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## INTRODUCTION

This General Catalog presents the vast array of capacitors, piezoceramic audible signal devices and other electronic components that are manufactured and distributed by North American Capacitor Company/Mallory. In addition to the General Catalog, NACC/Mallory has detailed technical bulletins available for some of the products. Over the life of this catalog, NACC/Mallory cannot guarantee availability of individual parts, and in limited cases, line item minimums may be required.

For pricing please request the Resale price book from our Authorized Sales Representative or Distributor.

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# Index Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors

Type	Features	Capacitance Range	Voltage Range	Temperature Range	Tolerances (%)	Case Dimensions (Inches)	Page Number
<b>Elastomer Seal</b>							
<b>MTP</b>	Max CV per Unit Volume Low DC Leakage Low DF Silver Case	3.3 $\mu$ F to 470 $\mu$ F	6 to 60	-55°C +85°C	$\pm$ 10 $\pm$ 20	(D x L) .115 x .300 to .225 x .778	3
<b>MTPH</b>	Max CV per Unit Volume Low DC Leakage Low DF Silver Case 100% Burn-In	4.7 $\mu$ F to 470 $\mu$ F	6 to 60	-55°C +85°C	$\pm$ 10 $\pm$ 20	(D x L) .115 x .403 to .225 x .778	4
<b>TLS TLH</b>	Standard Range and Extended Range Silver Case Low DCL Low ESR	TLS - to 1200 $\mu$ F TLH - to 2200 $\mu$ F	TLS - 6 to 125 TLH - 6 to 75	-55°C +125°C	$\pm$ 10 $\pm$ 20 $\pm$ 5 (Special Order)	(D x L) .188 x .453 to .375 x 1.062	5

<b>Glass to Metal Seal</b>							
<b>TLW</b>	Silver Case Low DCL Low ESR Commercial CLR65	2.5 $\mu$ F to 1200 $\mu$ F	6 to 125	-55°C +175°C (With proper derating)	$\pm$ 10 $\pm$ 20 $\pm$ 5 (Special Order)	(D x L) .188 x .453 to .375 x 1.062	7
<b>XTH XTK XTL XTM XTV</b>	High Capacitance High Voltage High Reliability	2 $\mu$ F to 2200 $\mu$ F	8 to 900	-55°C +175°C (With proper derating)	-15 +50% (Others Available)	(D x L) .656 x .438 to 1.125 x 2.810	9

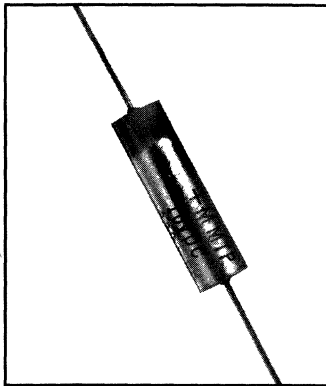
<b>All Tantalum - Glass to Metal Seal</b>							
<b>THT</b>	Reverse Voltage 200°C Operation High Ripple Capability Low DCL Low ESR	1.7 $\mu$ F to 1200 $\mu$ F	6 to 125	-55°C +200°C (With proper derating)	$\pm$ 5 $\pm$ 10 $\pm$ 20	(D x H) .188 x .453 to .375 x 1.062	12
<b>THX</b>	Extended Range 175°C Operation High Ripple Capability Low DCL Low ESR	6.8 $\mu$ F to 2200 $\mu$ F	6 to 125	-55°C +175°C (With proper derating)	$\pm$ 10 $\pm$ 20	(D x H) .188 x .453 to .375 x 1.062	14
<b>W13</b>	Stud or Pin Mounting 200°C Operation 100% Burn-In Commercial MIL-C-83500 Custom Designs Available	47 $\mu$ F to 1500 $\mu$ F	6 to 125	-55°C+200°C (With proper derating)	$\pm$ 10 $\pm$ 20	(D x H) .853 x .320	16

<b>Modules</b>							
<b>W14</b>	High Capacitance Reverse Voltage Constituent Units of W13 Design Long Life	94 $\mu$ F to 7500 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	2.000 x 2.000 .460 Thick Molded Package	17
<b>TMX</b>	High Capacitance Reverse Voltage Constituent Units of CLR81 Design Low DCL	25 $\mu$ F to 39,600 $\mu$ F	6 to 200	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	12 Package Sizes	18

## Military - Established Reliability

MIL Specification	MIL QPL Approvals Failure Rate Levels	Features	Capacitance Range	Voltage Range	Temperature Range	Tolerances (%)	Case Dimensions (Inches)	Page Number
<b>M3965/4 CLR65</b>	Not Applicable	Elastomer Seal Silver Case Rugged Construction Low DCL Low ESR	1.7 $\mu$ F to 560 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20 ( $\pm$ 5 by special order)	(D x L) .219 x .608 to .406 x .921	21
<b>M83500/01 CRL01 CRL02</b>	Not Applicable	All Tant Construction 3 Volts Reverse 200°C Operation 100% Burn-In Stud or Pin Mounting	47 $\mu$ F to 1200 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	(D x L) .853 x .320	16
<b>M39006/18 CLR10</b>	L, M, P	High Temperature High Voltage Hermetically Sealed Rugged Construction Long Shelf Life	2 $\mu$ F to 140 $\mu$ F	8 to 360	-55°C +125°C (With proper derating)	-15% +50%	(D x L) .656 x .438 to 1.781	23
<b>M39006/19 CLR14</b>	L, M, P	High Temperature High Voltage Hermetically Sealed Rugged Construction Long Shelf Life	3.5 $\mu$ F to 200 $\mu$ F	20 to 630	-55°C +125°C (With proper derating)	-15% +75%	(D x L) .875 x .540 to 4.062	24
<b>M39006/20 CLR17</b>	L, M, P	High Temperature High Voltage Hermetically Sealed Rugged Construction Long Shelf Life	12 $\mu$ F to 1300 $\mu$ F	30 to 630	-55°C +125°C (With proper derating)	$\pm$ 20% -15% +50%	(D x L) 1.125 x .600 to 2.810	25
<b>M39006/09 CLR65</b>	M, P, R	Silver Case Hermetic Seal Low DCL Low DF Long Life	1.7 $\mu$ F to 1200 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20 ( $\pm$ by special order)	(D x L) .219 x .608 to .406 x 1.217	27
<b>M39006/21 CLR69</b>	M, P, R	Silver Case Hermetic Seal Low DCL Low DF Long Life	6.8 $\mu$ F to 2200 $\mu$ F	6 to 126	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	(D x L) .219 x .608 to .406 x 1.217	30
<b>M39006/22 CLR79</b>	M, P, R	Tantalum Case 3 Volts Reverse Low DCL Low DF High Ripple Capability	1.7 $\mu$ F to 1200 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20 ( $\pm$ 5 by special order)	(D x L) .219 x .608 to .406 x 1.217	32
<b>M39006,25 CLR81</b>	M, P, R	Tantalum Case 3 Volts Reverse Extended Range Low DCL Low DF	6.8 $\mu$ F to 2200 $\mu$ F	6 to 125	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	(D x L) .219 x .608 to .406 x 1.217	35

# Type MTP Wet Tantalum Capacitors



- Maximum CV / Unit Volume
- Ruggedized Construction
- Low Dissipation Factor
- Low DC Leakage
- 100% 25°C DCL Screening
- 100% Voltage Age @ 85°C - 8 Hours
- 100 % Cap & DF Screening
- Monthly Lot Conformance
- Reliability: 2.0%/1000 Hrs.

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +85°C

Voltage Range:  
6 to 60 VDC

Reverse Voltage:  
None

Capacitance Range:  
3.3  $\mu$ F to 470  $\mu$ F

Tolerance Range:  
 $\pm$ 10%,  $\pm$ 20%

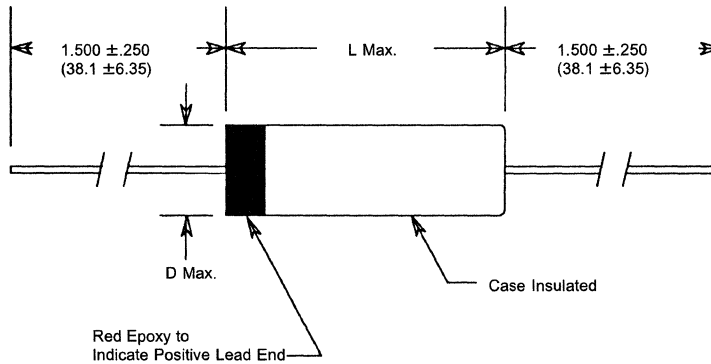
DC Leakage:  
At +25°C - 2.0  $\mu$ A max  
At +85°C - 6.0 to 10.0  $\mu$ A max

Max RMS Ripple Current @ 85°C:  
Case Code: D A B C  
 $\mu$ A: 7.5 12.5 50 140

Case Sizes: (Four)  
.115 x .300 to .225 x .778

Wet Tantalum Capacitors

## PHYSICAL SPECIFICATIONS



CASE	D INCHES(mm)	L INCHES(mm)	APPROX WT GRAMS
D	.115 (2.92)	.300 (7.62)	0.40
A	.115 (2.92)	.403 (10.2)	0.50
B	.145 (3.68)	.600 (15.2)	1.00
C	.225 (5.72)	.778 (19.8)	2.60

Cap. ( $\mu$ F)	Volts DC	Case Size	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$ +25°C	Max. Z $\Omega$ -55°C	Max. $\Delta$ C	
				+25°C	+85°C			-55°C	+85°C

15	6	D	MTP156*006PID	2.0	6.0	17.6	300	-40	+15
47	6	A	MTP476*006PIA	2.0	6.0	6.8	85	-60	+15
150	6	B	MTP157*006PIB	2.0	8.0	2.2	35	-50	+15
180	6	B	MTP187*006PIB	2.0	8.0	1.9	32	-50	+15
450	6	C	MTP457*006PIC	2.0	10.0	1.0	25	-60	+15
470	6	C	MTP477*006PIC	2.0	10.0	1.0	23	-60	+15
10	10	D	MTP106*010PID	2.0	6.0	21.2	380	-40	+15
33	10	A	MTP336*010PIA	2.0	6.0	8.4	100	-40	+15
100	10	B	MTP107*010PIB	2.0	8.0	2.7	46	-45	+15
120	10	B	MTP127*010PIB	2.0	8.0	2.3	42	-50	+15
300	10	C	MTP307*010PIC	2.0	10.0	1.1	31	-60	+15
330	10	C	MTP337*010PIC	2.0	10.0	1.0	31	-60	+15
22	15	A	MTP226*015PIA	2.0	6	10.8	120	-40	+12
68	15	B	MTP686*015PIB	2.0	8.0	3.7	58	-45	+12
80	15	B	MTP806*015PIB	2.0	8.0	3.4	50	-45	+12
200	15	C	MTP207*015PIC	2.0	10.0	1.4	37	-50	+12
220	15	C	MTP227*015PIC	2.0	10.0	1.4	36	-50	+12
6.8	20	D	MTP685*020PID	2.0	6.0	27.3	445	-35	+11
15	20	A	MTP156*020PIA	2.0	6.0	14.0	150	-40	+11
47	20	B	MTP476*020PIB	2.0	8.0	5.0	73	-40	+11
60	20	B	MTP606*020PIB	2.0	8.0	4.0	60	-45	+11
150	20	C	MTP157*020PIC	2.0	10.0	1.8	38	-50	+11

Cap. ( $\mu$ F)	Volts DC	Case Size	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$ +25°C	Max. Z $\Omega$ -55°C	Max. $\Delta$ C	
				+25°C	+85°C			-55°C	+85°C

6	30	D	MTP605*030PID	2.0	6.0	26.5	459	-40	+10
10	30	A	MTP106*030PIA	2.0	6.0	18.5	200	-35	+10
45	30	B	MTP456*030PIB	2.0	8.0	5.3	80	-35	+10
120	30	C	MTP127*030PIC	2.0	10.0	2.2	42	-45	+10
4.7	35	D	MTP475*035PID	2.0	6.0	33.8	570	-30	+10
10	35	A	MTP106*035PIA	2.0	6.0	18.5	240	-35	+10
100	35	C	MTP107*035PIC	2.0	10.0	2.2	48	-45	+10
4	50	D	MTP405*050PID	2.0	6.0	33.1	600	-30	+10
6.8	50	A	MTP685*050PIA	2.0	6.0	27.0	310	-30	+10
30	50	B	MTP306*050PIB	2.0	8.0	6.2	120	-30	+10
33	50	B	MTP336*050PIB	2.0	8.0	3.2	120	-30	+10
68	50	C	MTP686*050PIC	2.0	10.0	2.9	54	-40	+10
78	50	C	MTP786*050PIC	2.0	10.0	2.4	52	-40	+10
3.3	60	D	MTP335*060PID	2.0	6.0	40.2	680	-25	+9
4.7	60	A	MTP475*060PIA	2.0	6.0	39.5	400	-30	+9
6.8	60	A	MTP685*060PIA	2.0	6.0	27.3	367	-30	+9
10	60	B	MTP106*060PIB	2.0	8.0	22.5	217	-35	+9
15	60	B	MTP156*060PIB	2.0	8.0	15.9	174	-35	+9
22	60	B	MTP226*060PIB	2.0	8.0	10.8	140	-30	+9
33	60	C	MTP336*060PIC	2.0	10.0	5.0	75	-35	+9
47	60	C	MTP476*060PIC	2.0	10.0	4.0	62	-40	+9
68	60	C	MTP686*060PIC	2.0	10.0	2.7	51	-40	+9

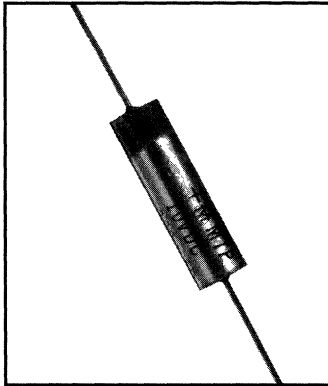
\* Insert Proper Letter Code For Tolerance: M =  $\pm$ 20%, K =  $\pm$ 10%

Further information may be obtained by ordering Technical Bulletin 4-606A

# Type MTPH Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



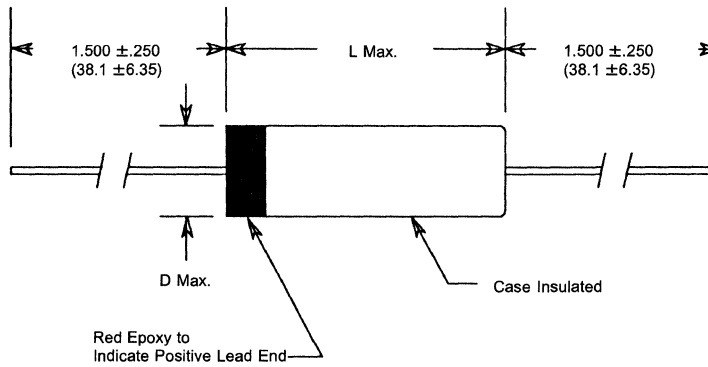
- Maximum CV / Unit Volume
- Ruggedized Construction
- Very Low Dissipation Factor
- Very Low DC Leakage
- 100% "Hot" 85°C DCL Screening
- 100% Voltage Age @ 85°C - 48 Hours
- Quality Assurance Testing on Each Production Lot to MIL-STD-202
- Accelerated Life: .65%/AQL
- Recorded Available Test Data
- Reliability: 0.1%/1000 Hrs.

## GENERAL SPECIFICATIONS

Operating Temperature: -55°C to +85°C  
 Voltage Range: 6 to 60VDC  
 Reverse Voltage: None  
 Capacitance Range: 4.7  $\mu$ F to 470  $\mu$ F  
 Tolerance Range:  $\pm$ 10%,  $\pm$ 20%

DC Leakage:  
 At +25°C - 2.0  $\mu$ A max  
 At +85°C - 6.0 to 10.0  $\mu$ A max  
 Max RMS Ripple Current @ 85°C:  
 Case Code:    A    B    C  
 $\mu$ A:           12.5 50 140  
 Case Sizes: (Three)  
               .115 x .403 to .225 x .778

## PHYSICAL SPECIFICATIONS



CASE	D INCHES(mm)	L INCHES(mm)	APPROX WT GRAMS
A	.115 (2.92)	.403 (10.2)	0.50
B	.145 (3.68)	.600 (15.2)	1.00
C	.225 (5.72)	.778 (19.8)	2.60

Cap. ( $\mu$ F)	Volts DC	Case Size	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. $\% \Delta C$	
				+25°C	+85°C			+25°C	+85°C

47	6	A	MTPH476*006PIA	2.0	6.0	6.8	85	-60	+15
150	6	B	MTPH157*006PIB	2.0	8.0	2.2	35	-50	+15
180	6	B	MTPH187*006PIB	2.0	8.0	1.9	32	-50	+15
450	6	C	MTPH457*006PIC	2.0	10.0	1.0	25	-60	+15
470	6	C	MTPH477*006PIC	2.0	10.0	1.0	23	-60	+15
33	10	A	MTPH336*010PIA	2.0	6.0	8.4	100	-40	+15
100	10	B	MTPH107*010PIB	2.0	8.0	2.7	46	-45	+15
120	10	B	MTPH127*010PIB	2.0	8.0	2.3	42	-50	+15
300	10	C	MTPH307*010PIC	2.0	10.0	1.1	31	-60	+15
330	10	C	MTPH337*010PIC	2.0	10.0	1.0	31	-60	+15
22	15	A	MTPH226*015PIA	2.0	6	10.8	120	-40	+12
68	15	B	MTPH686*015PIB	2.0	8.0	3.7	58	-45	+12
80	15	B	MTPH806*015PIB	2.0	8.0	3.4	50	-45	+12
200	15	C	MTPH207*015PIC	2.0	10.0	1.4	37	-50	+12
220	15	C	MTPH227*015PIC	2.0	10.0	1.4	36	-50	+12
15	20	A	MTPH156*020PIA	2.0	6.0	14.0	150	-40	+11
47	20	B	MTPH476*020PIB	2.0	8.0	5.0	73	-40	+11
60	20	B	MTPH606*020PIB	2.0	8.0	4.0	60	-45	+11
150	20	C	MTPH157*020PIC	2.0	10.0	1.8	38	-50	+11

\* Insert Proper Letter Code For Tolerance: M =  $\pm$ 20%, K =  $\pm$ 10%

Cap. ( $\mu$ F)	Volts DC	Case Size	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. $\% \Delta C$	
				+25°C	+85°C			+25°C	+85°C

10	30	A	MTPH106*030PIA	2.0	6.0	18.5	200	-35	+10
45	30	B	MTPH456*030PIB	2.0	8.0	5.3	80	-35	+10
120	30	C	MTPH127*030PIC	2.0	10.0	2.2	42	-45	+10
10	35	A	MTPH106*035PIA	2.0	6.0	18.5	240	-35	+10
100	35	C	MTPH107*035PIC	2.0	10.0	2.2	48	-45	+10
6.8	50	A	MTPH685*050PIA	2.0	6.0	27.0	310	-30	+10
30	50	B	MTPH306*050PIB	2.0	8.0	6.2	120	-30	+10
33	50	B	MTPH336*050PIB	2.0	8.0	3.2	120	-30	+10
68	50	C	MTPH686*050PIC	2.0	10.0	2.9	54	-40	+10
78	50	C	MTPH786*050PIC	2.0	10.0	2.4	52	-40	+10
4.7	60	A	MTPH475*060PIA	2.0	6.0	39.5	400	-30	+9
6.8	60	A	MTPH685*060PIA	2.0	6.0	27.3	367	-30	+9
10	60	B	MTPH106*060PIB	2.0	8.0	22.5	217	-35	+9
15	60	B	MTPH156*060PIB	2.0	8.0	15.9	174	-35	+9
22	60	B	MTPH226*060PIB	2.0	8.0	10.8	140	-30	+9
33	60	C	MTPH336*060PIC	2.0	10.0	5.0	75	-35	+9
47	60	C	MTPH476*060PIC	2.0	10.0	4.0	62	-40	+9
68	60	C	MTPH686*060PIC	2.0	10.0	2.7	51	-40	+9

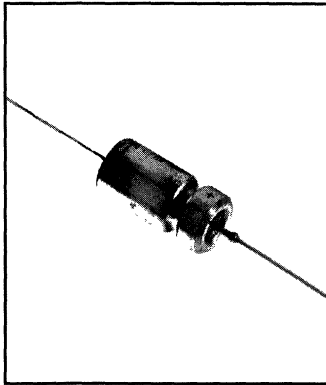
Further information may be obtained by ordering Technical Bulletin 4-614



# Type TLS & TLH Wet Tantalum Capacitors



Wet Tantalum Capacitors



- High capacitance per Case Size
- Extremely Low DCL
- Long Operating Life
- Rugged Mechanical Construction
- Wide Operating Temperature Range

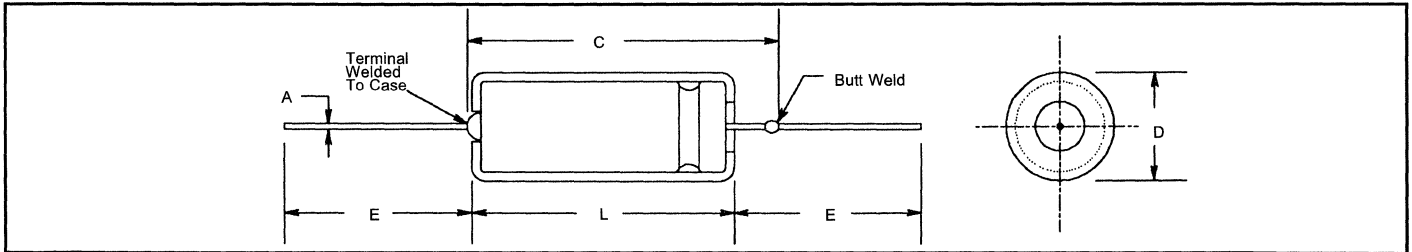
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC @ 85°C  
4 to 85 VDC @ 125°C

Capacitance:  
TLS - to 1200  $\mu$ F  
TLH - to 2200  $\mu$ F

Tolerance Range:  
 $\pm$ 20%,  $\pm$ 10%  
( $\pm$ 5% on special order)



INCHES										MILLIMETERS							
Case -M MIL	Uninsulated		Insulated		C	A Lead Dia. Nom AWG	E Lead Lgth. $\pm$ .250	Approximate Weight (Grams)		Case -M MIL	Uninsulated		Insulated		C	A Lead Dia. Nom AWG	E Lead Lgth. $\pm$ 6.35
	D	L	D	L				TLS	TLH		D	L	D	L			
A T1	.188	.453	.219	.608	.734	.025 #22	1.500	1.4	1.4	A T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
B T2	.281	.641	.312	.796	.922	.025 #22	2.250	3.0	4.2	B T2	7.41	16.28	7.92	20.22	23.41	.64 #22	57.15
C T3	.375	.766	.406	.921	1.047	.025 #22	2.250	5.6	7.4	C T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
F T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	9.2	7.8	F T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

## Type TLS Standard Ratings

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>6 WVDC; 7 VDC Surge @ 85°C 4 WVDC; 4.7 VDC Surge @ 125°C</b>									
30	A	TLS306*006CIA	1	2	4.0	100	-40	+10.5	+12
68	A	TLS686*006CIA	1	2	4.3	60	-40	+14	+16
140	B	TLS147*006CIB	1	3	2.0	40	-40	+14	+16
270	B	TLS277*006CIB	1	6.5	4.0	25	-44	+17.5	+20
330	C	TLS337*006CIC	2	7.9	2.0	20	-44	+14	+16
560	C	TLS567*006CIC	2	13	3.0	25	-64	+17.5	+20
1200	F	TLS128*006CIF	3	14	1.5	20	-80	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>8 WVDC; 9.2 VDC Surge @ 85°C 5 WVDC; 5.7 VDC Surge @ 125°C</b>									
25	A	TLS256*008CIA	1	2	4.0	100	40	+10.5	+12
56	A	TLS566*008CIA	1	2	4.0	59	-40	+14	+16
220	B	TLS227*008CIB	1	7	4.0	30	-44	+17.5	+20
430	C	TLS437*008CIC	2	14	2.8	25	-64	+17.5	+20
850	F	TLS857*008CIF	4	16	1.0	22	-80	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>10 WVDC; 11.5 VDC Surge @ 85°C 7 WVDC; 8 VDC Surge @ 125°C</b>									
20	A	TLS206*010CIA	1	2	4.0	175	-32	+10.5	+12
47	A	TLS476*010CIA	1	2	5.0	100	-36	+14	+16
100	B	TLS107*010CIB	1	4	2.0	60	-36	+14	+16
180	B	TLS187*010CIB	1	7	3.8	40	-36	+14	+16
250	C	TLS257*010CIC	2	10	2.0	30	-40	+14	+16
390	C	TLS397*010CIC	2	16	2.9	25	-64	+17.5	+20
750	F	TLS757*010CIF	4	16	1.0	23	-80	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>15 WVDC; 17.2 VDC Surge @ 85°C 10 WVDC; 11.5 VDC Surge @ 125°C</b>									
15	A	TLS156*015CIA	1	2	5.0	155	-24	+10.5	+12
33	A	TLS336*015CIA	1	2	5.0	90	-28	+14	+16
70	B	TLS706*015CIB	1	4	2.5	75	-28	+14	+16
120	B	TLS127*015CIB	1	7	4.0	50	-28	+17.5	+20
170	C	TLS177*015CIC	2	10	2.0	35	-32	+14	+16
270	C	TLS277*015CIC	2	16	3.0	30	-56	+17.5	+20
540	F	TLS547*015CIF	6	24	1.2	23	-80	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>25 WVDC; 28.8 VDC Surge @ 85°C 15 WVDC; 17.2 VDC Surge @ 125°C</b>									
10	A	TLS106*025CIA	1	2	6.0	220	-16	+8	+9
22	A	TLS226*025CIA	1	2	4.8	140	-20	+10.5	+12
100	B	TLS107*025CIB	1	10	4.0	50	-28	+13	+15
180	C	TLS187*025CIC	2	18	3.8	32	-48	+13	+15
350	F	TLS357*025CIF	7	28	1.3	24	-70	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	+85°C
<b>30 WVDC; 34.5 VDC Surge @ 85°C 20 WVDC; 23 VDC Surge @ 125°C</b>									
8	A	TLS805*030CIA	1	2	7.5	275	-16	+8	+12
15	A	TLS156*030CIA	1	2	8.0	175	-20	+10.5	+12
40	B	TLS406*030CIB	1	5	4.0	65	-24	+10.5	+12
68	B	TLS686*030CIB	1	8	2.4	60	-24	+13	+15
100	C	TLS107*030CIC	2	12	2.5	40	-28	+10.5	+12
150	C	TLS157*030CIC	2	18	4.0	35	-48	+13	+15
300	F	TLS307*030CIF	8	32	1.5	25	-60	+25	+25

\* Insert Proper Letter Code For Tolerance: J =  $\pm$ 5%, K =  $\pm$ 10%, M =  $\pm$ 20%

Further information may be obtained by ordering Technical Bulletin 604

# Type TLS & TLH Wet Tantalum Capacitors

**MALLORY**

## Type TLS Standard Ratings

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	-55°C

**50 WVDC; 57.5 VDC Surge @ 85°C**  
**30 WVDC; 34.5 VDC Surge @ 125°C**

5	A	TLS505*050CIA	1	2	6.0	400	-16	+5	+6
10	A	TLS106*050CIA	1	2	4.0	250	-24	+8	+9
25	B	TLS256*050CIB	1	5	3.0	95	-20	+10.5	+12
47	B	TLS476*050CIB	1	9	3.0	70	-28	+13	+15
60	C	TLS606*050CIC	2	12	2.0	45	-16	+10.5	+12
82	C	TLS826*050CIC	2	16	3.0	45	-32	+13	+15
160	F	TLS167*050CIF	8	32	2.0	27	-50	+25	+25

**60 WVDC; 69 VDC Surge @ 85°C**  
**40 WVDC; 46 VDC Surge @ 125°C**

4	A	TLS405*060CIA	1	2	8.0	550	-16	+5	+6
8.2	A	TLS825*060CIA	1	2	5.0	275	-24	+8	+9
20	B	TLS206*060CIB	1	5	3.0	105	-16	+10.5	+12
39	B	TLS396*060CIB	1	9	4.0	90	-28	+10.5	+12
50	C	TLS506*060CIC	2	12	2.0	50	-16	+10.5	+12
68	C	TLS686*060CIC	2	16	3.0	50	-32	+10.5	+12
140	F	TLS147*060CIF	8	32	2.4	28	-40	+20	+20

**75 WVDC; 86.2VDC Surge @ 85°C**  
**50 WVDC; 57.5 VDC Surge @ 125°C**

3.5	A	TLS355*075CIA	1	2	8.0	650	-16	+5	+6
6.8	A	TLS685*075CIA	1	2	5.0	300	-20	+8	+9
15	B	TLS156*075CIB	1	5	3.0	150	-16	+8	+9
33	B	TLS336*075CIB	1	10	4.0	90	-24	+10.5	+15

\* Insert Proper Letter Code For Tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	-55°C

**75 WVDC; 86.2VDC Surge @ 85°C**  
**50 WVDC; 57.5 VDC Surge @ 125°C**

40	C	TLS406*075CIC	2	12	2.0	60	-16	+10.5	+12
56	C	TLS566*075CIC	2	17	4.0	60	-28	+10.5	+15
110	F	TLS117*075CIF	9	36	2.6	29	-35	+20	+20

**100 WVDC; 115 VDC Surge @ 85°C**  
**65 WVDC; 74.8 VDC Surge @ 125°C**

2.5	A	TLS255*100CIA	1	2	12.0	950	-16	+7	+8
4.7	A	TLS475*100CIA	1	2	6.0	500	-16	+7	+8
11	B	TLS116*100CIB	1	4	4.0	200	-16	+7	+8
22	B	TLS226*100CIB	1	9	4.0	100	-16	+7	+8
30	C	TLS306*100CIC	2	12	3.0	80	-16	+7	+8
43	C	TLS436*100CIC	2	17	4.0	70	-20	+7	+8
86	F	TLS866*100CIF	9	36	3.0	30	-25	+15	+15

**125 WVDC; 144 VDC Surge @ 85°C**  
**85 WVDC; 97.8 VDC Surge @ 125°C**

1.7	A	TLS175*125CIA	1	2	14.0	1250	-16	+7	+8
3.6	A	TLS365*125CIA	1	2	8.0	600	-16	+7	+8
9	B	TLS905*125CIB	1	5	5.0	240	-16	+7	+8
14	B	TLS146*125CIB	1	7	6.0	167	-16	+7	+8
18	C	TLS186*125CIC	2	9	3.0	129	-16	+7	+8
25	C	TLS256*125CIC	2	13	5.0	93	-16	+7	+8
56	F	TLS566*125CIF	10	40	4.0	32	-25	+15	+15

Further information may be obtained by ordering Technical Bulletin 604

## Type TLH Extended Capacitance Ratings

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	-55°C

**6 WVDC; 7 VDC Surge @ 85°C**  
**4 WVDC; 4.7 VDC Surge @ 125°C**

220	A	TLH227*006CIA	3	9	3.2	36	-64	+18	+21
820	B	TLH827*006CIB	5	14	2.5	18	-88	+18	+21
1500	C	TLH158*006CIC	6	20	1.5	18	-90	+20	+25
2200	F	TLH228*006CIF	8	24	1.1	13	-90	+25	+30

**8 WVDC; 9.2 VDC Surge @ 85°C**  
**5 WVDC; 5.7 VDC Surge @ 125°C**

180	A	TLH187*008CIA	3	9	3.3	45	-60	+16	+20
680	B	TLH687*008CIB	5	14	2.2	22	-83	+18	+21
1500	C	TLH158*008CIC	6	20	1.5	18	-90	+20	+25
1800	F	TLH188*008CIF	8	25	1.0	14	-90	+25	+30

**10 WVDC; 11.5 VDC Surge @ 85°C**  
**7 WVDC; 8 VDC Surge @ 125°C**

150	A	TLH157*010CIA	3	9	3.1	54	-55	+16	+20
560	B	TLH567*010CIB	5	16	2.4	27	-77	+18	+21
1200	C	TLH128*010CIC	6	20	1.5	18	-88	+20	+25
1500	F	TLH158*010CIF	8	25	1.0	15	-88	+25	+30

**15 WVDC; 17.2 VDC Surge @ 85°C**  
**10 WVDC; 11.5 VDC Surge @ 125°C**

100	A	TLH107*015CIA	3	9	4.0	72	-44	+13	+16
390	B	TLH397*015CIB	5	16	2.4	31	-66	+16	+20
820	C	TLH827*015CIC	6	24	1.7	22	-77	+20	+25
1000	F	TLH108*015CIF	8	32	1.2	17	-77	+25	+30

**25 WVDC; 28.8 VDC Surge @ 85°C**  
**15 WVDC; 17.2 VDC Surge @ 125°C**

68	A	TLH686*025CIA	3	9	4.1	90	-40	+13	+16
270	B	TLH277*025CIB	5	16	2.6	33	-62	+13	+16

\* Insert Proper Letter Code For Tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max. ESR $\Omega$	Max. Z $\Omega$	Max. % Cap. Change From 25°C		
			25°C	85°C			+25°C	-55°C	-55°C

**25 WVDC; 28.8 VDC Surge @ 85°C**  
**15 WVDC; 17.2 VDC Surge @ 125°C**

560	C	TLH567*025CIC	7	28	1.8	24	-72	+20	+25
680	F	TLH687*025CIF	8	32	1.2	19	-72	+25	+30

**30 WVDC; 34.5 VDC Surge @ 85°C**  
**20 WVDC; 23 VDC Surge @ 125°C**

56	A	TLH566*030CIA	3	9	5.0	100	-38	+12	+15
220	B	TLH227*030CIB	5	16	2.5	36	-60	+13	+16
470	C	TLH477*030CIC	8	32	1.9	25	-65	+20	+25
560	F	TLH567*030CIF	9	36	1.3	20	-65	+25	+30

**50 WVDC; 57.5 VDC Surge @ 85°C**  
**30 WVDC; 34.5 VDC Surge @ 125°C**

33	A	TLH336*050CIA	3	9	5.0	135	-29	+10	+12
120	B	TLH127*050CIB	5	24	2.5	49	-42	+12	+15
270	C	TLH277*050CIC	8	32	1.8	29	-46	+20	+25
330	F	TLH337*050CIF	9	36	1.2	22	-46	+25	+30

**60 WVDC; 69 VDC Surge @ 85°C**  
**40 WVDC; 46 VDC Surge @ 125°C**

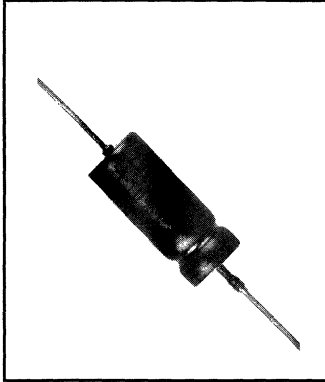
27	A	TLH276*060CIA	3	12	5.0	144	-24	+10	+12
100	B	TLH107*060CIB	5	20	2.5	54	-36	+12	+15
220	C	TLH227*060CIC	8	32	1.8	29	-40	+16	+20
270	F	TLH277*060CIF	9	36	1.2	23	-45	+20	+25

**75 WVDC; 86.2 VDC Surge @ 85°C**  
**50 WVDC; 57.5 VDC Surge @ 125°C**

22	A	TLH226*075CIA	3	12	5.0	157	-19	+10	+12
82	B	TLH826*075CIB	5	24	2.3	63	-30	+12	+15
180	C	TLH187*075CIC	9	36	1.8	30	-35	+16	+20
220	F	TLH227*075CIF	10	40	2.2	24	-40	+20	+25

Further information may be obtained by ordering Technical Bulletin 604

# Type TLW Wet Tantalum Capacitors



- 175°C Operation
- Silver Case Technology
- MIL-C-39006/09 Designs
- Hermetically Sealed
- Rugged Construction
- High Shock and Vibration Capability
- High Capacitance per Case Size
- Low DCL and ESR
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +175°C

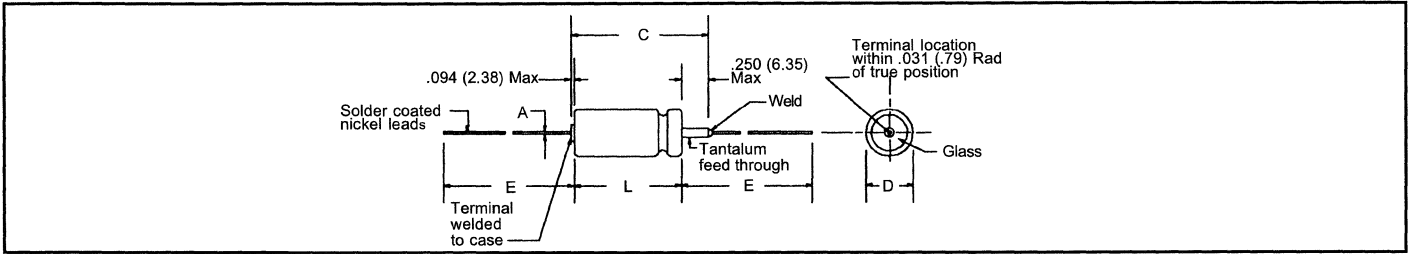
Voltage Range:  
6 to 125 VDC

Capacitance Range:  
2.5  $\mu$ F to 1200  $\mu$ F

Tolerance Range:  
 $\pm$ 10%,  $\pm$ 20%  
( $\pm$ 5% by special order)

Case Sizes: (Four)  
.188 x .453 to .375 x 1.062

Maximum rms Ripple Current @ 85°C	
Case Code	mA
A	50
B	250
C	500
F	750



INCHES (DIMENSIONS) MILLIMETERS

Case -M MIL	Uninsulated L		Insulated D L		C	A Lead Dia.		E Lead Lgth.	Approximate Weight (Grams)	Case -M MIL	Uninsulated D L		Insulated D L		C	A Lead Dia		E Lead Lgth
	D	L	D	L		Max	Max				Max	Max	Max	Max		Max	Max	
A T1	.188	.453	.219	.608	.734	.025	#22	1.500	2.7	A T1	4.78	11.51	5.56	15.45	18.64	.64	#22	38.10
B T2	.281	.641	.312	.796	.922	.025	#22	2.250	6.5	B T2	7.14	16.28	7.92	20.22	23.41	.64	#22	57.15
C T3	.375	.766	.406	.921	1.047	.025	#22	2.250	12.0	C T3	9.53	19.46	10.31	23.40	26.59	.64	#22	57.15
F T4	.375	1.062	.406	1.217	1.343	.025	#22	2.250	18.0	F T4	9.53	26.97	10.31	30.91	34.11	.64	#22	57.15

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>6 WVDC @ 85°C 4 WVDC @ 125°C; 3 WVDC @ 175°C</b>									
30	A	TLW306*006P6A	1.0	2.0	5.8	4.0	100	+10.5	+12
68	A	TLW686*006P6A	1.0	2.0	13.0	4.0	60	+14	+16
140	A	TLW147*006P6A	1.0	3.0	27.0	2.0	40	+14	+16
270	B	TLW277*006P6B	1.0	6.5	52.0	4.0	25	+17.5	+20
330	C	TLW337*006P6C	2.0	7.9	70.0	2.0	20	+14	+16
560	C	TLW567*006P6C	2.0	13.0	110.0	3.0	25	+17.5	+20
1000	C	TLW108*006P6C	3.0	14.0	200.0	1.6	20	+20	+20
1200	F	TLW128*006P6F	3.0	14.0	230.0	1.5	20	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>8 WVDC @ 85°C 5 WVDC @ 125°C; 4 WVDC @ 175°C</b>									
25	A	TLW256*008P6A	1.0	2.0	6.4	4.0	100	+10.5	+12
56	A	TLW566*008P6A	1.0	2.0	14.0	3.9	59	+14	+16
120	A	TLW127*008P6A	1.0	4.0	30.0	3.2	50	+14	+16
220	B	TLW227*008P6B	1.0	7.0	56.0	4.0	30	+17.5	+20
430	B	TLW437*008P6B	2.0	14.0	110.0	2.8	25	+17.5	+20
850	C	TLW857*008P6C	4.0	16.0	218.0	1.0	22	+25	+25
1000	F	TLW108*008P6F	4.0	16.0	250.0	1.0	16	+25	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>10 WVDC @ 85°C 7 WVDC @ 125°C; 5 WVDC @ 175°C</b>									
20	A	TLW206*010P6A	1.0	2.0	6.4	4.0	175	+10.5	+12
39	A	TLW396*010P6A	1.0	2.0	12.0	4.0	80	+12	+15
47	A	TLW476*010P6A	1.0	2.0	15.0	5.0	100	+14	+16
82	A	TLW826*010P6A	1.0	2.0	26.0	4.0	70	+14	+16
100	A	TLW107*010P6A	1.0	4.0	32.0	2.0	60	+14	+16
180	B	TLW187*010P6B	1.0	7.0	58.0	4.0	40	+14	+16

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>10 WVDC @ 85°C 7 WVDC @ 125°C; 5 WVDC @ 175°C</b>									
250	B	TLW257*010P6B	2.0	10.0	80.0	2.0	30	+14	+16
390	B	TLW397*010P6B	2.0	16.0	120.0	3.0	25	+17.5	+20
600	C	TLW607*010P6C	5.0	16.0	150.0	1.5	20	+20	+25
680	F	TLW687*010P6F	4.0	16.0	175.0	1.2	18	+20	+25
750	C	TLW757*010P6C	4.0	16.0	210.0	1.0	23	+20	+25
820	F	TLW827*010P6F	4.0	16.0	240.0	1.0	17	+20	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>15 WVDC @ 85°C 10 WVDC @ 125°C; 8 WVDC @ 175°C</b>									
15	A	TLW156*015P6A	1.0	2.0	7.2	5.0	155	+10.5	+12
33	A	TLW336*015P6A	1.0	2.0	16.0	5.0	90	+14	+16
55	B	TLW556*015P6B	1.0	4.0	17.0	4.0	90	+14	+16
68	A	TLW686*015P6A	1.0	4.0	34.0	3.8	80	+14	+16
70	B	TLW706*015P6B	1.0	4.0	34.0	2.0	75	+14	+16
120	B	TLW127*015P6B	2.0	7.0	58.0	4.3	50	+17.5	+20
170	C	TLW177*015P6C	2.0	10.0	82.0	2.0	35	+14	+16
270	C	TLW277*015P6C	2.0	16.0	130.0	3.2	30	+17.5	+20
540	C	TLW547*015P6C	6.0	24.0	260.0	1.2	23	+20	+25
560	F	TLW567*015P6F	6.0	24.0	270.0	1.1	19	+20	+25

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz	Max. Z $\Omega$ 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			
<b>20 WVDC @ 85°C 13 WVDC @ 125°C; 10 WVDC @ 175°C</b>									
27	A	TLW276*020P6A	1.0	2.0	25.0	4.0	100	+11	+14
56	A	TLW566*020P6A	2.0	9.0	55.0	4.2	90	+13	+16
100	B	TLW107*020P6B	1.0	7.0	96.0	2.0	50	+12	+15
170	B	TLW177*020P6B	2.0	16.0	150.0	2.0	35	+17.5	+20
220	B	TLW227*020P6B	3.0	16.0	220.0	3.1	35	+16	+20

\* Insert Proper Letter Code For Tolerance: J =  $\pm$ 5%, K =  $\pm$ 10%, M =  $\pm$ 20%

Further information may be obtained by ordering Technical Bulletin 4-611B

# Type TLW Wet Tantalum Capacitors



Wet Tantalum Capacitors

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz + 25°C	Max. Z $\Omega$ -55°C	Max. Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C	200°C			

20 WVDC @ 85°C 13 WVDC @ 125°C; 10 WVDC @ 175°C									
390	C	TLW397*020P6C	6.0	24.0	350.0	1.9	25	+20	+25
470	F	TLW477*020P6F	6.0	24.0	450.0	1.2	20	+20	+25

25 WVDC @ 85°C 15 WVDC @ 125°C; 13 WVDC @ 175°C									
10	A	TLW106*025P6A	1.0	2.0	8.0	6.0	220	+8	+9
22	A	TLW226*025P6A	1.0	2.0	18.0	5.0	140	+10.5	+12
47	A	TLW476*025P6A	1.0	4.0	38.0	5.0	100	+14	+16
50	B	TLW506*025P6B	1.0	4.0	38.0	5.1	100	+14	+16
100	B	TLW107*025P6B	1.0	10.0	80.0	4.1	50	+13	+15
180	B	TLW187*025P6B	2.0	18.0	140.0	4.0	32	+13	+15
350	C	TLW357*025P6C	7.0	28.0	280.0	1.3	24	+25	+25
390	F	TLW397*025P6F	7.0	28.0	312.0	1.2	21	+25	+25

30 WVDC @ 85°C 20 WVDC @ 125°C; 15 WVDC @ 175°C									
18	A	TLW186*030P6A	1.0	2.0	8.0	9.0	130	+10.5	+20
39	A	TLW396*030P6A	1.0	5.0	37.0	4.2	110	+16	+20
40	B	TLW406*030P6B	1.0	5.0	38.0	4.1	65	+16	+20
68	B	TLW686*030P6B	1.0	8.0	65.0	6.0	60	+13	+20
100	C	TLW107*030P6C	2.0	12.0	96.0	2.5	40	+10.5	+20
150	C	TLW157*030P6C	2.0	18.0	140.0	4.0	35	+13	+20
300	C	TLW307*030P6C	8.0	32.0	290.0	1.5	25	+20	+20
330	F	TLW337*030P6F	8.0	32.0	320.0	2.5	40	+20	+20

35 WVDC @ 85°C 23 WVDC @ 125°C; 18 WVDC @ 175°C									
12	A	TLW126*035P6A	1.0	2.0	13.0	14.0	175	+10.5	+20
15	A	TLW156*035P6A	1.0	7.0	17.0	11.0	170	+10.5	+20
27	A	TLW276*035P6A	2.0	9.0	30.0	6.0	150	+10.5	+20
33	A	TLW336*035P6A	2.0	9.0	37.0	5.2	130	+12	+20
56	B	TLW566*035P6B	1.0	7.0	63.0	3.1	60	+12	+20
68	B	TLW686*035P6B	1.0	7.0	76.0	6.0	60	+13	+20
100	C	TLW107*035P6C	3.0	16.0	110.0	2.5	50	+10.5	+20
120	B	TLW127*035P6B	3.0	16.0	135.0	2.2	45	+11	+20
180	C	TLW187*035P6C	8.0	32.0	200.0	1.8	30	+20	+20
220	F	TLW227*035P6F	8.0	32.0	250.0	1.5	25	+20	+20
270	F	TLW277*035P6F	8.0	32.0	300.0	1.8	23	+20	+20

50 WVDC @ 85°C 30 WVDC @ 125°C; 25 WVDC @ 175°C									
10	A	TLW106*050P6A	1.0	2.0	16.0	18.0	250	+8	+20
22	A	TLW226*050P6A	1.0	5.0	35.0	7.5	200	+14	+20
25	B	TLW256*050P6B	1.0	5.0	40.0	6.5	95	+10.5	+20
47	B	TLW476*050P6B	1.0	9.0	75.0	6.0	70	+13	+20
82	C	TLW826*050P6C	2.0	16.0	130.0	4.0	45	+13	+20
160	C	TLW167*050P6C	8.0	32.0	260.0	2.0	27	+20	+20
180	F	TLW186*050P6F	8.0	32.0	260.0	1.8	25	+20	+20

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A				Max. ESR $\Omega$ 120 Hz + 25°C	Max. Z $\Omega$ -55°C	Max. Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C	200°C			

60 WVDC @ 85°C 40 WVDC @ 125°C; 30 WVDC @ 175°C									
8.2	A	TLW825*060P6A	1.0	2.0	16.0	22.0	275	+8	+20
18	A	TLW186*060P6A	1.0	6.0	35.0	9.0	245	+12	+20
39	B	TLW396*060P6B	1.0	9.0	75.0	7.0	90	+10.5	+20
68	C	TLW686*060P6C	2.0	16.0	130.0	6.0	50	+10.5	+20
140	C	TLW147*060P6C	3.0	25.0	270.0	3.2	55	+16	+20
150	F	TLW157*060P6F	8.0	32.0	290.0	3.0	45	+16	+20

75 WVDC @ 85°C 50 WVDC @ 125°C; 38 WVDC @ 175°C									
5.6	A	TLW565*075P6A	1.0	2.0	14.0	6.0	320	+8	+20
6.8	A	TLW685*075P6A	1.0	2.0	16.0	8.0	300	+8	+20
12	A	TLW126*075P6A	1.0	5.0	28.0	8.0	200	+8	+20
15	B	TLW156*075P6B	1.0	5.0	36.0	6.5	175	+8	+20
27	B	TLW276*075P6B	1.0	10.0	52.0	6.0	95	+8	+20
33	B	TLW336*075P6B	1.0	10.0	79.0	7.0	75	+10.5	+20
47	B	TLW476*075P6B	2.0	16.0	115.0	4.0	60	+10.5	+20
56	B	TLW566*075P6B	2.0	17.0	130.0	6.0	55	+10.5	+20
82	C	TLW826*075P6C	9.0	36.0	200.0	5.0	50	+12	+20
100	F	TLW107*075P6F	9.0	36.0	240.0	3.2	35	+12	+20
110	C	TLW117*075P6C	9.0	36.0	260.0	3.0	33	+20	+20
120	F	TLW127*075P6F	3.0	25.0	290.0	2.8	27	+16	+20

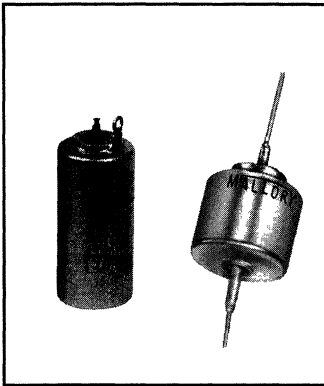
100 WVDC @ 85°C 65 WVDC @ 125°C; 50 WVDC @ 175°C									
2.5	A	TLW255*100P6A	1.0	2.0	8.0	100.0	950	+7	+20
3.9	A	TLW395*100P6A	1.0	2.0	12.0	59.0	600	+7	+20
4.7	A	TLW475*100P6A	1.0	2.0	15.0	36.0	500	+7	+20
10	B	TLW106*100P6B	1.0	4.0	32.0	17.0	200	+7	+20
11	B	TLW116*100P6B	1.0	4.0	35.0	16.0	200	+7	+20
15	B	TLW156*100P6B	1.0	7.0	48.0	11.0	135	+7	+20
18	B	TLW186*100P6B	1.0	5.0	57.0	9.0	110	+7	+20
22	B	TLW226*100P6B	1.0	5.0	70.0	7.0	100	+7	+20
25	B	TLW256*100P6B	2.0	13.0	80.0	9.0	150	+8	+20
33	C	TLW336*100P6C	2.0	16.0	106.0	4.0	80	+7	+20
43	C	TLW436*100P6C	2.0	16.0	140.0	5.0	70	+7	+20
68	F	TLW686*100P6F	9.0	36.0	215.0	3.0	30	+15	+20
86	F	TLW866*100P6F	9.0	36.0	280.0	3.0	30	+15	+20

125 WVDC @ 85°C 85 WVDC @ 125°C; 62 WVDC @ 175°C									
1.7	A	TLW175*125P6A	1.0	2.0	7.0	70.0	1240	+7	+20
3.6	A	TLW365*125P6A	1.0	2.0	14.0	15.0	600	+7	+20
9.0	B	TLW905*125P6B	1.0	5.0	36.0	15.0	240	+7	+20
14	B	TLW146*125P6B	1.0	7.0	56.0	12.0	167	+7	+20
18	C	TLW186*125P6C	2.0	9.0	72.0	11.0	129	+7	+20
25	C	TLW256*125P6C	2.0	13.0	100.0	10.0	93	+7	+20
56	F	TLW566*125P6F	10.0	40.0	220.0	4.0	32	+15	+20

Further information may be obtained by ordering  
Technical Bulletin 4-611B

\* Insert Proper Letter Code For Tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

# Types XTH - K - L - M - V Wet Tantalum Capacitors



- High Temperature
- High Voltage
- High Capacitance
- Withstands High Frequency Vibration to 2000 Hz
- Hermetically Sealed
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +175°C

Voltage Range:  
8 to 600 VDC @ 85°C

Reverse Voltage:  
None

Capacitance Range:  
2  $\mu$ F to 2200  $\mu$ F

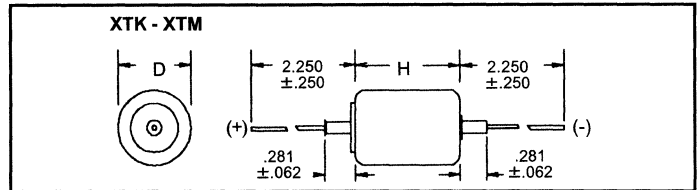
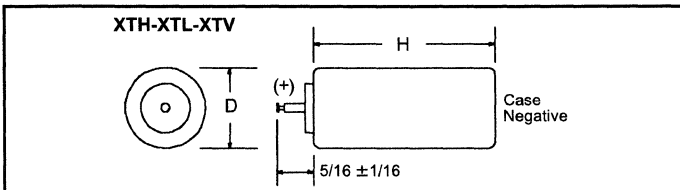
Tolerance Range:  
-15 +50%  
(Others Available)

Case Sizes:

Type	D	H
XTK - XTM	.656	.438 to 1.781
XTL - XTH	.875	.540 to 4.062
XTV	1.125	.600 to 2.810

Note: Photo of XTH-L-V shown with optional solder lug available as special order. Other configurations also available.

Wet Tantalum Capacitors



Other configurations, tolerances, and insulated versions are available. Ask for Technical Information Bulletin No. 4-84-A

Capacitance ( $\mu$ F)	Maximum Working Voltage		Typical ESR (Ohms)	Maximum DCL @ Maximum WVDC in $\mu$ A			Max Z 85°C (Ohms)	Maximum % Capacitance Change from Room Temperature			Approx Weight (Grams)	Max Ripple 120 Hz RMS -55°C to +175°C (mA)	Size		Catalog Number
	+125°C	+175°C		+85°C	+125°C	+175°C		-55°C	+85°C	+175°C			D + .031 - .015	H + .062 - .062	
<b>8 WVDC @ 85°C</b>															
70	7	5	10.0	30	45	60	60	-60	+30	+30	14	137	.656	.438	XTK706T008P0A
140	7	5	5.0	50	75	100	30	-60	+30	+30	15	213	.656	.562	XTM147T008P0A
<b>10 WVDC @ 85°C</b>															
50	8.5	7	10.0	25	37	50	75	-60	+30	+30	14	137	.656	.438	XTK506T010P0A
100	8.5	7	5.0	45	67	90	40	-60	+30	+30	15	213	.656	.562	XTM107T010P0A
<b>12 WVDC @ 85°C</b>															
580	10	8	1.5	135	197	270	20	-90	+20	+35	48	550	1.125	.600	XTV587T012P0A
850	10	8	1.5	135	197	270	20	-90	+20	+35	50	550	1.125	.600	XTV857T012P0A
1100	10	8	1.5	135	197	270	20	-90	+20	+35	60	694	1.125	1.100	XTV1187T012P0A
2200	10	8	1.5	135	197	270	20	-90	+20	+35	82	694	1.125	1.100	XTV228T012P0A
<b>18 WVDC @ 85°C</b>															
35	15	12	10.0	30	45	60	85	-60	+30	+30	14	137	.656	.438	XTK356T018P0A
70	15	12	5.0	50	75	100	45	-60	+30	+30	15	213	.656	.562	XTM706T018P0A
120	15	12	2.8	50	75	100	30	-60	+15	+40	26	328	.875	.540	XTL127T018P0A
240	15	12	2.5	80	120	160	20	-60	+15	+40	32	390	.875	.732	XTH247T018P0A
390	15	12	1.5	165	227	330	20	-85	+20	+35	48	550	1.125	.600	XTV397T018P0A
560	15	12	1.5	165	227	330	20	-85	+20	+35	50	550	1.125	.600	XTV567T018P0A
900	15	12	1.5	165	227	330	20	-85	+20	+35	68	694	1.125	1.100	XTV907T018P0A
1800	15	12	1.5	165	227	330	20	-85	+20	+35	82	694	1.125	1.100	XTV188T018P0A
<b>20 WVDC @ 85°C</b>															
28	17.5	13	10.0	30	45	60	85	-60	+30	+30	14	137	.656	.438	XTK286T020P0A
56	17.5	13	5.0	50	75	100	45	-60	+30	+30	15	213	.656	.562	XTM566T020P0A
100	17.5	13	2.8	50	75	100	30	-60	+15	+40	26	328	.875	.540	XTL107T020P0A
200	17.5	13	2.5	80	120	160	20	-60	+15	+40	32	390	.875	.732	XTH207T020P0A
<b>30 WVDC @ 85°C</b>															
20	25	20	10.0	35	52	70	125	-40	+20	+20	14	137	.656	.438	XTK206T030P0A
40	25	20	5.0	60	90	120	75	-40	+20	+20	15	213	.656	.562	XTM406T030P0A
75	25	20	2.7	55	82	110	45	-45	+15	+30	26	333	.875	.540	XTL756T030P0A
150	25	20	2.7	90	135	180	30	-45	+15	+30	32	375	.875	.732	XTH157T030P0A
250	25	20	2.5	195	287	390	20	-65	+20	+35	48	427	1.125	.600	XTV257T030P0A
370	25	20	1.5	125	170	215	15	-65	+20	+35	50	550	1.125	.600	XTV377T030P0A
650	25	20	1.5	145	202	250	15	-85	+20	+35	68	694	1.125	1.100	XTV657T030P0A
1300	25	20	1.5	190	282	375	10	-85	+20	+35	82	694	1.125	1.100	XTV138T030P0A

# Types XTH - K - L - M - V Wet Tantalum Capacitors



Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Maximum Working Voltage		Typical ESR (Ohms)	Maximum DCL @ Maximum WVDC in $\mu$ A			Max Z 85°C (Ohms)	Maximum % Capacitance Change from Room Temperature			Approx Weight (Grams)	Max Ripple 120 Hz RMS -55°C to +175°C (mA)	Size		Catalog Number
	+125°C	+175°C		+85°C	+125°C	+175°C		-55°C	+85°C	+175°C			D + .031 - .015	H + .062 - .062	
<b>35 WVDC @ 85°C</b>															
20	30	23	10.0	35	52	70	125	-40	+20	+20	14	137	.656	.438	XTK206T035P0A
40	30	23	5.0	60	90	120	75	-40	+20	+20	15	213	.656	.562	XTM406T035P0A
60	30	23	2.7	55	82	110	45	-45	+10	+30	26	333	.875	.540	XTL606T035P0A
<b>40 WVDC @ 85°C</b>															
190	34	27	2.5	195	297	400	20	-55	+20	+35	48	427	1.125	.600	XTV197T040P0A
290	34	27	2.5	200	300	400	20	-55	+20	+35	50	427	1.125	.600	XTV297T040P0A
500	34	27	1.5	200	300	400	20	-75	+20	+35	68	694	1.125	1.100	XTV507T040P0A
1000	34	27	1.5	195	297	400	20	-75	+20	+35	82	694	1.125	1.100	XTV108T040P0A
<b>50 WVDC @ 85°C</b>															
900	44	32	1.5	195	297	400	25	-85	+20	+35	82	694	1.125	1.100	XTV907T050P0A
<b>60 WVDC @ 85°C</b>															
12	50	40	10.0	35	52	70	180	-30	+20	+20	14	137	.656	.438	XTK126T060P0A
25	50	40	5.0	60	90	120	90	-30	+20	+20	15	213	.656	.562	XTM256T060P0A
40	50	40	2.7	60	90	120	65	-35	+10	+20	26	333	.875	.540	XTL406T060P0A
70	50	40	2.7	90	135	180	40	-35	+10	+20	32	375	.875	.732	XTH706T060P0A
80	50	40	2.7	95	142	190	35	-35	+10	+20	32	375	.875	.732	XTH806T060P0A
130	50	40	2.5	210	315	420	30	-50	+20	+35	48	427	1.125	.600	XTV137T060P0A
200	50	40	1.5	135	182	230	30	-50	+20	+35	50	550	1.125	.600	XTV207T060P0A
350	50	40	1.5	155	210	265	25	-70	+20	+35	68	694	1.125	1.100	XTV357T060P0A
700	50	40	1.5	200	275	350	15	-70	+20	+35	82	694	1.125	1.100	XTV707T060P0A
750	50	40	1.5	200	275	350	29	-70	+20	+35	82	694	1.125	1.100	XTV757T060P0A
<b>90 WVDC @ 85°C</b>															
8	80	60	10.0	35	52	70	250	-30	+20	+20	14	137	.656	.438	XTK805T090P0A
16	80	60	5.0	60	90	120	125	-30	+20	+20	15	213	.656	.562	XTM166T090P0A
25	80	60	2.7	55	82	110	90	-35	+10	+20	26	333	.875	.540	XTL256T090P0A
50	80	60	2.7	90	135	180	45	-35	+10	+20	32	375	.875	.732	XTH506T090P0A
84	80	60	2.5	195	287	390	40	-40	+20	+35	48	427	1.125	.600	XTV846T090P0A
120	80	60	1.5	135	182	230	40	-40	+20	+35	50	550	1.125	.600	XTV127T090P0A
220	80	60	1.5	145	202	250	30	-60	+20	+35	68	694	1.125	1.100	XTV227T090P0A
450	80	60	1.5	195	215	235	25	-60	+20	+35	82	694	1.125	1.100	XTV457T090P0A
<b>180 WVDC @ 85°C</b>															
2	160	120	20.0	75	112	150	850	-30	+20	+20	21	108	.656	.719	XTK205T180P0A
4	160	120	20.0	35	52	70	500	-30	+20	+20	21	117	.656	.719	XTK405T180P0A
8	160	120	10.0	60	90	120	250	-30	+20	+20	23	186	.656	.938	XTM805T180P0A
12	160	120	5.6	55	82	110	180	-35	+10	+20	44	282	.875	.920	XTL126T180P0A
25	160	120	5.3	90	135	180	90	-35	+10	+20	56	341	.875	1.300	XTH256T180P0A
42	160	120	5.0	120	162	205	75	-40	+20	+35	74	363	1.125	.976	XTV426T180P0A
60	160	120	3.0	135	182	230	60	-40	+20	+35	78	363	1.125	.976	XTV606T180P0A
110	160	120	3.0	145	202	250	60	-60	+20	+35	114	631	1.125	1.938	XTV117T180P0A
230	160	120	3.0	200	275	350	50	-60	+20	+35	142	631	1.125	1.938	XTV237T180P0A
<b>270 WVDC @ 85°C</b>															
2.5	240	180	30.0	35	52	70	750	-30	+20	+20	28	112	.656	1.031	XTK255T270P0A
5	240	180	15.0	55	82	110	375	-30	+20	+20	31	179	.656	1.375	XTM505T270P0A
8	240	180	8.3	55	82	110	270	-35	+10	+20	62	266	.875	1.270	XTL805T270P0A
16	240	180	8.3	90	135	180	135	-35	+10	+20	81	320	.875	1.865	XTH166T270P0A
28	240	180	7.5	120	162	205	80	-40	+20	+35	100	339	1.125	1.350	XTV286T270P0A
40	240	180	7.5	135	182	230	100	-40	+20	+35	104	339	1.125	1.350	XTV406T270P0A
75	240	180	4.5	145	202	250	90	-60	+20	+35	160	608	1.125	2.812	XTV756T270P0A
150	240	180	4.5	195	215	235	75	-60	+20	+35	202	608	1.125	2.812	XTV157T270P0A
<b>360 WVDC @ 85°C</b>															
2	320	240	40.0	35	52	70	1000	-30	+20	+20	37	108	.656	1.312	XTK205T360P0A
4	320	240	20.0	60	90	120	500	-30	+20	+20	41	175	.656	1.781	XTM405T360P0A
6	320	240	11.0	55	82	110	360	-35	+10	+20	80	258	.875	1.635	XTL605T360P0A
12	320	240	11.0	90	135	180	180	-35	+10	+20	105	314	.875	2.420	XTH126T360P0A
22	320	240	10.0	125	170	215	100	-40	+20	+35	126	323	1.125	1.705	XTV226T360P0A
30	320	240	10.0	135	182	230	120	-40	+20	+35	133	323	1.125	1.705	XTV306T360P0A

# Types XTH - K - L - M - V Wet Tantalum Capacitors

**MALLORY**

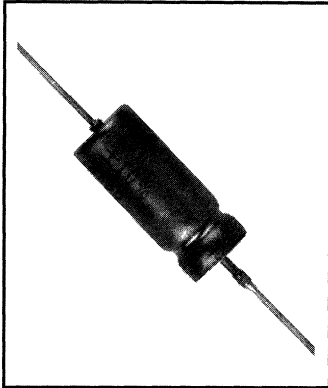
Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Maximum Working Voltage		Typical ESR (Ohms)	Maximum DCL @ Maximum WVDC in $\mu$ A			Max Z 85°C (Ohms)	Maximum % Capacitance Change from Room Temperature			Approx Weight (Grams)	Max Ripple 120 Hz RMS -55°C to +175°C (mA)	Size		Catalog Number
	+125 C	+175 C		+85°C	+125°C	+175°C		-55°C	+85°C	+175°C			D +0.031 -0.015	H +0.062 -0.062	
<b>450 WVDC @ 85°C</b>															
5	400	300	13.0	55	82	110	450	-35	+10	+20	98	262	.875	2.000	XTL505T450P0A
10	400	300	13.0	90	135	180	225	-35	+10	+20	130	318	.875	2.980	XTH106T450P0A
17	400	300	12.5	125	170	215	130	-40	+20	+35	152	315	1.125	2.080	XTV176T450P0A
25	400	300	12.5	135	182	230	150	-40	+20	+35	164	315	1.125	2.080	XTV256T450P0A
<b>540 WVDC @ 85°C</b>															
4	480	360	16.6	55	82	110	540	-35	+10	+20	114	250	.875	2.365	XTL405T540P0A
8	480	360	16.6	90	135	180	270	-35	+10	+20	154	306	.875	3.532	XTH805T540P0A
14	480	300	15.0	120	162	205	160	-40	+20	+35	178	309	1.125	2.435	XTV146T540P0A
20	480	300	15.0	135	182	230	170	-40	+20	+35	196	309	1.125	2.435	XTV206T540P0A
<b>630 WVDC @ 85°C</b>															
3.5	560	420	18.9	55	82	110	630	-35	+10	+20	133	249	.875	2.720	XTL355T630P0A
7	560	420	18.9	90	135	180	315	-35	+10	+20	179	308	.875	4.062	XTH705T630P0A
12	560	420	17.5	120	162	205	180	-40	+20	+35	204	306	1.125	2.810	XTV126T630P0A
18	560	420	17.5	135	182	230	200	-40	+20	+35	225	306	1.125	2.810	XTV186T630P0A
<b>720 WVDC @ 85°C</b>															
3.5	640	480	21.6	55	82	110	800	-20	+10	+20	153	246	.875	3.062	XTL355T720P0A
<b>810 WVDC @ 85°C</b>															
2.2	720	540	24.3	55	82	110	900	-20	+10	+20	170	245	.875	3.440	XTL225T810P0A
<b>900 WVDC @ 85°C</b>															
2.5	800	600	27.0	55	82	110	1000	-20	+10	+20	190	244	.875	3.795	XTL255T900P0A

# Type THT Wet Tantalum Capacitors



Wet Tantalum Capacitors



- Tantalum Case Technology
- Hermetically Sealed
- Rugged Construction
- Stable in Hostile Environments
- 200°C Operating Temperature
- Up to 3 Volts Reverse Capability
- High Ripple Current Rating
- Low DCL
- Low ESR
- Long Active Life
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +200°C

Voltage Range:  
6 to 125 VDC @ 85°C  
2.4 to 75 VDC @ 200°C

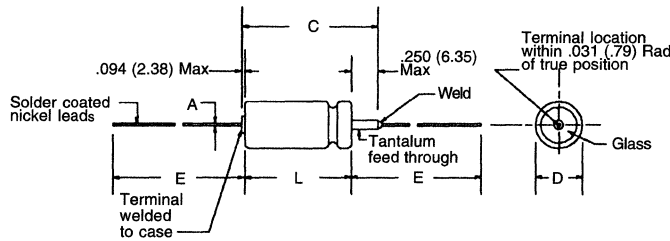
Capacitance Range:  
1.7 μF to 1200 μF

Tolerance Range:  
±20%, ±10%, ±5%

Case Sizes: (Four)  
.188 x .453 to .375 x 1.062

The maximum ripple current carrying capability at 40 kHz and 85°C is shown in the Standard Rating Table. Maximum ripple capability at other frequencies and temperatures can be determined in the following table based on 60% of the rated voltage.

Freq.	Ripple Multipliers at:				
	-55°C	85°C	125°C	175°C	200°C
120 Hz	.60	.60	.27	.19	.13
1 kHz	.72	.72	.32	.23	.16
10 kHz	.88	.88	.40	.28	.19
40 kHz	1.0	1.0	.45	.32	.24
100 kHz	1.1	1.1	.50	.35	.24



INCHES (DIMENSIONS) MILLIMETERS

Case #	MIL	Uninsulated L		Insulated L		C	A Lead Dia. Nom	E Lead Lgth. ±.250	Approximate Weight (Grams)	Case #	MIL	Uninsulated L		Insulated L		C	A Lead Dia Nom	E Lead Lgth ±6.35
		±.016	+.031, -.016	Max	Max							Max	Max	Max	Max			
A	T1	.188	.453	.219	.608	.734	.025 #22	1.500	2.7	A	T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
B	T2	.281	.641	.312	.796	.922	.025 #22	2.250	6.5	B	T2	7.14	16.28	7.92	20.22	23.41	.64 #22	57.15
C	T3	.375	.766	.406	.921	1.047	.025 #22	2.250	12.0	C	T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
F	T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	18.0	F	T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

Cap. μF	Case Code	Catalog Number	Max. DCL μA				Max. ESR Ω 120 Hz	Max. Z Ω 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			

6 WVDC @ 85°C 3.6 WVDC @ 200°C									
30	A	THT306*006P6A	1	2	4	6	4.0	100	820
68	A	THT686*006P6A	1	2	4	6	2.9	60	960
140	B	THT147*006P6B	1	3	6	9	2.2	40	1200
270	B	THT277*006P6B	1	7	14	21	2.0	25	1375
330	C	THT337*006P6C	2	8	16	24	1.4	20	1800
560	C	THT567*006P6C	2	13	26	39	1.3	25	1900
1200	F	THT128*006P6F	3	14	28	42	1.0	20	2265

8 WVDC @ 85°C 4.8 WVDC @ 200°C									
25	A	THT256*008P6A	1	2	4	6	4.0	100	820
56	A	THT566*008P6A	1	2	4	6	3.3	59	900
120	B	THT127*008P6B	1	2	4	6	2.6	50	1220
220	B	THT227*008P6B	1	7	14	21	2.4	30	1370
290	C	THT297*008P6C	2	6	12	18	1.8	25	1770
430	C	THT437*008P6C	2	14	28	42	1.4	25	1825
850	F	THT857*008P6F	4	16	32	48	1.0	22	2330

10 WVDC @ 85°C 6 WVDC @ 200°C									
20	A	THT206*010P6A	1	2	4	6	4.0	175	820
47	A	THT476*010P6A	1	2	4	6	3.7	100	855
100	B	THT107*010P6B	1	4	8	12	2.4	60	1200
180	B	THT187*010P6B	1	7	14	21	2.2	40	1365
250	C	THT257*010P6C	2	10	20	30	1.8	30	1720
390	B	THT397*010P6B	2	16	32	48	1.5	25	1800
750	F	THT757*010P6F	4	16	32	48	1.0	23	2360

\* Insert Proper Letter Code For Tolerance: M = ±20%, K = ±10%, J = ±5%

Cap. μF	Case Code	Catalog Number	Max. DCL μA				Max. ESR Ω 120 Hz	Max. Z Ω 40kHz	Max. Ripple mA rms 85°C
			25°C	125°C	175°C	200°C			

15 WVDC @ 85°C 9 WVDC @ 200°C									
15	A	THT156*015P6A	1	2	3	4	4.4	155	780
33	A	THT336*015P6A	1	2	3	4	4.0	90	820
70	B	THT706*015P6B	1	4	6	8	2.8	75	1150
120	B	THT127*015P6B	1	7	11	14	2.6	50	1450
170	C	THT177*015P6C	2	10	15	20	2.4	35	1480
270	C	THT277*015P6C	2	16	24	32	2.2	30	1740
540	F	THT547*015P6F	6	24	36	48	1.0	23	2300

25 WVDC @ 85°C 12 WVDC @ 200°C									
10	A	THT106*025P6A	1	2	3	4	5.3	220	715
22	A	THT226*025P6A	1	2	3	4	4.2	140	825
50	B	THT506*025P6B	1	2	3	4	3.0	70	1130
100	B	THT107*025P6B	1	10	15	20	2.8	50	1435
120	C	THT127*025P6C	2	6	9	12	2.6	38	1450
180	C	THT187*025P6C	2	18	27	36	2.2	32	1525
350	F	THT357*025P6F	7	28	42	56	1.3	24	1970

30 WVDC @ 85°C 18 WVDC @ 200°C									
8	A	THT805*030P6A	1	2	3	4	6.6	275	640
15	A	THT156*030P6A	1	2	3	4	6.2	175	780
40	B	THT406*030P6B	1	5	8	10	4.0	65	1120
68	B	THT686*030P6B	1	8	12	16	2.9	60	1285
100	C	THT107*030P6C	2	12	18	24	2.7	40	1450
150	C	THT157*030P6C	2	18	27	36	2.3	35	1525
300	F	THT307*030P6F	8	32	48	64	1.4	25	1950

Further information may be obtained by ordering Technical Bulletin 4-618



# Type THT Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors

Cap. μF	Case Code	Catalog Number	Max. DCL μA				Max. ESR Ω 120 Hz + 25°C	Max. Z Ω -55°C	Max.Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C	200°C			

35 WVDC @ 85°C 21 WVDC @ 200°C									
7	A	THT705*035P6A	1	2	3	4	7.0	315	620
15	A	THT156*035P6A	1	2	3	4	6.2	175	660
35	B	THT356*035P6B	1	5	8	10	4.2	75	1000
68	B	THT686*035P6B	1	8	12	16	2.9	60	1195
82	C	THT826*035P6C	2	12	18	24	2.5	45	1400
120	C	THT127*035P6C	2	18	27	36	2.4	40	1490
270	F	THT277*035P6F	8	32	48	64	1.4	26	1950

50 WVDC @ 85°C 30 WVDC @ 200°C									
5	A	THT505*050P6A	1	2	3	4	8.0	400	580
10	A	THT106*050P6A	1	2	3	4	6.4	250	715
25	B	THT256*050P6B	1	5	8	10	4.6	95	1005
47	B	THT476*050P6B	1	9	14	18	3.7	70	1155
60	C	THT606*050P6C	2	12	18	24	2.9	45	1335
82	C	THT826*050P6C	2	16	24	32	2.5	45	1400
160	F	THT167*050P6F	8	32	48	64	1.5	27	1900

60 WVDC @ 85°C 36 WVDC @ 200°C									
4	A	THT405*060P6A	1	2	3	4	9.3	550	525
8.2	A	THT825*060P6A	1	2	3	4	6.6	275	625
20	B	THT206*060P6B	1	5	8	10	4.7	105	930
39	B	THT396*060P6B	1	9	14	18	4.1	90	1110
50	C	THT506*060P6C	2	12	18	24	2.9	50	1330
68	C	THT686*060P6C	2	16	24	32	2.5	50	1365
140	F	THT147*060P6F	8	32	48	64	1.5	28	1850

\* Insert Proper Letter Code For Tolerance: M = ±20%, K = ±10%, J = ±5%

Cap. μF	Case Code	Catalog Number	Max. DCL μA				Max. ESR Ω 120 Hz + 25°C	Max. Z Ω -55°C	Max.Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C	200°C			

75 WVDC @ 85°C 45 WVDC @ 200°C									
3.5	A	THT355*075P6A	1	2	3	4	9.5	650	525
6.8	A	THT685*075P6A	1	2	3	4	6.8	300	610
15	B	THT156*075P6B	1	5	8	10	5.3	150	890
33	B	THT336*075P6B	1	10	15	20	4.2	90	1000
40	C	THT406*075P6C	2	12	18	24	3	60	1250
56	C	THT566*075P6C	2	17	26	34	2.6	55	1335
110	F	THT117*075P6F	9	36	54	72	1.5	29	1850

100 WVDC @ 85°C 60 WVDC @ 200°C									
2.5	A	THT255*100P6A	1	2	3	4	10.6	950	505
4.7	A	THT475*100P6A	1	2	3	4	8.5	500	565
11	B	THT116*100P6B	1	4	6	8	6.0	200	835
22	B	THT226*100P6B	1	9	14	18	4.8	100	965
30	C	THT306*100P6C	2	12	18	24	3.3	80	1240
43	C	THT436*100P6C	2	17	26	34	2.6	70	1335
86	F	THT866*100P6F	9	36	54	72	1.6	30	1800

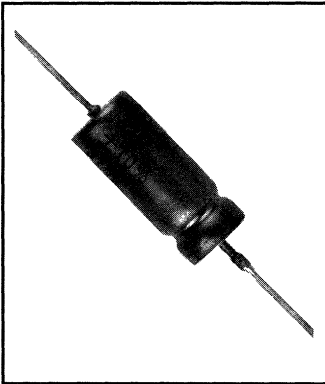
125 WVDC @ 85°C 75 WVDC @ 200°C									
1.7	A	THT175*125P6A	1	2	3	4	16.0	1250	415
3.6	A	THT365*125P6A	1	2	3	4	10.1	600	520
9.0	B	THT905*125P6B	1	5	8	10	7.6	240	755
14	B	THT146*125P6B	1	7	11	14	5.8	167	860
18	C	THT186*125P6C	2	9	14	18	3.8	129	1130
25	C	THT256*125P6C	2	13	20	26	3.2	93	1200
56	F	THT566*125P6F	10	40	60	80	1.6	32	1800

Further information may be obtained by ordering Technical Bulletin 4-611B

# Type THX Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- Extended Range
- Tantalum Case Technology
- Hermetically Sealed
- Rugged Construction
- Stable in Hostile Environments
- Up to 3 Volts Reverse Capability
- High Ripple Current Rating
- Low DCL and ESR
- Long Active Life
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +175°C

Voltage Range:  
6 to 125 VDC @ 85°C  
4 to 85 VDC @ 175°C

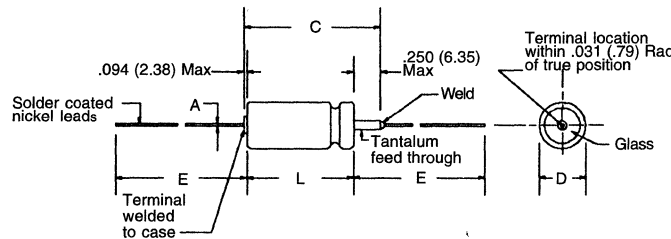
Capacitance Range:  
6.8 μF to 2200 μF

Tolerance Range:  
±20%, ±10%

Case Sizes: (Four)  
.188 x .453 to .375 x .1.062

The maximum ripple current carrying capability at 40 kHz and 85°C is shown in the Standard Rating Table. Maximum ripple capability at other frequencies and temperatures can be determined in the following table based on 60% of the rated voltage.

Freq.	Ripple Multipliers at:				
	-55°C	85°C	125°C	175°C	200°C
120 Hz	.60	.60	.27	.19	.13
1 kHz	.72	.72	.32	.23	.16
10 kHz	.88	.88	.40	.28	.19
40 kHz	1.0	1.0	.45	.32	.24
100 kHz	1.1	1.1	.50	.35	.24



INCHES (DIMENSIONS) MILLIMETERS

Case #	MIL	Uninsulated		Insulated		C	A		E	Approximate Weight (Grams)	Case #	MIL	Uninsulated		Insulated		C	A		E
		D	L	D	L		Lead Dia. Nom	Lead Dia. AWG					Lead Lgth. ±.250	D	L	D		L	Lead Dia. Nom	
A	T1	.188	.453	.219	.608	.734	.025	#22	1.500	2.7	A	T1	4.78	11.51	5.56	15.45	18.64	.64	#22	38.10
B	T2	.281	.641	.312	.796	.922	.025	#22	2.250	6.5	B	T2	7.14	16.28	7.92	20.22	23.41	.64	#22	57.15
C	T3	.375	.766	.406	.921	1.047	.025	#22	2.250	12.0	C	T3	9.53	19.46	10.31	23.40	26.59	.64	#22	57.15
F	T4	.375	1.062	.406	1.217	1.343	.025	#22	2.250	18.0	F	T4	9.53	26.97	10.31	30.91	34.11	.64	#22	57.15

Cap. μF	Case Code	Catalog Number	Max. DCL μA			Max. ESR Ω	Max DF %	Max. Ripple mA rms
			25°C	125°C	175°C			
220	A	THX227*006P6A	2	9	18	2.7	50	1010
820	B	THX827*006P6B	3	14	28	2.2	155	1550
1500	C	THX158*006P6C	5	20	40	1.3	172	1930
2200	F	THX228*006P6F	6	24	48	.9	170	2330

Cap. μF	Case Code	Catalog Number	Max. DCL μA			Max. ESR Ω	Max DF %	Max. Ripple mA rms
			25°C	125°C	175°C			
82	A	THX826*015P6A	2	6	12	2.9	20	915
100	A	THX107*015P6A	2	9	18	3.6	30	930
390	B	THX397*015P6B	3	16	32	1.8	59	1470
680	C	THX687*015P6C	6	18	36	1.2	71	1860
827	C	THX827*015P6C	6	24	48	1.1	80	1930
1000	F	THX108*015P6F	8	32	64	.9	75	2330

6 WVDC @ 85°C 4 WVDC @ 175°C								
220	A	THX227*006P6A	2	9	18	2.7	50	1010
820	B	THX827*006P6B	3	14	28	2.2	155	1550
1500	C	THX158*006P6C	5	20	40	1.3	172	1930
2200	F	THX228*006P6F	6	24	48	.9	170	2330

15 WVDC @ 85°C 10 WVDC @ 175°C								
82	A	THX826*015P6A	2	6	12	2.9	20	915
100	A	THX107*015P6A	2	9	18	3.6	30	930
390	B	THX397*015P6B	3	16	32	1.8	59	1470
680	C	THX687*015P6C	6	18	36	1.2	71	1860
827	C	THX827*015P6C	6	24	48	1.1	80	1930
1000	F	THX108*015P6F	8	32	64	.9	75	2330

8 WVDC @ 85°C 5 WVDC @ 175°C								
180	A	THX187*008P6A	2	9	18	2.4	36	1010
680	B	THX687*008P6B	3	14	28	2.3	130	1550
1500	A	THX158*008P6A	5	20	40	1.3	170	1930
1800	F	THX188*008P6F	7	25	50	.9	195	2330

25 WVDC @ 85°C 15 WVDC @ 175°C								
68	A	THX686*025P6A	2	9	18	3.9	22	850
270	B	THX277*025P6B	3	16	32	1.8	42	1430
560	C	THX567*025P6C	7	28	56	1.6	76	1750
680	F	THX687*025P6F	8	32	64	1.1	61	2120

10 WVDC @ 85°C 7 WVDC @ 175°C								
120	A	THX127*010P6A	2	6	12	2.8	28	930
150	A	THX157*010P6A	2	9	18	2.7	34	960
470	B	THX477*010P6B	3	9	18	1.7	67	1500
560	B	THX567*010P6B	3	16	32	1.6	76	1550
1000	C	THX108*010P6C	6	18	36	1.2	98	1930
1200	C	THX128*010P6C	5	20	40	1.1	117	1930
1200	F	THX128*010P6F	7	25	50	.9	90	2330
1500	F	THX158*010P6F	7	25	50	.9	114	2330

30 WVDC @ 85°C 20 WVDC @ 175°C								
47	A	THX476*030P6A	2	6	12	3.6	14	830
56	A	THX566*030P6A	2	9	18	3.2	15	890
150	B	THX157*030P6B	3	9	18	2.2	28	1340
180	B	THX187*030P6B	3	9	18	2.0	30	1400
220	B	THX227*030P6B	3	16	32	2.3	42	1400
390	C	THX397*030P6C	6	18	36	1.4	47	1740
470	C	THX477*030P6C	8	32	64	1.3	53	1800
560	F	THX567*030P6F	9	36	72	1.1	54	2040

\* Insert Proper Letter Code For Tolerance: M = ±20%, K = ±10%

# Type THX Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A			Max. ESR $\Omega$ 120 Hz + 25°C	Max DF % 120 Hz +25 C	Max.Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C			

35 WVDC @ 85°C 23 WVDC @ 175°C								
39	A	THX396*035P6A	2	6	12	3.7	12	820
330	C	THX337*035P6C	6	18	36	1.6	44	1640
470	F	THX477*030P6F	9	36	72	1.1	46	2040

50 WVDC @ 85°C 30 WVDC @ 175°C								
33	A	THX336*050P6A	2	9	18	4.0	11	795
120	B	THX127*050P6B	4	24	48	2.2	22	1315
270	C	THX277*050P6C	8	32	64	1.6	37	1560
330	F	THX337*050P6F	9	36	72	1.3	32	2040

60 WVDC @ 85°C 40 WVDC @ 175°C								
27	A	THX276*060P6A	3	12	24	4.0	9	785
100	B	THX107*060P6B	4	20	40	2.3	20	1240
220	C	THX227*060P6C	8	32	64	1.6	30	1520
270	F	THX277*060P6F	9	36	72	1.2	27	1970

\* Insert Proper Letter Code For Tolerance: M =  $\pm$ 20%, K =  $\pm$ 10%

Cap. $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A			Max. ESR $\Omega$ 120 Hz + 25°C	Max DF % 120 Hz +25°C	Max.Ripple mA rms 40kHz 85°C
			25°C	125°C	175°C			

75 WVDC @ 85°C 50 WVDC @ 175°C								
22	A	THX226*075P6A	3	12	24	4.0	8	745
68	B	THX686*075P6B	4	16	32	2.6	15	1200
82	B	THX826*075P6B	4	24	48	2.2	15	1200
180	C	THX187*075P6C	8	36	72	1.6	24	1490
220	F	THX227*075P6F	10	40	80	2.0	24	1900

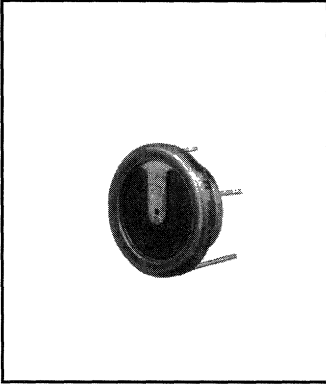
100 WVDC @ 85°C 65 WVDC @ 175°C								
10	A	THX106*100P6A	3	12	36	5.9	4	800
39	B	THX396*100P6B	5	24	48	3.2	10.4	1300
68	C	THX686*100P6C	10	40	80	2.0	11.3	1600
120	F	THX127*100P6F	12	48	96	2.5	25	2000

125 WVDC @ 85°C 85 WVDC @ 175°C								
6.8	A	THX685*125P6A	3	12	24	10.6	6	700
27	B	THX276*125P6B	5	24	48	3.2	7.2	1200
47	C	THX476*125P6C	10	40	80	2.0	7.9	1500
82	F	THX826*125P6F	12	48	96	2.5	17.4	1900

# Type W13 All-Tantalum Button Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- High AC and Surge Currents
- All Tantalum Construction
- Qualified to MIL-C- 83500
- 3 Volt Reverse Voltage To 125°C
- 100% Burn In
- Custom Designs Available

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +200°C

Voltage Range:  
3 to 125 VDC

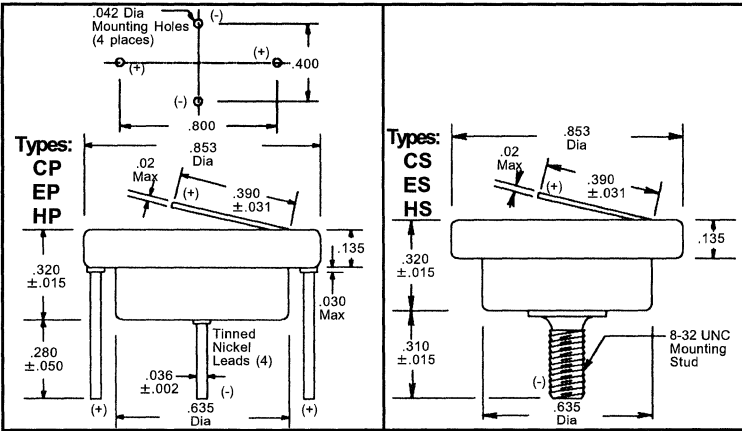
Capacitance Range:  
47µF to 1500 µF

Ripple Current:  
Maxat 85°C: 40kHz up to 2.9A rms, dependent on C/V rating

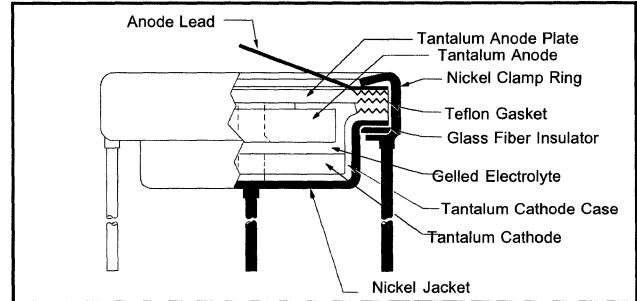
Leakage Current:  
At 25°C: 2 µA to 8 µA depending on voltage rating

Approximate Weight:  
Pin Mount: 17.3 grams  
Stud mount: 18.1 grams

The W13 design was developed to provide a wet-slug unit with no metal migration, or reverse voltage and shelf life degradation, and was the first unit of All-Tantalum construction. Since the 1960's millions of units in critical applications have demonstrated unsurpassed reliability and performance. The W13 series is qualified to MIL-C-83500 and meets the equivalent requirements of MIL-C-39006. The capacitors are also approved to NATO and European standards.



The EP/ES is an extension of the CP/CS types, utilizing select materials to result in a capacitor with higher CV product while retaining all the essential features of the MIL range. The HP/HS type is designed to give high stability up to 200°C. Every unit is burned in for 16 hours at 200°C prior to final test. In addition to standard military applications, this device is aimed at 'down the hole' drilling activities, high temperature engine control and other high stress environments.



Ratings			Catalog Number		Equivalent MIL Part No M83500/01----	
VDC @ 85°C	Cap (nom) µF	Cap Tol %	Type CS Stud Mount	Type CP Printed Circuit Mount	STUD Style CRL 02	PC Style CRL 01

Type CP/CS (MIL-C83500/1 - Style CRL01, CRL02)						
6	1200	20	W131200M0006CS	W131200M0006CP	1001	0001
8	1000	20	W131000M0008CS	W131000M0008CP	1002	0002
10	820	20	W130820M0010CS	W130820M0010CP	1003	0003
15	680	10	W130680K0015CS	W130680K0015CP	1004	0004
15	680	20	W130680M0015CS	W130680M0015CP	1005	0005
20	560	10	W130560K0020CS	W130560K0020CP	1006	0006
20	560	20	W130560M0020CS	W130560M0020CP	1007	0007
20	470	10	W130470K0020CS	W130470K0020CP	1008	0008
20	470	20	W130470M0020CS	W130470M0020CP	1009	0009
20	390	10	W130390K0020CS	W130390K0020CP	1010	0010
20	390	20	W130390M0020CS	W130390M0020CP	1011	0011
30	330	10	W130330K0030CS	W130330K0030CP	1012	0012
30	330	20	W130330M0030CS	W130330M0030CP	1013	0013
30	270	10	W130270K0030CS	W130270K0030CP	1014	0014
30	270	20	W130270M0030CS	W130270M0030CP	1015	0015
50	220	10	W130220K0050CS	W130220K0050CP	1016	0016
50	220	20	W130220M0050CS	W130220M0050CP	1017	0017
50	180	10	W130180K0050CS	W130180K0050CP	1018	0018
50	180	20	W130180M0050CS	W130180M0050CP	1019	0019
50	150	10	W130150K0050CS	W130150K0050CP	1020	0020
50	150	20	W130150M0050CS	W130150M0050CP	1021	0021
75	120	10	W130120K0075CS	W130120K0075CP	1022	0022
75	120	20	W130120M0075CS	W130120M0075CP	1023	0023
75	100	10	W130100K0075CS	W130100K0075CP	1024	0024
75	100	20	W130100M0075CS	W130100M0075CP	1025	0025
75	82	10	W130082K0075CS	W130082K0075CP	1026	0026
75	82	20	W130082M0075CS	W130082M0075CP	1027	0027
75	68	10	W130068K0075CS	W130068K0075CP	1028	0028
75	68	20	W130068M0075CS	W130068M0075CP	1029	0029
100	56	10	W130056K0100CS	W130056K0100CP	1030	0030
100	56	20	W130056M0100CS	W130056M0100CP	1031	0031
125	47	10	W130047K0125CS	W130047K0125CP	1032	0032
125	47	20	W130047M0125CS	W130047M0125CP	1033	0033

VDC @ 85°C	Cap (nom) µF	Cap Tol %	Catalog Number	
			Type ES Printed Circuit Mount	Type EP Printed Circuit Mount
Type EP/ES - Extended Capacitance Range				
6	1500	20	W131500M0006ES	W131500M0006EP
10	1200	20	W131200M0010ES	W131200M0010EP
10	1000	20	W131000M0010ES	W131000M0010EP
15	820	20	W130820M0015ES	W130820M0015EP
15	680	20	W130680M0015ES	W130680M0015EP
25	560	20	W130560M0025ES	W130560M0025EP
25	470	20	W130470M0025ES	W130470M0025EP
40	390	20	W130390M0040ES	W130390M0040EP
40	330	20	W130330M0040ES	W130330M0040EP
40	270	20	W130270M0040ES	W130270M0040EP
60	220	20	W130220M0060ES	W130220M0060EP
75	180	20	W130180M0075ES	W130180M0075EP
75	150	20	W130150M0075ES	W130150M0075EP
100	120	20	W130120M0100ES	W130120M0100EP
100	100	20	W130100M0100ES	W130100M0100EP
125	82	20	W130082M0125ES	W130082M0125EP

VDC @ 150°C	Cap (nom) µF	Cap Tol %	Catalog Number	
			Type ES Printed Circuit Mount	Type EP Printed Circuit Mount
Type HP/HS - High Temperature Range				
75	47	20	W130047M0075HS	W130047M0075HP
50	68	20	W130068M0050HS	W130068M0050HP
35	100	20	W130100M0035HS	W130100M0035HP
25	150	20	W130150M0025HS	W130150M0025HP
15	220	20	W130220M0015HS	W130220M0015HP
10	270	20	W130270M0010HS	W130270M0010HP
6	330	20	W130330M0006HS	W130330M0006HP

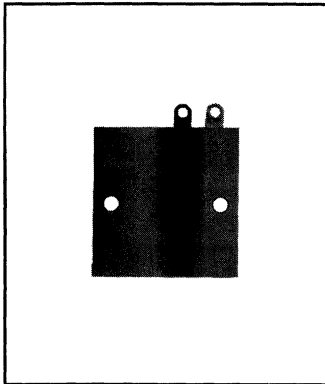
## TO ORDER BY MIL NUMBER:

Indicate the prefix M83500/01 followed by the applicable MIL dash number.  
Example: For M83500/01-1001; order M83500/011001

# Type W14 All-Tantalum Module Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- High AC and Surge Currents
- All Tantalum Construction Of Constituent Units
- Long Life/Operation and Shelf
- 3 Volt Reverse Voltage to 125°C
- High Efficiency Package
- Custom Designs Available

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC

Capacitance Range:  
230  $\mu$ F to 7500  $\mu$ F

Ripple Current:  
Max at 85°C, 40kHz up to 11.7A rms, dependent on C/V rating

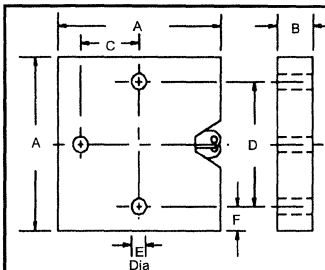
Leakage Current:  
At 25°C: 15 $\mu$ A to 75 $\mu$ A depending on voltage rating

Module Weight:  
130 Grams Approximate

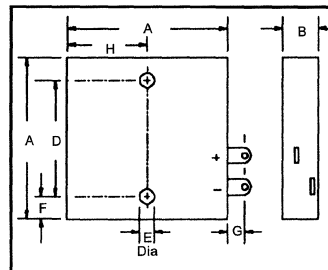
The W14 series capacitor module has been designed to meet the requirements for a very high CV device, in excess of that available in an individual capacitor. The standard arrangement of five W13 series units connected in parallel achieves excellent volumetric efficiency.

A highly qualified applications engineering service is available to assist in design of special packages to meet specific customer needs for both prototype and production quantities.

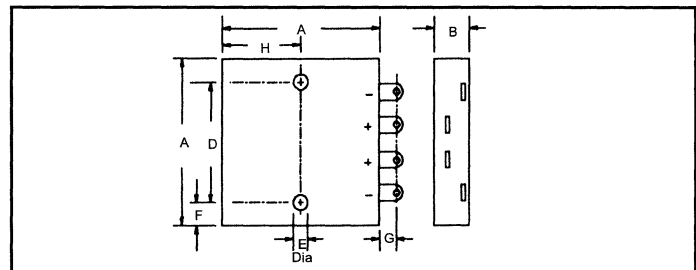
Dimensions: (Inches) (Unless specified, tolerances $\pm$ .010)	A max	B max	C ctrs	D ctrs	E dia	F dim	G min	H dim
	2.080	.460	.750	1.500	.190	.260	.170	1.000



**Type MA - Standard 2-Terminal**  
A package of five CP type units connected in parallel.



**Type MB - Off-Set Terminal**  
Identical to the type MA, but with protruding terminals.



**Type MC - Four Terminal**  
This arrangement has a bank of two parallel connected W13 units and a bank of three parallel connected W13 units. Each bank has a terminal pair.

VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>Standard Range</b>			
6	6000	20	W14600M0006MA
8	5000	20	W14500M0008MA
10	4100	20	W144100M0010MA
15	3400	20	W143400M0015MA
20	2800	20	W142800M0020MA
20	2350	20	W142350M0020MA
20	1950	20	W141950M0020MA
30	1650	20	W141650M0030MA
30	1350	20	W141350M0030MA
50	1100	20	W141100M0050MA
50	900	20	W14900M0050MA
50	750	20	W14750M0050MA
75	600	20	W14600M0075MA
75	500	20	W14500M0075MA
75	410	20	W14410M0075MA
75	340	20	W14340M0075MA
100	280	20	W14280M0100MA
125	235	20	W14235M0125MA

VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>Standard Range</b>			
6	6000	20	W14600M0006MB
8	5000	20	W14500M0008MB
10	4100	20	W144100M0010MB
15	3400	20	W143400M0015MB
20	2800	20	W142800M0020MB
20	2350	20	W142350M0020MB
20	1950	20	W141950M0020MB
30	1650	20	W141650M0030MB
30	1350	20	W141350M0030MB
50	1100	20	W141100M0050MB
50	900	20	W14900M0050MB
50	750	20	W14750M0050MB
75	600	20	W14600M0075MB
75	500	20	W14500M0075MB
75	410	20	W14410M0075MB
75	340	20	W14340M0075MB
100	280	20	W14280M0100MB
125	235	20	W14235M0125MB

VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>(Right Hand) Terminal Pair 1</b>			
6	2400	20	W1424-M06-MC
8	2000	20	W1420-M08-MC
10	1640	20	W1416-M10-MC
15	1360	20	W1413-M15-MC
20	1120	20	W1411-M20-MC
20	940	20	W1494-M20-MC
20	780	20	W1478-M20-MC
30	660	20	W1466-M30-MC
30	540	20	W1454-M30-MC
50	440	20	W1444-M50-MC
50	360	20	W1436-M50-MC
50	300	20	W1430-M50-MC
75	240	20	W1424-M75-MC
75	200	20	W1420-M75-MC
75	164	20	W1416-M75-MC
75	136	20	W1413-M75-MC
100	112	20	W1411-M10-MC
125	94	20	W1494-M12-MC

VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>(Left Hand) Terminal Pair 2</b>			
6	3600	20	W14-36M-06MC
8	3000	20	W14-30M-08MC
10	2460	20	W14-24M-10MC
15	2040	20	W14-20M-15MC
20	1680	20	W14-16M-20MC
20	1410	20	W14-14M-20MC
20	1170	20	W14-11M-20MC
30	990	20	W14-99M-30MC
30	810	20	W14-81M-30MC
50	660	20	W14-66M-50MC
50	540	20	W14-54M-50MC
50	450	20	W14-45M-50MC
75	360	20	W14-36M-75MC
75	300	20	W14-30M-75MC
75	246	20	W14-24M-75MC
75	204	20	W14-20M-75MC
100	168	20	W14-16M-10MC
125	141	20	W14-14M-12MC

Assume the Right Hand Terminals are to be 1640  $\mu$ F/10 Volts and the Left Hand Terminals are to be 3600  $\mu$ F/6 Volts  
The Part Number would be W131636M1006MC

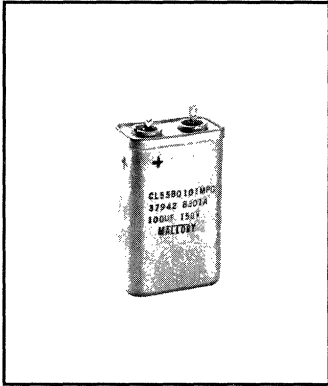
VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>Hi Cap Range</b>			
6	7500	20	W147500M0006MA
10	6000	20	W146000M0010MA
10	5000	20	W145000M0010MA
15	3400	20	W143400M0015MA
15	4100	20	W144100M0015MA
25	2800	20	W142800M0025MA
25	2350	20	W142350M0025MA
40	1950	20	W141950M0040MA
40	1650	20	W141650M0040MA
40	1350	20	W141350M0040MA
60	1100	20	W141100M0060MA
75	900	20	W14900M0075MA
75	750	20	W14750M0075MA
100	600	20	W14600M0100MA
100	500	20	W14500M0100MA
125	410	20	W14410M0125MA

VDC @ 85°C	Cap (nom)	Cap Tol %	Catalog Number
<b>Hi Cap Range</b>			
6	7500	20	W147500M0006MB
10	6000	20	W146000M0010MB
10	5000	20	W145000M0010MB
15	3400	20	W143400M0015MB
15	4100	20	W144100M0015MB
25	2800	20	W142800M0025MB
25	2350	20	W142350M0025MB
40	1950	20	W141950M0040MB
40	1650	20	W141650M0040MB
40	1350	20	W141350M0040MB
60	1100	20	W141100M0060MB
75	900	20	W14900M0075MB
75	750	20	W14750M0075MB
100	600	20	W14600M0100MB
100	500	20	W14500M0100MB
125	410	20	W14410M0125MB

# Type TMX - All-Tantalum Module Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- High Capacitance per Case Size
- Hermetic Seal
- All Tantalum Construction Of Constituent Units
- Wide Operating Temp Range
- Temperature & Life Stability
- Low DCL
- Long Shelf Life
- Very High Ripple Current Capability
- Reverse Voltage Capability
- High Freq Vibration - 80g's  
Random Vibration - 50g's

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 250 VDC @ 85°C  
4 to 165 VDC @ 125°C

Capacitance:  
to 39,600 µF

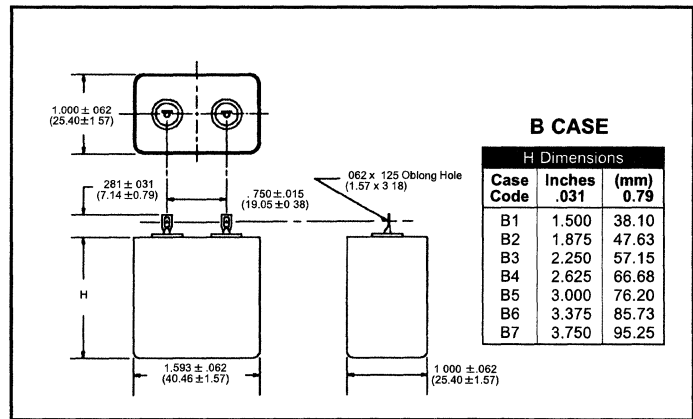
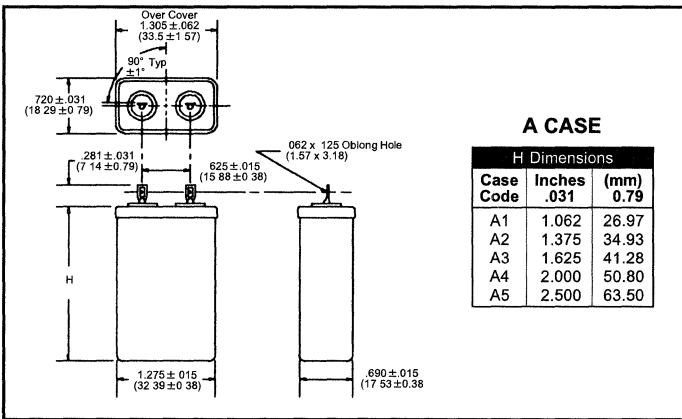
Tolerance:  
±10%, ±20%

Ripple Current Capability:  
to 41.4 Amps @ 40 kHz

The MALLORY TMX capacitor is a module consisting of several TXT (M39006/25) wet slug, all-tantalum units wired in parallel, insulated and mounted in a rectangular metal case.

The case is potted with a compound that provides excellent thermal conductivity, high heat performance, increased shock resistance and improved coefficient of thermal expansion.

The assembly leads are brought out through glass-to-metal hermetic seals on the cover and the cover is soldered to the container.



## RIPPLE CURRENT MULTIPLIERS FOR FREQUENCY, TEMPERATURE, AND APPLIED PEAK VOLTAGE

Applied Voltage in Percent of Rated WVDC	Ripple Current Frequency																			
	120 Hz				1 kHz				10 kHz				40 kHz				100 kHz			
	Operating Temperature °C																			
	≤55°	85°	105°	125°	≤55°	85°	105°	125°	≤55°	85°	105°	125°	≤55°	85°	105°	125°	≤55°	85°	105°	125°
100%	.60	.39	—	—	.72	.45	—	—	.88	.55	—	—	1.0	.63	—	—	1.1	.69	—	—
90%	.60	.46	—	—	.72	.55	—	—	.88	.67	—	—	1.0	.77	—	—	1.1	.85	—	—
80%	.60	.52	.35	—	.72	.62	.42	—	.88	.76	.52	—	1.0	.87	.59	—	1.1	.96	.65	—
70%	.60	.58	.44	—	.72	.70	.52	—	.88	.85	.64	—	1.0	.97	.73	—	1.1	1.07	.80	—
66-2/3% and below	.60	.60	.46	.27	.72	.72	.55	.32	.88	.88	.68	.40	1.0	1.0	.77	.45	1.1	1.1	.85	.50

Cap. µF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω @ +25°C	Max Imp Ω
				+25°C	+125°C		
<b>6 WVDC; 7 VDC Surge @ 85°C 4 WVDC; 4.7 VDC Surge @ 125°C</b>							
4,500	A1	TMX458*006P0A1	5.7	15	60	.13	6.0
6,000	A2	TMX608*006P0A2	7.6	20	80	.10	5.0
7,500	A3	TMX758*006P0A3	9.5	25	100	.08	4.0
9,000	A4	TMX908*006P0A4	11.4	30	120	.067	3.0
12,000	A5	TMX129*006P0A5	15.2	40	160	.05	2.5
13,200	B1	TMX1328*006P0B1	13.8	36	144	.075	1.0
17,600	B2	TMX1768*006P0B2	18.4	48	192	.056	.80
22,000	B3	TMX229*006P0B3	23.0	60	240	.045	.65
26,400	B4	TMX2648*006P0B4	27.6	72	288	.037	.54
30,800	B5	TMX3088*006P0B5	32.2	84	336	.032	.46
35,200	B6	TMX3528*006P0B6	36.8	96	384	.028	.40
39,600	B7	TMX3968*006P0B7	41.2	100	432	.025	.36

Cap. µF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω @ +25°C	Max Imp Ω
				+25°C	+125°C		
<b>8 WVDC; 9.2 VDC Surge @ 85°C 5 WVDC; 5.7 VDC Surge @ 125°C</b>							
4,500	A1	TMX458*008P0A1	5.7	15	60	.13	6.0
6,000	A2	TMX608*008P0A2	7.6	20	80	.10	5.0
7,500	A3	TMX758*008P0A3	9.5	25	100	.08	4.0
9,000	A4	TMX908*008P0A4	11.4	30	120	.067	3.0
10,800	B1	TMX1088*008P0B1	13.8	42	150	.075	1.15
12,000	A5	TMX129*008P0A5	15.2	40	160	.05	2.5
14,400	B2	TMX1448*008P0B2	18.4	56	200	.056	.87
18,000	B3	TMX189*008P0B3	23.0	70	250	.045	.70
21,600	B4	TMX2168*008P0B4	27.6	84	300	.037	.58
25,200	B5	TMX2528*008P0B5	32.2	98	350	.032	.50
28,800	B6	TMX2888*008P0B6	36.8	112	400	.028	.43
32,400	B7	TMX3248*008P0B7	41.2	126	450	.025	.39

\* Insert Proper Letter Code For Tolerance: K = ±10%, M = ±20%

# Type TMX - All-Tantalum Module Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors

Cap. μF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω +25°C	Max Imp Ω
				+25°C	+85°C & +125°C		

10 WVDC; 11.5 VDC Surge @ 85°C 7 WVDC; 8 VDC Surge @ 125°C							
3,600	A1	TMX368*010P0A1	5.5	15	60	.13	6.0
4,800	A2	TMX488*010P0A2	7.4	20	80	.10	5.0
6,000	A3	TMX608*010P0A3	9.25	25	100	.08	4.0
7,200	A4	TMX728*010P0A4	11.1	30	120	.067	3.0
9,000	B1	TMX908*010P0B1	13.8	42	150	.075	1.25
9,600	A5	TMX968*010P0A5	14.8	40	160	.05	2.5
12,000	B2	TMX129*010P0B2	18.4	56	200	.056	.93
15,000	B3	TMX159*010P0B3	23.0	70	250	.045	.75
18,000	B4	TMX189*010P0B4	27.6	84	300	.037	.62
21,000	B5	TMX219*010P0B5	32.2	98	350	.032	.53
24,000	B6	TMX249*010P0B6	36.8	112	400	.028	.47
27,000	B7	TMX279*010P0B7	41.4	126	450	.025	.42

15 WVDC; 17.2 VDC Surge @ 85°C 10 WVDC; 11.5 VDC Surge @ 125°C							
2,500	A1	TMX258*015P0A1	5.4	18	72	.13	8.0
3,300	A2	TMX338*015P0A2	7.2	24	96	.10	6.0
4,100	A3	TMX418*015P0A3	9.0	30	120	.08	5.0
4,900	A4	TMX498*015P0A4	10.8	36	144	.069	4.0
6,000	B1	TMX608*015P0B1	13.8	48	192	.092	1.42
6,600	A5	TMX668*015P0A5	14.4	48	192	.051	3.0
8,000	B2	TMX808*015P0B2	18.4	64	256	.069	1.06
10,000	B3	TMX109*015P0B3	23.0	80	320	.055	.85
12,000	B4	TMX129*015P0B4	27.6	96	384	.046	.71
14,000	B5	TMX149*015P0B5	32.2	112	448	.039	.61
16,000	B6	TMX169*015P0B6	36.8	128	512	.034	.53
18,000	B7	TMX189*015P0B7	41.4	144	576	.03	.47

25 WVDC; 28.8 VDC Surge @ 85°C 15 WVDC; 17.2 VDC Surge @ 125°C							
1,700	A1	TMX178*025P0A1	5.25	21	84	.17	8.0
2,200	A2	TMX228*025P0A2	7.0	28	112	.13	6.0
2,800	A3	TMX288*025P0A3	8.75	35	140	.10	5.0
3,400	A4	TMX348*025P0A4	10.5	42	168	.085	4.0
4,000	B1	TMX408*025P0B1	12.6	48	192	.092	1.58
4,500	A5	TMX458*025P0A5	14.0	56	224	.064	3.0
5,400	B2	TMX548*025P0B2	16.8	64	256	.069	1.19
6,800	B3	TMX688*025P0B3	21.0	80	320	.055	.95
8,100	B4	TMX818*025P0B4	25.2	96	384	.046	.79
9,500	B5	TMX958*025P0B5	29.4	112	448	.039	.68
10,900	B6	TMX1098*025P0B6	33.6	128	512	.034	.59
12,200	B7	TMX1228*025P0B7	37.8	144	576	.03	.53

30 WVDC; 34.5 VDC Surge @ 85°C 20 WVDC; 23 VDC Surge @ 125°C							
1,400	A1	TMX148*030P0A1	4.5	24	96	.15	9.0
1,900	A2	TMX198*030P0A2	6.0	32	128	.11	7.0
2,300	A3	TMX238*030P0A3	7.5	40	160	.094	6.0
2,800	A4	TMX288*030P0A4	9.0	48	192	.077	5.0
3,300	B1	TMX338*030P0B1	12.0	54	216	.092	1.67
3,800	A5	TMX388*030P0A5	12.0	64	256	.057	3.5
4,500	B2	TMX458*030P0B2	16.0	72	288	.069	1.25
5,600	B3	TMX568*030P0B3	20.0	90	360	.055	1.0
6,700	B4	TMX678*030P0B4	24.0	108	432	.046	.83
7,800	B5	TMX788*030P0B5	28.0	126	504	.039	.71
8,900	B6	TMX898*030P0B6	32.0	144	576	.034	.62
10,000	B7	TMX109*030P0B7	36.0	162	648	.03	.55

50 WVDC; 57.5 VDC Surge @ 85°C 30 WVDC; 34.5 VDC Surge @ 125°C							
800	A1	TMX807*050P0A1	4.35	24	96	.22	10.0
1,100	A2	TMX118*050P0A2	5.8	32	128	.16	8.0
1,300	A3	TMX138*050P0A3	7.25	40	160	.14	7.0
1,600	A4	TMX168*050P0A4	8.7	48	192	.11	5.0
2,000	B1	TMX208*050P0B1	11.4	54	216	.11	1.83
2,200	A5	TMX228*050P0A5	11.6	64	256	.082	4.0

Cap. μF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω +25°C	Max Imp Ω
				+25°C	+85°C & +125°C		

50 WVDC; 57.5 VDC Surge @ 85°C 30 WVDC; 34.5 VDC Surge @ 125°C							
2,600	B2	TMX268*050P0B2	15.2	72	288	.081	1.37
3,300	B3	TMX338*050P0B3	19.0	90	360	.065	1.10
4,000	B4	TMX408*050P0B4	22.8	108	432	.054	.92
4,600	B5	TMX468*050P0B5	26.6	126	504	.046	.78
5,300	B6	TMX538*050P0B6	30.4	144	576	.041	.69
5,900	B7	TMX598*050P0B7	34.2	162	648	.036	.61

60 WVDC; 69 VDC Surge @ 85°C 40 WVDC; 46 VDC Surge @ 125°C							
660	A1	TMX667*060P0A1	4.2	24	96	.22	10.0
880	A2	TMX887*060P0A2	5.6	32	128	.16	8.0
1,100	A3	TMX118*060P0A3	7.0	40	160	.13	6.0
1,300	A4	TMX138*060P0A4	8.4	48	192	.11	5.0
1,600	B1	TMX168*060P0B1	11.1	54	216	.10	1.92
1,800	A5	TMX188*060P0A5	11.2	64	256	.08	4.0
2,200	B2	TMX228*060P0B2	14.8	72	288	.075	1.44
2,700	B3	TMX278*060P0B3	18.5	90	360	.06	1.15
3,200	B4	TMX328*060P0B4	22.2	108	432	.05	.96
3,800	B5	TMX388*060P0B5	25.9	126	504	.043	.82
4,300	B6	TMX438*060P0B6	29.6	144	576	.038	.72
4,900	B7	TMX498*060P0B7	33.3	162	648	.033	.64

75 WVDC; 86.2 VDC Surge @ 85°C 50 WVDC; 57.5 VDC Surge @ 125°C							
540	A1	TMX547*075P0A1	3.9	27	108	.26	10.0
720	A2	TMX727*075P0A2	5.2	36	144	.20	8.0
900	A3	TMX907*075P0A3	6.5	45	180	.16	7.0
1,100	A4	TMX118*075P0A4	7.8	54	216	.13	5.0
1,300	B1	TMX138*075P0B1	10.8	60	240	.13	2.0
1,400	A5	TMX148*075P0A5	10.4	72	288	.10	4.0
1,800	B2	TMX188*075P0B2	14.4	80	320	.10	1.5
2,200	B3	TMX228*075P0B3	18.0	100	400	.08	1.2
2,600	B4	TMX268*075P0B4	21.6	120	480	.067	1.0
3,100	B5	TMX318*075P0B5	25.2	140	560	.057	.86
3,500	B6	TMX358*075P0B6	28.8	160	640	.05	.75
4,000	B7	TMX408*075P0B7	32.4	180	720	.044	.67

100 WVDC; 115 VDC Surge @ 85°C 65 WVDC; 74.8 VDC Surge @ 125°C							
200	A1	TMX207*100P0A1	4.8	30	120	.48	14.0
270	A2	TMX277*100P0A2	6.4	40	160	.35	10.0
340	A3	TMX347*100P0A3	8.0	50	200	.28	8.0
400	A4	TMX407*100P0A4	9.6	60	240	.24	7.0
540	A5	TMX547*100P0A5	12.8	80	320	.18	5.0
720	B1	TMX727*100P0B1	12.0	72	288	.15	2.5
960	B2	TMX967*100P0B2	16.0	96	384	.11	1.88
1,200	B3	TMX128*100P0B3	20.0	120	480	.09	1.5
1,400	B4	TMX148*100P0B4	24.0	144	576	.075	1.25
1,700	B5	TMX178*100P0B5	28.0	168	672	.064	1.07
1,900	B6	TMX198*100P0B6	32.0	192	768	.056	.94
2,200	B7	TMX228*100P0B7	36.0	216	864	.05	.83

125 WVDC; 144 VDC Surge @ 85°C 100 WVDC; 115 VDC Surge @ 125°C							
140	A1	TMX147*125P0A1	4.5	30	120	.51	17.0
190	A2	TMX197*125P0A2	6.0	40	160	.38	13.0
240	A3	TMX247*125P0A3	7.5	50	200	.30	10.0
280	A4	TMX287*125P0A4	9.0	60	240	.26	8.0
380	A5	TMX387*125P0A5	12.0	80	320	.19	6.0
500	B1	TMX507*125P0B1	11.4	72	288	.16	5.3
660	B2	TMX667*125P0B2	15.2	96	384	.13	4.0
820	B3	TMX827*125P0B3	19.0	120	480	.10	3.2
980	B4	TMX987*125P0B4	22.8	144	576	.084	2.6
1,150	B5	TMX1157*125P0B5	26.6	168	672	.072	2.3
1,310	B6	TMX1317*125P0B6	30.4	192	768	.063	2.0
1,480	B7	TMX1487*125P0B7	34.2	216	864	.056	1.8

\* Insert Proper Letter Code For Tolerance: K = ±10%, M = ±20%

# Type TMX - All-Tantalum Module Wet Tantalum Capacitors



Wet Tantalum Capacitors

Cap. μF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω +25°C	Max Imp Ω
				+25°C	+85°C & +125°C		
<b>150 WVDC; 172 VDC Surge @ 85°C 100 WVDC; 115 VDC Surge @ 125°C</b>							
90	A1	TMX906*150P0A1	1.3	10	40	1.60	60.0
180	A2	TMX187*150P0A2	2.6	18	72	.80	30.0
220	A3	TMX227*150P0A3	3.6	20	80	.65	24.0
270	A4	TMX277*150P0A4	3.9	27	108	.53	20.0
330	B1	TMX337*150P0B1	5.4	30	120	.53	8.0
360	A5	TMX367*150P0A5	5.2	36	144	.40	15.0
440	B2	TMX447*150P0B2	7.2	40	160	.40	6.0
550	B3	TMX557*150P0B3	9.0	50	200	.32	4.8
660	B4	TMX667*150P0B4	10.8	60	240	.27	4.0
770	B5	TMX777*150P0B5	12.6	70	280	.23	3.4
880	B6	TMX887*150P0B6	14.4	80	320	.20	3.0
990	B7	TMX997*150P0B7	16.2	90	360	.18	2.7

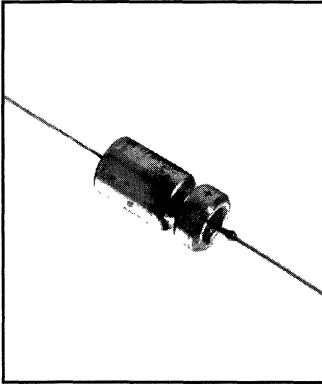
Cap. μF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω +25°C	Max Imp Ω
				+25°C	+85°C & +125°C		
<b>250 WVDC; 288 VDC Surge @ 85°C 165 WVDC; 190 VDC Surge @ 125°C</b>							
25	A1	TMX256*250P0A1	1.5	10	40	2.50	100
47	A2	TMX476*250P0A2	3.0	20	80	1.25	50.0
70	A3	TMX706*250P0A3	4.5	30	120	.85	32.0
80	A4	TMX806*250P0A4	3.8	24	96	1.00	32.0
90	A5	TMX906*250P0A5	6.0	40	160	.65	25.0
120	B1	TMX127*250P0B1	5.7	36	144	.67	21.0
160	B2	TMX167*250P0B2	7.6	48	192	.50	16.0
200	B3	TMX207*250P0B3	9.5	60	240	.40	12.8
240	B4	TMX247*250P0B4	11.4	72	288	.33	10.7
280	B5	TMX287*250P0B5	13.3	84	336	.29	9.1
320	B6	TMX327*250P0B6	15.2	96	384	.25	8.0
360	B7	TMX367*250P0B7	17.1	108	432	.22	7.1

Cap. μF	Case Code	Catalog Number	Max 85°C 40 kHz Ripple (Amps rms)	DC Leakage (max)		Max ESR Ω +25°C	Max Imp Ω
				+25°C	+85°C & +125°C		
<b>200 WVDC; 230 VDC Surge @ 85°C 130 WVDC; 149 VDC Surge @ 125°C</b>							
35	A1	TMX356*200P0A1	1.6	10	40	2.50	40.0
70	A2	TMX706*200P0A2	3.2	20	80	1.25	20.0
100	A3	TMX107*200P0A3	4.8	30	120	.85	15.0
120	A4	TMX127*200P0A4	4.0	24	96	.90	15.0
140	A5	TMX147*200P0A5	6.4	40	160	.65	10.0
180	B1	TMX187*200P0B1	6.0	36	144	.60	10.0
240	B2	TMX247*200P0B2	8.0	48	192	.45	7.5
300	B3	TMX307*200P0B3	10.0	60	240	.36	6.0
360	B4	TMX367*200P0B4	12.0	72	288	.30	5.0
420	B5	TMX427*200P0B5	14.0	84	336	.25	4.3
480	B6	TMX487*200P0B6	16.0	96	384	.23	3.75
540	B7	TMX547*200P0B7	18.0	108	432	.20	3.3

\* Insert Proper Letter Code For Tolerance: K = ±10%, M = ±20%



# CL65 (MIL-C-3965/4C) Wet Tantalum Capacitors



- High Capacitance Per Case Size
- Extremely Low DCL
- Long Operating Life
- Rugged Mechanical Construction
- Wide Operating Temperature Range

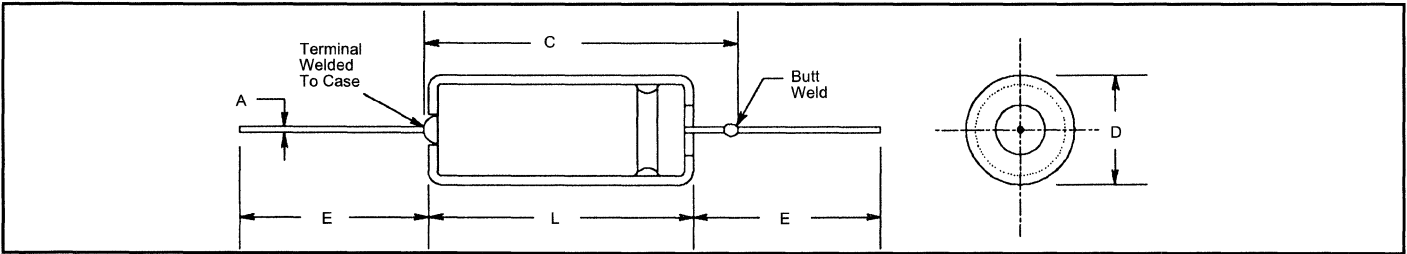
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC @ 85°C  
4 to 85 VDC @ 125°C

Capacitance:  
1.7  $\mu$ F to 330  $\mu$ F

Tolerance Range:  
 $\pm$ 10%,  $\pm$ 20%  
( $\pm$ 5% on special order)



INCHES (DIMENSIONS) MILLIMETERS

Case Code	D Max	L Max	C Max	A Lead Dia.		E Lead Lgth $\pm$ .250	Approximate Weight (Grams)	Case Code	D Max	L Max	C Max	A Lead Dia.		E Lead Lgth. $\pm$ 6.35
				Nom	AWG							Nom	AWG	
T1	.219	.608	.734	.025	#22	1.500	1.4	T1	5.56	15.45	18.64	.64	#22	38.10
T2	.312	.796	.922	.025	#22	2.250	3.0	T2	7.92	20.22	23.41	.64	#22	57.15
T3	.406	.921	1.047	.025	#22	2.250	5.6	T3	10.31	23.40	26.59	.64	#22	57.15

Cap $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max DF +25°C	Max Z $\Omega$ -55°C	Max % Cap Change From 25°C		
			25°C	85°C/ 125°C			-55°C	+85°C	+125°C

6 WVDC; 6.9 VDC Surge @ 85°C 4 WVDC; 4.7 VDC Surge @ 125°C									
30	T1	CL65BB300*PE	1	2	9.1	100	-40	+10.5	+12
68	T1	CL65BB680*PE	1	2	20.4	60	-40	+14	+16
140	T2	CL65BB141*PE	1	3	21.3	40	-40	+14	+16
270	T2	CL65BB271*PE	1	6.5	81.8	25	-44	+17.5	+20
330	T3	CL65BB331*PE	2	7.9	49.6	20	-44	+14	+16
560	T3	CL65BB561*PE	2	13	128	25	-64	+17.5	+20

8 WVDC; 9.2 VDC Surge @ 85°C 5 WVDC; 5.7 VDC Surge @ 125°C									
25	T1	CL65BC250*PE	1	2	7.6	100	-40	+10.5	+12
56	T1	CL65BC560*PE	1	2	17	59	-40	+14	+16
220	T2	CL65BC221*PE	1	7	66.4	30	-44	+17.5	+20
430	T3	CL65BC431*PE	2	14	91.5	25	-64	+17.5	+20

10 WVDC; 11.5 VDC Surge @ 85°C 7 WVDC; 8 VDC Surge @ 125°C									
20	T1	CL65BD200*PE	1	2	6.1	175	-32	+10.5	+12
47	T1	CL65BD470*PE	1	2	18.1	100	-36	+14	+16
100	T2	CL65BD101*PE	1	4	15.2	60	-36	+14	+16
180	T2	CL65BD181*PE	1	7	54.4	40	-36	+14	+16
250	T3	CL65BD251*PE	2	10	37.8	30	-40	+14	+16
390	T3	CL65BD391*PE	2	16	87.6	25	-64	+17.5	+20

15 WVDC; 17.2 VDC Surge @ 85°C 10 WVDC; 11.5 VDC Surge @ 125°C									
15	T1	CL65BE150*PE	1	2	5.7	155	-24	+10.5	+12
33	T1	CL65BE330*PE	1	2	12.5	90	-28	+14	+16
70	T2	CL65BE700*PE	1	4	13.1	75	-28	+14	+16

Cap $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max DF +25°C	Max Z $\Omega$ -55°C	Max % Cap Change From 25°C		
			25°C	85°C/ 125°C			-55°C	+85°C	+125°C

15 WVDC; 17.2 VDC Surge @ 85°C 10 WVDC; 11.5 VDC Surge @ 125°C									
120	T2	CL65BE121*PE	1	7	36.8	50	-28	+17.5	+20
170	T3	CL65BE171*PE	2	10	25.4	35	-32	+14	+16
270	T3	CL65BE271*PE	2	16	60.9	30	-56	+17.5	+20

25 WVDC; 28.8 VDC Surge @ 85°C 15 WVDC; 17.2 VDC Surge @ 125°C									
10	T1	CL65BG100*PE	1	2	4.6	220	-16	+8	+9
22	T1	CL65BG220*PE	1	2	8.3	140	-20	+10.5	+12
100	T2	CL65BG101*PE	1	10	31.5	50	-28	+13	+15
180	T3	CL65BG181*PE	2	18	54.3	32	-48	+13	+15

30 WVDC; 34.5 VDC Surge @ 85°C 20 WVDC; 23 VDC Surge @ 125°C									
8	T1	CL65BH080*PE	1	2	4.5	275	-16	+8	+12
15	T1	CL65BH150*PE	1	2	9.1	175	-20	+10.5	+12
40	T2	CL65BH400*PE	1	5	12.2	65	-24	+10.5	+12
68	T2	CL65BH680*PE	1	8	31	60	-24	+13	+15
100	T3	CL65BH101*PE	2	12	19	40	-28	+10.5	+12
150	T3	CL65BH151*PE	2	18	46	35	-48	+13	+15

50 WVDC; 57.5 VDC Surge @ 85°C 30 WVDC; 34.5 VDC Surge @ 125°C									
5	T1	CL65BJ050*PE	1	2	3.4	400	-16	+5	+6
10	T1	CL65BJ100*PE	1	2	6	250	-24	+8	+9
25	T2	CL65BJ250*PE	1	5	11.2	95	-20	+10.5	+12
47	T2	CL65BJ470*PE	1	9	21.4	70	-28	+13	+15
60	T3	CL65BJ600*PE	2	12	13.6	45	-16	+10.5	+12
82	T3	CL65BJ820*PE	2	16	24.9	45	-32	+13	+15

\* Insert Proper Letter Code For Tolerance: J =  $\pm$ 5%, K =  $\pm$ 10%, M =  $\pm$ 20%

# CL65 (MIL-C-3965/4C) Wet Tantalum Capacitors



Wet Tantalum Capacitors

Cap $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max DF	Max Z ( $\Omega$ )	Max % Cap Change From 25°C		
			25°C	85°C/125°C			+25°C	-55°C	+85°C

60 WVDC; 69 VDC Surge @ 85°C 40 WVDC; 46 VDC Surge @ 125°C									
4	T1	CL65BK040*PE	1	2	3	550	-16	+5	+6
8.2	T1	CL65BK8R2*PE	1	2	5	275	-24	+8	+9
20	T2	CL65BK200*PE	1	5	7.6	105	-16	+10.5	+12
39	T2	CL65BK390*PE	1	9	20.7	90	-24	+10.5	+12
50	T3	CL65BK500*PE	2	12	15.3	50	-16	+10.5	+12
68	T3	CL65BK680*PE	2	16	30.7	50	-32	+10.5	+12

75 WVDC; 86.2 VDC Surge @ 85°C 50 WVDC; 57.5 VDC Surge @ 125°C									
3.5	T1	CL65BL3R5*PE	1	2	2.5	650	-16	+5	+6
6.8	T1	CL65BL6R8*PE	1	2	4.1	300	-20	+8	+9
15	T2	CL65BL150*PE	1	5	7.5	150	-16	+8	+9
33	T2	CL65BL330*PE	1	10	17.5	90	-24	+10.5	+15
40	T3	CL65BL400*PE	2	12	15.2	60	-16	+10.5	+12
56	T3	CL65BL560*PE	2	17	26	60	-28	+10.5	+15

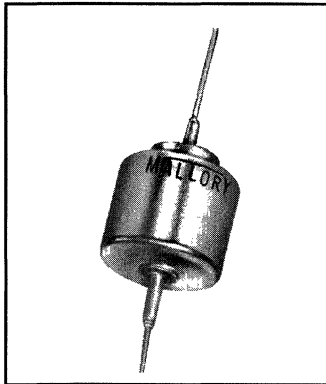
\* Insert Proper Letter Code For Tolerance: J =  $\pm$ 5%, K =  $\pm$ 10%, M =  $\pm$ 20%

Cap $\mu$ F	Case Code	Catalog Number	Max. DCL $\mu$ A		Max DF	Max Z ( $\Omega$ )	Max % Cap Change From 25°C		
			25°C	85°C/125°C			+25°C	-55°C	+85°C

100 WVDC; 115 VDC Surge @ 85°C 65 WVDC; 74.8 VDC Surge @ 125°C									
2.5	T1	CL65BN2R5*PE	1	2	5	950	-16	+7	+8
4.7	T1	CL65BN4R7*PE	1	2	3.6	500	-16	+7	+8
11	T2	CL65BN110*PE	1	4	5	200	-16	+7	+8
22	T2	CL65BN220*PE	1	9	11.8	100	-16	+7	+8
30	T3	CL65BN300*PE	2	12	9.1	80	-16	+7	+8
43	T3	CL65BN430*PE	2	17	10.7	70	-20	+7	+8

125 WVDC; 144 VDC Surge @ 85°C 85 WVDC; 97.8 VDC Surge @ 125°C									
1.7	T1	CL65BP1R7*PE	1	2	7	1250	-16	+7	+8
3.6	T1	CL65BP3R6*PE	1	2	4.1	600	-16	+7	+8
9	T2	CL65BP090*PE	1	5	10.2	240	-16	+7	+8
14	T2	CL65BP140*PE	1	7	12.7	167	-16	+7	+8
25	T3	CL65BP250*PE	2	13	19	93	-16	+7	+8

# CLR10 (MIL-C-39006/18) Wet Tantalum Capacitors



- High Temperature
- High Voltage
- High Capacitance
- Withstands High Frequency Vibration to 2000 Hz
- Hermetically Sealed
- Long Shelf Life
- Failure Rate Levels L, M and P

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
8 to 360 VDC @ 85°C

Reverse Voltage:  
None

Capacitance Range:  
2 μF to 140 μF

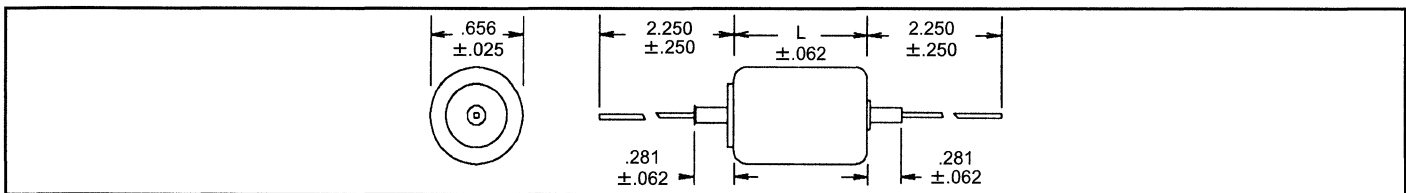
Tolerance Range:  
-15 +50%

$$ESR = \frac{10,000 \times DF}{6.28 \times f \times \mu F}$$

DF = Dissipation Factor %  
f = Frequency in Hz

Case Sizes:  
Diameter Length  
.656 .438 to 1.781

Wet Tantalum Capacitors



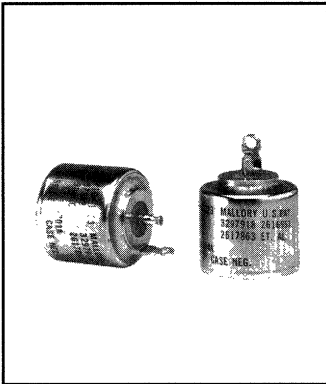
Capacitance (μF)	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/18 Failure Rate Level (% / 1,000 Hrs )			Max. DF (%)	Max. Z 85°C (Ohms)	Maximum DC Leakage (mA)			Maximum % Capacitance Change from Room Temperature -55°C	Dimension L ±.062
	+85°C	+125°C		L (2.0)	M (1.0)	P (0.1)			+25°C	+85°C	+125°C		
	70 140	8 8		7 7	9.2 9.2	1000 1001			1018 1019	1036 1037	47 47		
50 100	10 10	9 9	11.5 11.5	1002 1003	1020 1021	1038 1039	35 35	75 40	5 9	25 45	37 67	-60 -60	.438 .562
28 56	20 20	18 18	23 23	1004 1005	1022 1023	1040 1041	21 21	85 45	6 10	30 50	45 75	-60 -60	.438 .562
20 40	30 30	26 26	34.5 34.5	1006 1007	1024 1025	1042 1043	15 15	125 75	7 12	35 60	52 90	-40 -40	.438 .562
12 25	60 60	52 52	69 69	1008 1009	1026 1027	1044 1045	9.1 9.6	180 90	7 12	35 60	52 90	-30 -30	.438 .562
8 16	90 90	78 78	103 103	1010 1011	1028 1029	1046 1047	6.1 6.1	250 125	7 12	35 60	52 90	-30 -30	.438 .562
4 8	180 180	155 155	207 207	1012 1013	1030 1031	1048 1049	6.1 6.1	500 250	7 12	35 60	52 90	-30 -30	.719 .938
2.5 5	270 270	235 235	310 310	1014 1015	1032 1033	1050 1051	5.7 5.7	750 375	7 11	35 55	52 82	-30 -30	1.031 1.375
2 4	360 360	310 310	414 414	1016 1017	1034 1035	1052 1053	6.1 6.1	1000 500	7 12	35 60	52 90	-30 -30	1.312 1.781

**TO ORDER:** Indicate the prefix CLR10 followed by the applicable MIL dash number  
Example: For M39006/18-1036 order CLR101036

# CLR14 (MIL-C-39006/19) Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- High Temperature
- High Voltage
- High Capacitance
- Withstands High Frequency Vibration to 2000 Hz
- Hermetically Sealed
- Long Shelf Life
- Failure Rate Levels L, M and P

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
20 to 630 VDC @ 85°C

Reverse Voltage:  
None

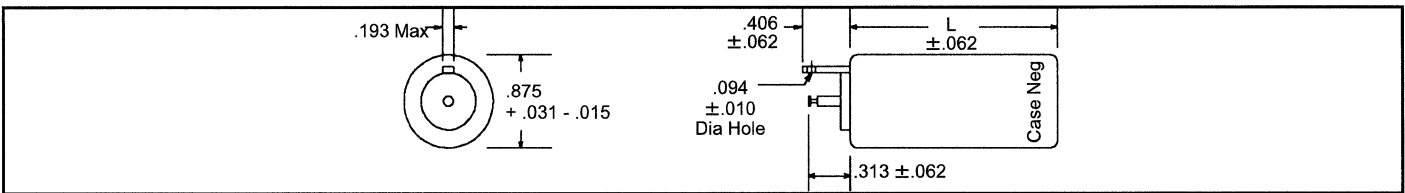
Capacitance Range:  
3.5 μF to 200 μF

Tolerance Range:  
-15 +75%

$$ESR = \frac{10,000 \times DF}{6.28 \times f \times \mu F}$$

DF = Dissipation Factor %  
f = Frequency in Hz

Case Sizes:  
Diameter Length  
.875 .540 to 4.062



Capacitance (μF)	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/19 Failure Rate Level (% / 1,000 Hrs)			Max. DF (%)	Max. Z 85°C (Ohms)	Maximum DC Leakage (mA)			Maximum % Capacitance Change from Room Temperature -55°C	Dimension L ± .062
	+85°C	+125°C		L (2.0)	M (1.0)	P (0.1)			+25°C	+85°C	+125°C		
100	20	18	23	1000	1020	1040	21	30	10	50	75	-60	.540
200	20	18	23	1001	1021	1041	36	20	16	80	128	-60	.732
75	30	26	34.5	1002	1022	1042	15	45	11	55	82	-45	.540
150	30	26	34.5	1003	1023	1043	29	30	13	90	135	-45	.732
40	60	52	69	1004	1024	1044	8.2	65	12	60	90	-35	.540
80	60	52	69	1005	1025	1045	16	35	19	95	142	-35	.732
25	90	78	103	1006	1026	1046	5.1	90	11	55	82	-35	.540
50	90	78	103	1007	1027	1047	10	45	18	90	135	-35	.732
12	180	155	207	1008	1028	1048	5.1	180	11	55	82	-35	.920
25	180	155	207	1009	1029	1049	10	90	18	90	135	-35	1.300
8	270	235	310	1010	1030	1050	5.1	270	11	55	82	-35	1.270
16	270	235	310	1011	1031	1051	10	135	18	90	135	-35	1.865
6	360	310	414	1012	1032	1052	5	360	11	55	82	-35	1.635
12	360	310	414	1013	1033	1053	10	180	18	90	135	-35	2.420
5.0	450	390	518	1014	1034	1054	4.9	450	11	55	82	-35	2.000
10	450	390	518	1015	1035	1055	9.8	225	18	90	135	-35	2.980
4.0	540	470	621	1016	1036	1056	5.1	540	11	55	82	-35	2.365
8.0	540	470	621	1017	1037	1057	10	270	18	90	135	-35	3.532
3.5	630	545	624	1018	1038	1058	5	630	11	55	82	-35	2.720
7.0	630	545	724	1019	1039	1059	10	315	18	90	135	-35	4.062

**TO ORDER:** Indicate the prefix CLR14 followed by the applicable MIL dash number  
Example: For M39006/19-1030 order CLR141030

# CLR17 (MIL-C-39006/20) Wet Tantalum Capacitors



- High Temperature
- High Voltage
- High Capacitance
- Withstands High Frequency Vibration to 2000 Hz
- Hermetically Sealed
- Long Shelf Life
- Failure Rate Levels L, M and P

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
30 to 630 VDC @ 85°C

Reverse Voltage:  
None

Capacitance Range:  
12  $\mu$ F to 1300  $\mu$ F

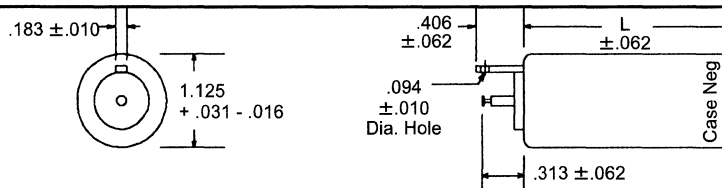
Tolerance Ranges:  
 $\pm$ 20%  
-15 +50%

$$ESR = \frac{10,000 \times DF}{6.28 \times f \times \mu F}$$

DF = Dissipation Factor %  
f = Frequency in Hz

Case Sizes:  
Diameter Length  
1.125 .600 to 2.810

Wet Tantalum Capacitors



Capacitance ( $\mu$ F)	Cap Tol	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/20 Failure Rate Level (% / 1,000 Hrs)			Max. DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)			Maximum % Capacitance Change from Room Temperature -55°C	Dimension L $\pm$ .062
		+85°C	+125°C		L (2.0)	M (1.0)	P (0.1)			+25°C	+85°C	+125°C		
370	$\pm$ 20	30	26	34.5	1000	1050	1100	39	15	18	125	170	-65	.600
370	-10+50	30	26	34.5	1001	1051	1101	39	15	18	125	170	-65	.600
650	$\pm$ 20	30	26	34.5	1002	1052	1102	60	15	21	145	202	-85	1.100
650	-10+50	30	26	34.5	1003	1053	1103	60	15	21	145	202	-85	1.100
1300	$\pm$ 20	30	26	34.5	1004	1054	1104	83	10	27	190	282	-85	1.100
1300	-10+50	30	26	34.5	1005	1055	1105	83	10	27	190	282	-85	1.100
200	$\pm$ 20	60	52	69	1006	1056	1106	22	30	19	135	182	-50	.600
200	-10+50	60	52	69	1007	1057	1107	22	30	19	135	182	-50	.600
350	$\pm$ 20	60	52	69	1008	1058	1108	37	25	22	155	210	-70	1.100
350	-10+50	60	52	69	1009	1059	1109	37	25	22	155	210	-70	1.100
700	$\pm$ 20	60	52	69	1010	1060	1110	62	15	29	200	275	-70	1.100
700	-10+50	60	52	69	1011	1061	1111	62	15	29	200	275	-70	1.100
120	$\pm$ 20	90	78	103	1012	1062	1112	13	40	19	135	182	-40	.600
120	-10+50	90	78	103	1013	1063	1113	13	40	19	135	182	-40	.600
220	$\pm$ 20	90	78	103	1014	1064	1114	24	30	21	145	202	-60	1.100
220	-10+50	90	78	103	1015	1065	1115	24	30	21	145	202	-60	1.100
450	$\pm$ 20	90	78	103	1016	1066	1116	45	25	29	195	215	-60	1.100
450	-10+50	90	78	103	1017	1067	1117	45	25	29	195	215	-60	1.100
42	$\pm$ 20	180	155	207	1018	1068	1118	16	75	17	120	162	-40	.976
42	-10+50	180	155	207	1019	1069	1119	16	75	17	120	162	-40	.976
60	$\pm$ 20	180	155	207	1020	1070	1120	13	60	19	135	182	-40	.976
60	-10+50	180	155	207	1021	1071	1121	13	60	19	135	182	-40	.976
110	$\pm$ 20	180	155	207	1022	1072	1122	24	60	21	145	202	-60	1.938
110	-10+50	180	155	207	1023	1073	1123	24	60	21	145	202	-60	1.938
230	$\pm$ 20	180	155	207	1024	1074	1124	46	50	29	200	275	-60	1.938
230	-10+50	180	155	207	1025	1075	1125	46	50	29	200	275	-60	1.938
28	$\pm$ 20	270	235	310	1026	1076	1126	16	80	19	120	182	-40	1.350
28	-10+50	270	235	310	1027	1077	1127	16	80	19	120	182	-40	1.350
40	$\pm$ 20	270	235	310	1028	1078	1128	22	100	19	135	182	-40	1.350
40	-10+50	270	235	310	1029	1079	1129	22	100	19	135	182	-40	1.350
75	$\pm$ 20	270	235	310	1030	1080	1130	24	90	21	145	202	-60	2.812
75	-10+50	270	235	310	1031	1081	1131	24	90	21	145	202	-60	2.812
150	$\pm$ 20	270	235	310	1032	1082	1132	45	75	28	195	215	-60	2.812
150	-10+50	270	235	310	1033	1083	1133	45	75	28	195	215	-60	2.812
22	$\pm$ 20	360	310	414	1034	1084	1134	16	100	18	125	170	-40	1.705
22	-10+50	360	310	414	1035	1085	1135	16	100	18	125	170	-40	1.705
30	$\pm$ 20	360	310	414	1036	1086	1136	22	120	19	135	182	-40	1.705
30	-10+50	360	310	414	1037	1087	1137	22	120	19	135	182	-40	1.705

**TO ORDER:** Indicate the prefix CLR17 followed by the applicable MIL dash number  
Example: For M39006/20-1076 order CLR171076

# CLR17 (MIL-C-39006/20) Wet Tantalum Capacitors

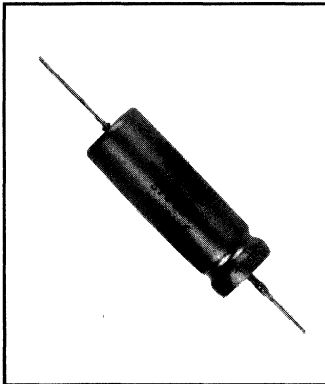


Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Cap Tol	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/20 Failure Rate Level (% / 1,000 Hrs)			Max. DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)			Maximum % Capacitance Change from Room Temperature	Dimension L $\pm$ .062
		+85°C	+125°C		L (2.0)	M (1.0)	P (0.1)			+25°C	+85°C	+125°C		
17	$\pm$ 20	450	390	518	1038	1088	1138	16	130	18	125	170	-40	2.080
17	-10+50	450	390	518	1039	1089	1139	16	130	18	125	170	-40	2.080
25	$\pm$ 20	450	390	518	1040	1090	1140	23	150	19	135	182	-40	2.080
25	-10+50	450	390	518	1041	1091	1141	23	150	19	135	182	-40	2.080
14	$\pm$ 20	540	470	621	1042	1092	1142	16	160	17	120	162	-40	2.435
14	-10+50	540	470	621	1043	1093	1143	16	160	17	120	162	-40	2.435
20	$\pm$ 20	540	470	621	1044	1094	1144	22	170	19	135	182	-40	2.435
20	-10+50	540	470	621	1045	1095	1145	22	170	19	135	182	-40	2.435
12	$\pm$ 20	630	545	724	1046	1096	1146	16	180	17	120	162	-40	2.810
12	-10+50	630	545	724	1047	1097	1147	16	180	17	120	162	-40	2.810
18	$\pm$ 20	630	545	724	1048	1098	1148	23	200	19	135	182	-40	2.810
18	-10+50	630	545	724	1049	1099	1149	23	200	19	135	182	-40	2.810

**TO ORDER:** Indicate the prefix CLR17 followed by the applicable MIL dash number  
Example: For M39006/20-1076 order CLR171076

# CLR65 (MIL-C-39006/09) Wet Tantalum Capacitors



- Silver Case Technology
- Hermetically Sealed
- Rugged Construction
- High Shock and Vibration Capability
- High Capacitance per Case Size
- Low DCL and ESR
- Long Shelf Life
- Failure Rate Levels M, P and R

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC

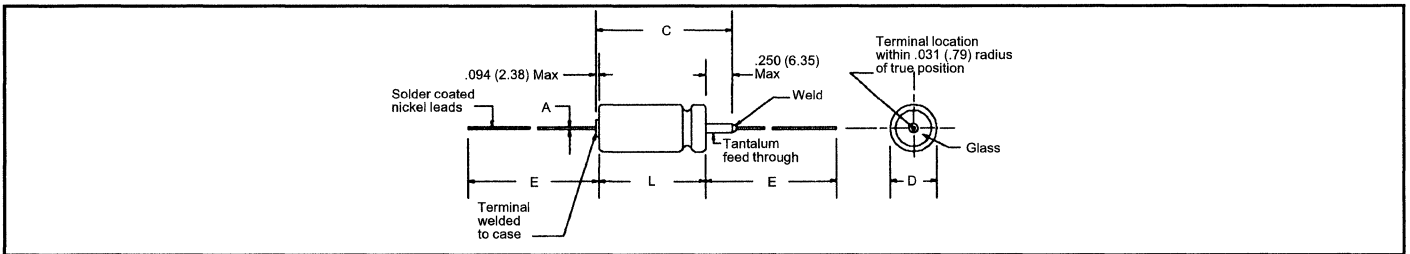
Capacitance Range:  
1.7  $\mu$ F to 1200  $\mu$ F

Tolerance Range:  
 $\pm 10\%$ ,  $\pm 20\%$

Case Sizes: (Four)  
.188 x .453 to .375 x 1.062

Maximum rms Ripple Current @ 85°C	
Case Code	mA
A	50
B	250
C	500
F	750

Wet Tantalum Capacitors



**INCHES (DIMENSIONS) MILLIMETERS**

Case Code	Uninsulated		Insulated		C	A Lead Dia. Nom AWG	E Lead Lgth $\pm .250$	Approximate Weight (Grams)	Case Code	Uninsulated		Insulated		C	A Lead Dia. Nom AWG	E Lead Lgth. $\pm 6.35$
	D $\pm .016$	L $+ .031, - .016$	D Max	L Max						D Max	L Max	D Max	L Max			
T1	.188	.453	.219	.608	.734	.025 #22	1.500	1.2	T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
T2	.281	.641	.312	.796	.922	.025 #22	2.250	3.1	T2	7.41	16.28	7.92	20.22	23.41	.64 #22	57.15
T3	.375	.766	.406	.921	1.047	.025 #22	2.250	5.8	T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	9.0	T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/09 Failure Rate Level (% / 1,000 Hrs.)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C	-55°C	+85°C	+125°C	

30	20	6	4	6.9	8206	8411	8616	9.1	100	1	2	-40	+10.5	+12	T1
30	10	6	4	6.9	8207	8412	8617	9.1	100	1	2	-40	+10.5	+12	T1
68	20	6	4	6.9	8209	8414	8619	20.4	60	1	2	-40	+14	+16	T1
68	10	6	4	6.9	8210	8415	8620	20.4	60	1	2	-40	+14	+16	T1
140	20	6	4	6.9	8212	8417	8623	21.3	40	1	3	-40	+14	+16	T2
140	10	6	4	6.9	8213	8418	8624	21.3	40	1	3	-40	+14	+16	T2
270	20	6	4	6.9	8215	8420	8625	81.8	25	1	6.5	-40	+17.5	+20	T2
270	10	6	4	6.9	8216	8421	8626	81.8	25	1	6.5	-44	+17.5	+20	T2
330	20	6	4	6.9	8218	8423	8628	49.6	20	2	7.9	-44	+14	+16	T3
330	10	6	4	6.9	8219	8424	8629	49.6	20	2	7.9	-44	+14	+16	T3
560	20	6	4	6.9	8221	8426	8631	128	25	2	13	-64	+17.5	+20	T3
560	10	6	4	6.9	8222	8427	8632	128	25	2	13	-64	+17.5	+20	T3
1200	20	6	4	6.9	8224	8429	8634	144.4	20	3	14	-80	+25	+25	T4
1200	10	6	4	6.9	8225	8430	8635	144.4	20	3	14	-80	+25	+25	T4
25	20	8	5	9.2	8226	8431	8636	7.6	100	1	2	-40	+10.5	+12	T1
25	10	8	5	9.2	8227	8432	8637	7.6	100	1	2	-40	+10.5	+12	T1
56	20	8	5	9.2	8229	8434	8639	17	59	1	2	-40	+14	+16	T1
56	10	8	5	9.2	8230	8435	8640	17	59	1	2	-40	+14	+16	T1
220	20	8	5	9.2	8232	8437	8642	66.4	30	1	7	-44	+17.5	+20	T2
220	10	8	5	9.2	8233	8438	8643	66.4	30	1	7	-44	+17.5	+20	T2
430	20	8	5	9.2	8235	8440	8645	91.5	25	2	14	-64	+17.5	+20	T3
430	10	8	5	9.2	8236	8441	8646	91.5	25	2	14	-64	+17.5	+20	T3
850	20	8	5	9.2	8238	8443	8648	65.8	22	4	16	-80	+25	+25	T4
850	10	8	5	9.2	8239	8444	8649	65.8	22	4	16	-80	+25	+25	T4

**TO ORDER:** Indicate the prefix CLR65 followed by the applicable MIL dash number  
Example: For M39006/09-8210 order CLR658210

# CLR65 (MIL-C-39006/09) Wet Tantalum Capacitors



Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/09 Failure Rate Level (% / 1,000 Hrs.)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C	-55°C	+85°C	+125°C	
		20	20		10	7	11.5			8240	8445	8650	6.1	175	
20	10	10	7	11.5	8241	8446	8651	6.1	175	1	2	-32	+10.5	+12	T1
47	20	10	7	11.5	8243	8448	8653	18.1	100	1	2	-36	+14	+16	T1
47	10	10	7	11.5	8244	8449	8654	18.1	100	1	2	-36	+14	+16	T1
100	20	10	7	11.5	8246	8451	8656	15.2	60	1	4	-36	+14	+16	T2
100	10	10	7	11.5	8247	8452	8657	15.2	60	1	4	-36	+14	+16	T2
180	20	10	7	11.5	8249	8454	8659	54.4	40	1	7	-36	+14	+16	T2
180	10	10	7	11.5	8250	8455	8660	54.4	40	1	7	-36	+14	+16	T2
250	20	10	7	11.5	8252	8457	8662	37.8	30	2	10	-40	+14	+16	T3
250	10	10	7	11.5	8253	8458	8663	37.8	30	2	10	-40	+14	+16	T3
390	20	10	7	11.5	8255	8460	8665	87.6	25	2	16	-64	+20	+20	T3
390	10	10	7	11.5	8256	8461	8666	87.6	25	2	16	-64	+20	+20	T3
750	20	10	7	11.5	8258	8463	8668	56.5	23	4	16	-80	+25	+25	T4
750	10	10	7	11.5	8259	8464	8669	56.5	23	4	16	-80	+25	+25	T4
15	20	15	10	17.2	8260	8465	8670	5.7	155	1	2	-24	+10.5	+12	T1
15	10	15	10	17.2	8261	8566	8671	5.7	155	1	2	-24	+10.5	+12	T1
33	20	15	10	17.2	8263	8468	8673	12.5	90	1	2	-28	+14	+16	T1
33	10	15	10	17.2	8264	8569	8674	12.5	90	1	2	-28	+14	+16	T1
70	20	15	10	17.2	8266	8471	8676	13.1	75	1	4	-28	+14	+16	T2
70	10	15	10	17.2	8267	8472	8677	13.1	75	1	4	-28	+14	+16	T2
120	20	15	10	17.2	8269	8474	8679	36.8	50	1	7	-28	+17.5	+20	T2
120	10	15	10	17.2	8270	8475	8680	36.8	50	1	7	-28	+17.5	+20	T2
170	20	15	10	17.2	8272	8477	8682	25.4	35	2	10	-32	+14	+16	T3
170	10	15	10	17.2	8273	8478	8683	25.4	35	2	10	-32	+14	+16	T3
270	20	15	10	17.2	8275	8480	8685	60.9	30	2	16	-56	+17.5	+20	T3
270	10	15	10	17.2	8276	8481	8686	60.9	30	2	16	-56	+17.5	+20	T3
540	20	15	10	17.2	8278	8483	8688	49	23	6	24	-80	+25	+25	T4
540	10	15	10	17.2	8279	8484	8689	49	23	6	24	-80	+25	+25	T4
10	20	25	15	28.8	8280	8485	8690	4.6	220	1	2	-16	+8	+9	T1
10	10	25	15	28.8	8281	8486	8691	4.6	220	1	2	-16	+8	+9	T1
22	20	25	15	28.8	8283	8488	8693	8.3	140	1	2	-20	+10.5	+15	T1
22	10	25	15	28.8	8284	8489	8694	8.3	140	1	2	-20	+10.5	+15	T1
100	20	25	15	28.8	8286	8491	8696	31.4	50	1	10	-28	+13	+15	T2
100	10	25	15	28.8	8287	8492	8697	31.4	50	1	10	-28	+13	+15	T2
180	20	25	15	28.8	8289	8494	8699	54.3	32	2	18	-48	+13	+15	T3
180	10	25	15	28.8	8290	8495	8700	54.3	32	2	18	-48	+13	+15	T3
350	20	25	15	28.8	8292	8497	8702	35	24	7	28	-70	+25	+25	T4
350	10	25	15	28.8	8293	8498	8703	35	24	7	28	-70	+25	+25	T4
8	20	30	20	34.5	8294	8499	8704	4.5	275	1	2	-16	+8	+12	T1
8	10	30	20	34.5	8295	8500	8705	4.5	275	1	2	-16	+8	+12	T1
15	20	30	20	34.5	8297	8502	8707	9.1	175	1	2	-20	+10.5	+12	T1
15	10	30	20	34.5	8298	8503	8708	9.1	175	1	2	-20	+10.5	+12	T1
40	20	30	20	34.5	8300	8505	8710	12.2	65	1	5	-24	+10.5	+12	T2
40	10	30	20	34.5	8301	8506	8711	12.2	65	1	5	-24	+10.5	+12	T2
68	20	30	20	34.5	8303	8508	8713	31	60	1	8	-24	+13	+15	T2
68	10	30	20	34.5	8304	8509	8714	31	60	1	8	-24	+13	+15	T2
100	20	30	20	34.5	8306	8511	8716	19	40	2	12	-28	+10.5	+12	T3
100	10	30	20	34.5	8307	8512	8717	19	40	2	12	-28	+10.5	+12	T3
150	20	30	20	34.5	8309	8514	8719	46	35	2	18	-48	+13	+15	T3
150	10	30	20	34.5	8310	8515	8720	46	35	2	18	-48	+13	+15	T3
300	20	30	20	34.5	8312	8517	8722	35	25	8	32	-60	+25	+25	T4
300	10	30	20	34.5	8313	8518	8723	35	25	8	32	-60	+25	+25	T4
5	20	50	30	57.5	8314	8519	8724	3.4	400	1	2	-16	+5	+6	T1
5	10	50	30	57.5	8315	8520	8725	3.4	400	1	2	-16	+5	+6	T1
10	20	50	30	57.5	8317	8522	8727	6	250	1	2	-24	+8	+9	T1
10	10	50	30	57.5	8318	8523	8728	6	250	1	2	-24	+8	+9	T1
25	20	50	30	57.5	8320	8525	8730	11.2	95	1	5	-20	+10.5	+12	T2
25	10	50	30	57.5	8321	8526	8731	11.2	95	1	5	-20	+10.5	+12	T2
47	20	50	30	57.5	8323	8528	8733	21.4	70	1	9	-28	+13	+15	T2
47	10	50	30	57.5	8324	8529	8734	21.4	70	1	9	-28	+13	+15	T2
60	20	50	30	57.5	8326	8531	8736	13.6	45	2	12	-16	+10.5	+12	T3
60	10	50	30	57.5	8327	8532	8737	13.6	45	2	12	-16	+10.5	+12	T3
82	20	50	30	57.5	8329	8534	8739	24.9	45	2	16	-32	+13	+15	T3
82	10	50	30	57.5	8330	8535	8740	24.9	45	2	16	-32	+13	+15	T3
160	20	50	30	57.5	8332	8537	8742	25.7	27	8	32	-50	+25	+25	T4
160	10	50	30	57.5	8333	8538	8743	25.7	27	8	32	-50	+25	+25	T4

**TO ORDER:** Indicate the prefix CLR65 followed by the applicable MIL dash number  
Example: For M39006/09-8210 order CLR658210



# CLR65 (MIL-C-39006/09) Wet Tantalum Capacitors



Wet Tantalum Capacitors

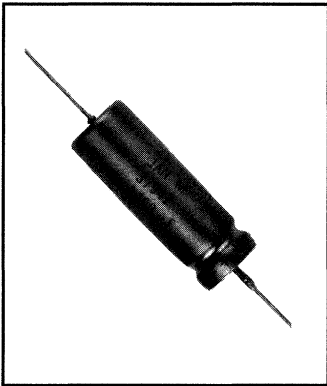
Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/09 Failure Rate Level (% / 1,000 Hrs.)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C	-55°C	+85°C	+125°C	
		4	20		60	40	69			8334	8539	8744	3	550	
4	10	60	40	69	8335	8540	8745	3	550	1	2	-16	+5	+6	T1
8.2	20	60	40	69	8337	8542	8747	5	275	1	2	-24	+8	+9	T1
8.2	10	60	40	69	8338	8543	8748	5	275	1	2	-24	+8	+9	T1
20	20	60	40	69	8340	8544	8750	7.6	105	1	5	-16	+10.5	+12	T2
20	10	60	40	69	8341	8546	8751	7.6	105	1	5	-16	+10.5	+12	T2
39	20	60	40	69	8343	8548	8753	20.7	90	1	9	-28	+10.5	+12	T2
39	10	60	40	69	8344	8549	8754	20.7	90	1	9	-28	+10.5	+12	T2
50	20	60	40	69	8346	8551	8756	15.3	50	2	12	-16	+10.5	+12	T3
50	10	60	40	69	8347	8552	8757	15.3	50	2	12	-16	+10.5	+12	T3
68	20	60	40	69	8349	8554	8759	30.7	50	2	16	-32	+10.5	+12	T3
68	10	60	40	69	8350	8555	8760	30.7	50	2	16	-32	+10.5	+12	T3
140	20	60	40	69	8352	8557	8762	25.7	28	8	32	-40	+20	+20	T4
140	10	60	40	69	8353	8558	8763	25.7	28	8	32	-40	+20	+20	T4
3.5	20	75	50	86.2	8354	8559	8764	2.5	650	1	2	-16	+5	+6	T1
3.5	10	75	50	86.2	8355	8560	8765	2.5	650	1	2	-16	+5	+6	T1
6.8	20	75	50	86.2	8357	8562	8767	4.1	300	1	2	-20	+8	+9	T1
6.8	10	75	50	86.2	8358	8563	8768	4.1	300	1	2	-20	+8	+9	T1
15	20	75	50	86.2	8360	8565	8770	7.5	150	1	5	-16	+8	+9	T2
15	10	75	50	86.2	8361	8566	8771	7.5	150	1	5	-16	+8	+9	T2
33	20	75	50	86.2	8363	8568	8773	17.5	90	1	10	-24	+10.5	+15	T2
33	10	75	50	86.2	8364	8569	8774	17.5	90	1	10	-24	+10.5	+15	T2
40	20	75	50	86.2	8366	8571	8776	15.2	60	2	12	-16	+10.5	+12	T3
40	10	75	50	86.2	8367	8572	8777	15.2	60	2	12	-16	+10.5	+12	T3
56	20	75	50	86.2	8369	8574	8779	26	60	2	17	-28	+10.5	+15	T3
56	10	75	50	86.2	8370	8575	8780	26	60	2	17	-28	+10.5	+15	T3
110	20	75	50	86.2	8372	8577	8782	25.7	29	9	36	-35	+20	+20	T4
110	10	75	50	86.2	8373	8578	8783	25.7	29	9	36	-35	+20	+20	T4
2.5	20	100	65	115	8374	8579	8784	5	950	1	2	-16	+7	+8	T1
2.5	10	100	65	115	8375	8580	8785	5	950	1	2	-16	+7	+8	T1
4.7	20	100	65	115	8377	8582	8787	3.6	500	1	2	-16	+7	+8	T1
4.7	10	100	65	115	8378	8583	8788	3.6	500	1	2	-16	+7	+8	T1
11	20	100	65	115	8380	8585	8790	5	200	1	4	-16	+7	+8	T2
11	10	100	65	115	8381	8586	8791	5	200	1	4	-16	+7	+8	T2
22	20	100	65	115	8383	8588	8793	11.8	100	1	9	-16	+7	+8	T2
22	10	100	65	115	8384	8589	8794	11.8	100	1	9	-16	+7	+8	T2
30	20	100	65	115	8386	8591	8796	9.1	80	2	12	-16	+7	+8	T3
30	10	100	65	115	8387	8592	8797	9.1	80	2	12	-16	+7	+8	T3
43	20	100	65	115	8389	8594	8799	19.7	70	2	17	-20	+7	+8	T3
43	10	100	65	115	8390	8595	8800	19.7	70	2	17	-20	+7	+8	T3
86	20	100	65	115	8392	8597	8802	20.7	30	9	36	-25	+15	+15	T4
86	10	100	65	115	8393	8598	8803	20.7	30	9	36	-25	+15	+15	T4
1.7	20	125	85	144	8394	8599	8804	7	1250	1	2	-16	+7	+8	T1
1.7	10	125	85	144	8395	8600	8805	7	1250	1	2	-16	+7	+8	T1
3.6	20	125	85	144	8397	8602	8807	4.1	600	1	2	-16	+7	+8	T1
3.6	10	125	85	144	8398	8603	8808	4.1	600	1	2	-16	+7	+8	T1
9	20	125	85	144	8400	8605	8810	10.2	240	1	5	-16	+7	+8	T2
9	10	125	85	144	8401	8606	8811	10.2	240	1	5	-16	+7	+8	T2
14	20	125	85	144	8403	8608	8813	12.7	167	1	7	-16	+7	+8	T2
14	10	125	85	144	8404	8609	8814	12.7	167	1	7	-16	+7	+8	T2
18	20	125	85	144	8406	8611	8816	15	129	2	9	-16	+7	+8	T3
18	10	125	85	144	8407	8612	8817	15	129	2	9	-16	+7	+8	T3
25	20	125	85	144	8409	8614	8819	19	93	2	13	-16	+7	+8	T3
25	10	125	85	144	8410	8615	8820	19	93	2	13	-16	+7	+8	T3
56	20	125	85	144	9030	9033	9036	17.5	32	10	40	-25	+15	+15	T4
56	10	125	85	144	9031	9034	9037	17.5	32	10	40	-25	+15	+15	T4

**TO ORDER:** Indicate the prefix CLR65 followed by the applicable MIL dash number  
Example: For M39006/09-8210 order CLR658210

# CLR69 (MIL-C-39006/21) Wet Tantalum Capacitors

**MALLORY**

Wet Tantalum Capacitors



- Silver Case Technology
- Hermetically Sealed
- Rugged Construction
- High Shock and Vibration Capability
- High Capacitance per Case Size
- Low DCL and ESR
- Long Shelf Life
- Failure Rate Levels M, P and R

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC

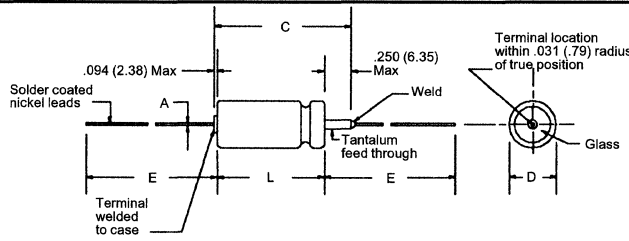
Capacitance Range:  
6.8 μF to 2200 μF

Tolerance Range:  
±20%, ±10%

Case Sizes: (Four)  
.188 x .453 to .375 x 1.062

### Maximum rms Ripple Current @ 85°C

Case Code	mA
A	50
B	250
C	500
F	750



**INCHES (DIMENSIONS) MILLIMETERS**

Case Code	Uninsulated		Insulated		C	A Lead Dia Nom AWG	E Lead Lgth ±.250	Approximate Weight (Grams)	Case Code	Uninsulated		Insulated		C	A Lead Dia. Nom AWG	E Lead Lgth. ±6.35
	D	L	D	L						D	L	D	L			
T1	.188	.453	.219	.608	.734	.025 #22	1.500	1.2	T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
T2	.281	.641	.312	.796	.922	.025 #22	2.250	3.1	T2	7.41	16.28	7.92	20.22	23.41	.64 #22	57.15
T3	.375	.766	.406	.921	1.047	.025 #22	2.250	5.8	T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	9.0	T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

Capacitance (μF)	Cap Tol (±)	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/21 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C	-55°C	+85°C	+125°C	

220	20	6	4	6.9	0089	0177	0265	50	36	2	9	-64	+13	+16	T1
220	10	6	4	6.9	0090	0178	0266	50	36	2	9	-64	+13	+16	T1
820	20	6	4	6.9	0091	0179	0267	155	18	3	14	-88	+16	+20	T2
820	10	6	4	6.9	0092	0180	0268	155	18	3	14	-88	+16	+20	T2
1500	20	6	4	6.9	0093	0181	0269	172	18	5	20	-90	+20	+25	T3
1500	10	6	4	6.9	0094	0182	0270	172	18	5	20	-90	+20	+25	T3
2200	20	6	4	6.9	0095	0183	0271	170	13	6	24	-90	+25	+30	T4
2200	10	6	4	6.9	0096	0184	0272	170	13	6	24	-90	+25	+30	T4
180	20	8	5	9.2	0097	0185	0273	41	45	2	9	-60	+13	+16	T1
180	10	8	5	9.2	0098	0186	0274	41	45	2	9	-60	+13	+16	T1
680	20	8	5	9.2	0099	0187	0275	130	22	3	14	-83	+16	+20	T2
680	10	8	5	9.2	0100	0188	0276	130	22	3	14	-83	+16	+20	T2
1500	20	8	5	9.2	0101	0189	0277	170	18	5	20	-90	+20	+25	T3
1500	10	8	5	9.2	0102	0190	0278	170	18	5	20	-90	+20	+25	T3
1800	20	8	5	9.2	0103	0191	0279	138	14	7	25	-90	+25	+30	T4
1800	10	8	5	9.2	0104	0192	0280	138	14	7	25	-90	+25	+30	T4
150	20	10	7	11.5	0105	0193	0281	34	54	2	9	-55	+13	+16	T1
150	10	10	7	11.5	0106	0194	0282	34	54	2	9	-55	+13	+16	T1
560	20	10	7	11.5	0107	0195	0283	106	27	3	16	-77	+16	+20	T2
560	10	10	7	11.5	0108	0196	0284	106	27	3	16	-77	+16	+20	T2
1200	20	10	7	11.5	0109	0197	0285	137	18	5	20	-77	+20	+25	T3
1200	10	10	7	11.5	0110	0198	0286	137	18	5	20	-77	+20	+25	T3
1500	20	10	7	11.5	0111	0199	0287	114	15	7	25	-88	+25	+30	T4
1500	10	10	7	11.5	0112	0200	0288	114	15	7	25	-88	+25	+30	T4

**TO ORDER:** Indicate the prefix CLR69 followed by the applicable MIL dash number  
Example: For M39006/21-0197 order CLR690197

# CLR69 (MIL-C-39006/21) Wet Tantalum Capacitors



Wet Tantalum Capacitors

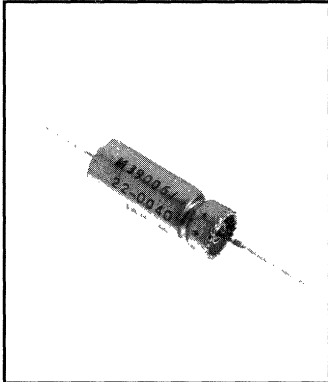
Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/21 Failure Rate Level (% / 1,000 Hrs.)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C	-55°C	+85°C	+125°C	
		100	20		15	10	17.2			0113	0201	0289	30	72	
100	10	15	10	17.2	0114	0202	0290	30	72	2	9	-44	+13	+16	T1
390	20	15	10	17.2	0115	0203	0291	74	31	3	16	-66	+16	+20	T2
390	10	15	10	17.2	0116	0204	0292	74	31	3	16	-66	+16	+20	T2
820	20	15	10	17.2	0117	0205	0293	111	22	6	28	-77	+20	+25	T3
820	10	15	10	17.2	0118	0206	0294	111	22	6	28	-77	+20	+25	T3
1000	20	15	10	17.2	0119	0207	0295	92	17	8	32	-77	+25	+30	T4
1000	10	15	10	17.2	0120	0208	0296	92	17	8	32	-77	+25	+30	T4
68	20	25	15	28.8	0121	0209	0297	22	90	2	9	-40	+12	+15	T1
68	10	25	15	28.8	0122	0210	0298	22	90	2	9	-40	+12	+15	T1
270	20	25	15	28.8	0123	0211	0299	55	33	3	16	-62	+13	+16	T2
270	10	25	15	28.8	0124	0212	0300	55	33	3	16	-62	+13	+16	T2
560	20	25	15	28.8	0125	0213	0301	76	24	7	28	-72	+20	+25	T3
560	10	25	15	28.8	0126	0214	0302	76	24	7	28	-72	+20	+25	T3
680	20	25	15	28.8	0127	0215	0303	63	19	8	32	-72	+25	+30	T4
680	10	25	15	28.8	0128	0216	0304	63	19	8	32	-72	+25	+30	T4
56	20	30	20	34.5	0129	0217	0305	22	100	2	9	-38	+12	+15	T1
56	10	30	20	34.5	0130	0218	0306	22	100	2	9	-38	+12	+15	T1
220	20	30	20	34.5	0131	0219	0307	42	36	3	16	-60	+13	+16	T2
220	10	30	20	34.5	0132	0220	0308	42	36	3	16	-60	+13	+16	T2
470	20	30	20	34.5	0133	0221	0309	64	25	8	32	-65	+20	+25	T3
470	10	30	20	34.5	0134	0222	0310	64	25	8	32	-65	+20	+25	T3
560	20	30	20	34.5	0135	0223	0311	55	20	9	36	-65	+25	+30	T4
560	10	30	20	34.5	0136	0224	0312	55	20	9	36	-65	+25	+30	T4
33	20	50	30	57.5	0137	0225	0313	12.3	135	2	9	-29	+10	+12	T1
33	10	50	30	57.5	0138	0226	0314	12.3	135	2	9	-29	+10	+12	T1
120	20	50	30	57.5	0139	0227	0315	22.5	49	4	24	-42	+12	+15	T2
120	10	50	30	57.5	0140	0228	0316	22.5	49	4	24	-42	+12	+15	T2
270	20	50	30	57.5	0141	0229	0317	37	29	8	32	-46	+20	+25	T3
270	10	50	30	57.5	0142	0230	0318	37	29	8	32	-46	+20	+25	T3
330	20	50	30	57.5	0143	0231	0319	38	22	9	36	-46	+25	+30	T4
330	10	50	30	57.5	0144	0232	0320	38	22	9	36	-46	+25	+30	T4
27	20	60	40	69	0145	0233	0321	10.2	144	3	12	-24	+10	+12	T1
27	10	60	40	69	0146	0234	0322	10.2	144	3	12	-24	+10	+12	T1
100	20	60	40	69	0147	0235	0323	19	54	4	20	-36	+12	+15	T2
100	10	60	40	69	0148	0236	0324	19	54	4	20	-36	+12	+15	T2
220	20	60	40	69	0149	0237	0325	30	29	8	32	-40	+16	+20	T3
220	10	60	40	69	0150	0238	0326	30	29	8	32	-40	+16	+20	T3
270	20	60	40	69	0151	0239	0327	27	23	9	36	-45	+20	+25	T4
270	10	60	40	69	0152	0240	0328	27	23	9	36	-45	+20	+25	T4
22	20	75	50	86.2	0153	0241	0329	8.5	157	3	12	-19	+10	+12	T1
22	10	75	50	86.2	0154	0242	0330	8.5	157	3	12	-19	+10	+12	T1
82	20	75	50	86.2	0155	0243	0331	15.2	63	4	24	-30	+12	+15	T2
82	10	75	50	86.2	0156	0244	0332	15.2	63	4	24	-30	+12	+15	T2
180	20	75	50	86.2	0157	0245	0333	24.4	30	9	36	-35	+16	+20	T3
180	10	75	50	86.2	0158	0246	0334	24.4	30	9	36	-35	+16	+20	T3
220	20	75	50	86.2	0159	0247	0335	37	24	10	40	-40	+20	+25	T4
220	10	75	50	86.2	0160	0248	0336	37	24	10	40	-40	+20	+25	T4
10	20	100	65	115	0161	0249	0337	4.5	200	3	12	-17	+10	+12	T1
10	10	100	65	115	0162	0250	0338	4.5	200	3	12	-17	+10	+12	T1
39	20	100	65	115	0163	0251	0339	10.5	80	5	24	-20	+12	+15	T2
39	10	100	65	115	0164	0252	0340	10.5	80	5	24	-20	+12	+15	T2
68	20	100	65	115	0165	0253	0341	11.3	40	10	40	-30	+14	+16	T3
68	10	100	65	115	0166	0254	0342	11.3	40	10	40	-30	+14	+16	T3
120	20	100	65	115	0167	0255	0343	25	30	12	48	-35	+15	+17	T4
120	10	100	65	115	0168	0256	0344	25	30	12	48	-35	+15	+17	T4
6.8	20	125	85	144	0169	0257	0345	6	300	3	12	-14	+10	+12	T1
6.8	10	125	85	144	0170	0258	0346	6	300	3	12	-14	+10	+12	T1
27	20	125	85	144	0171	0259	0347	7.2	90	5	24	-18	+12	+15	T2
27	10	125	85	144	0172	0260	0348	7.2	90	5	24	-18	+12	+15	T2
47	20	125	85	144	0173	0261	0349	7.9	50	10	40	-26	+14	+16	T3
47	10	125	85	144	0174	0262	0350	7.9	50	10	40	-26	+14	+16	T3
82	20	125	85	144	0175	0263	0351	17.4	32	12	48	-30	+15	+17	T4
82	10	125	85	144	0176	0264	0352	17.4	32	12	48	-30	+15	+17	T4

**TO ORDER:** Indicate the prefix CLR69 followed by the applicable MIL dash number  
Example: For M39006/21-0197 order CLR690197

# CLR79 (MIL-C-39006/22) Wet Tantalum Capacitors



Wet Tantalum Capacitors



- All Tantalum Case
- Hermetically Sealed
- Up to 3 Volts Reverse Capability
- Higher Ripple Current Capability
- Low DCL and ESR
- Rugged Construction
- Failure Rate Levels M, P and R

## GENERAL SPECIFICATIONS

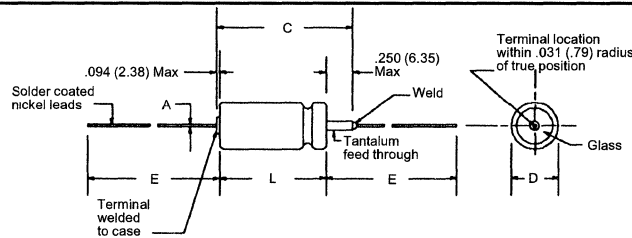
Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC

Capacitance Range:  
1.7  $\mu$ F to 1200  $\mu$ F

Tolerance Range:  
 $\pm$ 10%,  $\pm$ 20%  
( $\pm$ 5% by special order)

Case Sizes: (Four)  
.188 x .453 to .375 x 1.062



INCHES (DIMENSIONS) MILLIMETERS

Case Code	Uninsulated		Insulated		C	A Lead Dia Nom	E Lead Lgth Nom	Approximate Weight (Grams)	Case Code	Uninsulated		Insulated		C	A Lead Dia. Nom	E Lead Lgth. Nom
	D	L	D	L						D	L	D	L			
T1	.188	.453	.219	.608	.734	.025 #22	1.500	2.0	T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
T2	.281	.641	.312	.796	.922	.025 #22	2.250	4.5	T2	7.41	16.28	7.92	20.22	23.41	.64 #22	57.15
T3	.375	.766	.406	.921	1.047	.025 #22	2.250	8.0	T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	12.0	T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/22 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Max. Ripple @ 85°C 40kHz (mA)	Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C		-55°C	+85°C	+125°C	
30	20	6	4	6.9	0001	0221	0441	9	100	1	2	820	-40	+10.5	+12	T1
30	10	6	4	6.9	0002	0222	0442	9	100	1	2	820	-40	+10.5	+12	T1
68	20	6	4	6.9	0004	0224	0444	15	60	1	2	960	-40	+14	+16	T1
68	10	6	4	6.9	0005	0225	0445	15	60	1	2	960	-40	+14	+16	T1
140	20	6	4	6.9	0007	0227	0447	21	40	1	3	1200	-40	+14	+16	T2
140	10	6	4	6.9	0008	0228	0448	21	40	1	3	1200	-40	+14	+16	T2
270	20	6	4	6.9	0010	0230	0450	45	25	1	6.5	1375	-44	+17.5	+20	T2
270	10	6	4	6.9	0011	0231	0451	45	25	1	6.5	1375	-44	+17.5	+20	T2
330	20	6	4	6.9	0013	0233	0453	36	20	2	7.9	1800	-44	+14	+16	T3
330	10	6	4	6.9	0014	0234	0454	36	20	2	7.9	1800	-44	+14	+16	T3
560	20	6	4	6.9	0016	0236	0456	55	25	2	13	1900	-64	+17.5	+20	T3
560	10	6	4	6.9	0017	0237	0457	55	25	2	13	1900	-64	+17.5	+20	T3
1200	20	6	4	6.9	0019	0239	0459	90	20	3	14	2265	-80	+25	+25	T4
1200	10	6	4	6.9	0020	0240	0460	90	20	3	14	2265	-80	+25	+25	T4
25	20	8	5	9.2	0021	0241	0461	7.5	100	1	2	820	-40	+10.5	+12	T1
25	10	8	5	9.2	0022	0242	0462	7.5	100	1	2	820	-40	+10.5	+12	T1
56	20	8	5	9.2	0024	0244	0464	14	59	1	2	900	-40	+14	+16	T1
56	10	8	5	9.2	0025	0245	0465	14	59	1	2	900	-40	+14	+16	T1
120	20	8	5	9.2	0027	0247	0467	20	50	1	2	1220	-44	+17.5	+20	T2
120	10	8	5	9.2	0028	0248	0468	20	50	1	2	1220	-44	+17.5	+20	T2
220	20	8	5	9.2	0030	0250	0470	37	30	1	7	1370	-44	+17.5	+20	T2
220	10	8	5	9.2	0031	0251	0470	37	30	1	7	1370	-44	+17.5	+20	T2
290	20	8	5	9.2	0033	0253	0473	34	25	2	6	1770	-64	+17.5	+20	T3
290	10	8	5	9.2	0034	0254	0474	34	25	2	6	1770	-64	+17.5	+20	T3
430	20	8	5	9.2	0036	0256	0476	46	25	2	14	1825	-64	+17.5	+20	T3
430	10	8	5	9.2	0037	0257	0477	46	25	2	14	1825	-64	+17.5	+20	T3
850	20	8	5	9.2	0039	0259	0479	60	22	4	16	2330	-80	+25	+25	T4
850	10	8	5	9.2	0040	0260	0480	60	22	4	16	2330	-80	+25	+25	T4

**TO ORDER:** Indicate the prefix CLR79 followed by the applicable MIL dash number  
 Example: For M39006/22-0251 order CLR790251. To obtain the optional  
 vibration and shock requirements, add 'H' (CLR790251H)

# CLR79 (MIL-C-39006/22) Wet Tantalum Capacitors



Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/22 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Max. Ripple @ 85°C 40kHz (mA)	Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C		-55°C	+85°C	+125°C	
		20	20		10	7	11.5			0041	0261		0481	6	175	
20	10	10	7	11.5	0042	0262	0482	6	175	1	2	820	-32	+10.5	+12	T1
47	20	10	7	11.5	0044	0264	0484	13	100	1	2	855	-36	+14	+16	T1
47	10	10	7	11.5	0045	0265	0485	13	100	1	2	855	-36	+14	+16	T1
100	20	10	7	11.5	0047	0267	0487	15	60	1	4	1200	-36	+14	+16	T2
100	10	10	7	11.5	0048	0268	0488	15	60	1	4	1200	-36	+14	+16	T2
180	20	10	7	11.5	0050	0270	0490	30	40	1	7	1365	-36	+14	+16	T2
180	10	10	7	11.5	0051	0271	0491	30	40	1	7	1365	-36	+14	+16	T2
250	20	10	7	11.5	0053	0273	0493	30	30	2	10	1720	-40	+14	+16	T3
250	10	10	7	11.5	0054	0274	0494	30	30	2	10	1720	-40	+14	+16	T3
390	20	10	7	11.5	0056	0276	0496	44	25	2	16	1800	-64	+17.5	+20	T3
390	10	10	7	11.5	0057	0277	0497	44	25	2	16	1800	-64	+17.5	+20	T3
750	20	10	7	11.5	0059	0279	0499	50	23	4	16	2360	-80	+25	+25	T4
750	10	10	7	11.5	0060	0280	0500	50	23	4	16	2360	-80	+25	+25	T4
15	20	15	10	17.2	0061	0281	0501	5	155	1	2	780	-24	+10.5	+12	T1
15	10	15	10	17.2	0062	0282	0502	5	155	1	2	780	-24	+10.5	+12	T1
33	20	15	10	17.2	0064	0284	0504	10	90	1	2	820	-28	+14	+16	T1
33	10	15	10	17.2	0065	0285	0505	10	90	1	2	820	-28	+14	+16	T1
70	20	15	10	17.2	0067	0287	0507	13	75	1	4	1150	-28	+14	+16	T2
70	10	15	10	17.2	0068	0288	0508	13	75	1	4	1150	-28	+14	+16	T2
120	20	15	10	17.2	0070	0290	0510	18	50	1	7	1450	-28	+17.5	+20	T2
120	10	15	10	17.2	0071	0291	0511	18	50	1	7	1450	-28	+17.5	+20	T2
170	20	15	10	17.2	0073	0293	0513	25	35	2	10	1480	-32	+14	+16	T3
170	10	15	10	17.2	0074	0294	0514	25	35	2	10	1480	-32	+14	+16	T3
270	20	15	10	17.2	0076	0296	0516	32	30	2	16	1740	-56	+17.5	+20	T3
270	10	15	10	17.2	0077	0297	0517	32	30	2	16	1740	-56	+17.5	+20	T3
540	20	15	10	17.2	0079	0299	0519	40	23	6	24	2300	-80	+25	+25	T4
540	10	15	10	17.2	0080	0300	0520	40	23	6	24	2300	-80	+25	+25	T4
10	20	25	15	28.8	0081	0301	0521	4	220	1	2	715	-16	+8	+9	T1
10	10	25	15	28.8	0082	0302	0522	4	220	1	2	715	-16	+8	+9	T1
22	20	25	15	28.8	0084	0304	0524	6.6	140	1	2	825	-20	+10.5	+12	T1
22	10	25	15	28.8	0085	0305	0525	6.6	140	1	2	825	-20	+10.5	+12	T1
50	20	25	15	28.8	0087	0307	0527	11	70	1	2	1130	-28	+13	+15	T2
50	10	25	15	28.8	0088	0308	0528	11	70	1	2	1130	-28	+13	+15	T2
100	20	25	15	28.8	0090	0310	0530	15	50	1	10	1435	-28	+13	+15	T2
100	10	25	15	28.8	0091	0311	0531	15	50	1	10	1435	-28	+13	+15	T2
120	20	25	15	28.8	0093	0313	0533	21	38	2	6	1450	-32	+13	+15	T3
120	10	25	15	28.8	0094	0314	0534	21	38	2	6	1450	-32	+13	+15	T3
180	20	25	15	28.8	0096	0316	0536	26	32	2	18	1525	-48	+13	+15	T3
180	10	25	15	28.8	0097	0317	0537	26	32	2	18	1525	-48	+13	+15	T3
350	20	25	15	28.8	0099	0319	0539	35	24	7	28	1970	-70	+25	+25	T4
350	10	25	15	28.8	0100	0320	0540	35	24	7	28	1970	-70	+25	+25	T4
8	20	30	20	34.5	0101	0321	0541	4	275	1	2	640	-16	+8	+12	T1
8	10	30	20	34.5	0102	0322	0542	4	275	1	2	640	-16	+8	+12	T1
15	20	30	20	34.5	0104	0324	0544	5	175	1	2	780	-20	+10.5	+12	T1
15	10	30	20	34.5	0105	0325	0545	5	175	1	2	780	-20	+10.5	+12	T1
40	20	30	20	34.5	0107	0327	0547	10	65	1	5	1120	-24	+10.5	+12	T2
40	10	30	20	34.5	0108	0328	0548	10	65	1	5	1120	-24	+10.5	+12	T2
68	20	30	20	34.5	0110	0330	0550	13	60	1	8	1285	-24	+13	+15	T2
68	10	30	20	34.5	0111	0331	0551	13	60	1	8	1285	-24	+13	+15	T2
100	20	30	20	34.5	0113	0333	0553	17	40	2	12	1450	-28	+10.5	+12	T3
100	10	30	20	34.5	0114	0334	0554	17	40	2	12	1450	-28	+10.5	+12	T3
150	20	30	20	34.5	0116	0336	0556	23	35	2	18	1525	-48	+13	+15	T3
150	10	30	20	34.5	0117	0337	0557	23	35	2	18	1525	-48	+13	+15	T3
300	20	30	20	34.5	0119	0339	0559	31	25	8	32	1950	-60	+25	+25	T4
300	10	30	20	34.5	0120	0340	0560	31	25	8	32	1950	-60	+25	+25	T4
5	20	50	30	57.5	0121	0341	0561	3	400	1	2	580	-16	+5	+6	T1
5	10	50	30	57.5	0122	0342	0562	3	400	1	2	580	-16	+5	+6	T1
10	20	50	30	57.5	0124	0344	0564	4	250	1	2	715	-24	+8	+9	T1
10	10	50	30	57.5	0125	0345	0565	4	250	1	2	715	-24	+8	+9	T1
25	20	50	30	57.5	0127	0347	0567	8	95	1	5	1005	-20	+10.5	+12	T2
25	10	50	30	57.5	0128	0348	0568	8	95	1	5	1005	-20	+10.5	+12	T2
47	20	50	30	57.5	0130	0350	0570	11	70	1	9	1155	-28	+13	+15	T2
47	10	50	30	57.5	0131	0351	0571	11	70	1	9	1155	-28	+13	+15	T2
60	20	50	30	57.5	0133	0353	0573	12	45	2	12	1335	-16	+10.5	+12	T3
60	10	50	30	57.5	0134	0354	0574	12	45	2	12	1335	-16	+10.5	+12	T3
82	20	50	30	57.5	0136	0356	0576	15	45	2	16	1400	-32	+13	+15	T3
82	10	50	30	57.5	0137	0357	0577	15	45	2	16	1400	-32	+13	+15	T3

**TO ORDER:** Indicate the prefix CLR79 followed by the applicable MIL dash number  
 Example: For M39006/22-0251 order CLR790251. To obtain the optional  
 vibration and shock requirements, add 'H' (CLR790251H)

# CLR79 (MIL-C-39006/22) Wet Tantalum Capacitors

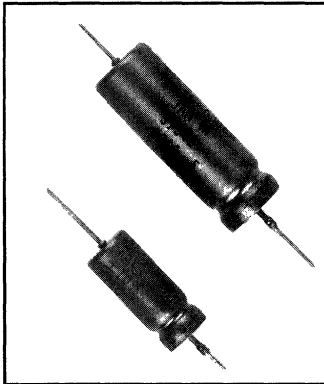


Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/22 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Max. Ripple @ 85°C 40kHz (mA)	Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C		-55°C	+85°C	+125°C	
		160	20		50	30	57.5			0139	0359		0579	17	27	
160	10	50	30	57.5	0140	0360	0580	17	27	8	32	1900	-50	+25	+25	T4
4	20	60	40	69	0141	0381	0581	2.8	550	1	2	525	-16	+5	+6	T1
4	10	60	40	69	0142	0382	0582	2.8	550	1	2	525	-16	+5	+6	T1
8.2	20	60	40	69	0144	0384	0584	4	275	1	2	625	-24	+8	+9	T1
8.2	10	60	40	69	0145	0385	0585	4	275	1	2	625	-24	+8	+9	T1
20	20	60	40	69	0147	0387	0587	7	105	1	5	930	-16	+10.5	+12	T2
20	10	60	40	69	0148	0388	0588	7	105	1	5	930	-16	+10.5	+12	T2
39	20	60	40	69	0150	0390	0590	10	90	1	9	1110	-28	+10.5	+12	T2
39	10	60	40	69	0151	0391	0591	10	90	1	9	1110	-28	+10.5	+12	T2
50	20	60	40	69	0153	0393	0593	10	50	2	12	1330	-16	+10.5	+12	T3
50	10	60	40	69	0154	0394	0594	10	50	2	12	1330	-16	+10.5	+12	T3
68	20	60	40	69	0156	0376	0596	13	50	2	16	1365	-32	+10.5	+12	T3
68	10	60	40	69	0157	0377	0597	13	50	2	16	1365	-32	+10.5	+12	T3
140	20	60	40	69	0159	0379	0599	16	28	8	32	1850	-40	+20	+20	T4
140	10	60	40	69	0160	0380	0600	16	28	8	32	1850	-40	+20	+20	T4
3.5	20	75	50	86.2	0161	0381	0601	2.5	650	1	2	525	-16	+5	+6	T1
3.5	10	75	50	86.2	0162	0382	0602	2.5	650	1	2	525	-16	+5	+6	T1
6.8	20	75	50	86.2	0164	0384	0604	3.5	300	1	2	610	-20	+8	+9	T1
6.8	10	75	50	86.2	0165	0385	0605	3.5	300	1	2	610	-20	+8	+9	T1
15	20	75	50	86.2	0167	0387	0607	6	150	1	5	890	-16	+8	+9	T2
15	10	75	50	86.2	0168	0388	0608	6	150	1	5	890	-16	+8	+9	T2
33	20	75	50	86.2	0170	0390	0610	10	90	1	10	1000	-24	+10.5	+15	T2
33	10	75	50	86.2	0171	0391	0611	10	90	1	10	1000	-24	+10.5	+15	T2
40	20	75	50	86.2	0173	0393	0613	9	60	2	12	1250	-16	+10.5	+12	T3
40	10	75	50	86.2	0174	0394	0614	9	60	2	12	1250	-16	+10.5	+12	T3
56	20	75	50	86.2	0176	0396	0616	11	60	2	17	1335	-28	+10.5	+15	T3
56	10	75	50	86.2	0177	0397	0617	11	60	2	17	1335	-28	+10.5	+15	T3
110	20	75	50	86.2	0179	0399	0619	12	29	9	36	1850	-35	+20	+20	T4
110	10	75	50	86.2	0180	0400	0620	12	29	9	36	1850	-35	+20	+20	T4
2.5	20	100	65	115	0181	0401	0621	2	950	1	2	505	-16	+7	+8	T1
2.5	10	100	65	115	0182	0402	0622	2	950	1	2	505	-16	+7	+8	T1
4.7	20	100	65	115	0184	0404	0624	3	500	1	2	565	-16	+7	+8	T1
4.7	10	100	65	115	0185	0405	0625	3	500	1	2	565	-16	+7	+8	T1
11	20	100	65	115	0187	0407	0627	5	200	1	4	835	-16	+8	+8	T2
11	10	100	65	115	0188	0408	0628	5	200	1	4	835	-16	+8	+8	T2
22	20	100	65	115	0190	0410	0630	7.5	100	1	9	965	-16	+8	+8	T2
22	10	100	65	115	0191	0411	0632	7.5	100	1	9	965	-16	+8	+8	T2
30	20	100	65	115	0193	0413	0633	7	80	2	12	1240	-16	+8	+8	T3
30	10	100	65	115	0194	0414	0634	7	80	2	12	1240	-16	+8	+8	T3
43	20	100	65	115	0196	0416	0636	8.5	70	2	17	1335	-20	+8	+8	T3
43	10	100	65	115	0197	0417	0637	8.5	70	2	17	1335	-20	+8	+8	T3
86	20	100	65	115	0199	0419	0639	10	30	9	36	1800	-25	+15	+15	T4
86	10	100	65	115	0200	0420	0640	10	30	9	36	1800	-25	+15	+15	T4
1.7	20	125	85	144	0201	0421	0641	2	1250	1	2	415	-16	+7	+8	T1
1.7	10	125	85	144	0202	0422	0642	2	1250	1	2	415	-16	+7	+8	T1
3.6	20	125	85	144	0204	0424	0644	2.7	600	1	2	520	-16	+7	+8	T1
3.6	10	125	85	144	0205	0425	0645	2.7	600	1	2	520	-16	+7	+8	T1
9	20	125	85	144	0207	0427	0647	5	240	1	5	755	-16	+7	+8	T2
9	10	125	85	144	0208	0428	0648	5	240	1	5	755	-16	+7	+8	T2
14	20	125	85	144	0210	0430	0650	6	167	1	7	860	-16	+7	+8	T2
14	10	125	85	144	0211	0431	0651	6	167	1	7	860	-16	+7	+8	T2
18	20	125	85	144	0213	0433	0653	5	129	2	9	1130	-16	+7	+8	T3
18	10	125	85	144	0214	0434	0654	5	129	2	9	1130	-16	+7	+8	T3
25	20	125	85	144	0216	0436	0656	6	93	2	13	1200	-16	+7	+8	T3
25	10	125	85	144	0217	0437	0657	6	93	2	13	1200	-16	+7	+8	T3
56	20	125	85	144	0219	0439	0659	6.5	32	10	40	1800	-25	+15	+15	T4
56	10	125	85	144	0220	0440	0660	6.5	32	10	40	1800	-25	+15	+15	T4

**TO ORDER:** Indicate the prefix CLR79 followed by the applicable MIL dash number  
 Example: For M39006/22-0251 order CLR790251. To obtain the optional vibration and shock requirements, add 'H' (CLR790251H)

# CLR81 (MIL-C-39006/25) Wet Tantalum Capacitors



- Extended Range
- All Tantalum Case
- Hermetically Sealed
- Up to 3 Volts Reverse Capability
- Highest CV per Case Size
- Low DCL and ESR
- Rugged Construction
- Failure Rate Levels M, P and R

## GENERAL SPECIFICATIONS

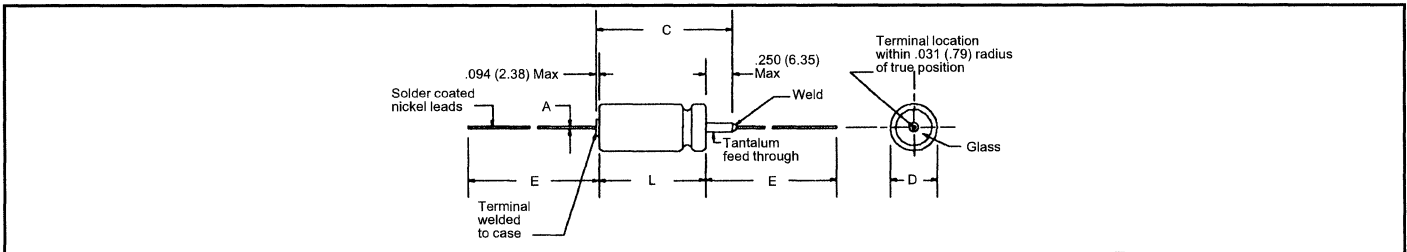
Operating Temperature:  
-55°C to +125°C

Voltage Range:  
6 to 125 VDC

Capacitance Range:  
6.8  $\mu$ F to 2200  $\mu$ F

Tolerance Range:  
 $\pm$ 10%,  $\pm$ 20%

Case Sizes: (Four)  
.188 x.453 to .375 x 1.062



INCHES (DIMENSIONS) MILLIMETERS

Case Code	Uninsulated L		Insulated L		C	A Lead Dia Nom AWG	E Lead Lgth $\pm$ .250	Approximate Weight (Grams)	Case Code	Uninsulated L		Insulated L		C	A Lead Dia. Nom AWG	E Lead Lgth. $\pm$ 6.35
	D	L	D	L						D	L	D	L			
T1	.188	.453	.219	.608	.734	.025 #22	1.500	2.0	T1	4.78	11.51	5.56	15.45	18.64	.64 #22	38.10
T2	.281	.641	.312	.796	.922	.025 #22	2.250	5.5	T2	7.41	16.28	7.92	20.22	23.41	.64 #22	57.15
T3	.375	.766	.406	.921	1.047	.025 #22	2.250	10.0	T3	9.53	19.46	10.31	23.40	26.59	.64 #22	57.15
T4	.375	1.062	.406	1.217	1.343	.025 #22	2.250	16.0	T4	9.53	26.97	10.31	30.91	34.11	.64 #22	57.15

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/25 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Max Ripple @ 85°C 40kHz (mA)	Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C		-55°C	+85°C	+125°C	
		220	20		6	4	6.9			0001	0089		0177	50	36	
220	10	6	4	6.9	0002	0090	0178	50	36	2	9	1000	-64	+13	+16	T1
820	20	6	4	6.9	0003	0091	0179	155	18	3	14	1500	-88	+16	+20	T2
820	10	6	4	6.9	0004	0092	0180	155	18	3	14	1500	-88	+16	+20	T2
1500	20	6	4	6.9	0005	0093	0181	172	18	5	20	1900	-90	+20	+25	T3
1500	10	6	4	6.9	0006	0094	0182	172	18	5	20	1900	-90	+20	+25	T3
2200	20	6	4	6.9	0007	0095	0183	170	13	6	24	2300	-90	+25	+30	T4
2200	10	6	4	6.9	0008	0096	0184	170	13	6	24	2300	-90	+25	+30	T4
180	20	8	5	9.2	0009	0097	0185	41	45	2	9	1000	-60	+13	+16	T1
180	10	8	5	9.2	0010	0098	0186	41	45	2	9	1000	-60	+13	+16	T1
680	20	8	5	9.2	0011	0099	0187	130	22	3	14	1500	-83	+16	+20	T2
680	10	8	5	9.2	0012	0100	0188	130	22	3	14	1500	-83	+16	+20	T2
1500	20	8	5	9.2	0013	0101	0189	170	18	5	20	1900	-90	+20	+25	T3
1500	10	8	5	9.2	0014	0102	0190	170	18	5	20	1900	-90	+20	+25	T3
1800	20	8	5	9.2	0015	0103	0191	138	14	7	25	2300	-90	+25	+30	T4
1800	10	8	5	9.2	0016	0104	0192	138	14	7	25	2300	-90	+25	+30	T4
150	20	10	7	11.5	0017	0105	0193	34	54	2	9	900	-55	+13	+16	T1
150	10	10	7	11.5	0018	0106	0194	34	54	2	9	900	-55	+13	+16	T1
560	20	10	7	11.5	0019	0107	0195	106	27	3	16	1450	-77	+16	+20	T2
560	10	10	7	11.5	0020	0108	0196	106	27	3	16	1450	-77	+16	+20	T2
1200	20	10	7	11.5	0021	0109	0197	137	18	5	20	1850	-88	+20	+25	T3
1200	10	10	7	11.5	0022	0110	0198	137	18	5	20	1850	-88	+20	+25	T3
1500	20	10	7	11.5	0023	0111	0199	114	15	7	25	2300	-88	+25	+30	T4
1500	10	10	7	11.5	0024	0112	0200	114	15	7	25	2300	-88	+25	+30	T4
100	20	15	10	17.2	0025	0113	0201	30	72	2	9	900	-44	+13	+16	T1
100	10	15	10	17.2	0026	0114	0202	30	72	2	9	900	-44	+13	+16	T1

**TO ORDER:** Indicate the prefix CLR81 followed by the applicable MIL dash number  
Example: For M39006/25-0193 order CLR810193. To obtain the optional vibration and shock requirements, add 'H' (CLR810193H)

# CLR81 (MIL-C-39006/25) Wet Tantalum Capacitors



Wet Tantalum Capacitors

Capacitance ( $\mu$ F)	Cap Tol ( $\pm$ )	Maximum Working Voltage		Surge Voltage @ +85°C	Part Number MIL-C-39006/25 Failure Rate Level (% / 1,000 Hrs)			Max DF (%)	Max Z 85°C (Ohms)	Maximum DC Leakage (mA)		Max Ripple @ 85°C 40kHz (mA)	Maximum % Capacitance Change from Room Temperature			Case Code
		+85°C	+125°C		M (1.0)	P (0.1)	R (0.01)			+25°C	+85°C & +125°C		-55°C	+85°C	+125°C	
		390	20		15	10	17.2			0027	0115		0203	74	31	
390	10	15	10	17.2	0028	0116	0204	74	31	3	16	1450	-66	+16	+20	T2
820	20	15	10	17.2	0029	0117	0205	111	22	6	20	1800	-77	+20	+25	T3
820	10	15	10	17.2	0030	0118	0206	111	22	6	20	1800	-77	+20	+25	T3
1000	20	15	10	17.2	0031	0119	0207	92	17	8	25	2300	-77	+25	+30	T4
1000	10	15	10	17.2	0032	0120	0208	92	17	8	25	2300	-77	+25	+30	T4
68	20	25	15	28.8	0033	0121	0209	22	90	2	9	850	-40	+12	+15	T1
68	10	25	15	28.8	0034	0122	0210	22	90	2	9	850	-40	+12	+15	T1
270	20	25	15	28.8	0035	0123	0211	55	33	3	16	1400	-62	+13	+16	T2
270	10	25	15	28.8	0036	0124	0212	55	33	3	16	1400	-62	+13	+16	T2
560	20	25	15	28.8	0037	0125	0213	76	24	7	28	1750	-72	+20	+25	T3
560	10	25	15	28.8	0038	0126	0214	76	24	7	28	1750	-72	+20	+25	T3
680	20	25	15	28.8	0039	0127	0215	63	19	8	32	2100	-72	+25	+30	T4
680	10	25	15	28.8	0040	0128	0216	63	19	8	32	2100	-72	+25	+30	T4
56	20	30	20	34.5	0041	0129	0217	22	100	2	9	800	-38	+12	+15	T1
56	10	30	20	34.5	0042	0130	0218	22	100	2	9	800	-38	+12	+15	T1
220	20	30	20	34.5	0043	0131	0219	42	36	3	16	1200	-60	+13	+16	T2
220	10	30	20	34.5	0044	0132	0220	42	36	3	16	1200	-60	+13	+16	T2
470	20	30	20	34.5	0045	0133	0221	64	25	8	32	1500	-65	+20	+25	T3
470	10	30	20	34.5	0046	0134	0222	64	25	8	32	1500	-65	+20	+25	T3
560	20	30	20	34.5	0047	0135	0223	55	20	9	36	2000	-65	+25	+30	T4
560	10	30	20	34.5	0048	0136	0224	55	20	9	36	2000	-65	+25	+30	T4
33	20	50	30	57.5	0049	0137	0225	12.3	135	2	9	700	-29	+10	+12	T1
33	10	50	30	57.5	0050	0138	0226	12.3	135	2	9	700	-29	+10	+12	T1
120	20	50	30	57.5	0051	0139	0227	22.5	49	4	24	1200	-42	+12	+15	T2
120	10	50	30	57.5	0052	0140	0228	22.5	49	4	24	1200	-42	+12	+15	T2
270	20	50	30	57.5	0053	0141	0229	37	29	8	32	1450	-46	+20	+25	T3
270	10	50	30	57.5	0054	0142	0230	37	29	8	32	1450	-46	+20	+25	T3
330	20	50	30	57.5	0055	0143	0231	38	22	9	36	1900	-46	+25	+30	T4
330	10	50	30	57.5	0056	0144	0232	38	22	9	36	1900	-46	+25	+30	T4
27	20	60	40	69	0057	0145	0233	10.2	144	3	12	700	-24	+10	+12	T1
27	10	60	40	69	0058	0146	0234	10.2	144	3	12	700	-24	+10	+12	T1
100	20	60	40	69	0059	0147	0235	19	54	4	20	1100	-36	+12	+15	T2
100	10	60	40	69	0060	0148	0236	19	54	4	20	1100	-36	+12	+15	T2
220	20	60	40	69	0061	0149	0237	30	29	8	32	1400	-40	+16	+20	T3
220	10	60	40	69	0062	0150	0238	30	29	8	32	1400	-40	+16	+20	T3
270	20	60	40	69	0063	0151	0239	27	23	9	36	1850	-45	+20	+25	T4
270	10	60	40	69	0064	0152	0240	27	23	9	36	1850	-45	+20	+25	T4
22	20	75	50	86.2	0065	0153	0241	8.5	157	3	12	600	-19	+10	+12	T1
22	10	75	50	86.2	0066	0154	0242	8.5	157	3	12	600	-19	+10	+12	T1
82	20	75	50	86.2	0067	0155	0243	15.2	63	4	24	1000	-30	+12	+15	T2
82	10	75	50	86.2	0068	0156	0244	15.2	63	4	24	1000	-30	+12	+15	T2
180	20	75	50	86.2	0069	0157	0245	24.4	30	9	36	1300	-35	+16	+20	T3
180	10	75	50	86.2	0070	0158	0246	24.4	30	9	36	1300	-35	+16	+20	T3
220	20	75	50	86.2	0071	0159	0247	37	24	10	40	1800	-40	+20	+25	T4
220	10	75	50	86.2	0072	0160	0248	37	24	10	40	1800	-40	+20	+25	T4
10	20	100	65	115	0073	0161	0249	4.5	200	3	12	800	-17	+10	+12	T1
10	10	100	65	115	0074	0162	0250	4.5	200	3	12	800	-17	+10	+12	T1
39	20	100	65	115	0075	0163	0251	10.4	80	5	24	1300	-20	+12	+15	T2
39	10	100	65	115	0076	0164	0252	10.4	80	5	24	1300	-20	+12	+15	T2
68	20	100	65	115	0077	0165	0253	11.3	40	10	40	1600	-30	+14	+16	T3
68	10	100	65	115	0078	0166	0254	11.3	40	10	40	1600	-30	+14	+16	T3
120	20	100	65	115	0079	0167	0255	25	30	12	48	2000	-35	+15	+17	T4
120	10	100	65	115	0080	0168	0256	25	30	12	48	2000	-35	+15	+17	T4
6.8	20	125	85	144	0081	0169	0257	6	300	3	12	700	-14	+10	+12	T1
6.8	10	125	85	144	0082	0170	0258	6	300	3	12	700	-14	+10	+12	T1
27	20	125	85	144	0083	0171	0259	7.2	90	5	24	1200	-18	+12	+15	T2
27	10	125	85	144	0084	0172	0260	7.2	90	5	24	1200	-18	+12	+15	T2
47	20	125	85	144	0085	0173	0261	7.9	50	10	40	1500	-26	+14	+16	T3
47	10	125	85	144	0086	0174	0262	7.9	50	10	40	1500	-26	+14	+16	T3
82	20	125	85	144	0087	0175	0263	17.4	32	12	48	1900	-30	+15	+17	T4
82	10	125	85	144	0088	0176	0264	17.4	32	12	48	1900	-30	+15	+17	T4

**TO ORDER:** Indicate the prefix CLR81 followed by the applicable MIL dash number  
 Example: For M39006/25-0193 order CLR810193. To obtain the optional  
 vibration and shock requirements, add 'H' (CLR810193H)



Type	Features	Capacitance Range	Voltage Range	Temperature Range	Tolerances (%)	Case Dimensions (Inches)	Page Number
<b>Hermetically Sealed /Axial</b>							
<b>TAS</b>	Low DC Leakage Temperature Stable Frequency Stable Commercial CSR13	.0047 $\mu$ F to 330 $\mu$ F	6 VDC to 100 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .135 x .286 to .351 x .786	38
<b>TXA</b>	Extended Capacitance Low DC Leakage Temperature Stable Frequency Stable Commercial CSR23	1.2 $\mu$ F to 1,000 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .135 x .286 to .351 x .786	40
<b>THF</b>	High Ripple Current Low Impedance Low ESR Temperature Stable Commercial CSR21	5.6 $\mu$ F to 330 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .289 x .686 to .3511 x .786	41

<b>Molded Case</b>							
<b>TAC</b>	Axial Leads Taped and Reeled Highest CV per Case Automatic Insertion	0.1 $\mu$ F to 330 $\mu$ F	6 VDC to 50 VDC	-40°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .095 x .260 to .300 x .710	51
<b>TIM</b>	Radial Leads Precision Molded Low DC Leakage Low ESR	0.1 $\mu$ F to 220 $\mu$ F	6 VDC to 50 VDC	-40°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	(H x W x T) .345 x .230 x .105 to .375 x .600 x .195	53
<b>TSC</b>	Surface Mount Precision Molded Taped and Reeled EIA and IECQ Standards	0.1 $\mu$ F to 150 $\mu$ F	4 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 10 $\pm$ 20	(L x W x H) .126 x .063 x .063 to .287 x .169 x .110	59

<b>Dipped</b>							
<b>TDC</b>	Radial Leads Low Cost Conformally Coated Low DC Leakage Low ESR & Impedance Resistant to Shock and Vibration	0.1 $\mu$ F to 330 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x H) .175 x .350 to .350 x .650  Lead Spacing: .125 and .250	55
<b>TDL</b>	Radial Leads Low Profile Conformally Coated Low DC Leakage Low ESR and Impedance Resistant to Shock and Vibration	0.1 $\mu$ F to 330 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x H) .180 x .280 to .440 x .680  Lead Spacing: .100 and .200	57

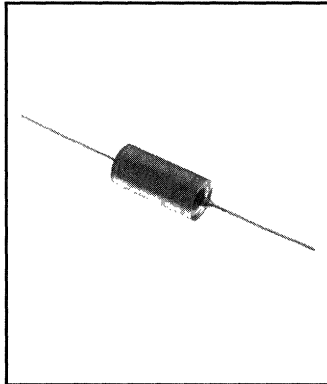
### Military - Established Reliability Type

MIL Specification	MIL QPL Approvals Failure Rate Levels	Features	Capacitance Range	Voltage Range	Temperature Range	Tolerances (%)	Case Dimensions (Inches)	Page Number
<b>M39003/01 CSR13</b>	Exponential: M, P, R, S Weibull: B, C, D	Graded Reliability Low DC Leakage Temperature Stable Frequency Stable Long Shelf Life	.0047 $\mu$ F to 330 $\mu$ F	6 VDC to 100 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .135 x .286 to .351 x .786	42
<b>M39003/09 CSR21</b>	Exponential: M, P, R, S Weibull: B, C, D	High Ripple Current Low Impedance Low ESR Graded Reliability Low DC Leakage Temperature Stable Frequency Stable Long Shelf Life	5.6 $\mu$ F to 330 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .289 x .686 to .351 x .786	47
<b>M39003/03 CSR23</b>	Exponential: M, P, R, S Weibull: B, C, D	Extended Capacitance Graded Reliability Low DC Leakage Temperature Stable Frequency Stable Long Shelf Life	1.2 $\mu$ F to 1,000 $\mu$ F	6 VDC to 50 VDC	-55°C +125°C (With proper derating)	$\pm$ 5 * $\pm$ 10 $\pm$ 20	(D x L) .135 x .286 to .351 x .786	49

\* By special order only.

# Type TAS Solid Tantalum Capacitors

**MALLORY**



- Hermetically Sealed
- High Capacitance/Case
- Low DC Leakage
- Low Dissipation Factor
- Temperature Stable
- Frequency Stable
- Moisture/Solvent Resistant
- Miniature Size
- Long Shelf Life

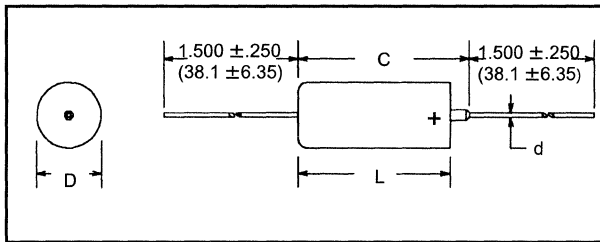
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)  
Voltage Range:  
6 to 100 WVDC @ 85°C  
Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C  
Capacitance Range:  
.0047  $\mu$ F to 330  $\mu$ F  
Capacitance Tolerance:  
 $\pm 10\%$ ,  $\pm 20\%$   
( $\pm 5\%$  by special order.)

DC Leakage:  
At +25°C - See Table Limit.  
At +85°C - 10 x Table Limit.  
At +125°C - 12.5 x Table Limit.  
Capacitance Change Maximum:  
-10% @ -55°C  
+8% @ +85°C  
+12% @ +125°C

Maximum Power Dissipation @ 25°C:

Case Code	Watts
A	.09
C	.100
F	.125
G	.180



Case Code	Uninsulated		Insulated		C Maximum	d $\pm .001$ ( $\pm .03$ )
	D $\pm .005$ ( $\pm .13$ )	L $\pm .031$ ( $\pm .79$ )	D $\pm .010$ ( $\pm .25$ )	L $\pm .031$ ( $\pm .79$ )		
A	.125(3.18)	.250(6.35)	.135(3.43)	.286(7.26)	.422(10.72)	.020(.51)
C	.175(4.45)	.438(11.13)	.185(4.70)	.474(12.04)	.610(15.49)	.020(.51)
F	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
G	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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6 WVDC @ 85°C 4 WVDC @ 125°C				
2.2	A	0.3	4	TAS225*006PIA
2.7	A	0.3	4	TAS275*006PIA
3.3	A	0.3	4	TAS335*006PIA
3.9	A	0.3	4	TAS395*006PIA
4.7	A	0.3	4	TAS475*006PIA
5.6	A	0.3	4	TAS565*006PIA
6.8	A	0.3	6	TAS685*006PIA
8.2	C	0.3	6	TAS825*006PIC
10	C	0.3	6	TAS106*006PIC
12	C	0.5	6	TAS126*006PIC
15	C	0.9	6	TAS156*006PIC
18	C	0.9	6	TAS186*006PIC
22	C	0.9	6	TAS226*006PIC
27	C	0.9	6	TAS276*006PIC
33	C	0.9	6	TAS336*006PIC
39	C	0.9	6	TAS396*006PIC
47	C	1.5	6	TAS476*006PIC
56	C	1.5	6	TAS566*006PIC
68	F	3.0	6	TAS686*006PIF
82	F	3.0	6	TAS826*006PIF
100	F	3.0	6	TAS107*006PIF
120	F	3.0	6	TAS127*006PIF
150	F	4.5	6	TAS157*006PIF
180	F	5.5	6	TAS187*006PIF
220	G	6.0	8	TAS227*006PIG
270	G	6.0	8	TAS277*006PIG
330	G	7.5	8	TAS337*006PIG

10 WVDC @ 85°C 7 WVDC @ 125°C				
6.8	C	1.0	6	TAS685*010PIC
8.2	C	1.0	6	TAS825*010PIC
10	C	1.0	6	TAS106*010PIC
12	C	1.0	6	TAS126*010PIC
15	C	1.0	6	TAS156*010PIC
18	C	1.0	6	TAS186*010PIC
22	C	2.0	6	TAS226*010PIC
27	C	2.0	6	TAS276*010PIC
33	C	2.0	6	TAS336*010PIC
39	C	2.0	6	TAS396*010PIC
47	F	3.0	6	TAS476*010PIF
56	F	3.0	6	TAS566*010PIF
68	F	3.0	6	TAS686*010PIF
82	F	3.0	6	TAS826*010PIF
100	F	5.0	6	TAS107*010PIF
120	F	5.0	6	TAS127*010PIF
150	G	9.0	6	TAS157*010PIG
180	G	9.0	6	TAS187*010PIG
220	G	10.0	8	TAS227*010PIG

15 WVDC @ 85°C 10 WVDC @ 125°C				
10	C	1.0	6	TAS106*015PIC
12	C	1.0	6	TAS126*015PIC
15	C	2.0	6	TAS156*015PIC
18	C	2.0	6	TAS186*015PIC
22	C	2.0	6	TAS226*015PIC
27	F	3.0	6	TAS276*015PIF
33	F	3.0	6	TAS336*015PIF
39	F	3.0	6	TAS396*015PIF
47	F	4.0	6	TAS476*015PIF
56	F	4.0	6	TAS566*015PIF
68	F	5.0	6	TAS686*015PIF
82	G	6.0	6	TAS826*015PIG
100	G	6.0	6	TAS107*015PIG
120	G	6.0	6	TAS127*015PIG
150	G	8.0	6	TAS157*015PIG

10 WVDC @ 85°C 7 WVDC @ 125°C				
1.0	A	0.3	3	TAS105*010PIA
1.2	A	0.3	4	TAS125*010PIA
1.5	A	0.3	4	TAS155*010PIA
1.8	A	0.3	4	TAS185*010PIA
2.2	A	0.3	4	TAS225*010PIA
2.7	A	0.3	4	TAS275*010PIA
3.3	A	0.3	4	TAS335*010PIA
3.9	A	0.3	4	TAS395*010PIA
4.7	A	0.4	4	TAS475*010PIA
5.6	C	0.4	4	TAS565*010PIA

15 WVDC @ 85°C 10 WVDC @ 125°C				
0.33	A	0.3	3	TAS334*015PIA
0.39	A	0.3	3	TAS394*015PIA
0.47	A	0.3	3	TAS474*015PIA
0.56	A	0.3	3	TAS564*015PIA
0.68	A	0.3	3	TAS684*015PIA
0.82	A	0.3	3	TAS824*015PIA
1.0	A	0.3	3	TAS105*015PIA
1.2	A	0.3	4	TAS125*015PIA
1.5	A	0.3	4	TAS155*015PIA
1.8	A	0.3	4	TAS185*015PIA
2.2	A	0.3	4	TAS225*015PIA
2.7	A	0.3	4	TAS275*015PIA
3.3	A	0.4	4	TAS335*015PIA
3.9	C	0.4	4	TAS395*015PIC
4.7	C	0.7	4	TAS475*015PIC
5.6	C	0.7	4	TAS565*015PIC
6.8	C	0.7	6	TAS685*015PIC
8.2	C	0.7	6	TAS825*015PIC

20 WVDC @ 85°C 13 WVDC @ 125°C				
0.047	A	0.1	3	TAS473*020PIA
0.056	A	0.1	3	TAS563*020PIA
0.068	A	0.1	3	TAS683*020PIA
0.082	A	0.1	3	TAS823*020PIA
0.10	A	0.3	3	TAS104*020PIA
0.12	A	0.3	3	TAS124*020PIA
0.15	A	0.3	3	TAS154*020PIA
0.18	A	0.3	3	TAS184*020PIA
0.22	A	0.3	3	TAS224*020PIA
0.27	A	0.3	3	TAS274*020PIA
0.33	A	0.3	3	TAS334*020PIA
0.39	A	0.3	3	TAS394*020PIA
0.47	A	0.3	3	TAS474*020PIA
0.56	A	0.3	3	TAS564*020PIA
0.68	A	0.3	3	TAS684*020PIA
0.82	A	0.3	3	TAS824*020PIA
1.0	A	0.3	3	TAS105*020PIA
1.2	A	0.3	4	TAS125*020PIA
1.5	A	0.3	4	TAS155*020PIA
1.8	A	0.3	4	TAS185*020PIA
2.2	A	0.4	4	TAS225*020PIA
2.7	C	0.5	4	TAS275*020PIA

\* Indicate capacitance tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

# Type TAS Solid Tantalum Capacitors



Solid Tantalum Capacitors

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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20 WVDC @ 85°C 13 WVDC @ 125°C				
3.3	C	1.0	4	TAS335*020PIC
3.9	C	1.0	4	TAS395*020PIC
4.7	C	1.0	4	TAS475*020PIC
5.6	C	1.0	4	TAS565*020PIC
6.8	C	1.0	6	TAS685*020PIC
8.2	C	1.0	6	TAS825*020PIC
10	C	1.0	6	TAS106*020PIC
12	C	1.0	6	TAS126*020PIC
15	C	2.0	6	TAS156*020PIC
18	F	2.0	6	TAS186*020PIF
22	F	2.5	6	TAS226*020PIF
27	F	2.5	6	TAS276*020PIF
33	F	3.0	6	TAS336*020PIF
39	F	3.0	6	TAS396*020PIF
47	F	4.5	6	TAS476*020PIF
56	G	5.5	6	TAS566*020PIG
68	G	6.0	6	TAS686*020PIG
82	G	6.0	6	TAS826*020PIG
100	G	10.0	6	TAS107*020PIG

35 WVDC @ 85°C 23 WVDC @ 125°C				
0.0047	A	0.1	3	TAS472*035PIA
0.0056	A	0.1	3	TAS562*035PIA
0.0068	A	0.1	3	TAS682*035PIA
0.0082	A	0.1	3	TAS822*035PIA
0.01	A	0.1	3	TAS103*035PIA
0.012	A	0.1	3	TAS123*035PIA
0.015	A	0.1	3	TAS153*035PIA
0.018	A	0.1	3	TAS183*035PIA
0.022	A	0.1	3	TAS223*035PIA
0.027	A	0.1	3	TAS273*035PIA
0.033	A	0.1	3	TAS333*035PIA
0.039	A	0.1	3	TAS393*035PIA
0.047	A	0.1	3	TAS473*035PIA
0.056	A	0.1	3	TAS563*035PIA
0.068	A	0.1	3	TAS683*035PIA
0.082	A	0.1	3	TAS823*035PIA
0.10	A	0.5	3	TAS104*035PIA
0.12	A	0.5	3	TAS124*035PIA
0.15	A	0.5	3	TAS154*035PIA
0.18	A	0.5	3	TAS184*035PIA
0.22	A	0.5	3	TAS224*035PIA
0.27	A	0.5	3	TAS274*035PIA
0.33	A	0.5	3	TAS334*035PIA
0.39	A	0.5	3	TAS394*035PIA
0.47	A	0.5	3	TAS474*035PIA
0.56	A	0.5	3	TAS564*035PIA
0.68	A	0.5	3	TAS684*035PIA
0.82	A	0.5	3	TAS824*035PIA
1.0	A	0.5	3	TAS105*035PIC
1.2	C	0.5	4	TAS125*035PIC
1.5	C	0.5	4	TAS155*035PIC
1.8	C	0.5	4	TAS185*035PIC
2.2	C	1.0	4	TAS225*035PIC
2.7	C	1.0	4	TAS275*035PIC
3.3	C	1.0	4	TAS335*035PIC
3.9	C	1.0	4	TAS395*035PIC
4.7	C	1.0	4	TAS475*035PIC
5.6	C	1.0	4	TAS565*035PIC
6.8	C	1.5	4	TAS685*035PIC
8.2	F	3.0	4	TAS825*035PIF
10	F	3.0	4	TAS106*035PIF
12	F	3.0	4	TAS126*035PIF
15	F	3.0	4	TAS156*035PIF
18	F	3.0	4	TAS186*035PIF
22	F	4.0	4	TAS226*035PIF
27	G	4.5	4	TAS276*035PIG
33	G	5.5	4	TAS336*035PIG
39	G	6.0	4	TAS396*035PIG
47	G	8.0	4	TAS476*035PIG

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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50 WVDC @ 85°C 33 WVDC @ 125°C				
0.0047	A	0.1	2	TAS472*050PIA
0.0056	A	0.1	2	TAS562*050PIA
0.0068	A	0.1	2	TAS682*050PIA
0.0082	A	0.1	2	TAS822*050PIA
0.01	A	0.1	2	TAS103*050PIA
0.012	A	0.1	2	TAS123*050PIA
0.015	A	0.1	2	TAS153*050PIA
0.018	A	0.1	2	TAS183*050PIA
0.022	A	0.1	2	TAS223*050PIA
0.027	A	0.1	2	TAS273*050PIA
0.033	A	0.1	2	TAS333*050PIA
0.039	A	0.1	2	TAS393*050PIA
0.047	A	0.1	2	TAS473*050PIA
0.056	A	0.1	2	TAS563*050PIA
0.068	A	0.1	2	TAS683*050PIA
0.082	A	0.1	2	TAS823*050PIA
0.10	A	0.3	2	TAS104*050PIA
0.12	A	0.3	2	TAS124*050PIA
0.15	A	0.3	2	TAS154*050PIA
0.18	A	0.3	2	TAS184*050PIA
0.22	A	0.3	2	TAS224*050PIA
0.27	A	0.3	2	TAS274*050PIA
0.33	A	0.3	2	TAS334*050PIA
0.39	A	0.3	2	TAS394*050PIA
0.47	A	0.3	2	TAS474*050PIA
0.56	A	0.3	2	TAS564*050PIA
0.68	A	0.3	2	TAS684*050PIA
0.82	A	0.3	2	TAS824*050PIA
1.0	A	0.4	2	TAS105*050PIA
1.2	C	0.4	4	TAS125*050PIC
1.5	C	0.5	4	TAS155*050PIC
1.8	C	0.5	4	TAS185*050PIC
2.2	C	0.8	4	TAS225*050PIC
2.7	C	0.8	4	TAS275*050PIC
3.3	C	1.2	4	TAS335*050PIC
3.9	C	1.5	4	TAS395*050PIC
4.7	C	1.7	4	TAS475*050PIC
5.6	F	2.2	4	TAS565*050PIF
6.8	F	2.2	4	TAS685*050PIF
8.2	F	2.5	4	TAS825*050PIF
10	F	2.5	4	TAS106*050PIF
12	F	3.0	4	TAS126*050PIF
15	F	4.0	4	TAS156*050PIF
18	F	4.5	4	TAS186*050PIF
22	G	5.5	4	TAS226*050PIG

75 WVDC @ 85°C 50 WVDC @ 125°C				
0.0047	A	0.3	2	TAS472*075PIA
0.0056	A	0.3	2	TAS562*075PIA
0.0068	A	0.3	2	TAS682*075PIA
0.0082	A	0.3	2	TAS822*075PIA
0.01	A	0.3	2	TAS103*075PIA
0.012	A	0.3	2	TAS123*075PIA
0.015	A	0.3	2	TAS153*075PIA
0.018	A	0.3	2	TAS183*075PIA
0.022	A	0.3	2	TAS223*075PIA
0.027	A	0.3	2	TAS273*075PIA
0.033	A	0.3	2	TAS333*075PIA
0.039	A	0.3	2	TAS393*075PIA
0.047	A	0.3	2	TAS473*075PIA
0.056	A	0.3	2	TAS563*075PIA
0.068	A	0.3	2	TAS683*075PIA
0.082	A	0.3	2	TAS823*075PIA
0.10	A	0.3	2	TAS104*075PIA
0.12	A	0.3	2	TAS124*075PIA
0.15	A	0.3	2	TAS154*075PIA
0.18	A	0.3	2	TAS184*075PIA
0.22	A	0.3	2	TAS224*075PIA
0.27	A	0.3	2	TAS274*075PIA
0.33	A	0.3	2	TAS334*075PIA

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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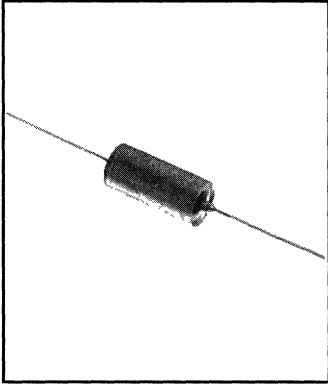
75 WVDC @ 85°C 50 WVDC @ 125°C				
0.39	A	0.3	2	TAS394*075PIA
0.47	A	0.3	2	TAS474*075PIA
0.56	A	0.3	2	TAS564*075PIA
0.68	A	0.3	2	TAS684*075PIA
0.82	C	0.3	2	TAS824*075PIC
1.0	C	0.3	2	TAS105*075PIC
1.2	C	0.3	4	TAS125*075PIC
1.5	C	0.6	4	TAS155*075PIC
1.8	C	0.7	4	TAS185*075PIC
2.2	C	0.8	4	TAS225*075PIC
2.7	C	1.0	4	TAS275*075PIC
3.3	C	1.2	4	TAS335*075PIC
3.9	C	1.5	4	TAS395*075PIC
4.7	F	3.0	4	TAS475*075PIF
5.6	F	3.0	4	TAS565*075PIF
6.8	F	5.0	4	TAS685*075PIF
8.2	F	5.0	4	TAS825*075PIF
10	F	5.0	4	TAS106*075PIF
12	G	5.0	4	TAS126*075PIG
15	G	7.0	4	TAS156*075PIG

100 WVDC @ 85°C 67 WVDC @ 125°C				
0.0047	A	0.3	2	TAS472*100PIA
0.0056	A	0.3	2	TAS562*100PIA
0.0068	A	0.3	2	TAS682*100PIA
0.0082	A	0.3	2	TAS822*100PIA
0.01	A	0.3	2	TAS103*100PIA
0.012	A	0.3	2	TAS123*100PIA
0.015	A	0.3	2	TAS153*100PIA
0.018	A	0.3	2	TAS183*100PIA
0.022	A	0.3	2	TAS223*100PIA
0.027	A	0.3	2	TAS273*100PIA
0.033	A	0.3	2	TAS333*100PIA
0.039	A	0.3	2	TAS393*100PIA
0.047	A	0.3	2	TAS473*100PIA
0.056	A	0.3	2	TAS563*100PIA
0.068	A	0.3	2	TAS683*100PIA
0.082	A	0.3	2	TAS823*100PIA
0.10	A	0.3	2	TAS104*100PIA
0.12	A	0.3	2	TAS124*100PIA
0.15	A	0.3	2	TAS154*100PIA
0.18	A	0.3	2	TAS184*100PIA
0.22	A	0.3	2	TAS224*100PIA
0.27	A	0.3	2	TAS274*100PIA
0.33	A	0.3	2	TAS334*100PIA
0.39	A	0.3	2	TAS394*100PIA
0.47	A	0.3	2	TAS474*100PIA
0.56	A	0.3	2	TAS564*100PIA
0.68	C	0.3	2	TAS684*100PIC
0.82	C	0.4	2	TAS824*100PIC
1.0	C	0.5	2	TAS105*100PIC
1.2	C	0.5	3	TAS125*100PIC
1.5	C	0.7	3	TAS155*100PIC
1.8	C	0.7	3	TAS185*100PIC
2.2	C	0.9	3	TAS225*100PIC
2.7	C	1.1	3	TAS275*100PIC
3.3	F	1.5	3	TAS335*100PIF
3.9	F	1.5	3	TAS395*100PIF
4.7	F	2.5	3	TAS475*100PIF
5.6	F	2.5	3	TAS565*100PIF
6.8	F	2.5	3	TAS685*100PIF
8.2	G	5.0	3	TAS825*100PIG
10	G	5.0	3	TAS106*100PIG

\* Indicate capacitance tolerance:  
J = ±5%  
K = ±10%  
M = ±20%

# Type TXA Solid Tantalum Capacitors

**MALLORY**



- Extended Range
- Hermetically Sealed
- Low DC Leakage
- Low Dissipation Factor
- Temperature Stable
- Frequency Stable
- Moisture/Solvent Resistant
- Miniature Size
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)  
Voltage Range:  
6 to 50 WVDC @ 85°C  
Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C  
Capacitance Range:  
1.2  $\mu$ F to 1000  $\mu$ F  
Capacitance Tolerance:  
 $\pm$ 10%,  $\pm$ 20%  
( $\pm$ 5% by special order)

## DC Leakage:

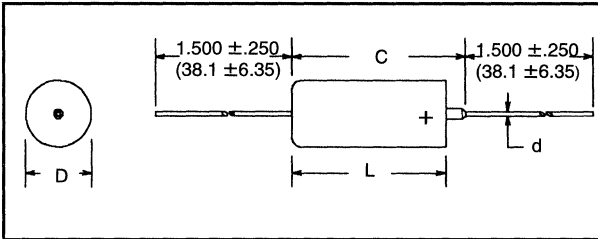
At +25°C - See Table Limit  
At +85°C - 10 x Table Limit  
At +125°C - 12.5 x Table Limit

## Capacitance Change Maximum:

-10% @ -55°C  
+8% @ +85°C  
+12% @ +125°C

## Maximum Power Dissipation @ 25°C:

Case Code	Watts
A	.09
C	.100
F	.125
G	.180



Case Code	Uninsulated		Insulated		C Maximum	d $\pm$ .001 ( $\pm$ .03)
	D $\pm$ .005 ( $\pm$ .13)	L $\pm$ .031 ( $\pm$ .79)	D $\pm$ .010 ( $\pm$ .25)	L $\pm$ .031 ( $\pm$ .79)		
A	.125(3.18)	.250(6.35)	.135(3.43)	.286(7.26)	.422(10.72)	.020(.51)
C	.175(4.45)	.438(11.13)	.185(4.70)	.474(12.04)	.610(15.49)	.020(.51)
F	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
G	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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6 WVDC @ 85°C 4 WVDC @ 125°C				
8.2	A	0.5	6	TXA825*006PIA
10	A	0.9	6	TXA106*006PIA
12	A	1.0	6	TXA126*006PIA
82	C	4.5	6	TXA826*006PIC
100	C	6.0	8	TXA107*006PIC
220	F	12.0	8	TXA227*006PIF
270	F	13.0	8	TXA277*006PIF
330	F	15.0	8	TXA337*006PIF
390	F	15.0	10	TXA397*006PIF
470	F	15.0	10	TXA477*006PIF
560	G	20.0	10	TXA567*006PIG
680	G	20.0	10	TXA687*006PIG
820	G	20.0	10	TXA827*006PIG
1000	G	30.0	10	TXA108*006PIG

15 WVDC @ 85°C 10 WVDC @ 125°C				
27	C	4.0	6	TXA276*015PIC
33	C	5.0	6	TXA336*015PIC
39	C	6.0	6	TXA396*015PIC
82	F	12.0	6	TXA826*015PIF
100	F	15.0	8	TXA107*015PIF
120	F	15.0	8	TXA127*015PIF
150	F	15.0	8	TXA157*015PIF
180	F	15.0	8	TXA187*015PIF
220	G	20.0	8	TXA227*015PIG
270	G	20.0	8	TXA277*015PIG
330	G	20.0	8	TXA337*015PIG

30 WVDC @ 85°C 20 WVDC @ 125°C				
39	F	8.0	6	TXA396*030PIF
47	F	11.0	6	TXA476*030PIF
56	F	12.0	6	TXA566*030PIF
68	F	18.0	6	TXA686*030PIF
100	G	20.0	8	TXA107*030PIG

10 WVDC @ 85°C 7 WVDC @ 125°C				
5.6	A	0.9	6	TXA565*010PIA
6.8	A	1.0	6	TXA685*010PIA
8.2	A	1.2	6	TXA825*010PIA
47	C	5.0	6	TXA476*010PIC
56	C	6.0	6	TXA566*010PIC
68	C	7.0	6	TXA686*010PIC
82	C	8.0	6	TXA826*010PIC
150	F	15.0	8	TXA157*010PIF
180	F	15.0	8	TXA187*010PIF
220	F	15.0	8	TXA227*010PIF
270	F	15.0	8	TXA277*010PIF
330	G	20.0	8	TXA337*010PIG
390	G	20.0	10	TXA397*010PIG
470	G	20.0	10	TXA477*010PIG
560	G	30.0	10	TXA567*010PIG

20 WVDC @ 85°C 13 WVDC @ 125°C				
2.7	A	0.8	4	TXA275*020PIA
3.3	A	1.0	4	TXA335*020PIA
3.9	A	1.2	4	TXA395*020PIA
4.7	A	1.2	4	TXA475*020PIA
18	C	4.0	6	TXA186*020PIC
22	C	5.0	6	TXA226*020PIC
27	C	5.0	6	TXA276*020PIC
56	F	10.0	6	TXA566*020PIF
68	F	10.0	6	TXA686*020PIF
82	F	10.0	6	TXA826*020PIF
100	F	15.0	6	TXA107*020PIF
120	F	15.0	6	TXA127*020PIF
150	G	20.0	8	TXA157*020PIG
180	G	20.0	8	TXA187*020PIG

35 WVDC @ 85°C 23 WVDC @ 125°C				
1.5	A	0.8	4	TXA155*035PIA
1.8	A	1.0	4	TXA185*035PIA
8.2	C	3.0	6	TXA825*035PIC
10	C	4.0	6	TXA106*035PIC
27	F	7.0	6	TXA276*035PIF
33	F	10.0	6	TXA336*035PIF
39	F	10.0	6	TXA396*035PIF
47	F	10.0	6	TXA476*035PIF
56	G	15.0	6	TXA566*035PIG
68	G	15.0	6	TXA686*035PIG

15 WVDC @ 85°C 10 WVDC @ 125°C				
3.9	A	0.8	4	TXA395*015PIA
4.7	A	1.0	4	TXA475*015PIA
5.6	A	1.3	4	TXA565*015PIA

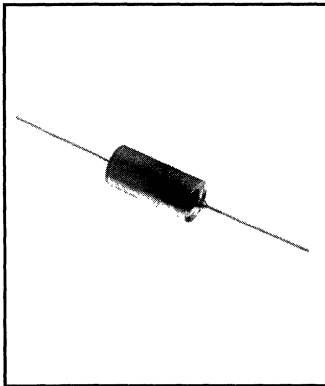
30 WVDC @ 85°C 20 WVDC @ 125°C				
1.8	A	1.0	4	TXA185*030PIA
2.2	A	1.0	4	TXA225*030PIA
2.7	A	1.0	4	TXA275*030PIA
12	C	4.5	6	TXA126*030PIC
15	C	5.0	6	TXA156*030PIC
18	C	5.0	6	TXA186*030PIC
33	F	8.0	6	TXA336*030PIF

50 WVDC @ 85°C 33 WVDC @ 125°C				
1.2	A	0.9	4	TXA125*050PIA
1.5	A	1.2	4	TXA155*050PIA
5.6	C	4.5	4	TXA565*050PIC
6.8	C	4.5	6	TXA685*050PIC
22	F	10.0	6	TXA226*050PIF
27	F	10.0	6	TXA276*050PIF
33	G	10.0	6	TXA336*050PIG
39	G	10.0	6	TXA396*050PIG

\* Indicate capacitance tolerance:

- J =  $\pm$ 5%
- K =  $\pm$ 10%
- M =  $\pm$ 20%

# Type THF Solid Tantalum Capacitors



- High Ripple Current
- Low ESR
- Lower Impedance at High Frequencies
- Small Size
- Extremely Stable Capacitance
- Hermetic Seal
- Long Life
- Switching Regulators
- High Frequency Power Supplies
- By-pass Filtering

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)

Voltage Range:  
6 to 50 WVDC @ 85°C

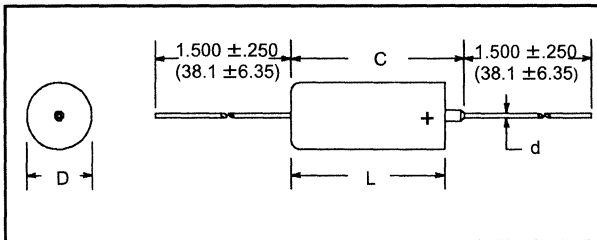
Capacitance Range:  
5.6  $\mu$ F to 330  $\mu$ F

Capacitance Tolerance:  
Standard  $\pm$ 20%  
( $\pm$ 10% by special order)

DC Leakage:  
At +25°C - See Table Limit  
At +85°C - 10 x Table Limit  
At +125°C - 12.5 x Table Limit

Ripple Current Capability:  
1.2 to 4.4 amperes  
@ 25°C and 100 KHz

Typical ESR:  
.03 to .212 ohms



Case Code	Uninsulated		Insulated		C Maximum	d $\pm$ .001 ( $\pm$ .03)
	D $\pm$ .005 ( $\pm$ .13)	L $\pm$ .031 ( $\pm$ .79)	D $\pm$ .010 ( $\pm$ .25)	L $\pm$ .031 ( $\pm$ .79)		
F	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
G	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 1 kHz	Typical ESR (ohms) @100kHz +25°C	Max Ripple RMS Amps @ 40kHz +25°C	Catalog Number
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6 WVDC @ 85°C 4 WVDC @ 125°C						
150	F	9	10	.044	3.3	THF157*006PIF
180	F	11	10	.040	3.4	THF187*006PIF
270	G	13	10	.033	4.1	THF277*006PIG
330	G	15	12	.030	4.3	THF337*006PIG

10 WVDC @ 85°C 7 WVDC @ 125°C						
82	F	8	8	.059	2.9	THF826*010PIF
100	F	10	8	.054	3.0	THF107*010PIF
120	F	12	8	.049	3.2	THF127*010PIF
180	G	18	8	.040	3.7	THF187*010PIG
220	G	20	10	.037	3.9	THF227*010PIG

15 WVDC @ 85°C 10 WVDC @ 125°C						
56	F	8	6	.071	2.6	THF566*015PIF
68	F	10	6	.064	2.7	THF686*015PIF
120	G	18	8	.049	3.5	THF127*015PIG
150	G	20	8	.044	3.6	THF157*015PIG

20 WVDC @ 85°C 13 WVDC @ 125°C						
27	F	5	5	.100	2.2	THF276*020PIF
33	F	7	5	.091	2.3	THF336*020PIF
39	F	8	5	.084	2.4	THF396*020PIF
47	F	9	6	.077	2.5	THF476*020PIF
56	G	11	6	.071	2.9	THF566*020PIG
68	G	14	6	.064	3.0	THF686*020PIG
82	G	16	6	.059	3.1	THF826*020PIG
100	G	20	8	.054	3.3	THF107*020PIG

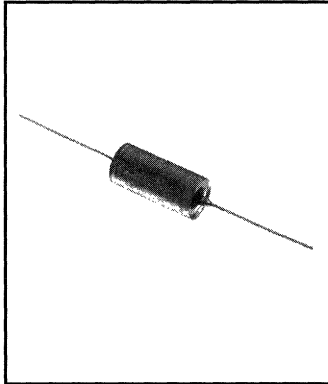
Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 1 kHz	Typical ESR (ohms) @100kHz +25°C	Max Ripple RMS Amps @ 40kHz +25°C	Catalog Number
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35 WVDC @ 85°C 23 WVDC @ 125°C						
10	F	4	4	.161	1.5	THF106*035PIF
22	F	8	4	.110	2.1	THF226*035PIF
27	G	9	4	.100	2.4	THF276*035PIG
33	G	11	5	.091	2.5	THF336*035PIG
39	G	14	5	.084	2.6	THF396*035PIG
47	G	16	5	.077	2.7	THF476*035PIG

50 WVDC @ 85°C 33 WVDC @ 125°C						
5.6	F	4	3	.212	1.5	THF565*050PIF
6.8	F	4	3	.193	1.6	THF685*050PIF
8.2	F	5	3	.177	1.6	THF825*050PIF
10	F	5	3	.161	1.7	THF106*050PIF
12	F	6	3	.147	1.8	THF126*050PIF
15	F	8	3	.132	1.9	THF156*050PIF
18	F	9	4	.121	2.0	THF186*050PIF
22	G	11	4	.110	2.3	THF226*050PIG

\* Indicate capacitance tolerance:  
K = 10%  
M = 20%

# CSR13 (MIL-C-39003/01) Solid Tantalum Capacitors



- Hermetically Sealed
- Graded Failure Rates
- Low DC Leakage
- Low Dissipation Factor
- Temperature Stable
- Frequency Stable
- Moisture/Solvent Resistant
- Miniature Size
- Long Shelf Life

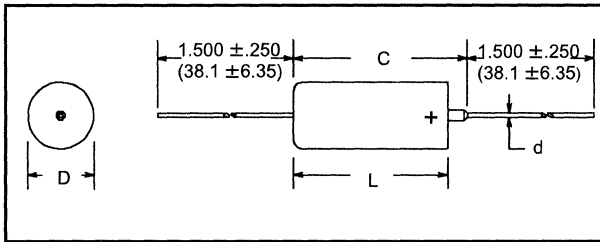
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)  
Voltage Range:  
6 to 100 WVDC @ 85°C  
Reverse Voltage (non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C  
Capacitance Range:  
.0047 μF to 330 μF  
Capacitance Tolerance:  
±10%, ±20%  
(±5% by special order)

DC Leakage:  
At +25°C - See Table Limit.  
At +85°C - 10 x Table Limit.  
At +125°C - 12.5 x Table Limit.  
Capacitance Change Maximum:  
-10% @ -55°C  
+8% @ +85°C  
+12% @ +125°C

Maximum Power Dissipation @ 25°C:

Case Code	Watts
A	.09
B	.100
C	.125
D	.180



Case Code	Uninsulated		Insulated		C Maximum	d ±.001 (±.03)
	D ±.005 (±.13)	L ±.031 (±.79)	D ±.010 (±.25)	L ±.031 (±.79)		
A	.125(3.18)	.250(6.35)	.135(3.43)	.286(7.26)	.422(10.72)	.020(.51)
B	.175(4.45)	.438(11.13)	.185(4.70)	.474(12.04)	.610(15.49)	.020(.51)
C	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
D	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. (μF)	Cap. Tolerance (±)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	MIL-C-39003/1 (CSR 13) Dash Numbers							MIL Reference Number
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)			
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)	

### 6 WVDC @ 85°C — 4 WVDC @ 125°C

5.6	10	A	0.3	4	2241	2481	2721	2961	6002	7002	8002	CSR13B565K*
6.8	10	A	0.3	6	2242	2482	2722	2962	6004	7004	8004	CSR13B685K*
6.8	20	A	0.3	6	2243	2483	2723	2963	6005	7005	8005	CSR13B685M*
47	10	B	1.5	6	2244	2484	2724	2964	6007	7007	8007	CSR13B476K*
47	20	B	1.5	6	2245	2485	2725	2965	6008	7008	8008	CSR13B476M*
56	10	B	1.5	6	2246	2486	2726	2966	6010	7010	8010	CSR13B566K*
150	10	C	4.5	6	2247	2487	2727	2967	6012	7012	8012	CSR13B157K*
150	20	C	4.5	6	2248	2488	2728	2968	6013	7013	8013	CSR13B157M*
180	10	C	5.5	6	2249	2489	2729	2969	6015	7015	8015	CSR13B187K*
270	10	D	6.0	8	2250	2490	2730	2970	6017	7017	8017	CSR13B277K*
330	10	D	7.5	8	2251	2491	2731	2971	6019	7019	8019	CSR13B337K*
330	20	D	7.5	8	2252	2492	2732	2972	6020	7020	8020	CSR13B337M*

### 10 WVDC @ 85°C — 7 WVDC @ 125°C

3.9	10	A	0.3	4	2253	2493	2733	2973	6022	7022	8022	CSR13C395K*
4.7	10	A	0.4	4	2254	2494	2734	2974	6024	7024	8024	CSR13C475K*
4.7	20	A	0.4	4	2255	2495	2735	2975	6025	7025	8025	CSR13C475M*
27	10	B	2.0	6	2256	2496	2736	2976	6027	7027	8027	CSR13C276K*
33	10	B	2.0	6	2257	2497	2737	2977	6029	7029	8029	CSR13C336K*
33	20	B	2.0	6	2258	2498	2738	2978	6030	7030	8030	CSR13C336M*
39	10	B	2.0	6	2259	2499	2739	2979	6032	7032	8032	CSR13C396K*
82	10	C	3.0	6	2260	2500	2740	2980	6034	7034	8034	CSR13C826K*
100	10	C	5.0	6	2261	2501	2741	2981	6036	7036	8036	CSR13C107K*
100	20	C	5.0	6	2262	2502	2742	2982	6037	7037	8037	CSR13C107M*
120	10	C	6.0	6	2263	2503	2743	2983	6039	7039	8039	CSR13C127K*
180	10	D	9.0	6	2264	2504	2744	2984	6041	7041	8041	CSR13C187K*
220	10	D	10.0	8	2265	2505	2745	2985	6043	7043	8043	CSR13C227K*
220	20	D	10.0	8	2266	2506	2746	2986	6044	7044	8044	CSR13C227M*

### 15 WVDC @ 85°C — 10 WVDC @ 125°C

2.7	10	A	0.3	4	2267	2507	2747	2987	6046	7046	8046	CSR13D275K*
3.3	10	A	0.4	4	2268	2508	2748	2988	6048	7048	8048	CSR13D335K*
3.3	20	A	0.4	4	2269	2509	2749	2989	6049	7049	8049	CSR13D335M*
18	10	B	2.0	6	2270	2510	2750	2990	6051	7051	8051	CSR13D186K*
22	10	B	2.0	6	2271	2511	2751	2991	6053	7053	8053	CSR13D226K*
22	20	B	2.0	6	2272	2512	2752	2992	6054	7054	8054	CSR13D226M*

**TO ORDER:** Indicate the prefix CSR13 followed by the applicable MIL dash number.  
Example: For M39003/01-2241 or CSR13B565KM; order CSR132241

\* Failure rate level indicator (M, P, R, S)

# CSR13 (MIL-C-39003/01) Solid Tantalum Capacitors



Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	MIL-C-39003/1(CSR 13) Dash Numbers							MIL Reference Number
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)			
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)	

15 WVDC @ 85°C — 10 WVDC @ 125°C												
56	10	C	4.0	6	2273	2513	2753	2993	6056	7056	8056	CSR13D566K*
68	10	C	5.0	6	2274	2514	2754	2994	6058	7058	8058	CSR13D686K*
68	20	C	5.0	6	2275	2515	2755	2995	6059	7059	8059	CSR13D686M*
120	10	D	6.0	6	2276	2516	2756	2996	6061	7061	8061	CSR13D127K*
150	10	D	8.0	6	2277	2517	2757	2997	6063	7063	8063	CSR13D157K*
150	20	D	8.0	6	2278	2518	2758	2998	6064	7064	8064	CSR13D157M*

20 WVDC @ 85°C — 13 WVDC @ 125°C												
1.2	10	A	0.3	6	2279	2519	2759	2999	6066	7066	8066	CSR13E125K*
1.5	10	A	0.3	6	2280	2520	2760	3000	6068	7068	8068	CSR13E155K*
1.5	20	A	0.3	6	2281	2521	2761	3001	6069	7069	8069	CSR13E155M*
1.8	10	A	0.3	6	2282	2522	2762	3002	6071	7071	8071	CSR13E185K*
2.2	10	A	0.4	6	2283	2523	2763	3003	6073	7073	8073	CSR13E225K*
2.2	20	A	0.4	6	2284	2524	2764	3004	6074	7074	8074	CSR13E225M*
8.2	10	B	1.0	6	2285	2525	2765	3005	6076	7076	8076	CSR13E825K*
10	10	B	1.0	6	2286	2526	2766	3006	6078	7078	8078	CSR13E106K*
10	20	B	1.0	6	2287	2527	2767	3007	6079	7079	8079	CSR13E106M*
12	10	B	1.0	6	2288	2528	2768	3008	6081	7081	8081	CSR13E126K*
15	10	B	2.0	6	2289	2529	2769	3009	6083	7083	8083	CSR13E156K*
15	20	B	2.0	6	2290	2530	2770	3010	6084	7084	8084	CSR13E156M*
27	10	C	2.5	6	2291	2531	2771	3011	6086	7086	8086	CSR13E276K*
33	10	C	3.0	6	2292	2532	2772	3012	6088	7088	8088	CSR13E336K*
33	20	C	3.0	6	2293	2533	2773	3013	6089	7089	8089	CSR13E336M*
39	10	C	3.0	6	2294	2534	2774	3014	6091	7091	8091	CSR13E396K*
47	10	C	4.5	6	2295	2535	2775	3015	6093	7093	8093	CSR13E476K*
47	20	C	4.5	6	2296	2536	2776	3016	6094	7094	8094	CSR13E476M*
56	10	D	5.5	6	2297	2537	2777	3017	6096	7096	8096	CSR13E566K*
68	10	D	6.0	6	2298	2538	2778	3018	6098	7098	8098	CSR13E686K*
68	20	D	6.0	6	2299	2539	2779	3019	6099	7099	8099	CSR13E686M*
82	10	D	6.0	6	2300	2540	2780	3020	6101	7101	8101	CSR13E826K*
100	10	D	10.0	6	2301	2541	2781	3021	6103	7103	8103	CSR13E107K*
100	20	D	10.0	6	2302	2542	2782	3022	6104	7104	8104	CSR13E107M*

35 WVDC @ 85°C — 23 WVDC @ 125°C												
5.6	10	B	1.0	4	2303	2543	2783	3023	6106	7106	8106	CSR13F565K*
6.8	10	B	1.5	4	2304	2544	2784	3024	6108	7108	8108	CSR13F685K*
6.8	20	B	1.5	4	2305	2545	2785	3025	6109	7109	8109	CSR13F685M*
22	10	C	4.0	4	2306	2546	2786	3026	6111	7111	8111	CSR13F226K*
22	20	C	4.0	4	2307	2547	2787	3027	6112	7112	8112	CSR13F226M*
27	10	D	4.5	4	2308	2548	2788	3028	6114	7114	8114	CSR13F276K*
33	10	D	5.5	4	2309	2549	2789	3029	6116	7116	8116	CSR13F336K*
33	20	D	5.5	4	2310	2550	2790	3030	6117	7117	8117	CSR13F336M*
39	10	D	6.0	4	2311	2551	2791	3031	6119	7119	8119	CSR13F396K*
47	10	D	6.0	4	2312	2552	2792	3032	6121	7121	8121	CSR13F476K*
47	20	D	8.0	4	2313	2553	2793	3033	6122	7122	8122	CSR13F476M*

50 WVDC @ 85°C — 33 WVDC @ 125°C												
0.0047	10	A	0.1	2	2314	2554	2794	3034	6124	7124	8124	CSR13G472K*
0.0047	20	A	0.1	2	2315	2555	2795	3035	6125	7125	8125	CSR13G472M*
0.0056	10	A	0.1	2	2316	2556	2796	3036	6127	7127	8127	CSR13G562K*
0.0068	10	A	0.1	2	2317	2557	2797	3037	6129	7129	8129	CSR13G682K*
0.0068	20	A	0.1	2	2318	2558	2798	3038	6130	7130	8130	CSR13G682M*
0.0082	10	A	0.1	2	2319	2559	2799	3039	6132	7132	8132	CSR13G822K*
0.01	10	A	0.1	2	2320	2560	2800	3040	6134	7134	8134	CSR13G103K*
0.01	20	A	0.1	2	2321	2561	2801	3041	6135	7135	8135	CSR13G103M*
0.012	10	A	0.1	2	2322	2562	2802	3042	6137	7137	8137	CSR13G123K*
0.015	10	A	0.1	2	2323	2563	2803	3043	6139	7139	8139	CSR13G153K*
0.015	20	A	0.1	2	2324	2564	2804	3044	6140	7140	8140	CSR13G153M*
0.018	10	A	0.1	2	2325	2565	2805	3045	6142	7142	8142	CSR13G183K*
0.022	10	A	0.1	2	2326	2566	2806	3046	6144	7144	8144	CSR13G223K*
0.022	20	A	0.1	2	2327	2567	2807	3047	6145	7145	8145	CSR13G223M*
0.027	10	A	0.1	2	2328	2568	2808	3048	6147	7147	8147	CSR13G273K*
0.033	10	A	0.1	2	2329	2569	2809	3049	6149	7149	8149	CSR13G333K*
0.033	20	A	0.1	2	2330	2570	2810	3050	6150	7150	8150	CSR13G333M*
0.039	10	A	0.1	2	2331	2571	2811	3051	6152	7152	8152	CSR13G393K*
0.047	10	A	0.1	2	2332	2572	2812	3052	6154	7154	8154	CSR13G473K*

**TO ORDER:** Indicate the prefix CSR13 followed by the applicable MIL dash number.  
Example: For M39003/01-2241 or CSR13B565KM; order CSR132241

\* Failure rate level indicator  
(M, P, R, S)

# CSR13 (MIL-C-39003/01) Solid Tantalum Capacitors



Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @+25°C 120 Hz	MIL-C-39003/1(CSR 13) Dash Numbers							MIL Reference Number
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)			
					'M' Level (.1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)	

## 50 WVDC @ 85°C — 33 WVDC @ 125°C

0.047	20	A	0.1	2	2333	2573	2813	3053	6155	7155	8155	CSR13G473M*
0.056	10	A	0.1	2	2334	2574	2814	3054	6157	7157	8157	CSR13G563K*
0.068	10	A	0.1	2	2335	2575	2815	3055	6159	7159	8159	CSR13G683K*
0.068	20	A	0.1	2	2336	2576	2816	3056	6160	7160	8160	CSR13G683M*
0.082	10	A	0.1	2	2337	2577	2817	3057	6162	7162	8162	CSR13G823K*
0.1	10	A	0.3	2	2338	2578	2818	3058	6164	7164	8164	CSR13G104K*
0.1	20	A	0.3	2	2339	2579	2819	3059	6165	7165	8165	CSR13G104M*
0.12	10	A	0.3	2	2340	2580	2820	3060	6167	7167	8167	CSR13G124K*
0.15	10	A	0.3	2	2341	2581	2821	3061	6169	7169	8169	CSR13G154K*
0.15	20	A	0.3	2	2342	2582	2822	3062	6170	7170	8170	CSR13G154M*
0.18	10	A	0.3	2	2343	2583	2823	3063	6172	7172	8172	CSR13G184K*
0.22	10	A	0.3	2	2344	2584	2824	3064	6174	7174	8174	CSR13G224K*
0.22	20	A	0.3	2	2345	2585	2825	3065	6175	7175	8175	CSR13G224M*
0.27	10	A	0.3	2	2346	2586	2826	3066	6177	7177	8177	CSR13G274K*
0.33	10	A	0.3	2	2347	2587	2827	3067	6179	7179	8179	CSR13G334K*
0.33	20	A	0.3	2	2348	2588	2828	3068	6180	7180	8180	CSR13G334M*
0.39	10	A	0.3	2	2349	2589	2829	3069	6182	7182	8182	CSR13G394K*
0.47	10	A	0.3	2	2350	2590	2830	3070	6184	7184	8184	CSR13G474K*
0.47	20	A	0.3	2	2351	2591	2831	3071	6185	7185	8185	CSR13G474M*
0.56	10	A	0.3	2	2352	2592	2832	3072	6187	7187	8187	CSR13G564K*
0.68	10	A	0.3	2	2353	2593	2833	3073	6189	7189	8189	CSR13G684K*
0.68	20	A	0.3	2	2354	2594	2834	3074	6190	7190	8190	CSR13G684M*
0.82	10	A	0.3	2	2355	2595	2835	3075	6192	7192	8192	CSR13G824K*
1.0	10	A	0.4	2	2356	2596	2836	3076	6194	7194	8194	CSR13G105K*
1.0	20	A	0.4	2	2357	2597	2837	3077	6195	7195	8195	CSR13G105M*
1.2	10	B	0.4	4	2358	2598	2838	3078	6197	7197	8197	CSR13G125K*
1.5	10	B	0.5	4	2359	2599	2839	3079	6199	7199	8199	CSR13G155K*
1.5	20	B	0.5	4	2360	2600	2840	3080	6200	7200	8200	CSR13G155M*
1.8	10	B	0.5	4	2361	2601	2841	3081	6202	7202	8202	CSR13G185K*
2.2	10	B	0.8	4	2362	2602	2842	3082	6204	7204	8204	CSR13G225K*
2.2	20	B	0.8	4	2363	2603	2843	3083	6205	7205	8205	CSR13G225M*
2.7	10	B	0.8	4	2364	2604	2844	3084	6207	7207	8207	CSR13G275K*
3.3	10	B	1.2	4	2365	2605	2845	3085	6209	7209	8209	CSR13G335K*
3.3	20	B	1.2	4	2366	2606	2846	3086	6210	7210	8210	CSR13G335M*
3.9	10	B	1.5	4	2367	2607	2847	3087	6212	7212	8212	CSR13G395K*
4.7	10	B	1.7	4	2368	2608	2848	3088	6214	7214	8214	CSR13G475K*
4.7	20	B	1.7	4	2369	2609	2849	3089	6215	7215	8215	CSR13G475M*
5.6	10	C	2.2	4	2370	2610	2850	3090	6217	7217	8217	CSR13G565K*
6.8	10	C	2.2	4	2371	2611	2851	3091	6219	7219	8219	CSR13G685K*
6.8	20	C	2.2	4	2372	2612	2852	3092	6220	7220	8220	CSR13G685M*
8.2	10	C	2.5	4	2373	2613	2853	3093	6222	7222	8222	CSR13G825K*
10	10	C	2.5	4	2374	2614	2854	3094	6224	7224	8224	CSR13G106K*
10	20	C	2.5	4	2375	2615	2855	3095	6225	7225	8225	CSR13G106M*
12	10	C	0.3	4	2376	2616	2856	3096	6227	7227	8227	CSR13G126K*
15	10	C	4.0	4	2377	2617	2857	3097	6229	7229	8229	CSR13G156K*
15	20	C	4.0	4	2378	2618	2858	3098	6230	7230	8230	CSR13G156M*
18	10	C	4.5	4	2379	2619	2859	3099	6232	7232	8232	CSR13G186K*
22	10	D	5.5	4	2380	2620	2860	3100	6234	7234	8234	CSR13G226K*
22	20	D	5.5	4	2381	2621	2861	3101	6235	7235	8235	CSR13G226M*

## 75 WVDC @ 85°C — 50 WVDC @ 125°C

0.1	10	A	0.3	2	2382	2622	2862	3102	6237	7237	8237	CSR13H104K*
0.1	20	A	0.3	2	2383	2623	2863	3103	6238	7238	8238	CSR13H104M*
0.12	10	A	0.3	2	2384	2624	2864	3104	6240	7240	8240	CSR13H124K*
0.15	10	A	0.3	2	2385	2625	2865	3105	6242	7242	8242	CSR13H154K*
0.15	20	A	0.3	2	2386	2626	2866	3106	6243	7243	8243	CSR13H154M*
0.18	10	A	0.3	2	2387	2627	2867	3107	6245	7245	8245	CSR13H184K*
0.22	10	A	0.3	2	2388	2628	2868	3108	6247	7247	8247	CSR13H224K*
0.22	20	A	0.3	2	2389	2629	2869	3109	6248	7248	8248	CSR13H224M*
0.27	10	A	0.3	2	2390	2630	2870	3110	6250	7250	8250	CSR13H274K*
0.33	10	A	0.3	2	2391	2631	2871	3111	6252	7252	8252	CSR13H334K*
0.33	20	A	0.3	2	2392	2632	2872	3112	6253	7253	8253	CSR13H334M*
0.39	10	A	0.3	2	2393	2633	2873	3113	6255	7255	8255	CSR13H394K*
0.47	10	A	0.3	2	2394	2634	2874	3114	6257	7257	8257	CSR13H474K*
0.47	20	A	0.3	2	2395	2635	2875	3115	6258	7258	8258	CSR13H474M*
0.56	10	A	0.3	2	2396	2636	2876	3116	6260	7260	8260	CSR13H564K*
0.68	10	A	0.3	2	2397	2637	2877	3117	6262	7262	8262	CSR13H684K*
0.68	20	A	0.3	2	2398	2638	2878	3118	6263	7263	8263	CSR13H684M*

**TO ORDER:** Indicate the prefix CSR13 followed by the applicable MIL dash number.  
Example: For M39003/01-2241 or CSR13B565KM; order CSR132241

\* Failure rate level indicator  
(M, P, R, S)



# CSR13 (MIL-C-39003/01) Solid Tantalum Capacitors



Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	MIL-C-39003/1 (CSR 13) Dash Numbers							MIL Reference Number
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)			
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)	

75 WVDC @ 85°C — 50 WVDC @ 125°C												
0.82	10	B	0.3	2	2399	2639	2879	3119	6265	7265	8265	CSR13H824K*
1.0	10	B	0.3	2	2400	2640	2880	3120	6267	7267	8267	CSR13H105K*
1.0	20	B	0.3	2	2401	2641	2881	3121	6268	7268	8268	CSR13H105M*
1.2	10	B	0.3	4	2402	2642	2882	3122	6270	7270	8270	CSR13H125K*
1.5	10	B	0.6	4	2403	2643	2883	3123	6272	7272	8272	CSR13H155K*
1.5	20	B	0.6	4	2404	2644	2884	3124	6273	7273	8273	CSR13H155M*
1.8	10	B	0.7	4	2405	2645	2885	3125	6275	7275	8275	CSR13H185K*
2.2	10	B	0.8	4	2406	2646	2886	3126	6277	7277	8277	CSR13H225K*
2.2	20	B	0.8	4	2407	2647	2887	3127	6278	7278	8278	CSR13H225M*
2.7	10	B	1.0	4	2408	2648	2888	3128	6280	7280	8280	CSR13H275K*
3.3	10	B	1.2	4	2409	2649	2889	3129	6282	7282	8282	CSR13H335K*
3.3	20	B	1.2	4	2410	2650	2890	3130	6283	7283	8283	CSR13H335M*
3.9	10	B	1.5	4	2411	2651	2891	3131	6285	7285	8285	CSR13H395K*
4.7	10	C	3.0	4	2412	2652	2892	3132	6287	7287	8287	CSR13H475K*
4.7	20	C	3.0	4	2413	2653	2893	3133	6288	7288	8288	CSR13H475M*
5.6	10	C	3.0	4	2414	2654	2894	3134	6290	7290	8290	CSR13H565K*
6.8	10	C	5.0	4	2415	2655	2895	3135	6292	7292	8292	CSR13H685K*
6.8	20	C	5.0	4	2416	2656	2896	3136	6293	7293	8293	CSR13H685M*
8.2	10	C	5.0	4	2417	2657	2897	3137	6295	7295	8295	CSR13H825K*
10	10	C	5.0	4	2418	2658	2898	3138	6297	7297	8297	CSR13H106K*
10	20	C	5.0	4	2419	2659	2899	3139	6298	7298	8298	CSR13H106M*
12	10	D	5.0	4	2420	2660	2900	3140	6300	7300	8300	CSR13H126K*
15	10	D	7.0	4	2421	2661	2901	3141	6302	7302	8302	CSR13H156K*
15	20	D	7.0	4	2422	2662	2902	3142	6303	7303	8303	CSR13H156M*

100 WVDC @ 85°C — 67 WVDC @ 125°C												
0.0047	10	A	0.3	2	2423	2663	2903	3143	6305	7305	+8305	CSR13J472K*
0.0047	20	A	0.3	2	2424	2664	2904	3144	6306	7306	+8306	CSR13J472M*
0.0056	10	A	0.3	2	2425	2665	2905	3145	6308	7308	+8308	CSR13J562K*
0.0068	10	A	0.3	2	2426	2666	2906	3146	6310	7310	+8310	CSR13J682K*
0.0068	20	A	0.3	2	2427	2667	2907	3147	6311	7311	+8311	CSR13J682M*
0.0082	10	A	0.3	2	2428	2668	2908	3148	6313	7313	+8313	CSR13J822K*
0.01	10	A	0.3	2	2429	2669	2909	3149	6315	7315	+8315	CSR13J103K*
0.01	20	A	0.3	2	2430	2670	2910	3150	6316	7316	+8316	CSR13J103M*
0.012	10	A	0.3	2	2431	2671	2911	3151	6318	7318	+8318	CSR13J123K*
0.015	10	A	0.3	2	2432	2672	2912	3152	6320	7320	+8320	CSR13J153K*
0.015	20	A	0.3	2	2433	2673	2913	3153	6321	7321	+8321	CSR13J153M*
0.018	10	A	0.3	2	2434	2674	2914	3154	6323	7323	+8323	CSR13J183K*
0.022	10	A	0.3	2	2435	2675	2915	3155	6325	7325	+8325	CSR13J223K*
0.022	20	A	0.3	2	2436	2676	2916	3156	6326	7326	+8326	CSR13J223M*
0.027	10	A	0.3	2	2437	2677	2917	3157	6328	7328	+8328	CSR13J273K*
0.033	10	A	0.3	2	2438	2678	2918	3158	6330	7330	+8330	CSR13J333K*
0.033	20	A	0.3	2	2439	2679	2919	3159	6331	7331	+8331	CSR13J333M*
0.039	10	A	0.3	2	2440	2680	2920	3160	6333	7333	+8333	CSR13J393K*
0.047	10	A	0.3	2	2441	2681	2921	3161	6335	7335	+8335	CSR13J473K*
0.047	20	A	0.3	2	2442	2682	2922	3162	6336	7336	+8336	CSR13J473M*
0.056	10	A	0.3	2	2443	2683	2923	3163	6338	7338	+8338	CSR13J563K*
0.068	10	A	0.3	2	2444	2684	2924	3164	6340	7340	+8340	CSR13J683K*
0.068	20	A	0.3	2	2445	2685	2925	3165	6341	7341	+8341	CSR13J683M*
0.082	10	A	0.3	2	2446	2686	2926	3166	6343	7343	+8343	CSR13J823K*
0.1	10	A	0.3	2	2447	2687	2927	3167	6345	7345	+8345	CSR13J104K*
0.1	20	A	0.3	2	2448	2688	2928	3168	6346	7346	+8346	CSR13J104M*
0.12	10	A	0.3	2	2449	2689	2929	3169	6348	7348	+8348	CSR13J124K*
0.15	10	A	0.3	2	2450	2690	2930	3170	6350	7350	+8350	CSR13J154K*
0.15	20	A	0.3	2	2451	2691	2931	3171	6351	7351	+8351	CSR13J154M*
0.18	10	A	0.3	2	2452	2692	2932	3172	6353	7353	+8353	CSR13J184K*
0.22	10	A	0.3	2	2453	2693	2933	3173	6355	7355	+8355	CSR13J224K*
0.22	20	A	0.3	2	2454	2694	2934	3174	6356	7356	+8356	CSR13J224M*
0.27	10	A	0.3	2	2455	2695	2935	3175	6358	7358	+8358	CSR13J274K*
0.33	10	A	0.3	2	2456	2696	2936	3176	6360	7360	+8360	CSR13J334K*
0.33	20	A	0.3	2	2457	2697	2937	3177	6361	7361	+8361	CSR13J334M*
0.39	10	A	0.3	2	2458	2698	2938	3178	6363	7363	+8363	CSR13J394K*
0.47	10	A	0.3	2	2459	2699	2939	3179	6365	7365	+8365	CSR13J474K*
0.47	20	A	0.3	2	2460	2700	2940	3180	6366	7366	+8366	CSR13J474M*
0.56	10	A	0.3	2	2461	2701	2941	3181	6368	7368	+8368	CSR13J564K*

**TO ORDER:** Indicate the prefix CSR13 followed by the applicable MIL dash number.  
Example: For M39003/01-2241 or CSR13B565KM; order CSR132241

+ C failure rate: Not QPL for -7390 thru -7401  
+ D failure rate: Not QPL for -8305 thru -8401

\* Failure rate level indicator  
(M, P, R, S)

# CSR13 (MIL-C-39003/01) Solid Tantalum Capacitors



Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @+25°C 120 Hz	MIL-C-39003/1 (CSR 13) Dash Numbers						MIL Reference Number	
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)			
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)		'D' Level (.001)

## 100 WVDC @ 85°C — 67 WVDC @ 125°C

0.68	10	B	0.3	2	2462	2702	2942	3182	6370	7370	+8370	CSR13J684K*
0.68	20	B	0.3	2	2463	2703	2943	3183	6371	7371	+8371	CSR13J684M*
0.82	10	B	0.4	2	2464	2704	2944	3184	6373	7373	+8373	CSR13J824K*
1.0	10	B	0.5	2	2465	2705	2945	3185	6375	7375	+8375	CSR13J105K*
1.0	20	B	0.5	2	2466	2706	2946	3186	6376	7376	+8376	CSR13J105M*
1.2	10	B	0.5	3	2467	2707	2947	3187	6378	7378	+8378	CSR13J125K*
1.5	10	B	0.7	3	2468	2708	2948	3188	6380	7380	+8380	CSR13J155K*
1.5	20	B	0.7	3	2469	2709	2949	3189	6381	7381	+8381	CSR13J155M*
1.8	10	B	0.7	3	2470	2710	2950	3190	6383	7383	+8383	CSR13J185K*
2.2	10	B	0.9	3	2471	2711	2951	3191	6385	7385	+8385	CSR13J225K*
2.2	20	B	0.9	3	2472	2712	2952	3192	6386	7386	+8386	CSR13J225M*
2.7	10	B	1.1	3	2473	2713	2953	3193	6388	7388	+8388	CSR13J275K*
3.3	10	C	1.5	3	5157	5357	5557	5757	6390	+7390	+8390	CSR13J335K*
3.3	20	C	1.5	3	5158	5358	5558	5758	6391	+7391	+8391	CSR13J335M*
3.9	10	C	1.5	3	5160	5360	5560	5760	6393	+7393	+8393	CSR13J395K*
4.7	10	C	2.5	3	5162	5362	5562	5762	6395	+7395	+8395	CSR13J475K*
4.7	20	C	2.5	3	5163	5363	5563	5763	6396	+7396	+8396	CSR13J475M*
5.6	10	C	2.5	3	5165	5365	5565	5765	6398	+7398	+8398	CSR13J565K*
6.8	10	C	2.5	3	5167	5367	5567	5767	6400	+7400	+8400	CSR13J685K*
6.8	20	C	2.5	3	5168	5368	5568	5768	6401	+7401	+8401	CSR13J685M*

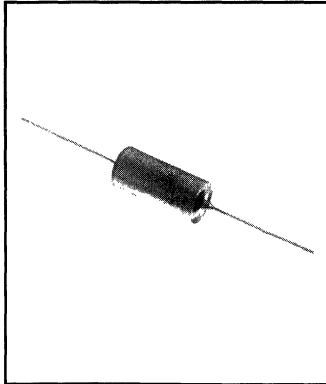
**TO ORDER:** Indicate the prefix CSR13 followed by the applicable MIL dash number.  
Example: For M39003/01-2241 or CSR13B565KM; order CSR132241

+ C failure rate: Not QPL for -7390 thru -7401  
+ D failure rate: Not QPL for -8305 thru -8401

\* Failure rate level indicator  
(M, P, R, S)

Solid Tantalum Capacitors

# CSR21 (MIL-C-39003/09) Solid Tantalum Capacitors



- High Frequency Operation
- High Ripple Capability
- Very Low ESR/Impedance
- Hermetically Sealed
- Graded Failure Rates
- Low DC Leakage
- Temperature Stable
- Frequency Stable
- Moisture/Solvent Resistant
- Miniature Size
- Long Shelf Life

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)

Voltage Range:  
6 to 50 WVDC @ 85°C

Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C

Capacitance Range:  
5.6  $\mu$ F to 330  $\mu$ F

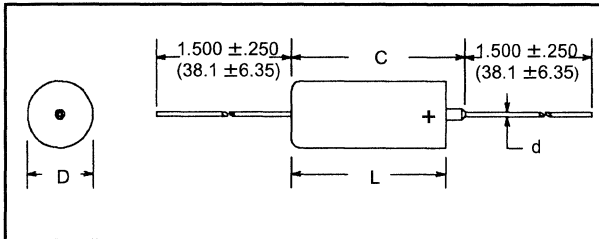
Capacitance Tolerance:  
 $\pm$ 10%,  $\pm$ 20%

Capacitance Change Maximum:  
-10% @ -55°C  
+ 8% @ +85°C  
+12% @ +125°C

DC Leakage:  
At +25°C - See Table Limit  
At +85°C - 10 x Table Limit  
At +125°C - 12.5 x Table Limit

Ripple Current @ +25°C  
RMS Amps @ 40kHz

Case	WVDC					
	6	10	15	20	35	50
C	3.4	3.2	2.7	2.5	2.1	2.0
D	4.3	3.9	3.6	3.3	2.7	2.3



Case Code	Uninsulated		Insulated		C Maximum	d $\pm$ .001 ( $\pm$ .03)
	D $\pm$ .005 ( $\pm$ .13)	L $\pm$ .031 ( $\pm$ .79)	D $\pm$ .010 ( $\pm$ .25)	L $\pm$ .031 ( $\pm$ .79)		
C	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
D	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 1kHz	Max. ESR (ohms) @ 100kHz +25°C	Max. Ripple RMS Amps @ 40kHz +25°C	MIL-C-39003/9(CSR 21) Dash Numbers						
							Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)		
							'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)

6 WVDC @ 85°C — 4 WVDC @ 125°C													
150	10	C	4.5	10	.065	3.3	0002	0102	0202	0302	2002	3002	4002
150	20	C	4.5	10	.065	3.3	0003	0103	0203	0303	2003	3003	4003
180	10	C	5.5	10	.060	3.4	0005	0105	0205	0305	2005	3005	4005
270	10	D	6.5	10	.050	4.1	0007	0107	0207	0307	2007	3007	4007
330	10	D	7.5	12	.045	4.3	0009	0109	0209	0309	2009	3009	4009
330	20	D	7.5	12	.045	4.3	0010	0110	0210	0310	2010	3010	4010

10 WVDC @ 85°C — 7 WVDC @ 125°C													
82	10	C	4.0	8	.085	2.9	0012	0112	0212	0312	2012	3012	4012
100	10	C	5.0	8	.075	3.0	0014	0114	0214	0314	2014	3014	4014
100	20	C	5.0	8	.075	3.0	0015	0115	0215	0315	2015	3015	4015
120	10	C	6.0	8	.070	3.2	0017	0117	0217	0317	2017	3017	4017
180	10	D	9.0	8	.060	3.7	0019	0119	0219	0319	2019	3019	4019
220	10	D	10.0	10	.055	3.9	0021	0121	0221	0321	2021	3021	4021
220	20	D	10.0	10	.055	3.9	0022	0122	0222	0322	2022	3022	4022

15 WVDC @ 85°C — 13 WVDC @ 125°C													
56	10	C	4.0	6	.100	2.6	0024	0124	0224	0324	2024	3024	4024
68	10	C	5.0	6	.095	2.7	0026	0126	0226	0326	2026	3026	4026
68	20	C	5.0	6	.095	2.7	0027	0127	0227	0327	2027	3027	4027
120	10	D	9.0	8	.070	3.5	0029	0129	0229	0329	2029	3029	4029
150	10	D	10.0	8	.065	3.6	0031	0131	0231	0331	2031	3031	4031
150	20	D	10.0	8	.065	3.6	0032	0132	0232	0332	2032	3032	4032

**TO ORDER:** Indicate the prefix CSR21 followed by the applicable MIL dash number.  
Example: For M39003/09-0002; order CSR210002

Solid Tantalum Capacitors

# CSR21 (MIL-C-39003/09) Solid Tantalum Capacitors

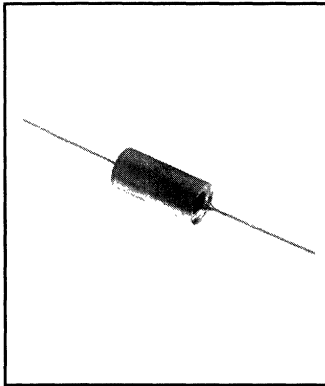


Solid Tantalum Capacitors

Cap. (μF)	Cap. Tolerance (±)	Case Code	Max. DCL @+25°C (μA)	Max. D.F. % @+25°C 1kHz	Max. ESR (ohms) @100kHz +25°C	Max. Ripple RMS Amps @ 40kHz +25°C	MIL-C-39003/9 (CSR 21) Dash Numbers						
							Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)		
							'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)
<b>20 WVDC @ 85°C — 13 WVDC @ 125°C</b>													
27	10	C	2.5	5	.145	2.2	0034	0134	0234	0334	2034	3034	4034
33	10	C	3.5	5	.130	2.3	0036	0136	0236	0336	2036	3036	4036
33	20	C	3.5	5	.130	2.3	0037	0137	0237	0337	2037	3037	4037
39	10	C	4.0	5	.120	2.4	0039	0139	0239	0339	2039	3039	4039
47	10	C	4.5	6	.110	2.5	0041	0141	0241	0341	2041	3041	4041
47	20	C	4.5	6	.110	2.5	0042	0142	0242	0342	2042	3042	4042
56	10	D	5.5	6	.100	2.9	0044	0144	0244	0344	2044	3044	4044
68	10	D	7.0	6	.095	3.0	0046	0146	0246	0346	2046	3046	4046
68	20	D	7.0	6	.095	3.0	0047	0147	0247	0347	2047	3047	4047
82	10	D	8.0	6	.085	3.1	0049	0149	0249	0349	2049	3049	4049
100	10	D	10.0	8	.075	3.3	0051	0151	0251	0351	2051	3051	4051
100	20	D	10.0	8	.075	3.3	0052	0152	0252	0352	2052	3052	4052
<b>35 WVDC @ 85°C — 23 WVDC @ 125°C</b>													
22	10	C	4.0	4	.160	2.1	0054	0154	0254	0354	2054	3054	4054
22	20	C	4.0	4	.160	2.1	0055	0155	0255	0355	2055	3055	4055
27	10	D	4.5	4	.145	2.4	0057	0157	0257	0357	2057	3057	4057
33	10	D	5.5	5	.130	2.5	0059	0159	0259	0359	2059	3059	4059
33	20	D	5.5	5	.130	2.5	0060	0160	0260	0360	2060	3060	4060
39	10	D	7.0	5	.120	2.6	0062	0162	0262	0362	2062	3062	4062
47	10	D	8.0	5	.110	2.7	0064	0164	0264	0364	2064	3064	4064
47	20	D	8.0	5	.110	2.7	0065	0165	0265	0365	2065	3065	4065
<b>50 WVDC @ 85°C — 33 WVDC @ 125°C</b>													
5.6	10	C	2.2	3	.300	1.5	0067	0167	0267	0367	2067	3067	4067
6.8	10	C	2.2	3	.275	1.6	0069	0169	0269	0369	2069	3069	4069
6.8	20	C	2.2	3	.250	1.6	0070	0170	0270	0370	2070	3070	4070
8.2	10	C	2.5	3	.250	1.6	0072	0172	0272	0372	2072	3072	4072
10	10	C	2.5	3	.230	1.7	0074	0174	0274	0374	2074	3074	4074
10	20	C	2.5	3	.230	1.7	0075	0175	0275	0375	2075	3075	4075
12	10	C	3.0	3	.210	1.8	0077	0177	0277	0377	2077	3077	4077
15	10	C	4.0	3	.190	1.9	0079	0179	0279	0379	2079	3079	4079
15	20	C	4.0	3	.190	1.9	0080	0180	0280	0380	2080	3080	4080
18	10	C	4.5	4	.175	2.0	0082	0182	0282	0382	2082	3082	4082
22	10	D	5.5	4	.160	2.3	0084	0184	0284	0384	2084	3084	4084
22	20	D	5.5	4	.160	2.3	0085	0185	0285	0385	2085	3085	4085

**TO ORDER:** Indicate the prefix CSR21 followed by the applicable MIL dash number.  
Example: For M39003/09-0002; order CSR210002

# CSR23 (MIL-C-39003/03) Solid Tantalum Capacitors



- Extended Capacitance
- Graded Failure Rates
- Hermetically Sealed
- Low DC Leakage
- Low Dissipation Factor
- Temperature Stable
- Frequency Stable
- Moisture/Solvent Resistant
- Miniature Size
- Long Shelf Life

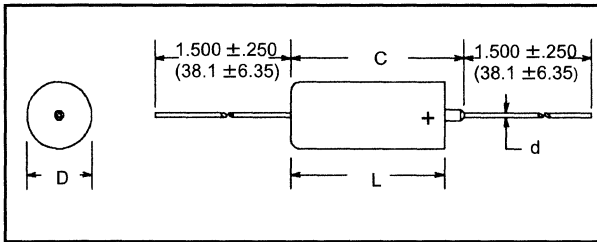
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)  
Voltage Range:  
6 to 50 WVDC @ 85°C  
Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C  
Capacitance Range:  
1.2 μF to 1000 μF  
Capacitance Tolerance:  
±10%, ±20%  
(±5% by special order)

DC Leakage:  
At +25°C - See Table Limit  
At +85°C - 10 x Table Limit  
At +125°C - 12.5 x Table Limit  
Capacitance Change Maximum:  
-10% @ -55°C  
+8% @ +85°C  
+12% @ +125°C

Maximum Power Dissipation @ 25°C:

Case Code	Watts
A	.09
B	.100
C	.125
D	.180



Case Code	Uninsulated		Insulated		C Maximum	d ±.001 (±.03)
	D ±.005 (±.13)	L ±.031 (±.79)	D ±.010 (±.25)	L ±.031 (±.79)		
A	.125(3.18)	.250(6.35)	.135(3.43)	.286(7.26)	.422(10.72)	.020(.51)
B	.175(4.45)	.438(11.13)	.185(4.70)	.474(12.04)	.610(15.49)	.020(.51)
C	.279(7.09)	.650(16.51)	.289(7.34)	.686(17.42)	.822(20.88)	.025(.64)
D	.341(8.66)	.750(19.05)	.351(8.92)	.786(19.96)	.922(23.42)	.025(.64)

Cap. (μF)	Cap. Tolerance (±)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	MIL-C-39003/3(CSR 23) Dash Numbers						
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)		
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)

### 6 WVDC @ 85°C — 4 WVDC @ 125°C

10	10	A	0.9	6	0101	0201	0301	0401	2001	3001	4001
10	20	A	0.9	6	0102	0202	0302	0402	2002	3002	4002
12	10	A	1.0	6	0103	0203	0303	0403	2003	3003	4003
100	10	B	6.0	8	0104	0204	0304	0404	2004	3004	4004
100	20	B	6.0	8	0105	0205	0305	0405	2005	3005	4005
330	10	C	15.0	8	0106	0206	0306	0406	2006	3006	4006
330	20	C	15.0	8	0107	0207	0307	0407	2007	3007	4007
390	10	C	15.0	10	0108	0208	0308	0408	2008	3008	4008
470	10	C	15.0	10	0109	0209	0309	0409	2009	3009	4009
470	20	C	15.0	10	0110	0210	0310	0410	2010	3010	4010
680	10	D	20.0	10	0111	0211	0311	0411	2011	3011	4011
680	20	D	20.0	10	0112	0212	0312	0412	2012	3012	4012
820	10	D	20.0	10	0113	0213	0313	0413	2013	3013	4013
1000	10	D	30.0	10	0114	0214	0314	0414	2014	3014	4014
1000	20	D	30.0	10	0115	0215	0315	0415	2015	3015	4015

### 10 WVDC @ 85°C — 7 WVDC @ 125°C

6.8	10	A	1.0	6	0116	0216	0316	0416	2016	3016	4016
6.8	20	A	1.0	6	0117	0217	0317	0417	2017	3017	4017
8.2	10	A	1.2	6	0118	0218	0318	0418	2018	3018	4018
47	10	B	5.0	6	0119	0219	0319	0419	2019	3019	4019
47	20	B	5.0	6	0120	0220	0320	0420	2020	3020	4020
56	10	B	6.0	6	0121	0221	0321	0421	2021	3021	4021
68	10	B	7.0	6	0122	0222	0322	0422	2022	3022	4022
68	20	B	7.0	6	0123	0223	0323	0423	2023	3023	4023
82	10	B	8.0	6	0124	0224	0324	0424	2024	3024	4024
220	10	C	15.0	6	0125	0225	0325	0425	2025	3025	4025
220	20	C	15.0	6	0126	0226	0326	0426	2026	3026	4026
270	10	C	15.0	8	0127	0227	0327	0427	2027	3027	4027
390	10	D	20.0	10	0128	0228	0328	0428	2028	3028	4028
470	10	D	20.0	10	0129	0229	0329	0429	2029	3029	4029
470	20	D	20.0	10	0130	0230	0330	0430	2030	3030	4030
560	10	D	30.0	10	0131	0231	0331	0431	2031	3031	4031

**TO ORDER:** Indicate the prefix CSR23 followed by the applicable MIL dash number.  
Example: For M39003/03-0182; order CSR230182

Solid Tantalum Capacitors

# CSR23 (MIL-C-39003/03) Solid Tantalum Capacitors



Solid Tantalum Capacitors

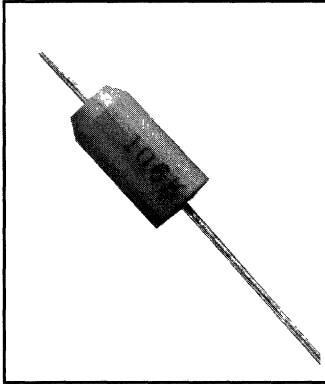
Cap. ( $\mu$ F)	Cap. Tolerance ( $\pm$ )	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	MIL-C-39003/3 (CSR 23) Dash Numbers						
					Exponential Failure Rate (% per 1000 hours)				Weibull Failure Rate (% per 1000 hours)		
					'M' Level (1.0)	'P' Level (.10)	'R' Level (.01)	'S' Level (.001)	'B' Level (.10)	'C' Level (.01)	'D' Level (.001)
<b>15 WVDC @ 85°C — 10 WVDC @ 125°C</b>											
4.7	10	A	1.0	4	0132	0232	0332	0432	2032	3032	4032
4.7	20	A	1.0	4	0133	0233	0333	0433	2033	3033	4033
5.6	10	A	1.3	4	0134	0234	0334	0434	2034	3034	4034
33	10	B	6.0	6	0135	0235	0335	0435	2035	3035	4035
33	20	B	6.0	6	0136	0236	0336	0436	2036	3036	4036
39	10	B	15.0	6	0137	0237	0337	0437	2037	3037	4037
150	10	C	15.0	8	0138	0238	0338	0438	2038	3038	4038
150	20	C	15.0	8	0139	0239	0339	0439	2039	3039	4039
180	10	C	20.0	8	0140	0240	0340	0440	2040	3040	4040
220	10	D	20.0	8	0141	0241	0341	0441	2041	3041	4041
220	20	D	20.0	8	0142	0242	0342	0442	2042	3042	4042
270	10	D	20.0	8	0143	0243	0343	0443	2043	3043	4043
330	10	D	20.0	8	0144	0244	0344	0444	2044	3044	4044
330	20	D	20.0	8	0145	0245	0345	0445	2045	3045	4045
<b>20 WVDC @ 85°C — 13 WVDC @ 125°C</b>											
2.7	10	A	0.8	4	0146	0246	0346	0446	2046	3046	4046
3.3	10	A	1.0	4	0147	0247	0347	0447	2047	3047	4047
3.3	20	A	1.0	4	0148	0248	0348	0448	2048	3048	4048
3.9	10	A	1.2	4	0149	0249	0349	0449	2049	3049	4049
18	10	B	4.0	6	0150	0250	0350	0450	2050	3050	4050
22	10	B	4.0	6	0151	0251	0351	0451	2051	3051	4051
22	20	B	4.0	6	0152	0252	0352	0452	2052	3052	4052
27	10	B	5.0	6	0153	0253	0353	0453	2053	3053	4053
56	10	C	9.0	6	0154	0254	0354	0454	2054	3054	4054
68	10	C	10.0	6	0155	0255	0355	0455	2055	3055	4055
68	20	C	10.0	6	0156	0256	0356	0456	2056	3056	4056
82	10	C	10.0	6	0157	0257	0357	0457	2057	3057	4057
100	10	C	15.0	6	0158	0258	0358	0458	2058	3058	4058
100	20	C	15.0	6	0159	0259	0359	0459	2059	3059	4059
120	10	C	15.0	6	0160	0260	0360	0460	2060	3060	4060
150	10	D	20.0	8	0161	0261	0361	0461	2061	3061	4061
150	20	D	20.0	8	0162	0262	0362	0462	2062	3062	4062
180	10	D	20.0	8	0163	0263	0363	0463	2063	3063	4063
<b>35 WVDC @ 85°C — 23 WVDC @ 125°C</b>											
1.8	10	A	1.0	4	0164	0264	0364	0464	2064	3064	4064
8.2	10	B	3.5	6	0165	0265	0365	0465	2065	3065	4065
10	10	B	4.0	6	0166	0266	0366	0466	2066	3066	4066
10	20	B	4.0	6	0167	0267	0367	0467	2067	3067	4067
33	10	C	10.0	6	0168	0268	0368	0468	2068	3068	4068
33	20	C	10.0	6	0169	0269	0369	0469	2069	3069	4069
39	10	C	10.0	6	0170	0270	0370	0470	2070	3070	4070
47	10	C	10.0	6	0171	0271	0371	0471	2071	3071	4071
47	20	C	10.0	6	0172	0272	0372	0472	2072	3072	4072
56	10	D	15.0	6	0173	0273	0373	0473	2073	3073	4073
68	10	D	15.0	6	0174	0274	0374	0474	2074	3074	4074
68	20	D	15.0	6	0175	0275	0375	0475	2075	3075	4075
<b>50 WVDC @ 85°C — 33 WVDC @ 125°C</b>											
1.2	10	A	0.9	4	0176	0276	0376	0476	2076	3076	4076
1.5	10	A	1.2	4	0177	0277	0377	0477	2077	3077	4077
1.5	20	A	1.2	4	0178	0278	0378	0478	2078	3078	4078
5.6	10	B	4.5	4	0179	0279	0379	0479	2079	3079	4079
6.8	10	B	4.5	6	0180	0280	0380	0480	2080	3080	4080
6.8	20	B	4.5	6	0181	0281	0381	0481	2081	3081	4081
22	10	C	10.0	6	0182	0282	0382	0482	2082	3082	4082
22	20	C	10.0	6	0183	0283	0383	0483	2083	3083	4083
27	10	C	10.0	6	0184	0284	0384	0484	2084	3084	4084
33	10	D	10.0	6	0185	0285	0385	0485	2085	+ 3085	+ 4085
33	20	D	10.0	6	0186	0286	0386	0486	2086	+ 3086	+ 4086
39	10	D	10.0	6	0187	0287	0387	0487	2087	+ 3087	+ 4087

**TO ORDER:** Indicate the prefix CSR23 followed by the applicable MIL dash number.  
Example: For M39003/03-0182; order CSR230182

+ C failure rate: Not QPL for -3085 thru -3087  
+ D failure rate: Not QPL for -4085 thru -4087

# Type TAC Solid Tantalum Capacitors

**MALORY**



- Precision Molded
- Flame Retardant
- Resistant to Shock & Vibration
- Tapered for Polarity Identification
- Taped and Reeled
- Highest CV per Case Size
- Long Shelf Life
- Miniature Sizes

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)

Voltage Range:  
6 to 50 WVDC @ 85°C

Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C

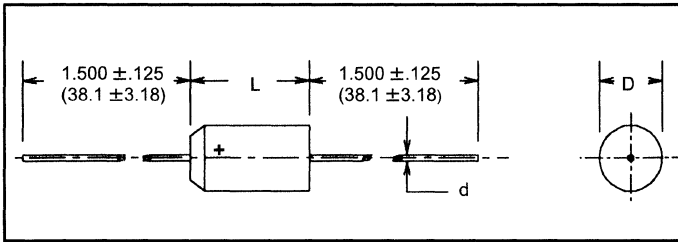
Capacitance Range:  
.10 μF to 330 μF

Capacitance Tolerance:  
±10% (±5% by special order)

Capacitance Change Maximum:  
-10% @ -55°C  
+10% @ +85°C  
+12% @ +125°C

Reel Packaged per EIA-RS 296

Case Code	Quantity
1	4500 per 12" Reel
2	4000 per 12" Reel
5 & 6	2500 per 12" Reel
7 & 8	500 per 12" Reel



## Dimensions - Inches (Millimeters)

Case Code	D (Max)	L (Max)	d
1	.095 (2.41)	.260 (6.6)	.020 (.51)
2	.110 (2.79)	.290 (7.37)	.020 (.51)
5	.180 (4.57)	.345 (8.76)	.020 (.51)
6	.180 (4.57)	.420 (10.67)	.020 (.51)
7	.280 (7.11)	.530 (13.46)	.025 (.64)
8	.300 (7.62)	.710 (18.03)	.025 (.64)

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ 120 Hz	Catalog Number
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Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ 120 Hz	Catalog Number
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Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ 120 Hz	Catalog Number
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6 WVDC @ 85°C 4 WVDC @ 125°C				
3.3	1	0.5	4	TAC335K006P01
3.9	1	0.5	4	TAC395K006P01
4.7	1	0.5	4	TAC475K006P01
5.6	2	0.5	4	TAC565K006P02
6.8	2	0.5	6	TAC685K006P02
8.2	2	0.5	6	TAC825K006P02
10	2	0.5	6	TAC106K006P02
12	2	0.6	6	TAC126K006P02
15	2	0.7	6	TAC156K006P02
18	5	0.9	6	TAC186K006P05
22	5	1.1	6	TAC226K006P05
27	5	1.3	6	TAC276K006P05
33	5	1.5	6	TAC336K006P05
39	6	1.9	6	TAC396K006P06
47	6	2.3	6	TAC476K006P06
56	6	2.7	6	TAC566K006P06
68	6	3.3	6	TAC686K006P06
82	7	3.9	8	TAC826K006P07
100	7	4.8	8	TAC107K006P07
120	7	5.0	8	TAC127K006P07
150	7	5.0	8	TAC157K006P07
180	7	8.6	8	TAC187K006P07
220	7	10	8	TAC227K006P07
270	8	10	8	TAC277K006P08
330	8	10	8	TAC337K006P08

10 WVDC @ 85°C 7 WVDC @ 125°C				
27	6	2.2	6	TAC276K010P06
33	6	2.6	6	TAC336K010P06
39	6	3.1	6	TAC396K010P06
47	6	3.8	6	TAC476K010P06
56	7	4.4	6	TAC566K010P07
68	7	5.0	6	TAC686K010P07
82	7	5.0	8	TAC826K010P07
100	7	8.0	8	TAC107K010P07
120	7	9.6	8	TAC127K010P07
150	7	10.0	8	TAC157K010P07
180	8	10.0	8	TAC187K010P08
220	8	10.0	8	TAC227K010P08

20 WVDC @ 85°C 13 WVDC @ 125°C				
1.0	1	0.5	4	TAC105K020P01
1.2	1	0.5	4	TAC125K020P01
1.5	1	0.5	4	TAC155K020P01
1.8	2	0.5	4	TAC185K020P02
2.2	2	0.5	4	TAC225K020P02
2.7	2	0.5	4	TAC275K020P02
3.3	2	0.5	4	TAC335K020P02
3.9	2	0.6	4	TAC395K020P02
4.7	2	0.8	4	TAC475K020P02
5.6	5	0.9	4	TAC565K020P05
6.8	5	1.1	6	TAC685K020P05
8.2	5	1.3	6	TAC825K020P05
10	5	1.6	6	TAC106K020P05
12	6	1.9	6	TAC126K020P06
15	6	2.4	6	TAC156K020P06
18	6	2.9	6	TAC186K020P06
22	6	3.5	6	TAC226K020P06
27	7	4.3	6	TAC276K020P07
33	7	5.0	6	TAC336K020P07
39	7	6.2	6	TAC396K020P07
47	7	7.5	6	TAC476K020P07
56	7	8.9	6	TAC566K020P07
68	7	10.0	6	TAC686K020P07
82	8	10.0	8	TAC826K020P08
100	8	10.0	8	TAC107K020P08

10 WVDC @ 85°C 7 WVDC @ 125°C				
2.2	1	0.5	4	TAC225K010P01
2.7	1	0.5	4	TAC275K010P01
3.3	1	0.5	4	TAC335K010P01
3.9	2	0.5	4	TAC395K010P02
4.7	2	0.5	4	TAC475K010P02
5.6	2	0.5	4	TAC565K010P02
6.8	2	0.5	6	TAC685K010P02
8.2	2	0.7	6	TAC825K010P02
10	2	0.8	6	TAC106K010P02
12	5	1.0	6	TAC126K010P05
15	5	1.2	6	TAC156K010P05
18	5	1.4	6	TAC186K010P05
22	5	1.5	6	TAC226K010P05

15 WVDC @ 85°C 10 WVDC @ 125°C				
1.5	1	0.5	4	TAC155K015P01
1.8	1	0.5	4	TAC185K015P01
2.2	1	0.5	4	TAC225K015P01
2.7	2	0.5	4	TAC275K015P02
3.3	2	0.5	4	TAC335K015P02
3.9	2	0.5	4	TAC395K015P02
4.7	2	0.6	4	TAC475K015P02
5.6	2	0.7	4	TAC565K015P02
6.8	2	0.8	6	TAC685K015P02
8.2	5	1.0	6	TAC825K015P05
10	5	1.2	6	TAC106K015P05
12	5	1.4	6	TAC126K015P05
15	5	1.5	6	TAC156K015P05
18	6	2.2	6	TAC186K015P06
22	6	2.6	6	TAC226K015P06
27	6	3.2	6	TAC276K015P06
33	6	4.0	6	TAC336K015P06
39	7	4.7	6	TAC396K015P07
47	7	5.0	6	TAC476K015P07
56	7	6.7	6	TAC566K015P07
68	7	8.2	6	TAC686K015P07
82	7	9.8	8	TAC826K015P07
100	7	10.0	8	TAC107K015P07
120	8	10.0	8	TAC127K015P08
150	8	10.0	8	TAC157K015P08

25 WVDC @ 85°C 17 WVDC @ 125°C				
0.47	1	0.5	3	TAC474K025P01
0.56	1	0.5	3	TAC564K025P01
0.68	1	0.5	3	TAC684K025P01
0.82	1	0.5	3	TAC824K025P01
1.0	1	0.5	3	TAC105K025P01
1.2	2	0.5	3	TAC125K025P02
1.5	2	0.5	3	TAC155K025P02
1.8	2	0.5	3	TAC185K025P02
2.2	2	0.5	3	TAC225K025P02
2.7	2	0.5	3	TAC275K025P02
3.3	2	0.7	3	TAC335K025P02
3.9	5	0.8	3	TAC395K025P05

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

Solid Tantalum Capacitors

# Type TAC Solid Tantalum Capacitors



Solid Tantalum Capacitors

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @+25°C 120 Hz	Catalog Number
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25 WVDC @ 85°C 17 WVDC @ 125°C				
4.7	5	0.9	4	TAC475K025P05
5.6	5	1.1	4	TAC565K025P05
6.8	5	1.4	4	TAC685K025P05
8.2	5	1.5	4	TAC825K025P05
10	5	1.5	4	TAC106K025P05
12	6	2.4	4	TAC126K025P06
15	6	3.0	4	TAC156K025P06
18	7	3.6	6	TAC186K025P07
22	7	4.4	6	TAC226K025P07
27	7	5.4	6	TAC276K025P07
33	7	6.6	6	TAC336K025P07
39	7	7.8	6	TAC396K025P07
47	7	9.4	6	TAC476K025P07
56	8	10.0	6	TAC566K025P08
68	8	10.0	6	TAC686K025P08

35 WVDC @ 85°C 23 WVDC @ 125°C				
0.10	1	0.5	3	TAC104K035P01
0.12	1	0.5	3	TAC124K035P01
0.15	1	0.5	3	TAC154K035P01
0.18	1	0.5	3	TAC184K035P01
0.22	1	0.5	3	TAC224K035P01
0.27	1	0.5	3	TAC274K035P01
0.33	1	0.5	3	TAC334K035P01

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @+25°C 120 Hz	Catalog Number
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35 WVDC @ 85°C 23 WVDC @ 125°C				
0.39	1	0.5	3	TAC394K035P01
0.47	1	0.5	3	TAC474K035P01
0.56	2	0.5	3	TAC564K035P02
0.68	2	0.5	3	TAC684K035P02
0.82	2	0.5	3	TAC824K035P02
1.0	2	0.5	3	TAC105K035P02
1.2	2	0.5	3	TAC125K035P02
1.5	2	0.5	3	TAC155K035P02
1.8	5	0.5	3	TAC185K035P05
2.2	5	0.6	3	TAC225K035P05
2.7	5	0.8	3	TAC275K035P05
3.3	5	0.9	4	TAC335K035P05
3.9	5	1.1	4	TAC395K035P05
4.7	5	1.3	4	TAC475K035P05
5.6	6	1.6	4	TAC565K035P06
6.8	6	1.9	4	TAC685K035P06
8.2	6	2.3	4	TAC825K035P06
10	6	2.8	4	TAC106K035P06
12	7	3.3	4	TAC126K035P07
15	7	4.2	6	TAC156K035P07
18	7	5.0	6	TAC186K035P07
22	7	6.2	6	TAC226K035P07
27	7	7.5	6	TAC276K035P07
33	7	9.2	6	TAC336K035P07
39	8	10.0	6	TAC396K035P08
47	8	10.0	6	TAC476K035P08

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @+25°C 120 Hz	Catalog Number
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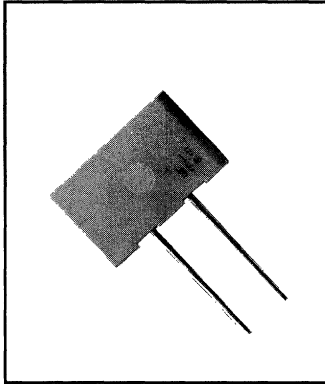
50 WVDC @ 85°C 33 WVDC @ 125°C				
0.10	1	0.5	3	TAC104K050P01
0.12	1	0.5	3	TAC124K050P01
0.15	1	0.5	3	TAC154K050P01
0.18	1	0.5	3	TAC184K050P01
0.22	1	0.5	3	TAC224K050P01
0.27	1	0.5	3	TAC274K050P01
0.33	2	0.5	3	TAC334K050P02
0.39	2	0.5	3	TAC394K050P02
0.47	2	0.5	3	TAC474K050P02
0.56	2	0.5	3	TAC564K050P02
0.68	2	0.5	3	TAC684K050P02
0.82	2	0.5	3	TAC824K050P02
1.0	2	0.5	3	TAC105K050P02
1.2	5	0.5	3	TAC125K050P05
1.5	5	0.6	4	TAC155K050P05
1.8	5	0.7	4	TAC185K050P05
2.2	5	0.9	4	TAC225K050P05
2.7	6	1.1	4	TAC275K050P06
3.3	6	1.3	4	TAC335K050P06
3.9	6	1.6	4	TAC395K050P06
4.7	6	1.9	4	TAC475K050P06
5.6	7	2.2	4	TAC565K050P07
6.8	7	2.7	4	TAC685K050P07
8.2	7	3.2	4	TAC825K050P07
10	7	4.0	6	TAC106K050P07
12	8	4.8	6	TAC126K050P08
15	8	6.0	6	TAC156K050P08
18	8	7.2	6	TAC186K050P08
22	8	8.8	6	TAC226K050P08

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.



# Type TIM Solid Tantalum Capacitors

**MALORY**



- Precision Molded
- Radial Leads
- Low DCL
- Low ESR
- Excellent Temperature Stability
- Resistant to Shock & Vibration
- Standoffs for Easier Flux Removal
- Radius on Vertical Edge Allows for Polarization During Automatic Insertion
- Tape & Reel Optional

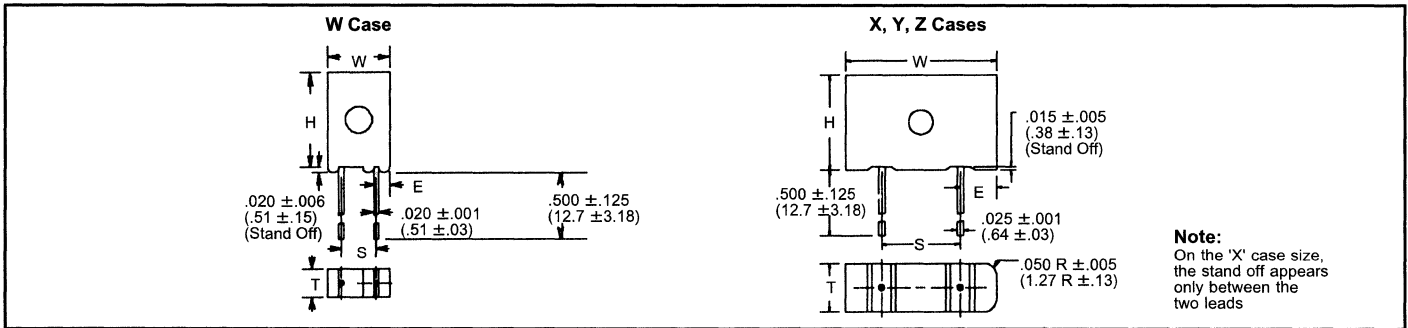
## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)  
Voltage Range:  
6 to 50WVDC @ 85°C  
Capacitance Range:  
.10 μF to 220 μF  
Capacitance Tolerance:  
±10%, ±20%  
Capacitance Change Maximum:  
-10% @ -55°C  
+10% @ +85°C  
+15% @ +125°C

DC Leakage:  
25°C - See Table Limit  
85°C - 10 x 25°C Limit  
125°C - 12.5 x 25°C Limit  
Maximum Power Dissipation:  
Case W & X .090 Watts  
Case Y .100 Watts  
Case Z .125 Watts

Reel Packaging per EIA-RS 468

Case Code	Quantity
W	1,500 per 14" Reel
X	1,500 per 14" Reel
Y	1,500 per 14" Reel
Z	N/A



Dimensions - Inches (Millimeters)

Case Code	H Case Height	W Case Width	T Case Thickness	E Case to Wire	S Lead Spacing
W	.345 ± .008 (8.76 ± .203)	.230 ± .005 (5.84 ± .127)	.105 ± .005 (2.67 ± .127)	.050 ± .010 (1.27 ± 0.25)	.125 ± .005 (3.18 ± .127)
X	.225 ± .015 (5.71 ± 0.38)	.285 ± .015 (7.24 ± 0.38)	.170 ± .015 (4.32 ± 0.38)	.042 ± .010 (1.07 ± 0.25)	.200 ± .005 (5.08 ± .127)
Y	.325 ± .015 (8.26 ± 0.38)	.325 ± .015 (8.26 ± 0.38)	.170 ± .015 (4.32 ± 0.38)	.062 ± .010 (1.57 ± 0.25)	.200 ± .005 (5.08 ± .127)
Z	.375 ± .015 (9.53 ± 0.38)	.600 ± .015 (15.24 ± 0.38)	.195 ± .015 (4.95 ± 0.38)	.200 ± .010 (5.08 ± 0.25)	.200 ± .005 (5.08 ± .127)

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Max Ripple mA rms		Catalog Number
				@ 120Hz +25°C	@ 1kHz +25°C	

6 WVDC @ 85°C 4 WVDC @ 125°C						
22	X	1	6	35	290	TIM226*006P0X
56	Y	5	6	89	570	TIM566*006P0Y
68	Y	5	6	100	630	TIM686*006P0Y
220	Z	10	6	350	1000	TIM227*006P0Z

10 WVDC @ 85°C 7 WVDC @ 125°C						
10	W	1	6	26	220	TIM106*010P0W
15	W	1	6	39	270	TIM156*010P0W
6.8	X	1	6	18	150	TIM685*010P0X
10	X	1	6	26	220	TIM106*010P0X
15	X	1	6	39	270	TIM156*010P0X
22	Y	2	6	58	360	TIM226*010P0Y
33	Y	2	6	87	440	TIM336*010P0Y
39	Y	5	6	100	480	TIM396*010P0Y
47	Y	5	6	120	590	TIM476*010P0Y
56	Y	5	6	140	650	TIM566*010P0Y
150	Z	10	6	390	920	TIM157*010P0Z

\* Indicate capacitance tolerance: K = ±10%, M = ±20%

Cap. (μF)	Case Code	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Max Ripple mA rms		Catalog Number
				@ 120Hz +25°C	@ 1kHz +25°C	

15 WVDC @ 85°C 10 WVDC @ 125°C						
5.6	X	1	6	22	180	TIM565*015P0X
6.8	X	1	6	27	180	TIM685*015P0X
8.2	X	1	6	32	200	TIM825*015P0X
10	Y	1	6	35	270	TIM106*015P0Y
15	Y	2	6	59	290	TIM156*015P0Y
22	Y	5	6	87	360	TIM226*015P0Y
27	Y	5	6	100	390	TIM276*015P0Y
33	Y	5	6	130	440	TIM336*015P0Y

20 WVDC @ 85°C 13 WVDC @ 125°C						
5.6	W	1	6	29	180	TIM565*020P0W
6.8	W	1	6	36	200	TIM685*020P0W

25 WVDC @ 85°C 17 WVDC @ 125°C						
1.0	X	1	6	9.3	77	TIM105*025P0X
3.3	W	1	4	21	150	TIM335*025P0W
3.3	X	1	6	21	150	TIM335*025P0X
4.7	X	1	6	31	180	TIM475*025P0X

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

# Type TIM Solid Tantalum Capacitors

**MALLORY**

Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Max Ripple mA rms		Catalog Number
				@ 120Hz +25°C	@ 1kHz +25°C	

25 WVDC @ 85°C 17 WVDC @ 125°C						
6.8	Y	1	6	45	200	TIM685*025P0Y
10	X	1	6	40	190	TIM106*025P0X
10	Y	1	6	66	240	TIM106*025P0Y
12	Y	1	6	79	260	TIM126*025P0Y
15	Y	2	6	99	290	TIM156*025P0Y

35 WVDC @ 85°C 23 WVDC @ 125°C						
2.2	W	1	4	20	120	TIM225*035P0W
2.7	W	1	4	25	140	TIM275*035P0W
0.10	X	1	6	1.0	9.0	TIM104*035P0X
0.22	X	1	6	2.0	17	TIM224*035P0X
0.47	X	1	6	4.3	36	TIM474*035P0X
1.0	X	1	6	9.3	77	TIM105*035P0X
2.2	X	1	6	20	120	TIM225*035P0X
3.3	X	1	6	30	150	TIM335*035P0X
3.9	Y	1	6	35	180	TIM395*035P0Y
4.7	X	1	6	32	155	TIM475*035P0X
4.7	Y	1	6	43	200	TIM475*035P0Y
6.8	Y	2	6	63	210	TIM685*035P0Y
8.2	Y	5	6	76	220	TIM825*035P0Y
10	Y	5	6	93	240	TIM106*035P0Y
22	Z	10	6	200	400	TIM226*035P0Z
27	Z	10	6	250	450	TIM276*035P0Z
33	Z	10	6	300	490	TIM336*035P0Z

Cap. ( $\mu$ F)	Case Code	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Max Ripple mA rms		Catalog Number
				@ 120Hz +25°C	@ 1kHz +25°C	

50 WVDC @ 85°C 33 WVDC @ 125°C						
0.10	X	1	6	1.3	11	TIM104*050P0X
0.22	X	1	6	2.9	24	TIM224*050P0X
0.33	X	1	6	4.4	36	TIM334*050P0X
1.0	W	1	4	13	86	TIM105*050P0W
1.0	X	1	6	13	87	TIM105*050P0X
1.5	W	1	4	19	100	TIM155*050P0W
1.5	X	1	6	19	100	TIM155*050P0X
2.2	X	1	6	29	120	TIM225*050P0X
4.7	Y	5	6	62	200	TIM475*050P0Y
5.6	Y	5	6	74	220	TIM565*050P0Y
6.8	Z	5	6	90	220	TIM685*050P0Z
10	Z	5	6	130	270	TIM106*050P0Z
15	Z	10	6	190	330	TIM156*050P0Z

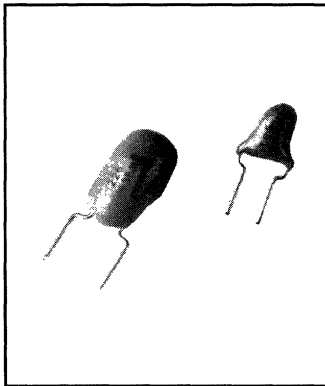
Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

\* Indicate capacitance tolerance: K =  $\pm 10\%$ , M =  $\pm 20\%$

Solid Tantalum Capacitors

# Type TDC Solid Tantalum Capacitors

**MALLORY**



- Tough Plastic Case
- UL94V0 Flammability Rating
- Laser Marking Clarity and Permanence
- Low Cost
- Low DCL
- Low ESR & Impedance
- Temperature Stable
- Long Shelf Life
- High Shock & Vibration
- Optional Reel Packaging Available

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)

Voltage Range:  
6 to 50WVDC @ 85°C

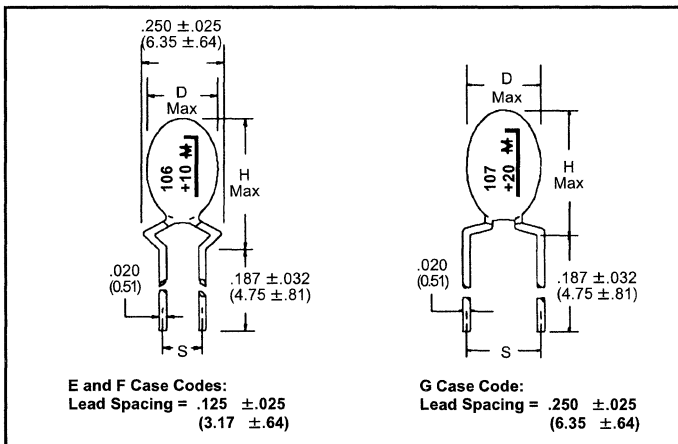
Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C

Capacitance Range:  
.10  $\mu$ F to 330  $\mu$ F

Capacitance Tolerance:  
 $\pm 10\%$ ,  $\pm 20\%$   
( $\pm 5\%$  by special order)

Capacitance Change From Initial +25°C Value:  
-10% @ -55°C  
+10% @ +85°C  
+12% @ +125°C

DC Leakage:  
At +25°C - See Table Limit.  
At +85°C - 10 x Table Limit.  
At +125°C - 12.5 x Table Limit.



## Dimensions - Inches (Millimeters)

Case Code	D (Max.)	H (Max.)	Leads	
			S	Code
E	.175 (4.45)	.350 (8.89)	.125 (3.17) (Standard)	N
			.250 (6.35) (Special)	W
F	.250 (6.35)	.500 (12.7)	.125 (3.17) (Standard)	N
			.250 (6.35) (Special)	W
G	.350 (8.89)	.650 (16.51)	.250 (6.35) (Standard)	W

Catalog Numbers listed below reflect dimensions and lead forms as shown in the outline drawing. Other lead spacing and lead lengths of .500 (12.7) minimum are available by special order.

Cap. ( $\mu$ F)	Case Code	Lead Spacing S	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. ( $\mu$ F)	Case Code	Lead Spacing S	Max. DCL @ +25°C ( $\mu$ A)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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6 WVDC; 8 VDC Surge @ 85°C 4 WVDC; 5 VDC Surge @ 125°C					
3.3	E	.125	0.5	5	TDC335*006NSE
3.9	E	.125	0.5	5	TDC395*006NSE
4.7	E	.125	0.5	5	TDC475*006NSE
5.6	E	.125	0.5	5	TDC565*006NSE
6.8	E	.125	0.5	5	TDC685*006NSE
8.2	E	.125	0.5	6	TDC825*006NSE
10	E	.125	0.5	6	TDC106*006NSE
12	E	.125	0.6	6	TDC126*006NSE
15	F	.125	0.7	6	TDC156*006NSF
18	F	.125	0.9	6	TDC186*006NSF
22	F	.125	1.1	6	TDC226*006NSF
27	F	.125	1.3	6	TDC276*006NSF
33	F	.125	1.6	6	TDC336*006NSF
39	F	.125	1.9	6	TDC396*006NSF
47	F	.125	2.3	6	TDC476*006NSF
56	F	.125	2.7	6	TDC566*006NSF
68	F	.125	3.3	6	TDC686*006NSF
82	F	.125	3.9	8	TDC826*006NSF
100	F	.125	4.8	8	TDC107*006NSF
120	G	.250	5.8	8	TDC127*006WSG
150	G	.250	7.2	8	TDC157*006WSG
180	G	.250	8.6	8	TDC187*006WSG
220	G	.250	10.0	8	TDC227*006WSG
270	G	.250	10.0	8	TDC277*006WSG
330	G	.250	10.0	8	TDC337*006WSG

10 WVDC; 13 VDC Surge @ 85°C 7 WVDC; 9 VDC SURGE @ 125°C					
3.9	E	.125	0.5	5	TDC395*010NSE
4.7	E	.125	0.5	5	TDC475*010NSE
5.6	E	.125	0.5	5	TDC565*010NSE
6.8	E	.125	0.5	5	TDC685*010NSE
8.2	E	.125	0.7	6	TDC825*010NSE
10	F	.125	0.8	6	TDC106*010NSF
12	F	.125	1.0	6	TDC126*010NSF
15	F	.125	1.2	6	TDC156*010NSF
18	F	.125	1.4	6	TDC186*010NSF
22	F	.125	1.8	6	TDC226*010NSF
27	F	.125	2.2	6	TDC276*010NSF
33	F	.125	2.6	6	TDC336*010NSF
39	F	.125	3.1	6	TDC396*010NSF
47	F	.125	3.8	6	TDC476*010NSF
56	F	.125	4.5	6	TDC566*010NSF
68	F	.125	5.4	6	TDC686*010NSF
82	G	.250	6.6	8	TDC826*010WSG
100	G	.250	8.0	8	TDC107*010WSG
120	G	.250	9.6	8	TDC127*010WSG
150	G	.250	10.0	8	TDC157*010WSG
180	G	.250	10.0	8	TDC187*010WSG
220	G	.250	10.0	8	TDC227*010WSG

10 WVDC; 13 VDC Surge @ 85°C 7 WVDC; 9 VDC SURGE @ 125°C					
2.2	E	.125	0.5	5	TDC225*010NSE
2.7	E	.125	0.5	5	TDC275*010NSE
3.3	E	.125	0.5	5	TDC335*010NSE

15 WVDC; 20 VDC Surge @ 85°C 10 WVDC; 12 VDC Surge @ 125°C					
1.5	E	.125	0.5	5	TDC155*015NSE
1.8	E	.125	0.5	5	TDC185*015NSE
2.2	E	.125	0.5	5	TDC225*015NSE
2.7	E	.125	0.5	5	TDC275*015NSE
3.3	E	.125	0.5	5	TDC335*015NSE
3.9	E	.125	0.5	5	TDC395*015NSE

\* Indicate capacitance tolerance: K =  $\pm 10\%$ , M  $\pm 20\%$ , (J =  $\pm 5\%$ , Special Order)

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

Solid Tantalum Capacitors

# TypeTDC Solid Tantalum Capacitors

**MALLORY**

Solid Tantalum Capacitors

Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @+25°C (μA)	Max. D.F. % @+25°C 120 Hz	Catalog Number
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Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @+25°C (μA)	Max. D.F. % @+25°C 120 Hz	Catalog Number
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15 WVDC; 20 VDC Surge @ 85°C 10 WVDC; 12 VDC Surge @ 125°C					
4.7	E	.125	0.6	5	TDC475*015NSE
5.6	E	.125	0.7	5	TDC565*015NSE
6.8	E	.125	0.9	5	TDC685*015NSE
8.2	E	.125	1.0	6	TDC825*015NSE
10	E	.125	1.3	6	TDC106*015NSE
12	E	.125	1.5	6	TDC126*015NSE
15	F	.125	1.8	6	TDC156*015NSF
18	F	.125	2.2	6	TDC186*015NSF
22	F	.125	2.6	6	TDC226*015NSF
27	F	.125	3.2	6	TDC276*015NSF
33	F	.125	4.0	6	TDC336*015NSF
39	G	.250	4.7	6	TDC396*015WSG
47	G	.250	5.6	6	TDC476*015WSG
56	G	.250	6.8	6	TDC566*015WSG
68	G	.250	8.2	6	TDC686*015WSG
82	G	.250	9.8	8	TDC826*015WSG
100	G	.250	10.0	8	TDC107*015WSG
120	G	.250	10.0	8	TDC127*015WSG
150	G	.250	10.0	8	TDC157*015WSG

25 WVDC; 32 VDC Surge @ 85°C 17 WVDC; 22 VDC Surge @ 125°C					
56	G	.250	10.0	6	TDC566*025WSG
68	G	.250	10.0	6	TDC686*025WSG

20 WVDC; 26 VDC Surge @ 85°C 13 WVDC; 16 VDC Surge @ 125°C					
1.0	E	.125	0.5	5	TDC105*020NSE
1.2	E	.125	0.5	5	TDC125*020NSE
1.5	E	.125	0.5	5	TDC155*020NSE
1.8	E	.125	0.5	5	TDC185*020NSE
2.2	E	.125	0.5	5	TDC225*020NSE
2.7	E	.125	0.5	5	TDC275*020NSE
3.3	E	.125	0.5	5	TDC335*020NSE
3.9	E	.125	0.6	5	TDC395*020NSE
4.7	E	.125	0.8	5	TDC475*020NSE
5.6	F	.125	0.9	5	TDC565*020NSF
6.8	F	.125	1.1	5	TDC685*020NSF
8.2	F	.125	1.3	6	TDC825*020NSF
10	F	.125	1.6	6	TDC106*020NSF
12	F	.125	1.9	6	TDC126*020NSF
15	F	.125	2.4	6	TDC156*020NSF
18	F	.125	2.9	6	TDC186*020NSF
22	F	.125	3.5	6	TDC226*020NSF
27	F	.125	4.3	6	TDC276*020NSF
33	G	.250	5.3	6	TDC336*020WSG
39	G	.250	6.2	6	TDC396*020WSG
47	G	.250	7.5	6	TDC476*020WSG
56	G	.250	9.0	6	TDC566*020WSG
68	G	.250	10.0	6	TDC686*020WSG
82	G	.250	10.0	8	TDC826*020WSG
100	G	.250	10.0	8	TDC107*020WSG

35 WVDC; 46 VDC Surge @ 85°C 23 WVDC; 28 VDC Surge @ 125°C					
0.10	E	.125	0.5	3	TDC104*035NSE
0.12	E	.125	0.5	3	TDC124*035NSE
0.15	E	.125	0.5	3	TDC154*035NSE
0.18	E	.125	0.5	3	TDC184*035NSE
0.22	E	.125	0.5	3	TDC224*035NSE
0.27	E	.125	0.5	3	TDC274*035NSE
0.33	E	.125	0.5	3	TDC334*035NSE
0.39	E	.125	0.5	3	TDC394*035NSE
0.47	E	.125	0.5	3	TDC474*035NSE
0.56	E	.125	0.5	3	TDC564*035NSE
0.68	E	.125	0.5	3	TDC684*035NSE
0.82	E	.125	0.5	3	TDC824*035NSE
1.0	E	.125	0.5	3	TDC105*035NSE
1.2	E	.125	0.5	5	TDC125*035NSE
1.5	E	.125	0.5	5	TDC155*035NSE
1.8	E	.125	0.5	5	TDC185*035NSE
2.2	E	.125	0.6	5	TDC225*035NSE
2.7	F	.125	0.7	5	TDC275*035NSF
3.3	F	.125	0.9	5	TDC335*035NSF
3.9	F	.125	1.0	5	TDC395*035NSF
4.7	F	.125	1.3	5	TDC475*035NSF
5.6	F	.125	1.6	5	TDC565*035NSF
6.8	F	.125	1.9	5	TDC685*035NSF
8.2	F	.125	2.3	6	TDC825*035NSF
10	F	.125	2.8	6	TDC106*035NSF
12	G	.250	3.4	6	TDC126*035WSG
15	G	.250	4.2	6	TDC156*035WSG
18	G	.250	5.0	6	TDC186*035WSG
22	G	.250	6.2	6	TDC226*035WSG
27	G	.250	7.6	6	TDC276*035WSG
33	G	.250	9.2	6	TDC336*035WSG
39	G	.250	10.0	6	TDC396*035WSG
47	G	.250	10.0	6	TDC476*035WSG

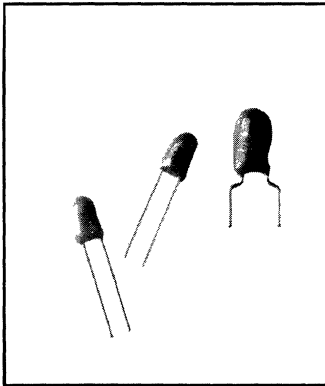
25 WVDC; 32 VDC Surge @ 85°C 17 WVDC; 22 VDC Surge @ 125°C					
1.0	E	.125	0.5	5	TDC105*025NSE
1.2	E	.125	0.5	5	TDC125*025NSE
1.5	E	.125	0.5	5	TDC155*025NSE
1.8	E	.125	0.5	5	TDC185*025NSE
2.2	E	.125	0.5	5	TDC225*025NSE
2.7	E	.125	0.5	5	TDC275*025NSE
3.3	E	.125	0.7	5	TDC335*025NSE
3.9	E	.125	0.8	5	TDC395*025NSE
4.7	E	.125	0.9	5	TDC475*025NSF
5.6	F	.125	1.1	5	TDC565*025NSF
6.8	F	.125	1.4	5	TDC685*025NSF
8.2	F	.125	1.6	6	TDC825*025NSF
10	F	.125	2.0	6	TDC106*025NSF
12	F	.125	2.4	6	TDC126*025NSF
15	F	.125	3.0	6	TDC156*025NSF
18	F	.125	3.6	6	TDC186*025NSF
22	F	.125	4.4	6	TDC226*025NSF
27	G	.250	5.4	6	TDC276*025WSG
33	G	.250	6.6	6	TDC336*025WSG
39	G	.250	7.8	6	TDC396*025WSG
47	G	.250	9.4	6	TDC476*025WSG

50 WVDC; 65 VDC Surge @ 85°C 33 WVDC; 40 VDC Surge @ 125°C					
0.10	E	.125	0.5	3	TDC104*050NSE
0.12	E	.125	0.5	3	TDC124*050NSE
0.15	E	.125	0.5	3	TDC154*050NSE
0.18	E	.125	0.5	3	TDC184*050NSE
0.22	E	.125	0.5	3	TDC224*050NSE
0.27	E	.125	0.5	3	TDC274*050NSE
0.33	E	.125	0.5	3	TDC334*050NSE
0.39	E	.125	0.5	3	TDC394*050NSE
0.47	E	.125	0.5	3	TDC474*050NSE
0.56	E	.125	0.5	3	TDC564*050NSE
0.68	E	.125	0.5	3	TDC684*050NSE
0.82	E	.125	0.5	3	TDC824*050NSE
1.0	E	.125	0.5	3	TDC105*050NSE
1.2	E	.125	0.5	5	TDC125*050NSE
1.5	E	.125	0.6	5	TDC155*050NSE
1.8	F	.125	0.7	5	TDC185*050NSF
2.2	F	.125	0.9	5	TDC225*050NSF
2.7	F	.125	1.1	5	TDC275*050NSF
3.3	F	.125	1.3	5	TDC335*050NSF
3.9	F	.125	1.6	5	TDC395*050NSF
4.7	F	.125	1.9	5	TDC475*050NSF
5.6	F	.125	2.2	5	TDC565*050NSF
6.8	G	.250	2.7	5	TDC685*050WSG
8.2	G	.250	3.3	6	TDC825*050WSG
10	G	.250	4.0	6	TDC106*050WSG
12	G	.250	4.8	6	TDC126*050WSG
15	G	.250	6.0	6	TDC156*050WSG
18	G	.250	7.2	6	TDC186*050WSG
22	G	.250	8.8	6	TDC226*050WSG

\* Indicate capacitance tolerance: K = ±10%, M = ±20%, (J = ±5%, Special Order)

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

# Type TDL Solid Tantalum Capacitors



- Tough Plastic Case
- UL94V0 Flammability Rating
- Laser Marking Clarity and Permanence
- Low Cost
- Low DCL
- Low ESR & Impedance
- Temperature Stable
- Long Shelf Life
- High Shock & Vibration
- Optional Reel Packaging Available

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C  
(With proper derating)

Voltage Range:  
6 to 50 WVDC @ 85°C

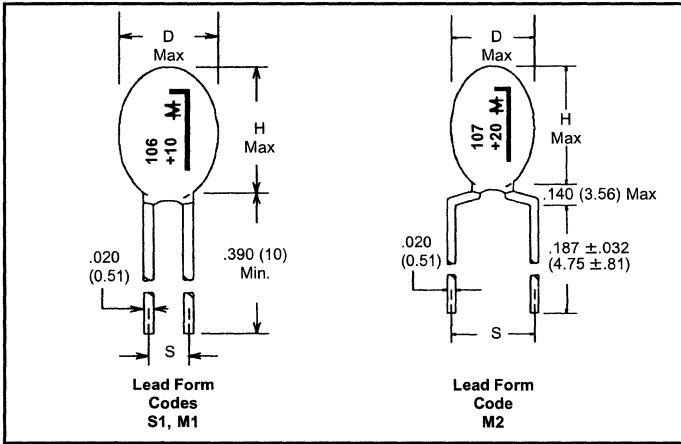
Reverse Voltage (Non-continuous):  
15% of rated voltage @ 25°C  
5% of rated voltage @ 85°C  
1% of rated voltage @ 125°C

Capacitance Range:  
.10 μF to 330 μF

Capacitance Tolerance:  
±10%, ±20%  
(±5% by special order)

Capacitance Change From  
Initial +25°C Value:  
-10% @ -55°C  
+10% @ +85°C  
+12% @ +125°C

DC Leakage:  
At +25°C - See Table Limit.  
At +85°C - 10 x Table Limit.  
At +125°C - 12.5 x Table Limit.



## Dimensions - Inches (Millimeters)

Case Code	D (Max.)	H (Max.)	Leads	
			S	Code
A	.180 (4.57)	.280 (7.11)	.100 (2.54) (Standard)	S1
			.200 (5.08) (Special)	M2
B	.200 (5.08)	.300 (7.62)	.100 (2.54) (Standard)	S1
			.200 (5.08) (Special)	M2
C	.260 (6.60)	.360 (9.14)	.100 (2.54) (Standard)	S1
			.200 (5.08) (Special)	M2
D	.340 (8.64)	.400 (10.16)	.100 (2.54) (Standard)	S1
			.200 (5.08) (Special)	M2
E	.400 (10.16)	.560 (14.22)	.200 (5.08) (Standard)	M1
F	.440 (11.18)	.680 (17.27)	.200 (5.08) (Standard)	M1

Listed Catalog Numbers reflect standard lead forms as indicated below. M2 lead form and lead lengths of .500 (12.7) minimum are available by special order.

Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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### 6.3 WVDC; 8 VDC Surge @ 85°C 4 WVDC; 5 VDC Surge @ 125°C

3.3	A	.100	0.5	5	TDL335*006S1A
3.9	A	.100	0.5	5	TDL395*006S1A
4.7	A	.100	0.5	5	TDL475*006S1A
5.6	A	.100	0.5	5	TDL565*006S1A
6.8	A	.100	0.5	5	TDL685*006S1A
8.2	B	.100	0.5	6	TDL825*006S1B
10	B	.100	0.5	6	TDL106*006S1B
12	B	.100	0.6	6	TDL126*006S1B
15	B	.100	0.7	6	TDL156*006S1B
18	B	.100	0.9	6	TDL186*006S1B
22	C	.100	1.1	6	TDL226*006S1C
27	C	.100	1.3	6	TDL276*006S1C
33	C	.100	1.6	6	TDL336*006S1C
39	C	.100	1.9	6	TDL396*006S1C
47	D	.100	2.3	6	TDL476*006S1D
56	D	.100	2.7	6	TDL566*006S1D
68	D	.100	3.3	6	TDL686*006S1D
82	D	.100	3.9	8	TDL826*006S1D
100	D	.100	4.8	8	TDL107*006S1D
120	D	.200	5.8	8	TDL127*006M1D
150	E	.200	7.2	8	TDL157*006M1E
180	E	.200	8.6	8	TDL187*006M1E
220	E	.200	10.0	8	TDL227*006M1E
270	E	.200	10.0	8	TDL277*006M1E
330	F	.200	10.0	8	TDL337*006M1F

### 10 WVDC; 13 VDC Surge @ 85°C 7 WVDC; 9 VDC Surge @ 125°C

3.9	A	.100	0.5	5	TDL395*010S1A
4.7	A	.100	0.5	5	TDL475*010S1A
5.6	A	.100	0.5	5	TDL565*010S1A
6.8	B	.100	0.5	5	TDL685*010S1B
8.2	B	.100	0.7	6	TDL825*010S1B
10	B	.100	0.8	6	TDL106*010S1B
12	C	.100	1.0	6	TDL126*010S1C
15	C	.100	1.2	6	TDL156*010S1C
18	C	.100	1.4	6	TDL186*010S1C
22	C	.100	1.8	6	TDL226*010S1C
27	C	.100	2.2	6	TDL276*010S1C
33	D	.100	2.6	6	TDL336*010S1D
39	D	.100	3.1	6	TDL396*010S1D
47	D	.100	3.8	6	TDL476*010S1D
56	D	.100	4.5	6	TDL566*010S1D
68	D	.100	5.4	6	TDL686*010S1D
82	E	.200	6.6	8	TDL826*010M1E
100	E	.200	8.0	8	TDL107*010M1E
120	E	.200	9.6	8	TDL127*010M1E
150	E	.200	10.0	8	TDL157*010M1E
180	E	.200	10.0	8	TDL187*010M1E
220	F	.200	10.0	8	TDL227*010M1F

### 16 WVDC; 20 VDC Surge @ 85°C 10 WVDC; 12 VDC Surge @ 125°C

1.5	A	.100	0.5	5	TDL155*016S1A
1.8	A	.100	0.5	5	TDL185*016S1A
2.2	A	.100	0.5	5	TDL225*016S1A
2.7	A	.100	0.5	5	TDL275*016S1A
3.3	B	.100	0.5	5	TDL335*016S1B
3.9	B	.100	0.5	5	TDL395*016S1B

10 WVDC; 13 VDC Surge @ 85°C 7 WVDC; 9 VDC Surge @ 125°C					
2.2	A	.100	0.5	5	TDL225*010S1A
2.7	A	.100	0.5	5	TDL275*010S1A
3.3	A	.100	0.5	5	TDL335*010S1A

\* Indicate capacitance tolerance: K = ±10%, M = ±20%, (J = ±5%, Special Order)

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

# TypeTDL Solid Tantalum Capacitors

**MALLORY**

Solid Tantalum Capacitors

Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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16 WVDC; 20 VDC Surge @ 85°C 10 WVDC; 12 VDC Surge @ 125°C					
4.7	B	.100	0.6	5	TDL475*016SIB
5.6	B	.100	0.7	5	TDL565*016SIB
6.8	B	.100	0.9	5	TDL685*016SIB
8.2	C	.100	1.0	6	TDL825*016SIC
10	C	.100	1.3	6	TDL106*016SIC
12	C	.100	1.5	6	TDL126*016SIC
15	C	.100	1.8	6	TDL156*016SIC
18	C	.100	2.2	6	TDL186*016SIC
22	D	.100	2.6	6	TDL226*016SID
27	D	.100	3.2	6	TDL276*016SID
33	D	.100	4.0	6	TDL336*016SID
39	E	.200	4.7	6	TDL396*016MIE
47	E	.200	5.6	6	TDL476*016MIE
56	E	.200	6.8	6	TDL566*016MIE
68	E	.200	8.2	6	TDL686*016MIE
82	E	.200	9.8	8	TDL826*016MIE
100	F	.200	10.0	8	TDL107*016MIF
120	F	.200	10.0	8	TDL127*016MIF
150	F	.200	10.0	8	TDL157*016MIF

20 WVDC; 26 VDC Surge @ 85°C 13 WVDC; 16 VDC Surge @ 125°C					
1.0	A	.100	0.5	5	TDL105*020SIA
1.2	A	.100	0.5	5	TDL125*020SIA
1.5	A	.100	0.5	5	TDL155*020SIA
1.8	A	.100	0.5	5	TDL185*020SIA
2.2	A	.100	0.5	5	TDL225*020SIA
2.7	A	.100	0.5	5	TDL275*020SIA
3.3	A	.100	0.5	5	TDL335*020SIA
3.9	B	.100	0.6	5	TDL395*020SIB
4.7	B	.100	0.8	5	TDL475*020SIB
5.6	B	.100	0.9	5	TDL565*020SIB
6.8	B	.100	1.1	5	TDL685*020SIB
8.2	B	.100	1.3	6	TDL825*020SIB
10	C	.100	1.6	6	TDL106*020SIC
12	C	.100	1.9	6	TDL126*020SIC
15	C	.100	2.4	6	TDL156*020SIC
18	C	.100	2.9	6	TDL186*020SIC
22	C	.100	3.5	6	TDL226*020SIC
27	E	.200	4.3	6	TDL276*020MIE
33	E	.200	5.3	6	TDL336*020MIE
39	E	.200	6.2	6	TDL396*020MIE
47	E	.200	7.5	6	TDL476*020MIE
56	E	.200	9.0	6	TDL566*020MIE
68	E	.200	10.0	6	TDL686*020MIE
82	F	.200	10.0	8	TDL826*020MIF
100	F	.200	10.0	8	TDL107*020MIF

25 WVDC; 32 VDC Surge @ 85°C 16.5 WVDC; 21.5 VDC Surge @ 125°C					
1.0	A	.100	0.5	5	TDL105*025SIA
1.2	A	.100	0.5	5	TDL125*025SIA
1.5	A	.100	0.5	5	TDL155*025SIA
1.8	A	.100	0.5	5	TDL185*025SIA
2.2	B	.100	0.5	5	TDL225*025SIB
2.7	B	.100	0.5	5	TDL275*025SIB
3.3	B	.100	0.7	5	TDL335*025SIB
3.9	B	.100	0.8	5	TDL395*025SIB
4.7	C	.100	0.9	5	TDL475*025SIC
5.6	C	.100	1.1	5	TDL565*025SIC
6.8	C	.100	1.4	5	TDL685*025SIC
8.2	C	.100	1.6	6	TDL825*025SIC
10	C	.100	2.0	6	TDL106*025SIC
12	C	.100	2.4	6	TDL126*025SIC
15	D	.100	3.0	6	TDL156*025SID
18	D	.100	3.6	6	TDL186*025SID
22	D	.100	4.4	6	TDL226*025SID
27	E	.100	5.4	6	TDL276*025MIE
33	E	.100	6.6	6	TDL336*025MIE
39	E	.100	7.8	6	TDL396*025MIE
47	E	.100	9.4	6	TDL476*025MIE

Cap. (μF)	Case Code	Lead Spacing S	Max. DCL @ +25°C (μA)	Max. D.F. % @ +25°C 120 Hz	Catalog Number
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25 WVDC; 32 VDC Surge @ 85°C 16.5 WVDC; 21.5 VDC Surge @ 125°C					
56	E	.100	10.0	6	TDL566*025MIE
68	F	.100	10.0	6	TDL686*025MIF

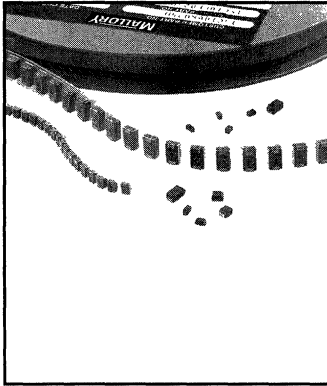
35 WVDC; 46 VDC Surge @ 85°C 23 WVDC; 28 VDC Surge @ 125°C					
0.10	A	.100	0.5	3	TDL104*035SIA
0.12	A	.100	0.5	3	TDL124*035SIA
0.15	A	.100	0.5	3	TDL154*035SIA
0.18	A	.100	0.5	3	TDL184*035SIA
0.22	A	.100	0.5	3	TDL224*035SIA
0.27	A	.100	0.5	3	TDL274*035SIA
0.33	A	.100	0.5	3	TDL334*035SIA
0.39	A	.100	0.5	3	TDL394*035SIA
0.47	A	.100	0.5	3	TDL474*035SIA
0.56	A	.100	0.5	3	TDL564*035SIA
0.68	A	.100	0.5	3	TDL684*035SIA
0.82	A	.100	0.5	3	TDL824*035SIA
1.0	B	.100	0.5	3	TDL105*035SIB
1.2	B	.100	0.5	5	TDL125*035SIB
1.5	B	.100	0.5	5	TDL155*035SIB
1.8	B	.100	0.5	5	TDL185*035SIB
2.2	C	.100	0.6	5	TDL225*035SIC
2.7	C	.100	0.7	5	TDL275*035SIC
3.3	C	.100	0.9	5	TDL335*035SIC
3.9	C	.100	1.0	5	TDL395*035SIC
4.7	D	.100	1.3	5	TDL475*035SID
5.6	D	.100	1.6	5	TDL565*035SID
6.8	D	.100	1.9	5	TDL685*035SID
8.2	D	.100	2.3	6	TDL825*035SID
10	D	.100	2.8	6	TDL106*035SID
12	E	.200	3.4	6	TDL126*035MIE
15	E	.200	4.2	6	TDL156*035MIE
18	E	.200	5.0	6	TDL186*035MIE
22	E	.200	6.2	6	TDL226*035MIE
27	E	.200	7.6	6	TDL276*035MIE
33	F	.200	9.2	6	TDL336*035MIF
39	F	.200	10.0	6	TDL396*035MIF
47	F	.200	10.0	6	TDL476*035MIF

50 WVDC; 65 VDC Surge @ 85°C 33 WVDC; 40 VDC Surge @ 125°C					
0.10	A	.100	0.5	3	TDL104*050SIA
0.12	A	.100	0.5	3	TDL124*050SIA
0.15	A	.100	0.5	3	TDL154*050SIA
0.18	A	.100	0.5	3	TDL184*050SIA
0.22	A	.100	0.5	3	TDL224*050SIA
0.27	A	.100	0.5	3	TDL274*050SIA
0.33	A	.100	0.5	3	TDL334*050SIA
0.39	A	.100	0.5	3	TDL394*050SIA
0.47	B	.100	0.5	3	TDL474*050SIB
0.56	B	.100	0.5	3	TDL564*050SIB
0.68	B	.100	0.5	3	TDL684*050SIB
0.82	B	.100	0.5	3	TDL824*050SIB
1.0	C	.100	0.5	3	TDL105*050SIC
1.2	C	.100	0.5	5	TDL125*050SIC
1.5	C	.100	0.6	5	TDL155*050SIC
1.8	C	.100	0.7	5	TDL185*050SIC
2.2	D	.100	0.9	5	TDL225*050SID
2.7	D	.100	1.1	5	TDL275*050SID
3.3	D	.100	1.3	5	TDL335*050SID
3.9	D	.100	1.6	5	TDL395*050SID
4.7	D	.100	1.9	5	TDL475*050SID
5.6	D	.100	2.2	5	TDL565*050SID
6.8	F	.200	2.7	5	TDL685*050MIF
8.2	F	.200	3.3	6	TDL825*050MIF
10	F	.200	4.0	6	TDL106*050MIF
12	F	.200	4.8	6	TDL126*050MIF
15	F	.200	6.0	6	TDL156*050MIF
18	F	.200	7.2	6	TDL186*050MIF
22	F	.200	8.8	6	TDL226*050MIF

\* Indicate capacitance tolerance: K = ±10%, M ±= 20%, (J = ±5%, Special Order)

Mallory reserves the right to substitute a tighter tolerance, higher voltage capacitor within the same case size.

# Type TSC - Chips Solid Tantalum Capacitors



- Highest Capacitance per Case
- Low DF and DC Leakage
- Temperature Stable
- Compatible with all Soldering Techniques
- Soldering Temperature up to 260°C for 10 Seconds
- Meets IECQ Standard QC300801/US0001 and EIA Standard 535BAAC
- Compatible with all Tape-Fed Automatic Pick and Place Systems

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C

Voltage Range:  
4 to 50 VDC

Capacitance Range:  
0.10  $\mu$ F to 150  $\mu$ F

Cap Change From Initial Limit  
-10% @ -55°C; +10% @ +85°C  
+12% @ +125°C

DC Leakage:  
At 25°C - .01  $\mu$ A/CV or .5  $\mu$ A,  
whichever is greater  
At 85°C - 10 x 25°C Limit  
At 125°C - 2 x 25°C Limit

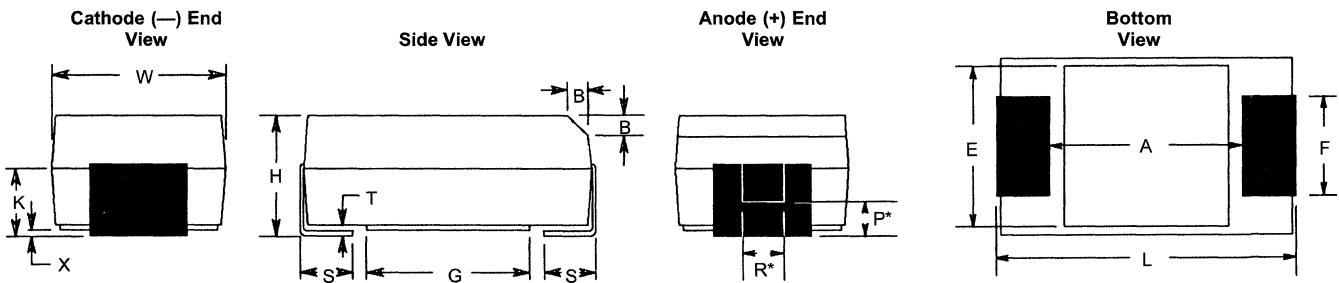
Dissipation Factor:  
.1  $\mu$ F to 1.0  $\mu$ F — 4%  
1.5  $\mu$ F to 68  $\mu$ F — 6%  
100  $\mu$ F to 150  $\mu$ F — 8%

Standard Packaging  
Tape & Reel per EIA RS-481-1

Case Code	EIA/IECQ	Qty per 7" Reel	Tape	
			Width	Pitch
A	3216	2,000	8mm	4mm
B	3528	2,000	8mm	4mm
C	6032	500	12mm	8mm
D	7343	500	12mm	8mm

13" Reels Available on Special Order

## Capacitor Outline Drawing



\* Notch at Supplier's Option

Case Code	Mallory	EIA/IECQ	Dimensions Millimeters (Inches)													
			L	W	H	K	F	S	B	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216		3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 ± 0.2 (.035 ± .008)	1.2 ± 0.1 (.047 ± .004)	0.8 ± 0.3 (.031 ± .012)	0.40 ± 0.15 (.016 ± .006)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	0.8 (.031)	1.4 (.055)	1.3 (.051)
B	3528		3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 ± 0.2 (.043 ± .008)	2.2 ± 0.1 (.087 ± .004)	0.8 ± 0.3 (.031 ± .012)	0.40 ± 0.15 (.016 ± .006)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.5 (.098)
C	6032		6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 ± 0.2 (.055 ± .008)	2.2 ± 0.1 (.087 ± .004)	1.3 ± 0.3 (.051 ± .012)	0.50 ± 0.15 (.020 ± .006)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.9 (.114)
D	7343		7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 ± 0.2 (.059 ± .008)	2.4 ± 0.1 (.094 ± .004)	1.3 ± 0.3 (.051 ± .012)	0.50 ± 0.15 (.020 ± .006)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	4.0 (.157)	3.9 (.154)

Surface Mount Capacitors

Capacitance $\mu$ F	* Cap Tol	Case Code	EIA/IECQ	Catalog Number	DC Leakage $\mu$ A @ +25°C Max	DF % @ +25°C 120 Hz Max
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4 WVDC @ +85°C (2.7 WVDC @ +125°C)						
2.2	10%	A	3216	TSC225K004A	0.5	6.0
3.3	10%	A	3216	TSC335K004A	0.5	6.0
4.7	10%	A	3216	TSC475K004A	0.5	6.0
+ 6.8	10%	A	3216	TSC685K004A	0.5	6.0
+ 10.0	10%	A	3216	TSC106K004A	0.5	6.0
15.0	10%	B	3528	TSC156K004B	0.6	6.0
+ 22.0	10%	B	3528	TSC226K004B	0.9	6.0
33.0	10%	C	6032	TSC336K004C	1.3	6.0
+ 47.0	10%	C	6032	TSC476K004C	1.9	6.0
68.0	10%	D	7343	TSC686K004D	2.7	6.0
100.0	10%	D	7343	TSC107K004D	4.0	8.0
+ 150.0	10%	D	7343	TSC157K004D	6.0	8.0

6 WVDC @ +85°C (4 WVDC @ +125°C)						
1.5	10%	A	3216	TSC155K006A	0.5	6.0
2.2	10%	A	3216	TSC225K006A	0.5	6.0
3.3	10%	A	3216	TSC335K006A	0.5	6.0

Capacitance $\mu$ F	* Cap Tol	Case Code	EIA/IECQ	Catalog Number	DC Leakage $\mu$ A @ +25°C Max	DF % @ +25°C 120 Hz Max
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6 WVDC @ +85°C (4 WVDC @ +125°C)						
+ 4.7	10%	A	3216	TSC475K006A	0.5	6.0
+ 6.8	10%	A	3216	TSC685K006A	0.5	6.0
10.0	10%	B	3528	TSC106K006B	0.6	6.0
+ 15.0	10%	B	3528	TSC156K006B	0.9	6.0
22.0	10%	C	6032	TSC226K006C	1.4	6.0
+ 33.0	10%	C	6032	TSC336K006C	2.0	6.0
47.0	10%	D	7343	TSC476K006D	2.9	6.0
68.0	10%	D	7343	TSC686K006D	4.1	6.0
+ 100.0	10%	D	7343	TSC107K006D	6.0	8.0

10 WVDC @ +85°C (7 WVDC @ +125°C)						
1.0	10%	A	3216	TSC105K010A	0.5	4.0
1.5	10%	A	3216	TSC155K010A	0.5	6.0
2.2	10%	A	3216	TSC225K010A	0.5	6.0
+ 3.3	10%	A	3216	TSC335K010A	0.5	6.0
+ 4.7	10%	A	3216	TSC475K010A	0.5	6.0
6.8	10%	B	3528	TSC685K010B	0.7	6.0

\* - ± 20% Tolerance Available by Special Order  
+ - Extended Values  
(Ref) - Dimensions provided for reference only

Note: Mallory reserves the right to offer higher rated voltage substitutes within the same case size. The marking will indicate the higher voltage.

# Type TSC - Chips Solid Tantalum Capacitors

**MALLORY**

Surface Mount Capacitors

Capacitance μF	* Cap Tol	Case Code		Catalog Number	DC Leakage μA @+25°C Max	DF % @ +25°C 120 Hz Max
		M	EIA/ IECQ			

10 WVDC @ +85°C (7 WVDC @ +125°C)						
+ 10.0	10%	B	3528	TSC106K010B	1.0	6.0
15.0	10%	C	6032	TSC156K010C	1.5	6.0
+ 22.0	10%	C	6032	TSC226K010C	2.2	6.0
33.0	10%	D	7343	TSC336K010D	3.3	6.0
47.0	10%	D	7343	TSC476K010D	4.7	6.0
+ 68.0	10%	D	7343	TSC686K010D	6.8	6.0

16 WVDC @ +85°C (10 WVDC @ +125°C)						
0.68	10%	A	3216	TSC684K016A	0.5	4.0
1.0	10%	A	3216	TSC105K016A	0.5	4.0
1.5	10%	A	3216	TSC155K016A	0.5	6.0
+ 2.2	10%	A	3216	TSC225K016A	0.5	6.0
+ 3.3	10%	A	3216	TSC335K016A	0.5	6.0
4.7	10%	B	3528	TSC475K016B	0.8	6.0
+ 6.8	10%	B	3528	TSC685K016B	1.1	6.0
10.0	10%	C	6032	TSC106K016C	1.6	6.0
+ 15.0	10%	C	6032	TSC156K016C	2.4	6.0
22.0	10%	D	7343	TSC226K016D	3.6	6.0
33.0	10%	D	7343	TSC336K016D	5.3	6.0
+ 47.0	10%	D	7343	TSC476K016D	7.5	6.0

20 WVDC @ +85°C (13 WVDC @ +125°C)						
0.47	10%	A	3216	TSC474K020A	0.5	4.0
0.68	10%	A	3216	TSC684K020A	0.5	4.0
1.0	10%	A	3216	TSC105K020A	0.5	4.0
+ 1.5	10%	A	3216	TSC155K020A	0.5	6.0
+ 2.2	10%	A	3216	TSC225K020A	0.5	6.0
3.3	10%	B	3528	TSC335K020B	0.7	6.0
+ 4.7	10%	B	3528	TSC475K020B	1.0	6.0
6.8	10%	C	6032	TSC685K020C	1.4	6.0
+ 10.0	10%	C	6032	TSC106K020C	2.0	6.0
15.0	10%	D	7343	TSC156K020D	3.0	6.0
22.0	10%	D	7343	TSC226K020D	4.4	6.0
+ 33.0	10%	D	7343	TSC336K020D	6.6	6.0

\* - ± 20% Tolerance Available by Special Order  
+ - Extended Values  
(Ref) - Dimensions provided for reference only

Capacitance μF	* Cap Tol	Case Code		Catalog Number	DC Leakage μA @+25°C Max	DF % @ +25°C 120 Hz Max
		M	EIA/ IECQ			

25 WVDC @ +85°C (17 WVDC @ +125°C)						
0.33	10%	A	3216	TSC334K025A	0.5	4.0
0.47	10%	A	3216	TSC474K025A	0.5	4.0
0.68	10%	B	3528	TSC684K025B	0.5	4.0
1.0	10%	B	3528	TSC105K025B	0.5	4.0
1.5	10%	B	3528	TSC155K025B	0.5	6.0
2.2	10%	C	6032	TSC225K025C	0.6	6.0
3.3	10%	C	6032	TSC335K025C	0.9	6.0
4.7	10%	C	6032	TSC475K025C	1.2	6.0
+ 6.8	10%	C	6032	TSC685K025C	1.7	6.0
10.0	10%	D	7343	TSC106K025D	2.5	6.0
15.0	10%	D	7343	TSC156K025D	3.8	6.0
+ 22.0	10%	D	7343	TSC226K025D	5.5	6.0

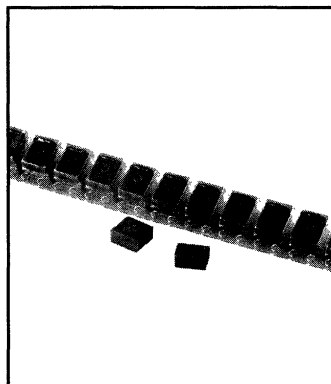
35 WVDC @ +85°C (23 WVDC @ +125°C)						
0.10	10%	A	3216	TSC104K035A	0.5	4.0
0.15	10%	A	3216	TSC154K035A	0.5	4.0
0.22	10%	A	3216	TSC224K035A	0.5	4.0
0.33	10%	A	3216	TSC334K035A	0.5	4.0
0.47	10%	B	3528	TSC474K035B	0.5	4.0
0.68	10%	B	3528	TSC684K035B	0.5	4.0
1.0	10%	B	3528	TSC105K035B	0.5	4.0
1.5	10%	C	6032	TSC155K035C	0.5	6.0
2.2	10%	C	6032	TSC225K035C	0.8	6.0
3.3	10%	C	6032	TSC335K035C	1.2	6.0
4.7	10%	D	7343	TSC475K035D	1.7	6.0
6.8	10%	D	7343	TSC685K035D	2.4	6.0
+ 10.0	10%	D	7343	TSC106K035D	3.5	6.0

50 WVDC @ +85°C (33 WVDC @ +125°C)						
0.10	10%	A	3216	TSC104K050A	0.5	4.0
0.15	10%	B	3528	TSC154K050B	0.5	4.0
0.22	10%	B	3528	TSC224K050B	0.5	4.0
0.33	10%	B	3528	TSC334K050B	0.5	4.0
0.47	10%	C	6032	TSC474K050C	0.5	4.0
0.68	10%	C	6032	TSC684K050C	0.5	4.0
1.0	10%	C	6032	TSC105K050C	0.5	4.0
+ 1.5	10%	C	6032	TSC155K050C	0.8	6.0
2.2	10%	D	7343	TSC225K050D	1.1	6.0
3.3	10%	D	7343	TSC335K050D	1.7	6.0
+ 4.7	10%	D	7343	TSC475K050D	2.4	6.0

**Note:** Mallory reserves the right to offer higher rated voltage substitutes within the same case size. The marking will indicate the higher voltage.



# Series 198 - Chips Metallized Polyester Capacitors



- Cast Epoxy Enclosure
- High Stability
- High Reliability
- Low Distortion
- No Piezoelectric Effect
- Wave Solderable
- Solder Plated (Sn/Pb)  
German Silver Termination

## GENERAL SPECIFICATIONS

Temperature Range:  
-55°C to +125°C with  
voltage derating above 85°C

Temperature Coefficient:  
±6% from -55°C to +85°C

Rated Voltage:  
50 VDC

Capacitance Range:  
.01  $\mu$ F to .47  $\mu$ F

Capacitance Tolerance:  
±5%, ±10%, ±20%

Self Inductance:  
5nH typical

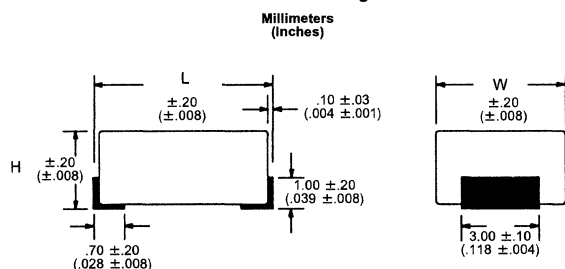
Dissipation Factor:  
1.0% max @ 1 kHz @ 25°C  
1.5% max @ 10 kHz @ 25°C

Dielectric Strength:  
1.6 x rated VDC

Dielectric Absorption:  
.30% typical

Maximum Pulse Rise Time:  
Ten volts per microsecond. If the  
working voltage is lower than  
rated voltage, the dV/dt can be  
higher by a ratio of the rated  
voltage divided by the working  
voltage, not to exceed a factor of  
five.

### Outline Drawing



### Insulation Resistance

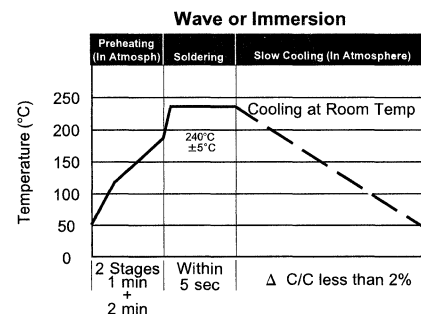
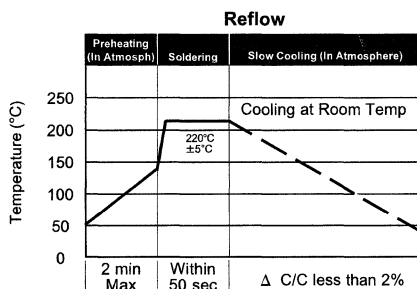
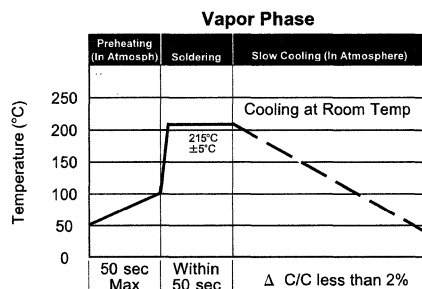
Temperature	25°C	85°C
Megohms x MicroFarads	1,000	100
Need Not Exceed (Megohms)	10,000	1,000

Cap. $\mu$ F	Catalog Number	Millimeters			Case Code	Inches		
		L	W	H		L	W	H
.01	198103*50F	7.30	5.00	3.00	F	.287	.197	.118
.015	198153*50F	7.30	5.00	3.00	F	.287	.197	.118
.022	198223*50F	7.30	5.00	3.00	F	.287	.197	.118
.033	198333*50F	7.30	5.00	3.00	F	.287	.197	.118
.047	198473*50F	7.30	5.00	3.00	F	.287	.197	.118
.068	198683*50F	7.30	5.00	3.00	F	.287	.197	.118
.1	198104*50F	7.30	5.00	3.00	F	.287	.197	.118
.15	198154*50G	7.30	5.30	3.00	G	.287	.217	.118
.22	198224*50G	7.30	5.30	3.00	G	.287	.217	.118
.33	198334*50H	7.30	6.50	3.50	H	.287	.256	.138
.47	198474*50L	7.30	7.00	4.00	L	.287	.276	.157

\* Insert proper letter code for capacitance tolerance:  
J = ±5%, K = ±10%, M = ±20%

**Note:** Standard parts as shown above are supplied in bulk pack of 100 pieces per sealed plastic bag.  
To order in Tape and Reel per EIA RS 481-1, insert 'R' before last character of part number. (i.e. 198103K50RF)  
.01  $\mu$ F to .22  $\mu$ F — 600 pcs. per 178 mm. reel (diameter).  
.33  $\mu$ F to .47  $\mu$ F — 248 pcs. per 248 mm. reel (diameter).

### Recommended Soldering Conditions (Typical)



### Cleaning Guidelines

**NOT ALLOWED:**  
—Trichloroethylene  
—Tetrachloroethylene  
—Methylene chloride and solvents containing Methylene Chloride (Freon® TMC, Flugene® 113CM, Arklone E, Delifrene® CM etc. ...)

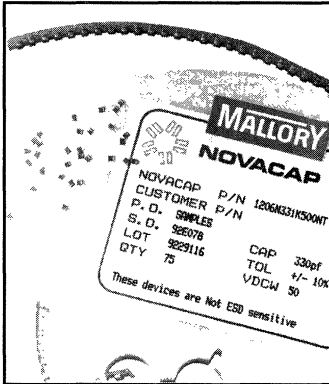
**ALLOWED:**  
—1.1.1 Trichloroethane  
—Solvent Trichlorotrifluoroethane based without Methylenechloride (Freon®, Flugene®, Delifrene, Arklone, etc. ...)  
—Alcohols: —Ethyl Alcohol  
—Methyl Alcohol  
—Isopropyl Alcohol  
—Etc. ...  
or mixture of alcohols with Freon  
—Water

For solvent not listed, please contact MALLORY

**NOTES:**  
Max advised cleaning temperature: 100°C  
Max cleaning time: 5 minutes  
Exposure to ultrasonic vibration in solvent: 3 minutes  
fr = 40KHz  
P = 25mW/cm<sup>3</sup>

# Chips Multilayer Ceramic Capacitors

**NOVACAP MALLORY**



- Surface Mount
- COG, X7R, Z5U  
Temperature Coefficients
- Nickel Barrier/Solder  
Terminations
- Tape and Reel — Standard

## GENERAL SPECIFICATIONS

Voltage Range:  
 COG: 100 and 200 Volts  
 X7R: 50 and 100 Volts  
 Z5U: 50 and 100 Volts

Capacitance Range:  
 COG: 1 pF to .010  $\mu$ F  
 X7R: 330 pF to .27  $\mu$ F  
 Z5U: 3900 pF to .82  $\mu$ F

Standard Sizes: (Three)  
 0805, 1206, 1210

Tape and Reel:  
 7" reel per EIA RS 481-1  
 Parts with • (dot) following part number are 4,000 pcs. per reel.  
 Parts with ^ (caret) following part number are 2,000 pcs. per reel.  
 All others are 3,000 pcs. per reel.  
 13" reels are available by special request:  
 0805 & 1206 sizes - 15,000 pcs.  
 1210 size - 10,000 pcs.

**Note:** Other chip sizes are available upon special request. Contact Mallory for availability and prices.

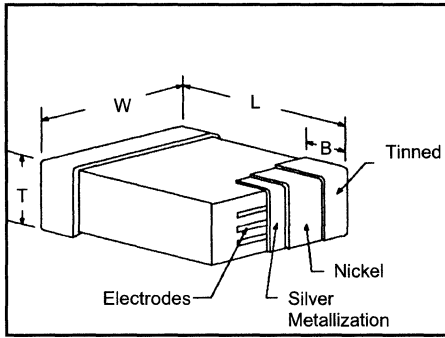
## Performance Characteristics

Parameter	COG (NPO)	X7R	Z5U
<b>Temperature Characteristics:</b>			
Range, °C: .....	-55°C to +125°C .....	-55°C to +125°C .....	+10°C to +85°C .....
Capacitance change without DC voltage: .....	0 $\pm$ 30 PPM/°C* .....	$\pm$ 15% .....	+22%, -56% .....
<b>Aging Rate:</b> % $\Delta$ C / Decade Hour, Maximum .....			
	0% .....	2.5% .....	5.0% .....
<b>Dissipation Factor:</b>			
Test Conditions @ 25°C: .....	> 100 pF w/1.0 vrms @ 1 KHz. ....	w/ 1.0 vrms @ 1 KHz. ....	w/ 0.5 vrms @ 1 KHz. ....
	$\leq$ 100 pF w/1.0 vrms @ 1 MHz. ....		
Limits: .....	0.10 % Max. ....	2.5 % Max. ....	3.0 % Max. ....
<b>Insulation Resistance (IR):</b>			
At rated voltage, whichever is smaller: .....	1000 megohms x $\mu$ F .....	1000 megohms x $\mu$ F .....	1000 megohms x $\mu$ F .....
	or 100 gigaohms .....	or 100 gigaohms .....	or 10 gigaohms .....
<b>Moisture Resistance:</b> MIL-STD-202, Method 106 (20 cycles with 50 Volts applied)			
Post test limits @ 25°C, whichever is smaller: .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....
	or 10 gigaohms .....	or 10 gigaohms .....	or 1 gigaohm .....
<b>Immersion Cycling:</b> MIL-STD-202, Method 104, Condition B (2 cycles @ 15 minutes each. Each cycle consists of immersion in hot bath @ 65°C followed by immersion in cold salt water bath.)			
Post test limits @ 25°C :			
Insulation Resistance, whichever is smaller: .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....
	or 10 gigaohms .....	or 10 gigaohms .....	or 1 gigaohm .....
<b>Life Test:</b> - 1000 Hrs.			
Test Potential and Temperature: .....	200% V @ 125°C .....	200% V @ 125°C .....	150% V @ 85°C .....
Post test limits @ 25°C:			
Capacitance Change, whichever is greater: .....	< 2% or 0.5pF .....	$\pm$ 15% of initial value** .....	$\pm$ 30% of initial value** .....
Dissipation Factor: .....	0.25% Max. ....	2.5% Max. ....	3.0% Max. ....
Insulation Resistance, whichever is smaller: .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....	100 megohms x $\mu$ F .....
	or 10 gigaohms .....	or 10 gigaohms .....	or 1 gigaohm .....
Dielectric Strength 2.5 times rated voltage with current limited to 50 mA			

\* 60 PPM/°C below 10pF nominal  
 +53 PPM -30 PPM/°C from +25°C to -55°C comparable to MIL-C-20

\*\* X7R and Z5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be deaged for 2 hours @ 150°C and stabilized at room temperature for 48 hours before capacitor measurements are made.

Surface Mount Capacitors



**Dimensions - Millimeters & (Inches)**

Size Code	L Length	W Width	T Thickness Maximum	B Bandwidth
0805	2.03(.080) ±0.25(.010)	1.27(.050) ±0.25(.010)	1.27(.050)	0.508(.020) ±0.25(.010)
1206	3.18(.125) ±0.25(.010)	1.52(.060) ±0.25(.010)	1.52(.060)	0.508(.020) ±0.25(.010)
1210	3.18(.125) ±0.25(.010)	2.54(.100) ±0.25(.010)	1.65(.065)	0.508(.020) ±0.25(.010)

**COG (NPO) Temperature Coefficient**

Capacitance	0805 Size Code	
	Part Number	
	100 Volts	200 Volts
1.0 pF	0805N109*101NT •	0805N109*201NT •
1.2 pF	0805N129*101NT •	0805N129*201NT •
10 pF	0805N100*101NT •	0805N100*201NT •
12 pF	0805N120*101NT •	0805N120*201NT •
15 pF	0805N150*101NT •	0805N150*201NT •
18 pF	0805N180*101NT •	0805N180*201NT •
22 pF	0805N220*101NT •	0805N220*201NT •
27 pF	0805N270*101NT •	0805N270*201NT •
33 pF	0805N330*101NT •	0805N330*201NT •
39 pF	0805N390*101NT •	0805N390*201NT •
47 pF	0805N470*101NT •	0805N470*201NT •
56 pF	0805N560*101NT •	0805N560*201NT •
68 pF	0805N680*101NT •	0805N680*201NT •
82 pF	0805N820*101NT •	0805N820*201NT •
100 pF	0805N101*101NT •	0805N101*201NT •
120 pF	0805N121*101NT •	0805N121*201NT •
150 pF	0805N151*101NT •	0805N151*201NT •
180 pF	0805N181*101NT •	0805N181*201NT •
220 pF	0805N221*101NT •	0805N221*201NT •
270 pF	0805N271*101NT •	0805N271*201NT •
330 pF	0805N331*101NT •	0805N331*201NT •
390 pF	0805N391*101NT •	0805N391*201NT •
470 pF	0805N471*101NT •	0805N471*201NT •
560 pF	0805N561*101NT •	0805N561*201NT •
680 pF	0805N681*101NT •	0805N681*201NT •
820 pF	0805N821*101NT •	
1000 pF	0805N102*101NT	
1200 pF	0805N122*101NT	
1500 pF	0805N152*101NT	

Capacitance	1206 Size Code	
	Part Number	
	100 Volts	200 Volts
10 pF	1206N100*101NT •	1206N100*201NT •
12 pF	1206N120*101NT •	1206N120*201NT •
15 pF	1206N150*101NT •	1206N150*201NT •
18 pF	1206N180*101NT •	1206N180*201NT •
22 pF	1206N220*101NT •	1206N220*201NT •
27 pF	1206N270*101NT •	1206N270*201NT •
33 pF	1206N330*101NT •	1206N330*201NT •
39 pF	1206N390*101NT •	1206N390*201NT •
47 pF	1206N470*101NT •	1206N470*201NT •
56 pF	1206N560*101NT •	1206N560*201NT •
68 pF	1206N680*101NT •	1206N680*201NT •
82 pF	1206N820*101NT •	1206N820*201NT •
100 pF	1206N101*101NT •	1206N101*201NT •
120 pF	1206N121*101NT •	1206N121*201NT •
150 pF	1206N151*101NT •	1206N151*201NT •
180 pF	1206N181*101NT •	1206N181*201NT •
220 pF	1206N221*101NT •	1206N221*201NT •
270 pF	1206N271*101NT •	1206N271*201NT •
330 pF	1206N331*101NT •	1206N331*201NT •
390 pF	1206N391*101NT •	1206N391*201NT •
470 pF	1206N471*101NT •	1206N471*201NT •
560 pF	1206N561*101NT •	1206N561*201NT •
680 pF	1206N681*101NT •	1206N681*201NT •
820 pF	1206N821*101NT •	1206N821*201NT •
1000 pF	1206N102*101NT •	1206N102*201NT •
1200 pF	1206N122*101NT •	1206N122*201NT •
1500 pF	1206N152*101NT •	1206N152*201NT •
1800 pF	1206N182*101NT •	1206N182*201NT •
2200 pF	1206N222*101NT •	1206N222*201NT •
2700 pF	1206N272*101NT	
3300 pF	1206N332*101NT	
3900 pF	1206N392*101NT	
4700 pF	1206N472*101NT	

Capacitance	1210 Size Code	
	Part Number	
	100 Volts	200 Volts
33 pF	1210N330*101NT	1210N330*201NT
39 pF	1210N390*101NT	1210N390*201NT
47 pF	1210N470*101NT	1210N470*201NT
56 pF	1210N560*101NT	1210N560*201NT
68 pF	1210N680*101NT	1210N680*201NT
82 pF	1210N820*101NT	1210N820*201NT
100 pF	1210N101*101NT	1210N101*201NT
120 pF	1210N121*101NT	1210N121*201NT
150 pF	1210N151*101NT	1210N151*201NT
180 pF	1210N181*101NT	1210N181*201NT
220 pF	1210N221*101NT	1210N221*201NT
270 pF	1210N271*101NT	1210N271*201NT
330 pF	1210N331*101NT	1210N331*201NT
390 pF	1210N391*101NT	1210N391*201NT
470 pF	1210N471*101NT	1210N471*201NT
560 pF	1210N561*101NT	1210N561*201NT
680 pF	1210N681*101NT	1210N681*201NT
820 pF	1210N821*101NT	1210N821*201NT
1000 pF	1210N102*101NT	1210N102*201NT
1200 pF	1210N122*101NT	1210N122*201NT
1500 pF	1210N152*101NT	1210N152*201NT
1800 pF	1210N182*101NT	1210N182*201NT
2200 pF	1210N222*101NT	1210N222*201NT
2700 pF	1210N272*101NT	1210N272*201NT
3300 pF	1210N332*101NT	1210N332*201NT
3900 pF	1210N392*101NT	1210N392*201NT ^
4700 pF	1210N472*101NT	1210N472*201NT ^
5600 pF	1210N562*101NT	
6800 pF	1210N682*101NT	
8200 pF	1210N822*101NT ^	
.010 uF	1210N103*101NT ^	

\* Insert proper letter code for desired tolerance:  
 ±0.1pF is standard on values less than 10 pF  
 ±5% is standard on values ≥ 10 pF

Values less than 10 pF:  
 B = ±0.1pF, C = ±0.25pF  
 Values to 20 pF:  
 D = ±0.5pF  
 Values greater than 10 pF:  
 F = ±1%; G = ±2%; H = ±3%;  
 J = ±5%; K = ±10%; M = ±20%

Note: COG also available in 200 volts as special order

Surface Mount Capacitors

### X7R Temperature Coefficient

0805 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
330 pF	0805B331*500NT •	0805B331*101NT •
390 pF	0805B391*500NT •	0805B391*101NT •
470 pF	0805B471*500NT •	0805B471*101NT •
560 pF	0805B561*500NT •	0805B561*101NT •
680 pF	0805B681*500NT •	0805B681*101NT •
820 pF	0805B821*500NT •	0805B821*101NT •
1000 pF	0805B102*500NT •	0805B102*101NT •
1200 pF	0805B122*500NT •	0805B122*101NT •
1500 pF	0805B152*500NT •	0805B152*101NT •
1800 pF	0805B182*500NT •	0805B182*101NT •
2200 pF	0805B222*500NT •	0805B222*101NT •
2700 pF	0805B272*500NT •	0805B272*101NT •
3300 pF	0805B332*500NT •	0805B332*101NT •
3900 pF	0805B392*500NT •	0805B392*101NT •
4700 pF	0805B472*500NT •	0805B472*101NT •
5600 pF	0805B562*500NT •	0805B562*101NT •
6800 pF	0805B682*500NT •	0805B682*101NT •
8200 pF	0805B822*500NT •	0805B822*101NT •
.010 uF	0805B103*500NT •	0805B103*101NT •
.012 uF	0805B123*500NT •	0805B123*101NT •
.015 uF	0805B153*500NT •	0805B153*101NT •
.018 uF	0805B183*500NT •	0805B183*101NT •
.022 uF	0805B223*500NT •	0805B223*101NT •
.027 uF	0805B273*500NT •	0805B273*101NT •
.033 uF	0805B333*500NT •	
.039 uF	0805B393*500NT •	
.047 uF	0805B473*500NT •	

1206 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
560 pF	1206B561*500NT •	1206B561*101NT •
680 pF	1206B681*500NT •	1206B681*101NT •
820 pF	1206B821*500NT •	1206B821*101NT •
1000 pF	1206B102*500NT •	1206B102*101NT •
1200 pF	1206B122*500NT •	1206B122*101NT •
1500 pF	1206B152*500NT •	1206B152*101NT •
1800 pF	1206B182*500NT •	1206B182*101NT •
2200 pF	1206B222*500NT •	1206B222*101NT •
2700 pF	1206B272*500NT •	1206B272*101NT •
3300 pF	1206B332*500NT •	1206B332*101NT •
3900 pF	1206B392*500NT •	1206B392*101NT •
4700 pF	1206B472*500NT •	1206B472*101NT •
5600 pF	1206B562*500NT •	1206B562*101NT •
6800 pF	1206B682*500NT •	1206B682*101NT •
8200 pF	1206B822*500NT •	1206B822*101NT •
.010 uF	1206B103*500NT •	1206B103*101NT •
.012 uF	1206B123*500NT •	1206B123*101NT •
.015 uF	1206B153*500NT •	1206B153*101NT •
.018 uF	1206B183*500NT •	1206B183*101NT •
.022 uF	1206B223*500NT •	1206B223*101NT •
.027 uF	1206B273*500NT •	1206B273*101NT •
.033 uF	1206B333*500NT •	1206B333*101NT •
.039 uF	1206B393*500NT •	1206B393*101NT •
.047 uF	1206B473*500NT •	1206B473*101NT •
.056 uF	1206B563*500NT •	1206B563*101NT •
.068 uF	1206B683*500NT •	1206B683*101NT •
.082 uF	1206B823*500NT •	1206B823*101NT •
.10 uF	1206B104*500NT •	1206B104*101NT •
.12 uF	1206B124*500NT •	
.15 uF	1206B154*500NT •	

1210 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
1000 pF	1210B102*500NT	1210B102*101NT
1200 pF	1210B122*500NT	1210B122*101NT
1500 pF	1210B152*500NT	1210B152*101NT
1800 pF	1210B182*500NT	1210B182*101NT
2200 pF	1210B222*500NT	1210B222*101NT
2700 pF	1210B272*500NT	1210B272*101NT
3300 pF	1210B332*500NT	1210B332*101NT
3900 pF	1210B392*500NT	1210B392*101NT
4700 pF	1210B472*500NT	1210B472*101NT
5600 pF	1210B562*500NT	1210B562*101NT
6800 pF	1210B682*500NT	1210B682*101NT
8200 pF	1210B822*500NT	1210B822*101NT
.010 uF	1210B103*500NT	1210B103*101NT
.012 uF	1210B123*500NT	1210B123*101NT
.015 uF	1210B153*500NT	1210B153*101NT
.018 uF	1210B183*500NT	1210B183*101NT
.022 uF	1210B223*500NT	1210B223*101NT
.027 uF	1210B273*500NT	1210B273*101NT
.033 uF	1210B333*500NT	1210B333*101NT
.039 uF	1210B393*500NT	1210B393*101NT
.047 uF	1210B473*500NT	1210B473*101NT
.056 uF	1210B563*500NT	1210B563*101NT
.068 uF	1210B683*500NT	1210B683*101NT
.082 uF	1210B823*500NT	1210B823*101NT
.10 uF	1210B104*500NT	1210B104*101NT
.12 uF	1210B124*500NT	1210B124*101NT
.15 uF	1210B154*500NT	1210B154*101NT ^
.18 uF	1210B184*500NT ^	1210B184*101NT ^
.22 uF	1210B224*500NT ^	
.27 uF	1210B274*500NT ^	

\* Insert proper letter code for desired tolerance:  
±10% Tolerance is standard  
J = ±5%; K = ±10%; M = ±20%  
P = +100%, -0%; Z = +80%, -20%

Note: X7R also available in 200 volts as special order

### Z5U Temperature Coefficient

0805 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
3900 pF	0805Z392*500NT •	0805Z392*101NT •
4700 pF	0805Z472*500NT •	0805Z472*101NT •
5600 pF	0805Z562*500NT •	0805Z562*101NT •
6800 pF	0805Z682*500NT •	0805Z682*101NT •
8200 pF	0805Z822*500NT •	0805Z822*101NT •
.010 uF	0805Z103*500NT •	0805Z103*101NT •
.012 uF	0805Z123*500NT •	0805Z123*101NT •
.015 uF	0805Z153*500NT •	0805Z153*101NT •
.018 uF	0805Z183*500NT •	0805Z183*101NT •
.022 uF	0805Z223*500NT •	0805Z223*101NT •
.027 uF	0805Z273*500NT •	0805Z273*101NT •
.033 uF	0805Z333*500NT •	0805Z333*101NT •
.039 uF	0805Z393*500NT •	0805Z393*101NT •
.047 uF	0805Z473*500NT •	0805Z473*101NT •
.056 uF	0805Z563*500NT •	0805Z563*101NT •
.068 uF	0805Z683*500NT •	
.082 uF	0805Z823*500NT •	
.10 uF	0805Z104*500NT •	
.12 uF	0805Z124*500NT •	
.15 uF	0805Z154*500NT •	

1206 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
6800 pF	1206Z682*500NT •	1206Z682*101NT •
8200 pF	1206Z822*500NT •	1206Z822*101NT •
.010 uF	1206Z103*500NT •	1206Z103*101NT •
.012 uF	1206Z123*500NT •	1206Z123*101NT •
.015 uF	1206Z153*500NT •	1206Z153*101NT •
.018 uF	1206Z183*500NT •	1206Z183*101NT •
.022 uF	1206Z223*500NT •	1206Z223*101NT •
.027 uF	1206Z273*500NT •	1206Z273*101NT •
.033 uF	1206Z333*500NT •	1206Z333*101NT •
.039 uF	1206Z393*500NT •	1206Z393*101NT •
.047 uF	1206Z473*500NT •	1206Z473*101NT •
.056 uF	1206Z563*500NT •	1206Z563*101NT •
.068 uF	1206Z683*500NT •	1206Z683*101NT •
.082 uF	1206Z823*500NT •	1206Z823*101NT •
.10 uF	1206Z104*500NT •	1206Z104*101NT •
.12 uF	1206Z124*500NT •	1206Z124*101NT •
.15 uF	1206Z154*500NT •	1206Z154*101NT •
.18 uF	1206Z184*500NT •	
.22 uF	1206Z224*500NT •	
.27 uF	1206Z274*500NT •	
.33 uF	1206Z334*500NT •	
.37 uF	1206Z374*500NT •	
.39 uF	1206Z394*500NT •	

1210 Size Code		
Capacitance	Part Number	
	50 Volts	100 Volts
.012 uF	1210Z123*500NT	1210Z123*101NT
.015 uF	1210Z153*500NT	1210Z153*101NT
.018 uF	1210Z183*500NT	1210Z183*101NT
.022 uF	1210Z223*500NT	1210Z223*101NT
.027 uF	1210Z273*500NT	1210Z273*101NT
.033 uF	1210Z333*500NT	1210Z333*101NT
.039 uF	1210Z393*500NT	1210Z393*101NT
.047 uF	1210Z473*500NT	1210Z473*101NT
.056 uF	1210Z563*500NT	1210Z563*101NT
.068 uF	1210Z683*500NT	1210Z683*101NT
.082 uF	1210Z823*500NT	1210Z823*101NT
.10 uF	1210Z104*500NT	1210Z104*101NT
.12 uF	1210Z124*500NT	1210Z124*101NT
.15 uF	1210Z154*500NT	1210Z154*101NT
.18 uF	1210Z184*500NT	1210Z184*101NT
.22 uF	1210Z224*500NT	1210Z224*101NT ^
# .22 uF	1210Z224M500NTX	
.27 uF	1210Z274*500NT	1210Z274*101NT ^
.33 uF	1210Z334*500NT	
# .33 uF	1210Z334M500NTX	
.39 uF	1210Z394*500NT	
.47 uF	1210Z474*500NT	
.56 uF	1210Z564*500NT ^	
.68 uF	1210Z684*500NT ^	
.82 uF	1210Z824*500NT ^	

\* Insert proper letter code for desired tolerance:  
±20 Tolerance is standard  
M = ±20%; P = +100%-0%; Z = +80%-0%

# Thin Profile design: (Available in 'M' tolerance only)

'T' dimension (thickness)

.22 uF = .558 mm (.021)

.33 uF = .660 mm (.026)

(.22 uF reel quantity is 4,000 pieces.)

(.33 uF reel quantity is 3,000 pieces.)

Surface Mount Capacitors

Type	Features	Capacitance Range	Voltage Range	Temperature Range	Termination	Nominal Case Size	Page Number
<b>Large Can</b>							
<b>CGS</b>	Standard High CV Computer Grade	75 $\mu$ F to 640,000 $\mu$ F	10 to 450	-40°C +85°C	Screw Terminals or PC Mount	1.375 x 2.125 3.000 x 8.625	68
<b>CG</b>	High Reliability Long Life	40 $\mu$ F to 160,000 $\mu$ F	10 to 450	-40° +85°C	Screw Terminals or PC Mount	1.375 x 2.125 3.000 x 8.625	71
<b>CGH</b>	Very High Capacitance High Ripple Current	620 $\mu$ F to 22,000 $\mu$ F	250 to 450	-40°C +85°C	Screw Terminals	2.000 x 2.625 3.000 x 8.625	73
<b>CGO</b>	SMPS Output Filter Very Low ESR	2,800 $\mu$ F to 45,000 $\mu$ F	5 to 55	-55°C +85°C	Low Post Screw Terminals	1.375 x 2.125 1.375 x 5.625	74
<b>CGR</b>	High Ripple Current Long Life	330 $\mu$ F to 100,000 $\mu$ F	7.5 to 200	-40°C +85°C	Screw Terminals	1.375 x 3.625 3.000 x 5.625	75
<b>HC</b>	Polarized Phenolic Case	100 $\mu$ F to 4,000 $\mu$ F	25 to 450	-20°C +85°C	Molded Top Screw Terminals	1.437 x 2.750 2.062 x 4.375	77
<b>NP</b>	Non-Polar Phenolic Case	15 $\mu$ F to 500 $\mu$ F	125 to 450	-20°C +85°C	Molded Top Screw Terminals	1.437 x 2.750 2.062 x 4.375	77
See pages 66 and 67 for part number formatting and outline dimensions.							
<b>Snap Mount</b>							
<b>LP</b>	High Temperature Long Life	100 $\mu$ F to 47,000 $\mu$ F	6.3 to 250	-40°C +105°C	2 Pin Terminals 10mm Lead Spacing	22mm x 25mm 35mm x 50mm	78
<b>LPX</b>	High Capacitance High Voltage	56 $\mu$ F to 2,700 $\mu$ F	160 to 450	-40°C +85°C	2 Pin Terminals 10mm Lead Spacing	22mm x 25mm 35mm x 50mm	80
<b>Radial Leaded</b>							
<b>VTL</b>	General Purpose	.47 $\mu$ F to 10,000 $\mu$ F	6.3 to 250	-40°C +85°C	Radial Leads	5mm x 11mm 16mm x 38mm	82
<b>VTH</b>	High Temperature Long Life	.47 $\mu$ F to 10,000 $\mu$ F	6.3 to 250	-40°C +105°C	Radial Leads	5mm x 11mm 18mm x 40mm	84
<b>VTM</b>	Sub-Miniature General Purpose	.10 $\mu$ F to 100 $\mu$ F	6.3 to 63	-40°C +85°C	Radial Leads	4mm x 7mm 6mm x 7mm	86
<b>VTN</b>	Non-Polar General Purpose	1.0 $\mu$ F to 10,000 $\mu$ F	6.3 to 160	-40°C +85°C	Radial Leads	5mm x 7mm 25mm x 64mm	87
<b>VTZ</b>	Very Low Impedance +105°C Long Life	22 $\mu$ F to 15,000 $\mu$ F	6.3 to 100	-40°C +105°C	Radial Leads	5mm x 11mm 18mm x 40mm	89
<b>VPR</b>	Low Impedance Wide Temperature Range	130 $\mu$ F to 12,000 $\mu$ F	6.3 to 100	-55°C +105°C	Radial Leads	.512 x 1.000 1.000 x 3.625	91
<b>Axial Leaded</b>							
<b>TC</b>	General Purpose	1.0 $\mu$ F to 5,000 $\mu$ F	16 to 450	-40°C +85°C	Axial Leads	.197 x .472 1.000 x 3.625	93
<b>TCG</b>	General Purpose	10 $\mu$ F to 10,000 $\mu$ F	10 to 450	-40°C +85°C	Axial Leads	.315 x .787 1.000 x 3.125	95
<b>TCX</b>	Wide Temperature Range Long Life	27 $\mu$ F to 12,000 $\mu$ F	10 to 150	-55°C +105°C	Axial Leads	.625 x 1.125 1.000 x 3.625	97
<b>TA</b>	General Purpose Decade Ratings	.10 $\mu$ F to 10,000 $\mu$ F	6.3 to 450	-40°C +85°C	Axial Leads	5mm x 11mm 22mm x 51mm	98
<b>TT</b>	Miniature General Purpose	1.0 $\mu$ F to 2,400 $\mu$ F	6 to 250	-40°C +85°C	Axial Leads	5mm x 12mm 13mm x 24mm	100
<b>Twist Lug/PC Mount</b>							
<b>FP WP PPF</b>	Multiple Capacitor Sections	10.0 $\mu$ F to 4,700 $\mu$ F	25 to 475	-30°C +85°C	Twist Lug or Printed Circuit	1.000 x 2.000 1.375 x 5.000	102

# Types CGS, CG, CGR, CGO, CGH

## Part Number Information

**MALLORY**

Mallory Catalog Number: CGS 184 U 010 X3L \*( 3 P H )

TYPE NUMBER: \_\_\_\_\_  
Identifies the basic type  
CGS, CG, CGR, CGO, CGH

CAPACITANCE: \_\_\_\_\_  
Expressed in microfarads  
The first two digits are significant figures  
The third digit is the number of zeros

CAPACITANCE TOLERANCE: \_\_\_\_\_  
U = -10% + 75% (6.3 to 150 VDC)  
T = -10% + 50% (151 to 450 VDC)  
M = ±20%

DC VOLTAGE RATING: \_\_\_\_\_  
Zeros are used to precede the voltage rating where  
necessary to complete the three digit block  
The letter 'R' indicates a decimal point

CASE CODE: \_\_\_\_\_  
See page 67 for sizes

INSULATING SLEEVE: \_\_\_\_\_  
3 = .008 PVC insulating material. (Standard)

POLARITY: \_\_\_\_\_  
P = Polar  
N = Non Polar

TERMINAL: \_\_\_\_\_  
H = High Post                      D = Low Post, Low Resistance Screw Mount (1/4 - 28 Thread)  
L = Low Post                        F = High Post Metric Thread  
S = Solder Lugs                    G = Low Post Metric Thread  
V = Printed Circuit Mount       N = High Post, Low Resistance Screw Mount (1/4 - 28 Thread)

\* NOTE ! The standard parts shown in the General Catalog have PVC sleeving and are polar, with high post terminals as standard. The 3PH is left off the part number, but is assumed. The CGO type has a 'L' at the end of the part number which stands for 'low post', while the case code has been omitted. Check Standard Parts List for case size

Aluminum Capacitors

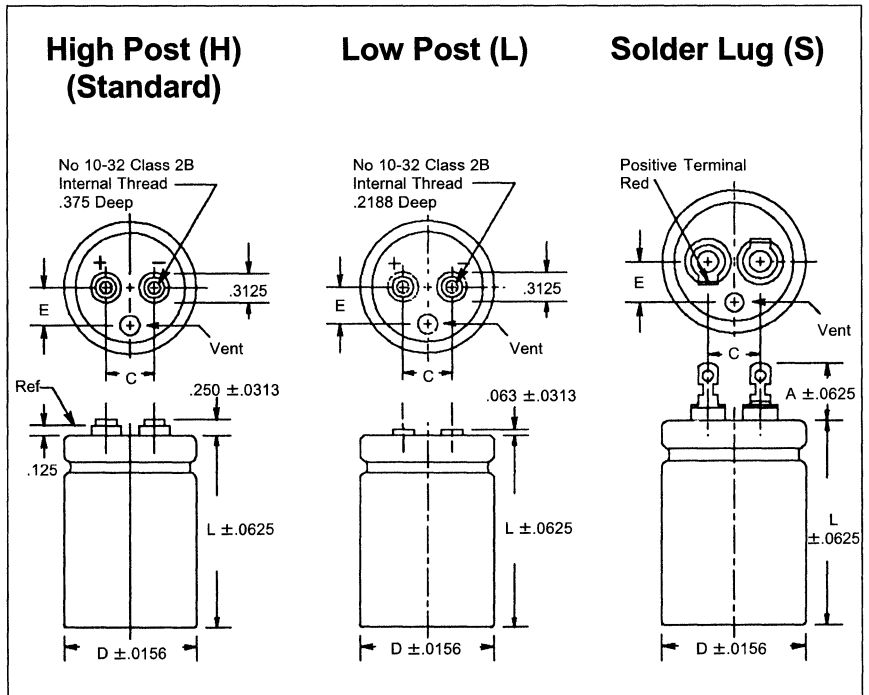
# Types CGS, CG, CGR, CGO, CGH Dimensions and Size Charts



## Case Code Chart

Uninsulated Can Size							
Case Code	Inches		mm		Inches		Mounting Bracket
	D	L	D	L	C	C	
R2C	1.375	2.125	35	54	.500	12.7	VR3
R2L	1.375	2.625	35	67	.500	12.7	VR3
R3C	1.375	3.125	35	79.4	.500	12.7	VR3
R3L	1.375	3.625	35	92	.500	12.7	VR3
R4C	1.375	4.125	35	105	.500	12.7	VR3
R4L	1.375	4.625	35	117.5	.500	12.7	VR3
R5C	1.375	5.125	35	130	.500	12.7	VR3
R5L	1.375	5.625	35	143	.500	12.7	VR3
U2C	1.750	2.125	44.5	54	.750	19	VR6
U2L	1.750	2.625	44.5	67	.750	19	VR6
U3C	1.750	3.125	44.5	79.4	.750	19	VR6
U3L	1.750	3.625	44.5	92	.750	19	VR6
U4C	1.750	4.125	44.5	105	.750	19	VR6
U4L	1.750	4.625	44.5	117.5	.750	19	VR6
U5C	1.750	5.125	44.5	130	.750	19	VR6
U5L	1.750	5.625	44.5	143	.750	19	VR6
V2C	2.000	2.125	50.8	54	.875	22.23	VR8
V2L	2.000	2.625	50.8	67	.875	22.23	VR8
V3C	2.000	3.125	50.8	79.4	.875	22.23	VR8
V3L	2.000	3.625	50.8	92	.875	22.23	VR8
V4C	2.000	4.125	50.8	105	.875	22.23	VR8
V4L	2.000	4.625	50.8	117.5	.875	22.23	VR8
V5C	2.000	5.125	50.8	130	.875	22.23	VR8
V5L	2.000	5.625	50.8	143	.875	22.23	VR8
W3C	2.500	3.125	63.5	79.4	1.125	28.58	VR10
W3L	2.500	3.625	63.5	92	1.125	28.58	VR10
W4C	2.500	4.125	63.5	105	1.125	28.58	VR10
W4L	2.500	4.625	63.5	117.5	1.125	28.58	VR10
W5C	2.500	5.125	63.5	130	1.125	28.58	VR10
W5L	2.500	5.625	63.5	143	1.125	28.58	VR10
X3L	3.000	3.625	76.2	92	1.250	31.75	VR12
X4C	3.000	4.125	76.2	105	1.250	31.75	VR12
X4L	3.000	4.625	76.2	117.5	1.250	31.75	VR12
X5C	3.000	5.125	76.2	130	1.250	31.75	VR12
X5L	3.000	5.625	76.2	143	1.250	31.75	VR12
X5R	3.000	5.875	76.2	149	1.250	31.75	VR12
X6L	3.000	6.625	76.2	168	1.250	31.75	VR12
X7L	3.000	7.625	76.2	194	1.250	31.75	VR12
X8L	3.000	8.625	76.2	219	1.250	31.75	VR12

Add .015 inches to diameter and .045 inches to length for PVC insulating sleeve.



Can Dia	E
1.375	.390
1.750	.453
2.000	.500
2.500	.625
3.000	.750

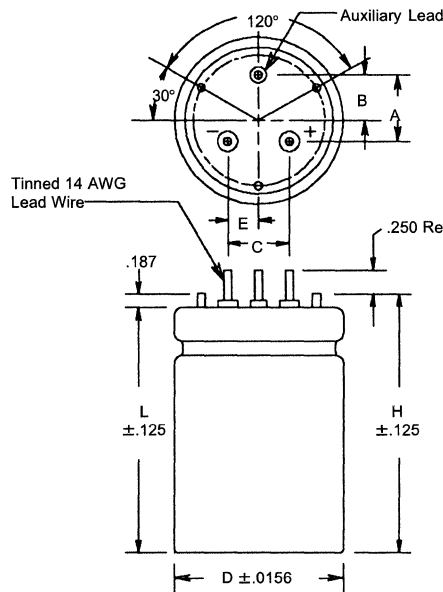
Can Dia	E
1.375	.390
1.750	.453
2.000	.500
2.500	.625
3.000	.750

Can Dia	A	E
1.375	.56	.31
1.750	.65	.40
2.000	.65	.50
2.500	.65	.62
3.000	.65	.75

Aluminum Capacitors

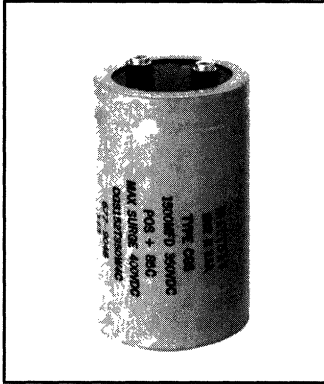
## PC Mounting Board Dimensions

Uninsulated Can Size							
Case Code	D	L	H	A	B	C	E
R1N	1.375	1.750	1.937	.550	.375	.500	.250
R2C	1.375	2.125	2.312	.550	.375	.500	.250
R2L	1.375	2.625	2.812	.550	.375	.500	.250
R3C	1.375	3.125	3.312	.550	.375	.500	.250
R3L	1.375	3.625	3.812	.550	.375	.500	.250
R4C	1.375	4.125	4.312	.550	.375	.500	.250
R4L	1.375	4.625	4.812	.550	.375	.500	.250
R5C	1.375	5.125	5.312	.550	.375	.500	.250
R5L	1.375	5.625	5.812	.550	.375	.500	.250
V2C	2.000	2.125	2.312	1.000	.575	.800	.400
V2L	2.000	2.625	2.812	1.000	.575	.800	.400
V3C	2.000	3.125	3.312	1.000	.575	.800	.400
V3L	2.000	3.625	3.812	1.000	.575	.800	.400
V4C	2.000	4.125	4.312	1.000	.575	.800	.400
V4L	2.000	4.625	4.812	1.000	.575	.800	.400
V5C	2.000	5.125	5.312	1.000	.575	.800	.400
V5L	2.000	5.625	5.812	1.000	.575	.800	.400



## Printed Circuit Board (V)

# Type CGS Computer Grade Capacitors



- High CV Product
- Screw Terminals
- Suitable for use in most demanding applications requiring high current filtering or energy storage
- Custom Designs Available Upon Request

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
6.3 WVDC to 450 WVDC

Capacitance Range:  
75µF to 640,000µF

Capacitance Tolerance:  
-10% +75% (6.3-150 WVDC)  
-10% +50% (200-450 WVDC)

DC Leakage Current:  
I = .006 √CV after 30 minutes  
Not to exceed 6mA  
C = Capacitance in µF  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at 85°C

- Capacitance change ≤15% from initial limits
- DC leakage current meets initial limits
- ESR ≤150% of initial measured value

The maximum ripple current at 85°C and 120 Hz for CGS capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers				
	60 Hz	120 Hz	400 Hz	1000 Hz	2500 Hz
3 to 50	0.8	1.0	1.05	1.10	1.14
51 to 150	0.8	1.0	1.08	1.13	1.16
151 & up	0.8	1.0	1.15	1.21	1.25

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C	2.0
+45°C	2.2

Cap. µF	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia.	Length	Catalog Number High Post
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Cap. µF	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia.	Length	Catalog Number High Post
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10 WVDC; 12 VDC Surge					
7,200	.035	4.5	1.375	2.125	CGS722U010R2C
12,000	.034	4.6	1.375	2.125	CGS123U010R2C
14,000	.030	4.9	1.375	2.125	CGS143U010R2C
18,000	.078	3.1	1.375	2.125	CGS183U010R2C
20,000	.025	5.9	1.375	2.625	CGS203U010R2L
26,000	.020	7.0	1.375	3.125	CGS263U010R3C
33,000	.018	7.4	1.375	3.125	CGS333U010R3C
44,000	.013	9.4	2.000	2.125	CGS443U010V2C
94,000	.007	16.3	2.000	4.125	CGS943U010V4C
110,000	.008	16.7	2.500	3.625	CGS114U010W3L

16 WVDC; 20 VDC Surge					
110,000	.010	16.0	2.500	4.125	CGS114U016W4C
120,000	.007	20.1	3.000	3.625	CGS124U016X3L
130,000	.009	17.6	2.500	4.625	CGS134U016W4L
150,000	.007	19.3	3.000	4.125	CGS154U016X4C
170,000	.004	23.5	2.000	4.125	CGS174U016V4C
180,000	.006	24.3	3.000	4.625	CGS184U016X4L
210,000	.005	29.2	3.000	5.875	CGS214U016X5R
220,000	.005	25.2	3.000	4.125	CGS224U016X4C
260,000	.003	29.8	2.000	5.625	CGS264U016V5L
640,000	.002	44.2	3.000	5.625	CGS644U016X5L

16 WVDC; 20 VDC Surge					
5,500	.037	4.4	1.375	2.125	CGS552U016R2C
8,900	.034	4.6	1.375	2.125	CGS892U016R2C
10,000	.024	6.4	1.375	3.125	CGS103U016R3C
10,000	.033	4.7	1.375	2.125	CGS103U016R2C
12,000	.031	4.8	1.375	2.125	CGS123U016R2C
15,000	.026	5.6	1.375	2.625	CGS153U016R2L
15,000	.061	4.5	1.375	4.125	CGS153U016R4C
17,000	.022	6.7	1.375	3.125	CGS173U016R3C
19,000	.021	6.8	1.375	3.125	CGS193U016R3C
21,000	.037	5.5	1.375	3.625	CGS213U016R3L
23,000	.027	7.6	2.000	3.125	CGS233U016V3C
24,000	.032	5.6	1.375	3.125	CGS243U016R3C
25,000	.016	8.8	1.375	4.125	CGS253U016R4C
25,000	.031	6.1	2.000	2.125	CGS253U016V2C
33,000	.020	7.9	1.375	4.125	CGS333U016R4C
33,000	.028	6.5	2.000	2.125	CGS333U016V2C
34,000	.016	8.8	2.000	4.125	CGS343U016V4C
34,000	.020	9.8	1.375	4.125	CGS343U016R4C
38,000	.021	8.6	2.000	3.125	CGS383U016V3C
50,000	.011	11.7	2.000	3.125	CGS503U016V3C
55,000	.018	9.6	2.000	3.625	CGS553U016V3L
66,000	.017	10.8	2.000	4.125	CGS663U016V4C
68,000	.017	9.5	2.000	3.125	CGS683U016V3C
70,000	.008	15.2	2.000	4.125	CGS703U016V4C
77,000	.015	11.8	2.000	4.625	CGS773U016V4L
80,000	.009	18.9	3.000	4.125	CGS803U016X4C
83,000	.015	12.9	2.000	5.625	CGS833U016V5L
91,000	.009	14.7	2.000	4.125	CGS913U016V4C
100,000	.007	22.5	3.000	5.125	CGS104U016X5C

25 WVDC; 30 VDC Surge					
3,000	.235	1.8	1.375	2.125	CGS302U025R2C
5,600	.026	6.1	1.375	3.125	CGS562U025R3C
6,000	.035	4.5	1.375	2.125	CGS602U025R2C
6,800	.096	2.8	1.375	2.125	CGS682U025R2C
8,200	.019	8.1	1.375	4.125	CGS822U025R4C
8,900	.024	6.4	1.375	3.125	CGS892U025R3C
10,000	.024	6.4	1.375	3.125	CGS103U025R3C
12,000	.023	6.6	1.375	3.125	CGS123U025R3C
12,000	.024	8.1	2.000	3.125	CGS123U025V3C
13,000	.082	3.9	1.375	4.125	CGS133U025R4C
14,000	.037	5.6	2.000	2.125	CGS143U025V2C
16,000	.017	8.5	1.375	4.125	CGS163U025R4C
18,000	.017	8.6	1.375	4.125	CGS183U025R4C
18,000	.052	6.1	2.000	4.125	CGS183U025V4C
20,000	.024	8.0	2.000	3.125	CGS203U025V3C
20,000	.014	10.3	1.375	5.125	CGS203U025R5C
22,000	.043	5.2	2.000	2.125	CGS223U025V2C
28,000	.028	7.5	2.000	3.125	CGS283U025V3C
29,000	.018	10.5	2.000	4.125	CGS293U025V4C
30,000	.029	8.4	2.500	3.125	CGS303U025W3C
32,000	.018	10.3	2.000	4.125	CGS323U025V4C
33,000	.018	9.3	2.000	3.125	CGS333U025V3C
41,000	.020	9.8	2.000	4.125	CGS413U025V4C
43,000	.021	12.2	3.000	4.125	CGS433U025X4C
47,000	.022	9.5	2.000	4.125	CGS473U025V4C
50,000	.018	11.7	2.000	5.625	CGS503U025V5L
50,000	.010	14.9	2.500	3.625	CGS503U025W3L
57,000	.017	14.6	3.000	5.125	CGS573U025X5C
65,000	.009	16.5	2.500	4.125	CGS653U025W4C

Aluminum Capacitors



# Type CGS Computer Grade Capacitors



Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia.	Length	Catalog Number High Post
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25 WVDC; 30 VDC Surge					
68,000	.006	17.9	2.000	4.125	CGS683U025V4C
70,000	.010	18.1	3.000	4.125	CGS703U025X4C
90,000	.007	21.4	2.500	5.625	CGS903U025W5L
92,000	.008	21.6	3.000	5.125	CGS923U025X5C
95,000	.011	16.9	3.000	4.125	CGS953U025X4C
100,000	.005	22.8	2.000	5.625	CGS104U025V5L
100,000	.011	16.0	3.000	3.625	CGS104U025X3L
110,000	.009	20.9	3.000	5.625	CGS114U025X5L
110,000	.008	20.7	3.000	5.125	CGS114U025X5C
120,000	.007	21.6	3.000	4.125	CGS124U025X4C
180,000	.004	30.3	3.000	4.125	CGS184U025X4C
204,000	.006	29.9	3.000	8.625	CGS2043U25X8L
270,000	.003	37.5	3.000	5.625	CGS274U025X5L

30 WVDC; 40 VDC Surge					
4,500	.037	4.4	1.375	2.125	CGS452U030R2C
5,000	.037	4.5	1.375	2.125	CGS502U030R2C
8,000	.024	6.4	1.375	3.125	CGS802U030R3C
9,200	.024	6.4	1.375	3.125	CGS922U030R3C
12,000	.018	8.4	1.375	4.125	CGS123U030R4C
13,000	.018	8.4	1.375	4.125	CGS133U030R4C
15,000	.016	9.3	1.375	4.625	CGS153U030R4L
20,000	.013	11.0	1.375	5.625	CGS203U030R5L
30,000	.019	10.0	2.000	4.125	CGS303U030V4C
33,000	.020	9.8	2.000	4.125	CGS333U030V4C
44,000	.015	11.7	2.500	3.125	CGS443U030W3C
50,000	.016	12.7	2.000	5.625	CGS503U030V5L
55,000	.009	16.3	2.500	4.125	CGS553U030V4C
78,000	.011	16.8	3.000	4.125	CGS783U030X4C
100,000	.008	22.4	3.000	5.625	CGS104U030X5L

35 WVDC; 45 VDC Surge					
4,400	.145	2.2	1.375	2.125	CGS442U035R2C
8,200	.024	6.4	1.375	3.125	CGS822U035R3C
10,000	.038	5.5	2.000	2.125	CGS103U035V2C
12,000	.018	8.4	1.375	4.125	CGS123U035R4C
21,000	.029	7.3	2.000	3.125	CGS213U035V3C
30,000	.028	8.6	2.500	3.125	CGS303U035V3C
31,000	.021	9.6	2.000	4.125	CGS313U035V4C
70,000	.012	16.6	3.000	4.125	CGS703U035X4C

40 WVDC; 50 VDC Surge					
2,200	.044	4.1	1.375	2.125	CGS222U040R2C
2,700	.042	4.2	1.375	2.125	CGS272U040R2C
3,500	.038	4.4	1.375	2.125	CGS352U040R2C
4,200	.028	6.0	1.375	3.125	CGS422U040R3C
4,700	.036	4.5	1.375	2.125	CGS472U040R2C
5,100	.026	6.1	1.375	3.125	CGS512U040R3C
6,000	.025	6.2	1.375	3.125	CGS602U040R3C
6,200	.020	7.9	1.375	4.125	CGS622U040R4C
7,500	.019	8.1	1.375	4.125	CGS752U040R4C
9,000	.019	8.2	1.375	4.125	CGS902U040R4C
9,300	.024	8.1	2.000	3.125	CGS932U040V3C
11,000	.024	8.0	2.000	3.125	CGS113U040V3C
12,000	.067	4.2	2.000	2.125	CGS123U040V2C
12,000	.049	5.0	1.375	4.125	CGS123U040R4C
13,000	.017	10.5	2.000	4.125	CGS133U040V4C
17,000	.018	10.4	2.000	4.125	CGS173U040V4C
17,000	.029	7.4	2.000	3.125	CGS173U040V3C
20,000	.014	13.6	2.000	5.625	CGS203U040V5L
22,000	.031	7.1	2.000	3.125	CGS223U040V3C
23,000	.020	9.9	2.000	4.125	CGS233U040V4C
32,000	.021	9.5	2.000	4.125	CGS323U040V4C
33,000	.021	9.7	2.000	4.125	CGS333U040V4C
35,000	.015	12.8	2.000	5.625	CGS353U040V5L
40,000	.010	18.1	3.000	4.125	CGS403U040X4C
40,000	.010	16.3	2.500	4.125	CGS403U040W4C
43,000	.020	13.8	3.000	5.125	CGS433U040X5C
47,000	.010	15.8	2.500	4.125	CGS473U040W4C
53,000	.008	21.5	3.000	5.125	CGS533U040X5C
55,000	.011	16.9	2.500	5.625	CGS553U040V5L

Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia.	Length	Catalog Number High Post
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40 WVDC; 50 VDC Surge					
68,000	.012	16.0	3.000	4.125	CGS683U040X4C
78,000	.009	22.7	3.000	6.625	CGS783U040X6L
150,000	.003	37.1	3.000	5.625	CGS154U040X5L

50 WVDC; 65 VDC Surge					
1,600	.048	3.9	1.375	2.125	CGS162U050R2C
2,200	.044	4.1	1.375	2.125	CGS222U050R2C
2,900	.030	5.7	1.375	3.125	CGS292U050R3C
3,000	.040	4.3	1.375	2.125	CGS302U050R2C
3,300	.182	2.0	1.375	2.125	CGS332U050R2C
4,100	.022	7.6	1.375	3.125	CGS412U050R3C
4,300	.022	7.6	1.375	4.125	CGS432U050R4C
4,900	.023	7.0	1.375	3.625	CGS492U050R3L
5,000	.026	6.1	1.375	3.125	CGS502U050R3C
5,700	.096	3.2	1.375	3.125	CGS572U050R3C
6,100	.020	7.9	1.375	4.125	CGS612U050R4C
6,500	.025	7.9	2.000	3.125	CGS652U050V3C
6,700	.022	7.2	1.375	3.625	CGS672U050R3L
6,800	.024	6.4	1.375	3.125	CGS682U050R3C
7,500	.019	8.1	1.375	4.125	CGS752U050R4C
8,000	.043	5.2	2.000	2.125	CGS802U050V2C
9,600	.018	10.3	2.000	4.125	CGS962U050V4C
10,000	.017	8.5	1.375	4.125	CGS103U050R4C
10,000	.049	4.9	2.000	2.125	CGS103U050V2C
12,000	.014	10.7	1.375	5.625	CGS123U050R5L
13,000	.029	7.3	2.000	3.125	CGS133U050V3C
14,000	.031	7.1	2.000	5.625	CGS143U050V5L
14,500	.022	7.3	2.000	3.125	CGS1452U050V3C
15,000	.019	10.0	2.000	4.125	CGS153U050V4C
18,000	.034	6.8	2.000	3.125	CGS183U050V3C
20,000	.014	13.2	2.000	5.625	CGS203U050V5L
20,000	.021	9.5	2.000	4.125	CGS203U050V4C
24,000	.014	12.1	2.500	3.125	CGS243U050V3C
25,000	.024	10.2	2.500	4.125	CGS253U050V4C
27,000	.022	9.3	2.000	4.125	CGS273U050V4C
28,000	.018	11.4	2.000	5.125	CGS283U050V5C
30,000	.016	12.4	2.000	5.625	CGS303U050V5L
31,000	.028	9.6	2.500	4.125	CGS313U050V4C
33,000	.025	10.0	2.500	4.125	CGS333U050V4C
41,000	.009	19.2	3.000	4.625	CGS413U050X4C
43,000	.023	12.7	3.000	5.125	CGS433U050X5C
48,000	.012	16.2	3.000	4.125	CGS483U050X4C
50,000	.008	20.4	2.500	5.625	CGS503U050W5L
56,000	.005	23.1	3.000	3.625	CGS563U050X3L
60,000	.010	19.8	3.000	5.125	CGS603U050X5C
63,000	.017	16.1	3.000	6.625	CGS633U050X6L
70,000	.016	15.7	3.000	5.625	CGS703U050X5L
82,000	.004	29.2	3.000	4.125	CGS823U050X4C
100,000	.007	29.3	3.000	8.625	CGS104U050X8L
120,000	.003	36.7	3.000	5.625	CGS124U050X5L

75 WVDC; 95 VDC Surge					
820	.591	1.1	1.375	2.125	CGS821U075R2C
1,500	.041	4.9	1.375	3.125	CGS152U075R3C
2,100	.036	5.3	1.375	3.125	CGS212U075R3C
2,200	.041	4.2	1.375	2.125	CGS222U075R2C
2,300	.028	6.6	1.375	4.125	CGS232U075R4C
2,900	.032	5.6	1.375	3.125	CGS292U075R3C
3,300	.120	2.9	1.375	3.125	CGS332U075R3C
4,200	.023	7.4	1.375	4.125	CGS422U075R4C
4,800	.030	7.2	2.000	3.125	CGS482U075V3C
5,600	.021	7.8	1.375	4.125	CGS562U075R4C
6,300	.017	9.8	1.375	5.625	CGS632U075R5L
7,100	.022	9.5	2.000	4.125	CGS712U075V4C
7,300	.078	4.5	2.000	3.125	CGS732U075V3C
7,500	.017	12.3	2.000	5.625	CGS752U075V5L
10,000	.041	6.2	2.000	3.125	CGS103U075V3C
10,000	.024	9.0	2.000	4.125	CGS103U075V4C
12,000	.026	8.7	2.000	4.125	CGS123U075V4C
15,000	.018	11.9	2.000	5.625	CGS153U075V5L
17,000	.033	9.8	3.000	4.125	CGS173U075X4C
17,000	.033	8.8	2.500	4.125	CGS173U075V4C

Aluminum Capacitors

# Type CGS Computer Grade Capacitors

**MALORY**

Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85° C	Dia.	Length	Catalog Number High Post
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75 WVDC; 95 VDC Surge					
18,000	.009	14.5	2.000	4.125	CGS183U075V4C
25,000	.039	9.0	2.500	5.625	CGS253U075LA
25,000	.024	11.7	2.500	5.625	CGS253U075W5L
25,000	.014	15.0	3.000	4.125	CGS253U075X4C
26,000	.037	10.6	3.000	5.875	CGS263U075X5R
27,000	.019	12.5	3.000	3.625	CGS273U075X3L
33,000	.019	12.7	3.000	4.125	CGS333U075X4C
37,000	.010	19.7	3.000	5.625	CGS373U075X5L
55,000	.008	27.4	3.000	8.625	CGS553U075X8L
68,000	.005	30.0	3.000	5.625	CGS683U075X5L

100 WVDC; 125 VDC Surge					
850	.120	2.5	1.375	2.125	CGS851U100R2C
1,200	.062	3.5	1.375	3.125	CGS122U100R3C
1,700	.069	3.8	1.375	3.125	CGS172U100R3C
2,400	.050	5.0	1.375	4.125	CGS242U100R4C
3,100	.036	6.4	1.375	5.125	CGS312U100R5C
4,000	.036	7.3	2.000	4.125	CGS402U100V4C
6,000	.033	7.6	2.000	4.125	CGS602U100V4C
9,000	.024	10.2	2.000	5.625	CGS902U100V5L
10,000	.040	8.0	2.500	4.125	CGS103U100W4C
15,000	.051	7.9	3.000	4.125	CGS153U100X4C
15,000	.043	8.6	2.500	5.625	CGS153U100W5L
33,000	.009	25.0	3.000	8.625	CGS333U100X8L

150 WVDC; 175 VDC Surge					
400	.137	2.3	1.375	2.125	CGS401U150R2C
720	.063	3.5	1.375	3.125	CGS721U150R3C
950	.087	3.4	1.375	3.125	CGS951U150R3C
1,100	.064	4.4	1.375	4.125	CGS112U150R4C
2,400	.117	3.7	2.000	3.125	CGS242U150V3C
3,300	.032	8.4	2.000	5.125	CGS332U150V5C
3,500	.031	11.4	2.000	5.625	CGS352U150V5L
4,800	.030	9.5	2.500	4.625	CGS482U150W4L
5,700	.037	9.3	3.000	4.125	CGS572U150X4C
6,200	.025	11.4	2.500	5.625	CGS622U150W5L
7,700	.029	11.3	3.000	5.125	CGS772U150X5C
8,700	.027	12.5	3.000	5.875	CGS872U150X5R
10,000	.034	10.4	3.000	5.125	CGS103U150X5C
12,000	.013	17.8	3.000	5.625	CGS123U150X5L

200 WVDC; 250 VDC Surge					
590	.151	2.6	1.375	3.125	CGS591T200R3C
1,000	.097	3.6	1.375	4.125	CGS102T200R4C
1,000	.113	3.2	2.000	2.125	CGS102T200V2C
1,400	.081	4.4	2.000	3.125	CGS142T200V3C
1,600	.074	4.6	2.000	3.125	CGS162T200V3C
2,000	.057	5.8	2.000	4.125	CGS202T200V4C
2,200	.054	6.0	2.000	4.125	CGS222T200V4C
2,700	.048	6.4	2.000	4.125	CGS272T200V4C
3,300	.060	6.5	2.500	4.125	CGS332T200W4C
3,400	.076	5.8	2.500	4.125	CGS342T200V4C
3,600	.042	6.7	2.000	4.125	CGS362T200V4C
4,000	.055	6.8	2.500	4.125	CGS402T200W4C
4,600	.047	8.2	3.000	4.125	CGS462T200X4C
4,800	.042	6.8	2.000	4.125	CGS482T200V4C
5,000	.036	9.2	2.500	5.125	CGS502T200W5C
5,200	.021	11.0	2.000	5.625	CGS522T200V5L
5,400	.021	12.6	3.000	4.625	CGS542T200X4L
6,200	.039	9.0	3.000	4.125	CGS622T200X4C
7,200	.019	11.5	2.000	5.625	CGS722T200V5L
7,400	.018	15.0	3.000	5.625	CGS742T200X5L
7,700	.018	15.0	3.000	5.625	CGS772T200X5L
9,400	.021	12.1	3.000	4.125	CGS942T200X4C
14,000	.015	16.1	3.000	5.625	CGS143T200X5L
18,000	.016	15.9	3.000	5.625	CGS183T200X5L
30,000	.011	22.7	3.000	8.625	CGS303T200X8L

Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85° C	Dia.	Length	Catalog Number High Post
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250 WVDC; 300 VDC Surge					
200	.241	1.7	1.375	2.125	CGS201T250R2C
250	.278	1.6	1.375	2.125	CGS251T250R2C
470	.439	1.5	1.375	3.125	CGS471T250R3C
550	.098	3.6	1.375	4.125	CGS551T250R4C
720	.110	3.4	1.375	4.125	CGS721T250R4C
1,000	.078	4.6	1.375	5.625	CGS102T250R5L
1,200	.080	4.4	2.000	3.125	CGS122T250V3C
1,700	.057	5.8	2.000	4.125	CGS172T250V4C
1,900	.105	4.9	2.000	5.625	CGS192T250V5L
2,500	.041	7.8	2.000	5.625	CGS252T250V5L
2,800	.046	6.5	2.000	4.125	CGS282T250V4C
2,900	.043	8.0	2.500	4.625	CGS292T250W4L
2,900	.050	8.0	3.000	4.125	CGS292T250X4C
4,100	.021	10.7	2.000	5.625	CGS412T250V5L
4,200	.023	11.9	2.500	5.625	CGS422T250W5L
6,000	.047	9.2	3.000	5.625	CGS602T250X5L
7,200	.023	11.7	3.000	4.125	CGS722T250X4C
10,000	.016	15.6	3.000	5.625	CGS103T250X5L

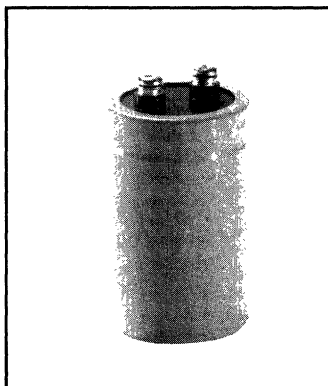
300 WVDC; 400 VDC Surge					
1,500	.107	4.9	2.500	4.125	CGS152T300W4C
3,500	.066	7.8	3.000	5.625	CGS352T300X5L
4,000	.058	8.3	3.000	5.625	CGS402T300X5L
6,000	.022	15.9	3.000	8.625	CGS602T300X8L

350 WVDC; 400 VDC Surge					
130	.683	1.0	1.375	2.125	CGS131T350R2C
250	.478	1.4	1.375	3.125	CGS251T350R3C
380	.318	2.0	1.375	4.125	CGS381T350R4C
650	.212	2.7	2.000	3.125	CGS651T350V3C
800	.170	3.4	2.000	4.125	CGS801T350V4C
1,000	.140	3.7	2.000	4.125	CGS102T350V4C
1,300	.108	4.8	2.000	5.625	CGS132T350V5L
1,500	.123	4.5	2.500	4.125	CGS152T350W4C
1,600	.072	5.2	2.000	4.125	CGS162T350V4C
2,100	.067	5.4	3.000	4.125	CGS212T350X4C
2,200	.063	7.2	2.500	5.625	CGS222T350V5L
2,400	.040	7.9	2.000	5.625	CGS242T350V5L
3,000	.048	9.3	3.000	5.875	CGS302T350X5R
3,300	.044	9.5	3.000	5.625	CGS332T350X5L
3,400	.043	9.6	3.000	5.625	CGS342T350X5L
4,200	.035	9.4	3.000	4.125	CGS422T350X4C
6,300	.025	12.7	3.000	5.625	CGS632T350X5L

450 WVDC; 525 VDC Surge					
75	.835	.9	1.375	2.125	CGS750T450R2C
100	.737	1.0	1.375	2.125	CGS101T450R2C
140	.496	1.4	1.375	3.125	CGS141T450R3C
170	.456	1.5	1.375	3.125	CGS171T450R3C
210	.332	1.9	1.375	4.125	CGS211T450R4C
250	.308	2.0	1.375	4.125	CGS251T450R4C
320	.253	2.5	2.000	3.125	CGS321T450V3C
350	.226	3.2	1.375	5.125	CGS351T450R5C
400	.198	2.9	1.375	5.625	CGS401T450R5L
450	.188	2.9	2.000	3.125	CGS451T450V3C
480	.171	3.4	2.000	4.125	CGS481T450V4C
650	.154	3.7	2.000	4.125	CGS651T450V4C
800	.108	4.4	2.000	4.625	CGS801T450V4L
970	.096	4.5	2.000	4.125	CGS971T450V4C
1,000	.082	5.5	2.500	4.125	CGS102T450W4C
1,100	.076	6.5	3.000	4.125	CGS112T450X4C
1,400	.060	7.1	2.500	5.125	CGS142T450W5L
1,400	.059	6.5	2.000	5.625	CGS142T450V5L
1,500	.057	8.1	3.000	5.125	CGS152T450X5C
1,500	.059	7.4	3.000	4.125	CGS152T450X4C
1,800	.048	9.3	3.000	5.875	CGS182T450X5R
2,000	.045	9.1	3.000	5.125	CGS202T450X5C
2,200	.045	8.4	3.000	4.125	CGS222T450X4C
2,400	.038	10.3	3.000	5.625	CGS242T450X5L
3,300	.031	11.4	3.000	5.625	CGS332T450X5L

Aluminum Capacitors

# Type CG Computer Grade Capacitors



- High Reliability 85°C
- Screw Terminals
- Long Life
- Custom Designs Available Upon Request

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
10 WVDC to 450 WVDC

Capacitance Range:  
40  $\mu$ F to 160,000  $\mu$ F

Capacitance Tolerance:  
-10% +75% (10 - 150 WVDC)  
-10% +50% (151 - 450 WVDC)

DC Leakage Current:  
 $I = 6 \times 10^{-6}$  CV after 30 minutes  
Not to exceed 4.0mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at +85°C  
•Capacitance change  
-15% +20% from initial limits  
•DC leakage current meets initial limits  
•ESR  $\leq$ 175% of initial measured value

The maximum ripple current at 85°C and 120 Hz for CG capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers			
	120 Hz	400 Hz	1000 Hz	2500Hz
10 to 75	1.0	1.05	1.08	1.13
100 to 250	1.0	1.08	1.12	1.15
350 to 450	1.0	1.10	1.15	1.20

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+65°C	1.5
+55°C	1.9
+45°C	2.1
+40°C & Less	2.25

Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia	Length	Catalog Number High Post
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Cap. $\mu$ F	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85°C	Dia	Length	Catalog Number High Post
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10 WVDC; 15 VDC Surge					
160,000	.006	27.10	3.000	5.625	CG164U010X5L

35 WVDC; 50 VDC Surge					
9,500	.025	7.90	2.000	3.125	CG952U035V3C
11,000	.021	11.00	2.500	4.125	CG113U035W4C
11,000	.020	9.10	1.750	4.125	CG113U035U4C
14,000	.018	10.40	2.000	4.125	CG143U035V4C
22,000	.011	15.20	2.500	4.125	CG223U035W4C
33,000	.006	23.00	3.000	4.125	CG333U035X4C

16 WVDC; 20 VDC Surge					
2,500	.047	3.90	1.375	2.125	CG252U016R2C
6,500	.039	4.30	1.375	2.125	CG652U016R2C
10,500	.027	7.60	2.000	3.125	CG1052U016V3C
12,000	.024	6.40	1.375	3.125	CG123U016R3C
18,000	.018	8.30	1.375	4.125	CG183U016R4C
21,000	.012	10.50	1.750	3.125	CG213U016U3C
27,000	.012	11.40	2.000	3.125	CG273U016V3C
40,000	.009	14.70	2.000	4.125	CG403U016V4C

50 WVDC; 75 VDC Surge					
800	.072	3.20	1.375	2.125	CG801U050R2C
1,500	.044	4.70	1.375	3.125	CG152U050R3C
1,500	.058	3.50	1.375	2.125	CG152U050R2C
2,000	.033	6.10	1.375	4.125	CG202U050R4C
2,500	.037	6.00	1.750	3.125	CG252U050U3C
2,900	.036	5.20	1.375	3.125	CG292U050R3C
3,300	.035	6.70	2.000	3.125	CG332U050V3C
4,300	.026	6.90	1.375	4.125	CG432U050R4C
4,500	.026	8.60	2.000	4.125	CG452U050V4C
5,000	.029	6.70	1.750	3.125	CG502U050U3C
6,500	.017	9.60	2.000	3.125	CG652U050V3C
7,300	.023	10.50	2.500	4.125	CG732U050W4C
7,400	.022	8.70	1.750	4.125	CG742U050U4C
9,500	.013	12.20	2.000	4.125	CG952U050V4C
10,000	.013	15.60	3.000	4.125	CG103U050X4C
15,000	.009	16.80	2.500	4.125	CG153U050W4C
16,500	.010	20.50	3.000	5.625	CG1652U050X5L
22,000	.006	22.50	3.000	4.125	CG223U050X4C
33,000	.005	29.00	3.000	5.625	CG333U050X5L

25 WVDC; 40 VDC Surge					
1,500	.058	3.50	1.375	2.125	CG152U025R2C
2,800	.036	5.20	1.375	3.125	CG282U025R3C
3,300	.043	4.10	1.375	2.125	CG332U025R2C
4,500	.006	14.80	1.750	3.125	CG452U025U3C
6,000	.029	7.30	2.000	3.125	CG602U025V3C
6,300	.028	5.90	1.375	3.125	CG632U025R3C
8,500	.022	9.40	2.000	4.125	CG852U025V4C
9,200	.022	7.50	1.375	4.125	CG922U025R4C
10,000	.026	7.10	1.750	3.125	CG103U025U3C
13,000	.024	8.00	2.000	3.125	CG133U025V3C
20,000	.019	10.10	2.000	4.125	CG203U025V4C
20,000	.019	12.90	3.000	4.125	CG203U025X4C
32,000	.010	15.90	2.500	4.125	CG323U025W4C
48,000	.005	25.20	3.000	4.125	CG483U025X4C

35 WVDC; 50 VDC Surge					
1,100	.063	3.40	1.375	2.125	CG112U035R2C
2,100	.039	5.00	1.375	3.125	CG212U035R3C
2,300	.051	3.80	1.375	2.125	CG232U035R2C
4,300	.030	5.70	1.375	3.125	CG432U035R3C

75 WVDC; 100 VDC Surge					
600	.085	2.90	1.375	2.125	CG601U075R2C
800	.072	3.20	1.375	2.125	CG801U075R2C
1,000	.053	4.30	1.375	3.125	CG102U075R3C
1,500	.037	5.80	1.375	4.125	CG152U075R4C
1,500	.045	4.70	1.375	3.125	CG152U075R3C

Aluminum Capacitors

Cap. μF	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85° C	Dia.	Length	Catalog Number High Post
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Cap. μF	Max ESR (ohms) @ 120Hz	Max Ripple RMS Amps @ 120Hz +85° C	Dia.	Length	Catalog Number High Post
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### 75 WVDC; 100 VDC Surge

2,000	.039	5.80	1.750	3.125	CG202U075U3C
2,500	.036	6.60	2.000	3.125	CG252U075V3C
2,600	.035	6.10	1.750	3.125	CG262U075U3C
3,300	.022	8.40	2.000	3.125	CG332U075V3C
3,450	.027	8.50	2.000	4.125	CG345U075V4C
4,900	.015	11.30	2.000	4.125	CG492U075V4C
7,900	.012	14.50	2.500	4.125	CG792U075W4C
8,200	.012	16.30	3.000	4.125	CG822U075X4C
11,000	.009	18.80	3.000	4.125	CG113U075X4C
12,500	.009	21.80	3.000	5.625	CG1252U075X5L

### 250 WVDC; 300 VDC Surge

140	.310	1.50	1.375	2.125	CG141T250R2C
375	.130	3.10	1.375	4.125	CG375T250R4C
600	.091	4.10	2.000	3.125	CG601T250V3C
800	.072	4.60	2.000	4.125	CG801T250V4C
3,000	.020	14.20	3.000	5.625	CG302T250X5L

### 300 WVDC; 350 VDC Surge

525	.095	4.00	2.000	3.125	CG525T300V3C
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### 100 WVDC; 135 VDC Surge

400	.180	2.00	1.375	2.125	CG401U100R2C
1,000	.068	4.30	1.375	4.125	CG102U100R4C
1,300	.066	4.50	1.750	3.125	CG132U100U3C
1,700	.050	5.70	1.750	4.125	CG172U100U4C
2,250	.036	7.30	2.000	4.125	CG225U100V4C
2,500	.030	8.00	2.000	4.125	CG252U100V4C
3,600	.020	11.30	2.500	4.125	CG362U100W4C
4,000	.019	11.50	2.500	4.125	CG402U100W4C

### 350 WVDC; 400 VDC Surge

100	.720	1.00	1.375	2.125	CG101T350R2C
180	.500	1.40	1.375	3.125	CG181T350R3C
250	.290	2.10	1.375	4.125	CG251T350R4C
400	.260	2.40	2.000	3.125	CG401T350V3C
550	.180	3.30	2.000	4.125	CG551T350V4C
2,000	.061	8.10	3.000	5.625	CG202T350X5L

### 400 WVDC; 475 VDC Surge

325	.220	3.00	2.000	4.125	CG325T400V4C
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### 150 WVDC; 185 VDC Surge

275	.170	2.10	1.375	2.125	CG275U150R2C
500	.103	3.10	1.375	3.125	CG501U150R3C
1,550	.052	6.10	2.000	4.125	CG1551U150V4C
2,500	.030	9.20	2.500	4.125	CG252U150W4C
3,600	.022	9.40	3.000	4.125	CG362U150X4C
5,600	.014	17.00	3.000	3.625	CG562U150X3L

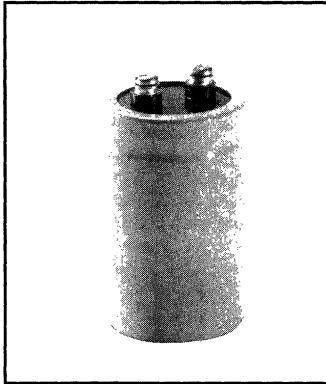
### 450 WVDC; 525 VDC Surge

40	3.240	.50	1.375	2.125	CG400T450R2C
110	1.220	1.00	1.375	4.125	CG111T450R4C
240	.330	2.40	2.000	4.125	CG241T450V4C

### 200 WVDC; 250 VDC Surge

180	.280	1.60	1.375	2.125	CG181T200R2C
450	.120	3.20	1.375	4.125	CG451T200R4C
550	.150	3.00	1.750	3.125	CG551T200U3C
750	.102	3.90	2.000	3.125	CG751T200V3C
1,000	.085	4.80	2.000	4.125	CG102T200V4C
1,650	.050	7.10	2.500	4.125	CG1651T200W4C
2,450	.034	9.70	3.000	4.125	CG2451T200X4C
3,800	.023	13.20	3.000	5.625	CG382T200X5L

# Type CGH Computer Grade Capacitors



- High Ripple Current
- Very High Capacitance
- High Reliability
- Suitable for Use in Most AC Drive and UPS Applications

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
250 WVDC to 450 WVDC

Capacitance Range:  
620  $\mu$ F to 22,000  $\mu$ F

Capacitance Tolerance:  
-10% +50%

DC Leakage Current:  
 $I = .006 \sqrt{CV}$  after 5 minutes  
Not to exceed 6mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at 85°C

- Capacitance change  $\leq$ 15% from initial limits
- DC Leakage current meets initial limits
- ESR  $\leq$  150% of initial measured value

The maximum ripple current at 85°C and 120 Hz for CGH capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Rated WVDC	Ripple Multipliers						
	50Hz	100Hz	120Hz	1000Hz	10kHz	25kHz	100kHz
250 to 450	0.80	0.90	1.00	1.13	1.23	1.25	1.28

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C	2.0
+45°C	2.2

Cap $\mu$ F	Max ESR (mOHMS)		Max Ripple RMS Amps		Dia	Length	Catalog Number	High Post
	120 Hz	20 kHz	120 Hz	20 kHz				

Cap $\mu$ F	Max ESR (mOHMS)		Max Ripple RMS Amps		Dia	Length	Catalog Number	High Post
	120 Hz	20 kHz	120 Hz	20 kHz				

250 WVDC; 300 VDC Surge								
1,700	65.8	67.2	4.0	4.5	2,000	2.625	CGH172T250V2L	
2,900	53.1	42.3	5.7	6.4	2,000	3.625	CGH292T250V3L	
4,100	25.7	20.8	9.1	10.1	2,000	4.625	CGH412T250V4L	
5,000	26.9	22.1	9.2	10.2	2,500	3.625	CGH502T250V3L	
5,300	20.6	15.9	11.0	12.2	2,000	5.625	CGH532T250V5L	
7,000	20.1	16.7	11.7	12.9	2,500	4.625	CGH702T250V4L	
7,400	27.1	20.7	10.3	11.6	3,000	3.625	CGH742T250X3L	
9,000	16.3	13.8	14.1	15.3	2,500	5.625	CGH902T250V5L	
10,000	20.4	15.8	13.0	14.8	3,000	4.625	CGH103T250X4L	
13,000	16.8	13.2	15.6	17.5	3,000	5.625	CGH133T250X5L	
22,000	11.5	9.7	22.3	24.3	3,000	8.625	CGH223T250X8L	

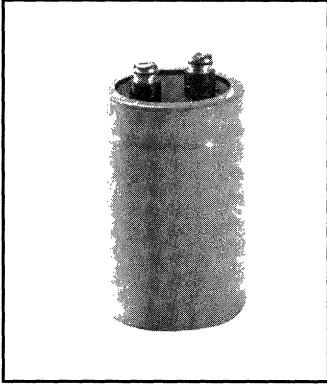
450 WVDC; 525 VDC Surge								
620	159.6	125.8	2.9	3.3	2,000	2.625	CGH621T450V2L	
1,000	83.4	62.5	4.8	5.3	2,000	3.625	CGH102T450V3L	
1,400	60.3	45.4	5.9	6.8	2,000	4.625	CGH142T450V4L	
1,700	55.3	43.1	6.4	7.3	2,500	3.625	CGH172T450W3L	
1,800	47.6	36.1	7.2	8.3	2,000	5.625	CGH182T450V5L	
2,400	40.1	31.5	8.3	9.4	2,500	4.625	CGH242T450W4L	
2,500	44.9	36.3	8.0	8.9	3,000	3.625	CGH252T450X3L	
3,100	31.7	25.2	10.1	11.3	2,500	5.625	CGH312T450W5L	
3,600	32.6	26.6	10.3	11.4	3,000	4.625	CGH362T450X4L	
4,600	26.2	21.6	12.4	13.7	3,000	5.625	CGH462T450X5L	
7,700	17.3	14.8	18.2	19.7	3,000	8.625	CGH772T450X8L	

350 WVDC; 400 VDC Surge								
1,000	162.6	139.7	2.9	3.1	2,000	2.625	CGH102T350V2L	
1,700	81.9	67.5	4.6	5.1	2,000	3.625	CGH172T350V3L	
2,400	58.8	48.7	6.0	6.6	2,000	4.625	CGH242T350V4L	
2,700	54.3	46.1	6.5	7.1	2,500	3.625	CGH272T350W3L	
3,100	46.2	38.5	7.4	8.1	2,000	5.625	CGH312T350V5L	
3,800	39.3	33.6	8.4	9.1	2,500	4.625	CGH382T350W4L	
4,000	44.3	38.3	8.1	8.7	3,000	3.625	CGH402T350X3L	
4,900	31.5	27.1	10.1	10.9	2,500	5.625	CGH492T350W5L	
5,700	32.5	28.4	10.3	11.0	3,000	4.625	CGH572T350X4L	
7,300	25.9	22.8	12.5	13.3	3,000	5.625	CGH732T350X5L	
10,000	20.7	18.4	16.6	17.6	3,000	8.625	CGH103T350X8L	

Aluminum Capacitors

# Type CGO Computer Grade Capacitors

**MALLOY**



- Output Filter for SMPS Applications
- Extremely Low Symmetrically Controlled ESR
- 35 mm Diameter

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +85°C

Voltage Range:  
5 WVDC to 55 WVDC

Capacitance Range:  
2,800  $\mu$ F to 45,000  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20%

DC Leakage Current:  
I = .0015  $\sqrt{CV}$  after 5 minutes  
Not to exceed 1.5mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at +85°C

- Capacitance change  $\leq$  15% from initial limits
- DC Leakage current meets initial limits
- ESR  $\leq$  130% of initial measured value

The maximum ripple current rating at 85°C and 20kHz for CGO capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Rated WVDC	Ripple Multipliers at						
	50 Hz	60 Hz	100 Hz	120 Hz	400 Hz	1000 Hz	5 kHz & Up
5 to 20	.55	.60	.75	.85	.95	.95	1.00
28 to 55	.45	.50	.65	.75	.85	.95	1.00

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C	2.0
+45°C	2.2

Cap $\mu$ F	ESR (mOHMS) @ 20 kHz +25°C		Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
	Max	Min				

Cap $\mu$ F	ESR (mOHMS) @ 20 kHz +25°C		Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
	Max	Min				

5 WVDC; 6 VDC Surge						
18,000	7.5	4.1	9.8	1.375	2.125	CGO183M005L

28 WVDC; 32 VDC Surge						
6,300	9.2	5.0	8.8	1.375	2.125	CGO632M028L
14,000	6.2	3.4	13.3	1.375	3.625	CGO143M028L

7.5 WVDC; 9 VDC Surge						
15,000	7.8	4.2	9.6	1.375	2.125	CGO153M7R5L
21,000	6.8	3.6	11.2	1.375	2.625	CGO213M7R5L
27,000	6.0	3.2	12.8	1.375	3.125	CGO273M7R5L
33,000	5.5	2.9	14.2	1.375	3.625	CGO333M7R5L
39,000	5.1	2.7	15.6	1.375	4.125	CGO393M7R5L
45,000	4.7	2.5	17.1	1.375	4.625	CGO453M7R5L

35 WVDC; 40 VDC Surge						
4,500	9.8	5.2	8.6	1.375	2.125	CGO452M035L
6,300	8.3	4.5	10.1	1.375	2.625	CGO632M035L
8,100	7.2	3.8	11.7	1.375	3.125	CGO812M035L
14,000	5.3	2.9	16.0	1.375	4.625	CGO143M035L

10 WVDC; 12 VDC Surge						
14,000	7.9	4.3	9.5	1.375	2.125	CGO143M010L
19,000	6.9	3.7	11.1	1.375	2.625	CGO193M010L

45 WVDC; 50 VDC Surge						
3,800	10.0	5.4	8.3	1.375	2.125	CGO382M045L
4,600	9.1	4.9	9.8	1.375	2.625	CGO143M045L
10,000	5.6	3.0	15.6	1.375	4.625	CGO103M045L

16 WVDC; 18 VDC Surge						
10,000	8.3	4.5	9.3	1.375	2.125	CGO103M016L
18,000	6.4	3.4	12.4	1.375	3.125	CGO183M016L
22,000	5.7	3.1	13.9	1.375	3.625	CGO223M016L

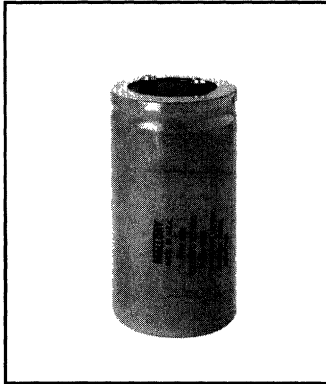
55 WVDC; 64 VDC Surge						
2,800	11.3	6.1	8.0	1.375	2.125	CGO283M055L
3,900	9.5	5.1	9.5	1.375	2.625	CGO392M055L
10,000	4.7	2.5	18.7	1.375	5.625	CGO103M055L

20 WVDC; 22 VDC Surge						
12,000	7.4	4.0	10.7	1.375	2.625	CGO123M020L
16,000	6.5	3.5	12.3	1.375	3.125	CGO163M016L
20,000	5.9	3.1	13.8	1.375	3.625	CGO203M020L
22,000	5.3	2.9	15.3	1.375	4.125	CGO223M020L
27,000	4.9	2.7	16.6	1.375	4.625	CGO273M020L
34,000	4.2	2.2	19.8	1.375	5.625	CGO343M020L

Aluminum Capacitors

# Type CGR Computer Grade Capacitors

**MALORY**



- High Ripple Current
- Very Low ESR
- 105°C Operation
- Custom Designs Available Upon Request

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
7.5 WVDC to 200 WVDC

Capacitance Range:  
330 μF to 100,000 μF

Capacitance Tolerance:  
-10% +75% (7.5 - 50 WVDC)  
-10% +50% (51 - 100 WVDC)

DC Leakage Current:  
 $I = 6 \times 10^{-6}$  after 5 minutes  
Not to exceed 1.5 mA  
C = Capacitance in μF  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at +85°C

- Capacitance change -15% +20% from initial limits
- DC leakage current meets initial limits
- ESR ≤175% of initial measured value

The maximum ripple current at 85°C and 120 Hz for CGR capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Rated WVDC	Ripple Multipliers at			
	120 Hz	400 Hz	1000 Hz	2500 Hz
10 to 75	1.0	1.05	1.08	1.13
100 to 250	1.0	1.08	1.12	1.15

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+65°C	1.5
+55°C	1.9
+45°C	2.1
+40°C & Less	2.25

Cap μF	Max ESR (ohms) @ 20 kHz	Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
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Cap μF	Max ESR (ohms) @ 20 kHz	Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
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7.5 WVDC; 12 VDC Surge					
34,000	0.1280	14.4	1.750	3.125	CGR343U7R5U3C
47,000	0.0098	17.8	2.000	3.125	CGR473U7R5V3C
66,000	0.0068	23.8	2.000	4.125	CGR663U7R5V4C

30 WVDC; 45 VDC Surge					
27,000	0.0053	30.0	2.000	5.625	CGR273U030V5L
30,000	0.0060	29.1	2.500	4.125	CGR303U030V4C

10 WVDC; 12 VDC Surge					
24,000	0.0110	9.5	1.375	3.125	CGR243U010R3C

40 WVDC; 60 VDC Surge					
2,100	0.0245	7.7	1.375	2.125	CGR212U040R2C
3,900	0.0133	12.2	1.375	3.125	CGR392U040R3C
5,600	0.0091	16.6	1.375	4.125	CGR562U040R4C
7,400	0.0100	12.3	1.375	5.125	CGR742U040R5C
9,600	0.0090	19.7	2.000	3.625	CGR962U040V3L
13,000	0.0068	25.0	2.000	4.625	CGR133U040V4L
22,000	0.0060	30.0	2.500	4.625	CGR223U040V4L
31,000	0.0051	30.0	3.000	4.625	CGR313U040X4L

12 WVDC; 15 VDC Surge					
12,000	0.0154	10.6	1.375	2.625	CGR123U012R2L
100,000	0.0043	30.0	2.500	5.125	CGR104U012W5C

16 WVDC; 20 VDC Surge					
7,700	0.0231	7.9	1.375	2.125	CGR772U016R2C
11,000	0.0161	10.3	1.375	2.625	CGR113U016R2L
14,000	0.0119	12.9	1.375	3.125	CGR143U016R3C
16,000	0.0173	11.6	1.750	2.625	CGR163U016U2L
20,000	0.0084	17.2	1.375	4.125	CGR203U016R4C
30,000	0.0098	17.8	2.000	3.125	CGR303U016V3C
42,000	0.0075	22.7	2.000	4.125	CGR423U016V4C
51,000	0.0085	22.0	2.500	3.125	CGR513U016W3C

50 WVDC; 75 VDC Surge					
1,000	0.1001	3.5	1.375	1.875	CGR102U050R1N
1,500	0.0672	4.7	1.375	2.125	CGR152U050R2C
2,900	0.0357	7.4	1.375	3.125	CGR292U050R3C
4,100	0.0180	8.3	1.375	4.125	CGR412U050R4C
6,200	0.0168	14.0	1.375	5.625	CGR622U050R5L
7,600	0.0165	13.7	2.000	3.125	CGR762U050V3C
10,000	0.0113	18.5	2.000	4.125	CGR103U050V4C
16,000	0.0085	24.2	2.000	5.625	CGR163U050V5L
21,000	0.0077	26.8	2.500	4.625	CGR213U050V4L
27,000	0.0060	30.0	2.500	5.625	CGR273U050V5L
37,000	0.0051	30.0	3.000	5.625	CGR373U050X5L

20 WVDC; 30 VDC Surge					
4,600	0.0224	8.1	1.375	2.125	CGR462U020R2C
10,000	0.0105	14.6	1.375	3.625	CGR103U020R3L
21,000	0.0090	19.7	2.000	3.625	CGR213U020V3L

75 WVDC; 100 VDC Surge					
1,200	0.0497	5.9	1.375	2.625	CGR122T075R2L
1,800	0.0329	8.2	1.375	3.625	CGR182U075R3L
2,000	0.0220	6.7	1.375	3.125	CGR202U075R3C
2,200	0.0200	7.9	1.375	4.125	CGR222U075R4C
3,100	0.0225	11.0	2.000	2.625	CGR312T075V2L
4,100	0.0140	10.9	1.750	4.125	CGR412T075U4C
4,700	0.0150	15.2	2.000	3.625	CGR472T075V3L
7,500	0.0095	16.2	2.000	5.625	CGR752U075V5L

30 WVDC; 45 VDC Surge					
2,200	0.0350	5.9	1.375	1.875	CGR222U030R1N
4,900	0.0248	10.3	1.750	2.125	CGR492U030U2C
7,400	0.0105	14.6	1.375	3.625	CGR742U030R3L
10,000	0.0077	18.9	1.375	4.625	CGR103U030R4L
12,000	0.0098	17.8	2.000	3.125	CGR123U030V3C
15,000	0.0090	19.7	2.000	3.625	CGR153U030V3L

Aluminum Capacitors

# Type CGR Computer Grade Capacitors

**MALORY**

Cap $\mu$ F	Max ESR (ohms) @ 20 kHz	Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
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Cap $\mu$ F	Max ESR (ohms) @ 20 kHz	Max Ripple RMS Amps @ 20 kHz +85°C	Dia	Length	Catalog Number High Post
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### 75 WVDC; 100 VDC Surge

8,000	0.0085	16.4	2.500	3.625	CGR802U075W3L
9,600	0.0094	23.2	2.500	4.125	CGR962T075W4C
11,000	0.0102	23.8	3.000	3.625	CGR113U075X3L
19,000	0.0056	30.0	3.000	5.625	CGR193U075X5L

### 200 WVDC; 250 VDC Surge

3,500	0.0240	11.5	3.000	4.125	CGR352T200X4C
5,200	0.0170	15.4	3.000	5.625	CGR522T200X5L

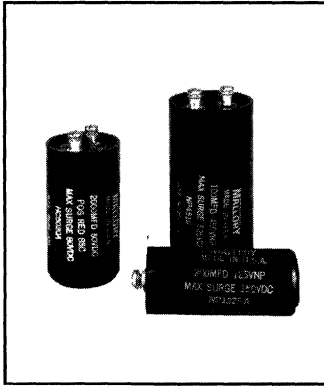
### 100 WVDC; 135 VDC Surge

330	0.0940	2.8	1.375	2.125	CGR331T100R2C
2,700	0.0120	18.8	2.000	4.625	CGR272T100V4L
4,500	0.0094	24.3	2.500	4.625	CGR452T100W4L
8,000	0.0085	21.8	3.000	5.625	CGR802T100X5L



# Type HC and NP Aluminum Electrolytic Capacitors

**MALLORY**



- Phenolic Case
- Polarized and Non-Polarized Ratings Available

## GENERAL SPECIFICATIONS

### Polarized - Type HC

Operating Temperature:  
-20°C to +85°C  
Voltage Range:  
25 WVDC to 450 WVDC  
Capacitance Range:  
100  $\mu$ F to 4,000  $\mu$ F  
Capacitance Tolerance:  
25 to 50 WVDC:  
-10% +150%  
150 to 450 WVDC:  
-10% +100%

### Non-Polarized - Type NP

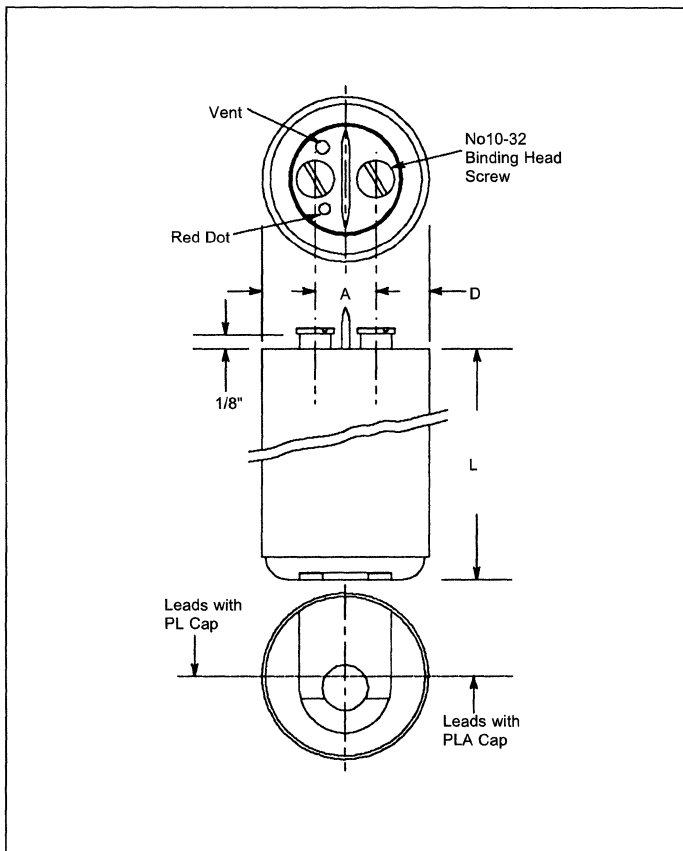
Operating Temperature:  
-20°C to +85°C  
Voltage Range:  
125 WVNP to 450 WVNP  
Capacitance Range:  
15  $\mu$ F to 500  $\mu$ F  
Capacitance Tolerance:  
 $\pm$ 25%

Cap $\mu$ F	WVDC	Dimensions (Inches)			Catalog Number
		D	x L	A	

Polarized - Type HC					
1,000	25	1 7/16	x 2 3/4	1/2	HC2510A
2,000	25	1 7/16	x 3 3/8	1/2	HC2520A
4,000	25	1 13/16	x 3 3/8	5/8	HC2540A
4,000	40	1 13/16	x 4 3/8	5/8	HC4040A
500	50	1 7/16	x 2 3/4	1/2	HC5005A
1,000	50	1 7/16	x 3 3/8	1/2	HC5010A
2,000	50	1 13/16	x 3 3/8	5/8	HC5020A
4,000	50	2 1/16	x 4 3/8	7/8	HC5040
1,000	150	2 1/16	x 4 3/8	7/8	HC15010
1,000	150	1 13/16	x 4 3/8	5/8	HC15010A
500	200	1 13/16	x 3 3/8	5/8	HC20005A
100	450	1 13/16	x 3 3/8	5/8	HC45001
300	450	2 1/16	x 4 3/8	7/8	HC45003

Cap $\mu$ F	WVNP	Dimensions (Inches)			Catalog Number
		D	x L	A	

Non-Polarized - Type NP					
200	125	1 7/16	x 3 3/8	1/2	NP1225A
500	125	1 13/16	x 4 3/8	5/8	NP1255A
15	300	1 7/16	x 2 3/4	1/2	NP3003A
50	300	1 7/16	x 2 3/4	1/2	NP3008
100	300	1 13/16	x 3 3/8	5/8	NP3014A
200	300	2 1/16	x 4 3/8	7/8	NP3025
50	450	1 13/16	x 3 3/8	5/8	NP4505
100	450	2 1/16	x 4 3/8	7/8	NP4510



Aluminum Capacitors

## PHOTOFLASH CAPACITORS

**HC45003** - 300 mfd. 450 WVDC; Plastic case  
2 1/16" dia. x 4 3/8". Max DCL (at 5 min.) 5.5 mA

**FF45052** - 525 mfd. 450 WVDC; Plastic case  
2 1/16" dia. x 4 3/8". Max DCL (at 5 min.) 2.0 mA

**FP240** - Specially engineered FP capacitor for photoflash use.  
Dual separate section, 50 mfd. at 450 WVDC each section.  
May be used in parallel for 100 mfd. Supplied with cardboard insulating tube. Uses standard FP mounting plate.  
1 3/8" dia. x 3".

# Type LP Radial Snap-In Capacitors



- 105°C - Long Life
- 22 to 35 mm Diameters  
10 mm Lead Spacing
- High Reliability
- Stable ESR

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +105°C

Voltage Range:  
6.3 WVDC to 250 WVDC

Capacitance Range:  
100  $\mu$ F to 47,000  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 20% (Standard)

DC Leakage Current:  
I = .02 CV  
Not to exceed 3.0 mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA.

QA Stability Test:  
Apply WVDC for 1,000 hrs at 105°C

- Capacitance Change:  $\leq$ 15% from initial limits
- DC Leakage Current meets initial limits
- ESR:  $\leq$ 150% of initial measured value

The maximum ripple current at 105°C and 120 Hz for LP capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Rated WVDC	Ripple Multipliers					
	50 Hz	120 Hz	300 Hz	1000 Hz	10 KHz	50 KHz
10 to 50	.95	1.0	1.03	1.05	1.08	1.08
63 to 100	.92	1.0	1.07	1.13	1.19	1.20
160 to 250	.81	1.0	1.17	1.32	1.45	1.50

Ambient Temperature	Ripple Multiplier
+85°C	1.75
+65°C	2.17
+45°C	2.40

Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Max Imp. mOhms	Size (Inches) D x L	Size (mm) D x L	Catalog Number
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Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Max Imp. mOhms	Size (Inches) D x L	Size (mm) D x L	Catalog Number
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### 6.3 WVDC; 8 VDC Surge

6,800	.185	1.195	200	.867 x .984	22 x 25	LP682M6R3A1P3
10,000	.105	1.810	170	.867 x 1.181	22 x 30	LP103M6R3A3P3
10,000	.105	1.480	150	.984 x .984	25 x 25	LP103M6R3C1P3
15,000	.085	2.111	130	.867 x 1.575	22 x 40	LP153M6R3A7P3
15,000	.085	2.111	120	1.181 x .984	30 x 25	LP153M6R3E1P3
22,000	.058	2.750	110	.984 x 1.575	25 x 40	LP223M6R3C7P3
22,000	.058	3.070	90	1.181 x 1.378	30 x 35	LP223M6R3E5P3
27,000	.036	3.116	90	.984 x 1.969	25 x 50	LP273M6R3C9P3
27,000	.036	4.150	80	1.378 x 1.378	35 x 35	LP273M6R3H5P3
39,000	.032	4.396	70	1.181 x 1.969	30 x 50	LP393M6R3E9P3

### 10 WVDC; 13 VDC Surge

5,600	.150	1.413	150	.867 x .984	22 x 25	LP562M010A1P3
8,200	.100	1.510	110	.984 x .984	25 x 25	LP822M010C1P3
12,000	.069	1.960	95	.867 x 1.378	22 x 35	LP123M010A5P3
12,000	.069	2.000	80	1.181 x .984	30 x 25	LP123M010E1P3
15,000	.055	2.310	70	.984 x 1.378	25 x 35	LP153M010C5P3
15,000	.051	2.286	70	1.181 x 1.181	30 x 30	LP153M010E3P3
22,000	.038	2.914	50	.984 x 1.969	25 x 50	LP223M010C9P3
22,000	.038	3.110	50	1.378 x 1.181	35 x 30	LP223M010H3P3
33,000	.025	4.029	35	1.181 x 1.969	30 x 50	LP333M010E9P3
33,000	.025	4.086	35	1.378 x 1.575	35 x 40	LP333M010H7P3
47,000	.018	5.170	25	1.378 x 1.969	35 x 50	LP473M010H9P3

### 16 WVDC; 25 VDC Surge

4,700	.141	1.200	150	.867 x .984	22 x 25	LP472M016A1P3
5,600	.120	1.429	120	.984 x .984	25 x 25	LP562M016C1P3
8,200	.081	1.820	95	.867 x 1.378	22 x 35	LP822M016A5P3
8,200	.080	1.771	90	1.181 x .984	30 x 25	LP822M016E1P3
12,000	.055	2.310	70	.984 x 1.378	25 x 35	LP123M016C5P3
12,000	.055	2.380	60	1.181 x 1.181	30 x 30	LP123M016E3P3
15,000	.044	2.730	60	.984 x 1.575	25 x 40	LP153M016C7P3
15,000	.046	3.000	60	1.181 x 1.181	30 x 30	LP153M016E3P3
15,000	.046	3.000	60	1.378 x 1.181	35 x 30	LP153M016H3P3
22,000	.030	3.530	40	1.181 x 1.575	30 x 40	LP223M016E7P3
22,000	.030	3.657	40	1.378 x 1.181	35 x 30	LP223M016H3P3
27,000	.025	4.270	30	1.378 x 1.575	35 x 40	LP273M016H7P3
33,000	.020	5.000	30	1.378 x 1.969	35 x 50	LP333M016H9P3

### 25 WVDC; 32 VDC Surge

2,700	.180	1.000	160	.867 x .984	22 x 25	LP272M025A1P3
2,700	.180	1.000	160	.984 x .984	25 x 25	LP272M025C1P3
3,300	.151	1.160	150	.867 x .984	22 x 25	LP332M025A1P3
3,300	.150	1.143	150	.984 x .984	25 x 25	LP332M025C1P3
4,700	.106	1.480	110	.984 x .984	25 x 25	LP472M025C1P3
5,600	.089	1.730	95	.867 x 1.378	22 x 35	LP562M025A5P3
5,600	.089	1.730	85	.984 x 1.181	25 x 30	LP562M025C3P3
5,600	.090	1.857	85	1.181 x .984	30 x 25	LP562M025E1P3
6,800	.073	1.940	80	1.181 x .984	30 x 25	LP682M025E1P3
6,800	.083	2.000	80	.984 x 1.378	25 x 35	LP682M025C5P3
10,000	.050	2.580	60	.984 x 1.575	25 x 40	LP103M025C7P3
10,000	.050	3.333	60	1.181 x 1.181	30 x 30	LP103M025E3P3
10,000	.050	3.333	60	1.378 x 1.181	35 x 30	LP103M025H3P3
12,000	.041	2.970	50	1.378 x 1.181	35 x 30	LP123M025H3P3
15,000	.033	3.360	40	1.181 x 1.575	30 x 40	LP153M025E7P3
22,000	.023	4.857	30	1.378 x 1.575	35 x 40	LP223M025H7P3
22,000	.023	4.857	30	1.378 x 1.969	35 x 50	LP223M025H9P3

### 35 WVDC; 44 VDC Surge

1,800	.188	1.040	150	.867 x .984	22 x 25	LP182M035A1P3
2,700	.155	1.257	120	.984 x .984	25 x 25	LP272M035C1P3
3,900	.106	1.580	95	.867 x 1.378	22 x 35	LP392M035A5P3
3,900	.108	1.571	85	.984 x .984	25 x 25	LP392M035C1P3
3,900	.108	1.571	85	1.181 x .984	30 x 25	LP392M035E1P3
5,600	.074	1.990	70	.984 x 1.378	25 x 35	LP562M035C5P3
5,600	.074	2.050	60	1.181 x 1.181	30 x 30	LP562M035E3P3
6,800	.061	2.320	60	.984 x 1.575	25 x 40	LP682M035C7P3
6,800	.060	2.286	60	1.181 x 1.181	30 x 30	LP682M035E3P3
6,800	.060	2.286	60	1.181 x 1.378	30 x 35	LP682M035E5P3
8,200	.051	2.690	50	1.378 x 1.181	35 x 30	LP822M035H3P3
10,000	.041	3.000	40	1.181 x 1.575	30 x 40	LP103M035E7P3
12,000	.035	3.590	30	1.378 x 1.575	35 x 40	LP123M035H7P3
15,000	.028	4.000	30	1.378 x 1.969	35 x 50	LP153M035H9P3

Aluminum Capacitors

# Type LP Radial Snap-In Capacitors

# MALORY

Cap. μF	Max ESR Ohms	Max Ripple Amps	Max Imp. mOhms	Size (inches) D x L	Size (mm) D x L	Catalog Number
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50 WVDC; 63 VDC Surge						
1,200	.280	.860	150	.867 x .984	22 x 25	LP122M050A1P3
1,500	.225	.983	135	.867 x .984	22 x 25	LP152M050A1P3
2,200	.151	1.330	95	.867 x 1.181	22 x 30	LP222M050A3P3
2,200	.151	1.330	95	.867 x 1.378	22 x 35	LP222M050A5P3
2,200	.150	1.429	95	.984 x .984	25 x 25	LP222M050C1P3
2,200	.150	1.429	95	1.181 x .984	30 x 25	LP222M050E1P3
3,300	.101	1.710	70	.984 x 1.181	25 x 30	LP332M050C3P3
3,300	.101	1.710	70	.984 x 1.378	25 x 35	LP332M050C5P3
3,300	.101	1.760	60	1.181 x 1.181	30 x 30	LP332M050E3P3
3,900	.085	1.970	60	.984 x 1.575	25 x 40	LP392M050C7P3
4,700	.071	2.270	50	1.181 x 1.181	30 x 30	LP472M050E3P3
4,700	.071	2.270	50	1.378 x 1.181	35 x 30	LP472M050H3P3
5,600	.059	2.600	40	1.378 x 1.378	35 x 35	LP562M050H5P3
6,800	.049	3.160	30	1.181 x 1.575	30 x 40	LP682M050E7P3
6,800	.049	3.160	30	1.181 x 1.969	30 x 50	LP682M050E9P3
8,200	.040	3.429	30	1.181 x 1.969	30 x 50	LP822M050E9P3
8,200	.040	3.429	30	1.378 x 1.969	35 x 50	LP822M050H9P3

63 WVDC; 75 VDC Surge						
820	.300	.770	150	.867 x .984	22 x 25	LP821M063A1P3
1,200	.210	.990	110	.867 x .984	22 x 25	LP122M063A1P3
1,200	.210	.990	110	.984 x .984	25 x 25	LP122M063C1P3
1,800	.138	1.340	80	.867 x 1.378	22 x 35	LP182M063A5P3
1,800	.138	1.340	80	.867 x 1.575	22 x 40	LP182M063A7P3
1,800	.140	1.371	80	1.181 x .984	30 x 25	LP182M063E1P3
2,200	.113	1.600	60	.984 x 1.181	25 x 30	LP222M063C3P3
2,200	.113	1.600	60	.984 x 1.575	25 x 40	LP222M063C7P3
2,200	.113	1.550	60	1.181 x 1.181	30 x 30	LP222M063E3P3
3,300	.075	2.080	45	.867 x 1.969	22 x 50	LP332M063A9P3
3,300	.075	2.080	45	.984 x 1.969	25 x 50	LP332M063C9P3
3,300	.076	1.200	45	.867 x 1.181	35 x 30	LP332M063H3P3
4,700	.053	2.840	30	.984 x 1.969	25 x 50	LP472M063C9P3
4,700	.053	2.840	30	1.181 x 1.969	30 x 50	LP472M063E9P3
6,800	.037	3.360	25	1.378 x 1.969	35 x 50	LP682M063H9P3

80 WVDC; 100 VDC Surge						
1,800	.138	1.510	60	.984 x 1.575	25 x 40	LP182M080C7P3
4,700	.053	2.920	25	1.378 x 1.969	35 x 50	LP472M080H9P3

100 WVDC; 125 VDC Surge						
680	.400	.870	105	.867 x 1.181	22 x 30	LP681M100A3P3
820	.300	.980	80	1.181 x .984	30 x 25	LP821M100E1P3
2,200	.113	2.030	30	1.378 x 1.181	35 x 30	LP222M100H3P3
2,200	.113	2.030	30	1.378 x 1.575	35 x 40	LP222M100H7P3
2,700	.092	2.320	25	1.378 x 1.575	35 x 40	LP272M100H7P3
2,700	.092	2.320	25	1.378 x 1.969	35 x 50	LP272M100H9P3

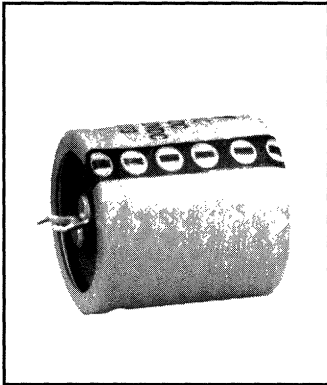
Cap. μF	Max ESR Ohms	Max Ripple Amps	Max Imp. mOhms	Size (inches) D x L	Size (mm) D x L	Catalog Number
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200 WVDC; 250 VDC Surge						
150	1.650	.509	800	.867 x .984	22 x 25	LP151M200A1P3
150	1.650	.509	800	.984 x .984	25 x 25	LP151M200C1P3
180	1.400	.571	700	.984 x .984	25 x 25	LP181M200C1P3
220	1.130	.660	700	.867 x 1.181	22 x 30	LP221M200A3P3
220	1.100	.646	660	.984 x .984	25 x 25	LP221M200C1P3
220	1.100	.646	660	1.181 x .984	30 x 25	LP221M200E1P3
270	.920	.780	520	.984 x 1.181	25 x 30	LP271M200C3P3
270	.920	.790	500	.984 x .984	25 x 25	LP271M200C1P3
270	.920	.790	500	1.181 x .984	30 x 25	LP271M200E1P3
330	.750	.886	500	.984 x 1.181	25 x 30	LP331M200C3P3
330	.750	.886	500	1.181 x 1.181	30 x 30	LP331M200E3P3
390	.640	.980	440	.984 x 1.378	25 x 35	LP391M200C5P3
470	.540	1.143	390	1.181 x 1.181	30 x 30	LP471M200E3P3
470	.540	1.143	390	1.378 x 1.181	35 x 30	LP471M200H3P3
470	.540	1.143	390	1.181 x 1.378	30 x 35	LP471M200E5P3
560	.440	1.310	320	1.181 x 1.181	30 x 30	LP561M200E3P3
560	.440	1.280	320	1.181 x 1.378	30 x 35	LP561M200E5P3
560	.440	1.310	320	1.378 x 1.181	35 x 30	LP561M200H3P3
680	.370	1.510	260	1.181 x 1.378	30 x 35	LP681M200E5P3
680	.370	1.510	260	1.378 x 1.378	35 x 35	LP681M200H5P3
820	.300	1.750	220	1.378 x 1.378	35 x 35	LP821M200H5P3
820	.300	1.750	220	1.378 x 1.575	35 x 40	LP821M200H7P3
1,000	.250	2.114	180	1.378 x 1.575	35 x 40	LP102M200H7P3
1,000	.250	2.114	180	1.378 x 1.969	35 x 50	LP102M200H9P3

250 WVDC; 300 VDC Surge						
100	2.500	.410	800	.867 x .984	22 x 25	LP101M250A1P3
100	2.500	.457	800	.984 x .984	25 x 25	LP101M250C1P3
150	1.660	.540	660	.867 x .984	22 x 25	LP151M250A1P3
150	1.660	.540	660	.984 x .984	25 x 25	LP151M250C1P3
150	1.650	.629	660	1.181 x .984	30 x 25	LP151M250E1P3
180	1.400	.686	560	.984 x 1.181	25 x 30	LP181M250C3P3
220	1.130	.700	520	.984 x 1.181	25 x 30	LP221M250C3P3
220	1.130	.710	500	1.181 x .984	30 x 25	LP221M250E1P3
270	.920	.840	400	1.181 x .984	30 x 25	LP271M250E1P3
270	.920	.810	440	.984 x 1.181	25 x 30	LP271M250C3P3
270	.920	.810	440	.984 x 1.378	25 x 35	LP271M250C5P3
270	.922	.840	400	1.181 x 1.181	30 x 30	LP271M250E3P3
330	.750	.914	380	1.181 x 1.181	30 x 30	LP331M250E3P3
330	.750	.914	380	1.378 x .984	35 x 25	LP331M250H1P3
390	.640	1.090	320	1.181 x 1.181	30 x 30	LP391M250E3P3
390	.640	1.090	320	1.378 x 1.181	35 x 30	LP391M250H3P3
470	.530	1.260	260	1.181 x 1.378	30 x 35	LP471M250E5P3
470	.530	1.220	290	1.181 x 1.575	30 x 40	LP471M250E7P3
470	.530	1.260	260	1.378 x 1.378	35 x 35	LP471M250H5P3
680	.370	1.714	200	1.181 x 1.969	30 x 50	LP681M250E9P3
680	.370	1.714	200	1.378 x 1.969	35 x 50	LP681M250H9P3

Aluminum Capacitors

# Type LPX Radial Snap-In Capacitors



- 85°C - General Purpose
- High Capacitance
- 22 to 35 mm Diameters  
10 mm Lead Spacing
- Ideal For Input Filter in SMPS

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
160 WVDC to 450 WVDC

Capacitance Range:  
56  $\mu$ F to 2,700  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20% at +20°C 120Hz

DC Leakage Current:

$$I = 3 \times \sqrt{CV}$$

C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:

- Apply WVDC for 2,000hrs. at 85°C
- Capacitance change < 20% from initial limits
- DC Leakage current meets initial limits
- ESR < 200% of initial measured value

The maximum ripple current at 85°C and 120 Hz for LPX capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Rated WVDC	Ripple Multipliers at		
	120 Hz	1000 Hz	10 KHz
160 to 250	1.0	1.15	1.20
315 to 450	1.0	1.10	1.15

Ambient Temperature	Ripple Multiplier
+75°C	1.4
+65°C	1.7
+55°C	2.2
+45°C	2.2

Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Size (inches) D x L	Size (mm) D x L	Catalog Number
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Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Size (inches) D x L	Size (mm) D x L	Catalog Number
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### 160 WVDC; 200 VDC Surge

390	.510	1.3	.867 x .984	22 x 25	LPX391M160A1P3
470	.423	1.6	.867 x 1.181	22 x 30	LPX471M160A3P3
470	.423	1.6	.984 x .984	25 x 25	LPX471M160C1P3
560	.355	1.8	.867 x 1.378	22 x 35	LPX561M160A5P3
560	.355	1.8	.984 x 1.181	25 x 30	LPX561M160C3P3
680	.293	2.1	.867 x 1.575	22 x 40	LPX681M160A7P3
680	.293	2.0	.984 x 1.181	25 x 30	LPX681M160C3P3
680	.293	2.0	1.181 x 1.181	30 x 30	LPX681M160E1P3
820	.243	2.4	.867 x 1.772	22 x 45	LPX821M160A4P3
820	.243	2.0	.984 x 1.378	25 x 35	LPX821M160C5P3
820	.243	2.3	1.181 x 1.181	30 x 30	LPX821M160E3P3
1,000	.199	2.6	.867 x 1.969	22 x 50	LPX1021M160A9P3
1,000	.199	2.6	.984 x 1.575	25 x 40	LPX1021M160C7P3
1,000	.199	2.5	1.181 x 1.181	30 x 30	LPX1021M160E3P3
1,000	.199	2.3	1.378 x .984	35 x 25	LPX1021M160H1P3
1,200	.166	3.0	.984 x 1.772	25 x 45	LPX1221M160C4P3
1,200	.166	2.9	1.181 x 1.378	30 x 35	LPX1221M160E5P3
1,200	.166	2.6	1.378 x 1.181	35 x 30	LPX1221M160H3P3
1,500	.133	3.3	1.181 x 1.575	30 x 40	LPX1521M160E7P3
1,500	.133	3.3	1.378 x 1.378	35 x 35	LPX1521M160H5P3
1,800	.111	4.0	1.181 x 1.969	30 x 50	LPX1821M160E9P3
1,800	.111	3.7	1.378 x 1.575	35 x 40	LPX1821M160H7P3
2,200	.090	4.2	1.378 x 1.772	35 x 45	LPX2221M160H4P3
2,700	.074	4.6	1.378 x 1.969	35 x 50	LPX2721M160H9P3

### 200 WVDC; 250 VDC Surge

1,500	.133	3.6	1.378 x 1.575	35 x 40	LPX152M200H7P3
1,800	.111	4.0	1.378 x 1.772	35 x 45	LPX182M200H4P3
2,200	.090	4.5	1.378 x 1.969	35 x 50	LPX222M200H9P3

### 250 WVDC; 300 VDC Surge

220	.904	1.2	.867 x .984	22 x 25	LPX221M250A1P3
270	.737	1.4	.867 x 1.181	22 x 30	LPX271M250A3P3
270	.737	1.4	.984 x .984	25 x 25	LPX271M250C1P3
330	.603	1.7	.867 x 1.378	22 x 35	LPX331M250A5P3
330	.603	1.7	.984 x 1.181	25 x 30	LPX331M250C3P3
390	.510	1.9	.867 x 1.575	22 x 40	LPX391M250A7P3
390	.510	1.8	.984 x 1.181	25 x 30	LPX391M250C3P3
390	.510	1.8	1.181 x .984	30 x 25	LPX391M250E1P3
470	.423	2.2	.867 x 1.772	22 x 45	LPX471M250A4P3
470	.423	2.1	.984 x 1.378	25 x 35	LPX471M250C5P3
470	.423	2.1	1.181 x 1.181	30 x 30	LPX471M250E3P3
560	.355	2.5	.867 x 1.969	22 x 50	LPX561M250A9P3
560	.355	2.4	.984 x 1.575	25 x 40	LPX561M250C7P3
560	.355	2.2	1.181 x 1.181	30 x 30	LPX561M250E3P3
560	.355	2.1	1.378 x .984	35 x 25	LPX561M250H1P3
680	.293	2.7	.984 x 1.772	25 x 45	LPX681M250C4P3
680	.293	2.6	1.181 x 1.378	30 x 35	LPX681M250E5P3
680	.293	2.5	1.378 x 1.181	35 x 30	LPX681M250H3P3
820	.243	3.0	1.181 x 1.575	30 x 40	LPX821M250E7P3
820	.243	3.0	1.378 x 1.378	35 x 35	LPX821M250H5P3
1,000	.199	3.4	1.181 x 1.772	30 x 45	LPX1021M250E4P3
1,000	.199	3.4	1.378 x 1.575	35 x 40	LPX1021M250H7P3
1,200	.166	3.8	1.378 x 1.772	35 x 45	LPX1221M250H4P3
1,500	.133	4.2	1.378 x 1.969	35 x 50	LPX1521M250H9P3

### 200 WVDC; 250 VDC Surge

270	.737	1.2	.867 x .984	22 x 25	LPX271M200A1P3
390	.510	1.6	.867 x 1.181	22 x 30	LPX391M200A3P3
390	.510	1.6	.984 x .984	25 x 25	LPX391M200C1P3
470	.423	1.8	.867 x 1.378	22 x 35	LPX471M200A5P3
470	.423	1.8	.984 x 1.181	25 x 30	LPX471M200C3P3
560	.355	2.1	.867 x 1.575	22 x 40	LPX561M200A7P3
560	.355	2.1	.984 x 1.378	25 x 35	LPX561M200C5P3
560	.355	1.9	1.181 x .984	30 x 25	LPX561M200E1P3
680	.293	2.4	.867 x 1.772	22 x 45	LPX681M200A4P3
680	.293	2.5	.984 x 1.575	25 x 40	LPX681M200C7P3
680	.293	2.3	1.181 x 1.181	30 x 30	LPX681M200E3P3
820	.243	2.8	.984 x 1.772	25 x 45	LPX821M200C4P3
820	.243	2.7	1.181 x 1.378	30 x 35	LPX821M200E5P3
820	.243	2.7	1.378 x 1.181	35 x 30	LPX821M200H3P3
1,000	.199	3.1	1.181 x 1.575	30 x 40	LPX1021M200E7P3
1,000	.199	2.7	1.378 x 1.181	35 x 30	LPX1021M200H3P3
1,200	.166	3.5	1.181 x 1.772	30 x 45	LPX1221M200E4P3
1,200	.166	3.1	1.378 x 1.378	35 x 35	LPX1221M200H5P3
1,500	.133	4.0	1.181 x 1.969	30 x 50	LPX1521M200E9P3

### 350 WVDC; 400 VDC Surge

100	1.989	.6	.867 x .984	22 x 25	LPX101M350A1P3
120	1.658	.7	.867 x 1.181	22 x 30	LPX121M350A3P3
120	1.658	.7	.984 x .984	25 x 25	LPX121M350C1P3
150	1.326	.8	.867 x 1.378	22 x 35	LPX151M350A5P3
150	1.326	.8	.984 x 1.181	25 x 30	LPX151M350C3P3
180	1.105	.9	.867 x 1.575	22 x 40	LPX181M350A7P3
180	1.105	.9	.984 x 1.181	25 x 30	LPX181M350C3P3
180	1.105	1.0	1.181 x .984	30 x 25	LPX181M350E1P3
220	.904	1.1	.867 x 1.772	22 x 45	LPX221M350A4P3
220	.904	1.1	.984 x 1.378	25 x 35	LPX221M350C5P3
220	.904	1.1	1.181 x 1.181	30 x 30	LPX221M350E3P3
270	.737	1.3	.867 x 1.969	22 x 50	LPX271M350A9P3
270	.737	1.2	.984 x 1.575	25 x 40	LPX271M350C7P3

# Type LPX Radial Snap-In Capacitors



Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Size (inches) D x L	Size (mm) D x L	Catalog Number
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350 WVDC; 400 VDC Surge					
270	.737	1.2	1.181 x 1.181	30 x 30	LPX271M350E3P3
270	.737	1.3	1.378 x .984	35 x 25	LPX271M350H1P3
330	.603	1.4	.984 x 1.772	25 x 45	LPX331M350C4P3
330	.603	1.4	1.181 x 1.378	30 x 35	LPX331M350E5P3
330	.603	1.4	1.378 x 1.181	35 x 30	LPX331M350H3P3
390	.510	1.8	1.181 x 1.575	30 x 40	LPX391M350E7P3
390	.510	1.6	1.378 x 1.181	35 x 30	LPX391M350H3P3
470	.423	1.9	1.181 x 1.772	30 x 45	LPX471M350E4P3
470	.423	1.8	1.378 x 1.378	35 x 35	LPX471M350H5P3
560	.355	2.1	1.378 x 1.575	35 x 40	LPX561M350H7P3
680	.293	2.4	1.378 x 1.772	35 x 45	LPX681M350H4P3

400 WVDC; 450 VDC Surge					
82	2.426	.6	.867 x .984	22 x 25	LPX820M400A1P3
100	1.989	.7	.867 x 1.181	22 x 30	LPX101M400A3P3
120	1.658	.7	.867 x 1.181	22 x 30	LPX121M400A3P3
120	1.658	.7	.984 x .984	25 x 25	LPX121M400C1P3
150	1.326	.9	.867 x 1.378	22 x 35	LPX151M400A5P3
150	1.326	.9	.984 x 1.181	25 x 30	LPX151M400C3P3
180	1.105	1.0	.867 x 1.575	22 x 40	LPX181M400A7P3
180	1.105	1.0	.984 x 1.378	25 x 35	LPX181M400C5P3
220	.904	1.2	.984 x 1.575	25 x 40	LPX221M400C7P3
220	.904	1.2	1.181 x 1.181	30 x 30	LPX221M400E3P3
220	.904	1.2	1.378 x .984	35 x 25	LPX221M400H1P3
270	.737	1.4	.984 x 1.772	25 x 45	LPX271M400C4P3
270	.737	1.4	1.181 x 1.378	30 x 35	LPX271M400E5P3
270	.737	1.4	1.378 x 1.181	35 x 30	LPX271M400H3P3
330	.603	1.6	1.181 x 1.575	30 x 40	LPX331M400E7P3
330	.603	1.5	1.378 x 1.181	35 x 30	LPX331M400H3P3
390	.510	1.8	1.181 x 1.772	30 x 45	LPX391M400E4P3
390	.510	1.8	1.378 x 1.378	35 x 35	LPX391M400H5P3

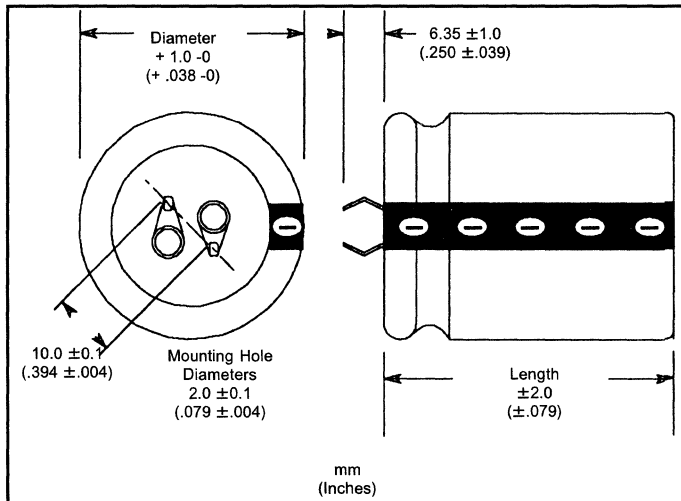
Cap. $\mu$ F	Max ESR Ohms	Max Ripple Amps	Size (inches) D x L	Size (mm) D x L	Catalog Number
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400 WVDC; 450 VDC Surge					
470	.423	2.0	1.181 x 1.969	30 x 50	LPX471M400E9P3
470	.423	2.0	1.378 x 1.575	35 x 40	LPX471M400H7P3
560	.355	2.3	1.378 x 1.772	35 x 45	LPX561M400H4P3
680	.293	2.6	1.378 x 1.969	35 x 50	LPX681M400H9P3

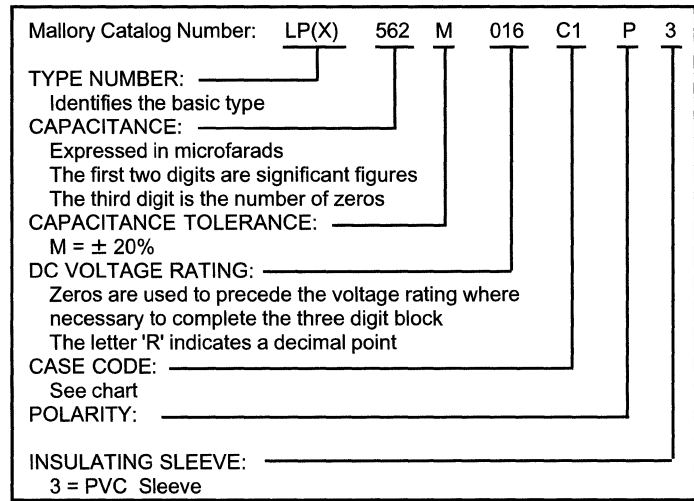
450 WVDC; 500 VDC Surge					
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56	3.553	.5	.867 x .984	22 x 25	LPX560M450A1P3
68	2.926	.6	.867 x 1.181	22 x 30	LPX680M450A3P3
82	2.426	.7	.867 x 1.181	22 x 30	LPX820M450A3P3
82	2.426	.7	.984 x .984	25 x 25	LPX820M450C1P3
100	1.989	.8	.867 x 1.378	22 x 35	LPX101M450A5P3
100	1.989	.8	.984 x 1.181	25 x 30	LPX101M450C3P3
120	1.658	.9	.867 x 1.575	22 x 40	LPX121M450A7P3
120	1.658	1.0	.984 x 1.378	25 x 35	LPX121M450C5P3
120	1.658	.9	1.181 x .984	30 x 25	LPX121M450E1P3
150	1.326	1.1	.867 x 1.969	22 x 50	LPX151M450A9P3
150	1.326	1.1	.984 x 1.575	25 x 40	LPX151M450C7P3
150	1.326	1.1	1.181 x 1.181	30 x 30	LPX151M450E3P3
180	1.105	1.3	.984 x 1.772	25 x 45	LPX181M450C4P4
180	1.105	1.4	1.181 x 1.575	30 x 40	LPX181M450E7P3
180	1.105	1.2	1.378 x .984	35 x 25	LPX181M450H1P3
220	.904	1.5	.984 x 1.969	25 x 50	LPX221M450C9P3
220	.904	1.6	1.181 x 1.575	30 x 40	LPX221M450E7P3
220	.904	1.5	1.378 x 1.181	35 x 30	LPX221M450H3P3
270	.737	1.7	1.181 x 1.772	30 x 45	LPX271M450E4P3
270	.737	1.7	1.378 x 1.378	35 x 35	LPX271M450H5P3
330	.603	2.0	1.181 x 1.969	30 x 50	LPX331M450E9P3
330	.603	2.0	1.378 x 1.575	35 x 40	LPX331M450H7P3
390	.510	2.2	1.378 x 1.772	35 x 45	LPX391M450H4P3
470	.423	2.5	1.181 x 1.969	35 x 50	LPX471M450H9P3

### Outline Dimensions



### Part Number Format

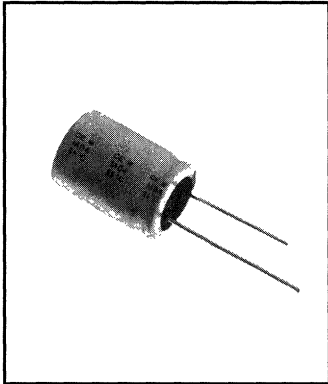


Aluminum Capacitors

### Case Code Chart

Diameter mm (Inches)	Length					
	25 (1.00)	30 (1.18)	35 (1.38)	40 (1.57)	45 (1.77)	50 (2.00)
22 (.87)	A1	A3	A5	A7	A4	A9
25 (1.00)	C1	C3	C5	C7	C4	C9
30 (1.18)	E1	E3	E5	E7	E4	E9
35 (1.38)	H1	H3	H5	H7	H4	H9

# Type VTL Radial Leaded Capacitors



- 85°C - General Purpose
- 5 to 18 mm Diameters

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
6.3 WVDC to 250 WVDC  
Over 250 VDC available

Capacitance Range:  
.47  $\mu$  to 10,000  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20%

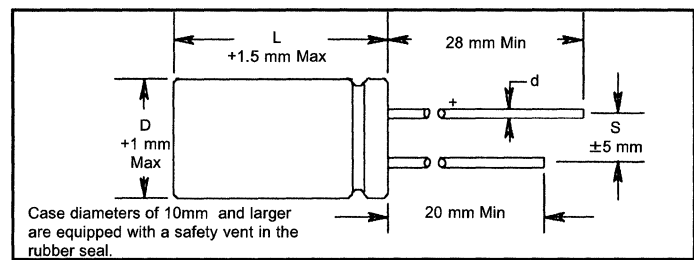
DC Leakage Current:  
I = .01 CV + 3 mA maximum  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at +85°C

- Capacitance change  $\leq$ 20% of initial limits
- DC Leakage current meets initial limits
- ESR  $\leq$ 150% of initial measured value

The maximum ripple current at 85°C and 120 Hz for VTL capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers				
	60 Hz	120 Hz	400 Hz	1000 Hz	10kHz Up
85°C	0.8	1.0	1.1	1.35	1.5
75°C	1.1	1.4	1.55	1.9	2.1
65°C	1.2	1.6	1.75	2.1	2.4
45°C	1.5	1.9	2.1	2.5	2.8
25°C	1.8	2.25	2.5	3.0	3.3



Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

### 6.3 WVDC; 8 VDC Surge

33	8.84	70	.197X .433	.079	5 X 11	2.0	.5	VTL33S6
47	6.21	90	.197X .433	.078	5 X 11	2.0	.5	VTL47S6
100	2.92	140	.236X .433	.098	6 X 11	2.5	.5	VTL100S6
220	1.33	240	.315X .472	.138	8 X 12	3.5	.5	VTL220S6
330	.88	310	.394X .512	.197	10 X 13	5.0	.6	VTL330S6
470	.62	380	.394X .512	.197	10 X 13	5.0	.6	VTL470S6
1000	.29	600	.394X .630	.197	10 X 16	5.0	.6	VTL1000S6
2200	.14	920	.512X .827	.197	13 X 21	5.0	.6	VTL2200S6
3300	.10	1100	.512X .827	.295	13 X 21	7.5	.8	VTL3300S6
4700	.08	1400	.630X 1.023	.295	16 X 26	7.5	.8	VTL4700S6
6800	.06	1600	.630X 1.260	.295	16 X 32	7.5	.8	VTL6800S6
10,000	.05	2000	.709X 1.457	.295	18 X 37	1.5	.8	VTL10000S6

### 16 WVDC; 20 VDC Surge

1000	.21	800	.394X .787	.197	10 X 20	5.0	.6	VTL1000S16
1000	.21	800	.512X .787	.295	13 X 20	7.5	.6	VTL2000S16A
2200	.11	1200	.512X 1.024	.295	13 X 26	7.5	.8	VTL2200S16
3300	.08	1500	.630X 1.062	.295	16 X 27	7.5	.8	VTL3300S16
4700	.06	1800	.630X 1.497	.295	16 X 38	7.5	.8	VTL4700S16

### 25 WVDC; 32 VDC Surge

4.7	39.51	30	.197X .433	.079	5 X 11	2.0	.5	VTL4R7S25
22	8.44	90	.197X .433	.079	5 X 11	2.0	.5	VTL22S25
33	5.63	115	.236X .433	.098	6 X 11	2.5	.5	VTL33S25
47	3.95	150	.236X .433	.098	6 X 11	2.5	.5	VTL47S25
68	2.73	200	.315X .472	.138	8 X 12	3.5	.5	VTL68S25
100	1.86	250	.315X .472	.138	8 X 12	3.5	.5	VTL100S25
220	.84	430	.315X .512	.197	8 X 13	5.0	.6	VTL220S25
330	.56	560	.394X .630	.197	10 X 16	5.0	.6	VTL330S25
470	.40	720	.394X .630	.197	10 X 16	5.0	.6	VTL470S25
1000	.19	1100	.512X .827	.295	13 X 21	7.5	.8	VTL1000S25
2200	.10	1500	.630X 1.220	.295	16 X 31	7.5	.8	VTL2200S25
3300	.07	1800	.709X 1.338	.295	18 X 34	7.5	.8	VTL3300S25

### 35 WVDC; 44 VDC Surge

4.7	33.88	30	.197X .433	.079	5 X 11	2.0	.5	VTL4R7S35
10	15.92	50	.197X .433	.079	5 X 11	2.0	.5	VTL10S35
22	7.24	100	.236X .433	.098	6 X 11	2.5	.5	VTL22S35
33	4.83	130	.236X .433	.098	6 X 11	2.5	.5	VTL33S35
47	3.39	170	.236X .433	.098	6 X 11	2.5	.5	VTL47S35
100	1.59	300	.394X .512	.197	10 X 13	5.0	.6	VTL100S35
220	.72	480	.394X .630	.197	10 X 16	5.0	.6	VTL220S35
330	.48	610	.394X .787	.197	10 X 20	5.0	.6	VTL330S35
470	.34	750	.512X .827	.197	13 X 21	5.0	.6	VTL470S35
1000	.16	1200	.512X 1.024	.295	13 X 26	7.5	.8	VTL1000S35
2200	.08	1800	.709X 1.339	.295	18 X 34	7.5	.8	VTL2200S35

### 16 WVDC; 20 VDC Surge

10	21.22	40	.197 .433	.079	5 X 11	2.0	.5	VTL10S16
22	9.65	70	.197X .433	.079	5 X 11	2.0	.5	VTL22S16
33	6.43	85	.197X .433	.079	5 X 11	2.0	.5	VTL33S16
47	4.52	110	.236X .433	.098	6 X 11	2.5	.5	VTL47S16
68	3.12	160	.315X .472	.138	8 X 12	3.5	.5	VTL68S16
100	2.12	190	.315X .472	.138	8 X 12	3.5	.5	VTL100S16A
220	.97	320	.394X .512	.197	10 X 13	5.0	.6	VTL220S16A
330	.64	410	.394X .512	.197	10 X 13	5.0	.6	VTL330S16A
470	.45	520	.394X .512	.197	10 X 13	5.0	.6	VTL470S16A

Aluminum Capacitors

# Type VTL Radial Leaded Capacitors

**MALLORY**

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

50 WVDC; 63 VDC Surge								
.47	282.33	7	.197X .433	.079	5 X 11	2.0	.5	VTLR47S50
1	132.70	12	.197X .433	.079	5 X 11	2.0	.5	VTL1S50
2.2	60.32	21	.197X .433	.079	5 X 11	2.0	.5	VTL2R2S50
3.3	40.21	28	.197X .433	.079	5 X 11	2.0	.5	VTL3R3S50
4.7	28.23	35	.197X .433	.079	5 X 11	2.0	.5	VTL4R7S50
10	13.27	60	.197X .433	.079	5 X 11	2.0	.5	VTL10S50
22	6.03	110	.236X .433	.098	6 X 11	2.5	.5	VTL22S50
33	4.02	150	.315X .472	.138	8 X 12	3.5	.5	VTL33S50
47	2.82	190	.315X .472	.138	8 X 12	3.5	.5	VTL47S50
100	1.33	330	.394X .512	.197	10 X 13	5.0	.6	VTL100S50
220	.60	540	.394X .512	.197	10 X 26	5.0	.6	VTL220S50
330	.40	650	.512X .787	.197	13 X 20	5.0	.6	VTL330S50
470	.28	800	.512X .984	.295	13 X 25	7.5	.8	VTL470S50
1000	.13	1250	.630X 1.220	.295	16 X 31	7.5	.8	VTL1000S50

63 WVDC; 80 VDC Surge								
4.7	28.33	35	.197X .433	.079	5 X 11	2.0	.5	VTL4R7S63
10	13.27	65	.236X .433	.098	6 X 11	2.5	.5	VTL10S63
22	6.03	120	.315X .472	.138	8 X 12	3.5	.5	VTL22S63
33	4.02	165	.315X .472	.138	8 X 12	3.5	.5	VTL33S63
47	2.82	210	.394X .512	.197	10 X 13	5.0	.5	VTL47S63
100	1.33	340	.394X .630	.197	10 X 16	5.0	.5	VTL100S63
220	.60	580	.512X .787	.197	13 X 20	5.0	.5	VTL220S63
330	.40	760	.512X 1.181	.197	13 X 30	5.0	.5	VTL330S63
470	.28	900	.630X 1.026	.295	16 X 26	7.5	.8	VTL470S63
1000	.13	1400	.630X 1.496	.295	16 X 38	7.5	.8	VTL1000S63

100 WVDC; 125 VDC Surge								
.47	225.87	8	.197X .433	.079	5 X 11	2.0	.5	VTLR47S100
1	106.16	15	.197X .433	.079	5 X 11	2.0	.5	VTL1S100
2.2	48.25	25	.197X .433	.079	5 X 11	2.0	.5	VTL2R2S100
3.3	32.17	35	.197X .433	.079	5 X 11	2.0	.5	VTL3R3S100
4.7	22.59	45	.236X .433	.098	6 X 11	2.5	.5	VTL4R7S100
10	10.62	80	.315X .472	.138	8 X 12	3.5	.5	VTL10S100
22	4.83	140	.394X .512	.197	10 X 13	5.0	.6	VTL22S100
33	3.22	195	.394X .630	.197	10 X 16	5.0	.6	VTL33S100
47	2.26	250	.394X .787	.197	10 X 20	5.0	.6	VTL47S100
100	1.06	420	.512X .787	.197	13 X 20	5.0	.6	VTL100S100
220	.48	700	.512X 1.220	.295	13 X 31	7.5	.8	VTL220S100
330	.32	900	.630X 1.220	.295	16 X 31	7.5	.8	VTL330S100
470	.23	1100	.630X 1.496	.295	16 X 38	7.5	.8	VTL470S100

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

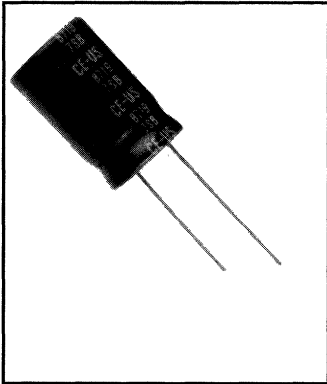
160 WVDC; 185 VDC Surge								
4.7	31.35	37	.315X .472	.138	8 X 12	3.5	.5	VTL4R7S160
10	14.74	70	.394X .630	.197	10 X 16	5.0	.6	VTL10S160
22	6.98	126	.394X .827	.197	10 X 21	5.0	.6	VTL22S160
33	4.47	165	.512X .787	.197	13 X 20	5.0	.6	VTL33S160
47	3.14	230	.512X 1.024	.295	13 X 26	7.5	.8	VTL47S160
100	1.47	386	.630X .984	.295	16 X 25	7.5	.8	VTL100S160
220	.67	748	.709X 1.417	.295	18 X 36	7.5	.8	VTL220S160
330	.45	1022	.866X 1.378	.394	22 X 35	10.0	1.0	VTL330S160

200 WVDC; 250 VDC Surge								
3.3	44.67	36	.315X .472	.138	8 X 12	3.5	.5	VTL3R3S200
4.7	31.35	49	.394X .512	.197	10 X 13	5.0	.6	VTL4R7S200
10	14.74	79	.394X .630	.197	10 X 16	5.0	.6	VTL10S200
22	6.69	137	.394X 1.025	.197	10 X 26	5.0	.6	VTL22S200
33	4.46	184	.512X 1.025	.197	13 X 26	5.0	.6	VTL33S200
47	3.14	234	.512X 1.181	.197	13 X 30	5.0	.6	VTL47S200
100	1.47	450	.630X 1.417	.295	16 X 36	7.5	.8	VTL100S200
150	.98	614	.709X 1.417	.295	18 X 36	7.5	.8	VTL150S200
220	.67	856	.709X 1.575	.295	18 X 40	7.4	.8	VTL220S200

250 WVDC; 300 VDC Surge								
1	294.70	16	.236X .472	.098	6 X 12	2.5	.5	VTL1S250
2.2	134.00	24	.315X .472	.138	8 X 12	3.5	.5	VTL2R2S250
3.3	89.31	33	.394X .512	.197	10 X 13	5.0	.6	VTL3R3S250
4.7	62.71	40	.394X .512	.197	10 X 13	5.0	.6	VTL4R7S250
10	29.47	64	.394X .827	.197	10 X 21	5.0	.6	VTL10S250
22	13.40	123	.512X 1.025	.197	13 X 26	5.0	.6	VTL22S250
33	8.93	160	.512X 1.025	.197	13 X 26	5.0	.6	VTL33S250
47	6.27	219	.630X .984	.295	16 X 25	7.5	.8	VTL47S250
100	2.95	389	.709X 1.417	.295	18 X 36	7.5	.8	VTL100S250

Aluminum Capacitors

# Type VTH Radial Leaded Capacitors



- +105°C - Long Life
- High Reliability
- 5 to 18 mm Diameters

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +105°C

Voltage Range:  
6.3 WVDC to 250 WVDC

Capacitance Range:  
.47  $\mu$ F to 10,000  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20%  
Other tolerances available

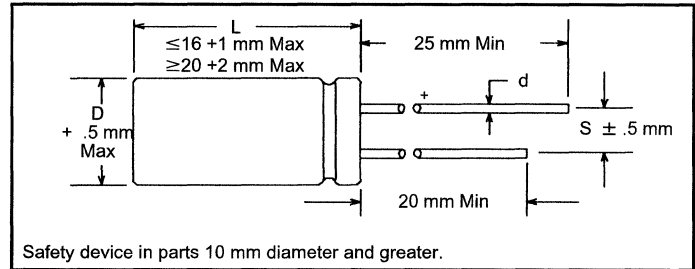
DC Leakage Current:  
6.3 - 100 WVDC  
 $I = .01 CV + 3 \text{ mA}$   
160 - 250 WVDC  
 $I = .03 CV + 10 \text{ mA}$   
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at +105°C

- Capacitance change  $\leq$  20% of initial limits
- DC Leakage current meets initial limits
- ESR  $\leq$  200% of initial measured value

The maximum ripple current at 85°C and 120 Hz for VTH capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers			
	50 Hz	120 Hz	400 Hz	1000 Hz
105°C	0.5	0.7	0.8	0.9
85°C	0.7	1.0	1.1	1.2
65°C	1.0	1.3	1.4	1.6
45°C	1.2	1.7	1.9	2.1
25°C	1.4	2.0	2.2	2.4



Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)		Size (mm)		Catalog Number
			D x L	S	D x L	S	

Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)		Size (mm)		Catalog Number
			D x L	S	D x L	S	

### 6.3 WVDC; 8 VDC Surge

220	1.45	240	.315 x .453	.138	8x11.5	3.5	.5	VTH220M6
330	.96	320	.394 x .472	.197	10x12	5	.6	VTH330M6
470	.68	420	.394 x .472	.197	10x12	5	.6	VTH470M6
1,000	.32	550	.394 x .787	.197	10x20	5	.6	VTH1000M6
2,200	.16	800	.512 x .984	.197	13x25	5	.6	VTH2200M6
3,300	.11	1035	.630 x .984	.295	16x25	7.5	.8	VTH3300M6
4,700	.09	1275	.630 x 1.260	.295	16x32	7.5	.8	VTH4700M6
6,800	.07	1750	.630 x 1.417	.295	16x36	7.5	.8	VTH6800M6
10,000	.06	2045	.709 x 1.575	.295	18x40	7.5	.8	VTH10000M6

### 25 WVDC; 32 VDC Surge

10	19.92	45	.197 x .433	.079	5x11	2	.5	VTH10M25
22	8.92	80	.197 x .433	.079	5x11	2	.5	VTH22M25
33	5.95	115	.236 x .433	.098	6x11	2.5	.5	VTH33M25
47	4.18	145	.236 x .433	.098	6x11	2.5	.5	VTH47M25
100	1.96	250	.315 x .453	.138	8x11.5	3.5	.5	VTH100M25
220	.89	400	.394 x .630	.197	10x16	5	.6	VTH220M25
330	.59	480	.394 x .787	.197	10x20	5	.6	VTH330M25
470	.42	470	.512 x .787	.197	13x20	5	.6	VTH470M25
2,000	.20	805	.630 x .984	.295	16x25	7.5	.8	VTH1000M25
2,200	.10	1235	.630 x 1.417	.295	16x36	7.5	.8	VTH2200M25
3,300	.08	1630	.709 x 1.575	.295	18x40	7.5	.8	VTH3300M25

### 10 WVDC; 13 VDC Surge

22	12.06	54	.197 x .433	.079	5x11	2	.5	VTH22M10
33	8.04	63	.197 x .433	.079	5x11	2	.5	VTH33M10
47	5.64	83	.197 x .433	.079	5x11	2	.5	VTH47M10
100	2.65	146	.236 x .433	.098	6x11	2.5	.5	VTH100M10
220	1.21	260	.315 x .453	.138	8x11.5	3.5	.5	VTH220M10
330	.80	340	.394 x .472	.197	10x12	5	.6	VTH330M10
470	.56	440	.394 x .630	.197	10x16	5	.6	VTH470M10
1,000	.27	680	.512 x .787	.197	13x20	5	.6	VTH1000M10
2,200	.13	960	.630 x .984	.295	16x25	7.5	.8	VTH2200M10
3,300	.10	1195	.630 x 1.260	.295	16x32	7.5	.8	VTH3300M10
4,700	.07	1425	.630 x 1.417	.295	16x36	7.5	.8	VTH4700M10
6,800	.06	1850	.709 x 1.575	.295	18x40	7.5	.8	VTH6800M10

### 35 WVDC; 44 VDC Surge

3.3	48.23	22	.197 x .433	.079	5x11	2	.5	VTH3R3M35
4.7	33.87	35	.197 x .433	.079	5x11	2	.5	VTH4R7M35
10	15.92	61	.197 x .433	.079	5x11	2	.5	VTH10M35
22	7.24	105	.236 x .433	.098	6x11	2.5	.5	VTH22M35
33	4.82	140	.236 x .433	.098	6x11	2.5	.5	VTH33M35
47	3.39	175	.315 x .453	.138	8x11.5	3.5	.5	VTH47M35
100	1.59	290	.394 x .472	.197	10x12	5	.6	VTH100M35
220	.72	480	.394 x .787	.197	10x20	5	.6	VTH220M35
330	.48	580	.512 x .787	.197	13x20	5	.6	VTH330M35
470	.34	670	.512 x .984	.197	13x25	5	.6	VTH470M35
1,000	.16	870	.630 x .984	.295	16x25	7.5	.8	VTH1000M35
2,200	.08	1365	.709 x 1.417	.295	18x36	7.5	.8	VTH2200M35

### 16 WVDC; 20 VDC Surge

10	22.56	40	.197 x .433	.079	5x11	2	.5	VTH10M16
22	10.25	75	.197 x .433	.079	5x11	2	.5	VTH22M16
33	6.83	100	.197 x .433	.079	5x11	2	.5	VTH33M16
47	4.80	125	.236 x .433	.098	6x11	2.5	.5	VTH47M16
100	2.25	200	.315 x .453	.138	8x11.5	3.5	.5	VTH100M16
220	1.03	335	.394 x .472	.197	10x12	5	.6	VTH220M16
330	.68	430	.394 x .630	.197	10x16	5	.6	VTH330M16
470	.48	575	.394 x .787	.197	10x20	5	.6	VTH470M16
1,000	.23	780	.512 x .984	.197	13x25	5	.6	VTH1000M16
2,200	.11	1055	.630 x .984	.295	16x25	7.5	.8	VTH2200M16
3,300	.08	1590	.630 x 1.417	.295	16x36	7.5	.8	VTH3300M16
4,700	.06	1890	.709 x 1.417	.295	18x36	7.5	.8	VTH4700M16

### 50 WVDC; 63 VDC Surge

.47	331.67	9	.197 x .433	.079	5x11	2	.5	VTHR47M50
1	132.64	15	.197 x .433	.079	5x11	2	.5	VTH1M50
2.2	60.31	21	.197 x .433	.079	5x11	2	.5	VTH2R2M50
3.3	40.19	30	.197 x .433	.079	5x11	2	.5	VTH3R3M50
4.7	28.22	35	.197 x .433	.079	5x11	2	.5	VTH4R7M50
10	13.26	61	.197 x .433	.079	5x11	2	.5	VTH10M50
22	6.03	110	.236 x .433	.098	6x11	2.5	.5	VTH22M50
33	4.02	150	.315 x .453	.138	8x11.5	3.5	.5	VTH33M50
47	2.82	190	.315 x .453	.138	8x11.5	3.5	.5	VTH47M50
100	1.33	330	.394 x .630	.197	10x16	5	.6	VTH100M50

Aluminum Capacitors



# Type VTH Radial Leaded Capacitors

**MALORY**

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

50 WVDC; 63 VDC Surge								
220	.60	545	.512 x .787	.197	13x20	5	.6	VTH220M50
330	.40	630	.512 x .787	.197	13x20	5	.6	VTH330M50
470	.28	710	.630 x .984	.295	16x25	7.5	.8	VTH470M50
1,000	.13	1025	.630 x 1.260	.295	16x32	7.5	.8	VTH1000M50

63 WVDC; 75 VDC Surge								
4.7	28.22	35	.197 x .433	.079	5x11	2	.5	VTH4R7M63
10	13.26	61	.236 x .433	.098	6x11	2.5	.5	VTH10M63
22	6.03	120	.315 x .453	.138	8x11.5	3.5	.5	VTH22M63
33	4.02	155	.315 x .453	.138	8x11.5	3.5	.5	VTH33M63
47	2.82	210	.394 x .472	.197	10x12	5	.6	VTH47M63
100	1.33	340	.394 x .787	.197	10x20	5	.6	VTH100M63
220	.60	550	.512 x .787	.197	13x20	5	.6	VTH220M63
330	.40	650	.512 x .984	.197	13x25	5	.6	VTH330M63
470	.28	725	.630 x .984	.295	16x25	7.5	.8	VTH470M63
1,000	.13	1220	.709 x 1.417	.295	18x36	7.5	.8	VTH1000M63

80 WVDC; 100 VDC Surge								
33	4.02	160	.394 x .472	.197	10x12	5	.6	VTH33M80
47	2.82	220	.394 x .630	.197	10x16	5	.6	VTH47M80
100	1.33	360	.512 x .787	.197	13x20	5	.6	VTH100M80
220	.60	600	.512 x .984	.197	13x25	5	.6	VTH220M80
330	.40	690	.630 x .984	.295	16x25	7.5	.8	VTH330M80
470	.28	810	.630 x 1.417	.295	16x36	7.5	.8	VTH470M80

100 WVDC; 125 VDC Surge								
.47	331.67	10	.197 x .433	.079	5x11	2	.5	VTHR47M100
1	132.64	17	.197 x .433	.079	5x11	2	.5	VTH1M100
2.2	60.31	27	.197 x .433	.079	5x11	2	.5	VTH2R2M100
3.3	40.19	44	.197 x .433	.079	5x11	2	.5	VTH3R3M100
4.7	28.22	50	.236 x .433	.098	6x11	2.5	.5	VTH4R7M100
10	13.26	100	.315 x .453	.138	8x11.5	3.5	.5	VTH10M100
22	6.03	170	.394 x .472	.197	10x12	5	.6	VTH22M100
33	4.02	210	.394 x .630	.197	10x16	5	.6	VTH33M100
47	2.82	320	.394 x .787	.197	10x20	5	.6	VTH47M100
100	1.33	470	.512 x .787	.197	13x20	5	.6	VTH100M100
220	.60	620	.630 x .984	.295	16x25	7.5	.8	VTH220M100
330	.40	705	.630 x 1.260	.295	16x32	7.5	.8	VTH330M100
470	.28	890	.709 x 1.417	.295	18x36	7.5	.8	VTH470M100

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

160 WVDC; 200 VDC Surge								
3.3	80.39	26	.394 x .472	.197	10x12	5	.6	VTH3R3M160
4.7	56.45	31	.394 x .472	.197	10x12	5	.6	VTH4R7M160
10	26.53	46	.394 x .630	.197	10x16	5	.6	VTH10M160
22	12.06	82	.512 x .787	.197	13x20	5	.6	VTH22M160
33	8.04	110	.512 x .984	.197	13x25	5	.6	VTH33M160
47	5.64	145	.630 x .984	.295	16x25	7.5	.8	VTH47M160
100	2.65	234	.630 x 1.417	.295	16x36	7.5	.8	VTH100M160

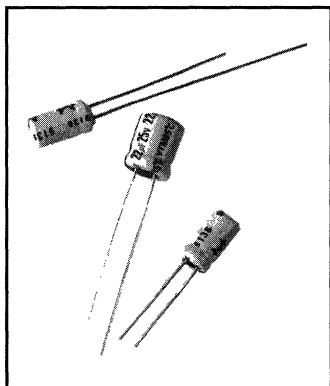
200 WVDC; 250 VDC Surge								
1	265.28	10	.236 x .433	.098	6x11	2.5	.5	VTH1M200
2.2	120.58	16	.315 x .453	.138	8x11.5	3.5	.5	VTH2R2M200
3.3	80.39	26	.394 x .472	.197	10x12	5	.6	VTH3R3M200
4.7	56.45	31	.394 x .472	.197	10x12	5	.6	VTH4R7M200
10	26.53	50	.394 x .630	.197	10x16	5	.6	VTH10M200
22	12.06	82	.512 x .984	.197	13x25	5	.6	VTH22M200
33	8.04	122	.630 x .984	.295	16x25	7.5	.8	VTH33M200
47	5.64	145	.630 x .984	.295	16x25	7.5	.8	VTH47M200
100	2.65	248	.709 x 1.575	.295	18x40	7.5	.8	VTH100M200

250 WVDC; 300 VDC Surge								
2.2	120.58	21	.394 x .472	.197	10x12	5	.6	VTH2R2M250
3.3	80.39	26	.394 x .472	.197	10x12	5	.6	VTH3R3M250
4.7	56.45	31	.394 x .630	.197	10x16	5	.6	VTH4R7M250
10	26.53	55	.394 x .787	.197	10x20	5	.6	VTH10M250
22	12.06	90	.512 x .984	.197	13x25	5	.6	VTH22M250
33	8.04	122	.630 x .984	.295	16x25	7.5	.8	VTH33M250
47	5.64	156	.630 x 1.260	.295	16x32	7.5	.8	VTH47M250

Aluminum Capacitors

# Type VTM Radial Leaded Capacitors

**MALLORY**



- +85°C - Sub-Miniature
- 4, 5 and 6 mm Diameters  
7 mm Height
- Ideal for Use Where  
Available Space is Limited

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
6.3 WVDC to 63 WVDC

Capacitance Range:  
.10  $\mu$ F to 100  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20%

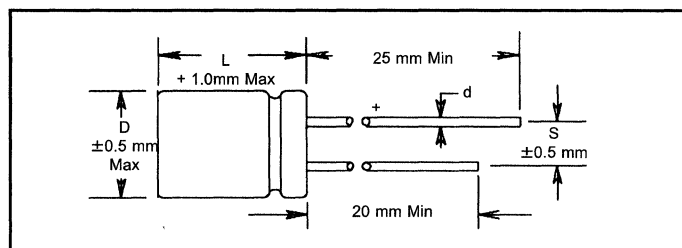
DC Leakage Current:  
I = .01 CV  
Not to exceed 3  $\mu$ A  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at +85°C

- Capacitance change within 20% of initial limits
- DC Leakage current not to exceed the initial requirement
- ESR  $\leq$  200% of initial measured value

The maximum ripple current at 85°C and 120 Hz for VTM capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers			
	50 Hz	120 Hz	400 Hz	1000 Hz
105°C	0.5	0.7	0.8	0.9
85°C	0.7	1.0	1.1	1.2
65°C	1.0	1.3	1.4	1.6
45°C	1.2	1.7	1.9	2.1
25°C	1.4	2.0	2.2	2.4



Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches) D x L S	Size (mm) D x L S d	Catalog Number
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Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches) D x L S	Size (mm) D x L S d	Catalog Number
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### 6.3 WVDC; 8 VDC Surge

22	14.47	34	.157 x .276	.059	4 x 7	1.5	.45	VTM22M6
33	9.65	42	.197 x .276	.079	5 x 7	2	.45	VTM33M6
47	6.77	50	.197 x .276	.079	5 x 7	2	.45	VTM47M6
100	3.18	77	.236 x .276	.098	6 x 7	2.5	.45	VTM100M6

### 35 WVDC; 44 VDC Surge

4.7	33.33	24	.157 x .276	.059	4 x 7	1.5	.45	VTM4R7M35
10	15.96	36	.197 x .276	.079	5 x 7	2	.45	VTM10M35
22	7.23	57	.236 x .276	.098	6 x 7	2.5	.45	VTM22M35

### 10 WVDC; 13 VDC Surge

22	12.06	38	.197 x .276	.079	5 x 7	2	.45	VTM22M10
33	8.04	47	.197 x .276	.079	5 x 7	2	.45	VTM33M10
47	5.64	59	.236 x .276	.098	6 x 7	2.5	.45	VTM47M10

### 50 WVDC; 63 VDC Surge

.10	1326.29	1	.157 x .276	.059	4 x 7	1.5	.45	VTMR10M50
.22	602.85	2	.157 x .276	.059	4 x 7	1.5	.45	VTMR22M50
.33	401.91	3	.157 x .276	.059	4 x 7	1.5	.45	VTMR33M50
.47	282.19	5	.157 x .276	.059	4 x 7	1.5	.45	VTMR47M50
1	132.63	10	.157 x .276	.059	4 x 7	1.5	.45	VTMR10M50
2.2	60.29	19	.157 x .276	.059	4 x 7	1.5	.45	VTMR22M50
3.3	40.19	24	.157 x .276	.059	4 x 7	1.5	.45	VTMR33M50
4.7	28.22	29	.197 x .276	.079	5 x 7	2	.45	VTMR47M50
10	13.26	44	.236 x .276	.098	6 x 7	2.5	.45	VTMR10M50

### 16 WVDC; 20 VDC Surge

10	22.55	29	.157 x .276	.059	4 x 7	1.5	.45	VTM10M16
22	10.25	44	.197 x .276	.079	5 x 7	2	.45	VTM22M16
33	6.83	57	.197 x .276	.079	5 x 7	2	.45	VTM33M16
47	4.8	68	.236 x .276	.098	6 x 7	2.5	.45	VTM47M16

### 63 WVDC; 75 VDC Surge

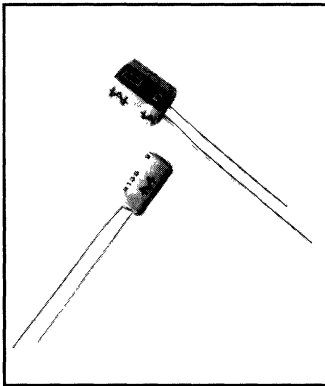
.10	1326.29	1	.157 x .276	.059	4 x 7	1.5	.45	VTMR10M63
.22	602.86	2	.157 x .276	.059	4 x 7	1.5	.45	VTMR22M63
.33	401.91	4	.157 x .276	.059	4 x 7	1.5	.45	VTMR33M63
.47	262.19	6	.157 x .276	.059	4 x 7	1.5	.45	VTMR47M63
1	132.63	13	.157 x .276	.059	4 x 7	1.5	.45	VTMR10M63
2.2	60.29	21	.157 x .276	.059	4 x 7	1.5	.45	VTMR22M63
3.3	40.19	26	.157 x .276	.059	4 x 7	1.5	.45	VTMR33M63
4.7	28.22	33	.236 x .276	.098	6 x 7	2.5	.45	VTMR47M63

### 25 WVDC; 32 VDC Surge

4.7	42.33	24	.157 x .276	.059	4 x 7	1.5	.45	VTM4R7M25
10	19.89	33	.197 x .276	.079	5 x 7	2	.45	VTM10M25
22	9.04	51	.236 x .276	.098	6 x 7	2.5	.45	VTM22M25
33	6.03	63	.236 x .276	.098	6 x 7	2.5	.45	VTM33M25

Aluminum Capacitors

# Type VTN Radial Leaded Capacitors



- 85°C - Non-Polar
- General Purpose
- 5 to 25 mm Diameters

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
6.3 WVDC to 160 WVNP

Capacitance Range:  
1  $\mu$ F to 10,000  $\mu$ F

Capacitance Tolerance:  
-10% +50%  
Other tolerances available

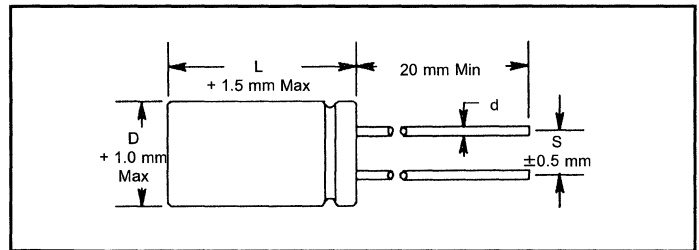
DC Leakage Current:  
 $I = .03 CV$   
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at +85°C

- Capacitance change within 20% of initial limits
- DC Leakage current not to exceed the initial requirement
- ESR  $\leq$  150% of initial measured value

The maximum ripple current at 85°C and 120 Hz for VTN capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers				
	60 Hz	120 Hz	400 Hz	1000 Hz	10kHz Up
85°C	0.8	1.0	1.1	1.35	1.5
75°C	1.1	1.4	1.55	1.9	2.1
65°C	1.2	1.6	1.75	2.1	2.4
45°C	1.5	1.9	2.1	2.5	2.8
25°C	1.8	2.25	2.5	3.0	3.3



Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

6.3 WVNP; 8 VNP Surge									
22	16.08	56	.197 x .433	.079	5 x 11	2.0	.5	VTN22T6	
47	7.53	90	.236 x .433	.098	6 x 11	2.5	.5	VTN47T6	
330	1.07	351	.394 x .630	.197	10 x 16	5.0	.6	VTN330T6	
470	.75	457	.394 x .787	.197	10 x 20	5.0	.6	VTN470T6	
1,500	.25	1039	.630 x .984	.295	16 x 25	7.5	.8	VTN1500T6	
3,300	.13	1584	.630 x 1.220	.295	16 x 31	7.5	.8	VTN3300T6	
4,700	.10	2061	.630 x 1.772	.295	16 x 45	7.5	.8	VTN4700T6	
6,800	.08	2187	.709 x 2.244	.295	18 x 57	7.5	.8	VTN6800T6	

16 WVNP; 20 VNP Surge									
1,500	.17	1370	.630 x 1.220	.295	16 x 31	7.5	.8	VTN1500T16	
2,200	.12	1751	.630 x 1.496	.295	16 x 38	7.5	.8	VTN2200T16	
4,700	.08	2052	.866 x 2.008	.394	22 x 51	10.0	.8	VTN4700T16	
6,800	.06	2536	.984 x 2.520	.492	25 x 64	12.5	1.0	VTN6800T16	
10,000	.05	2791	.984 x 2.520	.492	25 x 64	12.5	1.0	VTN10000T16	

10 WVNP; 13 VNP Surge									
15	19.65	51	.197 x .433	.079	5 x 11	2.0	.5	VTN15T10	
22	13.40	67	.236 x .433	.098	6 x 11	2.5	.5	VTN22T10	
33	8.93	82	.236 x .433	.098	6 x 11	2.5	.5	VTN33T10	
68	4.33	143	.315 x .472	.138	8 x 12	3.5	.5	VTN68T10	
100	2.95	173	.315 x .472	.138	8 x 12	3.5	.5	VTN100T10	
150	1.97	240	.394 x .512	.197	10 x 13	5.0	.6	VTN150T10	
220	1.34	314	.394 x .630	.197	10 x 16	5.0	.6	VTN220T10	
330	.89	419	.394 x .787	.197	10 x 20	5.0	.6	VTN330T10	
470	.63	557	.394 x 1.024	.197	10 x 26	5.0	.6	VTN470T10	
680	.43	670	.512 x .787	.197	13 x 20	5.0	.6	VTN680T10	
1,000	.30	900	.512 x 1.024	.197	13 x 26	5.0	.6	VTN1000T10	
1,500	.21	1233	.630 x 1.220	.295	16 x 31	7.5	.8	VTN1500T10	
2,200	.15	1458	.630 x 1.220	.295	16 x 31	7.5	.8	VTN2200T10	
3,300	.11	1857	.630 x 1.496	.295	16 x 38	7.5	.8	VTN3300T10	
4,700	.09	2304	.630 x 2.008	.295	16 x 51	7.5	.8	VTN4700T10	
6,800	.07	2139	.866 x 2.008	.394	22 x 51	10.0	1.0	VTN6800T10	

25 WVNP; 32 VNP Surge									
4.7	50.17	32	.197 x .433	.079	5 x 11	2.0	.5	VTN4R7T25	
10	23.58	51	.236 x .433	.098	6 x 11	2.5	.5	VTN10T25	
22	10.72	91	.315 x .472	.138	8 x 12	3.5	.5	VTN22T25	
47	5.02	150	.394 x .512	.197	10 x 13	5.0	.6	VTN47T25	
68	3.46	181	.394 x .512	.197	10 x 13	5.0	.6	VTN68T25	
100	2.36	236	.394 x .630	.197	10 x 16	5.0	.6	VTN100T25	
150	1.57	316	.394 x .787	.197	10 x 20	5.0	.6	VTN150T25	
220	1.07	426	.394 x 1.024	.197	10 x 26	5.0	.6	VTN220T25	
330	.72	522	.512 x .787	.197	13 x 20	5.0	.6	VTN330T25	
470	.50	590	.512 x 1.024	.197	13 x 26	5.0	.6	VTN470T25	
680	.35	951	.630 x 1.220	.295	16 x 31	7.5	.8	VTN680T25	
1,000	.24	1153	.630 x 1.220	.295	16 x 31	7.5	.8	VTN1000T25	
1,500	.17	1597	.630 x 1.772	.295	16 x 45	7.5	.8	VTN1500T25	
2,200	.12	1983	.630 x 2.008	.295	16 x 51	7.5	.8	VTN2200T25	
3,300	.09	1884	.866 x 2.008	.394	22 x 51	10.0	1.0	VTN3300T25	
4,700	.08	2277	.984 x 2.520	.492	25 x 64	12.5	1.0	VTN4700T25	

16 WVNP; 20 VNP Surge									
6.8	34.67	38	.197 x .433	.079	5 x 11	2.0	.5	VTN6R8T16	
10	23.58	46	.197 x .433	.079	5 x 11	2.0	.5	VTN10T16	
15	15.72	62	.236 x .433	.098	6 x 11	2.5	.5	VTN15T16	
33	7.15	111	.315 x .472	.138	8 x 12	3.5	.5	VTN33T16	
47	5.01	133	.315 x .472	.138	8 x 12	3.5	.5	VTN47T16	
100	2.36	219	.394 x .512	.197	10 x 13	5.0	.6	VTN100T16	
150	1.57	290	.394 x .630	.197	10 x 16	5.0	.6	VTN150T16	
220	1.07	383	.394 x .787	.197	10 x 20	5.0	.6	VTN220T16	
330	.72	522	.394 x 1.024	.197	10 x 26	5.0	.6	VTN330T16	
470	.50	623	.512 x .787	.197	13 x 20	5.0	.6	VTN470T16	
680	.35	830	.512 x 1.024	.197	13 x 26	5.0	.6	VTN680T16	
1,000	.24	1066	.512 x 1.181	.197	13 x 30	5.0	.6	VTN1000T16	

40 WVNP; 50 VNP Surge									
15	13.75	80	.315 x .472	.138	8 x 12	3.5	.5	VTN15T40	
33	6.25	134	.394 x .512	.197	10 x 13	5.0	.6	VTN33T40	
68	3.03	227	.394 x .787	.197	10 x 20	5.0	.6	VTN68T40	
100	2.06	276	.394 x .787	.197	10 x 20	5.0	.6	VTN100T40	
150	1.38	376	.512 x .787	.197	13 x 20	5.0	.6	VTN150T40	
330	.63	655	.512 x 1.181	.197	13 x 30	5.0	.6	VTN330T40	
680	.30	1185	.630 x 1.772	.295	16 x 45	7.5	.8	VTN680T40	
1,000	.21	1437	.630 x 1.772	.295	16 x 45	7.5	.8	VTN1000T40	
2,200	.11	1719	.866 x 2.008	.394	22 x 51	10.0	1.0	VTN2200T40	
3,300	.08	2203	.984 x 2.520	.492	25 x 64	12.5	1.0	VTN3300T40	

50 WVNP; 63 VNP Surge									
2.2	80.38	25	.197 x .433	.079	5 x 11	2.0	.5	VTN2R2T50	
3.3	53.59	34	.236 x .433	.098	6 x 11	2.5	.5	VTN3R3T50	

Aluminum Capacitors

# Type VTN Radial Leaded Capacitors



Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D x L	S	D x L	S	d		

50 WVNP; 63 VNP Surge								
4.7	37.63	40	.236 x .433	.098	6 x11	2.5	.5	VTN4R7T50
10	17.68	71	.315 x .472	.138	8 x12	3.5	.5	VTN10T50
15	11.79	98	.394 x .512	.197	10 x13	5.0	.6	VTN15T50
22	8.04	119	.394 x .512	.197	10 x13	5.0	.6	VTN22T50
47	3.76	187	.394 x .630	.197	10 x16	5.0	.6	VTN47T50
68	2.60	274	.394 x 1.024	.197	10 x26	5.0	.6	VTN68T50
100	1.77	332	.394 x 1.024	.197	10 x26	5.0	.6	VTN100T50
220	.80	545	.512 x 1.024	.197	13 x26	5.0	.6	VTN220T50
470	.38	913	.630 x 1.220	.295	16 x31	7.5	.8	VTN470T50
680	.26	1350	.630 x 2.008	.295	16 x51	7.5	.8	VTN680T50
1,500	.13	1575	.866 x 2.008	.394	22 x51	10.0	1.0	VTN1500T50
2,200	.09	2040	.984 x 2.520	.492	25 x64	12.5	1.0	VTN2200T50

100 WVNP; 125 VNP Surge								
1	132.60	21	.236 x .433	.098	6 x11	2.5	.5	VTN1T100
2.2	60.29	38	.315 x .472	.138	8 x12	3.5	.5	VTN2R2T100
3.3	40.19	47	.315 x .472	.138	8 x12	3.5	.5	VTN3R3T100
4.7	28.22	56	.315 x .472	.138	8 x12	3.5	.5	VTN4R7T100
6.8	19.50	76	.394 x .512	.197	10 x13	5.0	.6	VTN6R8T100
10	13.26	100	.394 x .630	.197	10 x16	5.0	.6	VTN10T100
15	8.84	133	.394 x .787	.197	10 x20	5.0	.6	VTN15T100
22	6.03	161	.394 x .787	.197	10 x20	5.0	.6	VTN22T100
33	4.02	220	.394 x 1.024	.197	10 x26	5.0	.6	VTN33T100
47	2.82	263	.512 x .787	.197	13 x20	5.0	.6	VTN47T100
68	1.95	350	.512 x 1.024	.197	13 x26	5.0	.6	VTN68T100
100	1.33	486	.630 x 1.220	.295	16 x31	7.5	.8	VTN100T100
150	.88	647	.630 x 1.496	.295	16 x38	7.5	.8	VTN150T100
220	.61	741	.630 x 1.772	.295	16 x45	7.5	.8	VTN220T100
330	.40	913	.709 x 1.929	.295	18 x49	7.5	.8	VTN330T100
470	.28	1060	.866 x 2.008	.394	22 x51	10.0	1.0	VTN470T100
680	.20	1415	.984 x 2.520	.492	25 x64	12.5	1.0	VTN680T100

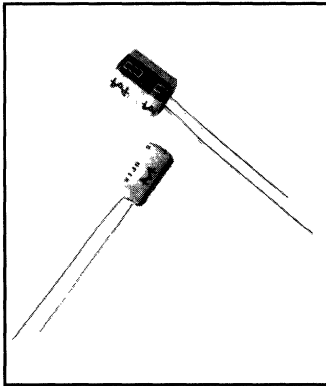
63 WVNP; 75 VNP Surge								
6.8	21.67	64	.315 x .472	.138	8 x12	3.5	.5	VTN6R8T63
15	9.82	107	.394 x .512	.197	10 x13	5.0	.6	VTN15T63
22	6.70	140	.394 x .630	.197	10 x16	5.0	.6	VTN22T63
33	4.47	172	.394 x .630	.197	10 x16	5.0	.6	VTN33T63
47	3.14	224	.394 x .787	.197	10 x20	5.0	.6	VTN47T63
68	2.17	300	.512 x .787	.197	13 x20	5.0	.6	VTN68T63
100	1.47	363	.512 x .787	.197	13 x20	5.0	.6	VTN100T63
150	.98	493	.512 x 1.024	.197	13 x26	5.0	.6	VTN150T63
220	.67	584	.630 x 1.220	.295	16 x31	7.5	.8	VTN220T63
330	.45	838	.630 x 1.220	.295	16 x31	7.5	.8	VTN330T63
470	.31	1166	.630 x 1.772	.295	16 x45	7.5	.8	VTN470T63
680	.22	1230	.709 x 1.929	.295	18 x49	7.5	.8	VTN680T63
1,000	.15	1474	.866 x 2.008	.394	22 x51	10.0	1.0	VTN1000T63
1,500	.11	1900	.984 x 2.520	.492	25 x64	12.5	1.0	VTN1500T63

160 WVNP; 200 VNP Surge								
1	147.40	25	.315 x .512	.138	8 x13	3.5	.5	VTN1T160
2.2	66.98	41	.394 x .512	.197	10 x13	5.0	.6	VTN2R2T160
3.3	44.66	54	.394 x .630	.197	10 x16	5.0	.6	VTN3R3T160
4.7	31.35	65	.394 x .630	.197	10 x16	5.0	.6	VTN4R7T160
6.8	21.67	85	.394 x .787	.197	10 x20	5.0	.6	VTN6R8T160
10	14.74	115	.394 x 1.024	.197	10 x26	5.0	.6	VTN10T160
15	9.82	156	.512 x 1.024	.197	13 x26	5.0	.6	VTN15T160

80 WVNP; 100 VNP Surge								
1	147.40	19	.197 x .433	.079	5 x11	2.0	.5	VTN1T80
2.2	66.98	30	.236 x .433	.098	6 x11	2.5	.5	VTN2R2T80
10	14.74	88	.394 x .512	.197	10 x13	5.0	.6	VTN10T80
15	9.82	116	.394 x .630	.197	10 x16	5.0	.6	VTN15T80
33	4.47	187	.394 x .787	.197	10 x20	5.0	.6	VTN33T80
47	3.14	249	.394 x 1.024	.197	10 x26	5.0	.6	VTN47T80
100	1.47	427	.512 x 1.181	.197	13 x30	5.0	.6	VTN100T80
150	.98	565	.630 x 1.220	.295	16 x31	7.5	.8	VTN150T80
220	.67	743	.630 x 1.496	.295	16 x38	7.5	.8	VTN220T80
330	.45	1031	.630 x 2.008	.295	16 x51	7.5	.8	VTN330T80
470	.31	1023	.709 x 1.929	.295	18 x49	7.5	.8	VTN470T80
680	.22	1267	.866 x 2.244	.394	22 x57	10.0	1.0	VTN680T80
1,000	.15	1627	.984 x 2.520	.492	25 x64	12.5	1.0	VTN1000T80

Aluminum Capacitors

# Type VTZ Radial Leaded Capacitors



- +105°C - Long Life
- Very Low Impedance and ESR
- Wide Temperature Range
- For Switching Regulators and Other High Frequency Applications

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +105°C

Voltage Range:  
6.3 WVDC to 100 WVDC

Capacitance Range:  
22  $\mu$ F to 15,000  $\mu$ F

Capacitance Tolerance:  
 $\pm$  20% (Standard)

DC Leakage Current:  
 $I = .01 CV$   
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

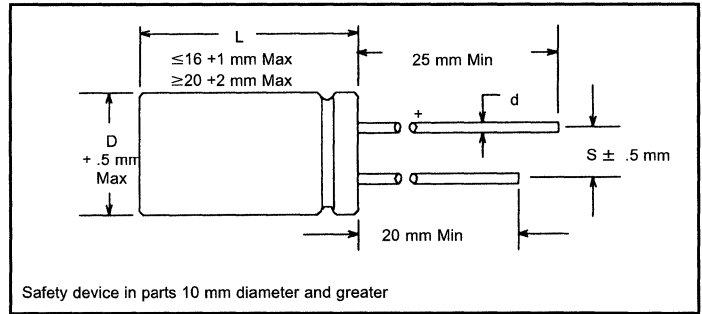
QA Stability Test:  
Apply WVDC for 1,000 hrs if diameter  $\leq$  8 mm  
Apply WVDC for 2,000 hrs if diameter  $\geq$  10 mm

- Capacitance change within 20% of initial limits
- DC Leakage current meets initial limits
- ESR not to exceed 200% of initial measured value

The maximum ripple current at 105°C and 100 KHz for VTZ capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables.

Capacitance ( $\mu$ F)	Ripple Multipliers				
	50 Hz	120 Hz	300 Hz	1 KHz	10 KHz
Below 4.7	0.3	0.4	0.5	0.7	0.8
5.6 - 33	0.4	0.5	0.6	0.8	0.9
39 - 330	0.6	0.7	0.8	0.9	0.95
390 - 1,000	0.65	0.8	0.9	0.98	1.0
1,200 - Above	0.8	0.9	0.95	0.98	1.0

Ambient Temperature	Ripple Multiplier
85°C	1.75
65°C	2.17
45°C	2.40



Cap $\mu$ F	Max Z Ohms 100KHz 20°C	Max Ripple mA 100KHz 105°C	Size (Inches)		Size (mm)			Catalog Number
			D x L	S	D x L	S	d	

6.3 WVDC; 8 VDC Surge								
120	1.300	154	.197 x .433	.079	5 x 11	2.0	.5	VTZ120M6
150	.920	210	.236 x .433	.098	6 x 11	2.5	.5	VTZ150M6
220	.610	260	.314 x .433	.138	8 x 11	3.5	.5	VTZ220M6
330	.400	350	.314 x .433	.138	8 x 11	3.5	.5	VTZ330M6
470	.280	510	.394 x .472	.197	10 x 12	5.0	.6	VTZ470M6
680	.220	635	.394 x .630	.197	10 x 16	5.0	.6	VTZ680M6
820	.190	650	.394 x .630	.197	10 x 16	5.0	.6	VTZ820M6
1,000	.170	860	.394 x .787	.197	10 x 20	5.0	.6	VTZ1000M6
1,200	.140	860	.394 x .787	.197	10 x 20	5.0	.6	VTZ1200M6
1,500	.120	1030	.394 x .984	.197	10 x 25	5.0	.6	VTZ1500M6
2,200	.095	1150	.394 x 1.181	.197	10 x 30	5.0	.6	VTZ2200M6
3,300	.081	1280	.472 x 1.378	.197	12 x 35	5.0	.6	VTZ3300M6
4,700	.053	1770	.472 x 1.378	.197	12 x 35	5.0	.6	VTZ4700M6
6,800	.055	1810	.630 x 1.259	.295	16 x 32	7.5	.8	VTZ6800M6
8,200	.047	2030	.630 x 1.417	.295	16 x 36	7.5	.8	VTZ8200M6
10,000	.039	2320	.630 x 1.575	.295	16 x 40	7.5	.8	VTZ10000M6
15,000	.037	2460	.708 x 1.575	.295	18 x 40	7.5	.8	VTZ15000M6

10 WVDC; 13 VDC Surge								
120	.910	210	.236 x .433	.098	6 x 11	2.5	.5	VTZ120M10
150	.700	240	.236 x .433	.098	6 x 11	2.5	.5	VTZ150M10
220	.480	300	.314 x .433	.098	8 x 11	2.5	.5	VTZ220M10
330	.330	400	.314 x .433	.098	8 x 11	2.5	.5	VTZ330M10
470	.240	500	.394 x .472	.098	10 x 12	2.5	.6	VTZ470M10
680	.180	650	.394 x .630	.197	10 x 16	5.0	.6	VTZ680M10
820	.140	860	.394 x .787	.197	10 x 20	5.0	.6	VTZ820M10
1,000	.120	970	.394 x .787	.197	10 x 20	5.0	.6	VTZ1000M10
1,200	.120	1030	.394 x .984	.197	10 x 25	5.0	.6	VTZ1200M10
1,500	.093	1150	.394 x 1.181	.197	10 x 30	5.0	.6	VTZ1500M10
2,200	.073	1320	.472 x 1.181	.197	12 x 30	5.0	.6	VTZ2200M10
3,300	.052	1770	.472 x 1.378	.197	12 x 35	5.0	.6	VTZ3300M10
4,700	.054	1810	.630 x 1.259	.295	16 x 32	7.5	.8	VTZ4700M10

Cap $\mu$ F	Max Z Ohms 100KHz 20°C	Max Ripple mA 100KHz 105°C	Size (Inches)		Size (mm)			Catalog Number
			D x L	S	D x L	S	d	

10 WVDC; 13 VDC Surge								
6,800	.046	2030	.630 x 1.417	.295	16 x 36	7.5	.8	VTZ6800M10
8,200	.038	2320	.630 x 1.575	.295	16 x 40	7.5	.8	VTZ8200M10
10,000	.037	2460	.708 x 1.575	.295	18 x 40	7.5	.8	VTZ10000M10

16 WVDC; 20 VDC Surge								
120	.580	260	.314 x .433	.138	8 x 11	3.5	.5	VTZ120M16
150	.470	300	.314 x .433	.138	8 x 11	3.5	.5	VTZ150M16
220	.330	400	.314 x .433	.138	8 x 11	3.5	.5	VTZ220M16
330	.230	500	.394 x .472	.197	10 x 12	5.0	.6	VTZ330M16
470	.180	650	.394 x .630	.197	10 x 16	5.0	.6	VTZ470M16
680	.140	860	.394 x .787	.197	10 x 20	5.0	.6	VTZ680M16
820	.120	1030	.394 x .984	.197	10 x 25	5.0	.6	VTZ820M16
1,000	.091	1150	.394 x 1.181	.197	10 x 30	5.0	.6	VTZ1000M16
1,200	.086	1120	.472 x .984	.197	12 x 25	5.0	.6	VTZ1200M16
1,500	.072	1320	.472 x .984	.197	12 x 25	5.0	.6	VTZ1500M16
2,200	.063	1540	.472 x 1.181	.197	12 x 30	5.0	.6	VTZ2200M16
3,300	.045	1980	.472 x 1.575	.197	12 x 40	5.0	.6	VTZ3300M16
4,700	.046	2030	.630 x 1.417	.295	16 x 36	7.5	.8	VTZ4700M16
6,800	.040	2240	.708 x 1.417	.295	18 x 36	7.5	.8	VTZ6800M16
8,200	.036	2460	.708 x 1.575	.295	18 x 40	7.5	.8	VTZ8200M16

25 WVDC; 32 VDC Surge								
120	.380	350	.314 x .433	.138	8 x 11	3.5	.5	VTZ120M25
150	.330	400	.394 x .472	.197	10 x 12	5.0	.6	VTZ150M25
220	.230	500	.394 x .472	.197	10 x 12	5.0	.6	VTZ220M25
330	.190	650	.394 x .630	.197	10 x 16	5.0	.6	VTZ330M25
470	.140	860	.394 x .787	.197	10 x 20	5.0	.6	VTZ470M25
680	.090	1150	.394 x 1.181	.197	10 x 30	5.0	.6	VTZ680M25
820	.085	1120	.472 x .984	.197	12 x 25	5.0	.6	VTZ820M25
1,000	.071	1320	.472 x .984	.197	12 x 25	5.0	.6	VTZ1000M25
1,200	.078	1400	.472 x 1.181	.197	12 x 30	5.0	.6	VTZ1200M25

Aluminum Capacitors

# Type VTZ Radial Leaded Capacitors



Cap $\mu$ F	Max Z Ohms 100KHz 20°C	Max Ripple mA 100KHz 105°C	Size (Inches)			Size (mm)			Catalog Number
			D	x L	S	D	x L	S	d

Cap $\mu$ F	Max Z Ohms 100KHz 20°C	Max Ripple mA 100KHz 105°C	Size (Inches)			Size (mm)			Catalog Number
			D	x L	S	D	x L	S	d

25 WVDC; 32 VDC Surge										
1,500	.062	1540	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ1500M25
2,200	.044	1980	.472	x 1.575	.197	12	x 40	5.0	.6	VTZ2200M25
3,300	.045	2030	.630	x 1.417	.295	16	x 36	7.5	.8	VTZ3300M25
4,700	.036	2460	.708	x 1.575	.295	18	x 40	7.5	.8	VTZ4700M25

80 WVDC; 100 VDC Surge										
33	.540	305	.394	x .472	.197	10	x 12	5.0	.6	VTZ33M80
47	.360	410	.394	x .630	.197	10	x 16	5.0	.6	VTZ47M80
68	.260	600	.394	x .787	.197	10	x 20	5.0	.6	VTZ68M80
100	.190	795	.394	x .984	.197	10	x 25	5.0	.6	VTZ100M80
120	.170	900	.394	x 1.181	.197	10	x 30	5.0	.6	VTZ120M80
150	.150	955	.394	x 1.181	.197	10	x 30	5.0	.6	VTZ150M80
220	.130	1200	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ220M80
330	.088	1450	.472	x 1.378	.197	12	x 35	5.0	.6	VTZ330M80
470	.063	1790	.630	x 1.259	.295	16	x 32	7.5	.8	VTZ470M80
680	.048	2200	.630	x 1.575	.295	16	x 40	7.5	.8	VTZ680M80
820	.060	1990	.709	x 1.417	.295	18	x 36	7.5	.8	VTZ820M80
1,000	.044	2370	.709	x 1.575	.295	18	x 40	7.5	.8	VTZ1000M80

35 WVDC; 44 VDC Surge										
100	.320	400	.394	x .472	.197	10	x 12	5.0	.6	VTZ100M35
120	.260	510	.394	x .472	.197	10	x 12	5.0	.6	VTZ120M35
150	.230	550	.394	x .472	.197	10	x 12	5.0	.6	VTZ150M35
220	.180	650	.394	x .630	.197	10	x 16	5.0	.6	VTZ220M35
330	.130	860	.394	x .787	.197	10	x 20	5.0	.6	VTZ330M35
470	.089	1150	.394	x 1.181	.197	10	x 30	5.0	.6	VTZ470M35
680	.070	1320	.472	x .984	.197	12	x 25	5.0	.6	VTZ680M35
820	.076	1400	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ820M35
1,000	.061	1540	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ1000M35
1,200	.049	1770	.472	x 1.378	.197	12	x 35	5.0	.6	VTZ1200M35
1,500	.043	1980	.472	x 1.575	.197	12	x 40	5.0	.6	VTZ1500M35
2,200	.044	2030	.630	x 1.417	.295	16	x 36	7.5	.8	VTZ2200M35
3,300	.035	2460	.708	x 1.575	.295	18	x 40	7.5	.8	VTZ3300M35

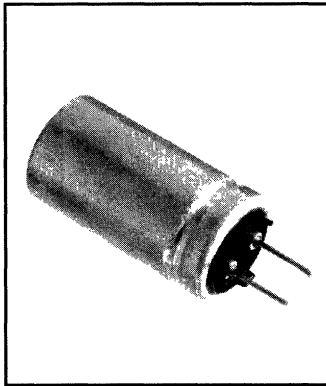
100 WVDC; 125 VDC Surge										
22	.530	305	.394	x .472	.197	10	x 12	5.0	.6	VTZ22M100
33	.350	500	.394	x .630	.197	10	x 16	5.0	.6	VTZ33M100
47	.300	600	.394	x .787	.197	10	x 20	5.0	.6	VTZ47M100
68	.190	795	.394	x .984	.197	10	x 25	5.0	.6	VTZ68M100
100	.150	955	.394	x 1.181	.197	10	x 30	5.0	.6	VTZ100M100
120	.130	1040	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ120M100
150	.110	1200	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ150M100
220	.086	1440	.630	x 1.259	.295	16	x 32	7.5	.8	VTZ220M100
330	.062	1790	.630	x 1.417	.295	16	x 36	7.5	.8	VTZ330M100
470	.047	2200	.630	x 1.575	.295	16	x 40	7.5	.8	VTZ470M100

50 WVDC; 63 VDC Surge										
68	.310	400	.394	x .472	.197	10	x 12	5.0	.6	VTZ68M50
100	.200	635	.394	x .630	.197	10	x 16	5.0	.6	VTZ100M50
120	.170	650	.394	x .630	.197	10	x 16	5.0	.6	VTZ120M50
150	.150	860	.394	x .787	.197	10	x 20	5.0	.6	VTZ150M50
220	.110	1030	.394	x .984	.197	10	x 25	5.0	.6	VTZ220M50
330	.086	1150	.394	x 1.181	.197	10	x 30	5.0	.6	VTZ330M50
470	.068	1320	.472	x .984	.197	12	x 25	5.0	.6	VTZ470M50
680	.048	1770	.472	x 1.378	.197	12	x 35	5.0	.6	VTZ680M50
820	.042	1980	.472	x 1.575	.197	12	x 40	5.0	.6	VTZ820M50
1,000	.050	1810	.630	x 1.259	.295	16	x 32	7.5	.8	VTZ1000M50
1,200	.043	2030	.630	x 1.417	.295	16	x 36	7.5	.8	VTZ1200M50
1,500	.035	2320	.630	x 1.575	.295	16	x 40	7.5	.8	VTZ1500M50

63 WVDC; 75 VDC Surge										
47	.560	305	.394	x .472	.197	10	x 12	5.0	.6	VTZ47M63
68	.360	500	.394	x .630	.197	10	x 16	5.0	.6	VTZ68M63
100	.310	550	.394	x .630	.197	10	x 16	5.0	.6	VTZ100M63
120	.270	620	.394	x .787	.197	10	x 20	5.0	.6	VTZ120M63
150	.200	795	.394	x .984	.197	10	x 25	5.0	.6	VTZ150M63
220	.160	890	.472	x .984	.197	12	x 25	5.0	.6	VTZ220M63
330	.130	1320	.472	x 1.181	.197	12	x 30	5.0	.6	VTZ330M63
470	.091	1450	.472	x 1.378	.197	12	x 35	5.0	.6	VTZ470M63
680	.065	1790	.630	x 1.259	.295	16	x 32	7.5	.8	VTZ680M63
820	.056	2000	.630	x 1.417	.295	16	x 36	7.5	.8	VTZ820M63
1,000	.049	2200	.709	x 1.417	.295	18	x 36	7.5	.8	VTZ1000M63
1,200	.046	2370	.709	x 1.575	.295	18	x 40	7.5	.8	VTZ1200M63

Aluminum Capacitors

# Type VPR Radial Leaded Capacitors



- 105°C - Long Life
- Low ESR
- High Reliability
- Ideal for Use as an Output Filter for SMPS

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +105°C

Voltage Range:  
6.3 WVDC to 100 WVDC  
Up to 250 VDC available

Capacitance Range:  
130  $\mu$ F to 12,000  $\mu$ F

Capacitance Tolerance:  
-10% +75%  
Other tolerances available

DC Leakage Current:  
 $I = .5 \sqrt{CV}$   
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at +105°C

- Capacitance change within 15% of initial limits
- DC Leakage current not to exceed the initial requirements
- ESR  $\leq$  150% of initial measured value

## Part Number Format

Mallory Catalog Number: VPR 372 U 016 L2C

TYPE NUMBER: \_\_\_\_\_  
Identifies the basic type.

CAPACITANCE: \_\_\_\_\_  
Expressed in microfarads.  
The first two digits are significant figures.  
The third digit is the number of zeros.

CAPACITANCE TOLERANCE: \_\_\_\_\_  
U = -10% +75% (Standard)  
Other tolerances are available on special request.

DC VOLTAGE RATING: \_\_\_\_\_  
Zeros are used to precede the voltage rating where necessary to complete the three digit block.  
The letter 'R' indicates a decimal point.

CASE CODE: \_\_\_\_\_

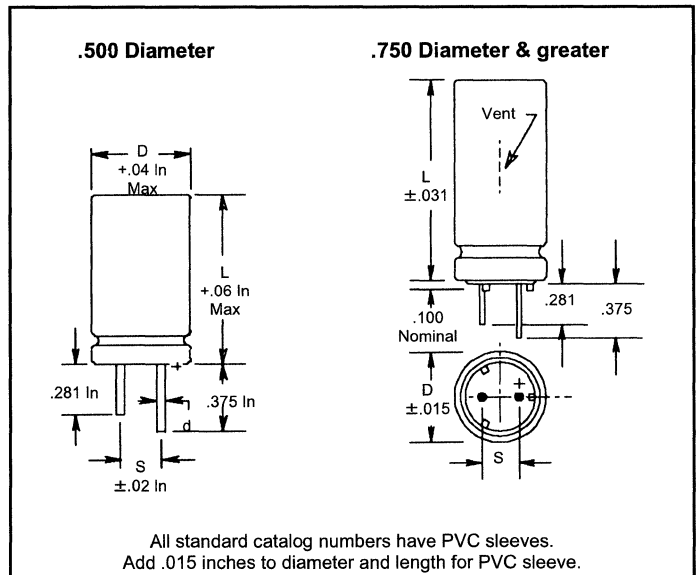
The maximum ripple current at 85°C and 120 Hz for VPR capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables

Ambient Temperature	Multiplier
95°C	0.7
85°C	1.0
75°C	1.2
65°C	1.4
55°C	1.58
45°C	1.7

## Case Code Chart

Uninsulated Case Size									
Case Code	Inches			(mm)			Lead Wire Size		
	D	L	S	D	L	S	Inches	AWG	
E1A	.512	1.024	.200	13	26	5.08	.023	#20	
E1E	.512	1.300	.200	13	33	5.08	.023	#20	
E1L	.512	1.654	.200	13	42	5.08	.023	#20	
J1C	.750	1.125	.250	19.1	28.6	6.35	.040	#18	
J1L	.750	1.625	.250	19.1	41.3	6.35	.040	#18	
J2C	.750	2.125	.250	19.1	53.9	6.35	.040	#18	
J2L	.750	2.625	.250	19.1	66.7	6.35	.040	#18	
J3C	.750	3.125	.250	19.1	79.4	6.35	.040	#18	
J3L	.750	3.625	.250	19.1	92.1	6.35	.040	#18	
L1C	.875	1.125	.300	22.2	28.6	7.62	.040	#18	
L1L	.875	1.625	.300	22.2	41.3	7.62	.040	#18	
L2C	.875	2.125	.300	22.2	53.9	7.62	.040	#18	
L2L	.875	2.625	.300	22.2	66.7	7.62	.040	#18	
L3C	.875	3.125	.300	22.2	79.4	7.62	.040	#18	
L3L	.875	3.625	.300	22.2	92.1	7.62	.040	#18	
N1C	1.000	1.125	.400	25.4	28.6	10.16	.040	#18	
N1L	1.000	1.625	.400	25.4	41.3	10.16	.040	#18	
N2C	1.000	2.125	.400	25.4	53.9	10.16	.040	#18	
N2L	1.000	2.625	.400	25.4	66.7	10.16	.040	#18	
N3C	1.000	3.125	.400	25.4	79.4	10.16	.040	#18	
N3L	1.000	3.625	.400	25.4	92.1	10.16	.040	#18	

## Outline Dimensions



# Type VPR Radial Leaded Capacitors

**MALLORY**

Cap. μF	Max ESR (ohms) @ 10kHz	Max Ripple RMS Amps @ 10kHz +85°C	Size (Inches)			Catalog Number
			D x L	S	d	

6.3 WVDC; 8 VDC Surge						
5,600	.034	3.767	1.000 x 1.625	.400	.040	VPR562U6R3N1L
8,800	.023	5.131	1.000 x 2.125	.400	.040	VPR882U6R3N2C
12,000	.018	6.364	1.000 x 2.625	.400	.040	VPR123U6R3N2L

7.5 WVDC; 10 VDC Surge						
780	.117	1.450	.512 x 1.024	.200	.023	VPR781U7R5E1A
2,600	.037	2.862	.750 x 1.625	.250	.040	VPR262U7R5J1L
4,900	.031	3.820	1.000 x 1.625	.400	.040	VPR492U7R5N1L

10 WVDC; 13 VDC Surge						
4,200	.032	3.702	1.000 x 1.625	.400	.040	VPR422U010N1L

12 WVDC; 18 VDC Surge						
1,200	.055	2.640	.512 x 1.654	.200	.023	VPR122U012E1L
1,800	.044	2.519	.750 x 1.625	.250	.040	VPR182U012J1L
5,600	.021	4.932	1.000 x 2.125	.400	.040	VPR562U012N2C

16 WVDC; 20 VDC Surge						
1,600	.044	2.465	.750 x 1.625	.250	.040	VPR162U016J1L
2,300	.040	2.863	.875 x 1.625	.300	.040	VPR232U016L1L
3,200	.029	3.637	1.000 x 1.625	.300	.040	VPR322U016N1L
3,700	.026	3.981	.875 x 2.125	.400	.040	VPR372U016L2C
5,000	.020	4.887	1.000 x 2.125	.400	.040	VPR502U016N2C
6,900	.017	6.105	1.000 x 2.625	.400	.040	VPR692U016N2L
10,000	.012	8.033	1.000 x 3.625	.400	.040	VPR103U016N3L

25 WVDC; 30 VDC Surge						
940	.037	2.404	.750 x 1.625	.250	.040	VPR941U025J1L
1,300	.035	2.729	.875 x 1.625	.300	.040	VPR132U025L1L
1,400	.026	3.230	.750 x 2.125	.250	.040	VPR142U025J2C
1,800	.035	3.006	1.000 x 1.625	.400	.040	VPR182U025N1L
2,800	.018	4.732	.875 x 2.625	.300	.040	VPR282U025L2L
2,800	.023	4.109	1.000 x 2.125	.400	.040	VPR282U025N2C
3,900	.018	5.191	1.000 x 2.625	.400	.040	VPR392U025N2L
5,900	.014	6.616	1.000 x 3.125	.400	.040	VPR492U025N3C

Cap. μF	Max ESR (ohms) @ 10kHz	Max Ripple RMS Amps @ 10kHz +85°C	Size (Inches)			Catalog Number
			D x L	S	d	

40 WVDC; 50 VDC Surge						
160	.171	1.200	.512 x 1.024	.200	.023	VPR161U040E1A
540	.044	1.925	.750 x 1.625	.250	.040	VPR541U040J1L
760	.040	2.194	.875 x 1.625	.300	.040	VPR761U040L1L
850	.029	2.683	.750 x 2.125	.250	.040	VPR861U040J2C
1,100	.018	3.695	.750 x 2.625	.250	.040	VPR112U040J2L
1,600	.021	3.755	1.000 x 2.125	.400	.040	VPR162U040N2C
2,200	.017	4.732	1.000 x 2.625	.400	.040	VPR222U040N2L
2,800	.014	5.651	1.000 x 3.125	.400	.040	VPR282U040N3C
3,300	.014	6.437	1.000 x 3.625	.400	.040	VPR332U040N3L

50 WVDC; 65 VDC Surge						
600	.049	1.964	.875 x 1.625	.300	.040	VPR601U050L1L
1,200	.028	3.297	1.000 x 2.125	.400	.040	VPR122U050N2C
2,400	.015	5.639	1.000 x 3.625	.400	.040	VPR242U050N3L

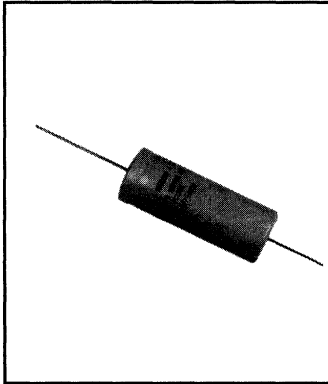
75 WVDC; 95 VDC Surge						
350	.063	2.047	.750 x 2.125	.250	.040	VPR351U075J2C
450	.102	1.779	1.000 x 1.625	.400	.040	VPR451U075N1L
680	.069	2.420	1.000 x 2.125	.400	.040	VPR681U075N2C
1,100	.044	3.577	1.000 x 3.125	.400	.040	VPR112U075N3C

100 WVDC; 125 VDC Surge						
130	.164	1.124	.750 x 1.625	.250	.040	VPR131U100J1L
190	.143	1.441	.750 x 2.125	.250	.040	VPR191U100J2C
250	.111	1.818	1.000 x 1.625	.400	.040	VPR251U100N1L

Aluminum Capacitors



# Type TC Axial Leaded Capacitors



- 85°C Industrial Grade
- Axial Leads for Low Profile Mounting
- Long Life
- High Reliability

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
16 WVDC to 450 WVDC

Capacitance Range:  
1  $\mu$ F to 5,000  $\mu$ F

Capacitance Tolerance:  
.625 diameter & larger:  
6 to 150 WVDC -10% +75%  
Over 150 WVDC -10% +50%  
Under .625 Dia.  $\pm$ 20%

DC Leakage Current:  
 $I = 6 \sqrt{CV}$  after 5 minutes  
Not to exceed 6 mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

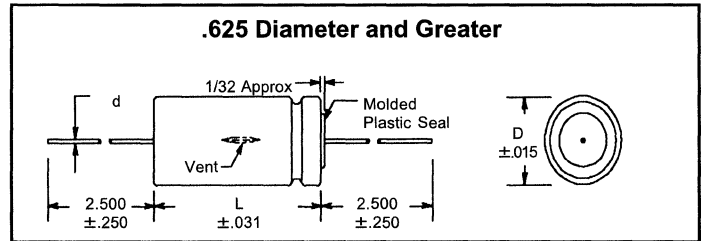
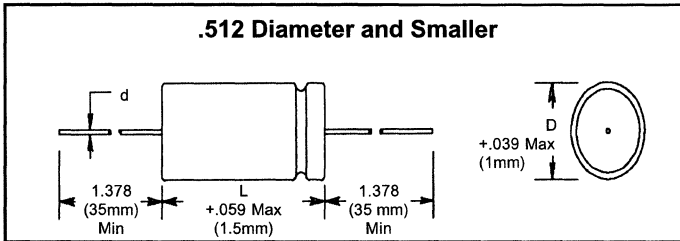
QA Stability Test:  
Apply WVDC for 1,000 hrs at 85°C

- Capacitance change  $\leq$ 15% from initial limits
- DC leakage current meets initial limits
- ESR  $\leq$ 150% of initial measured value

The maximum ripple current at 85°C and 120 Hz for TC capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers			
	60 Hz	400 Hz	1000 Hz	2400 Hz
0 to 50	0.8	1.05	1.10	1.14
51 to 150	0.8	1.08	1.13	1.16
151 & up	0.8	1.15	1.21	1.25

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C	2.0
+45°C	2.2



Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches) D x L d	Catalog Number
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Cap $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches) D x L d	Catalog Number
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**16 WVDC; 20 VDC Surge**

500	.56	.450	.394 x .826	.024	TC1505A
1,000	.28	.701	.394 x 1.181	.024	TC1501A
2,000	.16	.900	.512 x 1.259	.032	TC1520A
3,000	.11	2.066	.875 x 1.625	.040	TC1530
4,000	.08	2.518	.875 x 1.875	.040	TC1540
5,000	.07	3.217	.875 x 2.625	.040	TC1550

**50 WVDC; 65 VDC Surge**

100	1.66	.212	.315 x .787	.024	TC3501A
150	1.11	.320	.394 x .945	.024	TC50015A
250	.66	.400	.394 x .945	.024	TC50025A
500	.33	.680	.512 x .945	.032	TC50050A
1,000	.08	2.949	.875 x 2.625	.040	TC50100
1,500	.07	3.423	1.000 x 2.625	.040	TC50150
2,000	.07	3.448	1.000 x 2.625	.040	TC50200
3,000	.05	4.766	1.000 x 3.625	.040	TC50300
5,000	.03	5.820	1.000 x 3.625	.040	TC50500

**25 WVDC; 30 VDC Surge**

10	24.86	.040	.197 x .472	.024	TC22A
25	9.95	.060	.236 x .472	.024	TC26A
50	4.97	.100	.197 x .630	.024	TC29A
100	2.49	.158	.315 x .630	.024	TC2501A
150	1.66	.230	.315 x .630	.024	TC25015A
250	1.00	.320	.315 x .787	.024	TC25025A
500	.50	.550	.394 x .945	.024	TC2505A
1,000	.25	.796	.512 x .945	.032	TC2510A
1,500	.14	1.881	.750 x 2.125	.040	TC2515
2,000	.11	2.204	.875 x 1.875	.040	TC2520
3,000	.07	3.108	.875 x 2.625	.040	TC2530
4,000	.06	3.779	1.000 x 2.625	.040	TC2540
5,000	.05	4.136	1.000 x 2.625	.040	TC2550

**75 WVDC; 95 VDC Surge**

100	.77	.597	.625 x 1.375	.032	TC75101
250	.37	1.024	.750 x 1.625	.040	TC75251
500	.19	1.765	.875 x 2.125	.040	TC75501
1,000	.10	2.344	1.000 x 1.625	.040	TC75102
2,000	.05	3.991	1.000 x 2.625	.040	TC75202

**50 WVDC; 65 VDC Surge**

1	165.80	.012	.197 x .472	.024	TC31A
10	16.58	.035	.236 x .472	.024	TC32A
25	6.63	.080	.236 x .630	.024	TC36A
50	3.32	.140	.315 x .630	.024	TC39A

**100 WVDC; 125 VDC Surge**

1	132.60	.012	.197 x .472	.024	TC10010A
10	13.26	.068	.394 x .630	.024	TC10100A
100	.36	.974	.750 x 1.375	.040	TC10101
150	.24	1.276	.750 x 1.625	.040	TC10151
250	.15	1.885	.875 x 1.875	.040	TC10251
500	.08	3.251	1.000 x 2.625	.040	TC10501
1,000	.08	3.918	1.000 x 3.875	.040	TC10102
1,500	.06	4.495	1.000 x 3.625	.040	TC10152

Aluminum Capacitors

# Type TC Axial Leaded Capacitors



Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches)			Catalog Number
			D	x L	d	

Cap μF	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches)			Catalog Number
			D	x L	d	

150 WVDC; 175 VDC Surge						
1	133.00	.024	.500	x 1.125	.032	TC56
5	26.52	.040	.315	x .787	.024	TC40A
10	13.26	.067	.315	x .787	.024	TC42A
12	13.82	.070	.315	x .787	.024	TC43A
20	8.29	.115	.394	x .945	.024	TC45A
50	3.32	.235	.512	x 1.259	.032	TC49A
80	1.96	.670	.750	x 1.625	.040	TC492
100	.70	.748	.750	x 1.625	.040	TC493
150	.47	.993	.875	x 1.625	.040	TC495
200	.35	1.293	.875	x 2.125	.040	TC496
300	.24	1.687	1.000	x 2.125	.040	TC499
500	.15	2.362	1.000	x 2.625	.040	TC4990

350 WVDC; 400 VDC Surge						
2	62.02	.086	.500	x 1.125	.032	TC595
5	30.48	.139	.625	x 1.125	.032	TC60
8	19.05	.193	.625	x 1.375	.032	TC61
10	15.25	.215	.625	x 1.375	.032	TC62
12	12.71	.239	.750	x 1.125	.040	TC63
16	9.54	.302	.750	x 1.375	.040	TC64
20	7.63	.337	.750	x 1.375	.040	TC65
40	3.96	.514	.875	x 1.625	.040	TC67
60	2.78	.691	.875	x 2.125	.040	TC68
100	1.35	1.093	.875	x 2.625	.040	TC69
150	.96	1.495	1.000	x 3.625	.040	TC692

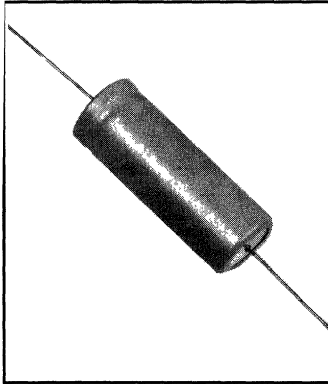
250 WVDC; 300 VDC Surge						
5	66.30	.045	.315	x .787	.024	TC50X
8	15.27	.197	.625	x 1.125	.032	TC51
10	12.22	.220	.625	x 1.125	.032	TC52
12	8.65	.262	.625	x 1.125	.032	TC53
16	7.64	.304	.625	x 1.375	.032	TC54
20	6.13	.345	.750	x 1.125	.040	TC55
30	4.09	.461	.750	x 1.375	.040	TC57
40	2.69	.573	.750	x 1.625	.040	TC58
50	2.15	.640	.750	x 1.625	.040	TC59
100	1.08	1.220	.875	x 2.625	.040	TC1265
160	.30	1.649	1.000	x 2.625	.040	TC1266
225	.22	2.105	1.000	x 3.125	.040	TC1267

450 WVDC; 525 VDC Surge						
1	170.09	.048	.500	x 1.125	.032	TC6942
2	86.91	.082	.625	x 1.125	.032	TC695
4	43.47	.116	.625	x 1.125	.032	TC697
5	35.86	.144	.750	x 1.125	.040	TC70
8	21.74	.183	.750	x 1.125	.040	TC71
10	17.39	.243	.875	x 1.375	.040	TC72
12	14.50	.267	.875	x 1.375	.040	TC73
16	10.88	.304	.750	x 1.625	.040	TC74
20	8.71	.371	.875	x 1.625	.040	TC75
30	5.82	.488	1.000	x 1.625	.040	TC77
40	4.36	.653	1.000	x 2.125	.040	TC78
50	3.06	.709	1.000	x 2.125	.040	TC79
60	2.55	.855	1.000	x 2.625	.040	TC795
80	2.19	1.068	1.000	x 3.125	.040	TC80
100	1.97	1.178	1.000	x 3.125	.040	TC807

300 WVDC; 350 VDC Surge						
150	.36	1.624	1.000	x 3.125	.040	TC593
200	.28	1.865	1.000	x 3.125	.040	TC594

# Type TCG Axial Leaded Capacitors

**MALORY**



- 85°C Industrial Grade
- Axial Leads for Low Profile Mounting
- Long Life
- High Reliability

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C

Voltage Range:  
10 WVDC to 450 WVDC

Capacitance Range:  
10  $\mu$ F to 10,000  $\mu$ F

Capacitance Tolerance:  
.625 diameter & larger:  
10 to 150 WVDC -10% +75%  
Over 150 WVDC -10% +50%  
Under .625 diameter  $\pm$  20%

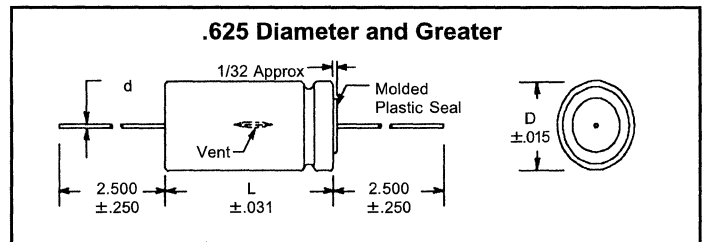
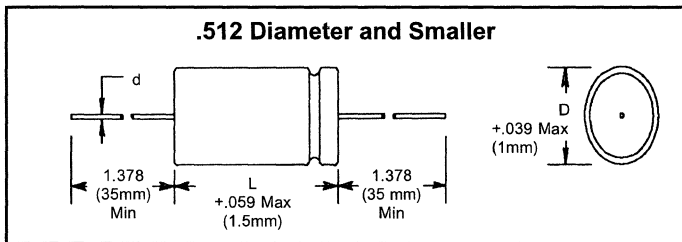
DC Leakage Current:  
 $I = 6 \sqrt{CV}$  after 5 minutes  
Not to exceed 3mA  
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 1,000 hrs at 85°C  
Capacitance change  $\leq$  15%  
from initial limits.  
DC leakage current meets  
initial limits.  
ESR  $\leq$  150% of initial  
measured value.

The maximum ripple current at 85°C and 120 Hz for TCG capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers			
	60 Hz	400 Hz	1000 Hz	2400 Hz
0 to 50	0.8	1.05	1.10	1.14
51 to 150	0.8	1.08	1.13	1.16
151 & up	0.8	1.15	1.21	1.25

Ambient Temperature	Ripple Multiplier
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C	2.0
+45°C	2.2



Cap. $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple $\mu$ A 120Hz 85°C	Size (Inches) D x L	d	Catalog Number
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Cap. $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple $\mu$ A 120Hz 85°C	Size (Inches) D x L	d	Catalog Number
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**10 WVDC; 12 VDC Surge**

1,000	.295	.585	.394 x .827	.024	TCG102M010D1A
2,500	.170	1.407	.875 x 1.125	.040	TCG252U010L1C
2,500	.171	1.521	1.000 x 1.125	.040	TCG252U010N1C
3,500	.092	2.424	1.000 x 1.625	.040	TCG352U010N1E
5,000	.088	2.488	1.000 x 1.375	.040	TCG502U010N1G
5,500	.081	2.584	1.000 x 1.625	.040	TCG552U010N1L
10,000	.046	4.274	.875 x 3.125	.040	TCG103U010L3C
10,000	.048	3.772	1.000 x 2.125	.040	TCG103U010N2C

**30 WVDC; 40 VDC Surge**

500	.369	.874	.750 x 1.125	.040	TCG501U030J1C
1,100	.169	1.721	.625 x 2.625	.032	TCG112U030G2L
2,100	.072	3.159	.875 x 2.625	.040	TCG212U030L2L
2,400	.082	2.961	.875 x 2.625	.040	TCG242U030L2L
2,500	.078	3.005	1.000 x 2.625	.040	TCG252U030N2L
3,000	.065	3.004	.875 x 2.125	.040	TCG302U030L2C

**15 WVDC; 20 VDC Surge**

1,200	.221	.855	.394 x 1.181	.024	TCG122M015D1D
2,500	.126	1.989	.625 x 2.625	.032	TCG252U015G2L
2,900	.110	2.134	.625 x 2.625	.032	TCG292U015G2L
4,000	.085	2.518	1.000 x 1.625	.040	TCG402U015N1L
4,100	.083	2.544	1.000 x 1.625	.040	TCG412U015N1L
5,000	.067	3.015	.750 x 2.625	.040	TCG502U015J2L
6,300	.055	3.612	.875 x 2.625	.040	TCG632U015L2L
8,000	.045	4.269	1.000 x 2.625	.040	TCG802U015N2L
8,200	.044	4.310	1.000 x 2.625	.040	TCG822U015N2L
10,000	.038	4.634	1.000 x 2.625	.040	TCG103U015N2L

**50 WVDC; 65 VDC Surge**

100	1.474	.212	.512 x 1.375	.024	TCG101U050E1G
250	.499	.742	.625 x 1.375	.032	TCG251U050G1G
500	.156	1.788	.625 x 2.625	.032	TCG501U050G2L
500	.262	1.227	1.000 x 1.125	.040	TCG501U050N1C
600	.211	1.539	.625 x 2.625	.032	TCG601U050G2L
600	.215	1.363	.875 x 1.375	.040	TCG601U050L1G
1,100	1.050	2.480	1.000 x 1.375	.040	TCG112U050N1G
1,100	.094	2.698	1.000 x 2.125	.040	TCG112U050N2C
1,200	.110	2.313	.875 x 2.125	.040	TCG122U050L2C
2,300	.062	3.653	1.000 x 2.625	.040	TCG232U050N2L
2,500	.058	3.777	1.000 x 2.625	.040	TCG252U050N2L

**25 WVDC; 30 VDC Surge**

1,000	.216	1.352	1.000 x 1.125	.040	TCG102U025N1C
1,100	.190	1.431	.750 x 1.625	.040	TCG112U025J1L
2,000	.154	2.137	1.000 x 1.625	.040	TCG202U025N1L
2,200	.098	2.487	.750 x 2.625	.040	TCG222U025J2L
4,000	.057	3.827	.875 x 3.125	.040	TCG402U025L3C

**150 WVDC; 175 VDC Surge**

50	2.941	.382	.512 x 1.260	.032	TCG500M150E1E
100	.696	.748	.750 x 1.625	.040	TCG101T150J1L
110	.634	.784	.750 x 1.625	.040	TCG111T150J1L
250	.284	1.439	.875 x 2.125	.040	TCG251T150L2C
530	.139	2.639	1.000 x 3.125	.040	TCG531T150N3C
560	.133	2.705	1.000 x 3.125	.040	TCG561T150N3C

Aluminum Capacitors

# Type TCG Axial Leaded Capacitors



Cap. $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple $\mu$ A 120Hz 85°C	Size (Inches)		Catalog Number
			D x L	d	

200 WVDC; 250 VDC Surge					
210	.646	1.780	1.000 X 2.125	.040	TCG211T200N2C
300	.517	1.977	1.000 X 2.125	.040	TCG301T200N2C
430	.411	2.116	1.000 X 3.625	.040	TCG431U200N3L

250 WVDC; 300 VDC Surge					
20	15.186	.101	.512 x 2.125	.032	TCG200T250E2C
50	2.450	.607	.875 x 1.375	.040	TCG500T250L1G
100	1.230	1.039	.875 x 2.125	.040	TCG101T250L2C
200	.277	1.726	1.000 x 2.625	.040	TCG201T250N2L

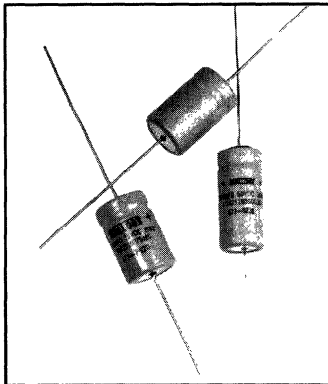
350 WVDC; 400 VDC Surge					
20	9.500	.294	.625 x 1.625	.032	TCG200T350G1L
20	9.520	.276	.750 x 1.125	.040	TCG200T350J1C
30	6.336	.408	.625 x 2.125	.032	TCG300T350G2C
30	6.368	.369	.875 x 1.125	.040	TCG300T350L1C
40	4.200	.460	1.000 x 1.125	.040	TCG400T350N1C
50	3.353	.560	1.000 x 1.375	.040	TCG500T350N1G
100	1.680	.957	1.000 x 2.125	.040	TCG101T350N2C
160	.469	1.327	1.000 x 2.625	.040	TCG161T350N2L
180	.417	1.524	1.000 x 3.125	.040	TCG181T350N3C

Cap. $\mu$ F	Max ESR Ohms 120Hz 25°C	Max Ripple $\mu$ A 120Hz 85°C	Size (Inches)		Catalog Number
			D x L	d	

450 WVDC; 525 VDC Surge					
10	17.392	.217	.625 x 1.625	.032	TCG100T450G1L
10	17.404	.204	.750 x 1.125	.040	TCG100T450J1C
12	14.500	.244	.750 x 1.375	.040	TCG120T450J1G
20	8.704	.384	.625 x 2.625	.032	TCG200T450G2L
20	8.732	.341	1.000 x 1.125	.040	TCG200T450N1C
50	4.742	.709	1.000 x 1.625	.040	TCG500T450N1L
50	4.049	.548	1.000 x 2.125	.040	TCG500T450N2C
60	3.950	.890	1.000 X 2.625	.040	TCG600T450N2L
75	1.980	.944	1.000 X 2.125	.040	TCG750T450N2C
85	1.869	.998	1.000 x 2.625	.040	TCG850T450N2L

Aluminum Capacitors

# Type TCX Axial Leaded Capacitors



- 105°C Industrial Grade
- Axial Leads for Low Profile Mounting
- Very High Ripple Current
- Long Life
- High Reliability

## GENERAL SPECIFICATIONS

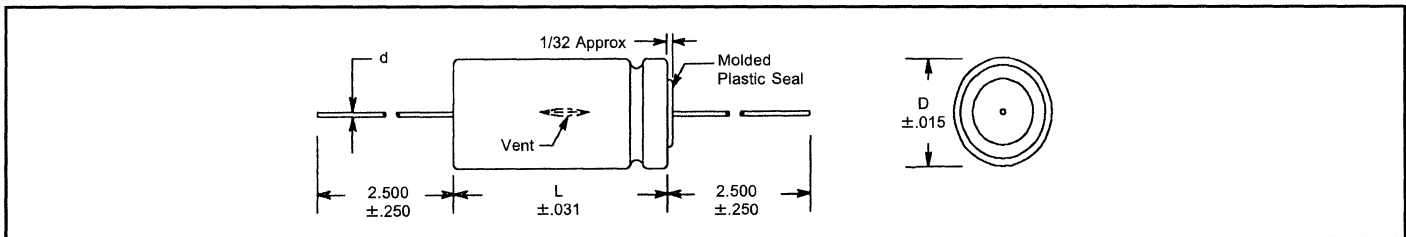
Operating Temperature:  
-55°C to +105°C  
Voltage Range:  
10 WVDC to 150 WVDC  
Capacitance Range:  
27 μF to 12,000 μF  
Capacitance Tolerance:  
10 to 75 WVDC -10% +75%  
100 WVDC & up -10% +50%

DC Leakage Current:  
 $I = .002 \sqrt{CV}$  after 5 minutes  
C = Capacitance in μF  
V = Rated Voltage  
I = Leakage Current in mA  
QA Stability Test:  
Apply WVDC for 2,000 hrs at 85°C  
Capacitance change ≤15%  
from initial limits  
DC leakage current meets  
initial limits  
ESR ≤125% of initial  
measured value

The maximum ripple current at 85°C and 120 Hz for TCX capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers			
	60 Hz	400 Hz	1000 Hz	2400 Hz
0 to 150	0.8	1.05	1.10	1.14

Ambient Temperature	Ripple Multiplier
+95°C	0.7
+85°C	1.0
+75°C	1.2
+65°C	1.4
+55°C	1.58
+45°C	1.7



Cap. μF	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches)		Catalog Number
			D x L	d	

10 WVDC; 12 VDC Surge					
10,000	.024	5.952	.875 x 3.125	.040	TCX103U010L3C

15 WVDC; 20 VDC Surge					
1,000	.145	1.394	.750 x 1.125	.040	TCX102U015J1C
2,100	.071	2.337	.750 x 1.625	.040	TCX212U015J1L
8,200	.025	5.796	1.000 x 2.625	.040	TCX822U015N2L
12,000	.019	7.589	1.000 x 3.625	.040	TCX123U015N3L

25 WVDC; 30 VDC Surge					
560	.207	1.249	.500 x 2.125	.032	TCX561U025E2C
1,200	.109	1.899	1.000 x 1.125	.040	TCX122U025N1C
1,800	.071	2.557	.875 x 1.625	.040	TCX182U025L1L
2,400	.057	3.081	1.000 x 1.625	.040	TCX242U025N1L
3,700	.037	4.370	.875 x 2.625	.040	TCX372U025L2L
7,200	.023	6.882	1.000 x 3.625	.040	TCX722U025N3L

30 WVDC; 40 VDC Surge					
310	.316	.852	.625 x 1.125	.032	TCX311U030G1C
470	.214	1.149	.750 x 1.125	.040	TCX471U030J1C
1,400	.075	2.583	.750 x 2.125	.040	TCX142U030J2C
2,700	.043	4.091	.875 x 2.625	.040	TCX272U030L2L
3,000	.039	4.643	.875 x 3.125	.040	TCX302U030L3C

40 WVDC; 50 VDC Surge					
360	.230	1.107	.750 x 1.125	.040	TCX361U040J1C
1,000	.088	2.290	.875 x 1.625	.040	TCX102U040L1L
1,400	.063	3.107	.750 x 2.625	.040	TCX142U040J2L

Cap. μF	Max ESR Ohms 120Hz 25°C	Max Ripple Amps 120Hz 85°C	Size (Inches)		Catalog Number
			D x L	d	

40 WVDC; 50 VDC Surge					
2,100	.045	3.975	.875 x 2.625	.040	TCX212U040L2L
4,200	.028	6.361	1.000 x 3.625	.040	TCX422U040N3L

50 WVDC; 65 VDC Surge					
110	.686	.560	.500 x 1.375	.032	TCX111U050E1G
250	.306	.947	.625 x 1.375	.032	TCX251U050G1G
370	.216	1.250	.875 x 1.125	.040	TCX371U050L1C
500	.155	1.624	.625 x 2.125	.032	TCX501U050G2C
710	.118	1.989	1.000 x 1.375	.040	TCX711U050N1G
950	.089	2.456	1.000 x 1.625	.040	TCX951U050N1L
1,400	.061	3.436	.875 x 2.625	.040	TCX142U050L2L
1,900	.047	4.170	1.000 x 2.625	.040	TCX192U050N2L
2,800	.035	5.655	1.000 x 3.625	.040	TCX282U050N3L

75 WVDC; 95 VDC Surge					
65	2.961	.419	.625 x 1.125	.032	TCX650U075G1C
100	1.932	.574	.750 x 1.125	.040	TCX101U075J1C
560	.115	2.491	.875 x 2.625	.040	TCX561U075L2L
740	.090	3.033	1.000 x 2.625	.040	TCX741U075N2L
1,100	.084	3.633	1.000 x 3.625	.040	TCX112U075N3L

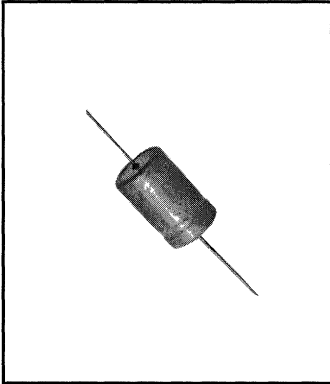
100 WVDC; 125 VDC Surge					
110	.404	.996	.875 x 1.375	.040	TCX111T100L1G
150	.297	1.248	.875 x 1.625	.040	TCX151T100L1L

150 WVDC; 175 VDC Surge					
27	5.720	.322	.625 x 1.125	.032	TCX270T150G1C
150	.404	1.225	.750 x 2.625	.040	TCX151T150J2L

Aluminum Capacitors

# Type TA Axial Leaded Capacitors

**MALLORY**



- 85°C General Purpose
- Decade Ratings
- Axial Leads for Low Profile Mounting
- Long Life
- High Reliability

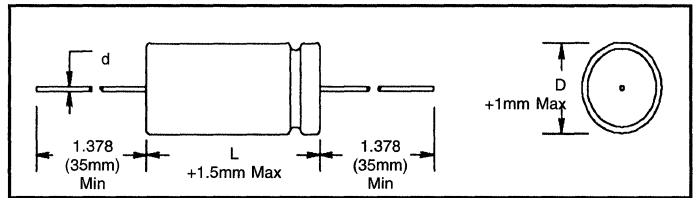
## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +85°C  
Voltage Range:  
6.3 WVDC to 450 WVDC  
Capacitance Range:  
.10 µF to 10,000 µF  
Capacitance Tolerance:  
± 20%  
Other tolerances available

DC Leakage Current:  
I = .01 CV Maximum  
C = Capacitance in µF  
V = Rated Voltage  
I = Leakage Current in mA  
QA Stability Test:  
Apply WVDC for 2,000 hrs at 85°C  
Capacitance change ≤20%  
from initial limits  
DC leakage current meets  
initial limits  
ESR ≤150% of initial  
measured value

The maximum ripple current at 85°C and 120 Hz for TA capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers				
	60 Hz	120 Hz	400 Hz	1000 Hz	10kHz up
105°C	0.4	0.5	0.55	0.67	0.75
85°C	0.8	1.0	1.1	1.35	1.5
75°C	1.1	1.4	1.55	1.9	2.1
65°C	1.2	1.6	1.75	2.1	2.4
45°C	1.5	1.9	2.1	2.5	2.8
25°C	1.8	2.25	2.5	3.0	3.3



Cap µF	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	L	d	D	L	d	

Cap µF	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	L	d	D	L	d	

### 6.3 WVDC; 8 VDC Surge

470	.78	282	.315 x .787	.024	8 x 20	.6	TA470M6
2200	.18	815	.512 x .945	.031	13 x 24	.8	TA2200M6
4700	.10	1308	.512 x 1.417	.031	13 x 32	.8	TA4700M6
6800	.08	1786	.630 x 1.575	.031	16 x 32	.8	TA6800M6
10000	.06	2138	.630 x 2.008	.031	16 x 40	.8	TA10000M6

### 40 WVDC; 50 VDC Surge

4.7	31.35	26	.197 x .472	.024	5 x 12	.6	TA4.7M40
10	14.74	29	.236 x .472	.024	6 x 12	.6	TA10M40
22	8.04	61	.236 x .472	.024	6 x 12	.6	TA22M40
220	.80	332	.394 x .827	.024	10 x 21	.6	TA220M40
470	.38	570	.394 x 1.024	.024	10 x 26	.6	TA470M40
680	.26	802	.512 x 1.024	.031	13 x 26	.8	TA680M40
1000	.18	1115	.512 x 1.260	.031	13 x 32	.8	TA1000M40
2200	.09	1651	.630 x 1.575	.031	16 x 40	.8	TA2200M40

### 10 WVDC; 13 VDC Surge

68	4.33	83	.236 x .472	.024	6 x 12	.6	TA68M10
100	2.95	101	.236 x .472	.024	6 x 12	.6	TA100M10
1000	.29	604	.315 x .787	.024	8 x 20	.6	TA1000M10
2200	.15	999	.512 x .945	.031	13 x 24	.8	TA2200M10
10000	.06	2302	.709 x 1.575	.031	18 x 40	.8	TA10000M10

### 63 WVDC; 80 VDC Surge

2.2	53.59	21	.197 x .472	.024	5 x 12	.6	TA2.2M63
4.7	31.35	26	.197 x .472	.024	5 x 12	.6	TA4.7M63
10	14.74	45	.236 x .472	.024	6 x 12	.6	TA10M63
33	4.47	99	.315 x .630	.024	8 x 16	.6	TA33M63
47	3.14	141	.315 x .630	.024	8 x 16	.6	TA47M63
68	2.17	183	.394 x .827	.024	10 x 21	.6	TA68M63
100	1.47	245	.394 x .827	.024	10 x 21	.6	TA100M63
220	.67	527	.394 x 1.024	.024	10 x 26	.6	TA220M63
470	.31	765	.512 x 1.260	.031	13 x 32	.8	TA470M63
680	.22	1007	.512 x 1.417	.031	13 x 36	.8	TA680M63
1000	.15	1318	.630 x 1.575	.031	16 x 40	.8	TA1000M63
2200	.08	2000	.866 x 1.575	.031	22 x 40	.8	TA2200M63

### 16 WVDC; 20 VDC Surge

22	10.05	45	.197 x .472	.024	5 x 12	.6	TA22M16
47	5.33	75	.236 x .472	.024	6 x 12	.6	TA47M16
100	2.51	133	.236 x .630	.024	6 x 16	.6	TA100M16
220	1.14	234	.315 x .630	.024	8 x 16	.6	TA220M16
470	.53	408	.315 x .787	.024	8 x 20	.6	TA470M16
680	.37	476	.394 x .827	.024	10 x 21	.6	TA680M16
1000	.25	698	.394 x .945	.024	10 x 24	.6	TA1000M16
2200	.13	1202	.512 x 1.260	.031	13 x 32	.8	TA2200M16
4700	.08	1826	.630 x 1.260	.031	16 x 32	.8	TA4700M16
6800	.06	2640	.630 x 1.575	.031	16 x 40	.8	TA6800M16

### 100 WVDC; 125 VDC Surge

.1	1179.00	1	.197 x .472	.024	5 x 12	.6	TA.1M100
.22	535.90	3	.197 x .472	.024	5 x 12	.6	TA.22M100
.33	357.30	4	.197 x .472	.024	5 x 12	.6	TA.33M100
.47	250.80	5	.197 x .472	.024	5 x 12	.6	TA.47M100
.68	173.40	9	.197 x .472	.024	5 x 12	.6	TA.68M100
1	117.90	12	.197 x .472	.024	5 x 12	.6	TA1M100
2.2	53.59	21	.197 x .472	.024	5 x 12	.6	TA2.2M100
4.7	25.08	34	.236 x .472	.024	6 x 12	.6	TA4.7M100
6.8	17.34	47	.236 x .630	.024	6 x 16	.6	TA6.8M100
10	11.79	68	.236 x .630	.024	6 x 16	.6	TA10M100
22	5.36	111	.315 x .787	.024	8 x 20	.6	TA22M100
47	2.51	189	.315 x .787	.024	8 x 20	.6	TA47M100
68	1.73	241	.394 x .827	.024	10 x 21	.6	TA68M100
100	1.18	323	.394 x 1.024	.031	10 x 26	.8	TA100M100
220	.54	602	.512 x 1.260	.031	13 x 32	.8	TA220M100

### 25 WVDC; 32 VDC Surge

10	14.74	29	.197 x .472	.024	5 x 12	.6	TA10M25
22	10.05	45	.197 x .472	.024	5 x 12	.6	TA22M25
47	4.70	75	.236 x .630	.024	6 x 16	.6	TA47M25
68	3.25	102	.236 x .630	.024	6 x 16	.6	TA68M25
100	2.21	142	.315 x .630	.024	8 x 16	.6	TA100M25
330	.67	364	.394 x .827	.024	10 x 21	.6	TA330M25
680	.33	613	.394 x 1.181	.024	10 x 30	.6	TA680M25
1000	.22	827	.512 x 1.024	.031	13 x 26	.8	TA1000M25
2200	.11	1389	.512 x 1.260	.031	13 x 32	.8	TA2200M25
4700	.07	2132	.709 x 1.575	.031	18 x 40	.8	TA4700M25

# Type TA Axial Leaded Capacitors

**MALLORY**

Cap μF	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	x L	d	D	x L	d	

100 WVDC; 125 VDC Surge									
470	.25	1031	.630	x 1.575	.031	16	x 40	.8	TA470M100
680	.17	1495	.630	x 1.575	.031	16	x 40	.8	TA680M100
1000	.12	1447	.709	x 1.575	.031	18	x 40	.8	TA1000M100

160 WVDC; 185 VDC Surge									
1	147.50	15	.236	x .472	.024	6	x 12	.6	TA1M160
2.2	66.98	24	.236	x .630	.024	6	x 16	.6	TA2.2M160
3.3	44.66	35	.236	x .630	.024	6	x 16	.6	TA3.3M160
4.7	31.35	46	.236	x .630	.024	6	x 16	.6	TA4.7M160
10	14.74	67	.315	x .787	.024	8	x 20	.6	TA10M160
22	6.69	122	.394	x .827	.024	10	x 21	.6	TA22M160
33	4.47	166	.394	x 1.024	.024	10	x 26	.6	TA33M160
47	3.13	235	.512	x 1.024	.031	13	x 26	.8	TA47M160
100	1.47	388	.630	x 1.024	.031	16	x 26	.8	TA100M160
220	.67	760	.709	x 1.575	.031	18	x 40	.8	TA220M160
330	.45	1115	.866	x 1.575	.031	22	x 40	.8	TA330M160

200 WVDC; 250 VDC Surge									
1	221.00	16	.236	x .472	.024	6	x 12	.6	TA1M200
2.2	100.50	29	.236	x .630	.024	6	x 16	.6	TA2.2M200
3.3	66.98	35	.315	x .630	.024	8	x 16	.6	TA3.3M200
4.7	47.03	46	.315	x .630	.024	8	x 16	.6	TA4.7M200
10	22.10	78	.394	x .827	.024	10	x 21	.6	TA10M200
22	10.05	136	.394	x 1.024	.024	10	x 26	.6	TA22M200
33	6.69	197	.512	x 1.024	.031	13	x 26	.8	TA33M200
47	4.70	235	.512	x 1.260	.031	13	x 32	.8	TA47M200
100	2.21	426	.630	x 1.260	.031	16	x 32	.8	TA100M200
220	1.01	843	.709	x 1.575	.031	18	x 40	.8	TA220M200

250 WVDC; 300 VDC Surge									
1	294.70	13	.236	x .630	.024	6	x 16	.6	TA1M250
2.2	134.50	23	.315	x .630	.024	8	x 16	.6	TA2.2M250
3.3	89.31	31	.315	x .630	.024	8	x 16	.6	TA3.3M250
4.7	62.71	37	.315	x .787	.024	8	x 20	.6	TA4.7M250
10	29.47	67	.394	x .827	.024	10	x 21	.6	TA10M250
22	13.40	118	.512	x 1.024	.031	13	x 26	.8	TA22M250
33	8.92	161	.512	x 1.260	.031	13	x 32	.8	TA33M250
47	6.27	211	.630	x 1.260	.031	16	x 32	.8	TA47M250
100	2.84	419	.630	x 1.575	.031	16	x 40	.8	TA100M250

Cap μF	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	x L	d	D	x L	d	

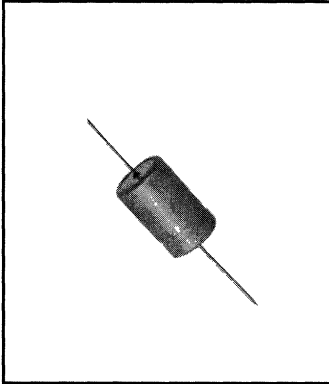
350 WVDC; 400 VDC Surge									
1	294.70	16	.236	x .630	.024	6	x 16	.6	TA1M350
2.2	134.00	25	.315	x .630	.024	8	x 16	.6	TA2.2M350
3.3	89.31	31	.315	x .787	.024	8	x 20	.6	TA3.3M350
4.7	62.71	44	.394	x .827	.024	10	x 21	.6	TA4.7M350
10	29.47	75	.512	x 1.024	.031	13	x 26	.8	TA10M350
22	13.40	139	.630	x 1.024	.031	16	x 26	.8	TA22M350
33	8.91	186	.630	x 1.260	.031	16	x 32	.8	TA33M350
47	6.27	238	.630	x 1.575	.031	16	x 40	.8	TA47M350

400 WVDC; 450 VDC Surge									
1	294.70	17	.315	x .630	.024	8	x 16	.6	TA1M400
2.2	134.00	25	.315	x .787	.024	8	x 20	.6	TA2.2M400
3.3	89.31	36	.394	x .827	.024	10	x 21	.6	TA3.3M400
4.7	62.71	46	.394	x .827	.024	10	x 21	.6	TA4.7M400
10	43.34	89	.512	x 1.024	.031	13	x 26	.8	TA10M400
22	13.40	151	.630	x 1.260	.031	16	x 32	.8	TA22M400
33	8.93	215	.630	x 1.575	.031	16	x 40	.8	TA33M400

450 WVDC; 500 VDC Surge									
1	294.70	17	.315	x .630	.024	8	x 16	.6	TA1M450
2.2	134.00	30	.394	x .827	.024	10	x 21	.6	TA2.2M450
3.3	89.31	39	.394	x .827	.024	10	x 21	.6	TA3.3M450
4.7	62.71	51	.394	x 1.024	.024	10	x 26	.6	TA4.7M450
10	29.47	89	.512	x 1.024	.031	13	x 26	.8	TA10M460
22	13.40	175	.630	x 1.260	.031	16	x 32	.8	TA22M450

Aluminum Capacitors

# Type TT Axial Leaded Capacitors



- 85°C General Purpose
- Axial Leads for Low Profile Mounting
- Long Life
- High Reliability

## GENERAL SPECIFICATIONS

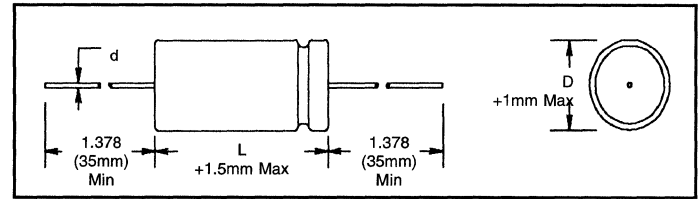
Operating Temperature:  
-40°C to +85°C  
Voltage Range:  
6 WVDC to 250 WVDC  
Capacitance Range:  
1.0 F to 2,400  $\mu$ F  
Capacitance Tolerance:  
 $\pm$ 20%  
Other tolerances available

DC Leakage Current:  
6 - 100 WVDC  
 $I = .01 V + 3 A \text{ max}$   
101 - 250 WVDC, CV < 1000  
 $I = .03 CV + 15 A \text{ max}$   
101 - 250 WVDC, CV > 1000  
 $I = .02 CV + 25 A \text{ max}$   
C = Capacitance in  $\mu$ F  
V = Rated Voltage  
I = Leakage Current in mA

QA Stability Test:  
Apply WVDC for 2,000 hrs at 85°C  
Capacitance change  $\leq$ 20%  
from initial limits  
DC leakage current meets  
initial limits  
ESR  $\leq$ 150% of initial  
measured value

The maximum ripple current at 85°C and 120 Hz for TT capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following table.

Temperature	Ripple Multipliers				
	60 Hz	120 Hz	400 Hz	1000 Hz	10 kHz up
105°C	0.4	0.5	0.55	0.67	0.75
85°C	0.8	1.0	1.1	1.35	1.5
75°C	1.1	1.4	1.55	1.9	2.1
65°C	1.2	1.6	1.75	2.1	2.4
45°C	1.5	1.9	2.1	2.5	2.8
25°C	1.8	2.25	2.5	3.0	3.3



Cap $\mu$ F	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	L	d	D	L	d	

Cap. $\mu$ F	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	L	d	D	L	d	

6 WVDC; 8 VDC Surge								
100	3.60	95	.236 x .472	.024	6 x 12	.6	TT6M100A	
150	2.46	142	.236 x .630	.024	6 x 16	.6	TT6M150A	
200	1.89	186	.315 x .630	.024	8 x 16	.6	TT6M200A	
250	1.52	216	.315 x .630	.024	8 x 16	.6	TT6M250A	
300	1.27	236	.315 x .630	.024	8 x 16	.6	TT6M300A	
560	.68	381	.394 x .827	.024	10 x 21	.6	TT6M560A	
1,000	.37	585	.394 x .945	.024	10 x 24	.6	TT6M1000A	

16 WVDC; 20 VDC Surge								
600	.43	480	.394 x .945	.024	10 x 24	.6	TT16M600A	
1,000	.25	701	.394 x 1.181	.024	10 x 30	.6	TT16M1000A	
1,500	.18	992	.512 x 1.260	.031	13 x 32	.8	TT16M1500A	

10 WVDC; 12 VDC Surge								
300	1.02	236	.315 x .630	.024	8 x 16	.6	TT10M300A	
400	.76	287	.315 x .787	.024	8 x 20	.6	TT10M400A	
600	.51	406	.394 x .827	.024	10 x 21	.6	TT10M600A	
1,500	.21	824	.512 x .945	.031	13 x 24	.8	TT10M1500A	
2,400	.14	1046	.512 x .945	.031	13 x 24	.8	TT10M2400A	

25 WVDC; 35 VDC Surge								
1	117.90	12	.197 x .472	.024	5 x 12	.6	TT25M1A	
2	68.33	18	.197 x .472	.024	5 x 12	.6	TT25M2A	
4	30.90	25	.197 x .472	.024	5 x 12	.6	TT25M4A	
5	29.96	25	.197 x .472	.024	5 x 12	.6	TT25M5A	
10	22.10	25	.197 x .472	.024	5 x 12	.6	TT25M10A	
15	14.74	36	.197 x .472	.024	5 x 12	.6	TT25M15A	
20	11.39	41	.236 x .472	.024	6 x 12	.6	TT25M20A	
25	9.14	56	.236 x .472	.024	6 x 12	.6	TT25M25A	
35	6.41	79	.236 x .630	.024	6 x 16	.6	TT25M35A	
50	4.50	94	.236 x .630	.024	6 x 16	.6	TT25M50A	
75	3.02	115	.236 x .630	.024	6 x 16	.6	TT25M75A	
100	2.21	158	.315 x .630	.024	8 x 16	.6	TT25M100A	
150	1.47	194	.315 x .630	.024	8 x 16	.6	TT25M150A	
200	1.14	239	.315 x .787	.024	8 x 20	.6	TT25M200A	
300	.76	337	.394 x .827	.024	10 x 21	.6	TT25M300A	
400	.57	414	.394 x .945	.024	10 x 24	.6	TT25M400A	
500	.45	484	.394 x .945	.024	10 x 24	.6	TT25M500A	
600	.38	557	.394 x 1.181	.024	10 x 30	.6	TT25M600A	
800	.29	682	.512 x .945	.031	13 x 24	.8	TT25M800A	

12 WVDC; 15 VDC Surge								
25	10.35	36	.197 x .472	.024	5 x 12	.6	TT12M25A	
50	5.10	73	.236 x .472	.024	6 x 12	.6	TT12M50A	
100	2.51	125	.236 x .630	.024	6 x 16	.6	TT12M100A	
250	1.04	241	.315 x .630	.024	8 x 16	.6	TT12M250A	
500	.51	426	.394 x .827	.024	10 x 21	.6	TT12M500A	
1,000	.25	701	.394 x 1.181	.024	10 x 30	.6	TT12M1000A	
2,000	.17	1118	.512 x 1.260	.024	13 x 32	.8	TT12M2000A	

50 WVDC; 65 VDC Surge								
1	117.90	12	.197 x .472	.024	5 x 12	.6	TT50M1A	
2	68.33	17	.197 x .472	.024	5 x 12	.6	TT50M2A	
4	33.71	23	.197 x .472	.024	5 x 12	.6	TT50M4A	
5	29.96	26	.197 x .472	.024	5 x 12	.6	TT50M5A	
10	14.74	35	.236 x .472	.024	6 x 12	.6	TT50M10A	
15	9.82	63	.236 x .630	.024	6 x 16	.6	TT50M15A	
20	7.59	73	.236 x .630	.024	6 x 16	.6	TT50M20A	
25	6.09	85	.236 x .630	.024	6 x 16	.6	TT50M25A	
35	4.28	114	.315 x .630	.024	8 x 16	.6	TT50M35A	
50	3.00	139	.315 x .630	.024	8 x 16	.6	TT50M50A	
75	2.02	183	.315 x .787	.024	8 x 20	.6	TT50M75A	
100	1.47	212	.315 x .787	.024	8 x 20	.6	TT50M100A	
150	.98	320	.394 x .945	.024	10 x 24	.6	TT50M150A	
200	.76	368	.394 x .945	.024	10 x 24	.6	TT50M200A	

16 WVDC; 20 VDC Surge								
2	68.33	18	.197 x .472	.024	5 x 12	.6	TT16M2A	
4	30.09	26	.197 x .472	.024	5 x 12	.6	TT16M4A	
5	29.96	26	.197 x .472	.024	5 x 12	.6	TT16M5A	
10	22.10	25	.197 x .472	.024	5 x 12	.6	TT16M10A	
15	14.74	36	.197 x .472	.024	5 x 12	.6	TT16M15A	
20	11.39	33	.197 x .472	.024	5 x 12	.6	TT16M20A	
25	1.35	36	.197 x .472	.024	5 x 12	.6	TT16M25A	
50	5.10	74	.236 x .472	.024	6 x 12	.6	TT16M50A	
100	2.51	125	.236 x .630	.024	6 x 16	.6	TT16M100A	
150	1.67	182	.315 x .630	.024	8 x 16	.6	TT16M150A	
200	1.29	209	.315 x .630	.024	8 x 16	.6	TT16M200A	
260	1.00	248	.315 x .630	.024	8 x 16	.6	TT16M260A	
350	.73	312	.315 x .787	.024	8 x 20	.6	TT16M350A	
500	.51	426	.394 x .827	.024	10 x 21	.6	TT16M500A	

Aluminum Capacitors



# Type TT Axial Leaded Capacitors



Cap $\mu$ F	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	x	L	d	D	x	

Cap $\mu$ F	Max ESR Ohms 120Hz 20°C	Max Ripple mA 120Hz 85°C	Size (Inches)			Size (mm)			Catalog Number
			D	x	L	d	D	x	

50 WVDC; 65 VDC Surge											
250	.61	425	.394	x	.945	.024	10	x	24	.6	TT50M250A
300	.51	475	.394	x	1.181	.024	10	x	30	.6	TT50M300A
350	.43	482	.394	x	1.181	.024	10	x	30	.6	TT50M350A
400	.38	501	.512	x	.945	.031	13	x	24	.8	TT50M400A
450	.33	550	.512	x	.945	.031	13	x	24	.8	TT50M450A

200 WVDC; 250 VDC Surge											
1	221.00	16	.236	x	.630	.024	6	x	16	.6	TT200M1A
2	113.90	27	.315	x	.630	.024	8	x	16	.6	TT200M2A

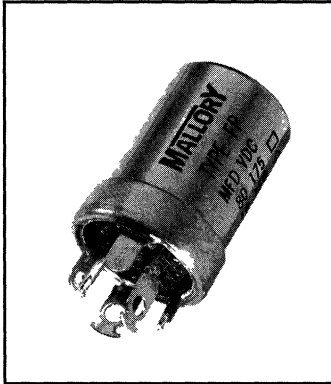
100 WVDC; 120 VDC Surge											
10	11.79	68	.315	x	.630	.024	8	x	16	.6	TT100M10A
20	6.07	103	.315	x	.787	.024	8	x	20	.6	TT100M20A
50	2.40	196	.394	x	.827	.024	10	x	21	.6	TT100M50A

250 WVDC; 300 VDC Surge											
2	152.22	22	.315	x	.630	.024	8	x	16	.6	TT250M2A
4	76.01	35	.394	x	.945	.024	10	x	24	.6	TT250M4A
10	29.57	67	.394	x	.945	.024	10	x	24	.6	TT250M10A
20	15.19	110	.512	x	.945	.031	13	x	24	.6	TT250M20A

150 WVDC; 175 VDC Surge											
1	147.40	15	.236	x	.551	.024	6	x	14	.6	TT150M1A
5	29.97	47	.315	x	.787	.024	8	x	20	.6	TT150M5A
10	14.74	67	.315	x	.787	.024	8	x	20	.6	TT150M10A
15	9.82	96	.394	x	.827	.024	10	x	21	.6	TT150M15A
20	7.59	114	.394	x	.945	.024	10	x	24	.6	TT150M20A
25	6.09	134	.394	x	.945	.024	10	x	24	.6	TT150M25A

# Type FP, WP, PFP, PWP Metal Can Electrolytic Capacitors

**MALLORY**



- Multiple Capacitor Sections
- Twist Prong or PC Mount
- Meets mechanical and electrical requirements of EIA Standard RS-395 Type 2 General Purpose Aluminum Electrolytic Capacitors

## GENERAL SPECIFICATIONS

Operating Temperature:  
 10 - 450 WVDC -30°C to +85°C  
 451 - 475 WVDC -30°C to +65°C

Voltage Range:  
 10 WVDC to 475 WVDC

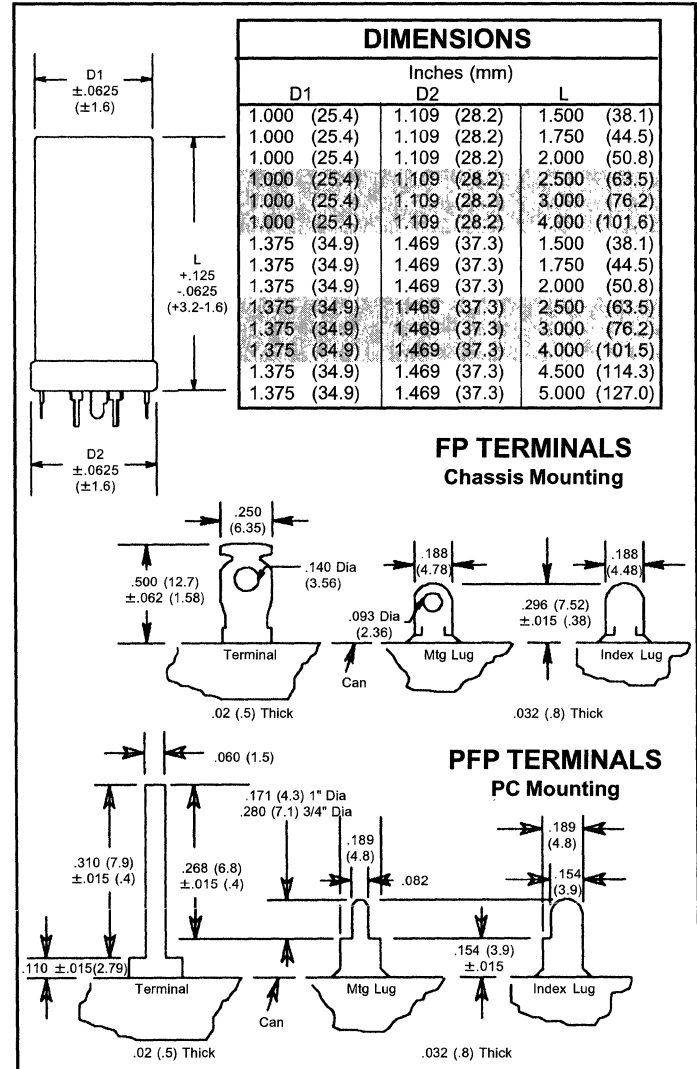
Capacitance Tolerance:  
 10 - 50 WVDC -10% +150%  
 51 - 350 WVDC -10% +100%  
 351 - 475 WVDC -10% + 50%

Capacitance μF	WVDC	Size (Inches) D x L	Catalog Number
<b>Single Section</b>			
1000	25	1.375 x 2.000	WP059
4700	40	1.375 x 2.500	FP061.1
500	50	1.375 x 2.000	WP065
1000	50	1.000 x 2.000	PFP066.4
1000	50	1.375 x 2.000	FP066.5
1500	50	1.375 x 2.000	WVP068
2000	50	1.375 x 3.000	FP070
100	150	1.000 x 1.500	FP116
300	150	1.375 x 2.000	FP119
1400	175	1.375 x 4.500	FP123.2
120	200	1.375 x 2.000	FP121
400	200	1.375 x 2.000	PFP122.9
500	200	1.375 x 3.000	WPI23
950	200	1.375 x 3.000	FP123.3
750	250	1.375 x 4.000	FP128.1
50	350	1.000 x 2.000	FP137
125	350	1.375 x 2.500	FP140
150	350	1.375 x 2.500	FP140.6
200	350	1.375 x 2.000	FP140.7
250	350	1.375 x 2.000	FP140.91
320	350	1.375 x 4.000	FP141
20	450	1.000 x 1.750	FP144
40	450	1.000 x 2.500	FP146
80	450	1.375 x 2.500	FP149
100	450	1.375 x 2.500	FP150
125	450	1.375 x 3.000	FP155

Capacitance μF	WVDC	Size (Inches) D x L	Catalog Number
<b>Quad Section</b>			
100-100-50-50	350-350-350-350	1.375 x 3.000	FP420.37
10-10-10-10	450-450-450-450	1.375 x 2.000	FP434
20-20-20-20	450-450-450-450	1.375 x 2.500	FP444
40-40-20-20	450-450-450-450	1.375 x 3.500	FP447
40-40-40-40	450-450-450-450	1.375 x 3.000	WVP447.7
20-20-20-20	475-475-475-475	1.375 x 2.000	FP475
40-20-10-10	475-475-475-475	1.375 x 2.500	FP476

Capacitance μF	WVDC	Size (Inches) D x L	Catalog Number
<b>Dual Section</b>			
1000-1000	25-25	1.375 x 2.000	PWP201.15
1000-1000	35-35	1.375 x 2.000	WP201.5
2000-2000	40-40	1.375 x 2.500	FP202
1000-1000	50-50	1.375 x 2.500	FP202.9
750-750	125-125	1.375 x 4.500	FP207.5
500-500	175-175	1.375 x 4.000	FP216.51
300-300	200-200	1.375 x 4.000	FP216.9
20-20	250-250	1.000 x 1.500	FP217
150-150	250-250	1.375 x 2.500	FP217.7
200-200	250-250	1.375 x 3.000	FP217.74
100-100	350-350	1.375 x 3.500	FP227.7
150-20	350-350	1.375 x 3.000	FP228.3
150-150	350-350	1.375 x 3.000	FP227.95
10-10	450-450	1.000 x 1.750	FP231
20-20	450-450	1.000 x 2.000	FP234
40-40	450-450	1.375 x 2.500	FP238
50-50	450-450	1.375 x 3.000	FP240 ++
80-80	450-450	1.375 x 3.500	FP245.5
100-40	450-450	1.375 x 3.500	FP247

Capacitance μF	WVDC	Size (Inches) D x L	Catalog Number
<b>Triple Section</b>			
40-40-40	150-150-150	1.000 x 1.750	FP311.5
100-400-400	275-200-200	1.375 x 4.500	FP323.01
20-20-20	450-450-25	1.000 x 2.500	FP345.8
10-10-10	450-450-450	1.000 x 2.500	FP375.8
20-20-20	450-450-450	1.375 x 2.000	FP376.5
40-40-40	450-450-450	1.375 x 3.000	FP377.1
40-20-20	475-475-475	1.375 x 2.500	FP396.1



Aluminum Capacitors

# Index and General Specifications Disc Ceramic Capacitors

**MALLORY**

Class	Capacitance Range	Voltage Range	Insulation Resistance	Dissipation Factor (Max)	Test Frequency	Breakdown Voltage	Page Number
<b>General Purpose</b>	1 to 100,000 pF	50, 100, 500, 1,000 VDC	10,000 megohms (min)	Z5U: 4.0% Y5U: 4.0% Y5V: 5.0% All others: 2.5%	1,000 Hz	2.5 x rated (5 seconds max)	105
<b>EIA class 1 TEMP Compensating</b>	1 to 910 pF	50, 500, 1,000, 3,000 VDC	10,000 megohms (min)	5.0%	1 MHz	3 x rated (5 seconds max)	107
<b>EIA Class 2 Temp/Freq Stable</b>	100 to 10,000 pF	500 and 1,000 VDC	10,000 megohms (min)	1.5%	1,000 Hz	2.5 x rated (5 seconds max)	109
<b>EIA Class 2 High Voltage</b>	100 to 10,000 pF	2,000 and 3,000 VDC	10,000 megohms (min)	2.5%	1,000 Hz	2.5 x rated (5 seconds max)	109
<b>EIA Class 3 Reduced Titanite</b>	.01 to .22 $\mu$ F	12, 25, 50 VDC	1 megohm (min)	Y5R: 1.5% Y5U: 7.0% Y5V: 5.0%	1,000 Hz (operating)	2.5 x rated (5 seconds max)	110
<b>Spark-Arrestor</b>	.75 pF max (gap only) to .01 $\mu$ F	1 - 3 KVDC	n/a	n/a	n/a	n/a	110
<b>U.L. &amp; CSA Recognized Across-The-Line</b>	.001 to .01 $\mu$ F	125, 250 vrms 60 Hz	UN: >10K megohms @ 25°C, 500 VDC 440L: 100 gigaohms	2.5%	1,000 Hz	Type UN: 3250 min vrms, 60 Hz (1 minute max) Type 440L: 3500 vrms, 60Hz (2 seconds max)	111

### CLASS 2 & 3

#### EIA TEMPERATURE COEFFICIENT CODES

A combination of characters designating capacitance drift over a temperature range.  
Example: Y5E could change  $\pm 4.7\%$  over a temperature range of  $-30^\circ\text{C}$  to  $+85^\circ\text{C}$ .

Letter Symbol	Low Temp Requirement
X	$-55^\circ\text{C}$
Y	$-30^\circ\text{C}$
Z	$+10^\circ\text{C}$

Number Symbol	High Temp Requirement
2	$+45^\circ\text{C}$
4	$+65^\circ\text{C}$
5	$+85^\circ\text{C}$
6	$+105^\circ\text{C}$
7	$+125^\circ\text{C}$

Letter Symbol	Maximum Capacitance Change Over Temp Rating
A	$\pm 1.0\%$
B	$\pm 1.5\%$
C	$\pm 2.2\%$
D	$\pm 3.3\%$
E	$\pm 4.7\%$
F	$\pm 7.5\%$
P	$\pm 10.0\%$
R	$\pm 15.0\%$
S	$\pm 22.0\%$
T	+22%, -33%
U	+22%, -56%
V	+22%, -82%

### CLASS 1 TEMPERATURE COEFFICIENT CODES

Temperature Range $-55^\circ\text{C}$ to $+125^\circ\text{C}$	% Change Per $1^\circ\text{C}$
NPO-(COG)	$\pm 30\text{ppm}$
N330	-330ppm
N470	-470ppm
N750	-750ppm
N1000	-1000ppm
N1500	-1500ppm
N2200	-2200ppm
N3300	-3300ppm
N4700	-4700ppm
N5600	-5600ppm
SL	-750, +100ppm
	$\pm 0.075\%$ Max

### Physical Specifications

**Case:** Conformal coating in compliance with EIA RS198-C

**Lead material:** Tinned copper wire. (Minimum lead content: 5%)

**Note:** Part numbers with 'X' suffix are multilayer construction rather than disc, and are rectangular in shape. The diameter dimension is the largest diameter of the footprint.

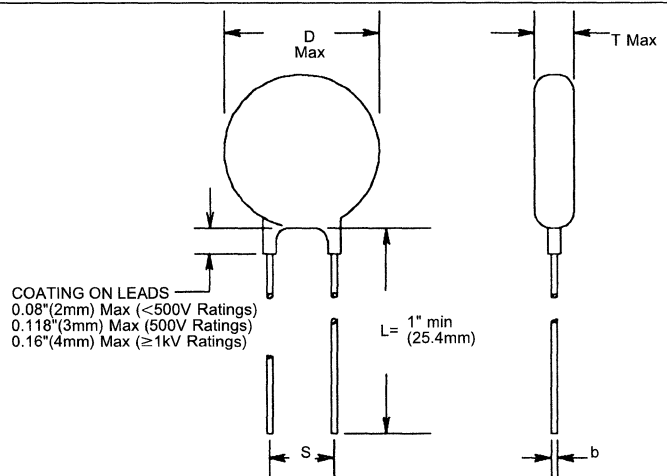
#### Tape and Reel Available upon Request

Leads are normally formed to .200" (5.1mm) lead spacing. (.250" (6.4mm) available if required.)

For D = .157" (4.0mm) to .276" (7.0mm) - Quantity/Reel = 2500 pcs.  
For D = .315" (8.0mm) to .394" (10.0mm) - Quantity/Reel = 2000 pcs.

Tape and Reel not available for D = > .394" (10mm).

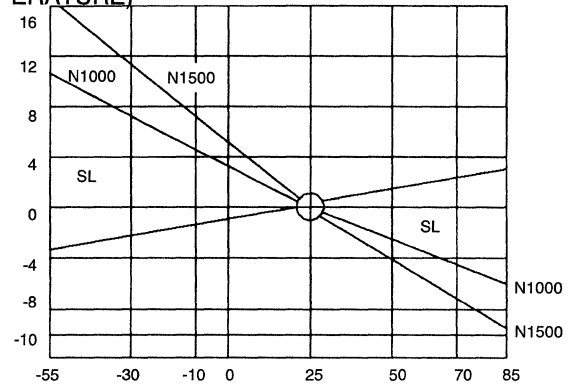
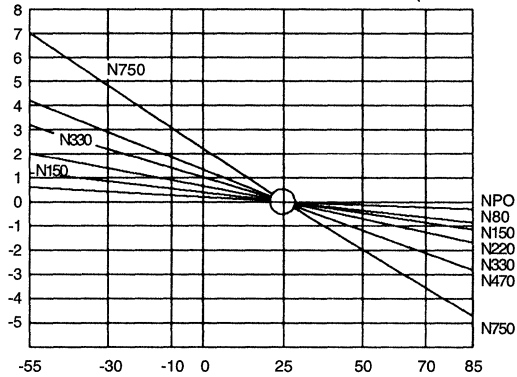
**Note:** Part numbers with 'X' suffix are all available in tape and reel: 2000 pcs per reel



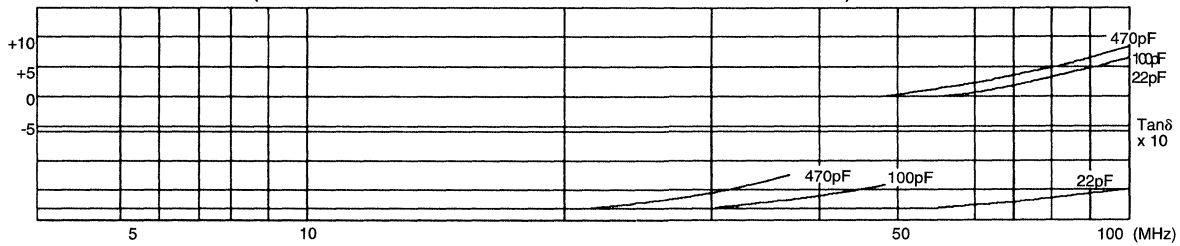
Disc Ceramic Capacitors

## CLASS 1

(CAPACITANCE VS. TEMPERATURE)



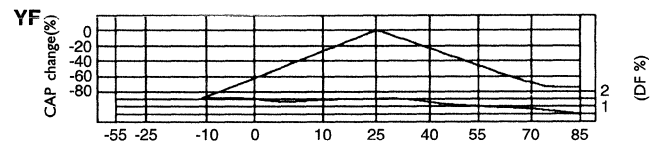
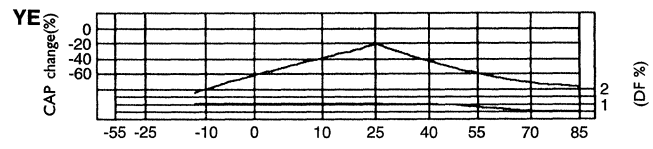
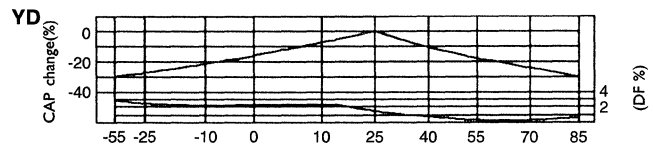
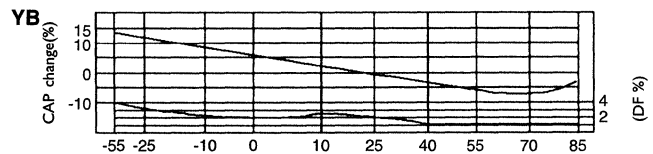
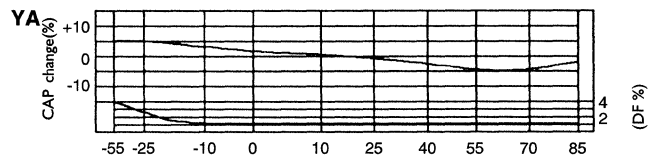
(CAPACITANCE AND DIS. FACTOR VS. FREQUENCY)



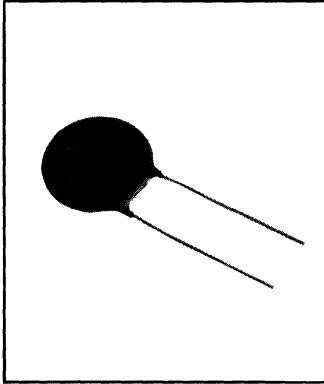
$$\frac{\Delta C}{C_{25}} \times 100 \%$$

## CLASS 2 AND 3

JIS Standard		E.I.A. Standard			
Temp Range -25°C +85°C	Cap Change (%)	Temp Range -25°C +85°C	Cap Change (%)	Temp Range -25°C +85°C	Cap Change (%)
YA	±4.7	Y5D (Special)	±3.3 (50V only)		
		Y5E	±4.7		
		Y5F	±7.5	X5F	±7.5
YB	±8	Y5P	±10		
		Y5R	±15	X5R	±15
		Y5S	±22		
YD	+5 -30	Y5T	+22 -33	X5T	+22 -33
YE	+5 -30	Y5U	+22 -56		
YF	+10 -80	Y5V	+22 -82		
ZF	+10 -80	Z5V	+22 -82		



# General Purpose Disc Ceramic Capacitors



- General Purpose
- Ideal For Use in Non-critical Coupling, Bypass and Filter Applications
- Humidity and Shock Resistant Coating Meets UL94V-0
- Radial Leads

## GENERAL SPECIFICATIONS

Voltage Range:  
50, 100, 500, 1,000 WVDC

Capacitance Range:  
1 pF to 100,000 pF

Insulation Resistance:  
10,000 megohms (min)

Power Factor @ 1KHz:  
2.5% Max (Y5V: 5%)

Breakdown Voltage:  
2.5 x rated  
(5 seconds Max)

Lead Length: 1 inch minimum

Capacity pF	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

50 WVDC											
1	.25pf	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE010C
3	.25pf	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE030C
5	.25pf	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE050C
6	.5 PF	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE060D
7	.5 PF	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE070D
8	.5 PF	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE080D
10	.5 PF	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE100D
12	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE120K
15	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE150K
18	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE180K
20	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE200K
22	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE220K
24	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE240K
27	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE270K
33	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE330K
39	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE390K
47	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE470K
51	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE510K
56	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE560K
68	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE680K
75	10 %	SL	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE750K
82	10 %	SL	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE820K
91	10 %	SL	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE910K
100	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE101K
120	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE121K
150	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE151K
180	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE181K
220	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE221K
270	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE271K
330	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE331K
390	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE391K
470	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE471K
560	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE561K
680	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE681K
820	10 %	Y5P	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE821K
1,000	10 %	Y5P	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE102K
1,000	20 %	Y5T	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE102M
1,000	-20+80	Y5V	.157	.118	.098	.015	4.0	3.0	2.5	.4	GE102Z
1,500	10 %	Y5P	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE152K
1,500	20 %	Y5T	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE152M
2,200	10 %	Y5P	.236	.118	.197	.020	6.0	3.0	5.0	.5	GE222K
2,200	20 %	Y5U	.197	.118	.098	.015	5.0	3.0	2.5	.4	GE222M
3,300	10 %	Y5P	.276	.118	.197	.020	7.0	3.0	5.0	.5	GE332K
3,900	10 %	Y5P	.315	.118	.197	.020	8.0	3.0	5.0	.5	GE392K
4,700	10 %	Y5P	.315	.118	.197	.020	8.0	3.0	5.0	.5	GE472K
4,700	20 %	Y5U	.236	.118	.197	.020	6.0	3.0	5.0	.5	GE472M
4,700	-20+80	Y5U	.197	.118	.197	.020	5.0	3.0	5.0	.5	GE472Z
6,800	10 %	Y5P	.374	.118	.197	.020	9.5	3.0	5.0	.5	GE682K
8,200	10 %	Y5P	.394	.118	.197	.020	10.0	3.0	5.0	.5	GE822K
10,000	10 %	Y5P	.472	.118	.197	.020	12.0	3.0	5.0	.5	GE103K
10,000	20 %	Y5U	.315	.118	.197	.020	8.0	3.0	5.0	.5	GE103M
10,000	-20+80	Y5V	.276	.118	.197	.020	7.0	3.0	5.0	.5	GE103Z
22,000	20 %	Y5U	.472	.118	.197	.020	12.0	3.0	5.0	.5	GE223M

\* Multilayer construction. See Physical Specification note.

Capacity pF	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

100 WVDC											
2,200	10 %	Y5P	.315	.118	.252	.025	8.0	3.0	6.4	.64	GH222K
2,200	20 %	Y5U	.236	.118	.252	.025	6.0	3.0	6.4	.64	GH222M
3,300	10 %	Y5P	.315	.118	.252	.025	8.0	3.0	6.4	.64	GH332K
3,900	10 %	Y5P	.315	.118	.252	.025	8.0	3.0	6.4	.64	GH392K
4,700	10 %	Y5P	.374	.118	.252	.025	9.0	3.0	6.4	.64	GH472K
4,700	-20+80	Y5U	.315	.118	.252	.025	8.0	3.0	6.4	.64	GH472Z
5,600	10 %	Y5P	.374	.118	.252	.025	9.5	3.0	6.4	.64	GH562K
10,000	10 %	Y5P	.472	.118	.252	.025	12.0	3.0	6.4	.64	GH103K
10,000	20 %	Y5U	.374	.118	.252	.025	9.5	3.0	6.4	.64	GH103M
10,000	-20+80	Y5U	.374	.118	.252	.025	9.5	3.0	6.4	.64	GH103Z
22,000	-20+80	Y5V	.472	.118	.252	.025	12.0	3.0	6.4	.64	GH223Z
100,000	-20+80	Z5U	.415	.150	.375	.025	10.5	3.8	9.5	.64	GH104ZX*
100,000	-20+80	Z5U	.310	.157	.375	.025	7.9	4.0	9.5	.64	GH104ZX3*

500 WVDC											
5	.25 pf	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM050C
7.5	.5 pf	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM7R5D
10	.5 pf	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM100D
15	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM150K
18	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM180K
20	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM200K
22	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM220K
24	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM240K
27	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM270K
39	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM390K
47	10 %	SL	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM470K
100	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM101K
150	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM151K
220	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM221K
270	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM271K
330	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM331K
470	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM471K
680	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM681K
1,000	10 %	Y5P	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM102K
1,000	20 %	Y5U	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM102M
1,000	-20+80	Y5U	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM102Z
2,200	10 %	Y5P	.339	.157	.252	.025	8.6	4.0	6.4	.64	GM222K
2,200	20 %	Y5U	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM222M
2,200	-20+80	Y5U	.236	.157	.252	.025	6.0	4.0	6.4	.64	GM222Z
3,300	10 %	Y5P	.433	.157	.252	.025	11.0	4.0	6.4	.64	GM332K
3,300	20 %	Y5U	.291	.157	.252	.025	7.4	4.0	6.4	.64	GM332M
4,700	10 %	Y5P	.492	.157	.252	.025	12.5	4.0	6.4	.64	GM472K
4,700	20 %	Y5U	.339	.157	.252	.025	8.6	4.0	6.4	.64	GM472M
6,800	-20+80	Y5U	.433	.157	.252	.025	11.0	4.0	6.4	.64	GM682Z
10,000	10 %	Y5P	.642	.157	.374	.025	16.3	4.0	9.5	.64	GM103K
10,000	20 %	Y5U	.492	.157	.252	.025	12.5	4.0	6.4	.64	GM103M
10,000	-20+80	Y5U	.492	.157	.252	.025	12.5	4.0	6.4	.64	GM103Z
22,000	20 %	Y5U	.642	.157	.374	.025	16.3	4.0	9.5	.64	GM223M
22,000	10 %	Y5U	.642	.157	.374	.025	16.3	4.0	9.5	.64	GM223Z
30,000	20 %	Z5U	.415	.150	.375	.025	10.5	3.8	9.5	.64	GM303MX*
30,000	20 %	Z5U	.310	.157	.375	.025	7.9	4.0	9.5	.64	GH303MX3*
50,000	20 %	Z5U	.415	.150	.375	.025	10.5	3.8	9.5	.64	GM503MX*
50,000	20 %	Z5U	.310	.157	.375	.025	7.9	4.0	9.5	.64	GM503MX3*
100,000	20 %	Z5U	.415	.150	.375	.025	10.5	3.8	9.5	.64	GM104MX*
100,000	20 %	Z5U	.310	.157	.375	.025	7.9	4.0	9.5	.64	GM104MX3*

Disc Ceramic Capacitors

# General Purpose Disc Ceramic Capacitors



Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

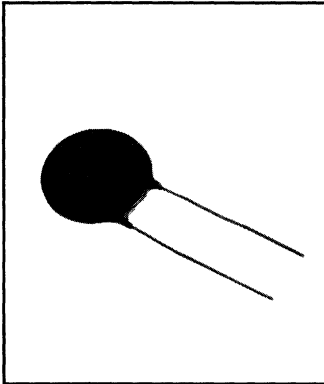
1000 WVDC											
3.3	.25PF	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP533
5	.25PF	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP550
6.8	.5PF	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP568
10	.5PF	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP410
12	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP412
15	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP415
20	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP420
22	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP422
27	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP427
30	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP430
33	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP433
39	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP439
47	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP447
56	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP456
68	10%	SL	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP468
91	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP491
100	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.55	GP310
120	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP312
150	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP315
180	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP318

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

1000 WVDC											
220	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP322
270	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP327
330	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP333
390	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP339
470	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP347
560	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP356
680	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP368
750	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP375
820	10%	YSP	.236	.177	.252	.025	6.0	4.5	6.4	.64	GP382
1,000	10%	YSP	.291	.177	.252	.025	7.4	4.5	6.4	.64	GP210
1,500	10%	YSP	.339	.177	.252	.025	8.6	4.5	6.4	.64	GP215
2,200	10%	YSP	.374	.177	.252	.025	9.5	4.5	6.4	.64	GP222
2,700	10%	YSP	.433	.177	.252	.025	11.0	4.5	6.4	.64	GP227
3,300	20%	YST	.433	.177	.252	.025	11.0	4.5	6.4	.64	GP233
3,900	10%	YSP	.492	.177	.252	.025	12.5	4.5	6.4	.64	GP239
4,700	20%	YSU	.433	.177	.252	.025	11.0	4.5	6.4	.64	GP247
5,600	10%	YSP	.591	.177	.374	.025	15.0	4.5	9.5	.64	GP256
6,800	20%	YST	.591	.177	.374	.025	15.0	4.5	9.5	.64	GP268
10,000	20%	YSU	.591	.177	.374	.025	15.0	4.5	9.5	.64	GP110
22,000	20%	YSU	.748	.177	.374	.025	19.0	4.5	9.5	.64	GP122

Disc Ceramic Capacitors

# EIA Class 1 Temperature Compensating Disc Ceramic Capacitors



- Temperature Compensating
- Ideal For Use in Timing and Oscillating Circuits
- Humidity and Shock Resistant Coating Meets UL94V-0
- Radial Leads

## GENERAL SPECIFICATIONS

Voltage Range:  
50, 500, 1,000, 3,000 WVDC

Capacitance Range:  
1 pF to 910 pF

Insulation Resistance:  
10,000 megohms (min.)

Power Factor @ 1 MHz:  
5% Max

Breakdown Voltage:  
3 x rated  
(5 seconds Max)

Lead Length: 1 inch minimum

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

50 WVDC											
1	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC010C
1.5	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC1R5C
2	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC020C
3	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC030C
4	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC040C
5	.25pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC050C
6	.5pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC060D
7	.5pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC070D
8	.5pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC080D
9	.5pf	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC090D
10	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC100J
10	.5 pf	N330	.157	.118	.098	.015	4.0	3.0	2.5	.4	CES100D
10	.5 pf	N750	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEU100D
12	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC120J
12	5%	N330	.157	.118	.098	.015	4.0	3.0	2.5	.4	CES120J
13	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC130J
15	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC150J
15	5%	N330	.157	.118	.098	.015	4.0	3.0	2.5	.4	CES150J
18	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC180J
18	5%	N330	.157	.118	.098	.015	4.0	3.0	2.5	.4	CES180J
20	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC200J
22	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC220J
22	5%	N750	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEU220J
24	5%	NPO	.157	.118	.098	.015	4.0	3.0	2.5	.4	CEC240J
27	5%	NPO	.197	.118	.098	.015	5.0	3.0	2.5	.4	CEC270J
27	5%	N330	.157	.118	.098	.015	4.0	3.0	2.5	.4	CES270J
30	5%	NPO	.197	.118	.098	.015	5.0	3.0	2.5	.4	CEC300J
33	5%	NPO	.197	.118	.098	.015	5.0	3.0	2.5	.4	CEC330J
33	5%	N330	.197	.118	.098	.015	5.0	3.0	2.5	.4	CES330J
39	5%	NPO	.197	.118	.197	.020	5.0	3.0	5.0	.5	CEC390J
43	5%	NPO	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEC430J
43	5%	N330	.197	.118	.098	.015	5.0	3.0	2.5	.4	CES430J
47	5%	NPO	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEC470J
51	5%	NPO	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEC510J
51	5%	N750	.236	.118	.098	.015	6.0	3.0	2.5	.4	CEU510J
56	5%	NPO	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEC560J
62	5%	NPO	.276	.118	.197	.020	7.0	3.0	5.0	.5	CEC620J
68	5%	NPO	.276	.118	.197	.020	7.0	3.0	5.0	.5	CEC680J
68	5%	N750	.197	.118	.197	.020	5.0	3.0	5.0	.5	CEU680J
75	5%	NPO	.276	.118	.197	.020	7.0	3.0	5.0	.5	CEC750J
82	5%	NPO	.276	.118	.197	.020	7.0	3.0	5.0	.5	CEC820J
91	5%	NPO	.315	.118	.197	.020	8.0	3.0	5.0	.5	CEC910J
100	5%	NPO	.315	.118	.197	.020	8.0	3.0	5.0	.5	CEC101J
100	5%	N750	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEU101J
110	5%	NPO	.315	.118	.197	.020	8.0	3.0	5.0	.5	CEC111J
120	5%	NPO	.315	.118	.197	.020	8.0	3.0	5.0	.5	CEC121J
120	5%	N750	.236	.118	.197	.020	6.0	3.0	5.0	.5	CEU121J
130	5%	NPO	.354	.118	.197	.020	9.0	3.0	5.0	.5	CEC131J
150	5%	NPO	.354	.118	.197	.020	9.0	3.0	5.0	.5	CEC151J
180	5%	NPO	.375	.118	.197	.020	9.5	3.0	5.0	.5	CEC181J
220	5%	NPO	.413	.118	.197	.020	10.5	3.0	5.0	.5	CEC221J
220	5%	N750	.315	.118	.197	.020	8.0	3.0	5.0	.5	CEU221J
240	5%	NPO	.472	.118	.197	.020	12.0	3.0	5.0	.5	CEC241J
270	5%	NPO	.472	.118	.197	.020	12.0	3.0	5.0	.5	CEC271J
270	5%	N750	.354	.118	.197	.020	9.0	3.0	5.0	.5	CEU271J

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

50 WVDC											
300	5%	NPO	.472	.118	.197	.020	12.0	3.0	5.0	.5	CEC301J
300	5%	N750	.354	.118	.197	.020	9.0	3.0	5.0	.5	CEU301J
330	5%	N750	.394	.118	.197	.020	10.0	3.0	5.0	.5	CEU331J
390	5%	N750	.413	.118	.197	.020	10.5	3.0	5.0	.5	CEU391J
470	5%	N750	.413	.118	.197	.020	10.5	3.0	5.0	.5	CEU471J

500 WVDC										
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1	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC010C
1.5	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC1R5C
1.5	.25 p	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU1R5C
2	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC020C
3	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC030C
3.3	.25 p	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU3R3C
4	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC040C
4.7	.25 p	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU4R7C
5	.25pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC050C
5	.25 p	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU050C
6	.5 pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC060D
6.8	.5 pf	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU6R8D
7	.5 pf	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU070D
8.2	.5 pf	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU8R2D
9	.5 pf	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC090D
10	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC100J
10	.5 pf	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU100D
10	.5 pf	N1500	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMW100D
12	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC120J
12	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU120J
15	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC150J
15	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU150J
18	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC180J
18	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU180J
20	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC200J
20	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU200J
22	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC220J
22	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU220J
22	5%	N1500	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMW220J
24	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC240J
27	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC270J
30	5%	NPO	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMC300J
33	5%	NPO	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMC330J
33	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU330J
39	5%	NPO	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMC390J
39	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU390J
47	5%	NPO	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMC470J
47	5%	N1500	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMW470J
51	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU510J
51	5%	N1500	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMW510J
56	5%	NPO	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMC560J
56	5%	N750	.236	.157	.252	.025	6.0	4.0	6.4	.64	CMU560J
62	5%	NPO	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMC620J
68	5%	NPO	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMC680J
68	5%	N750	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMU680J
75	5%	NPO	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMC750J
82	5%	NPO	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMC820J

Disc Ceramic Capacitors

# EIA Class 1 Temperature Compensating Disc Ceramic Capacitors

**MALLORY**

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

500 WVDC											
100	5 %	NPO	.433	.157	.252	.025	11.0	4.0	6.4	.64	CMC101J
100	5 %	N750	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMU101J
100	5 %	N1500	.291	.157	.252	.025	7.4	4.0	6.4	.64	CMW101J
110	5 %	N750	.374	.157	.252	.025	9.5	4.0	6.4	.64	CMU111J
120	5 %	NPO	.433	.157	.252	.025	11.0	4.0	6.4	.64	CMC121J
150	5 %	NPO	.492	.157	.252	.025	12.5	4.0	6.4	.64	CMC151J
160	5 %	NPO	.492	.157	.252	.025	12.5	4.0	6.4	.64	CMC161J
180	5 %	NPO	.571	.157	.374	.025	14.5	4.0	9.5	.64	CMC181J
220	5 %	NPO	.571	.157	.374	.025	14.5	4.0	9.5	.64	CMC221J
390	5 %	N1500	.492	.157	.252	.025	12.5	4.0	6.4	.64	CMW391J

1000 WVDC											
1.0	.25pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC010C
1.5	.25pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC1R5C
2.2	.25pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC2R2C
3.3	.25pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC3R3C
4.7	.25pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC4R7C
6.8	.5 pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC6R8D
8.2	.5 pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC8R2D
9.6	.5 pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC9R6D
10	.5 pf	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC100D
10	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU100J
11	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC110J
12	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC120J
12	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU120J
13	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC130J
15	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC150J
15	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU150J
18	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC180J
20	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC200J
20	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU200J
22	5 %	NPO	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPC220J
22	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU220J
24	5 %	NPO	.291	.177	.252	.025	7.4	4.5	6.4	.64	CPC240J

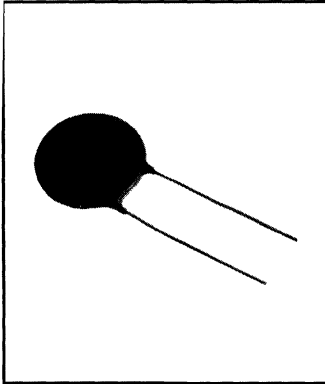
Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

1000 WVDC											
27	5 %	NPO	.291	.177	.252	.025	7.4	4.5	6.4	.64	CPC270J
30	5 %	NPO	.291	.177	.252	.025	7.4	4.5	6.4	.64	CPC300J
33	5 %	NPO	.291	.177	.252	.025	7.4	4.5	6.4	.64	CPC330J
33	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU330J
36	5 %	NPO	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPC360J
39	5 %	NPO	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPC390J
39	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU390J
47	5 %	NPO	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPC470J
47	5 %	N750	.236	.177	.252	.025	6.0	4.5	6.4	.64	CPU470J
51	5 %	NPO	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPC510J
56	5 %	NPO	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPC560J
68	5 %	NPO	.433	.177	.252	.025	11.0	4.5	6.4	.64	CPC680J
75	5 %	NPO	.433	.177	.252	.025	11.0	4.5	6.4	.64	CPC750J
100	5 %	NPO	.492	.177	.252	.025	12.5	4.5	6.4	.64	CPC101J
100	5 %	N750	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPU101J
100	5 %	N1500	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPW101J
120	5 %	N1500	.374	.177	.252	.025	9.5	4.5	6.4	.64	CPW121J
150	5 %	NPO	.591	.177	.374	.025	15.0	4.5	9.5	.64	CPC151J
180	5 %	NPO	.591	.177	.374	.025	15.0	4.5	9.5	.64	CPC181J
200	5 %	NPO	.669	.177	.374	.025	17.0	4.5	9.5	.64	CPC201J
220	5 %	NPO	.669	.177	.374	.025	17.0	4.5	9.5	.64	CPC221J
270	5 %	NPO	.748	.177	.374	.025	19.0	4.5	9.5	.64	CPC271J
270	5 %	N750	.492	.177	.252	.025	12.5	4.5	6.4	.64	CPU271J
300	5 %	NPO	.748	.177	.374	.025	19.0	4.5	9.5	.64	CPC301J
330	5 %	NPO	.748	.177	.374	.025	19.0	4.5	9.5	.64	CPC331J
330	5 %	N750	.591	.177	.374	.025	15.0	4.5	9.5	.64	CPU331J
330	5 %	N1500	.591	.177	.252	.025	15.0	4.5	6.4	.64	CPW331J
390	5 %	N1500	.591	.177	.374	.025	15.0	4.5	9.5	.64	CPW391J
470	5 %	N1500	.669	.177	.374	.025	17.0	4.5	9.5	.64	CPW471J

3000 WVDC											
22	10 %	SL	.394	.236	.374	.032	10.0	6.0	9.5	.81	CTZ220K
100	10 %	SL	.591	.236	.374	.032	15.0	6.0	9.5	.81	CTZ101K

Disc Ceramic Capacitors





## TEMPERATURE/ FREQUENCY STABLE

- Provides Exceptional Stability Where Minimum Variation in Capacitance is Required
- Humidity and Shock Resistant Coating Meets UL94V-0
- Radial Leads

## GENERAL SPECIFICATIONS

Voltage Range:  
500 and 1,000 VDC

Capacitance Range:  
100 pF to 10,000 pF

Insulation Resistance:  
10,000 megohms (min)

Power Factor @ 1000 Hz:  
1.5% Max

Breakdown Voltage:  
2.5 x rated  
(5 seconds Max)

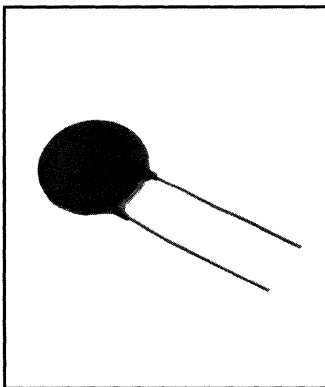
Lead Length: 1 inch minimum

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

500 WVDC											
150	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM151K
220	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM221K
390	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM391K
470	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM471K
560	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM561K
680	10%	YSE	.236	.157	.250	.025	6.0	4.0	6.4	.64	SM681K
1,000	10%	YSE	.339	.157	.250	.025	8.6	4.0	6.4	.64	SM102K
2,200	10%	YSE	.433	.157	.250	.025	11.0	4.0	6.4	.64	SM222K
4,700	10%	YSE	.571	.157	.375	.025	14.5	4.0	9.5	.64	SM472K
6,800	10%	YSE	.748	.157	.375	.025	19.0	4.0	9.5	.64	SM682K
10,000	10%	YSE	.748	.157	.375	.025	19.0	4.0	9.5	.64	SM103K

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

1000 WVDC											
100	10%	YSE	.236	.177	.250	.022	6.0	4.5	6.4	.64	SP101K
150	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP151K
180	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP181K
220	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP221K
270	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP271K
330	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP331K
390	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP391K
470	10%	YSE	.236	.177	.250	.025	6.0	4.5	6.4	.64	SP471K
560	10%	YSE	.291	.177	.250	.025	7.4	4.5	6.4	.64	SP561K
680	10%	YSE	.291	.177	.250	.025	7.4	4.5	6.4	.64	SP681K
1,000	10%	YSE	.374	.177	.250	.025	9.5	4.5	6.4	.64	SP102K
1,500	10%	YSE	.433	.177	.250	.025	11.0	4.5	6.4	.64	SP152K
1,800	10%	YSE	.433	.177	.250	.025	11.0	4.5	6.4	.64	SP182K
2,200	10%	YSE	.492	.177	.250	.025	12.5	4.5	6.4	.64	SP222K
2,700	10%	YSE	.591	.177	.375	.025	15.0	4.5	9.5	.64	SP272K
3,300	10%	YSE	.591	.177	.375	.025	15.0	4.5	9.5	.64	SP332K
3,900	10%	YSE	.669	.177	.375	.025	17.0	4.5	9.5	.64	SP392K
4,700	10%	YSE	.669	.177	.375	.025	17.0	4.5	9.5	.64	SP472K



## HIGH VOLTAGE

- Highly Efficient for Bypass and Coupling Applications
- Designed Around EIA Test Spec. RS-165A
- Radial Leads

## GENERAL SPECIFICATIONS

Voltage Range:  
2,000 and 3,000 WVDC

Capacitance Range:  
270 pF to 10,000 pF

Insulation Resistance:  
10,000 megohms (min.)

Power Factor @ 1000 Hz:  
2.5% Max

Breakdown Voltage:  
2.5 x rated  
(5 seconds Max)

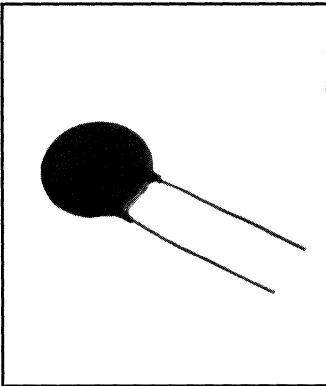
Lead Length: 1 inch minimum

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

2000 WVDC											
1,000	20%	YSU	.394	.197	.250	.032	10.0	5.0	6.4	.81	HS102M
10,000	20%	YSU	.787	.197	.375	.032	20.0	5.0	9.5	.81	HS103M

Capacity pF	Tol.	Temp. Coef.	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	

3000 WVDC											
270	20%	YSP	.394	.236	.375	.032	10.0	6.0	9.5	.81	HT271M
330	10%	YSP	.394	.236	.375	.032	10.0	6.0	9.5	.81	HT331K
470	10%	YSP	.394	.236	.375	.032	10.0	6.0	9.5	.81	HT471K
560	10%	YSP	.394	.236	.375	.032	10.0	6.0	9.5	.81	HT561K
680	20%	YSP	.472	.236	.375	.032	12.0	6.0	9.5	.81	HT681M
1,000	20%	YSU	.591	.236	.375	.032	15.0	6.0	9.5	.81	HT102M
1,500	20%	YSU	.591	.236	.375	.032	15.0	6.0	9.5	.81	HT152M
1,800	20%	YSU	.591	.236	.375	.032	15.0	6.0	9.5	.81	HT182M
2,200	20%	YSU	.787	.236	.375	.032	20.0	6.0	9.5	.81	HT222M
4,700	20%	YSU	.787	.236	.375	.032	20.0	6.0	9.5	.81	HT472M



## Reduced Titanite

- Ideal in Transistorized Circuitry for Bypass and Coupling Applications
- Low Power Factor & Superior Radio Frequency Impedance Characteristics
- Meets RS-198C for Class 3 Ceramic Capacitors
- Radial Leads

## GENERAL SPECIFICATIONS

Voltage Range:  
25, 50 WVDC

Capacitance Range:  
.01  $\mu$ F to .22  $\mu$ F

Insulation Resistance:  
1 megohm (min)

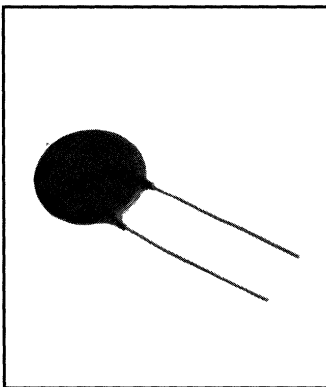
Power Factor @ 1000 Hz:  
7.0% Max

Breakdown Voltage:  
2.5 x rated  
(5 seconds Max)

Lead Length: 1 inch minimum

Capacity $\mu$ F	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	
<b>25 WVDC</b>											
.01	20%	Y5R	.235	.138	.250	.025	6.0	3.5	6.4	.64	LC103M
.022	20%	Y5R	.315	.138	.250	.025	8.0	3.5	6.4	.64	LC223M
.033	20%	Y5R	.350	.138	.250	.025	8.9	3.5	6.4	.64	LC333M
.100	20%	Y5R	.495	.138	.250	.025	12.6	3.5	6.4	.64	LC104M
.220	20%	Y5R	.495	.138	.250	.025	12.6	3.5	6.4	.64	LC224M

Capacity $\mu$ F	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	
<b>50 WVDC</b>											
.010	20%	Y5U	.230	.138	.250	.025	5.8	3.5	6.4	.64	LE103M
.022	20%	Y5U	.290	.138	.250	.025	7.4	3.5	6.4	.64	LE223M
.047	20%	Y5U	.359	.138	.250	.025	9.1	3.5	6.4	.64	LE473M
.100	20%	Y5U	.484	.138	.250	.025	12.3	3.5	6.4	.64	LE104M



## Spark-Arrestor

- Radial Leads

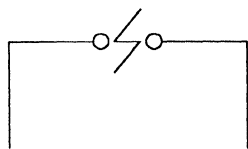
## GENERAL SPECIFICATIONS

### Type 1 Spark-Arrestor

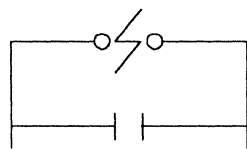
Consists of a wire loop encased in phenolic resin. After the loop has been encased, a precise slot is cut through the wire loop and its protective case to form a gap. Type 1 does not include a parallel disc ceramic.

### Type 2 Spark-Arrestor

A combination of a ceramic disc in parallel with the gap. Useful in either industrial or commercial applications which require bypassing of transient over voltages. The precise gap allows the stray transients to be harmlessly bypassed.  
Temperature Characteristic = Z5U.



Type 1

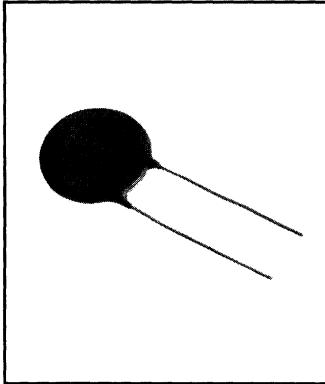


Type 2

Capacity	Voltage	Type	Size (Inches)				Size (Millimeters)				Catalog Number
			D	H	S	d	D	H	S	d	
<b>1 - 3 KVDC</b>											
*.75pF max.	1-2 KVDC	1	.350	.500	.250	.032	8.9	12.7	6.4	.81	ASR75A
*.75pF max.	2-3 KVDC	1	.350	.500	.250	.032	8.9	12.7	6.4	.81	ATR75A
# .01 $\mu$ F	2-3 KVDC	2	.770	1.126	.375	.032	19.6	28.6	9.5	.81	AT103A

\* Inherent capacity of gap only. No parallel disc ceramic.  
# Includes parallel disc ceramic. Tol. +80,-20%

# Across-The-Line Disc Ceramic Capacitors



## CERA-MITE® Y Type Filter

- 250 VAC/4000 VDC
- Across-The-Line Filter
- EMI / RFI Filter
- CERA-MITE® Y Type Filter Capacitors are also Suitable for X Applications up to 250 VAC

\* For other Y Type capacitors, see our 173Y Film Capacitors on page 154

## GENERAL SPECIFICATIONS

Voltage Range:  
250VAC or 4000VDC

Capacitance Range:  
.001  $\mu$ F to .01  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 20%

Dielectric Strength:  
3500 VAC at 60Hz for 2 seconds  
7000VDC for 1 minute

Dissipation Factor:  
1.0% at 25°C

Operating Temperature:  
Y5U -30°C to +85°C  
Z5U +10°C to +85°C

Case Breakdown:  
2500VAC

Insulation Resistance:  
100 Gigaohms minimum.

Environmental:  
HPF (Per VDE and IEC)  
-25°C +85°C  
(21 days at 93% Humidity)

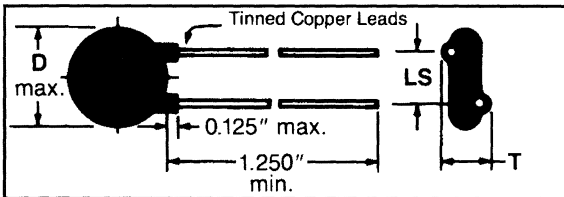
## CERA-MITE® International Agency Approvals

The following licenses cover product listed

UL 1414, File E99264 - Across the line, coupling, line bypass  
CSA 22.2 N0.1, File LR62016 - Across the line, coupling, line bypass  
SEV 1055, Files 89.100576.01/89.101529.01 - EMI/RFI Filters  
VDE 0565-1, Files 14239-4670-1001/1008 - EMI/RFI Filters  
VDE 0560-2, Files 14239-4620-1010/1011 - Coupling

SEMCO 1151B, Files 8947050/8947051/9113198 - EMI/RFI Filters  
NEMKO, File E43326/E43254 - EMI/RFI Filters  
DEMKO, File 97090EC/97091EC - EMI/RFI Filters  
SETI 27001, File 133203-01/02 - EMI/RFI Filters

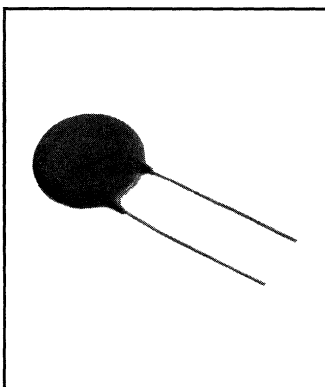
Agency logos which may appear on a CERA-MITE® Y type filter depending upon space constraints and application:



Capacity $\mu$ F	Tol	Temp Coef	A-C Leakage 250 VRMS 60Hz	Rated DC Voltage	Maximum Dimensions (Inches)				Max Dimensions (Millimeters)				Catalog Number
					D	T	S	d	D	T	S	d	
.001	20%	Y5U	0.15mA	4000	.460	.240	.375	.032	11.5	6.1	9.4	.81	440LD10
.0022	20%	Z5U	0.34mA	4000	.460	.240	.375	.032	11.5	6.1	9.4	.81	440LD22
.0033	20%	Z5U	0.50mA	4000	.620	.240	.375	.032	15.5	6.1	9.4	.81	440LD33
.0047	20%	Z5U	0.72mA	4000	.720	.240	.375	.032	18.0	6.1	9.4	.81	440LD47
.01	20%	Z5U	1.5mA	4000	.900	.240	.375	.032	22.5	6.1	9.4	.81	440LS10

Transient Energy Requirements (discharge or Dump Tests). The discharge test required often is the determining factor in selection of the right capacitor. These tests vary in severity and require different thickness and diameter parts to absorb the transient energy. The following classification states the requirements in order of severity:

Class A: UL 1414 para. 9 and CSA 22.2, No. 1, Figure 11 and ANSI/IEEE 62.41 Category B  
Class B: UL 1414 para. 14 and CSA 22.2, No. 8 (IEC) and ANSI/IEEE 62.41 Category A  
Class C: VDE 0565 para. 4.5 & 4.7 and CSA 22.2, No. 1, Figure 9



## X Type Filter

- 125VAC/2000 VDC
- Line By-Pass Filter
- UL Recognized  
UL 1414, File E38785.
- CSA Certified  
CSA 22.2#1, File LR33468

\* For other X Type capacitors, see our 158X Film Capacitors on page 153

## GENERAL SPECIFICATIONS

Voltage Range:  
125 VAC or 2000 VDC

Capacitance Range:  
.001  $\mu$ F to .01  $\mu$ F

Capacity Tolerance:  
 $\pm$ 20%

Dielectric Strength:  
3250 vrms minimum for  
2 minutes

Dissipation Factor:  
2.5% Max. at 25°C

Operating Temperature:  
+10°C to +85°C

Case Breakdown:  
> 1000 VAC (RMS)  
at 60Hz for 1 minute

Insulation Resistance:  
10K megohms @ 25°C

Discharge Tests:  
220 VAC @ 85°C for 42 days,  
then cycle at 1/10 sec/hr. for  
42 days at 440 VAC  
50% humidity

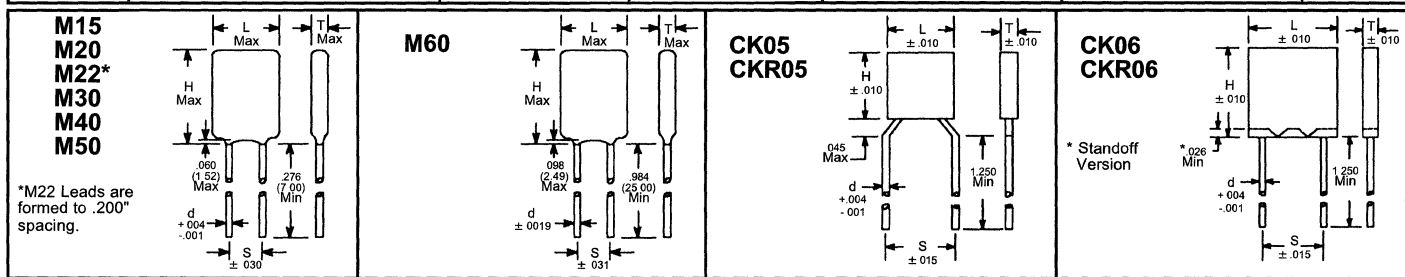
Capacity $\mu$ F	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	
<b>125 VAC(RMS) / 2000 VDC</b>											
.001	20%	Z5U	.472	.315	.375	.032	12.0	8.0	9.5	.81	UN102M
.0015	20%	Z5U	.472	.315	.375	.032	12.0	8.0	9.5	.81	UN152M
.002	20%	Z5U	.472	.315	.375	.032	12.0	8.0	9.5	.81	UN202M
.003	20%	Z5U	.590	.315	.375	.032	15.0	8.0	9.5	.81	UN302M
.0047	20%	Z5U	.748	.315	.375	.032	19.0	8.0	9.5	.81	UN472M

Capacity $\mu$ F	Tol	Temp Coef	Size (Inches)				Size (Millimeters)				Catalog Number
			D	T	S	d	D	T	S	d	
<b>125 VAC(RMS) / 2000 VDC</b>											
.005	20%	Z5U	.748	.315	.375	.032	19.0	8.0	9.5	.81	UN502M
.0068	20%	Z5U	.787	.315	.375	.032	20.0	8.0	9.5	.81	UN682M
.01	20%	Z5U	.905	.315	.500	.032	23.0	8.0	12.7	.81	UN103M
.01	20%	Z5U	.905	.315	.375	.032	23.0	8.0	9.5	.81	UN103MS

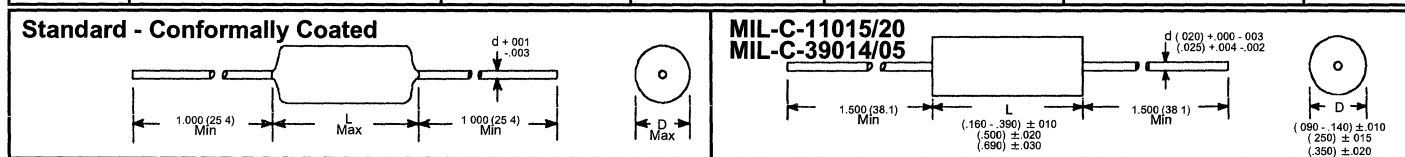
# Index and Dimensions Multilayer Ceramic Capacitors



Type	Style	Capacitance Range	Voltages	Dimensions (Inches)					Dimensions (Millimeters)					Page Number
				L	H	T	S	d	L	H	T	S	d	
<b>Radial Leaded</b>														
<b>M15</b>	Standard - Conformally Coated	1.0pF to .1 $\mu$ F	50, 100, 200	.150	.210	.100	.100	.020	3.8	5.3	2.5	2.5	.51	<b>115</b>
<b>M20</b> <b>M22</b>	Standard - Conformally Coated Standard - Conformally Coated	1.0pF to .56 $\mu$ F 1.0pF to .56 $\mu$ F	50, 100, 200 50, 100, 200	.200	.260	.125	.100	.020	5.1	6.6	3.2	2.5	.51	
<b>M30</b>	Standard - Conformally Coated	2700pF to 1.8 $\mu$ F	50, 100, 200	.300	.360	.150	.200	.020	7.6	9.1	3.8	5.1	.51	
<b>M40</b>	Standard - Conformally Coated	.012 $\mu$ F to 4.7 $\mu$ F	50, 100, 200	.400	.460	.150	.200	.020	10.2	11.7	3.8	5.1	.51	
<b>M50</b>	Standard - Conformally Coated	.039 $\mu$ F to 6.8 $\mu$ F	50, 100, 200	.500	.560	.200	.400	.025	12.7	14.2	5.1	10.2	.64	
<b>M60</b>	Standard - Conformally Coated	.1 $\mu$ F to 100 $\mu$ F	25, 50, 100, 250	See Standard Parts List									<b>119</b>	
<b>CK05</b> <b>CKR05</b>	MIL-C-11015/18 - Molded MIL-C-39014/01 - Molded	10pF to .1 $\mu$ F 10pF to .1 $\mu$ F	50, 100, 200 50, 100, 200	.190	.190	.090	.200	.025	4.83	4.83	2.29	5.08	.64	<b>122</b>
<b>CK06</b> <b>CKR06</b>	MIL-C-11015/19 - Molded MIL-C-39014/02 - Molded	1200pF to 1.0 $\mu$ F 1200pF to 1.0 $\mu$ F	50, 100, 200 50, 100, 200	.290	.290	.090	.200	.025	7.37	7.37	2.29	5.08	.64	<b>123</b>



Type	Style	Capacitance Range	Voltages	Dimensions (Inches)			Dimensions (Millimeters)			Page Number
				D	L	d	D	L	d	
<b>Axial Leaded</b>										
<b>P10</b>	Standard - Conformally Coated	10pF to .22 $\mu$ F	50, 100	.100	.170	.020	2.54	4.32	.51	<b>120</b>
<b>P12</b>	Standard - Conformally Coated	1200pF to .33 $\mu$ F	50, 100	.120	.170	.020	3.05	4.32	.51	
<b>P20</b>	Standard - Conformally Coated	560pF to .33 $\mu$ F	50, 100	.100	.260	.020	2.54	6.60	.51	
<b>P30</b>	Standard - Conformally Coated	1800pF to .47 $\mu$ F	50, 100	.150	.290	.020	3.81	7.37	.51	
<b>P40</b>	Standard - Conformally Coated	1800pF to .47 $\mu$ F	50, 100	.150	.400	.020	3.81	10.16	.51	
<b>CK12</b> <b>CKR11</b>	MIL-C-11015/20 - Molded MIL-C-39014/05 - Molded	10pF to .01 $\mu$ F 10pF to .01 $\mu$ F	50, 100 50, 100	.090	.160	.020	2.29	4.04	.51	<b>123</b>
<b>CK13</b> <b>CKR12</b>	MIL-C-11015/20 - Molded MIL-C-39014/05 - Molded	5600pF to .047 $\mu$ F 5600pF to .047 $\mu$ F	50, 100 50, 100	.090	.250	.020	2.29	6.35	.51	<b>124</b>
<b>CK14</b> <b>CKR14</b>	MIL-C-11015/20 - Molded MIL-C-39014/05 - Molded	.012 $\mu$ F to .27 $\mu$ F .012 $\mu$ F to .27 $\mu$ F	50, 100 50, 100	.140	.390	.025	3.56	9.91	.64	<b>124</b>
<b>CK15</b> <b>CKR15</b>	MIL-C-11015/20 - Molded MIL-C-39014/05 - Molded	.056 $\mu$ F to 1.0 $\mu$ F .056 $\mu$ F to 1.0 $\mu$ F	50, 100 50, 100	.250	.500	.025	6.35	12.70	.64	<b>124</b>
<b>CK16</b> <b>CKR16</b>	MIL-C-11015/20 - Molded MIL-C-39014/05 - Molded	.47 $\mu$ F to 3.3 $\mu$ F .47 $\mu$ F to 3.3 $\mu$ F	50, 100 50, 100	.350	.690	.025	8.89	17.53	.64	<b>124</b>



Type	Size Codes	Capacitance Range	Voltages	Dimensions	Page
<b>CHIPS</b>	0805, 1206, 1210	1 pF to .82 $\mu$ F	50, 100, 200	See Standard Parts List	<b>62</b>

# Performance Characteristics Multilayer Ceramic Capacitors

**MALLORY**

Multilayer Ceramic Capacitors

The EIA Standard for ceramic dielectric capacitors (RS-198C) divides them into three classes. MALLORY multilayer ceramic capacitors are available in the three most popular temperature characteristics:

**COG: Class I (Also known as 'NPO')**  
**Temperature Compensating capacitors**, suitable for resonant circuits where stable capacitance and high Q are necessary. They are made of non ferro-electric materials yielding superior stability and low volumetric efficiency.

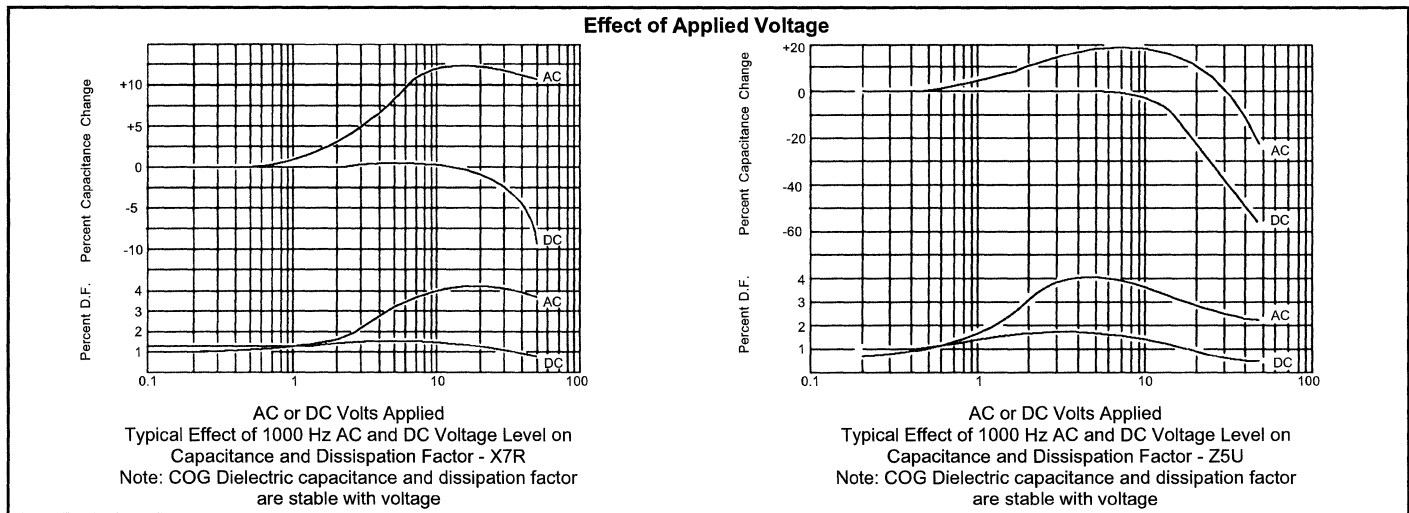
**X7R: Class II**  
**Stable capacitors**, made of ferro electric materials, yielding higher volumetric efficiency but less stability. These capacitors are suitable for by-pass or coupling applications where stability and Q are not a major factor.

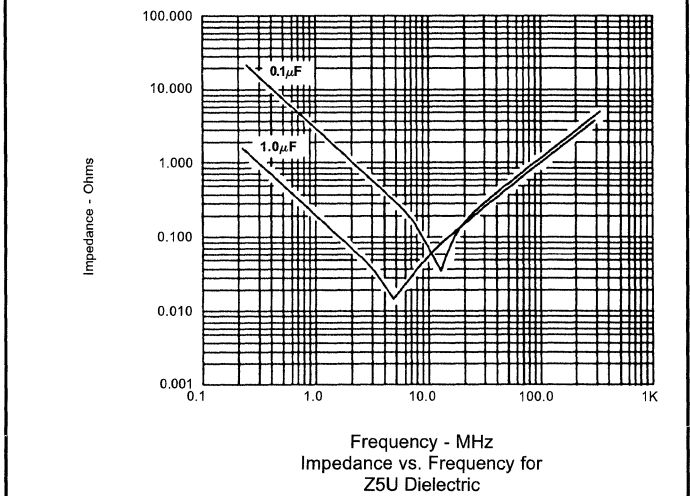
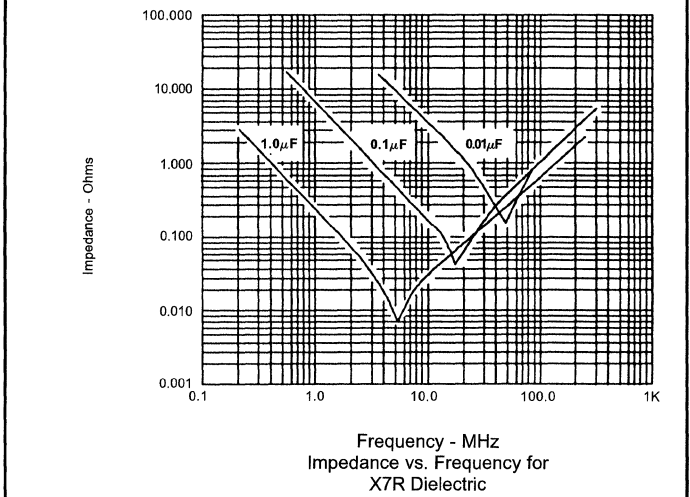
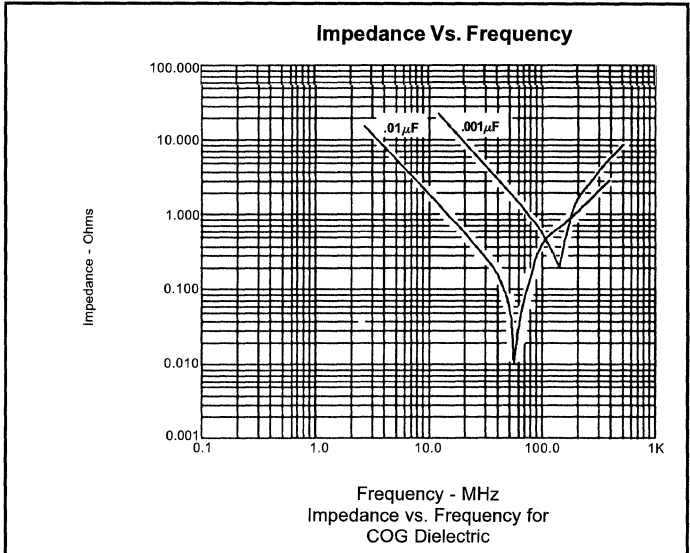
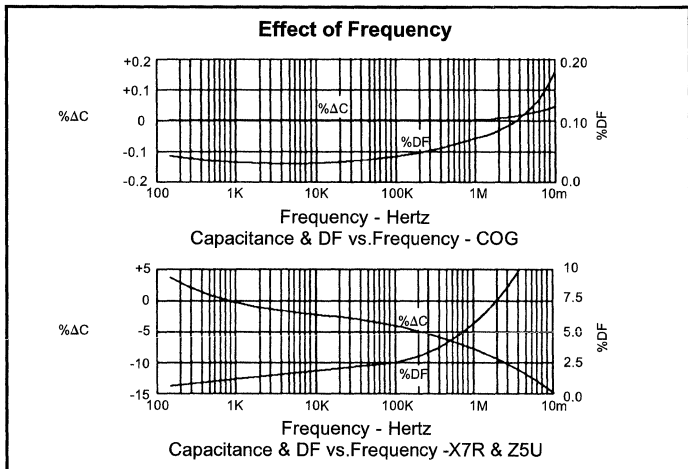
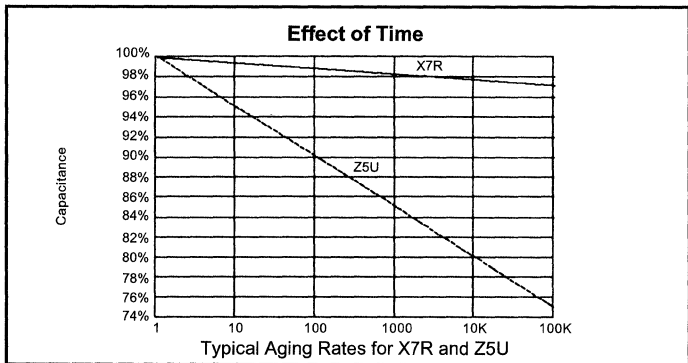
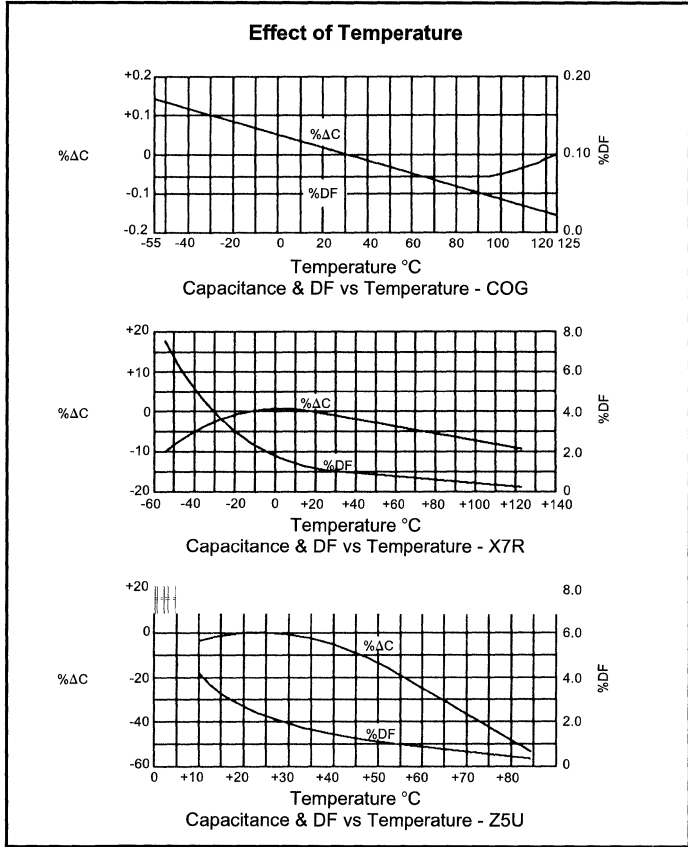
**Z5U: Class III**  
**General Purpose capacitors**, suitable for bypass coupling where dielectric losses, high insulation resistance and stability are not required. Made of ferro-electric materials, Class III capacitors have the lowest stability, but the highest volumetric efficiency.

Parameter	COG (NPO)	X7R	Z5U
<b>Temperature Characteristics:</b>			
Range, °C: .....	-55°C to +125°C .....	-55°C to +125°C .....	+10°C to +85°C .....
Capacitance change without DC voltage: .....	0 ±30 PPM/°C * .....	±15 % .....	+22 %, -56 % .....
<b>Aging Rate: % ΔC / Decade Hour, Maximum. ....</b>			
	0 % .....	2.5 % .....	5.0 % .....
<b>Dissipation Factor:</b>			
Test Conditions @ 25°C: .....	> 1000 pF w/1.0 vrms @ 1 KHz. ....	w/ 1.0 vrms @ 1 KHz. ....	w/ 0.5 vrms @ 1 KHz. ....
	≤ 1000 pF w/1.0 vrms @ 1 MHz. ....		
Limits: .....	0.15 % Max. ....	2.5 % Max. ....	3.0 % Max. ....
<b>Insulation Resistance (IR):</b>			
At rated voltage, whichever is smaller: .....	1000 megohms x μF ..... or 100 gigaohms	1000 megohms x μF ..... or 100 gigaohms	1000 megohms x μF ..... or 10 gigaohms
<b>Moisture Resistance: EIA RS-198C, Method B2, Condition A</b> (10 cycles without applied voltage)			
Post test limits @ 25°C, whichever is smaller: .....	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 1 gigaohm
<b>Immersion Cycling: EIA RS-198C Method D2, Condition A</b> (2 cycles @ 15 minutes each. Each cycle consists of immersion in hot bath @ 65°C followed by immersion in cold tap water.)			
Post test limits @ 25°C :			
Insulation Resistance, whichever is smaller: .....	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 1 gigaohm
<b>Life Test: - 1000 Hrs.</b>			
Test Potential and Temperature: .....	200 % V @ 125°C .....	200 % V @ 125°C .....	150 % V @ 85°C .....
Post test limits @ 25°C:			
Capacitance Change, whichever is greater: .....	±2% or 0.5pF .....	±20% of initial value** .....	±30 % of initial value** .....
Dissipation Factor: .....	0.25 % Max. ....	3.0 % Max. ....	4.0 % Max. ....
Insulation Resistance, whichever is smaller: .....	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 10 gigaohms	100 megohms x μF ..... or 1 gigaohm
Dielectric Strength 2.5 times rated voltage with current limited to 50 mA.			

\* 60 PPM/°C below 10pF nominal.  
 +53 PPM -30 PPM/°C from +25°C to -55°C comparable to MIL-C-20

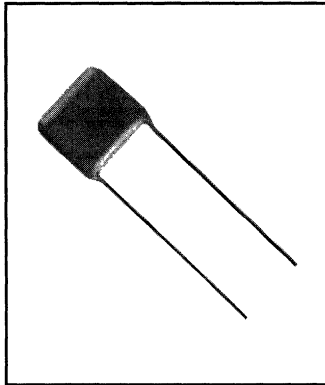
\*\* X7R and Z5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be deaged for 2 hours @ 150°C and stabilized at room temperature for 48 hours before capacitor measurements are made.





# M15 to M50 Series Multilayer Ceramic Capacitors

**MALORY**



- Radial Leaded  
Conformally Coated
- Encapsulation consists of a moisture and shock resistant coating that meets UL94V-0
- Over 300 CV values available
- Applications :  
Filtering, Bypass, Coupling

## GENERAL SPECIFICATIONS

Voltage Range:  
50, 100, 200 VDC

Capacitance Range:  
1 pF to 6.8  $\mu$ F

Temperature Coefficients:  
COG(NPO), X7R, Z5U

Available in Tape and Reel configuration:  
Add 'TR' to end of catalog number.

Multilayer Ceramic Capacitors

## COG (NPO) Temperature Coefficient 200 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
1.0 pF	.150	.210	.100	.100	M15G109D2
1.0 pF	.200	.260	.125	.100	M20G109D2
1.0 pF	.200	.260	.125	.200	M22G109D2
1.5 pF	.150	.210	.100	.100	M15G159D2
1.5 pF	.200	.260	.125	.100	M20G159D2
1.5 pF	.200	.260	.125	.200	M22G159D2
2.2 pF	.150	.210	.100	.100	M15G229D2
2.2 pF	.200	.260	.125	.100	M20G229D2
2.2 pF	.200	.260	.125	.200	M22G229D2
2.7 pF	.150	.210	.100	.100	M15G279D2
2.7 pF	.200	.260	.125	.100	M20G279D2
2.7 pF	.200	.260	.125	.200	M22G279D2
3.3 pF	.150	.210	.100	.100	M15G339D2
3.3 pF	.200	.260	.125	.100	M20G339D2
3.3 pF	.200	.260	.125	.200	M22G339D2
3.9 pF	.150	.210	.100	.100	M15G399D2
3.9 pF	.200	.260	.125	.100	M20G399D2
3.9 pF	.200	.260	.125	.200	M22G399D2
4.7 pF	.150	.210	.100	.100	M15G479D2
4.7 pF	.200	.260	.125	.100	M20G479D2
4.7 pF	.200	.260	.125	.200	M22G479D2
5.6 pF	.150	.210	.100	.100	M15G569D2
5.6 pF	.200	.260	.125	.100	M20G569D2
5.6 pF	.200	.260	.125	.200	M22G569D2
6.8 pF	.150	.210	.100	.100	M15G689D2
6.8 pF	.200	.260	.125	.100	M20G689D2
6.8 pF	.200	.260	.125	.200	M22G689D2
8.2 pF	.150	.210	.100	.100	M15G829D2
8.2 pF	.200	.260	.125	.100	M20G829D2
8.2 pF	.200	.260	.125	.200	M22G829D2
10 pF	.150	.210	.100	.100	M15G100*2
10 pF	.200	.260	.125	.100	M20G100*2
10 pF	.200	.260	.125	.200	M22G100*2
12 pF	.150	.210	.100	.100	M15G120*2
12 pF	.200	.260	.125	.100	M20G120*2
12 pF	.200	.260	.125	.200	M22G120*2
15 pF	.150	.210	.100	.100	M15G150*2
15 pF	.200	.260	.125	.100	M20G150*2
15 pF	.200	.260	.125	.200	M22G150*2
18 pF	.150	.210	.100	.100	M15G180*2
18 pF	.200	.260	.125	.100	M20G180*2
18 pF	.200	.260	.125	.200	M22G180*2
22 pF	.150	.210	.100	.100	M15G220*2
22 pF	.200	.260	.125	.100	M20G220*2
22 pF	.200	.260	.125	.200	M22G220*2

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
27 pF	.150	.210	.100	.100	M15G270*2
27 pF	.200	.260	.125	.100	M20G270*2
27 pF	.200	.260	.125	.200	M22G270*2
33 pF	.150	.210	.100	.100	M15G330*2
33 pF	.200	.260	.125	.100	M20G330*2
33 pF	.200	.260	.125	.200	M22G330*2
39 pF	.150	.210	.100	.100	M15G390*2
39 pF	.200	.260	.125	.100	M20G390*2
39 pF	.200	.260	.125	.200	M22G390*2
47 pF	.150	.210	.100	.100	M15G470*2
47 pF	.200	.260	.125	.100	M20G470*2
47 pF	.200	.260	.125	.200	M22G470*2
56 pF	.150	.210	.100	.100	M15G560*2
56 pF	.200	.260	.125	.100	M20G560*2
56 pF	.200	.260	.125	.200	M22G560*2
68 pF	.150	.210	.100	.100	M15G680*2
68 pF	.200	.260	.125	.100	M20G680*2
68 pF	.200	.260	.125	.200	M22G680*2
82 pF	.150	.210	.100	.100	M15G820*2
82 pF	.200	.260	.125	.100	M20G820*2
82 pF	.200	.260	.125	.200	M22G820*2
100 pF	.150	.210	.100	.100	M15G100*2
100 pF	.200	.260	.125	.100	M20G100*2
100 pF	.200	.260	.125	.200	M22G100*2
120 pF	.150	.210	.100	.100	M15G120*2
120 pF	.200	.260	.125	.100	M20G120*2
120 pF	.200	.260	.125	.200	M22G120*2
150 pF	.150	.210	.100	.100	M15G150*2
150 pF	.200	.260	.125	.100	M20G150*2
150 pF	.200	.260	.125	.200	M22G150*2
180 pF	.150	.210	.100	.100	M15G180*2
180 pF	.200	.260	.125	.100	M20G180*2
180 pF	.200	.260	.125	.200	M22G180*2
220 pF	.150	.210	.100	.100	M15G220*2
220 pF	.200	.260	.125	.100	M20G220*2
220 pF	.200	.260	.125	.200	M22G220*2
270 pF	.150	.210	.100	.100	M15G270*2
270 pF	.200	.260	.125	.100	M20G270*2
270 pF	.200	.260	.125	.200	M22G270*2
330 pF	.150	.210	.100	.100	M15G330*2
330 pF	.200	.260	.125	.100	M20G330*2
330 pF	.200	.260	.125	.200	M22G330*2
390 pF	.150	.210	.100	.100	M15G390*2
390 pF	.200	.260	.125	.100	M20G390*2
390 pF	.200	.260	.125	.200	M22G390*2

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
470 pF	.150	.210	.100	.100	M15G470*2
470 pF	.200	.260	.125	.100	M20G470*2
470 pF	.200	.260	.125	.200	M22G470*2
560 pF	.200	.260	.125	.100	M20G560*2
560 pF	.200	.260	.125	.200	M22G560*2
680 pF	.200	.260	.125	.100	M20G680*2
680 pF	.200	.260	.125	.200	M22G680*2
820 pF	.200	.260	.125	.100	M20G820*2
820 pF	.200	.260	.125	.200	M22G820*2
1000 pF	.200	.260	.125	.100	M20G1000*2
1000 pF	.200	.260	.125	.200	M22G1000*2
1200 pF	.200	.260	.125	.100	M20G1200*2
1200 pF	.200	.260	.125	.200	M22G1200*2
1500 pF	.200	.260	.125	.100	M20G1500*2
1500 pF	.200	.260	.125	.200	M22G1500*2
1800 pF	.200	.260	.125	.100	M20G1800*2
1800 pF	.200	.260	.125	.200	M22G1800*2
2200 pF	.200	.260	.125	.100	M20G2200*2
2200 pF	.200	.260	.125	.200	M22G2200*2
2700 pF	.200	.260	.125	.100	M20G2700*2
2700 pF	.200	.260	.125	.200	M22G2700*2
2700 pF	.300	.360	.150	.200	M30G2700*2
3300 pF	.200	.260	.125	.100	M20G3300*2
3300 pF	.200	.260	.125	.200	M22G3300*2
3300 pF	.300	.360	.150	.200	M30G3300*2
3900 pF	.300	.360	.150	.200	M30G3900*2
4700 pF	.300	.360	.150	.200	M30G4700*2
5600 pF	.300	.360	.150	.200	M30G5600*2
6800 pF	.300	.360	.150	.200	M30G6800*2
8200 pF	.300	.360	.150	.200	M30G8200*2
.01 $\mu$ F	.300	.360	.150	.200	M30G010*2
.012 $\mu$ F	.300	.360	.150	.200	M30G012*2
.012 $\mu$ F	.400	.460	.150	.200	M40G012*2
.015 $\mu$ F	.300	.360	.150	.200	M30G015*2
.015 $\mu$ F	.400	.460	.150	.200	M40G015*2
.018 $\mu$ F	.300	.360	.150	.200	M30G018*2
.018 $\mu$ F	.400	.460	.150	.200	M40G018*2
.022 $\mu$ F	.400	.460	.150	.200	M40G022*2
.027 $\mu$ F	.400	.460	.150	.200	M40G027*2
.033 $\mu$ F	.400	.460	.150	.200	M40G033*2
.039 $\mu$ F	.400	.460	.150	.200	M40G039*2
.039 $\mu$ F	.500	.560	.200	.400	M50G039*2
.047 $\mu$ F	.400	.460	.150	.200	M40G047*2
.047 $\mu$ F	.500	.560	.200	.400	M50G047*2
.056 $\mu$ F	.500	.560	.200	.400	M50G056*2
.068 $\mu$ F	.500	.560	.200	.400	M50G068*2

Add 'TR' to end of part number for Tape & Reel  
M15, M20, M22 - 2,500 per reel  
M30 - 1,500 per reel  
M40 - 1,000 per reel  
M50 - N/A  
(Available in full reels only)

\* Insert proper letter symbol for tolerance:  
10 pF to 22 pF: J =  $\pm$ 5%, K =  $\pm$ 10%  
27 pF to 47 pF: G =  $\pm$ 2%, J =  $\pm$ 5%, K =  $\pm$ 10%  
56 pF & Up: F =  $\pm$ 1%, G =  $\pm$ 2%, J =  $\pm$ 5%, K =  $\pm$ 10%  
(1 pF to 8.2 pF available in D =  $\pm$ .5 pF only.)

# M15 to M50 Series Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors

## COG (NPO) Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
120 pF	.150	.210	.100	.100	M15G121*1
150 pF	.150	.210	.100	.100	M15G151*1
180 pF	.150	.210	.100	.100	M15G181*1
220 pF	.150	.210	.100	.100	M15G221*1
270 pF	.150	.210	.100	.100	M15G271*1
330 pF	.150	.210	.100	.100	M15G331*1
470 pF	.150	.210	.100	.100	M15G471*1
560 pF	.150	.210	.100	.100	M15G561*1
680 pF	.150	.210	.100	.100	M15G681*1
680 pF	.200	.260	.125	.100	M20G681*1
680 pF	.200	.260	.125	.200	M22G681*1
820 pF	.150	.210	.100	.100	M15G821*1
820 pF	.200	.260	.125	.100	M20G821*1
820 pF	.200	.260	.125	.200	M22G821*1
1000 pF	.150	.210	.100	.100	M15G102*1
1000 pF	.200	.260	.125	.100	M20G102*1
1000 pF	.200	.260	.125	.200	M22G102*1
1200 pF	.200	.260	.125	.100	M20G122*1
1200 pF	.200	.260	.125	.200	M22G122*1
1500 pF	.200	.260	.125	.100	M20G152*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
1500 pF	.200	.260	.125	.200	M22G152*1
1800 pF	.200	.260	.125	.100	M20G182*1
1800 pF	.200	.260	.125	.200	M22G182*1
2200 pF	.200	.260	.125	.100	M20G222*1
2200 pF	.200	.260	.125	.200	M22G222*1
2700 pF	.200	.260	.125	.100	M20G272*1
2700 pF	.200	.260	.125	.200	M22G272*1
3300 pF	.200	.260	.125	.100	M20G332*1
3300 pF	.200	.260	.125	.200	M22G332*1
3300 pF	.300	.360	.150	.200	M30G332*1
3900 pF	.200	.260	.125	.100	M20G392*1
3900 pF	.200	.260	.125	.200	M22G392*1
3900 pF	.300	.360	.150	.200	M30G392*1
4700 pF	.200	.260	.125	.100	M20G472*1
4700 pF	.200	.260	.125	.200	M22G472*1
4700 pF	.300	.360	.150	.200	M30G472*1
5600 pF	.200	.260	.125	.100	M20G562*1
5600 pF	.200	.260	.125	.200	M22G562*1
5600 pF	.300	.360	.150	.200	M30G562*1
6800 pF	.300	.360	.150	.200	M30G682*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
8200 pF	.300	.360	.150	.200	M30G822*1
.01 uF	.300	.360	.150	.200	M30G103*1
.012 uF	.300	.360	.150	.200	M30G123*1
.015 uF	.300	.360	.150	.200	M30G153*1
.018 uF	.300	.360	.150	.200	M30G183*1
.022 uF	.300	.360	.150	.200	M30G223*1
.027 uF	.300	.360	.150	.200	M30G273*1
.027 uF	.400	.460	.150	.200	M40G273*1
.033 uF	.400	.460	.150	.200	M40G333*1
.039 uF	.400	.460	.150	.200	M40G393*1
.039 uF	.500	.560	.200	.400	M50G393*1
.047 uF	.400	.460	.150	.200	M40G473*1
.047 uF	.500	.560	.200	.400	M50G473*1
.056 uF	.400	.460	.150	.200	M40G563*1
.056 uF	.500	.560	.200	.400	M50G563*1
.068 uF	.400	.460	.150	.200	M40G683*1
.068 uF	.500	.560	.200	.400	M50G683*1
.082 uF	.500	.560	.200	.400	M50G823*1
.1 uF	.500	.560	.200	.400	M50G104*1
.12 uF	.500	.560	.200	.400	M50G124*1

\* Insert proper letter symbol for tolerance:  
 10 pF to 22 pF: J = 5%, K = ±10%  
 27 pF to 47 pF: G = ±2%, J = ±5%, K = ±10%  
 56 pF & Up: F = ±1%, G = ±2%, J = ±5%, K = ±10%  
 (1 pF to 8.2 pF available in D = ±.5 pF only.)

## X7R Temperature Coefficient 200 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
100 pF	.150	.210	.100	.100	M15R101*2
120 pF	.150	.210	.100	.100	M15R121*2
150 pF	.150	.210	.100	.100	M15R151*2
180 pF	.150	.210	.100	.100	M15R181*2
220 pF	.150	.210	.100	.100	M15R221*2
270 pF	.150	.210	.100	.100	M15R271*2
330 pF	.150	.210	.100	.100	M15R331*2
390 pF	.150	.210	.100	.100	M15R391*2
470 pF	.150	.210	.100	.100	M15R471*2
560 pF	.150	.210	.100	.100	M15R561*2
680 pF	.150	.210	.100	.100	M15R681*2
820 pF	.150	.210	.100	.100	M15R821*2
1000 pF	.150	.210	.100	.100	M15R102*2
1000 pF	.200	.260	.125	.100	M20R102*2
1000 pF	.200	.260	.125	.200	M22R102*2
1200 pF	.150	.210	.100	.100	M15R122*2
1200 pF	.200	.260	.125	.100	M20R122*2
1200 pF	.200	.260	.125	.200	M22R122*2
1500 pF	.150	.210	.100	.100	M15R152*2
1500 pF	.200	.260	.125	.100	M20R152*2
1500 pF	.200	.260	.125	.200	M22R152*2
1800 pF	.150	.210	.100	.100	M15R182*2
1800 pF	.200	.260	.125	.100	M20R182*2
1800 pF	.200	.260	.125	.200	M22R182*2

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
2200 pF	.150	.210	.100	.100	M15R222*2
2200 pF	.200	.260	.125	.100	M20R222*2
2200 pF	.200	.260	.125	.200	M22R222*2
2700 pF	.200	.260	.125	.100	M20R272*2
2700 pF	.200	.260	.125	.200	M22R272*2
3300 pF	.200	.260	.125	.100	M20R332*2
3300 pF	.200	.260	.125	.200	M22R332*2
3900 pF	.200	.260	.125	.100	M20R392*2
3900 pF	.200	.260	.125	.200	M22R392*2
4700 pF	.200	.260	.125	.100	M20R472*2
4700 pF	.200	.260	.125	.200	M22R472*2
5600 pF	.200	.260	.125	.100	M20R562*2
5600 pF	.200	.260	.125	.200	M22R562*2
6800 pF	.200	.260	.125	.100	M20R682*2
6800 pF	.200	.260	.125	.200	M22R682*2
8200 pF	.200	.260	.125	.100	M20R822*2
8200 pF	.200	.260	.125	.200	M22R822*2
.01 uF	.200	.260	.125	.100	M20R103*2
.01 uF	.200	.260	.125	.200	M22R103*2
.012 uF	.200	.260	.125	.100	M20R123*2
.012 uF	.200	.260	.125	.200	M22R123*2
.015 uF	.200	.260	.125	.100	M20R153*2
.015 uF	.200	.260	.125	.200	M22R153*2
.015 uF	.300	.360	.150	.200	M30R153*2

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.018 uF	.200	.260	.125	.100	M20R183*2
.018 uF	.200	.260	.125	.200	M22R183*2
.018 uF	.300	.360	.150	.200	M30R183*2
.022 uF	.200	.260	.125	.100	M20R223*2
.022 uF	.200	.260	.125	.200	M22R223*2
.022 uF	.300	.360	.150	.200	M30R223*2
.027 uF	.300	.360	.150	.200	M30R273*2
.033 uF	.300	.360	.150	.200	M30R333*2
.039 uF	.300	.360	.150	.200	M30R393*2
.047 uF	.300	.360	.150	.200	M30R473*2
.056 uF	.300	.360	.150	.200	M30R563*2
.068 uF	.300	.360	.150	.200	M30R683*2
.082 uF	.300	.360	.150	.200	M30R823*2
.082 uF	.400	.460	.150	.200	M40R823*2
.1 uF	.300	.360	.150	.200	M30R104*2
.1 uF	.400	.460	.150	.200	M40R104*2
.12 uF	.400	.460	.150	.200	M40R124*2
.15 uF	.400	.460	.150	.200	M40R154*2
.18 uF	.400	.460	.150	.200	M40R184*2
.22 uF	.400	.460	.150	.200	M40R224*2
.22 uF	.500	.560	.200	.400	M50R224*2
.27 uF	.400	.460	.150	.200	M40R274*2
.27 uF	.500	.560	.200	.400	M50R274*2
.33 uF	.500	.560	.200	.400	M50R334*2
.39 uF	.500	.560	.200	.400	M50R394*2
.47 uF	.500	.560	.200	.400	M50R474*2

Add "TR" to end of part number for Tape & Reel  
 M15, M20, M22 - 2,500 per reel  
 M30 - 1,500 per reel  
 M40 - 1,000 per reel  
 M50 - N/A  
 (Available in full reels only)

\* Insert proper letter symbol for tolerance:  
 K = ±10%, M = ±20%



# M15 to M50 Series Multilayer Ceramic Capacitors

**MALLORY**

Multilayer Ceramic Capacitors

## X7R Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
820 pF	.150	.210	.100	.100	M15R821*1
1000 pF	.150	.210	.100	.100	M15R102*1
1200 pF	.150	.210	.100	.100	M15R122*1
1500 pF	.150	.210	.100	.100	M15R152*1
1800 pF	.150	.210	.100	.100	M15R182*1
2200 pF	.150	.210	.100	.100	M15R222*1
2700 pF	.150	.210	.100	.100	M15R272*1
3300 pF	.150	.210	.100	.100	M15R332*1
3900 pF	.150	.210	.100	.100	M15R392*1
4700 pF	.150	.210	.100	.100	M15R472*1
4700 pF	.200	.260	.125	.100	M20R472*1
4700 pF	.200	.260	.125	.200	M22R472*1
5600 pF	.150	.210	.100	.100	M15R562*1
5600 pF	.200	.260	.125	.100	M20R562*1
5600 pF	.200	.260	.125	.200	M22R562*1
6800 pF	.150	.210	.100	.100	M15R682*1
6800 pF	.200	.260	.125	.100	M20R682*1
6800 pF	.200	.260	.125	.200	M22R682*1
8200 pF	.150	.210	.100	.100	M15R822*1
8200 pF	.200	.260	.125	.100	M20R822*1
8200 pF	.200	.260	.125	.200	M22R822*1
.01 uF	.150	.210	.100	.100	M15R103*1
.01 uF	.200	.260	.125	.100	M20R103*1
.01 uF	.200	.260	.125	.200	M22R103*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.012 uF	.200	.260	.125	.100	M20R123*1
.012 uF	.200	.260	.125	.200	M22R123*1
.015 uF	.200	.260	.125	.100	M20R153*1
.015 uF	.200	.260	.125	.200	M22R153*1
.018 uF	.200	.260	.125	.100	M20R183*1
.018 uF	.200	.260	.125	.200	M22R183*1
.022 uF	.200	.260	.125	.100	M20R223*1
.022 uF	.200	.260	.125	.200	M22R223*1
.027 uF	.200	.260	.125	.100	M20R273*1
.027 uF	.200	.260	.125	.200	M22R273*1
.033 uF	.200	.260	.125	.100	M20R333*1
.033 uF	.200	.260	.125	.200	M22R333*1
.039 uF	.200	.260	.125	.100	M20R393*1
.039 uF	.200	.260	.125	.200	M22R393*1
.047 uF	.200	.260	.125	.100	M20R473*1
.047 uF	.200	.260	.125	.200	M22R473*1
.056 uF	.200	.260	.125	.100	M20R563*1
.056 uF	.200	.260	.125	.200	M22R563*1
.068 uF	.200	.260	.125	.100	M20R683*1
.068 uF	.200	.260	.125	.200	M22R683*1
.068 uF	.300	.360	.150	.200	M30R683*1
.082 uF	.200	.260	.125	.100	M20R823*1
.082 uF	.200	.260	.125	.200	M22R823*1
.082 uF	.300	.360	.150	.200	M30R823*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.1 uF	.200	.260	.125	.100	M20R104*1
.1 uF	.200	.260	.125	.200	M22R104*1
.1 uF	.300	.360	.150	.200	M30R104*1
.12 uF	.300	.360	.150	.200	M30R124*1
.15 uF	.300	.360	.150	.200	M30R154*1
.18 uF	.300	.360	.150	.200	M30R184*1
.22 uF	.300	.360	.150	.200	M30R224*1
.27 uF	.300	.360	.150	.200	M30R274*1
.33 uF	.300	.360	.150	.200	M30R334*1
.33 uF	.400	.460	.150	.200	M40R334*1
.39 uF	.300	.360	.150	.200	M30R394*1
.39 uF	.400	.460	.150	.200	M40R394*1
.47 uF	.300	.360	.150	.200	M30R474*1
.47 uF	.400	.460	.150	.200	M40R474*1
.56 uF	.400	.460	.150	.200	M40R564*1
.68 uF	.400	.460	.150	.200	M40R684*1
.68 uF	.500	.560	.200	.400	M50R684*1
.82 uF	.400	.460	.150	.200	M40R824*1
.82 uF	.500	.560	.200	.400	M50R824*1
1.0 uF	.400	.460	.150	.200	M40R105*1
1.0 uF	.500	.560	.200	.400	M50R105*1
1.2 uF	.500	.560	.200	.400	M50R125*1

\* Insert proper letter symbol for tolerance:  
K = ±10%, M = ±20%

## X7R Temperature Coefficient 50 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
3300 pF	.150	.210	.100	.100	M15R332*5
3900 pF	.150	.210	.100	.100	M15R392*5
4700 pF	.150	.210	.100	.100	M15R472*5
5600 pF	.150	.210	.100	.100	M15R562*5
6800 pF	.150	.210	.100	.100	M15R682*5
8200 pF	.150	.210	.100	.100	M15R822*5
.01 uF	.150	.210	.100	.100	M15R103*5
.012 uF	.150	.210	.100	.100	M15R123*5
.012 uF	.200	.260	.125	.100	M20R123*5
.012 uF	.200	.260	.125	.200	M22R123*5
.015 uF	.150	.210	.100	.100	M15R153*5
.015 uF	.200	.260	.125	.100	M20R153*5
.015 uF	.200	.260	.125	.200	M22R153*5
.018 uF	.150	.210	.100	.100	M15R183*5
.018 uF	.200	.260	.125	.100	M20R183*5
.018 uF	.200	.260	.125	.200	M22R183*5
.022 uF	.150	.210	.100	.100	M15R223*5
.022 uF	.200	.260	.125	.100	M20R223*5
.022 uF	.200	.260	.125	.200	M22R223*5
.027 uF	.150	.210	.100	.100	M15R273*5
.027 uF	.200	.260	.125	.100	M20R273*5
.027 uF	.200	.260	.125	.200	M22R273*5

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.033 uF	.150	.210	.100	.100	M15R333*5
.033 uF	.200	.260	.125	.100	M20R333*5
.033 uF	.200	.260	.125	.200	M22R333*5
.039 uF	.200	.260	.125	.100	M20R393*5
.039 uF	.200	.260	.125	.200	M22R393*5
.047 uF	.200	.260	.125	.100	M20R473*5
.047 uF	.200	.260	.125	.200	M22R473*5
.056 uF	.200	.260	.125	.100	M20R563*5
.056 uF	.200	.260	.125	.200	M22R563*5
.068 uF	.200	.260	.125	.100	M20R683*5
.068 uF	.200	.260	.125	.200	M22R683*5
.082 uF	.200	.260	.125	.100	M20R823*5
.082 uF	.200	.260	.125	.200	M22R823*5
.1 uF	.200	.260	.125	.100	M20R104*5
.1 uF	.200	.260	.125	.200	M22R104*5
.12 uF	.200	.260	.125	.100	M20R124*5
.12 uF	.200	.260	.125	.200	M22R124*5
.15 uF	.200	.260	.125	.100	M20R154*5
.15 uF	.200	.260	.125	.200	M22R154*5
.15 uF	.300	.360	.150	.200	M30R154*5
.18 uF	.200	.260	.125	.100	M20R184*5
.18 uF	.200	.260	.125	.200	M22R184*5
.18 uF	.300	.360	.150	.200	M30R184*5

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.22 uF	.200	.260	.125	.100	M20R224*5
.22 uF	.200	.260	.125	.200	M22R224*5
.22 uF	.300	.360	.150	.200	M30R224*5
.27 uF	.200	.260	.125	.100	M20R274*5
.27 uF	.200	.260	.125	.200	M22R274*5
.27 uF	.300	.360	.150	.200	M30R274*5
.33 uF	.300	.360	.150	.200	M30R334*5
.39 uF	.300	.360	.150	.200	M30R394*5
.47 uF	.300	.360	.150	.200	M30R474*5
.56 uF	.300	.360	.150	.200	M30R564*5
.68 uF	.300	.360	.150	.200	M30R684*5
.82 uF	.300	.360	.150	.200	M30R824*5
1.0 uF	.300	.360	.150	.200	M30R105*5
1.0 uF	.400	.460	.150	.200	M40R105*5
1.2 uF	.400	.460	.150	.200	M40R125*5
1.5 uF	.400	.460	.150	.200	M40R155*5
1.8 uF	.400	.460	.150	.200	M40R185*5
2.2 uF	.400	.460	.150	.200	M40R225*5
2.2 uF	.500	.560	.200	.400	M50R225*5
2.7 uF	.500	.560	.200	.400	M50R275*5
3.3 uF	.500	.560	.200	.400	M50R335*5
3.9 uF	.500	.560	.200	.400	M50R395*5

\* Insert proper letter symbol for tolerance:  
K = ±10%, M = ±20%

Add 'TR' to end of part number for Tape & Reel  
M15, M20, M22 - 2,500 per reel  
M30 - 1,500 per reel  
M40 - 1,000 per reel  
M50 - N/A  
(Available in full reels only)

# M15 to M50 Series Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors

## Z5U Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
1000 pF	.150	.210	.100	.100	M15U102*1
1200 pF	.150	.210	.100	.100	M15U122*1
1500 pF	.150	.210	.100	.100	M15U152*1
1800 pF	.150	.210	.100	.100	M15U182*1
2200 pF	.150	.210	.100	.100	M15U222*1
2700 pF	.150	.210	.100	.100	M15U272*1
3300 pF	.150	.210	.100	.100	M15U332*1
3900 pF	.150	.210	.100	.100	M15U392*1
4700 pF	.150	.210	.100	.100	M15U472*1
5600 pF	.150	.210	.100	.100	M15U562*1
6800 pF	.150	.210	.100	.100	M15U682*1
8200 pF	.150	.210	.100	.100	M15U822*1
.01 uF	.150	.210	.100	.100	M15U103*1
.01 uF	.200	.260	.125	.100	M20U103*1
.01 uF	.200	.260	.125	.200	M22U103*1
.012 uF	.150	.210	.100	.100	M15U123*1
.012 uF	.200	.260	.125	.100	M20U123*1
.012 uF	.200	.260	.125	.200	M22U123*1
.015 uF	.150	.210	.100	.100	M15U153*1
.015 uF	.200	.260	.125	.100	M20U153*1
.015 uF	.200	.260	.125	.200	M22U153*1
.018 uF	.150	.210	.100	.100	M15U183*1
.018 uF	.200	.260	.125	.100	M20U183*1
.018 uF	.200	.260	.125	.200	M22U183*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.022 uF	.200	.260	.125	.100	M20U223*1
.022 uF	.200	.260	.125	.200	M22U223*1
.027 uF	.200	.260	.125	.100	M20U273*1
.027 uF	.200	.260	.125	.200	M22U273*1
.033 uF	.200	.260	.125	.100	M20U333*1
.033 uF	.200	.260	.125	.200	M22U333*1
.039 uF	.200	.260	.125	.100	M20U393*1
.039 uF	.200	.260	.125	.200	M22U393*1
.047 uF	.200	.260	.125	.100	M20U473*1
.047 uF	.200	.260	.125	.200	M22U473*1
.056 uF	.200	.260	.125	.100	M20U563*1
.056 uF	.200	.260	.125	.200	M22U563*1
.068 uF	.200	.260	.125	.100	M20U683*1
.068 uF	.200	.260	.125	.200	M22U683*1
.082 uF	.200	.260	.125	.100	M20U823*1
.082 uF	.200	.260	.125	.200	M22U823*1
.1 uF	.200	.260	.125	.100	M20U104*1
.1 uF	.200	.260	.125	.200	M22U104*1
.1 uF	.300	.360	.150	.200	M30U104*1
.12 uF	.200	.260	.125	.100	M20U124*1
.12 uF	.200	.260	.125	.200	M22U124*1
.12 uF	.300	.360	.150	.200	M30U124*1
.15 uF	.200	.260	.125	.100	M20U154*1

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.15 uF	.200	.260	.125	.200	M22U154*1
.15 uF	.300	.360	.150	.200	M30U154*1
.18 uF	.300	.360	.150	.200	M30U184*1
.22 uF	.300	.360	.150	.200	M30U224*1
.27 uF	.300	.360	.150	.200	M30U274*1
.33 uF	.300	.360	.150	.200	M30U334*1
.33 uF	.400	.460	.150	.200	M40U334*1
.39 uF	.300	.360	.150	.200	M30U394*1
.39 uF	.400	.460	.150	.200	M40U394*1
.47 uF	.300	.360	.150	.200	M30U474*1
.47 uF	.400	.460	.150	.200	M40U474*1
.56 uF	.400	.460	.150	.200	M40U564*1
.68 uF	.400	.460	.150	.200	M40U684*1
.82 uF	.400	.460	.150	.200	M40U824*1
1.0 uF	.400	.460	.150	.200	M40U105*1
1.0 uF	.500	.560	.200	.400	M50U105*1
1.2 uF	.400	.460	.150	.200	M40U125*1
1.2 uF	.500	.560	.200	.400	M50U125*1
1.5 uF	.400	.460	.150	.200	M40U155*1
1.5 uF	.500	.560	.200	.400	M50U155*1
1.8 uF	.500	.560	.200	.400	M50U185*1
2.2 uF	.500	.560	.200	.400	M50U225*1

\* Insert proper letter symbol for tolerance:  
M = ±20%, Z = + 80% - 20%, P = + 100% - 0%

## Z5U Temperature Coefficient 50 VOLTS

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
4700 pF	.150	.210	.100	.100	M15U472*5
5600 pF	.150	.210	.100	.100	M15U562*5
6800 pF	.150	.210	.100	.100	M15U682*5
8200 pF	.150	.210	.100	.100	M15U822*5
.01 uF	.150	.210	.100	.100	M15U103*5
.012 uF	.150	.210	.100	.100	M15U123*5
.015 uF	.150	.210	.100	.100	M15U153*5
.018 uF	.150	.210	.100	.100	M15U183*5
.022 uF	.150	.210	.100	.100	M15U223*5
.027 uF	.150	.210	.100	.100	M15U273*5
.027 uF	.200	.260	.125	.100	M20U273*5
.027 uF	.200	.260	.125	.200	M22U273*5
.033 uF	.150	.210	.100	.100	M15U333*5
.033 uF	.200	.260	.125	.100	M20U333*5
.033 uF	.200	.260	.125	.200	M22U333*5
.039 uF	.150	.210	.100	.100	M15U393*5
.039 uF	.200	.260	.125	.100	M20U393*5
.039 uF	.200	.260	.125	.200	M22U393*5
.047 uF	.150	.210	.100	.100	M15U473*5
.047 uF	.200	.260	.125	.100	M20U473*5
.047 uF	.200	.260	.125	.200	M22U473*5
.056 uF	.150	.210	.100	.100	M15U563*5
.056 uF	.200	.260	.125	.100	M20U563*5
.056 uF	.200	.260	.125	.200	M22U563*5

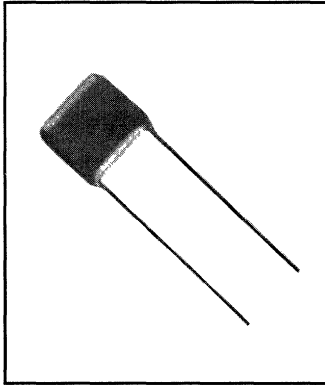
Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.068 uF	.150	.210	.100	.100	M15U683*5
.068 uF	.200	.260	.125	.100	M20U683*5
.068 uF	.200	.260	.125	.200	M22U683*5
.082 uF	.200	.260	.125	.100	M20U823*5
.082 uF	.200	.260	.125	.200	M22U823*5
.1 uF	.150	.210	.100	.100	M15U104*5
.1 uF	.200	.260	.125	.100	M20U104*5
.1 uF	.200	.260	.125	.200	M22U104*5
.12 uF	.200	.260	.125	.100	M20U124*5
.12 uF	.200	.260	.125	.200	M22U124*5
.15 uF	.200	.260	.125	.100	M20U154*5
.15 uF	.200	.260	.125	.200	M22U154*5
.18 uF	.200	.260	.125	.100	M20U184*5
.18 uF	.200	.260	.125	.200	M22U184*5
.22 uF	.200	.260	.125	.100	M20U224*5
.22 uF	.200	.260	.125	.200	M22U224*5
.27 uF	.200	.260	.125	.100	M20U274*5
.27 uF	.200	.260	.125	.200	M22U274*5
.27 uF	.300	.360	.150	.200	M30U274*5
.33 uF	.200	.260	.125	.100	M20U334*5
.33 uF	.200	.260	.125	.200	M22U334*5
.33 uF	.300	.360	.150	.200	M30U334*5
.39 uF	.200	.260	.125	.100	M20U394*5
.39 uF	.200	.260	.125	.200	M22U394*5
.39 uF	.300	.360	.150	.200	M30U394*5

Capacity	Size (Inches)				Catalog Number
	L	H	T	S	
.47 uF	.200	.260	.125	.100	M20U474*5
.47 uF	.200	.260	.125	.200	M22U474*5
.47 uF	.300	.360	.150	.200	M30U474*5
.56 uF	.200	.260	.125	.100	M20U564*5
.56 uF	.200	.260	.125	.200	M22U564*5
.56 uF	.300	.360	.150	.200	M30U564*5
.82 uF	.300	.360	.150	.200	M30U824*5
1.0 uF	.300	.360	.150	.200	M30U105*5
1.2 uF	.300	.360	.150	.200	M30U125*5
1.2 uF	.400	.460	.150	.200	M40U125*5
1.5 uF	.300	.360	.150	.200	M30U155*5
1.5 uF	.400	.460	.150	.200	M40U155*5
1.8 uF	.300	.360	.150	.200	M30U185*5
1.8 uF	.400	.460	.150	.200	M40U185*5
2.2 uF	.400	.460	.150	.200	M40U225*5
2.7 uF	.400	.460	.150	.200	M40U275*5
3.3 uF	.400	.460	.150	.200	M40U335*5
3.9 uF	.400	.460	.150	.200	M40U395*5
3.9 uF	.500	.560	.200	.400	M50U395*5
4.7 uF	.400	.460	.150	.200	M40U475*5
4.7 uF	.500	.560	.200	.400	M50U475*5
5.6 uF	.500	.560	.200	.400	M50U565*5
6.8 uF	.500	.560	.200	.400	M50U685*5

\* Insert proper letter symbol for tolerance:  
M = ±20%, Z = + 80% - 20%, P = + 100% - 0%

Add 'TR' to end of part number for Tape & Reel  
M15, M20, M22 - 2,500 per reel  
M30 - 1,500 per reel  
M40 - 1,000 per reel  
M50 - N/A  
(Available in full reels only)

# M60 Series Multilayer Ceramic Capacitors



- Radial Leaded  
Conformally Coated
- Ultra High Insulation  
Resistance and Withstand  
Voltage
- Excellent Noise Suppression
- Applications :  
Ignition Noise Suppression  
for Automotive Application

## GENERAL SPECIFICATIONS

Voltage Range:  
25, 50, 100, 250 VDC

Capacitance Range:  
.1  $\mu$ F to 100  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 20%

Temperature Coefficient:  
Y5U

Operating Temperature:  
-55°C to +125°C

Dissipation Factor:  
2.5% Maximum

Insulation Resistance:  
 $\geq$  1000  $\Omega \times \mu$ F or 10,000 M $\Omega$ .  
whichever is less

Withstand Voltage:  
250% of rated voltage is  
applied for 1 to 5 seconds

Available in Tape and Ammo pack  
configuration: Add 'TR' to end of  
catalog number

Multilayer Ceramic Capacitors

Capacity $\mu$ F	Volts	Temp. Coeff.	Size (Inches)					Catalog Number
			L	H	T	S	d	
1	25	Y5U	.197	.177	.138	.197	.020	M60U1M25
1.5	25	Y5U	.248	.197	.157	.197	.020	M60U1R5M25
2.2	25	Y5U	.248	.197	.157	.197	.020	M60U2R2M25
3.3	25	Y5U	.295	.295	.157	.197	.020	M60U3R3M25
4.7	25	Y5U	.295	.285	.157	.197	.020	M60U4R7M25
6.8	25	Y5U	.394	.394	.197	.197	.020	M60U6R8M25
10	25	Y5U	.394	.394	.197	.197	.020	M60U10M25
15	25	Y5U	.500	.472	.197	.394	.024	M60U15M25
22	25	Y5U	.500	.472	.197	.394	.024	M60U22M25
33	25	Y5U	.866	.591	.295	.787	.031	M60U33M25
47	25	Y5U	.866	.591	.295	.787	.031	M60U47M25
68	25	Y5U	1.102	.591	.295	.984	.031	M60U68M25
100	25	Y5U	1.102	.591	.295	.984	.031	M60U100M25
4.7	50	Y5U	.394	.394	.197	.197	.020	M60U4R7M50
6.8	50	Y5U	.394	.394	.197	.197	.020	M60U6R8M50
10	50	Y5U	.500	.472	.197	.394	.024	M60U10M50
15	50	Y5U	.500	.472	.197	.394	.024	M60U15M50
22	50	Y5U	.866	.591	.295	.787	.031	M60U22M50
33	50	Y5U	.866	.591	.295	.787	.031	M60U33M50
47	50	Y5U	1.102	.591	.295	.984	.031	M60U47M50
68	50	Y5U	1.102	.591	.295	.984	.031	M60U68M50

Capacity $\mu$ F	Volts	Temp. Coeff.	Size (Inches)					Catalog Number
			L	H	T	S	d	
2.2	100	Y5U	.394	.394	.197	.197	.020	M60U2R2M100
3.3	100	Y5U	.394	.394	.197	.197	.020	M60U3R3M100
4.7	100	Y5U	.500	.472	.197	.394	.024	M60U4R7M100
6.8	100	Y5U	.500	.472	.197	.394	.024	M60U6R8M100
10	100	Y5U	.866	.591	.295	.787	.031	M60U10M100
15	100	Y5U	.866	.591	.295	.787	.031	M60U15M100
22	100	Y5U	1.102	.591	.295	.984	.031	M60U22M100
33	100	Y5U	1.102	.591	.295	.984	.031	M60U33M100
.1	250	Y5U	.197	.177	.138	.197	.020	M60UR10M250
.15	250	Y5U	.248	.197	.157	.197	.020	M60UR15M250
.22	250	Y5U	.295	.295	.157	.197	.020	M60UR22M250
.33	250	Y5U	.295	.295	.157	.197	.020	M60UR33M250
.47	250	Y5U	.394	.394	.197	.197	.020	M60UR47M250
.68	250	Y5U	.394	.394	.197	.197	.020	M60UR68M250
1	250	Y5U	.500	.472	.197	.394	.024	M60UR10M250
1.5	250	Y5U	.500	.472	.197	.394	.024	M60UR15M250
2.2	250	Y5U	.866	.591	.295	.787	.031	M60UR22M250
3.3	250	Y5U	.866	.591	.295	.787	.031	M60UR33M250
4.7	250	Y5U	1.102	.591	.295	.984	.031	M60UR47M250
6.8	250	Y5U	1.102	.591	.295	.984	.031	M60UR68M250

Add 'TR' to end of part number for lead taping.  
Available in Ammo Pack only. (Full boxes only.)

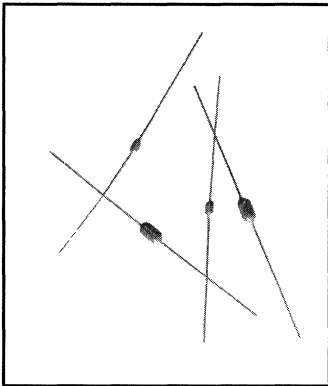
LENGTH	QUANTITY PER BOX
.197	2,000 pcs
.248	2,000 pcs
.394	1,500 pcs

Not available in larger sizes

# P10 to P40 Series Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors



- Axial Leaded  
Conformally Coated
- Encapsulation consists of a moisture and shock resistant coating that meets UL94V-0
- Over 135 CV values available
- Applications:  
Filtering, Bypass, Coupling

## GENERAL SPECIFICATIONS

Voltage Range:  
50, 100 VDC

Capacitance Range:  
10 pF to 1.0  $\mu$ F

Temperature Coefficients:  
COG(NPO), X7R, Z5U

Available in Tape and Reel configuration:  
Add 'TR' to end of catalog number.

### COG (NPO) Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
10 pF	.100	.170	P10G100*1
12 pF	.100	.170	P10G120*1
15 pF	.100	.170	P10G150*1
18 pF	.100	.170	P10G180*1
22 pF	.100	.170	P10G220*1
27 pF	.100	.170	P10G270*1
33 pF	.100	.170	P10G330*1
39 pF	.100	.170	P10G390*1
47 pF	.100	.170	P10G470*1
56 pF	.100	.170	P10G560*1
68 pF	.100	.170	P10G680*1
82 pF	.100	.170	P10G820*1
100 pF	.100	.170	P10G101*1
120 pF	.100	.170	P10G121*1
150 pF	.100	.170	P10G151*1
180 pF	.100	.170	P10G181*1

Capacity	Size (Inches)		Catalog Number
	D	L	
220 pF	.100	.170	P10G221*1
270 pF	.100	.170	P10G271*1
330 pF	.100	.170	P10G331*1
390 pF	.100	.170	P10G391*1
470 pF	.100	.170	P10G471*1
560 pF	.100	.170	P10G561*1
560 pF	.100	.260	P20G561*1
680 pF	.100	.170	P10G681*1
680 pF	.100	.260	P20G681*1
820 pF	.100	.170	P10G821*1
820 pF	.100	.260	P20G821*1
1000 pF	.100	.170	P10G102*1
1000 pF	.100	.260	P20G102*1
1200 pF	.100	.260	P20G122*1
1500 pF	.100	.260	P20G152*1
1800 pF	.100	.260	P20G182*1

Capacity	Size (Inches)		Catalog Number
	D	L	
1800 pF	.150	.290	P30G182*1
2200 pF	.100	.260	P20G222*1
2200 pF	.150	.290	P30G222*1
2700 pF	.150	.290	P30G272*1
3300 pF	.150	.290	P30G332*1
3900 pF	.150	.290	P30G392*1
4700 pF	.150	.290	P30G472*1
5600 pF	.150	.290	P30G562*1
5600 pF	.150	.400	P40G562*1
6800 pF	.150	.290	P30G682*1
6800 pF	.150	.400	P40G682*1
8200 pF	.150	.290	P30G822*1
8200 pF	.150	.400	P40G822*1
.01 $\mu$ F	.150	.400	P40G103*1
.012 $\mu$ F	.150	.400	P40G123*1
.015 $\mu$ F	.150	.400	P40G153*1

\* Insert proper letter symbol for tolerance:  
J =  $\pm$ 5%, K =  $\pm$  10%, M =  $\pm$ 20%

### COG (NPO) Temperature Coefficient 50 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
560 pF	.100	.170	P10G561*5
680 pF	.100	.170	P10G681*5
820 pF	.100	.170	P10G821*5
1000 pF	.100	.170	P10G102*5
1000 pF	.100	.260	P20G102*5
1200 pF	.120	.170	P12G122*5
1200 pF	.100	.260	P20G122*5
1500 pF	.120	.170	P12G152*5
1500 pF	.100	.260	P20G152*5

Capacity	Size (Inches)		Catalog Number
	D	L	
1800 pF	.120	.170	P12G182*5
1800 pF	.100	.260	P20G182*5
2200 pF	.120	.170	P12G222*5
2200 pF	.100	.260	P20G222*5
2700 pF	.120	.170	P12G272*5
2700 pF	.150	.290	P30G272*5
3300 pF	.150	.290	P30G332*5
3900 pF	.150	.290	P30G392*5
4700 pF	.150	.290	P30G472*5

Capacity	Size (Inches)		Catalog Number
	D	L	
5600 pF	.150	.290	P30G562*5
6800 pF	.150	.290	P30G682*5
6800 pF	.150	.400	P40G682*5
8200 pF	.150	.290	P30G822*5
8200 pF	.150	.400	P40G822*5
.01 $\mu$ F	.150	.400	P40G103*5
.012 $\mu$ F	.150	.400	P40G123*5
.015 $\mu$ F	.150	.400	P40G153*5

\* Insert proper letter symbol for tolerance:  
J =  $\pm$ 5%, K =  $\pm$  10%, M =  $\pm$ 20%

Add 'TR' to end of part number for Tape & Reel  
P10, P12, P20 - 5,000 per reel  
P30, P40 - 2,500 per reel  
(Available in full reels only)

# P10 to P40 Series Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors

## X7R Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
470 pF	.100	.170	P10R471*1
560 pF	.100	.170	P10R561*1
680 pF	.100	.170	P10R681*1
820 pF	.100	.170	P10R821*1
1000 pF	.100	.170	P10R102*1
1200 pF	.100	.170	P10R122*1
1500 pF	.100	.170	P10R152*1
1800 pF	.100	.170	P10R182*1
2200 pF	.100	.170	P10R222*1
2700 pF	.100	.170	P10R272*1
3300 pF	.100	.170	P10R332*1
3900 pF	.100	.170	P10R392*1
4700 pF	.100	.170	P10R472*1

Capacity	Size (Inches)		Catalog Number
	D	L	
5600 pF	.100	.170	P10R562*1
6800 pF	.100	.170	P10R682*1
8200 pF	.100	.170	P10R822*1
.01 uF	.100	.170	P10R103*1
.012 uF	.100	.170	P10R123*1
.015 uF	.100	.260	P20R123*1
.015 uF	.120	.170	P12R153*1
.015 uF	.100	.260	P20R153*1
.018 uF	.120	.170	P12R183*1
.018 uF	.100	.260	P20R183*1
.022 uF	.120	.170	P12R223*1
.022 uF	.100	.260	P20R223*1
.027 uF	.120	.170	P12R273*1

Capacity	Size (Inches)		Catalog Number
	D	L	
.027 uF	.100	.260	P20R273*1
.033 uF	.100	.260	P20R333*1
.033 uF	.150	.290	P30R333*1
.039 uF	.150	.290	P30R393*1
.047 uF	.150	.290	P30R473*1
.056 uF	.150	.290	P30R563*1
.068 uF	.150	.290	P30R683*1
.082 uF	.150	.290	P30R823*1
.082 uF	.150	.400	P40R823*1
.1 uF	.150	.290	P30R104*1
.1 uF	.150	.400	P40R104*1
.12 uF	.150	.290	P40R124*1
.15 uF	.150	.400	P40R154*1

\* Insert proper letter symbol for tolerance:  
K = ±10%, M = ±20%

## X7R Temperature Coefficient 50 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
8200 pF	.100	.170	P10R822*5
.01 uF	.100	.170	P10R103*5
.012 uF	.100	.170	P10R123*5
.015 uF	.100	.170	P10R153*5
.018 uF	.100	.170	P10R183*5
.022 uF	.100	.170	P10R223*5
.027 uF	.100	.170	P10R273*5
.033 uF	.100	.170	P10R333*5
.039 uF	.100	.170	P10R393*5

Capacity	Size (Inches)		Catalog Number
	D	L	
.047 uF	.100	.170	P10R473*5
.056 uF	.120	.170	P12R563*5
.056 uF	.100	.260	P20R563*5
.068 uF	.120	.170	P12R683*5
.068 uF	.100	.260	P20R683*5
.082 uF	.120	.170	P12R823*5
.082 uF	.100	.260	P20R823*5
.1 uF	.120	.170	P12R104*5
.1 uF	.100	.260	P20R104*5

Capacity	Size (Inches)		Catalog Number
	D	L	
.12 uF	.150	.290	P30R124*5
.15 uF	.150	.290	P30R154*5
.18 uF	.150	.290	P30R184*5
.22 uF	.150	.290	P30R224*5
.27 uF	.150	.290	P30R274*5
.27 uF	.150	.400	P40R274*5
.33 uF	.150	.400	P40R334*5

\* Insert proper letter symbol for tolerance:  
K = ±10%, M = ±20%

## Z5U Temperature Coefficient 100 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
.01 uF	.100	.170	P10U103*1
.012 uF	.100	.170	P10U123*1
.015 uF	.100	.170	P10U153*1
.018 uF	.100	.170	P10U183*1
.022 uF	.100	.170	P10U223*1
.027 uF	.100	.260	P20U273*1

Capacity	Size (Inches)		Catalog Number
	D	L	
.033 uF	.100	.260	P20U333*1
.039 uF	.100	.260	P20U393*1
.047 uF	.100	.260	P20U473*1
.056 uF	.150	.290	P30U563*1
.068 uF	.150	.290	P30U683*1
.082 uF	.150	.290	P30U823*1

Capacity	Size (Inches)		Catalog Number
	D	L	
.1 uF	.150	.290	P30U104*1
.12 uF	.150	.290	P30U124*1
.15 uF	.150	.290	P30U154*1
.18 uF	.150	.400	P40U184*1
.22 uF	.150	.400	P40U224*1

\* Insert proper letter symbol for tolerance:  
M = ±20%, Z = + 80 - 20%, P = + 100 - 0%

## Z5U Temperature Coefficient 50 VOLTS

Capacity	Size (Inches)		Catalog Number
	D	L	
.027 uF	0.100	0.170	P10U273*5
.033 uF	0.100	0.170	P10U333*5
.039 uF	0.100	0.170	P10U393*5
.047 uF	0.100	0.170	P10U473*5
.056 uF	0.100	0.170	P10U563*5
.068 uF	0.100	0.170	P10U683*5
.082 uF	0.100	0.170	P10U823*5
.1 uF	0.100	0.170	P10U104*5
.12 uF	0.100	0.170	P10U124*5
.12 uF	0.100	0.260	P20U124*5

Capacity	Size (Inches)		Catalog Number
	D	L	
.15 uF	0.100	0.170	P10U154*5
.15 uF	0.100	0.260	P20U154*5
.18 uF	0.100	0.170	P10U184*5
.18 uF	0.100	0.260	P20U184*5
.22 uF	0.100	0.170	P10U224*5
.22 uF	0.100	0.260	P20U224*5
.22 uF	0.150	0.290	P30U224*5
.27 uF	0.120	0.170	P12U274*5
.27 uF	0.100	0.260	P20U274*5
.27 uF	0.150	0.290	P30U274*5

Capacity	Size (Inches)		Catalog Number
	D	L	
.33 uF	0.120	0.170	P12U334*5
.33 uF	0.100	0.260	P20U334*5
.33 uF	0.150	0.290	P30U334*5
.39 uF	0.150	0.290	P30U394*5
.47 uF	0.150	0.290	P30U474*5
.56 uF	0.150	0.400	P40U564*5
.68 uF	0.150	0.400	P40U684*5
.82 uF	0.150	0.400	P40U824*5
1.0 uF	0.150	0.400	P40U105*5

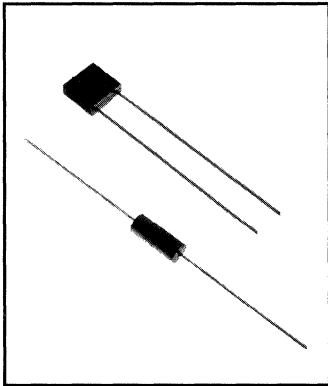
\* Insert proper letter symbol for tolerance:  
M = ±20%, Z = + 80 - 20%, P = + 100 - 0%

Add 'TR' to end of part number for Tape & Reel  
P10, P12, P20 - 5,000 per reel  
P30, P40 - 2,500 per reel  
(Available in full reels only)

# MIL-C-11015 & 39014 Multilayer Ceramic Capacitors

**MALLOY**

Multilayer Ceramic Capacitors



- Radial and Axial Leaded
- Molded Case Construction
- Stand-off Version Available in Radial Leaded CKR Type
- Hot Solder Dipped Leads in CKR Type

## GENERAL SPECIFICATIONS

Voltage Range:  
50, 100, 200 VDC

Capacitance Range:  
1 pF to 3.3 μF

Temperature Coefficient:  
X7R (Mil BX or BR)

Available in Tape and Reel configuration:  
Add 'TR' to end of catalog number.

Cap.	Tol. %	MIL-C-11015/18	MIL-C-39014/01	39014/01 for Failure Rate Levels			
				M	P	R	S
<b>200 Volt - Radial Leaded - CK05/CKR05</b>							
10 pF	10	CK05BX100K	CKR05BX100K*	1201	1241	1281	1321
10 pF	20	CK05BX100M	CKR05BX100M*	1202	1242	1282	1322
12 pF	10	CK05BX120K	CKR05BX120K*	1203	1243	1283	1323
15 pF	10	CK05BX150K	CKR05BX150K*	1204	1244	1284	1324
15 pF	20	CK05BX150M	CKR05BX150M*	1205	1245	1285	1325
18 pF	10	CK05BX180K	CKR05BX180K*	1206	1246	1286	1326
22 pF	10	CK05BX220K	CKR05BX220K*	1207	1247	1287	1327
22 pF	20	CK05BX220M	CKR05BX220M*	1208	1248	1288	1328
27 pF	10	CK05BX270K	CKR05BX270M*	1209	1249	1289	1329
33 pF	10	CK05BX330K	CKR05BX330K*	1210	1250	1290	1330
33 pF	20	CK05BX330M	CKR05BX330M*	1211	1251	1291	1331
39 pF	10	CK05BX390K	CKR05BX390K*	1212	1252	1292	1332
47 pF	10	CK05BX470K	CKR05BX470K*	1213	1253	1293	1333
47 pF	20	CK05BX470M	CKR05BX470M*	1214	1254	1294	1334
56 pF	10	CK05BX560K	CKR05BX560K*	1215	1255	1295	1335
68 pF	10	CK05BX680K	CKR05BX680K*	1216	1256	1296	1336
68 pF	20	CK05BX680M	CKR05BX680M*	1217	1257	1297	1337
82 pF	10	CK05BX820K	CKR05BX820K*	1218	1258	1298	1338
100 pF	10	CK05BX101K	CKR05BX101K*	1219	1259	1299	1339
100 pF	20	CK05BX101M	CKR05BX101M*	1220	1260	1300	1340
120 pF	10	CK05BX121K	CKR05BX121K*	1221	1261	1301	1341
150 pF	10	CK05BX151K	CKR05BX151K*	1222	1262	1302	1342
150 pF	20	CK05BX151M	CKR05BX151M*	1223	1263	1303	1343
180 pF	10	CK05BX181K	CKR05BX181K*	1224	1264	1304	1344
220 pF	10	CK05BX221K	CKR05BX221K*	1225	1265	1305	1345
220 pF	20	CK05BX221M	CKR05BX221M*	1226	1266	1306	1346
270 pF	10	CK05BX271K	CKR05BX271K*	1227	1267	1307	1347
330 pF	10	CK05BX331K	CKR05BX331K*	1228	1268	1308	1348
330 pF	20	CK05BX331M	CKR05BX331M*	1229	1269	1309	1349
390 pF	10	CK05BX391K	CKR05BX391K*	1230	1270	1310	1350
470 pF	10	CK05BX471K	CKR05BX471K*	1231	1271	1311	1351
470 pF	20	CK05BX471M	CKR05BX471M*	1232	1272	1312	1352
560 pF	10	CK05BX561K	CKR05BX561K*	1233	1273	1313	1353
680 pF	10	CK05BX681K	CKR05BX681K*	1234	1274	1314	1354
680 pF	20	CK05BX681M	CKR05BX681M*	1235	1275	1315	1355
820 pF	10	CK05BX821K	CKR05BX821K*	1236	1276	1316	1356
1000 pF	10	CK05BX102K	CKR05BX102K*	1237	1277	1317	1357
1000 pF	20	CK05BX102M	CKR05BX102M*	1238	1278	1318	1358

Cap.	Tol. %	MIL-C-11015/18	MIL-C-39014/01	39014/01 for Failure Rate Levels			
				M	P	R	S
<b>100 Volt - Radial Leaded - CK05/CKR05</b>							
1200 pF	10	CK05BX122K	CKR05BX122K*	1239	1279	1319	1359
1500 pF	10	CK05BX152K	CKR05BX152K*	1240	1280	1320	1360
1500 pF	20	CK05BX152M	CKR05BX152M*	1441	1481	1521	1561
1800 pF	10	CK05BX182K	CKR05BX182K*	1442	1482	1522	1562
2200 pF	10	CK05BX222K	CKR05BX222K*	1443	1483	1523	1563
2200 pF	20	CK05BX222M	CKR05BX222M*	1444	1484	1524	1564
2700 pF	10	CK05BX272K	CKR05BX272K*	1445	1485	1525	1565
3300 pF	10	CK05BX332K	CKR05BX332K*	1446	1486	1526	1566
3300 pF	20	CK05BX332M	CKR05BX332M*	1447	1487	1527	1567
3900 pF	10	CK05BX392K	CKR05BX392K*	1448	1488	1528	1568
4700 pF	10	CK05BX472K	CKR05BX472K*	1449	1489	1529	1569
4700 pF	20	CK05BX472M	CKR05BX472M*	1450	1490	1530	1570
5600 pF	10	CK05BX562K	CKR05BX562K*	1451	1491	1531	1571
6800 pF	10	CK05BX682K	CKR05BX682K*	1452	1492	1532	1572
6800 pF	20	CK05BX682M	CKR05BX682M*	1453	1493	1533	1573
8200 pF	10	CK05BX822K	CKR05BX822K*	1454	1494	1534	1574
.01 μF	10	CK05BX103K	CKR05BX103K*	1455	1495	1535	1575
.01 μF	20	CK05BX103M	CKR05BX103M*	1456	1496	1536	1576

Cap.	Tol. %	MIL-C-11015/18	MIL-C-39014/01	39014/01 for Failure Rate Levels			
				M	P	R	S
<b>50 Volt - Radial Leaded - CK05/CKR05</b>							
.012 μF	10	CK05BX123K	CKR05BX123K*	1457	1497	1537	1577
.015 μF	10	CK05BX153K	CKR05BX153K*	1458	1498	1538	1578
.015 μF	20	CK05BX153M	CKR05BX153M*	1459	1499	1539	1579
.018 μF	10	CK05BX183K	CKR05BX183K*	1460	1500	1540	1580
.022 μF	10	CK05BX223K	CKR05BX223K*	1461	1501	1541	1581
.022 μF	20	CK05BX223M	CKR05BX223M*	1462	1502	1542	1582
.027 μF	10	CK05BX273K	CKR05BX273K*	1463	1503	1543	1583
.033 μF	10	CK05BX333K	CKR05BX333K*	1464	1504	1544	1584
.033 μF	20	CK05BX333M	CKR05BX333M*	1465	1505	1545	1585
.039 μF	10	CK05BX393K	CKR05BX393K*	1466	1506	1546	1586
.047 μF	10	CK05BX473K	CKR05BX473K*	1467	1507	1547	1587
.047 μF	20	CK05BX473M	CKR05BX473M*	1468	1508	1548	1588
.056 μF	10	CK05BX563K	CKR05BX563K*	1469	1509	1549	1589
.068 μF	10	CK05BX683K	CKR05BX683K*	1470	1510	1550	1590
.068 μF	20	CK05BX683M	CKR05BX683M*	1471	1511	1551	1591
.082 μF	10	CK05BX823K	CKR05BX823K*	1472	1512	1552	1592
.1 μF	10	CK05BX104K	CKR05BX104K*	1473	1513	1553	1593
.1 μF	20	CK05BX104M	CKR05BX104M*	1474	1514	1554	1594

Add 'TR' to end of part number for Tape & Reel  
 CK05 - 2,000 per reel  
 CKR05 - 1,700 per reel  
 (Available in full reels only)

\* Insert proper letter symbol for Failure Rate Designator:  
 M = 1% / 1000 Hours, P = 0.1% / 1000 Hours,  
 R = 0.01% / 1000 Hours, S = 0.001% / 1000 Hours  
 Add 'V' at end of failure rate designator if stand-off design is required. (CKR only)

# MIL-C-11015 & 39014 Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S

200 Volt - Radial Leaded - CK06/CKR06							
1200 pF	10	CK06BX122K	CKR06BX122K*	1201	1241	1281	1321
1500 pF	10	CK06BX152K	CKR06BX152K*	1202	1242	1282	1322
1500 pF	20	CK06BX152M	CKR06BX152M*	1203	1243	1283	1323
1800 pF	10	CK06BX182K	CKR06BX182K*	1204	1244	1284	1324
2200 pF	10	CK06BX222K	CKR06BX222K*	1206	1246	1286	1326
2200 pF	20	CK06BX222M	CKR06BX222M*	1207	1247	1287	1327
2700 pF	10	CK06BX272K	CKR06BX272K*	1208	1248	1288	1328
3300 pF	10	CK06BX332K	CKR06BX332K*	1209	1249	1289	1329
3300 pF	20	CK06BX332M	CKR06BX332M*	1210	1250	1290	1330
3900 pF	10	CK06BX392K	CKR06BX392K*	1211	1251	1291	1331
4700 pF	10	CK06BX472K	CKR06BX472K*	1212	1252	1292	1332
4700 pF	20	CK06BX472M	CKR06BX472M*	1213	1253	1293	1333
5600 pF	10	CK06BX562K	CKR06BX562K*	1214	1254	1294	1334
6800 pF	10	CK06BX682K	CKR06BX682K*	1215	1255	1295	1335
6800 pF	20	CK06BX682M	CKR06BX682M*	1216	1256	1296	1336
8200 pF	10	CK06BX822K	CKR06BX822K*	1217	1257	1297	1337
.01 uF	10	CK06BX103K	CKR06BX103K*	1218	1258	1298	1338
.01 uF	20	CK06BX103M	CKR06BX103M*	1219	1259	1299	1339

100 Volt - Radial Leaded - CK06/CKR06							
.012 uF	10	CK06BX123K	CKR06BX123K*	1231	1271	1311	1351
.015 uF	10	CK06BX153K	CKR06BX153K*	1220	1260	1300	1340
.015 uF	20	CK06BX153M					
.018 uF	10	CK06BX183K	CKR06BX183K*	1221	1261	1301	1341
.022 uF	10	CK06BX223K	CKR06BX223K*	1222	1262	1302	1342
.022 uF	20	CK06BX223M					
.027 uF	10	CK06BX273K	CKR06BX273K*	1232	1272	1312	1352
.033 uF	10	CK06BX333K	CKR06BX333K*	1223	1263	1303	1343
.033 uF	20	CK06BX333M					
.039 uF	10	CK06BX393K	CKR06BX393K*	1224	1264	1304	1344

Add 'TR' to end of part number for Tape & Reel  
CK06 - 1,500 per reel  
CKR06 - 1,500 per reel  
(Available in full reels only)

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S

100 Volt - Radial Leaded - CK06/CKR06							
.047 uF	10	CK06BX473K	CKR06BX473K*	1225	1265	1305	1345
.047 uF	20	CK06BX473M					
.056 uF	10	CK06BX563K	CKR06BX563K*	1226	1266	1306	1346
.068 uF	10	CK06BX683K	CKR06BX683K*	1227	1267	1307	1347
.068 uF	20	CK06BX683M					
.082 uF	10	CK06BX823K	CKR06BX823K*	1229	1269	1309	1349
.1 uF	10	CK06BX104K	CKR06BX104K*	1230	1270	1310	1350
.1 uF	20	CK06BX104M					

50 Volt - Radial Leaded - CK06/CKR06							
.12 uF	10	CK06BX124K	CKR06BX124K*	1233	1273	1313	1353
.15 uF	10	CK06BX154K	CKR06BX154K*	1234	1274	1314	1354
.15 uF	20	CK06BX154M					
.18 uF	10	CK06BX184K	CKR06BX184K*	1235	1275	1315	1355
.22 uF	10	CK06BX224K	CKR06BX224K*	1236	1276	1316	1356
.22 uF	20	CK06BX224M					
.27 uF	10	CK06BX274K	CKR06BX274K*	1237	1277	1317	1357
.33 uF	10	CK06BX334K	CKR06BX334K*	1238	1278	1318	1358
.33 uF	20	CK06BX334M					
.39 uF	10	CK06BX394K	CKR06BX394K*	1239	1279	1319	1359
.47 uF	10	CK06BX474K	CKR06BX474K*	1240	1280	1320	1360
.47 uF	20	CK06BX474M					
.56 uF	10	CK06BX564K	CKR06BX564K*	1404	1408	1412	1416
.68 uF	10	CK06BX684K	CKR06BX684K*	1405	1409	1413	1417
.68 uF	20	CK06BX684M					
.82 uF	10	CK06BX824K	CKR06BX824K*	1406	1410	1414	1418
1.0 uF	10	CK06BX105K	CKR06BX105K*	1407	1411	1415	1419
1.0 uF	20	CK06BX105M					

\* Insert proper letter symbol for Failure Rate Designator:  
M = 1% / 1000 Hours, P = 0.1% / 1000 Hours,  
R = 0.01% / 1000 Hours, S = 0.001% / 1000 Hours  
Add 'V' at end of failure rate designator if stand-off design is required. (CKR only)

Cap.	Tol. %	MIL-C-11015/20	MIL-C-39014/05	39014/05 for Failure Rate Levels			
				M	P	R	S

100 Volt - Axial Leaded - CK12/CKR11							
10 pF	10	CK12BX100K	CKR11BX100K*	2601	2801	2001	2201
10 pF	20	CK12BX100M	CKR11BX100M*	2602	2802	2002	2202
12 pF	10	CK12BX120K	CKR11BX120K*	2603	2803	2003	2203
15 pF	10	CK12BX150K	CKR11BX150K*	2604	2804	2004	2204
15 pF	20	CK12BX150M	CKR11BX150M*	2605	2805	2005	2205
18 pF	10	CK12BX180K	CKR11BX180K*	2606	2806	2006	2206
22 pF	10	CK12BX220K	CKR11BX220K*	2607	2807	2007	2207
22 pF	20	CK12BX220M	CKR11BX220M*	2608	2808	2008	2208
27 pF	10	CK12BX270K	CKR11BX270K*	2609	2809	2009	2209
33 pF	10	CK12BX330K	CKR11BX330K*	2610	2810	2010	2210
33 pF	20	CK12BX330M	CKR11BX330M*	2611	2811	2011	2211
39 pF	10	CK12BX390K	CKR11BX390K*	2612	2812	2012	2212
47 pF	10	CK12BX470K	CKR11BX470K*	2613	2813	2013	2213
47 pF	20	CK12BX470M	CKR11BX470M*	2614	2814	2014	2214
56 pF	10	CK12BX560K	CKR11BX560K*	2615	2815	2015	2215
68 pF	10	CK12BX680K	CKR11BX680K*	2616	2816	2016	2216
68 pF	20	CK12BX680M	CKR11BX680M*	2617	2817	2017	2217
82 pF	10	CK12BX820K	CKR11BX820K*	2618	2818	2018	2218
100 pF	10	CK12BX101K	CKR11BX101K*	2619	2819	2019	2219
100 pF	20	CK12BX101M	CKR11BX101M*	2620	2820	2020	2220
120 pF	10	CK12BX121K	CKR11BX121K*	2621	2821	2021	2221
150 pF	10	CK12BX151K	CKR11BX151K*	2622	2822	2022	2222
150 pF	20	CK12BX151M	CKR11BX151M*	2623	2823	2023	2223
180 pF	10	CK12BX181K	CKR11BX181K*	2624	2824	2024	2224
220 pF	10	CK12BX221K	CKR11BX221K*	2625	2825	2025	2225
220 pF	20	CK12BX221M	CKR11BX221M*	2626	2826	2026	2226
270 pF	10	CK12BX271K	CKR11BX271K*	2627	2827	2027	2227
330 pF	10	CK12BX331K	CKR11BX331K*	2628	2828	2028	2228
330 pF	20	CK12BX331M	CKR11BX331M*	2629	2829	2029	2229
390 pF	10	CK12BX391K	CKR11BX391K*	2630	2830	2030	2230

Add 'TR' to end of part number for Tape & Reel  
CK12 - 5,000 per reel  
CKR11 - 2,500 per reel  
(Available in full reels only)

Cap.	Tol. %	MIL-C-11015/20	MIL-C-39014/05	39014/05 for Failure Rate Levels			
				M	P	R	S

100 Volt - Axial Leaded - CK12/CKR11							
470 pF	10	CK12BX471K	CKR11BX471K*	2631	2831	2031	2231
470 pF	20	CK12BX471M	CKR11BX471M*	2632	2832	2032	2232
560 pF	10	CK12BX561K	CKR11BX561K*	2633	2833	2033	2233
680 pF	10	CK12BX681K	CKR11BX681K*	2634	2834	2034	2234
680 pF	20	CK12BX681M	CKR11BX681M*	2635	2835	2035	2235
820 pF	10	CK12BX821K	CKR11BX821K*	2636	2836	2036	2236
1000 pF	10	CK12BX102K	CKR11BX102K*	2637	2837	2037	2237
1000 pF	20	CK12BX102M	CKR11BX102M*	2638	2838	2038	2238
1200 pF	10	CK12BX122K	CKR11BX122K*	2639	2839	2039	2239
1500 pF	10	CK12BX152K	CKR11BX152K*	2640	2840	2040	2240
1500 pF	20	CK12BX152M	CKR11BX152M*	2641	2841	2041	2241
1800 pF	10	CK12BX182K	CKR11BX182K*	2642	2842	2042	2242
2200 pF	10	CK12BX222K	CKR11BX222K*	2643	2843	2043	2243
2200 pF	20	CK12BX222M	CKR11BX222M*	2644	2844	2044	2244
2700 pF	10	CK12BX272K	CKR11BX272K*	2645	2845	2045	2245
3300 pF	10	CK12BX332K	CKR11BX332K*	2646	2846	2046	2246
3300 pF	20	CK12BX332M	CKR11BX332M*	2647	2847	2047	2247
3900 pF	10	CK12BX392K	CKR11BX392K*	2648	2848	2048	2248
4700 pF	10	CK12BX472K	CKR11BX472K*	2649	2849	2049	2249
4700 pF	20	CK12BX472M	CKR11BX472M*	2650	2850	2050	2250

50 Volt - Axial Leaded - CK12/CKR11							
5600 pF	10	CK12BX562K	CKR11BX562K*	2651	2851	2051	2251
6800 pF	10	CK12BX682K	CKR11BX682K*	2652	2852	2052	2252
6800 pF	20	CK12BX682M	CKR11BX682M*	2653	2853	2053	2253
8200 pF	10	CK12BX822K	CKR11BX822K*	2654	2854	2054	2254
0.01 uF	10	CK12BX103K	CKR11BX103K*	2655	2855	2055	2255
0.01 uF	20	CK12BX103M	CKR11BX103M*	2656	2856	2056	2256

\* Insert proper letter symbol for Failure Rate Designator:  
M = 1% / 1000 Hours, P = 0.1% / 1000 Hours,  
R = 0.01% / 1000 Hours, S = 0.001% / 1000 Hours

# MIL-C-11015 & 39014 Multilayer Ceramic Capacitors



Multilayer Ceramic Capacitors

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>100 Volt - Axial Leaded - CK13/CKR12</b>							
5600 pF	10	CK13BX562K	CKR12BX562K*	2657	2857	2057	2257
6800 pF	10	CK13BX682K	CKR12BX682K*	2658	2858	2058	2258
6800 pF	20	CK13BX682M	CKR12BX682M*	2659	2859	2059	2259
8200 pF	10	CK13BX822K	CKR12BX822K*	2660	2860	2060	2260
.01 uF	10	CK13BX103K	CKR12BX103K*	2661	2861	2061	2261
.01 uF	20	CK13BX103M	CKR12BX103M*	2662	2862	2062	2262

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>100 Volt - Axial Leaded - CK14/CKR14</b>							
.012 uF	10	CK14BX123K	CKR14BX123K*	2675	2875	2075	2275
.015 uF	10	CK14BX153K	CKR14BX153K*	2676	2876	2076	2276
.015 uF	20	CK14BX153M	CKR14BX153M*	2677	2877	2077	2277
.018 uF	10	CK14BX183K	CKR14BX183K*	2678	2878	2078	2278
.022 uF	10	CK14BX223K	CKR14BX223K*	2679	2879	2079	2279
.022 uF	20	CK14BX223M	CKR14BX223M*	2680	2880	2080	2280
.027 uF	10	CK14BX273K	CKR14BX273K*	2681	2881	2081	2281
.033 uF	10	CK14BX333K	CKR14BX333K*	2682	2882	2082	2282
.033 uF	20	CK14BX333M	CKR14BX333M*	2683	2883	2083	2283
.039 uF	10	CK14BX393K	CKR14BX393K*	2684	2884	2084	2284
.047 uF	10	CK14BX473K	CKR14BX473K*	2685	2885	2085	2285
.047 uF	20	CK14BX473M	CKR14BX473M*	2686	2886	2086	2286
.056 uF	10	CK14BR563K	CKR14BR563K*	2693	2893	2093	2293
.068 uF	10	CK14BR683K	CKR14BR683K*	2694	2894	2094	2294
.068 uF	20	CK14BR683M	CKR14BR683M*	2695	2895	2095	2295
.082 uF	10	CK14BR823K	CKR14BR823K*	2696	2896	2096	2296
.1 uF	10	CK14BR104K	CKR14BR104K*	2697	2897	2097	2297
.1 uF	20	CK14BR104M	CKR14BR104M*	2698	2898	2098	2298

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>100 Volt - Axial Leaded - CK15/CKR15</b>							
.056 uF	10		CKR15BX563K*	2706	2906	2106	2306
.068 uF	10		CKR15BX683K*	2707	2907	2107	2307
.068 uF	20		CKR15BX683M*	2708	2908	2108	2308
.082 uF	10		CKR15BX823K*	2709	2909	2109	2309
.1 uF	10	CK15BX104K	CKR15BX104K*	2710	2910	2110	2310
.1 uF	20	CK15BX104M	CKR15BX104M*	2711	2911	2111	2311
.12 uF	10	CK15BR124K	CKR15BR124K*	2712	2912	2112	2312
.15 uF	10	CK15BR154K	CKR15BR154K*	2713	2913	2113	2313
.15 uF	20	CK15BR154M	CKR15BR154M*	2714	2914	2114	2314
.18 uF	10	CK15BR184K	CKR15BR184K*	2715	2915	2115	2315
.22 uF	10	CK15BR224K	CKR15BR224K*	2716	2916	2116	2316
.22 uF	20	CK15BR224M	CKR15BR224M*	2717	2917	2117	2317
.27 uF	10	CK15BR274K	CKR15BR274K*	2718	2918	2118	2318

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>100 Volt - Axial Leaded - CK16/CKR16</b>							
.47 uF	10	CK16BR474K	CKR16BR474K*	2727	2927	2127	2327
.47 uF	20	CK16BR474M	CKR16BR474M*	2728	2928	2128	2328
.68 uF	10		CKR16BR684K*	2729	2929	2129	2329
.68 uF	20		CKR16BR684M*	2730	2930	2130	2330

Add 'TR' to end of part number for Tape & Reel  
 CK13 - 5,000 per reel, CKR12 - 2,500 per reel  
 CK14 - 3,000 per reel, CKR14 - 1,500 per reel  
 CK15, CKR15 - 500 per reel  
 CK16, CKR16 - 300 per reel  
 (Available in full reels only)

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>50 Volt - Axial Leaded - CK13/CKR12</b>							
.012 uF	10	CK13BX123K	CKR12BX123K*	2663	2863	2063	2263
.015 uF	10	CK13BX153K	CKR12BX153K*	2664	2864	2064	2264
.015 uF	20	CK13BX153M	CKR12BX153M*	2665	2865	2065	2265
.018 uF	10	CK13BX183K	CKR12BX183K*	2666	2866	2066	2266
.022 uF	10	CK13BX223K	CKR12BX223K*	2667	2867	2067	2267
.022 uF	20	CK13BX223M	CKR12BX223M*	2668	2868	2068	2268
.027 uF	10	CK13BR273K	CKR12BX273K*	2669	2869	2069	2269
.033 uF	10	CK13BR333K	CKR12BX333K*	2670	2870	2070	2270
.033 uF	20	CK13BR333M	CKR12BX333M*	2671	2871	2071	2271
.039 uF	10	CK13BR393K	CKR12BX393K*	2672	2872	2072	2272
.047 uF	10	CK13BR474K	CKR12BX474K*	2673	2873	2073	2273
.047 uF	20	CK13BR474M	CKR12BX474M*	2674	2874	2074	2274

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>50 Volt - Axial Leaded - CK14/CKR14</b>							
.056 uF	10		CKR14BX563K*	2687	2887	2087	2287
.068 uF	10		CKR14BX683K*	2688	2888	2088	2288
.068 uF	20		CKR14BX683M*	2689	2889	2089	2289
.082 uF	10		CKR14BX823K*	2690	2890	2090	2290
.1 uF	10		CKR14BX104K*	2691	2891	2091	2291
.1 uF	20		CKR14BX104M*	2692	2892	2092	2292
.12 uF	10	CK14BR124K	CKR14BR124K*	2699	2899	2099	2299
.15 uF	10	CK14BR154K	CKR14BR154K*	2700	2900	2100	2300
.15 uF	20	CK14BR154M	CKR14BR154M*	2701	2901	2101	2301
.18 uF	10	CK14BR184K	CKR14BR184K*	2702	2902	2102	2302
.22 uF	10	CK14BR224K	CKR14BR224K*	2703	2903	2103	2303
.22 uF	20	CK14BR224M	CKR14BR224M*	2704	2904	2104	2304
.27 uF	10	CK14BR274K	CKR14BR274K*	2705	2905	2105	2305

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>50 Volt - Axial Leaded - CK15/CKR15</b>							
.33 uF	10	CK15BR334K	CKR15BR334K*	2719	2919	2119	2319
.33 uF	20	CK15BR334M	CKR15BR334M*	2720	2920	2120	2320
.47 uF	10	CK15BR474K	CKR15BR474K*	2721	2921	2121	2321
.47 uF	20	CK15BR474M	CKR15BR474M*	2722	2922	2122	2322
.68 uF	10		CKR15BR684K*	2723	2923	2123	2323
.68 uF	20		CKR15BR684M*	2724	2924	2124	2324
1.0 uF	10	CK15BR105K	CKR15BR105K*	2725	2925	2125	2325
1.0 uF	20	CK15BR105M	CKR15BR105M*	2726	2926	2126	2326

Cap.	Tol. %	MIL-C-11015/19	MIL-C-39014/02	39014/02 for Failure Rate Levels			
				M	P	R	S
<b>50 Volt - Axial Leaded - CK16/CKR16</b>							
1 uF	10	CK16BR105K	CKR16BR105K*	2731	2931	2131	2331
1 uF	20	CK16BR105M	CKR16BR105M*	2732	2932	2132	2332
2.2 uF	10	CK16BR225K	CKR16BR225K*	2733	2933	2133	2333
2.2 uF	20	CK16BR225M	CKR16BR225M*	2734	2934	2134	2334
3.3 uF	10	CK16BR335K	CKR16BR335K*	2735	2935	2135	2335
3.3 uF	20	CK16BR335M	CKR16BR335M*	2736	2936	2136	2336

\* Insert proper letter symbol for Failure Rate Designator:  
 M = 1% / 1000 Hours, P = 0.1% / 1000 Hours,  
 R = 0.01% / 1000 Hours, S = 0.001% / 1000 Hours



Series	Description	Lead Spacing	Capacitance Range	Voltage Range	Temperature Range (°C)	Standard Cap Tolerance % (±)	Page
<b>General Purpose</b>							
<b>150</b>	Metallized Polyester Axial Leads	N/A	0.001 to 10 $\mu$ F	63 to 630 VDC 40 to 220 VAC	-55 to +125	5, 10, 20	126
<b>160</b>	Metallized Polyester Radial Leads	.393" to 1.083" 10mm to 27.5mm	0.001 to 10 $\mu$ F	63 to 1000 VDC 40 to 250 VAC	-55 to +125	5, 10, 20	128
<b>167/ 184</b>	Metallized Polyester Radial Leads	.295" 7.5mm	0.001 to 10 $\mu$ F	63 to 630 VDC 40 to 220 VAC	-55 to +125	5, 10, 20	132
<b>168/ 185</b>	Metallized Polyester Radial Leads	.200" 5.0mm	0.001 to 10 $\mu$ F	50 to 100 VDC 30 to 63 VAC	-55 to +125	5, 10, 20	135
<b>170</b>	Metallized Polypropylene Axial Leads	N/A	0.001 to 4.7 $\mu$ F	160 to 630 VDC 90 to 250 VAC	-55 to +105	5, 10, 20	138
<b>171</b>	Metallized Polypropylene Radial Leads	.295" to 1.083" 7.5mm to 27.5mm	0.001 to 10 $\mu$ F	160 to 630 VDC 90 to 250 VAC	-55 to +105	5, 10, 20	141
<b>PVC</b>	Polyester - Foil (to 600V) Polypropylene Foil (1000-2000V) Radial Leads	.500" to 1.344" 12.7mm to 34.1mm	0.001 to .68 $\mu$ F	100 to 2000 VDC 70 to 500 VAC	-55 to +105 (1600 - 2000 VDC) -55 to +125 (100 - 1000 VDC)	10	144

<b>Precision Film Capacitors</b>							
<b>SX</b>	Polystyrene Foil Axial Leads	N/A	20 pF to 0.1 $\mu$ F	33 to 500 VDC	-40 to +70	5% SX 2.5% SXK to SXM	147
<b>148</b>	Metallized Polypropylene Axial Leads	N/A	0.001 to 4.7 $\mu$ F	160 to 250 VDC 90 to 220 VAC	-55 to +105	1, 1.25, 2, 2.5	150

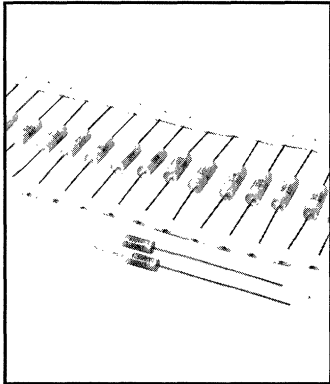
<b>Interference Suppressor</b>							
<b>158</b>	Metallized Polyester Radial Across-the-Line (X2) Type Suppressor Capacitor	.591" to 1.08" 15mm to 27.4mm	.01 to 1.0 $\mu$ F	250 VAC	-40 to +100	20	152
<b>158X</b>	Metallized Polyester Radial Across-the-Line (X2) Type Suppressor Capacitor	.591" to 1.48" 15mm to 37.5mm	.01 to 2.2 $\mu$ F	250 VAC	-40 to +100	20	153
<b>173Y</b>	Polypropylene - Foil Radial Leads Line to Ground (Y) Type Suppressor	.600" to 1.10" 15.2mm to 27.9mm	0.001 to .047 $\mu$ F	250 VAC	-40 to +85	20	154

<b>Surface Mount Film Chips</b>							
<b>198</b>	Metallized Polyester Surface Mount Film Chip Capacitor	N/A	0.001 to .47 $\mu$ F	50 VDC	-55 to +125	5, 10, 20	61

<b>Performance Curves</b>							
Metallized Polyester Capacitors							155
Metallized Polypropylene Capacitors							156

# 150 Series Metallized Polyester / Axial Leads

**MALLORY**



- Axial Leads
- Available Tape and Reel
- Tape Wrapped with Epoxy End Fill
- Non Inductively Wound
- Flame Retardant Polyester Wrap Meets UL510
- Epoxy End Fill Meets UL94V0

Excellent choice for general purpose applications such as blocking, bypass, decoupling, smoothing and some timing, energy storage/discharge and arc suppression.

## GENERAL SPECIFICATIONS

Operating Temperature: -55°C to +125°C  
 Voltage Range: 63 VDC to 630 VDC  
 Capacitance Range: 0.001  $\mu$ F to 10  $\mu$ F  
 Capacitance Tolerance:  $\pm$ 5%,  $\pm$ 10%,  $\pm$ 20%  
 Total Self Inductance (L): 1nH maximum per 1mm lead and capacitor length

Dielectric Withstand: 1.6 x Vn applied for 2 sec at +25°C  $\pm$  5°C  
 CECC Approval: Detail Specification 30401-021

## Dissipation Factor (DF) tg $\delta$ x 10<sup>-4</sup> at +25°C $\pm$ 5°C

	KHz	C $\leq$ 0.1 $\mu$ F	0.1 $\mu$ F<C $\leq$ 1 $\mu$ F	C>1 $\mu$ F
Max Value	1	80	80	100
Typical Value	10	150	150	—
Value	100	250	—	—

## Maximum Pulse Rise Time dv/dt and Pulse Characteristic (Wo)

Vn	L max				
	$\leq$ 16.5	19-20.5	26.5-28	31.5-33	
50-63	4	2	1.5	1	dv/dt (V/ $\mu$ sec)
	504	252	189	126	Wo (V <sup>2</sup> / $\mu$ sec)
100	5	3	2	1	dv/dt (V/ $\mu$ sec)
	1,000	600	400	300	Wo (V <sup>2</sup> / $\mu$ sec)
250	10	7	4	2.5	dv/dt (V/ $\mu$ sec)
	5,000	3,500	2,000	1,250	Wo (V <sup>2</sup> / $\mu$ sec)
400	13.5	10	6.5	4	dv/dt (V/ $\mu$ sec)
	10,800	8,000	5,200	3,200	Wo (V <sup>2</sup> / $\mu$ sec)
630	20	15	10	6	dv/dt (V/ $\mu$ sec)
	25,200	18,900	12,600	7,560	Wo (V <sup>2</sup> / $\mu$ sec)

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V. The pulse characteristic (Wo) is a function of the peak-to-peak voltage and may not exceed the value given in the above table.

## Tape and Reel Specifications<sup>^</sup>

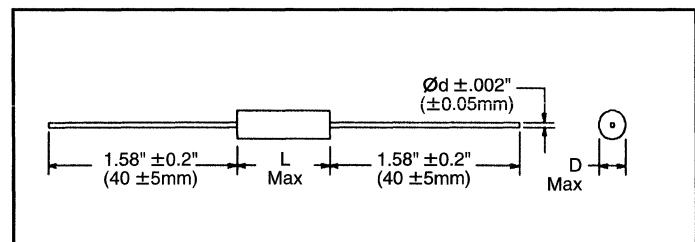
L Max (Body Length)		Lead Spacing		Distance Between Reel Flanges		Class
Inches	mm	Inches	mm	Inches	mm	
$\leq$ .433	$\leq$ 11	2.06	52.4	3.0	75	1
.551 - .808	14 - 20.5	2.5	63.6	3.4	86	2
$\geq$ 1.03	$\geq$ 26	2.87	73	3.7	95	3

<sup>^</sup> Add class number (1, 2, or 3) to Catalog Number to indicate tape and reel

Diameter		Quantity per Reel
Inches	mm	
.197	5	3,000
.236 thru .256	6.0 thru 6.5	1,200
.276	7	1,100
.315 thru .346	8 thru 8.5	800
.354 thru .413	9 thru 10.5	500
.433 thru .512	11 thru 13	300
.551 thru .571	14 thru 14.5	200
> .571	> 14.5	Not available

## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	25°C $\pm$ 5°C
Voltage Charge Time	1 minute
Voltage Charge	50 VDC for Vn < 100 VDC 100 VDC for Vn $\geq$ 100 VDC
<b>Performance</b>	
For Vn > 100 VDC	$\geq$ 30,000 M $\Omega$ for C $\leq$ 0.33 $\mu$ F $\geq$ 10,000 M $\Omega$ x $\mu$ F for C > 0.33 $\mu$ F
For Vn $\leq$ 100 VDC	$\geq$ 10,000 M $\Omega$ for C $\leq$ 0.1 $\mu$ F $\geq$ 1,000 M $\Omega$ x $\mu$ F for C > 0.1 $\mu$ F
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93% $\pm$ 2%
Test Duration	56 days
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 50 x 10 <sup>-4</sup> at 1KHz
Insulation Resistance	$\geq$ 50% of limit value
Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	1000 h
Voltage Applied	1.25 x Vn
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10KHz for C $\leq$ 1 $\mu$ F $\leq$ 20 x 10 <sup>-4</sup> at 1KHz for C > 1 $\mu$ F
Insulation Resistance	$\geq$ 50% of limit value
Soldering	
<b>Test Conditions</b>	
Soldering Temperature	260°C $\pm$ 5°C
Soldering Duration	10 sec $\pm$ 1 sec
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 2%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10 KHz for C $\leq$ 1 $\mu$ F $\leq$ 20 x 10 <sup>-4</sup> at 1 KHz for C > 1 $\mu$ F
Insulation Resistance	$\geq$ 50% of limit value
Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 3% for C $\leq$ 0.1 $\mu$ F $\leq$ $\pm$ 2% for C > 0.1 $\mu$ F



# 150 Series Metallized Polyester / Axial Leads

**MALLORY**

Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d
<b>63 VDC/40 VAC</b>							
150154*63AA^	0.15	0.197	0.433	0.024	5	11	0.6
150184*63AA^	0.18	0.197	0.433	0.024	5	11	0.6
150224*63BB^	0.22	0.236	0.650	0.024	6	16.5	0.6
150274*63BB^	0.27	0.236	0.650	0.024	6	16.5	0.6
150334*63BB^	0.33	0.236	0.650	0.024	6	16.5	0.6
150394*63CB^	0.39	0.256	0.650	0.024	6.5	16.5	0.6
150474*63DB^	0.47	0.276	0.650	0.024	7	16.5	0.6
150564*63DB^	0.56	0.276	0.650	0.024	7	16.5	0.6
150684*63DC^	0.68	0.276	0.807	0.024	7	20.5	0.6
150824*63EC^	0.82	0.315	0.807	0.031	8	20.5	0.8
150105*63EC^	1	0.315	0.807	0.031	8	20.5	0.8
150155*63HC^	1.5	0.374	0.807	0.031	9.5	20.5	0.8
150225*63HE^	2.2	0.374	1.102	0.031	9.5	28	0.8
150335*63KE^	3.3	0.433	1.102	0.031	11	28	0.8
150475*63ME^	4.7	0.492	1.299	0.031	12.5	33	0.8
150685*63QF^	6.8	0.571	1.299	0.031	14.5	33	0.8
150106*63TF^	10	0.610	1.299	0.031	15.5	33	0.8

Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d
<b>100 VDC/63 VAC</b>							
150683*100AA^	0.068	0.197	0.433	0.024	5	11	0.6
150823*100AA^	0.082	0.197	0.433	0.024	5	11	0.6
150104*100AA^	0.1	0.197	0.433	0.024	5	11	0.6
150124*100AA^	0.12	0.197	0.433	0.024	5	11	0.6
150154*100BB^	0.15	0.236	0.650	0.024	6	16.5	0.6
150184*100CB^	0.18	0.256	0.650	0.024	6.5	16.5	0.6
150224*100CB^	0.22	0.256	0.650	0.024	6.5	16.5	0.6
150274*100CB^	0.27	0.256	0.650	0.024	6.5	16.5	0.6
150334*100EB^	0.33	0.315	0.650	0.031	8	16.5	0.8
150394*100EB^	0.39	0.315	0.650	0.031	8	16.5	0.8
150474*100DC^	0.47	0.276	0.807	0.031	7	20.5	0.8
150564*100EC^	0.56	0.315	0.807	0.031	8	20.5	0.8
150684*100FC^	0.68	0.335	0.807	0.031	8.5	20.5	0.8
150824*100HC^	0.82	0.374	0.807	0.031	9.5	20.5	0.8
150105*100IC^	1	0.394	0.807	0.031	10	20.5	0.8
150155*100IE^	1.5	0.394	1.102	0.031	10	28	0.8
150225*100LE^	2.2	0.453	1.102	0.031	11.5	28	0.8
150335*100PE^	3.3	0.531	1.102	0.031	13.5	28	0.8
150475*100RF^	4.7	0.591	1.299	0.031	15	33	0.8
150685*100WF^	6.8	0.689	1.299	0.031	17.5	33	0.8
150106*100YF^	10	0.807	1.299	0.031	20.5	33	0.8

Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d
<b>250 VDC/160 VAC</b>							
150153*250AA^	0.015	0.197	0.433	0.024	5	11	0.6
150183*250AA^	0.015	0.197	0.433	0.024	5	11	0.6
150183*250AA^	0.018	0.197	0.433	0.024	5	11	0.6
150223*250AA^	0.022	0.197	0.433	0.024	5	11	0.6
150273*250AA^	0.027	0.197	0.433	0.024	5	11	0.6
150333*250AA^	0.033	0.197	0.433	0.024	5	11	0.6
150393*250AA^	0.039	0.197	0.433	0.024	5	11	0.6
150473*250AA^	0.047	0.197	0.433	0.024	5	11	0.6
150563*250AA^	0.056	0.197	0.433	0.024	5	11	0.6
150683*250BB^	0.068	0.236	0.650	0.024	6	16.5	0.6
150823*250BB^	0.082	0.236	0.650	0.024	6	16.5	0.6
150104*250CB^	0.1	0.256	0.650	0.024	6.5	16.5	0.6
150124*250DB^	0.12	0.276	0.650	0.024	7	16.5	0.6
150154*250EB^	0.15	0.315	0.650	0.031	8	16.5	0.8
150184*250EB^	0.18	0.315	0.650	0.031	8	16.5	0.8
150224*250FB^	0.22	0.335	0.650	0.031	8.5	16.5	0.8
150274*250EC^	0.27	0.315	0.807	0.031	8	20.5	0.8
150334*250FC^	0.33	0.335	0.807	0.031	8.5	20.5	0.8
150394*250GC^	0.39	0.354	0.807	0.031	9	20.5	0.8
150474*250HC^	0.47	0.374	0.807	0.031	9.5	20.5	0.8
150564*250IC^	0.56	0.394	0.807	0.031	10	20.5	0.8
150684*250GE^	0.68	0.354	1.102	0.031	9	28	0.8
150824*250HE^	0.82	0.374	1.102	0.031	9.5	28	0.8
150105*250JE^	1	0.413	1.102	0.031	10.5	28	0.8
150155*250ME^	1.5	0.492	1.102	0.031	12.5	28	0.8
150225*250PF^	2.2	0.531	1.299	0.031	13.5	33	0.8
150335*250TF^	3.3	0.610	1.299	0.031	15.5	33	0.8
150475*250XF^	4.7	0.728	1.299	0.031	18.5	33	0.8
150685*250ZF^	6.8	0.845	1.299	0.031	21.5	33	0.8

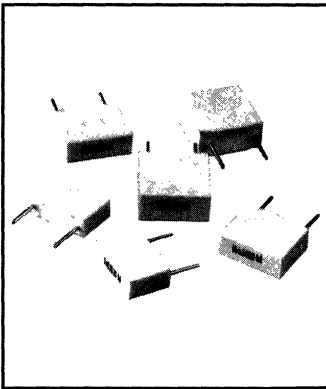
Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d
<b>400 VDC/200 VAC</b>							
150822*400AA^	0.0082	0.197	0.433	0.024	5	11	0.6
150103*400AA^	0.01	0.197	0.433	0.024	5	11	0.6
150123*400AA^	0.012	0.197	0.433	0.024	5	11	0.6
150153*400BB^	0.015	0.236	0.650	0.024	6	16.5	0.6
150183*400BB^	0.018	0.236	0.650	0.024	6	16.5	0.6
150223*400BB^	0.022	0.236	0.650	0.024	6	16.5	0.6
150273*400BB^	0.027	0.236	0.650	0.024	6	16.5	0.6
150333*400BB^	0.033	0.236	0.650	0.024	6	16.5	0.6
150393*400CB^	0.039	0.256	0.650	0.024	6.5	16.5	0.6
150473*400DB^	0.047	0.276	0.650	0.024	7	16.5	0.6
150563*400EB^	0.056	0.315	0.650	0.024	8	16.5	0.6
150683*400DC^	0.068	0.276	0.807	0.024	7	20.5	0.6
150823*400EC^	0.082	0.315	0.807	0.031	8	20.5	0.8
150104*400EC^	0.1	0.315	0.807	0.031	8	20.5	0.8
150124*400EC^	0.12	0.315	0.807	0.031	8	20.5	0.8
150154*400GC^	0.15	0.354	0.807	0.031	9	20.5	0.8
150184*400EE^	0.18	0.315	1.102	0.031	8	28	0.8
150224*400FE^	0.22	0.335	1.102	0.031	8.5	28	0.8
150274*400GE^	0.27	0.354	1.102	0.031	9	28	0.8
150334*400IE^	0.33	0.394	1.102	0.031	10	28	0.8
150394*400IE^	0.39	0.413	1.102	0.031	10.5	28	0.8
150474*400LE^	0.47	0.453	1.102	0.031	11.5	28	0.8
150564*400LF^	0.56	0.453	1.299	0.031	11.5	33	0.8
150684*400MF^	0.68	0.492	1.299	0.031	12.5	33	0.8
150824*400PF^	0.82	0.531	1.299	0.031	13.5	33	0.8
150105*400QF^	1	0.571	1.299	0.031	14.5	33	0.8
150155*400VFA^	1.5	0.689	1.299	0.031	17.5	33	0.8
150225*400YFA^	2.2	0.807	1.299	0.031	20.5	33	0.8

Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d
<b>630 VDC/220 VAC</b>							
150102*630AA^	0.001	0.197	0.433	0.024	5	11	0.6
150122*630AA^	0.0012	0.197	0.433	0.024	5	11	0.6
150152*630AA^	0.0015	0.197	0.433	0.024	5	11	0.6
150182*630AA^	0.0018	0.197	0.433	0.024	5	11	0.6
150222*630AA^	0.0022	0.197	0.433	0.024	5	11	0.6
150272*630AA^	0.0027	0.197	0.433	0.024	5	11	0.6
150332*630AA^	0.0033	0.197	0.433	0.024	5	11	0.6
150392*630AA^	0.0039	0.197	0.433	0.024	5	11	0.6
150472*630AA^	0.0047	0.197	0.433	0.024	5	11	0.6
150562*630AA^	0.0056	0.197	0.433	0.024	5	11	0.6
150682*630AA^	0.0068	0.197	0.433	0.024	5	11	0.6
150822*630BB^	0.0082	0.236	0.650	0.024	6	16.5	0.6
150103*630BB^	0.01	0.236	0.650	0.024	6	16.5	0.6
150123*630BB^	0.012	0.236	0.650	0.024	6	16.5	0.6
150153*630BB^	0.015	0.236	0.650	0.024	6	16.5	0.6
150183*630CB^	0.018	0.256	0.650	0.024	6.5	16.5	0.6
150223*630DB^	0.022	0.276	0.650	0.024	7	16.5	0.6
150273*630CC^	0.027	0.256	0.807	0.024	6.5	20.5	0.6
150333*630EC^	0.033	0.315	0.807	0.031	8	20.5	0.8
150393*630EC^	0.039	0.315	0.807	0.031	8	20.5	0.8
150473*630EC^	0.047	0.315	0.807	0.031	8	20.5	0.8
150563*630FC^	0.056	0.335	0.807	0.031	8.5	20.5	0.8
150683*630GC^	0.068	0.354	0.807	0.031	9	20.5	0.8
150823*630HC^	0.082	0.374	0.807	0.031	9.5	20.5	0.8
150104*630FE^	0.1	0.335	1.102	0.031	8.5	28	0.8
150124*630GE^	0.12	0.354	1.102	0.031	9	28	0.8
150154*630IE^	0.15	0.394	1.102	0.031	10	28	0.8
150184*630IE^	0.18	0.413	1.102	0.031	10.5	28	0.8
150224*630LE^	0.22	0.453	1.102	0.031	11.5	28	0.8
150274*630ME^	0.27	0.492	1.102	0.031	12.5	28	0.8
150334*630NF^	0.33	0.512	1.299	0.031	13	33	0.8
150394*630QF^	0.39	0.571	1.299	0.031	14.5	33	0.8
150474*630RF^	0.47	0.591	1.299	0.031	15	33	0.8
150564*630TF^	0.56	0.630	1.299	0.031	16	33	0.8
150684*630VFA^	0.68	0.689	1.299	0.031	17.5	33	0.8
150824*630XFA^	0.82	0.728	1.299	0.031	18.5	33	0.8
150105*630YFA^	1	0.807	1.299	0.031	20.5	33	0.8

\* Indicate capacitance tolerance  
 J =  $\pm 5\%$   
 K =  $\pm 10\%$   
 M =  $\pm 20\%$

^ If ordering Tape & Reel, insert 1, 2, or 3  
 (See page 126 to determine which class applies)

# 160 Series Metallized Polyester / Radial Leads



- Radial Leaded (10 mm to 27.5 mm)
- Non Inductively Wound
- Flame Retardant Case Meets UL94V0
- Epoxy Encapsulant Meets UL94V0

Excellent choice for general purpose applications such as bypass, decoupling, smoothing and some timing, energy storage/discharge and arc suppression.

## GENERAL SPECIFICATIONS

Operating Temperature: -55°C to +125°C with voltage derating above 85°C  
 Voltage Range: 63 VDC to 1000 VDC  
 Capacitance Range: 0.001  $\mu$ F to 10  $\mu$ F  
 Capacitance Tolerance:  $\pm$ 5%,  $\pm$ 10%,  $\pm$ 20%  
 CECC Approval: Detail Specification 30401-009

Total Self Inductance (L):

pitch (mm)	10	15	22.5	27.5
L (nH) $\approx$	9	10	18	18

Dielectric Withstand: 1.6 x Vn applied for 2 sec at +25°C  $\pm$ 5°C

Dissipation Factor (DF):  $\text{tg}\delta \times 10^{-4}$  at +25°C  $\pm$ 5°C

KHz	C $\leq$ 1 $\mu$ F	C > 1 $\mu$ F
1	$\leq$ 100	$\leq$ 100
10	$\leq$ 150	

## Maximum Pulse Rise Time (dv/dt)

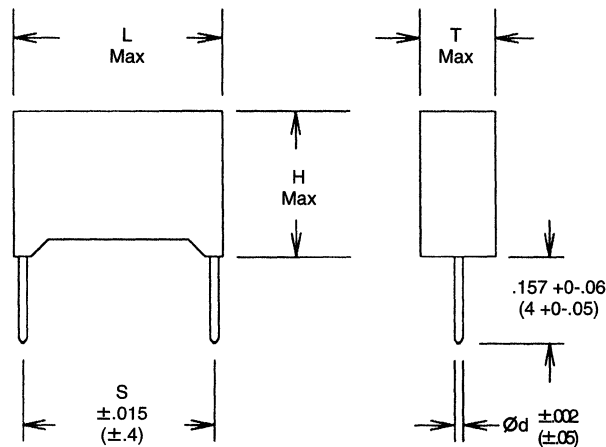
Vn	(Pitch mm)			
	10	15	22.5	27.5
63	3	1.5	1	1
100/160	6/8	3	2	1
250	11	7	4	3
400	20	10	5.5	5
630	30	15	8	7
1000	60	25	15	10

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V.

## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	25°C $\pm$ 5°C
Temperature	1 minute
Voltage Charge Time	50 VDC for Vn < 100 VDC
Voltage Charge	100 VDC for Vn $\geq$ 100 VDC
<b>Performance</b>	
For Vn > 100 VDC	$\geq$ 30,000 M $\Omega$ for C $\leq$ 0.33 $\mu$ F
	$\geq$ 10,000 M $\Omega$ x $\mu$ F for C > 0.33 $\mu$ F
For Vn $\leq$ 100 VDC	$\geq$ 10,000 M $\Omega$ for C $\leq$ 0.1 $\mu$ F
	$\geq$ 1,000 M $\Omega$ x $\mu$ F for C > 0.1 $\mu$ F
Damp Heat Test	
<b>Test Conditions</b>	+40°C
Temperature	93% $\pm$ 2%
Relative Humidity	56 days
Test Duration	
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 50 x 10 <sup>-4</sup> at 1KHz
Insulation Resistance	$\geq$ 50% of limit value
Life Test	
<b>Test Conditions</b>	+85°C
Temperature	1000 h
Test Duration	1.25 x Vn
Voltage Applied	
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10KHz for C $\leq$ 1 $\mu$ F
	$\leq$ 20 x 10 <sup>-4</sup> at 1KHz for C > 1 $\mu$ F
Insulation Resistance	$\geq$ 50% of limit value
Soldering	
<b>Test Conditions</b>	260°C $\pm$ 5°C
Soldering Temperature	10 sec $\pm$ 1 sec
Soldering Duration	
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 2%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10KHz for C $\leq$ 1 $\mu$ F
	$\leq$ 20 x 10 <sup>-4</sup> at 1KHz for C > 1 $\mu$ F
Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 3% for C $\leq$ 0.1 $\mu$ F
	$\leq$ $\pm$ 2% for C > 0.1 $\mu$ F
<b>Corona (Partial Discharge Inception Voltage)</b>	200 VAC for 100 VDC, 200 VDC
	250 VAC for 400 VDC, 630 VDC,
	1000 VDC

## OUTLINE DIMENSIONS



Note: The lead diameter is a maximum dimension for lead spacing  $\leq$  15mm and a nominal for lead spacing > 15mm.

# 160 Series Metallized Polyester / Radial Leads



General Purpose Film

Catalog Number	Cap $\mu$ F	Inches					Millimeters				
		L Length	T Thickness	H Height	S Spacing	$\varnothing$ d	L Length	T Thickness	H Height	S Spacing	$\varnothing$ d
<b>63 VDC/40 VAC</b>											
160224*63C	0.2200	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160274*63C	0.2700	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160334*63C	0.3300	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160394*63C	0.3900	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160474*63D	0.4700	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160564*63D	0.5600	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160684*63D	0.6800	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160684*63F	0.6800	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160824*63E	0.8200	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160824*63F	0.8200	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160105*63E	1.0000	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160105*63F	1.0000	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160155*63F	1.5000	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160225*63G	2.2000	0.709	0.295	0.571	0.591	0.031	18	6	12	15	0.8
160335*63M	3.3000	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160475*63N	4.7000	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160685*63O	6.8000	1.043	0.394	0.748	0.886	0.031	26.5	10	19	22.5	0.8
160106*63P	10.0000	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
<b>100 VDC/63 VAC</b>											
# 160104*100C	0.1000	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160124*100C	0.1200	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160154*100C	0.1500	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160184*100C	0.1800	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160224*100D	0.2200	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160274*100D	0.2700	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160334*100E	0.3300	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160334*100F	0.3300	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160394*100D	0.3900	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160394*100F	0.3900	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160474*100E	0.4700	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160474*100F	0.4700	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160564*100G	0.5600	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160684*100G	0.6800	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160824*100H	0.8200	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160105*100H	1.0000	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160155*100M	1.5000	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160225*100N	2.2000	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160335*100O	3.3000	1.043	0.394	0.748	0.886	0.031	26.5	10	19	22.5	0.8
160475*100P	4.7000	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160685*100Q	6.8000	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8
160106*100U	10.0000	1.457	0.630	1.043	1.083	0.031	37	16	26.5	27.5	0.8
<b>250 VDC/160 VAC</b>											
160333*250C	0.0330	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160393*250C	0.0390	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160473*250C	0.0470	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160563*250C	0.0560	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160683*250C	0.0680	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160823*250C	0.0820	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160104*250D	0.1000	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160104*250F	0.1000	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160124*250D	0.1200	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160124*250F	0.1200	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160154*250E	0.1500	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160154*250F	0.1500	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160184*250E	0.1800	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160184*250F	0.1800	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160224*250F	0.2200	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160274*250G	0.2700	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160334*250G	0.3300	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160394*250H	0.3900	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160474*250H	0.4700	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160474*250L	0.4700	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160564*250I	0.5600	0.709	0.335	0.571	0.591	0.031	18	8.5	14.5	15	0.8
160564*250M	0.5600	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160684*250I	0.6800	0.709	0.335	0.571	0.591	0.031	18	8.5	14.5	15	0.8
160684*250M	0.6800	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160824*250M	0.8200	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160105*250N	1.0000	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160155*250O	1.5000	1.043	0.394	0.748	0.886	0.031	26.5	10	19	22.5	0.8
160225*250P	2.2000	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160335*250Q	3.3000	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8
160475*250U	4.7000	1.457	0.630	1.043	1.083	0.031	37	16	26.5	27.5	0.8
160685*250U	6.8000	1.457	0.630	1.043	1.083	0.031	37	16	26.5	27.5	0.8

\* Indicate capacitance tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

# Also available in 160 VDC

# 160 Series Metallized Polyester / Radial Leads



Catalog Number	Cap $\mu$ F	Inches					Millimeters				
		L Length	T Thickness	H Height	S Spacing	$\varnothing$ d	L Length	T Thickness	H Height	S Spacing	$\varnothing$ d
<b>400 VDC/200 VAC</b>											
160123*400C	0.0120	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160153*400C	0.0150	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160183*400C	0.0180	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160223*400C	0.0220	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160273*400C	0.0270	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160333*400D	0.0330	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160393*400D	0.0390	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160473*400E	0.0470	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160473*400F	0.0470	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160563*400F	0.0560	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160683*400F	0.0680	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160823*400F	0.0820	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160104*400G	0.1000	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160124*400G	0.1200	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160154*400H	0.1500	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160154*400L	0.1500	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160184*400L	0.1800	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160224*400L	0.2200	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160274*400L	0.2700	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160334*400M	0.3300	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160394*400M	0.3900	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160474*400N	0.4700	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160564*400Q	0.5600	1.043	0.394	0.748	0.886	0.031	26.5	10	19	22.5	0.8
160684*400P	0.6800	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160824*400P	0.8200	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160105*400P	1.0000	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
<b>630 VDC/220 VAC</b>											
160392*630C	0.0039	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160472*630C	0.0047	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160562*630C	0.0056	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160682*630C	0.0068	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160822*630C	0.0082	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160103*630C	0.0100	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160123*630D	0.0120	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160153*630D	0.0150	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160183*630D	0.0180	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160223*630E	0.0220	0.512	0.236	0.472	0.394	0.031	13	6	12	10	0.8
160273*630F	0.0270	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160333*630F	0.0330	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160393*630G	0.0390	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160473*630G	0.0470	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160563*630G	0.0560	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160683*630H	0.0680	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160683*630L	0.0680	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160823*630L	0.0820	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160104*630L	0.1000	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160124*630M	0.1200	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160154*630M	0.1500	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160184*630N	0.1800	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160224*630N	0.2200	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160274*630Q	0.2700	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8
160334*630P	0.3300	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160394*630P	0.3900	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160474*630Q	0.4700	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8
<b>1000 VDC/250 VAC</b>											
160102*1000C	0.0010	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160122*1000C	0.0012	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160152*1000C	0.0015	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160182*1000C	0.0018	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160222*1000C	0.0022	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160272*1000C	0.0027	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160332*1000C	0.0033	0.512	0.157	0.374	0.394	0.031	13	4	9.5	10	0.8
160392*1000D	0.0039	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160472*1000D	0.0047	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160562*1000D	0.0056	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160682*1000D	0.0068	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160822*1000D	0.0082	0.512	0.197	0.433	0.394	0.031	13	5	11	10	0.8
160103*1000F	0.0100	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160123*1000F	0.0120	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160153*1000F	0.0150	0.709	0.197	0.433	0.591	0.031	18	5	11	15	0.8
160183*1000G	0.0180	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8
160223*1000G	0.0220	0.709	0.236	0.472	0.591	0.031	18	6	12	15	0.8

\* Indicate capacitance tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

# 160 Series Metallized Polyester / Radial Leads

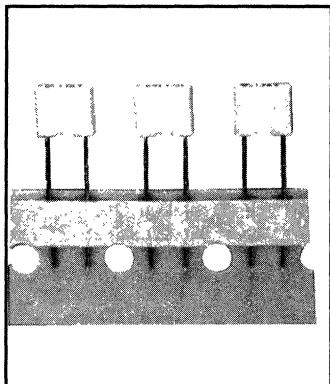


Catalog Number	Cap $\mu$ F	Inches					Millimeters				
		L Length	T Thickness	H Height	S Spacing	$\varnothing$ d	L Length	T Thickness	H Height	S Spacing	$\varnothing$ d
<b>1000 VDC/250 VAC</b>											
160273*1000H	0.0270	0.709	0.295	0.531	0.591	0.031	18	7.5	13.5	15	0.8
160333*1000L	0.0330	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160393*1000L	0.0390	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160473*1000L	0.0470	1.043	0.236	0.591	0.886	0.031	26.5	6	15	22.5	0.8
160563*1000M	0.0560	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160683*1000M	0.0680	1.043	0.276	0.630	0.886	0.031	26.5	7	16	22.5	0.8
160823*1000N	0.0820	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160104*1000N	0.1000	1.043	0.335	0.669	0.886	0.031	26.5	8.5	17	22.5	0.8
160124*1000O	0.1200	1.043	0.394	0.748	0.886	0.031	26.5	10	19	22.5	0.8
160154*1000P	0.1500	1.260	0.433	0.787	1.083	0.031	32	11	20	27.5	0.8
160184*1000Q	0.1800	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8
160224*1000Q	0.2200	1.260	0.512	0.886	1.083	0.031	32	13	22.5	27.5	0.8

\* Indicate capacitance tolerance: J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

# 167/184 Series Metalized Polyester / Radial Leads

**MALLORY**



- 167 Series Bulk Packaging
- 184 Series Available Reel or Ammo Pack
- Radial Leaded (7.5mm)
- Flame Retardant Case Meets UL94V0
- Epoxy Encapsulant Meets UL94V0

Excellent choice for general purpose applications such as bypass, decoupling, smoothing and some timing, energy storage/discharge and arc suppression.

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C with voltage derating above 85°C

Voltage Range:  
63 VDC to 630 VDC

Capacitance Range:  
0.001  $\mu$ F to 1.0  $\mu$ F

Capacitance Tolerance:  
 $\pm 5\%$ ,  $\pm 10\%$ ,  $\pm 20\%$

CECC Approval:  
Detail Specification 30401-009

Total Self Inductance:  
Approximately 8nH

Dielectric Withstand Voltage:  
1.6 x rated voltage for 2 sec  
at +25°C  $\pm 5^\circ$ C

Dissipation Factor (DF):  
 $\text{tg}\delta \times 10^{-4}$  at +25°C  $\pm 5^\circ$ C

KHz	$\text{tg}\delta \times 10^{-4}$
1	$\leq 100$
10	$\leq 150$

## Maximum Pulse Rise Time (dv/dt)

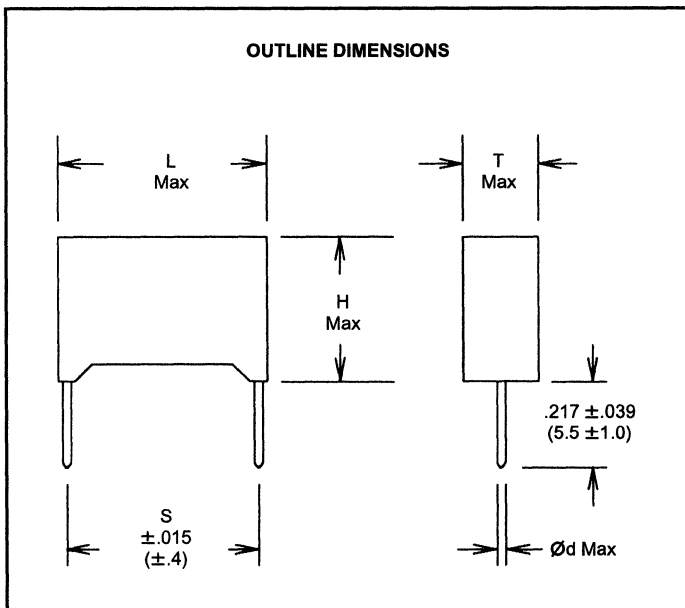
Vn	V/ $\mu$ Sec
63	5
100	6
250	15
400	30
630	40

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V.

## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	25°C $\pm 5^\circ$ C
Voltage Charge Time	1 minute
Voltage Charge	50 VDC for Vn < 100 VDC 100 VDC for Vn $\geq$ 100 VDC
<b>Performance</b>	
For Vn > 100 VDC	$\geq 30,000 \text{ M}\Omega$ (50,000 M $\Omega$ typical)
For Vn $\leq$ 100 VDC	$\geq 10,000 \text{ M}\Omega$ for C $\leq 0.1 \mu\text{F}$ $\geq 1,000 \text{ M}\Omega \times \mu\text{F}$ for C > 0.1 $\mu\text{F}$
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93% $\pm 2\%$
Test Duration	56 days
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 5\%$
DF Change $\Delta \text{tg}\delta$	$\leq 50 \times 10^{-4}$ at 1KHz
Insulation Resistance	$\geq 50\%$ of limit value
Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	1000 h
Voltage Applied	1.25 x Vn
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 5\%$
DF Change $\Delta \text{tg}\delta$	$\leq 30 \times 10^{-4}$ at 10KHz
Insulation Resistance	$\geq 50\%$ of limit value
Soldering	
<b>Test Conditions</b>	
Soldering Temperature	260°C $\pm 5^\circ$ C
Soldering Duration	10 sec $\pm 1$ sec
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 2\%$
DF Change $\Delta \text{tg}\delta$	$\leq 30 \times 10^{-4}$ at 10 KHz
Insulation Resistance	$\geq$ limit value
Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change $\Delta C/C$	$\leq \pm 3\%$ for C $\leq 0.1 \mu\text{F}$ $\leq \pm 2\%$ for C > 0.1 $\mu\text{F}$

## OUTLINE DIMENSIONS





# 167/184 Series Metallized Polyester / Radial Leads



Catalog Number		Cap $\mu$ F	Inches					Millimeters				
Bulk Pack	Tape and Reel Ammo Pack		L Length	T Thickness	H Height	S Spacing	$\varnothing$ d	L Length	T Thickness	H Height	S Spacing	$\varnothing$ d
<b>63 VDC/40 VAC</b>												
167683*63A	184683*63#A>	0.068	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167104*63A	184104*63#A>	0.1	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167154*63A	184154*63#A>	0.15	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167224*63A	184224*63#A>	0.22	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167334*63A	184334*63#A>	0.33	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167474*63B	184474*63#B>	0.47	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167684*63C	184684*63#C>	0.68	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
167105*63C	184105*63#C>	1	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
<b>100 VDC/63 VAC</b>												
167333*100A	184333*100#A>	0.033	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167473*100A	184473*100#A>	0.047	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167683*100A	184683*100#A>	0.068	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167104*100A	184104*100#A>	0.1	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167154*100B	184154*100#B>	0.15	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167224*100C	184224*100#C>	0.22	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
167334*100C	184334*100#C>	0.33	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
<b>250 VDC/160 VAC</b>												
167103*250A	184103*250#A>	0.01	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167153*250A	184153*250#A>	0.015	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167183*250A	184183*250#A>	0.018	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167223*250A	184223*250#A>	0.022	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167333*250B	184333*250#B>	0.033	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167473*250B	184473*250#B>	0.047	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167683*250C	184683*250#C>	0.068	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
167104*250C	184104*250#C>	0.1	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
<b>400 VDC/200 VAC</b>												
167472*400A	184472*400#A>	0.0047	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167472*400B	184472*400#B>	0.0047	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
168682*400A	184682*400#A>	0.0068	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167103*400A	184103*400#A>	0.01	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167153*400B	184153*400#B>	0.015	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167223*400C	184223*400#C>	0.022	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
167333*400C	184333*400#C>	0.033	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
<b>630 VDC/220 VAC</b>												
167102*630A	184102*630#A>	0.001	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167152*630A	184152*630#A>	0.0015	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167222*630A	184222*630#A>	0.0022	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167332*630A	184332*630#A>	0.0033	0.413	0.138	0.276	0.295	0.024	10.5	3.5	7.0	7.5	0.6
167472*630B	184472*630#B>	0.0047	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167682*630B	184682*630#B>	0.0068	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6
167103*630C	184103*630#C>	0.01	0.413	0.197	0.433	0.295	0.024	10.5	5.0	11.0	7.5	0.6
167153*630D	184153*630#D>	0.015	0.413	0.236	0.472	0.295	0.024	10.5	6.0	12.0	7.5	0.6

\* Indicate capacitance tolerance:  
J =  $\pm 5\%$ , K =  $\pm 10\%$ , M =  $\pm 20\%$

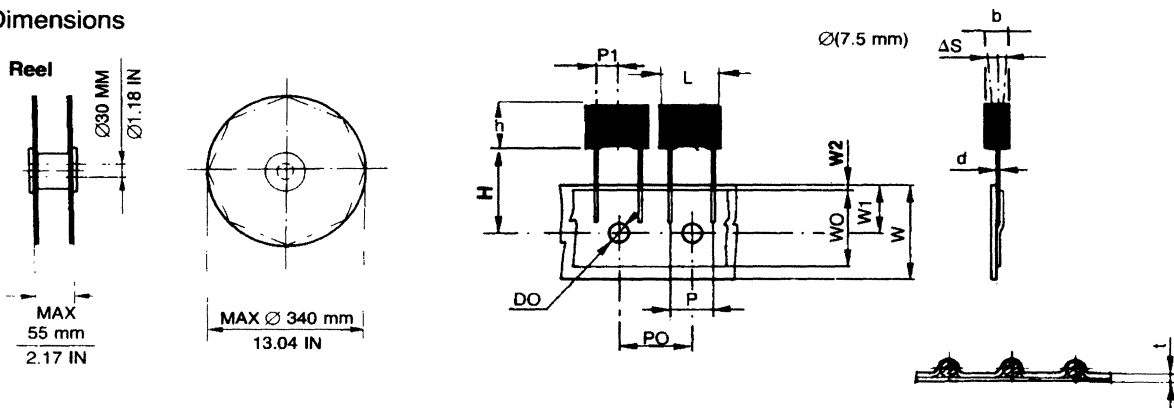
# Indicate packaging type:  
R = tape and reel, A = ammo pack

> Indicate tooling code:  
A = 16.5mm, B = 18.5mm, C = 16.0mm  
(See H dimension in taping specifications)

General Purpose Film

## Specifications for Tape and Reel or Ammo Pack

### Dimensions



Item	Symbol	Dimensions		Tolerance	
		mm	Inches	mm	Inches
Body width	L	10.5	.414	Max	Max
Body height	h	6.5-12	.236-.472	Max	Max
Body thickness	b	3.5-6	.138-.236	Max	Max
Lead-wire diameter	d	0.6	.024	+0.05	$\pm .002$
Feed hole pitch	$p_0$	12.7	.5	$\pm 0.2$	$\pm .007$
Lead-to-lead distance	F	7.5	.295	$\pm 0.6-0.1$	$\pm .024-.040$
Component alignment F-R	$\Delta S$	0	0	$\pm 2$	$\pm .080$
Height from sprocket hole center to the comp. body	$H^*$	16.0(C)	.630	$\pm .5$	$\pm .020$
	$H^*$	16.5(A)	.679	$\pm .3$	$\pm .010$
	$H^*$	18.5(B)	.729	$\pm .5$	$\pm .020$
Tape width	W	18	.709	+1 -0.5	+ .039 -.020
Hold-down tape width	$W_0$	15	.591	$\pm 0.5$	$\pm .020$
Hole position	$W_1$	9	.355	$\pm 0.5$	$\pm .020$
Hold-down tape position	$W_2$	3	.118	Max	Max
Feed hole diameter	$D_0$	4	.157	$\pm 0.2$	$\pm .008$
Total tape thickness	t	0.7	.028	$\pm 0.2$	$\pm .008$

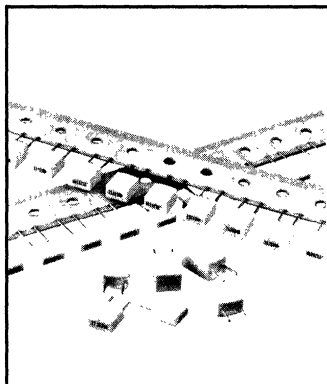
\*The H dimension depends on the insertion equipment used. Specify the required dimension and tolerance when ordering.

### Component Quantity Per Reel

Case Code	Quantity Reeled	Quantity Ammo Pack
A	1900	1800
B	1500	1500
C	1200	1200
D	1000	1000

# 168/185 Series Metallized Polyester / Radial Leads

**MALLORY**



- 168 Series Bulk Packaging
- 185 Series Available Reel or Ammo Pack
- Radial Leaded (5.0mm)
- Flame Retardant Case Meets UL94V0
- Epoxy Encapsulant Meets UL94V0

Excellent choice for general purpose applications such as bypass, decoupling, smoothing and some timing, energy storage/discharge and arc suppression.

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +125°C with voltage derating above 85°C

Voltage Range:  
50, 63 and 100 VDC

Capacitance Range:  
0.001  $\mu$ F to 1.0  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 5%,  $\pm$ 10%,  $\pm$ 20%

CECC Approval:  
Detail Specification 30401-009

Total Self Inductance:  
Approximately 7nH

Dielectric Withstand Voltage:  
1.6 x rated voltage for 2 sec at +25°C  $\pm$ 5°C

Dissipation Factor (DF):  
 $\text{tg}\delta \times 10^{-4}$  at +25°C  $\pm$ 5°C

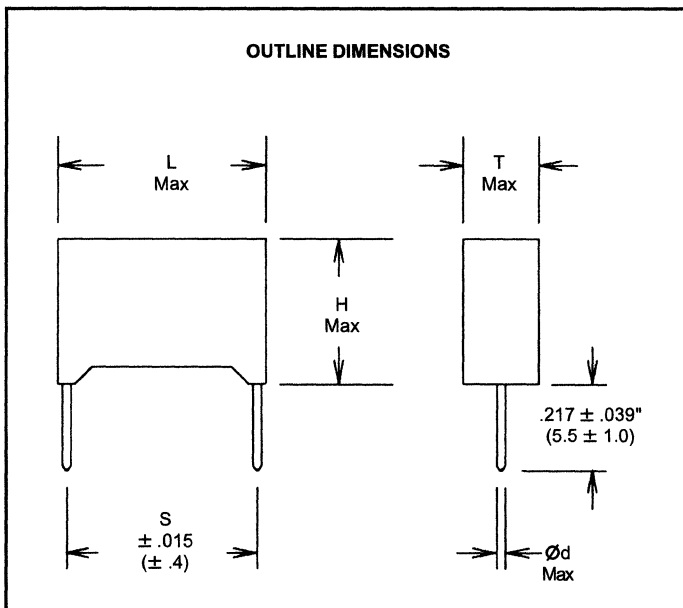
KHz	C $\leq$ 0.1 $\mu$ F	C $>$ 0.1 $\mu$ F
1	$\leq$ 100	$\leq$ 100
10	$\leq$ 150	$\leq$ 150
100	$\leq$ 300	$\leq$ 300

## Maximum Pulse Rise Time (dv/dt)

Vn	Capacitance	V/ $\mu$ Sec
50		4
63		8
100	C > .0068 $\mu$ F	10
	.0033 $\mu$ F < C < .0068 $\mu$ F	15
	C $\leq$ .0033 $\mu$ F	30

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V.

## OUTLINE DIMENSIONS



## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	25°C $\pm$ 5°C
Voltage Charge Time	1 minute
Voltage Charge	50 VDC for Vn < 100 VDC 100 VDC for Vn $\geq$ 100 VDC
<b>Performance</b>	
For Vn > 100 VDC	$\geq$ 30,000 M $\Omega$
For Vn $\leq$ 100 VDC	$\geq$ 10,000 M $\Omega$ for C $\leq$ 0.1 $\mu$ F $\geq$ 1,000 M $\Omega$ x $\mu$ F for C > 0.1 $\mu$ F
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93% $\pm$ 2%
Test Duration	21 days
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 50 x 10 <sup>-4</sup> at 1KHz
Insulation Resistance	$\geq$ 50% of limit value
Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	2000 h
Voltage Applied	1.25 x Vn
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 5%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10 KHz
Insulation Resistance	$\geq$ 50% of limit value
Soldering	
<b>Test Conditions</b>	
Soldering Temperature	260°C $\pm$ 5°C
Soldering Duration	5 sec $\pm$ 1 sec
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 2%
DF Change $\Delta$ tg $\delta$	$\leq$ 30 x 10 <sup>-4</sup> at 10 KHz
Insulation Resistance	$\geq$ limit value
Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 3%

General Purpose Film

# 168/185 Series Metallized Polyester / Radial Leads



Catalog Number		Cap μF	Inches					Millimeters				
Bulk Pack	Tape and Reel Ammo Pack		L Length	T Thickness	H Height	S Spacing	Ød	L Length	T Thickness	H Height	S Spacing	Ød

### 50 VDC 30 VAC

168104*50A	185104*50#A>	0.1	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168154*50A	185154*50#A>	0.15	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168224*50C	185224*50#C>	0.22	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168334*50C	185334*50#C>	0.33	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168474*50H	185474*50#H>	0.47	0.283	0.177	0.335	0.197	0.024	7.2	4.5	8.5	5	0.6
168684*50F	185684*50#F>	0.68	0.283	0.197	0.394	0.197	0.024	7.2	5	10	5	0.6
168105*50G	185105*50#G>	1.0	0.283	0.236	0.433	0.197	0.024	7.2	6	11	5	0.6

### 63 VDC 40 VAC

168473*63A	185473*63#A>	0.047	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168683*63A	185683*63#A>	0.068	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168104*63A	185104*63#A>	0.1	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168154*63C	185154*63#C>	0.15	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168224*63C	185224*63#C>	0.22	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168334*63H	185334*63#H>	0.33	0.283	0.177	0.335	0.197	0.024	7.2	4.5	8.5	5	0.6
168474*63H	185474*63#H>	0.47	0.283	0.177	0.335	0.197	0.024	7.2	4.5	8.5	5	0.6
168684*63F	185684*63#G>	0.68	0.283	0.236	0.433	0.197	0.024	7.2	6	11	5	0.6
168105*63G	185105*63#G>	1.0	0.283	0.236	0.433	0.197	0.024	7.2	6	11	5	0.6

### 100 VDC 63 VAC

168102*100A	185102*100#A>	0.001	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168152*100A	185152*100#A>	0.0015	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168222*100A	185222*100#A>	0.0022	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168332*100A	185332*100#A>	0.0033	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168472*100A	185472*100#A>	0.0047	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168562*100A	185562*100#A>	0.0056	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168682*100A	185682*100#A>	0.0068	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168103*100A	185103*100#A>	0.01	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168153*100A	185153*100#A>	0.015	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168223*100A	185223*100#A>	0.022	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168273*100A	185273*100#A>	0.027	0.283	0.098	0.256	0.197	0.024	7.2	2.5	6.5	5	0.6
168333*100C	185333*100#C>	0.033	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168473*100C	185473*100#C>	0.047	0.283	0.138	0.295	0.197	0.024	7.2	3.5	7.5	5	0.6
168683*100H	185683*100#H>	0.068	0.283	0.177	0.335	0.197	0.024	7.2	4.5	8.5	5	0.6
168104*100H	185104*100#H>	0.1	0.283	0.177	0.335	0.197	0.024	7.2	4.5	8.5	5	0.6
168154*100F	185154*100#F>	0.15	0.283	0.197	0.394	0.197	0.024	7.2	5	10	5	0.6
168224*100G	185224*100#G>	0.22	0.283	0.236	0.433	0.197	0.024	7.2	6	11	5	0.6

\* Indicate capacitance tolerance:  
J = ±5%, K = ±10%, M = ±20%

# Indicate packaging type:  
R = tape and reel, A = ammo pack

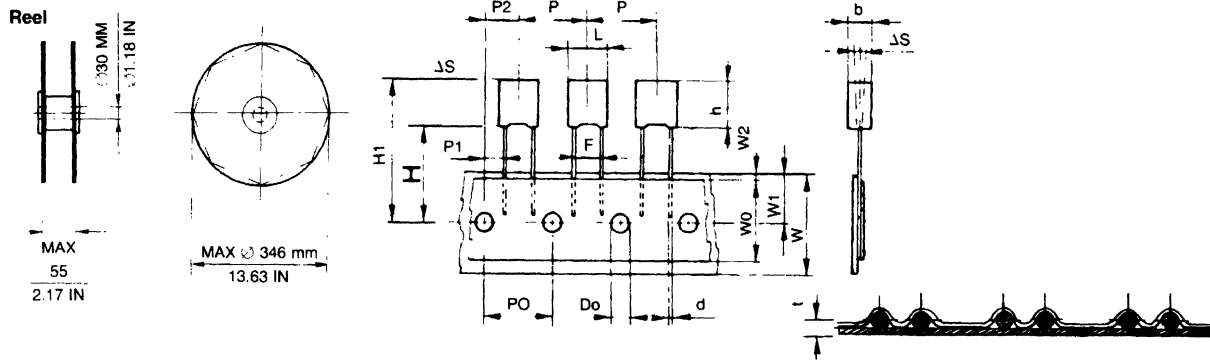
> Indicate tooling code:  
A = 16.5mm, B = 18.5mm  
(See H dimension in taping specifications)

# 168/185 Series Metallized Polyester / Radial Leads

**MALLOY**

## Specifications for Tape and Reel or Ammo Pack

### Dimensions



Item	Symbol	Dimensions		Tolerance	
		mm	Inches	mm	Inches
Body width	L	7.5	.296	Max	Max
Body height	h	6-8.5	.236-.335	Max	Max
Body thickness	b	6.5	.256	Max	Max
Lead-wire diameter	d	0.6	.024	+0.06-0.05	.002
Pitch of component	p	12.7	.500	±1.0	±.04
Feed hole pitch	p <sub>0</sub>	12.7	.5	±0.2	±.006
Feed hole centered to lead	p <sub>1</sub>	3.85	.153	±0.7	±.027
Hole center to comp. center	p <sub>2</sub>	6.35	.250	±1	±.04
Lead-to-lead distance	F	5	.197	±0.6-0.1	±.002-.004
Component alignment F-R	ΔS	0	0	±0	±.08-.003
Height from sprocket hole center to the comp. body	H*	16.5(A) 18.5(B)	.679 .729	±.75	±.030
Tape width	W	18	.709	±1-0.5	±.039-.02
Hold-down tape width	W <sub>0</sub>	15	.591	±0.5	±.02
Hole position	W <sub>1</sub>	9	.355	±0.5	±.02
Hold-down tape position	W <sub>2</sub>	3	.118	Max	Max
Component height	H <sub>1</sub>	32.25	1.27	Max	Max
Feed hole diameter	D <sub>0</sub>	4	.157	±0.2	±.008
Total tape thickness	t	0.7	.028	±0.2	±.008

\*The H dimension depends on the insertion equipment used. Specify the required dimension and tolerance when ordering.

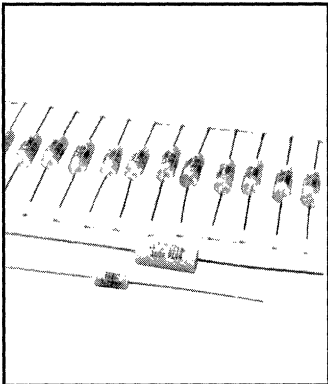
### Component Quantity Per Reel

Case Code	Quantity Reeled	Quantity Ammo Pack
A	2500	3500
C	1900	1500
F	1200	1200
G	1000	1000
H	1400	1400

General Purpose Film

# 170 Series Metallized Polyester / Axial Leads

**MALLORY**



- Axial Leads
- Available Tape and Reel For Automatic Insertion
- Non Inductively Wound
- Flame Retardant Polyester Wrap Meets UL510
- Epoxy Encapsulant Meets UL94V0
- Excellent choice for applications requiring low dielectric losses, high voltage capability and stable characteristics.

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +105°C with voltage derating above 85°C

Voltage Range:  
160 VDC (90 VAC) to 630 VDC (250 VAC)

Capacitance Range:  
0.001  $\mu$ F to 4.7  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 5%,  $\pm$ 10%,  $\pm$ 20%

Total Self Inductance (L):  
1nH maximum per 1mm lead and capacitor length

Test Voltage Between Terminations:  
1.6Vn applied for 2 sec at +25°C  $\pm$ 5°C

Dissipation Factor (DF)  
 $tg\delta \times 10^{-4}$  at +25°C  $\pm$ 5°C

	C	C	C
KHz	$\leq 0.1\mu F$	0.1 $\mu F$ to 1 $\mu F$	>1 $\mu F$
1	$\leq 6$	$\leq 6$	$\leq 6$
10	$\leq 10$	$\leq 20$	
100	$\leq 30$		

## Maximum Pulse Rise Time dv/dt (V/ $\mu$ sec)

Vn	L max				
	11	16.5	20.5	28	33
160	5	5	3	2	1
250	11	10	7	4	2.5
400	—	13.5	10	6.5	4
630	—	20	15	10	6

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V.

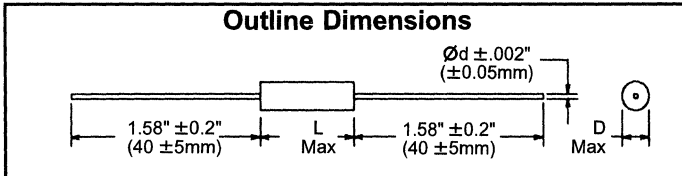
## Tape and Reel Specifications<sup>^</sup>

L Max (Body Length)		Lead Spacing		Distance Between Reel Flanges		Class
Inches	mm	Inches	mm	Inches	mm	
$\leq .433$	$\leq 11$	2.06	52.4	3.0	75	1
.551 - .808	14 - 20.5	2.5	63.6	3.4	86	2
$\geq 1.03$	$\geq 26$	2.87	73	3.7	95	3

<sup>^</sup> Add class number (1, 2, or 3) to Catalog Number to indicate tape and reel

Diameter		
Inches	mm	Quantity per Reel
.197	5	3,000
.236 thru .256	6.0 thru 6.5	1,200
.276	7	1,100
.315 thru .346	8 thru 8.5	800
.354 thru .413	9 thru 10.5	500
.433 thru .512	11 thru 13	300
.551 thru .571	14 thru 14.5	200
>.571	>14.5	Not available

## Outline Dimensions



## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	25°C $\pm$ 5°C
Voltage Charge Time	1 minute
Voltage Charge	100 VDC
<b>Performance</b>	
For C $\leq 0.33\mu F$	$\geq 1 \times 10^5 M\Omega$
For C > 0.33 $\mu F$	$\geq 30,000 M\Omega \times \mu F$
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93% $\pm$ 2%
Test Duration	56 days
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 2\%$
DF Change $\Delta tg\delta$	$\leq 10 \times 10^{-4}$ at 1 KHz
Insulation Resistance	$\geq 50\%$ of limit value
Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	2000 h
Voltage Applied	1.25 x Vn
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 3\%$
DF Change $\Delta tg\delta$	$\leq 10 \times 10^{-4}$ for C > 1 $\mu F$ at 1 KHz $\leq 10 \times 10^{-4}$ for C $\leq 1\mu F$ at 10 KHz
Insulation Resistance	$\geq 50\%$ of limit value
Soldering	
<b>Test Conditions</b>	
Soldering Temperature	+260°C $\pm$ 5°C
Soldering Duration	10 sec $\pm$ 1 sec
<b>Performance</b>	
Capacitance Change $\Delta C/C$	$\leq \pm 1\%$
DF Change $\Delta tg\delta$	$\leq 10 \times 10^{-4}$ for C > 1 $\mu F$ at 1 KHz $\leq 10 \times 10^{-4}$ for C $\leq 1\mu F$ at 10 KHz
Insulation Resistance	$\geq 50\%$ of limit value
Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change $\Delta C/C$	$\leq \pm 0.5\%$

General Purpose Film

# 170 Series Metallized Polyester / Axial Leads



Catalog Number	Cap $\mu$ F	Inches			Millimeters			ESR (mOhms) 20KHz to 100KHz	IRMS			
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d		25°C	45°C	85°C	
<b>160 VDC/90 VAC</b>												
170223*160AA^	0.022	0.197	0.433	0.020	5	11	0.5	Not applicable. These capacitor values are not currently used in switched-mode power supplies.				
170273*160AA^	0.027	0.197	0.433	0.020	5	11	0.5					
170333*160AA^	0.033	0.197	0.433	0.020	5	11	0.5					
170393*160AA^	0.039	0.197	0.433	0.020	5	11	0.5					
170473*160AA^	0.047	0.197	0.433	0.020	5	11	0.5					
170563*160BB^	0.056	0.236	0.650	0.024	6	16.5	0.6					
170683*160BB^	0.068	0.236	0.650	0.024	6	16.5	0.6					
170823*160BB^	0.082	0.236	0.650	0.024	6	16.5	0.6					
170104*160BB^	0.1	0.236	0.650	0.024	6	16.5	0.6					
170124*160DB^	0.12	0.276	0.650	0.024	7	16.5	0.6					
170154*160DB^	0.15	0.276	0.650	0.024	7	16.5	0.6					
170184*160EB^	0.18	0.315	0.650	0.031	8	16.5	0.8					
170224*160EB^	0.22	0.315	0.650	0.031	8	16.5	0.8					
170274*160EC^	0.27	0.315	0.807	0.031	8	20.5	0.8					
170334*160EC^	0.33	0.315	0.807	0.031	8	20.5	0.8					
170394*160HC^	0.39	0.374	0.807	0.031	9.5	20.5	0.8					
170474*160HC^	0.47	0.374	0.807	0.031	9.5	20.5	0.8		37.0	8.7	3.1	1.4
170564*160GE^	0.56	0.354	1.102	0.031	9	28	0.8		35.0	3.9	3.3	1.5
170684*160GE^	0.68	0.354	1.102	0.031	9	28	0.8	33.0	4.1	3.5	1.6	
170824*160JE^	0.82	0.413	1.102	0.031	10.5	28	0.8	31.0	4.3	3.6	1.7	
170105*160JE^	1.0	0.413	1.102	0.031	10.5	28	0.8	26.0	5.5	4.7	2.6	
170155*160ME^	1.5	0.492	1.102	0.031	12.5	28	0.8	20.0	6.1	5.1	3.1	
170225*160PF^	2.2	0.531	1.299	0.031	13.5	33	0.8	18.0	6.8	5.7	3.3	
170335*160TF^	3.3	0.630	1.299	0.039	16	33	1	16.0	7.4	6.4	3.6	
170475*160XF^	4.7	0.709	1.299	0.039	18	33	1	15.0	8.1	6.8	3.9	

<b>250 VDC/200 VAC</b>											
170103*250AA^	0.01	0.197	0.433	0.020	5	11	0.5	Not applicable. These capacitor values are not currently used in switched-mode power supplies.			
170123*250AA^	0.012	0.197	0.433	0.020	5	11	0.5				
170153*250AA^	0.015	0.197	0.433	0.020	5	11	0.5				
170183*250BB^	0.018	0.236	0.650	0.024	6	16.5	0.6				
170223*250BB^	0.022	0.236	0.650	0.024	6	16.5	0.6				
170273*250BB^	0.027	0.236	0.650	0.024	6	16.5	0.6				
170333*250BB^	0.033	0.236	0.650	0.024	6	16.5	0.6				
170393*250CB^	0.039	0.256	0.650	0.024	6.5	16.5	0.6				
170473*250CB^	0.047	0.256	0.650	0.024	6.5	16.5	0.6				
170563*250EB^	0.056	0.295	0.650	0.031	7.5	16.5	0.8				
170683*250EB^	0.068	0.295	0.650	0.031	7.5	16.5	0.8				
170823*250FB^	0.082	0.335	0.650	0.031	8.5	16.5	0.8				
170104*250FB^	0.1	0.335	0.650	0.031	8.5	16.5	0.8				
170124*250FC^	0.12	0.335	0.807	0.031	8.5	20.5	0.8				
170154*250FC^	0.15	0.335	0.807	0.031	8.5	20.5	0.8				
170184*250HC^	0.18	0.374	0.807	0.031	9.5	20.5	0.8				
170224*250HC^	0.22	0.374	0.807	0.031	9.5	20.5	0.8				
170274*250GE^	0.27	0.354	1.102	0.031	9	28	0.8				
170334*250GE^	0.33	0.354	1.102	0.031	9	28	0.8				
170394*250JE^	0.39	0.413	1.102	0.031	10.5	28	0.8				
170474*250JE^	0.47	0.413	1.102	0.031	10.5	28	0.8	35.0	3.8	3.6	1.7
170564*250ME^	0.56	0.472	1.102	0.031	12	28	0.8	33.0	3.9	3.7	1.8
170684*250ME^	0.68	0.472	1.102	0.031	12	28	0.8	32.0	4.0	3.8	1.9
170824*250NF^	0.82	0.512	1.299	0.031	13	33	0.8	31.0	4.2	4.0	2.0
170105*250NF^	1.0	0.512	1.299	0.031	13	33	0.8	28.0	4.4	4.4	3.2
170155*250TF^	1.5	0.610	1.299	0.031	15.5	33	0.8	26.0	5.1	4.9	3.5
170225*250XF^	2.2	0.709	1.299	0.039	18	33	1	20.0	8.4	7.0	4.1
170335*250ZF^	3.3	0.846	1.299	0.039	21.5	33	1	18.0	9.0	7.8	4.5

\* Indicate capacitance tolerance  
 J =  $\pm$ 5%  
 K =  $\pm$ 10%  
 M =  $\pm$ 20%

^ If ordering Tape & Reel, insert 1, 2, or 3  
 (See page 126 to determine which class applies)

General Purpose Film

# 170 Series Metallized Polypropylene / Axial Leads



Catalog Number	Cap $\mu$ F	Inches			Millimeters			ESR (mOhms) 20KHz to 100KHz	IRMS			
		D Max	L Max	$\varnothing$ d	D Max	L Max	$\varnothing$ d		25°C	45°C	85°C	
<b>400 VDC/220 VAC</b>												
170153*400BB <sup>^</sup>	0.015	0.236	0.650	0.024	6	16.5	0.6	Not applicable. These capacitor values are not currently used in switched-mode power supplies.				
170183*400CB <sup>^</sup>	0.018	0.256	0.650	0.024	6.5	16.5	0.6					
170223*400CB <sup>^</sup>	0.022	0.256	0.650	0.024	6.5	16.5	0.6					
170273*400DB <sup>^</sup>	0.027	0.276	0.650	0.024	7	16.5	0.6					
170333*400DB <sup>^</sup>	0.033	0.276	0.650	0.024	7	16.5	0.6					
170393*400EB <sup>^</sup>	0.039	0.315	0.650	0.031	8	16.5	0.8					
170473*400EB <sup>^</sup>	0.047	0.315	0.650	0.031	8	16.5	0.8					
170563*400EC <sup>^</sup>	0.056	0.315	0.807	0.031	8	20.5	0.8					
170683*400EC <sup>^</sup>	0.068	0.315	0.807	0.031	8	20.5	0.8					
170823*400GC <sup>^</sup>	0.082	0.354	0.807	0.031	9	20.5	0.8					
170104*400GB <sup>^</sup>	0.1	0.354	0.807	0.031	9	20.5	0.8					
170124*400FE <sup>^</sup>	0.12	0.335	1.102	0.031	8.5	28	0.8					
170154*400FE <sup>^</sup>	0.15	0.335	1.102	0.031	8.5	28	0.8					
170184*400IE <sup>^</sup>	0.18	0.394	1.102	0.031	10	28	0.8					
170224*224IE <sup>^</sup>	0.22	0.394	1.102	0.031	10	28	0.8					
170274*400LE <sup>^</sup>	0.27	0.453	1.102	0.031	11.5	28	0.8					
170334*400LE <sup>^</sup>	0.33	0.453	1.102	0.031	11.5	28	0.8					
170394*400NE <sup>^</sup>	0.39	0.512	1.102	0.031	13	28	0.8					
170474*400NE <sup>^</sup>	0.47	0.512	1.102	0.031	13	28	0.8		32.0	5.7	5.0	2.2
170564*400QF <sup>^</sup>	0.56	0.571	1.299	0.031	14.5	33	0.8		31.0	5.7	5.3	2.3
170684*400QF <sup>^</sup>	0.68	0.571	1.299	0.031	14.5	33	0.8	30.0	5.7	5.5	2.4	
170824*400VF <sup>^</sup>	0.82	0.669	1.299	0.039	17	33	1	28.0	5.7	5.6	2.6	
170105*400VF <sup>^</sup>	1.0	0.669	1.299	0.039	17	33	1	27.0	5.7	5.7	4.3	
170155*400YF <sup>^</sup>	1.5	0.709	1.299	0.039	18	33	1	25.0	7.0	6.7	4.7	

<b>630 VDC /250 VAC</b>											
170102*630BB <sup>^</sup>	0.001	0.236	0.650	0.024	6	16.5	0.6	Not applicable. These capacitor values are not currently used in switched-mode power supplies.			
170122*630BB <sup>^</sup>	0.0012	0.236	0.650	0.024	6	16.5	0.6				
170152*630BB <sup>^</sup>	0.0015	0.236	0.650	0.024	6	16.5	0.6				
170182*630BB <sup>^</sup>	0.0018	0.236	0.650	0.024	6	16.5	0.6				
170222*630BB <sup>^</sup>	0.0022	0.236	0.650	0.024	6	16.5	0.6				
170272*630BB <sup>^</sup>	0.0027	0.236	0.650	0.024	6	16.5	0.6				
170332*630BB <sup>^</sup>	0.0033	0.236	0.650	0.024	6	16.5	0.6				
170392*630BB <sup>^</sup>	0.0039	0.236	0.650	0.024	6	16.5	0.6				
170472*630BB <sup>^</sup>	0.0047	0.236	0.650	0.024	6	16.5	0.6				
170562*630BB <sup>^</sup>	0.0056	0.236	0.650	0.024	6	16.5	0.6				
170682*630CB <sup>^</sup>	0.0068	0.236	0.650	0.024	6	16.5	0.6				
170822*630CB <sup>^</sup>	0.0082	0.256	0.650	0.024	6.5	16.5	0.6				
170103*630CB <sup>^</sup>	0.01	0.256	0.650	0.024	6.5	16.5	0.6				
170123*630EB <sup>^</sup>	0.012	0.295	0.650	0.031	7.5	16.5	0.8				
170153*630EB <sup>^</sup>	0.015	0.295	0.650	0.031	7.5	16.5	0.8				
170183*630FB <sup>^</sup>	0.018	0.335	0.650	0.031	8.5	16.5	0.8				
170223*630FB <sup>^</sup>	0.022	0.335	0.650	0.031	8.5	16.5	0.8				
170273*630FC <sup>^</sup>	0.027	0.335	0.807	0.031	8.5	20.5	0.8				
170333*630FC <sup>^</sup>	0.033	0.335	0.807	0.031	8.5	20.5	0.8				
170393*630HC <sup>^</sup>	0.039	0.374	0.807	0.031	9.5	20.5	0.8				
170473*630HC <sup>^</sup>	0.047	0.374	0.807	0.031	9.5	20.5	0.8				
170563*630GE <sup>^</sup>	0.056	0.354	1.102	0.031	9	28	0.8				
170683*630GE <sup>^</sup>	0.068	0.354	1.102	0.031	9	28	0.8				
170823*630IE <sup>^</sup>	0.082	0.394	1.102	0.031	10	28	0.8				
170104*630IE <sup>^</sup>	0.1	0.394	1.102	0.031	10	28	0.8				
170124*630ME <sup>^</sup>	0.12	0.472	1.102	0.031	12	28	0.8				
170154*630ME <sup>^</sup>	0.15	0.472	1.102	0.031	12	28	0.8				
170184*630NF <sup>^</sup>	0.18	0.512	1.299	0.031	13	33	0.8				
170224*630NF <sup>^</sup>	0.22	0.512	1.299	0.031	13	33	0.8				
170274*630TF <sup>^</sup>	0.27	0.610	1.299	0.031	15.5	33	0.8				
170334*630TF <sup>^</sup>	0.33	0.610	1.299	0.031	15.5	33	0.8				
170394*630XF <sup>^</sup>	0.39	0.709	1.299	0.039	18	33	1				
170474*630XF <sup>^</sup>	0.47	0.709	1.299	0.039	18	33	1	28.0	6.8	5.8	2.6
170564*630ZF <sup>^</sup>	0.56	0.827	1.299	0.039	21	33	1	26.0	7.4	6.3	2.8
170684*630ZF <sup>^</sup>	0.68	0.827	1.299	0.039	21	33	1	25.0	7.8	6.8	2.9

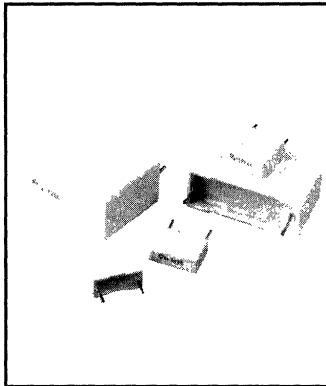
\* Indicate capacitance tolerance  
 J =  $\pm 5\%$   
 K =  $\pm 10\%$   
 M =  $\pm 20\%$

<sup>^</sup> If ordering Tape & Reel, insert 1, 2, or 3  
 (See page 138 to determine which class applies)

General Purpose Film



# 171 Series Metallized Polypropylene / Radial Leads



- Radial Leaded (7.5 mm to 27.4 mm)
- Non Inductively Wound
- Flame Retardant Case Meets UL94V0
- Epoxy Encapsulant Meets UL94V0

Excellent choice for applications requiring low dielectric losses, high insulation resistance, high voltage capability and stable characteristics.

## GENERAL SPECIFICATIONS

Operating Temperature: -55°C to +105°C with voltage derating above 85°C

Voltage Range: 160 VDC (90 VAC) to 630 VDC (250 VAC)

Capacitance Range: 0.001 μF to 10 μF

Capacitance Tolerance: ±5%, ±10%, ±20%

Total Self Inductance (2mm lead length)

pitch (mm)	7.5	10	15	22.5	27.5
L (nH) ≈	8	9	10	18	18

Dielectric Withstand: 1.6 x Vn applied for 2 sec at +25°C ±5°C

Dissipation Factor (DF):  $tg\delta \times 10^{-4}$  at +25°C ±5°C

	C	C	C
KHz	≤0.1μF	0.1μF to 1μF	>1μF
1	≤6	≤6	≤6
10	≤10	≤20	≤6
100	≤30		

## Maximum Pulse Rise Time dv/dt (V/μsec)

Vn	Pitch (mm)				
	7.5	10	15	22.5	27.5
160	5.5	4	2	1.5	1
250	15	11	7	4	3
400	35	20	10	5.5	5
630	55	30	15	8	7

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value (See table dv/dt) with the ratio Vn/V.

## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	+25°C ± 5°C
Voltage Charge Time	1 minute
Voltage Charge	100VDC
<b>Performance</b>	
For C ≤ 0.33 μF	≥ 100,000 MΩ
For C > 0.33 μF	≥ 30,000 MΩ x μF

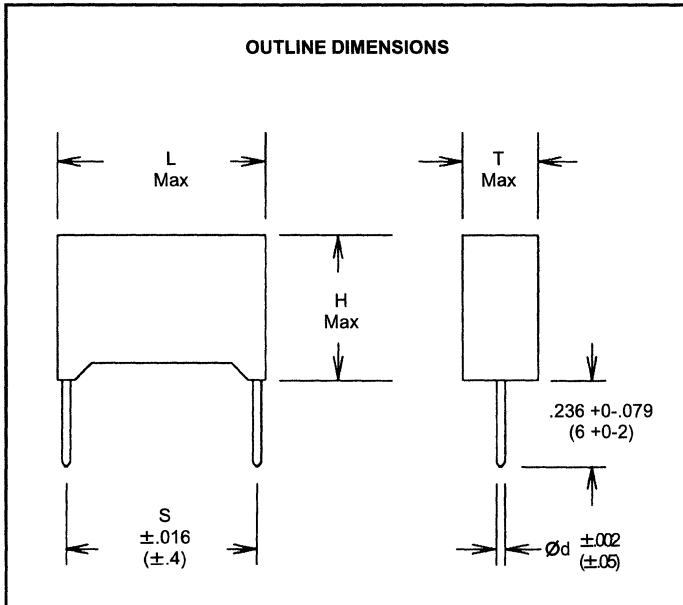
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93% ± 2%
Test Duration	56 days
<b>Performance</b>	
Capacitance Change ΔC/C	≤ ± 2%
DF Change Δtgδ	≤ 10 x 10 <sup>-4</sup> at 1 KHz
Insulation Resistance	≥ 50% of limit value

Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	2000h
Voltage Applied	1.25 x Vn
<b>Performance</b>	
Capacitance Change ΔC/C	≤ ± 3%
DF Change Δtgδ	≤ 10 x 10 <sup>-4</sup> for C > 1μF at 1 KHz ≤ 10 x 10 <sup>-4</sup> for C ≤ 1μF at 10 KHz
Insulation Resistance	≥ 50% of limit value

Soldering	
<b>Test Conditions</b>	
Soldering Temperature	+260°C ± 5°C
Soldering Duration	10 sec ± 1 sec
<b>Performance</b>	
Capacitance Change ΔC/C	≤ ± 1%
DF Change Δtgδ	≤ 10 x 10 <sup>-4</sup> for C > 1μF at 1 KHz ≤ 10 x 10 <sup>-4</sup> for C ≤ 1μF at 10 KHz

Long Term Stability (after two years)	
<b>Storage Performance</b>	Standard Environmental Conditions
Capacitance Change ΔC/C	≤ ± 0.5%
<b>Corona (Partial Discharge Inception Voltage)</b>	200 VAC for 160 VDC, 250 VDC 250 VAC for 400 VDC, 630 VDC

## OUTLINE DIMENSIONS



General Purpose Film

# 171 Series Metallized Polypropylene / Radial Leads



Catalog Number	Cap $\mu$ F	Inches					Millimeters					ESR (mOhms) 20KHz to 100KHz	IRMS		
		L Length	T Thickness	H Height	S Spacing	$\phi$ d	L Length	T Thickness	H Height	S Spacing	$\phi$ d		25°C	45°C	85°C

### 160 VDC/90 VAC

171333*160B	0.033	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6	Not applicable. These capacitance values are not customarily used in switched-mode power supplies.	37	3.7	3.1	1.4
171473*160B	0.047	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6					
171473*160C	0.047	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8					
171683*160B	0.068	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6					
171683*160C	0.068	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8					
171104*160C7	0.1	0.413	0.197	0.433	0.295	0.031	10.5	5.0	11.0	7.5	0.8					
171104*160D	0.1	0.512	0.197	0.433	0.394	0.031	13.0	5.0	11.0	10.0	0.8					
171154*160D7	0.15	0.413	0.236	0.472	0.295	0.031	10.5	6.0	12.0	7.5	0.8					
171154*160D	0.15	0.512	0.197	0.433	0.394	0.031	13.0	5.0	11.0	10.0	0.8					
171224*160F	0.22	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8					
171334*160G	0.33	0.709	0.236	0.472	0.591	0.031	18.0	6.0	12.0	15.0	0.8					
171474*160H	0.47	0.709	0.295	0.531	0.591	0.031	18.0	7.5	13.5	15.0	0.8					
171684*160L	0.68	1.04	0.236	0.591	0.886	0.031	26.4	6.0	15.0	22.5	0.8					
171105*160N	1.0	1.04	0.335	0.669	0.886	0.031	26.4	8.5	17.0	22.5	0.8					
171155*160O	1.5	1.04	0.394	0.728	0.886	0.031	26.4	10.0	18.5	22.5	0.8					
171225*160P	2.2	1.26	0.433	0.787	1.03	0.031	32.0	11.0	20.0	27.5	0.8					
171335*160Q	3.3	1.26	0.512	0.866	1.03	0.031	32.0	13.0	22.0	27.5	0.8					
171475*160R	4.7	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8					
171685*160R	6.8	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8					
171106*160T	10.0	1.26	0.866	1.46	1.03	0.031	32.0	22.0	37.1	27.5	0.8					

### 250 VDC/200 VAC

171153*250B	0.015	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6	Not applicable. These capacitance values are not customarily used in switched-mode power supplies.	35	3.8	3.6	1.7
171223*250B	0.022	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6					
171223*250C	0.022	0.512	0.157	0.354	0.394	0.024	13.0	4.0	9.0	10.0	0.8					
171333*250C	0.033	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8					
171473*250D	0.047	0.512	0.197	0.433	0.394	0.031	13.0	5.0	11.0	10.0	0.8					
171683*250E	0.068	0.512	0.236	0.472	0.394	0.031	13.0	6.0	12.0	10.0	0.8					
171104*250F	0.10	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8					
171154*250G	0.15	0.709	0.236	0.472	0.591	0.031	18.0	6.0	12.0	15.0	0.8					
171224*250H	0.22	0.709	0.295	0.531	0.591	0.031	18.0	7.5	13.5	15.0	0.8					
171334*250L	0.33	1.04	0.236	0.591	0.886	0.031	26.4	6.0	15.0	22.5	0.8					
171474*250M	0.47	1.04	0.276	0.63	0.886	0.031	26.4	7.0	16.0	22.5	0.8					
171684*250Q	0.68	1.04	0.394	0.728	0.886	0.031	26.4	10.0	18.5	22.5	0.8					
171105*250P	1.0	1.26	0.433	0.787	1.03	0.031	32.0	11.0	20.0	27.5	0.8					
171155*250Q	1.5	1.26	0.512	0.866	1.03	0.031	32.0	13.0	22.0	27.5	0.8					
171225*250R	2.2	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8					
171335*250S	3.3	1.26	0.709	1.299	1.03	0.031	32.0	18.0	33.0	27.5	0.8					
171475*250T	4.7	1.26	0.866	1.46	1.03	0.031	32.0	22.0	37.1	27.5	0.8					

### 400 VDC/220 VAC

171682*400B	0.0068	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6	Not applicable. These capacitance values are not customarily used in switched-mode power supplies.	32	5.7	5	2.2
171103*400B	0.01	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6					
171103*400C	0.01	0.512	0.157	0.354	0.394	0.024	13.0	4.0	9.0	10.0	0.6					
171153*400C	0.015	0.512	0.157	0.354	0.394	0.024	13.0	4.0	9.0	10.0	0.6					
171223*400D	0.022	0.512	0.197	0.433	0.394	0.031	13.0	5.0	11.0	10.0	0.8					
171333*400E	0.033	0.512	0.236	0.472	0.394	0.031	13.0	6.0	12.0	10.0	0.8					
171473*400E	0.047	0.512	0.236	0.472	0.394	0.031	13.0	6.0	12.0	10.0	0.8					
171683*400G	0.068	0.709	0.236	0.472	0.591	0.031	18.0	6.0	12.0	15.0	0.8					
171104*400H	0.1	0.709	0.295	0.531	0.591	0.031	18.0	7.5	13.5	15.0	0.8					
171154*400I	0.15	0.709	0.335	0.571	0.591	0.031	18.0	8.5	14.5	15.0	0.8					
171224*400M	0.22	1.04	0.276	0.63	0.886	0.031	26.4	7.0	16.0	22.5	0.8					
171334*400N	0.33	1.04	0.335	0.669	0.886	0.031	26.4	8.5	17.0	22.5	0.8					
171474*400P	0.47	1.26	0.354	0.669	1.03	0.031	32.0	9.0	17.0	27.5	0.8					
171684*400P	0.68	1.26	0.433	0.787	1.03	0.031	32.0	11.0	20.0	27.5	0.8					
171105*400R	1.0	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8					
171155*400R	1.5	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8					
171225*400S	2.2	1.26	0.709	1.299	1.03	0.031	32.0	18.0	33.0	27.5	0.8					

\* Indicate capacitance tolerance  
 J =  $\pm 5\%$   
 K =  $\pm 10\%$   
 M =  $\pm 20\%$

General Purpose Film

# 171 Series Metallized Polypropylene / Radial Leads

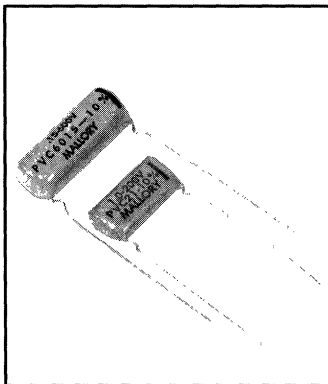


Catalog Number	Cap $\mu$ F	Inches					Millimeters					ESR (mOhms) 20KHz to 100KHz	IRMS		
		L Length	T Thickness	H Height	S Spacing	$\varnothing$ d	L Length	T Thickness	H Height	S Spacing	$\varnothing$ d		25°C	45°C	85°C
<b>630 VDC/250 VAC</b>															
171102*630B	0.001	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6	Not applicable. These capacitance values are not customarily used in switched-mode power supplies.			
171102*630C	0.001	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171152*630B	0.0015	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6				
171152*630C	0.0015	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171222*630B	0.0022	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6				
171222*630C	0.0022	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171332*630B	0.0033	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6				
171332*630C	0.0033	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171472*630B	0.0047	0.413	0.157	0.354	0.295	0.024	10.5	4.0	9.0	7.5	0.6				
171472*630C	0.0047	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171682*630C	0.0068	0.512	0.157	0.354	0.394	0.031	13.0	4.0	9.0	10.0	0.8				
171103*630D	0.01	0.512	0.197	0.433	0.394	0.031	13.0	5.0	11.0	10.0	0.8				
171153*630E	0.015	0.512	0.236	0.472	0.394	0.031	13.0	6.0	12.0	10.0	0.8				
171223*630F	0.022	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8				
171333*630G	0.033	0.709	0.236	0.472	0.591	0.031	18.0	6.0	12.0	15.0	0.8				
171473*630H	0.047	0.709	0.295	0.531	0.591	0.031	18.0	7.5	13.5	15.0	0.8				
171683*630I	0.068	0.709	0.335	0.571	0.591	0.031	18.0	8.5	14.5	15.0	0.8				
171104*630M	0.1	1.04	0.276	0.63	0.886	0.031	26.4	7.0	16.0	22.5	0.8				
171154*630N	0.15	1.04	0.335	0.669	0.886	0.031	26.4	8.5	17.0	22.5	0.8				
171224*630P1	0.22	1.26	0.354	0.669	1.03	0.031	32.0	9.0	17.0	27.5	0.8				
171334*630Q	0.33	1.26	0.512	0.866	1.03	0.031	32.0	13.0	22.0	27.5	0.8				
171474*630R	0.47	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8	28	6.8	5.8	2.6
171684*630R	0.68	1.26	0.591	1.18	1.03	0.031	32.0	15.0	30.0	27.5	0.8	25	7.8	6.6	2.9
171105*630S	1.0	1.26	0.709	1.299	1.03	0.031	32.0	18.0	33.0	27.5	0.8	18	8.6	7.3	3.6

\* Indicate capacitance tolerance  
 J =  $\pm$ 5%  
 K =  $\pm$ 10%  
 M =  $\pm$ 20%

General Purpose Film

# PVC Series — Polyester Film / Foil (to 1000V) Polypropylene Film / Foil (1600 - 2000V)



- Radial Leaded
- Wire Leads Crimped to Provide Seating on Printed Circuit Boards
- Non Inductively Wound
- 100 - 600 VDC Meets UL94V0\*  
1000 - 2000 VDC Meets UL94V2
- Adaptable to all electronic circuit applications calling for bypass and coupling.

\*PVC4047 and PVC6015 to PVC6033 meets UL94V2

## GENERAL SPECIFICATIONS

Operating Temperature:  
 100 - 1000 VDC:  
 -55°C to +125°C\*  
 1600 - 2000 VDC:  
 -55°C to 105°C\*  
 (\*Provided the working voltage is reduced to 50% of the 85°C rating.)

Voltage Range:  
 100 VDC to 2000 VDC

Capacitance Range:  
 0.001  $\mu$ F to .68  $\mu$ F

Capacitance Tolerance (1KHz):  
 $\pm$ 10%

CECC Approval:  
 Detail Specification 30401-009

Dielectric Withstand:  
 Capacitors < 1000 volts can withstand a DC potential of 250% of rated voltage between terminals of not more than 5 seconds. However,  $\geq$  1000 volts the DC potential is 200%

Dissipation Factor (DF):  
 At +25°C ratings  
 1600-2000 VDC are 0.1% Max  
 All others are 0.75% Max

## Insulation Resistance (IR)

After a two minute charge at rated voltage or 500 V whichever is less at 25°C

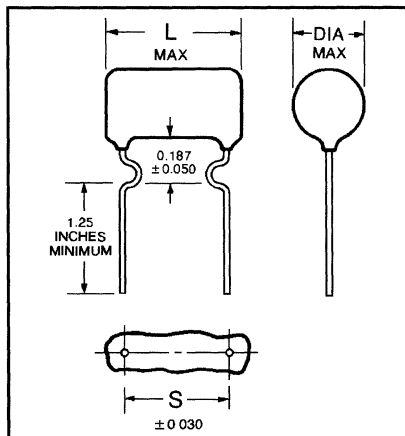
### 100 - 1000 VDC

For C  $\leq$  0.25  $\mu$ F      100,000 M $\Omega$   
 For C > 0.25  $\mu$ F      25,000 M $\Omega$  x  $\mu$ F

### 1600 - 2000 VDC

For C  $\leq$  0.50  $\mu$ F      400,000 M $\Omega$   
 For C > 0.50  $\mu$ F      200,000 M $\Omega$  x  $\mu$ F

## Outline Dimensions



## Test Method and Performance

### Lead Pull Test

Capacitor leads shall withstand a steady pull of 5lbs. applied radially to the capacitor body for 1 minute.

### Lead Bend Test

Capacitor leads shall be bent without breakage below the lead crimp, first 90° in one direction, then back to the original position and then 90° in the opposite direction.

### Life Test

Conducted at +85°C: 500 hours with 1.5 times rated voltage DC.

Catalog Number	Cap $\mu$ F	Inches				Millimeters			
		L Max	Dia Max	S Lead Spacing	$\phi$ d	L Max	Dia Max	S Lead Spacing	$\phi$ d
<b>100 VDC/70 VAC</b>									
PVC1118	0.0180	0.700	0.330	0.500	0.031	17.8	8.4	12.7	0.8
PVC1122	0.0220	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC1133	0.0330	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC114	0.0400	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC1147	0.0470	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC1156	0.0560	0.700	0.380	0.500	0.031	17.8	9.7	12.7	0.8
PVC1168	0.0680	0.700	0.380	0.500	0.031	17.8	9.7	12.7	0.8
PVC101	0.1000	0.900	0.400	0.688	0.031	22.9	10.2	17.5	0.8
PVC1015	0.1500	0.900	0.450	0.688	0.031	22.9	11.4	17.5	0.8
PVC1022	0.2200	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC1025	0.2500	1.200	0.500	0.969	0.031	30.5	12.7	24.6	0.8
PVC1033	0.3300	1.200	0.500	0.969	0.031	30.5	12.7	24.6	0.8
PVC1047	0.4700	1.600	0.500	1.344	0.031	40.6	12.7	34.1	0.8
PVC105	0.5000	1.600	0.600	1.344	0.031	40.6	15.2	34.1	0.8
PVC1068	0.6800	1.600	0.600	1.344	0.031	40.6	15.2	34.1	0.8
<b>200 VDC/140 VAC</b>									
PVC211	0.0100	0.700	0.330	0.500	0.031	17.8	8.4	12.7	0.8
PVC2115	0.0150	0.700	0.330	0.500	0.031	17.8	8.4	12.7	0.8
PVC212	0.0200	0.700	0.330	0.500	0.031	17.8	8.4	12.7	0.8
PVC2122	0.0220	0.700	0.330	0.500	0.031	17.8	8.4	12.7	0.8
PVC2133	0.0330	0.900	0.380	0.688	0.031	22.9	9.7	17.5	0.8
PVC2147	0.0470	0.900	0.380	0.688	0.031	22.9	9.7	17.5	0.8
PVC215	0.0500	0.900	0.380	0.688	0.031	22.9	9.7	17.5	0.8
PVC201	0.1000	1.200	0.400	0.969	0.031	30.5	10.2	24.6	0.8
PVC2015	0.1500	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC2022	0.2200	1.200	0.500	0.969	0.031	30.5	12.7	24.6	0.8
PVC2025	0.2500	1.600	0.500	0.969	0.031	40.6	12.7	24.6	0.8
PVC2033	0.3300	1.600	0.500	1.344	0.031	40.6	12.7	34.1	0.8
PVC2047	0.4700	1.600	0.560	1.344	0.031	40.6	14.2	34.1	0.8
PVC205	0.5000	1.600	0.560	1.344	0.031	40.6	14.2	34.1	0.8

General Purpose Film

# PVC Series — Polyester Film / Foil (to 1000V) Polypropylene Film / Foil (1600 - 2000V)



Catalog Number	Cap $\mu$ F	Inches				Millimeters			
		L Max	Dia Max	S Lead Spacing	$\emptyset$ d	L Max	Dia Max	S Lead Spacing	$\emptyset$ d
<b>400 VDC/200 VAC</b>									
PVC411	0.0100	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC412	0.0200	0.900	0.390	0.688	0.031	22.9	9.9	17.5	0.8
PVC4147	0.0470	1.200	0.400	0.969	0.031	30.5	10.2	24.6	0.8
PVC415	0.0500	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC401	0.1000	1.200	0.530	0.969	0.031	30.5	13.5	24.6	0.8
PVC4022	0.2200	1.600	0.600	1.344	0.031	40.6	15.2	34.1	0.8
PVC4025	0.2500	1.600	0.650	1.344	0.031	40.6	16.5	34.1	0.8
PVC4047	0.4700	1.600	0.800	1.344	0.031	40.6	20.3	34.1	0.8
<b>600 VDC/200 VAC</b>									
PVC621	0.0010	0.700	0.300	0.500	0.031	17.8	7.6	12.7	0.8
PVC6212	0.0012	0.700	0.340	0.500	0.031	17.8	8.6	12.7	0.8
PVC6215	0.0015	0.700	0.340	0.500	0.031	17.8	8.6	12.7	0.8
PVC622	0.0020	0.700	0.340	0.500	0.031	17.8	8.6	12.7	0.8
PVC6222	0.0022	0.700	0.340	0.500	0.031	17.8	8.6	12.7	0.8
PVC6225	0.0025	0.700	0.340	0.500	0.031	17.8	8.6	12.7	0.8
PVC6227	0.0027	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC623	0.0030	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC6233	0.0033	0.700	0.350	0.500	0.031	17.8	8.9	12.7	0.8
PVC6239	0.0039	0.700	0.390	0.500	0.031	17.8	9.9	12.7	0.8
PVC624	0.0040	0.700	0.390	0.500	0.031	17.8	9.9	12.7	0.8
PVC6247	0.0047	0.700	0.390	0.500	0.031	17.8	9.9	12.7	0.8
PVC625	0.0050	0.700	0.390	0.500	0.031	17.8	9.9	12.7	0.8
PVC6256	0.0056	0.700	0.400	0.500	0.031	17.8	10.2	12.7	0.8
PVC6268	0.0068	0.700	0.400	0.500	0.031	17.8	10.2	12.7	0.8
PVC6275	0.0075	0.700	0.400	0.500	0.031	17.8	10.2	12.7	0.8
PVC611	0.0100	0.900	0.400	0.688	0.031	22.9	10.2	17.5	0.8
PVC6112	0.0120	0.900	0.400	0.688	0.031	22.9	10.2	17.5	0.8
PVC6115	0.0150	0.900	0.400	0.688	0.031	22.9	10.2	17.5	0.8
PVC612	0.0200	0.900	0.450	0.688	0.031	22.9	11.4	17.5	0.8
PVC6122	0.0220	0.900	0.450	0.688	0.031	22.9	11.4	17.5	0.8
PVC6125	0.0250	0.900	0.450	0.688	0.031	22.9	11.4	17.5	0.8
PVC6127	0.0270	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC613	0.0300	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC6133	0.0330	1.200	0.450	0.969	0.031	30.5	11.4	24.6	0.8
PVC6139	0.0390	1.200	0.560	0.969	0.031	30.5	14.2	24.6	0.8
PVC6147	0.0470	1.200	0.560	0.969	0.031	30.5	14.2	24.6	0.8
PVC615	0.0500	1.200	0.560	0.969	0.031	30.5	14.2	24.6	0.8
PVC6156	0.0560	1.200	0.600	0.969	0.031	30.5	15.2	24.6	0.8
PVC6168	0.0680	1.200	0.600	0.969	0.031	30.5	15.2	24.6	0.8
PVC6182	0.0820	1.200	0.650	0.969	0.031	30.5	16.5	24.6	0.8
PVC601	0.1000	1.200	0.650	0.969	0.031	30.5	16.5	24.6	0.8
PVC6015	0.1500	1.600	0.700	1.344	0.031	40.6	17.8	34.1	0.8
PVC602	0.2000	1.600	0.800	1.344	0.031	40.6	20.3	34.1	0.8
PVC6022	0.2200	1.600	0.800	1.344	0.031	40.6	20.3	34.1	0.8
PVC6025	0.2500	1.600	0.800	1.344	0.031	40.6	20.3	34.1	0.8
PVC6033	0.3300	1.810	0.890	1.531	0.031	46.0	22.6	38.9	0.8
<b>1000 VDC/200 VAC</b>									
PVC10010	0.1000	1.600	0.850	1.344	0.031	40.6	21.6	34.1	0.8

General Purpose Film

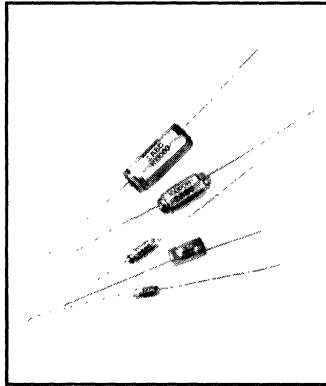
**PVC Series — Polyester Film / Foil (to 1000V)  
Polypropylene Film / Foil (1600 - 2000V)**



Catalog Number	Cap $\mu$ F	Inches				Millimeters			
		L Max	Dia Max	S Lead Spacing	$\varnothing$ d	L Max	Dia Max	S Lead Spacing	$\varnothing$ d
<b>1600 VDC/475 VAC</b>									
PVC1621	0.0010	1.300	0.500	0.969	0.031	33.0	12.7	24.6	0.8
PVC16215	0.0015	1.300	0.500	0.969	0.031	33.0	12.7	24.6	0.8
PVC16222	0.0022	1.300	0.500	0.969	0.031	33.0	12.7	24.6	0.8
PVC16227	0.0027	1.300	0.550	0.969	0.031	33.0	14.0	24.6	0.8
PVC16233	0.0033	1.300	0.550	0.969	0.031	33.0	14.0	24.6	0.8
PVC1624	0.0040	1.300	0.600	0.969	0.031	33.0	15.2	24.6	0.8
PVC16247	0.0047	1.300	0.600	0.969	0.031	33.0	15.2	24.6	0.8
PVC1625	0.0050	1.300	0.500	0.969	0.031	33.0	12.7	24.6	0.8
PVC1626	0.0060	1.300	0.550	0.969	0.031	33.0	14.0	24.6	0.8
PVC16268	0.0068	1.300	0.650	0.969	0.031	33.0	16.5	24.6	0.8
PVC16275	0.0075	1.300	0.550	0.969	0.031	33.0	14.0	24.6	0.8
PVC1628	0.0080	1.300	0.600	0.969	0.031	33.0	15.2	24.6	0.8
PVC16282	0.0082	1.300	0.700	0.969	0.031	33.0	17.8	24.6	0.8
PVC1611	0.0100	1.300	0.700	0.969	0.031	33.0	17.8	24.6	0.8
PVC16115	0.0150	1.300	0.700	1.344	0.031	33.0	17.8	34.1	0.8
PVC1612	0.0200	1.700	0.650	1.344	0.031	43.2	16.5	34.1	0.8
PVC16122	0.0220	1.700	0.650	1.344	0.031	43.2	16.5	34.1	0.8
PVC16133	0.0330	1.700	0.750	1.344	0.031	43.2	19.1	34.1	0.8
PVC16147	0.0470	1.700	0.850	1.344	0.031	43.2	21.6	34.1	0.8
PVC1615	0.0500	1.700	0.850	1.344	0.031	43.2	21.6	34.1	0.8
<b>2000 VDC/500 VAC</b>									
PVC2X21	0.0010	1.300	0.500	0.969	0.031	33.0	12.7	24.6	0.8
PVC2X256	0.0056	1.300	0.650	0.969	0.031	33.0	16.5	24.6	0.8
PVC2X268	0.0068	1.300	0.650	0.969	0.031	33.0	16.5	24.6	0.8

General Purpose Film

# SX Series Polystyrene-Foil / Axial Leads



- Axial Leads (Solder Coated or Tinned Solid Wire)
- High Q and Excellent Stability
- High Insulation, Low Absorption
- Low Dissipation Factor, Tight Temperature Coefficient

Ideally suited for precision circuits such as sample and hold, dual Slope Integration and Temperature Compensation

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +70°C (Derate 0.67% per °C above 40°C)

Voltage Range:  
40°C - 33 VDC to 630 VDC  
70°C - 25 VDC to 500 VDC

Capacitance Range:  
20 pF to 1.0 μF

Capacitance Tolerance:  
±2.5% (SXX, SXL, SXM)  
±5.0% (SX)

Total Self Inductance:  
Body: 10 to 30 nH, function of the body length  
Leads: 10 nH/cm of length

Dielectric Withstand:  
2.5 x V rated for 5 seconds  
Charge and discharge current ≤ 50 mA

Dissipation Factor (DF):  
Shall not be > .05%

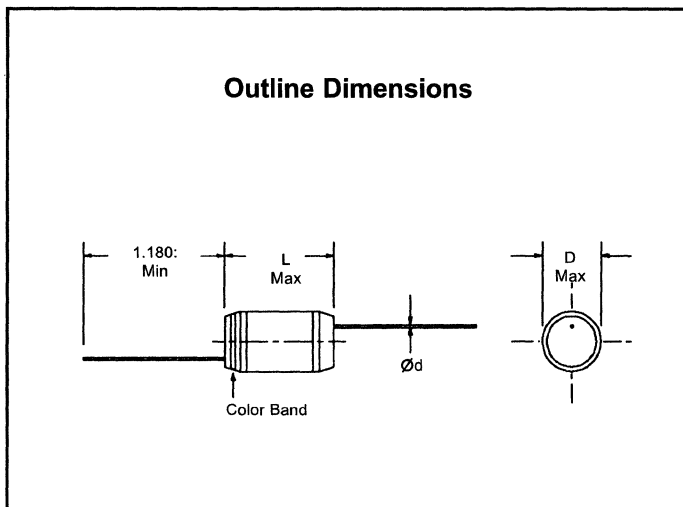
## Temperature Coefficient

<b>For 33 VDC:</b>	
-125 ± 75 PPM/°C	
<b>For 63, 160, 250, 630 VDC</b>	
Capacitance Values ≤ 500 pF	-175 ± 75 PPM/°C
Capacitance Values > 500 pF	-125 ± 75 PPM/°C

## Specifications

<p><b>Insulation Resistance (IR)</b> Shall be less than: 50,000 MΩ or 1000/C (MΩ) (C in MFD) whichever is lower for 33 VDC at 10 VDC 100,000 MΩ or 2000/C (MΩ) (C in MFD) whichever is lower for 63 VDC at 10 VDC 500,000 MΩ or 10,000/C (MΩ) (C in MFD) whichever is lower for 160 to 630 VDC at 100 VDC</p>
<p><b>Dielectric Absorption:</b> Equal to or less than .02%</p>
<p><b>Capacitance Drift:</b> Equal to or less than ± 0.3% + 0.4 pF after thermal cycle from +25°C to -25°C to +70°C and back to +25°C</p>
<p><b>Storage:</b> ΔC/C ≤ ± 0.5% +.4pF for SXX, SXL ΔC/C ≤ ± 0.2% +.4PF for SXM, SX When stored in constant climate ≤ 70% RH within operating temperature range and stabilized at 40% RH 25°C ± 5°C for 24 hours before measurements</p>
<p><b>Life Test:</b> 125% of rated voltage for 250 hrs at 85°C</p>
<p><b>Soldering Conditions:</b> Not recommended for wave soldering For manual soldering: Solder Temperature: 270°C Time: 4 seconds maximum .236 inches from capacitor body</p> <p><b>Caution:</b> Exposure to temperatures &gt; 70°C will result in serious degradation Clean with deionized water only. Do not expose to solvents</p>

## Outline Dimensions



Precision Film

# SX Series Polystyrene-Foil / Axial Leads

**MALLORY**

Catalog Number	Cap pF	Inches			Millimeters		
		D	L	Ød	D	L	Ød

33 WVDC @ +40°C 25 WVDC @ +85°C (Blue Color Band)							
SXK310	100	0.118	0.315	.012	3.00	8.00	0.30
SXK312	120	0.118	0.315	.012	3.00	8.00	0.30
SXK315	150	0.122	0.315	.012	3.10	8.00	0.30
SXK318	180	0.122	0.315	.012	3.10	8.00	0.30
SXK322	220	0.126	0.315	.012	3.20	8.00	0.30
SXK327	270	0.130	0.315	.012	3.30	8.00	0.30
SXK333	330	0.134	0.315	.012	3.40	8.00	0.30
SXK339	390	0.142	0.315	.012	3.61	8.00	0.30
SXK347	470	0.146	0.315	.012	3.71	8.00	0.30
SXK356	560	0.150	0.315	.012	3.81	8.00	0.30
SXK368	680	0.154	0.315	.012	3.91	8.00	0.30
SXK382	820	0.157	0.315	.012	3.99	8.00	0.30
SXK210	1,000	0.161	0.315	.012	4.09	8.00	0.30
SXK212	1,200	0.150	0.473	.016	3.81	12.01	0.41
SXK215	1,500	0.154	0.473	.016	3.91	12.01	0.41
SXK218	1,800	0.165	0.473	.016	4.19	12.01	0.41
SXK222	2,200	0.173	0.473	.016	4.39	12.01	0.41
SXK227	2,700	0.193	0.473	.016	4.90	12.01	0.41
SXK233	3,300	0.205	0.473	.016	5.21	12.01	0.41
SXK239	3,900	0.217	0.473	.016	5.51	12.01	0.41
SXK247	4,700	0.236	0.473	.016	5.99	12.01	0.41
SXK256	5,600	0.220	0.670	.020	5.59	17.02	0.51
SXK268	6,800	0.236	0.670	.020	5.99	17.02	0.51
SXK282	8,200	0.252	0.670	.020	6.40	17.02	0.51
SXK110	10,000	0.272	0.670	.020	6.91	17.02	0.51
SXK112	12,000	0.291	0.670	.020	7.39	17.02	0.51
SXK115	15,000	0.323	0.670	.020	8.20	17.02	0.51
SXK118	18,000	0.350	0.670	.020	8.89	17.02	0.51
SXK122	22,000	0.386	0.670	.020	9.80	17.02	0.51
SXK125	25,000	0.407	0.670	.020	10.34	17.02	0.51
SXK127	27,000	0.421	0.670	.020	10.69	17.02	0.51
SXK133	33,000	0.402	0.867	.020	10.21	22.02	0.51
SXK139	39,000	0.453	0.867	.020	11.51	22.02	0.51
SXK147	47,000	0.480	0.867	.020	12.19	22.02	0.51
SXK156	56,000	0.520	0.867	.020	13.21	22.02	0.51
SXK168	68,000	0.563	0.867	.020	14.30	22.02	0.51
SXK182	82,000	0.626	0.867	.020	15.90	22.02	0.51
SXK010	100,000	0.670	0.867	.020	17.02	22.02	0.51

63 WVDC @ +40°C 50 WVDC @ +85°C (Yellow Color Band)							
SXL482	82	0.122	0.315	.012	3.10	8.00	0.30
SXL310	100	0.122	0.315	.012	3.10	8.00	0.30
SXL315	150	0.126	0.315	.012	3.20	8.00	0.30
SXL318	180	0.126	0.315	.012	3.20	8.00	0.30
SXL322	220	0.130	0.315	.012	3.30	8.00	0.30
SXL327	270	0.134	0.315	.012	3.40	8.00	0.30
SXL333	330	0.138	0.315	.012	3.51	8.00	0.30
SXL347	470	0.154	0.315	.012	3.91	8.00	0.30
SXL356	560	0.157	0.315	.012	3.99	8.00	0.30
SXL368	680	0.169	0.315	.012	4.29	8.00	0.30
SXL210	1,000	0.173	0.473	.016	4.39	12.01	0.41
SXL212	1,200	0.189	0.473	.016	4.80	12.01	0.41
SXL215	1,500	0.213	0.473	.016	5.41	12.01	0.41
SXL218	1,800	0.224	0.473	.016	5.69	12.01	0.41
SXL222	2,200	0.232	0.473	.016	5.89	12.01	0.41
SXL227	2,700	0.244	0.473	.016	6.20	12.01	0.41
SXL233	3,300	0.256	0.473	.016	6.50	12.01	0.41
SXL239	3,900	0.280	0.473	.016	7.11	12.01	0.41
SXL247	4,700	0.303	0.473	.016	7.70	12.01	0.41
SXL256	5,600	0.276	0.670	.020	7.01	17.02	0.51
SXL268	6,800	0.287	0.670	.020	7.29	17.02	0.51
SXL282	8,200	0.303	0.670	.020	7.70	17.02	0.51
SXL110	10,000	0.319	0.670	.020	8.10	17.02	0.51
SXL112	12,000	0.303	0.867	.020	7.70	22.02	0.51
SXL115	15,000	0.323	0.867	.020	8.20	22.02	0.51
SXL116	16,000	0.330	0.867	.020	8.38	22.02	0.51
SXL118	18,000	0.346	0.867	.020	8.79	22.02	0.51
SXL120	20,000	0.358	0.867	.020	9.09	22.02	0.51
SXL122	22,000	0.378	0.867	.020	9.60	22.02	0.51
SXL125	25,000	0.402	0.867	.020	10.21	22.02	0.51

Catalog Number	Cap pF	Inches			Millimeters		
		D Max	L Max	Ød	D Max	L Max	Ød

160 WVDC @ +40°C 125 WVDC @ +85°C (Red Color Band)							
SXM420	20	0.173	0.315	.012	4.39	8.00	0.30
SXM427	27	0.173	0.315	.012	4.39	8.00	0.00
SXM433	33	0.173	0.315	.012	4.39	8.00	0.30
SXM439	39	0.181	0.315	.012	4.60	8.00	0.30
SXM447	47	0.185	0.315	.012	4.70	8.00	0.30
SXM456	56	0.177	0.315	.012	4.50	8.00	0.30
SXM468	68	0.165	0.315	.012	4.19	8.00	0.30
SXM482	82	0.146	0.315	.012	3.71	8.00	0.30
SXM310	100	0.154	0.315	.012	3.91	8.00	0.30
SXM312	120	0.161	0.315	.012	4.09	8.00	0.30
SXM315	150	0.169	0.315	.012	4.29	8.00	0.30
SXM318	180	0.173	0.315	.012	4.39	8.00	0.30
SXM322	220	0.177	0.315	.012	4.50	8.00	0.30
SXM327	270	0.181	0.315	.012	4.60	8.00	0.30
SXM330	300	0.185	0.315	.012	4.70	8.00	0.30
SXM333	330	0.189	0.315	.012	4.80	8.00	0.30
SXM336	360	0.194	0.315	.012	4.93	8.00	0.30
SXM339	390	0.201	0.315	.012	5.11	8.00	0.30
SXM343	430	0.204	0.315	.012	5.18	8.00	0.30
SXM347	470	0.209	0.315	.012	5.31	8.00	0.30
SXM350	500	0.211	0.315	.012	5.36	8.00	0.30
SXM351	510	0.213	0.315	.012	5.41	8.00	0.30
SXM356	560	0.213	0.315	.012	5.41	8.00	0.30
SXM360	600	0.220	0.315	.012	5.59	8.00	0.30
SXM362	620	0.222	0.473	.016	5.64	12.01	0.41
SXM368	680	0.228	0.473	.016	5.79	12.01	0.41
SXM375	750	0.232	0.473	.016	5.89	12.01	0.41
SXM382	820	0.236	0.473	.016	5.99	12.01	0.41
SXM391	910	0.240	0.473	.016	6.10	12.01	0.41
SXM210	1,000	0.244	0.473	.016	6.20	12.01	0.41
SXM211	1,100	0.250	0.473	.016	6.35	12.01	0.41
SXM212	1,200	0.256	0.473	.016	6.50	12.01	0.41
SXM213	1,300	0.262	0.473	.016	6.65	12.01	0.41
SXM215	1,500	0.268	0.473	.016	6.81	12.01	0.41
SXM216	1,600	0.272	0.473	.016	6.91	12.01	0.41
SXM218	1,800	0.280	0.473	.016	7.11	12.01	0.41
SXM220	2,000	0.285	0.473	.016	7.24	12.01	0.41
SXM222	2,200	0.228	0.670	.020	5.79	17.02	0.51
SXM224	2,400	0.236	0.670	.020	5.99	17.02	0.51
SXM227	2,700	0.252	0.670	.020	6.40	17.02	0.51
SXM230	3,000	0.268	0.670	.020	6.81	17.02	0.51
SXM233	3,300	0.280	0.670	.020	7.11	17.02	0.51
SXM236	3,600	0.295	0.670	.020	7.49	17.02	0.51
SXM239	3,900	0.307	0.670	.020	7.80	17.02	0.51
SXM243	4,300	0.324	0.670	.020	8.23	17.02	0.51
SXM247	4,700	0.335	0.670	.020	8.51	17.02	0.51
SXM250	5,000	0.340	0.670	.020	8.64	17.02	0.51
SXM251	5,100	0.310	0.867	.020	7.87	22.02	0.51
SXM256	5,600	0.315	0.867	.020	8.00	22.02	0.51
SXM262	6,200	0.325	0.867	.020	8.26	22.02	0.51
SXM268	6,800	0.335	0.867	.020	8.51	22.02	0.51
SXM275	7,500	0.346	0.867	.020	8.79	22.02	0.51
SXM282	8,200	0.358	0.867	.020	9.09	22.02	0.51
SXM110	10,000	0.382	0.867	.020	9.70	22.02	0.51
SXM112	12,000	0.417	0.867	.020	10.59	22.02	0.51
SXM113	13,000	0.434	0.867	.020	11.02	22.02	0.51
SXM115	15,000	0.452	0.867	.020	11.48	22.02	0.51
SXM118	18,000	0.429	1.260	.020	10.90	32.00	0.51
SXM122	22,000	0.465	1.260	.020	11.81	32.00	0.51
SXM124	24,000	0.485	1.260	.020	12.32	32.00	0.51

Precision Film



# SX Series Polystyrene-Foil / Axial Leads

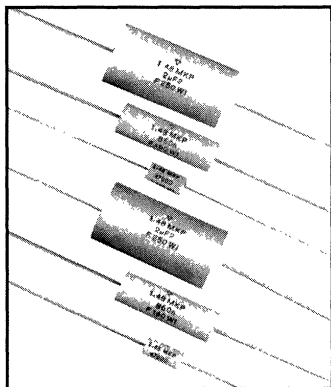
**MALLORY**

Catalog Number	Cap pF	Inches			Millimeters		
		D Max	L Max	Ød	D Max	L Max	Ød
<b>630 WVDC @ +40°C 500 WVDC @ +85°C (Black Color Band)</b>							
SX420	20	0.173	0.473	.016	4.39	12.01	0.41
SX422	22	0.173	0.473	.016	4.39	12.01	0.41
SX424	24	0.173	0.473	.016	4.39	12.01	0.41
SX426	26	0.186	0.473	.016	4.72	12.01	0.41
SX430	30	0.173	0.473	.016	4.39	12.01	0.41
SX433	33	0.173	0.473	.016	4.39	12.01	0.41
SX436	36	0.178	0.473	.016	4.52	12.01	0.41
SX439	39	0.181	0.473	.016	4.60	12.01	0.41
SX443	43	0.183	0.473	.016	4.65	12.01	0.41
SX447	47	0.185	0.473	.016	4.70	12.01	0.41
SX456	56	0.189	0.473	.016	4.80	12.01	0.41
SX462	62	0.191	0.473	.016	4.85	12.01	0.41
SX468	68	0.193	0.473	.016	4.90	12.01	0.41
SX475	75	0.195	0.473	.016	4.95	12.01	0.41
SX482	82	0.197	0.473	.016	5.00	12.01	0.41
SX491	91	0.199	0.473	.016	5.05	12.01	0.41
SX310	100	0.201	0.473	.016	5.11	12.01	0.41
SX311	110	0.203	0.473	.016	5.16	12.01	0.41
SX312	120	0.205	0.473	.016	5.21	12.01	0.41
SX313	130	0.207	0.473	.016	5.26	12.01	0.41
SX315	150	0.209	0.473	.016	5.31	12.01	0.41
SX316	160	0.211	0.473	.016	5.36	12.01	0.41
SX318	180	0.213	0.473	.016	5.41	12.01	0.41
SX320	200	0.217	0.473	.016	5.51	12.01	0.41
SX322	220	0.220	0.473	.016	5.59	12.01	0.41
SX324	240	0.222	0.473	.016	5.64	12.01	0.41
SX328	270	0.224	0.473	.016	5.69	12.01	0.41
SX330	300	0.226	0.473	.016	5.74	12.01	0.41
SX333	330	0.228	0.473	.016	5.79	12.01	0.41
SX336	360	0.232	0.473	.016	5.89	12.01	0.41
SX339	390	0.236	0.473	.016	5.99	12.01	0.41
SX343	430	0.242	0.473	.016	6.15	12.01	0.41
SX347	470	0.248	0.473	.016	6.30	12.01	0.41
SX351	510	0.214	0.670	.020	5.44	17.02	0.51

Catalog Number	Cap pF	Inches			Millimeters		
		D Max	L Max	Ød	D Max	L Max	Ød
<b>630 WVDC @ +40°C 500 WVDC @ +85°C (Black Color Band)</b>							
SX356	560	0.217	0.670	.020	5.51	17.02	0.51
SX362	620	0.226	0.670	.020	5.74	17.02	0.51
SX368	680	0.232	0.670	.020	5.89	17.02	0.51
SX375	750	0.244	0.670	.020	6.20	17.02	0.51
SX382	820	0.248	0.670	.020	6.30	17.02	0.51
SX391	910	0.256	0.670	.020	6.50	17.02	0.51
SX210	1,000	0.264	0.670	.020	6.71	17.02	0.51
SX211	1,100	0.276	0.670	.020	7.01	17.02	0.51
SX212	1,200	0.283	0.670	.020	7.19	17.02	0.51
SX213	1,300	0.291	0.670	.020	7.39	17.02	0.51
SX215	1,500	0.299	0.670	.020	7.59	17.02	0.51
SX218	1,800	0.319	0.670	.020	8.10	17.02	0.51
SX220	2,000	0.329	0.670	.020	8.36	17.02	0.51
SX222	2,200	0.339	0.670	.020	8.61	17.02	0.51
SX224	2,400	0.352	0.670	.020	8.94	17.02	0.51
SX225	2,500	0.355	0.670	.020	9.02	17.02	0.51
SX227	2,700	0.362	0.670	.020	9.19	17.02	0.51
SX230	3,000	0.366	0.670	.020	9.30	17.02	0.51
SX233	3,300	0.378	0.867	.020	9.60	22.02	0.51
SX236	3,600	0.388	0.867	.020	9.86	22.02	0.51
SX239	3,900	0.398	0.867	.020	10.11	22.02	0.51
SX243	4,300	0.414	0.867	.020	10.52	22.02	0.51
SX247	4,700	0.425	0.867	.020	10.80	22.02	0.51
SX250	5,000	0.445	0.867	.020	11.30	22.02	0.51
SX251	5,100	0.447	0.867	.020	11.35	22.02	0.51
SX256	5,600	0.453	0.867	.020	11.51	22.02	0.51
SX262	6,200	0.470	0.867	.020	11.94	22.02	0.51
SX268	6,800	0.480	0.867	.020	12.19	22.02	0.51
SX275	7,500	0.498	0.867	.020	12.65	22.02	0.51
SX282	8,200	0.516	0.867	.020	13.11	22.02	0.51
SX291	9,100	0.532	0.867	.020	13.51	22.02	0.51
SX110	10,000	0.555	0.867	.020	14.10	22.02	0.51
SX112	12,000	0.520	1.260	.020	13.21	32.00	0.51

Precision Film

# 148 Series Metallized Polypropylene / Axial Leads



- Axial Leads
- Close Capacitance Tolerances
- Available Tape and Reel
- Tape Wrapped with Epoxy End Fill
- Non Inductively Wound
- Flame Retardant Polyester Wrap Meets UL510
- Epoxy End Fill Meets UL94V0

## GENERAL SPECIFICATIONS

Operating Temperature:  
-55°C to +105°C with voltage derating above 85°C

Voltage Range:  
160 VDC and 250 VDC

Capacitance Range:  
0.001  $\mu$ F to 4.7  $\mu$ F

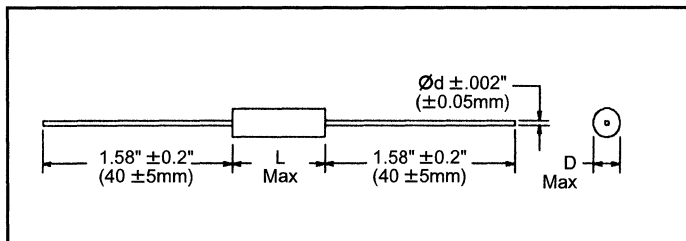
Capacitance Tolerance:  
 $\pm$ 1%,  $\pm$ 1.25%,  $\pm$ 2%,  $\pm$ 2.5%

Total Self Inductance (L):  
1nH maximum per 1mm lead and capacitor length

Test Voltage Between Terminations:  
1.6 x Vn applied for 2 sec at +25°C  $\pm$  5°C

Dissipation Factor (tg $\delta$ ) at 1 KHz:  
3 x 10<sup>-4</sup> for C  $\leq$  0.120  $\mu$ F  
5 x 10<sup>-4</sup> for 0.120  $\mu$ F > C  $\leq$  0.500  $\mu$ F  
10 x 10<sup>-4</sup> for 0.500  $\mu$ F > C  $\leq$  1.0  $\mu$ F  
20 x 10<sup>-4</sup> for C > 1.0  $\mu$ F

## Outline Dimensions



## Tape and Reel Specifications<sup>^</sup>

L Max (Body Length)		Lead Spacing		Distance Between Reel Flanges		Class
Inches	mm	Inches	mm	Inches	mm	
$\leq$ .433	$\leq$ 11	2.06	52.4	3.0	75	1
.551 - .808	14 - 20.5	2.5	63.6	3.4	86	2
$\geq$ 1.03	$\geq$ 26	2.87	73	3.7	95	3

<sup>^</sup> Add class number (1, 2, or 3) to Catalog Number to indicate tape and reel

Diameter		Quantity per Reel
Inches	mm	
.197	5	3,000
.216 thru .256	5.5 thru 6.5	1,200
.276	7	1,100
.295	7.5	1,000
.315 thru .346	8 thru 8.5	800
.354 thru .413	9 thru 10.5	500
.433 thru .512	11 thru 13	300
.551 thru .571	14 thru 14.5	250
>.571	>14.5	Not available

## Test Method and Performance

Insulation Resistance	
<b>Test Conditions</b>	
Temperature	25°C $\pm$ 5°C
Voltage Charge Time	1 minute
Voltage Charge	100 VDC
<b>Performance</b>	
	$\geq$ 1 x 10 <sup>9</sup> M $\Omega$ for C $\leq$ 0.33 $\mu$ F
	$\geq$ 30,000 M $\Omega$ x $\mu$ F for C > 0.33 $\mu$ F
Damp Heat Test	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity	93%
Test Duration	56 days
<b>Performance</b>	
Capacitance change $\Delta$ C/C	$\leq$ $\pm$ 0.3%
Insulation Resistance	$\geq$ 5 x 10 <sup>4</sup> M $\Omega$
Life Test	
<b>Test Conditions</b>	
Temperature	+85°C
Test Duration	2000 h
Voltage Applied	1.25 Vn
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 0.5%
DF Change $\Delta$ tg $\delta$	$\leq$ 20 x 10 <sup>-4</sup> at 1 KHz for C > 1 $\mu$ F $\leq$ 30 x 10 <sup>-4</sup> at 10 KHz for C $\leq$ 1 $\mu$ F
Soldering	
<b>Test Conditions</b>	
Soldering Temperature	260°C $\pm$ 5°C
Soldering Duration	5 sec $\pm$ 1 sec
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 0.2%
Long Term Stability	
<b>Test Conditions</b>	
Temperature	+40°C
Relative Humidity (RH)	70% max
Test Duration	2 years
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 0.5%
Thermal Shock	
<b>Test Conditions</b>	
Temperature	+40°C to +70°C
Cycles	nr. 5
<b>Performance</b>	
Capacitance Change $\Delta$ C/C	$\leq$ $\pm$ 0.3%

# 148 Series Metallized Polypropylene / Axial Leads



Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D	L	$\varnothing$ d	D	L	$\varnothing$ d
<b>160 VDC/90 VAC</b>							
I48223*160AA^	0.0220	0.217	0.433	0.024	5.5	11.0	0.6
I48273*160AA^	0.0270	0.217	0.433	0.024	5.5	11.0	0.6
I48333*160AA^	0.0330	0.217	0.433	0.024	5.5	11.0	0.6
I48393*160AA^	0.0390	0.217	0.433	0.024	5.5	11.0	0.6
I48473*160AA^	0.0470	0.217	0.433	0.024	5.5	11.0	0.6
I48563*160AA^	0.0560	0.217	0.433	0.024	5.5	11.0	0.6
I48683*160BB^	0.0680	0.236	0.650	0.024	6.0	16.5	0.6
I48823*160BB^	0.0820	0.236	0.650	0.024	6.0	16.5	0.6
I48104*160BB^	0.1000	0.236	0.650	0.024	6.0	16.5	0.6
I48124*160BB^	0.1200	0.236	0.650	0.024	6.0	16.5	0.6
I48154*160DB^	0.1500	0.276	0.650	0.024	7.0	16.5	0.6
I48184*160DB^	0.1800	0.276	0.650	0.024	7.0	16.5	0.6
I48224*160FB^	0.2200	0.315	0.650	0.031	8.0	16.5	0.8
I48274*160FC^	0.2700	0.315	0.807	0.031	8.0	20.5	0.8
I48334*160FC^	0.3300	0.315	0.807	0.031	8.0	20.5	0.8
I48394*160GC^	0.3900	0.335	0.807	0.031	8.5	20.5	0.8
I48474*160IC^	0.4700	0.374	0.807	0.031	9.5	20.5	0.8
I48564*160JC^	0.5600	0.394	0.807	0.031	10.0	20.5	0.8
I48684*160HD^	0.6800	0.354	1.102	0.031	9.0	28.0	0.8
I48824*160ID^	0.8200	0.374	1.102	0.031	9.5	28.0	0.8
I48105*160KD^	1.0000	0.413	1.102	0.031	10.5	28.0	0.8
I48155*160PD^	1.5000	0.492	1.102	0.031	12.5	28.0	0.8
I48225*160RE^	2.2000	0.531	1.299	0.031	13.5	33.0	0.8
I48335*160VE^	3.3000	0.630	1.299	0.031	16.0	33.0	0.8
I48475*160XE^	4.7000	0.709	1.299	0.031	18.0	33.0	0.8

\* Indicate capacitance tolerance:

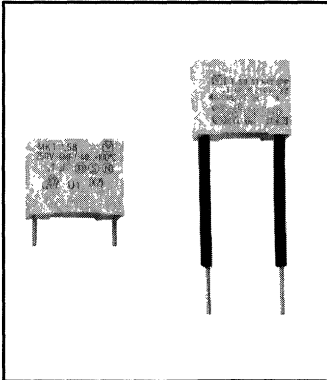
- F =  $\pm 1\%$
- A =  $\pm 1.25\%$
- G =  $\pm 2\%$
- H =  $\pm 2.5\%$

^ If ordering Tape and Reel, insert 1, 2, or 3  
(See page 150 to determine which class applies)

Catalog Number	Cap $\mu$ F	Inches			Millimeters		
		D	L	$\varnothing$ d	D	L	$\varnothing$ d
<b>250 VDC/220 VAC</b>							
I48102*250AA^	0.0010	0.217	0.433	0.024	5.5	11.0	0.6
I48122*250AA^	0.0012	0.217	0.433	0.024	5.5	11.0	0.6
I48152*250AA^	0.0015	0.217	0.433	0.024	5.5	11.0	0.6
I48182*250AA^	0.0018	0.217	0.433	0.024	5.5	11.0	0.6
I48222*250AA^	0.0022	0.217	0.433	0.024	5.5	11.0	0.6
I48272*250AA^	0.0027	0.217	0.433	0.024	5.5	11.0	0.6
I48332*250AA^	0.0033	0.217	0.433	0.024	5.5	11.0	0.6
I48392*250AA^	0.0039	0.217	0.433	0.024	5.5	11.0	0.6
I48472*250AA^	0.0047	0.217	0.433	0.024	5.5	11.0	0.6
I48562*250AA^	0.0056	0.217	0.433	0.024	5.5	11.0	0.6
I48682*250AA^	0.0068	0.217	0.433	0.024	5.5	11.0	0.6
I48822*250AA^	0.0082	0.217	0.433	0.024	5.5	11.0	0.6
I48103*250AA^	0.0100	0.217	0.433	0.024	5.5	11.0	0.6
I48123*250AA^	0.0120	0.217	0.433	0.024	5.5	11.0	0.6
I48153*250AA^	0.0150	0.217	0.433	0.024	5.5	11.0	0.6
I48183*250AA^	0.0180	0.217	0.433	0.024	5.5	11.0	0.6
I48223*250BB^	0.0220	0.236	0.650	0.024	6.0	16.5	0.6
I48273*250BB^	0.0270	0.236	0.650	0.024	6.0	16.5	0.6
I48333*250BB^	0.0330	0.236	0.650	0.024	6.0	16.5	0.6
I48393*250CB^	0.0390	0.256	0.650	0.024	6.5	16.5	0.6
I48473*250CB^	0.0470	0.256	0.650	0.024	6.5	16.5	0.6
I48563*250DB^	0.0560	0.276	0.650	0.024	7.0	16.5	0.6
I48683*250EB^	0.0680	0.295	0.650	0.031	7.5	16.5	0.8
I48823*250FB^	0.0820	0.315	0.650	0.031	8.0	16.5	0.8
I48104*250GB^	0.1000	0.335	0.650	0.031	8.5	16.5	0.8
I48124*250FC^	0.1200	0.315	0.807	0.031	8.0	20.5	0.8
I48154*250GC^	0.1500	0.335	0.807	0.031	8.5	20.5	0.8
I48184*250HC^	0.1800	0.354	0.807	0.031	9.0	20.5	0.8
I48224*250IC^	0.2200	0.374	0.807	0.031	9.5	20.5	0.8
I48274*250HD^	0.2700	0.354	1.102	0.031	9.0	28.0	0.8
I48334*250HD^	0.3300	0.354	1.102	0.031	9.0	28.0	0.8
I48394*250JD^	0.3900	0.394	1.102	0.031	10.0	28.0	0.8
I48474*250KD^	0.4700	0.413	1.102	0.031	10.5	28.0	0.8
I48564*250MD^	0.5600	0.453	1.102	0.031	11.5	28.0	0.8
I48684*250ND^	0.6800	0.472	1.102	0.031	12.0	28.0	0.8
I48824*250QD^	0.8200	0.512	1.102	0.031	13.0	28.0	0.8
I48105*250QE^	1.0000	0.512	1.299	0.031	13.0	33.0	0.8
I48155*250UE^	1.5000	0.610	1.299	0.031	15.5	33.0	0.8
I48225*250XE^	2.2000	0.709	1.299	0.031	18.0	33.0	0.8

Precision Film

# 158 Series — Type X2 Suppressor Capacitors Metallized Polyester / Radial Leads



- Available in Four Lead Configurations
- Radial Leads
- Flame Retardant Case Meets UL94V0
- U.S. and European Safety Agency Approvals
- Used in Connecting Line-to-Line on 210 VAC or 115 VAC

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +100°C

Voltage Range:  
250 VAC

Capacitance Range:  
0.01  $\mu\text{F}$  to 1.0  $\mu\text{F}$

Capacitance Tolerance:  
 $\pm 10\%$ ,  $\pm 20\%$

Reference Standards:  
VDE 0565-1, IEC 384.14,  
DIN 40040

Test Voltage Between Terminations:  
1700 VDC for 2 seconds  
at +25°C  $\pm 5^\circ\text{C}$

Test Voltage - Terminal to Case:  
2500 VAC for 2 seconds  
at +25°C  $\pm 5^\circ\text{C}$

Dissipation Factor (DF)  
 $\text{tg}\delta \times 10^{-4}$  at +25°C  $\pm 5^\circ\text{C}$   
 $\leq 150\Omega$  measured at 10 KHz

Maximum Pulse Rise Time:

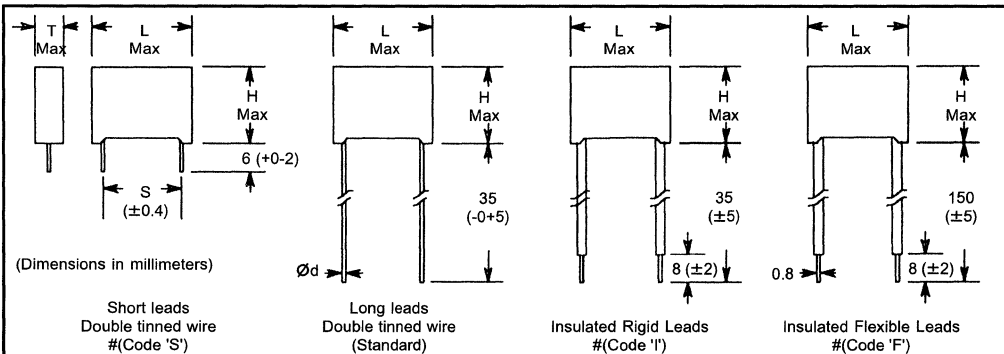
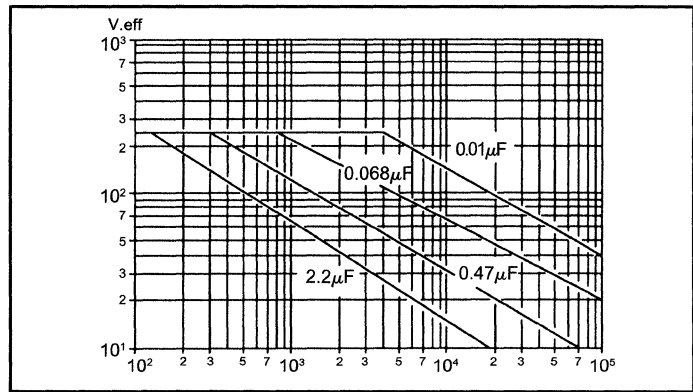
Vn	V/ $\mu\text{sec}$
350	100

For other X type capacitors see  
our UN series ceramic on page 111

## International Approvals

Safety Agency	Class	File No.	Model
VDE 0565-1	Class X2 Capacitors (250VAC and 300VAC)	22721	All Models
UL 1283	Electromagnetic Interference capacitors	E85238 (M)	All Models
OVE IEC 384-14	Class X2 capacitors	1275-000-03	Up to 0.47 $\mu\text{F}$
DEMKO IEC 384-14	Class X2 capacitors	77227 EC	Up to 0.47 $\mu\text{F}$
IMQ CEI 40-7	Class X2 capacitors (250VAC and 300VAC)	802.002.002	Up to 0.47 $\mu\text{F}$
SEMKO IEC 384-14	Class X2 capacitors	8648071	Up to 0.47 $\mu\text{F}$
NEMKO IEC 384-14	Class X2 capacitors	E33260	Up to 0.47 $\mu\text{F}$
SEV 1055	Class X2 capacitors	87,100888,02	Up to 0.47 $\mu\text{F}$
FI IEC 384-14	Class X2 capacitors	089853-01	Up to 0.47 $\mu\text{F}$

## Rated Voltage Change as a Function of Frequency



## Insulation Resistance (IR)

Test Conditions	
Temperature	25°C
Voltage Charge	100 V
Performance	
$\geq 30,000 \text{ M}\Omega$ for $C \leq 0.33 \mu\text{F}$	
$\geq 10,000 \text{ M}\Omega \times \mu\text{F}$ for $C > 0.33 \mu\text{F}$	

Catalog Number	Cap $\mu\text{F}$	Inches					Millimeters				
		L Length	T Thickness	H Height	S Spacing	$\varnothing d$	L Length	T Thickness	H Height	S Spacing	$\varnothing d$
158103*250F#	0.010	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8
158153*250F#	0.015	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8
158223*250F#	0.022	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8
158333*250F#	0.033	0.709	0.197	0.433	0.591	0.031	18.0	5.0	11.0	15.0	0.8
158473*250G#	0.047	0.709	0.236	0.472	0.591	0.031	18.0	6.0	12.0	15.0	0.8
158683*250H#	0.068	0.709	0.295	0.531	0.591	0.031	18.0	7.5	13.5	15.0	0.8
158104*250#	0.100	0.709	0.335	0.571	0.591	0.031	18.0	8.5	14.5	15.0	0.8
158154*250M#	0.150	1.043	0.276	0.630	0.886	0.031	26.5	7.0	16.0	22.5	0.8
158224*250O#	0.220	1.043	0.394	0.728	0.886	0.031	26.5	10.0	18.5	22.5	0.8
158274*250P#	0.270	1.260	0.433	0.728	1.083	0.031	32.0	11.0	18.5	27.5	0.8
158334*250P#	0.330	1.260	0.433	0.787	1.083	0.031	32.0	11.0	20.0	27.5	0.8
158474*250Q#	0.470	1.260	0.512	0.866	1.083	0.031	32.0	13.0	22.0	27.5	0.8
158684*250R#	0.680	1.260	0.591	1.180	1.083	0.031	32.0	15.0	30.0	27.5	0.8
158105*250S#	1.000	1.260	0.709	1.299	1.083	0.031	32.0	18.0	33.0	27.5	0.8

\* Indicate capacitance tolerance: K =  $\pm 10\%$ , M =  $\pm 20\%$   
 # Parts are normally supplied with bare long leads  
 Add the letters shown at right to the Catalog Number, if other lead versions are required

'S' = Short leads  
'I' = Insulated leads  
'F' = Flexible leads

# 158X Series — Type X2 Suppressor Capacitors Metallized Polyester / Radial Leads

**MALLORY**



- Radial Leads in Two Lengths
- UL 1414 and CSA Approved
- Flame Retardant Case Meets UL94V0
- Polyurethane End Fill Meets UL94V0
- Used in applications where damage to the capacitor will not lead to the danger of electrical shock

For other X type capacitors see our UN series ceramic on page 111

## GENERAL SPECIFICATIONS

Operating Temperature: -40°C to +100°C  
 Voltage Range: 250 VAC  
 Capacitance Range: 0.01  $\mu$ F to 2.2  $\mu$ F  
 Capacitance Tolerance:  $\pm$ 20% only  
 Dissipation Factor (DF)  $tg\delta$  0.01 Max at 1,000  $\pm$  100KHz

Insulation Resistance (IR) (@ 500 VDC and 20°C)  
 Terminal to Terminal:  
 $\leq 0.33\mu$ F 15,000 M $\Omega$  min  
 $\geq 0.47\mu$ F 5,000 M $\Omega$  x  $\mu$ F min  
 Both Terminals to Body: 100,000 M $\Omega$  min

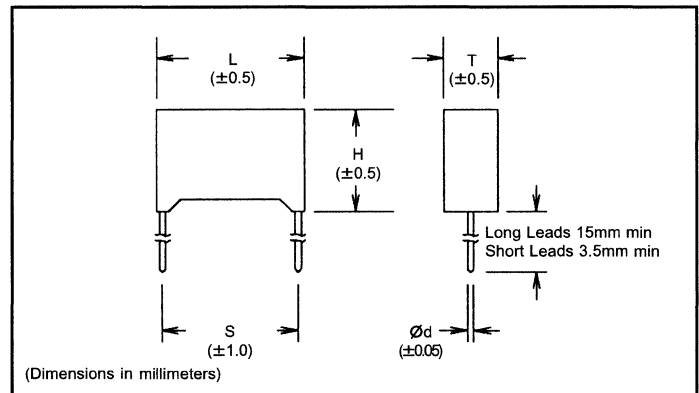
Maximum Pulse Rise Time

$\mu$ F	V/ $\mu$ s	$\mu$ F	V/ $\mu$ s
.01	2800	.22	1200
.022	2400	.47	1000
.033	2400	.68	1000
.047	2000	1.0	800
.068	2000	1.5	800
.100	1600	2.2	800

## International Approvals

Safety Agency	Standard
UL	UL-1414
UL	UL-1283
CSA	C22 2, No.8-M1986
VDE	VDE0565-1
SEMKO	SS443-04-01
SEV	SEV1055
EI	E384/14-82 (IEC384-14, 1981)
DEMKO	Heavy Current Regulations Section 21 and IEC384-14
NEMKO	NEMKO132/85

## Outline Dimensions

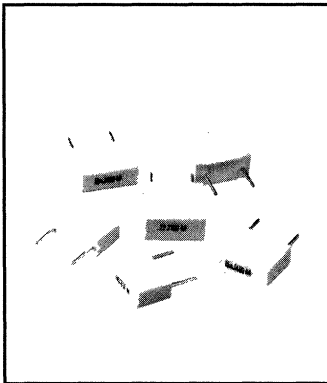


Catalog Number	Cap $\mu$ F	Inches					Millimeters				
		L	T	H	S	$\phi$ d	L	T	H	S	$\phi$ d
158X103	0.0100	0.669	0.197	0.472	0.591	0.024	17.0	5.0	12.0	15.0	0.6
158X223	0.0220	0.669	0.197	0.472	0.591	0.024	17.0	5.0	12.0	15.0	0.6
158X333	0.0330	0.669	0.197	0.472	0.591	0.024	17.0	5.0	12.0	15.0	0.6
158X473	0.0470	0.669	0.217	0.492	0.591	0.031	17.0	5.5	12.5	15.0	0.8
158X683	0.0680	0.669	0.256	0.531	0.591	0.031	17.0	6.5	13.5	15.0	0.8
158X104	0.1000	0.669	0.256	0.591	0.591	0.031	17.0	6.5	15.0	15.0	0.8
158X224	0.2200	0.984	0.315	0.689	0.886	0.031	25.0	8.0	17.5	22.5	0.8
158X474	0.4700	1.181	0.433	0.866	1.083	0.031	30.0	11.0	22.0	27.5	0.8
158X684	0.6800	1.181	0.531	0.965	1.083	0.031	30.0	13.5	24.5	27.5	0.8
158X105	1.0000	1.201	0.630	1.102	1.083	0.039	30.5	16.0	28.0	27.5	1.0
158X155	1.5000	1.614	0.610	1.102	1.476	0.039	41.0	15.5	28.0	37.5	1.0
158X225	2.2000	1.614	0.689	1.280	1.476	0.039	41.0	17.5	32.5	37.5	1.0

**NOTE:** Parts are normally supplied with long leads (15mm / .591")  
 If short leads (3.5mm / .138") are required, add 'S' to end of Catalog Number

Suppressor Film

# 173Y Series — Line-To-Ground Suppressor Film-Foil Polypropylene / Radial Leads



- Radial Leads
- Used in Line-to-Ground or Across-the-Line Applications
- Non-Inductively Wound
- Flame Retardant Case Meets UL94V0
- Epoxy Encapsulant Meets UL94V1
- U.S., Canadian and European Safety Agency Approvals

Excellent choice for 115 or 250 VAC (50-60Hz) applications, to reduce interference from power lines, motors, SCR switching, ignition systems, fluorescent lamps, neon lamps and thermostats.

## GENERAL SPECIFICATIONS

- Rated Voltage:  
250 VAC - 50/60Hz
- Capacitance Range:  
0.001  $\mu$ F to 0.047  $\mu$ F
- Capacitance Tolerance:  
 $\pm$ 20% only
- Test Voltage Between Terminals:  
3000 VDC for 2 seconds  
at +25°C  $\pm$  5°C
- Test Voltage - Terminal to Case:  
2500 VAC for 2 seconds  
at +25°C  $\pm$  5°C

## Dissipation Factor (DF)

$\text{tg}\delta \times 10^{-4}$  at +25°C  $\pm$  5°C  
 $\leq$  0.05% measured at 10 kHz

## Life Test:

1.7Vn in A.C. + 1000VAC 0.1 sec/h  
for 1000h @ Max Category Temp.

## Reference Standards:

VDE 0565-1: IEC 384.14; DIN 40040

## International Approvals

Safety Agency	Class	File No.
VDE 0565-1	Class Y Capacitors	27937
CSA C.22.2 No.1-M1981	Across-the-line or line-to-ground capacitors	55370
SEV 1055	Class Y capacitors	J1.21/415
IMQ CEI 40-7	Class Y capacitors	V 1038
DEMKO IEC 384-14	Class Y capacitors	55897 EC
NEMKO IEC 384-14	Class Y capacitors	E14434/01 E14435 E14436
FI IEC 384-14	Class Y capacitors	089854-01
SEMKO IEC 384-14	Class Y capacitors	8648072

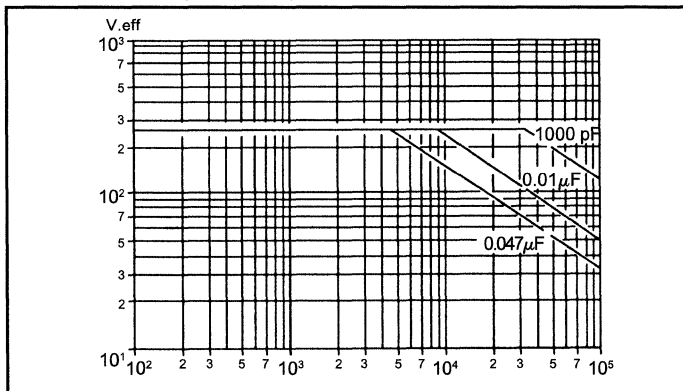
## Maximum Pulse Rise Time (dv/dt)

Pitch (mm)	15	22.5	27.5
V/ $\mu$ s	17,000	6,000	4,500

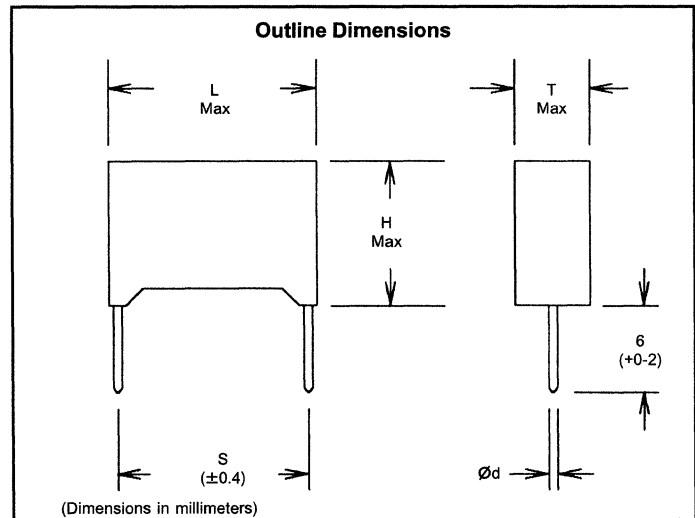
## Insulation Resistance (IR)

<b>Test Conditions</b>	
Temperature	+25°C $\pm$ 5°C
Voltage Charge	100VDC
<b>Performance</b>	$\geq 1 \times 10^5$ M $\Omega$

## Rated Voltage Change as a Function of Frequency

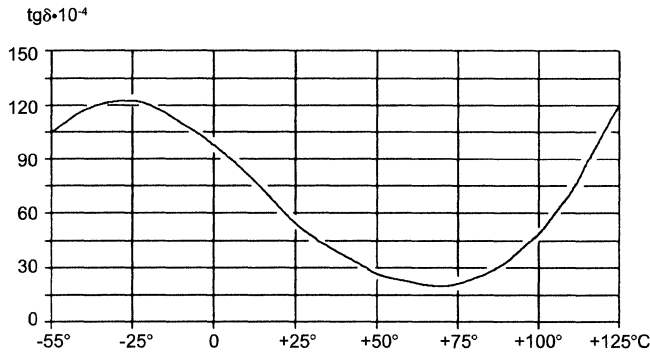


## Outline Dimensions

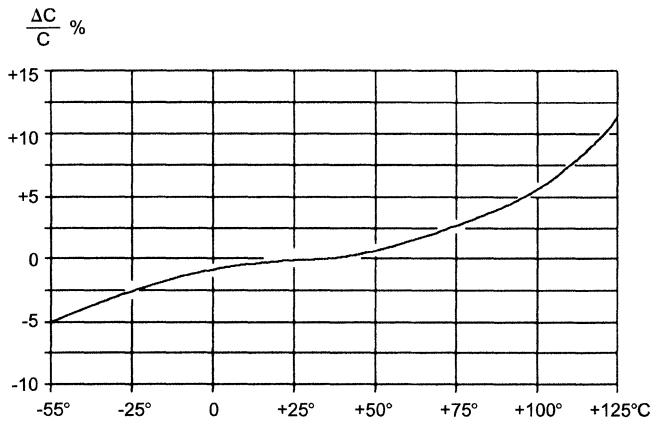


Catalog Number	Cap $\mu$ F	Inches					Millimeters				
		L	T	H	S	$\varnothing$ d	L	T	H	S	$\varnothing$ d
173102M250Y	0.0010	0.709	0.433	0.197	0.591	0.031	18.0	11.0	5.0	15.0	0.08
173152M250Y	0.0015	0.709	0.433	0.197	0.591	0.031	18.0	11.0	5.0	15.0	0.08
173222M250Y	0.0022	0.709	0.472	0.236	0.591	0.031	18.0	12.0	6.0	15.0	0.08
173332M250Y	0.0033	0.709	0.531	0.295	0.591	0.031	18.0	13.5	7.5	15.0	0.08
173472M250Y	0.0047	0.709	0.571	0.335	0.591	0.031	18.0	14.5	8.5	15.0	0.08
173682M250Y	0.0068	1.043	0.591	0.236	0.886	0.031	26.5	15.0	6.0	22.5	0.08
173103M250Y	0.0100	1.043	0.591	0.236	0.886	0.031	26.5	15.0	6.0	22.5	0.08
173153M250Y	0.0150	1.043	0.669	0.335	0.886	0.031	26.5	17.0	8.5	22.5	0.08
173223M250Y	0.0220	1.043	0.728	0.394	0.886	0.031	26.5	18.5	10.0	22.5	0.08
173333M250Y	0.0330	1.260	0.787	0.433	1.083	0.031	32.0	20.0	11.0	27.5	0.08
173473M250Y	0.0470	1.260	0.866	0.512	1.083	0.031	32.0	22.0	13.0	27.5	0.08

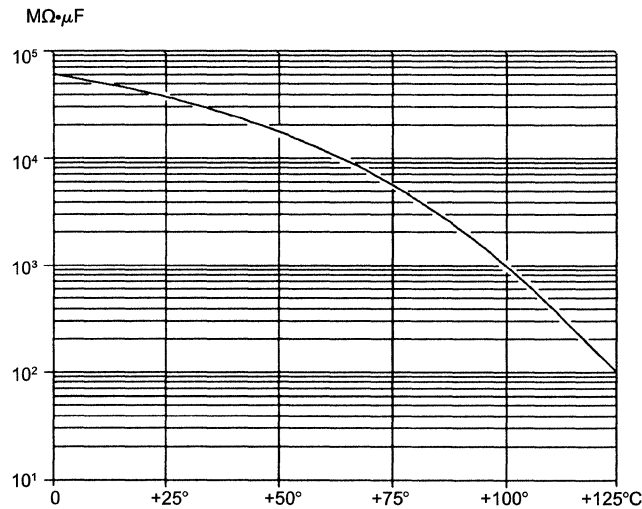
# Typical Curves Polyester Film Capacitors



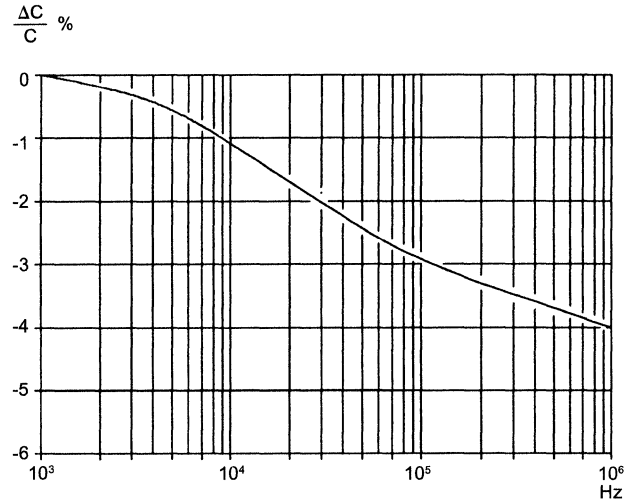
Dissipation factor variation as a function of temperature at 1KHz



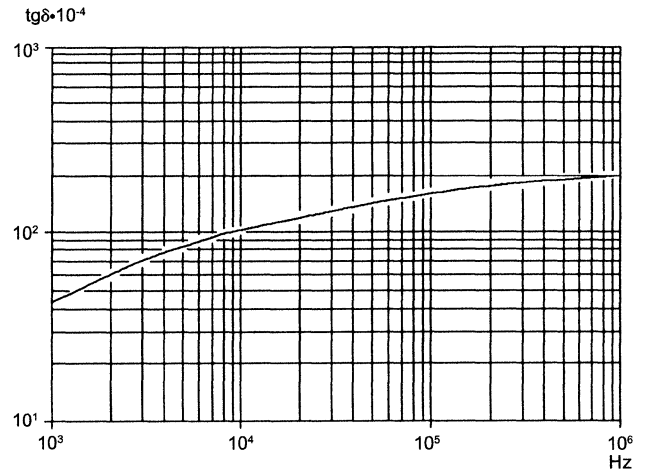
Capacitance variation as a function of temperature at 1KHz



Insulation resistance as a function of temperature



Capacitance change as a function of frequency (Room temperature)



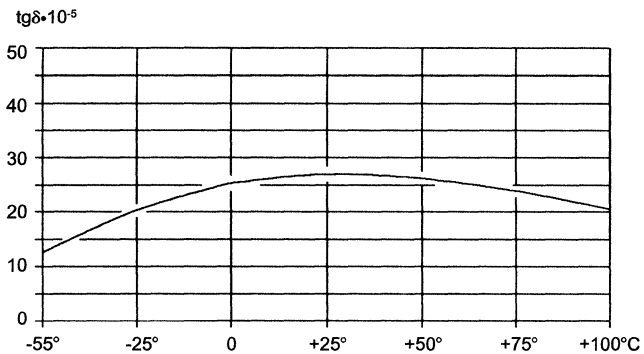
Dissipation factor change as a function of frequency (Room temperature)

Polyester Film Curves

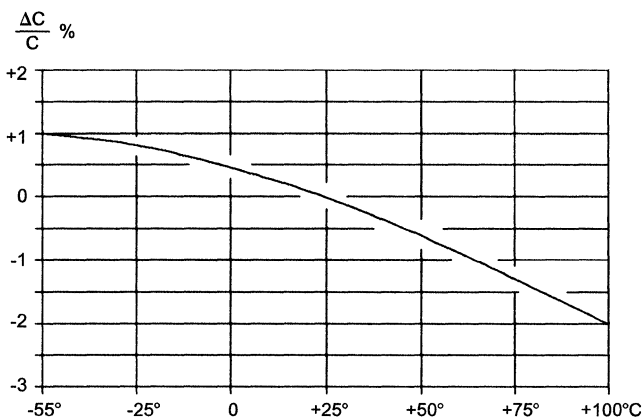
# Typical Curves Polypropylene Film Capacitors



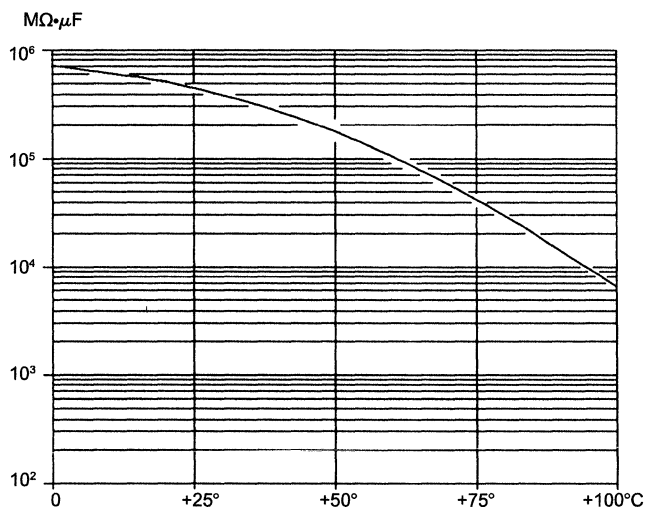
Polypropylene Film Curves



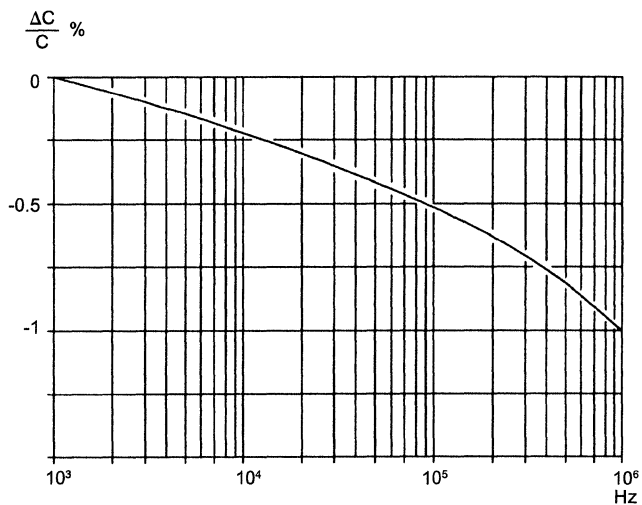
Dissipation factor variation as a function of temperature at 1KHz



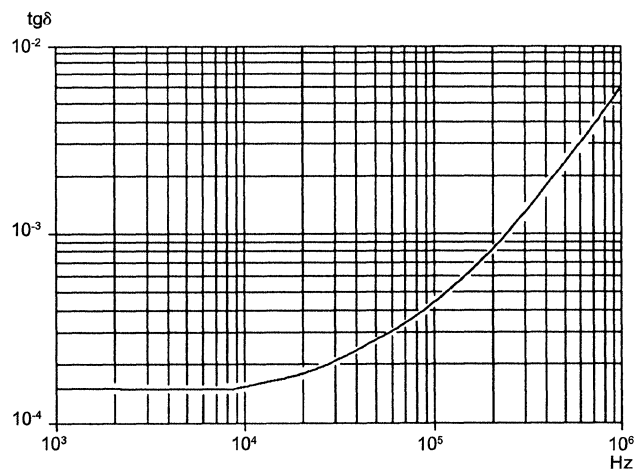
Capacitance variation as a function of temperature at 1KHz



Insulation resistance as a function of temperature



Capacitance change as a function of frequency (Room temperature)

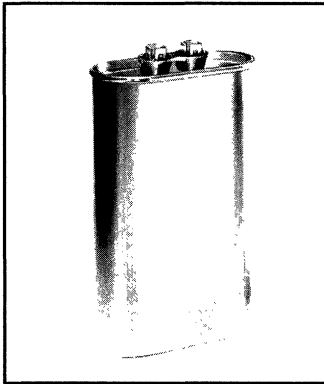


Dissipation factor change as a function of frequency (Room temperature)



# Type MPD, MPF (OPN, RPN) AC Metallized Polypropylene Motor Run Capacitors

**MALLORY**



- Internal Protector
- Environmentally Safe
- Light Weight
- Small Size
- Long Life and High Reliability
- Double Rolled Seams
- Applications:
  - Lighting
  - Motors
  - Power Factor Correction
  - Phase Shifting
  - Air Conditioning
  - Refrigeration

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +70°C  
Voltage Range:  
330, 370 and 440 VAC  
Capacitance Range:  
1  $\mu$ F to 80  $\mu$ F  
Capacitance Tolerance:  
 $\pm$ 10%  
Operating Frequency:  
50 to 60 Hz  
Dissipation Factor:  
0.1% max @ 60 Hz  
UL Recognized: Yellow Card  
Number E65270

**Round and Flat Oval Cans**  
Metallized polypropylene film dielectric capacitors offer a new option for alternating current applications. All devices have metal cases and 4-prong quick disconnect terminals. These capacitors pack the same capacitance and voltage capabilities of a conventional paper capacitor into a smaller case of considerably lighter weight. In addition, these parts have extremely low dissipation factors. They offer high reliability and long life and meet EIA Standard RS-456 Characteristic 'E'. Allow 1/2 inch clearance above the terminals on fluid-filled capacitors for interrupter operation.

The following part numbers have been changed as shown below  
For easy identification, the catalog parts will be stamped with both numbers  
Order only by the new part number shown

Old Part Number	New Part Number
OPN140	32FB4401
OPN160	32KB6601
OPN170	32FD3701
OPN240	32FB4402
OPN260	32KE6602
OPN270	32FD3702
OPN336	32FD3703
OPN340	32FB4403
OPN360	37KE6603
OPN370	32FD3703
OPN436	32FD3704
OPN440	32FB4404

Old Part Number	New Part Number
OPN460	37KE6604
OPN470	32FD3704
OPN536	32FD3705
OPN540	32FB4405
OPN560	37KE6605
OPN570	32FD3705
OPN640	32FB4406
OPN660	37KE6606
OPN670	32FD3706
OPN860	37KD6608
OPN1040	37FB4410
OPN1060	37KD6610

Old Part Number	New Part Number
OPN1070	32FD3710
OPN7X36	32FD37075
OPN7X60	37KD66075
OPN7X570	32FD37075
RPN3303	23FD3303
RPN3304	23FD3304
RPN3305	23FD3305
RPN3306	23FD3306
RPN3307	23FD3307
RPN3308	23FD3308
RPN3310	23FD3310
21DE2415	21FD3715

Old Part Number	New Part Number
21DE2420	21FD3720
21DE2425	21FD3725
21DE2430	21FD3730
21DE2435	21FD3735
21DE2440	21FD3740
23DE2445	23FD3745
23DE2450	23FD3750
23DE2455	23FD3755
24DE2460	24FD3760
24DE2465	24FD3765
24DE2470	24FD3770

## ROUND STYLE

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
3	330	23	3.00	23FD3303
4	330	23	3.00	23FD3304
5	330	23	3.00	23FD3305
6	330	23	3.00	23FD3306
7	330	23	3.00	23FD3307
8	330	23	3.00	23FD3308
10	330	23	3.00	23FD3310
3	370	21	2.63	21FD3703
4	370	21	2.63	21FD3704
5	370	21	2.63	21FD3705
6	370	21	2.63	21FD3706
7	370	21	2.63	21FD3707
8	370	21	2.63	21FD3708
10	370	21	2.63	21FD3710
12.5	370	21	2.63	21FD37125
15.0	370	21	2.63	21FD3715
17.5	370	21	2.63	21FD37175
20	370	21	2.63	21FD3720

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
25	370	21	3.00	21FD3725
25	370	23	3.00	23FD3725
30	370	21	3.00	21FD3730
30	370	23	3.00	23FD3730
35	370	21	3.75	21FD3735
35	370	23	3.00	23FD3735
40	370	21	3.75	21FD3740
40	370	23	3.00	23FD3740
45	370	23	3.75	23FD3745
45	370	24	3.00	24FD3745
50	370	23	3.75	23FD3750
50	370	24	3.00	24FD3750
55	370	23	3.75	23FD3755
55	370	24	3.00	24FD3755
60	370	24	3.00	24FD3760
65	370	24	3.75	24FD3765
70	370	24	4.75	24FD3770
80	370	24	4.75	24FD3780

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
15	440	21	3.00	21FB4415
20	440	21	3.75	21FB4420
20	440	23	3.00	23FB4420
22.5	440	21	3.75	21FB44225
22.5	440	23	3.00	23FB44225
25	440	21	3.75	21FB4425
25	440	23	3.0	23FB4425
30	440	23	3.75	23FB4430
30	440	24	3.00	24FB4430
35	440	23	4.75	23FB4435
35	440	24	3.00	24FB4435
40	440	23	4.75	23FB4440
40	440	24	3.75	24FB4440
45	440	24	3.75	24FB4445
50	440	24	3.75	24FB4450
55	440	24	4.75	24FB4455
60	440	24	4.75	24FB4460

## FLAT OVAL (SINGLE) STYLE

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
1	370	32	2.13	32FD3701
2	370	32	2.13	32FD3702
3	370	32	2.13	32FD3703
4	370	32	2.13	32FD3704
5	370	32	2.38	32FD3705
6	370	32	2.38	32FD3706
7.5	370	32	2.38	32FD37075
10	370	32	2.88	32FD3710
12.5	370	37	2.88	37FD37125
15	370	37	2.88	37FD3715
17.5	370	37	2.88	37FD37175
20	370	37	2.88	37FD3720
22.5	370	37	2.88	37FD37225
25	370	37	2.88	37FD3725

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
27.5	370	38	2.88	38FD37275
30	370	38	2.88	38FD3730
35	370	38	2.88	38FD3735
40	370	38	2.88	38FD3740
45	370	38	2.88	38FD3745
50	370	38	2.88	38FD3750
1	440	32	2.13	32FB4401
2	440	32	2.13	32FB4402
3	440	32	2.38	32FB4403
4	440	32	2.38	32FB4404
5	440	32	2.88	32FB4405
6	440	32	2.88	32FB4406
7.5	440	37	2.88	37FB44075

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
10	440	37	2.88	37FB4410
12.5	440	37	2.88	37FB44125
15	440	37	2.88	37FB4415
17.5	440	37	2.88	37FB44175
20	440	38	2.88	38FB4420
25	440	38	3.88	38FB4425
30	440	38	3.88	38FB4430
35	440	38	3.88	38FB4435
40	440	38	3.88	38FB4440
45	440	38	3.88	38FB4445
50	440	38	3.88	38FB4450
55	440	38	4.75	38FB4455
60	440	38	4.75	38FB4460

# Type MPD, MPF (OPN, RPN)

## AC Metallized Polypropylene Motor Run Capacitors



### FLAT OVAL (DUAL) STYLE

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
15+4	370	37	2.88	37FD371504
15+5	370	37	2.88	37FD371505
15+10	370	37	2.88	37FD371510
20+5	370	37	2.88	37FD372005
20+15	370	38	2.88	38FD372015
25+5	370	38	2.88	38FD372505

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
30+5	370	38	2.88	38FD373005
35+3	370	38	2.88	38FD373503
35+4	370	38	2.88	38FD373504
35+5	370	38	2.88	38FD373505
40+5	370	38	4.75	38FD374005
40+7.5	370	38	4.75	38FD374007.5

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
45+5	370	38	4.75	38FD374505
45+7.5	370	38	4.75	38FD374507.5
45+10	370	38	4.75	38FD374510
25+5	440	37	2.88	37FB442505
30+5	440	38	4.75	38FB443005
35+5	440	38	4.75	38FB443505

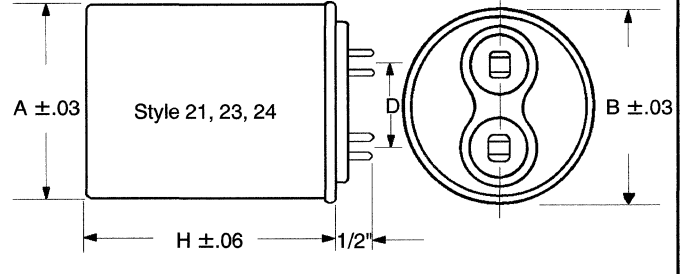
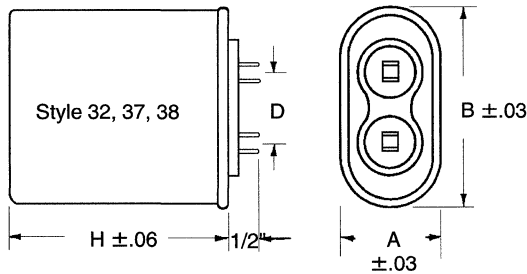
### OUTLINE DIMENSIONS (MPD, MPF, MSF, OPN, RPN) (Inches)

Flat Oval Containers					
Style	A	B	H	D	Industry Type
32	1-5/16	2-5/32	*	13/16	1-1/4 F.O.
37	1-29/32	2-29/32	*	13/16	1-3/4 F.O.
38	1-31/32	3-21/32	*	13/16	2 F.O.

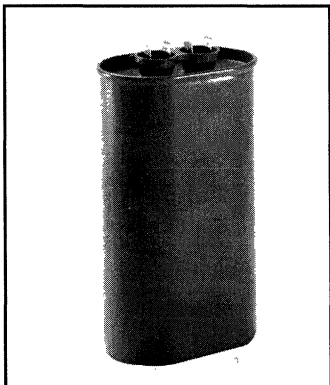
\* See Rating Tables for 'H' Dimension

Round Containers					
Style	A	B	H	D	Industry Type
21	1-3/4	1-7/8	*	13/16	1-3/4" Round
23	2	2-1/8	*	13/16	2" Round
24	2-1/2	2-5/8	*	13/16	2-1/2" Round

\* See Rating Tables for 'H' Dimension



# Type MSF AC Power Supply Capacitors



- Internal Protector
- Environmentally Safe
- Low Dissipation Factor
- Small Size
- Long Life and High Reliability
- Self Healing
- Applications:
  - Lighting
  - Power Supplies
  - Motor Run
  - Power Factor Correction
  - Phase Conversion

### GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +70°C

Voltage:  
660 VAC

Capacitance Range:  
1  $\mu$ F to 30  $\mu$ F

Capacitance Tolerance:  
 $\pm$ 6%

Operating Frequency:  
50 to 60 Hz

Dissipation Factor:  
0.1% max @ 60 Hz

Flat oval 1-1/4", 1-3/4", 2" industry types

### Metallized Paper-Polypropylene

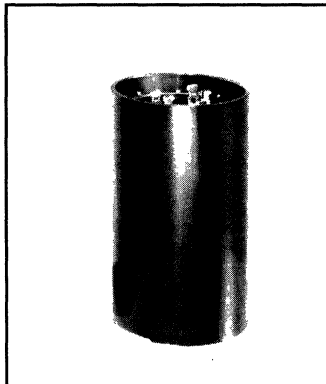
Metallized paper-polypropylene capacitors are suitable for use in ferroresonant power supplies as well as other AC continuous duty applications. They are supplied in the same rigid metal cases as the AC Motor Run series, have biodegradable oil, and are UL recognized: Yellow Card Number E65270

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
1	660	32	2.0	32KB6601
2	660	32	2.0	32KC6602
3	660	32	2.0	32KE6603
3	660	37	2.0	37KE6603
4	660	32	2.25	32KE6604
4	660	37	2.0	37KE6604
5	660	32	2.5	32KE6605

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
5	660	37	2.5	37KE6605
6	660	32	2.75	32KE6606
6	660	37	2.5	37KE6606
7	660	32	3.5	32KD6607
7.5	660	37	2.38	37KD6607.5
8	660	32	3.5	32KD6608
8	660	37	2.63	37KD6608

Cap $\mu$ F	VAC	Base Style	Height (Inches)	Catalog Number
10	660	37	3.0	37KD6610
12	660	37	3.0	37KD6612
15	660	37	3.5	37KD6615
18	660	37	4.13	37KC6618
20	660	38	3.63	38KC6620
25	660	38	4.13	38KC6625
30	660	38	4.63	38KD6630

# PSU Series AC Motor Start Capacitors

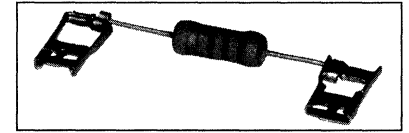


- For Motor Starting and other Intermittent Duty AC Applications
- Dual Quick Connect Terminals
- Rugged Bakelite Case
- Compact Size
- Easily Mounted

## GENERAL SPECIFICATIONS

Operating Temperature:  
-40°C to +65°C  
Storage Temperature:  
-55°C to +85°C  
Voltage Range:  
110 to 330 VAC  
Capacitance Range:  
21  $\mu$ F to 1280 $\mu$ F  
Operating Frequency:  
50 to 60 Hz  
Power Factor: 10% max  
(12%  $\leq$  30 $\mu$ F)  
Meets EIA RS-463 Type 2  
(Normal Performance)

## ACR15KT Motor Start Resistor

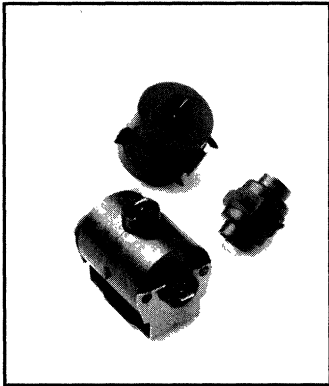


15KOhm 2 watt bleeder resistor for AC motor start applications. Saves relay switch contacts and capacitor, particularly in capacitor start-run applications. 1/4" quick connect terminals eliminate need for soldering.

Cap $\mu$ F	VAC	Case Code	Diameter (Inches)	Length (Inches)	Catalog Number
21-25	110/125	1	1 7/16	2 3/4	PSU2115
25-30	110/125	1	1 7/16	2 3/4	PSU2515
30-36	110/125	1	1 7/16	2 3/4	PSU3015
36-43	110/125	1	1 7/16	2 3/4	PSU3615
43-52	110/125	1	1 7/16	2 3/4	PSU4315
47-56	110/125	1	1 7/16	2 3/4	PSU4715
53-64	110/125	1	1 7/16	2 3/4	PSU5315
64-77	110/125	1	1 7/16	2 3/4	PSU6415
72-86	110/125	1	1 7/16	2 3/4	PSU7215
88-106	110/125	1	1 7/16	2 3/4	PSU8815
108-130	110/125	1	1 7/16	2 3/4	PSU10815
124-149	110/125	1	1 7/16	2 3/4	PSU12415
130-156	110/125	1	1 7/16	2 3/4	PSU13015
145-174	110/125	1	1 7/16	2 3/4	PSU14515
161-193	110/125	1	1 7/16	2 3/4	PSU16115
189-227	110/125	1	1 7/16	2 3/4	PSU18915A
200-240	110/125	2	1 7/16	3 3/8	PSU20015
216-259	110/125	2	1 7/16	3 3/8	PSU21615
233-280	110/125	2	1 7/16	3 3/8	PSU23315A
243-292	110/125	2	1 7/16	3 3/8	PSU24315A
270-324	110/125	2	1 7/16	3 3/8	PSU27015A
300-360	110/125	4	1 13/16	3 3/8	PSU30015
324-389	110/125	3	1 7/16	4 3/8	PSU32415A
340-408	110/125	4	1 13/16	3 3/8	PSU34015
378-454	110/125	4	1 13/16	3 3/8	PSU37815
400-480	110/125	4	1 13/16	3 3/8	PSU40015
430-516	110/125	4	1 13/16	3 3/8	PSU43015A
460-552	110/125	4	1 13/16	3 3/8	PSU46015A
540-648	110/125	4	1 13/16	3 3/8	PSU54015A
540-648	110/125	5	1 13/16	4 3/8	PSU54015B
590-708	110/125	5	1 13/16	4 3/8	PSU59015A
645-774	110/125	5	1 13/16	4 3/8	PSU64515
708-850	110/125	5	1 13/16	4 3/8	PSU70815
720-864	110/125	5	1 13/16	4 3/8	PSU72015
800-960	110/125	5	1 13/16	4 3/8	PSU80015
815-978	110/125	5	1 13/16	4 3/8	PSU81515
829-995	110/125	5	1 13/16	4 3/8	PSU82915A
850-1020	110/125	5	1 13/16	4 3/8	PSU85015
1000-1200	110/125	7	2 1/16	4 3/8	PSU100015A
1020-1224	110/125	7	2 1/16	4 3/8	PSU102015
1175-1410	110/125	7	2 1/16	4 3/8	PSU11715
1280-1536	110/125	7	2 1/16	4 3/8	PSU128015
21-25	165	1	1 7/16	2 3/4	PSU2165A
25-30	165	1	1 7/16	2 3/4	PSU2565A
30-36	165	1	1 7/16	2 3/4	PSU3065A
36-43	165	1	1 7/16	2 3/4	PSU3665A
43-52	165	1	1 7/16	2 3/4	PSU4365A
47-56	165	1	1 7/16	2 3/4	PSU4765A
53-64	165	1	1 7/16	2 3/4	PSU5365A
64-77	165	1	1 7/16	2 3/4	PSU6465A
72-86	165	1	1 7/16	2 3/4	PSU7265A
88-106	165	2	1 7/16	3 3/8	PSU8865
108-130	165	2	1 7/16	3 3/8	PSU10865
124-149	165	2	1 7/16	3 3/8	PSU12465
130-154	165	2	1 7/16	3 3/8	PSU13065

Cap $\mu$ F	VAC	Case Code	Diameter (Inches)	Length (Inches)	Catalog Number
145-174	165	2	1 7/16	3 3/8	PSU14565
161-193	165	2	1 7/16	3 3/8	PSU16165
189-227	165	2	1 7/16	3 3/8	PSU18965B
216-259	165	4	1 13/16	3 3/8	PSU21665A
233-280	165	3	1 7/16	4 3/8	PSU23365
243-292	165	3	1 7/16	4 3/8	PSU24365
270-324	165	3	1 7/16	4 3/8	PSU27065A
324-389	165	5	1 13/16	4 3/8	PSU32465
340-408	165	5	1 13/16	4 3/8	PSU34065
378-454	165	5	1 13/16	4 3/8	PSU37865
400-480	165	5	1 13/16	4 3/8	PSU40065
430-516	165	5	1 13/16	4 3/8	PSU43065
460-552	165	5	1 13/16	4 3/8	PSU46065
540-648	165	7	2 1/16	4 3/8	PSU54065
21-25	220/250	1	1 7/16	2 3/4	PSU2135
25-30	220/250	1	1 7/16	2 3/4	PSU2535
30-36	220/250	1	1 7/16	2 3/4	PSU3035
36-43	220/250	1	1 7/16	2 3/4	PSU3635
43-52	220/250	2	1 7/16	3 3/8	PSU4335B
47-56	220/250	2	1 7/16	3 3/8	PSU4735
53-64	220/250	2	1 7/16	3 3/8	PSU5335
64-77	220/250	2	1 7/16	3 3/8	PSU6435
72-86	220/250	4	1 13/16	3 3/8	PSU7235
88-106	220/250	4	1 13/16	3 3/8	PSU8835
108-130	220/250	4	1 13/16	3 3/8	PSU10835A
124-149	220/250	5	1 13/16	4 3/8	PSU12435
130-156	220/250	5	1 13/16	4 3/8	PSU13035
145-174	220/250	5	1 13/16	4 3/8	PSU14535
161-193	220/250	7	2 1/16	4 3/8	PSU16135A
189-227	220/250	7	2 1/16	4 3/8	PSU18935A
216-259	220/250	7	2 1/16	4 3/8	PSU21635A
233-280	220/250	7	2 1/16	4 3/8	PSU23335A
243-292	220/250	7	2 1/16	4 3/8	PSU24335
270-324	220/250	7	2 1/16	4 3/8	PSU27035A
21-25	330	1	1 7/16	2 3/4	PSU2130
25-30	330	2	1 7/16	3 3/8	PSU2530
30-36	330	2	1 7/16	3 3/8	PSU3030
36-43	330	2	1 7/16	3 3/8	PSU3630
43-52	330	2	1 7/16	3 3/8	PSU4330
47-56	330	4	1 13/16	3 3/8	PSU4730
53-64	330	4	1 13/16	3 3/8	PSU5330B
64-77	330	4	1 13/16	3 3/8	PSU6430
72-86	330	5	1 13/16	4 3/8	PSU7230B
88-106	330	5	1 13/16	4 3/8	PSU8830A
108-130	330	7	2 1/16	4 3/8	PSU10830B
124-149	330	8	2 9/16	4 3/8	PSU12430
124-149	330	7	2 1/16	4 3/8	PSU12430A
130-156	330	7	2 1/16	4 3/8	PSU13030
145-174	330	7	2 1/16	4 3/8	PSU14530A
161-193	330	8	2 9/16	4 3/8	PSU16130
189-227	330	8	2 9/16	4 3/8	PSU18930
216-259	330	8	2 9/16	4 3/8	PSU21630
270-324	330	8	2 9/16	4 3/8	PSU27030
378-454	330	8	2 9/16	4 3/8	PSU37830
460-552	330	8	2 9/16	4 3/8	PSU46030

# Type PTCR Positive Temperature Coefficient Resistor



- Provides Additional Starting Torque for Motors and Compressors
- Economical
- Three Sizes Available
- Connection Wires Available
- Uses Standard Mounting Bracket
- UL Recognized File E97640

## GENERAL SPECIFICATIONS

Suitable for hard starting compressors and sites with soft line voltage.

Reliable, cost effective alternative to capacitor type torque boosters.

Covers compressors from 5,000 to 62,000 BTU and horse powers up to 6HP.

Suitable for 120 thru 240 VAC applications.

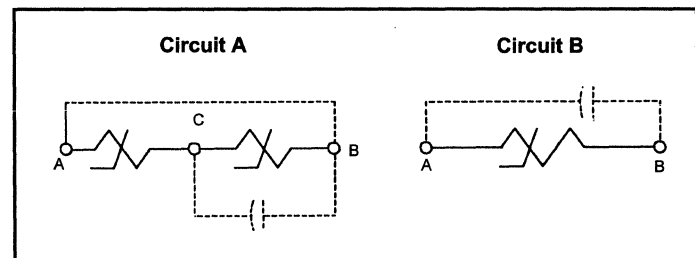
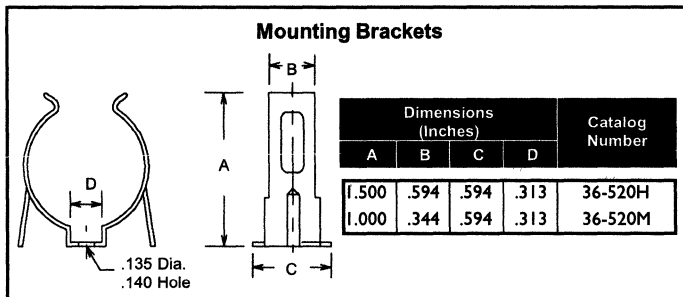
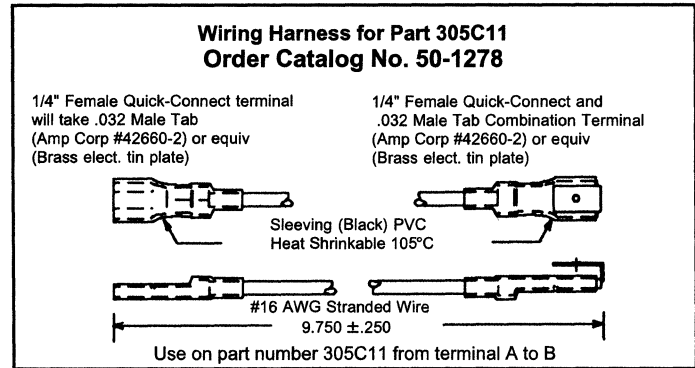
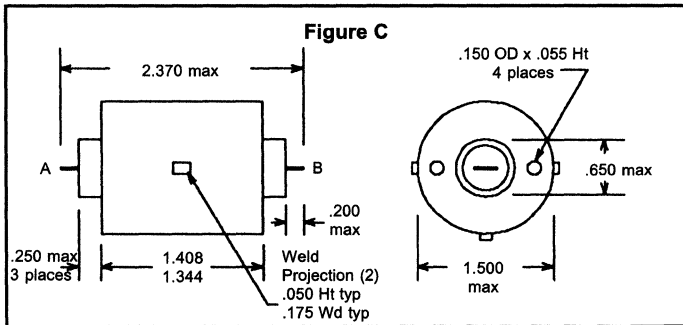
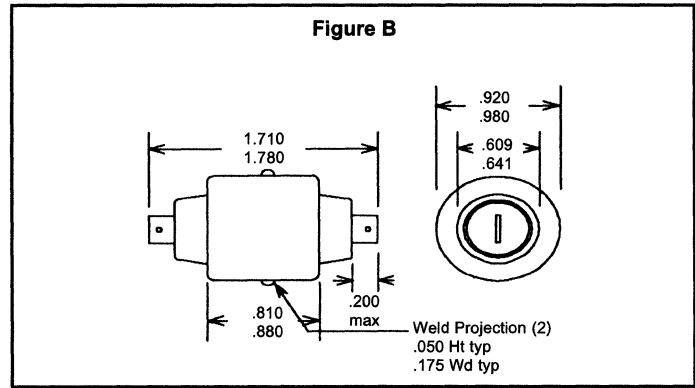
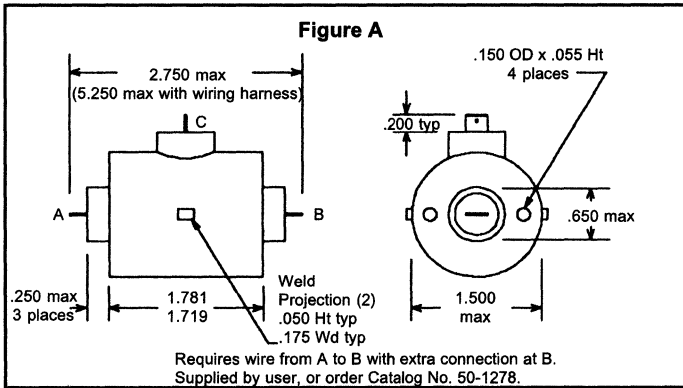
Installs quickly to run capacitor terminals using special piggyback connecting leads.

Mounts securely with a single screw, with optional mounting bracket.

## PTCR Suggested Application Table for 240 Volt PSC Motors

Nominal Resistance at 230 VAC (Ohms)	Application Ranges				DC Measured Cold Resistance		Case Color	Approximate Dimensions		Bracket Number	Figure #	Circuit #	Catalog Number (see note)
	Compressor Size BTU Min (BTU)	Compressor Size BTU Max (BTU)	Max Motor (HP)	Max Inrush Thru PTCR (Amps)	Min (Ohms)	Max (Ohms)		Diameter (Inches)	Length (Inches)				
25	5,000	25,000	2.5	10	24	50	Black	.950	1.750	36-520M	B	B	305C20
20	18,000	40,000	4	18	20	40	Blue	1.500	2.370	36-520H	C	B	305C19
12.5	30,000	62,000	6	36	12	25	Tan	1.500	5.250	36-520H	A	A	305C11

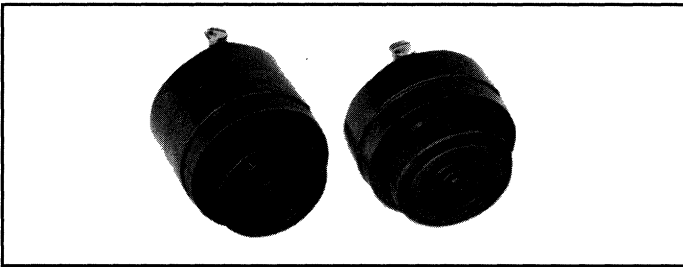
Note: Add the letter 'A' to Catalog Number to include mounting bracket.



Series	Mounting	Frequency ±500 Hz	Voltage	Loudness	Current	Function	Page
<b>Sonalert® Audible Signal Devices (Commercial and Industrial)</b>							
<b>SC</b>	Classic Panel (Screw Neck)	1900 Hz 2900 Hz 4500 Hz	1 - 250 V AC & DC	Loud: 80 - 95 dB Med: 65 - 80 dB Soft: 50 - 65 dB	1 - 28 mA	Continuous Pulse Dual Mode Chime Chirp Warble	<b>162</b>
<b>SBM</b>	Printed Circuit Board	2900 Hz	1 - 28 VDC	Med: 55 - 78 dB	3 - 16 mA	Continuous Pulse Dual Mode	<b>162</b>
<b>SNP</b>	Panel (Snap in)	2900 Hz	4 - 28 VDC	Med: 55 - 76 dB	3 - 18 mA	Continuous Pulse	<b>162</b>
<b>Sonalert® Multi-Tone</b>							
<b>SC</b>	Classic Panel (Screw Neck)	1750 Hz 3000 Hz	6 - 16 VDC	Med: 60 - 72 dB	2 - 27 mA	Multi-Tone 3 Mode 5 Mode	<b>164</b>
<b>Sonalert® for Military Applications</b>							
<b>SC</b>	Classic Panel (Screw Neck)	1900 Hz 2900 Hz 4500 Hz	6 - 250 V AC & DC	Loud: 80 - 90 dB Med: 68 - 80 dB	3 - 18 mA	Continuous Pulse Dual Mode Warble	<b>165</b>
<b>Sonalert II™</b>							
<b>MSR MSO</b>	Printed Circuit Board (15 mm Pitch)	3.4 KHz	3 - 20 VDC	Med: 55 - 74 dB	3 - 20 mA	Continuous	<b>170</b>
<b>Minilert Audible Signals</b>							
<b>MCP</b>	Printed Circuit Board	3150 Hz	2 - 20 VDC	Med: 55 - 74 dB	3 - 20 mA	Continuous	<b>171</b>
<b>Piezoelectric Transducer Units</b>							
<b>EFB</b>	Printed Circuit & Flange	Various	30 V. Max	Medium	Requires Drive Circuitry	Continuous	<b>172</b>
<b>Loud Audible Alarm</b>							
<b>SC 194</b>	Bracket or Flange	3000 Hz	5 - 12 VDC	X-loud 120 dB	120 mA @ 9 VDC	Continuous	<b>173</b>
<b>Technical Information on Sound</b>							<b>174</b>

# Commercial and Industrial Sonalert® Audible Signal Devices

**MALLORY**



Because the operation of the Sonalert audible signal device is dependent upon the circuit in which it is used, it is advisable to thoroughly test the selected device in the specific circuit and application to assure mechanical and electrical compatibility and verify system performance.

Mallory Sonalert® signals produce an audible tone by electronic means when voltage is applied. Voltages from 1V to 250V may be used depending upon the model.

Electrical power is converted to sound by means of a piezoelectric transducer operating substantially at resonance in a solid state oscillator resulting in efficient power conversion.

Sonalert signals may be powered by many electrical sources ranging from single cell batteries to industrial power lines. Little electrical power is required making them ideally suitable for portable battery operated equipment. This low power feature allows the Sonalert signal to be turned on or off with a low power transistor, SCR, or integrated circuit. Completely solid state with no circuit interruptions which may cause arcing or electrical noise. And no mechanical wear. The Mallory Sonalert signals should give you many years of trouble-free service.

## Audio and Electrical Specifications

### Continuous Tones

Catalog Number	Loudness Category	Mounting Method	Case Style	Frequency ±500 Hz	Minimum Sound Pressure dB (A) at Two Feet		Operating Voltage *AC/DC Non-polar All Others DC Only		Typical Operating Current mA	
					At Min. V	At Max. V	**Min.	Max.	At Min. V	At Max. V
					• SC110N	Loud	Panel	D	2900	80
SC307N	Loud	Panel	C	2900	80	90	3	7	3	8
SC616N	Loud	Panel	C	2900	80	95	6	16	4	16
SC616NL	Loud	Panel	C-3	2900	80	95	6	16	4	16
SC628N	Loud	Panel	C	2900	80	90	6	28	3	14
SC628NL	Loud	Panel	C-3	2900	80	90	6	28	3	14
SC628AN	Loud	Panel	D	2900	80	95	*6	28	8	28
SC648AN	Loud	Panel	D	2900	80	95	*10	48	8	28
• SBM2	Medium	Printed Board	F	2900	55	68	1	5	3	16
• SBM428	Medium	Printed Board	F	2900	64	78	4	28	3	16
• SNP2	Medium	Snap In Panel	B	2900	55	68	1	5	2	12
• SNP428	Medium	Snap In Panel	B	2900	64	76	4	28	3	18
SC105	Medium	Panel	C	2900	60	75	1	5	3	16
• SC110	Medium	Panel	D	2900	68	80	*30	120	6	21
• SC110D	Medium	Panel	D	1900	60	75	*30	120	6	21
• SC110H	Medium	Panel	D	4500	68	80	*30	120	6	21
SC250	Medium	Panel	D	2900	68	80	*60	250	4	16
SC250D	Medium	Panel	D	1900	60	72	*60	250	4	16
SC250H	Medium	Panel	D	4500	68	80	*60	250	4	16
• SC416	Medium	Panel	C	2900	68	80	4	16	4	14
• SC628	Medium	Panel	C	2900	68	80	6	28	3	18
• SC628A	Medium	Panel	D	2900	68	80	*6	28	6	23
• SC628AD	Medium	Panel	D	1900	60	75	*6	28	4	16
• SC628AH	Medium	Panel	D	4500	68	80	*6	28	4	16
• SC628D	Medium	Panel	C	1900	60	75	6	28	6	23
• SC628H	Medium	Panel	C	4500	68	80	6	28	6	23
• SC628L	Medium	Panel	C-3	2900	68	80	6	28	3	14
• ST628	Medium	Panel	C	2900	60	80	6	28	1.5	12
• SC648	Medium	Panel	C	2900	68	80	10	48	5	22
• SC648A	Medium	Panel	D	2900	68	80	*10	48	4	16
• SC648AD	Medium	Panel	D	1900	60	75	*10	48	4	16
• SC648AH	Medium	Panel	D	4500	68	80	*10	48	4	16
• SC648D	Medium	Panel	C	1900	60	75	10	48	3	14
• SC648H	Medium	Panel	C	4500	68	80	10	48	3	14
SC1.5	Soft	Twist Tab	A	3500	60 @1.5V		1	4	4@1.5V	
SC6	Soft	Twist Tab	A	3500	68 @6V		4	8	12 @6V	
SC12	Soft	Twist Tab	A	3500	70 @12V		8	15	14 @12V	
SC18	Soft	Twist Tab	A	3500	70 @18V		14	20	16 @18V	
SC24	Soft	Twist Tab	A	3500	70 @24V		20	30	16 @24V	
SNP428F	Soft	Snap In Panel	B	2900	52	68	4	28	0.5	3
SC110E	Soft	Panel	D	1900	55	65	30	120	3	14
SC110F	Soft	Panel	D	2900	55	65	30	120	1	4
SC250E	Soft	Panel	D	1900	55	65	60	250	3	14
SC250F	Soft	Panel	D	2900	55	65	60	250	1	4
SC628AE	Soft	Panel	D	1900	55	65	*6	28	3	14
SC628AF	Soft	Panel	D	2900	55	70	*6	28	1	4
SC628E	Soft	Panel	C	1900	55	68	6	28	3	8
SC628F	Soft	Panel	C	2900	55	70	6	28	0.5	3
SC648AE	Soft	Panel	D	1900	55	65	*10	48	3	14

\* For operation on 50 or 60 Hz Power Line  
• Denotes UL Models

\*\* Minimum voltage specified for sound test does not represent sound turn-on or turn-off points. Units will sound at lower voltages.  
• Denotes High Trigger Model (Start Up Voltage Approximately 3 V).

## Intermittent Tones

Catalog Number		Loudness Category	Mounting Method	Case Style	Frequency ±500 Hz	Minimum Sound Pressure dB (A) at Two Feet		Operating Voltage *AC/DC Non-polar All Others DC Only		Typical Operating Current mA	
						At Min. V	At Max. V	**Min.	Max.	At Min. V	At Max. V
<b>Fast Pulse (1)</b>	<b>Slow Pulse (2)</b>	(1) Turns on and off at 2 to 10 pulses per second depending upon voltage at 50% duty cycle. (2) Turns on and off at .5 to 2 pulses per second depending upon voltage at 50% duty cycle.									
SC110NP	SC110NJ	Loud	Panel	D	2900	80	95	*30	120	8	28
SC616NP	SC616NJ	Loud	Panel	C	2900	80	95	6	16	4	16
SC628ANP	SC628ANJ	Loud	Panel	D	2900	80	95	*6	28	8	28
SC648ANP	SC648ANJ	Loud	Panel	D	2900	80	95	*10	48	8	28
SBM616P	SBM616J	Medium	Printed Board	F	2900	68	78	6	16	1	4
SC110DP	SC110DJ	Medium	Panel	E	1900	60	75	*30	120	4	16
SC110HP	SC110HJ	Medium	Panel	E	4500	68	80	*30	120	4	16
SC110P	SC110J	Medium	Panel	E	2900	68	80	*30	120	6	21
SC250DP	SC250DJ	Medium	Panel	E	1900	60	72	*60	250	4	16
SC250HP	SC250HJ	Medium	Panel	E	4500	68	80	*60	250	4	16
SC250P	SC250J	Medium	Panel	E	2900	68	78	*60	250	4	16
SNP616P	SNP616J	Medium	Snap In Panel	B-1	2900	65	75	6	16	1	5
SC616P	SC616J	Medium	Panel	C-1	2900	68	78	6	16	1	4
SC616P-1	SC616J-1	Medium	Panel	C-11	2900	68	78	6	16	1	4
SC628ADP	SC628ADJ	Medium	Panel	E	1900	60	75	*6	28	4	16
SC628AHP	SC628AHJ	Medium	Panel	E	4500	68	80	*6	28	4	16
SC628AP	SC628AJ	Medium	Panel	E	2900	68	80	*6	28	4	16
SC628DP	SC628DJ	Medium	Panel	D	1900	60	75	6	28	3	14
SC628HP	SC628HJ	Medium	Panel	D	4500	68	80	6	28	3	14
SC628P	SC628J	Medium	Panel	D	2900	68	80	6	28	6	22
SC648ADP	SC648ADJ	Medium	Panel	E	1900	60	75	*10	48	4	16
SC648AP	SC648AJ	Medium	Panel	E	2900	68	80	*10	48	4	16
SC110EP	SC110EJ	Soft	Panel	E	1900	55	65	*30	120	3	14
SC110FP	SC110FJ	Soft	Panel	E	2900	55	65	*30	120	4	16
SC250EP	SC250EJ	Soft	Panel	E	1900	55	68	*60	250	3	14
SC250FP	SC250FJ	Soft	Panel	E	2900	55	65	*60	250	4	16
SC628AEP	SC628AEJ	Soft	Panel	E	1900	50	65	*6	28	3	14
SC628AFP	SC628AFJ	Soft	Panel	E	2900	55	68	*6	28	4	16
SC628EP	SC628EJ	Soft	Panel	D	1900	50	65	6	28	3	8
SC628FP	SC628FJ	Soft	Panel	D	2900	50	65	6	28	3	14
<b>Short Pulse</b>		Turns on and off at .5 to 2 pulses per second depending upon voltage at 10% duty cycle.									
SC110K		Medium	Panel	E	2900	68	80	*30	120	6	22
SC250K		Medium	Panel	E	2900	68	80	*60	250	5	18
SC628K		Medium	Panel	D	2900	68	80	6	28	3	14
SC628AK		Medium	Panel	E	2900	68	80	*6	28	4	16
SC648AK		Medium	Panel	E	2900	68	80	*6	48	6	24
SC110FK		Soft	Panel	E	2900	55	65	*30	120	4	16
SC250FK		Soft	Panel	E	2900	52	65	*60	250	4	16
SC628FK		Soft	Panel	D	2900	50	65	6	28	3	14
SC628AFK		Soft	Panel	E	2900	55	70	*6	28	2	8
<b>Dual Mode Operation (4)</b>		When power terminals are connected, third terminal may be switched to open to select a continuous sound or switched to positive (+) to select a pulsing sound. Switching current is less than 2.0 milliamp.									
<b>Continuous or Fast Pulse</b>	<b>Continuous or Slow Pulse</b>										
SC616NPU	SC616NJU	Loud	Panel	D-1	2900	80	90	6	16	4	16
SBM616PU	SBM616JU	Medium	Printed Board	F	2900	68	78	6	16	3	12
SC616PU	SC616JU	Medium	Panel	C-7	2900	68	78	6	16	3	12
SC616PU-1	SC616JU-1	Medium	Panel	C-7	2900	68	80	6	16	3	12
<b>Fast Warble</b>	<b>Slow Warble</b>	Produces two tones alternately when used with additional continuous tone unit.									
SC628W	SC628JW	Medium	Panel	D-1	2900	68	80	6	28	3	16
(Use with SC628D or SC628H)											
SC628FW	SC628FJW	Soft	Panel	D-1	2900	55	70	6	28	3	14
(Use with SC628E)											
<b>Chime Tone</b>		A pleasant sound which chimes every one or two seconds as long as voltage is applied. Pulse rate is 0.3 to 2 pps at 50% duty cycle.									
SC110CP		Medium	Panel	E	2900	68	78	*30	120	4	16
SC616CP		Medium	Panel	D	2900	68	78	6	16	3	8
SC616CPN		Loud	Panel	D	2900	76	86	6	16	6	16
<b>Chirp</b>		A unique sound which pulses at 20 to 60 pps.									
SC110Q (AC Only)		Medium	Panel	C	2900	68	80	30 AC	120 AC	6	22
SC616Q		Medium	Panel	C-1	2900	68	78	6	16	1	4

\* For operation on 50 or 60 Hz Power Line

\*\* Minimum voltage specified for sound test does not represent sound turn-on or turn-off points. Units will sound at lower voltages.

• Denotes UL Models

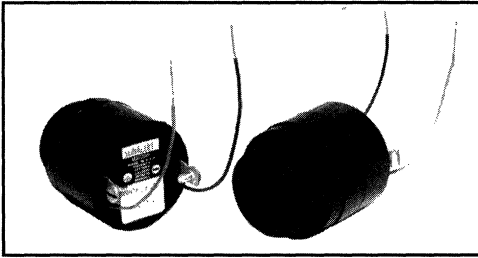
### Underwriters Laboratories

The following models are listed as recognized components - audible signal appliances: SNP428 SC628 SC648 SC628P SC110 SC110P SC110J SC628A SC628J SBM2 SBM428 SC416 SC628H SC648AD SC628-9B SC110H SC110D SC110N SC110K SC110Q SC628D

Guide Number UCST2, Yellow Card Number S1290.

# Multi-Tone Sonalert® Audible Signal Devices

**MALLORY**



## Models SC616WY & SC616WXY

### Key Features

The Multi-Tone Sonalert models SC616WY and SC616WXY are piezoelectric signaling devices with several functions. When operated and controlled from a 6-16 VDC source, they produce distinctive tone patterns. The SC616WY tone patterns are pulsate high frequency, pulsate low frequency and warble. The SC616WXY has two additional tones - continuous high and low frequency. Operating modes are determined by the connection of two control wires.

The Multi-Tone Sonalert employs all solid state circuitry. When driven at the maximum supply voltage, a sound pressure of 72 dB at 2 feet is obtained. Both models have a low current drain (27 mA max).

### Mechanical

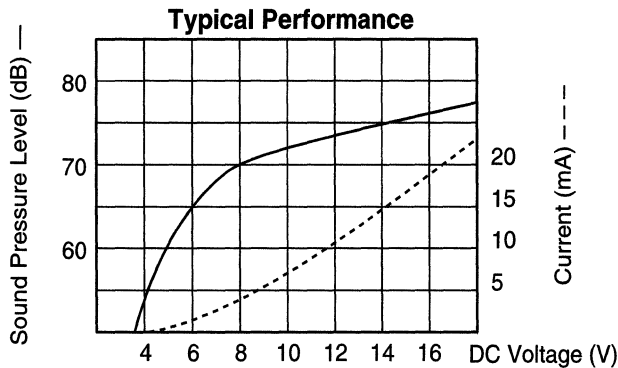
Outline drawing and dimensions - see figure 1.

Case Material: Nylon  
 Mounting method: Panel  
 Terminals: .032 brass, tin plated, tapped for #6-32 screw.  
 Two #6-32 nickel plated brass screws included. Will accept 1/4" quick disconnect (non-standard).

Control lead wire size: 24AWG, stranded, 6" long  
 Operating temperature: -30°C to +65°C

### Control Functions

The red and black leads control the several functions. A logic "Low" is a voltage less than 1/3 of supply voltage. A logic "High" is a voltage greater than 1/2 supply voltage. A red or black input lead left unconnected is considered an open state.



### Dimensions: (Case Style D2)

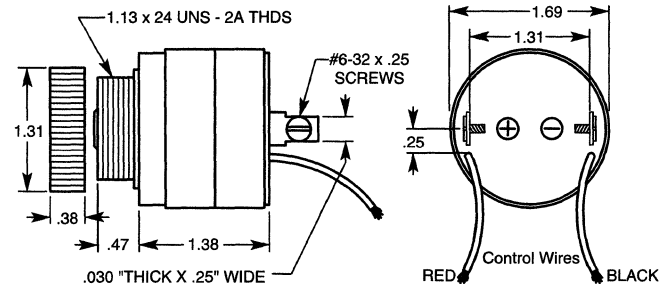


FIGURE 1

### Electrical

Catalog No.	Voltage		Typical Current mA		High Tone Frequency ±500	Low Tone Frequency ±500	Pulse Rate Per Second *	Min. Sound Pressure dB at Two Feet	
	Min.	Max.	At Min. V	At Max. V				At Min. V	At Max. V
SC616WY	6	16	2	18	3000	1750	.5 - 1.2	60	72
SC616WXY	6	16	2	18	3000	1750	.5 - 1.2	60	72

\* 50% Duty Cycle

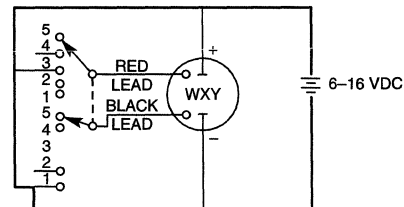
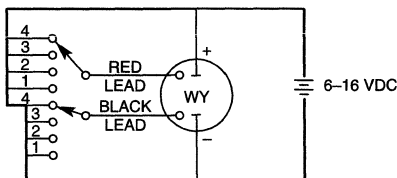
### Truth Table for SC616WY

Control Lead		Function Mode
Red	Black	
Low	Low	Off
High	Low	High Pulse
Low	High	Low Pulse
High	High	Warble

### Truth Table for SC616WXY

Control Lead		Function Mode
Red	Black	
High	Low	Off
Open	High	High Continuous
Open	Low	Low Continuous
High	Open	High Pulse
Low	Open	Low Pulse
Open	Open	Warble

### Schematics: Set to Warble





For applications requiring operation over extended temperature ranges, or in extreme environmental conditions, military models are recommended. These special units use MIL approved components if available. Exposed surface of the sound transducer is treated with a corrosion protective coating. Mounting nut is anodized aluminum. Terminals are tin plated brass with nickel plated 6-32 screws. All units are marked with Mallory name, part number, polarity and date code per MIL-STD-1285. Marking is permanently preserved by a layer of clear epoxy. Customer part number may be included on label if desired. A certificate of compliance to Mallory specifications will be supplied if requested.

Black plastic case and black anodized aluminum mounting nut is standard. To specify olive drab case and mounting nut, add G to part number. *Example:* SC628MG. To specify black case and clear anodized mounting nut, add C to part number. *Example:* SC628MC.

### Quality Specifications

#### Operating

100% measurement of sound output and frequency at +25°C. Data is supplied with parts. Operation of each part confirmed at -40°C and +85°C.

#### Environmental

MIL Std. 105D Level II single normal inspection .65 AQL

#### Life Specifications

500 hours continuous operation at 85°C and maximum rated voltage applied. 10,000 cycles one minute on, 5 minutes off at 25°C and maximum rated voltage applied.

#### Life Expectancy

10 years under normal operating conditions

#### Operating Temperature

-40°C to +85°C

#### Storage Temperature

-65°C to +85°C

#### Altitude Change

10,000 feet per minute maximum

### Environmental Specifications

Test	MIL-STD-202 Method	Test Condition
Thermal shock	107	A
Humidity	103	B
Salt spray	101	A
Shock	213	H
Vibration	201	None
Terminal strength	211	A (5 lbs.)

#### Notice

Because the operation of the Sonalert audible signal device is dependent upon the circuit in which it is used, it is advisable to thoroughly test the selected device in the specific circuit and application to assure mechanical and electrical compatibility and verify system performance.

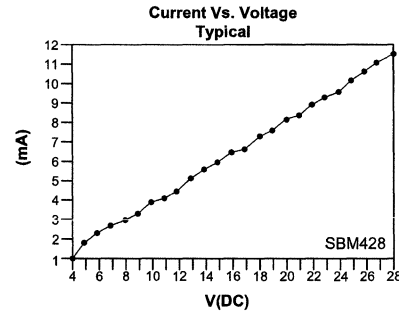
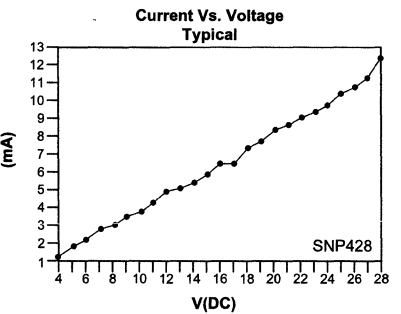
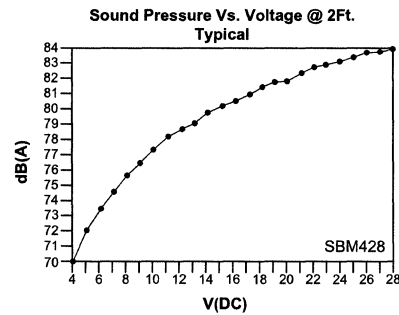
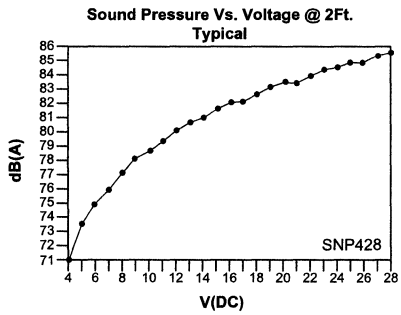
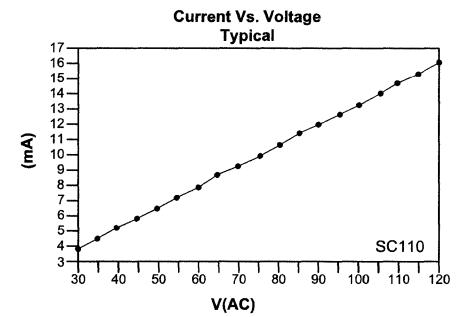
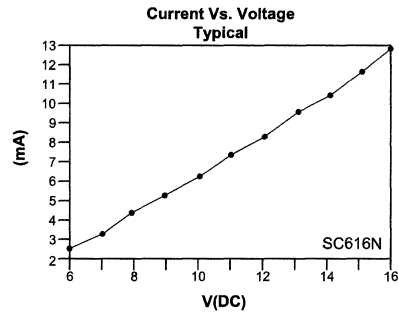
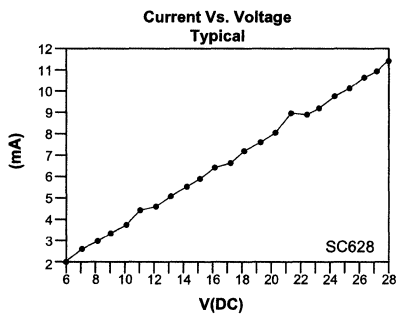
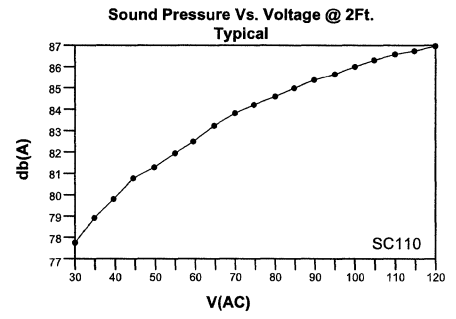
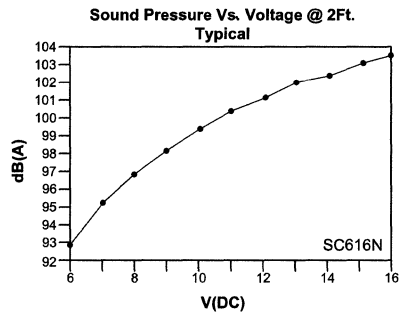
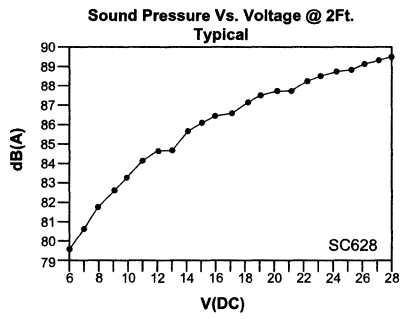
North American Capacitor Co. code identification - 37942

### Continuous Tones

Catalog Number	Loudness Category	Mounting Method	Case Style	Frequency ±500 Hz	Minimum Sound Pressure dB (A) at Two Feet		Operating Voltage *AC/DC Non-polar All Others DC Only		Typical Operating Current MA	
					At Min. V	At Max. V	**Min.	Max.	At Min. V	At Max. V
SC628MN	Loud	Panel	C	2900	80	90	6	28	4	16
SC628M	Medium	Panel	C	2900	68	80	6	28	3	14
SC628MD	Medium	Panel	C	1900	60	75	6	28	3	14
SC628MH	Medium	Panel	C	4500	68	80	6	28	3	14
SC648M	Medium	Panel	C	2900	68	80	10	48	3	14
SC648MD	Medium	Panel	C	1900	60	75	10	48	3	14
SC628MA	Medium	Panel	D	2900	68	80	*6	28	4	16
SC628MAH	Medium	Panel	D	4500	68	80	*6	28	4	16
SC648MA	Medium	Panel	D	2900	68	80	*10	48	4	16
SC648MAH	Medium	Panel	D	4500	68	80	*10	48	4	16
SC110M	Medium	Panel	D	2900	68	80	*30	120	4	16
SC110MH	Medium	Panel	D	4500	68	80	*30	120	4	16
SC250M	Medium	Panel	D	2900	68	80	*60	250	4	16
<b>Fast Pulse:</b> Turns on and off at 2 to 9 pulses per second depending upon voltage at 50% duty cycle.										
SC628MNP	Loud	Panel	D	2900	80	90	6	28	4	16
SC628MP	Medium	Panel	D	2900	68	80	6	28	3	14
SC628MHP	Medium	Panel	D	4500	68	80	6	28	3	14
<b>Fast Warble:</b> Produces two tones alternately when used with additional continuous unit.										
SC628MW	Medium	Panel	D-1	2900	68	80	6	28	3	16
<b>Continuous or Fast Pulse:</b> Dual mode operation.										
SC616MPU	Medium	Panel	D-1	2900	68	78	6	16	3	12

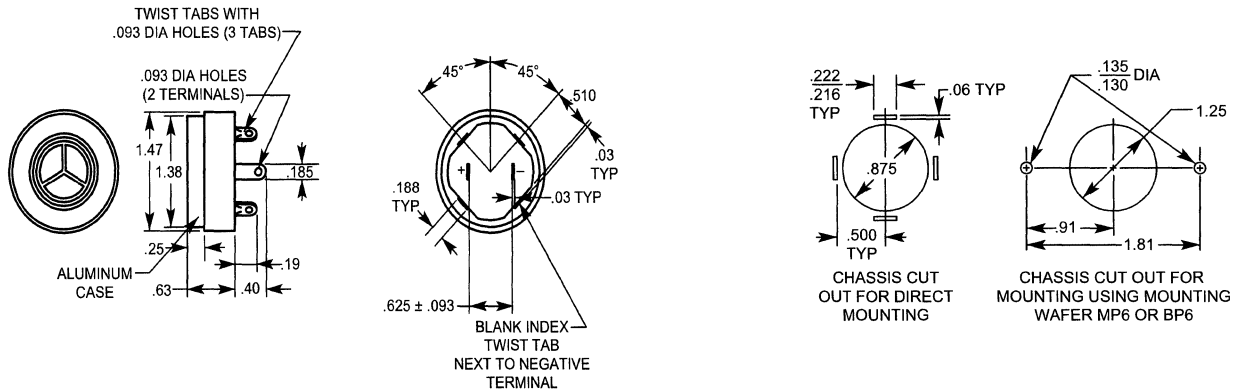
\*\*Minimum voltage specified does not represent sound turn-off point. Some units will sound at lower voltage.

# Typical Performance Curves Sonalert® Audible Signal Devices



SONALERT®

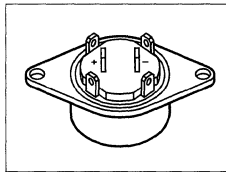
## Case Style A



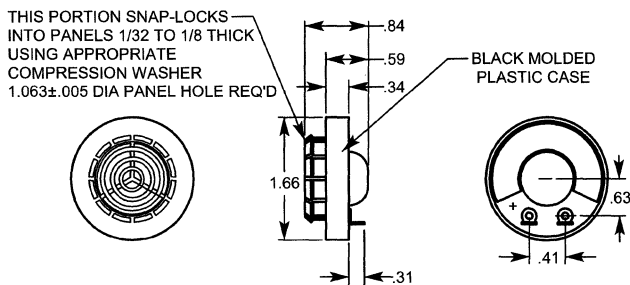
**Terminals** – .032 steel, tin plated with .093 dia. wire hole, will accept standard 3/16" quick disconnect.

**Mounting** – Four Twist Tabs per EIA std. RS395 are provided for mounting. Terminals are electrically isolated from case and Twist Tabs. Also may be mounted using mounting wafer number MP6 for uninsulated mounting or mounting wafer number BP6 to insulate case from chassis.

**Bakelite Mounting Wafer Catalog No. BP6**

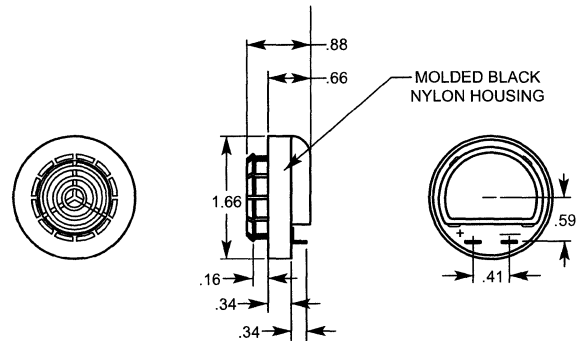


## Case Style B

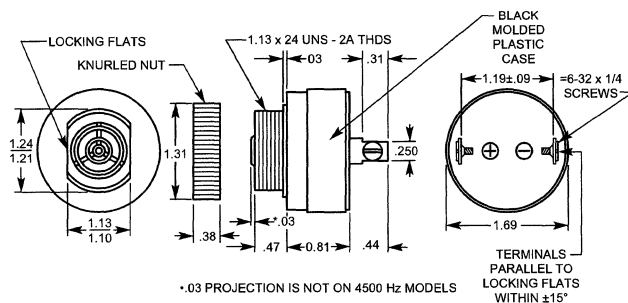


**Terminals** – .020 brass, hot tin finish with .065 wire hole. Terminal will accept standard 1/8" quick disconnect.

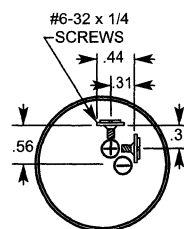
## Case Style B - 1



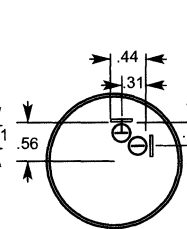
## Case Style C



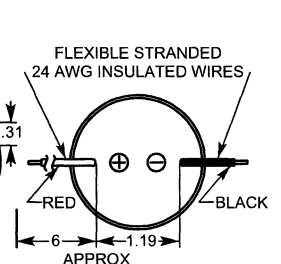
## Case Style C-1



## C-2



## C-3

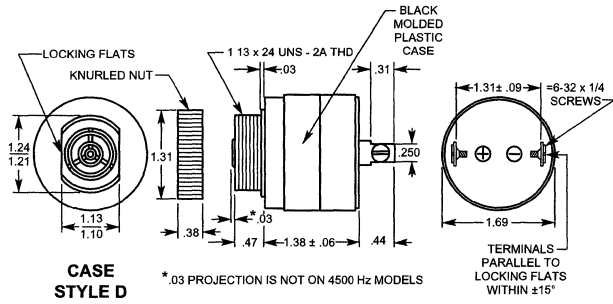


C 11: Same as C-2 except terminal height is .56".

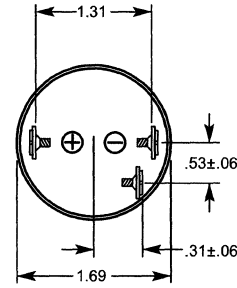
# Case Styles Sonalert® Audible Signal Devices

**MALLORY**

## Case Style D



## Case Style D-1 and C-7



**Terminals** – .032 brass, tin plated, tapped for #6-32 screw. Two #6-32 nickel plated brass screws included. Will accept 1/4" quick disconnect with 3/16" opening.

**Mounting** – Remove black plastic nut and insert threaded front through 1.25" hole. If orientation is needed, note locking flats on drawing. Screw nut back on. Do not overtighten.

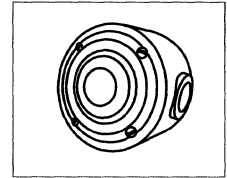
**Optional Mounting Nuts** – To substitute natural finished aluminum nut, add C to catalog number. To substitute anodized black aluminum nut, add B to catalog number.  
*Example: SC628B.*

## Case Style E

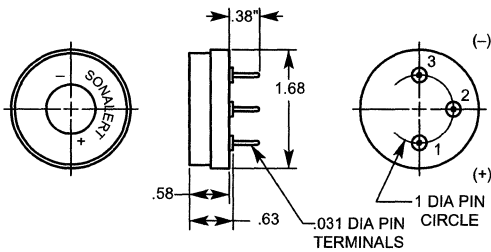
Outline dimensions are the same as case style D except length is changed to  $1 - 15/16 \pm 3/32$  (1.94" ± .094").

## Electrical Mounting Box – Catalog Number SCMB

Used to mount Sonalert® signal case styles C and D on standard 3/4" electrical conduit. 3 - 1/2" diameter, 2" deep ABS plastic.



## Case Style F



**Terminals** – .031 dia. soldercoated copperclad steel

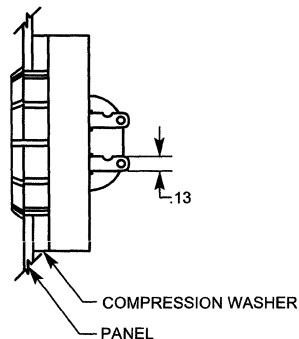
**Mounting** – Insert into printed circuit board and hand or machine solder. For recommended fluxing, soldering, and cleaning procedures, send for Mallory Audio Signal Engineering Bulletin 778.

**Electrical Connections** – SBM2, SBM428, SBM616P, SBM616J – When pin 1 is connected to + voltage and pin 3 is connected to common (-), unit will sound. Pin 2 is for mechanical support only and is not connected internally.

SBM616PU, SBM616JU – When pin 1 is connected to + voltage, and pin 3 is connected to common (-), and the voltage on pin 2 is within 1.25V of pin 1 or higher, the unit will sound a pulsing tone. When the voltage on pin 2 is within .9V of pin 3 or lower, the unit will sound a continuous tone. The maximum voltage which may be applied to pin 2 before damage may occur is ± 16V referenced to pin 3. Pin 2 input impedance is 110K ohm.

## Typical Panel Installation Case Style B

**Mounting** – Panel hole 1.063 ± .005 diameter should be punched from the back side so that locking fingers enter on the slightly rounded edge of the hole. Assemble proper compression washer and press into panel hole until locking fingers snap over hole edge. Installation pressure should be applied only at the circumference of the device.



## Compression Washer

Catalog No.	Thickness	Panel Thickness
PW1	.063	11-12 GA (.125-.109)
PW2	.125	13-17 GA (.093-.056)
PW3	.187	18-22 GA (.050-.031)

Material: Black ester foam    Compression 5:1  
Size: 1.06" I.D. x 1.50" O.D. (Ref.)

Mallory Sonalerts are covered by one or more of the following U.S. Patent Numbers: – 3,815,219 - 3,879,726 - 4,104,628 - 4,213,121 - 4,225,856 - 4,626,799 - 3,922,672.

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## Commercial and Industrial Models

### Surge Voltage

15% over maximum rated voltage applied for less than one minute.

### Reverse Voltage – DC Models

Maximum reverse polarity equal to rated voltage for one minute. Some models may sound softly when subjected to reversed polarity voltage.

### Life Specification

Continuous – 250 hours continuous operation at 65°C with maximum rated voltage applied.

Intermittent – A duty cycle of 1 minute on, 5 minutes off, a minimum of 10,000 times at room temperature and maximum rated voltage applied.

### Life Expectancy

7 years under normal operating conditions

### Storage Temperature

-40°C to +85°C

### Operating Temperature

-30°C to +65°C

### Humidity

The Sonalert® signal should operate after having been subjected to 95% Relative Humidity at +40°C continuously for 100 hours. After removal from test, the unit should be allowed to dry a minimum of 4 hours at room temperature before operation. Units should deliver original output characteristics.

### Vibration

The Sonalert signal should be mounted in the standard manner on a mounting panel. The specimens should be subjected to a harmonic motion having an amplitude of 0.03 inch (0.06 inch maximum total excursion). The frequency should be varied uniformly between a limit of 10 and 55 Hertz. The entire frequency range from 10 to 55 Hertz and return to 10 Hertz should be traversed in approximately one minute. Motion should be applied for two hours in each of 3 mutually perpendicular planes (total 6 hours). This test should be conducted while the Sonalert signal is not operating. After completion of test, Sonalert signals should meet specifications.

### Salt Spray

The Sonalert signal should meet specified operating conditions after completing 96 hours in an atomized salt spray while not operating. The spray should consist of a 5% salt solution atomized by a forced air supply. The solution should be sprayed through a nozzle into a chamber maintained at 35°C. After salt spray, the unit should be removed and washed in running water not warmer than 40°C. A soft hairbrush or plastic bristle brush should be used, lightly brushing to remove salt deposits from the unit. The cleaned Sonalert signals should be placed on absorbent material with the nose pointed downward and allowed to dry at room temperature for 24 hours prior to use.

### Terminal Strength

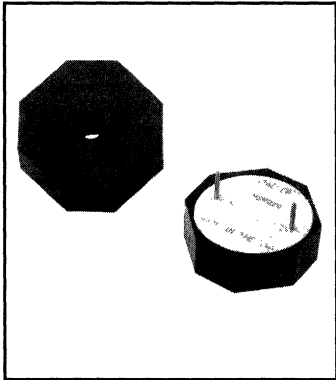
5 pounds, applied axially for a period of 5 minutes. This is considered a destructive test.

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## Custom Designed Sonalerts®

Even though there are many standard Sonalert models listed in this bulletin, we encourage you to contact Mallory regarding other audio signaling devices for your OEM custom applications. These can involve the modification of existing models, a completely new design or an entire system to provide multi-signals for various functions.

Our engineering staff has over 20 years experience in the design of audible signaling products for commercial, military, industrial, and automotive applications. We have an excellent, well equipped laboratory for the measurement of electrical and acoustical characteristics and can assist you in establishing audible signal specifications.



- Made in USA
- Low Power Consumption
- Low Cost
- Low Profile and Compact
- Piezo Tone Quality
- Wave Solderable

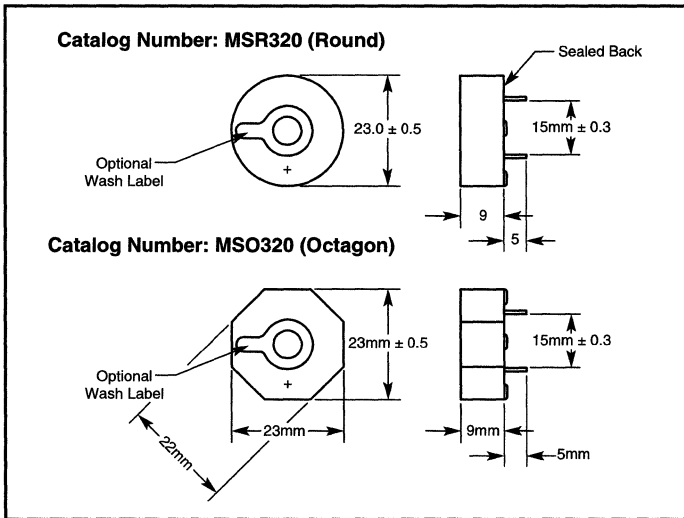
## GENERAL SPECIFICATIONS

Resonant Frequency:  
3.4 ± .5 KHz  
Min. Sound Pressure (dB/2 Ft.)  
75 @ 12 V  
Rated Voltage:  
3-20 VDC to +65°C  
Max. Current:  
3-16 mA @ 3-20 VDC  
Operating Temperature:  
-20°C to +65°C  
Storage Temperature:  
-30°C to +80°C  
Solder Temperature:  
270°C for 3 seconds  
Case Material (Black):  
VALOX (UL-94V0)  
Weight (Typical):  
3 grams

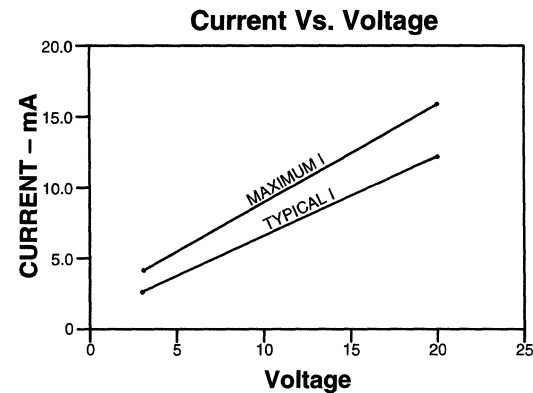
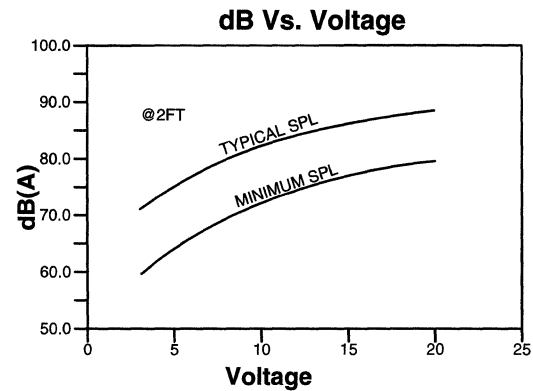
## APPLICATIONS

- Fire Alarm
- Crime Prevention Alarm
- Call Buzzer
- Automotive
- Clocks
- Cash Registers & P.O.S. Equipment
- Medical Instruments
- Electrical Instruments

## Shape and Dimensions (mm)



## Characteristics



## Replacements for MCP320B2 and MCP320

A piezoelectric audible signal with a built-in oscillator circuit. The MSR320 and MSO320 are suitable for wave soldering when ordered with the sound emission hole covered.

## Notice

Because the operation of the Sonalert II audible signal device is dependent upon the circuit in which it is used, it is advisable to thoroughly test the selected device in the specific circuit and application to assure mechanical and electrical compatibility and verify system performance.

# Type MCP320 Minilert Audible Signal Devices



- Low Power Consumption
- Low Cost
- Piezoelectric Tone Quality
- Wave Solderable
- Compact

## GENERAL SPECIFICATIONS

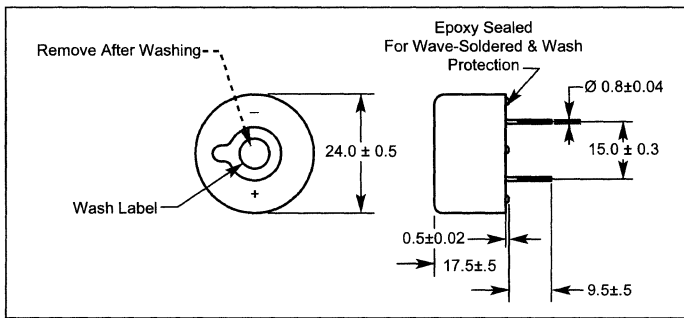
Resonant Frequency:  
3.15 ± 0.5 KHz  
Min. Sound Pressure (dB/2 Ft.):  
55 dB @ 3 VDC, 74 dB @  
20 VDC

Rated Voltage to 70°C:  
3-20 VDC  
Max. Current:  
3 mA @ 3 VDC & 20 mA @  
20 VDC  
Operating Temperature:  
-20°C to +70°C  
Storage Temperature:  
-30°C to +80°C  
Solder Temperature:  
270°C for 3 seconds  
Case Material (Black):  
ABS UL-94VO  
Weight (Typical):  
4.3 grams

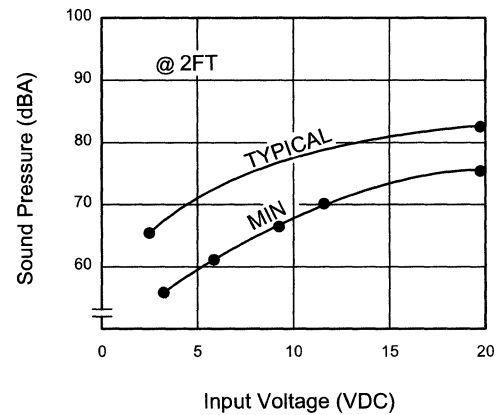
## APPLICATIONS

- Fire Alarms
- Crime Prevention Alarms
- Call Buzzers
- Automotive
- Clocks
- Cash Registers & Point of Sale Equipment
- Medical Instruments
- Electrical Instruments

## Shape and Dimensions (mm)

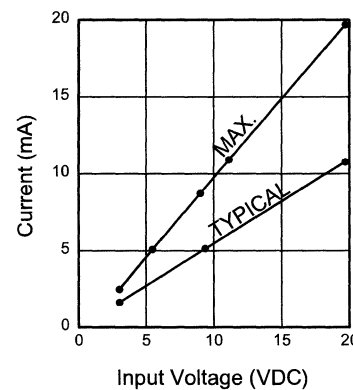


## Characteristics



## Replacement for MCP320B2

A piezoelectric audible signal with a built-in oscillator circuit. The MCP320 is suitable for wave soldering when ordered with the sound emission hole covered.

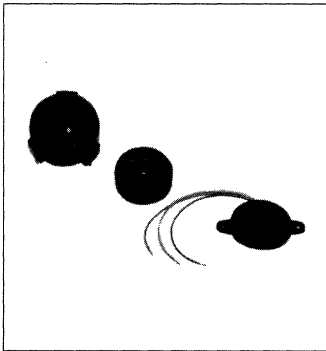


## Notice

Because the operation of the Minilert audible signal device is dependent upon the circuit in which it is used, it is advisable to thoroughly test the selected device in the specific circuit and application to assure mechanical and electrical compatibility and verify system performance.

SONALERT®

# Type EFB Piezoelectric Transducer Units



- Low Cost
- Small Size
- High Reliability
- Low Power Input
- Easy Assembly

## ENVIRONMENTAL SPECIFICATIONS

Storage Temperature:  
-25°C to +70°C

Operating Temperature:  
-20°C to +60°C

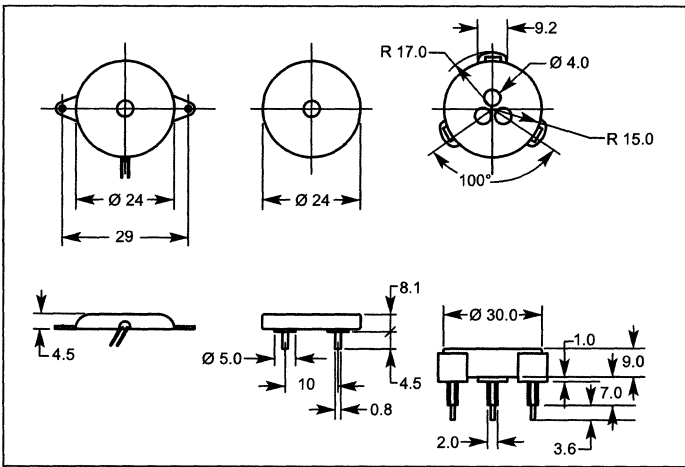
Terminal Strength:  
1Kg 10 seconds

## APPLICATIONS

- Alarm Clocks
- Business Machines
- Calculators
- Medical Equipment
- Cameras
- Refrigerators
- Microwave Ovens

## Shape and Dimensions

EFB-RC24C41    EFB-RD24C41    EFB-RL37C20



## Characteristics

### External Drive (without feedback)

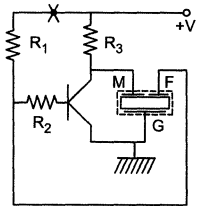
Catalog Number	Input Voltage Max.	Sound Output 2.5 KHz & 10 cm	Capacitance pF ± 30%
EFB-RC24C41	30 V	Min 70 dB @ 5 V p-p	12,000
EFB-RD24C41	30 V	Min 70 dB @ 5 V p-p	12,000

### Self Drive (with feedback)

Catalog Number	Input Voltage Max.	Sound Output 12 VDC & 10 cm	Resonance Freq. KHz
EFB-RL37C20	30 V	100 dB	3.7 ± 0.5

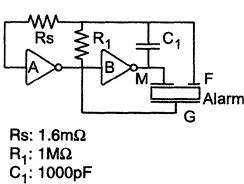
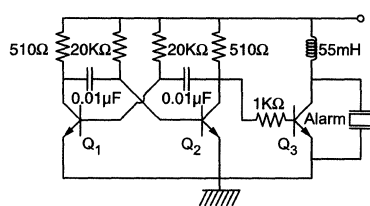
## Typical Drive Circuits

### With Feedback

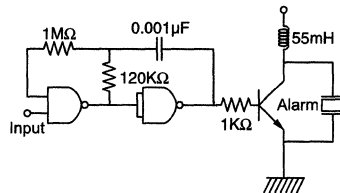


R<sub>1</sub>: 200KΩ  
R<sub>2</sub>: 10KΩ  
R<sub>3</sub>: 510Ω

### Without Feedback

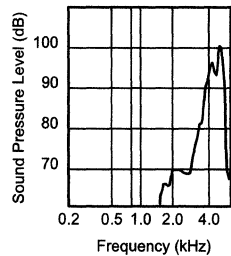


Rs: 1.6mΩ  
R<sub>1</sub>: 1MΩ  
C<sub>1</sub>: 1000pF

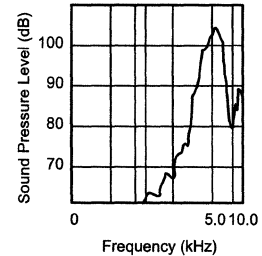


## Frequency Characteristics

### EFB-RC24C41



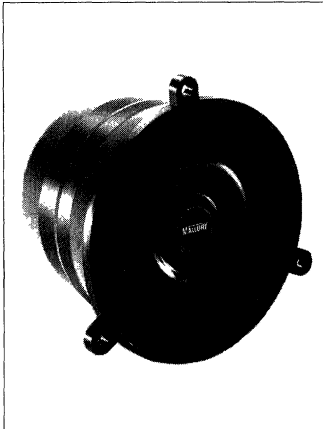
### EFB-RD24C41



The Piezoelectric Transducer Unit consists of a piezoelectric ceramic element in a housing that provides acoustic enhancement and a convenient mounting vehicle. Models are provided for direct mounting on a chassis or soldering onto a P.C. board. When activated with a typical drive circuit, the unit will produce a clear, audible tone requiring very low electronic power input for the acoustic output.



# Type SC194 Loud Audible Alarm



- High Efficiency
- High Intensity: 125 dB (20 dB greater than UL requirements for smoke detectors and intrusion alarms).
- Patented Transducer and Horn Design
- Low Cost
- Light Weight
- Complete with Driving Electronics
- Low Power Drain
- UL 464 Listed for Indoor Use
- UL Recognized for Outdoor Use

## GENERAL SPECIFICATIONS

Voltage:  
5 to 12 VDC  
125 dB (12 VDC Supply)  
120 dB (9-volt battery)

Current:  
120 mA maximum at 9 VDC

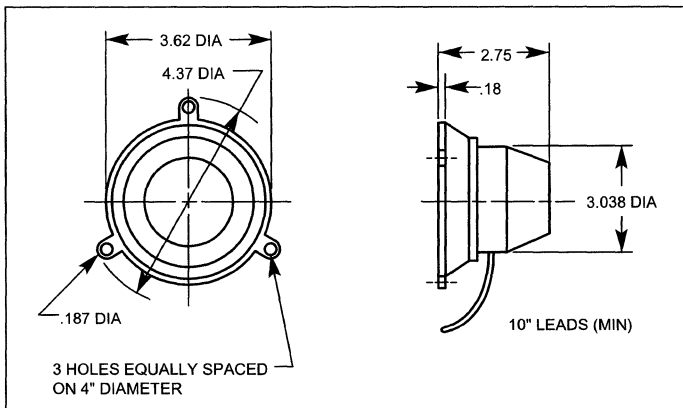
Operating Temperature:  
0°C to +70°C

Humidity:  
0 to 90% Non-Condensing

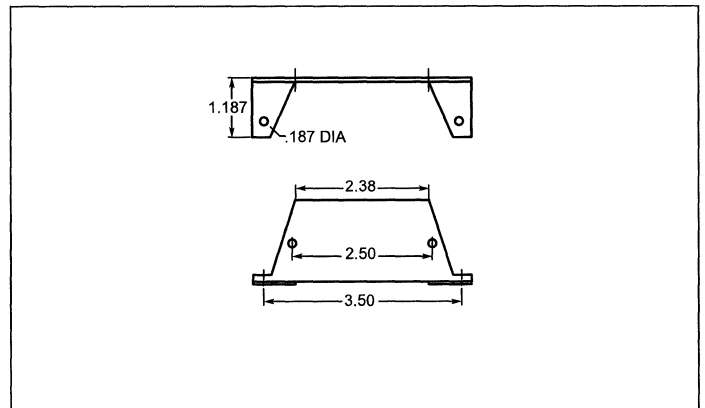
## APPLICATIONS

- Burglar Alarms
- Warning Devices
- Smoke Detectors
- Alarm Signal Repeaters
- General Purpose Noisemakers
- Megaphones (electronic)
- Vehicle Alarms & Signals
- Signal or Security Systems

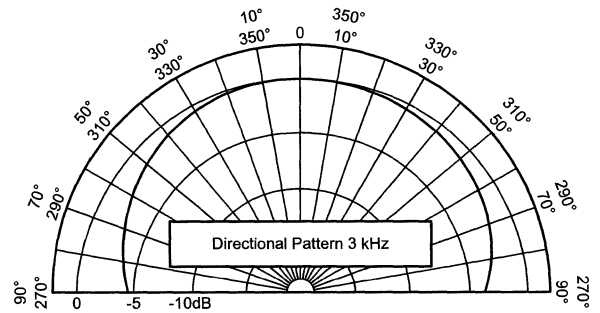
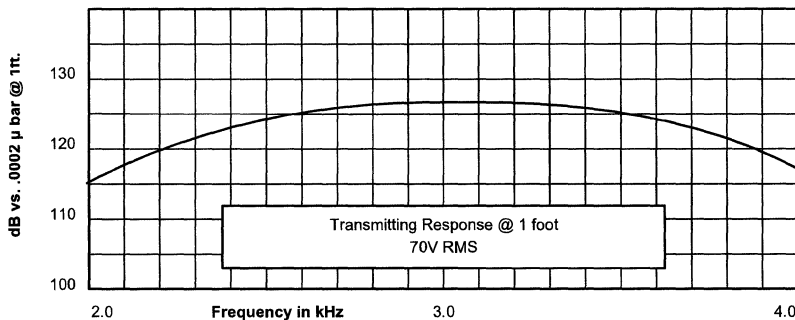
## Dimensions (inches)



## Mounting Bracket (Optional) Catalog Number: 200188-501



## Performance Characteristics



The model SC194 is a high-intensity, low cost alarm comprising an audio transducer and horn assembly plus all the driving electronics contained in a small attractive package. The small, light-weight unit is designed for O.E.M.'s or other users who have need for a self-contained, high-intensity alarm which can be operated from a 9 V battery. The SC194 delivers a sound level of 120 dB at one foot over the frequency range of 2 1/2 to 3 1/2 KHz when connected to a 9-volt battery with a current drain of less than 120 mA. This acoustic power output is 15 dB greater than present UL specification requirements for smoke alarms and intrusion alarms.

**Caution**  
SC194 Audible Alarm emits a high-intensity sound which can be harmful to hearing if exposed to the alarm at close range over prolonged periods of time.

SONALERT®

## Loudness

The loudness of sound heard from a Sonalert signal depends upon, among other things, the hearing sensitivity of the listener, the frequency of the sound, the distance to the listener, the density and humidity of the air, the design of the Sonalert signal and the voltage applied. Technically, loudness as perceived by the human ear, is measured in sones and this unit may be used to judge the relative loudness between sounds. For example, a sound with a loudness of 4 sones will sound about 4 times louder than a sound of 1 sone. Because loudness at the listener's location is dependent upon the environment, it is not specified for Sonalert signals.

## Sound Pressure

Sonalert signals generate air pressure waves which travel through the air to the listener's ear where they produce a sensation of sound. The amount of pressure produced depends upon the loudness and the frequency ratings of the Sonalert signal. Sonalert signal frequencies have been selected for maximum loudness with minimum amount of sound pressure.

Measurements of sound air pressure are expressed as a ratio compared to a pressure of .0002 dynes per square centimeter. This is the smallest sound pressure heard by the average person. The largest pressure that can be heard before pain is felt is about 3 million times higher. For measurement convenience, this wide pressure range is converted to a logarithmic ratio and expressed decibels (dB) according to the formula:

$$dB = 20 \text{ Log } \frac{\text{measured pressure}}{.0002 \text{ dynes/cm}^2}$$

The threshold of hearing has a ratio of 1:1, or a dB of 0. The threshold of pain has a ratio of 3 million:1, or a dB of 130.

## Sound Pressure Change with Distance

When the sound pressure leaves the Sonalert signal, it radiates in all directions and is about 2 or 3 dB greater in the direction the open grill is facing. As the sound pressure travels towards the listener, it covers a greater area with a corresponding reduction in pressure at any one point until it is below the threshold of hearing.

For distances shorter than 50 meters, sound pressure drops 6 dB each time the distance traveled is doubled. Variations as much as ±8 dB may occur inside a room or around large objects such as buildings due to echo cancellation and reinforcement effects.

For distances longer than 2KM, air friction reduces sound air pressure about 10 dB/KM @ 1500 Hz, and 20 dB/KM @ 3000 Hz. Of course, the reduction in sound pressure between stationary points also depends upon wind direction and turbulence.

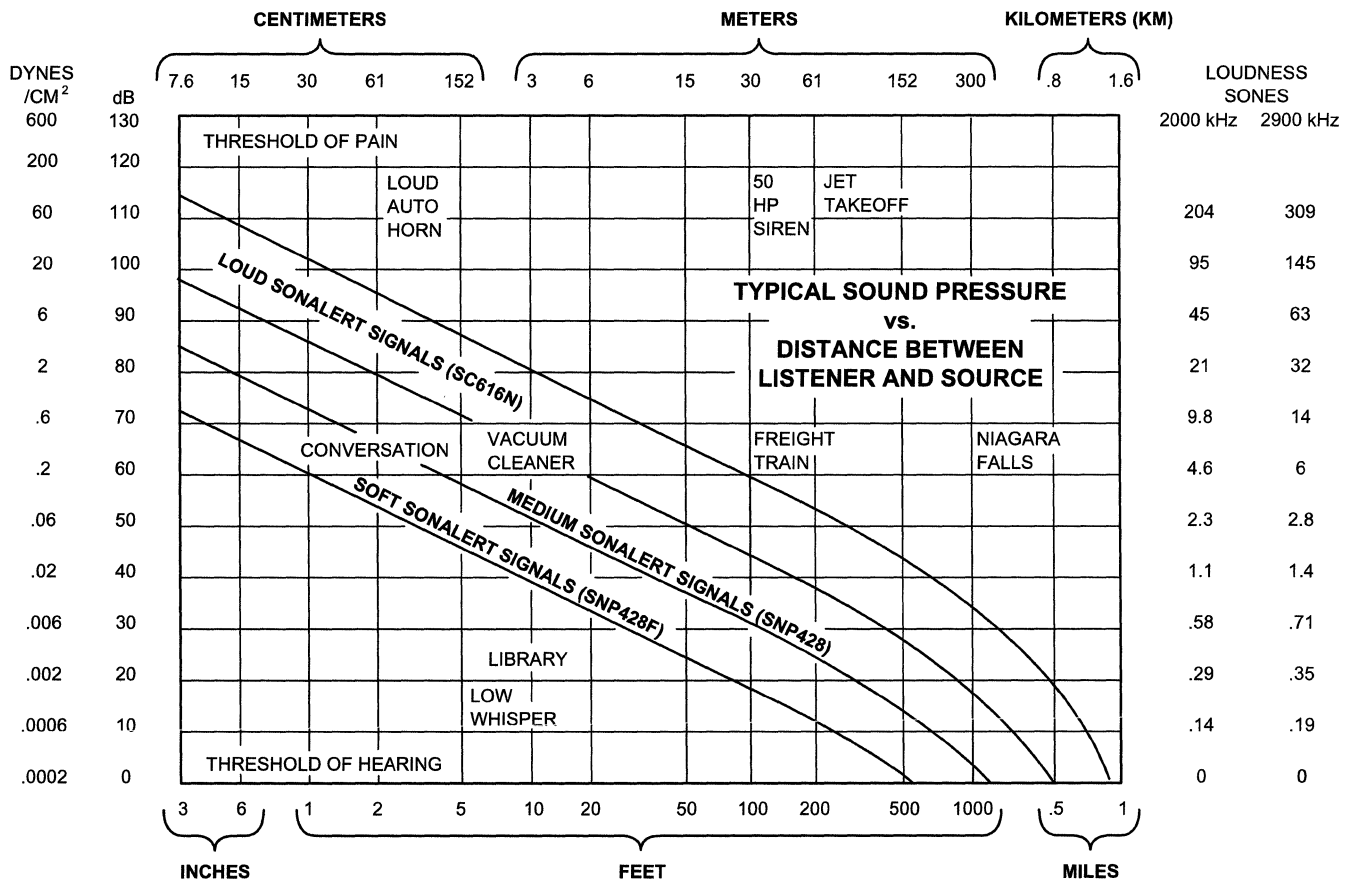
Perhaps the loudest known sound was caused by the eruption of Mt. Krakatua in 1883 which was estimated at 170 dB at 3 miles.

## Sound Pressure Specifications

Since sound pressure decreases as it travels from the Sonalert® signal, standard measurements must be made at a standard distance. Mallory standard measurements are made at a distance of 2 feet in an anechoic chamber; or 10 feet above the ground in an open area with no wind. Sound pressure specifications for all Sonalert signal models are shown on pages 162 - 164.

## Frequency

Each Sonalert signal model has its own frequency (tone) which cannot be changed. Models are available to provide frequencies from 1900 to 4500 Hz. For equal sound pressure, 1900 Hz Sonalert signals sound softer and more pleasant than 2900 Hz and 4500 Hz Sonalert signals.



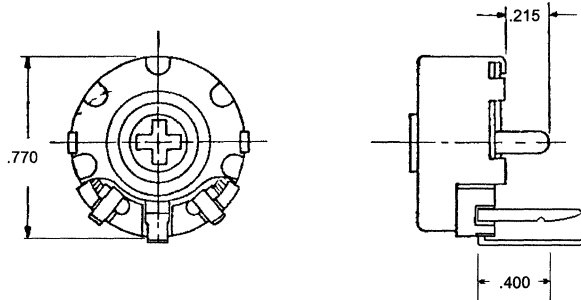
SONALERT®

Type	Description	Features	Page Number
<b>Wirewound Controls</b>			
<b>MR</b>	3 Watt Multiple Mounting	Wirewound - Linear Taper	176
<b>M LW MG R</b>	3 to 12.5 Watt	Wirewound Miniature / Bushing Mount	177
<b>VW VWS</b>	5 Watt - Rugged Construction	Wirewound Subminiature - Linear Taper	177
<b>Wirewound Audio Attenuators</b>			
<b>L-Pad</b>	15 Watt — Mono	Wirewound -2 section.	179
<b>T-Pad</b>			179
<b>RT-Pad</b>	15 Watt — Mono	Wirewound - 3 section.	180
<b>MGL-Pad</b>			179
<b>MGLL-Pad</b>	10Watt — Mono	Wirewound - 3 section.	180
<b>RR-Pad</b>			180
<b>Carbon Trimmers</b>			
<b>MTC</b>	15 mm Diameter	Vertical and horizontal mounting.	181
<b>PT10</b>			182
<b>Rotary Switch</b>			
<b>3000 Series</b>	Multiple Poles and Positions	General purpose — Bushing mount.	183
<b>Hardware</b>			
<b>Switch &amp; Control</b>	Knobs, Dial Plates Brackets, Shafts, Nuts & Washers	Wide variety	185

# Type MR - 3 Watt Wirewound Controls

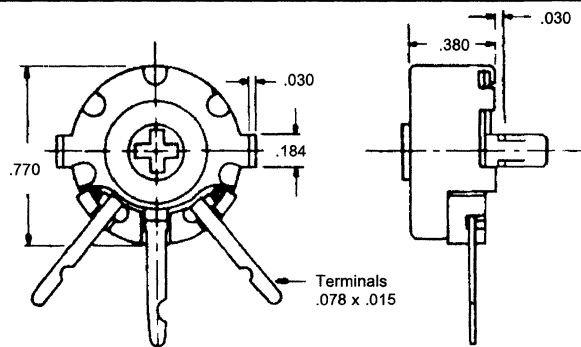
**MALLOY**

Power Rating: 3 Watts @ 55°C  
Derate linearly to 0 @ 105°C.  
Ohms Tolerance: ±20% (Standard)  
(Other tolerances available.)  
Dielectric Strength: Mounting plate to terminals,  
high pot test for 1 minute  
@ 900 VAC.  
Stop Strength: 12 inch pounds (Minimum)  
Operating Torque: 1/2 - 10 inch ounces  
Resistance Taper: Linear only.  
Mechanical Rotation: 240  
Electrical Rotation: 215  
Contact Arm: Insulated from case.



## PC Mount - No Snap

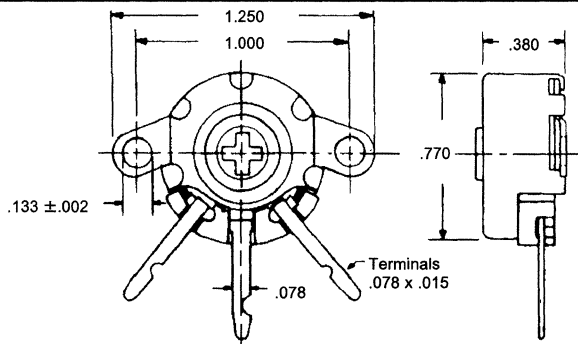
Ohms Rating	Max. Amperes	Catalog Number
15	.450	MR15P
100	.170	MR100P
600	.071	MR600P
1000	.055	MR1000P
1500	.045	MR1500P
3000	.032	MR3000P
5000	.024	MR5000P



## Tab Mount

Ohms Rating	Max. Amperes	Catalog Number
50	.240	MR50T
10,000	.017	MR10KT

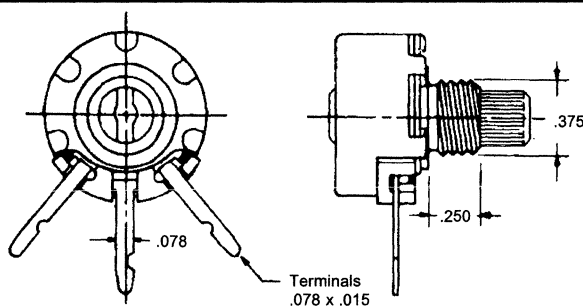
.154 Twist Tab, .246 Long  
Center-to-center mounting dimension: - .925



## Flange Mount

Ohms Rating	Max. Amperes	Catalog Number
100	.170	MR100F
500	.077	MR500F
1,000	.055	MR1000F

Mounting ear holes - .130 Dia. on 1" centers.



## Bushing Mount

Ohms Rating	Max. Amperes	Catalog Number
100	.170	MR100B

Bushing 3/8-32 x 1/4"

# Bushing Mount Wirewound Controls

**MALLOY**

## 3 Watt - R Series

Power Rating: 3 Watts @ 40°C  
Derated linearly to 0°C @ 105°C.

Ohms Tolerance: ± 10% (Standard)  
(Other tolerances available.)

Dielectric Strength: Mounting plate to terminals,  
high pot test for 1 minute  
@ 900 VAC.

Insulation Resistance: 1000 megohms minimum.  
(50% relative humidity @ 25°C.)

Operating Temperature: -30°C to +105°C.

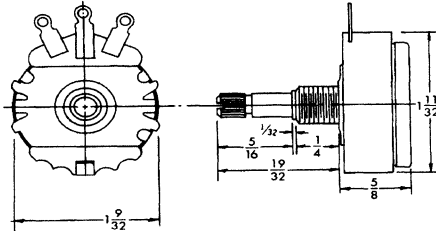
Operating Life: 10,000 cycles standard.

Resistance Taper: Linear.  
(Other tapers available.)

Mechanical Rotation: 297° ± 5°.

Bushing Information: Thread: 3/8-32 NEF-2A.

Contact Arm: Insulated from case.



Ohms Rating	Max. Amperes	Catalog Number
500	.077	R500L
1K	.055	R1000L
2.5K	.035	R2500L

## 4 Watt - M Series

Power Rating: 4 Watts @ 40°C

Ohms Tolerance: ± 10% (Standard)  
(Other tolerances available.)

Dielectric Strength: Mounting plate to terminals,  
high pot test for 1 minute  
@ 900 VAC.

Insulation Resistance: 1000 megohms minimum.  
(50% relative humidity @ 25°C.)

Operating Temperature: -55°C to +105°C.

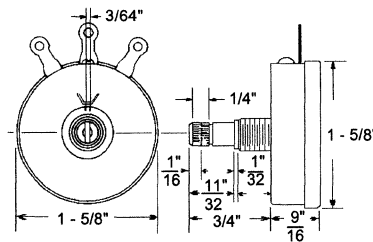
Operating Life: 10,000 cycles standard.

Resistance Taper: Linear.  
(Other tapers available.)

Mechanical Rotation: 294° ± 5°.

Bushing Information: Thread: 3/8-32 NEF-2A.

Contact Arm: Insulated from case.



Ohms Rating	Max. Amperes	Catalog Number
25	.400	M25PK
50	.280	M50PK
100	.200	M100PK
200	.140	M200PK
300	.116	M300PK
500	.090	M500PK
1K	.063	M10PK
2K	.045	M20PK
5K	.028	M50PK
10K	.020	M100PK
20K	.014	M200PK
25K	.013	M250PK
50K	.009	M500PK
100K	.0062	M1000PK

## 5 Watt - VW Series

Power Rating: 5 Watts @ 35°C

Ohms Tolerance: ± 10% (Standard)  
(Other tolerances available.)

Dielectric Strength: Mounting plate to terminals,  
high pot test for 1 minute  
@ 900 VAC.

Insulation Resistance: 1000 megohms minimum.  
(50% relative humidity @ 25°C.)

Operating Temperature: -30°C to +105°C.

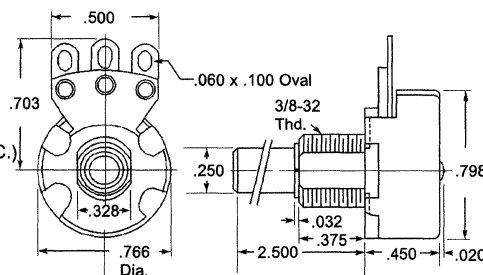
Operating Life: 10,000 cycles standard.

Resistance Taper: Linear  
(Others available)

Mechanical Rotation: 305° ± 5°.

Bushing Information: Thread: 3/8-32 NEF-2A.

Contact Arm: Insulated from case.

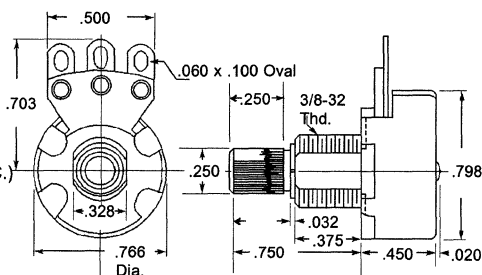


Ohms Rating	Max. Amperes	Catalog Number
1	2.2	VW1
2	1.6	VW2
5	1.0	VW5
10	.710	VW10
15	.580	VW15
20	.500	VW20
25	.450	VW25
50	.320	VW50
100	.220	VW100
200	.160	VW200
250	.140	VW250
300	.130	VW300
500	.100	VW500
1000	.071	VW1K
2000	.050	VW2K
2500	.045	VW2P5K
3000	.041	VW3K
4000	.035	VW4K
5000	.032	VW5K
10,000	.022	VW10K
20,000	.016	VW20K
25,000	.014	VW25K

Controls & Switches

## 5 Watt - VWS Series

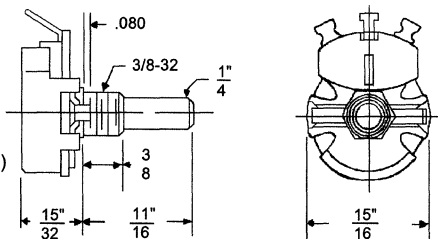
Power Rating: 5 Watts @ 35°C  
 Ohms Tolerance: ± 10% (Standard)  
 (Other tolerances available.)  
 Dielectric Strength: Mounting plate to terminals,  
 high pot test for 1 minute  
 @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum.  
 (50% relative humidity @ 25°C.)  
 Operating Temperature: -30°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Resistance Taper: Linear  
 (Others available)  
 Mechanical Rotation: 305° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case.



Ohms Rating	Max. Amperes	Catalog Number
1	2.2	VWS1
50	.320	VWS50
100	.220	VWS100
200	.160	VWS200
1000	.071	VWS1K
5000	.032	VWS5K

## 5 Watts - LW Series

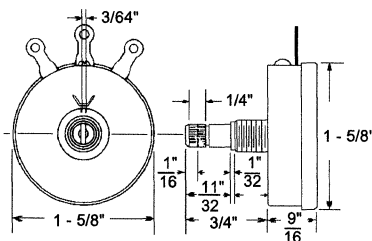
Power Rating: 5 Watts @ 25°C  
 4 Watts @ 55°C  
 Ohms Tolerance: ± 10% (Standard)  
 (Other tolerances available.)  
 Dielectric Strength: Mounting plate to terminals,  
 high pot test for 1 minute  
 @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum.  
 (50% relative humidity @ 25°C.)  
 Operating Temperature: -30°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Resistance Taper: Linear only.  
 Mechanical Rotation: 300° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case.



Ohms Rating	Max. Amperes	Catalog Number
5	.890	LW5
8	.710	LW8
10	.630	LW10
50	.280	LW50
100	.200	LW100
250	.130	LW250
500	.089	LW500
1K	.063	LW1K
2.5K	.040	LW2.5K
5K	.028	LW5K
10K	.020	LW10K

## 12.5 Watts - MG Series

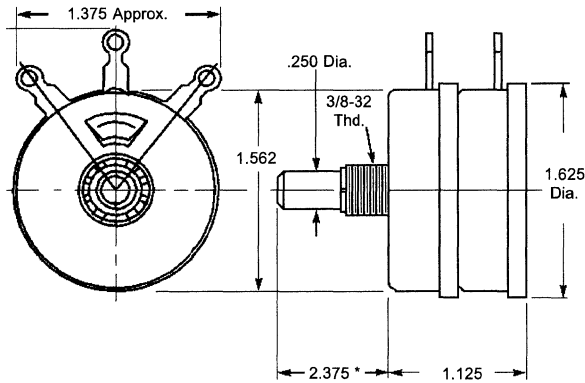
Power Rating: 12.5 Watts @ 40°C  
 Derated linearly to 0°C @ 250°C.  
 Ohms Tolerance: ± 10% (Standard)  
 (Other tolerances available.)  
 Dielectric Strength: Mounting plate to terminals,  
 high pot test for 1 minute  
 @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum.  
 (50% relative humidity @ 25°C.)  
 Operating Temperature: -55°C to +250°C.  
 Operating Life: 10,000 cycles standard.  
 Resistance Taper: Linear.  
 (Other tapers available.)  
 Mechanical Rotation: 294° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case.



Ohms Rating	Max. Amperes	Catalog Number
10	1.100	MG10
25	.710	MG25
50	.550	MG50
500	.160	MG500
1K	.110	MG1000
2.5K	.070	MG2500

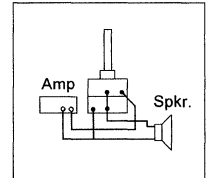
## L Pad Attenuator

Power Rating: 4 Watts  
 Continuous Audio: 15 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -55°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 294° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug



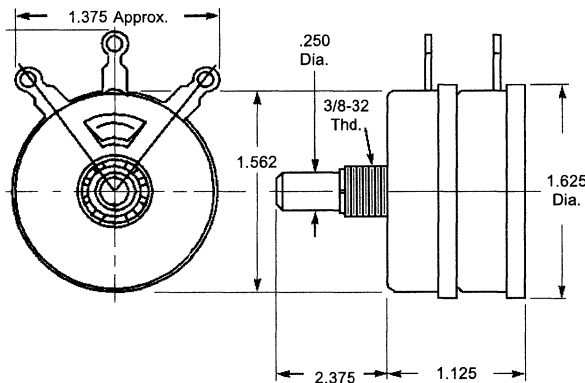
\* Shaft length on L8A is 1.500

Ohms Rating	Catalog Number
4	L4
8	L8
8	L8A *
15	L15
50	L50
600	L600
2000	L2000

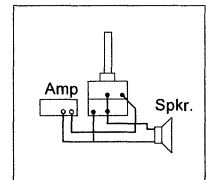


## MGL Pad Attenuator

Power Rating: 12.5Watts  
 Continuous Audio: 50 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -55°C to +250°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 294° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug

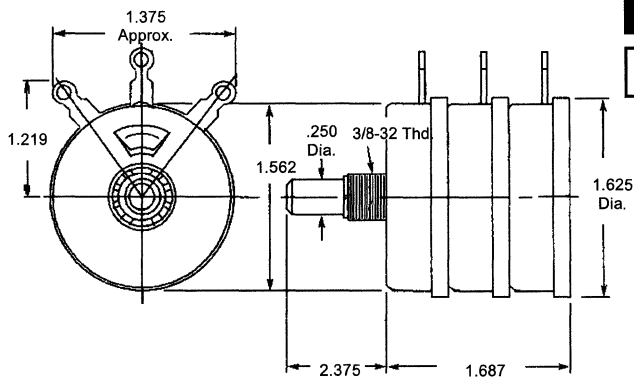


Ohms Rating	Catalog Number
8	MGL8
16	MGL16

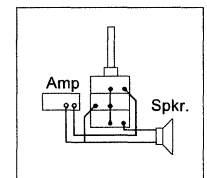


## T Pad Attenuator

Power Rating: 4Watts  
 Continuous Audio: 15 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -55°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 294° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug



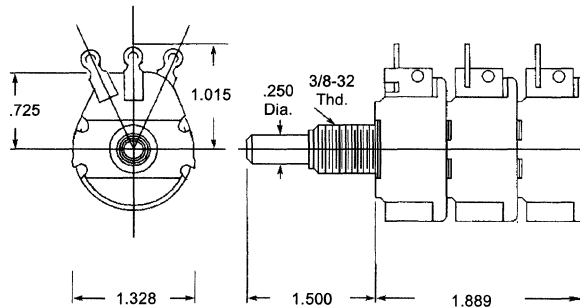
Ohms Rating	Catalog Number
8	T8
600	T600



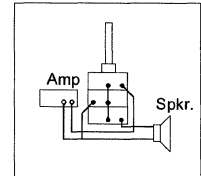
All Audio Attenuators are supplied with palnut and dial plate.  
 Dial Plate 395 for Mono and Dial Plate 495 for Stereo.

## RT Pad Attenuator

Power Rating: 3 Watts  
 Continuous Audio: 10 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -30°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 300° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug

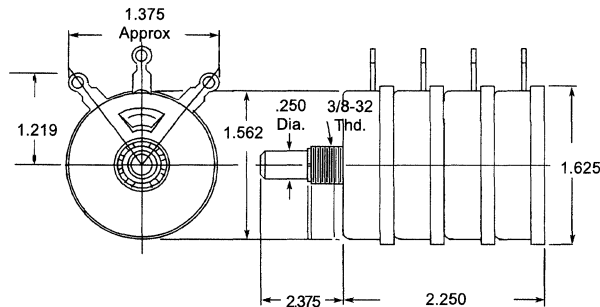


Ohms Rating	Catalog Number
8	RT8

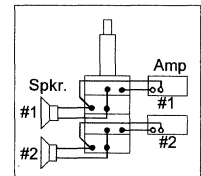


## MGLL Pad Attenuator

Power Rating: 12.5 Watts  
 Continuous Audio: 50 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -55°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 294° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug

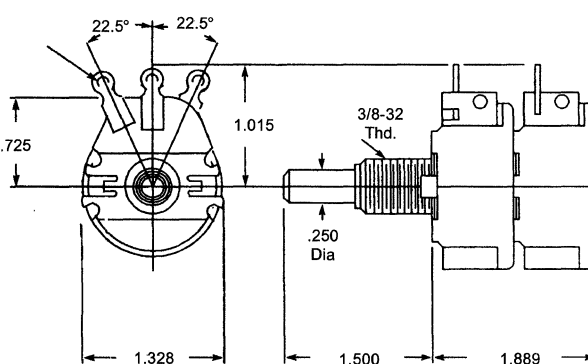


Ohms Rating	Catalog Number
8	MGLL8

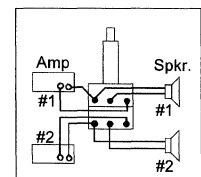


## Stereo Level Control

Power Rating: 4 Watts  
 Continuous Audio: 15 Watts  
 Dielectric Strength: Mounting plate to terminals, high pot test for 1 minute @ 900 VAC.  
 Insulation Resistance: 1000 megohms minimum. (50% relative humidity @ 25°C.)  
 Operating Temperature: -30°C to +105°C.  
 Operating Life: 10,000 cycles standard.  
 Mechanical Rotation: 300° ±5°.  
 Bushing Information: Thread: 3/8-32 NEF-2A.  
 Contact Arm: Insulated from case  
 Terminals: Solder Lug



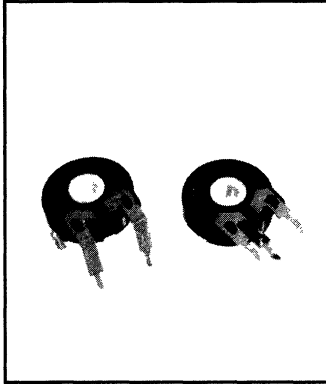
Ohms Rating	Catalog Number
8	RR50



All Audio Attenuators are supplied with palnut and dial plate.  
 Dial Plate 395 for Mono and Dial Plate 495 for Stereo.



# Type MTC Carbon Trimmers



- Miniature 15mm Size
- Horizontal and Vertical Mounting
- Thru Hole Adjustment
- Low Static Noise
- Dual Contact Wipers

## GENERAL SPECIFICATIONS

Operating Temperature:  
-25°C to +70°C

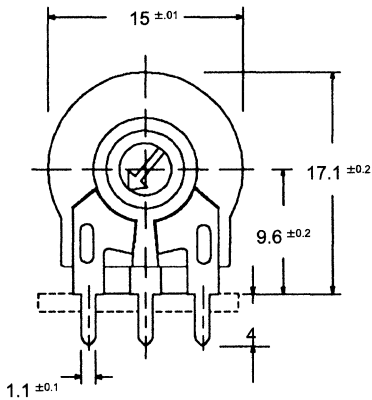
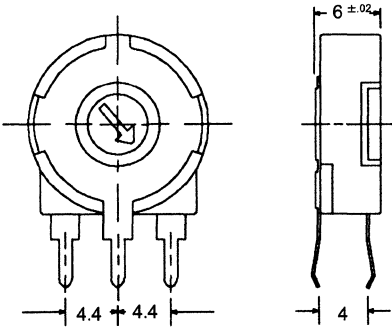
Mechanical Rotation:  
270° ±10°

Electrical Rotation:  
250° ±20°

Nominal Power:  
.25 Watts @ 40°C  
.10 Watts @ 70°C

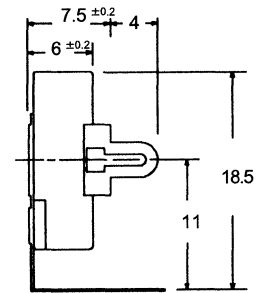
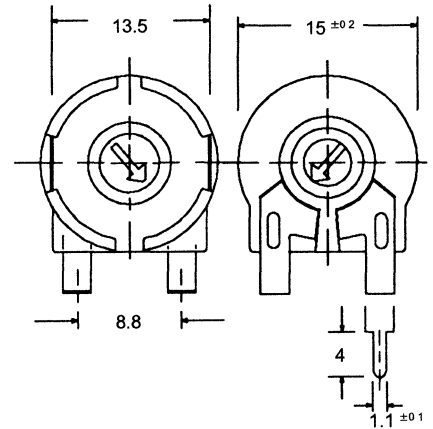
Tolerance:  
100 Ω to 1meg ±20%  
> 1meg to 3.5meg ±30%  
5meg +50 -30  
Static Noise: < 5μV/V

**MTC--L1A**  
Vertical Mounting



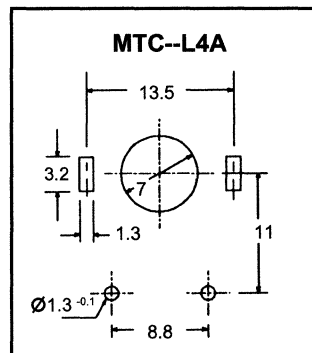
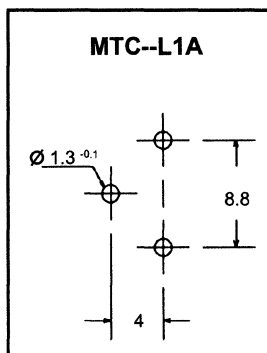
Vertical Mount Catalog Number	Resistance Ohms	Horizontal Mount Catalog Number
MTC12L1A	100	
MTC22L1A	200	
MTC251L1A	250	MTC251L4A
MTC32L1A	300	
MTC52L1A	500	MTC52L4A
MTC13L1A	1000	MTC13L4A
MTC23L1A	2000	MTC23L4A
MTC252L1A	2500	
MTC33L1A	3000	
MTC53L1A	5000	MTC53L4A
MTC682L1A	6800	
MTC14L1A	10K	MTC14L4A
MTC24L1A	20K	MTC24L4A
MTC253L1A	25K	MTC253L4A
MTC54L1A	50K	MTC54L4A
MTC15L1A	100K	MTC15L4A
MTC184L1A	180K	
MTC254L1A	250K	MTC254L4A
MTC55L1A	500K	MTC55L4A
MTC16L1A	1 MEG	MTC16L4A
MTC26L1A	2 MEG	MTC26L4A
MTC355L1A	3.5 MEG	MTC355L4A
MTC56L1A	5MEG	

**MTC--L4A**  
Horizontal Mounting



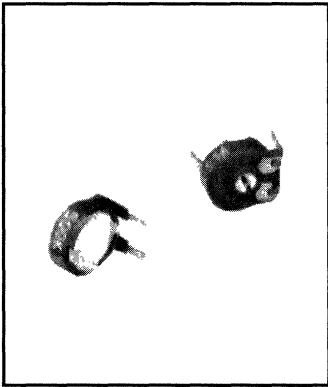
All dimensions in millimeters

## Footprints For Mounting



Controls & Switches

# Type PT10 Carbon Trimmers



- Miniature 10mm Size
- Horizontal and Vertical mounting
- Thru Hole Adjustment
- Low Static Noise
- Automatic Insertion Packaging Available by Special Order

## GENERAL SPECIFICATIONS

Operating Temperature:  
-25°C to +70°C

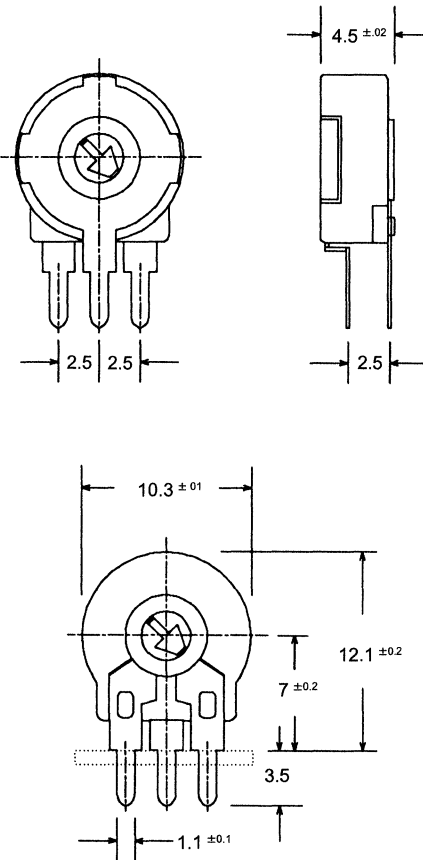
Mechanical Rotation:  
235° ±5°

Electrical Rotation:  
220° ±5°

Tolerance:  
100 Ω to 1meg ±20%  
> 1meg to 4.7meg ±30  
>4.7meg to 10meg +50 -30

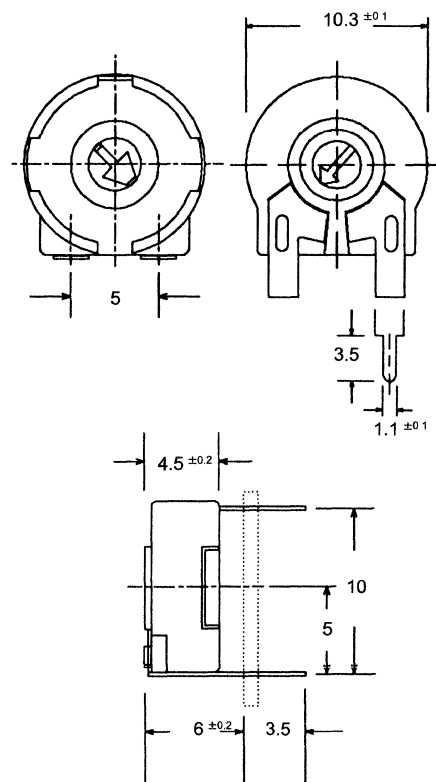
Static Noise: < 5μV/V

### PT10V Vertical Mounting



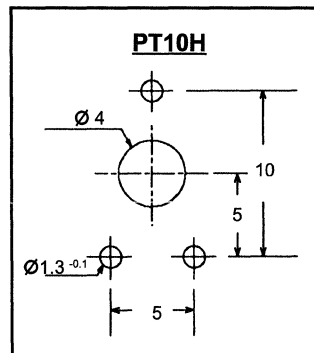
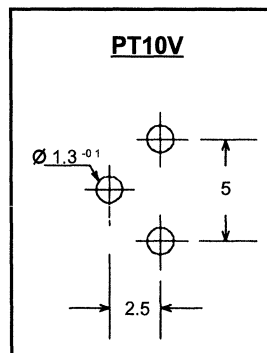
Vertical Mount Catalog Number	Resistance Ohms	Horizontal Mount Catalog Number
PT10V100	100	PT10H100
PT10V220	220	PT10H220
PT10V250	250	PT10H250
PT10V470	470	PT10H470
PT10V500	500	PT10H500
PT10V1K	1000	PT10H1K
PT10V2K	2000	PT10H2K
PT10V2R2K	2200	PT10H2R2K
PT10V2R5K	2500	PT10H2R5K
PT10V4R7K	4700	PT10H4R7K
PT10V5K	5000	PT10H5K
PT10V10K	10K	PT10H10K
PT10V20K	20K	PT10H20K
PT10V22K	22K	PT10H22K
PT10V25K	25K	PT10H25K
PT10V47K	47K	PT10H47K
PT10V50K	50K	PT10H50K
PT10V100K	100K	PT10H100K
PT10V220K	220K	PT10H220K
PT10V250K	250K	PT10H250K
PT10V470K	470K	PT10H470K
PT10V500K	500K	PT10H500K
PT10V1MEG	1 MEG	PT10H1MEG
PT10V2MEG	2 MEG	PT10H2MEG
PT10V2R2MEG	2.2 MEG	PT10H2R2MEG
PT10V4R7MEG	4.7 MEG	PT10H4R7MEG
PT10V5MEG	5 MEG	PT10H5MEG
PT10V10MEG	10 MEG	PT10H10MEG

### PT10H Horizontal Mounting



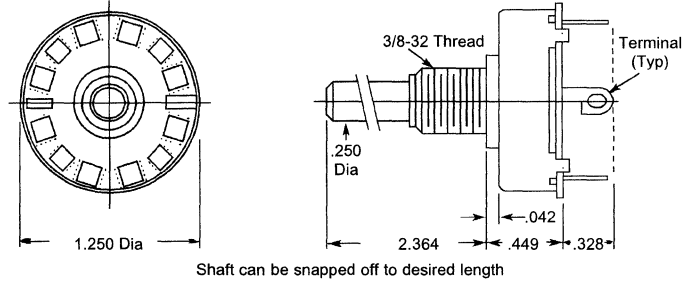
All dimensions in millimeters

### Footprints For Mounting



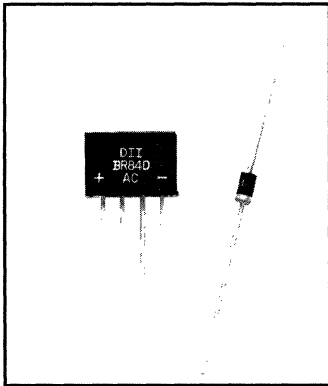
## General Purpose Rotary Switches

<b>Positions (Max.):</b>	12
<b>Maximum number of poles:</b>	4
<b>Indexing Angle:</b>	30°
<b>Contact Resistance (initial):</b>	Less than .010 ohms
<b>Dielectric Strength:</b>	500 volts AC or 500 volts DC between terminals or terminals to ground
<b>Operating Life:</b>	10,000 cycles
<b>Insulation Resistance:</b>	1000 megohms minimum @ 25°C and 40% relative humidity
<b>Sections:</b>	One only
<b>Detent Type:</b>	Hill and valley
<b>Terminals:</b>	Silver plated high quality non-ferrous material
<b>Ground Rings:</b>	Silver plated brass
<b>Insulation:</b>	High grade phenolic



Number of Poles	Maximum Positions	Catalog Number	
		Shorting	Non-Shorting
1	5	—	3215J
1	12	31112J	32112J
2	2	—	3222J
2	3	3123J	3223J
2	6	3126J	3226J
3	4	3134J	3234J
4	2	—	3242J
4	3	3143J	3243J

Electrical Limits @ Voltage			
300 VDC	.2 Amp	300 VAC	.25 Amp
100 VDC	.4 Amp	100 VAC	.5 Amp
50 VDC	1 Amp	50 VAC	1 Amp
25 VDC	2 Amp	25 VAC	2 Amp
12 VDC	4 Amp	12 VAC	4 Amp
6 VDC	5 Amp	6 VAC	6 Amp



- Uniform Size
- Low Cost
- Low Leakage
- Low Forward Voltage Drop
- High Current Capability

### Bridge Rectifiers

Ideal for printed circuit board  
 Surge Overload Rating:  
 50 Amperes peak  
 Mounting Position: Any  
 Weight: 2.74 grams.  
 Operating Temp. Range:  
 -55°C to +125°C  
 Storage Temp. Range:  
 -55°C to +150°C

### Diode Rectifier

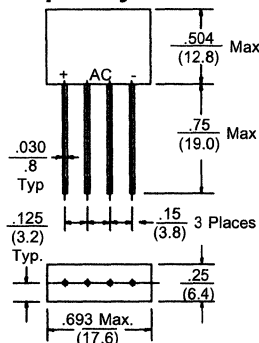
Case: Molded plastic  
 Epoxy: UL 94V-0 rate flame  
 retardant  
 Lead: MIL-STD-202E method  
 Mounting Position: Any  
 Weight: .70 grams

### Bridge Rectifiers

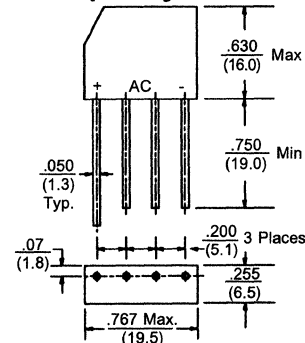
Maximum Peak Reverse Voltage	Maximum Average Rectified Current @ Half-Wave Resistive Load 60Hz		Maximum Forward Peak Surge Current @ 8.3ms Superimposed	Maximum Reverse Current @ PRV @ 25°C T <sub>A</sub>	Maximum Forward Voltage @ 25°C T <sub>A</sub>		Catalog Number
	PRV	I <sub>o</sub> @ T <sub>A</sub>			I <sub>FM</sub> (Surge)	I <sub>R</sub>	
V <sub>PK</sub>	A <sub>AV</sub>	°C	A <sub>PK</sub>	μA <sub>dc</sub>	A <sub>PK</sub>	V <sub>PK</sub>	
<b>2 Amp</b>							
50	2.0	75	50	10	1.0	1.0	FW50
100	2.0	75	50	10	1.0	1.0	FW100
200	2.0	75	50	10	1.0	1.0	FW200
400	2.0	75	50	10	1.0	1.0	FW400
600	2.0	75	50	10	1.0	1.0	FW600
1000	2.0	75	50	10	1.0	1.0	FW1000

<b>4 Amp</b>							
100	4.0	50	200	10	3.0	1.0	FWLC100
200	4.0	50	200	10	3.0	1.0	FWLC200
400	4.0	50	200	10	3.0	1.0	FWLC400
600	4.0	50	200	10	3.0	1.0	FWLC600
1000	4.0	50	200	10	3.0	1.0	FWLC1000

#### 2 Amp - Style FW



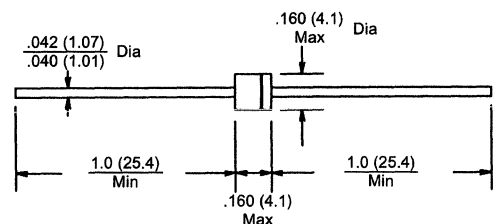
#### 4 Amp - Style FWLC



### Diode Rectifier — Catalog Number: M2.5A

**Maximum Ratings and Electrical Characteristics:** Ratings at 25°C ambient temperature unless otherwise specified. Single phase, half wave, 60 Hz, resistive or inductive load. For capacitive load, derate current by 20%.

Maximum Recurrent Peak Reverse Voltage:	1000	Maximum DC Reverse Current T <sub>A</sub> = 25°C at Rated DC Blocking Voltage T <sub>A</sub> = 100°C:	5.0μA 50μA
Maximum RMS Voltage:	700	Maximum Full Load Reverse Current Full Cycle Average .375" (9.5 mm) lead length at T <sub>L</sub> = 75°C:	30μA
Maximum DC Blocking Voltage:	1000	Typical Junction Capacitance (Note 1):	60pF
Maximum Average Forward Rectified Current .375" (9.5 mm) lead length at T <sub>A</sub> = 75°C:	2.5 Amps	Typical Thermal Resistance R <sub>θJA</sub> :	35 °C/W
Peak Forward Surge Current 8.3 ms single half sine-wave superimposed on rated load (JEDEC method):	150 Amps	Operating and Storage Temperature Range T <sub>J</sub> , T <sub>STG</sub> :	-65°C to +175°C
Maximum instantaneous Forward Voltage at 1.0A DC:	1.0	Note 1. Measured at 1 MHz and applied reverse voltage of 4.0 volts	



## DIAL PLATES

### 30° Marking

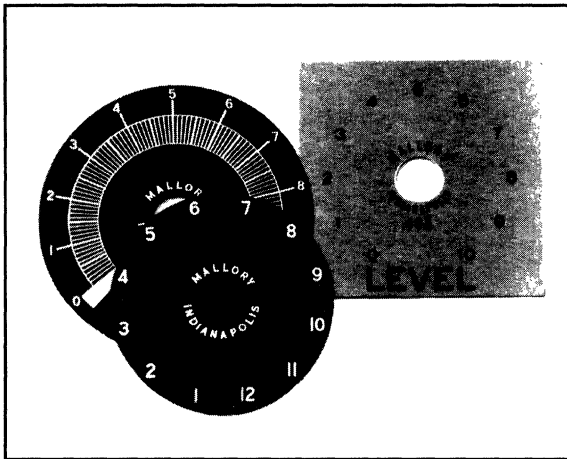
Aluminum dial plates with figures etched on solid black background. Diameter is 1-13/16", with a 7/16" hole. Lettering is 7/16" high, .020" wide.

Markings	Catalog Number
1 to 2	372
1 to 3	373
1 to 4	374
1 to 6	376
1 to 7	377
1 to 8	378
1 to 9	379
1 to 10	380
1 to 11	381
1 to 12	382
OFF 1 to 3	383
OFF 1 to 9	389
OFF 1 to 10	390

### Other Marking

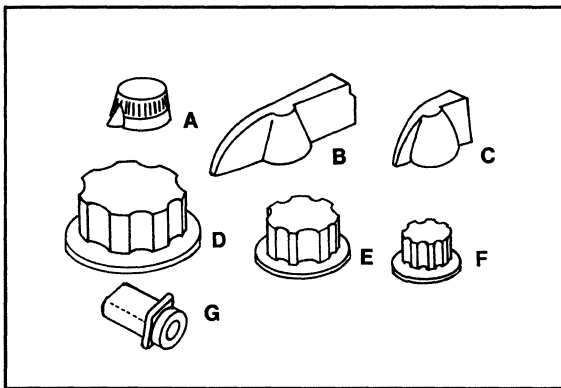
Aluminum dial plates with figures etched on solid black background. Similar to dial plates at left, but with various spacing and markings.

Size (Diameter)	Markings	Degrees Spacing	Catalog Number
1-13/16"	1 to 24	15	394
2-1/4"	0 to 10	330	369
2-1/4"	0 to 10	275	395
2-1/4"	0 to 10	260	397
2-1/4"	0 to 10	305	399
2" (Square)	Level		495
1-13/16"	1 to 17	20	467



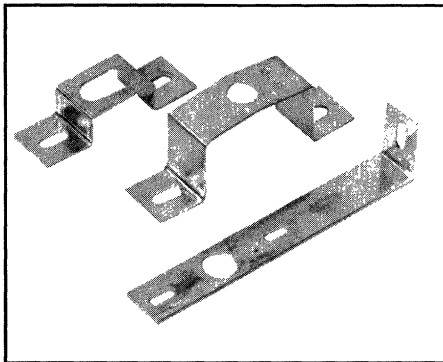
## SWITCH and CONTROL KNOBS

Figure	Description	Shaft Size	Catalog Number
A	11/16" Black Pointer	1/4"	364
B	2" Black Bar	1/4"	365-1
C	1-1/4" Black	1/4"	366-1
D	1-1/2" Black	1/4"	367-1
E	1-1/8" Black	1/4"	368-1
F	3/4" Black		1910K
G	9/16" x 13/16" Black for lever switches	1/8"	GS5149A



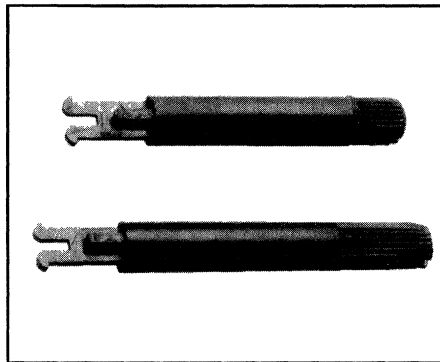
Control Hardware

## ADJUSTABLE MOUNTING BRACKETS



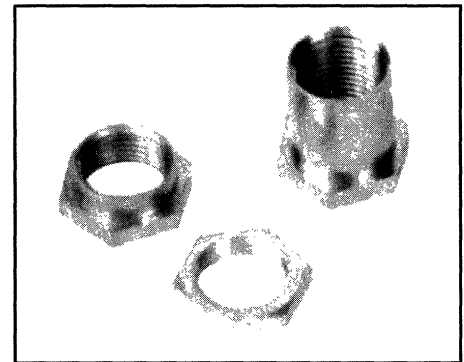
Description	Catalog Number
1-1/4" mounting centers	RB248
2-1/2" mounting centers	RB249
Universal	RB254

## SHAFTS FOR MR CONTROLS



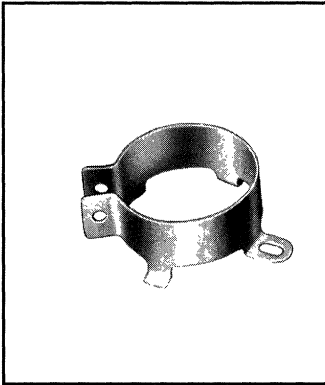
Description	Catalog Number
1/4" dia x 1-1/4" from front of mounting surface. Knurled and slotted nylon. Plugs into either end of MR controls.	MRS1250
1/4" dia x 1-9/16" from front of mounting surface. Knurled and slotted nylon. Plugs into either end of MR controls.	MRS1563

## HEX NUTS AND WASHERS



Description	Catalog Number
3/8"-32 Hex Nut	232
.218 shoulder length	255
.328 shoulder length	A1126012
.578 shoulder length	A112602
3/8" I.D. metal washer	225

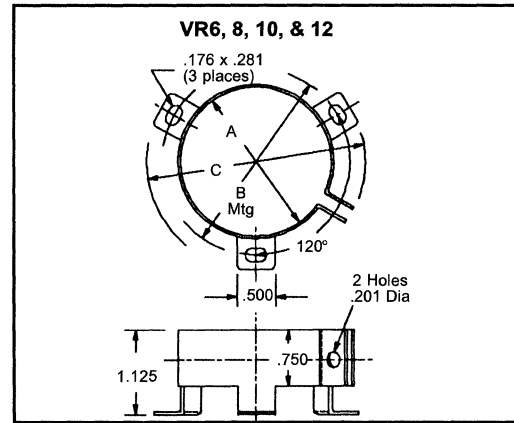
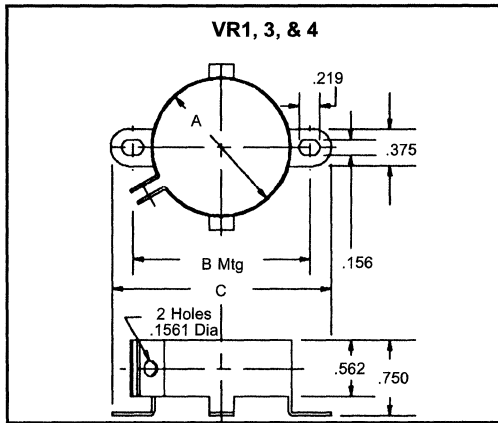
## TYPE VR VERTICAL MOUNTING CLAMP



Diameter of Part to be Mounted	Catalog Number			Dimensions		
	Without Screw & Nut	Unassembled Screw & Nut Included	Assembled with Screw & Nut	A	B	C
1" to 1-1/16"	VR1B	VR1	VR1A	1"	1-7/16"	1-7/8"
1-3/8" to 1-7/16"	VR3B	VR3	VR3A	1-3/8"	1-25/32"	2-7/32"
1-1/2" to 1-9/16"	VR4B	VR4	VR4A	1-1/2"	1-15/16"	2-11/32"
1-3/4" to 1-13/16"	VR6B	VR6	VR6A	1-3/4"	2-1/4"	2-9/16"
2" to 2-1/16"	VR8B	VR8	VR8A	2"	2-1/2"	2-13/16"
2-1/2" to 2-9/16"	VR10B	VR10	VR10A	2-1/2"	3"	3-5/16"
3" to 3-1/8"	VR12B	VR12	VR12A	3"	3-7/16"	3-13/16"
Screw	VRSCREW	—	—	9/16" long 6-32 thread NC-2A		
Nut	VRNUT	—	—	Standard hex nut to fit screw		

Mallory VR mounting clamps may be used to mount any cylindrical capacitor with a 1" to 3" diameter that is to be mounted in a vertical position. Material is 1010 CRS, commercial grade #4 temper ASI-scale. Parts are finished with .0001 (nominal) zinc chromate plating.

Use for mounting CG types, PSU, HC/NP and MPD/MPF types. Material thickness is .035"

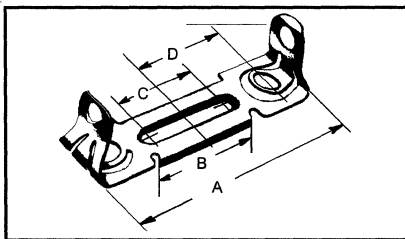


## MOUNTING ACCESSORIES FOR PSU AND HC/NP TYPE CAPACITORS

### Type HB Horizontal Mounting Bracket

EIA Case Code	Dimensions				Catalog Number
	A	B	C*	D	
1	3-3/8"	1-11/64"	7/8"	1.258	HB2
2-4-6	4-1/64"	1-13/16"	1-1/2"	1-37/64	HB4
3-5-7-8	5-1/64"	2-23/32"	1-25/32"	2-5/64"	HB8

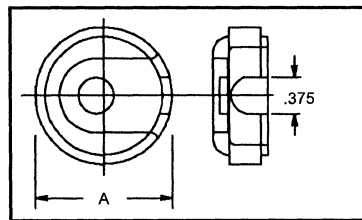
HB brackets are used with PL or PLA end caps. The bracket is assembled to the motor or any suitable surface by two screws in line at any convenient position within the center-to-center dimension (C) shown in the chart. Material: .042 spring steel with black parkerized finish



\*C dimension = max mounting hole center  
Use 10-32" flat head screws

### Type PL and PLA End Caps

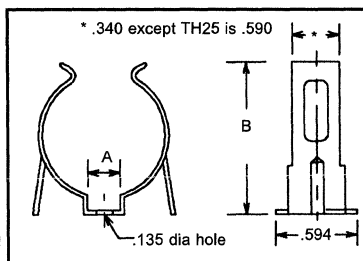
EIA Case Code	A Dimension	Catalog Number	
		Wire Hole Toward Bracket	Wire Hole Away From Bracket
1-2-3	1-7/16"	PL3	PLA3
4-5	1-13/16"	PL6	PLA6
6-7	2-1/16"	PL8	PLA8
8	2-9/16"	PL10	PLA10



PL and PLA end caps are usually used with HB type brackets. The drawing shown at left is type PL for use with the wiring through the bracket to the motor. For off motor mounting, use type PLA. See page 77 for a picture showing a capacitor and end cap mounted in a bracket.

## TYPE TH HORIZONTAL MOUNTING CLIP

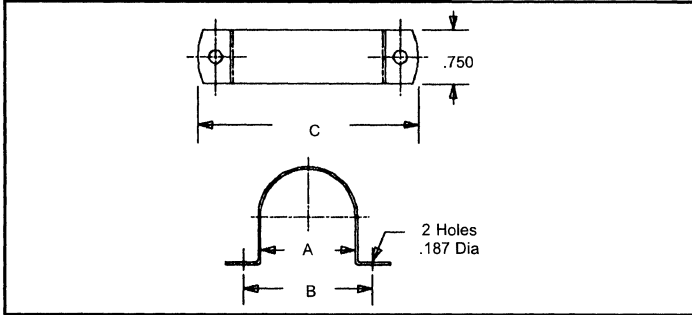
Nominal Diameter of Part to be Mounted	Dimensions		Catalog Number
	A	B	
.375	.250	.470	TH13
.500	.250	.620	TH15
.625	.312	.720	TH17
.750	.312	.890	TH19
.875	.312	1.000	TH21
1.000	.312	1.060	TH23
1.375	.312	1.500	TH25



These clips, though designed for capacitors, have varied applications to retain many cylindrical components. They are used extensively in the electrical and electronic industries to hold spindles, condensers, capacitors, tubes, rods and conduit. Clips have phosphate and oil finish. Material thickness TH13 thru TH17 is .016". TH19 thru TH25 is .020"

## MOUNTING ACCESSORIES FOR MOTOR RUN CAPACITORS

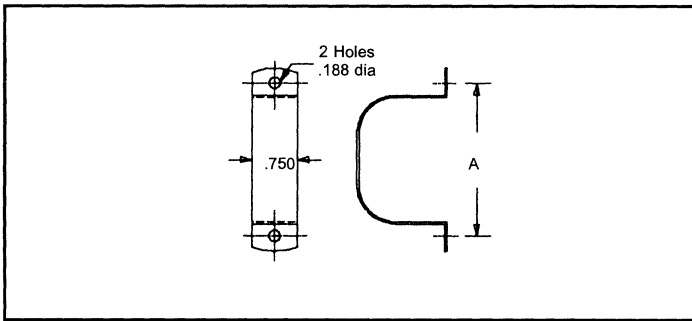
### Type RB Cylindrical Capacitor Mounting Clamp



This clamp has a galvanized finish and is designed for use with the round base style motor run capacitor, types MPD/MPF. Material thickness is .035"

Base Style	Dimensions			Catalog Number
	A Nominal Diameter	B	C	
21	1.750	2.500	2.875	RB175
23	2.000	2.750	3.125	RB200
24	2.500	3.250	3.625	RB250
21	1.750	2.500	3.250	RB175A
23	2.000	2.750	3.500	RB200A
24	2.500	3.250	4.000	RB250A

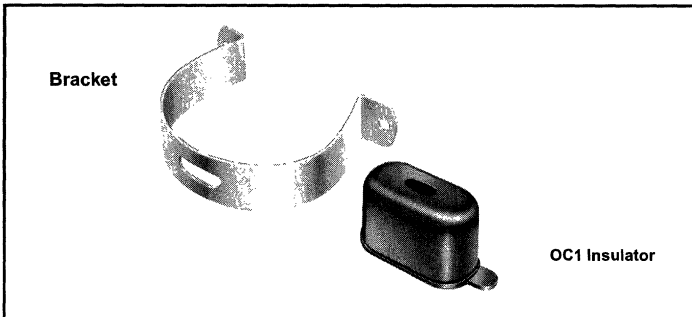
### Type OB Oval Capacitor Mounting Clamp



This clamp has a galvanized finish and is designed for use with the flat oval base style motor run capacitor, types MPD/MPF. Material thickness is .036"

Base Style	Dimensions		Catalog Number
	Base Size	A	
32	1-5/16" x 2-5/32"	2-9/16"	OB2
37	1-31/32" x 2-29/32"	3-5/16"	OB4
38	1-31/32" x 3-21/32"	4-1/16"	OB3

### Neoprene Terminal Insulator

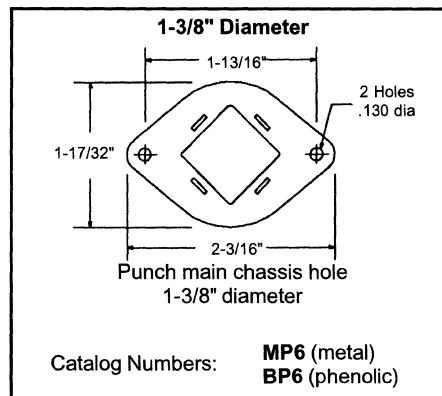
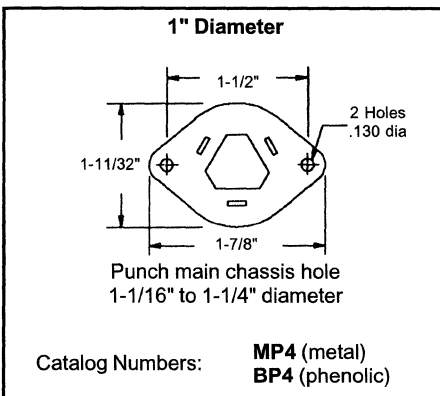


For use on capacitor types MPD/MPF, this neoprene terminal insulator, or 'boot', is used to insulate and protect the terminal area of single section units only. Material is classified 94V-1 when tested per UL94.

Order catalog number: **OC1**

## ACCESSORIES FOR FP/PFP 'TWIST LOCK' CAPACITORS

FP/PFP series capacitors are available in two diameters: 1" and 1-3/8". Use BP (phenolic) or MP (metal) mounting plates to lock these capacitors securely to the chassis. Requires chassis holes as shown below.



### Type CE Cardboard Insulating Tubes

Closed end cardboard tubes used to insulate metal cans where shock potential is present, the CE tube slips over the body of the FP/PFP capacitor and is held in place with a light glue. Tubes add 3/32" to can base diameter and 3/16" to overall height.

Capacitor Dimensions D x L	Catalog Number
1" x 2"	CE3
1" x 2-1/2"	CE7
1" x 3"	CE4
1-3/8" x 2"	CE5
1-3/8" x 2-1/2"	CE9
1-3/8" x 3"	CE6
1-3/8" x 3-1/2"	CE12
1-3/8" x 4"	CE10

## Wrap-It-Ties

Catalog Number	Bundle Dia. (Max)	Length (Approx)	Width (Approx)	Thickness (Approx)	Min Loop Tensile
WIT18S	5/8 (15.9)	3-1/4 (82.6)	.10 (2.5)	.04 (1.0)	18 Lbs.
WIT18R	3/4 (19.1)	4-33/64 (203.2)	.10 (2.5)	.04 (1.3)	18 Lbs.
WIT18L	1-3/8 (34.9)	5-3/4 (146.1)	.10 (2.5)	.04 (1.3)	18 Lbs.
WIT30R	1-1/4 (31.8)	5-3/4 (146.1)	.14 (3.6)	.05 (1.3)	30 Lbs.
WIT30L	1-7/8 (47.6)	7-5/16 (185.7)	.14 (3.6)	.05 (1.3)	30 Lbs.
WIT50R	2 (50.8)	8 (203.2)	.19 (4.8)	.05 (1.3)	50 Lbs.

Wire Bundle Range		Length Overall	Tensile Strength	Catalog Number
Min.	Max.			
1/16"	3/4"	4-3/16"	18 lb.	WIT18R
1/16"	5/8"	3-1/4"	18 lb.	WIT18S
1/16"	1-3/8"	5-3/4"	18 lb.	WIT18L
1/16"	1-1/4"	5-3/4"	30 lb.	WIT30R
1/16"	2"	7-1/2"	30 lb.	WIT30L
1/16"	2"	8"	50 lb.	WIT50R

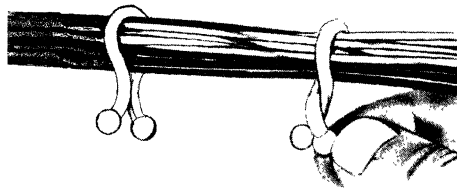
UL Recognized #E71558  
Standard Color: Natural  
Material: Nylon 6/6  
(Other sizes and colors available by special order)

## Twist-Lok Ties

Slip bundle of wires into the tie, then twist the ends together with a flick of the fingers. The TWIST-LOK locks in place and holds your wire bundle securely and firmly. To open, another flick of the fingers releases the tie instantly—ready to use again.

Approximate Overall Height	Wire Bundle Range	Catalog Number
.900"	.200 - .300"	TL250
1.032"	.300 - .400"	TL350
1.200"	.400 - .500"	TL450
1.550"	.700 - .800"	TL750

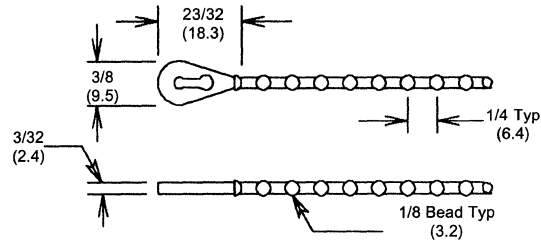
Standard Color: Natural  
Material: Nylon 6/6  
(Other colors available by special order)



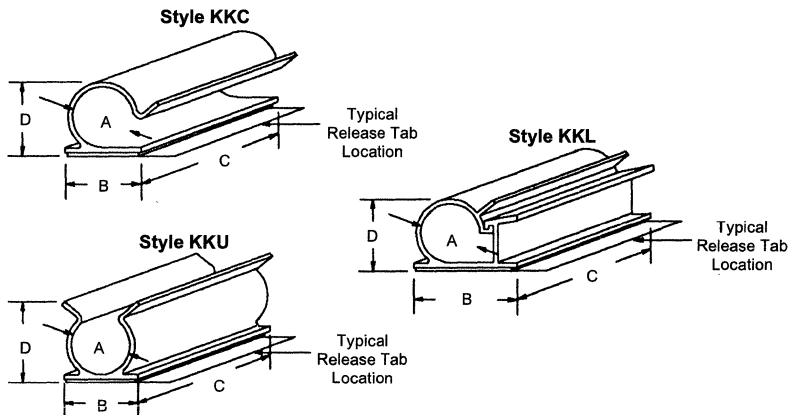
## Beaded Wire Ties

Material	Color	Overall Length	Catalog Number
Nylon 6/6	Yellow	10-3/4" (273.1)	BT1010YL
Flame Retardant Nylon	Natural	10-3/4" (273.1)	BT1001NT

Just wrap them around the wire bundle, thread the end through the specially designed loop, pull it tight and lock in place. Easy to re-open for adding wires or re-use. (Other sizes and colors available by special order)



## Kwik-Klips



A	Dimensions (Inches)			Catalog Number
	B	C	D	
1/8	3/4	3/4	3/4	KKC2
1/4	3/4	3/4	3/4	KKC4
3/8	3/4	3/4	3/4	KKC6
1/2				KKC8
3/4				KKC12
1/4"	3/4	3/4	3/4	KKL4
1/2				KKL8
3/4				KKL12
1/8	3/4	3/4	3/4	KKU2
1/4	3/4	3/4	3/4	KKU4
3/8	3/4	3/4	3/4	KKU6
1/2				KKU8
3/4				KKU12

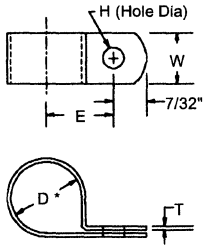
Material: Gray PVC  
Adhesive backing mounts quickly and easily  
(Available in clear PVC by special order)



# Clamps & Clips, Circuit Board Hdwre. Plastic Components



## Type N & NB Nylon Cable Clamps



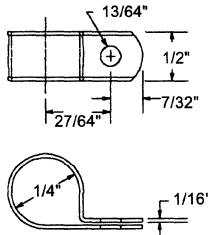
\* 'D' dim is recommended holding diameter only

3/8 Inch Wide					
Dimensions (Inches)					Catalog Number
D	W	E	T	H	
1/8	3/8	21/64	1/16	11/64	N2
3/16	3/8	25/64	1/16	11/64	N3
1/4	3/8	27/64	1/16	11/64	N4
5/16	3/8	29/64	1/16	11/64	N5
3/8	3/8	31/64	1/16	11/64	N6
7/16	3/8	17/32	1/16	11/64	N7
1/2	3/8	9/16	1/16	11/64	N8

1/2 Inch Wide					
Dimensions (Inches)					Catalog Number
D	W	E	T	H	
5/16	1/2	29/64	1/16	13/64	N5B
3/8	1/2	31/64	1/16	13/64	N6B
1/2	1/2	9/16	1/16	13/64	N8B
9/16	1/2	19/32	1/16	13/64	N9B
5/8	1/2	5/8	1/16	13/64	N10B
3/4	1/2	49/64	1/16	13/64	N12B
1	1/2	29/32	1/16	13/64	N16B

Color: White  
Material: Nylon 6/6  
(Other sizes available by special order)

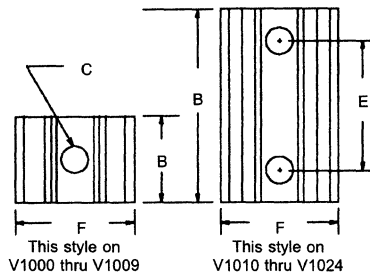
## Type 'E' Proprietary Cable Clamp



Light weight and chemical resistant with excellent shock resisting properties in a temperature range from 185°F to -40°F

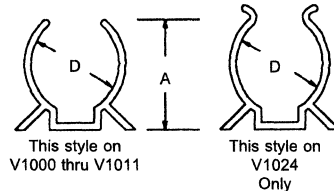
Order Catalog Number: E4

(Other Sizes available by special order)



This style on V1000 thru V1009

This style on V1010 thru V1024



This style on V1000 thru V1011

This style on V1024 Only

## Component Clips

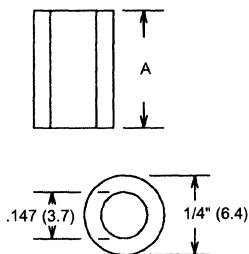
Dia of Part To Be Held D	Height A (Ref)	Length B	Hole Dia. C	E	F (Ref)	Catalog Number
1/4" (6.4)	19/64" (7.5)	1/2" (12.7)	3/32" (2.4)	N/A	1/2" (12.7)	V1000
1/2" (12.7)	33/64" (13.1)				43/64" (17.1)	V1004
5/8" (15.9)	23/32" (18.3)				55/64" (21.8)	V1006
3/4" (19.1)	23/32" (18.3)				29/32" (23.0)	V1008
7/8" (22.2)	27/32" (21.4)	1 - 1/8" (28.6)	5/32" (4.0)	3/4" (19.1)	1" (25.4)	V1009
1" (25.4)	1 - 1/16" (27.0)				1 - 11/64" (29.8)	V1010
1 - 3/8" (34.9)	1 - 27/64" (36.1)				1 - 25/64" (35.3)	V1011
1 - 1/2" (38.1)	1 - 13/16" (46.0)	1 3/4" (44.5)			2" (50.8)	V1024

Color: Black  
Material: PVC  
(Other sizes available by special order)

## Round Plastic Spacers

For #6 Screw

Dimension "A"	Catalog Number
3/8" (9.5)	SS63
3/4" (19.1)	SS66

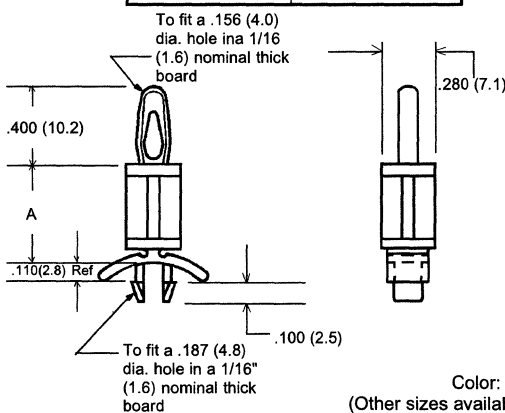


Material: CPVC  
Color: Gray  
(Other sizes available by special order)

## Circuit Board Supports

Lock to Chassis, Snap to Board

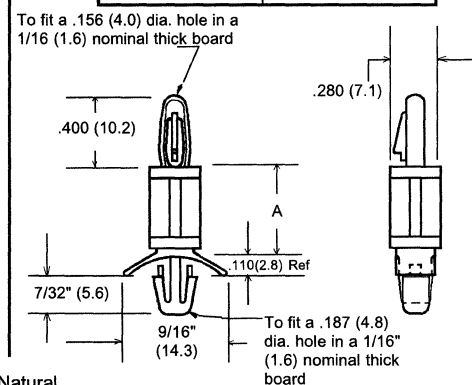
Dimension "A"	Catalog Number
1/4" (6.4)	CBS4N
3/8" (9.5)	CBS6N
1/2" (12.7)	CBS8N
5/8" (15.9)	CBS10N



To fit a .187 (4.8) dia. hole in a 1/16" (1.6) nominal thick board

Both Ends Lock

Dimension "A"	Catalog Number
3/16" (4.7)	LCBS3N
1/4" (6.3)	LCBS4N
3/8" (9.5)	LCBS6N
1/2" (12.7)	LCBS8N

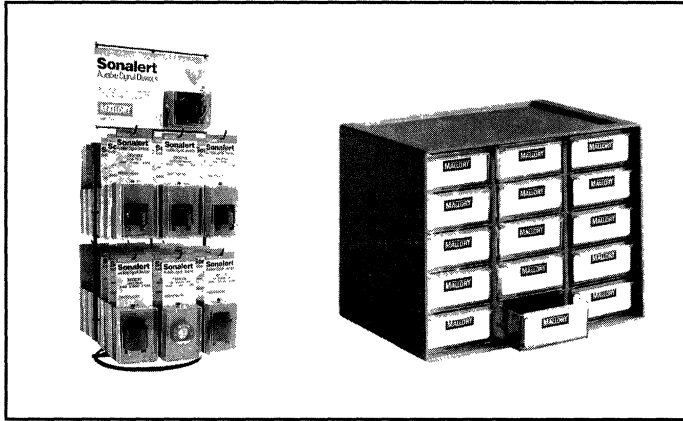


To fit a .187 (4.8) dia. hole in a 1/16" (1.6) nominal thick board

Color: Natural

(Other sizes available by special order)

Plastic Components



Mallory components are available in popular Mallobin Merchandisers. The Mallobin is a handsome, easy to stack display case designed for quick access to a variety of electronic components. The Mallobin is a sturdy, metal cabinet containing fifteen drawers.

When you choose a Mallobin, you can rest assured you will receive the component reliability you have come to expect from Mallory. Quantity per each drawer differs for each individual Mallobin kit.

Contact Mallory for detailed information or to discuss other possible Mallobin configurations.

The 'SONAK' kit comes complete with 8 of the most popular SONALERT® Audible Signal devices (36 pieces total), individually packaged in see-through hard plastic display boxes. Included is an attractive display rack with a built-in Audible Signal demonstrator.

Catalog Number	Cap $\mu$ F	Voltage	Description
<b>DISC151M</b>	1 pf to .1 $\mu$ F	50 VDC to 1000 VDC	An assortment of general purpose disc ceramic capacitors.
<b>MONO151A</b>	22 pf to 1 $\mu$ F	Up to 200 VDC	A collection of monolithic ceramic capacitors.
<b>RPE60</b>	.001 $\mu$ F to 3.3 $\mu$ F	63 VDC to 1000 VDC	An assortment of radial leaded metallized polyester film 160 series capacitors.
<b>RPE6768</b>	.001 $\mu$ F to 1.0 $\mu$ F	63 VDC to 250 VDC	A mix of radial leaded metallized polyester film 167 and 168 capacitor series.
<b>SMT CER</b>	22 pF to .33 $\mu$ F	50 VDC to 100 VDC	An offering of ceramic chip capacitors in three different case sizes to include the 0805, 1206 and 1210 sizes.
<b>SMTKIT</b>	1-33 $\mu$ F .1-.22 $\mu$ F 22pF-.1 $\mu$ F	10 - 35 VDC 50VDC 50 - 100 VDC	Surface mount capacitors: Solid tantalum chips DC Film chips Multilayer ceramic chips
<b>SX301</b>	22 pF to 10,000 pF	33 VDC to 630 VDC	This kit includes polystyrene axial leaded capacitors with standard tolerance ratings.
<b>TAC151</b>	.1 $\mu$ F to 47 $\mu$ F	10 VDC to 50 VDC	A selection of fully precision axial leaded molded solid tantalum capacitors in high impact resistance epoxy cases.
<b>TC151</b>	10 $\mu$ F to 500 $\mu$ F	Up to 450 VDC	Assorted axial leaded aluminum electrolytic capacitors.

Catalog Number	Cap $\mu$ F	Voltage	Description
<b>TC151A</b>	20 $\mu$ F to 2000 $\mu$ F	Up to 450 VDC	An assortment of axial leaded aluminum electrolytic capacitors similar to TC151.
<b>TDC151A</b>	.1 $\mu$ F to 200 $\mu$ F	Up to 50 VDC	An assortment of epoxy dipped solid tantalum capacitors with capacitance tolerance of $\pm 10\%$ .
<b>TCG151</b>	100 $\mu$ F to 10,000 $\mu$ F	10 VDC to 450 VDC	A selection of tubular computer grade capacitors.
<b>TSC151</b>	.47 $\mu$ F to 68 $\mu$ F	6 VDC to 35 VDC	This kit consists of tantalum chip capacitors in precision molded cases to offer dimensional consistency and uniform surfaces for pick and place equipment.
<b>TT151</b>	1 $\mu$ F to 200 $\mu$ F	Up to 50 VDC	An assortment of axial leaded miniature aluminum electrolytic capacitors.
<b>TT151A</b>	Up to 100 $\mu$ F	Up to 50 WVDC	A selection of axial leaded miniature electrolytic similar to TT151.
<b>VPR151</b>	130 $\mu$ F to 5900 $\mu$ F	10 VDC to 100 VDC	An assortment of vertical single ended aluminum electrolytic capacitors.
<b>VTL151</b>	1 $\mu$ F to 6800 $\mu$ F	Up to 100 VDC	A selection of single ended aluminum electrolytic capacitors.
<b>SONAK</b> consists of:			
6 each	BSBM428	3 each	BSC616NL
3 each	BSC110	6 each	BSC628
6 each	BSC616N	3 each	BSC628P
3 each	BSC616NJ	6 each	BSNP428

# Competitive Cross Reference

# MALLORY

Competitive Series	Competitor Name	Mallory Series
100	Maida	AT, ATR, ASR
101	Sangamo	CGR
101R	Sangamo	CGR
101X	Sangamo	CGO
109D/130D	Sprague	TLH, TLS
135D	Sprague	THT
137D	Sprague	TLW
138D	Sprague	TXX
139R	Sangamo	CGO
140D	Sprague	XTL, XTH
141D	Sprague	XTV
146D	Sprague	MTP
147D	Sprague	MTP
148D	Sprague	TAP
149D	Sprague	MTP
150D	Sprague	TAS
173D	Sprague	TAC
196D	Sprague	TDC
199D	Sprague	TDL
1C	Sprague	M20
202D	Sprague	TMX
210	Electrocube	150
230	Electrocube	150
232	Electrocube	160
293D	Sprague	TSC
2C	Sprague	M30
3070	Philips	TT, TC
30D	Sprague	TT
3120	Philips	CGR
3186	Philips	CGS
3188	Philips	CG, CGR
3191	Philips	CGO
325P	Sprague	21, 23, 24
325P,OV	Sprague	32, 37, 38
32D	Sprague	CG
32DR	Sprague	CG
32DX	Sprague	CG
3476	Philips	VTL
3480	Philips	VTH
3481	Philips	VPR
3487	Philips	LPX
3488	Philips	LP
3489	Philips	LPX
3534	Philips	PSU
3534B	Philips	PSU
35F	G.E.	PSU
36D	Sprague	CGS
36DY	Sprague	CGS
39D	Sprague	TC, TCG
3C	Sprague	M40
40AW	Philips	TLT
40BW	Philips	TXT
40CS	Philips	TAC
40CW	Philips	MTP
40ES	Philips	TAC
40EW	Philips	TLH
40GW	Philips	TLW
40JW	Philips	TL
40LW	Philips	TLS
40SS	Philips	TAS, TER
40SW	Philips	TLX
40TW	Philips	THT
40XS	Philips	TXA, TXE
40XW	Philips	XTH, XTK, XTM, XTV
40YS	Philips	TXR
40YW	Philips	MTP
40ZS	Philips	THF
41GS	Philips	TDC
41PS	Philips	TIM
432D	Sprague	SFC
43XW	Philips	XTL, XTH, XTV
49MC	Philips	TSC
4C	Sprague	M50

Competitive Series	Competitor Name	Mallory Series
500	Sangamo	CG
500D	Sprague	TA, TC
500R	Sangamo	CG
500X	Sangamo	CG
501D	Sprague	TA, TC, TT
511D	Sprague	VPR
515D	Sprague	VTL
516D	Sprague	TA
517D	Sprague	VPR, VTH
53D	Sprague	TC, TCG
592C (B)	Sprague	P10
592C (C)	Sprague	P20
592C (D)	Sprague	P30
592C (E)	Sprague	P40
601	Sprague	TCX
602D	Sprague	CGR
602DX	Sprague	CGR
622D	Sprague	CGO
636D	Sprague	CG
672D	Sprague	VPR
673D	Sprague	VPR
703E1	Philips	172
712A1	Philips	160
719A1	Philips	160, 167/184, 168/185
719F1	Philips	171
719J1	Philips	158
80D	Sprague	LPR
81D	Sprague	LP
82D	Sprague	LPX
910	Electrocube	170
912	Electrocube	171
952	Electrocube	173
A	Philips	P10 - P40
AQ	Tansitor	TLT
AR	Tansitor	TXT
AREM	Aerovox	150
ARPK	Aerovox	152
ARPM	Aerovox	170
AS	Tansitor	TXT
AT	Tansitor	TLT
AU	RMC	UN
BCR	Illinois Cap	C
C	RMC	C
C315	Kemet	M15
C320	Kemet	M20
C322	Kemet	M22
C330	Kemet	M30
C340	Kemet	M40
C350	Kemet	M50
C410	Kemet	P10
C420	Kemet	P20
C430	Kemet	P30
C440	Kemet	P40
CPR	Cornell Dubilier	21
CRC115	Corning	M15
CRC120	Corning	M20
CRC220	Corning	M22
CRC230	Corning	M30
CRS	Cornell Dubilier	23
CRT	Cornell Dubilier	24
CWT	Hilton	MTP
D	Maida	G, C, S, H, L
DD05-DD112	Murata	C, S, H, L
ECCF	Panasonic	G, C, L
ECEA-K	Panasonic	VTM
ECEA-U	Panasonic	VTL
ECEA-V-S	Panasonic	VTL
ECEB-U	Panasonic	TA
ECEB-V-S	Panasonic	TA
ECKF	Panasonic	H, S
ECQ-E	Panasonic	160, 167/184, 168/185
GL	Panasonic	UN

Competitive Series	Competitor Name	Mallory Series
GR40	Murata	0805
GR42-2	Murata	1210
GR42-6	Murata	1206
GR43-2	Murata	1812
H50	Aerovox	32
H62	Aerovox	38
H64	Aerovox	37
HAQ	Tansitor	THT
K	Philips	M15 - M50
KBN+SF	Cornell Dubilier	38
KKN+SF	Cornell Dubilier	32
KME(VB)	United Chemi-Con	VTH
KMG-VN	United Chemi-Con	LP
KP173	Saha	173
KP173Y	Saha	173Y
KS130	Saha	130
KTN+SF	Cornell Dubilier	37
LGK	Nichicon	LP
LGQ	Nichicon	LP
LLK	Nichicon	LPX
LLQ	Nichicon	LPX
LNR	Nichicon	CGS
MCH21	Rohm	0805
MCH31	Rohm	1206
MCH32	Rohm	1210
MDA	Elpac	152
MF	Paktron	160
MFWA	Rifa/Evox	152
MKP171	Saha	171
MKP1839	Roederstein	170
MKP1840	Roederstein	171
MKT158X	Saha	158X
MKT160	Saha	160
MKT167	Saha	167/184
MKT1813	Roederstein	150
MKT1817	Roederstein	168/185
MKT1818	Roederstein	167/184
MKT1822	Roederstein	160
MKT185	Saha	168/185
MMK	Rifa/Evox	160
MMK10..27.5	Evox	160
MMK5	Rifa/Evox	168/185
MMK7.5	Evox	167
MMK7.5	Rifa/Evox	167/184
MMW	Cornell Dubilier	150
MMWA	Rifa/Evox	150
MMX	Rifa/Evox	158
MP	Paktron	171
MPR	Saha	150
N50	Aerovox	32
N62	Aerovox	38
N64	Aerovox	37
P50	Aerovox	32
P62	Aerovox	38
P64	Aerovox	37
PA	Elpac	170
PFR	Rifa/Evox	173
PMR	Rifa/Evox	171
PMR10..27.5	Evox	171
PMWA	Rifa/Evox	170
PP	Paktron	172
PR	Elpac	171
PSA	Aero-M	PSU
R09	Johanson	0403
R11	Johanson	0504
R15	Johanson	0805
R18	Johanson	1206
R29	Johanson	1808
RA	Tansitor	TLT
RB	Paktron	160
RBEN	Aerovox	168/185
RBEO	Aerovox	167/184
RBEP	Aerovox	160
RBEX	Aerovox	158X

This Cross Reference does not warrant exact interchangeability of components. In most cases, the terminal configuration, performance specifications, and basic dimensions are similar. The end user must make the ultimate decision for suitability of the component in their application.

Competitive Series	Competitor Name	Mallory Series
RPA10	Murata	P10
RPA20	Murata	P20
RPA30	Murata	P30
RPA40	Murata	P40
RPE110	Murata	M15
RPE113	Murata	M30
RPE114	Murata	M40
RPE117	Murata	M50
RPE121	Murata	M20
RPE122	Murata	M22
RW	Tansitor	TL
RWC	Paktron	150
RWP	Paktron	170
S41	Johanson	1210
S43	Johanson	1812
S47	Johanson	2221
SA10	AVX	P10
SA20	AVX	P20
SA30	AVX	P30
SA40	AVX	P40
SME(T)	United Chemi-Con	TA
SME(VB)	United Chemi-Con	VTL
SME-BP	United Chemi-Con	VTN
SMG-VN	United Chemi-Con	LPX
SMH-VN	United Chemi-Con	LPX
SMX	Saha	198
SR15	AVX	M15
SR20	AVX	M20

Competitive Series	Competitor Name	Mallory Series
SR21	AVX	M22
SR30	AVX	M30
SR40	AVX	M40
SR50	AVX	M50
SRAC	United Chemi-Con	VTM
ST	Paktron	198
SWT	Hilton	MTP
T110	Kemet	TAS
T140	Kemet	TXA
T242	Kemet	TXE(CSR23)
T252	Kemet	TXR(CSR33)
T262	Kemet	THF
T322	Kemet	TAC
T330	Kemet	TIM
T350	Kemet	TDL
T351	Kemet	TDL
T352	Kemet	TDL
T353	Kemet	TDL
T354	Kemet	TDC
T355	Kemet	TDC
T356	Kemet	TDL
T361	Kemet	TDL
T362	Kemet	TDC
T368	Kemet	TDC
T491	Kemet	TSC
TAP	AVX	TDL
TE	Sprague	TT
TLB	Nichicon	TA, TT

Competitive Series	Competitor Name	Mallory Series
TVA	Sprague	TC
TVX	Nichicon	TA, TT
ULB	Nichicon	VTL
UPR	Nichicon	VPR
USK	Nichicon	VTM
UVP	Nichicon	VTN
UVX	Nichicon	VTL
UVZ	Nichicon	VPR
UW	Maida	UN
UW	Tansitor	TLH
VJ0805	Vitramon	0805
VJ1206	Vitramon	1206
VJ1210	Vitramon	1210
WC	Tansitor	TL5
WC	Paktron	150
WH	Tansitor	TLW
WP	Paktron	170
WT	Tansitor	TLX
X3865,D	ASC	21, 23, 24
X3875,D	ASC	32, 37, 38
Z23	Aerovox	21
Z24	Aerovox	23
Z26	Aerovox	24
Z50	Aerovox	32
Z62	Aerovox	38
Z64	Aerovox	37
ZA	Elpac	150
ZDR	Elpac	160

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