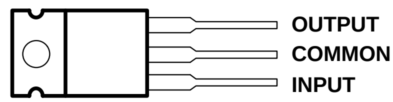
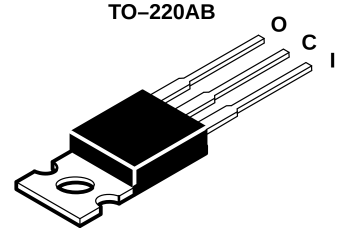
- **3-Terminal Regulators**
- **Output Current Up to 1.5 A**
- **Internal Thermal Overload Protection**
- **High Power Dissipation Capability**
- **Internal Short-Circuit Current Limiting**
- **Output Transistor Safe-Area Compensation**
- **Direct Replacements for Fairchild µA7800 Series**

KC PACKAGE
(TOP VIEW)

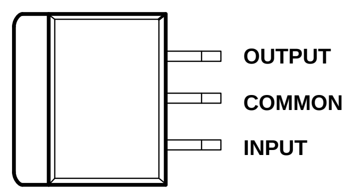


The common terminal is in electrical contact with the mounting base.

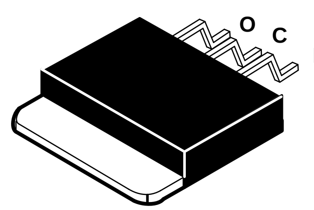
TO–220AB



KTE PACKAGE
(TOP VIEW)



The common terminal is in electrical contact with the mounting base.



description

This series of fixed-voltage monolithic integrated-circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 A of output current. The internal current limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents and also used as the power-pass element in precision regulators.

The µA7800C series is characterized for operation over the virtual junction temperature range of 0°C to 125°C. The µA7805Q and µA7812Q are characterized for operation over the virtual junction temperature range of –40°C to 125°C.

AVAILABLE OPTIONS

T_J	$V_{O(nom)}$ (V)	PACKAGED DEVICES		CHIP FORM (Y)
		PLASTIC FLANGE-MOUNT (KC)	HEAT-SINK MOUNTED† (KTE)	
0°C to 125°C	5	µA7805CKC	µA7805CKTE	µA7805Y
	6	µA7806CKC	µA7806CKTE	µA7806Y
	8	µA7808CKC	µA7808CKTE	µA7808Y
	8.5	µA7885CKC	µA7885CKTE	µA7885Y
	10	µA7810CKC	µA7810CKTE	µA7810Y
	12	µA7812CKC	µA7812CKTE	µA7812Y
	15	µA7815CKC	µA7815CKTE	µA7815Y
	18	µA7818CKC	µA7818CKTE	µA7818Y
	24	µA7824CKC	µA7824CKTE	µA7824Y
–40°C to 125°C	5	µA7805QKC	µA7805QKTE	—
	12	µA7812QKC	µA7812QKTE	—

† The KTE package is also available taped and reeled.

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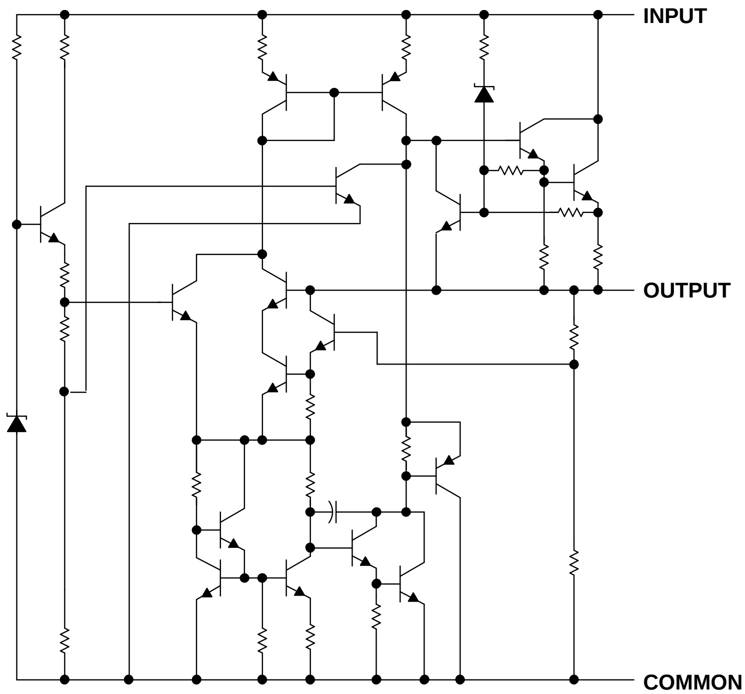
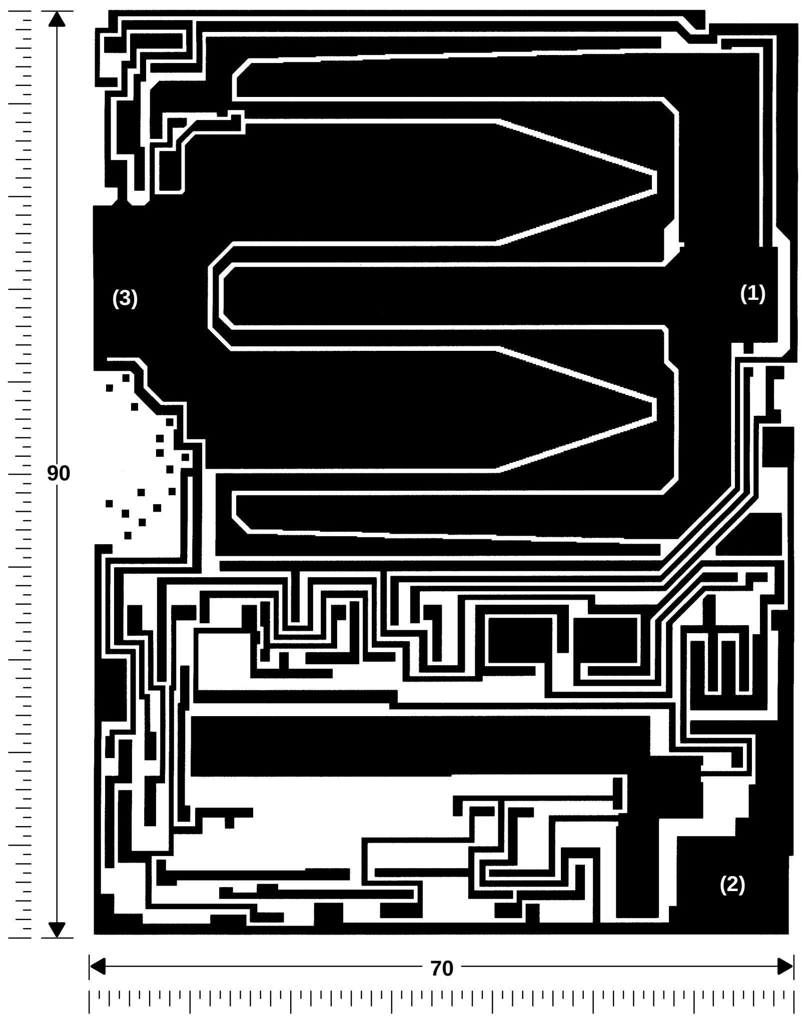
schematic

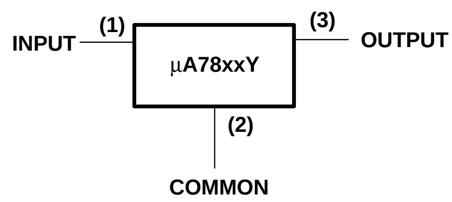


μA78xxY chip information

These chips, when properly assembled, display characteristics similar to the μA78xxC. Thermal compression or ultrasonic bonding may be used on the doped aluminum bonding pads. The chips may be mounted with conductive epoxy or a gold-silicon preform.

BONDING PAD ASSIGNMENTS





CHIP THICKNESS: 15 MILS TYPICAL

BONDING PADS: 4 × 4 MILS MINIMUM

$T_J$max = 150°C

TOLERANCES ARE ±10%.

ALL DIMENSIONS ARE IN MILS.

absolute maximum ratings over operating temperature ranges (unless otherwise noted)†

Input voltage, V_I: μA7824C . . . . 40 V
All others . . . . 35 V
Continuous total power dissipation at (or below) T_A = 25°C (see Note 1) . . . . See Disipation Rating Tables
Continuous total power dissipation at (or below) T_C = 90°C (see Note 1) . . . . See Disipation Rating Tables
Operating free-air, T_A, case, T_C, or virtual junction, T_J, temperature range . . . . –40 to 150°C
Storage temperature range, T_{stg} . . . . –65 to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . 260°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: For operation above 25°C free-air or 90°C case temperature, refer to Figure 1 and Figure 2. To avoid exceeding the design maximum virtual junction temperature, these ratings should not be exceeded. Due to variations in individual device electrical characteristics and thermal resistance, the built-in thermal overload protection may be activated at power levels slightly above or below the rated dissipation.

DISSIPATION RATING TABLE — FREE-AIR TEMPERATURE

PACKAGE	$T_A \le$ 25°C POWER RATING	DERATING FACTOR ABOVE T_A = 25°C	T_A = 70°C POWER RATING	T_A = 105°C POWER RATING	T_A = 125°C POWER RATING
KC	2000 mW	16.0 mW/°C	1280 mW	720 mW	400 mW
KTE	1900 mW	15.2 mW/°C	1216 mW	684 mW	380 mW

DISSIPATION RATING TABLE — CASE TEMPERATURE

PACKAGE	$T_C \le$ 90°C POWER RATING	DERATING FACTOR ABOVE T_C = 90°C	T_A = 125°C POWER RATING
KC	15000 mW	250.0 mW/°C	6250 mW
KTE	14300 mW	238.0 mW/°C	5970 mW

FREE-AIR TEMPERATURE DISSIPATATION DERATING CURVE

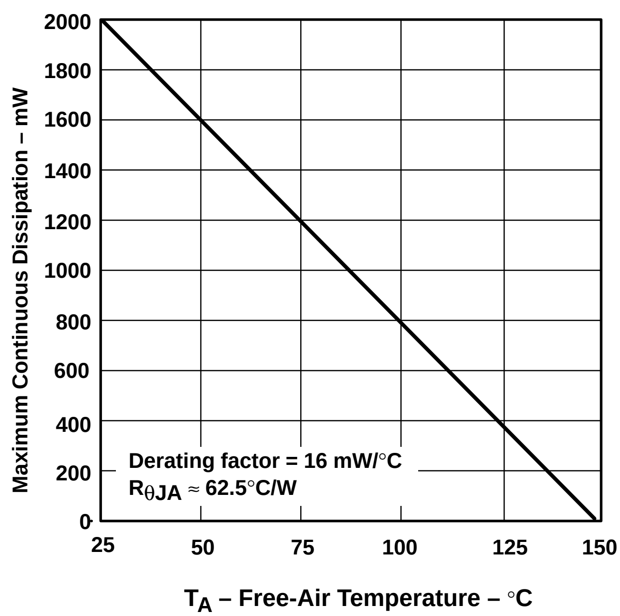


Figure 1

CASE TEMPERATURE DISSIPATION DERATING CURVE

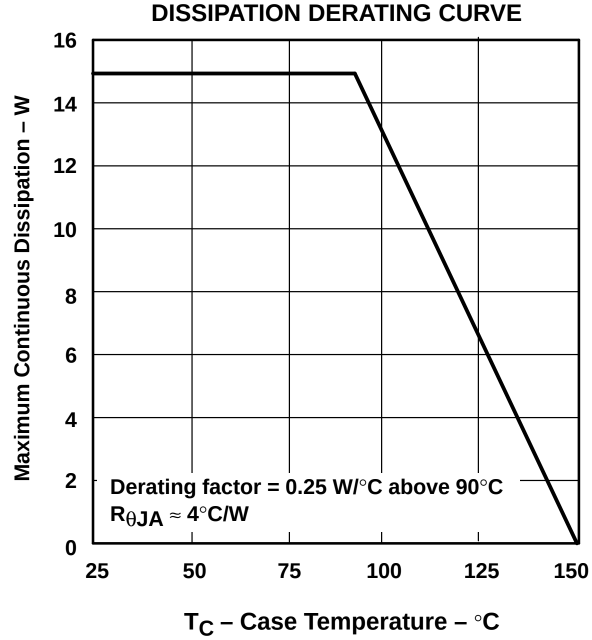


Figure 2

recommended operating conditions

		MIN	MAX	UNIT
Input voltage, V_I	μA7805C	7	25	V
	μA7806C	8	25	
	μA7808C	10.5	25	
	μA7885C	10.5	25	
	μA7810C	12.5	28	
	μA7812C	14.5	30	
	μA7815C	17.5	30	
	μA7818C	21	33	
	μA7824C	27	38	
Output current, I_O			1.5	A
Operating virtual junction temperature, T_J	μA7800C Series	0	125	°C
	μA7805Q, μA7812Q	–40	125	

electrical characteristics at specified virtual junction temperature, V_I = 10 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA7805C, μA7805Q MIN	TYP	MAX	UNIT
Output voltage‡		25°C	4.8	5	5.2	V
	I_O = 5 mA to 1 A, V_I = 7 V to 20 V, P ≤ 15 W	Full range§	4.75		5.25	
Input voltage regulation	V_I = 7 V to 25 V	25°C		3	100	mV
	V_I = 8 V to 12 V			1	50	
Ripple rejection	V_I = 8 V to 18 V, f = 120 Hz	Full range§	62	78		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		15	100	mV
	I_O = 250 mA to 750 mA			5	50	
Output resistance	f = 1 kHz	Full range§		0.017		Ω
Temperature coefficient of output voltage	I_O = 5 mA	Full range§		–1.1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		40		μV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.2	8	mA
Bias current change	V_I = 7 V to 25 V	Full range§			1.3	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		750		mA
Peak output current		25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.
§ Full range virtual junction temperature is 0°C to 125°C for the μA7805C and –40°C to 125°C for the μA7805Q.

electrical characteristics at specified virtual junction temperature, V_I = 11 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	µA7806C MIN	µA7806C TYP	µA7806C MAX	UNIT
Output voltage‡		25°C	5.75	6	6.25	V
	I_O = 5 mA to 1 A, V_I = 8 V to 21 V, P ≤ 15 W	0°C to 125°C	5.7		6.3	
Input voltage regulation	V_I = 8 V to 25 V	25°C		5	120	mV
	V_I = 9 V to 13 V			1.5	60	
Ripple rejection	V_I = 9 V to 19 V, f = 120 Hz	0°C to 125°C	59	75		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		14	120	mV
	I_O = 250 mA to 750 mA			4	60	
Output resistance	f = 1 kHz	0°C to 125°C		0.019		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		45		µV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.3	8	mA
Bias current change	V_I = 8 V to 25 V	0°C to 125°C			1.3	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		550		mA
Peak output current		25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 14 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	µA7808C MIN	µA7808C TYP	µA7808C MAX	UNIT
Output voltage‡		25°C	7.7	8	8.3	V
	I_O = 5 mA to 1 A, V_I = 10.5 V to 23 V, P ≤ 15 W	0°C to 125°C	7.6		8.4	
Input voltage regulation	V_I = 10.5 V to 25 V	25°C		6	160	mV
	V_I = 11 V to 17 V			2	80	
Ripple rejection	V_I = 11.5 V to 21.5 V, f = 120 Hz	0°C to 125°C	55	72		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		12	160	mV
	I_O = 250 mA to 750 A			4	80	
Output resistance	f = 1 kHz	0°C to 125°C		0.016		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		52		µV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.3	8	mA
Bias current change	V_I = 10.5 V to 25 V	0°C to 125°C			1	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		450		mA
Peak output current		25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 15 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA7885C MIN	μA7885C TYP	μA7885C MAX	UNIT
Output voltage‡		25°C	8.15	8.5	8.85	V
	I_O = 5 mA to 1 A, V_I = 11 V to 23.5 V, P ≤ 15 W	0°C to 125°C	8.1		8.9	
Input voltage regulation	V_I = 10.5 V to 25 V	25°C		6	170	mV
	V_I = 11 V to 17 V			2	85	
Ripple rejection	V_I = 11.5 V to 21.5 V, f = 120 Hz	0°C to 125°C	54	70		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		12	170	mV
	I_O = 250 mA to 750 mA			4	85	
Output resistance	f = 1 kHz	0°C to 125°C		0.016		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		55		μV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.3	8	mA
Bias current change	V_I = 10.5 V to 25 V	0°C to 125°C			1	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		450		mA
Peak output current		25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 17 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA7810C MIN	μA7810C TYP	μA7810C MAX	UNIT
Output voltage‡		25°C	9.6	10	10.4	V
	I_O = 5 mA to 1 A, V_I = 12.5 V to 25 V, P ≤ 15 W	0°C to 125°C	9.5	10	10.5	
Input voltage regulation	V_I = 12.5 V to 28 V	25°C		7	200	mV
	V_I = 14 V to 20 V			2	100	
Ripple rejection	V_I = 13 V to 23 V, f = 120 Hz	0°C to 125°C	55	71		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		12	200	mV
	I_O = 250 mA to 750 mA			4	100	
Output resistance	f = 1 kHz	0°C to 125°C		0.018		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		70		μV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.3	8	mA
Bias current change	V_I = 12.5 V to 28 V	0°C to 125°C			1	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		400		mA
Peak output current		25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 19 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	μA7812C MIN	μA7812C TYP	μA7812C MAX	UNIT
Output voltage‡			25°C	11.5	12	12.5	V
	I_O = 5 mA to 1 A, P ≤ 15 W	V_I = 14.5 V to 27 V,	Full range§	11.4		12.6	
Input voltage regulation	V_I = 14.5 V to 30 V		25°C		10	240	mV
	V_I = 16 V to 22 V				3	120	
Ripple rejection	V_I = 15 V to 25 V,	f = 120 Hz	Full range§	55	71		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		25°C		12	240	mV
	I_O = 250 mA to 750 mA				4	120	
Output resistance	f = 1 kHz		Full range§		0.018		Ω
Temperature coefficient of output voltage	I_O = 5 mA		Full range§		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		75		μV
Dropout voltage	I_O = 1 A		25°C		2		V
Bias current			25°C		4.3	8	mA
Bias current change	V_I = 14.5 V to 30 V		Full range§			1	mA
	I_O = 5 mA to 1 A					0.5	
Short-circuit output current			25°C		350		mA
Peak output current			25°C		2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.
§ Full range virtual junction temperature is 0°C to 125°C for the μA7812C and –40°C to 125°C for the μA7812Q.

electrical characteristics at specified virtual junction temperature, V_I = 23 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS		T_J†	μA7815C MIN	μA7815C TYP	μA7815C MAX	UNIT
Output voltage‡			25°C	14.4	15	15.6	V
	I_O = 5 mA to 1 A, P ≤ 15 W	V_I = 17.5 V to 30 V	0°C to 125°C	14.25		15.75	
Input voltage regulation	V_I = 17.5 V to 30 V		25°C		11	300	mV
	V_I = 20 V to 26 V				3	150	
Ripple rejection	V_I = 18.5 V to 28.5 V,	f = 120 Hz	0°C to 125°C	54	70		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		25°C		12	300	mV
	I_O = 250 mA to 750 mA				4	150	
Output resistance	f = 1 kHz		0°C to 125°C		0.019		Ω
Temperature coefficient of output voltage	I_O = 5 mA		0°C to 125°C		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		25°C		90		μV
Dropout voltage	I_O = 1 A		25°C		2		V
Bias current			25°C		4.4	8	mA
Bias current change	V_I = 17.5 V to 30 V		0°C to 125°C			1	mA
	I_O = 5 mA to 1 A					0.5	
Short-circuit output current			25°C		230		mA
Peak output current			25°C		2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 27 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA7818C MIN	μA7818C TYP	μA7818C MAX	UNIT
Output voltage‡		25°C	17.3	18	18.7	V
	I_O = 5 mA to 1 A, V_I = 21 V to 33 V, P ≤ 15 W	0°C to 125°C	17.1		18.9	
Input voltage regulation	V_I = 21 V to 33 V	25°C		15	360	mV
	V_I = 24 V to 30 V			5	180	
Ripple rejection	V_I = 22 V to 32 V, f = 120 Hz	0°C to 125°C	53	69		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		12	360	mV
	I_O = 250 mA to 750 mA			4	180	
Output resistance	f = 1 kHz	0°C to 125°C		0.022		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		110		μV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.5	8	mA
Bias current change	V_I = 21 V to 33 V	0°C to 125°C			1	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		200		mA
Peak output current		25°C		2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 33 V, I_O = 500 mA (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T_J†	μA7824C MIN	μA7824C TYP	μA7824C MAX	UNIT
Output voltage‡		25°C	23	24	25	V
	I_O = 5 mA to 1 A, V_I = 27 V to 38 V, P ≤ 15 W	0°C to 125°C	22.8		25.2	
Input voltage regulation	V_I = 27 V to 38 V	25°C		18	480	mV
	V_I = 30 V to 36 V			6	240	
Ripple rejection	V_I = 28 V to 38 V, f = 120 Hz	0°C to 125°C	50	66		dB
Output voltage regulation	I_O = 5 mA to 1.5 A	25°C		12	480	mV
	I_O = 250 mA to 750 mA			4	240	
Output resistance	f = 1 kHz	0°C to 125°C		0.028		Ω
Temperature coefficient of output voltage	I_O = 5 mA	0°C to 125°C		–1.5		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz	25°C		170		μV
Dropout voltage	I_O = 1 A	25°C		2		V
Bias current		25°C		4.6	8	mA
Bias current change	V_I = 27 V to 38 V	0°C to 125°C			1	mA
	I_O = 5 mA to 1 A				0.5	
Short-circuit output current		25°C		150		mA
Peak output current		25°C		2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 10 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7805Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			5		V
Input voltage regulation	V_I = 7 V to 25 V		3		mV
	V_I = 8 V to 12 V		1		
Ripple rejection	V_I = 8 V to 18 V, f = 120 Hz		78		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		15		mV
	I_O = 250 mA to 750 mA		5		
Output resistance	f = 1 kHz		0.017		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1.1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		40		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.2		mA
Short-circuit output current			750		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 11 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7806Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			6		V
Input voltage regulation	V_I = 8 V to 25 V		5		mV
	V_I = 9 V to 13 V		1.5		
Ripple rejection	V_I = 9 V to 19 V, f = 120 Hz		75		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		14		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.019		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		45		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.3		mA
Short-circuit output current			550		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 14 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7808Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			8		V
Input voltage regulation	V_I = 10.5 V to 25 V		6		mV
	V_I = 11 V to 17 V		2		
Ripple rejection	V_I = 11.5 V to 21.5 V, f = 120 Hz		72		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 A		4		
Output resistance	f = 1 kHz		0.016		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		52		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.3		mA
Short-circuit output current			450		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 15 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7885Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			8.5		V
Input voltage regulation	V_I = 10.5 V to 25 V		6		mV
	V_I = 11 V to 17 V		2		
Ripple rejection	V_I = 11.5 V to 21.5 V, f = 120 Hz		70		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.016		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–0.8		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		55		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.3		mA
Short-circuit output current			450		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 17 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7810Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			10		V
Input voltage regulation	V_I = 12.5 V to 28 V		7		mV
	V_I = 14 V to 20 V		2		
Ripple rejection	V_I = 13 V to 23 V, f = 120 Hz		71		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.018		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		70		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.3		mA
Short-circuit output current			400		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 19 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7812Y			UNIT
		MIN	TYP	MAX	
Output voltage‡			12		V
Input voltage regulation	V_I = 14.5 V to 30 V		10		mV
	V_I = 16 V to 22 V		3		
Ripple rejection	V_I = 15 V to 25 V, f = 120 Hz		71		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.018		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		75		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.3		mA
Short-circuit output current			350		mA
Peak output current			2.2		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 23 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	µA7815Y MIN	µA7815Y TYP	µA7815Y MAX	UNIT
Output voltage‡			15		V
Input voltage regulation	V_I = 17.5 V to 30 V		11		mV
	V_I = 20 V to 26 V		3		
Ripple rejection	V_I = 18.5 V to 28.5 V, f = 120 Hz		70		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.019		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		90		µV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.4		mA
Short-circuit output current			230		mA
Peak output current			2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 27 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	µA7818Y MIN	µA7818Y TYP	µA7818Y MAX	UNIT
Output voltage‡			18		V
Input voltage regulation	V_I = 21 V to 33 V		15		mV
	V_I = 24 V to 30 V		5		
Ripple rejection	V_I = 22 V to 32 V, f = 120 Hz		69		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.022		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		110		µV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.5		mA
Short-circuit output current			200		mA
Peak output current			2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-µF capacitor across the input and a 0.1-µF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

electrical characteristics at specified virtual junction temperature, V_I = 33 V, I_O = 500 mA, T_J = 25°C† (unless otherwise noted)

PARAMETER	TEST CONDITIONS	μA7824Y MIN	μA7824Y TYP	μA7824Y MAX	UNIT
Output voltage‡			24		V
Input voltage regulation	V_I = 27 V to 38 V		18		mV
	V_I = 30 V to 36 V		6		
Ripple rejection	V_I = 28 V to 38 V, f = 120 Hz		66		dB
Output voltage regulation	I_O = 5 mA to 1.5 A		12		mV
	I_O = 250 mA to 750 mA		4		
Output resistance	f = 1 kHz		0.028		Ω
Temperature coefficient of output voltage	I_O = 5 mA		–1.5		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz		170		μV
Dropout voltage	I_O = 1 A		2		V
Bias current			4.6		mA
Short-circuit output current			150		mA
Peak output current			2.1		A

† Pulse-testing techniques maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output.
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.

APPLICATION INFORMATION

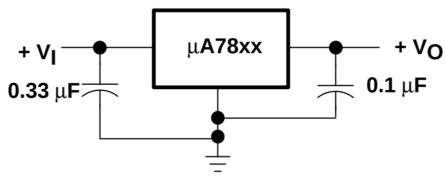


Figure 3. Fixed Output Regulator

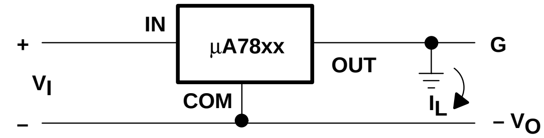
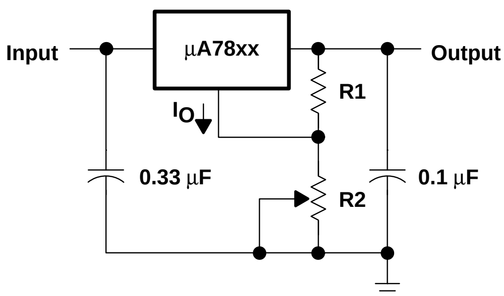


Figure 4. Positive Regulator in Negative Configuration (V_I Must Float)



NOTE A: The following formula is used when Vxx is the nominal output voltage (output to common) of the fixed regulator.

$$V_O = V_{xx} + \left(\frac{V_{xx}}{R1} + I_Q\right) R2$$

Figure 5. Adjustable Output Regulator

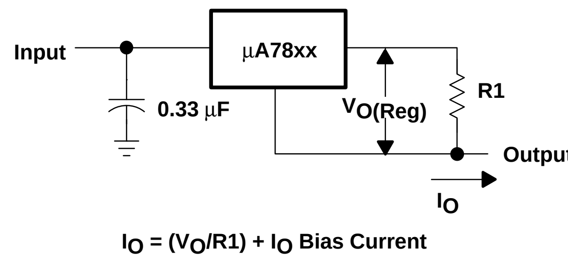


Figure 6. Current Regulator

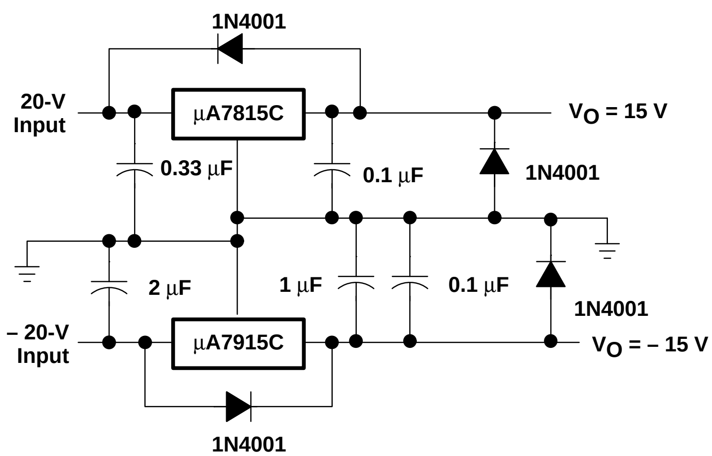


Figure 7. Regulated Dual Supply

APPLICATION INFORMATION

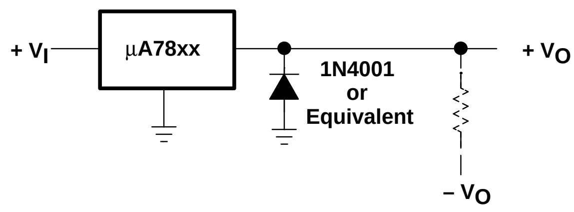


Figure 8. Output Polarity-Reversal Protection Circuit

operation with a load common to a voltage of opposite polarity

In many cases, a regulator powers a load that is not connected to ground but instead is connected to a voltage source of opposite polarity (e.g., op amps, level-shifting circuits, etc.). In these cases, a clamp diode should be connected to the regulator output as shown in Figure 8. This protects the regulator from output polarity reversals during startup and short-circuit operation.

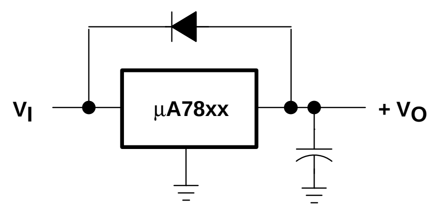


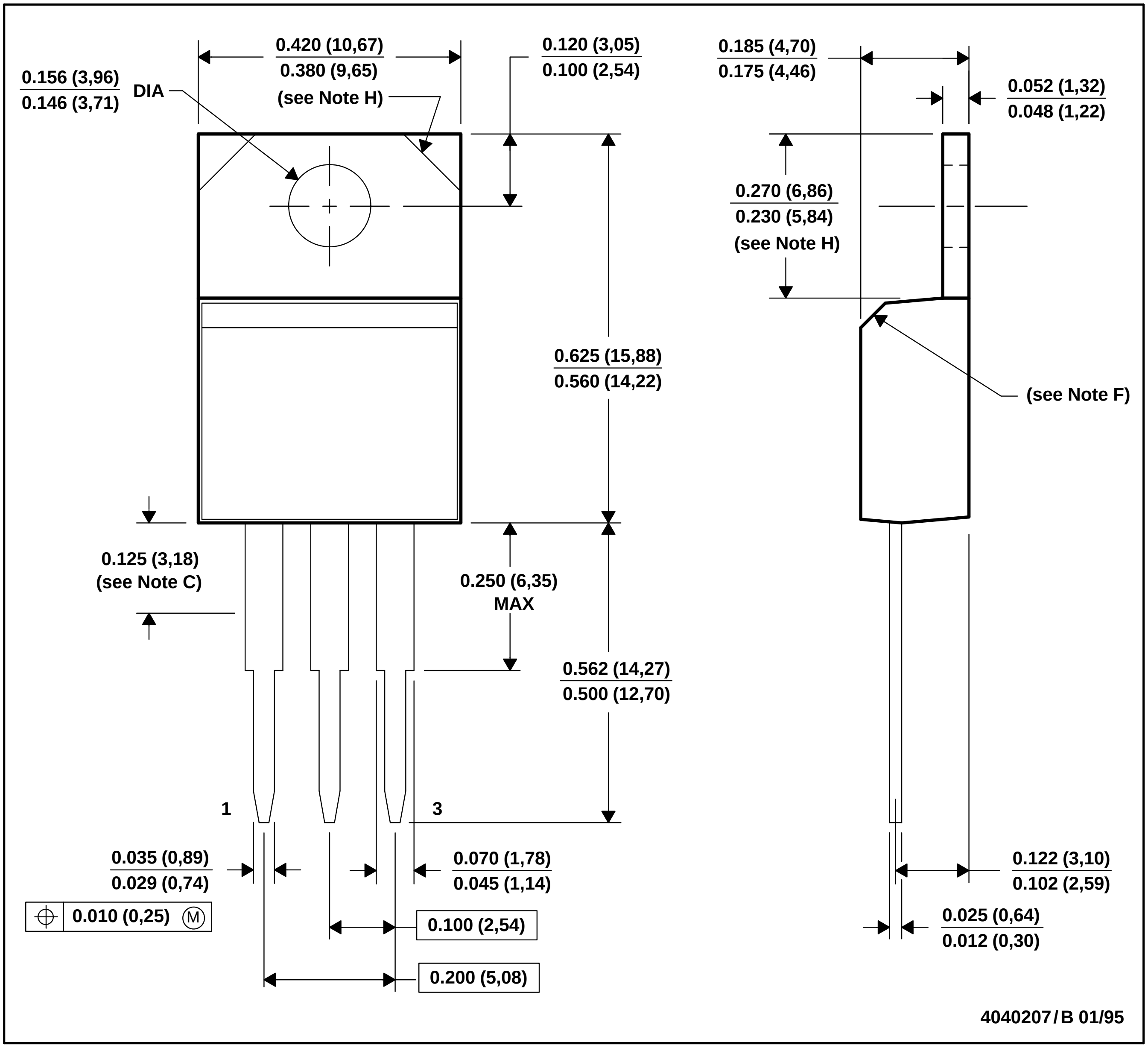
Figure 9. Reverse-Bias Protection Circuit

reverse-bias protection

Occasionally, there exists the possibility that the input voltage to the regulator can collapse faster than the output voltage. This could occur, for example, when the input supply is crowbarred during an output overvoltage condition. If the output voltage is greater than approximately 7 V, the emitter-base junction of the series pass element (internal or external) could break down and be damaged. To prevent this, a diode shunt can be employed as shown in Figure 9.

MECHANICAL INFORMATION

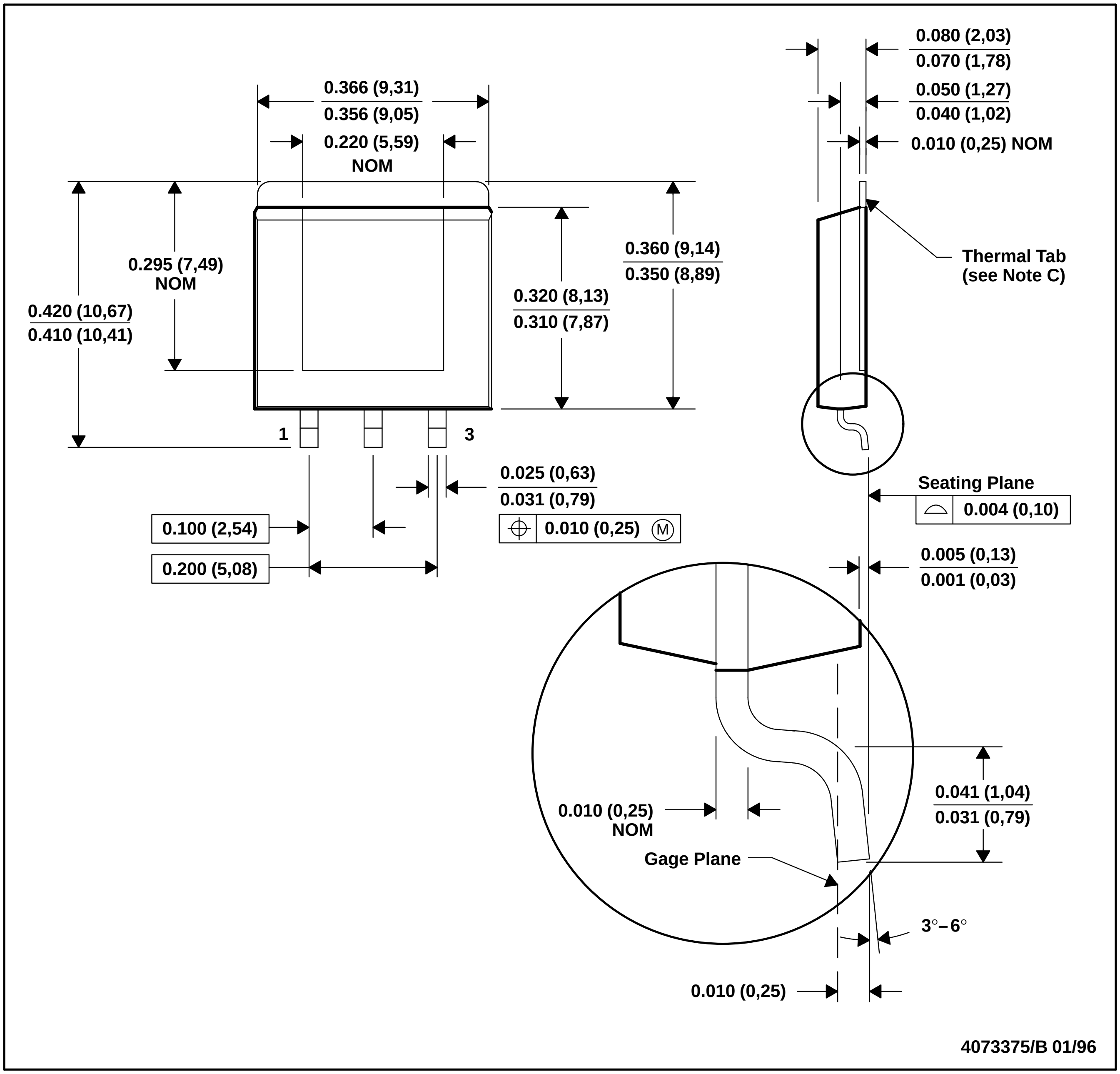
KC (R-PSFM-T3) **PLASTIC FLANGE-MOUNT PACKAGE**



NOTES: B. All linear dimensions are in inches (millimeters).
C. This drawing is subject to change without notice.
D. Lead dimensions are not controlled within this area.
E. All lead dimensions apply before solder dip.
F. The center lead is in electrical contact with the mounting tab.
G. The chamfer is optional.
H. Falls within JEDEC TO-220AB
I. Tab contour optional within these dimensions

MECHANICAL INFORMATION

KTE (R-PSFM-T3) **PLASTIC FLANGE-MOUNT PACKAGE**



NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. The center lead is in electrical contact with the thermal tab.

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