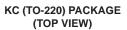
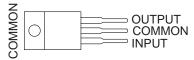
The  $\mu$ A78M15 is obsolete and no longer is supplied.

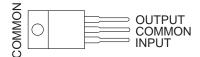
SLVS059O - JUNE 1976 - REVISED APRIL 2005

- 3-Terminal Regulators
- Output Current Up To 500 mA
- No External Components
- Internal Thermal-Overload Protection



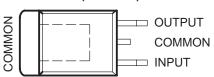


#### KCS (TO-220) PACKAGE (TOP VIEW)



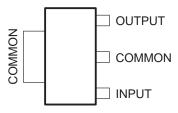
- High Power-Dissipation Capability
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation

### KTP (PowerFLEX™/TO-252\*) PACKAGE (TOP VIEW)



\*Complies with JEDEC TO-252, variation AC

### DCY (SOT-223) PACKAGE (TOP VIEW)



### description/ordering information

This series of fixed-voltage 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 500 mA of output current. The internal current-limiting and thermal-shutdown features of these regulators essentially make them 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 as the power-pass element in precision regulators.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PowerFLEX is a trademark of Texas Instruments.



### description/ordering information (continued)

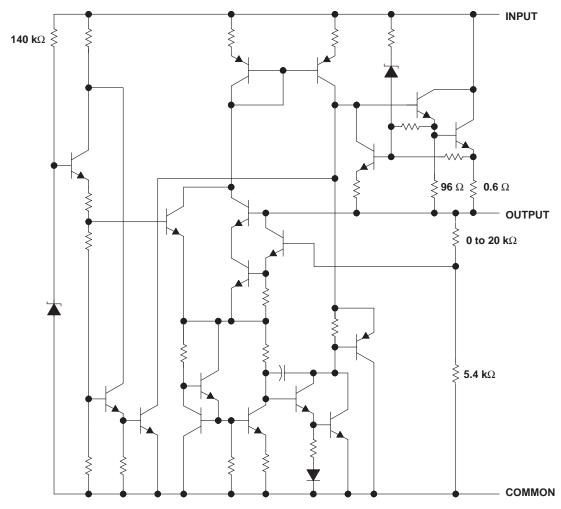
#### **ORDERING INFORMATION**

TJ	V <sub>O</sub> (NOM) (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
		PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M33CKTPR	UA78M33C
		00T 000 (DO)()	Tube of 80	μΑ78M33CDCY	00
	3.3	SOT-223 (DCY)	Reel of 2500	μΑ78M33CDCYR	C3
		TO-220 (KC)	Tube of 50	μΑ78М33СКС	UA78M33C
		PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M05CKTPR	UA78M05C
		00T 000 (DO)()	Tube of 80	μΑ78M05CDCY	0.5
	5	SOT-223 (DCY)	Reel of 2500	μΑ78M05CDCYR	C5
		TO-220 (KC)	Tube of 50	μΑ78M05CKC	1147014050
0°C to 125°C		TO-220, short shoulder (KCS)	Tube of 20	μΑ78M05CKCS	UA78M05C
0°C to 125°C	6	PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M06CKTPR	UA78M06C
		PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M08CKTPR	UA78M08C
		COT 222 (DOV)	Tube of 80	μΑ78M08CDCY	00
	8	SOT-223 (DCY)	Reel of 2500	μΑ78M08CDCYR	C8
		TO-220 (KC)	Tube of 50	μΑ78M08CKC	UA78M08C
	9	PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M09CKTPR	UA78M09C
	10	PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M10CKTPR	UA78M10C
	12	Power Flex/TO-252* (KTP)	Reel of 3000	μΑ78M12CKTPR	UA78M12C
	12	TO-220 (KC)	Tube of 50	μΑ78M12CKC	UA78M12C
		PowerFLEX/TO-252* (KTP)	Reel of 3000	μΑ78M05IKTPR	UA78M05I
		00T 000 (DO)()	Tube of 80	μΑ78M05IDCY	le.
-40°C to 125°C	5	SOT-223 (DCY)	Reel of 2500	μΑ78M05IDCYR	J5
		TO-220 (KC)	Tube of 50	μΑ78M05IKC	UA78M05I
		TO-220, short shoulder (KCS)	Tube of 20	μΑ78M05IKCS	UA/ OIVIUSI

<sup>\*</sup>Complies with TO-252, variation AC.

<sup>†</sup> Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

### schematic



Resistor values shown are nominal.

### The $\mu$ A78M15 is obsolete and no longer is supplied.

#### absolute maximum ratings over virtual junction temperature range (unless otherwise noted)

Input voltage, V <sub>I</sub>		. 35 V
Operating virtual junction temperature, T <sub>J</sub>		150°C
Storage temperature range, T <sub>stq</sub>	$-65^{\circ}\text{C}$ to	150°C

#### package thermal data (see Note 1)

PACKAGE	BOARD	θ <b>JP</b> ‡	θЈС	$\theta$ JA
PowerFLEX/TO-252 (KTP)	High K, JESD 51-5	1.4°C/W	19°C/W	28°C/W
SOT-223 (DCY)	High K, JESD 51-7		4°C/W	53°C/W
TO-220 (KC/KCS)	High K, JESD 51-5	3°C/W	17°C/W	19°C/W

<sup>‡</sup> For packages with exposed thermal pads, such as QFN, PowerPAD, and PowerFLEX, θ<sub>JP</sub> is defined as the thermal resistance between the die junction and the bottom of the exposed pad.

#### recommended operating conditions

			MIN	MAX	UNIT
		μΑ78Μ33	5.3	25	
		μΑ78Μ05	7	25	
		μΑ78Μ06	8	25	
		μΑ78Μ08	10.5	25	
VI	Input voltage	μΑ78Μ09	11.5	26	V
		μΑ78Μ10	12.5	28	
		μA78M12	14.5	30	
		μA78M15	17.5		
lo	Output current	•		500	mA
_	On and in a sixtual invasion to a second and	μΑ78МххС	0	125	00
ТJ	Operating virtual junction temperature	μΑ78MxxI	-40	125	°C

<sup>†</sup> 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: Maximum power dissipation is a function of  $T_J(max)$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(max) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.

### electrical characteristics at specified virtual junction temperature, $V_I = 8 \text{ V}$ , $I_O = 350 \text{ mA}$ , $T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

24244555		ar coupirioust	μ <b>Α78M33C</b>			
PARAMETER	IES	T CONDITIONS†	MIN	TYP	MAX	UNIT
0	$I_{O} = 5 \text{ mA to } 350 \text{ mA},$		3.2	3.3	3.4	.,
Output voltage‡	$V_{I} = 8 \text{ V to } 20 \text{ V}$	T <sub>J</sub> = 0°C to 125°C	3.1	3.3	3.5	V
Land and the manufaction	L 000 A	V <sub>I</sub> = 5.3 V to 25 V		9	100	>/
Input voltage regulation	I <sub>O</sub> = 200 mA	V <sub>I</sub> = 8 V to 25 V		3	50	mV
Ripple rejection	$V_{I} = 8 \text{ V to } 18 \text{ V},$	$I_{O} = 100 \text{ mA}, T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$	62			
	f = 120 Hz	I <sub>O</sub> = 300 mA	62	80		dB
Output voltage regulation	V <sub>I</sub> = 8 V,	I <sub>O</sub> = 5 mA to 500 mA		20	100	mV
Temperature coefficient of output voltage	$I_O = 5 \text{ mA},$	T <sub>J</sub> = 0°C to 125°C		-1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz			40	200	μV
Dropout voltage				2		V
Bias current				4.5	6	mA
S	I <sub>O</sub> = 200 mA,	$V_I = 8 \text{ V to } 25 \text{ V}, T_J = 0^{\circ}\text{C to } 125^{\circ}\text{C}$			8.0	
Bias current change	$I_{O} = 5 \text{ mA to } 350 \text{ mA},  T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$				0.5	mA
Short-circuit output current	V <sub>I</sub> = 35 V			300		mA
Peak output current				700		mA

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.

# electrical characteristics at specified virtual junction temperature, $V_I$ = 10 V, $I_O$ = 350 mA, $T_J$ = 25°C (unless otherwise noted)

545445			μ <b>Α78M05C</b>				
PARAMETER	TES	ST CONDITIONS†	TYP	MAX	UNIT		
Output walks as	$I_{O} = 5 \text{ mA to } 350 \text{ mA},$		4.8	5	5.2	.,	
Output voltage	$V_{I} = 7 \text{ V to } 20 \text{ V}$	$T_J = 0$ °C to 125°C	4.75		5.25	V	
land and a man and affect		V <sub>I</sub> = 7 V to 25 V		3	100	>/	
Input voltage regulation	I <sub>O</sub> = 200 mA	V <sub>I</sub> = 8 V to 25 V		1	50	mV	
Ripple rejection	$V_{I} = 8 \text{ V to } 18 \text{ V,}$	$I_{O} = 100 \text{ mA}, T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$	62			-ID	
	f = 120 Hz	I <sub>O</sub> = 300 mA	62	80		dB	
Output wells as a welsten	I <sub>O</sub> = 5 mA to 500 mA			20	100	.,	
Output voltage regulation	$I_O = 5 \text{ mA to } 200 \text{ mA}$			10	50	mV	
Temperature coefficient of output voltage	$I_O = 5 \text{ mA},$	$T_J = 0$ °C to 125°C		-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz			40	200	μV	
Dropout voltage				2		V	
Bias current				4.5	6	mA	
5.	I <sub>O</sub> = 200 mA,	$V_{I} = 8 \text{ V to } 25 \text{ V}, T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$			8.0		
Bias current change	$I_{O} = 5 \text{ mA to } 350 \text{ mA},  T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$				0.5	mA	
Short-circuit output current	V <sub>I</sub> = 35 V			300		mA	
Peak output current				0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.



<sup>&</sup>lt;sup>‡</sup> This specification applies only for dc power dissipation permitted by absolute maximum ratings.

### electrical characteristics at specified virtual junction temperature, $V_I = 10 \text{ V}$ , $I_O = 350 \text{ mA}$ , $T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

DADAMETED		or completenet	μΑ	μ <b>Α78Μ05Ι</b>			
PARAMETER	I E;	ST CONDITIONS†	MIN TYP MAX			UNIT	
Output walte as	$I_{O} = 5 \text{ mA to } 350 \text{ mA},$		4.8	5	5.2	V	
Output voltage	$V_I = 7 \text{ V to } 20 \text{ V}$	$T_J = -40^{\circ}\text{C} \text{ to } 125^{\circ}\text{C}$	4.75		5.25	V	
Input voltage regulation	I- 200 m A	V <sub>I</sub> = 7 V to 25 V		3	100	m)/	
Input voltage regulation	I <sub>O</sub> = 200 mA	V <sub>I</sub> = 8 V to 25 V		1	50	mV	
Ripple rejection	$V_{ } = 8 \text{ V to } 18 \text{ V},$	$I_{O} = 100 \text{ mA}, T_{J} = -40^{\circ}\text{C to } 125^{\circ}\text{C}$	62			10	
	f = 120 Hz	I <sub>O</sub> = 300 mA	62	80		dB	
Output voltage regulation	$I_O = 5 \text{ mA to } 500 \text{ mA}$			20	100	mV	
	$I_O = 5 \text{ mA to } 200 \text{ mA}$			10	50	IIIV	
Temperature coefficient of output voltage	$I_O = 5 \text{ mA},$	$T_J = -40^{\circ}C$ to $125^{\circ}C$		-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz			40	200	μV	
Dropout voltage				2		V	
Bias current				4.5	6	mA	
Bias current change	I <sub>O</sub> = 200 mA,	$V_I = 8 \text{ V to } 25 \text{ V},$ $T_J = -40^{\circ}\text{C to } 125^{\circ}\text{C}$			0.8	mA	
Ç	$I_{O} = 5 \text{ mA to } 350 \text{ mA},  T_{J} = -40^{\circ}\text{C to } 125^{\circ}\text{C}$				0.5	]	
Short-circuit output current	V <sub>I</sub> = 35 V			300		mA	
Peak output current				0.7		Α	

TAII characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.

# electrical characteristics at specified virtual junction temperature, $V_I = 11 \text{ V}$ , $I_O = 350 \text{ mA}$ , $T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

DADAMETED				μ <b>Α78M06C</b>			UNIT
PARAMETER		TEST CONDITIONS†		MIN	UNIT		
Outrout walte ma	La E mA to 250 mA	\/. 0 \/ to 24 \/		5.75	6	6.25	V
Output voltage	$I_O = 5 \text{ mA to } 350 \text{ mA},$	V <sub>I</sub> = 8 V to 21 V	$T_J = 0$ °C to 125°C	5.7		6.3	V
lanut valta na namulatian	L = 000 m A	$V_{I} = 8 \text{ V to } 25 \text{ V}$			5	100	>/
Input voltage regulation	I <sub>O</sub> = 200 mA	$V_{ } = 9 \text{ V to } 25 \text{ V}$			1.5	50	mV
Ripple rejection	V <sub>I</sub> = 9 V to 19 V,	f = 120 Hz	I <sub>O</sub> = 100 mA, T <sub>J</sub> = 0°C to 125°C	59			dB
	•		I <sub>O</sub> = 300 mA	59	80		
Output voltage regulation	I <sub>O</sub> = 5 mA to 500 mA				20	120	>/
	I <sub>O</sub> = 5 mA to 200 mA				10	60	mV
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA,	$T_J = 0$ °C to 125°C			-1		mV/°C
Output noise voltage	f = 10 Hz to 100 kHz				45		μV
Dropout voltage					2		V
Bias current					4.5	6	mA
B:	$V_{I} = 9 V \text{ to } 25 V,$	I <sub>O</sub> = 200 mA,	$T_J = 0$ °C to 125°C			0.8	
Bias current change	$I_{O} = 5 \text{ mA to } 350 \text{ mA},$	T <sub>J</sub> = 0°C to 125°C				0.5	mA
Short-circuit output current	V <sub>I</sub> = 35 V	•			270		mA
Peak output current					0.7		Α

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.



### electrical characteristics at specified virtual junction temperature, $V_I = 14 \text{ V}$ , $I_O = 350 \text{ mA}$ , $T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

242445752		TEST SOMETIONS		μ <b>Α78M08C</b>				
PARAMETER		TEST CONDITIONST		MIN	UNIT			
0	V 40.5.V/1-00.V/	L 5 A (- 050 A		7.7	8	8.3	V	
Output voltage	$V_I = 10.5 \text{ V to } 23 \text{ V},$	$I_O = 5 \text{ mA to } 350 \text{ mA}$	$T_J = 0$ °C to 125°C	7.6		8.4	V	
lanut valta en vanulation	L- 200 A	V <sub>I</sub> = 10.5 V to 25 V			6	100	\/	
Input voltage regulation	I <sub>O</sub> = 200 mA	$V_{ } = 11 \text{ V to } 25 \text{ V}$			2	50	mV	
Disabe advertise	V <sub>I</sub> = 11.5 V to 21.5 V,	I <sub>O</sub> = 100 mA,	$T_J = 0$ °C to 125°C	56			.ID	
Ripple rejection	f = 120 Hz	I <sub>O</sub> = 300 mA		56	80		dB	
Outside all and an analysis and	$I_O = 5 \text{ mA to } 500 \text{ mA}$				25	160	mV	
Output voltage regulation	$I_O = 5 \text{ mA to } 200 \text{ mA}$				10	80	mv	
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA,	$T_J = 0$ °C to 125°C			-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz				52		μV	
Dropout voltage					2		V	
Bias current					4.6	6	mA	
D'an arment als arme	V <sub>I</sub> = 10.5 V to 25 V,	I <sub>O</sub> = 200 mA,	$T_J = 0^{\circ}C$ to $125^{\circ}C$			0.8	0	
Bias current change	$I_O = 5 \text{ mA to } 350 \text{ mA},$	T <sub>J</sub> = 0°C to 125°C				0.5	mA	
Short-circuit output current	V <sub>I</sub> = 35 V				250		mA	
Peak output current			_		0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.

## electrical characteristics at specified virtual junction temperature, $V_I = 16 \text{ V}, I_O = 350 \text{ mA}, T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

24244555				μ <b>Α78Μ09C</b>				
PARAMETER		TEST CONDITIONS†					UNIT	
Output well-an-	V: 44 5 V to 24 V	I- 5 A to 250 A		8.6	9	9.4	V	
Output voltage	$V_{\parallel} = 11.5 \text{ V to } 24 \text{ V},$	$I_O = 5 \text{ mA to } 350 \text{ mA}$	$T_J = 0$ °C to 125°C	8.5		9.5	V	
Input voltage regulation	I - 200 - A	V <sub>I</sub> = 11.5 V to 26 V			6	100	\/	
	I <sub>O</sub> = 200 mA	$V_{ } = 12 \text{ V to } 26 \text{ V}$			2	50	mV	
Ripple rejection	V <sub>I</sub> = 13 V to 23 V,	I <sub>O</sub> = 100 mA,	$T_J = 0$ °C to 125°C	56			-10	
	f = 120 Hz	I <sub>O</sub> = 300 mA		56	80		dB	
0	I <sub>O</sub> = 5 mA to 500 mA				25	180	\/	
Output voltage regulation	I <sub>O</sub> = 5 mA to 200 mA				10	90	mV	
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA,	T <sub>J</sub> = 0°C to 125°C			-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz				58		μV	
Dropout voltage					2		V	
Bias current					4.6	6	mA	
5	V <sub>I</sub> = 11.5 V to 26 V,	I <sub>O</sub> = 200 mA,	$T_J = 0$ °C to 125°C			0.8		
Bias current change	$I_O = 5 \text{ mA to } 350 \text{ mA},$	T <sub>J</sub> = 0°C to 125°C				0.5	mA	
Short-circuit output current	V <sub>I</sub> = 35 V				250		mA	
Peak output current					0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>,I</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.



### electrical characteristics at specified virtual junction temperature, $V_I$ = 17 V, $I_O$ = 350 mA, $T_J$ = 25°C (unless otherwise noted)

242445752				μ <b>Α78M10C</b>			LINUT	
PARAMETER		TEST CONDITIONS†		MIN	UNIT			
O double allows	V: 40 E V to 0E V	I- 5 A to 250 A		9.6	10	10.4	V	
Output voltage	$V_I = 12.5 \text{ V to } 25 \text{ V},$	$I_O = 5 \text{ mA to } 350 \text{ mA}$	$T_J = 0$ °C to 125°C	9.5		10.5	V	
1	I - 200 A	V <sub>I</sub> = 12.5 V to 28 V			7	100	>/	
Input voltage regulation	I <sub>O</sub> = 200 mA	V <sub>I</sub> = 14 V to 28 V			2	50	mV	
Ripple rejection	V <sub>I</sub> = 15 V to 25 V,	$I_O = 100 \text{ mA},$	$T_J = 0$ °C to 125°C	59			-ID	
	f = 120 Hz	IO = 300 mA		55	80		dB	
Outrot calls as a soluti	$I_O = 5 \text{ mA to } 500 \text{ mA}$				25	200	>/	
Output voltage regulation	$I_O = 5 \text{ mA to } 200 \text{ mA}$				10	100	mV	
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA,	$T_J = 0$ °C to 125°C			-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz				64		μV	
Dropout voltage					2		V	
Bias current					4.7	6	mA	
5:	V <sub>I</sub> = 12.5 V to 28 V,	I <sub>O</sub> = 200 mA,	T <sub>J</sub> = 0°C to 125°C			0.8		
Bias current change	$I_{O} = 5 \text{ mA to } 350 \text{ mA},$	$T_J = 0$ °C to 125°C				0.5	mA	
Short-circuit output current	V <sub>I</sub> = 35 V				245		mA	
Peak output current					0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.

### electrical characteristics at specified virtual junction temperature, $V_I$ = 19 V, $I_O$ = 350 mA, $T_J$ = 25°C (unless otherwise noted)

242445752				μ <b>Α78M12C</b>				
PARAMETER		TEST CONDITIONS†		MIN	MAX	UNIT		
Outrout walte as	V: 445 V: 07 V	I- 5 A to 250 A		11.5	12	12.5	.,	
Output voltage	$V_{I} = 14.5 \text{ V to } 27 \text{ V},$	$I_O = 5 \text{ mA to } 350 \text{ mA}$	$T_J = 0$ °C to 125°C	11.4		12.6	V	
land delta manufation	J 000 A	V <sub>I</sub> = 14.5 V to 30 V			8	100		
Input voltage regulation	I <sub>O</sub> = 200 mA	V <sub>I</sub> = 16 V to 30 V			2	50	mV	
Ripple rejection	V <sub>I</sub> = 15 V to 25 V,	I <sub>O</sub> = 100 mA,	$T_J = 0$ °C to 125°C	55			40	
	f = 120 Hz	I <sub>O</sub> = 300 mA		55	80		dB	
	$I_O = 5 \text{ mA to } 500 \text{ mA}$				25	240	>/	
Output voltage regulation	$I_O = 5 \text{ mA to } 200 \text{ mA}$	mA to 200 mA			10	120	mV	
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA				-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz				75		μV	
Dropout voltage					2		V	
Bias current					4.8	6	mA	
D'an annual abanan	V <sub>I</sub> = 14.5 V to 30 V,	I <sub>O</sub> = 200 mA,	$T_J = 0^{\circ}C$ to $125^{\circ}C$			0.8	4	
Bias current change	$I_O = 5 \text{ mA to } 350 \text{ mA},$	T <sub>J</sub> = 0°C to 125°C				0.5	mA	
Short-circuit output current	V <sub>I</sub> = 35 V				240		mA	
Peak output current			_		0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.



# electrical characteristics at specified virtual junction temperature, $V_I$ = 23 V, $I_O$ = 350 mA, $T_J$ = 25°C (unless otherwise noted)

DADAMETED		μ <b>Α78M15C</b>						
PARAMETER		MIN	TYP	MAX	UNIT			
Outset williams	V: 47 5 V to 20 V	I - 5 1 to 250 1		14.4	15	15.6	V	
Output voltage	$V_I = 17.5 \text{ V to } 30 \text{ V},$	$I_O = 5 \text{ mA to } 350 \text{ mA}$	$T_J = 0^{\circ}C$ to $125^{\circ}C$	14.25		15.75	]	
Input voltage regulation	In 200 m A	V <sub>I</sub> = 17.5 V to 30 V			10	100	mV	
	I <sub>O</sub> = 200 mA	$V_{I} = 20 \text{ V to } 30 \text{ V}$		3	50			
Ripple rejection	$V_{\parallel} = 18.5 \text{ V to } 28.5 \text{ V},$	$I_{O} = 100 \text{ mA},$ $T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$		54			10	
	f = 120 Hz	I <sub>O</sub> = 300 mA		54	70		dB	
Output voltage regulation	$I_O = 5 \text{ mA to } 500 \text{ mA}$	5 mA to 500 mA				300	mV	
	$I_O = 5 \text{ mA to } 200 \text{ mA}$			10 150			IIIV	
Temperature coefficient of output voltage	I <sub>O</sub> = 5 mA,	$T_J = 0^{\circ}C$ to $125^{\circ}C$			-1		mV/°C	
Output noise voltage	f = 10 Hz to 100 kHz				90		μV	
Dropout voltage		40			2		V	
Bias current					4.8	6	mA	
Bias current change	$V_I = 17.5 \text{ V to } 30 \text{ V},$	$I_{O} = 200 \text{ mA},$ $T_{J} = 0^{\circ}\text{C to } 125^{\circ}\text{C}$				0.8	0	
	$I_O = 5 \text{ mA to } 350 \text{ mA},$	$T_J = 0$ °C to 125°C	= 0°C to 125°C				mA	
Short-circuit output current	V <sub>I</sub> = 35 V				240		mA	
Peak output current					0.7		Α	

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques maintain T<sub>J</sub> as close to T<sub>A</sub> as possible. Thermal effects must be taken into account separately.



### **PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
UA78M05CDCY	ACTIVE	SOT-223	DCY	4	80	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M05CDCYR	ACTIVE	SOT-223	DCY	4	2500	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M05CKC	ACTIVE	TO-220	KC	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M05CKCS	ACTIVE	TO-220	KCS	3	50	TBD	CU	Level-NC-NC-NC
UA78M05CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M05IDCY	ACTIVE	SOT-223	DCY	4	80	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M05IDCYR	ACTIVE	SOT-223	DCY	4	2500	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M05IKC	ACTIVE	TO-220	KC	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M05IKCS	ACTIVE	TO-220	KCS	3	50	TBD	CU	Level-NC-NC-NC
UA78M05IKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M06CKC	OBSOLETE	TO-220	KC	3		TBD	Call TI	Call TI
UA78M06CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M06CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM
UA78M08CDCY	ACTIVE	SOT-223	DCY	4	80	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M08CDCYR	ACTIVE	SOT-223	DCY	4	2500	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M08CKC	ACTIVE	TO-220	KC	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M08CKCS	ACTIVE	TO-220	KCS	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M08CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M08CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM
UA78M09CKC	OBSOLETE	TO-220	KC	3		TBD	Call TI	Call TI
UA78M09CKTP	OBSOLETE	PFM	KTP	2		TBD	Call TI	Call TI
UA78M09CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M09CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM
UA78M10CKC	OBSOLETE	TO-220	KC	3		TBD	Call TI	Call TI
UA78M10CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M10CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM
UA78M12CKC	ACTIVE	TO-220	KC	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M12CKCS	ACTIVE	TO-220	KCS	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M12CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M12CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM
UA78M15CKC	OBSOLETE	TO-220	KC	3		TBD	Call TI	Call TI
UA78M15CKTPR	OBSOLETE	PFM	KTP	2		TBD	Call TI	Call TI
UA78M20CKC	OBSOLETE	TO-220	KC	3		TBD	Call TI	Call TI
UA78M20CKTPR	OBSOLETE	PFM	KTP	2		TBD	Call TI	Call TI
UA78M20Y	OBSOLETE	XCEPT	Υ	0		TBD	Call TI	Call TI
UA78M24CKTPR	OBSOLETE	PFM	KTP	2		TBD	Call TI	Call TI
UA78M33CDCY	ACTIVE	SOT-223	DCY	4	80	TBD	CU SNPB	Level-2-235C-1 YEAR
UA78M33CDCYR	ACTIVE	SOT-223	DCY	4	2500	TBD	CU SNPB	Level-2-235C-1 YEAR



#### PACKAGE OPTION ADDENDUM

10-May-2005

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
UA78M33CKC	ACTIVE	TO-220	KC	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M33CKCS	ACTIVE	TO-220	KCS	3	50	TBD	CU SNPB	Level-NC-NC-NC
UA78M33CKTPR	ACTIVE	PFM	KTP	2	3000	TBD	CU SNPB	Level-1-220C-UNLIM
UA78M33CKTPRG3	ACTIVE	PFM	KTP	2	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free** (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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### DCY (R-PDSO-G4)

#### **PLASTIC SMALL-OUTLINE**



NOTES: A. All linear dimensions are in millimeters (inches).

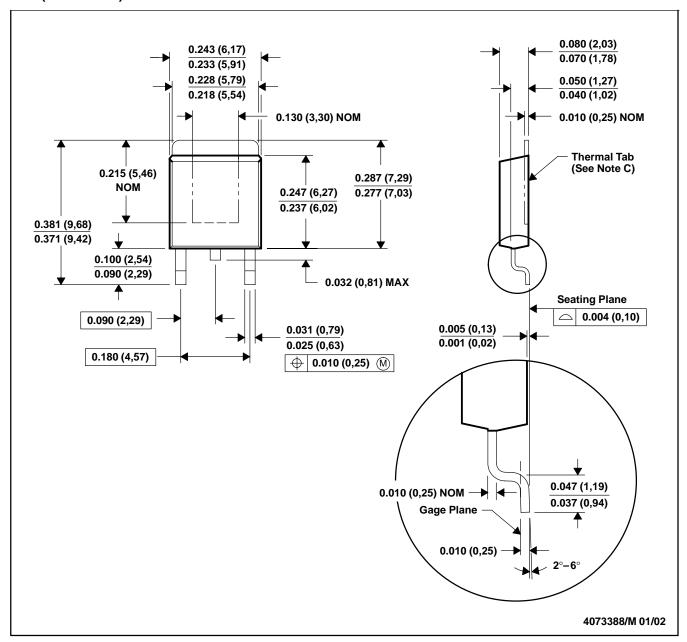
B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion.

D. Falls within JEDEC TO-261 Variation AA.

#### KTP (R-PSFM-G2)

#### PowerFLEX™ PLASTIC FLANGE-MOUNT PACKAGE



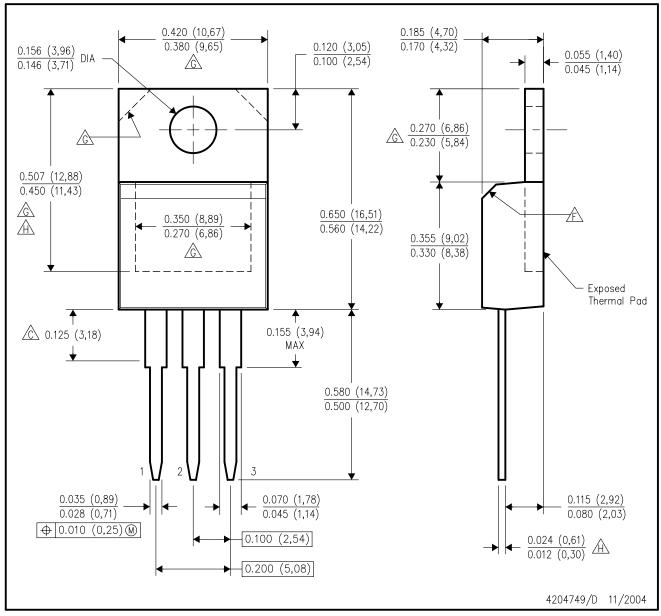
- NOTES: A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. The center lead is in electrical contact with the thermal tab.
  - D. Dimensions do not include mold protrusions, not to exceed 0.006 (0,15).
  - E. Falls within JEDEC TO-252 variation AC.

PowerFLEX is a trademark of Texas Instruments.



### KCS (R-PSFM-T3)

### PLASTIC FLANGE-MOUNT PACKAGE



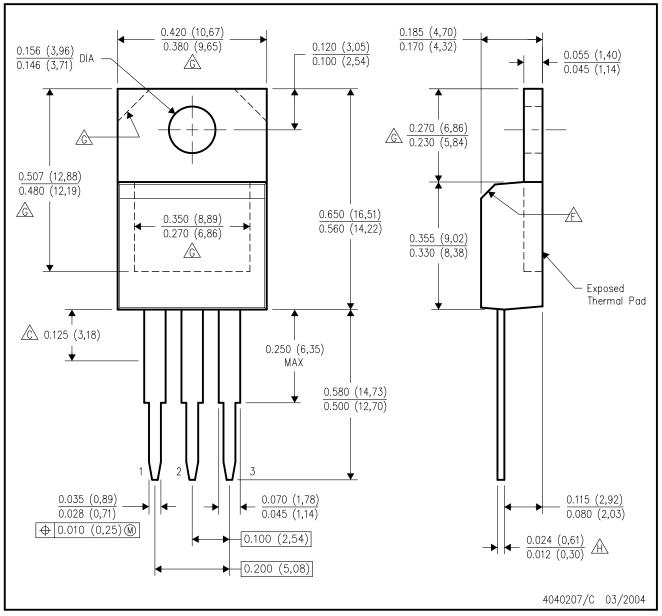
NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Lead dimensions are not controlled within this area.
- D. All lead dimensions apply before solder dip.
- E. The center lead is in electrical contact with the mounting tab.
- The chamfer is optional.
- Thermal pad contour optional within these dimensions.
- Falls within JEDEC T0—220 variation AB, except minimum lead thickness and minimum exposed pad length.



### KC (R-PSFM-T3)

### PLASTIC FLANGE-MOUNT PACKAGE



NOTES: A

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Lead dimensions are not controlled within this area.
- D. All lead dimensions apply before solder dip.
- E. The center lead is in electrical contact with the mounting tab.
- The chamfer is optional.
- Thermal pad contour optional within these dimensions.
- Falls within JEDEC TO-220 variation AB, except minimum lead thickness.



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