

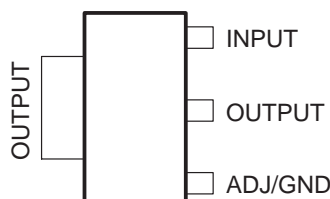
TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

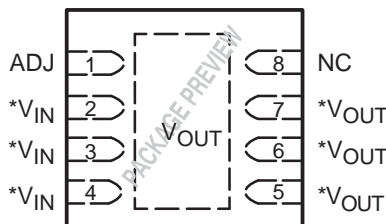
SLVS561 – DECEMBER 2004

- 1.5 V, 1.8 V, 2.5 V, 2.85 V, 3.3 V, 5 V, and Adjustable Output Voltage Options
- Output Current of 800 mA
- Operates Down to 1.1-V Dropout
- Specified Dropout Voltage at Multiple Current Levels
- 0.2% Line Regulation Maximum
- 0.4% Load Regulation Maximum
- Max V_{IN} of 15 V

DCY (SOT-223) PACKAGE
(TOP VIEW)

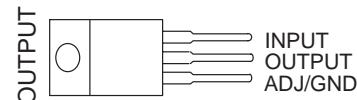


DRJ (QFN) PACKAGE
(TOP VIEW)

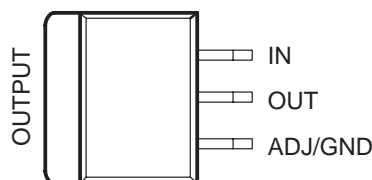


* V_{IN} pins (2, 3, 4) must be connected together;
 V_{OUT} pins (5, 6, 7) must be connected together.

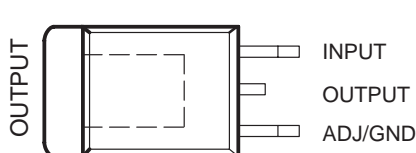
KCS (TO-220) PACKAGE
(TOP VIEW)



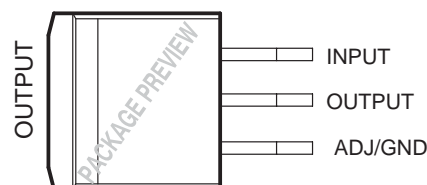
KTE (PowerFLEX™) PACKAGE
(TOP VIEW)



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



KTT (TO-263) PACKAGE
(TOP VIEW)



description/ordering information

The TLV1117 is a positive low-dropout voltage regulator, designed to provide up to 800 mA of output current. The device is available in 1.5 V, 1.8 V, 2.5 V, 2.85 V, 3.3 V, 5 V, and adjustable output voltage options. All internal circuitry is designed to operate down to 1 V input-to-output differential. Dropout voltage is specified at a maximum of 1.3 V at 800 mA, decreasing at lower load currents.

The low-profile surface-mount KTP package allows the device to be used in applications where space is limited. The TLV1117 requires a minimum of 10 μ F of output capacitance for stability. Output capacitors of this size or larger normally are included in most regulator designs.

Unlike pnp-type regulators, where up to 10% of the output current is wasted as quiescent current, the quiescent current of the TLV1117 flows into the load, increasing efficiency.

The TLV1117C device is characterized for operation over the virtual junction temperature range of 0°C to 125°C, and the TLV1117I device is characterized for operation over the virtual junction temperature range of –40°C to 125°C.



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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2004, Texas Instruments Incorporated

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

description/ordering information (continued)

TLV1117C ORDERING INFORMATION

T _J	V _O TYP (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 125°C	1.5 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-15CKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-15CKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-15CDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-15CDCY	
			Reel of 2500	TLV1117-15CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-15CKCS	
		TO-263 (KTT)	Tube of	TLV1117-15CKTT	
			Reel of	TLV1117-15CKTTR	
	1.8 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-18CKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-18CKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-18CDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-18CDCY	
			Reel of 2500	TLV1117-18CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-18CKCS	
		TO-263 (KTT)	Tube of	TLV1117-18CKTT	
			Reel of	TLV1117-18CKTTR	
	2.5 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-25CKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-25CKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-25CDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-25CDCY	
			Reel of 2500	TLV1117-25CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-25CKCS	
		TO-263 (KTT)	Tube of	TLV1117-25CKTT	
			Reel of	TLV1117-25CKTTR	
	2.85 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-285CKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-285CKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-285CDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-285CDCY	
			Reel of 2500	TLV1117-285CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-285CKCS	
		TO-263 (KTT)	Tube of	TLV1117-285CKTT	
			Reel of	TLV1117-285CKTTR	
	3.3 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-33CKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-33CKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-33CDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-33CDCY	
			Reel of 2500	TLV1117-33CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-33CKCS	
		TO-263 (KTT)	Tube of	TLV1117-33CKTT	
			Reel of	TLV1117-33CKTTR	

*Complies with TO-252, variation AC.

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



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117C ORDERING INFORMATION (continued)

T _J	V _O TYP (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 125°C	5 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-50CKTER	PREVIEW
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-50CKTPR	PREVIEW
		QFN (DRJ)	Reel of 1000	TLV1117-50CDRJR	PREVIEW
		SOT-223 (DCY)	Tube of 80	TLV1117-50CDCY	PREVIEW
			Reel of 2500	TLV1117-50CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-50CKCS	PREVIEW
		TO-263 (KTT)	Tube of	TLV1117-50CKTT	PREVIEW
			Reel of	TLV1117-50CKTTR	
	ADJ	PowerFLEX (KTE)	Reel of 2000	TLV1117CKTER	TLV1117C
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117CKTPR	TV1117
		QFN (DRJ)	Reel of 1000	TLV1117CDRJR	PREVIEW
		SOT-223 (DCY)	Tube of 80	TLV1117CDCY	V4
			Reel of 2500	TLV1117CDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117CKCS	TLV1117C
		TO-263 (KTT)	Tube of	TLV1117CKTT	PREVIEW
			Reel of	TLV1117CKTTR	

*Complies with TO-252, variation AC.

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



TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117I ORDERING INFORMATION

T _J	V _O TYP (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 125°C	1.5 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-15IKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-15IKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-15IDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-15IDCY	
			Reel of 2500	TLV1117-15IDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-15IKCS	
	1.8 V	TO-263 (KTT)	Tube of	TLV1117-15IKTT	
			Reel of	TLV1117-15IKTTR	
		PowerFLEX (KTE)	Reel of 2000	TLV1117-18IKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-18IKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-18IDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-18IDCY	
			Reel of 2500	TLV1117-18IDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-18IKCS	
	2.5 V	TO-263 (KTT)	Tube of	TLV1117-18IKTT	
			Reel of	TLV1117-18IKTTR	
		PowerFLEX (KTE)	Reel of 2000	TLV1117-25IKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-25IKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-25IDRJR	
		SOT-223 (DCY)	Tube of 80	TLV1117-25IDCY	
			Reel of 2500	TLV1117-25IDCYR	
–40°C to 125°C	2.85 V	TO-220 (KCS)	Tube of 50	TLV1117-25IKCS	
		TO-263 (KTT)	Tube of	TLV1117-25IKTT	
			Reel of	TLV1117-25IKTTR	
		PowerFLEX (KTE)	Reel of 2000	TLV1117-285IKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-285IKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-285IDRJR	
	3.3 V	SOT-223 (DCY)	Tube of 80	TLV1117-33IDCY	
			Reel of 2500	TLV1117-33IDCYR	
–40°C to 125°C	3.3 V	TO-220 (KCS)	Tube of 50	TLV1117-33IKCS	
		TO-263 (KTT)	Tube of	TLV1117-33IKTT	
			Reel of	TLV1117-33IKTTR	
		PowerFLEX (KTE)	Reel of 2000	TLV1117-33IKTER	
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-33IKTPR	
		QFN (DRJ)	Reel of 1000	TLV1117-33IDRJR	
	3.3 V	SOT-223 (DCY)	Tube of 80	TLV1117-33IDCY	
			Reel of 2500	TLV1117-33IDCYR	

*Complies with TO-252, variation AC.

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



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

description/ordering information (continued)

TLV1117I ORDERING INFORMATION (continued)

T _J	V _O TYP (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 125°C	5 V	PowerFLEX (KTE)	Reel of 2000	TLV1117-50IKTER	PREVIEW
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117-50IKTPR	PREVIEW
		QFN (DRJ)	Reel of 1000	TLV1117-50DRJR	PREVIEW
		SOT-223 (DCY)	Tube of 80	TLV1117-50IDCY	PREVIEW
			Reel of 2500	TLV1117-50IDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117-50IKCS	PREVIEW
		TO-263 (KTT)	Tube of	TLV1117-50IKTT	PREVIEW
			Reel of	TLV1117-50IKTTR	
	ADJ	PowerFLEX (KTE)	Reel of 2000	TLV1117IKTER	TLV1117I
		PowerFLEX/TO-252* (KTP)	Reel of 2000	TLV1117IKTPR	TY1117
		QFN (DRJ)	Reel of 1000	TLV1117IDRJR	PREVIEW
		SOT-223 (DCY)	Tube of 80	TLV1117IDCY	V2
			Reel of 2500	TLV1117IDCYR	
		TO-220 (KCS)	Tube of 50	TLV1117IKCS	TLV1117I
		TO-263 (KTT)	Tube of	TLV1117IKTT	PREVIEW
			Reel of	TLV1117IKTTR	

*Complies with TO-252, variation AC.

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

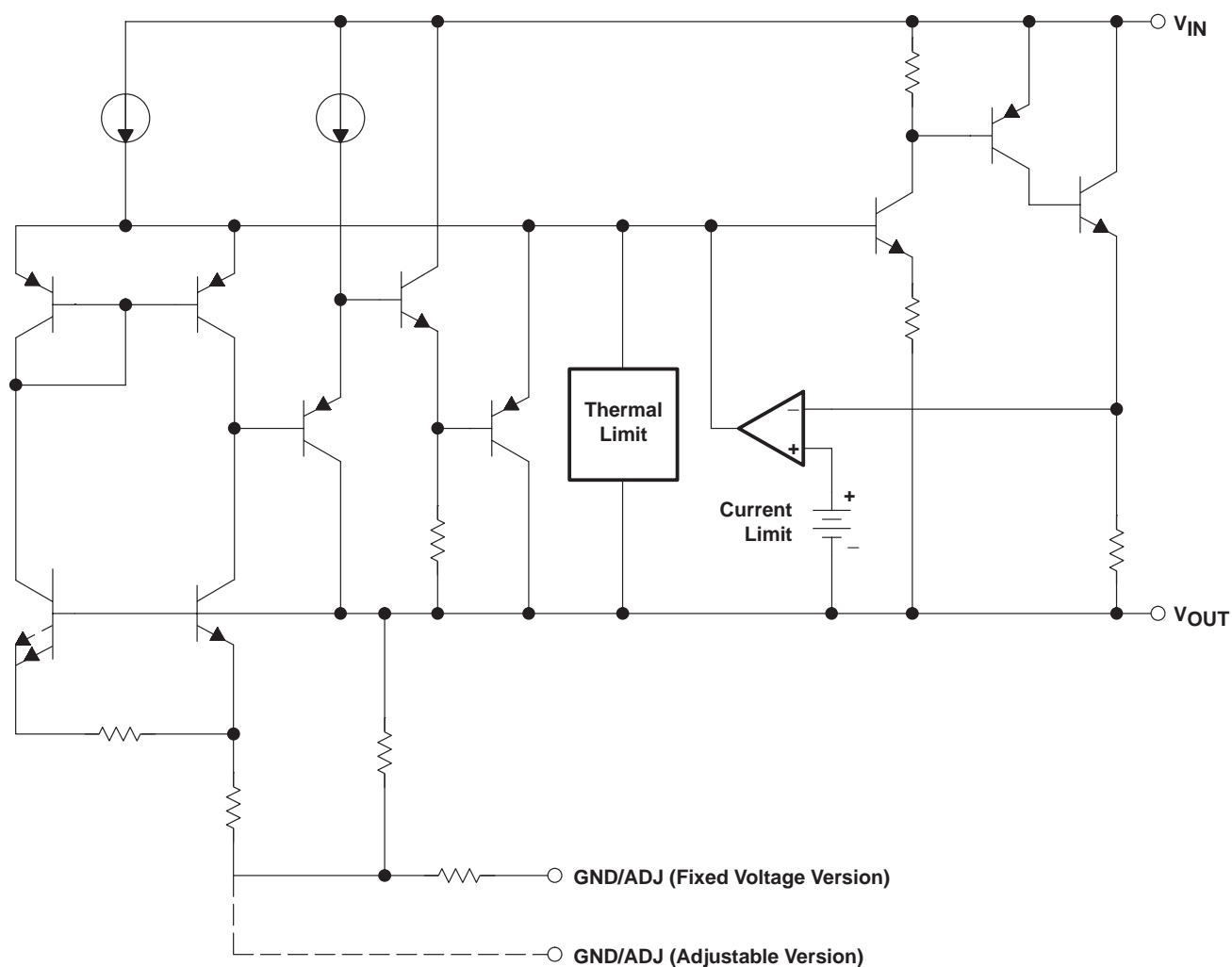
DEVICE COMPONENT COUNT	
Transistors	
Diodes	
Resistors	
Capacitors	
JFET	
Tunnels (emitter R)	

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

functional block diagram



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Continuous input voltage	15 V
Operating virtual junction temperature	150°C
Storage temperature range, T_{stg}	-65°C to 150°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.

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

package thermal data (see Note 1)

PACKAGE	BOARD	θ_{JP}^*	θ_{JC}	θ_{JA}
PowerFLEX (KTE)	High K, JESD 51-5	2.7°C/W		23°C/W
PowerFLEX/TO-252 (KTP)	High K, JESD 51-5	3°C/W		28°C/W
QFN (DRJ)	High K, JESD 51-5	TBD		TBD
SOT (DCY)	High K, JESD 51-7		4°C/W	53°C/W
TO-263 (KTT)	High K, JESD 51-5	TBD		TBD
TO-220 (KCS)	High K, JESD 51-5	3°C/W		19°C/W

*For packages with exposed thermal pads, such as QFN, PowerPAD, and PowerFLEX, θ_{JP} is defined as the thermal resistance between the die junction and the bottom of the exposed pad.

NOTE 1: Maximum power dissipation is a function of $T_J(\text{max})$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

recommended operating conditions

		MIN†	MAX	UNIT
V_{IN} Input voltage	TLV1117	2.7	15	V
	TLV1117-15	2.9	15	
	TLV1117-18	3.2	15	
	TLV1117-25	3.9	15	
	TLV1117-285	4.25	15	
	TLV1117-33	4.7	15	
	TLV1117-50	6.4	15	
I_{OUT} Output current			0.8	A
T_J Operating virtual junction temperature range	TLV1117C	0	125	°C
	TLV1117I	-40	125	

† The input-to-output differential across the regulator should provide for some margin against regulator operation at the maximum dropout (for a particular current value). This margin is needed to account for tolerances in both the input voltage (lower limit) and the output voltage (upper limit). The absolute minimum V_{IN} for a desired maximum output current can be calculated by the following:

$$V_{IN(\text{min})} = V_{OUT(\text{max})} + V_{DO(\text{max @ rated current})}$$

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117C electrical characteristics, $T_J = 0^\circ\text{C}$ to 125°C , all typical values are at $T_J = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS†		MIN	TYP	MAX	UNIT
Output voltage, V_{OUT}	$V_{IN} - V_{OUT} = 2\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117	1.238	1.250	1.262	V
	$I_{OUT} = 10\text{ mA}$ to 800 mA , $V_{IN} - V_{OUT} = 1.4\text{ V}$ to 10 V		1.225	1.250	1.270	
	$V_{IN} = 3.5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-15	1.485	1.500	1.515	
	$V_{IN} = 2.9\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		1.470	1.500	1.530	
	$V_{IN} = 3.8\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-18	1.782	1.800	1.818	
	$V_{IN} = 3.2\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		1.764	1.800	1.836	
	$V_{IN} = 4.5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-25	2.475	2.500	2.525	
	$V_{IN} = 3.9\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		2.450	2.500	2.550	
	$V_{IN} = 4.85\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-285	2.820	2.850	2.880	
	$V_{IN} = 4.25\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		2.790	2.850	2.910	
	$V_{IN} = 4.1\text{ V}$, $I_{OUT} = 0$ to 500 mA		2.790	2.850	2.910	
	$V_{IN} = 5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-33	3.267	3.300	3.333	
	$V_{IN} = 4.75\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		3.235	3.300	3.365	
	$V_{IN} = 7\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^\circ\text{C}$	TLV1117-50	4.950	5.000	5.050	
	$V_{IN} = 6.5\text{ V}$ to 12 V , $I_{OUT} = 0$ to 800 mA		4.900	5.000	5.100	
Line regulation	$I_{OUT} = 10\text{ mA}$, $V_{IN} - V_{OUT} = 1.5\text{ V}$ to 13.75 V	TLV1117		0.035	0.2	%
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 2.9\text{ V}$ to 10 V	TLV1117-15		1	6	mV
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 3.2\text{ V}$ to 10 V	TLV1117-18		1	6	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 3.9\text{ V}$ to 10 V	TLV1117-25		1	6	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 4.25\text{ V}$ to 10 V	TLV1117-285		1	6	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 4.75\text{ V}$ to 15 V	TLV1117-33		1	6	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 6.5\text{ V}$ to 15 V	TLV1117-50		1	10	
Load regulation	$I_{OUT} = 10\text{ mA}$ to 800 mA , $V_{IN} - V_{OUT} = 3\text{ V}$	TLV1117		0.2	0.4	%
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 2.9\text{ V}$	TLV1117-15		1	10	mV
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 3.2\text{ V}$	TLV1117-18		1	10	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 3.9\text{ V}$	TLV1117-25		1	10	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 4.25\text{ V}$	TLV1117-285		1	10	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 4.75\text{ V}$	TLV1117-33		1	10	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 6.5\text{ V}$	TLV1117-50		1	15	
Dropout voltage, V_{DO} (see Note 2)	$I_{OUT} = 100\text{ mA}$			1.1	1.20	V
	$I_{OUT} = 500\text{ mA}$			1.15	1.25	
	$I_{OUT} = 800\text{ mA}$			1.2	1.3	
Current limit	$V_{IN} - V_{OUT} = 5\text{ V}$, $T_J = 25^\circ\text{C}$		0.8	1.2	1.5	A
Minimum load current	$V_{IN} = 15\text{ V}$	TLV1117		1.7	5	mA
Quiescent current	$V_{IN} \leq 15\text{ V}$	All fixed voltage options		5	10	mA
Thermal regulation	30 ms pulse, $T_A = 25^\circ\text{C}$			0.01	0.1	%/W
Ripple rejection	$V_{IN} - V_{OUT} = 3\text{ V}$, $V_{\text{ripple}} = 1\text{ V}_{pp}$	$f = 120\text{ Hz}$	60	78		dB

† All characteristics are measured with a $10\text{-}\mu\text{F}$ capacitor across the input and a $10\text{-}\mu\text{F}$ capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

NOTE 2: Dropout is defined as the V_{IN} to V_{OUT} differential at which V_{OUT} drops 100 mV below the value of V_{OUT} , measured at $V_{IN} = V_{OUT(\text{nom})} + 1.5\text{ V}$.

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117C electrical characteristics, $T_J = 0^{\circ}\text{C}$ to 125°C , all typical values are at $T_J = 25^{\circ}\text{C}$ (unless otherwise noted) (continued)

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
ADJUSTMENT pin current			80	120	μA
Change in ADJUSTMENT pin current	$I_{\text{OUT}} = 10\text{ mA to }800\text{ mA}$, $V_{\text{IN}} - V_{\text{OUT}} = 1.4\text{ V to }10\text{ V}$		0.2	5	μA
Temperature stability	$T_J = \text{full range}$		0.5		%
Long-term stability	1000 hrs, no load $T_A = 125^{\circ}\text{C}$		0.3		%
Output noise voltage (% of V_{OUT})	$f = 10\text{ Hz to }100\text{ kHz}$,		0.003		%

† All characteristics are measured with a 10- μF capacitor across the input and a 10- μF capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.



TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117I electrical characteristics, $T_J = -40^{\circ}\text{C}$ to 125°C , all typical values are at $T_J = 25^{\circ}\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS†		MIN	TYP	MAX	UNIT
Output voltage, V_{OUT}	$V_{IN} - V_{OUT} = 2\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117	1.238	1.250	1.262	V
	$I_{OUT} = 10\text{ mA}$ to 800 mA , $V_{IN} - V_{OUT} = 1.4\text{ V}$ to 10 V		1.200	1.250	1.290	
	$V_{IN} = 3.5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-15	1.485	1.500	1.515	
	$V_{IN} = 2.9\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		1.440	1.500	1.560	
	$V_{IN} = 3.8\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-18	1.782	1.800	1.818	
	$V_{IN} = 3.2\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		1.728	1.800	1.872	
	$V_{IN} = 4.5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-25	2.475	2.500	2.525	
	$V_{IN} = 3.9\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		2.400	2.500	2.600	
	$V_{IN} = 4.85\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-285	2.820	2.850	2.880	
	$V_{IN} = 4.25\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		2.736	2.850	2.964	
	$V_{IN} = 5\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-33	3.267	3.300	3.333	
	$V_{IN} = 4.75\text{ V}$ to 10 V , $I_{OUT} = 0$ to 800 mA		3.168	3.300	3.432	
	$V_{IN} = 7\text{ V}$, $I_{OUT} = 10\text{ mA}$, $T_J = 25^{\circ}\text{C}$	TLV1117-50	4.950	5.000	5.050	
	$V_{IN} = 6.5\text{ V}$ to 12 V , $I_{OUT} = 0$ to 800 mA		4.800	5.000	5.200	
Line regulation	$I_{OUT} = 10\text{ mA}$, $V_{IN} - V_{OUT} = 1.5\text{ V}$ to 13.75 V	TLV1117		0.035	0.3	%
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 2.9\text{ V}$ to 10 V	TLV1117-15		1	4.5	mV
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 3.2\text{ V}$ to 10 V	TLV1117-18		1	5.5	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 3.9\text{ V}$ to 10 V	TLV1117-25		1	7.5	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 4.25\text{ V}$ to 10 V	TLV1117-285		1	8.5	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 4.75\text{ V}$ to 15 V	TLV1117-33		1	10	
	$I_{OUT} = 0\text{ mA}$, $V_{IN} = 6.5\text{ V}$ to 15 V	TLV1117-50		1	15	
Load regulation	$I_{OUT} = 10\text{ mA}$ to 800 mA , $V_{IN} - V_{OUT} = 3\text{ V}$	TLV1117		0.2	0.5	%
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 2.9\text{ V}$	TLV1117-15		1	7.5	mV
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 3.2\text{ V}$	TLV1117-18		1	9	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 3.9\text{ V}$	TLV1117-25		1	12.5	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 4.25\text{ V}$	TLV1117-285		1	14.5	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 4.75\text{ V}$	TLV1117-33		1	15	
	$I_{OUT} = 0$ to 800 mA , $V_{IN} = 6.5\text{ V}$	TLV1117-50		1	20	
Dropout voltage, V_{DO} (see Note 2)	$I_{OUT} = 100\text{ mA}$			1.10	1.30	V
	$I_{OUT} = 500\text{ mA}$			1.15	1.35	
	$I_{OUT} = 800\text{ mA}$			1.20	1.40	
Current limit	$V_{IN} - V_{OUT} = 5\text{ V}$, $T_J = 25^{\circ}\text{C}$		0.8	1.2	1.5	A
Minimum load current	$V_{IN} = 15\text{ V}$	TLV1117		1.7	5	mA
Quiescent current	$V_{IN} \leq 15\text{ V}$	All fixed-voltage options		5	15	mA
Thermal regulation	30-ms pulse, $T_A = 25^{\circ}\text{C}$			0.01	0.1	%/W
Ripple rejection	$V_{IN} - V_{OUT} = 3\text{ V}$, $V_{\text{ripple}} = 1\text{ V}_{\text{pp}}$	$f = 120\text{ Hz}$	60	75		dB

† All characteristics are measured with a 10- μF capacitor across the input and a 10- μF capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

NOTE 2: Dropout is defined as the V_{IN} to V_{OUT} differential at which V_{OUT} drops 100 mV below the value of V_{OUT} , measured at $V_{IN} = V_{OUT}(\text{nom}) + 1.5\text{ V}$.

TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

TLV1117I electrical characteristics, $T_J = 40^\circ\text{C}$ to 125°C , all typical values are at $T_J = 25^\circ\text{C}$ (unless otherwise noted) (continued)

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
ADJUSTMENT pin current			80	120	μA
Change in ADJUSTMENT pin current	$I_{\text{OUT}} = 10\text{ mA to }800\text{ mA}$, $V_{\text{IN}} - V_{\text{OUT}} = 1.4\text{ V to }10\text{ V}$		0.2	10	μA
Temperature stability	$T_J = \text{full range}$		0.5		%
Long-term stability	1000 hrs, no load $T_A = 125^\circ\text{C}$		0.3		%
Output noise voltage (% of V_{OUT})	$f = 10\text{ Hz to }100\text{ kHz}$,		0.003		%

† All characteristics are measured with a 10- μF capacitor across the input and a 10- μF capacitor across the output. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

GRAPHS (PREVIEW):

Figure 1. Short-Circuit Current vs ($V_{\text{IN}} - V_{\text{OUT}}$)

Figure 2. Load Regulation vs Temperature

Figure 3. Ripple Rejection vs Frequency (ADJ Version)

Figure 4. Ripple Rejection vs Current (ADJ Version)

Figure 5. Temperature Stability

Figure 6. ADJ Pin Current vs Temperature

Figure 7. TLV1117–25 Load Transient Response

Figure 8. TLV1117–25 Line Transient Response

Figure 9. TLV1117–285 Load Transient Response

Figure 10. TLV1117–285 Line Transient Response

Figure 11. TLV1117–33 Load Transient Response

Figure 12. TLV1117–33 Line Transient Response

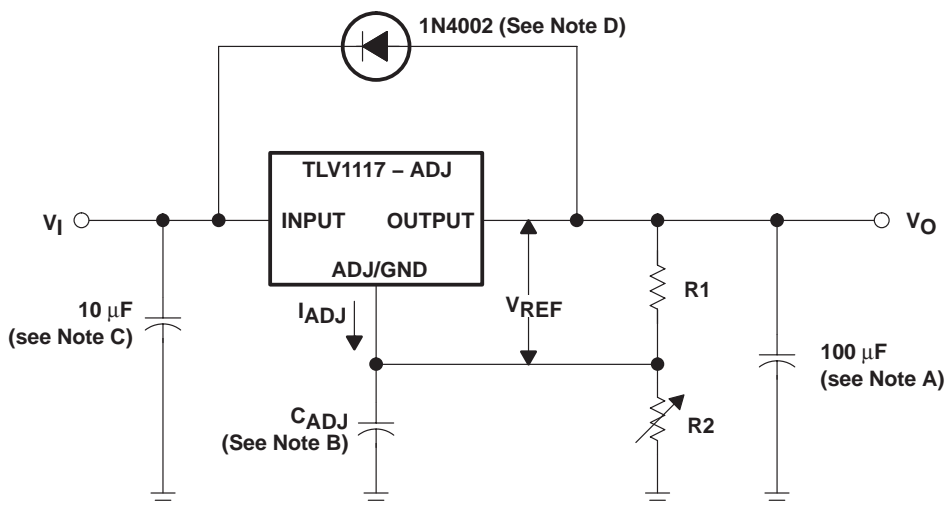


TLV1117

ADJUSTABLE AND FIXED LOW-DROPOUT VOLTAGE REGULATORS

SLVS561 – DECEMBER 2004

APPLICATION INFORMATION



V_{OUT} is calculated as:

$$V_{OUT} = V_{REF} \left(1 + \frac{R2}{R1} \right) + (I_{ADJ} \times R2)$$

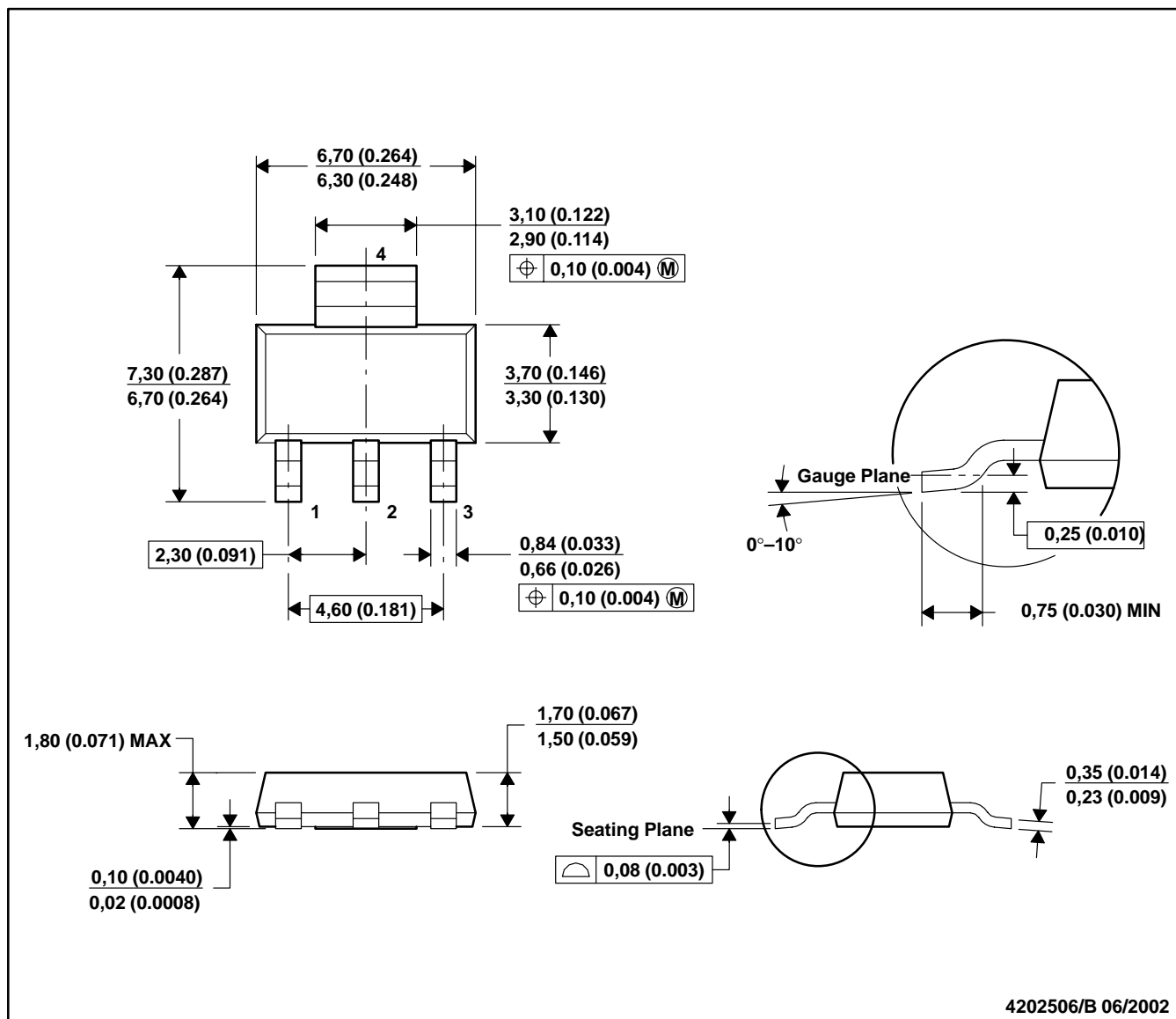
Since I_{ADJ} typically is 55 μA , it is negligible in most applications.

- NOTES:
- A. Output capacitor selection is critical for regulator stability. The recommended minimum is 10- μF tantalum or 50- μF aluminum electrolytic, with either one having an ESR between 0.3 Ω and 22 Ω . Larger C_{OUT} values benefit the regulator by improving transient response and loop stability.
 - B. C_{ADJ} can be used to improve ripple rejection. Ensure that the impedance of C_{ADJ} $\left(X_{C_{ADJ}} = \frac{1}{2\pi f_{ripple} C_{ADJ}} \right)$ is $< R1$ to prevent the ripple from being amplified. If C_{ADJ} is used, then a larger C_{OUT} is required (22- μF tantalum or 150- μF aluminum electrolytic).
 - C. C_{IN} is recommended if TLV1117 is not located near the power-supply filter.
 - D. An external diode is recommended to protect the regulator if the input instantaneously is shorted to GND.

Figure 13. Basic Adjustable Regulator

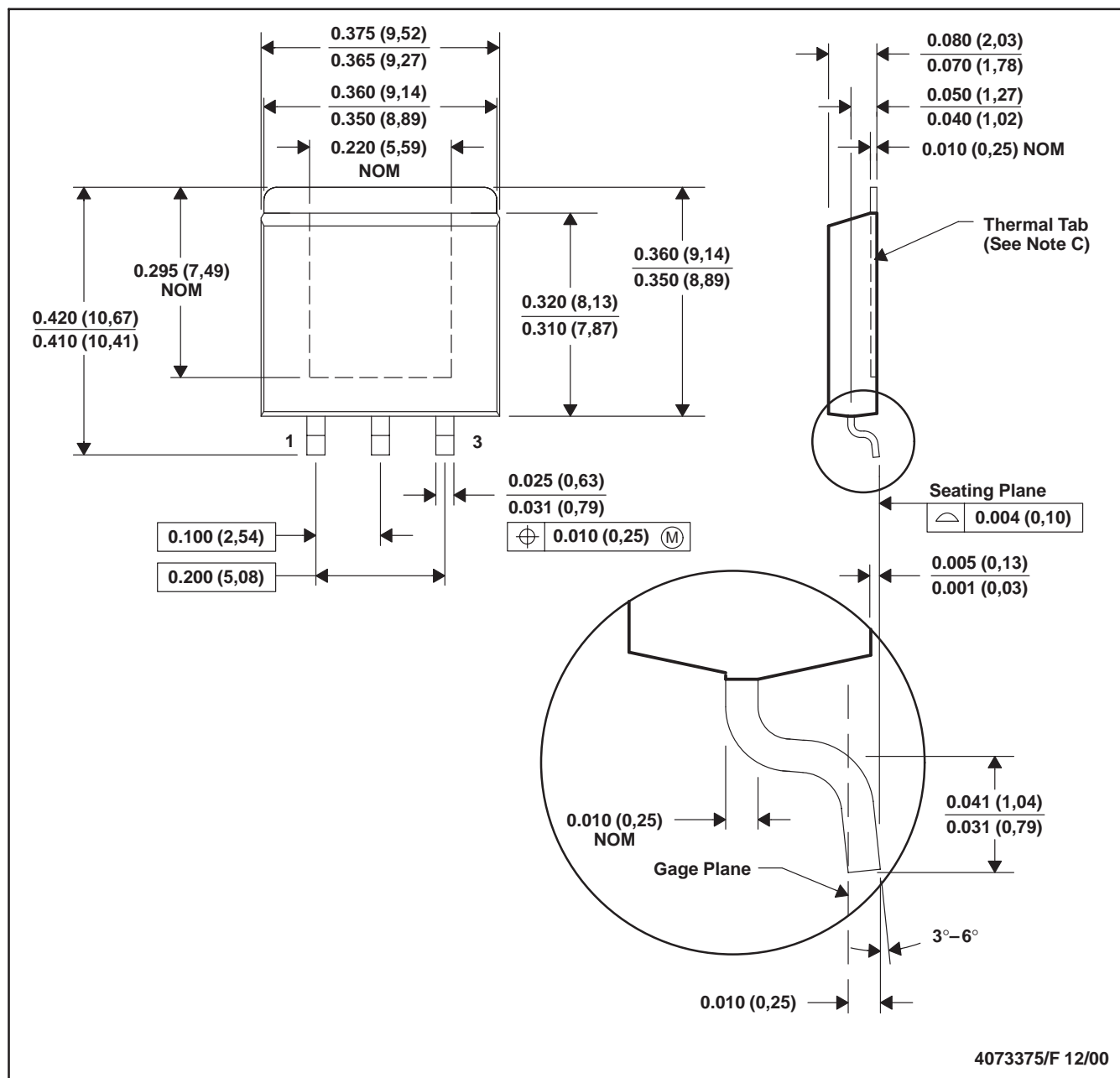
DCY (R-PDSO-G4)

PLASTIC SMALL-OUTLINE



KTE (R-PSFM-G3)

PowerFLEX™ PLASTIC FLANGE-MOUNT

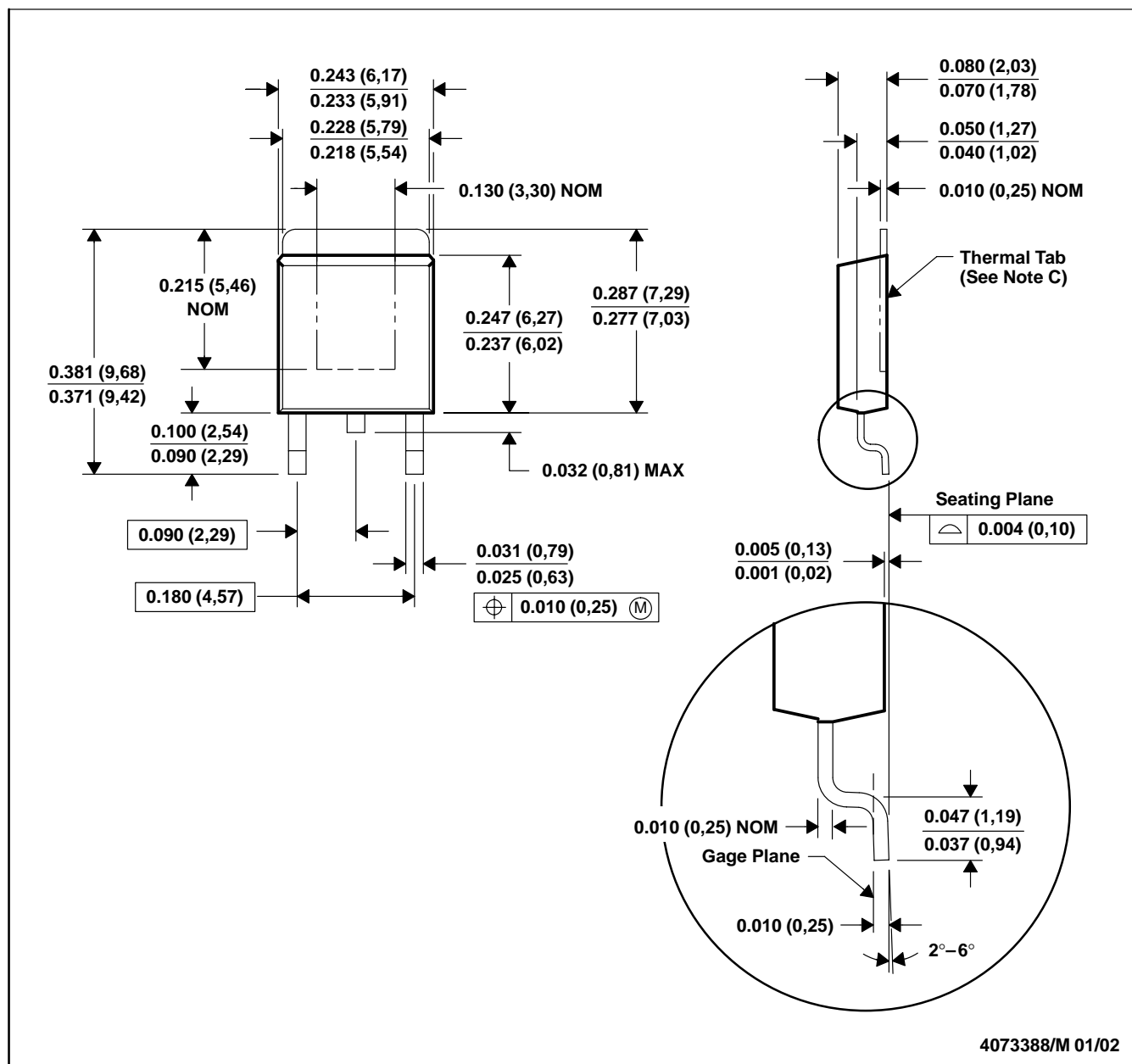


- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - The center lead is in electrical contact with the thermal tab.
 - Dimensions do not include mold protrusions, not to exceed 0.006 (0,15).
 - Falls within JEDEC MO-169

PowerFLEX is a trademark of Texas Instruments.

KTP (R-PSFM-G2)

PowerFLEX™ PLASTIC FLANGE-MOUNT PACKAGE

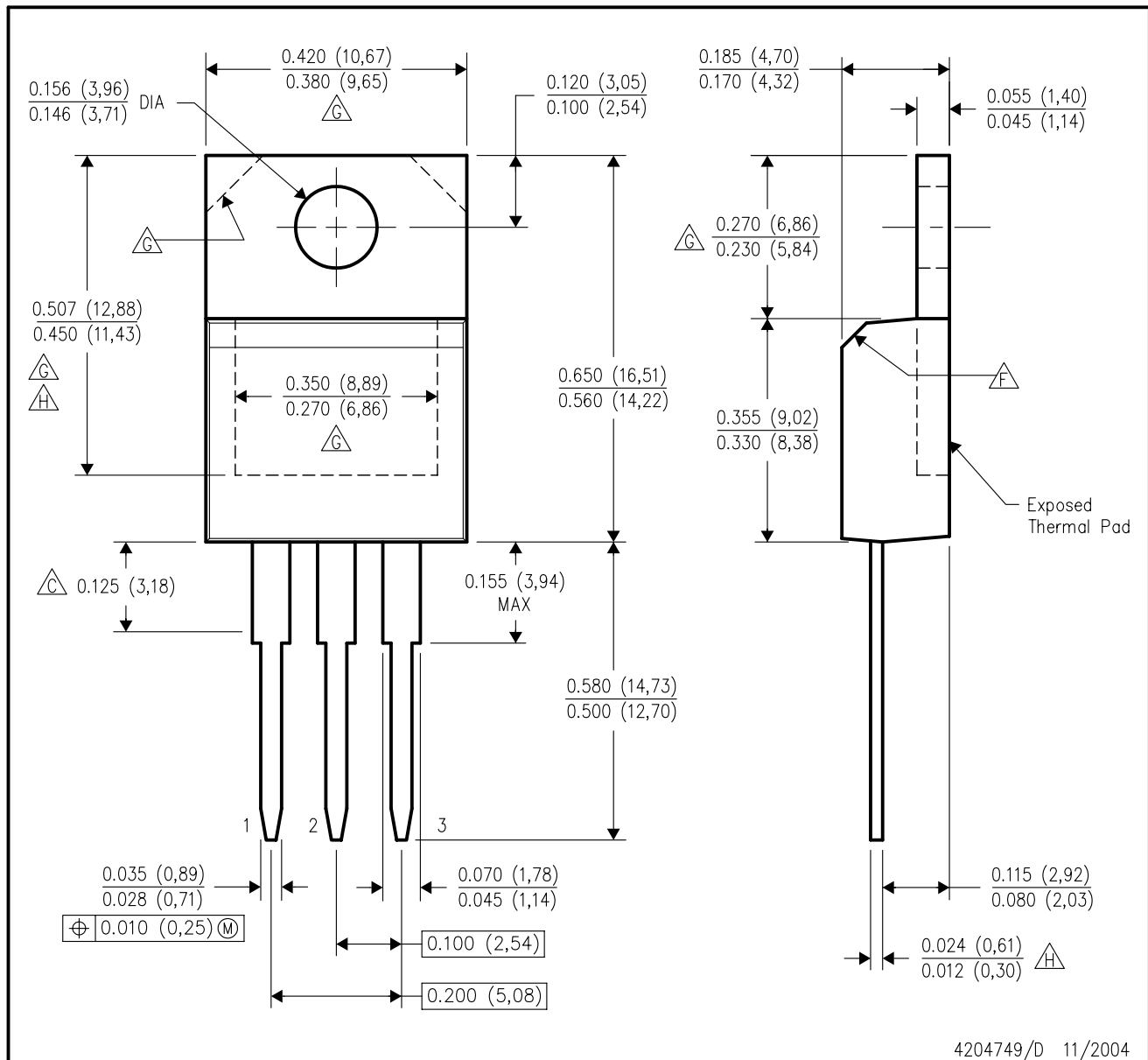


- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - The center lead is in electrical contact with the thermal tab.
 - Dimensions do not include mold protrusions, not to exceed 0.006 (0,15).
 - Falls within JEDEC TO-252 variation AC.

PowerFLEX is a trademark of Texas Instruments.

KCS (R-PSFM-T3)

PLASTIC FLANGE-MOUNT PACKAGE

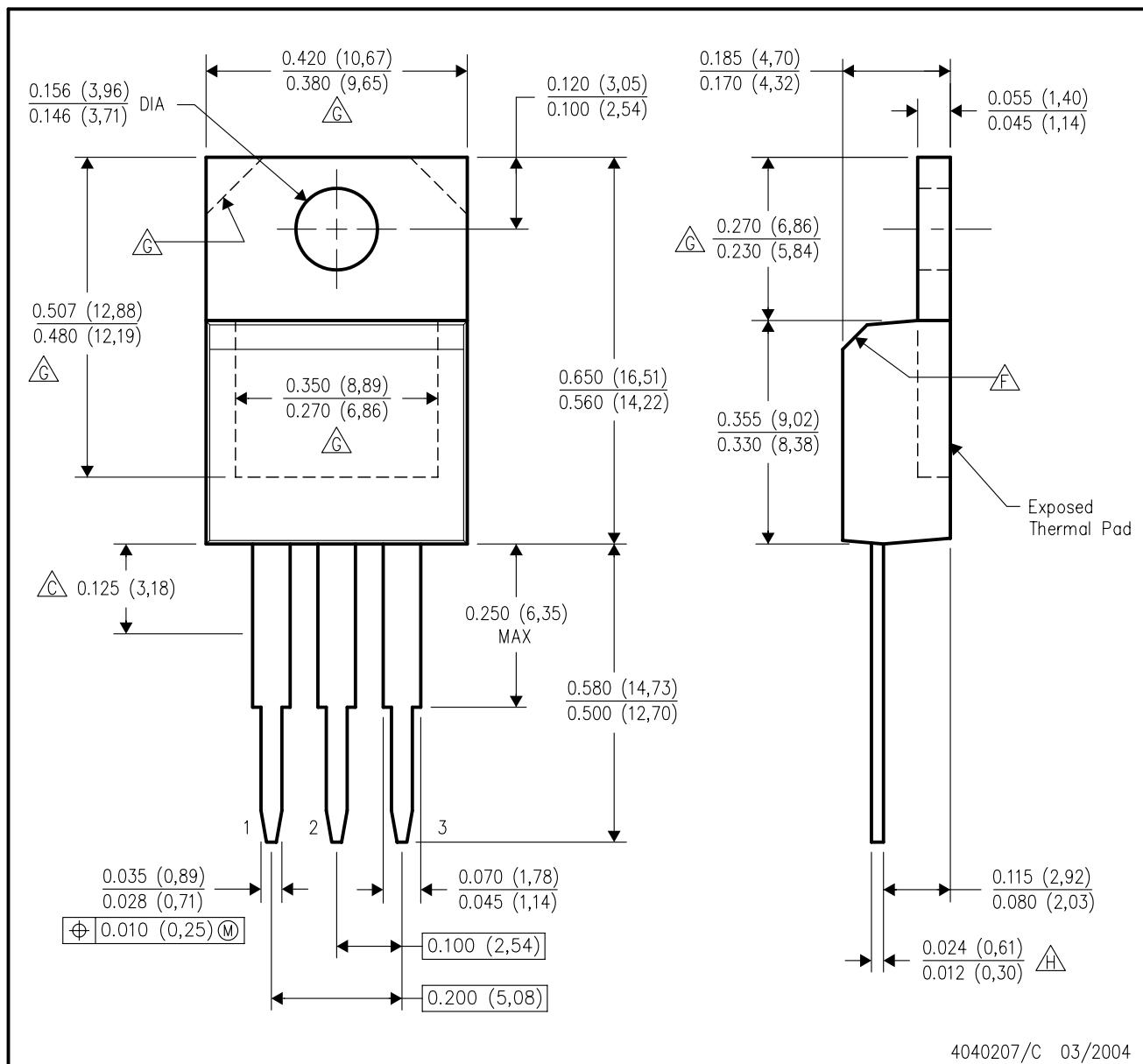


4204749/D 11/2004

- 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 TO-220 variation AB, except minimum lead thickness and minimum exposed pad length.

KC (R-PSFM-T3)

PLASTIC FLANGE-MOUNT PACKAGE



4040207/C 03/2004

NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. 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.
- F. The chamfer is optional.
- G. Thermal pad contour optional within these dimensions.
- H. Falls within JEDEC TO-220 variation AB, except minimum lead thickness.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2004, Texas Instruments Incorporated