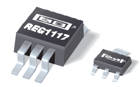



# REG1117
# REG1117A

SBVS001D − OCTOBER 1992 − REVISED JULY 2004

# 800mA and 1A Low Dropout Positive Regulator 1.8V, 2.5V, 2.85, 3.3V, 5V, and Adjustable

## FEATURES

- **FIXED AND ADJUSTABLE VERSIONS**
- **2.85V MODEL FOR SCSI-2 ACTIVE TERMINATION**
- **OUTPUT CURRENT:**
  **REG1117: 800mA max**
  **REG1117A: 1A max**
- **OUTPUT TOLERANCE: ±1% max**
- **DROPOUT VOLTAGE:**
  **REG1117: 1.2V max at $I_O$ = 800mA**
  **REG1117A: 1.3V max at $I_O$ = 1A**
- **INTERNAL CURRENT LIMIT**
- **THERMAL OVERLOAD PROTECTION**
- **SOT-223 AND DDPAK SURFACE-MOUNT PACKAGES**

## APPLICATIONS

- **SCSI-2 ACTIVE TERMINATION**
- **HAND-HELD DATA COLLECTION DEVICES**
- **HIGH EFFICIENCY LINEAR REGULATORS**
- **BATTERY-POWERED INSTRUMENTATION**
- **BATTERY MANAGEMENT CIRCUITS FOR NOTEBOOK AND PALMTOP PCs**
- **CORE VOLTAGE SUPPLY: FPGA, PLD, DSP, CPU**

## DESCRIPTION

The REG1117 is a family of easy-to-use three-terminal voltage regulators. The family includes a variety of fixed- and adjustable-voltage versions, two currents (800mA and 1A) and two package types (SOT-223 and DDPAK). See the chart below for available options.

Output voltage of the adjustable versions is set with two external resistors. The REG1117 low dropout voltage allows its use with as little as 1V input-output voltage differential.

Laser trimming assures excellent output voltage accuracy without adjustment. An NPN output stage allows output stage drive to contribute to the load current for maximum efficiency.

| | 800mA | | 1A | |
|---|---|---|---|---|
| **VOLTAGE** | **SOT-223** | **DDPAK** | **SOT-223** | **DDPAK** |
| 1.8V | | | ✓ | ✓ |
| 2.5V | | | ✓ | ✓ |
| 2.85V | ✓ | | | |
| 3.3V | ✓ | ✓ | | |
| 5V | ✓ | | | ✓ |
| Adjustable | ✓ | | ✓ | ✓ |

## ABSOLUTE MAXIMUM RATINGS(1)

| | |
|---|---|
| Power Dissipation | Internally Limited |
| Input Voltage | +15V |
| Operating Junction Temperature Range | −40°C to +125°C |
| Storage Temperature Range | −65°C to +150°C |
| Lead Temperature (soldering, 10s)(2) | +300°C |

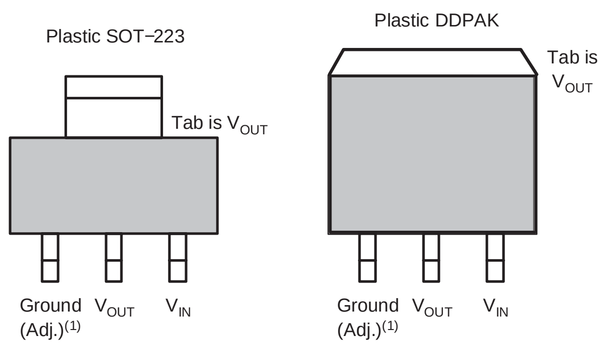
(1) Stresses above these ratings may cause permanent damage.
(2) See *Soldering Methods* section.

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

## CONNECTION DIAGRAM

**Front View**




NOTE: (1) Adjustable−Voltage Model.

## PACKAGE/ORDERING INFORMATION(1)

| PRODUCT | $V_O/I_O$ | PACKAGE-LEAD | PACKAGE DESIGNATOR | OPERATING TEMPERATURE RANGE | PACKAGE MARKING | ORDERING NUMBER | TRANSPORT MEDIA, QUANTITY |
|---|---|---|---|---|---|---|---|
| REG1117-2.85 | 2.85/800mA | SOT223-3 | DCY | −40°C to +125°C | BB11172 | REG1117-2.85 | Rails, 80 |
| | | | | | | REG1117-2.85 | Tape and Reel, 2500 |
| REG1117-3.3 | 3.3/800mA | SOT223-3 | DCY | −40°C to +125°C | BB11174 | REG1117-3.3 | Rails, 80 |
| | | | | | | REG1117-3.3 | Tape and Reel, 2500 |
| REG1117F-3.3 | 3.3/800mA | DDPAK-3 | KTT | −40°C to +125°C | BB1117F4 | REG1117F-3.3KTTT | Tape and Reel, 50 |
| | | | | | | REG1117F-3.3/500 | Tape and Reel, 500 |
| REG1117-5 | 5V/800mA | SOT223-3 | DCY | −40°C to +125°C | BB11175 | REG1117-5 | Rails, 80 |
| | | | | | | REG1117-5 | Tape and Reel, 2500 |
| REG1117 | Adj./800mA | SOT223-3 | DCY | −40°C to +125°C | BB1117 | REG1117 | Rails, 80 |
| | | | | | | REG1117 | Tape and Reel, 2500 |
| REG1117A-1.8 | 1.8V/1A | SOT223-3 | DCY | −40°C to +125°C | R111718 | REG1117A-1.8 | Rails, 80 |
| | | | | | | REG1117A-1.8 | Tape and Reel, 2500 |
| REG1117FA-1.8 | 1.8/1A | DDPAK-3 | KTT | −40°C to +125°C | REG1117FA1.8 | REG1117FA-1.8KTTT | Tape and Reel, 50 |
| | | | | | | REG1117FA-1.8/500 | Tape and Reel, 500 |
| REG1117A-2.5 | 2.5/1A | SOT223-3 | DCY | −40°C to +125°C | R111725 | REG1117A-2.5 | Rails, 80 |
| | | | | | | REG1117A-2.5 | Tape and Reel, 2500 |
| REG1117FA-2.5 | 2.5/1A | DDPAK-3 | KTT | −40°C to +125°C | REG1117FA2.5 | REG1117FA-2.5KTTT | Tape and Reel, 50 |
| | | | | | | REG1117FA-2.5/500 | Tape and Reel, 500 |
| REG1117FA-5 | 5/1A | DDPAK-3 | KTT | −40°C to +125°C | BB1117FA5.0 | REG1117FA-5/KTTT | Tape and Reel, 50 |
| | | | | | | REG1117FA-5/500 | Tape and Reel, 500 |
| REG1117A | Adj./1A | SOT223-3 | DCY | −40°C to +125°C | BB1117A | REG1117A | Rails, 80 |
| | | | | | | REG1117A | Tape and Reel, 2500 |
| REG1117FA | Adj./1A | DDPAK-3 | KTT | −40°C to +125°C | REG1117FA | REG1117FA/KTTT | Tape and Reel, 50 |
| | | | | | | REG1117FA/500 | Tape and Reel, 500 |

(1) For the most current package and ordering information, see the Package Option Addendum located at the end of this data sheet.

## ELECTRICAL CHARACTERISTICS

At $T_J$ = +25°C, unless otherwise noted.

| PARAMETER | CONDITION | REG1117, REG1117A | | | UNIT |
|---|---|---|---|---|---|
| | | MIN | TYP | MAX | |
| **OUTPUT VOLTAGE** | | | | | |
| REG1117-2.85 | $I_O$ = 10mA, $V_{IN}$ = 4.85V | 2.820 | 2.85 | 2.880 | V |
| See Note 1 | $I_O$ = 0 to 800mA, $V_{IN}$ = 4.05V to 10V | 2.790 | 2.85 | 2.910 | V |
| REG1117-3.3 | $I_O$ = 10mA, $V_{IN}$ = 5.3V | 3.270 | 3.30 | 3.330 | V |
| See Note 1 | $I_O$ = 0 to 800mA, $V_{IN}$ = 4.8V to 10V | 3.240 | 3.30 | 3.360 | V |
| REG1117-5 | $I_O$ = 10mA, $V_{IN}$ = 7V | 4.950 | 5.00 | 5.050 | V |
| See Note 1 | $I_O$ = 0 to 800mA, $V_{IN}$ = 6.5V to 10V | 4.900 | 5.00 | 5.100 | V |
| REG1117A-1.8 | $I_O$ = 10mA, $V_{IN}$ = 3.8V | 1.782 | 1.8 | 1.818 | V |
| See Note 1 | $I_O$ = 0 to 1A, $V_{IN}$ = 3.8V to 10V | 1.764 | 1.8 | 1.836 | V |
| REG1117A-2.5 | $I_O$ = 10mA, $V_{IN}$ = 4.5V | 2.475 | 2.5 | 2.525 | V |
| See Note 1 | $I_O$ = 0 to 1A, $V_{IN}$ = 4.5V to 10V | 2.450 | 2.5 | 2.550 | V |
| REG1117A-5 | $I_O$ = 10mA, $V_{IN}$ = 7V | 4.950 | 5.0 | 5.050 | V |
| See Note 1 | $I_O$ = 0 to 1A, $V_{IN}$ = 7V to 10V | 4.900 | 5.0 | 5.100 | V |
| **REFERENCE VOLTAGE** | | | | | |
| REG1117 (Adjustable) | $I_O$ = 10mA, $V_{IN} - V_O$ = 2V | 1.238 | 1.250 | 1.262 | V |
| See Note 1 | $I_O$ = 10 to 800mA, $V_{IN} - V_O$ = 1.4 to 10V | 1.225 | 1.250 | 1.280 | V |
| REG1117A (Adjustable) | $I_O$ = 10mA, $V_{IN} - V_O$ = 2V | 1.238 | 1.250 | 1.262 | V |
| See Note 1 | $I_O$ = 10mA to 1A, $V_{IN} - V_O$ = 1.4 to 10V | 1.225 | 1.250 | 1.280 | V |
| **LINE REGULATION** | | | | | |
| REG1117-2.85(1) | $I_O$ = 0, $V_{IN}$ = 4.25 to 10V | | 1 | 7 | mV |
| REG1117-3.3(1) | $I_O$ = 0, $V_{IN}$ = 4.8 to 10V | | 2 | 7 | mV |
| REG1117-5(1) | $I_O$ = 0, $V_{IN}$ = 6.5 to 15V | | 3 | 10 | mV |
| REG1117 (Adjustable)(1) | $I_O$ = 10mA, $V_{IN} - V_O$ = 1.5 to 13.75V | | 0.1 | 0.4 | % |
| REG1117A (Adjustable)(1) | $I_O$ = 10mA, $V_{IN} - V_O$ = 1.5 to 13.75V | | 0.1 | 0.4 | % |
| REG1117A-1.8(1) | $I_O$ = 0, $V_{IN}$ = 3.8V to 10V | | 1 | 7 | mV |
| REG1117A-2.5(1) | $I_O$ = 0, $V_{IN}$ = 4.5V to 10V | | 1 | 7 | mV |
| REG1117A-5.0(1) | $I_O$ = 0, $V_{IN}$ = 7V to 15V | | 3 | 10 | mV |
| **LOAD REGULATION** | | | | | |
| REG1117-2.85(1) | $I_O$ = 0 to 800mA, $V_{IN}$ = 4.25V | | 2 | 10 | mV |
| REG1117-3.3(1) | $I_O$ = 0 to 800mA, $V_{IN}$ = 4.8V | | 3 | 12 | mV |
| REG1117-5(1) | $I_O$ = 0 to 800mA, $V_{IN}$ = 6.5V | | 3 | 15 | mV |
| REG1117 (Adjustable)(1)(2) | $I_O$ = 10 to 800mA, $V_{IN} - V_O$ = 3V | | 0.1 | 0.4 | % |
| REG1117A (Adjustable)(1)(2) | $I_O$ = 10mA to 1A, $V_{IN} - V_O$ = 3V | | 0.1 | 0.4 | % |
| REG1117A-1.8(1) | $I_O$ = 0 to 1A, $V_{IN}$ = 3.8V | | 2 | 10 | mV |
| REG1117A-2.5 | $I_O$ = 0 to 1A, $V_{IN}$ = 4.5V | | 2 | 10 | mV |
| REG1117A-5 | $I_O$ = 0 to 1A, $V_{IN}$ = 7.0V | | 3 | 15 | mV |
| **DROPOUT VOLTAGE(3)** | | | | | |
| All Models(1) | $I_O$ = 100mA | | 1.00 | 1.10 | V |
| See Note 1 | $I_O$ = 500mA | | 1.05 | 1.15 | V |
| REG1117 Models(1) | $I_O$ = 800mA | | 1.10 | 1.20 | V |
| REG1117A | $I_O$ = 1A | | 1.2 | 1.30 | V |
| See Note 1 | $I_O$ = 1A | | 1.2 | 1.55 | V |

(1) Specification applies over the full specified junction temperature range, 0°C to +125°C.
(2) REG1117 and REG1117A adjustable versions require a minimum load current for ±3% regulation.
(3) Dropout voltage is the input voltage minus output voltage that produces a 1% decrease in output voltage.
(4) Percentage change in unloaded output voltage before versus after a 30ms power pulse of $I_O$ = 800mA (REG1117 models), $I_O$ = 1A (REG1117A), $V_{IN} - V_O$ = 1.4V (reading taken 10ms after pulse).

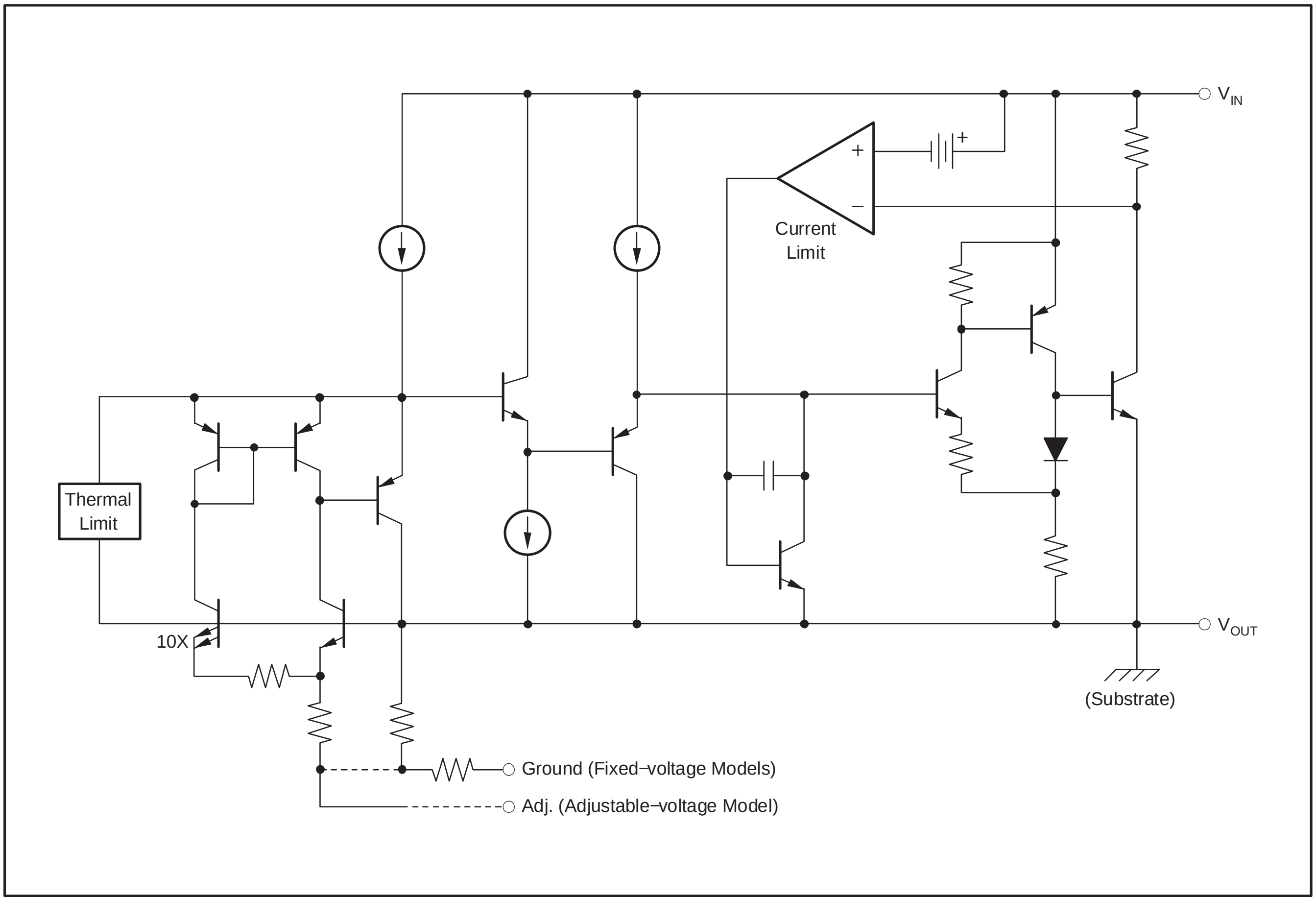
## ELECTRICAL CHARACTERISTICS (continued)

At $T_J$ = +25°C, unless otherwise noted.

| PARAMETER | CONDITION | REG1117, REG1117A MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **CURRENT LIMIT** | | | | | |
| REG1117 Models | $V_{IN} - V_O$ = 5V | 800 | 950 | 1200 | mA |
| REG1117A | $V_{IN} - V_O$ = 5V | 1000 | 1250 | 1600 | mA |
| **MINIMUM LOAD CURRENT** | | | | | |
| Adjustable Models(1)(2) | $V_{IN} - V_O$ = 13.75V | | 1.7 | 5 | mA |
| **QUIESCENT CURRENT** | | | | | |
| Fixed-Voltage Models(1) | $V_{IN} - V_O$ = 5V | | 4 | 10 | mA |
| **ADJUSTABLE PIN CURRENT(1)(2)** | $I_O$ = 10mA, $V_{IN} - V_O$ = 1.4 to 10V | | 50 | 120 | µA |
| vs Load Current, REG1117(1) | $I_O$ = 10mA to 800mA, $V_{IN} - V_O$ = 1.4 to 10V | | 0.5 | 5 | µA |
| vs Load Current, REG1117A(1) | $I_O$ = 10mA to 1A, $V_{IN} - V_O$ = 1.4 to 10V | | 0.5 | 5 | µA |
| **THERMAL REGULATION** | | | | | |
| All Models(4) | 30ms Pulse | | 0.01 | 0.1 | %/W |
| **RIPPLE REJECTION** | | | | | |
| All Models | f = 120Hz, $V_{IN} - V_{OUT}$ = 3V + 1$V_{PP}$ Ripple | | 62 | | dB |
| **TEMPERATURE DRIFT** | | | | | |
| Fixed-Voltage Models | $T_J$ = 0°C to +125°C | | 0.5 | | % |
| Adjustable Models | $T_J$ = 0°C to +125°C | | 2 | | % |
| **LONG-TERM STABILITY** | | | | | |
| All Models | $T_A$ = 125°C, 1000Hr | | 0.3 | | % |
| **OUTPUT NOISE** | | | | | |
| rms Noise, All Models | f = 10Hz to 10kHz | | 0.003 | | % |
| **THERMAL RESISTANCE** | | | | | |
| Thermal Resistance, $\theta_{JC}$ | (Junction-to-Case at Tab) | | | | |
| 3-Lead SOT-223 Surface-Mount | | | 15 | | °C/W |
| 3-Lead DDPAK Surface-Mount | f > 50Hz | | 2 | | °C/W |
| | dc | | 3 | | °C/W |
| Thermal Resistance, $\theta_{JA}$ | (Junction-to-Case at Tab) | | | | |
| 3-Lead DDPAK Surface-Mount | No Heatsink | | 65 | | °C/W |

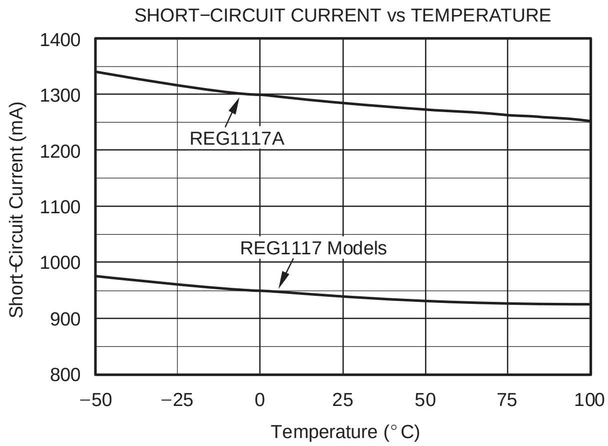
(1) Specification applies over the full specified junction temperature range, 0°C to +125°C.
(2) REG1117 and REG1117A adjustable versions require a minimum load current for ±3% regulation.
(3) Dropout voltage is the input voltage minus output voltage that produces a 1% decrease in output voltage.
(4) Percentage change in unloaded output voltage before versus after a 30ms power pulse of $I_O$ = 800mA (REG1117 models), $I_O$ = 1A (REG1117A), $V_{IN} - V_O$ = 1.4V (reading taken 10ms after pulse).

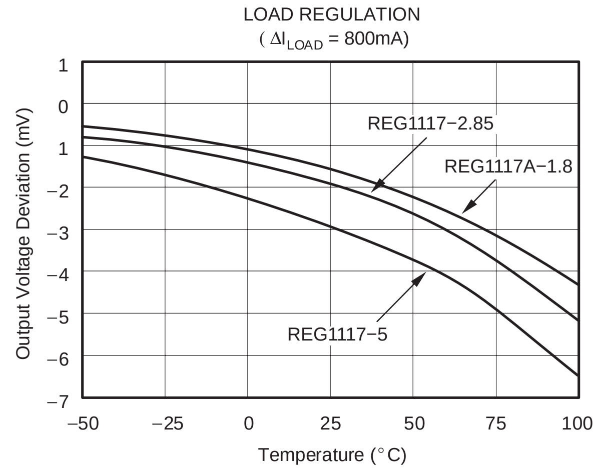
## SIMPLIFIED SCHEMATIC

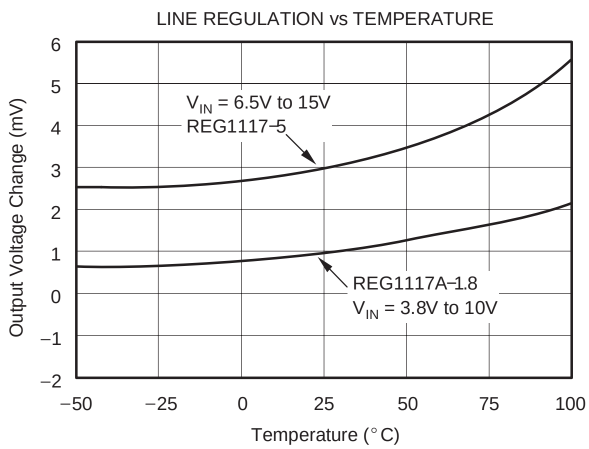


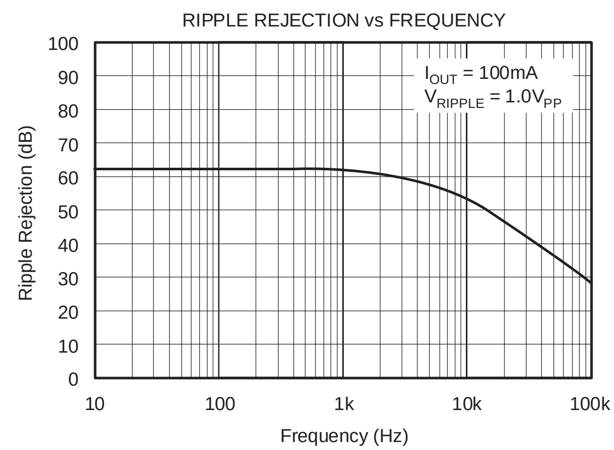
## TYPICAL CHARACTERISTICS

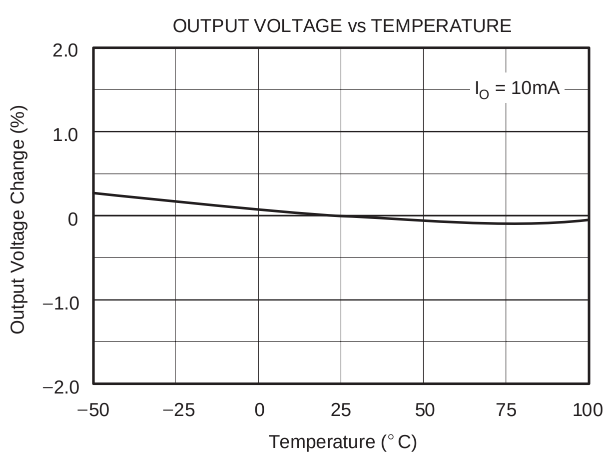
At $T_A$ = +25°C, all models, unless otherwise noted.

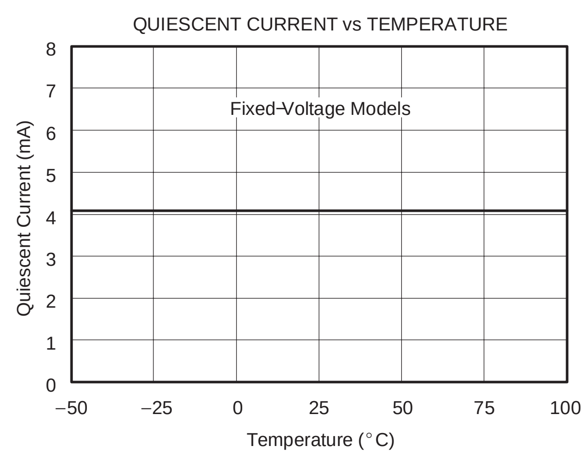


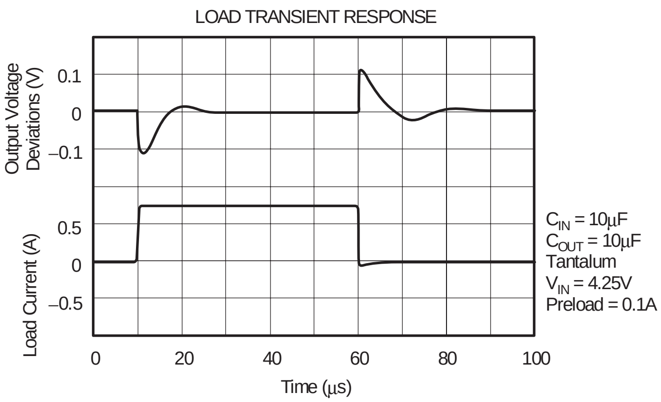



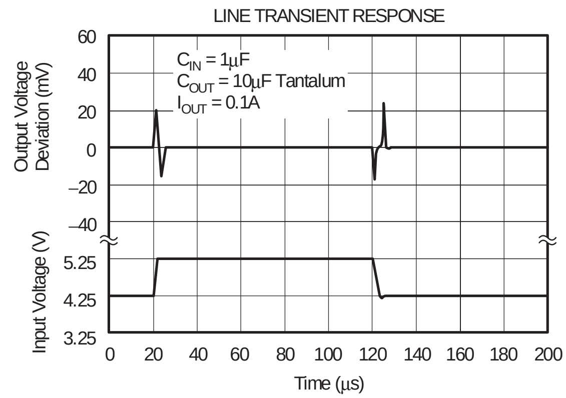



## TYPICAL CHARACTERISTICS (continued)

At $T_A$ = +25°C, all models, unless otherwise noted.




# APPLICATIONS INFORMATION

Figure 1 shows the basic hookup diagram for fixed-voltage models. All models require an output capacitor for proper operation, and for improving high-frequency load regulation; a 10µF tantalum capacitor is recommended. Aluminum electrolytic types of 50µF or greater can also be used. A high-quality capacitor should be used to assure that the ESR (Effective Series Resistance) is less than 0.5Ω.

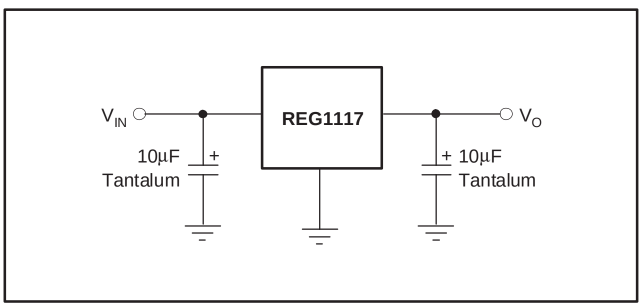



**Figure 1. Fixed-Voltage Model—Basic Connections**

Figure 2 shows a hookup diagram for the adjustable voltage model. Resistor values are shown for some commonly-used output voltages. Values for other voltages can be calculated from the equation shown in Figure 2. For best load regulation, connect $R_1$ close to the output pin and $R_2$ close to the ground side of the load as shown.

## THERMAL CONSIDERATIONS

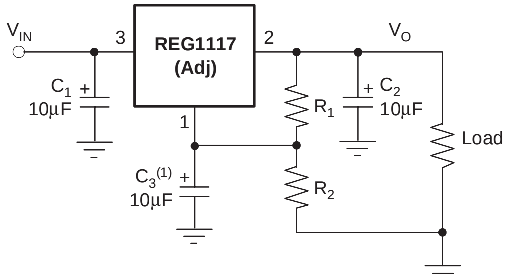
The REG1117 has current limit and thermal shutdown circuits that protect it from overload. The thermal shutdown activates at approximately $T_J$ = 165°C. For continuous operation, however, the junction temperature should not be allowed to exceed 125°C. Any tendency to activate the thermal shutdown in normal use is an indication of an inadequate heat sink or excessive power dissipation. The power dissipation is equal to:

$$P_D = (V_{IN} - V_{OUT})\, I_{OUT}$$

The junction temperature can be calculated by:

$$T_J = T_A + P_D\,(\theta_{JA})$$

where $T_A$ is the ambient temperature, and $\theta_{JA}$ is the junction-to-ambient thermal resistance.




$$V_O = \frac{R_1 + R_2}{R_1} \times (1.25V) + (50\mu A)(R_2)$$

This term is negligible with proper choice of values−see table at right.

| $V_{OUT}$ (V) | $R_1$ (Ω)(2) | $R_2$ (Ω)(2) |
|---|---|---|
| 1.25 | Open | Short |
| 1.5 | 750 | 147 |
| 2.1 | 158 | 107 |
| 2.85 | 169 | 215 |
| 3 | 137 | 191 |
| 3.3 | 115 | 187 |
| 5 | 113 | 340 |
| 10 | 113 | 787 |

NOTES: (1) $C_3$ optional. Improves high-frequency line rejection. (2) Resistors are standard 1% values.

**Figure 2. Adjustable-Voltage Model—Basic Connections**

A simple experiment will determine whether the maximum recommended junction temperature is exceeded in an actual circuit board and mounting configuration: Increase the ambient temperature above that expected in normal operation until the device's thermal shutdown is activated. If this occurs at more than 40°C above the maximum expected ambient temperature, then $T_J$ will be less than 125°C during normal operation.

The internal protection circuitry of the REG1117 was designed to protect against overload conditions. It was not intended to replace proper heat sinking. Continuously running the REG1117 into thermal shutdown will degrade reliability.

## LAYOUT CONSIDERATIONS

The DDPAK (REG1117F-3.3 and REG1117FA) is a surface-mount power package that has excellent thermal characteristics. For best thermal performance, the mounting tab should be soldered directly to a circuit board copper area, as shown in Figure 3. Increasing the copper area improves heat dissipation. Figure 4 shows typical thermal resistance from junction-to-ambient as a function of the copper area.

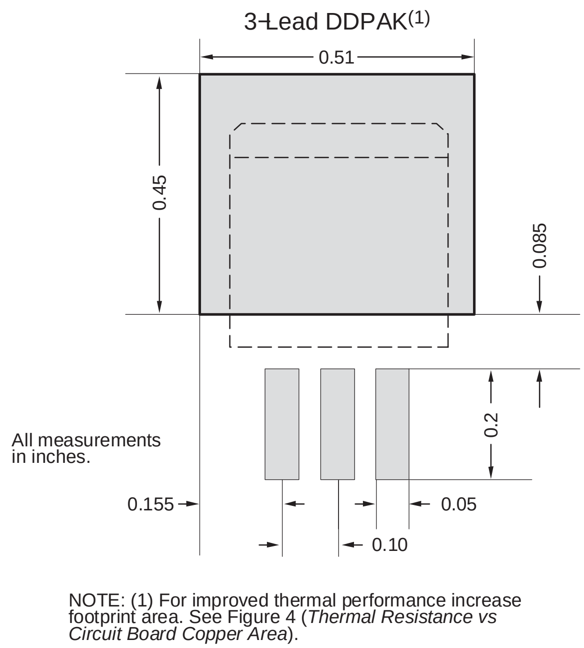



**Figure 3. DDPAK Footprint**

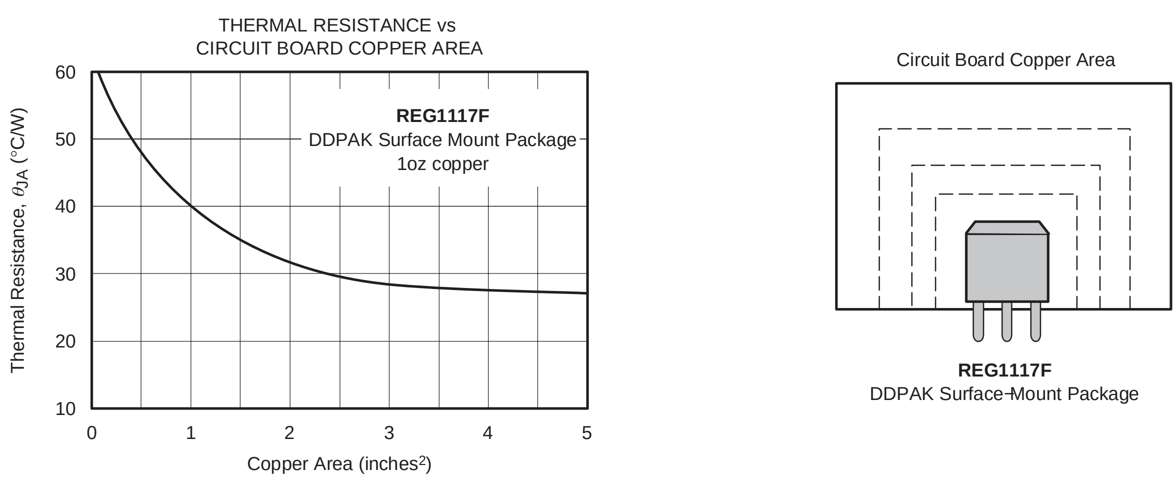



**Figure 4. DDPAK Thermal Resistance versus Circuit Board Copper Area**

The SOT-223 package derives heat sinking from conduction through its copper leads, especially the large mounting tab. These must be soldered to a circuit board with a substantial amount of copper remaining, as shown in Figure 5. Circuit board traces connecting the tab and the leads should be made as large as practical. The mounting tab of both packages is electrically connected to $V_{OUT}$.

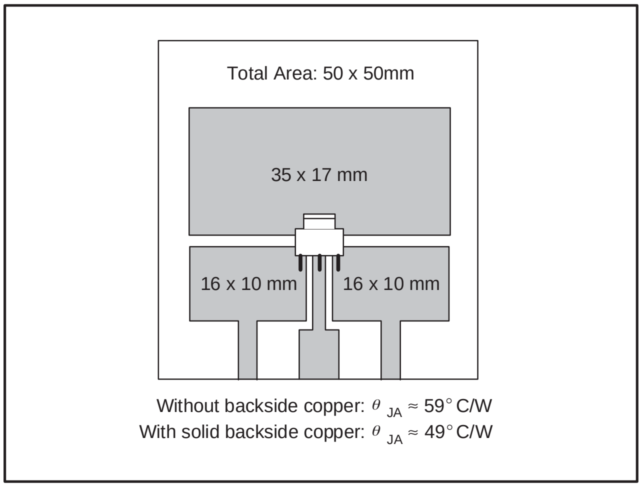



**Figure 5. SOT-223 Circuit Board Layout Example**

Other nearby circuit traces, including those on the back side of the circuit board, help conduct heat away from the device, even though they may not be electrically connected. Make all nearby copper traces as wide as possible and leave only narrow gaps between traces.

Table 1 shows approximate values of $\theta_{JA}$ for various circuit board and copper areas for the SOT-223 package. Nearby heat dissipating components, circuit board mounting conditions, and ventilation can dramatically affect the actual $\theta_{JA}$. Proper heat sinking significantly increases the maximum power dissipation at a given ambient temperature, as shown in Figure 6.

**Table 1. SOT-223 $\theta_{JA}$ for Various Board Configurations**

| TOTAL PC BOARD AREA | TOPSIDE(1) COPPER AREA | BACKSIDE COPPER AREA | SOT-223 THERMAL RESISTANCE JUNCTION-TO-AMBIENT |
|---|---|---|---|
| 2500mm$^2$ | 2500mm$^2$ | 2500mm$^2$ | 46°C/W |
| 2500mm$^2$ | 1250mm$^2$ | 2500mm$^2$ | 47°C/W |
| 2500mm$^2$ | 950mm$^2$ | 2500mm$^2$ | 49°C/W |
| 2500mm$^2$ | 2500mm$^2$ | 0 | 51°C/W |
| 2500mm$^2$ | 1800mm$^2$ | 0 | 53°C/W |
| 1600mm$^2$ | 600mm$^2$ | 1600mm$^2$ | 55°C/W |
| 2500mm$^2$ | 1250mm$^2$ | 0 | 58°C/W |
| 2500mm$^2$ | 915mm$^2$ | 0 | 59°C/W |
| 1600mm$^2$ | 600mm$^2$ | 0 | 67°C/W |
| 900mm$^2$ | 340mm$^2$ | 900mm$^2$ | 72°C/W |
| 900mm$^2$ | 340mm$^2$ | 0 | 85°C/W |

(1) Tab is attached to the topside copper.

## SOLDERING METHODS

Both REG1117 packages are suitable for infrared reflow and vapor-phase reflow soldering techniques. The high rate of temperature change that occurs with wave soldering or hand soldering can damage the REG1117.

INSPEC Abstract Number: B91007604, C91012627. Kelly, E.G. “Thermal Characteristics of Surface 5WK9Ω Packages.” The Proceedings of SMTCON. Surface Mount Technology Conference and Exposition: Competitive Surface Mount Technology, April 3−6, 1990, Atlantic City, NJ, USA. Abstract Publisher: IC Manage, 1990, Chicago, IL, USA.

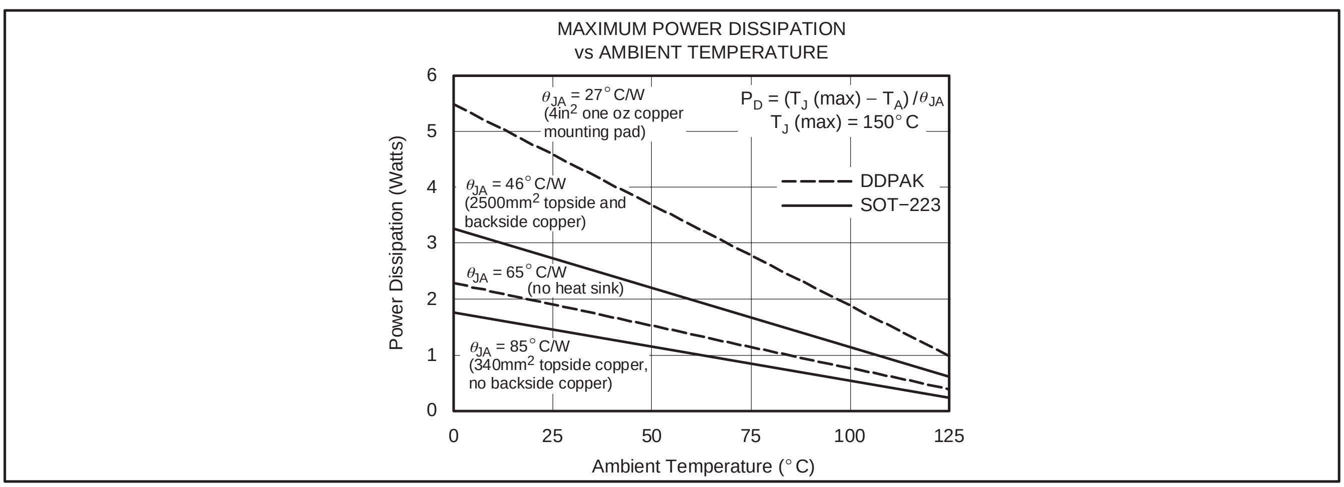



**Figure 6. Maximum Power Dissipation versus Ambient Temperature**

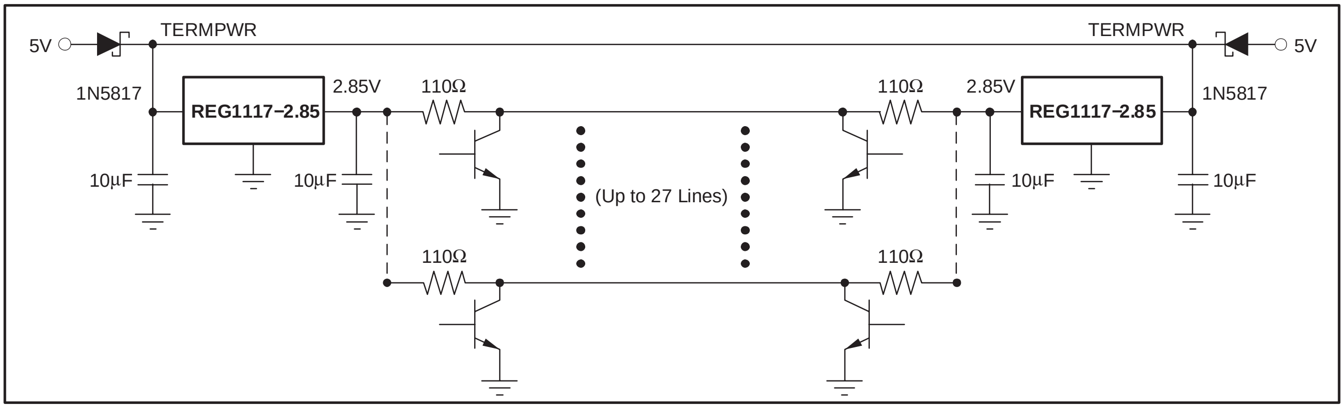



**Figure 7. SCSI Active Termination Configuration**

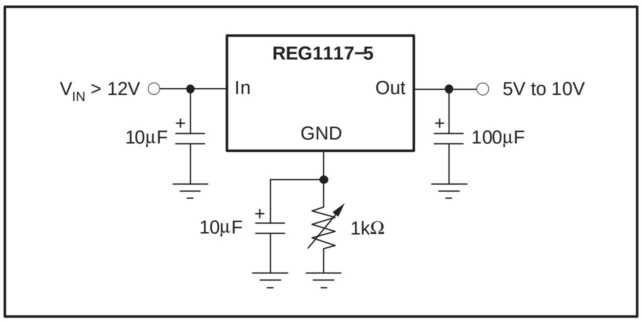



**Figure 8. Adjusting Output of Fixed Voltage Models**

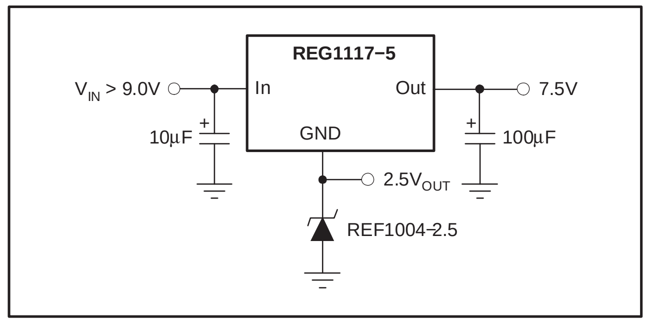



**Figure 9. Regulator with Reference**

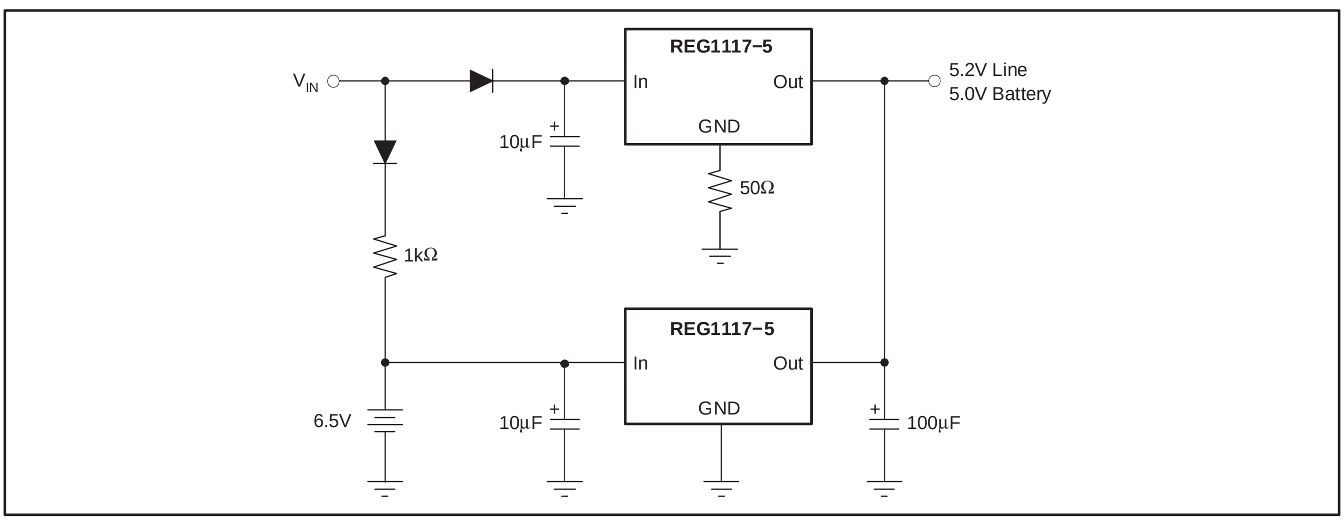



**Figure 10. Battery Backed-Up Regulated Supply**

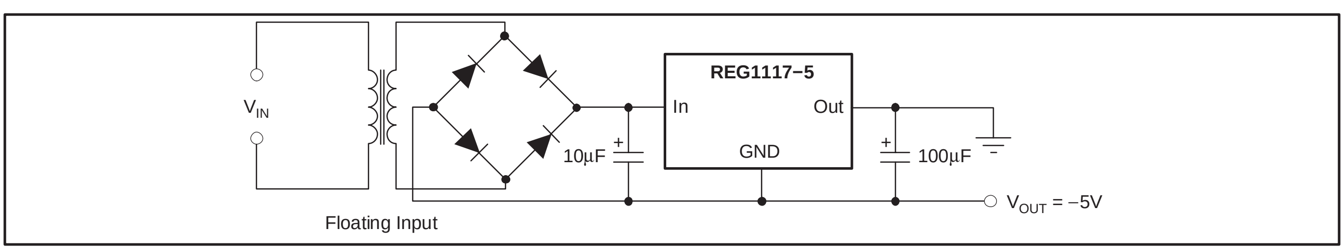



**Figure 11. Low Dropout Negative Supply**

## PACKAGING INFORMATION

| Orderable Device | Status [1] | Package Type | Package Drawing | Pins | Package Qty | Eco Plan [2] | Lead/Ball Finish | MSL Peak Temp [3] |
|---|---|---|---|---|---|---|---|---|
| REG1117 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-2.85 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-2.85/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-3.3 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-3.3/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-5 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117-5/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A-1.8 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A-1.8/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A-2.5 | ACTIVE | SOT-223 | DCY | 4 | 80 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A-2.5/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117A/2K5 | ACTIVE | SOT-223 | DCY | 4 | 2500 | TBD | CU SNPB | Level-3-220C-168 HR |
| REG1117F-3.3 | OBSOLETE | DDPAK/ TO-263 | KTT | 3 | | TBD | Call TI | Call TI |
| REG1117F-3.3/500 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 500 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117F-3.3KTTT | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117F33KTTTG3 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA | OBSOLETE | DDPAK/ TO-263 | KTT | 3 | | TBD | Call TI | Call TI |
| REG1117FA-1.8 | OBSOLETE | DDPAK/ TO-263 | KTT | 3 | | TBD | Call TI | Call TI |
| REG1117FA-1.8/500 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 500 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA-1.8KTTT | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA-2.5 | OBSOLETE | DDPAK/ TO-263 | KTT | 3 | | TBD | Call TI | Call TI |
| REG1117FA-2.5/500 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 500 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA-2.5KTTT | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA-5.0 | OBSOLETE | DDPAK/ TO-263 | KTT | 3 | | TBD | Call TI | Call TI |
| REG1117FA-5.0/500 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 500 | TBD | CU SN | Level-3-235C-168 HR |
| REG1117FA-5.0KTTT | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | TBD | CU SN | Level-3-235C-168 HR |
| REG1117FA/500 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 500 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA1.8KTTTG3 | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |
| REG1117FA2.5KTTTG3 | ACTIVE | DDPAK/ | KTT | 3 | 50 | Green (RoHS & | CU SN | Level-2-260C-1 YEAR |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) |
|---|---|---|---|---|---|---|---|---|
| | | TO-263 | | | | no Sb/Br) | | |
| REG1117FAKTTT | ACTIVE | DDPAK/ TO-263 | KTT | 3 | 50 | Green (RoHS & no Sb/Br) | CU SN | Level-2-260C-1 YEAR |

(1) 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), Pb-Free (RoHS Exempt), 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.
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
**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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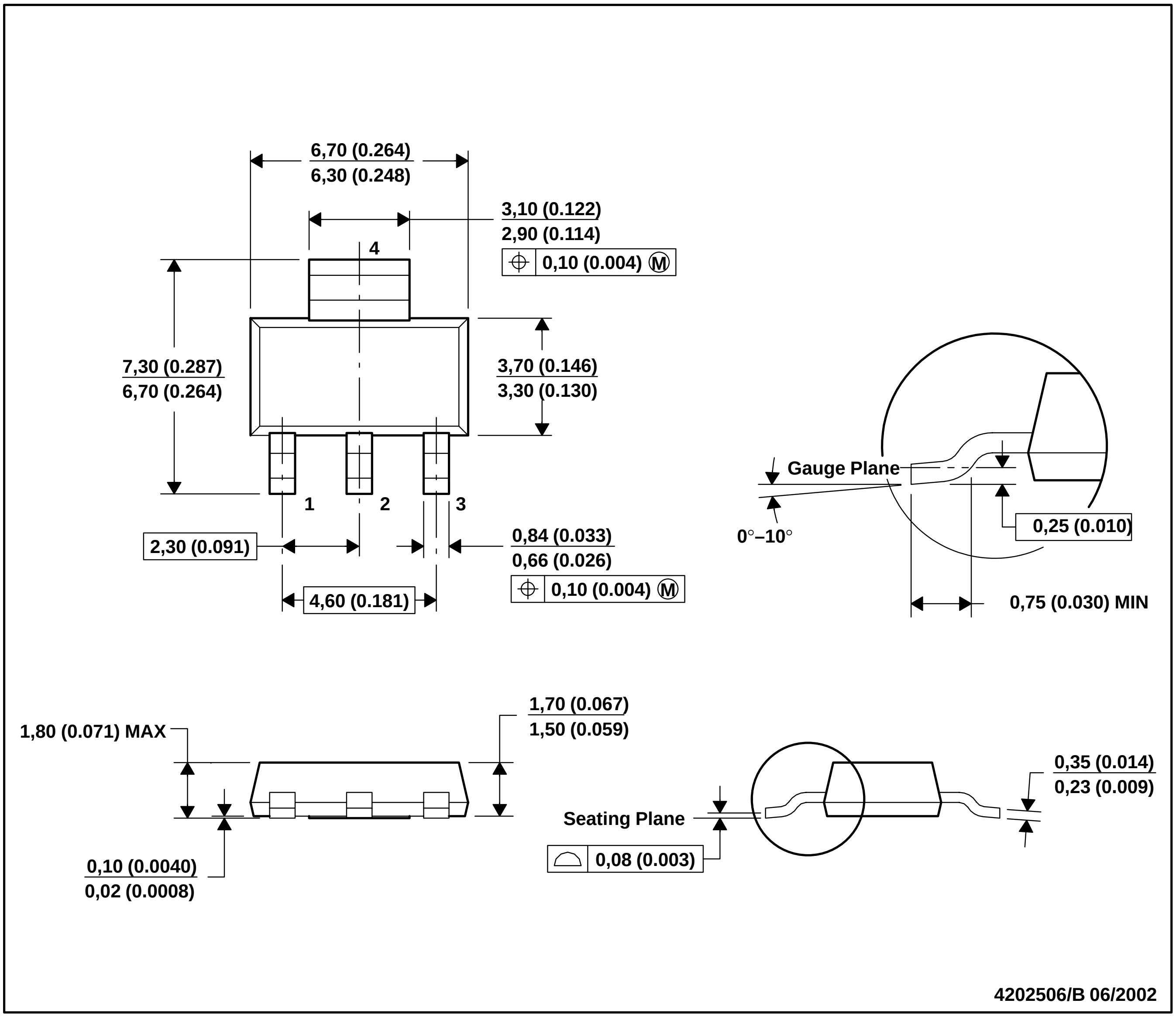
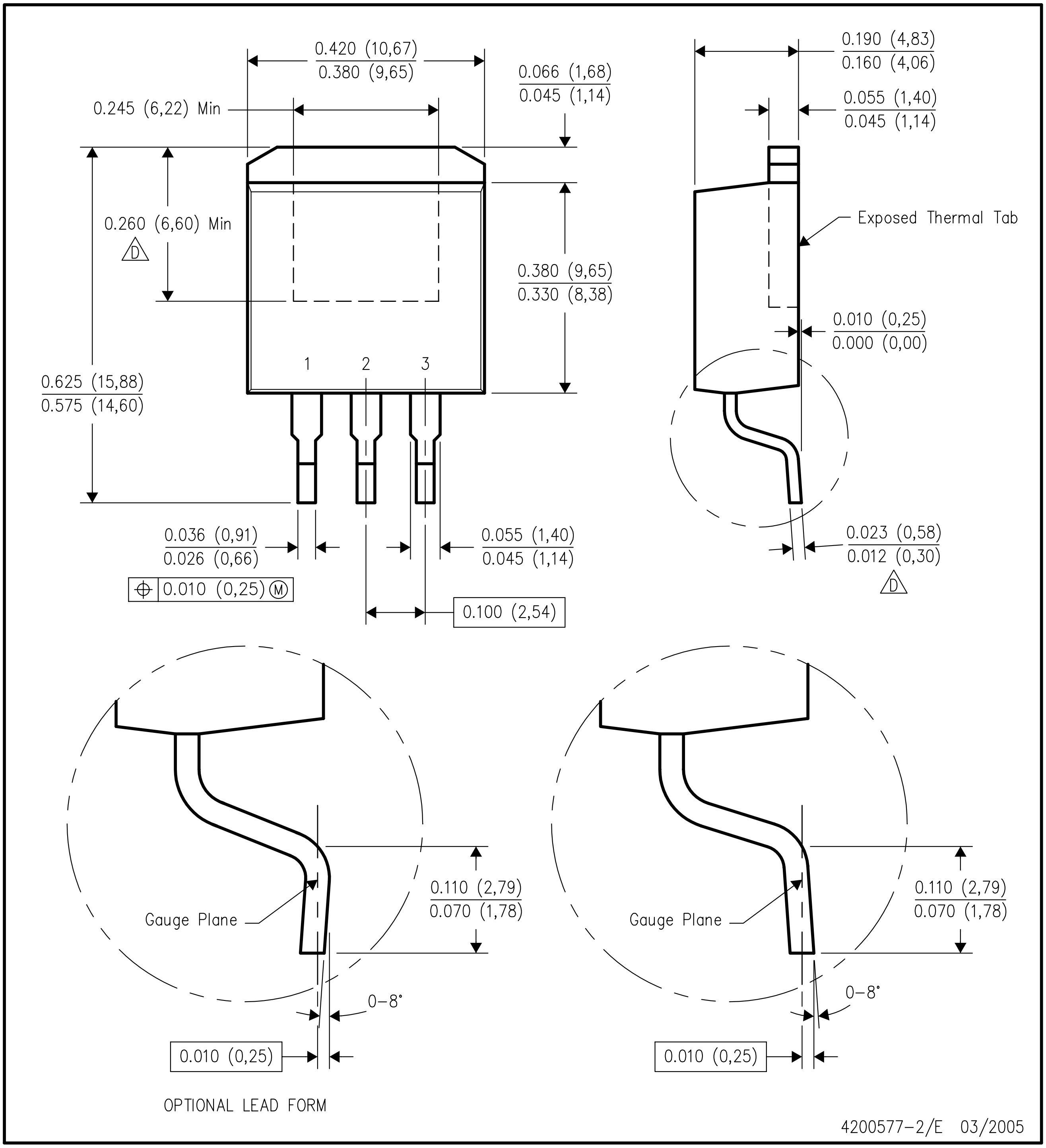
**DCY (R-PDSO-G4)** **PLASTIC SMALL-OUTLINE**




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.

## KTT (R–PSFM–G3) PLASTIC FLANGE–MOUNT PACKAGE




NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash or protrusion not to exceed 0.005 (0,13) per side.
D. Falls within JEDEC TO–263 variation AA, except minimum lead thickness and minimum exposed pad length.

## IMPORTANT NOTICE



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

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| 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 |
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