# SPX1117

# 800mA Low Dropout Voltage Regulator

## FEATURES

- Guaranteed 0.8A Output Current
- Guaranteed 1A Peak Current
- Three Terminal Adjustable or Fixed 1.5V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V and 5V
- Low Quiescent Current
- Low Dropout Voltage of 1.1V at 0.8A
- 0.1% Line and 0.2% Load Regulation
- Stable with 2.2uF Ceramic Capacitor
- Overcurrent and Thermal Protection
- Lead Free, RoHS Compliant Packages:

  SOT-223,TO-252, TO-220, and TO-263

## APPLICATIONS

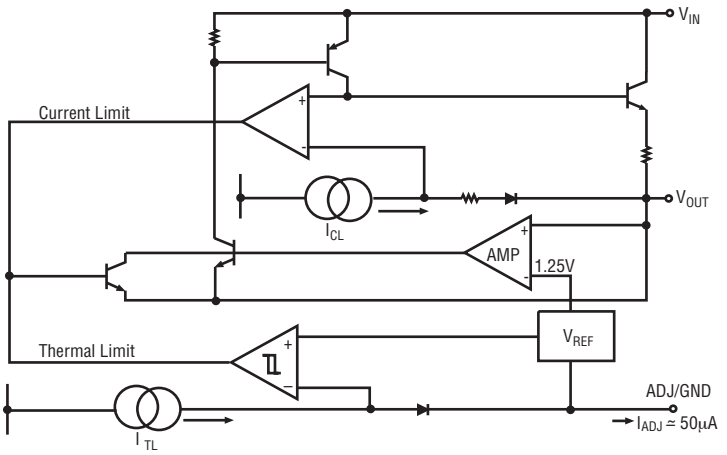
- Desktop PC's Servers
- SCSI-II Active Terminator
- Portable/ Palm Top / Notebook Computers
- Cordless Phones
- Battery Chargers
- Disk Drives
- Portable Consumer Equipment
- Portable Instrumentation
- SMPS Post-Regulator

## DESCRIPTION

The SPX1117 is a low power positive-voltage regulator designed to satisfy moderate power requirements with a cost effective, small footprint solution. This device is an excellent choice for use in battery-powered applications and portable computers. The SPX1117 features very low quiescent current and a low dropout voltage of 1.1V at a full load. As output current decreases, quiescent current flows into the load, increasing efficiency. SPX1117 is available in adjustable or fixed 1.5V, 1.8V, 2.5V,2.5V, 2.85V, 3.0V, 3.3V and 5V output voltages.

The SPX1117 is offered in several 3-pin surface mount packages: SOT-223, TO-252, TO-220 and TO-263. An output capacitor of 10μF provides unconditional stability while a smaller 2.2μF capacitor is sufficient for most applications.

## FUNCTIONAL DIAGRAM






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## ABSOLUTE MAXIMUM RATINGS

Power Dissipation.....Internally Limited
Lead Temperature (soldering, 5 seconds) .....260°C
Storage Temperature Range.....-65°C to +150°C
Operating Junction Temperature Range.....-40°C to +125°C
Input Supply Voltage ..... +20V
Input to Output Voltage ..... 18.8V
ESD Rating.....2kV min

These are sterss ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications below is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C, $C_{IN}$ = $C_{OUT}$ = 10µF, unless otherwise specified. The Boldface applies over the full operating temperature range.

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **1.5V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =3.0V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 2.9V ≤ $V_{IN}$ ≤ 10V | 1.485<br>**1.470** | 1.500 | 1.515<br>**1.530** | V |
| **1.8V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =3.3V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 3.2V ≤ $V_{IN}$ ≤ 10V | 1.782<br>**1.764** | 1.800 | 1.818<br>**1.836** | V |
| **2.5V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =4.0V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 3.9V ≤ $V_{IN}$ ≤ 10V | 2.475<br>**2.450** | 2.500 | 2.525<br>**2.550** | V |
| **2.85V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =4.35V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 4.25V ≤ $V_{IN}$ ≤ 10V | 2.821<br>**2.793** | 2.850 | 2.878<br>**2.907** | V |
| **3.00V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =4.5V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 4.4V ≤ $V_{IN}$ ≤ 10V | 2.970<br>**2.940** | 3.000 | 3.030<br>**3.060** | V |
| **3.30V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =4.8V, $T_J$ = 25ºC<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 4.7V ≤ $V_{IN}$ ≤ 10V | 3.267<br>**3.234** | 3.300 | 3.333<br>**3.366** | V |
| **5V Version** | | | | | |
| Output Voltage | $I_{OUT}$ = 5mA, $V_{IN}$ =6.5V<br>5mA ≤ $I_{OUT}$ ≤ 800mA, 6.4V ≤ $V_{IN}$ ≤ 12V | 4.950<br>**4.90** | 5 | 5.050<br>**5.10** | V |
| **All Voltage Options** | | | | | |
| Reference Voltage | $I_{OUT}$=5mA, ($V_{IN}$ - $V_{OUT}$)= 2V, $T_J$ = 25ºC<br>5mA≤$I_{OUT}$≤ 800mA, 1.4V≤($V_{IN}$-$V_{OUT}$)≤ 10V | 1.238<br>**1.225** | 1.250 | 1.262<br>**1.270** | V |
| Output Voltage Temperature Stability | | | 0.3 | | % |
| Line Regulation (Note 1) | $V_{INMIN}$ ≤$V_{IN}$≤ 12V,$V_{OUT}$=Fixed/Adj, $I_{OUT}$=5mA | | 3 | 7 | mV |
| Load Regulation (Note 1) | 5mA≤$I_{OUT}$≤ 800mA,$V_{OUT}$=Fixed/Adj | | 6 | **12** | mV |
| Dropout Voltage (Note 2) | $I_{OUT}$=100mA<br>$I_{OUT}$=500mA<br>$I_{OUT}$=800mA | | 1.00<br>1.05<br>1.10 | **1.20**<br>**1.25**<br>**1.30** | V |
| Quiescent Current | 4.25V≤$V_{IN}$≤ 6.5V | | 5 | **10** | mA |


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## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C, $C_{IN}$ = $C_{OUT}$ = 10µF, unless otherwise specified. The Boldface applies over the full operating temperature range.

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| Adjust Pin Current | | | 50 | **120** | µA |
| Current Limit | ($V_{IN}$-$V_{OUT}$)=5V | 1.0 | 1.5 | 2.0 | A |
| Thermal Regulation | 25°C, 30mS pulse | | 0.01 | 0.1 | %/W |
| Ripple Rejection | $f_{RIPPLE}$=120Hz, ($V_{IN}$-$V_{OUT}$)=2V, $V_{RIPPLE}$=1$V_{PP}$ | 60 | 75 | | dB |
| Long Term Stability | 125°C, 1000Hrs | | 0.03 | | % |
| RMS Output Noise | % of $V_{OUT}$, 10Hz≤f≤10kHz | | 0.003 | | % |

*Note 1 - For fixed option, $V_{INMIN}$ = $V_{OUT}$ + 1.5V
- For adjustable option, $V_{INMIN}$ = $V_{IN}$ - $V_{OUT}$ = 1.4V

*Note 2 - Dropout voltage is the input voltage minus output voltage that produces a 1% decrease in output voltage with respect to the nominal output voltage at $V_{IN}$ = $V_{OUT}$ + 1.5V


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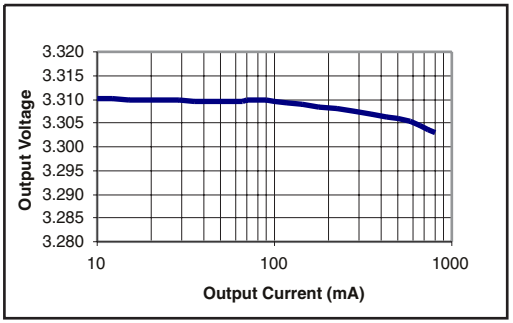



*Figure 1. Load Regulation for SPX1117M3-3.3; $V_{IN}$=4.8V*

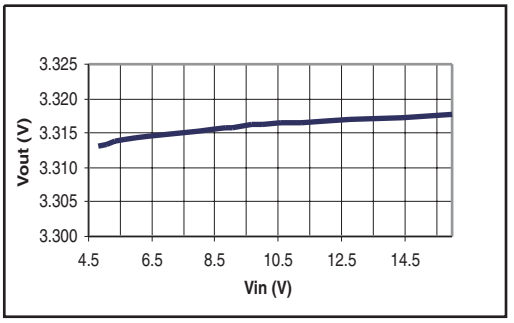



*Figure 2. Line Regulation for SPX1117M3-3.3; $I_{OUT}$=10mA*

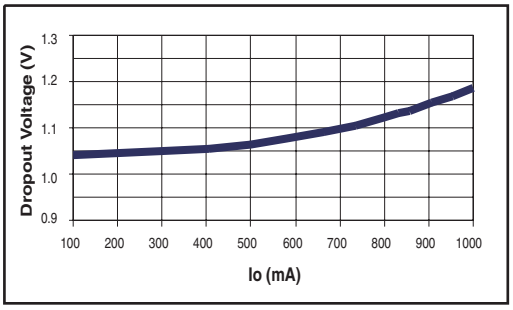



*Figure 3. Dropout Voltage vs Output Current for SPX1117M3-3.3; $V_{IN}$=4.8V, $C_{OUT}$=2.2µF*

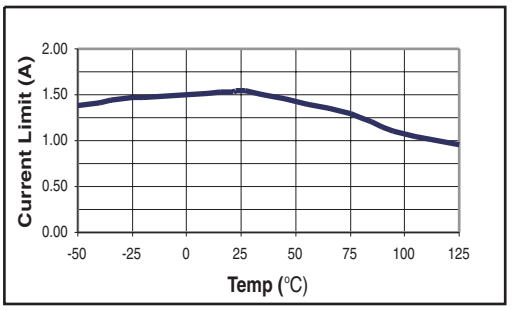



*Figure 4. Current Limit for SP1117M3-3.3; $V_{IN}$=4.8V, $C_{IN}$=$C_{OUT}$=1µF, $I_{OUT}$ pulsed from 10mA to Current Limit*

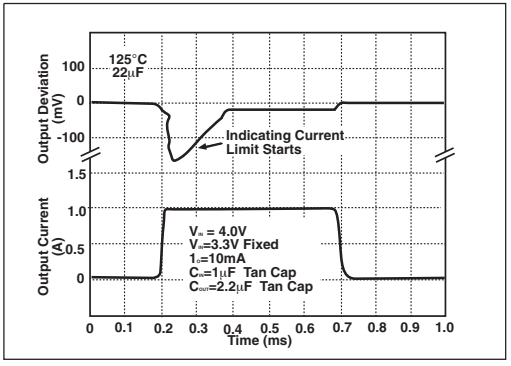



*Figure 5. Current Limit for SPX1117M3-3.3, Output Voltage Deviation with $I_{OUT}$=10mA to 1A Step*

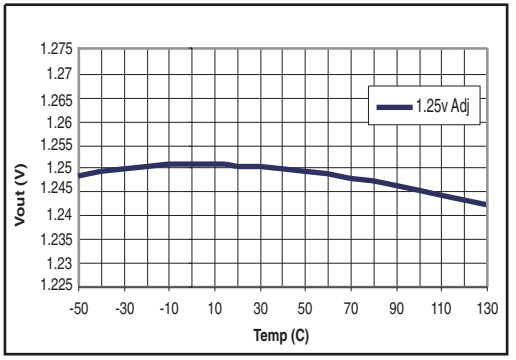



*Figure 6. $V_{OUT}$ vs Temperature, $V_{IN}$=2.5V, $I_{OUT}$=10mA*

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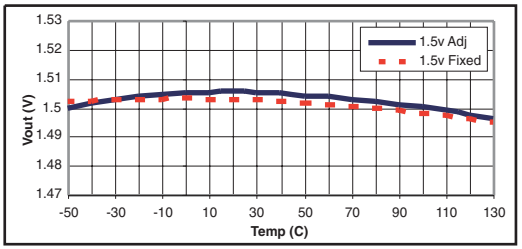



*Figure 7. $V_{IN}$=3.0V, $I_{OUT}$=10mA*

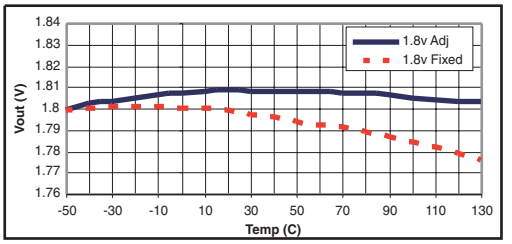



*Figure 8. $V_{IN}$=3.3V, $I_{OUT}$=10mA*

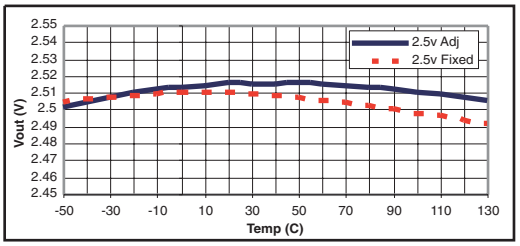



*Figure 9. $V_{IN}$=4.0V, $I_{OUT}$=10mA*

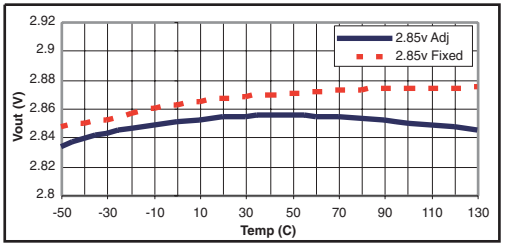



*Figure 10. $V_{IN}$=4.85V, $I_{OUT}$=10mA*

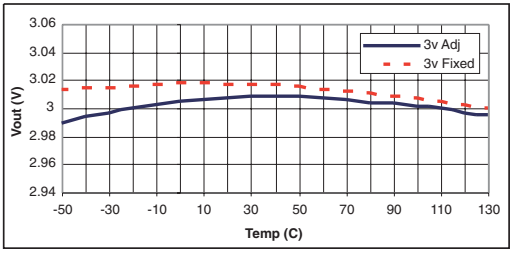



*Figure 11. $V_{IN}$=4.85V, $I_{OUT}$=10mA*

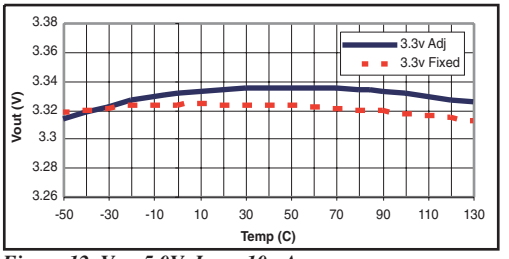



*Figure 12. $V_{IN}$=5.0V, $I_{OUT}$=10mA*

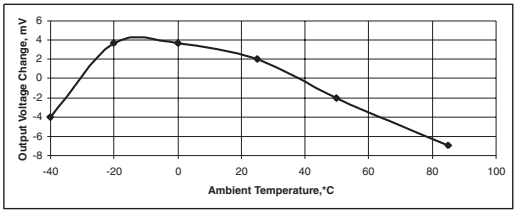



*Figure 13. Line Regulation vs Temperature. $V_{OUT}$=1.8V (adjustable), $V_{IN}$= 3.3V*

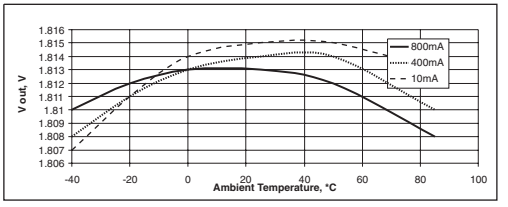



*Figure 14. Output Voltage vs Temperature at different Current Loads, $V_{IN}$=3.3V, $V_{OUT}$ = 1.8V Adjustable*

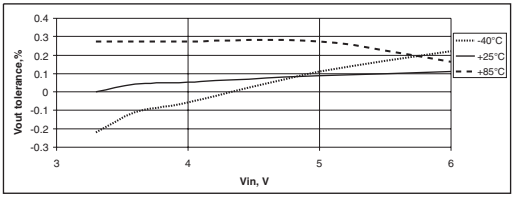
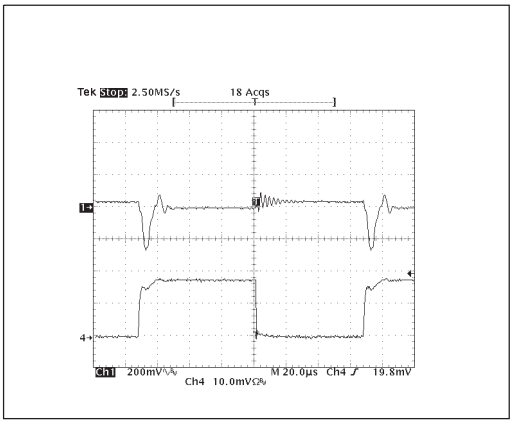



*Figure 15. Line Regulation at $I_{LOAD}$=800mA over Temperature, $V_{OUT}$=1.8V adjustable*

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### Output Capacitor

To ensure the stability of the SPX1117, an output capacitor of at least 2.2µF (tantalum or ceramic) or 10µF (aluminum) is required. The value may change based on the application requirements of the output load or temperature range. The value of ESR can vary based on the type of capacitor used in the applications to guarantee stability. The recommended value for ESR is 0.5Ω or less. A larger value of output capacitance (up to 100µF) can improve the load transient response.



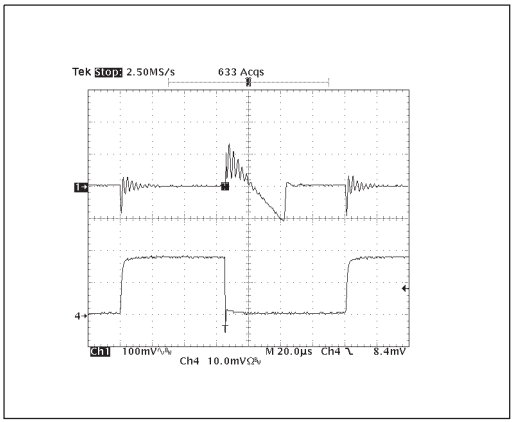




***Figure 16. Load Step Response (0 to 800mA), Vin=3.3V, Vout=1.8V, Cin=10µF, Cout=2.2µF, Ceramic; 1 = Vout, 4= Iload***

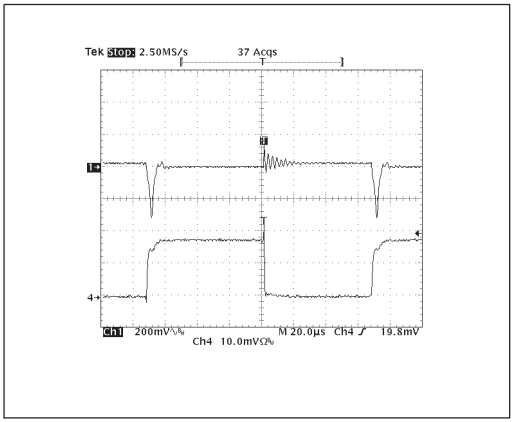



***Figure 17. Load Step Response (0 to 800mA), Vin=3.3V, Vout=1.8V, Cin=10µF, Cout=2.2µF, OSCON; 1 = Vout, 4= Iload***

### Soldering Methods

The SPX1117 SOT-223 package is designed to be compatible with infrared reflow or vapor-phase reflow soldering techniques. During soldering, the non-active or mildly active fluxes may be used. The SPX1117 die is attached to the heatsink lead which exits opposite the input, output, and ground pins.

Hand soldering and wave soldering should be avoided since these methods can cause damage to the device with excessive thermal gradients on the package. The SOT-223 recommended soldering method are as follows: vapor phase reflow and infrared reflow with the component preheated to within 65°C of the soldering temperature range.

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**Thermal Characteristics**

The thermal resistance of SPX1117 (SOT-223 Package) is 15°C/W from junction to tab and 31 °C/W from tab to ambient for a total of 46 °C/W from junction to ambient (Table 1). The SPX1117 features the internal thermal limiting to protect the device during overload conditions. Special care needs to be taken during continuous load conditions such that the maximum junction temperature does not exceed 125 °C. Thermal protection is activated at >155°C and deactiviated at <140 °C.

Taking the FR-4 printed circuit board and 1/16 thick with 1 ounce copper foil as an experiment (fig.13), the PCB material is effective at transmitting heat with the tab attached to the pad area and a ground plane layer on the backside of the substrate. Refer to table 1 for the results of the experiment.

The thermal interaction from other components in the application can effect the thermal resistance of the SPX1117. The actual thermal resistance can be determined with experimentation.

SPX1117 power dissipation is calculated as follows:

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

Maximum Junction Temperature range:

$T_J = T_A(max) + P_D$* thermal resistance (junction-to-ambient)

Maximum junction temperature must not exceed the 125°C.

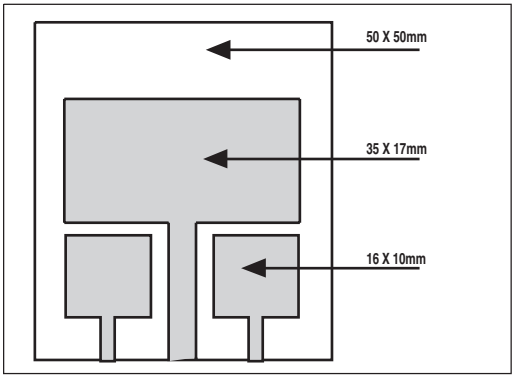



*Figure 19. Substrate Layout for SOT-223*

**Ripple Rejection**

Ripple rejection can be improved by adding a capacitor between the ADJ pin and ground as shown in Figure 23. When ADJ pin bypassing is used, the value of the output capacitor required increases to its maximum. If the ADJ pin is not bypassed, the value of the output capacitor can be lowered to 10µF for an electrolytic aluminum capacitor or 2.2µF for a ceramic or solid tantalum capacitor (Fig 22).

However the value of the ADJ-bypass capacitor should be chosen with respect to the following equation:

$$C = 1 / ( 6.28 * F_R * R_1 )$$

Where

C = value of the capacitor in Farads (select an equal or larger standard value),

$F_R$ = ripple frequency in Hz,

$R_1$ = value of resistor R1 in Ohms.

If an ADJ-bypass capacitor is used, the amplitude of the output ripple will be independent of the output voltage. If an ADJ-bypass capacitor is not used, the output ripple will be proportional to the ratio of the output voltage to the reference voltage:

$$M = V_{OUT} / V_{REF}$$

Where M = multiplier for the ripple seen when the ADJ pin is optimally bypassed.

$$V_{REF} = 1.25V$$

Ripple rejection for the adjustable version is shown in Figure 20.

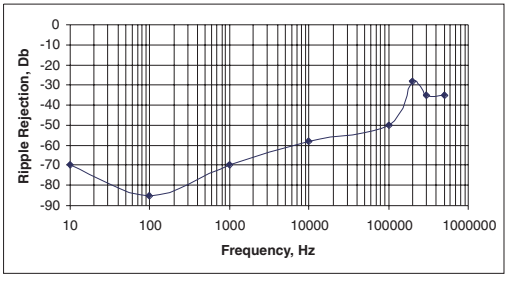



***Figure 20. Ripple Rejection; Vin=3.3V, Vout=1.8V (adj.), Iload=200mA***

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**TABLE 1**

| PC BOARD $mm^2$ | TOPSIDE COPPER $mm^2$ | BACKSIDE COPPER $mm^2$ | THERMAL RESISTANCE JUNC. TO AMB. °C/W |
|---|---|---|---|
| 2500 | 2500 | 2500 | 46 |
| 2500 | 1250 | 2500 | 47 |
| 2500 | 950 | 2500 | 49 |
| 2500 | 2500 | 0 | 51 |
| 2500 | 1800 | 0 | 53 |
| 1600 | 600 | 1600 | 55 |
| 2500 | 1250 | 0 | 58 |
| 2500 | 915 | 0 | 59 |
| 1600 | 600 | 0 | 67 |
| 900 | 240 | 900 | 72 |
| 900 | 240 | 0 | 85 |

**Output Voltage**

The output of the adjustable regulator can be set to any voltage between 1.25V and 15V. The value of $V_{OUT}$ can be quickly approximated using the formula

$$V_{OUT}=1.25 *(R_1 + R_2)/R_1.$$

A small correction to this formula is required depending on the values of resistors $R_1$ and $R_2$, since the adjustable pin current (approx 50µA) flows through $R_2$. When $I_{ADJ}$ is taken into account, the formula becomes

$$V_{OUT} = V_{REF}(1+ (R_2/R_1)) + I_{ADJ} * R_2,$$

where

$$V_{REF}=1.25V.$$

**Layout Considerations**

Parasitic line resistance can degrade load regulation. In order to avoid this, connect $R_1$ directly to $V_{OUT}$ as illustrated in Figure 25. For the same reason, $R_2$ should be connected to the negative side of the load.

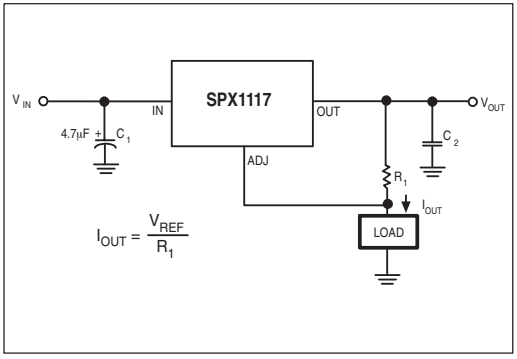



*Figure 21. Current Source*

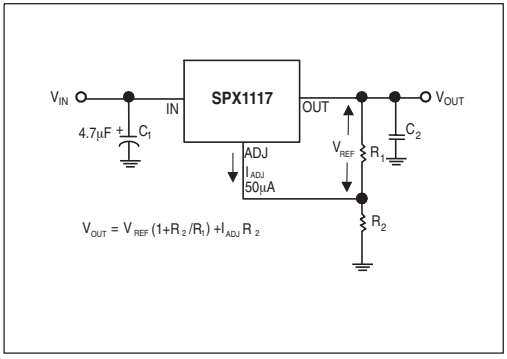



*Figure 22. Typical Adjustable Regulator*

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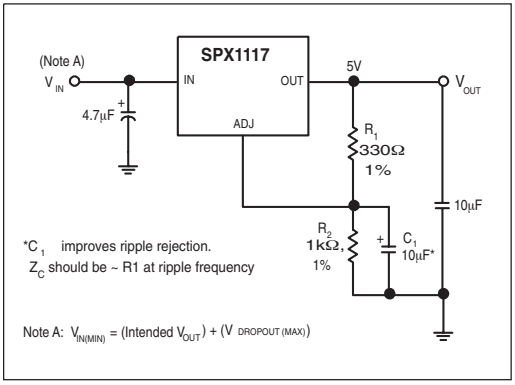



*Figure 23. Improving Ripple Rejection*

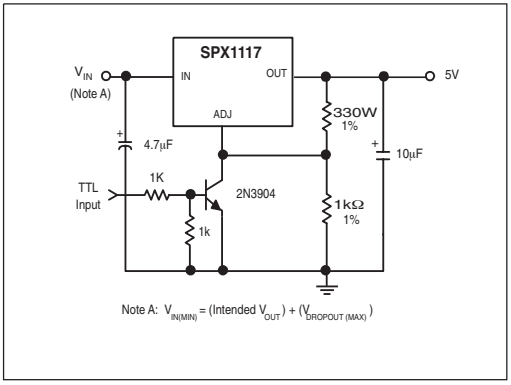



*Figure 24. 5V Regulator with Shutdown*

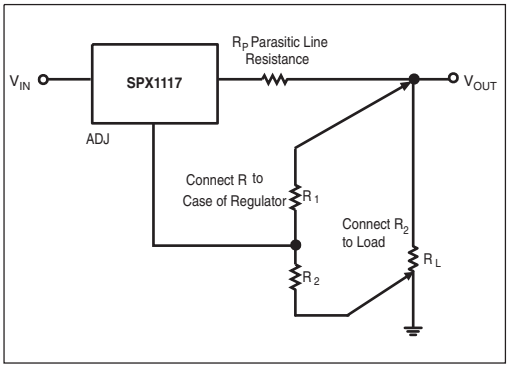
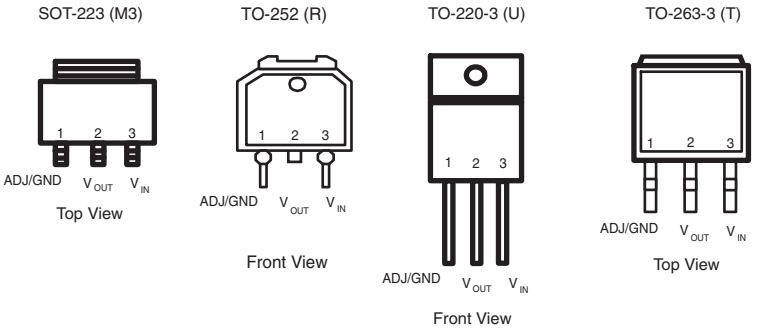



*Figure 25. Recommended Connections for Best Results*

## PINOUTS

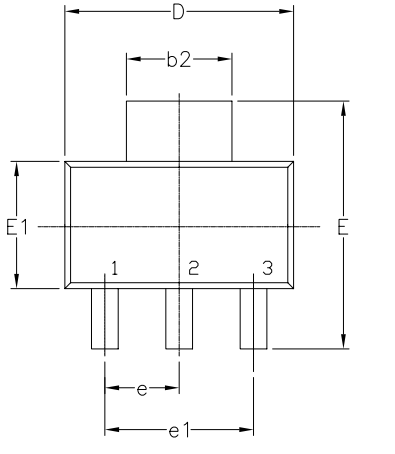


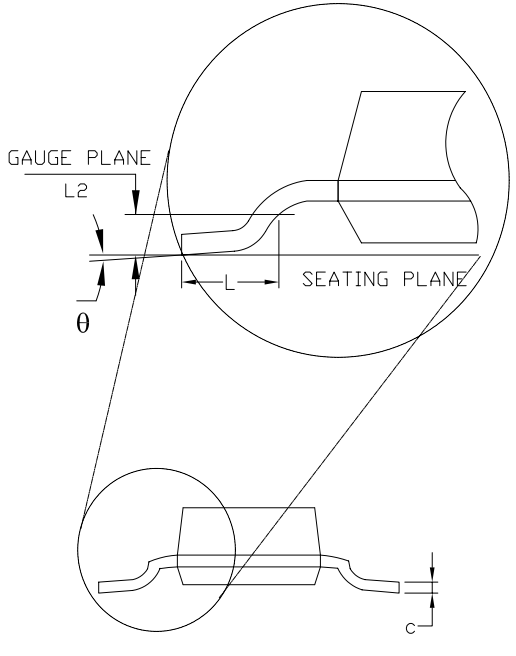

*Note: For all Pinouts, TAB is connected to Pin2 VOUT.*

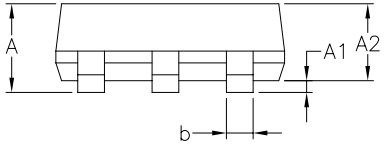
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| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DISCRIPTION | DATE | APP'D |
| A | DRAWING ORIGINATION | 08/08/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 09/11/06 | JL |

Top View



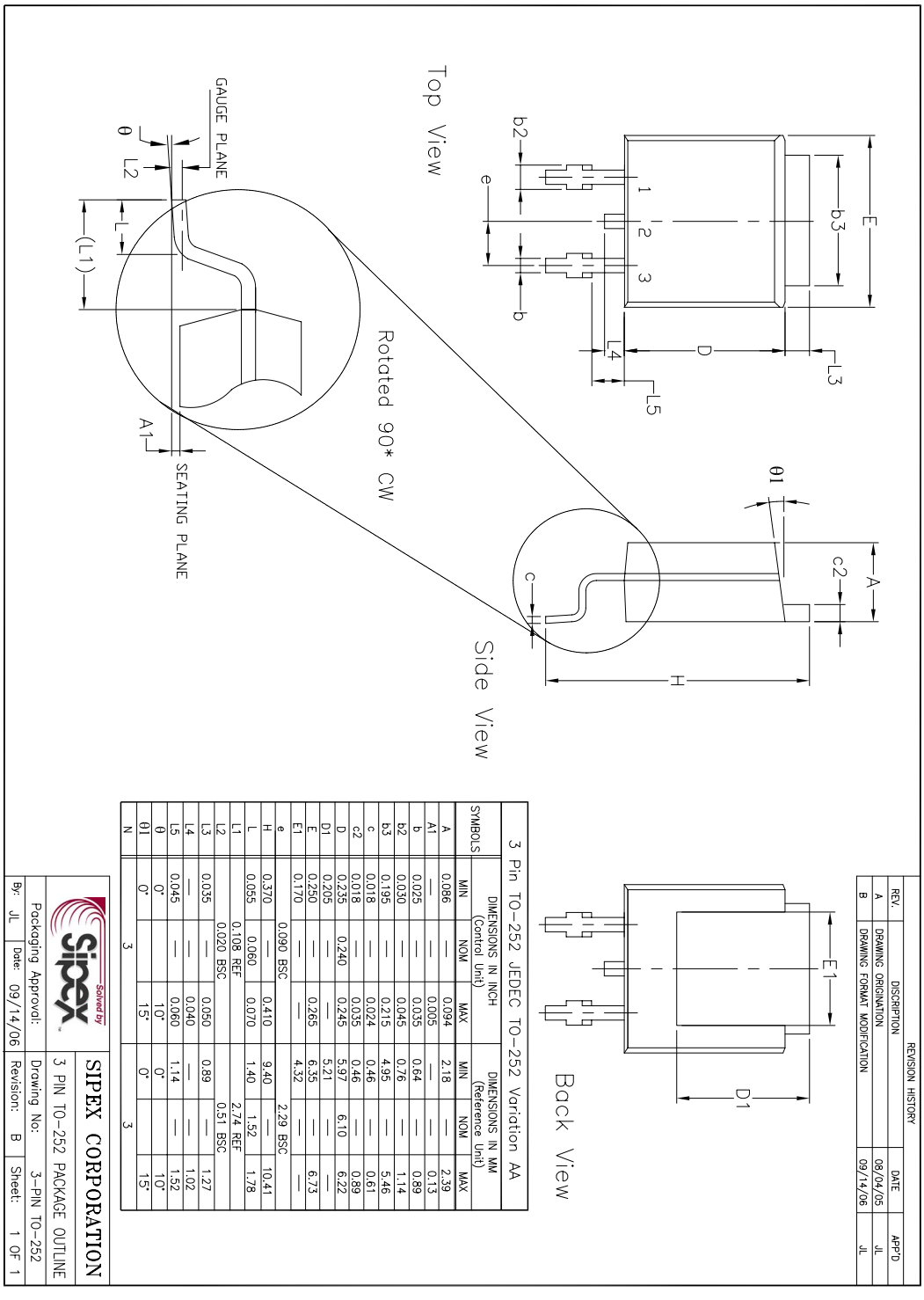

Side View

Front View

| 3 Pin SOT-223 JEDEC TO-261 Variation AA | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOLS | DIMENSIONS IN MM (Control Unit) | | | DIMENSIONS IN INCH (Reference Unit) | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | — | — | 1.80 | — | — | 0.071 |
| A1 | 0.02 | — | 0.10 | 0.001 | — | 0.004 |
| A2 | 1.50 | 1.60 | 1.70 | 0.060 | 0.063 | 0.067 |
| b | 0.66 | 0.76 | 0.84 | 0.026 | 0.030 | 0.033 |
| b2 | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| c | 0.23 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| D | 6.30 | 6.50 | 6.70 | 0.248 | 0.256 | 0.264 |
| E | 6.70 | 7.00 | 7.30 | 0.264 | 0.276 | 0.287 |
| E1 | 3.30 | 3.50 | 3.70 | 0.130 | 0.138 | 0.146 |
| e | 2.30 BSC | | | 0.091 BSC | | |
| e1 | 4.60 BSC | | | 0.182 BSC | | |
| L | 0.75 | — | — | 0.030 | — | — |
| L2 | 0.25 BSC | | | 0.010 BSC | | |
| θ | 0° | — | 10° | 0° | — | 10° |
| N | 3 | | | 3 | | |

| | | | |
|---|---|---|---|
| Solved by Sipex | | SIPEX CORPORATION | |
| | | 3 PIN SOT-223 PACKAGE OUTLINE | |
| Packaging Approval: | | Drawing No: | 3-PIN SOT-223 |
| By: JL | Date: 09/11/06 | Revision: B | Sheet: 1 OF 1 |

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3 Pin TO-252 JEDEC TO-252 Variation AA

| SYMBOLS | DIMENSIONS IN INCH (Control Unit) | | | DIMENSIONS IN MM (Reference Unit) | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.086 | — | 0.094 | 2.18 | — | 2.39 |
| A1 | — | — | 0.005 | — | — | 0.13 |
| b | 0.025 | — | 0.035 | 0.64 | — | 0.89 |
| b2 | 0.030 | — | 0.045 | 0.76 | — | 1.14 |
| b3 | 0.195 | — | 0.215 | 4.95 | — | 5.46 |
| c | 0.018 | — | 0.024 | 0.46 | — | 0.61 |
| c2 | 0.018 | — | 0.035 | 0.46 | — | 0.89 |
| D | 0.235 | 0.240 | 0.245 | 5.97 | 6.10 | 6.22 |
| D1 | 0.205 | — | — | 5.21 | — | — |
| E | 0.250 | — | 0.265 | 6.35 | — | 6.73 |
| E1 | 0.170 | — | — | 4.32 | — | — |
| e | 0.090 BSC | | | 2.29 BSC | | |
| H | 0.370 | — | 0.410 | 9.40 | — | 10.41 |
| L | 0.055 | 0.060 | 0.070 | 1.40 | 1.52 | 1.78 |
| L1 | 0.108 REF | | | 2.74 REF | | |
| L2 | 0.020 BSC | | | 0.51 BSC | | |
| L3 | 0.035 | — | 0.050 | 0.89 | — | 1.27 |
| L4 | — | — | 0.040 | — | — | 1.02 |
| L5 | 0.045 | — | 0.060 | 1.14 | — | 1.52 |
| θ | 0° | | 10° | 0° | | 10° |
| θ1 | 0° | | 15° | 0° | | 15° |
| N | 3 | | | 3 | | |

Sipex Saved by

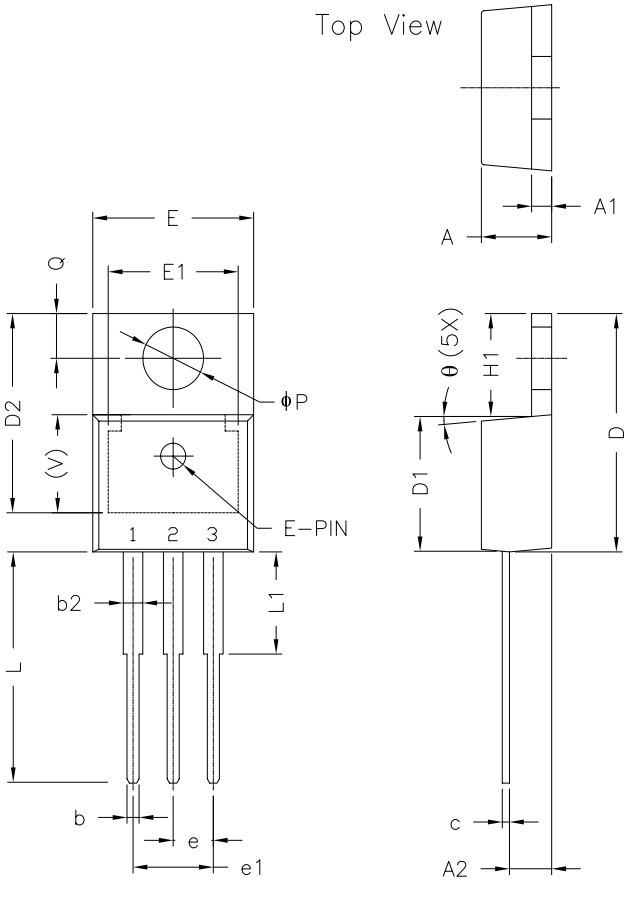
SIPEX CORPORATION

3 PIN TO-252 PACKAGE OUTLINE

| Packaging Approval: | Drawing No: 3-PIN TO-252 | |
|---|---|---|
| By: JL Date: 09/14/06 | Revision: B | Sheet: 1 OF 1 |

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| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DISCRIPTION | DATE | APP'D |
| A | DRAWING ORIGINATION | 08/04/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 05/25/06 | JL |

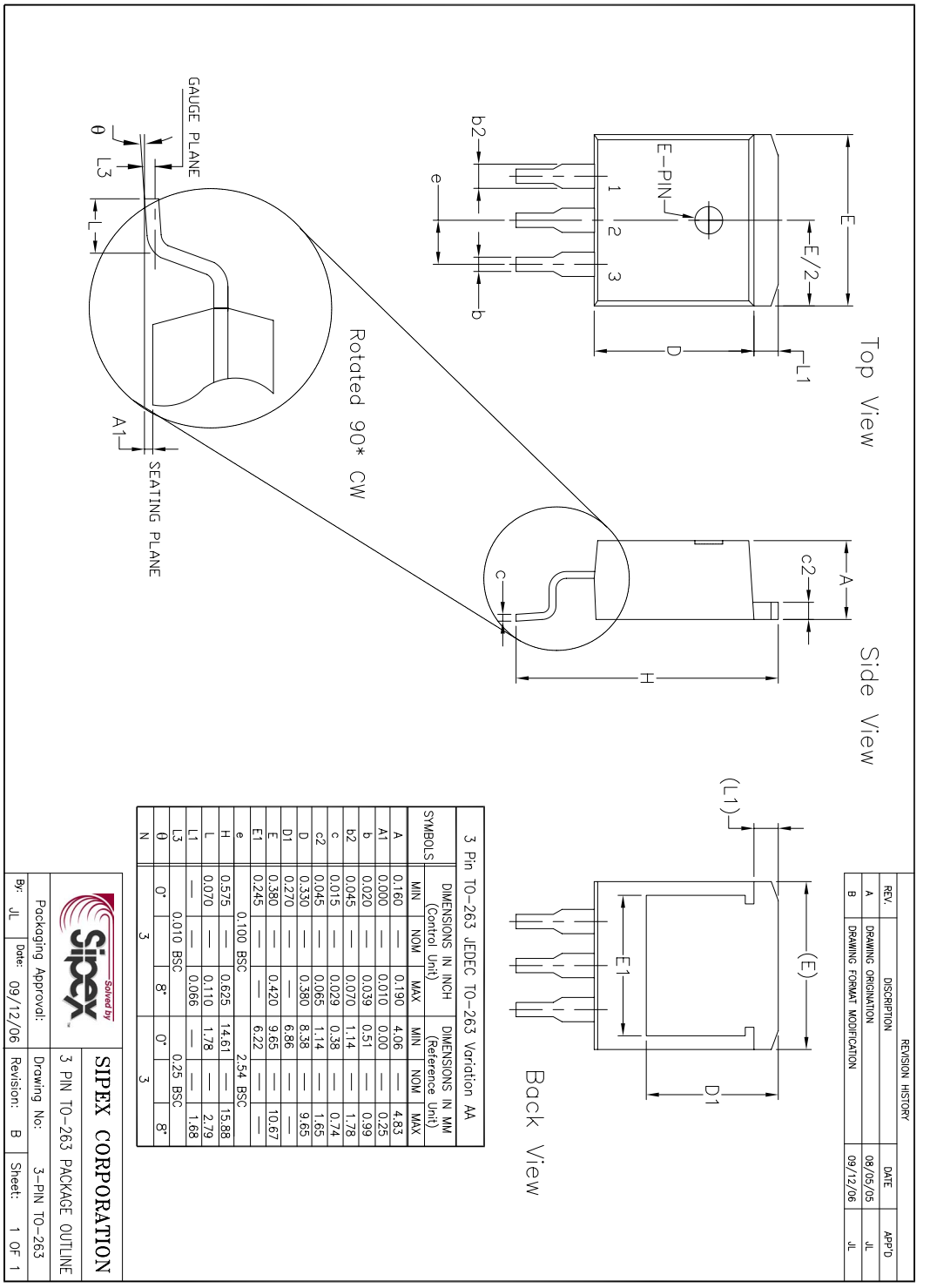



| 3 Pin TO-220 (Option 1)* JEDEC TO-220-AB | | | | |
|---|---|---|---|---|
| SYMBOLS | DIMENSIONS IN INCH (Control Unit) | | DIMENSIONS IN MM (Reference Unit) | |
| | MIN | MAX | MIN | MAX |
| A | 0.140 | 0.190 | 3.56 | 4.82 |
| A1 | 0.020 | 0.055 | 0.51 | 1.40 |
| A2 | 0.080 | 0.115 | 2.03 | 2.92 |
| b | 0.015 | 0.040 | 0.38 | 1.02 |
| c | 0.014 | 0.024 | 0.36 | 0.61 |
| D | 0.560 | 0.650 | 14.22 | 16.51 |
| D1 | 0.330 | 0.355 | 8.38 | 9.02 |
| D2 | 0.480 | 0.507 | 12.19 | 12.88 |
| E | 0.380 | 0.420 | 9.65 | 10.67 |
| E1 | 0.270 | 0.350 | 6.86 | 8.89 |
| e | 0.100 BSC | | 2.54 BSC | |
| e1 | 0.200 BSC | | 5.08 BSC | |
| H1 | 0.230 | 0.270 | 5.84 | 6.86 |
| L | 0.500 | 0.580 | 12.70 | 14.73 |
| L1 | — | 0.250 | — | 6.35 |
| P | 0.139 | 0.156 | 3.53 | 3.96 |
| Q | 0.103 | 0.113 | 2.62 | 2.87 |
| V | 0.240 REF | | 6.10 REF | |
| θ | 3° | 7° | 3° | 7° |
| N | 3 | | 3 | |

* Refer to product datasheet for POD option being used

| | | |
|---|---|---|
| Solved by Sipex | SIPEX CORPORATION | |
| | 3 PIN TO-220 PACKAGE OUTLINE | |
| Packaging Approval: | Drawing No: | 3-PIN TO-220 |
| By: JL Date: 05/25/06 | Revision: B | Sheet: 1 OF 2 |

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| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DISCRIPTION | DATE | APP'd |
| A | DRAWING ORIGINATION | 08/05/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 09/12/06 | JL |

3 Pin TO-263 JEDEC TO-263 Variation AA

| SYMBOLS | DIMENSIONS IN INCH (Control Unit) | | | DIMENSIONS IN MM (Reference Unit) | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.160 | — | 0.190 | 4.06 | — | 4.83 |
| A1 | 0.000 | — | 0.010 | 0.00 | — | 0.25 |
| b | 0.020 | — | 0.039 | 0.51 | — | 0.99 |
| b2 | 0.045 | — | 0.070 | 1.14 | — | 1.78 |
| c | 0.015 | — | 0.029 | 0.38 | — | 0.74 |
| c2 | 0.045 | — | 0.065 | 1.14 | — | 1.65 |
| D | 0.330 | — | 0.380 | 8.38 | — | 9.65 |
| D1 | 0.270 | — | — | 6.86 | — | — |
| E | 0.380 | — | 0.420 | 9.65 | — | 10.67 |
| E1 | 0.245 | — | — | 6.22 | — | — |
| e | 0.100 BSC | | | 2.54 BSC | | |
| H | 0.575 | — | 0.625 | 14.61 | — | 15.88 |
| L | 0.070 | — | 0.110 | 1.78 | — | 2.79 |
| L1 | — | — | 0.066 | — | — | 1.68 |
| L3 | 0.010 BSC | | | 0.25 BSC | | |
| θ | 0° | 8° | | 0° | 8° | |
| N | 3 | | | 3 | | |

Solved by Sipex

SIPEX CORPORATION

3 PIN TO-263 PACKAGE OUTLINE

| Packaging Approval: | | Drawing No: | 3-PIN TO-263 |
|---|---|---|---|
| By: JL | Date: 09/12/06 | Revision: B | Sheet: 1 OF 1 |


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## Ordering Information

| Part Number | Status | RoHS | Package | Pack Type | Quantity |
|---|---|---|---|---|---|
| SPX1117HM3/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-1-8/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3 | Active | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-1-5/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-1-8/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-2-5/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-2-85 | Active | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-3-0/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-3-3/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-5-0/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L | Active | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-1-5 | Active | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-1-5/TR | Active | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-1-8/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-2-5/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-2-85/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-3-0 | Active | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-3-0/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-3-3/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-L-5-0/TR | Active | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117R | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-1-5 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-1-5/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-1-8 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-1-8/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-2-5 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-2-5/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-2-85 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-2-85/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-3-0 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-3-0/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-3-3 | Active | No | TO-252-3 | TUBE | 77 |
| SPX1117R-3-3/TR | Active | No | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-1-5 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-1-5/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-1-8 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-1-8/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-2-5 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-2-5/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-2-85 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-2-85/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-3-0 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-3-0/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |
| SPX1117R-L-3-3 | Active | Yes | TO-252-3 | TUBE | 77 |
| SPX1117R-L-3-3/TR | Active | Yes | TO-252-3 | Tape & Reel | 2000 |


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## Ordering Information

| Part Number | Status | RoHS | Package | Pack Type | Quantity |
|---|---|---|---|---|---|
| SPX1117T | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-1-5 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-1-5/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-1-8 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-1-8/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-2-5 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-2-5/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-2-85 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-3-0 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-3-0/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-3-3 | Active | No | TO-263-3 | TUBE | 50 |
| SPX1117T-3-3/TR | Active | No | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L-1-5 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-1-5/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L-1-8 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-1-8/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L-2-5 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-2-5/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L-2-85 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-2-85/TR | Active | Yes | TO-263-3 | Tape & Reel | 50 |
| SPX1117T-L-3-0 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-3-0/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117T-L-3-3 | Active | Yes | TO-263-3 | TUBE | 50 |
| SPX1117T-L-3-3/TR | Active | Yes | TO-263-3 | Tape & Reel | 500 |
| SPX1117U | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-1-5 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-1-8 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-2-5 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-2-85 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-3-0 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-3-3 | Active | No | TO-220-3 | TUBE | 50 |
| SPX1117U-L | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-1-5 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-1-8 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-2-5 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-2-8-5 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-3-0 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117U-L-3-3 | Active | Yes | TO-220-3 | TUBE | 50 |
| SPX1117HM3 | CF | No | SOT-223-3 | TUBE | 78 |


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## Ordering Information

| Part Number | Status | RoHS | Package | Pack Type | Quantity |
|---|---|---|---|---|---|
| SPX1117HM3-1-5 | CF | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-2-5 | CF | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-3-3 | CF | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-5-0 | CF | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-1-5 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-1-5/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-1-8 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-2-5 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-2-5/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-2-85 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-2-85/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-3-0 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-3-0/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-3-3 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-3-3/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-L-5-0 | CF | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-L-5-0/TR | CF | Yes | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117M3-1-5 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-1-8 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-2-5 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-3-0 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-3-3 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-5-0 | CF_ | No | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-1-8 | CF_ | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-2-5 | CF_ | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-2-85 | CF_ | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-3-3 | CF_ | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117M3-L-5-0 | CF_ | Yes | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-1-5/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-1-8 | OBS | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-1-8/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-2-5/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-2-85 | OBS | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-2-85/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-3-0 | OBS | No | SOT-223-3 | TUBE | 78 |
| SPX1117HM3-3-0/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-3-3/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |
| SPX1117HM3-5-0/TR | OBS | No | SOT-223-3 | Tape & Reel | 2500 |

For further assistance:

Email: Sipexsupport@sipex.com
WWW Support page: http://www.sipex.com/content.aspx?p=support
Sipex Application Notes: http://www.sipex.com/applicationNotes.aspx

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