# SPX1202

# 600mA Low Dropout Voltage Regulator

## FEATURES

- Guaranteed 600mA Output
- Three Terminal Adjustable or Fixed 2.5V, 3V and 3.3V
- Low Quiescent Current
- Low Dropout Voltage of 1.1V at Full Load
- 0.2% Line and 0.3% Load Regulation
- Voltage Temperature Stability 0.05%
- Overcurrent and Thermal Protection
- Available Packages: SOT-223,TO-252, TO-220, and TO-263

## APPLICATIONS

- SCSI-II Active Terminator
- Portable/ Palm Top / Notebook Computers
- Battery Chargers
- Disk Drives
- Portable Consumer Equipment
- Portable Instrumentation
- SMPS Post-Regulator

*Now Available in Lead Free Packaging*

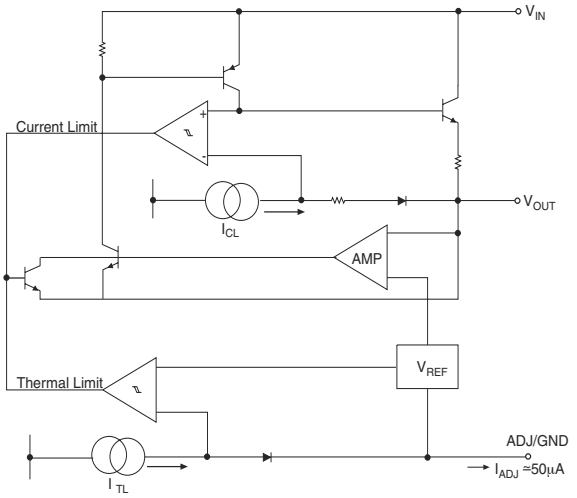
Refer to page 6 for pinouts.

## DESCRIPTION

The SPX1202 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 SPX1202 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. SPX1202 is available in adjustable or fixed 2.5V, 3V and 3.3V output voltages.

The SPX1202 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.

## BLOCK 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
ESD Rating ..... 2kV min

## ELECTRICAL CHARACTERISTICS

at $V_{IN}=V_{OUT}+1.5V$, $T_A = 25°C$, $C_{IN} = C_{OUT} = 10\mu F$, unless otherwise specified. Limits in **Boldface** applies over the full operating temperature range.

| PARAMETER | CONDITIONS | TYP | MIN | MAX | UNITS |
|---|---|---|---|---|---|
| **2.5V Version** | | | | | |
| Output Voltage | $I_{OUT}$= 10mA, $V_{IN}$= 5.00V<br>$0 \le I_{OUT} \le 600mA$, $4.50V \le V_{IN} \le 10V$ | 2.475<br>**2.450** | 2.500 | 2.525<br>**2.550** | V |
| **3.0V Version** | | | | | |
| Output Voltage | $I_{OUT}$= 10mA, $V_{IN}$= 5.00V<br>$0 \le I_{OUT} \le 600mA$, $4.50V \le V_{IN} \le 10V$ | 2.970<br>**2.940** | 3.000 | 3.030<br>**3.060** | V |
| **3.3V Version** | | | | | |
| Output Voltage | $I_{OUT}$= 10mA, $V_{IN}$= 5.00V<br>$0 \le I_{OUT} \le 600mA$, $4.50V \le V_{IN} \le 10V$ | 3.267<br>**3.234** | 3.300 | 3.333<br>**3.366** | V |
| **All Output Options** | | | | | |
| Reference Voltage | $I_{OUT}$=10mA, $(V_{IN} - V_{OUT}) = 2V$<br>$10 \le I_{OUT} \le 600mA$, $1.4V \le (V_{IN}-V_{OUT}) \le 10V$ | 1.238<br>**1.225** | 1.250 | 1.262<br>**1.270** | V |
| Output Voltage Temperature Stability | (Note 1) | | | **0.05** | % |
| Line Regulation | $4.50V \le V_{IN} \le 12V$, $V_{OUT}$=3.00, $I_{OUT}$=0<br>$4.80V \le V_{IN} \le 12V$, $V_{OUT}$=3.30, $I_{OUT}$=0<br>$6.50V \le V_{IN} \le 12V$, $V_{OUT}$=5.00, $I_{OUT}$=0 | | 1.00<br>1.00<br>1.00 | 7.00<br>7.00<br>10.00 | mV |
| Load Regulation | $0 \le I_{OUT} \le 600mA$, $V_{IN}$=4.50V, $V_{OUT}$=3.00<br>$0 \le I_{OUT} \le 600mA$, $V_{IN}$=4.80V, $V_{OUT}$=3.30<br>$0 \le I_{OUT} \le 600mA$, $V_{IN}$=6.50V, $V_{OUT}$=5.0 | | 1.00<br>1.00<br>1.00 | 12.00<br>12.00<br>15.00 | mV |
| Dropout Voltage (Note 2) | $I_L$ =100mA<br>$I_L$ =600mA | | 1.00<br>1.05 | 1.10<br>1.15 | V |
| Quiescent Current | $4.25V \le V_{IN} \le 6.5V$ | | 5.00 | 10.00 | mA |
| Adjust Pin Current | | | 50 | | μA |
| Current Limit | $(V_{IN}-V_{OUT})=5V$ | | .850 | 1.0 | A |
| Thermal Regulation | 25°C, 30mS Pulse | | 0.01 | 0.1 | %/W |
| Ripple Rejection | $f_{RIPPLE}$=120Hz, $(V_{IN}-V_{OUT})=3V$,<br>$V_{RIPPLE}=1V_{PP}$ | | 60 | 75 | dB |
| Long Term Stability | 125°C, 1000Hrs | | | 0.03 | % |
| RMS Output Noise | % of $V_{OUT}$, $10Hz \le f \le 10kHz$ | | | 0.003 | % |
| Thermal Resistance | Junction to Case, at tab | | | 15 | °C/W |

NOTES:
Note 1: Output temperature coefficient is defined as the worst case voltage change divided by the total temperature range.
Note 2: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 1V differential at very low values of programmed output voltage, the minimum input supply voltage of 2V ( 2.3V over temperature) must be taken into account.
Note 3: Thermal regulation is defined as the change in output voltage at a time T after a change in power dissipation is applied excluding load or line regulation effect.


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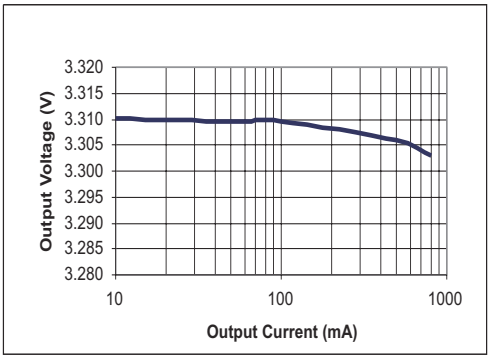


*Figure 1. Load Regulation for SPX1202M3-3.3; $V_{IN}$=4.8V, $C_{OUT}$=2.2µF*

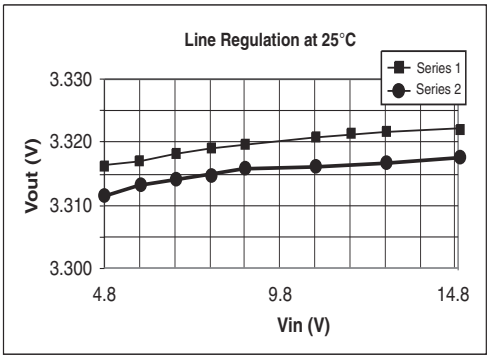


*Figure 2. Line Regulation for SPX1202M3-3.3; $V_{IN}$=4.8V to 16V, $C_{OUT}$=2.2µF*

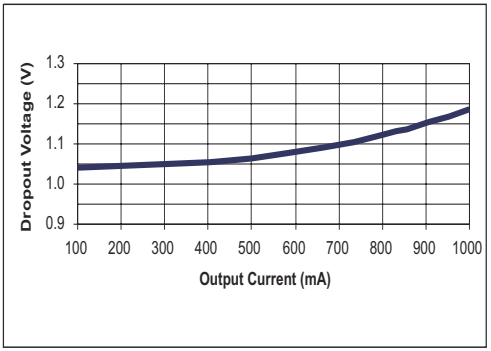


*Figure 3. Dropout Voltage vs Output Current for SPX1202M3-3.3; $V_{IN}$=4.89V, $C_{OUT}$=2.2µF*

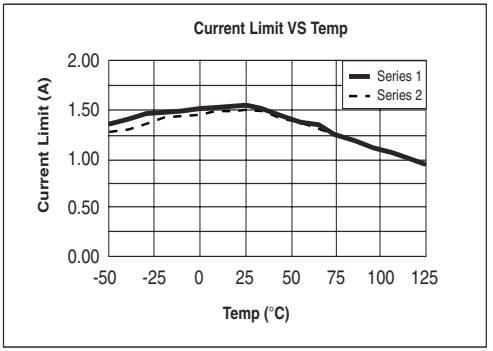


*Figure 4. Current Limit for SP1202M3-3.3; $V_{IN}$=4.8V, $C_{IN}$=$C_{OUT}$=1.0µF, $I_{OUT}$pulsed from 10mA to Current Limit*

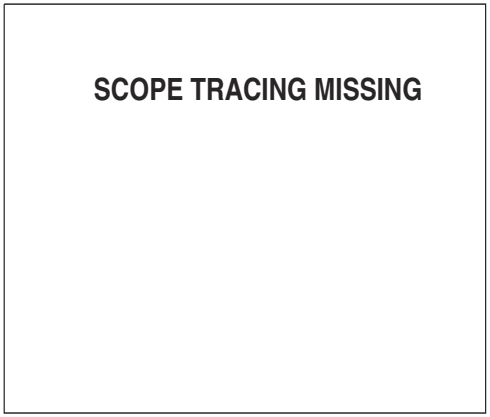


*Figure 5. Current Limit for SPX1202M3-3.3, Output Voltage Deviation with $I_{OUT}$=10mA to 1A Step.*

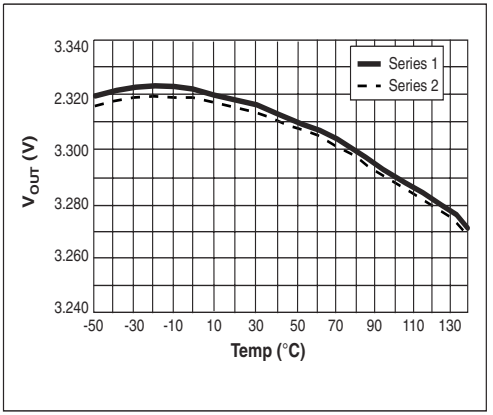


*Figure 6. $V_{OUT}$vs Temperature $I_{OUT}$pilsed from 10mA to Current Limit*

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## APPLICATION INFORMATION

### Output Capacitor

To ensure the stability of the SPX1202, an output capacitor of at least 10µF (tantalum or ceramic)or 50µF (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. 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.

## SOLDERING METHODS

The SPX1202 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 SPX1202 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

## THERMAL CHARACTERISTICS

The thermal resistance of SPX1202 depends on the type of package and PC board layout as shown in Table 1. The SPX1202 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 >144°C and deactiviated at <137°C.

Taking the FR-4 printed circuit board and 1/16 thick with 1 ounce copper foil as an experiment, 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

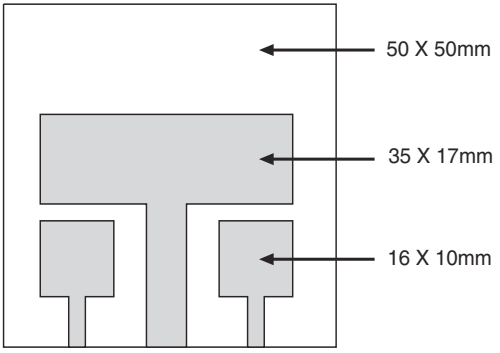


*Figure 7. Substrate Layout for SOT-223*

in the application can effect the thermal resistance of the SPX1202. The actual thermal resistance can be determined with experimentation.

SPX1202 power dissipation is calculated as follows:

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

Maximum Junction Temperature range:

$$T_J = T_{AMBIENT}(max) + P_D * (\text{Thermal Resistance (Junction-to-ambient)})$$

Maximum junction temperature must not exceed the 125°C.

### Ripple Rejection

Ripple rejection can be improved by adding a capacitor between the ADJ pin and ground as shown in Figure 7. 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 solid tantalum capacitor (Fig 10).

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 $R_1$ in Ohms.

If an ADJ-bypass capacitor is used, the ampli-

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tude 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.

$$V_{REF}=1.25V$$

## 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. (Figure 9)

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

A small correction to this formula is required depending on the values of resistors R1 and R2, since adjustable pin current (approx 50µA) flows through R2. 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.

| PC BOARD AREA mm² | TOPSIDE COPPER AREA mm² | BACKSIDE COPPER AREA mm² | THERMAL RESISTANCE JUNCTION TO AMBIENT °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 |

*Table 1*

## TYPICAL APPLICATIONS

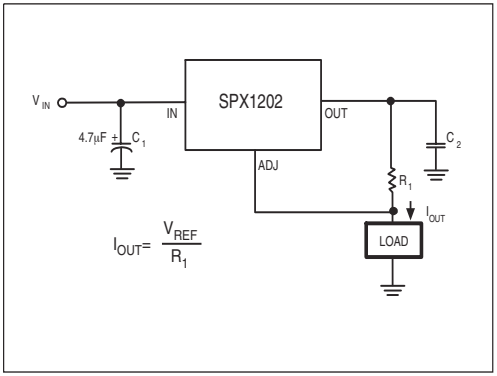


*Figure 8. 600mA Current Source*

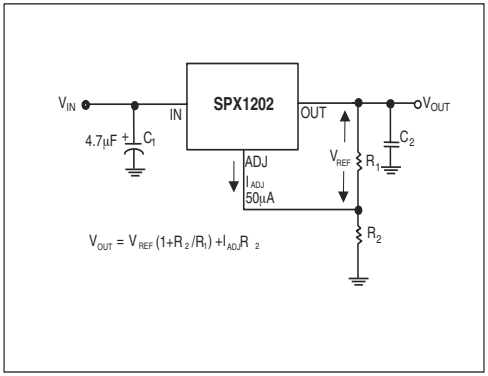


*Figure 9. Typical Adjustable Regulator*

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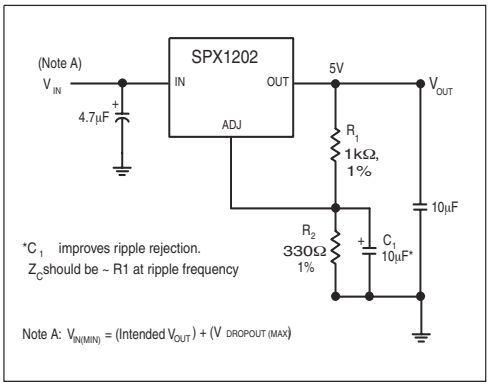



*Figure 10. Improving Ripple Rejection*

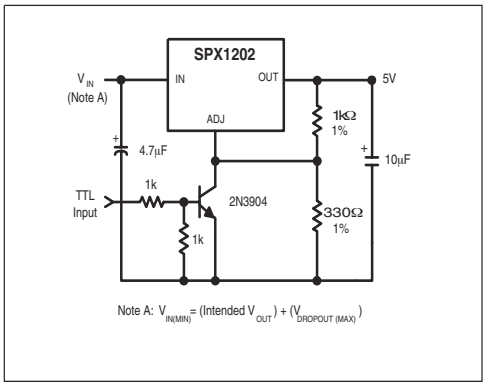



*Figure 11. 5V Regulator with Shutdown*

## LAYOUT CONSIDERATIONS

Parasitic line resistance can degrade load regulation. In order not to affect the behavior of the regulator, it is best to connect $R_1$ to the case as illustrated in Figure 12. For the same reason, $R_2$ should be connected to the negative side of the load.

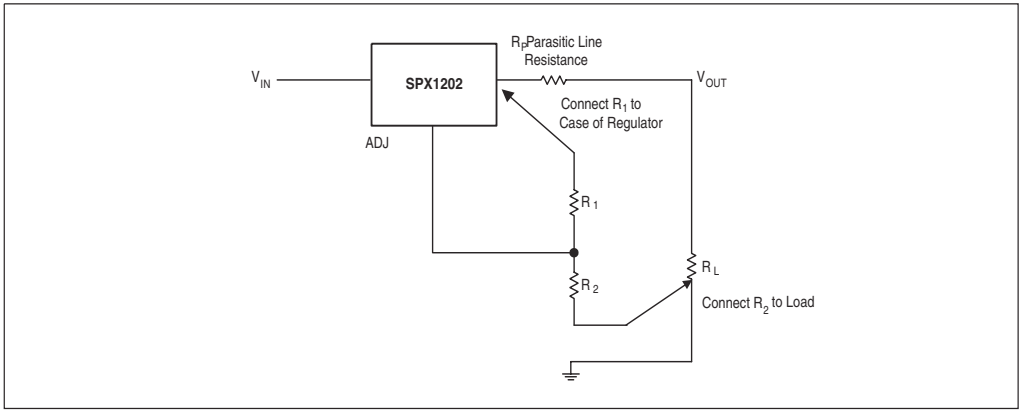
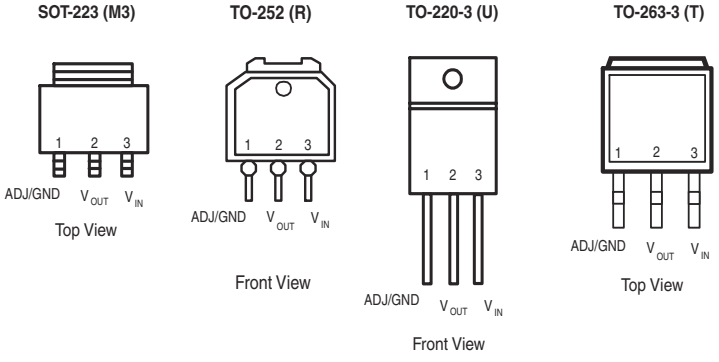



*Figure 12. Recommended Connections for Best Results*

## PACKAGE PINOUTS

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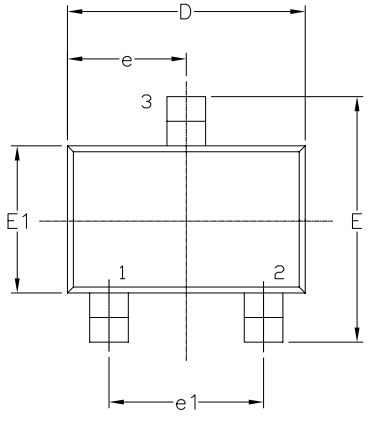
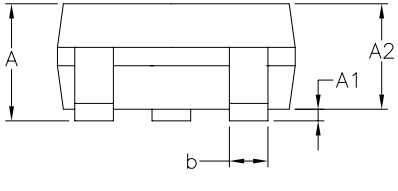
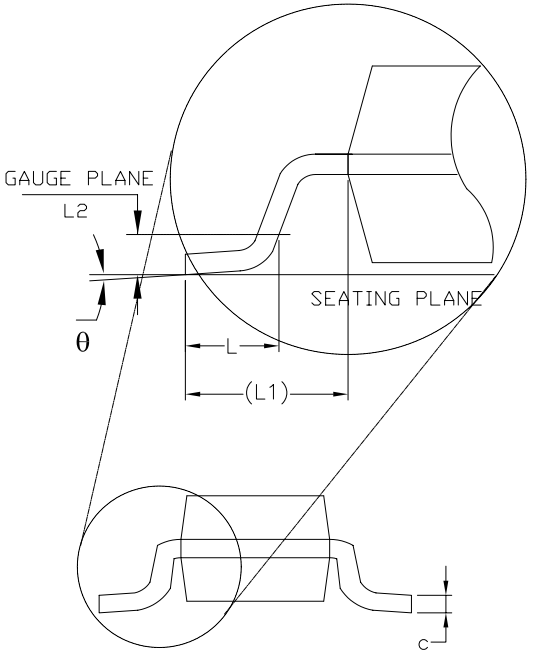
| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DISCRIPTION | DATE | APP'D |
| A | DRAWING ORIGINATION | 10/25/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 07/25/06 | JL |

Top View




Side View




Front View

| 3 Pin SOT-23 JEDEC TO-236 Variation AB | | | | | | | |
|---|---|---|---|---|---|---|---|
| SYMBOLS | DIMENSIONS IN MM (Control Unit) | | | DIMENSIONS IN INCH (Reference Unit) | | | |
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| A | 0.89 | — | 1.12 | 0.035 | — | 0.044 | |
| A1 | 0.01 | — | 0.10 | 0.000 | — | 0.004 | |
| A2 | 0.88 | 0.95 | 1.02 | 0.035 | 0.037 | 0.040 | |
| b | 0.30 | — | 0.50 | 0.012 | — | 0.020 | |
| c | 0.08 | — | 0.20 | 0.003 | — | 0.008 | |
| D | 2.80 | 2.90 | 3.04 | 0.110 | 0.114 | 0.120 | |
| E | 2.10 | — | 2.64 | 0.083 | — | 0.104 | |
| E1 | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 | |
| e | 0.95 BSC | | | 0.038 BSC | | | |
| e1 | 1.90 BSC | | | 0.075 BSC | | | |
| L | 0.40 | 0.50 | 0.60 | 0.016 | 0.020 | 0.024 | |
| L1 | 0.54 REF | | | 0.021 REF | | | |
| L2 | 0.25 BSC | | | 0.010 BSC | | | |
| θ | 0° | — | 8° | 0° | — | 8° | |
| N | 3 | | | 3 | | | |

| | | | |
|---|---|---|---|
| Solved by Sipex | SIPEX CORPORATION | | |
| | 3 PIN SOT-23 PACKAGE OUTLINE | | |
| Packaging Approval: | Drawing No: 3-PIN SOT-23 | | |
| By: JL / Date: 07/25/06 | Revision: B | Sheet: 1 OF 1 | |

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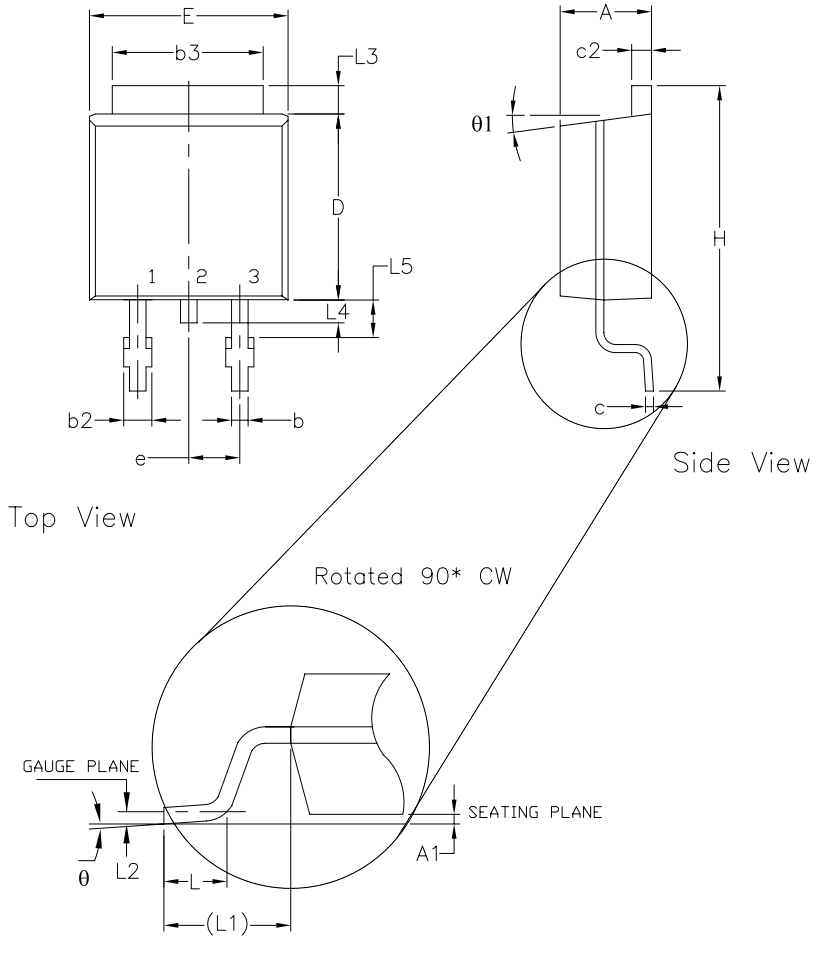
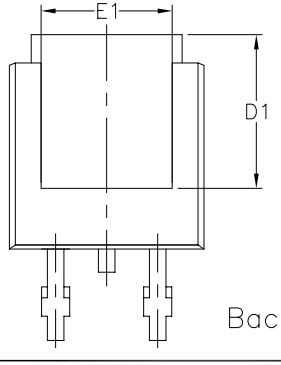
| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DISCRIPTION | DATE | APP'D |
| A | DRAWING ORIGINATION | 08/04/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 09/14/06 | JL |




| 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 | | |

| | | | |
|---|---|---|---|
| Solved by Sipex | 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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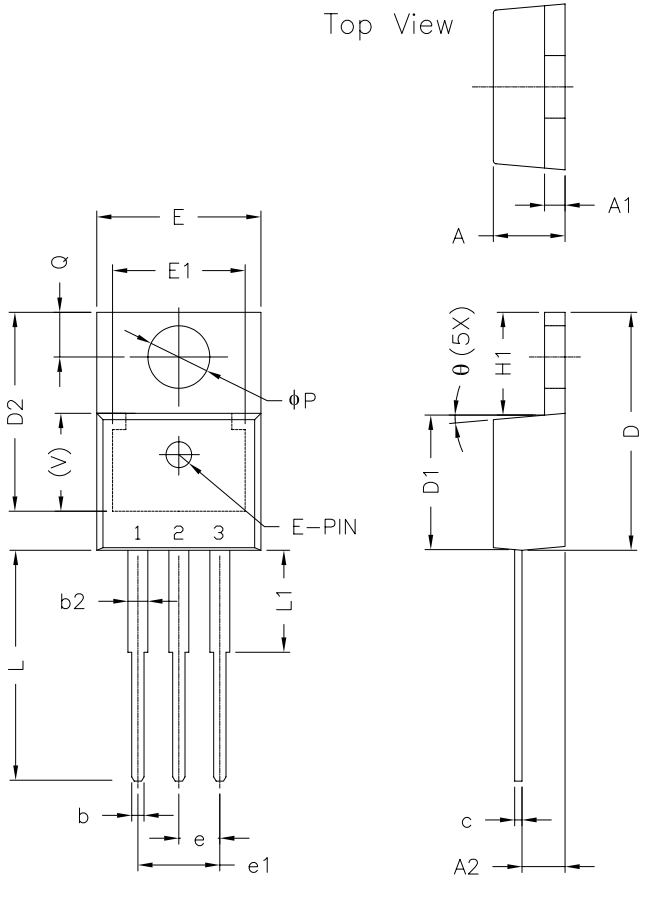
| B | DRAWING FORMAT MODIFICATION | 05/25/06 | JL |




| 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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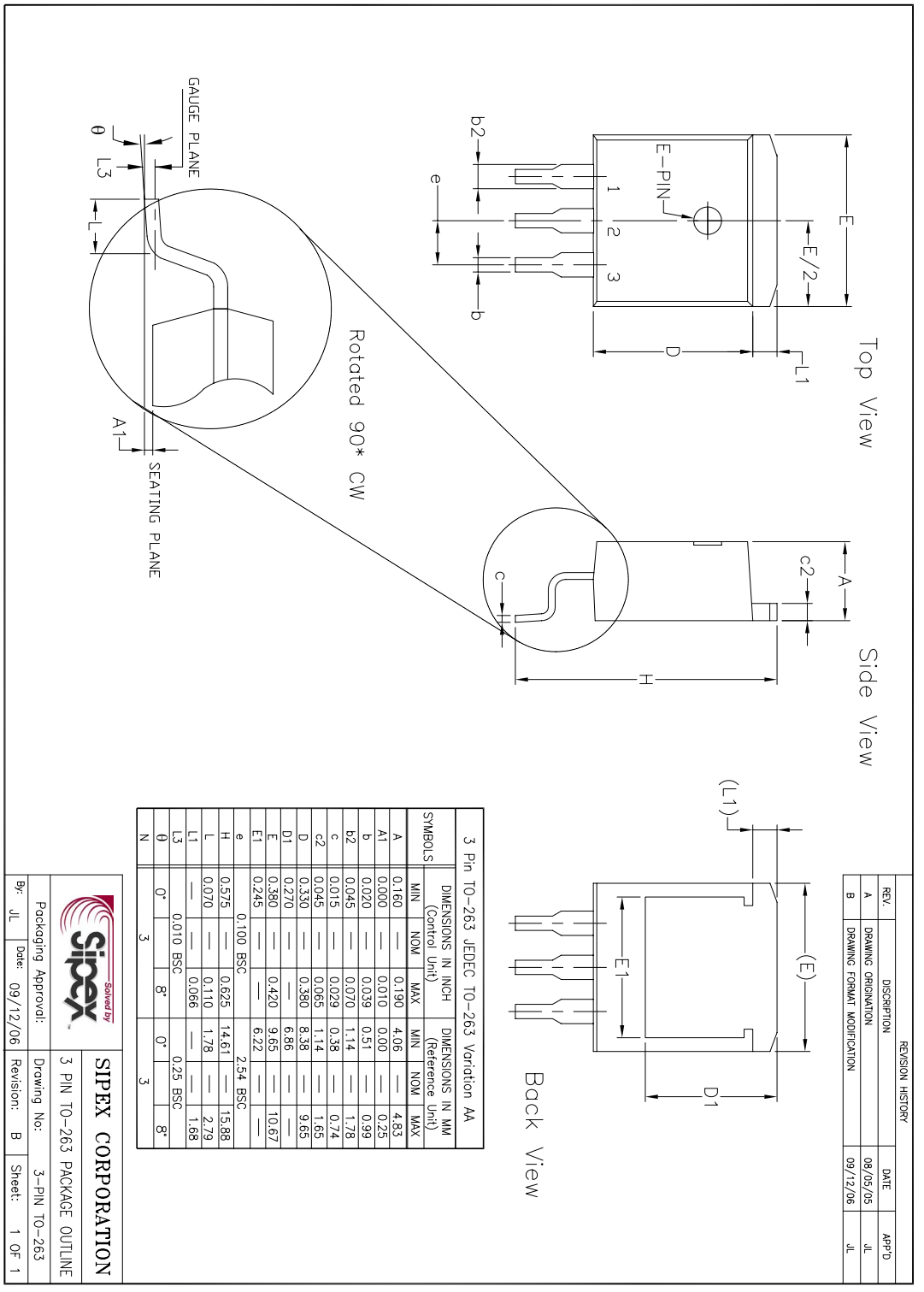


| REVISION HISTORY | | | |
|---|---|---|---|
| REV. | DESCRIPTION | DATE | APP'D |
| A | DRAWING ORGINATION | 08/05/05 | JL |
| B | DRAWING FORMAT MODIFICATION | 09/12/06 | JL |

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 | | | |

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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| Part Number | Package Code | RoHS | Sta-tus | Pack Quantity |
|---|---|---|---|---|
| SPX1202M3 | SOT-223-3 | | OBS | Bulk |
| SPX1202M3/TR | SOT-223-3 | | OBS | 2500 |
| SPX1202M3-2-5 | SOT-223-3 | | OBS | Bulk |
| SPX1202M3-2-5/TR | SOT-223-3 | | OBS | 2500 |
| SPX1202M3-3-0 | SOT-223-3 | | OBS | Bulk |
| SPX1202M3-3-0/TR | SOT-223-3 | | OBS | 2500 |
| SPX1202M3-3-3 | SOT-23-3 | | EOL | Bulk |
| SPX1202M3-3-3/TR | SOT-223-3 | | OBS | 2500 |
| SPX1202M3-L | SOT-223-3 | ▪ | OBS | Bulk |
| SPX1202M3-L/TR | SOT-223-3 | ▪ | OBS | 2500 |
| SPX1202M3-L-2-5 | SOT-223-3 | ▪ | EOL | Bulk |
| SPX1202M3-L-2-5/TR | SOT-223-3 | ▪ | OBS | 2500 |
| SPX1202M3-L-3-0 | SOT-223-3 | ▪ | OBS | Bulk |
| SPX1202M3-L-3-0/TR | SOT-223-3 | ▪ | OBS | 2500 |
| SPX1202M3-L-3-3 | SOT-223-3 | ▪ | EOL | Bulk |
| SPX1202M3-L-3-3/TR | SOT-223-3 | ▪ | OBS | 2500 |
| SPX1202R | TO-252 | | OBS | Bulk |
| SPX1202R/TR | TO-252 | | OBS | 2000 |
| SPX1202R-2-5 | TO-252 | | OBS | Bulk |
| SPX1202R-2-5/TR | TO-252 | | OBS | 2000 |
| SPX1202R-3-0 | TO-252 | | OBS | Bulk |
| SPX1202R-3-0/TR | TO-252 | | OBS | 2000 |
| SPX1202R-3-3 | TO-252 | | OBS | Bulk |
| SPX1202R-3-3/TR | TO-252 | | OBS | 2000 |
| SPX1202R-L | TO-252 | ▪ | OBS | Bulk |
| SPX1202R-L/TR | TO-252 | ▪ | OBS | 2000 |
| SPX1202R-L-2-5 | TO-252 | ▪ | OBS | Bulk |
| SPX1202R-L-2-5/TR | TO-252 | ▪ | OBS | 2000 |
| SPX1202R-L-3-0 | TO-252 | ▪ | OBS | Bulk |
| SPX1202R-L-3-0/TR | TO-252 | ▪ | OBS | 2000 |
| SPX1202R-L-3-3 | TO-252 | ▪ | OBS | Bulk |
| SPX1202R-L-3-3/TR | TO-252 | ▪ | OBS | 2000 |


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| Part Number | Package Code | RoHS | Status | Pack Quantity |
|---|---|---|---|---|
| SPX1202T | TO-263-3 | | OBS | Bulk |
| SPX1202T/TR | TO-263-3 | | OBS | 2000 |
| SPX1202T-2-5 | TO-263-3 | | OBS | Bulk |
| SPX1202T-2-5/TR | TO-263-3 | | OBS | 500 |
| SPX1202T-3-0 | TO-263-3 | | OBS | Bulk |
| SPX1202T-3-0/TR | TO-263-3 | | OBS | 500 |
| SPX1202T-3-3 | TO-263-3 | | EOL | Bulk |
| SPX1202T-3-3/TR | TO-263-3 | | OBS | 500 |
| SPX1202T-L | TO-263-3 | ▪ | OBS | Bulk |
| SPX1202T-L/TR | TO-263-3 | ▪ | OBS | 500 |
| SPX1202T-L-2-5 | TO-263-3 | ▪ | OBS | Bulk |
| SPX1202T-L-2-5/TR | TO-263-3 | ▪ | OBS | 500 |
| SPX1202T-L-3-0 | TO-263-3 | ▪ | OBS | Bulk |
| SPX1202T-L-3-0/TR | TO-263-3 | ▪ | OBS | 500 |
| SPX1202T-L-3-3 | TO-263-3 | ▪ | OBS | Bulk |
| SPX1202T-L-3-3/TR | TO-263-3 | ▪ | OBS | 500 |
| SPX1202U | TO-220-3 | | EOL | Bulk |
| SPX1202U-2-5 | TO-220-3 | | OBS | Bulk |
| SPX1202U-3-0 | TO-220-3 | | OBS | Bulk |
| SPX1202U-3-3 | TO-220-3 | | EOL | Bulk |
| SPX1202U-L | TO-220-3 | ▪ | OBS | Bulk |
| SPX1202U-L-2-5 | TO-220-3 | ▪ | OBS | Bulk |
| SPX1202U-L-3-0 | TO-220-3 | ▪ | OBS | Bulk |
| SPX1202U-L-3-3 | TO-220-3 | ▪ | OBS | Bulk |

Solved by Sipex™

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