# 100V PNP MEDIUM POWER TRANSISTOR IN SOT89

## Features

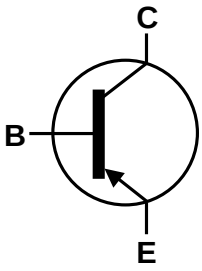
- $BV_{CEO}$ > -100V
- $BV_{ECO}$ > -7V
- $I_C$ = -1A Continuous Collector Current
- $I_{CM}$ = -3A Peak Collector Current
- $V_{CE(SAT)}$ < -225mV @ -1A
- $R_{CE(SAT)}$ = 155mΩ for a Low Equivalent On-Resistance
- Complementary NPN Type: ZXTN25100DZ
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

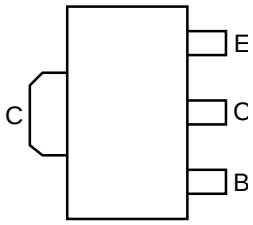
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.05 grams (Approximate)

SOT89

Top View




Device Symbol



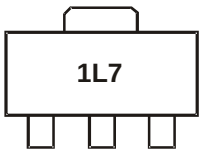

Top View
Pin Out

## Ordering Information (Note 4)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---|---|---|---|---|---|
| ZXTP25100CZTA | AEC-Q101 | 1L7 | 7 | 12 | 1,000 |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




1L7 = Product Type Marking Code

## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Limit | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -115 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -100 | V |
| Emitter-Collector Voltage (Reverse Blocking) | $V_{ECO}$ | -7 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -7 | V |
| Continuous Collector Current | $I_C$ | -1 | A |
| Peak Pulse Current | $I_{CM}$ | -3 | A |
| Base Current | $I_B$ | -500 | mA |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

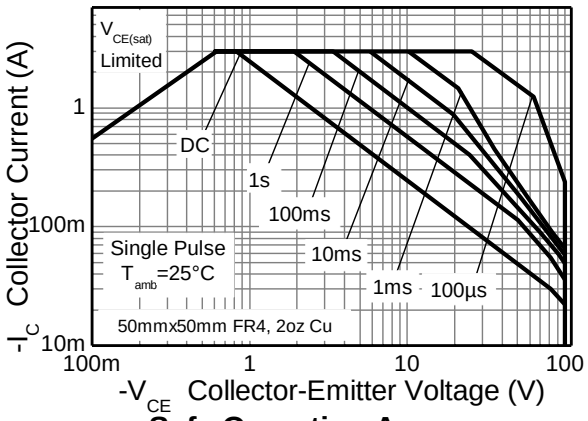
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation<br>Linear Derating Factor | (Note 5) | $P_D$ | 1.1<br>8.8 | W<br>mW/°C |
| | (Note 6) | | 1.8<br>14.4 | |
| | (Note 7) | | 2.4<br>19.2 | |
| | (Note 8) | | 4.46<br>35.7 | |
| Thermal Resistance, Junction to Ambient Air | (Note 5) | $R_{\theta JA}$ | 117 | °C/W |
| | (Note 6) | | 68 | |
| | (Note 7) | | 51 | |
| | (Note 8) | | 28 | |
| Thermal Resistance, Junction to Lead | (Note 9) | $R_{\theta JL}$ | 7.95 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 10)

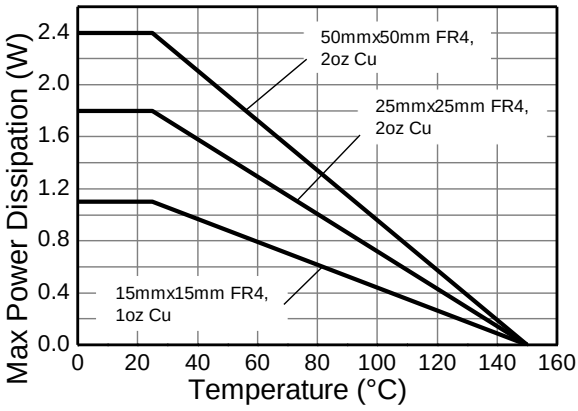
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 0.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
8. Same as Note 7, except the device is measured at t<5 seconds.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

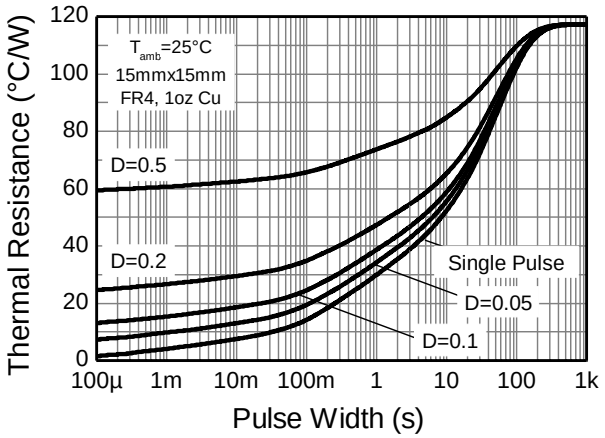



**Safe Operating Area**

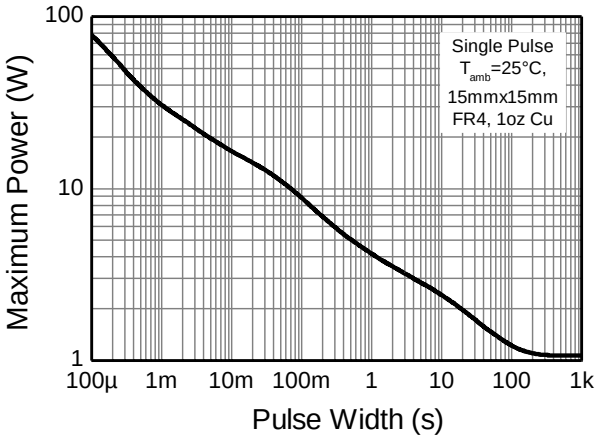



**Derating Curve**

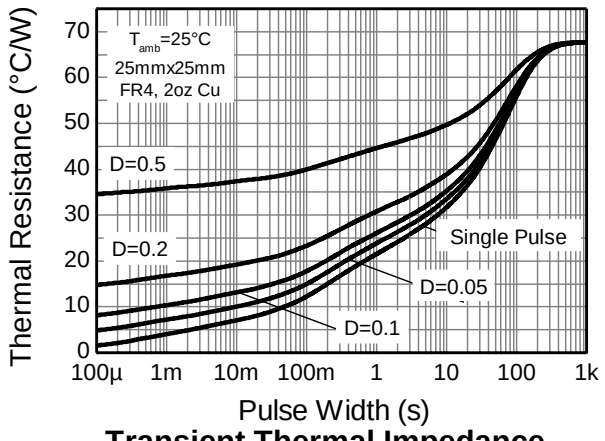
## Thermal Characteristics and Derating Information (Continued)



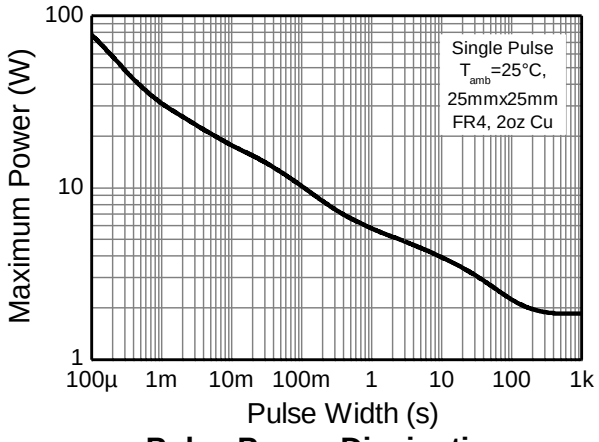

**Transient Thermal Impedance**



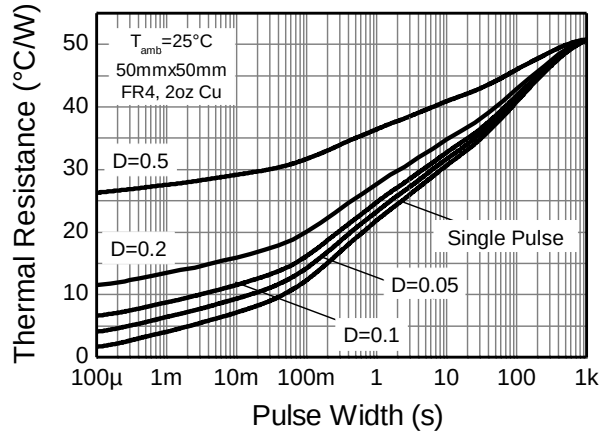

**Pulse Power Dissipation**



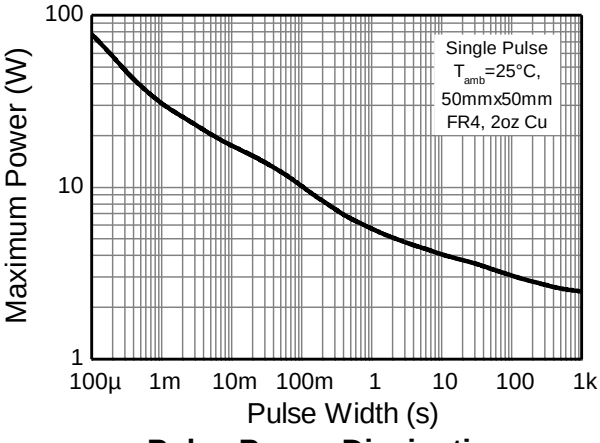

**Transient Thermal Impedance**




**Pulse Power Dissipation**




**Transient Thermal Impedance**



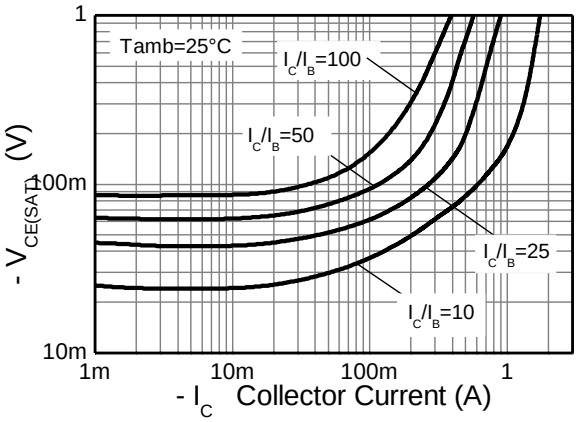

**Pulse Power Dissipation**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

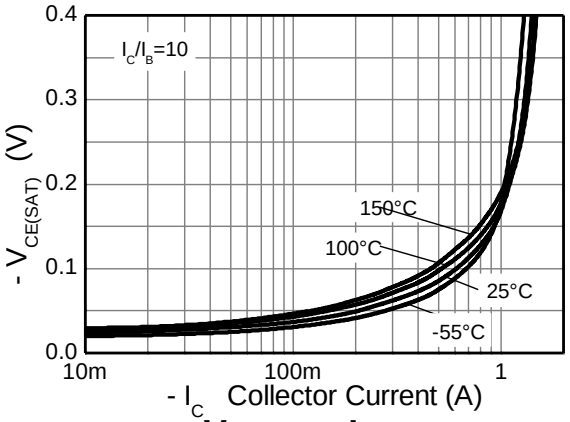
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -115 | -180 | — | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage (Note 11) | $BV_{CEO}$ | -100 | -140 | — | V | $I_C$ = -10mA |
| Emitter-Collector Breakdown Voltage (reverse blocking) | $BV_{ECX}$ | -7 | -8.3 | — | V | $I_E$ = -100µA, $R_{BC}$ <1kΩ or -0.25V > $V_{BC}$ > 0.25V |
| Emitter-Collector Breakdown Voltage (Reverse Blocking) | $BV_{ECO}$ | -7 | -8.8 | — | V | $I_E$ = -100µA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -7 | -8.4 | — | V | $I_E$ = -100µA |
| Collector-Base Cutoff Current | $I_{CBO}$ | — | <-1 | -50<br>-0.5 | nA<br>µA | $V_{CB}$ = -115V<br>$V_{CB}$ = -115V, $T_A$ = +100°C |
| Collector-Emitter Cutoff Current | $I_{CEX}$ | — | — | -100 | nA | $V_{CE}$ = -90V, $R_{BE}$ <1kΩ or -0.25V < $V_{BE}$ < 1V |
| Emitter Cutoff Current | $I_{EBO}$ | — | <1 | -50 | nA | $V_{EB}$ = -5.6V |
| DC current transfer Static ratio (Note 11) | $h_{FE}$ | 200<br>180<br>110<br>20 | 350<br>320<br>190<br>35 | 500<br>—<br>—<br>— | — | $I_C$ = -10mA, $V_{CE}$ = -2V<br>$I_C$ = -100mA, $V_{CE}$ = -2V<br>$I_C$ = -500mA, $V_{CE}$ = -2V<br>$I_C$ = -1A, $V_{CE}$ = -2V |
| Collector-Emitter Saturation Voltage (Note 11) | $V_{CE(SAT)}$ | — | -140<br>-80<br>-180<br>-155 | -210<br>-115<br>-315<br>-225 | mV | $I_C$ = -100mA, $I_B$ = -1mA<br>$I_C$ = -500mA, $I_B$ = -50mA<br>$I_C$ = -500mA, $I_B$ = -20mA<br>$I_C$ = -1A, $I_B$ = -100mA |
| Base-Emitter Saturation Voltage (Note 11) | $V_{BE(SAT)}$ | — | -860 | -950 | mV | $I_C$ = -1A, $I_B$ = -100mA |
| Base-Emitter Turn-On Voltage (Note 11) | $V_{BE(ON)}$ | — | -800 | -900 | mV | $I_C$ = -1A, $V_{CE}$ = -2V |
| Transitional Frequency | $f_T$ | — | 180 | — | MHz | $I_E$ = -20mA, $V_{CE}$ = -15V f = 100MHz |
| Input Capacitance | $C_{IBO}$ | | 153 | — | pF | $V_{EB}$ = -0.5V, f = 1MHz, |
| Output Capacitance | $C_{OBO}$ | — | 14.1 | 20 | pF | $V_{CB}$ = -10V, f = 1MHz, |
| Delay Time | $t_D$ | — | 15.8 | — | ns | $I_C$ = -500mA, $V_{CC}$ = -10V, $I_{B1}$ = -$I_{B2}$ = -50mA |
| Rise Time | $t_R$ | — | 41 | — | ns | |
| Storage Time | $t_S$ | — | 411 | — | ns | |
| Fall Time | $t_F$ | — | 89 | — | ns | |

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

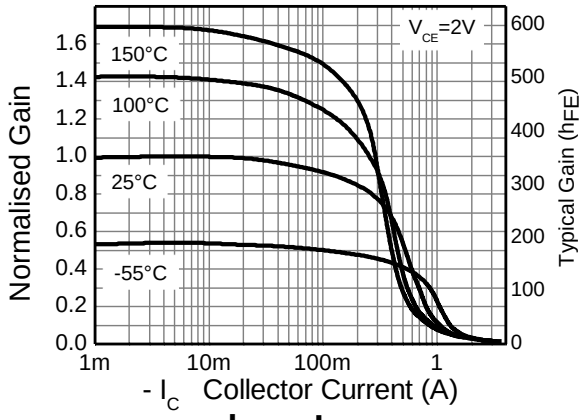
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



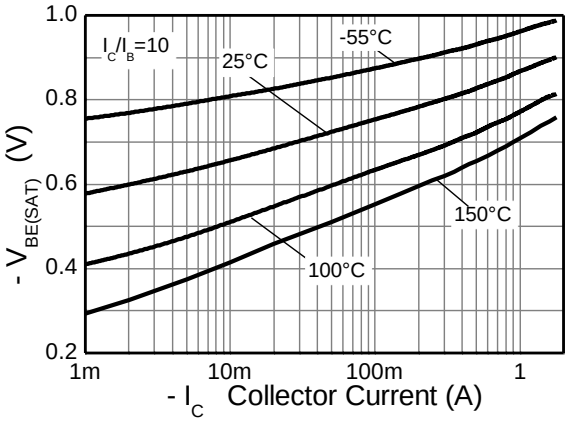

**$V_{CE(SAT)}$ v $I_C$**



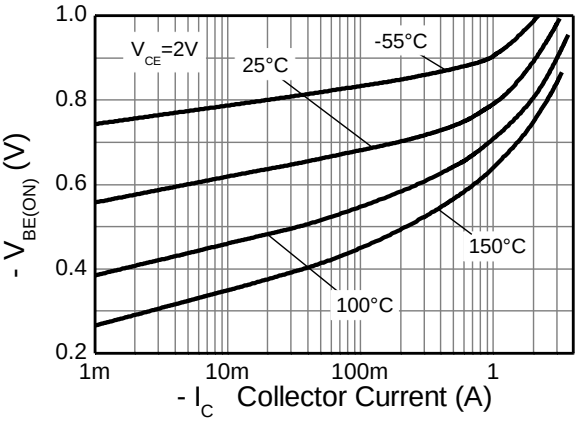

**$V_{CE(SAT)}$ v $I_C$**



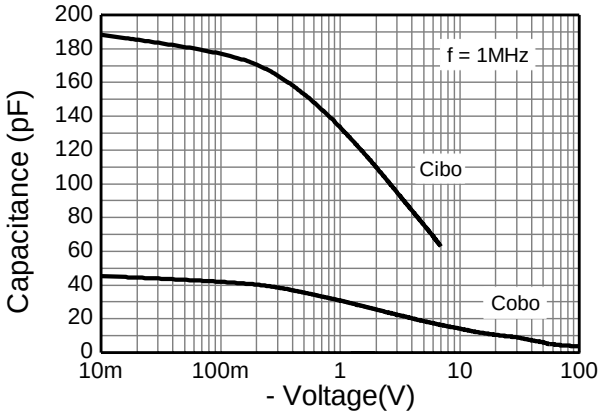

**$h_{FE}$ v $I_C$**




**$V_{BE(SAT)}$ v $I_C$**




**$V_{BE(ON)}$ v $I_C$**

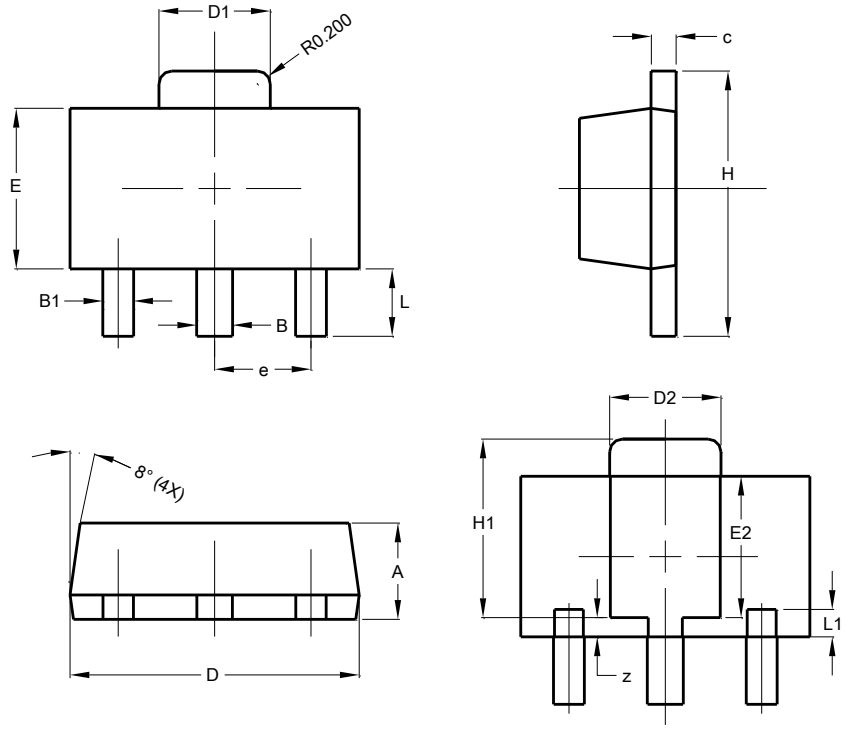



**Capacitance v Voltage**

## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT89**

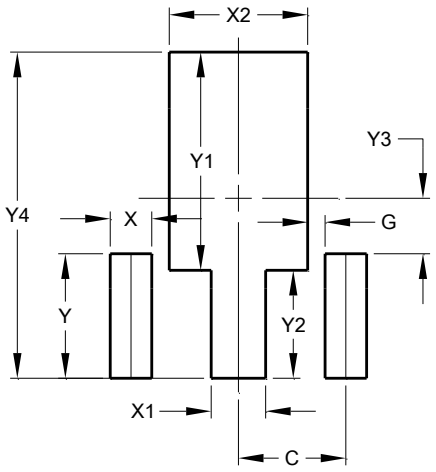



| SOT89 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.40 | 1.60 | 1.50 |
| **B** | 0.50 | 0.62 | 0.56 |
| **B1** | 0.42 | 0.54 | 0.48 |
| **c** | 0.35 | 0.43 | 0.38 |
| **D** | 4.40 | 4.60 | 4.50 |
| **D1** | 1.62 | 1.83 | 1.733 |
| **D2** | 1.61 | 1.81 | 1.71 |
| **E** | 2.40 | 2.60 | 2.50 |
| **E2** | 2.05 | 2.35 | 2.20 |
| **e** | - | - | 1.50 |
| **H** | 3.95 | 4.25 | 4.10 |
| **H1** | 2.63 | 2.93 | 2.78 |
| **L** | 0.90 | 1.20 | 1.05 |
| **L1** | 0.327 | 0.527 | 0.427 |
| **z** | 0.20 | 0.40 | 0.30 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT89**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 1.500 |
| **G** | 0.244 |
| **X** | 0.580 |
| **X1** | 0.760 |
| **X2** | 1.933 |
| **Y** | 1.730 |
| **Y1** | 3.030 |
| **Y2** | 1.500 |
| **Y3** | 0.770 |
| **Y4** | 4.530 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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