

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEX} > 150V$
- $BV_{CEO} > 60V$
- $BV_{ECO} > 6V$
- $I_C = 5A$ Continuous Collector Current
- $V_{CE(sat)} < 70mV @ 1A$
- $R_{CE(sat)} = 48m\Omega$ for a Low Equivalent On-Resistance
- Very Low Saturation Voltages
- Excellent hFE Characteristics
- 6V Reverse Blocking Capability
- **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**
- **PPAP Capable (Note 4)**

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 @3
- Weight: 0.055 grams (Approximate)

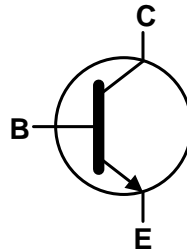
Applications

- Motor Driving (including DC fans)
- Solenoid, Relay and Actuator Drivers
- DC-DC Modules
- Power Switches
- MOSFET Gate Drivers

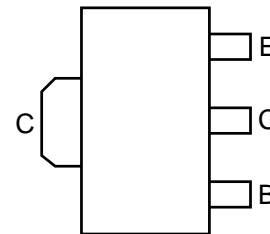
SOT89



Top View



Equivalent Circuit



Top View
Pin-Out

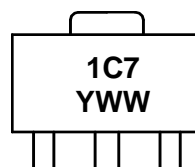
Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|------------|---------|--------------------|-----------------|-------------------|
| ZXTN25060BZQTA | Automotive | 1C7 | 7 | 12mm | 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

SOT89



1C7= Product Type Marking Code
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 5 = 2015)
 WW = Week Code (01 ~ 53)

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

| Characteristic | Symbol | Value | Unit |
|--|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 150 | V |
| Collector-Emitter Voltage (Forward Blocking) | V _{CEx} | 150 | V |
| Collector-Emitter Voltage | V _{CE0} | 60 | V |
| Emitter-Collector Voltage (Reverse Blocking) | V _{EC0} | 6 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 5 | A |
| Base Current | I _B | 1 | A |
| Peak Pulse Current | I _{CM} | 10 | A |

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

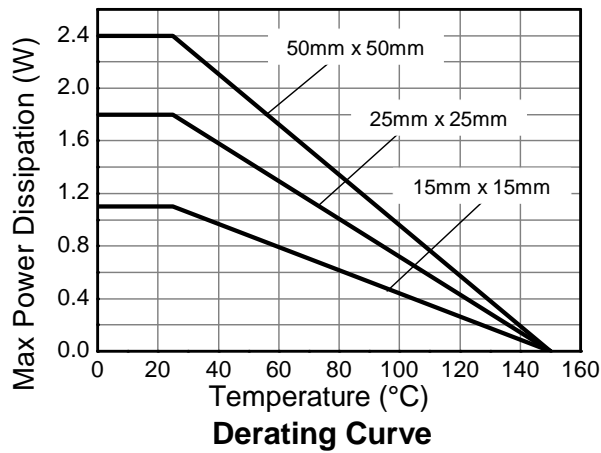
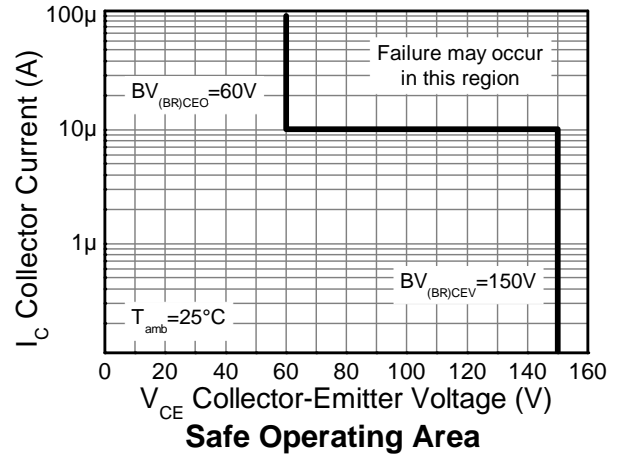
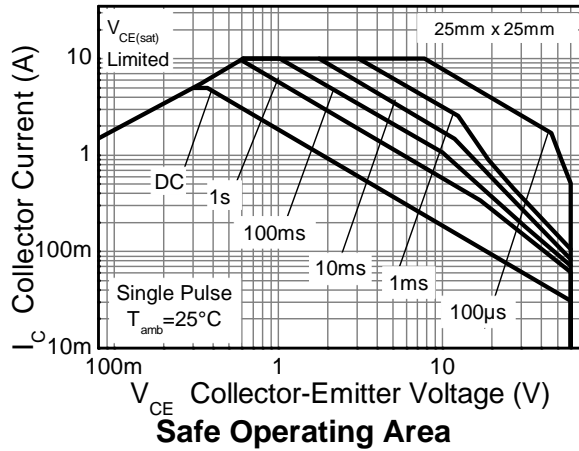
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 6) | 1.1 |
| | | (Note 7) | 1.8 |
| | | (Note 8) | 2.4 |
| | | (Note 9) | 4.46 |
| Thermal Resistance, Junction to Ambient Air | R _{θJA} | (Note 6) | 117 |
| | | (Note 7) | 68 |
| | | (Note 8) | 51 |
| | | (Note 9) | 28 |
| Thermal Resistance, Junction to Lead | R _{θJL} | 8 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 11)

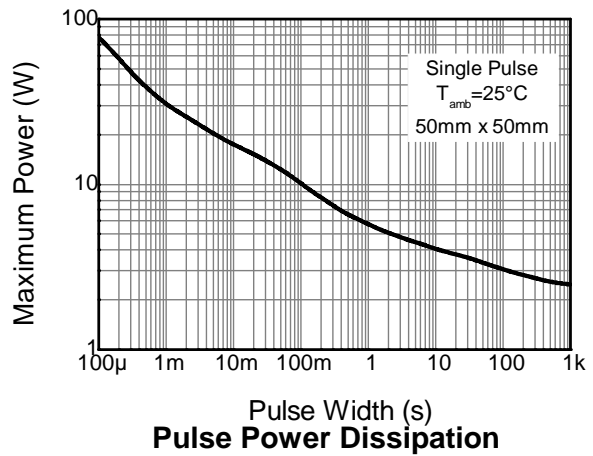
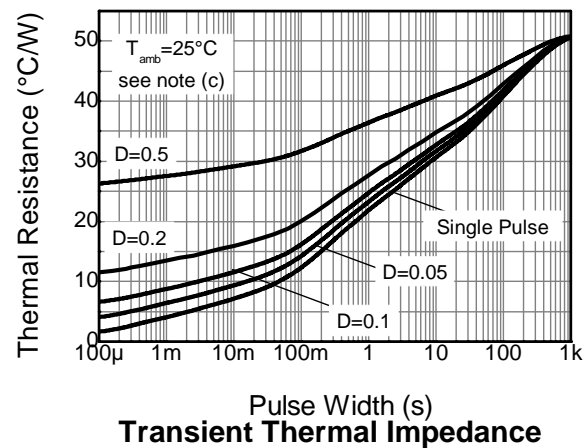
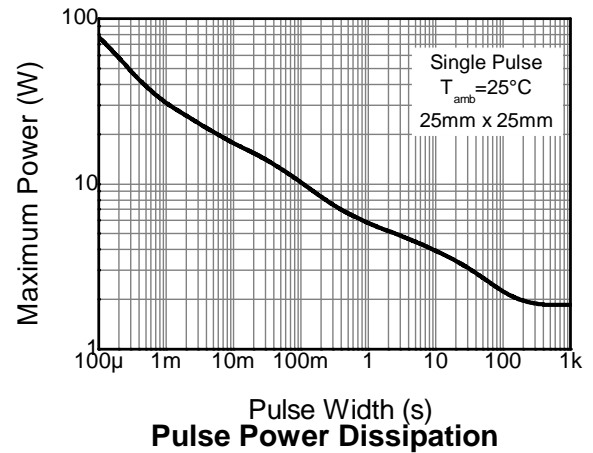
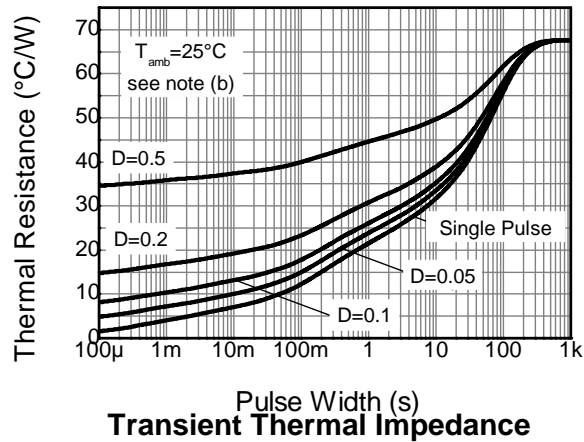
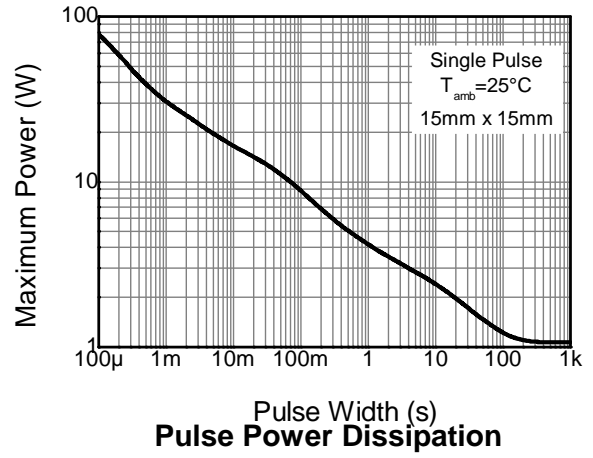
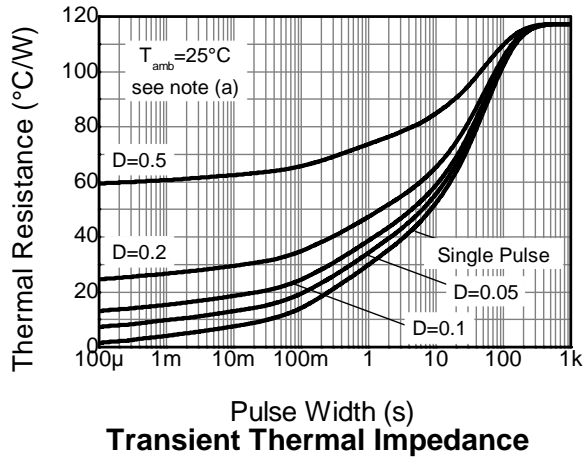
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 8. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
 9. Same as Note 7 measured at t<5 seconds.
 10. Thermal resistance from junction to solder-point (on the exposed collector pad).
 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information



Thermal Characteristics and Derating Information (continued)

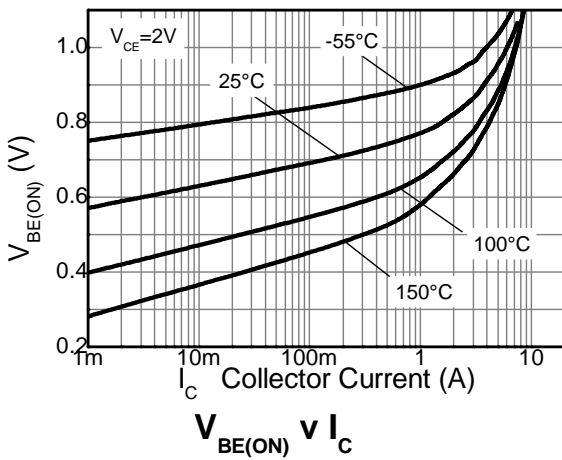
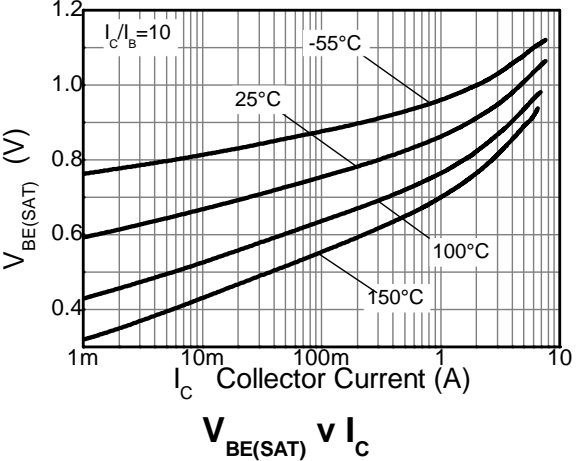
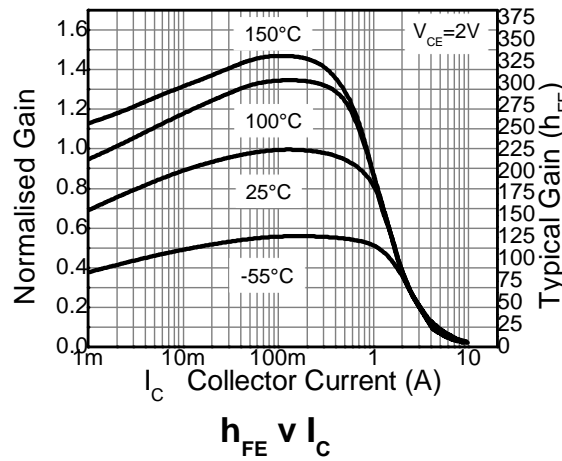
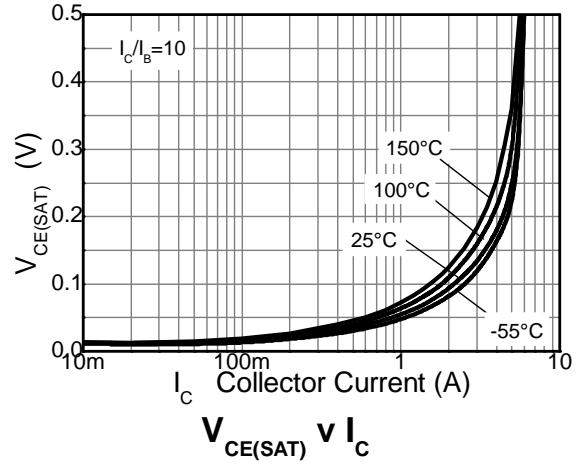
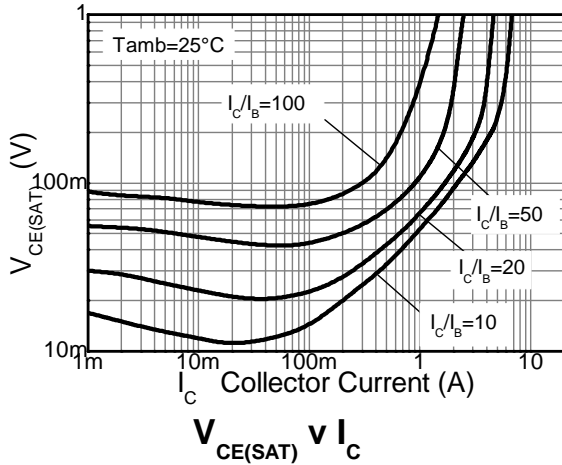


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|----------------------|------------------------|------------------------|----------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | 150 | 190 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Forward Blocking) | BV _{CEX} | 150 | 190 | — | V | I _C = 100μA, R _{BE} ≤ 1kΩ or -1V < V _{BE} < 0.25V |
| Collector-Emitter Breakdown Voltage (Note 12) | BV _{CEO} | 60 | 80 | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.0 | — | V | I _E = 100μA |
| Emitter-Collector Breakdown Voltage (Reverse Blocking) | BV _{ECX} | 6 | 8 | — | V | I _E = 100μA, R _{BC} ≤ 1kΩ or <0.25V > V _{BC} > 0.25V |
| Emitter-Collector Breakdown Voltage (Base Open) | BV _{ECO} | 6 | 7 | — | V | I _E = 100μA |
| Collector-Base Cutoff Current | I _{CBO} | — | <1 | 50 20 | nA μA | V _{CB} = 120V V _{CB} = 120V, T _A = +100°C |
| Collector-Emitter Cutoff Current | I _{CEX} | — | — | 100 | nA | V _{CE} = 120V, R _{BE} ≤ 1kΩ or -1V < V _{BE} < 0.25V |
| Emitter-Base Cutoff Current | I _{EBO} | — | <1 | 50 | nA | V _{EB} = 5.6V |
| Collector-Emitter Saturation Voltage (Note 12) | V _{CE(sat)} | — | 55 70 185 240 | 70 90 230 305 | mV | I _C = 1A, I _B = 100mA I _C = 1A, I _B = 50mA I _C = 4A, I _B = 400mA I _C = 5A, I _B = 500mA |
| Base-Emitter Saturation Voltage (Note 12) | V _{BE(sat)} | — | 1,020 | 1,100 | mV | I _C = 5A, I _B = 500mA |
| Base-Emitter Turn-On Voltage (Note 12) | V _{BE(on)} | — | 960 | 1,050 | mV | I _C = 5A, V _{CE} = 2V |
| DC Current Gain (Note 12) | h _{FE} | 100 90 45 — | 200 180 90 20 | 300 — — — | — | I _C = 10mA, V _{CE} = 2V I _C = 1A, V _{CE} = 2V I _C = 2A, V _{CE} = 50V I _C = 5A, V _{CE} = 5V |
| Transitional Frequency | f _T | — | 185 | — | MHz | I _C = 100mA, V _{CE} = 5V f=100MHz |
| Output Capacitance | C _{obo} | — | 11.5 | 20 | pF | V _{CB} = 10V, f=1MHz |
| Delay Time | t _d | — | 16 | — | ns | V _{CC} = 10V, I _{CC} = 500mA I _{B1} = - I _{B2} = 50mA |
| Rise Time | t _r | — | 15 | — | ns | |
| Storage Time | t _s | — | 509 | — | ns | |
| Fall Time | t _f | — | 57 | — | ns | |

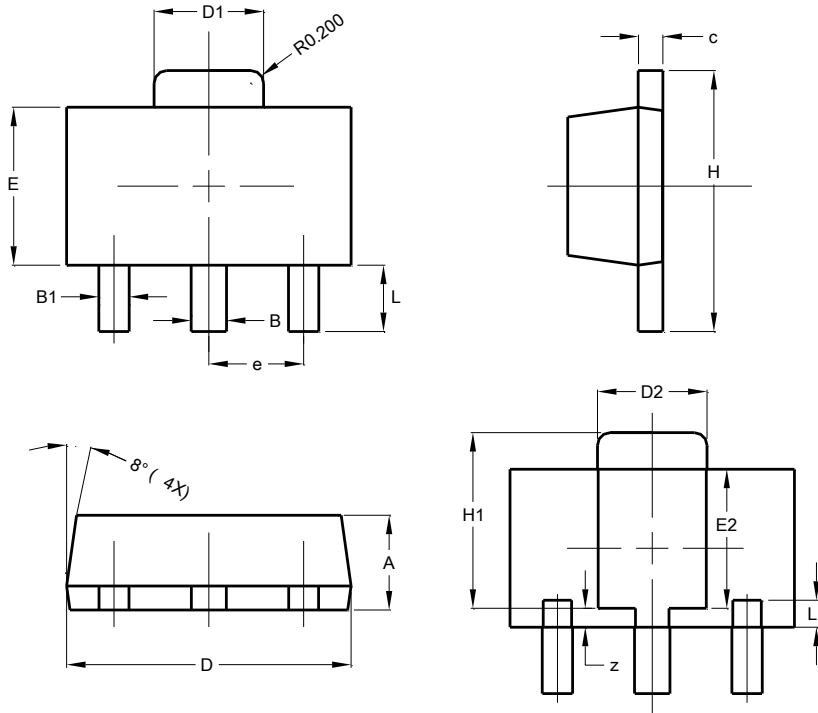
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

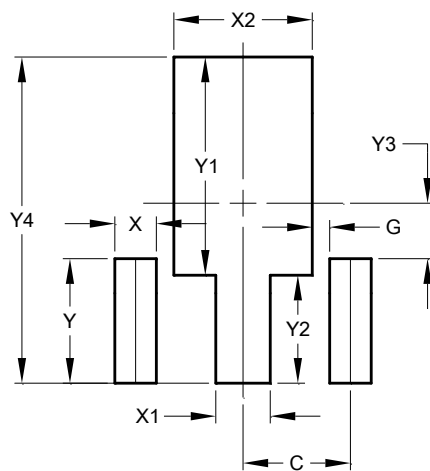
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| 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 |

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