

## 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)

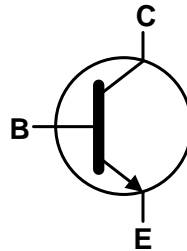
## Applications

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

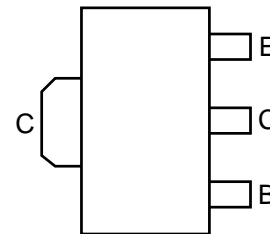
SOT89



Top View



Equivalent Circuit



Top View  
Pin-Out

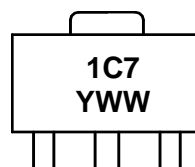
## Ordering Information (Notes 4 & 5)

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](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/](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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	150	V
Collector-Emitter Voltage (Forward Blocking)	V <sub>CEx</sub>	150	V
Collector-Emitter Voltage	V <sub>CE0</sub>	60	V
Emitter-Collector Voltage (Reverse Blocking)	V <sub>EC0</sub>	6	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	5	A
Base Current	I <sub>B</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	10	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

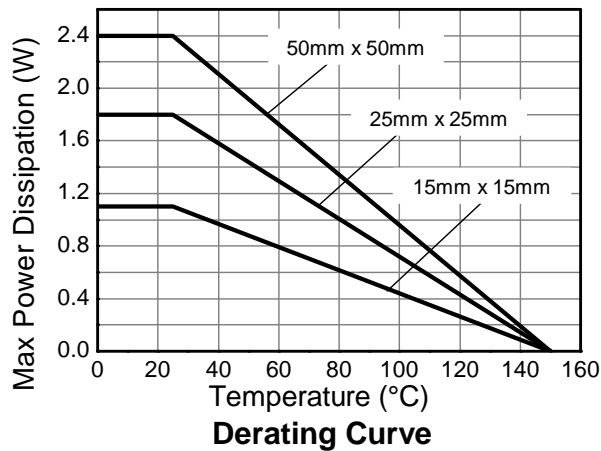
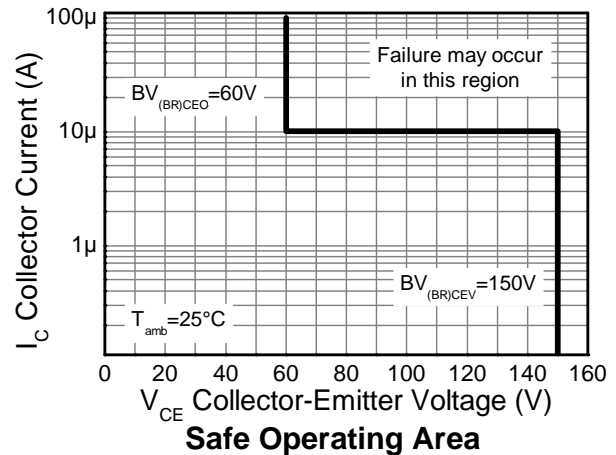
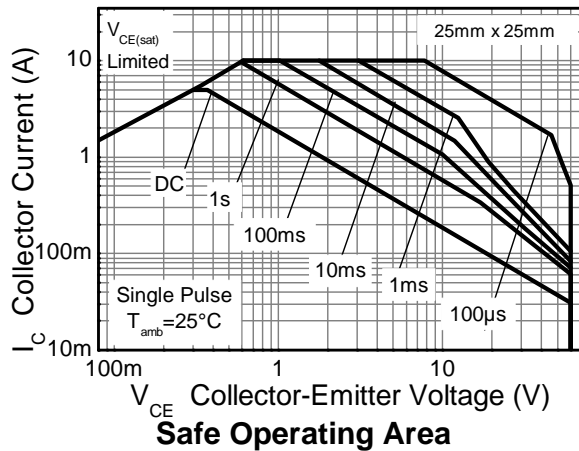
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	1.1
		(Note 7)	1.8
		(Note 8)	2.4
		(Note 9)	4.46
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 6)	117
		(Note 7)	68
		(Note 8)	51
		(Note 9)	28
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	8	°C/W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

**ESD Ratings** (Note 11)

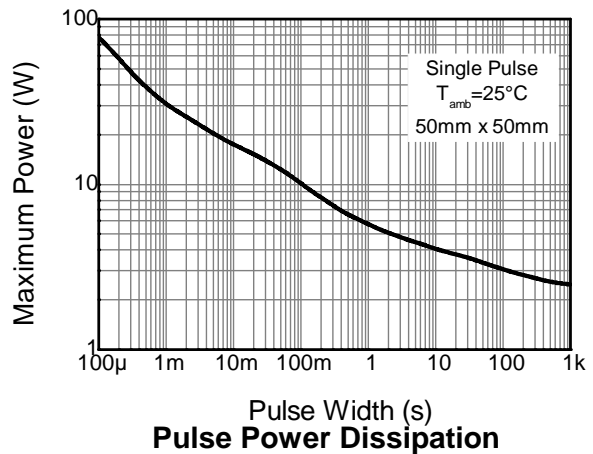
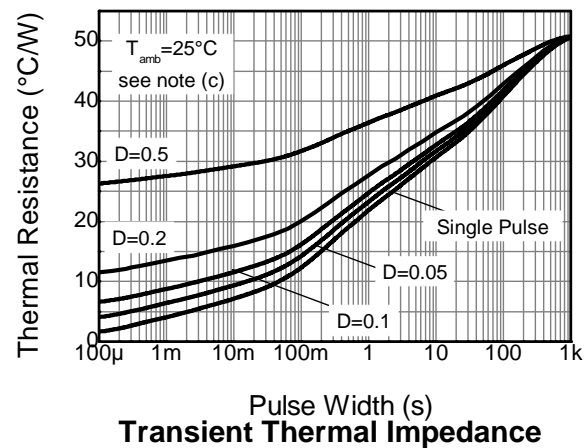
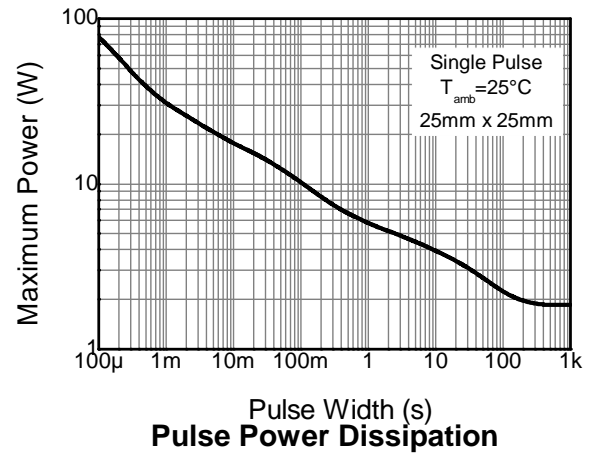
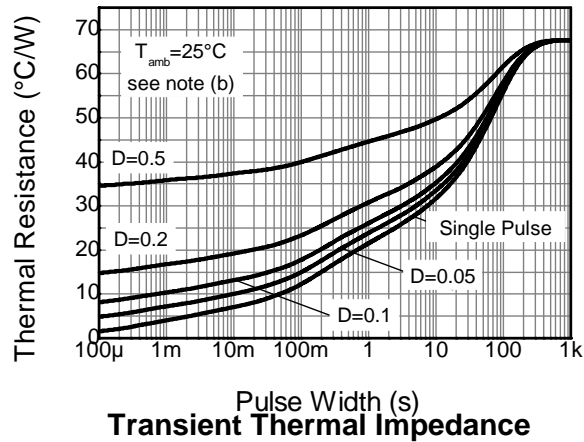
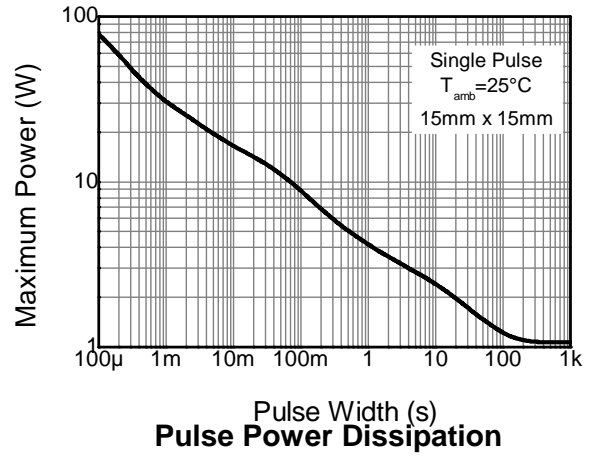
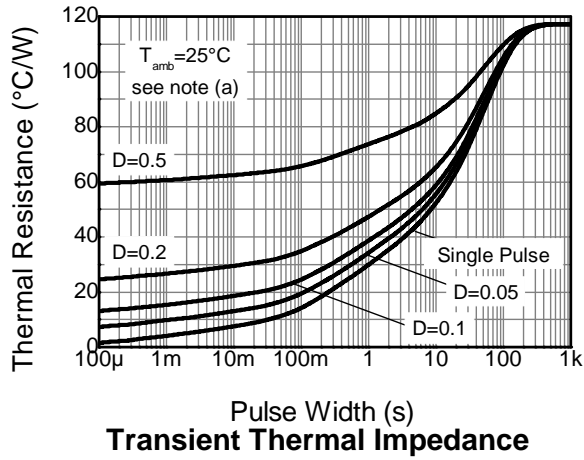
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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)

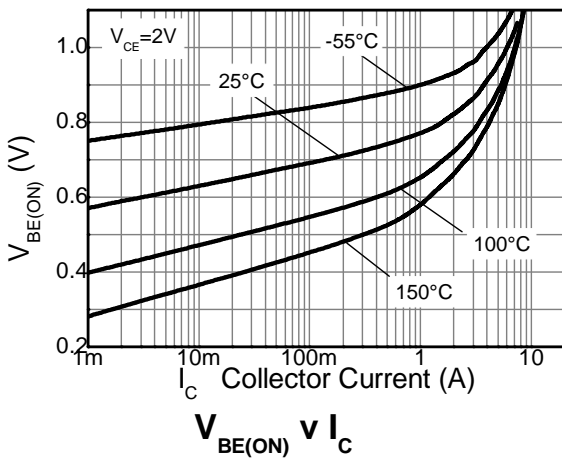
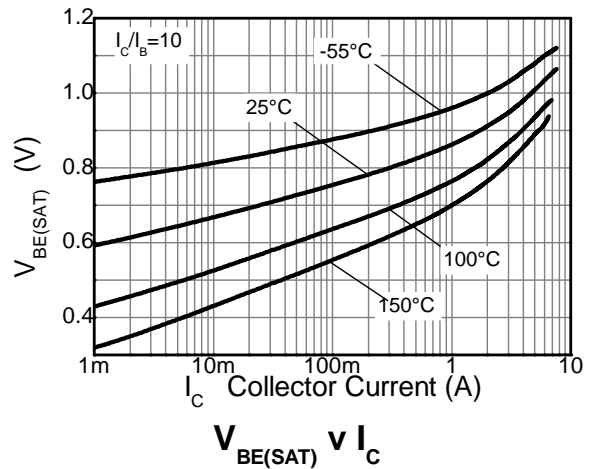
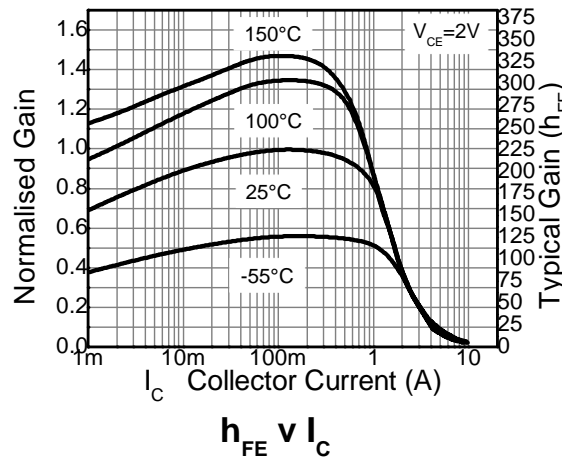
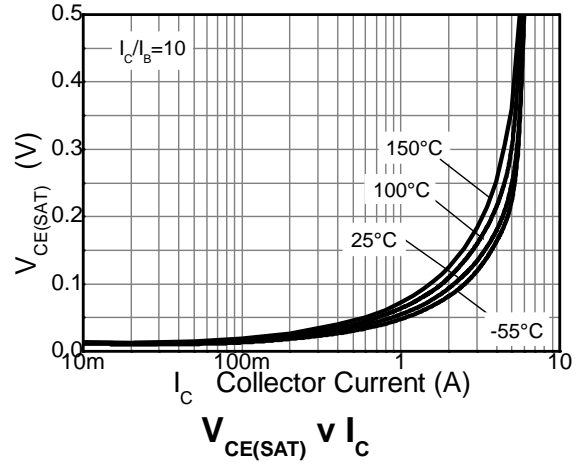
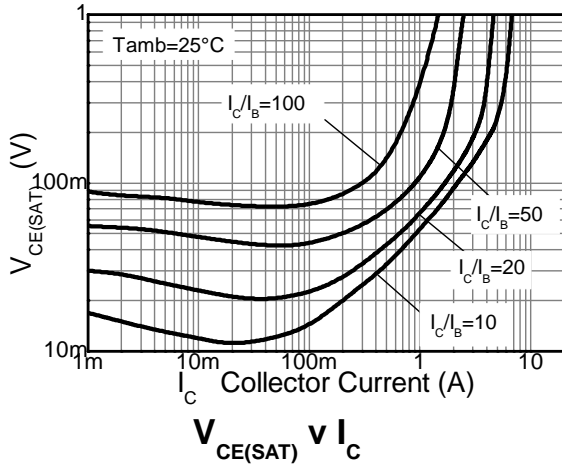


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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

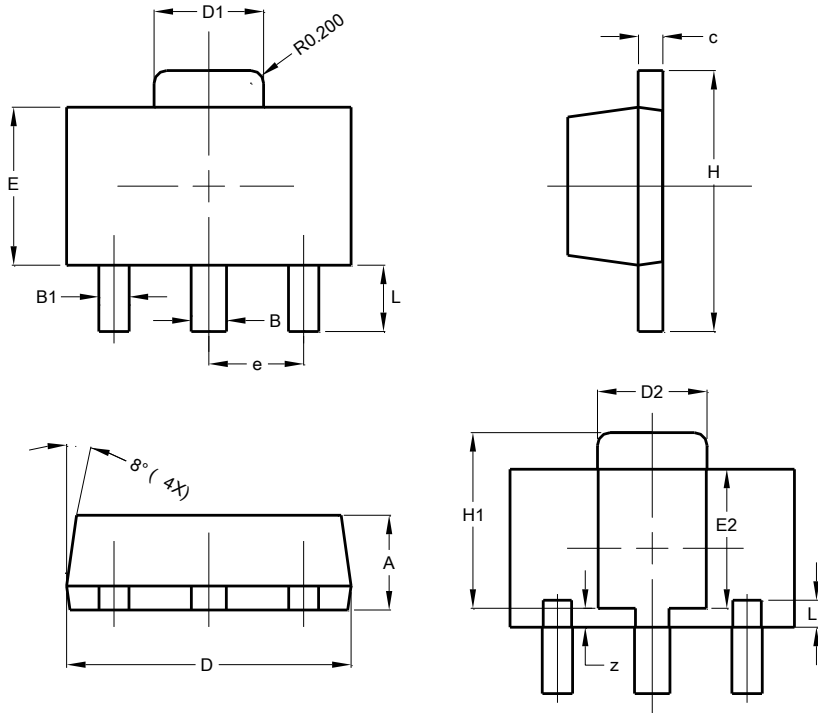
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



**Package Outline Dimensions**

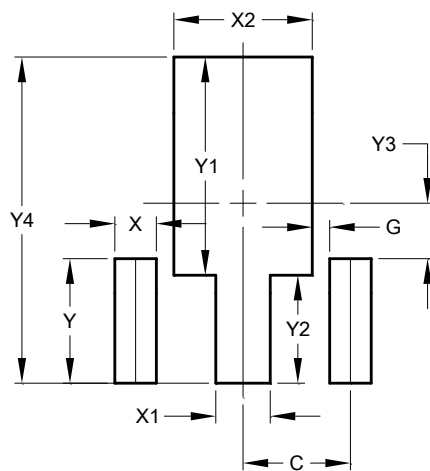
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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