

## Features

- $BV_{CEO} > 100V$
- $BV_{ECO} > 6V$
- $I_C = 2.5A$  Continuous Collector Current
- $I_{CM} = 3.5A$  Peak Collector Current
- $V_{CE(SAT)} < 100mV @ 1A$
- $R_{CE(SAT)} = 80m\Omega$  for a Low Equivalent On-Resistance
- Complementary PNP Type: ZXTN25100CZ
- **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**

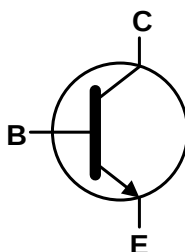
## Mechanical Data

- 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 
- Weight: 0.05 grams (Approximate)

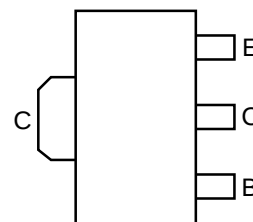
SOT89



Top View



Device Symbol



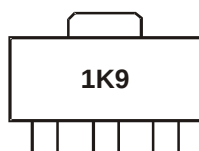
Top View  
Pin Out

## Ordering Information (Note 4)

| Part Number   | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---------------|------------|---------|--------------------|-----------------|-------------------|
| ZXTN25100DZTA | AEC-Q101   | 1K9     | 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](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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



1K9 = Product Type Marking Code

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

| Characteristic                               | Symbol           | Value | Unit |
|----------------------------------------------|------------------|-------|------|
| Collector-Base Voltage                       | V <sub>CBO</sub> | 180   | V    |
| Collector-Emitter Voltage (Forward Blocking) | V <sub>CEX</sub> | 180   | V    |
| Collector-Emitter Voltage                    | V <sub>CEO</sub> | 100   | V    |
| Emitter-Collector Voltage (Reverse Blocking) | V <sub>ECO</sub> | 6     | V    |
| Emitter-Base Voltage                         | V <sub>EBO</sub> | 7     | V    |
| Continuous Collector Current                 | I <sub>C</sub>   | 2.5   | A    |
| Peak Pulse Current                           | I <sub>CM</sub>  | 3.5   | A    |
| Base Current                                 | I <sub>B</sub>   | 1     | A    |

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

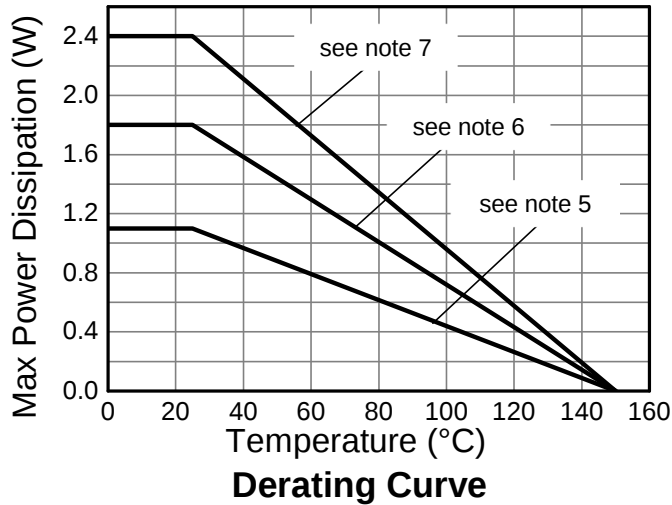
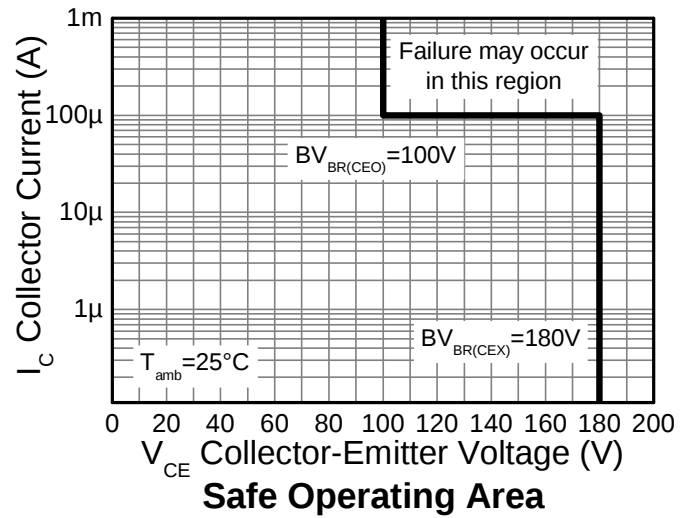
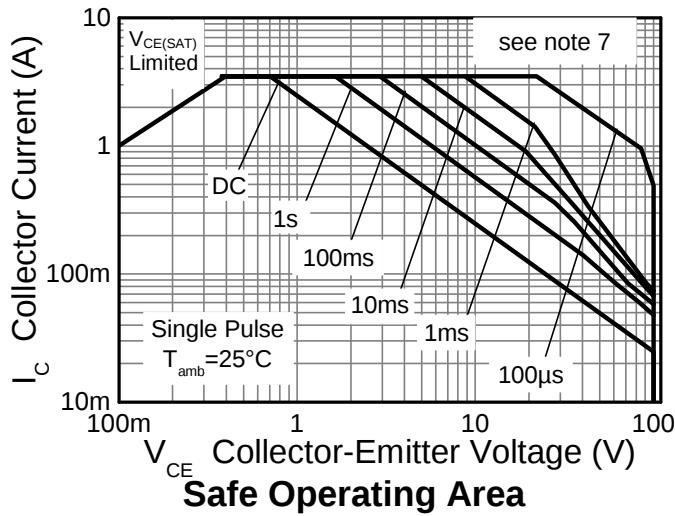
| Characteristic                              | Symbol                            | Value       | Unit       |
|---------------------------------------------|-----------------------------------|-------------|------------|
| Power Dissipation<br>Linear Derating Factor | P <sub>D</sub>                    | 1.1         | W<br>mW/°C |
|                                             |                                   | 8.8         |            |
|                                             |                                   | 1.8         |            |
|                                             |                                   | 14.4        |            |
|                                             |                                   | 2.4         |            |
| Thermal Resistance, Junction to Ambient Air | R <sub>θJA</sub>                  | 19.2        | °C/W       |
|                                             |                                   | 4.46        |            |
|                                             |                                   | 35.7        |            |
|                                             |                                   | 117         |            |
|                                             |                                   | 68          |            |
| Thermal Resistance, Junction to Lead        | R <sub>θJL</sub>                  | 51          | °C/W       |
|                                             |                                   | 28          |            |
|                                             |                                   | 7.95        |            |
| Operating and Storage Temperature Range     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C         |

**ESD Ratings** (Note 10)

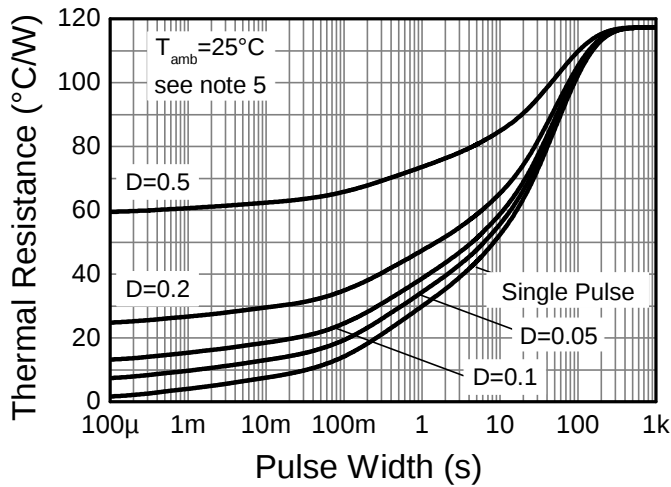
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model 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

- Notes:
- For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 0.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
  - Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
  - Same as Note 7, except the device is measured at t<5 seconds.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

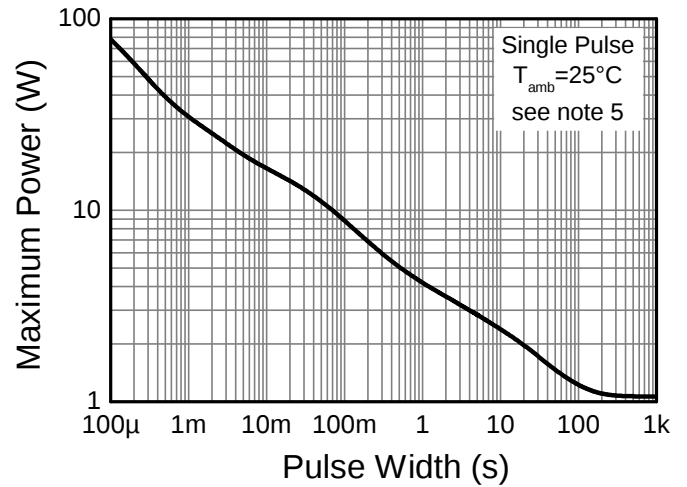
## Thermal Characteristics and Derating Information



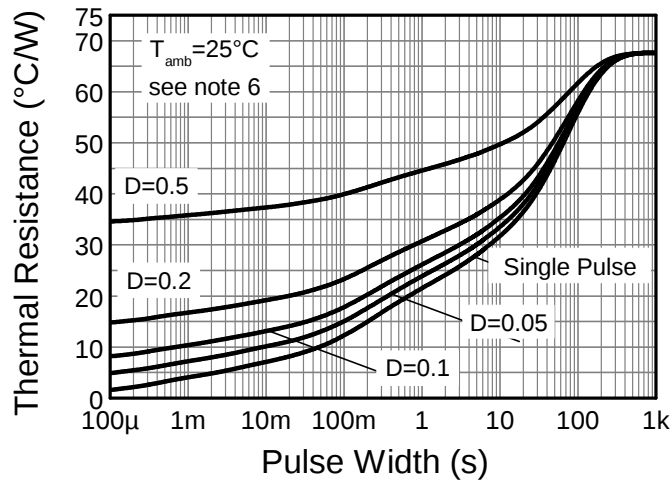
## Thermal Characteristics and Derating Information



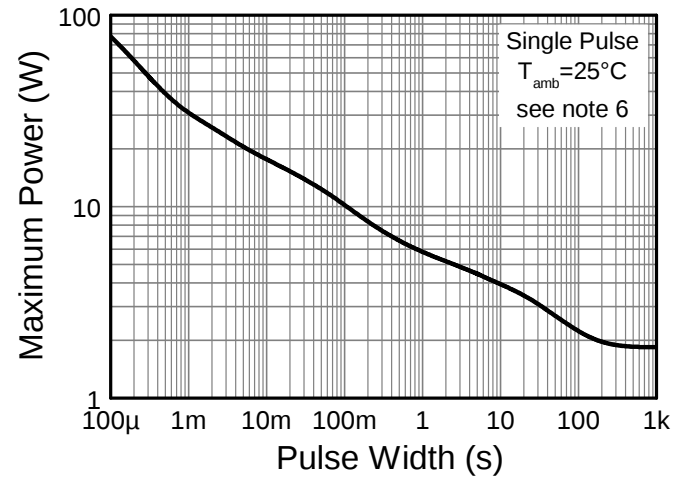
**Transient Thermal Impedance**



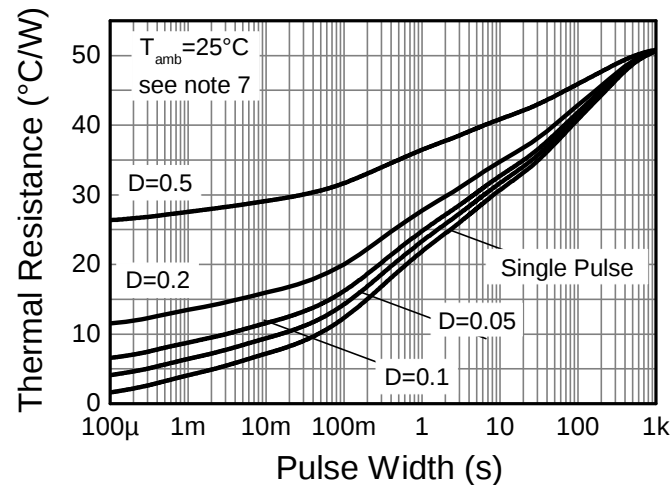
**Pulse Power Dissipation**



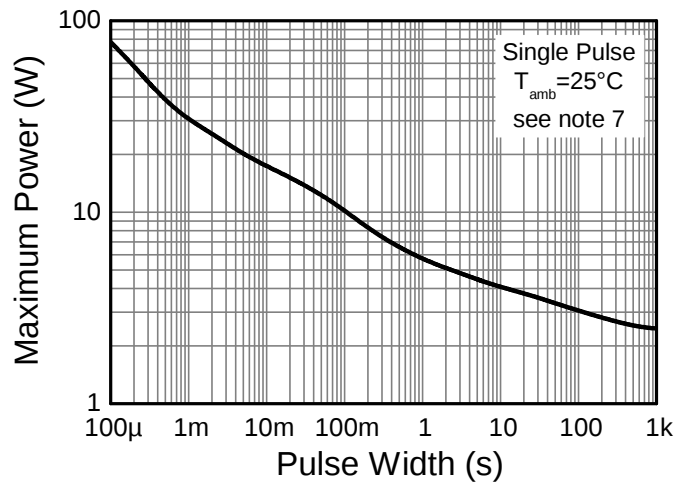
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Transient Thermal Impedance**



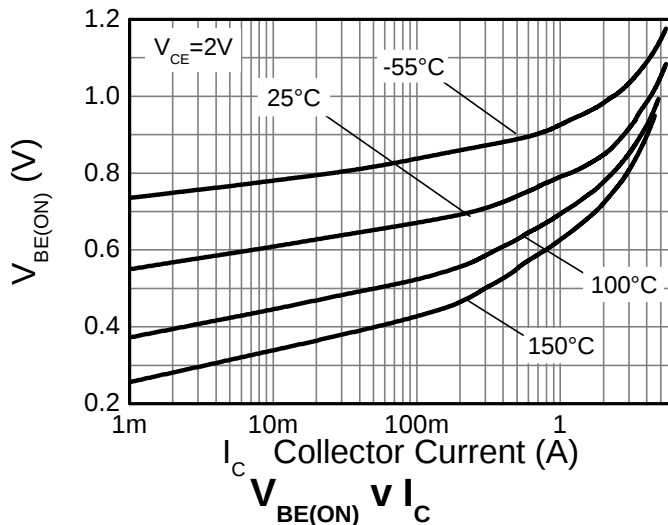
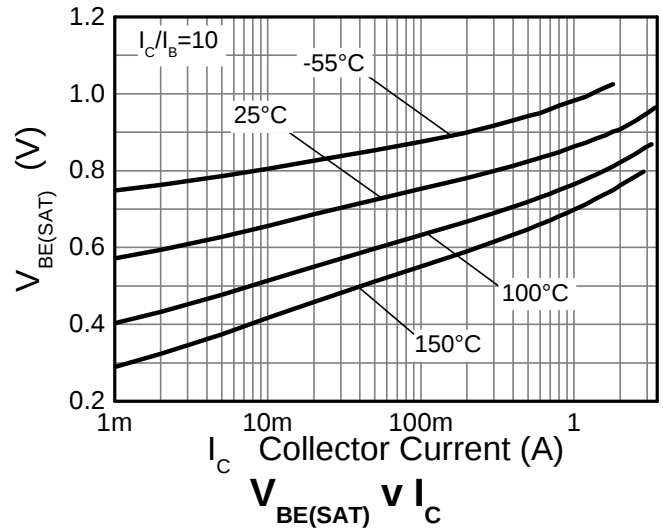
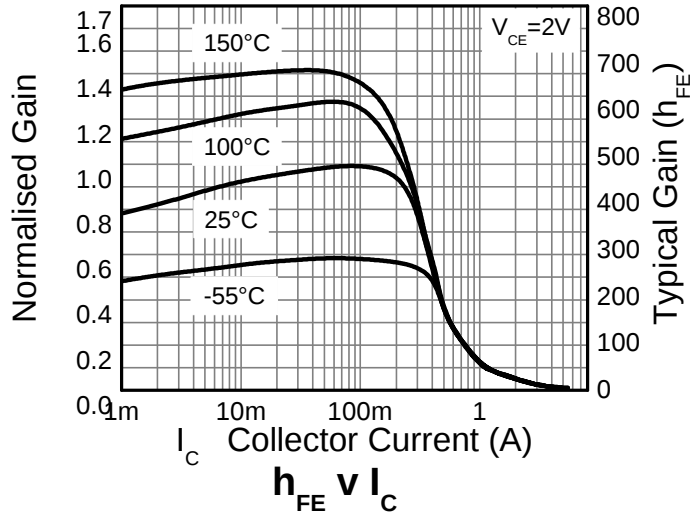
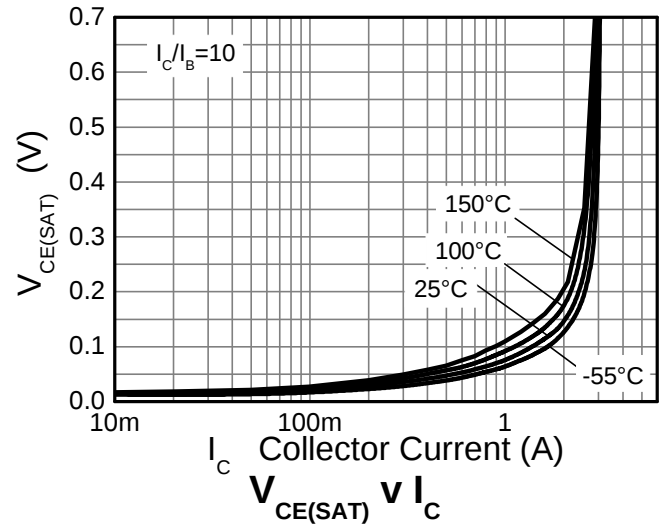
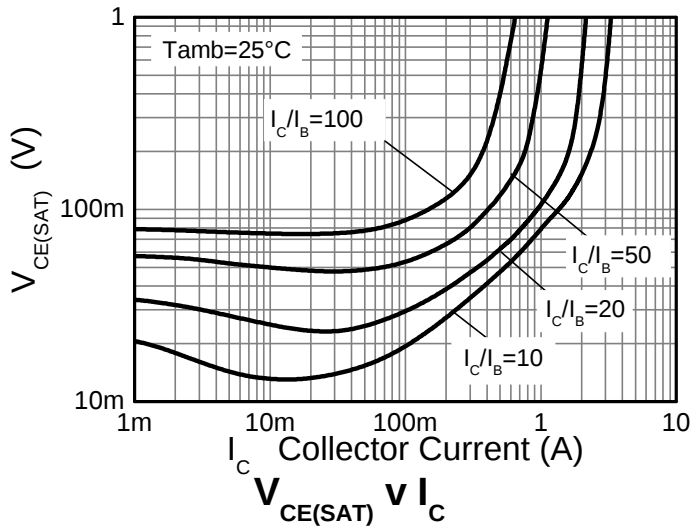
**Pulse Power Dissipation**

**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>    | 180                   | 220                    | —                  | V        | I <sub>C</sub> = 100μA                                                                                                                                                                 |
| Collector-Emitter Breakdown Voltage (Forward Blocking) | BV <sub>CEX</sub>    | 180                   | 220                    | —                  | V        | I <sub>C</sub> = 100μA, R <sub>BE</sub> < 1kΩ or -1V > V <sub>BE</sub> > 0.25V                                                                                                         |
| Collector-Emitter Breakdown Voltage (Note 11)          | BV <sub>CEO</sub>    | 100                   | 130                    | —                  | V        | I <sub>C</sub> = 10mA                                                                                                                                                                  |
| Emitter-Collector Breakdown Voltage (Reverse Blocking) | BV <sub>ECX</sub>    | 6                     | 8.2                    | —                  | V        | I <sub>E</sub> = 100μA, R <sub>BC</sub> < 1kΩ or 0.25V > V <sub>BC</sub> > -0.25V                                                                                                      |
| Emitter-Collector Breakdown Voltage (Reverse Blocking) | BV <sub>ECO</sub>    | 6                     | 8.7                    | —                  | V        | I <sub>E</sub> = 100μA                                                                                                                                                                 |
| Emitter-Base Breakdown Voltage                         | BV <sub>EBO</sub>    | 7                     | 8.3                    | —                  | V        | I <sub>E</sub> = 100μA                                                                                                                                                                 |
| Collector-Base Cutoff Current                          | I <sub>CBO</sub>     | —                     | <1                     | 50<br>0.5          | nA<br>μA | V <sub>CB</sub> = 180V<br>V <sub>CB</sub> = 180V, T <sub>A</sub> = +100°C                                                                                                              |
| Collector-Emitter Cutoff Current                       | I <sub>CEX</sub>     | —                     | —                      | 100                | nA       | V <sub>CE</sub> = 100V, R <sub>BE</sub> < 1kΩ or 1V < V <sub>BE</sub> < 0.25V                                                                                                          |
| Emitter Cutoff Current                                 | I <sub>EBO</sub>     | —                     | <1                     | 50                 | nA       | V <sub>EB</sub> = 5.6V                                                                                                                                                                 |
| DC Current Transfer Static Ratio (Note 11)             | h <sub>FE</sub>      | 300<br>120<br>40<br>— | 450<br>170<br>60<br>20 | 900<br>—<br>—<br>— | —        | I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 0.5A, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 2.5A, V <sub>CE</sub> = 2V |
| Collector-Emitter Saturation Voltage (Note 11)         | V <sub>CE(SAT)</sub> | —                     | 120<br>80<br>220       | 170<br>100<br>345  | mV       | I <sub>C</sub> = 0.5A, I <sub>B</sub> = 10mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA<br>I <sub>C</sub> = 2.5A, I <sub>B</sub> = 250mA                                           |
| Base-Emitter Saturation Voltage (Note 11)              | V <sub>BE(SAT)</sub> | —                     | 935                    | 1000               | mV       | I <sub>C</sub> = 2.5A, I <sub>B</sub> = 250mA                                                                                                                                          |
| Base-Emitter Turn-on Voltage (Note 11)                 | V <sub>BE(ON)</sub>  | —                     | 890                    | 950                | mV       | I <sub>C</sub> = 2.5A, V <sub>CE</sub> = 2V                                                                                                                                            |
| Transitional Frequency                                 | f <sub>T</sub>       | —                     | 175                    | —                  | MHz      | I <sub>E</sub> = 50mA, V <sub>CE</sub> = 10V<br>f = 100MHz                                                                                                                             |
| Input Capacitance                                      | C <sub>IBO</sub>     | —                     | 154                    | 250                | pF       | V <sub>EB</sub> = 0.5V, f = 1MHz                                                                                                                                                       |
| Output Capacitance                                     | C <sub>OBO</sub>     | —                     | 8.7                    | 15                 | pF       | V <sub>CB</sub> = 10V, f = 1MHz                                                                                                                                                        |
| Delay Time                                             | t <sub>D</sub>       | —                     | 16.4                   | —                  | ns       | I <sub>C</sub> = 500mA, V <sub>CC</sub> = 10V,<br>I <sub>B1</sub> = -I <sub>B2</sub> = 50mA                                                                                            |
| Rise Time                                              | t <sub>R</sub>       | —                     | 115                    | —                  | ns       |                                                                                                                                                                                        |
| Storage Time                                           | t <sub>S</sub>       | —                     | 763                    | —                  | ns       |                                                                                                                                                                                        |
| Fall Time                                              | t <sub>F</sub>       | —                     | 158                    | —                  | ns       |                                                                                                                                                                                        |

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

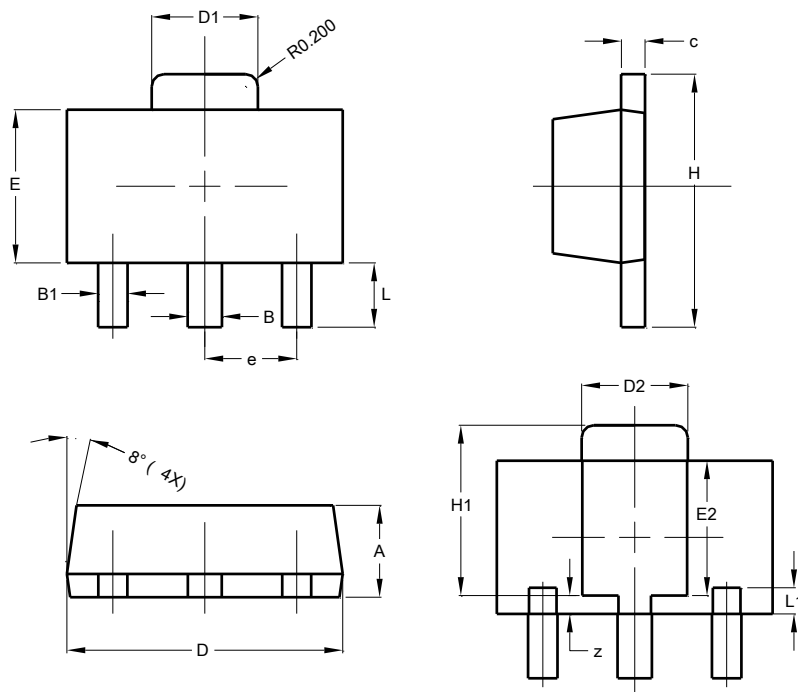
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

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

### SOT89

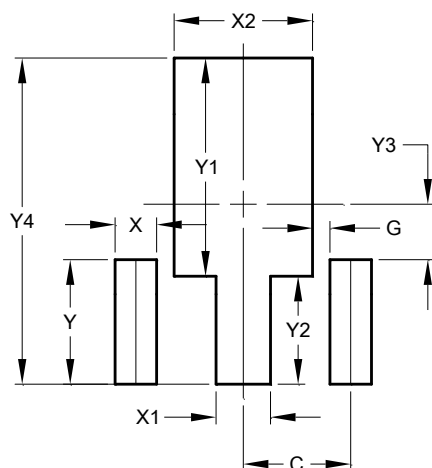


| SOT89                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 1.40  | 1.60  | 1.50  |
| B                    | 0.50  | 0.62  | 0.56  |
| B1                   | 0.42  | 0.54  | 0.48  |
| c                    | 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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