

## Features

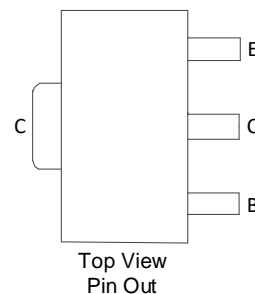
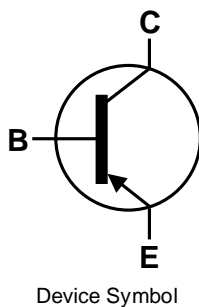
- $V_{CE0} > -60V$
- $I_C = -4.3A$  High Continuous Current
- $R_{SAT} = 32m\Omega$  for a Low Equivalent On-Resistance
- Low Saturation Voltage  $V_{CE(sat)} < -65mV @ I_C = -1A$
- $h_{FE}$  Specified Up to  $-10A$  for High Current Gain Hold Up
- Complementary NPN Type: DIODES™ ZXTN2010Z
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (ZXTP2012ZQ)**

## Mechanical Data

- Package: SOT89
- Package 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: 0.05 grams (Approximate)

## Application

- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs

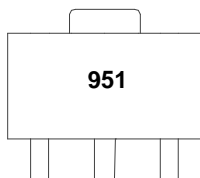


## Ordering Information (Note 4)

| Part Number   | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---------------|---------|--------------------|-----------------|-------------------|
| ZXTP2012ZTA   | 951     | 7                  | 12              | 1,000             |
| ZXTP2012Z-13R | 951     | 13                 | 12              | 4,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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



951 = Product Type Marking Code

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

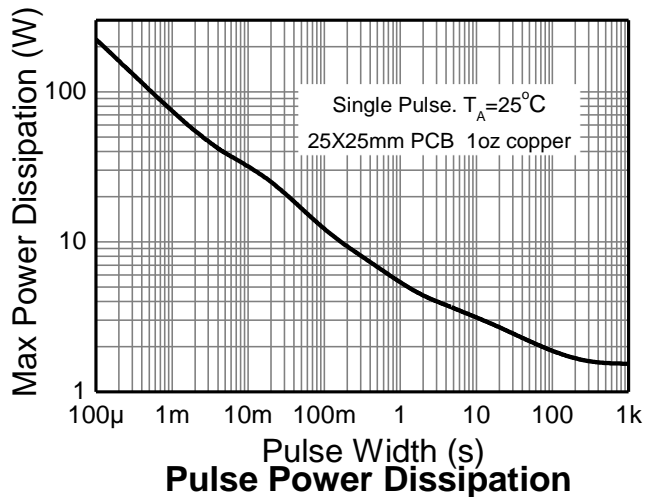
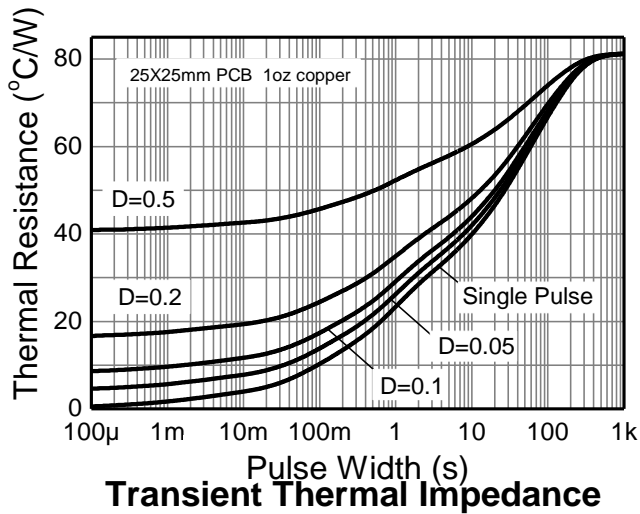
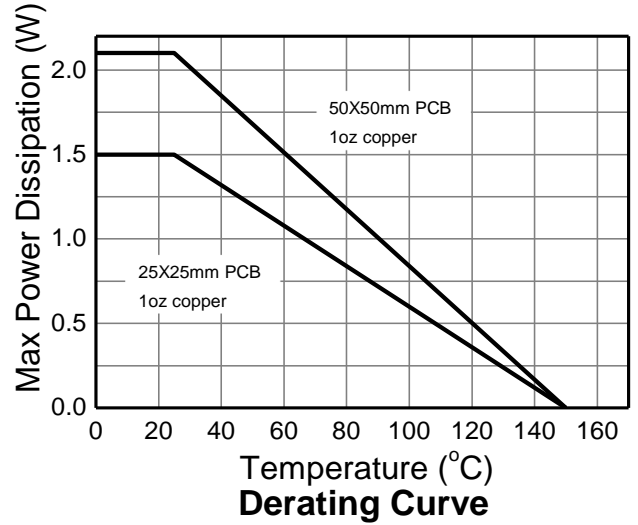
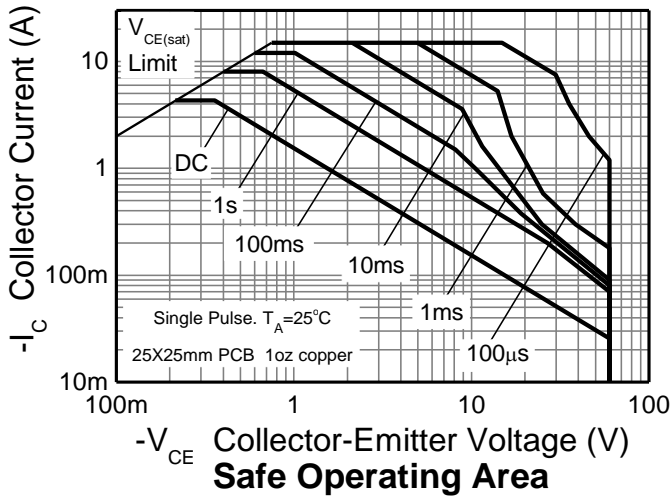
| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$ | -100  | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | -60   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | -7    | V    |
| Base Current                 | $I_B$     | -2    | A    |
| Continuous Collector Current | $I_C$     | -4.3  | A    |
| Peak Pulse Current           | $I_{CM}$  | -15   | A    |

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

| Characteristic                                   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 5)                       | $P_D$           | 1           | W                         |
| Linear Derating Factor                           |                 | 8           | mW/ $^\circ\text{C}$      |
| Power Dissipation (Note 6)                       | $P_D$           | 1.5         | W                         |
| Linear Derating Factor                           |                 | 12          | mW/ $^\circ\text{C}$      |
| Power Dissipation (Note 7)                       | $P_D$           | 2.1         | W                         |
| Linear Derating Factor                           |                 | 16.8        | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 125         | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 83          | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient (Note 7) | $R_{\theta JA}$ | 60          | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case (Note 5)    | $R_{\theta JC}$ | 21          | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Leads (Note 8)   | $R_{\theta JL}$ | 3.23        | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

- Notes:
5. Minimum recommended pad layout
  6. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
  7. Same as note (6), except the device is mounted on 50mm x 50mm single sided 1oz weight copper.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).

**Thermal Characteristics and Derating Information**

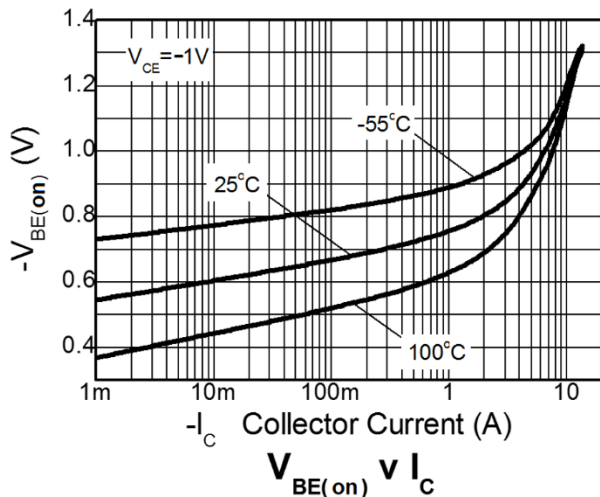
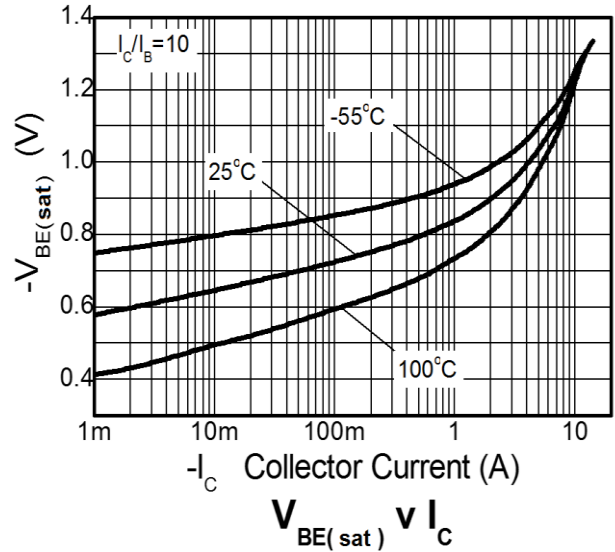
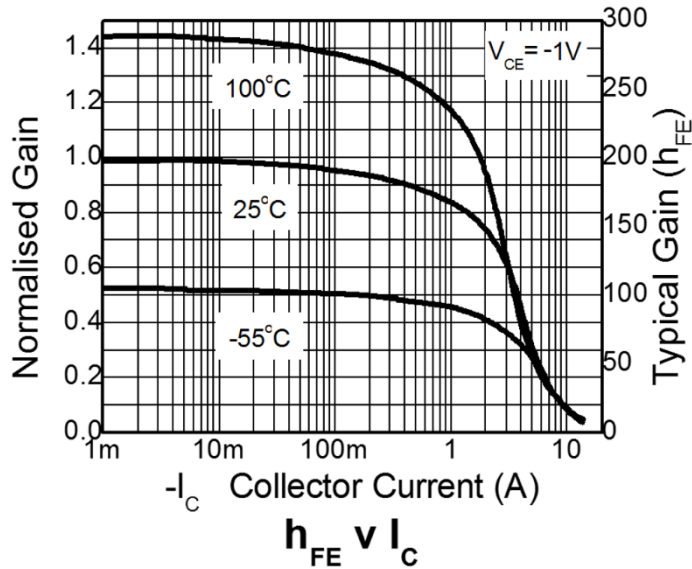
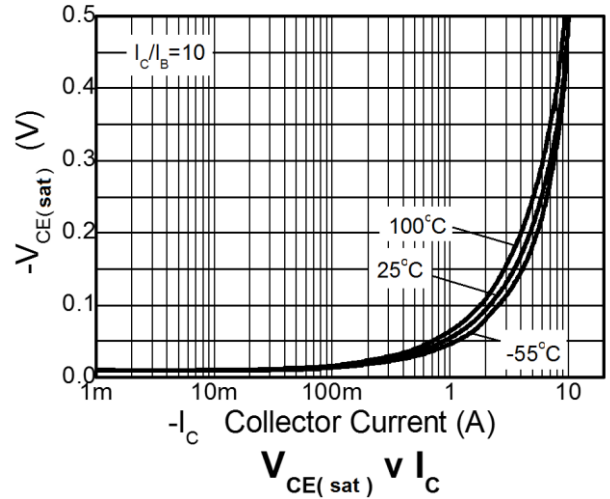
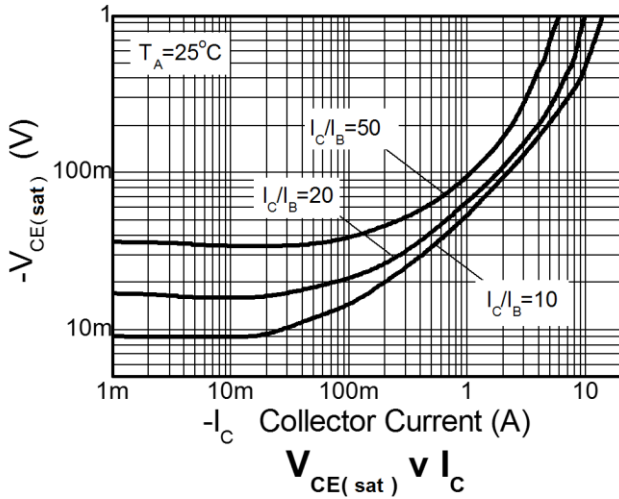


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                                | Symbol                                | Min  | Typ  | Max   | Unit | Test Condition   |
|---|---------------------------------------|------|------|-------|------|--|
| Collector-Base Breakdown Voltage              | $BV_{CBO}$                            | -100 | -120 | —     | V    | $I_C = -100\mu\text{A}$  |
| Collector-Emitter Breakdown Voltage (Note 9)  | $BV_{CER}$                            | -100 | -120 | —     | V    | $I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$                     |
| Collector-Emitter Breakdown Voltage (Note 9)  | $BV_{CEO}$                            | -60  | -80  | —     | V    | $I_C = -10\text{mA}$   |
| Emitter-Base Breakdown Voltage                | $BV_{EBO}$                            | -7   | -8.1 | —     | V    | $I_E = -100\mu\text{A}$  |
| Collector Cutoff Current                      | $I_{CBO}$                             | —    | -1   | -20   | nA   | $V_{CB} = -80\text{V}$   |
|   |                                       |      | —    | -500  | nA   | $V_{CB} = -80\text{V}$ , $T_A = +100^\circ\text{C}$                    |
| Collector Cutoff Current                      | $I_{CER}$<br>$R \leq 1\text{k}\Omega$ | —    | -1   | -20   | nA   | $V_{CB} = -80\text{V}$   |
|   |                                       |      | —    | -500  | nA   | $V_{CB} = -80\text{V}$ , $T_A = +100^\circ\text{C}$                    |
| Emitter Cutoff Current                        | $I_{EBO}$                             | —    | -1   | -10   | nA   | $V_{EB} = -6\text{V}$  |
| DC Current Transfer Static Ratio (Note 9)     | $h_{FE}$                              | 100  | 250  | —     | —    | $I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}$                           |
|   |                                       | 100  | 200  | 300   |      | $I_C = -2\text{A}$ , $V_{CE} = -1\text{V}$                             |
|   |                                       | 45   | 90   | —     |      | $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}$                             |
|   |                                       | 10   | 25   | —     |      | $I_C = -10\text{A}$ , $V_{CE} = -1\text{V}$                            |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(sat)}$                         | —    | -14  | -20   | mV   | $I_C = -100\text{mA}$ , $I_B = -10\text{mA}$                           |
|   |                                       |      | -50  | -65   |      | $I_C = -1\text{A}$ , $I_B = -100\text{mA}$                             |
|   |                                       |      | -75  | -110  |      | $I_C = -2\text{A}$ , $I_B = -200\text{mA}$                             |
|   |                                       |      | -160 | -215  |      | $I_C = -5\text{A}$ , $I_B = -500\text{mA}$                             |
| Base-Emitter Saturation Voltage (Note 9)      | $V_{BE(sat)}$                         | —    | -950 | -1050 | mV   | $I_C = -5\text{A}$ , $I_B = -500\text{mA}$                             |
| Base-Emitter Turn-on Voltage (Note 9)         | $V_{BE(on)}$                          | —    | -840 | -950  | mV   | $I_C = -5\text{A}$ , $V_{CE} = -1\text{V}$                             |
| Transitional Frequency (Note 9)               | $f_T$                                 | —    | 120  | —     | MHz  | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$ ,<br>$f = 50\text{MHz}$ |
| Output Capacitance                            | $C_{obo}$                             | —    | 48   | —     | pF   | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$                             |
| Switching Time                                | $t_{on}$                              | —    | 39   | —     | ns   | $V_{CC} = -10\text{V}$ , $I_C = -1\text{A}$ ,                          |
|   | $t_{off}$                             | —    | 370  | —     |      | $I_{B1} = -I_{B2} = -100\text{mA}$                                     |

Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

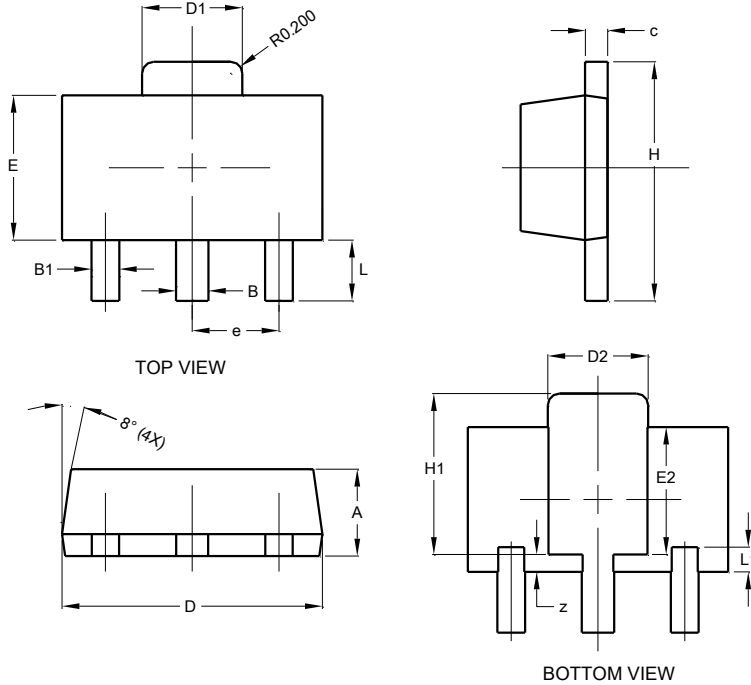
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimension

Please see <https://www.diodes.com/design/support/packaging/> for the latest version.

### SOT89

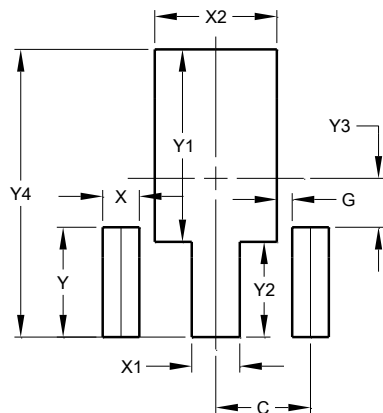


| SOT89                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 1.40  | 1.60  | 1.50  |
| B                    | 0.50  | 0.62  | 0.56  |
| B1                   | 0.42  | 0.54  | 0.48  |
| c                    | 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 <https://www.diodes.com/design/support/packaging/> 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         |

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