

Features

- $BV_{CEO} > -60V$
- $I_C = -4.3A$ 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: ZXTN2010Z
- **Lead-Free Finish; 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

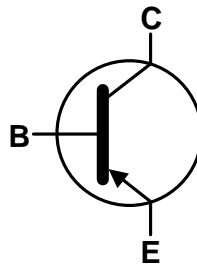
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.05 grams (Approximate)

Application

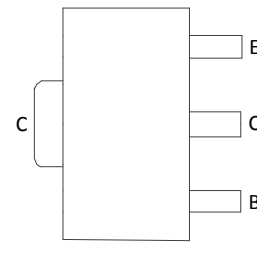
- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs



Top View



Device Symbol



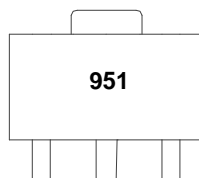
Top View
Pin Out

Ordering Information (Note 5)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---------------|------------|---------|--------------------|-----------------|-------------------|
| ZXTP2012ZTA | AEC-Q101 | 951 | 7 | 12 | 1,000 |
| ZXTP2012Z-13R | AEC-Q101 | 951 | 13 | 12 | 4,000 |
| ZXTP2012ZQTA | Automotive | 951 | 7 | 12 | 1,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
 5. 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°C, unless otherwise specified.)

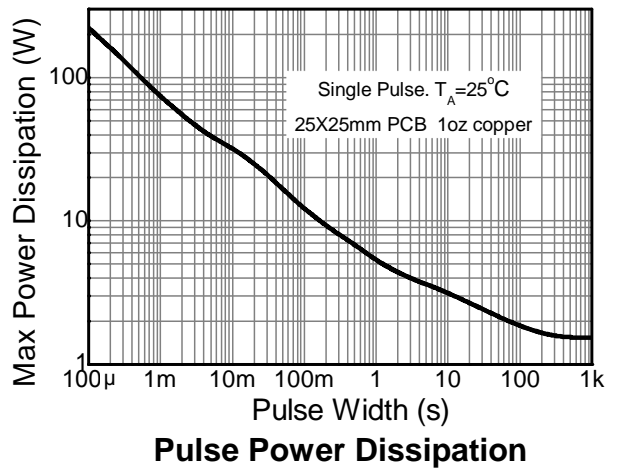
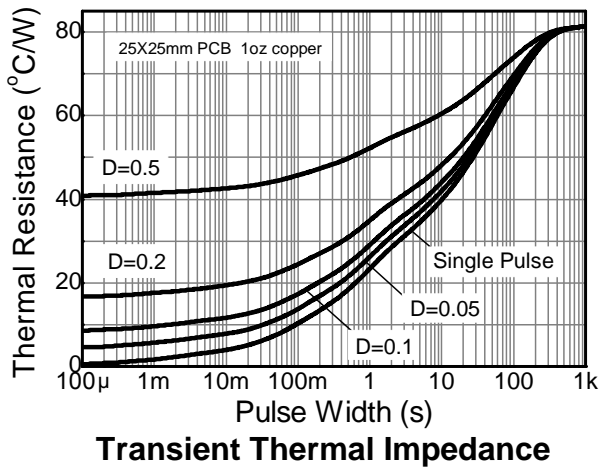
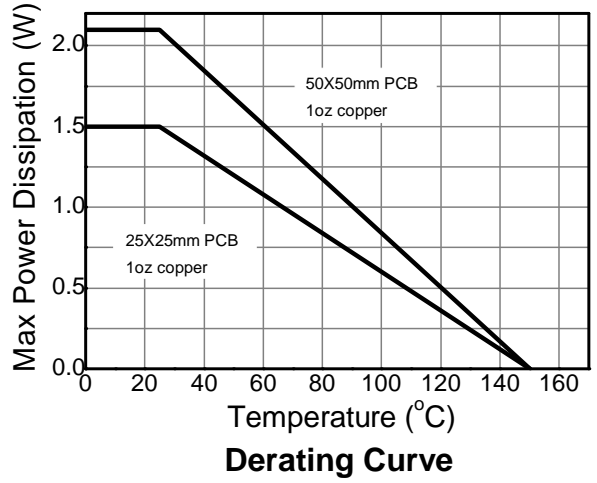
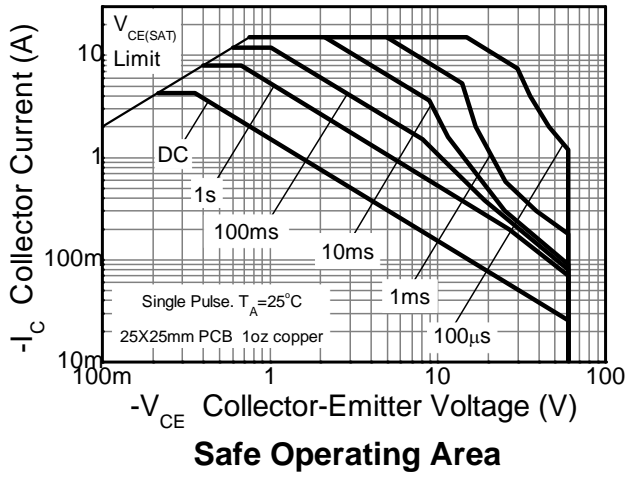
| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -100 | V |
| Collector-Emitter Voltage | V _{CEO} | -60 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Base Current | I _B | -2 | A |
| Continuous Collector Current | I _C | -4.3 | A |
| Peak Pulse Current | I _{CM} | -15 | A |

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

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|-------|
| Power Dissipation (Note 6) | P _D | 1.5 | W |
| Linear Derating Factor | | 12 | mW/°C |
| Power Dissipation (Note 7) | P _D | 2.1 | W |
| Linear Derating Factor | | 16.8 | mW/°C |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 83 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 7) | R _{θJA} | 60 | °C/W |
| Thermal Resistance, Junction to Leads (Note 8) | R _{θJL} | 3.23 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Notes:
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

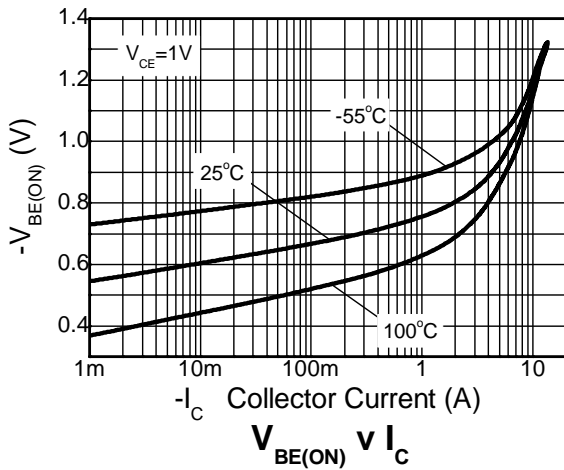
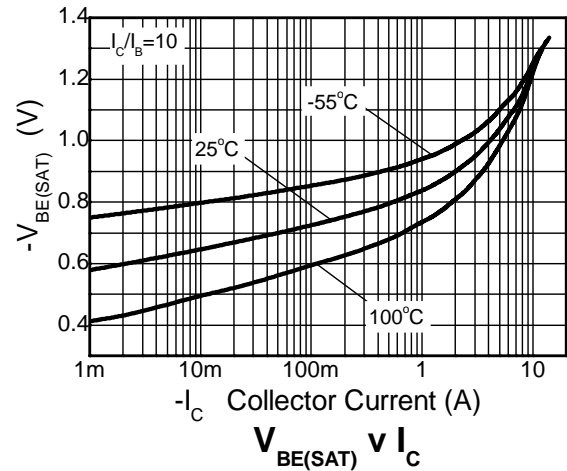
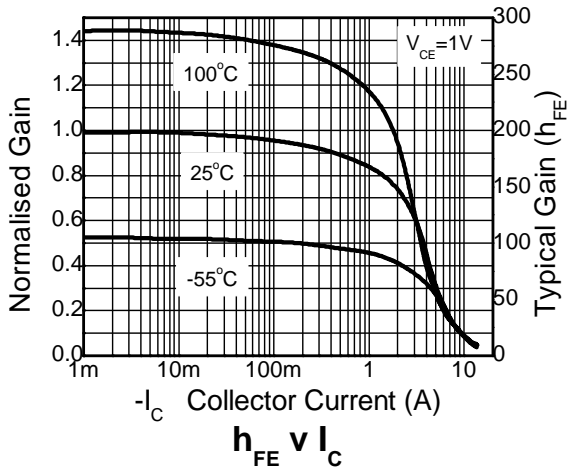
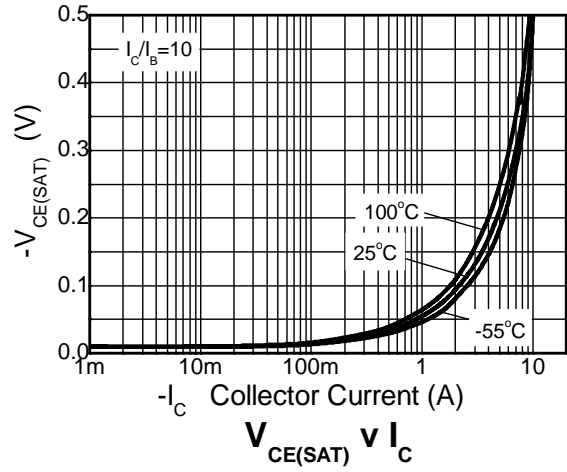
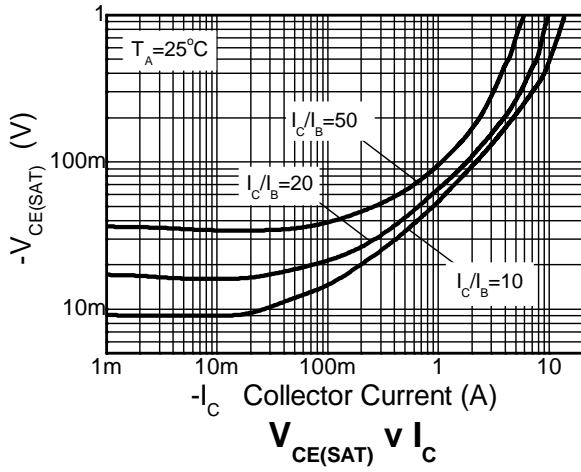


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| 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 | $V_{CB} = -80\text{V}$ |
| Collector Cutoff Current | I_{CER} $R \leq 1\text{k}\Omega$ | — | < -1 | -20 | nA | $V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | — | < -1 | -10 | nA | $V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$ |
| 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 -50 -75 -160 | -20 -65 -110 -215 | mV | $I_C = -100\text{mA}$, $I_B = -10\text{mA}$ $I_C = -1\text{A}$, $I_B = -100\text{mA}$ $I_C = -2\text{A}$, $I_B = -200\text{mA}$ $I_C = -5\text{A}$, $I_B = -500\text{mA}$ |
| 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 | $I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$ |
| Output Capacitance | C_{OBO} | — | 48 | — | pF | $V_{CB} = -10\text{V}$, $f = 1\text{MHz}$ |
| Switching Time | t_{ON} | — | 39 | — | ns | $V_{CC} = -10\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = -100\text{mA}$ |
| | t_{OFF} | — | 370 | — | | |

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

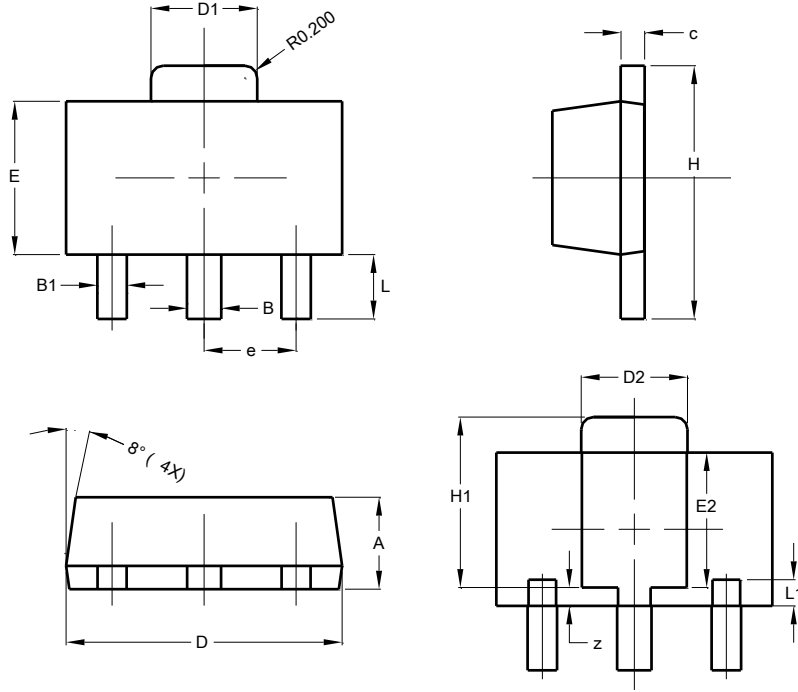
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT89

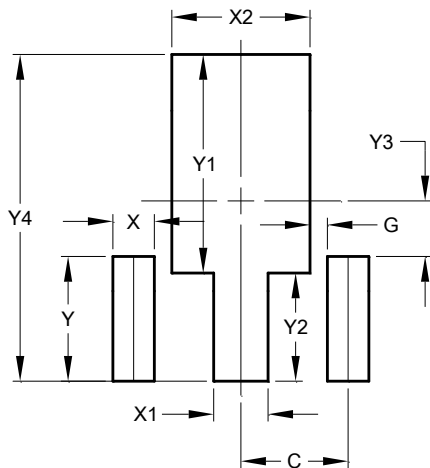


| SOT89 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.60 | 1.50 |
| B | 0.50 | 0.62 | 0.56 |
| B1 | 0.42 | 0.54 | 0.48 |
| c | 0.35 | 0.43 | 0.38 |
| D | 4.40 | 4.60 | 4.50 |
| D1 | 1.62 | 1.83 | 1.733 |
| D2 | 1.61 | 1.81 | 1.71 |
| E | 2.40 | 2.60 | 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 |

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