

60V PNP MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

Features

- $BV_{CEO} > -60V$
- $I_C = -5.5A$ High Continuous Collector Current
- $I_{CM} = -15A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -70mV @ -1A$
- $R_{SAT} = 39m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified Up to $-10A$ for a High Gain Hold Up
- Complementary NPN Type: ZX5T851G
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

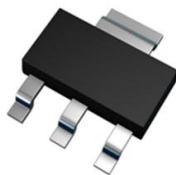
Mechanical Data

- Case: SOT223
- 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 (e3)
- Weight: 0.112 grams (Approximate)

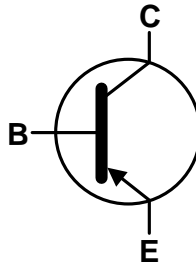
Applications

- DC-DC Converters
- MOSFET & IGBT Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

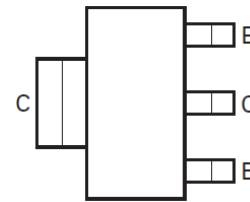
SOT223



Top View



Device Symbol



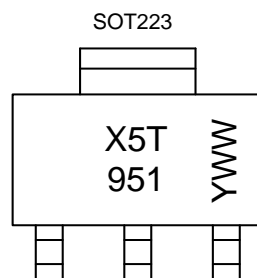
Top View
Pin-Out

Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|---------|--------------------|-----------------|-------------------|
| ZX5T951GTA | X5T951 | 7 | 12 | 1,000 |
| ZX5T951GTC | X5T951 | 13 | 12 | 4,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See <http://www.diodes.com> 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 <http://www.diodes.com>.

Marking Information



X5T 951 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
 WW or $\bar{W}W$ = Week Code (01~53)

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 |
| Continuous Collector Current | I _C | -5.5 | A |
| Peak Pulse Current | I _{CM} | -15 | A |

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

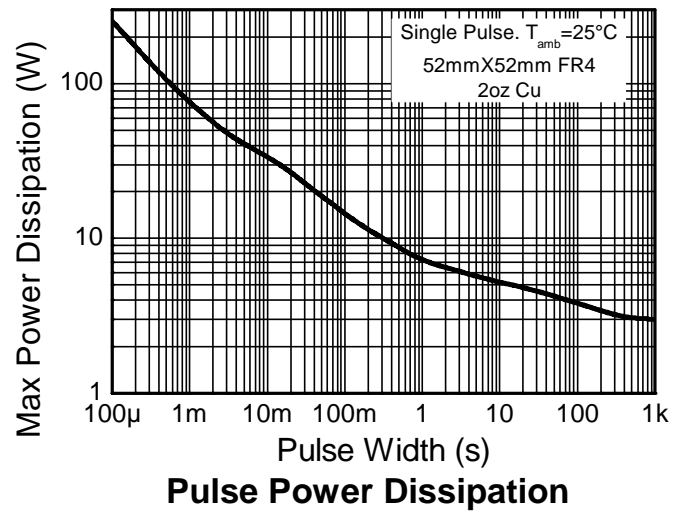
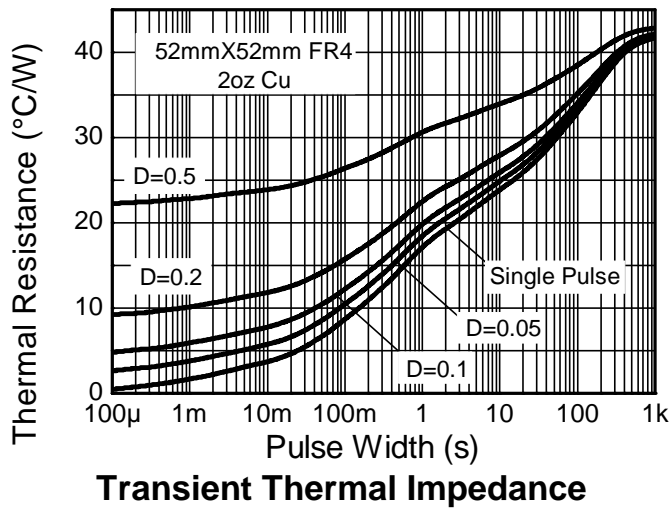
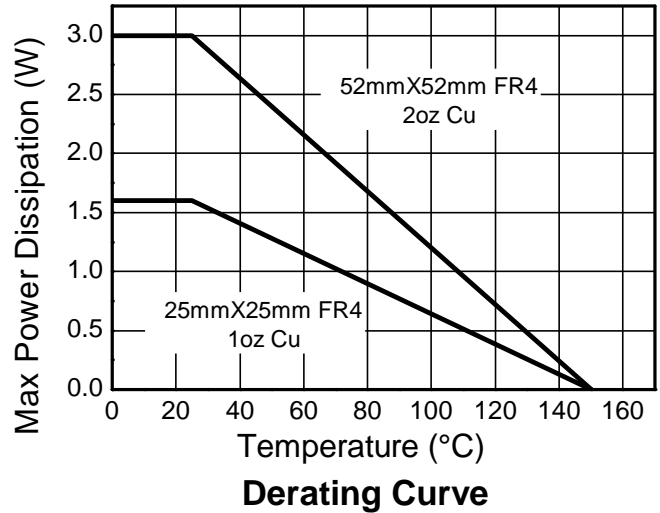
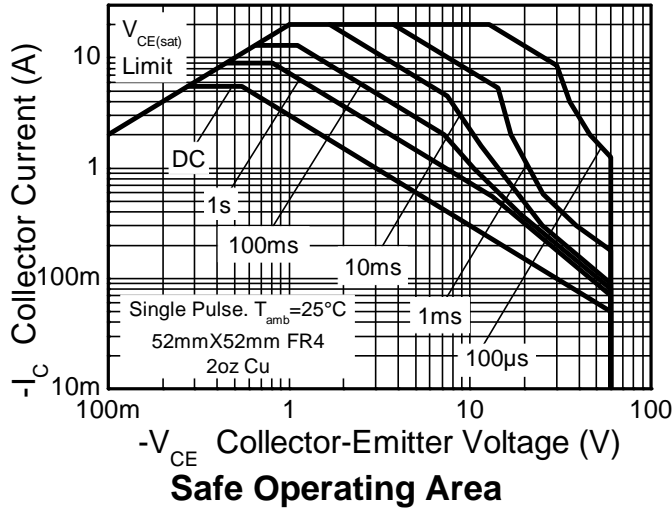
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|--------|
| Power Dissipation | P _D | 3.0 | W |
| | | 24 | |
| Linear Derating Factor | | 1.6 | mW /°C |
| | | 12.8 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} (Note 5) | 42 | °C/W |
| | R _{θJA} (Note 6) | 78 | |
| Thermal Resistance Junction to Lead | R _{θJL} (Note 7) | 10.48 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

| 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:
5. For a device surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 6. Same as Note (5), except the device is surface mounted on 25mm x 25mm with 1oz copper.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

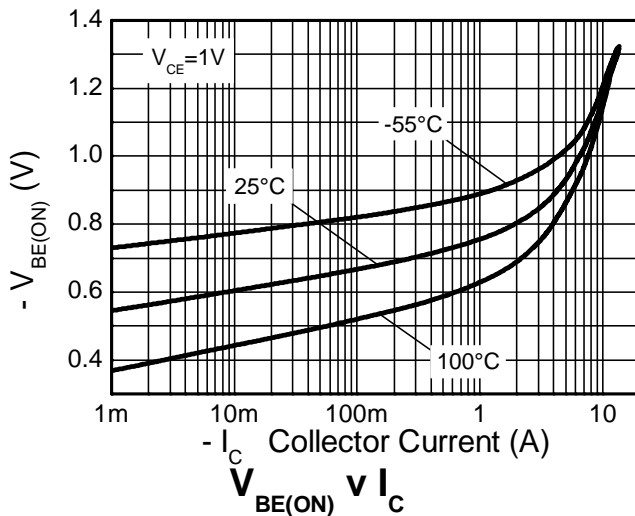
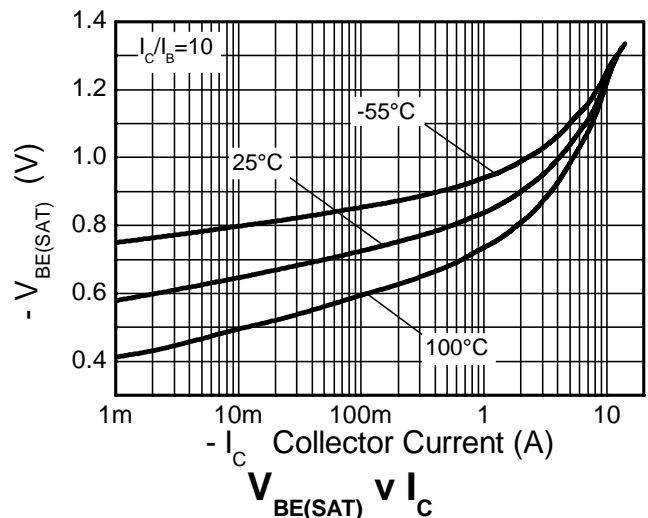
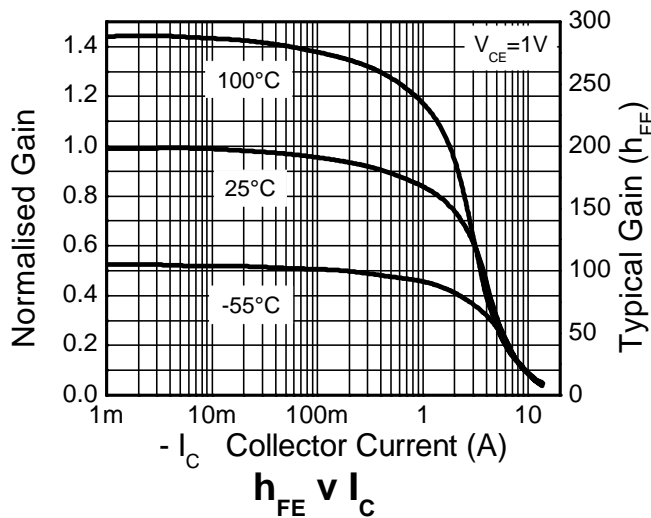
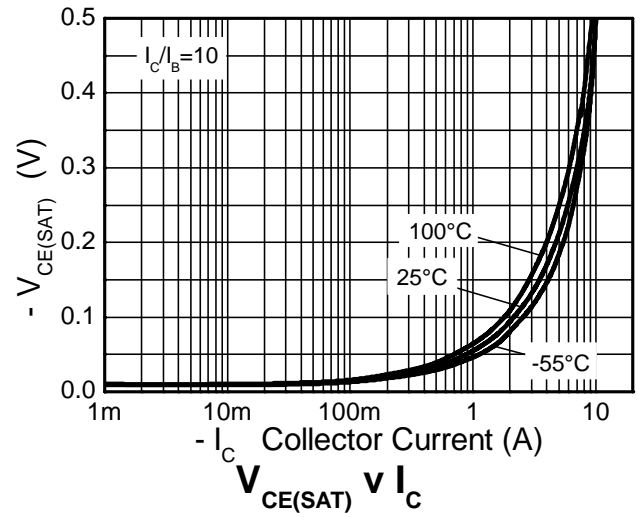
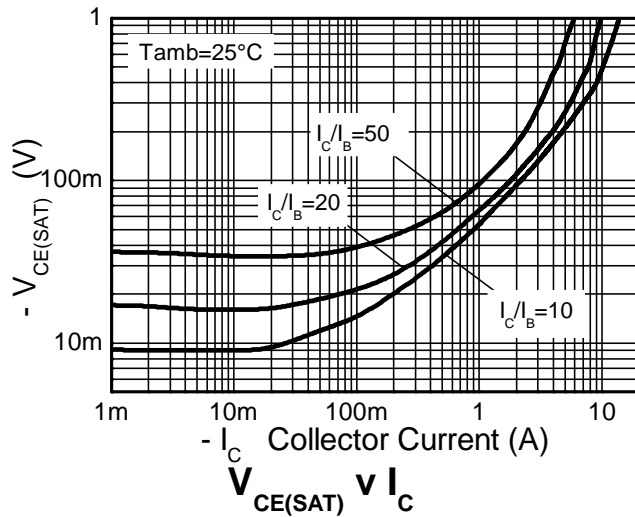


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| 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 | 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-Base Cutoff Current | I_{CBO} | - | <1 | -20 | nA | $V_{CB} = -80\text{V}$ |
| | | | | -0.5 | μA | $V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$ |
| Collector-Emitter Cutoff Current | I_{CER} $R \leq 1\text{k}\Omega$ | - | <1 | -20 | nA | $V_{CB} = -80\text{V}$ |
| | | | | -0.5 | μA | $V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | - | <1 | -10 | nA | $V_{EB} = -6\text{V}$ |
| Static Forward Current Transfer 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) | $V_{CE(sat)}$ | - | -15 | -25 | mV | $I_C = -100\text{mA}$, $I_B = -10\text{mA}$ |
| | | - | -55 | -70 | | $I_C = -1\text{A}$, $I_B = -100\text{mA}$ |
| | | - | -90 | -120 | | $I_C = -2\text{A}$, $I_B = -200\text{mA}$ |
| | | - | -195 | -250 | | $I_C = -5\text{A}$, $I_B = -500\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 9) | $V_{BE(sat)}$ | - | -1,030 | -1,150 | mV | $I_C = -5\text{A}$, $I_B = -500\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 9) | $V_{BE(on)}$ | - | -920 | -1,020 | mV | $I_C = -5\text{A}$, $V_{CE} = -1\text{V}$ |
| Output Capacitance (Note 9) | C_{obo} | - | 48 | - | pF | $V_{CB} = -10\text{V}$, $f = 1\text{MHz}$ |
| Transition Frequency | f_T | - | 120 | - | MHz | $V_{CE} = -10\text{V}$, $I_C = -100\text{mA}$ $f = 50\text{MHz}$ |
| 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 | - | | |

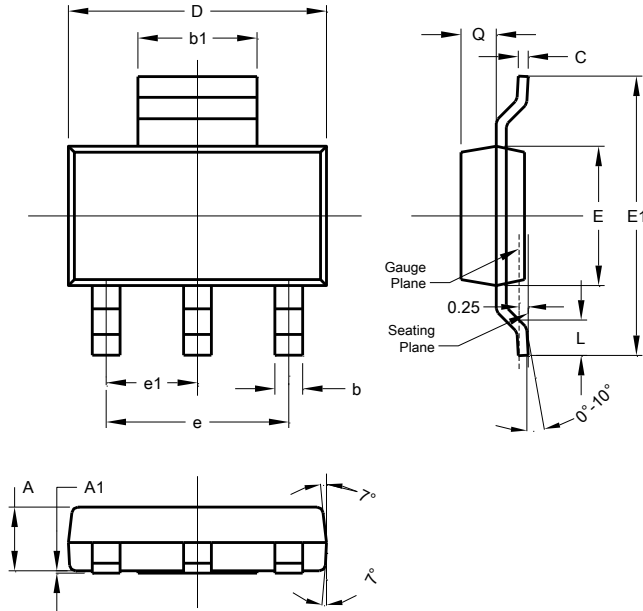
Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

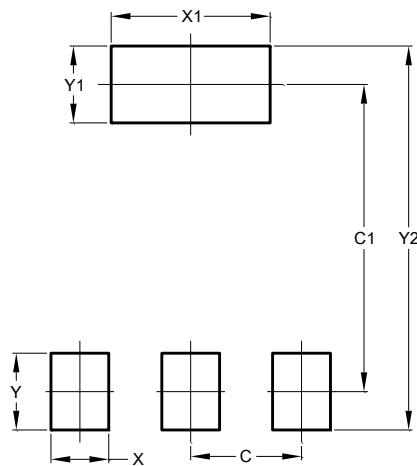
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT223 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b1 | 2.90 | 3.10 | 3.00 |
| b2 | 0.60 | 0.80 | 0.70 |
| C | 0.20 | 0.30 | 0.25 |
| D | 6.45 | 6.55 | 6.50 |
| E | 3.45 | 3.55 | 3.50 |
| E1 | 6.90 | 7.10 | 7.00 |
| e | — | — | 4.60 |
| e1 | — | — | 2.30 |
| L | 0.85 | 1.05 | 0.95 |
| Q | 0.84 | 0.94 | 0.89 |
| 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 | 2.30 |
| C1 | 6.40 |
| X | 1.20 |
| X1 | 3.30 |
| Y | 1.60 |
| Y1 | 1.60 |
| Y2 | 8.00 |

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