

140V PNP MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

Features

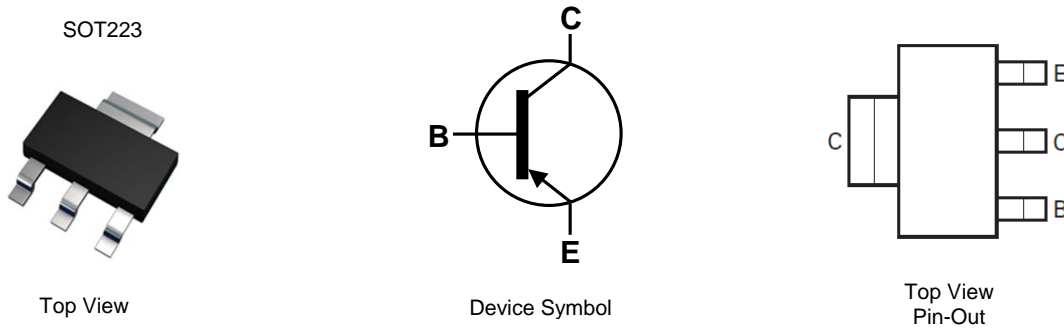
- $BV_{CEO} > -140V$
- $I_C = -4A$ High Continuous Collector Current
- $I_{CM} = -10A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -120mV @ I_C = -1A$
- $R_{SAT} = 92m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified up to -10A for a High Gain Hold-Up
- **Lead-Free Finish; 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)

Application

- Motor Driving
- Line Switching
- High Side Switches
- Subscriber Line Interface Cards (SLIC)

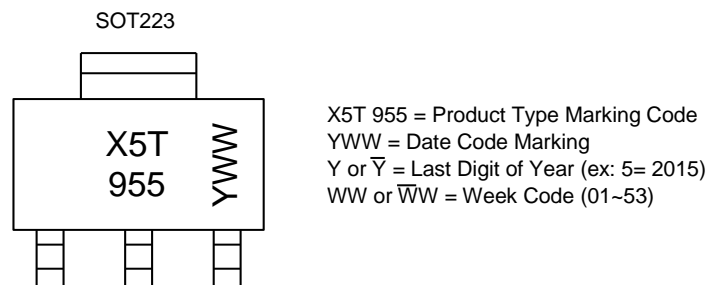


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|---------|--------------------|-----------------|-------------------|
| ZX5T955GTA | X5T955 | 7 | 12 | 1,000 |
| ZX5T955GTC | X5T955 | 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/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 <http://www.diodes.com/products/packages.html>.

Marking Information



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -180 | V |
| Collector-Emitter Voltage | V _{CEO} | -140 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Continuous Collector Current | I _C | -4 | A |
| Peak Pulse Current | I _{CM} | -10 | A |

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

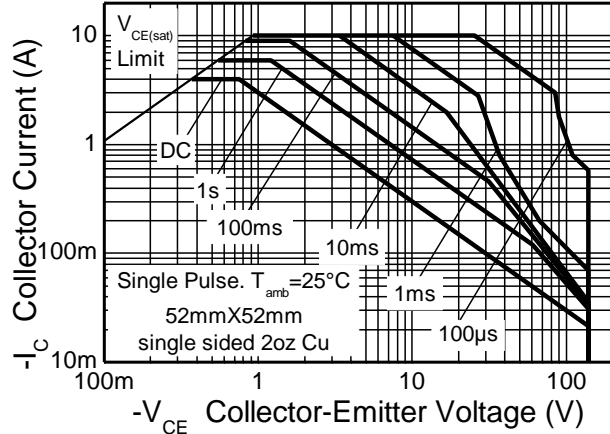
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 10.5 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 10)

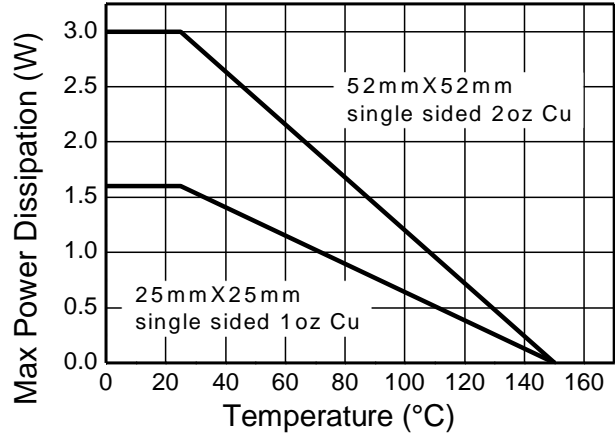
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 8,000 | V | 3B |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
- For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR4 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 25mm x 25mm 1oz copper.
 - Same as Note 5, except the device is mounted on minimum recommended pad layout.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

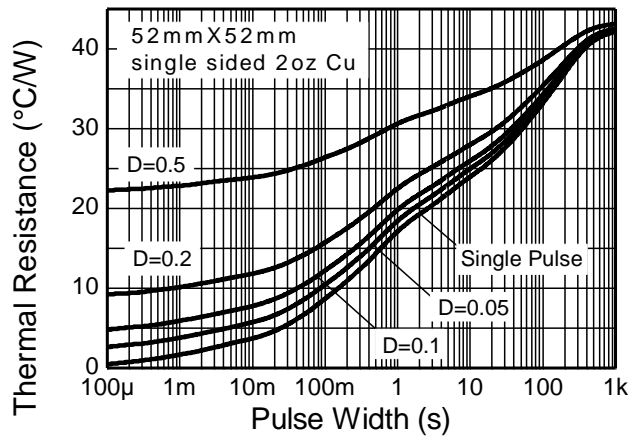
Thermal Characteristics and Derating Information



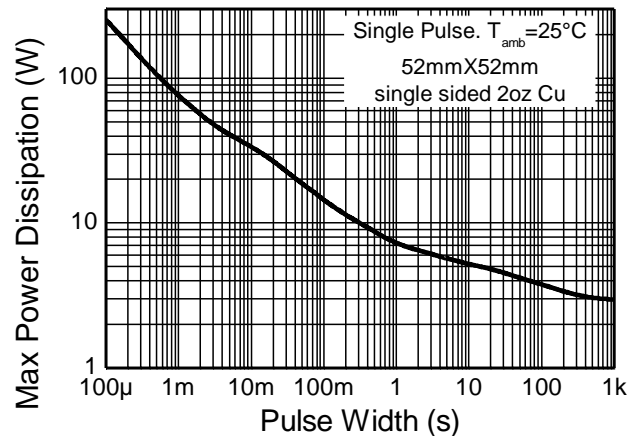
Safe Operating Area



Derating Curve



Transient Thermal Impedance



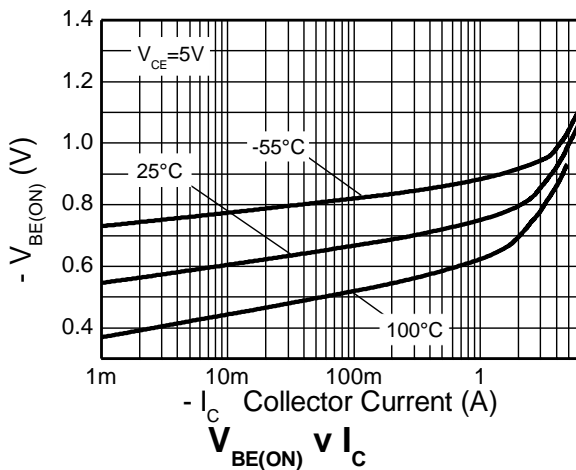
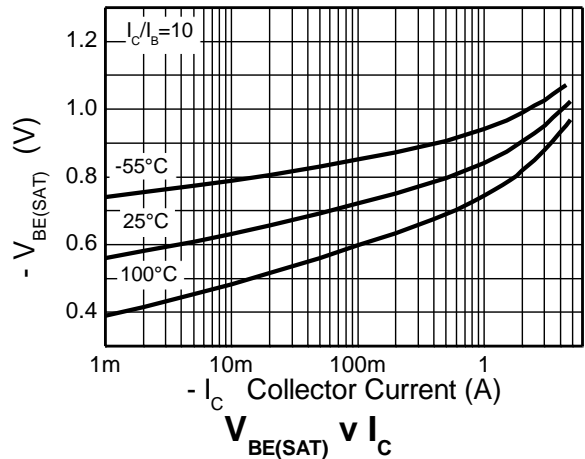
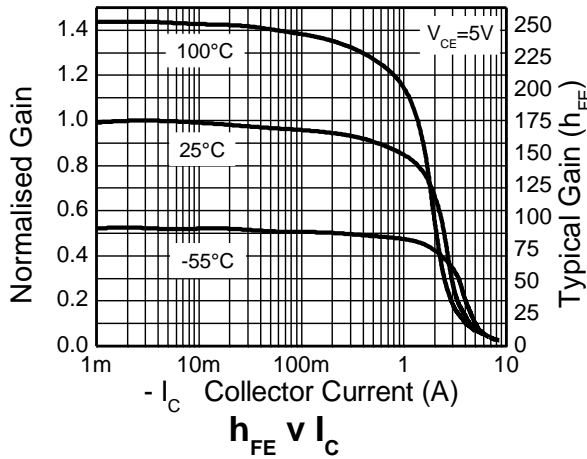
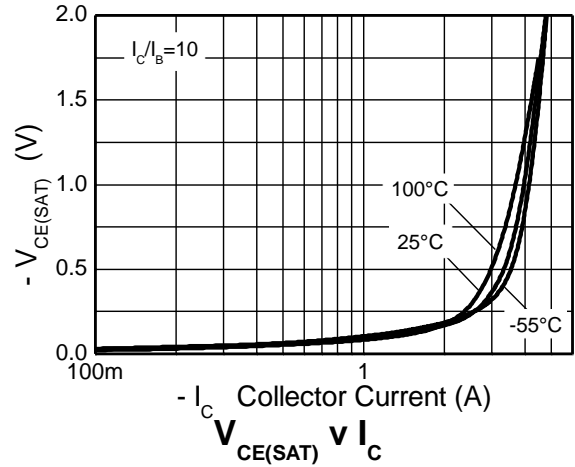
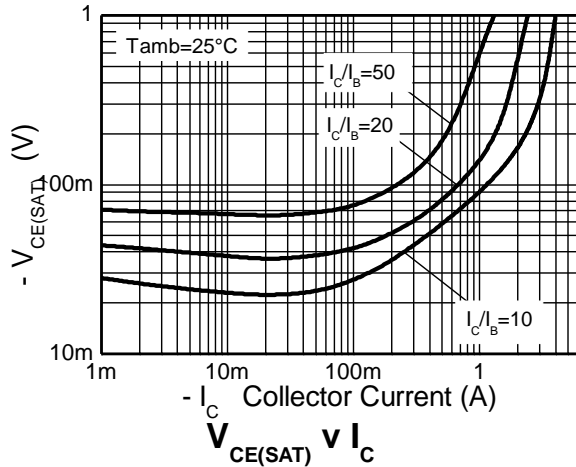
Pulse Power Dissipation

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} | -180 | -200 | - | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 11) | BV_{CER} | -180 | -200 | - | V | $I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$ |
| Collector-Emitter Breakdown Voltage (Note 11) | BV_{CEO} | -140 | -160 | - | V | $I_C = -1\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -7 | -8.3 | - | V | $I_E = -100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | - | < -1 | -20 | nA | $V_{CB} = -150\text{V}$ |
| | | - | - | -500 | nA | $V_{CB} = -150\text{V}$, $T_A = +100^\circ\text{C}$ |
| Collector Cut-Off Current | I_{CER} $R \leq 1\text{k}\Omega$ | - | < -1 | -20 | nA | $V_{CB} = -150\text{V}$ |
| | | - | - | -500 | nA | $V_{CB} = -150\text{V}$, $T_A = +100^\circ\text{C}$ |
| Emitter Cut-Off Current | I_{EBO} | - | < -1 | -10 | nA | $V_{EB} = -6\text{V}$ |
| DC Current Transfer Static Ratio (Note 11) | h_{FE} | 100 | 225 | - | - | $I_C = -10\text{mA}$, $V_{CE} = -5\text{V}$ |
| | | 100 | 200 | 300 | - | $I_C = -1\text{A}$, $V_{CE} = -5\text{V}$ |
| | | 45 | 100 | - | - | $I_C = -3\text{A}$, $V_{CE} = -5\text{V}$ |
| | | - | 5 | - | - | $I_C = -10\text{A}$, $V_{CE} = -5\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 11) | $V_{CE(sat)}$ | - | -40 | -60 | mV | $I_C = -100\text{mA}$, $I_B = -5\text{mA}$ |
| | | - | -55 | -80 | | $I_C = -0.5\text{A}$, $I_B = -50\text{mA}$ |
| | | - | -85 | -120 | | $I_C = -1\text{A}$, $I_B = -100\text{mA}$ |
| | | - | -275 | -360 | | $I_C = -3\text{A}$, $I_B = -300\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 11) | $V_{BE(sat)}$ | - | -940 | -1040 | mV | $I_C = -3\text{A}$, $I_B = -300\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 11) | $V_{BE(on)}$ | - | -830 | -930 | mV | $I_C = -3\text{A}$, $V_{CE} = -5\text{V}$ |
| Transitional Frequency (Note 11) | f_T | - | 120 | - | MHz | $I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$ |
| Output Capacitance | C_{obo} | - | 33 | - | pF | $V_{CB} = -10\text{V}$, $f = 1\text{MHz}$ |
| Switching Time | t_{ON} | - | 42 | - | ns | $V_{CC} = -50\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = -100\text{mA}$ |
| | t_{OFF} | - | 636 | - | | |

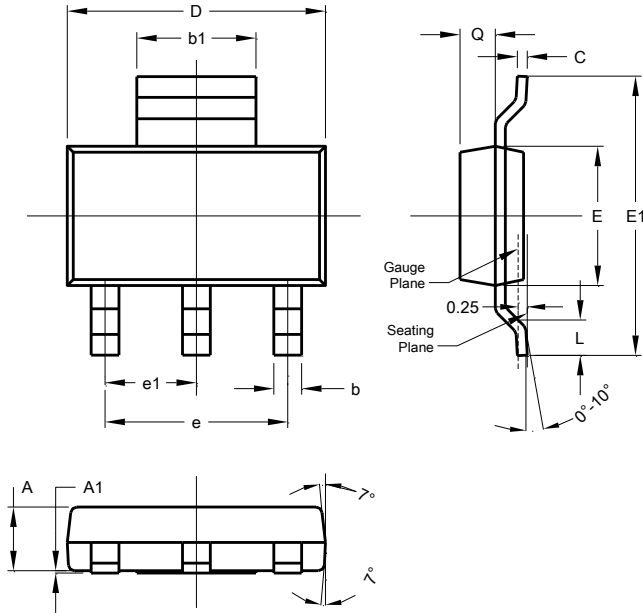
Note: 11. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

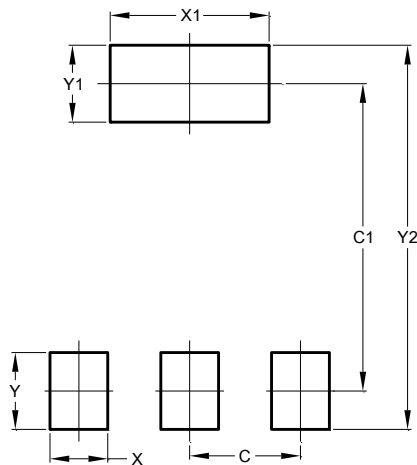
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT223 | | | |
|-----------------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b | 0.60 | 0.80 | 0.70 |
| b1 | 2.90 | 3.10 | 3.00 |
| 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 |

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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