

60V PNP MEDIUM POWER TRANSISTOR IN SOT223

Features

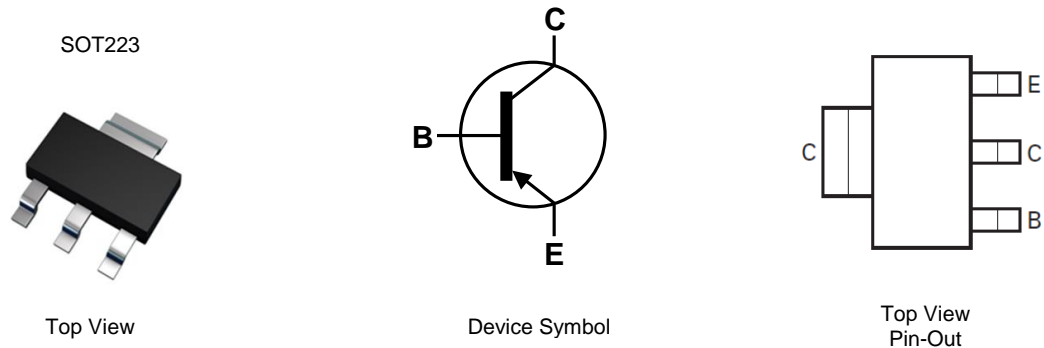
- $BV_{CEO} > -60V$
- $I_C = -1A$ High Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < -600mV @ -1A$
- Complementary NPN Type: FZT491
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 208③
- Weight: 0.112 grams (Approximate)

Applications

- Power MOSFET & IGBT Gate Driving
- Low Loss Power Switching

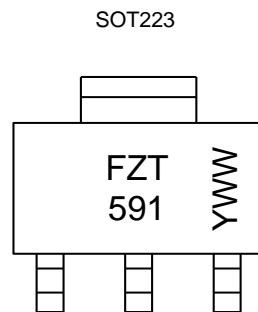


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------|---------|--------------------|-----------------|-------------------|
| FZT591TA | FZT591 | 7 | 12 | 1,000 |

- 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



FZT 591 = 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)

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -80 | V |
| Collector-Emitter Voltage | V _{CEO} | -60 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Continuous Collector Current | I _C | -1 | A |
| Peak Pulse Current | I _{CM} | -2 | A |
| Base Current | I _B | -200 | mA |

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

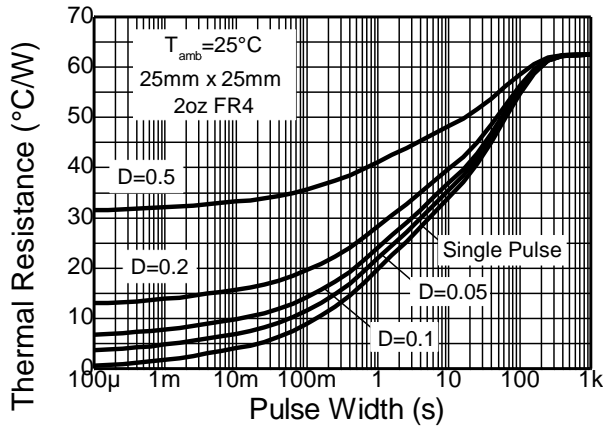
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 19.4 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

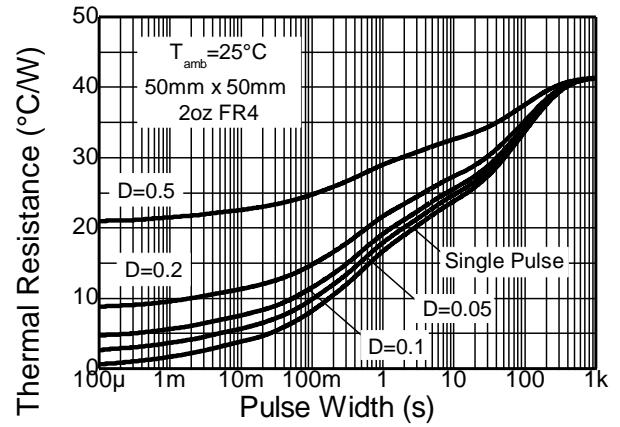
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 8,000 | V | 3B |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
- For a device mounted with the collector lead on 50mm x 50mm 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.

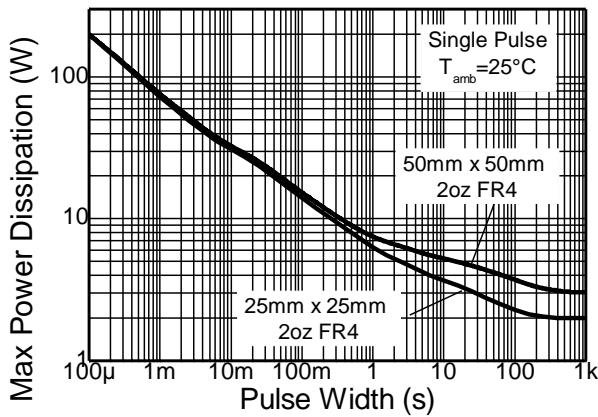
Thermal Characteristics and Derating Information



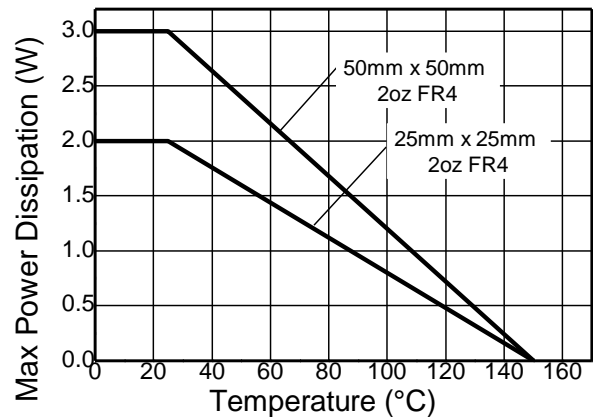
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



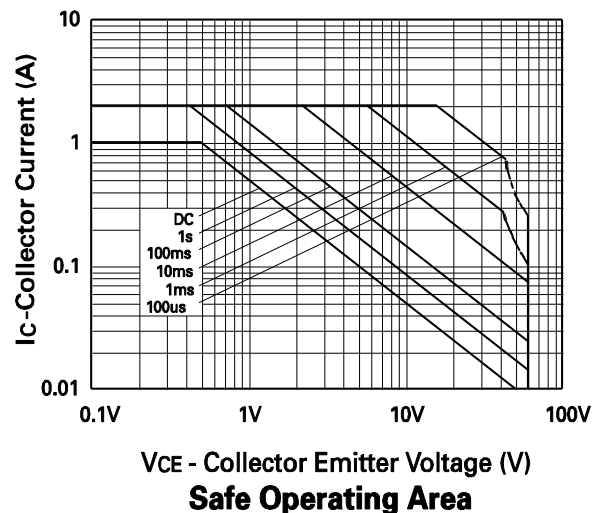
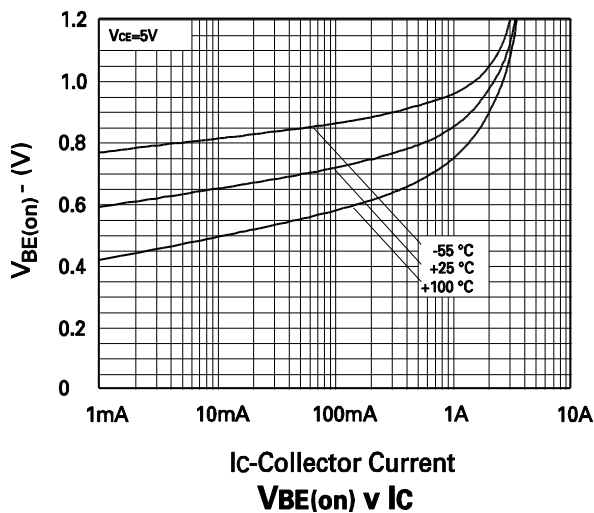
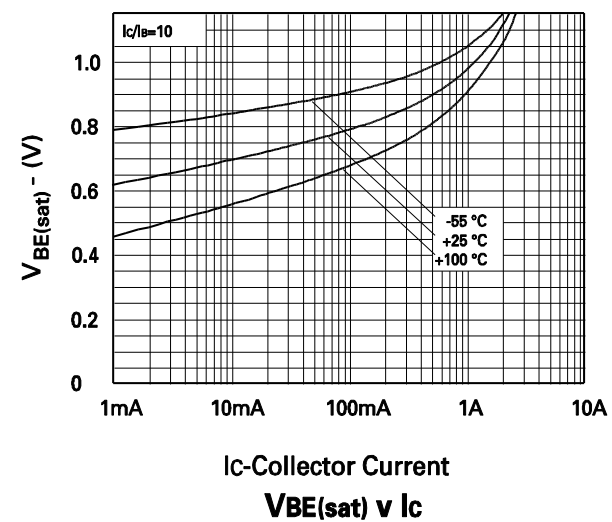
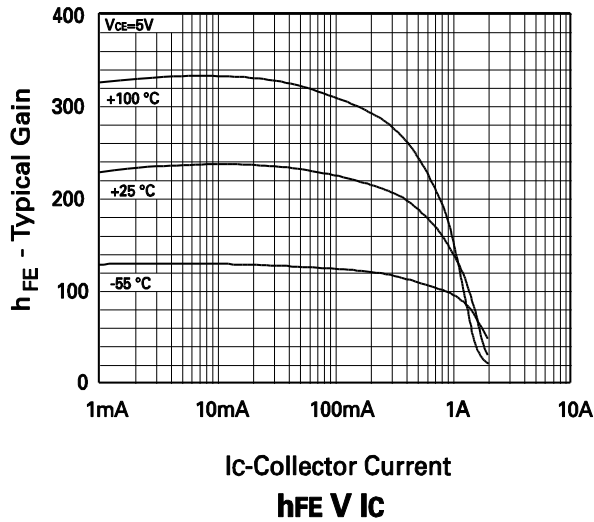
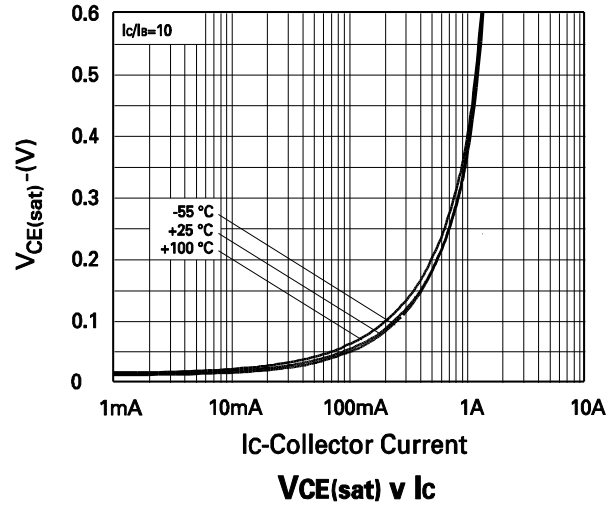
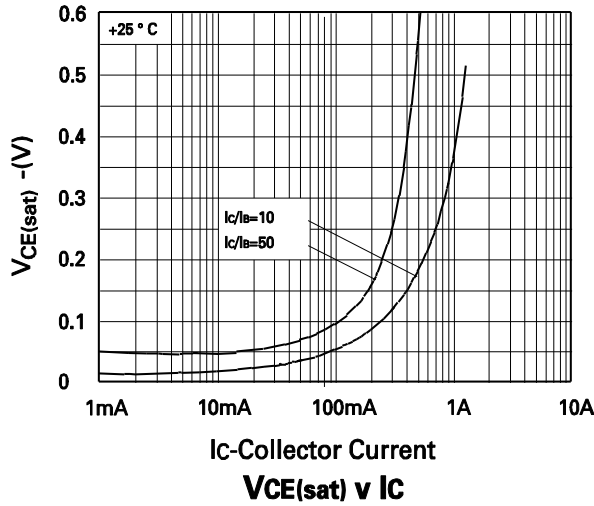
Derating Curve

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} | -80 | – | – | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 11) | BV_{CEO} | -60 | – | – | V | $I_C = -10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -7 | 8.1 | – | V | $I_E = -100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | – | <1 | -100 | nA | $V_{CB} = -60\text{V}$ |
| Collector Cut-Off Current | I_{CES} | – | <1 | -100 | nA | $V_{CES} = -60\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | – | <1 | -100 | nA | $V_{EB} = -5.6\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 11) | $V_{CE(sat)}$ | – | -175 -350 | -300 -600 | mV | $I_C = -500\text{mA}, I_B = -50\text{mA}$ $I_C = -1\text{A}, I_B = -100\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 11) | $V_{BE(sat)}$ | – | 965 | -1200 | mV | $I_C = -1\text{A}, I_B = -100\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 11) | $V_{BE(on)}$ | – | 830 | -1000 | mV | $I_C = -1\text{A}, V_{CE} = -5\text{V}$ |
| DC Current Transfer Static Ratio (Note 11) | h_{FE} | 100 100 80 15 | 220 175 155 40 | – 300 – – | – | $I_C = -1\text{mA}, V_{CE} = -5\text{V}$ $I_C = -500\text{mA}, V_{CE} = -5\text{V}$ $I_C = -1\text{A}, V_{CE} = -5\text{V}$ $I_C = -2\text{A}, V_{CE} = -5\text{V}$ |
| Transitional Frequency | f_T | 150 | – | – | MHz | $V_{CE} = -10\text{V}, I_C = -50\text{mA}$ $f = 100\text{MHz}$ |
| Output Capacitance | C_{obo} | – | – | 10 | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}$ |

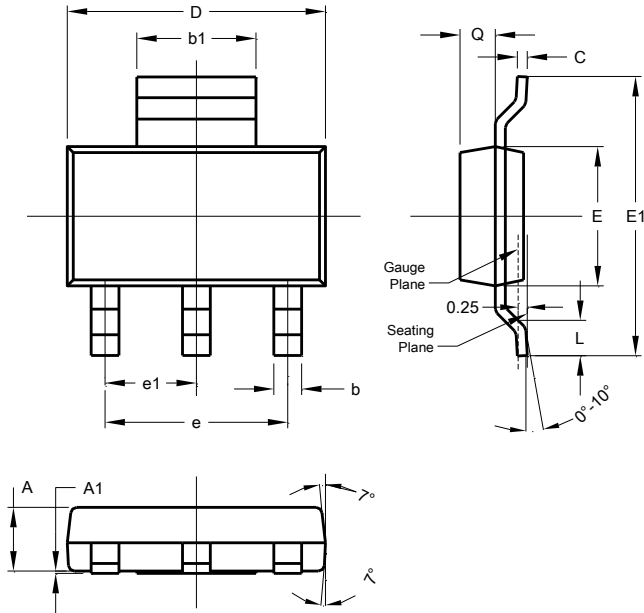
Note: 11. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

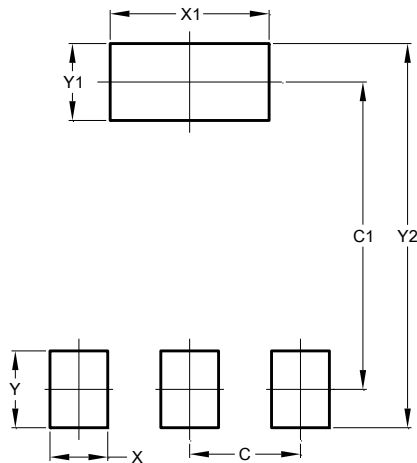
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 |

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