



**THE DATASHEET OF
FZT589TA**



30V PNP MEDIUM POWER TRANSISTOR IN SOT223

Features

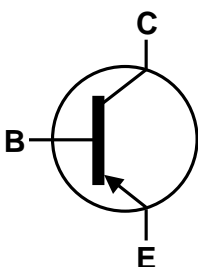
- $BV_{CEO} > -30V$
- $I_C = -1A$ High Continuous Current
- Excellent h_{FE} Characteristics up to -2A
- Low Saturation Voltage $V_{CE(sat)} < -0.35V @ -1A$
- Complementary NPN Type: FZT489
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

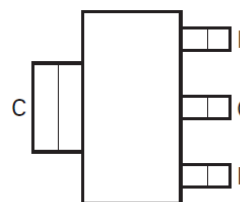
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208⁽³⁾
- Weight: 0.112 grams (Approximate)



Top View



Device Symbol



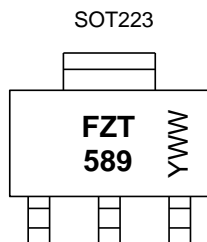
Top View
Pin-Out

Ordering Information (Note 4)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------|------------|---------|--------------------|-----------------|-------------------|
| FZT589TA | AEC-Q101 | FZT589 | 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 589 = 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 _{CB0} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -30 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Continuous Collector Current | I _C | -1 | A |
| Peak Pulse Current | I _{CM} | -2 | A |

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

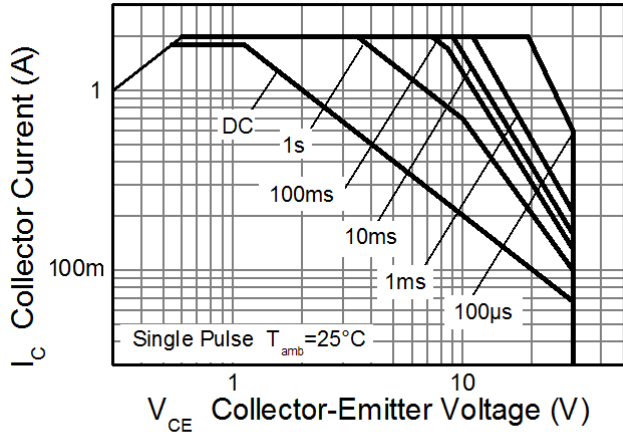
| Characteristic | Symbol | Value | Unit | |
|--|-----------------------------------|-------------|------|------|
| Power Dissipation | P _D | (Note 5) | 2 | W |
| | | (Note 6) | 3 | W |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 62.5 | °C/W |
| | | (Note 6) | 41.7 | °C/W |
| Thermal Resistance, Junction to Leads (Note 7) | R _{θJL} | 19.4 | °C/W | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C | |

ESD Ratings (Note 8)

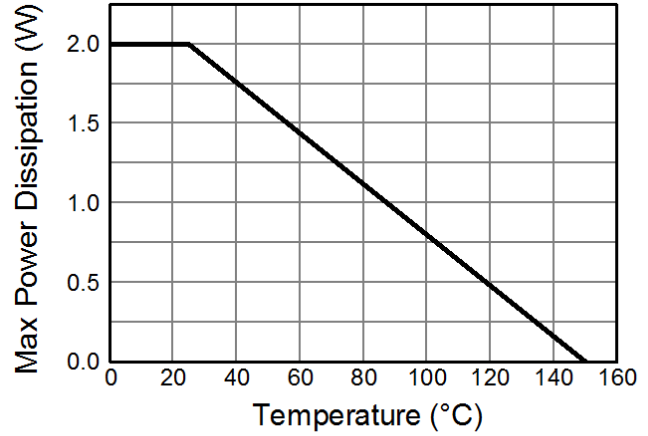
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
5. For a device mounted with the collector lead on 25mm x 25mm 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.
 6. Same as Note 5, except the device is mounted on 50mm x 50mm single sided 2oz weight 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.

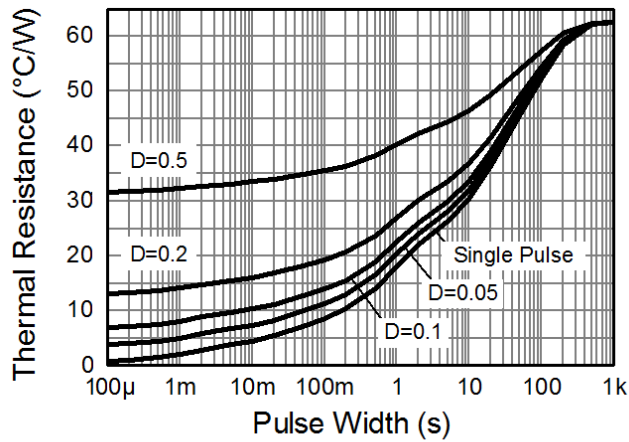
Thermal Characteristics and Derating Information



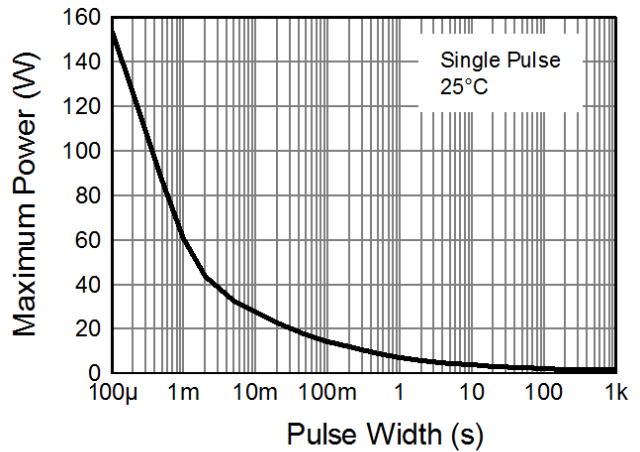
Safe Operating Area



Derating Curve



Transient Thermal Impedance



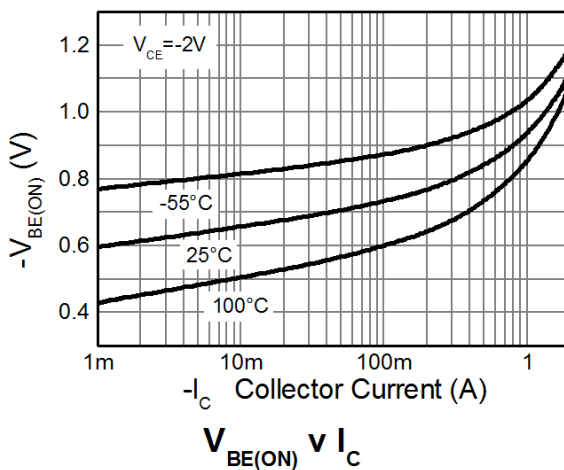
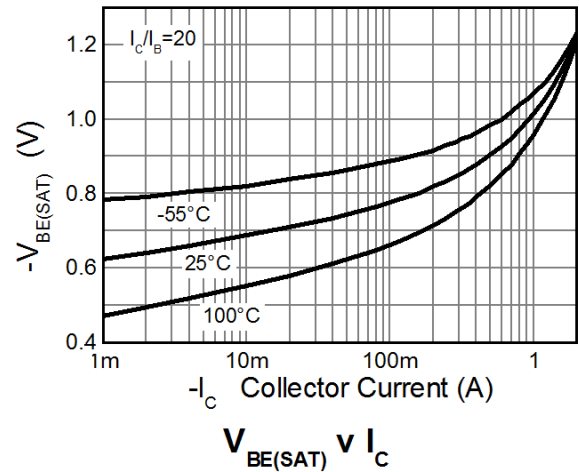
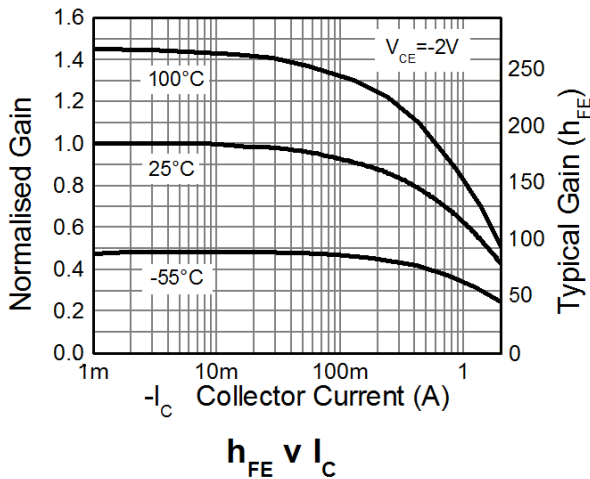
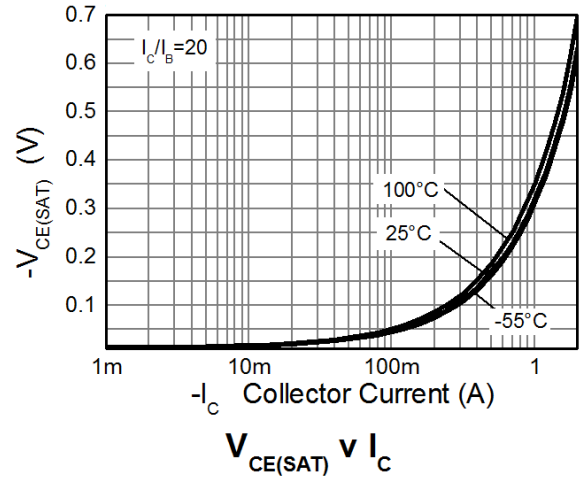
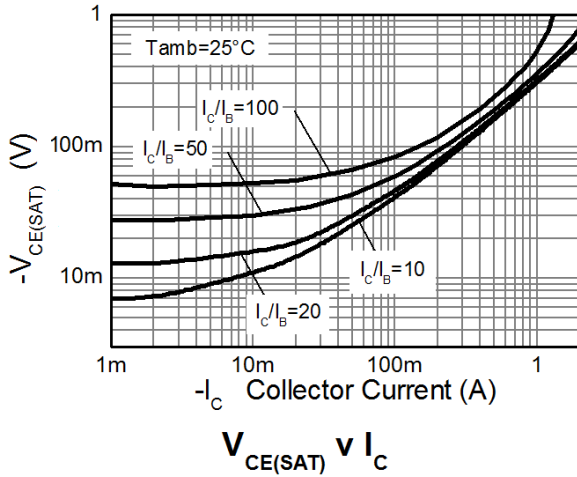
Pulse Power Dissipation

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|------------------------|------------------|--------------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -50 | – | – | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | -30 | – | – | V | I _C = -1mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7 | – | – | V | I _E = -100μA |
| Collector Cut-Off Current | I _{CBO} | – | – | -100 | nA | V _{CB} = -30V |
| Collector Emitter Cut-Off Current | I _{CES} | – | – | -100 | nA | V _{CES} = -30V |
| Emitter Cut-Off Current | I _{EBO} | – | – | -100 | nA | V _{EB} = -4V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | – | – | -0.35 -0.65 | V | I _C = -1A, I _B = -100mA I _C = -2A, I _B = -200mA |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(sat)} | – | – | -1.2 | V | I _C = -1A, I _B = -100mA |
| Base-Emitter Turn-On Voltage (Note 9) | V _{BE(on)} | – | – | -1.1 | V | I _C = -1A, V _{CE} = -2V |
| DC Current Transfer Static Ratio (Note 9) | h _{FE} | 100 100 80 40 | – – – – | – 300 – – | – | I _C = -1mA, V _{CE} = -2V I _C = -500mA, V _{CE} = -2V I _C = -1A, V _{CE} = -2V I _C = -2A, V _{CE} = -2V |
| Transitional Frequency (Note 9) | f _T | 100 | – | – | MHz | V _{CE} = -5V, I _C = -100mA f = 100MHz |
| Output Capacitance (Note 9) | C _{obo} | – | – | 15 | pF | V _{CB} = -10V, f = 1MHz |
| Switching Times | t _{on} | – | 50 | – | ns | I _C = -500mA, V _{CC} = -10V I _{B1} = I _{B2} = -50mA |
| | t _{off} | – | 300 | – | | |

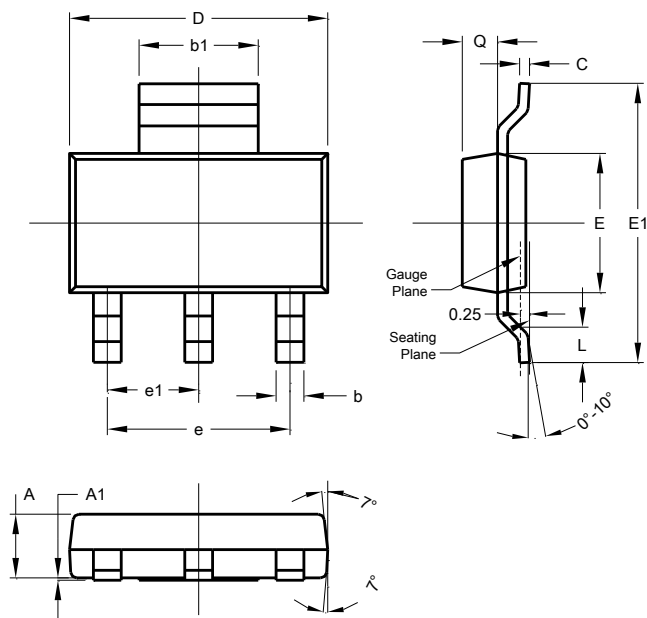
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

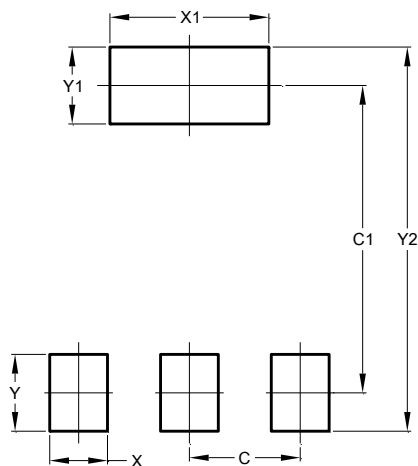
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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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