

Features

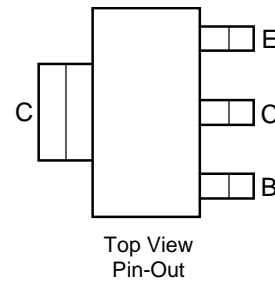
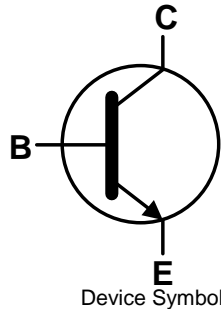
- $BV_{CEO} > 12V$
- $BV_{CBO} > 12V$
- $I_C = 4A$ High Continuous Current
- $hFE > 400 @ 3A$ and Low Saturation Voltage
- Extremely Low Equivalent On-Resistance; $RCE_{(SAT)} 83m\Omega @ 3A$
- Complementary PNP Type: FZT788B
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony 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

- Flash Gun Convertors
- Battery Powered Circuits

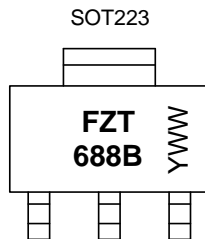


Ordering Information (Note 4)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-----------|------------|---------|--------------------|-----------------|-------------------|
| FZT688BTA | AEC-Q101 | FZT688B | 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 688B = 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} | 12 | V |
| Collector-Emitter Voltage | V _{CEO} | 12 | 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.)

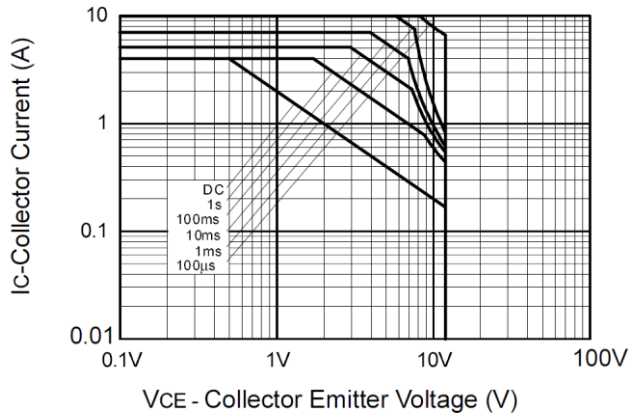
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 12.9 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 10)

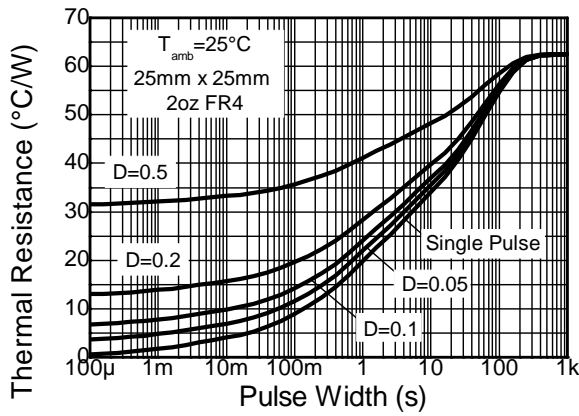
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- 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.

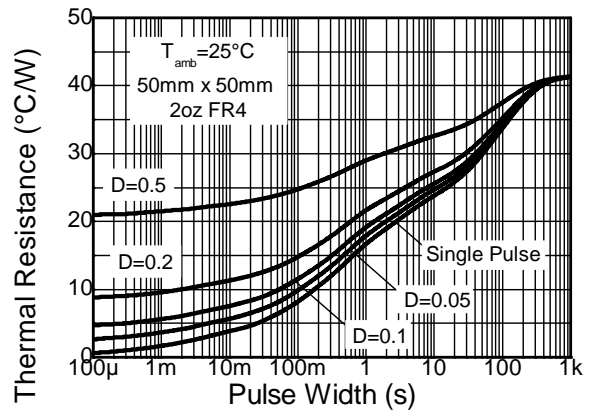
Thermal Characteristics and Derating Information



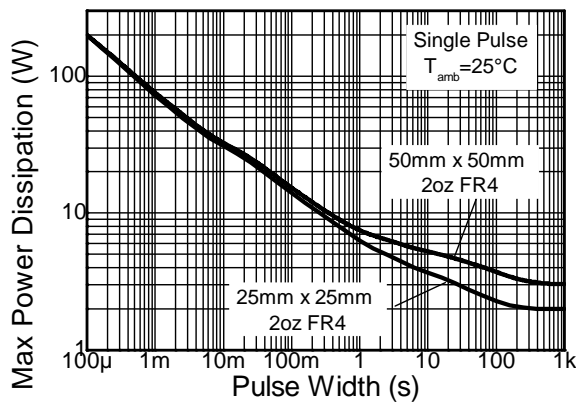
Safe Operating Area



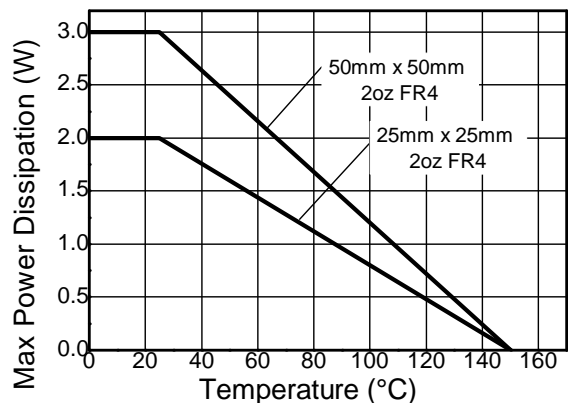
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



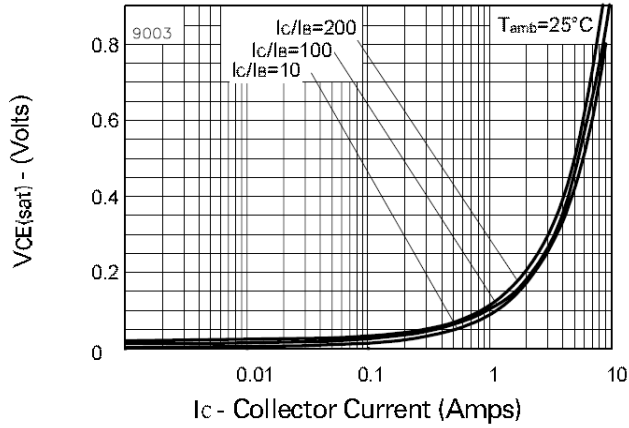
Derating Curve

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

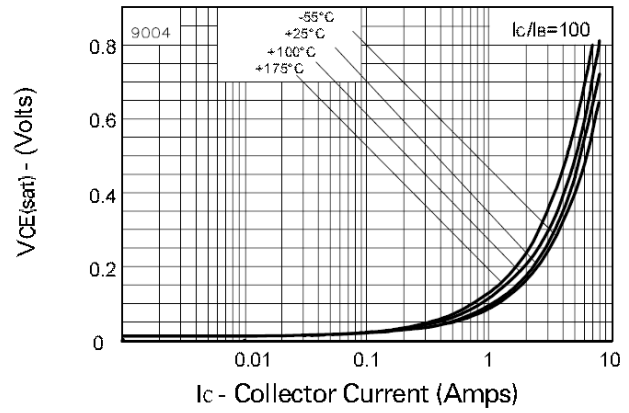
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----------------------|-----------------------|-------------------------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CB0} | 12 | — | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | 12 | — | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | — | — | V | I _E = 100μA |
| Collector-Base Cut-Off Current | I _{CBO} | — | — | 50 | nA | V _{CB} = 10V |
| Collector-Emitter Cut-Off Current | I _{CES} | — | — | 50 | nA | V _{CE} = 10V |
| Emitter Cut-Off Current | I _{EBO} | — | — | 50 | nA | V _{EB} = 6V |
| DC Current Gain (Note 9) | h _{FE} | 500 400 100 | — — — | — — — | — | I _C = 0.1A, V _{CE} = 2V I _C = 3A, V _{CE} = 2V I _C = 10A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(sat)} | — — — — — | — — — — — | 40 60 180 350 400 | mV | I _C = 0.1A, I _B = 1mA I _C = 0.1A, I _B = 0.5mA I _C = 1A, I _B = 50mA I _C = 3A, I _B = 20mA I _C = 4A, I _B = 50mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(sat)} | — | — | 1.1 | V | I _C = 3A, I _B = 20mA |
| Base-Emitter Turn-On Voltage (Note 11) | V _{BE(on)} | — | — | 1 | V | I _C = 3A, V _{CE} = 2V |
| Input Capacitance | C _{ibo} | — | 200 | — | pF | V _{EB} = 0.5V, f = 1MHz |
| Output Capacitance | C _{obo} | — | 40 | — | pF | V _{CB} = 10V, f = 1MHz |
| Current Gain-Bandwidth Product | f _T | 150 | — | — | MHz | V _{CE} = 5V, I _C = 50mA, f=50MHz |
| Turn-On Time | t _{on} | — | 40 | — | ns | V _{CC} = 10V, I _C = 500mA |
| Turn-Off Time | t _{off} | — | 500 | — | ns | I _{B1} = -I _{B2} = 50mA |

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

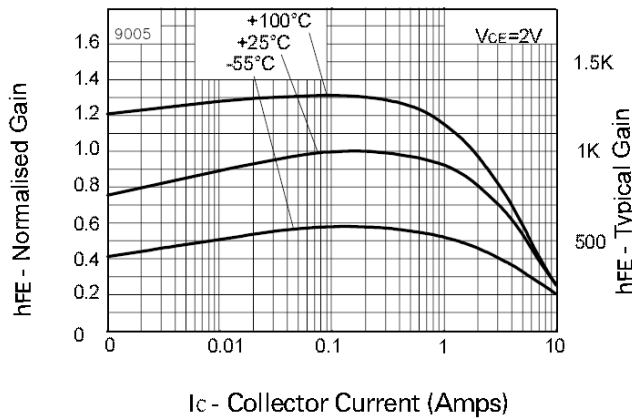
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



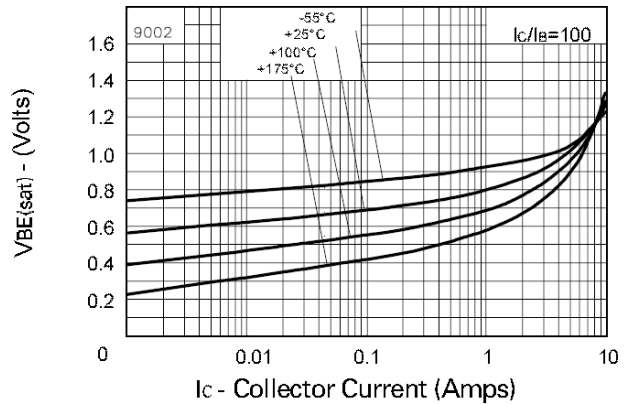
$V_{CE(sat)}$ v I_C



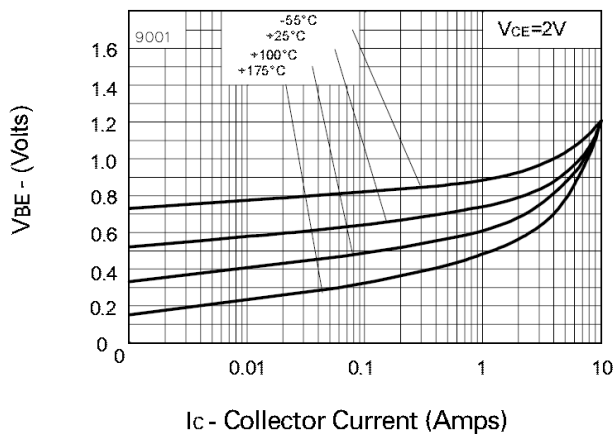
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



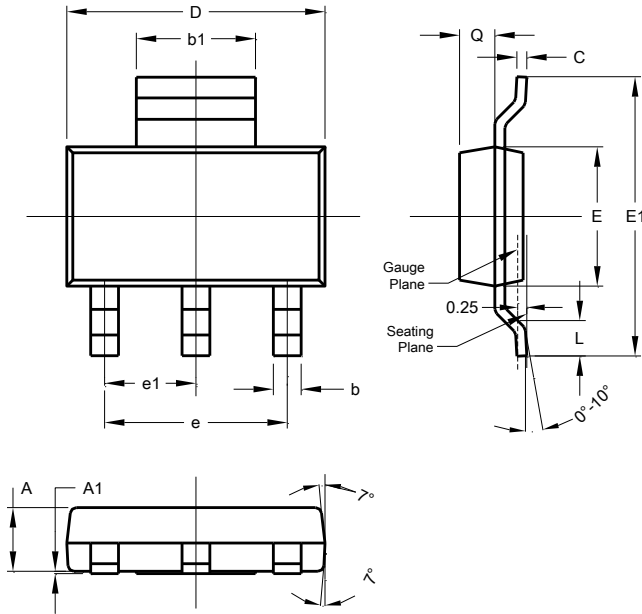
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

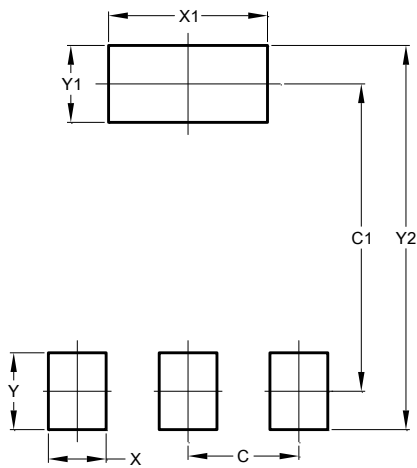
Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.



| 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/_files/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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