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400V NPN HIGH VOLTAGE TRANSISTOR IN SOT223

Features

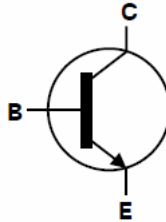
- $BV_{CEO} > 400V$
- $I_C = 500mA$ High Continuous Current
- $I_{CM} = 1A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)} < 250mV @ 50mA$
- $h_{FE} > 40$ Specified up to 200mA for High Current Gain Hold-Up
- Complementary PNP Type: FZT758
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

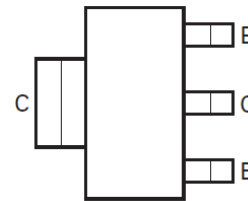
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.112 grams (Approximate)



Top View



Device Symbol



Top View
Pin-Out

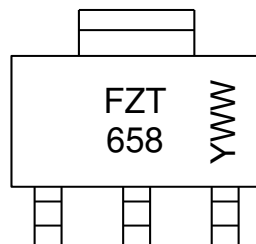
Ordering Information (Note 4)

| Product | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|----------|---------|--------------------|-----------------|-------------------|
| FZT658TA | FZT658 | 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

SOT223



FZT 658 = 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} | 400 | V |
| Collector-Emitter Voltage | V _{CEO} | 400 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 0.5 | A |
| Peak Pulse Current | I _{CM} | 1 | A |

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

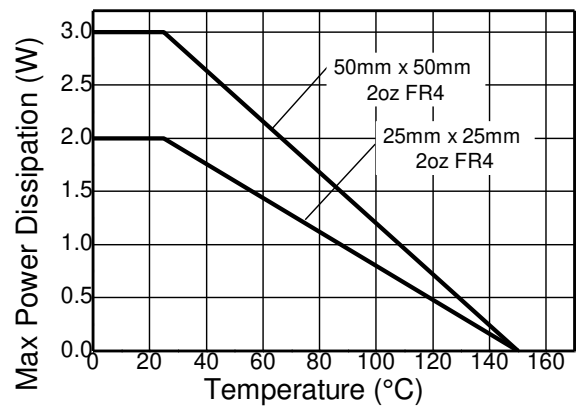
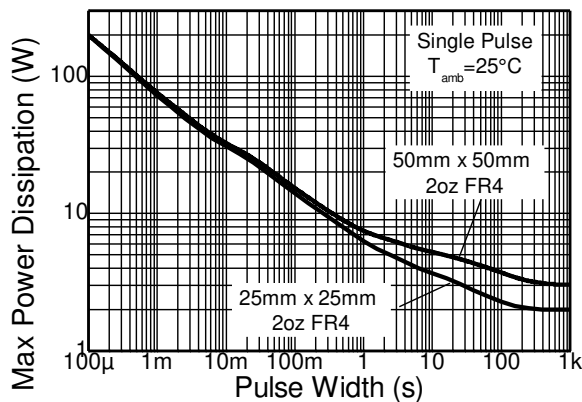
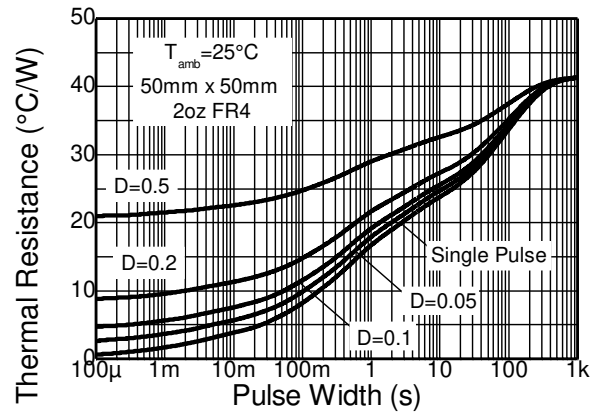
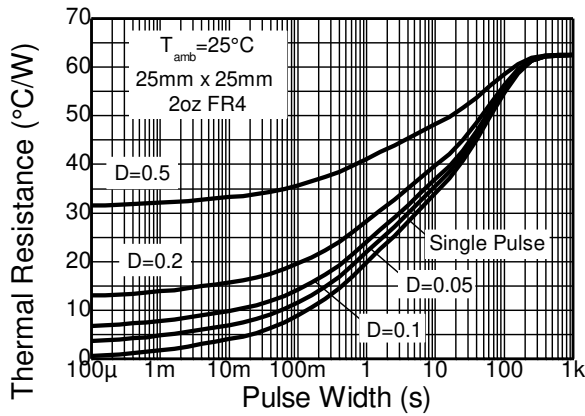
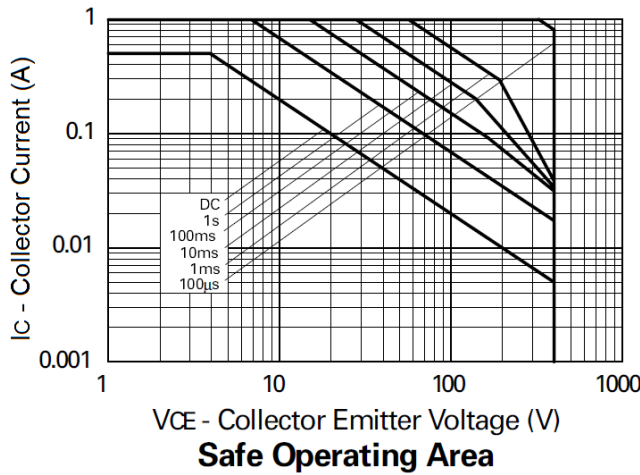
| Characteristic | Symbol | Value | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | 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:
5. 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.
 6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 7. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
 8. Same as Note 5, except the device is mounted on minimum recommended pad layout.
 9. Thermal resistance from junction to solder-point (at the end of the collector lead).
 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

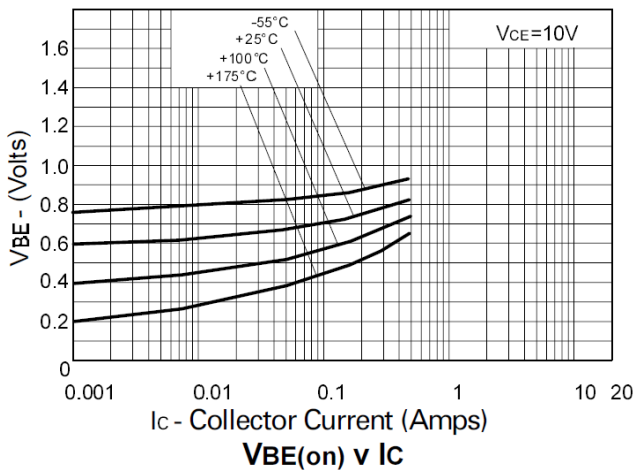
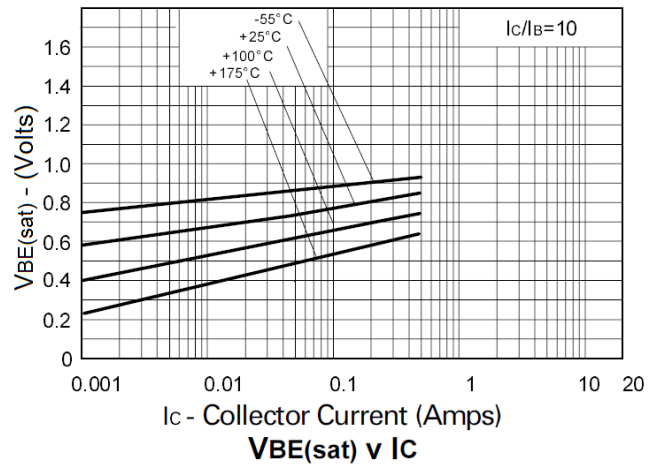
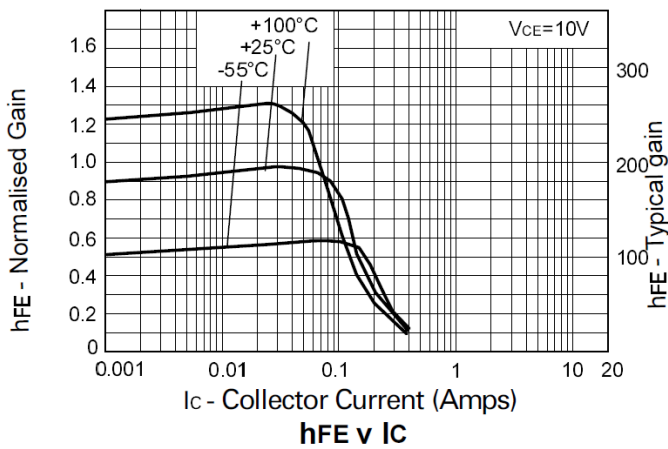
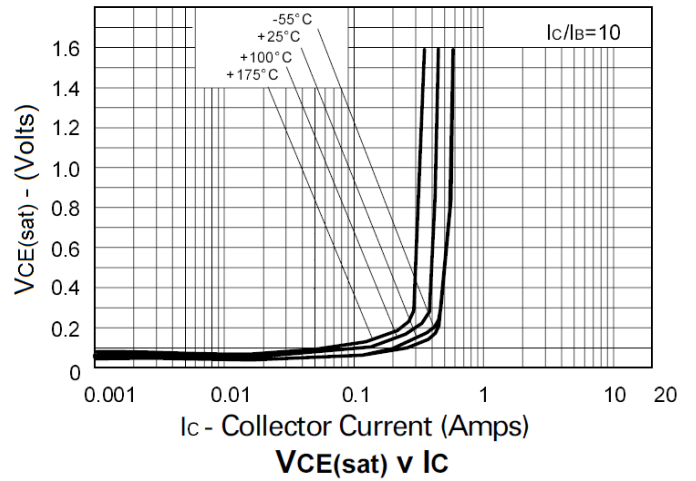
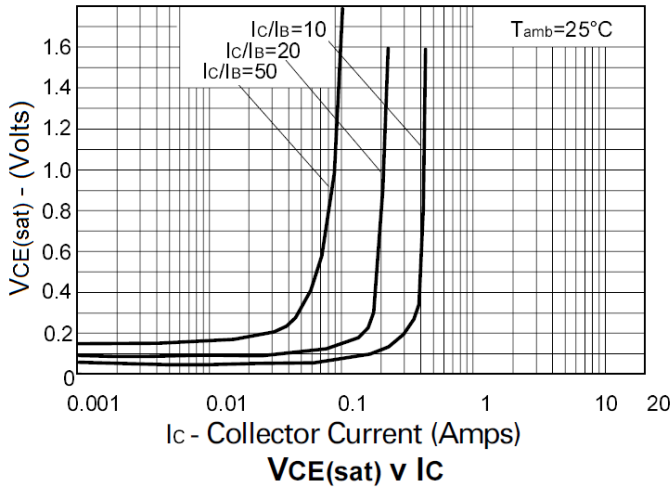


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-----------------------------------------------|----------------------|-----|-------|------|------|---------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV _{CBO} | 400 | – | – | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 400 | – | – | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | – | – | V | I _E = 100μA |
| Collector Cut-Off Current | I _{CBO} | – | – | 100 | nA | V _{CB} = 320V |
| Emitter Cut-Off Current | I _{EBO} | – | – | 100 | nA | V _{EB} = 6V |
| Collector-Emitter Saturation Voltage (Note 9) | V _{CE(sat)} | – | – | 0.30 | V | I _C = 20mA, I _B = 1mA |
| | | | | 0.25 | | I _C = 50mA, I _B = 5mA |
| | | | | 0.50 | | I _C = 100mA, I _B = 10mA |
| Base-Emitter Saturation Voltage (Note 9) | V _{BE(sat)} | – | – | 0.9 | V | I _C = 100mA, I _B = 10mA |
| Base-Emitter Turn-On Voltage (Note 9) | V _{BE(on)} | – | – | 1.0 | V | I _C = 100mA, V _{CE} = 5V |
| DC Current Gain (Note 9) | h _{FE} | – | – | – | – | I _C = 1mA, V _{CE} = 5V |
| | | | | | | I _C = 100mA, V _{CE} = 5V |
| | | | | | | I _C = 200mA, V _{CE} = 10V |
| Current Gain-Bandwidth Product (Note 9) | f _T | 50 | – | – | MHz | V _{CE} = 20V, I _C = 10mA, f = 20MHz |
| Output Capacitance (Note 9) | C _{obo} | – | 10 | – | pF | V _{CB} = 20V, f = 1MHz |
| Switching Times | t _{on} | – | 130 | – | ns | I _C = 100mA, V _{CC} = 100V I _{B1} = 10mA, I _{B2} = -20mA |
| | t _{off} | – | 3,300 | – | | |

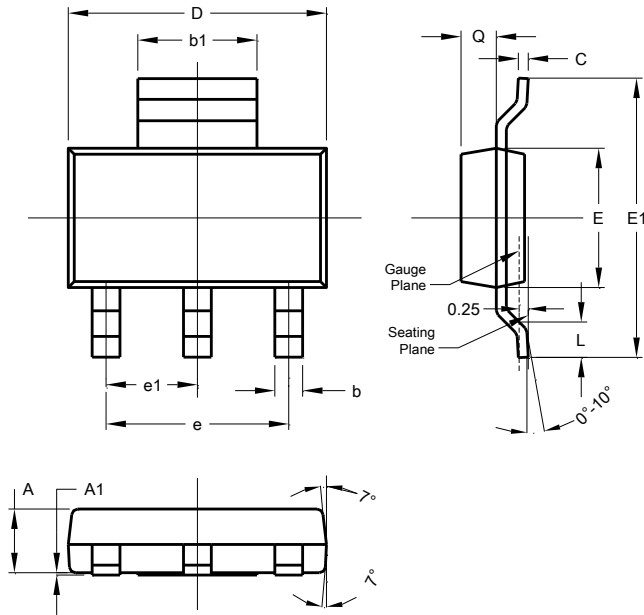
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

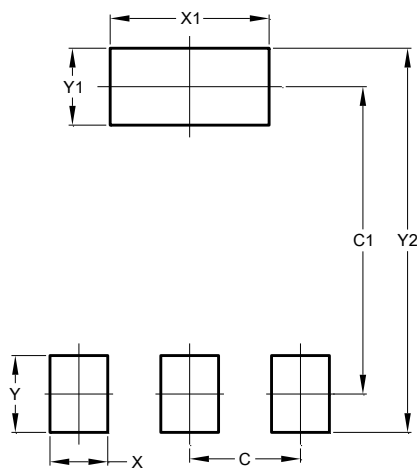
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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