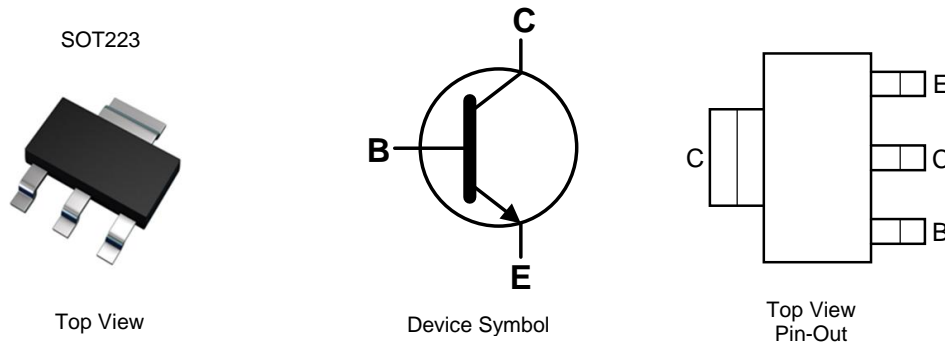


Features

- $BV_{CEO} > 100V$
- $I_C = 2A$ High Continuous Current
- $I_{CM} = 6A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)} < 300mV @ 1A$
- Complementary PNP Type: FZT753
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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)

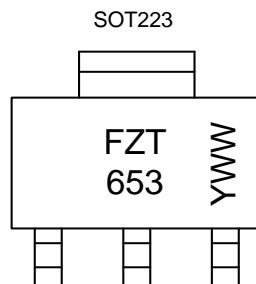


Ordering Information (Note 5)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Peel |
|-----------|------------|---------|--------------------|-----------------|-------------------|
| FZT653QTA | Automotive | FZT653 | 7 | 12 | 1,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



FZT 653 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 8 = 2018)
 WW or $\bar{W}W$ = Week Code (01 to 53)

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 120 | V |
| Collector-Emitter Voltage | V _{CEO} | 100 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 2 | A |
| Peak Pulse Current | I _{CM} | 6 | A |

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

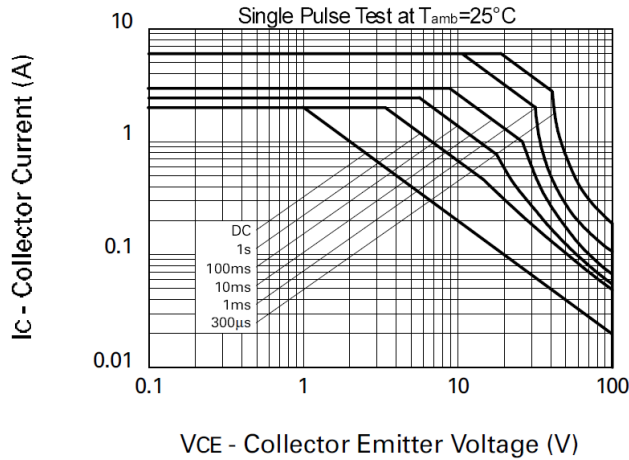
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 6) | 3 |
| | | (Note 7) | 2 |
| | | (Note 8) | 1.6 |
| | | (Note 9) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 6) | 41.7 |
| | | (Note 7) | 62.5 |
| | | (Note 8) | 78.1 |
| | | (Note 9) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 12.9 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 11)

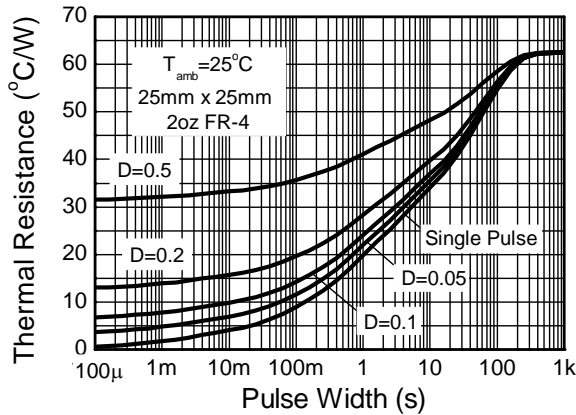
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
6. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.
 8. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
 9. Same as Note 6, except the device is mounted on minimum recommended pad layout.
 10. Thermal resistance from junction to solder-point (at the end of the collector lead).
 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

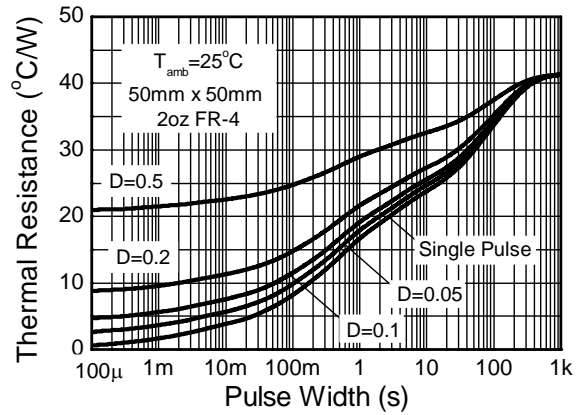
Thermal Characteristics and Derating Information



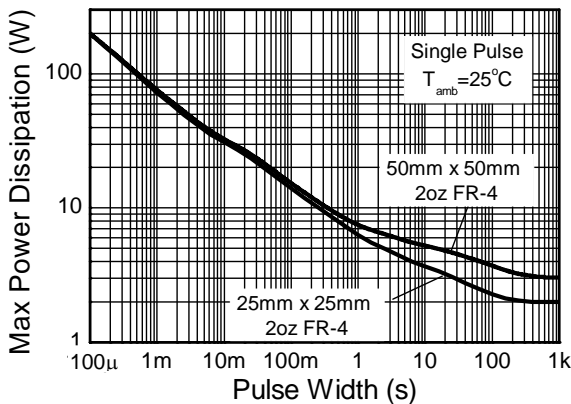
Safe Operating Area



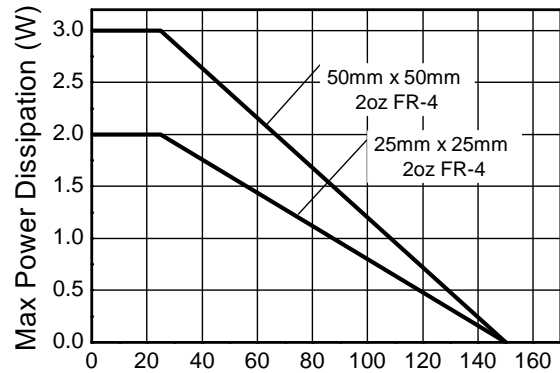
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



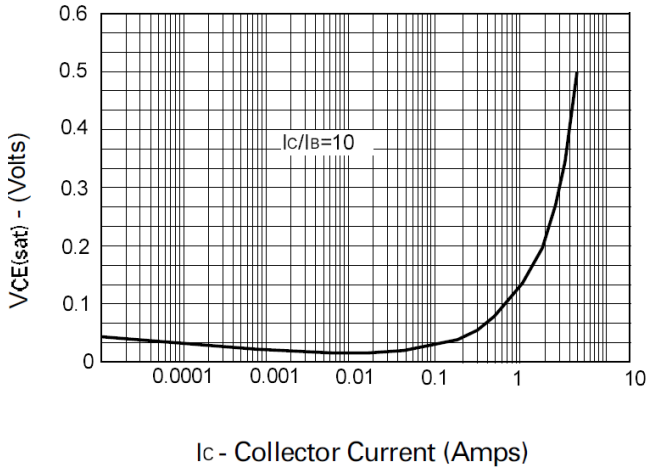
Derating Curve

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

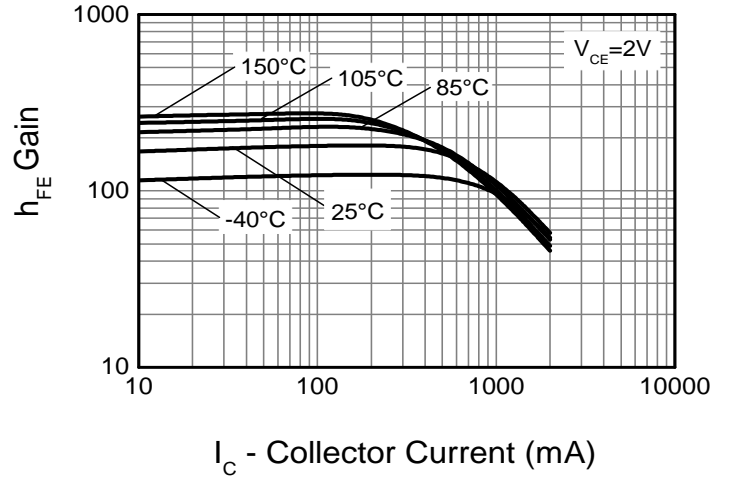
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------|-----|------|------|---------------|---|
| Collector-Base Breakdown Voltage | BV_{CBO} | 120 | – | – | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 12) | BV_{CEO} | 100 | – | – | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | – | – | V | $I_E = 100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | – | < 1 | 100 | nA | $V_{CB} = 100\text{V}$ |
| | | – | – | 10 | μA | $V_{CB} = 100\text{V}, T_A = +125^\circ\text{C}$ |
| Emitter Cut-Off Current | I_{EBO} | – | < 1 | 100 | nA | $V_{EB} = 5.6\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 12) | $V_{CE(SAT)}$ | – | 0.13 | 0.3 | V | $I_C = 1\text{A}, I_B = 100\text{mA}$ |
| | | – | 0.23 | 0.5 | | $I_C = 2\text{A}, I_B = 200\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 12) | $V_{BE(SAT)}$ | – | 0.9 | 1.25 | V | $I_C = 1\text{A}, I_B = 100\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 12) | $V_{BE(ON)}$ | – | 0.8 | 1.0 | V | $I_C = 1\text{A}, V_{CE} = 2\text{V}$ |
| DC Current Gain (Note 12) | h_{FE} | 70 | 200 | – | – | $I_C = 50\text{mA}, V_{CE} = 2\text{V}$ |
| | | 100 | 200 | 300 | | $I_C = 500\text{mA}, V_{CE} = 2\text{V}$ |
| | | 55 | 110 | – | | $I_C = 1\text{A}, V_{CE} = 2\text{V}$ |
| | | 25 | 55 | – | | $I_C = 2\text{A}, V_{CE} = 2\text{V}$ |
| Current Gain-Bandwidth Product | f_T | 140 | 175 | – | MHz | $V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$ |
| Switching Times | t_{ON} | – | 80 | – | ns | $I_C = 500\text{mA}, V_{CC} = 10\text{V}, I_{B1} = -I_{B2} = 50\text{mA}$ |
| | t_{OFF} | – | 1200 | – | | |
| Output Capacitance | C_{OBO} | – | – | 30 | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |

Note: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

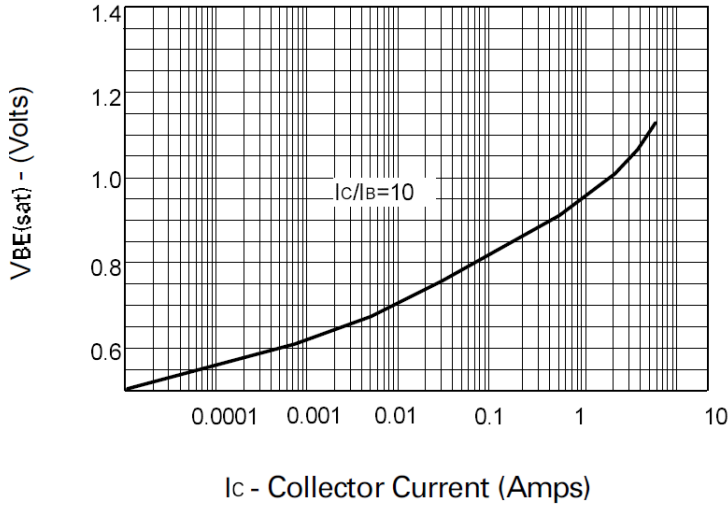
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



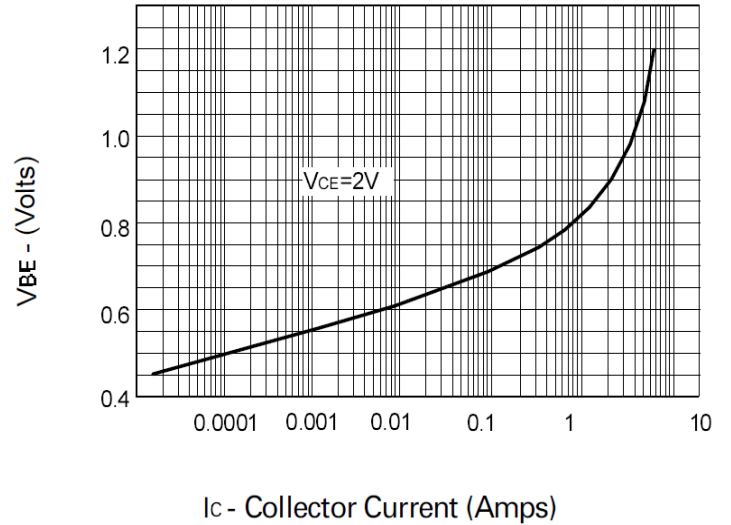
$V_{CE(sat)}$ v I_C



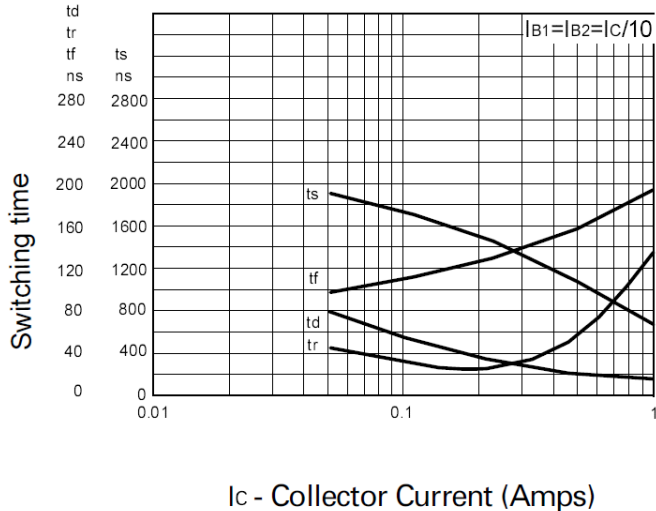
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



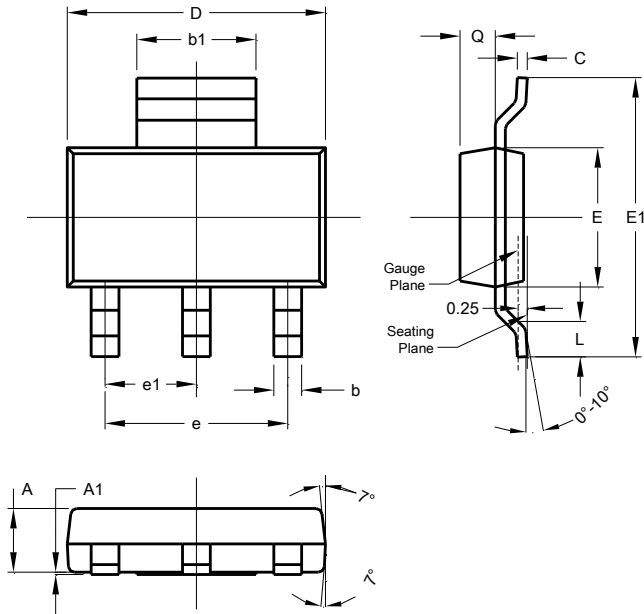
$V_{BE(on)}$ v I_C



Switching Speeds

Package Outline Dimensions

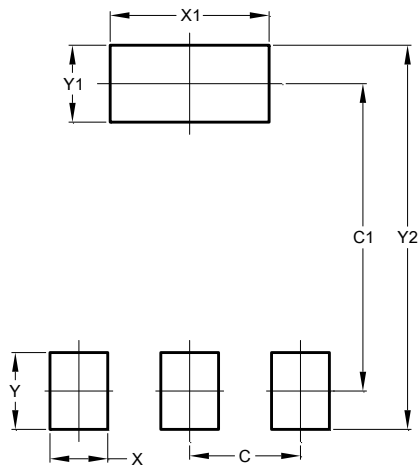
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| 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 <http://www.diodes.com/package-outlines.html> 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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