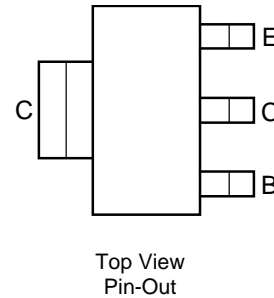
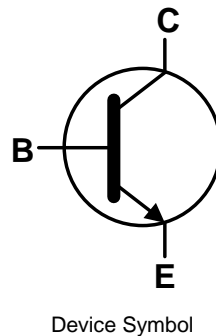
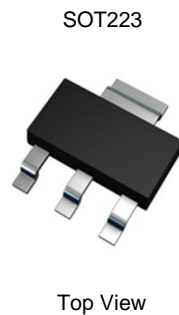


Features

- $BV_{CEO} > 100V$
- $I_C = 2A$ 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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (FZT653Q)**

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)

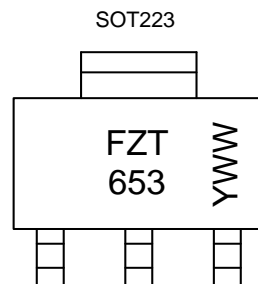


Ordering Information (Note 4)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Peel |
|----------|------------|---------|--------------------|-----------------|-------------------|
| FZT653TA | AEC-Q101 | FZT653 | 7 | 12 | 1,000 |
| FZT653TC | AEC-Q101 | FZT653 | 13 | 12 | 4,000 |

- 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. 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.)

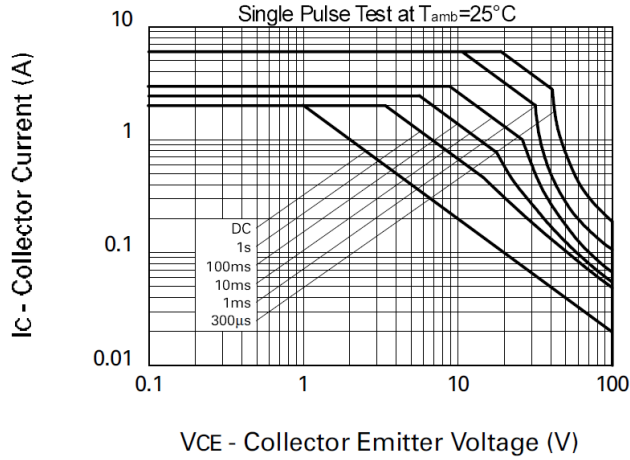
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3 |
| | | (Note 6) | 2 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 12.9 | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 10)

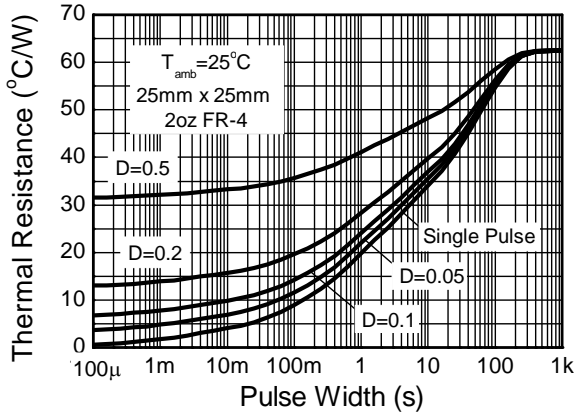
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 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.

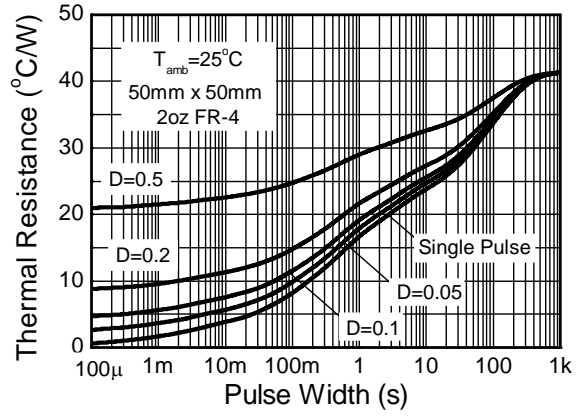
Thermal Characteristics and Derating Information



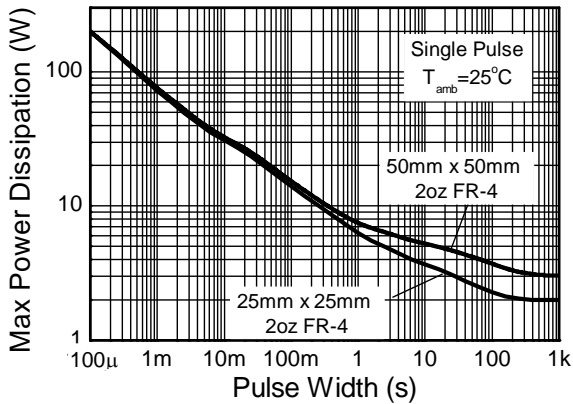
Safe Operating Area



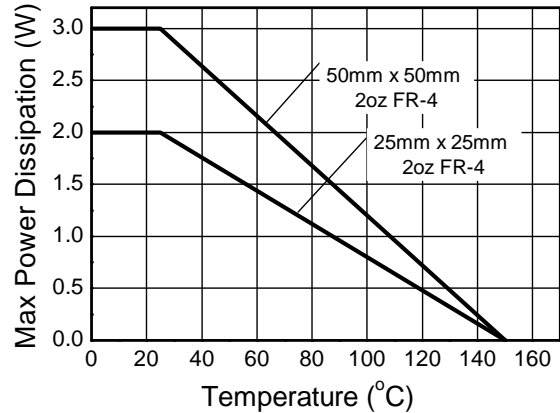
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



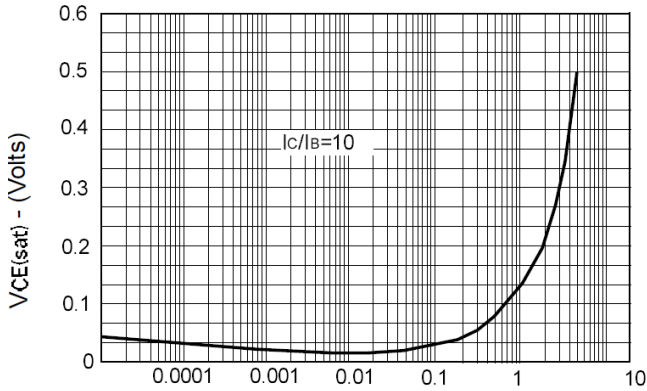
Derating Curve

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----|------|------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 120 | – | – | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | 100 | – | – | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | – | – | V | I _E = 100μA |
| Collector Cut-Off Current | I _{CBO} | – | < 1 | 100 | nA | V _{CB} = 100V |
| | | – | – | 10 | μA | V _{CB} = 100V, T _A = +125°C |
| Emitter Cut-Off Current | I _{EBO} | – | < 1 | 100 | nA | V _{EB} = 5.6V |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(SAT)} | – | 0.13 | 0.3 | V | I _C = 1A, I _B = 100mA |
| | | – | 0.23 | 0.5 | | I _C = 2A, I _B = 200mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(SAT)} | – | 0.9 | 1.25 | V | I _C = 1A, I _B = 100mA |
| Base-Emitter Turn-On Voltage (Note 11) | V _{BE(ON)} | – | 0.8 | 1.0 | V | I _C = 1A, V _{CE} = 2V |
| DC Current Gain (Note 11) | h _{FE} | 70 | 200 | – | – | I _C = 50mA, V _{CE} = 2V |
| | | 100 | 200 | 300 | | I _C = 500mA, V _{CE} = 2V |
| | | 55 | 110 | – | | I _C = 1A, V _{CE} = 2V |
| | | 25 | 55 | – | | I _C = 2A, V _{CE} = 2V |
| Current Gain-Bandwidth Product | f _T | 140 | 175 | – | MHz | V _{CE} = 5V, I _C = 100mA, f = 100MHz |
| Switching Times | t _{ON} | – | 80 | – | ns | I _C = 500mA, V _{CC} = 10V, I _{B1} = -I _{B2} = 50mA |
| | t _{OFF} | – | 1200 | – | | |
| Output Capacitance | C _{OBO} | – | – | 30 | pF | V _{CB} = 10V, f = 1MHz |

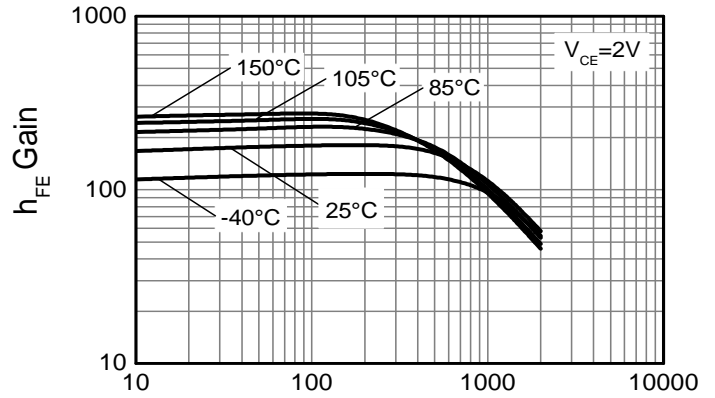
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



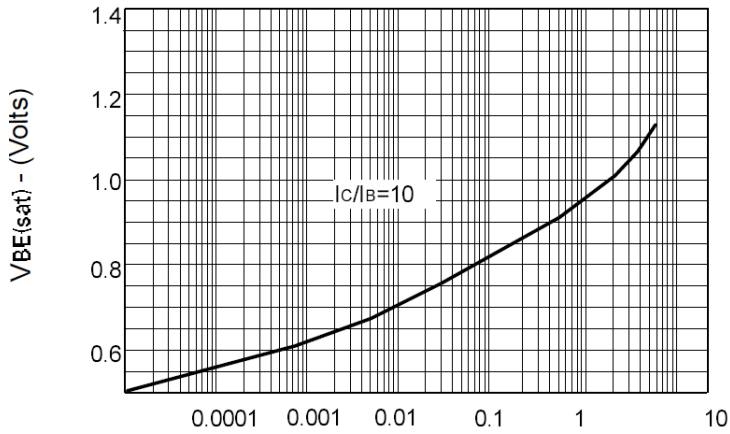
I_C - Collector Current (Amps)

$V_{CE(sat)}$ v I_C



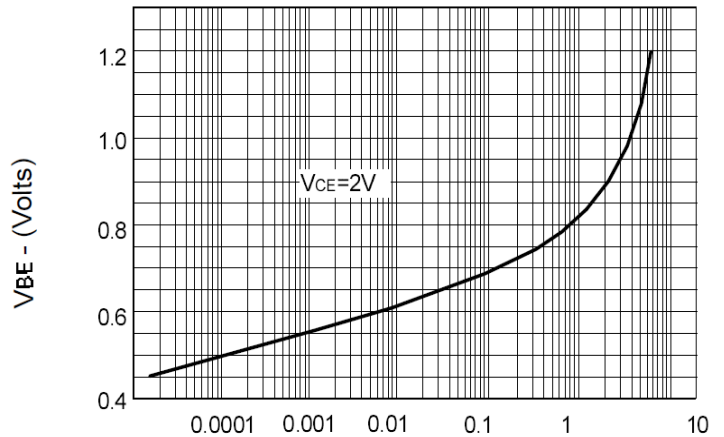
I_C - Collector Current (mA)

h_{FE} v I_C



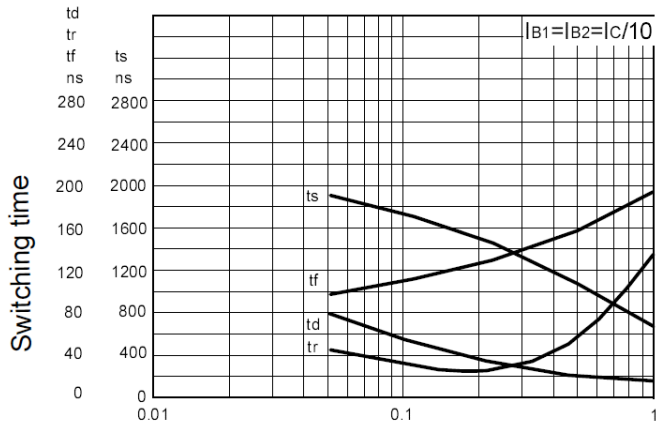
I_C - Collector Current (Amps)

$V_{BE(sat)}$ v I_C



I_C - Collector Current (Amps)

$V_{BE(on)}$ v I_C

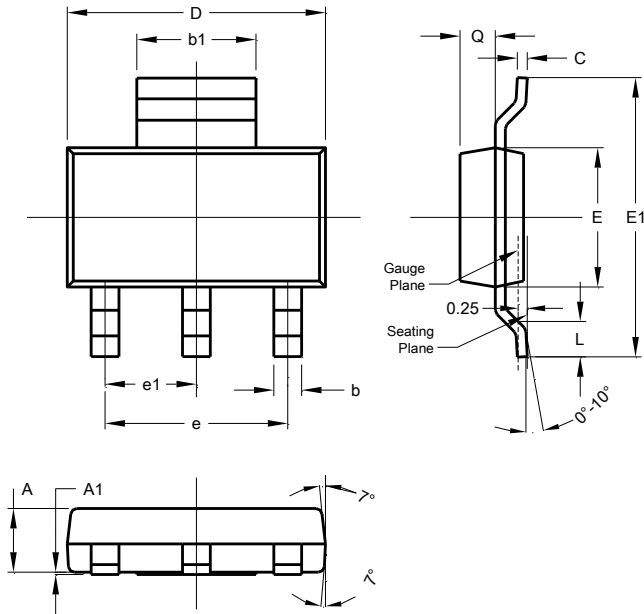


I_C - Collector Current (Amps)

Switching Speeds

Package Outline Dimensions

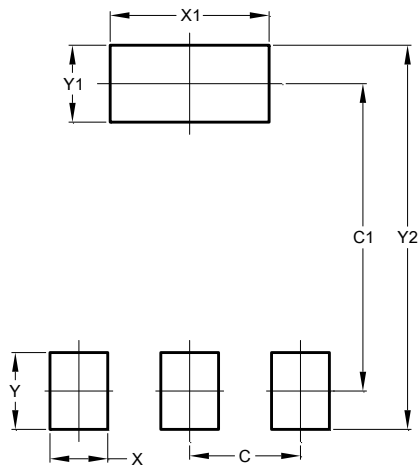
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| 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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