

Features

- $BV_{CEO} > -60V$
- $I_C = -1A$ High Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < -600mV @ -1A$
- Complementary NPN Type: FZT491
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony-Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**

Mechanical Data

- Package: SOT223
- Package 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)

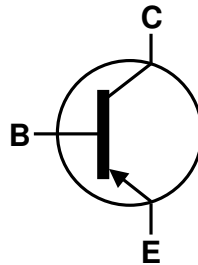
Applications

- Power MOSFET and IGBT Gate Driving
- Low Loss Power Switching

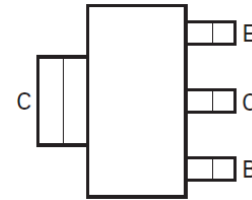
SOT223 (Type DN)



Top View



Device Symbol



Top View
Pin-Out

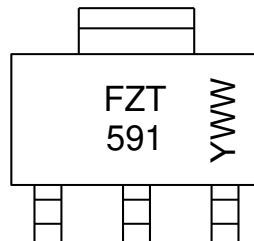
Ordering Information (Note 4)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Packing | |
|-------------|------------|---------|--------------------|-----------------|---------|---------|
| | | | | | Qty. | Carrier |
| FZT591TA | Standard | FZT591 | 7 | 12 | 1,000 | Reel |

- 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

SOT223 (Type DN)



FZT 591 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 2 = 2022)
 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 _{CBO} | -80 | V |
| Collector-Emitter Voltage | V _{CEO} | -60 | V |
| Emitter-Base Voltage | V _{EBO} | -7 | V |
| Continuous Collector Current | I _C | -1 | A |
| Peak Pulse Current | I _{CM} | -2 | A |
| Base Current | I _B | -200 | mA |

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

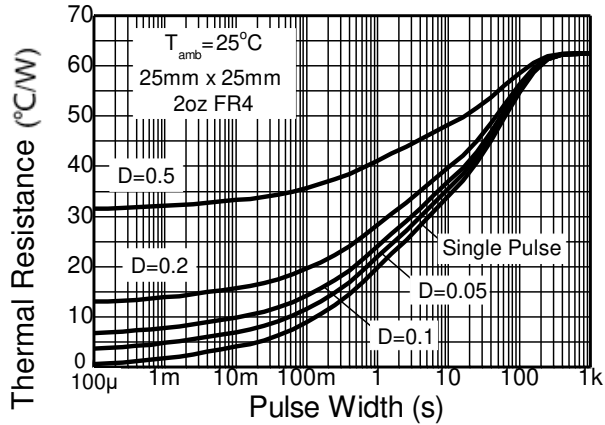
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 19.4 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 10)

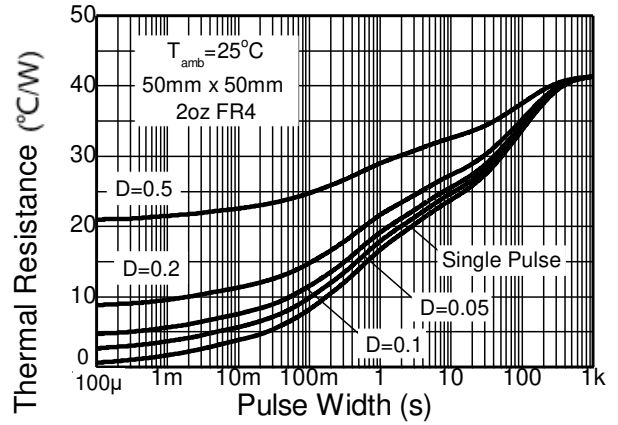
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 8,000 | V | 3B |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- 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.

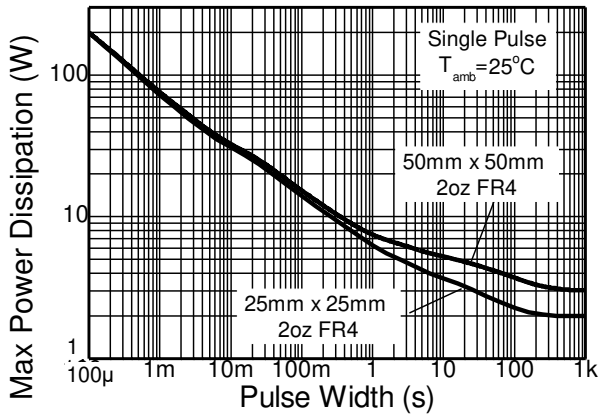
Thermal Characteristics and Derating Information



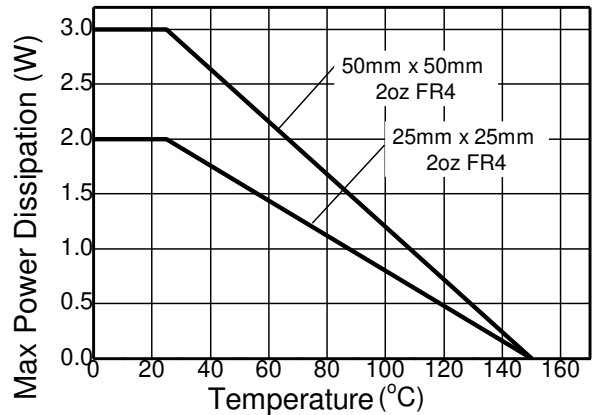
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



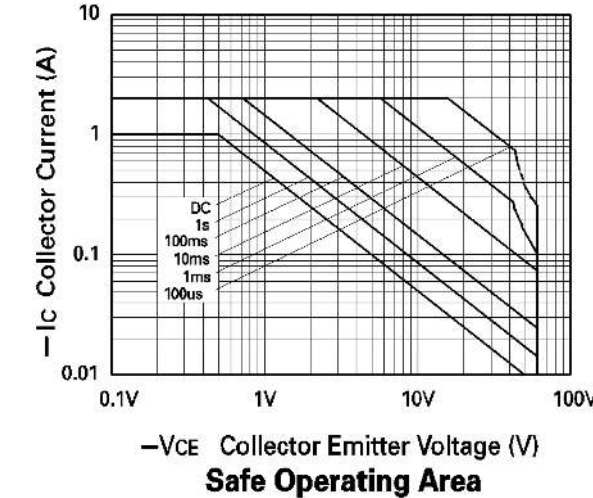
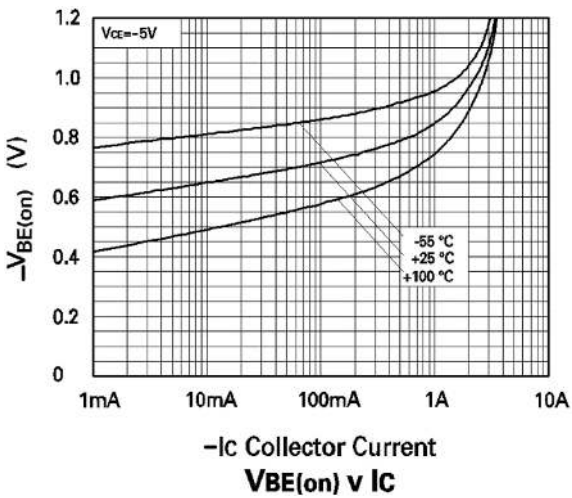
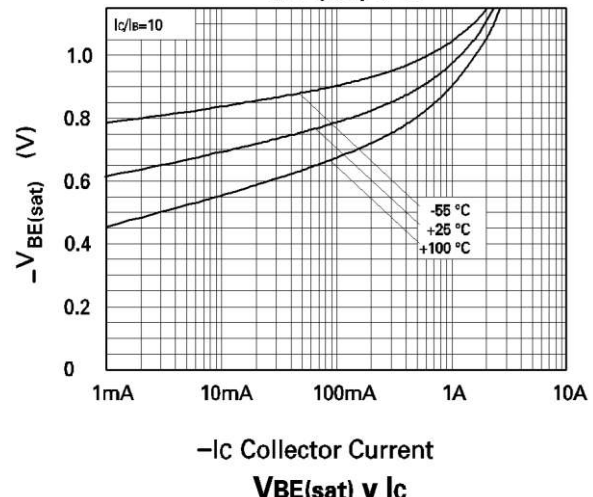
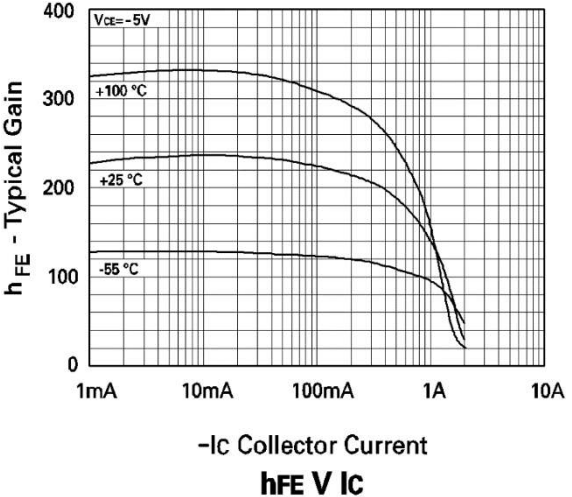
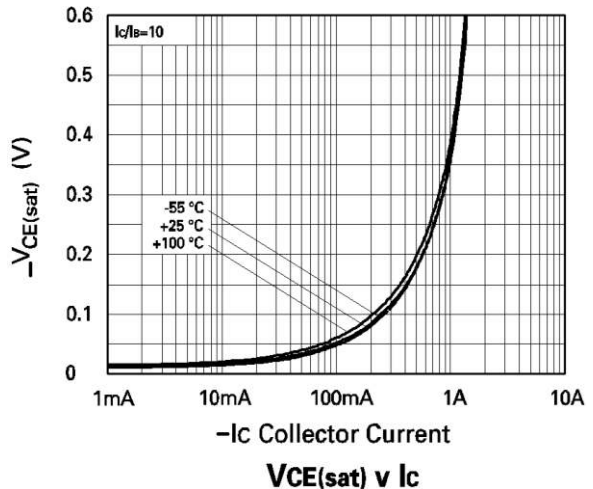
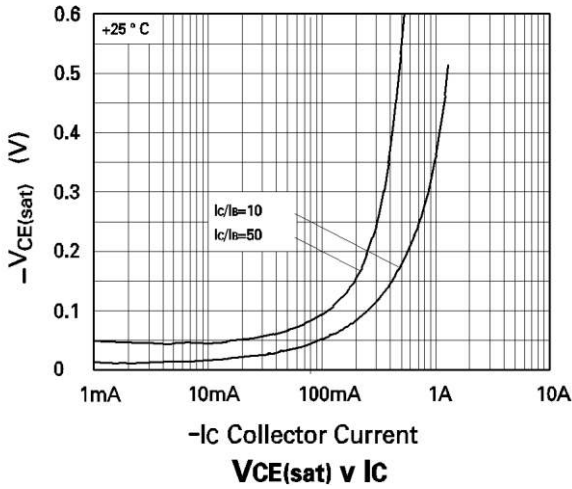
Derating Curve

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|------------------------|-------------------------|--------------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | -80 | — | — | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | -60 | — | — | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -7 | -8.1 | — | V | I _E = -100μA |
| Collector Cut-Off Current | I _{CBO} | — | -1 | -50 | nA | V _{CB} = -60V |
| Collector Cut-Off Current | I _{CES} | — | -1 | -50 | nA | V _{CES} = -60V |
| Emitter Cut-Off Current | I _{EBO} | — | -1 | -20 | nA | V _{EB} = -6V |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(sat)} | — | -175 -350 | -300 -600 | mV | I _C = -500mA, I _B = -50mA I _C = -1A, I _B = -100mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(sat)} | — | -965 | -1200 | mV | I _C = -1A, I _B = -100mA |
| Base-Emitter Turn-On Voltage (Note 11) | V _{BE(on)} | — | -830 | -1000 | mV | I _C = -1A, V _{CE} = -5V |
| DC Current Transfer Static Ratio (Note 11) | h _{FE} | 100 100 80 15 | 220 175 155 40 | — 300 — — | — | I _C = -1mA, V _{CE} = -5V I _C = -500mA, V _{CE} = -5V I _C = -1A, V _{CE} = -5V I _C = -2A, V _{CE} = -5V |
| Transitional Frequency | f _T | 150 | — | — | MHz | V _{CE} = -10V, I _C = -50mA f = 100MHz |
| Output Capacitance | C _{obo} | — | — | 10 | pF | V _{CB} = -10V, f = 1MHz |

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

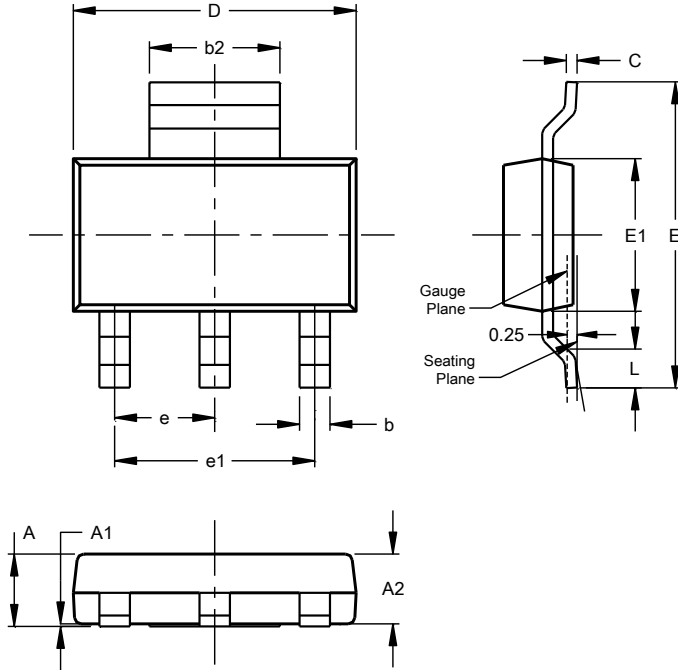
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

SOT223 (Type DN)

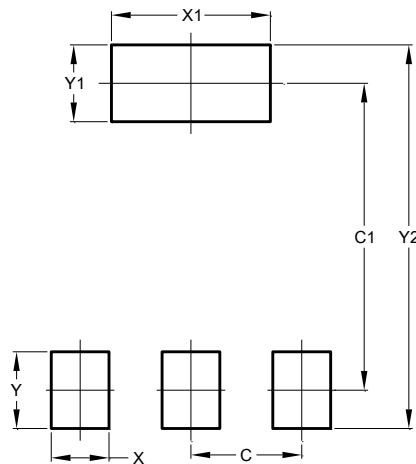


| SOT223 (Type DN) | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | -- | 1.70 | -- |
| A1 | 0.01 | 0.15 | -- |
| A2 | 1.50 | 1.68 | 1.60 |
| b | 0.60 | 0.80 | 0.70 |
| b2 | 2.90 | 3.10 | -- |
| c | 0.20 | 0.32 | -- |
| D | 6.30 | 6.70 | -- |
| E | 6.70 | 7.30 | -- |
| E1 | 3.30 | 3.70 | -- |
| e | -- | -- | 2.30 |
| e1 | -- | -- | 4.60 |
| L | 0.85 | -- | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT223 (Type DN)



| 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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