

Features

- $BV_{CEO} > 45V$
- $BV_{CBO} > 45V$
- $I_C = 3.0A$ High Continuous Current
- $hFE > 400$ @ 1A and Low Saturation Voltage
- $R_{CE(SAT)} = 125m\Omega$ @ 2A for Low Equivalent On-Resistance
- Very Low-Saturation Voltage
- **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)**

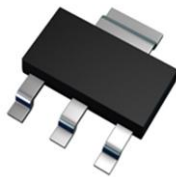
Mechanical Data

- 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 208 ③
- Weight: 0.112 grams (Approximate)

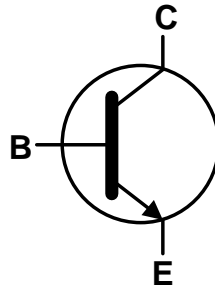
Applications

- Darlington Replacement
- Flash-Gun Convertors and Battery-Powered Circuits
- Siren Drivers, DC-DC Converters

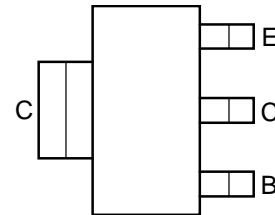
SOT223 (Type DN)



Top View



Device Symbol



Top View
Pin-Out

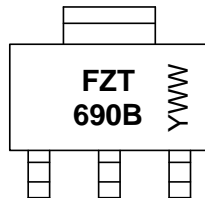
Ordering Information (Notes 4 and 5)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| FZT690BTA | AEC-Q101 | FZT690B | 7 | 12 | 1,000 |
| FZT690BQTA | Automotive | FZT690B | 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 http://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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please 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

SOT223 (Type DN)



FZT690B = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 8= 2018)
 WW or \bar{WW} = Week Code (01 to 53)

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 45 | V |
| Collector-Emitter Voltage | V _{CEO} | 45 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 3 | A |
| Peak Pulse Current | I _{CM} | 6 | A |

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

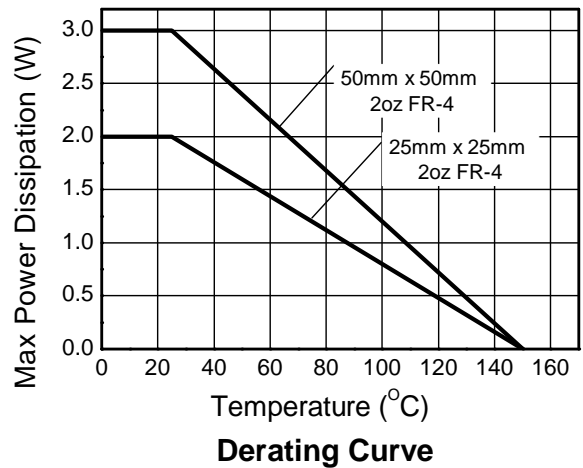
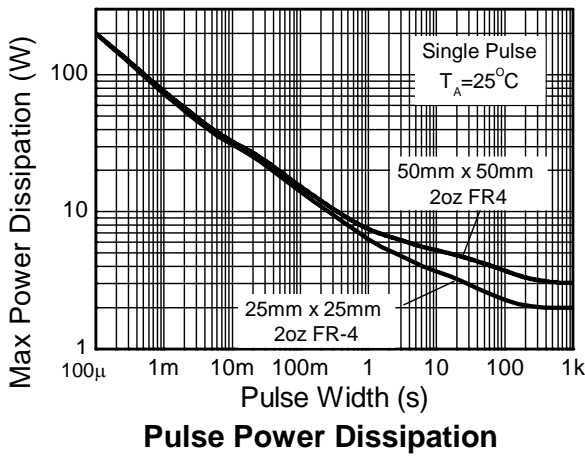
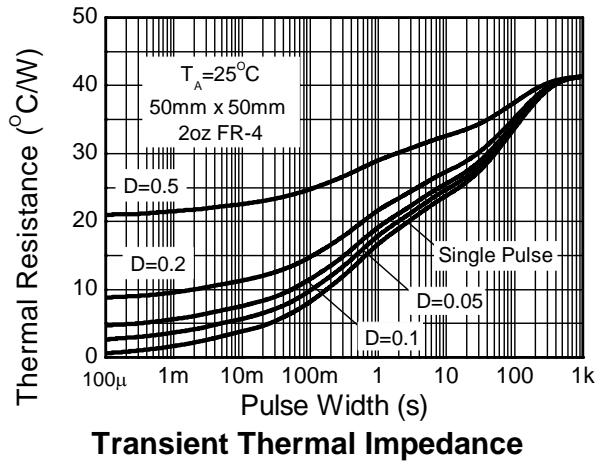
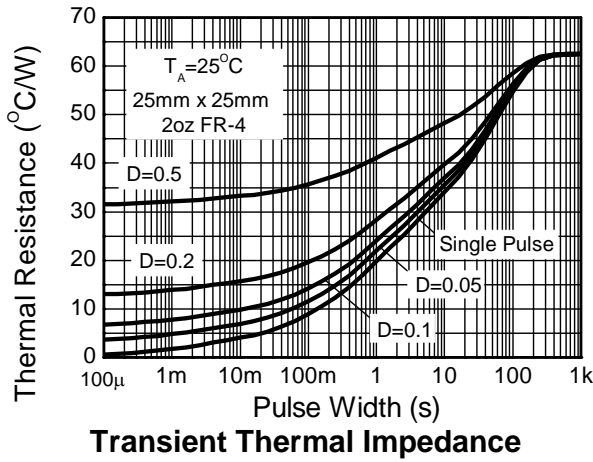
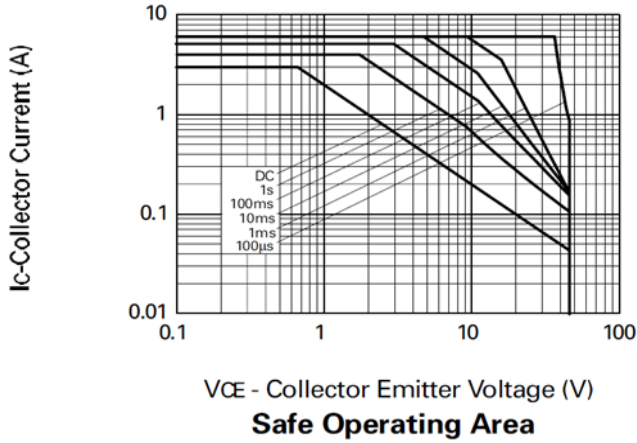
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 6) | 3.0 |
| | | (Note 7) | 2.0 |
| | | (Note 8) | 1.6 |
| | | (Note 9) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 6) | 41.7 |
| | | (Note 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

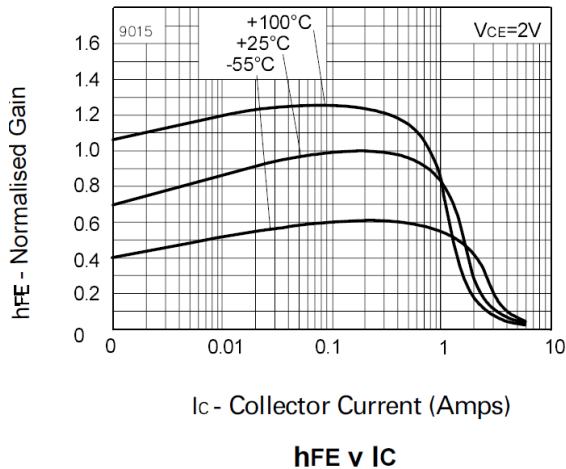
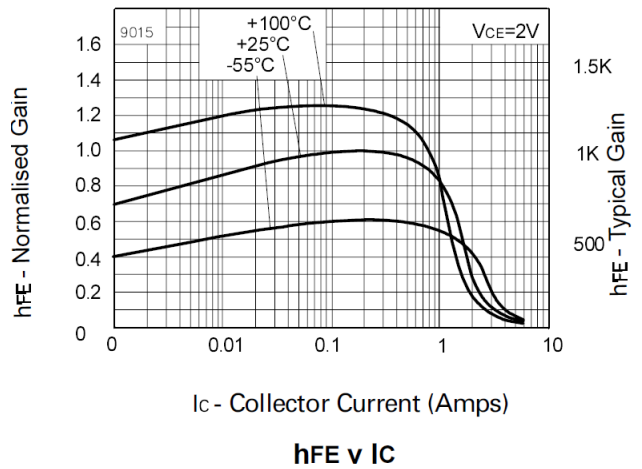
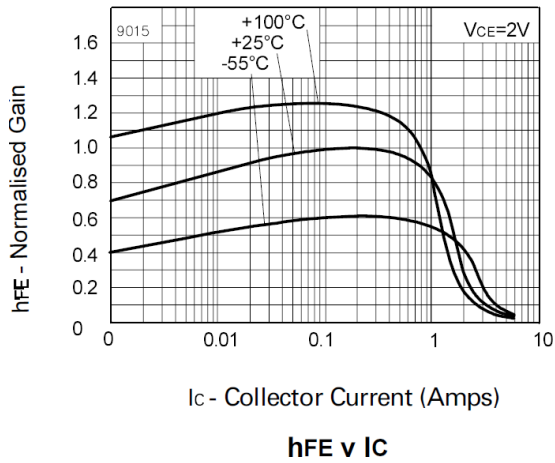
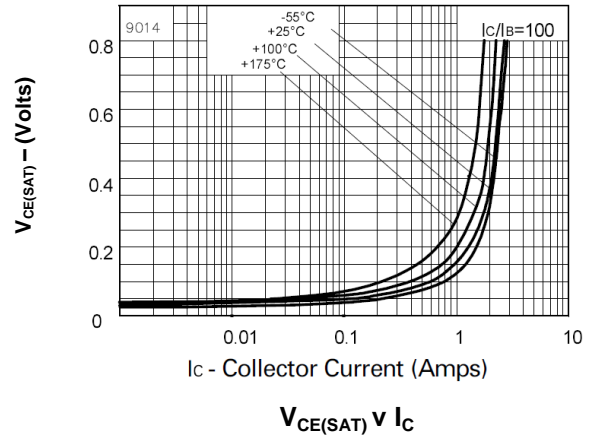
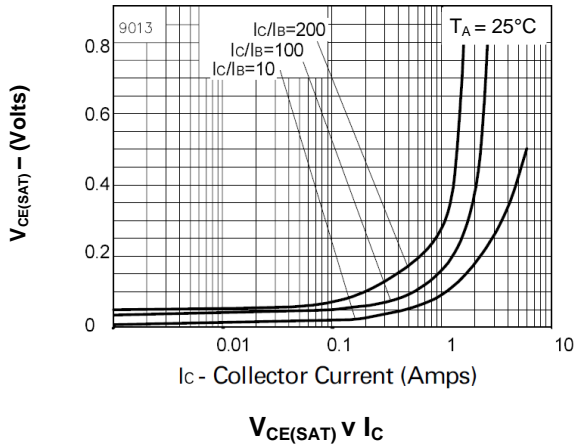


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|-----|-------|--------------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 45 | — | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 12) | BV _{CEO} | 45 | — | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | — | — | V | I _E = 100μA |
| Collector-Base Cut-Off Current | I _{CBO} | — | — | 0.1 | μA | V _{CB} = 35V |
| Emitter Cut-Off Current | I _{EBO} | — | — | 0.1 | μA | V _{EB} = 4V |
| DC Current Gain (Note 12) | h _{FE} | 500 | — | — | — | I _C = 0.1A, V _{CE} = 2V |
| | | 400 | — | — | | I _C = 1A, V _{CE} = 2V |
| | | 150 | — | — | | I _C = 2A, V _{CE} = 2V |
| | | 50 | — | — | | I _C = 3A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 12) | V _{CE(SAT)} | — | — | 0.10 0.50 | V | I _C = 0.1A, I _B = 0.5mA I _C = 1A, I _B = 5mA |
| Base-Emitter Saturation Voltage (Note 12) | V _{BE(SAT)} | — | — | 0.9 | V | I _C = 1A, I _B = 10mA |
| Base-Emitter Turn-On Voltage (Note 12) | V _{BE(ON)} | — | — | 0.9 | V | I _C = 1A, V _{CE} = 2V |
| Input Capacitance | C _{ibo} | — | 200 | — | pF | V _{EB} = 0.5V, f = 1MHz |
| Output Capacitance | C _{obo} | — | 16 | — | 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} | — | 33 | — | ns | V _{CC} = 10V, I _C = 500mA I _{B1} = -I _{B2} = 50mA |
| Turn-Off Time | t _{OFF} | — | 1,300 | — | ns | |

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

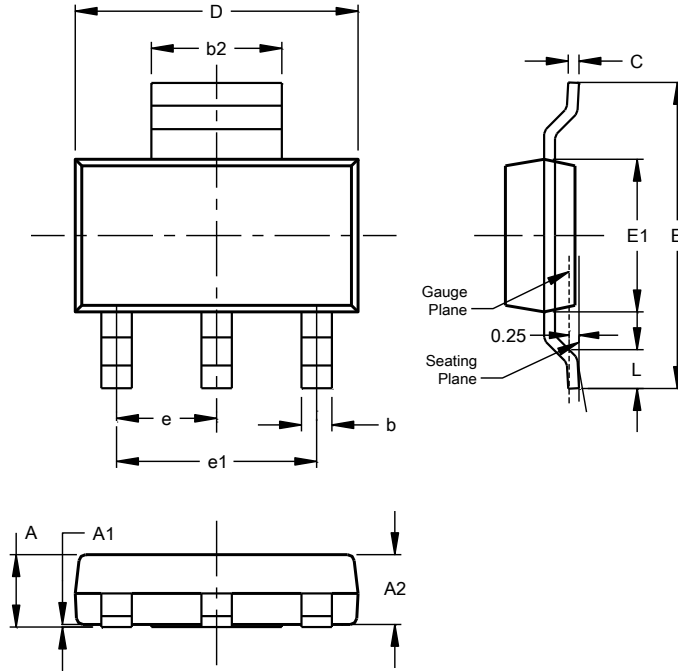
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT223 (Type DN)



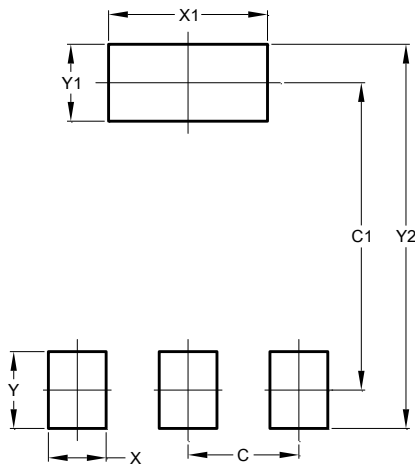
| SOT223 (Type DN) | | | |
|------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | -- | 1.70 | -- |
| A1 | 0.01 | 0.15 | -- |
| A2 | 1.50 | 1.68 | 1.60 |
| b | 0.60 | 0.80 | 0.70 |
| b2 | 2.90 | 3.10 | -- |
| c | 0.20 | 0.32 | -- |
| D | 6.30 | 6.70 | -- |
| E | 6.70 | 7.30 | -- |
| 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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