

25V NPN MEDIUM POWER TRANSISTOR IN SOT223

Features

- $BV_{CEO} > 25V$
- $I_C = 5A$ high Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 70mV @ 1A$
- $R_{CE(sat)} = 50m\Omega$ for a low equivalent On-Resistance
- h_{FE} specified up to 20A for a high gain hold up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

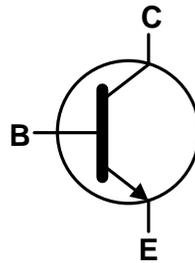
Mechanical Data

- 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)

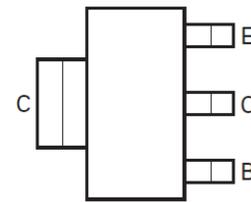


SOT223

Top View



Device Symbol



Top View
Pin-Out

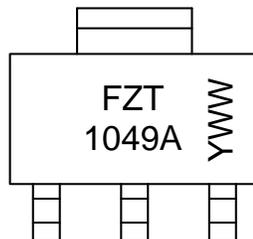
Ordering Information (Note 4)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|------------|----------|--------------------|-----------------|-------------------|
| FZT1049ATA | AEC-Q101 | FZT1049A | 7 | 12 | 1,000 |
| FZT1049ATC | AEC-Q101 | FZT1049A | 13 | 12 | 4,000 |

- 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>.

Marking Information

SOT223



FZT 1049A = 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 80 | V |
| Collector-Emitter Voltage | V_{CEO} | 25 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 5 | A |
| Peak Pulse Current | I_{CM} | 20 | A |

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

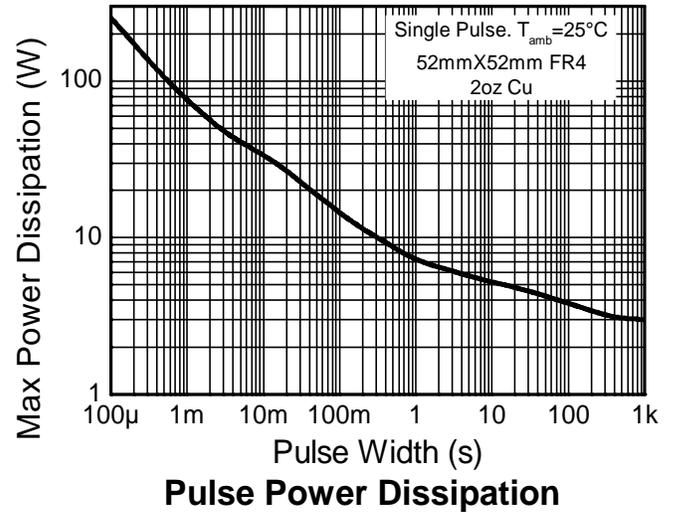
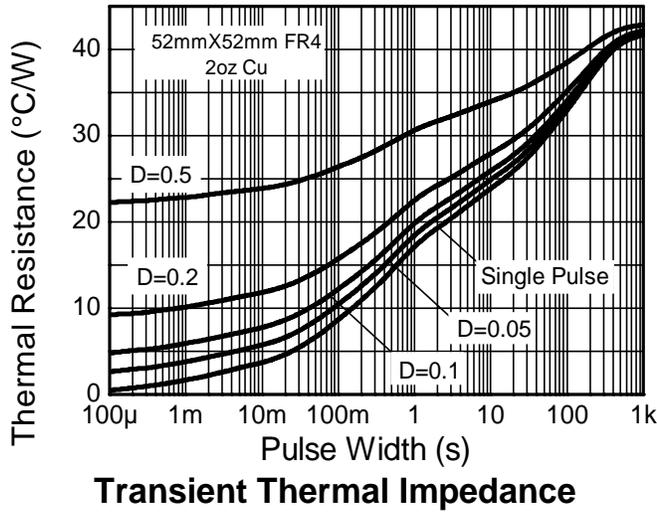
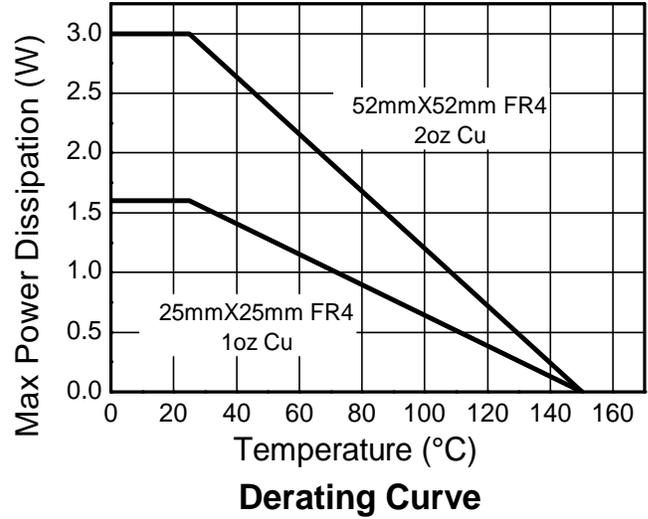
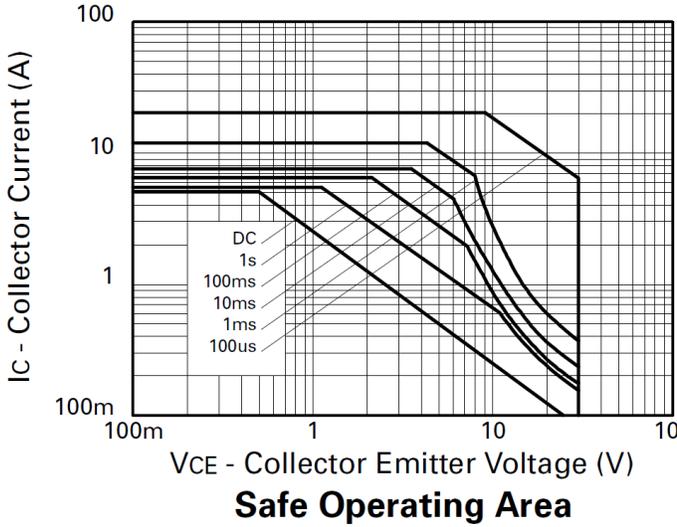
| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|------------------|
| Power Dissipation | P_D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 10.9 | |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

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 52mm x 52mm 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

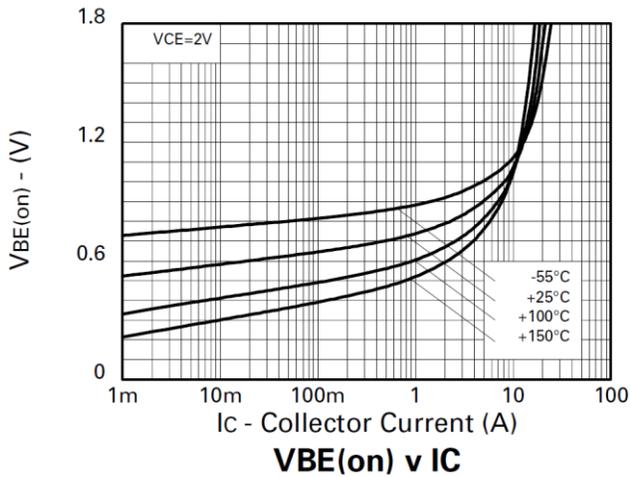
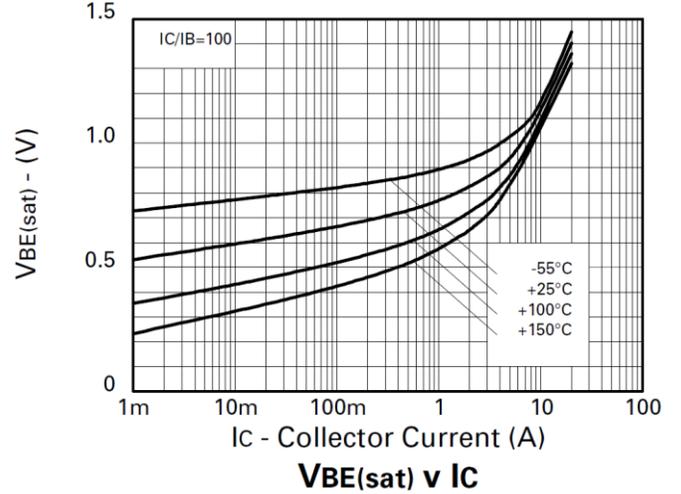
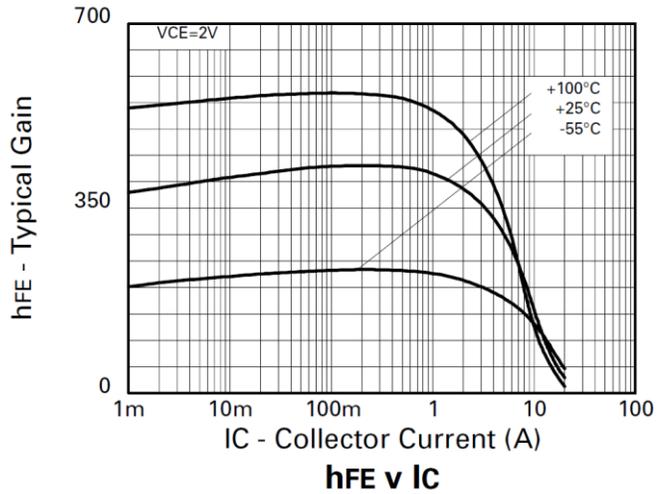
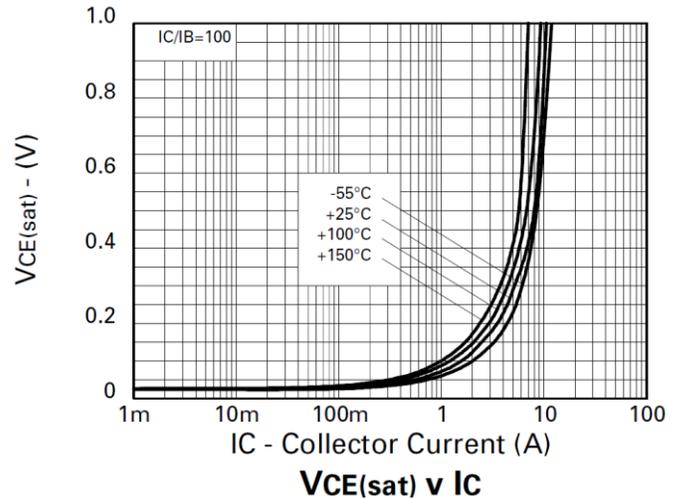
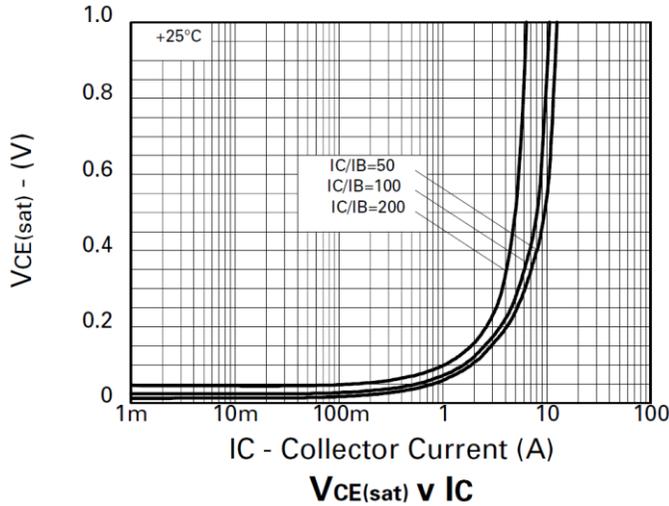


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ. | Max | Unit | Test Condition |
|--|----------------------|-----|------|-------|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 80 | 130 | - | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CER} | 80 | 130 | - | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | 25 | 30 | - | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 9 | - | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | - | 0.3 | 10 | nA | V _{CB} = 35V |
| Emitter Cutoff Current | I _{EBO} | - | 0.3 | 10 | nA | V _{EB} = 4V |
| DC Current Transfer Static Ratio (Note 11) | h _{FE} | 280 | 440 | - | - | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | - | | I _C = 0.5A, V _{CE} = 2V |
| | | 300 | 450 | 1,200 | | I _C = 1A, V _{CE} = 2V |
| | | 180 | 280 | - | | I _C = -5A, V _{CE} = 2V |
| | | 40 | 80 | - | | I _C = 20A, V _{CE} = 2V |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(sat)} | - | 35 | 60 | mV | I _C = 0.5A, I _B = 10mA |
| | | - | 70 | 100 | | I _C = 1A, I _B = 10mA |
| | | - | 180 | 250 | | I _C = 3A, I _B = 30mA |
| | | - | 250 | 330 | | I _C = 5A, I _B = 50mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(sat)} | - | 950 | 1,050 | mV | I _C = 5A, I _B = 50mA |
| Base-Emitter Turn-on Voltage (Note 11) | V _{BE(on)} | - | 900 | 1,000 | mV | I _C = 5A, V _{CE} = 2V |
| Transitional Frequency (Note 11) | f _T | - | 180 | - | MHz | I _C = 50mA, V _{CE} = 10V, f = 100MHz |
| Output Capacitance | C _{obo} | - | 45 | 60 | pF | V _{CB} = 10V, f = 1MHz |
| Switching Time | t _{ON} | - | 125 | - | ns | V _{CC} = 10V, I _C = 4A, I _{B1} = -I _{B2} = 40mA |
| | t _{OFF} | - | 380 | - | | |

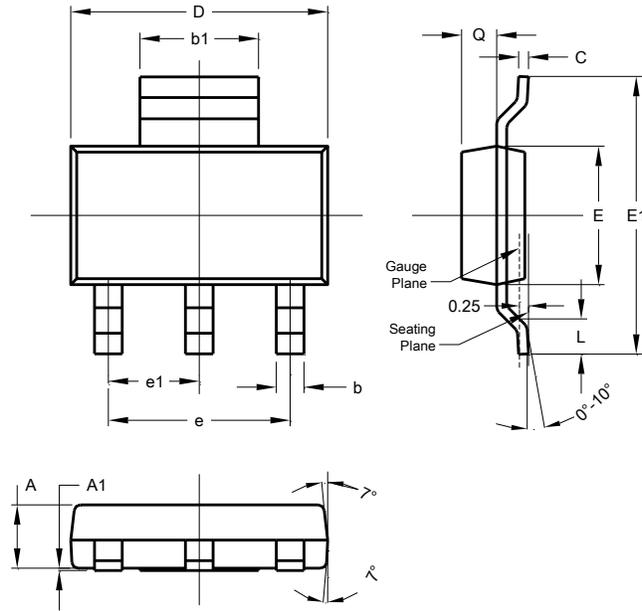
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

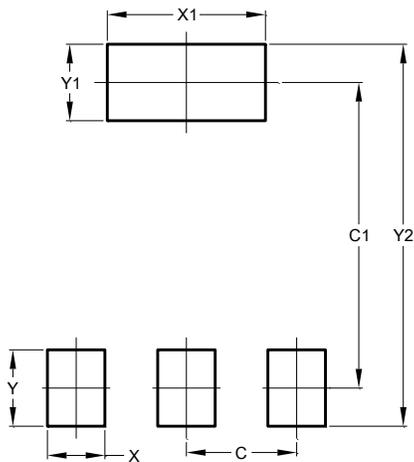
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT223 | | | |
|-----------------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 1.55 | 1.65 | 1.60 |
| A1 | 0.010 | 0.15 | 0.05 |
| b1 | 2.90 | 3.10 | 3.00 |
| b2 | 0.60 | 0.80 | 0.70 |
| 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 |

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