

17.5V NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SOT223

Features

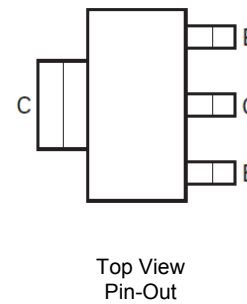
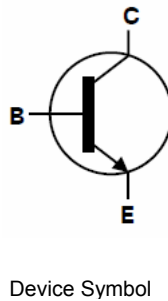
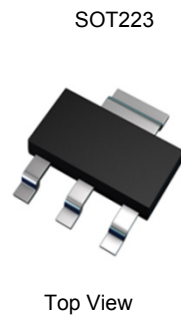
- $BV_{CEO} > 17.5V$
- $BV_{CES} > 50V$
- $I_C = 5A$ High Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 45mV @ 500mA$
- $R_{SAT} = 50m\Omega @ 5A$ for a Low Equivalent On-Resistance
- h_{FE} Specified up to 20A for a High Gain Hold-Up
- **Lead-Free 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 ③
- Weight: 0.112 grams (approximate)

Applications

- Solenoid, Relay and Actuator Drivers
- DC Modules
- Motor Control

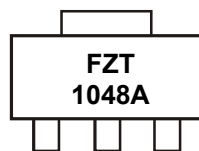


Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|----------|--------------------|-----------------|-------------------|
| FZT1048ATA | FZT1048A | 7 | 12 | 1,000 |

- 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/products/packages.html>.

Marking Information



FZT1048A = Product Type Marking Code

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 17.5 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 5 | A |
| Peak Pulse Current | I _{CM} | 20 | A |
| Base Current | I _B | 500 | mA |

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

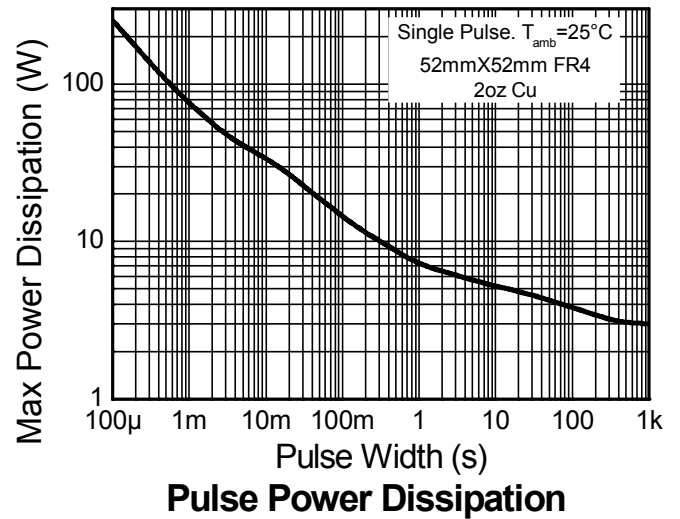
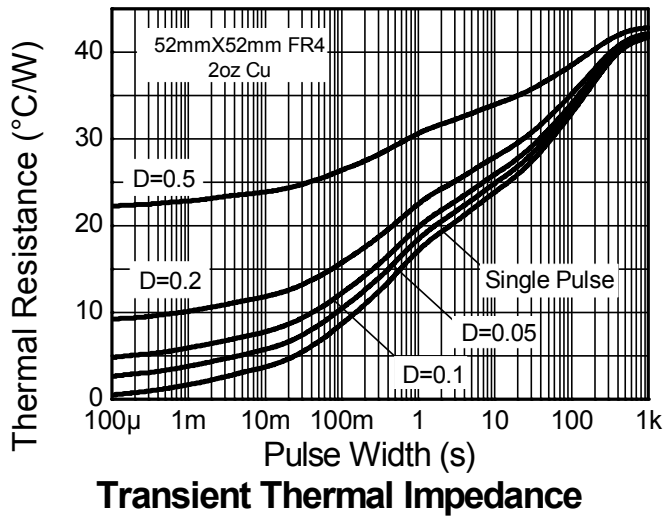
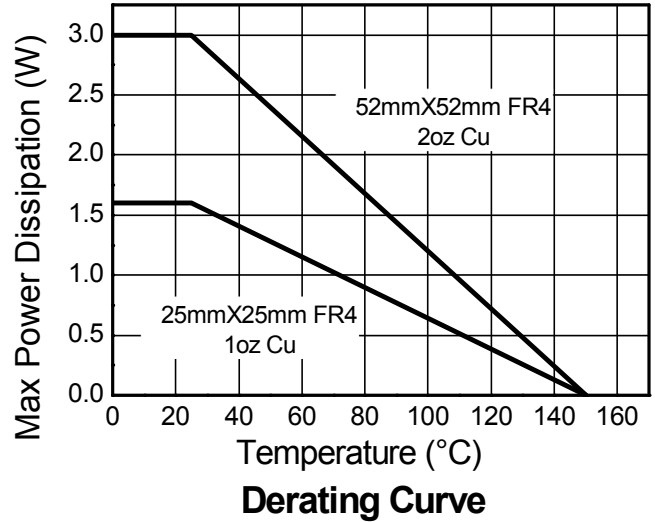
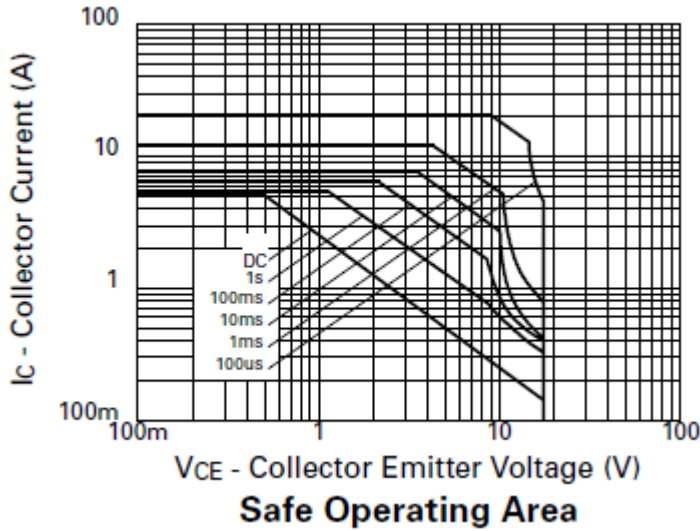
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | P _D | (Note 5) | 3.0 |
| | | (Note 6) | 2.0 |
| | | (Note 7) | 1.6 |
| | | (Note 8) | 1.2 |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) | 41.7 |
| | | (Note 6) | 62.5 |
| | | (Note 7) | 78.1 |
| | | (Note 8) | 104 |
| Thermal Resistance Junction to Lead | R _{θJL} | 10.9 | °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 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

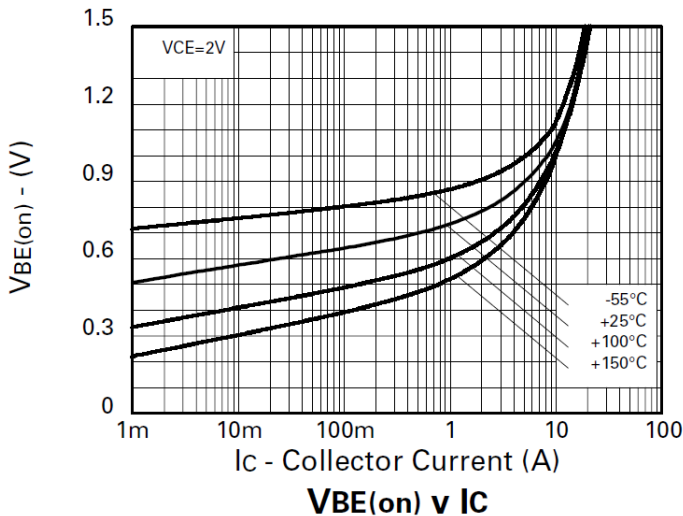
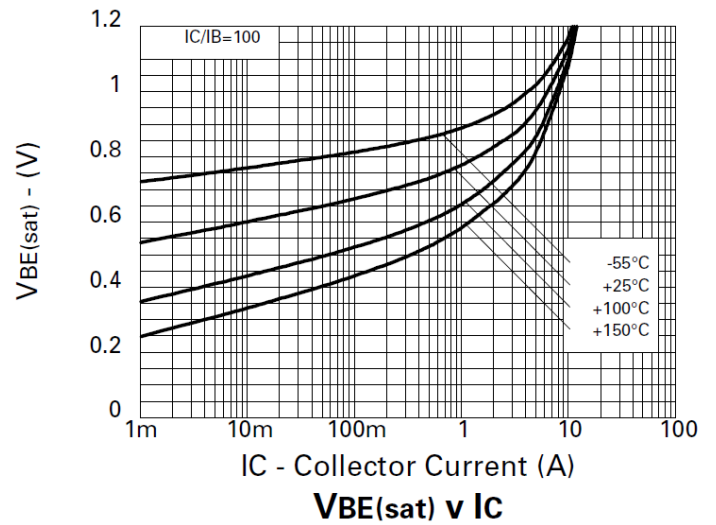
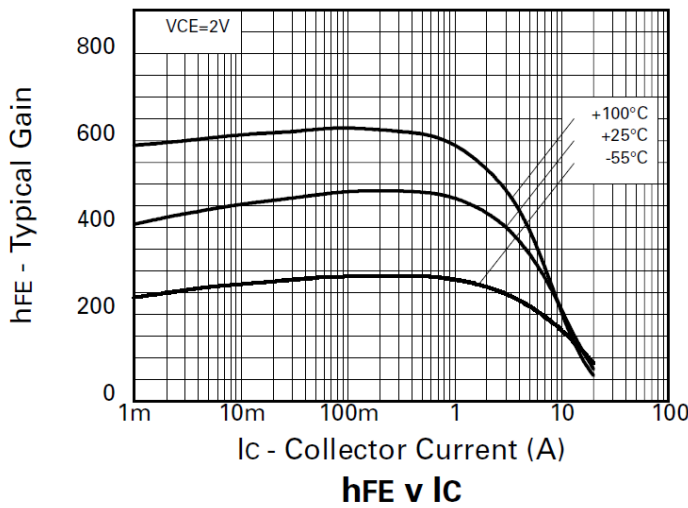
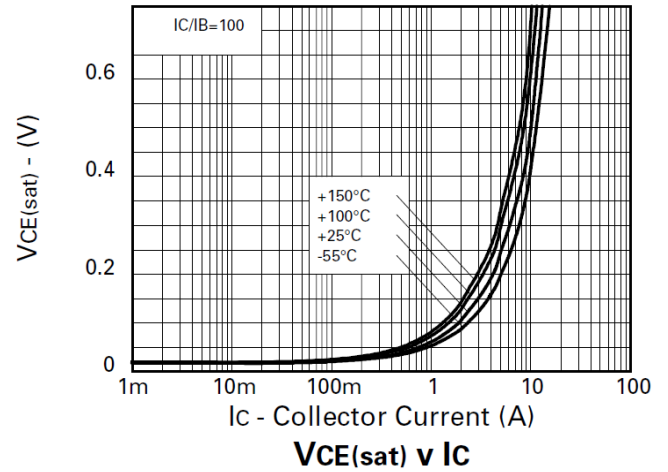
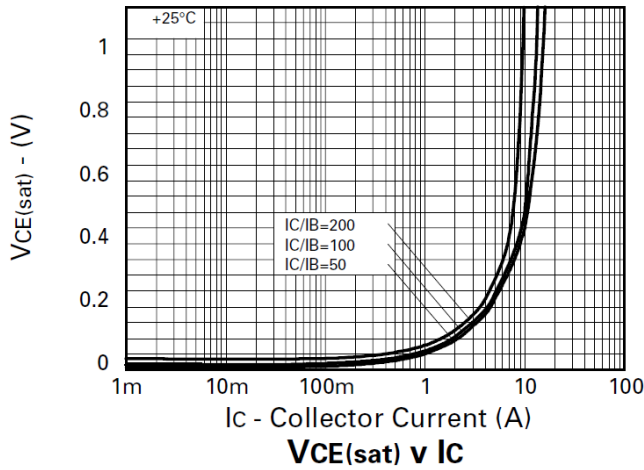


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|------|-----|------|------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | 50 | 85 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage | BV _{CES} | 50 | 85 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage | BV _{CEV} | 50 | 85 | — | V | I _C = 100μA, V _{EB} = 1V |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | 17.5 | 24 | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.7 | — | V | I _E = 100μA |
| Collector Cut-off Current | I _{CBO} | — | 0.3 | 10 | nA | V _{CB} = 35V |
| Collector Cut-off Current | I _{CES} | — | 0.3 | 10 | nA | V _{CB} = 35V |
| Emitter Cut-off Current | I _{EBO} | — | 0.3 | 10 | nA | V _{EB} = 4V |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(sat)} | — | 27 | 45 | mV | I _C = 500mA, I _B = 10mA |
| | | — | 55 | 75 | | I _C = 1A, I _B = 10mA |
| | | — | 155 | 210 | | I _C = 3A, I _B = 15mA |
| | | — | 250 | 350 | | I _C = 5A, I _B = 25mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(sat)} | — | 920 | 1000 | mV | I _C = 5A, I _B = 25mA |
| Base-Emitter Turn-On Voltage (Note 11) | V _{BE(on)} | — | 880 | 970 | mV | I _C = 5A, V _{CE} = 2V |
| DC Current Gain (Note 11) | h _{FE} | 290 | 440 | 1200 | — | I _C = 10mA, V _{CE} = 2V |
| | | 300 | 450 | 1200 | | I _C = 1A, V _{CE} = 2V |
| | | 180 | 300 | — | | I _C = 5A, V _{CE} = 2V |
| | | 50 | 90 | — | | I _C = 20A, V _{CE} = 2V |
| Output Capacitance | C _{obo} | — | 60 | 80 | pF | V _{CB} = 10V, f = 1MHz |
| Current Gain-Bandwidth Product | f _T | — | 150 | — | MHz | V _{CE} = 10V, I _C = 50mA, f = 50MHz |
| Switching Times | t _{on} | — | 120 | — | ns | I _C = 4A, V _{CC} = 10V, I _{B1} = -I _{B2} = 40mA |
| | t _{off} | — | 310 | — | | |

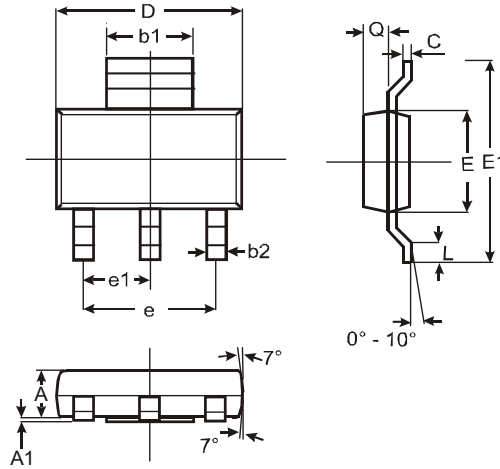
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2

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



Package Outline Dimensions

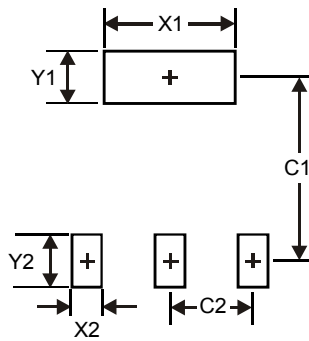
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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) |
|------------|---------------|
| X1 | 3.3 |
| X2 | 1.2 |
| Y1 | 1.6 |
| Y2 | 1.6 |
| C1 | 6.4 |
| C2 | 2.3 |

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