

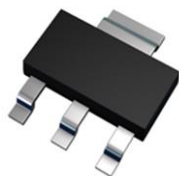
## Features

- $BV_{CEO} > -12V$
- $I_C = -6A$  High Continuous Collector Current
- $I_{CM} = -20A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -170mV @ -2A$
- $h_{FE}$  Specified up to -10A for a High Gain Hold Up
- **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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

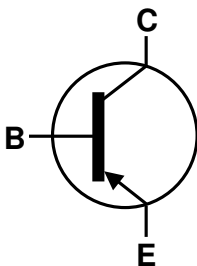
## Mechanical Data

- Package: SOT223 (Type DN)
- 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 208 (E3)
- Weight: 0.112 grams (Approximate)

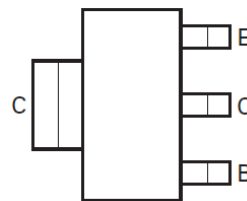
SOT223 (Type DN)



Top View



Device Symbol


 Top View  
Pin-Out

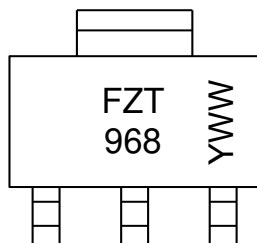
## Ordering Information (Note 4)

| Orderable Part Number | Package          | Marking | Reel size (inches) | Tape width (mm) | Packing  |         |
|-----------------------|------------------|---------|--------------------|-----------------|----------|---------|
|                       |                  |         |                    |                 | Quantity | Carrier |
| FZT968TA              | SOT223 (Type DN) | FZT968  | 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 968 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last digit of year (ex: 3 = 2023)  
 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       | $V_{CBO}$ | -15   | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | -12   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | -6    | V    |
| Continuous Collector Current | $I_C$     | -6    | A    |
| Peak Pulse Current           | $I_{CM}$  | -20   | A    |

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

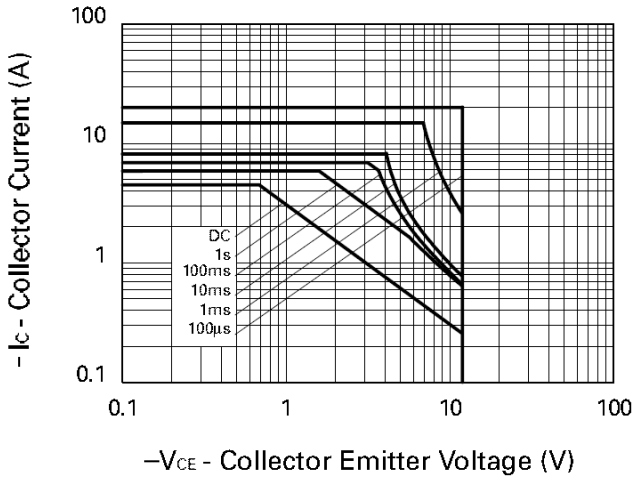
| Characteristic                              | Symbol          | Value       | Unit                       |
|---|-----------------|-------------|----------------------------|
| Power Dissipation<br>Linear derating factor | $P_D$           | 3.0         | W<br>mW / $^\circ\text{C}$ |
|   |                 | 24          |                            |
|   |                 | 1.6         |                            |
| Thermal Resistance, Junction to Ambient     | $R_{\theta JA}$ | 12.8        | $^\circ\text{C}/\text{W}$  |
|   |                 | 42          |                            |
| Thermal Resistance Junction to Lead         | $R_{\theta JL}$ | 78          | $^\circ\text{C}/\text{W}$  |
|   |                 | 8.8         |                            |
| Operating and Storage Temperature Range     | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$           |

**ESD Ratings** (Note 8)

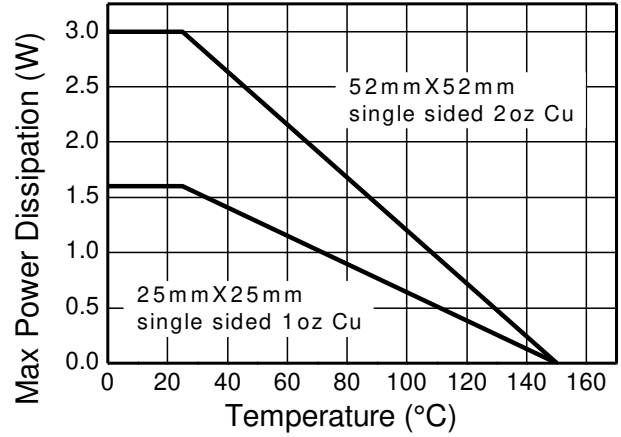
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

- 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 steady-state.
  6. Same as note 5, except the device is mounted on 25mm x 25mm 1oz copper.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

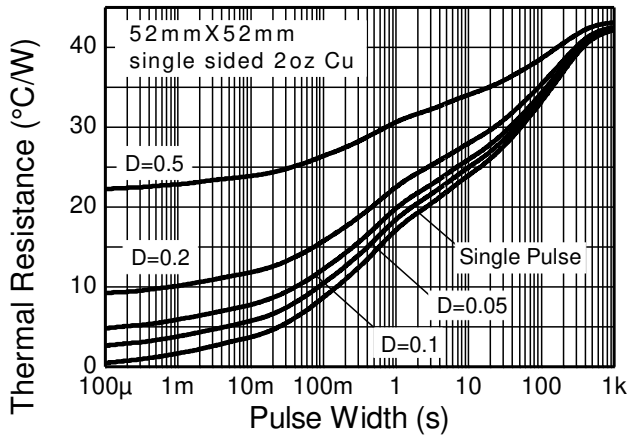
**Thermal Characteristics and Derating Information**



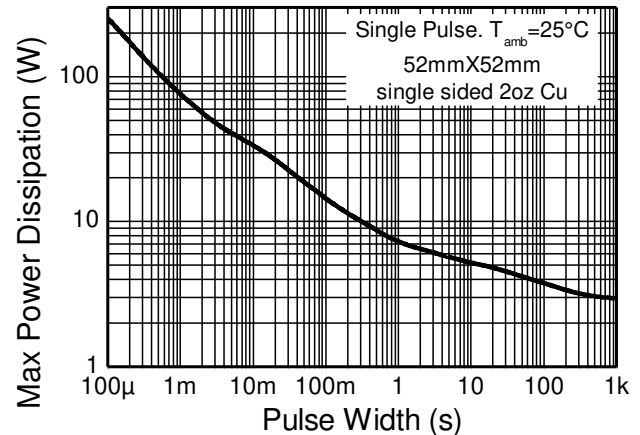
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



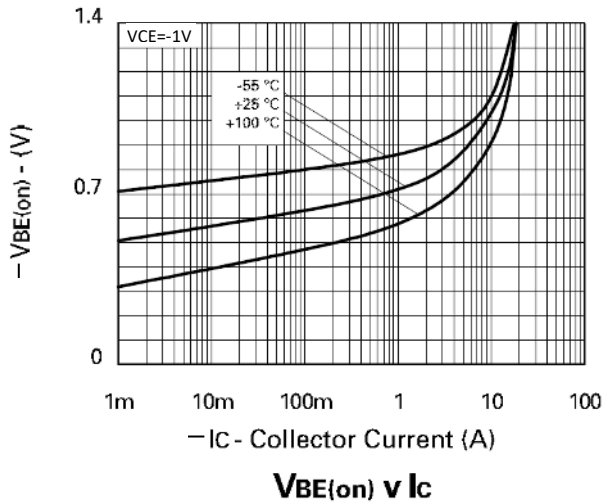
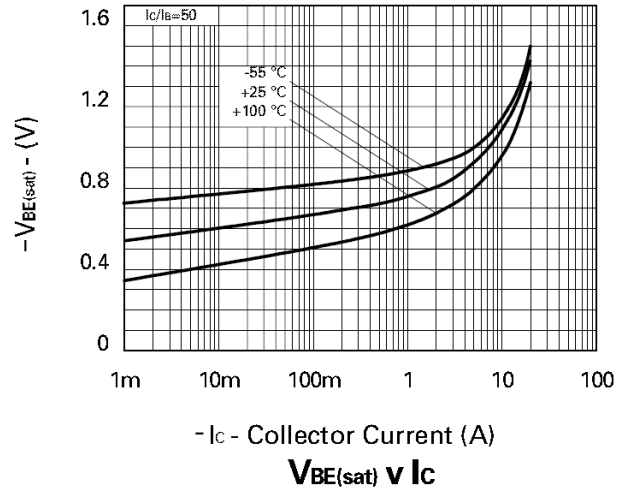
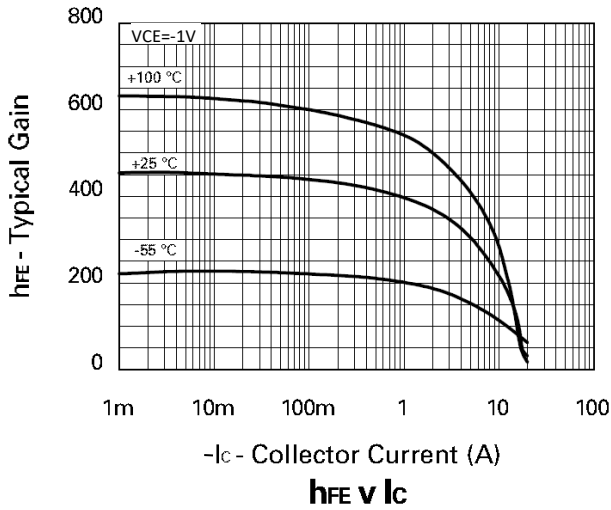
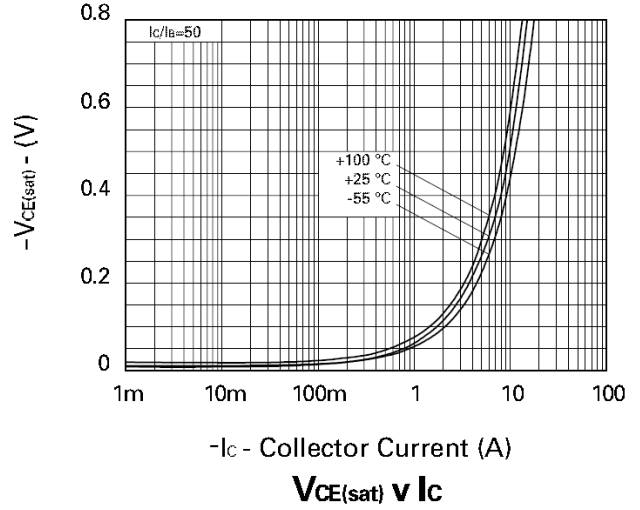
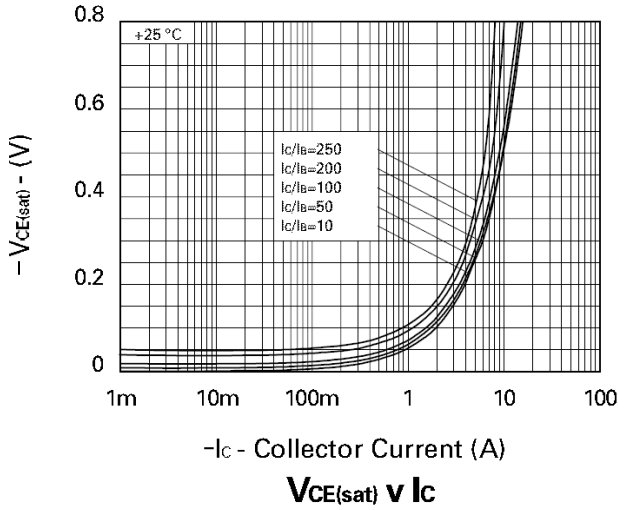
**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                | Symbol               | Min | Typ   | Max       | Unit     | Test Condition   |
|---|----------------------|-----|-------|-----------|----------|--|
| Collector-Base Breakdown Voltage              | BV <sub>CB0</sub>    | -15 | -28   | —         | V        | I <sub>C</sub> = -100μA  |
| Collector-Emitter Breakdown Voltage (Note 9)  | BV <sub>CEO</sub>    | -12 | -20   | —         | V        | I <sub>C</sub> = -10mA   |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | -6  | -8    | —         | V        | I <sub>E</sub> = -100μA  |
| Collector Cutoff Current                      | I <sub>CB0</sub>     | —   | —     | -10<br>-1 | nA<br>μA | V <sub>CB</sub> = -12V<br>V <sub>CB</sub> = -12V, T <sub>A</sub> = +100°C                    |
| Emitter Cutoff Current                        | I <sub>EBO</sub>     | —   | —     | -10       | nA       | V <sub>EB</sub> = -6V  |
| DC current transfer Static ratio (Note 9)     | h <sub>FE</sub>      | 300 | 450   | —         | —        | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V  |
|   |                      | 300 | 450   | 1000      |          | I <sub>C</sub> = -500mA, V <sub>CE</sub> = -1V   |
|   |                      | 200 | 300   | —         |          | I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V  |
|   |                      | 150 | 240   | —         |          | I <sub>C</sub> = -10A, V <sub>CE</sub> = -1V   |
|   |                      | —   | 50    | —         |          | I <sub>C</sub> = -20A, V <sub>CE</sub> = -1V   |
| Collector-Emitter Saturation Voltage (Note 9) | V <sub>CE(sat)</sub> | —   | -65   | -130      | mV       | I <sub>C</sub> = -500mA, I <sub>B</sub> = -5mA   |
|   |                      | —   | -132  | -170      |          | I <sub>C</sub> = -2A, I <sub>B</sub> = -50mA   |
|   |                      | —   | -360  | -450      |          | I <sub>C</sub> = -6A, I <sub>B</sub> = -250mA  |
| Base-Emitter Saturation Voltage (Note 9)      | V <sub>BE(sat)</sub> | —   | -1.05 | -1.2      | V        | I <sub>C</sub> = -6A, I <sub>B</sub> = -250mA  |
| Base-Emitter Turn-on Voltage (Note 9)         | V <sub>BE(on)</sub>  | —   | -0.87 | -1.05     | V        | I <sub>C</sub> = -6A, V <sub>CE</sub> = -1V  |
| Transitional Frequency (Note 9)               | f <sub>T</sub>       | —   | 80    | —         | MHz      | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V,<br>f = 50MHz                                |
| Output capacitance                            | C <sub>obo</sub>     | —   | 161   | —         | pF       | V <sub>CB</sub> = -20V, f = 1MHz   |
| Switching Time                                | t <sub>on</sub>      | —   | 120   | —         | ns       | V <sub>CC</sub> = -10V, I <sub>C</sub> = -4A,<br>I <sub>B1</sub> = -I <sub>B2</sub> = -400mA |
|   | t <sub>off</sub>     | —   | 116   | —         |          |  |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

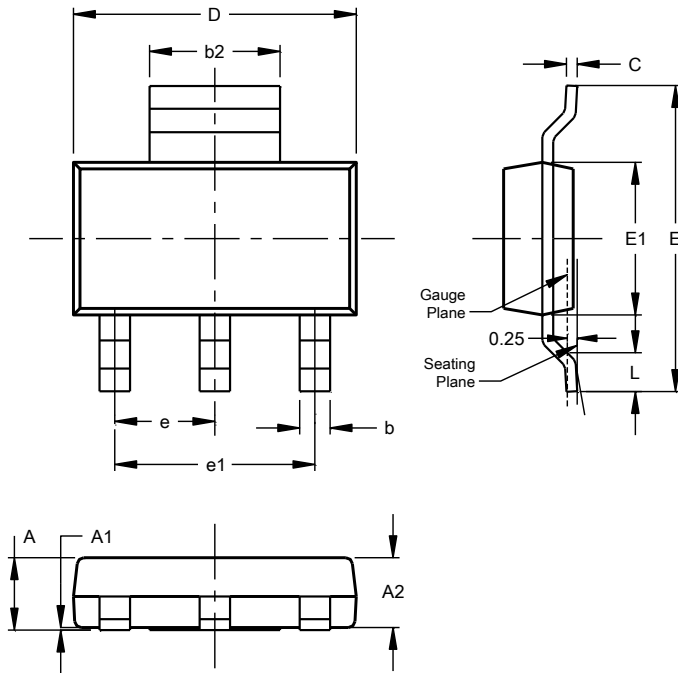
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

Please see <https://www.diodes.com/design/support/packaging/diodes-packaging/> for the latest version.

SOT223 (Type DN)

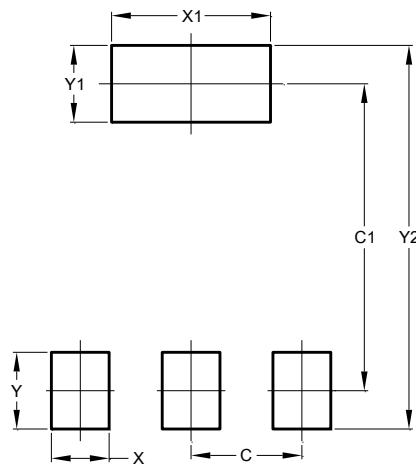


| SOT223 (Type DN)     |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | --   | 1.70 | --   |
| A1                   | 0.01 | 0.15 | --   |
| A2                   | 1.50 | 1.68 | 1.60 |
| b                    | 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/> 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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