



# THE DATASHEET OF FZT956QTA



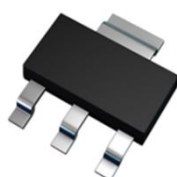
## Features

- $BV_{CEO} > -200V$
- $I_C = -2A$  High Continuous Collector Current
- $I_C = -5A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -165mV$  @  $-1A$
- $h_{FE}$  Specified up to  $-5A$  for a High Gain Hold-Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet (DIODES™ [FZT956Q](#))**

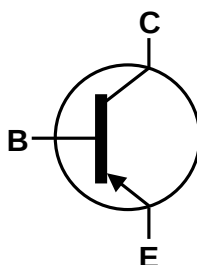
## Mechanical Data

- 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 208③
- Weight: 0.112 grams (Approximate)

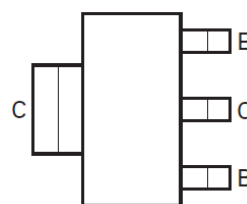
SOT223



Top View



Device Symbol


 Top View  
Pin-Out

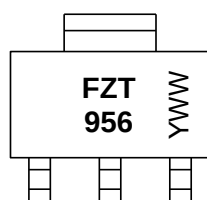
## Ordering Information (Note 4)

| Product  | Package          | Marking | Reel Size (inches) | Tape Width (mm) | Packing |         |
|----------|------------------|---------|--------------------|-----------------|---------|---------|
|          |                  |         |                    |                 | Qty.    | Carrier |
| FZT956TA | SOT223 (Type DN) | FZT956  | 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



FZT 956 = 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | -220  | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -200  | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -7    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -2    | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | -5    | A    |

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

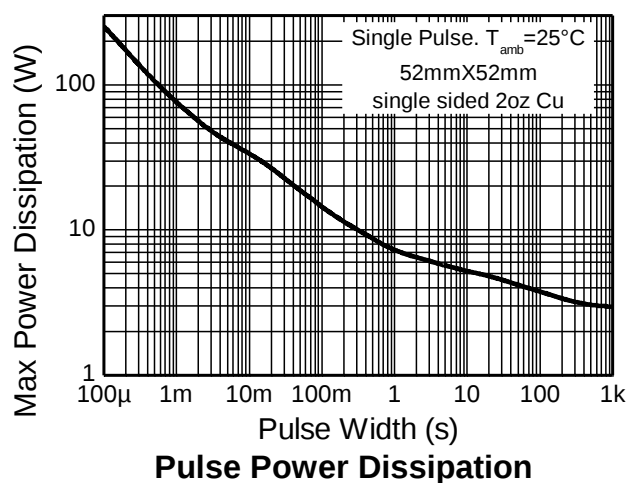
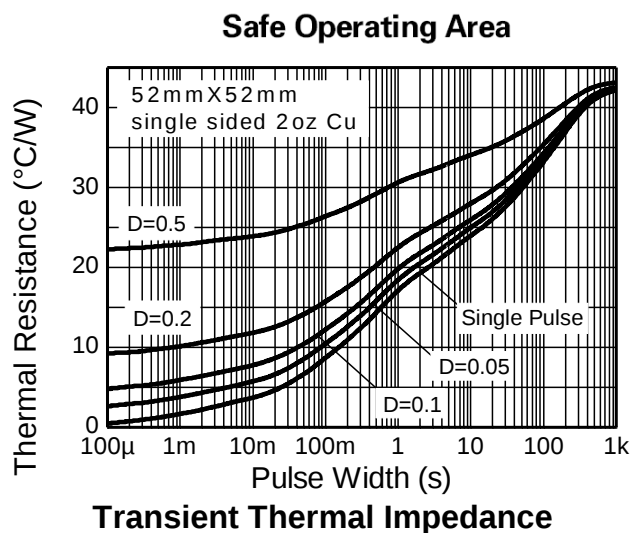
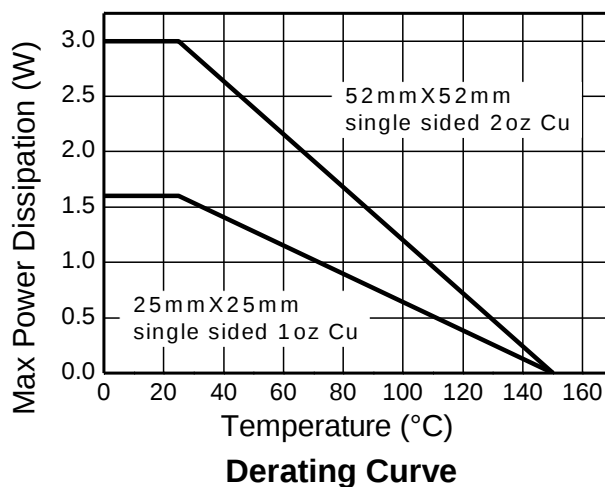
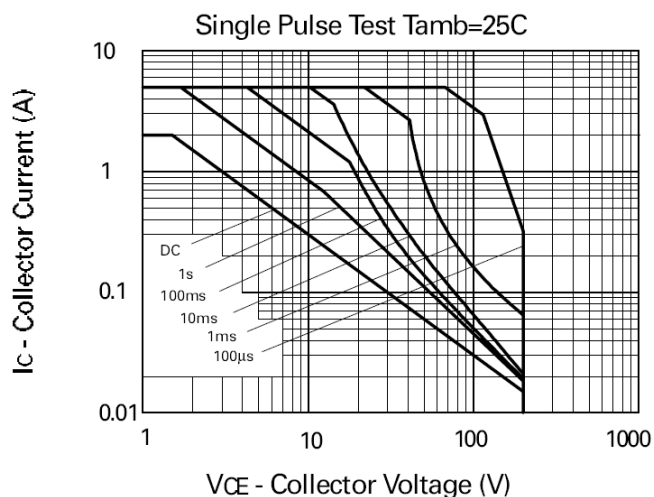
| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                       | P <sub>D</sub>                    | 3.0         | W    |
| Linear Derating Factor                  |                                   | 24          |      |
|                                         |                                   | 1.6         |      |
|                                         |                                   | 12.8        | °C/W |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 42          |      |
|                                         | R <sub>θJA</sub>                  | 78          |      |
| Thermal Resistance Junction to Lead     | R <sub>θJL</sub>                  | 8.8         | °C   |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 |      |

## 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 a steady state.
  6. Same as Note 5, except 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

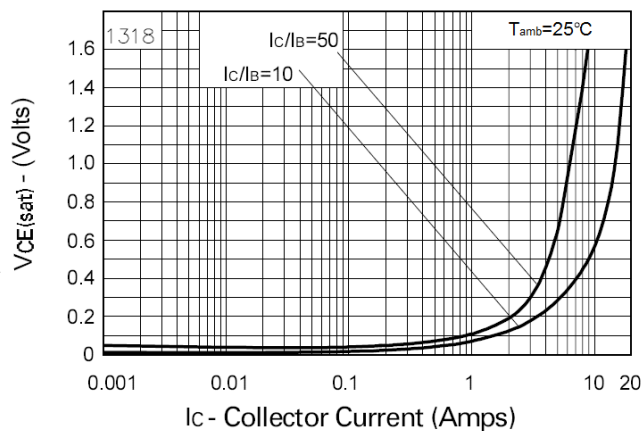


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

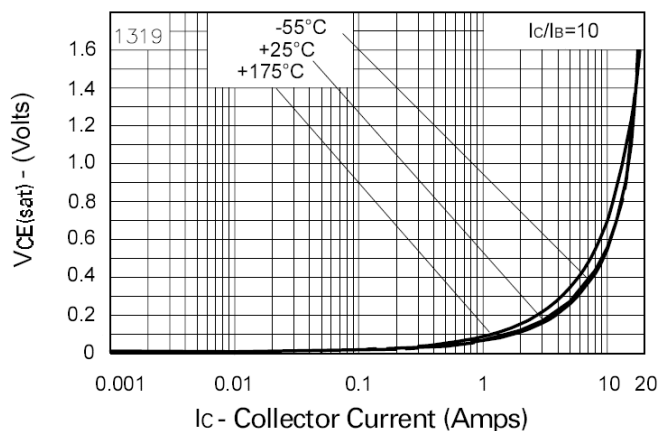
| Characteristic                                | Symbol               | Min  | Typ.  | Max       | Unit     | Test Condition                                                                               |
|-----------------------------------------------|----------------------|------|-------|-----------|----------|----------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage              | BV <sub>CBO</sub>    | -220 | -300  | —         | V        | I <sub>C</sub> = -100μA                                                                      |
| Collector-Emitter Breakdown Voltage (Note 9)  | BV <sub>CER</sub>    | -220 | -300  | —         | V        | I <sub>C</sub> = -1μA, R <sub>B</sub> ≤ 1kΩ                                                  |
| Collector-Emitter Breakdown Voltage (Note 9)  | BV <sub>CEO</sub>    | -200 | -240  | —         | V        | I <sub>C</sub> = -1mA                                                                        |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | -7   | -8.3  | —         | V        | I <sub>E</sub> = -100μA                                                                      |
| Collector Cut-Off Current                     | I <sub>CBO</sub>     | —    | —     | -50<br>-1 | nA<br>μA | V <sub>CB</sub> = -200V<br>V <sub>CB</sub> = -200V, T <sub>A</sub> = +100°C                  |
| Collector Cut-Off Current                     | I <sub>CER</sub>     | —    | —     | -50<br>-1 | nA<br>μA | V <sub>CE</sub> = -200V, R ≤ 1kΩ<br>V <sub>CE</sub> = -200V, T <sub>A</sub> = +100°C         |
| Emitter Cut-Off Current                       | I <sub>EBO</sub>     | —    | —     | -10       | nA       | V <sub>EB</sub> = -6V                                                                        |
| DC Current Transfer Static Ratio (Note 9)     | h <sub>FE</sub>      | 100  | 200   | —         | —        | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V                                                |
|                                               |                      | 100  | 200   | 300       |          | I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V                                                  |
|                                               |                      | 50   | 150   | —         |          | I <sub>C</sub> = -2A, V <sub>CE</sub> = -5V                                                  |
|                                               |                      | —    | 10    | —         |          | I <sub>C</sub> = -5A, V <sub>CE</sub> = -5V                                                  |
| Collector-Emitter Saturation Voltage (Note 9) | V <sub>CE(sat)</sub> | —    | -30   | -50       | mV       | I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA                                              |
|                                               |                      | —    | -120  | -165      |          | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA                                                |
|                                               |                      | —    | -168  | -275      |          | I <sub>C</sub> = -2A, I <sub>B</sub> = -400mA                                                |
| Base-Emitter Saturation Voltage (Note 9)      | V <sub>BE(sat)</sub> | —    | -970  | -1,110    | mV       | I <sub>C</sub> = -2A, I <sub>B</sub> = -400mA                                                |
| Base-Emitter Turn-On Voltage (Note 9)         | V <sub>BE(on)</sub>  | —    | -810  | -950      | mV       | I <sub>C</sub> = -2A, V <sub>CE</sub> = -5V                                                  |
| Transitional Frequency (Note 9)               | f <sub>T</sub>       | —    | 110   | —         | MHz      | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V,<br>f = 50MHz                                |
| Output Capacitance                            | C <sub>obo</sub>     | —    | 32    | —         | pF       | V <sub>CB</sub> = -20V, f = 1MHz                                                             |
| Switching Time                                | t <sub>on</sub>      | —    | 67    | —         | ns       | V <sub>CC</sub> = -50V, I <sub>C</sub> = -1A,<br>-I <sub>B1</sub> = I <sub>B2</sub> = -100mA |
|                                               | t <sub>off</sub>     | —    | 1,140 | —         |          |                                                                                              |

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

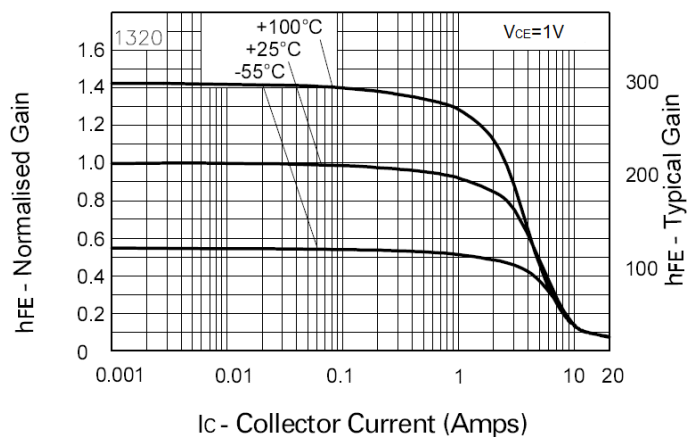
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



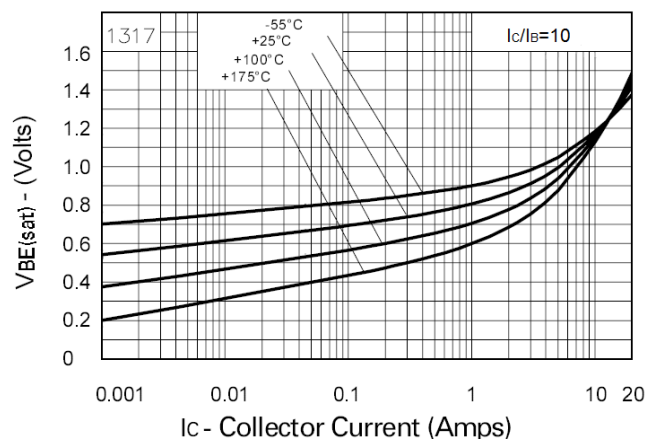
**$V_{CE(sat)}$  v  $I_C$**



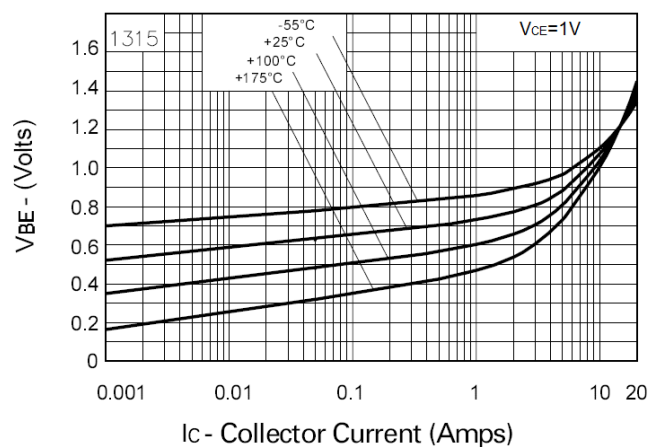
**$V_{CE(sat)}$  v  $I_C$**



**$h_{FE}$  v  $I_C$**



**$V_{BE(sat)}$  v  $I_C$**

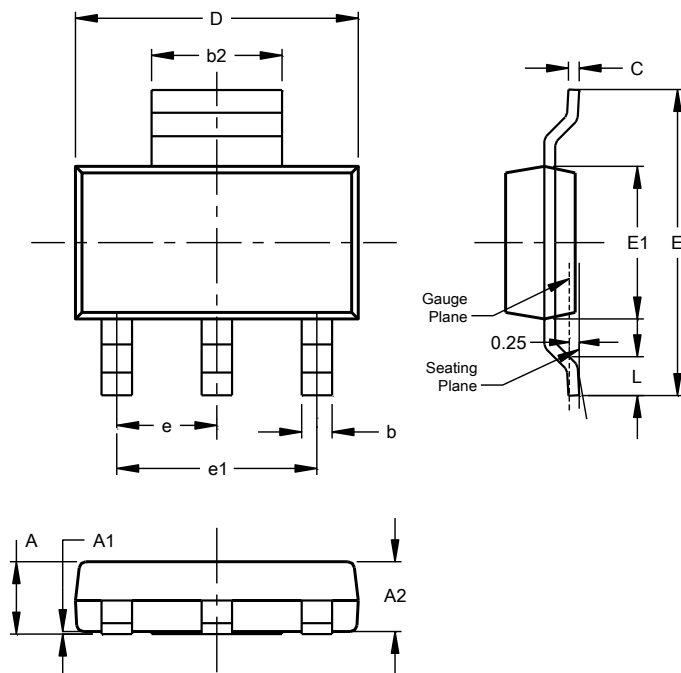


**$V_{BE(on)}$  v  $I_C$**

## Package Outline Dimensions

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

SOT223 (Type DN)

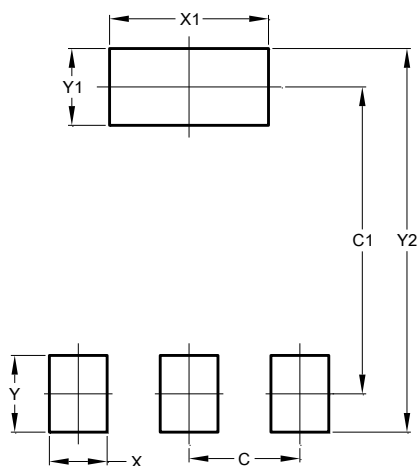


| SOT223 (Type DN)     |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | --   | 1.70 | --   |
| A1                   | 0.01 | 0.15 | --   |
| A2                   | 1.50 | 1.68 | 1.60 |
| b                    | 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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