

Description

This bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

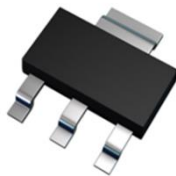
- $BV_{CEO} > -200V$
- $I_C = -2A$ High Continuous Collector Current
- $I_C = -5A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -165mV @ -1A$
- h_{FE} Specified up to -5A for a High Gain Hold-Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DIODES™ FZT956Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

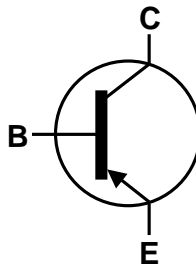
Mechanical Data

- Package: SOT223 (Type ZN)
- 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 Ⓜ3
- Weight: 0.112 grams (Approximate)

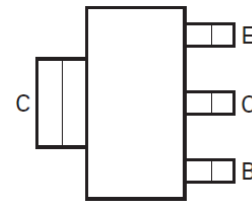
SOT223 (Type ZN)



Top View



Device Symbol



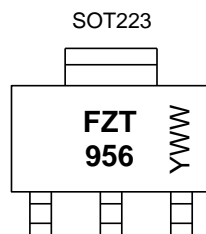
Top View
Pin-Out

Ordering Information (Note 4)

Product	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FZT956QTA	SOT223	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



FZT 956 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 2 = 2022)
 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}	-220	V
Collector-Emitter Voltage	V_{CEO}	-200	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-2	A
Peak Pulse Current	I_{CM}	-5	A

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

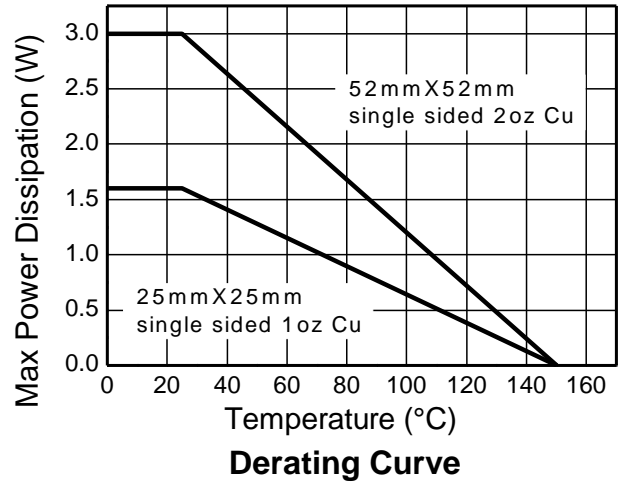
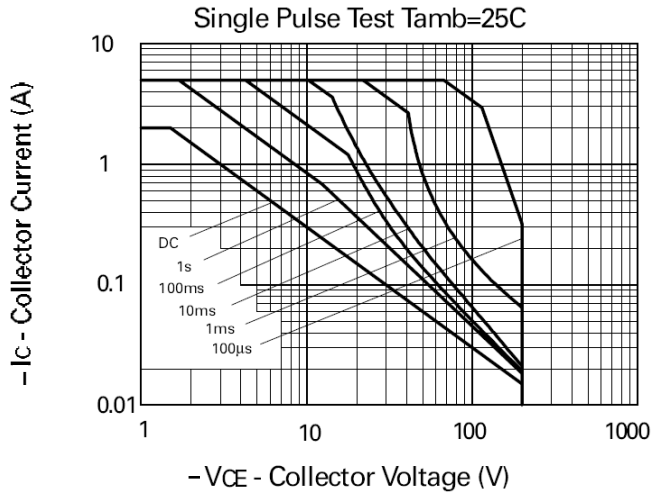
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P_D	3.0	W
		24	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.6	mW / $^{\circ}\text{C}$
		12.8	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	42	$^{\circ}\text{C/W}$
		78	
Thermal Resistance Junction to Lead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

ESD Ratings (Note 8)

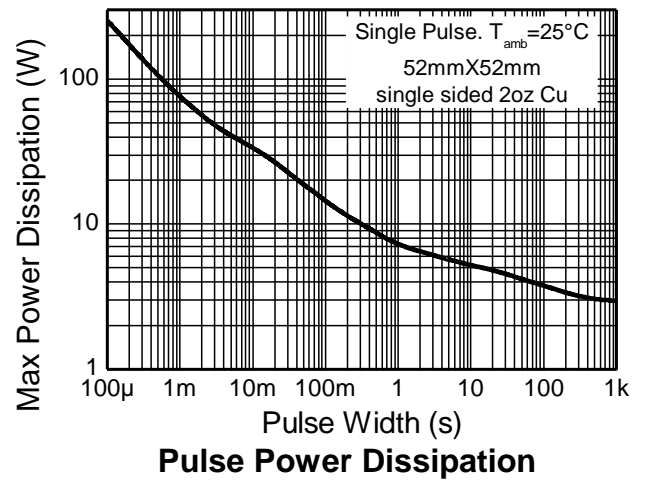
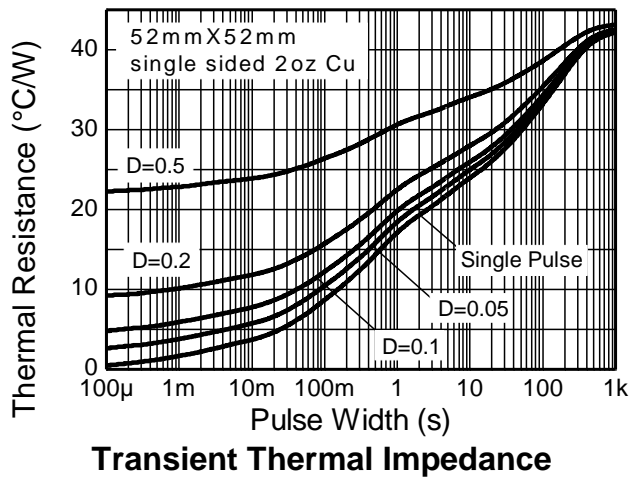
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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 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



Safe Operating Area

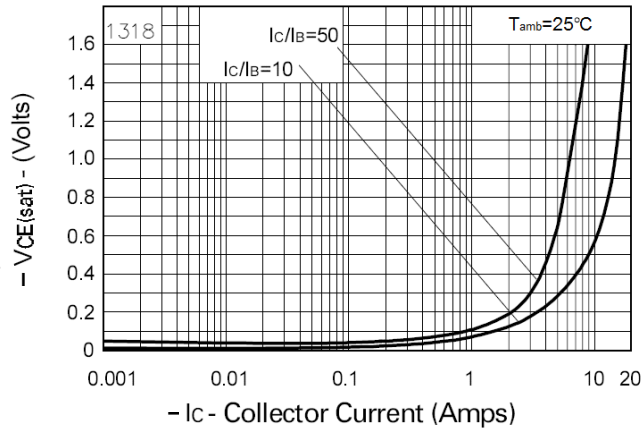


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

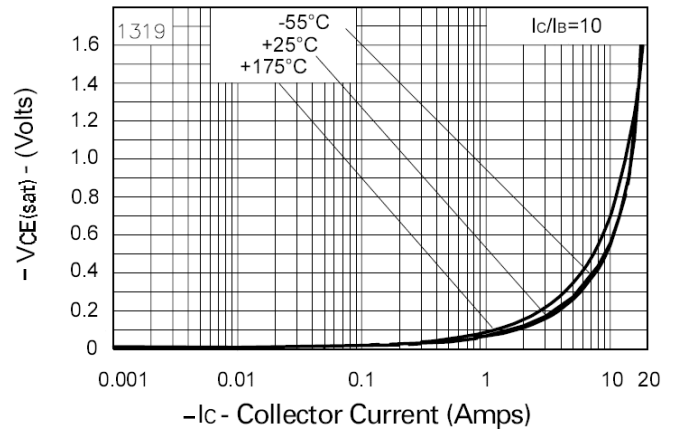
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-220	-300	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	-220	-300	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-200	-240	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.3	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	—	-50 -1	nA μA	$V_{CB} = -200\text{V}$ $V_{CB} = -200\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cut-Off Current	I_{CER}	—	—	-50 -1	nA μA	$V_{CE} = -200\text{V}$, $R \leq 1\text{k}\Omega$ $V_{CE} = -200\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cut-Off Current	I_{EBO}	—	—	-10	nA	$V_{EB} = -6\text{V}$
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100	200	—	—	$I_C = -10\text{mA}$, $V_{CE} = -5\text{V}$
		100	200	300		$I_C = -1\text{A}$, $V_{CE} = -5\text{V}$
		50	150	—		$I_C = -2\text{A}$, $V_{CE} = -5\text{V}$
		—	10	—		$I_C = -5\text{A}$, $V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-30	-50	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$
		—	-120	-165		$I_C = -1\text{A}$, $I_B = -100\text{mA}$
		—	-168	-275		$I_C = -2\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-970	-1,110	mV	$I_C = -2\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	-810	-950	mV	$I_C = -2\text{A}$, $V_{CE} = -5\text{V}$
Transitional Frequency (Note 9)	f_T	—	110	—	MHz	$I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{obo}	—	32	—	pF	$V_{CB} = -20\text{V}$, $f = 1\text{MHz}$
Switching Time	t_{on}	—	67	—	ns	$V_{CC} = -50\text{V}$, $I_C = -1\text{A}$, $-I_{B1} = I_{B2} = -100\text{mA}$
	t_{off}	—	1,140	—		

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

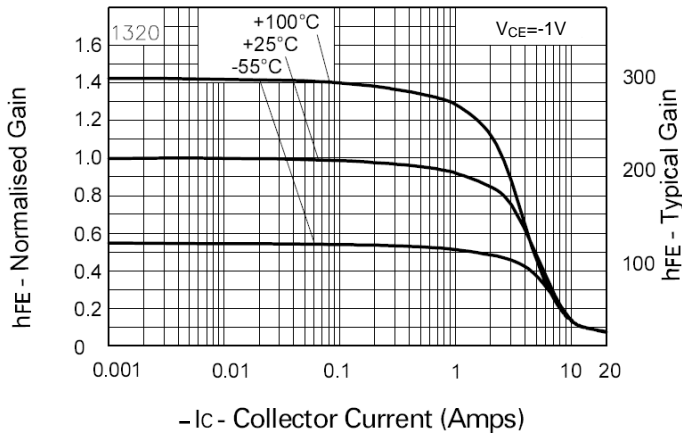
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



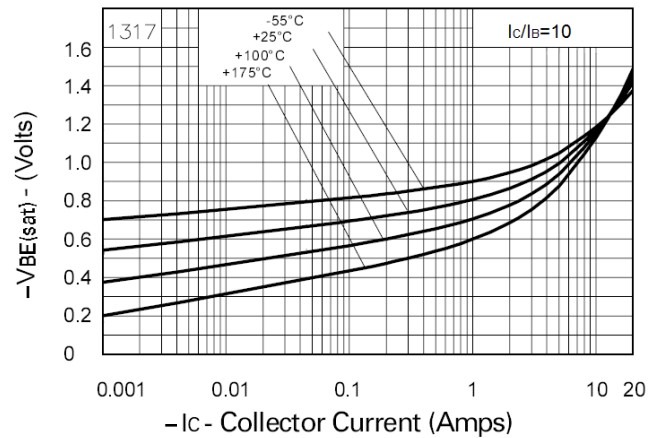
VCE(sat) v IC



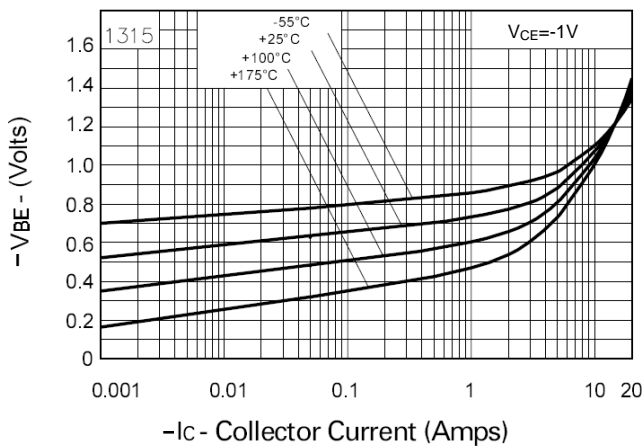
VCE(sat) v IC



hFE v IC



VBE(sat) v IC

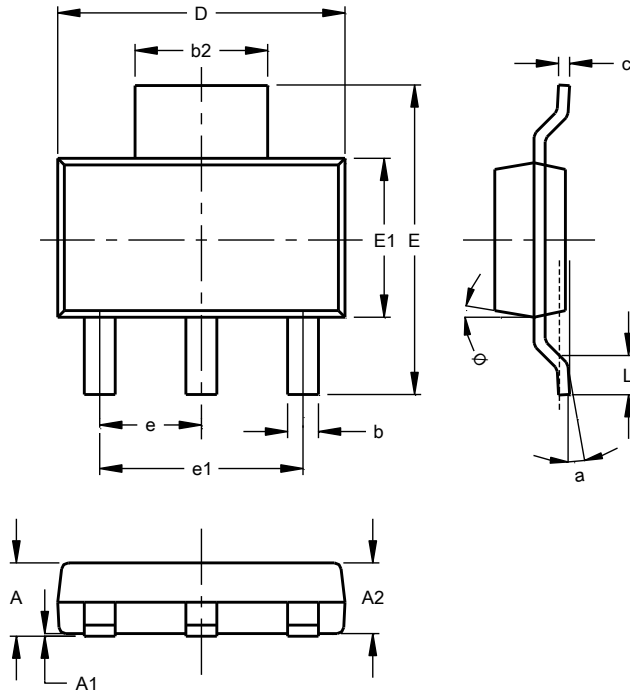


VBE(on) v IC

Package Outline Dimensions

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

SOT223 (Type ZN)

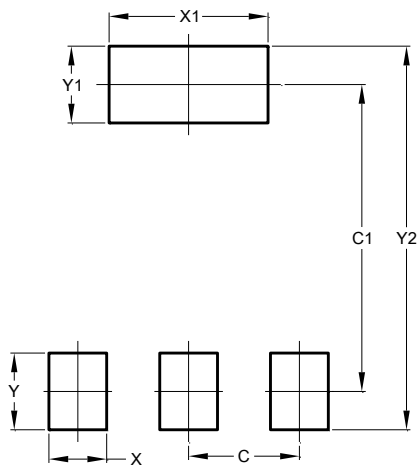


SOT223 (Type ZN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.02	0.10	--
A2	1.50	1.68	1.60
b	0.60	0.80	--
b2	2.90	3.10	--
c	0.24	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	2.30 NOM		
e1	4.60 NOM		
L	0.90	--	--
a	--	--	10°
θ	--	15°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT223 (Type ZN)



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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