FZT658

400V NPN HIGH VOLTAGE TRANSISTOR IN SOT223

Features

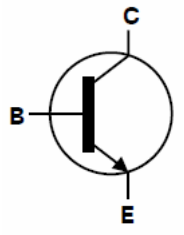
- BV_{CEO} > 400V
- I_C = 500mA High Continuous Current
- I_{CM} = 1A Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)}$ < 250mV @ 50mA
- h_{FE} > 40 Specified up to 200mA for High Current Gain Hold-Up
- Complementary PNP Type: FZT758
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

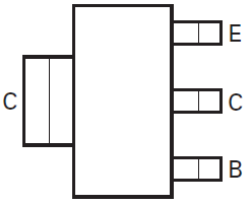
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Device Symbol



Top View
Pin-Out

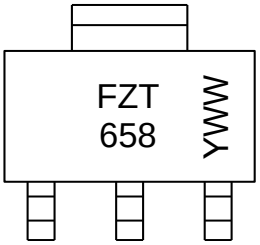
Ordering Information (Note 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FZT658TA	FZT658	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

SOT223



FZT 658 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{WW}$ = Week Code (01~53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	400	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	0.5	A
Peak Pulse Current	I_{CM}	1	A

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

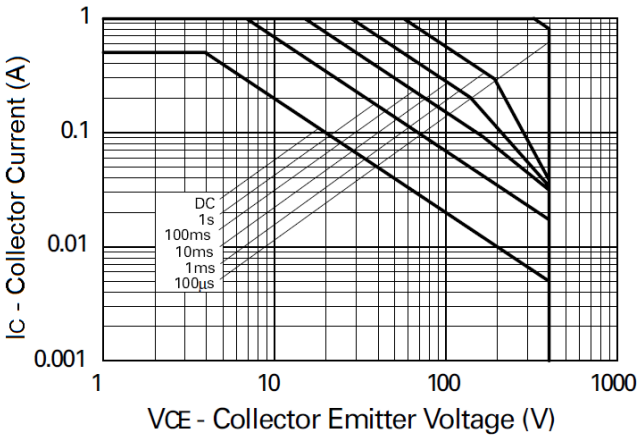
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	3.0	W
	(Note 6)		2.0	
	(Note 7)		1.6	
	(Note 8)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	41.7	°C/W
	(Note 6)		62.5	
	(Note 7)		78.1	
	(Note 8)		104	
Thermal Resistance Junction to Lead	(Note 9)	$R_{\theta JL}$	12.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

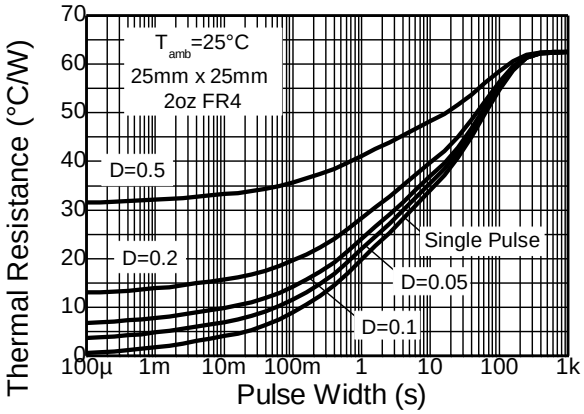
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 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.

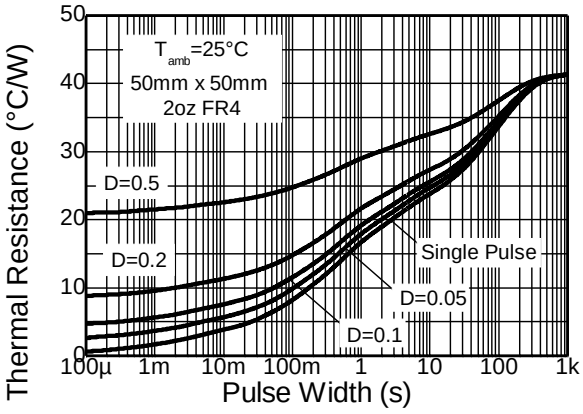
Thermal Characteristics and Derating Information



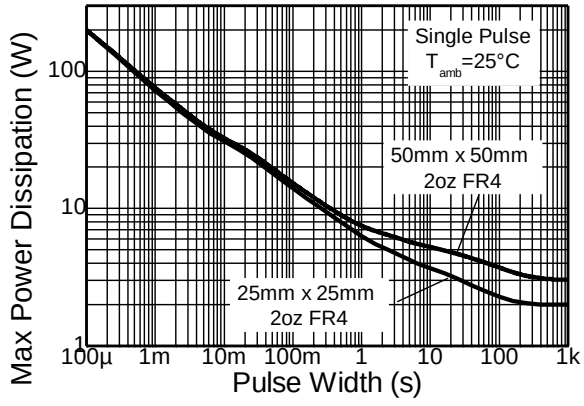
Safe Operating Area



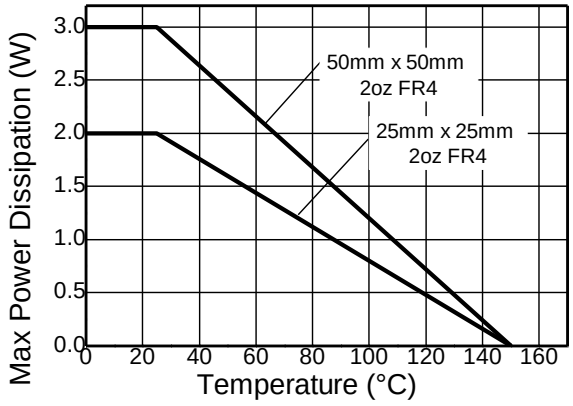
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



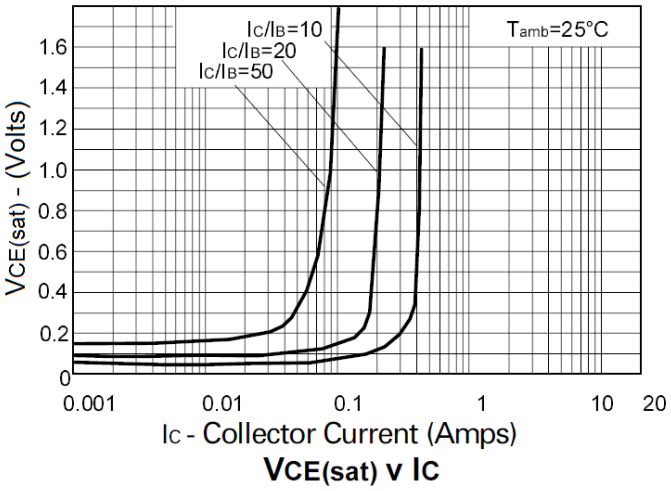
Derating Curve

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

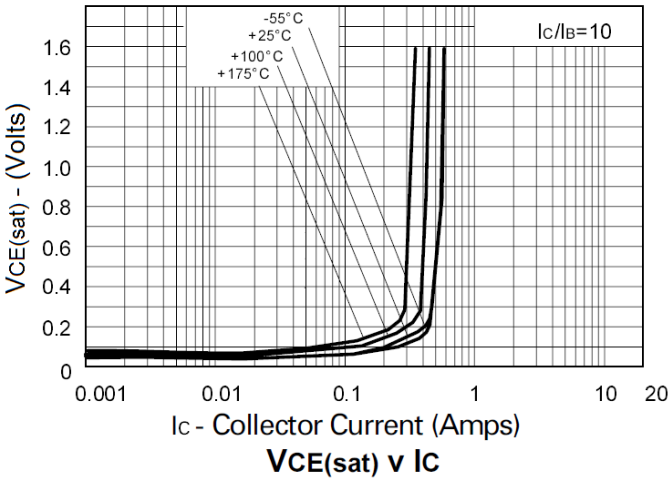
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	400	–	–	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	400	–	–	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	–	–	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	–	–	100	nA	V_{CB} = 320V
Emitter Cut-Off Current	I_{EBO}	–	–	100	nA	V_{EB} = 6V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	–	–	0.30	V	I_C = 20mA, I_B = 1mA
				0.25		I_C = 50mA, I_B = 5mA
				0.50		I_C = 100mA, I_B = 10mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	–	–	0.9	V	I_C = 100mA, I_B = 10mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	–	–	1.0	V	I_C = 100mA, V_{CE} = 5V
DC Current Gain (Note 9)	h_{FE}	50	–	–	–	I_C = 1mA, V_{CE} = 5V
		50	–	–		I_C = 100mA, V_{CE} = 5V
		40	–	–		I_C = 200mA, V_{CE} = 10V
Current Gain-Bandwidth Product (Note 9)	f_T	50	–	–	MHz	V_{CE} = 20V, I_C = 10mA, f = 20MHz
Output Capacitance (Note 9)	C_{obo}	–	10	–	pF	V_{CB} = 20V, f = 1MHz
Switching Times	t_{on}	–	130	–	ns	I_C = 100mA, V_{CC} = 100V
	t_{off}	–	3,300	–		I_{B1} = 10mA, I_{B2} = -20mA

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

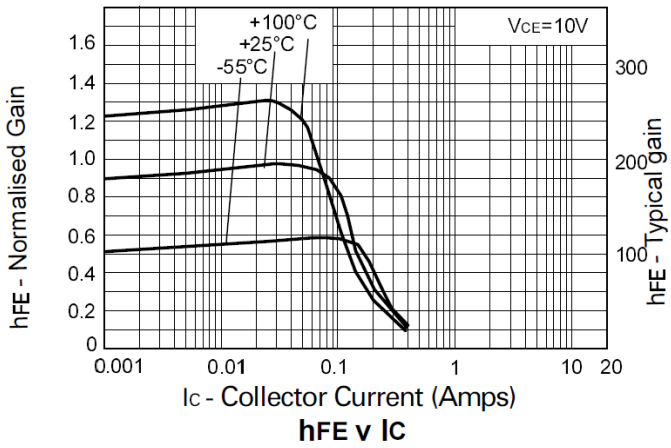
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



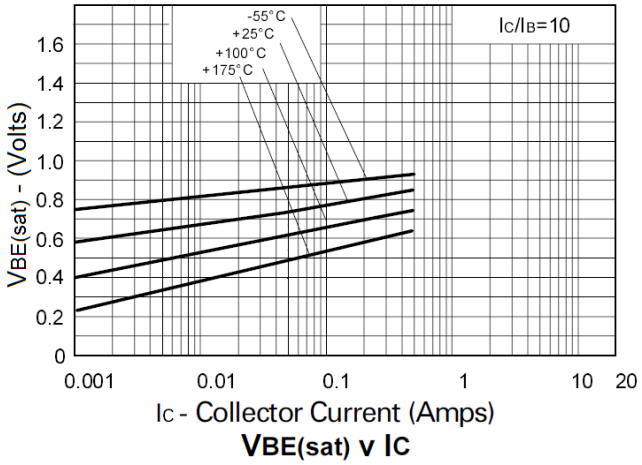
VCE(sat) v IC



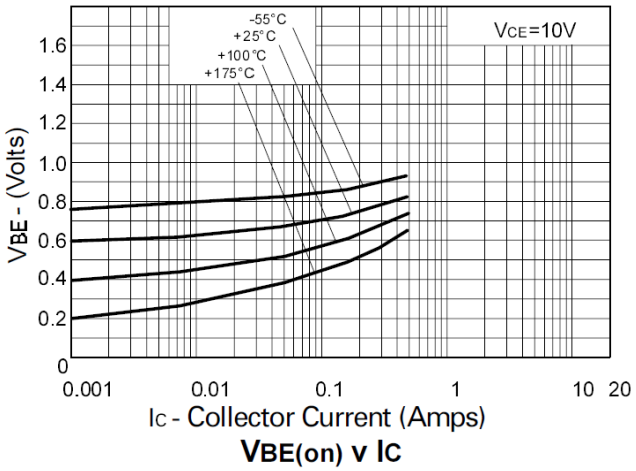
VCE(sat) v IC



hFE v IC



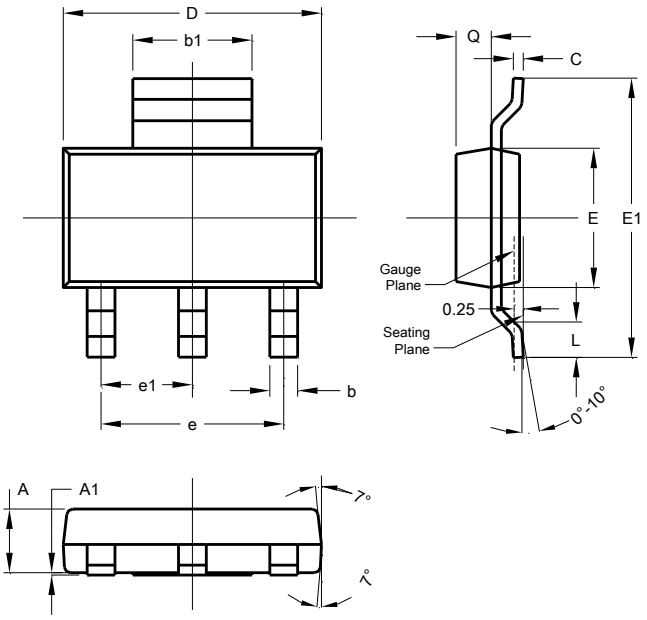
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

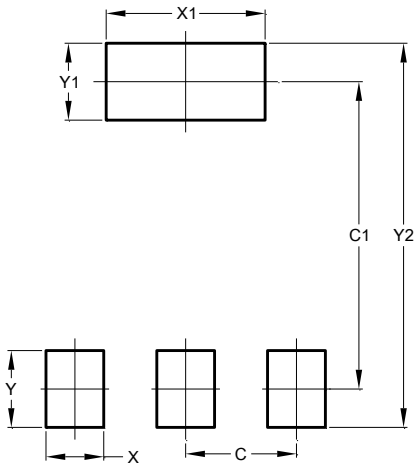
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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