75V NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SOT223

Description

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

Features

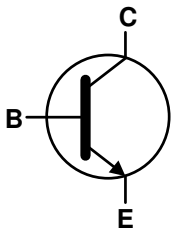
- BV_{CEO} > 75V
- I_C= 4.5A High Continuous Collector Current
- I_{CM} = 10A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < 120mV @ 1A
- h_{FE} > 300 @ I_C=1A for a High Gain Hold-Up
- $R_{CE(sat)}$ = 78mΩ at 4.5A for a Low Equivalent On-Resistance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

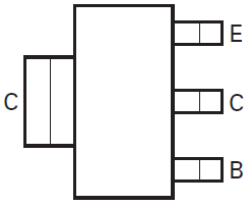
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Device Symbol



Top View
Pin-Out

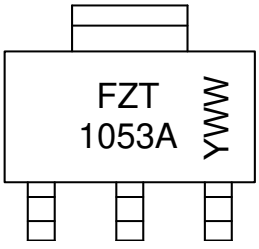
Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FZT1053AQTA	Automotive	FZT1053A	7	12	1,000

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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to https://www.diodes.com/quality/.
5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SOT223



FZT1053A = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 9 = 2019)
WW or $\overline{WW}$ = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	4.5	A
Continuous Base Current	I_B	500	mA
Peak Pulse Collector Current	I_{CM}	10	A

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

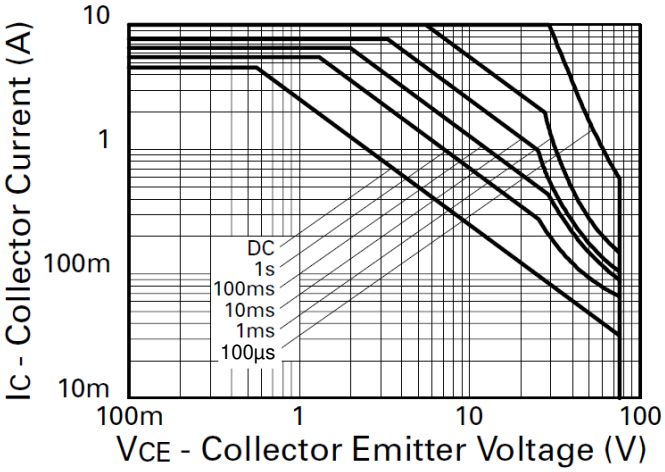
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	3.0	W
	(Note 7)		2.0	
	(Note 8)		1.6	
	(Note 9)		1.2	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	41.7	°C/W
	(Note 7)		62.5	
	(Note 8)		78.1	
	(Note 9)		104	
Thermal Resistance Junction to Lead	(Note 10)	$R_{\theta JL}$	10.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 11)

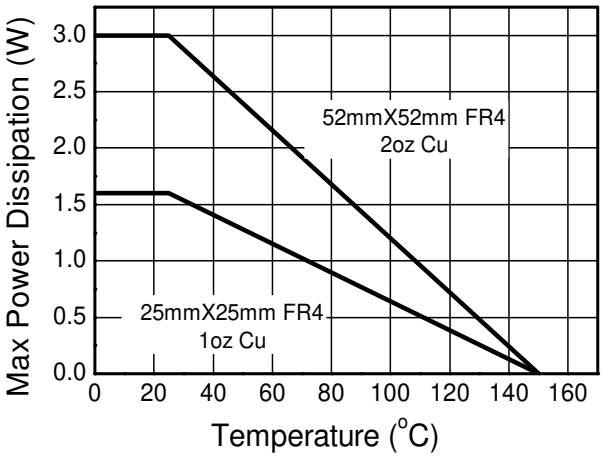
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge—Machine Model	ESD MM	400	V	C

Notes:
6. 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.
7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.
8. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
9. Same as Note 6, except the device is mounted on minimum recommended pad layout.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

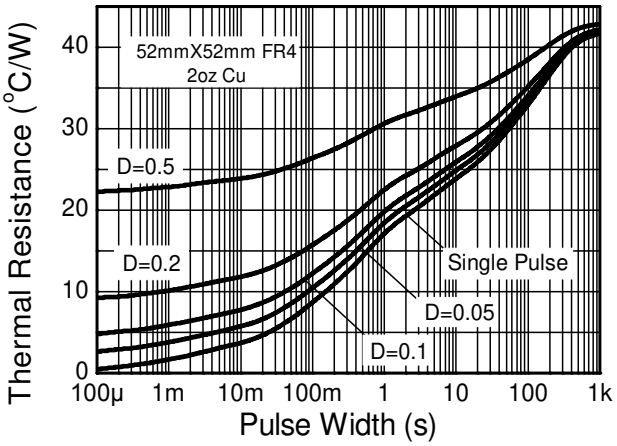
Thermal Characteristics and Derating Information



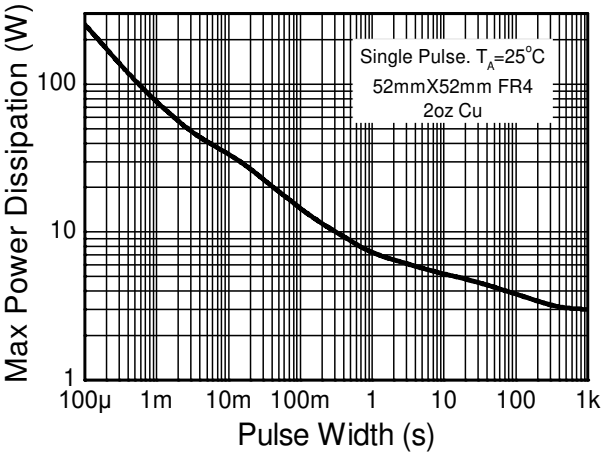
Safe Operating Area



Derating Curve



Transient Thermal Impedance



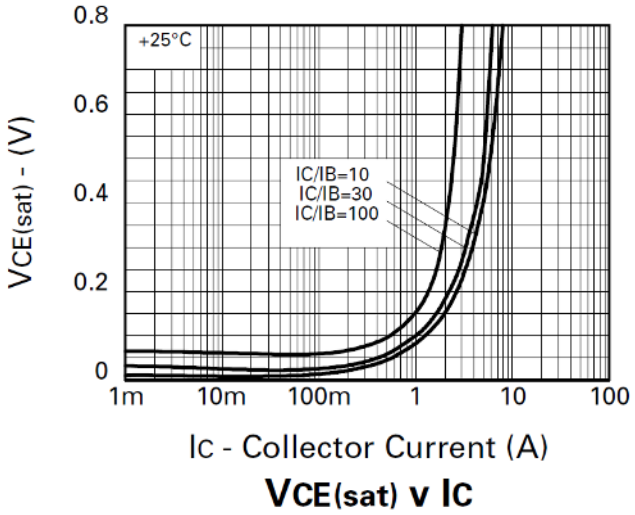
Pulse Power Dissipation

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

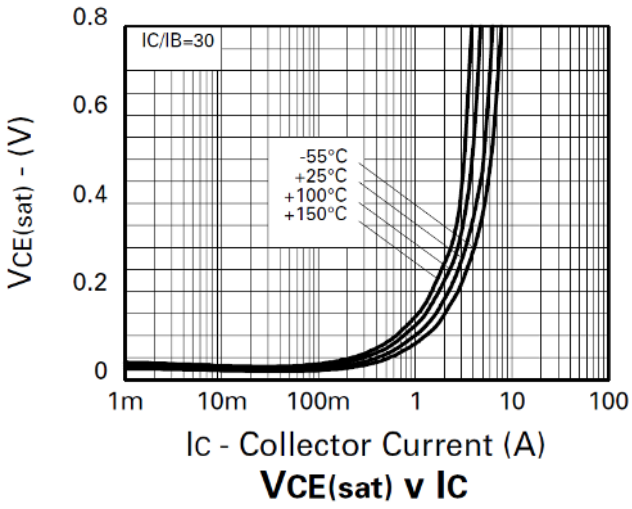
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	250	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CES}	150	250	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	75	100	—	V	I_C = 10mA
Collector-Emitter Breakdown Voltage	BV_{CEV}	150	250	—	V	I_C = 100µA, V_{EB} = 1V
Emitter-Base Breakdown Voltage	BV_{EBO}	7.0	8.8	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	0.9	10	nA	V_{CB} = 120V
Collector Cutoff Current	I_{CES}	—	1.5	10	nA	V_{CES} = 120V
Emitter Cutoff Current	I_{EBO}	—	0.3	10	nA	V_{EB} = 4V
DC Current Transfer Static Ratio (Note 12)	h_{FE}	270	440	—	—	I_C = 10mA, V_{CE} = 2V
		300	450	1,200		I_C = 0.5A, V_{CE} = 2V
		300	450	—		I_C = 1A, V_{CE} = 2V
		40	60	—		I_C = 4.5A, V_{CE} = 2V
		—	20	—		I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	—	21	30	mV	I_C = 0.2A, I_B = 20mA
		—	55	75		I_C = 0.5A, I_B = 20mA
		—	150	200		I_C = 1A, I_B = 10mA
		—	160	210		I_C = 2A, I_B = 100mA
		—	350	440		I_C = 4.5A, I_B = 200mA
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	—	900	1,000	mV	I_C = 3A, I_B = 100mA
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	—	825	950	mV	I_C = 3A, V_{CE} = 2V
Transitional Frequency (Note 12)	f_T	—	140	—	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Output Capacitance	C_{obo}	—	21	30	pF	V_{CB} = 10V, f = 1MHz
Switching Time	t_{on}	—	162	—	ns	V_{CC} = 50V, I_C = 2A, I_{B1} = I_{B2} = ±20mA
	t_{off}	—	900	—	ns	

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

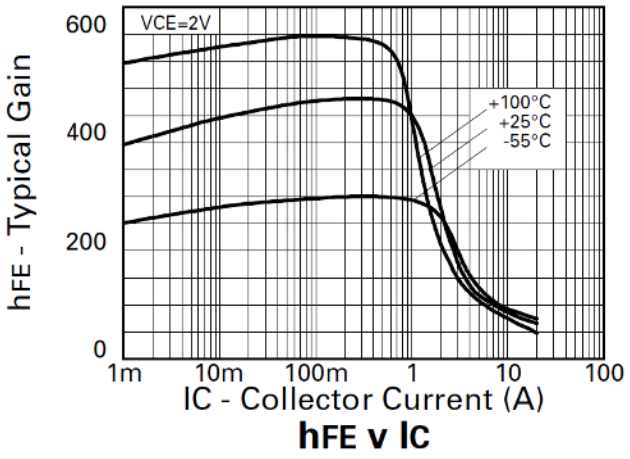
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



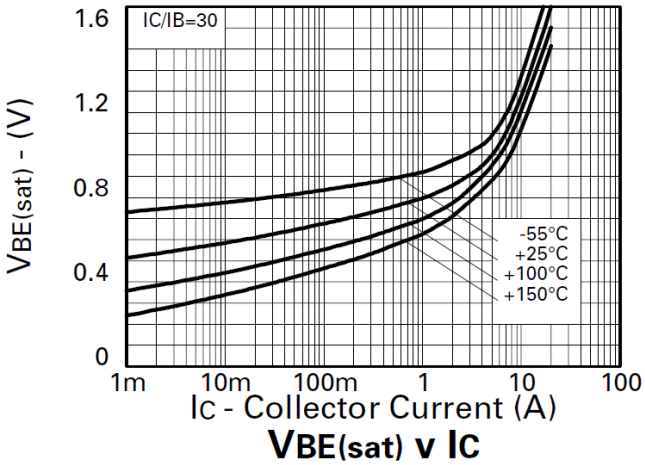
VCE(sat) v IC



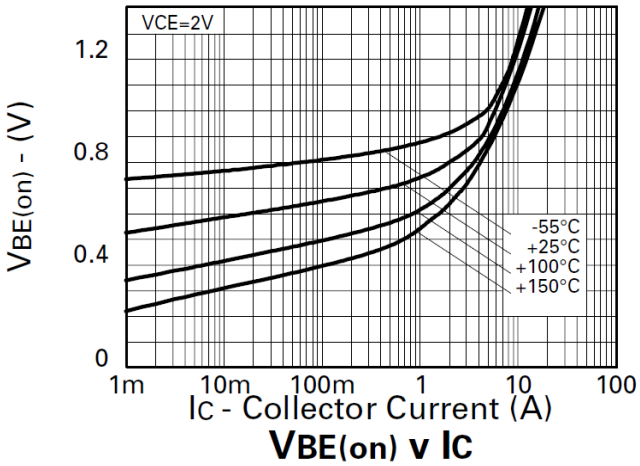
VCE(sat) v IC



hFE v IC



VBE(sat) v IC

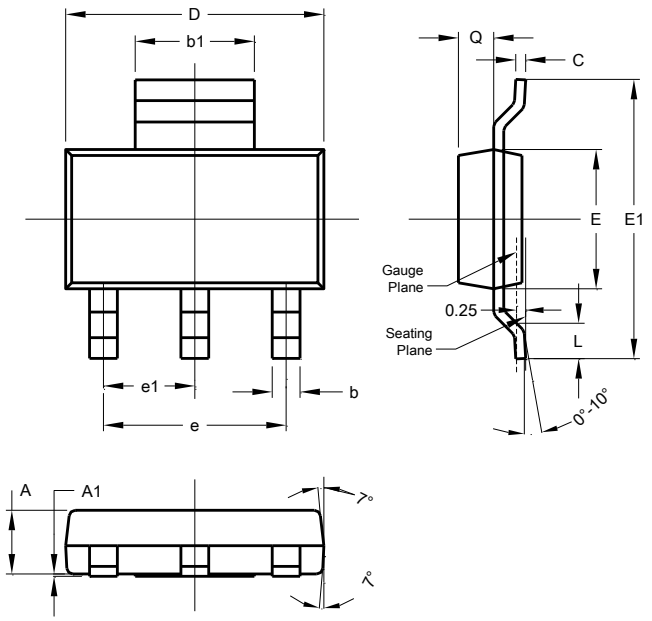


VBE(on) v IC

Package Outline Dimensions

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

SOT223

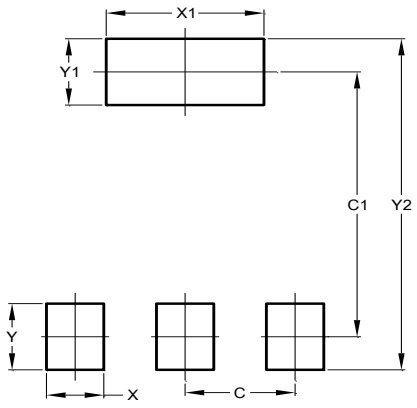


SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

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

SOT223



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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