40V NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SOT223

Features

- BV_{CEO} > 40V
- I_C = 5A high Continuous Collector Current
- I_{CM} = 20A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < 120mV @ 1A
- R_{SAT} = 50mΩ @ 5A for a low equivalent On-Resistance
- h_{FE} specified up to 10A for a high gain hold-up
- Complementary PNP Type: FZT1151A
- **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)

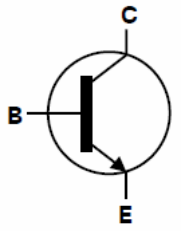
Applications

- Solenoid, relay and actuator drivers
- DC Modules
- Motor control

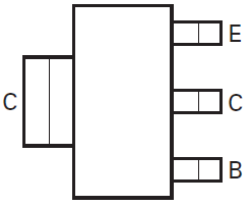
SOT223



Top View



Device Symbol



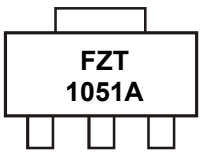
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT1051ATA	FZT1051A	7	12	1,000
FZT1051ATC	FZT1051A	13	12	4,000

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



FZT1051A = Product Type Marking Code

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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}	40	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Current	I_{CM}	10	A
Base Current	I_B	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)	$R_{\theta JL}$	10.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

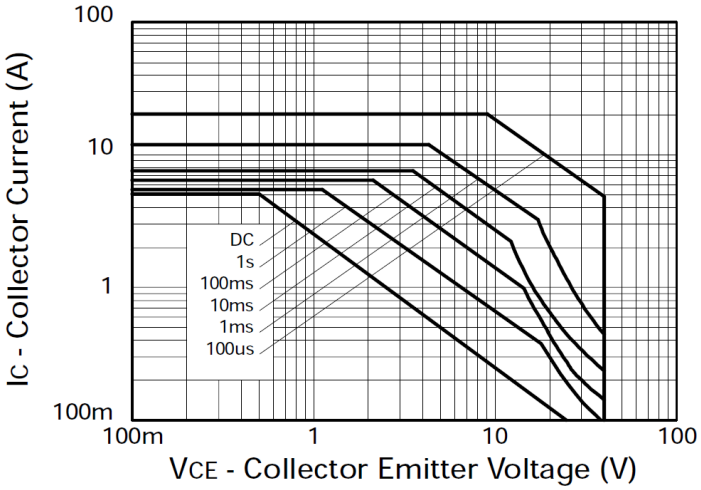
ESD Ratings (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

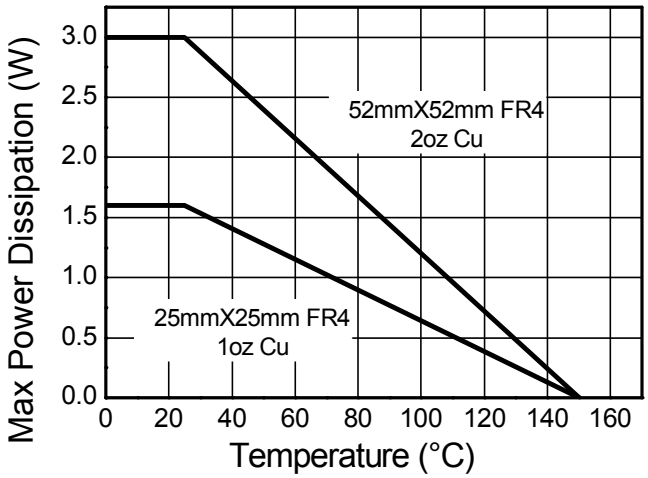
Notes:
5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as note (5), except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as note (5), 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.

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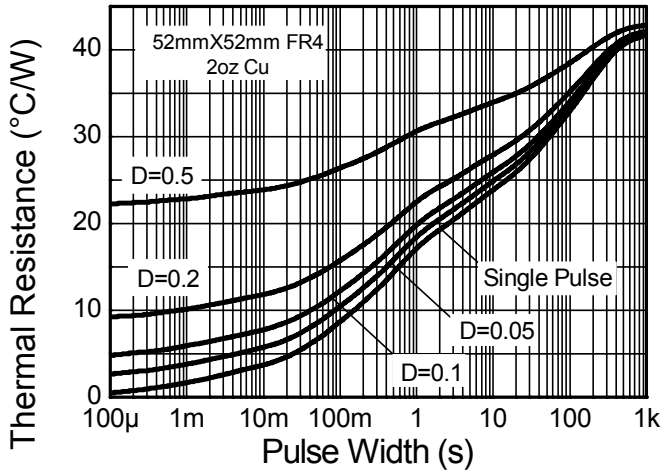
Thermal Characteristics and Derating Information



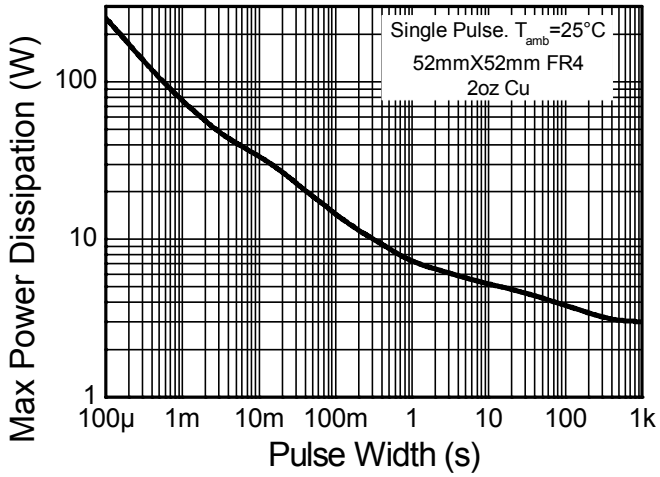
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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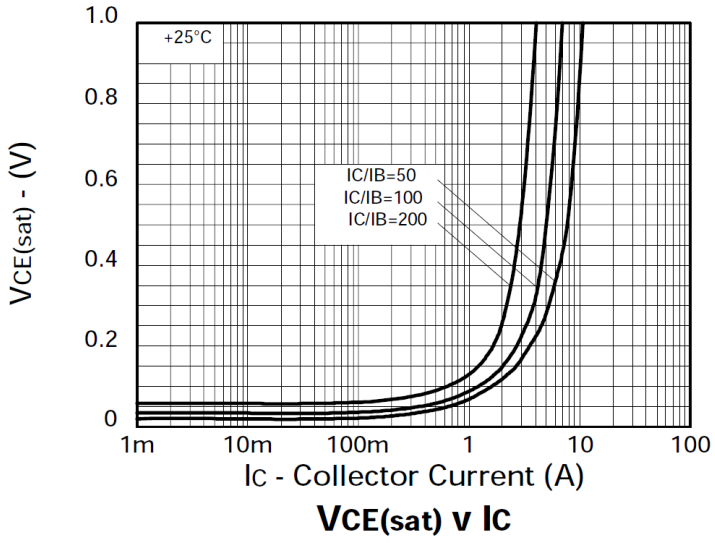
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	–	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CES}	150	190	–	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	150	190	–	V	I_C = 100µA, V_{EB} = 1V
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	40	60	–	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	–	V	I_E = 100µA
Collector Cut-off Current	I_{CBO}	– –	<1 –	10 0.5	nA µA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Collector Cut-off Current	I_{CES}	–	<1	10	nA	V_{CB} = 120V
Emitter Cut-off Current	I_{EBO}	–	<1	10	nA	V_{EB} = 6V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	–	17	25	mV	I_C = 200mA, I_B = 10mA
		–	85	120		I_C = 1A, I_B = 10mA
		–	140	180		I_C = 2A, I_B = 20mA
		–	250	340		I_C = 5A, I_B = 100mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	–	980	1100	mV	I_C = 5A, I_B = 100mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	–	915	1000	mV	I_C = 5A, V_{CE} = 2V
DC Current Gain (Note 11)	h_{FE}	290	440	–	–	I_C = 10mA, V_{CE} = 2V
		270	450	1200		I_C = 1A, V_{CE} = 2V
		130	220	–		I_C = 5A, V_{CE} = 2V
		40	55	–		I_C = 10A, V_{CE} = 2V
Output Capacitance	C_{obo}	–	27	40	pF	V_{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f_T	–	155	–	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Switching Times	t_{on}	–	220	–	ns	I_C = 3A, V_{CC} = 10V, I_{B1} = -I_{B2} = 30mA
	t_{off}	–	540	–		

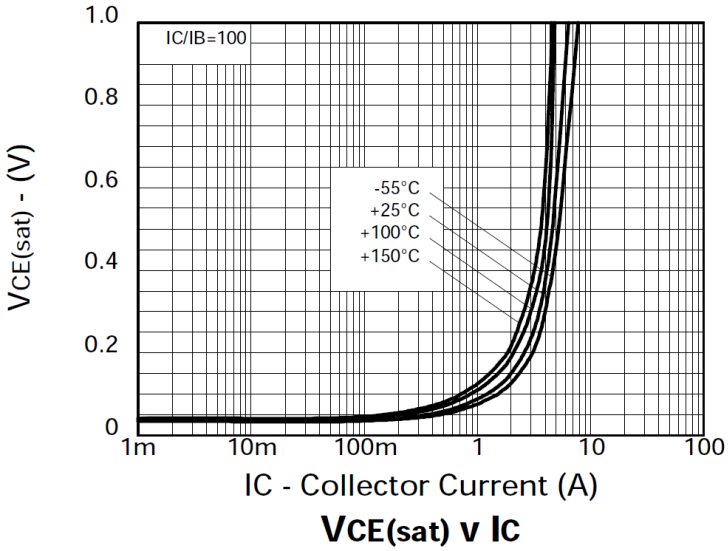
Notes: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%

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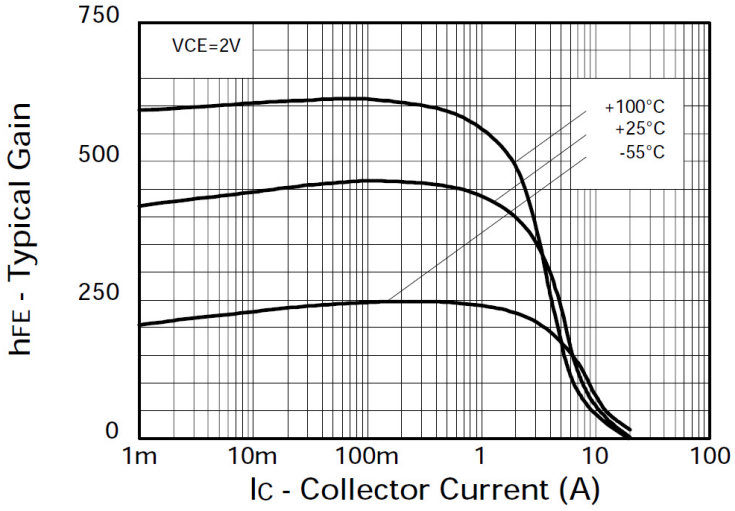
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



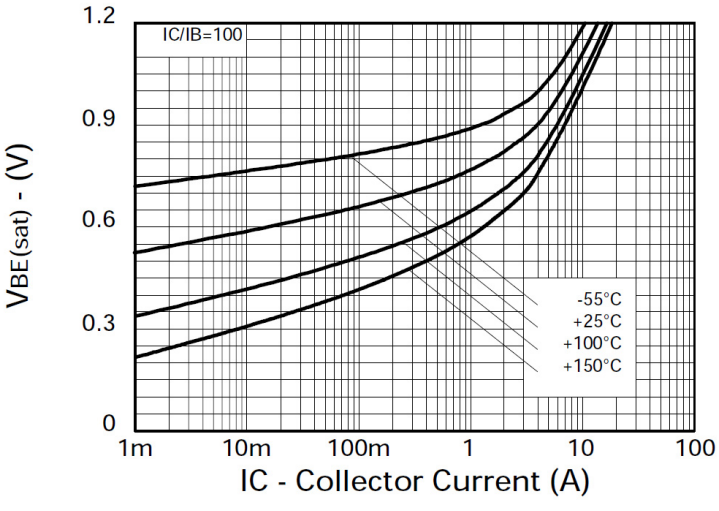
VCE(sat) v IC



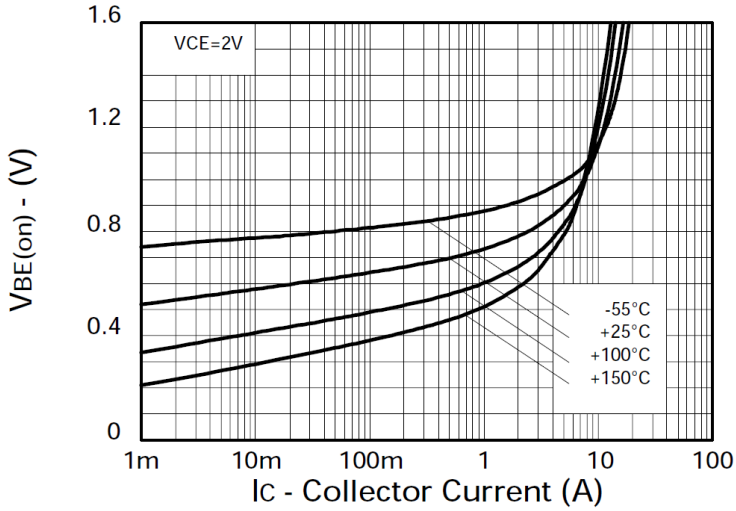
VCE(sat) v IC



hFE v IC



VBE(sat) v IC

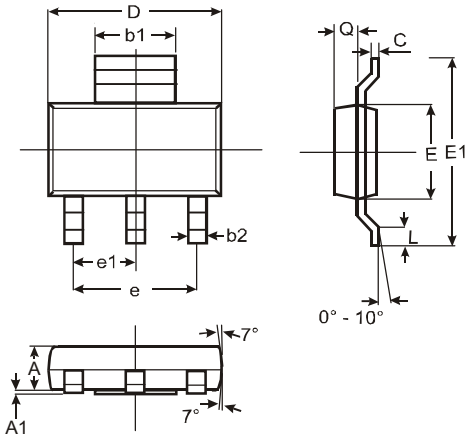


VBE(on) v IC

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Package Outline Dimensions

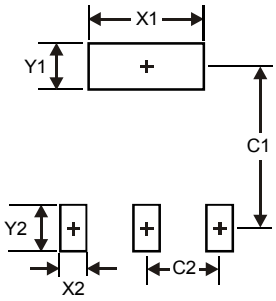
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
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)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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