

60V NPN HIGH PERFORMANCE TRANSISTOR IN SOT223

Features

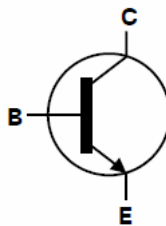
- $BV_{CEO} > 60V$
- $I_C = 3A$ High Continuous Current
- $I_{CM} = 6A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 300mV @ 1A$
- Complementary PNP Type: FZT751
- **Lead-Free Finish; RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

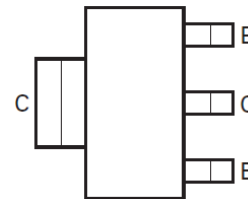
- Case: SOT223
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.112 grams (approximate)



Top View



Device Symbol



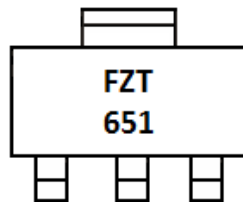
Top View
Pin-Out

Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT651TA	AEC-Q101	FZT651	7	12	1,000
FZT651TC	AEC-Q101	FZT651	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



FZT651 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	3	A
Peak Pulse Current	I_{CM}	6	A

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

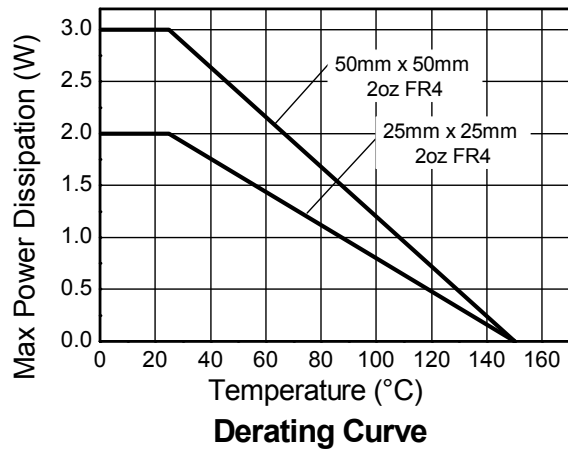
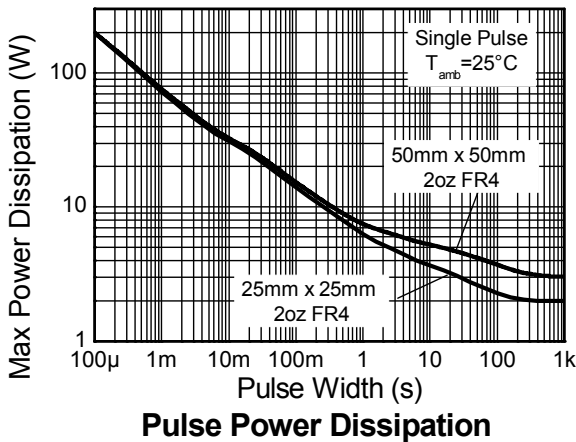
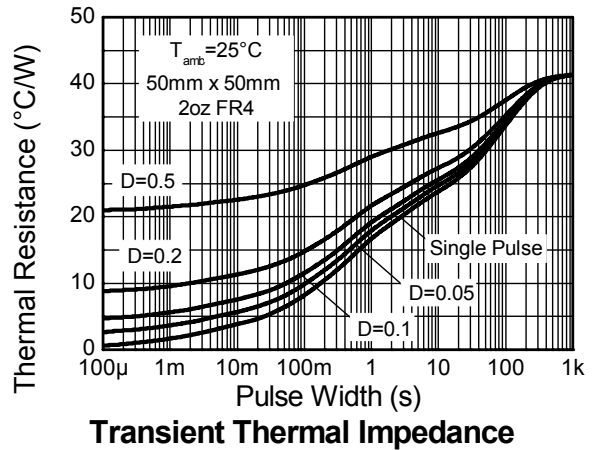
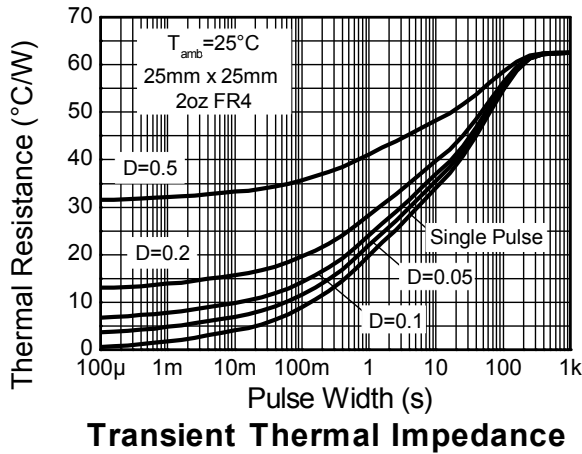
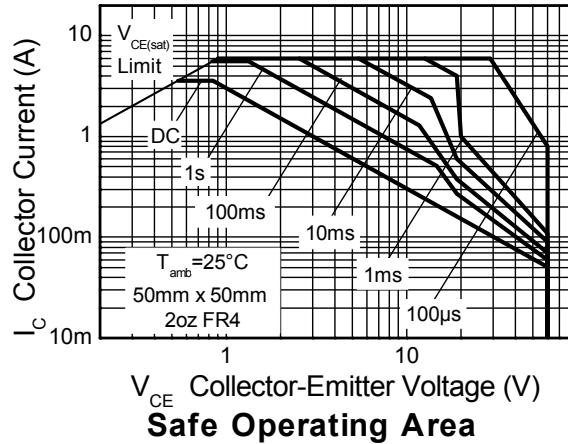
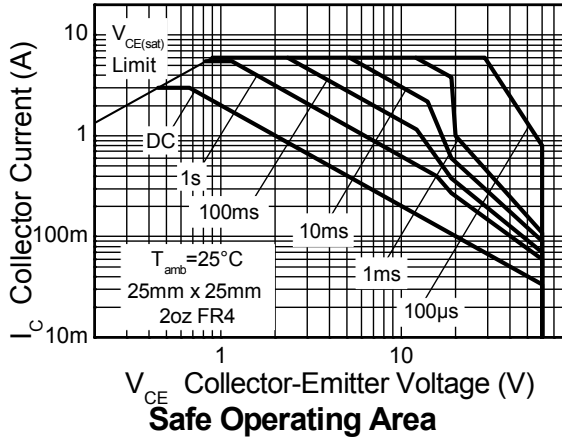
Characteristic	Symbol	Value	Unit	
Power Dissipation	P_D	(Note 5)	2	W
		(Note 6)	3	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	62.5	$^\circ\text{C/W}$
		(Note 6)	41.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	12.9	$^\circ\text{C/W}$	
Operating 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 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
 6. Same as note (5), except the device is mounted on 50mm x 50mm 2oz 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

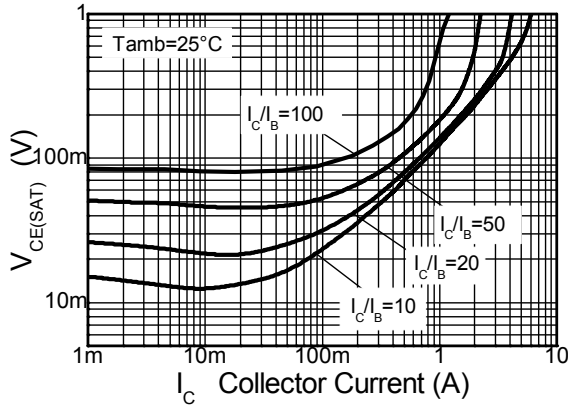


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

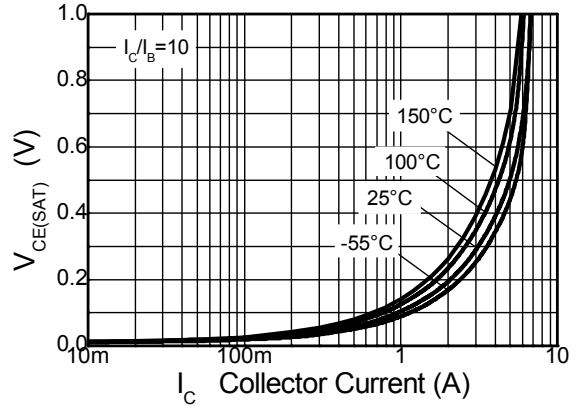
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	–	–	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	–	–	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	–	–	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	I_{CBO}	–	–	0.1	μA	$V_{CB} = 60\text{V}$
		–	–	10		$V_{CB} = 60\text{V}, T_A = +125^\circ\text{C}$
Emitter Cut-off Current	I_{EBO}	–	–	100	nA	$V_{EB} = 4\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	–	0.12	0.3	V	$I_C = 1\text{A}, I_B = 100\text{mA}$
		–	0.43	0.6		$I_C = 3\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	–	0.9	1.25	V	$I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	–	0.8	1.0	V	$I_C = 1\text{A}, V_{CE} = 2\text{V}$
DC Current Gain (Note 9)	h_{FE}	70	200	–	–	$I_C = 50\text{mA}, V_{CE} = 2\text{V}$
		100	200	300		$I_C = 500\text{mA}, V_{CE} = 2\text{V}$
		80	170	–		$I_C = 1\text{A}, V_{CE} = 2\text{V}$
		40	80	–		$I_C = 2\text{A}, V_{CE} = 2\text{V}$
Current Gain-Bandwidth Product (Note 9)	f_T	140	175	–	MHz	$V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$
Switching Times	t_{on}	–	45	–	ns	$I_C = 500\text{mA}, V_{CC} = 10\text{V}, I_{B1} = I_{B2} = 50\text{mA}$
	t_{off}	–	800	–		
Output Capacitance (Note 9)	C_{obo}	–	–	30	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$

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

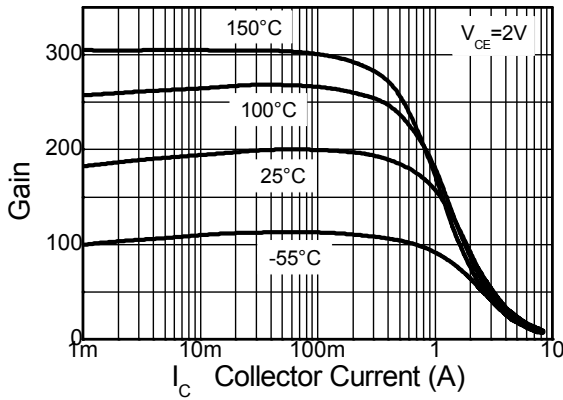
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



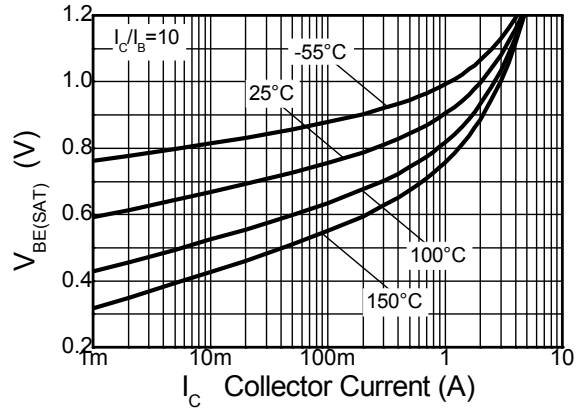
$V_{CE(SAT)} \ v \ I_C$



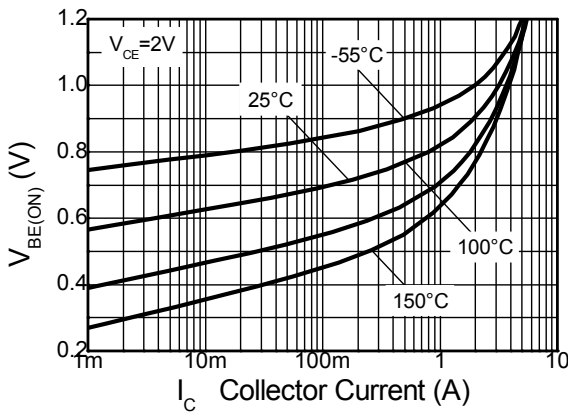
$V_{CE(SAT)} \ v \ I_C$



$h_{FE} \ v \ I_C$



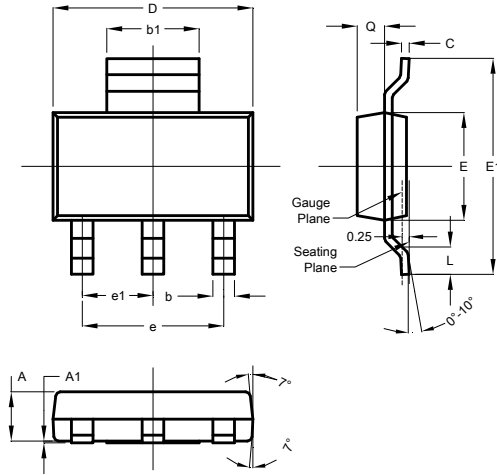
$V_{BE(SAT)} \ v \ I_C$



$V_{BE(ON)} \ v \ I_C$

Package Outline Dimensions

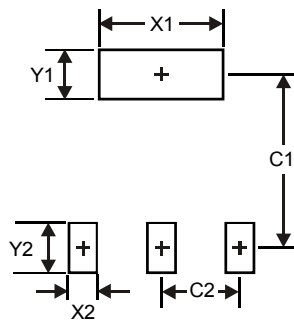
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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