

FZT651

60V NPN HIGH PERFORMANCE TRANSISTOR IN SOT223

Features

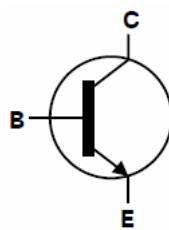
- $BV_{CEO} > 60V$
- $I_C = 3A$ High Continuous Current
- $I_{CM} = 6A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 300mV @ 1A$
- Complementary PNP Type: FZT751
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to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

Mechanical Data

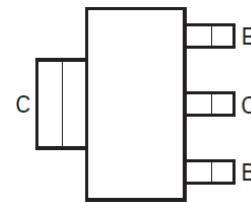
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)



Top View



Device Symbol

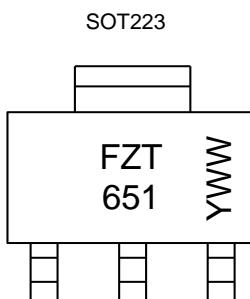
Top View
Pin-Out

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



FZT 651 = Product Type Marking Code
YWW = Date Code Marking
Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
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}	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.)

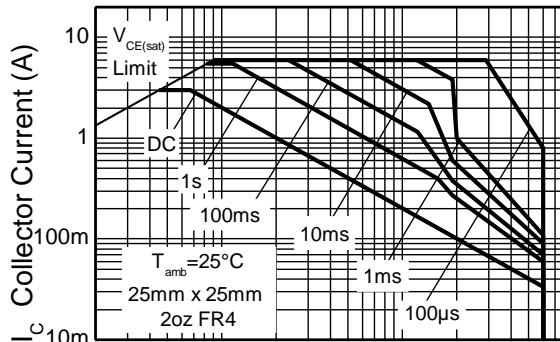
Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	2	W
		3	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
		41.7	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	12.9	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

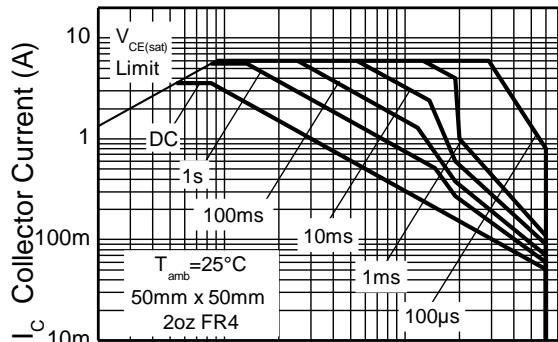
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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.

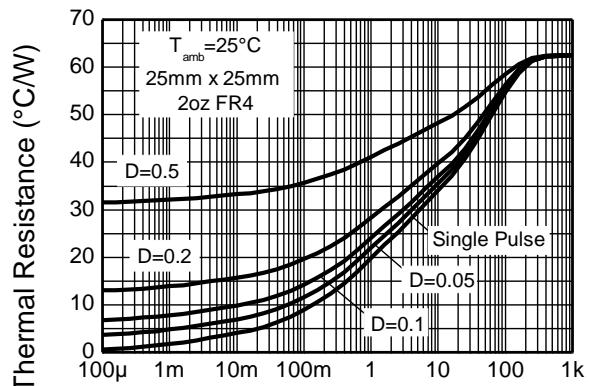
Thermal Characteristics and Derating Information



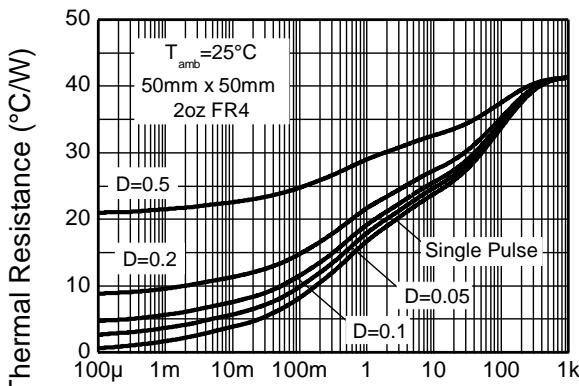
V_{CE} Collector-Emitter Voltage (V)
Safe Operating Area



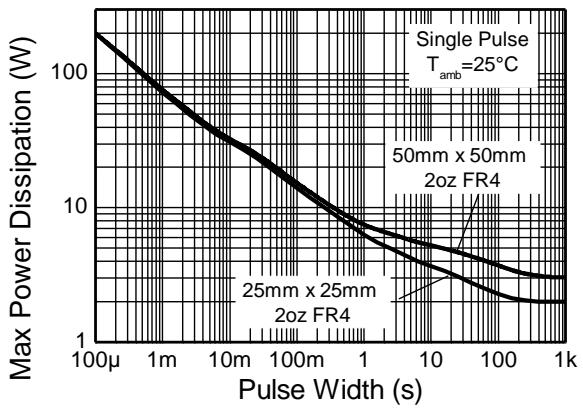
V_{CE} Collector-Emitter Voltage (V)
Safe Operating Area



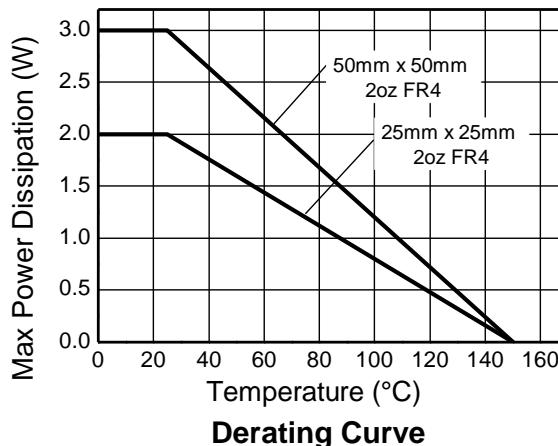
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



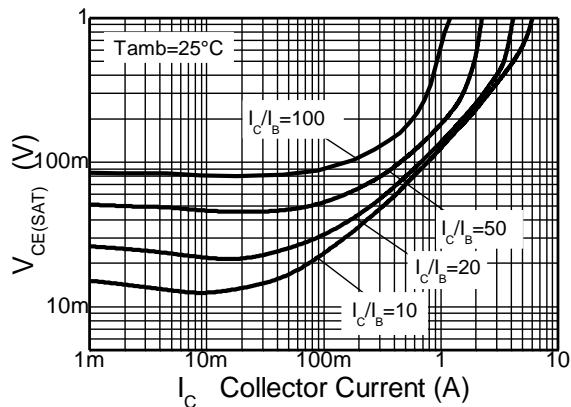
Derating Curve

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

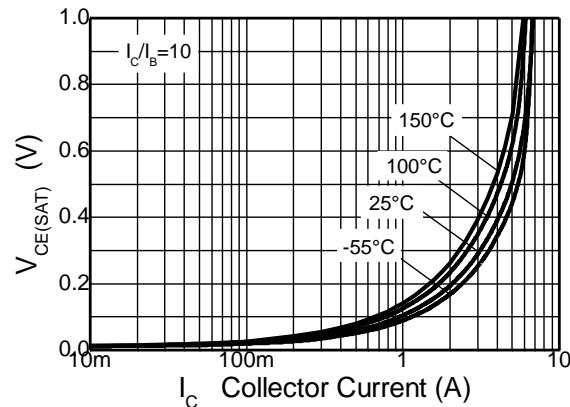
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current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

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

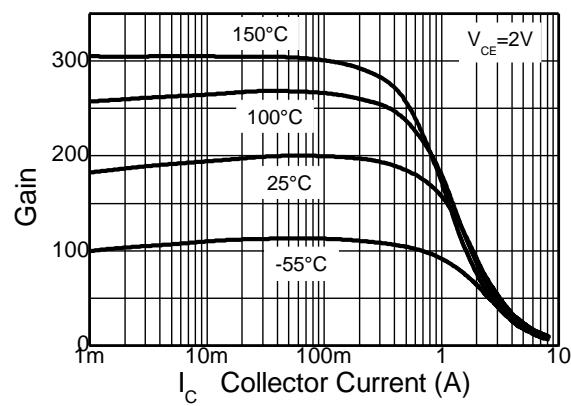
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



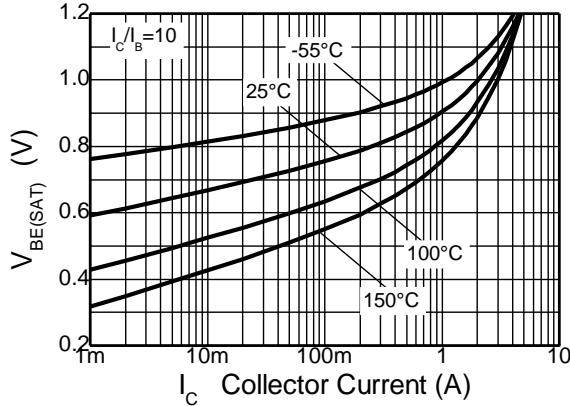
$V_{CE(SAT)}$ v I_C



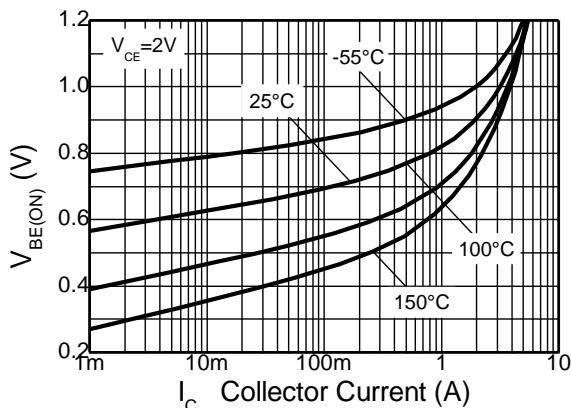
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



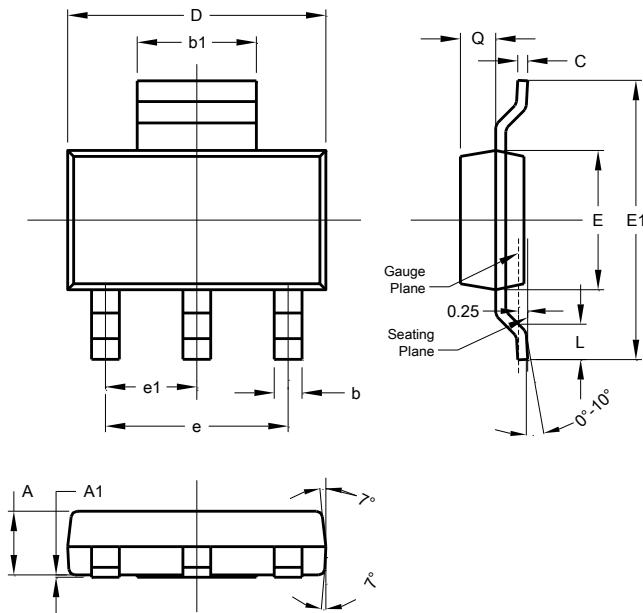
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

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

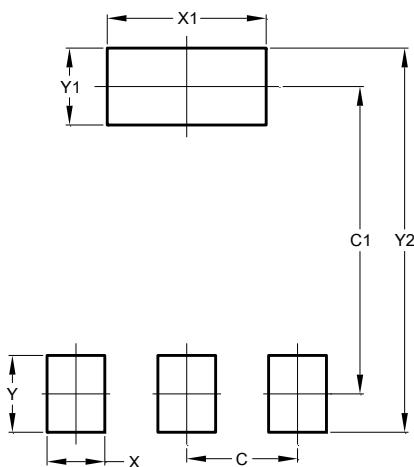


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

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

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