

**60V PNP HIGH PERFORMANCE TRANSISTOR IN SOT223**

**Description**

This Bipolar Junction Transistor (BJT) has been designed to meet the stringent requirements of Automotive Applications.

**Features**

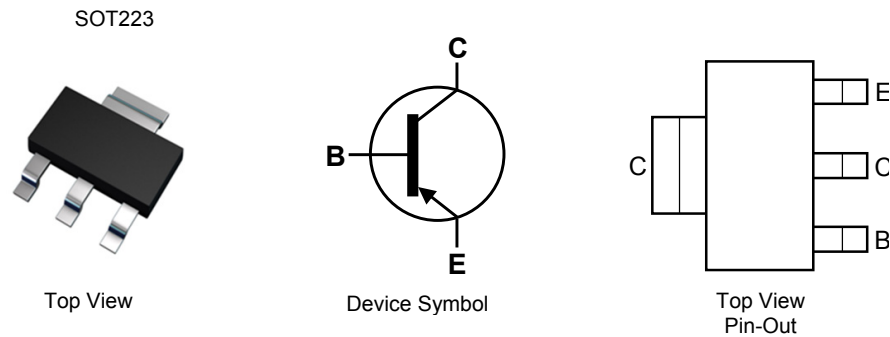
- $BV_{CEO} > -60V$
- $I_C = -3A$  high Continuous Current
- $I_{CM} = -6A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -300mV @ -1A$
- Complementary NPN Type: FZT651Q
- **Lead-Free Finish; RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Applications**

- Automotive lighting
- MOSFET and IGBT gate driving

**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  $\text{E3}$
- Weight: 0.112 grams (approximate)

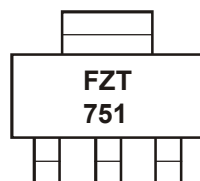


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT751QTA	Automotive	FZT751	7	12	1,000
FZT751QTC	Automotive	FZT751	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](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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

**Marking Information**



FZT751 = Product Type Marking Code

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-3	A
Peak Pulse Current	I <sub>CM</sub>	-6	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

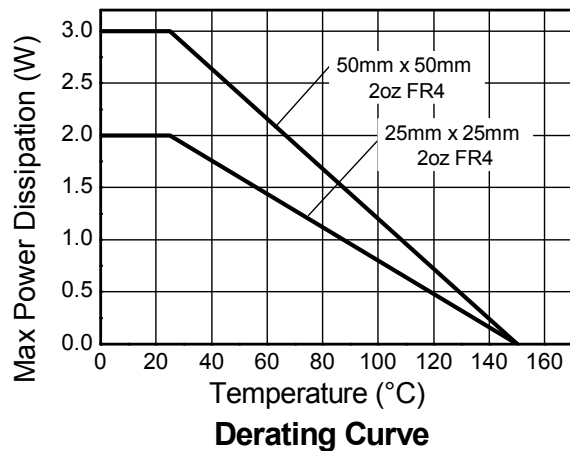
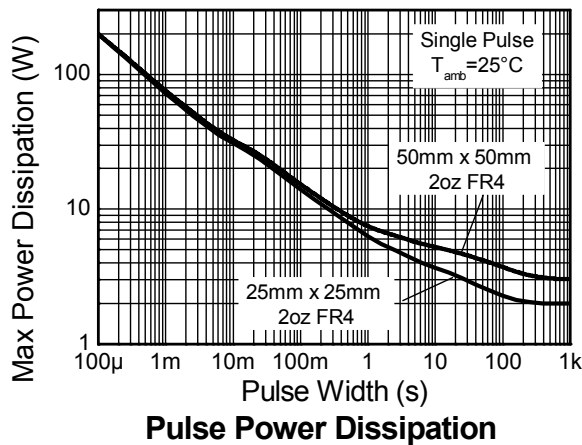
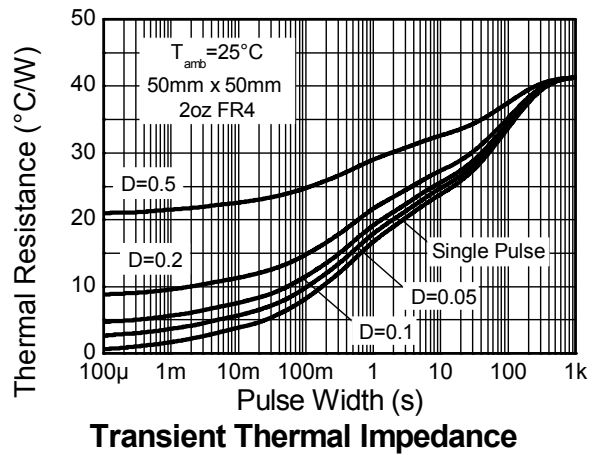
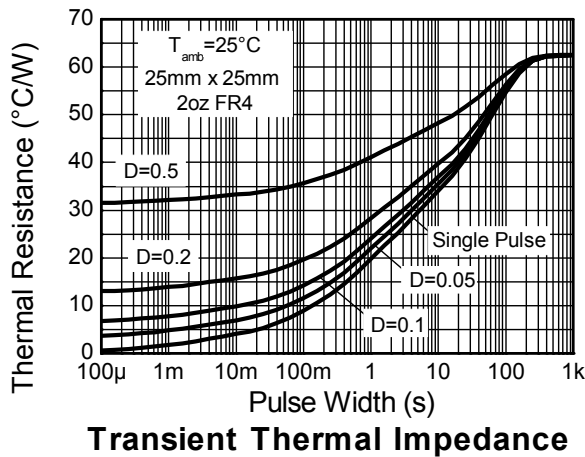
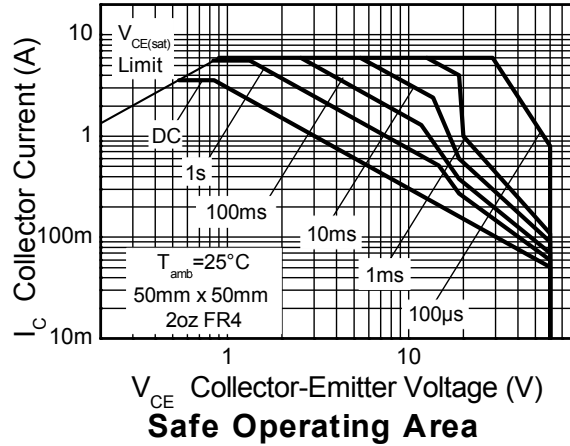
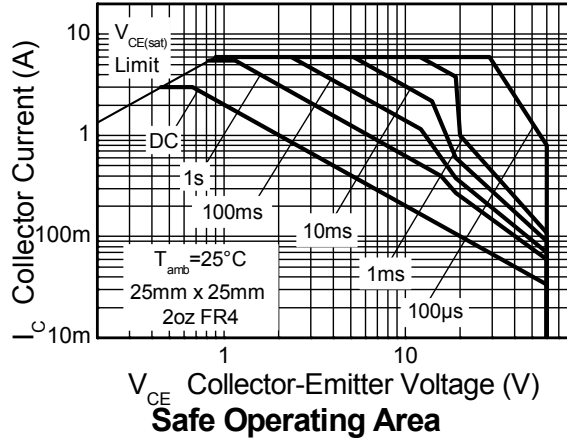
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	2	W
		3	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	62.5	°C/W
		41.7	°C/W
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	12.9	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 9)

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:
- 6. 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.
  - 7. Same as note (6), except the device is mounted on 50mm x 50mm 2oz copper.
  - 8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  - 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

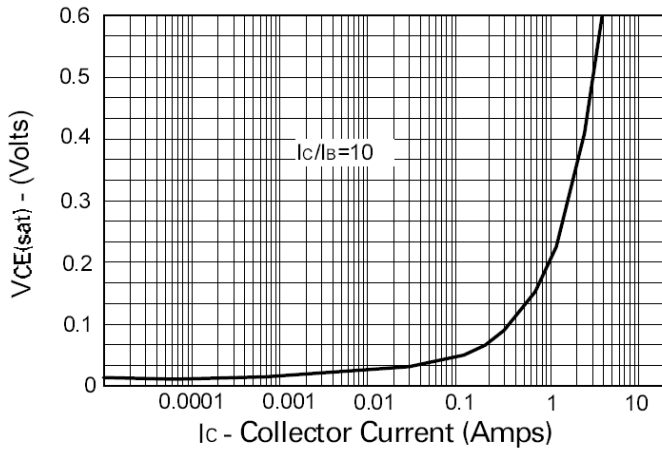


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

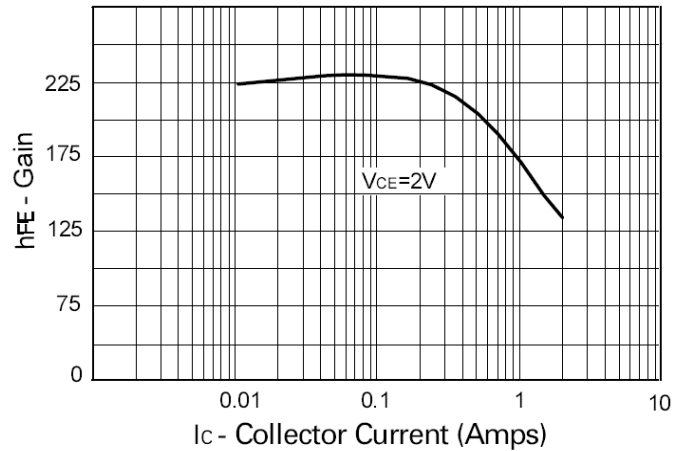
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-80	-	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CEO}$	-60	-	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	-	-	V	$I_E = -100\mu\text{A}$
Collector Cut-off Current	$I_{CBO}$	-	<1	-100	nA	$V_{CB} = -60\text{V}$
		-	-	-10	$\mu\text{A}$	$V_{CB} = -60\text{V}, T_{\text{amb}} = +100^\circ\text{C}$
Emitter Cut-off Current	$I_{EBO}$	-	<1	-100	nA	$V_{EB} = -4\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(\text{sat})}$	-	-0.15	-0.3	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
		-	-0.45	-0.6		$I_C = -3\text{A}, I_B = -300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{CE(\text{sat})}$	-	-0.9	-1.25	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(\text{on})}$	-	-0.8	-1.0	V	$I_C = -1\text{A}, V_{CE} = -2\text{V}$
DC Current Gain (Note 10)	$h_{FE}$	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	150	-		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Current Gain-Bandwidth Product	$f_T$	100	140	-	MHz	$V_{CE} = -5\text{V}, I_C = -100\text{mA}$ $f = 100\text{MHz}$
Turn-On Time	$t_{\text{on}}$	-	40	-	ns	$V_{CC} = -10\text{V}, I_C = -500\text{mA}$
Turn-Off Time	$t_{\text{off}}$	-	450	-	ns	$I_{B1} = I_{B2} = -50\text{mA}$
Output Capacitance	$C_{\text{obo}}$	-	-	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

Notes: 10. Measured under pulsed conditions. Pulse width  $\leq 300 \mu\text{s}$ . Duty cycle  $\leq 2\%$

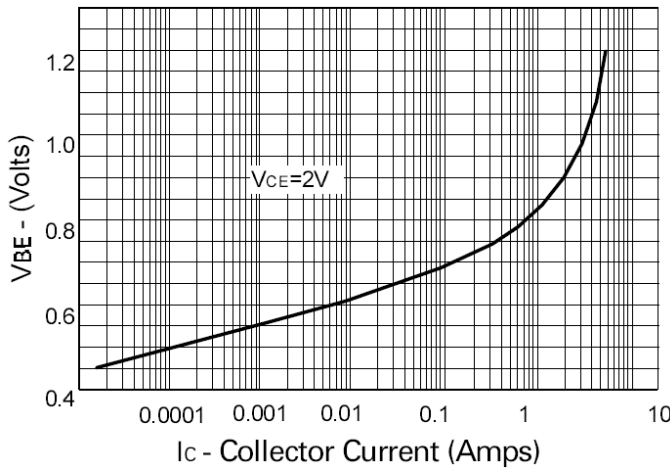
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



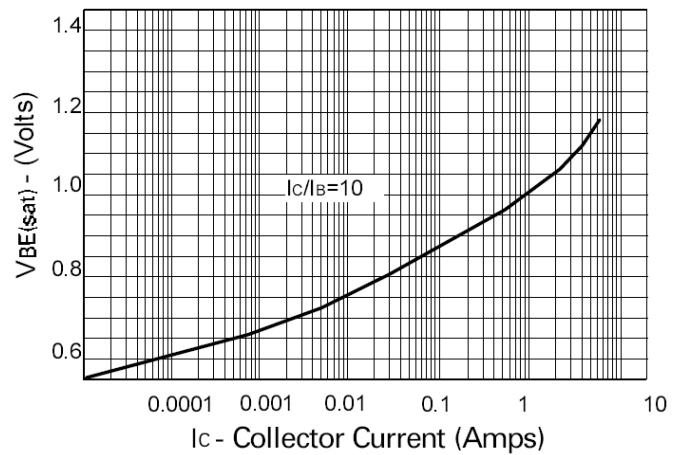
**$V_{CE(sat)}$  v  $I_C$**



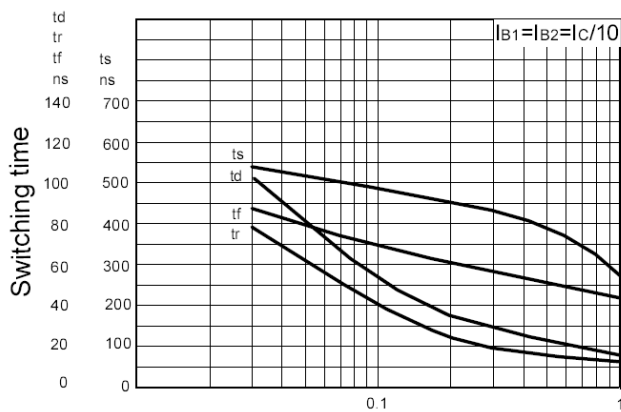
**$h_{FE}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**



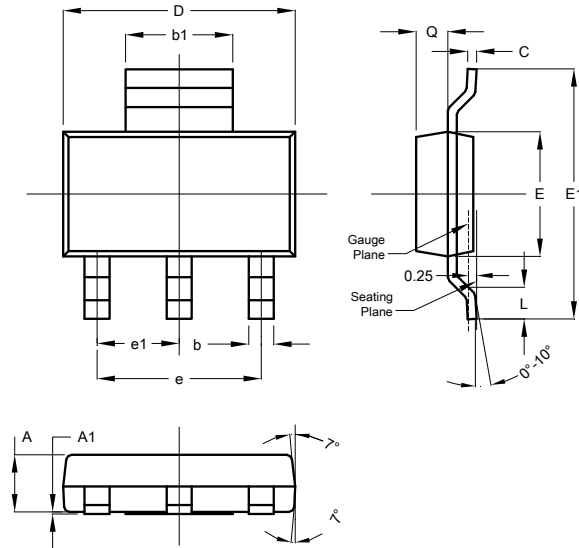
**$V_{BE(sat)}$  v  $I_C$**



**Switching Speeds**

## Package Outline Dimensions

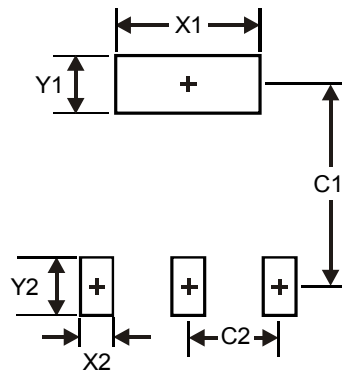
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
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)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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