

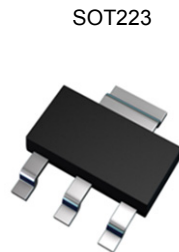
**60V NPN MEDIUM POWER TRANSISTOR IN SOT223**

**Features**

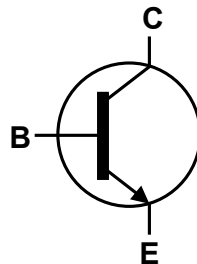
- $BV_{CEO} > 60V$
- $I_C = 6A$  High Continuous Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < 100mV @ 1A$
- $R_{CE(sat)} = 44m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified Up to 10A for a High Gain Hold Up
- Complementary PNP Type: FZT951
- **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**

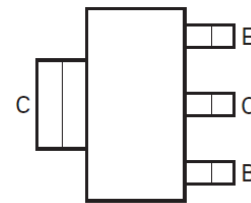
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208③
- Weight: 0.112 grams (approximate)



Top View



Device Symbol



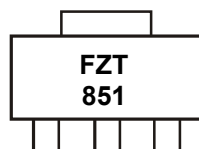
Top View  
Pin-Out

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

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT851TA	AEC-Q101	FZT851	7	12	1,000
FZT851QTA	Automotive	FZT851	7	12	1,000

- 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> 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.
  5. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**



FZT851 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	150	V
Collector-Emitter Voltage	$V_{CEO}$	60	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	6	A
Peak Pulse Current	$I_{CM}$	20	A

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

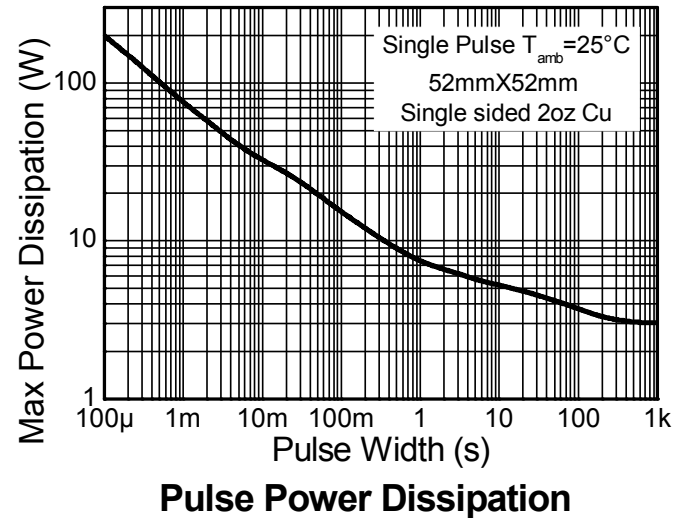
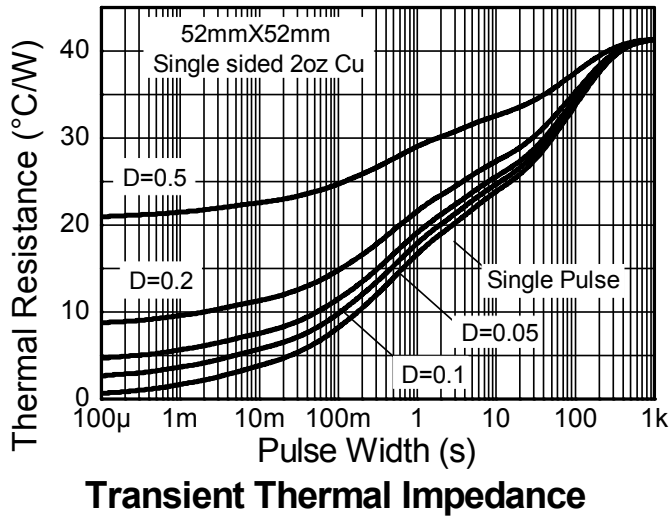
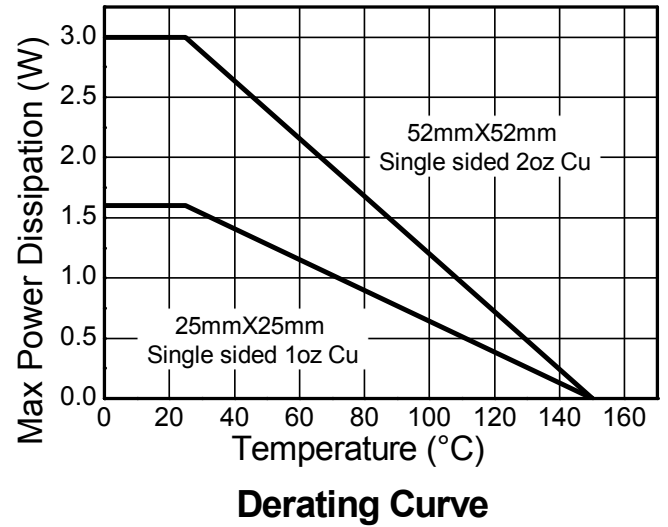
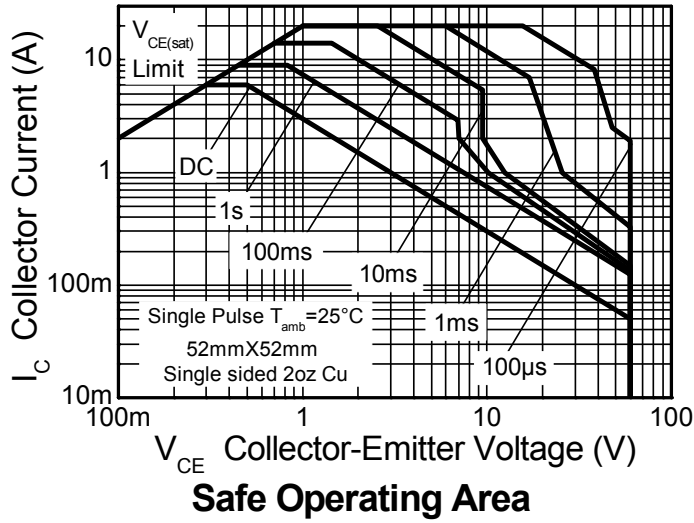
Characteristic	Symbol	Value	Unit
Power Dissipation Linear derating factor	$P_D$	3.0	W
		24	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.6	$\text{mW}/^\circ\text{C}$
		12.8	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	42	$^\circ\text{C}/\text{W}$
		78	
Thermal Resistance Junction to Lead	$R_{\theta JL}$	8.84	$^\circ\text{C}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### ESD Ratings (Note 9)

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

- Notes:
6. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.
  7. Same as note (6), except the device is mounted on 50mm X 50mm single sided 2oz weight 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**

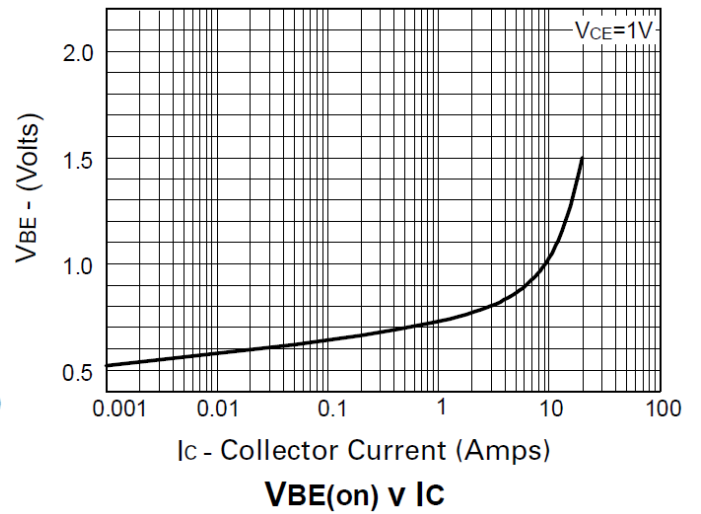
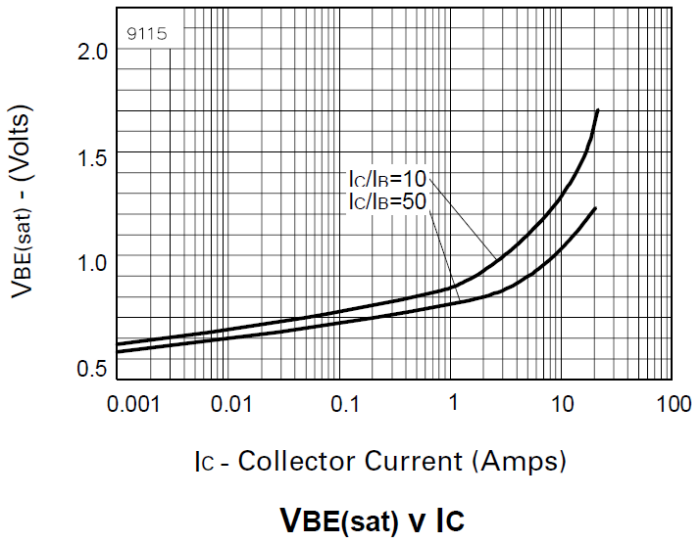
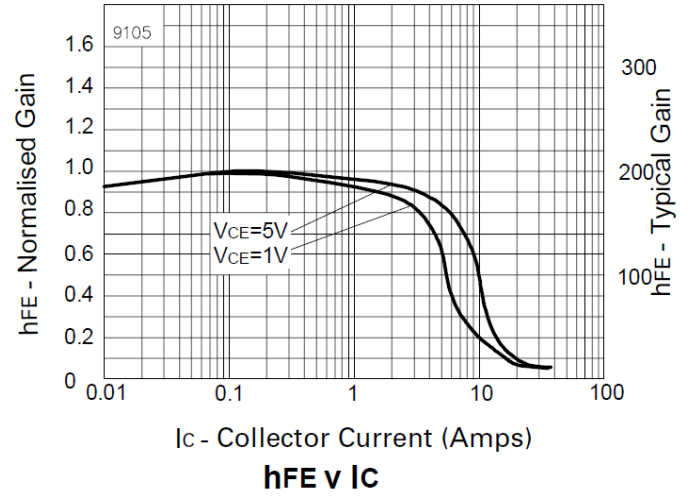
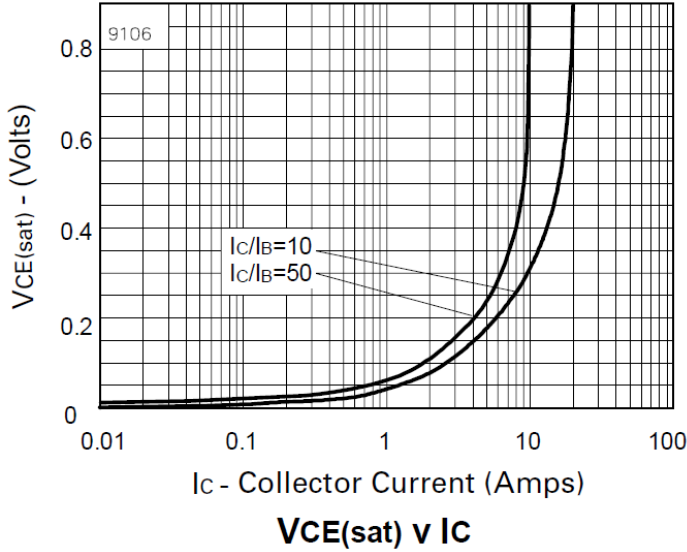


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	150	220	–	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage	BV <sub>CER</sub>	150	220	–	V	I <sub>C</sub> = 1μA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	60	85	–	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.1	–	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	–	<1	50	nA μA	V <sub>CB</sub> = 120V V <sub>CB</sub> = 120V, T <sub>A</sub> = +100°C
Collector Cut-off Current	I <sub>CER</sub>	–	<1	50	nA μA	V <sub>CB</sub> = 120V, R <sub>B</sub> ≤ 1kΩ V <sub>CB</sub> = 120V, T <sub>A</sub> = +100°C
Emitter Cut-off Current	I <sub>EBO</sub>	–	<1	10	nA	V <sub>EB</sub> = 6V
DC Current Gain (Note 10)	h <sub>FE</sub>	100	200	–	–	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 1V
		100	200	300		I <sub>C</sub> = 2A, V <sub>CE</sub> = 1V
		75	120	–		I <sub>C</sub> = 5A, V <sub>CE</sub> = 1V
		25	50	–		I <sub>C</sub> = 10A, V <sub>CE</sub> = 1V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	–	–	50	mV	I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
		–	–	100		I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA
		–	–	170		I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
		–	–	375		I <sub>C</sub> = 6A, I <sub>B</sub> = 300mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	–	–	1200	mV	I <sub>C</sub> = 6A, I <sub>B</sub> = 300mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	–	–	1150	mV	I <sub>C</sub> = 6A, V <sub>CE</sub> = 1V
Current Gain-Bandwidth Product (Note 10)	f <sub>T</sub>	–	130	–	MHz	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V, f = 50MHz
Output Capacitance (Note 10)	C <sub>obo</sub>	–	45	–	pF	V <sub>CB</sub> = 10V, f = 1MHz
Switching Times	t <sub>on</sub>	–	45	–	ns	I <sub>C</sub> = 1A, V <sub>CC</sub> = 10V, I <sub>B1</sub> = -I <sub>B2</sub> = 100mA
	t <sub>off</sub>	–	1100	–		

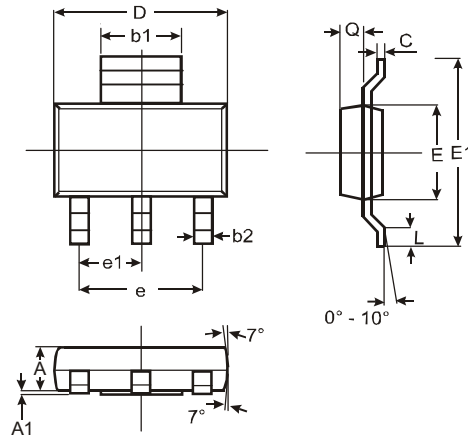
Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



## Package Outline Dimensions

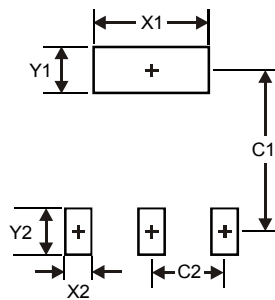
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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