

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

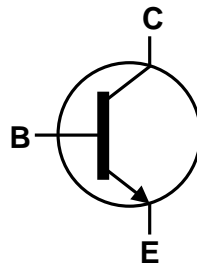
- $BV_{CEO} > 60V$
- $I_C = 6A$  High Continuous Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(SAT)} < 100mV @ 1A$
- $R_{CE(SAT)} = 44m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified Up to 10A for a High Gain Hold Up
- Complementary PNP Type: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

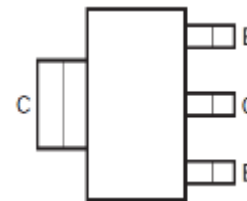
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.112 grams (Approximate)



Top View



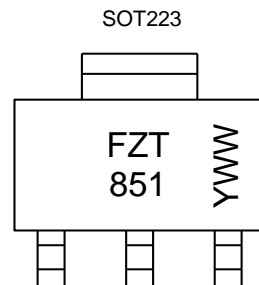
Device Symbol


 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/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**


FZT 851 = 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	150	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>	6	A
Peak Pulse Current	I <sub>CM</sub>	20	A

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

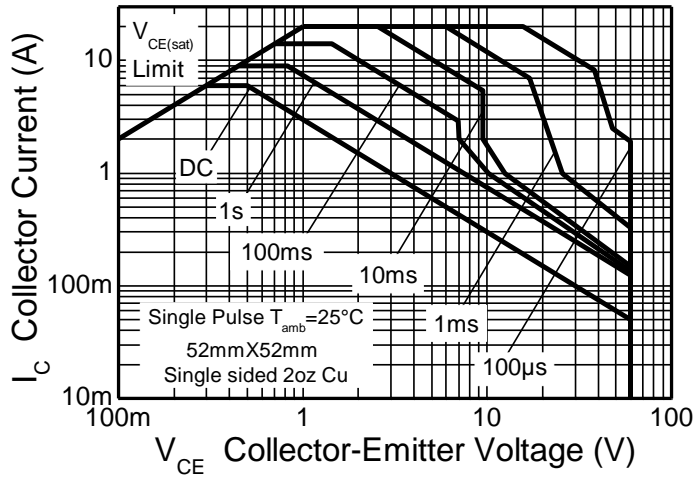
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3.0	W
		24	
Linear Derating Factor		1.6	mW/°C
		12.8	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	42	°C/W
	R <sub>θJA</sub>	78	
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	8.8	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 9)

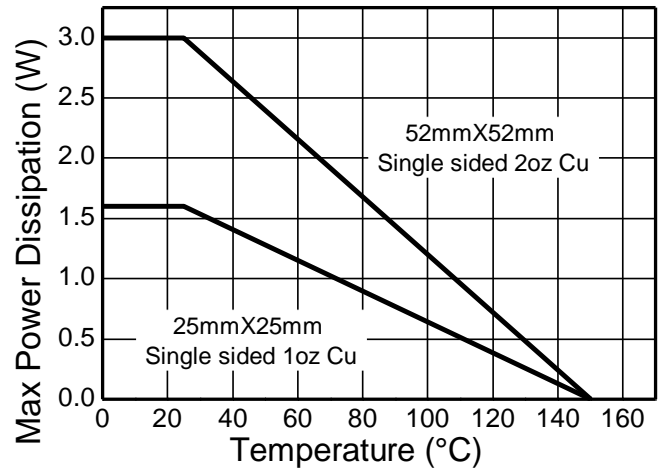
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. 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 steady-state.
  7. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz 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.

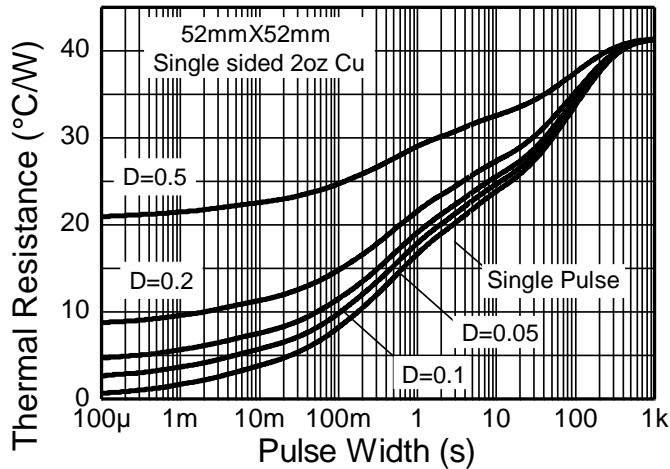
**Thermal Characteristics and Derating Information**



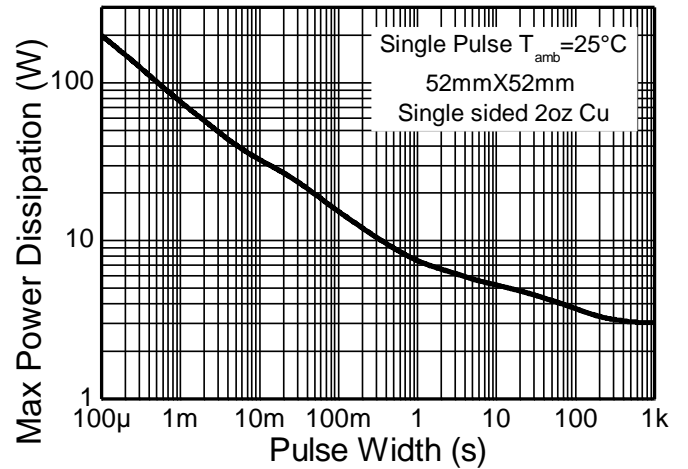
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



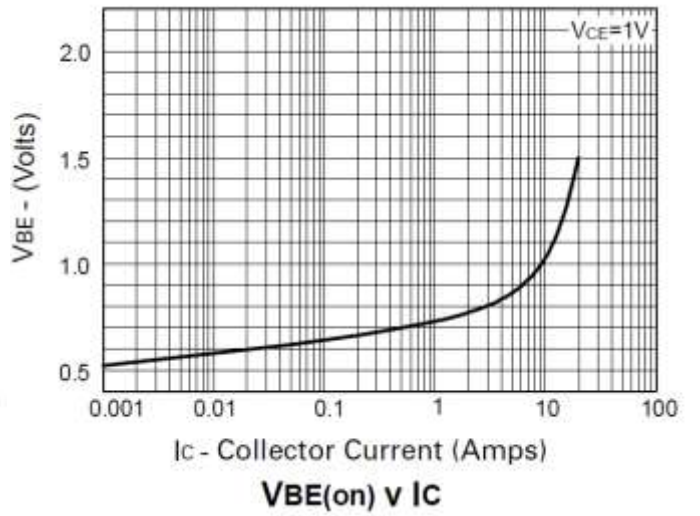
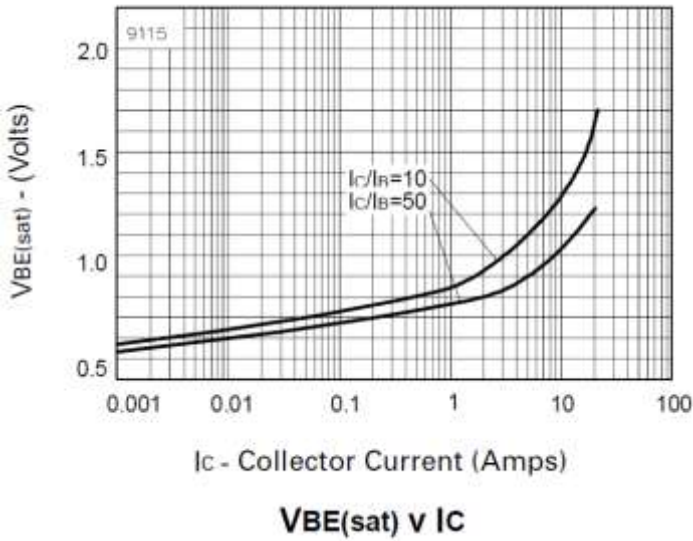
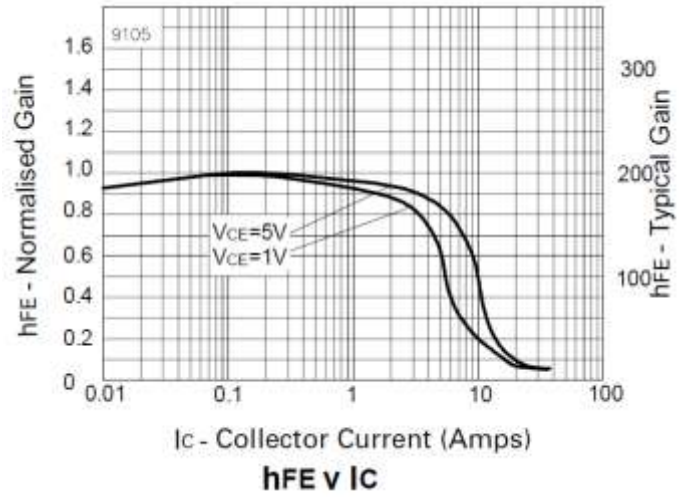
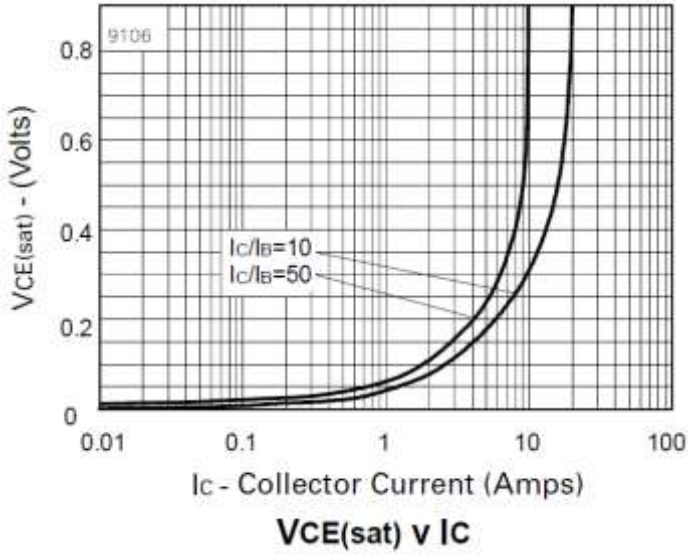
**Pulse Power Dissipation**

**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>CE</sub> = 120V, R <sub>B</sub> ≤ 1kΩ V <sub>CE</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>	—	—	1,200	mV	I <sub>C</sub> = 6A, I <sub>B</sub> = 300mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(ON)</sub>	—	—	1,150	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	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>	—	1,100	—		

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

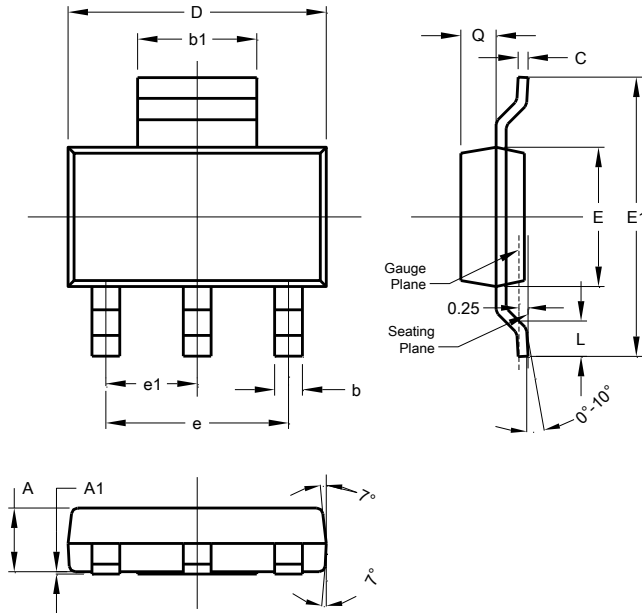
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT223**



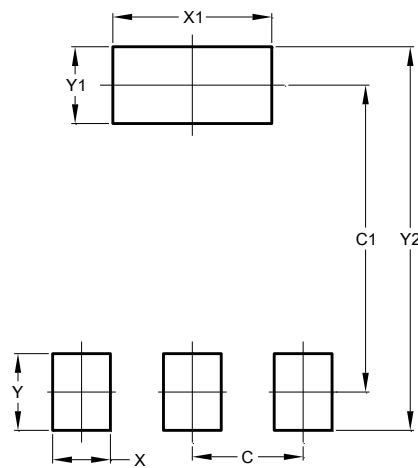
SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

All Dimensions in mm

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT223**



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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