

60V NPN MEDIUM POWER TRANSISTOR IN SOT223

Features

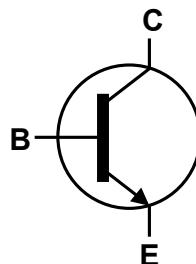
- $BV_{CEO} > 60V$
- $I_C = 6A$ High Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 100mV$ @ 1A
- $R_{CE(sat)} = 44m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified Up to 10A for a High Gain Hold Up
- Complementary PNP Type: FZT951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

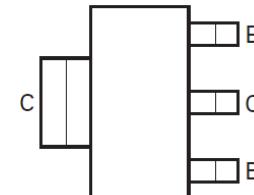
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208^(E3)
- Weight: 0.112 grams (approximate)



Top View



Device Symbol


Top View
Pin-Out

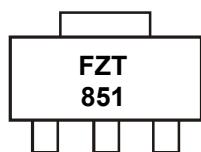
Ordering Information (Notes 4 & 5)

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> 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 mW/°C
		24	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.6	°C/W
		12.8	
Thermal Resistance Junction to Lead	$R_{\theta JL}$	8.84	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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	≥ 400	V	C

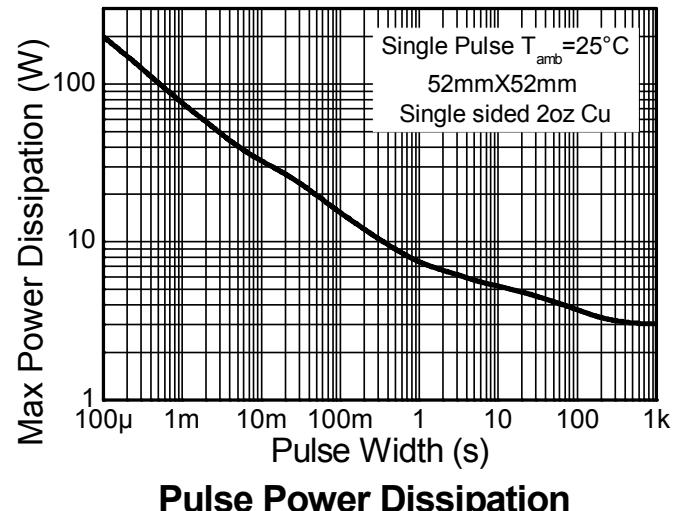
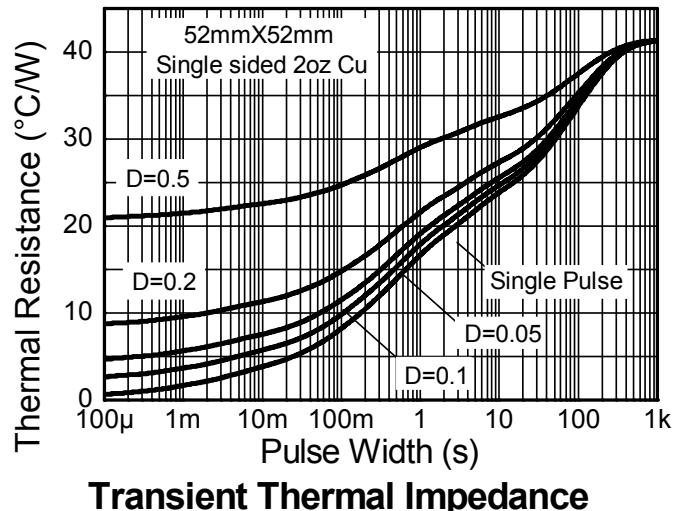
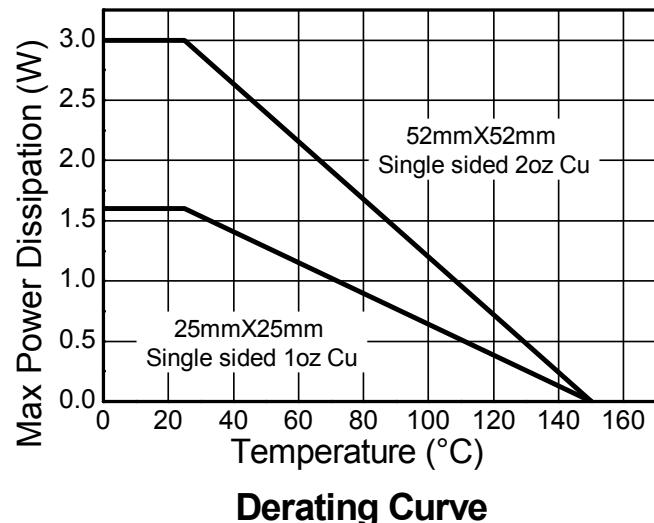
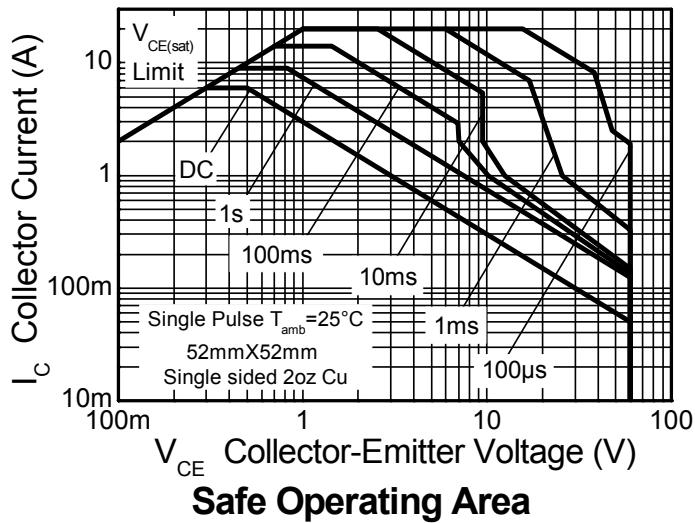
Notes: 6. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.

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

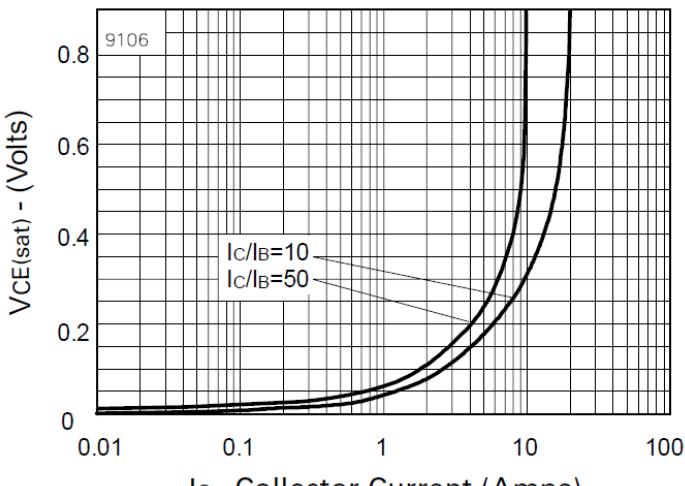


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

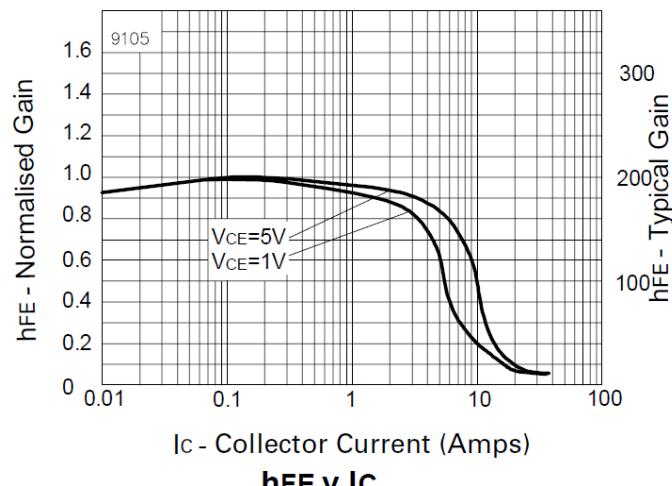
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	220	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	150	220	—	V	$I_C = 1\mu\text{A}, R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	60	85	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	I_{CBO}	—	<1	50	nA	$V_{\text{CB}} = 120\text{V}$
		—	—	1	μA	$V_{\text{CB}} = 120\text{V}, T_A = +100^\circ\text{C}$
Collector Cut-off Current	I_{CER}	—	<1	50	nA	$V_{\text{CB}} = 120\text{V}, R_B \leq 1\text{k}\Omega$
		—	—	1	μA	$V_{\text{CB}} = 120\text{V}, T_A = +100^\circ\text{C}$
Emitter Cut-off Current	I_{EBO}	—	<1	10	nA	$V_{\text{EB}} = 6\text{V}$
DC Current Gain (Note 10)	h_{FE}	100	200	—	—	$I_C = 10\text{mA}, V_{\text{CE}} = 1\text{V}$
		100	200	300		$I_C = 2\text{A}, V_{\text{CE}} = 1\text{V}$
		75	120	—		$I_C = 5\text{A}, V_{\text{CE}} = 1\text{V}$
		25	50	—		$I_C = 10\text{A}, V_{\text{CE}} = 1\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{\text{CE}(\text{sat})}$	—	—	50	mV	$I_C = 100\text{mA}, I_B = 5\text{mA}$
		—	—	100		$I_C = 1\text{A}, I_B = 50\text{mA}$
		—	—	170		$I_C = 2\text{A}, I_B = 50\text{mA}$
		—	—	375		$I_C = 6\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{\text{BE}(\text{sat})}$	—	—	1200	mV	$I_C = 6\text{A}, I_B = 300\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{\text{BE}(\text{on})}$	—	—	1150	mV	$I_C = 6\text{A}, V_{\text{CE}} = 1\text{V}$
Current Gain-Bandwidth Product (Note 10)	f_T	—	130	—	MHz	$I_C = 100\text{mA}, V_{\text{CE}} = 10\text{V}, f = 50\text{MHz}$
Output Capacitance (Note 10)	C_{obo}	—	45	—	pF	$V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$
Switching Times	t_{on}	—	45	—	ns	$I_C = 1\text{A}, V_{\text{CC}} = 10\text{V}, I_{B1} = -I_{B2} = 100\text{mA}$
	t_{off}	—	1100	—		

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

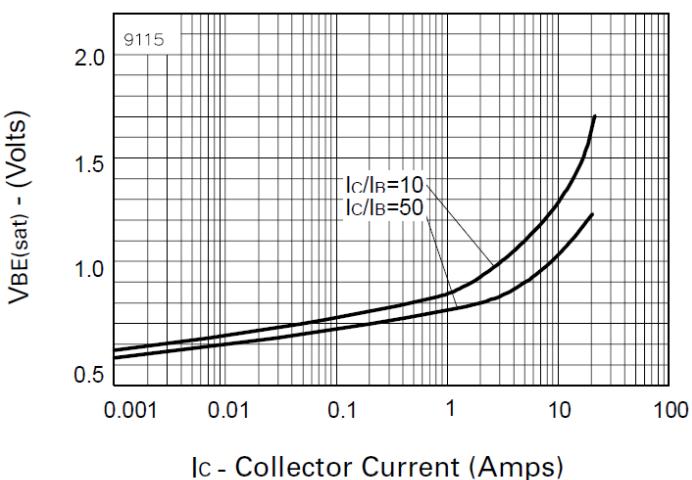
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



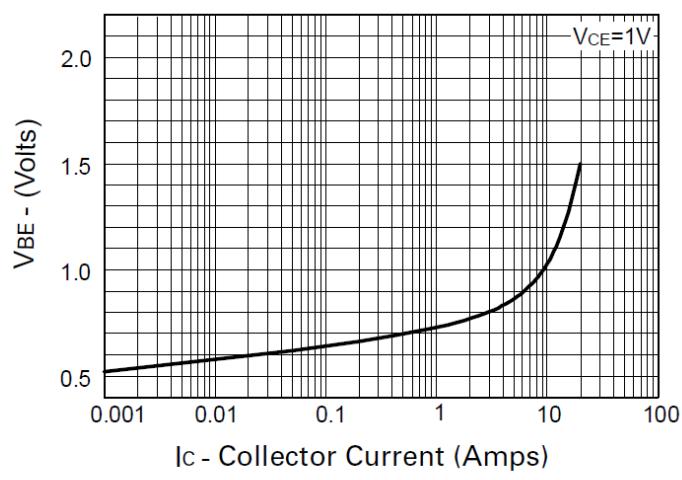
$V_{CE(\text{sat})} v I_C$



$hFE v I_C$



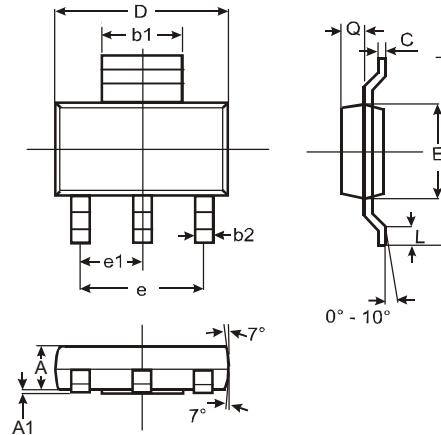
$V_{BE(\text{sat})} v I_C$



$V_{BE(\text{on})} v I_C$

Package Outline Dimensions

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

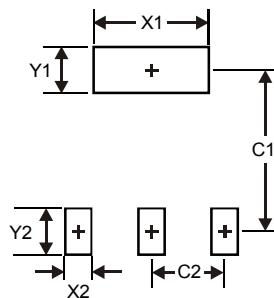


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	4.60
e1	—	—	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

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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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru
moschip.ru_4

moschip.ru_6
moschip.ru_9