

**60V PNP MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223**

**Features**

- $BV_{CEO} > -60V$
- $I_C = -5.5A$  High Continuous Collector Current
- $I_{CM} = -15A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -70mV @ -1A$
- $R_{SAT} = 39m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified Up to  $-10A$  for a High Gain Hold Up
- Complementary NPN Type: ZX5T851G
- **Lead-Free Finish; RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

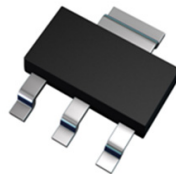
**Mechanical Data**

- 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 **Ⓔ**
- Weight: 0.112 grams (approximate)

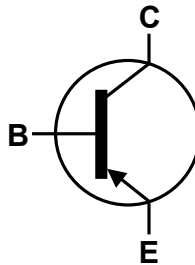
**Applications**

- DC-DC converters
- MOSFET & IGBT gate drivers
- Charging circuits
- Power switches
- Motor control

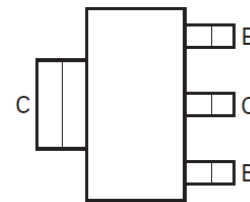
SOT223



Top View



Device Symbol



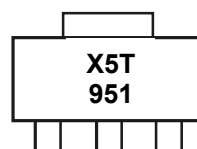
Top View  
Pin-Out

**Ordering Information** (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZX5T951GTA	X5T951	7	12	1,000
ZX5T951GTC	X5T951	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> 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>

**Marking Information**



X5T951 = Product type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-100	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>	-5.5	A
Peak Pulse Current	I <sub>CM</sub>	-15	A

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

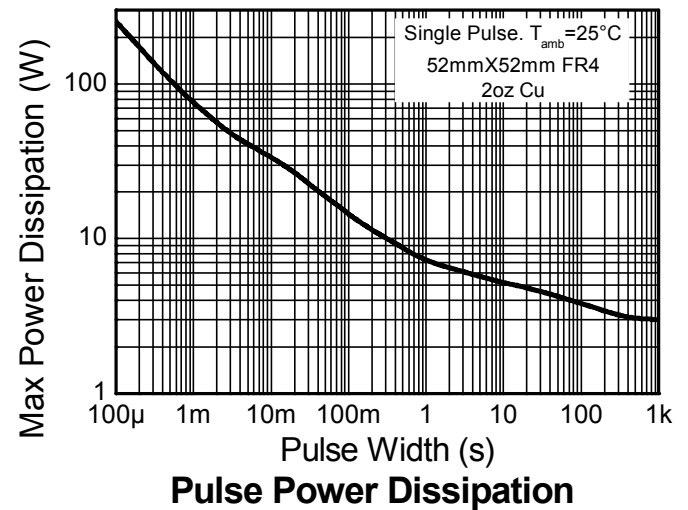
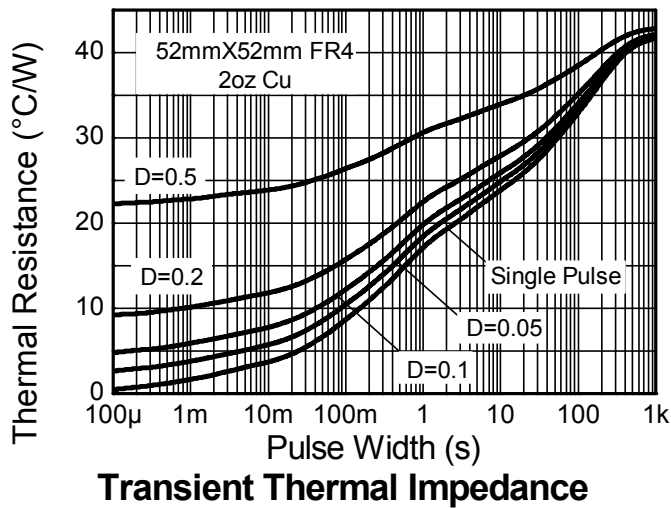
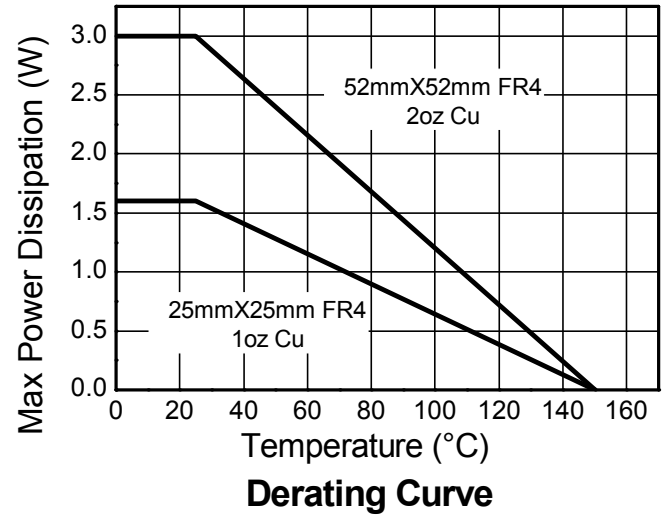
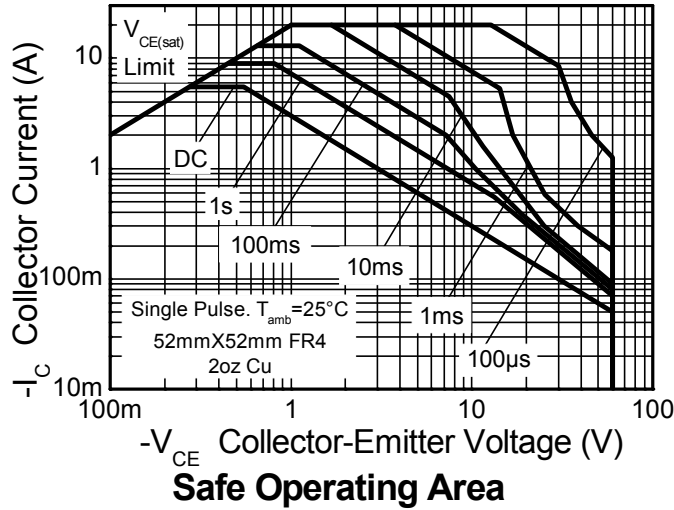
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3.0	W
Linear derating factor		24	
		1.6	
		12.8	mW / °C
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	42	°C/W
	R <sub>θJA</sub>	78	
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	10.48	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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 surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  6. Same as note (5), except the device is surface mounted on 25mm x 25mm with 1oz 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

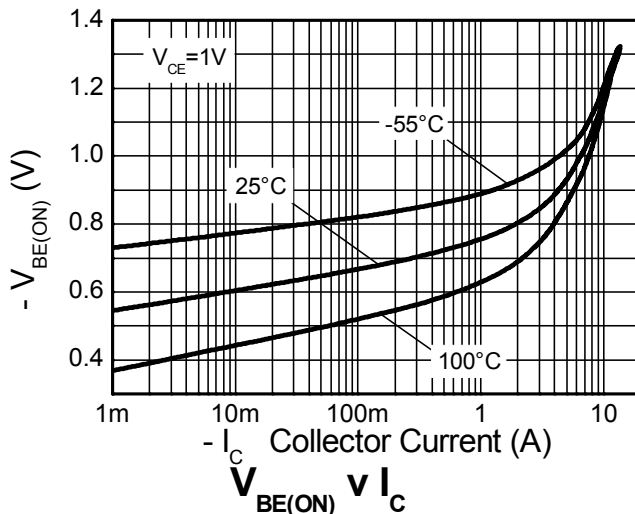
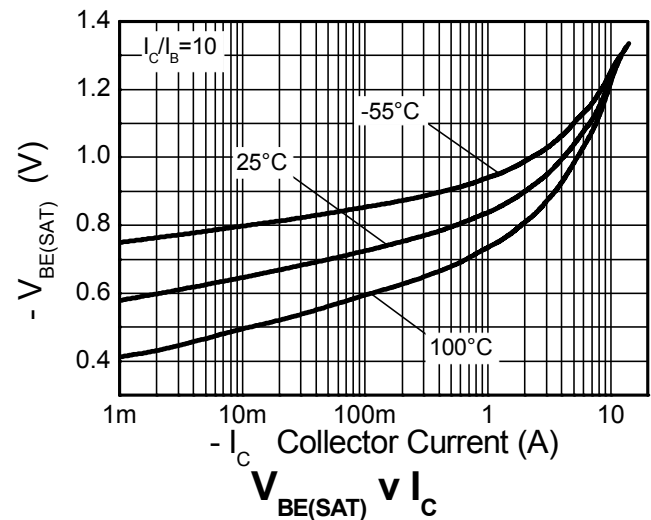
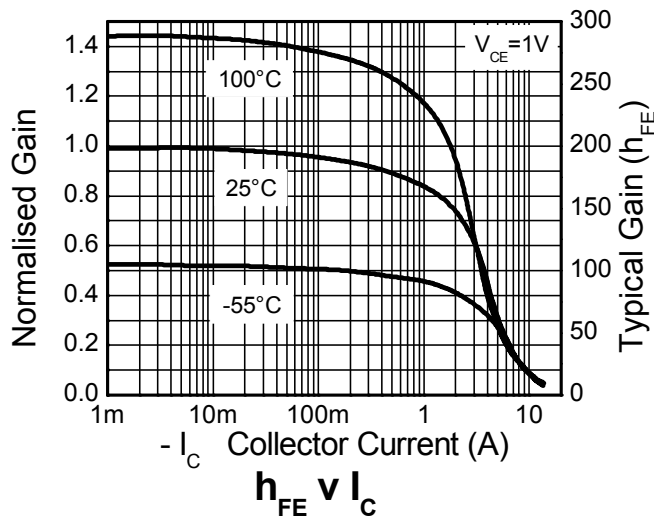
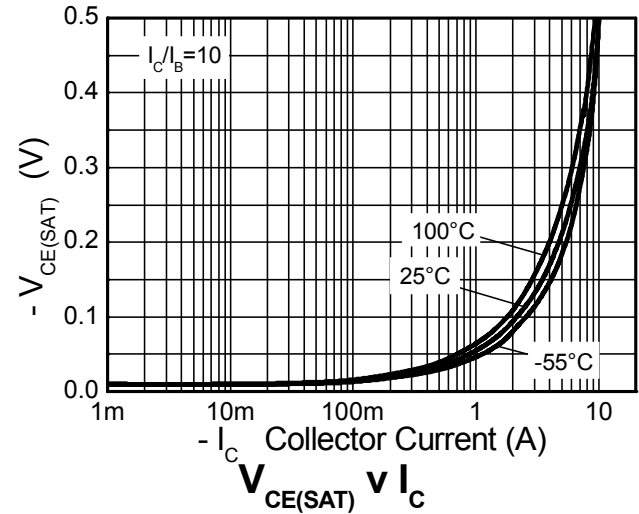
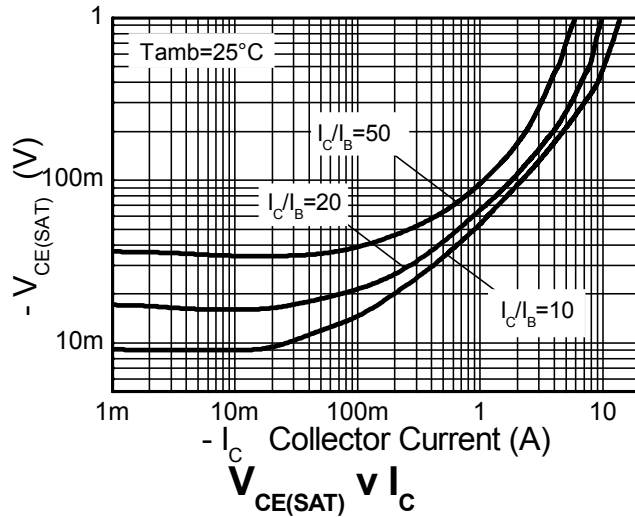


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-100	-120	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage	BV <sub>CER</sub>	-100	-120	-	V	I <sub>C</sub> = -1μA, R <sub>B</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-60	-80	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.1	-	V	I <sub>E</sub> = -100μA
Collector-Base Cutoff Current	I <sub>CBO</sub>	-	<1	-20	nA	V <sub>CB</sub> = -80V
			-	-0.5	μA	V <sub>CB</sub> = -80V, T <sub>A</sub> = +100°C
Collector-Emitter Cutoff Current	I <sub>CER</sub> R ≤ 1kΩ	-	<1	-20	nA	V <sub>CB</sub> = -80V
			-	-0.5	μA	V <sub>CB</sub> = -80V, T <sub>A</sub> = +100°C
Emitter Cutoff Current	I <sub>EBO</sub>	-	<1	-10	nA	V <sub>EB</sub> = -6V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	100	250	-	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V
		100	200	300		I <sub>C</sub> = -2A, V <sub>CE</sub> = -1V
		45	90	-		I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V
		10	25	-		I <sub>C</sub> = -10A, V <sub>CE</sub> = -1V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	-	-15	-25	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA
		-	-55	-70		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		-	-90	-120		I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA
		-	-195	-250		I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	-1030	-1150	mV	I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(on)</sub>	-	-920	-1020	mV	I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V
Output Capacitance (Note 9)	C <sub>obo</sub>	-	48	-	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	-	120	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -100mA f = 50MHz
Switching Time	t <sub>on</sub>	-	39	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A I <sub>B1</sub> = -I <sub>B2</sub> = -100mA
	t <sub>off</sub>	-	370	-		

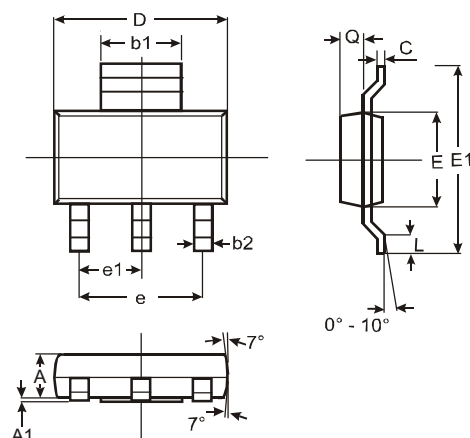
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



## Package Outline Dimensions

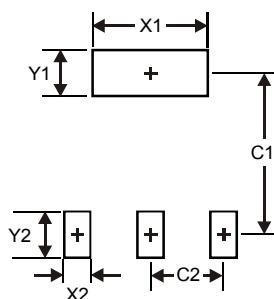
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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