

**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**

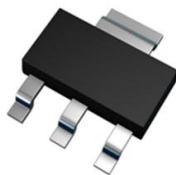
**Mechanical Data**

- 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 (e3)
- Weight: 0.112 grams (Approximate)

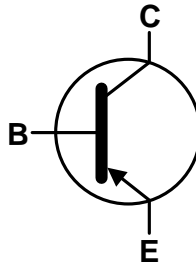
**Applications**

- DC-DC Converters
- MOSFET & IGBT Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

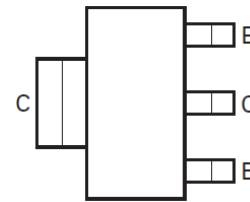
SOT223



Top View



Device Symbol



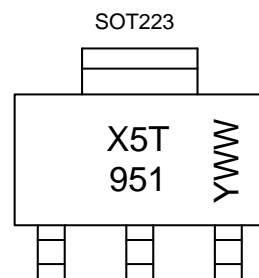
Top View  
Pin-Out

**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**



X5T 951 = 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)

### 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.)

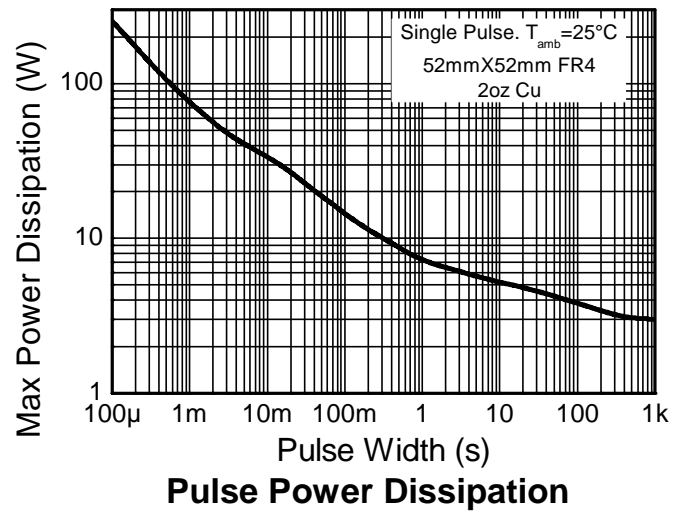
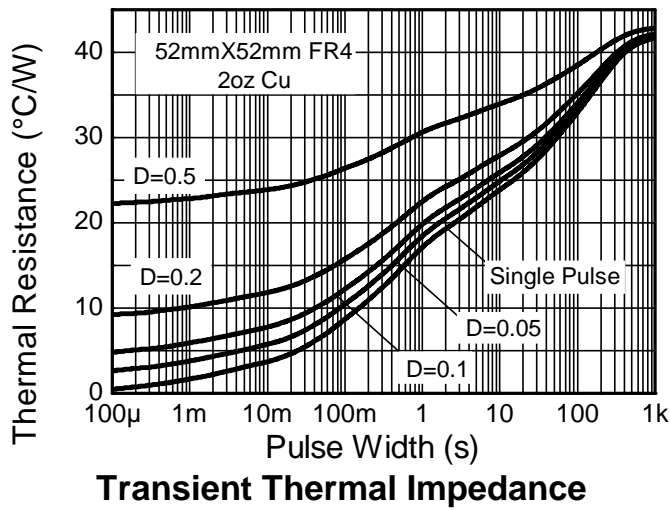
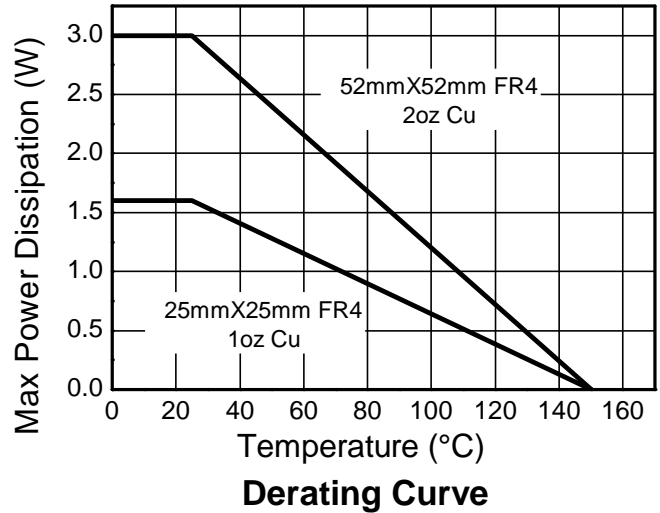
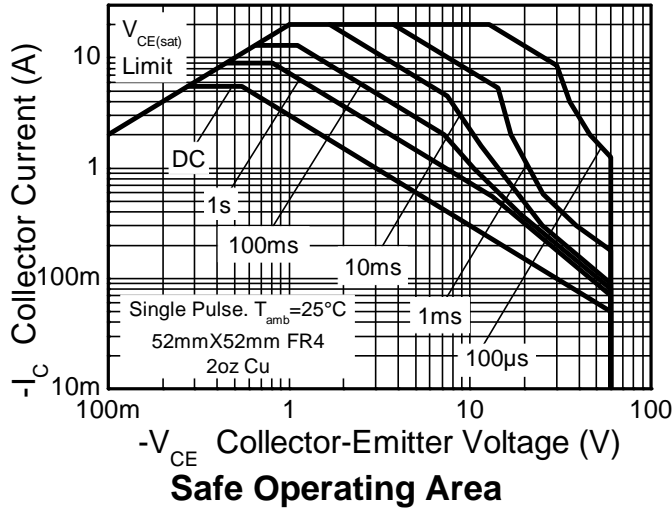
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3.0	W
		24	
Linear Derating Factor		1.6	mW /°C
		12.8	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub> (Note 5)	42	°C/W
	R <sub>θJA</sub> (Note 6)	78	
Thermal Resistance Junction to Lead	R <sub>θJL</sub> (Note 7)	10.48	
Operating 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**

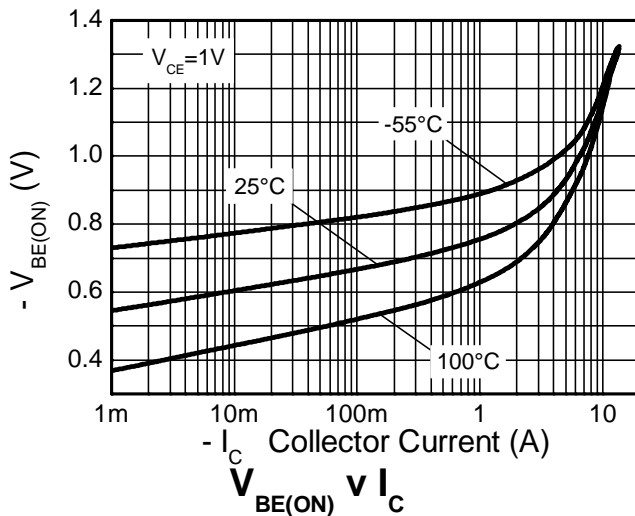
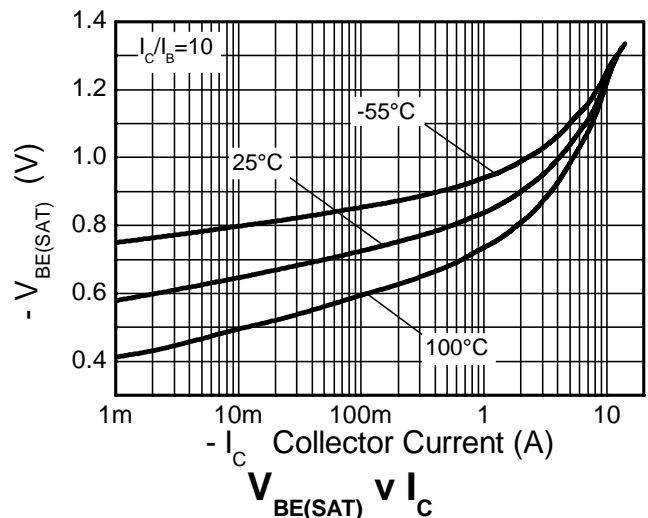
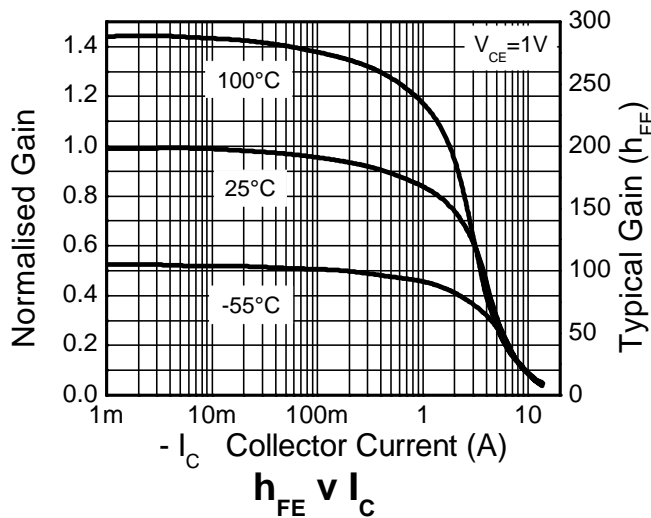
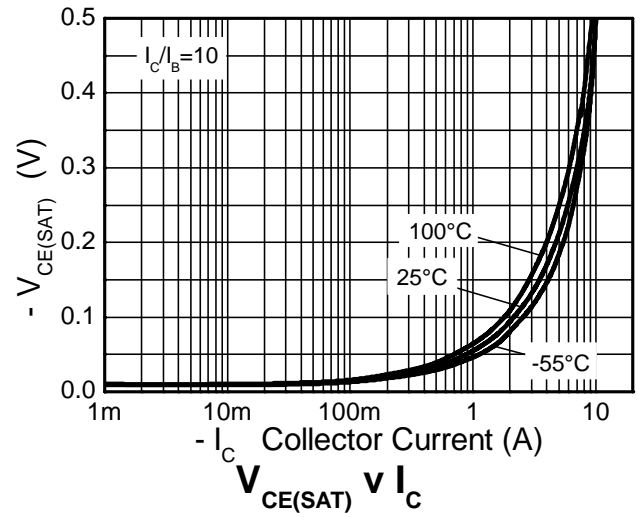
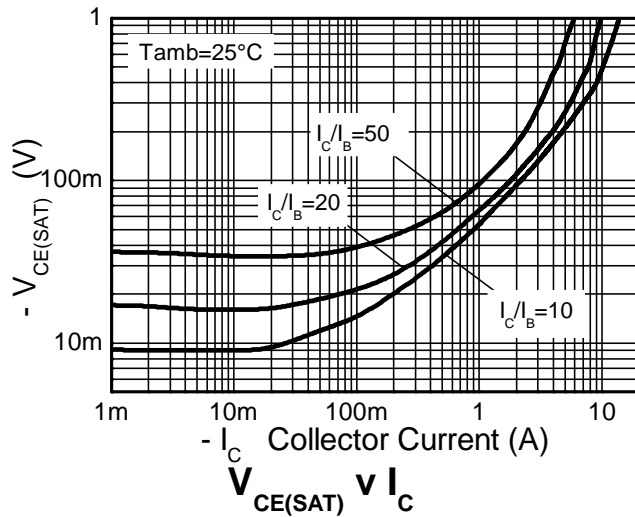


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-100	-120	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CER}$	-100	-120	-	V	$I_C = -1\mu\text{A}$ , $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	-60	-80	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	-8.1	-	V	$I_E = -100\mu\text{A}$
Collector-Base Cutoff Current	$I_{CBO}$	-	<1	-20	nA	$V_{CB} = -80\text{V}$
				-0.5	$\mu\text{A}$	$V_{CB} = -80\text{V}$ , $T_A = +100^\circ\text{C}$
Collector-Emitter Cutoff Current	$I_{CER}$ $R \leq 1\text{k}\Omega$	-	<1	-20	nA	$V_{CB} = -80\text{V}$
				-0.5	$\mu\text{A}$	$V_{CB} = -80\text{V}$ , $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	-	<1	-10	nA	$V_{EB} = -6\text{V}$
Static Forward Current Transfer Ratio (Note 9)	$h_{FE}$	100	250	-	-	$I_C = -10\text{mA}$ , $V_{CE} = -1\text{V}$
		100	200	300		$I_C = -2\text{A}$ , $V_{CE} = -1\text{V}$
		45	90	-		$I_C = -5\text{A}$ , $V_{CE} = -1\text{V}$
		10	25	-		$I_C = -10\text{A}$ , $V_{CE} = -1\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	-	-15	-25	mV	$I_C = -100\text{mA}$ , $I_B = -10\text{mA}$
		-	-55	-70		$I_C = -1\text{A}$ , $I_B = -100\text{mA}$
		-	-90	-120		$I_C = -2\text{A}$ , $I_B = -200\text{mA}$
		-	-195	-250		$I_C = -5\text{A}$ , $I_B = -500\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	-	-1,030	-1,150	mV	$I_C = -5\text{A}$ , $I_B = -500\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	-	-920	-1,020	mV	$I_C = -5\text{A}$ , $V_{CE} = -1\text{V}$
Output Capacitance (Note 9)	$C_{obo}$	-	48	-	pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Transition Frequency	$f_T$	-	120	-	MHz	$V_{CE} = -10\text{V}$ , $I_C = -100\text{mA}$ $f = 50\text{MHz}$
Switching Time	$t_{on}$	-	39	-	ns	$V_{CC} = -10\text{V}$ , $I_C = -1\text{A}$ $I_{B1} = -I_{B2} = -100\text{mA}$
	$t_{off}$	-	370	-		

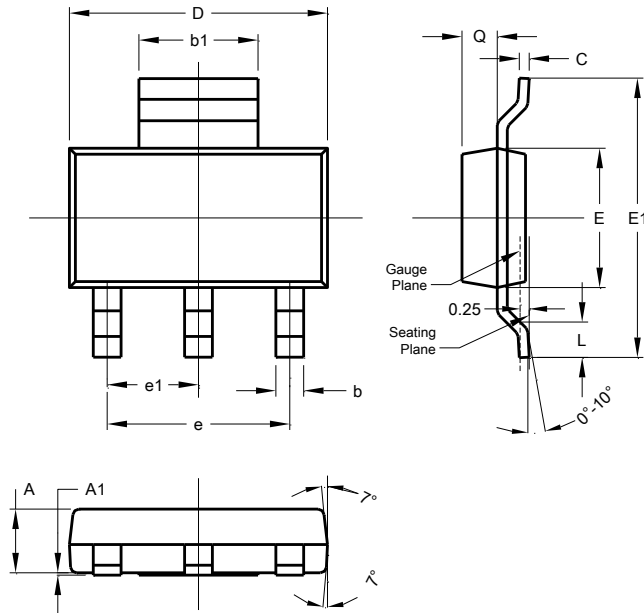
Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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



## Package Outline Dimensions

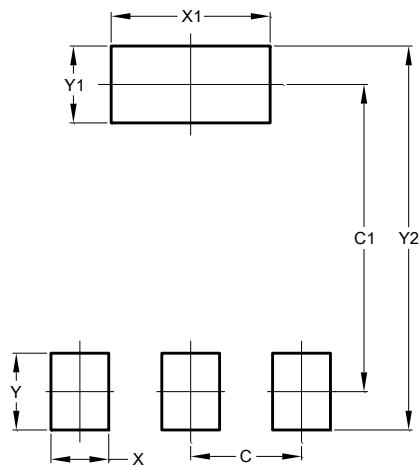
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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)
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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