60V PNP MEDIUM POWER LOW SATURATION TRANSISTOR IN SOT223

Description

This bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

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)

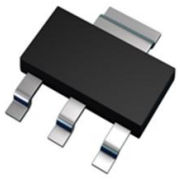
Features

- 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} = 39mΩ for a Low Equivalent On-Resistance
- h_{FE} Specified Up to -10A for a High Gain Hold Up
- Complementary NPN Type: ZX5T851GQ
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. “Green” Device (Note 3)**
- **The ZX5T951GQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

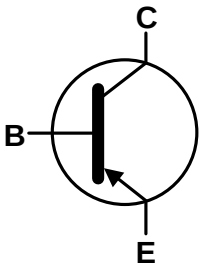
Applications

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

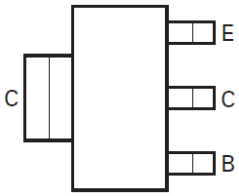
SOT223



Top View



Device Symbol



Top View
Pin-Out

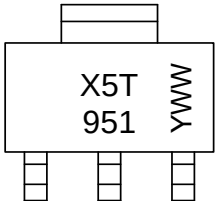
Ordering Information (Note 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZX5T951GQTC	X5T951	13	12	4000

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ 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/products/packages.html.

Marking Information

SOT223



X5T 951 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 0= 2020)
WW or $\overline{WW}$ = Week Code (01~53)

Absolute Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-5.5	A
Peak Pulse Current	I_{CM}	-15	A

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

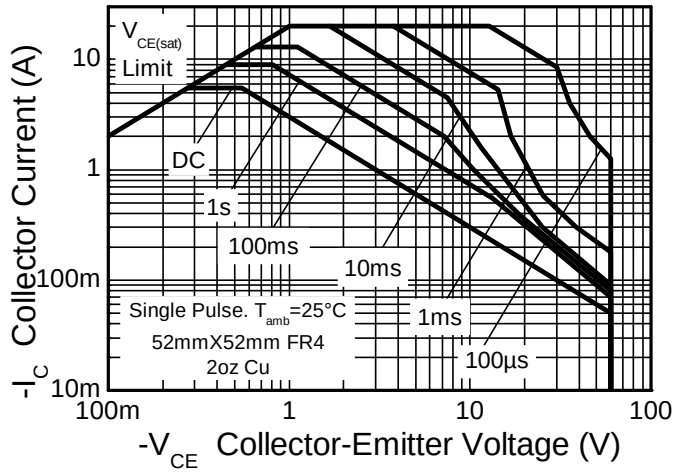
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	3.0 24	W mW /°C
	(Note 6)		1.6 12.8	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	42	°C/W
	(Note 6)	$R_{\theta JA}$	78	
Thermal Resistance Junction to Lead	(Note 7)	$R_{\theta JL}$	10.48	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

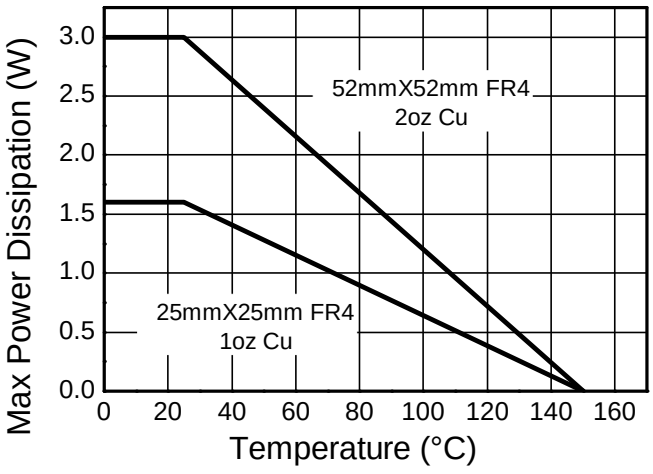
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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.

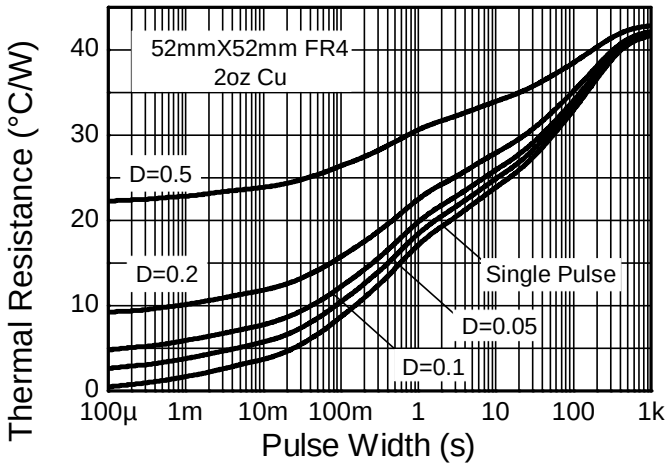
Thermal Characteristics and Derating Information



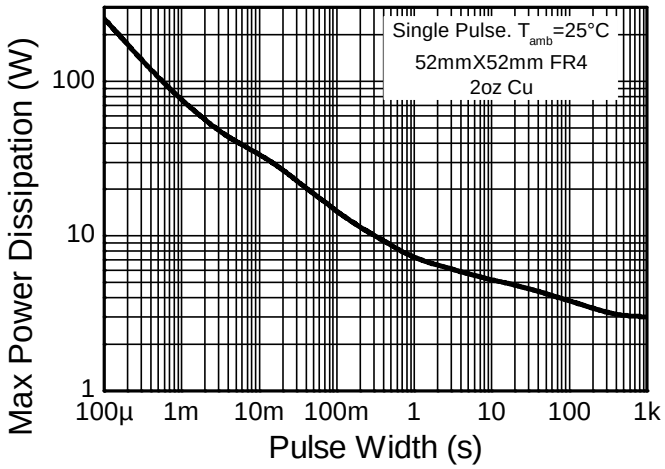
Safe Operating Area



Derating Curve



Transient Thermal Impedance



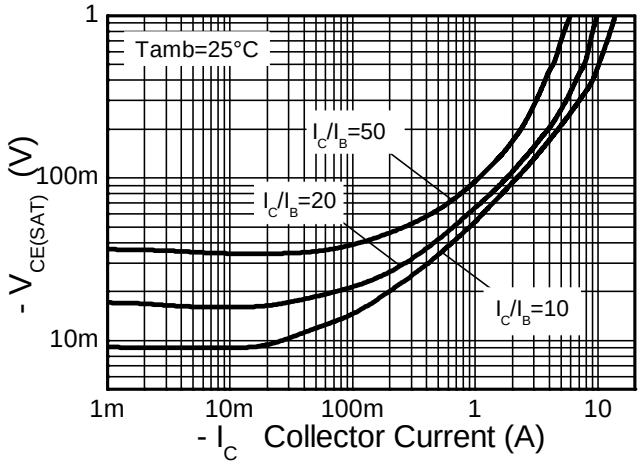
Pulse Power Dissipation

Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

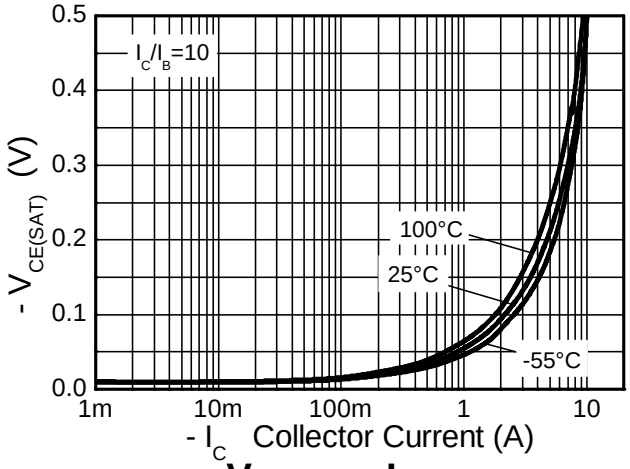
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage	BV_{CER}	-100	-120	—	V	I_C = -1µA, RB ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-80	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	—	V	I_E = -100µA
Collector-Base Cutoff Current	I_{CBO}	—	<-1 —	-20 -0.5	nA µA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Collector-Emitter Cutoff Current	I_{CER} R ≤ 1kΩ	—	<-1 —	-20 -0.5	nA µA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	<-1	-10	nA	V_{EB} = -6V
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	100	250	—	—	I_C = -10mA, V_{CE} = -1V
		100	200	300		I_C = -2A, V_{CE} = -1V
		45	90	—		I_C = -5A, V_{CE} = -1V
		10	25	—		I_C = -10A, V_{CE} = -1V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-15	-25	mV	I_C = -100mA, I_B = -10mA
		—	-55	-70		I_C = -1A, I_B = -100mA
		—	-90	-120		I_C = -2A, I_B = -200mA
		—	-195	-250		I_C = -5A, I_B = -500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-1030	-1150	mV	I_C = -5A, I_B = -500mV
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	-920	-1020	mV	I_C = -5A, V_{CE} = -1V
Output Capacitance (Note 9)	C_{obo}	—	48	—	pF	V_{CB} = -10V, f = 1MHz
Transition Frequency	f_T	—	120	—	MHz	V_{CE} = -10V, I_C = -100mA f = 50MHz
Switching Time	t_{on}	—	39	—	ns	V_{CC} = -10V, I_C = -1A
	t_{off}	—	370	—		I_{B1} = $-I_{B2}$ = -100mA

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

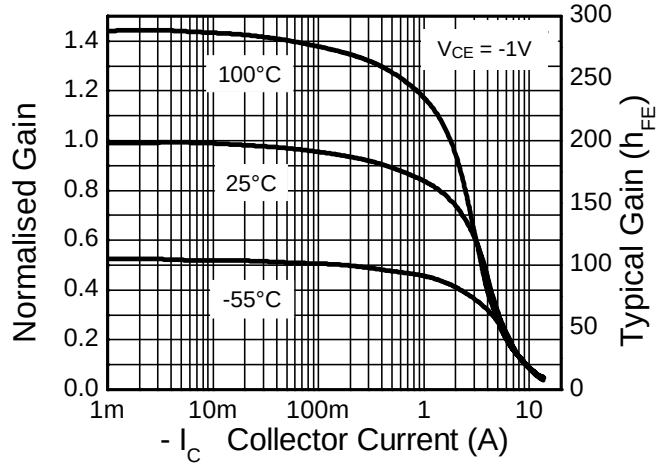
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



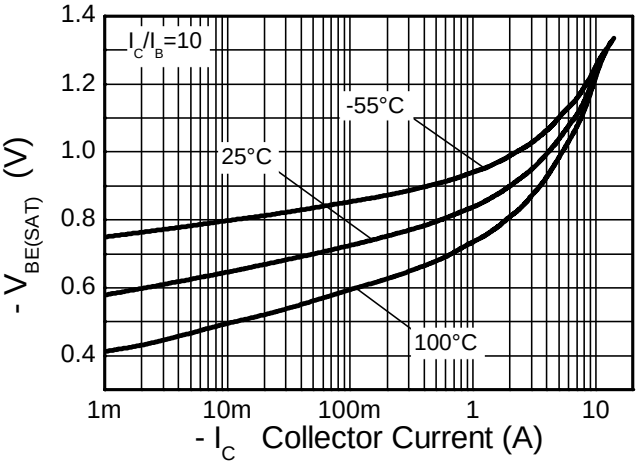
$V_{CE(SAT)}$ v I_C



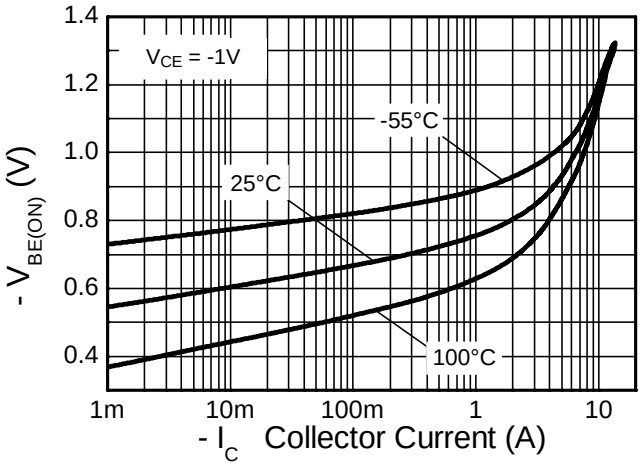
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



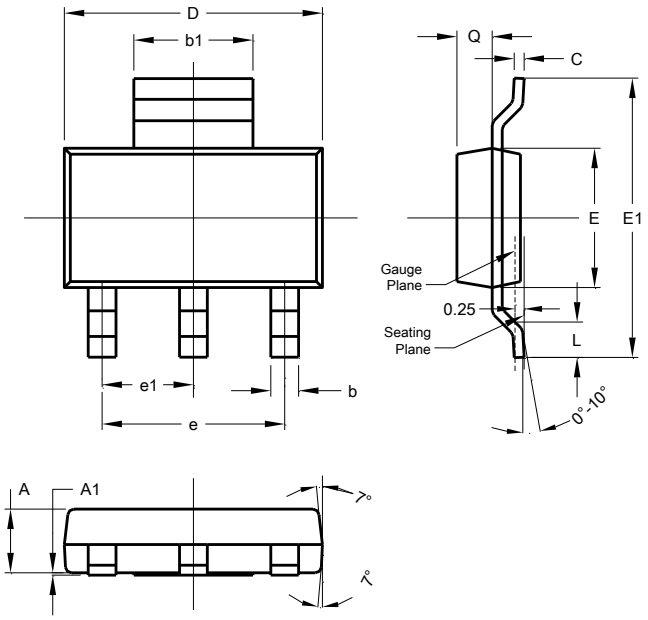
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

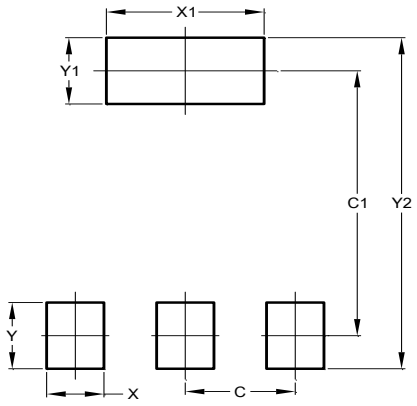
Please see http://www.diodes.com/package-outlines.html for the latest version.



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.



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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