优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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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
- Weight: 0.112 grams (Approximate) e3

Features

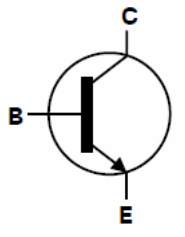
- $BV_{CEO} > 60V$
- $I_C = 6A$ High Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 60mV$ @ 1A
- $R_{SAT} = 35m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified up to 10A for High Gain Hold-Up
- Complementary PNP Type: NK-ZX5T951GQ

Applications

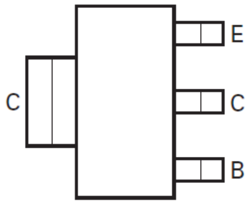
- Emergency Lighting Circuits
- MOSFET & IGBT Gate Drivers
- Solenoid, Relay and Actuator Drivers
- DC Modules
- Motor Control

SOT223

Top View



Device Symbol



Top View
Pin-Out

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

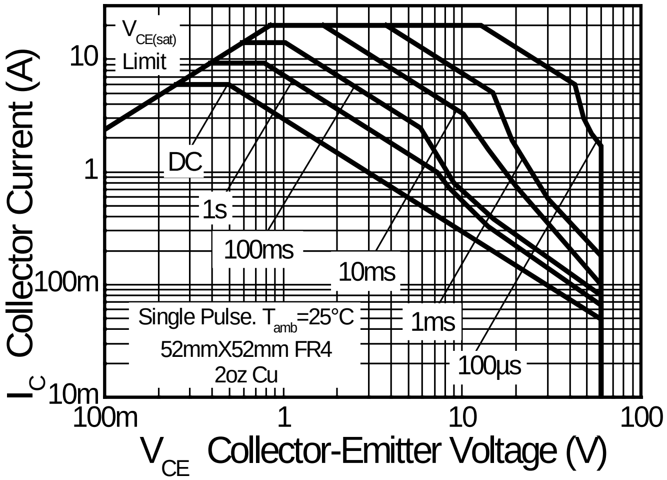
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	3.0	W
	(Note 6)		2.0	
	(Note 7)		1.6	
	(Note 8)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	41.7	°C/W
	(Note 6)		62.5	
	(Note 7)		78.1	
	(Note 8)		104	
Thermal Resistance Junction to Lead	(Note 9)	$R_{\theta JL}$	10.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

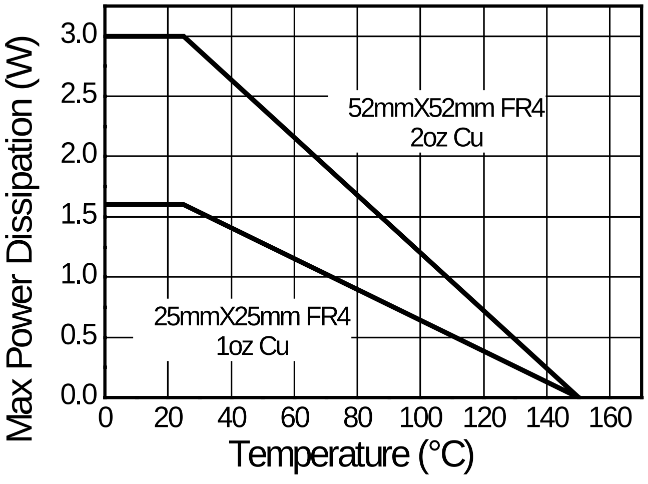
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5 except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5 except the device is mounted on 25mm x 25mm 1oz copper.
8. Same as Note 5 except the device is mounted on minimum recommended pad layout.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

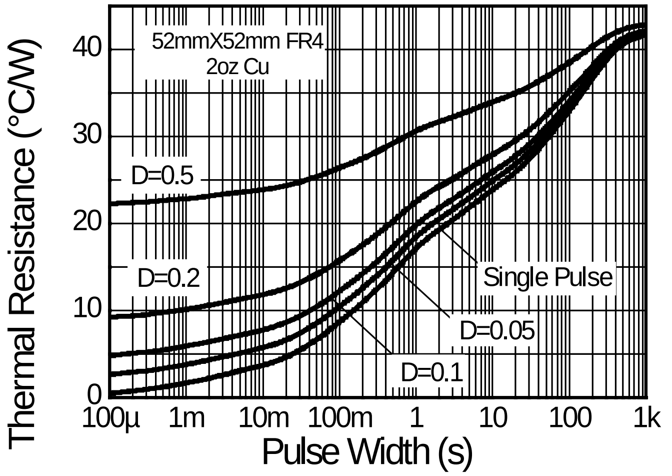
Thermal Characteristics and Derating Information



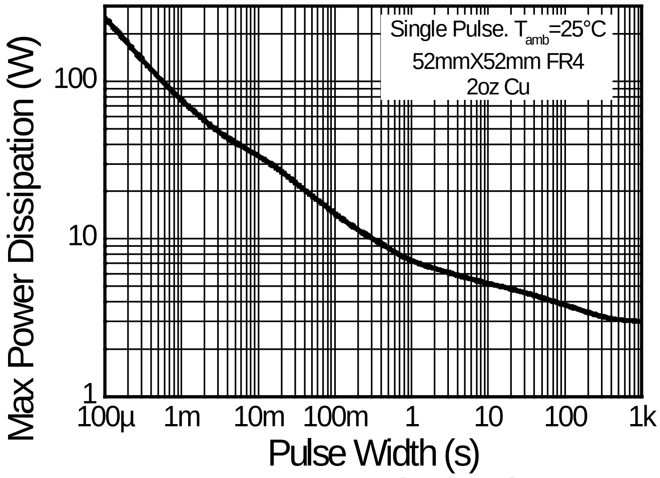
Safe Operating Area



Derating Curve



Transient Thermal Impedance



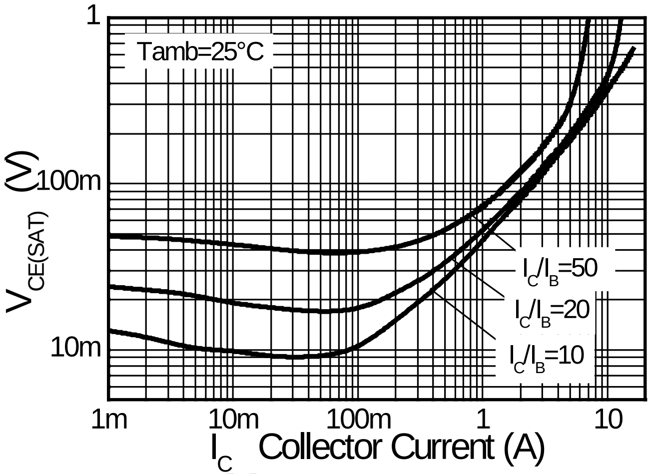
Pulse Power Dissipation

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

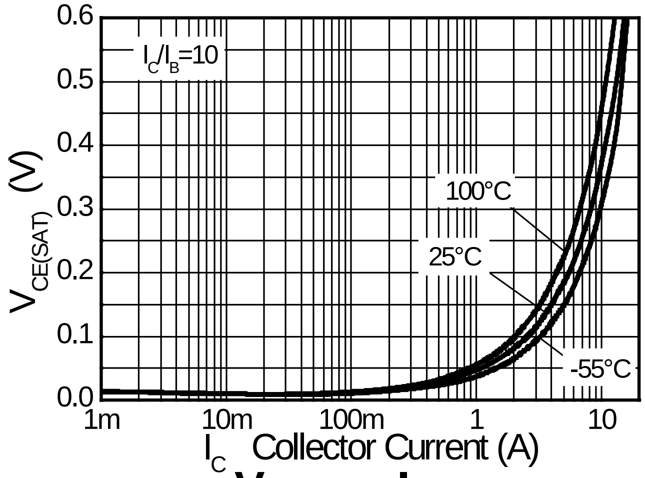
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CER}	150	190	—	V	I_C = 1µA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	— —	<1 —	20 0.5	nA µA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Collector Cut-Off Current	I_{CER} R_B ≤ 1kΩ	— —	<1 —	20 0.5	nA µA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Emitter Cut-Off Current	I_{EBO}	—	<1	10	nA	V_{EB} = 6V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	20	30	mV	I_C = 100mA, I_B = 5mA
		—	45	60		I_C = 1A, I_B = 100mA
		—	50	70		I_C = 1A, I_B = 50mA
		—	100	135		I_C = 2A, I_B = 50mA
		—	210	260		I_C = 6A, I_B = 300mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	1000	1100	mV	I_C = 6A, I_B = 300mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	940	1050	mV	I_C = 6A, V_{CE} = 1V
DC Current Gain (Note 11)	h_{FE}	100	200	—	–	I_C = 10mA, V_{CE} = 1V
		100	200	300		I_C = 2A, V_{CE} = 1V
		55	105	—		I_C = 5A, V_{CE} = 1V
		20	40	—		I_C = 10A, V_{CE} = 1V
Output Capacitance	C_{obo}	—	31	—	pF	V_{CB} = 10V. f = 1MHz
Current Gain-Bandwidth Product	f_T	—	130	—	MHz	V_{CE} = 5V, I_C = 100mA, f = 100MHz
Switching Times	t_{on}	—	42	—	ns	I_C = 1A, V_{CC} = 10V, I_{B1} = -I_{B2} = 100mA
	t_{off}	—	760	—		

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

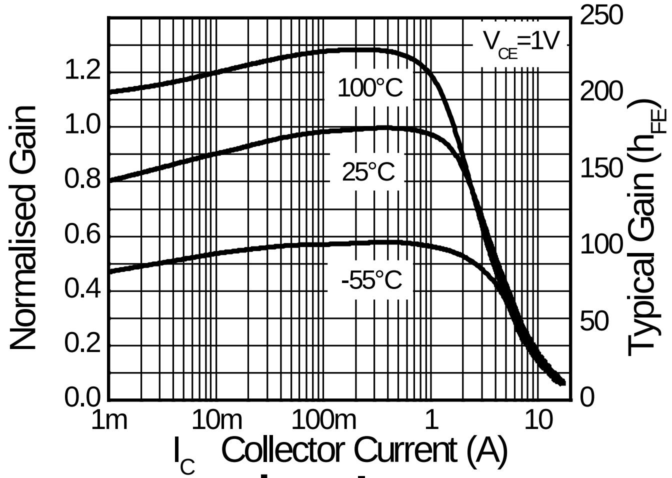
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



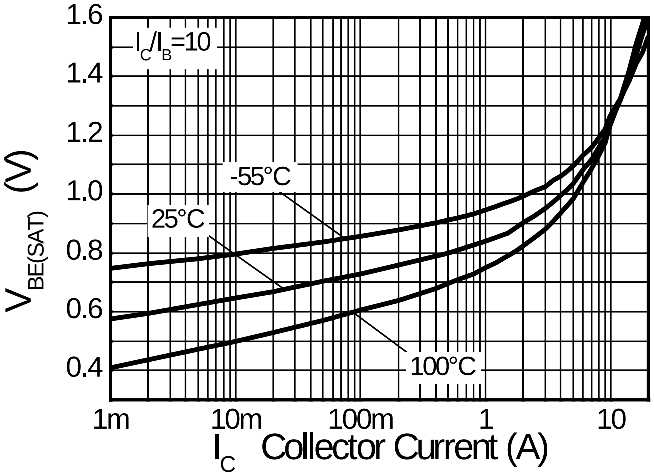
$V_{CE(SAT)}$ v I_C



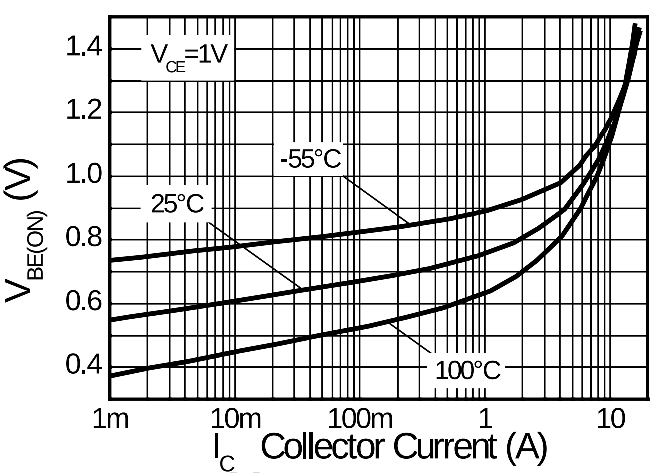
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

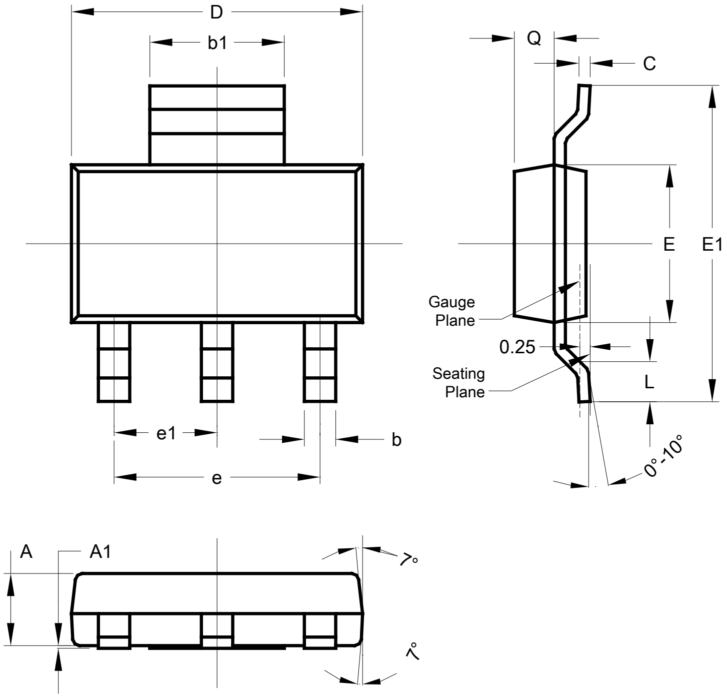


$V_{BE(SAT)}$ v I_C



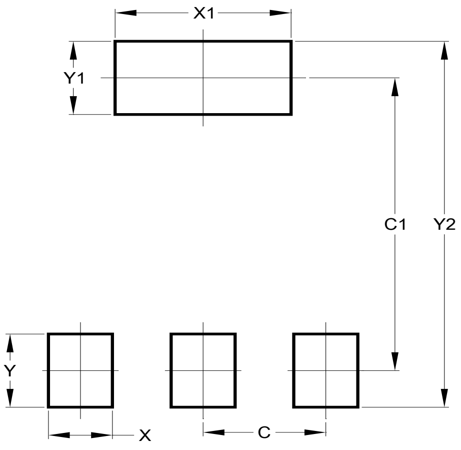
$V_{BE(ON)}$ v I_C

Package Outline Dimensions



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



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