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 requirement of automotive applications

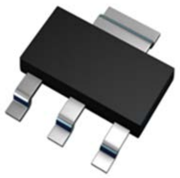
Features

- BV_{CEO} > 80V
- BV_{CBO} > 100V
- I_C = 2A High Continuous Current
- Useful hFE up to 6A

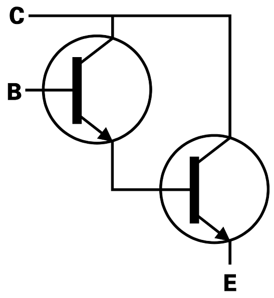
Mechanical Data

- 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)

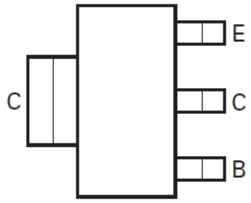
SOT223



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}	100	V
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Base Voltage	V_{EBO}	10	V
Continuous Collector Current	I_C	2	A
Peak Pulse Current	I_{CM}	6	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	3.0	W
	(Note 7)		2.0	
	(Note 8)		1.6	
	(Note 9)		1.2	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\Theta JA}$	41.7	°C/W
	(Note 7)		62.5	
	(Note 8)		78.1	
	(Note 9)		104	
Thermal Resistance Junction to Lead	(Note 10)	$R_{\Theta JL}$	12.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 11)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	2000	V	2
Electrostatic Discharge—Machine Model	ESD MM	200	V	B

Notes:
6. For a device mounted with the collector lead on 50mm × 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.
7. Same as Note 5, except the device is mounted on 25mm × 25mm 2oz copper.
8. Same as Note 5, except the device is mounted on 25mm × 25mm 1oz copper.
9. Same as Note 5, except the device is mounted on minimum recommended pad layout.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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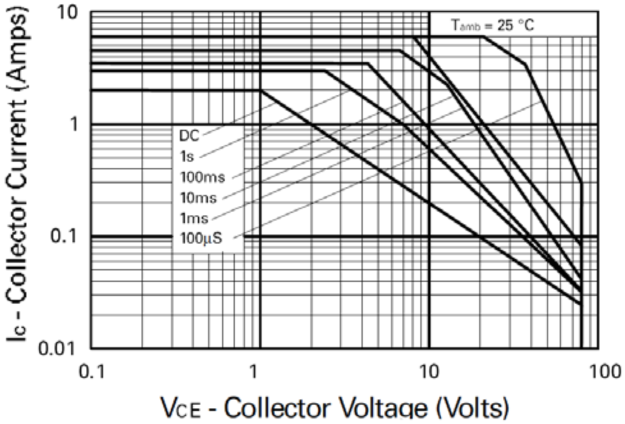
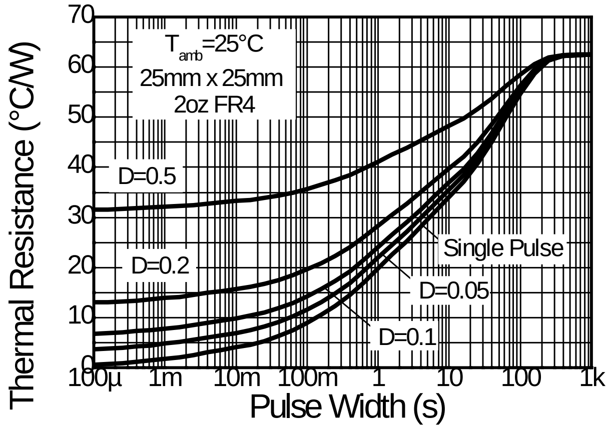
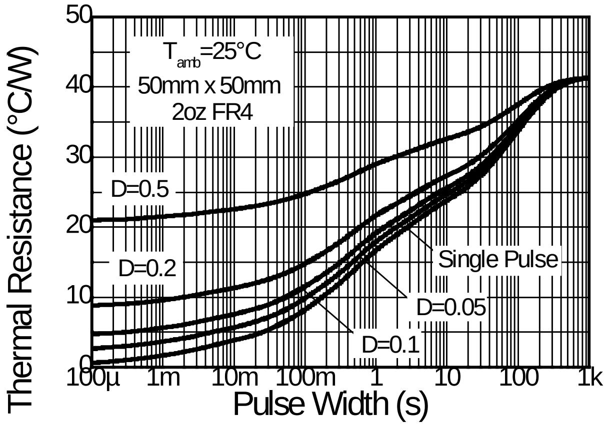
Thermal Characteristics and Derating Information



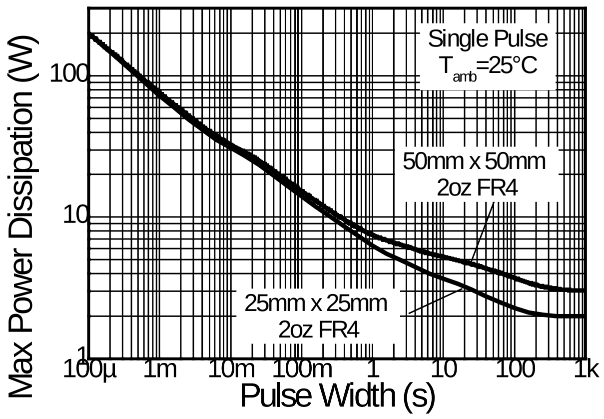
Safe Operating Area



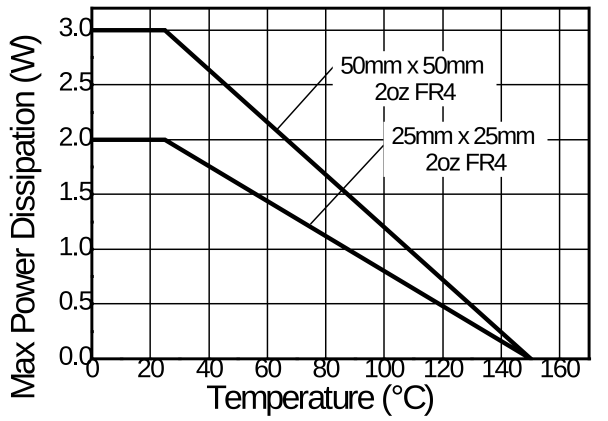
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



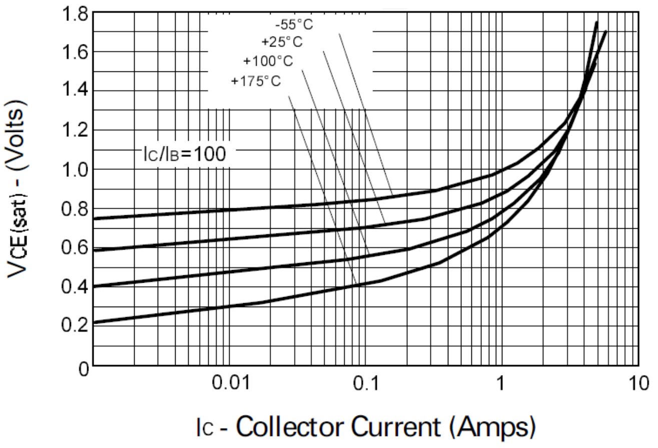
Derating Curve

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

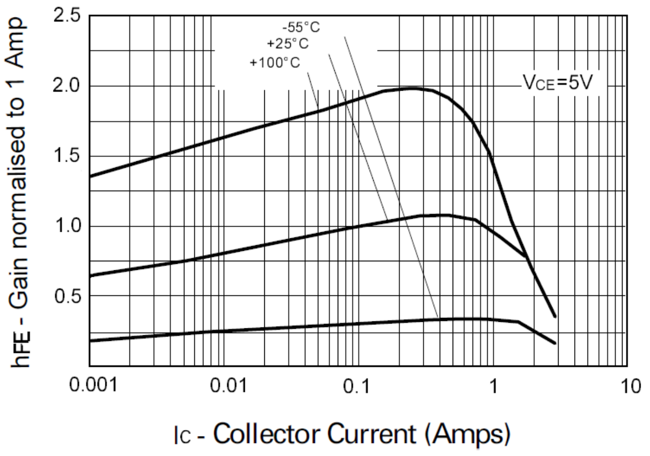
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	240	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	80	110	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	10	16	—	V	I_E = 100µA
Collector-Base Cut-Off Current	I_{CBO}	— —	—	10 10	nA µA	V_{CB} = 80V V_{CB} = 80V, T_A = +100°C
Collector-Emitter Cut-Off Current	I_{CES}	—	—	10	µA	V_{CES} = 80V
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	V_{EB} = 8V
DC Current Gain (Note 11)	h_{FE}	3000 5000 3000 2000 — —	14,000 15,000 14,000 10,000 2000 750	— 100,000 — — — —	—	I_C = 50mA, V_{CE} = 5V I_C = 500mA, V_{CE} = 5V I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V I_C = 5A, V_{CE} = 5V I_C = 6A, V_{CE} = 5V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	— —	0.79 0.80 0.88 0.99 0.86	0.88 0.90 1.00 1.13 —	V	I_C = 250mA, I_B = 0.25mA I_C = 0.4A, I_B = 0.4mA I_C = 1A, I_B = 1mA I_C = 2A, I_B = 20mA I_C = 2A, I_B = 20mA,T_J = +150°C
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	1.70	1.95	V	I_C = 2A, I_B = 20mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	1.50	1.75	V	I_C = 2A, V_{CE} = 5V
Input Capacitance (Note 11)	C_{ibo}	—	90	—	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance (Note 11)	C_{obo}	—	15	—	pF	V_{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product (Note 11)	f_T	150	—	—	MHz	V_{CE} = 10V, I_C = 100mA, f=20MHz
Turn-On Time	t_{on}	—	0.5	—	µs	V_{CC} = 10V, I_C = 500mA I_{B1} = -I_{B2} = 0.5mA
Turn-Off Time	t_{off}	—	1.6	—	µs	

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300 µs. Duty cycle ≤ 2%.

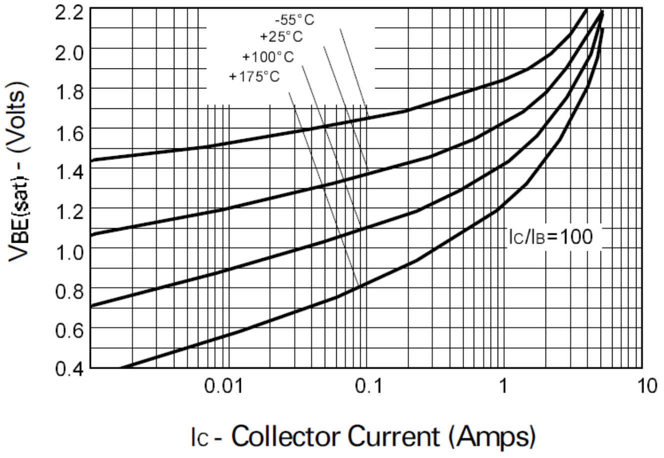
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



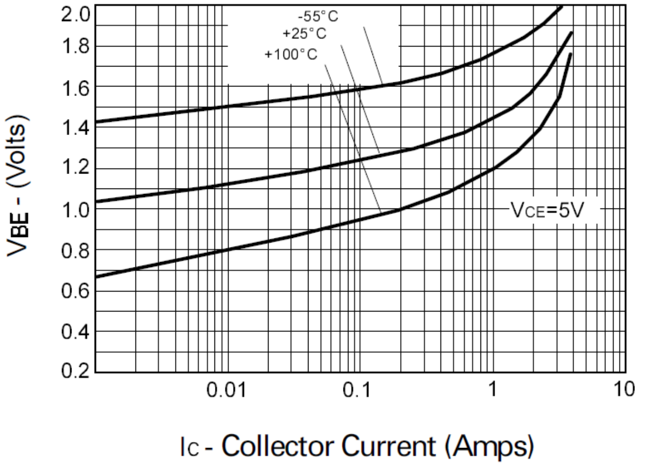
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



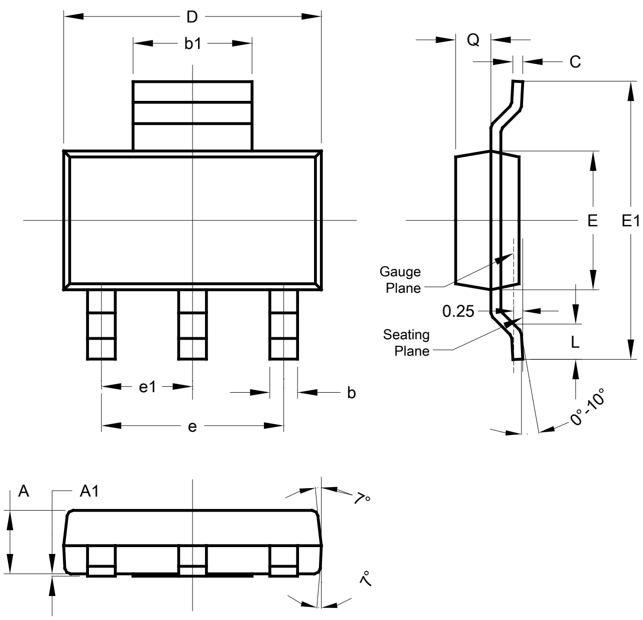
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

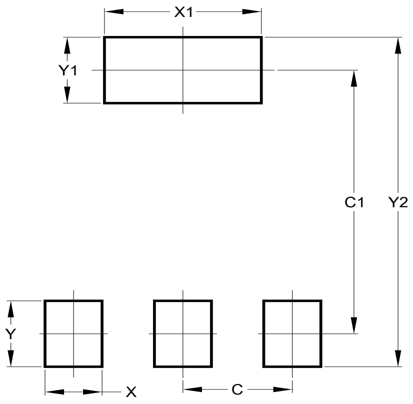
SOT223



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

SOT223



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