



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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## Features

- $BV_{CEO} > -500V$
- $I_C = -150mA$  High Continuous Current
- $I_{CM} = -500mA$  Peak Pulse Current

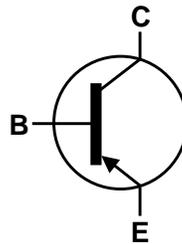
## Mechanical Data

- Package: SOT223
- Package 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)

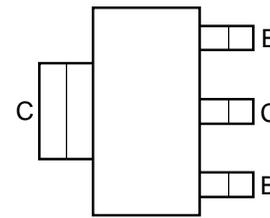
SOT223 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-500	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-500	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-150	mA
Peak Pulse Current	I <sub>CM</sub>	-500	mA

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

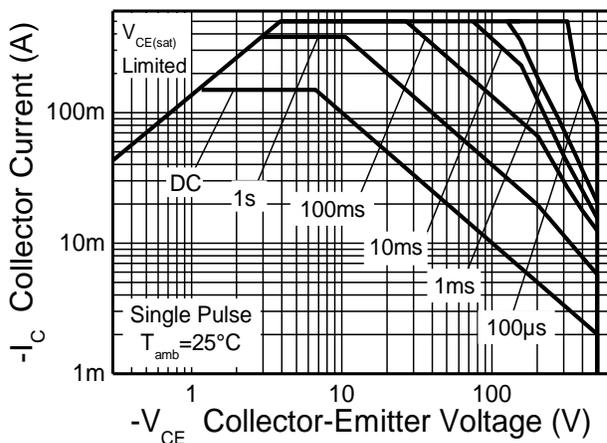
Characteristic	Symbol	Value	Unit
Power Dissipation	(Note 5)	2	W
	(Note 6)	3	W
Thermal Resistance, Junction to Ambient	(Note 5)	62.5	°C/W
	(Note 6)	41.7	°C/W
Thermal Resistance, Junction to Leads	(Note 7)	14.8	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

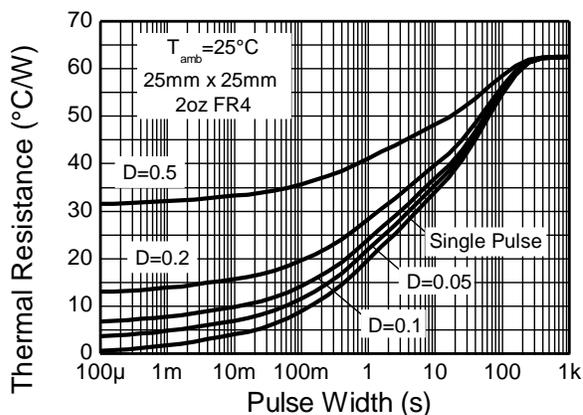
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
  6. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz 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.

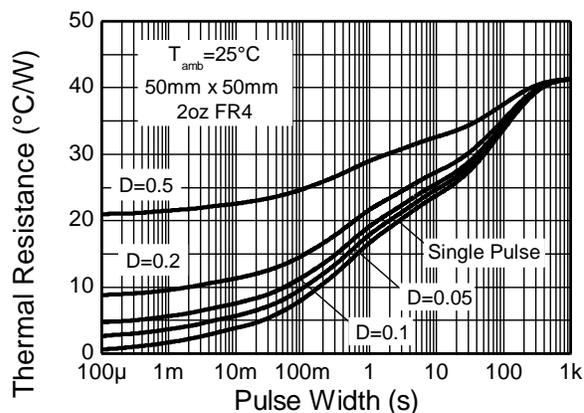
**Thermal Characteristics and Derating Information**



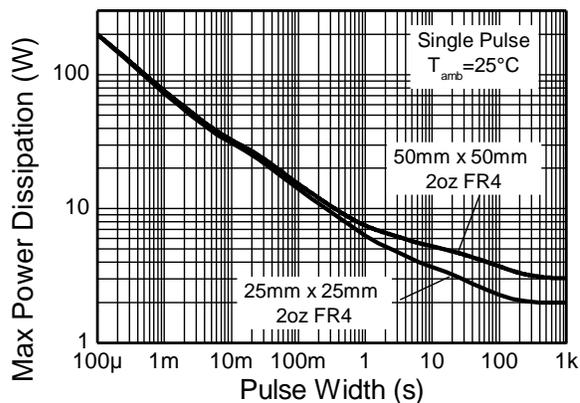
**Figure 1. Safe Operating Area**



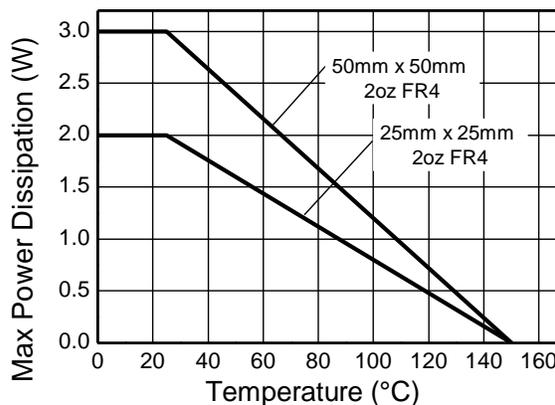
**Figure 2. Transient Thermal Impedance**



**Figure 3. Transient Thermal Impedance**



**Figure 4. Pulse Power Dissipation**



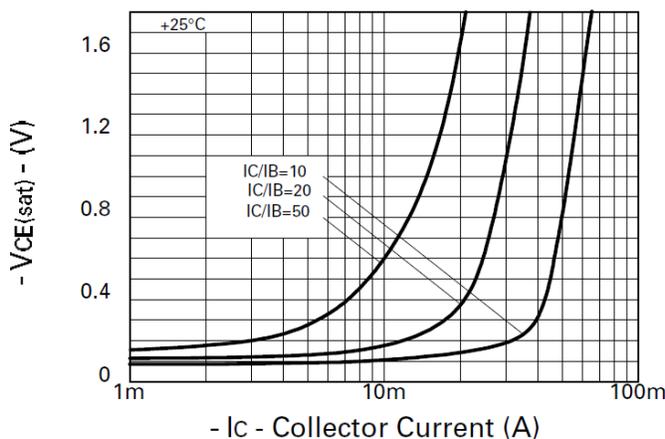
**Figure 5. Derating Curve**

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

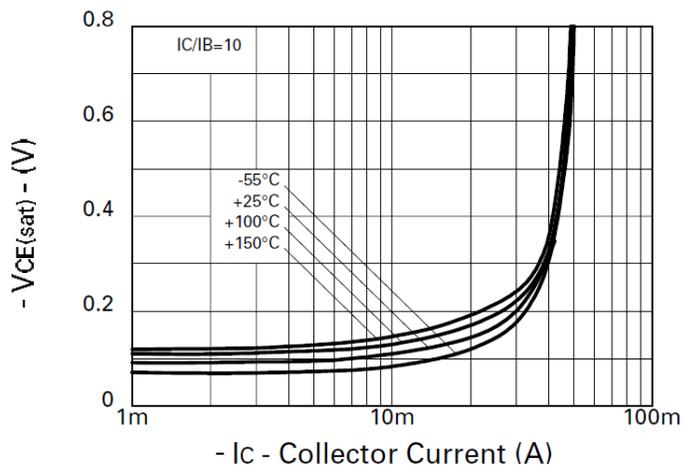
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-500	—	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-500	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	—	—	V	I <sub>E</sub> = -100μA
Collector Cut-Off Current	I <sub>CBO</sub>	—	—	-100	nA	V <sub>CB</sub> = -500V
Collector Cut-Off Current	I <sub>CES</sub>	—	—	-100	nA	V <sub>CE</sub> = -500V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-100	nA	V <sub>EB</sub> = -5.6V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	—	-200	mV	I <sub>C</sub> = -20mA, I <sub>B</sub> = -2mA
		—	—	-500		I <sub>C</sub> = -50mA, I <sub>B</sub> = -10mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	—	—	-900	mV	I <sub>C</sub> = -50mA, I <sub>B</sub> = -10mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(on)</sub>	—	—	-900	mV	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V
DC Current Gain (Note 9)	h <sub>FE</sub>	100	—	300	—	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -10V
		80	—	300		I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V
		—	15	—		I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V
Current Gain-Bandwidth Product	f <sub>T</sub>	60	—	—	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -10mA f = 50MHz
Turn-On Time	t <sub>on</sub>	—	110	—	ns	V <sub>CC</sub> = -100V, I <sub>C</sub> = -50mA
Turn-Off Time	t <sub>off</sub>	—	1.5	—	μs	I <sub>B1</sub> = -5mA, I <sub>B2</sub> = 10mA
Output Capacitance	C <sub>obo</sub>	—	—	8	pF	V <sub>CB</sub> = -20V, f = 1MHz

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

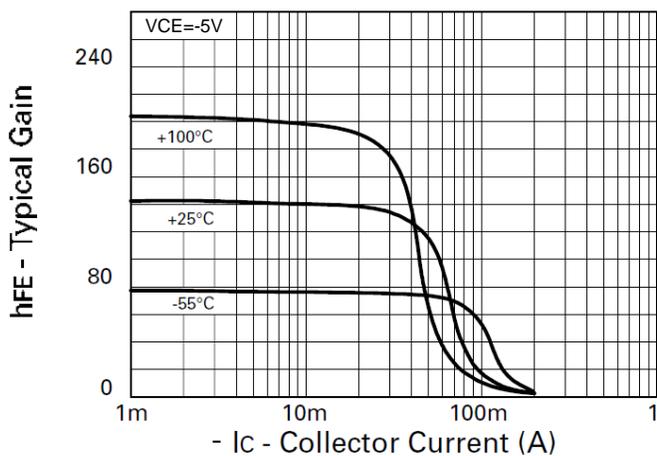
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



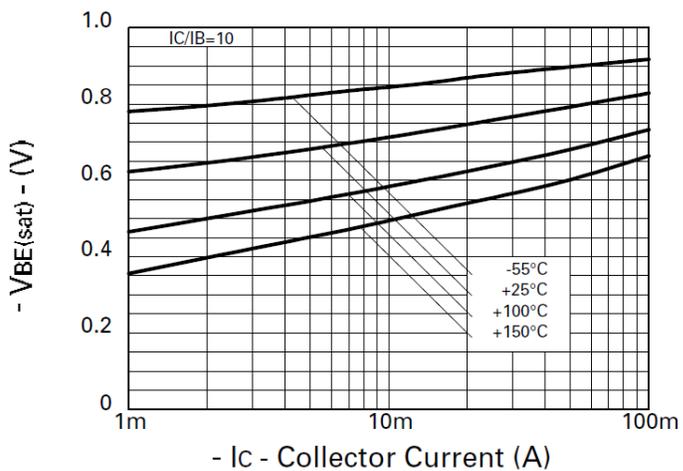
**Figure 6.  $V_{CE(sat)}$  v  $I_c$**



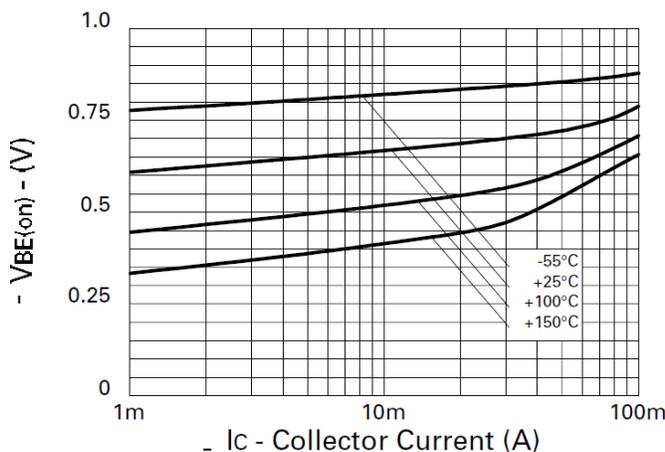
**Figure 7.  $V_{CE(sat)}$  v  $I_c$**



**Figure 8.  $h_{FE}$  v  $I_c$**



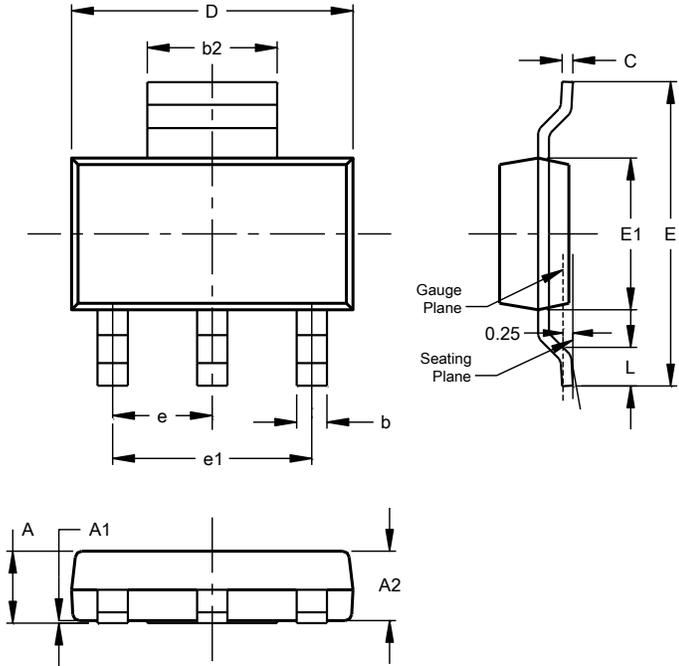
**Figure 9.  $V_{BE(sat)}$  v  $I_c$**



**Figure 10.  $V_{BE(on)}$  v  $I_c$**

### Package Outline Dimensions

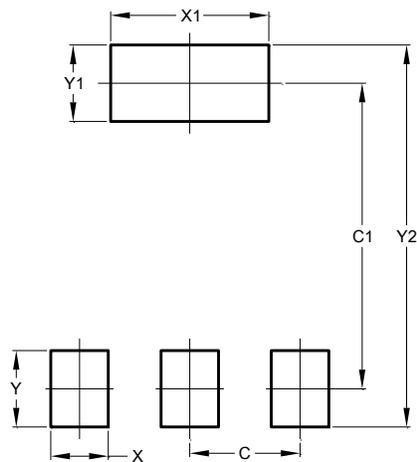
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Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

### Suggested Pad Layout

SOT223 (Type DN)



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