



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

- $BV_{CEO} > 25V$
- $I_C = 5A$  high Continuous Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < 70mV @ 1A$
- $R_{CE(sat)} = 50m\Omega$  for a low equivalent On-Resistance
- $h_{FE}$  specified up to 20A for a high gain hold up

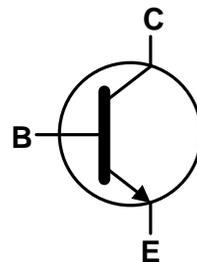
## Mechanical Data

- 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)

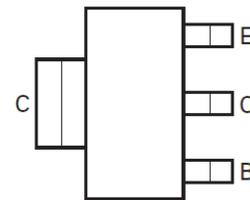
SOT223



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>CBO</sub>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	25	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	5	A
Peak Pulse Current	I <sub>CM</sub>	20	A

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

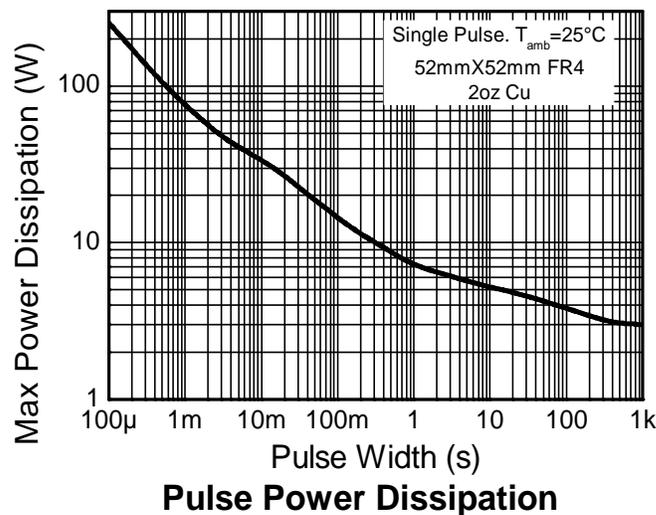
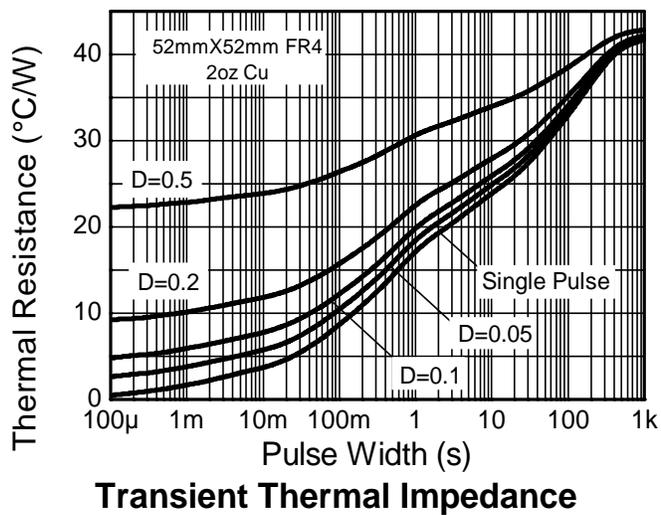
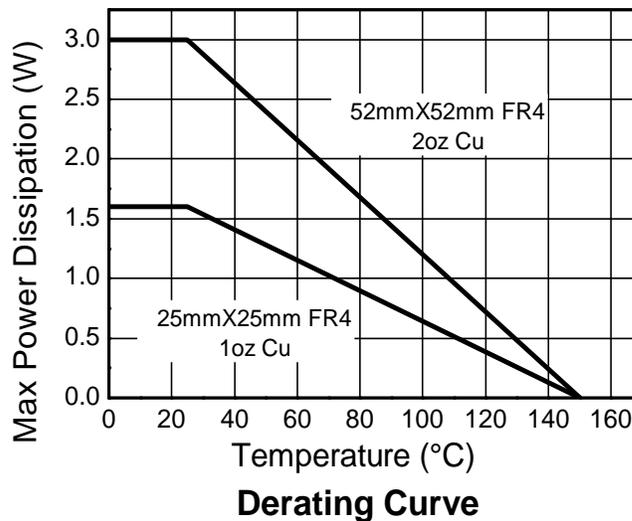
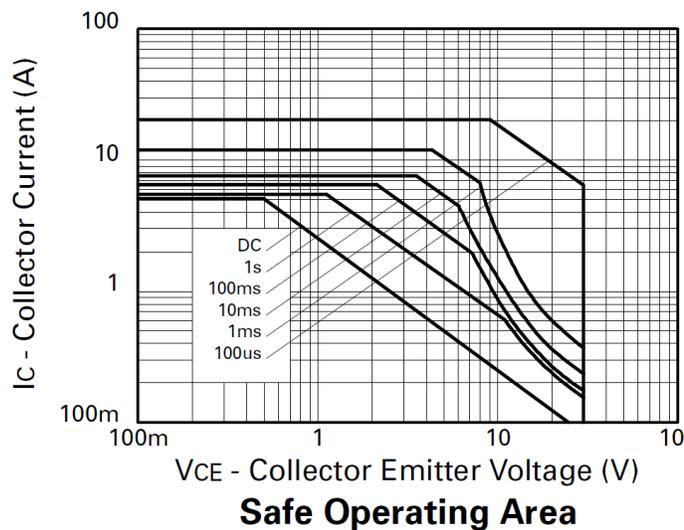
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	3.0
		(Note 6)	2.0
		(Note 7)	1.6
		(Note 8)	1.2
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	41.7
		(Note 6)	62.5
		(Note 7)	78.1
		(Note 8)	104
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	10.9	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 10)

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 52mm x 52mm 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

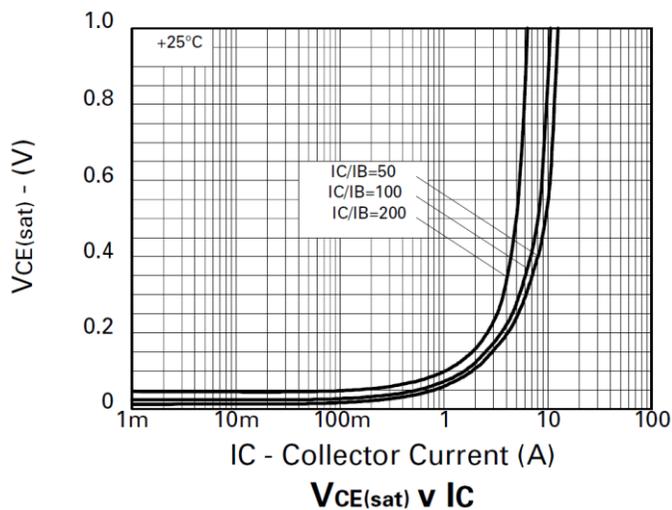


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

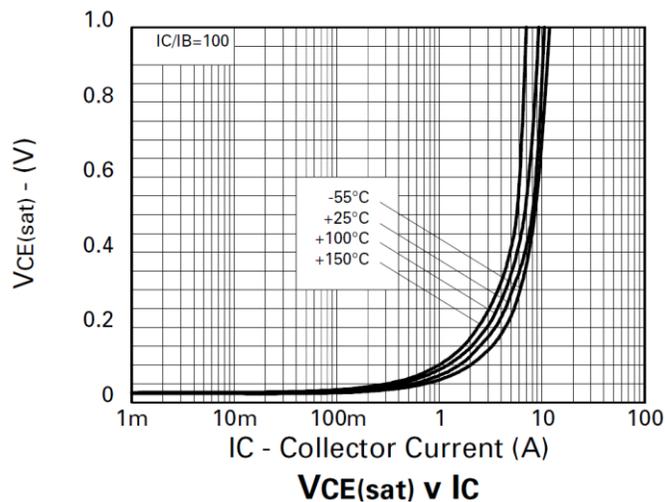
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	80	130	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV <sub>CER</sub>	80	130	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV <sub>CEO</sub>	25	30	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	9	-	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	0.3	10	nA	V <sub>CB</sub> = 35V
Emitter Cutoff Current	I <sub>EBO</sub>	-	0.3	10	nA	V <sub>EB</sub> = 4V
DC Current Transfer Static Ratio (Note 11)	h <sub>FE</sub>	280	440	-	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	450	-		I <sub>C</sub> = 0.5A, V <sub>CE</sub> = 2V
		300	450	1,200		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		180	280	-		I <sub>C</sub> = -5A, V <sub>CE</sub> = 2V
		40	80	-		I <sub>C</sub> = 20A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 11)	V <sub>CE(sat)</sub>	-	35	60	mV	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 10mA
		-	70	100		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		-	180	250		I <sub>C</sub> = 3A, I <sub>B</sub> = 30mA
		-	250	330		I <sub>C</sub> = 5A, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage (Note 11)	V <sub>BE(sat)</sub>	-	950	1,050	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 50mA
Base-Emitter Turn-on Voltage (Note 11)	V <sub>BE(on)</sub>	-	900	1,000	mV	I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
Transitional Frequency (Note 11)	f <sub>T</sub>	-	180	-	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Output Capacitance	C <sub>obo</sub>	-	45	60	pF	V <sub>CB</sub> = 10V, f = 1MHz
Switching Time	t <sub>ON</sub>	-	125	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 4A, I <sub>B1</sub> = -I <sub>B2</sub> = 40mA
	t <sub>OFF</sub>	-	380	-		

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

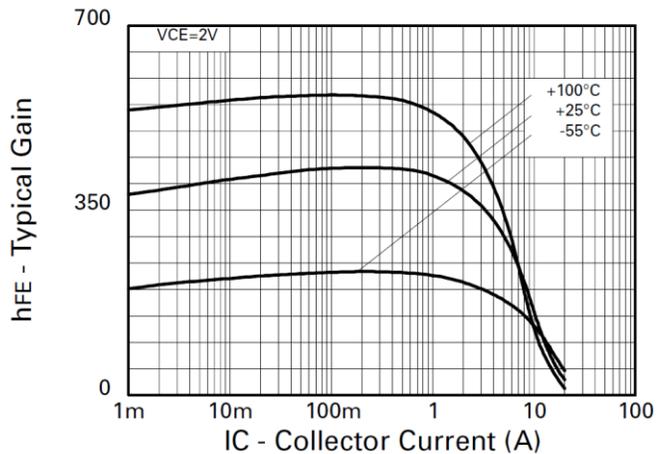
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



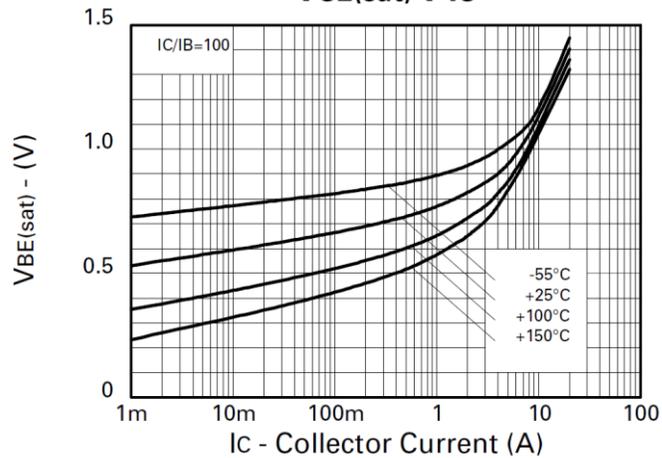
**$V_{CE(sat)}$  v  $I_C$**



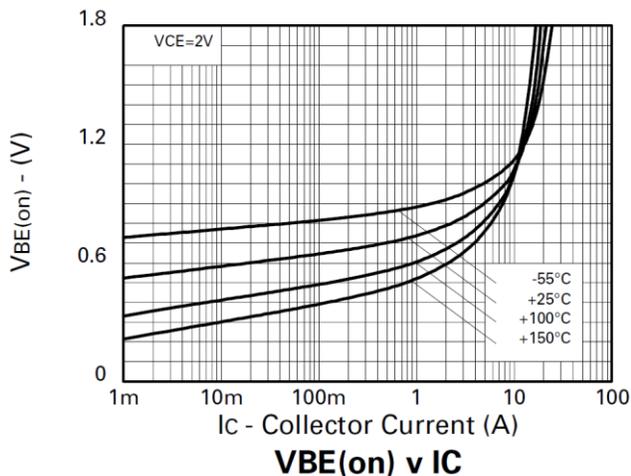
**$V_{CE(sat)}$  v  $I_C$**



**$h_{FE}$  v  $I_C$**

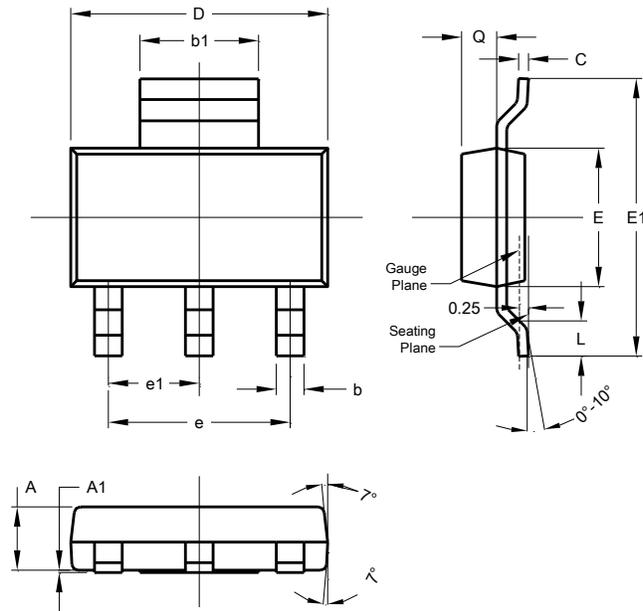


**$V_{BE(sat)}$  v  $I_C$**



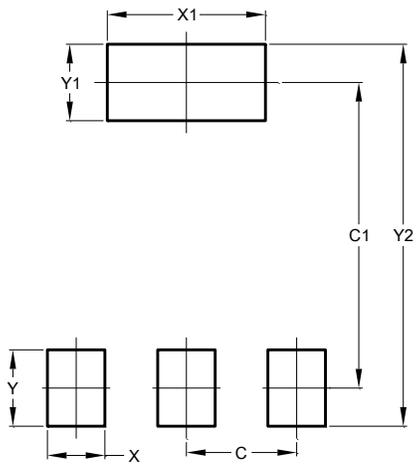
**$V_{BE(on)}$  v  $I_C$**

### Package Outline Dimensions



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
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
<b>All Dimensions in mm</b>			

### 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