



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

- $BV_{CEO} > 30V$
- $I_C = 7A$  High Continuous Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- $P_D = 3W$  Power Dissipation
- Extremely Low Equivalent On-Resistance;  $R_{CE(SAT)} = 36\Omega$  at 5A
- Very Low Saturation Voltages
- Complimentary PNP Type NK-FZT949

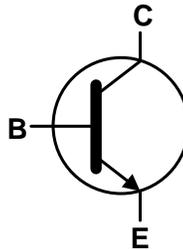
## Mechanical Data

- 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)

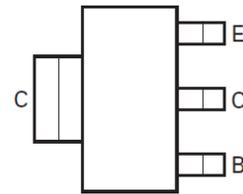
SOT223



Top View



Equivalent Circuit



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>	30	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	7	A
Peak Pulse Current	I <sub>CM</sub>	20	A

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

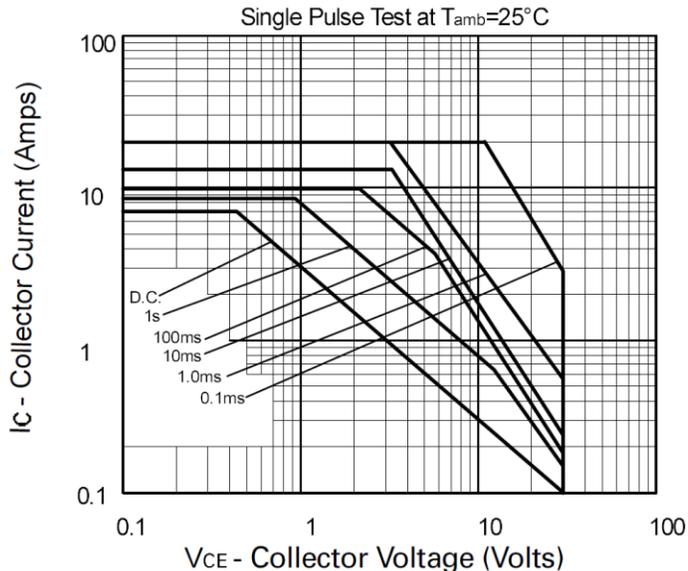
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	3	W
	(Note 6)		24	
Linear Derating Factor	(Note 5)	R <sub>θJA</sub>	1.6	mW/°C
	(Note 6)		12.8	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	42	°C/W
	(Note 6)		78	
Thermal Resistance, Junction to Lead	(Note 7)	R <sub>θJL</sub>	8.8	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

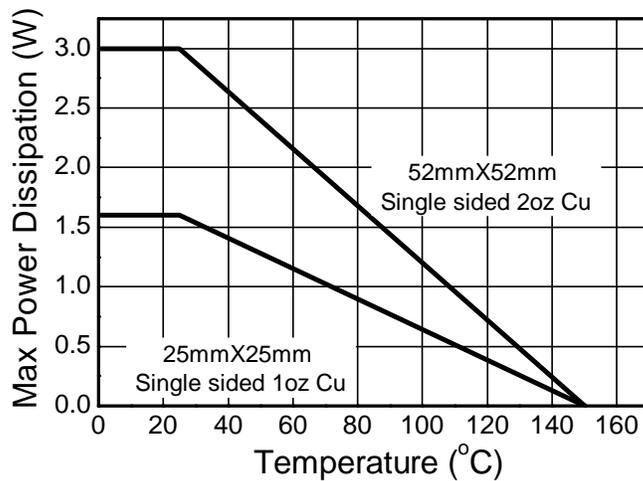
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
  6. Same as Note 5, except the device is mounted on 25mm x 25mm 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.

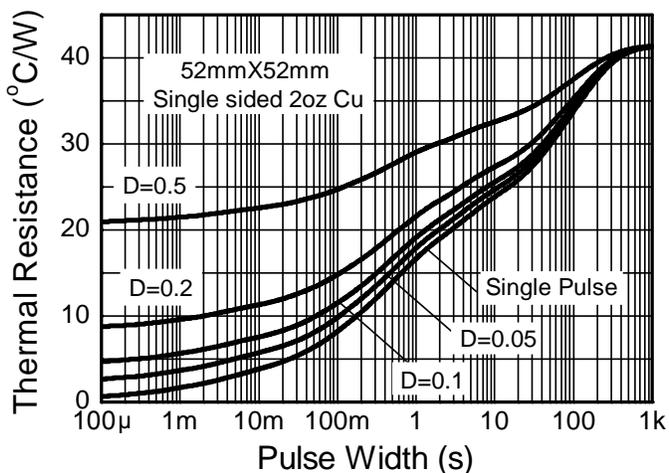
**Thermal Characteristics and Derating Information**



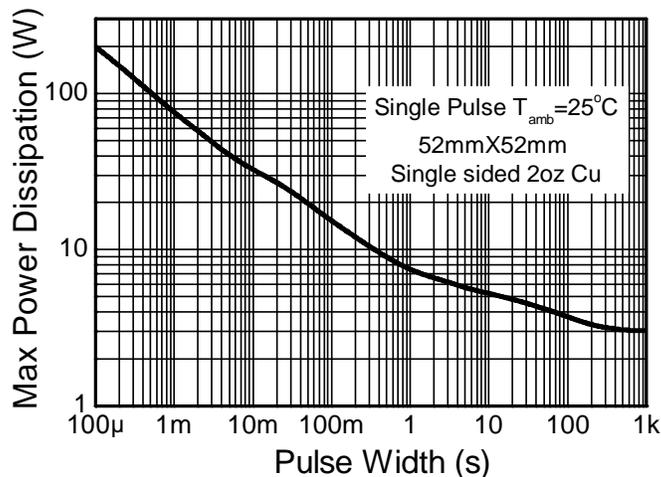
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



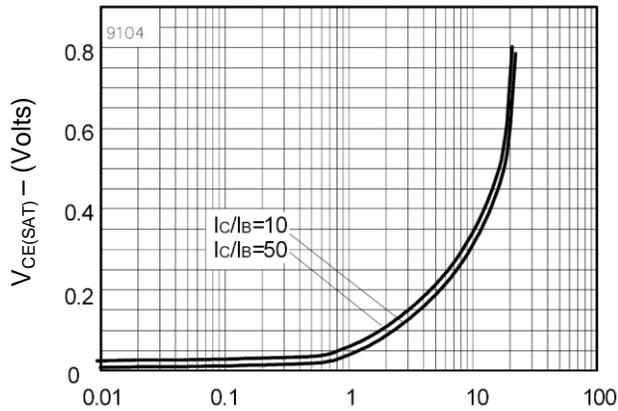
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	80	120	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CER}$	80	120	—	V	$I_C = 1\mu\text{A}, R \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	30	40	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	8	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cut-Off Current	$I_{CBO}$	—	—	50 1	nA $\mu\text{A}$	$V_{CB} = 70\text{V}$ $V_{CB} = 70\text{V}, T_A = +100^\circ\text{C}$
Collector Cut-Off Current	$I_{CER}$	—	—	50	nA	$V_{CE} = 70\text{V}, R \leq 1\text{k}\Omega$
		—	—	1	$\mu\text{A}$	$V_{CE} = 70\text{V}, R \leq 1\text{k}\Omega, T_A = +100^\circ\text{C}$
Emitter Cut-Off Current	$I_{EBO}$	—	—	10	nA	$V_{EB} = 6\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	35 67 188 —	50 110 215 350	mV	$I_C = 500\text{mA}, I_B = 20\text{mA}$ $I_C = 1\text{A}, I_B = 20\text{mA}$ $I_C = 2\text{A}, I_B = 20\text{mA}$ $I_C = 6.5\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	—	1.2	V	$I_C = 6.5\text{A}, I_B = 300\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	—	1.13	V	$I_C = 6.5\text{A}, V_{CE} = 1\text{V}$
DC Current Gain (Note 9)	$h_{FE}$	100	200	—	—	$I_C = 10\text{mA}, V_{CE} = 1\text{V}$ $I_C = 1\text{A}, V_{CE} = 1\text{V}$ $I_C = 7\text{A}, V_{CE} = 1\text{V}$ $I_C = 20\text{A}, V_{CE} = 2\text{V}$
		100	200	300		
		100	150	—		
		30	65	—		
Transitional Frequency	$f_T$	100	—	—	MHz	$I_C = 100\text{mA}, V_{CE} = 10\text{V}$ $f = 50\text{MHz}$
Output Capacitance	$C_{OBO}$	—	75	—	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Switching Time	$t_{ON}$	—	45	—	ns	$I_C = 1\text{A}, I_{B1} = 100\text{mA}$ $I_{B2} = -100\text{mA}, V_{CC} = 10\text{V}$
	$t_{OFF}$	—	630	—	ns	

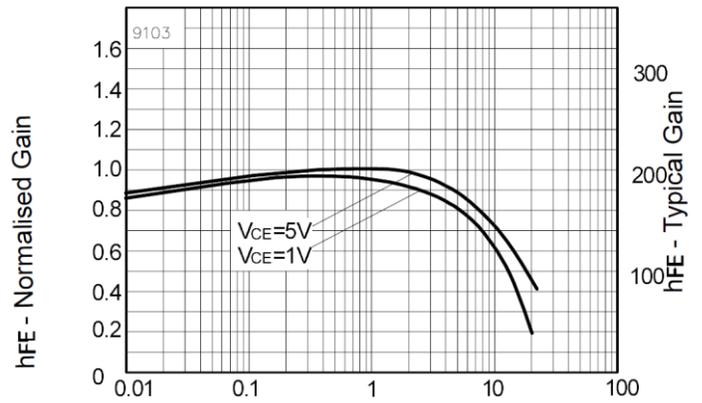
 Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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



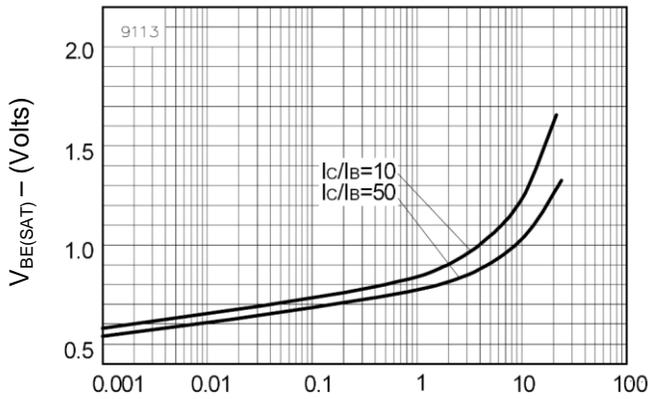
$I_C$  - Collector Current (Amps)

$V_{CE(SAT)} \text{ v } I_C$



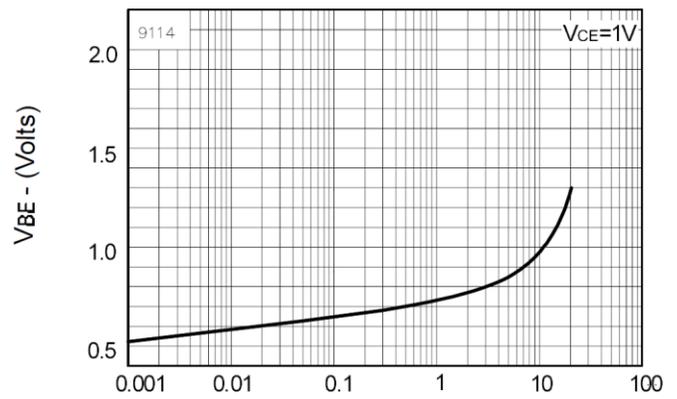
$I_C$  - Collector Current (Amps)

$hFE \text{ v } I_C$



$I_C$  - Collector Current (Amps)

$V_{BE(SAT)} \text{ v } I_C$

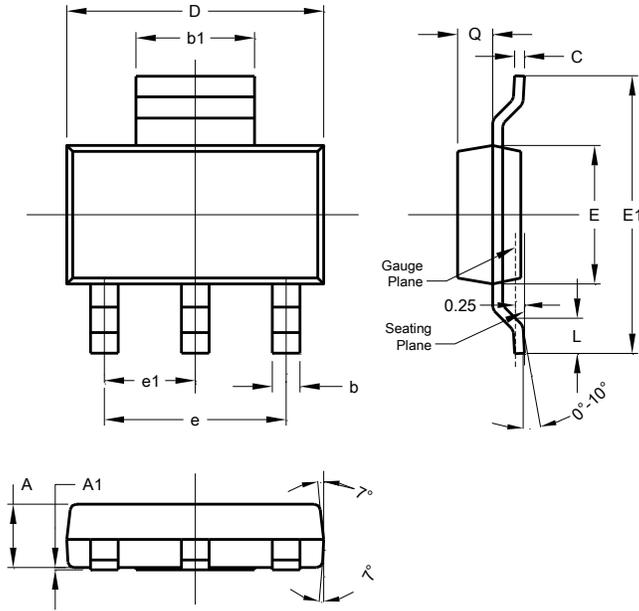


$I_C$  - Collector Current (Amps)

$V_{BE(ON)} \text{ v } I_C$

## Package Outline Dimensions

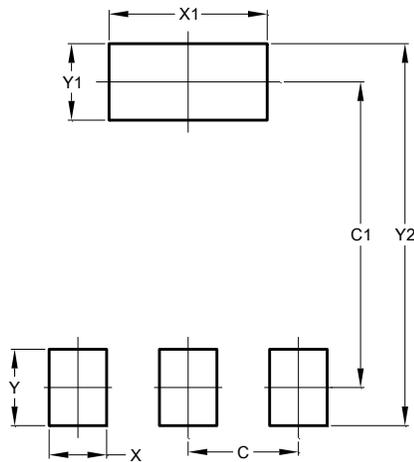
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SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## 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