



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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企业微信二维码



企业QQ二维码

## Features

- $BV_{CE0} > -100V$
- $I_C = -2A$  High Continuous Current
- $I_{CM} = -6A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -300mV @ -1A$
- Complementary NPN Type: NK-FZT653

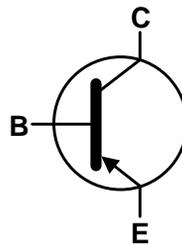
## Mechanical Data

- 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 ③
- Weight: 0.112 grams (Approximate)

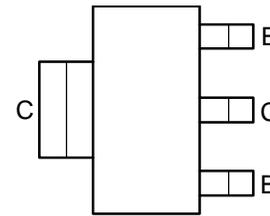
SOT223



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>	-120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-100	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-2	A
Peak Pulse Current	I <sub>CM</sub>	-6	A

### Thermal Characteristics

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	3.0
		(Note 7)	2.0
		(Note 8)	1.6
		(Note 9)	1.2
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 6)	41.7
		(Note 7)	62.5
		(Note 8)	78.1
		(Note 9)	104
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	12.9	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

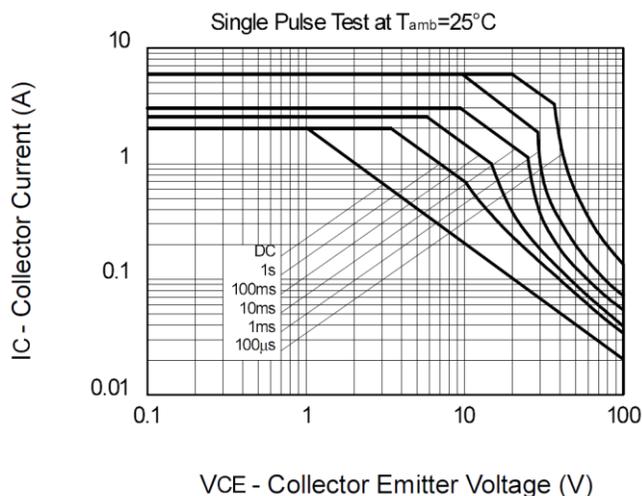
### ESD Ratings

 (Note 11)

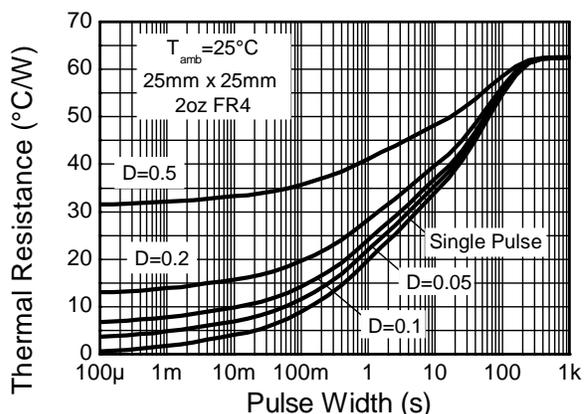
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. 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.
  7. Same as Note 6, except the device is mounted on 25mm x 25mm 2oz copper.
  8. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
  9. Same as Note 6, 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.

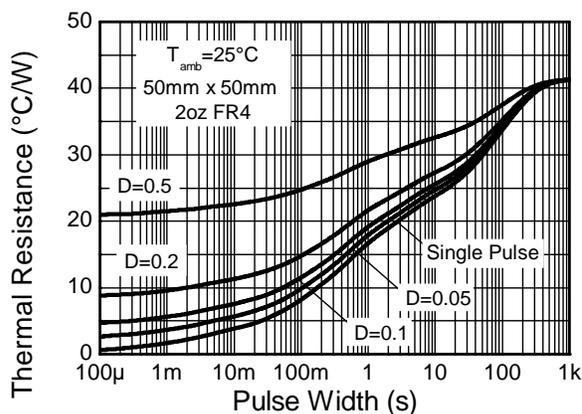
### Thermal Characteristics and Derating Information



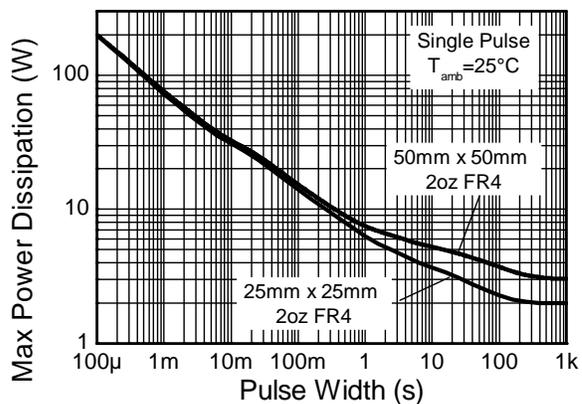
#### Safe Operating Area



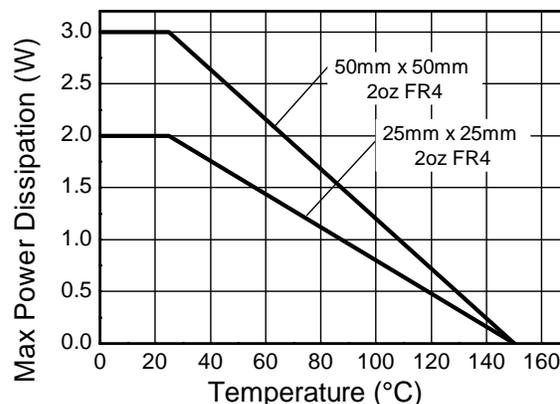
#### Transient Thermal Impedance



#### Transient Thermal Impedance



#### Pulse Power Dissipation



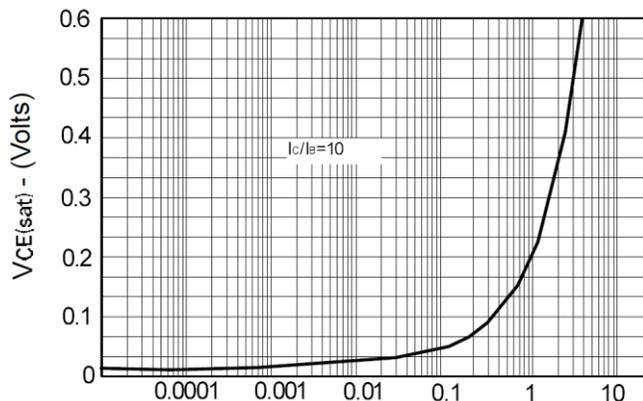
#### Derating Curve

**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>CBO</sub>	-120	-	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV <sub>CEO</sub>	-100	-	-	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>	-	<1	-100	nA	V <sub>CB</sub> = -100V
		-	-	-10	μA	V <sub>CB</sub> = -100V, T <sub>A</sub> = +125°C
Emitter Cut-Off Current	I <sub>EBO</sub>	-	<1	-100	nA	V <sub>EB</sub> = -5.6V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(sat)</sub>	-	-0.17	-0.3	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		-	-0.30	-0.5		I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(sat)</sub>	-	-0.9	-1.25	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
Base-Emitter Turn-On Voltage (Note 12)	V <sub>BE(on)</sub>	-	-0.8	-1.0	V	I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
DC Current Gain (Note 12)	h <sub>FE</sub>	70	200	-	-	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -2V
		100	200	300		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
		55	170	-		I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
		25	55	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
Current Gain-Bandwidth Product	f <sub>T</sub>	100	140	-	MHz	V <sub>CE</sub> = -5V, I <sub>C</sub> = -100mA f = 100MHz
Turn-On Time	t <sub>on</sub>	-	40	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -500mA
Turn-Off Time	t <sub>off</sub>	-	600	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = -50mA
Output Capacitance	C <sub>obo</sub>	-	-	30	pF	V <sub>CB</sub> = -10V, f = 1MHz

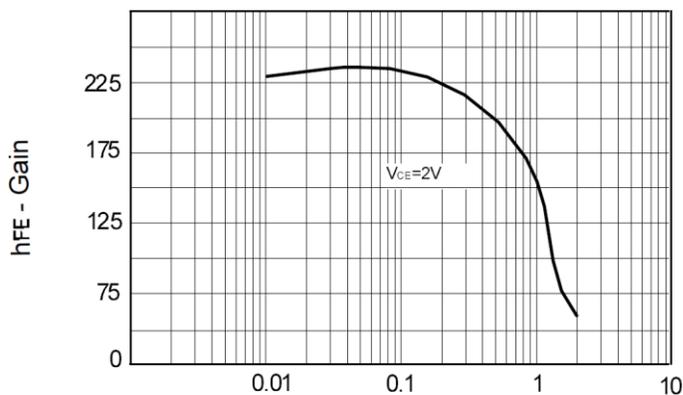
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



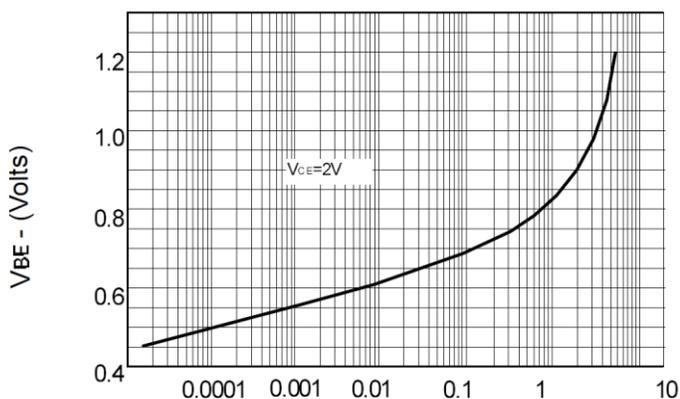
IC - Collector Current (Amps)

**VCE(sat) v IC**



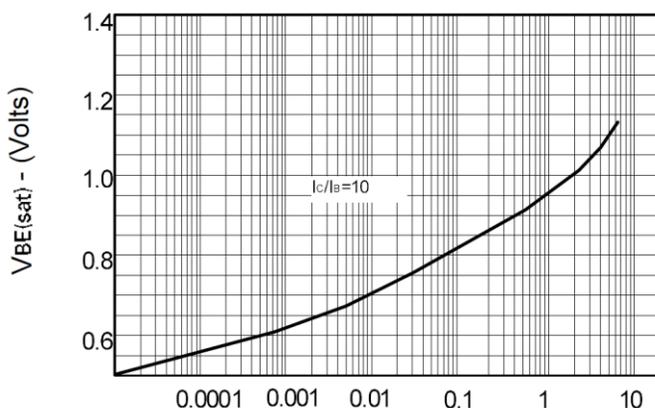
IC - Collector Current (Amps)

**hFE v IC**



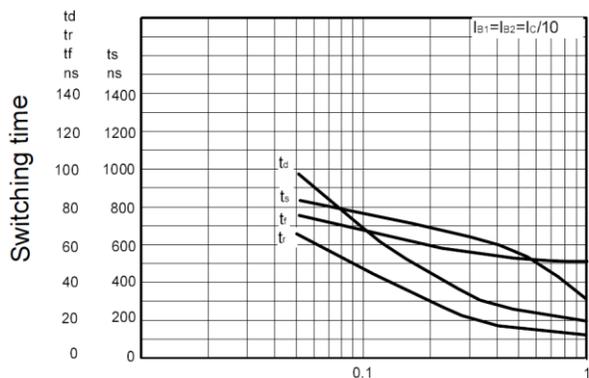
IC - Collector Current (Amps)

**VBE(on) v IC**



IC - Collector Current (Amps)

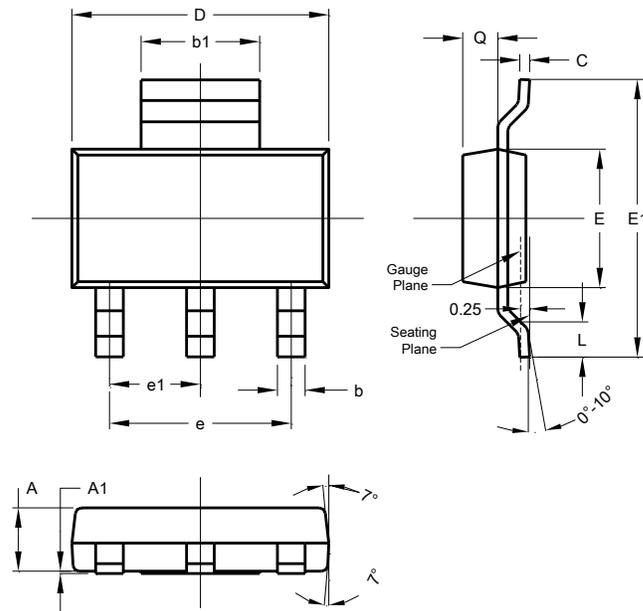
**VBE(sat) v IC**



IC - Collector Current (Amps)

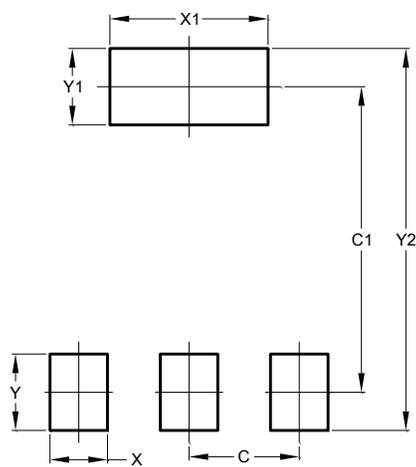
**Switching Speeds**

## 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
C2	8.00

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.