



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

- $BV_{CEO} > 40V$
- $I_C = 1A$  High Continuous Current
- $I_{CM} = 2A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(SAT)} < 500mV @ 1A$
- Complementary PNP Type: NK-FZT591A

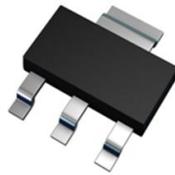
## Mechanical Data

- 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)

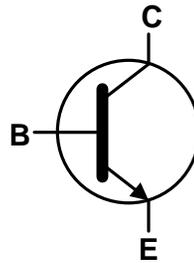
## Applications

- Power MOSFET Gate Driving
- Low Loss Power Switching

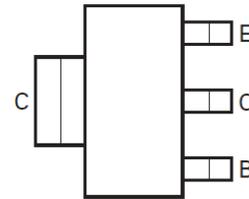
SOT223 (Type DN)



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>CBO</sub>	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	1	A
Base Current	I <sub>B</sub>	200	mA
Peak Pulse Current	I <sub>CM</sub>	2	A

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

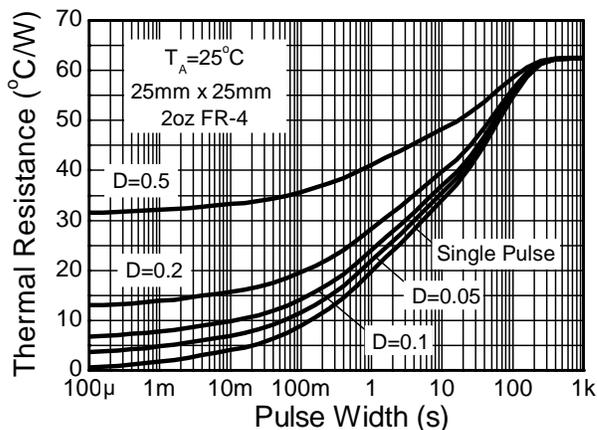
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	3.0
		(Note 7)	2.0
		(Note 8)	1.6
		(Note 9)	1.2
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 6)	41.7
		(Note 7)	62.5
		(Note 8)	78.1
		(Note 9)	104
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	19.4	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 11)

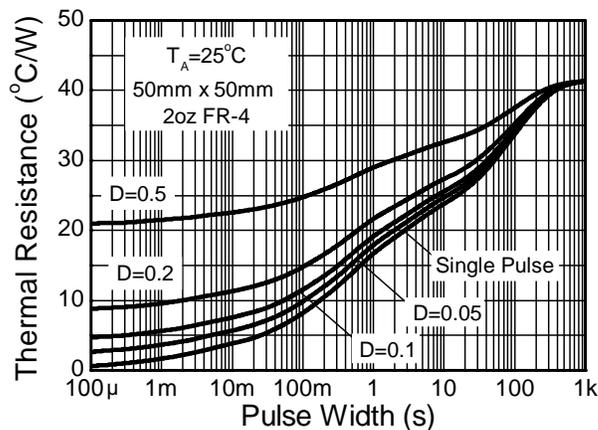
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 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.

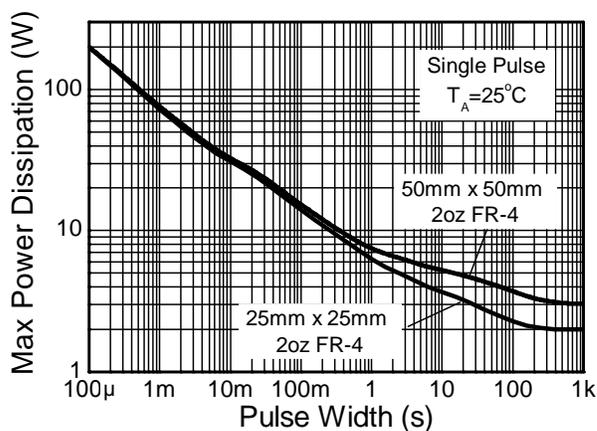
**Thermal Characteristics and Derating Information**



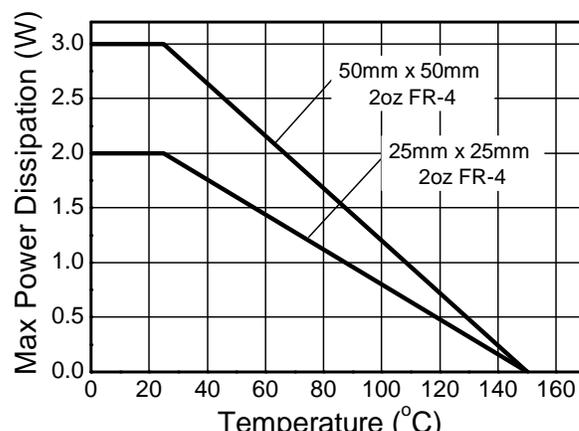
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



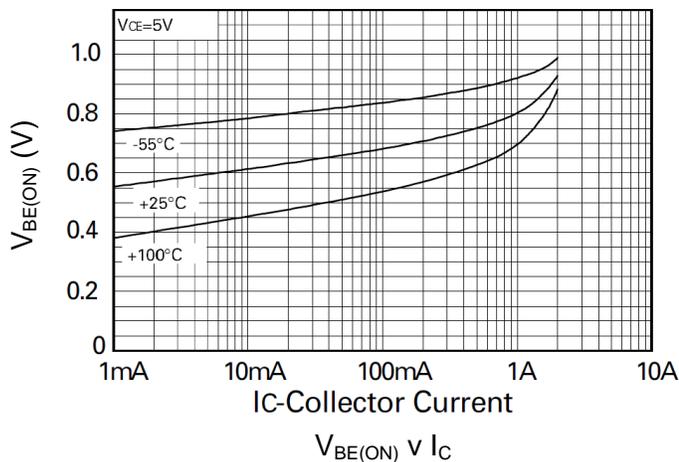
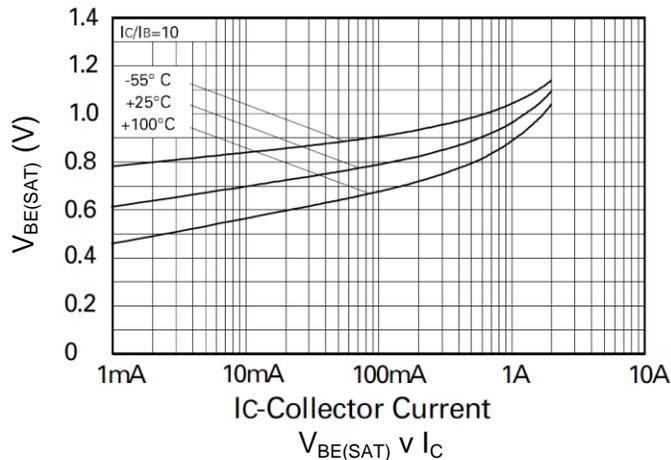
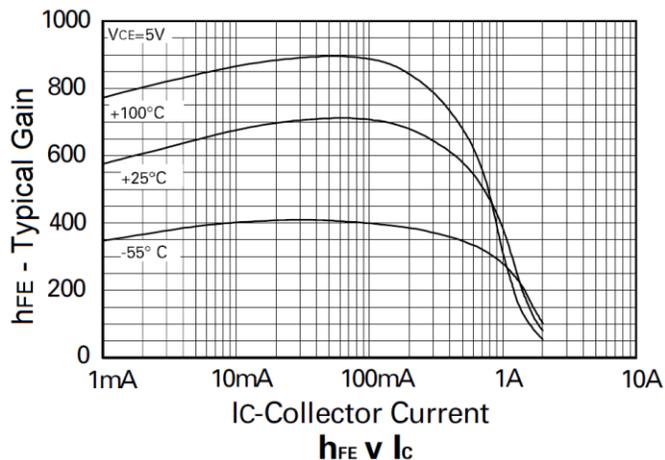
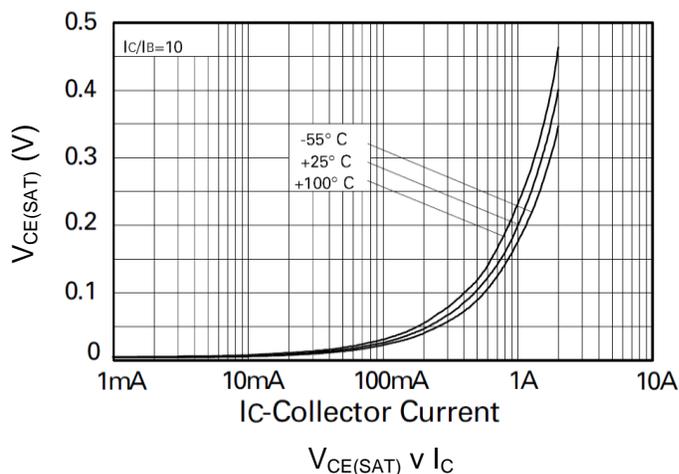
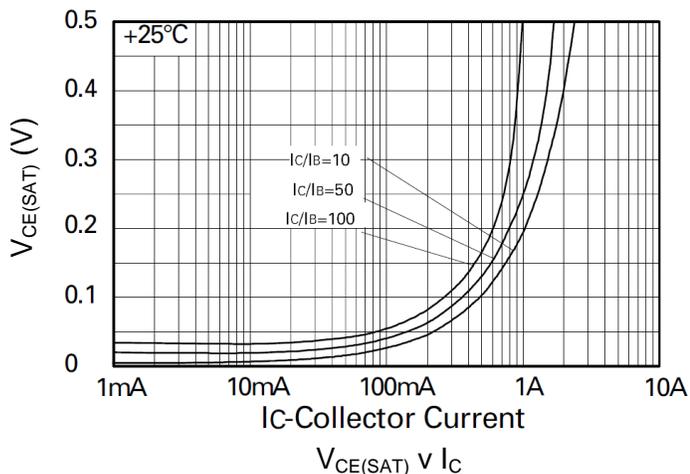
**Derating Curve**

**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>	40	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV <sub>CEO</sub>	40	—	—	V	I <sub>C</sub> = 10mA
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> = 30V
Collector Cut-Off Current	I <sub>CES</sub>	—	—	100	nA	V <sub>CE</sub> = 30V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 4V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(SAT)</sub>	—	—	0.3 0.5	V	I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(SAT)</sub>	—	—	1.1	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Turn-On Voltage (Note 12)	V <sub>BE(ON)</sub>	—	—	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V
DC Current Gain (Note 12)	h <sub>FE</sub>	300 300 200 35	— — — —	— 900 — —	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 500mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V I <sub>C</sub> = 2A, V <sub>CE</sub> = 5V
Current Gain-Bandwidth Product	f <sub>T</sub>	150	—	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA f = 100MHz
Output Capacitance	C <sub>OBO</sub>	—	—	10	pF	V <sub>CB</sub> = 10V, f = 1MHz

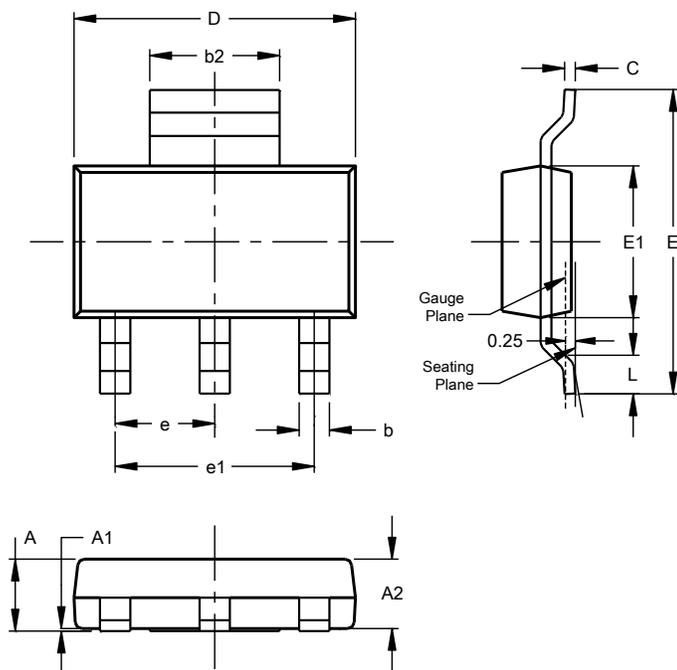
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

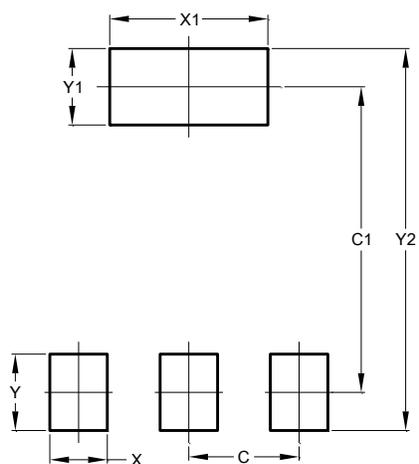
SOT223 (Type DN)



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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