



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

- $BV_{CEO} > -20V$
- $BV_{CBO} > -25V$
- $I_C = -6A$  High Continuous Current
- $h_{FE} > 200$  @  $-1A$  and Low Saturation Voltage
- Extremely Low Equivalent On-Resistance  $R_{CE(sat)} 42m\Omega$
- Complementary NPN Type: NK-ZXTN25020DG

## 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 (E3)
- Weight: 0.112 grams (Approximate)

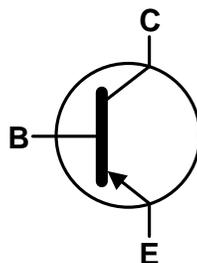
## Applications

- Load Switch
- Motor Drive
- Regulator Circuit

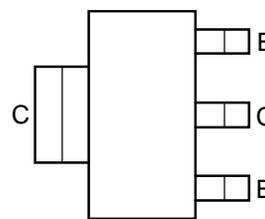


SOT223

Top View



Device Symbol



Top View  
Pin-Out

### Absolute Maximum Ratings

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-25	V
Collector-Emitter Voltage	$V_{CEO}$	-20	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-6	A
Peak Pulse Current	$I_{CM}$	-10	A

### Thermal Characteristics

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

Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	(Note 5)	3
		(Note 6)	2
		(Note 7)	1.6
		(Note 8)	1.2
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	41.7
		(Note 6)	62.5
		(Note 7)	78.1
		(Note 8)	104
Thermal Resistance Junction to Lead	$R_{\theta JL}$	12.9	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

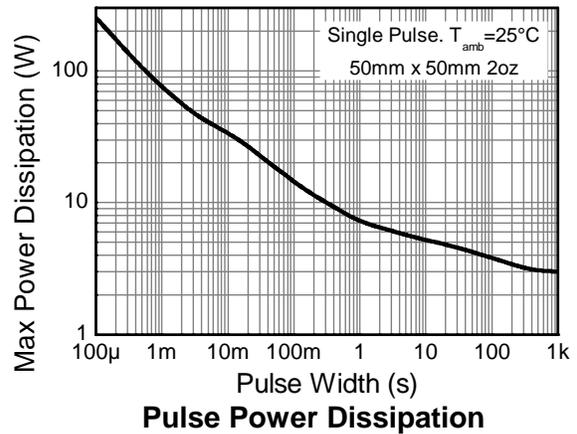
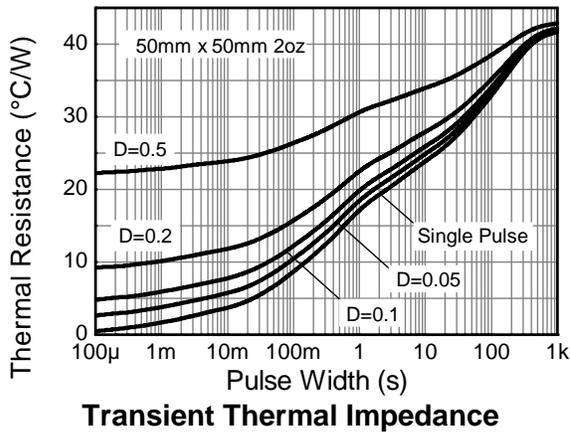
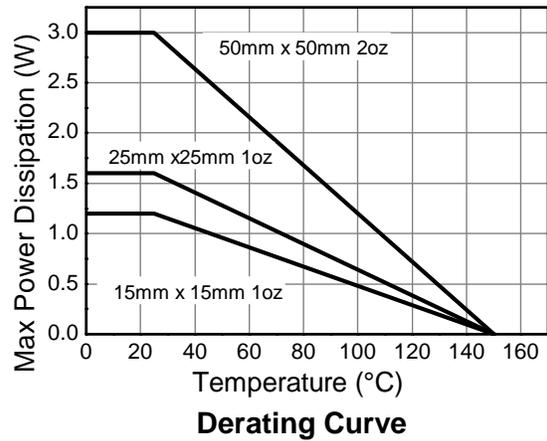
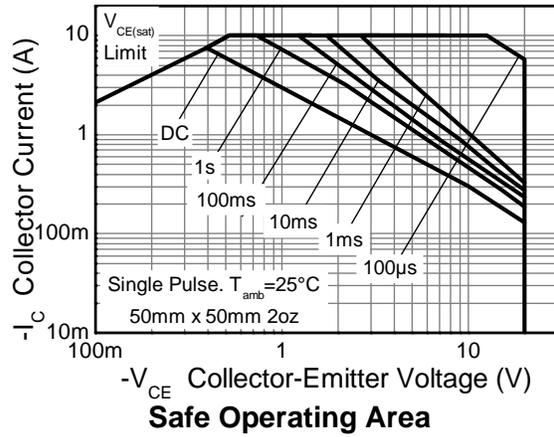
### ESD Ratings

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

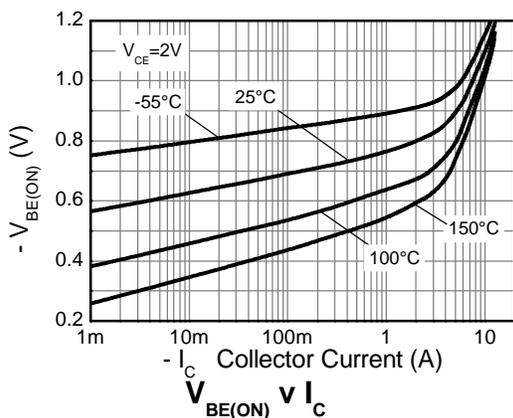
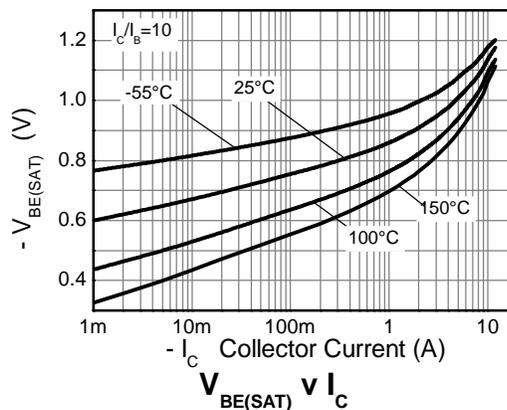
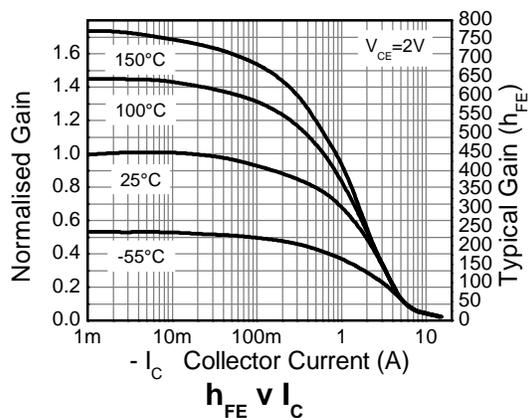
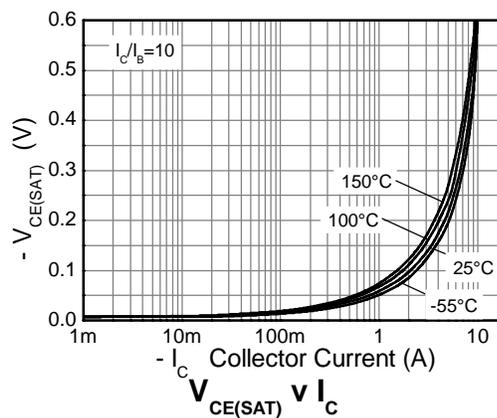
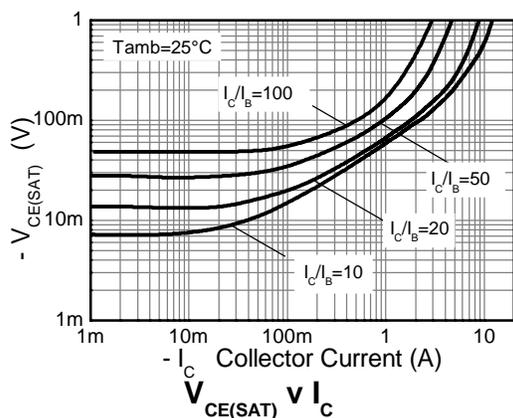


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

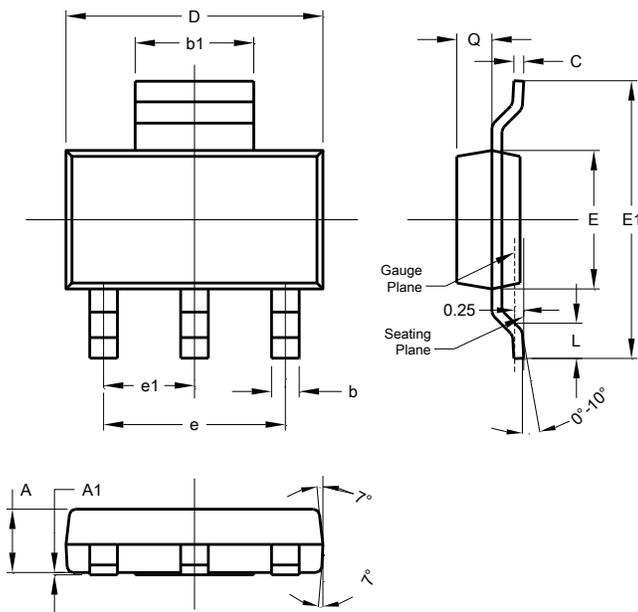
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-25	-55	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV <sub>CEO</sub>	-20	-45	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.3	—	V	I <sub>E</sub> = -100μA
Emitter-Base Breakdown Voltage	BV <sub>ECO</sub>	-4	-8.5	—	V	I <sub>E</sub> = -100μA
Collector-Base Cut-Off Current	I <sub>CBO</sub>	—	<1	50	nA	V <sub>CB</sub> = -25V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	<1	100	nA	V <sub>EB</sub> = -5.6V
DC Current Gain (Note 11)	h <sub>FE</sub>	300 200 25 —	450 310 50 20	900 — — —	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V I <sub>C</sub> = -10A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 11)	V <sub>CE(sat)</sub>	— — — —	-50 -150 -190 -250	-65 -215 -245 -355	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA I <sub>C</sub> = -2A, I <sub>B</sub> = -40mA I <sub>C</sub> = -6A, I <sub>B</sub> = -600mA
Base-Emitter Saturation Voltage (Note 11)	V <sub>BE(sat)</sub>	—	-1.05	-1.15	V	I <sub>C</sub> = -6A, I <sub>B</sub> = -600mA
Base-Emitter Turn-On Voltage (Note 11)	V <sub>BE(on)</sub>	—	-0.91	-1	V	I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V
Input Capacitance	C <sub>ibo</sub>	—	157	400	pF	V <sub>EB</sub> = -0.5V, f = 1MHz
Output Capacitance	C <sub>obo</sub>	—	21	30	pF	V <sub>CB</sub> = -10V, f = 1MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	—	290	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f=50MHz
Delay Time	t <sub>d</sub>	—	14.2	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A I <sub>B1</sub> = -I <sub>B2</sub> = -50mA
Rise Time	t <sub>r</sub>	—	16.3	—	ns	
Turn-On Time	t <sub>s</sub>	—	186	—	ns	
Turn-Off Time	t <sub>f</sub>	—	32.7	—	ns	

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

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

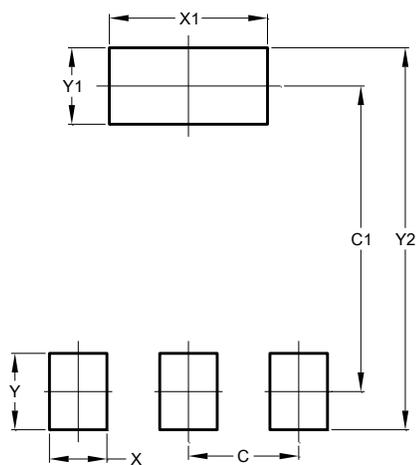


### Package Outline Dimensions



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
Y2	8.00