



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

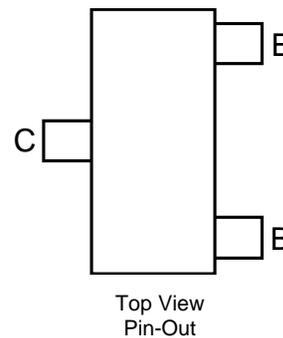
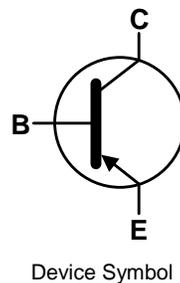
- $BV_{CEO} > -60V$
- $I_C = -4A$  High Continuous Collector Current
- $I_{CM} = -10A$  Peak Pulse Current
- Low Saturation Voltage -60mV Max @  $I_C = -1A$ .
- $R_{CE(SAT)} = 45m\Omega$  at 1A for a Low Equivalent On-Resistance
- 1.2W Power Dissipation
- Complimentary NPN Type: NK-ZXTN2018F

## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification 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 0.008 grams (Approximate)

## Application

- Gate Driving MOSFETs and IGBTs
- Motor Drive
- Relay, Lamp and Solenoid Drive
- High Side Switches



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	-100	V
Collector-Emitter Voltage	V <sub>CEV</sub>	-100	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Peak Pulse Collector Current	I <sub>CM</sub>	-10	A
Continuous Collector Current	I <sub>C</sub>	-4	A
Base Current	I <sub>B</sub>	-1	A

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

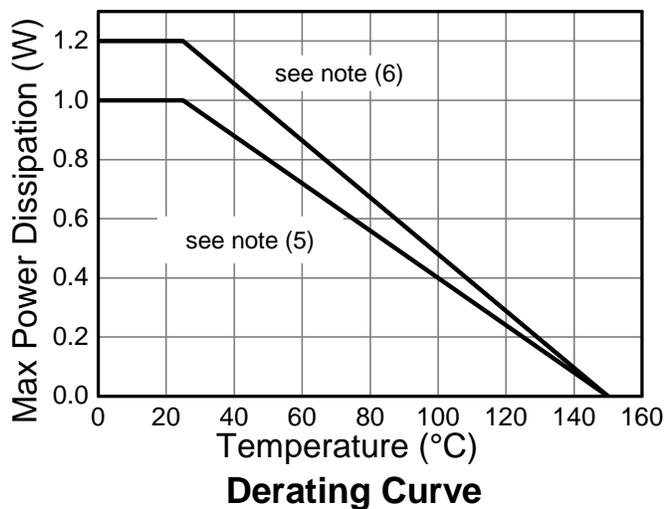
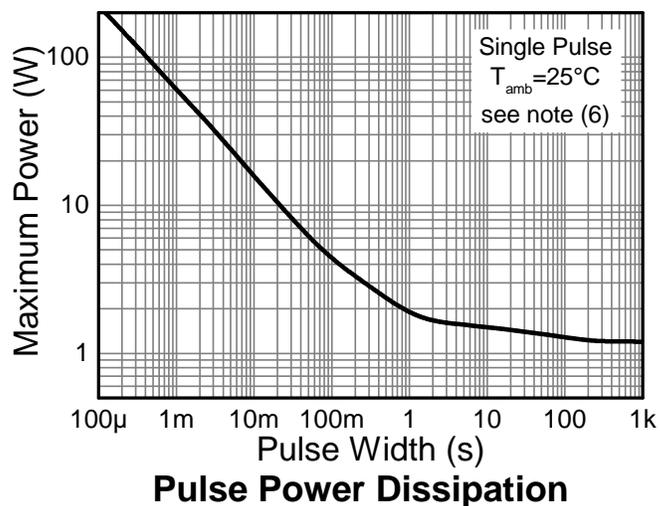
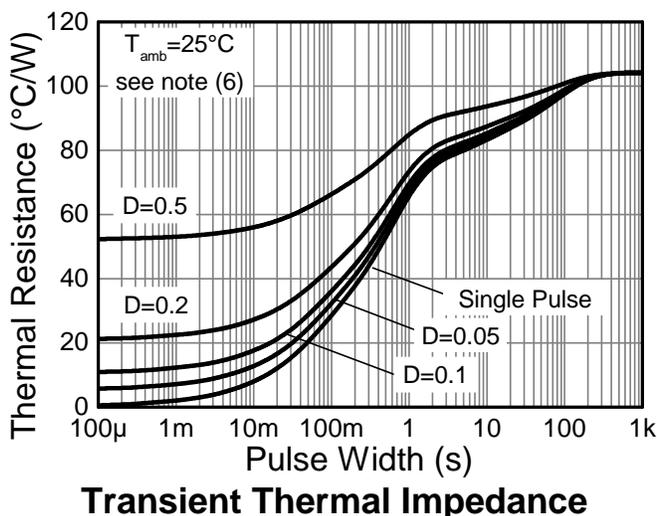
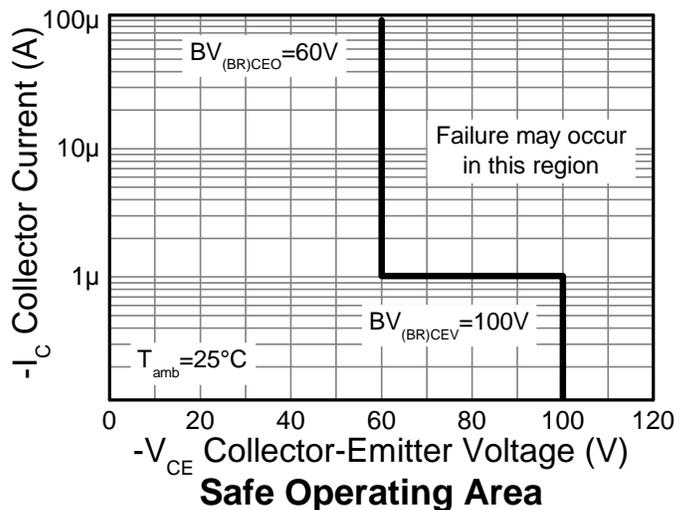
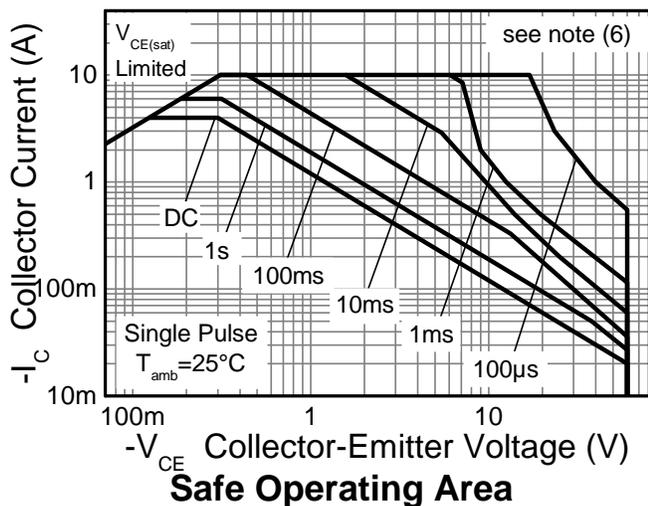
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1.0	W
Power Dissipation (Note 6)	P <sub>D</sub>	1.2	W
Power Dissipation (Note 7)	P <sub>D</sub>	1.56	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	125	°C/W
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	104	°C/W
Thermal Resistance, Junction to Ambient Air (Note 7)	R <sub>θJA</sub>	80	°C/W
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 18mm x 18mm 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.
  6. Same as note (5), except the device is mounted on 30mm x 30mm 2oz copper.
  7. Same as note (6), except measured at t<5secs.
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

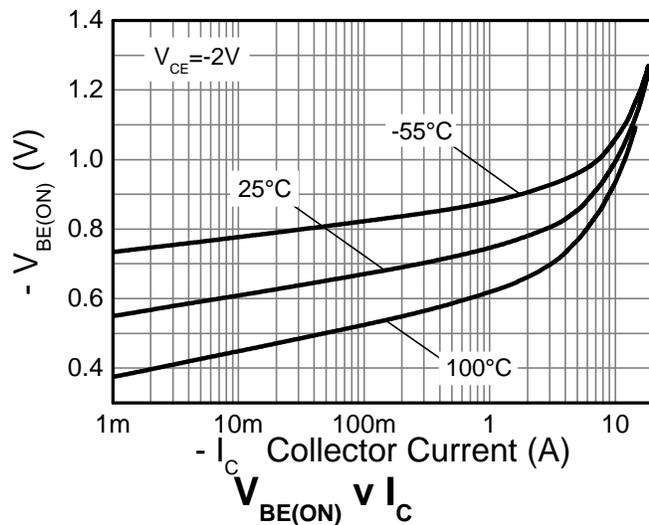
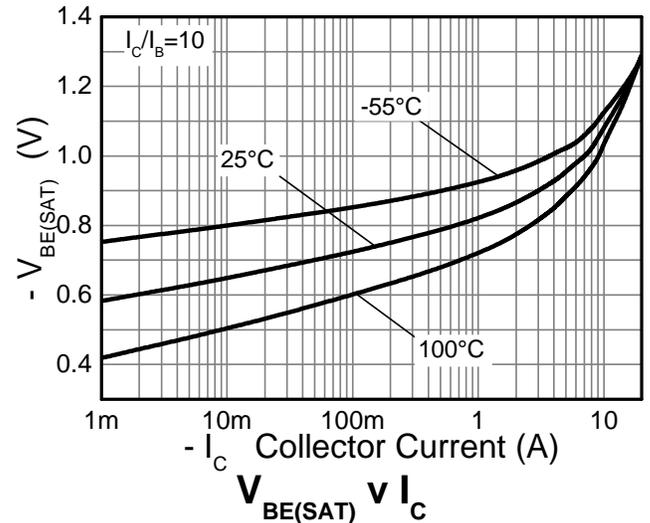
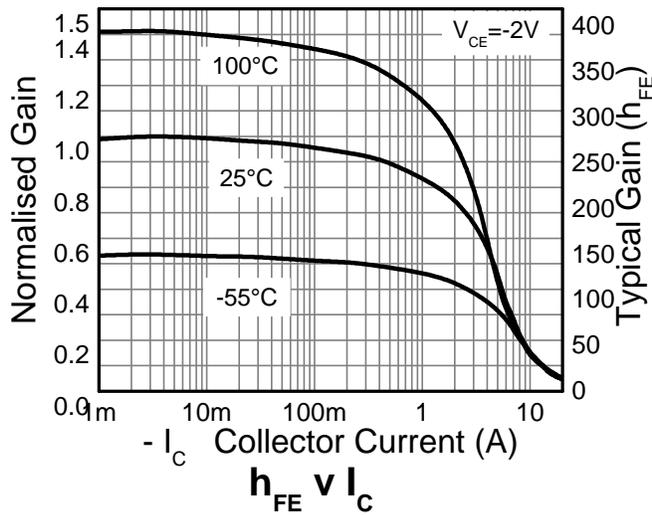
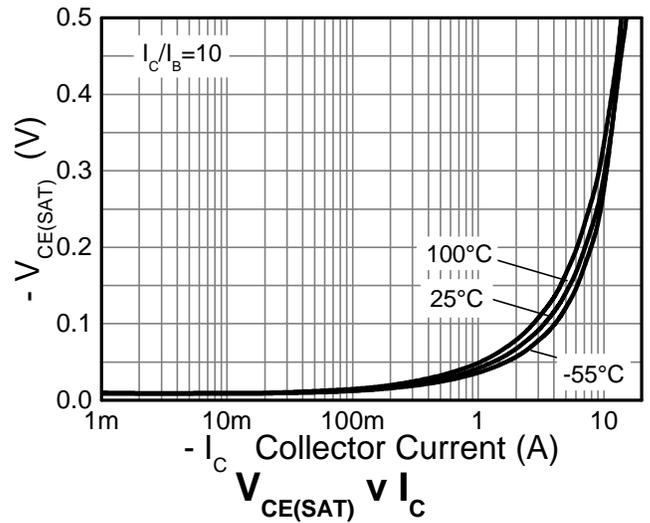
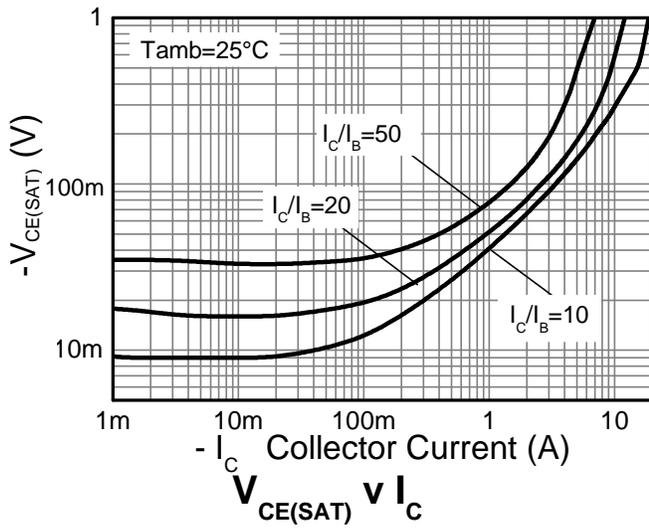


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-100	-120	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage	BV <sub>CEV</sub>	-100	-120	—	V	I <sub>C</sub> = -1μA, 1V > V <sub>BE</sub> > -0.3V
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-60	-75	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7.0	-8.2	—	V	I <sub>E</sub> = -100μA
Collector-Emitter Cutoff Current	I <sub>CEV</sub>	—	—	-20	nA	V <sub>CE</sub> = -80V, V <sub>BE</sub> = 1V
Collector-Base Cutoff Current	I <sub>CBO</sub>	—	—	-20	nA	V <sub>CB</sub> = -80V, I <sub>E</sub> = 0
Emitter-Base Cutoff Current	I <sub>EBO</sub>	—	—	-10	nA	V <sub>EB</sub> = -6V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 9)</b>						
DC Current Gain	h <sub>FE</sub>	100	250	—	—	V <sub>CE</sub> = -2V, I <sub>C</sub> = -10mA
		100	200	300		V <sub>CE</sub> = -2V, I <sub>C</sub> = -2A
		80	145	—		V <sub>CE</sub> = -2V, I <sub>C</sub> = -4A
		20	40	—		V <sub>CE</sub> = -2V, I <sub>C</sub> = -10A
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	-15	-25	mV	I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA
		—	-45	-60		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		—	-70	-95		I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA
		—	-155	-240		I <sub>C</sub> = -4A, I <sub>B</sub> = -200mA
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>	—	-0.89	-1.0	V	I <sub>C</sub> = -4A, I <sub>B</sub> = -200mA
Base-Emitter Turn-On Voltage	V <sub>BE(ON)</sub>	—	-0.81	-0.95	V	V <sub>CE</sub> = -2V, I <sub>C</sub> = -4A
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Switching times	t <sub>D</sub>	—	12.6	—	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -2A, -I <sub>B1</sub> = I <sub>B2</sub> = -200mA
	t <sub>R</sub>	—	10.2	—		
	t <sub>S</sub>	—	220	—		
	t <sub>F</sub>	—	21	—		
Transition Frequency	f <sub>T</sub>	—	165	—	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -100mA, f = 50MHz
Output Capacitance	C <sub>OBO</sub>	—	44	—	pF	V <sub>CB</sub> = -10V, f = 1MHz

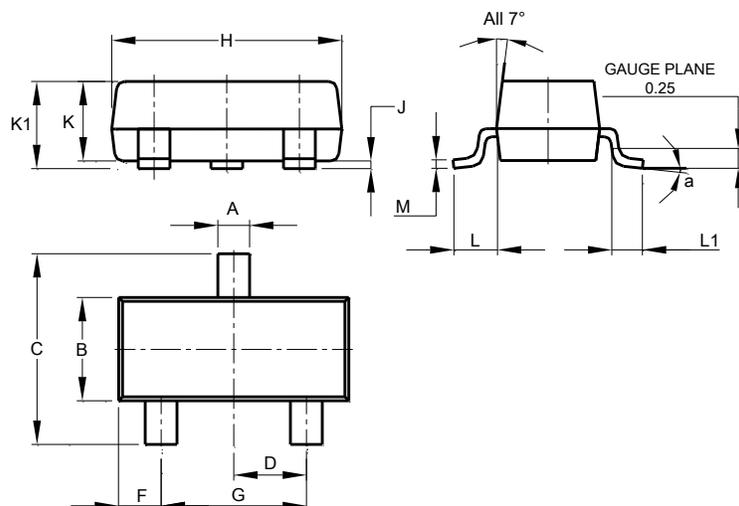
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



## Package Outline Dimensions

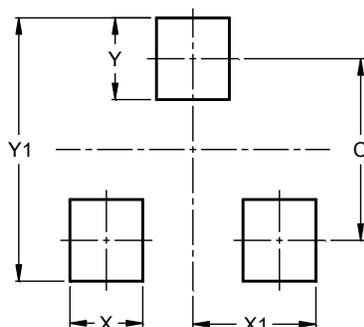
SOT23



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9