



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

- $BV_{CEO} > -40V$
- Maximum Continuous Current  $I_C = -1A$
- Low Saturation Voltage  $V_{CE(sat)} < -500mV @ -1A$
- Complementary NPN Type: NK-FCX491A

## Mechanical Data

- Package: SOT89
- Package 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: 0.05 grams (Approximate)

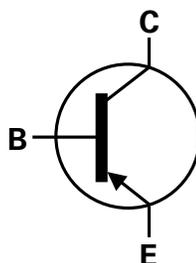
## Application

- Power MOSFET & IGBT gate driving
- Low loss power switching

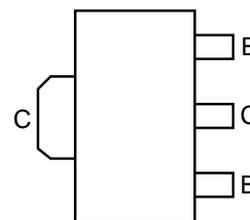
SOT89



Top View



Device Symbol



Top View  
Pin Out

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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V <sub>CB0</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
Peak Pulse Current	I <sub>CM</sub>	-2	A
Peak Base Current	I <sub>B</sub>	-200	mA

**Thermal Characteristics**

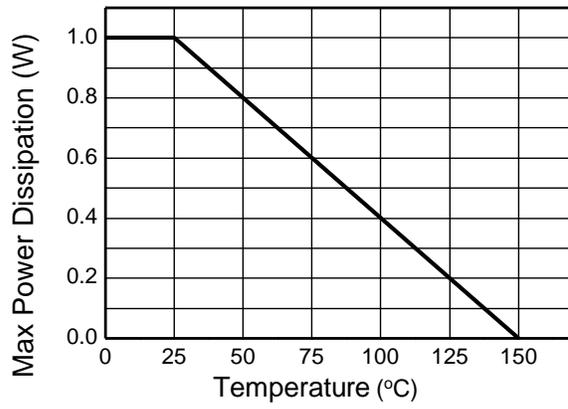
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	R <sub>θJL</sub>	10.01	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

**ESD Ratings** (Note 7)

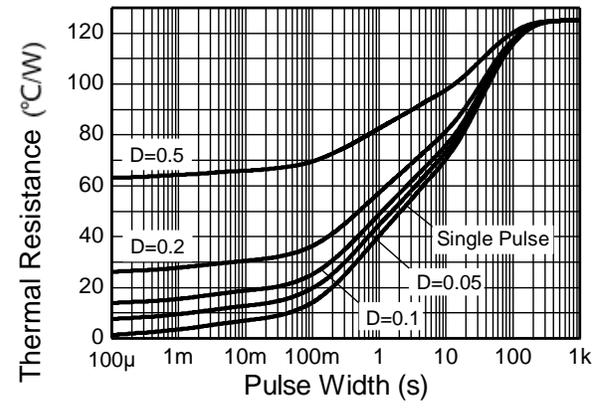
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device surface mounted on 15mm X 15mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; device measured when operating in steady state condition.
  6. Thermal resistance from junction to solder-point (on the exposed collector pad).
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

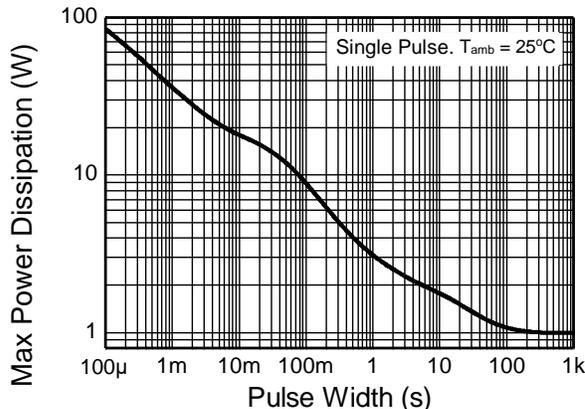
## Thermal Characteristics and Derating Information



**Derating Curve**



**Transient Thermal Impedance**



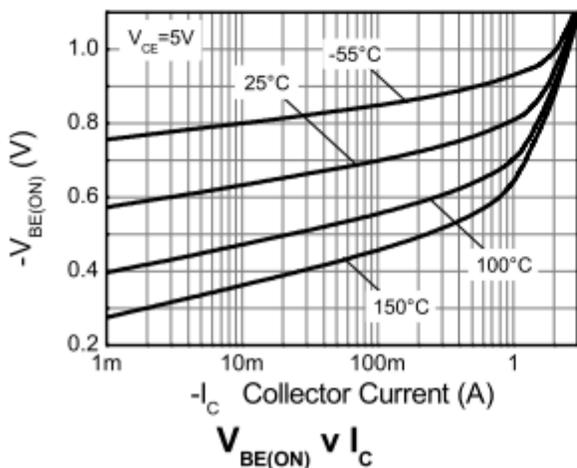
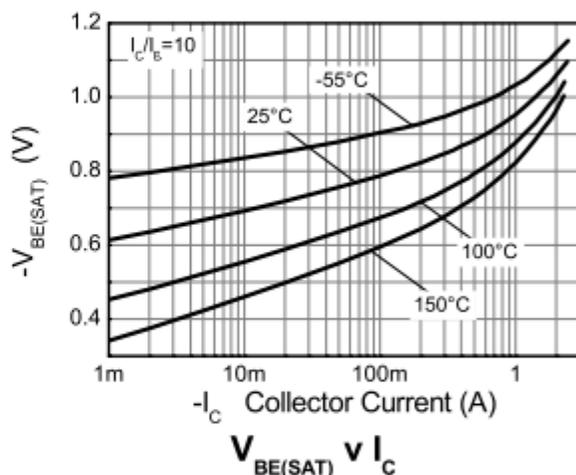
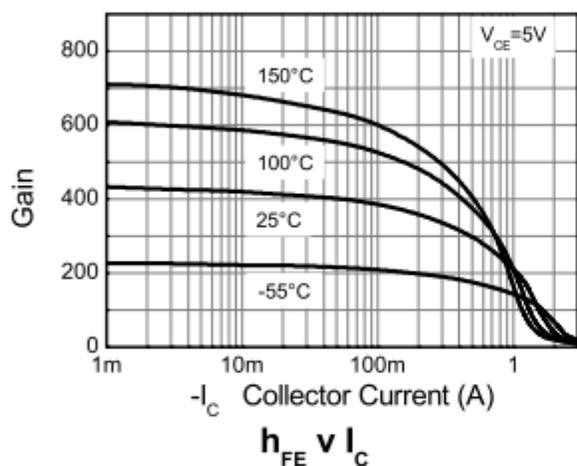
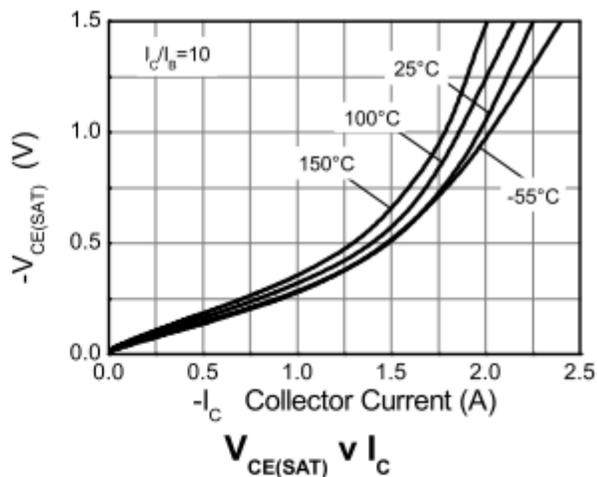
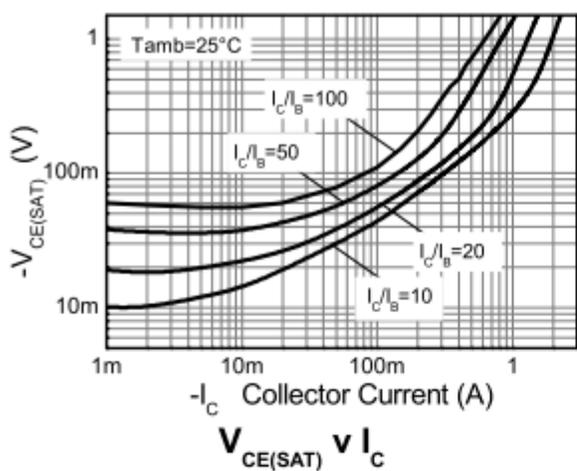
**Pulse Power Dissipation**

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

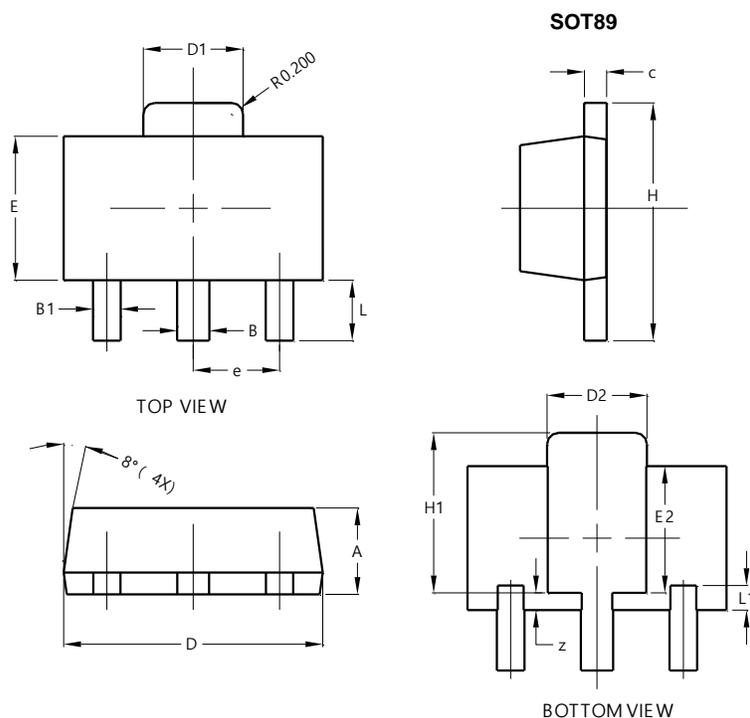
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-40	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 8)	$BV_{CEO}$	-40	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	—	—	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	—	-100	nA	$V_{CB} = -30\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	—	-100	nA	$V_{EB} = -4\text{V}$
Emitter Cutoff Current	$I_{CES}$	—	—	-100	nA	$V_{CES} = -30\text{V}$
DC Current Transfer Static Ratio (Note 8)	$h_{FE}$	300	—	—	—	$I_C = -1\text{mA}, V_{CE} = -5\text{V}$
		300	—	800		$I_C = -100\text{mA}, V_{CE} = -5\text{V}$
		250	—	—		$I_C = -500\text{mA}, V_{CE} = -5\text{V}$
		160	—	—		$I_C = -1\text{A}, V_{CE} = -5\text{V}$
		30	—	—		$I_C = -2\text{A}, V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	-0.2	V	$I_C = -100\text{mA}, I_B = -1\text{mA}$
		—	—	-0.35		$I_C = -500\text{mA}, I_B = -20\text{mA}$
		—	—	-0.5		$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	—	-1.1	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	—	-1.0	V	$I_C = -1\text{A}, V_{CE} = -5\text{V}$
Transitional Frequency	$f_T$	150	—	—	MHz	$I_E = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	—	10	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

Note: 8. 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.)

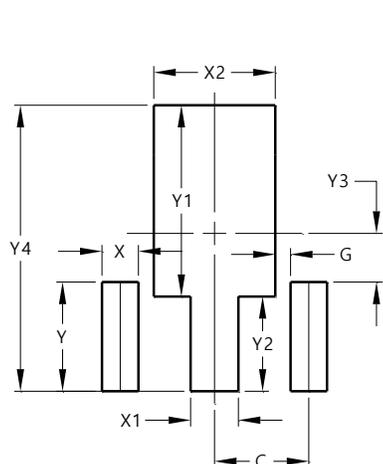


## Package Outline Dimensions



SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

## Suggested Pad Layout



SOT89

Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530