



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

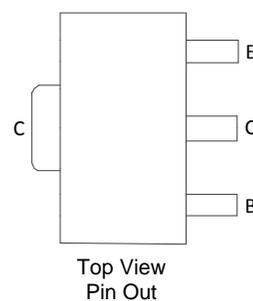
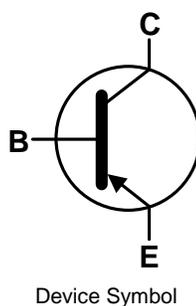
- $BV_{CEO} > -100V$
- $I_C = -3.5A$ High Continuous Current
- $R_{SAT} = 57m\Omega$ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < -85mV$ @ $I_C = -1A$
- h_{FE} Specified Up to $-10A$ for High Current Gain Hold Up
- Complementary NPN Type: NK-ZXTN2011Z

Mechanical Data

- Case: SOT89
- 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 Q3
- Weight: 0.05 grams (Approximate)

Application

- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs



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

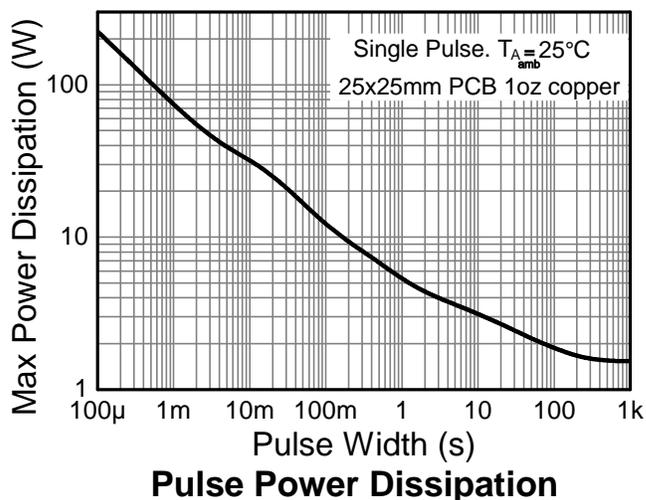
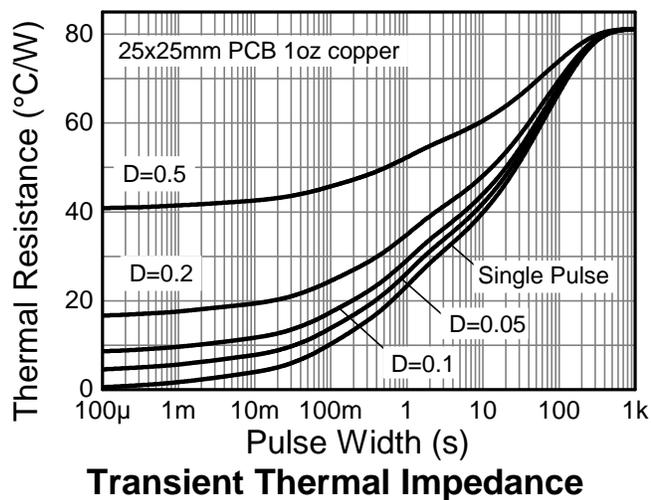
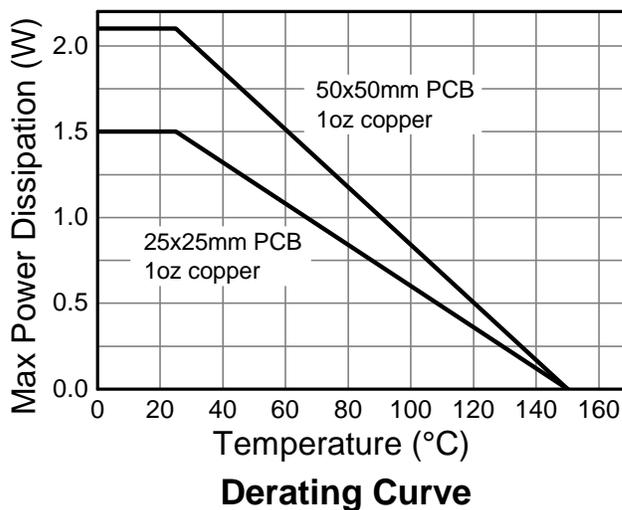
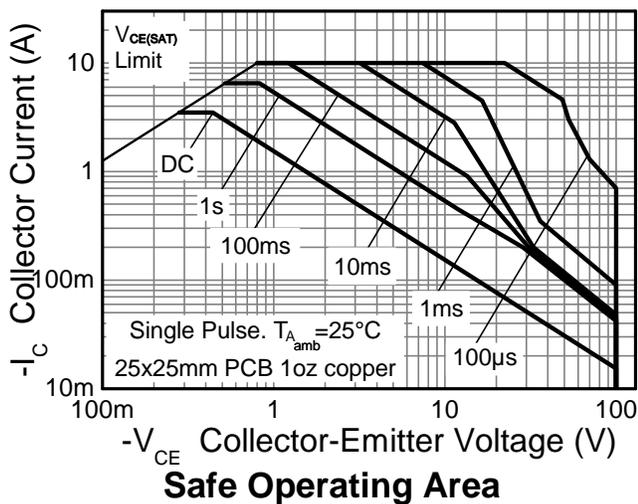
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-140	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3.5	A
Peak Pulse Current	I_{CM}	-10	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.5	W
Linear Derating Factor		12	mW/ $^\circ\text{C}$
Power Dissipation (Note 6)	P_D	2.1	W
Linear Derating Factor		16.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. For a device surface mounted on 25mm × 25mm × 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
 6. Same as note (5), except the device is mounted on 50mm × 50mm single sided 1oz weight copper.

Thermal Characteristics and Derating Information

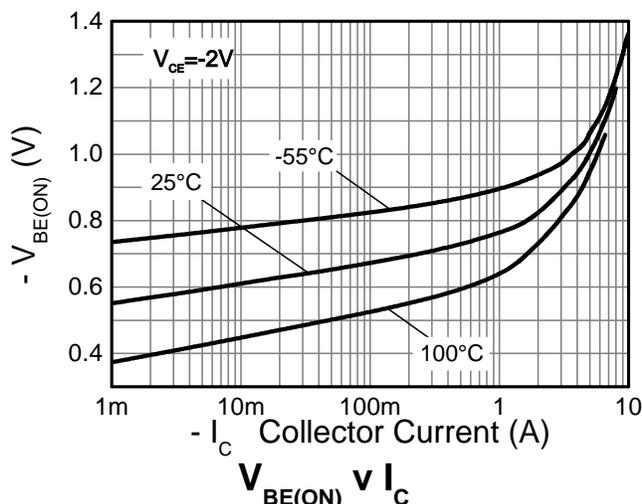
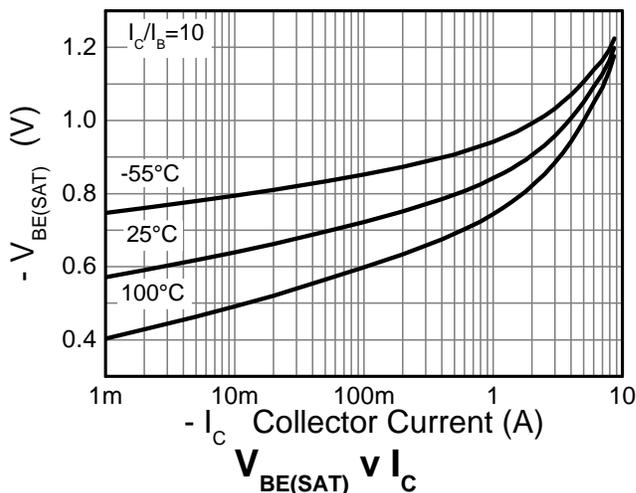
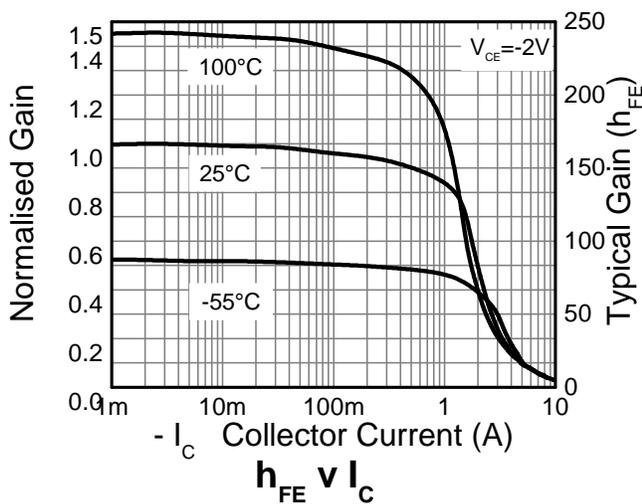
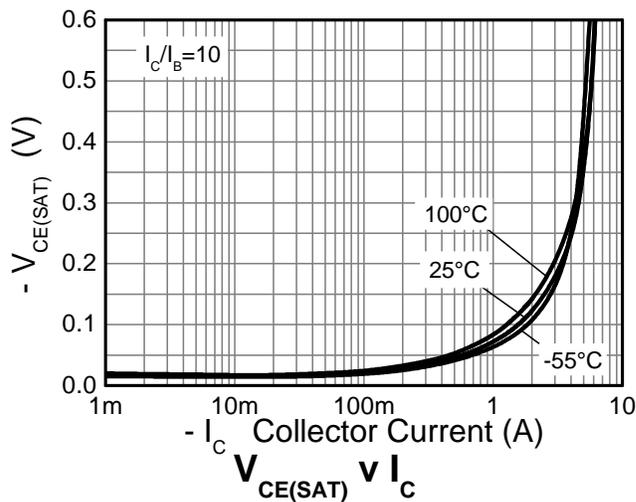
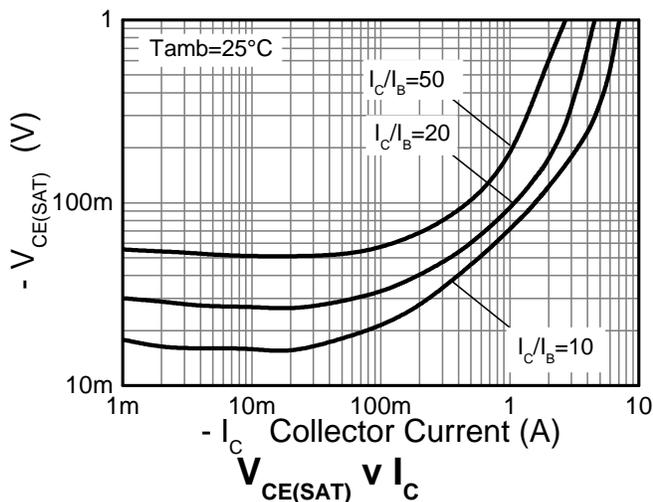


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-140	-160	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CER}	-140	-160	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-100	-115	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	—	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	< -1	-20 -500	nA nA	$V_{CB} = -100\text{V}$ $V_{CB} = -100\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	—	< -1	-20 -500	nA nA	$V_{CB} = -100\text{V}$ $V_{CB} = -100\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	< -1	-10	nA	$V_{EB} = -6\text{V}$
DC Current Transfer Static Ratio (Note 7)	h_{FE}	100 100 25 15 —	250 200 50 30 5	— 300 — — —	—	$I_C = -10\text{mA}$, $V_{CE} = -1\text{V}$ $I_C = -1\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -3\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -4\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -10\text{A}$, $V_{CE} = -1\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(SAT)}$	—	-20 -65 -110 -230	-30 -85 -135 -300	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$ $I_C = -1\text{A}$, $I_B = -100\text{mA}$ $I_C = -2\text{A}$, $I_B = -200\text{mA}$ $I_C = -4\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(SAT)}$	—	-970	-1060	mV	$I_C = -4\text{A}$, $I_B = -400\text{mA}$
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(ON)}$	—	-910	-1030	mV	$I_C = -4\text{A}$, $V_{CE} = -1\text{V}$
Transitional Frequency	f_T	—	125	—	MHz	$I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$
Output Capacitance (Note 7)	C_{OBO}	—	42	—	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Switching Time	t_{ON}	—	42	—	ns	$V_{CC} = -10\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = -100\text{mA}$
	t_{OFF}	—	540	—		

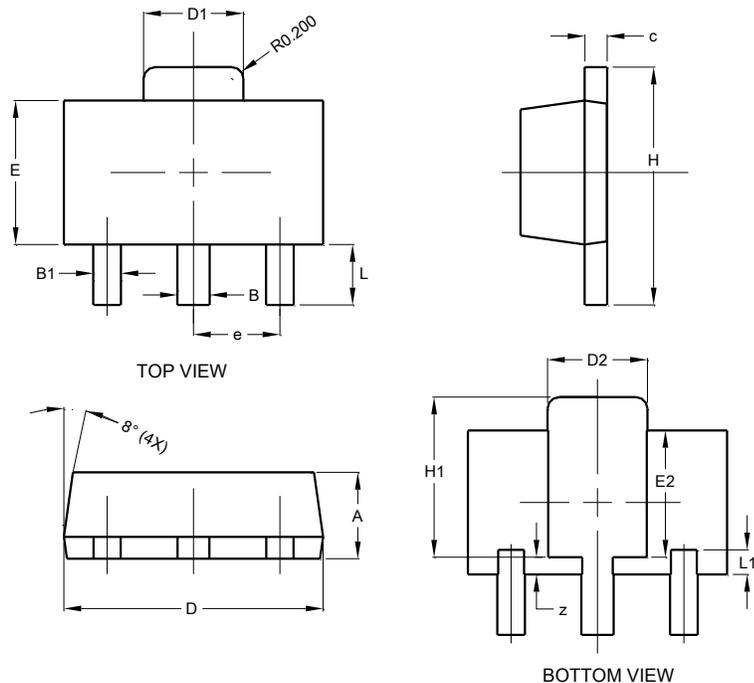
 Note: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

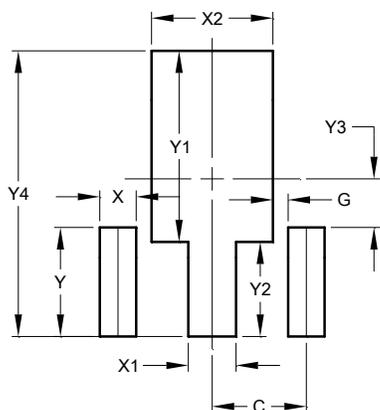
SOT89



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