



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

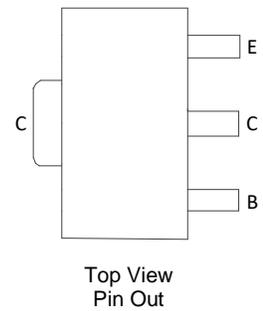
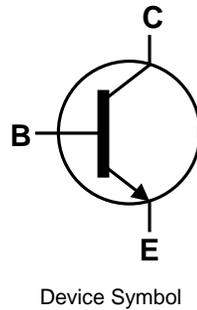
- $BV_{CEO} > 60V$
- $I_C = 5A$ High Continuous Current
- $R_{SAT} = 30m\Omega$ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < 65mV @ I_C = 1A$
- h_{FE} Specified Up to 10A for High Current Gain Hold Up
- Complementary PNP Type: ZXTN2012Z

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

- Emergency lighting circuits
- Motor driving (including DC fans)
- Backlight inverters
- Power switches
- Gate-driving MOSFETs and IGBTs



Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	150	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	7	V
Base Current	I _B	2	A
Continuous Collector Current	I _C	5	A
Peak Pulse Current	I _{CM}	20	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.5	W
Linear Derating Factor		12	mW/°C
Power Dissipation (Note 6)	P _D	2.1	W
Linear Derating Factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	60	°C/W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	5.3	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R _{θJL}	3.23	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-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 exposed collector pad on 25mm x 25mm 1oz 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 50mm x 50mm 1oz copper.
 7. Thermal resistance from junction to solder-point (on the exposed collector pad).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

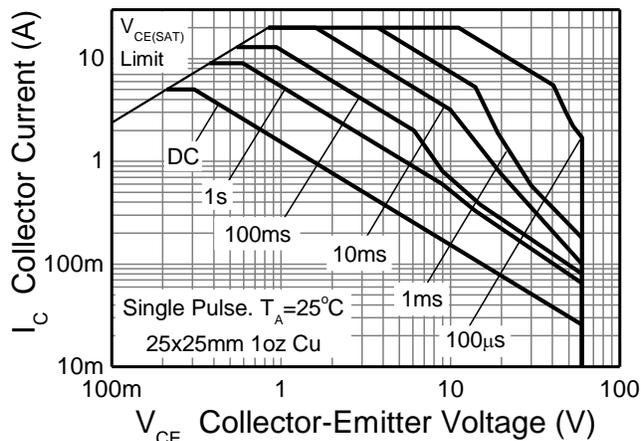


Fig 1. Safe Operating Area

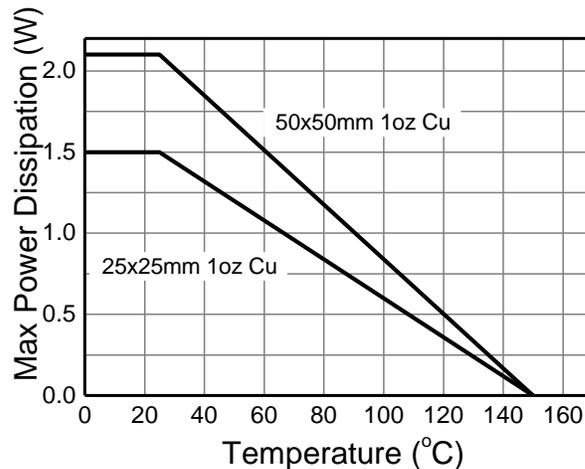


Fig 2. Derating Curve

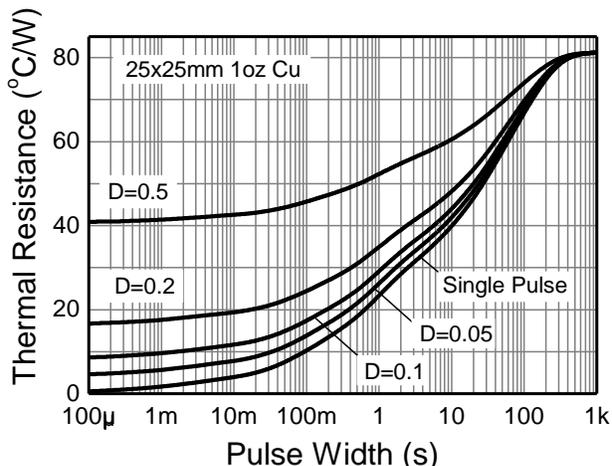


Fig 3. Transient Thermal Impedance

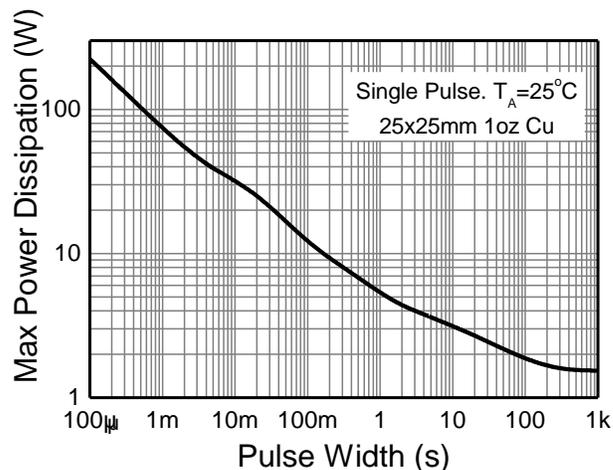


Fig 4. Pulse Power Dissipation

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}	150	190	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	150	190	—	V	$I_C = 1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	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	50 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	—	< 1	100 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	< 1	10	nA	$V_{EB} = 6\text{V}$
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100	200	—	—	$I_C = 10\text{mA}$, $V_{CE} = 1\text{V}$
		100	200	300		$I_C = 2\text{A}$, $V_{CE} = 1\text{V}$
		55	105	—		$I_C = 5\text{A}$, $V_{CE} = 1\text{V}$
		20	40	—		$I_C = 10\text{A}$, $V_{CE} = 1\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	17	30	mV	$I_C = 100\text{mA}$, $I_B = 5\text{mA}$
		—	35	55		$I_C = 1\text{A}$, $I_B = 100\text{mA}$
		—	40	65		$I_C = 1\text{A}$, $I_B = 50\text{mA}$
		—	90	125		$I_C = 2\text{A}$, $I_B = 50\text{mA}$
		—	170	230		$I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	970	1100	mV	$I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	910	1050	mV	$I_C = 6\text{A}$, $V_{CE} = 1\text{V}$
Transitional Frequency	f_T	—	130	—	MHz	$I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{OBO}	—	31	—	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}	—	760	—		

 Note: 9. 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.)

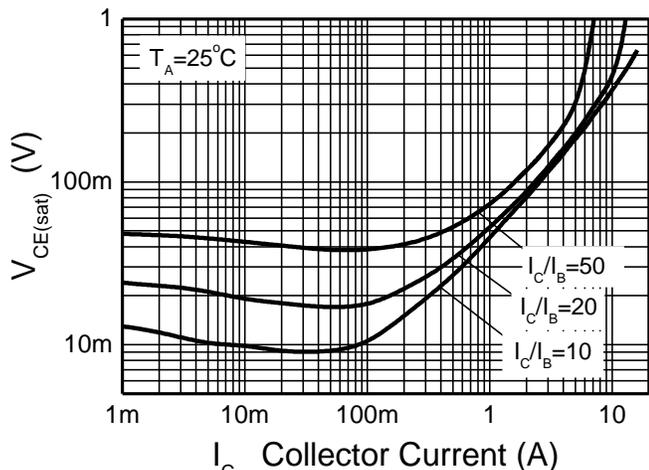


Fig 5. $V_{CE(sat)}$ v I_C

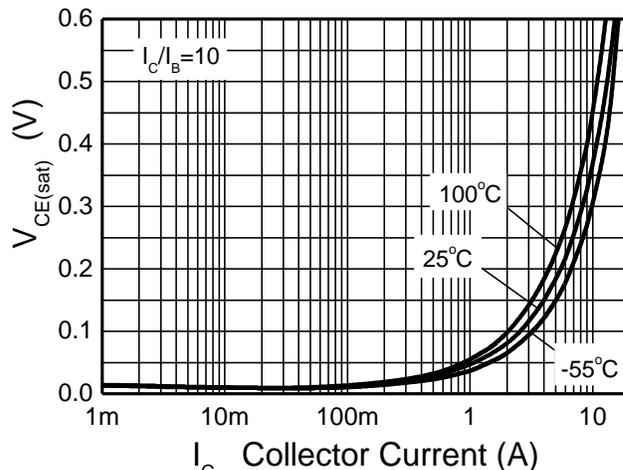


Fig 6. $V_{CE(sat)}$ v I_C

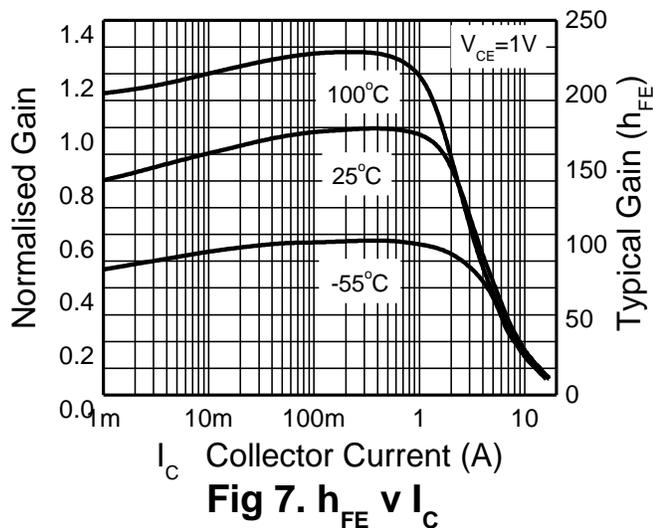


Fig 7. h_{FE} v I_C

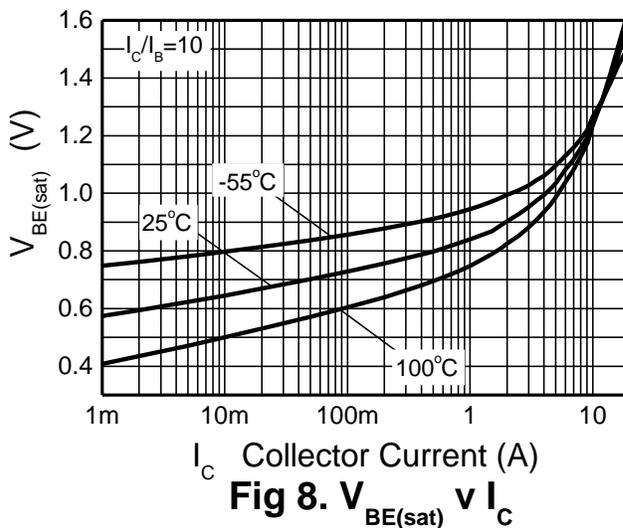


Fig 8. $V_{BE(sat)}$ v I_C

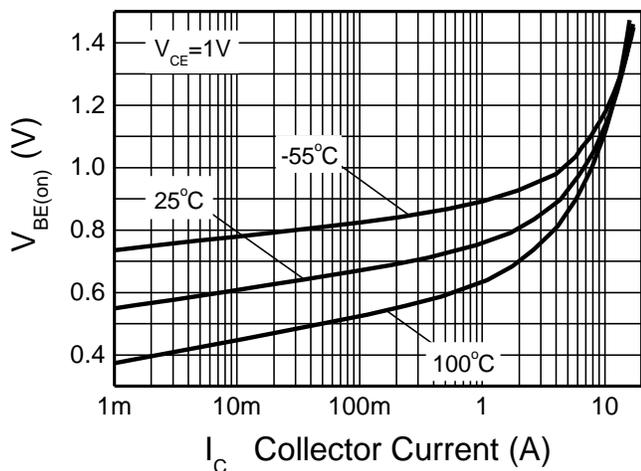
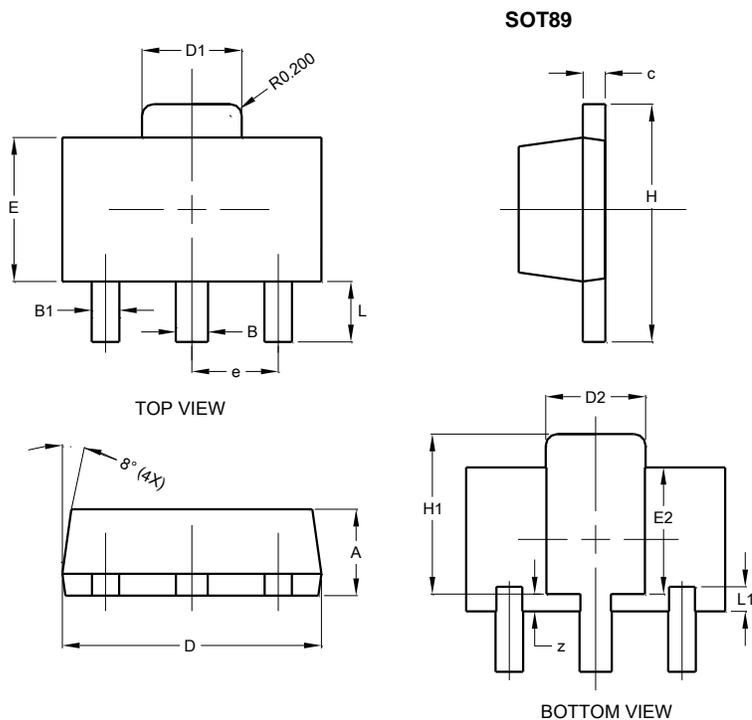


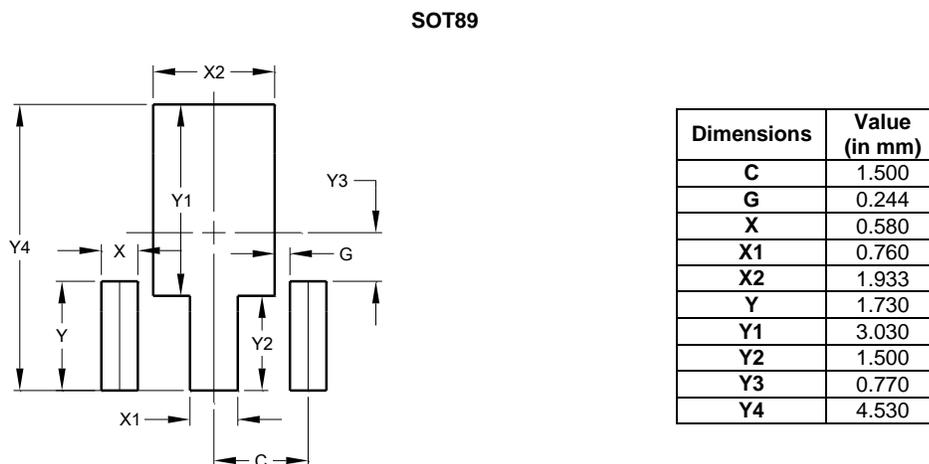
Fig 9. $V_{BE(on)}$ v I_C

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



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