



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

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



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Features

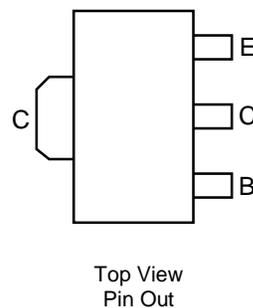
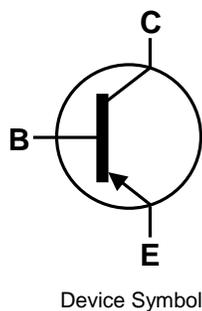
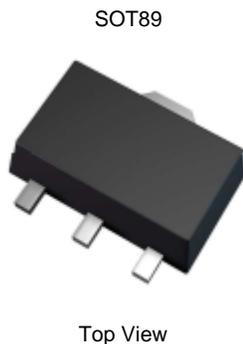
- $BV_{CE0} > -40V$
- $I_C = -5.5A$ High Continuous Current
- $I_{CM} = -15A$ Peak Pulse Current
- $R_{CE(sat)} = 29m\Omega$ for a low equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)} < -60mV @ -1A$
- h_{FE} Specified Up to $-10A$ for High Current Gain Hold Up

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 (E3)
- Weight: 0.05 grams (Approximate)

Applications

- Charging circuits
- DC-DC converters
- MOSFET and IGBT gate driving
- Power switches
- Motor controls



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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V _{CB0}	-50	V
Collector-Base Voltage	V _{CBS}	-50	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-7.5	V
Continuous Collector Current	I _C	-5.5	A
Peak Pulse Current	I _{CM}	-15	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	0.9
		(Note 6)	1.5
		(Note 7)	2.1
		(Note 8)	3.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 5)	139
		(Note 6)	83
		(Note 7)	60
		(Note 8)	42
Thermal Resistance, Junction to Lead	R _{θJL}	2.81	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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:
- For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper.
 - Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
 - Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper and measured at t<5secs.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

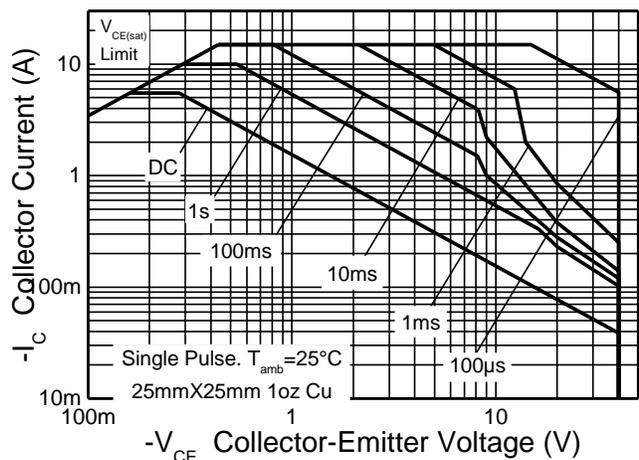


Figure 1. Safe Operating Area

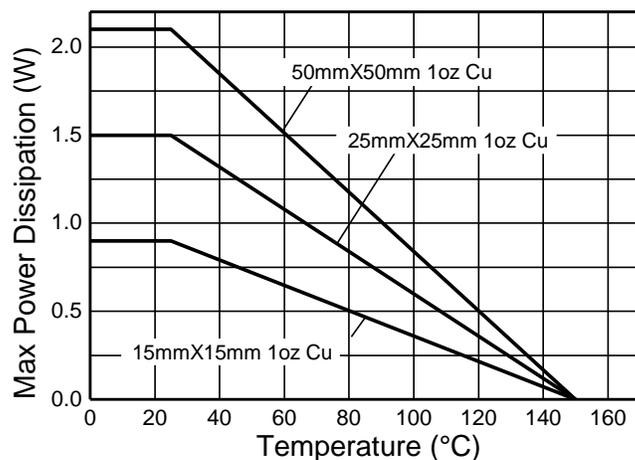


Figure 2. Derating Curve

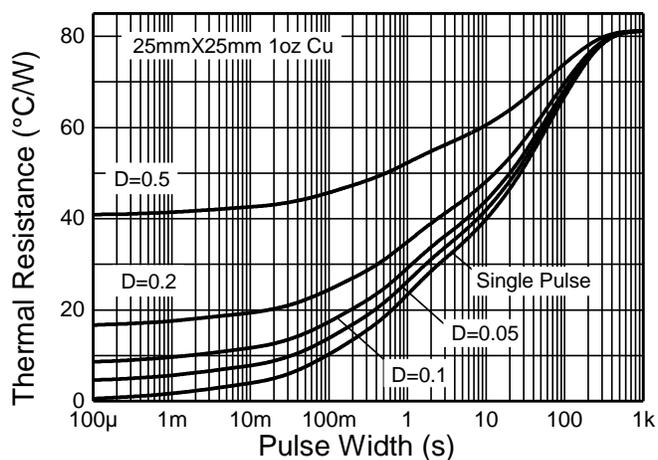


Figure 3. Transient Thermal Impedance

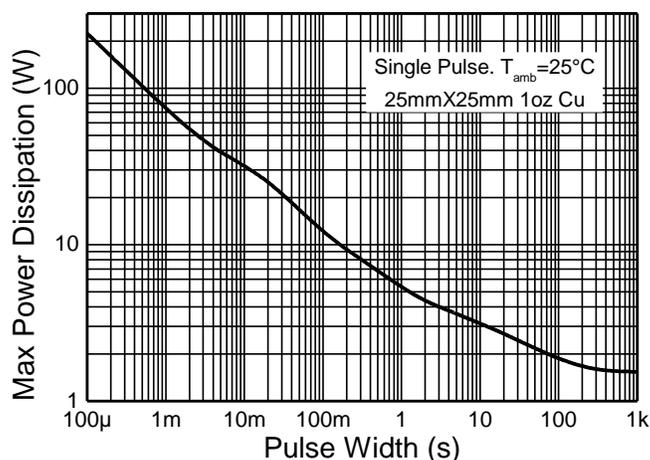


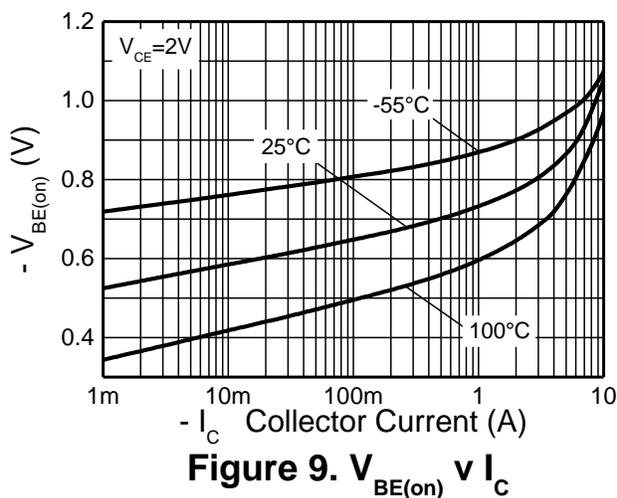
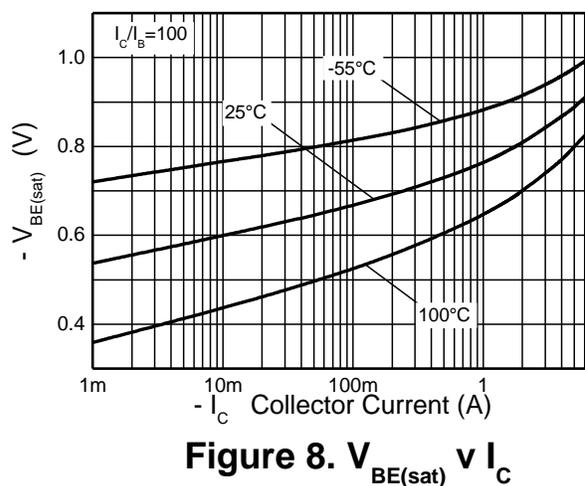
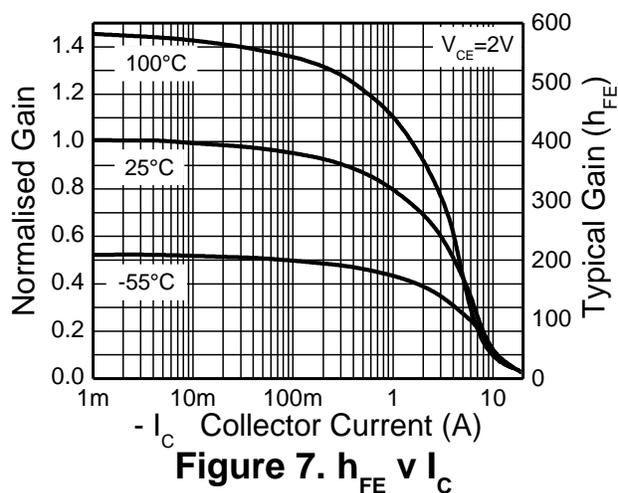
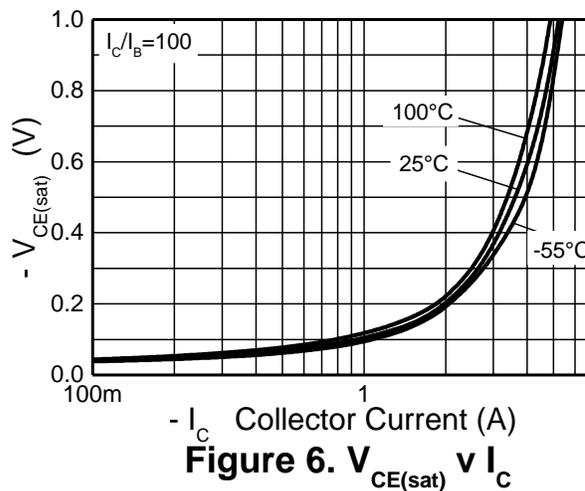
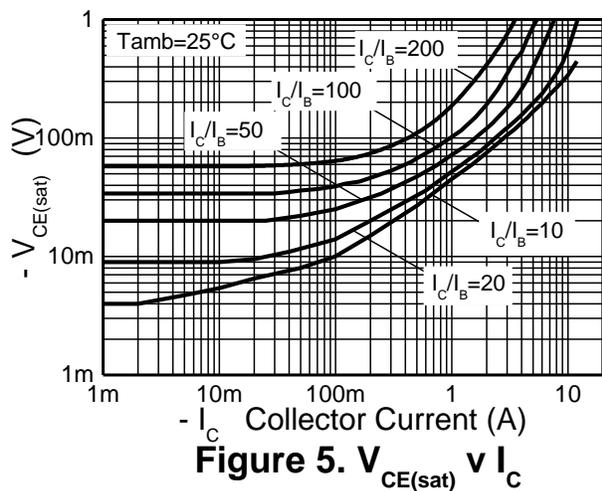
Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CB0}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage	BV _{CES}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	-40	-58	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7.5	-8.3	—	V	I _E = -100μA
Collector Cutoff Current	I _{CB0}	—	1	-20	nA	V _{CB} = -40V
Collector Cutoff Current	I _{CES}	—	1	-20	nA	V _{CE} = -32V
Emitter Cutoff Current	I _{EBO}	—	1	-20	nA	V _{EB} = -6V
DC Current Transfer Static Ratio (Note 11)	h _{FE}	200	390	—	—	I _C = -10mA, V _{CE} = -2V
		200	350	550		I _C = -0.5A, V _{CE} = -2V
		170	290	—		I _C = -2A, V _{CE} = -2V
		110	175	—		I _C = -5.5A, V _{CE} = -2V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	—	-15	-30	mV	I _C = -0.1A, I _B = -10mA
		—	-44	-60		I _C = -1A, I _B = -100mA
		—	-50	-70		I _C = -1A, I _B = -50mA
		—	-120	-165		I _C = -1A, I _B = -10mA
		—	-70	-80		I _C = -2A, I _B = -200mA
		—	-125	-175		I _C = -2A, I _B = -40mA
		—	-130	-175		I _C = -3.5A, I _B = -175mA
		—	-162	-185		I _C = -5.5A, I _B = -550mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	-820 -1000	-900 -1075	mV	I _C = -2A, I _B = -40mA I _C = -5.5A, I _B = -550mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(om)}	—	-778 -869	-850 -950	mV	I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V
Transitional Frequency	f _T	—	152	—	MHz	I _C = -50mA, V _{CE} = -10V f = 100MHz
Output Capacitance	C _{obo}	—	53	—	pF	V _{CB} = -10V, f = 1MHz,
Switching Times	t _d	—	18	—	ns	I _C = -1A, V _{CC} = -10V I _{B1} = -I _{B2} = -100mA
	t _r		17			
	t _s		325			
	t _f		60			
Switching Times	t _d	—	55	—	ns	I _C = -2A, V _{CC} = -30V I _{B1} = -I _{B2} = -20mA
	t _r		107			
	t _s		264			
	t _f		103			

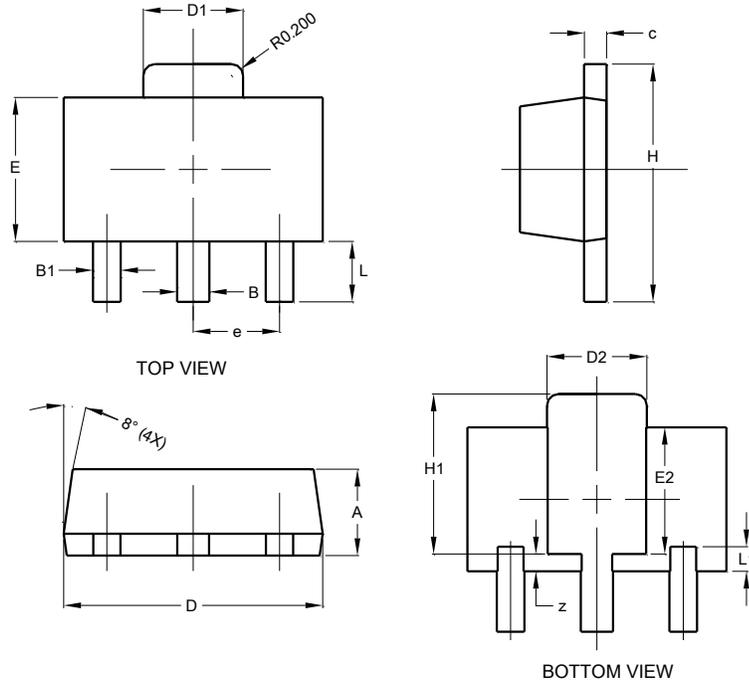
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

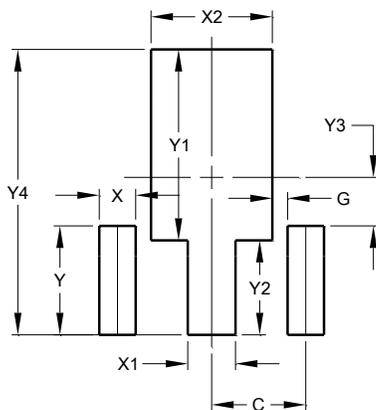
SOT89



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