



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

- $BV_{CEO} > 60V$
- Darlington Transistor $h_{FE} > 10k$ @ 100mA for High Gain
- $I_C = 500mA$ High Continuous Collector Current
- Complementary Darlington PNP Type: FCX705

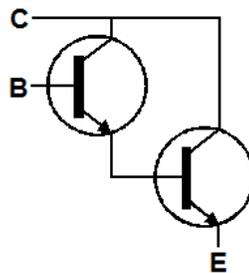
Mechanical Data

- 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 ③
- Weight 0.052 grams (Approximate)

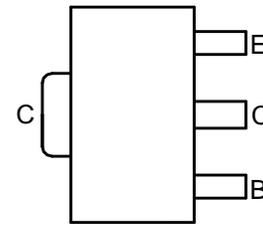
SOT89



Top View



Device Symbol



Top View
Pin-Out

Absolute Maximum Ratings

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	10	V
Continuous Collector Current	I_C	500	mA
Peak Pulse Current	I_{CM}	800	mA

Thermal Characteristics

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	(Note 5) 1.1	W
		(Note 6) 1.5	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5) 113	$^\circ\text{C/W}$
		(Note 6) 83	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	9.9	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

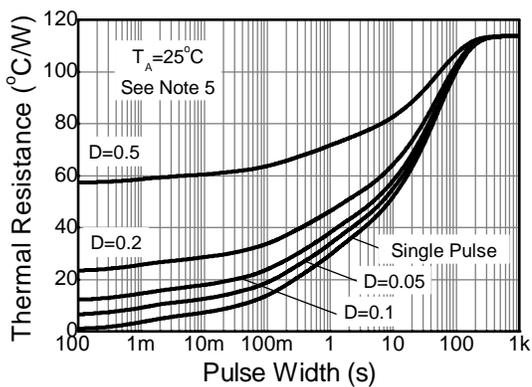
ESD Ratings

 (Note 8)

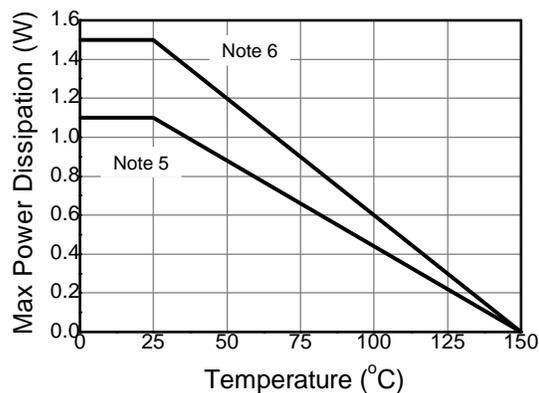
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 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 25mm x 25mm 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.

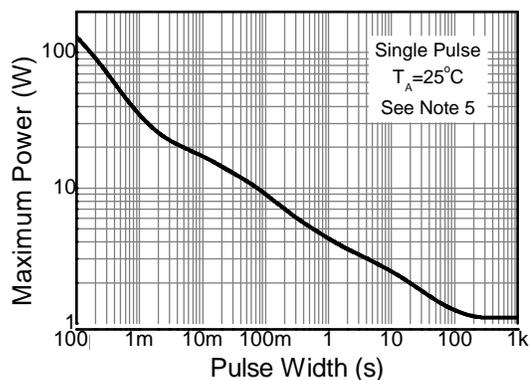
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



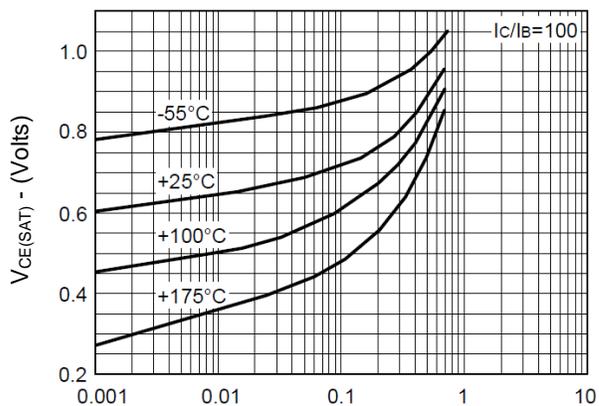
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CB0}	80	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	60	—	—	V	I _{CEO} = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	10	—	—	V	I _{EBO} = 10μA
Collector Cut-Off Current	I _{CB0}	—	<1	100	nA	V _{CB} = 60V
		—	—	10	μA	V _{CB} = 60V, T _A = +150°C
Emitter-Base Cut-Off Current	I _{EBO}	—	<1	100	nA	V _{EB} = 4V
ON CHARACTERISTICS (Note 9)						
Static Forward Current Transfer Ratio	h _{FE}	2,000 4,000 10,000 2,000	—	—	—	I _C = 100μA, V _{CE} = 1V I _C = 10mA, V _{CE} = 5V I _C = 100mA, V _{CE} = 5V I _C = 500mA, V _{CE} = 5V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	1.0	V	I _C = 100mA, I _B = 0.1mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	—	1.5	V	I _C = 100mA, I _B = 0.1mA
SMALL SIGNAL CHARACTERISTICS (Note 9)						
Transition Frequency	f _T	—	170	—	MHz	I _C = 50mA, V _{CE} = 5V, f = 20MHz
Output Capacitance	C _{OBO}	—	3.5	—	pF	V _{CB} = 10V, f = 1MHz

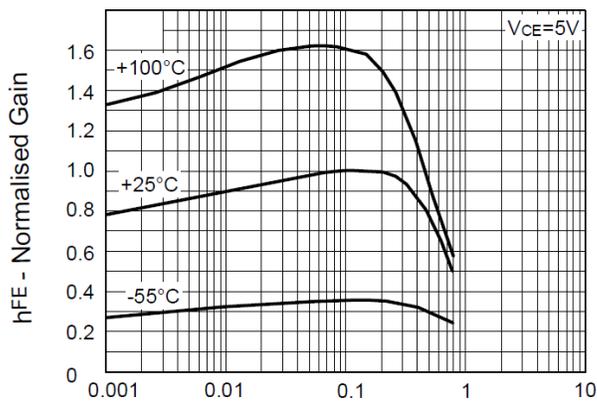
Note 9: Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics



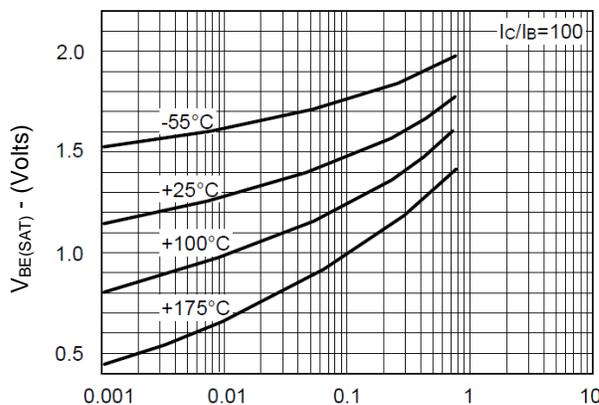
I_C - Collector Current (Amps)

$V_{CE(SAT)}$ v I_C



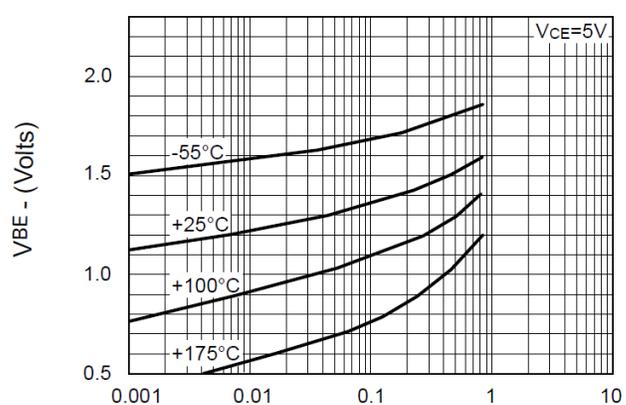
I_C - Collector Current (Amps)

h_{FE} v I_C



I_C - Collector Current (Amps)

$V_{BE(SAT)}$ v I_C

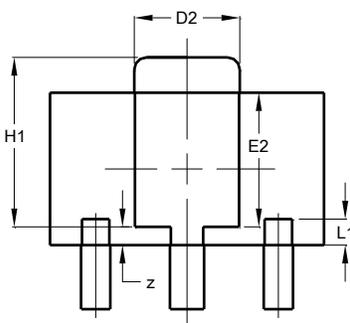
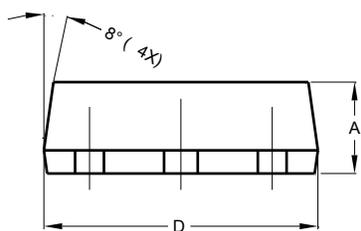
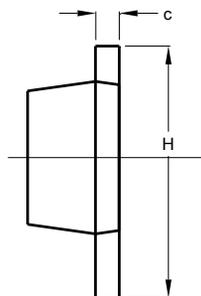
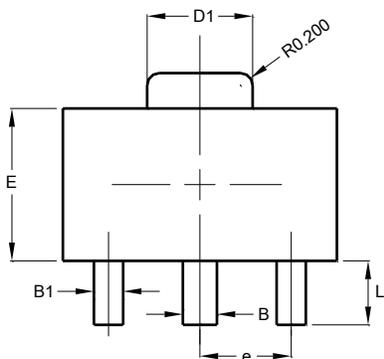


I_C - Collector Current (Amps)

$V_{BE(ON)}$ v I_C

Package Outline Dimensions

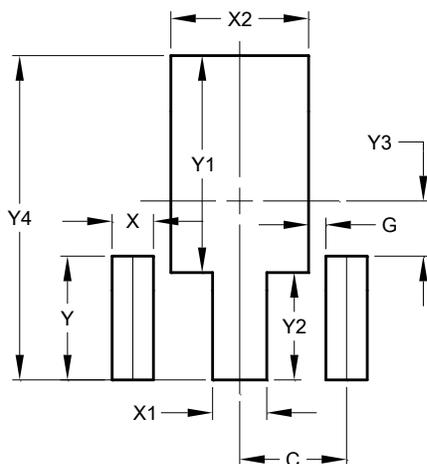
SOT89



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