



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

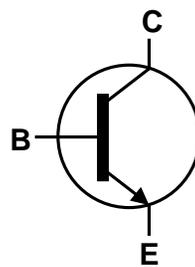
- $BV_{CEO} > 70V$
- $I_C = 2A$ High Continuous Collector Current
- I_{CM} Up to 4A Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage $< 300\text{ mV @ } 1A$

Mechanical Data

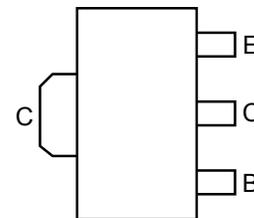
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Lead.
Solderable per MIL-STD-202, Method 208 ⁽³⁾
- Weight: 0.052 grams (Approximate)



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_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	70	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	2	A
Peak Pulse Current (Note 5)	I_{CM}	4	A

Note 5. Measured under pulsed conditions. Pulse width = 300 μs . Duty cycle \leq 2%.

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

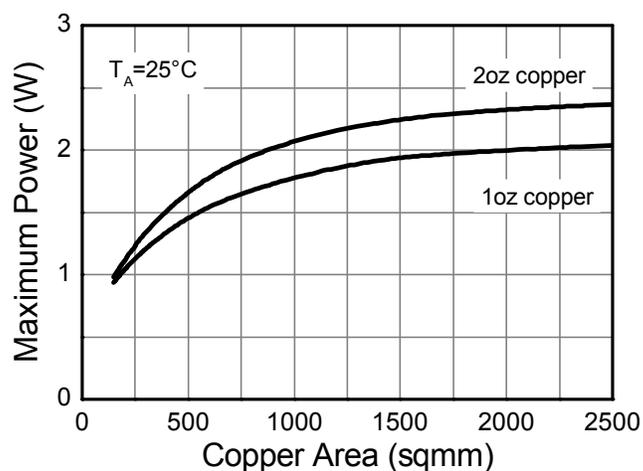
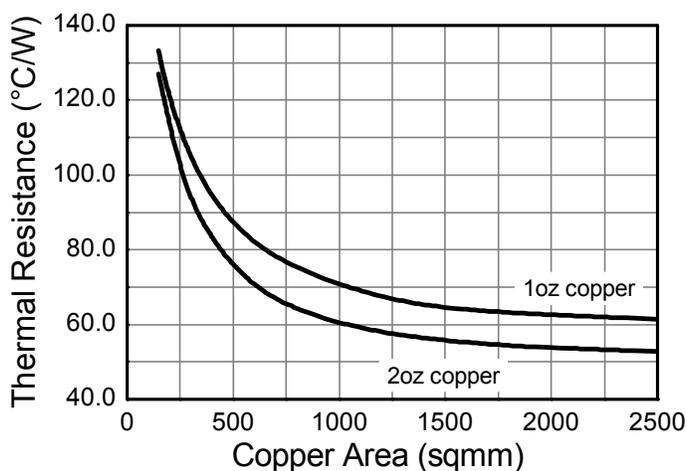
Characteristic	Symbol	Value	Unit	
Power Dissipation	(Note 6)	0.7	W	
	(Note 7)	1.0		
	(Note 8)	1.5		
	(Note 9)	2.0		
Thermal Resistance, Junction to Ambient Air	(Note 6)	178	$^\circ\text{C/W}$	
	(Note 7)	125		
	(Note 8)	83		
	(Note 9)	60		
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	22	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$	

ESD Ratings (Note 11)

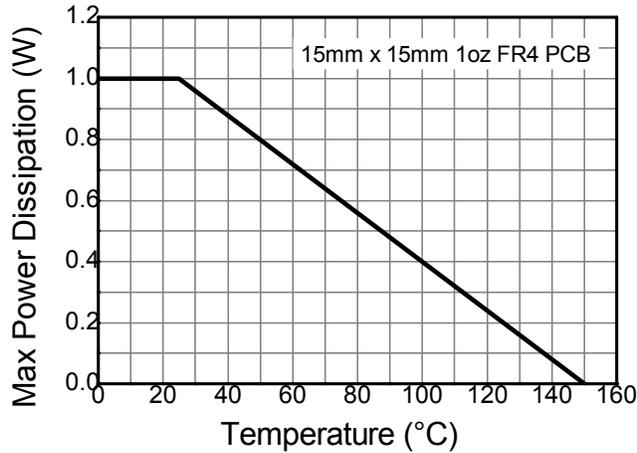
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the exposed collector pad on minimum recommended pad layout (MRP) 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 with the exposed collector pad on 15mm x 15mm 1oz copper.
 - Same as Note 5, except the device is mounted with the exposed collector pad on 25mm x 25mm 1oz copper.
 - Same as Note 5, except the device is mounted with the exposed collector pad on 50mm x 50mm 1oz copper.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

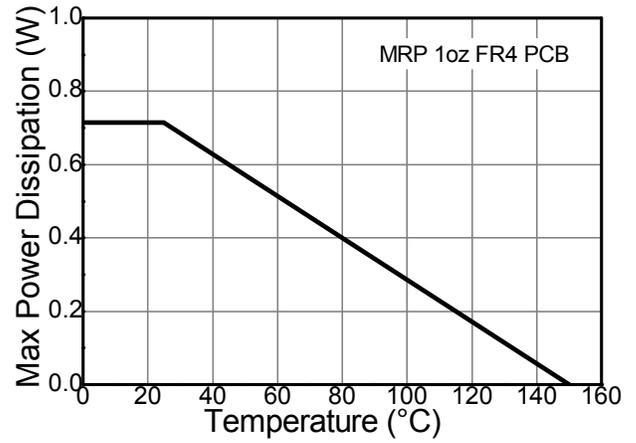
Thermal Characteristics and Derating Information



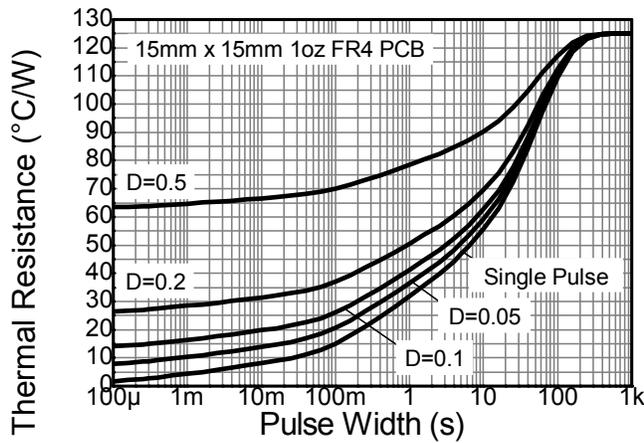
Thermal Characteristics and Derating Information (continued)



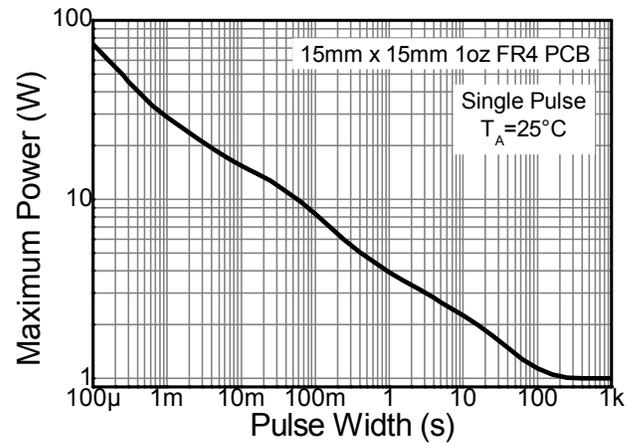
Derating Curve



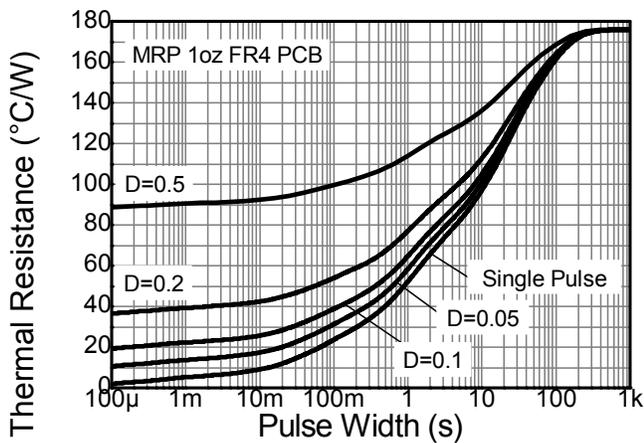
Derating Curve



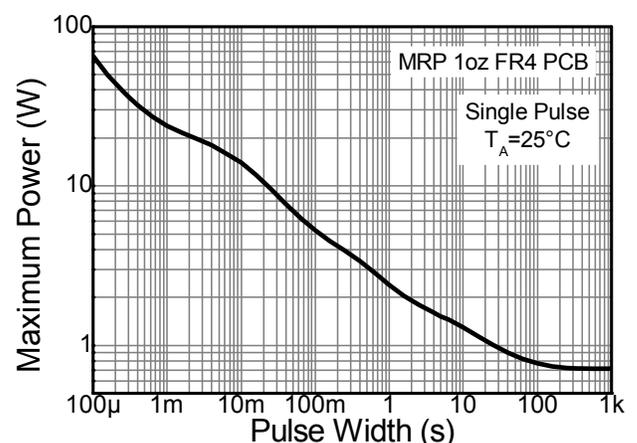
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



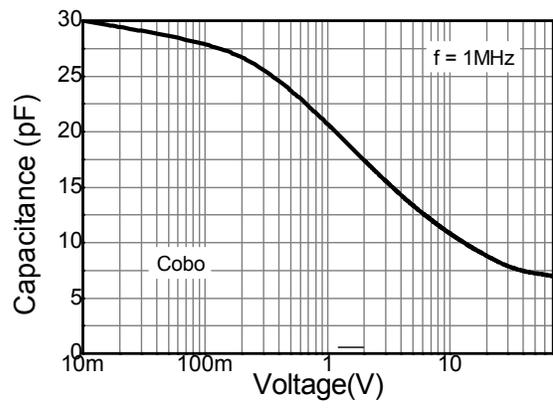
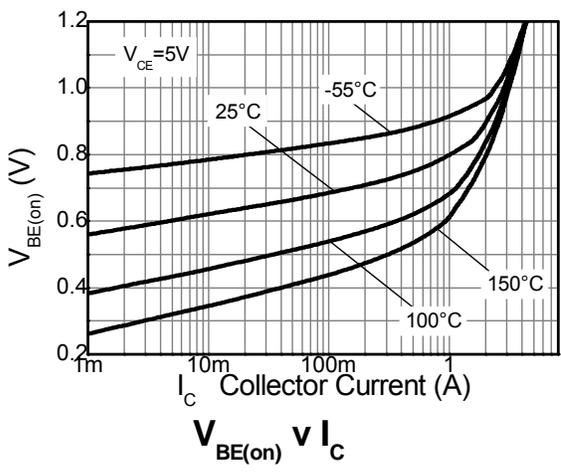
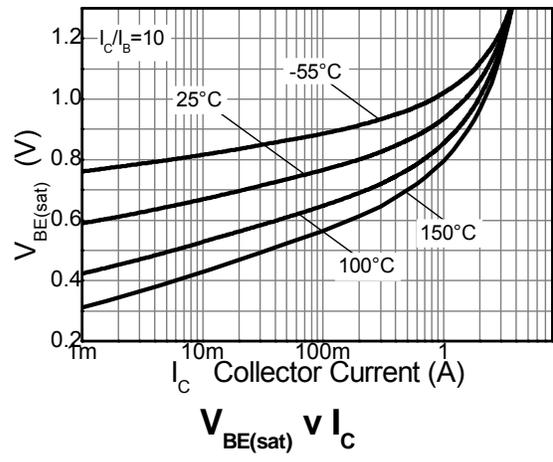
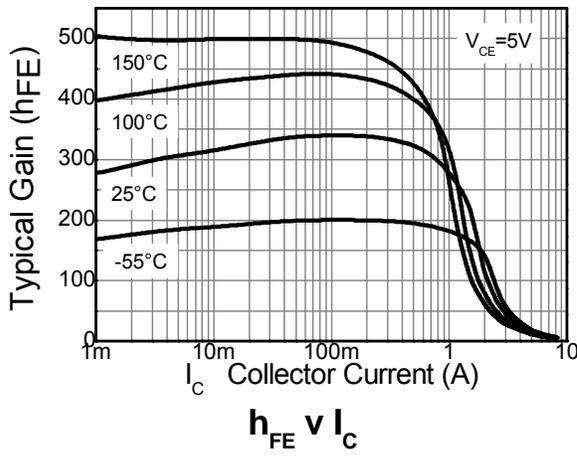
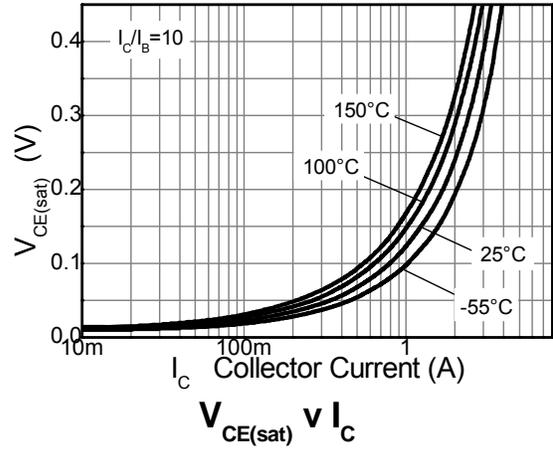
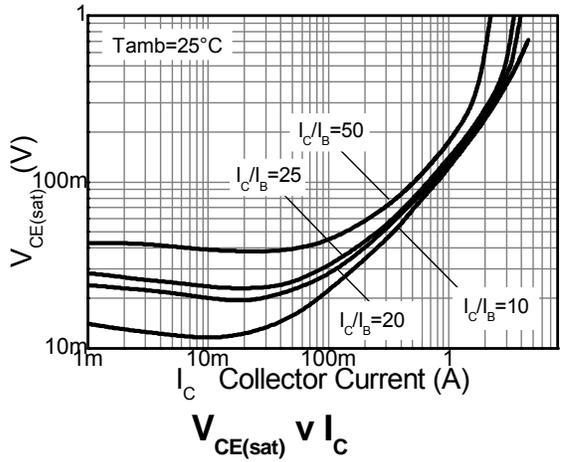
Pulse Power Dissipation

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

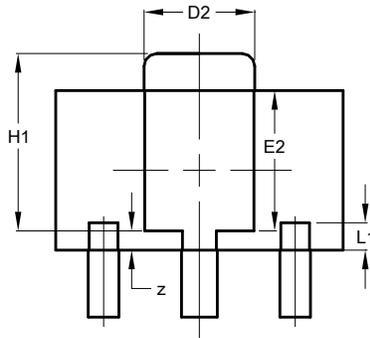
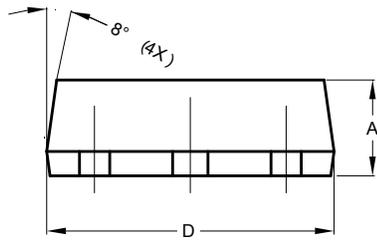
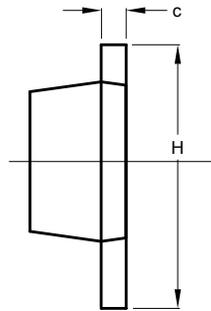
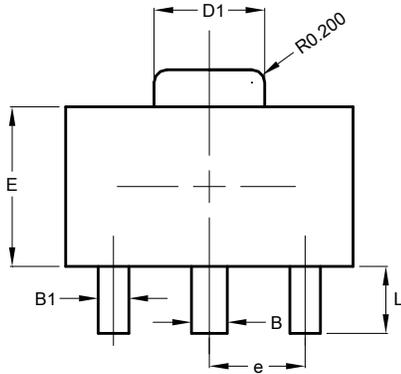
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	150	-	-	V	$I_C = 100 \mu A$
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	70	-	-	V	$I_C = 1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	-	V	$I_E = 100 \mu A$
Collector-Base Cutoff Current	I_{CBO}	-	<1	50	nA	$V_{CB} = 96V$
		-	-	10	μA	$V_{CB} = 96V, T_A = +100^\circ C$
Emitter-Base Cutoff Current	I_{EBO}	-	<1	20	nA	$V_{EB} = 5.6V$
ON CHARACTERISTICS (Note 12)						
Static Forward Current Transfer Ratio	h_{FE}	120 150 200	260 290 300	- - 500	- - -	$I_C = 1mA, V_{CE} = 5V$ $I_C = 10mA, V_{CE} = 2V$ $I_C = 100mA, V_{CE} = 2V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	150	300	mV	$I_C = 1A, I_B = 100mA$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	-	780	-	mV	$I_C = 1A, V_{CE} = 5V$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-	950	-	mV	$I_C = 1A, I_B = 50mA$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	-	10	-	pF	$V_{CB} = 10V, f = 1MHz$
Transition Frequency	f_T	150	220	-	MHz	$V_{CE} = 10V, I_C = 50mA, f = 100MHz$
Turn-On Time	t_{on}	-	63	-	ns	$V_{CC} = 10V, I_C = 0.5A$ $I_{B2} = -I_{B1} = 25mA$
Delay Time	t_d	-	33	-		
Rise Time	t_r	-	30	-		
Turn-Off Time	t_{off}	-	420	-		
Storage Time	t_s	-	380	-		
Fall Time	t_f	-	40	-		

 Note: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu s$. Duty cycle $\leq 2\%$.

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

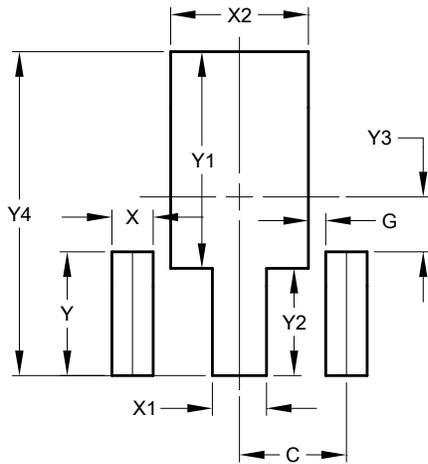


Package Outline Dimensions



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	0.427 REF		
Z	0.30 REF		
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