



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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Description

This bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

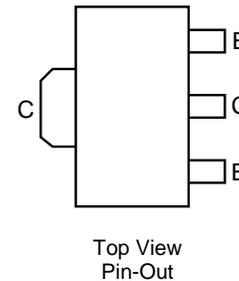
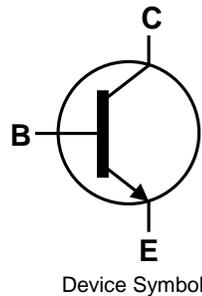
- $BV_{CEX} > 70V$
- $BV_{CEO} > 20V$
- $BV_{ECO} > 4.5V$
- $I_C = 7.5A$ High Continuous Current
- $V_{CE(SAT)} < 35mV @ 1A$
- Low Equivalent On-Resistance; $R_{CE(sat)} = 21m\Omega$

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 
- Weight: 0.05 grams (Approximate)

Applications

- Emergency Lighting Circuits
- Motor Driving
- Camera Strobe
- Boost Converter
- CCFL Backlight Inverters
- MOSFET Gate Drivers
- LED Driving



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	70	V
Collector-Emitter Voltage (Forward Blocking)	V _{CEX}	70	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Collector Voltage (Reverse Blocking)	V _{ECX}	6	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	7.5	A
Base Current	I _B	1	A
Peak Pulse Current	I _{CM}	20	A

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

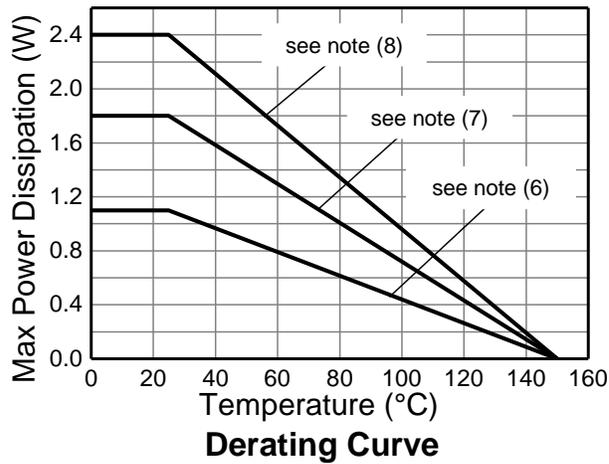
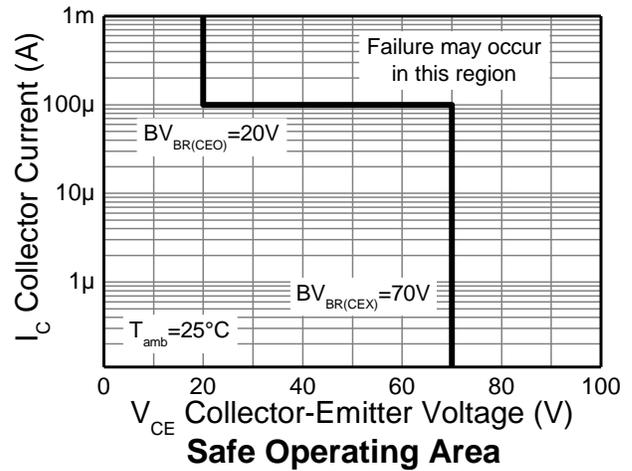
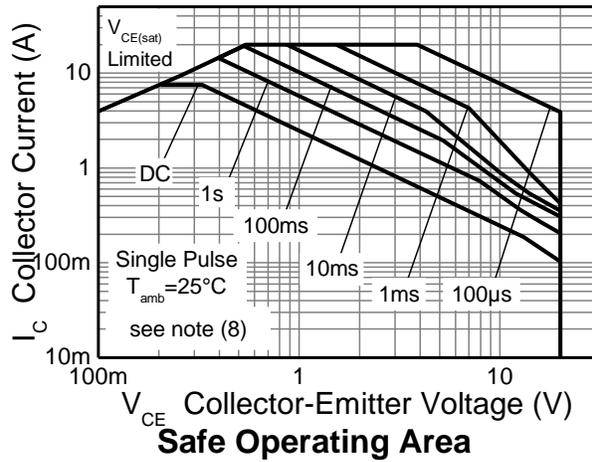
Characteristic	Symbol	Value	Unit	
Power Dissipation Linear Derating Factor	P _D	1.1	W mW/°C	
		8.8		
		1.8		
		14.4		
		2.4		
		19.2		
Thermal Resistance, Junction to Ambient Air	R _{θJA}	4.46	°C/W	
		35.7		
		27.8		
		222		
Thermal Resistance, Junction to Case	R _{θJL}	117	°C/W	
		68		
		51		
		28		
Thermal Resistance, Junction to Case	(Note 10)	R _{θJL}	4.69	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C	

ESD Ratings (Note 11)

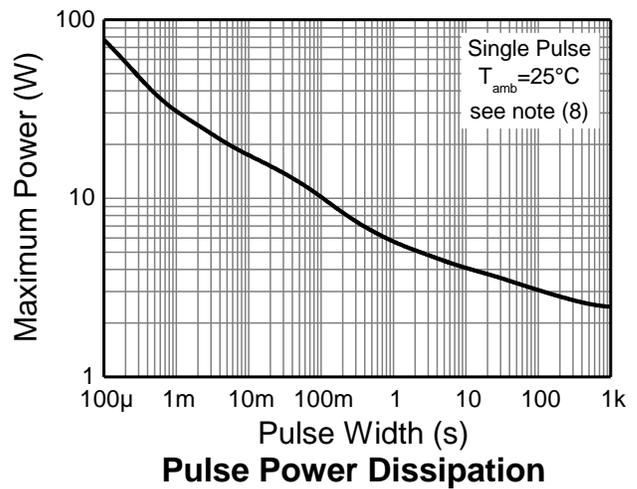
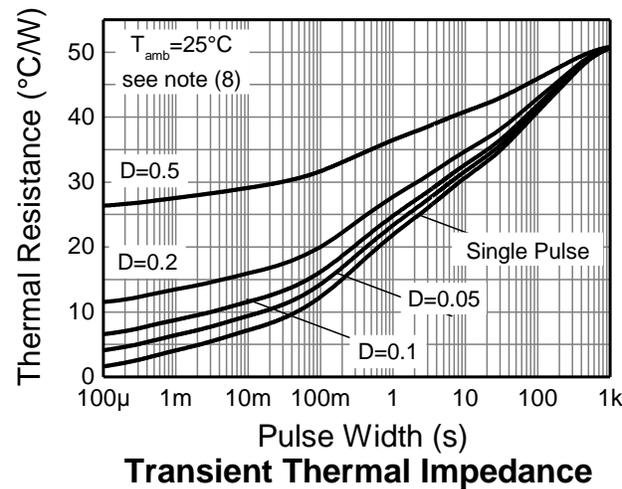
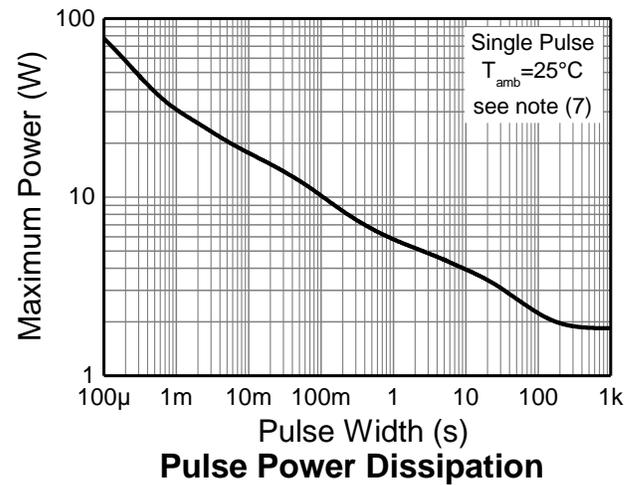
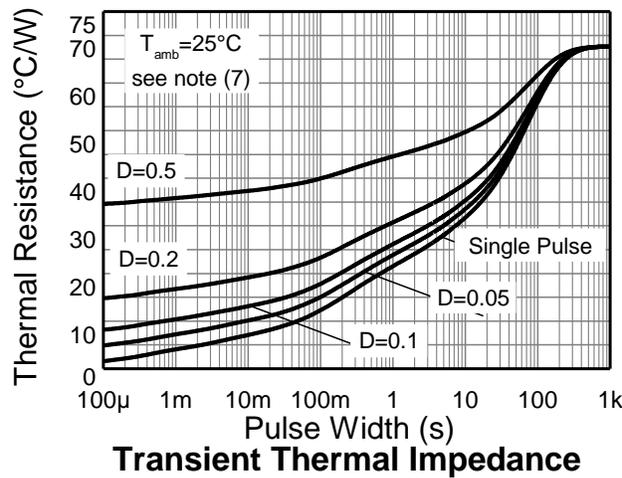
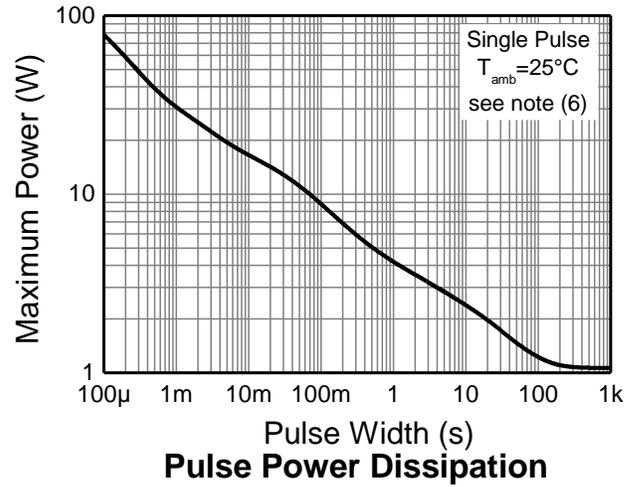
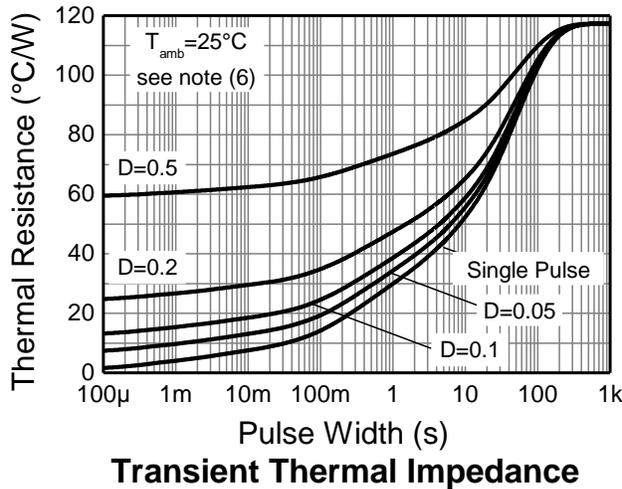
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge—Machine Model	ESD MM	400	V	C

- Notes:
- For a device mounted with the exposed collector pad on 15mm × 15mm 1oz copper that is on a single-sided 0.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as Note 6 except the device is mounted on 25mm × 25mm 1oz copper.
 - Same as Note 6 except the device is mounted on 50mm × 50mm 1oz copper.
 - As (9) above at 5 < 5 seconds.
 - Junction to case (collector tab). Typical.
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information



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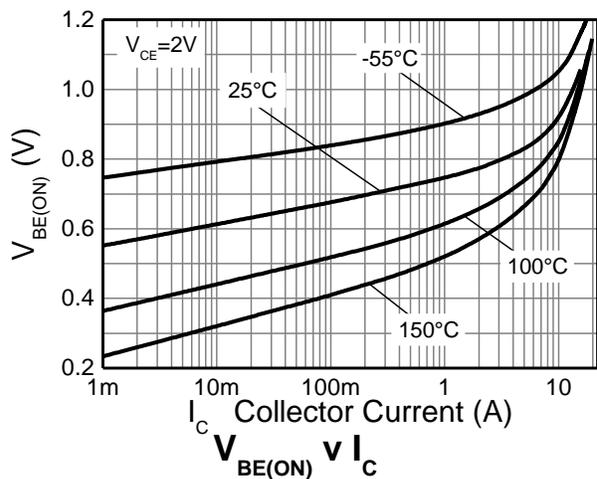
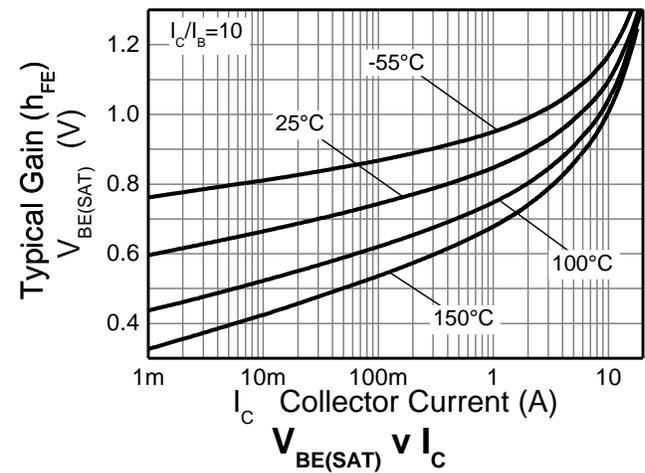
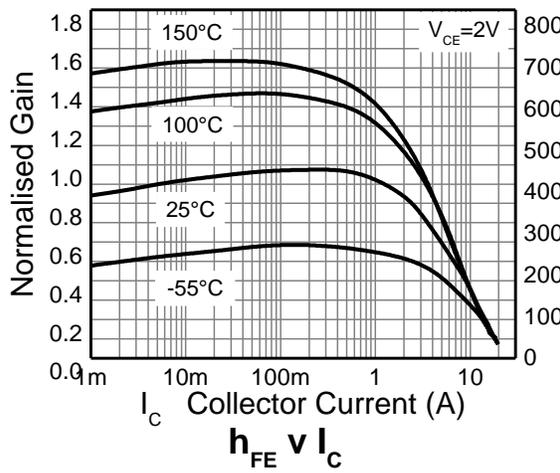
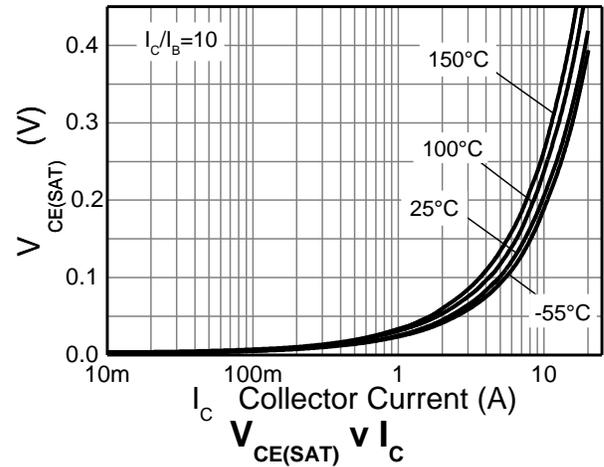
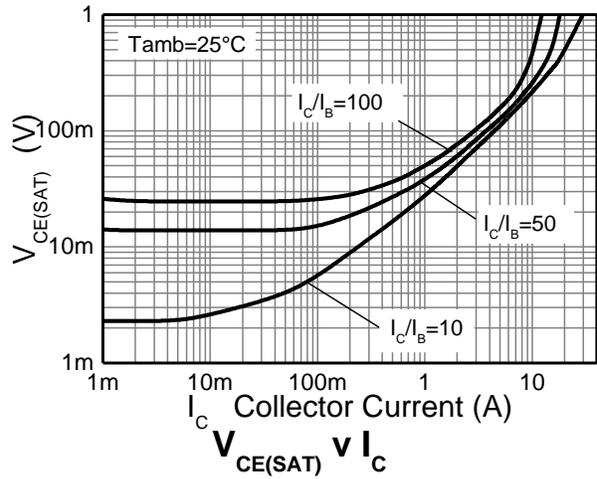


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

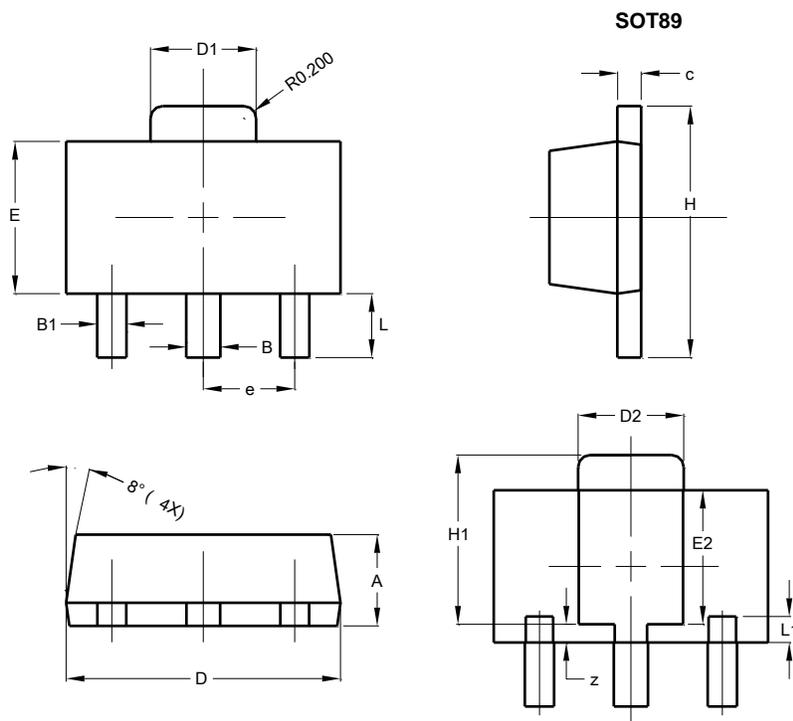
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	70	100	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Forwarding Block)	BV _{CEX}	70	100	—	V	I _C = 100μA, R _{BE} ≤ 1kΩ or -1V < V _{BE} < 0.25V
Collector-Emitter Breakdown Voltage (Notes 12)	BV _{CEO}	20	30	—	V	I _C = 10mA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV _{ECX}	6	8.4	—	V	I _E = 100μA, R _{BC} ≤ 1kΩ or 0.25V < V _{BC} < -0.25V
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV _{ECO}	4.5	5.7	—	V	I _E = 100μA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.4	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	<1	50 0.5	nA μA	V _{CB} = 70V V _{CB} = 70V, T _{amb} = 100°C
Collector-Emitter Cutoff Current	I _{CEX}	—	—	100	nA	V _{CE} = 70V, R _{BE} ≤ 1kΩ or -1V < V _{BE} < 0.25V
Emitter Cutoff Current	I _{EBO}	—	<1	50	nA	V _{EB} = 5.6V
DC current transfer Static ratio (Notes 12)	h _{FE}	300 260 150 50 —	450 390 210 75 35	900 — — — —	—	I _C = 100mA, V _{CE} = 2V I _C = 2A, V _{CE} = 2V I _C = 7.5A, V _{CE} = 2V I _C = 15A, V _{CE} = 2V I _C = 20A, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Notes 12)	V _{CE(sat)}	— — — — — —	26 50 75 60 83 155	32 70 100 80 105 200	mV	I _C = 1A, I _B = 100mA I _C = 1A, I _B = 10mA I _C = 2A, I _B = 20mA I _C = 2A, I _B = 40mA I _C = 4A, I _B = 400mA I _C = 7.5A, I _B = 375mA
Base-Emitter Saturation Voltage (Notes 12)	V _{BE(sat)}	—	1000	1100	mV	I _C = 7.5A, I _B = 375mA
Base-Emitter Turn-on Voltage (Notes 12)	V _{BE(on)}	—	870	1000	mV	I _C = 7.5A, V _{CE} = 2V
Transitional Frequency	f _T	—	160	—	MHz	I _C = 50mA, V _{CE} = 10V, f = 100MHz
Input Capacitance	C _{ibo}	—	297	400	pF	V _{EB} = 0.5V, f = 1MHz,
Output Capacitance	C _{obo}	—	32.6	40	pF	V _{CB} = 10V, f = 1MHz,
Switching Time	t _d	—	129	—	ns	V _{CC} = 10V, I _C = 1A, I _{B1} = -I _{B2} = 10mA
	t _r	—	96	—	ns	
	t _s	—	398	—	ns	
	t _f	—	90	—	ns	

Note: 12. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

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

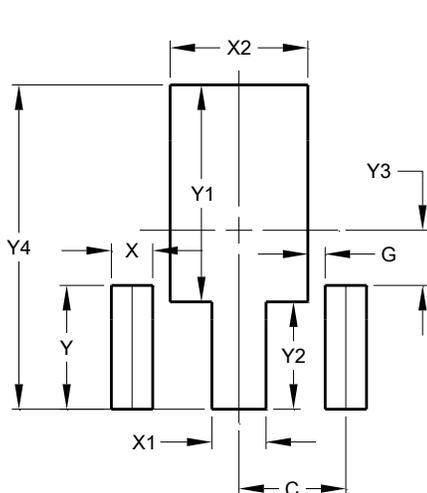


Package Outline Dimensions



SOT89			
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