优尚

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 requirement of Automotive Applications.

Features

- BV_{CEO} > -400V
- I_C = -0.5A Continuous Collector Current
- I_{CM} = -1A Peak Pulse Current
- High Gain Holds up $h_{FE} \geq 140$ @ I_C = -100mA

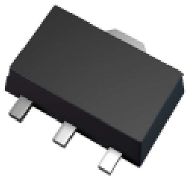
Mechanical Data

- 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 e3
- Weight: 0.05 grams (Approximate)

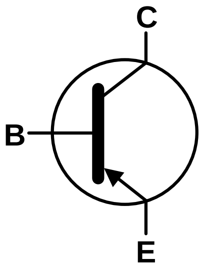
Applications

- High Voltage Switching

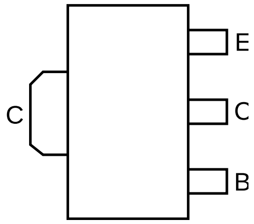
SOT89



Top View



Device Symbol



Top View
Pin Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-400	V
Collector-Emitter Voltage	V_{CEO}	-400	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-0.5	A
Peak Pulse Current	I_{CM}	-1	A
Base Current	I_B	-250	mA

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

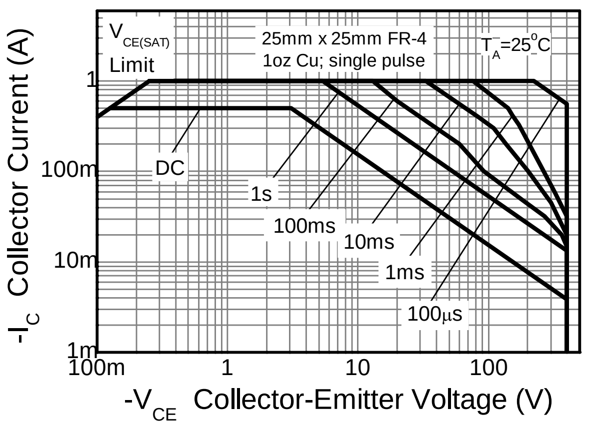
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	10.4	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

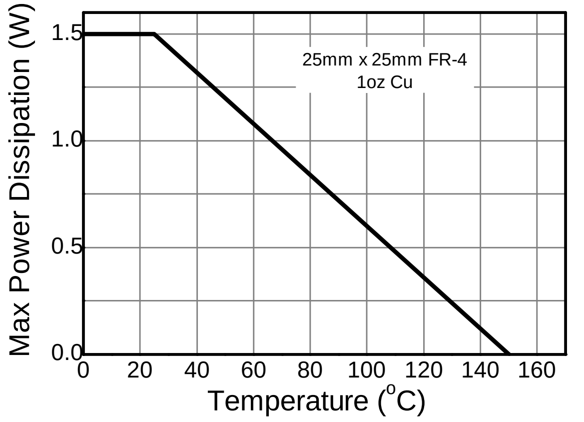
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
6. For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

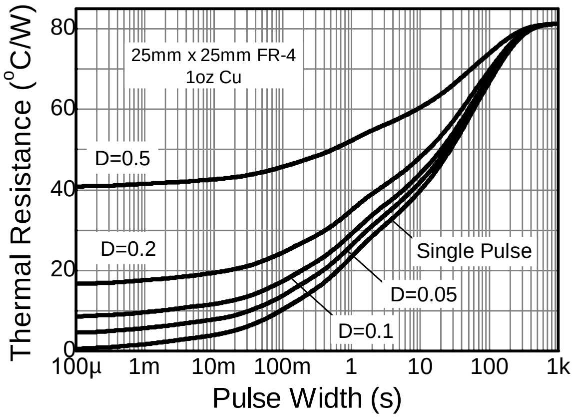
Thermal Characteristics and Derating information



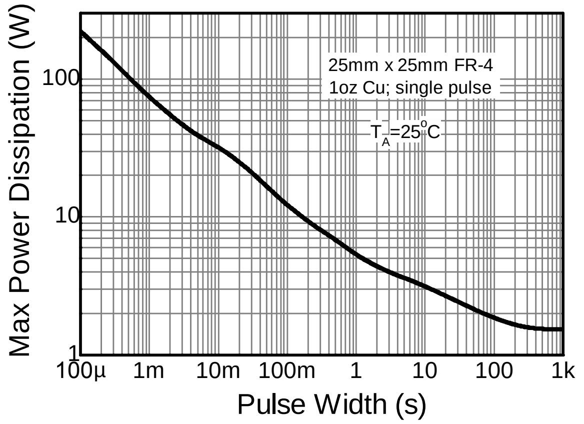
Safe Operating Area



Derating Curve



Transient Thermal Impedance



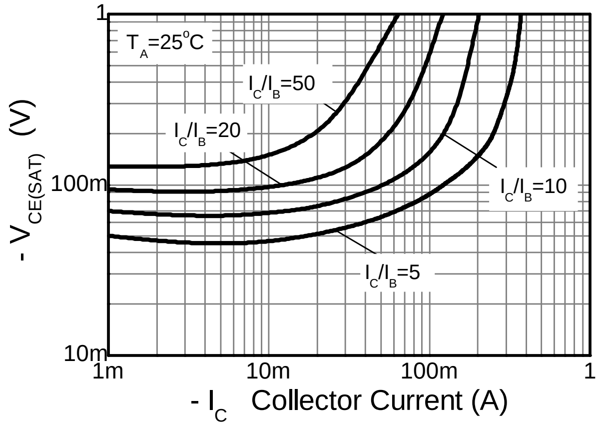
Pulse Power Dissipation

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

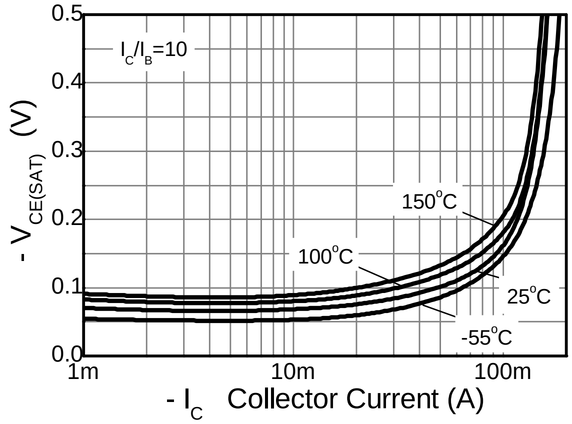
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-400	—	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-400	—	—	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	I_E = -100µA
Collector-Emitter Cut-off Current	I_{CES}	—	—	-100	nA	V_{CE} = -320V
Collector Cut-off Current	I_{CBO}	—	—	-100	nA	V_{CB} = -320V
Emitter Cut-off Current	I_{EBO}	—	—	-100	nA	V_{EB} = -6V
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	140 140	—	450 400	—	I_C = -20mA, V_{CE} = -5V I_C = -100mA, V_{CE} = -5V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	—	-250	mV	I_C = -100mA, I_B = -10mA
				-400		I_C = -200mA, I_B = -40mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	-0.75	-0.9	V	I_C = -100mA, I_B = -10mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	—	-0.8	V	I_C = -200mA, V_{CE} = -10V
Transition Frequency	f_T	—	75	—	MHz	I_C = -50mA, V_{CE} = -5V, f = 50MHz
Collector Output Capacitance	C_{OBO}	—	19	—	pF	V_{CB} = -10V, I_E = 0, f = 1MHz
Delay Time	$t_{(D)}$	—	89	—	ns	V_{CC} = -200V, I_C = -100mA, I_{B1} = -10mA, I_{B2} = 20mA
Rise Time	$t_{(R)}$	—	111	—	ns	
Storage Time	$t_{(S)}$	—	2165	—	ns	
Fall Time	$t_{(F)}$	—	185	—	ns	

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

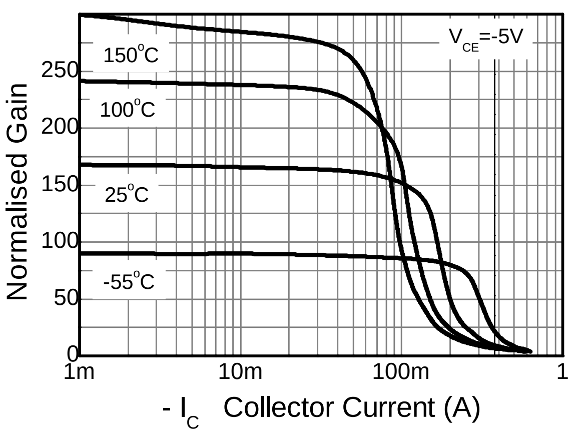
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



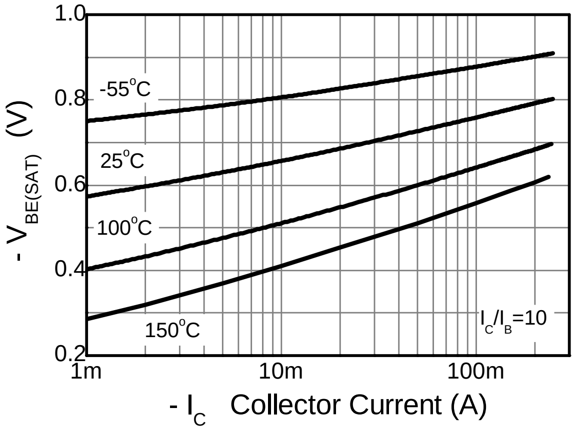
$V_{CE(SAT)}$ v I_C



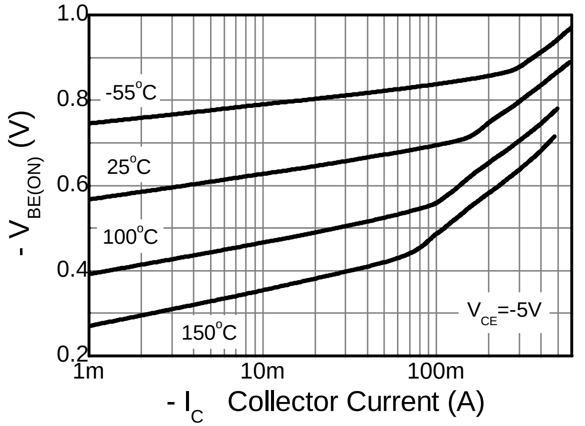
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



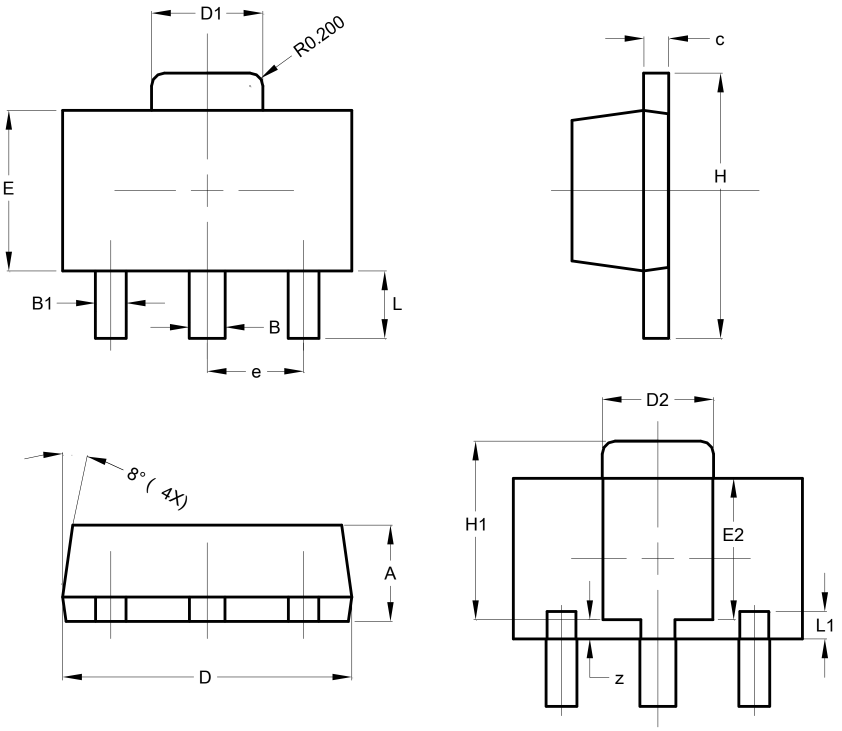
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

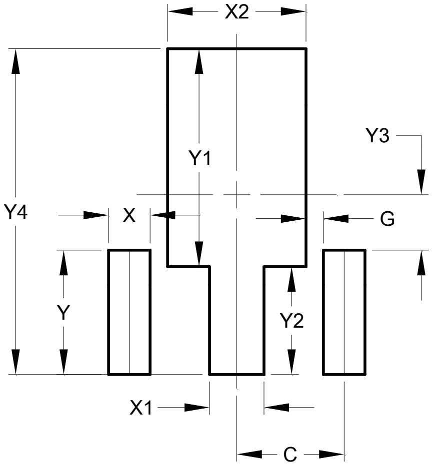
SOT89



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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.