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} > -140V
- I_C = -3A Continuous Collector Current
- I_{CM} = -10A Peak Pulse Current
- Very Low Saturation Voltage
- R_{SAT} = 85mΩ @ I_C -3A for Low Equivalent On-Resistance

Mechanical Data

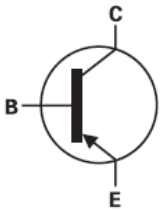
- Case: SOT89
- Case Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Applications

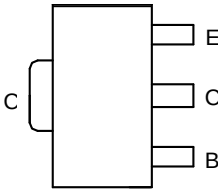
- Motor Driving
- Line Switching
- High Side Switches
- Subscriber Line Interface Cards (SLIC)

SOT89

Top View



Device Schematic



Pin-Out Top View

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-180	V
Collector-Emitter Voltage	V_{CEO}	-140	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3	A
Peak Pulse Current	I_{CM}	-10	A

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

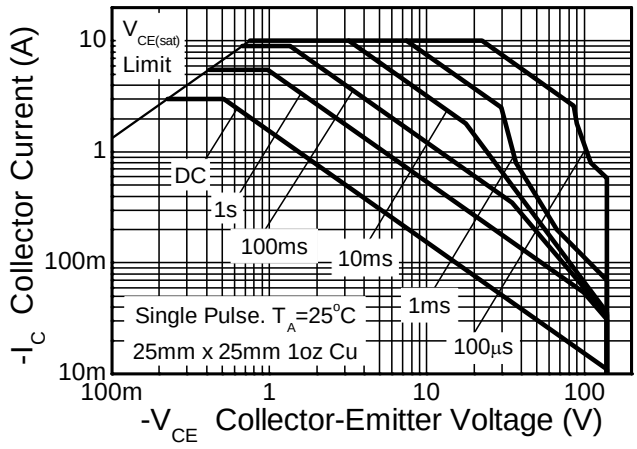
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	1.5 12	W mW/°C
	(Note 6)		2.1 16.8	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\Theta JA}$	83	°C/W
	(Note 6)	$R_{\Theta JA}$	60	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

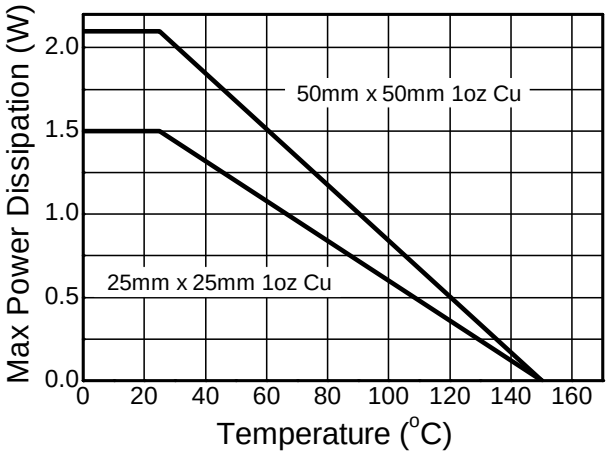
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge — Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge — Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 25mm × 25mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as Note 5, except the device is mounted on 50mm × 50mm 1oz copper.
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

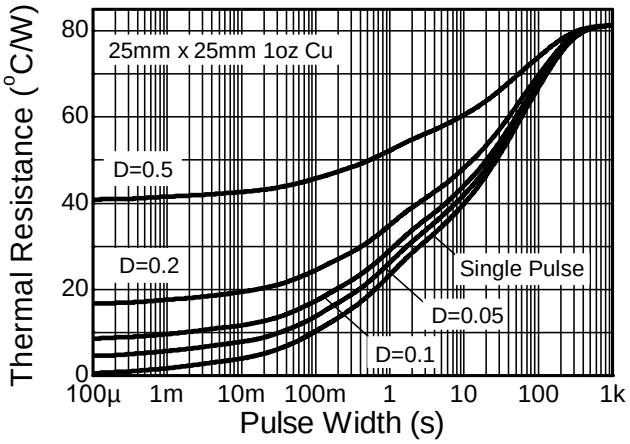
Thermal Characteristics and Derating Information



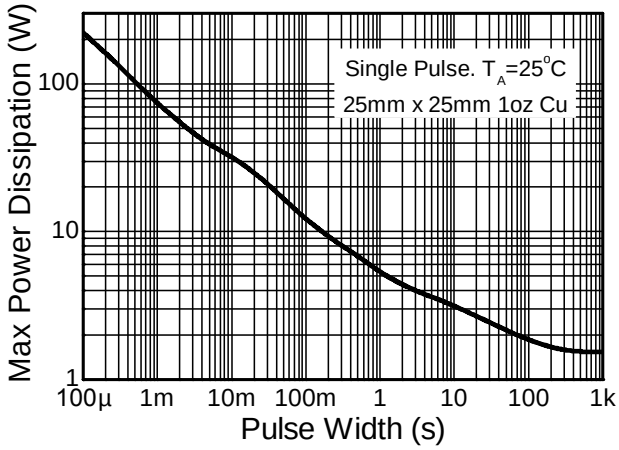
Safe Operating Area



Derating Curve



Transient Thermal Impedance



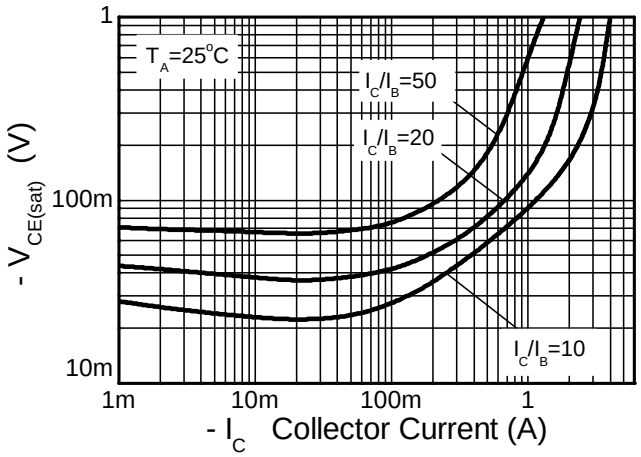
Pulse Power Dissipation

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

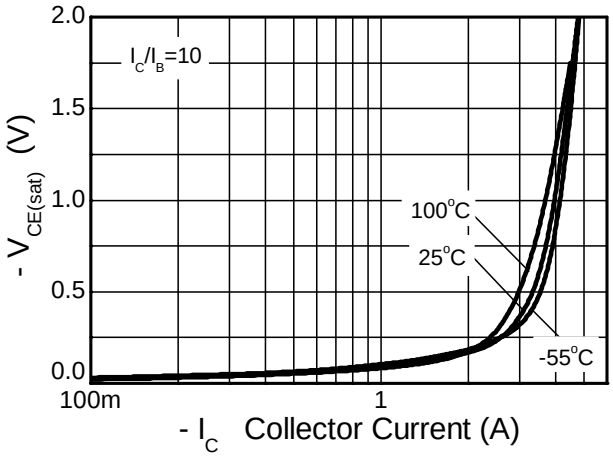
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-180	-200	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage	BV_{CER}	-180	-200	—	V	I_C = -1μA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-140	-160	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.0	-8.0	—	V	I_E = -100μA
Collector Cutoff Current	I_{CBO}	—	< -1 —	-20 -0.5	nA μA	V_{CB} = -150V V_{CB} = -150V, T_A = +100°C
Collector Cutoff Current	I_{CER} R ≤ 1kΩ	—	< -1 —	-20 -0.5	nA μA	V_{CB} = -150V V_{CB} = -150V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	< -1	-10	nA	V_{EB} = -6V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	-37 -50 -80 -255	-60 -75 -115 -330	mV	I_C = -0.1A, I_B = -5mA I_C = -0.5A, I_B = -50mA I_C = -1A, I_B = -100mA I_C = -3A, I_B = -300mA
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	-910	-1010	mV	I_C = -3A, I_B = -300mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	-800	-900	mV	I_C = -3A, V_{CE} = -5V
DC Current Gain (Note 8)	h_{FE}	100 100 45 —	225 200 100 5	— 300 — —	—	I_C = -10mA, V_{CE} = -5V I_C = -1A, V_{CE} = -5V I_C = -3A, V_{CE} = -5V I_C = -10A, V_{CE} = -5V
Transition Frequency	f_T	—	120	—	MHz	V_{CE} = -10V, I_C = -100mA, f = 50MHz
Output Capacitance	C_{OBO}	—	33	—	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{ON}	—	42	—	ns	V_{CC} = -50V, I_C = -1A, I_{B1} = -I_{B2} = -100mA
	t_{OFF}	—	636	—		

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

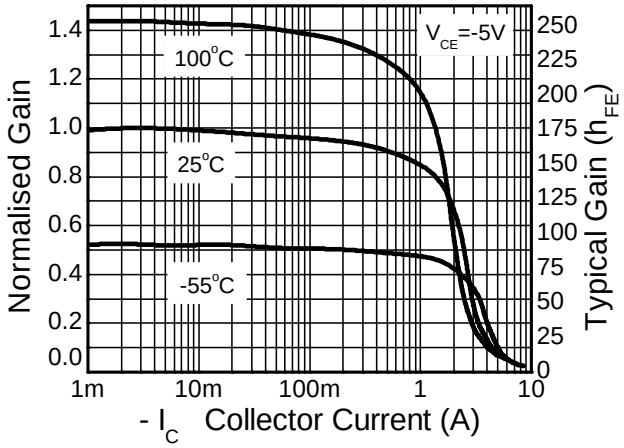
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



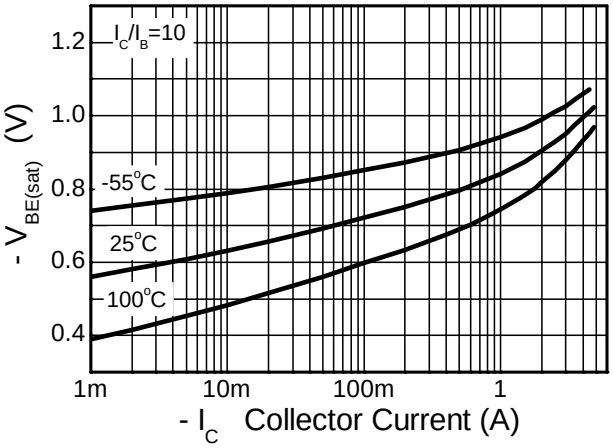
$V_{CE(sat)}$ v I_C



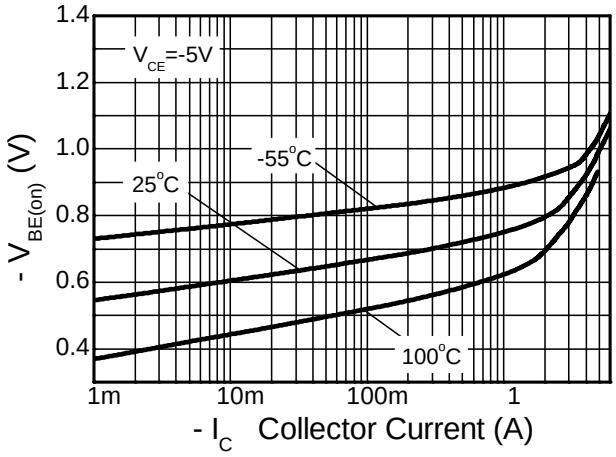
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



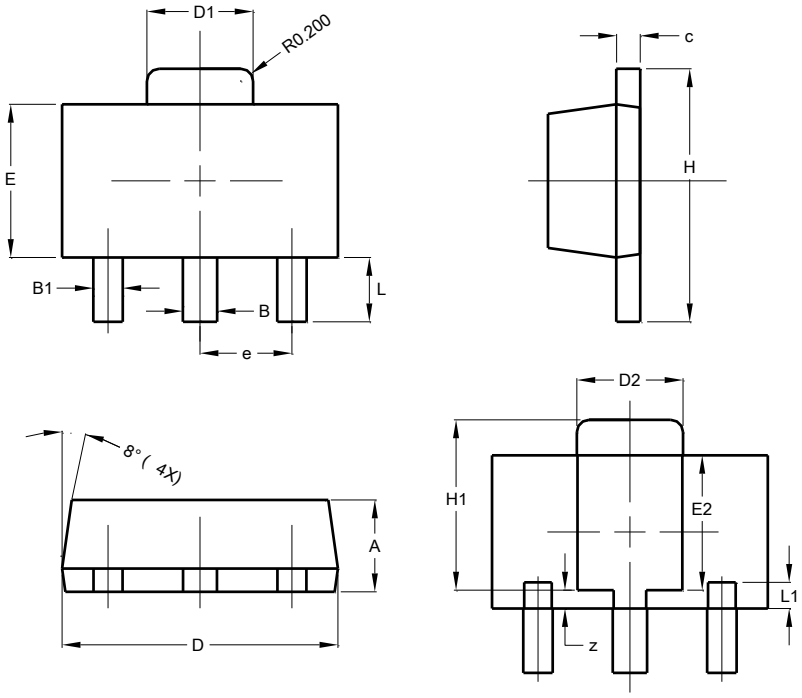
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

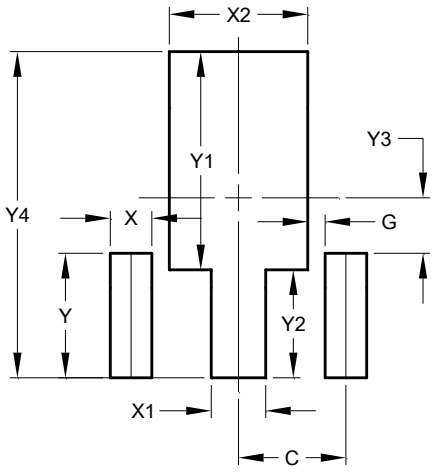
SOT89



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