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

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码

企业QQ二维码

Description

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

Mechanical Data

- Package: SOT89
- Package 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)

Features

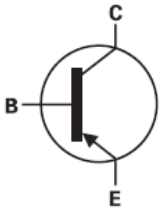
- BV_{CEO} > -40V
- I_C = -5.5A Continuous Collector Current
- I_{CM} = -15A Peak Pulse Current
- Very Low Saturation Voltage $V_{CE(SAT)}$ < -60mV max @ -1A
- R_{SAT} = 29mΩ @ -5.5A for Low Equivalent On-Resistance

Applications

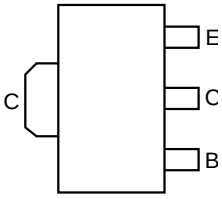
- DC-DC converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Motor controls

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}	-50	V
Collector-Base Voltage	V_{CBS}	-50	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-5.5	A
Peak Pulse Current	I_{CM}	-15	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	0.9 7.2	W mW/°C
	(Note 6)		1.5 12	
	(Note 7)		2.1 16.8	
	(Note 8)		3 24	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	139	°C/W
	(Note 6)		83	
	(Note 7)		60	
	(Note 8)		42	
Thermal Resistance, Junction to Case	(Note 9)	$R_{\theta JC}$	25	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

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 15mm × 15mm 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 6, except the device is mounted on 25mm × 25mm 1oz copper.
7. Same as Note 6, except the device is mounted on 50mm × 50mm 1oz copper.
8. Same as Note 6, except the device is mounted on 25mm × 25mm measured at t < 5 secs.
9. Device mounted on FR-4 PCB with minimum recommended pad layout.
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

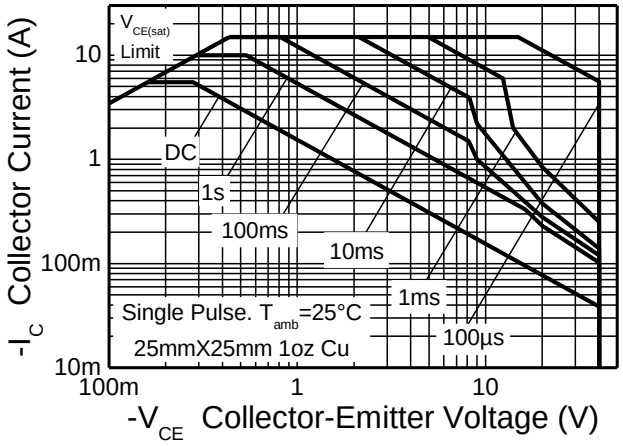


Figure 1. Safe Operating Area

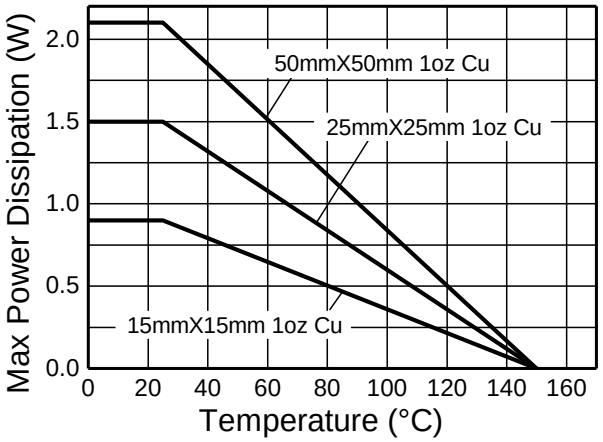


Figure 2. Derating Curve

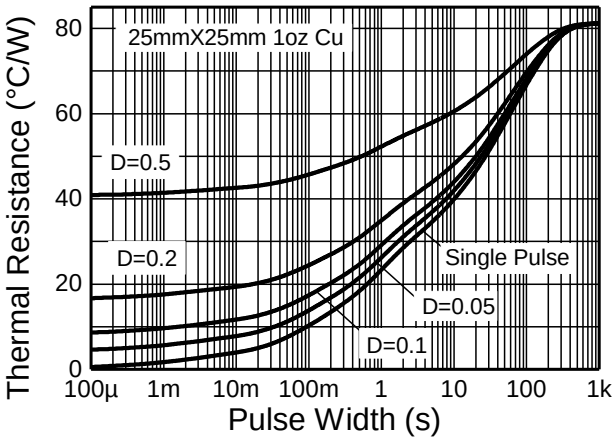


Figure 3. Transient Thermal Impedance

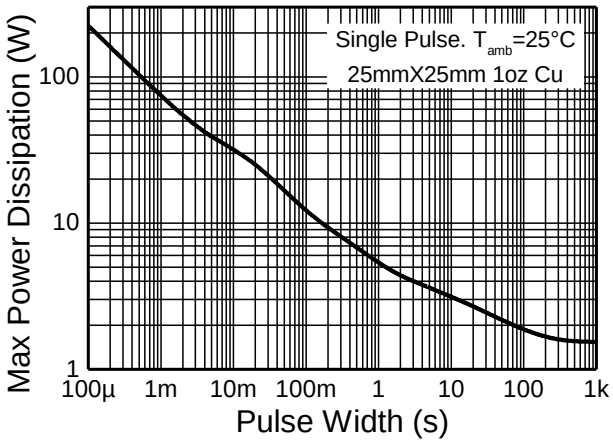


Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	-90	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage	BV_{CER}	-50	-90	—	V	I_C = -1μA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	-40	-58	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.5	-8.3	—	V	I_E = -100μA
Collector Cutoff Current	I_{CBO}	—	-1	-20	nA	V_{CB} = -40V
Collector Cutoff Current	I_{CES}	—	-1	-20	nA	V_{CB} = -32V
Emitter Cutoff Current	I_{EBO}	—	-1	-20	nA	V_{EB} = -6V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	-15 -44 -50 -120 -70 -125 -130 -162	-30 -60 -70 -165 -80 -175 -175 -185	mV	I_C = -0.1A, I_B = -10mA I_C = -1A, I_B = -100mA I_C = -1A, I_B = -50mA I_C = -1A, I_B = -10mA I_C = -2A, I_B = -200mA I_C = -2A, I_B = -40mA I_C = -3.5A, I_B = -175mA I_C = -5.5A, I_B = -550mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	-820 -1000	-900 -1075	mV	I_C = -2A, I_B = -40mA I_C = -5.5A, I_B = -550mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	-778 -869	-850 -950	mV	I_C = -2A, V_{CE} = -2V I_C = -5.5A, V_{CE} = -2V
DC Current Gain (Note 11)	h_{FE}	200 200 170 110	390 350 290 175	550	—	I_C = -10mA, V_{CE} = -2V I_C = -0.5A, V_{CE} = -2V I_C = -2A, V_{CE} = -2V I_C = -5.5A, V_{CE} = -2V
Transition Frequency	f_T	—	152	—	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Output Capacitance (Note 11)	C_{OBO}	—	53	—	pF	V_{CB} = -10V, f = 1MHz
Switching Times	t_d	—	18	—	ns	V_{CC} = -10V, I_C = -1A, I_{B1} = -I_{B2} = -100mA
	t_r	—	17	—		
	t_s	—	325			
	t_r	—	60	—		
Switching Times	t_d	—	55	—	ns	V_{CC} = -30V, I_C = -2A, I_{B1} = -I_{B2} = -20mA
	t_r	—	107	—		
	t_s	—	264	—		
	t_r	—	103	—		

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

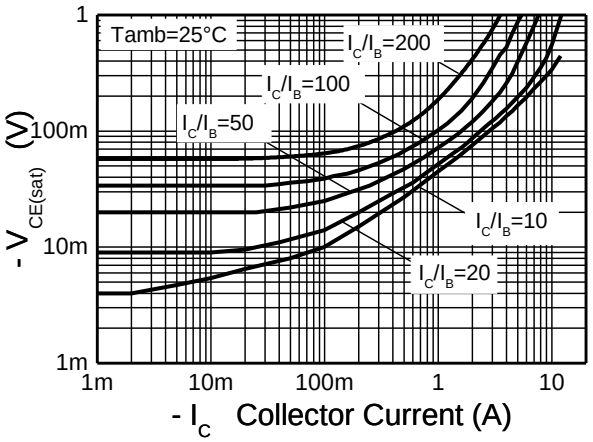


Figure 5. $V_{CE(sat)}$ v I_C

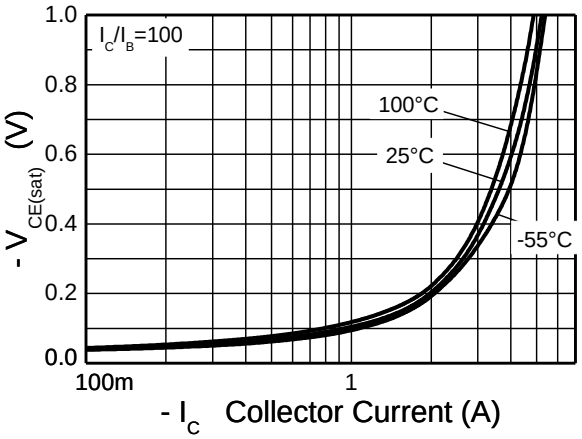


Figure 6. $V_{CE(sat)}$ v I_C

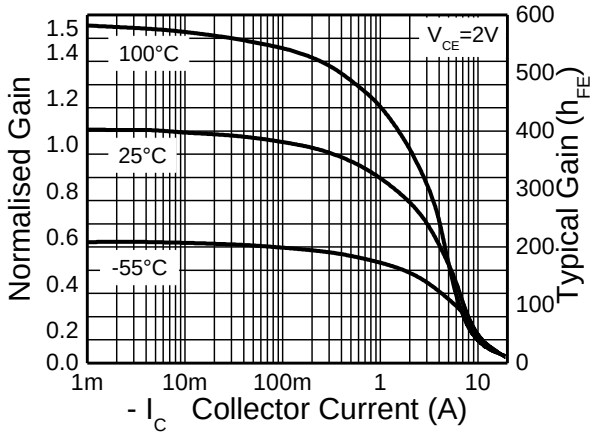


Figure 7. h_{FE} v I_C

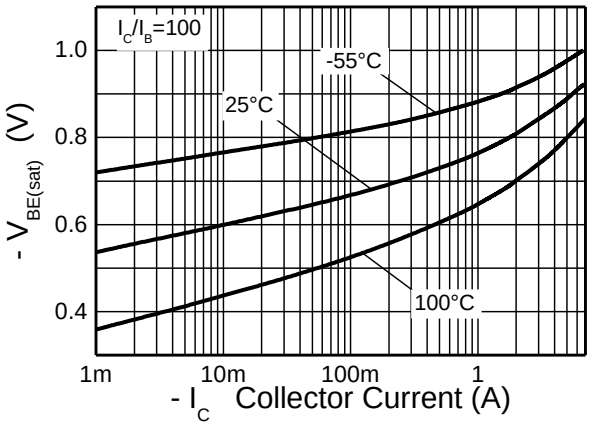


Figure 8. $V_{BE(sat)}$ v I_C

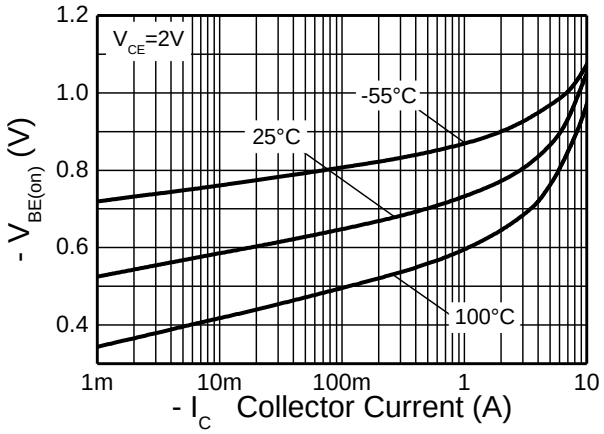
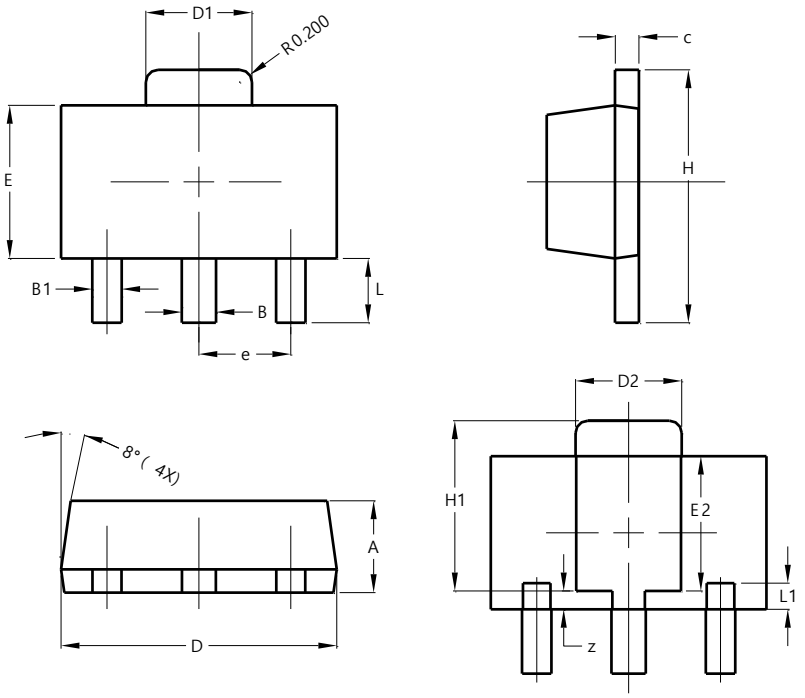


Figure 9. $V_{BE(on)}$ v I_C

Package Outline Dimensions

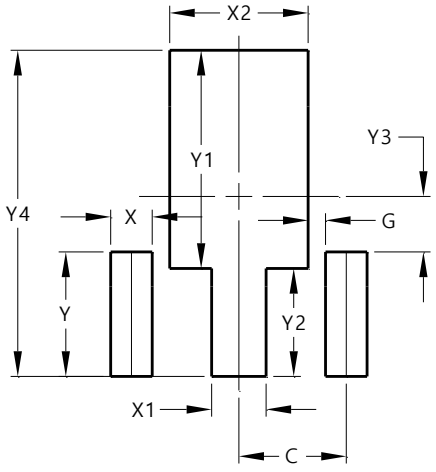
SOT89



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