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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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.

Features

- BV_{CEO} > 60V
- I_C = 5A High Continuous Current
- R_{SAT} = 30mΩ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)}$ < 65mV @ I_C = 1A
- h_{FE} Specified up to 10A for High Current Gain Hold up
- Complementary PNP Type: NK-ZXTP2012ZQ

Mechanical Data

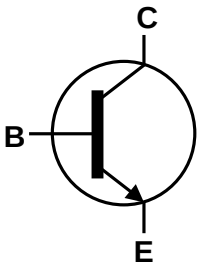
- Package: SOT89
- Package Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

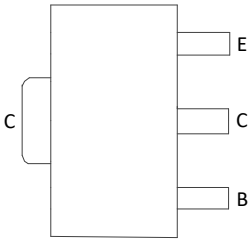
- Emergency lighting circuits
- Motor driving (including DC fans)
- Backlight inverters
- Power switches
- Gate driving MOSFETs and IGBTs

SOT89

Top View



Device Symbol



Top View
Pin Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Base Current	I_B	2	A
Continuous Collector Current	I_C	5	A
Peak Pulse Current	I_{CM}	20	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	5.3	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	3.23	°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	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady state.
6. Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
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

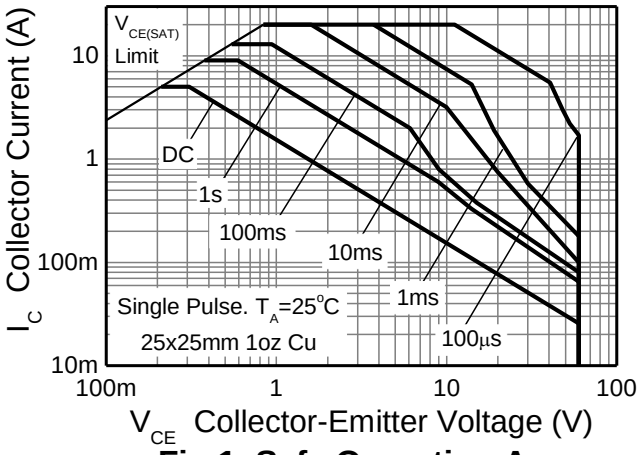


Fig 1. Safe Operating Area

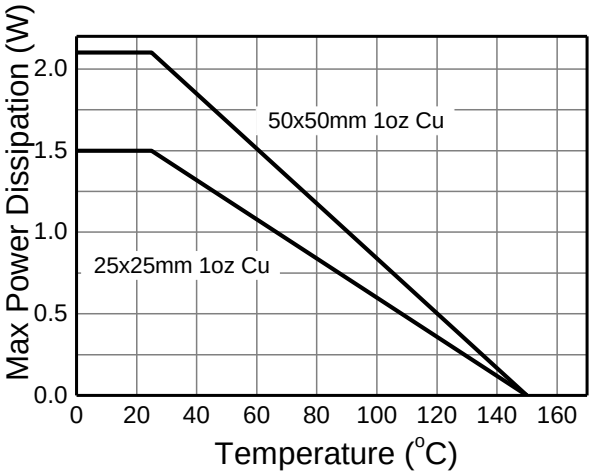


Fig 2. Derating Curve

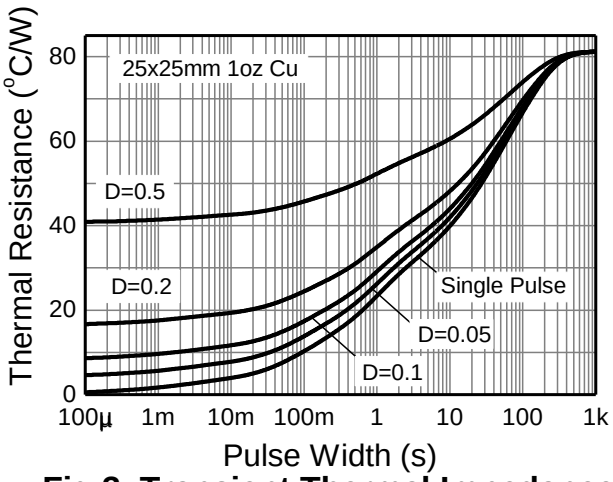


Fig 3. Transient Thermal Impedance

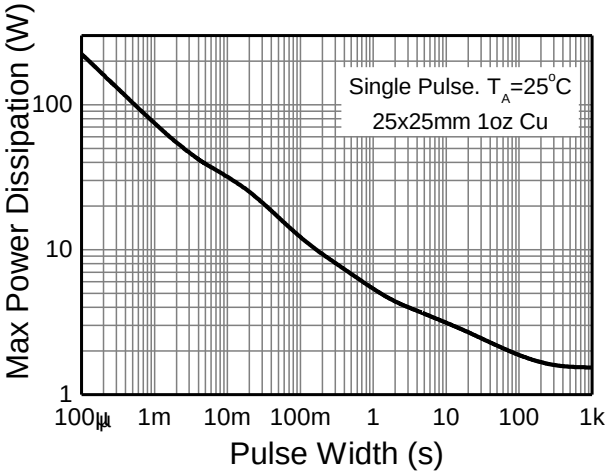


Fig 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	150	190	—	V	I_C = 1μA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	I_E = 100μA
Collector Cutoff Current	I_{CBO}	—	< 1	50 500	nA nA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Collector Cutoff Current	I_{CER} R ≤ 1kΩ	—	< 1	100 500	nA nA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	< 1	10	nA	V_{EB} = 6V
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100	200	—	—	I_C = 10mA, V_{CE} = 1V
		100	200	300		I_C = 2A, V_{CE} = 1V
		55	105	—		I_C = 5A, V_{CE} = 1V
		20	40	—		I_C = 10A, V_{CE} = 1V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	17	30	mV	I_C = 100mA, I_B = 5mA
		—	35	55		I_C = 1A, I_B = 100mA
		—	40	65		I_C = 1A, I_B = 50mA
		—	90	125		I_C = 2A, I_B = 50mA
		—	170	230		I_C = 6A, I_B = 300mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	970	1100	mV	I_C = 6A, I_B = 300mA
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	910	1050	mV	I_C = 6A, V_{CE} = 1V
Transitional Frequency	f_T	—	130	—	MHz	I_C = 100mA, V_{CE} = 10V f = 50MHz
Output Capacitance	C_{obo}	—	31	—	pF	V_{CB} = 10V, f = 1MHz
Switching Time	t_{on}	—	42	—	ns	V_{CC} = 10V, I_C = 1A I_{B1} = -I_{B2} = 100mA
	t_{off}		760			

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

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

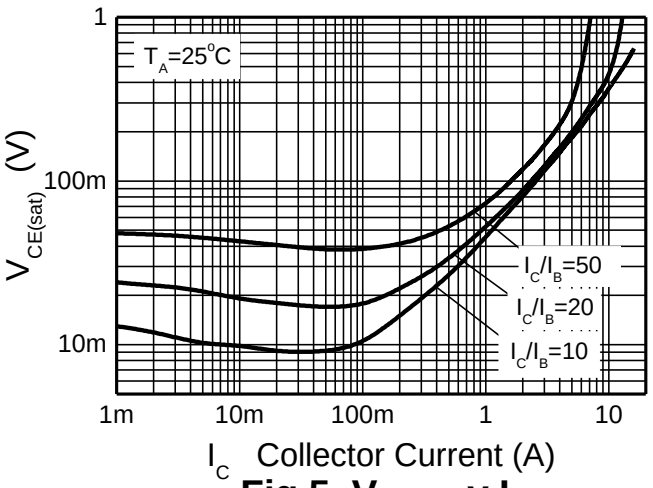


Fig 5. $V_{CE(sat)}$ v I_C

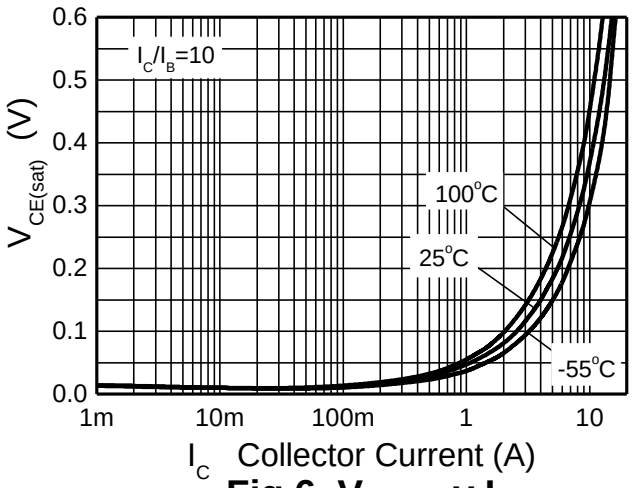


Fig 6. $V_{CE(sat)}$ v I_C

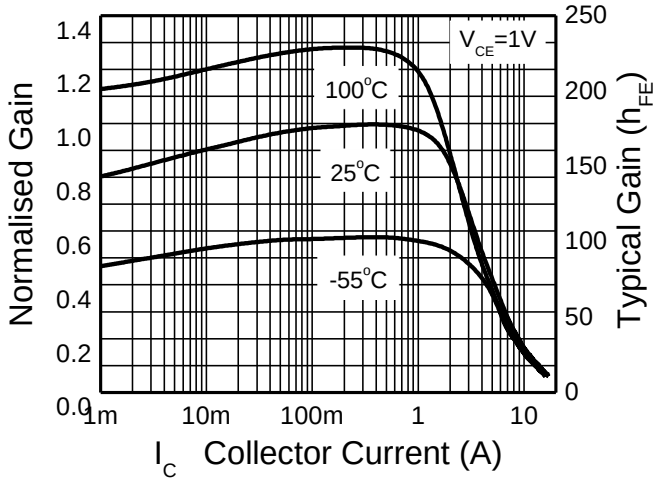


Fig 7. h_{FE} v I_C

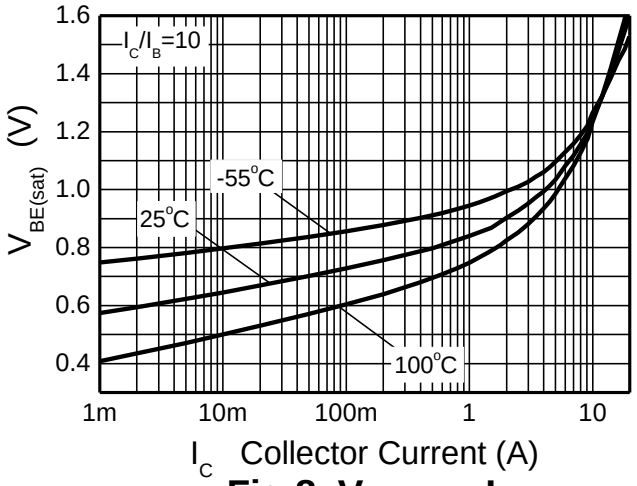


Fig 8. $V_{BE(sat)}$ v I_C

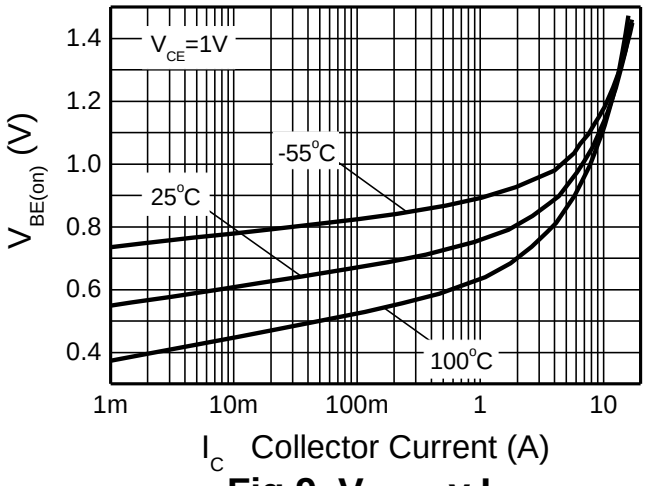
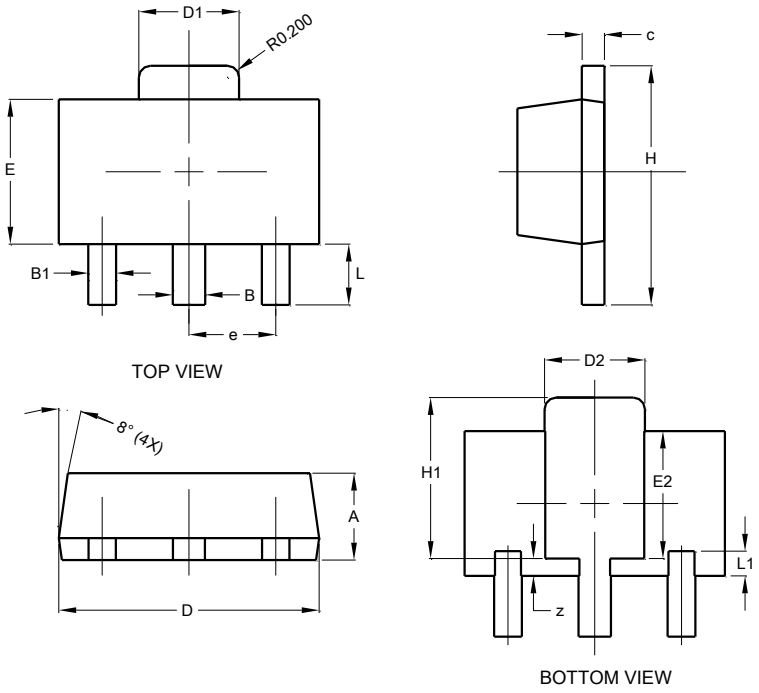


Fig 9. $V_{BE(on)}$ v I_C

Package Outline Dimensions

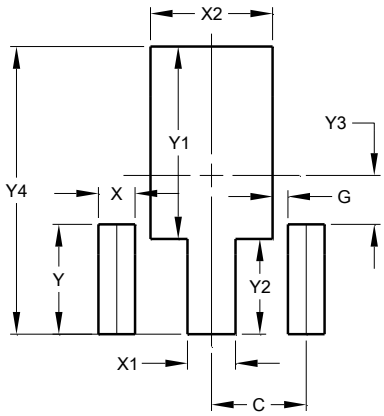
SOT89



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