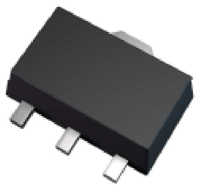
PBSS304

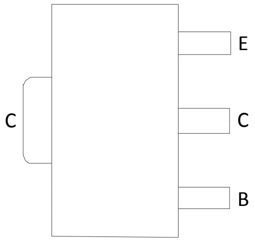
Features

- 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
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **PPAP Capable (Note 4)**

SOT89



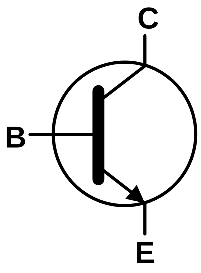
Top View



Top View
Pin Out

Application

- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs



Device Symbol

Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.05 grams (Approximate)

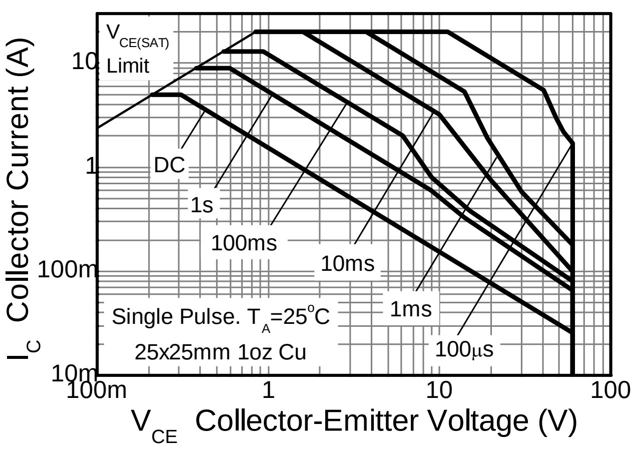
Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

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

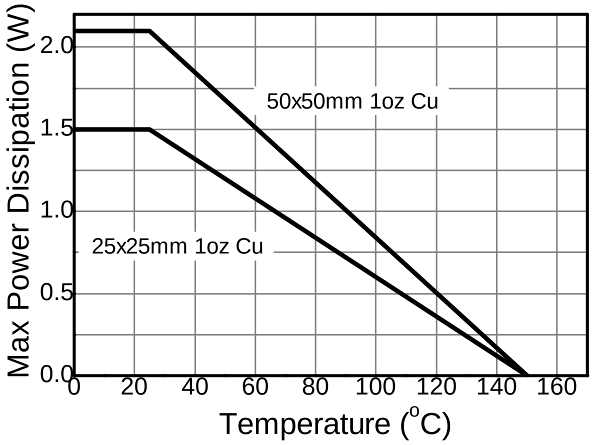
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 7) Linear Derating Factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	3.23	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

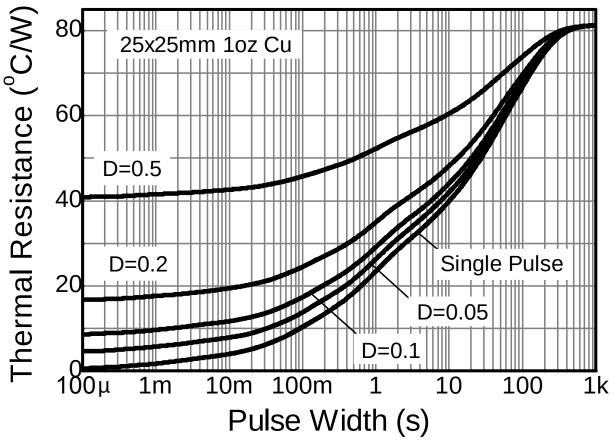
Thermal Characteristics and Derating Information



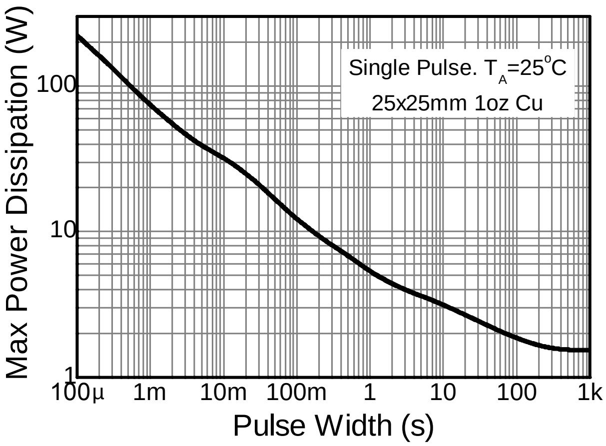
Safe Operating Area



Derating Curve



Transient Thermal Impedance



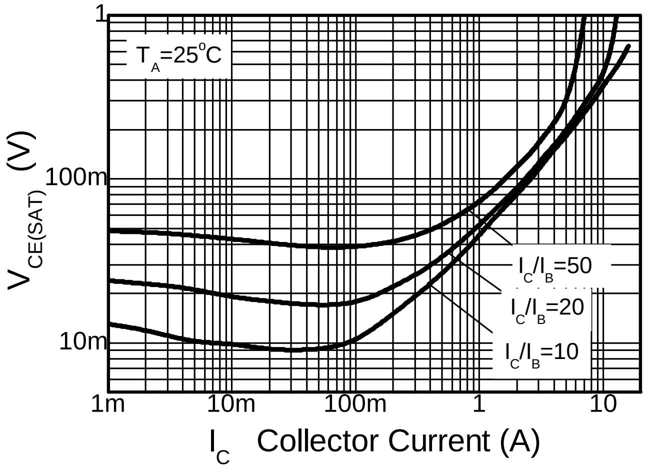
Pulse Power Dissipation

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

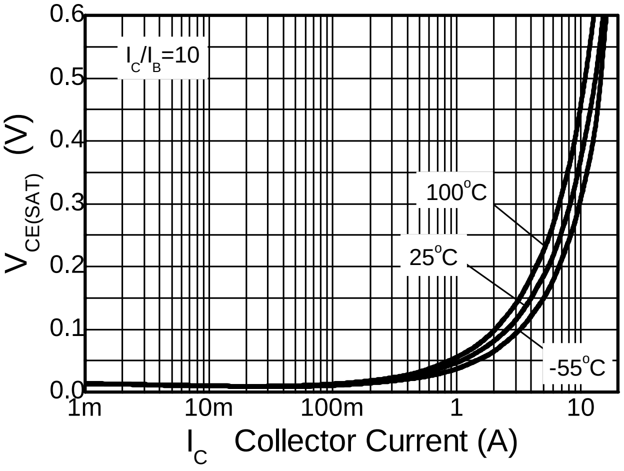
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CER}	150	190	—	V	I_C = 1µA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown 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 10)	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 10)	$V_{CE(SAT)}$	—	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 10)	$V_{BE(SAT)}$	—	970	1100	mV	I_C = 6A, I_B = 300mA
Base-Emitter Turn-on Voltage (Note 10)	$V_{BE(ON)}$	—	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: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

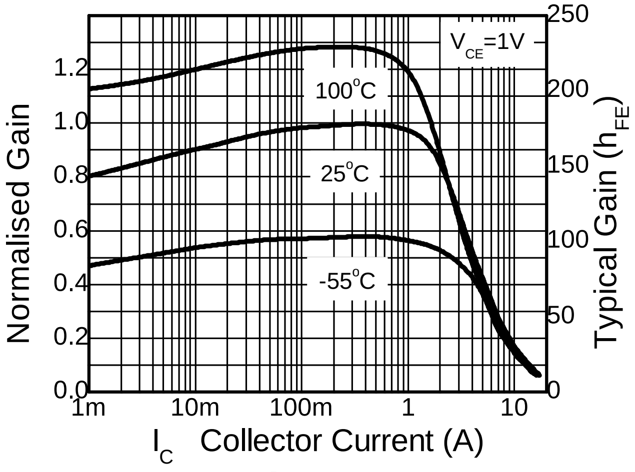
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



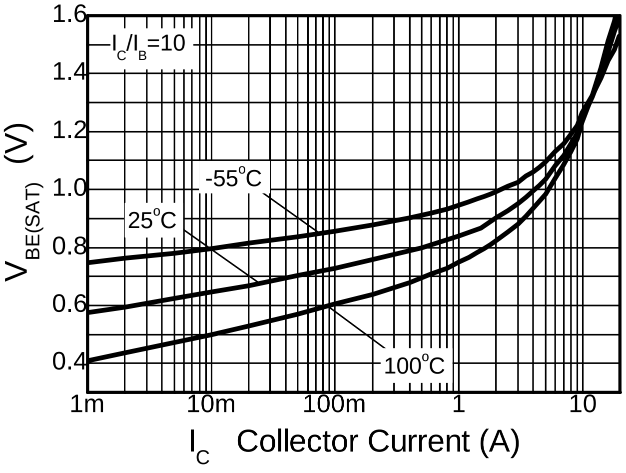
$V_{CE(SAT)}$ v I_C



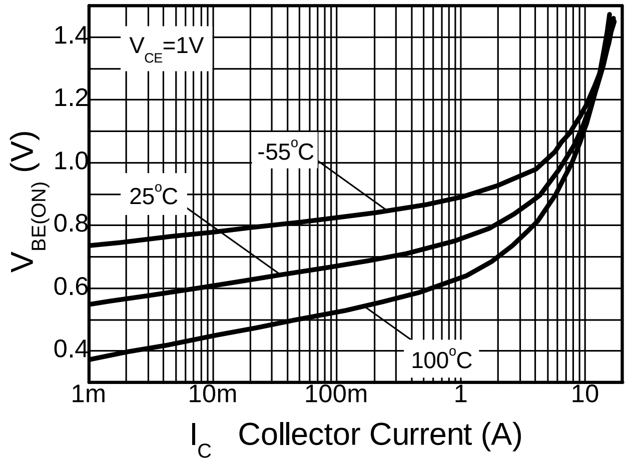
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



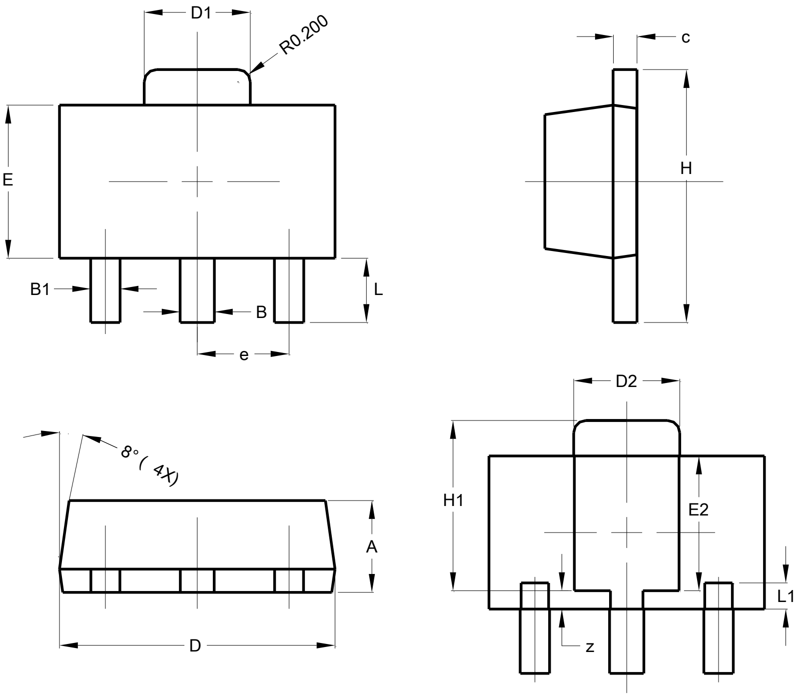
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

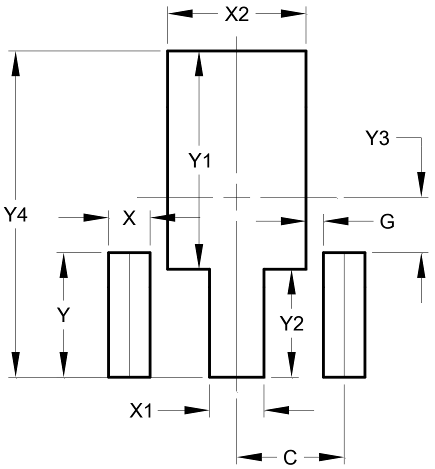
SOT89



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