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 requirements of Automotive Applications.

Features

- BV_{CEO} > -140V
- BV_{ECO} > -7V
- I_C = -1A Continuous Collector Current
- $V_{CE(sat)}$ < -260mV @ -1A
- $R_{CE(sat)}$ = 180mΩ
- High Power Dissipation SOT23
- 180V Forward Blocking Voltage
- Low Saturation Voltage

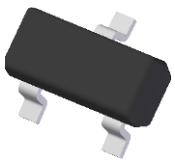
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, “Green” Molding Compound UL Flammability Classification 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: 0.008 grams (Approximate)

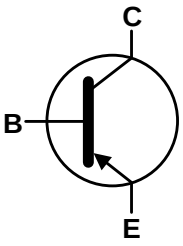
Applications

- DC-DC Converters
- High Side Switching

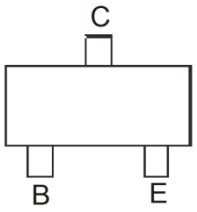
SOT23



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}	-180	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEX}	-180	V
Collector-Emitter Voltage	V_{CEO}	-140	V
Emitter-collector voltage (Reverse Blocking)	V_{ECO}	-7	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current (Note 5)	I_C	-1	A
Peak Pulse Current	I_{CM}	-3	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear derating factor	(Note 6)	P_D	0.73 5.84	W
	(Note 7)		1.05 8.4	
	(Note 8)		1.25 9.6	
	(Note 9)		1.81 14.5	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	171	°C/W
	(Note 7)		119	
	(Note 8)		100	
	(Note 9)		69	
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	74.95	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

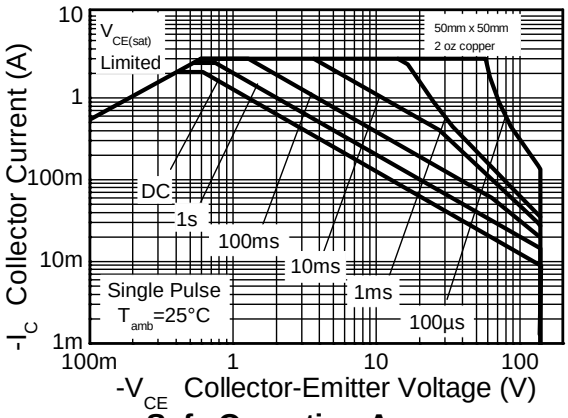
Notes: 6. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. Same as note (4), except the device is surface mounted on 25mm x 25mm with 2 oz copper.
8. Same as note (4), except the device is surface mounted on 50mm x 50mm with 2 oz copper.
9. Same as note (6), except the device is measured at t<5secs.
10. Thermal resistance from junction to solder-point (at the end of the collector lead).

ESD Ratings (Note 11)

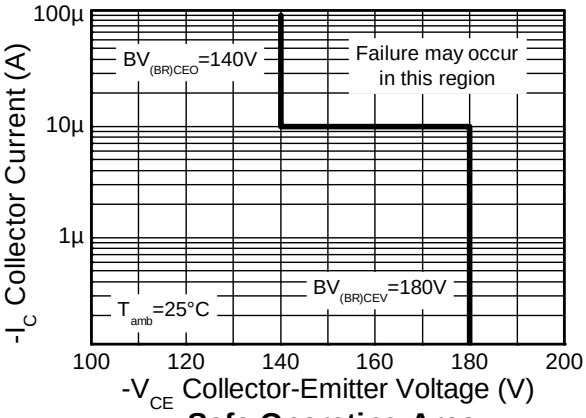
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes: 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

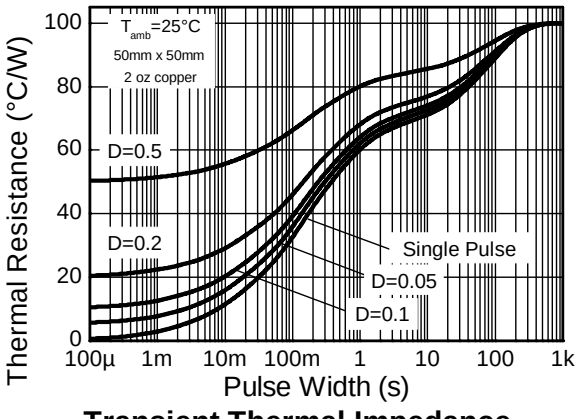
Thermal Characteristics and Derating Information



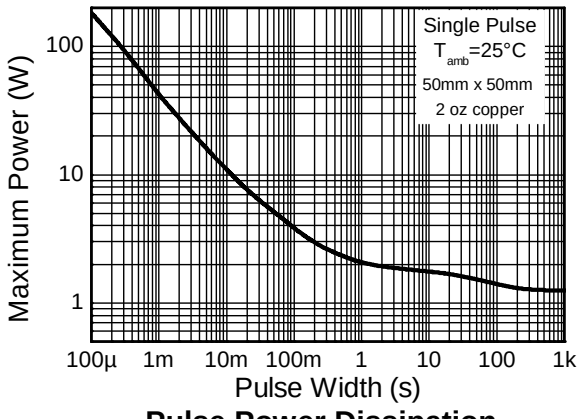
Safe Operating Area



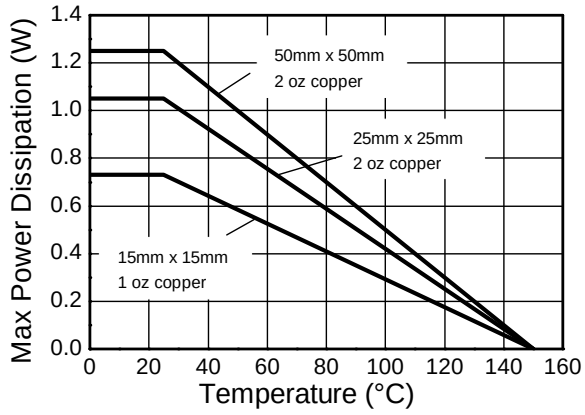
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



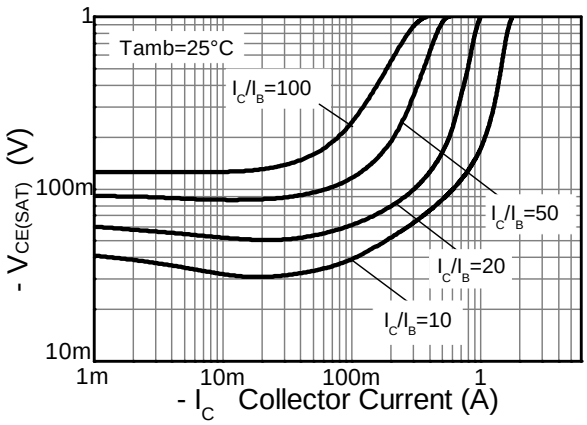
Derating Curve

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

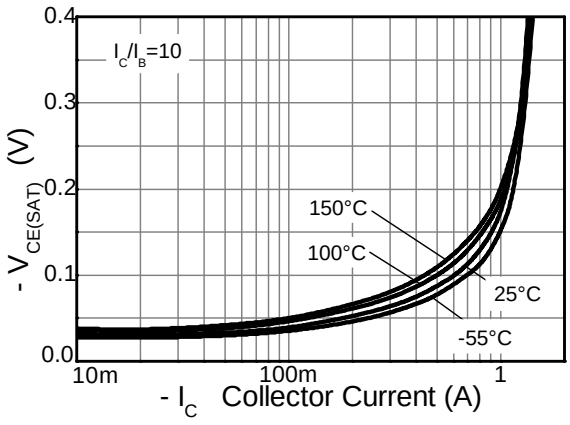
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-180	-205	-	V	I_C = -100μA
Collector-Emitter Breakdown Voltage (Forward Blocking)	BV_{CEX}	-180	-205	-	V	I_C = -100μA R_{BE} ≤1kΩ or -0.25V < V_{BE} < 1V
Collector-Emitter Breakdown Voltage (Base Open) (Note 12)	BV_{CEO}	-140	-160	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.2	-	V	I_E = -100μA
Emitter-Base Breakdown Voltage (Reverse Blocking) (Note 12)	BV_{ECO}	-7	-8.5	-	V	I_E = -100μA
Collector-Base Cutoff Current	I_{CBO}	-	< -1	-50	nA	V_{CB} = -144V
		-	-	-20	μA	V_{CB} = -144V, T_{amb} = +100°C
Collector-Emitter Cutoff Current	I_{CEX}		-	-100	nA	V_{CE} = -144V; R_{BE} ≤1kΩ or -0.25V < V_{BE} < 1V
Emitter-Base Cutoff Current	I_{EBO}	-	< -1	-50	nA	V_{EB} = -5.6V
Static Forward Current Transfer Ratio (Note 12)	h_{FE}	100	200	300	-	I_C = -10mA, V_{CE} = -2V
		100	190	-		I_C = -0.1A, V_{CE} = -2V
		20	30	-		I_C = -1A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	-	-40	-50	mV	I_C = -0.1A, I_B = -10mA
		-	-110	-135		I_C = -0.1A, I_B = -2mA
		-	-90	-110		I_C = -0.5A, I_B = -50mA
			-170	-230		I_C = -0.5A, I_B = -25mA
		-	-180	-260		I_C = -1A, I_B = -100mA
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	-	-850	-950	mV	I_C = -1A, I_B = -100mA
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(on)}$	-	-800	-900	mV	I_C = -1A, V_{CE} = -2V
Output Capacitance	C_{obo}	-	10	-	pF	V_{CB} = -20V, f = 1MHz
Transition Frequency	f_T	-	75	-	MHz	V_{CE} = -20V, I_C = -10mA, f = 20MHz
Turn-on time	t_{on}	-	102	-	ns	V_{CC} = -20V, I_C = -100mA, I_{B1} = I_{B2}= -10mA
Turn-off time	t_{off}	-	854	-	ns	

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

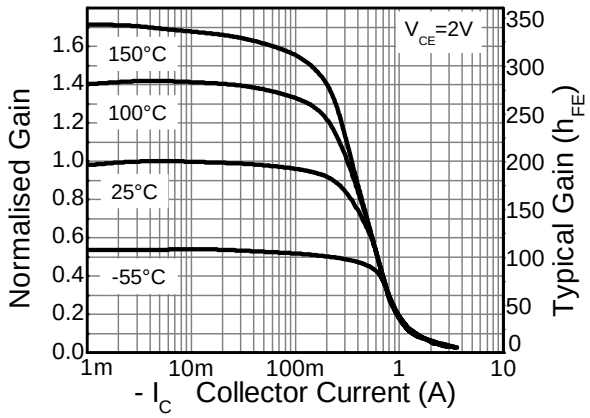
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



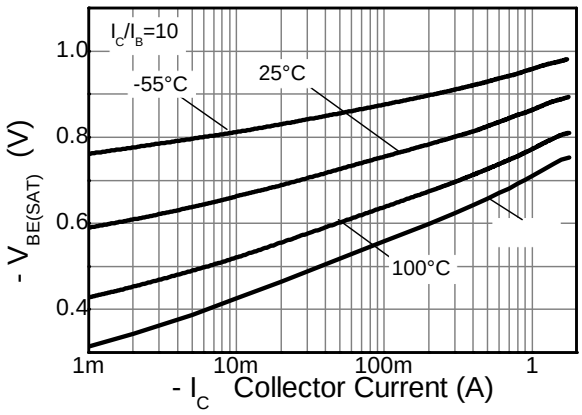
$V_{CE(SAT)}$ v I_C



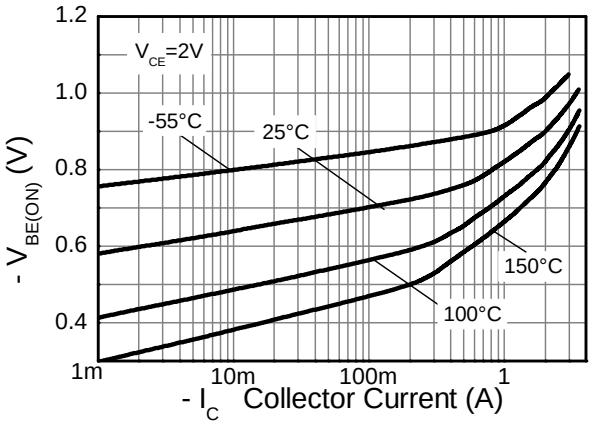
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

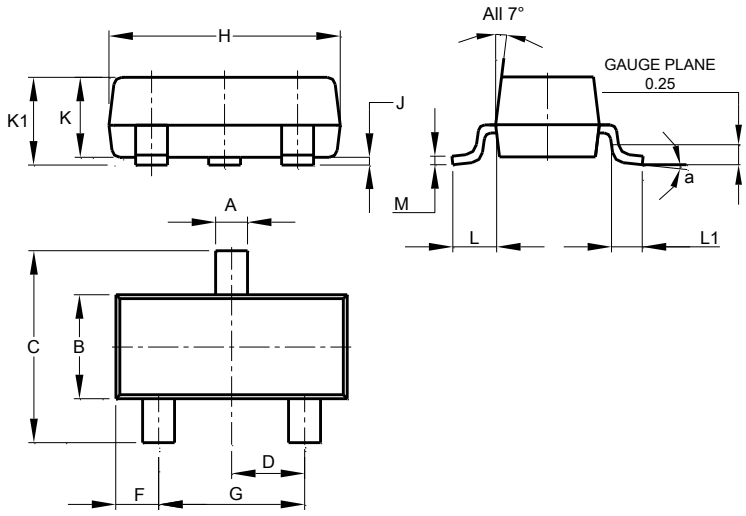


$V_{BE(SAT)}$ v I_C



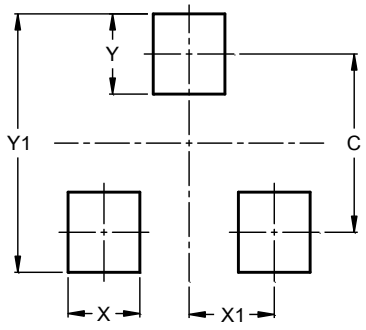
$V_{BE(ON)}$ v I_C

Package Outline Dimensions



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9