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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Features

- BV_{CEO} > -60V
- I_C = -5.5A Continuous Collector Current
- I_{CM} = -15A Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)}$ < -70mV Max @ -1A
- R_{SAT} = 39mΩ @ -5A for Low Equivalent On-Resistance
- h_{FE} Specified up to -10A for High Gain Hold Up

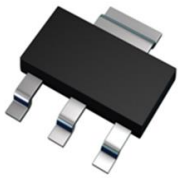
Mechanical Data

- Case: SOT223
- 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 ⓔ3
- Weight: 0.112 grams (Approximate)

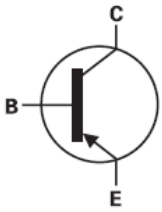
Applications

- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control

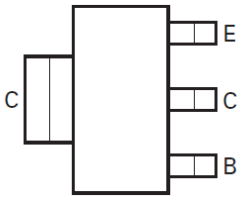
SOT223



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}	-100	V
Collector-Emitter Voltage	V_{CEO}	-60	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.)

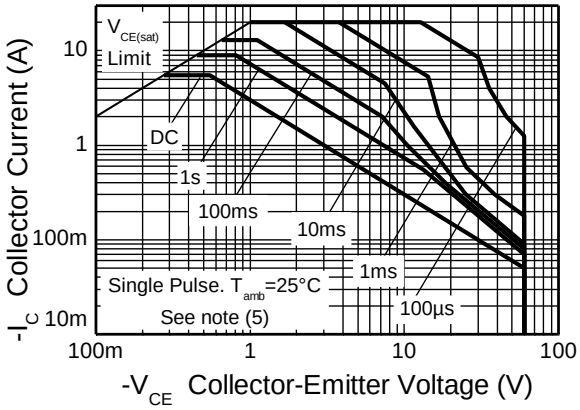
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	3.0 24	W mW/°C
	(Note 6)		1.6 12.8	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	42	°C/W
	(Note 6)	$R_{\theta JA}$	78	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	8.8	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

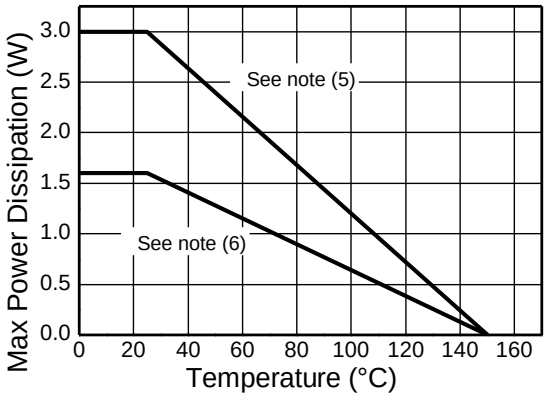
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

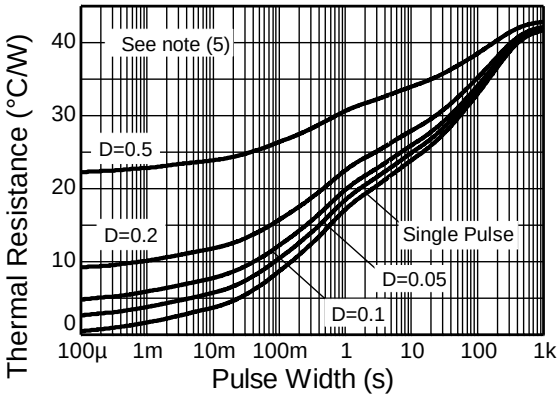
Thermal Characteristics and Derating Information



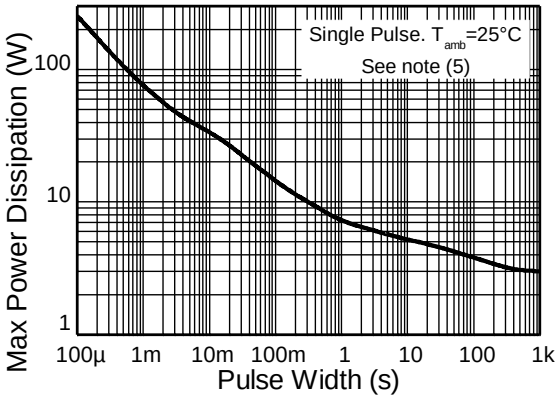
Safe Operating Area



Derating Curve



Transient Thermal Impedance



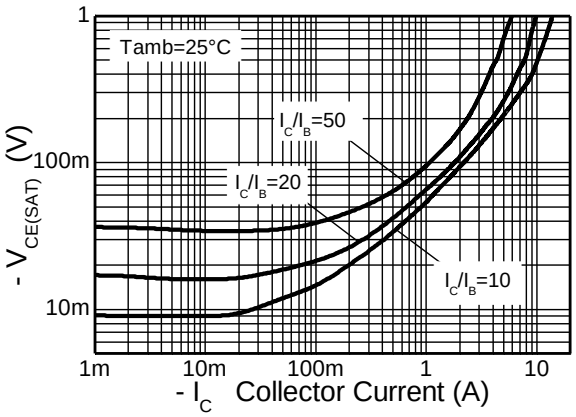
Pulse Power Dissipation

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

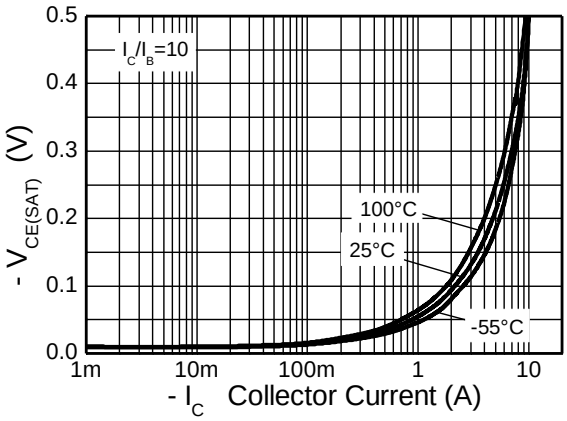
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage	BV_{CER}	-100	-120	—	V	I_C = -1μA, RB ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-80	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	—	V	I_E = -100μA
Collector Cutoff Current	I_{CBO}	— —	< -1 —	-20 -0.5	nA μA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Collector Cutoff Current	I_{CER} R≤1kΩ	— —	< -1 —	-20 -0.5	nA μA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	< -1	-10	nA	V_{EB} = -6V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	-15 -55 -90 -195	-25 -70 -120 -250	mV	I_C = -0.1A, I_B = -10mA I_C = -1A, I_B = -100mA I_C = -2A, I_B = -200mA I_C = -5A, I_B = -500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	-1.03	-1.15	V	I_C = -5A, I_B = -500mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	-0.92	-1.02	V	I_C = -5A, V_{CE} = -1V
DC Current Gain (Note 9)	h_{FE}	100 100 45 10	250 200 90 25	300	—	I_C = -10mA, V_{CE} = -1V I_C = -2A, V_{CE} = -1V I_C = -5A, V_{CE} = -1V I_C = -10A, V_{CE} = -1V
Transition Frequency	f_T	—	120	—	MHz	V_{CE} = -10V, I_C = -100mA, f = 50MHz
Output Capacitance (Note 9)	C_{OBO}	—	48	—	pF	V_{CB} = -10V, f = 1MHz
Switching Times	t_{ON}	—	39	—	ns	V_{CC} = -10V, I_C = -1A, I_{B1} = -I_{B2} = 100mA
	t_{OFF}	—	370	—		

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

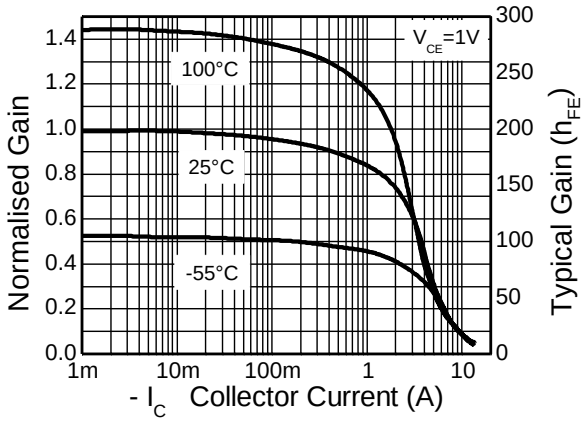
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



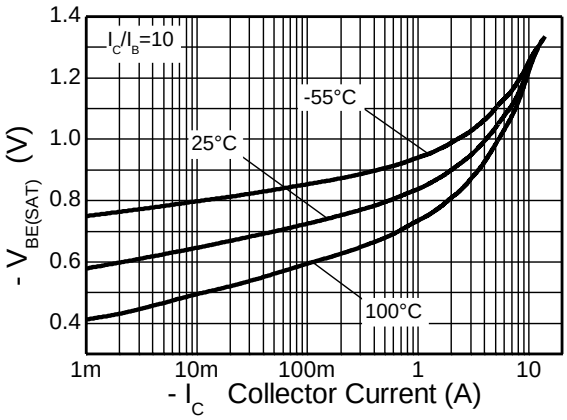
$V_{CE(SAT)}$ v I_C



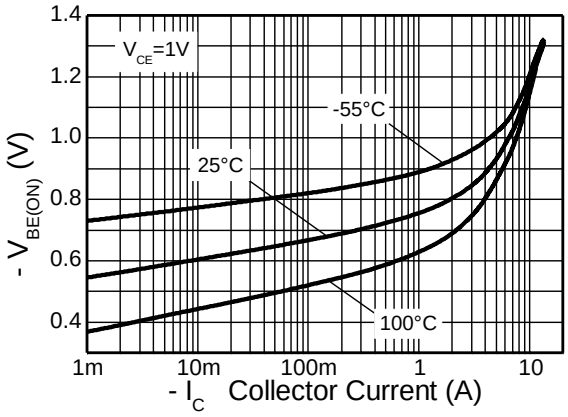
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



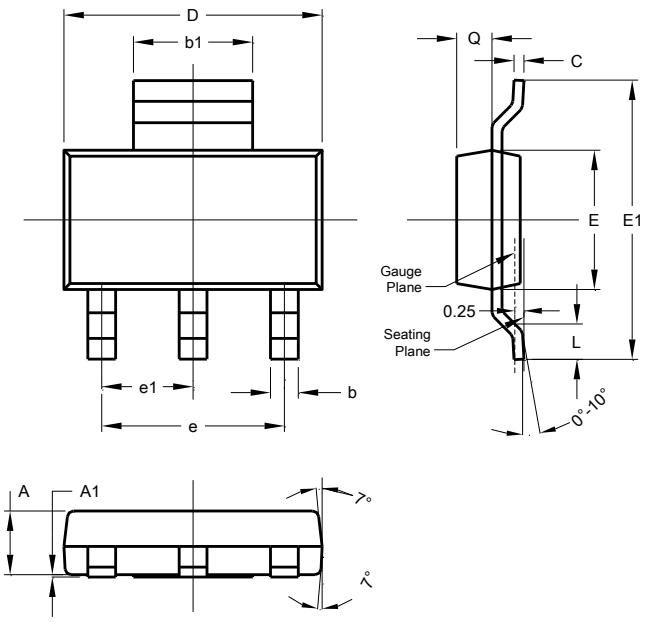
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

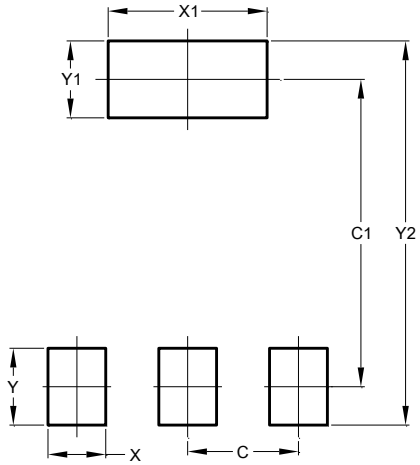
SOT223



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
C2	8.00