



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

- $BV_{CEO} > -30V$
- $I_C = -5.5A$ Continuous Collector Current
- $I_{CM} = -20A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(SAT)} < -60mV$ max @ $-1A$
- $R_{SAT} = 31m\Omega$ @ $-5.5A$ for Low Equivalent On-Resistance
- Exceptional Gain Linearity Down to $-10mA$
- h_{FE} Specified up to $-20A$ for High Gain Hold Up

Mechanical Data

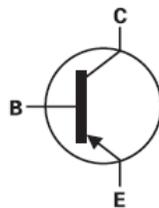
- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 
- Weight: 0.112 grams (Approximate)

Applications

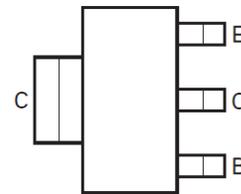
- DC-DC Converters
- MOSFET Gate Drivers
- Charging Circuits
- Power Switches
- Motor Control



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-Emitter Voltage	V _{CEO}	-30	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-5.5	A
Peak Pulse Current	I _{CM}	-20	A

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

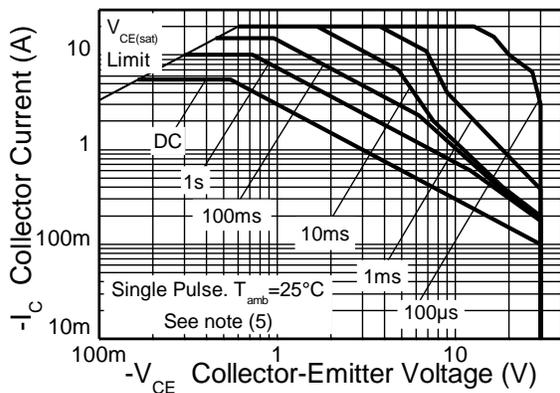
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	3.0	W
			24	
Linear Derating Factor	(Note 6)		1.6	mW/°C
			12.8	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	42	°C/W
	(Note 6)	R _{θJA}	78	
Thermal Resistance, Junction to Lead	(Note 7)	R _{θJL}	8.8	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

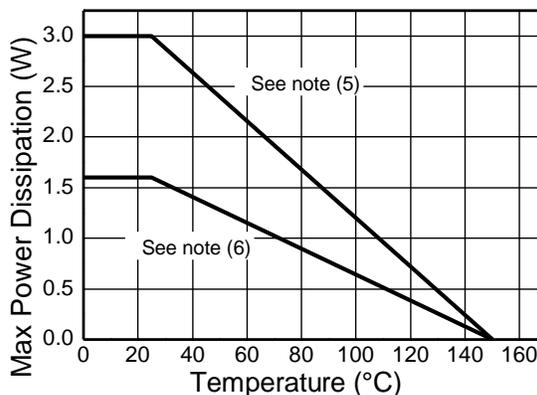
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- 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.

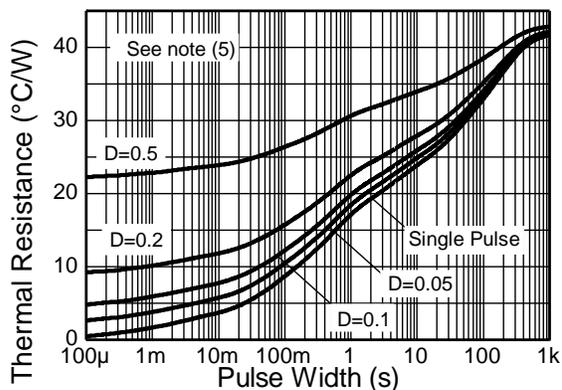
Thermal Characteristics and Derating Information



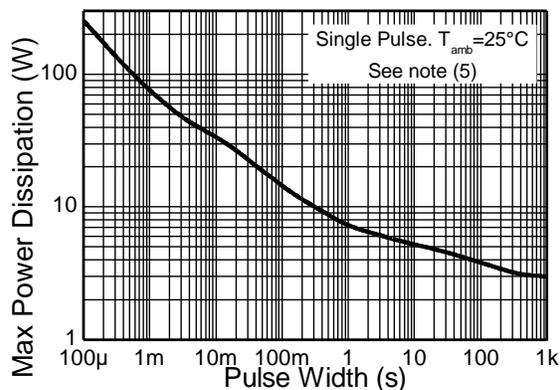
Safe Operating Area



Derating Curve



Transient Thermal Impedance



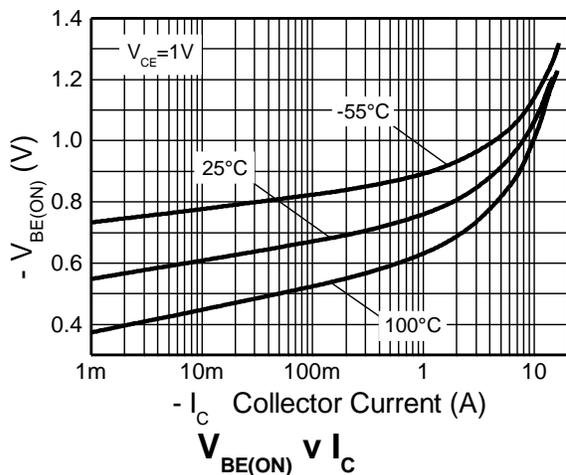
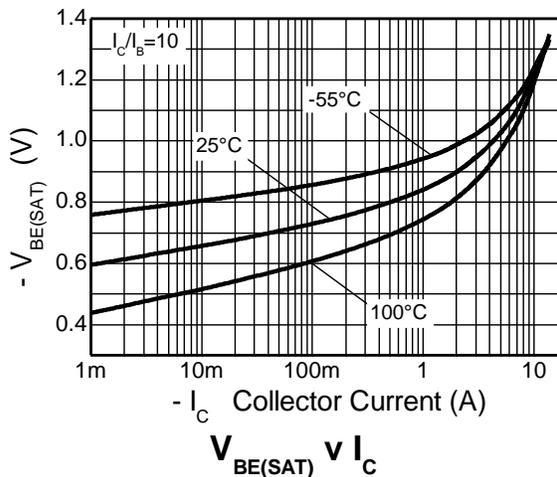
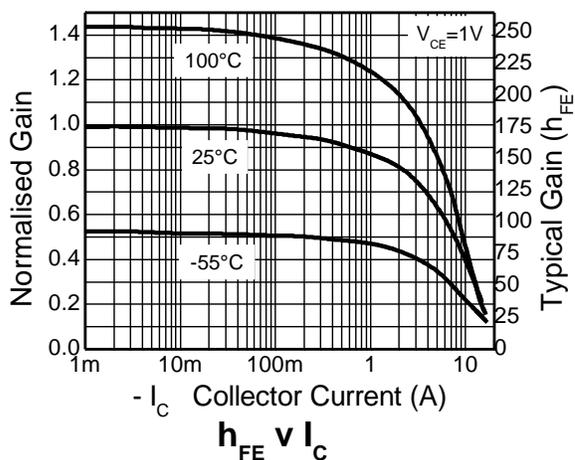
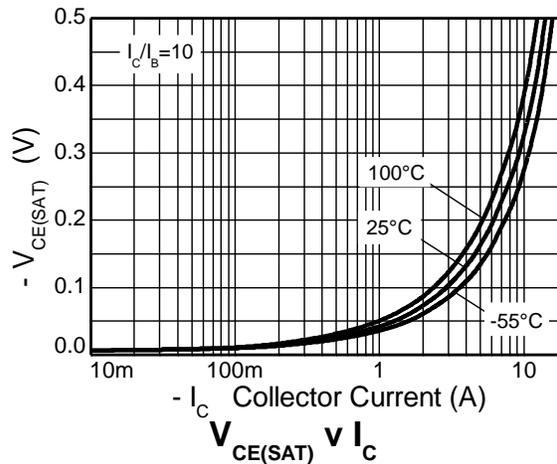
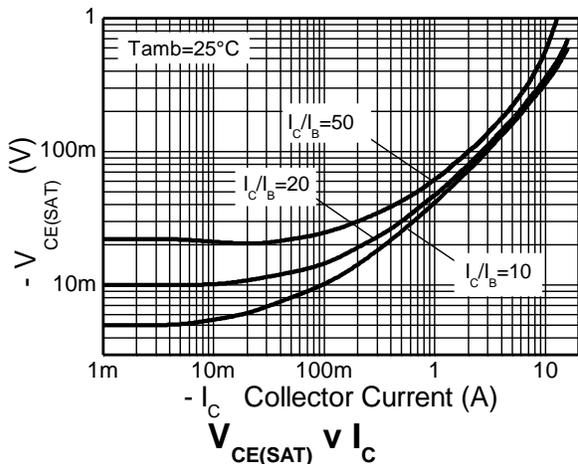
Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

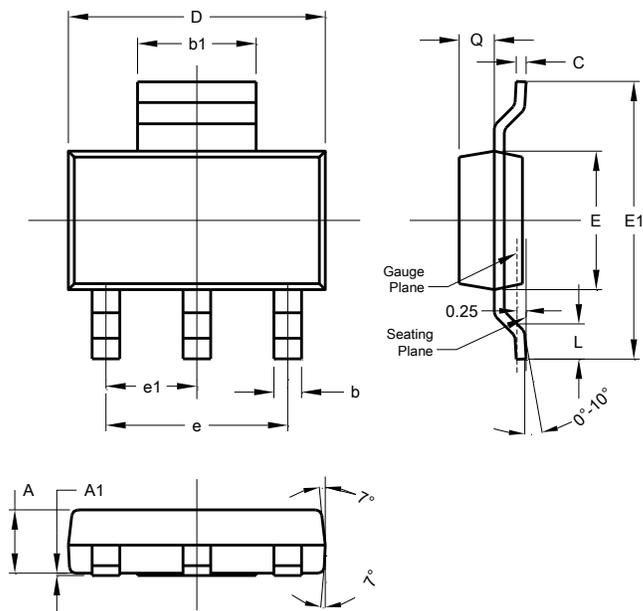
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	-70	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	-50	-70	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-30	-40	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8	—	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	< -1	-20 -0.5	nA μA	$V_{CB} = -40\text{V}$ $V_{CB} = -40\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	—	< -1	-20 -0.5	nA μA	$V_{CB} = -40\text{V}$ $V_{CB} = -40\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	< -1	-10	nA	$V_{EB} = -6\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	-30 -40 -60 -70 -170	-45 -60 -85 -90 -210	mV	$I_C = -0.5\text{A}$, $I_B = -20\text{mA}$ $I_C = -1\text{A}$, $I_B = -100\text{mA}$ $I_C = -1\text{A}$, $I_B = -20\text{mA}$ $I_C = -2\text{A}$, $I_B = -200\text{mA}$ $I_C = -5.5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	-1.03	-1.13	V	$I_C = -5.5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	-0.9	-1	V	$I_C = -5.5\text{A}$, $V_{CE} = -1\text{V}$
DC Current Gain (Note 9)	h_{FE}	100 100 70 10	225 200 145 20	300	—	$I_C = -10\text{mA}$, $V_{CE} = -1\text{V}$ $I_C = -1\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -5\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -20\text{A}$, $V_{CE} = -1\text{V}$
Transition Frequency	f_T	—	110	—	MHz	$V_{CE} = -10\text{V}$, $I_C = -100\text{mA}$, $f = 50\text{MHz}$
Output Capacitance (Note 9)	C_{OBO}	—	83	—	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Switching Times	t_{ON}	—	43	—	ns	$V_{CC} = -10\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = 100\text{mA}$
	t_{OFF}	—	230	—		

 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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

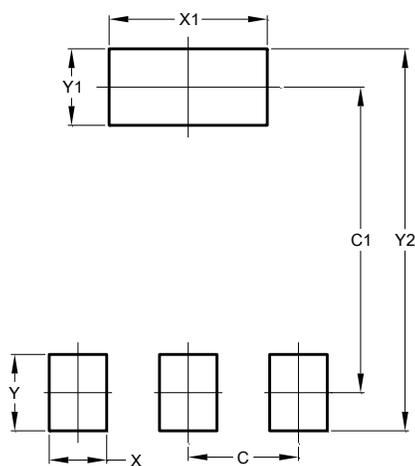


Package Outline Dimensions

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