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

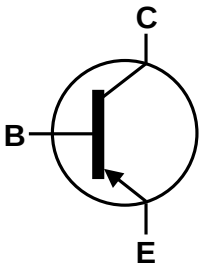
- BV_{CEO} > -30V
- I_C = -5.5A High Continuous Collector Current
- I_C = -20A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < -140mV @ -1A
- h_{FE} Specified up to -20A for a High Gain Hold-up

Mechanical Data

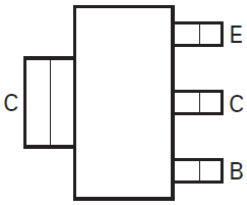
- Package: SOT223
- Package Material: Molded Plastic. “Green” Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223 (Type ZN)

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}	-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 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 a steady state.
6. Same as Note 5, except 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

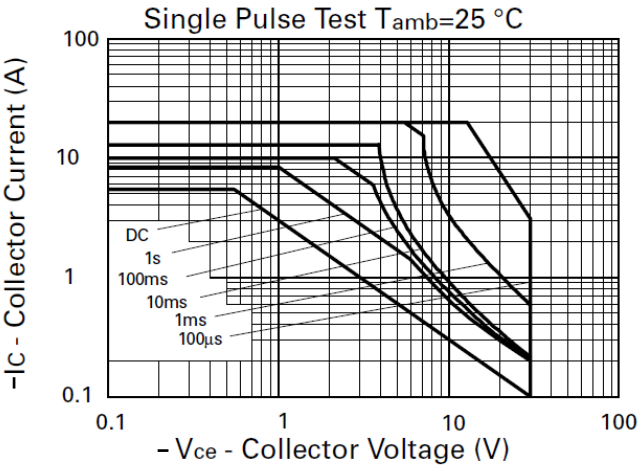


Figure 1. Safe Operating Area

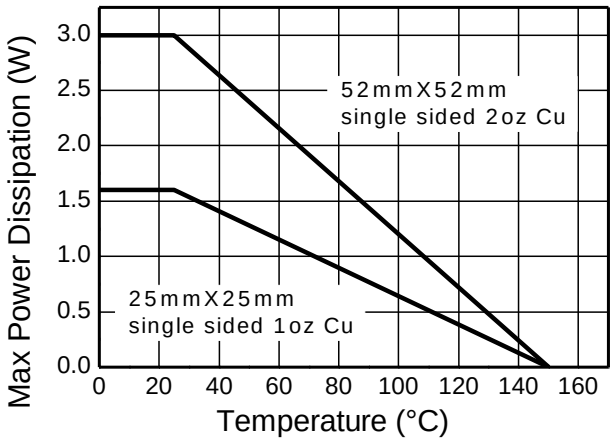


Figure 2. Derating Curve

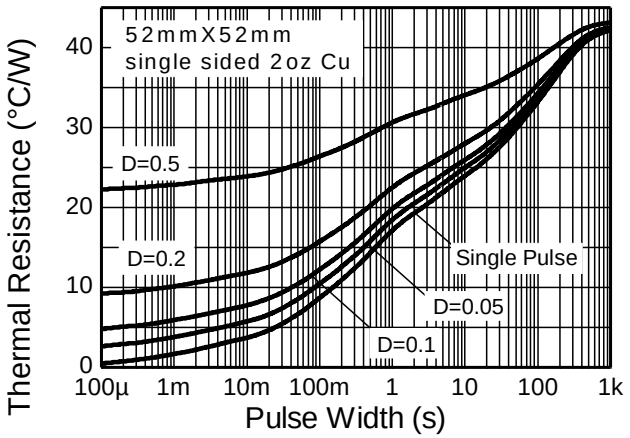


Figure 3. Transient Thermal Impedance

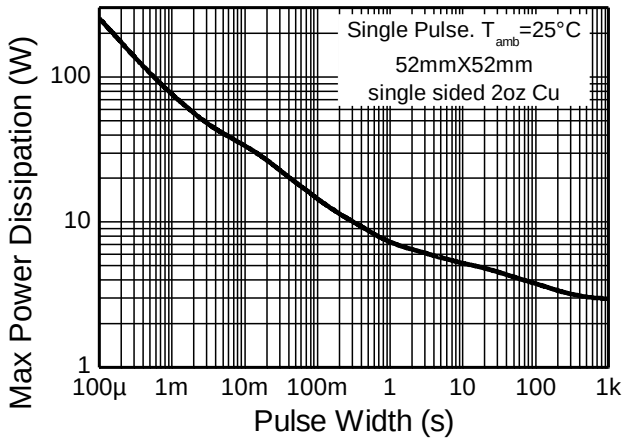


Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	-80	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	-50	-80	—	V	I_C = -1μA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-30	-45	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8	—	V	I_E = -100μA
Collector Cut-Off Current	I_{CBO}	— —	— —	-50 -1	nA μA	V_{CB} = -40V V_{CB} = -40V, T_A = +100°C
Collector Cut-Off Current	I_{CER}	— —	— —	-50 -1	nA μA	V_{CE} = -40V, R ≤ 1kΩ V_{CE} = -40V, T_A = +100°C
Emitter Cut-Off Current	I_{EBO}	—	—	-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 = -1A, V_{CE} = -1V
		75	140	—		I_C = -5A, V_{CE} = -1V
		—	35	—		I_C = -20A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-50	-75	mV	I_C = -500mA, I_B = -20mA
		—	-85	-140		I_C = -1A, I_B = -20mA
		—	-190	-270		I_C = -2A, I_B = -200mA
		—	-350	-440		I_C = -5.5A, I_B = -500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-1,100	-1,250	mV	I_C = -5.5A, I_B = -500mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	-900	-1,060	mV	I_C = -5.5A, V_{CE} = -1V
Transitional Frequency (Note 9)	f_T	—	100	—	MHz	I_C = -100mA, V_{CE} = -10V f = 50MHz
Output Capacitance	C_{obo}	—	122	—	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{on}	—	120	—	ns	V_{CC} = -10V, I_C = -4A I_{B1} = -I_{B2} = -400mA
	t_{off}	—	130	—		

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

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

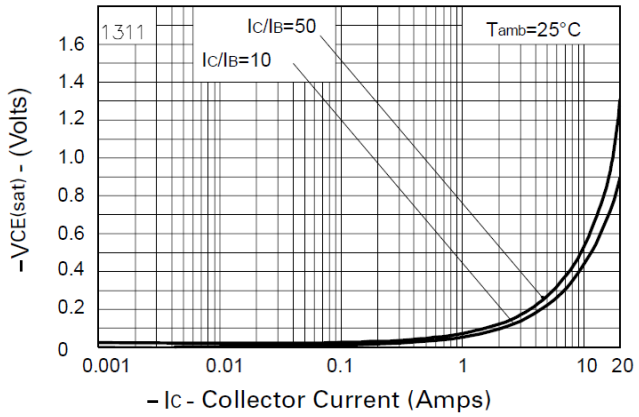


Figure 5. $V_{CE(sat)}$ v I_C

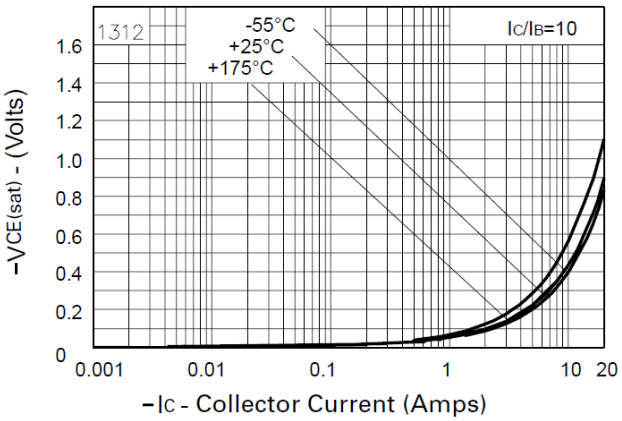


Figure 6. $V_{CE(sat)}$ v I_C

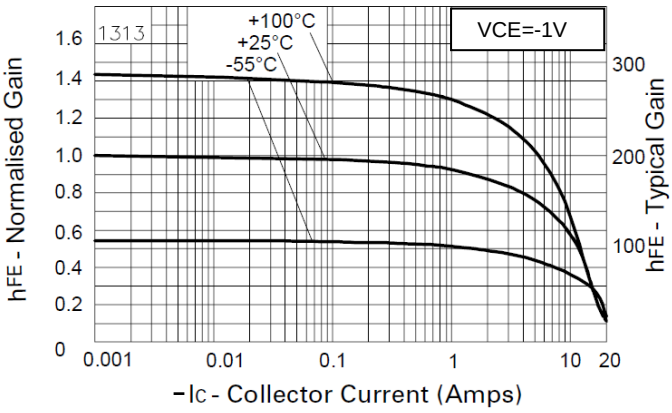


Figure 7. h_{FE} v I_C

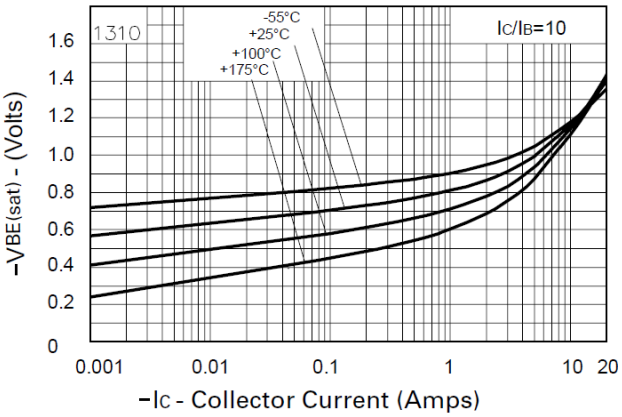


Figure 8. $V_{BE(sat)}$ v I_C

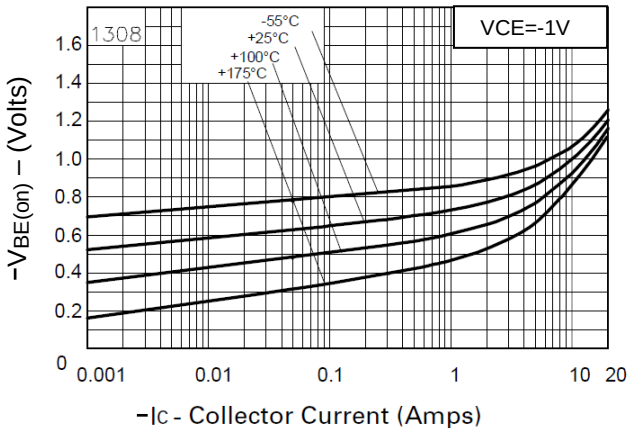
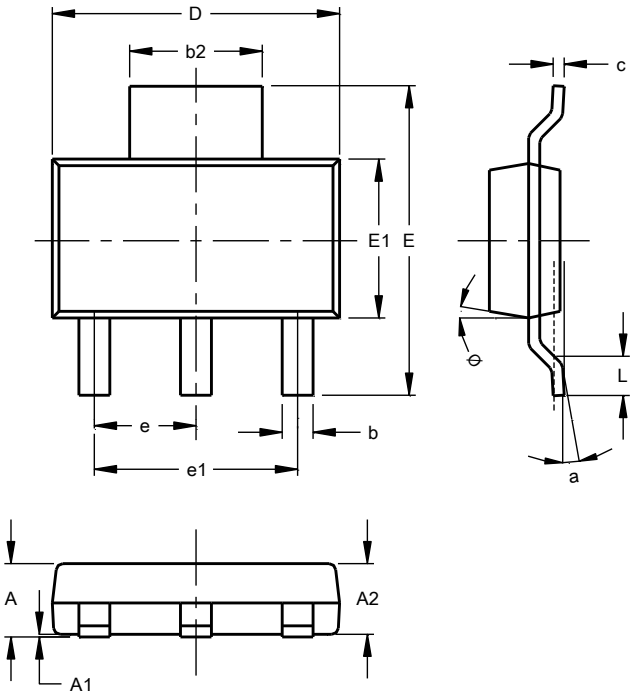


Figure 9. $V_{BE(on)}$ v I_C

Package Outline Dimensions

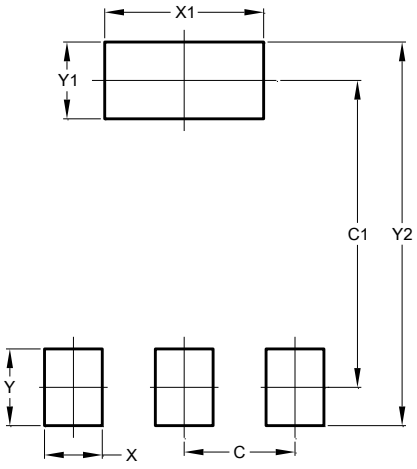
SOT223 (Type ZN)



SOT223 (Type ZN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.02	0.10	--
A2	1.50	1.68	1.60
b	0.60	0.80	--
b2	2.90	3.10	--
c	0.24	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	2.30 NOM		
e1	4.60 NOM		
L	0.90	--	--
a	--	--	10°
θ	--	15°	--
All Dimensions in mm			

Suggested Pad Layout

SOT223 (Type ZN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00