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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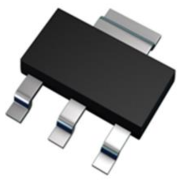
Features

- BV_{CEO} > -140V
- I_C = -4A High Continuous Collector Current
- I_{CM} = -10A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < -120mV @ I_C = -1A
- R_{SAT} = 92mΩ for a Low Equivalent On-Resistance
- h_{FE} Specified up to -10A for a High Gain Hold-Up

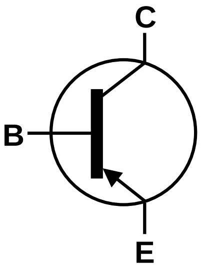
Mechanical Data

- 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 e3
- Weight: 0.112 grams (Approximate)

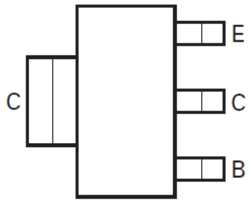
SOT223



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	V_{CEO}	-140	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-4	A
Peak Pulse Current	I_{CM}	-10	A

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

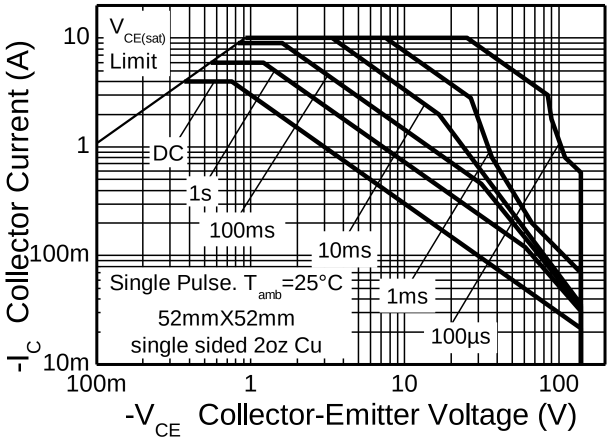
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	3.0	W
	(Note 6)		2.0	
	(Note 7)		1.6	
	(Note 8)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	41.7	°C/W
	(Note 6)		62.5	
	(Note 7)		78.1	
	(Note 8)		104	
Thermal Resistance Junction to Lead	(Note 9)	$R_{\theta JL}$	10.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 9)

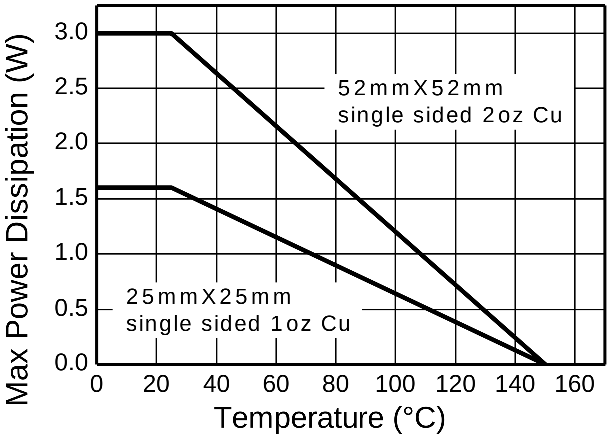
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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 the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
8. Same as Note 5, except the device is mounted on minimum recommended pad layout.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

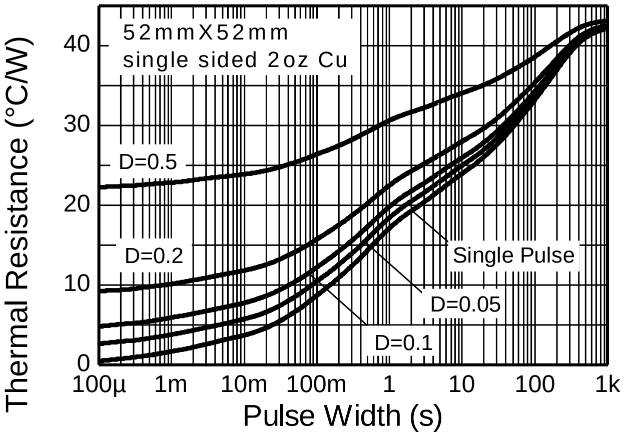
Thermal Characteristics and Derating Information



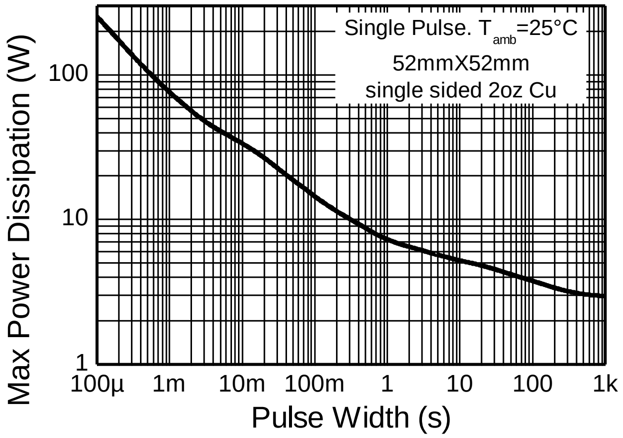
Safe Operating Area



Derating Curve



Transient Thermal Impedance



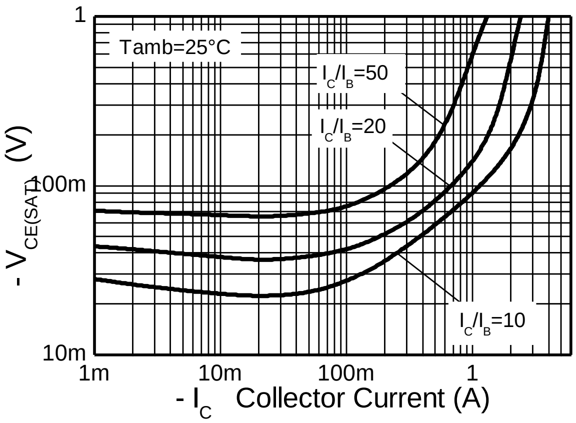
Pulse Power Dissipation

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

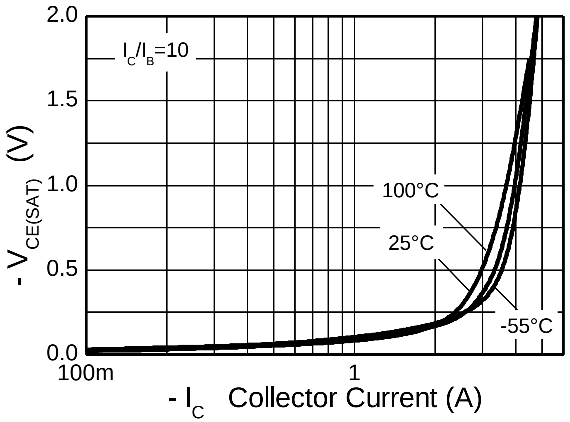
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-180	-200	-	V	$I_C = -100\mu A$
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CER}	-180	-200	-	V	$I_C = -1\mu A$, $R_B \leq 1k\Omega$
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	-140	-160	-	V	$I_C = -1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.3	-	V	$I_E = -100\mu A$
Collector Cut-Off Current	I_{CBO}	- -	< -1 -	-20 -500	nA nA	$V_{CB} = -150V$ $V_{CB} = -150V$, $T_A = +100°C$
Collector Cut-Off Current	I_{CER} R ≤1kΩ	- -	< -1 -	-20 -500	nA nA	$V_{CB} = -150V$ $V_{CB} = -150V$, $T_A = +100°C$
Emitter Cut-Off Current	I_{EBO}	-	< -1	-10	nA	$V_{EB} = -6V$
DC Current Transfer Static Ratio (Note 11)	h_{FE}	100	225	-	-	$I_C = -10mA$, $V_{CE} = -5V$
		100	200	300		$I_C = -1A$, $V_{CE} = -5V$
		45	100	-		$I_C = -3A$, $V_{CE} = -5V$
		-	5	-		$I_C = -10A$, $V_{CE} = -5V$
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	-	-40	-60	mV	$I_C = -100mA$, $I_B = -5mA$
		-	-55	-80		$I_C = -0.5A$, $I_B = -50mA$
		-	-85	-120		$I_C = -1A$, $I_B = -100mA$
		-	-275	-360		$I_C = -3A$, $I_B = -300mA$
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	-	-940	-1,040	mV	$I_C = -3A$, $I_B = -300mA$
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	-	-830	-930	mV	$I_C = -3A$, $V_{CE} = -5V$
Transitional Frequency	f_T	-	120	-	MHz	$I_C = -100mA$, $V_{CE} = -10V$, f = 50MHz
Output Capacitance	C_{obo}	-	33	-	pF	$V_{CB} = -10V$, f = 1MHz
Switching Time	t_{ON}	-	42	-	ns	$V_{CC} = -50V$, $I_C = -1A$, $I_{B1} = -I_{B2} = -100mA$
	t_{OFF}	-	636	-		

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

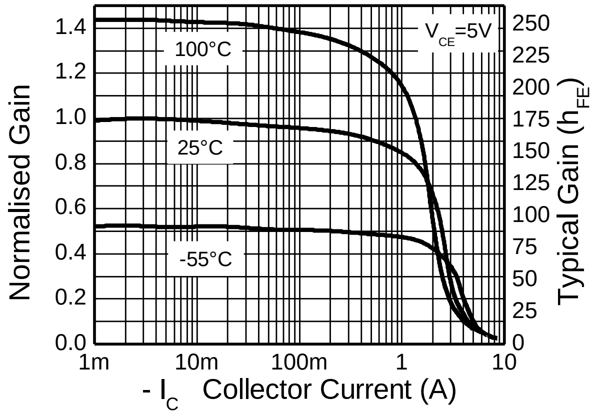
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



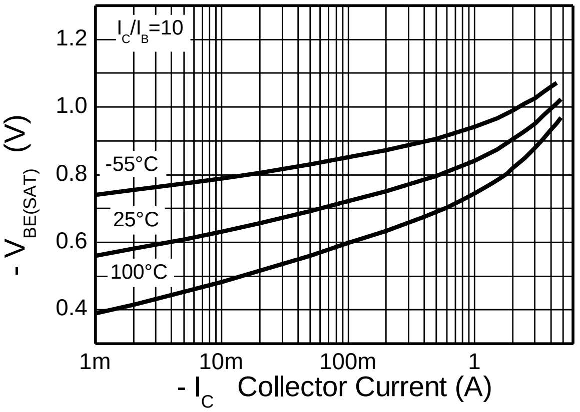
$V_{CE(SAT)}$ v I_C



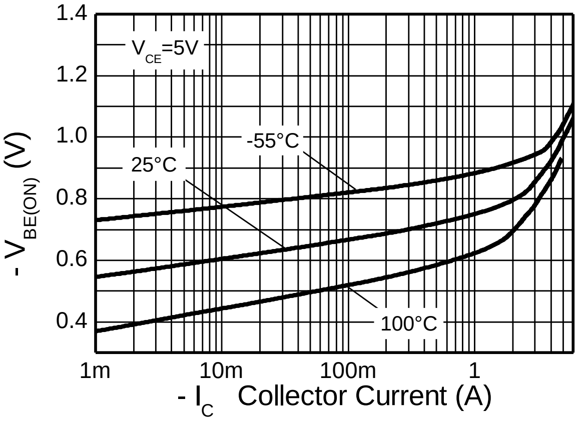
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

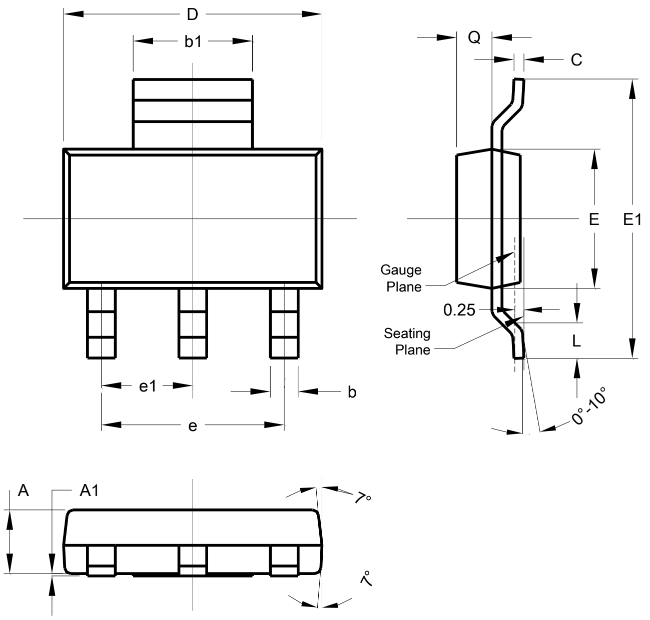


$V_{BE(SAT)}$ v I_C



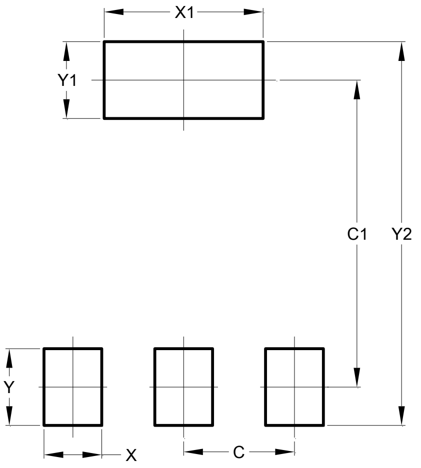
$V_{BE(ON)}$ v I_C

Package Outline Dimensions



SOT223			
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



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

For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.