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 and Benefits

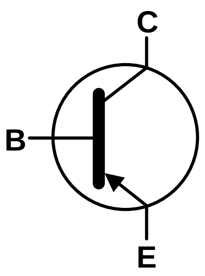
- BV_{CEO} > -12V
- Maximum Continuous Current I_C = -5A
- Peak Pulse Current I_C = -20A
- High Gain Holds Up h_{FE} > 200 @ I_C = -2A
- Very Low Equivalent On-Resistance; $R_{CE(sat)}$ = 85mΩ at -2A

Mechanical Data

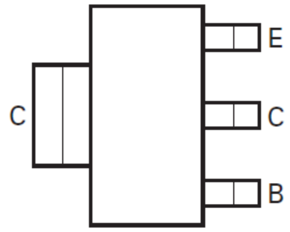
- Case: SOT223
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

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}	-15	V
Collector-Emitter Voltage	V_{CEO}	-12	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-5	A
Base Current	I_B	-500	mA
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
	(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)	$R_{\theta JL}$	10.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

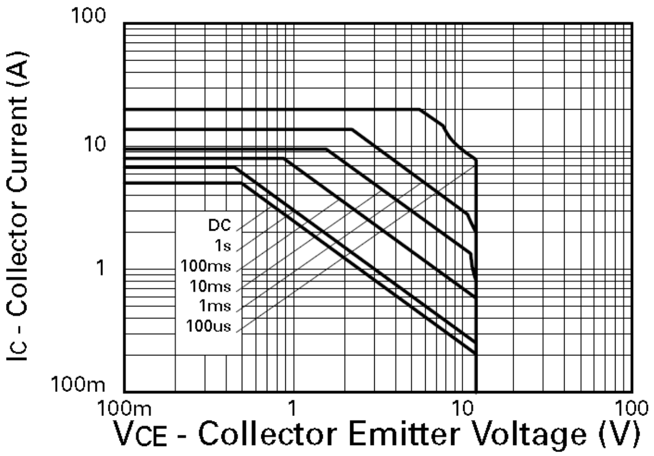
ESD Ratings (Note 10)

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

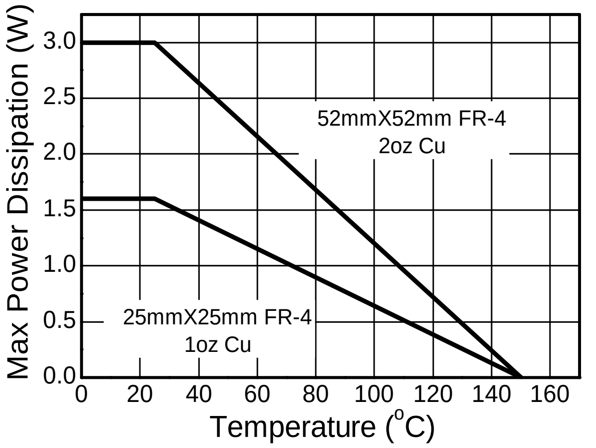
Notes:

5. For a device mounted with the collector lead on 52mm x 52mm 2oz copper that is on a single-sided 1.6mm FR-4 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.

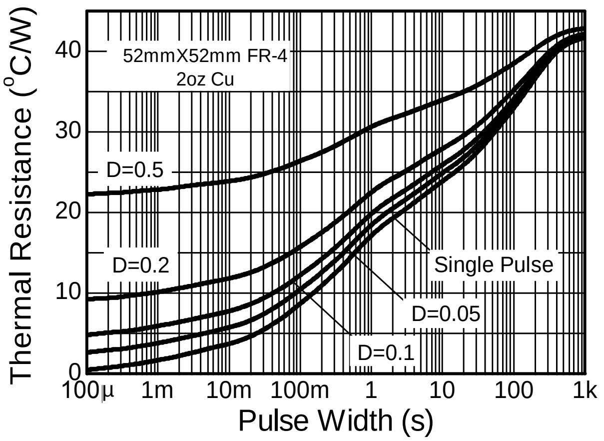
Thermal Characteristics and Derating Information



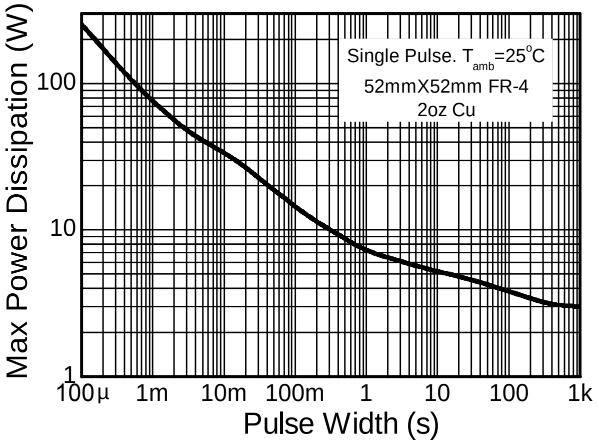
Safe Operating Area



Derating Curve



Transient Thermal Impedance



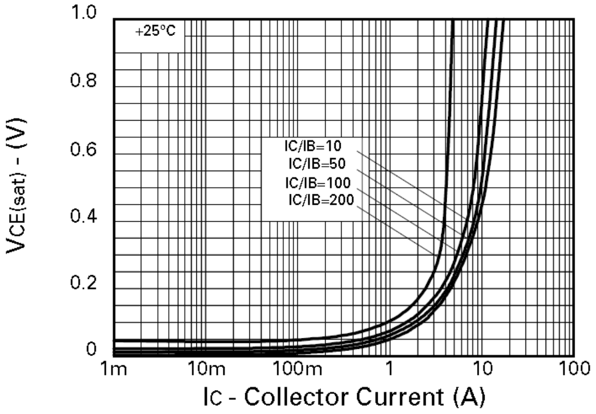
Pulse Power Dissipation

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

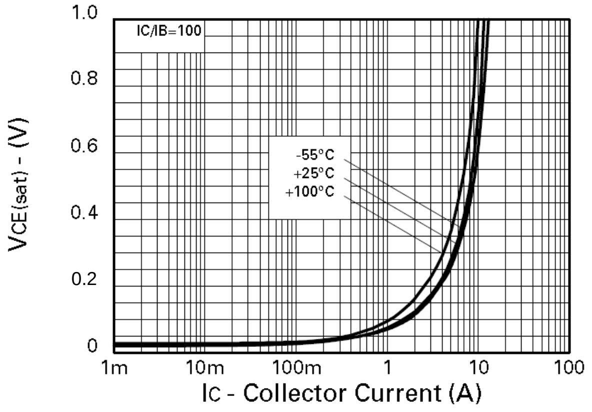
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-15	-35	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage	BV_{CES}	-12	-25	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	-12	-25	-	V	I_C = -10mA
Collector-Emitter Breakdown Voltage	BV_{CEV}	-12	-25	-	V	I_C = -100µA, V_{EB} = -1V
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.5	-	V	I_E = -100µA
Collector Cut Off Current	I_{CBO}	-	-0.3	-100	nA	V_{CB} = -12V
Collector Cut Off Current	I_{CES}	-	-0.3	-100	nA	V_{CES} = -10V
Emitter Cut Off Current	I_{EBO}	-	-0.3	-100	nA	V_{EB} = -6V
DC Current Transfer Static Ratio (Note 11)	h_{FE}	270	450	-	-	I_C = -10mA, V_{CE} = -2V
		250	400	850		I_C = -0.5A, V_{CE} = -2V
		200	340	-		I_C = -2A, V_{CE} = -2V
		150	245	-		I_C = -5A, V_{CE} = -2V
		90	145	-		I_C = -10A, V_{CE} = -2V
		-	50	-		I_C = -20A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	-	-25	-50	mV	I_C = -0.1A, I_B = -1mA
		-	-70	-110		I_C = -0.5A, I_B = -2.5mA
		-	-90	-130		I_C = -1A, I_B = -6mA
		-	-115	-170		I_C = -2A, I_B = -20mA
		-	-250	-400		I_C = -5A, I_B = -50mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	-	-950	-1,050	mV	I_C = -5A, I_B = -50mA
Base-Emitter Turn-on Voltage (Note 11)	$V_{BE(on)}$	-	-905	-1,000	mV	I_C = -5A, V_{CE} = -2V
Transitional Frequency	f_T	-	115	-	MHz	I_C = -50mA, V_{CE} = -10V, f = 50MHz
Output Capacitance	C_{obo}	-	80	-	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{ON}	-	150	-	ns	V_{CC} = -10V, I_C = -4A, -I_{B1} = I_{B2} = 40mA
	t_{OFF}	-	220	-	ns	

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

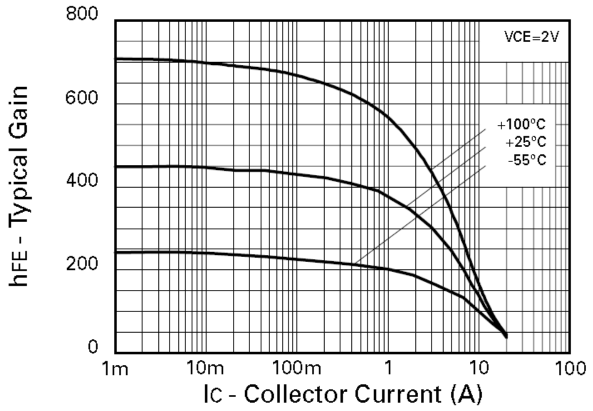
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



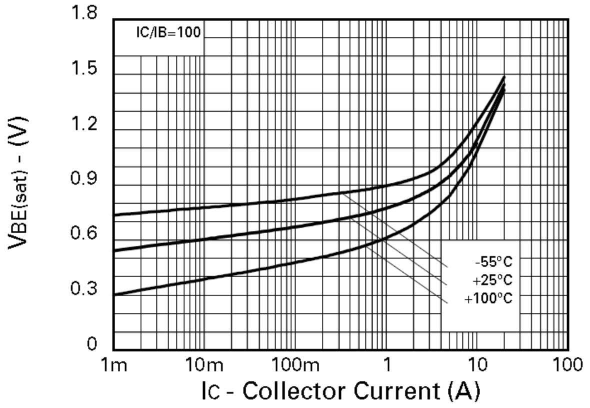
$V_{CE(sat)}$ v I_C



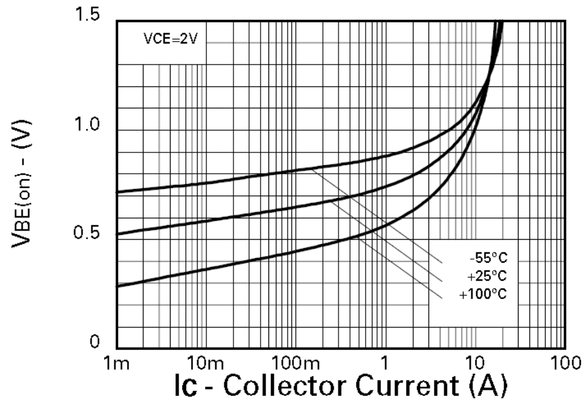
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



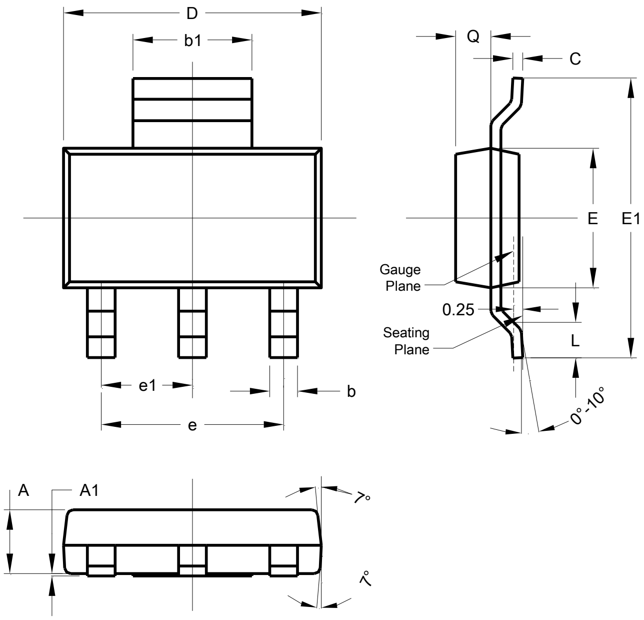
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

SOT223



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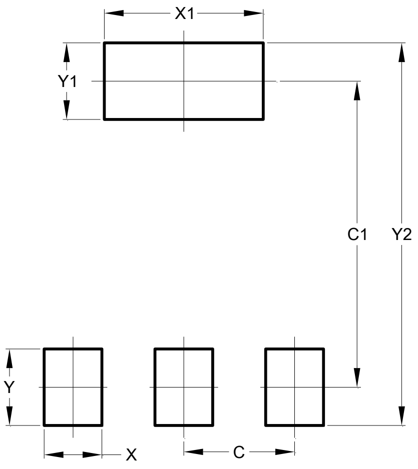
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

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
Y2	8.00