



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

- $BV_{CEO} > 25V$
- $I_C = 7A$ High Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- Very Low Saturation Voltage $V_{CE(SAT)} < 110mV @ 1A$
- $R_{CE(SAT)} = 36m\Omega$ at 5A for a Low Equivalent On-Resistance
- h_{FE} Specified Up to 20A for a High Gain Hold Up
- $P_{TOT} = 3W$

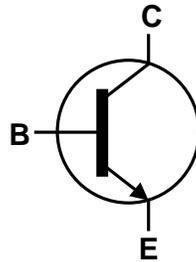
Mechanical Data

- 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)

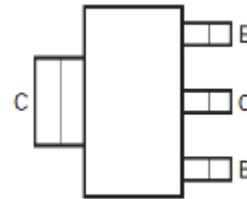
SOT223



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}	60	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	6	V
Continuous Collector Current	I _C	7	A
Peak Pulse Current	I _{CM}	20	A

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

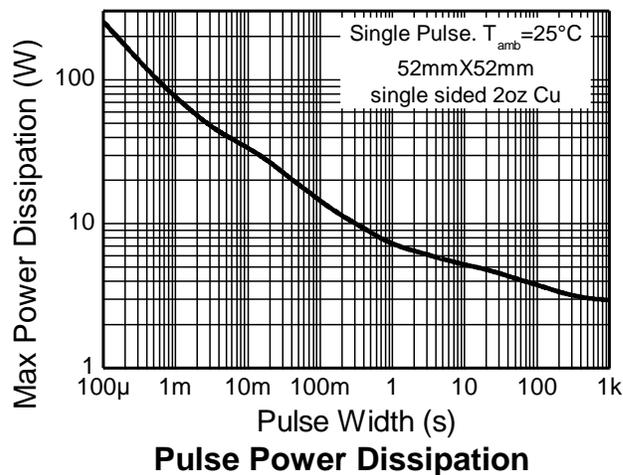
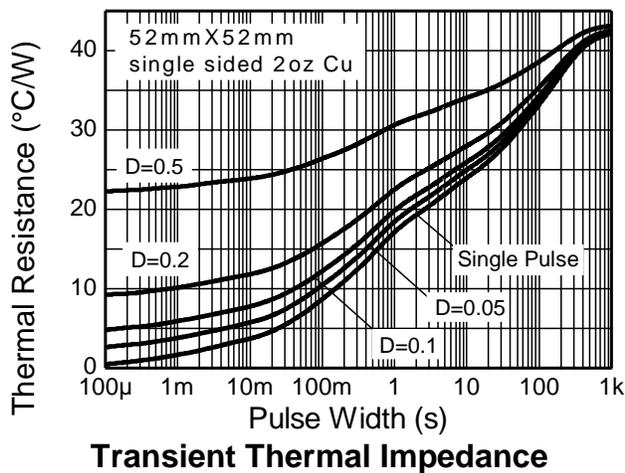
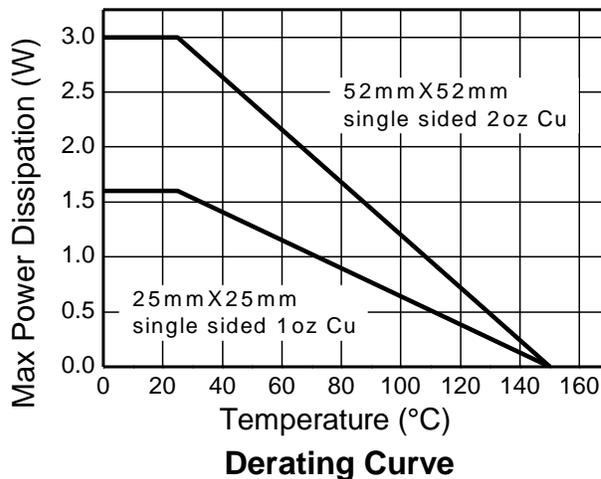
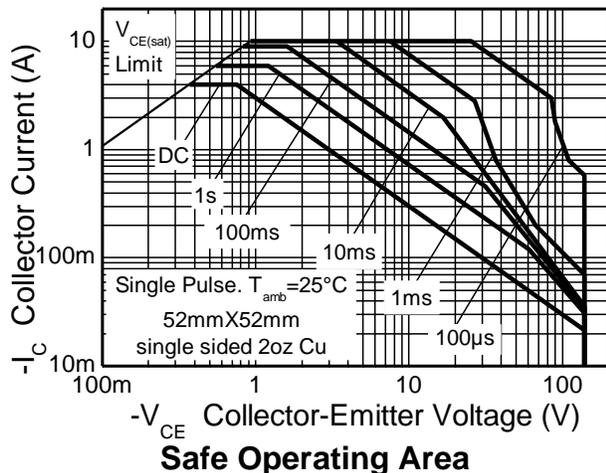
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P _D	3	W
			24	
	(Note 6)		1.6	
			12.8	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	42	°C/W
	(Note 6)	R _{θJA}	78	
Thermal Resistance Junction to Lead	(Note 7)	R _{θJL}	8.8	
Operating and Storage Temperature 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:
- 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.
 - Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

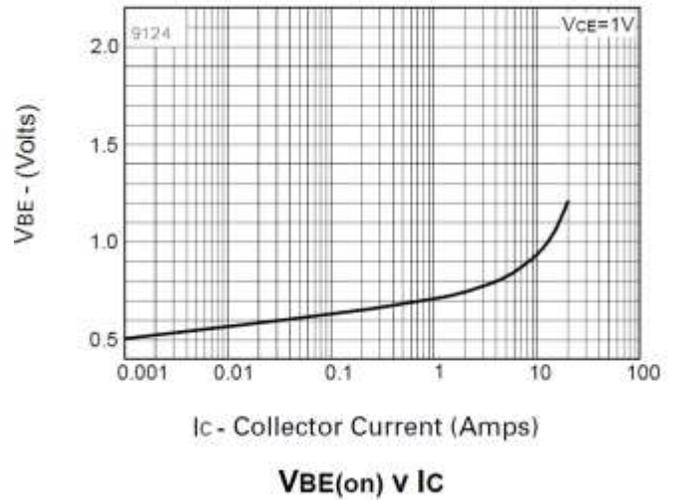
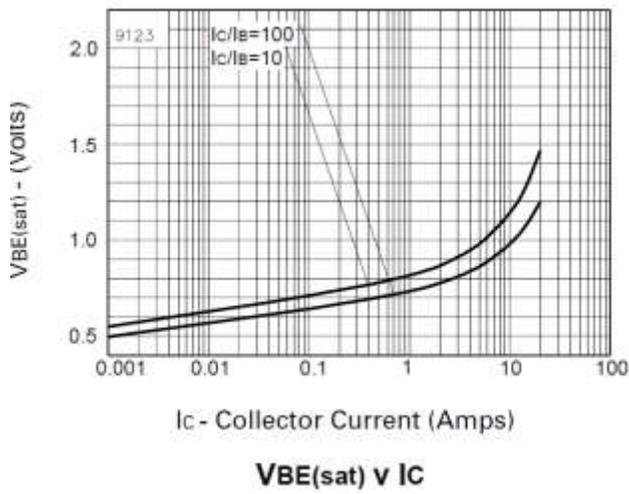
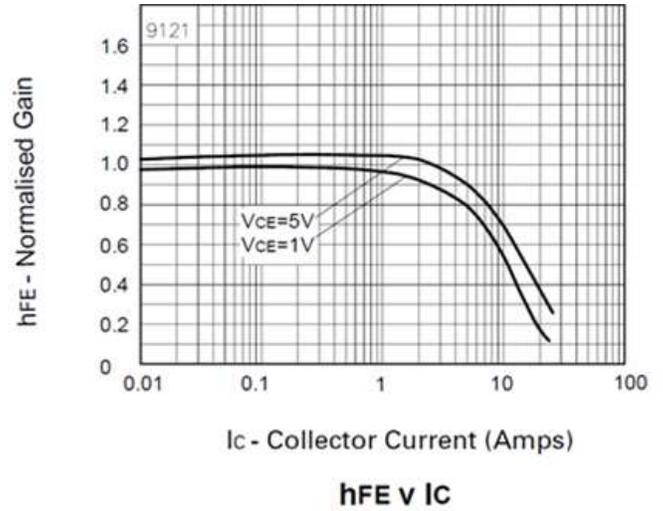
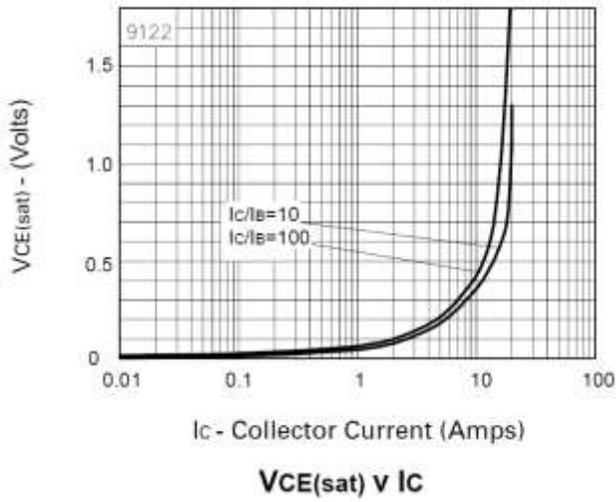


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	60	120	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	60	120	—	V	$I_C = 1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	25	35	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	6	8	—	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	I_{CBO}	—	—	50 1	nA μA	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cut-off Current	I_{CER}	—	—	50 1	nA μA	$V_{CE} = 50\text{V}$, $R_B \leq 1\text{k}\Omega$ $V_{CE} = 50\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cut-off Current	I_{EBO}	—	—	10	nA	$V_{EB} = 6\text{V}$
DC Current Gain (Note 9)	h_{FE}	300	450	—	—	$I_C = 10\text{mA}$, $V_{CE} = 1\text{V}$
		300	450	—		$I_C = 1\text{A}$, $V_{CE} = 1\text{V}$
		200	300	—		$I_C = 7\text{A}$, $V_{CE} = 1\text{V}$
		40	100	—		$I_C = 20\text{A}$, $V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	35	50	mV	$I_C = 0.5\text{mA}$, $I_B = 10\text{mA}$
		—	67	110		$I_C = 1\text{A}$, $I_B = 10\text{mA}$
		—	168	215		$I_C = 2\text{A}$, $I_B = 10\text{mA}$
		—	—	350		$I_C = 6.5\text{A}$, $I_B = 150\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	—	1.2	V	$I_C = 6.5\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	—	1.13	mV	$I_C = 6.5\text{A}$, $V_{CE} = 1\text{V}$
Current Gain-Bandwidth Product (Note 9)	f_T	—	100	—	MHz	$I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{OBO}	—	70	—	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$
Switching Times	t_{ON}	—	60	—	ns	$I_C = 1\text{A}$, $V_{CC} = 10\text{V}$, $I_{B1} = -I_{B2} = 100\text{mA}$
	t_{OFF}	—	680	—		

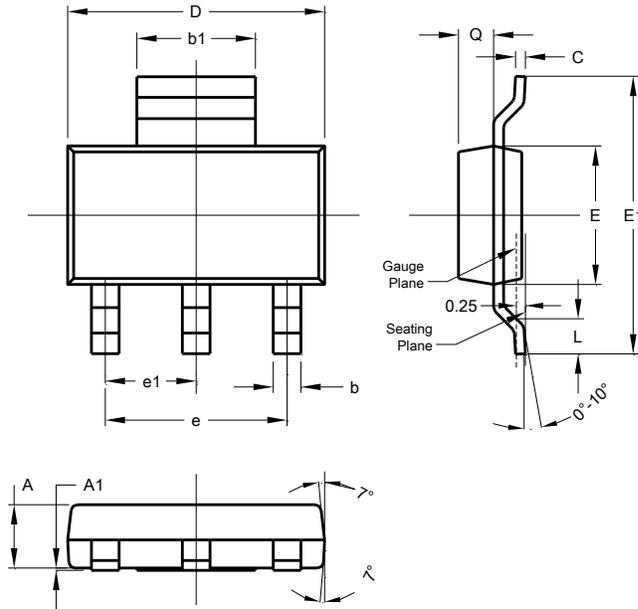
 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

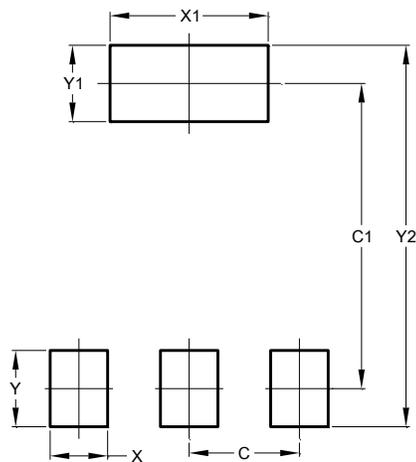
SOT223



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
Y2	8.00

Note: 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.