



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

- $BV_{CEO} > -60V$
- $I_C = -5.5A$ High Continuous Collector Current
- $I_{CM} = -15A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -70mV @ -1A$
- $R_{SAT} = 39m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Specified Up to $-10A$ for a High Gain Hold Up
- Complementary NPN Type: NK-ZX5T851G

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)

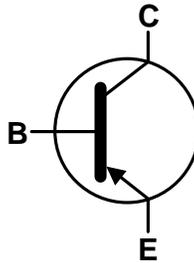
Applications

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

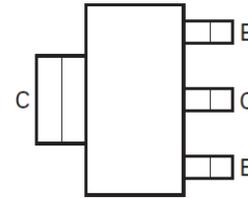
SOT223



Top View



Device Symbol



Top View
Pin-Out

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-100	V
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-5.5	A
Peak Pulse Current	I _{CM}	-15	A

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

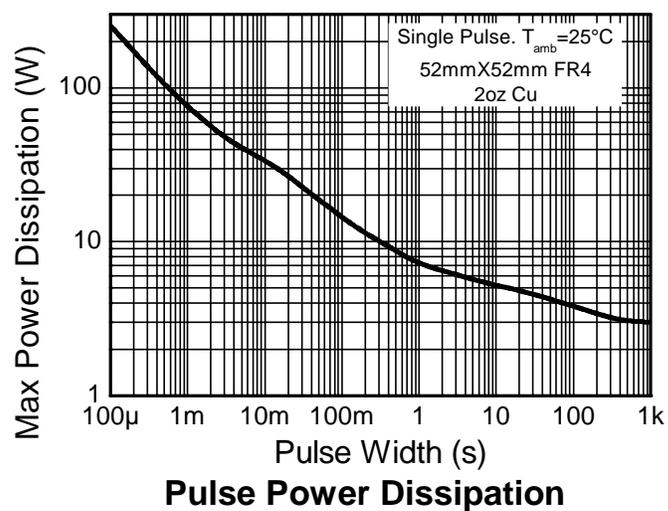
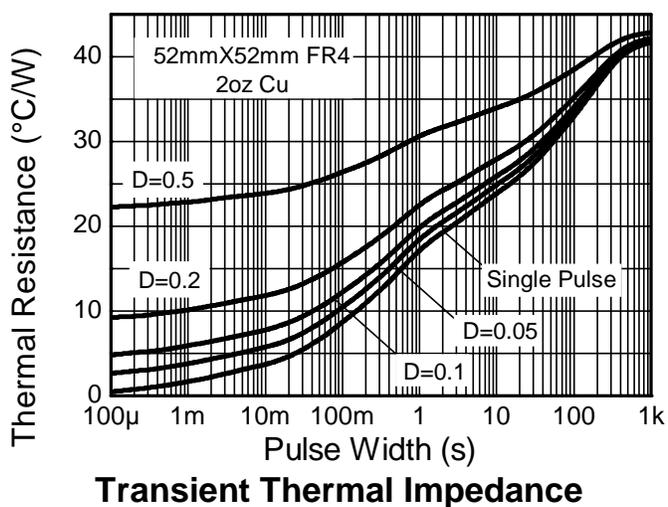
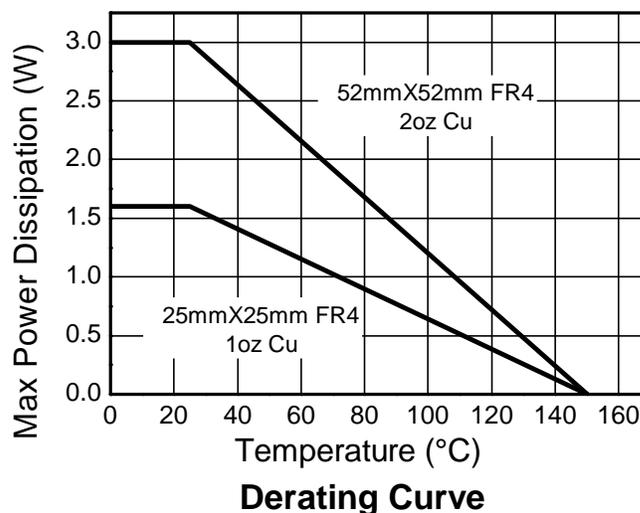
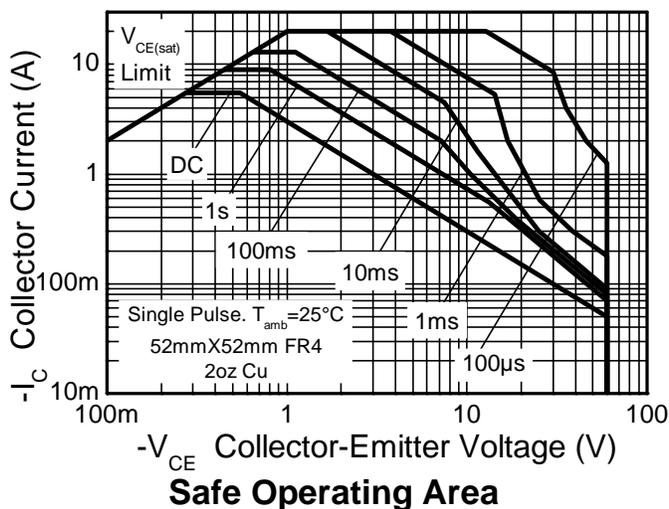
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	3.0	W
		24	
Linear Derating Factor		1.6	mW /°C
		12.8	
Thermal Resistance, Junction to Ambient	R _{θJA}	42	°C/W
	R _{θJA}	78	
Thermal Resistance Junction to Lead	R _{θJL}	10.48	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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 surface mounted on 52mm x 52mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - Same as Note (5), except the device is surface mounted on 25mm x 25mm with 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

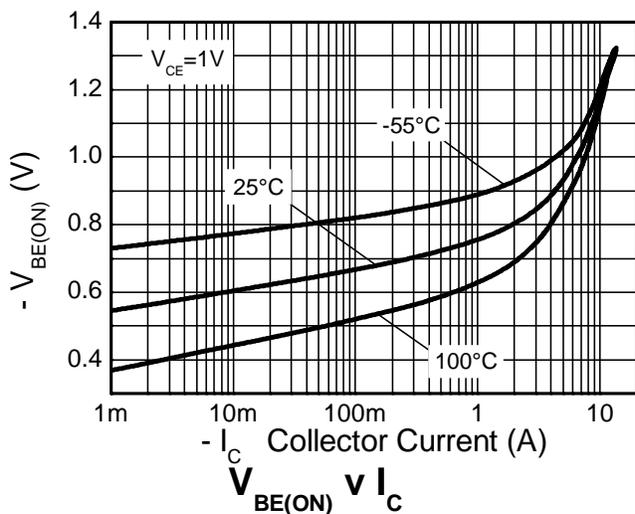
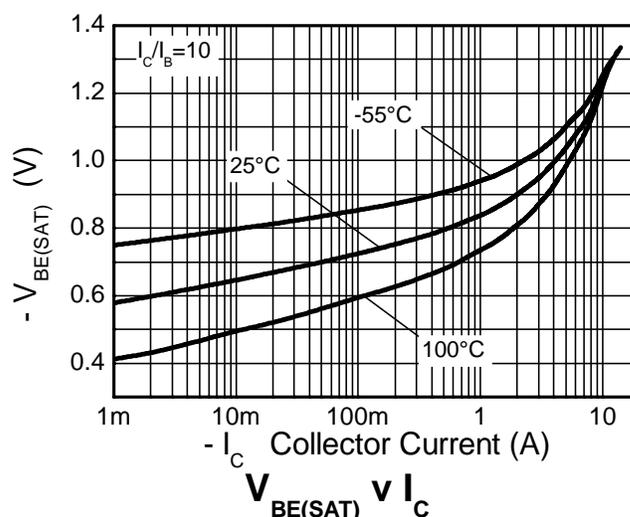
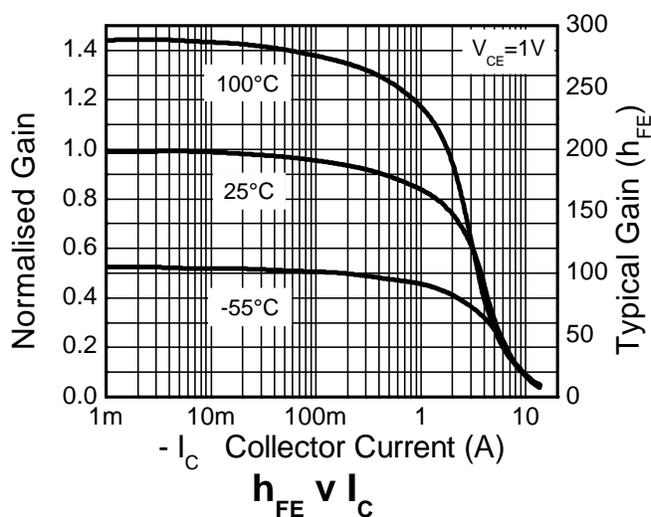
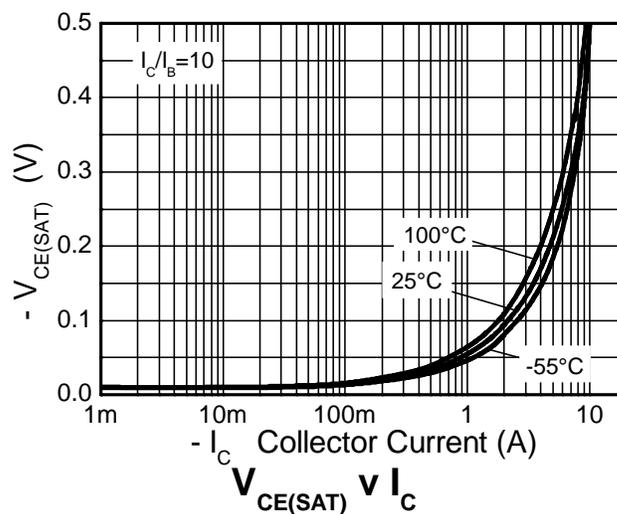
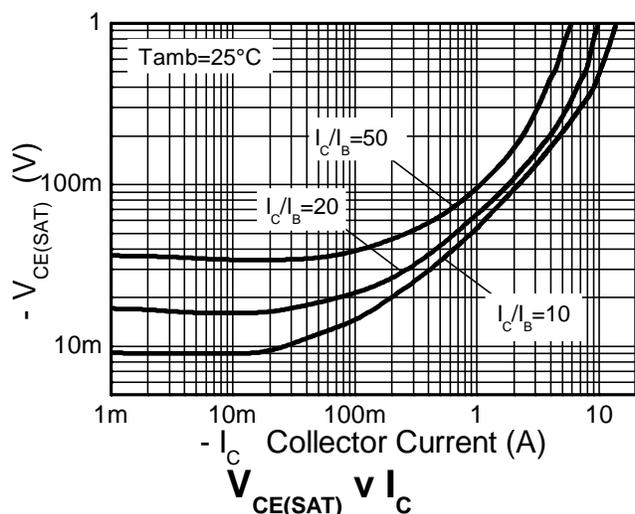


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

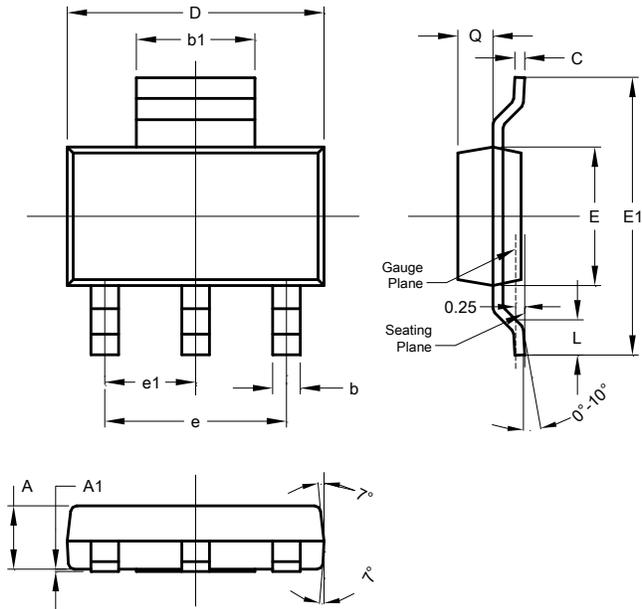
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CER}	-100	-120	-	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-80	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	-	V	$I_E = -100\mu\text{A}$
Collector-Base Cutoff Current	I_{CBO}	-	<1	-20	nA	$V_{CB} = -80\text{V}$
				-0.5	μA	$V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$
Collector-Emitter Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	-	<1	-20	nA	$V_{CB} = -80\text{V}$
				-0.5	μA	$V_{CB} = -80\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	-	<1	-10	nA	$V_{EB} = -6\text{V}$
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	100	250	-	-	$I_C = -10\text{mA}$, $V_{CE} = -1\text{V}$
		100	200	300		$I_C = -2\text{A}$, $V_{CE} = -1\text{V}$
		45	90	-		$I_C = -5\text{A}$, $V_{CE} = -1\text{V}$
		10	25	-		$I_C = -10\text{A}$, $V_{CE} = -1\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	-	-15	-25	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$
		-	-55	-70		$I_C = -1\text{A}$, $I_B = -100\text{mA}$
		-	-90	-120		$I_C = -2\text{A}$, $I_B = -200\text{mA}$
		-	-195	-250		$I_C = -5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	-	-1,030	-1,150	mV	$I_C = -5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	-	-920	-1,020	mV	$I_C = -5\text{A}$, $V_{CE} = -1\text{V}$
Output Capacitance (Note 9)	C_{obo}	-	48	-	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Transition Frequency	f_T	-	120	-	MHz	$V_{CE} = -10\text{V}$, $I_C = -100\text{mA}$ $f = 50\text{MHz}$
Switching Time	t_{on}	-	39	-	ns	$V_{CC} = -10\text{V}$, $I_C = -1\text{A}$ $I_{B1} = -I_{B2} = -100\text{mA}$
	t_{off}	-	370	-		

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

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

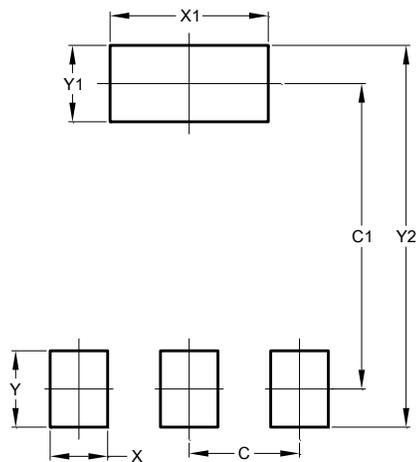


Package Outline Dimensions



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
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