



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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企业微信二维码



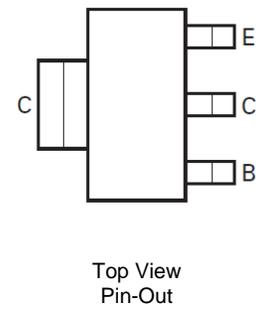
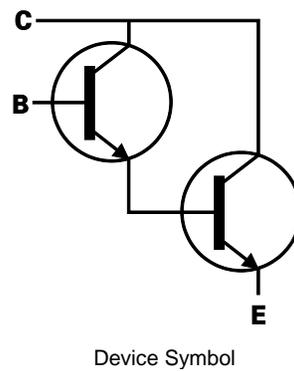
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Features

- $BV_{CE0} > 140V$
- $BV_{CBO} > 160V$
- $I_C = 2A$ High Continuous Current
- NPN Darlington with Gain $> 10k$
- Guaranteed h_{FE} Specified up to 1A

Mechanical Data

- Case: SOT223 (Type ZN)
- 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 ③
- Weight: 0.112 grams (Approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	160	V
Collector-Emitter Voltage	V _{CEO}	140	V
Emitter-Base Voltage	V _{EBO}	10	V
Continuous Collector Current	I _C	2	A
Peak Pulse Current	I _{CM}	4	A

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

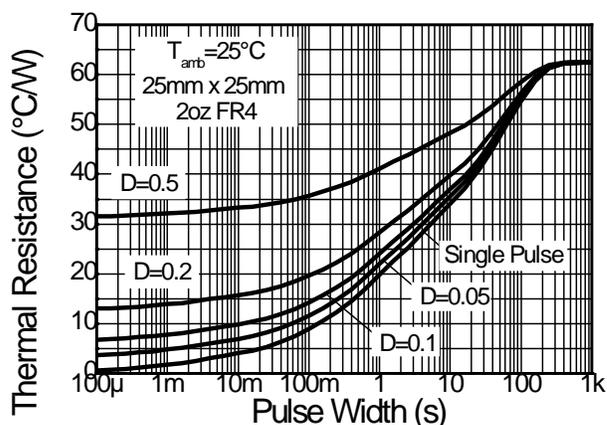
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 6)	3.0
		(Note 7)	2.0
		(Note 8)	1.6
		(Note 9)	1.2
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 6)	41.7
		(Note 7)	62.5
		(Note 8)	78.1
		(Note 9)	104
Thermal Resistance Junction to Lead	R _{θJL}	12.9	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 11)

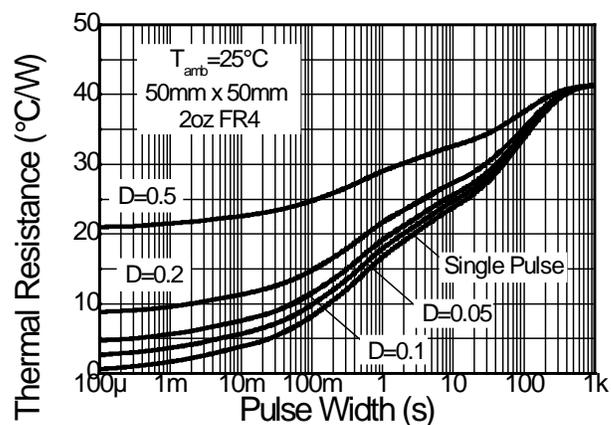
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	2000	V	2
Electrostatic Discharge—Machine Model	ESD MM	200	V	B

- Notes:
6. For a device mounted with the collector lead on 50mm × 50mm 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.
 7. Same as Note 6, except the device is mounted on 25mm × 25mm 2oz copper.
 8. Same as Note 6, except the device is mounted on 25mm × 25mm 1oz copper.
 9. Same as Note 6, except the device is mounted on minimum recommended pad layout.
 10. Thermal resistance from junction to solder-point (at the end of the collector lead).
 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

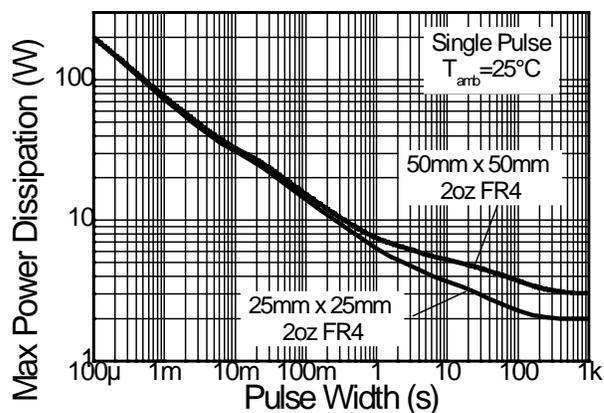
Thermal Characteristics and Derating Information



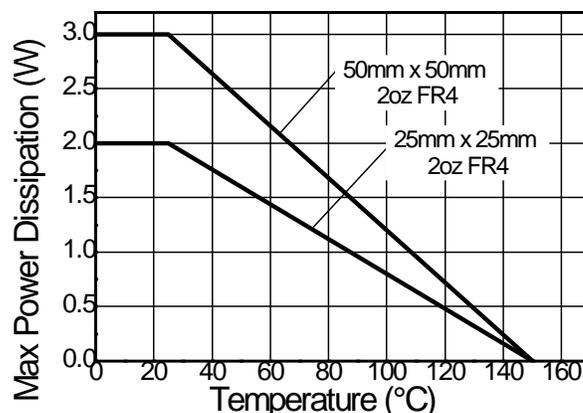
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



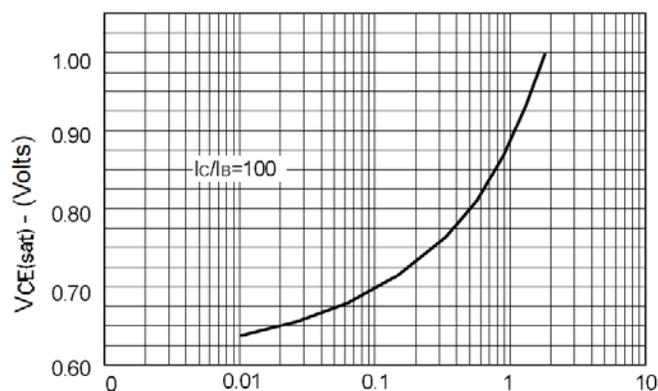
Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	160	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 12)	BV _{CEO}	140	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	10	—	—	V	I _E = 100μA
Collector-Base Cut-Off Current	I _{CBO}	—	—	0.01 10	μA μA	V _{CB} = 140V V _{CB} = 140V, T _A = +100°C
Collector-Emitter Cut-Off Current	I _{CES}	-	—	10	μA	V _{CES} = 140V
Emitter Cut-Off Current	I _{EBO}	-	—	0.1	μA	V _{EB} = 8V
DC Current Gain (Note 12) (Group B)	h _{FE}	5000 10,000 5000	10,000 20,000 10,000	— 100,000 —	—	I _C = 50mA, V _{CE} = 10V I _C = 500mA, V _{CE} = 10V I _C = 1A, V _{CE} = 10V
Collector-Emitter Saturation Voltage (Note 12)	V _{CE(sat)}	—	0.75 0.85	1.1 1.2	V	I _C = 500mA, I _B = 5mA I _C = 1A, I _B = 10mA
Base-Emitter Saturation Voltage (Note 12)	V _{BE(sat)}	—	1.7	1.9	V	I _C = 1A, I _B = 10mA
Base-Emitter Turn-On Voltage (Note 12)	V _{BE(on)}	—	1.5	1.7	V	I _C = 1A, V _{CE} = 5V
Output Capacitance (Note 12)	C _{obo}	—	10	15	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product (Note 12)	f _T	150	250	—	MHz	V _{CE} = 10V, I _C = 100mA, f=20MHz
Turn-On Time	t _{on}	—	0.75	—	μs	V _{CC} = 10V, I _C = 500mA
Turn-Off Time	t _{off}	—	2.20	—	μs	I _{B1} = -I _{B2} = 0.5mA

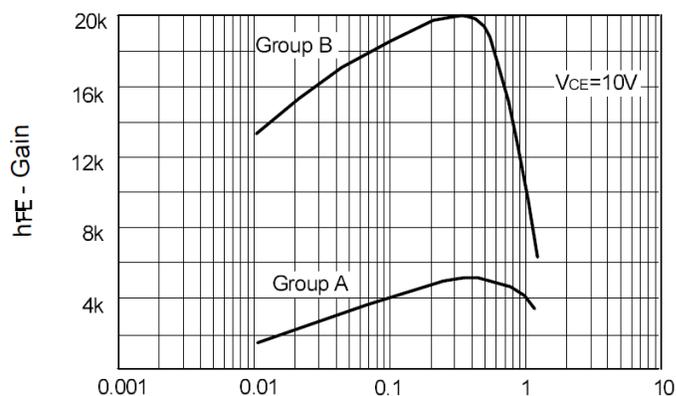
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

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



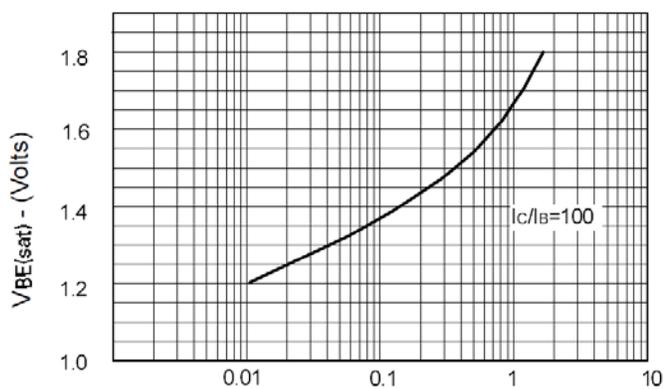
I_C - Collector Current (Amps)

$V_{CE(sat)}$ v I_C



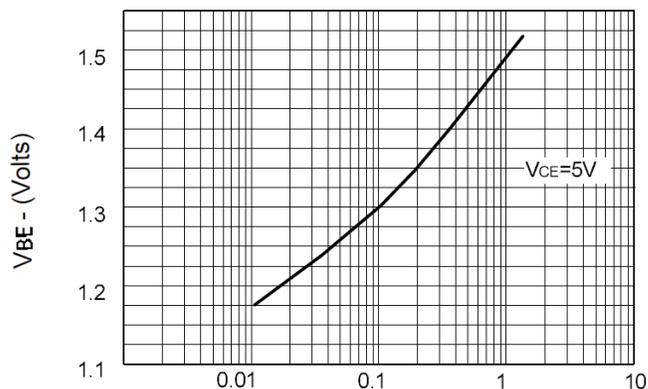
I_C - Collector Current (Amps)

h_{FE} v I_C



I_C - Collector Current (Amps)

$V_{BE(sat)}$ v I_C

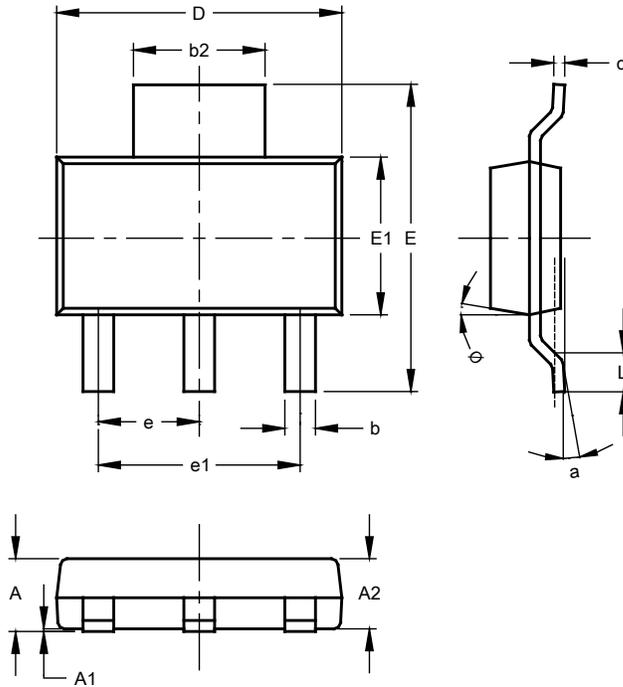


I_C - Collector Current (Amps)

$V_{BE(on)}$ v I_C

Package Outline Dimensions

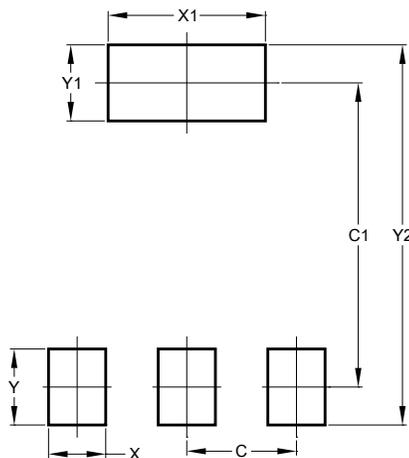
SOT223 (Type ZN)



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

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.