



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

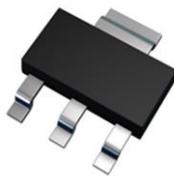
- $BV_{CEO} > 12V$
- $BV_{CBO} > 12V$
- $I_C = 4A$ High Continuous Current
- $h_{FE} > 400$ @ 3A and Low Saturation Voltage
- Extremely Low Equivalent On-Resistance; $R_{CE(sat)} 83m\Omega$ at 3A
- Complementary PNP Type: NK-FZT788B

Mechanical Data

- Package: SOT223
- Package 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)

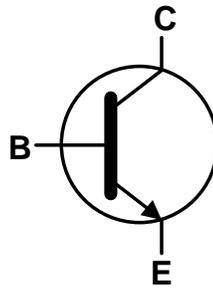
Applications

- Flash gun convertors
- Battery powered circuits

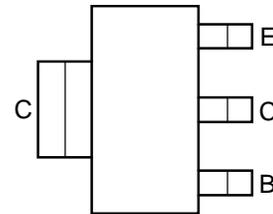


Top View

SOT223 (Type DN)



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	12	V
Collector-Emitter Voltage	V _{CEO}	12	V
Emitter-Base Voltage	V _{EB0}	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.)

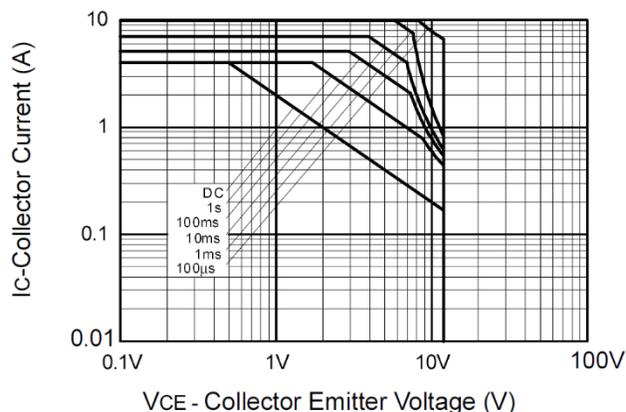
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	3
		(Note 6)	2
		(Note 7)	1.6
		(Note 8)	1.2
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 5)	41.7
		(Note 6)	62.5
		(Note 7)	78.1
		(Note 8)	104
Thermal Resistance Junction to Lead	R _{θJL}	12.9	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 10)

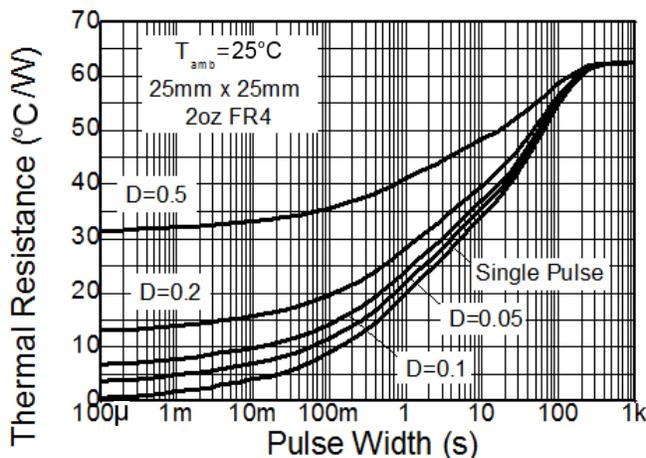
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 50mm x 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.
 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.

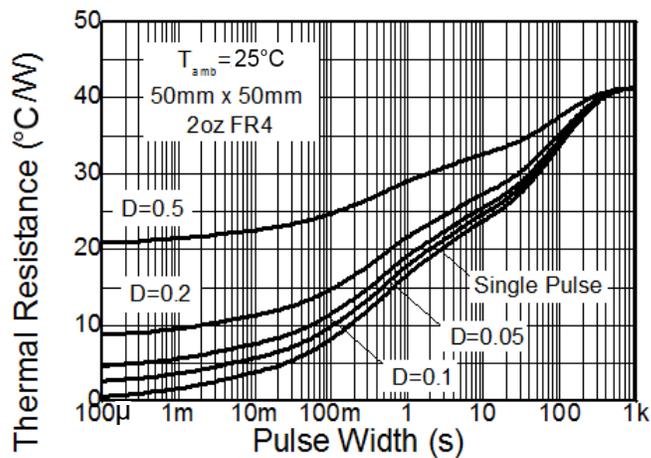
Thermal Characteristics and Derating Information



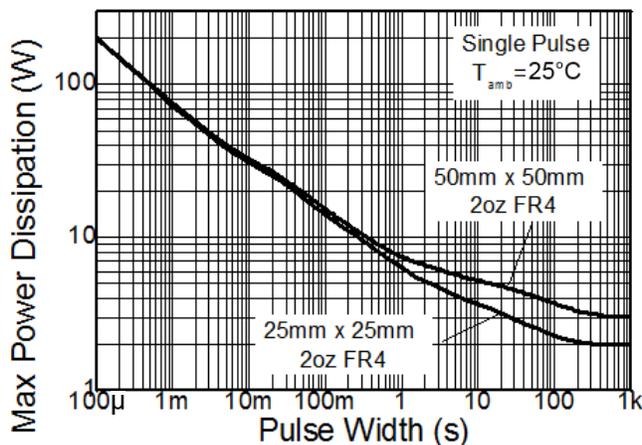
Safe Operating Area



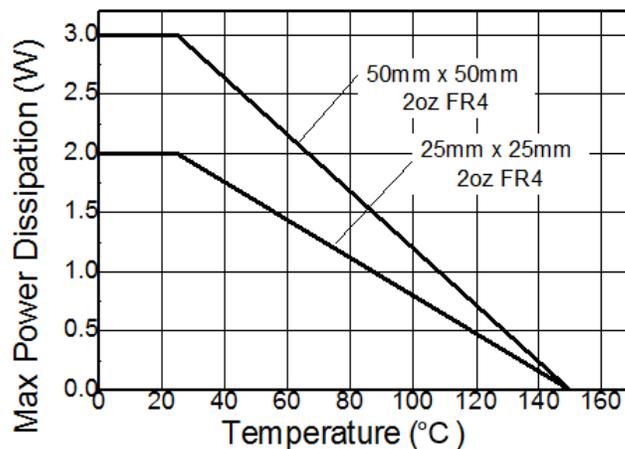
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



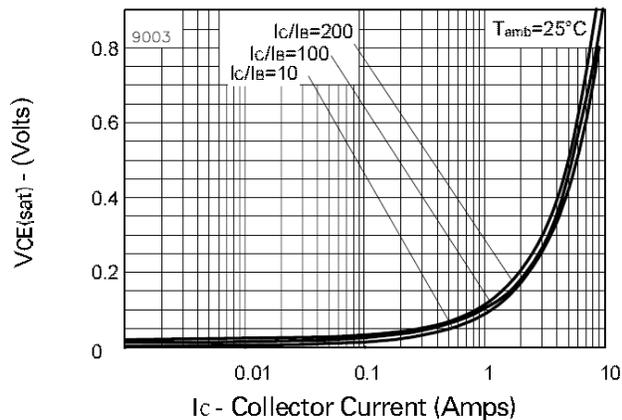
Derating Curve

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

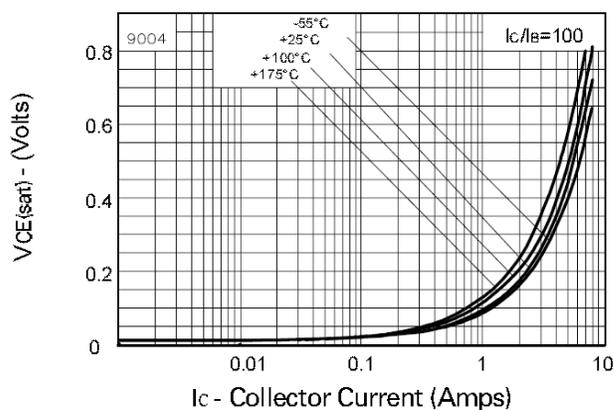
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	12	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	12	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector-Base Cut-Off Current	I _{CBO}	—	—	20	nA	V _{CB} = 10V
Collector-Emitter Cut-Off Current	I _{CES}	—	—	20	nA	V _{CE} = 10V
Emitter Cut-Off Current	I _{EBO}	—	—	20	nA	V _{EB} = 6V
DC Current Gain (Note 11)	h _{FE}	500	—	—	—	I _C = 0.1A, V _{CE} = 2V
		400	—	—		I _C = 3A, V _{CE} = 2V
		100	—	—		I _C = 10A, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	—	—	40	mV	I _C = 0.1A, I _B = 1mA
		—	—	60		I _C = 0.1A, I _B = 0.5mA
		—	—	180		I _C = 1A, I _B = 50mA
		—	—	350		I _C = 3A, I _B = 20mA
		—	—	400		I _C = 4A, I _B = 50mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	—	1.1	V	I _C = 3A, I _B = 20mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(on)}	—	—	1	V	I _C = 3A, V _{CE} = 2V
Input Capacitance	C _{ibo}	—	200	—	pF	V _{EB} = 0.5V, f = 1MHz
Output Capacitance	C _{obo}	—	40	—	pF	V _{CB} = 10V, f = 1MHz
Current Gain-Bandwidth Product	f _T	150	—	—	MHz	V _{CE} = 5V, I _C = 50mA, f = 50MHz
Turn-On Time	t _{on}	—	40	—	ns	V _{CC} = 10V, I _C = 500mA
Turn-Off Time	t _{off}	—	500	—	ns	I _{B1} = -I _{B2} = 50mA

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

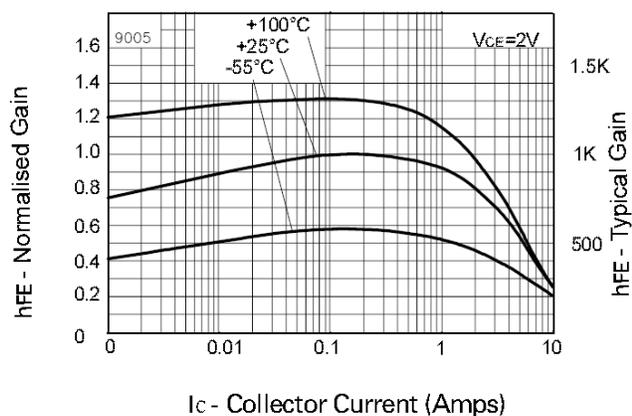
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



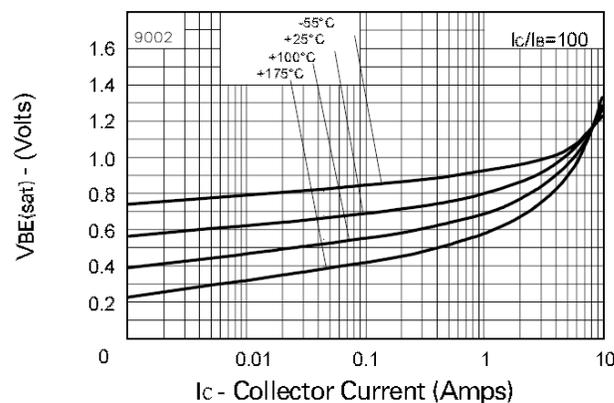
VCE(sat) v IC



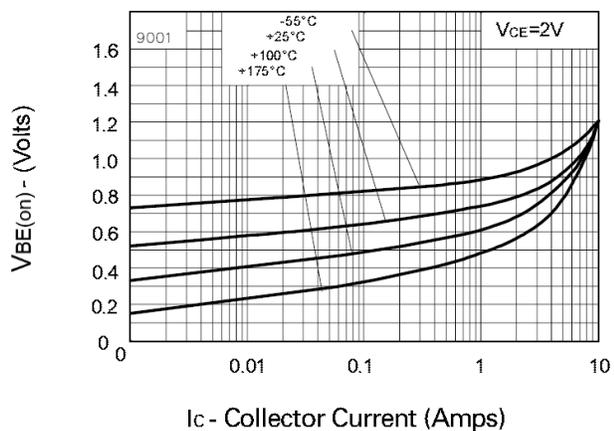
VCE(sat) v IC



hFE v IC



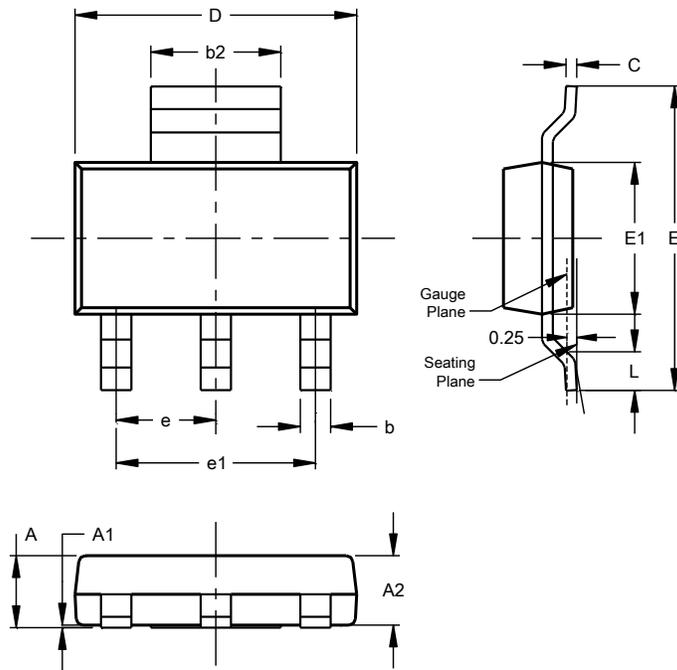
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

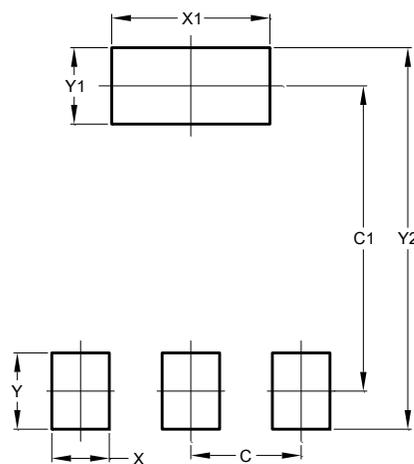
SOT223 (Type DN)



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Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

SOT223 (Type DN)



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