



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

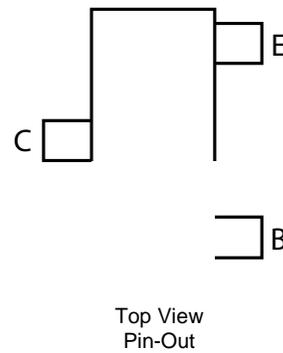
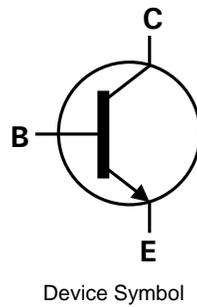
- $BV_{CEO} > 20V$
- $I_C = 2.5A$  Continuous Collector Current
- $R_{CE(SAT)} = 50m\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- $h_{FE}$  characterised up to 6A for high current gain hold up
- Complementary NPN type: NK-FMMT718

## Mechanical Data

- Case: SOT23
- 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
- Weight 0.008 grams (approximate)

## Applications

- DC-DC Modules
- Gate driver
- LED driver



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

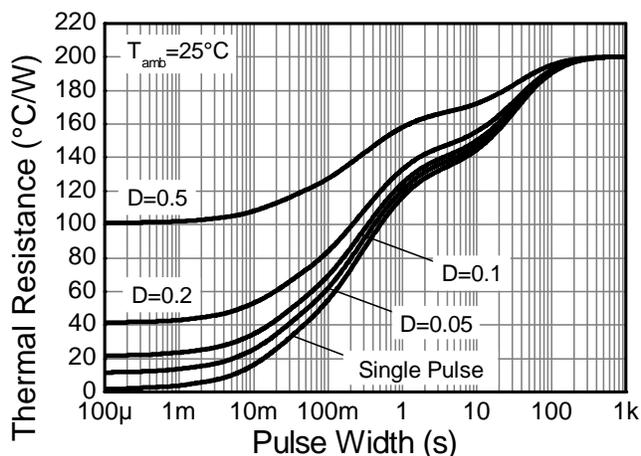
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	20	V
Collector-Emitter Voltage	$V_{CEO}$	20	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	2.5	A
Peak Pulse Current	$I_{CM}$	6	A
Base Current	$I_B$	500	mA

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

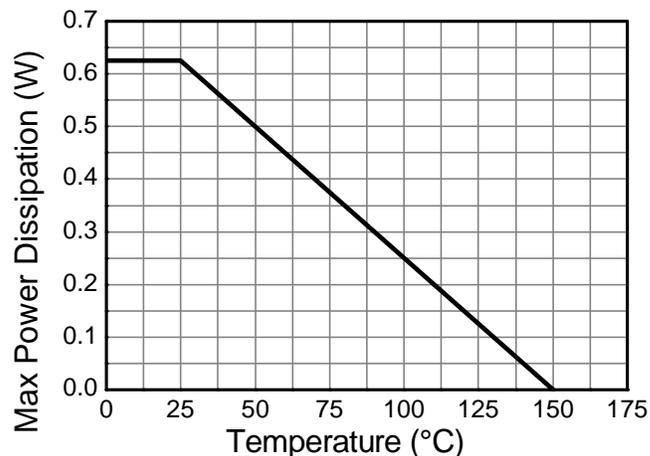
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	625	mW
Power Dissipation (Note 7)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	194	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
6. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  7. Same as note 6, except the device is measured at  $t \leq 5$  sec.
  8. Thermal resistance from junction to solder-point (at the end of the collector lead).

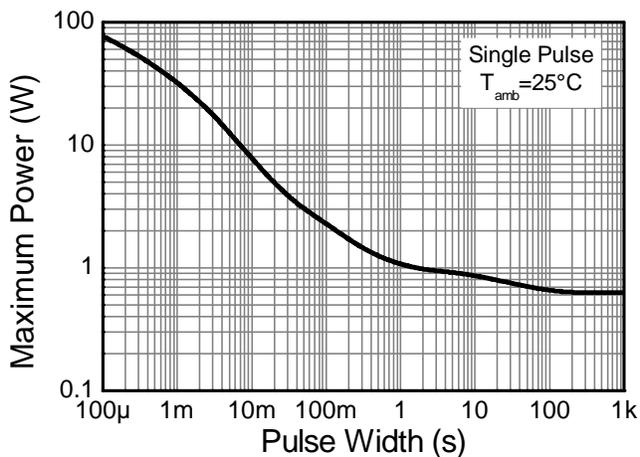
**Thermal Characteristics and Derating information**



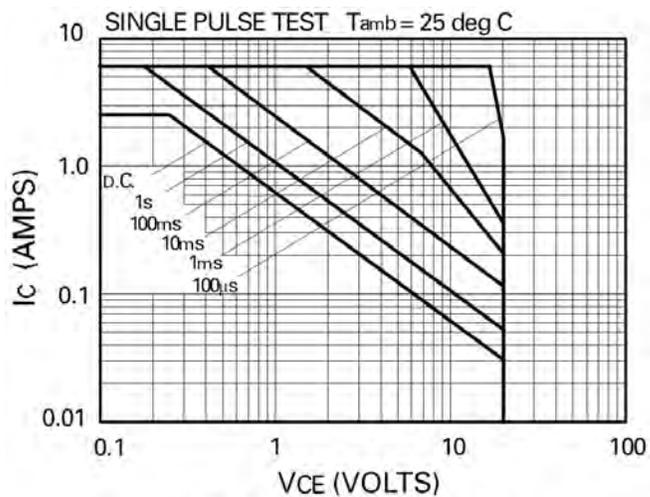
**Transient Thermal Impedance**



**Derating Curve**



**Pulse Power Dissipation**



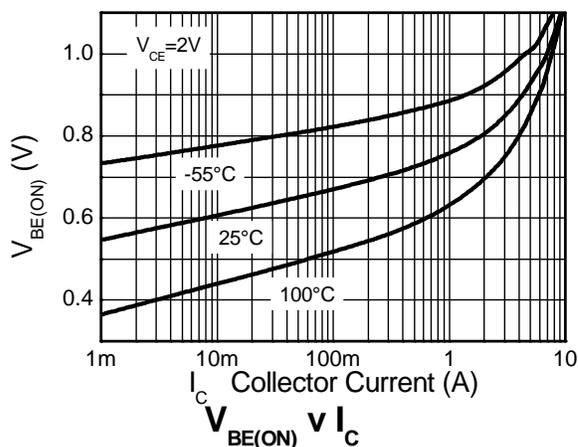
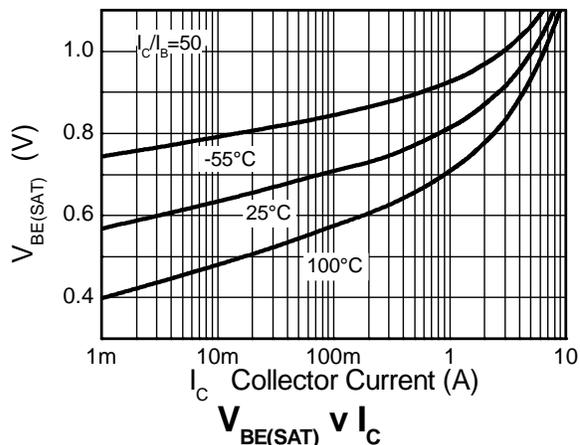
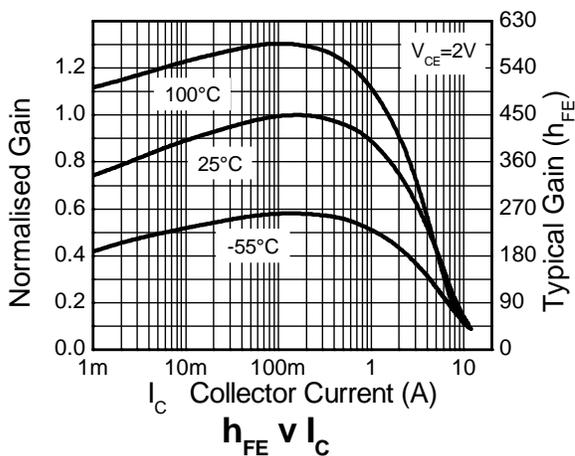
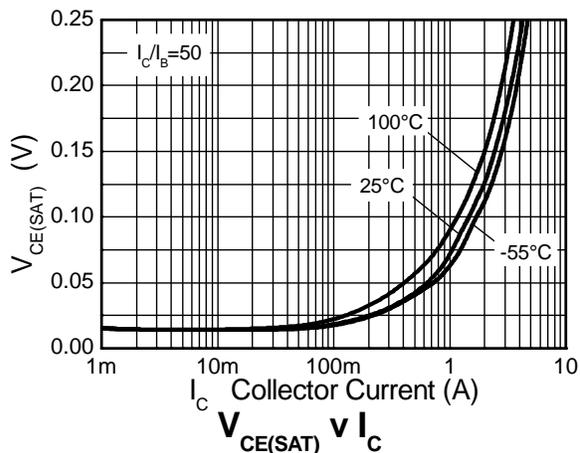
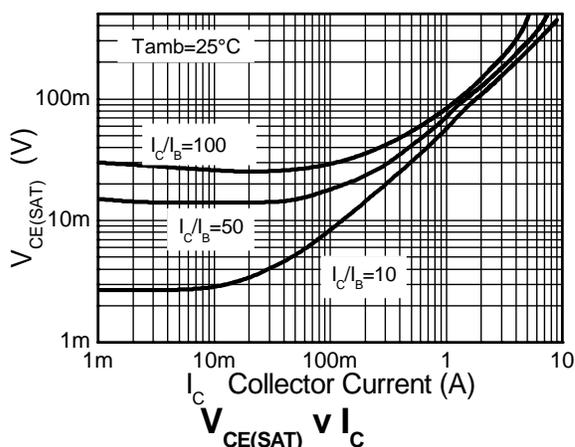
**Safe Operating Area**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

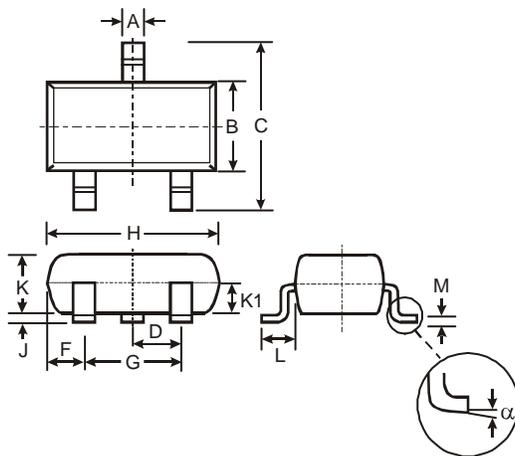
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	20	100	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	20	27	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.3	-	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	-	-	100	nA	V <sub>CB</sub> = 20V
Emitter Cut-off Current	I <sub>EBO</sub>	-	-	100	nA	V <sub>EB</sub> = 4V
Collector Emitter Cut-off Current	I <sub>CES</sub>	-	-	100	nA	V <sub>CES</sub> = 20V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	200 300 200 100	400 450 340 150	- - - -	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	- - -	8 70 130	15 150 200	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA I <sub>C</sub> = 2.5A, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	0.89	1.0	V	I <sub>C</sub> = 2.5A, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(on)</sub>	-	0.83	1.0	V	I <sub>C</sub> = 2.5A, V <sub>CE</sub> = 2V
Transition Frequency	f <sub>T</sub>	100	140	-	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Collector Output Capacitance	C <sub>obo</sub>	-	23	30	pF	V <sub>CB</sub> = 10V, f = 1MHz
Turn-On Time	t <sub>(on)</sub>	-	170	-	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A,
Turn-Off Time	t <sub>(off)</sub>	-	400	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 10mA

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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

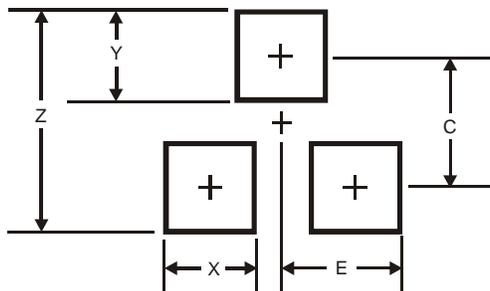


### Package Outline Dimensions



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
$\alpha$	0°	8°	-
All Dimensions in mm			

### Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35