



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

- $BV_{CEO} > -400V$
- $I_C = -150mA$  high Continuous Collector Current
- $I_{CM} = -500mA$  Peak Pulse Current
- 500mW Power Dissipation
- Excellent  $h_{FE}$  Characteristics Up To -100mA
- Complementary NPN Type: NK-FMMT458Q

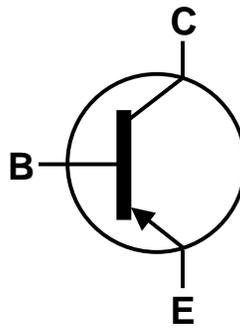
## Mechanical Data

- Package: SOT23 (Type DN)
- 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 
- Weight: 0.008 grams (Approximate)

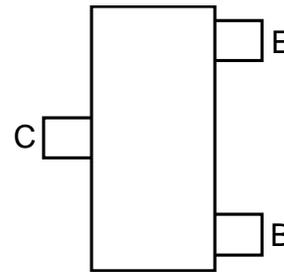
SOT23 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-400	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-400	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-150	mA
Peak Pulse Current	I <sub>CM</sub>	-500	mA
Base Current	I <sub>B</sub>	-200	mA

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

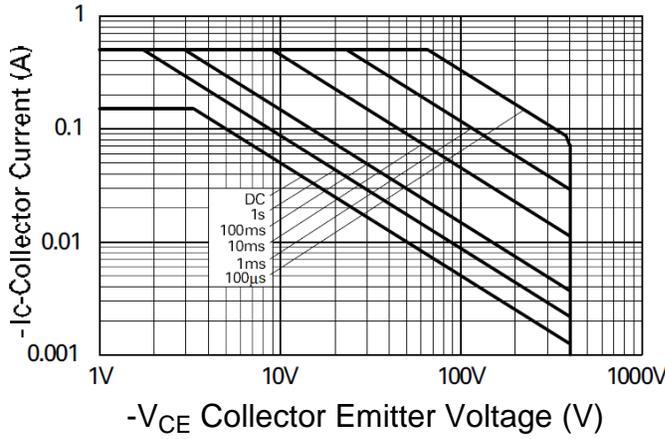
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	250	°C/W
Thermal Resistance, Junction to Lead (Note 6)	R <sub>θJL</sub>	197	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 7)

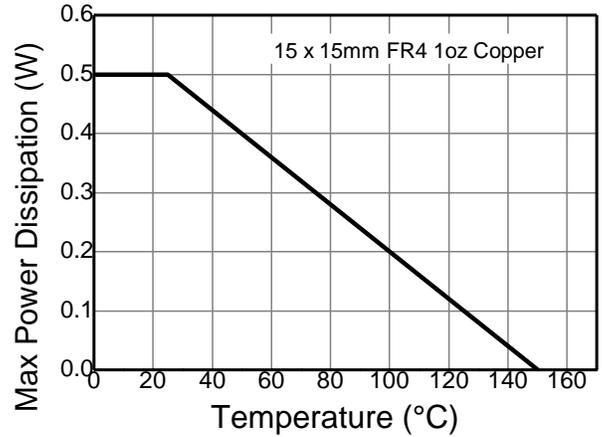
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

Notes: 5. For a device surface mounted on 15mm X 15mm X 1.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions  
 6. Thermal resistance from junction to solder-point (at the end of the collector lead).  
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

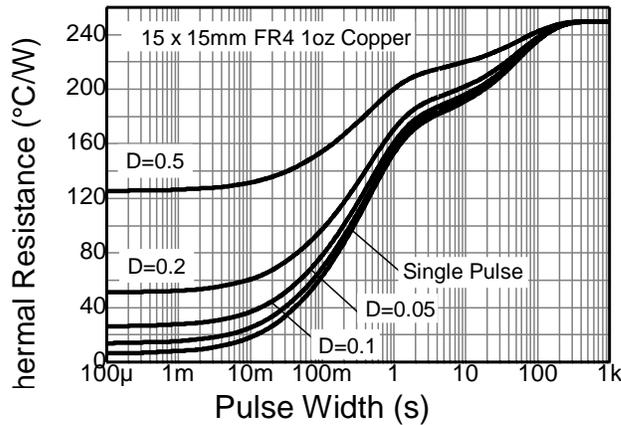
**Thermal Characteristics and Derating information**



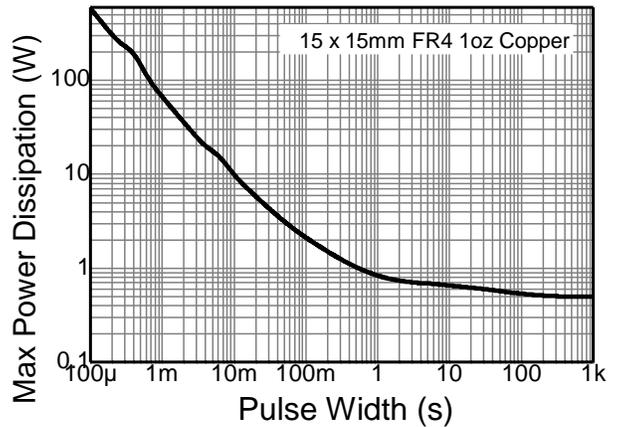
**Figure 1. Safe Operating Area**



**Figure 2. Derating Curve**



**Figure 3. Transient Thermal Impedance**



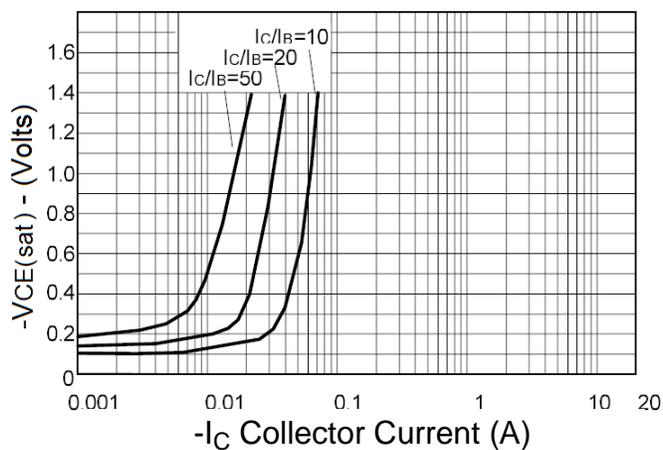
**Figure 4. Pulse Power Dissipation**

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

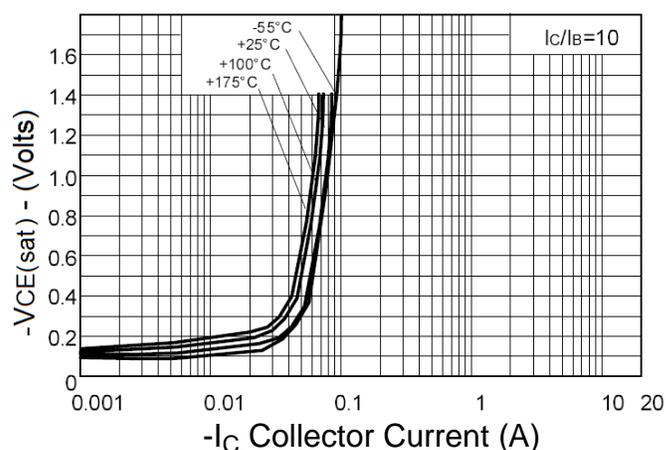
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-400	-	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	-400	-	-	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	-100	nA	V <sub>CB</sub> = -320V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> = -5.6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	-	-100	nA	V <sub>CE</sub> = -320V
Static Forward Current Transfer Ratio (Note 8)	h <sub>FE</sub>	100 100 15	- - -	- 300 -	-	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	-	-	-200 -500	mV mV	I <sub>C</sub> = -20mA, I <sub>B</sub> = -2mA I <sub>C</sub> = -50mA, I <sub>B</sub> = -6mA
Base-Emitter Turn-On Voltage (Note 8)	V <sub>BE(on)</sub>	-	-	-0.9	V	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	-	-	-0.9	V	I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA
Output Capacitance	C <sub>obo</sub>	-	-	5	pF	V <sub>CB</sub> = -20V, f = 1MHz
Transition Frequency	f <sub>T</sub>	50	-	-	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -10mA, f = 20MHz
Turn-On Time	t <sub>on</sub>	-	95	-	ns	V <sub>CE</sub> = -100V, I <sub>C</sub> = -50mA
Turn-Off Time	t <sub>off</sub>	-	1600	-	ns	I <sub>B1</sub> = 5mA, I <sub>B2</sub> = -10mA

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

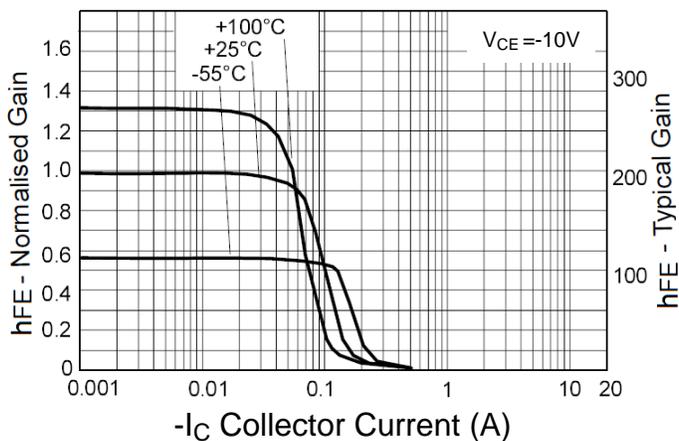
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



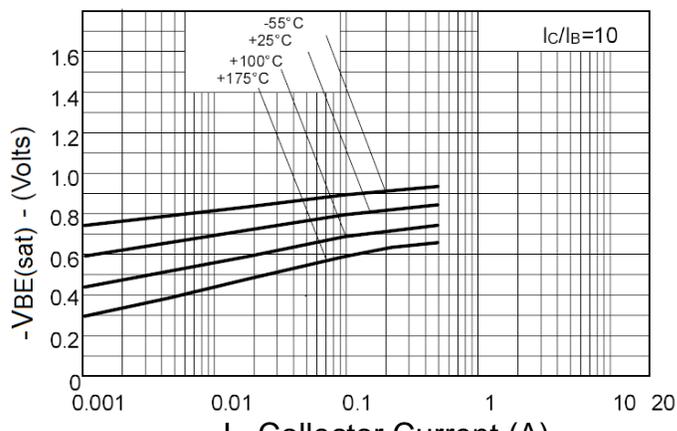
**Figure 5.  $V_{CE(sat)} \vee I_C$**



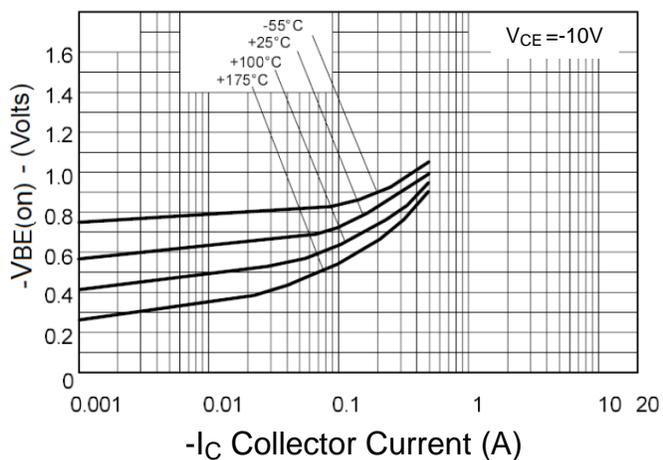
**Figure 6.  $V_{CE(sat)} \vee I_C$**



**Figure 7.  $h_{FE} \vee I_C$**



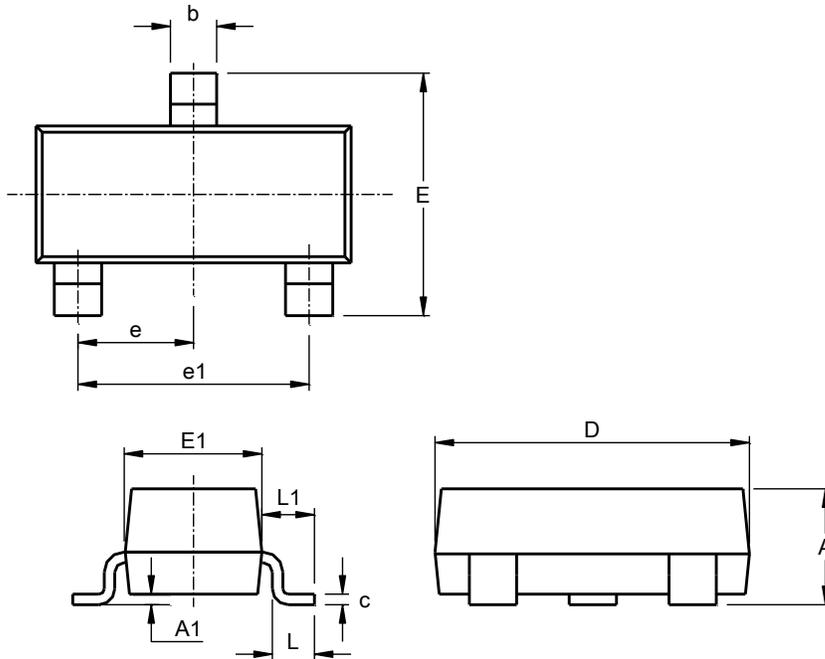
**Figure 8.  $V_{BE(sat)} \vee I_C$**



**Figure 9.  $V_{BE(on)} \vee I_C$**

## Package Outline Dimensions

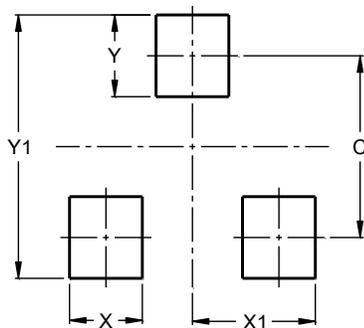
SOT23 (Type DN)



SOT23 Type DN			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

## Suggested Pad Layout

SOT23 (Type DN)



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9