



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



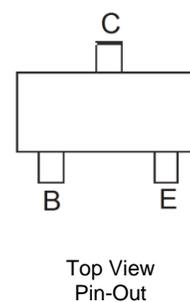
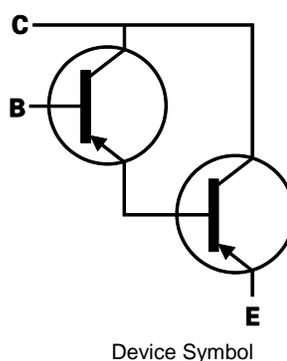
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## Features

- $BV_{CEO} > -100V$
- $I_C = -800mA$  High Continuous Collector Current
- Darlington Transistor  $h_{FE} > 20k$  @ 100mA for High Gain
- High Gain Hold-Up to 5A
- 625mW Power Dissipation
- Complementary Darlington NPN Type: NK-FMMT634

## 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)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-100	V
Emitter-Base Voltage	$V_{EBO}$	-12	V
Continuous Collector Current	$I_C$	-800	mA
Peak Pulse Current	$I_{CM}$	-5	A

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

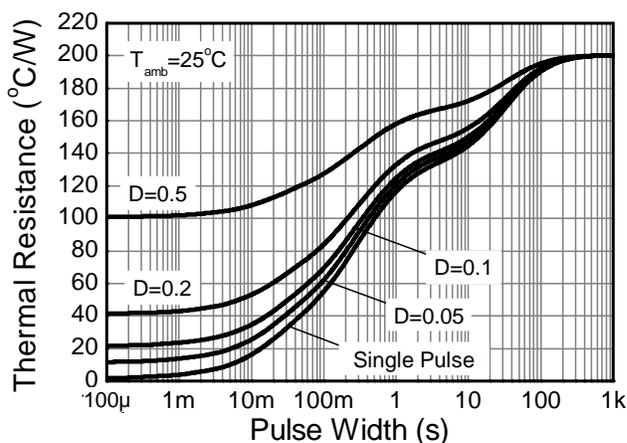
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	625	mW
Power Dissipation (Note 6)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	194	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 8)

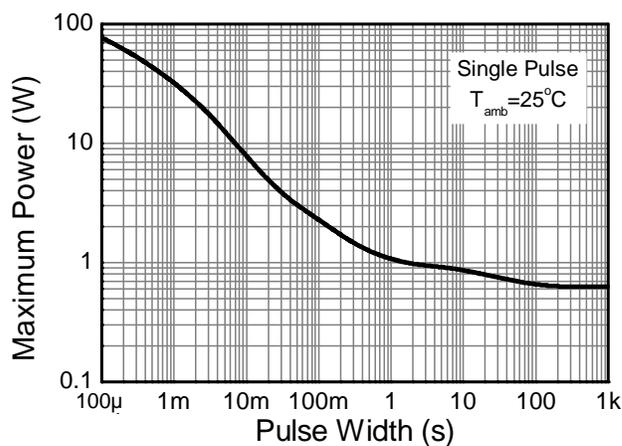
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	1C
Electrostatic Discharge - Machine Model	ESD MM	200	V	A

- Notes:
5. For a device surface mounted on 25mm X 25mm FR-4 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.
  6. Same as note 5, except the device is measured at  $t \leq 5$  sec.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

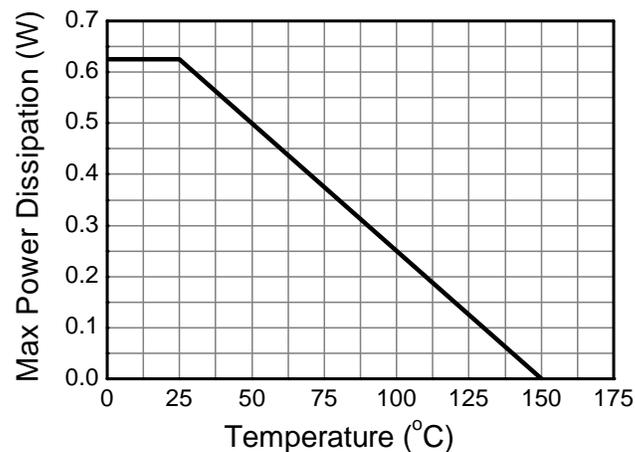
## Thermal Characteristics and Derating Information



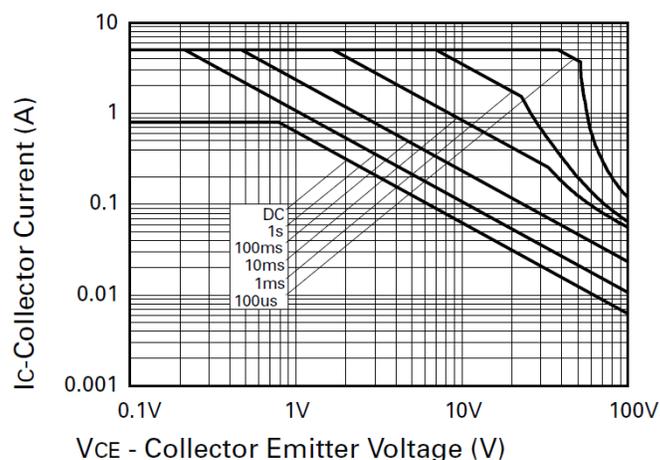
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Derating Curve**



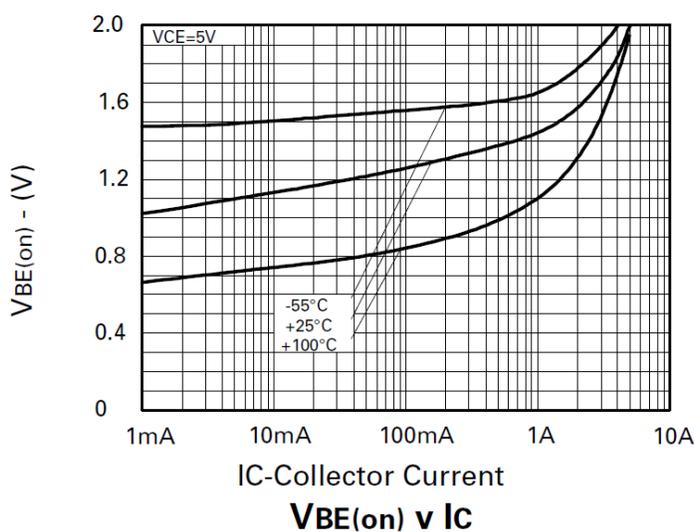
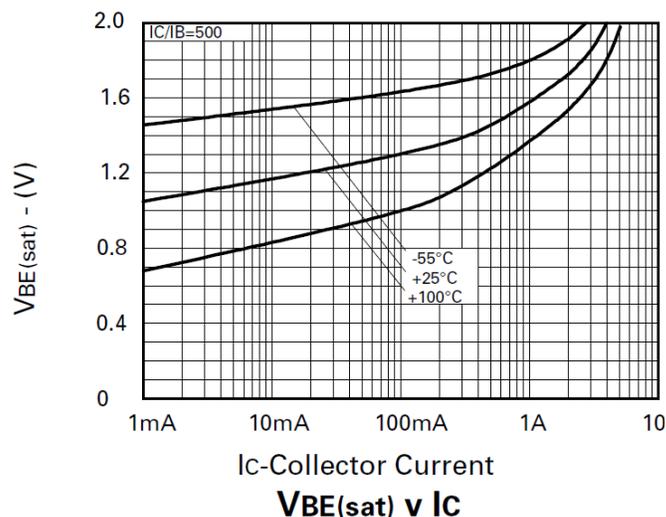
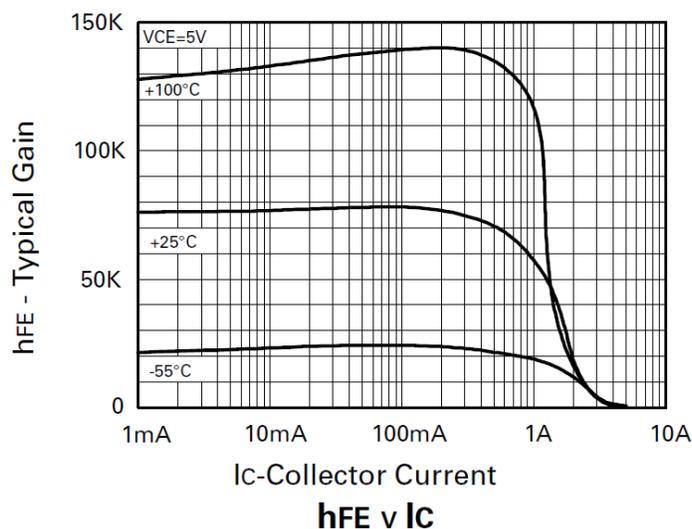
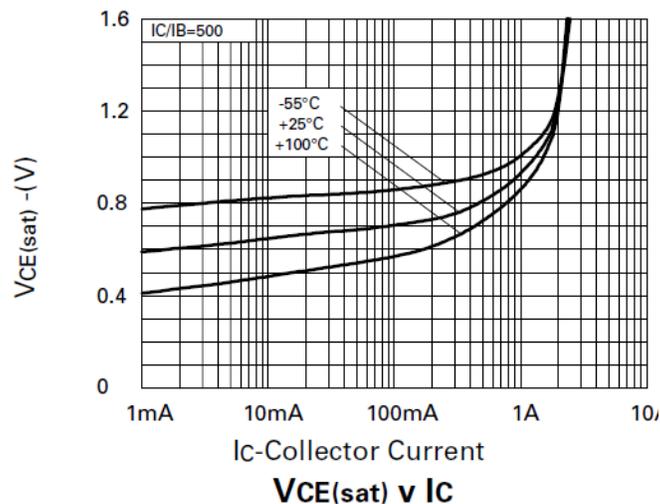
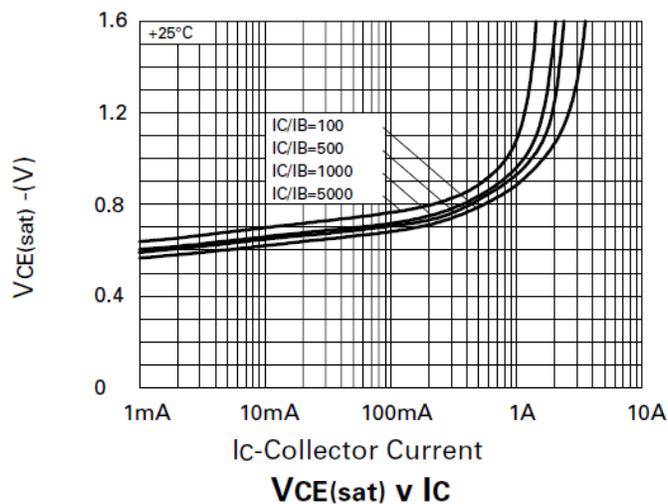
**Safe Operating Area**

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

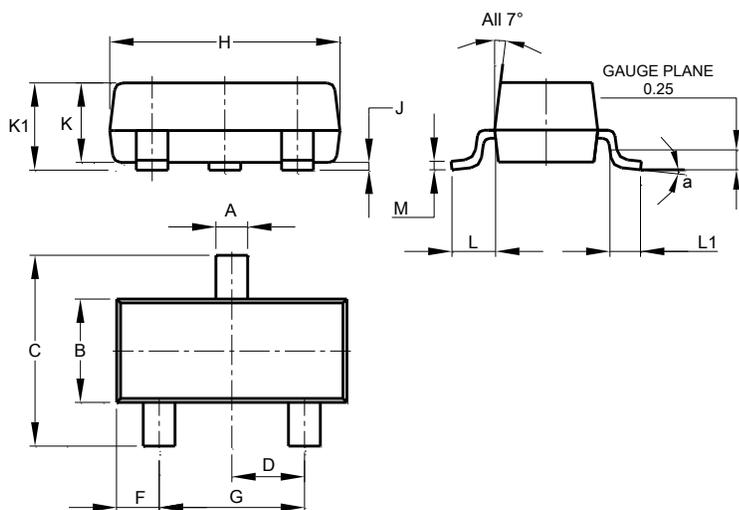
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-100	-130	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	-100	-116	-	V	I <sub>C</sub> = -5mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-12	-17	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	-10	nA	V <sub>CB</sub> = -80V
Collector Cutoff Current	I <sub>CES</sub>	-	-	-200	nA	V <sub>CES</sub> = -80V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-10	nA	V <sub>EB</sub> = -7V
<b>ON CHARACTERISTICS (Note 9)</b>						
Static Forward Current Transfer Ratio	h <sub>FE</sub>	- 20,000 15,000 5,000 - -	60,000 60,000 50,000 15,000 150 20,000	- - - - - -	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -5V I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V I <sub>C</sub> = -2A, V <sub>CE</sub> = -5V I <sub>C</sub> = -5A, V <sub>CE</sub> = -5V I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	-0.68 -0.72 -0.78 -0.86 -0.72 -0.90	-0.75 -0.80 -0.86 -0.97 - -1.05	V	I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -250mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -5mA I <sub>C</sub> = -800mA, I <sub>B</sub> = -5mA I <sub>C</sub> = -800mA, I <sub>B</sub> = -5mA, T <sub>J</sub> = +150°C I <sub>C</sub> = -1A, I <sub>B</sub> = -5mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	-	-1.6	-1.75	V	I <sub>C</sub> = -1A, I <sub>B</sub> = -5mA
Base-Emitter Turn-On Voltage	V <sub>BE(on)</sub>	-	-1.3	-1.75	V	I <sub>C</sub> = -1A, V <sub>CE</sub> = -5V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	f <sub>T</sub>	-	140	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -10mA, f = 100MHz
Output Capacitance	C <sub>obo</sub>	-	14	25	pF	V <sub>CB</sub> = -10V, f = 1MHz
Turn-On Time	t <sub>(on)</sub>	-	460	-	ns	I <sub>C</sub> = -500mA, V <sub>CC</sub> = -20V
Turn-Off Time	t <sub>(off)</sub>	-	1200	-	ns	I <sub>B</sub> = ±1mA

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

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

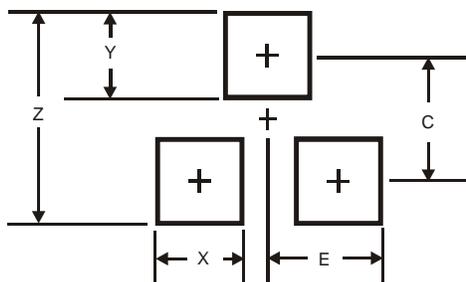


## Package Outline Dimensions

**SOT23**


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	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

## Suggested Pad Layout

**SOT23**


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

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.