优尚

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

- Avalanche Transistor
- 60A Peak Avalanche Current (Pulse width = 20ns)
- BV_{CES} > 260V (415) & 320V (417)
- BV_{CEO} > 100V
- Specifically designed for Avalanche mode operation

Description

The NK-FMMT415/417 are NPN silicon planar bipolar transistors designed for operating in avalanche mode. Tight process control and low inductance packaging combine to produce high-current pulses with fast edges.

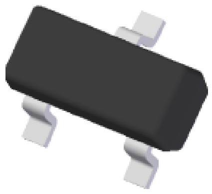
Mechanical Data

- 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 e3
- Weight: 0.008 grams (Approximate)

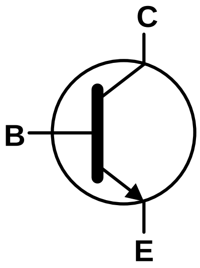
Applications

- Laser Diode Drivers for Ranging and Measurement (LIDAR)
- Radar Systems
- Fast Edge Switch Generator
- High Speed Pulse Generators

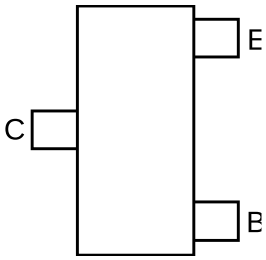
SOT23



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	FMMT415	FMMT417	Unit
Collector-Base Voltage	V_{CBO}	260	320	V
Collector-Emitter Voltage	V_{CES}	260	320	V
Collector-Emitter Voltage	V_{CEO}	100	100	V
Emitter-Base Voltage	V_{EBO}	6		V
Continuous Collector Current	I_C	500		mA
Peak Collector Current (Pulse Width = 20ns)	I_{CM}	60		A

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

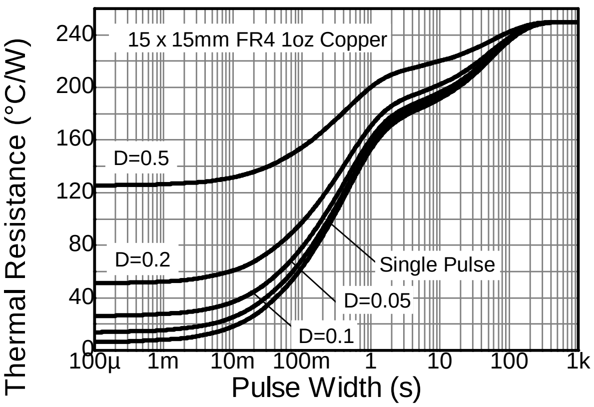
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	500	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction to Lead	(Note 6)	$R_{\theta JL}$	197	°C/W
Operating and Storage Temperature Range		$T_{J,}$ T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

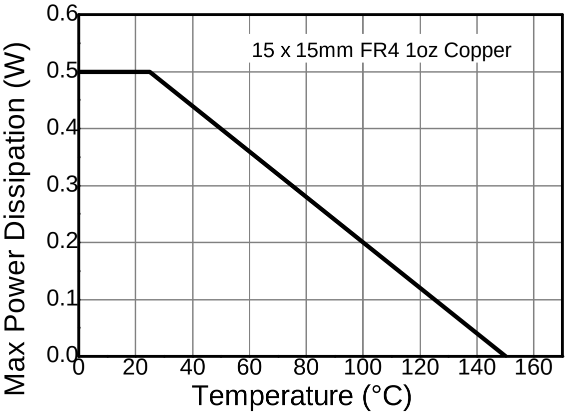
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 15mm x 15mm 1oz 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. Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

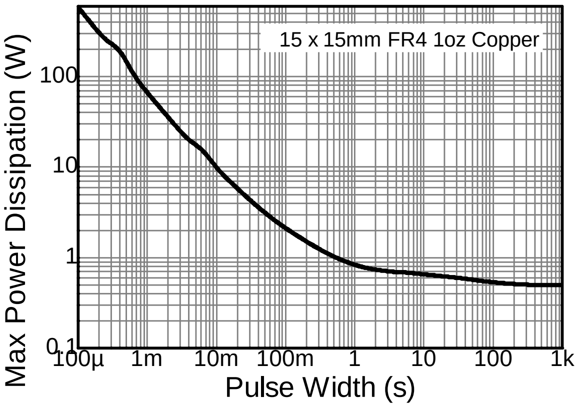
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



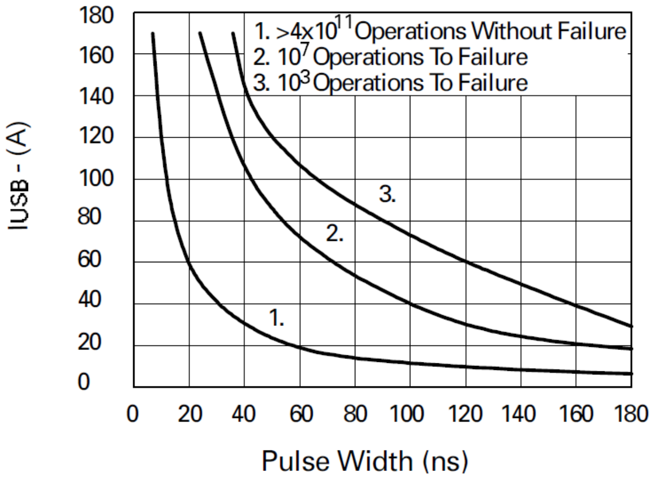
Pulse Power Dissipation

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

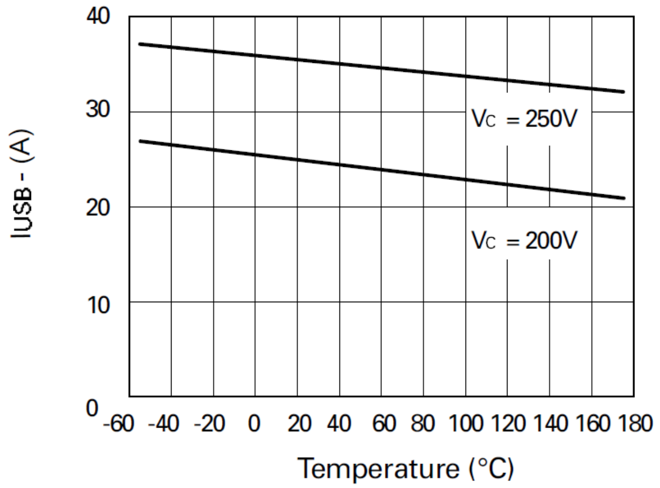
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	FMMT415	BV_{CES}	260	—	—	V	I_C = 1mA T_J = -55 to +150°C
	FMMT417		320	—	—		I_C = 1mA
Collector-Emitter Breakdown Voltage (Note 8)		BV_{CEO}	100	—	—	V	I_C = 100µA
Emitter-Base Breakdown Voltage		BV_{EBO}	6	—	—	V	I_E = 100µA
Collector Cutoff Current		I_{CBO}	—	—	100 10	nA µA	V_{CB} = 180V V_{CB} = 180V, T_J = +100°C
Emitter Cutoff Current		I_{EBO}	—	—	100	nA	V_{EB} = 4V
Static Forward Current Transfer Ratio (Note 8)		h_{FE}	25	—	—	—	I_C = 10mA, V_{CE} = 10V
Collector-Emitter Saturation Voltage (Note 8)		$V_{CE(sat)}$	—	—	500	mV	I_C = 10mA, I_B = 1mA
Base-Emitter Saturation Voltage (Note 8)		$V_{BE(sat)}$	—	—	900	mV	I_C = 10mA, I_B = 1mA
Pulsed Current in Second Breakdown		I_{USB}	— —	25 35	— —	A A	V_C = 200V, C_{CE} = 620pF V_C = 250V, C_{CE} = 620pF
Collector-Emitter Inductance		L_{ce}	—	2.5	—	nH	Standard SOT23 leads
Output Capacitance		C_{obo}	—	—	8	pF	V_{CB} = 20V, I_E = 0 f = 100MHz
Transition Frequency		f_T	40	—	—	MHz	V_{CE} = 20V, I_C = 10mA, f = 20MHz

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

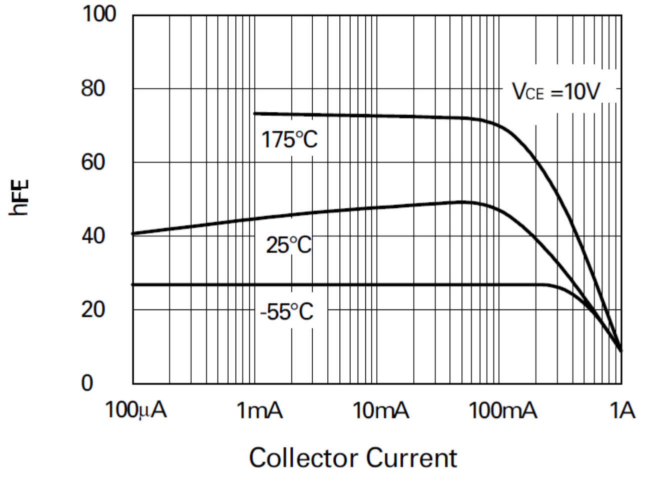
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



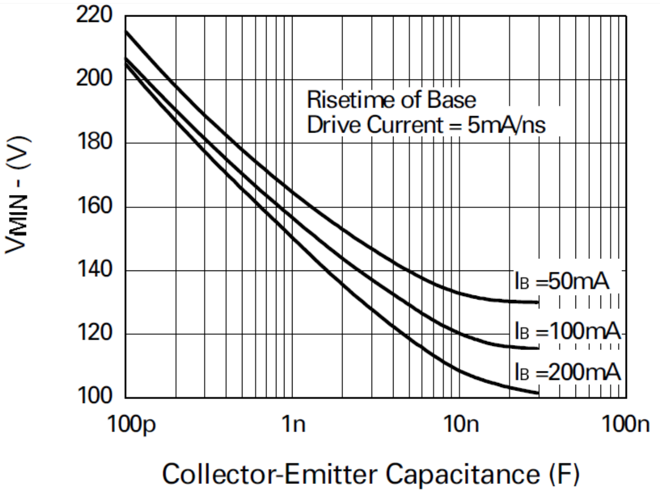
Maximum Avalanche Current v Pulse Width



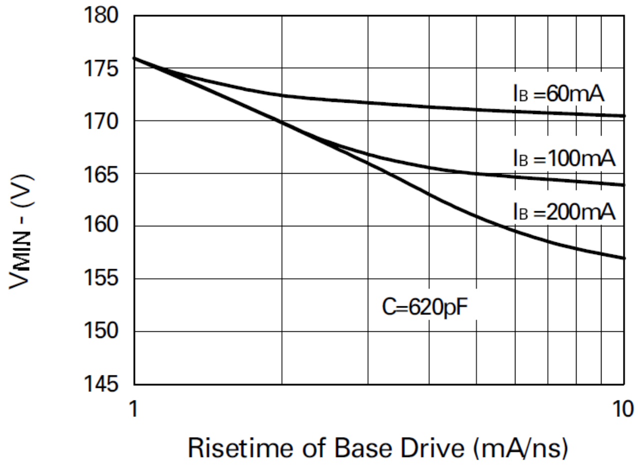
IUSB v Temperature for the specified conditions



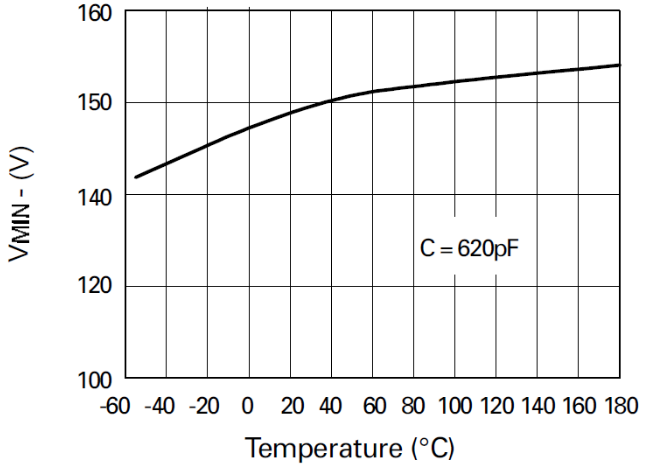
hFE v IC



Minimum starting voltage as a function of capacitance

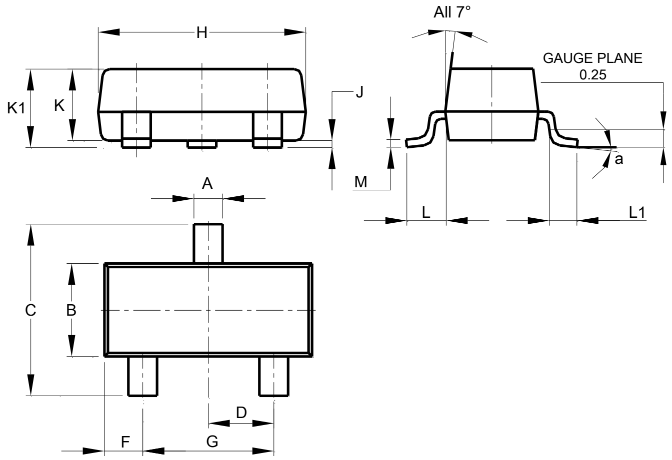


Minimum starting voltage as a function of drive current



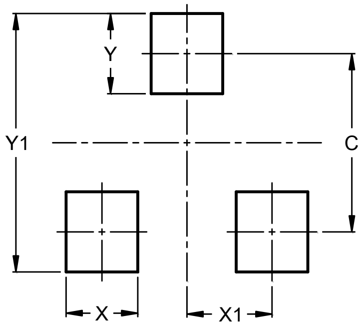
Minimum starting voltage as a function of temperature

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	0.890	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	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout



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

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.