



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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Description

This Bipolar Junction Transistor (BJT) has been designed to meet the stringent requirements of Automotive Applications.

Features

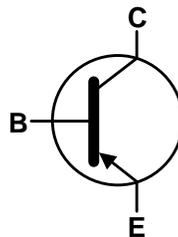
- $BV_{CEO} > -60V$
- $I_C = -1A$ High Continuous Collector Current
- $I_{CM} = -2A$ Peak Pulse Current
- $R_{SAT} = 295m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Characterized up to -2A for High Current Gain Hold Up
- Complementary NPN Type: NK-FMMT491Q

Mechanical Data

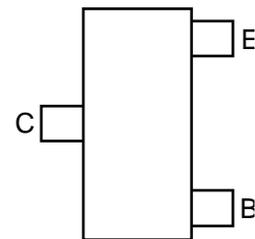
- Case: SOT23
- Case Material: molded plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	-80	V
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current	I _C	-1	A
Peak Pulse Current	I _{CM}	-2	A
Base Current	I _B	-200	mA

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

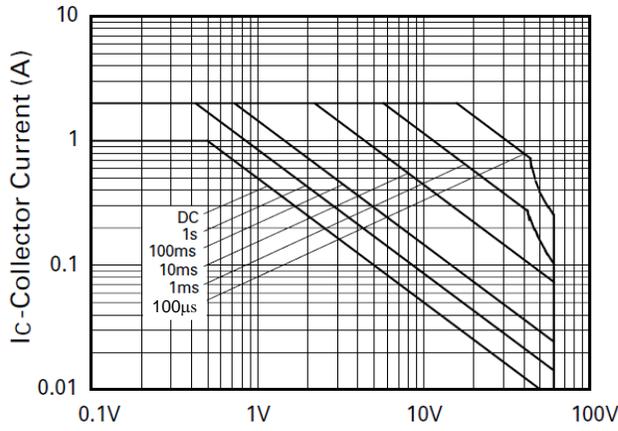
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R _{θJL}	197	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

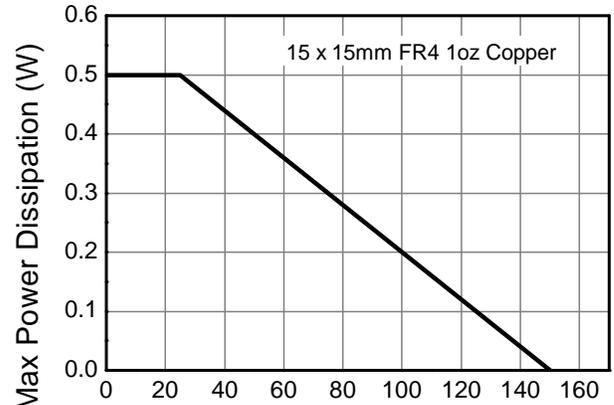
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 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.

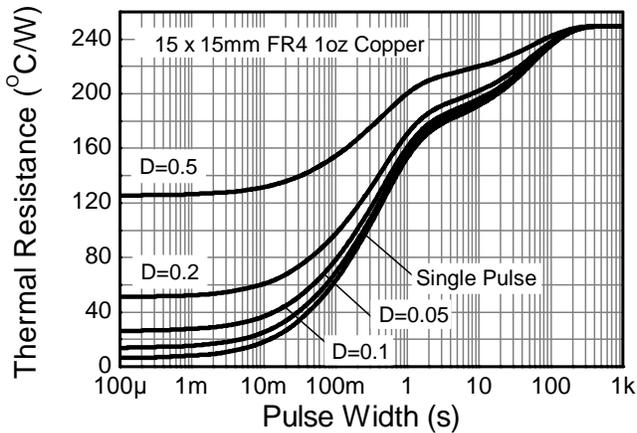
Thermal Characteristics and Derating Information



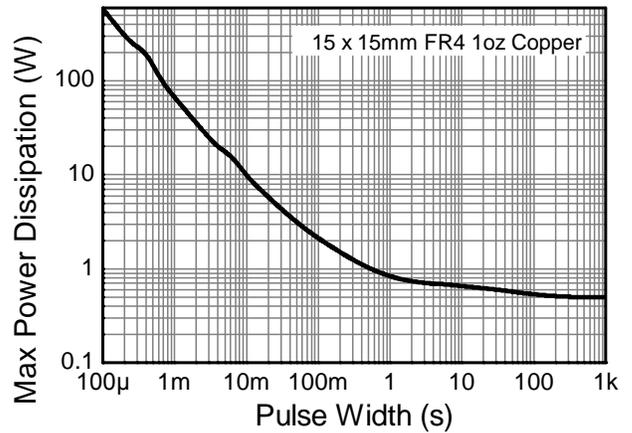
VCE - Collector Emitter Voltage (V)
Safe Operating Area



Temperature (°C)
Derating Curve



Transient Thermal Impedance



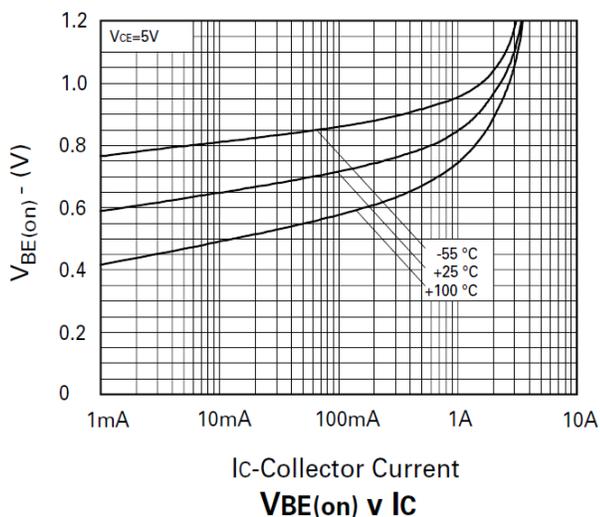
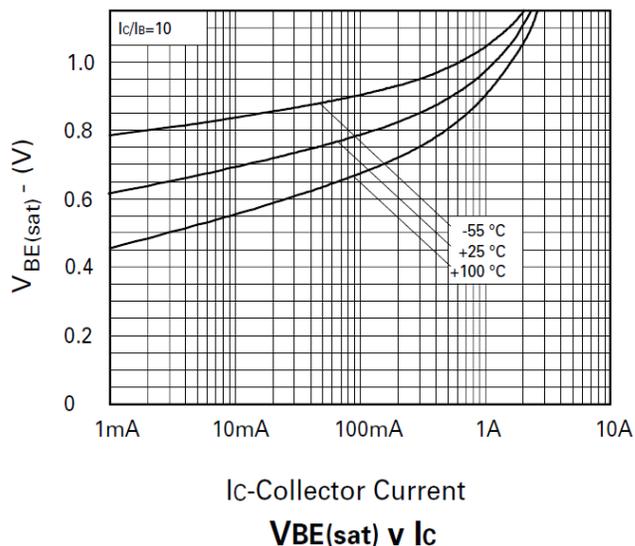
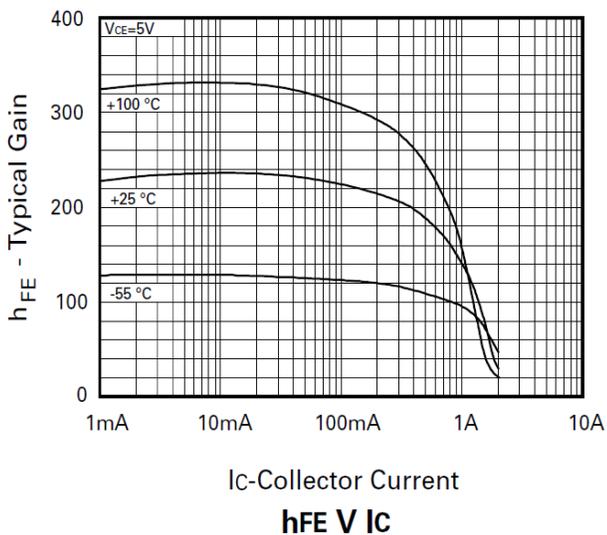
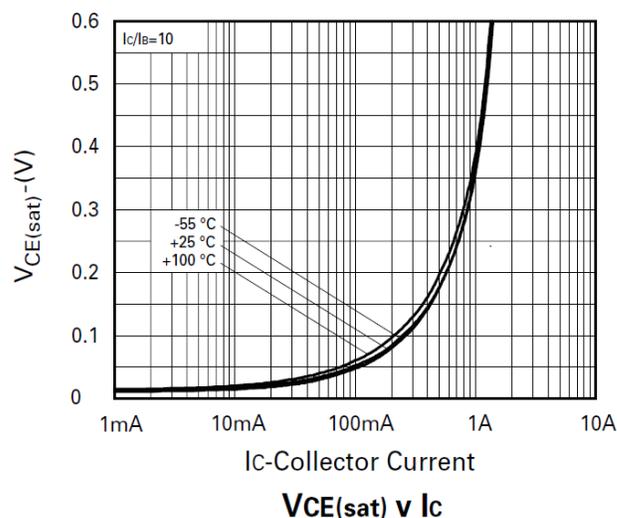
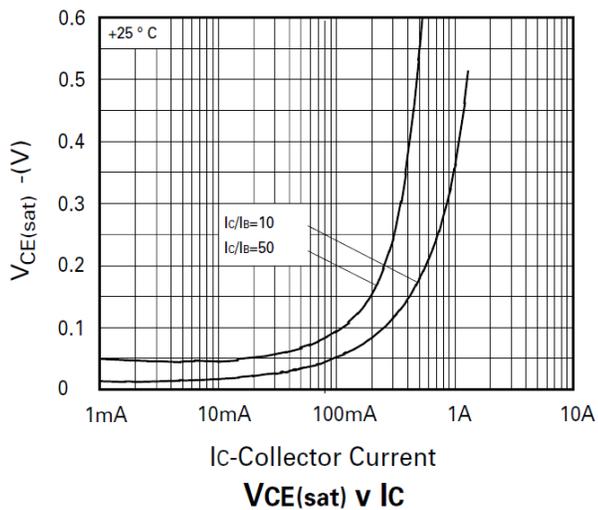
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BV _{CBO}	-80	—	—	V	I _C = -100μA	
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	-60	—	—	V	I _C = -10mA	
Emitter-Base Breakdown Voltage	BV _{EBO}	-7	-8.1	—	V	I _E = -100μA	
Collector-Base Cutoff Current	I _{CBO}	—	<1	-100	nA	V _{CB} = -60V	
Emitter-Base Cutoff Current	I _{EBO}	—	<1	-100	nA	V _{EB} = -5.6V	
Collector-Emitter Cut-Off Current	I _{CES}	—	<1	-100	nA	V _{CE} = -50V	
Static Forward Current Transfer Ratio (Note 9)	h _{FE}	100	220	—	—	I _C = -1mA, V _{CE} = -5V	
		100	175	300		I _C = -500mA, V _{CE} = -5V	
		80	155	—		I _C = -1A, V _{CE} = -5V	
		15	40	—		I _C = -2A, V _{CE} = -5V	
Collector-Emitter Saturation Voltage (Note 9)	V _{CE(SAT)}	—	-155 -295	-180 -350	mV	I _C = -500mA, I _B = -50mA I _C = -1A, I _B = -100mA	
Base-Emitter Saturation Voltage (Note 9)	V _{BE(SAT)}	—	965	-1200	mV	I _C = -1A, I _B = -100mA	
Base-Emitter Turn-On Voltage (Note 9)	V _{BE(ON)}	—	830	-1000	mV	I _C = -1A, V _{CE} = -5V	
Transition Frequency	f _T	150	—	—	MHz	V _{CE} = -10V, I _C = -50mA, f = 100MHz	
Output Capacitance	C _{obo}	—	—	10	pF	V _{CB} = -10V, f = 1MHz	
Switching Time	Delay Time	t _d	—	29.1	—	ns	V _{CC} = -10V, I _C = -500mA, I _{B1} = -I _{B2} = -25mA
	Rise Time	t _r	—	26.5	—		
	Storage Time	t _s	—	99.3	—		
	Fall Time	t _f	—	18.9	—		

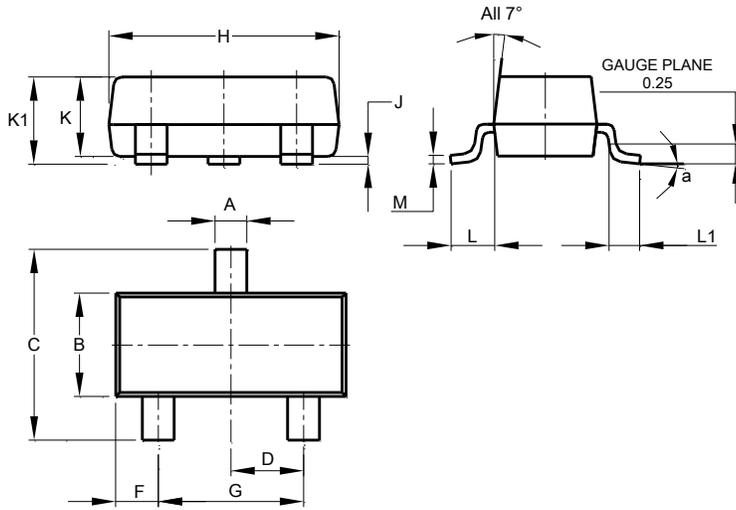
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

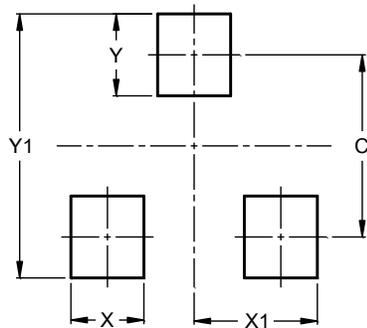
SOT23



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	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

SOT23



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