



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

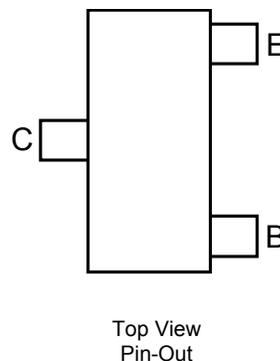
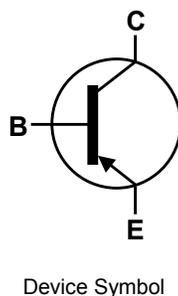
- $BV_{CEO} > -20V$
- $I_C = -1.5A$ Continuous Collector Current
- $I_{CM} = -6A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -200mV @ -1A$
- $R_{CE(SAT)} = 97m\Omega$ for a low equivalent on-resistance
- 625mW power dissipation
- h_{FE} characterized up to -6A for high current gain hold-up
- Complementary NPN Type: NK-FMMT618Q

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

- Gate Driving MOSFETs and IGBTs
- DC-DC Converters
- Charging circuit
- Power switches



Absolute 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	-1.5	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.)

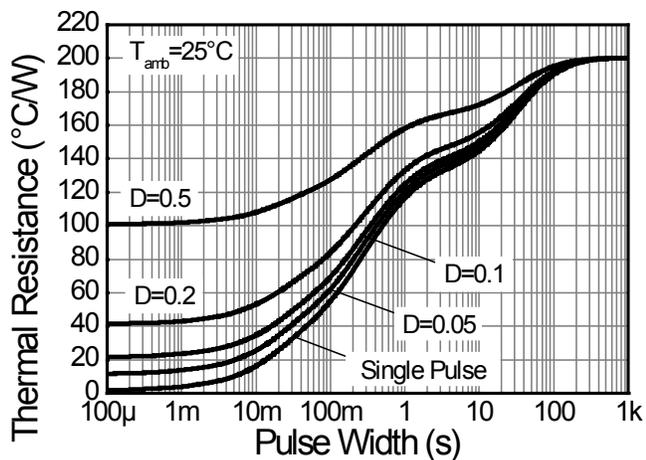
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	625	mW
Power Dissipation (Note 6)	P_D	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	155	$^\circ\text{C/W}$
Thermal Resistance,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

ESD Ratings (Note 8)

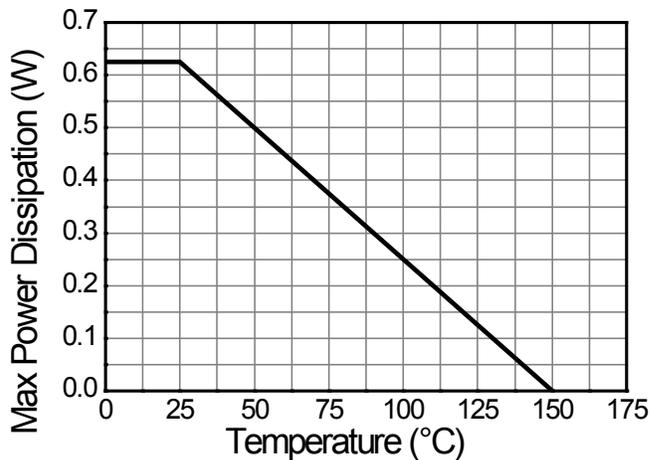
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- Notes:
5. 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.
 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.

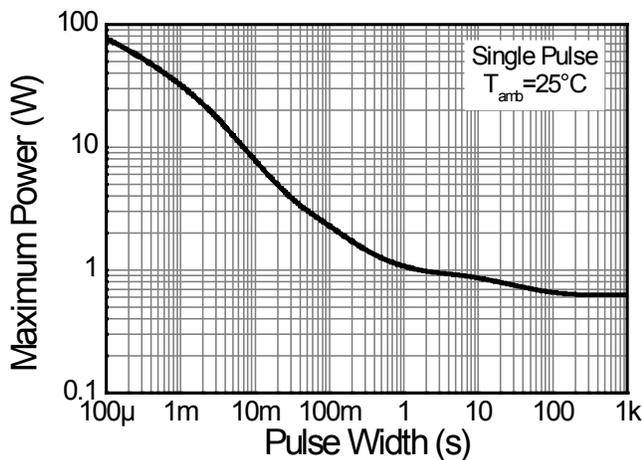
Thermal Characteristics and Derating information



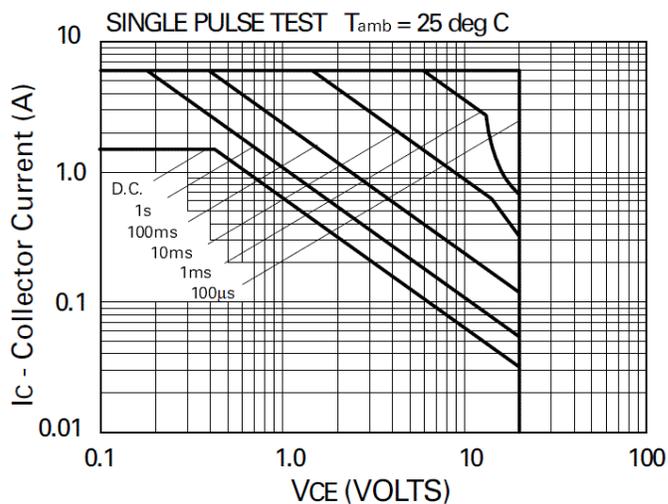
Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation



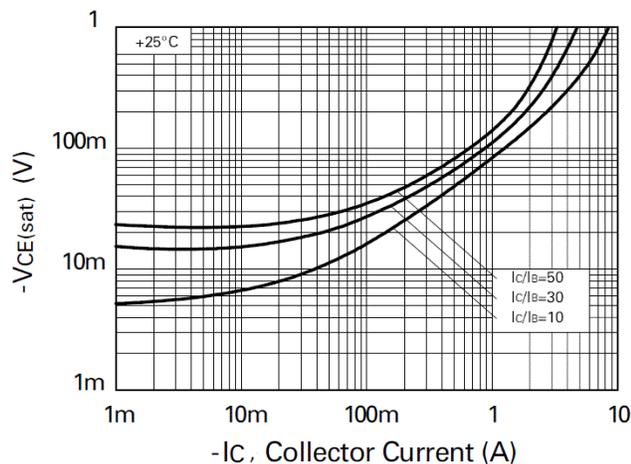
Safe Operating Area

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

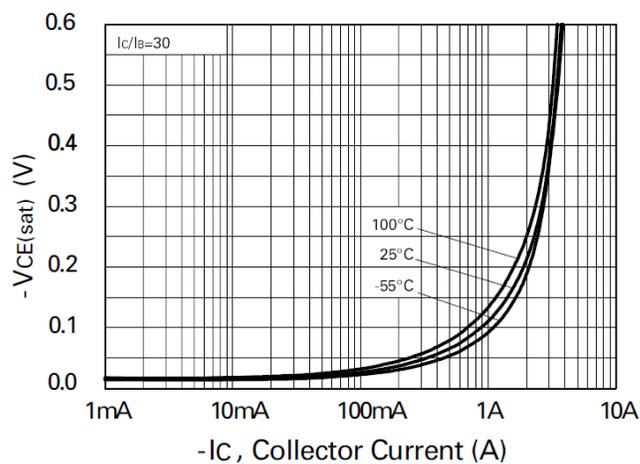
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-20	-65	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-20	-55	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.8	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	$V_{CB} = -15\text{V}$
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	$V_{CE} = -15\text{V}$
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	300	475	-	-	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		300	450	-		$I_C = -100\text{mA}, V_{CE} = -2\text{V}$
		150	230	-		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
		35	70	-		$I_C = -4\text{A}, V_{CE} = -2\text{V}$
		15	30	-		$I_C = -6\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	-	-16	-40	mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}$
		-	-130	-200	mV	$I_C = -1\text{A}, I_B = -20\text{mA}$
		-	-145	-220	mV	$I_C = -1.5\text{A}, I_B = -50\text{mA}$
Base-Emitter Turn-On Voltage(Note 9)	$V_{BE(on)}$	-	-0.81	-1.0	V	$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Base-Emitter Saturation Voltage(Note 9)	$V_{BE(sat)}$	-	-0.87	-1.0	V	$I_C = -1.5\text{A}, I_B = -50\text{mA}$
Output Capacitance	C_{obo}	-	34	43	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	150	180	-	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Turn-On Time	t_{on}	-	68	-	ns	$V_{CC} = -10\text{V}, I_C = -1\text{A}$
Turn-Off Time	t_{off}	-	270	-	ns	$I_{B1} = I_{B2} = -20\text{mA}$

 Notes: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$

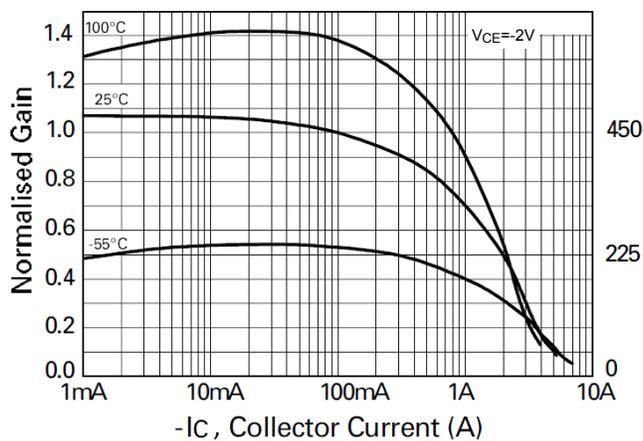
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



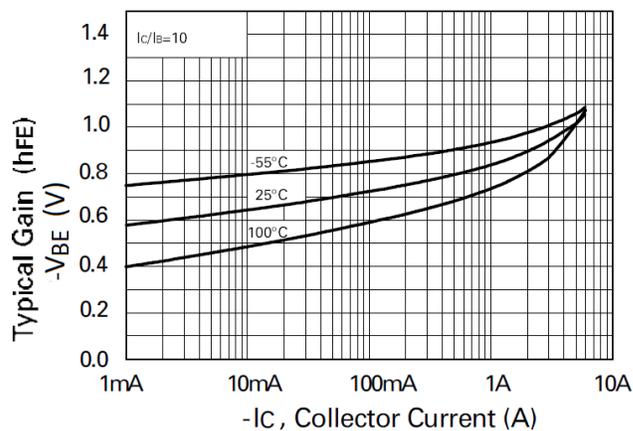
$V_{CE(sat)} \text{ v } I_C$



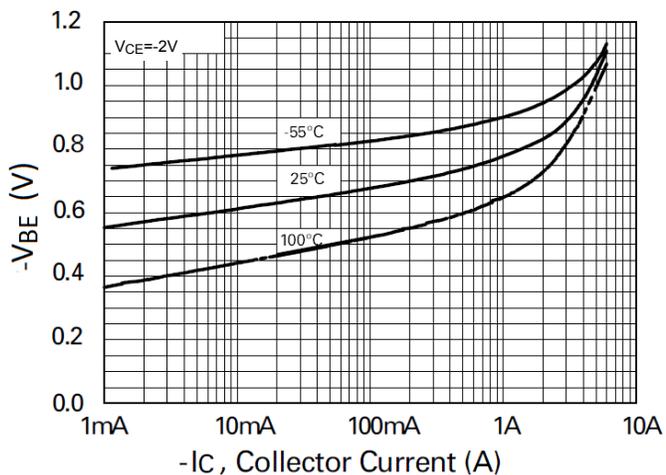
$V_{CE(sat)} \text{ v } I_C$



$h_{FE} \text{ v } I_C$



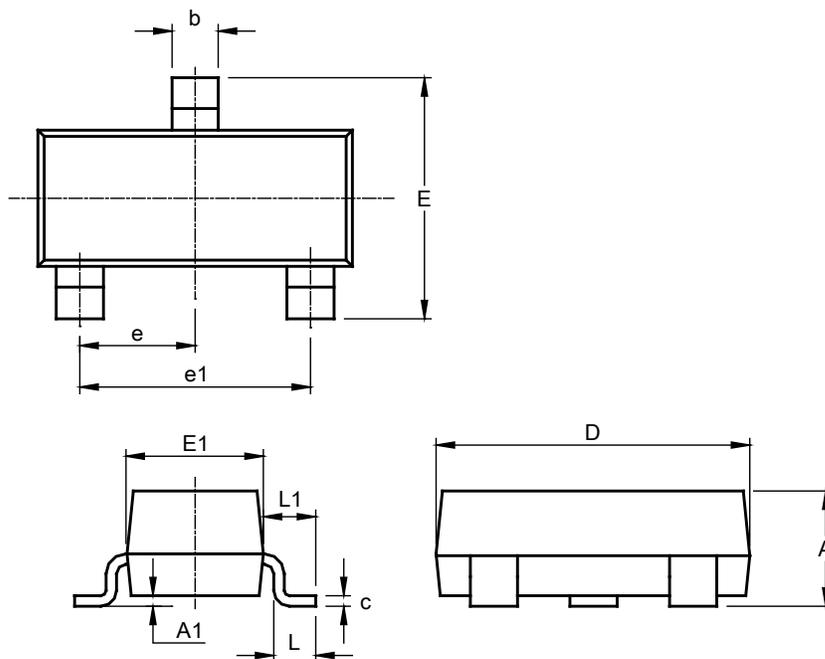
$V_{BE(sat)} \text{ v } I_C$



$V_{BE(on)} \text{ v } I_C$

Package Outline Dimensions

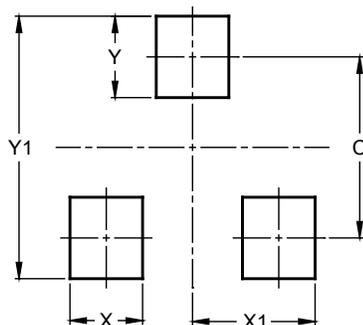
SOT23 (Type DN)



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