



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

- $BV_{CEO} > 50V$
- $I_C = 2A$ Continuous Collector Current
- 625mW Power Dissipation
- Low Saturation Voltage $V_{CE(sat)} < 200mV @ 1A$
- $R_{CE(sat)} = 68m\Omega$ for a Low Equivalent On-Resistance
- h_{FE} Characterised up to 6A for High Current Gain Hold-up
- Complementary PNP Type: DIODES™ NK-FMMT720Q

Mechanical Data

- Package: SOT23
- Package 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 [\(3\)](#)
- Weight 0.008 grams (Approximate)

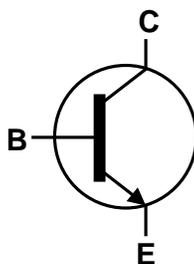
Applications

- MOSFET gate driving
- DC-DC / DC-AC converters
- Regulators
- LED drivers
- Motor controls

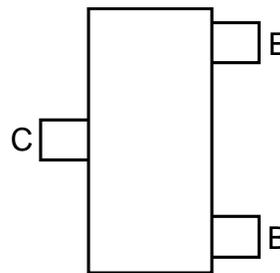
SOT23 (Type DN)



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 _{CB0}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	2	A
Peak Pulse Current	I _{CM}	6	A
Base Current	I _B	500	mA

Thermal Characteristics (@T_A = +25°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 _{θJA}	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	155	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R _{θJL}	194	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz 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 ≤ 5 sec.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).

Thermal Characteristics and Derating Information

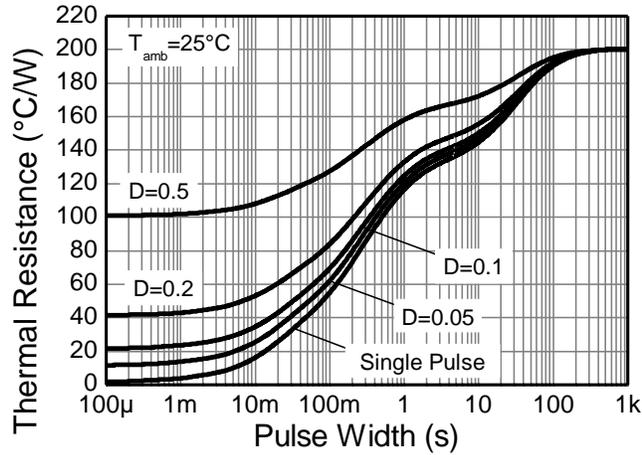


Figure 1. Transient Thermal Impedance

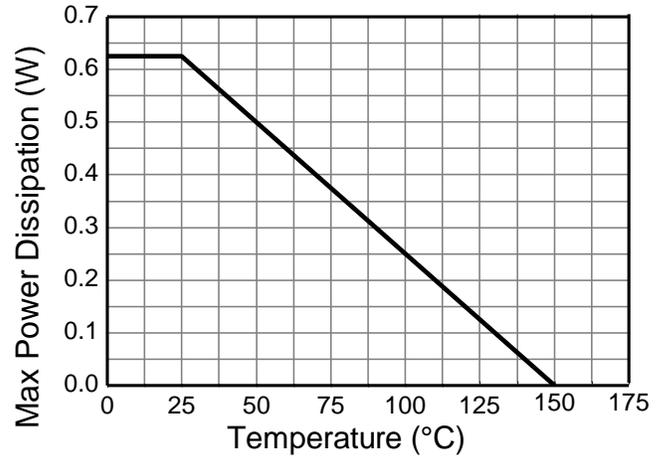


Figure 2. Derating Curve

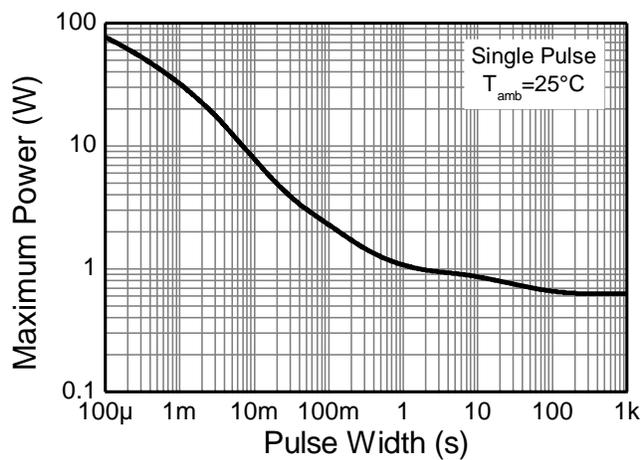


Figure 3. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	50	190	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	50	65	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	$I_E = 100\mu\text{A}$
Collector Cut-off Current	I_{CBO}	—	—	100	nA	$V_{CB} = 40\text{V}$
Emitter Cut-off Current	I_{EBO}	—	—	100	nA	$V_{EB} = 6\text{V}$
Collector Emitter Cut-off Current	I_{CES}	—	—	100	nA	$V_{CES} = 40\text{V}$
ON CHARACTERISTICS (Note 8)						
Static Forward Current Transfer Ratio	h_{FE}	200	400	—	—	$I_C = 10\text{mA}, V_{CE} = 2\text{V}$ $I_C = 200\text{mA}, V_{CE} = 2\text{V}$ $I_C = 1\text{A}, V_{CE} = 2\text{V}$ $I_C = 2\text{A}, V_{CE} = 2\text{V}$ $I_C = 6\text{A}, V_{CE} = 2\text{V}$
		300	450	—		
		200	400	—		
		100	225	—		
		—	40	—		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	10	20	mV	$I_C = 0.1\text{A}, I_B = 10\text{mA}$ $I_C = 1\text{A}, I_B = 10\text{mA}$ $I_C = 2\text{A}, I_B = 50\text{mA}$
		—	125	200		
		—	150	220		
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	0.87	1.0	V	$I_C = 2\text{A}, I_B = 50\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	0.82	1.0	V	$I_C = 2\text{A}, V_{CE} = 2\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	100	165	—	MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Collector Output Capacitance	C_{obo}	—	12	20	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Turn-On Time	t_{on}	—	170	—	ns	$V_{CC} = 10\text{V}, I_C = 1\text{A}$ $I_{B1} = -I_{B2} = 10\text{mA}$
Turn-Off Time	t_{off}	—	750	—	ns	

 Note: 8. 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.)

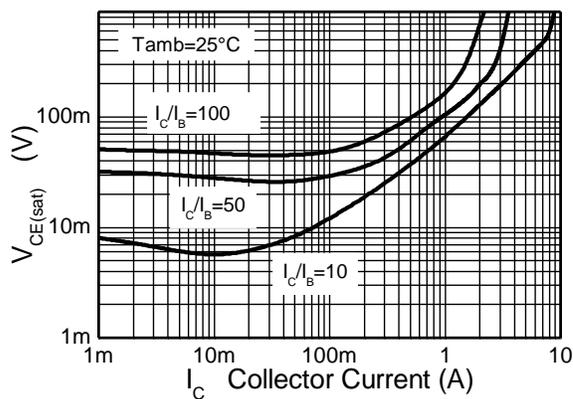


Figure 4. $V_{CE(sat)}$ v I_C

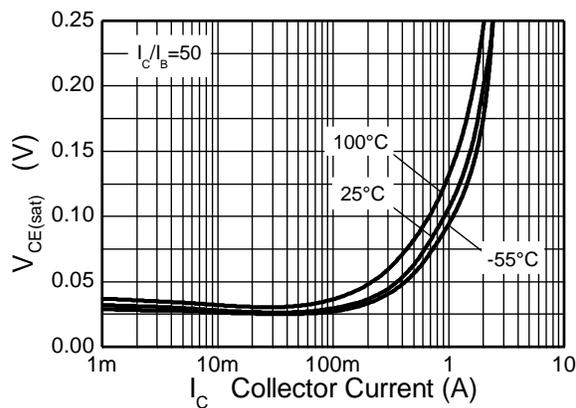


Figure 5. $V_{CE(sat)}$ v I_C

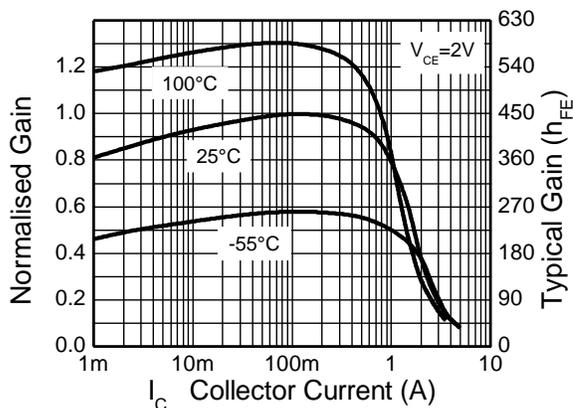


Figure 6. h_{FE} v I_C

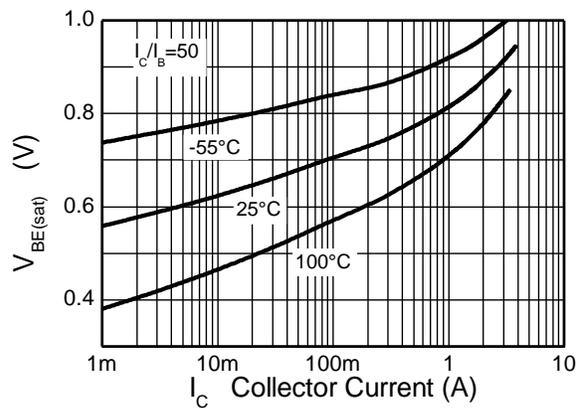


Figure 7. $V_{BE(sat)}$ v I_C

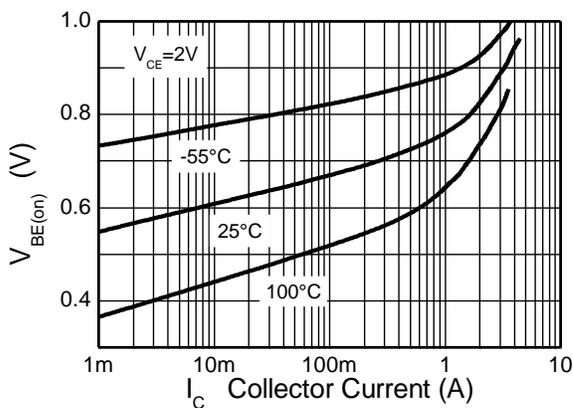
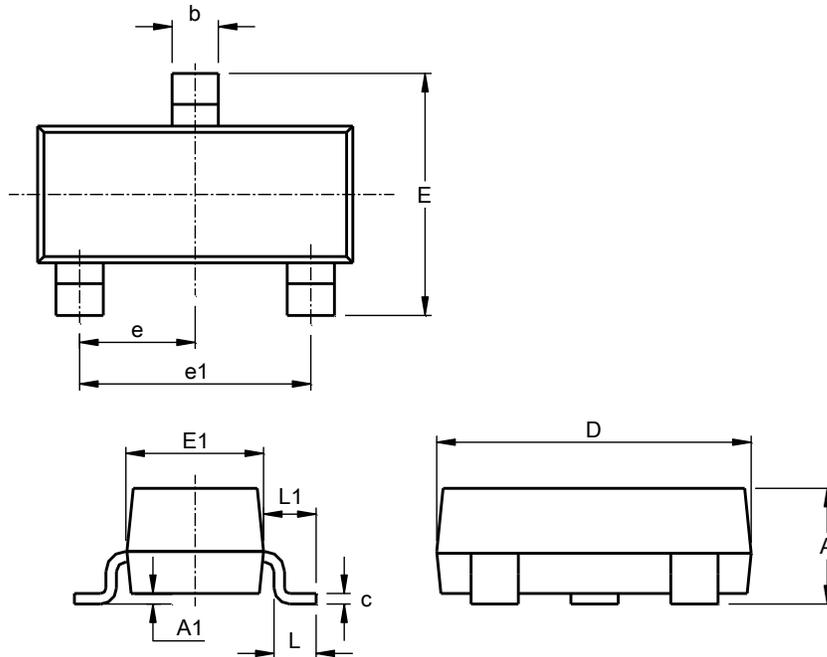


Figure 8. $V_{BE(on)}$ v I_C

Package Outline Dimensions

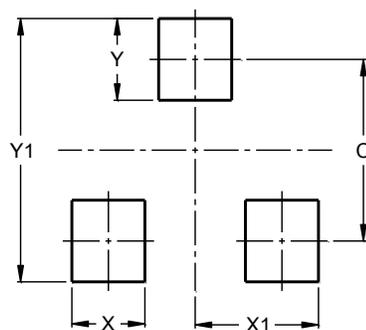
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SOT23 Type DN			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

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