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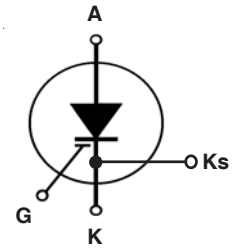
Contact us

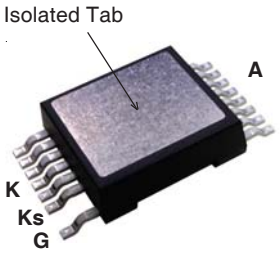
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

1500V MOS Gated Thyristor

MMJX1H40N150 **V_{DM} = 1500V**

(Electrically Isolated Tab)





Symbol	Test Conditions	Maximum Ratings	
V_{DM}	T_J = 25°C to 150°C	1500	V
V_{GK}	Continuous	±30	V
V_{GK}	Transient	±40	V
I_{TSM}	T_C = 25°C, 1µs	15.5	kA
	T_C = 25°C, 10µs	6.4	kA
P_D	T_C = 25°C	320	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10s	260	°C
V_{ISOL}	50/60Hz, 1 minute	2500	V~
F_C	Mounting Force	50..200/11..45	N/lb
Weight		5	g

G = Gate K = Cathode
A = Anode Ks = Cathode Sense

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_{BR}	I_A = 250µA, V_{GK} = 0V	1500			V
$V_{GK(th)}$	I_A = 250µA, V_{AK} = V_{GK}	2.5		5.0	V
V_T	I_T = 1000A, V_{GK} = 15V		4.75	6.0	V
r_T	I_T > I_L, V_{GK} = 15V		1.20		mΩ
V_{BO}	V_{GK} = 15V		5.25		V
I_D	V_{AK} = 1500V, V_{GK} = 0V			15	µA
	T_J = 125°C			1.5	mA
I_L			250		A
I_H			200		A
I_{GKS}	V_{AK} = 0V, V_{GK} = ±30V			±200	nA

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Very High Current Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Capacitive Discharge Circuits
- Ignition Circuits
- Solid State Surge Protection

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
C_{iks}	V_{AK} = 25V, V_{GK} = 0V, f = 1MHz		2825	pF
C_{oks}			164	pF
C_{rks}			50	pF
$Q_{g(on)}$	I_C = 40A, V_{GK} = 15V, V_{AK} = 600V		99	nC
Q_{gk}			22	nC
Q_{ga}			36	nC
t_{ri}	**Capacitive Discharge, T_J = 25°C**		100	ns
t_d	I_A = 2000A, V_{GK} = 15V, R_G = 1Ω V_{AK} = 1000V, L < 20nH, Notes 2 & 3		50	ns
t_{ri}	**Capacitive Discharge, T_J = 125°C**		100	ns
t_d	I_A = 2000A, V_{GK} = 15V, R_G = 1Ω V_{AK} = 1000V, L < 20nH, Notes 2 & 3		50	ns
R_{thJC}				0.39 °C/W
R_{thCS}			0.12	°C/W
R_{thJA}			30	°C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. It is recommended to use a gate driver capable of supplying more than 4Amps and ≥15V gate voltage.
3. Refer to fig. 8 & 9.

Fig. 1. Extended Output Characteristics @ T_J = 25°C

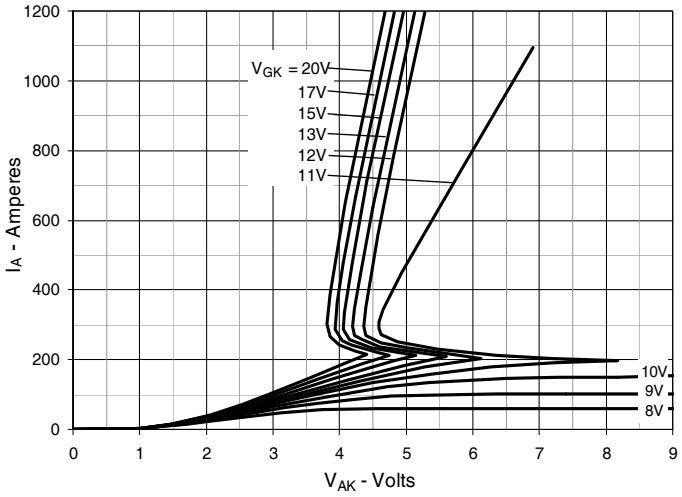


Fig. 2. Extended Output Characteristics @ T_J = 125°C

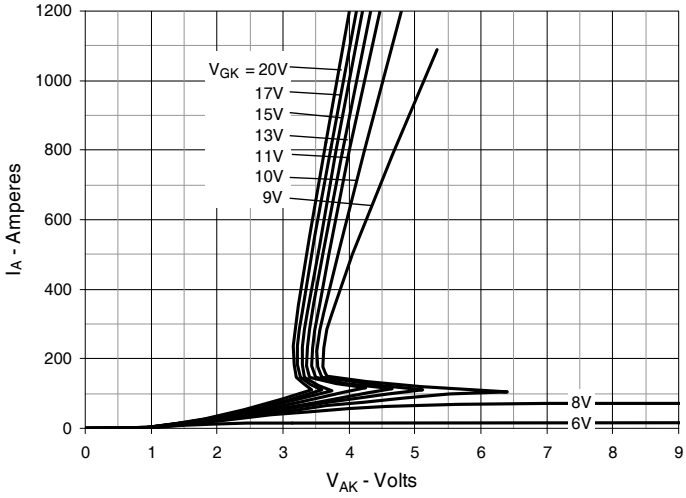


Fig. 3. Extended Output Characteristics @ T_J = - 40°C

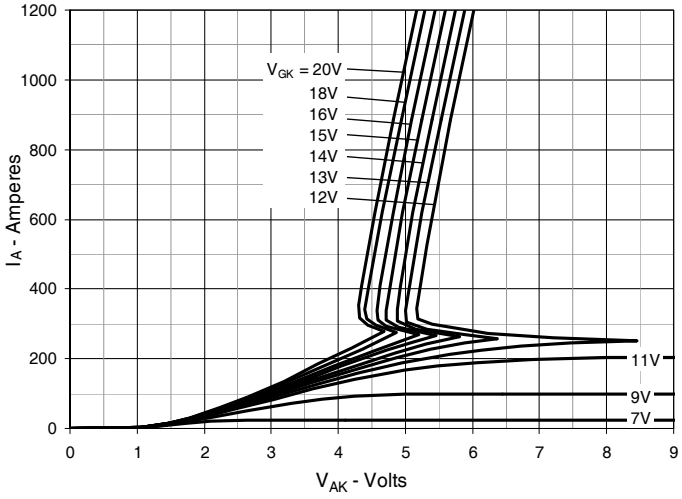


Fig. 4. Gate Charge

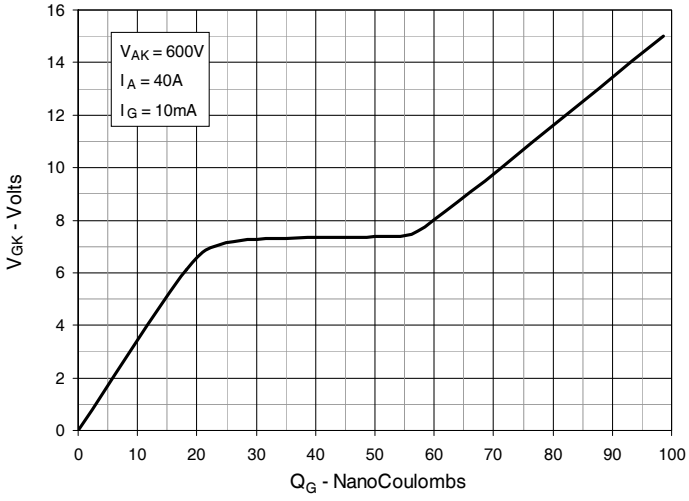


Fig. 5. Capacitance

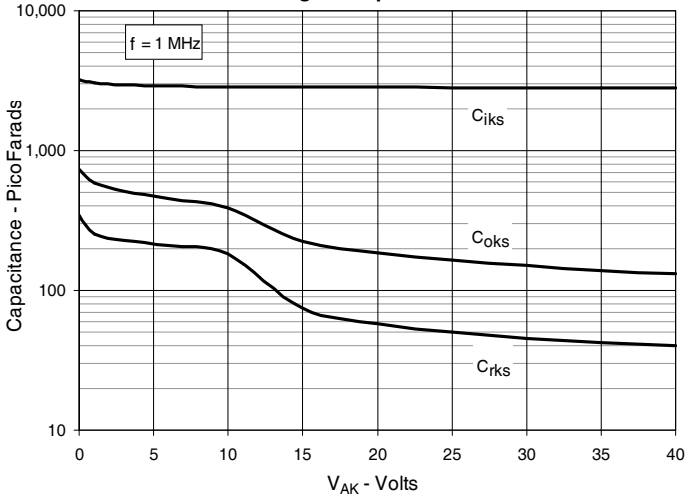


Fig. 6. Maximum Transient Thermal Impedance

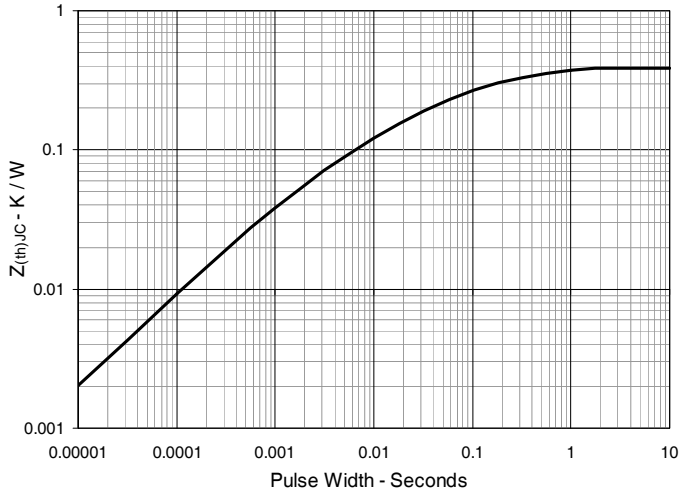
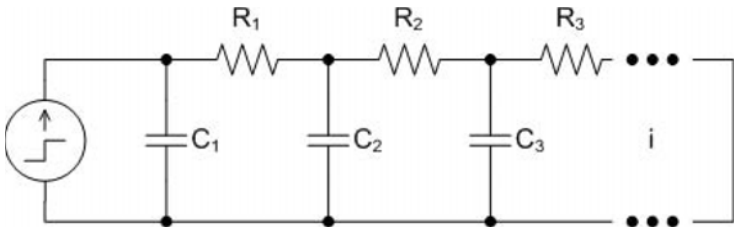


Fig. 7. Cauer Thermal Network



i	Ri (Ω)	Ci (F)
1	0.014083	0.0078555
2	0.068078	0.0196550
3	0.133430	0.1199600
4	0.121939	2.5000000

Fig. 8. Capacitive Discharge

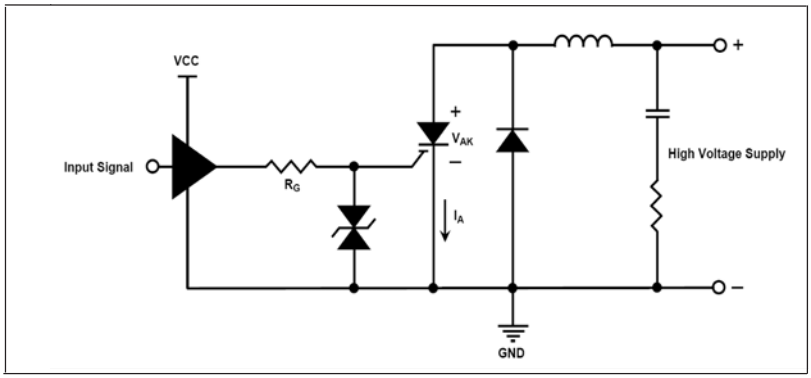
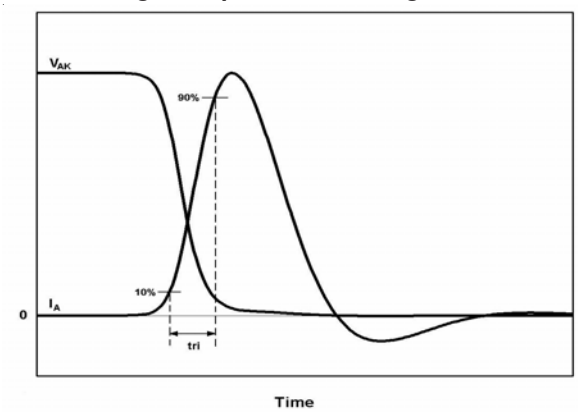
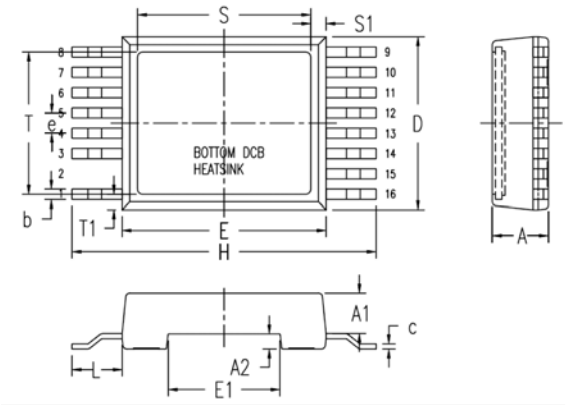
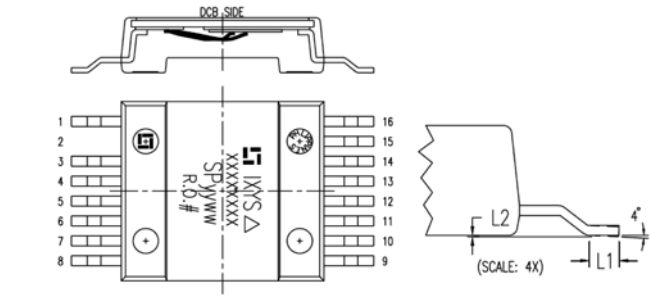


Fig. 9. Capacitive Discharge Waveform







SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.661	.677	16.80	17.20
E	.780	.795	19.80	20.20
E1	.425	.441	10.80	11.20
e	.079 BSC		2.00 BSC	
H	1.161	1.185	29.50	30.10
L	.181	.209	4.60	5.30
L1	.051	.067	1.30	1.70
L2	.000	.006	0.00	0.15
S	.661	.677	16.80	17.20
S1	.051	.067	1.30	1.70
T	.543	.559	13.80	14.20
T1	.051	.067	1.30	1.70

NOTE:
1. ALL LEADS ARE MATTE PURE TIN PLATED.
2. CU SURFACE OF BOTTOM DCB IS PRE-NI PLATED UNLESS OTHERWISE.
3. CU SURFACE OF BOTTOM DCB IS ELECTRICALLY ISOLATED 2,500V AC FROM ALL OTHER LEADS.
4. UNLESS OTHER SPECIFED, PIN OUT ARE AS FOLLOWS.

PINS:
1 - GATE
3 - Ks = Cathode Sense
4 - 8 - K = Cathode
9 - 16 - A = Anode