MMK40J160D

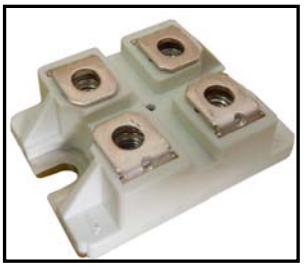
1600V 40A thyristor Module
RoHS Compliant

MACMIC

March 2011 PRELIMINARY

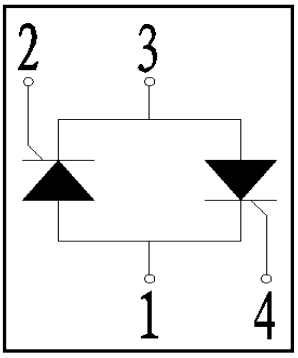
Features

- Isolation voltage 3500 V~
- Industrial Standard Package
- High Surge Capability
- Glass Passivated Chips
- Simple Mounting
- Electrically Isolated by DBC Ceramic



Applications

- DC Motor Control and Drives
- Battery Charges
- Welders
- Power Converters
- Lighting Control
- Heat and Temperature Control



Advantages

- Space and weight savings
- Improved temperature and power cycling

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Test Condition	Value	Unit
V_{RRM} /V_{DRM}		1600	V
$I_{T(AV)}$	T_C=85℃, 180° conduction, half sine wave;	40	A
$I_{T(RMS)}$	as AC switch;	100	A
I_{TSM}	T_J=45℃, t=10ms (50Hz), sine, V_R=0;	850	A
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R=0;	890	
	T_J=45℃, t=10ms (50Hz), sine, V_R=V_{RRM};	715	
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R= V_{RRM};	750	
I^2t	T_J=45℃, t=10ms (50Hz), sine, V_R=0;	3.61	K A^2s
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R=0;	3.3	
	T_J=45℃, t=10ms (50Hz), sine, V_R=V_{RRM};	2.56	
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R= V_{RRM};	2.33	
I_{DRM}/I_{RRM}	V_D=V_R=1600V, gate open circuit;	0.5	mA
I_{DRM}/I_{RRM}	T_J=125℃, V_D=V_R=1600V, gate open circuit;	15	mA
dv/dt	T_J=125℃, exponential to 67% rated V_{DRM}	500	V/us
V_{ISOL}	50Hz, all terminals shorted, t=1s, I_{ISOL}≤1mA ;	3500	V~
T_J	Max. junction operating temperature range	-40～125	℃
T_{STG}	Max. storage temperature range	-40～125	℃

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ELECTRICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Test Condition	Min.	Typ.	Max.	Unit
V_{TO}	16.7% x p x I_{AV}＜ I＜p x I_{AV}, T_J =130°C;			0.88	V
	I＞ p x I_{AV} , T_J =130°C;			0.91	V
r_t	16.7% x p x I_{AV}＜ I＜p x I_{AV}, T_J =130°C;			5.9	mΩ
	I＞ p x I_{AV} , T_J =130°C;			5.74	mΩ
I_H	V_{AK}= 6V, resistive load;			200	mA
I_L	Anode supply =6V, resistive load=1Ω, gate pulse =10V, 100us;			400	mA
V_{TM}	I_{TM}=150A, t_d=10 ms, half sine			2.1	V
P_{GM}	t_p≤5ms, T_J=125°C;			10	W
$P_{GM(AV)}$	f=50Hz, T_J =125°C;			2.5	W
I_{GM}	t_p≤5ms, T_J =125°C;			2.5	A
$-V_{GT}$				10	V
V_{GT}	V_A=6V, R_A=1Ω, T_J =-40°C;			4	V
	V_A=6V, R_A=1Ω;			2.5	
	V_A=6V, R_A=1Ω, T_J=125°C;			1.7	
I_{GT}	V_A=6V, R_A=1Ω, T_J=-40°C;			270	mA
	V_A=6V, R_A=1Ω;			140	
	V_A=6V, R_A=1Ω, T_J=125°C;			80	
V_{GD}	V_{AK}=V_{DRM}, T_J=125℃			0.25	V
I_{GD}				6	mA
di/dt	T_J= 25℃, V_D=0.67V_{DRM}, I_{TM} =125A, I_g = 500mA, tr< 0.5 μs, tp > 6 μs			150	A/us

THERMAL AND MECHANICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Test Condition	value	Unit
R_{thjc}	DC operation,per junction;	0.6	K/W
R_{THCS}	Mounting surface smooth,flat and greased,per junction	0.15	K/W
Md	Mounting torque(M5)	3 to 5	N·m
	Terminal connection torque(M5)		
Weight	Typical value	27	g

Characteristic curves

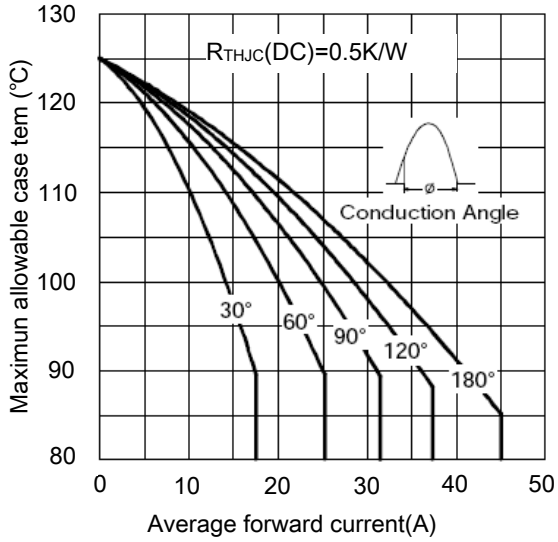

Figure 1. current rating characteristics

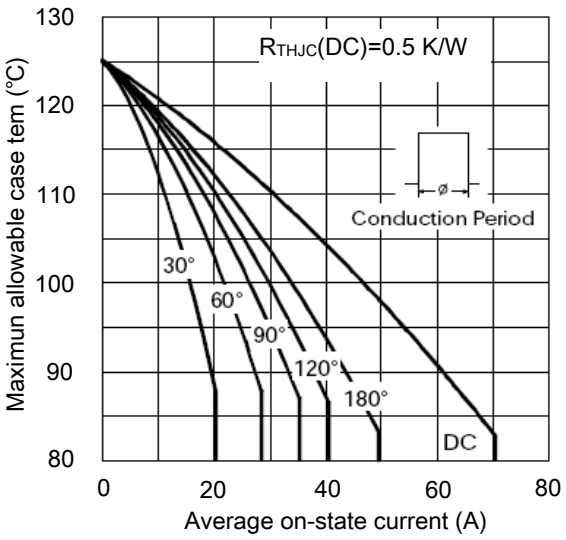

Figure 2. current rating characteristics

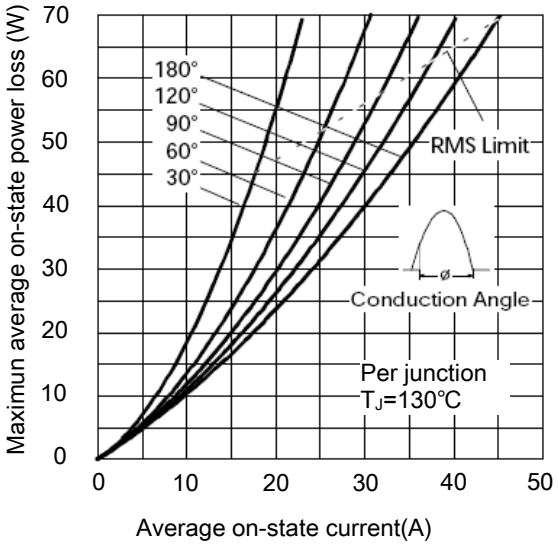

Figure 3. on-state power loss characteristics

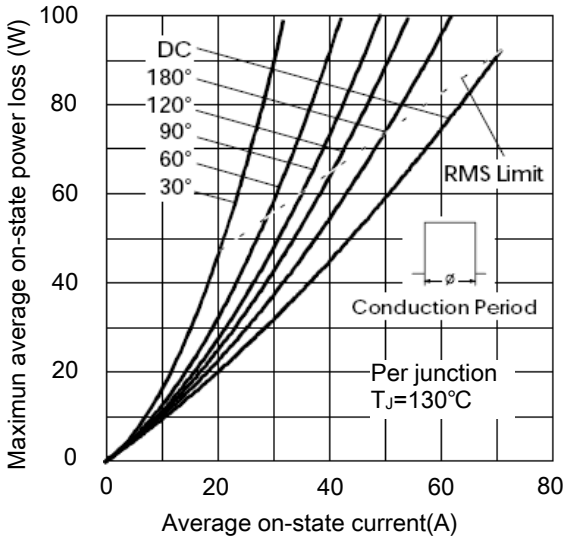

Figure 4. on-state power loss characteristics

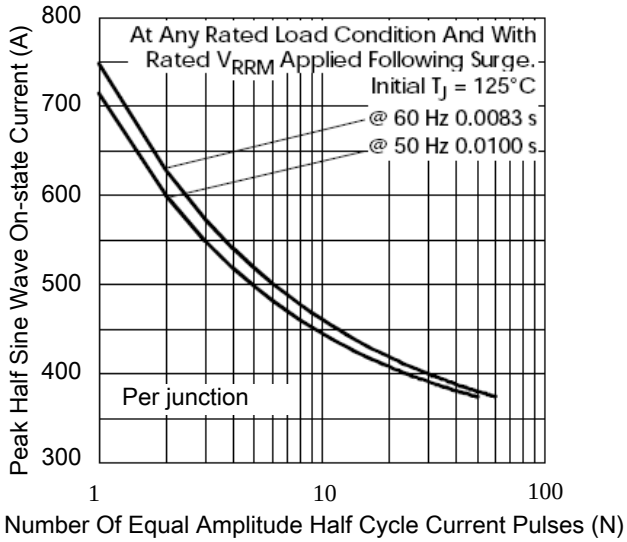

Figure 5. Maximum Non-Repetitive Surge Current

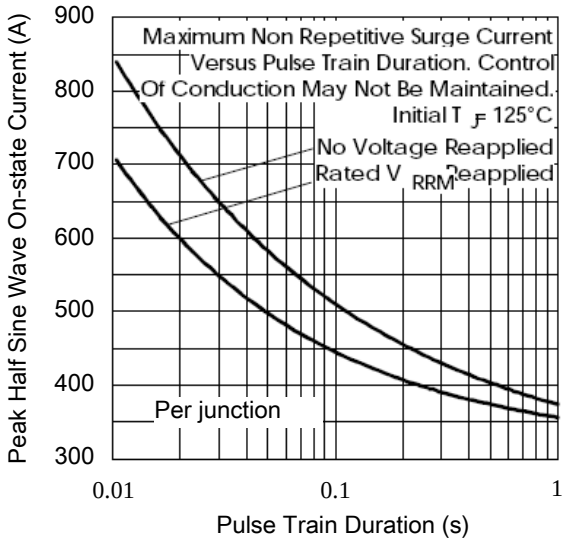

Figure 6. Maximum Non-Repetitive Surge Current

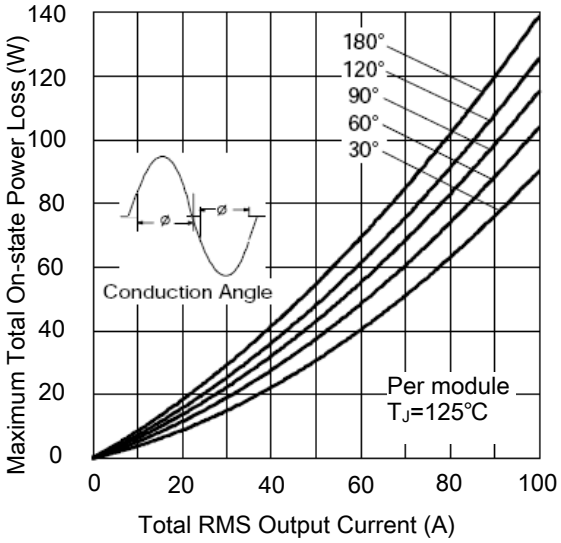

Figure 7. On-State Power Loss Characteristics-1

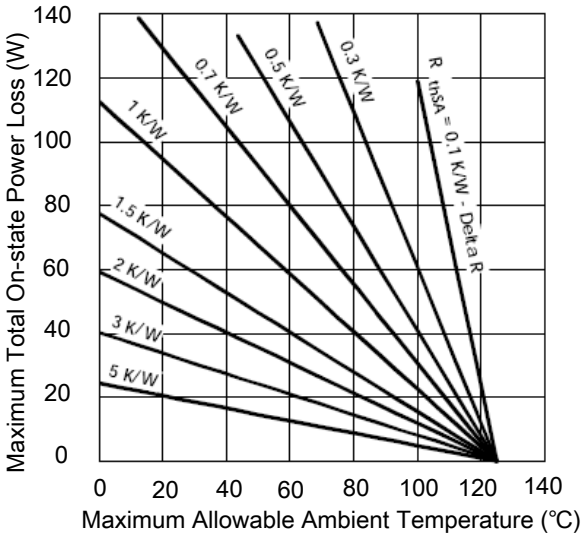

Figure.8 On-State Power Loss Characteristics-2

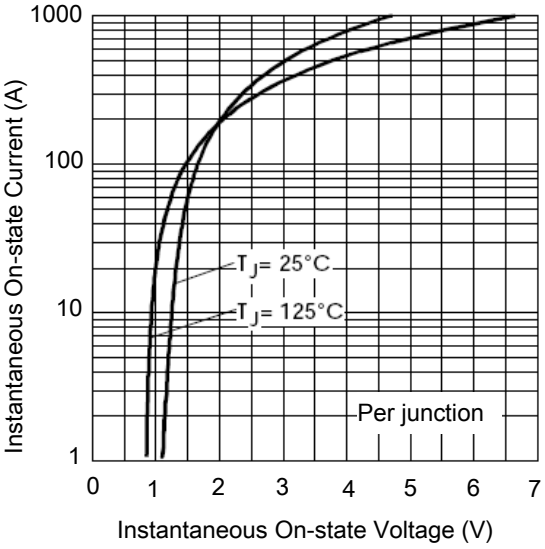

Figure.9 On State Voltage Drop Characteristics

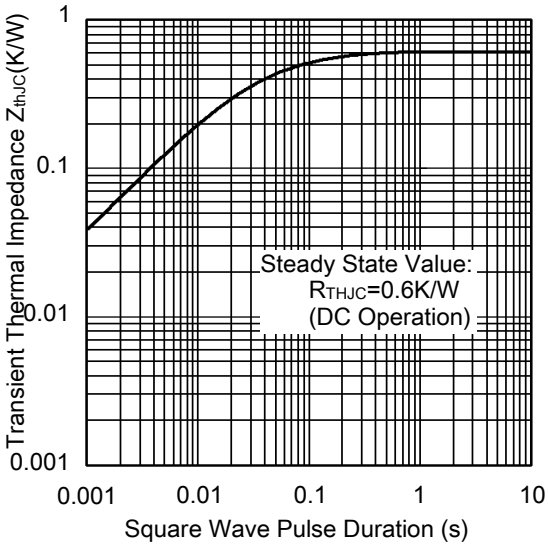

Figure.10 Thermal Impedance ZthJC Characteristics

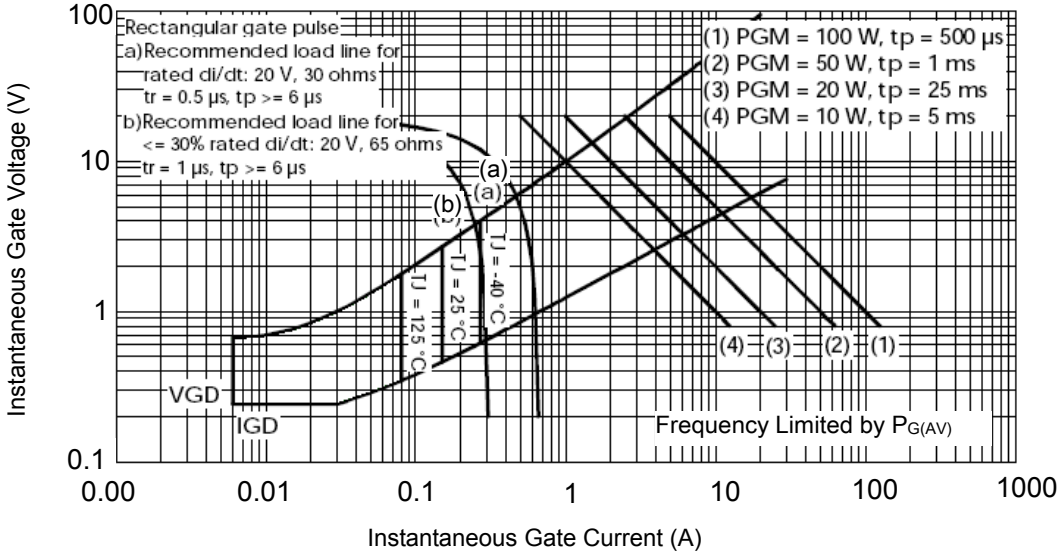

Figure.11 Gate Characteristics

Package Outline (Dimensions in mm)