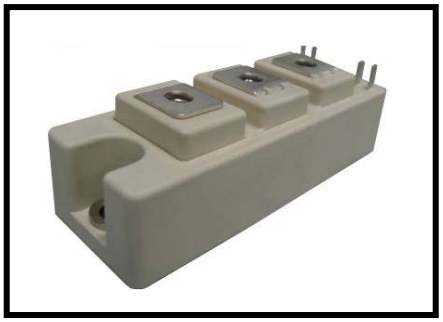
MMK160S160UA

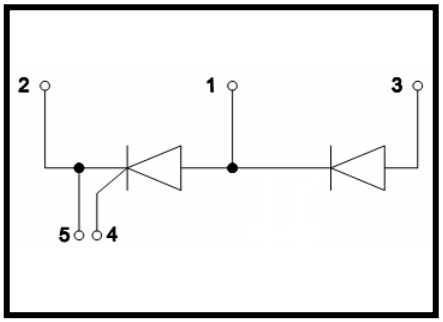
1600V 160A thyristor Module

July 2012 **PRELIMINARY** **RoHS Compliant**

Features

- Isolation Voltage 3000 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

■ Diode

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Test Condition	Value	Unit
V_{RRM}		1600	V
$I_{d(AV)}$	T_C=100℃, module	160	A
I_{FSM}	T_J=45℃; t=10ms (50Hz),sine	5160	A
	V_R=0 t=8.3ms(60Hz),sine	5420	A
I^2t	T_J=45℃; t=10ms (50Hz),sine	133.1	KA^2s
	V_R=0 t=8.3ms(60Hz),sine	121.9	KA^2s
T_J	Junction Temperature	-40～150	℃

ELECTRICAL AND THERMAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Test Condition	Value	Unit
I_R	V_R= V_{RRM}; T_J = 25℃	≤0.5	mA
	V_R= V_{RRM}; T_J =T_{JM}	≤6	mA
V_F	I_F=500A	1.50	V
V_{T0}	For power-loss calculations only	0.8	V
R_{thJC}	Thermal Resistance , Junction-to-Case	0.18	K/W
R_{thCS}	Thermal Resistance, Case -to-Sink	0.10	K/W

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■ Thyristor

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;	160	A
$I_{T(RMS)}$	as AC switch;	355	A
I_{TSM}	T_J=45℃, t=10ms (50Hz), sine, V_R=0;	3000	A
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R=0;	3200	
I^2t	T_J=45℃, t=10ms (50Hz), sine, V_R=0;	45	KA^2s
	T_J=45℃, t=8.3 ms (60Hz), sine, V_R=0;	42.5	
I_{DRM}/I_{RRM}	V_R=V_{RRM}, V_D=V_{DRM}, gate open circuit;	0.5	mA
	T_J=125℃, V_R=V_{RRM}, V_D=V_{DRM}, gate open circuit;	40	mA
dV/dt	T_J=125℃, exponential to 67% rated V_{DRM}	1000	V/us
V_{ISOL}	50Hz, all terminals shorted, t=1min, I_{ISOL}≤1mA ;	3000	V~
T_J	Max. junction operating temperature range	-40～125	℃
T_{STG}	Max. storage temperature range	-40～125	℃

ELECTRICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Test Condition	Min.	Typ.	Max.	Unit
V_{TO}	16.7% x π x I_{AV} < I <π x I_{AV}, T_J =125°C;			0.80	V
	I > π x I_{AV} , T_J =125°C;			0.98	V
r_t	16.7% x π x I_{AV} < I <π x I_{AV}, T_J =125°C;			1.67	mΩ
	I > π x I_{AV} , T_J =125°C;			1.38	mΩ
I_H	V_{AK}= 6V, initial I_T=30A;			200	mA
I_L	Anode supply =6V, resistive load=1Ω, gate pulse =10V, 100us;			400	mA
V_{TM}	I_{TM}=500A, t_d=10 ms, half sine;		1.54	2.0	V
P_{GM}	t_p≤5ms, Tj=125°C;			12	W
$P_{GM(AV)}$	f=50Hz, Tj=125°C;			3	W
I_{GM}	t_p≤5ms, Tj=125°C;			3	A
-V_{GT}				10	V
V_{GT}	V_A=6V, R_A=1Ω, Tj=-40°C;			4	V
	V_A=6V, R_A=1Ω;			2.5	
	V_A=6V, R_A=1Ω, Tj=125°C;			1.7	
I_{GT}	V_A=6V, R_A=1Ω, Tj=-40°C;			270	mA
	V_A=6V, R_A=1Ω;			150	
	V_A=6V, R_A=1Ω, Tj=125°C;			80	
V_{GD}	V_{AK}=V_{DRM}, Tj=125℃			0.3	V
I_{GD}				10	mA
di/dt	I_{TM}=400A, rated V_{DRM}, Tj=125℃			300	A/us

THERMAL AND MECHANICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Test Condition	value	Unit
R_{thjc}	DC operation, per junction;	0.18	K/W
R_{THCS}	Mounting surface smooth,flat and greased, per junction;	0.1	K/W
Md	Mounting torque(M6)	3 ~ 5	N·m
	Terminal connection torque(M6)		
Weight	Typical value	156	g

Characteristic curves

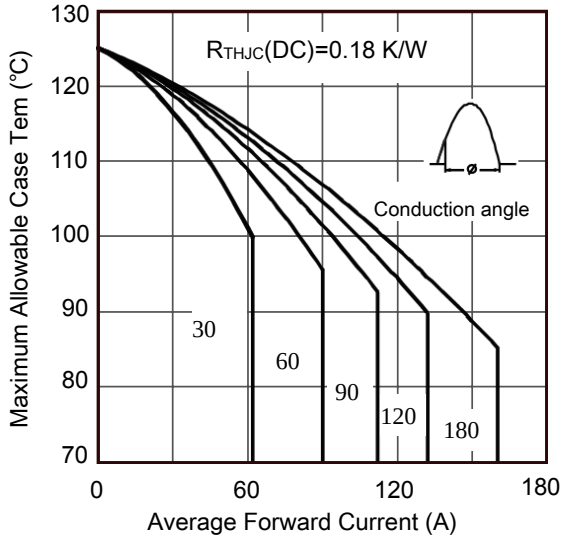

Figure 1. Current Rating Characteristics

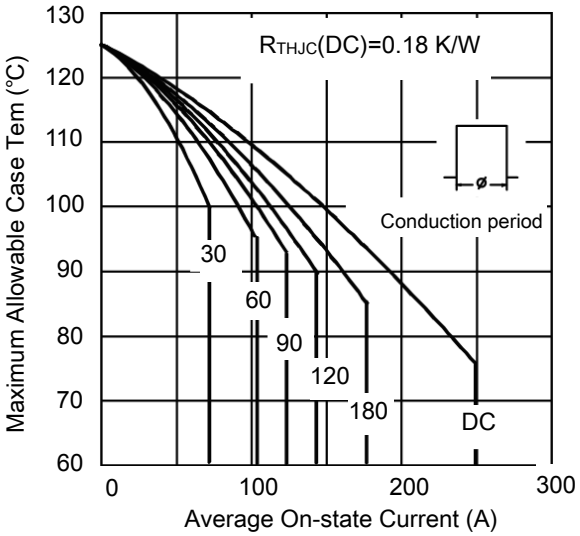

Figure 2. Current Rating Characteristics

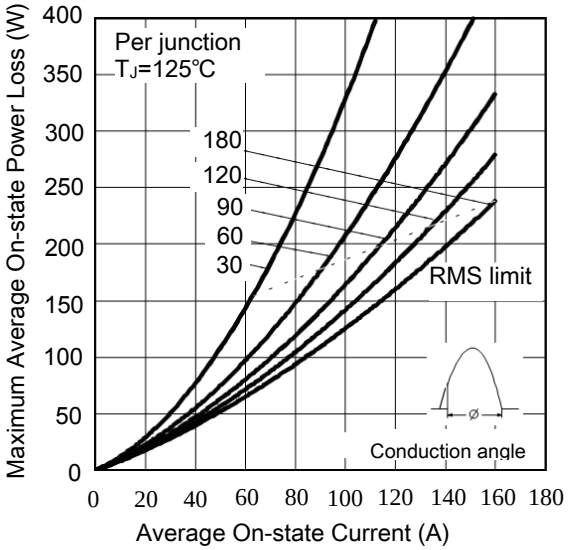

Figure 3. On-state Power Loss Characteristics

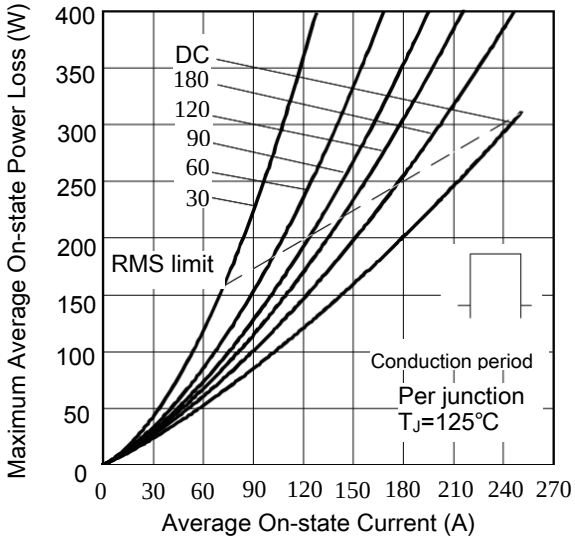

Figure 4. On-state Power Loss Characteristics

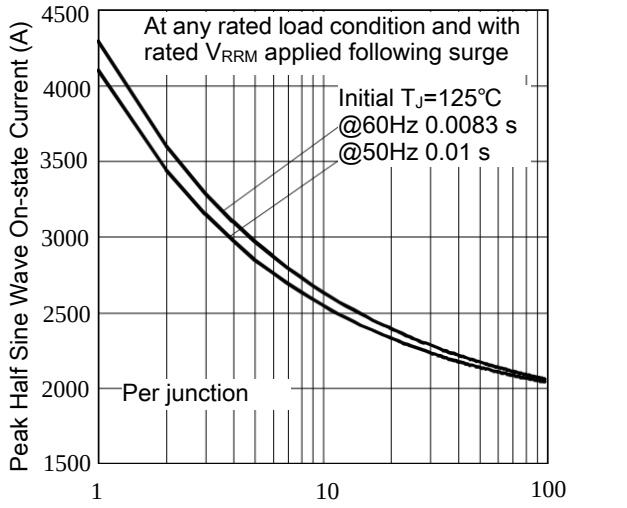

Figure 5. Maximum Non-Repetitive Surge Current

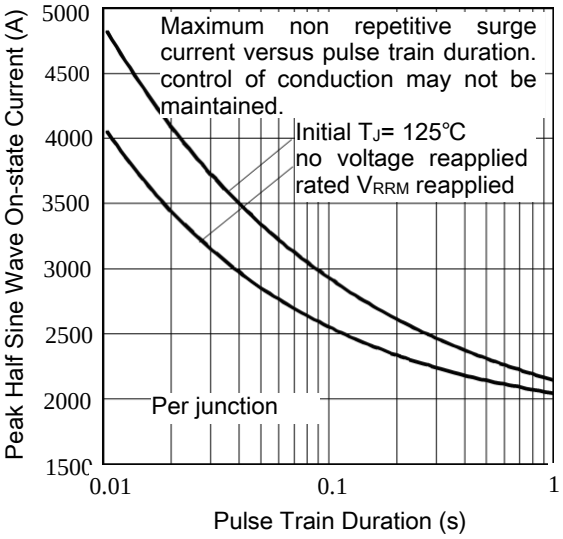

Figure 6. Maximum Non-Repetitive Surge Current

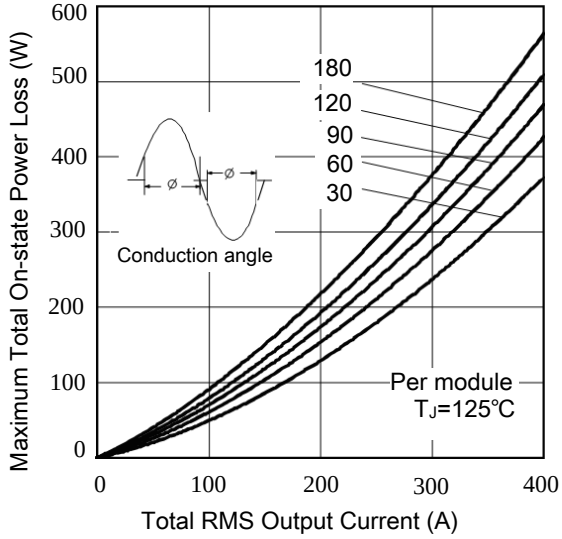

Figure 7. On-State Power Loss Characteristics-1

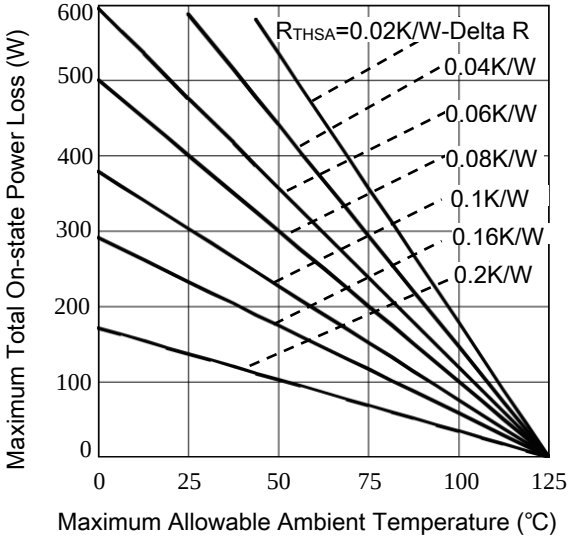

Figure.8 On-State Power Loss Characteristics-2

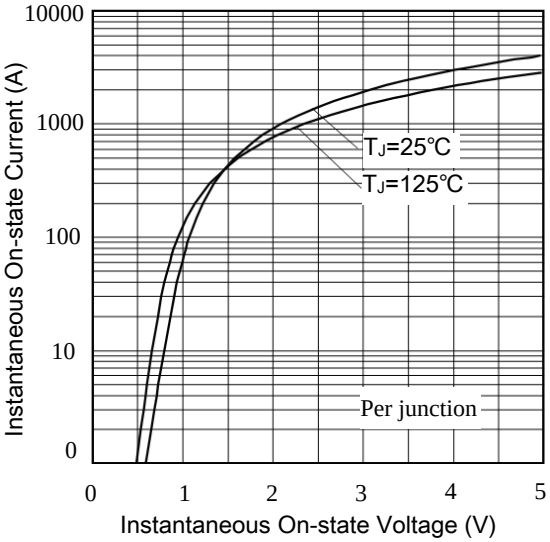

Figure 9. On State Voltage Drop Characteristics

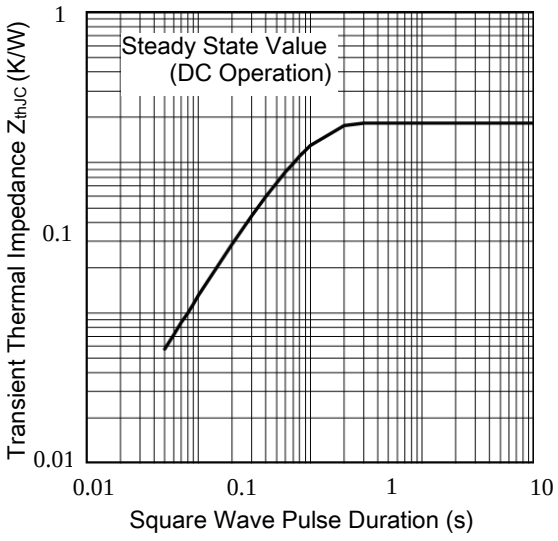

Figure 10. Thermal Impedance Z_{thJC} Characteristics

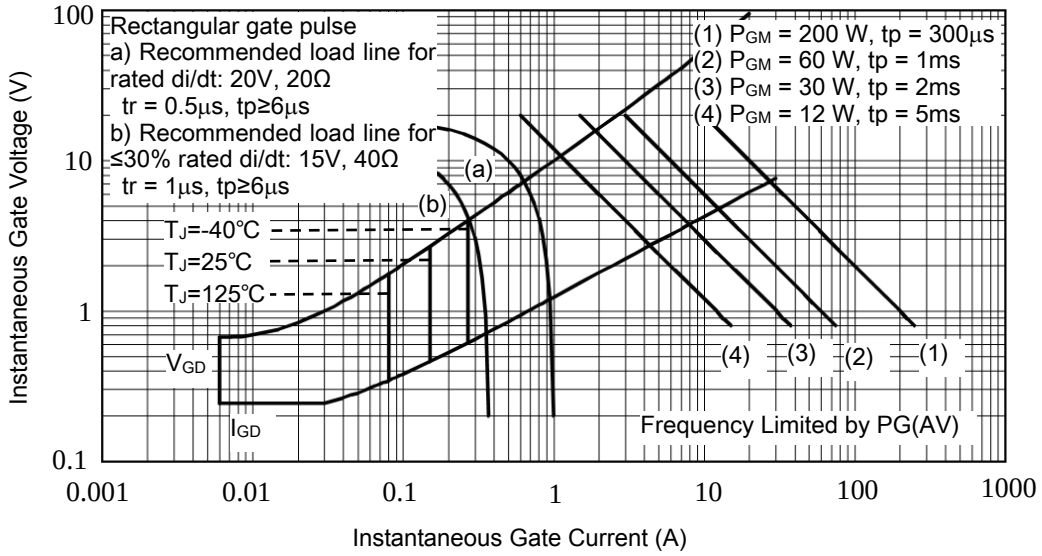

Figure 11. Gate Characteristics

Package Outline (Dimensions in mm)