MMK160S

160A Thyristor/Diode Module

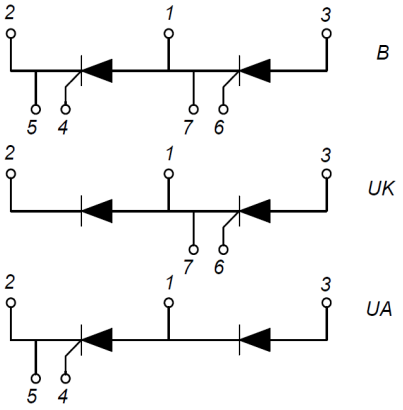
May 2015 **Version 01** **RoHS Compliant**

PRODUCT FEATURES

- Electrically Isolated by DBC Ceramic
- High Surge Current Capability
- Low Inductance Package

APPLICATIONS

- DC Motor Control and Drives
- Battery Charges ,Heater controls,Light dimmers
- Static switches



MAXIMUM VOLTAGE RATINGS

T_C=25°C unless otherwise specified

Module Type			V_{RRM}/V_{DRM}	V_{RSM}	Unit
MMK160S120B	MMK160S120UK	MMK160S120UA	1200	1300	V
MMK160S140B	MMK160S140UK	MMK160S140UA	1400	1500	
MMK160S160B	MMK160S160UK	MMK160S160UA	1600	1700	

ABSOLUTE MAXIMUM RATINGS (Thyristor)

Symbol	Parameter/Test Conditions		Values	Unit
$I_{T(AV)}$	Average On State Current	Single phase, half wave, 180°conduction, Tc= 80℃	160	A
$I_{T(RMS)}$	R.M.S. On State Current		250	
I_{TSM}	Non-Repetitive Surge On-State Current	1/2 cycle, 50/60HZ, peak value, Tc =45℃	3300/3600	
I^2t	For Fusing	1/2 cycle, 50/60HZ, peak value ,Tc =45℃	54.4/53.7	KA^2S
T_J	Junction Temperature(Thyristor)		-40 to +125	℃

ABSOLUTE MAXIMUM RATINGS (Diode)

Symbol	Parameter/Test Conditions		Values	Unit
$I_{F(AV)}$	Average Forward Current	Single phase, half wave, 180°conduction, Tc= 95℃	160	A
$I_{F(RMS)}$	R.M.S. Forward Current		250	
I_{FSM}	Non-Repetitive Surge Forward Current	1/2 cycle, 50/60HZ, peak value, Tc =45℃	5500/6000	
I^2t	For Fusing	1/2 cycle, 50/60HZ, peak value ,Tc =45℃	151.2/149.4	KA^2S
T_J	Junction Temperature(Diode)		-40 to +150	℃

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ELECTRICAL CHARACTERISTICS (Thyristor)

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
I_{DRM}	Maximum Peak Off-State Current	$V_D = V_{DRM}$, T_J = 125℃			25	mA
I_{RRM}	Maximum Peak Reverse Current	$V_R = V_{RRM}$, T_J = 125℃			25	
V_{TM}	Maximum on-state voltage drop	I_{TM}=500A,td=10 ms, half sine			1.75	V
V_{TO}	For power-loss calculations only	T_J = 125℃			0.85	V
r_T					2.0	mΩ
V_{GT}	Max. required DC gate voltage to trigger	V_A=6V, R_A=1Ω,T_J = -40℃			4.0	V
		V_A=6V, R_A=1Ω		1.0	2.5	
		V_A=6V, R_A=1Ω,T_J = 125℃			1.7	
I_{GT}	Max. required DC gate current to trigger	V_A=6V, R_A=1Ω,T_J = -40℃			270	mA
		V_A=6V, R_A=1Ω		75	150	
		V_A=6V, R_A=1Ω,T_J = 125℃			80	
V_{GD}	Max. required DC gate voltage not to trigger,$V_D = V_{DRM}$, T_J = 125℃				0.25	V
I_{GD}	Max. required DC gate current not to trigger,$V_D = V_{DRM}$, T_J = 125℃				6	mA
I_H	Maximum holding current			100	200	mA
I_L	Maximum latching current			200	400	mA
P_{GM}	Maximum peak gate power				12	W
$P_{G(AV)}$	Maximum average gate power				3.0	
I_{GM}	Maximum peak gate current				3.0	A
$-V_{GM}$	Maximum peak negative gate voltage				10	V
dv/dt	Critical Rate of Rise of Off-State Voltage,T_J=125℃,exponential to 67% rated V_{DRM}				1000	V/μs
di/dt	Max.Rate of Rise of Turned-on Current, T_J =125℃,I_{TM}=500A, rated V_{DRM}				150	A/μs

ELECTRICAL CHARACTERISTICS (Diode)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
I_{RM}	Maximum Reverse Leakage Current	$V_R = V_{RRM}$			0.5	mA
		$V_R = V_{RRM}$, T_J = 125℃			10	
V_F	Forward Voltage Drop	I_F=500A			1.5	V
V_{TO}	For power-loss calculations only , T_J = 125°C				0.88	V
r_T					1.25	mΩ

MODULE CHARACTERISTICS

T_C=25°C unless otherwise specified

T_J	Junction Temperature		-40 to +125	℃
T_{STG}	Storage Temperature Range		-40 to +125	℃
V_{ISO}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
Torque	to heatsink	Recommended（M6）	3～5	N.m
Torque	to terminal	Recommended（M6）	3～5	N.m
$R_{th(J-C)}$	Junction-to-Case Thermal Resistance(Per Thyristor/Per Diode)		0.16/0.18	K /W
Weight			160	g

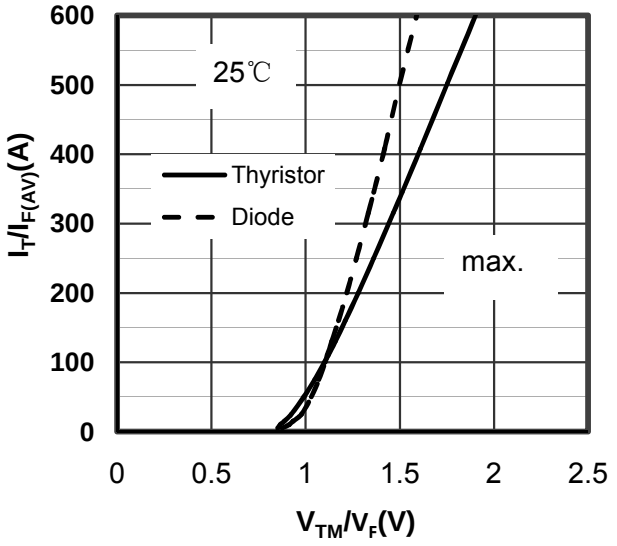


Figure1. Forward Voltage Drop vs Forward Current

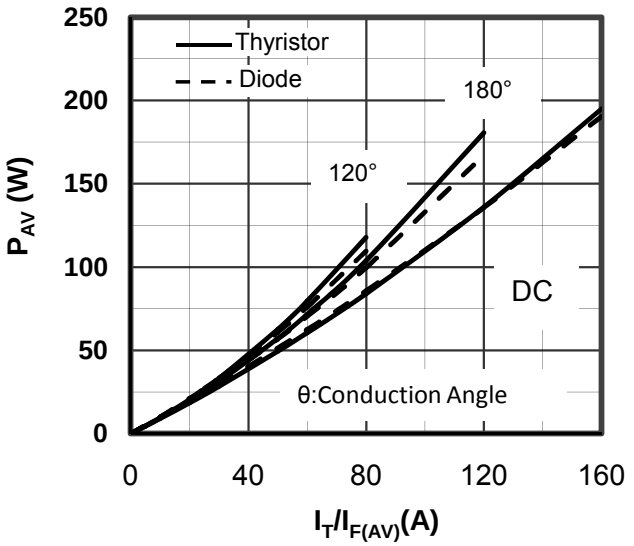


Figure2. Power dissipation vs. $I_T/I_{F(AV)}$

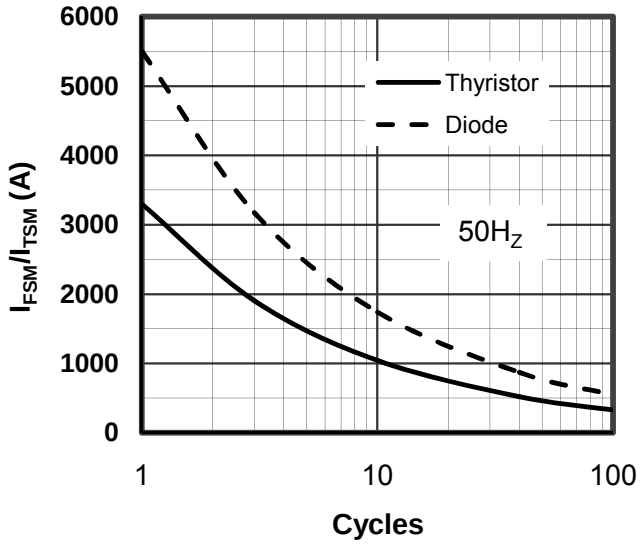


Figure3. Diode and SCR Max Non-Repetitive Surge

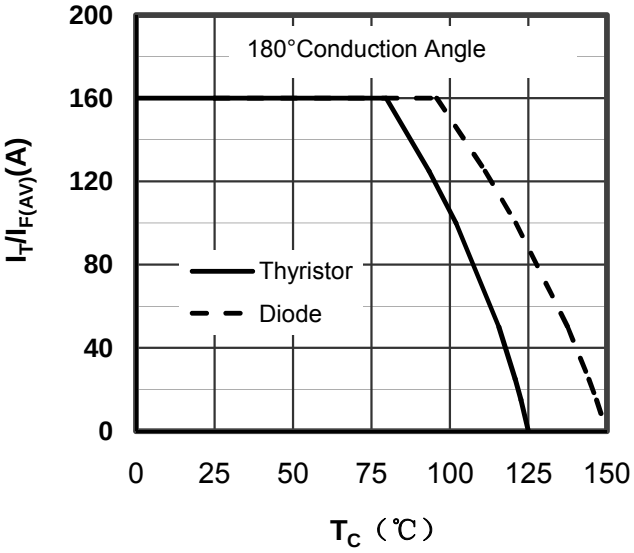


Figure4. Diode $I_{F(AV)}$ and SCR $I_{T(AV)}$vs.T_C

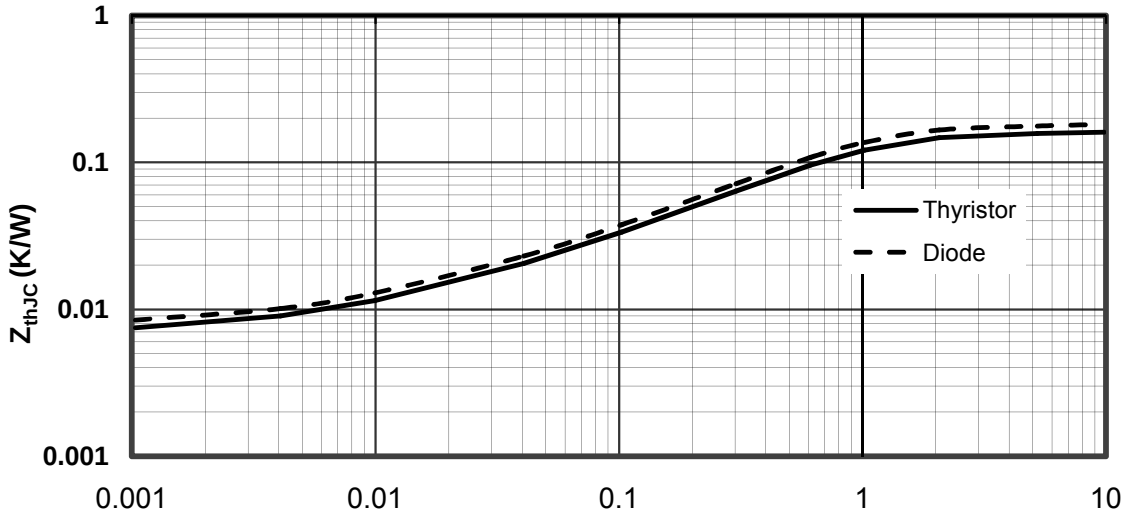


Figure5. Transient Thermal Impedance of Diode and SCR

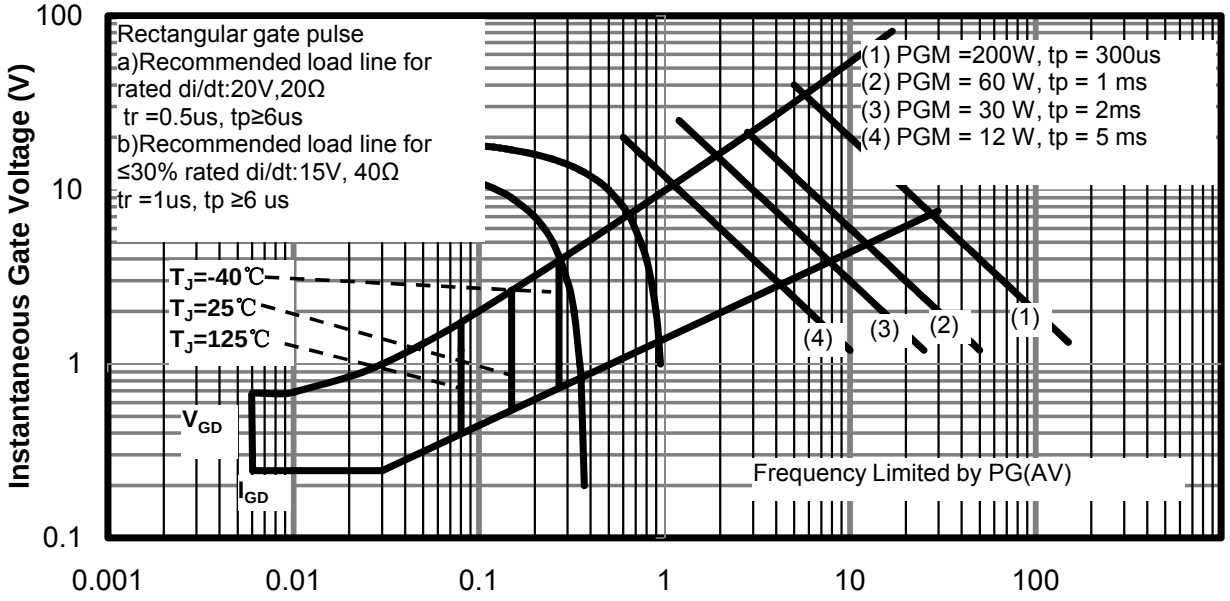
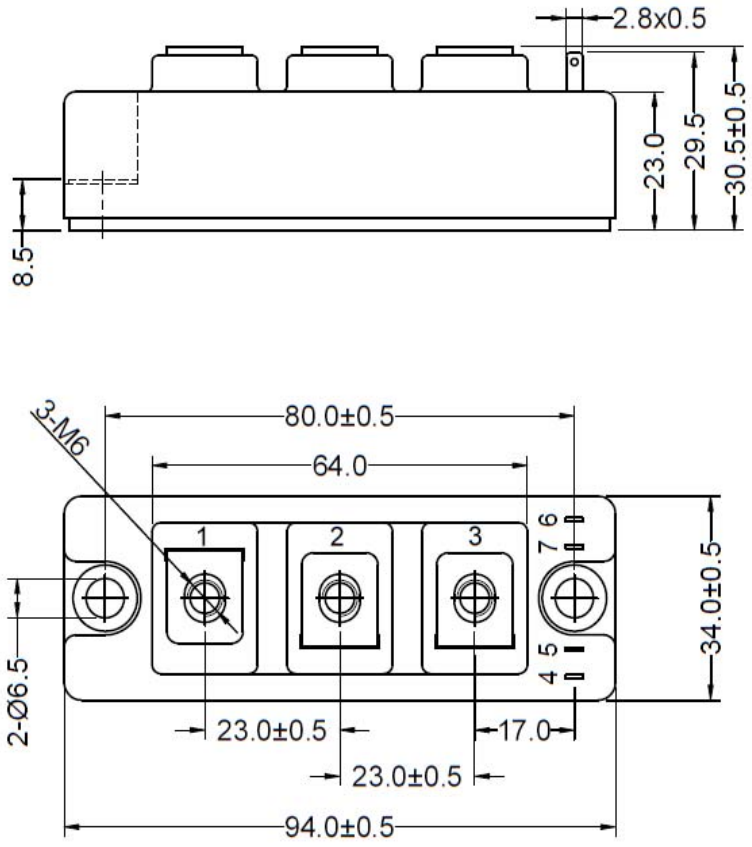


Figure 6. SCR Gate Characteristics



Dimensions in (mm)

Figure7. Package Outline