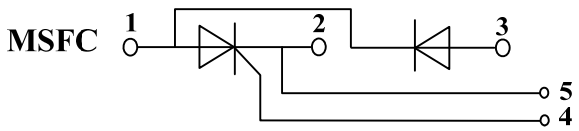
Thyristor/Diode Modules

VRRM / VDRM 800 to 1600V
IFAV / ITAV 60Amp

Applications

- Power Converters
- Lighting Control
- DC Motor Control and Drives
- Heat and temperature control

Circuit



Features

- International standard package
- High Surge Capability
- Glass passivated chip
- Simple Mounting
- Heat transfer through aluminum oxide DBC ceramic isolated metal baseplate
- UL E243882 approved

Module Type

TYPE	VRRM/VDRM	VRSM
MSFC60-08 MSFC60-12 MSFC60-16	800V 1200V 1600V	900V 1300V 1700V

◆Diode

Maximum Ratings

Symbol	Item	Conditions	Values	Units
ID	Output Current(D.C.)	Tc=85℃	60	A
IFSM	Surge forward current	t=10mS Tvj =45℃	1500	A
i^2t	Circuit Fusing Consideration		11000	A^2s
Visol	Isolation Breakdown Voltage(R.M.S)	a.c.50HZ;r.m.s.;1min	3000	V
Tvj	Operating Junction Temperature		-40 to +125	℃
Tstg	Storage Temperature		-40 to +125	℃
Mt	Mounting Torque	To terminals(M5)	3±15%	Nm
Ms		To heatsink(M6)	5±15%	Nm
Weight	Module（Approximately）		100	g

Thermal Characteristics

Symbol	Item	Conditions	Values	Units
$R_{th(j-c)}$	Thermal Impedance, max.	Junction to Case	0.29	℃/W
Rth(c-s)	Thermal Impedance, max.	Case to Heatsink	0.10	℃/W

Electrical Characteristics

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
VFM	Forward Voltage Drop, max.	T=25℃ IF =200A			1.65	V
IRRM	Repetitive Peak Reverse Current, max.	Tvj =25℃ VRD=VRRM Tvj =125℃ VRD=VRRM		≤0.5 ≤6		mA mA

◆Thyristor

Maximum Ratings

Symbol	Item	Conditions	Values	Units
I_{TAV}	Average On-State Current	Sine 180°;Tc=85℃	60	A
I_{TSM}	Surge On-State Current	T_{VJ}=45℃ t=10ms, sine T_{VJ}=125℃ t=10ms, sine	1500 1250	A
i^2t	Circuit Fusing Consideration	T_{VJ}=45℃ t=10ms, sine T_{VJ}=125℃ t=10ms, sine	11000 8000	A2s
Visol	Isolation Breakdown Voltage(R.M.S)	a.c.50HZ;r.m.s.;1min	3000	V
Tvj	Operating Junction Temperature		-40 to +125	℃
Tstg	Storage Temperature		-40 to +125	℃
Mt	Mounting Torque	To terminals(M5)	3±15%	Nm
Ms		To heatsink(M6)	5±15%	Nm
di/dt	Critical Rate of Rise of On-State Current	T_{VJ}= T_{VJM} , 2/3V_{DRM} ,I_G =500mA Tr<0.5us,tp>6us	150	A/us
dv/dt	Critical Rate of Rise of Off-State Voltage, min.	T_J=T_{VJM} ,2/3V_{DRM} linear voltage rise	1000	V/us
a	Maximum allowable acceleration		50	m/s^2

Thermal Characteristics

Symbol	Item	Conditions	Values	Units
$R_{th(j-c)}$	Thermal Impedance, max.	Junction to Case	0.57	℃/W
Rth(c-s)	Thermal Impedance, max.	Case to Heatsink	0.20	℃/W

Electrical Characteristics

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
V_{TM}	Peak On-State Voltage, max.	T=25℃ I_T =200A			1.65	V
I_{RRM}/I_{DRM}	Repetitive Peak Reverse Current, max. / Repetitive Peak Off-State Current, max.	T_{VJ}=T_{VJM} ,V_R=V_{RRM} ,V_D= V_{DRM}			15	mA
V_{TO}	On state threshold voltage	For power-loss calculations only (T_{VJ} =125℃)			0.9	V
r_T	Value of on-state slope resistance. max	T_{VJ} =T_{VJM}			3.5	mΩ
V_{GT}	Gate Trigger Voltage, max.	T_{VJ} =25℃ , V_D =6V			3.0	V
I_{GT}	Gate Trigger Current, max.	T_{VJ} =25℃ , V_D =6V			150	mA
V_{GD}	Non-triggering gate voltage, max.	T_{VJ}=125℃,V_D =2/3V_{DRM}			0.25	V
I_{GD}	Non-triggering gate current, max.	T_{VJ} =125℃, V_D =2/3V_{DRM}			6	mA
I_L	Latching current, max.	T_{VJ} =25℃ , R_G = 33 Ω		300	600	mA
I_H	Holding current, max.	T_{VJ} =25℃ , V_D =6V		150	250	mA
tgd	Gate controlled delay time	TVJ=25℃, IG=1A, diG/dt=1A/us		1		us
tq	Circuit commutated turn-off time	T_{VJ} =T_{VJM}		80		us

Performance Curves

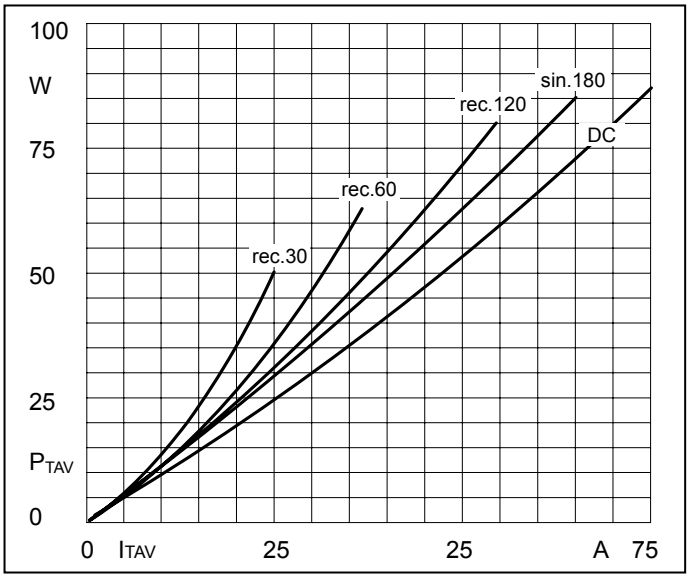


Fig1. Power dissipation

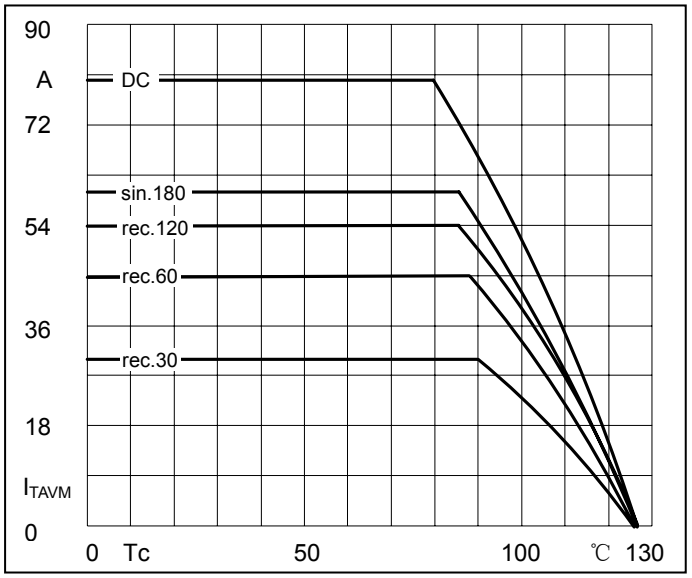


Fig2.Forward Current Derating Curve

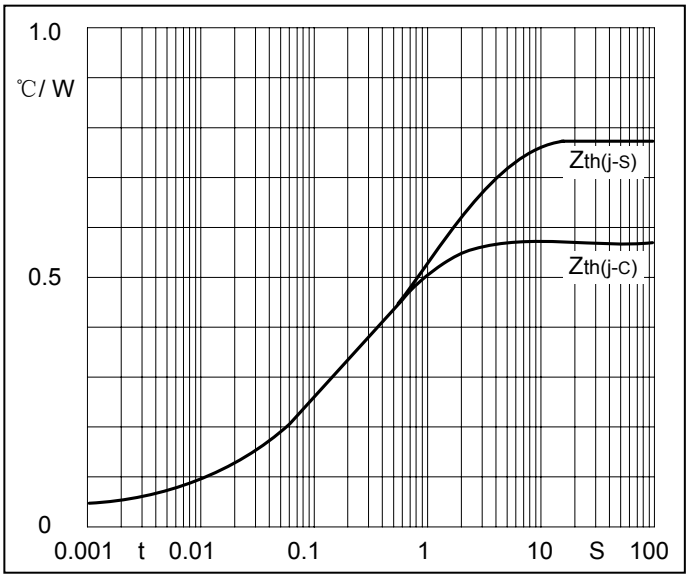


Fig3. Transient thermal impedance

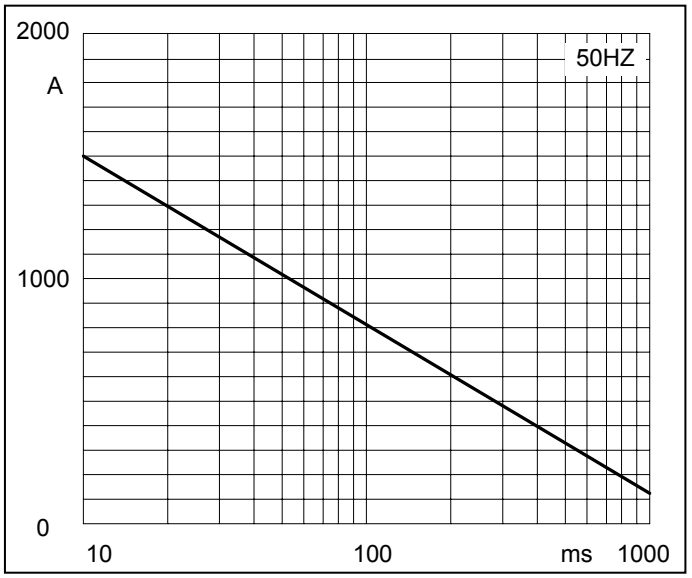


Fig4. Max Non-Repetitive Forward Surge Current

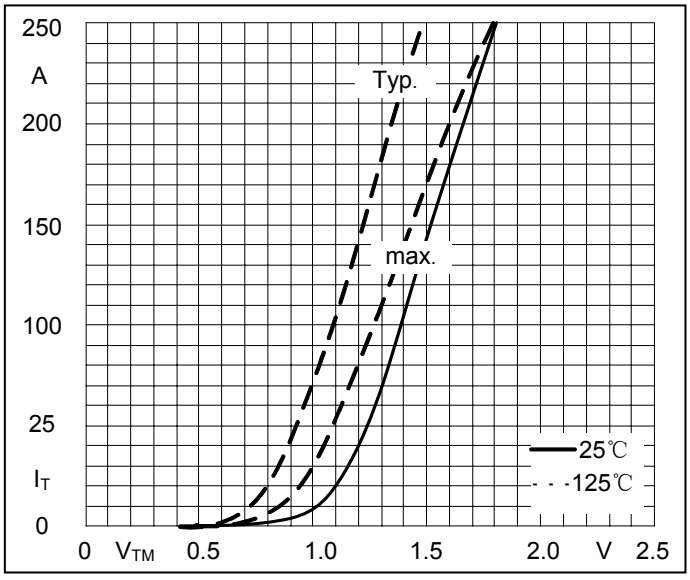


Fig5. Forward Characteristics

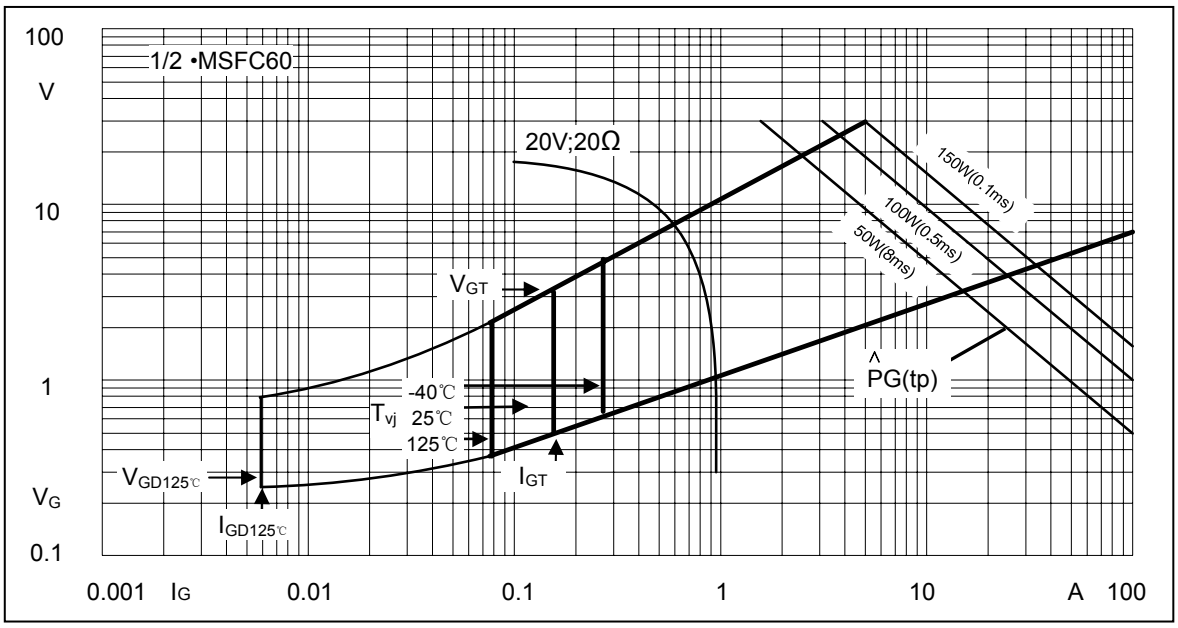
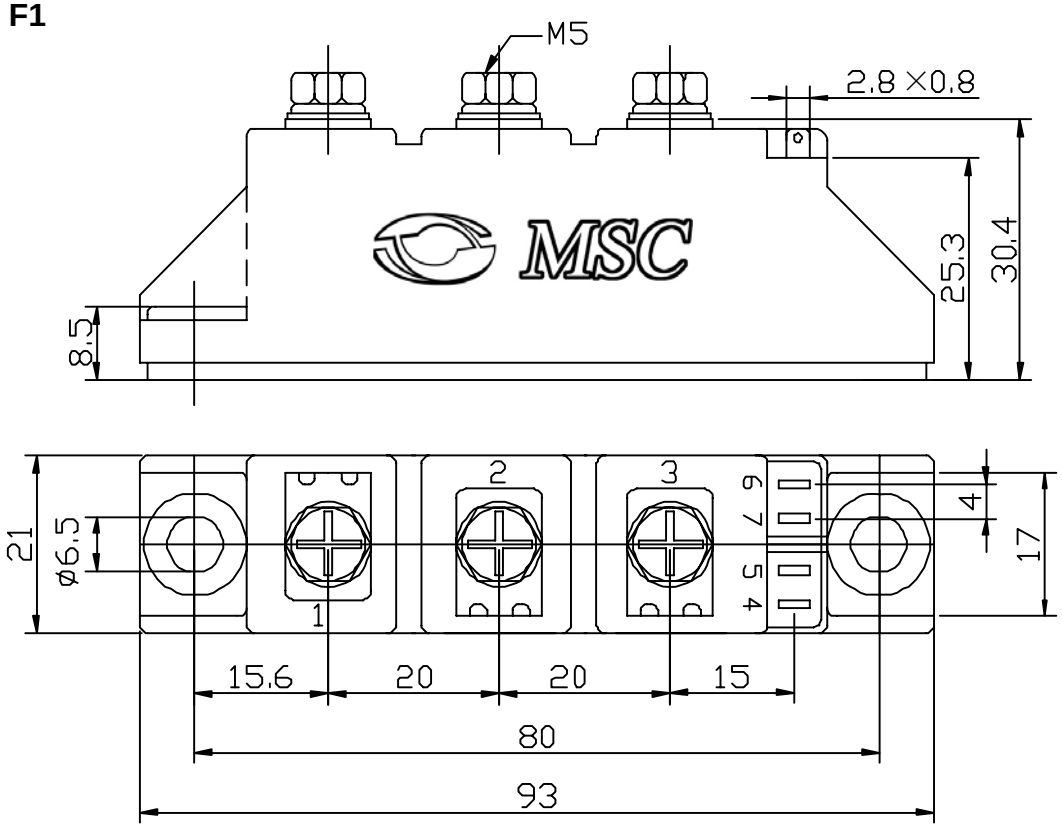


Fig6. Gate trigger Characteristics

Package Outline Information

CASE: F1



Dimensions in mm