

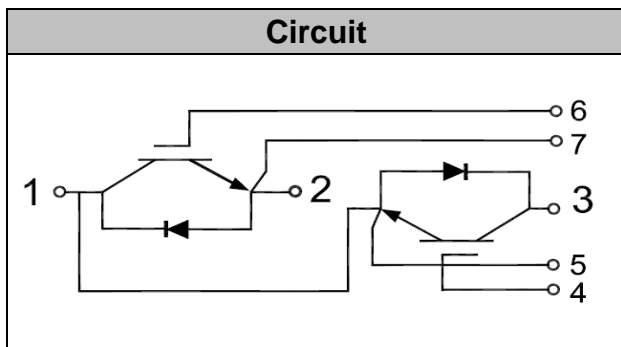
IGBT Modules



V_{CES} 1200V
I_c 400A

Applications

- High frequency switching application
- Medical applications
- Motion /servo control
- UPS systems



Features

- High short circuit capability, self limiting short circuit current
- V_{CE(sat)} with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses

Absolute Maximum Ratings (T_c = 25°C unless otherwise specified)

Symbol	Description	Values	Units	
V _{CES}	Collector - Emitter Voltage	1200	V	
V _{GES}	Gate-Emitter Voltage	±20	V	
I _c	DC Collector Current	T _c =25°C	580	A
		T _c =80°C	400	A
I _{CM}	Repetitive Peak Collector Current	tp=1ms	800	A
P _{tot}	Power Dissipation Per IGBT		1925	W
T _J	Junction Temperature Range		40 to +150	°C
T _{STG}	Storage Temperature Range		40 to +125	°C
Viso	Insulation Test Voltage	AC, t=1min	3000	V
Mounting Torque	Power Terminals Screw: M6		5±15%	N*m
	Mounting Screw:M6		5±15%	N*m

Notes :

(1) Repetitive Rating: Pulse width limited by max. junction temperature



PRELIMINARY

MG400HF12MRC2 **RoHS**
COMPLIANT

Electrical Characteristics of IGBT ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=1mA$	1200			V
I_{CES}	Collector Leakage Current	$V_{CE}=1200V, V_{GE}=0V, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=125^\circ\text{C}$			5	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0V, V_{GE}=\pm 20V$	-400		400	nA
ON Characteristics						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=6mA$	5.5	6	6.5	V
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	$I_C=400A, V_{GE}=15V, T_J=25^\circ\text{C}$		2.15	2.4	V
		$I_C=400A, V_{GE}=15V, T_J=125^\circ\text{C}$		2.6	2.8	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		28		nF
C_{oes}	Output Capacitance			1		nF
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=400A, R_G=3.5\Omega, V_{GE}=\pm 15V, T_J=25^\circ\text{C}$ Inductive Load		42		ns
t_r	Rise Time			80		ns
$t_{d(off)}$	Turn-off Delay Time			395		ns
T_f	Fall Time			185		ns
E_{on}	Turn-on Switching Loss	$V_{CC}=600V, I_C=400A, R_G=3.5\Omega, V_{GE}=\pm 15V$ Inductive Load	$T_J=25^\circ\text{C}$	15.5		mJ
			$T_J=125^\circ\text{C}$	32.4		mJ
E_{off}	Turn-off Switching Loss		$T_J=25^\circ\text{C}$	20.6		mJ
			$T_J=125^\circ\text{C}$	45.5		mJ
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V, I_C=400A, R_G=3.5\Omega, V_{GE}=\pm 15V, T_J=125^\circ\text{C}$ Inductive Load		49		ns
t_r	Rise Time			89		ns
$t_{d(off)}$	Turn-off Delay Time			420		ns
T_f	Fall Time			240		ns
Q_{ge}	Gate Charge	$V_{CC}=600V, I_C=400A, V_{GE}=\pm 15V$		1250		nC
SCSOA	Short Circuit Safe Operating Area	$V_{CC}=600V, V_{GE}\leq 15V, T_J=150^\circ\text{C}$	10			μs
				1600		A



PRELIMINARY

MG400HF12MRC2 **RoHS**
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Electrical Characteristics of FWD ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Item	Conditions	Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	$I_F=400\text{A}$, $V_{GE}=0\text{V}$	$T_J = 25^\circ\text{C}$		2.3	V
			$T_J = 125^\circ\text{C}$		2.35	
t_{rr}	Reverse Recovery Time	$I_F=400\text{A}$, $-di/dt = 2600\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$,	$T_J = 25^\circ\text{C}$		158	ns
			$T_J = 125^\circ\text{C}$		390	
I_{rr}	Peak Reverse Recovery Current	$I_F=400\text{A}$, $-di/dt = 2600\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$,	$T_J = 25^\circ\text{C}$		222	A
			$T_J = 125^\circ\text{C}$		255	
Q_{rr}	Reverse Recovery Charge	$I_F=400\text{A}$, $-di/dt = 2600\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$,	$T_J = 25^\circ\text{C}$		19.8	μC
			$T_J = 125^\circ\text{C}$		37.5	

Thermal Resistance Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)			0.065	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)			0.12	$^\circ\text{C}/\text{W}$
M_t	Power Terminals Screw:M5	3		5	N·m
M_s	Mounting Screw:M6	3		5	N·m
Weight	Weight Of Module			300	g

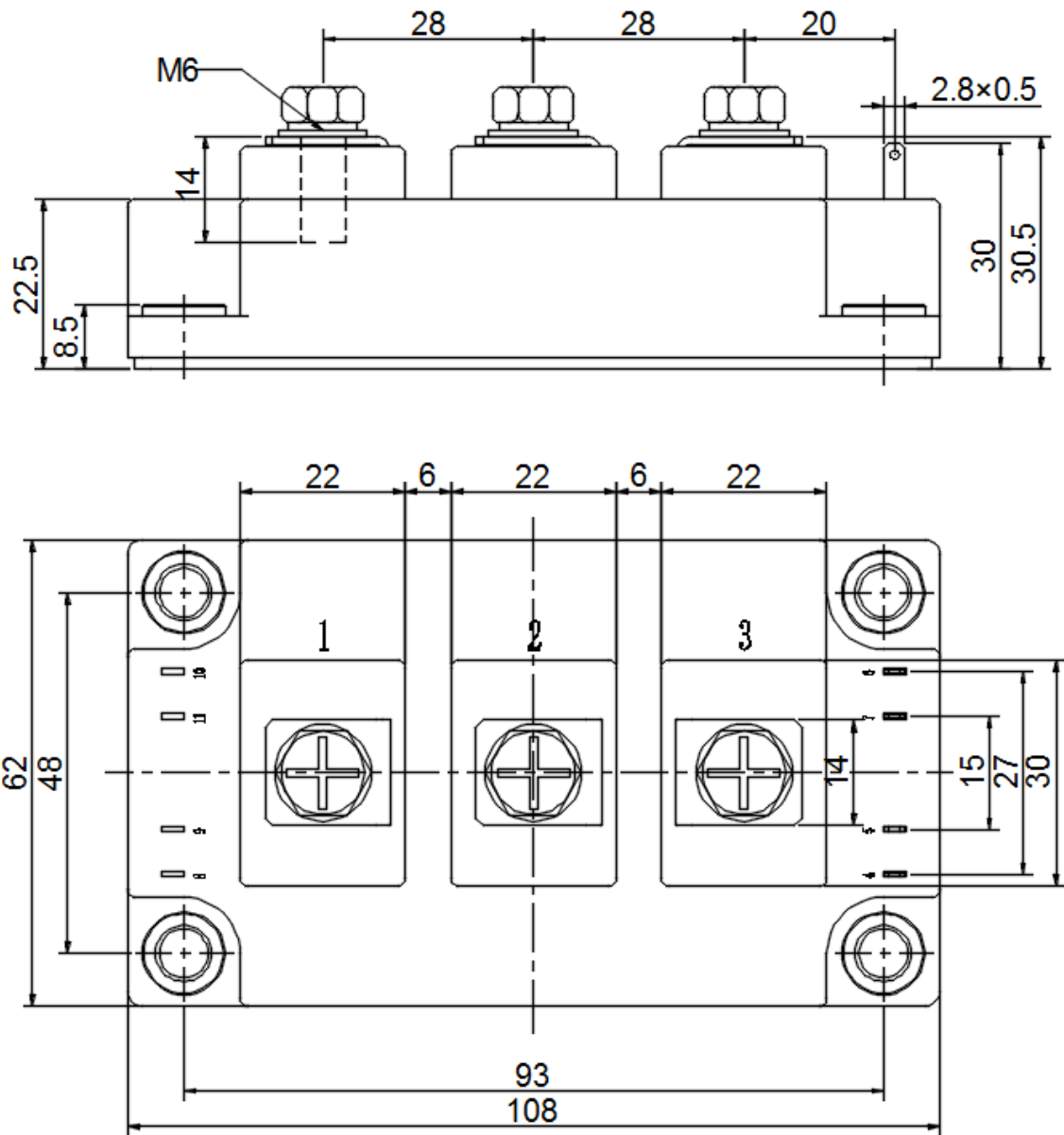


PRELIMINARY

MG400HF12MRC2 RoHS
COMPLIANT

Package Outline Information

CASE: C2



Dimensions in mm