MMG75S120B6TN

1200V 75A IGBT Module

March 2011 **PRELIMINARY** **RoHS Compliant**

FEATURES

- ☐ High short circuit capability,self limiting short circuit current
- ☐ IGBT^3 CHIP(Trench+Field Stop technology)
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Fast switching and short tail current
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐ Low switching losses

GS Series Module

APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage	T_{vj}=25°C	1200	V
V_{GES}	Gate - Emitter Voltage		±20	V
I_C	DC Collector Current	T_C=25°C	105	A
		T_C=80°C	75	A
I_{CM}	Repetitive Peak Collector Current	t_p=1ms	150	A
P_{tot}	Power Dissipation Per IGBT		348	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	T_{vj}=25°C	1200	V
$I_{F(AV)}$	Average Forward Current	T_C=25°C	105	A
		T_C=80°C	75	A
I_{FRM}	Repetitive Peak Forward Current	t_p=1ms	150	A
I^2t		T_{vj} =125°C, t=10ms, V_R=0V	1150	A^2s

ELECTRICAL AND THERMAL CHARACTERISTICS *T_C=25°C unless otherwise specified*

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
IGBT						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	V_{CE}=V_{GE}, I_C=3.0mA	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	I_C=75A, V_{GE}=15V, T_{vj}=25°C		1.7		V
		I_C=75A, V_{GE}=15V, T_{vj}=125°C		1.9		V
I_{CES}	Collector Leakage Current	V_{CE}=1200V, V_{GE}=0V, T_{vj}=25°C			1	mA
		V_{CE}=1200V, V_{GE}=0V, T_{vj}=125°C			10	mA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}±15V, T_{vj}=125°C	-400		400	nA
R_{Gint}	Integrated Gate Resistor			10		Ω
Q_{ge}	Gate Charge	V_{CE}=600V, I_C=75A , V_{GE}=±15V		0.7		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz		5.3		nF
C_{res}	Reverse Transfer Capacitance			0.2		nF
$t_{d(on)}$	Turn - on Delay Time	V_{CC}=600V,I_C=75A, R_G =4.7Ω , V_{GE}=±15V, Inductive Load — T_{vj} =25°C		260		ns
		T_{vj} =125°C		290		ns
t_r	Rise Time	T_{vj} =25°C		30		ns
		T_{vj} =125°C		50		ns
$t_{d(off)}$	Turn - off Delay Time	V_{CC}=600V,I_C=75A, R_G =4.7Ω , V_{GE}=±15V, Inductive Load — T_{vj} =25°C		420		ns
		T_{vj} =125°C		520		ns
t_f	Fall Time	T_{vj} =25°C		70		ns
		T_{vj} =125°C		90		ns
E_{on}	Turn - on Energy	V_{CC}=600V,I_C=75A, R_G =4.7Ω , V_{GE}=±15V, Inductive Load — T_{vj} =25°C		6.6		mJ
		T_{vj} =125°C		9.4		mJ
E_{off}	Turn - off Energy	T_{vj} =25°C		6.8		mJ
		T_{vj} =125°C		8.0		mJ
I_{SC}	Short Circuit Current	t_{psc}≤10μS , V_{GE}=15V T_{vj}=125°C,V_{CC}=900V		300		A
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per IGBT**）				0.36	K /W
Diode						
V_F	Forward Voltage	I_F=75A , V_{GE}=0V, T_{vj} =25°C		1.65		V
		I_F=75A , V_{GE}=0V, T_{vj} =125°C		1.65		V
I_{RRM}	Max. Reverse Recovery Current	I_F=75A , V_R=600V di_F/dt=-2000A/μs T_{vj}=125°C		85		A
Q_{rr}	Reverse Recovery Charge			13		μC
E_{rec}	Reverse Recovery Energy			6.5		mJ
R_{thJCD}	Junction-to-Case Thermal Resistance （ **Per Diode**）				0.6	K /W

MODULE CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$T_{Vj\ max}$	Max. Junction Temperature				150	°C
$T_{Vj\ op}$	Operating Temperature		-40		125	°C
T_{stg}	Storage Temperature		-40		125	°C
V_{isol}	Insulation Test Voltage	AC, t=1min		3000		V
CTI	Comparative Tracking Index		350			
Torque	Module-to-Sink	Recommended（M6）	3		5	N · m
Torque	Module Electrodes	Recommended（M5）	2.5		5	N · m
Weight				160		g

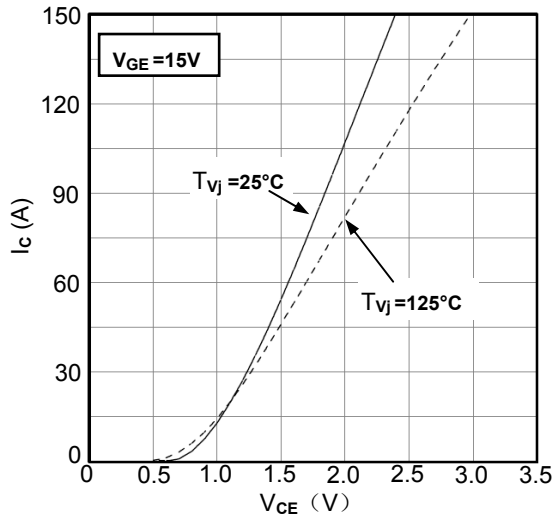


Figure1. Typical Output Characteristics

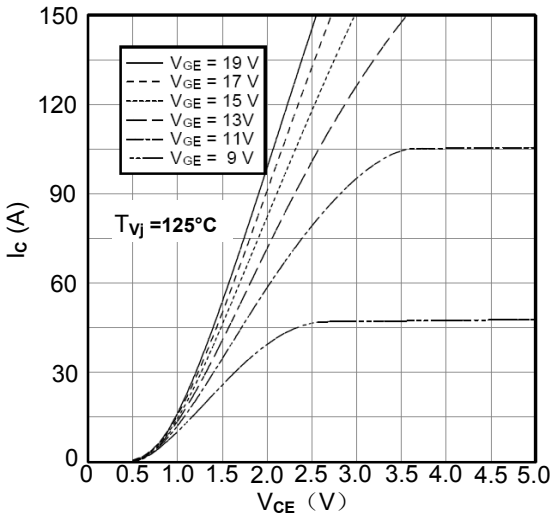


Figure2. Typical Output Characteristics

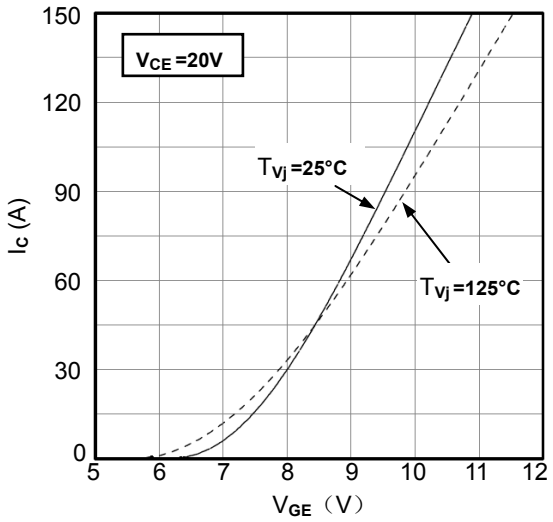


Figure3. Typical Transfer characteristics

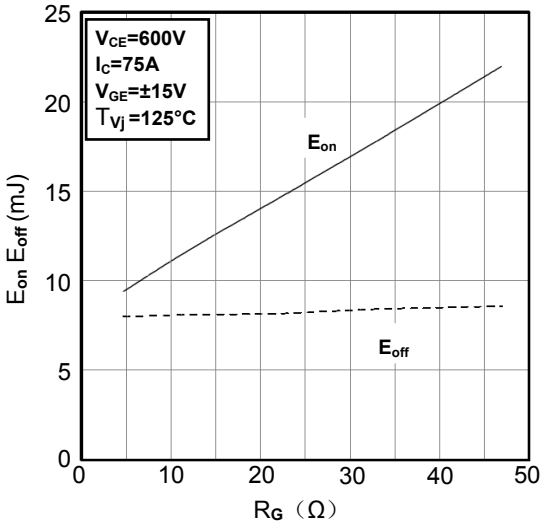


Figure4. Switching Energy vs. Gate Resistor

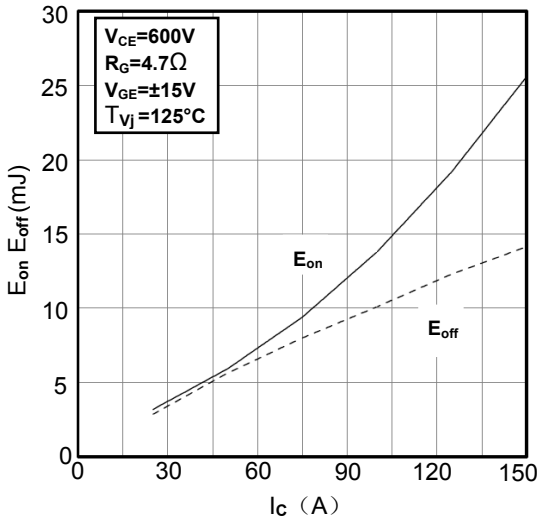


Figure5. Switching Energy vs. Collector Current

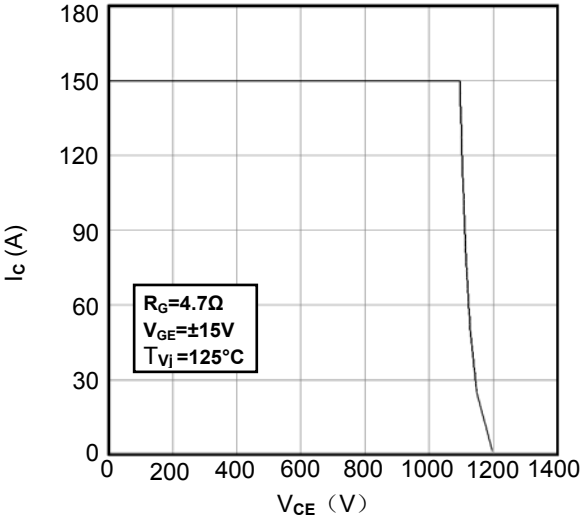


Figure6. Reverse Biased Safe Operating Area

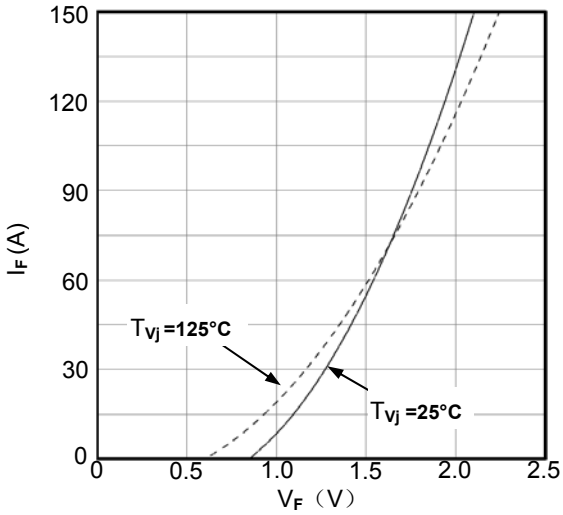


Figure7. Diode Forward Characteristics

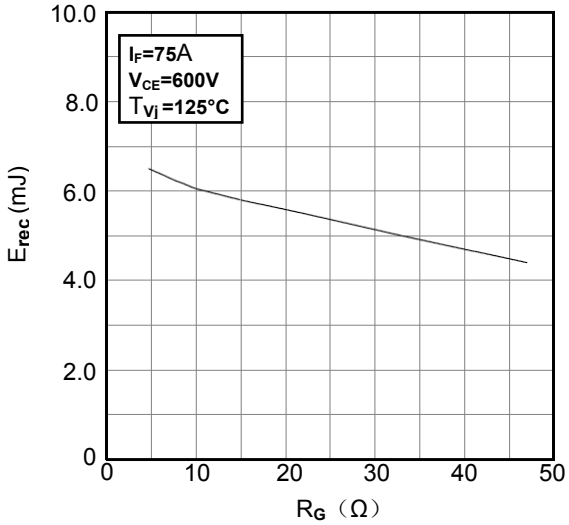


Figure8. Switching Energy vs. Gate Resistor

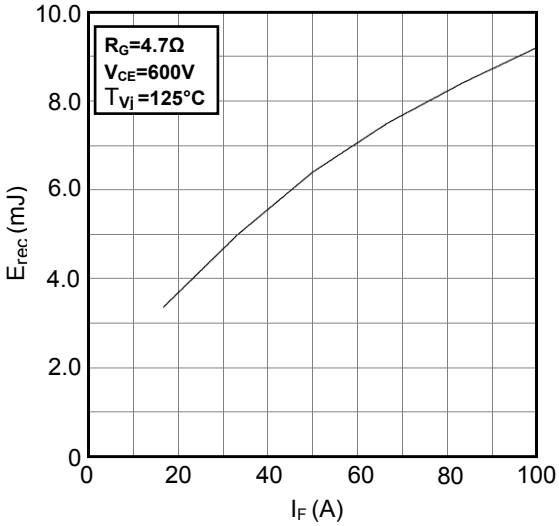
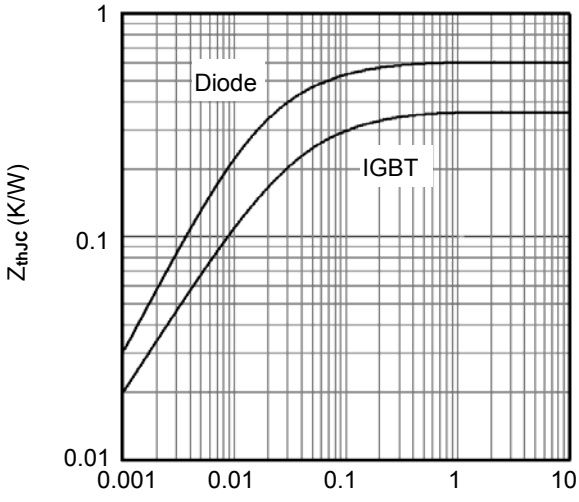


Figure9. Switching Energy vs. Forward Current



Rectangular Pulse Duration (seconds)

Figure10. Transient Thermal Impedance of Diode and IGBT

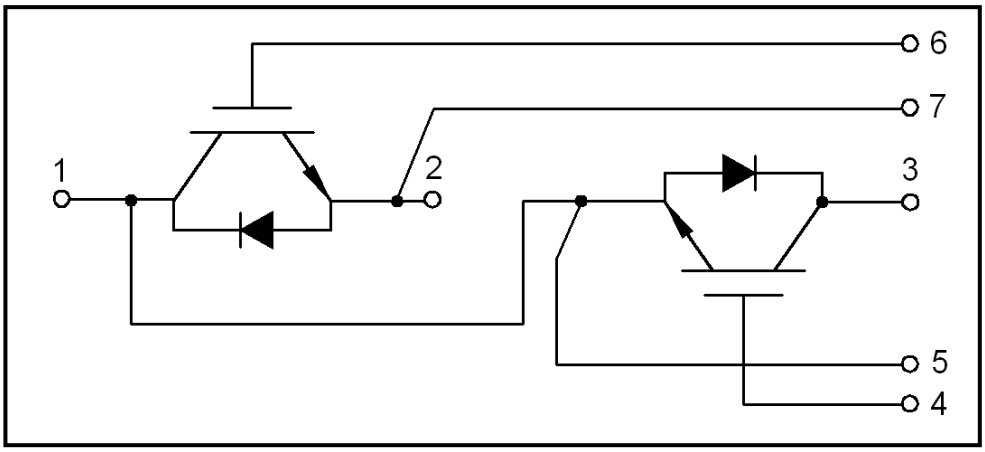
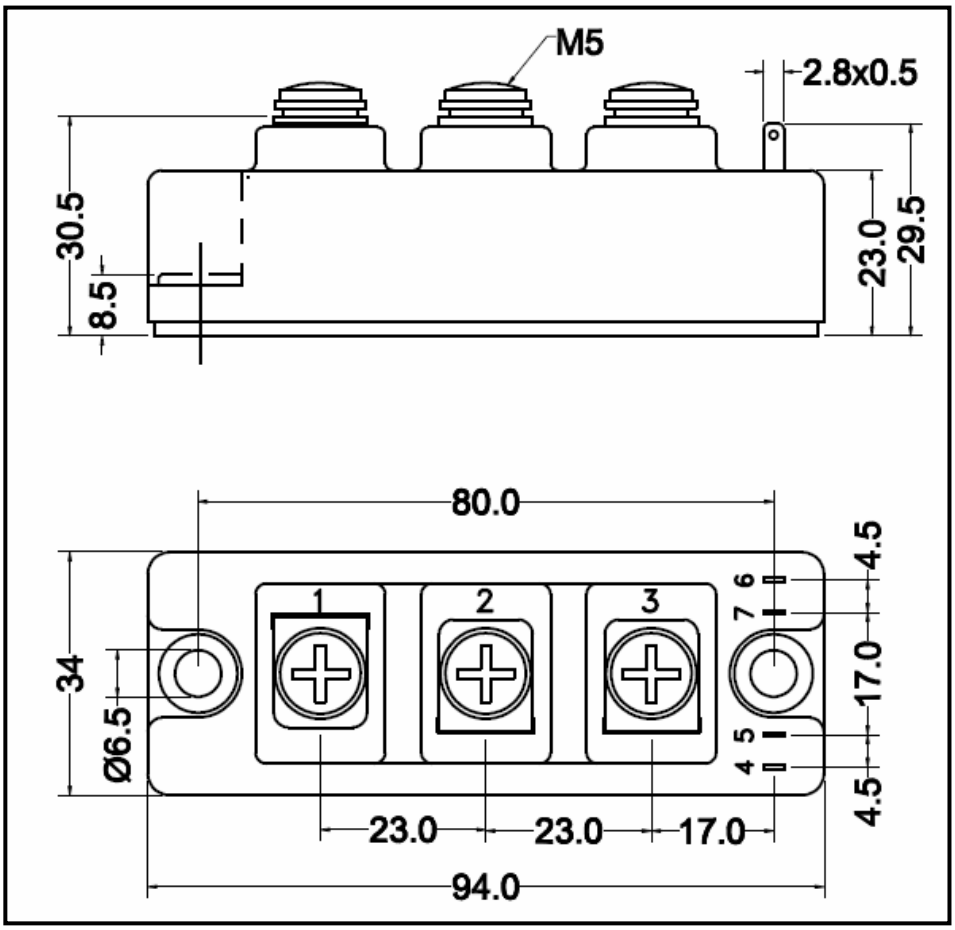


Figure11. Circuit Diagram



Dimensions (mm)
Figure12. Package Outline