

FEATURES

- Ultra Low Loss
- High Ruggedness
- High Short Circuit Capability
- Positive Temperature Coefficient
- With Fast Free-Wheeling Diodes

APPLICATIONS

- Inverter
- Convertor
- Welder
- SMPS and UPS
- Induction Heating



GD Series Module

ABSOLUTE MAXIMUM RATINGS

$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage		1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}$	300	A
		$T_C=80^{\circ}\text{C}$	210	A
I_{Cpuls}	Pulsed Collector Current	$T_C=25^{\circ}\text{C}$, $t_p=1\text{ms}$	600	A
		$T_C=80^{\circ}\text{C}$, $t_p=1\text{ms}$	420	A
P_{tot}	Power Dissipation Per IGBT		1400	W
T_J	Junction Temperature Range		-40 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range		-40 to +125	$^{\circ}\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$	3000	V
Free-Wheeling Diode				
V_{RRM}	Repetitive Reverse Voltage		1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	250	A
		$T_C=80^{\circ}\text{C}$	170	A
$I_{F(RMS)}$	RMS Forward Current		250	A
I_{FSM}	Non-Repetitive Surge	$T_J=45^{\circ}\text{C}$, $t=10\text{ms}$, Sine	1860	A
	Forward Current	$T_J=45^{\circ}\text{C}$, $t=8.3\text{ms}$, Sine	1920	A

MMG200DR120UA

ELECTRICAL 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 =8mA	5	6.2	7	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =200A, V _{GE} =15V, T _J =25°C		1.8		V
		I _C =200A, V _{GE} =15V, T _J =125°C		2.0		V
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C		0.4	1	mA
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C		6		mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =± 20V	-400		400	nA
Q _{ge}	Gate Charge	V _{CC} =600V, I _C =200A , V _{GE} =± 15V		2100		nC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		14.9		nF
C _{oes}	Output Capacitance			1.04		nF
C _{res}	Reverse Transfer Capacitance			0.7		nF
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =200A R _G =5 Ω , V _{GE} =± 15V T _J =25°C Inductive Load		125		ns
t _r	Rise Time			60		ns
t _{d(off)}	Turn - off Delay Time			420		ns
t _f	Fall Time			60		ns
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =200A R _G =5 Ω , V _{GE} =± 15V T _J =125°C Inductive Load		135		ns
t _r	Rise Time			60		ns
t _{d(off)}	Turn - off Delay Time			490		ns
t _f	Fall Time			75		ns
E _{on}	Turn - on Switching Energy	V _{CC} =600V, I _C =200A T _J =25°C		17		mJ
		R _G =5 Ω T _J =125°C		24.8		mJ
E _{off}	Turn - off Switching Energy	V _{GE} =± 15V T _J =25°C		13.6		mJ
		Inductive Load T _J =125°C		21.6		mJ
Free-Wheeling Diode						
V _F	Forward Voltage	I _F =200A , V _{GE} =0V, T _J =25°C		2.0	2.44	V
		I _F =200A , V _{GE} =0V, T _J =125°C		1.7	2.20	V
t _{rr}	Reverse Recovery Time	I _F =200A , V _R =800V di _F /dt=-1000A/μs T _J =125°C		260		ns
I _{RRM}	Max. Reverse Recovery Current			110		A
Q _{rr}	Reverse Recovery Charge			13.5		μC

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R _{thJC}	Junction-to-Case Thermal Resistance	Per IGBT			0.09	K /W
R _{thJCD}	Junction-to-Case Thermal Resistance	Per Inverse Diode			0.22	K /W
Torque	Module-to-Sink	Recommended (M6)	3		5	N · m
Torque	Module Electrodes	Recommended (M6)	2.5		5	N · m
Weight				285		g

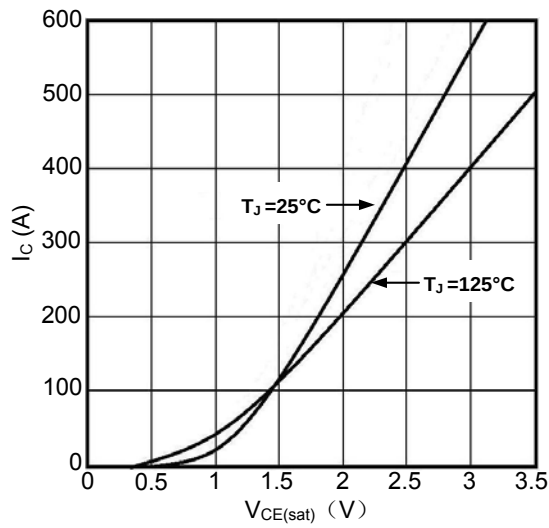


Figure1. Typical Output characteristics

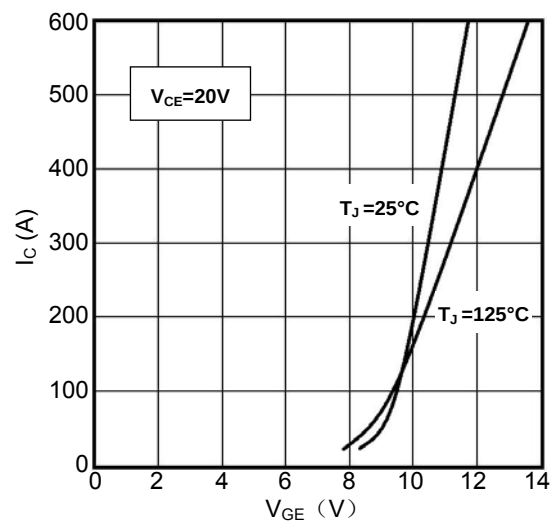


Figure2. Typical Transfer characteristics

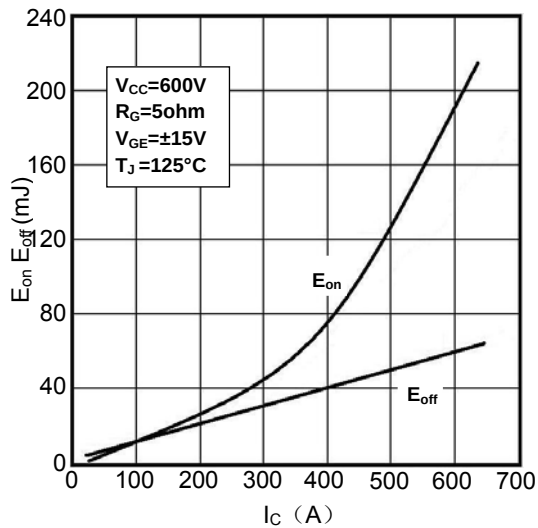


Figure3. Switching Energy vs. Collector Current

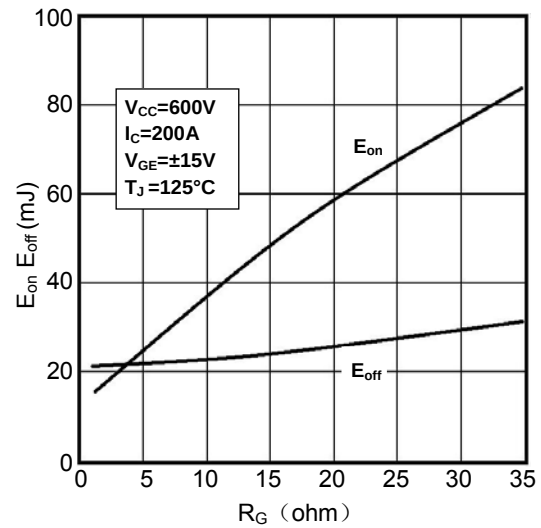


Figure4. Switching Energy vs. Gate Resistor

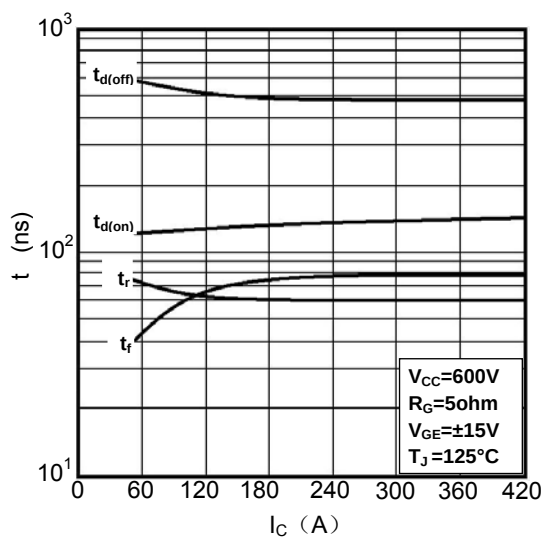


Figure5. Switching Times vs. Collector Current

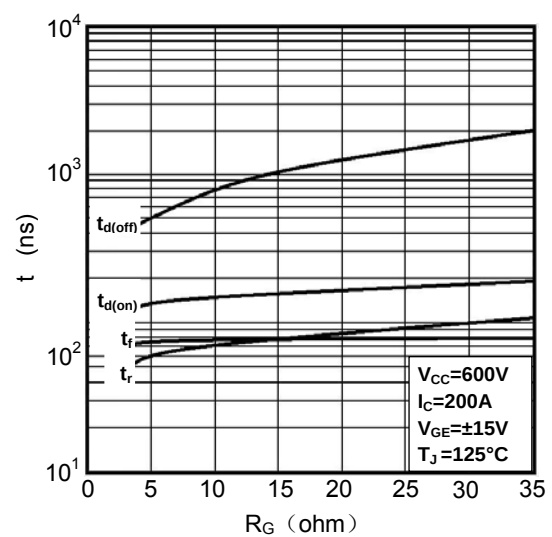


Figure6. Switching Times vs. Gate Resistor

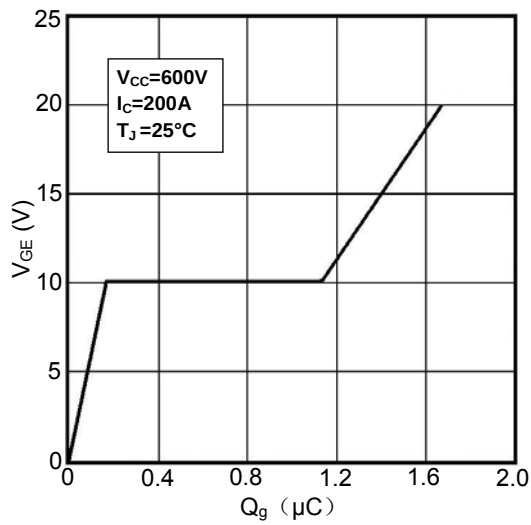


Figure7. Gate Charge characteristics

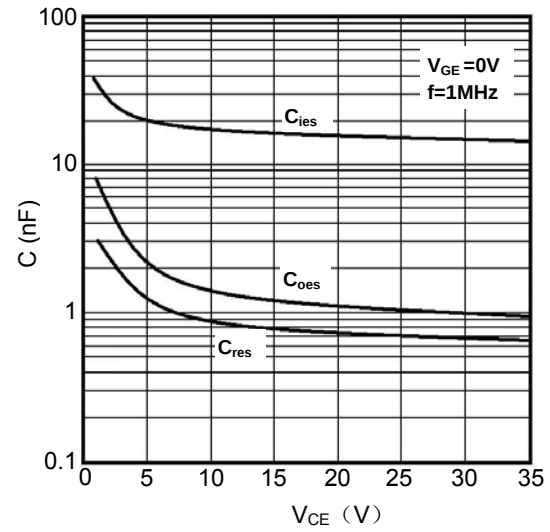


Figure8. Typical Capacitances vs. V_{CE}

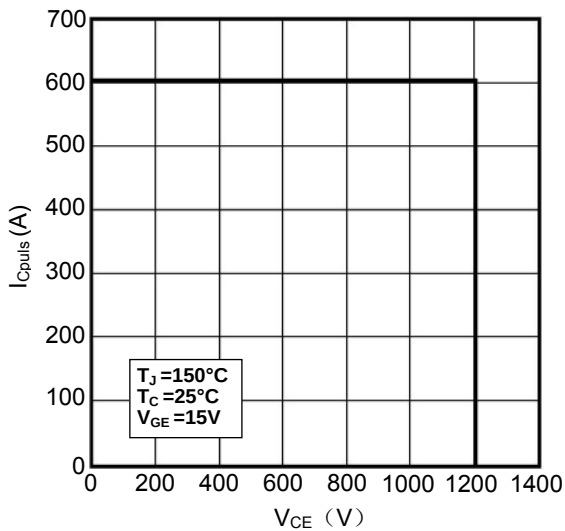


Figure9. Reverse Biased Safe Operating Area

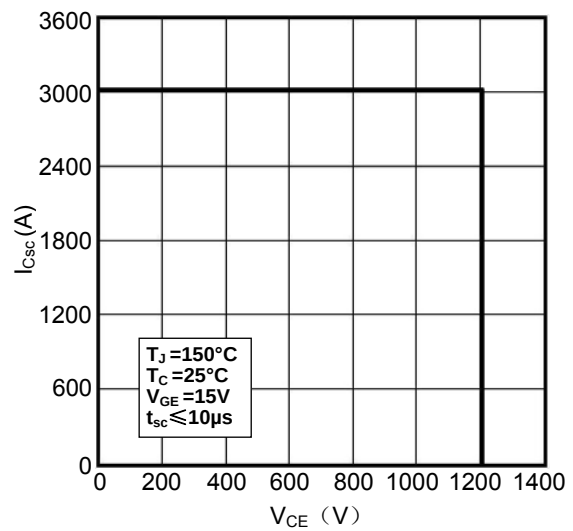


Figure10. Short Circuit Safe Operating Area

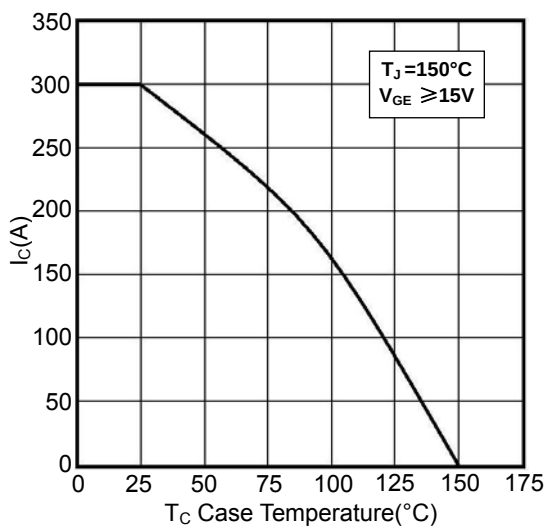


Figure11. Rated Current vs. T_C

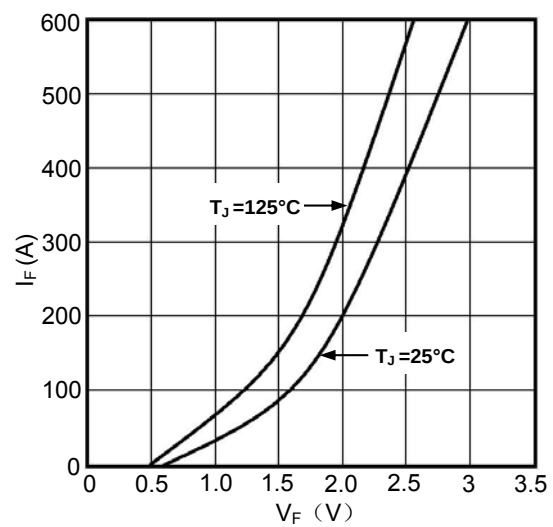


Figure12. Diode Forward Characteristics

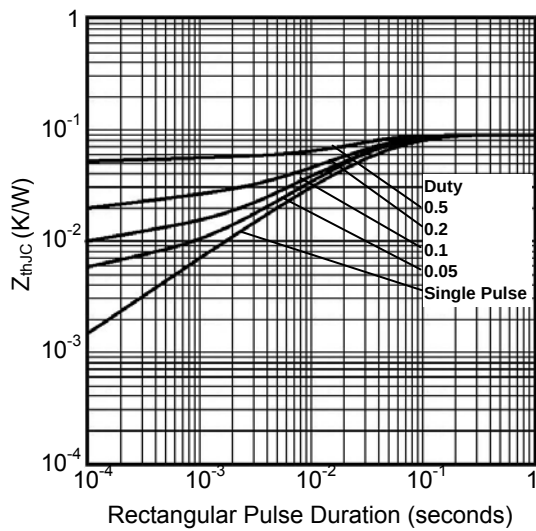


Figure13. Transient Thermal Impedance of IGBT

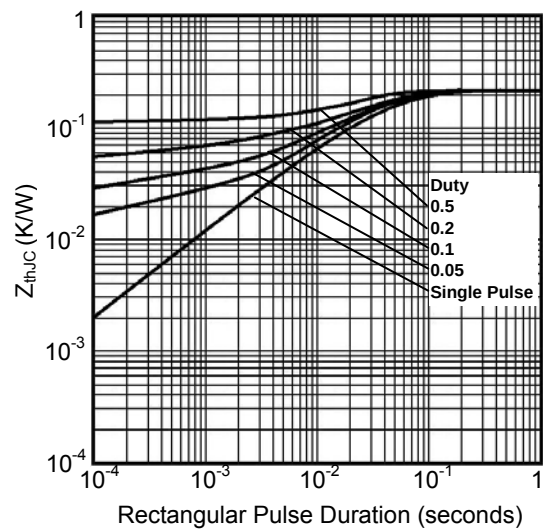


Figure14. Transient Thermal Impedance of Diode

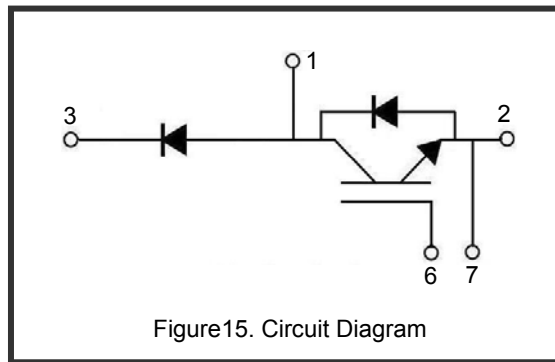


Figure15. Circuit Diagram

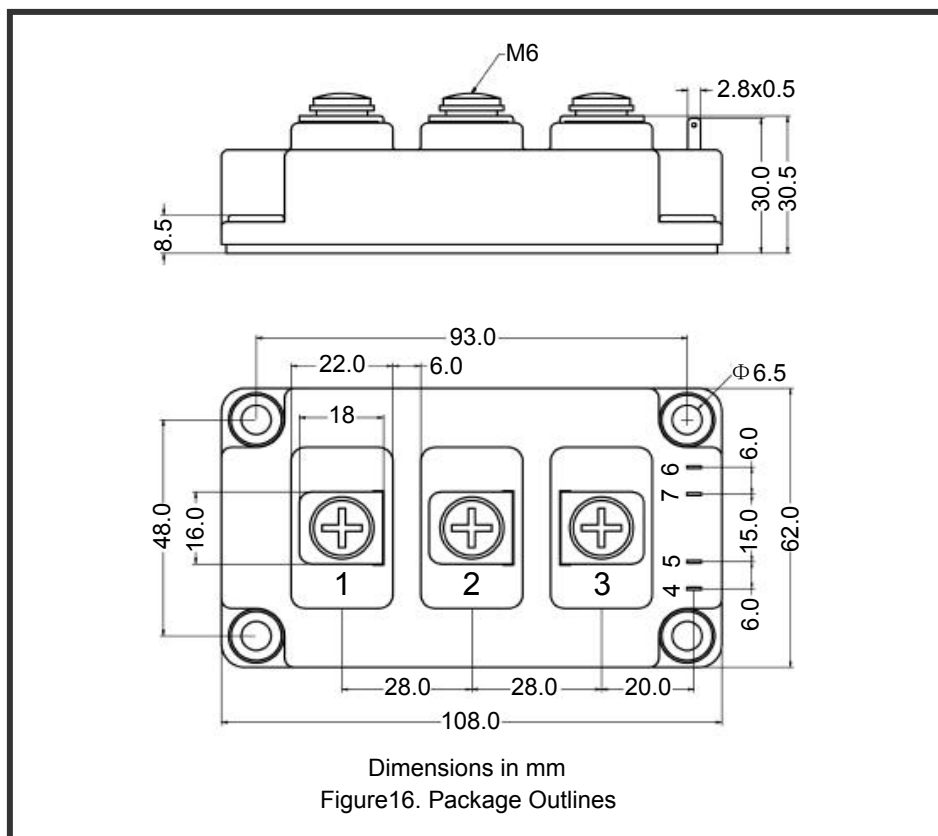


Figure16. Package Outlines