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Power Module

1200V 200A IGBT Module

MG12200D-BN2MM



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E71639

Features

- High short circuit capability, self limiting short circuit current
- IGBT³ 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

Applications

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

Module Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
$T_{J\max}$	Max. Junction Temperature				150	$^\circ\text{C}$
T_{Jop}	Operating Temperature		-40		125	$^\circ\text{C}$
T_{stg}	Storage Temperature		-40		125	$^\circ\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$		3000		V
CTI	Comparative Tracking Index		350			
Torque	Module-to-Sink	Recommended (M6)	3		5	N-m
Torque	Module Electrodes	Recommended (M6)	2.5		5	N-m
Weight				320		g

Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage	$T_J = 25^\circ\text{C}$	1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_C	DC Collector Current	$T_c = 25^\circ\text{C}$	290	A
		$T_c = 80^\circ\text{C}$	200	A
I_{CM}	Repetitive Peak Collector Current	$t_p = 1\text{ms}$	400	A
P_{tot}	Power Dissipation Per IGBT		1050	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	$T_J = 25^\circ\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_c = 25^\circ\text{C}$	290	A
		$T_c = 80^\circ\text{C}$	200	A
I_{FRM}	Repetitive Peak Forward Current		400	A
I^2t		$T_J = 125^\circ\text{C}$, $t = 10\text{ms}$, $V_R = 0\text{V}$	7750	A^2s

Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

MG12200D-BN2MM

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Electrical and Thermal Specifications ($T_c = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters	Test Conditions		Min	Typ	Max	Unit
IGBT							
V _{GE(th)}	Gate - Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =8mA		5.0	5.8	6.5	V
V _{CE(sat)}	Collector - Emitter	I _C =200A, V _{GE} =15V, T _J =25°C			1.7		V
	Saturation Voltage	I _C =200A, V _{GE} =15V, T _J =125°C			1.9		V
I _{ICES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C				1	mA
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C				5	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±15V, T _J =125°C		-400		400	nA
R _{Gint}	Integrated Gate Resistor				3.8		Ω
Q _{ge}	Gate Charge	V _{CE} =600V, I _C =200A , V _{GE} =±15V			1.9		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz			14		nF
C _{res}	Reverse Transfer Capacitance				0.5		nF
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V I _C =200A R _G =3.6Ω V _{GE} =±15V Inductive Load	T _J =25°C		160		ns
			T _J =125°C		170		ns
t _r	Rise Time		T _J =25°C		40		ns
			T _J =125°C		45		ns
t _{d(off)}	Turn - off Delay Time		T _J =25°C		450		ns
			T _J =125°C		520		ns
t _f	Fall Time		T _J =25°C		100		ns
			T _J =125°C		160		ns
E _{on}	Turn - on Energy		T _J =25°C		10		mJ
			T _J =125°C		15		mJ
E _{off}	Turn - off Energy		T _J =25°C		16.5		mJ
			T _J =125°C		25		mJ
I _{SC}	Short Circuit Current	t _{psc} ≤10μS , V _{GE} =15V, T _J =125°C , V _{CC} =900V			800		A
R _{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)					0.12	K/W
Diode							
V _F	Forward Voltage	I _F =200A, V _{GE} =0V, T _J =25°C			1.65		V
		I _F =200A, V _{GE} =0V, T _J =125°C			1.65		V
t _{RR}	Reverse Recovery Time	I _F =200A, V _R =600V di _F /dt=-4000A/μs T _J =125°C			190		ns
I _{RRM}	Max. Reverse Recovery Current				36		A
E _{rec}	Reverse Recovery Energy				17		mJ
R _{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)					0.2	K/W

Power Module 1200V 200A IGBT Module

Figure 1: Typical Output Characteristics

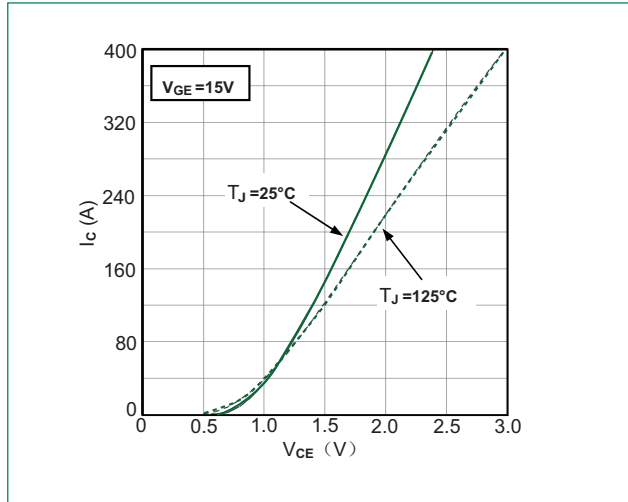


Figure 2: Typical Output Characteristics

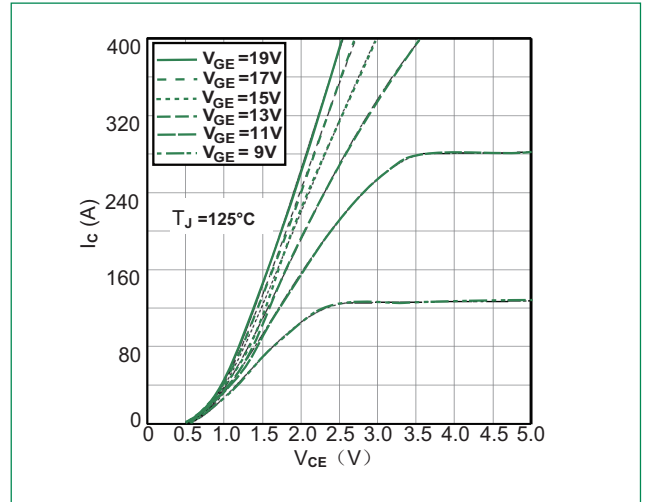


Figure 3: Typical Transfer characteristics

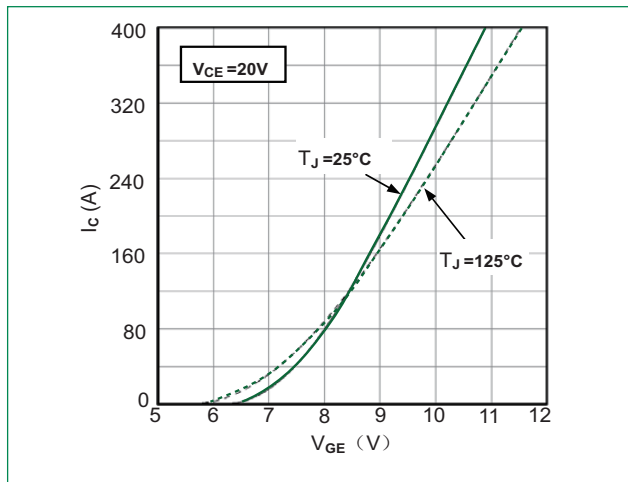


Figure 4: Switching Energy vs. Gate Resistor

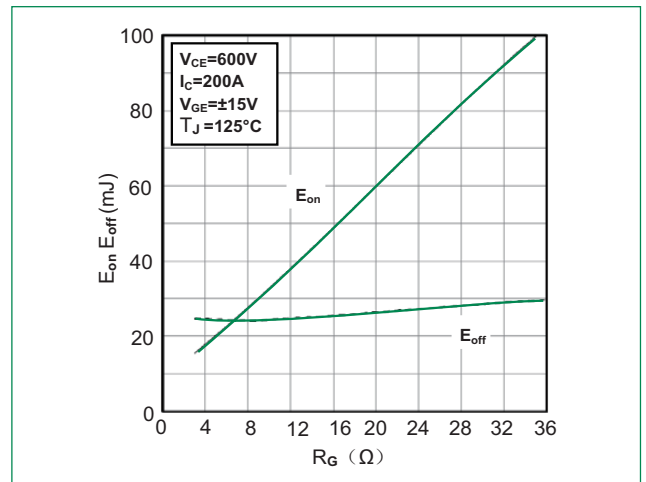


Figure 5: Switching Energy vs. Collector Current

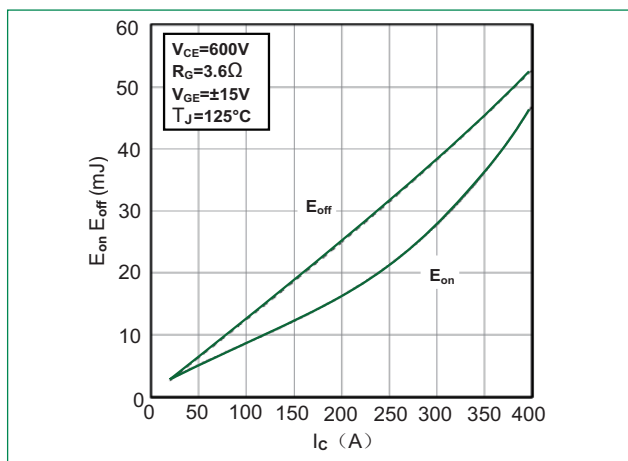


Figure 6: Reverse Biased Safe Operating Area

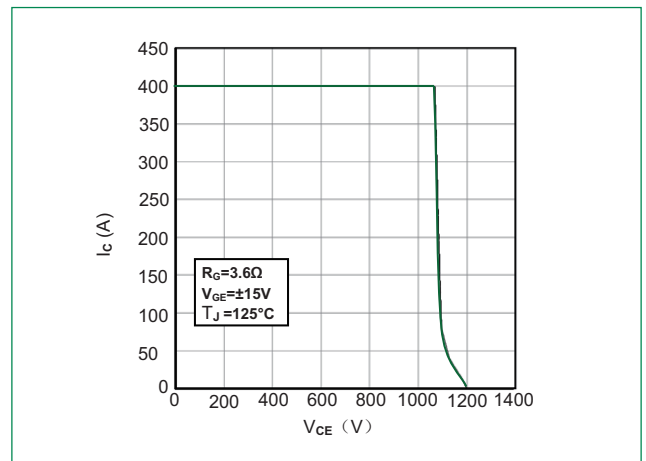


Figure 7: Diode Forward Characteristics

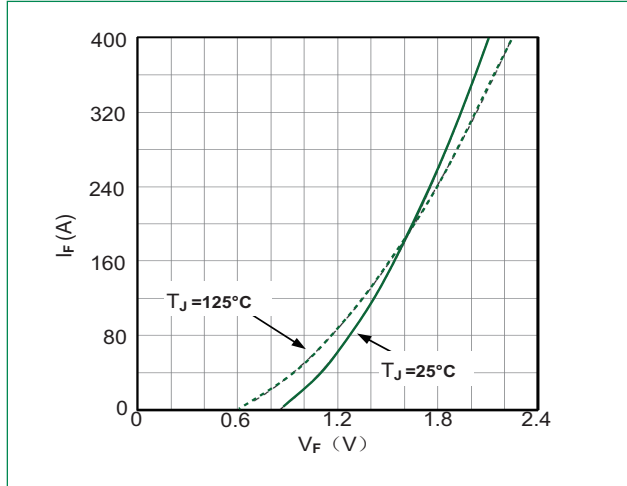


Figure 8: Switching Energy vs. Gate Resistor

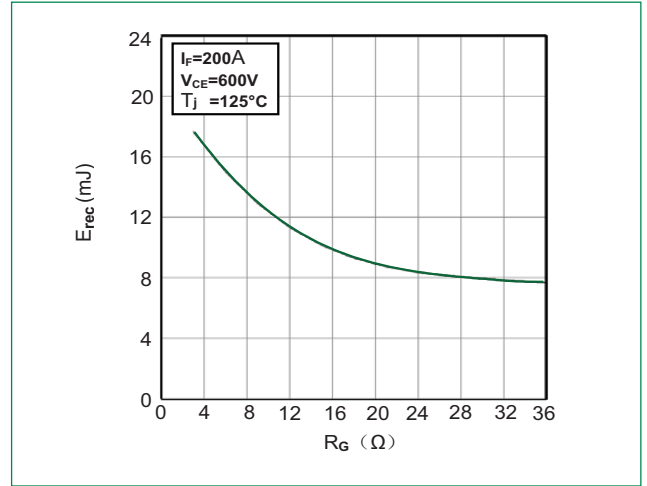


Figure 9: Switching Energy vs. Forward Current

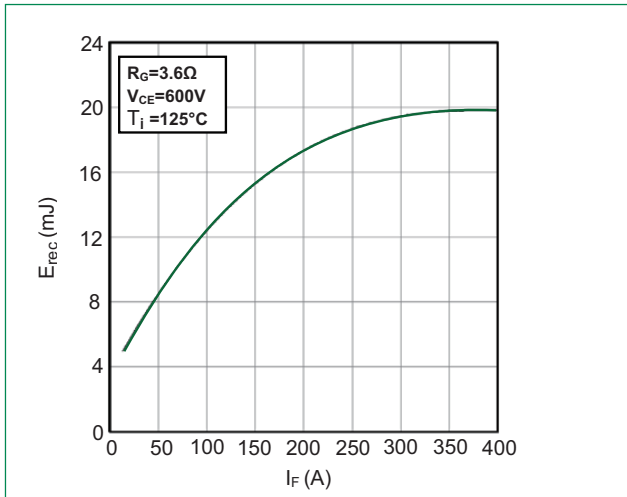
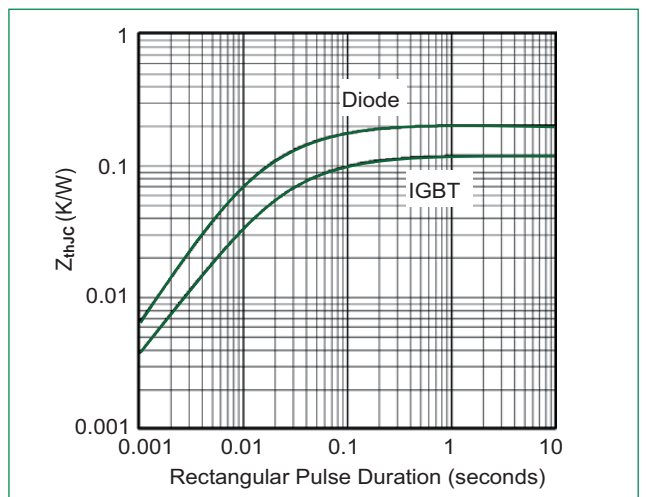


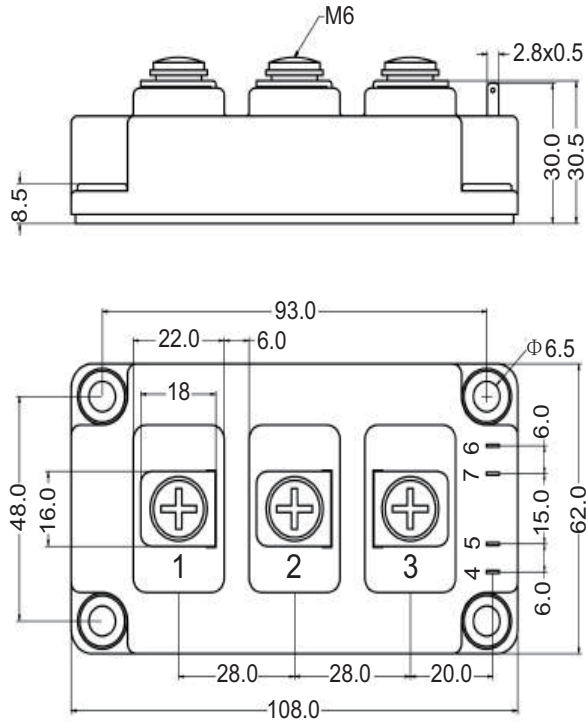
Figure 10: Transient Thermal Impedance



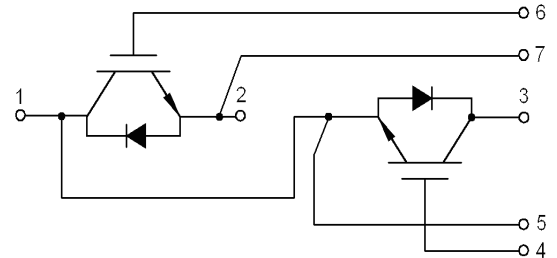
Power Module

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Dimensions-Package D



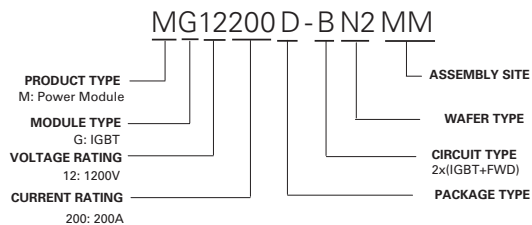
Circuit Diagram



Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12200D-BN2MM	MG12200D-BN2MM	320g	Bulk Pack	60

Part Numbering System



Part Marking System

