Littelfuse
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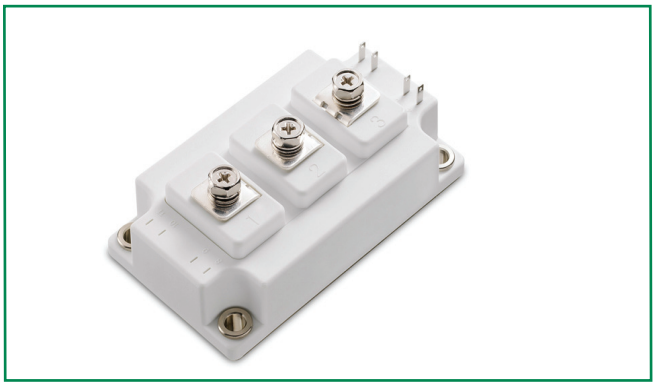
Power Module
1200V 200A IGBT Module

MG12200D-BN2MM

RoHS



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

Agency Approvals

AGENCY	AGENCY FILE NUMBER
®	E71639

Module Characteristics (T_J = 25°C, unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
$T_{J\,max}$	Max. Junction Temperature				150	°C
$T_{J\,op}$	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 (M6)	2.5		5	N·m
Weight				320		g

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

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

Electrical and Thermal Specifications (T_C = 25°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 Saturation Voltage	I_C=200A, V_{GE}=15V, T_J=25°C			1.7		V
		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

Figure 1: Typical Output Characteristics

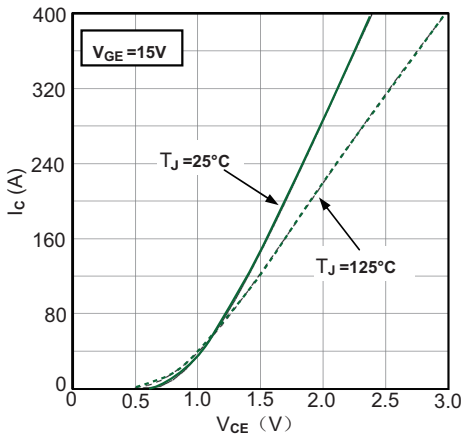


Figure 2: Typical Output Characteristics

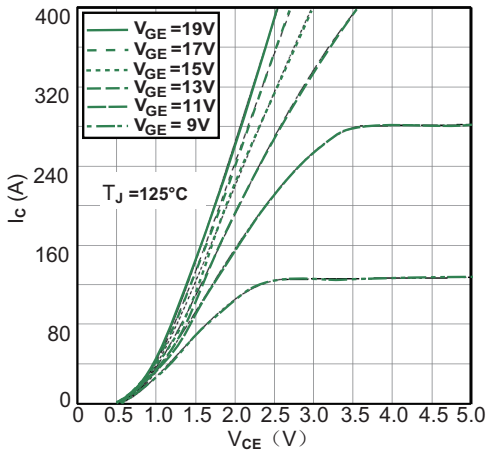


Figure 3: Typical Transfer characteristics

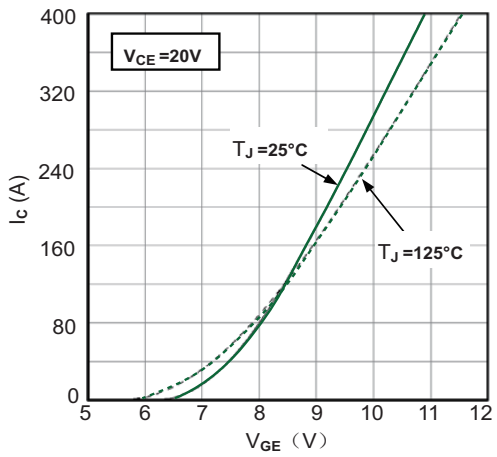


Figure 4: Switching Energy vs. Gate Resistor

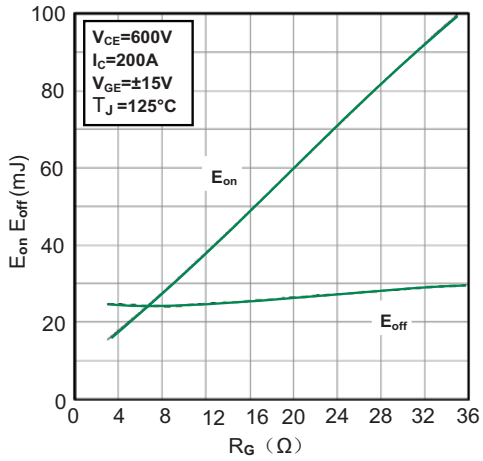


Figure 5: Switching Energy vs. Collector Current

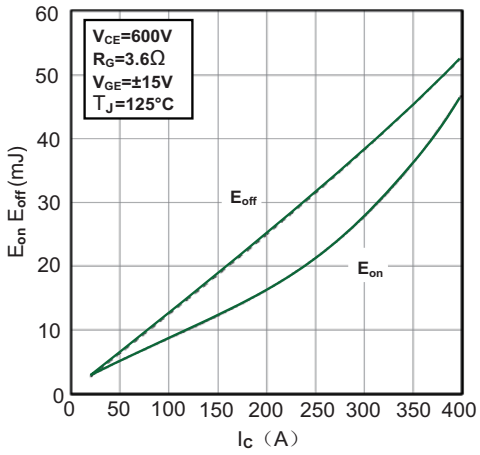


Figure 6: Reverse Biased Safe Operating Area

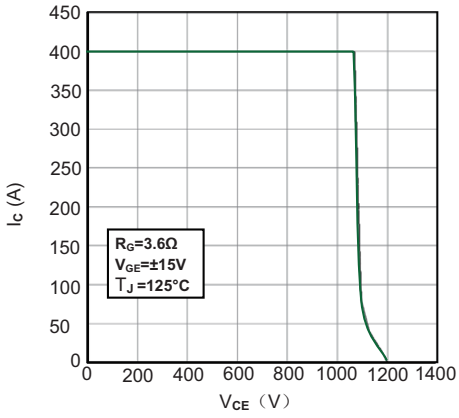


Figure 7: Diode Forward Characteristics

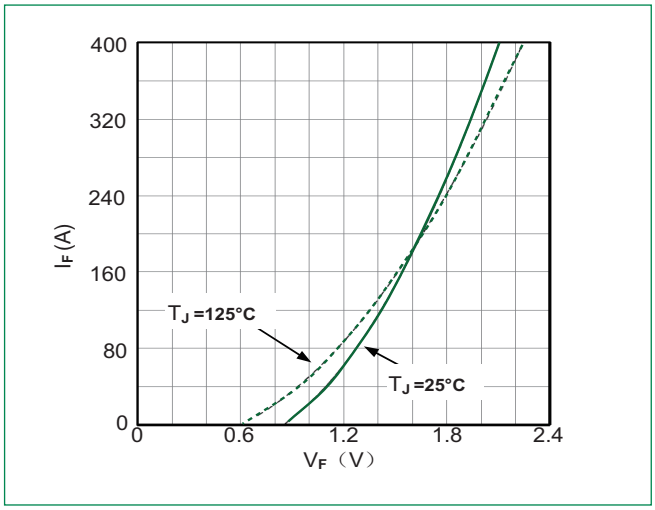


Figure 8: Switching Energy vs. Gate Resistor

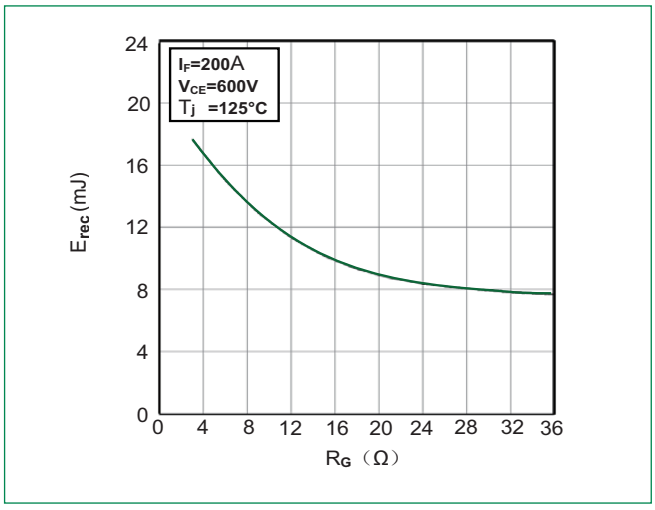


Figure 9: Switching Energy vs. Forward Current

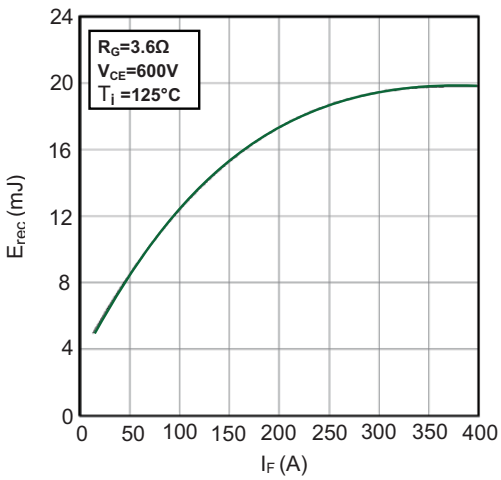
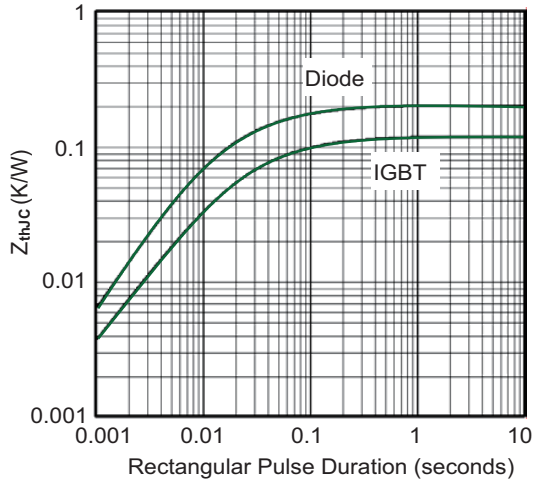
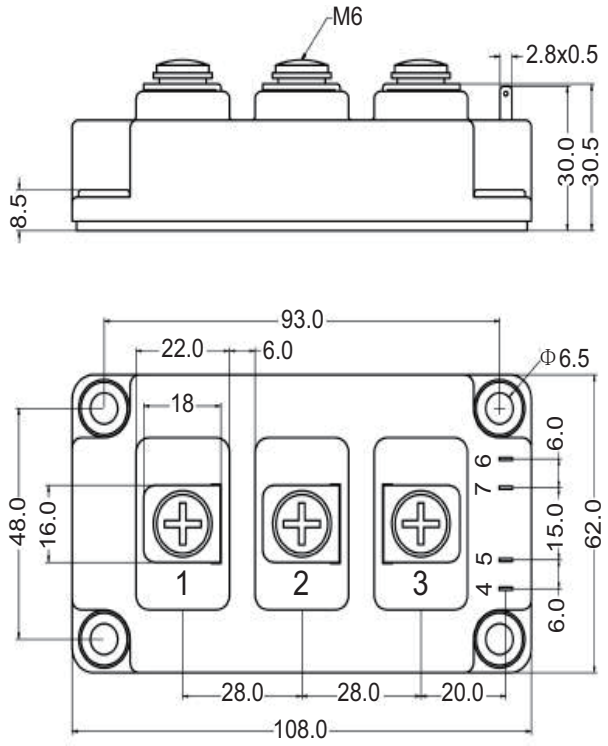


Figure 10: Transient Thermal Impedance

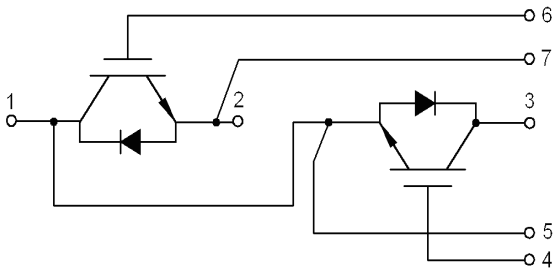


Power Module
1200V 200A IGBT Module

Dimensions-Package D



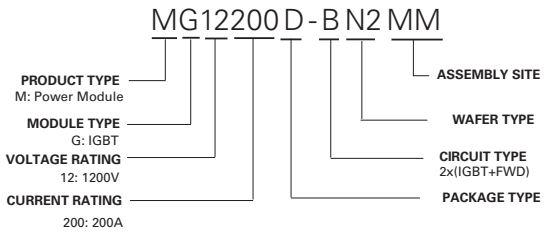
Circuit Diagram



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