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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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### MG12400D-BN2MM



#### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E71639

#### Features

- High short circuit capability, self limiting short circuit current
- IGBT<sup>3</sup> 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	$^\circ\text{C}$
$T_{J\text{op}}$	Operating Temperature		-40		125	$^\circ\text{C}$
$T_{\text{stg}}$	Storage Temperature		-40		125	$^\circ\text{C}$
$V_{\text{isol}}$	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 ( $T_c = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Parameters	Test Conditions	Values	Unit
<b>IGBT</b>				
$V_{\text{CES}}$	Collector - Emitter Voltage	$T_J = 25^\circ\text{C}$	1200	V
$V_{\text{GES}}$	Gate - Emitter Voltage		$\pm 20$	V
$I_c$	DC Collector Current	$T_c = 25^\circ\text{C}$	580	A
		$T_c = 80^\circ\text{C}$	400	A
$I_{\text{CM}}$	Repetitive Peak Collector Current	$t_p = 1\text{ms}$	800	A
$P_{\text{tot}}$	Power Dissipation Per IGBT		1925	W
<b>Diode</b>				
$V_{\text{RRM}}$	Repetitive Reverse Voltage	$T_J = 25^\circ\text{C}$	1200	V
$I_{\text{F(AV)}}$	Average Forward Current	$T_c = 25^\circ\text{C}$	580	A
		$T_c = 80^\circ\text{C}$	400	A
$I_{\text{FRM}}$	Repetitive Peak Forward Current		800	A
$I^2t$		$T_J = 125^\circ\text{C}, t = 10\text{ms}, V_R = 0\text{V}$	30000	$\text{A}^2\text{s}$

Life Support Note:

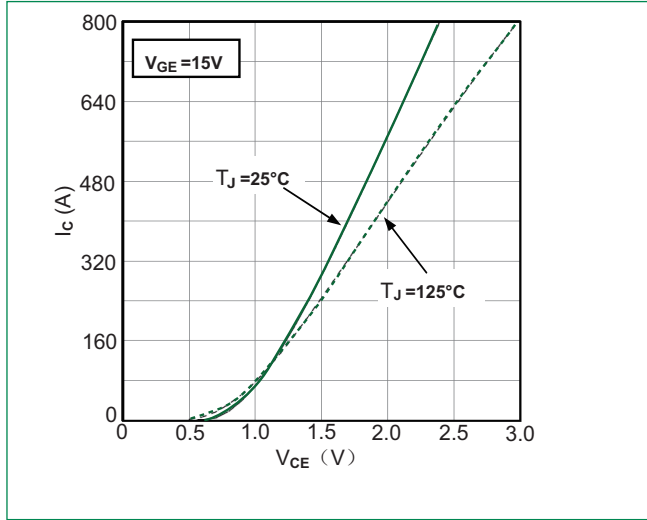
**Not Intended for Use in Life Support or Life Saving Applications**

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

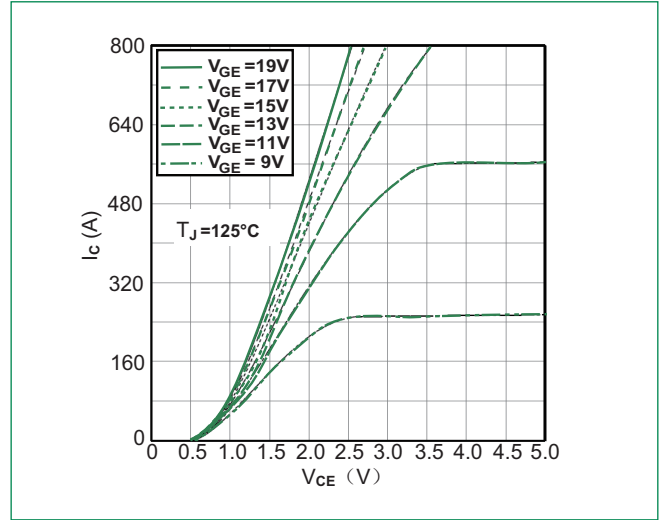
**Electrical and Thermal Specifications ( $T_c = 25^\circ\text{C}$ , unless otherwise specified)**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
<b>IGBT</b>						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=16\text{mA}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=400\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.7		V
		$I_C=400\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		1.9		V
$I_{ICES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			2	mA
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			10	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=125^\circ\text{C}$	-400		400	nA
$R_{Gint}$	Integrated Gate Resistor			1.9		$\Omega$
$Q_{ge}$	Gate Charge	$V_{CE}=600\text{V}, I_C=400\text{A}, V_{GE}=\pm 15\text{V}$		3.8		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		28		nF
$C_{res}$	Reverse Transfer Capacitance				1.0	
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=600\text{V}$ $I_C=400\text{A}$ $R_G=1.8\Omega$ $V_{GE}=\pm 15\text{V}$ Inductive Load	$T_J=25^\circ\text{C}$		160	ns
			$T_J=125^\circ\text{C}$		170	ns
$t_r$	Rise Time		$T_J=25^\circ\text{C}$		40	ns
			$T_J=125^\circ\text{C}$		45	ns
$t_{d(off)}$	Turn - off Delay Time		$T_J=25^\circ\text{C}$		450	ns
			$T_J=125^\circ\text{C}$		520	ns
$t_f$	Fall Time		$T_J=25^\circ\text{C}$		100	ns
			$T_J=125^\circ\text{C}$		160	ns
$E_{on}$	Turn - on Energy		$T_J=25^\circ\text{C}$		20	mJ
			$T_J=125^\circ\text{C}$		30	mJ
$E_{off}$	Turn - off Energy	$T_J=25^\circ\text{C}$		33	mJ	
		$T_J=125^\circ\text{C}$		50	mJ	
$I_{SC}$	Short Circuit Current	$t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}, V_{CC}=900\text{V}$		1550		A
$R_{thJC}$	Junction-to-Case Thermal Resistance (Per IGBT)				0.065	K/W
<b>Diode</b>						
$V_F$	Forward Voltage	$I_F=400\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.65		V
		$I_F=400\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.65		V
$t_{RR}$	Reverse Recovery Time	$I_F=400\text{A}, V_R=600\text{V}$ $di_F/dt=-8000\text{A}/\mu\text{s}$ $T_J=125^\circ\text{C}$		450		ns
$I_{RRM}$	Max. Reverse Recovery Current			75		A
$E_{rec}$	Reverse Recovery Energy				35	
$R_{thJCD}$	Junction-to-Case Thermal Resistance (Per Diode)				0.12	K/W

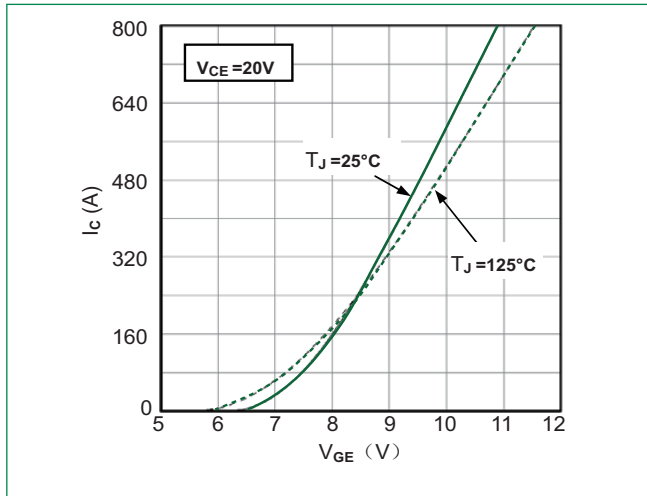
**Figure 1: Typical Output Characteristics**



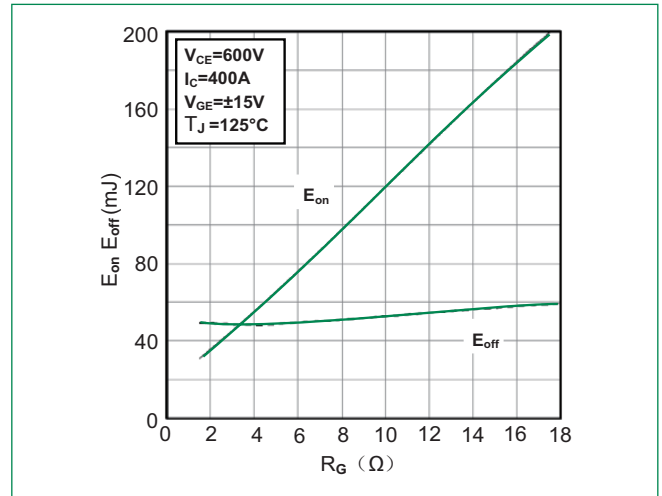
**Figure 2: Typical Output Characteristics**



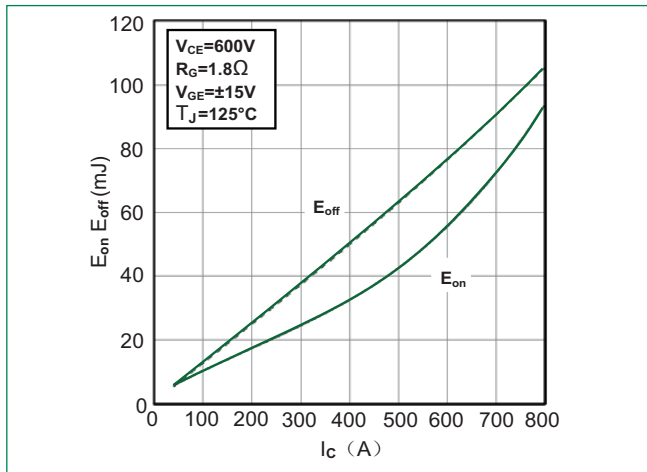
**Figure 3: Typical Transfer characteristics**



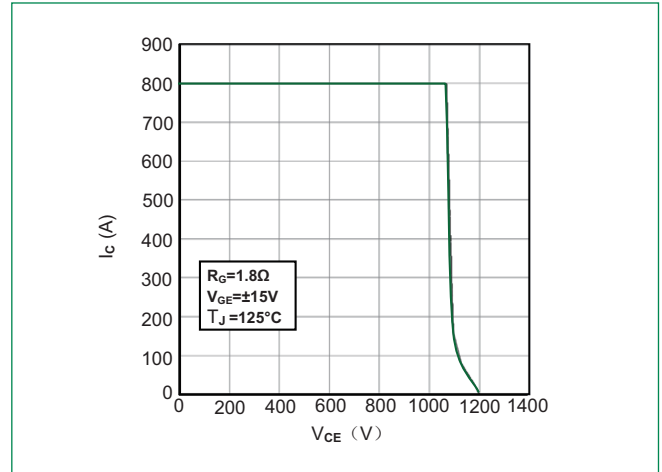
**Figure 4: Switching Energy vs. Gate Resistor**



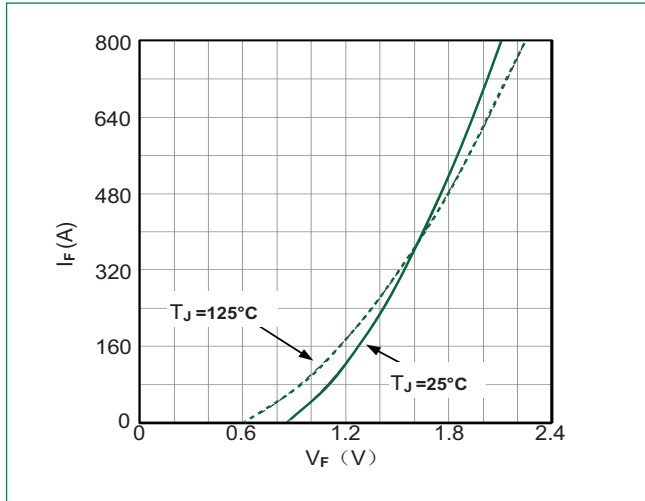
**Figure 5: Switching Energy vs. Collector Current**



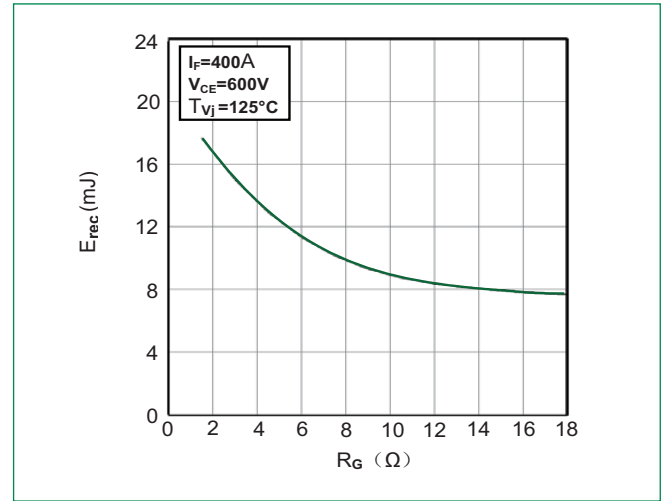
**Figure 6: Reverse Biased Safe Operating Area**



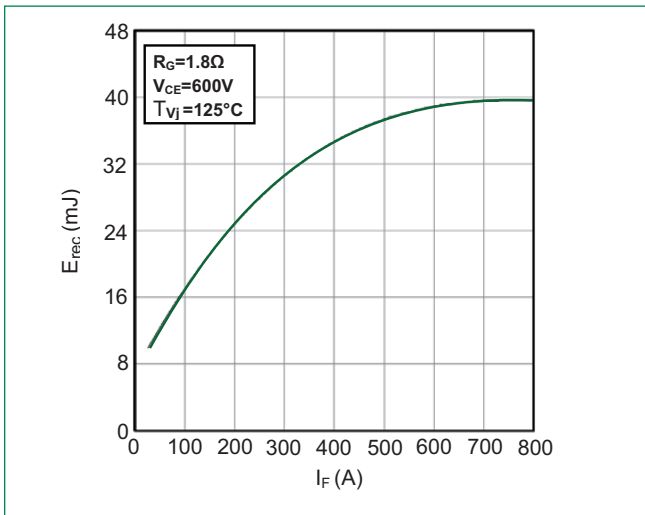
**Figure 7: Diode Forward Characteristics**



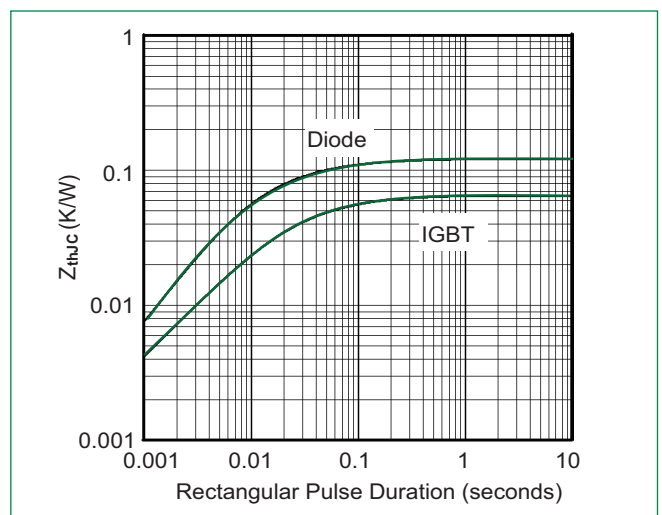
**Figure 8: Switching Energy vs. Gate Resistor**



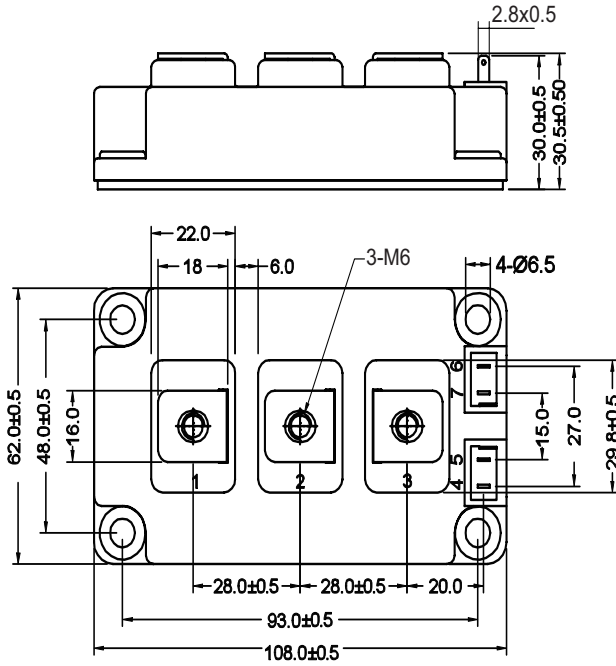
**Figure 9: Switching Energy vs. Forward Current**



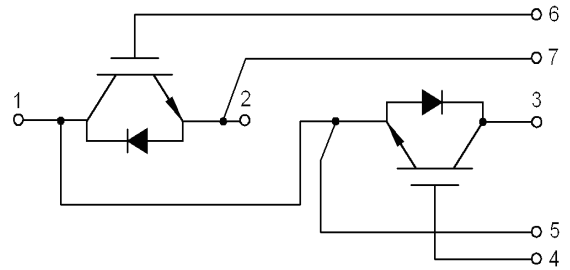
**Figure 10: Transient Thermal Impedance**



### Dimensions-Package D



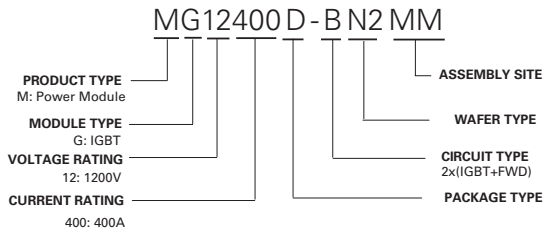
### Circuit Diagram



### Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12400D-BN2MM	MG12400D-BN2MM	320g	Bulk Pack	60

### Part Numbering System



### Part Marking System

