

MG12300D-BA1MM



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E71639

Features

- Ultra low loss
- High ruggedness
- High short circuit capability
- Positive temperature coefficient
- With fast free-wheeling diodes

Applications

- Inverter
- Converter
- Welder
- SMPS and UPS
- Induction heating

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

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
R_{thJC}	Junction-to-Case Thermal Resistance	Per IGBT			0.07	K/W
R_{thJCD}		Per Inverse Diode			0.15	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

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

Symbol	Parameters	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage		1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_c	DC Collector Current	$T_c = 25^\circ\text{C}$	450	A
		$T_c = 80^\circ\text{C}$	310	A
I_{Cpuls}	Pulsed Collector Current	$T_c = 25^\circ\text{C}, t_p = 1\text{ms}$	900	A
		$T_c = 80^\circ\text{C}, t_p = 1\text{ms}$	620	
P_{tot}	Power Dissipation Per IGBT		1800	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
Diode				
V_{RRM}	Repetitive Reverse Voltage		1200	V
$I_{F(AV)}$	Average Forward Current	$T_c = 25^\circ\text{C}$	380	A
		$T_c = 80^\circ\text{C}$	260	A
$I_{F(RMS)}$	RMS Forward Current		380	A
I_{FSM}	Non-Repetitive Surge Forward Current	$T_J = 45^\circ\text{C}, t = 10\text{ms}$, Sine	2260	A
		$T_J = 45^\circ\text{C}, t = 8.3\text{ms}$, Sine	2560	

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.

MG12300D-BA1MM

Power Module

1200V 300A IGBT Module

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 =12mA		5.0	6.2	7.0	V
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =300A, V _{GE} =15V, T _J =25°C			1.9		V
		I _C =300A, V _{GE} =15V, T _J =125°C			2.1		V
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C			0.4	2	mA
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C			10		mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V		-400		400	nA
Q _{ge}	Gate Charge	V _{CC} =600V, I _C =300A , V _{GE} =±15V			3060		nC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f = 1MHz			21.2		nF
C _{oes}	Output Capacitance				1.42		
C _{res}	Reverse Transfer Capacitance				0.94		
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V I _C =300A R _G =3.4Ω V _{GE} =±15V Inductive Load	T _J =25°C		190		ns
			T _J =125°C		220		ns
t _r	Rise Time		T _J =25°C		60		ns
			T _J =125°C		60		ns
t _{d(off)}	Turn - off Delay Time		T _J =25°C		460		ns
			T _J =125°C		530		ns
t _f	Fall Time		T _J =25°C		55		ns
			T _J =125°C		75		ns
E _{on}	Turn - on Energy		T _J =25°C		22.4		mJ
			T _J =125°C		33.4		mJ
E _{off}	Turn - off Energy		T _J =25°C		19.6		mJ
			T _J =125°C		30.6		mJ
Diode							
V _F	Forward Voltage	I _F =300A , V _{GE} =0V, T _J =25°C			2.0	2.44	V
		I _F =300A , V _{GE} =0V, T _J =125°C			1.7	2.20	V
t _{rr}	Reverse Recovery Time	I _F =300A , V _R =800V di _r /dt=-1000A/μs T _J =125°C			410		ns
I _{RRM}	Max. Reverse Recovery Current				120		A
Q _{rr}	Reverse Recovery Charge				25		μC

Figure 1: Typical Output Characteristics

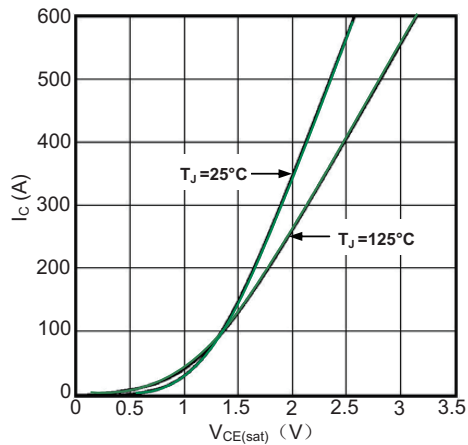


Figure 2: Typical Transfer characteristics

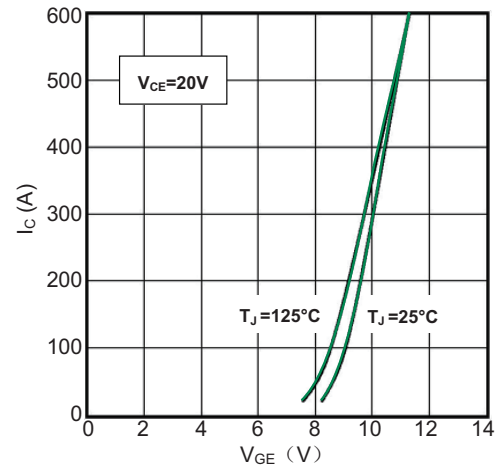


Figure 3: Switching Energy vs. Collector Current

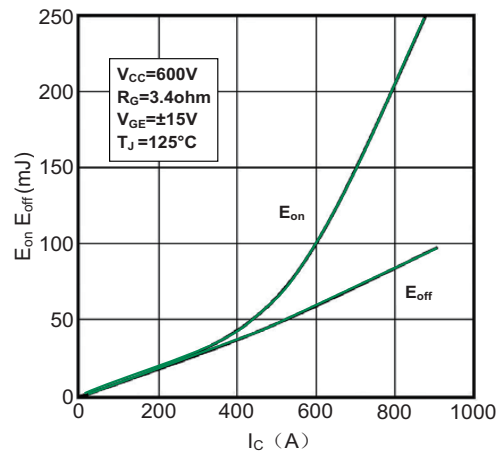


Figure 4: Switching Energy vs. Gate Resistor

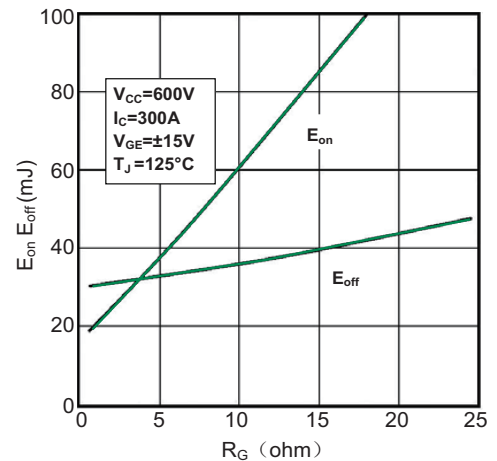


Figure 5: Switching Times vs. Collector Current

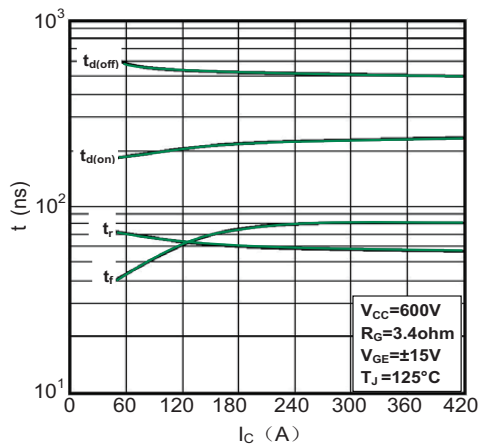


Figure 6: Switching Times vs. Gate Resistor

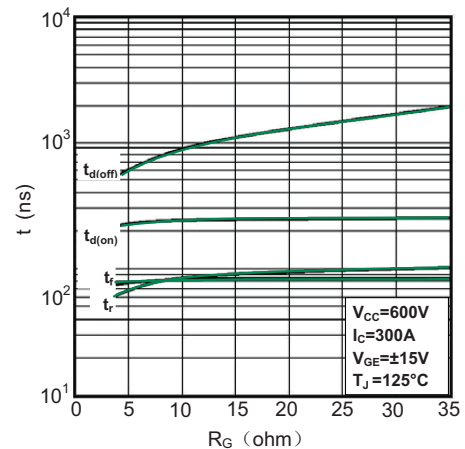


Figure 7: Gate Charge characteristics

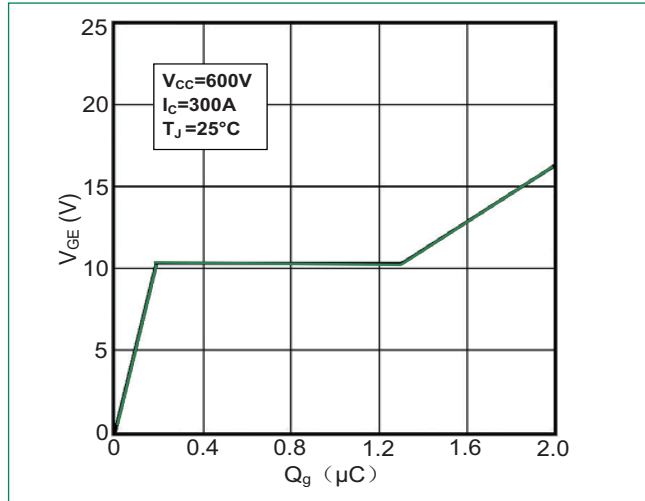


Figure 8: Typical Capacitances vs. V_{CE}

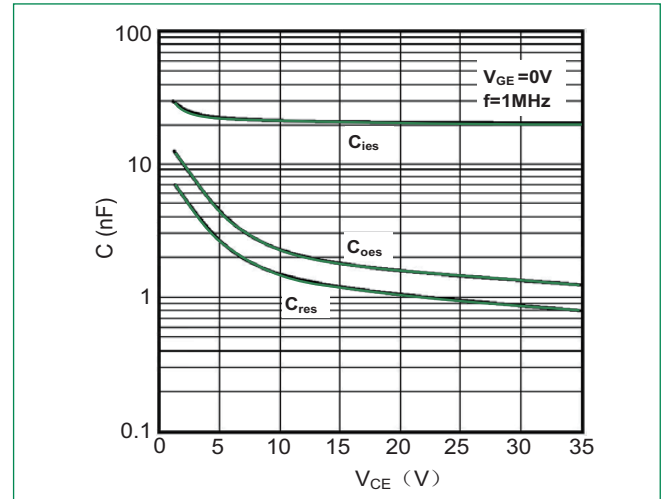


Figure 9: Reverse Biased Safe Operating Area

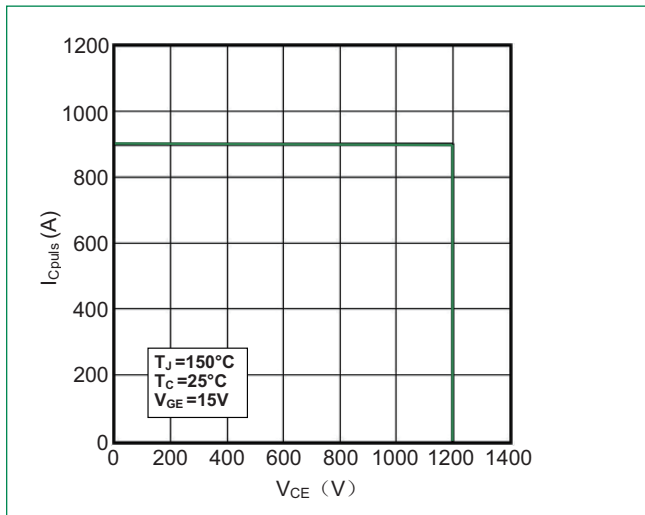


Figure 10: Short Circuit Safe Operating Area

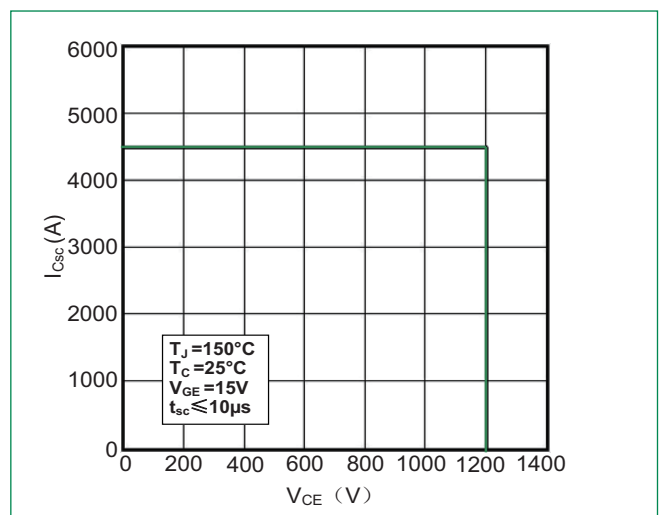


Figure 11: Rated Current vs. T_C

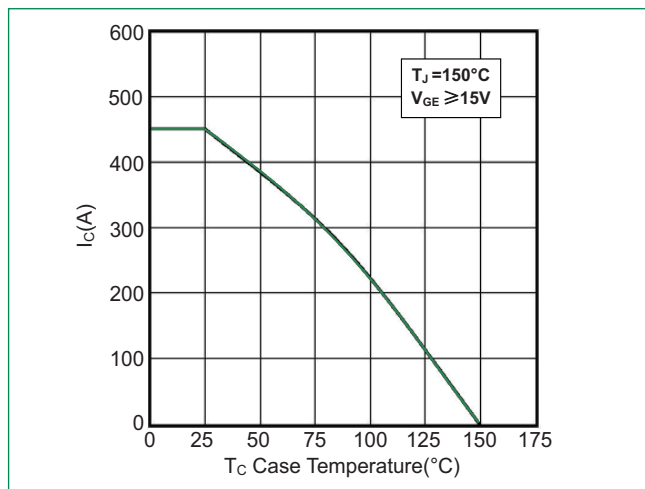


Figure 12: Diode Forward Characteristics

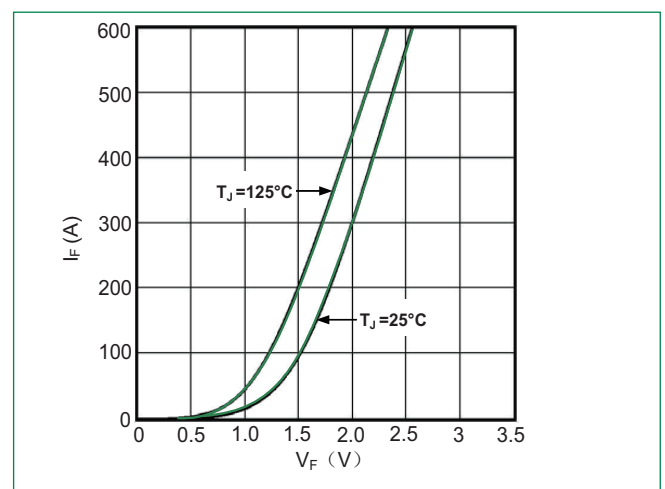


Figure 13: Transient Thermal Impedance of IGBT

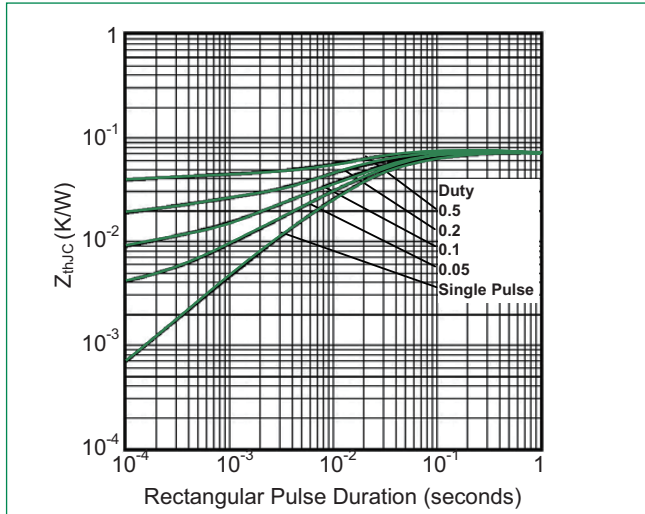
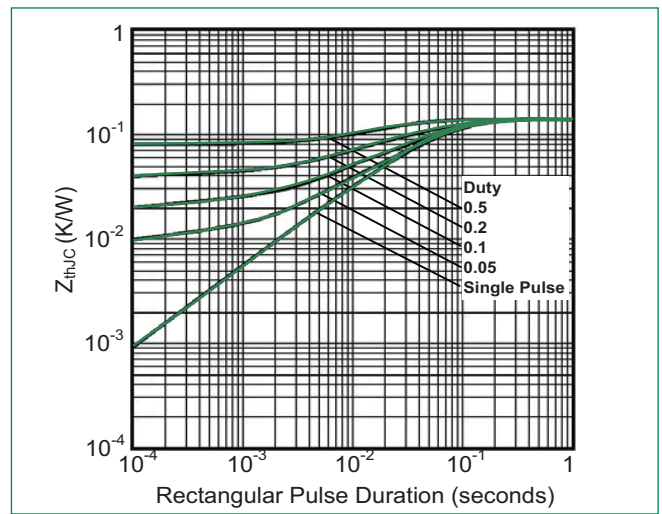
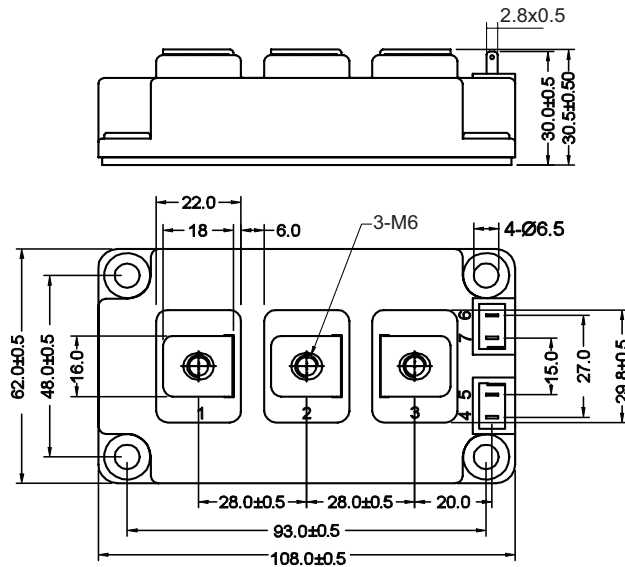


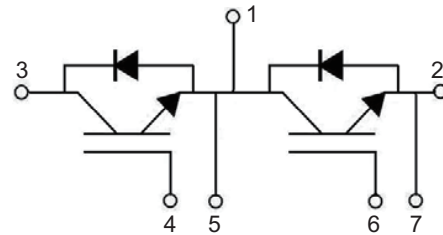
Figure 14: Transient Thermal Impedance of Diode



Dimensions-Package D



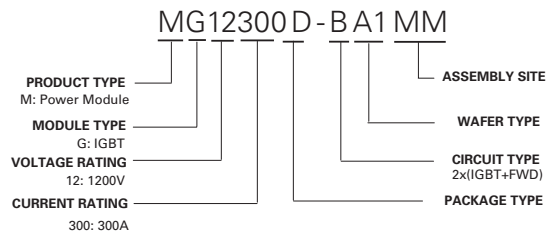
Circuit Diagram



Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12300D-BA1MM	MG12300D-BA1MM	285g	Bulk Pack	60

Part Numbering System



Part Marking System

