

MG12105S-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			0.18	K/W
R_{thJD}		Per Inverse Diode			0.45	K/W
Torque	Module-to-Sink	Recommended (M6)	3		5	N·m
Torque	Module Electrodes	Recommended (M5)	2.5		5	N·m
Weight				150		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	$T_c = 25^\circ\text{C}$	150	A
		$T_c = 80^\circ\text{C}$	105	A
I_{Cpuls}	Pulsed Collector Current	$T_c = 25^\circ\text{C}, t_p = 1\text{ms}$	300	A
		$T_c = 80^\circ\text{C}, t_p = 1\text{ms}$	210	
P_{tot}	Power Dissipation Per IGBT		690	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	$T_c = 25^\circ\text{C}$	125	A
		$T_c = 80^\circ\text{C}$	85	A
$I_{F(RMS)}$	RMS Forward Current		122	A
I_{FSM}	Non-Repetitive Surge Forward Current	$T_J = 45^\circ\text{C}, t = 10\text{ms}$, Sine	930	A
		$T_J = 45^\circ\text{C}, t = 8.3\text{ms}$, Sine	980	

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.

MG12105S-BA1MM

Power Module

1200V 100A 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 =4mA	5.0	6.2	7.0	V	
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =100A, V _{GE} =15V, T _J =25°C		1.8		V	
		I _C =100A, 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		0.2	0.5	mA	
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C		3		mA	
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V	-200		200	nA	
Q _{ge}	Gate Charge	V _{CC} =600V, I _C =100A , V _{GE} =±15V		1050		nC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		7.43		nF	
C _{oes}	Output Capacitance			0.52			
C _{res}	Reverse Transfer Capacitance			0.34			
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V I _C =100A R _G =10Ω V _{GE} =±15V Inductive Load	T _J =25°C		125	ns	
			T _J =125°C		135	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		420	ns	
			T _J =125°C		490	ns	
t _f	Fall Time		T _J =25°C		60	ns	
			T _J =125°C		75	ns	
E _{on}	Turn - on Energy		T _J =25°C		8.6	mJ	
			T _J =125°C		12.4	mJ	
E _{off}	Turn - off Energy		T _J =25°C		6.8	mJ	
			T _J =125°C		10.8	mJ	
Diode							
V _F	Forward Voltage	I _F =100A , V _{GE} =0V, T _J =25°C		2.0	2.44	V	
		I _F =100A , V _{GE} =0V, T _J =125°C		1.7	2.20	V	
t _{rr}	Reverse Recovery Time	I _F =100A , V _R =800V di _F /dt=-1000A/μs T _J =125°C		220		ns	
I _{RRM}	Max. Reverse Recovery Current			85		A	
Q _{rr}	Reverse Recovery Charge			9.8		μC	

Figure 1: Typical Output Characteristics

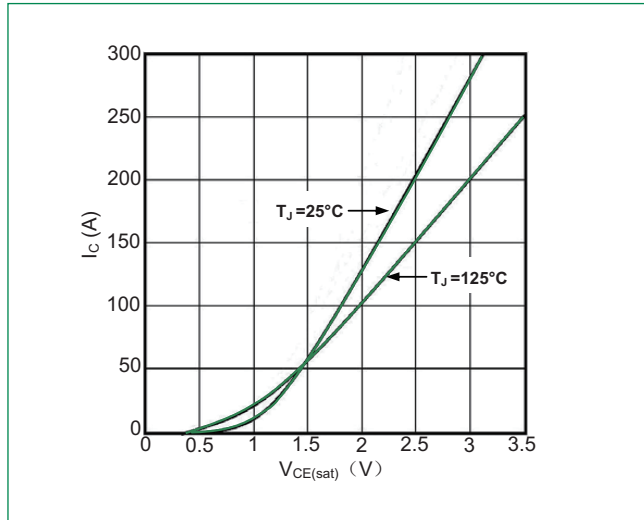


Figure 2: Typical Transfer characteristics

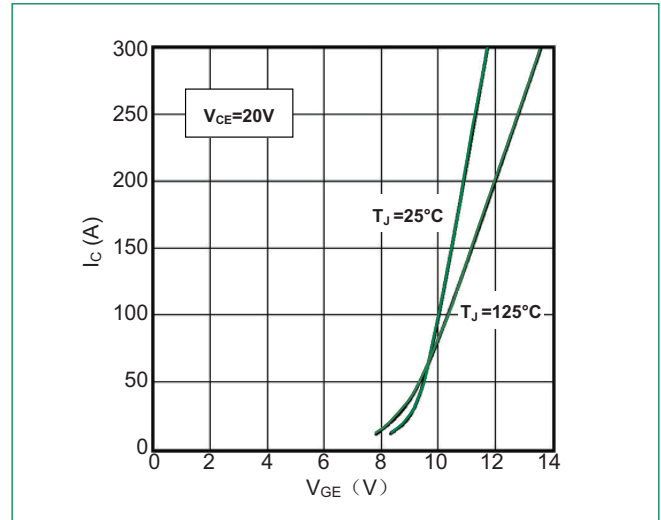


Figure 3: Switching Energy vs. Collector Current

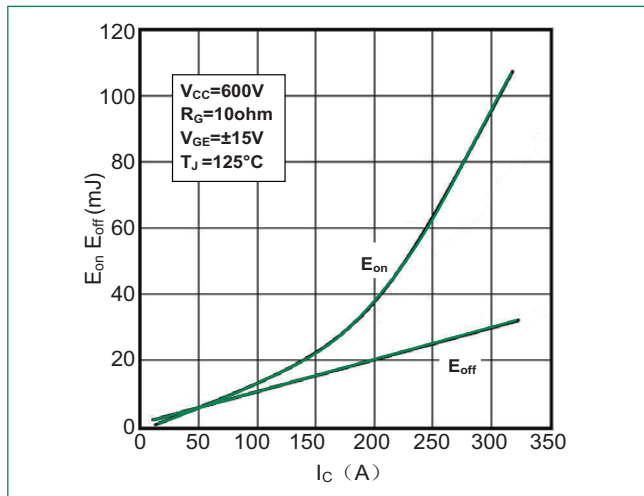


Figure 4: Switching Energy vs. Gate Resistor

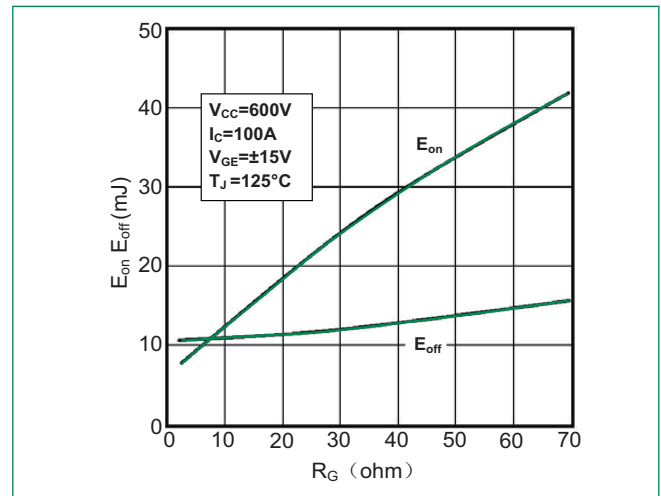


Figure 5: Switching Times vs. Collector Current

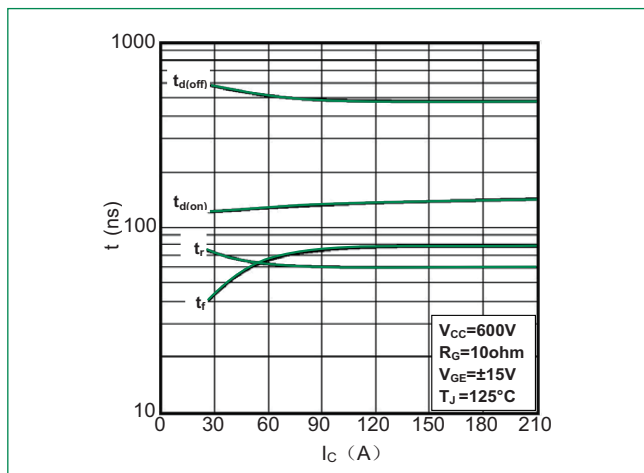


Figure 6: Switching Times vs. Gate Resistor

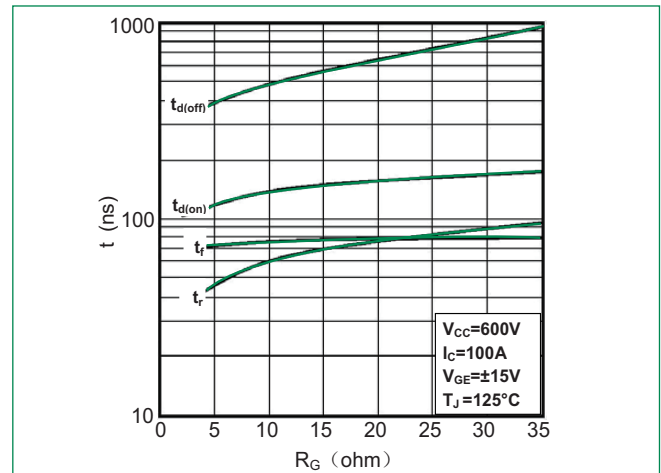


Figure 7: Gate Charge characteristics

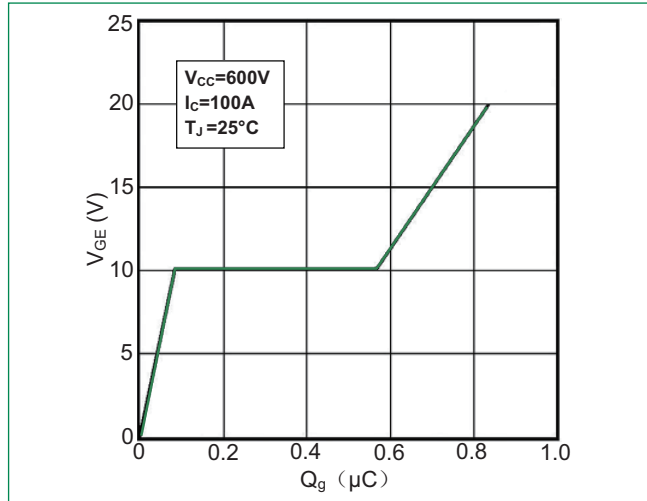


Figure 8: Typical Capacitances vs. V_{CE}

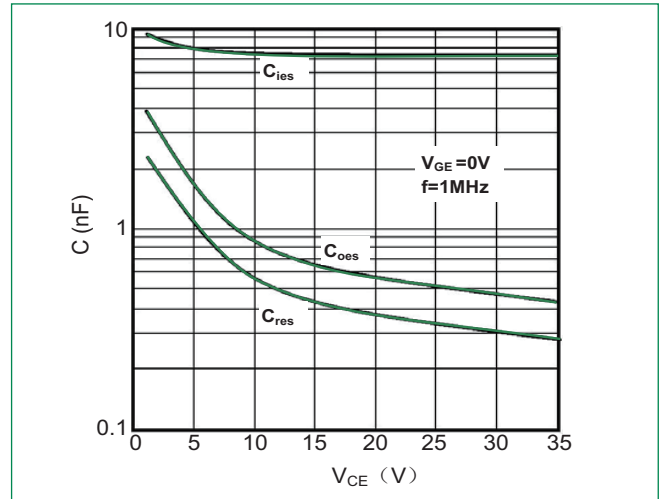


Figure 9: Reverse Biased Safe Operating Area

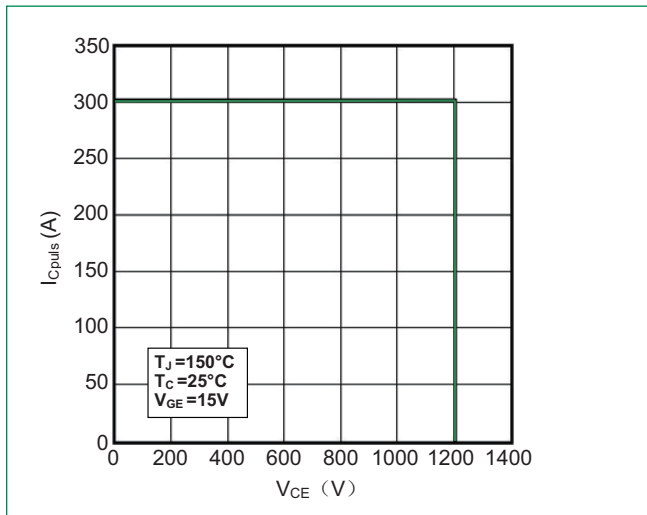


Figure 10: Short Circuit Safe Operating Area

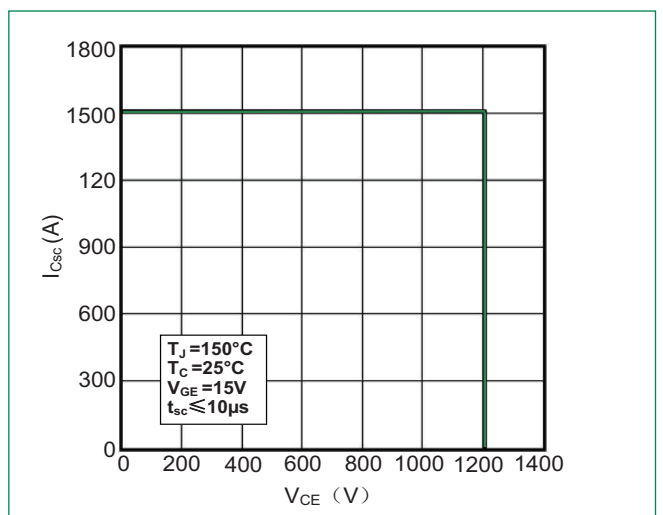


Figure 11: Rated Current vs. T_C

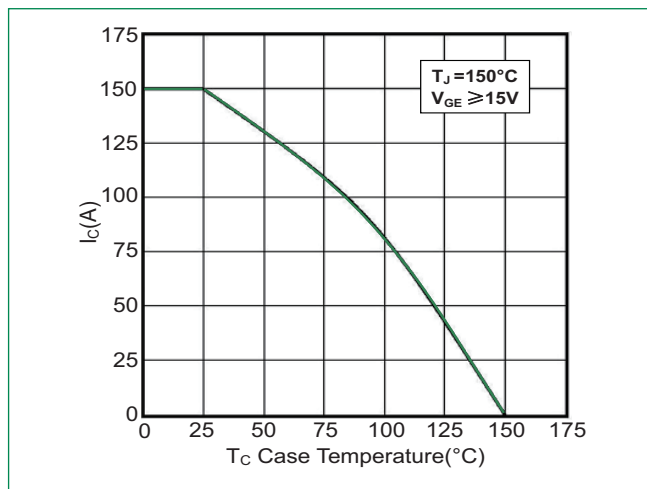


Figure 12: Diode Forward Characteristics

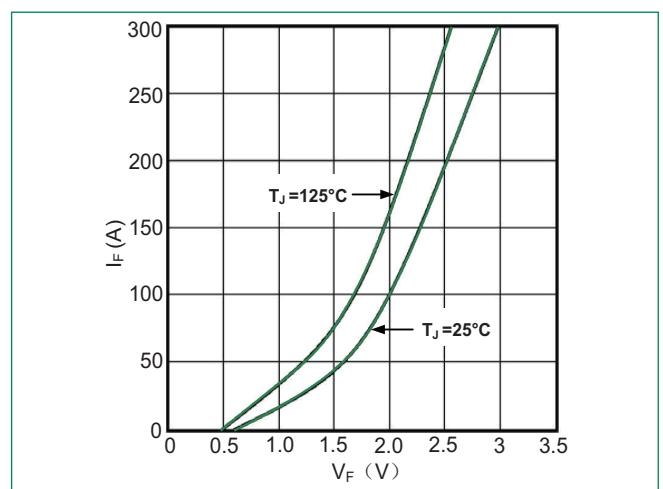


Figure 13: Transient Thermal Impedance of IGBT

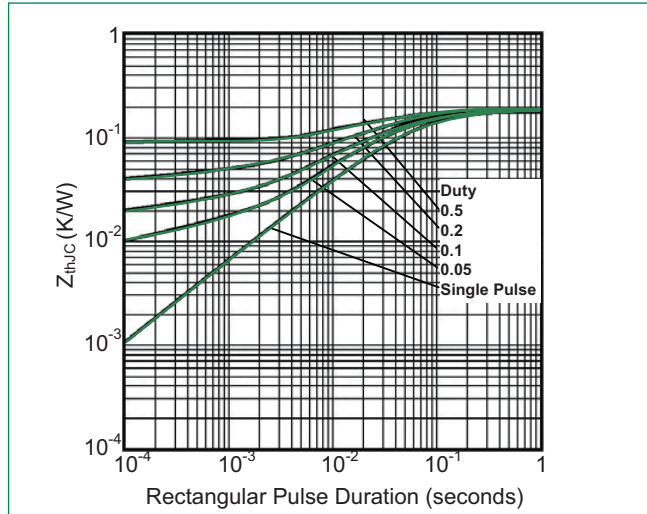
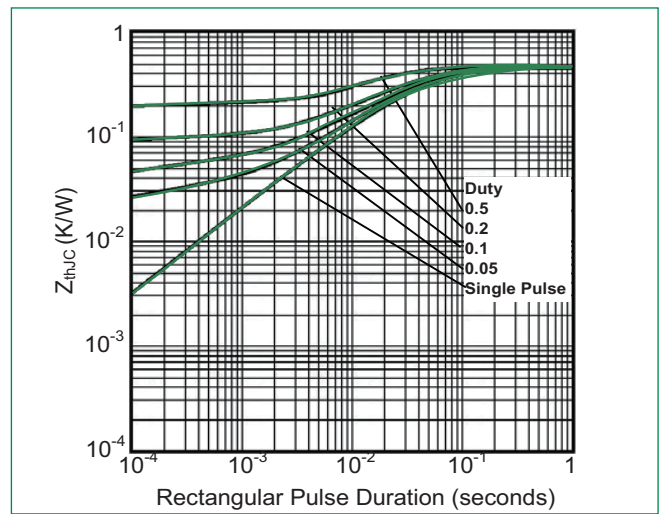
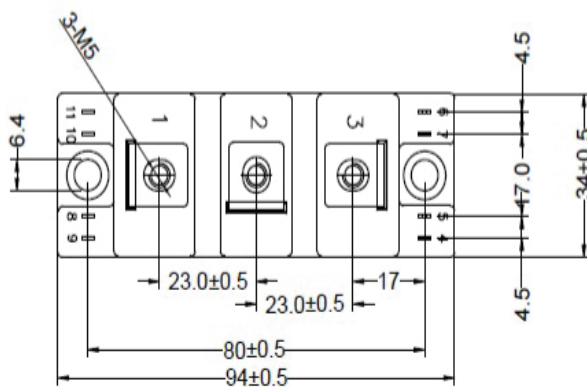
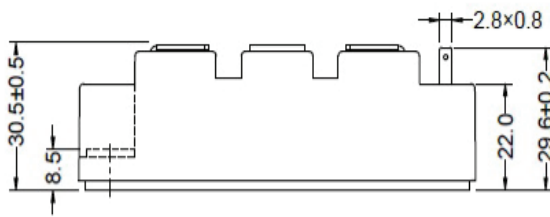


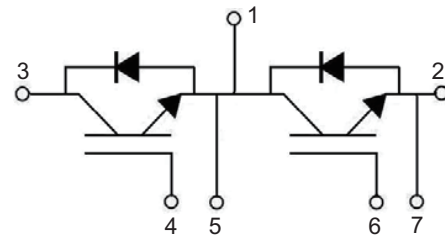
Figure 14: Transient Thermal Impedance of Diode



Dimensions-Package S



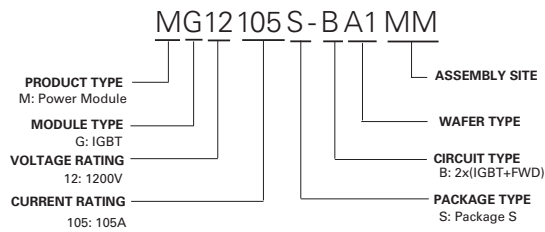
Circuit Diagram



Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12105S-BA1MM	MG12105S-BA1MM	150g	Bulk Pack	100

Part Numbering System



Part Marking System

