Littelfuse
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Power Module
1200V 100A IGBT Module

MG12105S-BA1MM

RoHS



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

Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E71639

Module Characteristics (T_c = 25°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_{thJCD}		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°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°C	150	A
		T_C=80°C	105	A
I_{Cpuls}	Pulsed Collector Current	T_C=25°C, t_p=1ms	300	A
		T_C=80°C, t_p=1ms	210	
P_{tot}	Power Dissipation Per IGBT		690	W
T_J	Junction Temperature Range		-40 to +150	°C
T_{STG}	Storage Temperature Range		-40 to +125	°C
V_{isol}	Insulation Test Voltage	AC, t=1min	3000	V
Diode				
V_{RRM}	Repetitive Reverse Voltage		1200	V
$I_{F(AV)}$	Average Forward Current	T_C=25°C	125	A
		T_C=80°C	85	A
$I_{F(RMS)}$	RMS Forward Current		122	A
I_{FSM}	Non-Repetitive Surge Forward Current	T_J =45°C, t=10ms, Sine	930	A
		T_J =45°C, t=8.3ms, 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.

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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=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

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Figure 1: Typical Output Characteristics

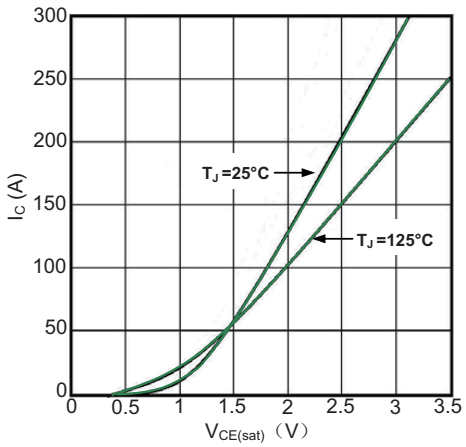


Figure 2: Typical Transfer characteristics

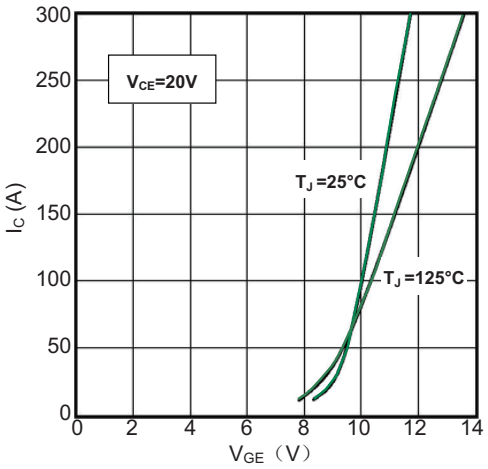


Figure 3: Switching Energy vs. Collector Current

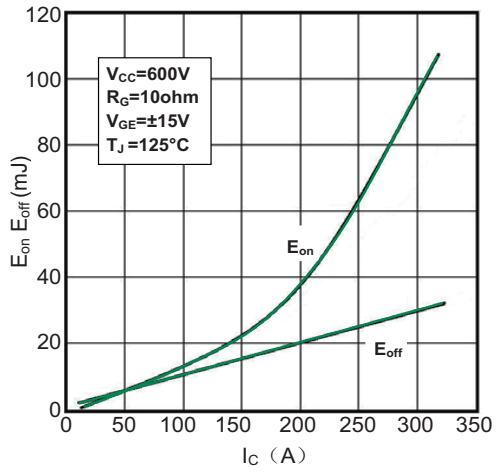


Figure 4: Switching Energy vs. Gate Resistor

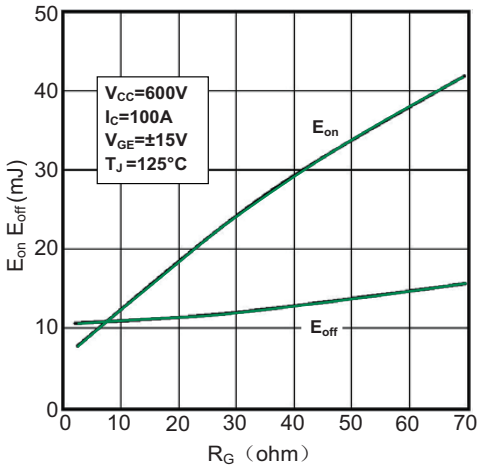


Figure 5: Switching Times vs. Collector Current

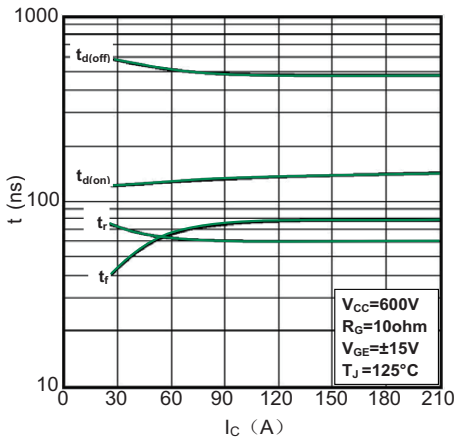
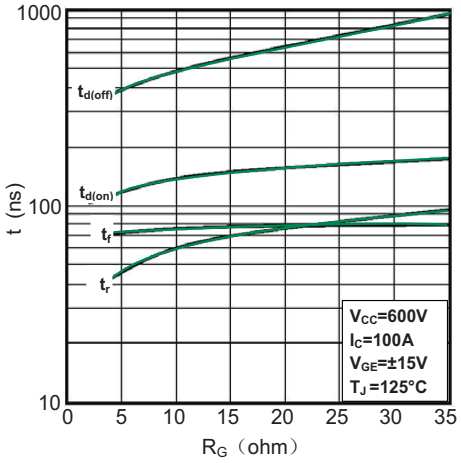


Figure 6: Switching Times vs. Gate Resistor



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Figure 7: Gate Charge characteristics

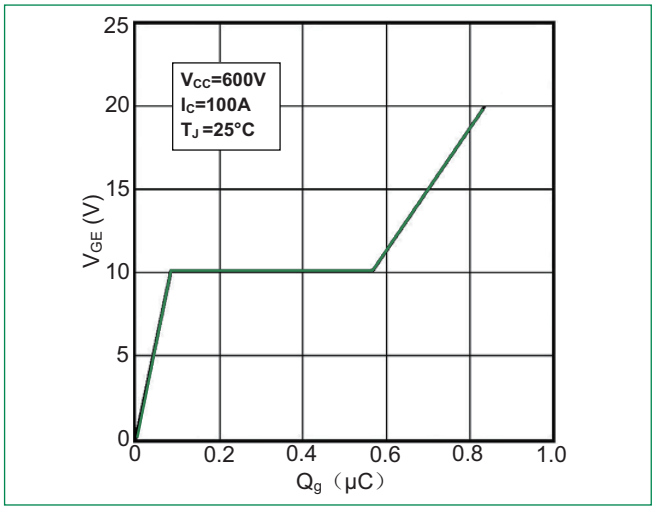


Figure 8: Typical Capacitances vs. V_{CE}

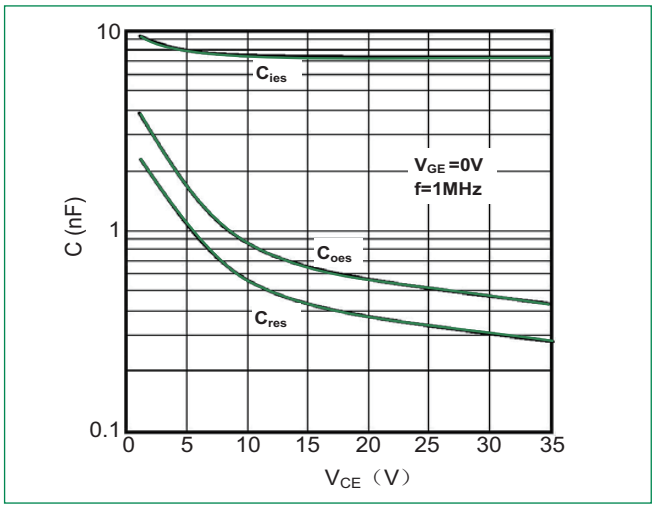


Figure 9: Reverse Biased Safe Operating Area

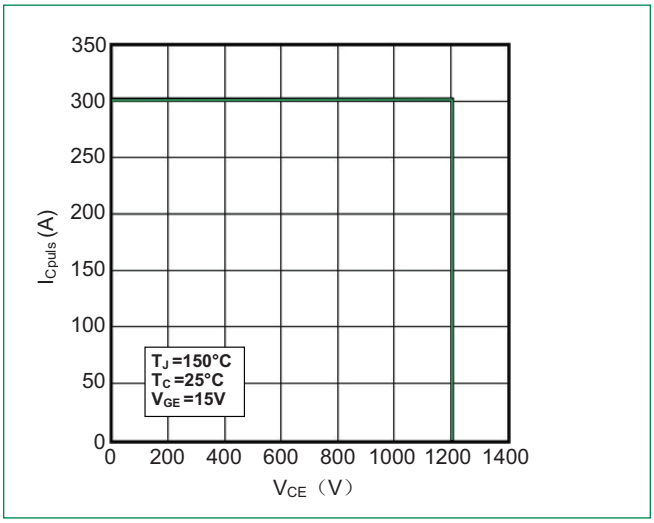


Figure 10: Short Circuit Safe Operating Area

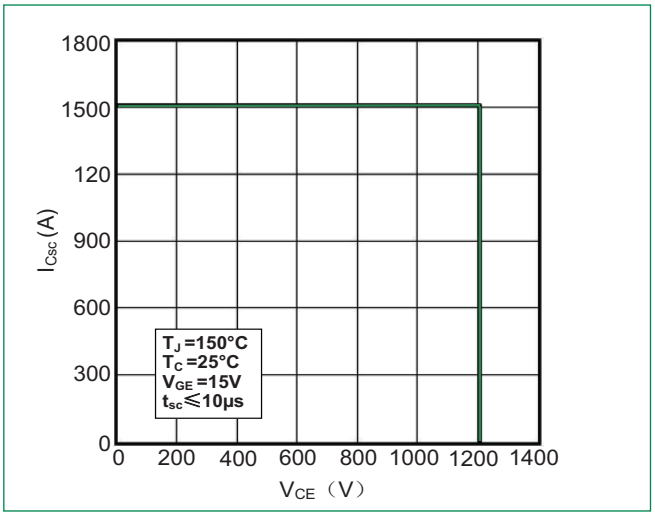


Figure 11: Rated Current vs. T_C

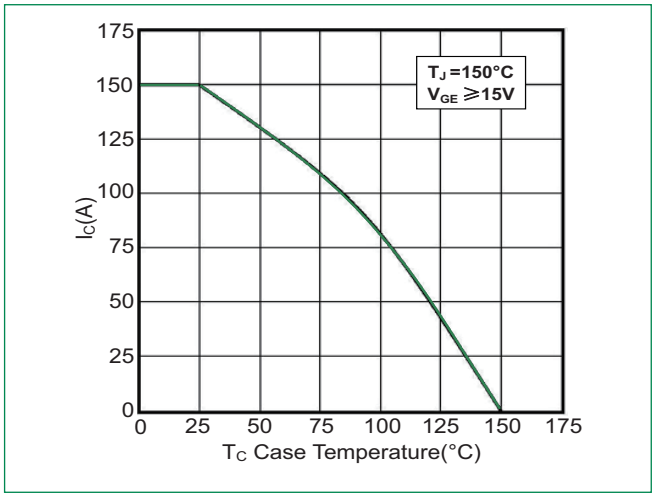
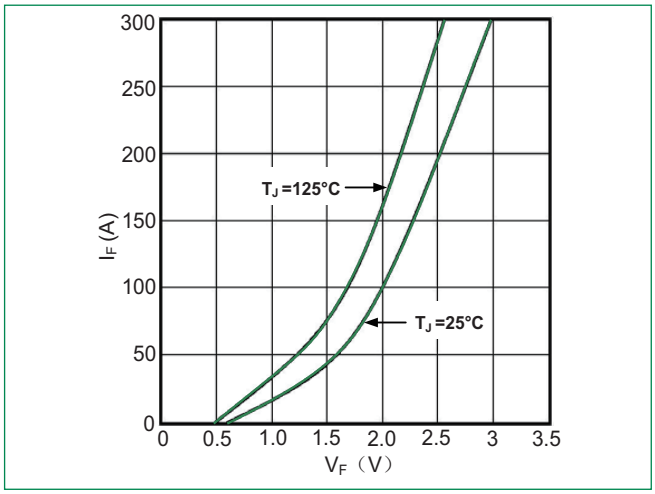


Figure 12: Diode Forward Characteristics



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Figure 13: Transient Thermal Impedance of IGBT

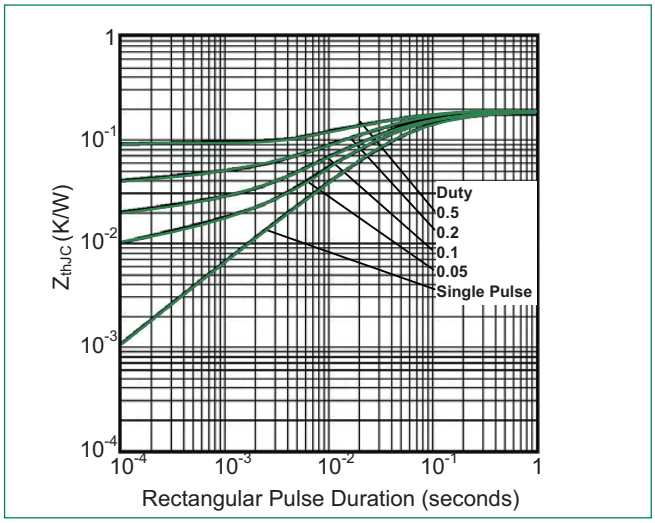
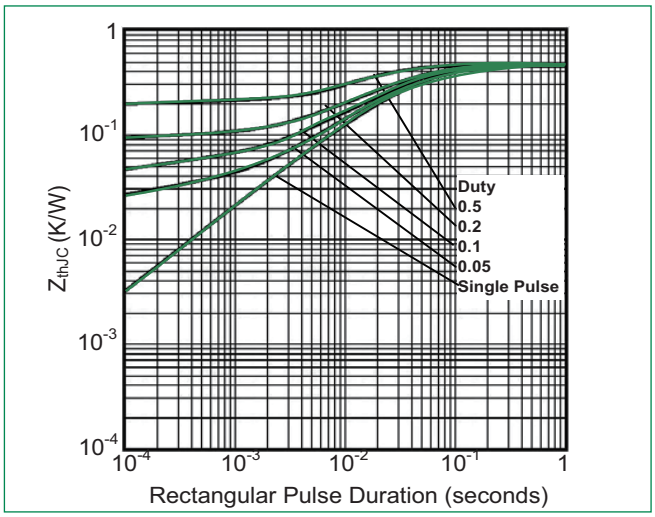
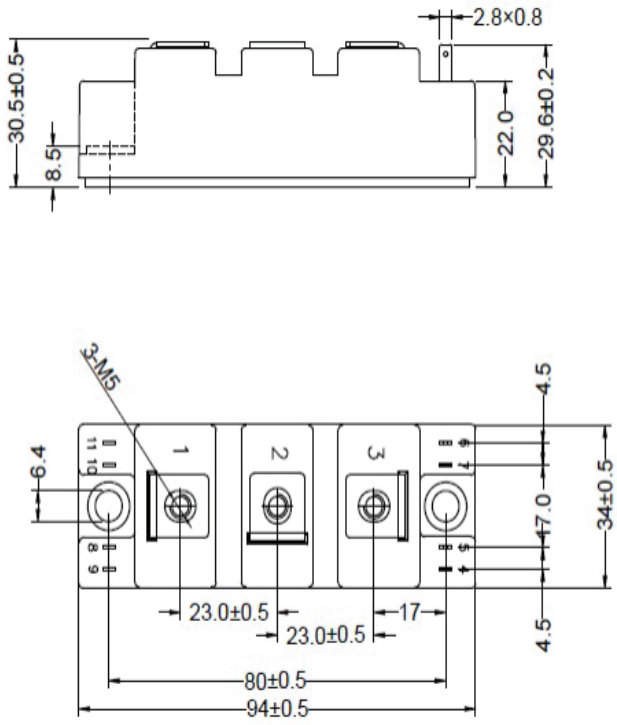


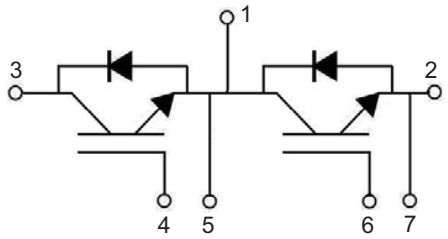
Figure 14: Transient Thermal Impedance of Diode



Dimensions-Package S



Circuit Diagram

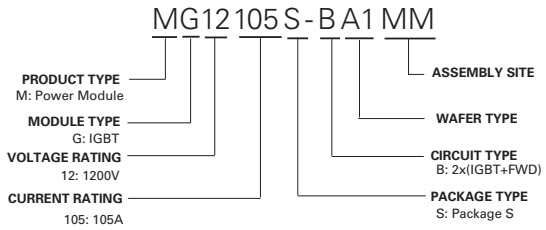


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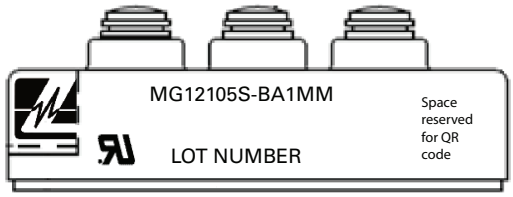
Packing Options

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

Part Numbering System



Part Marking System



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