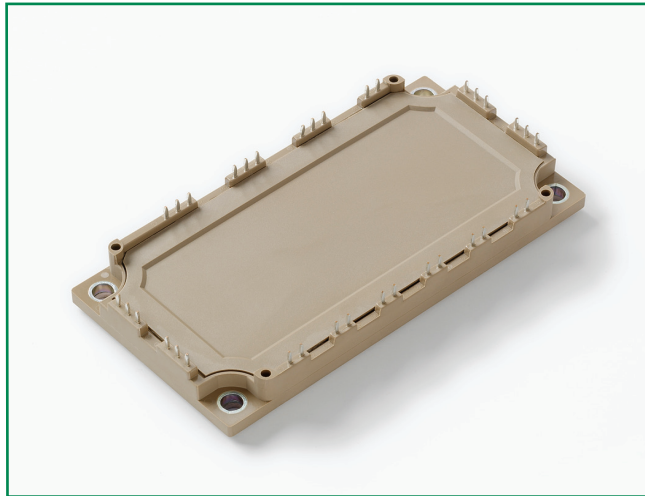


MG12100W-XN2MM

RoHS



Features

- High level of integration
- IGBT³ CHIP(Trench+Field Stop technology)
- Low saturation voltage and positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Solderable pins for PCB mounting
- Temperature sense included

Applications

- AC motor control
- Motion/servo control
- Inverter and power supplies

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	$^\circ\text{C}$
$T_{J op}$	Operating Temperature		-40		125	$^\circ\text{C}$
T_{stg}	Storage Temperature		-40		125	$^\circ\text{C}$
V_{isol}	Insulation Test Voltage	AC, t=1min		3000		V
CTI	Comparative Tracking Index		250			
M_d	Mounting Torque	Recommended (M5)	2.5		5	N·m
Weight				300		g

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

Symbol	Parameters	Test Conditions	Values	Unit
IGBT				
V_{CES}	Collector - Emitter Voltage	$T_J=25^\circ\text{C}$	1200	V
V_{GES}	Gate - Emitter Voltage		± 20	V
I_C	DC Collector Current	$T_C=25^\circ\text{C}$	140	A
		$T_C=80^\circ\text{C}$	100	A
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	200	A
P_{tot}	Power Dissipation Per IGBT		450	W
Diode				
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^\circ\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^\circ\text{C}$	140	A
		$T_C=80^\circ\text{C}$	100	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	200	A
I^2t		$T_J=125^\circ\text{C}$, t=10ms, $V_R=0\text{V}$	1850	A^2s

Power Module

1200V 100A IGBT Module

Electrical and Thermal Specifications ($T_J = 25^\circ\text{C}$, 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 =4.0mA		5.0	5.8	6.5	V
V _{CE(sat)}	Collector - Emitter	I _C =100A, V _{GE} =15V, T _J =25°C			1.7		V
	Saturation Voltage	I _C =100A, 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				10	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±15V, T _J =125°C		-400		400	nA
R _{Gint}	Integrated Gate Resistor				7.5		Ω
Q _{ge}	Gate Charge	V _{CE} =600V, I _C =100A , V _{GE} =±15V			0.9		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz			7.1		nF
C _{RES}	Reverse Transfer Capacitance				0.3		nF
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V I _C =100A R _G =3.9Ω V _{GE} =±15V Inductive Load	T _J =25°C		260		ns
			T _J =125°C		290		ns
t _r	Rise Time		T _J =25°C		30		ns
			T _J =125°C		50		ns
t _{d(off)}	Turn - off Delay Time		T _J =25°C		420		ns
			T _J =125°C		520		ns
t _f	Fall Time		T _J =25°C		70		ns
			T _J =125°C		90		ns
E _{on}	Turn - on Energy		T _J =25°C		7.8		mJ
			T _J =125°C		10		mJ
E _{off}	Turn - off Energy		T _J =25°C		8		mJ
			T _J =125°C		10		mJ
I _{SC}	Short Circuit Current	t _{psc} ≤10μS , V _{GE} =15V; T _J =125°C , V _{CC} =900V			400		A
R _{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)					0.28	K/W
Diode							
V _F	Forward Voltage	I _F =100A, V _{GE} =0V, T _J =25°C			1.65		V
		I _F =100A, V _{GE} =0V, T _J =125°C			1.65		V
t _{RR}	Reverse Recovery Time	I _F =100A, V _R =600V di _F /dt=2400A/μs T _J =125°C			320		ns
I _{RRM}	Max. Reverse Recovery Current				105		A
E _{rec}	Reverse Recovery Energy				9.5		mJ
R _{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)					0.5	K/W

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

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
R_{25}	Resistance	$T_c=25^\circ\text{C}$		5		K Ω
$B_{25/50}$				3375		K

Figure 1: Typical Output Characteristics for IGBT Inverter

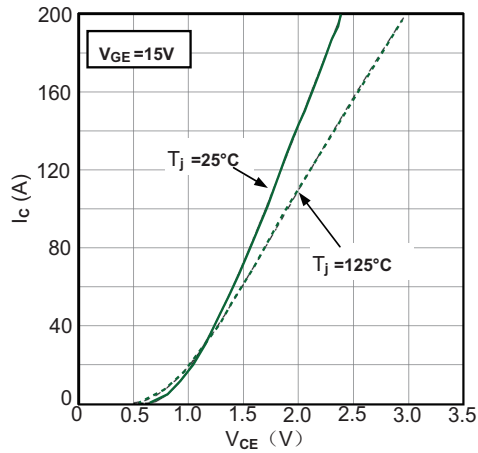


Figure 2: Typical Output Characteristics for IGBT Inverter

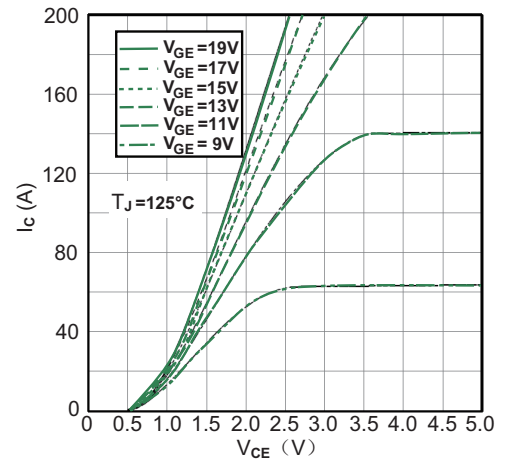


Figure 3: Typical Transfer Characteristics for IGBT Inverter

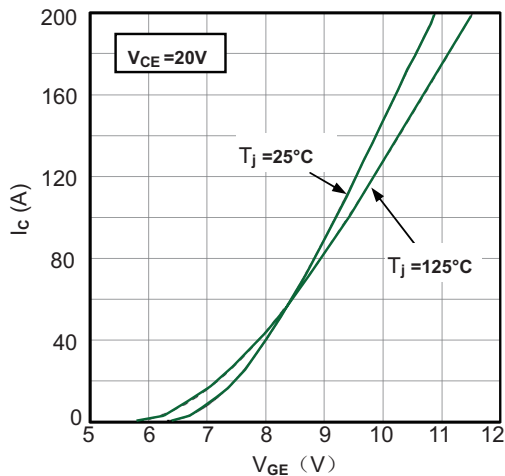


Figure 4: Switching Energy vs. Gate Resistor for IGBT Inverter

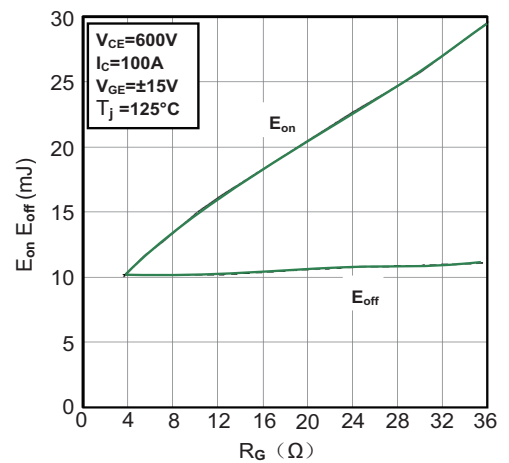


Figure 5: Switching Energy vs. Collector Current for IGBT Inverter

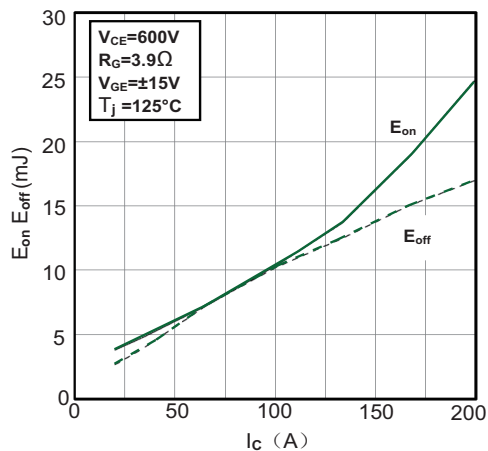


Figure 6: Reverse Biased Safe Operating Area for IGBT Inverter

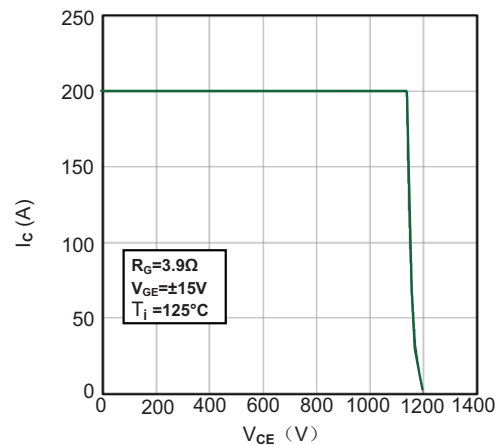


Figure 7: Diode Forward Characteristics for Diode Inverter

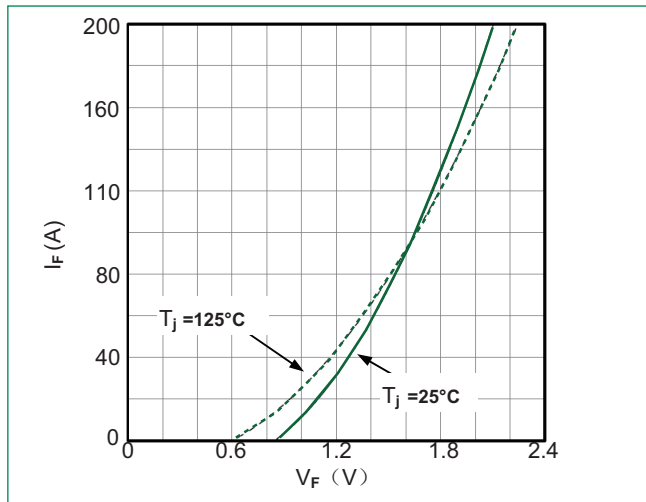


Figure 8: Switching Energy vs. Gate Resistort for Diode Inverter

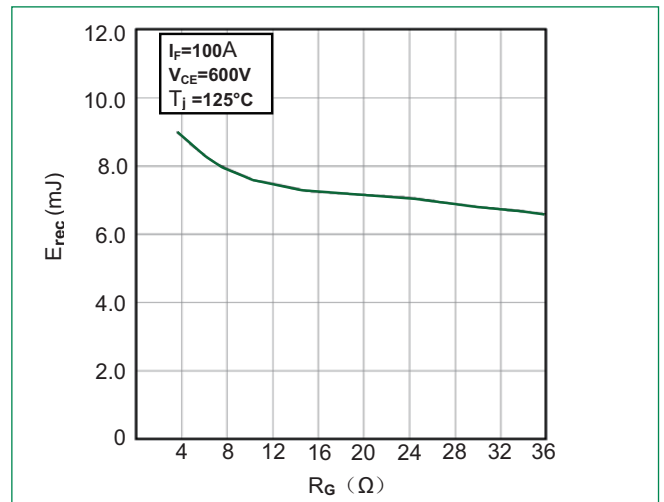


Figure 9: Switching Energy vs. Forward Current for Diode Inverter

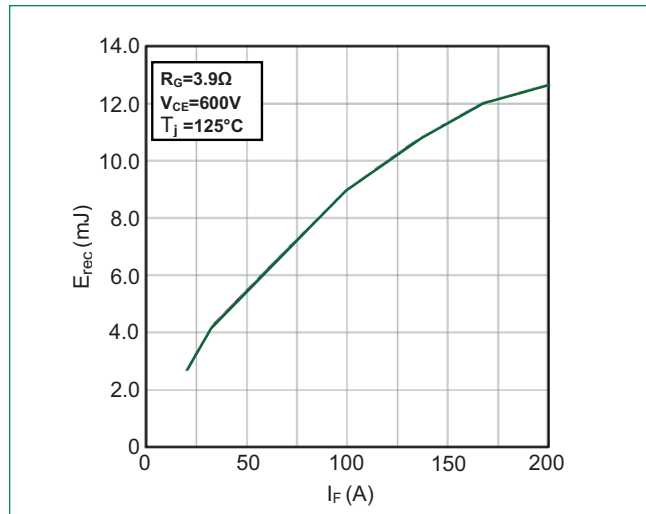


Figure 10: Transient Thermal Impedance of Diode and IGBT Inverter

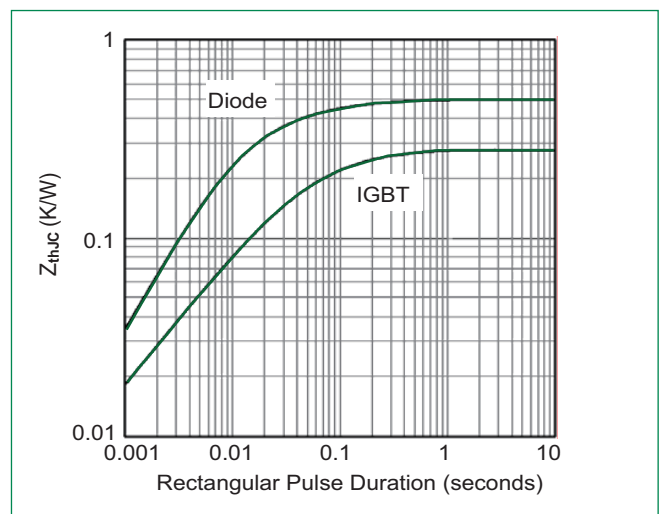
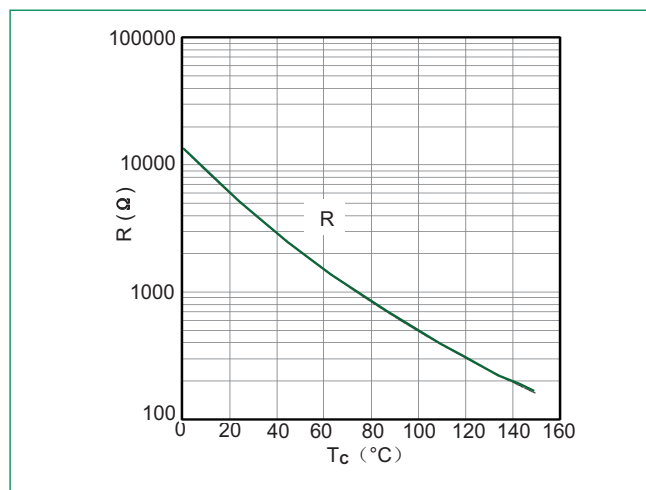
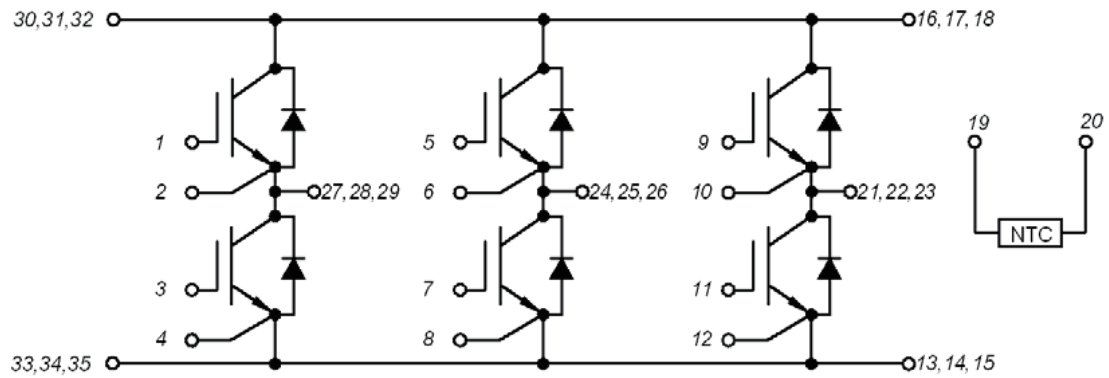


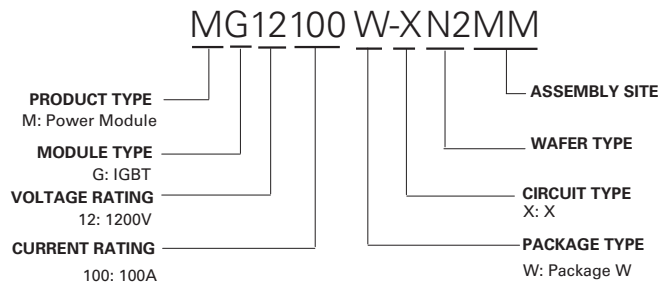
Figure 11: NTC Characteristics



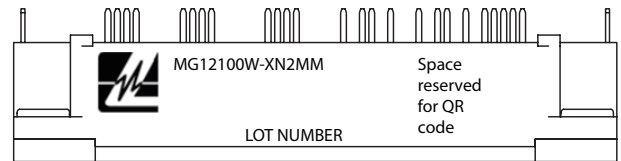
Circuit Diagram



Part Numbering System



Part Marking System



Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG12100W-XN2MM	MG12100W-XN2MM	300g	Bulk Pack	20

Technical drawing of a rectangular frame, showing dimensions in millimeters (mm). The drawing includes a top view and a cross-section view.

Top View Dimensions:

- Overall width: 122.00 mm
- Overall height: 62.00 mm
- Inner width: 110.00 mm
- Inner height: 50.00 mm
- Corner radius: R11.50
- Corner thickness: 11.50 mm
- Corner hole diameter: $\phi 5.50$
- Corner hole offset: 4.06 mm
- Corner hole offset: 0.00 mm
- Corner hole offset: 14.99 mm
- Corner hole offset: 18.80 mm
- Corner hole offset: 30.23 mm
- Corner hole offset: 34.04 mm
- Corner hole offset: 45.47 mm
- Corner hole offset: 49.28 mm
- Corner hole offset: 60.71 mm
- Corner hole offset: 64.52 mm
- Corner hole offset: 75.95 mm
- Corner hole offset: 79.76 mm
- Corner hole offset: 91.19 mm
- Corner hole offset: 95.00 mm
- Corner hole offset: 0.00 mm
- Corner hole offset: 4.20 mm
- Corner hole offset: 11.66 mm
- Corner hole offset: 15.47 mm
- Corner hole offset: 19.28 mm
- Corner hole offset: 30.71 mm
- Corner hole offset: 34.52 mm
- Corner hole offset: 38.33 mm
- Corner hole offset: 54.20 mm
- Corner hole offset: 93.10 mm
- Corner hole offset: 96.91 mm
- Corner hole offset: 70.24 mm
- Corner hole offset: 74.10 mm
- Corner hole offset: 77.90 mm
- Corner hole offset: 51.20 mm
- Corner hole offset: 55.00 mm
- Corner hole offset: 47.38 mm
- Corner hole offset: 32.14 mm
- Corner hole offset: 28.33 mm
- Corner hole offset: 24.50 mm
- Corner hole offset: 27 mm
- Corner hole offset: 24 mm
- Corner hole offset: 21 mm
- Corner hole offset: 20 mm

Cross-section View Dimensions:

- Overall width: 12.50 mm
- Overall height: 20.50 mm
- Inner width: 4.50 mm
- Inner height: 2.50 mm
- Inner width: 2.10 mm
- Inner height: 3.50 mm
- Inner width: 0.8 mm
- Inner height: 1.2 mm
- Inner width: 1.50 mm
- Inner height: 1.50 mm
- Inner width: 17.00 mm
- Inner height: 7.00 mm
- Inner width: 3.50 mm
- Inner height: 3.50 mm

Dimensions (mm)