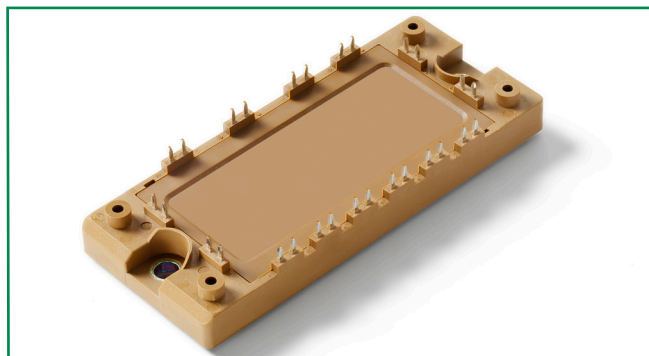


### MG1225H-XN2MM

#### Features

- High level of integration
- IGBT<sup>3</sup> 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	$^\circ\text{C}$
$T_{j\text{op}}$	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		250			
$M_d$	Mounting Torque	Recommended (M5)	2.5		5	N-m
Weight				180		g

#### Absolute Maximum Ratings ( $T_j = 25^\circ\text{C}$ , 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	$T_c=25^\circ\text{C}$	40	A
		$T_c=80^\circ\text{C}$	25	A
$I_{\text{CM}}$	Repetitive Peak Collector Current	$t_p=1\text{ms}$	50	A
$P_{\text{tot}}$	Power Dissipation Per IGBT		147	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	$T_c=25^\circ\text{C}$	35	A
		$T_c=80^\circ\text{C}$	25	A
$I_{\text{FRM}}$	Repetitive Peak Forward Current	$t_p=1\text{ms}$	50	A
$I^2t$		$T_j=125^\circ\text{C}$ , t=10ms, $V_R=0\text{V}$	200	$\text{A}^2\text{s}$

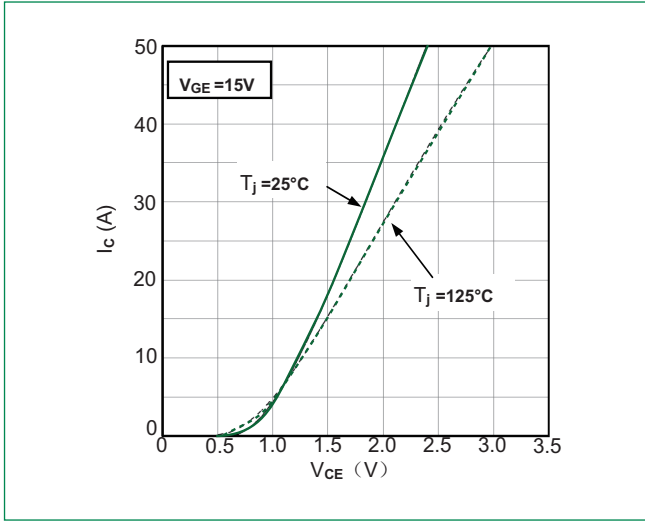
### Electrical and Thermal Specifications ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
<b>IGBT</b>						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=1\text{mA}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter	$I_C=25\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.7		V
	Saturation Voltage	$I_C=25\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		1.9		V
$I_{ICES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			0.1	mA
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$			1	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			8.0		$\Omega$
$Q_{ge}$	Gate Charge	$V_{CE}=600\text{V}, I_C=25\text{A}, V_{GE}=\pm 15\text{V}$		0.24		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		1.81		nF
$C_{res}$	Reverse Transfer Capacitance			0.08		nF
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=600\text{V}$ $I_C=25\text{A}$ $R_G=36\Omega$ $V_{GE}=\pm 15\text{V}$ Inductive Load	$T_J=25^\circ\text{C}$	90		ns
			$T_J=125^\circ\text{C}$	90		ns
$t_r$	Rise Time		$T_J=25^\circ\text{C}$	30		ns
			$T_J=125^\circ\text{C}$	50		ns
$t_{d(off)}$	Turn - off Delay Time		$T_J=25^\circ\text{C}$	420		ns
			$T_J=125^\circ\text{C}$	520		ns
$t_f$	Fall Time		$T_J=25^\circ\text{C}$	70		ns
			$T_J=125^\circ\text{C}$	90		ns
$E_{on}$	Turn - on Energy		$T_J=25^\circ\text{C}$	2.4		mJ
			$T_J=125^\circ\text{C}$	3.5		mJ
$E_{off}$	Turn - off Energy	$T_J=25^\circ\text{C}$	1.8		mJ	
		$T_J=125^\circ\text{C}$	2.1		mJ	
$I_{SC}$	Short Circuit Current	$t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}, V_{CC}=900\text{V}$		100		A
$R_{thJC}$	Junction-to-Case Thermal Resistance (Per IGBT)				0.85	K/W
<b>Diode</b>						
$V_F$	Forward Voltage	$I_F=25\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.55		V
		$I_F=25\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.54		V
$t_{RR}$	Reverse Recovery Time	$I_F=25\text{A}, V_R=600\text{V}$ $di_p/dt=-400\text{A}/\mu\text{s}$ $T_J=125^\circ\text{C}$		200		ns
$I_{RRM}$	Max. Reverse Recovery Current			20		A
$E_{rec}$	Reverse Recovery Energy			1.5		mJ
$R_{thJCD}$	Junction-to-Case Thermal Resistance (Per Diode)				1.4	K/W

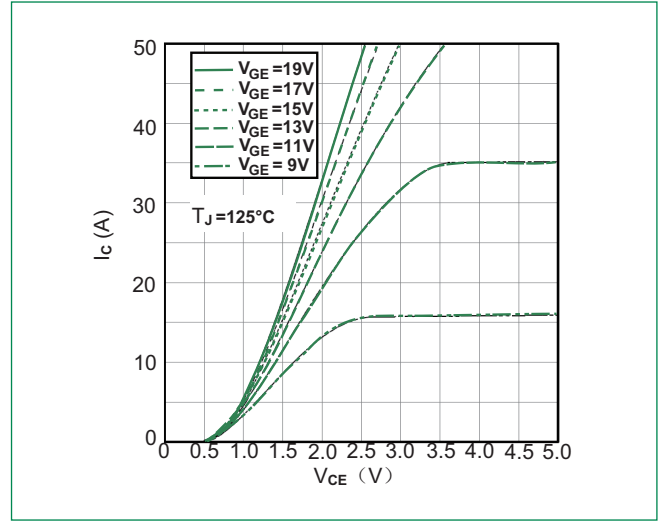
### NTC Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

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

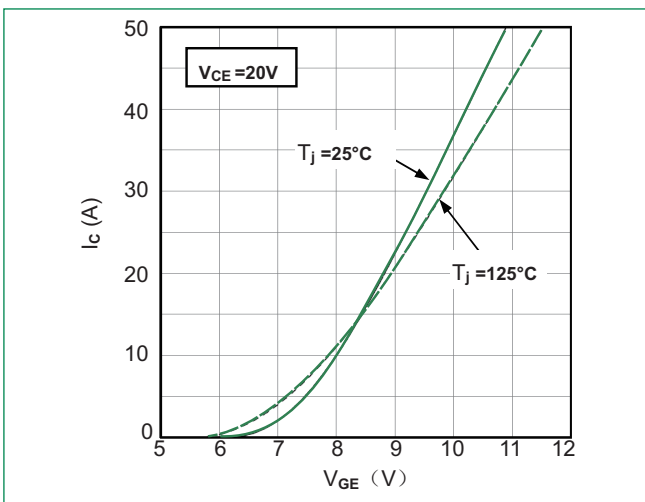
**Figure 1: Typical Output Characteristics for IGBT Inverter**



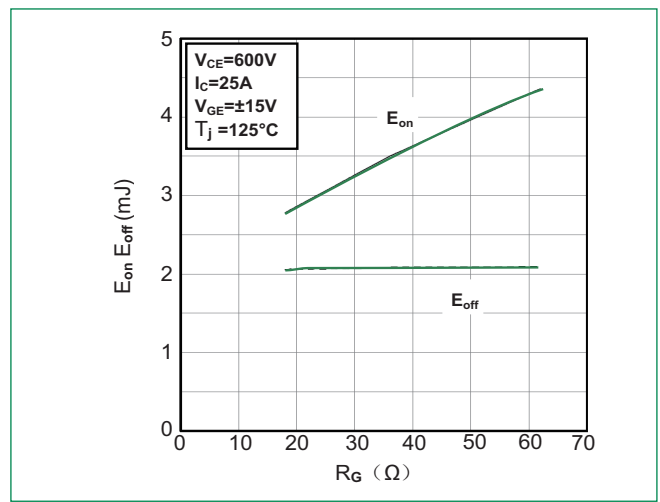
**Figure 2: Typical Output Characteristics for IGBT Inverter**



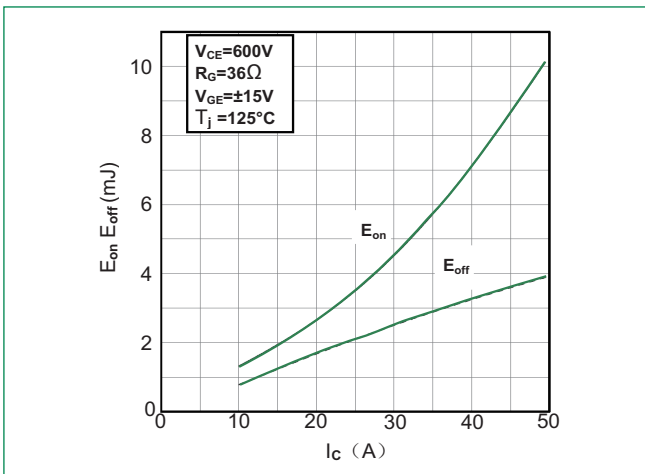
**Figure 3: Typical Transfer Characteristics for IGBT Inverter**



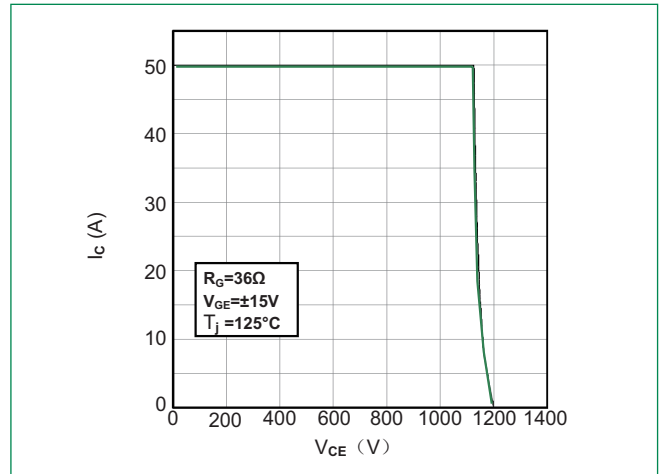
**Figure 4: Switching Energy vs. Gate Resistor for IGBT Inverter**



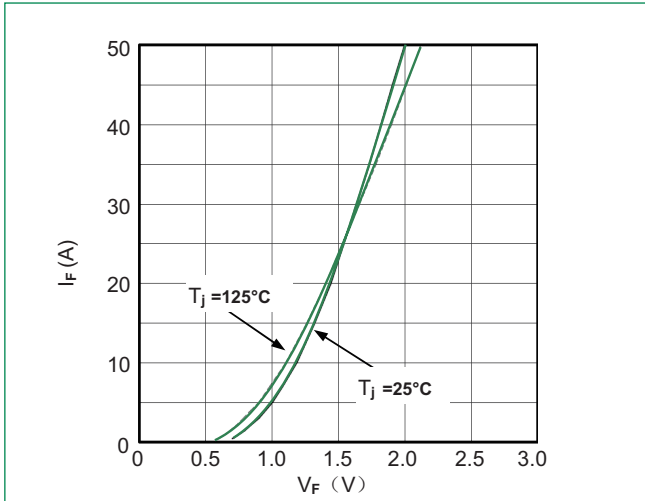
**Figure 5: Switching Energy vs. Collector Current for IGBT Inverter**



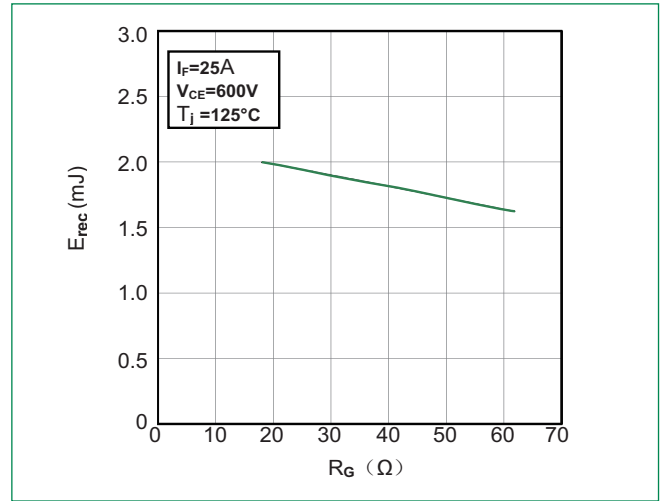
**Figure 6: Reverse Biased Safe Operating Area for IGBT Inverter**



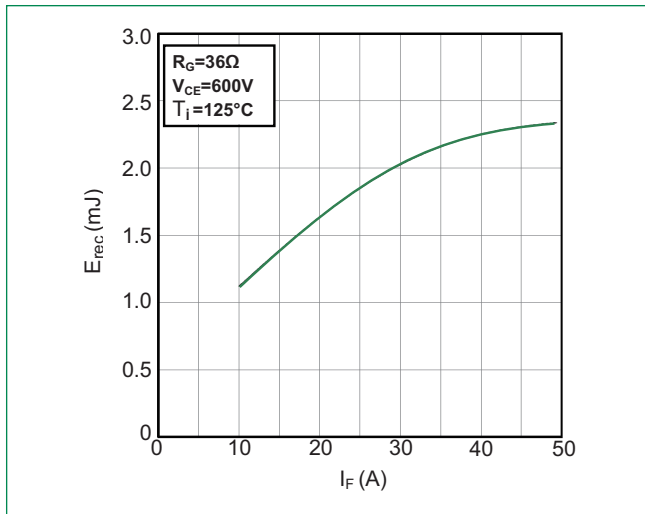
**Figure 7: Diode Forward Characteristics for Diode Inverter**



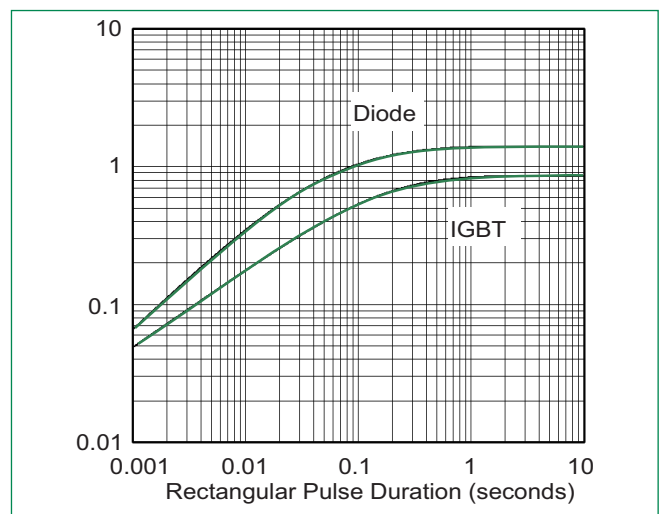
**Figure 8: Switching Energy vs. Gate Resistort for Diode Inverter**



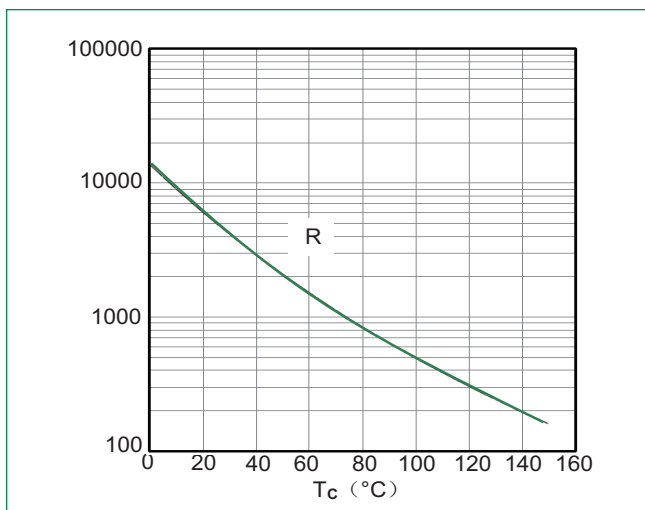
**Figure 9: Switching Energy vs. Forward Current Diode-inverter**



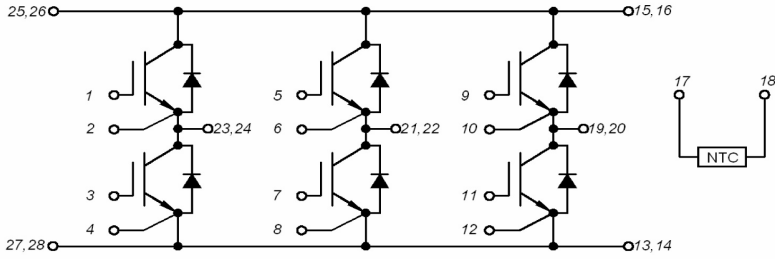
**Figure 10: Transient Thermal Impedance of Diode and IGBT-inverter**



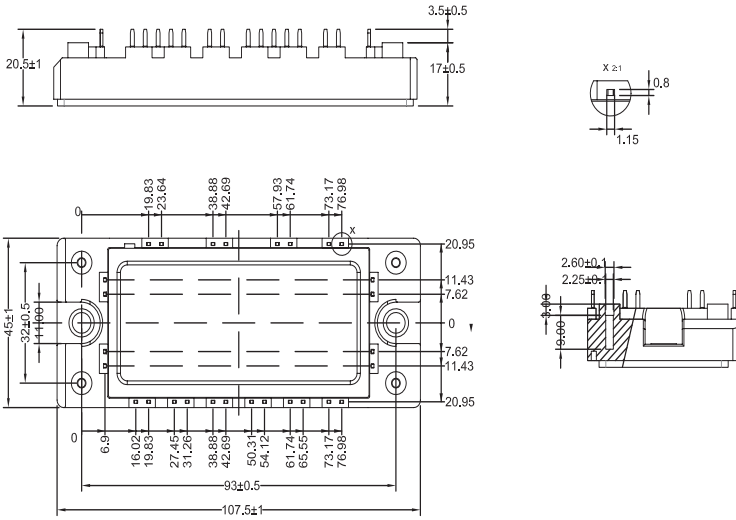
**Figure 11: NTC Characteristics**



### Circuit Diagram



### Dimensions-Package H

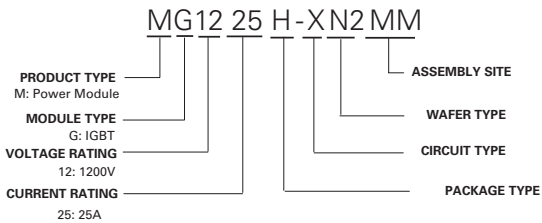


The foot pins are in gold / nickel coating

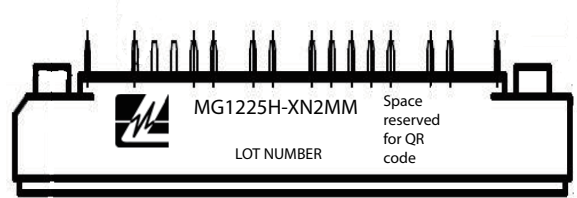
### Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q
MG1225H-XN2MM	MG1225H-XN2MM	180g	Bulk Pack	40

### Part Numbering System



### Part Marking System



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[F475R07W1H3B11ABOMA1](#) [FD1400R12IP4D](#) [FD200R12PT4\\_B6](#) [FD800R33KF2C-K](#) [FF1200R17KP4\\_B2](#) [FF300R17KE3\\_S4](#)  
[FF300R17ME4\\_B11](#) [FF401R17KF6C\\_B2](#) [FF650R17IE4D\\_B2](#) [FF900R12IP4D](#) [FF900R12IP4DV](#) [STGIF7CH60TS-L](#) [FP50R07N2E4\\_B11](#)  
[FS100R07PE4](#) [FS150R07N3E4\\_B11](#) [FS150R17N3E4](#) [FS150R17PE4](#)