MG12100W-XN2MM

RoHS

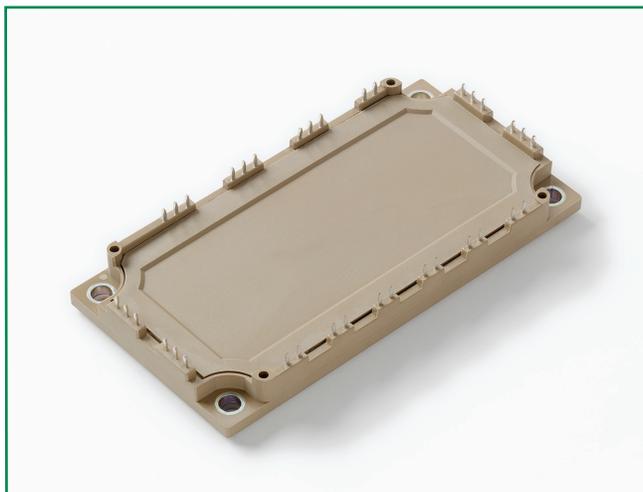### Features

- High level of integration
- IGBT[3] 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°C, unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
$T_{J\,max)}$	Max. Junction Temperature				150	°C
$T_{J\,op}$	Operating Temperature		-40		125	°C
T_{stg}	Storage Temperature		-40		125	°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°C, unless otherwise specified)

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

Electrical and Thermal Specifications (T_J = 25°C, unless otherwise specified)

Symbol	Parameters	Test Conditions		Min	Typ	Max	Unit
IGBT							
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}$, $I_C=4.0mA$		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	$V_{CE}=0V$, $V_{GE}=\pm15V$, $T_J=125°C$		-400		400	nA
R_{Gint}	Integrated Gate Resistor				7.5		Ω
Q_{ge}	Gate Charge	$V_{CE}=600V$, $I_C=100A$, $V_{GE}=\pm15V$			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	$V_{CC}=600V$ $I_C=100A$ $R_G =3.9Ω$ $V_{GE}=\pm15V$ 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	$t_{psc}\leq10µS$, $V_{GE}=15V$; $T_J=125°C$, $V_{CC}=900V$			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°C, unless otherwise specified)

Symbol	Parameters	Test Conditions	Min	Typ	Max	Unit
R_{25}	Resistance	$T_c=25°C$		5		KΩ
$B_{25/50}$				3375		K

Figure 1: Typical Output Characteristics for IGBT Inverter

$V_{GE}=15V$, $T_j=25°C$, $T_j=125°C$
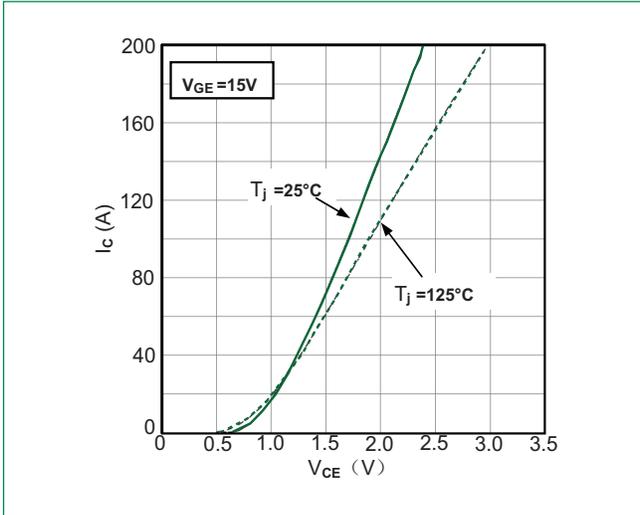
Figure 2: Typical Output Characteristics for IGBT Inverter

$V_{GE}=19V$, $V_{GE}=17V$, $V_{GE}=15V$, $V_{GE}=13V$, $V_{GE}=11V$, $V_{GE}=9V$, $T_J=125°C$
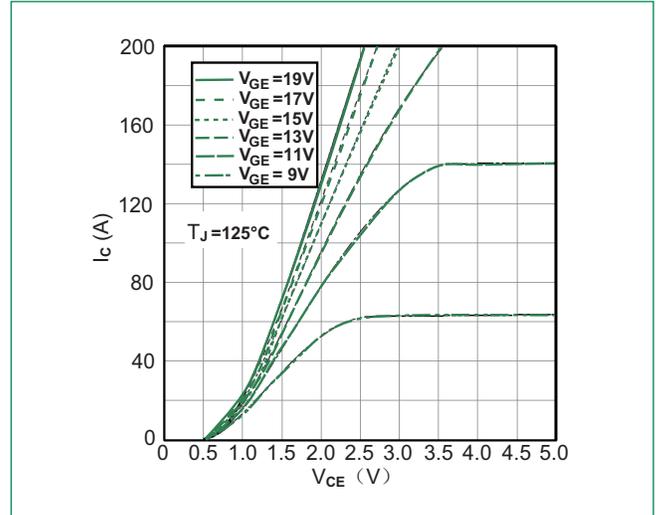
Figure 3: Typical Transfer Characteristics for IGBT Inverter

$V_{CE}=20V$, $T_j=25°C$, $T_j=125°C$
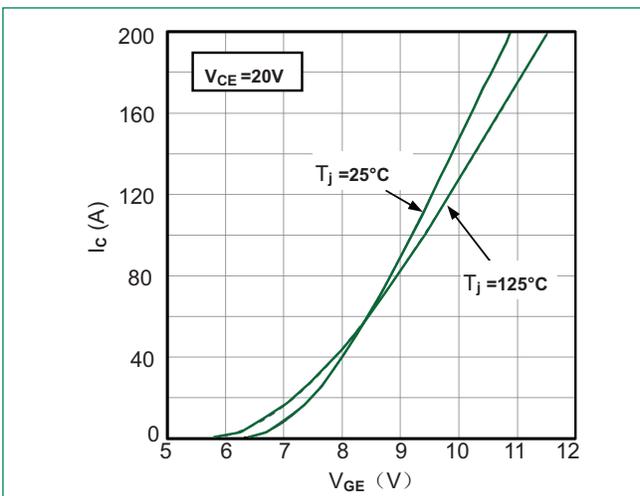
Figure 4: Switching Energy vs. Gate Resistor for IGBT Inverter

$V_{CE}=600V$, $I_C=100A$, $V_{GE}=\pm15V$, $T_j=125°C$, E_{on}, E_{off}
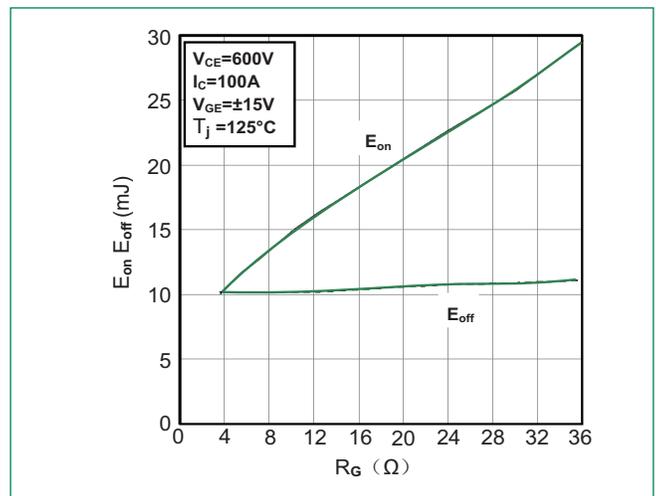
Figure 5: Switching Energy vs. Collector Current for IGBT Inverter

$V_{CE}=600V$, $R_G=3.9\Omega$, $V_{GE}=\pm15V$, $T_j=125°C$, E_{on}, E_{off}
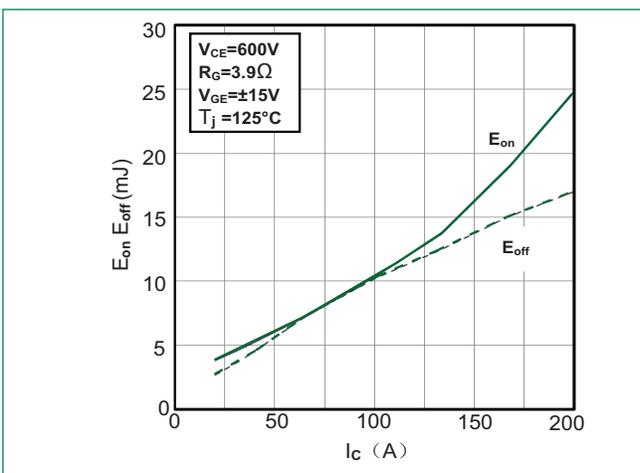
Figure 6: Reverse Biased Safe Operating Area for IGBT Inverter
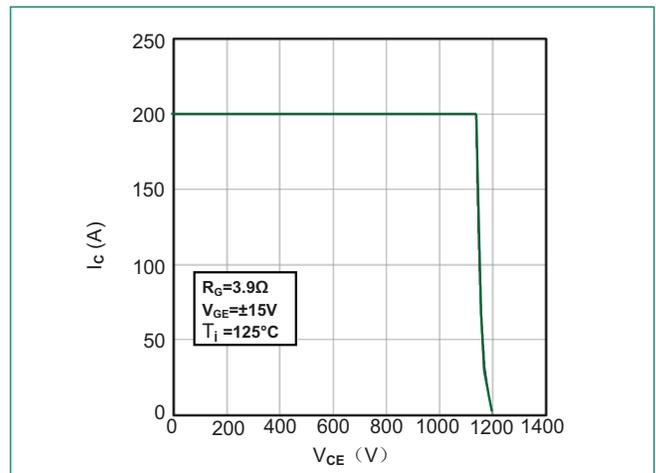

$R_G=3.9\Omega$, $V_{GE}=\pm15V$, $T_j=125°C$

Figure 7: Diode Forward Characteristics for Diode Inverter
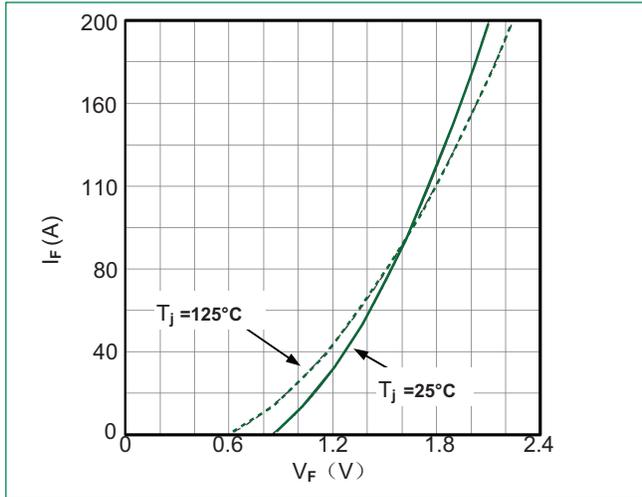
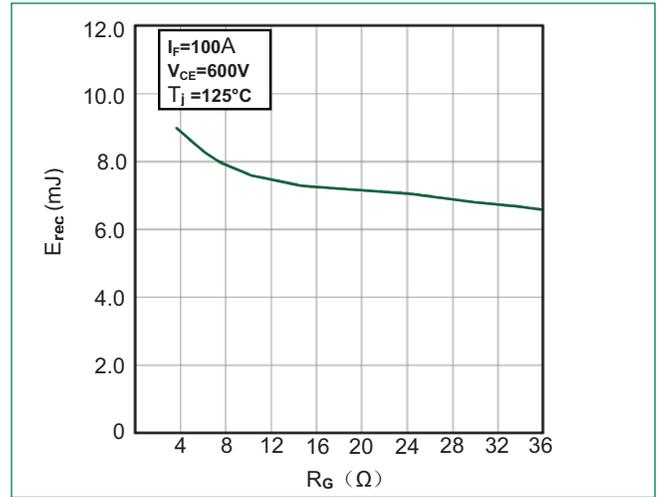### Figure 8: Switching Energy vs. Gate Resistort for Diode Inverter

$I_F = 100A$
$V_{CE} = 600V$
$T_j = 125°C$

Figure 9: Switching Energy vs. Forward Current for Diode Inverter
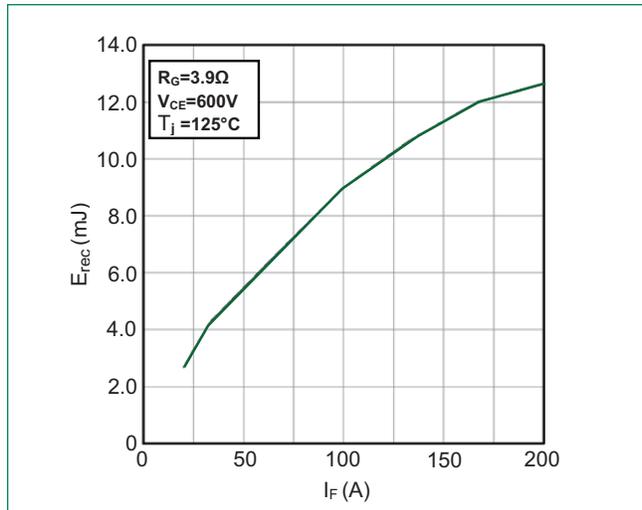
$R_G = 3.9Ω$
$V_{CE} = 600V$
$T_j = 125°C$
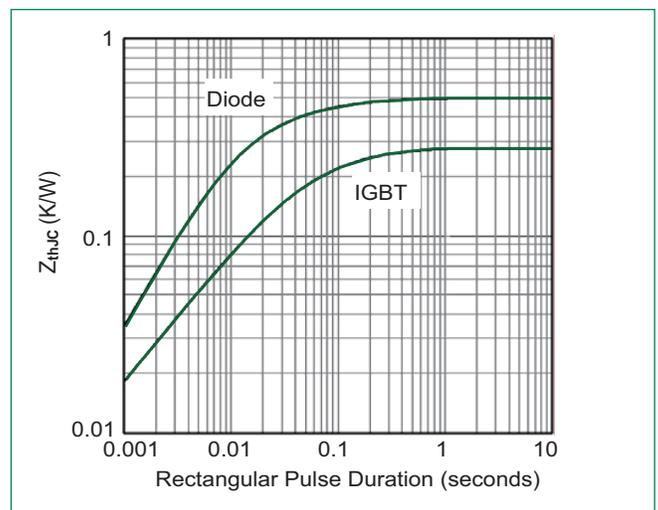

Figure 10: Transient Thermal Impedance of Diode and IGBT Inverter

Diode

IGBT

Figure 11: NTC Characteristics

R

MG12100W-XN2MM

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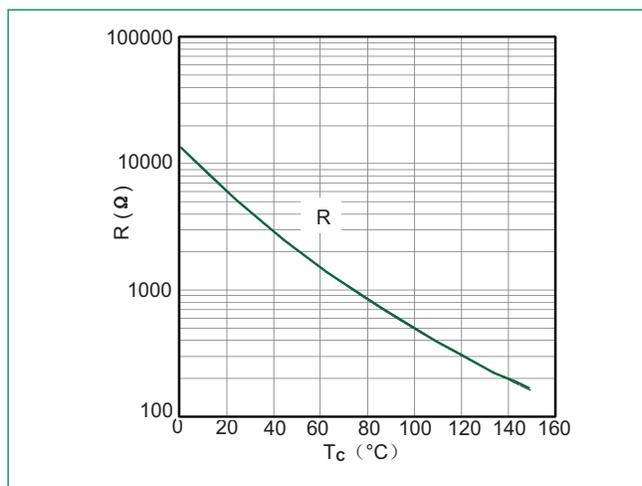
Circuit Diagram

Part Numbering System

MG 12 100 W-X N2MM

PRODUCT TYPE
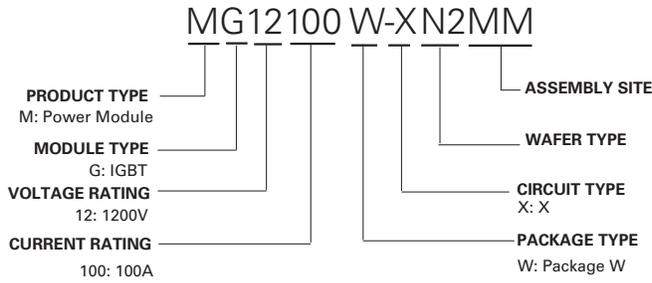M: Power Module

MODULE TYPE
G: IGBT

VOLTAGE RATING
12: 1200V

CURRENT RATING
100: 100A

ASSEMBLY SITE

WAFER TYPE

CIRCUIT TYPE
X: X

PACKAGE TYPE
W: Package W

Part Marking System

MG12100W-XN2MM

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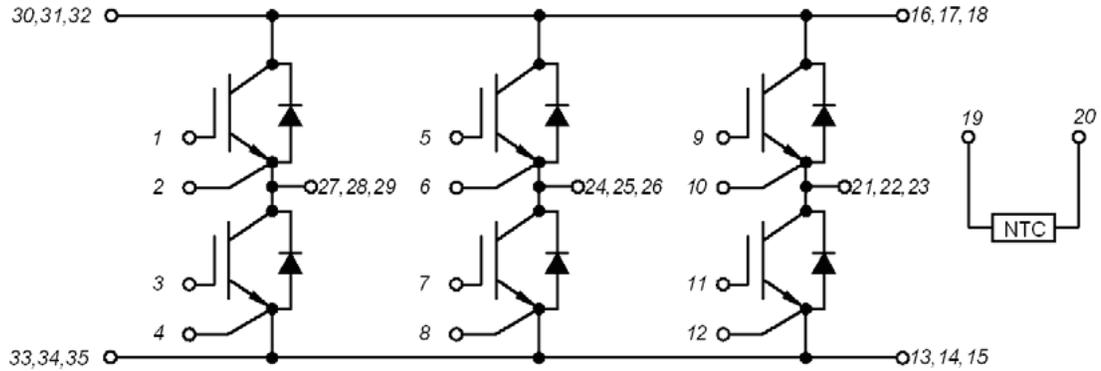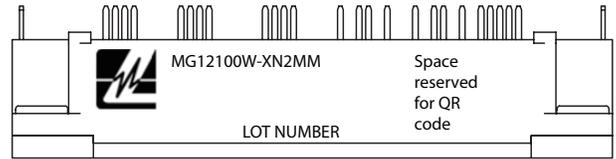
LOT NUMBER

Packing Options

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

Dimensions-Package W

Dimensions (mm)
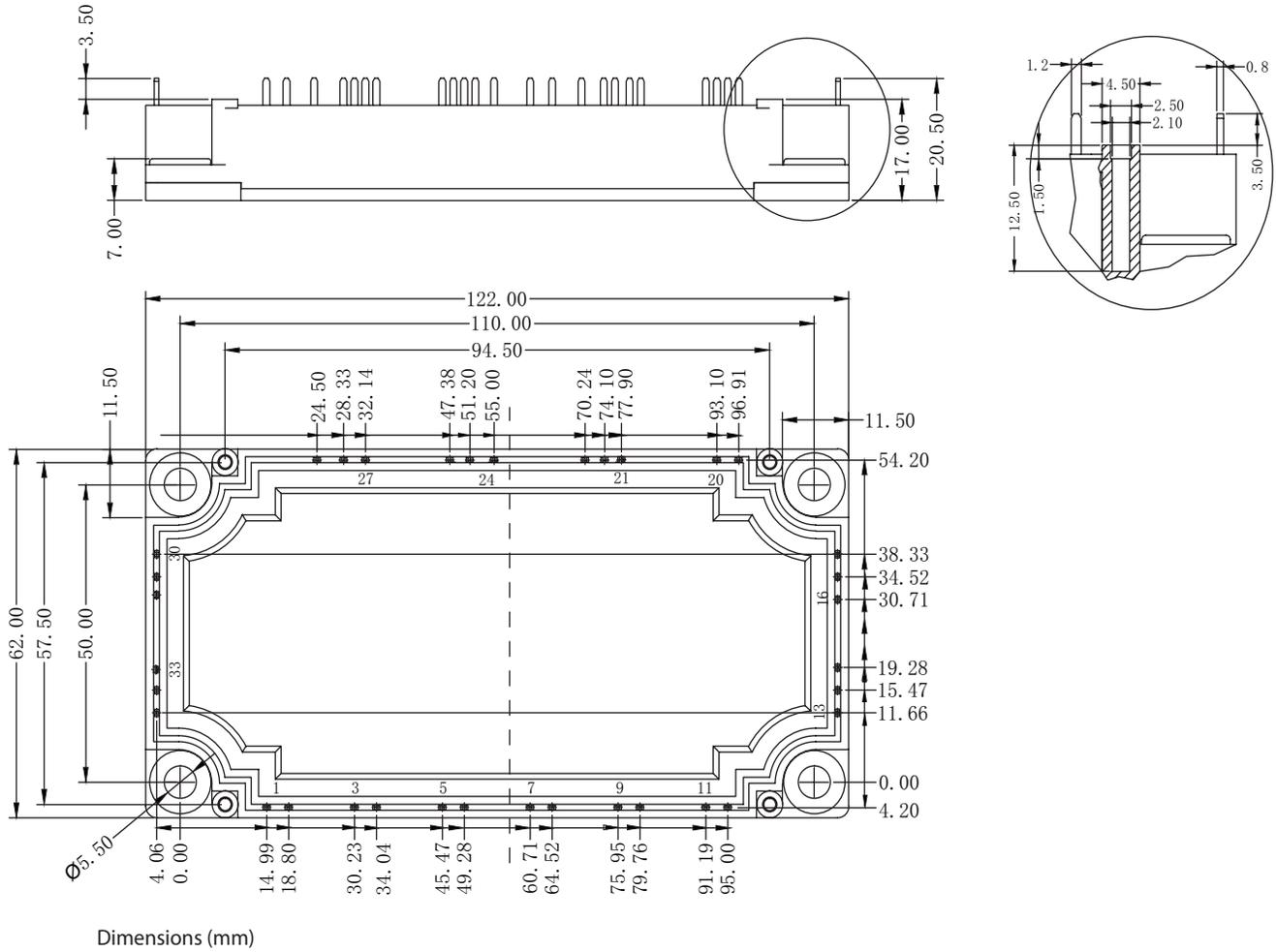
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Contact Us :

➤ ## Address :

  401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
  Minhang District, Shanghai , China

➤ ## Sales :

Direct   +86 (21) 6401-6692

Email   amall@ameya360.com

QQ   800077892

Skype   ameyasales1 ameyasales2

➤ ## Customer Service :

Email   service@ameya360.com

➤ ## Partnership :

Tel   +86 (21) 64016692-8333

Email   mkt@ameya360.com