# MIMMG225WB120B6TN

**1200V 225A Dual IGBT Module**

**RoHS Compliant**

## FEATURES

- ☐ 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
- ☐ Temperature sense included

**GWB Series Module**

## APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Photovoltaic/Fuel cell
- ☐ Inverter and power supplies

## INVERTER SECTOR

### ABSOLUTE MAXIMUM RATINGS

***$T_C$=25°C unless otherwise specified***

| Symbol | Parameter | Test Conditions | Values | Unit |
|---|---|---|---|---|
| **IGBT** | | | | |
| $V_{CES}$ | Collector - Emitter Voltage | $T_{vj}$=25°C | 1200 | V |
| $V_{GES}$ | Gate - Emitter Voltage | | ±20 | V |
| $I_C$ | DC Collector Current | $T_C$=25°C | 325 | A |
| | | $T_C$=80°C | 225 | A |
| $I_{CM}$ | Repetitive Peak Collector Current | $t_p$=1ms | 450 | A |
| $P_{tot}$ | Power Dissipation Per IGBT | | 1050 | W |
| **Diode** | | | | |
| $V_{RRM}$ | Repetitive Reverse Voltage | $T_{vj}$=25°C | 1200 | V |
| $I_{F(AV)}$ | Average Forward Current | $T_C$=25°C | 225 | A |
| | | $T_C$=80°C | 160 | A |
| $I_{FRM}$ | Repetitive Peak Forward Current | $t_p$=1ms | 450 | A |
| $I^2t$ | | $T_{vj}$ =125°C, t=10ms, $V_R$=0V | 9100 | $A^2s$ |

## INVERTER SECTOR

### ELECTRICAL AND THERMAL CHARACTERISTICS *$T_C$=25°C unless otherwise specified*

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **IGBT** | | | | | | |
| $V_{GE(th)}$ | Gate - Emitter Threshold Voltage | $V_{CE}$=$V_{GE}$, $I_C$=9mA | 5.0 | 5.8 | 6.5 | V |
| $V_{CE(sat)}$ | Collector - Emitter Saturation Voltage | $I_C$=225A, $V_{GE}$=15V, $T_{vj}$=25°C | | 1.7 | | V |
| | | $I_C$=225A, $V_{GE}$=15V, $T_{vj}$=125°C | | 2.0 | | V |
| $I_{CES}$ | Collector Leakage Current | $V_{CE}$=1200V, $V_{GE}$=0V, $T_{vj}$=25°C | | | 1 | mA |
| | | $V_{CE}$=1200V, $V_{GE}$=0V, $T_{vj}$=125°C | | | 5 | mA |
| $I_{GES}$ | Gate Leakage Current | $V_{CE}$=0V,$V_{GE}$±15V, $T_{vj}$=125°C | -400 | | 400 | nA |
| $R_{Gint}$ | Integrated Gate Resistor | | | 3.3 | | Ω |
| $Q_{ge}$ | Gate Charge | $V_{CE}$=600V, $I_C$=225A , $V_{GE}$=±15V | | 2.1 | | μC |
| $C_{ies}$ | Input Capacitance | $V_{CE}$=25V, $V_{GE}$=0V, f =1MHz | | 16 | | nF |
| $C_{res}$ | Reverse Transfer Capacitance | | | 0.75 | | nF |
| $t_{d(on)}$ | Turn - on Delay Time | $V_{CC}$=600V,$I_C$=225A, $R_G$ =3.3Ω , $V_{GE}$=±15V, Inductive Load — $T_{vj}$ =25°C | | 160 | | ns |
| | | $T_{vj}$ =125°C | | 170 | | ns |
| $t_r$ | Rise Time | $T_{vj}$ =25°C | | 45 | | ns |
| | | $T_{vj}$ =125°C | | 50 | | ns |
| $t_{d(off)}$ | Turn - off Delay Time | $V_{CC}$=600V,$I_C$=225A, $R_G$ =3.3Ω , $V_{GE}$=±15V, Inductive Load — $T_{vj}$ =25°C | | 460 | | ns |
| | | $T_{vj}$ =125°C | | 530 | | ns |
| $t_f$ | Fall Time | $T_{vj}$ =25°C | | 100 | | ns |
| | | $T_{vj}$ =125°C | | 150 | | ns |
| $E_{on}$ | Turn - on Energy | $V_{CC}$=600V,$I_C$=225A, $R_G$ =3.3Ω , $V_{GE}$=±15V, Inductive Load — $T_{vj}$ =25°C | | 9 | | mJ |
| | | $T_{vj}$ =125°C | | 13.5 | | mJ |
| $E_{off}$ | Turn - off Energy | $T_{vj}$ =25°C | | 22.5 | | mJ |
| | | $T_{vj}$ =125°C | | 33 | | mJ |
| $I_{SC}$ | Short Circuit Current | $t_{psc}$≤10μS , $V_{GE}$=15V $T_{vj}$=125°C,$V_{CC}$=900V | | 900 | | A |
| $R_{thJC}$ | Junction-to-Case Thermal Resistance （ **Per IGBT**） | | | | 0.12 | K /W |
| **Diode** | | | | | | |
| $V_F$ | Forward Voltage | $I_F$=225A , $V_{GE}$=0V, $T_{vj}$ =25°C | | 1.65 | | V |
| | | $I_F$=225A , $V_{GE}$=0V, $T_{vj}$ =125°C | | 1.6 | | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=225A , $V_R$=600V $di_F/dt$=-3600A/μs $T_{vj}$ =125°C | | 200 | | ns |
| $I_{RRM}$ | Max. Reverse Recovery Current | | | 180 | | A |
| $E_{rec}$ | Reverse Recovery Energy | | | 18 | | mJ |
| $R_{thJCD}$ | Junction-to-Case Thermal Resistance （ **Per Diode**） | | | | 0.2 | K /W |

## NTC CHARACTERISTIC VALUES

*$T_C$=25°C unless otherwise specified*

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $R_{25}$ | Resistance | $T_C$ =25°C | | 5 | | KΩ |
| $B_{25/50}$ | | | | 3375 | | K |

## MODULE CHARACTERISTICS

*$T_C$=25°C unless otherwise specified*

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $T_{Vj\ max}$ | Max. Junction Temperature | | | | 150 | °C |
| $T_{Vj\ op}$ | 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 | | | |
| Torque | Module-to-Sink | Recommended（M5） | 2.5 | | 5 | N· m |
| Torque | Module Electrodes | Recommended（M6） | 3 | | 5 | N· m |
| Weight | | | | 350 | | g |

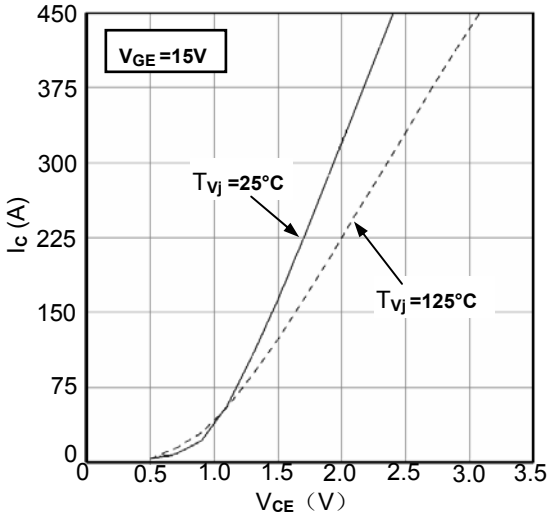



Figure1. Typical Output Characteristics
IGBT-inverter

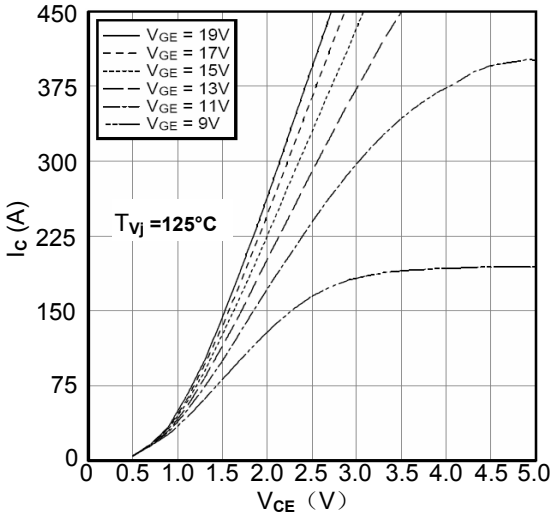



Figure2. Typical Output Characteristics
IGBT-inverter

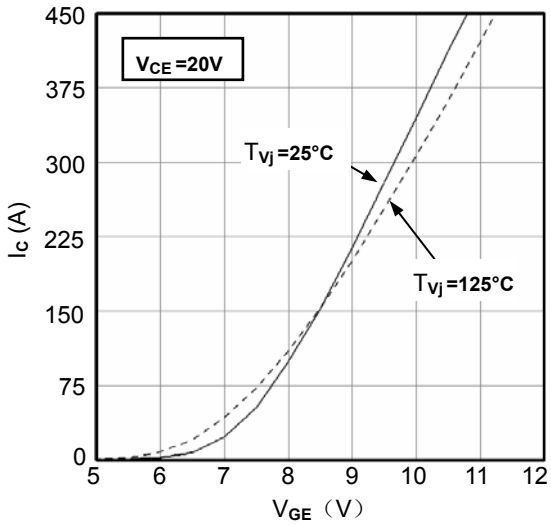



Figure3. Typical Transfer characteristics
IGBT-inverter

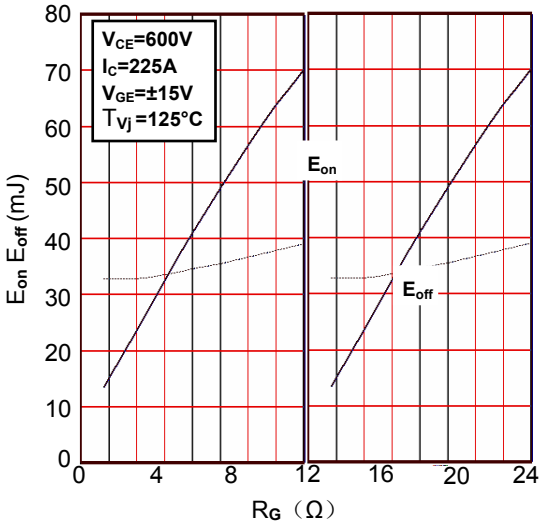



Figure4. Switching Energy vs. Gate Resistor
IGBT-inverter

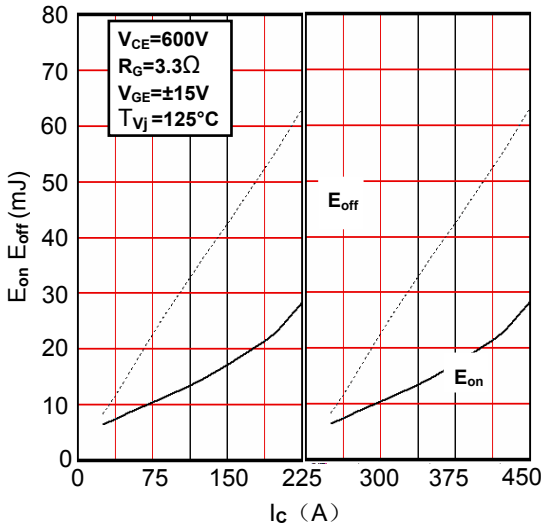



Figure5. Switching Energy vs. Collector Current
IGBT-inverter

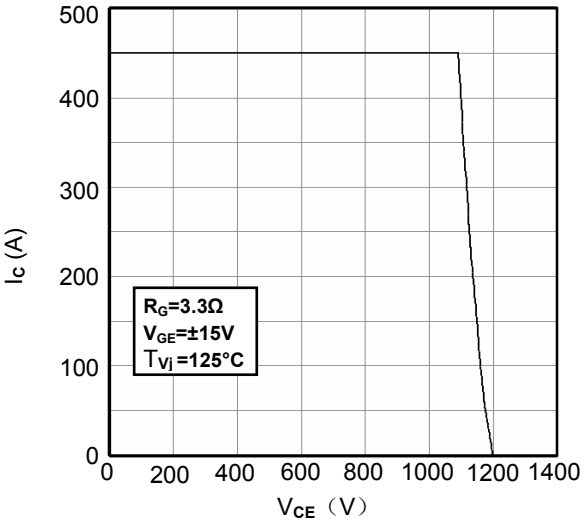



Figure6. Reverse Biased Safe Operating Area
IGBT-inverter

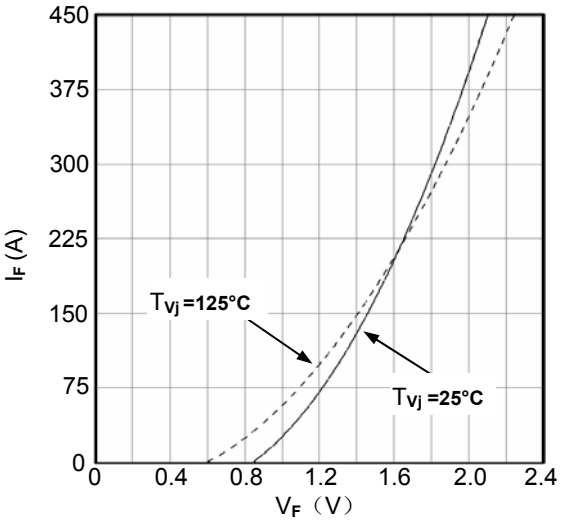



Figure7. Diode Forward Characteristics
Diode -inverter

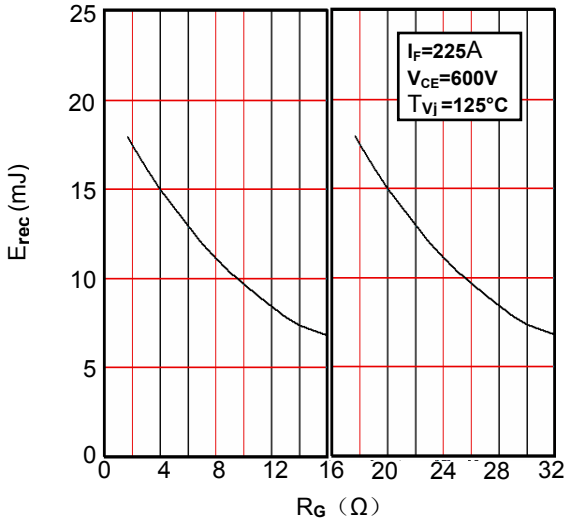



Figure8. Switching Energy vs. Gate Resistor
Diode -inverter

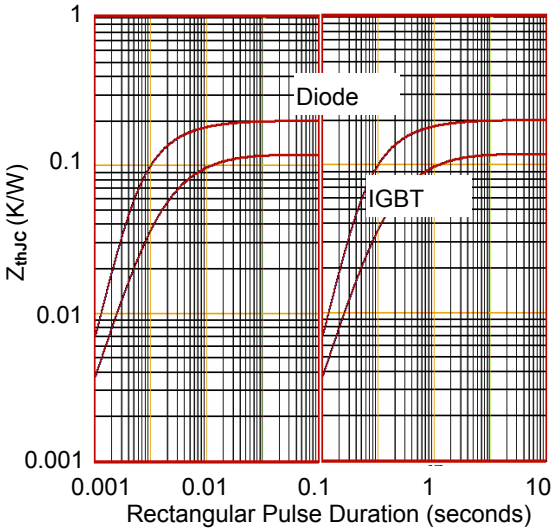



Figure9. Transient Thermal Impedance of
Diode and IGBT-inverter

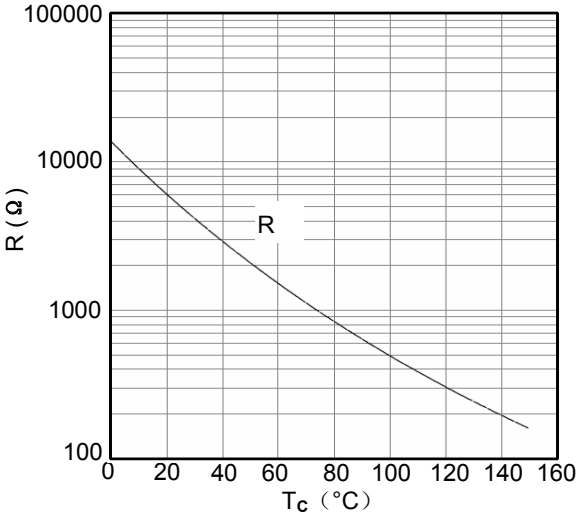



Figure10. NTC Characteristics

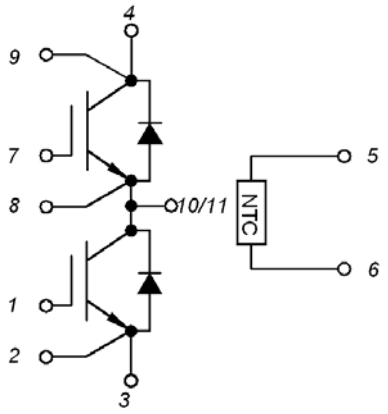
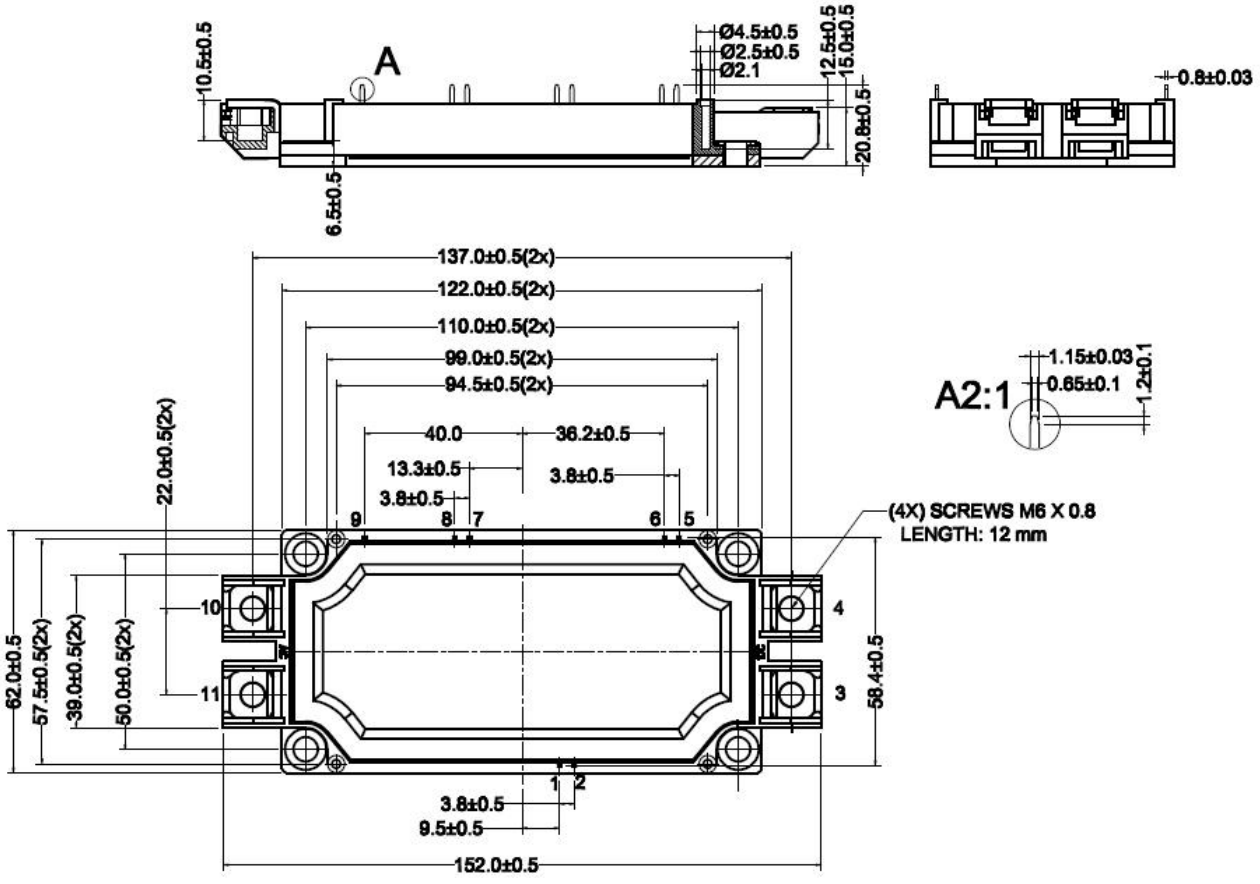



Figure11. Circuit Diagram




Dimensions (mm)
Figure12. Package Outline