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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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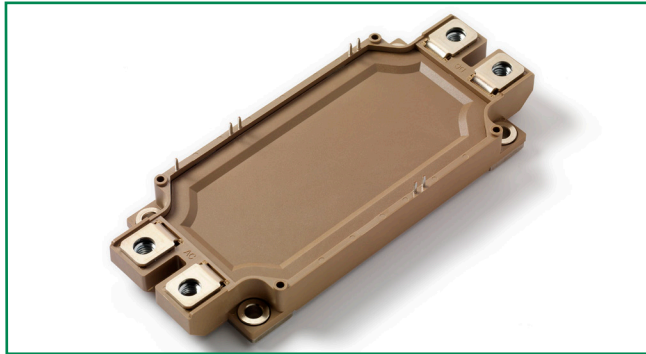
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**MG12450WB-BN2MM**

RoHS



**Features**

- 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
- Temperature sense included

**Applications**

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

**Module Characteristics (T<sub>J</sub> = 25°C, unless otherwise specified)**

| Symbol            | Parameters                 | Test Conditions  | Min | Typ  | Max | Unit |
|-------------------|----------------------------|------------------|-----|------|-----|------|
| T <sub>Jmax</sub> | Max. Junction Temperature  |                  |     |      | 150 | °C   |
| T <sub>Jop</sub>  | Operating Temperature      |                  | -40 |      | 125 | °C   |
| T <sub>stg</sub>  | Storage Temperature        |                  | -40 |      | 125 | °C   |
| V <sub>isol</sub> | Insulation Test Voltage    | AC, t=1min       |     | 3000 |     | V    |
| CTI               | Comparative Tracking Index |                  | 210 |      |     |      |
| Torque            | Module-to-Sink             | Recommended (M5) | 2.5 |      | 5   | N·m  |
| Torque            | Module Electrodes          | Recommended (M6) | 3   |      | 5   | N·m  |
| Weight            |                            |                  |     | 350  |     | g    |

**Absolute Maximum Ratings (T<sub>J</sub> = 25°C, unless otherwise specified)**

| Symbol             | Parameters                        | Test Conditions                                    | Values | Unit             |
|--------------------|-----------------------------------|--|--------|------------------|
| <b>IGBT</b>        |                                   |  |        |                  |
| V <sub>CES</sub>   | Collector - Emitter Voltage       | T <sub>J</sub> =25°C                               | 1200   | V                |
| V <sub>GES</sub>   | Gate - Emitter Voltage            |  | ±20    | V                |
| I <sub>C</sub>     | DC Collector Current              | T <sub>C</sub> =25°C                               | 600    | A                |
|                    |                                   | T <sub>C</sub> =80°C                               | 450    | A                |
| I <sub>CM</sub>    | Repetitive Peak Collector Current | t <sub>p</sub> =1ms                                | 900    | A                |
| P <sub>tot</sub>   | Power Dissipation Per IGBT        |  | 1950   | W                |
| <b>Diode</b>       |                                   |  |        |                  |
| V <sub>RRM</sub>   | Repetitive Reverse Voltage        | T <sub>J</sub> =25°C                               | 1200   | V                |
| I <sub>F(AV)</sub> | Average Forward Current           | T <sub>C</sub> =25°C                               | 450    | A                |
|                    |                                   | T <sub>C</sub> =80°C                               | 350    | A                |
| I <sub>FRM</sub>   | Repetitive Peak Forward Current   | t <sub>p</sub> =1ms                                | 900    | A                |
| I <sup>2</sup> t   |                                   | T <sub>J</sub> = 125°C, t=10ms, V <sub>R</sub> =0V | 34000  | A <sup>2</sup> s |

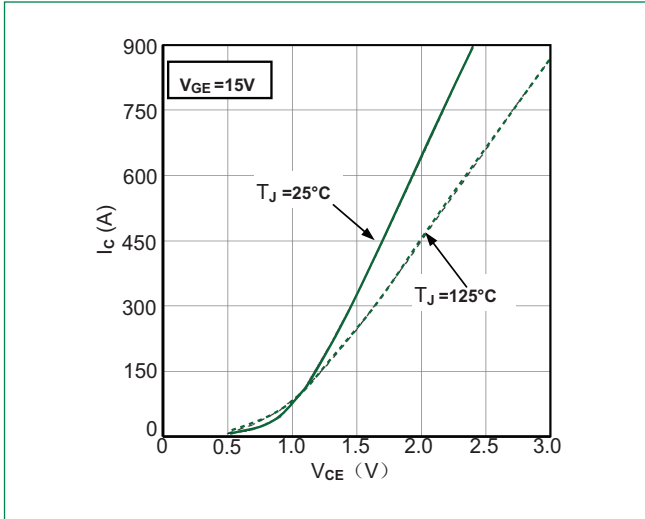
### Electrical and Thermal Specifications ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol        | Parameters                                      | Test Conditions   | Min                     | Typ  | Max   | Unit          |
|---------------|---|---|-------------------------|------|-------|---------------|
| <b>IGBT</b>   |   |   |                         |      |       |               |
| $V_{GE(th)}$  | Gate - Emitter Threshold Voltage                | $V_{CE}=V_{GE}, I_C=18\text{mA}$  | 5.0                     | 5.8  | 6.5   | V             |
| $V_{CE(sat)}$ | Collector - Emitter                             | $I_C=450\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$  |                         | 1.7  |       | V             |
|               | Saturation Voltage                              | $I_C=450\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$   |                         | 2.0  |       | V             |
| $I_{ICES}$    | Collector Leakage Current                       | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$   |                         |      | 1     | mA            |
|               |   | $V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$  |                         |      | 5     | 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                        |   |                         | 1.7  |       | $\Omega$      |
| $Q_{ge}$      | Gate Charge                                     | $V_{CE}=600\text{V}, I_C=450\text{A}, V_{GE}=\pm 15\text{V}$  |                         | 4.3  |       | $\mu\text{C}$ |
| $C_{ies}$     | Input Capacitance                               | $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$  |                         | 32   |       | nF            |
| $C_{res}$     | Reverse Transfer Capacitance                    |   |                         |      | 1.5   |               |
| $t_{d(on)}$   | Turn - on Delay Time                            | $V_{CC}=600\text{V}$<br>$I_C=450\text{A}$<br>$R_G=1.6\Omega$<br>$V_{GE}=\pm 15\text{V}$<br>Inductive Load | $T_J=25^\circ\text{C}$  |      | 160   | ns            |
|               |   |   | $T_J=125^\circ\text{C}$ |      | 170   | ns            |
| $t_r$         | Rise Time                                       |   | $T_J=25^\circ\text{C}$  |      | 45    | ns            |
|               |   |   | $T_J=125^\circ\text{C}$ |      | 50    | ns            |
| $t_{d(off)}$  | Turn - off Delay Time                           |   | $T_J=25^\circ\text{C}$  |      | 460   | ns            |
|               |   |   | $T_J=125^\circ\text{C}$ |      | 530   | ns            |
| $t_f$         | Fall Time                                       |   | $T_J=25^\circ\text{C}$  |      | 100   | ns            |
|               |   |   | $T_J=125^\circ\text{C}$ |      | 150   | ns            |
| $E_{on}$      | Turn - on Energy                                |   | $T_J=25^\circ\text{C}$  |      | 20    | mJ            |
|               |   |   | $T_J=125^\circ\text{C}$ |      | 31    | mJ            |
| $E_{off}$     | Turn - off Energy                               | $T_J=25^\circ\text{C}$  |                         | 33   | mJ    |               |
|               |   | $T_J=125^\circ\text{C}$   |                         | 55   | mJ    |               |
| $I_{SC}$      | Short Circuit Current                           | $t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}, V_{CC}=900\text{V}$                |                         | 1800 |       | A             |
| $R_{thJC}$    | Junction-to-Case Thermal Resistance (Per IGBT)  |   |                         |      | 0.064 | K/W           |
| <b>Diode</b>  |   |   |                         |      |       |               |
| $V_F$         | Forward Voltage                                 | $I_F=450\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$   |                         | 1.65 |       | V             |
|               |   | $I_F=450\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$  |                         | 1.6  |       | V             |
| $t_{RR}$      | Reverse Recovery Time                           | $I_F=450\text{A}, V_R=600\text{V}$<br>$di_F/dt=-7200\text{A}/\mu\text{s}$<br>$T_J=125^\circ\text{C}$      |                         | 255  |       | ns            |
| $I_{RRM}$     | Max. Reverse Recovery Current                   |   |                         | 385  |       | A             |
| $E_{rec}$     | Reverse Recovery Energy                         |   |                         | 38   |       | mJ            |
| $R_{thJCD}$   | Junction-to-Case Thermal Resistance (Per Diode) |   |                         |      | 0.12  | K/W           |

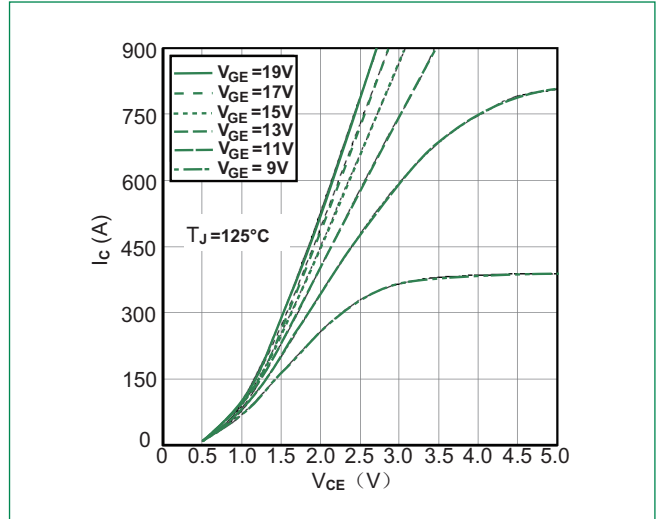
### NTC Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

| 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          |

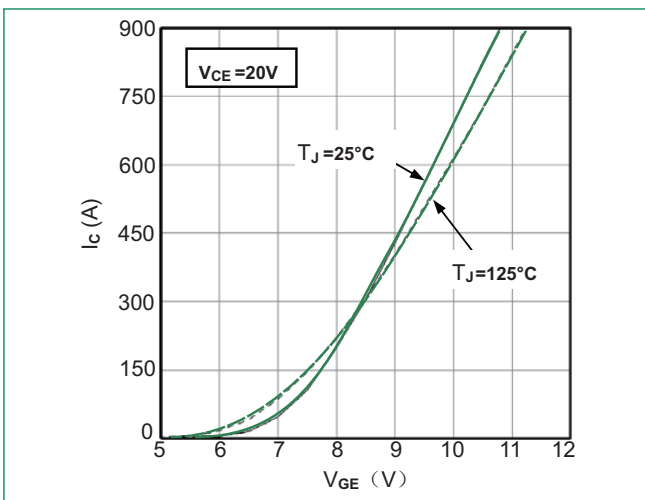
**Figure 1: Typical Output Characteristics for IGBT Inverter**



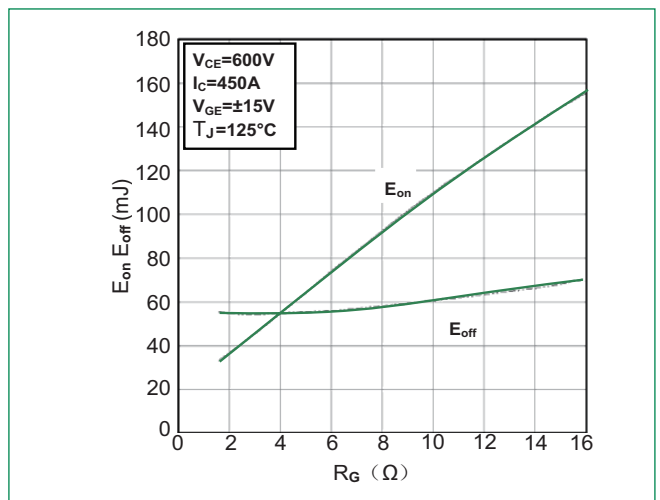
**Figure 2: Typical Output Characteristics for IGBT Inverter**



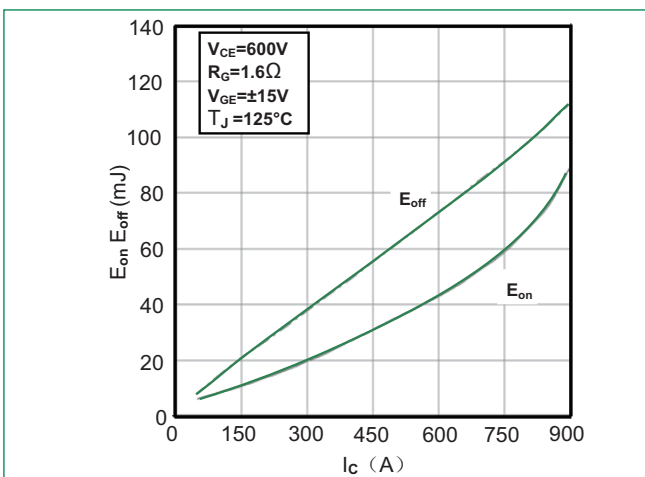
**Figure 3: Typical Transfer Characteristics for IGBT Inverter**



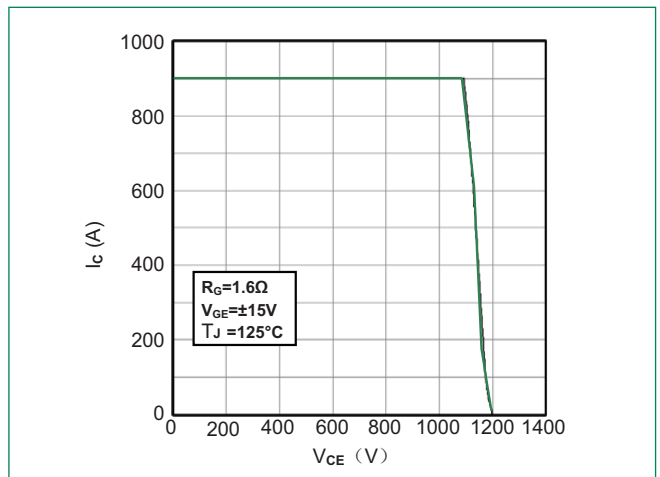
**Figure 4: Switching Energy vs. Gate Resistor for IGBT Inverter**



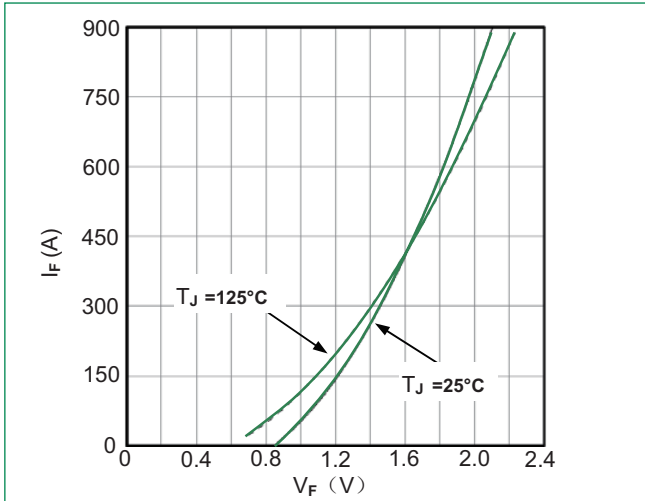
**Figure 5: Switching Energy vs. Collector Current for IGBT Inverter**



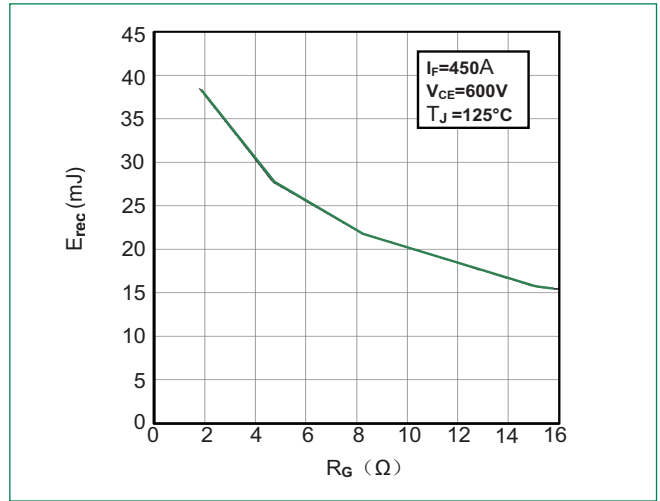
**Figure 6: Reverse Biased Safe Operating Area for IGBT Inverter**



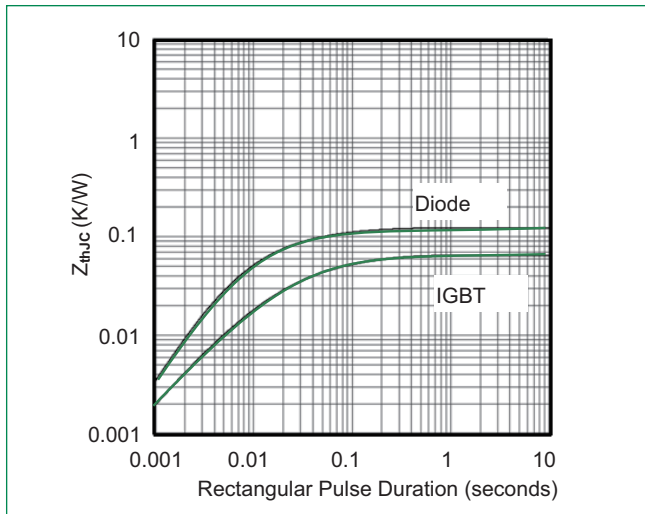
**Figure 7: Diode Forward Characteristics for Diode Inverter**



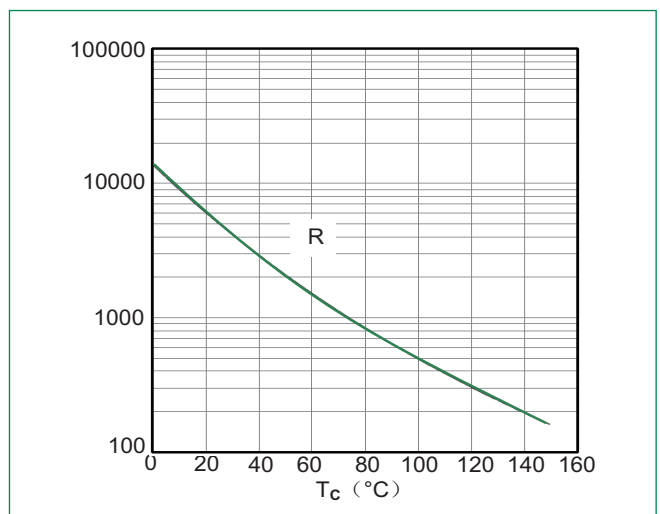
**Figure 8: Switching Energy vs. Gate Resistort for Diode Inverter**



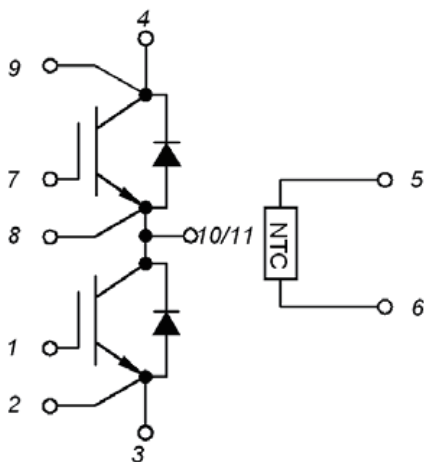
**Figure 9: Transient Thermal Impedance of Diode and IGBT Inverter**



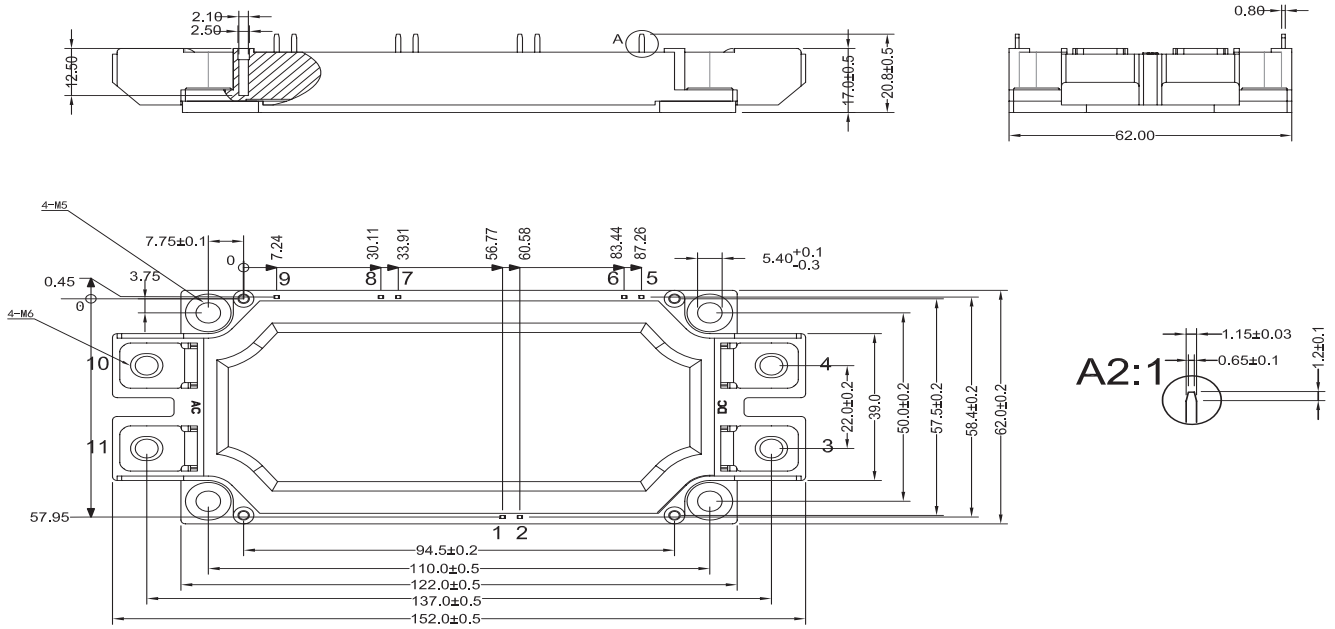
**Figure 10: NTC Characteristics**



**Circuit Diagram**



### Dimensions-Package WB

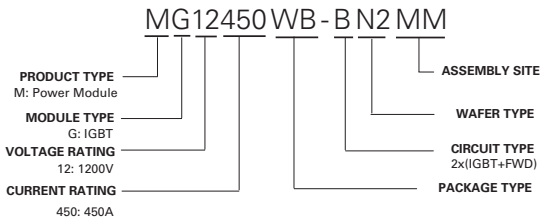


The foot pins are in gold / nickel coating

### Packing Options

| Part Number     | Marking         | Weight | Packing Mode | M.O.Q |
|-----------------|-----------------|--------|--------------|-------|
| MG12450WB-BN2MM | MG12450WB-BN2MM | 350g   | Bulk Pack    | 60    |

### Part Numbering System



### Part Marking System

