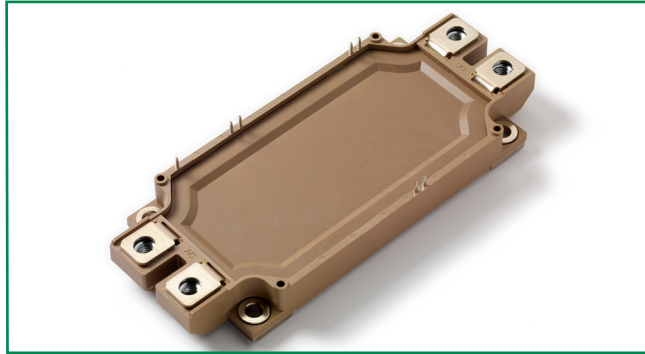


MG17450WB-BN4MM

RoHS



### Features

- IGBT<sup>3</sup> CHIP(1700V Trench+Field Stop technology)
- Low turn-off losses, short tail current
- $V_{CE(sat)}$  with positive temperature coefficient
- DIODE CHIP(1700V EMCON 3 technology)
- Free wheeling diodes with fast and soft reverse recovery

### Applications

- AC motor control
- Motion/servo control
- Photovoltaic/Fuel cell
- 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 | $^\circ\text{C}$ |
| $T_{Jop}$   | Operating Temperature      |                  | -40 |      | 125 | $^\circ\text{C}$ |
| $T_{stg}$   | Storage Temperature        |                  | -40 |      | 125 | $^\circ\text{C}$ |
| $V_{isol}$  | Insulation Test Voltage    | AC, t=1min       |     | 3500 |     | 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                |

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

| Symbol      | Parameters                        | Test Conditions                                   | Values   | Unit                 |
|-------------|-----------------------------------|---------------------------------------------------|----------|----------------------|
| IGBT        |                                   |                                                   |          |                      |
| $V_{CES}$   | Collector - Emitter Voltage       | $T_J=25^\circ\text{C}$                            | 1700     | V                    |
| $V_{GES}$   | Gate - Emitter Voltage            |                                                   | $\pm 20$ | V                    |
| $I_C$       | DC Collector Current              | $T_C=25^\circ\text{C}$                            | 600      | A                    |
|             |                                   | $T_C=80^\circ\text{C}$                            | 450      | A                    |
| $I_{CM}$    | Repetitive Peak Collector Current | $t_p=1\text{ms}$                                  | 900      | A                    |
| $P_{tot}$   | Power Dissipation Per IGBT        |                                                   | 2250     | W                    |
| Diode       |                                   |                                                   |          |                      |
| $V_{RRM}$   | Repetitive Reverse Voltage        | $T_J=25^\circ\text{C}$                            | 1700     | V                    |
| $I_{F(AV)}$ | Average Forward Current           | $T_C=25^\circ\text{C}$                            | 450      | A                    |
|             |                                   | $T_C=80^\circ\text{C}$                            | 350      | A                    |
| $I_{FRM}$   | Repetitive Peak Forward Current   | $t_p=1\text{ms}$                                  | 900      | A                    |
| $I^2t$      |                                   | $T_J=125^\circ\text{C}$ , t=10ms, $V_R=0\text{V}$ | 20000    | $\text{A}^2\text{s}$ |

# Power Module

## 1700V 450A IGBT Module

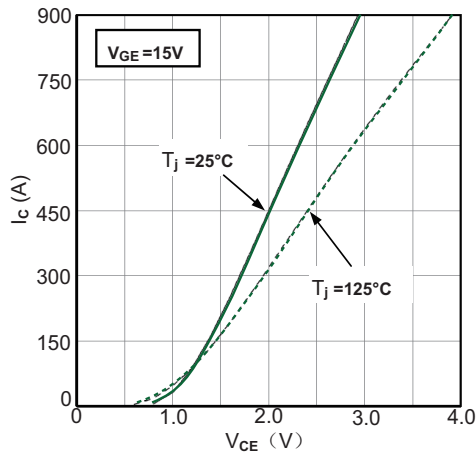
### Electrical and Thermal Specifications ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol               | Parameters                                      | Test Conditions                                                                                                  | Min                   | Typ  | Max   | Unit |
|----------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------|------|
| IGBT                 |                                                 |                                                                                                                  |                       |      |       |      |
| V <sub>GE(th)</sub>  | Gate - Emitter Threshold Voltage                | V <sub>CE</sub> =V <sub>GE</sub> , I <sub>C</sub> =18mA                                                          | 5.0                   | 5.8  | 6.4   | V    |
| V <sub>CE(sat)</sub> | Collector - Emitter                             | I <sub>C</sub> =450A, V <sub>GE</sub> =15V, T <sub>J</sub> =25°C                                                 |                       | 2.0  | 2.45  | V    |
|                      | Saturation Voltage                              | I <sub>C</sub> =450A, V <sub>GE</sub> =15V, T <sub>J</sub> =125°C                                                |                       | 2.4  |       | V    |
| I <sub>CES</sub>     | Collector Leakage Current                       | V <sub>CE</sub> =1700V, V <sub>GE</sub> =0V, T <sub>J</sub> =25°C                                                |                       |      | 3     | mA   |
|                      |                                                 | V <sub>CE</sub> =1700V, V <sub>GE</sub> =0V, T <sub>J</sub> =125°C                                               |                       |      | 20    | mA   |
| I <sub>GES</sub>     | Gate Leakage Current                            | V <sub>CE</sub> =0V, V <sub>GE</sub> =±15V, T <sub>J</sub> =125°C                                                | -400                  |      | 400   | nA   |
| R <sub>Gint</sub>    | Integrated Gate Resistor                        |                                                                                                                  |                       | 1.7  |       | Ω    |
| Q <sub>ge</sub>      | Gate Charge                                     | V <sub>CE</sub> =900V, I <sub>C</sub> =450A , V <sub>GE</sub> =±15V                                              |                       | 5.1  |       | μC   |
| C <sub>ies</sub>     | Input Capacitance                               | V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f =1MHz                                                               |                       | 40.5 |       | nF   |
| C <sub>res</sub>     | Reverse Transfer Capacitance                    |                                                                                                                  |                       | 1.3  |       | nF   |
| t <sub>d(on)</sub>   | Turn - on Delay Time                            | V <sub>CC</sub> =900V<br>I <sub>C</sub> =450A<br>R <sub>G</sub> =3.3Ω<br>V <sub>GE</sub> =±15V<br>Inductive Load | T <sub>J</sub> =25°C  |      | 280   | ns   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 300   | ns   |
| t <sub>r</sub>       | Rise Time                                       |                                                                                                                  | T <sub>J</sub> =25°C  |      | 80    | ns   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 100   | ns   |
| t <sub>d(off)</sub>  | Turn - off Delay Time                           |                                                                                                                  | T <sub>J</sub> =25°C  |      | 810   | ns   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 1000  | ns   |
| t <sub>f</sub>       | Fall Time                                       |                                                                                                                  | T <sub>J</sub> =25°C  |      | 180   | ns   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 300   | ns   |
| E <sub>on</sub>      | Turn - on Energy                                |                                                                                                                  | T <sub>J</sub> =25°C  |      | 96.5  | mJ   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 140   | mJ   |
| E <sub>off</sub>     | Turn - off Energy                               |                                                                                                                  | T <sub>J</sub> =25°C  |      | 96    | mJ   |
|                      |                                                 |                                                                                                                  | T <sub>J</sub> =125°C |      | 140   | mJ   |
| I <sub>SC</sub>      | Short Circuit Current                           | t <sub>psc</sub> ≤10μS , V <sub>GE</sub> =15V; T <sub>J</sub> =125°C , V <sub>CC</sub> =1000V                    |                       | 1800 |       | A    |
| R <sub>thJC</sub>    | Junction-to-Case Thermal Resistance (Per IGBT)  |                                                                                                                  |                       |      | 0.055 | K/W  |
| Diode                |                                                 |                                                                                                                  |                       |      |       |      |
| V <sub>F</sub>       | Forward Voltage                                 | I <sub>F</sub> =450A, V <sub>GE</sub> =0V, T <sub>J</sub> =25°C                                                  |                       | 1.8  | 2.2   | V    |
|                      |                                                 | I <sub>F</sub> =450A, V <sub>GE</sub> =0V, T <sub>J</sub> =125°C                                                 |                       | 1.9  |       | V    |
| I <sub>RRM</sub>     | Max. Reverse Recovery Current                   | I <sub>F</sub> =450A, V <sub>R</sub> =900V<br>di <sub>F</sub> /dt=-4500A/μs<br>T <sub>J</sub> =125°C             |                       | 570  |       | A    |
| Q <sub>rr</sub>      | Reverse Recovery Charge                         |                                                                                                                  |                       | 195  |       | μC   |
| E <sub>rec</sub>     | Reverse Recovery Energy                         |                                                                                                                  |                       | 110  |       | mJ   |
| R <sub>thJCD</sub>   | Junction-to-Case Thermal Resistance (Per Diode) |                                                                                                                  |                       |      | 0.10  | K/W  |

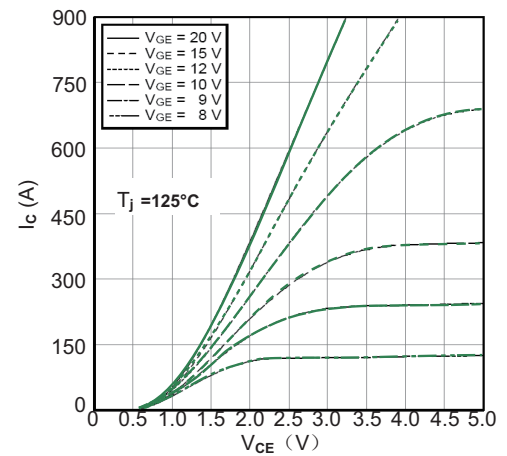
### NTC Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

| 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          |

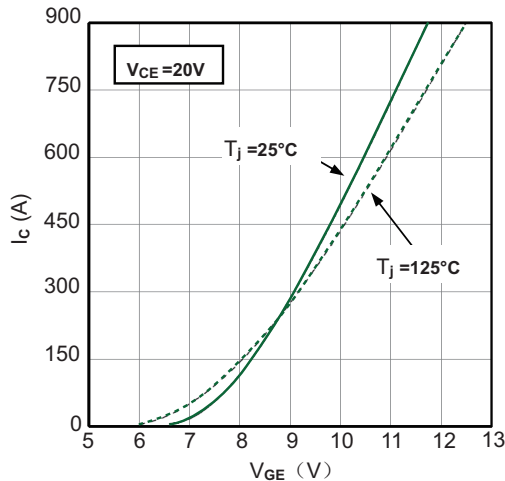
**Figure 1: Typical Output Characteristics for IGBT Inverter**



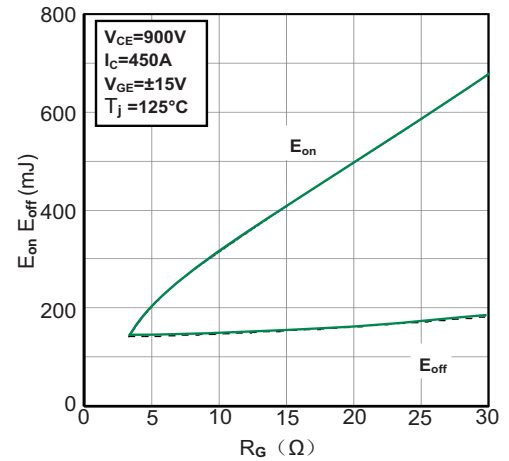
**Figure 2: Typical Output Characteristics for IGBT Inverter**



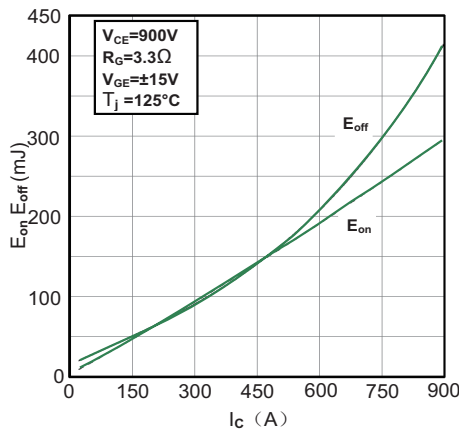
**Figure 3: Typical Transfer Characteristics for IGBT Inverter**



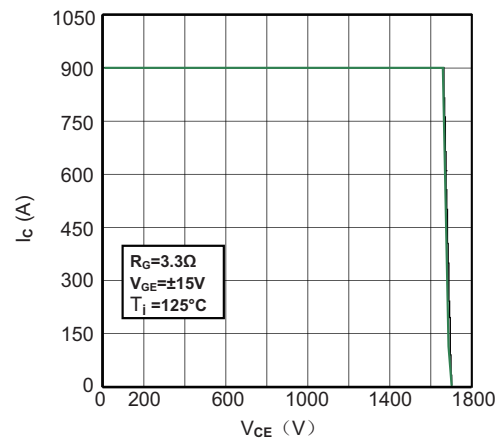
**Figure 4: Switching Energy vs. Gate Resistor for IGBT Inverter**



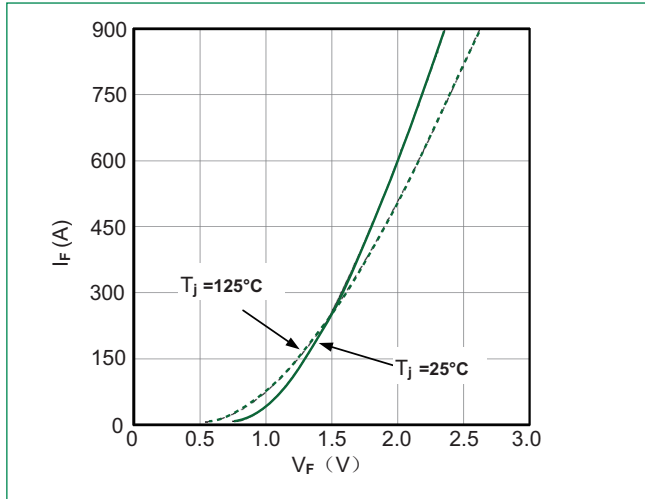
**Figure 5: Switching Energy vs. Collector Current for IGBT Inverter**



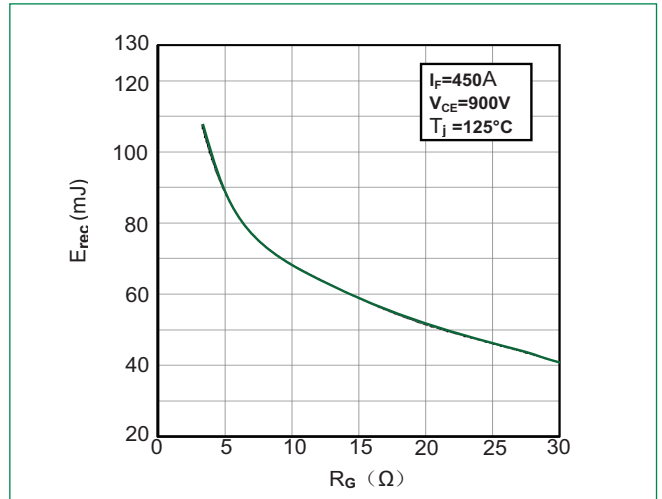
**Figure 6: Reverse Biased Safe Operating Area for IGBT Inverter**



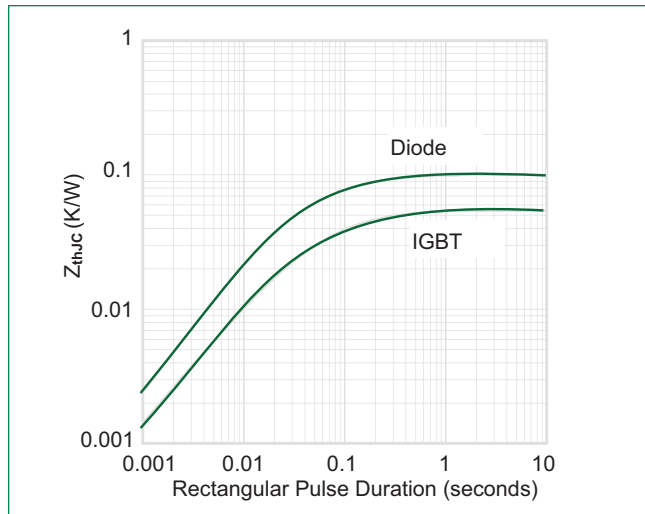
**Figure 7: Diode Forward Characteristics for Diode Inverter**



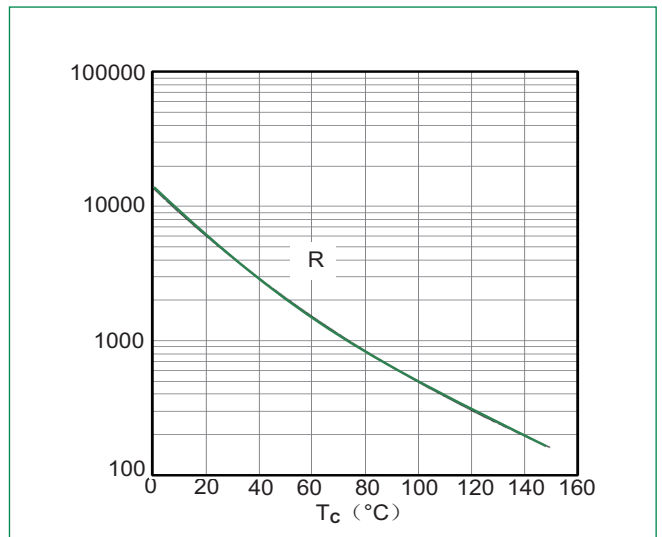
**Figure 8: Switching Energy vs. Gate Resistort for Diode Inverter**



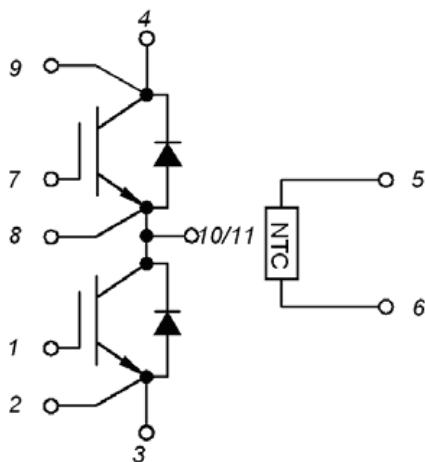
**Figure 9: Transient Thermal Impedance of Diode and IGBT Inverter**



**Figure 10: NTC Characteristics**



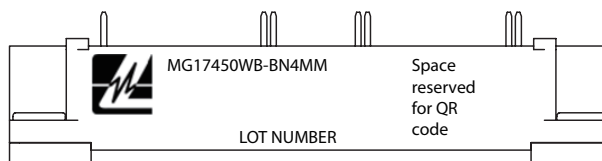
### Circuit Diagram



Technical drawing of a mechanical part, likely a bracket or support, showing three views: front, top, and side. The drawing includes dimensions in millimeters (mm) and degrees (°). Key dimensions include overall length 152.0±0.5, overall width 62.0±0.2, and various hole positions and diameters. A detail view A2:1 shows a cross-section of a hole with a diameter of 1.15±0.03 and a depth of 0.65±0.1. The part is labeled with 'AC' and 'DC' on the front view, and 'A' on the top view.

## Packing Options

## Part Numbering System



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