


MG1775S-BN4MM



Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|---|--------------------|
|  | E71639 |

Features

- IGBT³ 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

- High frequency switching application
- Medical applications
- Motion/servo control
- UPS systems

Module Characteristics ($T_c = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Unit |
|--------------|----------------------------|------------------|-----|------|-----|------------------|
| $T_{J(max)}$ | Max. Junction Temperature | | | | 150 | $^\circ\text{C}$ |
| $T_{J(op)}$ | Operating Temperature | | -40 | | 125 | $^\circ\text{C}$ |
| T_{stg} | Storage Temperature | | -40 | | 125 | $^\circ\text{C}$ |
| V_{isol} | Insulation Test Voltage | AC, t=1min | | 4000 | | V |
| CTI | Comparative Tracking Index | | 350 | | | |
| Torque | Module-to-Sink | Recommended (M6) | 3 | | 5 | N·m |
| Torque | Module Electrodes | Recommended (M5) | 2.5 | | 5 | N·m |
| Weight | | | | 160 | | g |

Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$, 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 | | ± 20 | V |
| I_C | DC Collector Current | $T_c=25^\circ\text{C}$ | 125 | A |
| | | $T_c=80^\circ\text{C}$ | 75 | A |
| I_{CM} | Repetitive Peak Collector Current | $t_p=1\text{ms}$ | 150 | A |
| P_{tot} | Power Dissipation Per IGBT | | 520 | W |
| Diode | | | | |
| V_{RRM} | Repetitive Reverse Voltage | $T_J=25^\circ\text{C}$ | 1700 | V |
| $I_{F(AV)}$ | Average Forward Current | $T_c=25^\circ\text{C}$ | 125 | A |
| | | $T_c=80^\circ\text{C}$ | 75 | A |
| I_{FRM} | Repetitive Peak Forward Current | $t_p=1\text{ms}$ | 150 | A |
| I^2t | | $T_J=125^\circ\text{C}$, $t=10\text{ms}$, $V_R=0\text{V}$ | 1050 | A^2S |

Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

MG1775S-BN4MM

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

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Unit |
|---------------|---|--|-------------------------|------|------|---------------|
| IGBT | | | | | | |
| $V_{GE(th)}$ | Gate - Emitter Threshold Voltage | $V_{CE}=V_{GE}, I_C=3.0\text{mA}$ | 5.2 | 5.8 | 6.4 | V |
| $V_{CE(sat)}$ | Collector - Emitter Saturation Voltage | $I_C=75\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$ | | 2.0 | 2.45 | V |
| | | $I_C=75\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$ | | 2.4 | | V |
| I_{CES} | Collector Leakage Current | $V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$ | | | 3 | mA |
| | | $V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$ | | | 20 | mA |
| I_{GES} | Gate Leakage Current | $V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=125^\circ\text{C}$ | -400 | | 400 | nA |
| R_{Gint} | Intergrated Gate Resistor | | | 8.5 | | Ω |
| Q_{ge} | Gate Charge | $V_{CE}=900\text{V}, I_C=75\text{A}, V_{GE}=\pm 15\text{V}$ | | 0.9 | | μC |
| C_{ies} | Input Capacitance | $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$ | | 6.8 | | nF |
| C_{res} | Reverse Transfer Capacitance | | | 0.22 | | nF |
| $t_{d(on)}$ | Turn - on Delay Time | $V_{CC}=900\text{V}$ $I_C=75\text{A}$ $R_G=6.8\Omega$ $V_{GE}=\pm 15\text{V}$ Inductive Load | $T_J=25^\circ\text{C}$ | | 370 | ns |
| | | | $T_J=125^\circ\text{C}$ | | 400 | ns |
| t_r | Rise Time | | $T_J=25^\circ\text{C}$ | | 40 | ns |
| | | | $T_J=125^\circ\text{C}$ | | 50 | ns |
| $t_{d(off)}$ | Turn - off Delay Time | | $T_J=25^\circ\text{C}$ | | 650 | ns |
| | | | $T_J=125^\circ\text{C}$ | | 800 | ns |
| t_f | Fall Time | | $T_J=25^\circ\text{C}$ | | 180 | ns |
| | | | $T_J=125^\circ\text{C}$ | | 300 | ns |
| E_{on} | Turn - on Energy | | $T_J=25^\circ\text{C}$ | | 16.5 | mJ |
| | | | $T_J=125^\circ\text{C}$ | | 24 | mJ |
| E_{off} | Turn - off Energy | $T_J=25^\circ\text{C}$ | | 16 | mJ | |
| | | $T_J=125^\circ\text{C}$ | | 23.5 | mJ | |
| I_{SC} | Short Circuit Current | $t_{psc}\leq 10\mu\text{S}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}, V_{CC}=1000\text{V}$ | | 300 | | A |
| R_{thJC} | Junction-to-Case Thermal Resistance (Per IGBT) | | | | 0.24 | K/W |
| Diode | | | | | | |
| V_F | Forward Voltage | $I_F=75\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$ | | 1.8 | 2.2 | V |
| | | $I_F=75\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$ | | 1.9 | | V |
| I_{RRM} | Max. Reverse Recovery Current | $I_F=75\text{A}, V_R=900\text{V}$ | | 125 | | A |
| Q_{rr} | Reverse Recovery Charge | $di_r/dt=-1800\text{A}/\mu\text{s}$ | | 36.5 | | μC |
| E_{rec} | Reverse Recovery Energy | $T_J=125^\circ\text{C}$ | | 20.5 | | mJ |
| R_{thJCD} | Junction-to-Case Thermal Resistance (Per Diode) | | | | 0.45 | K/W |

Figure 1: Typical Output Characteristics

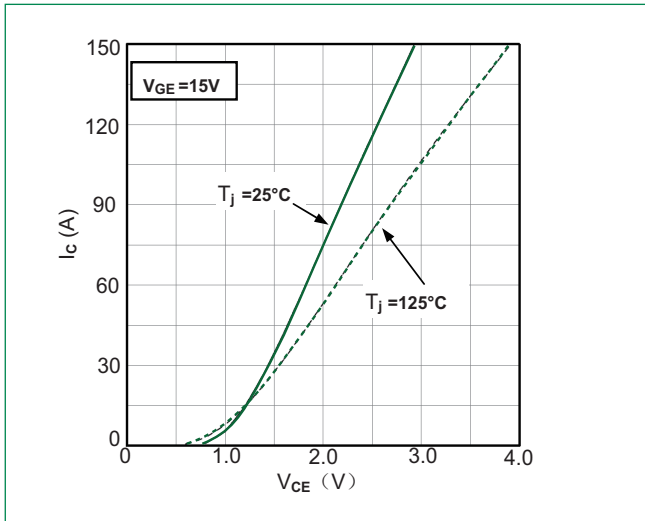


Figure 2: Typical Output Characteristics

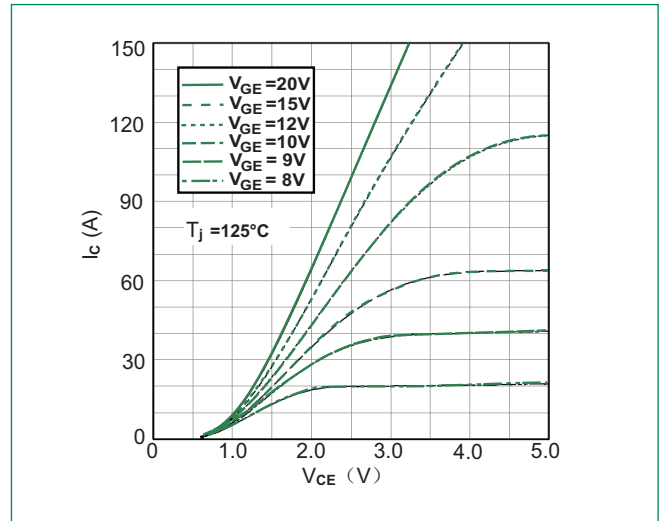


Figure 3: Typical Transfer characteristics

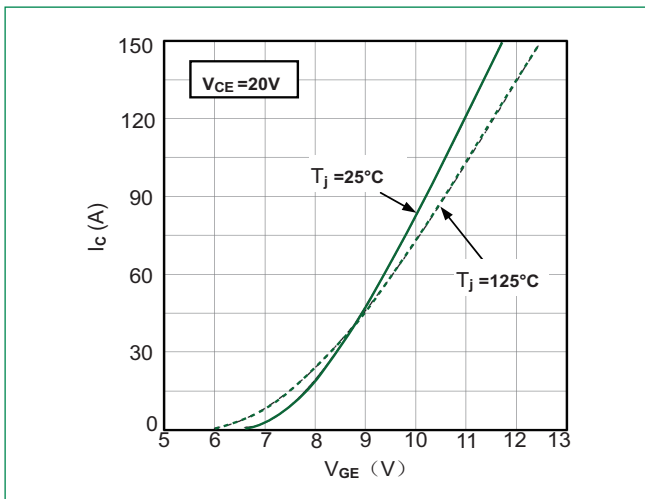


Figure 4: Switching Energy vs. Gate Resistor

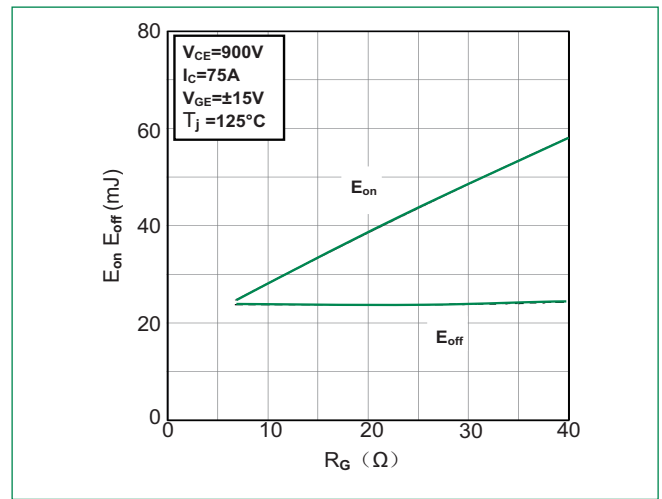


Figure 5: Switching Energy vs. Collector Current

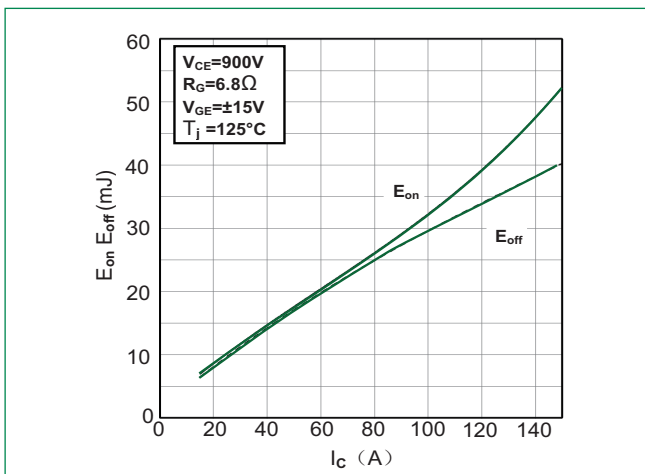


Figure 6: Reverse Biased Safe Operating Area

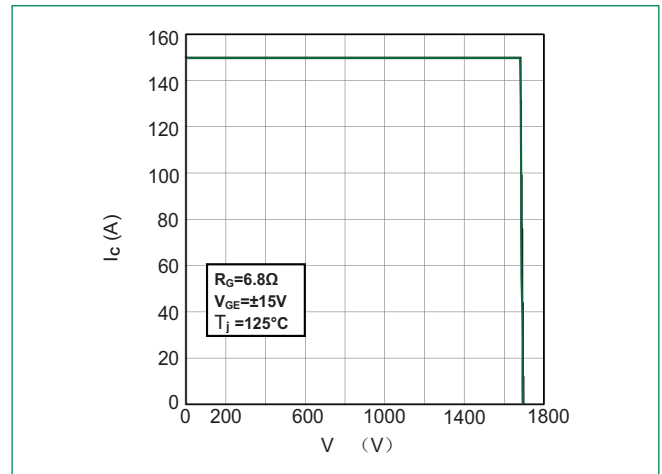


Figure 7: Diode Forward Characteristics

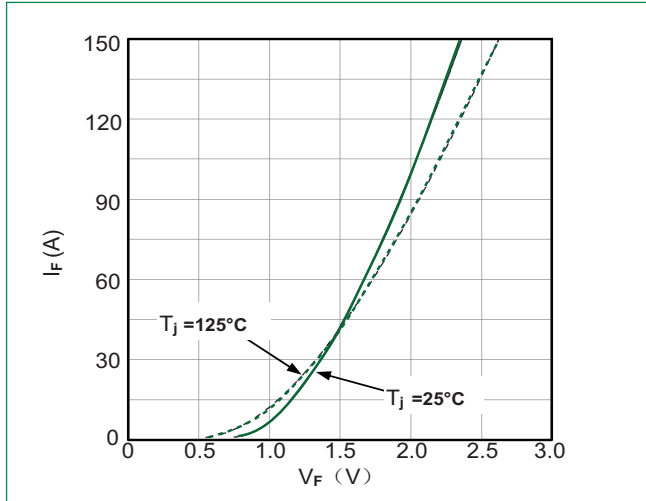


Figure 8: Switching Energy vs. Gate Resistor

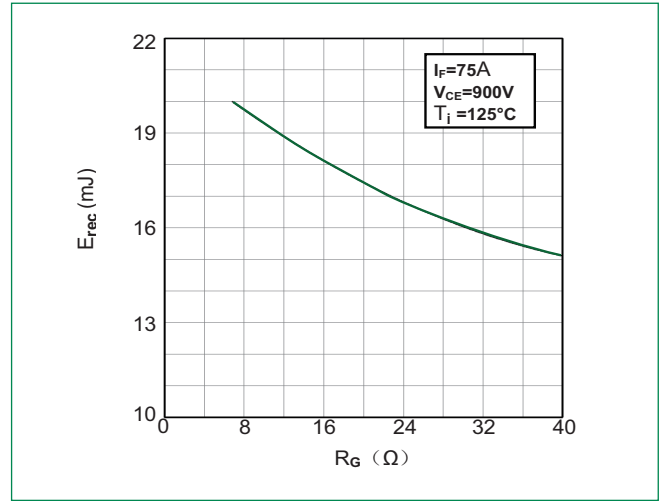


Figure 9: Switching Energy vs. Forward Current

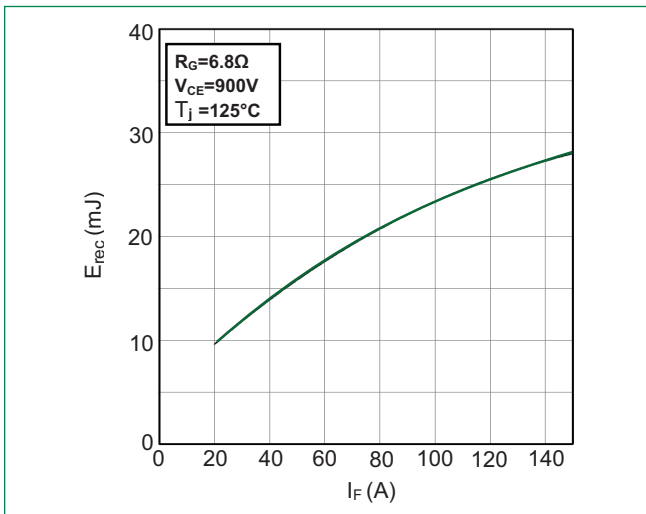
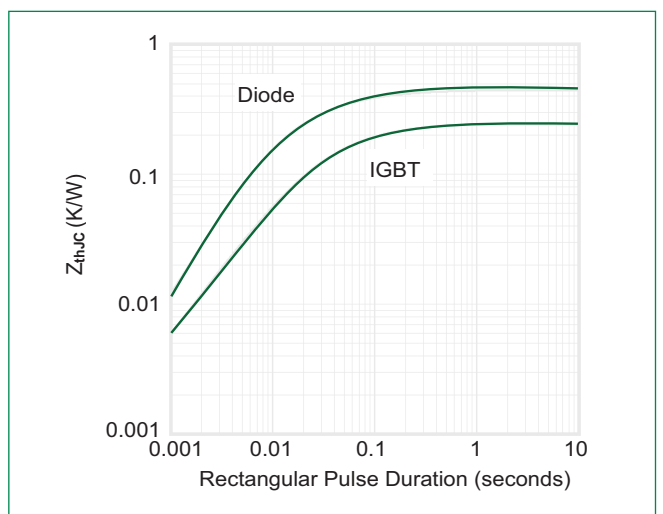
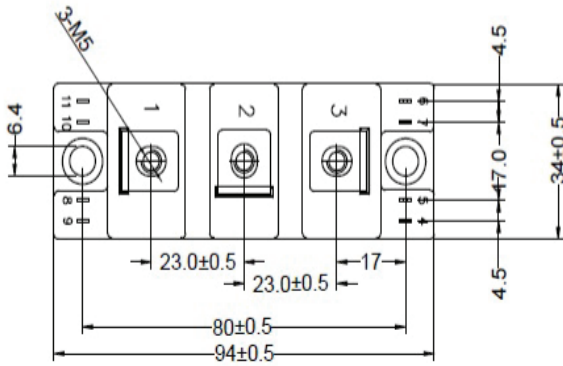
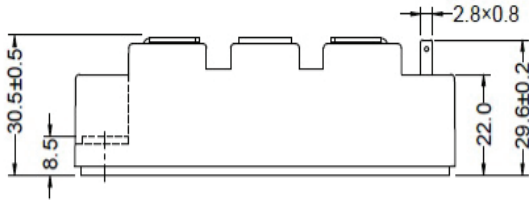


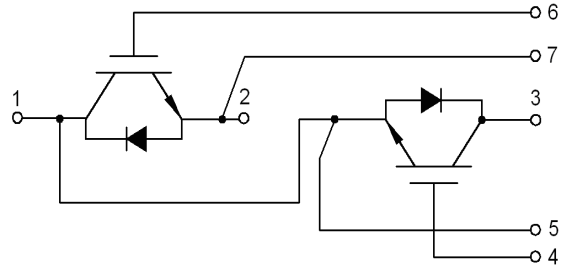
Figure 10: Transient Thermal Impedance of Diode and IGBT



Dimensions-Package S



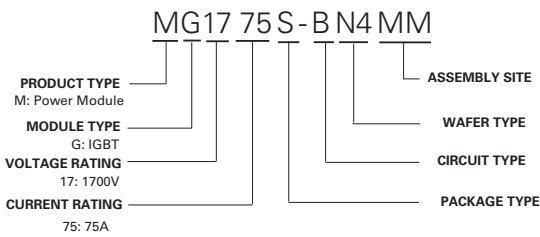
Circuit Diagram



Packing Options

| Part Number | Marking | Weight | Packing Mode | M.O.Q |
|---------------|---------------|--------|--------------|-------|
| MG1775S-BN4MM | MG1775S-BN4MM | 160g | Bulk Pack | 50 |

Part Numbering System



Part Marking System

