



PRELIMINARY

MG75HF12MIC1 **RoHS**
COMPLIANT

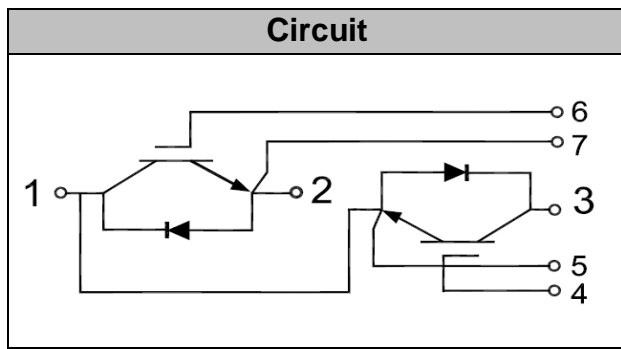
IGBT Modules



V_{CES} 1200V
I_C 75A

Applications

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



Features

- High short circuit capability, self limiting short circuit current
- IGBT CHIP (Trench+Field Stop technology)
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Low switching losses

Absolute Maximum Ratings (T_C = 25°C unless otherwise specified)

| Symbol | Description | Values | Units | |
|--------------------|---|---|------------|-----|
| V _{CES} | Collector - Emitter Voltage | 1200 | V | |
| V _{GES} | Gate-Emitter Voltage | ±20 | V | |
| I _C | DC Collector Current | T _C =25°C | 105 | A |
| | | T _C =80°C | 75 | A |
| I _{CM(1)} | Peak Collector Current Repetitive | T _J = 125°C | 150 | A |
| I _F | Diode Continuous Forward Current | T _J = 125°C | 75 | A |
| I _{FM} | Peak FWD Current Repetitive | | 150 | A |
| t _{SC} | Short Circuit Withstand Time | | >10 | µs |
| P _D | Maximum Power Dissipation (IGBT) | T _C = 25°C, T _{Jmax} =150°C | 625 | W |
| T _J | Maximum Junction Temperature | | 150 | °C |
| T _{JOP} | Operating Temperature | | -40 ~ +150 | °C |
| T _{stg} | Storage Temperature | | -40 ~ +125 | °C |
| Viso | Isolation Voltage (All Terminals Shorted) | f=50Hz, 1min | 3000 | V |
| Mounting Torque | Power Terminals Screw:M5 | | 3~5 | N*m |
| | Mounting Screw:M6 | | 4~6 | N*m |

Notes :

(1) Repetitive Rating: Pulse width limited by max. junction temperature.



Electrical Characteristics of IGBT ($T_J = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Item | Conditions | Values | | | Units |
|----------------------------------|--|--|--------|------|------|---------|
| | | | Min. | Typ. | Max. | |
| OFF Characteristics | | | | | | |
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage | $V_{GE}=0V, I_C=1mA$ | 1200 | | | V |
| I_{CES} | Collector Leakage Current | $V_{CE}=V_{CES}, V_{GE}=0V,$ | | | 100 | μA |
| | | $V_{CE}=V_{CES}, V_{GE}=0V,$ $T_J=125^\circ C$ | | | 1 | mA |
| I_{GES} | Gate Leakage Current | $V_{CE}=0V, V_{GE}=\pm 20V$ | -400 | | 400 | nA |
| ON Characteristics | | | | | | |
| $V_{GE(th)}$ | Gate - Emitter Threshold Voltage | $V_{CE}=V_{GE}, I_C=3mA$ | 5 | 6.2 | 6.8 | V |
| $V_{CE(sat)}$ | Collector – Emitter Saturation Voltage | $I_C=75A, V_{GE}=15V$ | | 1.75 | 2.1 | V |
| | | $I_C=75A, V_{GE}=15V,$ $T_J=125^\circ C$ | | 2 | 2.3 | V |
| Dynamic Characteristics | | | | | | |
| C_{ies} | Input Capacitance | $V_{CE} = 25V, V_{GE} = 0V,$ $f = 100kHz$ | | 6 | | nF |
| C_{oes} | Output Capacitance | | | 0.21 | | nF |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC} = 600V, I_C = 75A,$ $R_G = 3.5\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 25^\circ C$ | | 100 | | ns |
| t_r | Rise Time | | | 20 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | | 175 | | ns |
| T_f | Fall Time | | | 205 | | ns |
| E_{on} | Turn-on Switching Loss | | | 2.51 | | mJ |
| E_{off} | Turn-off Switching Loss | | | 3.87 | | mJ |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC} = 600V, I_C = 75A,$ $R_G = 3.5\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 125^\circ C$ | | 110 | | ns |
| t_r | Rise Time | | | 24 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | | 228 | | ns |
| T_f | Fall Time | | | 324 | | ns |
| E_{on} | Turn-on Switching Loss | | | 3.14 | | mJ |
| E_{off} | Turn-off Switching Loss | | | 6.16 | | mJ |
| Q_{ge} | Gate Charge | $V_{CC}=600V, I_C=75A,$ $V_{GE}=15V$ | | 138 | | nC |
| SCSOA | Short Circuit Safe Operating Area | $V_{CC} = 600V, V_{GE} \leq 15V,$ $T_J = 125^\circ C$ | 10 | | | μs |
| | | | | 234 | | A |



Electrical Characteristics of FWD ($T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Item | Conditions | Values | | | Units |
|----------|-------------------------------|--|---------------------------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| V_{FM} | Forward Voltage | $I_F = 75\text{A}$, $V_{GE} = 0\text{V}$ | $T_J = 25^\circ\text{C}$ | 1.7 | 2.0 | V |
| | | | $T_J = 125^\circ\text{C}$ | 1.79 | 2.1 | |
| t_{rr} | Reverse Recovery Time | $I_F = 75\text{A}$, $di/dt = 1400\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$ | $T_J = 25^\circ\text{C}$ | 110 | | ns |
| | | | $T_J = 125^\circ\text{C}$ | 176 | | |
| I_{rr} | Peak Reverse Recovery Current | $I_F = 75\text{A}$, $di/dt = 1400\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$ | $T_J = 25^\circ\text{C}$ | 88 | | A |
| | | | $T_J = 125^\circ\text{C}$ | 100 | | |
| Q_{rr} | Reverse Recovery Charge | $I_F = 75\text{A}$, $di/dt = 1400\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$ | $T_J = 25^\circ\text{C}$ | 4.52 | | μC |
| | | | $T_J = 125^\circ\text{C}$ | 7.21 | | |

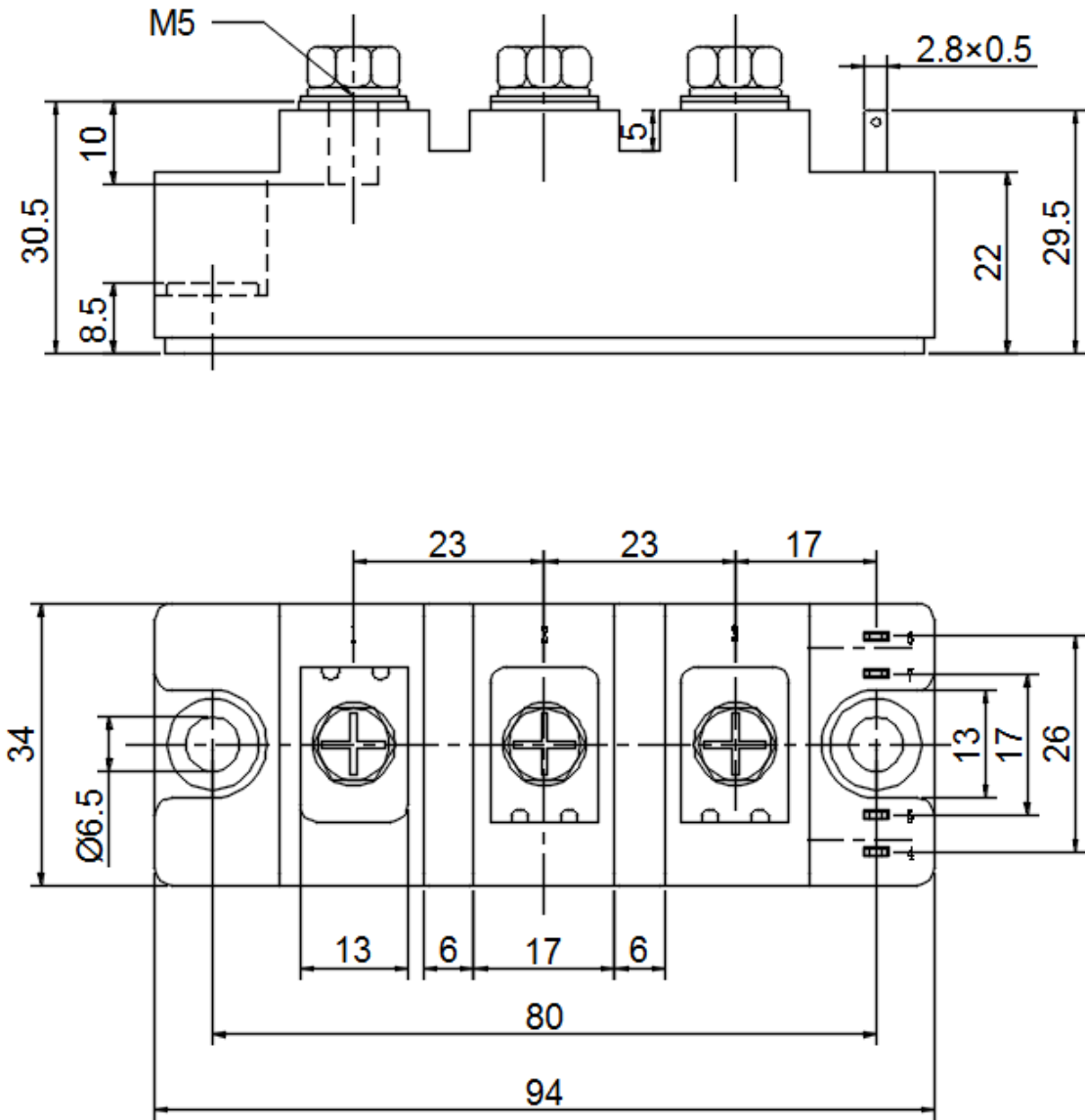
Thermal Resistance Characteristics

| Symbol | Description | Values | | | Units |
|-----------------|--|--------|------|------|---------------------------|
| | | Min. | Typ. | Max. | |
| $R_{\theta JC}$ | Junction-To-Case (IGBT Part, Per Leg) | | | 0.19 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Junction-To-Case (Diode Part, Per Leg) | | | 0.5 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta CS}$ | Case-To-Sink (Conductive Grease Applied) | | | 0.1 | $^\circ\text{C}/\text{W}$ |
| M_t | Power Terminals Screw:M5 | | 3 | 3.15 | N·m |
| M_s | Mounting Screw:M6 | | 5 | 5.75 | N·m |
| Weight | Weight Of Module | | 150 | 160 | g |



Package Outline Information

CASE: C1



Dimensions in mm