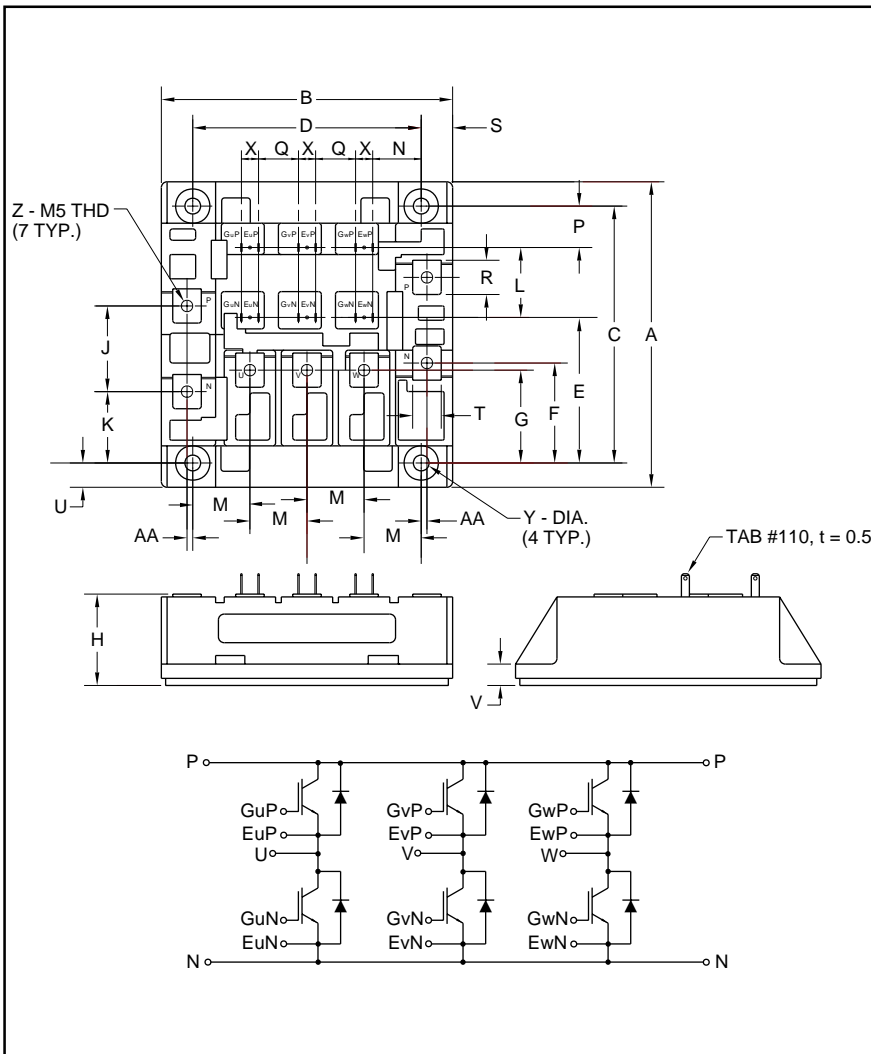


MITSUBISHI IGBT MODULES  
**CM75TF-24H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



**Description:**  
 Mitsubishi IGBT Modules are designed for use in switching applications. Each module consists of six IGBTs in a three phase bridge configuration, with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

- Features:**
- Low Drive Power
  - Low  $V_{CE(sat)}$
  - Discrete Super-Fast Recovery Free-Wheel Diode
  - High Frequency Operation
  - Isolated Baseplate for Easy Heat Sinking

- Applications:**
- AC Motor Control
  - Motion/Servo Control
  - UPS
  - Welding Power Supplies

**Ordering Information:**  
 Example: Select the complete part module number you desire from the table below -i.e. CM75TF-24H is a 1200V ( $V_{CES}$ ), 75 Ampere Six-IGBT Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 75                        | 24                        |

Outline Drawing and Circuit Diagram

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 4.21       | 107.0       |
| B          | 4.02       | 102.0       |
| C          | 3.543±0.01 | 90.0±0.25   |
| D          | 3.15±0.01  | 80.0±0.25   |
| E          | 2.01       | 51.0        |
| F          | 1.38       | 35.0        |
| G          | 1.28       | 32.5        |
| H          | 1.26 Max.  | 32.0 Max    |
| J          | 1.18       | 30.0        |
| K          | 0.98       | 25.0        |
| L          | 0.96       | 24.5        |
| M          | 0.79       | 20.0        |
| N          | 0.67       | 17.0        |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| P          | 0.57      | 14.5        |
| Q          | 0.55      | 14.0        |
| R          | 0.47      | 12.0        |
| S          | 0.43      | 11.0        |
| T          | 0.39      | 10.0        |
| U          | 0.33      | 8.5         |
| V          | 0.30      | 7.5         |
| X          | 0.24      | 6.0         |
| Y          | 0.22      | 5.5         |
| Z          | M5 Metric | M5          |
| AA         | 0.08      | 2.0         |

# CM75TF-24H

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

| Ratings   | Symbol    | CM75TF-24H  | Units            |
|---|-----------|-------------|------------------|
| Junction Temperature  | $T_j$     | -40 to 150  | $^\circ\text{C}$ |
| Storage Temperature   | $T_{stg}$ | -40 to 125  | $^\circ\text{C}$ |
| Collector-Emitter Voltage (G-E SHORT)   | $V_{CES}$ | 1200        | Volts            |
| Gate-Emitter Voltage (C-E SHORT)  | $V_{GES}$ | $\pm 20$    | Volts            |
| Collector Current ( $T_C = 25^\circ\text{C}$ )  | $I_C$     | 75          | Amperes          |
| Peak Collector Current  | $I_{CM}$  | 150*        | Amperes          |
| Emitter Current** ( $T_C = 25^\circ\text{C}$ )  | $I_E$     | 75          | Amperes          |
| Peak Emitter Current**  | $I_{EM}$  | 150*        | Amperes          |
| Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j \leq 150^\circ\text{C}$ ) | $P_c$     | 600         | Watts            |
| Mounting Torque, M5 Main Terminal   | -         | 1.47 ~ 1.96 | N · m            |
| Mounting Torque, M5 Mounting  | -         | 1.47 ~ 1.96 | N · m            |
| Weight  | -         | 830         | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)                                 | $V_{iso}$ | 2500        | Vrms             |

\*Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{j(max)}$  rating.  
\*\*Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

## Static Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics                      | Symbol        | Test Conditions  | Min. | Typ. | Max.  | Units         |
|--------------------------------------|---------------|--|------|------|-------|---------------|
| Collector-Cutoff Current             | $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$                       | -    | -    | 1.0   | mA            |
| Gate Leakage Current                 | $I_{GES}$     | $V_{GE} = V_{GES}$ , $V_{CE} = 0V$                       | -    | -    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 7.5\text{mA}$ , $V_{CE} = 10V$                    | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 75A$ , $V_{GE} = 15V$                             | -    | 2.5  | 3.4** | Volts         |
|                                      |               | $I_C = 75A$ , $V_{GE} = 15V$ , $T_j = 150^\circ\text{C}$ | -    | 2.25 | -     | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 600V$ , $I_C = 75A$ , $V_{GE} = 15V$           | -    | 375  | -     | nC            |
| Emitter-Collector Voltage            | $V_{EC}$      | $I_E = 75A$ , $V_{GE} = 0V$                              | -    | -    | 3.5   | Vrms          |

\*\* Pulse width and repetition rate should be such that device junction temperature rise is negligible.

## Dynamic Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics               | Symbol              | Test Conditions  | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|--|------|------|------|---------------|
| Input Capacitance             | $C_{ies}$           |  | -    | -    | 15   | nF            |
| Output Capacitance            | $C_{oes}$           | $V_{GE} = 0V$ , $V_{CE} = 10V$   | -    | -    | 5.3  | nF            |
| Reverse Transfer Capacitance  | $C_{res}$           |  | -    | -    | 3    | nF            |
| Resistive                     | Turn-on Delay Time  | $V_{CC} = 600V$ , $I_C = 75A$ ,<br>$V_{GE1} = V_{GE2} = 15V$ , $R_G = 4.2\Omega$ | -    | -    | 150  | ns            |
|                               | Rise Time           |  |      |      |      |               |
| Switching                     | Turn-off Delay Time | $V_{CC} = 600V$ , $I_C = 75A$ ,<br>$V_{GE1} = V_{GE2} = 15V$ , $R_G = 4.2\Omega$ | -    | -    | 250  | ns            |
|                               | Fall Time           |  |      |      |      |               |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 75A$ , $di_E/dt = -150A/\mu\text{s}$                                      | -    | -    | 250  | ns            |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 75A$ , $di_E/dt = -150A/\mu\text{s}$                                      | -    | 0.56 | -    | $\mu\text{C}$ |

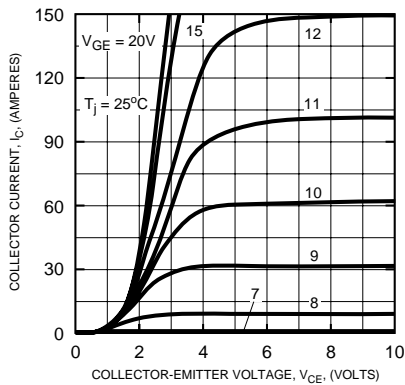
## Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics                      | Symbol        | Test Conditions                    | Min. | Typ. | Max.  | Units              |
|--------------------------------------|---------------|------------------------------------|------|------|-------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT                           | -    | -    | 0.21  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi                           | -    | -    | 0.47  | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | -    | -    | 0.025 | $^\circ\text{C/W}$ |

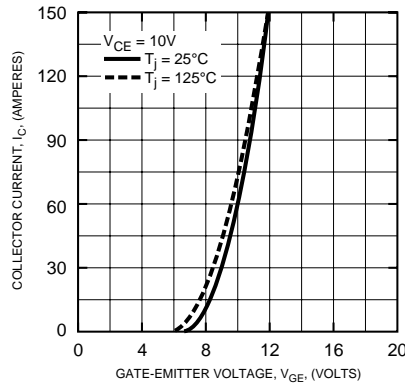
# CM75TF-24H

HIGH POWER SWITCHING USE  
INSULATED TYPE

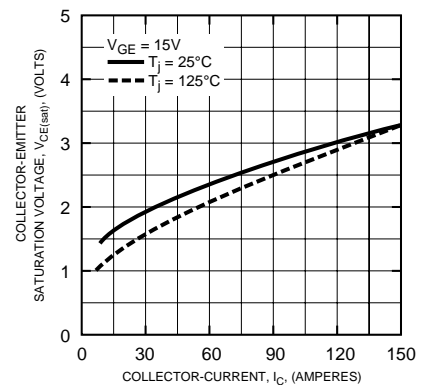
OUTPUT CHARACTERISTICS  
(TYPICAL)



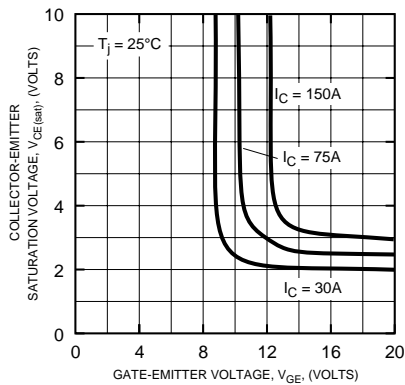
TRANSFER CHARACTERISTICS  
(TYPICAL)



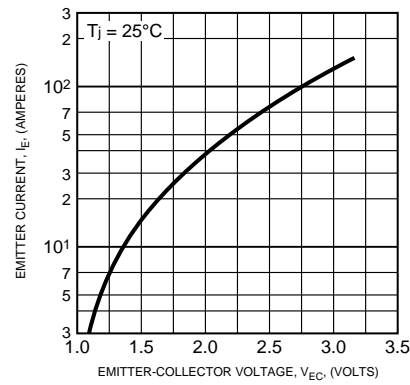
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



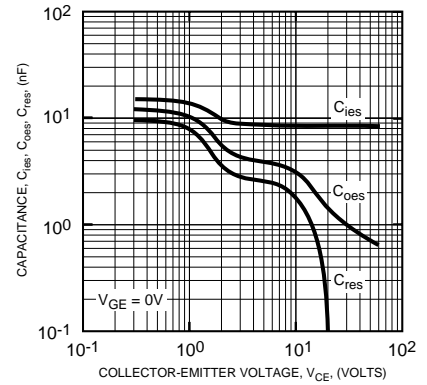
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



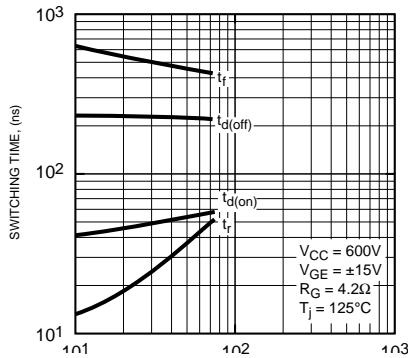
FREE-WHEEL DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



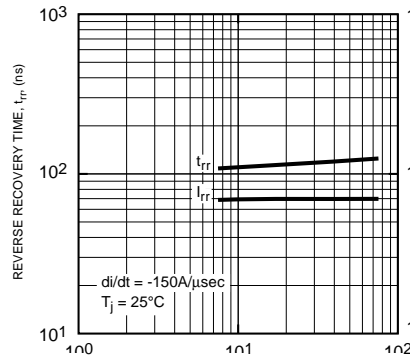
CAPACITANCE VS.  $V_{CE}$   
(TYPICAL)



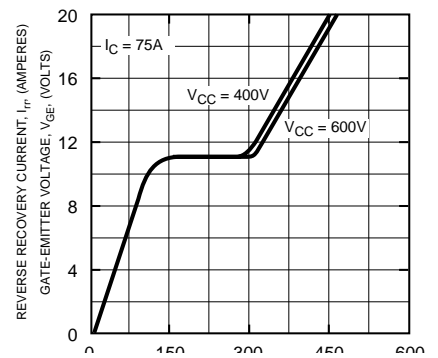
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE,  $V_{GE}$



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HIGH POWER SWITCHING USE  
INSULATED TYPE

