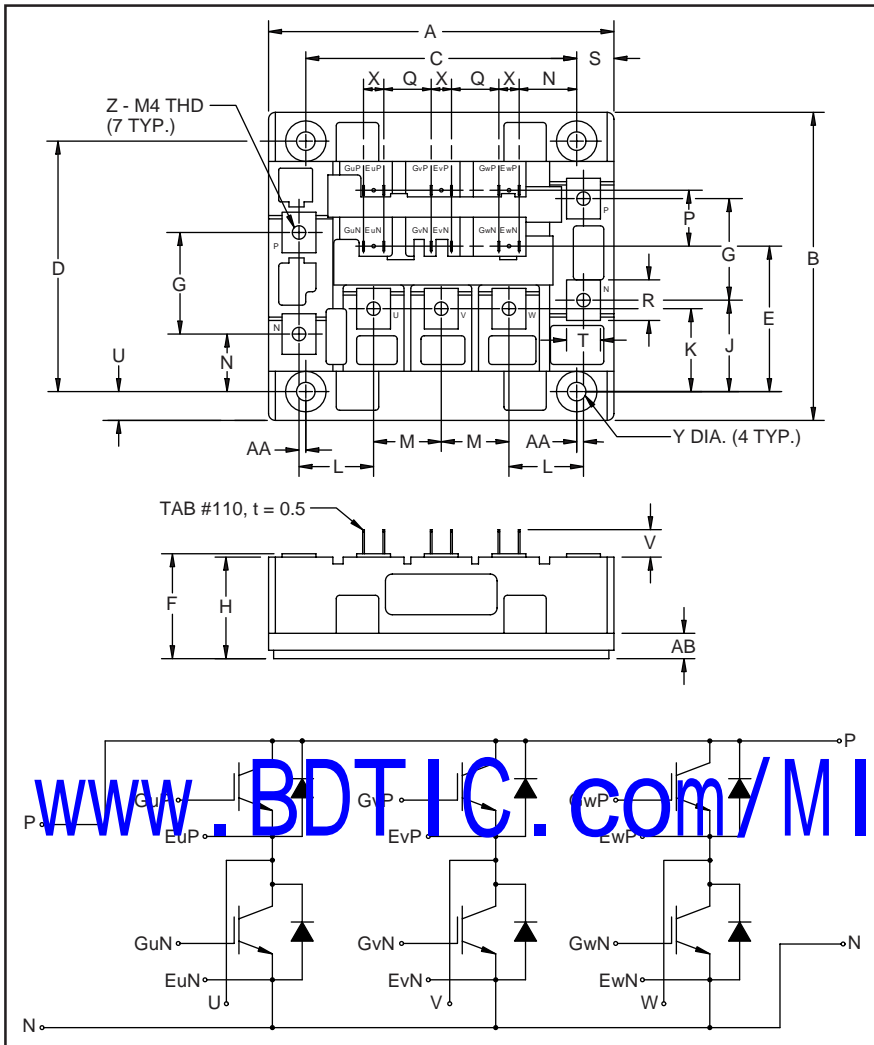


MITSUBISHI IGBT MODULES  
**CM100TF-12H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



Outline Drawing and Circuit Diagram

| Dimensions | Inches          | Millimeters   |
|------------|-----------------|---------------|
| A          | 4.02±0.02       | 102±0.5       |
| B          | 3.58±0.02       | 91.0±0.5      |
| C          | 3.15±0.01       | 80.0±0.25     |
| D          | 2.913±0.01      | 74.0±0.25     |
| E          | 1.69            | 43.0          |
| F          | 1.18+0.06/-0.02 | 30.0+1.5/-0.5 |
| G          | 1.18            | 30.0          |
| H          | 1.16            | 29.5          |
| J          | 1.06            | 27.0          |
| K          | 0.96            | 24.5          |
| L          | 0.87            | 22.0          |
| M          | 0.79            | 20.0          |
| N          | 0.67            | 17.0          |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| P          | 0.65      | 16.5        |
| 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          | 0.32      | 8.1         |
| X          | 0.24      | 6.0         |
| Y          | 0.22 Dia. | Dia. 5.5    |
| Z          | M4 Metric | M4          |
| AA         | 0.08      | 2.0         |
| AB         | 0.28      | 7.0         |



**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. CM100TF-12H is a 600V ( $V_{CES}$ ), 100 Ampere Six-IGBT Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 100                       | 12                        |

## CM100TF-12H

HIGH POWER SWITCHING USE  
INSULATED TYPEAbsolute Maximum Ratings,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified

|   | Symbol           | Ratings     | Units                     |
|---|------------------|-------------|---------------------------|
| Junction Temperature  | $T_j$            | -40 to 150  | $^\circ\text{C}$          |
| Storage Temperature   | $T_{\text{stg}}$ | -40 to 125  | $^\circ\text{C}$          |
| Collector-Emitter Voltage (G-E SHORT)   | $V_{\text{CES}}$ | 600         | Volts                     |
| Gate-Emitter Voltage (C-E SHORT)  | $V_{\text{GES}}$ | $\pm 20$    | Volts                     |
| Collector Current ( $T_C = 25\text{ }^\circ\text{C}$ )  | $I_C$            | 100         | Amperes                   |
| Peak Collector Current  | $I_{\text{CM}}$  | 200*        | Amperes                   |
| Emitter Current** ( $T_C = 25\text{ }^\circ\text{C}$ )  | $I_E$            | 100         | Amperes                   |
| Peak Emitter Current**  | $I_{\text{EM}}$  | 200*        | Amperes                   |
| Maximum Collector Dissipation ( $T_C = 25\text{ }^\circ\text{C}$ , $T_j \leq 150\text{ }^\circ\text{C}$ ) | $P_C$            | 400         | Watts                     |
| Mounting Torque, M4 Main Terminal   | -                | 0.98 ~ 1.47 | $\text{N} \cdot \text{m}$ |
| Mounting Torque, M5 Mounting  | -                | 1.47 ~ 1.96 | $\text{N} \cdot \text{m}$ |
| Weight  | -                | 540         | Grams                     |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)   | $V_{\text{iso}}$ | 2500        | $V_{\text{rms}}$          |

\*Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{j(\text{max})}$  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             | $I_{\text{CES}}$     | $V_{\text{CE}} = V_{\text{CES}}$ , $V_{\text{GE}} = 0\text{V}$                         | -    | -    | 1.0  | mA            |
| Gate Leakage Current                 | $I_{\text{GOS}}$     | $V_{\text{GE}} = V_{\text{GES}}$ , $V_{\text{CE}} = 0\text{V}$                         | -    | -    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{\text{GE(th)}}$  | $I_C = 10\text{mA}$ , $V_{\text{CE}} = 10\text{V}$                                     | 4.5  | 6.0  | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 100\text{A}$ , $V_{\text{GE}} = 15\text{V}$                                     | -    | 2.1  | 2.8  | Volts         |
|                                      |                      | $I_C = 100\text{A}$ , $V_{\text{GE}} = 15\text{V}$ , $T_j = 150\text{ }^\circ\text{C}$ | -    | 2.15 | -    | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 300\text{V}$ , $I_C = 100\text{A}$ , $V_{\text{GE}} = 15\text{V}$     | -    | 300  | -    | nC            |
| Emitter-Collector Voltage            | $V_{\text{EC}}$      | $I_E = 100\text{A}$ , $V_{\text{GE}} = 0\text{V}$                                      | -    | -    | 2.8  | Volts         |

\*\* 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

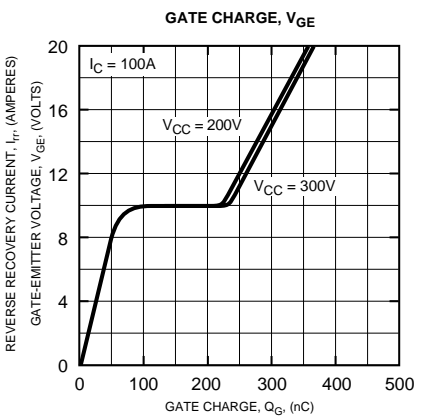
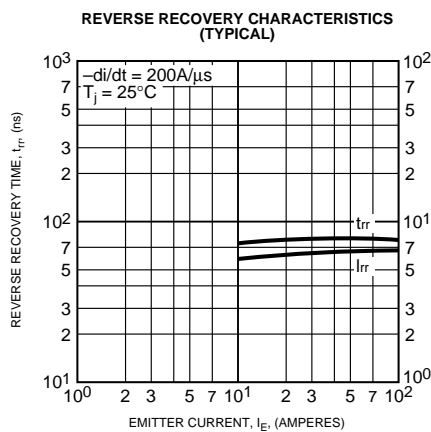
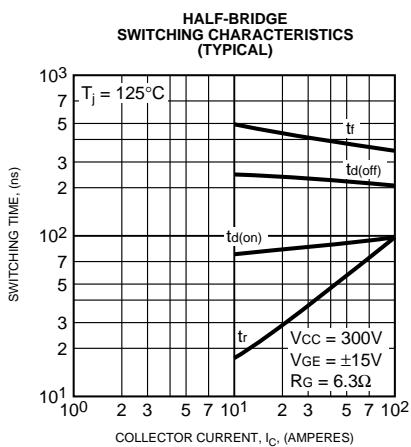
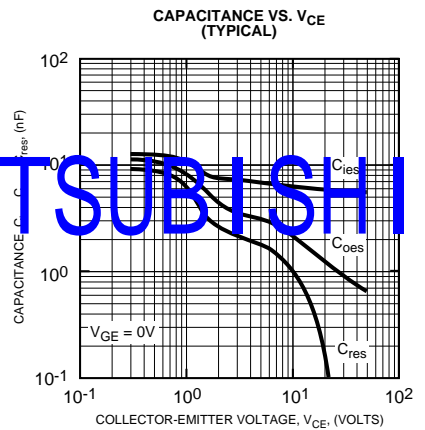
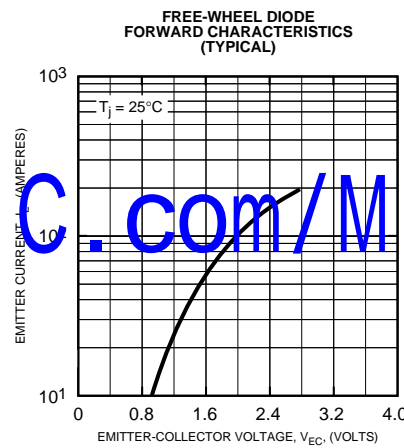
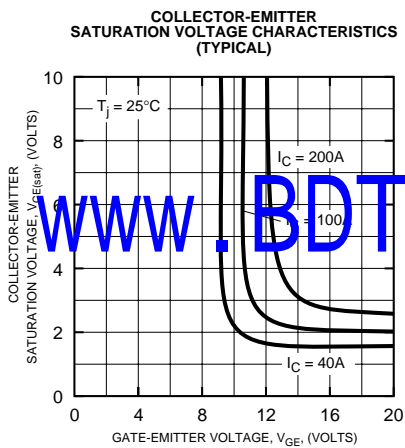
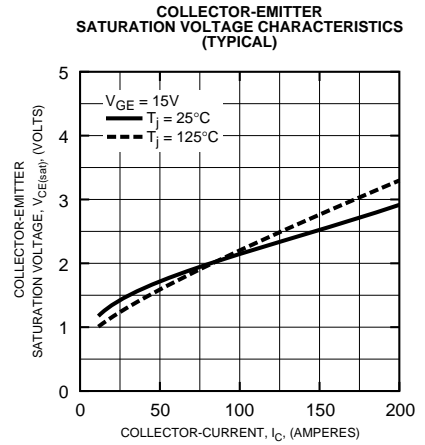
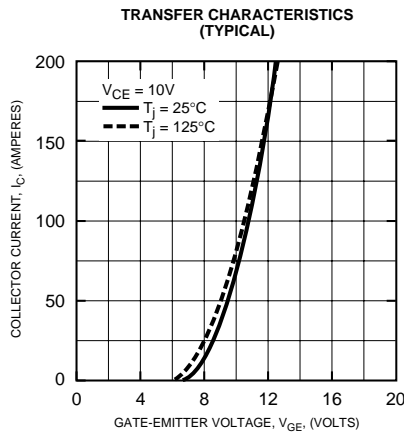
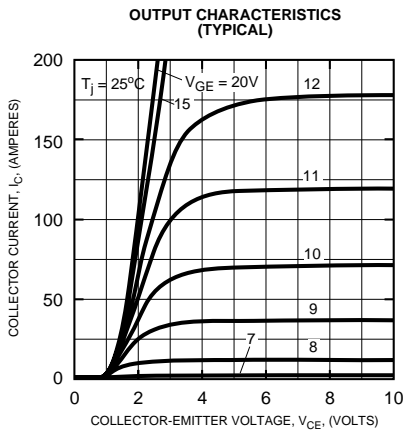
| Characteristics               | Symbol              | Test Conditions  | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|--|------|------|------|---------------|
| Input Capacitance             | $C_{\text{ies}}$    |  | -    | -    | 10   | nF            |
| Output Capacitance            | $C_{\text{oes}}$    | $V_{\text{GE}} = 0\text{V}$ , $V_{\text{CE}} = 10\text{V}$ | -    | -    | 3.5  | nF            |
| Reverse Transfer Capacitance  | $C_{\text{res}}$    |  | -    | -    | 2    | nF            |
| Resistive                     | Turn-on Delay Time  | $t_{\text{d(on)}}$   | -    | -    | 120  | ns            |
| Load                          | Rise Time           | $t_r$  | -    | -    | 300  | ns            |
| Switching                     | Turn-off Delay Time | $t_{\text{d(off)}}$  | -    | -    | 200  | ns            |
| Times                         | Fall Time           | $t_f$  | -    | -    | 300  | ns            |
| Diode Reverse Recovery Time   | $t_{\text{rr}}$     | $I_E = 100\text{A}$ , $di_E/dt = -200\text{A}/\mu\text{s}$ | -    | -    | 110  | ns            |
| Diode Reverse Recovery Charge | $Q_{\text{rr}}$     | $I_E = 100\text{A}$ , $di_E/dt = -200\text{A}/\mu\text{s}$ | -    | 0.27 | -    | $\mu\text{C}$ |

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 | $R_{\text{th(j-c)}}$ | Per IGBT                           | -    | -    | 0.31  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per FWDi                           | -    | -    | 0.70  | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{\text{th(c-f)}}$ | Per Module, Thermal Grease Applied | -    | -    | 0.033 | $^\circ\text{C}/\text{W}$ |

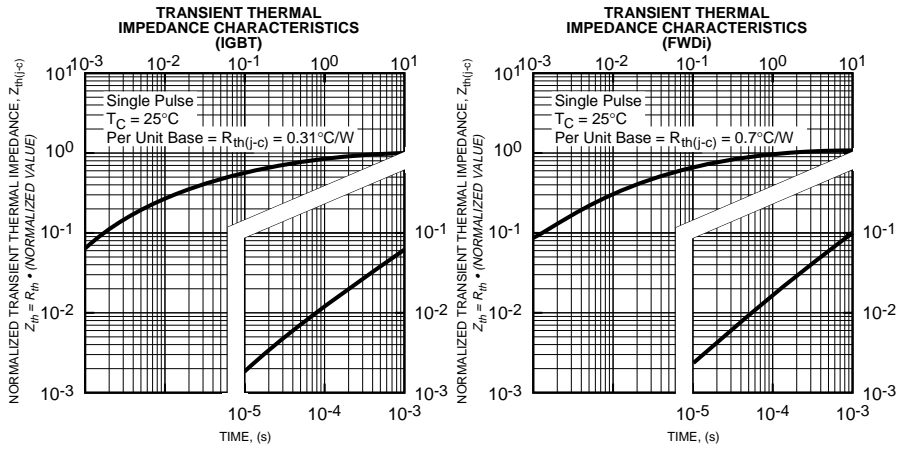
# CM100TF-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE



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