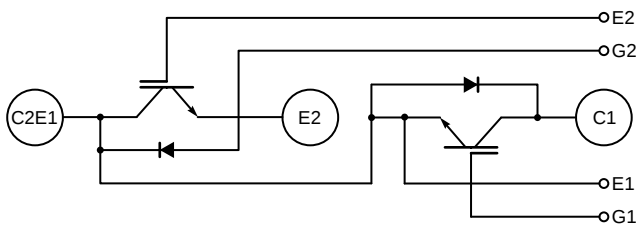
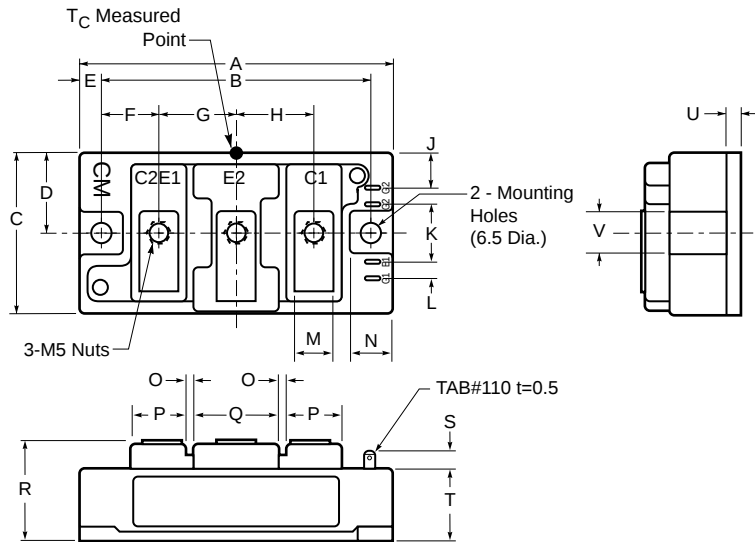


**MITSUBISHI IGBT MODULES**  
**CM200DU-12H**  
HIGH POWER SWITCHING USE  
INSULATED TYPE



**Outline Drawing and Circuit Diagram**

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| A          | 3.7       | 94.0        |
| B          | 3.15±0.01 | 80.0±0.25   |
| C          | 1.89      | 48.0        |
| D          | 0.94      | 24.0        |
| E          | 0.28      | 7.0         |
| F          | 0.67      | 17.0        |
| G          | 0.91      | 23.0        |
| H          | 0.91      | 23.0        |
| J          | 0.43      | 11.0        |
| K          | 0.71      | 18.0        |
| L          | 0.16      | 4.0         |

| Dimensions | Inches           | Millimeters    |
|------------|------------------|----------------|
| M          | 0.47             | 12.0           |
| N          | 0.53             | 13.5           |
| O          | 0.1              | 2.5            |
| P          | 0.63             | 16.0           |
| Q          | 0.98             | 25.0           |
| R          | 1.18 +0.04/-0.02 | 30.0 +1.0/-0.5 |
| S          | 0.3              | 7.5            |
| T          | 0.83             | 21.2           |
| U          | 0.16             | 4.0            |
| V          | 0.51             | 13.0           |



**Description:**

Mitsubishi IGBT Modules are designed for use in switching applications. Each module consists of two IGBTs in a half-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 module number you desire from the table - i.e. CM200DU-12H is a 600V ( $V_{CES}$ ), 200 Ampere Dual IGBT Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 200                       | 12                        |

**CM200DU-12H****HIGH POWER SWITCHING USE  
INSULATED TYPE****Absolute Maximum Ratings,  $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified**

| Ratings                                                                                       | Symbol           | CM200DU-12H | 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 ( $T_c = 25^{\circ}\text{C}$ )                                              | $I_c$            | 200         | Amperes                   |
| Peak Collector Current                                                                        | $I_{\text{CM}}$  | 400*        | Amperes                   |
| Emitter Current** ( $T_c = 25^{\circ}\text{C}$ )                                              | $I_E$            | 200         | Amperes                   |
| Peak Emitter Current**                                                                        | $I_{\text{EM}}$  | 400*        | Amperes                   |
| Maximum Collector Dissipation ( $T_c = 25^{\circ}\text{C}$ , $T_j \leq 150^{\circ}\text{C}$ ) | $P_c$            | 650         | Watts                     |
| Mounting Torque, M5 Main Terminal                                                             | —                | 2.5–3.5     | $\text{N} \cdot \text{m}$ |
| Mounting Torque, M6 Mounting                                                                  | —                | 3.5–4.5     | $\text{N} \cdot \text{m}$ |
| Weight                                                                                        | —                | 310         | 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    | mA            |
| Gate Leakage Voltage                 | $I_{\text{GES}}$     | $V_{\text{GE}} = V_{\text{GES}}$ , $V_{\text{CE}} = 0\text{V}$                     | —    | —    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{\text{GE(th)}}$  | $I_c = 20\text{mA}$ , $V_{\text{CE}} = 10\text{V}$                                 | 4.5  | 6    | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_c = 200\text{A}$ , $V_{\text{GE}} = 15\text{V}$ , $T_j = 25^{\circ}\text{C}$    | —    | 2.4  | 3.0  | Volts         |
|                                      |                      | $I_c = 200\text{A}$ , $V_{\text{GE}} = 15\text{V}$ , $T_j = 125^{\circ}\text{C}$   | —    | 2.6  | —    | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 300\text{V}$ , $I_c = 200\text{A}$ , $V_{\text{GE}} = 15\text{V}$ | —    | 400  | —    | nC            |
| Emitter-Collector Voltage**          | $V_{\text{EC}}$      | $I_E = 200\text{A}$ , $V_{\text{GE}} = 0\text{V}$                                  | —    | —    | 2.6  | Volts         |

\*\*Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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

| Characteristics                 | Symbol              | Test Conditions                                                                                                                            | Min. | Typ. | Max. | Units         |
|---------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance               | $C_{\text{ies}}$    | $V_{\text{CE}} = 10\text{V}$ , $V_{\text{GE}} = 0\text{V}$                                                                                 | —    | —    | 17.6 | nF            |
| Output Capacitance              | $C_{\text{oes}}$    |                                                                                                                                            | —    | —    | 9.6  | nF            |
| Reverse Transfer Capacitance    | $C_{\text{res}}$    |                                                                                                                                            | —    | —    | 2.6  | nF            |
| Resistive                       | Turn-on Delay Time  | $V_{\text{CC}} = 300\text{V}$ , $I_c = 200\text{A}$ ,<br>$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}$ ,<br>$R_G = 3.1\Omega$ , Resistive | —    | —    | 150  | ns            |
| Load                            | Rise Time           |                                                                                                                                            | —    | —    | 400  | ns            |
| Switch                          | Turn-off Delay Time | Load Switching Operation                                                                                                                   | —    | —    | 300  | ns            |
| Times                           | Fall Time           |                                                                                                                                            | —    | —    | 300  | ns            |
| Diode Reverse Recovery Time**   | $t_{\text{rr}}$     | $I_E = 200\text{A}$ , $di_E/dt = -400\text{A}/\mu\text{s}$                                                                                 | —    | —    | 160  | ns            |
| Diode Reverse Recovery Charge** | $Q_{\text{rr}}$     | $I_E = 200\text{A}$ , $di_E/dt = -400\text{A}/\mu\text{s}$                                                                                 | —    | 0.48 | —    | $\mu\text{C}$ |

\*\*Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

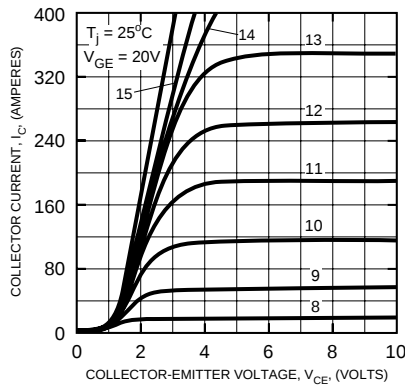
**Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified**

| Characteristics                      | Symbol                | Test Conditions                    | Min. | Typ.  | Max. | Units                       |
|--------------------------------------|-----------------------|------------------------------------|------|-------|------|-----------------------------|
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)Q}}$ | Per IGBT 1/2 Module                | —    | —     | 0.19 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)D}}$ | Per FWDi 1/2 Module                | —    | —     | 0.35 | $^{\circ}\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{\text{th(c-f)}}$  | Per Module, Thermal Grease Applied | —    | 0.035 | —    | $^{\circ}\text{C}/\text{W}$ |

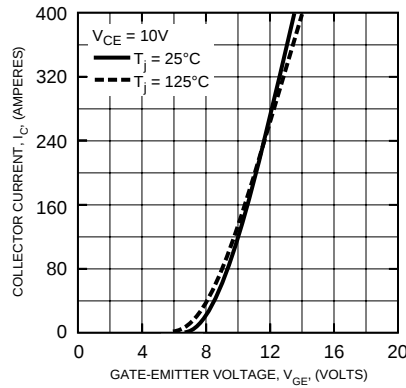
# CM200DU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

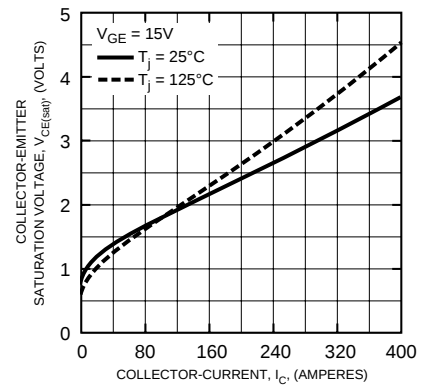
OUTPUT CHARACTERISTICS  
(TYPICAL)



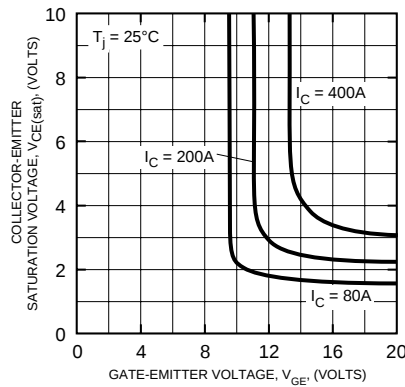
TRANSFER CHARACTERISTICS  
(TYPICAL)



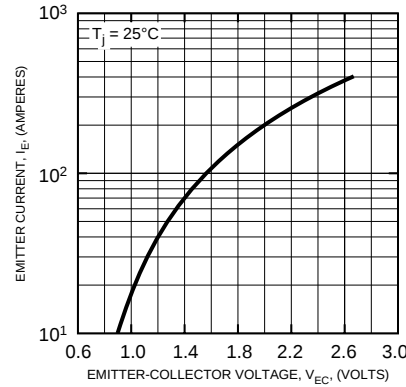
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



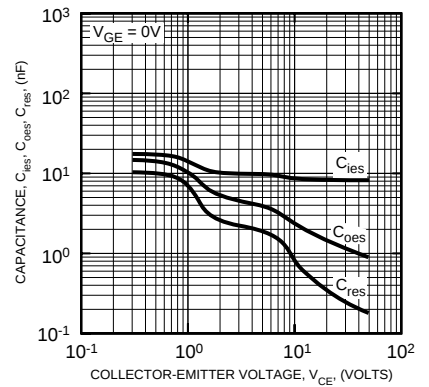
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



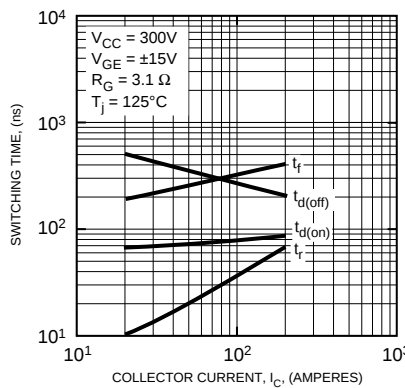
FREE-WHEEL DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



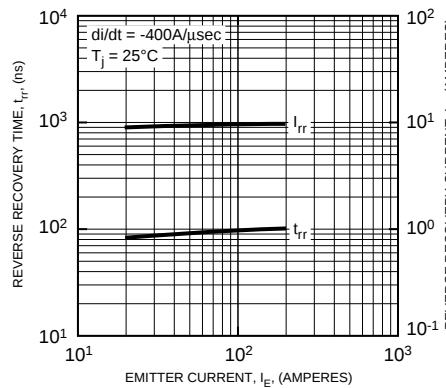
CAPACITANCE VS. Vce  
(TYPICAL)



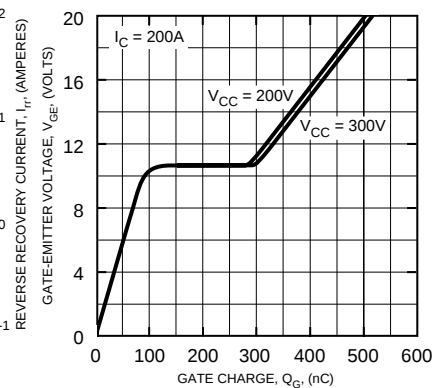
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE, Vge



# CM200DU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

