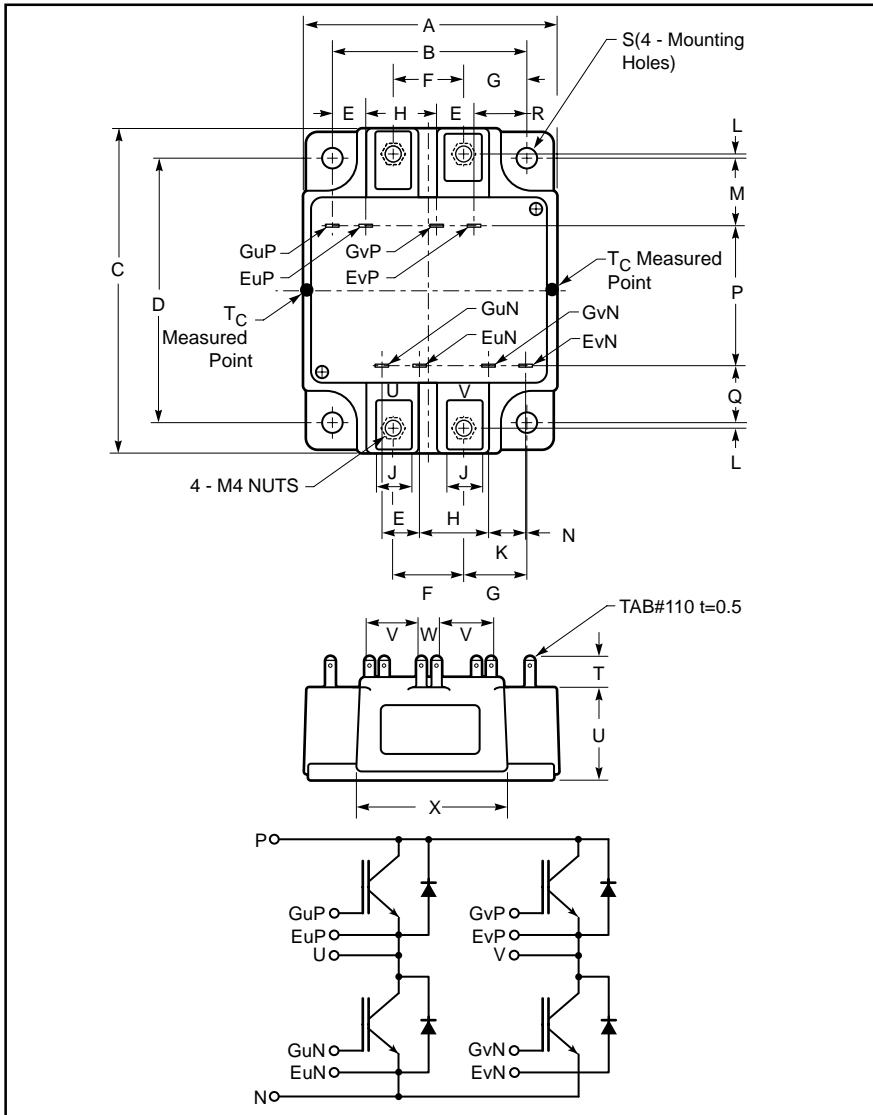


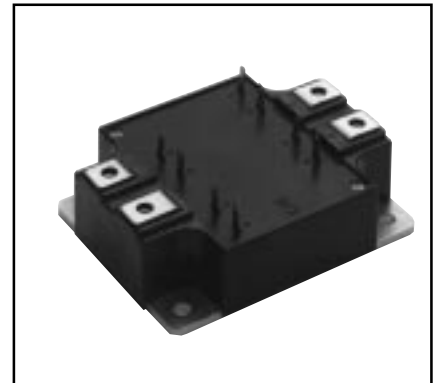
MITSUBISHI IGBT MODULES  
**CM100BU-12H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



Outline Drawing and Circuit Diagram

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| A          | 2.83      | 72.0        |
| B          | 2.17±0.01 | 55±0.25     |
| C          | 3.58      | 91.0        |
| D          | 2.91±0.01 | 74.0±0.25   |
| E          | 0.43      | 11.0        |
| F          | 0.79      | 20.0        |
| G          | 0.69      | 17.5        |
| H          | 0.75      | 19.1        |
| J          | 0.39      | 10.0        |
| K          | 0.41      | 10.5        |
| L          | 0.05      | 1.25        |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| M          | 0.74      | 18.7        |
| N          | 0.02      | 0.5         |
| P          | 1.55      | 39.3        |
| Q          | 0.63      | 16.0        |
| R          | 0.57      | 14.4        |
| S          | 0.22 Dia. | 5.5 Dia.    |
| T          | 0.32      | 8.1         |
| U          | 1.02      | 26.0        |
| V          | 0.59      | 15.0        |
| W          | 0.20      | 5.0         |
| X          | 1.61      | 41.0        |



**Description:**

Mitsubishi IGBT Modules are designed for use in switching applications. Each module consists of four IGBTs in an H-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. CM100BU-12H is a 600V ( $V_{CES}$ ), 100 Ampere Four-IGBT Module.

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

## CM100BU-12H

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

| Ratings  | Symbol    | CM100BU-12H | 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)                              | $V_{CES}$ | 600         | Volts            |
| Gate-Emitter Voltage (C-E SHORT)                                   | $V_{GES}$ | $\pm 20$    | Volts            |
| Collector Current ( $T_c = 25\text{ }^\circ\text{C}$ )             | $I_C$     | 100         | Amperes          |
| Peak Collector Current ( $T_j \leq 150\text{ }^\circ\text{C}$ )    | $I_{CM}$  | 200*        | Amperes          |
| Emitter Current** ( $T_c = 25\text{ }^\circ\text{C}$ )             | $I_E$     | 100         | Amperes          |
| Peak Emitter Current**   | $I_{EM}$  | 200*        | Amperes          |
| Maximum Collector Dissipation ( $T_c = 25\text{ }^\circ\text{C}$ ) | $P_C$     | 400         | Watts            |
| Mounting Torque, M4 Main Terminal                                  | –         | 1.3 ~ 1.7   | N · m            |
| Mounting Torque, M5 Mounting                                       | –         | 2.5 ~ 3.5   | N · m            |
| Weight   | –         | 390         | 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    | mA            |
| Gate Leakage Voltage                 | $I_{GES}$     | $V_{GE} = V_{GES}, V_{CE} = 0V$                                    | –    | –    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 10\text{mA}, V_{CE} = 10V$                                  | 4.5  | 6    | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100\text{A}, V_{GE} = 15V, T_j = 25\text{ }^\circ\text{C}$  | –    | 2.4  | 3.0  | Volts         |
|                                      |               | $I_C = 100\text{A}, V_{GE} = 15V, T_j = 125\text{ }^\circ\text{C}$ | –    | 2.6  | –    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 300V, I_C = 100\text{A}, V_{GE} = 15V$                   | –    | 200  | –    | nC            |
| Emitter-Collector Voltage*           | $V_{EC}$      | $I_E = 100\text{A}, V_{GE} = 0V$                                   | –    | –    | 2.6  | Volts         |

\* Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{j(max)}$  rating.Dynamic Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified

| Characteristics               | Symbol              | Test Conditions   | Min.                                | Typ. | Max. | Units         |    |
|-------------------------------|---------------------|---|-------------------------------------|------|------|---------------|----|
| Input Capacitance             | $C_{ies}$           |   | –                                   | –    | 8.8  | nF            |    |
| Output Capacitance            | $C_{oes}$           | $V_{CE} = 10V, V_{GE} = 0V$                             | –                                   | –    | 4.8  | nF            |    |
| Reverse Transfer Capacitance  | $C_{res}$           |   | –                                   | –    | 1.3  | nF            |    |
| Resistive                     | Turn-on Delay Time  | $t_{d(on)}$   | $V_{CC} = 300V, I_C = 100\text{A},$ | –    | –    | 100           | ns |
|                               | Rise Time           |   |                                     |      |      |               |    |
| Load                          | Turn-off Delay Time | $t_{d(off)}$  | $R_G = 6.3\Omega, \text{Resistive}$ | –    | –    | 200           | ns |
| Switch                        | Fall Time           | $t_f$   | Load Switching Operation            | –    | –    | 300           | ns |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 100\text{A}, di_E/dt = -200\text{A}/\mu\text{s}$ | –                                   | –    | 160  | ns            |    |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 100\text{A}, di_E/dt = -200\text{A}/\mu\text{s}$ | –                                   | 0.24 | –    | $\mu\text{C}$ |    |

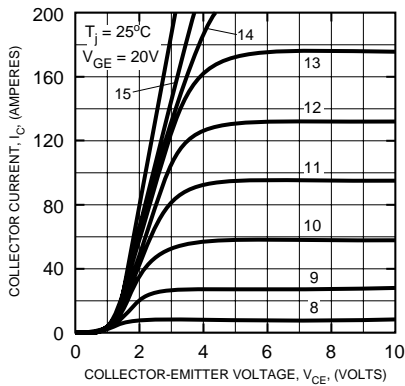
Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified

| Characteristics                      | Symbol         | Test Conditions                    | Min. | Typ.  | Max. | Units                     |
|--------------------------------------|----------------|------------------------------------|------|-------|------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)Q}$ | Per IGBT 1/4 Module                | –    | –     | 0.31 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$ | Per FWDi 1/4 Module                | –    | –     | 0.7  | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$  | Per Module, Thermal Grease Applied | –    | 0.025 | –    | $^\circ\text{C}/\text{W}$ |

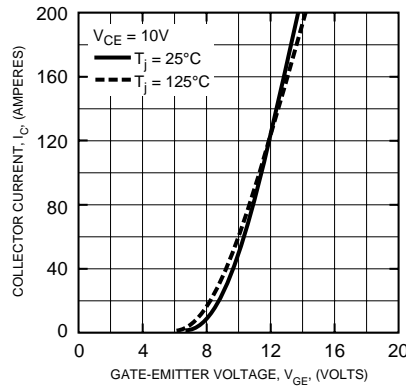
# CM100BU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

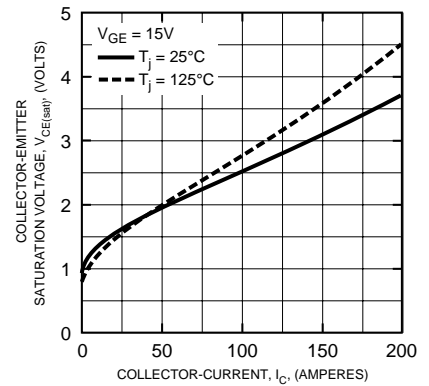
OUTPUT CHARACTERISTICS  
(TYPICAL)



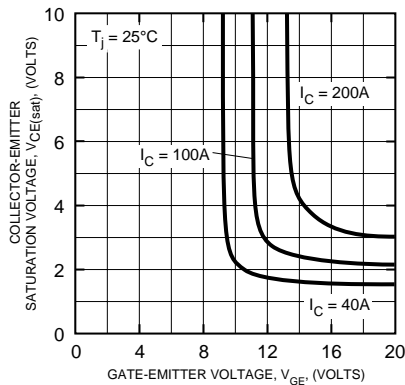
TRANSFER CHARACTERISTICS  
(TYPICAL)



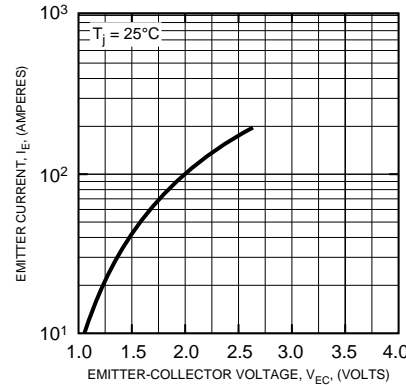
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



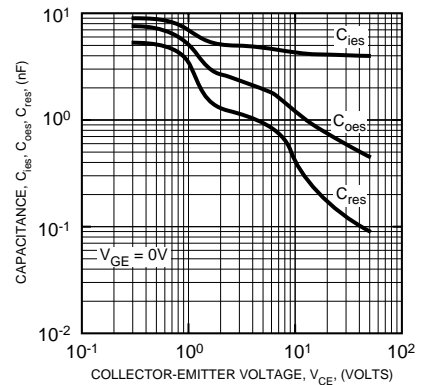
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



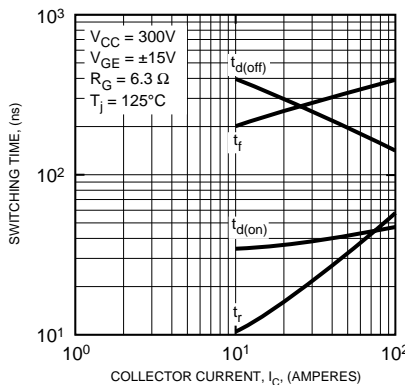
FREE-WHEEL DIODE FORWARD CHARACTERISTICS  
(TYPICAL)



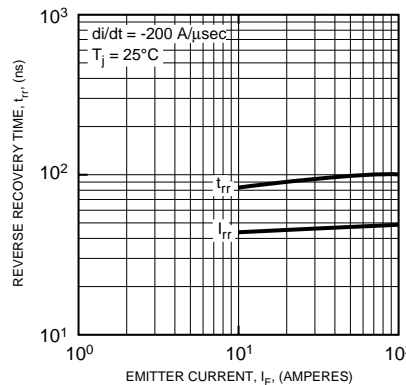
CAPACITANCE VS. V\_CE  
(TYPICAL)



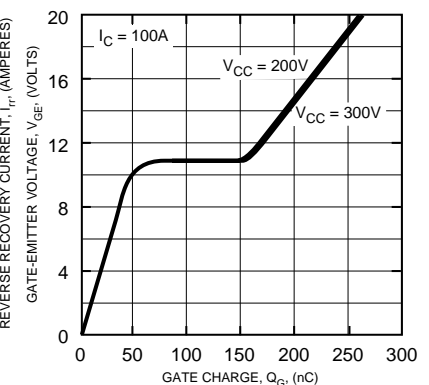
HALF-BRIDGE SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE, V\_GE



# CM100BU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

