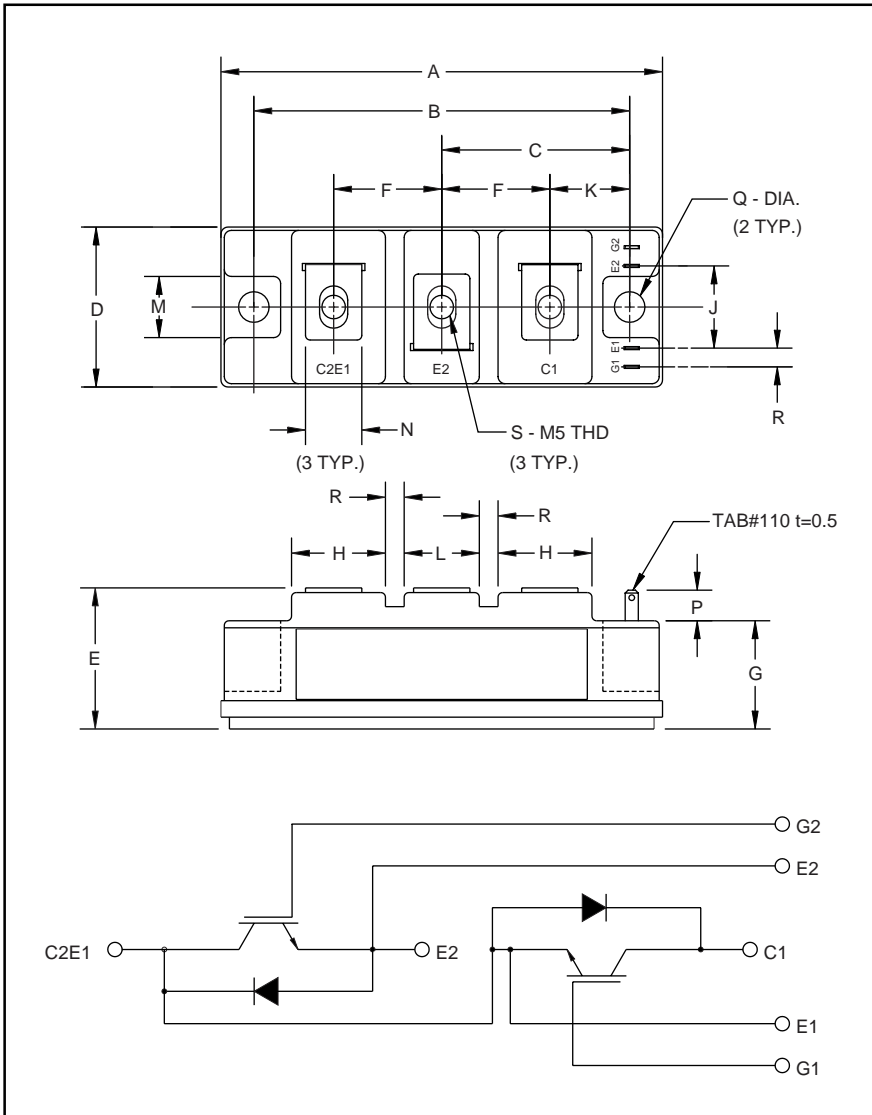


# MITSUBISHI IGBT MODULES

## CM100DY-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE



Outline Drawing and Circuit Diagram

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 3.70       | 94.0        |
| B          | 3.150±0.01 | 80.0±0.25   |
| C          | 1.57       | 40.0        |
| D          | 1.34       | 34.0        |
| E          | 1.22 Max.  | 31.0 Max.   |
| F          | 0.90       | 23.0        |
| G          | 0.85       | 21.5        |
| H          | 0.79       | 20.0        |
| J          | 0.71       | 18.0        |

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| K          | 0.67       | 17.0        |
| L          | 0.63       | 16.0        |
| M          | 0.51       | 13.0        |
| N          | 0.47       | 12.0        |
| P          | 0.28       | 7.0         |
| Q          | 0.256 Dia. | Dia. 6.5    |
| R          | 0.16       | 4.0         |
| S          | M5 Metric  | M5          |



### 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 part module number you desire from the table below -i.e. CM100DY-12H is a 600V ( $V_{CES}$ ), 100 Ampere Dual IGBT Module.

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

## CM100DY-12H

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

| Ratings   | Symbol           | CM100DY-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 ( $T_C = 25\text{ }^\circ\text{C}$ )  | $I_C$            | 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, M5 Main Terminal   | -                | 1.47 ~ 1.96 | N · m            |
| Mounting Torque, M6 Mounting  | -                | 1.96 ~ 2.94 | N · m            |
| Weight  | -                | 190         | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)   | $V_{\text{iso}}$ | 2500        | Vrms             |

\*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                 | $I_{\text{GES}}$     | $V_{\text{GE}} = V_{\text{GES}}$ , $V_{\text{CE}} = 0\text{V}$                         | -    | -    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{\text{GE(th)}}$  | $I_C = 10\text{mA}$ , $V_{\text{CE}} = 10\text{V}$                                     | 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            | $C_{\text{oes}}$    | $V_{\text{GE}} = 0$ , $V_{\text{CE}} = 10\text{V}$  | -    | -    | 3.5  | nF            |                     |
| Reverse Transfer Capacitance  | $C_{\text{res}}$    |   | -    | -    | 2    | nF            |                     |
| Resistive                     | Turn-on Delay Time  | $V_{\text{CC}} = 300\text{V}$ , $I_C = 100\text{A}$ ,<br>$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}$ , $R_G = 6.3\Omega$ | -    | -    | 120  | ns            |                     |
| Load                          | Rise Time           |   |      |      |      |               | $t_{\text{d(on)}}$  |
| Switch                        | Turn-off Delay Time |   |      |      |      |               | $t_r$               |
| Times                         | Fall Time           |   |      |      |      |               | $t_{\text{d(off)}}$ |
| 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 | -    | $\mu\text{C}$ |                     |

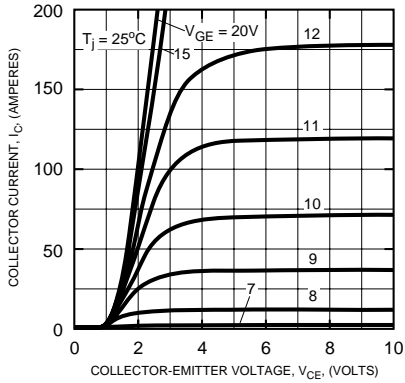
Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified

| 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 | -    | -    | 0.075 | $^\circ\text{C}/\text{W}$ |

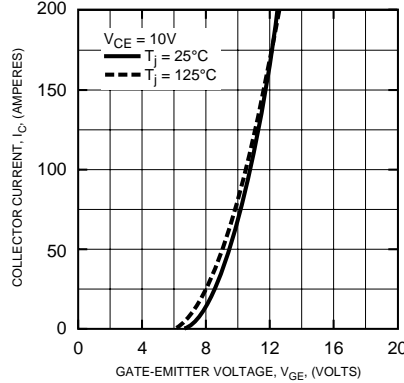
# CM100DY-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

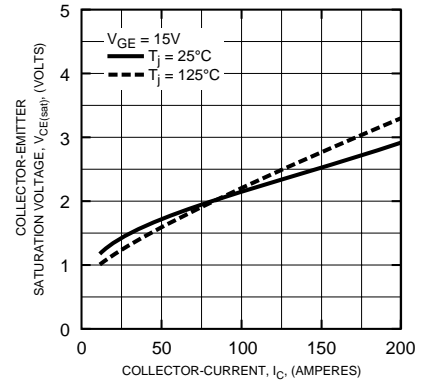
**OUTPUT CHARACTERISTICS (TYPICAL)**



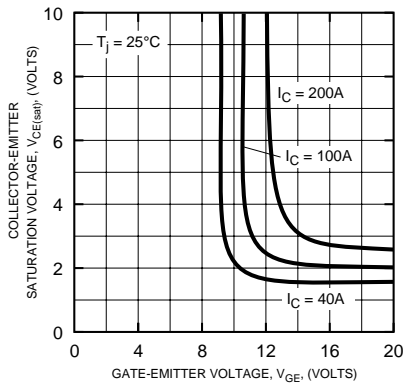
**TRANSFER CHARACTERISTICS (TYPICAL)**



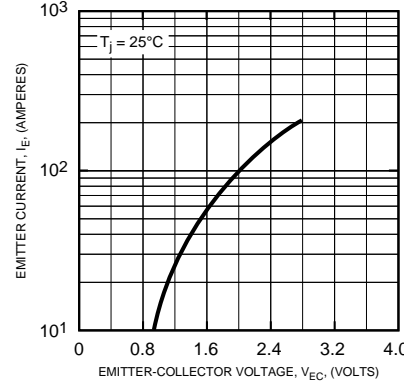
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



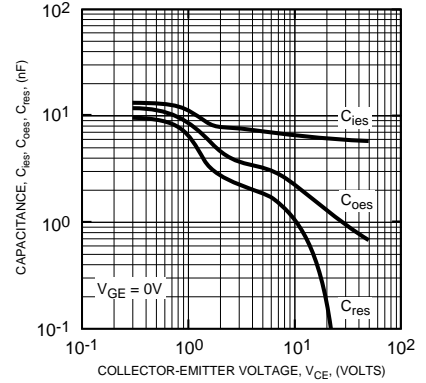
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



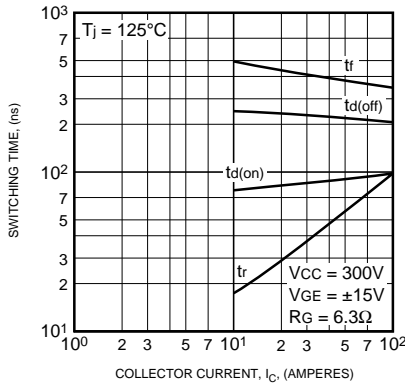
**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)**



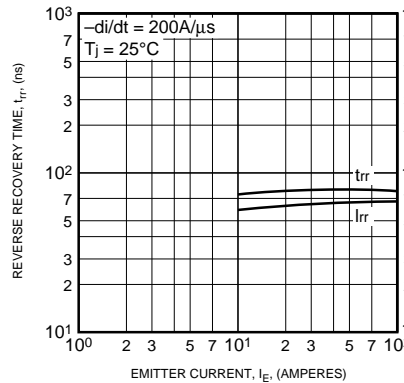
**CAPACITANCE VS.  $V_{CE}$  (TYPICAL)**



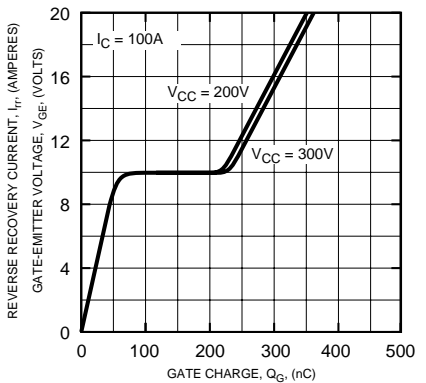
**HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)**



**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**



**GATE CHARGE,  $V_{GE}$**



# CM100DY-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

