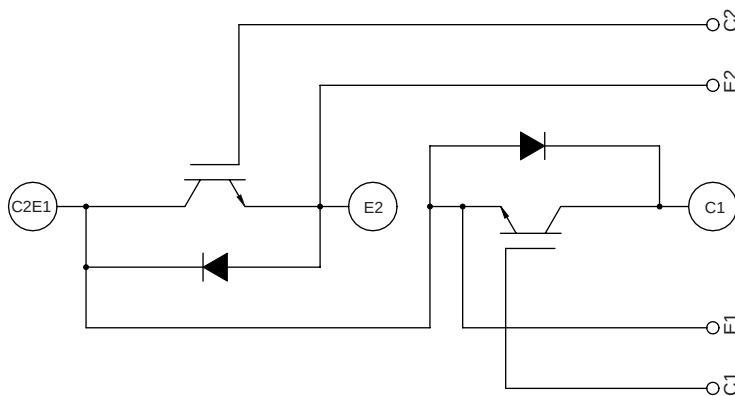
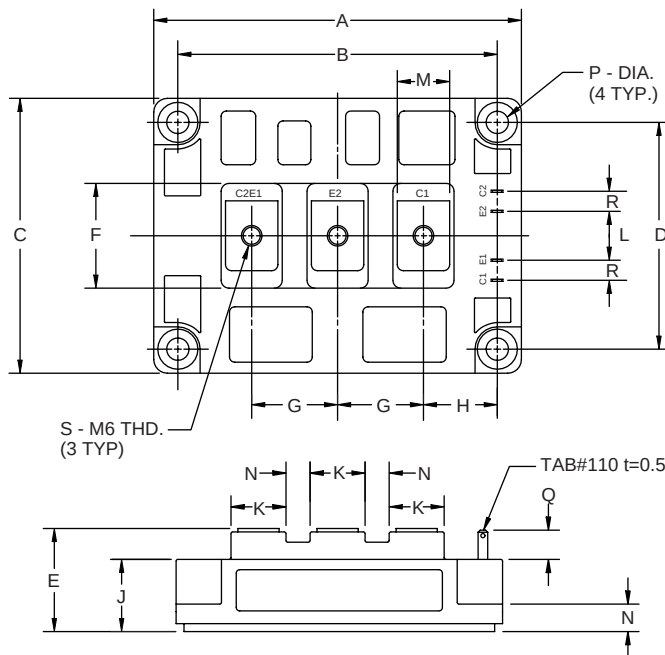


**MITSUBISHI IGBT MODULES**  
**CM300DY-24H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



**Outline Drawing and Circuit Diagram**

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 4.33       | 110.0       |
| B          | 3.661±0.01 | 93.0±0.25   |
| C          | 3.15       | 80.0        |
| D          | 2.441±0.01 | 62.0±0.25   |
| E          | 1.18 Max.  | 30.0 Max.   |
| F          | 1.18       | 30.0        |
| G          | 0.98       | 25.0        |
| H          | 0.85       | 21.5        |
| J          | 0.83       | 21.2        |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| K          | 0.71      | 18.0        |
| L          | 0.59      | 15.0        |
| M          | 0.55      | 14.0        |
| N          | 0.28      | 7.0         |
| P          | 0.26 Dia. | Dia. 6.5    |
| Q          | 0.33      | 8.5         |
| R          | 0.24      | 6.0         |
| S          | M6 Metric | M6          |



**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. CM300DY-24H is a 1200V ( $V_{CES}$ ), 300 Ampere Dual IGBT Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 300                       | 24                        |

# CM300DY-24H

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

| Ratings                                                                                       | Symbol    | CM300DY-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 ( $T_C = 25^{\circ}\text{C}$ )                                              | $I_C$     | 300         | Amperes            |
| Peak Collector Current                                                                        | $I_{CM}$  | 600*        | Amperes            |
| Emitter Current** ( $T_C = 25^{\circ}\text{C}$ )                                              | $I_E$     | 300         | Amperes            |
| Peak Emitter Current**                                                                        | $I_{EM}$  | 600*        | Amperes            |
| Maximum Collector Dissipation ( $T_C = 25^{\circ}\text{C}$ , $T_j \leq 150^{\circ}\text{C}$ ) | $P_C$     | 2100        | Watts              |
| Mounting Torque, M6 Main Terminal                                                             | —         | 1.96 ~ 2.94 | N · m              |
| Mounting Torque, M6 Mounting                                                                  | —         | 1.96 ~ 2.94 | N · m              |
| Weight                                                                                        | —         | 500         | 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       | $V_{GE(th)}$  | $I_C = 30\text{mA}$ , $V_{CE} = 10V$                               | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 300\text{A}$ , $V_{GE} = 15V$                               | —    | 2.5  | 3.4** | Volts         |
|                                      |               | $I_C = 300\text{A}$ , $V_{GE} = 15V$ , $T_j = 150^{\circ}\text{C}$ | —    | 2.25 | —     | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 600V$ , $I_C = 300\text{A}$ , $V_{GE} = 15V$             | —    | 1500 | —     | nC            |
| Emitter-Collector Voltage            | $V_{EC}$      | $I_E = 300\text{A}$ , $V_{GE} = 0V$                                | —    | —    | 3.5   | 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             | $C_{ies}$           | $V_{GE} = 0V$ , $V_{CE} = 10V$                                                           | —    | —    | 60   | nF            |
| Output Capacitance            | $C_{oes}$           |                                                                                          | —    | —    | 21   | nF            |
| Reverse Transfer Capacitance  | $C_{res}$           |                                                                                          | —    | —    | 12   | nF            |
| Resistive                     | Turn-on Delay Time  | $V_{CC} = 600V$ , $I_C = 300\text{A}$ ,<br>$V_{GE1} = V_{GE2} = 15V$ , $R_G = 1.0\Omega$ | —    | —    | 250  | ns            |
| Load                          | Rise Time           |                                                                                          | —    | —    | 500  | ns            |
| Switching                     | Turn-off Delay Time |                                                                                          | —    | —    | 350  | ns            |
| Times                         | Fall Time           |                                                                                          | —    | —    | 350  | ns            |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 300\text{A}$ , $di_E/dt = -600\text{A}/\mu\text{s}$                               | —    | —    | 250  | ns            |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 300\text{A}$ , $di_E/dt = -600\text{A}/\mu\text{s}$                               | —    | 2.23 | —    | $\mu\text{C}$ |

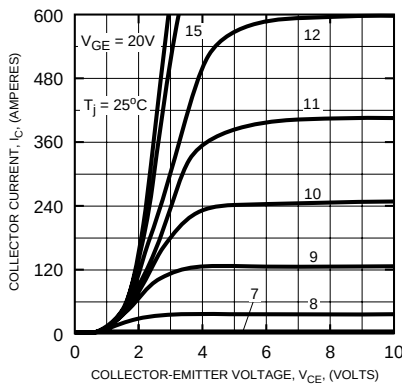
## Thermal and Mechanical Characteristics, $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

| Characteristics                      | Symbol        | Test Conditions                    | Min. | Typ. | Max.  | Units                |
|--------------------------------------|---------------|------------------------------------|------|------|-------|----------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT                           | —    | —    | 0.06  | $^{\circ}\text{C}/W$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi                           | —    | —    | 0.12  | $^{\circ}\text{C}/W$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | —    | —    | 0.035 | $^{\circ}\text{C}/W$ |

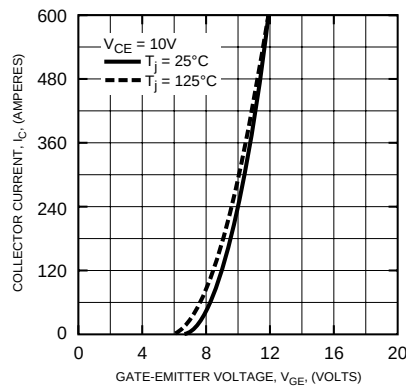
# CM300DY-24H

HIGH POWER SWITCHING USE  
INSULATED TYPE

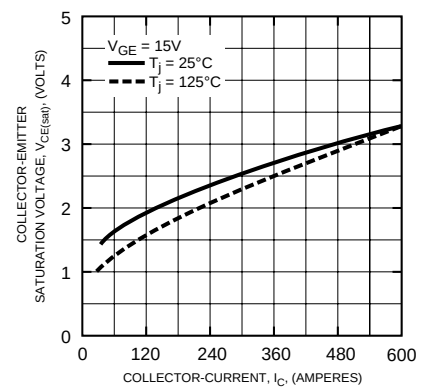
OUTPUT CHARACTERISTICS  
(TYPICAL)



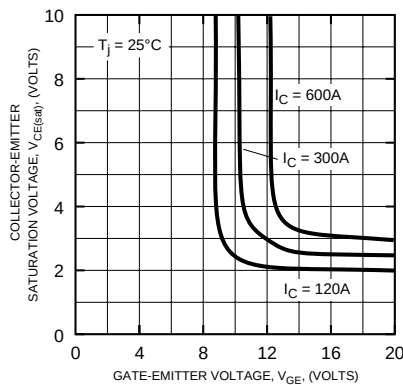
TRANSFER CHARACTERISTICS  
(TYPICAL)



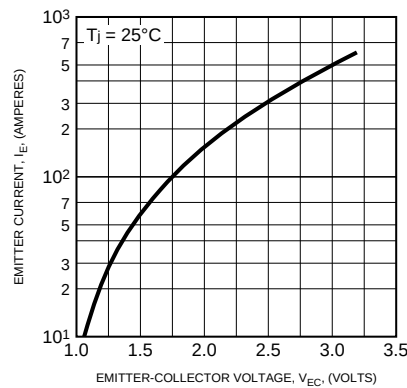
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



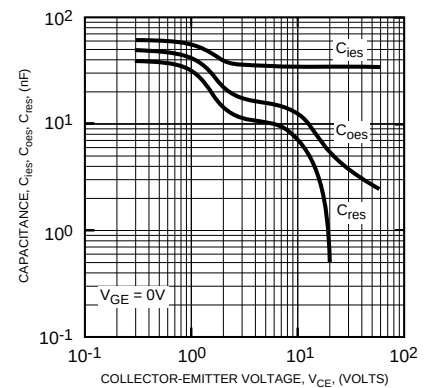
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



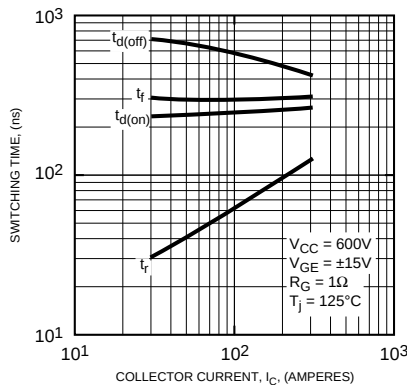
FREE-WHEEL DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



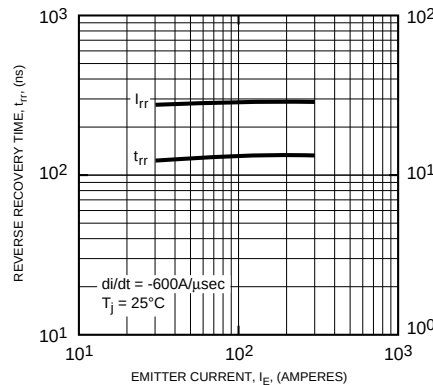
CAPACITANCE VS.  $V_{CE}$   
(TYPICAL)



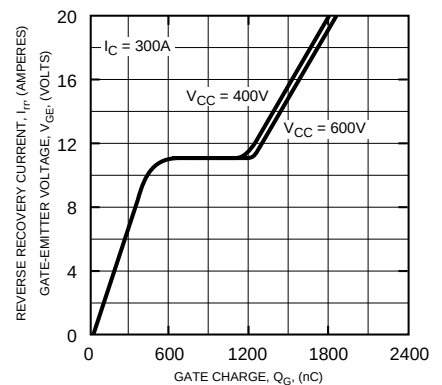
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE,  $V_{GE}$



# CM300DY-24H

HIGH POWER SWITCHING USE  
INSULATED TYPE

