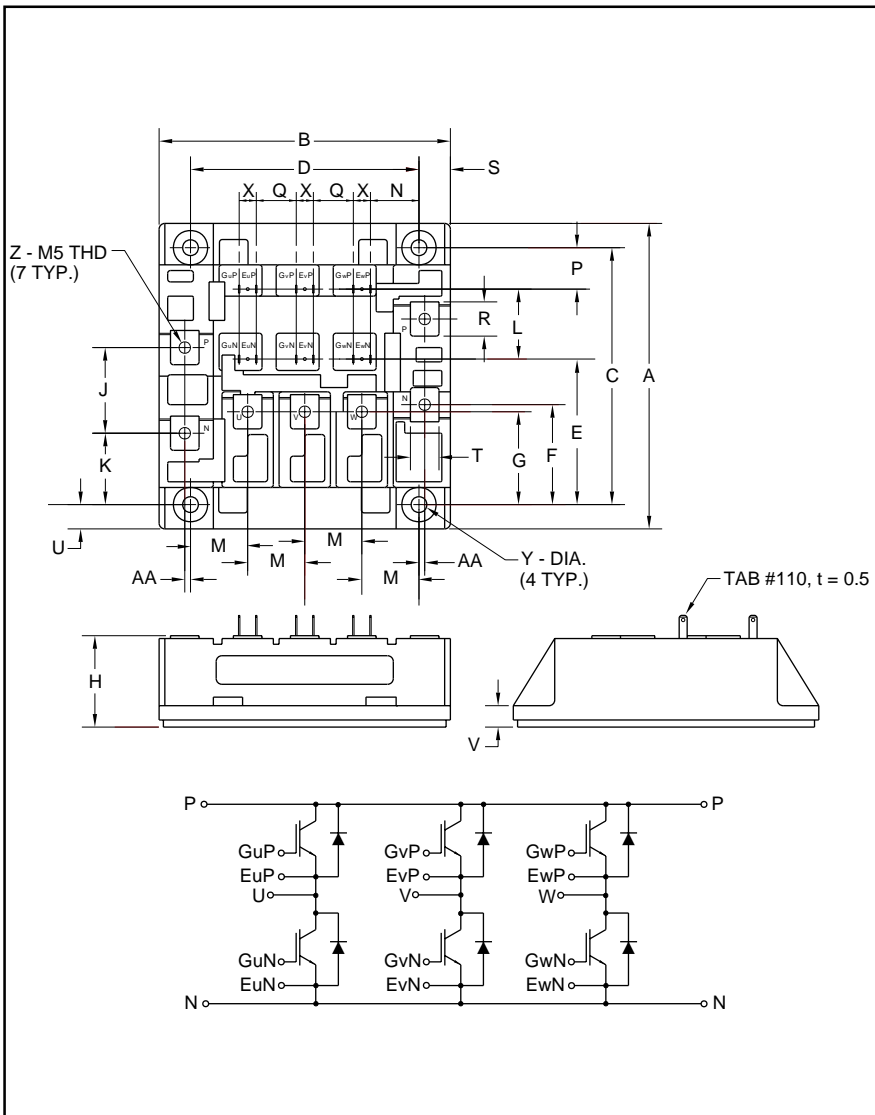


MITSUBISHI IGBT MODULES
CM100TF-28H
 HIGH POWER SWITCHING USE
 INSULATED TYPE



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-28H is a 1400V (V_{CES}), 100 Ampere Six-IGBT Module.

| Type | Current Rating Amperes | V_{CES} Volts (x 50) |
|------|---------------------------|---------------------------|
| CM | 100 | 28 |

Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| A | 4.21 | 107.0 |
| B | 4.02 | 102.0 |
| C | 3.54±0.01 | 90.0±0.25 |
| D | 3.15±0.01 | 80.0±0.25 |
| E | 2.01 | 51.0 |
| F | 1.38 | 35.0 |
| G | 1.28 | 32.5 |
| H | 1.26 Max. | 32.0 Max |
| J | 1.18 | 30.0 |
| K | 0.98 | 25.0 |
| L | 0.96 | 24.5 |
| M | 0.79 | 20.0 |
| N | 0.67 | 17.0 |

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| P | 0.57 | 14.5 |
| 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 | 0.30 | 7.5 |
| X | 0.24 | 6.0 |
| Y | 0.22 | 5.5 |
| Z | M5 Metric | M5 |
| AA | 0.08 | 2.0 |

CM100TF-28H

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

| Ratings | Symbol | CM100TF-28H | 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} | 1400 | Volts |
| Gate-Emitter Voltage (C-E-SHORT) | V_{GES} | ± 20 | Volts |
| Collector Current ($T_C = 25\text{ }^\circ\text{C}$) | I_C | 100 | Amperes |
| Peak Collector Current | 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 ($T_C = 25\text{ }^\circ\text{C}$, $T_j \leq 150\text{ }^\circ\text{C}$) | P_c | 780 | Watts |
| Mounting Torque, M5 Main Terminal | - | 1.47 ~ 1.96 | N · m |
| Mounting Torque, M5 Mounting | - | 1.47 ~ 1.96 | N · m |
| Weight | - | 830 | 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 | μA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $I_C = 10\text{mA}$, $V_{CE} = 10V$ | 5.0 | 6.5 | 8.0 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100A$, $V_{GE} = 15V$ | - | 3.1 | 4.2** | Volts |
| | | $I_C = 100A$, $V_{GE} = 15V$, $T_j = 150\text{ }^\circ\text{C}$ | - | 2.95 | - | Volts |
| Total Gate Charge | Q_G | $V_{CC} = 800V$, $I_C = 100A$, $V_{GE} = 15V$ | - | 510 | - | nC |
| Emitter-Collector Voltage | V_{EC} | $I_E = 100A$, $V_{GE} = 0V$ | - | - | 3.8 | 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_{ies} | | - | - | 20 | nF |
| Output Capacitance | C_{oes} | $V_{GE} = 0V$, $V_{CE} = 10V$ | - | - | 7 | nF |
| Reverse Transfer Capacitance | C_{res} | | - | - | 4 | nF |
| Resistive | Turn-on Delay Time | $V_{CC} = 800V$, $I_C = 100A$, | - | - | 250 | ns |
| | Rise Time | | | | | |
| Load | Turn-off Delay Time | $V_{GE1} = V_{GE2} = 15V$, $R_G = 3.1\Omega$ | - | - | 300 | ns |
| | Fall Time | | | | | |
| Switching | | | - | - | 500 | ns |
| Diode Reverse Recovery Time | t_{rr} | $I_E = 100A$, $di_E/dt = -200A/\mu\text{s}$ | - | - | 300 | ns |
| Diode Reverse Recovery Charge | Q_{rr} | $I_E = 100A$, $di_E/dt = -200A/\mu\text{s}$ | - | 1.0 | - | μC |

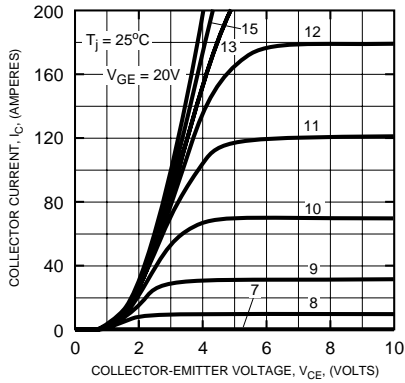
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|------------------------------------|------|------|-------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT | - | - | 0.16 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi | - | - | 0.35 | $^\circ\text{C/W}$ |
| Contact Thermal Resistance | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | - | - | 0.025 | $^\circ\text{C/W}$ |

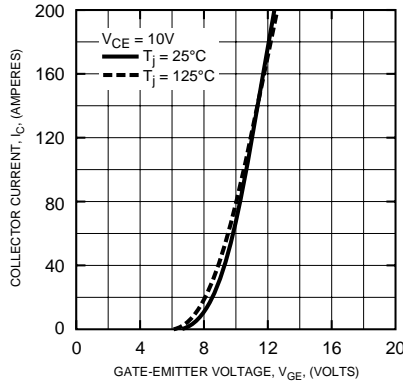
CM100TF-28H

HIGH POWER SWITCHING USE
INSULATED TYPE

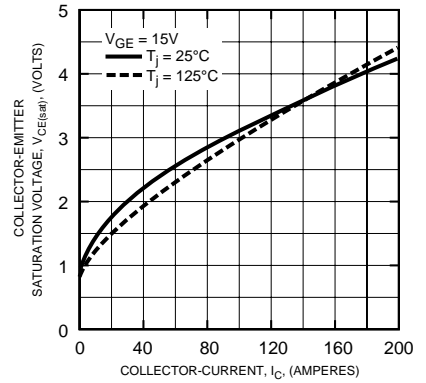
OUTPUT CHARACTERISTICS (TYPICAL)



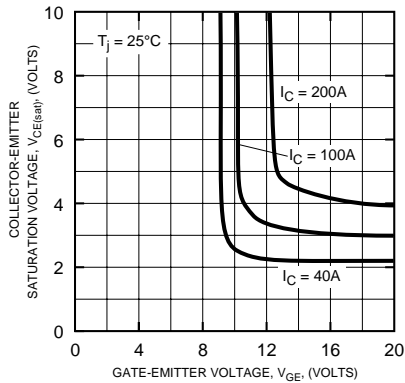
TRANSFER CHARACTERISTICS (TYPICAL)



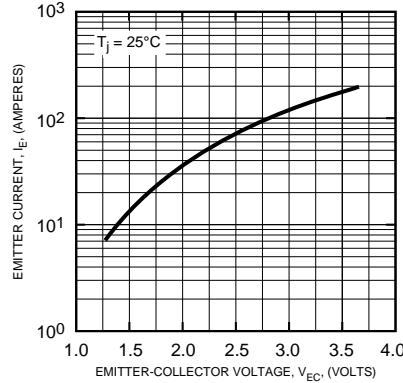
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



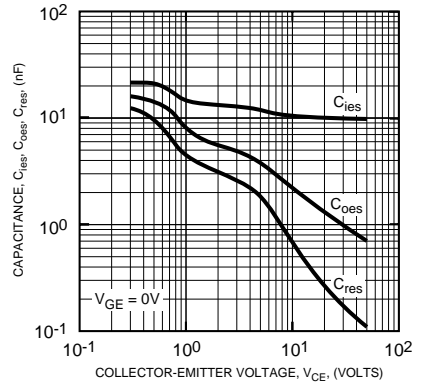
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



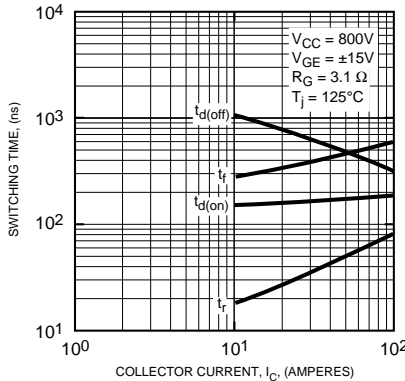
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



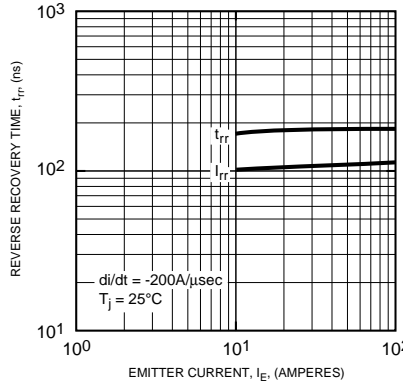
CAPACITANCE VS. VCE (TYPICAL)



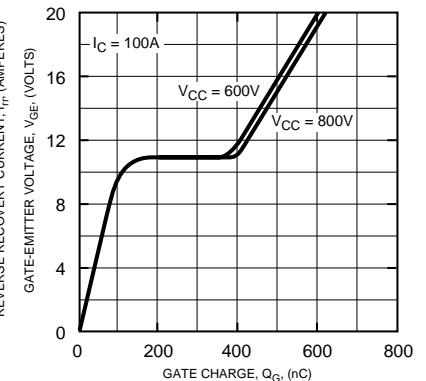
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, VGE



CM100TF-28H

HIGH POWER SWITCHING USE
INSULATED TYPE

