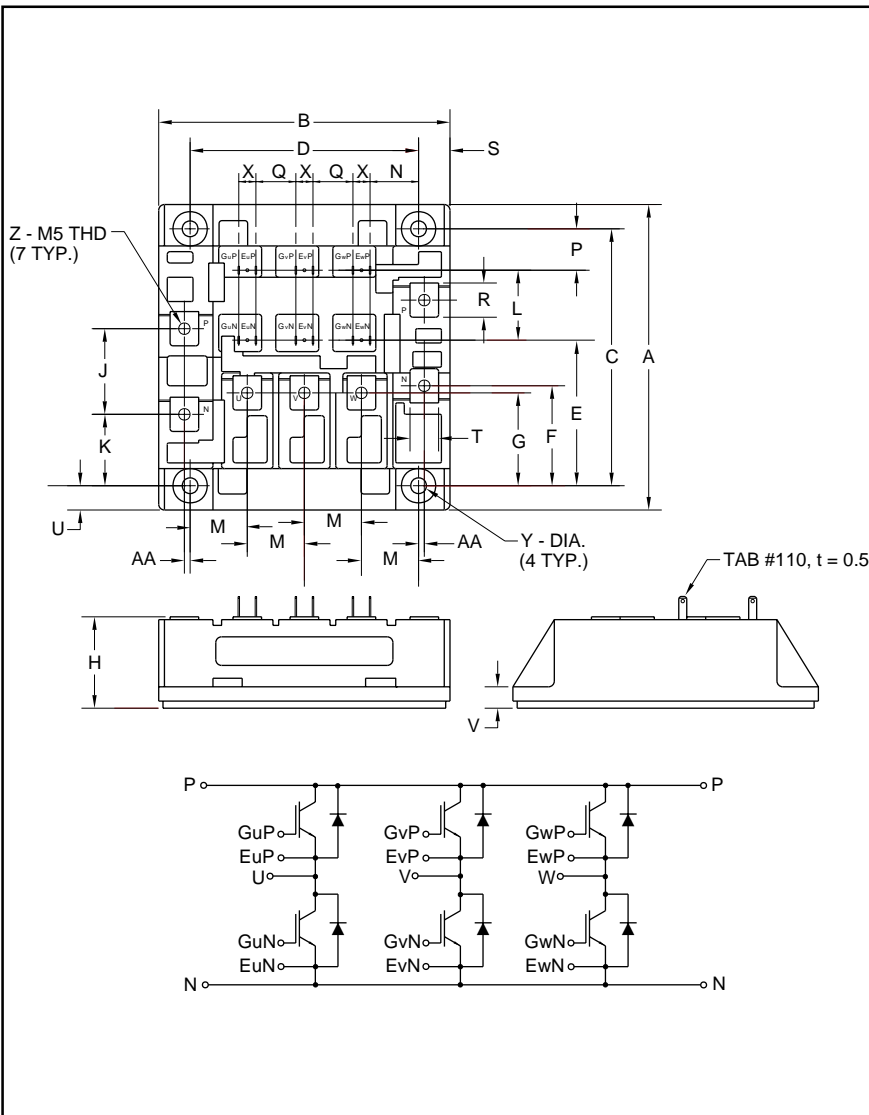


MITSUBISHI IGBT MODULES
CM75TF-28H
HIGH POWER SWITCHING USE
INSULATED TYPE



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 |



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. CM75TF-28H is a 1400V (V_{CES}), 75 Ampere Six-IGBT Module.

| Type | Current Rating Amperes | V_{CES} Volts (x 50) |
|------|---------------------------|---------------------------|
| CM | 75 | 28 |

CM75TF-28H

HIGH POWER SWITCHING USE
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| Ratings | Symbol | CM75TF-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 ($T_C = 25^{\circ}\text{C}$) | I_C | 75 | Amperes |
| Peak Collector Current | I_{CM} | 150* | Amperes |
| Emitter Current** ($T_C = 25^{\circ}\text{C}$) | I_E | 75 | Amperes |
| Peak Emitter Current** | I_{EM} | 150* | Amperes |
| Maximum Collector Dissipation ($T_C = 25^{\circ}\text{C}$, $T_j \leq 150^{\circ}\text{C}$) | P_C | 600 | Watts |
| Mounting Torque, M5 Main Terminal | — | 1.47 ~ 1.96 | $\text{N} \cdot \text{m}$ |
| Mounting Torque, M5 Mounting | — | 1.47 ~ 1.96 | $\text{N} \cdot \text{m}$ |
| Weight | — | 830 | Grams |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.) | V_{iso} | 2500 | V_{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_{CES} | $V_{\text{CE}} = V_{\text{CES}}$, $V_{\text{GE}} = 0\text{V}$ | — | — | 1.0 | mA |
| Gate Leakage Current | I_{GES} | $V_{\text{GE}} = V_{\text{GES}}$, $V_{\text{CE}} = 0\text{V}$ | — | — | 0.5 | μA |
| Gate-Emitter Threshold Voltage | $V_{\text{GE(th)}}$ | $I_C = 7.5\text{mA}$, $V_{\text{CE}} = 10\text{V}$ | 5.0 | 6.5 | 8.0 | Volts |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 75\text{A}$, $V_{\text{GE}} = 15\text{V}$ | — | 3.1 | 4.2** | Volts |
| | | $I_C = 75\text{A}$, $V_{\text{GE}} = 15\text{V}$, $T_j = 150^{\circ}\text{C}$ | — | 2.95 | — | Volts |
| Total Gate Charge | Q_G | $V_{\text{CC}} = 800\text{V}$, $I_C = 75\text{A}$, $V_{\text{GE}} = 15\text{V}$ | — | 383 | — | nC |
| Emitter-Collector Voltage | V_{EC} | $I_E = 75\text{A}$, $V_{\text{GE}} = 0\text{V}$ | — | — | 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} | $V_{\text{GE}} = 0\text{V}$, $V_{\text{CE}} = 10\text{V}$ | — | — | 15 | nF |
| Output Capacitance | C_{oes} | | — | — | 5.3 | nF |
| Reverse Transfer Capacitance | C_{res} | | — | — | 3 | nF |
| Resistive | Turn-on Delay Time | $V_{\text{CC}} = 800\text{V}$, $I_C = 75\text{A}$, $V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}$, $R_G = 4.2\Omega$ | — | — | 150 | ns |
| Load | Rise Time | | — | — | 350 | ns |
| Switching | Turn-off Delay Time | | — | — | 250 | ns |
| Times | Fall Time | | — | — | 500 | ns |
| Diode Reverse Recovery Time | t_{rr} | $I_E = 75\text{A}$, $di_E/dt = -150\text{A}/\mu\text{s}$ | — | — | 300 | ns |
| Diode Reverse Recovery Charge | Q_{rr} | $I_E = 75\text{A}$, $di_E/dt = -150\text{A}/\mu\text{s}$ | — | 0.75 | — | μC |

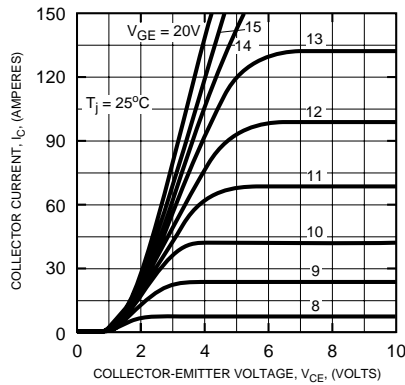
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|----------------------|------------------------------------|------|------|-------|-----------------------------|
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per IGBT | — | — | 0.21 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per FWDi | — | — | 0.47 | $^{\circ}\text{C}/\text{W}$ |
| Contact Thermal Resistance | $R_{\text{th(c-f)}}$ | Per Module, Thermal Grease Applied | — | — | 0.025 | $^{\circ}\text{C}/\text{W}$ |

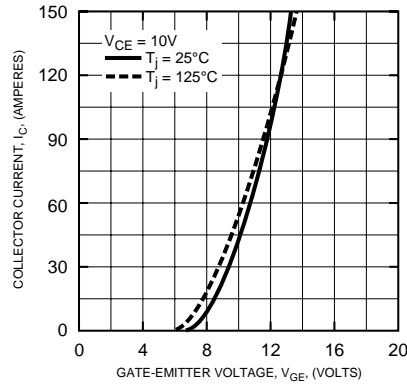
CM75TF-28H

HIGH POWER SWITCHING USE
INSULATED TYPE

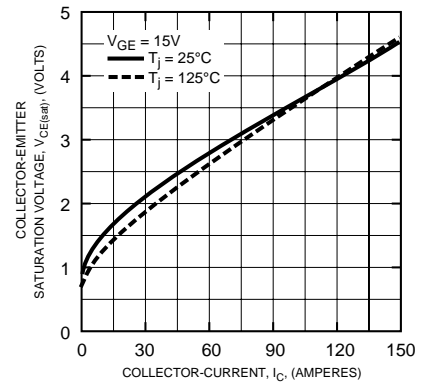
OUTPUT CHARACTERISTICS
(TYPICAL)



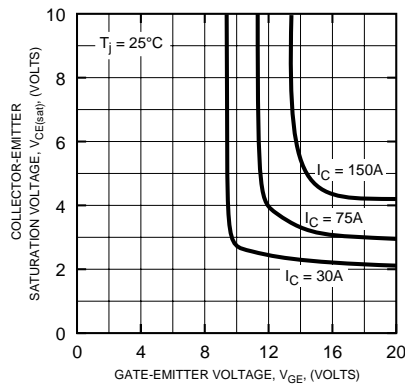
TRANSFER CHARACTERISTICS
(TYPICAL)



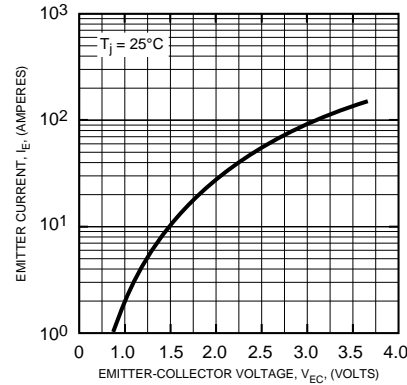
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



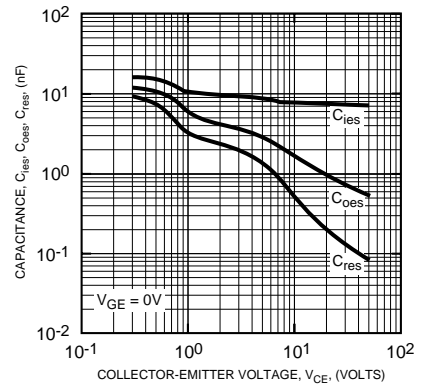
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



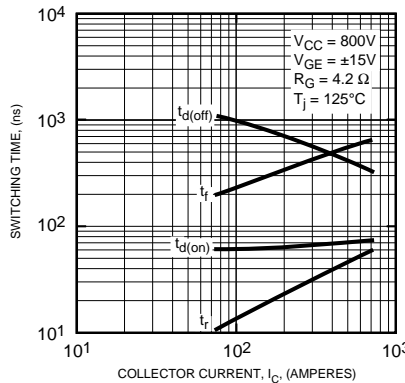
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



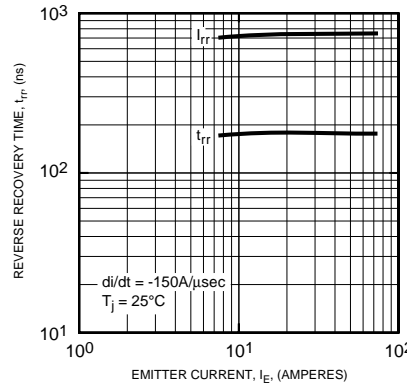
CAPACITANCE VS. V_{CE}
(TYPICAL)



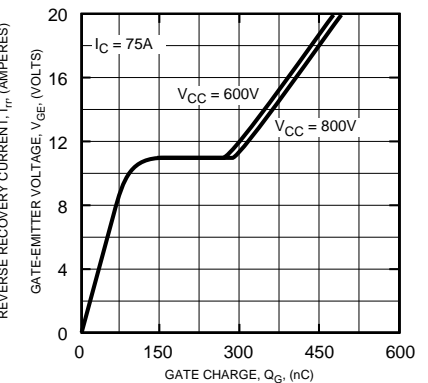
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



GATE CHARGE, V_{GE}



CM75TF-28H

HIGH POWER SWITCHING USE
INSULATED TYPE

