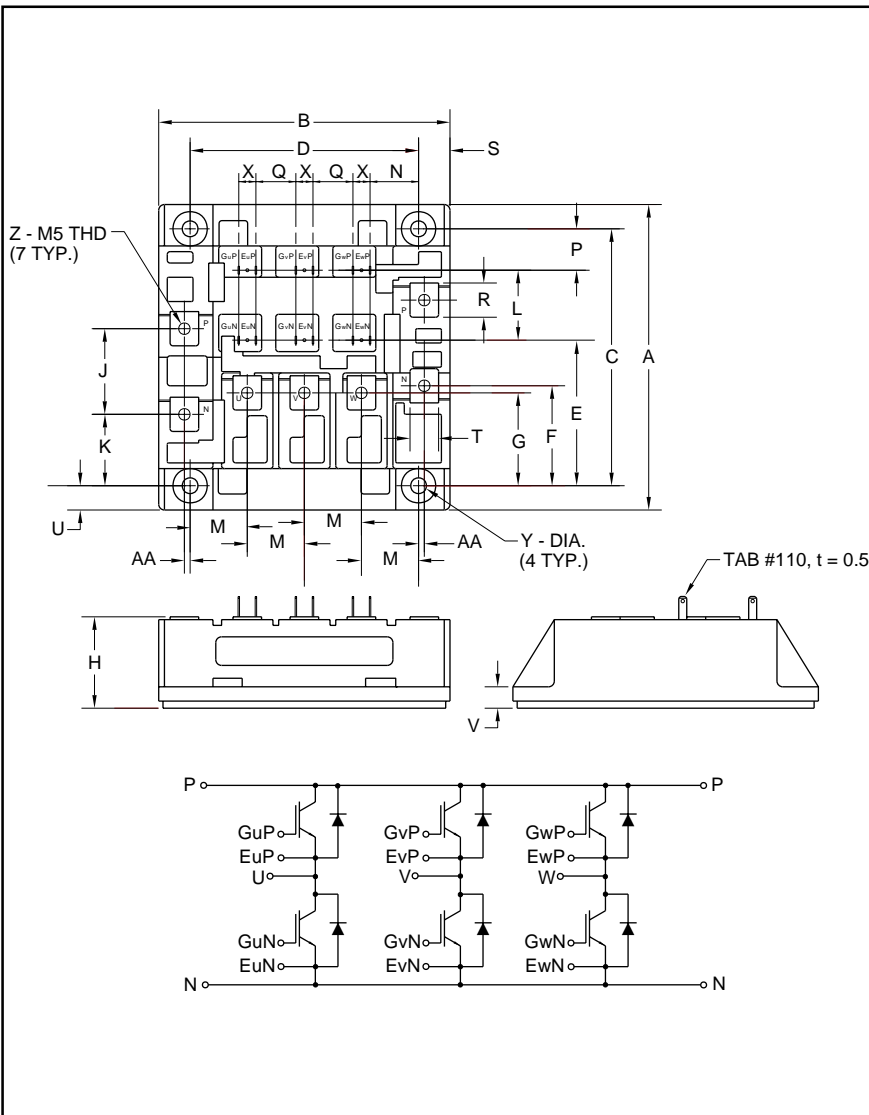


MITSUBISHI IGBT MODULES  
**CM75TF-28H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



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

Type	Current Rating Amperes	$V_{CES}$ Volts (x 50)
CM	75	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

## CM75TF-28H

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

Ratings	Symbol	CM75TF-28H	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)	$V_{\text{CES}}$	1400	Volts
Gate-Emitter Voltage (C-E-SHORT)	$V_{\text{GES}}$	$\pm 20$	Volts
Collector Current ( $T_C = 25^\circ\text{C}$ )	$I_C$	75	Amperes
Peak Collector Current	$I_{\text{CM}}$	150*	Amperes
Emitter Current** ( $T_C = 25^\circ\text{C}$ )	$I_E$	75	Amperes
Peak Emitter Current**	$I_{\text{EM}}$	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	N · m
Mounting Torque, M5 Mounting	–	1.47 ~ 1.96	N · m
Weight	–	830	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	$V_{\text{ISO}}$	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	$V_{\text{GE(th)}}$	$I_C = 7.5\text{mA}$ , $V_{\text{CE}} = 10\text{V}$	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	$V_{\text{EC}}$	$I_E = 75\text{A}$ , $V_{\text{GE}} = 0\text{V}$	–	–	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	$C_{\text{ies}}$		–	–	15	nF
Output Capacitance	$C_{\text{oes}}$	$V_{\text{GE}} = 0\text{V}$ , $V_{\text{CE}} = 10\text{V}$	–	–	5.3	nF
Reverse Transfer Capacitance	$C_{\text{res}}$		–	–	3	nF
Resistive	Turn-on Delay Time	$t_{\text{d(on)}}$	–	–	150	ns
	Rise Time	$t_r$	–	–	350	ns
Switching	Turn-off Delay Time	$t_{\text{d(off)}}$	–	–	250	ns
	Fall Time	$t_f$	–	–	500	ns
Diode Reverse Recovery Time	$t_{\text{rr}}$	$I_E = 75\text{A}$ , $di_E/dt = -150\text{A}/\mu\text{s}$	–	–	300	ns
Diode Reverse Recovery Charge	$Q_{\text{rr}}$	$I_E = 75\text{A}$ , $di_E/dt = -150\text{A}/\mu\text{s}$	–	0.75	–	$\mu\text{C}$

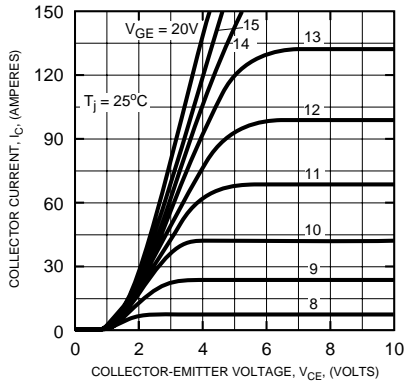
Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per IGBT	–	–	0.21	$^\circ\text{C}/\text{W}$
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	$^\circ\text{C}/\text{W}$

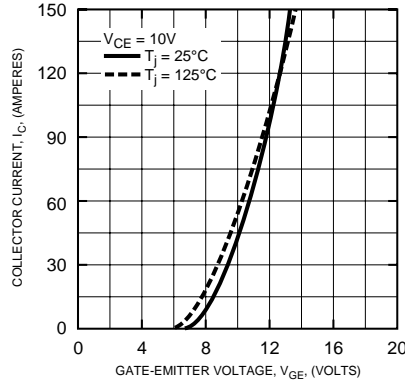
# CM75TF-28H

HIGH POWER SWITCHING USE  
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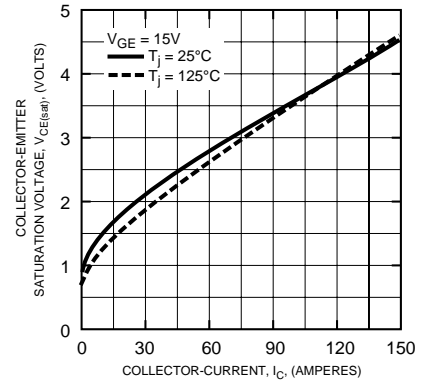
OUTPUT CHARACTERISTICS  
(TYPICAL)



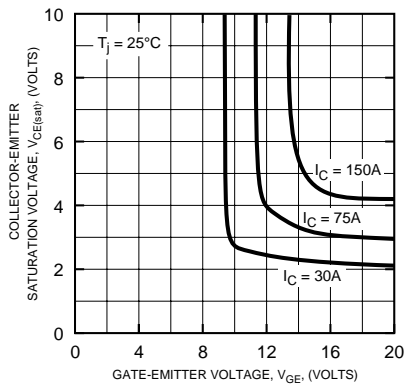
TRANSFER CHARACTERISTICS  
(TYPICAL)



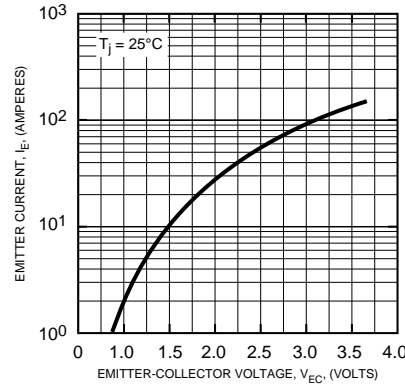
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



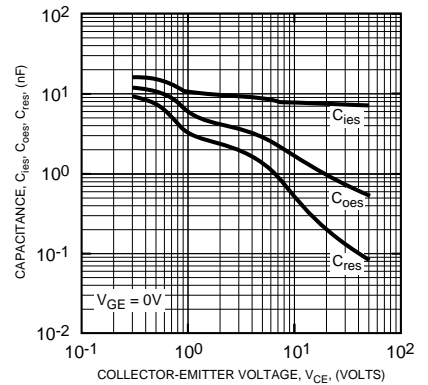
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



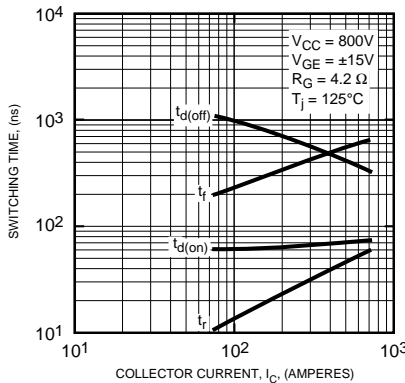
FREE-WHEEL DIODE FORWARD CHARACTERISTICS  
(TYPICAL)



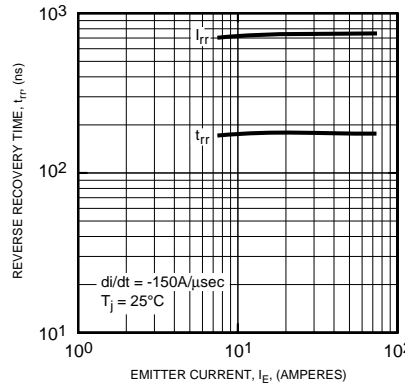
CAPACITANCE VS.  $V_{CE}$   
(TYPICAL)



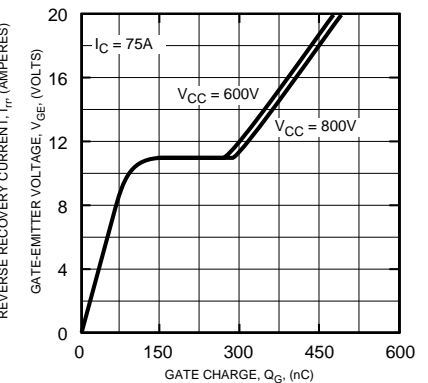
HALF-BRIDGE SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE,  $V_{GE}$



# CM75TF-28H

HIGH POWER SWITCHING USE  
INSULATED TYPE

