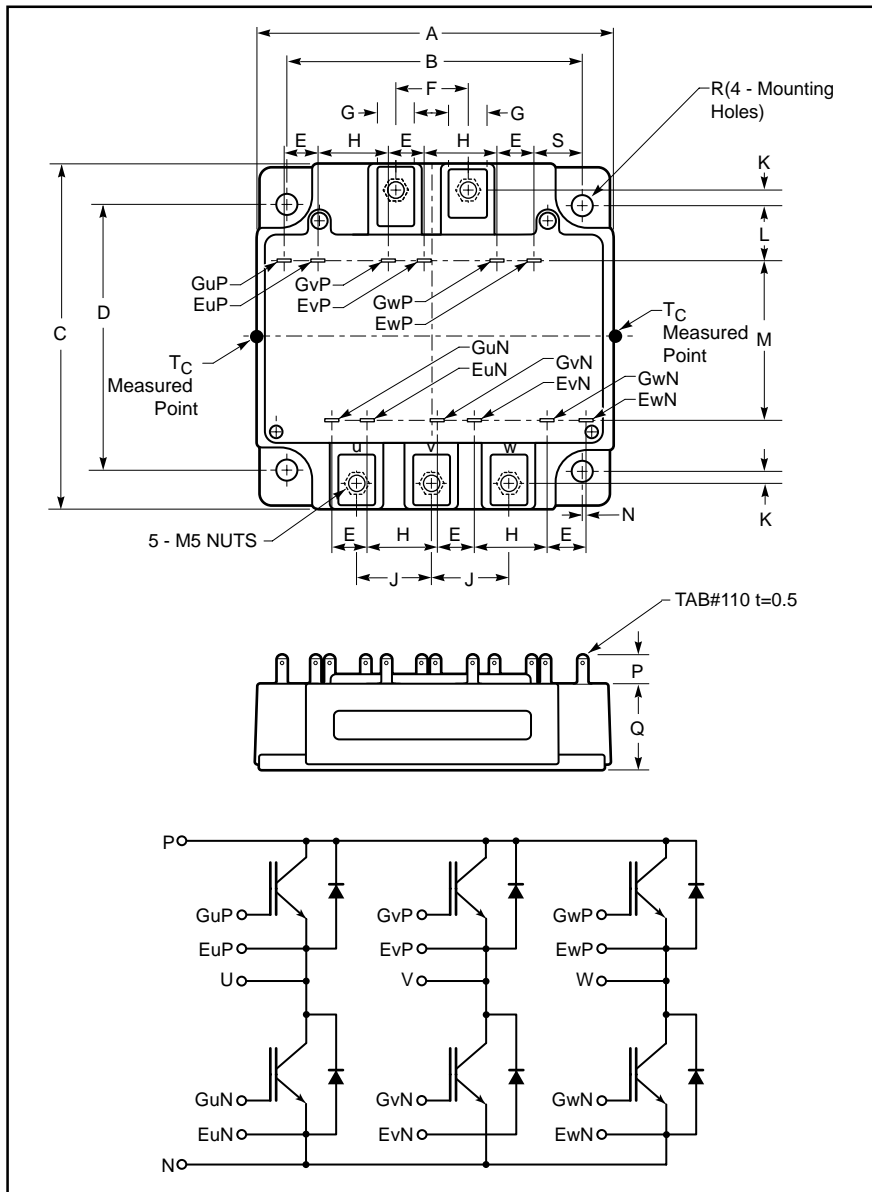


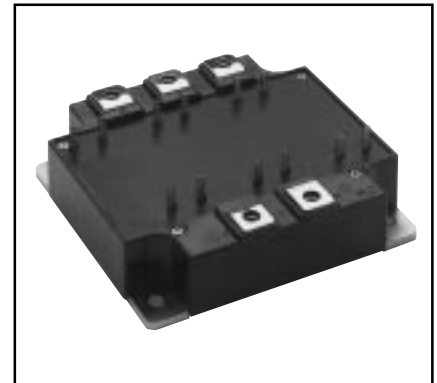
**MITSUBISHI IGBT MODULES**  
**CM150TU-12H**  
HIGH POWER SWITCHING USE  
INSULATED TYPE



**Outline Drawing and Circuit Diagram**

Dimensions	Inches	Millimeters
A	4.21	107.0
B	3.54±0.01	90.0±0.25
C	4.02	102.0
D	3.15±0.01	80.0±0.25
E	0.43	11.0
F	0.91	23.0
G	0.47	12.0
H	0.85	21.7
J	0.91	23.0

Dimensions	Inches	Millimeters
K	0.15	3.75
L	0.67	17.0
M	1.91	48.5
N	0.03	0.8
P	0.32	8.1
Q	1.02	26.0
R	0.22 Dia.	5.5 Dia.
S	0.57	14.4



**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 module number you desire from the table - i.e. CM150TU-12H is a 600V ( $V_{CES}$ ), 150 Ampere Six-IGBT Module.

Type	Current Rating Amperes	$V_{CES}$ Volts (x 50)
CM	150	12

## CM150TU-12H

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

Ratings	Symbol	CM150TU-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 ( $T_c = 25^{\circ}\text{C}$ )	$I_C$	150	Amperes
Peak Collector Current ( $T_j \leq 150^{\circ}\text{C}$ )	$I_{\text{CM}}$	300*	Amperes
Emitter Current**	$I_E$	150	Amperes
Peak Emitter Current**	$I_{\text{EM}}$	300*	Amperes
Maximum Collector Dissipation ( $T_j < 150^{\circ}\text{C}$ )	$P_c$	600	Watts
Mounting Torque, M5 Main Terminal	—	2.5~3.5	N · m
Mounting Torque, M5 Mounting	—	2.5~3.5	N · m
Weight	—	680	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	mA
Gate Leakage Voltage	$I_{\text{GES}}$	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	—	—	0.5	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_C = 15\text{mA}, V_{\text{CE}} = 10\text{V}$	4.5	6	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_C = 150\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 25^{\circ}\text{C}$	—	2.4	3.0	Volts
		$I_C = 150\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 125^{\circ}\text{C}$	—	2.6	—	Volts
Total Gate Charge	$Q_G$	$V_{\text{CC}} = 300\text{V}, I_C = 150\text{A}, V_{\text{GE}} = 15\text{V}$	—	300	—	nC
Emitter-Collector Voltage*	$V_{\text{EC}}$	$I_E = 150\text{A}, V_{\text{GE}} = 0\text{V}$	—	—	2.6	Volts

\* Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{j(\text{max})}$  rating.Dynamic Electrical Characteristics,  $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	$C_{\text{ies}}$	$V_{\text{CE}} = 10\text{V}, V_{\text{GE}} = 0\text{V}$	—	—	13.2	nF
Output Capacitance	$C_{\text{oes}}$		—	—	7.2	nF
Reverse Transfer Capacitance	$C_{\text{res}}$		—	—	2	nF
Resistive	Turn-on Delay Time	$V_{\text{CC}} = 300\text{V}, I_C = 150\text{A},$ $V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V},$ $R_G = 4.2\Omega, \text{Resistive}$	—	—	100	ns
Load	Rise Time		—	—	350	ns
Switch	Turn-off Delay Time	Load Switching Operation	—	—	300	ns
Times	Fall Time		—	—	300	ns
Diode Reverse Recovery Time	$t_{\text{rr}}$	$I_E = 150\text{A}, di_E/dt = -300\text{A}/\mu\text{s}$	—	—	160	$\mu\text{C}$
Diode Reverse Recovery Charge	$Q_{\text{rr}}$	$I_E = 150\text{A}, di_E/dt = -300\text{A}/\mu\text{s}$	—	0.36	—	$\mu\text{C}$

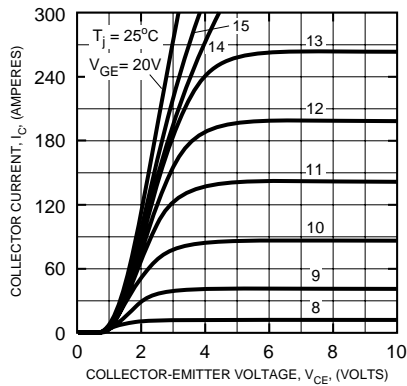
Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)Q}}$	Per IGBT 1/6 Module	—	—	0.21	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)D}}$	Per Free-Wheel Diode 1/6 Module	—	—	0.47	$^{\circ}\text{C}/\text{W}$
Contact Thermal Resistance	$R_{\text{th(c-f)}}$	Per Module, Thermal Grease Applied	—	0.015	—	$^{\circ}\text{C}/\text{W}$

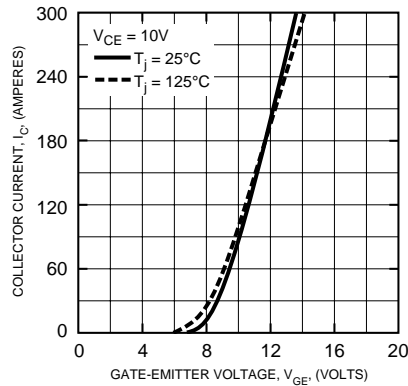
# CM150TU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

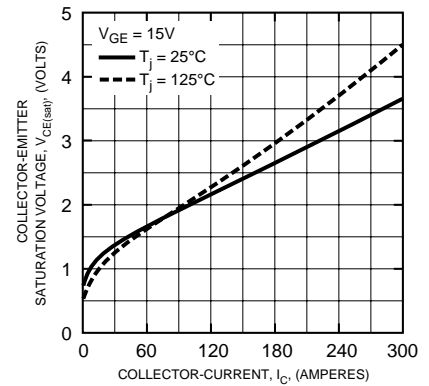
OUTPUT CHARACTERISTICS  
(TYPICAL)



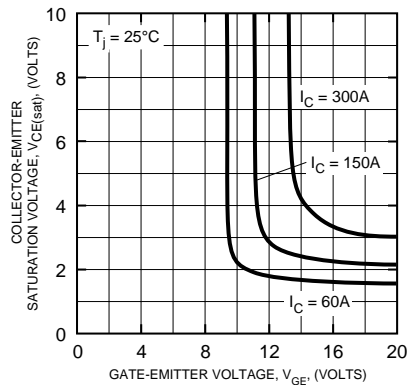
TRANSFER CHARACTERISTICS  
(TYPICAL)



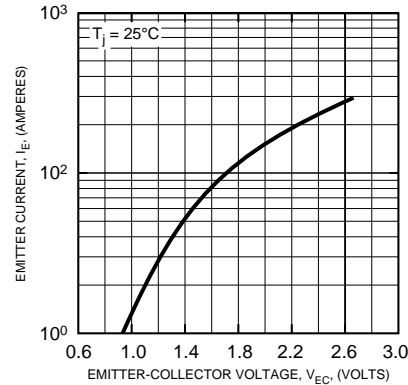
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



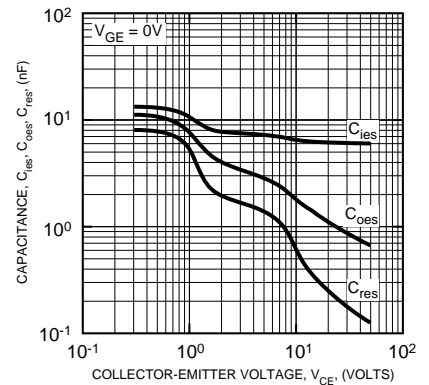
COLLECTOR-EMITTER  
SATURATION VOLTAGE CHARACTERISTICS  
(TYPICAL)



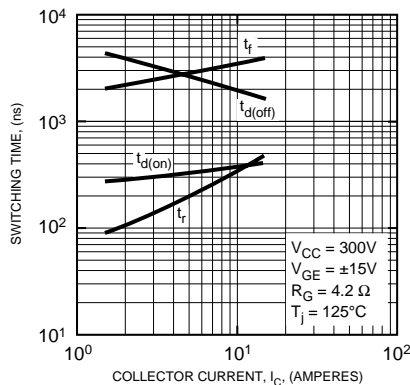
FREE-WHEEL DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



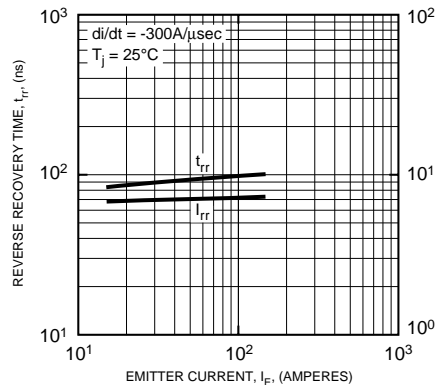
CAPACITANCE VS. V\_CE  
(TYPICAL)



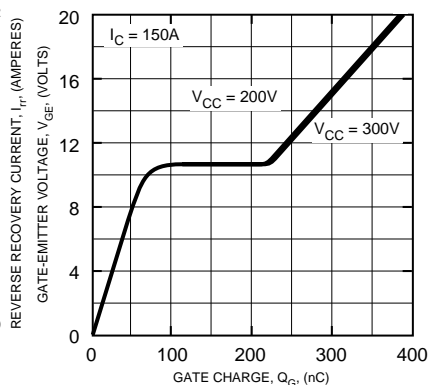
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



GATE CHARGE, V\_GE



# CM150TU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

