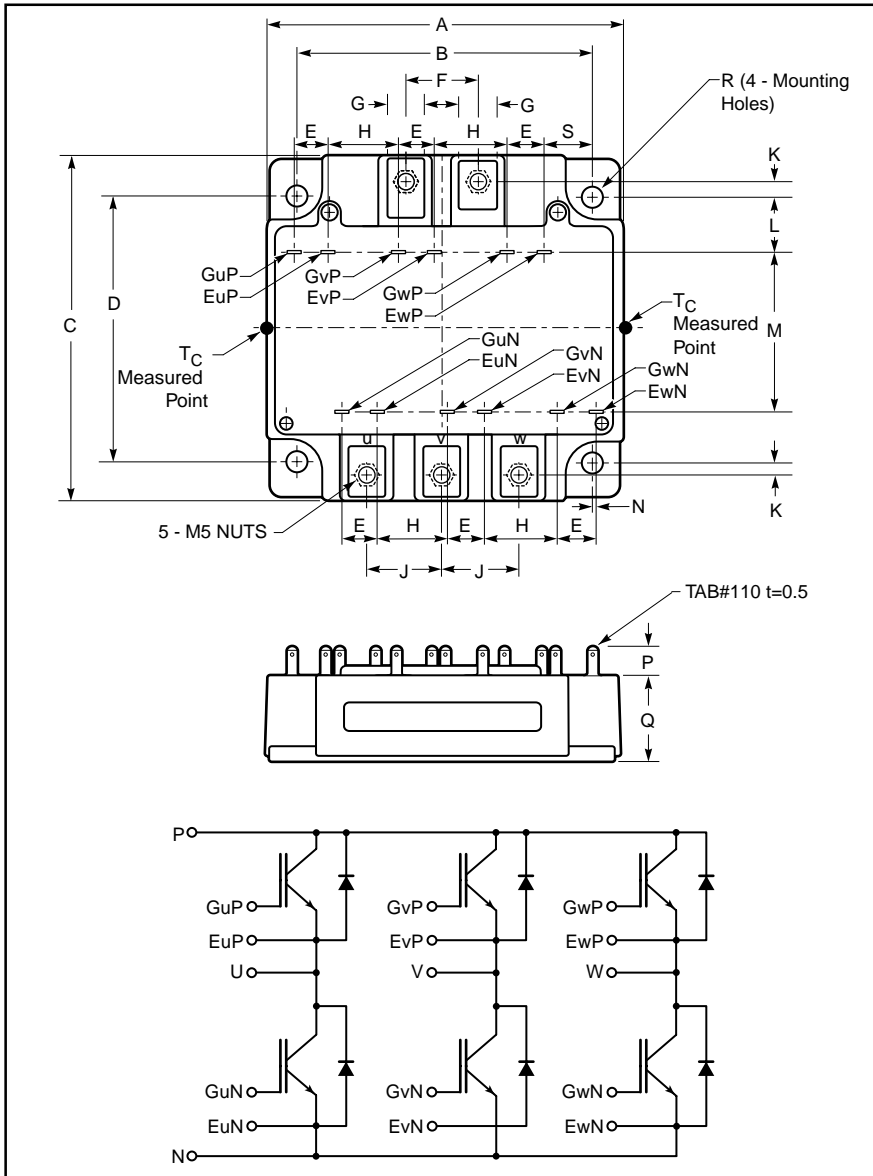


MITSUBISHI IGBT MODULES  
**CM200TU-12H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE



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. CM200TU-12H is a 600V ( $V_{CES}$ ), 200 Ampere Six-IGBT Module.

Type	Current Rating Amperes	$V_{CES}$ Volts (x 50)
CM	200	12

# CM200TU-12H

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

Ratings	Symbol	CM200TU-12H	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)	$V_{CES}$	600	Volts
Gate-Emitter Voltage (C-E SHORT)	$V_{GES}$	$\pm 20$	Volts
Collector Current ( $T_c = 25^\circ\text{C}$ )	$I_C$	200	Amperes
Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )	$I_{CM}$	400*	Amperes
Emitter Current**	$I_E$	200	Amperes
Peak Emitter Current**	$I_{EM}$	400*	Amperes
Maximum Collector Dissipation ( $T_j < 150^\circ\text{C}$ )	$P_C$	650	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.)	$V_{iso}$	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	mA
Gate Leakage Voltage	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	0.5	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 15\text{mA}, V_{CE} = 10V$	4.5	6	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 200\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}$	–	2.4	3.0	Volts
		$I_C = 200\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$	–	2.6	–	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 300V, I_C = 200\text{A}, V_{GE} = 15V$	–	400	–	nC
Emitter-Collector Voltage*	$V_{EC}$	$I_E = 200\text{A}, V_{GE} = 0V$	–	–	2.6	Volts

\* Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{j(max)}$  rating.

## Dynamic Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Input Capacitance	$C_{ies}$		–	–	17.6	nF	
Output Capacitance	$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V$	–	–	9.6	nF	
Reverse Transfer Capacitance	$C_{res}$		–	–	2.6	nF	
Resistive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 300V, I_C = 200\text{A},$	–	–	150	ns
Load	Rise Time	$t_r$	$V_{GE1} = V_{GE2} = 15V,$	–	–	400	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	$R_G = 3.1\Omega, \text{Resistive}$	–	–	300	ns
Times	Fall Time	$t_f$	Load Switching Operation	–	–	300	ns
Diode Reverse Recovery Time	$t_{rr}$	$I_E = 200\text{A}, di_E/dt = -400\text{A}/\mu\text{s}$	–	–	160	$\mu\text{C}$	
Diode Reverse Recovery Charge	$Q_{rr}$	$I_E = 200\text{A}, di_E/dt = -400\text{A}/\mu\text{s}$	–	0.48	–	$\mu\text{C}$	

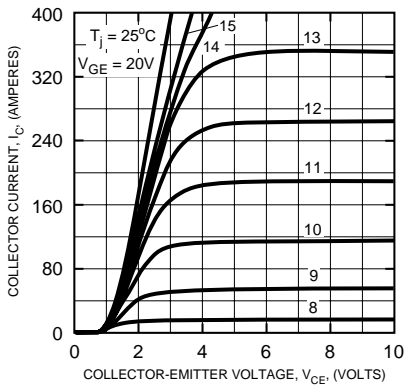
## Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/6 Module	–	–	0.19	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per Free-Wheel Diode 1/6 Module	–	–	0.35	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.015	–	$^\circ\text{C}/\text{W}$

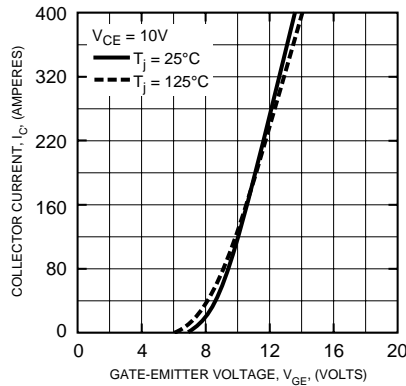
# CM200TU-12H

HIGH POWER SWITCHING USE  
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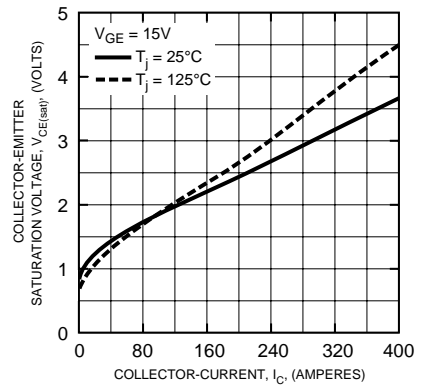
**OUTPUT CHARACTERISTICS (TYPICAL)**



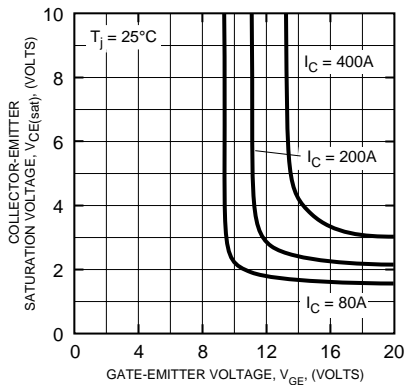
**TRANSFER CHARACTERISTICS (TYPICAL)**



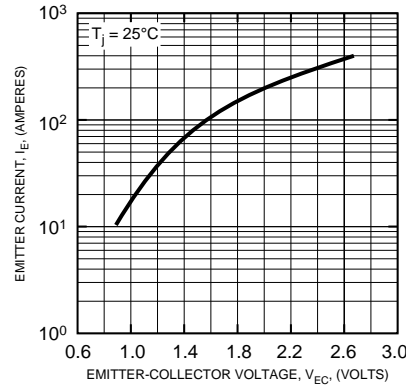
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



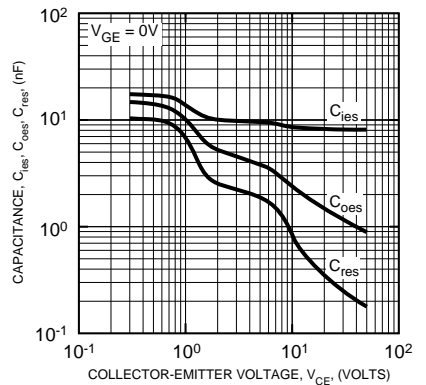
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



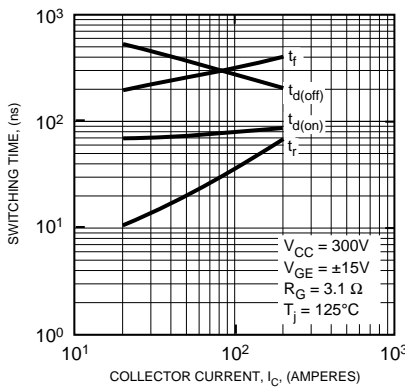
**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)**



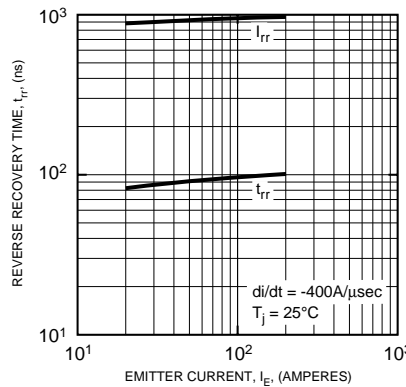
**CAPACITANCE VS. V\_CE (TYPICAL)**



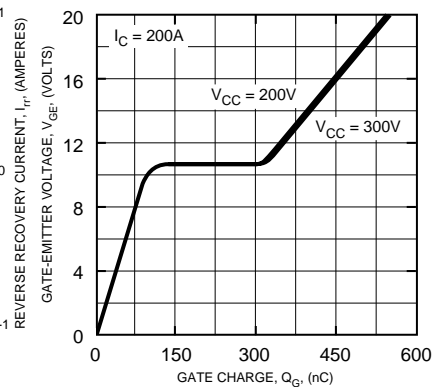
**HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)**



**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**



**GATE CHARGE, V\_GE**



# CM200TU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

