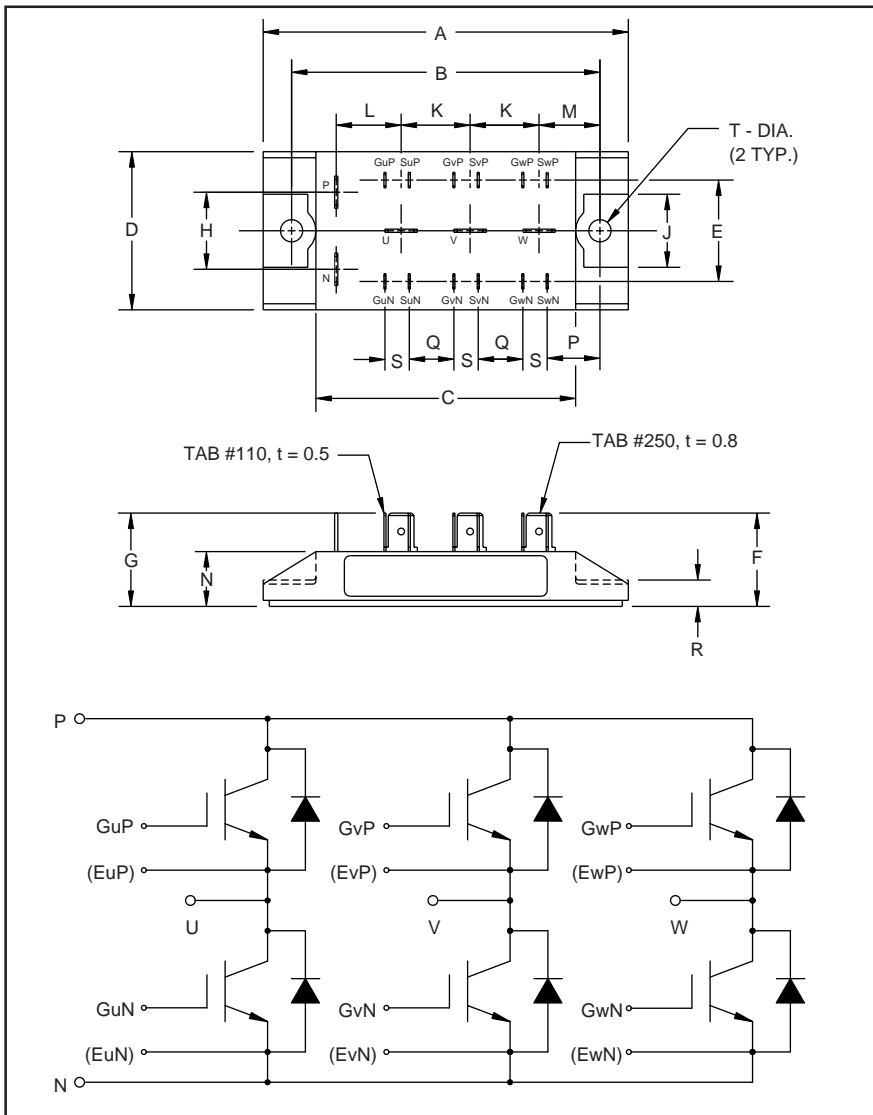


MITSUBISHI IGBT MODULES

CM15TF-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.54	90.0
B	2.99±0.01	76.0±0.2
C	2.52	64.0
D	1.54	39.0
E	0.98	25.0
F	0.90	23.0
G	0.87	22.0
H	0.75	19.0
J	0.71	18.0

Dimensions	Inches	Millimeters
K	0.67	17.0
L	0.63	16.0
M	0.59	15.0
N	0.56	14.1
P	0.51	13.0
Q	0.43	11.0
R	0.26	6.5
S	0.24	6.0
T	0.22 Dia.	Dia. 5.5



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. CM15TF-12H is a 600V (V_{CES}), 15 Ampere Six-IGBT Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	15	12

CM15TF-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

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

	Symbol	Ratings	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}	± 20	Volts
Collector Current ($T_C = 25\text{ }^\circ\text{C}$)	I_C	15	Amperes
Peak Collector Current	I_{CM}	30*	Amperes
Emitter Current** ($T_C = 25\text{ }^\circ\text{C}$)	I_E	15	Amperes
Peak Emitter Current**	I_{EM}	30*	Amperes
Maximum Collector Dissipation ($T_C = 25\text{ }^\circ\text{C}$, $T_j \leq 150\text{ }^\circ\text{C}$)	P_c	100	Watts
Mounting Torque, M5 Mounting	-	1.47 ~ 1.96	$\text{N} \cdot \text{m}$
Weight	-	150	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 $T_{j(max)}$ 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}	$V_{CE} = V_{CES}$, $V_{GE} = 0\text{V}$	-	-	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, $V_{CE} = 0\text{V}$	-	-	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 1.5\text{mA}$, $V_{CE} = 10\text{V}$	4.5	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 15\text{A}$, $V_{GE} = 15\text{V}$	-	2.1	2.8**	Volts
		$I_C = 15\text{A}$, $V_{GE} = 15\text{V}$, $T_j = 150\text{ }^\circ\text{C}$	-	2.15	-	Volts
Total Gate Charge	Q_G	$V_{CC} = 300\text{V}$, $I_C = 15\text{A}$, $V_{GE} = 15\text{V}$	-	45	-	nC
Emitter-Collector Voltage	V_{EC}	$I_E = 15\text{A}$, $V_{GE} = 0\text{V}$	-	-	2.8	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}		-	-	1.5	nF
Output Capacitance	C_{oes}	$V_{GE} = 0\text{V}$, $V_{CE} = 10\text{V}$	-	-	0.5	nF
Reverse Transfer Capacitance	C_{res}		-	-	0.3	nF
Resistive	Turn-on Delay Time	$V_{CC} = 300\text{V}$, $I_C = 15\text{A}$,	-	-	120	ns
	Rise Time					
Load	Turn-off Delay Time	$V_{GE1} = V_{GE2} = 15\text{V}$, $R_G = 42\Omega$	-	-	200	ns
	Fall Time					
Diode Reverse Recovery Time	t_{rr}	$I_E = 15\text{A}$, $di_E/dt = -30\text{A}/\mu\text{s}$	-	-	110	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E = 15\text{A}$, $di_E/dt = -30\text{A}/\mu\text{s}$	-	0.04	-	μC

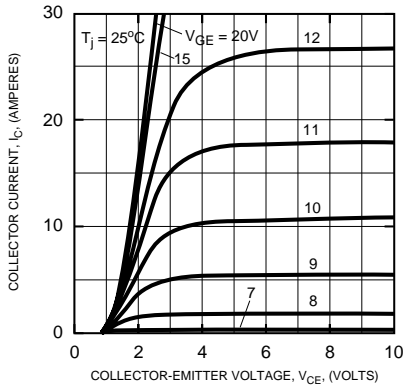
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per IGBT	-	-	1.30	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per FWDi	-	-	3.50	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	-	-	0.092	$^\circ\text{C}/\text{W}$

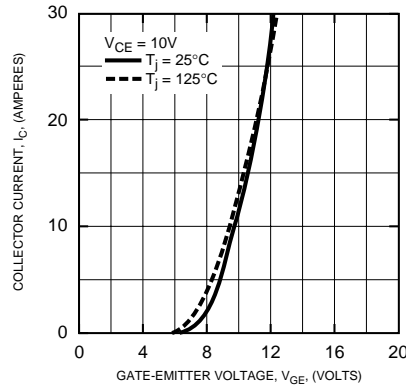
CM15TF-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

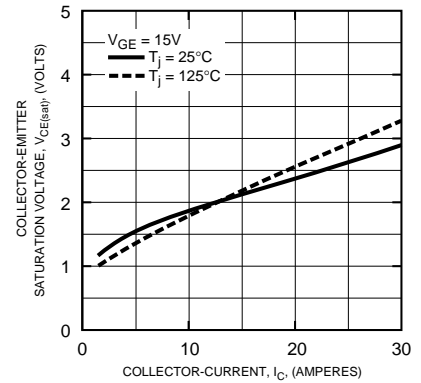
OUTPUT CHARACTERISTICS (TYPICAL)



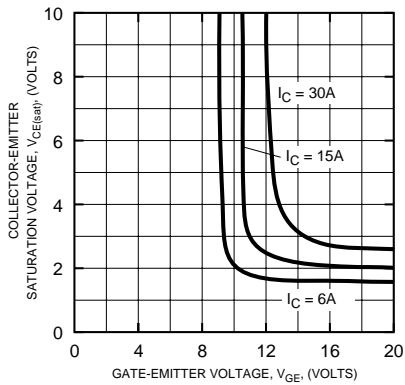
TRANSFER CHARACTERISTICS (TYPICAL)



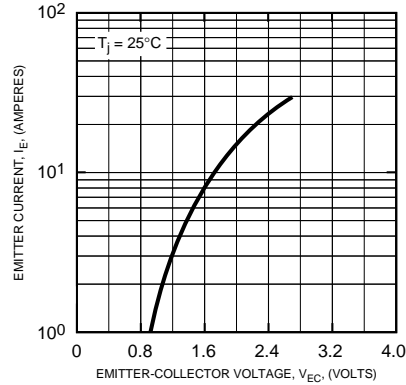
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



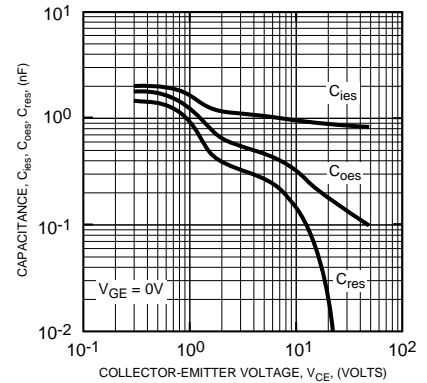
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



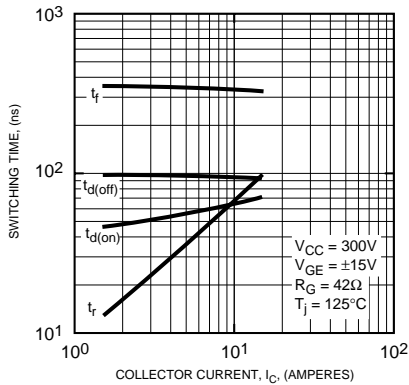
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



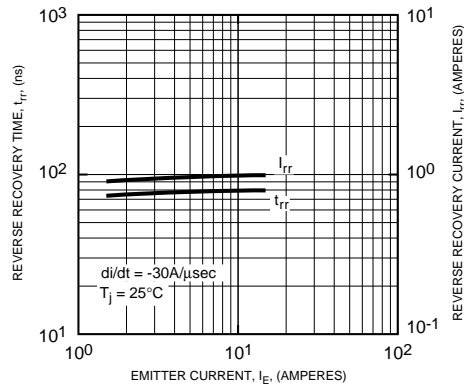
CAPACITANCE VS. VCE (TYPICAL)



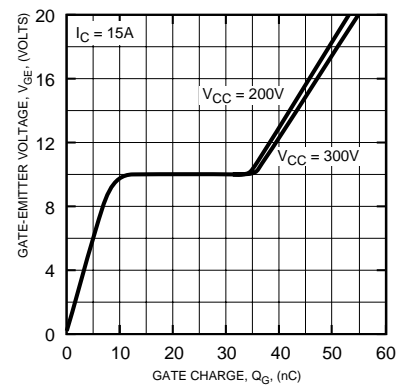
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, VGE



CM15TF-12H

MEDIUM POWER SWITCHING USE
INSULATED TYPE

