

MITSUBISHI IGBT MODULES
CM50DY-12H
 MEDIUM POWER SWITCHING USE
 INSULATED TYPE



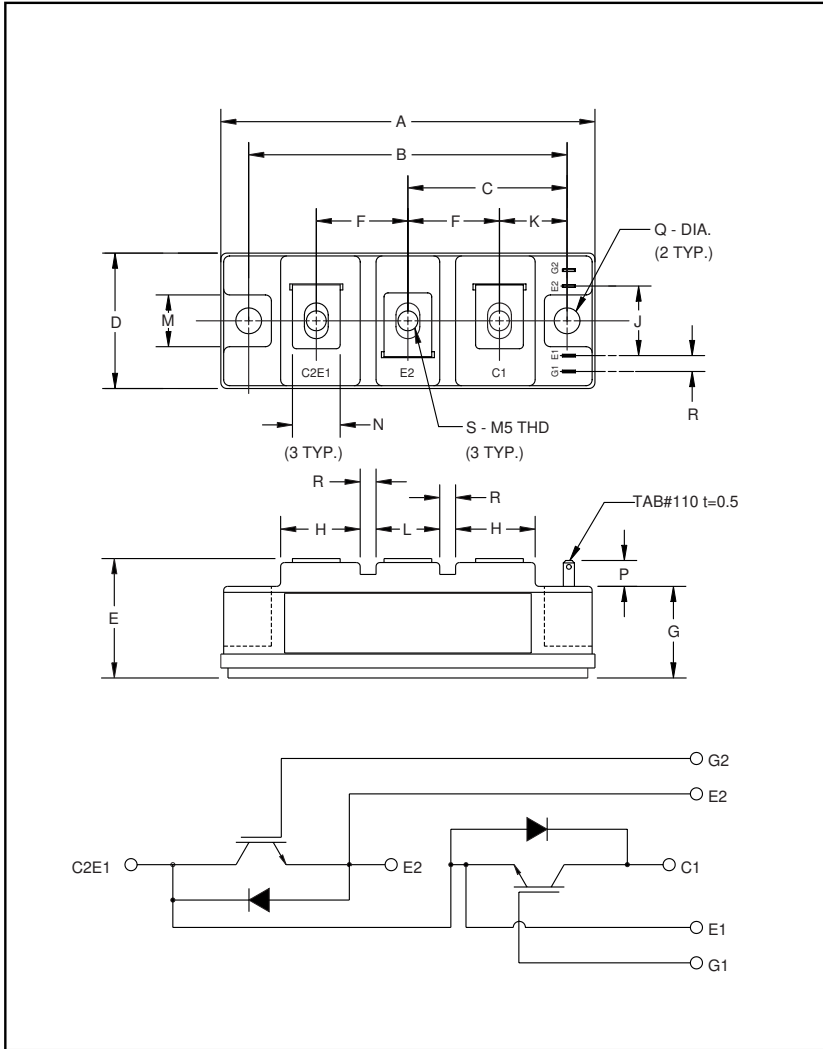
Description:
 Mitsubishi IGBT Modules are designed for use in switching applications. Each module consists of two IGBTs in a half-bridge configuration with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking 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. CM50DY-12H is a 600V (V_{CES}), 50 Ampere Dual IGBT Module.

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



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.70	94.0
B	3.150±0.01	80.0±0.25
C	1.57	40.0
D	1.34	34.0
E	1.22 Max.	31.0 Max.
F	0.90	23.0
G	0.85	21.5
H	0.79	20.0
J	0.71	18.0

Dimensions	Inches	Millimeters
K	0.67	17.0
L	0.63	16.0
M	0.51	13.0
N	0.47	12.0
P	0.28	7.0
Q	0.256 Dia.	Dia. 6.5
R	0.16	4.0
S	M5 Metric	M5

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

Ratings	Symbol	CM600HU-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}	± 20	Volts
Collector Current ($T_c = 25^\circ\text{C}$)	I_C	50	Amperes
Peak Collector Current ($T_j \leq 150^\circ\text{C}$)	I_{CM}	100*	Amperes
Emitter Current** ($T_c = 25^\circ\text{C}$)	I_E	50	Amperes
Peak Emitter Current**	I_{EM}	100*	Amperes
Maximum Collector Dissipation ($T_c = 25^\circ\text{C}$)	P_C	250	Watts
Mounting Torque, M5 Main Terminal	–	1.47~1.96	N · m
Mounting Torque, M6 Mounting	–	1.96~2.94	N · m
Weight	–	190	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 $T_{j(\text{max})}$ 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	$V_{\text{GE(th)}}$	$I_C = 5\text{mA}, V_{\text{CE}} = 10\text{V}$	4.5	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_C = 50\text{A}, V_{\text{GE}} = 15\text{V}$	–	2.1	2.8**	Volts
		$I_C = 50\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150^\circ\text{C}$	–	2.15	–	Volts
Total Gate Charge	Q_G	$V_{\text{CC}} = 300\text{V}, I_C = 50\text{A}, V_{\text{GE}} = 15\text{V}$	–	150	–	nC
Emitter-Collector Voltage	V_{EC}	$I_E = 50\text{A}, V_{\text{GE}} = 0\text{V}$	–	–	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

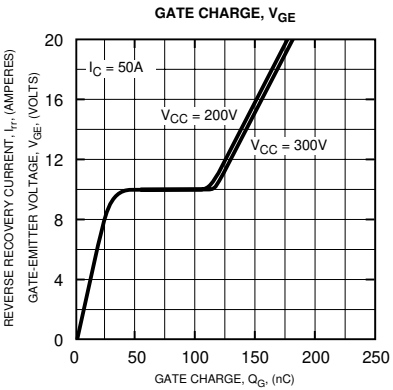
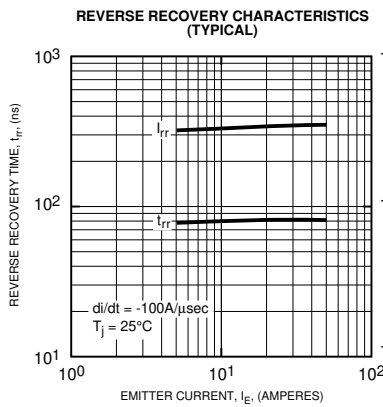
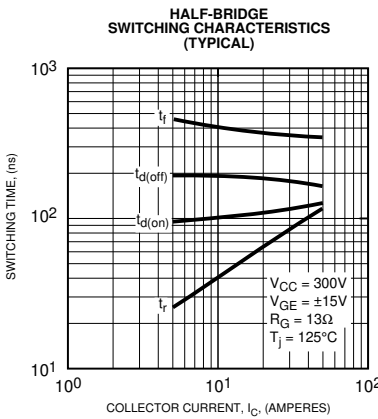
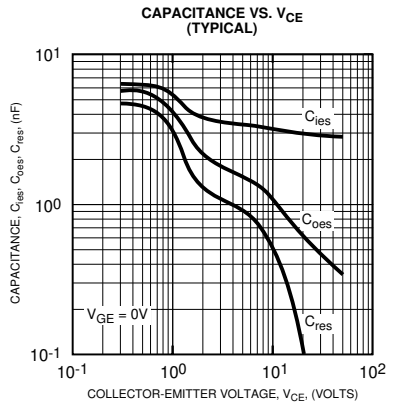
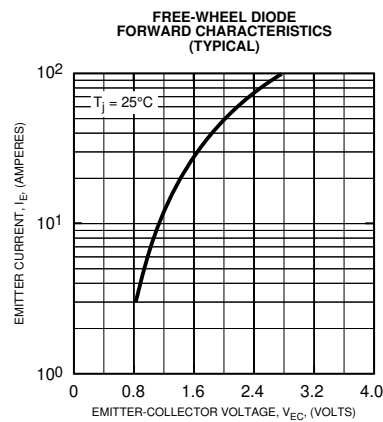
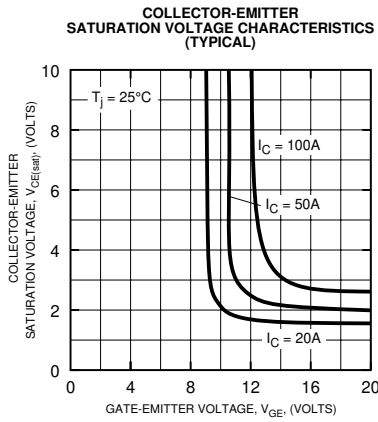
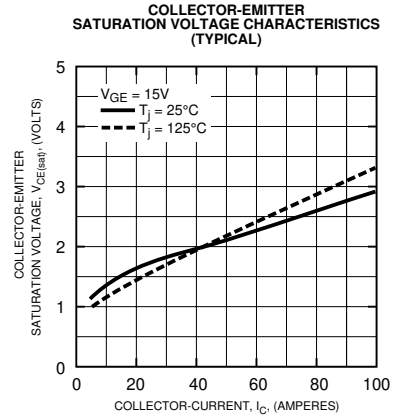
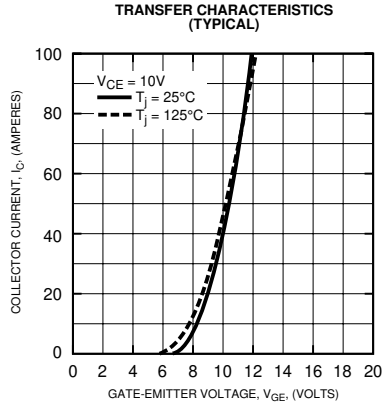
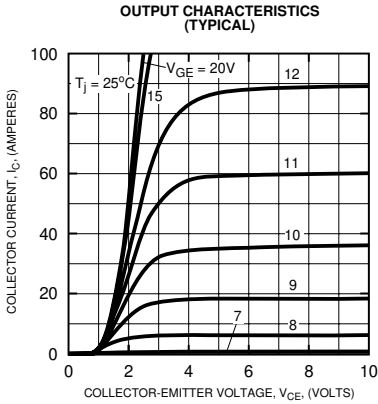
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}		–	–	5.0	nF
Output Capacitance	C_{oes}	$V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}$	–	–	1.8	nF
Reverse Transfer Capacitance	C_{res}		–	–	1.0	nF
Resistive	Turn-on Delay Time	$t_{\text{d(on)}}$	–	–	200	ns
	Rise Time	t_r	–	–	300	ns
Switching	Turn-off Delay Time	$t_{\text{d(off)}}$	–	–	200	ns
	Fall Time	t_f	–	–	300	ns
Diode Reverse Recovery Time	t_{rr}	$I_E = 50\text{A}, di_E/dt = -100\text{A}/\mu\text{s}$	–	–	110	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E = 50\text{A}, di_E/dt = -100\text{A}/\mu\text{s}$	–	0.14	–	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	–	–	0.50	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per FWDi	–	–	1.00	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{\text{th(c-f)}}$	Per Module, Thermal Grease Applied	–	–	0.075	$^\circ\text{C}/\text{W}$

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