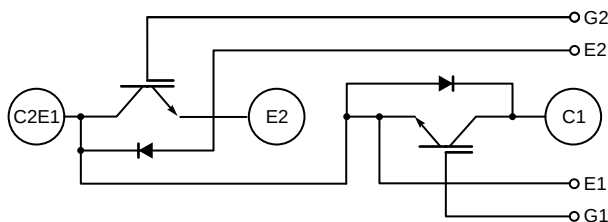
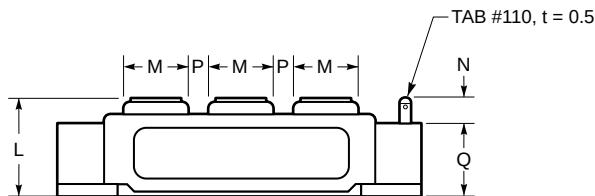
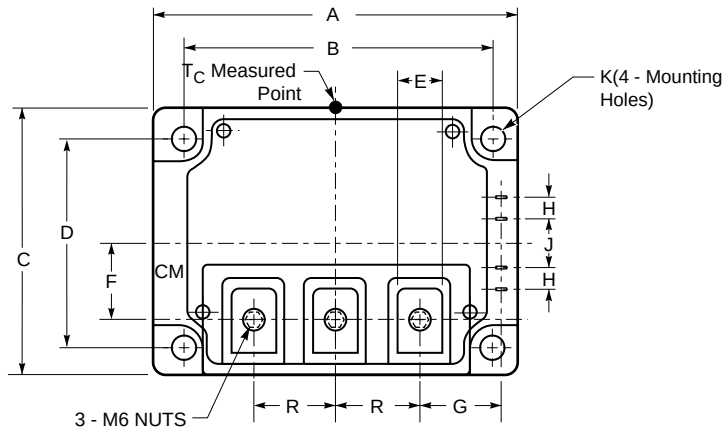


MITSUBISHI IGBT MODULES
CM350DU-5F
HIGH POWER SWITCHING USE
INSULATED TYPE



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.33	110.0
B	3.66±0.01	93.0±0.25
C	3.15	80.0
D	2.44±0.01	62.0±0.25
E	0.55	14.0
F	0.86	21.75
G	0.94	24.0
H	0.24	6.0

Dimensions	Inches	Millimeters
J	0.59	15.0
K	0.26 Dia.	6.5 Dia.
L	1.14 +0.04/-0.02	29 +1.0/-0.5
M	0.71	18.0
N	0.33	8.5
P	0.28	7.0
Q	0.83	21.0
R	0.98	25.0



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:

- ☐ UPS
- ☐ Forklift

Ordering Information:

Example: Select the complete module number you desire from the table - i.e. CM350DU-5F is a 250V (V_{CES}), 350 Ampere Trench Gate Design Dual IGBT Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	350	5

CM350DU-5F

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

Ratings	Symbol	CM350DU-5F	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}	250	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	± 20	Volts
Collector Current ($T_c = 25^{\circ}\text{C}$)	I_c	350	Amperes
Peak Collector Current	I_{CM}	700	Amperes
Emitter Current** ($T_c = 25^{\circ}\text{C}$)	I_E	350	Amperes
Peak Emitter Current**	I_{EM}	700*	Amperes
Maximum Collector Dissipation ($T_c = 25^{\circ}\text{C}$, $T_j \leq 150^{\circ}\text{C}$)	P_c	960	Watts
Mounting Torque, M6 Main Terminal	—	1.96 ~ 2.94	$\text{N} \cdot \text{m}$
Mounting Torque, M6 Mounting	—	1.96 ~ 2.94	$\text{N} \cdot \text{m}$
Weight	—	520	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 $T_{j(\text{max})}$ 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	mA
Gate Leakage Current	I_{GES}	$V_{\text{GE}} = V_{\text{CES}}$, $V_{\text{CE}} = 0\text{V}$	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_c = 35\text{mA}$, $V_{\text{CE}} = 10\text{V}$	3.0	4.0	5.0	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_c = 350\text{A}$, $V_{\text{GE}} = 10\text{V}$, $T_j = 25^{\circ}\text{C}$	—	1.2	1.7	Volts
		$I_c = 350\text{A}$, $V_{\text{GE}} = 10\text{V}$, $T_j = 125^{\circ}\text{C}$	—	1.10	—	Volts
Total Gate Charge	Q_G	$V_{\text{CC}} = 100\text{V}$, $I_c = 350\text{A}$, $V_{\text{GE}} = 10\text{V}$	—	1320	—	nC
Emitter-Collector Voltage*	V_{EC}	$I_E = 350\text{A}$, $V_{\text{GE}} = 0\text{V}$	—	—	2.0	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_{ies}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	99	nF
Output Capacitance		C_{oes}		—	—	4.5	nF
Reverse Transfer Capacitance		C_{res}		—	—	3.4	nF
Resistive Load	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 100V, I_C = 350A,$	—	—	1100	ns
	Rise Time	t_r	$V_{GE1} = V_{GE2} = 10V,$	—	—	2400	ns
Switching Times	Turn-off Delay Time	$t_{d(off)}$	$R_G = 7.1\Omega,$ Resistive	—	—	900	ns
	Fall Time	t_f	Load Switching Operation	—	—	500	ns
Diode Reverse Recovery Time		t_{rr}	$I_E = 350A, di_E/dt = -700A/\mu s$	—	—	300	ns
Diode Reverse Recovery Charge		Q_{rr}	$I_E = 350A, di_E/dt = -700A/\mu s$	—	5.7	—	μC

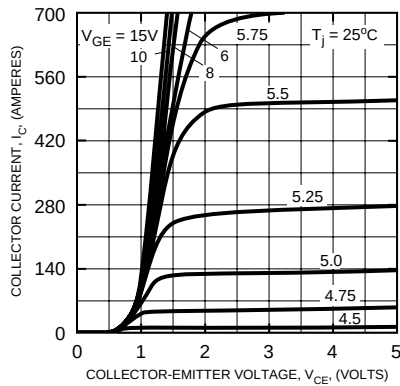
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per IGBT	—	—	0.17	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per Free-Wheel Diode	—	—	0.28	$^{\circ}\text{C}/\text{W}$
Contact Thermal Resistance	$R_{\text{th(c-f)}}$	Per Module, Thermal Grease Applied	—	0.010	—	$^{\circ}\text{C}/\text{W}$

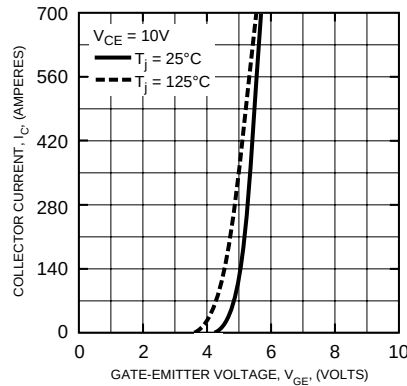
CM350DU-5F

HIGH POWER SWITCHING USE
INSULATED TYPE

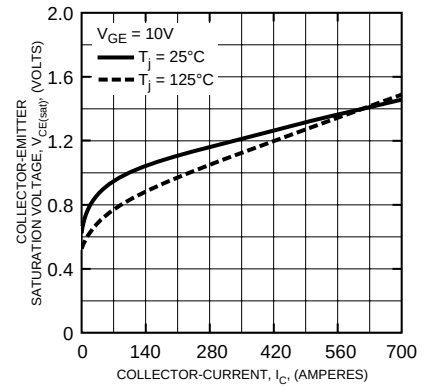
OUTPUT CHARACTERISTICS
(TYPICAL)



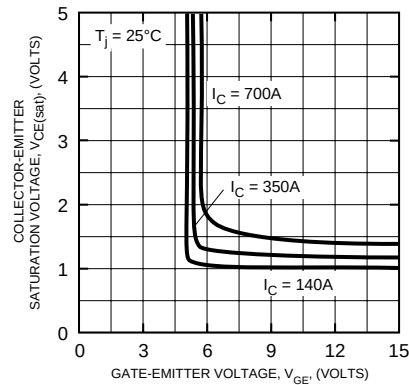
TRANSFER CHARACTERISTICS
(TYPICAL)



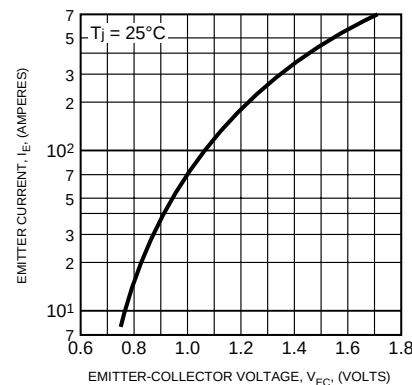
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



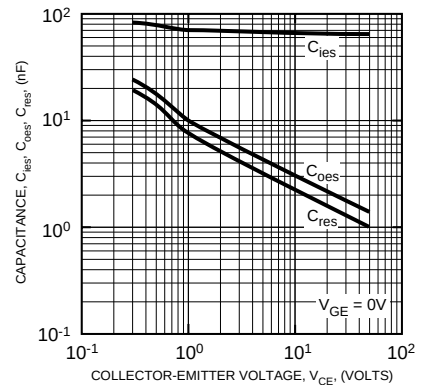
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



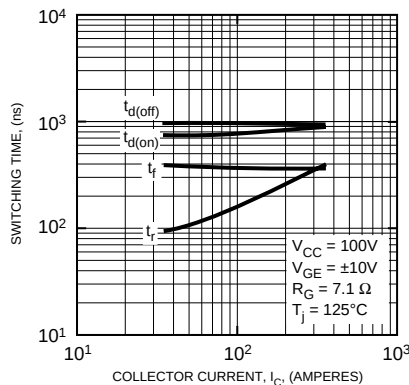
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



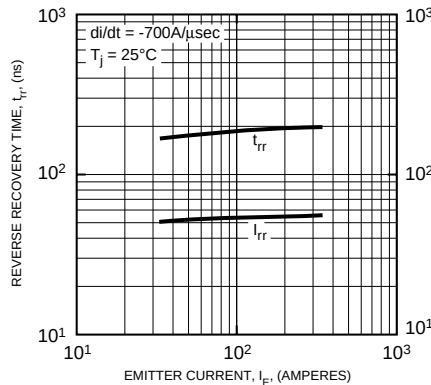
CAPACITANCE VS. V_{CE}
(TYPICAL)



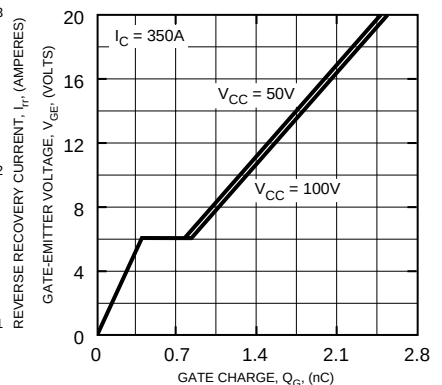
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



GATE CHARGE, V_{GE}



CM350DU-5F

HIGH POWER SWITCHING USE
INSULATED TYPE

