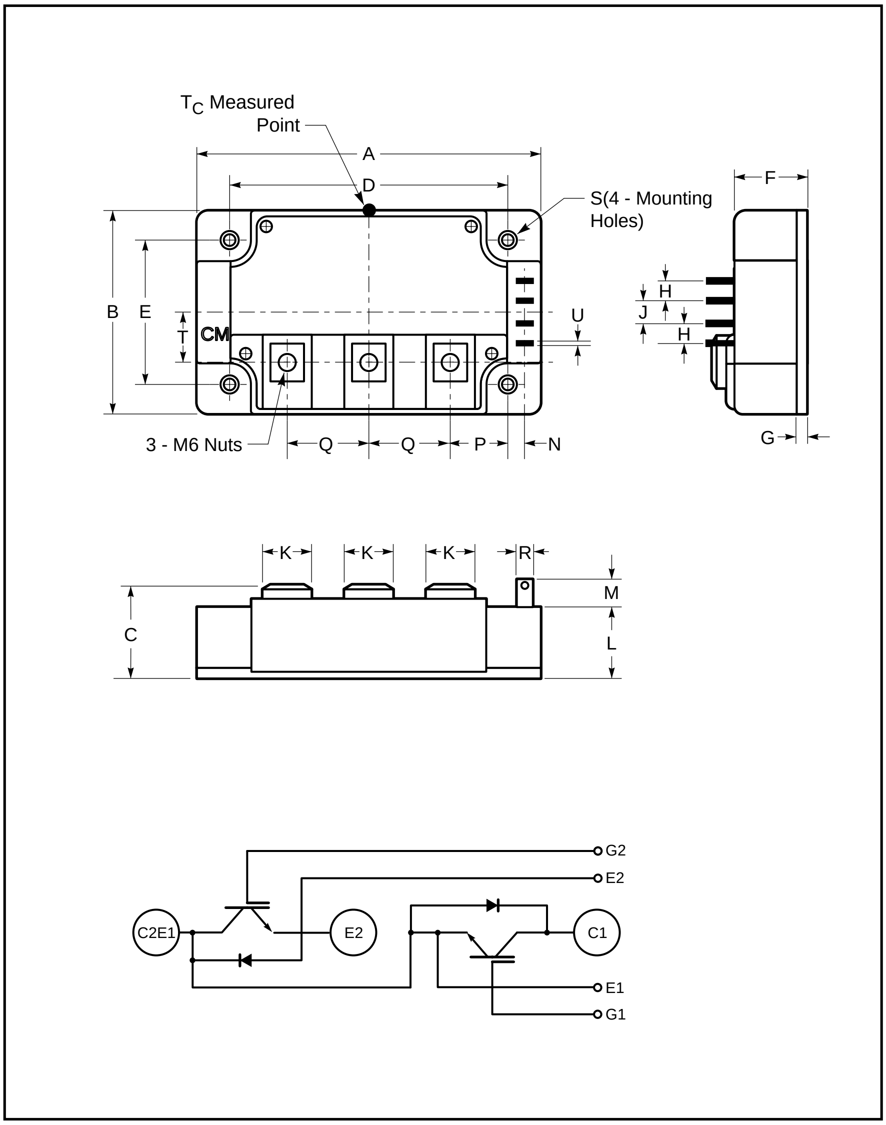
MITSUBISHI IGBT MODULES

CM300DU-12H

HIGH POWER SWITCHING USE
INSULATED TYPE



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.25	108.0
B	2.44	62.0
C	1.14 +0.04/-0.02	29 +1.0/-0.5
D	3.66±0.01	93.0±0.25
E	1.88±0.01	48.0±0.25
F	0.87	22.0
G	0.16	4.0
H	0.24	6.0
J	0.59	15.0

Dimensions	Inches	Millimeters
K	0.71	18.0
L	0.87	22.0
M	0.33	8.5
N	0.10	2.5
P	0.85	21.5
Q	0.98	25.0
R	0.11	2.8
S	0.25 Dia.	6.5 Dia.
T	0.6	15.15

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 module number you desire from the table - i.e. CM300DU-12H is a 600V (V_{CES}), 300 Ampere Dual IGBT Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	300	12

Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	CM300DU-12H	Units
Junction Temperature	T_j	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°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°C)	I_C	300	Amperes
Peak Collector Current ($T_j \leq$ 150°C)	I_{CM}	600*	Amperes
Emitter Current** (T_c = 25°C)	I_E	300	Amperes
Peak Emitter Current**	I_{EM}	600*	Amperes
Maximum Collector Dissipation (T_c = 25°C)	P_c	890	Watts
Mounting Torque, M6 Main Terminal	–	3.5~4.5	N · m
Mounting Torque, M6 Mounting	–	3.5~4.5	N · m
Weight	–	400	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 °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	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 30mA, V_{CE} = 10V	4.5	6	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 300A, V_{GE} = 15V, T_j = 25°C	–	2.4	3.0	Volts
		I_C = 300A, V_{GE} = 15V, T_j = 125°C	–	2.6	–	Volts
Total Gate Charge	Q_G	V_{CC} = 300V, I_C = 300A, V_{GE} = 15V	–	600	–	nC
Emitter-Collector Voltage*	V_{EC}	I_E = 300A, 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 °C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V	–	–	26.4	nF
Output Capacitance		C_{oes}		–	–	14.4	nF
Reverse Transfer Capacitance		C_{res}		–	–	4	nF
Resistive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 300V, I_C = 300A,	–	–	250	ns
Load	Rise Time	t_r	$V_{GE1} = V_{GE2}$ = 15V,	–	–	600	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	R_G = 2.1Ω, Resistive	–	–	350	ns
Times	Fall Time	t_f	Load Switching Operation	–	–	300	ns
Diode Reverse Recovery Time		t_{rr}	I_E = 300A, di_E/dt = -600A/µs	–	–	160	ns
Diode Reverse Recovery Charge		Q_{rr}	I_E = 300A, di_E/dt = -600A/µs	–	0.72	–	µC

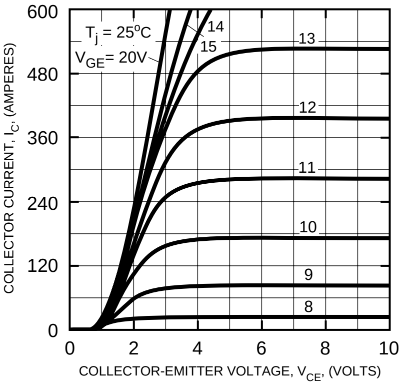
Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT 1/2 Module	–	–	0.14	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi 1/2 Module	–	–	0.24	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.020	–	°C/W

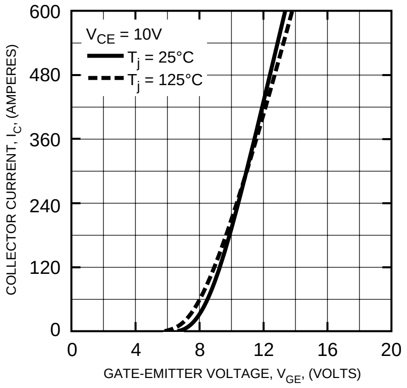
CM300DU-12H

HIGH POWER SWITCHING USE
INSULATED TYPE

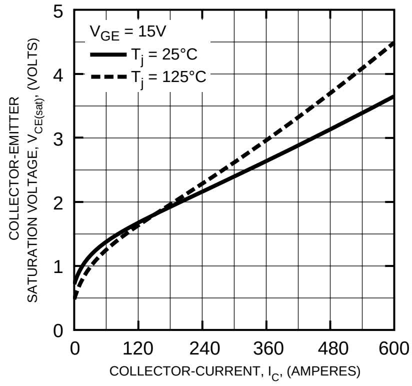
OUTPUT CHARACTERISTICS (TYPICAL)



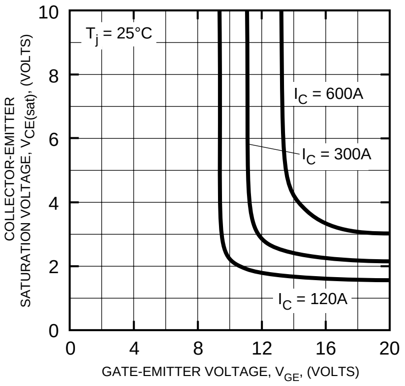
TRANSFER CHARACTERISTICS (TYPICAL)



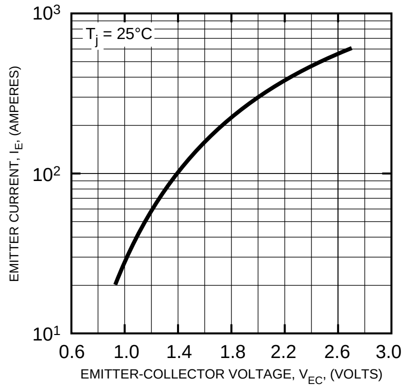
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



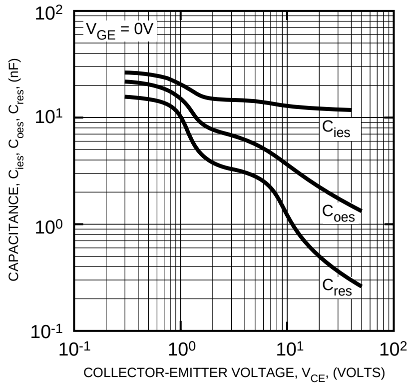
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



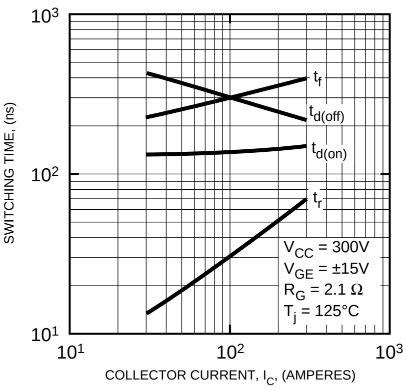
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



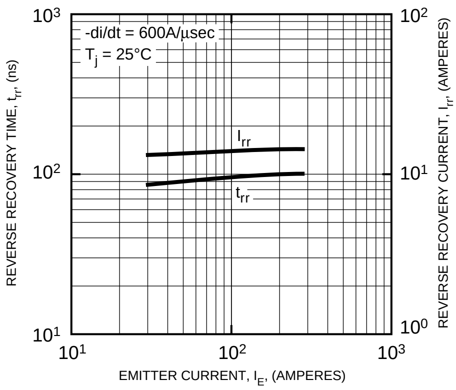
CAPACITANCE VS. V_{CE} (TYPICAL)



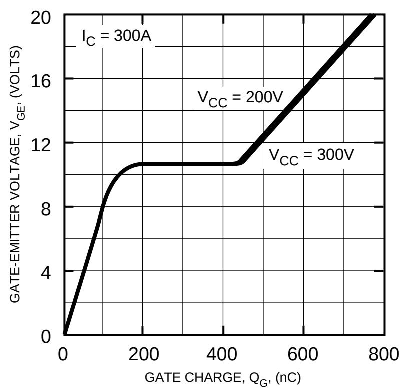
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

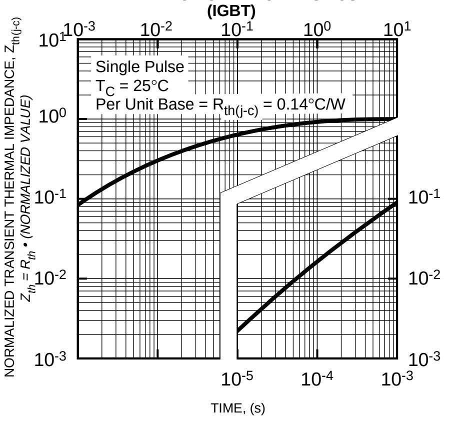


GATE CHARGE, V_{GE}



MITSUBISHI ELECTRIC

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi)