MITSUBISHI IGBT MODULES

CM200DU-24NFH

HIGH POWER SWITCHING USE

CM200DU-24NFH

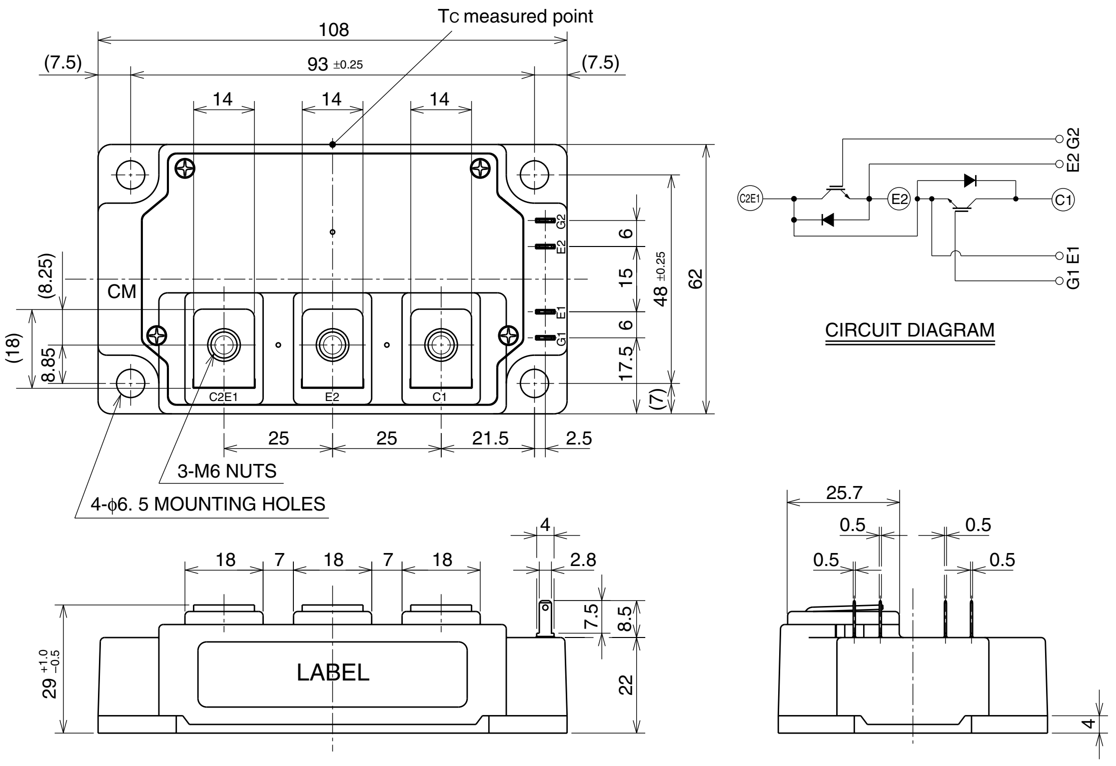
- I_C 200A
- V_{CES} 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION

High frequency switching use (30kHz to 60kHz).
Gradient amplifier, Induction heating, power supply, etc.

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



Feb. 2009

MITSUBISHI ELECTRIC

MAXIMUM RATINGS (Tj = 25°C, unless otherwise specified)

Symbol	Parameter	Conditions		Ratings	Unit
V_{CES}	Collector-emitter voltage	G-E Short		1200	V
V_{GES}	Gate-emitter voltage	C-E Short		±20	V
I_C	Collector current	Operation	(Note 2)	200	A
I_{CM}		Pulse	(Note 2)	400	A
I_E (Note 1)	Emitter current	Operation	(Note 2)	200	A
I_{EM} (Note 1)		Pulse	(Note 2)	400	A
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C		830	W
P_C' (Note 3)	Maximum collector dissipation	T_C' = 25°C[*4]		1300	W
T_j	Junction temperature			–40 ~ +150	°C
T_{stg}	Storage temperature			–40 ~ +125	°C
V_{iso}	Isolation voltage	Terminals to base plate, f = 60Hz, AC 1 minute		2500	Vrms
—	Mounting torque	Main terminals M6 screw		3.5 ~ 4.5	N • m
—		Mounting M6 screw		3.5 ~ 4.5	N • m
—	Weight	Typical value		400	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C, unless otherwise specified)

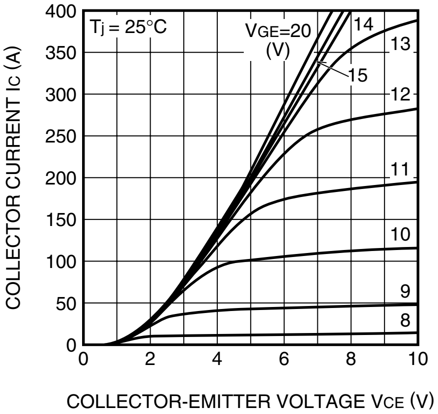
Symbol	Parameter	Test conditions		Limits			Unit
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 20mA, V_{CE} = 10V		4.5	6	7.5	V
I_{GES}	Gate leakage current	±V_{GE} = V_{GES}, V_{CE} = 0V		—	—	0.7	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C = 200A, V_{GE} = 15V	T_j = 25°C	—	5.0	6.5	V
			T_j = 125°C	—	5.0	—	
C_{ies}	Input capacitance	V_{CE} = 10V V_{GE} = 0V		—	—	32	nF
C_{oes}	Output capacitance			—	—	2.7	nF
C_{res}	Reverse transfer capacitance			—	—	0.6	nF
Q_G	Total gate charge	V_{CC} = 600V, I_C = 200A, V_{GE} = 15V		—	900	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 600V, I_C = 200A V_{GE} = ±15V R_G = 1.6Ω, Inductive load I_E = 200A		—	—	300	ns
t_r	Turn-on rise time			—	—	80	ns
$t_{d(off)}$	Turn-off delay time			—	—	500	ns
t_f	Turn-off fall time			—	—	150	ns
t_{rr} (Note 1)	Reverse recovery time			—	—	250	ns
Q_{rr} (Note 1)	Reverse recovery charge			—	7.5	—	μC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 200A, V_{GE} = 0V		—	—	3.5	V
$R_{th(j-c)}$Q	Thermal resistance[*1]	IGBT part (1/2 module)		—	—	0.15	K/W
$R_{th(j-c)}$R		FWDi part (1/2 module)		—	—	0.24	K/W
$R_{th(c-f)}$	Contact thermal resistance	Case to heat sink, Thermal compound Applied[*2] (1/2 module)		—	0.04	—	K/W
$R_{th(j-c')}$Q	Thermal resistance[*4]	IGBT part (1/2 module)		—	—	0.095[*3]	K/W
$R_{th(j-c')}$R		FWDi part (1/2 module)		—	—	0.14[*3]	K/W
R_G	External gate resistance			1.6	—	16	Ω

*1 : Case temperature (T_C) measured point is shown in page OUTLINE DRAWING.
*2 : Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].
*3 : If you use this value, $R_{th(f-a)}$ should be measured just under the chips.
*4 : Case temperature (T_C') measured point is just under the chips.

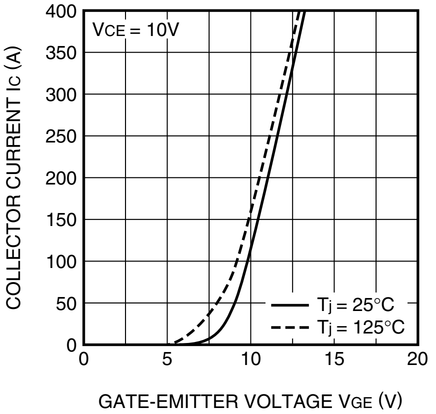
Note 1. I_E, I_{EM}, V_{EC}, t_{rr} & Q_{rr} represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).
2. Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed T_{jmax} rating.
3. Junction temperature (T_j) should not increase beyond 150°C.
4. No short circuit capability is designed.

PERFORMANCE CURVES

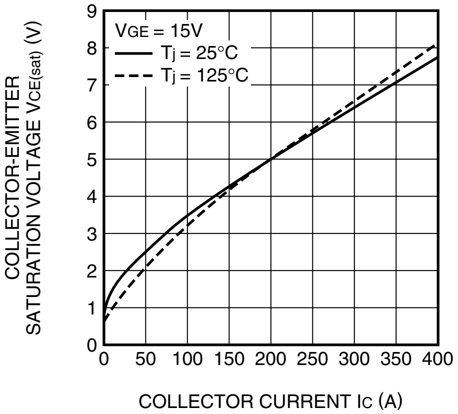
OUTPUT CHARACTERISTICS
(TYPICAL)



TRANSFER CHARACTERISTICS
(TYPICAL)



COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



COLLECTOR-EMITTER SATURATION
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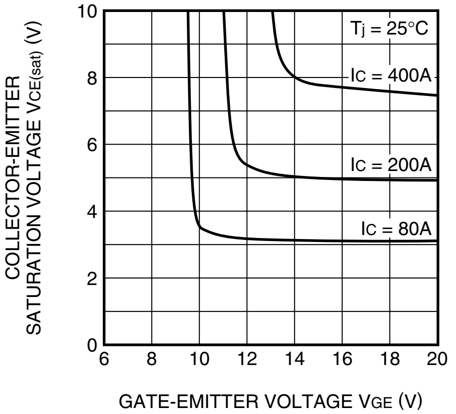
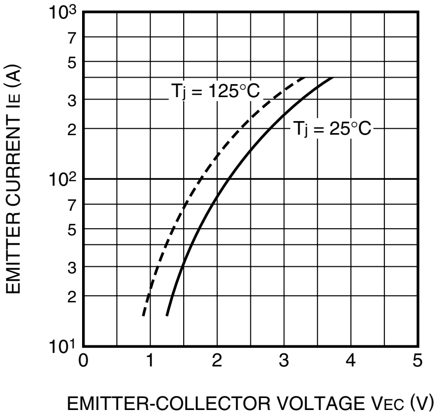
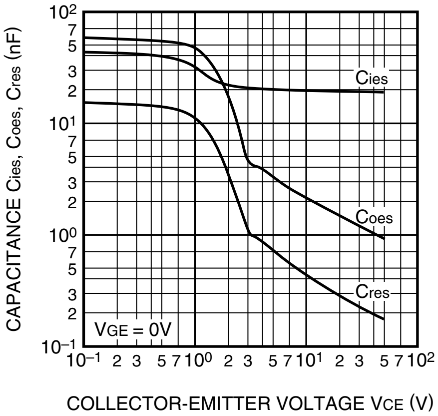


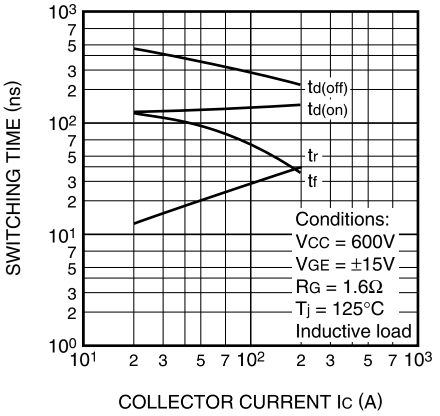
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



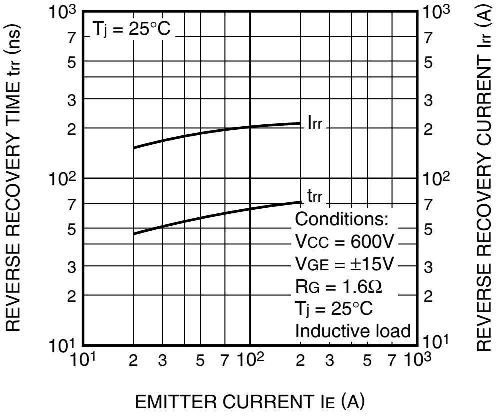
CAPACITANCE CHARACTERISTICS
(TYPICAL)



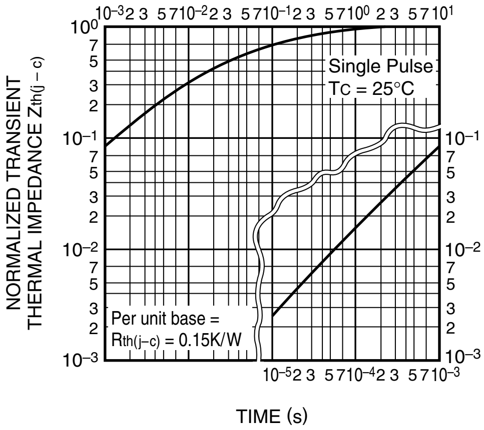
HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)



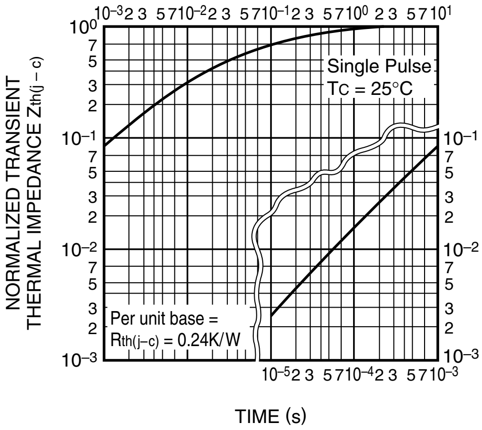
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)