CM300DU-12NFH

HIGH POWER SWITCHING USE

CM300DU-12NFH

- I_C 300A
- V_{CES} 600V
- Insulated Type
- 2-elements in a pack

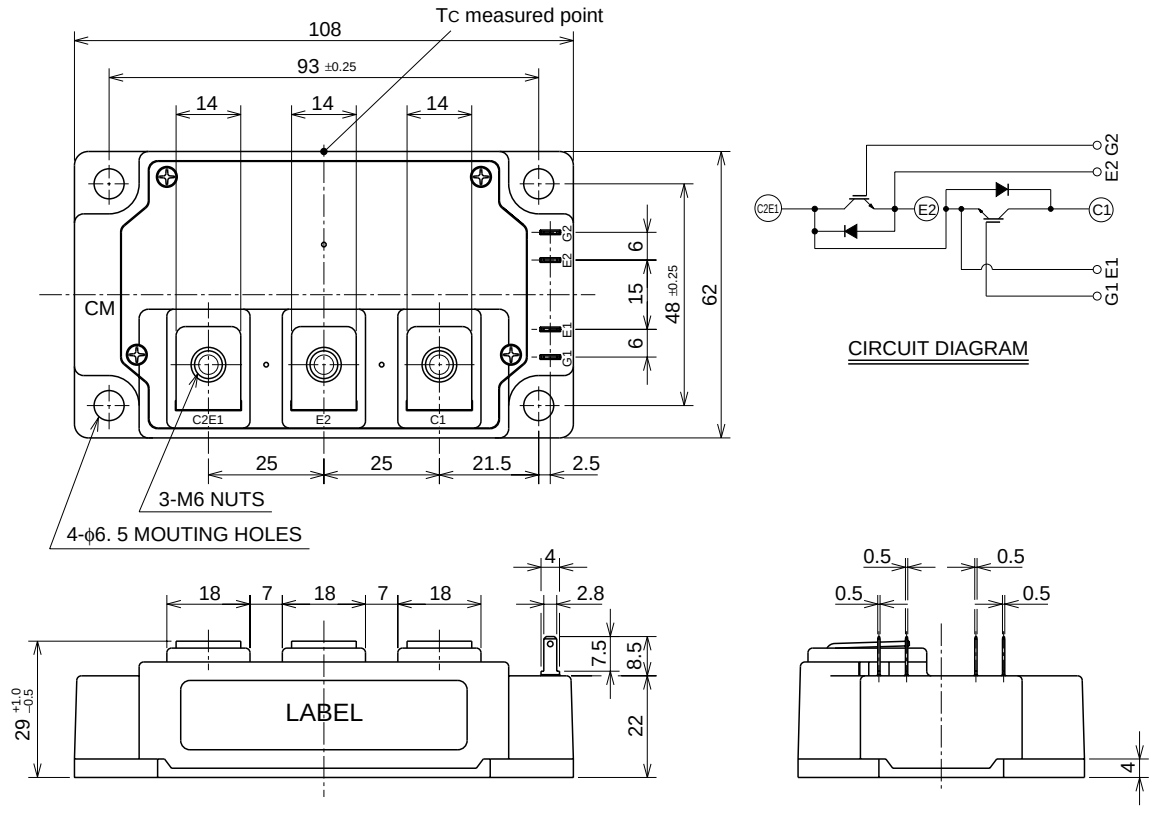
APPLICATION

High frequency switching use (30kHz to 60kHz).

Gradient amplifier, Induction heating, power supply, etc.

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



MITSUBISHI ELECTRIC

MAXIMUM RATINGS (Tj = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	Operation	300	A
I_{CM}		Pulse (Note 2)	600	A
I_E (Note 1)	Emitter current	Operation	300	A
I_{EM} (Note 1)		Pulse (Note 2)	600	A
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C	780	W
P_C' (Note 3)	Maximum collector dissipation	T_C' = 25°C*4	1250	W
T_j	Junction temperature		–40 ~ +150	°C
T_{stg}	Storage temperature		–40 ~ +125	°C
V_{iso}	Isolation voltage	Main Terminal to base plate, AC 1 min.	2500	V
—	Mounting torque	Main Terminal M6	3.5 ~ 4.5	N • m
—		Mounting holes M6	3.5 ~ 4.5	N • m
—	Weight	Typical value	400	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

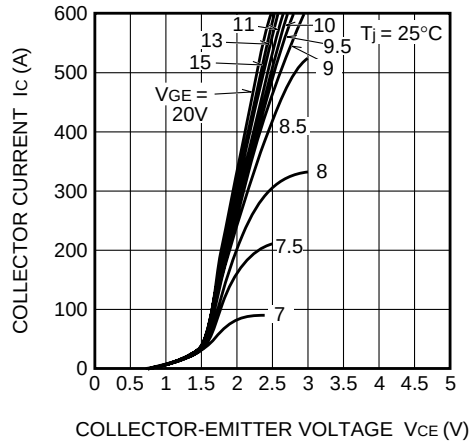
Symbol	Parameter	Test conditions		Limits			Unit
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 30mA, V_{CE} = 10V		5	6	7	V
I_{GES}	Gate leakage current	V_{GE} = V_{GES}, V_{CE} = 0V		—	—	0.5	µA
$V_{CE(sat)}$	Collector-emitter saturation voltage (Note 4)	T_j = 25°C	I_C = 300A, V_{GE} = 15V	—	2.0	2.7	V
		T_j = 125°C		—	1.95	—	
C_{ies}	Input capacitance	V_{CE} = 10V, V_{GE} = 0V		—	—	83	nF
C_{oes}	Output capacitance			—	—	5.4	nF
C_{res}	Reverse transfer capacitance			—	—	3.0	nF
Q_G	Total gate charge	V_{CC} = 300V, I_C = 300A, V_{GE} = 15V		—	1860	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 300V, I_C = 300A, V_{GE1} = V_{GE2} = 15V, R_G = 4.2Ω, Inductive load switching operation, I_E = 300A		—	—	350	ns
t_r	Turn-on rise time			—	—	150	ns
$t_{d(off)}$	Turn-off delay time			—	—	700	ns
t_f	Turn-off fall time			—	—	150	ns
t_{rr} (Note 1)	Reverse recovery time			—	—	200	ns
Q_{rr} (Note 1)	Reverse recovery charge			—	5.5	—	µC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 300A, V_{GE} = 0V		—	—	2.6	V
$R_{th(j-c)Q}$	Thermal resistance*1	IGBT part (1/2 module)		—	—	0.16	°C/W
$R_{th(j-c)R}$		FWDi part (1/2 module)		—	—	0.24	°C/W
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound Applied*2 (1/2 module)		—	0.04	—	°C/W
$R_{th(j-c')Q}$	Thermal resistance	Tc measured point is just under the chips (1/2 module)		—	—	0.10*3	°C/W
R_G	External gate resistance			2.1	—	21	Ω

*1 : T_C measured point is shown in page OUTLINE DRAWING.
*2 : Typical value is measured by using Shin-etsu Silicone "G-746".
*3 : If you use this value, $R_{th(f-a)}$ should be measured just under the chips.
*4 : T_C' measured point is just under the chips.

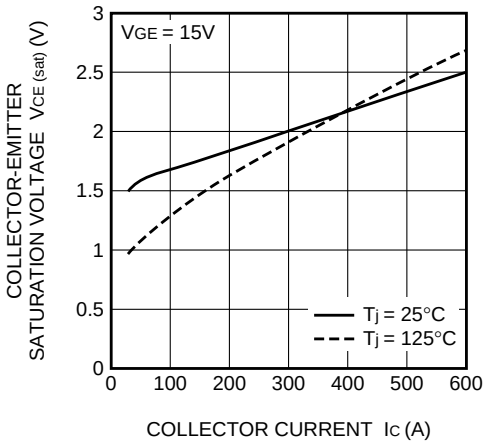
Note 1. I_E, V_{EC}, t_{rr} & Q_{rr} represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).
2. Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed T_{jmax} rating.
3. Junction temperature (T_j) should not increase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

PERFORMANCE CURVES

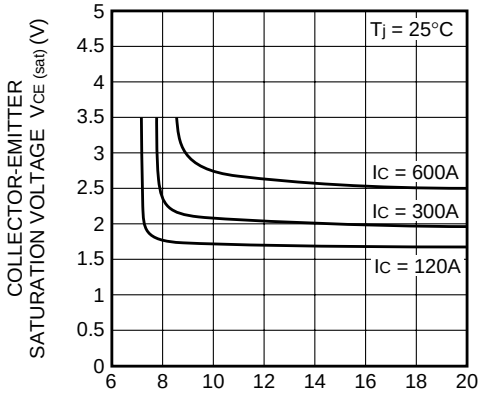
OUTPUT CHARACTERISTICS (TYPICAL)



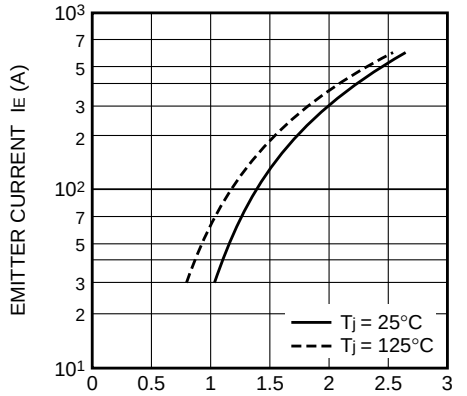
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



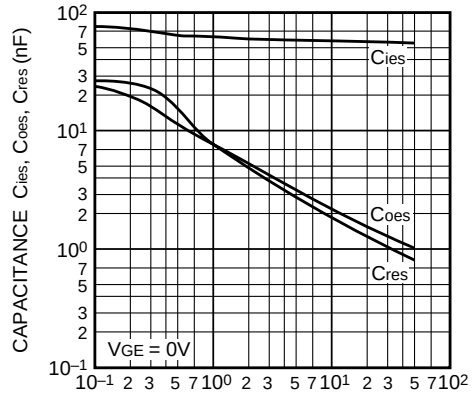
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



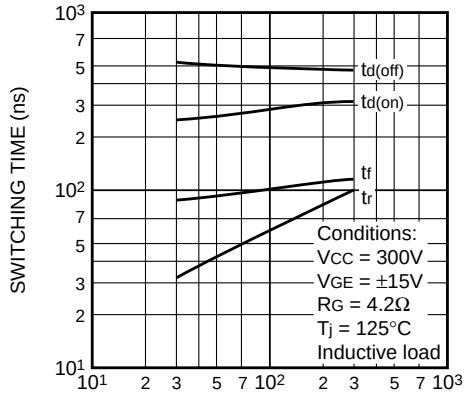
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



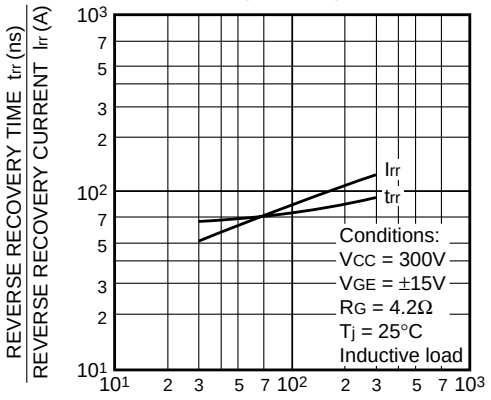
CAPACITANCE–VCE CHARACTERISTICS (TYPICAL)



HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)

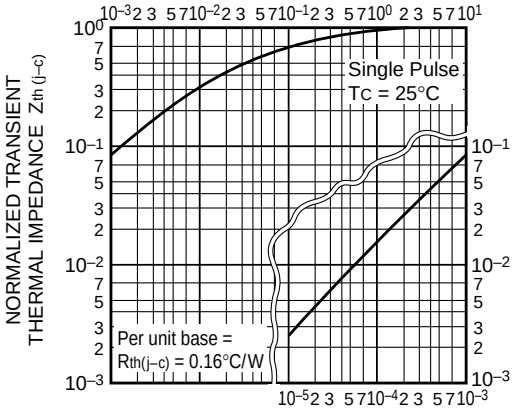


REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



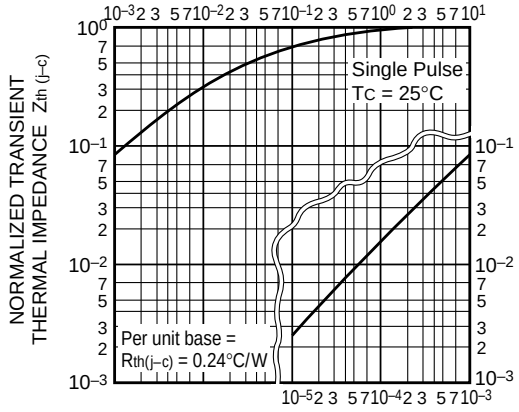
EMITTER CURRENT IE (A)

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



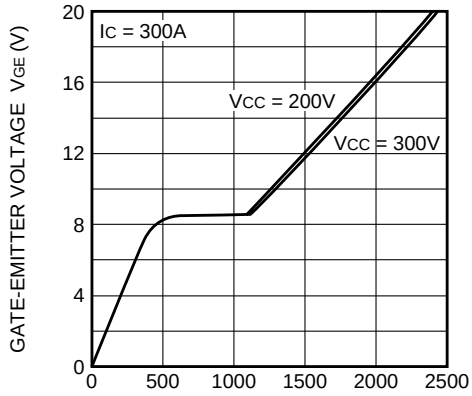
TIME (s)

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



TIME (s)

GATE CHARGE CHARACTERISTICS (TYPICAL)



GATE CHARGE QG (nC)

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