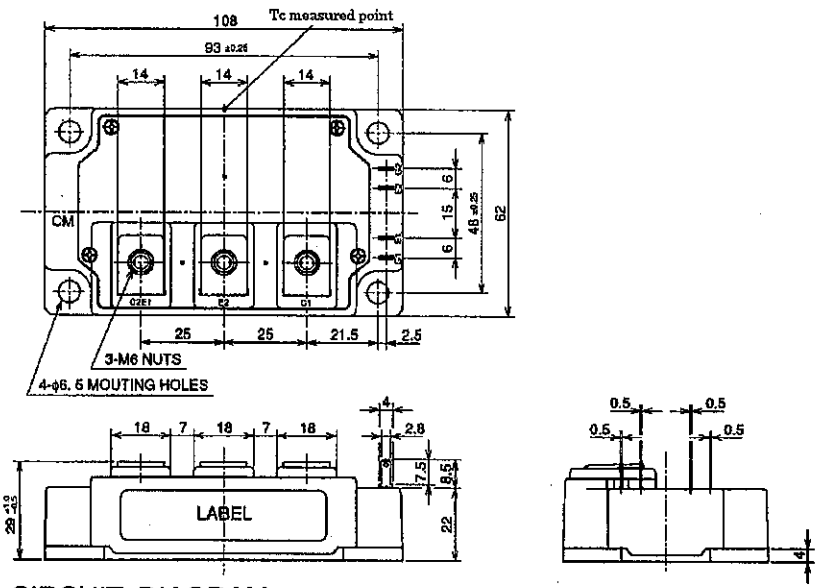
Pre.	S.Uchida	Rev	A	M. Kouzu
Apr.	M.Tabata 4-Sep.-'02			M.Tabata 29-Nov.-'02

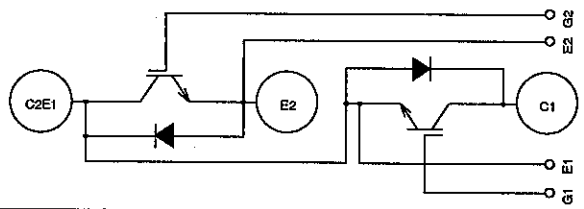
CM400DU-12NFH

- Ic ····· 400A
- V_{CES} ····· 600V
- Insulated Type
- 2-elements in a pack

OUTLINE DRAWING Dimensions in mm



CIRCUIT DIAGRAM



APPLICATION

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

A

ABSOLUTE MAXIMUM RATINGS (T_j = 25 °C)

Symbol	Item	Conditions	Ratings	Units
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	Tc= 25 °C	400	A
I_{CM}		Pulse ②	800	
I_E ①	Emitter current	Tc= 25 °C	400	A
I_{EM} ①		Pulse ②	800	
Pc ③	Maximum collector dissipation	Tc= 25 °C	960	W
Pc ③	Maximum collector dissipation	Tc' = 25 °C	1640	W
Tj	Junction temperature		−40~+150	°C
Tstg	Storage temperature		−40~+125	°C
Viso	Isolation voltage	Main terminal to base plate,AC 1 min.	2500	V
—	Torque strength	Main terminal M6	3.5 ~ 4.5	N·m
—	Torque strength	Mounting holes M6	3.5 ~ 4.5	N·m
—	Weight	Typical value	400	g

ELECTRICAL CHARACTERISTICS (T_j = 25 °C)

Symbol	Item	Conditions		Min.	Typ.	Max.	Units
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}, V_{GE}$= 0V		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=40mA, 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 to emitter saturation Voltage ④	T_j= 25 °C	I_C = 400A	—	2.0	2.7	V
		T_j= 125 °C	V_{GE}= 15V	—	1.95	—	
Cies	Input capacitance	V_{CE}= 10V		—	—	110	nF
Coes	Output capacitance	V_{GE}= 0V		—	—	7.2	
Cres	Reverse transfer capacitance			—	—	4.0	
Q_G	Total gate charge	V_{CC}=300V, Ic=400A, V_{GE}=15V		—	2480	—	nC
td(on)	Turn-on delay time	V_{CC}=300V, Ic=400A		—	—	400	ns
tr	Turn-on rise time	$V_{GE1}=V_{GE2}$=15V		—	—	200	
td(off)	Turn-off delay time	R_G=3.1Ω, Inductive load		—	—	700	
tf	Turn-off fall time	switching operation		—	—	150	
trr ①	Reverse recovery time	I_E=400A		—	—	200	ns
Qrr ①	Reverse recovery charge			—	7.7	—	μC
V_{EC} ①	Emitter-collector voltage	I_E=400A, V_{GE}= 0V		—	—	2.6	V
Rth(j-c)Q	Thermal resistance*1	IGBT part (1/2 module)		—	—	0.13	°C/W
Rth(j-c)R		FWDi part(1/2 module)		—	—	0.18	
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound Applied (1/2module) *2		—	0.04	—	
Rth(j-c')Q	Thermal resistance	Tc measured point is just under the chips (1/2module)		—	—	0.076*3	
RG	External gate resistance			1.6	—	16	Ω

*1:Tc measured point is shown in page "1-2".
*2:Typical value is measured by using Shin-etsu Silicone "G-746".
*3 :If you use this value , Rth(f-a) should be measured just under the chips.

① I_E, V_{EC}, trr, Qrr & die/dt 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) dose not exceed Tjmax rating.
③ Junction temperature (T_j) should not increase beyond 150°C.
④ Pulse width and repetition rate should be such as to cause neglible temperature rise.
⑤ No short circuit capability is designed.

A