

MITSUBISHI IGBT MODULES  
**CM1000DU-34NF**

HIGH POWER SWITCHING USE

**CM1000DU-34NF**



- Ic ..... 1000A
- VCES ..... 1700V
- Insulated Type
- 2-elements in a pack

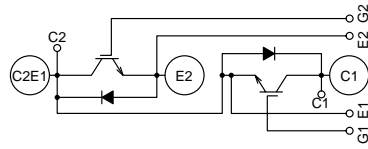
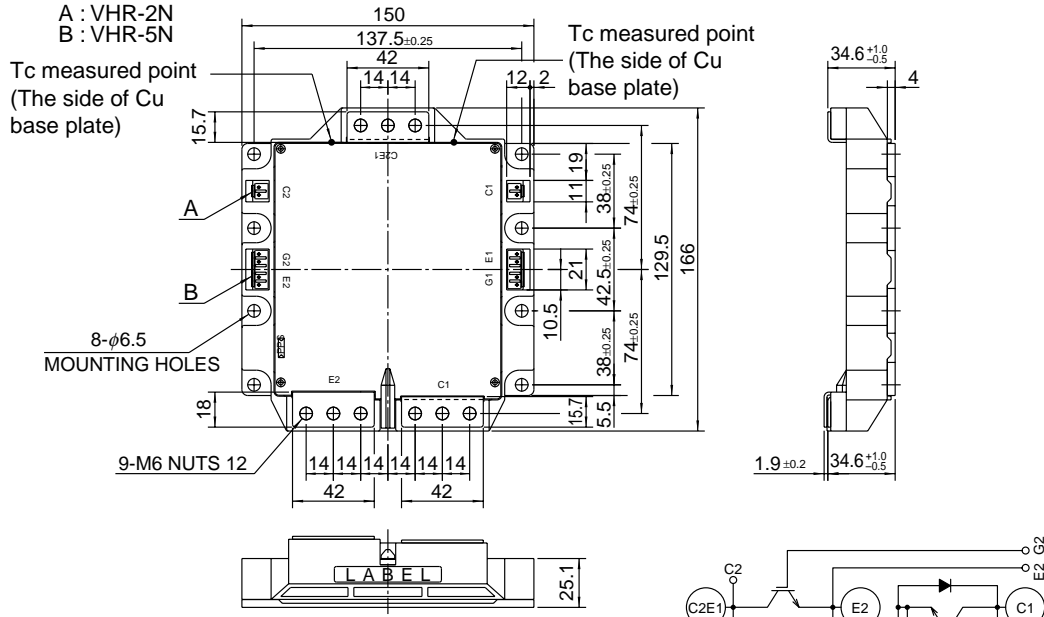
**APPLICATION**

General purpose inverters Servo controls, etc

**OUTLINE DRAWING & CIRCUIT DIAGRAM**

Dimensions in mm

A,B HOUSING Type  
 (J. S. T. Mfg. Co. Ltd)  
 A : VHR-2N  
 B : VHR-5N



CIRCUIT DIAGRAM

## CM1000DU-34NF

## HIGH POWER SWITCHING USE

MAXIMUM RATINGS (T<sub>j</sub> = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CE</sub>	Collector-emitter voltage	G-E Short	1700	V
V <sub>GE</sub>	Gate-emitter voltage	C-E Short	±20	V
I <sub>C</sub>	Collector current	T <sub>c</sub> ' = 104°C	1000	A
I <sub>CM</sub>		Pulse (Note 2)	2000	
I <sub>E</sub> (Note 1)	Emitter current	T <sub>c</sub> = 25°C	1000	A
I <sub>EM</sub> (Note 1)		Pulse (Note 2)	2000	
P <sub>C</sub> (Note 3)	Maximum collector dissipation	T <sub>c</sub> ' = 25°C	8900	W
T <sub>j</sub>	Junction temperature		-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature <sup>3</sup>		-40 ~ +125	°C
V <sub>iso</sub>	Isolation voltage	Main terminal to base plate, AC 1 min.	3500	V
—	Torque strength	Main terminal M6	3.5 ~ 4.5	N • m
—		Mounting holes M6	3.5 ~ 4.5	N • m
—	Weight	Typical value	1400	g

ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>CES</sub>	Collector cutoff current	V <sub>CE</sub> = V <sub>CE</sub> , V <sub>GE</sub> = 0V	—	—	1	mA
V <sub>GE(th)</sub>	Gate-emitter threshold voltage	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V	5.5	7	8.5	V
I <sub>GES</sub>	Gate leakage current	V <sub>GE</sub> = V <sub>GES</sub> , V <sub>CE</sub> = 0V	—	—	5	μA
V <sub>CE(sat)</sub> (chip)	Collector-emitter saturation voltage (without lead resistance)	T <sub>j</sub> = 25°C	—	2.2	2.8	V
		T <sub>j</sub> = 125°C	—	2.45	—	
R <sub>(lead)</sub>	Module lead resistance	I <sub>C</sub> = 1000A, terminal-chip	—	0.286	—	mΩ
C <sub>ies</sub>	Input capacitance	V <sub>CE</sub> = 10V V <sub>GE</sub> = 0V	—	—	220	nF
C <sub>oes</sub>	Output capacitance		—	—	25	
C <sub>res</sub>	Reverse transfer capacitance		—	—	4.7	
Q <sub>G</sub>	Total gate charge	V <sub>CC</sub> = 1000V, I <sub>C</sub> = 1000A, V <sub>GE</sub> = 15V	—	6000	—	nC
t <sub>d(on)</sub>	Turn-on delay time	V <sub>CC</sub> = 1000V, I <sub>C</sub> = 1000A V <sub>GE1</sub> = V <sub>GE2</sub> = 15V R <sub>G</sub> = 0.47Ω, Inductive load switching operation	—	—	600	ns
t <sub>r</sub>	Turn-on rise time		—	—	150	
t <sub>d(off)</sub>	Turn-off delay time		—	—	900	
t <sub>f</sub>	Turn-off fall time		—	—	200	
t <sub>rr</sub> (Note 1)	Reverse recovery time		I <sub>E</sub> = 1000A	—	—	
Q <sub>rr</sub> (Note 1)	Reverse recovery charge		—	90	—	μC
V <sub>EC</sub> (Note 1) (chip)	Emitter-collector voltage (without lead resistance)	I <sub>E</sub> = 1000A, V <sub>GE</sub> = 0V	—	2.3	3	V
R <sub>th(j-c)Q</sub>	Thermal resistance <sup>*1</sup>	IGBT part (1/2 module)	—	—	0.014	°C/W
R <sub>th(j-c)R</sub>		FWDi part (1/2 module)	—	—	0.023	
R <sub>th(c-f)</sub>	Contact thermal resistance <sup>*2</sup>	Case to fin, Thermal compound applied (1/2 module)	—	0.016	—	
R <sub>G</sub>	External gate resistance		0.47	—	4.7	Ω

Note 1. I<sub>E</sub>, V<sub>EC</sub>, t<sub>rr</sub> & Q<sub>rr</sub> 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<sub>j</sub>) does not exceed T<sub>jmax</sub> rating.

3. Junction temperature (T<sub>j</sub>) should not increase beyond 150°C.

4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

\*1 : T<sub>c</sub> measured point is just under the chips.

If you use this value, R<sub>th(f-a)</sub> should be measured just under the chips.

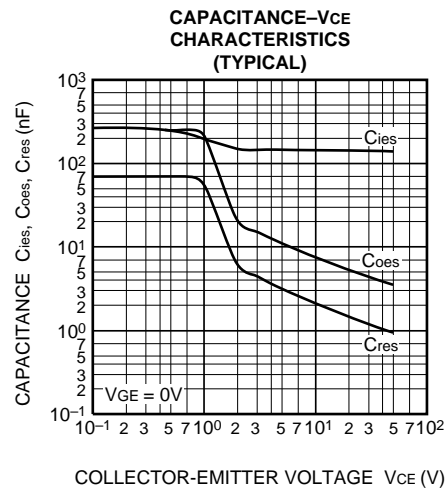
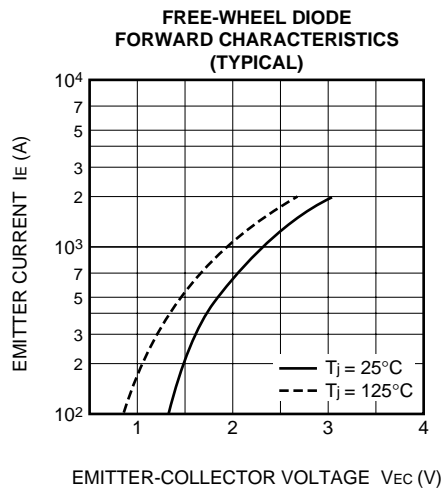
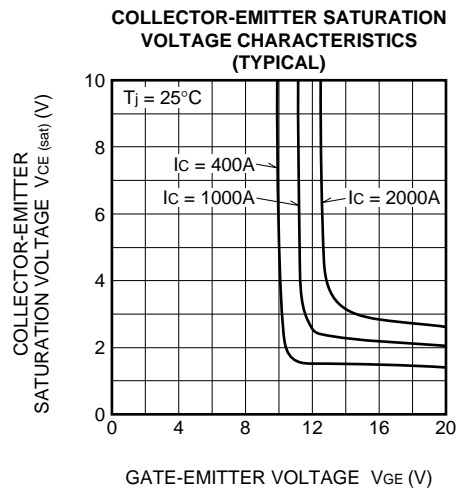
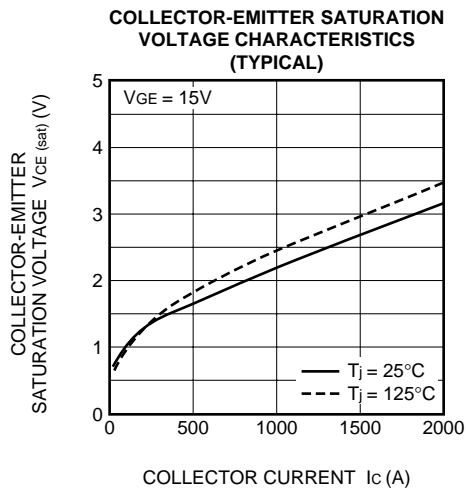
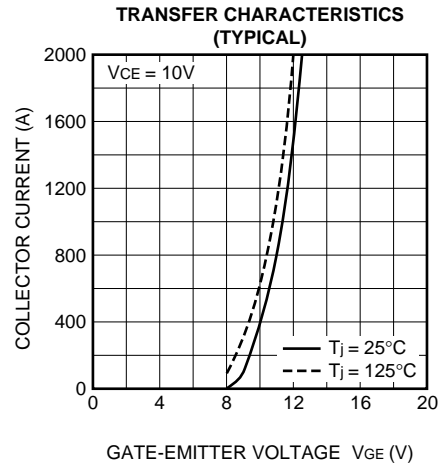
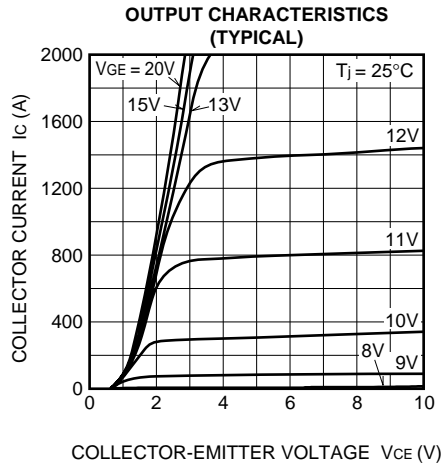
\*2 : Typical value is measured by using Shin-etsu Silicone "G-746".

\*3 : The operation temperature is restrained by the permission temperature of female connector.

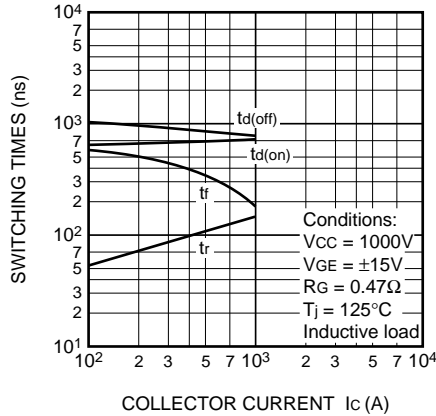
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HIGH POWER SWITCHING USE

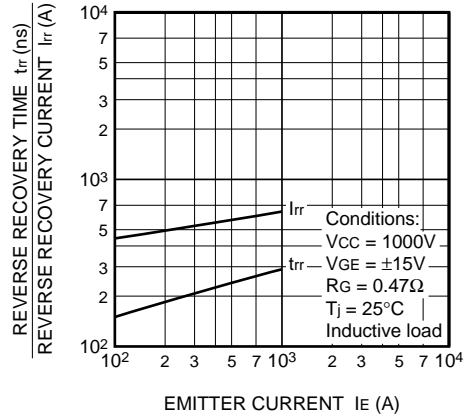
## PERFORMANCE CURVES



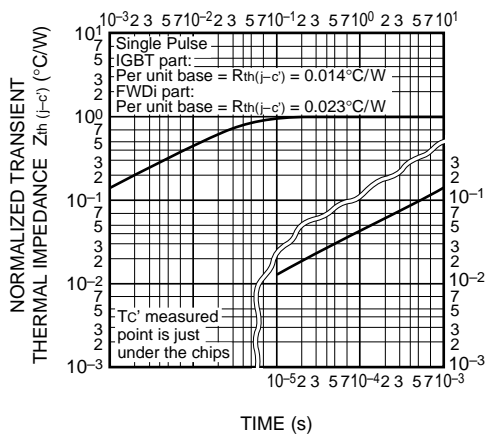
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



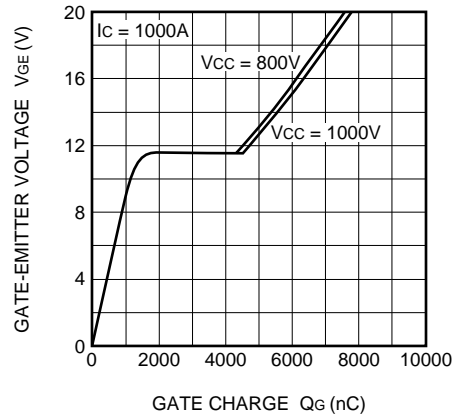
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



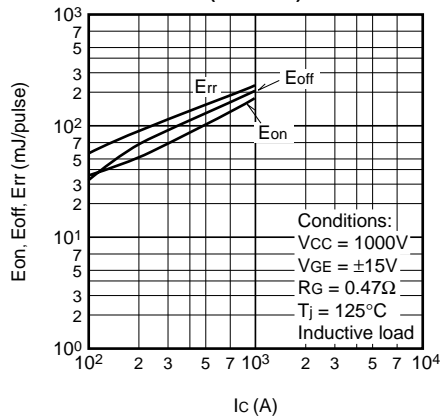
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)



Ic-Esw (TYPICAL)



Rg-Esw (TYPICAL)

