

MITSUBISHI IGBT MODULES  
**CM900DU-24NF**

HIGH POWER SWITCHING USE

**CM900DU-24NF**



- IC .....900A
- VCES ..... 1200V
- Insulated Type
- 2-elements in a pack

**APPLICATION**

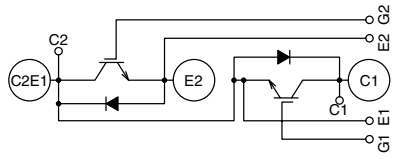
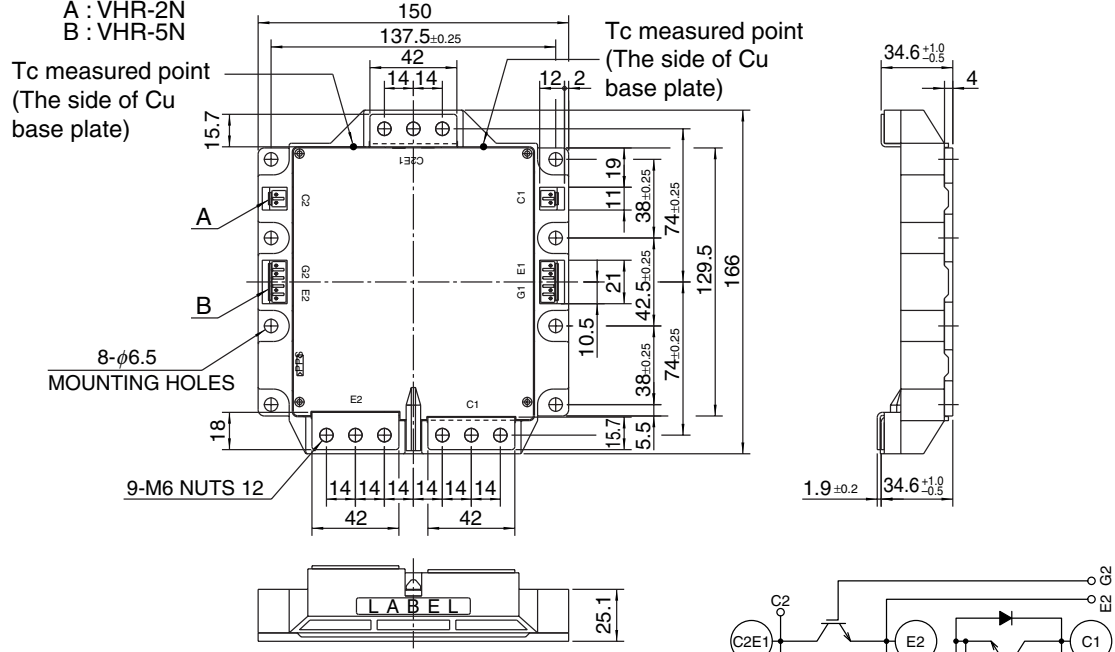
UPS & General purpose inverters, etc

**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

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

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CES</sub>	Collector-emitter voltage	G-E Short	1200	V
V <sub>GES</sub>	Gate-emitter voltage	C-E Short	±20	V
I <sub>C</sub>	Collector current	T <sub>C</sub> ' = 96°C <sup>*1</sup>	900	A
I <sub>CM</sub>		Pulse (Note 2)	1800	
I <sub>E</sub> (Note 1)	Emitter current	T <sub>C</sub> = 25°C	900	A
I <sub>EM</sub> (Note 1)		Pulse (Note 2)	1800	
P <sub>C</sub> (Note 3)	Maximum collector dissipation	T <sub>C</sub> = 25°C	2550	W
T <sub>j</sub>	Junction temperature		-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature <sup>*4</sup>		-40 ~ +125	°C
V <sub>iso</sub>	Isolation voltage	Terminals to base plate, f = 60Hz, AC 1 minute	2500	V <sub>rms</sub>
—	Torque strength	Main terminals M6 screw	3.5 ~ 4.5	N • m
		Mounting M6 screw	3.5 ~ 4.5	N • m
—	Weight	Typical value	1400	g

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>CES</sub>	Collector cutoff current	V <sub>CE</sub> = V <sub>CES</sub> , V <sub>GE</sub> = 0V	—	—	1	mA
V <sub>GE(th)</sub>	Gate-emitter threshold voltage	I <sub>C</sub> = 90mA, V <sub>CE</sub> = 10V	6	7	8	V
I <sub>GES</sub>	Gate leakage current	±V <sub>GE</sub> = V <sub>GES</sub> , V <sub>CE</sub> = 0V	—	—	1	µA
V <sub>CE(sat)</sub> (chip)	Collector-emitter saturation voltage (without lead resistance)	I <sub>C</sub> = 900A, V <sub>GE</sub> = 15V (Note 4)	—	1.8	2.5	V
		T <sub>j</sub> = 125°C	—	2.0	—	
R <sub>(lead)</sub>	Module lead resistance	I <sub>C</sub> = 900A, terminal-chip	—	0.286	—	mΩ
C <sub>ies</sub>	Input capacitance	V <sub>CE</sub> = 10V V <sub>GE</sub> = 0V	—	—	140	nF
C <sub>oes</sub>	Output capacitance		—	—	16	
C <sub>res</sub>	Reverse transfer capacitance		—	—	3	
Q <sub>G</sub>	Total gate charge	V <sub>CC</sub> = 600V, I <sub>C</sub> = 900A, V <sub>GE</sub> = 15V	—	4800	—	nC
t <sub>d(on)</sub>	Turn-on delay time	V <sub>CC</sub> = 600V, I <sub>C</sub> = 900A V <sub>GE</sub> = ±15V R <sub>G</sub> = 0.35Ω, Inductive load	—	—	600	ns
t <sub>r</sub>	Turn-on rise time		—	—	200	
t <sub>d(off)</sub>	Turn-off delay time		—	—	800	
t <sub>f</sub>	Turn-off fall time		—	—	300	
t <sub>rr</sub> (Note 1)	Reverse recovery time		I <sub>E</sub> = 900A	—	—	
Q <sub>rr</sub> (Note 1)	Reverse recovery charge		—	50	—	µC
V <sub>EC</sub> (Note 1) (chip)	Emitter-collector voltage (without lead resistance)	I <sub>E</sub> = 900A, V <sub>GE</sub> = 0V	—	—	3.2	V
R <sub>th(j-c)Q</sub>	Thermal resistance <sup>*3</sup>	IGBT part (1/2 module)	—	—	0.049	K/W
R <sub>th(j-c)R</sub>		FWDi part (1/2 module)	—	—	0.078	
R <sub>th(c-f)</sub>	Contact thermal resistance <sup>*2</sup>	Case to heat sink, Thermal compound applied (1/2 module)	—	0.016	—	
R <sub>th(j-c)Q</sub>	Thermal resistance <sup>*1</sup>	Case temperature measured point is just under the chips (IGBT part)	—	—	0.021	
R <sub>th(j-c)R</sub>		Case temperature measured point is just under the chips (FWDi part)	—	—	0.034	
R <sub>G</sub>	External gate resistance		0.35	—	2.2	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-collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temperature (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 : Case temperature (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 thermally conductive grease of λ = 0.9[W/(m • K)].

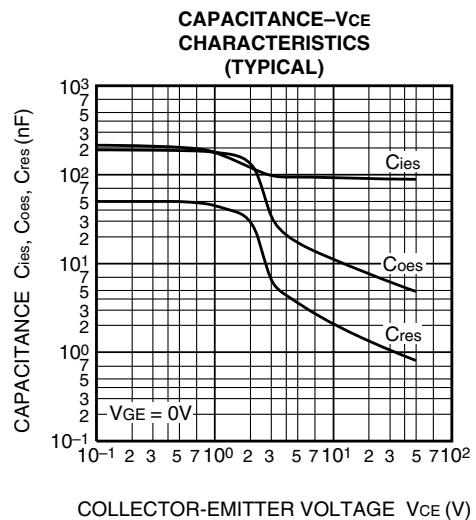
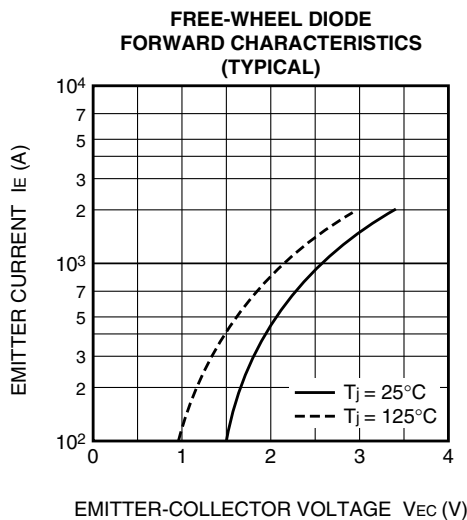
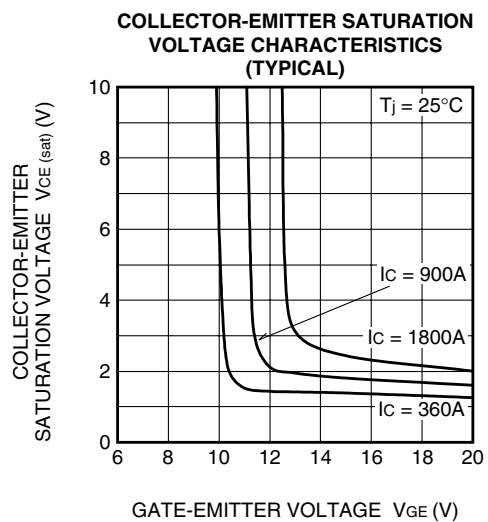
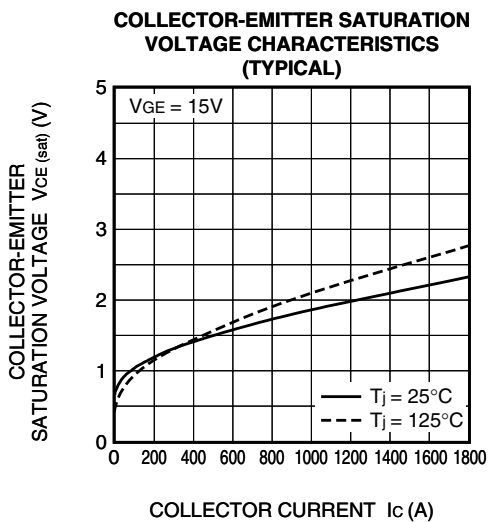
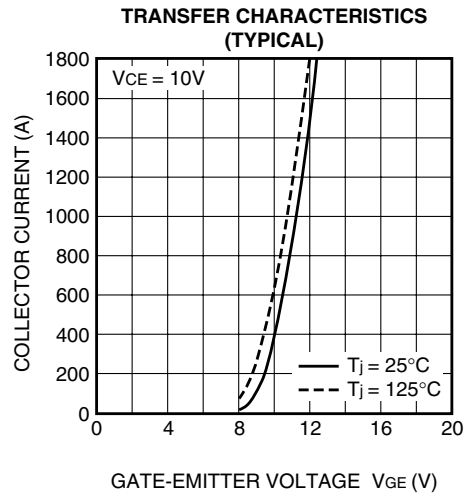
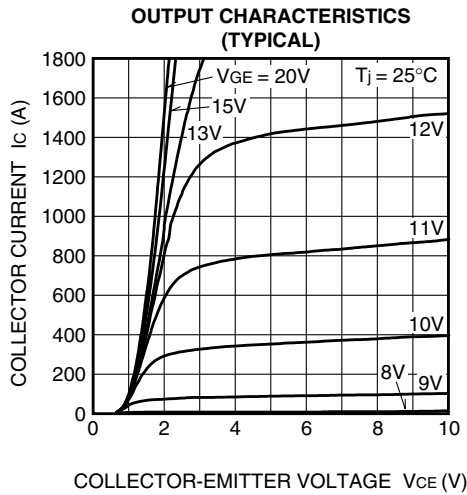
\*3 : Case temperature (T<sub>c</sub>) measured point is shown in page OUTLINE DRAWING.

\*4 : The operation temperature is restrained by the permission temperature of female connector.

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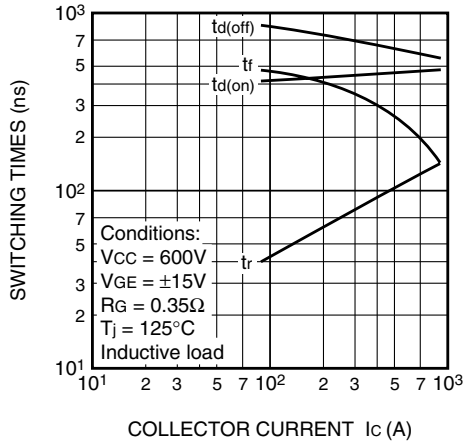
PERFORMANCE CURVES



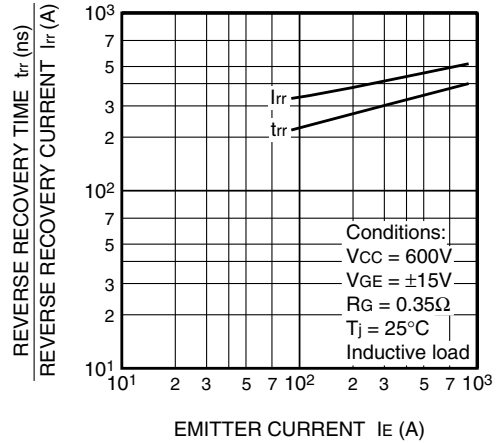
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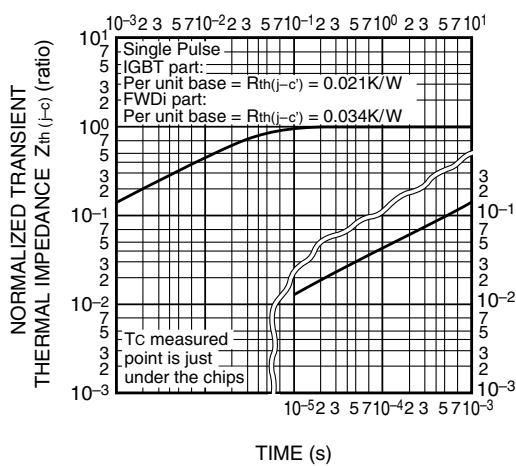
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



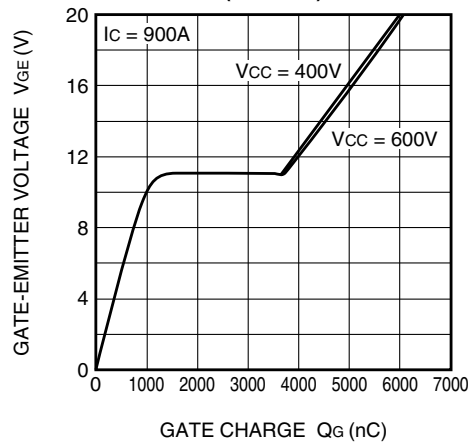
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



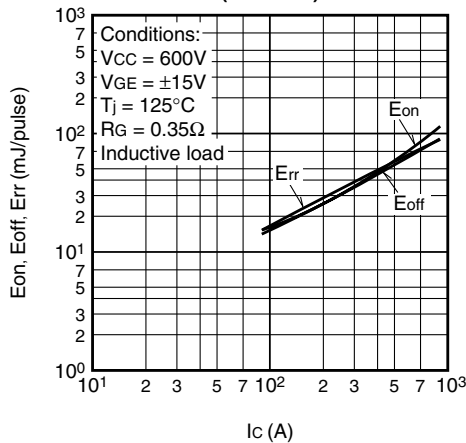
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)



Ic-Esw (TYPICAL)



Rg-Esw (TYPICAL)

