

Preliminary

CM1000DU-34NF

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|------|-----------------------|-----|---|---------------------------------|
| Pre. | J.Yamada | Rev | D | M. Koura T. Furuno 20-Oct-03 |
| Apr. | M.Yamamoto Dec.14 '01 | | | |

HIGH POWER SWITCHING USE

Notice : This is not a final specification. Some parametric limits are subject to change.

CM1000DU-34NF

- I_c 1000A
- V_{CES} 1700V
- Insulated Type
- 2-elements in a pack

APPLICATION

General purpose inverters & Servo controls,etc

ABSOLUTE MAXIMUM RATINGS ($T_j = 25^\circ\text{C}$)

| Symbol | Item | Conditions | Ratings | Units |
|------------|-----------------------------------|--|-----------------|------------------|
| V_{CES} | Collector-emitter voltage | G-E Short | 1700 | V |
| V_{GES} | Gate-emitter voltage | C-E Short | ± 20 | V |
| I_c | Collector current | $T_c = 104^\circ\text{C}$ | 1000 | A |
| | | Pulse ② | 2000 | |
| I_E ① | Emitter current | $T_c = 25^\circ\text{C}$ | 1000 | A |
| I_{EM} ① | | Pulse ② | 2000 | |
| P_c ③ | Maximum collector dissipation | $T_c = 25^\circ\text{C}$ | 3900 | W |
| T_j | Junction temperature | | $-40 \sim +150$ | $^\circ\text{C}$ |
| T_{stg} | Storage temperature ^{*3} | | $-40 \sim +125$ | $^\circ\text{C}$ |
| V_{iso} | Isolation voltage | Main terminal to base plate, AC 1 min. | 3500 | 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 | 1400 | g |

APPLICATION NOTE

MITSUBISHI<IGBT MODULE>

CM1000DU-34NF

HIGH POWER SWITCHING USE

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

| Symbol | Item | Conditions | Min. | Typ. | Max. | Units |
|--------------------------------|---|--|----------------------|-------|-------|------------------|
| I_{CES} | Collector cutoff current | $V_{CE}=V_{CES}, V_{GE}=0\text{V}$ | — | — | 1 | mA |
| $V_{GE(\text{th})}$ | Gate-emitter threshold voltage | $I_c=100\text{mA}, V_{CE}=10\text{V}$ | 6 | 7 | 8 | V |
| I_{GES} | Gate leakage current | $V_{GE}=V_{GES}, V_{CE}=0\text{V}$ | — | — | 5 | μA |
| $V_{CE(\text{sat})}$ (chip) | Collector to emitter saturation voltage (without lead resistance) | $T_j = 25^\circ\text{C}$ | $I_c = 1000\text{A}$ | — | 2.2 | 2.8 |
| | | $T_j = 125^\circ\text{C}$ | $V_{GE}=15\text{V}$ | — | 2.45 | — |
| R(lead) | Module lead resistance | $I_c = 1000\text{A}$, terminal-chip | — | 0.286 | — | $\text{m}\Omega$ |
| Cies | Input capacitance | $V_{CE}=10\text{V}$ | — | — | 220 | nF |
| Coes | Output capacitance | $V_{GE}=0\text{V}$ | — | — | 25 | |
| Cres | Reverse transfer capacitance | — | — | 4.7 | | |
| Q_g | Total gate charge | $V_{CC}=1000\text{V}, I_c=1000\text{A}, V_{GE}=15\text{V}$ | — | 6000 | — | nC |
| td(on) | Turn-on delay time | $V_{CC}=1000\text{V}, I_c=1000\text{A}$ | — | — | 600 | ns |
| tr | Turn-on rise time | $V_{GE1}=V_{GE2}=15\text{V}$ | — | — | 150 | |
| td(off) | Turn-off delay time | $R_g=0.47\Omega$, Inductive load switching operation | — | — | 900 | |
| tf | Turn-off fall time | — | — | 200 | | |
| trr | Reverse recovery time | $I_E=1000\text{A}$ | — | — | 450 | ns |
| Qrr | Reverse recovery charge | — | — | 90 | — | μC |
| V_{EC} ① | Emitter-collector voltage (without lead resistance) | $I_E=1000\text{A}, V_{GE}=0\text{V}$ | — | 2.3 | 3 | V |
| Rth(j-c)Q | Thermal resistance ^③ | IGBT part (1/2module) | — | — | 0.032 | °C/W |
| Rth(j-c)R | | FWDi part (1/2module) | — | — | 0.053 | |
| Rth(c-f) | Contact thermal resistance ^② | Case to fin, Thermal compound Applied (1/2module) | — | 0.016 | — | °C/W |
| Rth(j-c')Q | Thermal resistance ^④ | Tc measured point is just under the chips(IGBT part) | — | — | 0.014 | |
| Rth(j-c')R | | Tc measured point is just under the chips(FWDi part) | — | — | 0.023 | |
| Rg | External gate resistance | — | 0.47 | — | 4.7 | Ω |

*1: Tc' measured point is just under the chips.

If you use this value, Rth(f-a) should be measured just under the chips.

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

*3: Tc measured point is shown in page "3-3".

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

① I_E, V_{EC}, trr & Qrr 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 T_{jmax} 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.

OUTLINE DRAWING

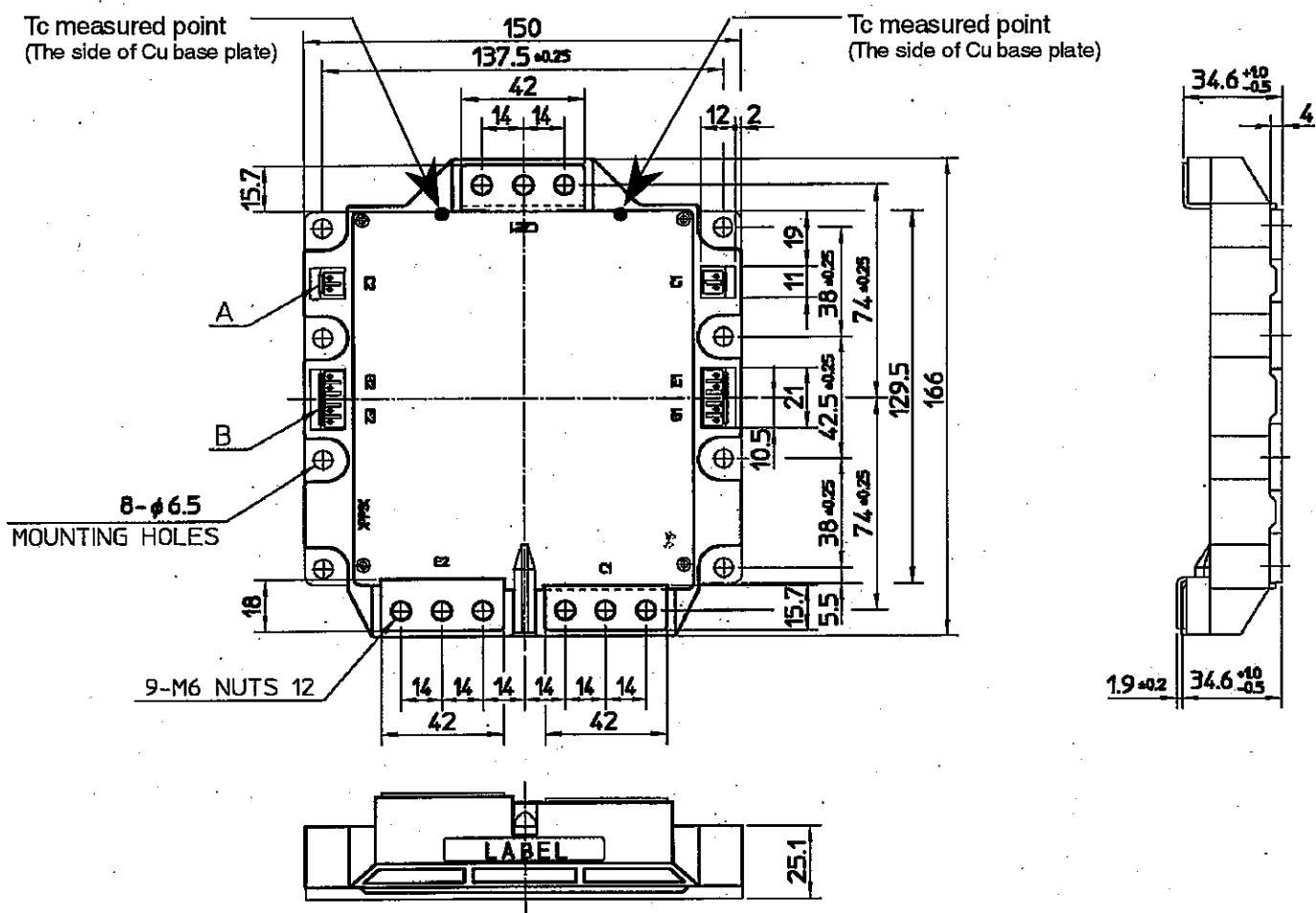
Dimensions in mm

A
B

A,B HOUSING Type
(U.S.T.Mfg.Co.Ltd)

A : VHR-2N
B : VHR-5N

Tc measured point
(The side of Cu base plate)



CIRCUIT DIAGRAM

