

MITSUBISHI IGBT MODULES
CM600DU-24NFH

HIGH POWER SWITCHING USE

CM600DU-24NFH



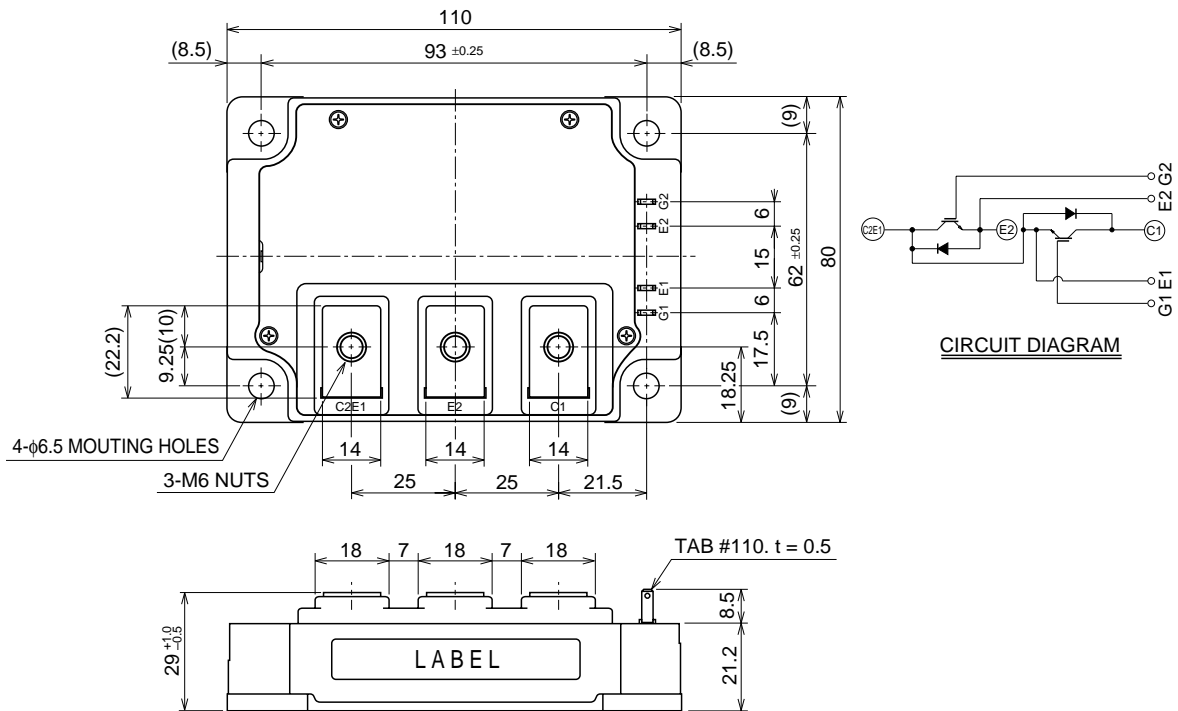
- IC600A
- VCES 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION

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

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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MAXIMUM RATINGS (Tj = 25°C)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---------------------------|-------------------------------|--|------------|-------|
| V _{CE} | Collector-emitter voltage | G-E Short | 1200 | V |
| V _{GE} | Gate-emitter voltage | C-E Short | ±20 | V |
| I _C | Collector current | Operation (Note 2) | 600 | A |
| I _{CM} | | Pulse (Note 2) | 1200 | A |
| I _E (Note 1) | Emitter current | Operation (Note 2) | 600 | A |
| I _{EM} (Note 1) | | Pulse (Note 2) | 1200 | A |
| P _C (Note 3) | Maximum collector dissipation | T _C = 25°C | 1500 | W |
| P _C ' (Note 3) | Maximum collector dissipation | T _C ' = 25°C ⁴ | 3670 | 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 | 580 | g |

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|--------------------------|---|---|--------|------|---------------------|------|
| | | | Min. | Typ. | Max. | |
| I _{CE} | Collector cutoff current | V _{CE} = V _{CE} , V _{GE} = 0V | — | — | 1 | mA |
| V _{GE(th)} | Gate-emitter threshold voltage | I _C = 60mA, V _{CE} = 10V | 4.5 | 6 | 7.5 | V |
| I _{GE} | Gate leakage current | V _{GE} = V _{GE} , V _{CE} = 0V | — | — | 2.0 | μA |
| V _{CE(sat)} | Collector-emitter saturation voltage (Note 4) | I _C = 600A, V _{GE} = 15V | — | 5.0 | 6.5 | V |
| | | T _j = 125°C | — | 5.0 | — | |
| C _{ies} | Input capacitance | V _{CE} = 10V V _{GE} = 0V | — | — | 95 | nF |
| C _{oes} | Output capacitance | | — | — | 8.0 | nF |
| C _{res} | Reverse transfer capacitance | | — | — | 1.8 | nF |
| Q _G | Total gate charge | V _{CC} = 600V, I _C = 600A, V _{GE} = 15V | — | 2700 | — | nC |
| t _{d(on)} | Turn-on delay time | V _{CC} = 600V, I _C = 600A V _{GE1} = V _{GE2} = 15V R _G = 0.52Ω, Inductive load switching operation I _E = 600A | — | — | 400 | ns |
| t _r | Turn-on rise time | | — | — | 120 | 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 | | — | — | 250 | ns |
| Q _{rr} (Note 1) | Reverse recovery charge | | — | 28 | — | μC |
| V _{EC} (Note 1) | Emitter-collector voltage | I _E = 600A, V _{GE} = 0V | — | — | 3.5 | V |
| R _{th(j-c)Q} | Thermal resistance*1 | IGBT part (1/2 module) | — | — | 0.083 | °C/W |
| R _{th(j-c)R} | | FWDi part (1/2 module) | — | — | 0.15 | °C/W |
| R _{th(c-f)} | Contact thermal resistance | Case to fin, Thermal compound Applied*2 (1/2 module) | — | 0.02 | — | °C/W |
| R _{th(j-c')Q} | Thermal resistance*4 | IGBT part (1/2 module) | — | — | 0.034 ^{*3} | °C/W |
| R _{th(j-c')R} | | FWDi part (1/2 module) | — | — | 0.06 ^{*3} | °C/W |
| R _G | External gate resistance | | 0.52 | — | 5.2 | 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.

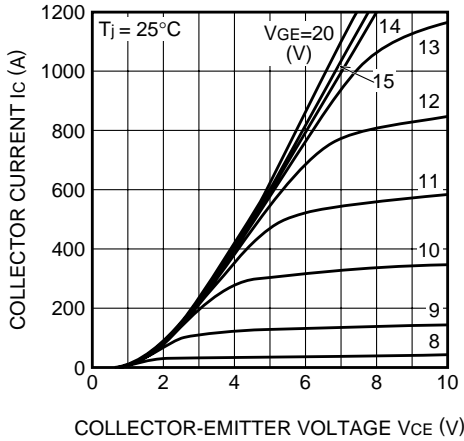
4. No short circuit capability is designed.

CM600DU-24NFH

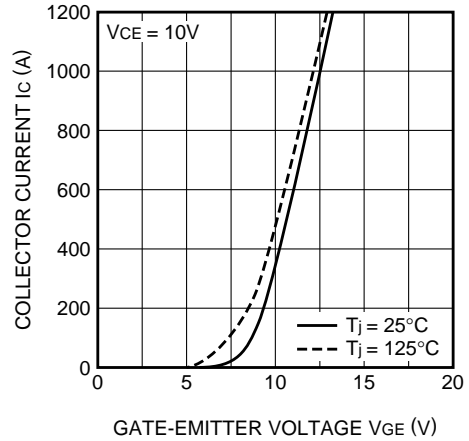
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

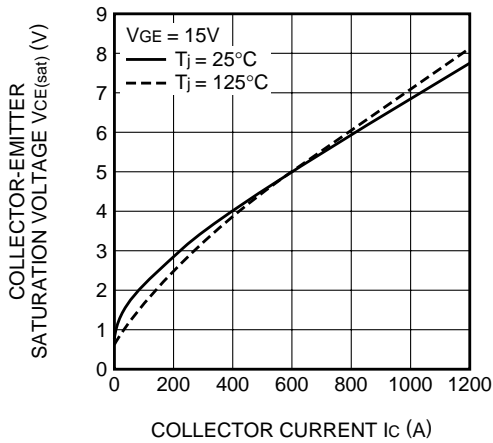
OUTPUT CHARACTERISTICS (TYPICAL)



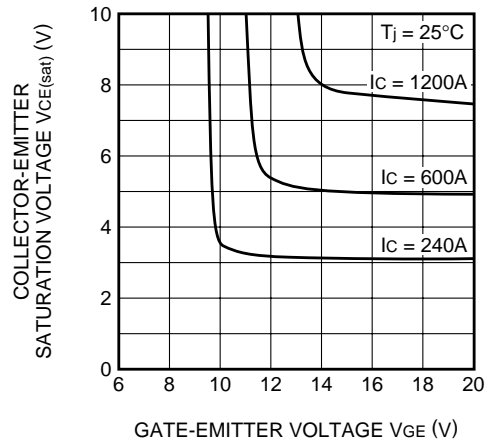
TRANSFER CHARACTERISTICS (TYPICAL)



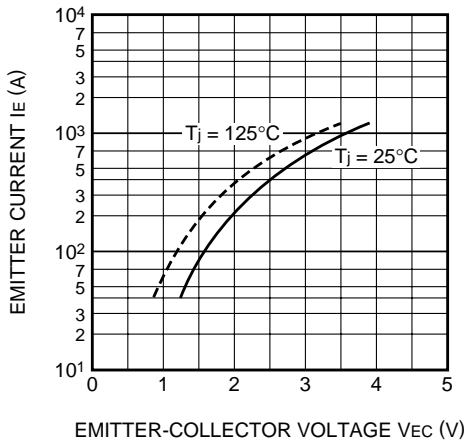
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



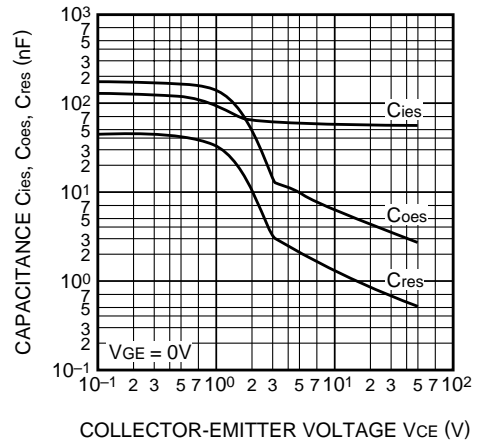
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



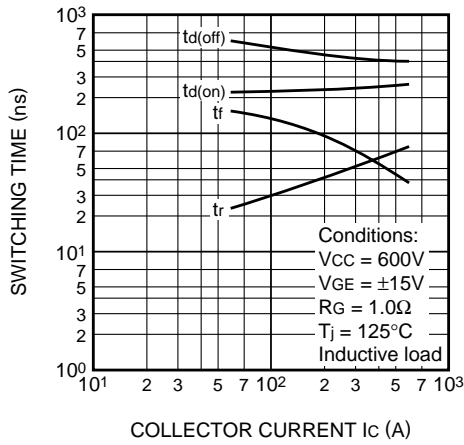
CAPACITANCE CHARACTERISTICS (TYPICAL)



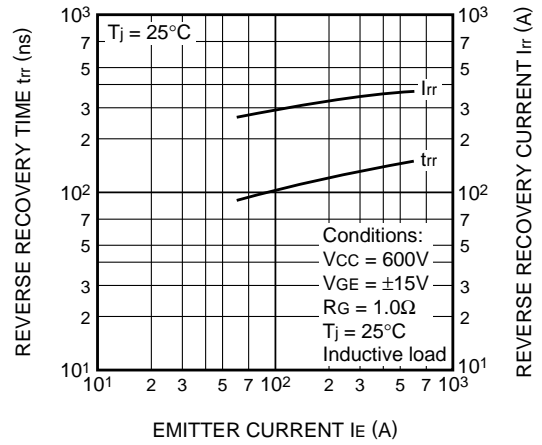
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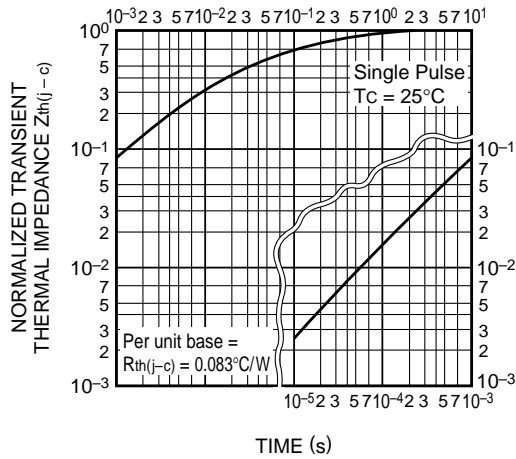
HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)



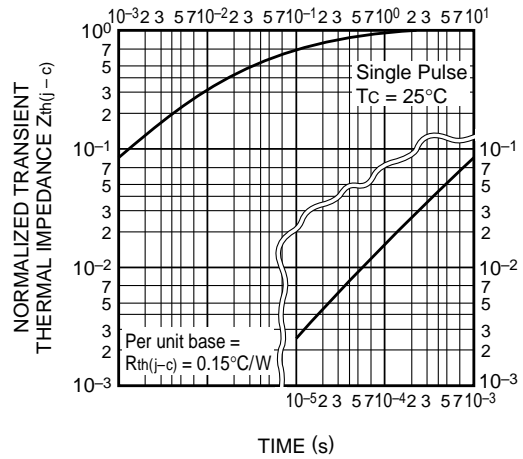
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)

