

MITSUBISHI IGBT MODULES
CM200DU-12NFH

HIGH POWER SWITCHING USE

CM200DU-12NFH



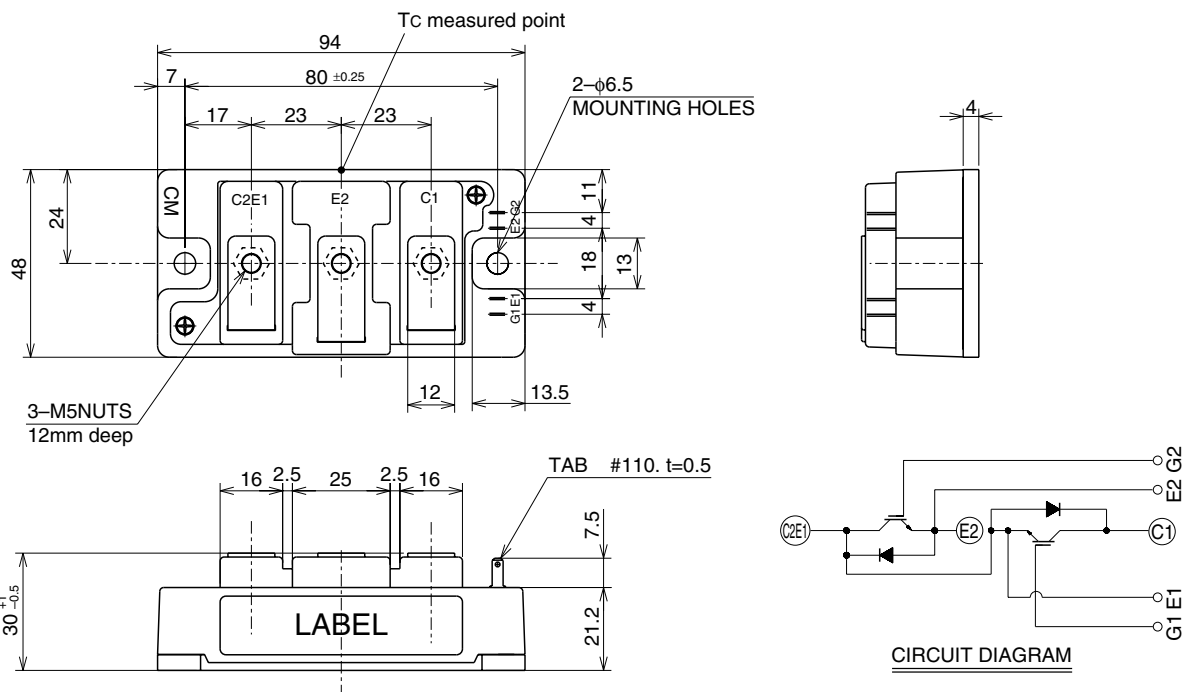
- IC 200A
- VCES 600V
- Insulated Type
- 2-elements in a pack

APPLICATION

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

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



CM200DU-12NFH

HIGH POWER SWITCHING USE

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

| Symbol | Parameter | Conditions | Ratings | Unit |
|---------------------------|-------------------------------|--|------------|------------------|
| V _{CE} | Collector-emitter voltage | G-E Short | 600 | V |
| V _{GE} | Gate-emitter voltage | C-E Short | ±20 | V |
| I _C | Collector current | Operation | 200 | A |
| I _{CM} | | Pulse (Note 2) | 400 | A |
| I _E (Note 1) | Emitter current | Operation | 200 | A |
| I _{EM} (Note 1) | | Pulse (Note 2) | 400 | A |
| P _C (Note 3) | Maximum collector dissipation | T _c = 25°C | 590 | W |
| P _C ' (Note 3) | Maximum collector dissipation | T _c ' = 25°C ⁴ | 830 | W |
| T _j | Junction temperature | | -40 ~ +150 | °C |
| T _{stg} | Storage temperature | | -40 ~ +125 | °C |
| V _{iso} | Isolation voltage | Terminals to base plate, f = 60Hz, AC 1 minute | 2500 | V _{rms} |
| — | Mounting torque | Main terminals M5 screw | 2.5 ~ 3.5 | N • m |
| — | | Mounting M6 screw | 3.5 ~ 4.5 | N • m |
| — | Weight | Typical value | 310 | g |

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

| 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 = 20mA, 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-emitter saturation voltage | I _C = 200A, V _{GE} = 15V | T _j = 25°C | — | 2.0 | 2.7 | V |
| | | | T _j = 125°C | — | 1.95 | — | |
| C _{ies} | Input capacitance | V _{CE} = 10V V _{GE} = 0V | — | — | 55 | nF | |
| C _{oes} | Output capacitance | | — | — | 3.6 | nF | |
| C _{res} | Reverse transfer capacitance | | — | — | 2.0 | nF | |
| Q _G | Total gate charge | V _{CC} = 300V, I _C = 200A, V _{GE} = 15V | — | 1240 | — | nC | |
| t _{d(on)} | Turn-on delay time | V _{CC} = 300V, I _C = 200A V _{GE} = ±15V R _G = 6.3Ω, Inductive load | — | — | 250 | ns | |
| t _r | Turn-on rise time | | — | — | 150 | ns | |
| t _{d(off)} | Turn-off delay time | | — | — | 500 | ns | |
| t _f | Turn-off fall time | | — | — | 150 | ns | |
| t _{rr} (Note 1) | Reverse recovery time | | I _E = 200A | — | — | 150 | ns |
| Q _{rr} (Note 1) | Reverse recovery charge | | | — | 3.5 | — | μC |
| V _{EC} (Note 1) | Emitter-collector voltage | I _E = 200A, V _{GE} = 0V | — | — | 2.6 | V | |
| R _{th(j-c)Q} | Thermal resistance*1 | IGBT part (1/2 module) | — | — | 0.21 | K/W | |
| R _{th(j-c)R} | | FWDi part (1/2 module) | — | — | 0.35 | K/W | |
| R _{th(c-f)} | Contact thermal resistance | Case to heat sink, Thermal compound Applied*2 (1/2 module) | — | 0.07 | — | K/W | |
| R _{th(j-c)Q} | Thermal resistance | Case temperature measured point is just under the chips (1/2 module) | — | — | 0.15*3 | K/W | |
| R _G | External gate resistance | | 3.1 | — | 31 | Ω | |

*1 : Case temperature (T_c) measured point is shown in page OUTLINE DRAWING.

*2 : Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].

*3 : If you use this value, R_{th(f-a)} should be measured just under the chips.

*4 : Case temperature (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-collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed T_{jmax} rating.

3. Junction temperature (T_j) should not increase beyond 150°C.

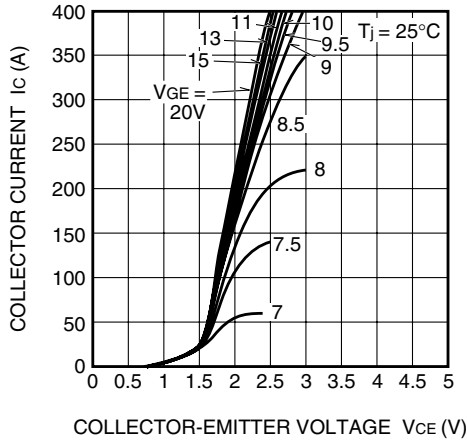
4. No short circuit capability is designed.

CM200DU-12NFH

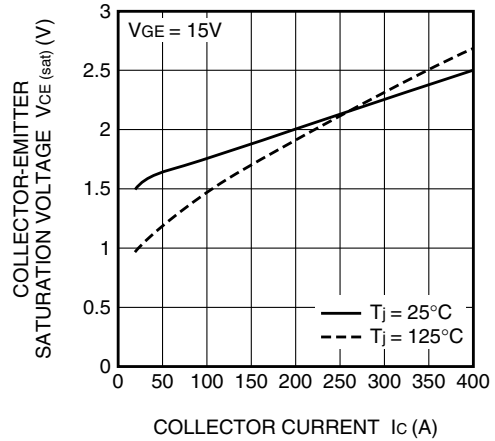
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

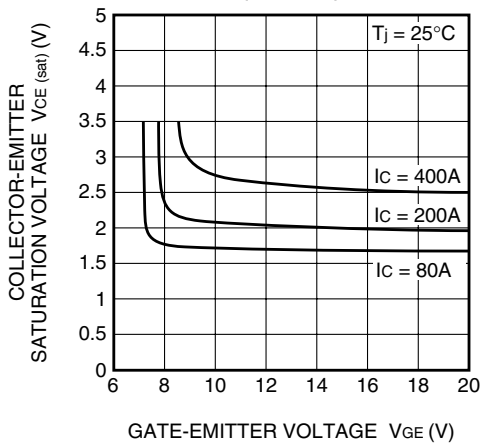
OUTPUT CHARACTERISTICS (TYPICAL)



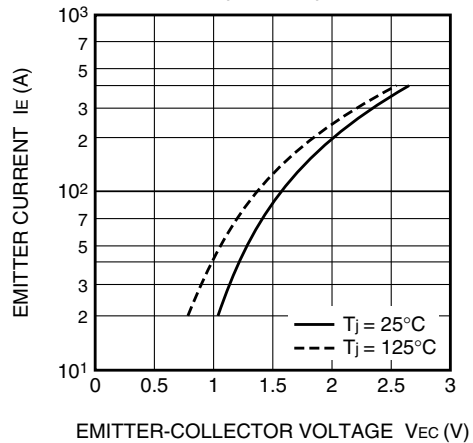
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



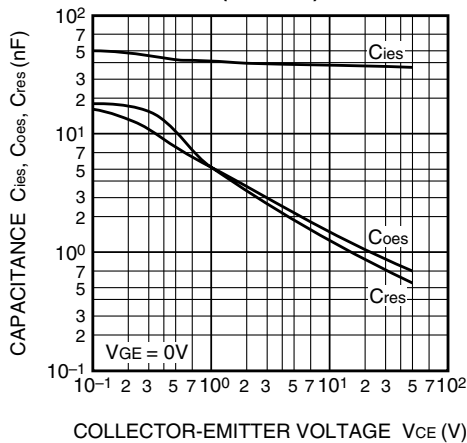
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



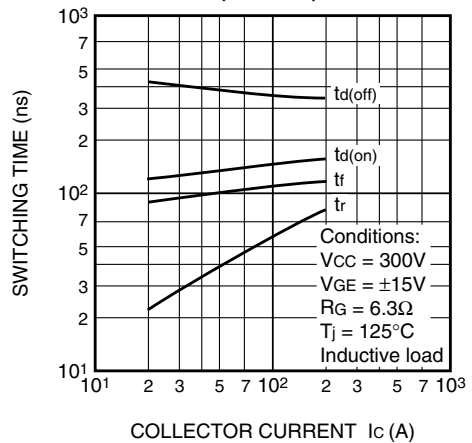
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



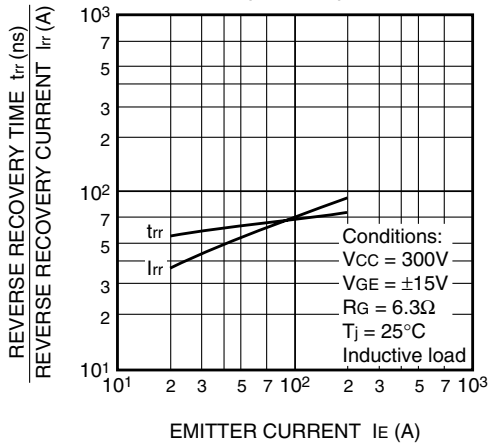
CAPACITANCE- V_{CE} CHARACTERISTICS (TYPICAL)



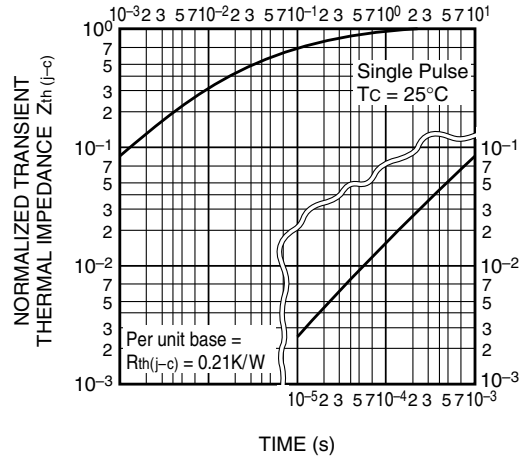
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



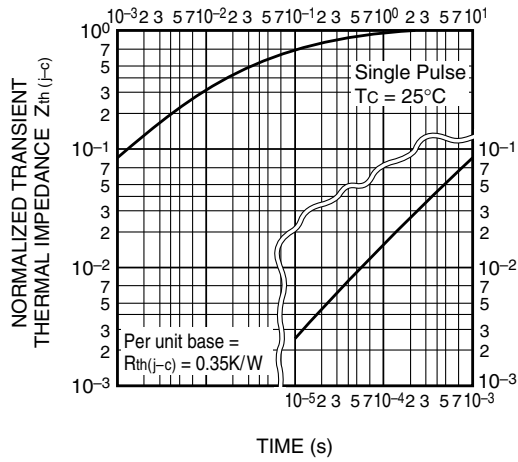
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)

