

MITSUBISHI IGBT MODULES
CM600DY-24A

HIGH POWER SWITCHING USE

CM600DY-24A



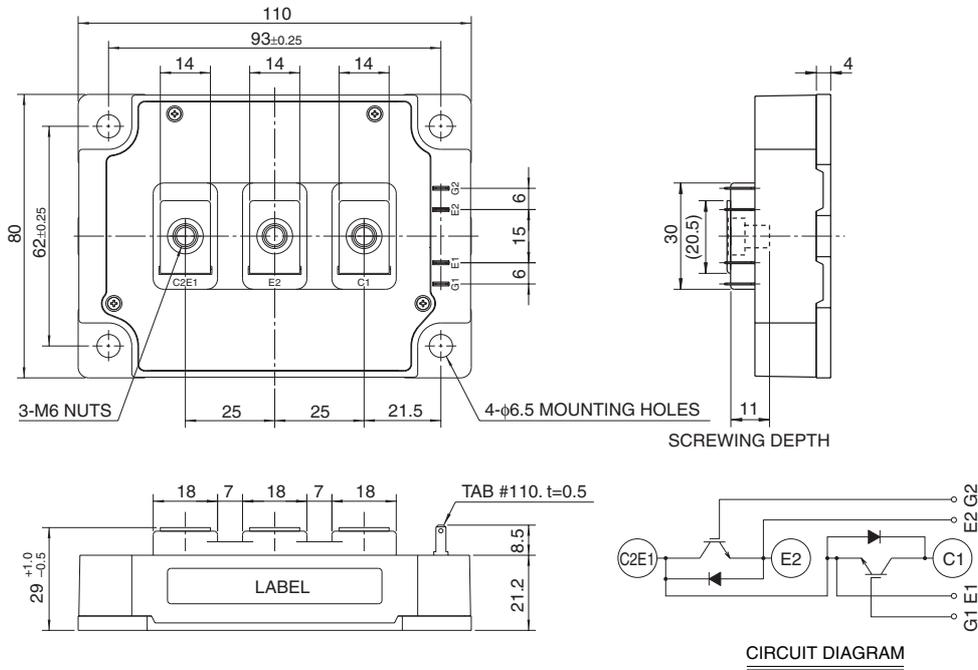
- IC 600A
- VCES 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION

AC drive inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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

| Symbol | Parameter | Conditions | Ratings | Unit |
|--------------------------|-------------------------------|--|------------|------------------|
| V _{CE} S | Collector-emitter voltage | G-E Short | 1200 | V |
| V _{GE} S | Gate-emitter voltage | C-E Short | ±20 | V |
| I _C | Collector current | DC, T _C = 78°C* ¹ | 600 | A |
| I _{CM} | | Pulse (Note 2) | 1200 | |
| I _E (Note 1) | Emitter current | | 600 | A |
| I _{EM} (Note 1) | | Pulse (Note 2) | 1200 | |
| P _C (Note 3) | Maximum collector dissipation | T _C = 25°C* ¹ | 3670 | 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} |
| — | Torque strength | Main terminals M6 screw | 3.5 ~ 4.5 | N • m |
| — | | Mounting M6 screw | 3.5 ~ 4.5 | |
| — | Weight | Typical value | 580 | g |

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

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|--------------------------|--------------------------------------|--|--------|------------------------------|-------|------|
| | | | Min. | Typ. | Max. | |
| I _{CES} | Collector cutoff current | V _{CE} = V _{CE} S, V _{GE} = 0V | — | — | 1 | mA |
| V _{GE(th)} | Gate-emitter threshold voltage | I _C = 60mA, V _{CE} = 10V | 6 | 7 | 8 | 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 = 600A, V _{GE} = 15V | — | T _J = 25°C 2.1 | 3.0 | V |
| | | T _J = 125°C 2.4 | | — | | |
| C _{ies} | Input capacitance | V _{CE} = 10V V _{GE} = 0V | — | — | 94 | nF |
| C _{oes} | Output capacitance | | — | — | 8 | |
| C _{res} | Reverse transfer capacitance | | — | — | 1.8 | |
| 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 _{GE} = ±15V R _G = 0.52Ω, Inductive load I _E = 600A | — | — | 660 | ns |
| t _r | Turn-on rise time | | — | — | 190 | |
| t _{d(off)} | Turn-off delay time | | — | — | 700 | |
| t _f | Turn-off fall time | | — | — | 350 | |
| t _{rr} (Note 1) | Reverse recovery time | | — | — | 250 | ns |
| Q _{rr} (Note 1) | Reverse recovery charge | | — | 19 | — | μC |
| V _{EC} (Note 1) | Emitter-collector voltage | I _E = 600A, V _{GE} = 0V | — | — | 3.8 | V |
| R _{th(j-c)Q} | Thermal resistance | IGBT part (1/2 module)* ¹ | — | — | 0.034 | K/W |
| R _{th(j-c)R} | | FWDi part (1/2 module)* ¹ | — | — | 0.062 | |
| R _{th(c-f)} | Contact thermal resistance | Case to heat sink, Thermal compound Applied (1/2 module)* ² | — | 0.018 | — | |
| R _G | External gate resistance | | 0.52 | — | 7.8 | Ω |

*1 : Case temperature (T_C), heat sink temperature (T_t) measured point is just under the chips.

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

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.

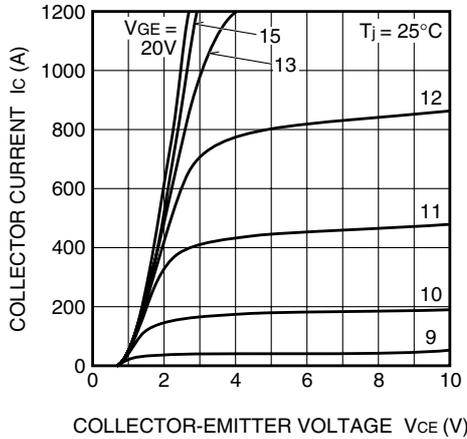
3. Junction temperature (T_J) should not increase beyond 150°C.

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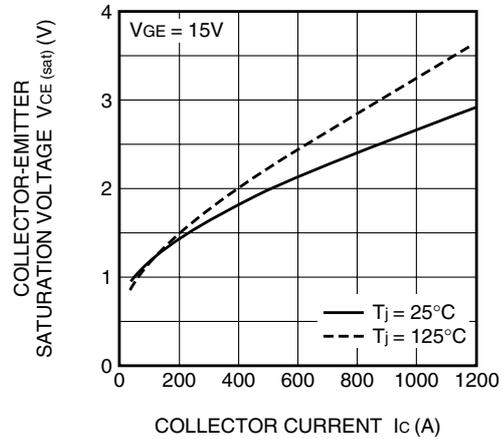
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

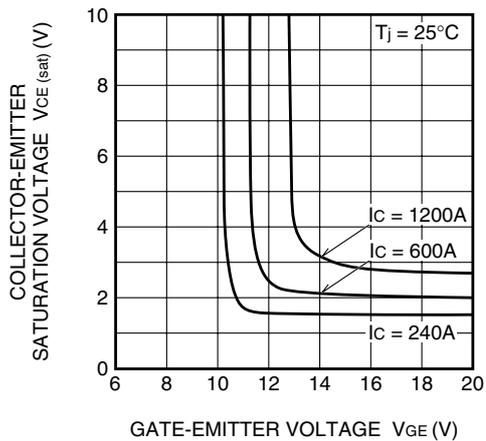
OUTPUT CHARACTERISTICS (TYPICAL)



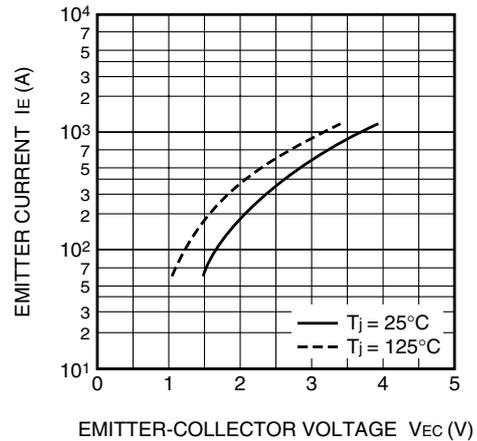
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



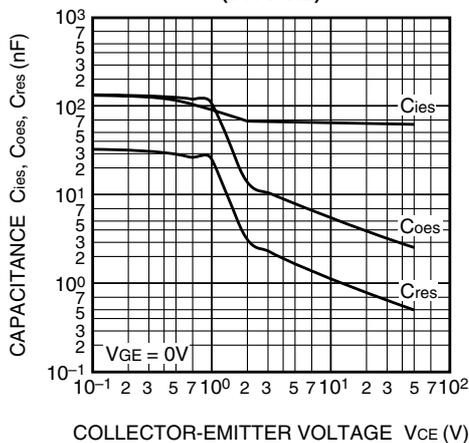
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



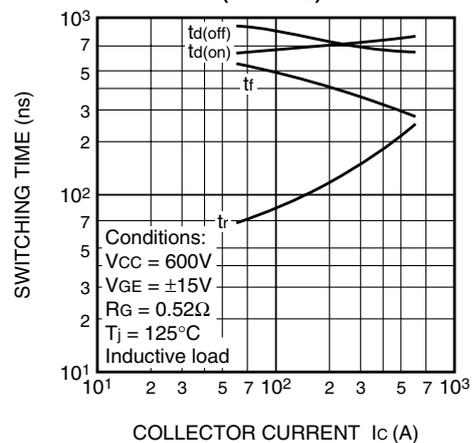
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



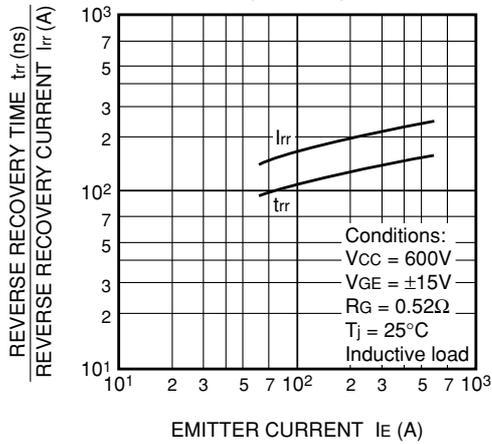
CAPACITANCE-VCE CHARACTERISTICS (TYPICAL)



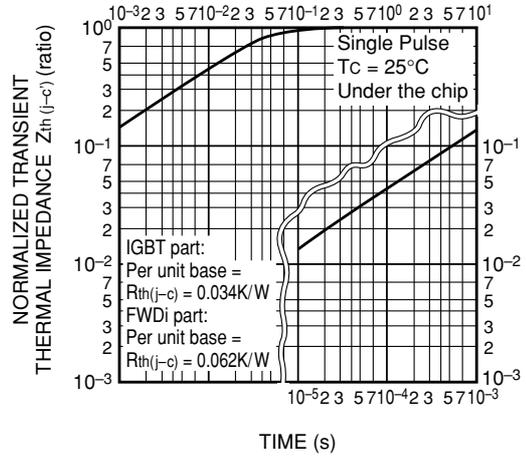
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



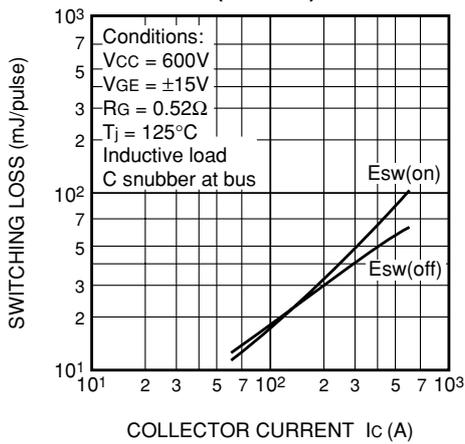
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



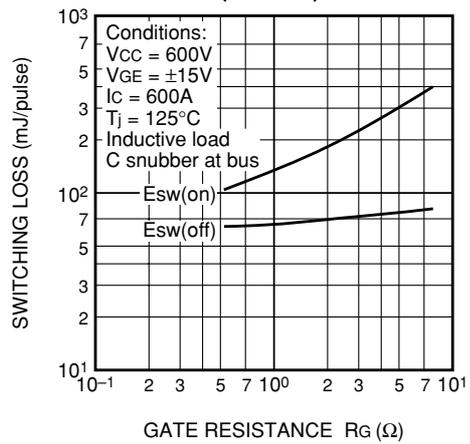
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



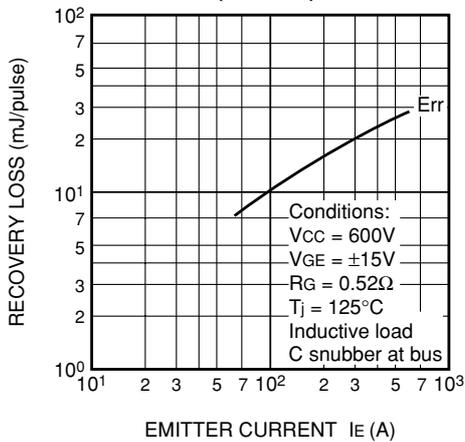
SWITCHING LOSS vs. COLLECTOR CURRENT (TYPICAL)



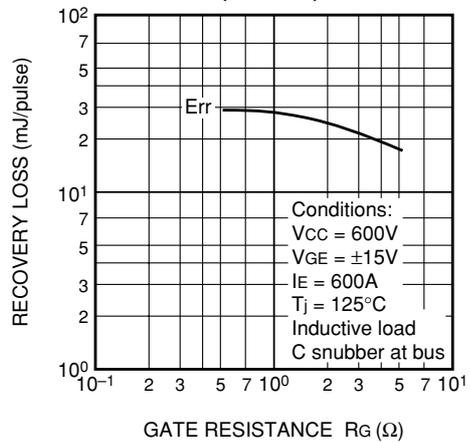
SWITCHING LOSS vs. GATE RESISTANCE (TYPICAL)



RECOVERY LOSS vs. IE (TYPICAL)

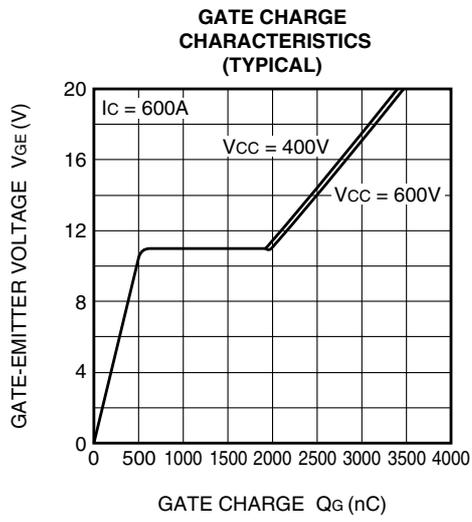


RECOVERY LOSS vs. GATE RESISTANCE (TYPICAL)



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