

# 2MBI200UC-120

## IGBT MODULE (U series) 1200V / 200A / 2 in one package

### ■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

### ■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as Welding machines

### ■ Maximum Ratings and Characteristics

#### ● Absolute Maximum Ratings (at Tc=25°C unless otherwise specified)

| Items                       | Symbols                               | Conditions | Maximum ratings      | Units      |      |     |
|-----------------------------|---------------------------------------|------------|----------------------|------------|------|-----|
| Collector-Emitter voltage   | V <sub>CEs</sub>                      |            | 1200                 | V          |      |     |
| Gate-Emitter voltage        | V <sub>GES</sub>                      |            | ±20                  | V          |      |     |
| Collector current           | I <sub>c</sub>                        | Continuous | T <sub>c</sub> =25°C | 300        | A    |     |
|                             |                                       |            | T <sub>c</sub> =80°C | 200        |      |     |
|                             | I <sub>c</sub> pulse                  | 1ms        | T <sub>c</sub> =25°C | 600        |      |     |
|                             |                                       |            | T <sub>c</sub> =80°C | 400        |      |     |
|                             | -I <sub>c</sub>                       |            |                      | 200        |      |     |
| -I <sub>c</sub> pulse       |                                       |            | 400                  |            |      |     |
| Collector power dissipation | P <sub>c</sub>                        | 1 device   | 1040                 | W          |      |     |
| Junction temperature        | T <sub>j</sub>                        |            | 150                  | °C         |      |     |
| Storage temperature         | T <sub>stg</sub>                      |            | -40 to +125          | °C         |      |     |
| Isolation voltage           | Between terminal and copper base (*1) |            | V <sub>iso</sub>     | AC : 1min. | 2500 | VAC |
| Screw torque                | Mounting (*2)                         |            |                      |            | 3.5  | N·m |
|                             | Terminals (*2)                        |            |                      |            | 4.5  |     |

Note \*1: All terminals should be connected together when isolation test will be done.

Note \*2: Recommendable value : Mounting : 2.5-3.5 N·m (M5 or M6), Terminals : 3.5-4.5 N·m (M6)

#### ● Electrical characteristics (at Tj= 25°C unless otherwise specified)

| Items                                | Symbols                            | Conditions   | Characteristics       |      |      | Units |   |
|--------------------------------------|------------------------------------|--|-----------------------|------|------|-------|---|
|                                      |                                    |  | min.                  | typ. | max. |       |   |
| Zero gate voltage collector current  | I <sub>CEs</sub>                   | V <sub>GE</sub> = 0V, V <sub>CE</sub> = 1200V  | -                     | -    | 2.0  | mA    |   |
| Gate-Emitter leakage current         | I <sub>GES</sub>                   | V <sub>CE</sub> = 0V, V <sub>GE</sub> = ±20V   | -                     | -    | 400  | nA    |   |
| Gate-Emitter threshold voltage       | V <sub>GE(th)</sub>                | V <sub>CE</sub> = 20V, I <sub>c</sub> = 200mA  | 4.5                   | 6.5  | 8.5  | V     |   |
| Collector-Emitter saturation voltage | V <sub>CE(sat)</sub><br>(terminal) | V <sub>GE</sub> = 15V<br>I <sub>c</sub> = 200A   | T <sub>j</sub> =25°C  | -    | 1.85 | 2.20  | V |
|                                      |                                    |  | T <sub>j</sub> =125°C | -    | 2.10 | -     |   |
|                                      | V <sub>CE(sat)</sub><br>(chip)     |  | T <sub>j</sub> =25°C  | -    | 1.75 | 2.10  |   |
|                                      |                                    |  | T <sub>j</sub> =125°C | -    | 2.00 | -     |   |
| Input capacitance                    | C <sub>ies</sub>                   | V <sub>GE</sub> = 0V, V <sub>CE</sub> = 10V, f = 1MHz  | -                     | 22   | -    | nF    |   |
| Turn-on time                         | t <sub>on</sub>                    | V <sub>CC</sub> = 600V<br>I <sub>c</sub> = 200A<br>V <sub>GE</sub> = ±15V<br>R <sub>G</sub> = 3Ω | -                     | 0.36 | 1.20 | μs    |   |
|                                      | t <sub>r</sub>                     |  | -                     | 0.21 | 0.60 |       |   |
| Turn-off time                        | t <sub>r(i)</sub>                  |  | -                     | 0.03 | -    |       |   |
|                                      | t <sub>off</sub>                   |  | -                     | 0.37 | 1.00 |       |   |
| Forward on voltage                   | V <sub>F</sub><br>(terminal)       | V <sub>GE</sub> = 0V<br>I <sub>F</sub> = 200A  | T <sub>j</sub> =25°C  | -    | 1.70 | 2.00  | V |
|                                      |                                    |  | T <sub>j</sub> =125°C | -    | 1.80 | -     |   |
|                                      | V <sub>F</sub><br>(chip)           |  | T <sub>j</sub> =25°C  | -    | 1.60 | 1.90  |   |
|                                      |                                    |  | T <sub>j</sub> =125°C | -    | 1.70 | -     |   |
| Reverse recovery time                | t <sub>rr</sub>                    | I <sub>F</sub> = 200A  | -                     | -    | 0.35 | μs    |   |
| Lead resistance, terminal-chip (*3)  | R lead                             |  | -                     | 0.53 | -    | mΩ    |   |

Note \*3: Biggest internal terminal resistance among arm.

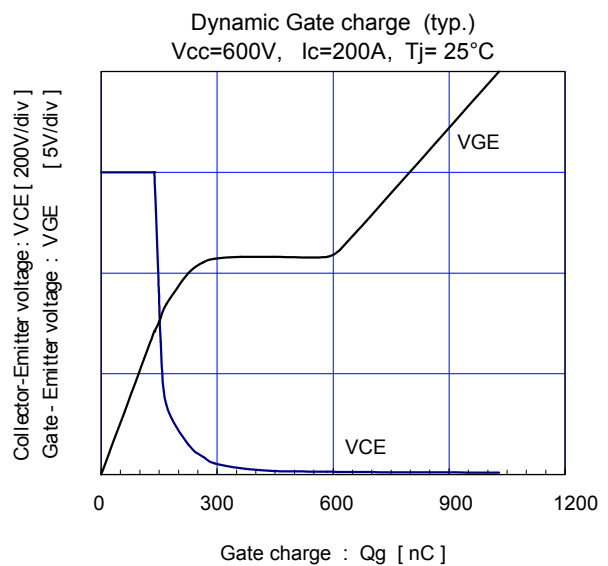
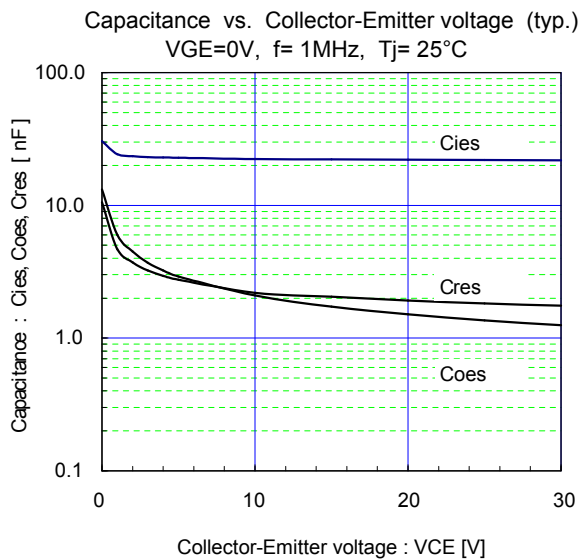
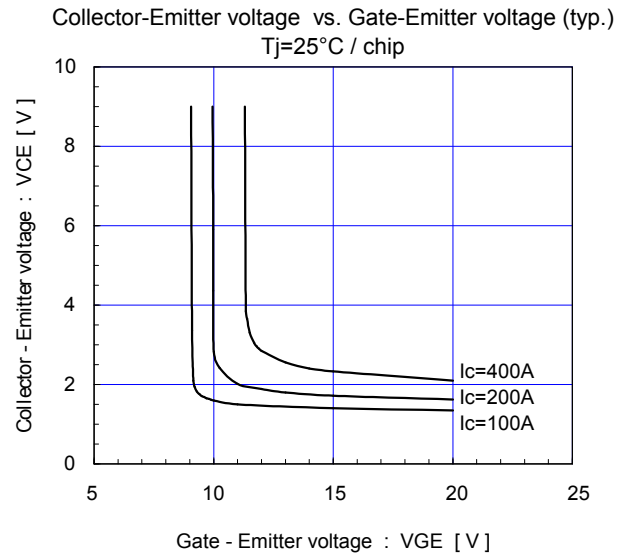
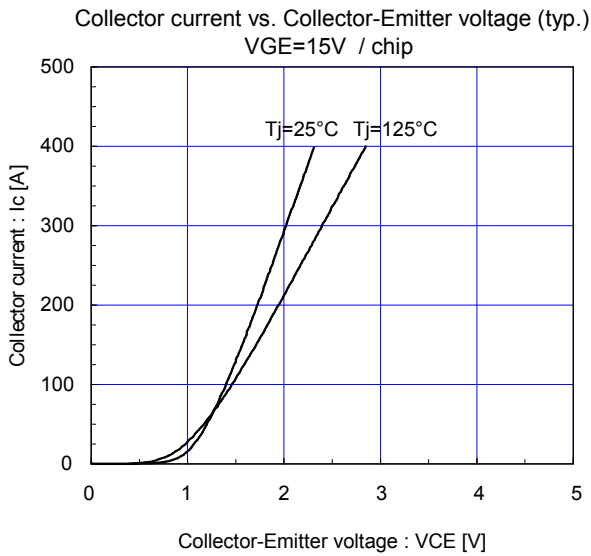
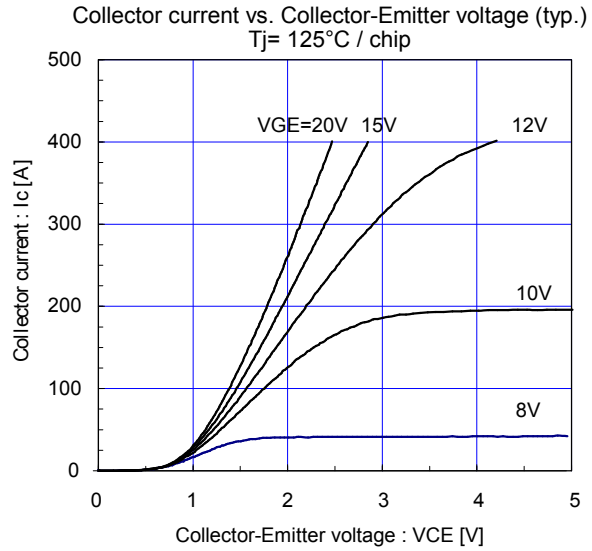
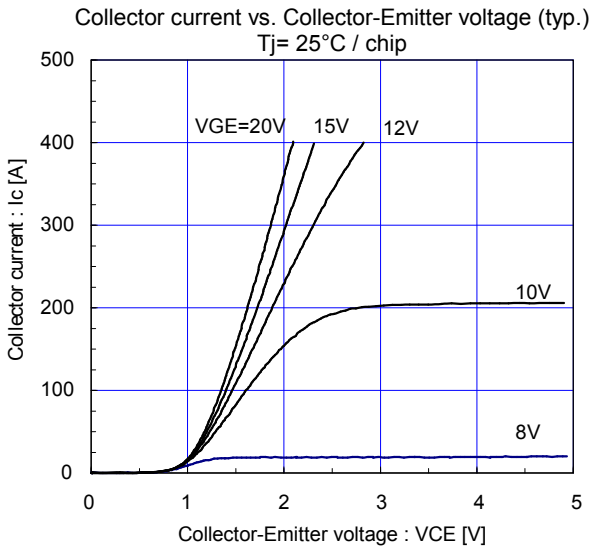
#### ● Thermal resistance characteristics

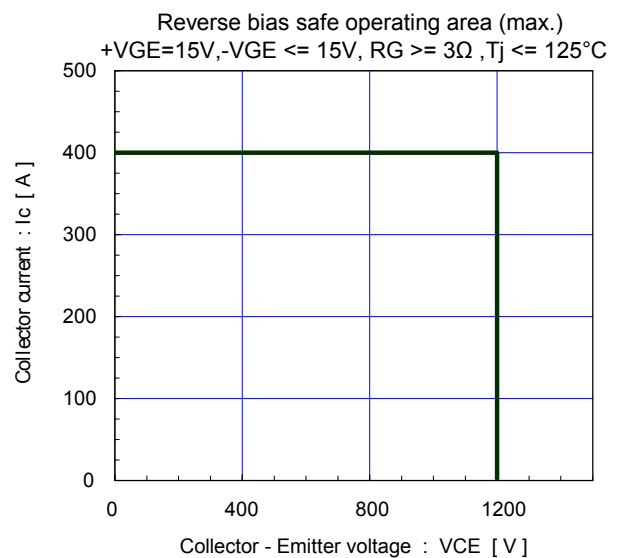
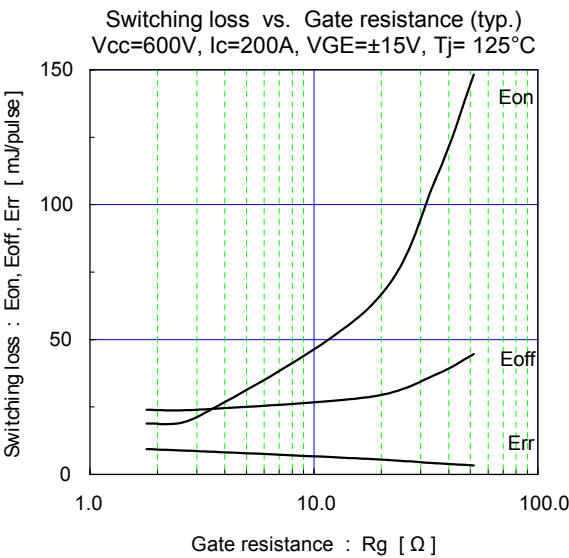
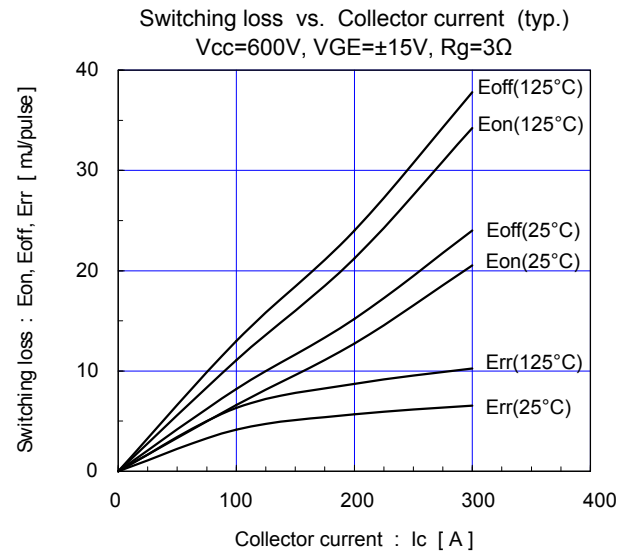
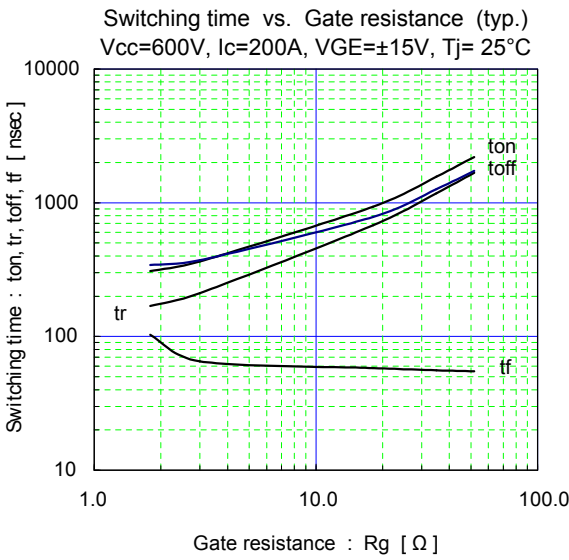
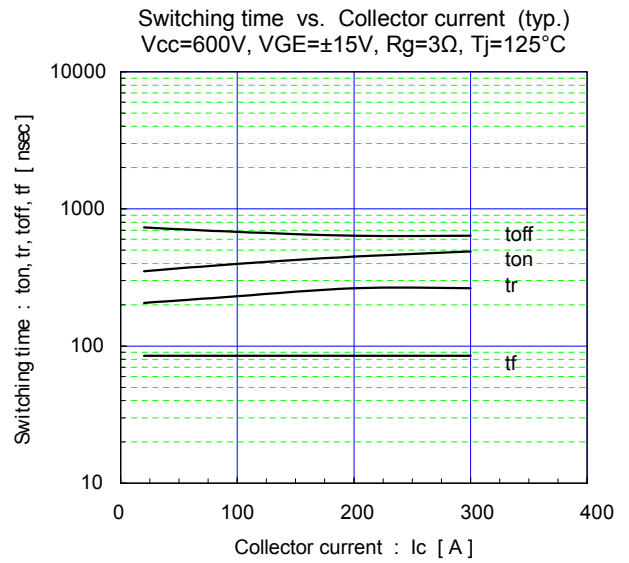
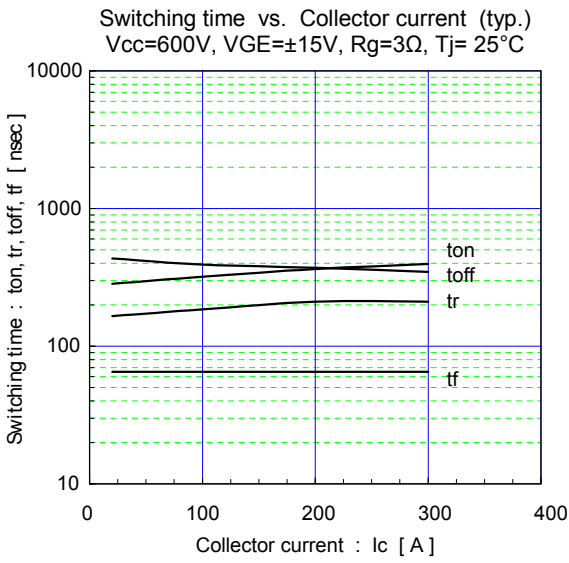
| Items                        | Symbols              | Conditions                 | Characteristics |       |      | Units |
|------------------------------|----------------------|----------------------------|-----------------|-------|------|-------|
|                              |                      |                            | min.            | typ.  | max. |       |
| Thermal resistance (1device) | R <sub>th(j-c)</sub> | IGBT                       | -               | -     | 0.12 | °C/W  |
|                              |                      | FWD                        | -               | -     | 0.20 |       |
| Contact thermal resistance   | R <sub>th(c-f)</sub> | with Thermal Compound (*4) | -               | 0.025 | -    |       |

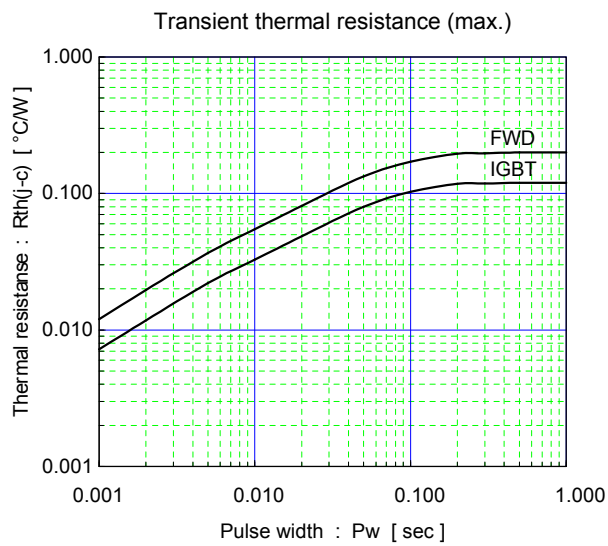
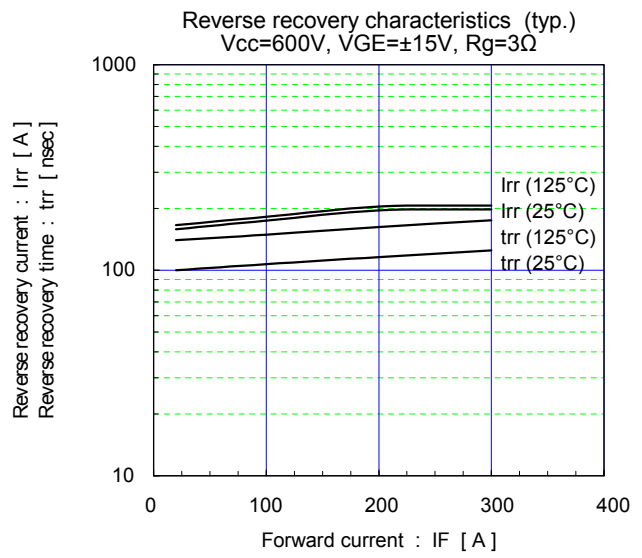
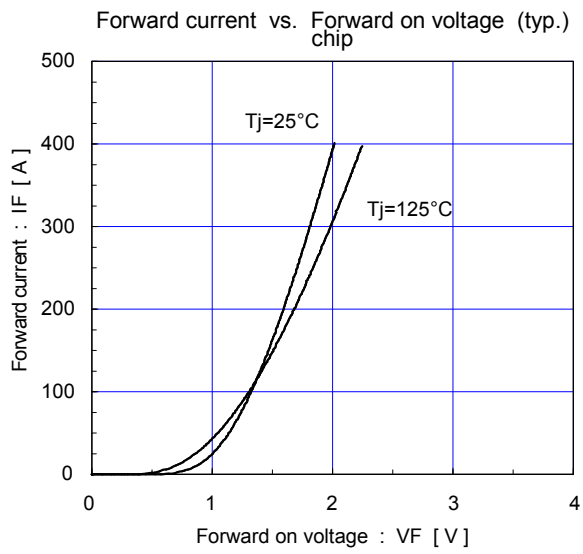
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.



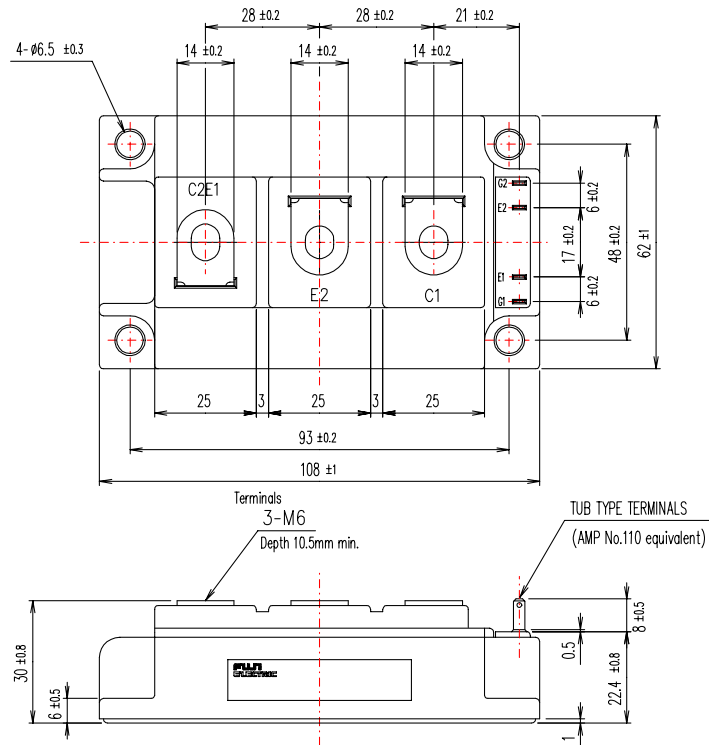
■ Characteristics (Representative)



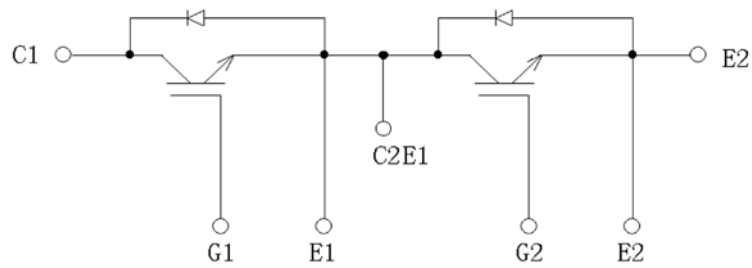




■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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