

2MBI200VB-120-50

IGBT Modules

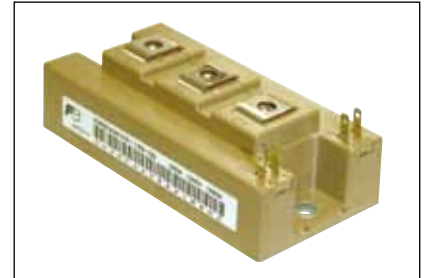
IGBT MODULE (V series) 1200V / 200A / 2 in one package

■ 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 T_c=25°C unless otherwise specified)

| Items | Symbols | Conditions | Maximum ratings | Units |
|---|---|----------------------------------|-----------------|-------|
| Collector-Emitter voltage | V _{CEs} | | 1200 | V |
| Gate-Emitter voltage | V _{GES} | | ±20 | V |
| Collector current | I _c | Continuous T _c =100°C | 200 | |
| | I _{c pulse} | 1ms | 400 | |
| | -I _c | | 200 | |
| | -I _{c pulse} | 1ms | 400 | |
| Collector power dissipation | P _C | 1 device | 1500 | W |
| Junction temperature | T _j | | 175 | °C |
| Operating junction temperature (under switching conditions) | T _{jop} | | 150 | |
| Case temperature | T _c | | 125 | |
| Storage temperature | T _{stg} | | -40 ~ 125 | |
| Isolation voltage | between terminal and copper base (*1) V _{iso} | AC : 1min. | 2500 | VAC |
| Screw torque | Mounting (*2) | | 3.5 | N m |
| | Terminals (*3) | | 3.5 | |

Note *1: All terminals should be connected together during the test.

Note *2: Recommendable Value : 2.5-3.5 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5-3.5 Nm (M5)

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

| Items | Symbols | Conditions | Characteristics | | | Units | |
|--------------------------------------|---------------------------------|---|-----------------------|------|------|-------|---|
| | | | min. | typ. | max. | | |
| Zero gate voltage collector current | I _{CEs} | V _{GE} = 0V, V _{CE} = 1200V | - | - | 2.0 | mA | |
| Gate-Emitter leakage current | I _{GES} | V _{CE} = 0V, V _{GE} = ±20V | - | - | 400 | nA | |
| Gate-Emitter threshold voltage | V _{GE(th)} | V _{CE} = 20V, I _c = 200mA | 6.0 | 6.5 | 7.0 | V | |
| Collector-Emitter saturation voltage | V _{CE(sat)} (terminal) | V _{GE} = 15V I _c = 200A | T _j =25°C | - | 1.95 | 2.40 | V |
| | | | T _j =125°C | - | 2.25 | - | |
| | | | T _j =150°C | - | 2.30 | - | |
| | V _{CE(sat)} (chip) | V _{GE} = 15V I _c = 200A | T _j =25°C | - | 1.75 | 2.20 | |
| | | | T _j =125°C | - | 2.05 | - | |
| | | | T _j =150°C | - | 2.1 | - | |
| Internal gate resistance | R _{G(int)} | - | - | 3.8 | - | Ω | |
| Input capacitance | C _{ies} | V _{CE} = 10V, V _{GE} = 0V, f = 1MHz | - | 18.2 | - | nF | |
| Turn-on time | t _{on} | V _{CC} = 600V | - | 600 | - | nsec | |
| | t _r | I _c = 200A | - | 200 | - | | |
| | t _{r(i)} | V _{GE} = ±15V | - | 50 | - | | |
| Turn-off time | t _{off} | R _θ = 2.7Ω | - | 800 | - | nsec | |
| | t _r | T _j = 150°C | - | 80 | - | | |
| | | | - | 80 | - | | |
| Forward on voltage | V _F (terminal) | V _{GE} = 0V I _F = 200A | T _j =25°C | - | 1.85 | 2.30 | V |
| | | | T _j =125°C | - | 2.00 | - | |
| | | | T _j =150°C | - | 1.95 | - | |
| | V _F (chip) | V _{GE} = 0V I _F = 200A | T _j =25°C | - | 1.70 | 2.15 | |
| | | | T _j =125°C | - | 1.85 | - | |
| | | | T _j =150°C | - | 1.80 | - | |
| Reverse recovery time | t _{rr} | I _F = 200A | - | 150 | - | nsec | |

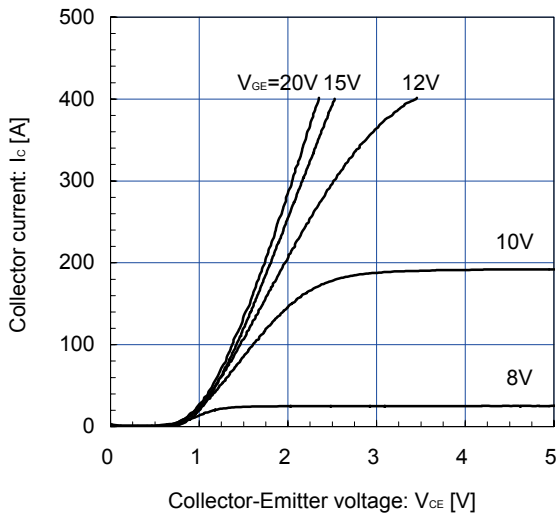
● Thermal resistance characteristics

| Items | Symbols | Conditions | Characteristics | | | Units |
|---|----------------------|-----------------------|-----------------|-------|-------|-------|
| | | | min. | typ. | max. | |
| Thermal resistance (1device) | R _{th(j-c)} | IGBT | - | - | 0.100 | °C/W |
| | | FWD | - | - | 0.160 | |
| Contact thermal resistance (1device) (*4) | R _{th(c-f)} | with Thermal Compound | - | 0.025 | - | |

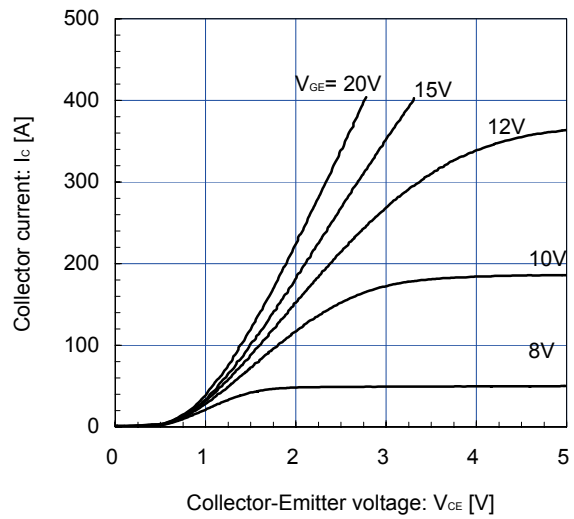
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

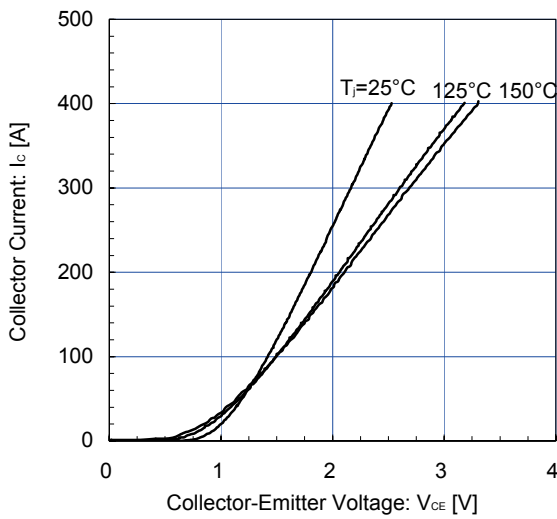
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



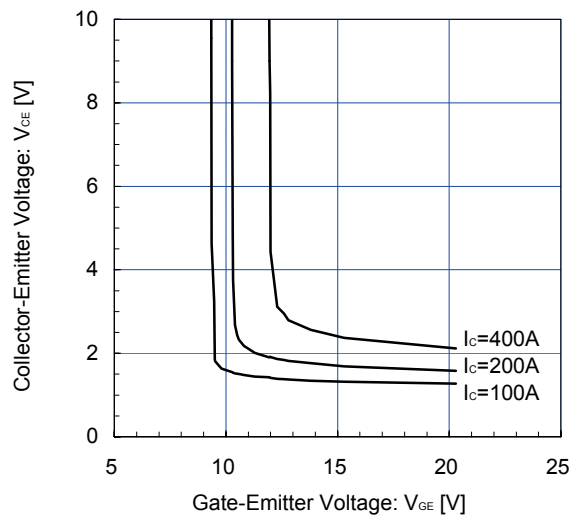
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 150^\circ\text{C}$ / chip



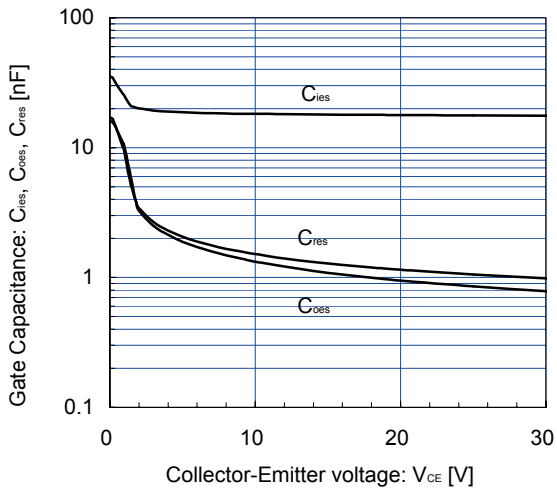
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



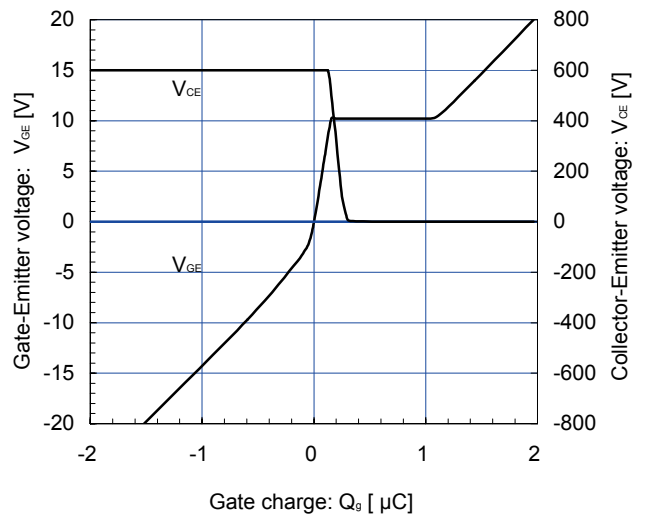
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_J = 25^\circ\text{C}$ / chip



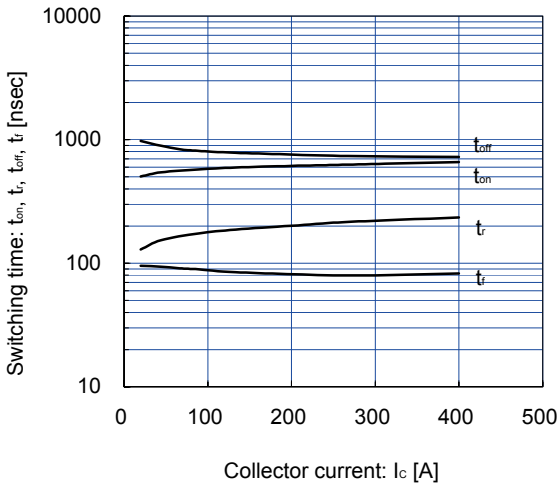
Gate Capacitance vs. Collector-Emitter Voltage
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$



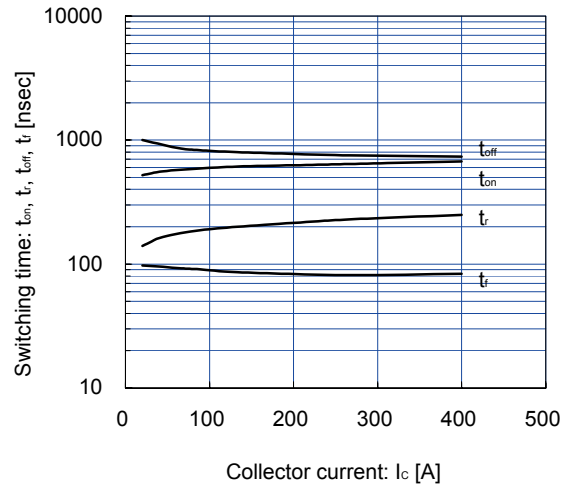
Dynamic Gate Charge (typ.)
 $V_{CC} = 600\text{V}$, $I_C = 200\text{A}$, $T_J = 25^\circ\text{C}$



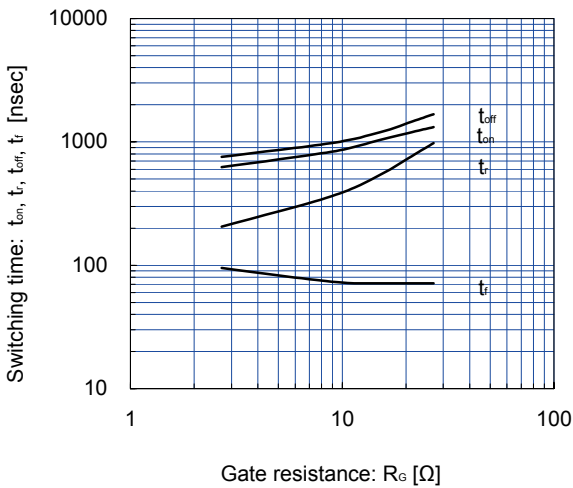
Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=2.7\Omega, T_J=125^\circ C$



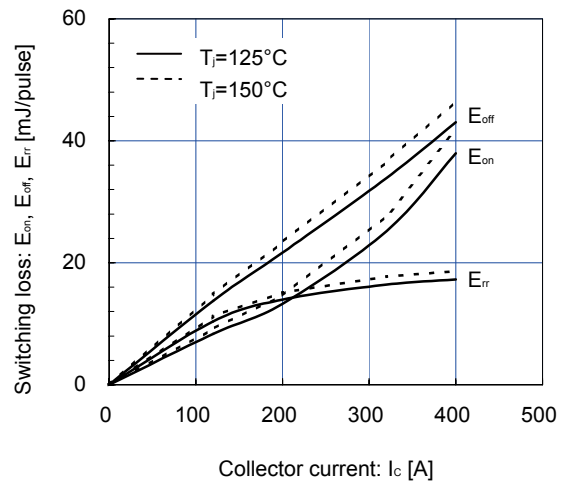
Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=2.7\Omega, T_J=150^\circ C$



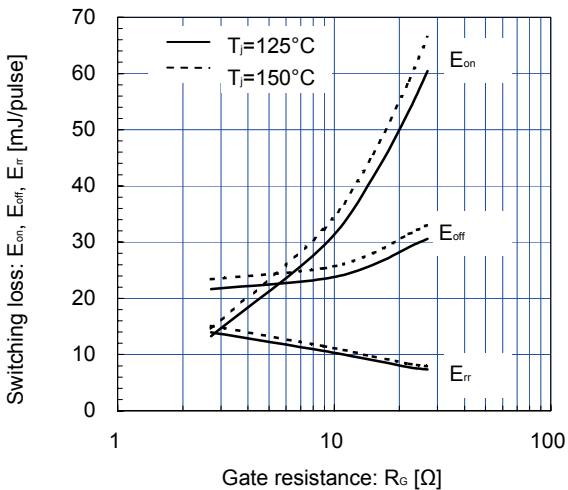
Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=200A, V_{GE}=\pm 15V, T_J=125^\circ C$



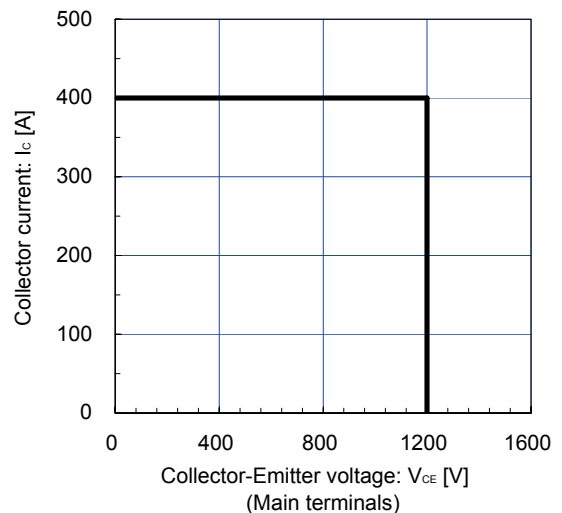
Switching loss vs. Collector current (typ.)
 $V_{CC}=600, V_{GE}=\pm 15V, R_G=2.7\Omega, T_J=125, 150^\circ C$



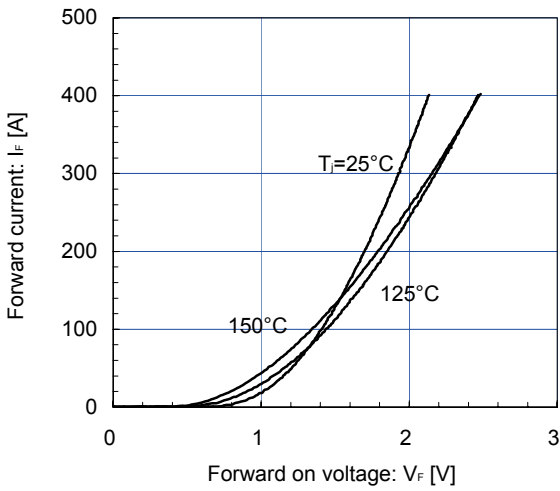
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=200A, V_{GE}=\pm 15V, T_J=125, 150^\circ C$



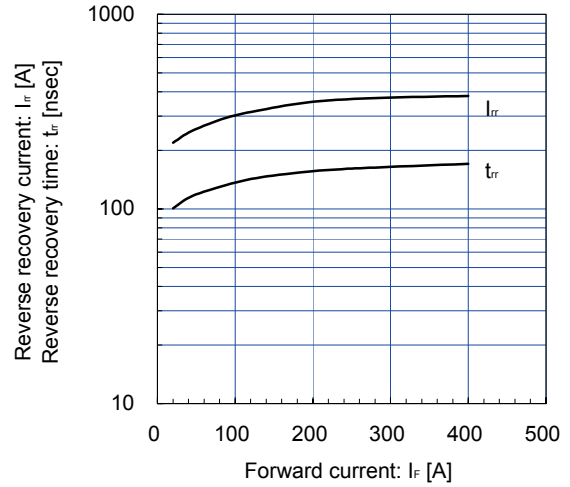
Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE}=15V, R_G=2.7\Omega, T_J=150^\circ C$



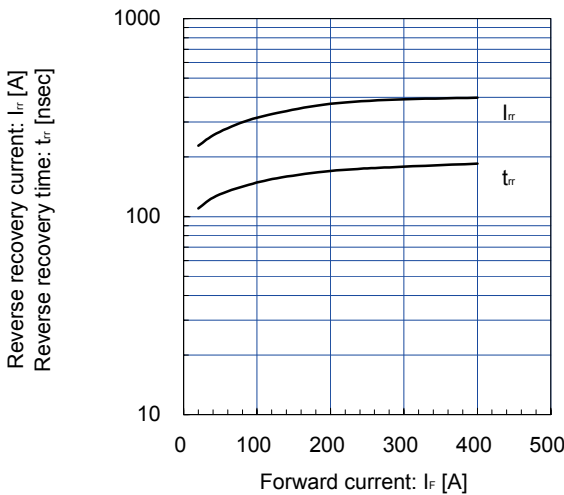
Forward Current vs. Forward Voltage (typ.)
chip



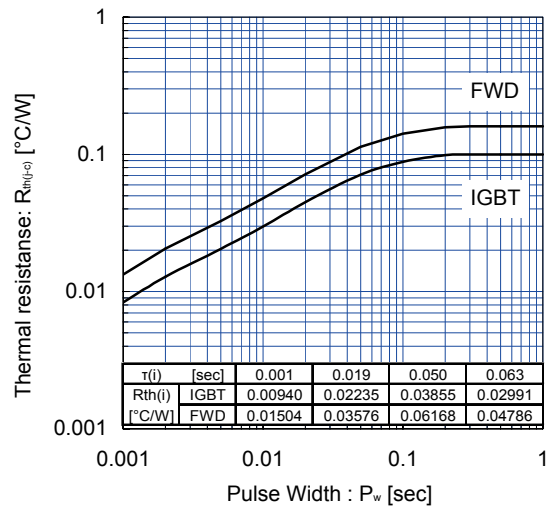
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=2.7\Omega, T_J=125^\circ C$



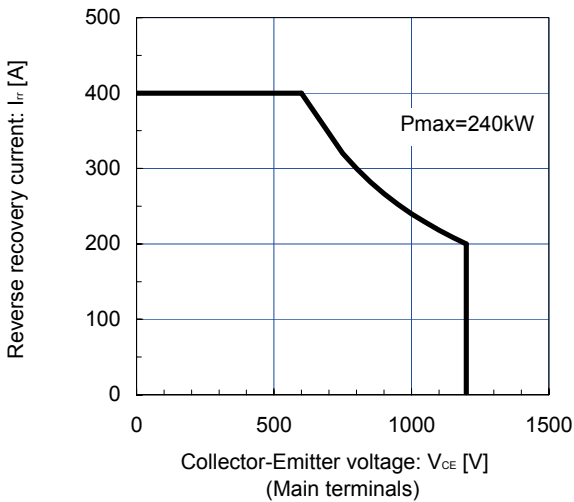
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=2.7\Omega, T_J=150^\circ C$



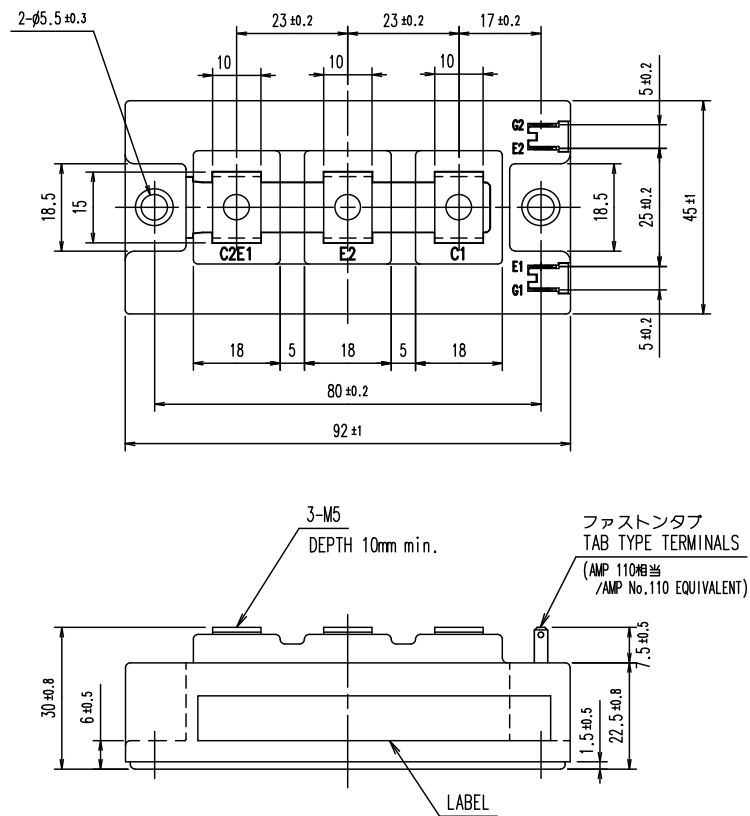
Transient Thermal Resistance (max.)



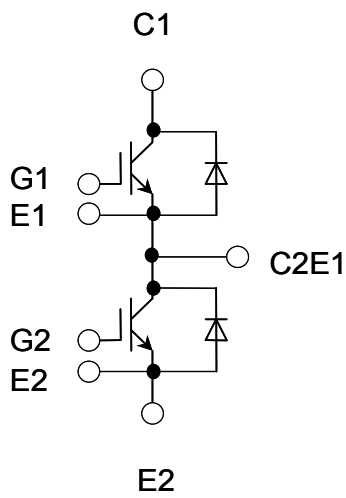
FWD safe operating area (max.)
 $T_J=150^\circ C$



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



WARNING

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