

2MBI900VXA-120P-50

IGBT Modules

IGBT MODULE (V series) 1200V / 900A / 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 | |
|---|---------------------------|---------------------------------------|-----------------|-----------------|-----|
| Inverter | Collector-Emitter voltage | V_{CES} | 1200 | V | |
| | Gate-Emitter voltage | V_{GES} | ± 20 | V | |
| | Collector current | I_c | Continuous | Tc=25°C 1200 | A |
| | | | | Tc=100°C 900 | |
| | | I_c pulse | 1ms | 1800 | |
| | | $-I_c$ | | 900 | |
| Collector power dissipation | P_c | $-I_c$ pulse | 1ms | 1800 | |
| | | 1 device | | 5100 | W |
| Junction temperature | T_j | | 175 | °C | |
| Operating junction temperature (under switching conditions) | T_{jop} | | 150 | | |
| Case temperature | T_c | | 150 | | |
| Storage temperature | T_{stg} | | -40 ~ +150 | | |
| Isolation voltage | V_{iso} | between terminal and copper base (*1) | AC : 1min. | 4000 | VAC |
| | | between thermistor and others (*2) | | | |
| Screw torque (*3) | - | Mounting | M5 | 6.0 | N m |
| | | Main Terminals | M8 | 10.0 | |
| | | Sense Terminals | M4 | 2.1 | |

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

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable Value : Mounting 3.0 ~ 6.0 Nm (M5) Recommendable Value : Main Terminals 8.0 ~ 10.0 Nm (M8)
Recommendable Value : Sense Terminals 1.8 ~ 2.1 Nm (M4)

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

| Items | Symbols | Conditions | Characteristics | | | Units | |
|--------------------------------------|-------------------------------|--|-----------------|------|------|----------|---|
| | | | min. | typ. | max. | | |
| Zero gate voltage collector current | I_{CES} | $V_{GE} = 0V, V_{CE} = 1200V$ | - | - | 8.0 | mA | |
| Gate-Emitter leakage current | I_{GES} | $V_{CE} = 0V, V_{GE} = \pm 20V$ | - | - | 1600 | nA | |
| Gate-Emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = 20V, I_c = 900mA$ | 6.0 | 6.5 | 7.0 | V | |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ (terminal) (*4) | $V_{GE} = 15V$ $I_c = 900A$ | Tj=25°C | - | 1.75 | 2.20 | V |
| | | | Tj=125°C | - | 2.10 | - | |
| | Tj=150°C | | - | 2.15 | - | | |
| | $V_{CE(sat)}$ (chip) | | Tj=25°C | - | 1.65 | 2.10 | |
| | | | Tj=125°C | - | 2.00 | - | |
| | | | Tj=150°C | - | 2.05 | - | |
| Input capacitance | C_{ies} | $V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$ | - | 83 | - | nF | |
| Turn-on time | t_{on} | $V_{CC} = 600V$ $I_c = 900A$ $V_{GE} = \pm 15V$ $R_G = 1.6\Omega$ | - | 1.00 | - | μs | |
| | t_r | | - | 0.40 | - | | |
| | $t_r(i)$ | | - | 0.15 | - | | |
| | t_{off} | | - | 1.20 | - | | |
| Turn-off time | t_f | | - | 0.15 | - | | |
| | V_F (terminal) (*4) | $V_{GE} = 0V$ $I_F = 900A$ | Tj=25°C | - | 1.90 | 2.35 | V |
| Tj=125°C | | | - | 2.05 | - | | |
| Tj=150°C | | | - | 2.00 | - | | |
| V_F (chip) | | | Tj=25°C | - | 1.80 | 2.25 | |
| | | | Tj=125°C | - | 1.95 | - | |
| | | | Tj=150°C | - | 1.90 | - | |
| Reverse recovery time | t_{rr} | $I_F = 900A$ | - | 0.20 | - | μs | |
| Resistance | R | T=25°C | - | 5000 | - | Ω | |
| | | T=100°C | 465 | 495 | 520 | | |
| B value | B | T=25/50°C | 3305 | 3375 | 3450 | K | |

Note *4: Please refer to page 6, there is definition of on-state voltage at terminal.

● Thermal resistance characteristics

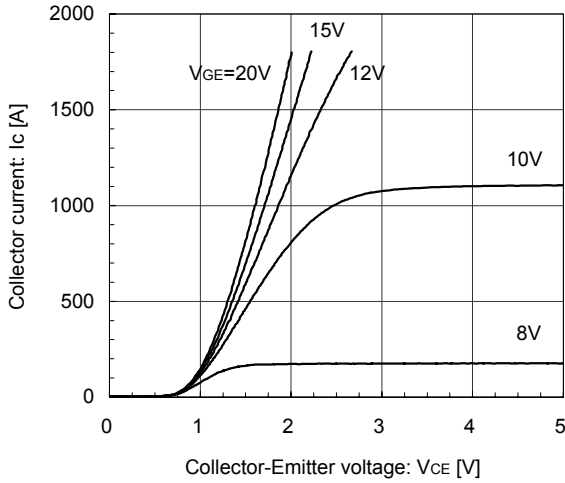
| Items | Symbols | Conditions | Characteristics | | | Units |
|---|---------------|-----------------------|-----------------|---------|-------|-------|
| | | | min. | typ. | max. | |
| Thermal resistance (1device) | $R_{th(j-c)}$ | Inverter IGBT | - | - | 0.030 | °C/W |
| | | Inverter FWD | - | - | 0.054 | |
| Contact thermal resistance (1device) (*5) | $R_{th(c-f)}$ | with Thermal Compound | - | 0.00625 | - | |

Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

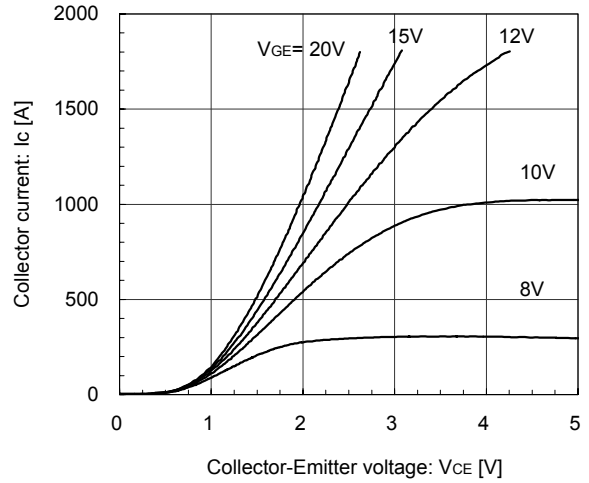
[INVERTER]

Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip



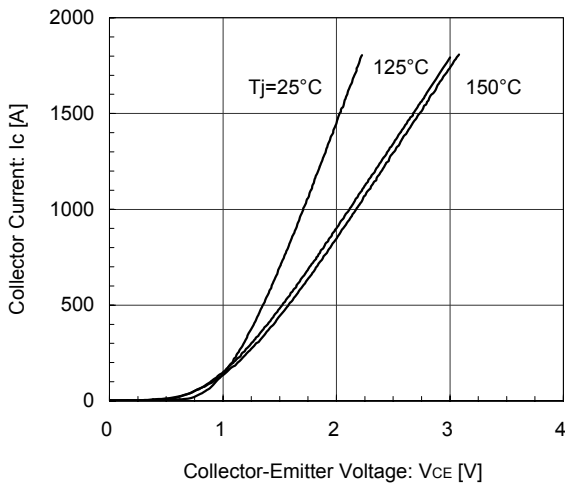
[INVERTER]

Collector current vs. Collector-Emitter voltage (typ.)
Tj= 150°C / chip



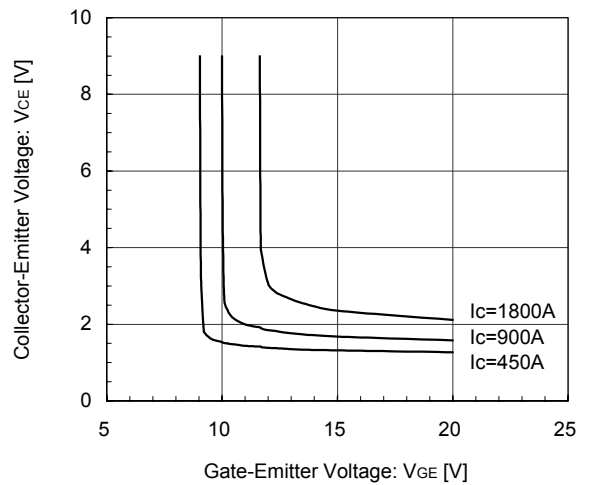
[INVERTER]

Collector current vs. Collector-Emitter voltage (typ.)
VGE= 15V / chip



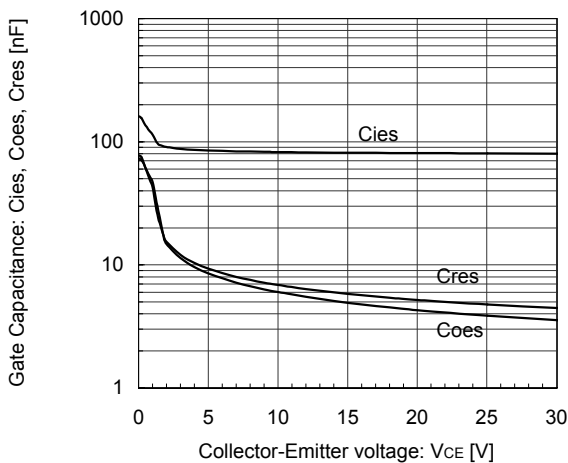
[INVERTER]

Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj= 25°C / chip



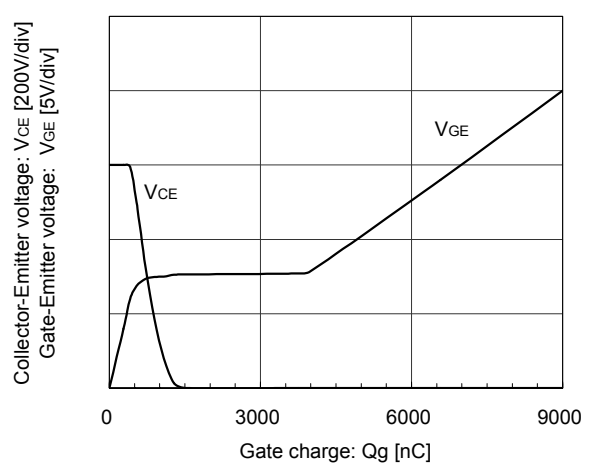
[INVERTER]

Gate Capacitance vs. Collector-Emitter Voltage (typ.)
VGE= 0V, f= 1MHz, Tj= 25°C



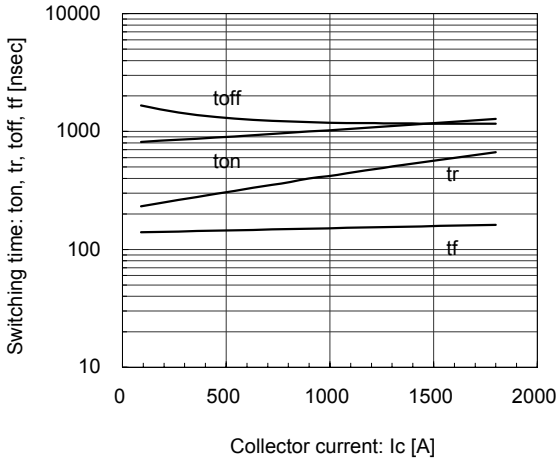
[INVERTER]

Dynamic Gate Charge (typ.)
Vcc=600V, Ic=900A, Tj= 25°C



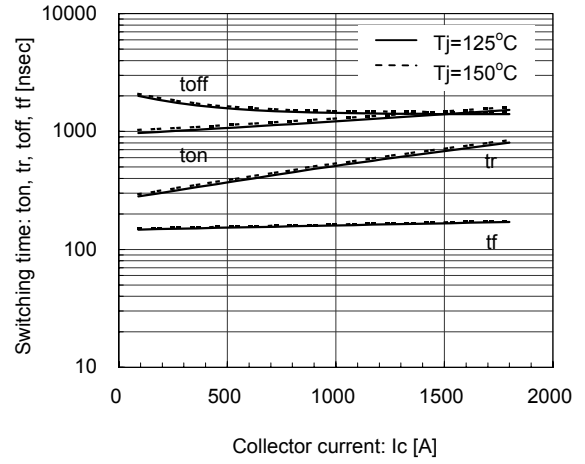
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=25^\circ C$



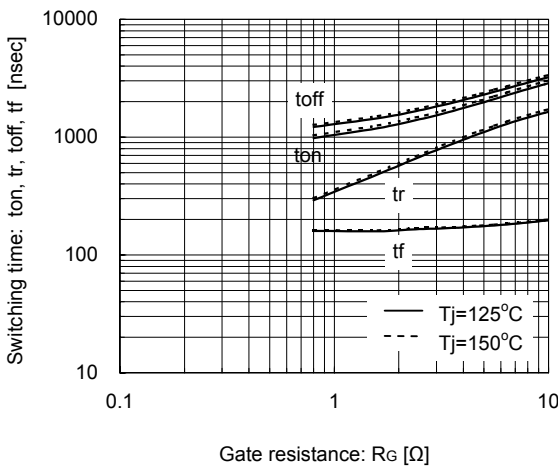
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=125^\circ C, 150^\circ C$



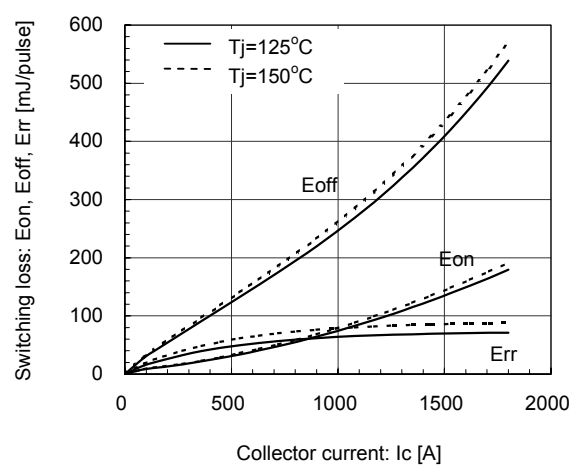
[INVERTER]

Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=900A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



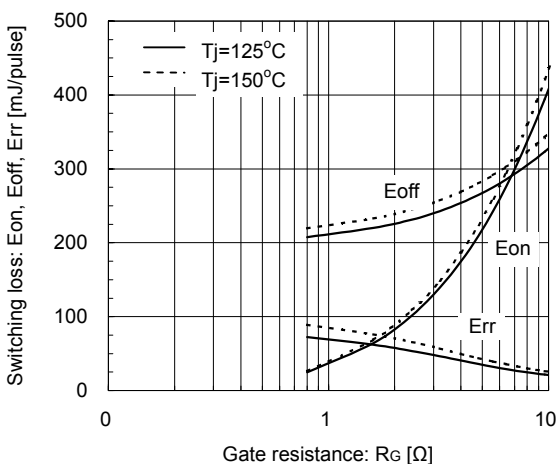
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{CC}=600, V_{GE}=\pm 15V, R_G=1.6\Omega, T_J=125^\circ C, 150^\circ C$



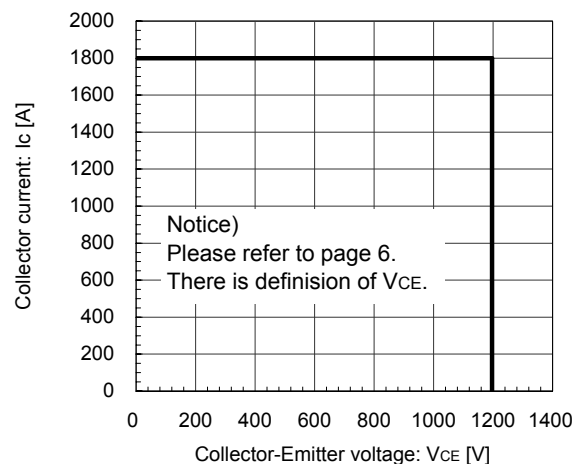
[INVERTER]

Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V, I_c=900A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



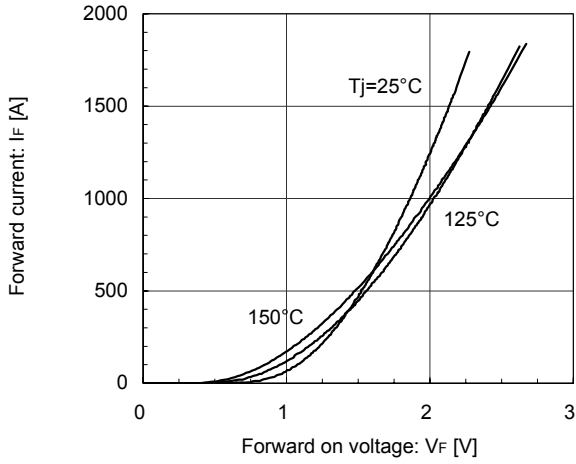
[INVERTER]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE}=15V, R_G=1.6\Omega, T_J=150^\circ C$



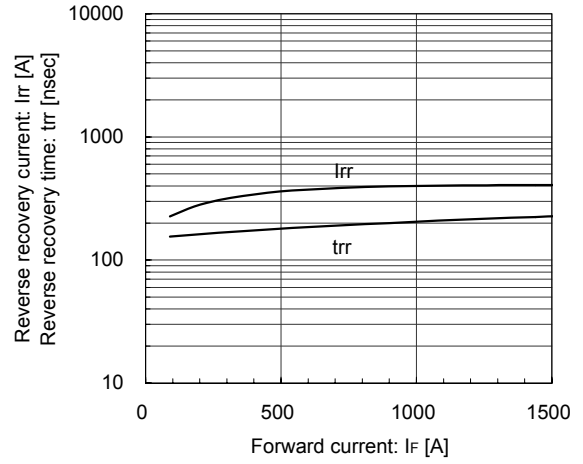
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip



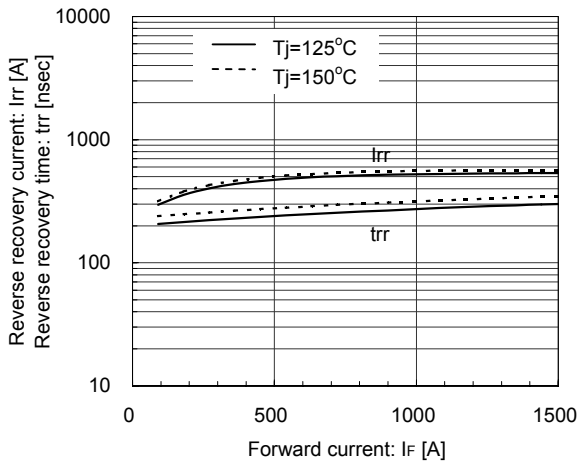
[INVERTER]

Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1.6\Omega$, $T_j=25^\circ\text{C}$

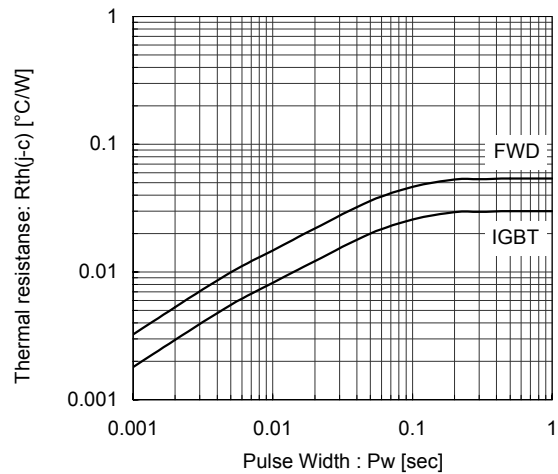


[INVERTER]

Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1.6\Omega$, $T_j=125^\circ\text{C}$, 150°C

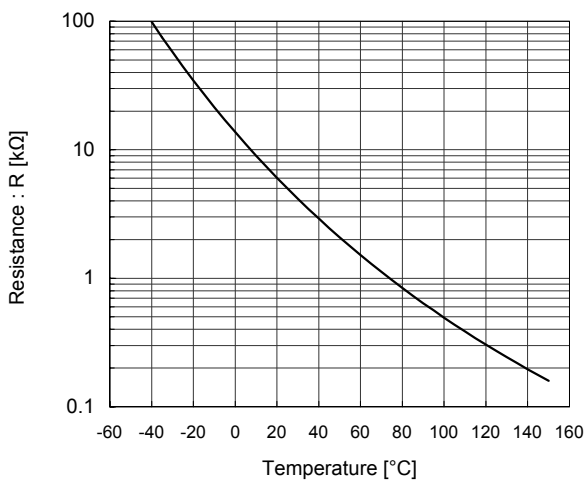


Transient Thermal Resistance (max.)

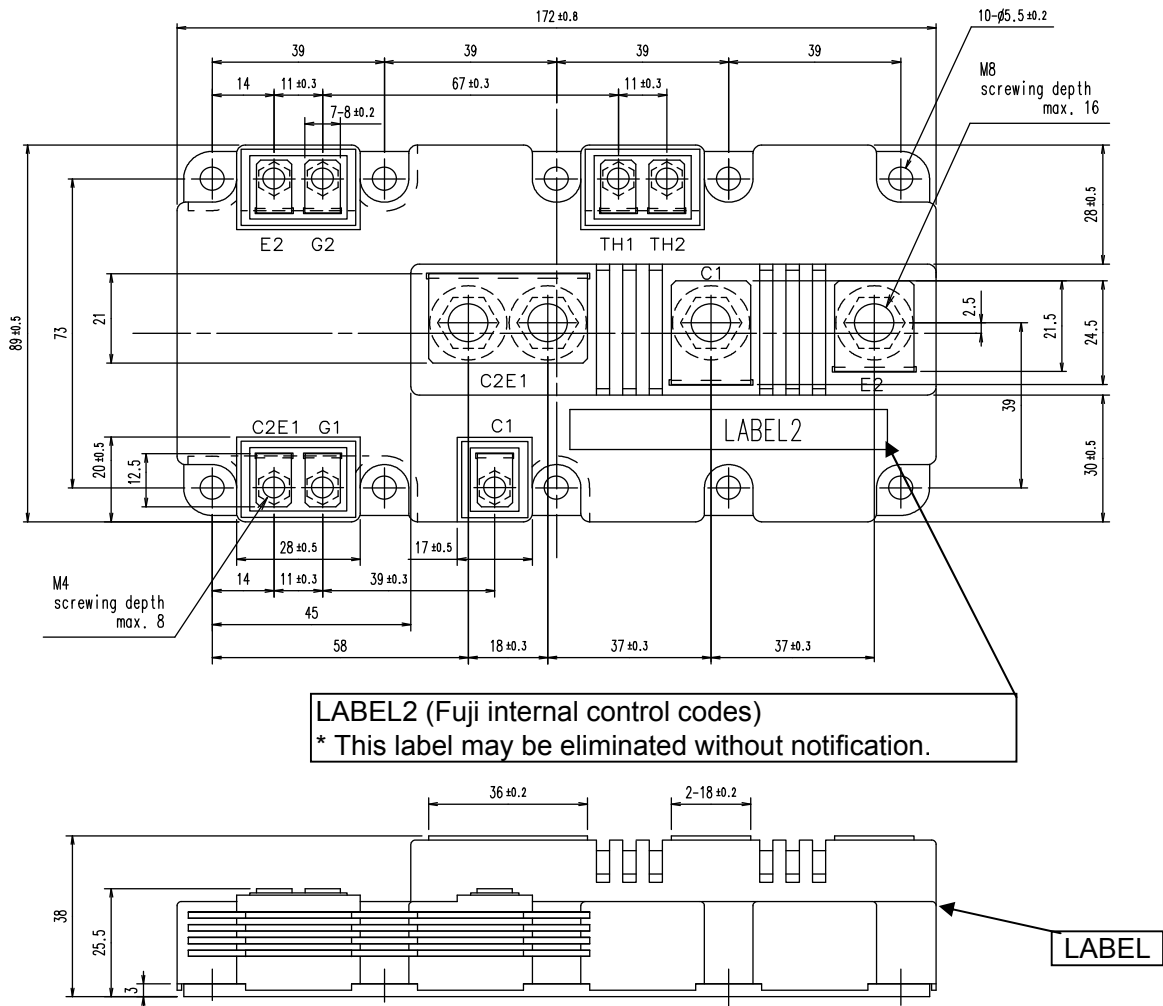


[THERMISTOR]

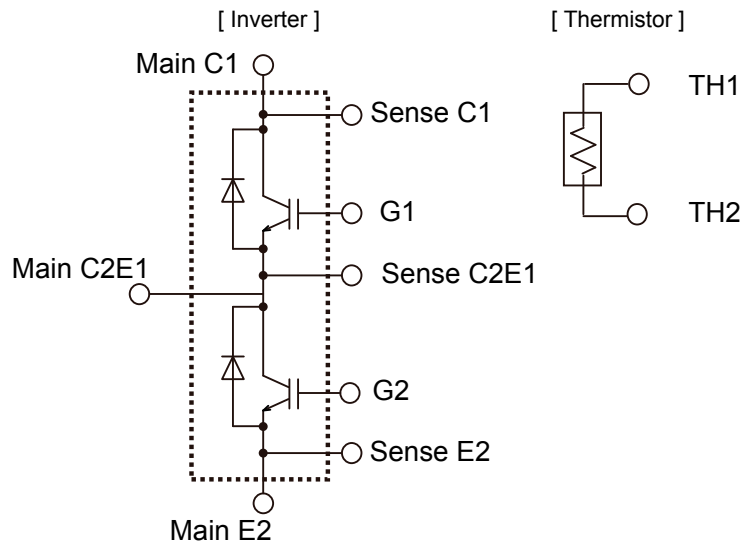
Temperature characteristic (typ.)



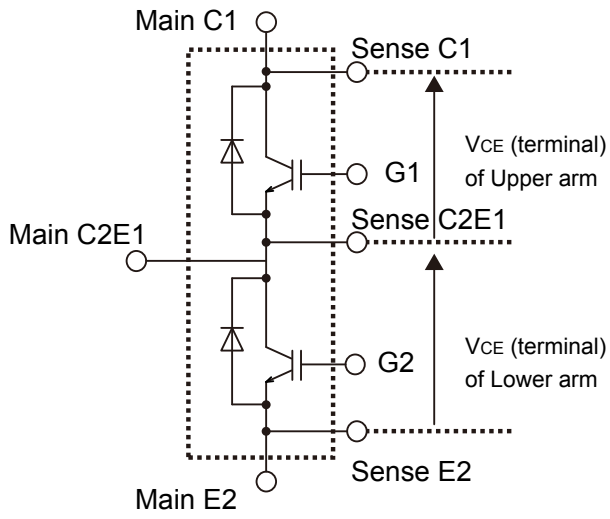
■ Outline Drawings, mm



■ Equivalent Circuit Schematic



■ Definition of on-state voltage at terminal and switching characteristics



Fuji defined V_{CE} value of terminal by using Sense C1 and Sense C2E1 for Upper arm and Sense C2E1 and Sense E2 for Lower arm .

Switching characteristics of V_{CE} also is defined between Sense C1 and Sense C2E1 for Upper arm and Sense C2E1 and Sense E2 for Lower arm .

Please use these terminals whenever measure spike voltage and on-state voltage .

WARNING

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