

6MBI150VB-060-50

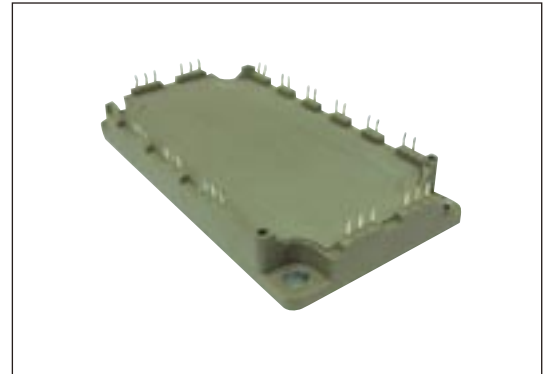
IGBT MODULE (V series) 600V / 150A / 6 in one package

■ Features

- Compact Package
- P.C.Board Mount
- Low $V_{CE(sat)}$

■ 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 $T_c=25^\circ\text{C}$ unless otherwise specified)

| Items | | Symbols | Conditions | | Maximum ratings | Units |
|---|---|--------------|------------|------------------------|------------------|-------|
| Inverter | Collector-Emitter voltage | V_{CES} | | | 600 | V |
| | Gate-Emitter voltage | V_{GES} | | | ± 20 | V |
| | Collector current | I_c | Continuous | $T_c=80^\circ\text{C}$ | 150 | A |
| | | I_{cp} | 1ms | $T_c=80^\circ\text{C}$ | 300 | |
| | | $-I_c$ | | | 150 | |
| | | $-I_c$ pulse | 1ms | | 300 | |
| Collector power dissipation | P_c | 1 device | | 485 | W | |
| Junction temperature | T_j | | | 175 | $^\circ\text{C}$ | |
| Operating junction temperature (under switching conditions) | T_{jop} | | | 150 | | |
| Case temperature | T_c | | | 125 | | |
| Storage temperature | T_{stg} | | | -40 to +125 | | |
| Isolation voltage | between terminal and copper base (*1) between thermistor and others (*2) | V_{iso} | AC : 1min. | | | 2500 |
| Screw torque | Mounting (*3) | - | M5 | | 3.5 | N m |

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 : 2.5-3.5 Nm (M5)

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

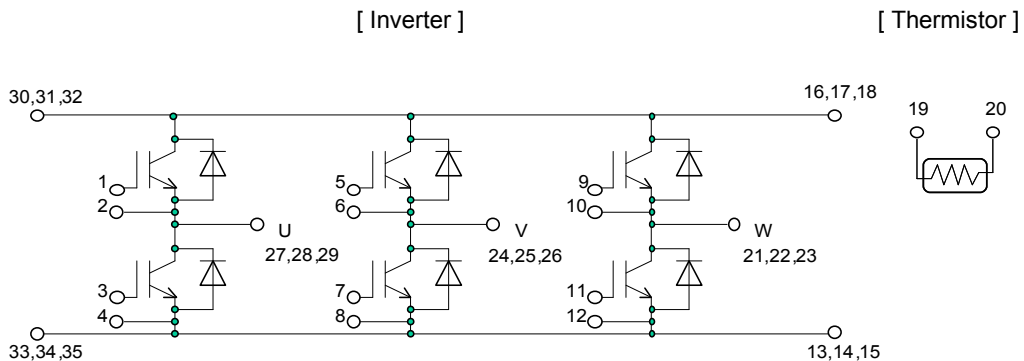
| Items | Symbols | Conditions | Characteristics | | | Units | |
|--------------------------------------|-----------------------------|---|-----------------|------|------|----------|---|
| | | | min. | typ. | max. | | |
| Zero gate voltage collector current | I_{CES} | $V_{GE} = 0V, V_{CE} = 600V$ | - | - | 1.0 | mA | |
| Gate-Emitter leakage current | I_{GES} | $V_{GE} = 0V, V_{GE} = \pm 20V$ | - | - | 200 | nA | |
| Gate-Emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = 20V, I_c = 150mA$ | 6.2 | 6.7 | 7.2 | V | |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ (terminal) | $V_{GE} = 15V$ $I_c = 100A$ | Tj=25°C | - | 2.40 | 2.85 | V |
| | | | Tj=125°C | - | 2.70 | - | |
| | | | Tj=150°C | - | 2.90 | - | |
| | $V_{CE(sat)}$ (chip) | $V_{GE} = 15V$ $I_c = 150A$ | Tj=25°C | - | 1.60 | 2.05 | |
| | | | Tj=125°C | - | 1.90 | - | |
| | | | Tj=150°C | - | 2.10 | - | |
| Input capacitance | C_{ies} | $V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$ | - | 9.7 | - | nF | |
| Turn-on time | t_{on} | $V_{CC} = 300V$ $I_c = 150A$ $V_{GE} = +15 / -15V$ $R_G = 9\Omega$ | - | 0.39 | 1.20 | μs | |
| | t_r | | - | 0.09 | 0.60 | | |
| | $t_r(i)$ | | - | 0.03 | - | | |
| Turn-off time | t_{off} | $R_G = 9\Omega$ | - | 0.53 | 1.00 | μs | |
| | t_f | | - | 0.06 | 0.30 | | |
| Forward on voltage | V_F (terminal) | $I_F = 150A$ | Tj=25°C | - | 2.40 | 2.85 | V |
| | | | Tj=125°C | - | 2.30 | - | |
| | | | Tj=150°C | - | 2.30 | - | |
| | V_F (chip) | $I_F = 150A$ | Tj=25°C | - | 1.60 | 2.05 | |
| | | | Tj=125°C | - | 1.50 | - | |
| | | | Tj=150°C | - | 1.47 | - | |
| Reverse recovery time | t_{rr} | $I_F = \pm 20$ | - | - | 0.35 | 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 | |

● Thermal resistance characteristics

| Items | Symbols | Conditions | Characteristics | | | Units |
|---|----------|-----------------------|-----------------|------|------|-------|
| | | | min. | typ. | max. | |
| Thermal resistance (1device) | Rth(j-c) | Inverter IGBT | - | - | 0.31 | °C/W |
| | | Inverter FWD | - | - | 0.60 | |
| Contact thermal resistance (1device) (*4) | Rth(c-f) | with Thermal Compound | - | 0.05 | - | |

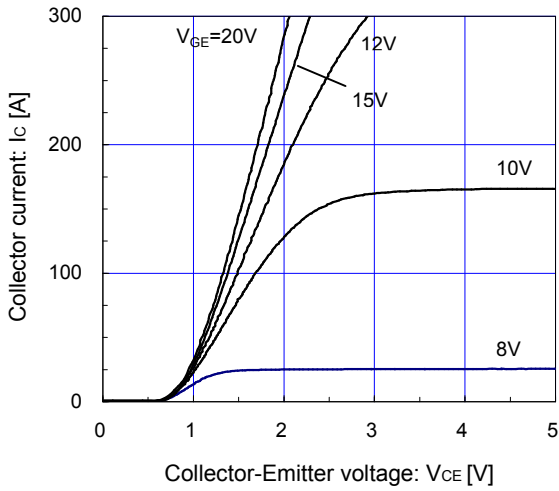
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Equivalent Circuit Schematic

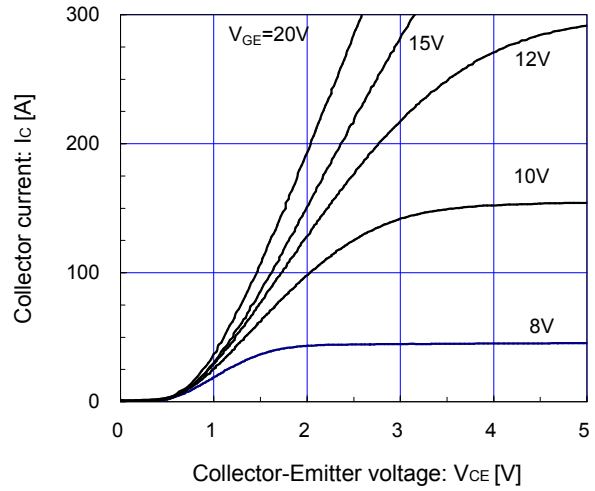


■ Characteristics (Representative)

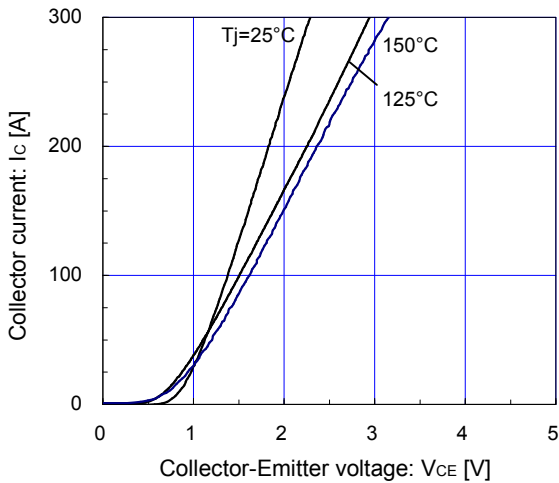
[Inverter]
 Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C} / \text{chip}$



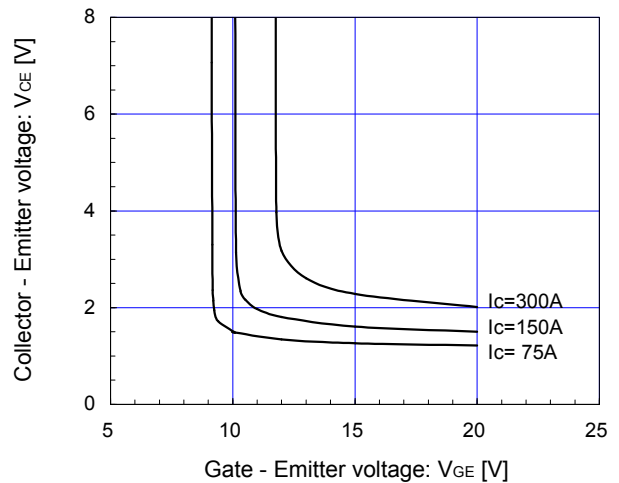
[Inverter]
 Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 150^\circ\text{C} / \text{chip}$



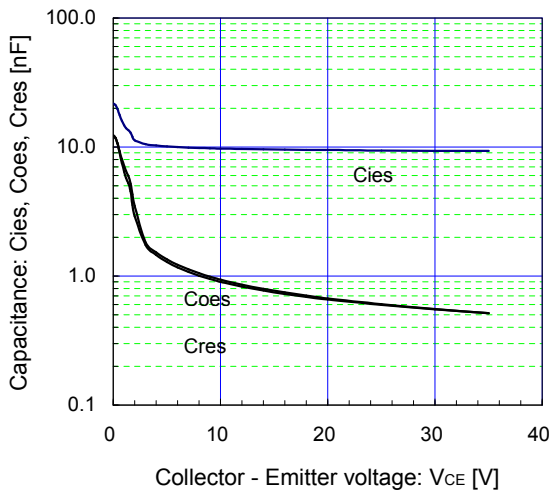
[Inverter]
 Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V} / \text{chip}$



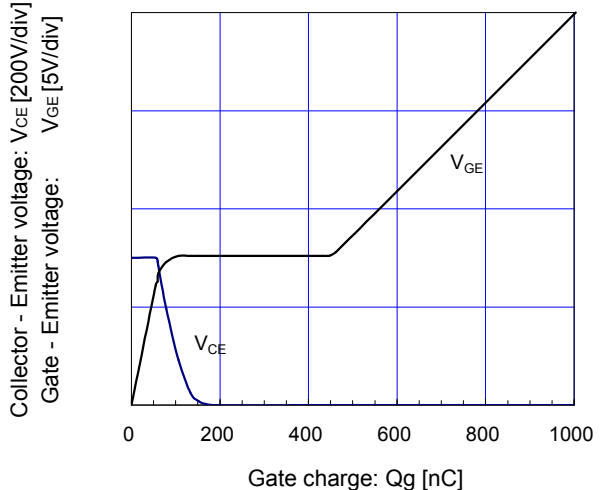
[Inverter]
 Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C} / \text{chip}$



[Inverter]
 Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}, f = 1\text{MHz}, T_j = 25^\circ\text{C}$

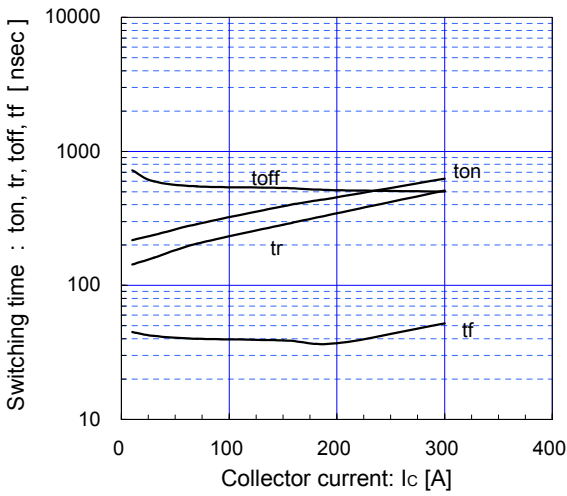


[Inverter]
 Dynamic gate charge (typ.)
 $V_{CC} = 300\text{V}, I_C = 150\text{A}, T_j = 25^\circ\text{C}$



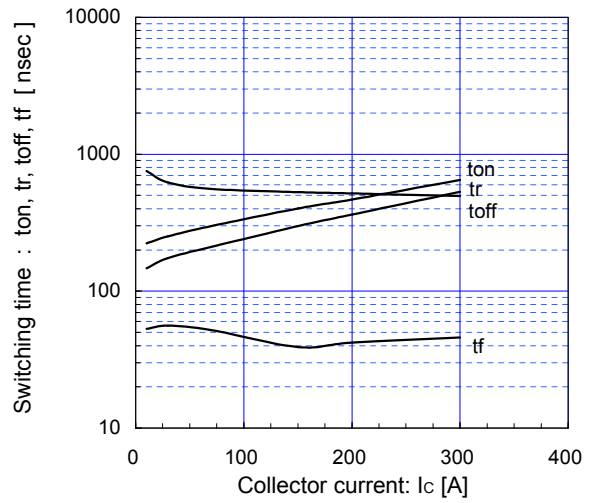
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=9\Omega, T_j=125^\circ C$



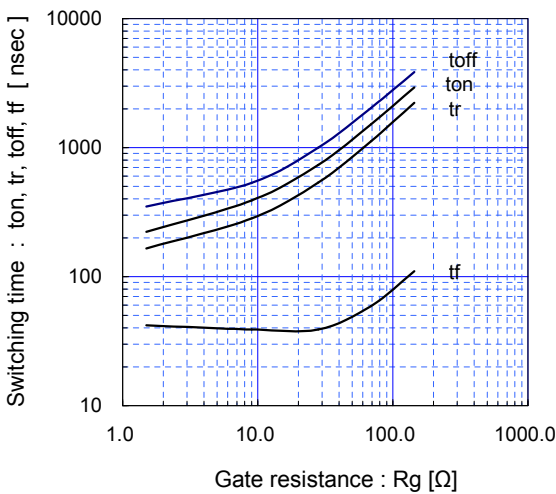
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=9\Omega, T_j=150^\circ C$



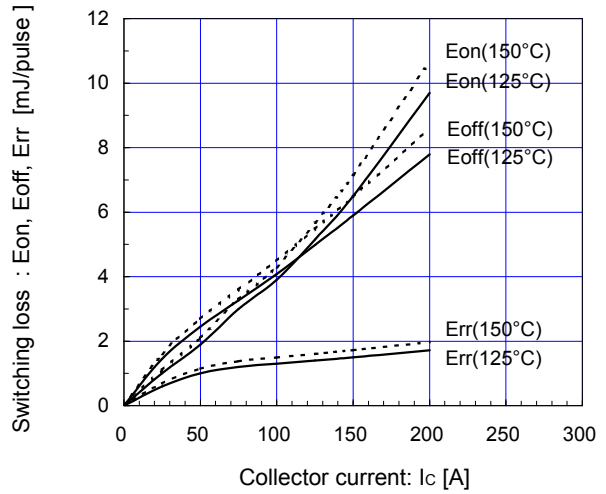
[Inverter]

Switching time vs. gate resistance (typ.)
 $V_{cc}=300V, I_c=150A, V_{GE}=\pm 15V, T_j=125^\circ C$



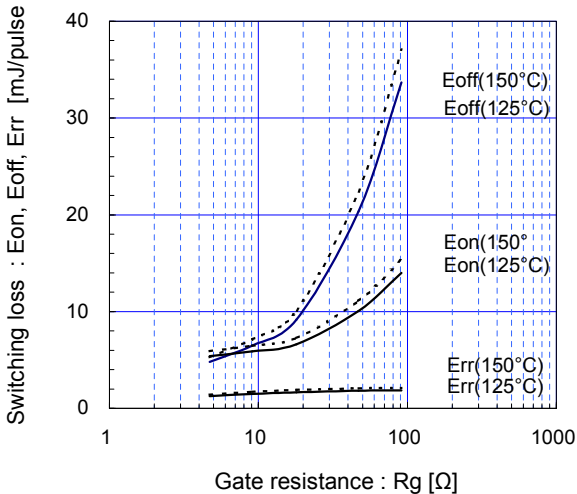
[Inverter]

Switching loss vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=9\Omega$



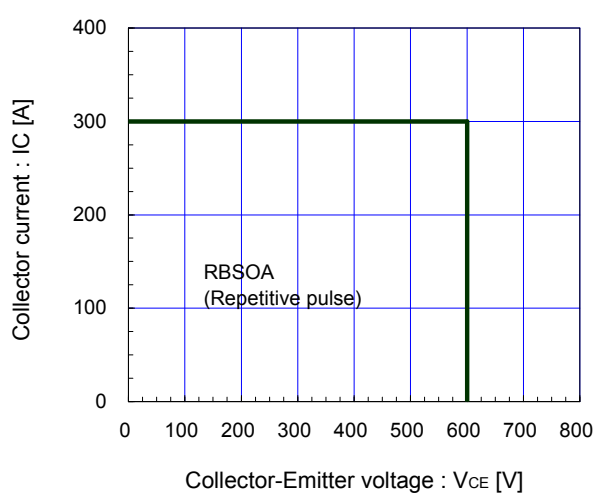
[Inverter]

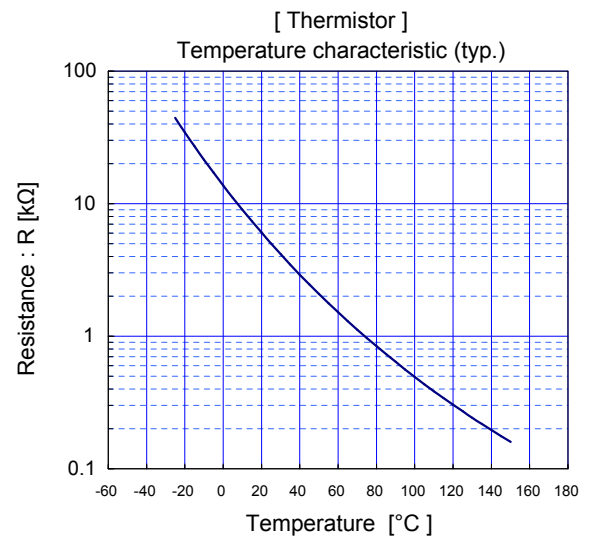
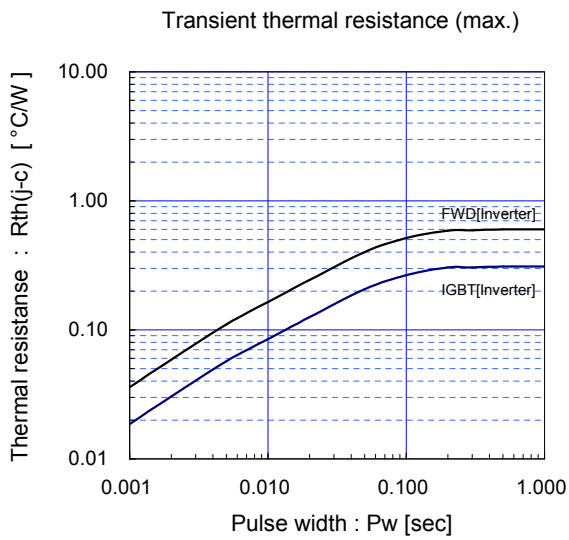
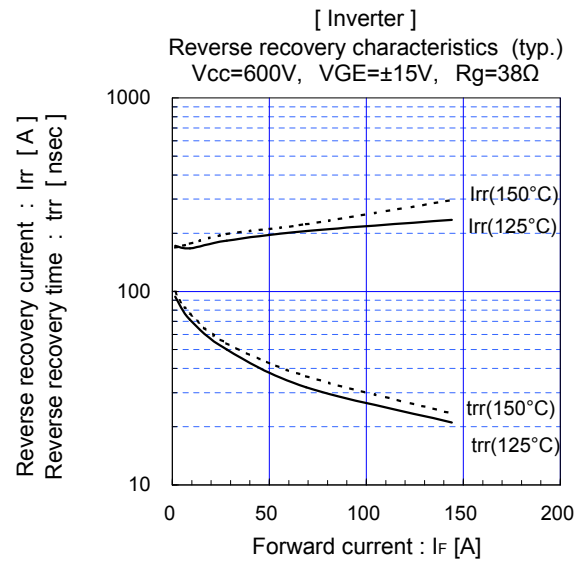
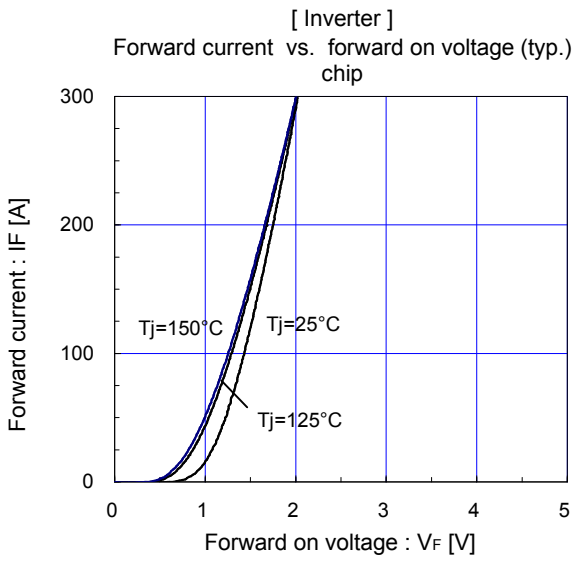
Switching loss vs. gate resistance (typ.)
 $V_{cc}=300V, I_c=150A, V_{GE}=\pm 15V$



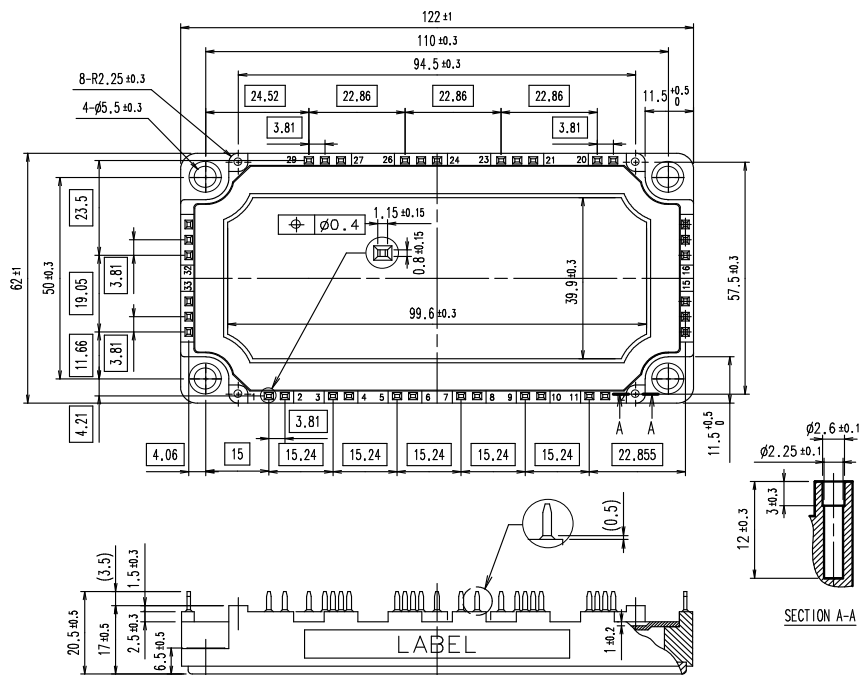
[Inverter]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 9\Omega, T_j \leq 125^\circ C$





■ Outline Drawings, mm



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