

# 6MBI75VA-120-50

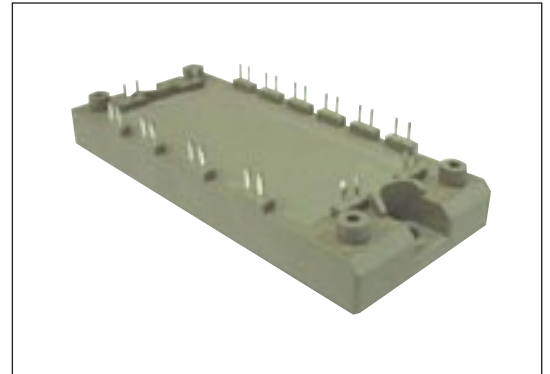
## IGBT MODULE (V series) 1200V / 75A / 6 in one package

### ■ 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

#### ● Maximum ratings (at $T_c=25^\circ\text{C}$ unless otherwise specified)

| Items   |   | Symbols      | Conditions |                        | Maximum ratings | Units |     |
|---|---|--------------|------------|------------------------|-----------------|-------|-----|
| Inverter  | Collector-Emitter voltage   | $V_{CES}$    |            |                        | 1200            | V     |     |
|   | Gate-Emitter voltage  | $V_{GES}$    |            |                        | $\pm 20$        | V     |     |
|   | Collector current   | $I_c$        | Continuous | $T_c=80^\circ\text{C}$ |                 | 75    | A   |
|   |   | $I_{cp}$     | 1ms        | $T_c=80^\circ\text{C}$ |                 | 150   |     |
|   |   | $-I_c$       |            |                        | 75              |       |     |
|   |   | $-I_c$ pulse | 1ms        |                        |                 | 150   |     |
| Collector power dissipation                                 | $P_c$   | 1 device     |            | 385                    | 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 to +125            |                 |       |     |
| Isolation voltage   | between terminal and copper base (*1)<br>between thermistor and others (*2) | $V_{iso}$    | AC : 1min. |                        |                 | 2500  | VAC |
| 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)

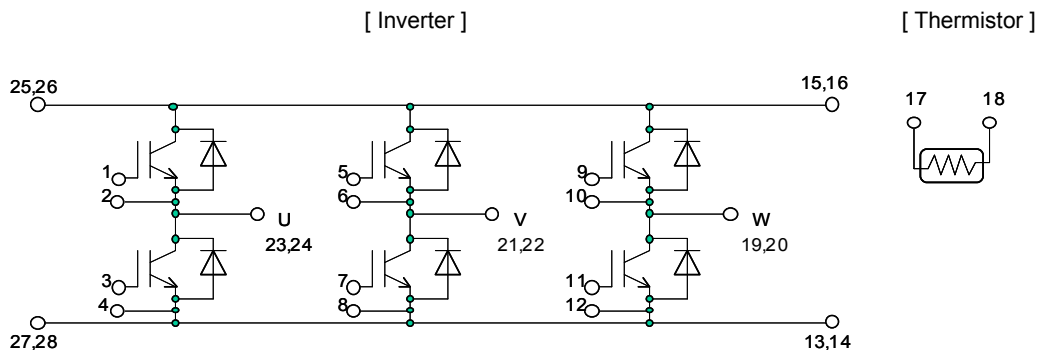
| Items                                | Symbols                     | Conditions   | Characteristics |      |      | Units    |      |
|--------------------------------------|-----------------------------|--|-----------------|------|------|----------|------|
|                                      |                             |  | min.            | typ. | max. |          |      |
| Zero gate voltage collector current  | $I_{CES}$                   | $V_{GE} = 0V, V_{CE} = 1200V$  | -               | -    | 1.0  | mA       |      |
| Gate-Emitter leakage current         | $I_{GES}$                   | $V_{GE} = 0V, V_{GE} = \pm 20V$  | -               | -    | 200  | nA       |      |
| Gate-Emitter threshold voltage       | $V_{GE(th)}$                | $V_{CE} = 20V, I_c = 75mA$   | 6.0             | 6.5  | 7.0  | V        |      |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$<br>(terminal) | $V_{GE} = 15V$<br>$I_c = 75A$  | Tj=25°C         | -    | 2.25 | 2.70     | V    |
|                                      |                             |  | Tj=125°C        | -    | 2.60 | -        |      |
|                                      |                             |  | Tj=150°C        | -    | 2.65 | -        |      |
|                                      | $V_{CE(sat)}$<br>(chip)     | $V_{GE} = 15V$<br>$I_c = 75A$  | Tj=25°C         | -    | 1.85 | 2.30     |      |
|                                      |                             |  | Tj=125°C        | -    | 2.20 | -        |      |
|                                      |                             |  | Tj=150°C        | -    | 2.25 | -        |      |
| Input capacitance                    | $C_{ies}$                   | $V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$  | -               | 6.0  | -    | nF       |      |
| Turn-on time                         | $t_{on}$                    | $V_{CC} = 600V$<br>$I_c = 75A$<br>$V_{GE} = +15 / -15V$<br>$R_G = 2.2\Omega$ | -               | 0.39 | 1.20 | $\mu s$  |      |
|                                      | $t_r$                       |  | -               | 0.09 | 0.60 |          |      |
|                                      | $t_r(i)$                    |  | -               | 0.03 | -    |          |      |
|                                      | Turn-off time               |  | $t_{off}$       | -    | 0.53 |          | 1.00 |
| Forward on voltage                   | $V_F$<br>(terminal)         | $I_F = 75A$  | Tj=25°C         | -    | 2.10 | 2.55     | V    |
|                                      |                             |  | Tj=125°C        | -    | 2.25 | -        |      |
|                                      |                             |  | Tj=150°C        | -    | 2.20 | -        |      |
|                                      | $V_F$<br>(chip)             | $I_F = 75A$  | Tj=25°C         | -    | 1.70 | 2.15     |      |
|                                      |                             |  | Tj=125°C        | -    | 1.85 | -        |      |
|                                      |                             |  | Tj=150°C        | -    | 1.80 | -        |      |
| Reverse recovery time                | $t_{rr}$                    | $I_F = \pm 20$   | -               | -    | 0.1  | $\mu s$  |      |
| Thermistor                           | Resistance                  | $T = 25^\circ C$   | -               | 5000 | -    | $\Omega$ |      |
|                                      |                             | $T = 100^\circ C$  | 465             | 495  | 520  |          |      |
|                                      | B value                     | $T = 25 / 50^\circ C$  | 3305            | 3375 | 3450 | K        |      |

● Thermal resistance characteristics

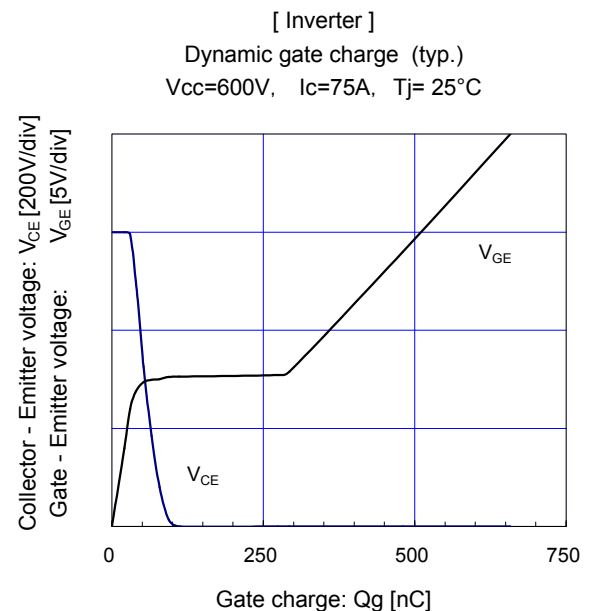
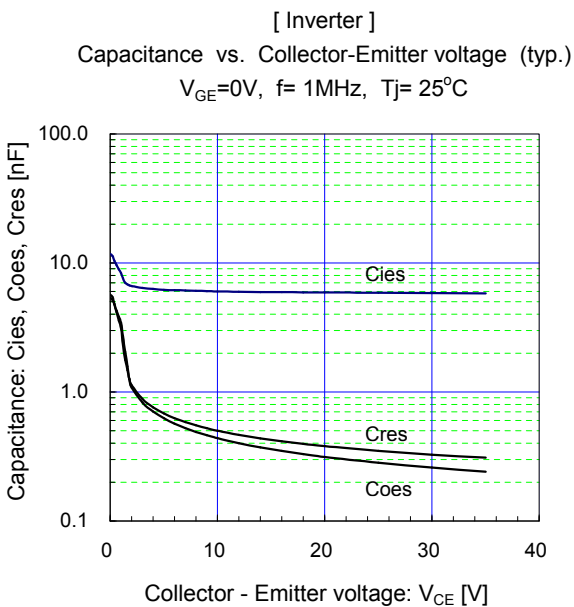
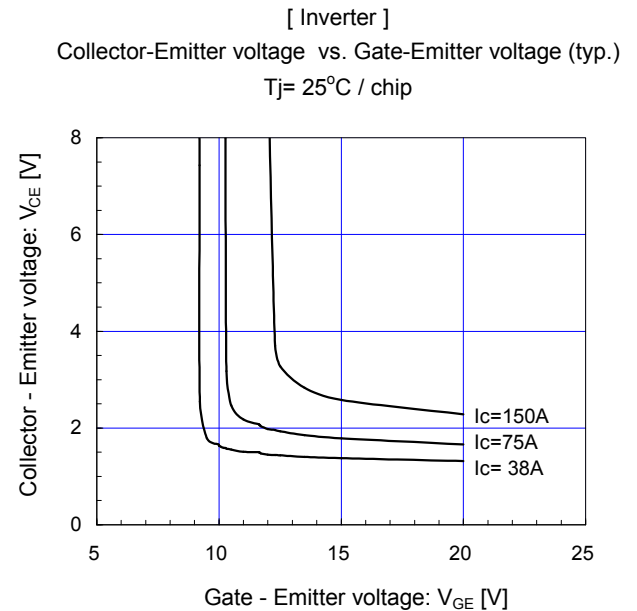
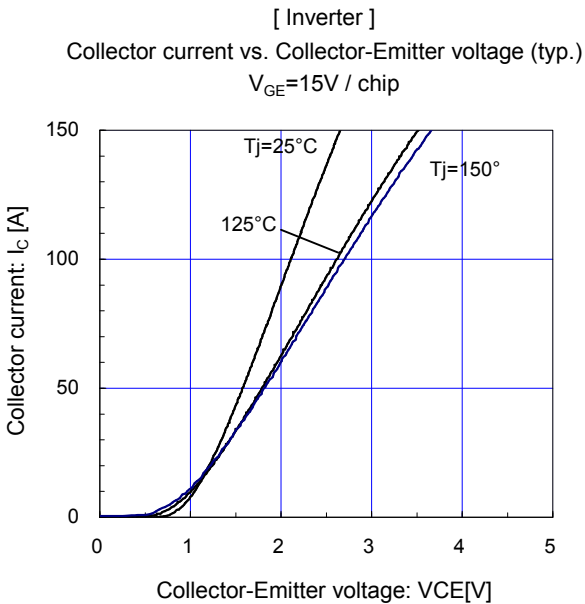
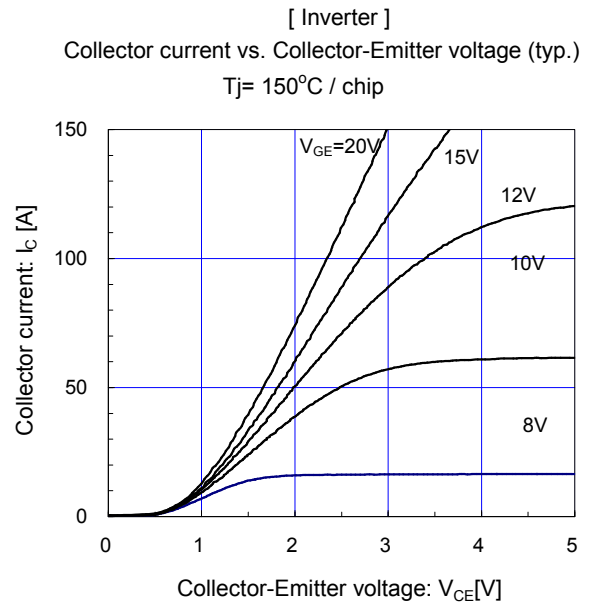
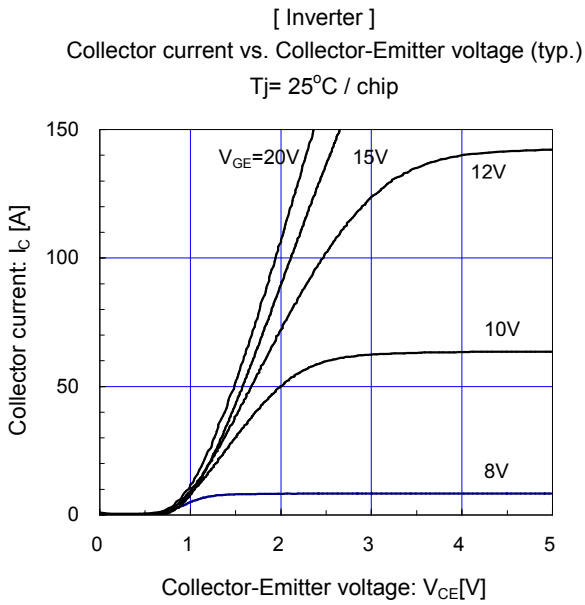
| Items                                     | Symbols       | Conditions            | Characteristics |      |      | Units        |
|---|---------------|-----------------------|-----------------|------|------|--------------|
|   |               |                       | min.            | typ. | max. |              |
| Thermal resistance (1device)              | $R_{th(j-c)}$ | Inverter IGBT         | -               | -    | 0.39 | $^\circ C/W$ |
|   |               | Inverter FWD          | -               | -    | 0.55 |              |
| Contact thermal resistance (1device) (*4) | $R_{th(c-f)}$ | 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

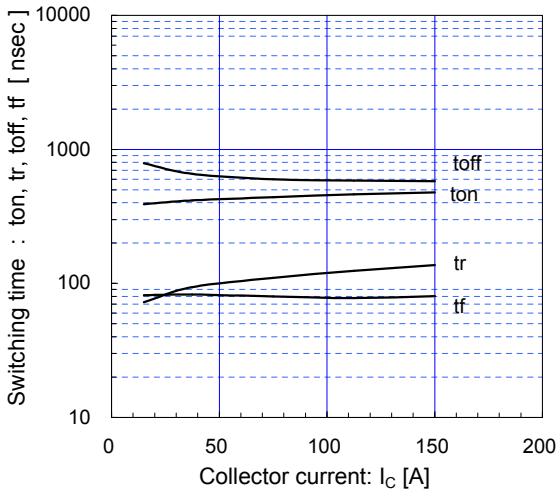


■ Characteristics (Representative)



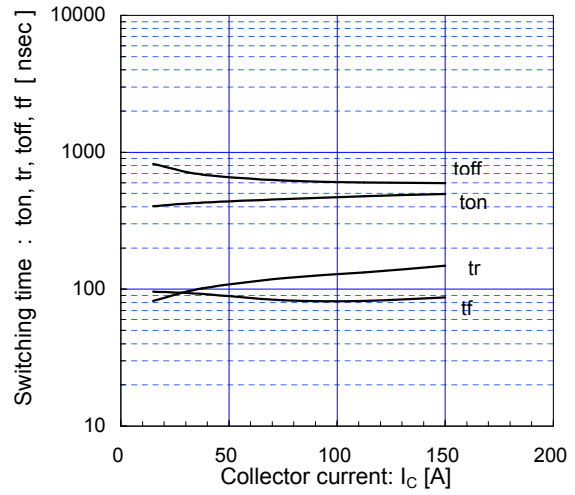
[ Inverter ]

Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=125^\circ C$



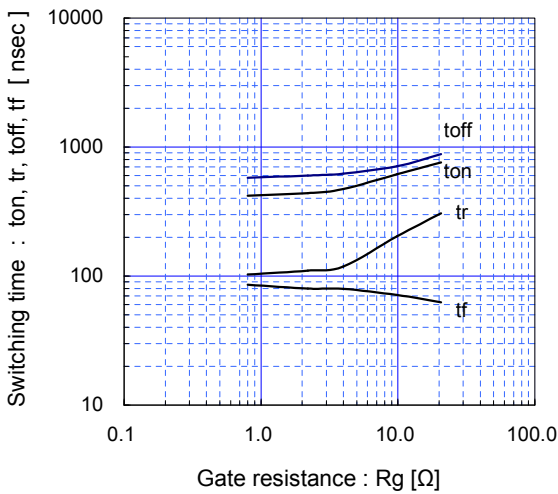
[ Inverter ]

Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=150^\circ C$



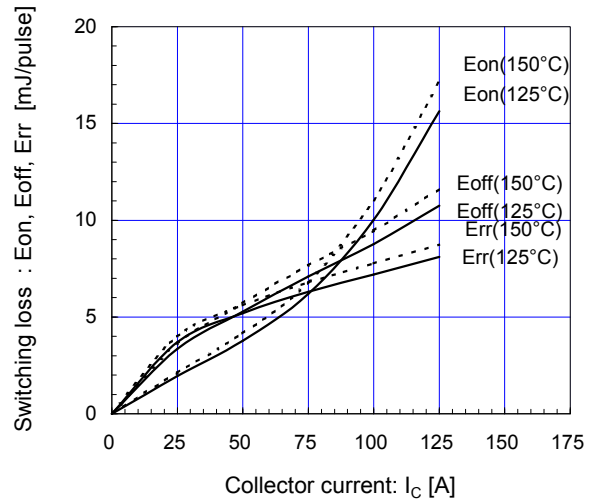
[ Inverter ]

Switching time vs. gate resistance (typ.)  
 $V_{cc}=600V, I_c=75A, V_{GE}=\pm 15V, T_j=125^\circ C$



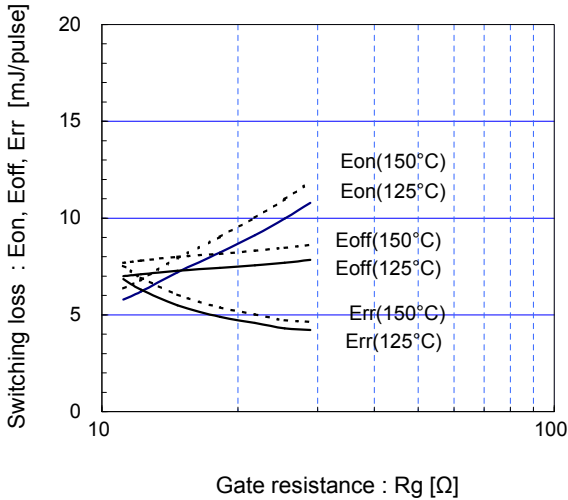
[ Inverter ]

Switching loss vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=2.2\Omega$



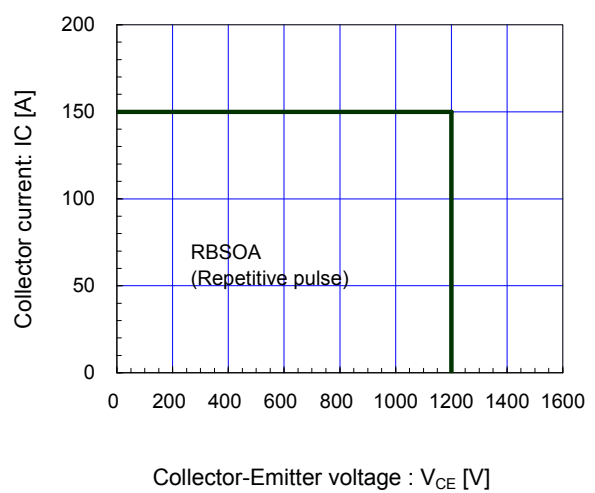
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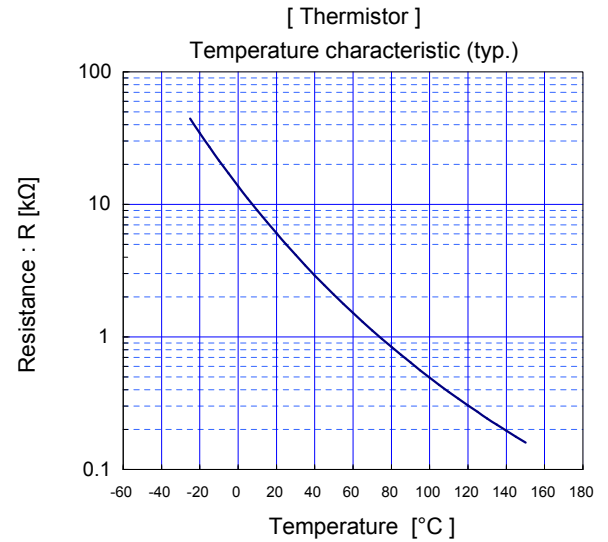
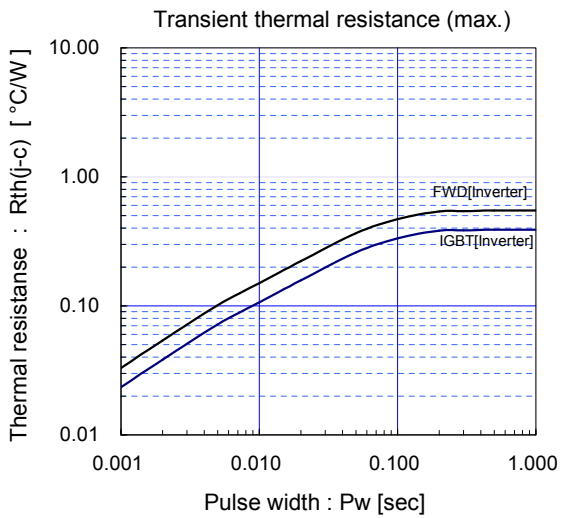
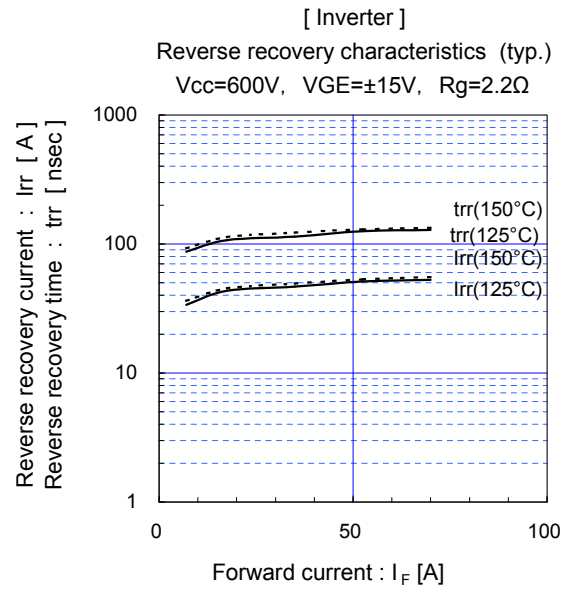
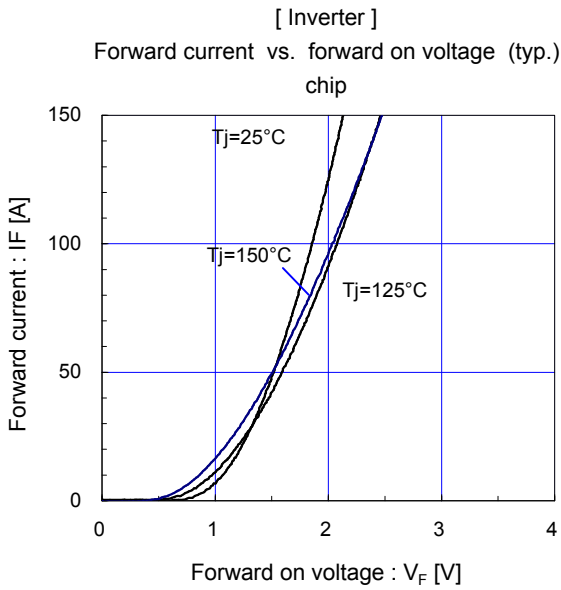
Switching loss vs. gate resistance (typ.)  
 $V_{cc}=600V, I_c=75A, V_{GE}=\pm 15V$



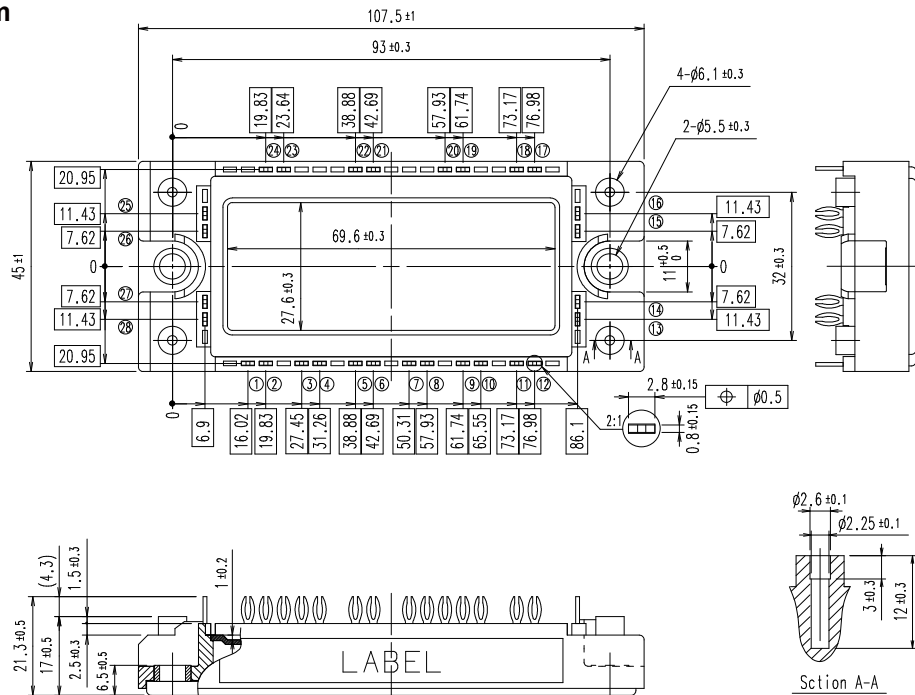
[ Inverter ]

Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 2.2\Omega, T_j \leq 125^\circ C$





■ Outline Drawings, mm



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