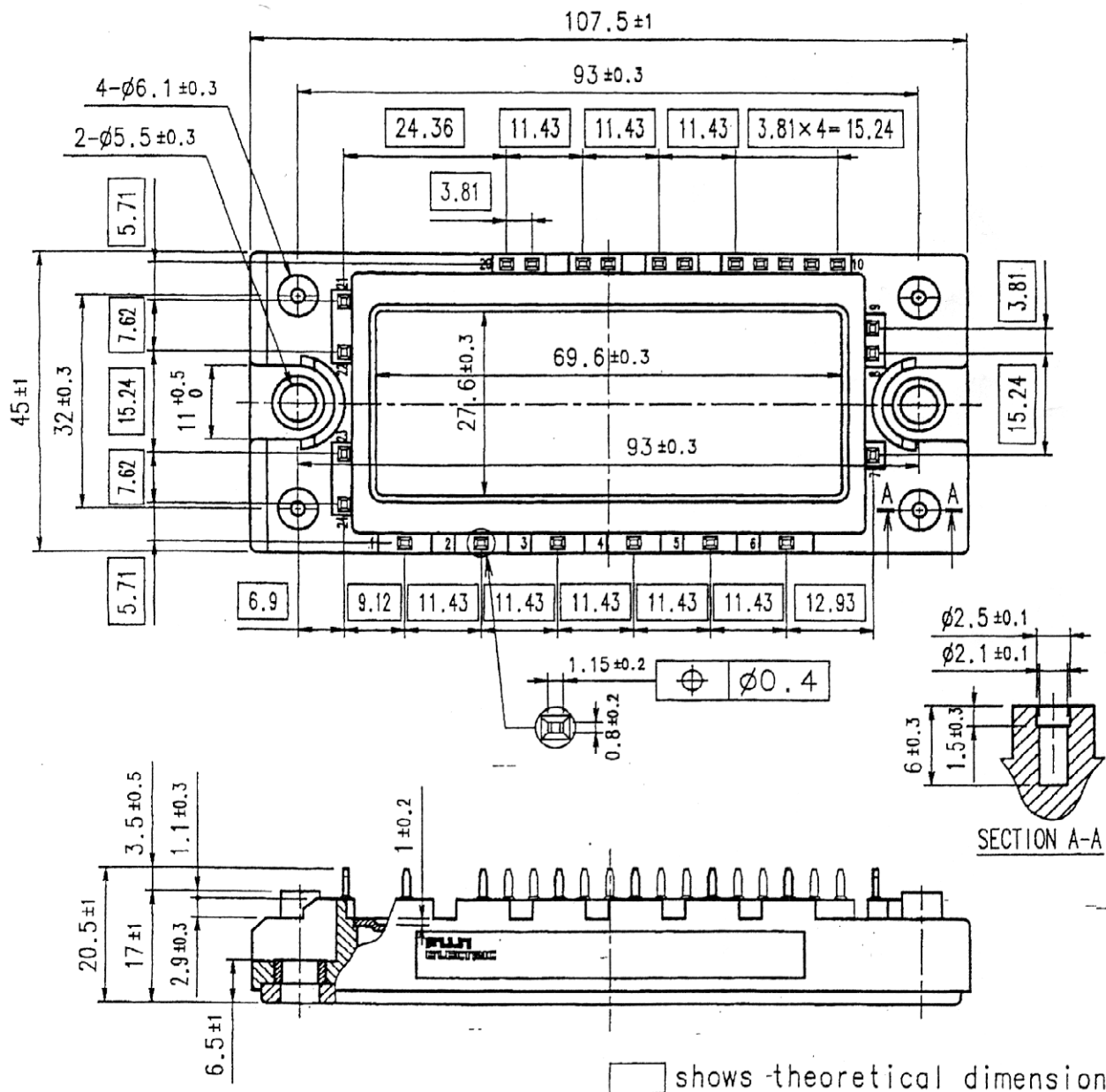
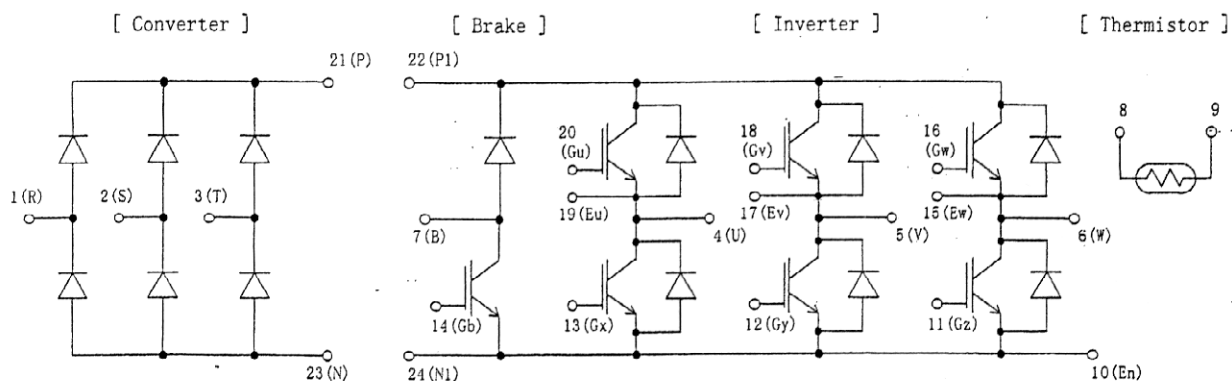


# Target Specification of 7MBR10KA060

## 1. Outline Drawing ( Unit : mm )



## 2. Equivalent circuit



| DATE           | NAME      | APPROVED | Fuji Electric Co.,Ltd. |
|----------------|-----------|----------|------------------------|
| DRAWN Mar-4-99 | T. Satoru |          |                        |
| CHECKED        |           |          |                        |
| REVISIONS      |           |          |                        |

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3. Absolute Maximum Ratings ( at Tc= 25°C unless otherwise specified)

| Items                                 |                                                  | Symbols          | Conditions             | Maximum Ratings | Units            |
|---------------------------------------|--------------------------------------------------|------------------|------------------------|-----------------|------------------|
| Inverter                              | Collector-Emitter voltage                        | VCES             |                        | 600             | V                |
|                                       | Gate-Emitter voltage                             | VGES             |                        | ±20             | V                |
|                                       | Collector current                                | Ic               | Continuous             | 10              | A                |
|                                       |                                                  | Icp              | 1ms                    | 20              | A                |
|                                       |                                                  | -Ic              |                        | 10              | A                |
|                                       | Collector Power Dissipation                      | Pc               | 1 device               | 40              | W                |
| Brake                                 | Collector-Emitter voltage                        | VCES             |                        | 600             | V                |
|                                       | Gate-Emitter voltage                             | VGES             |                        | ±20             | V                |
|                                       | Collector current                                | Ic               | Continuous             | 10              | A                |
|                                       |                                                  | Icp              | 1ms                    | 20              | A                |
|                                       | Collector Power Dissipation                      | Pc               | 1 device               | 40              | W                |
|                                       | Repetitive peak reverse Voltage(Diode)           | VRRM             |                        | 600             | V                |
| Converter                             | Repetitive peak reverse Voltage                  | VRRM             |                        | 800             | V                |
|                                       | Average Output Current                           | Io               | 50Hz/60Hz<br>sine wave | 10              | A                |
|                                       | Surge Current (Non-Repetitive)                   | IFSM             | Tj=150°C, 10ms         | 70              | A                |
|                                       | I <sup>2</sup> t (Non-Repetitive)                | I <sup>2</sup> t | half sine wave         | 25              | A <sup>2</sup> s |
| Junction temperature                  |                                                  | Tj               |                        | 150             | °C               |
| Storage temperature                   |                                                  | Tstg             |                        | -40~ +125       | °C               |
| Isolation voltage                     | between terminal and copper base <sup>(*)1</sup> | Viso             | AC : 1min.             | 2500            | V                |
|                                       | between thermistor and others <sup>(*)2</sup>    |                  |                        | 2500            | V                |
| Mounting Screw Torque <sup>(*)3</sup> |                                                  |                  |                        | 3.5             | N · m            |

(\*)1 All terminals should be connected together when isolation test will be done.

(\*)2 Terminal 8 and 9 should be connected together. Terminal 1 to 7 and 10 to 24 should be connected together and shorted to copper base.

(\*)3 Recommendable Value : 2.5~3.5 N · m (M5)

Note :

- This specification is only for technical considerations, and not for contract.
- This specification is subject to be changed without notices.

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

| Items                 |                                         | Symbols    | Conditions                         |          | Characteristics |      |      | Units |
|-----------------------|-----------------------------------------|------------|------------------------------------|----------|-----------------|------|------|-------|
|                       |                                         |            |                                    |          | min.            | typ. | Max. |       |
| Inverter              | Zero gate voltage<br>Collector current  | ICES       | VGE = 0 V, VCE = 600 V             |          |                 |      | 1.0  | mA    |
|                       | Gate-Emitter leakage current            | IGES       | VCE = 0 V, VGE = ±20 V             |          |                 |      | 200  | nA    |
|                       | Gate-Emitter<br>threshold voltage       | VGE(th)    | VCE = 20 V, Ic = 10 mA             |          | 6.0             |      | 9.0  | V     |
|                       | Collector-Emitter<br>saturation voltage | VCE(sat)   | VGE = 15 V,                        | chip     |                 | 2.3  |      | V     |
|                       |                                         |            | Ic = 10 A                          | terminal |                 | 2.5  | 3.0  |       |
|                       | Input capacitance                       | Cies       | VGE = 0 V, VCE = 10 V<br>f = 1 MHz |          |                 | 660  |      | pF    |
|                       | Turn-on time                            | ton        | Vcc= 300 V                         |          |                 | 0.7  | 1.2  | μs    |
|                       |                                         | tr         | Ic = 10 A                          |          |                 | 0.2  | 0.6  |       |
|                       |                                         | tr(i)      | VGE = ±15 V                        |          |                 |      |      |       |
|                       | Turn-off time                           | toff       | RG = 220 Ω                         |          |                 | 0.6  | 1.0  |       |
|                       |                                         | tf         |                                    |          |                 | 0.2  | 0.35 |       |
| Forward on voltage    | VF                                      | IF = 10 A  | chip                               |          | 1.8             |      | V    |       |
|                       |                                         |            | terminal                           |          | 2.0             | 2.6  |      |       |
| Reverse recovery time | trr                                     | IF = 10 A  |                                    |          |                 | 300  | ns   |       |
| Brake                 | Zero gate voltage<br>Collector current  | ICES       | VGE = 0 V, VCE = 600 V             |          |                 |      | 1.0  | mA    |
|                       | Gate-Emitter leakage current            | IGES       | VCE = 0 V, VGE = ±20 V             |          |                 |      | 200  | nA    |
|                       | Collector-Emitter<br>saturation voltage | VCE(sat)   | VGE = 15 V,                        | chip     |                 | 2.3  |      | V     |
|                       |                                         |            | Ic = 10 A                          | terminal |                 | 2.5  | 3.0  |       |
|                       | Turn-on time                            | ton        | Vcc= 300 V                         |          |                 | 0.7  | 1.2  | μs    |
|                       |                                         | tr         | Ic = 10 A                          |          |                 | 0.2  | 0.6  |       |
|                       | Turn-off time                           | toff       | VGE = ±15 V                        |          |                 | 0.6  | 1.0  |       |
|                       |                                         | tf         | RG = 220 Ω                         |          |                 | 0.2  | 0.35 |       |
| Reverse current       | IRRM                                    | VR = 600 V |                                    |          |                 | 1.0  | mA   |       |
| Converter             | Forward on voltage                      | VFM        | IF = 10 A                          | chip     |                 | 1.1  | V    |       |
|                       |                                         |            |                                    | terminal |                 | 1.2  |      | 1.5   |
|                       | Reverse current                         | IRRM       | VR = 800 V                         |          |                 |      | 1.0  | mA    |
| Thermistor            | Resistance                              | R          | T = 25°C                           |          |                 | 5000 |      | Ω     |
|                       |                                         |            | T =100°C                           |          | 465             | 495  | 520  |       |
|                       | B value                                 | B          | T = 25/50°C                        |          | 3305            | 3375 | 3450 | K     |

## 5. Thermal resistance characteristics

| Items                            | Symbols  | Conditions                | Characteristics |      |      | Units |
|----------------------------------|----------|---------------------------|-----------------|------|------|-------|
|                                  |          |                           | min.            | typ. | Max. |       |
| Thermal resistance<br>(1 device) | Rth(j-c) | Inverter IGBT             |                 |      | 3.13 | °C/W  |
|                                  |          | Inverter FWD              |                 |      | 5.10 |       |
|                                  |          | Brake IGBT                |                 |      | 3.13 |       |
|                                  |          | Converter Diode           |                 |      | 2.00 |       |
| Contact Thermal resistance       | Rth(c-f) | with Thermal Compound (※) |                 | 0.05 |      | °C/W  |

※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

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