

Ratings and characteristics of Fuji IGBT (MBT) Module

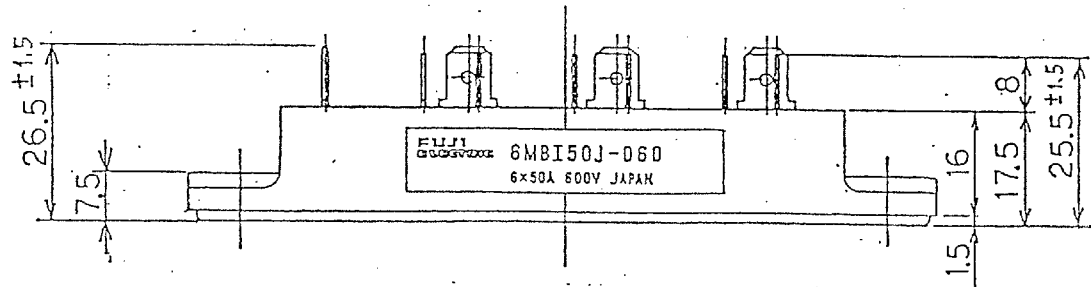
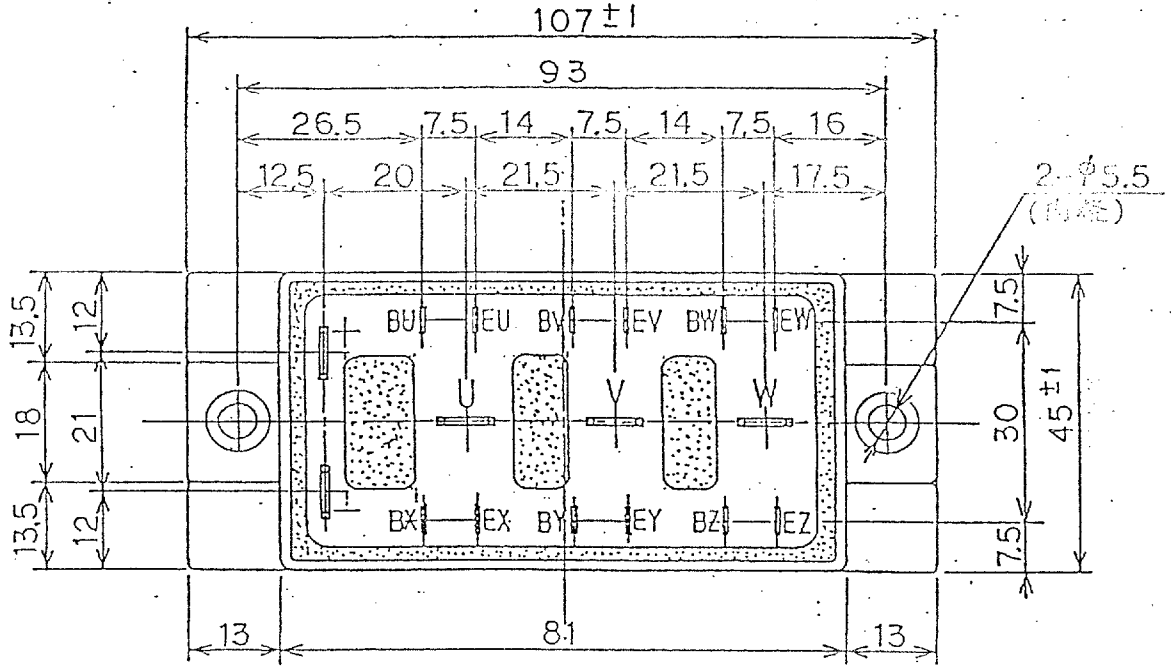
6MBI50J-060 (TENTATIVE)

1. Outline Drawing

Unit : mm

* Isolation Voltage : AC 2500 V 1 minute

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| | Mar-5-'93 | A. Yamaguchi | |
| | Mar-5-'93 | T. Miyasaka | |

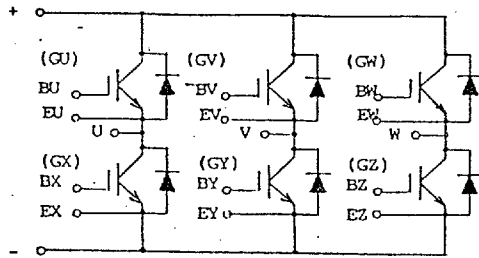
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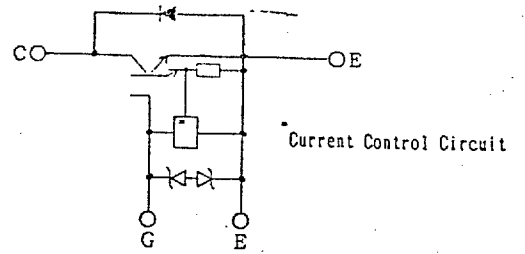
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2. Equivalent Circuit of Module



3. Equivalent Circuit



4. Absolute Maximum Ratings (Tj=25 °C)

| Items | | Symbols | Ratings | Units |
|---------------------------|------------|--------------|-----------------|-------|
| Collector-emitter voltage | | V_{CES} | 600 | V |
| Gate-emitter voltage | | V_{GES} | ± 20 | V |
| Collector current | Continuous | I_c | 50 | A |
| | 1 ms | I_c pulse | 100 | |
| | | $-I_c$ | 50 | |
| | 1 ms | $-I_c$ pulse | 100 | |
| Max.power dissipation | | PC | 150 | W |
| Operating temperature | | T_j | +150 | °C |
| Storage temperature | | T_{stg} | -40 ~ +125 | °C |
| Isolation voltage | | V_{is} | AC 2500 (1 min) | V |
| Screw Torque | | Mounting *1 | 3.5 | N·m |

Note : *1 Recommendable Value : 2.5 ~ 3.5 N·m (M5)

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5. Static electrical characteristics (at $T_j=25^\circ\text{C}$ unless otherwise specified)

| Items | Symbols | Characteristics | | | Conditions | | Units |
|--|---------------|-----------------|------|------|---------------------------|----------------------------|---------------|
| | | min. | typ. | max. | | | |
| Zero gate voltage collector current | I_{CES} | | | 1.0 | $T_j = 25^\circ\text{C}$ | $V_{GE} = 0\text{V}$ | m A |
| | | | | | $T_j = 125^\circ\text{C}$ | $V_{CE} = 600\text{V}$ | m A |
| Gate-emitter leakage current | I_{GES} | | | 15 | $V_{CE} = 0\text{V}$ | $V_{GE} = \pm 2.0\text{V}$ | μA |
| Gate-emitter threshold voltage | $V_{GE(th)}$ | 3.5 | 5.0 | 6.5 | $V_{CE} = 2.0\text{V}$ | $I_C = 5.0\text{mA}$ | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 1.7 | 2.5 | $V_{GE} = 1.5\text{V}$ | $I_C = 5.0\text{A}$ | V |

6. Dynamic ratings (at $T_j=25^\circ\text{C}$ unless otherwise specified)

| Items | Symbols | Characteristics | | | Conditions | Units |
|---------------------------------|-----------|-----------------|------|------|--|---------------|
| | | min. | typ. | max. | | |
| Input capacitance | C_{ies} | | 3200 | | $V_{GE} = 0\text{V}$ | p F |
| Output capacitance | C_{oes} | | | | $V_{CE} = 1.0\text{V}$ | |
| Reverse transfer capacitance | C_{res} | | | | $f = 1\text{MHz}$ | |
| Turn-on time | t_{on} | | 0.6 | 1.2 | $V_{CC} = 300\text{V}$ $I_C = 5.0\text{A}$ $V_{GE} = \pm 15\text{V}$ $R_g = 51\Omega$ | μs |
| | t_r | | 0.2 | 0.6 | | |
| Turn-off time | t_{off} | | 0.8 | 1.5 | | |
| | t_f | | 0.15 | 0.35 | | |

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7. Characteristics of reverse diode (at $T_j=25^\circ\text{C}$ unless otherwise specified)

| Items | Symbols | Characteristics | | | Conditions | Units |
|-----------------------------|-----------------|-----------------|------|------|--|-------|
| | | min. | typ. | max. | | |
| Diode forward on-voltage | V _F | | 2.3 | 3.0 | I _F = 50A V _{GE} = 0V | V |
| Reverse recovery time | t _{rr} | | | 300 | I _F = 50A -di/dt = 150A/μs | ns |

8. Thermal resistance characteristics

| Items | Symbols | Characteristics | | | Conditions | Units |
|-----------------------|---------------------------|-----------------|------|-------|----------------------------|-------|
| | | min. | typ. | max. | | |
| Thermal resistance | R _{th(j-c)} | | | 0.833 | IGBT | °C/W |
| | R _{th(j-c)} | | | 2.00 | Diode | |
| | ※ R _{th(c-f)} | | 0.05 | | the base to cooling fin | |

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

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