

FUJI IGBT Modeules U Series Mounting Instructions ECONOPACK™+

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This manual describes the recommended method to install and use ECONOPACK™+ safely.

Note: ECONOPACK™+ is a registered trademark of Infineon Technologies AG, Germany

1 Mounting

1.1 Colling fin mounting

Since thermal resistance varies according to the position of the mounted modules, pay attention to the following points:

- a. When mounting only one module, position it in the center of the cooling fin in order to minimize the thermal resistance.
- b. When mounting several modules, determine the individual positions on the cooling fin according to the amount of heat that each module generates. Leave more space for modules that generate more heat.

1.2 Cooling fin surface finishing (module mounting area)

The mounting surface of the cooling fin should be finished to the roughness of 10µm or less and a warp based on a length of 100mm should be 50µm or less. If the surface of the cooling fin is not flat enough, there will be a sharp increase in the contact thermal resistance (Rth(c-f)). If the flatness of the cooling fin does not meet the above requirements, the mounted module will experience extreme stress on the DBC substrate possibly destroying its insulating barrier.

Roughness: 10µm max:

Flatness of the cooling fin: 50µm max. (based on a length of 100mm)

1.3 Thermal compound application

To reduce the contact thermal resistance, we recommend applying thermal compound with screen printing, rollers or spatulas between the cooling fin and the base plate of the module. Recommended thickness of the compound is approx.100µm.

Recommended thermal compound for your reference

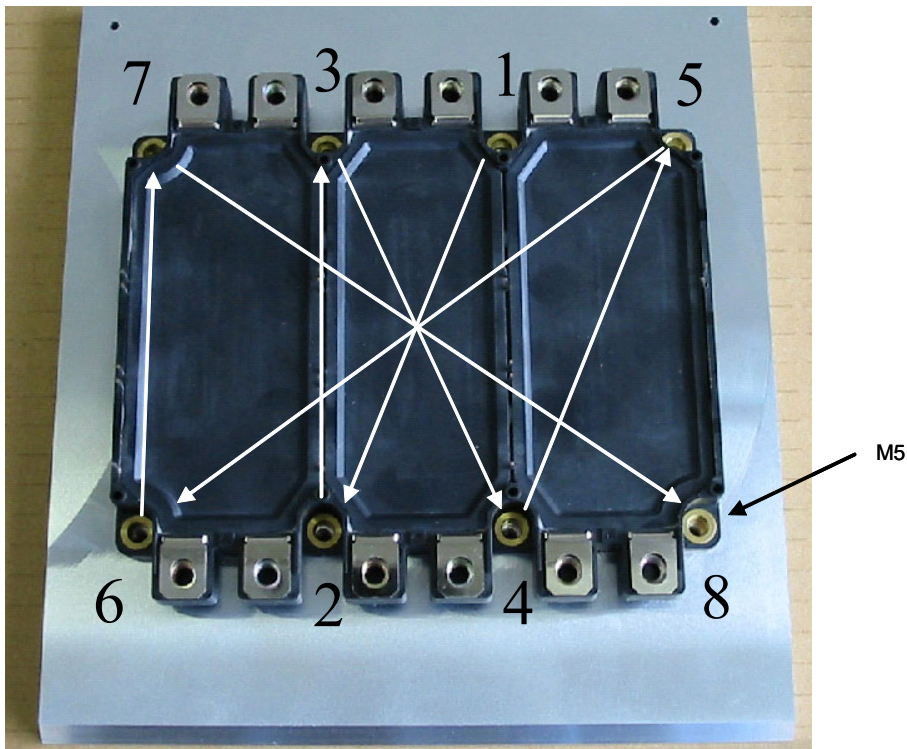
Penetration (typ.)	338 min.
Thermal conductivity	0.92 W/m·k min.
Thickness of the compound	100µm±30µm

Note:

- 1) The contact thermal resistance is dependent on the compound's efficiency and thickness.
The thickness of the compound could be lessened if the warp of the cooling fin could be reduced.
Use the above table as a reference to decide the thickness of the compound being used.
- 2) Confirm the expansion of the compound when the module is installed with high viscosity compound. On the other hand, note that low viscosity compound may flow out due to the temperature cycle.

1.4 Mounting procedure

- 1) Recommended tightening torques: 3 to 6 N•m (M5)
- 2) Initial: Torque 0.5 to 1.0 (N•m), sequence (1)-(2)-(3)-(4)-(5)-(6)-(7)-(8)
- 3) Final: Full specified torque (3 to 6 N•m), sequence (1)-(2)-(3)-(4)-(5)-(6)-(7)-(8)



1.5 ESD

If excessive static electricity is applied to the control terminals, the devices could be broken. Some countermeasures against static electricity is necessary. Refer to the Chapter 3-2 of the Application Manual (REH984).

2 Main terminal connection

2.1 Bus bar connection

- 1) Screw: M6
- 2) Screw length: Bus bar thickness + (7mm to 9mm)
- 3) Tightening torque: 3 to 6 [N•m]
- 4) Allowable terminal temperature: 100°C max.

Note:

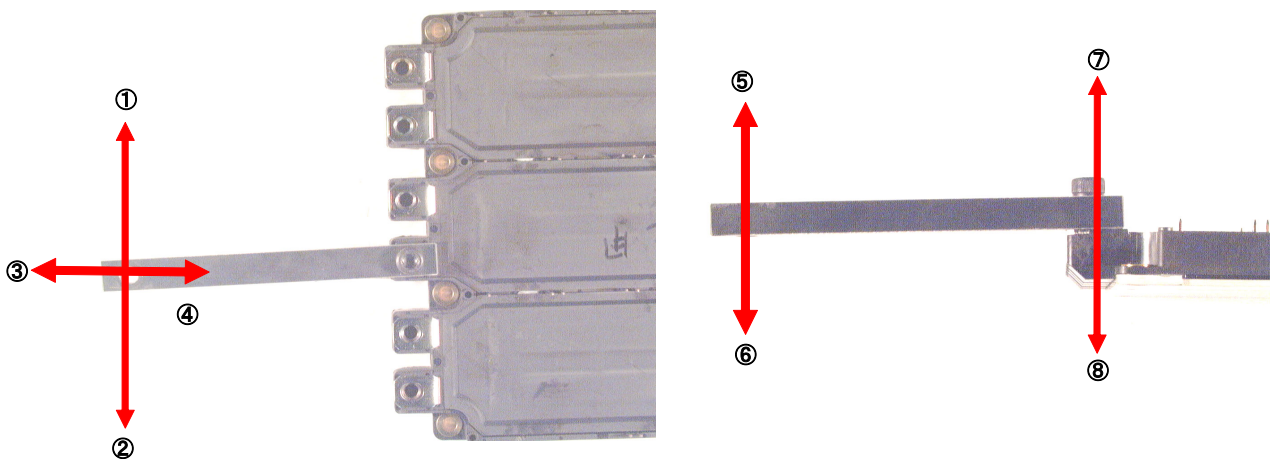
In case of connecting a bus bar to the main terminal, avoid excessive force to a terminal part.

Especially, the applied force at the opposite end of the copper bar will act as much bigger to the terminal part, because the moment force is proportional to the copper bar length.

Moreover, if a screw will be tightened when there is position gap between a terminal and a copper bar, stress will be generated continuously in the terminal part, and becomes the cause of damage.

Fasten the screw so that position gap does not occur.

2.2 Limitation of forces for the mounted conductors



Force direction	①	②	③	④	⑤	⑥	⑦	⑧
Strength*	5N•m	3N•m	500N	500N	5N•m	5N•m	500N	1000N

* Strength for a short time during mounting

3 PCB fixed on the module

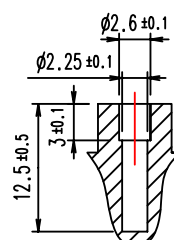
3.1 Fixing by screws

The hole diameters are 2.25mm and 2.6mm.

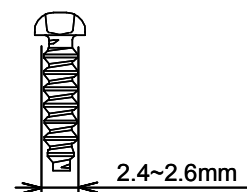
Therefore, a diameter of 2.4-2.6mm is recommended.

1. Screw type: Self tapping screw
(In Japan, M2.6 self tapping screw)

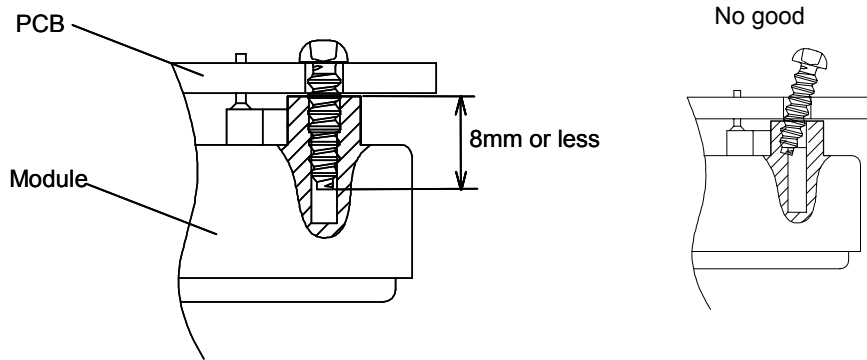
Mounting hole



Screw



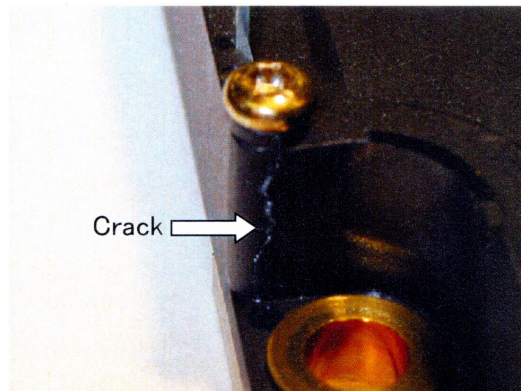
2. Screw length : PCB thickness +(5mm to 8mm)



Note : Recommended tightening torque: 0.4 +/- 0.05 N•m
(Make installation of the screw perpendicular to the module.)

3. Recommended tightening method: Hand tightening

Note : If high speed tightening tool is used, the module case might be damaged. Confirm the tightening torque of the high speed tightening tool in advance.



Note : The case might break if screws beside the above recommendation are used.
Confirm the screws before using them.

3.2 Soldering pin-terminals

- 1) Plating of pin terminal: Sn/Cu (lead-free plating)
- 2) Recommended soldering method: Flow soldering or hand soldering
- 3) Soldering conditions
 - a. Flow soldering
 - Pre heat: 125°C max.
 - Post heat: 265°C/11s max.
 - b. Hand soldering (by soldering iron)
 - Iron tip temperature: 410°C max.
 - Soldering time: 5s/terminal max.

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