

# Mounting Instruction for M629 Package (EconoPACK™+ Module)

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

Note: EconoPACK™+ is registered trademarks of Infineon Technologies AG, Germany.

## **1** Mounting

### 1.1 Heat sink 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 heat sink in order to minimize the thermal resistance.
- b. When mounting several modules, determine the individual positions on the heat sink according to the amount of heat that each module generates. Leave more space for modules that generate more heat.

### 1.2 Heat sink surface finishing (module mounting area)

The mounting surface of the heat sink 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 heat sink is not flat enough, there will be a sharp increase in the contact thermal resistance (Rth(c-f)). If the flatness of the heat sink does not meet the above requirements, the mounted module will experience extreme stress on the DCB substrate possibly destroying its insulating barrier.

Roughness: 10µm max:

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

### 1.3 Application of thermal grease

Thermal grease between heat sink and module baseplate is absolutely necessary to reduce the contact thermal resistance. Screen-printing, rollers or spatulas are typical method of thermal grease pasting, however, using a stencil mask is recommended when the target grease thickness is less than 100µm.

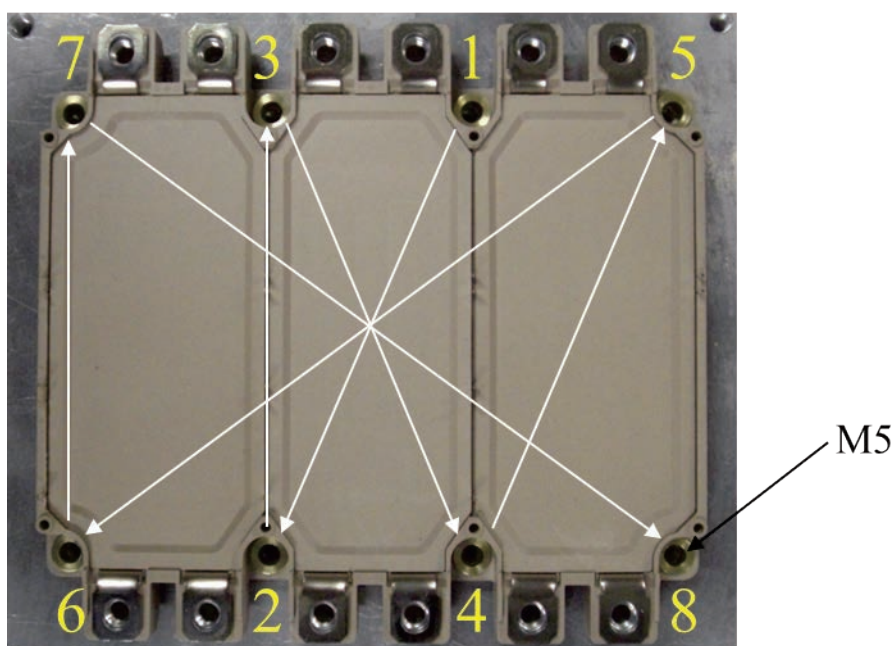
Table 1 Recommended thermal compound for your reference

| Items                     | Recommendation |
|---------------------------|----------------|
| Penetration (typ.)        | ≥ 338          |
| Thermal conductivity      | ≥ 0.92 W/m·k   |
| Thickness of the compound | 100µm ±30µm    |

- \*1 The thermal resistance between the heat sink and the module depends on the thermal grease properties and thickness. Fuji Electric strongly recommends customers to confirm contact interface after mounting whether the terminal grease spreading is good enough or not. Also Fuji Electric recommends confirmation of the thermal interface status after thermal cycling if the thermal grease has low viscosity.
- \*2 Electrical document of the recommended stencil mask pattern and recommended method are also available on request.

### 1.4 Mounting procedure

- 1) Recommended tightening torques: 2.5 to 3.5 N•m (M5)
- 2) Initial: 1/3 of specified torque, sequence (1)-(2)-(3)-(4)-(5)-(6)-(7)-(8)
- 3) Final: Full specified torque (2.5 to 3.5 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: 3.5 to 4.5 [N•m]
- 4) Allowable terminal temperature: 100°C max.

Note:

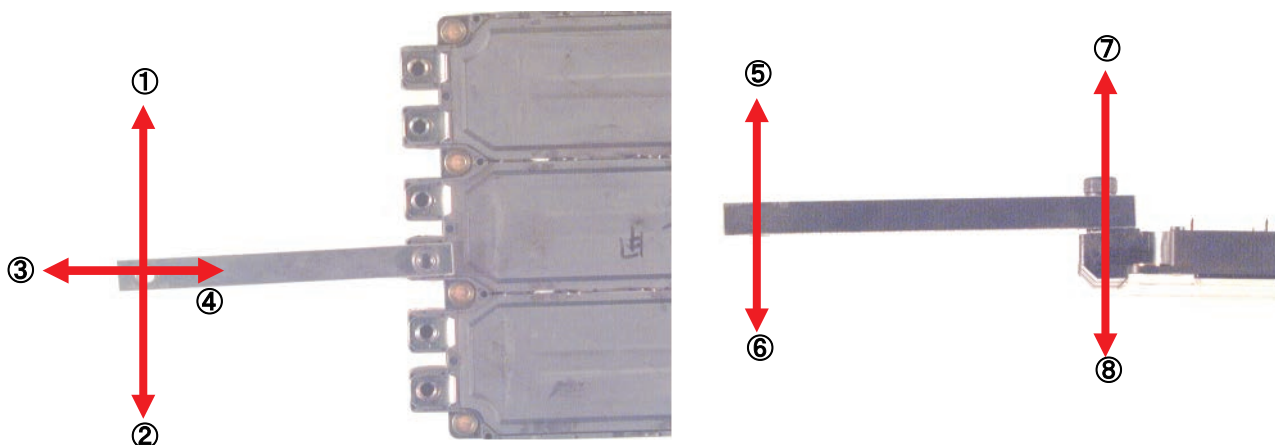
In case of connecting a bus bar to the main terminal, avoid excessive force to a terminal part.

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 |

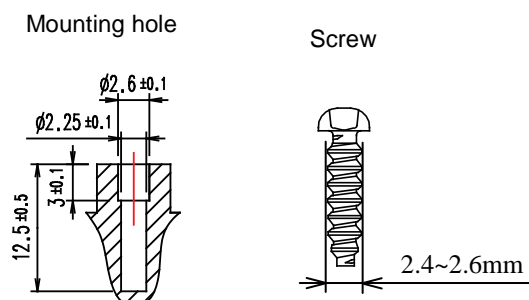
\* Strength for a short time during mounting

## 3 PCB fixed on the module

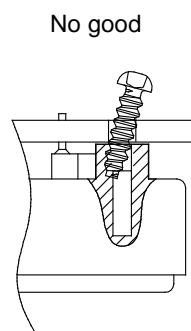
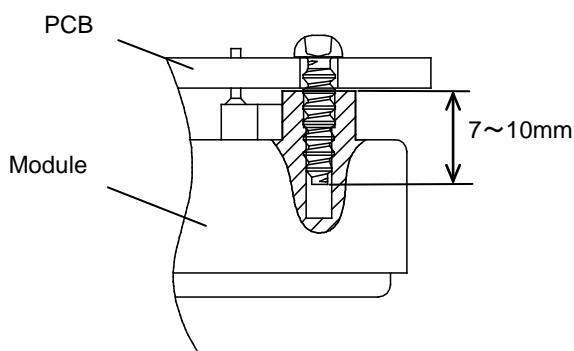
### 3.1 Fixing by screws

The diameter of mounting holes for PCBs are 2.15 - 2.35mm. It is recommend that the diameter of screw to attach PCB is 2.4-2.6mm. Recommended screw type and length are shown as follows. The recommended screw type is a self-tapping screw.

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



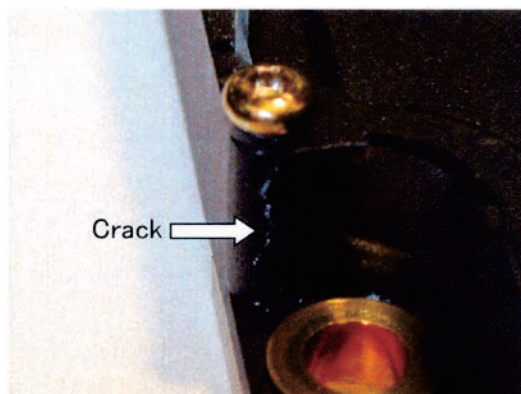
2. Screw length : PCB thickness +(7mm to 10mm)



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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