

FUJI IGBT Modeules U Series

Mounting Instructions Small-Pack and Small-PIM

CONTENTS

Page

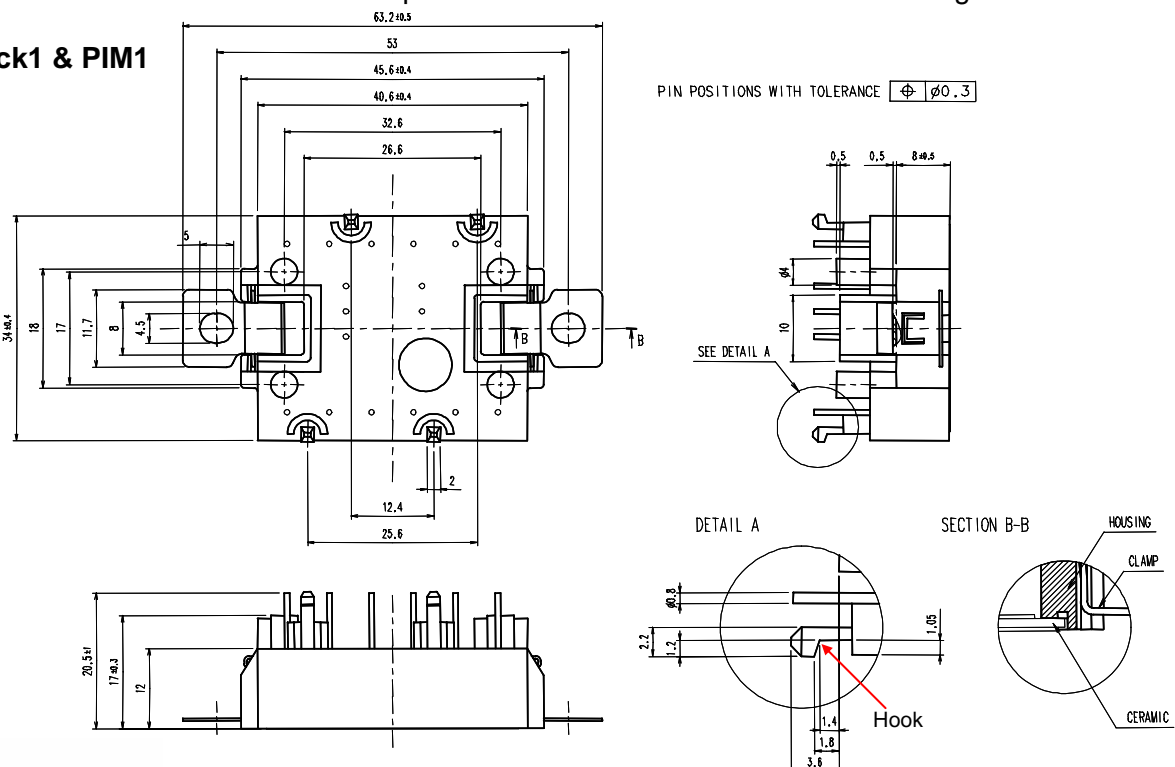
1. Package design	1
2. Installing the module on PCB	2
3. Cooling fin mounting precautions	3

This manual describes the recommended method to install and use Fuji Small-Pack & PIM safely.

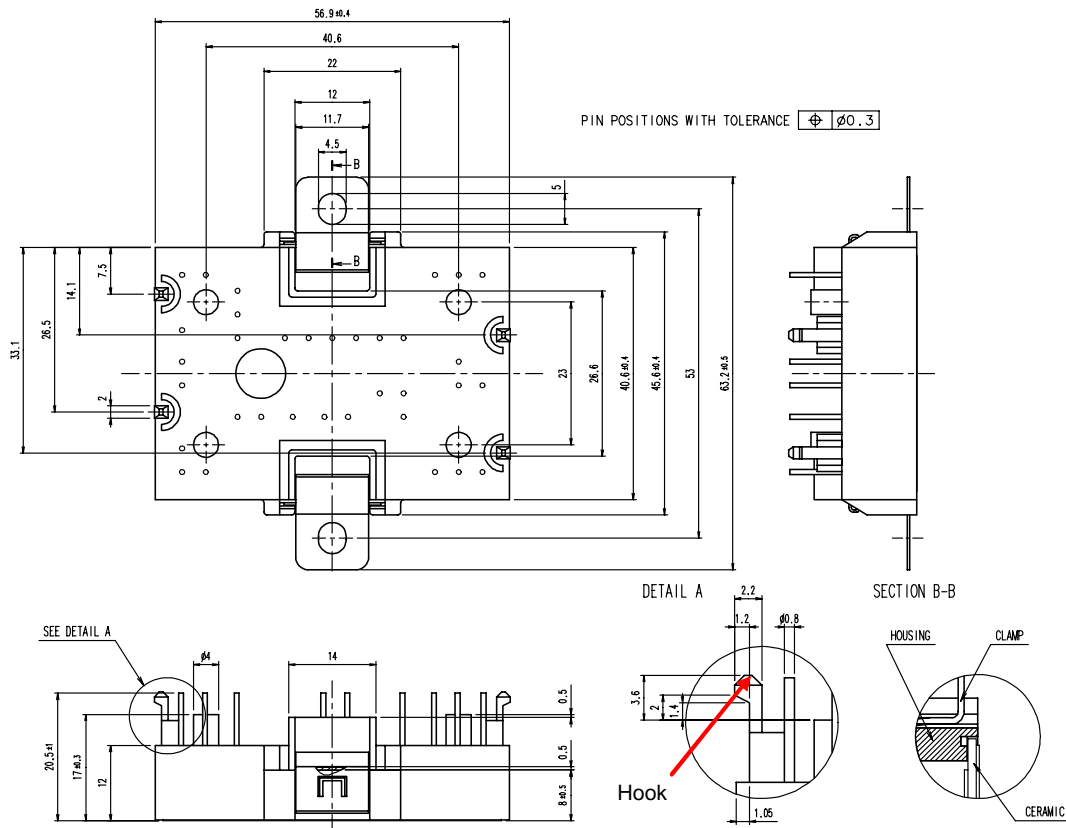
1 Package design

There are two kinds of packages for FUJI Small-Pack & PIM shown in below, and have the locking hooks to attach PCB (power circuit board) on the housing. The hooks are inserted in the holes of PCB to fix the module. Two screw clamps are attached to fix the module on cooling fin.

Small-Pack1 & PIM1



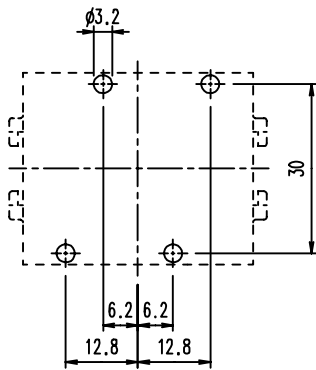
Small-Pack2 & PIM2



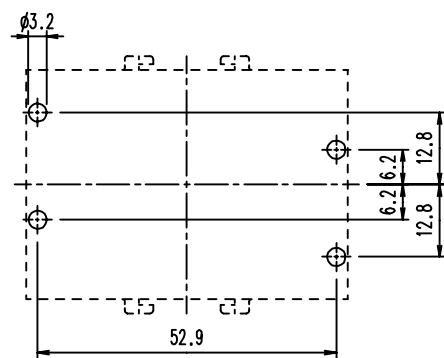
2 Installing the module on PCB

The locking holes in the PCB are necessary at specified position in below (Drilling layout). The module is locked into the PCB. After locking the module, all outer pins are to be soldered. The allowable thickness of PCB is 1.6 ± 0.2 mm in Small-Pack1 and PIM1, and 1.8 ± 0.2 mm in Small-Pack2 and PIM2.

Small-Pack1 & PIM1



Small-Pack2 & PIM2



Note:

The point of the hooks are exposed on the soldering side. The thermal stress which exceeds deflection temperature should be avoided.

Properties of case material:	Melting point	224°C
	Deflection temperature	200°C ASTM D648
	Heatproof temperature	260°C x 3 sec.

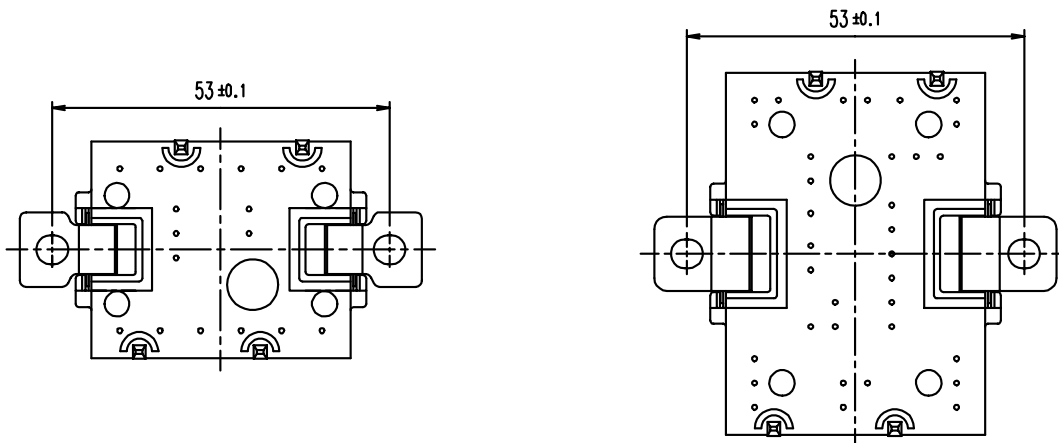
3 Cooling fin mounting precautions

3.1 Cooling fin mounting

Since thermal resistance varies according to position of 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 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.

The pitch size of two screw clamps is designed at 53 ± 0.1 mm.



3.2 Cooling fin surface finishing (module mounting area)

The mounting surface of the cooling fin should be finished to the roughness of $10 \mu\text{m}$ or less and a warp based on a length of 100mm should be $50 \mu\text{m}$ or less.

If the surface of cooling fin is not flat enough, there will be a sharp increase in the contact thermal resistance ($R_{th(c-f)}$). If the flatness of the cooling fin does not meet the above requirements, then mounted module will experience extreme stress on the DBC substrate possibly destroying this insulating barrier.

Roughness: $10 \mu\text{m}$ max.

Flatness of the cooling fin: $50 \mu\text{m}$ max. (based on a length of 100mm)

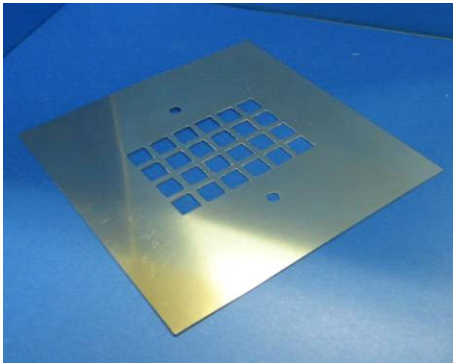
3.3 Thermal compound application

To reduce contact thermal resistance, we recommend applying thermal compound with screen printing, rollers or a spatula between cooling fin and base plate of the module. Recommended thickness of the compound after mounting the module is approx. $100 \mu\text{m}$. The example of the method by the screen printing is shown as follows.

Note:

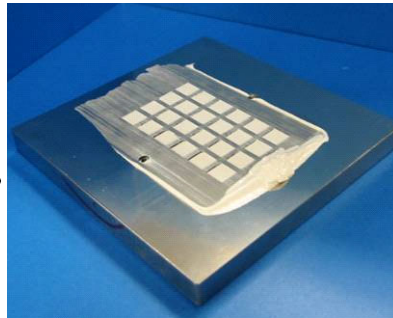
Confirm the extension when the module is installed to the compound and the viscosity is high. On the other hand, note effusing by the temperature cycle when the viscosity is low.

Metal mask



For Small-Pack2 & PIM2

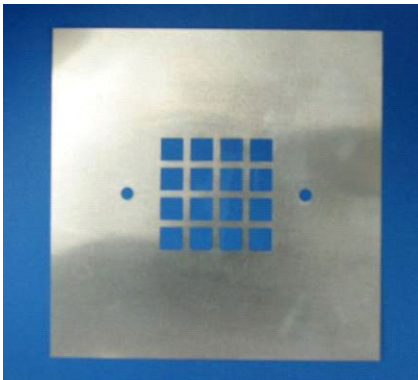
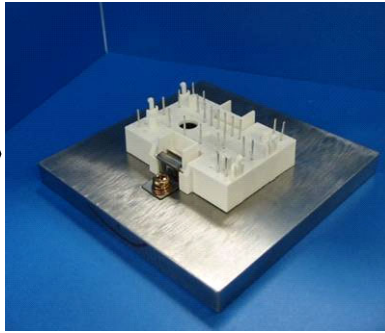
Put the metal mask onto the cooling fin and screen printing.



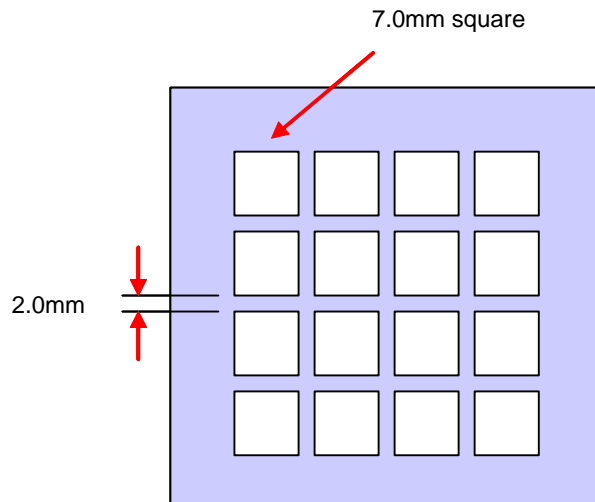
Lift off the metal mask.



Mount the module onto the cooling fin.



For Small-Pack1 & PIM1



Design for metal mask

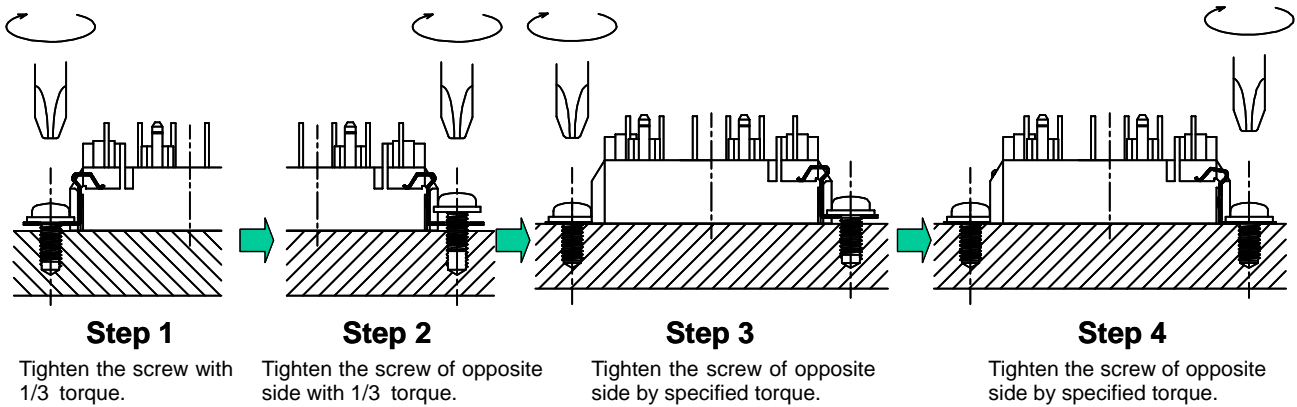
In this case, recommended thickness of the metal mask is $150\mu\text{m}$ that can form approx. $100\mu\text{m}$ thickness compound layer after mounting the module. The recommended compound thickness after mounting is $80\mu\text{m}$ to $150\mu\text{m}$.

3.4 Mounting procedure

Following diagrams show how to tighten screws when mounting module. Each screw (M4 with 9mm washer) must be tightened using a specified torque. For proper tightening torque, recommended value is 1.3 to 1.7 (N•m). An insufficient tightening torque may cause the contact thermal resistance to increase or the screws to come loose during operation.

Note:

When you install the detached module again, replacing with new clamps is recommended to secure proper contact thermal resistance.



When the design of the PCB and the arrangement of the module are decided, it is necessary to consider the insulation distance between the module and PCB.

When this module is installed in PCB, minimum clearance and creepage distance should be between the top of the clamp and the bottom side of PCB.

