
Press fit application note

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1. Feature

The press fit is a method of solderless connection.

The press fit connection is performed by inserting a press fit terminal into the through hole on the printed circuit board.

This application note explains the method of assembly, disassembly and the specification of the printed circuit board which is required for the assured connection.

[Identification of type name]

Add the symbol "P" in type name for discrimination between solder type and press fit type

[Type name example]

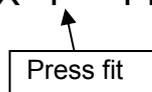
■T series

CM***X**P-**T



■T1 series

CM***X**P-**T1



[Line up]

■T, T1 series 650V

Type name	Circuit	Pin type
CM150RXP-13T	7in1	A
CM200RXP-13T		
CM300DXP-13T	2in1	
CM450DXP-13T		
CM600DXP-13T		
CM100TXP-13T	6in1	
CM150TXP-13T		
CM200TXP-13T		
CM50MXUBP-13T	CIB	
CM75MXUBP-13T		
CM100MXUBP-13T		
CM100MXUDP-13T		
CM150MXUDP-13T		
CM50MXUBP-13T1		
CM75MXUBP-13T1		
CM100MXUBP-13T1		
CM100MXUDP-13T1		
CM150MXUDP-13T1		

■T, T1 series 1200V

Type name	Circuit	Pin type
CM100RXP-24T	7in1	A
CM150RXP-24T		
CM225DXP-24T	2in1	
CM300DXP-24T		
CM450DXP-24T		
CM600DXP-24T		
CM1000DXP-24T		
CM300DXP-24T1		6in1
CM450DXP-24T1		
CM600DXP-24T1		
CM800DXP-24T1		
CM100TXP-24T		
CM150TXP-24T		
CM200TXP-24T	CIB	
CM35MXUAP-24T		
CM50MXUAP-24T		
CM75MXUBP-24T		
CM75MXUCP-24T		
CM100MXUCP-24T		
CM150MXUDP-24T		
CM35MXUAP-24T1		
CM50MXUAP-24T1		
CM75MXUBP-24T1		
CM75MXUCP-24T1		
CM100MXUCP-24T1		
CM150MXUDP-24T1		

■T series 1700V

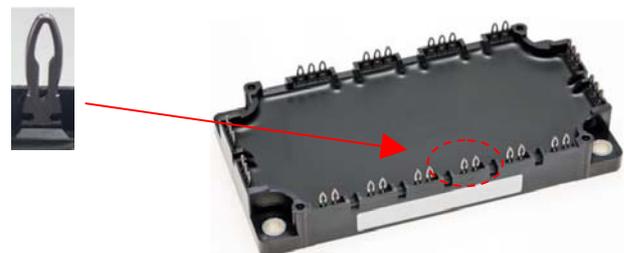
Type name	Circuit	Pin type
CM225DXP-34T	2in1	A
CM300DXP-34T		
CM450DXP-34T		
CM600DXP-34T		
CM100TXP-34T	6in1	B
CM150TXP-34T		

[Press fit pin shape and module appearance]

Pin type A) 2in1,7in1 module



Pin type B) 6in1,CIB module



2. Printed circuit board specification

2.1 Specification

Table 1 is the recommended specifications of the printed circuit board adapting to Mitsubishi press fit module and Figure 1 is a cross section view of the through hole part.

The printed circuit board recommends double-sided board or multilayered board. It is necessary to be managed the diameter of through hole (last form hole diameter) for maintain the connection between press fit pin and a printed circuit board.

The surface treatment recommend the electroless Sn plating.

Please enough inspection when you use the press fit connection.

Table1. Recommended specifications of the printed circuit board

Item	Value		Remarks
	2in1,7in1	6in1,CIB	
Number of layer	Double-sided or multilayer		
Printed circuit board thickness	1.6mm		
Printed circuit board materials	FR-4		
Thickness of copper foil	35~70μm		
Through hole diameter	0.94~1.09mm	2.14~2.29mm	Finished diameter
Through hole position accuracy	±0.1mm		
Cu plating thickness	25~50μm		Inner face of through hole
Sn plating thickness	0.5~2μm Electroless Sn plating		Inner face of through hole
Minimum land width	0.2mm	0.4mm	

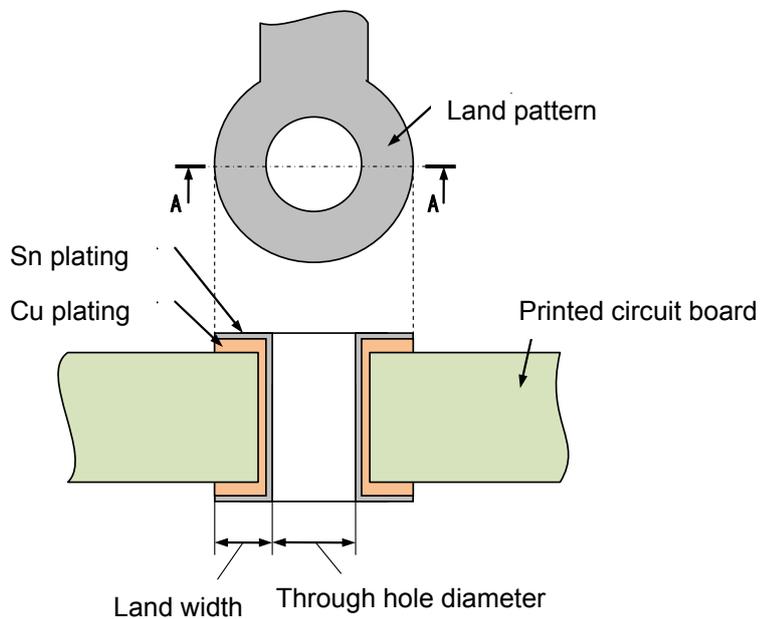


Figure1. Cross section view of through hole for insertion

2.2 Limitation regarding parts location on printed circuit board

It is necessary to consider the damage should not affect the on board parts around the press fit through hole since this connection is performed by press fit.

The parts position is recommended to take a distance more than 5mm from the center of the through hole for preventing from damage

And the through hole center is recommended to get off more than 4mm from the edge of printed circuit board. However, It is recommended to confirm individually for each application because such damage may affect easily depending on the state of the printed circuit board and parts.

3. Assembly

3.1. Assembly machine and jig

An automatic press machine or a hand press machine is applied to this method.

Please choose the press machine in consideration of required press force.

The press power approximately 70N /pin is necessary for insertion and required minimum total press power is calculated by the following formula (total pin number multiplied by 70N).The minimum total insertion press force varies depending on the state of printed circuit board. It is recommended to select the press machine ability with margin.

Figure 2 describes an example of assembly jig.

The assembly jig consists of a holding jig for setting the circuit board and a press jig for pushing IGBT module into the board.

Please design the press jig so that it can apply the insertion pressure to the metal base plate area of the IGBT module back side. And about the holding jig it should be designed for holding the area near the through hole into which the press fit pin is inserted.

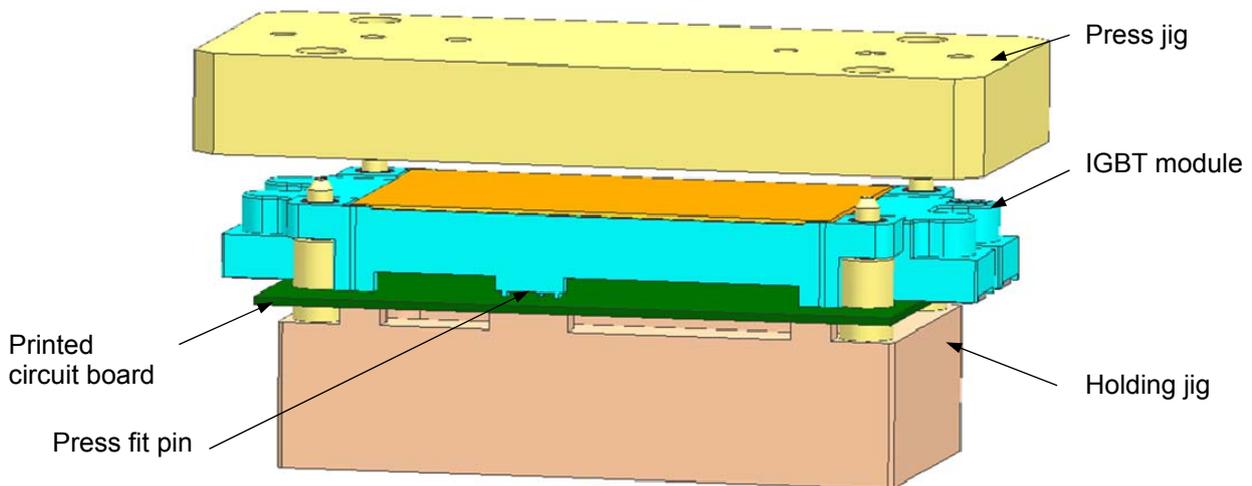


Figure2. Example of jig for press fit

3.2 Assembly procedure

Figure 3 explains assembly procedure

- (1) Put the printed circuit board on the holding jig
- (2) Set an IGBT module on the printed circuit board temporarily. At this time IGBT module should be set to the proper position so that the tip of the press fit pin matches the location of through hole.
- (3) Get down the press jig then apply the pressure to the base plate of IGBT module for insertion of press fit pin. In this process apply the pressure perpendicularly without inclination of press jig.
- (4)The insertion speed of press fit pin is set to 25~450mm/min and push it until the stand off part of the IGBT module touches on the surface of the printed circuit board.

Please set the pressure load limitation in the press machine as not to add overload after contacting the circuit board.

Table2. Press fit insert maximum force

circuit	insert maximum force	Remarks
2in1	840N	
7in1	2160N	
6in1	2800N	
CIB	1840N	CM**MXUAP-**T CM**MXUAP-**T1
	2480N	CM**MXUBP-**T CM**MXUBP-**T1
	2800N	CM**MXUCP-**T CM**MXUCP-**T1
	3440N	CM**MXUDP-**T CM**MXUDP-**T1

*)Press fit insert maximum force (Basis of selection for press machine)

If there is a problem like the printed circuit board does not contact the stands off part of the IGBT module despite applying above maximum pressure mentioned above, there may be some abnormality in the IGBT module or the printed circuit board. Please confirm whether there are some wrong points about them and insertion method.

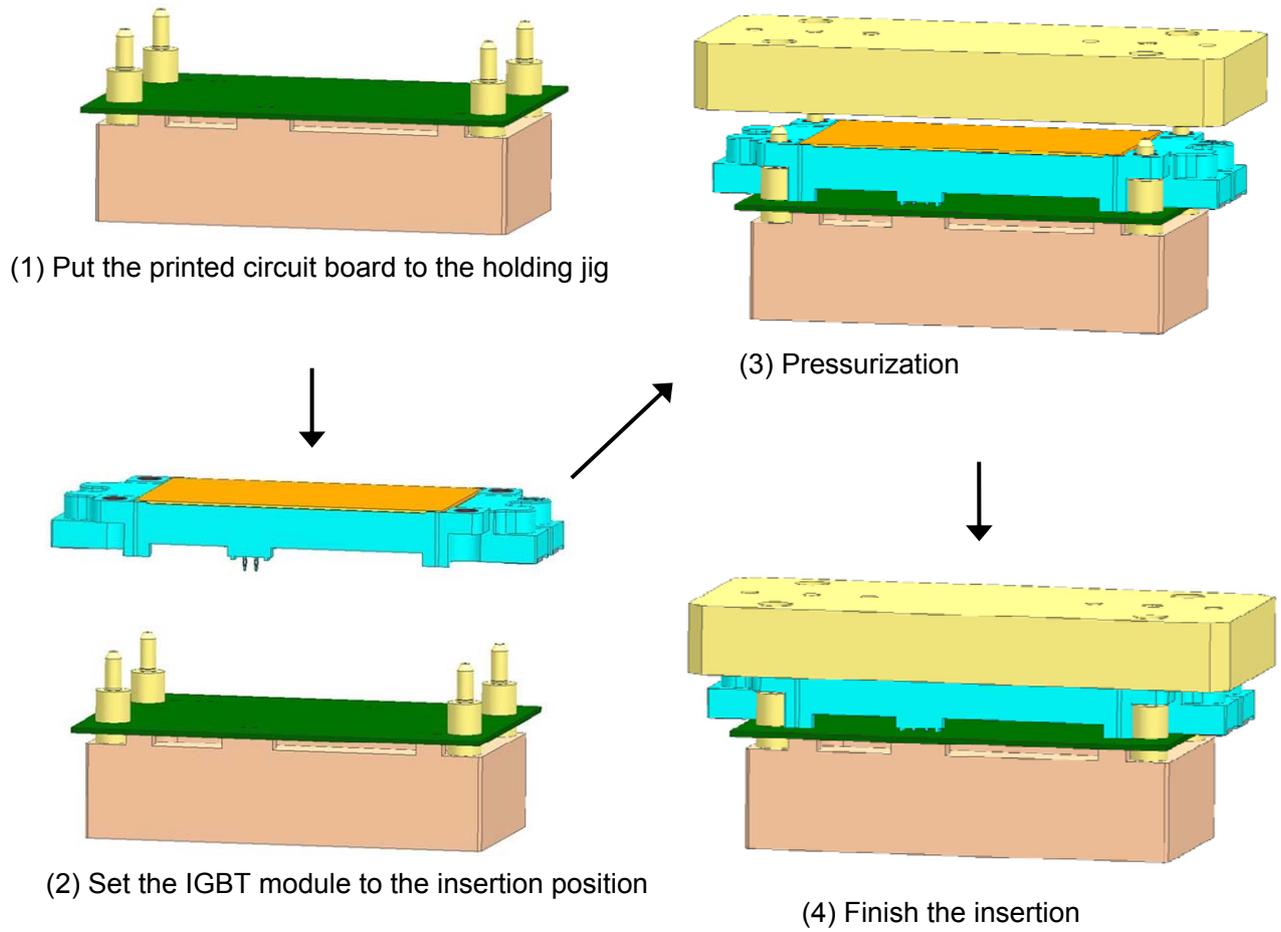


Figure3. Assembly procedure

3.3 Notice about the module with PC-TIM

The press jig should be designed so as to apply the pressure to the base plate part of the IGBT module. But in the case of assembling the press fit module with PC-TIM, the press jig should avoid the PC-TIM applied area when adding the pressure.(Don't touch the PC-TIM directly.) When the detail Information (e.g. pattern, area, type name or something) of PC-TIM is required, Please contact to us.

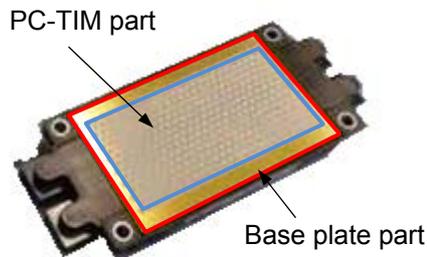


Figure4. Back side of IGBT module with PC-TIM

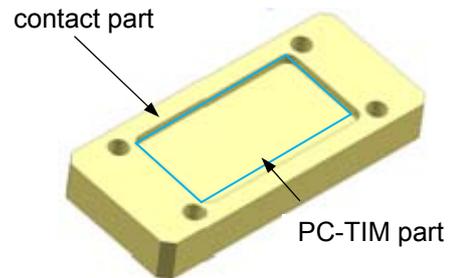


Figure5. Pressurization board (Contact surface to IGBT module)

3.4 Exchange of module

The IGBT module which has been removed once cannot connect by press fit again. If that IGBT module is re-used, it is necessary to connect by soldering. However the printed circuit board from which IGBT module was removed can be used again, it is necessary to consider about the number of assembly/disassembly depending on the condition of the printed circuit board.

3.5 Fixing by screw

It is recommended to use the screw for fixing IGBT module with the printed circuit board. About the screw fixation method, please refer to the datasheet of each product.

4. Disassembly method

An automatic press machine or a hand press machine is applied for disassembling the module.

Figure 6 shows an example of the disassembly jig.

The disassembly jig consists of a fixed jig for holding the IGBT module by screws and a press jig for pushing back the printed circuit board.

A nail part of the press jig pushes up the printed circuit board and removes IGBT module from the printed circuit board by pushing the fixed jig.

The disassembly speed should be set to less than 12mm/min.

The nail part for pushing up should be located as close to the press fit pin as possible.

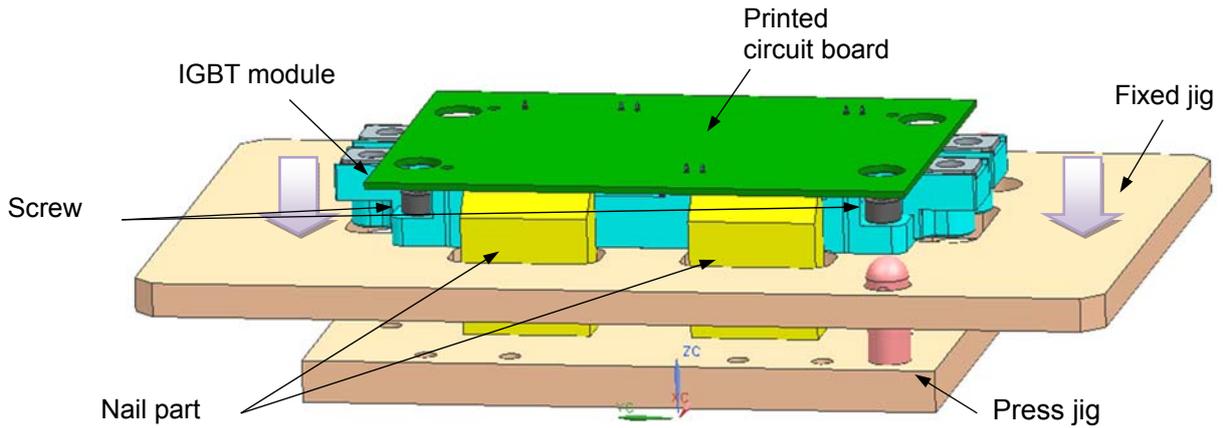


Figure6. Example of disassembly jig

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