

Mounting Instructions E2 and E3 Series - PressFit-Pin Module

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1 General

The following mounting instructions include diagrams to help describe the solderless assembly and disassembly procedure of the E2 and E3 power module series (rectifier or IGBT modules) using the new PressFIT-contacts.

These module types are marked with a “P” after the voltage class resp. for older types by the add on “-PFP” = “PressFIT-Pin”, which stands after the module name (Examples see fig. 1 and fig. 2).

The power modules contain sensitive semiconductor components and therefore require careful handling and mounting, as well as strict compliance of the essential ESD rules.

These mounting instructions when adhered to correctly should result in a good electrical/mechanical contact to the circuit board. The user should carry out a detailed qualification evaluation and verification of the module PressFIT-Pin to circuit board connection.

The package for the E2 / E3 module series was developed to incorporate the special PressFit-Pin¹⁾ (fig. 3) design, allowing for a reliable contact against the insertion zone of the FR4 circuit board, realized by a cold welding technique, resulting in an extremely low contact resistance.

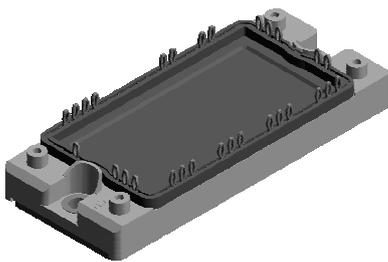


Fig. 1: MDMA210UB1600PTED

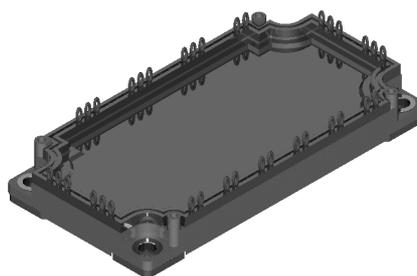


Fig. 2: MIXA150W1200PTEH

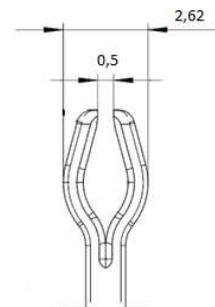


Fig. 3: IXYS-PFP¹⁾

¹⁾ Pin is based upon the “BIZON-Design”

2 Circuit board requirements

The qualification of the PressFit-Pin, which is used in the module series E2 and E3, was carried out according to IEC 60352-5. Consequently for the reliable assembly of the modules the circuit boards used must cope with the following demands:

- Double-sided circuit board according to IEC 60249-2-4 and IEC 60249-2-5
- Multi-layer circuit board according to IEC 60249-2-11 and IEC 60249-2-12

Table 1: Circuit board requirements

	Min	Typ.	Max
Bore diameter		2,35mm	
End hole diameter	2,14mm	2,2mm	2,29mm
Cu-gauge in hole	>25µm		
Plating in hole			<15µm
Cu-gauge of strip line	35µm	70µm 105µm	
Circuit board thickness	1,6mm	2,0mm	
Plating circuit board	Chemical tin		
Circuit board material	FR4		

Should other processing technologies and/or materials be used for the circuit board for the planned applications, these have to be tested and qualified accordingly.

3 Assembly and disassembly process

It is of the utmost importance that the user adheres to the following instructions to prevent damage to the module and/or circuit board.

Firstly remove the modules from the delivery packaging. The modules are then ready to be assembled onto a circuit board that has already been soldered with other components. The PressFIT-pins of the modules are placed in the prepared holes of the circuit board according to the module layout, and then pressed into the circuit board by means of a mounting fixture and a press tool. The assembly fixture, consisting of an upper and lower insertion tool as well as the press unit must ensure a secure guide of circuit board and module. The insertion tools as well as the insertion units have to be adapted respectively to the application and the relative dimensions of the circuit board. It is very important that the contact surfaces of the insertion tools as well as the circuit board are parallel to each other. It is also very important that adequate measures are taken so that during the insertion process the already mounted devices of the circuit board as well as the thermal interface materials on the module baseplate are not damaged.

Module assembly with the PressFit-Pin module has the advantage that it is much easier to replace a defective module or one that has become damaged during operation. Removal of a module in the circuit board, to allow for replacement with a new device, should only be carried out using special tools so as not to damage the circuit board.

The PressFit-Pins of the modules can only be inserted into a circuit board assembly once. Thereafter functioning modules that have undergone an assembly + disassembly may only be reassembled using solder mounting with the appropriate hole diameters.

Table 2: Mean press-in and press-out forces per pin ²⁾

	Min	Typ.	Max
End hole diameter	2,14mm		2,29mm
Press-in speed		25mm/min	
Press-in force per pin ³⁾	50N		110N
Press-out force per pin ³⁾	>30N		>30N

²⁾ Example table values for double-sided circuit board according to table 1, forces vary depending on number of layers of circuit board as well as press-in speed

³⁾ values in each case in relation to end hole diameter

To fix the circuit board to the mounted module the circuit board should be screwed into the provided holes on the module, with the appropriate screws. Assembly should be carried out using the recommended self-cutting screws (e.g. EJOT PT type DS K25 with diameter 2,5mm). The thread length of the screw in the module bore hole must be at least 4mm and not exceed 6mm, i.e. the screw's total length results from the circuit board gauge and the thread length in the module bore hole. To fix the circuit board onto the module a fastening torque of 1,5Nm for each screw must be used. It is possible that in special application circumstances that additional fixings should be used.

4 Module assembly on the heat sink

To assemble the modules to the heatsink and to find the correct specifications of the heatsink please reference the IXYS mounting instructions IXAN0024 „Mounting Instruction for E2-/E3- and E9-module series”.