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# PrimeSTACK

Mounting of PrimeSTACK IPM on a heat sink.

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**eupec**  
An Infineon brand



Never stop thinking

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	<b>Table of Contents</b>	<b>Page</b>
<b>1.0</b>	<b>General</b>	<b>5</b>
<b>1.1</b>	<b>Condition of the heat sink for module assembly</b>	<b>5</b>
<b>1.2</b>	<b>Recommended thermal grease</b>	<b>5</b>
<b>1.3</b>	<b>Recommended bolts and spring washers</b>	<b>5</b>
<b>2.0</b>	<b>Recommended equipment</b>	<b>6</b>
<b>3.0</b>	<b>Mounting instruction</b>	<b>8</b>
<b>4.0</b>	<b>Verification</b>	<b>11</b>

## 1.0 General

This application note describes the mounting of PrimeSTACK IPM on air- or watercooled heat sinks.

Examples are given how to fix this special IGBT-converter and how to check, if everything is well done.

### 1.1 Heat sink

The mounting surface must not have any scratches and dips.

Flatness  $\leq 25\mu\text{m}$  on a length of 100mm

This applies as well for mounted modules.

Roughness  $R_z \leq 10\mu\text{m}$

### 1.2 Thermal grease

Example for recommended thermal grease : "DowCorning 340" heat sink compound.

### 1.1 Bolts and spring washers

To mount IGBT-Modules on heat sink we recommend the following bolts:

- Hexagon socket head cap screws **M5**, 8.8 ( at least 6.8 ): DIN 912 / ISO4762
- Hexagon head bolts **M5**, 8.8 ( at least 6.8 ): DIN 931
- Hexagon head screws **M5**, 8.8 ( at least 6.8 ): DIN 933
- Hexagon socket screw, centre hole and low head **M5**, 8.8 (at least 6.8 ): DIN 6912
- Hexagon socket head cap screws with low head **M5**, 8.8 (at least 6.8 ): DIN 7984
- Cross recessed pan head screw **M5**, 8.8 (at least 6.8 ): DIN 7985
- Cross recessed pan head screw **M5** with flat and spring washer as assembly: DIN 6900

To save the connection we recommend the following spring washers:

- Safety washers type "SK Sperrkantscheibe M5" , form "M" or "S" :  
Distributor: Würth Industrie Service GmbH&Co KG; ITW Shakeproof GmbH&Co KG
- Safety washers type "VSK Sperrkantring M5":  
Distributor: Würth Industrie Service GmbH&Co KG; ITW Shakeproof GmbH&Co KG

## 2.0 Recommended equipment

- Cleaning accessories like: Isopropyl or ethylene alcohol
- Non-fuzzing rag and gloves
- Brush
- Screen print template as shown in drawing no.: 88000162.0 (figure 2)
- Scraper made of Steel, plastic scrapers are not allowed
- contingently: Jig ( to place the screen print template exactly on the heat sink )
- Torque wrench, or electronically controlled slow moving electrical screwdriver
- Note: Due to missing accuracy and precision we don't recommend pneumatic screwdrivers.



Figure 1

- Screen print template as shown on drawing no.: 88000349
- Screen print template for PrimeSTACK size C2.

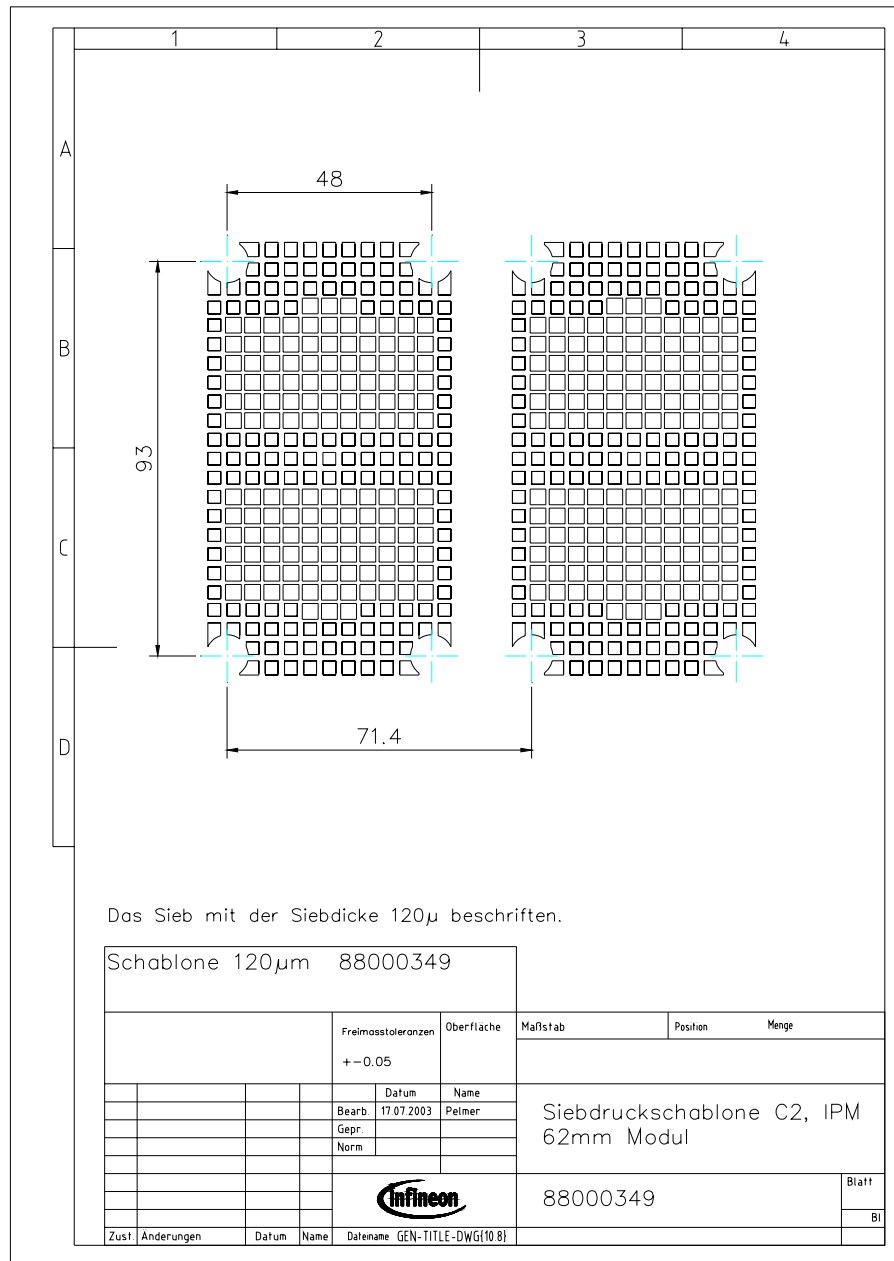


Figure 2

### 3.0 Mounting instruction

-1. step:

Clean the surface of IGBT baseplate and heat sink. If necessary, use isopropanol alcohol.

The surface must be free of any particles and residues of thermal grease.

Make sure that there are no damages like scratches and dips.

-2. step:

Adjust the screen print template on the heatsink ( air- or water- cooled ).

-3. step:

Apply a sufficient amount of thermal paste.

Dispense the paste by crosswise moves of a scraper and make that all square holes are properly filled. (figure 3)

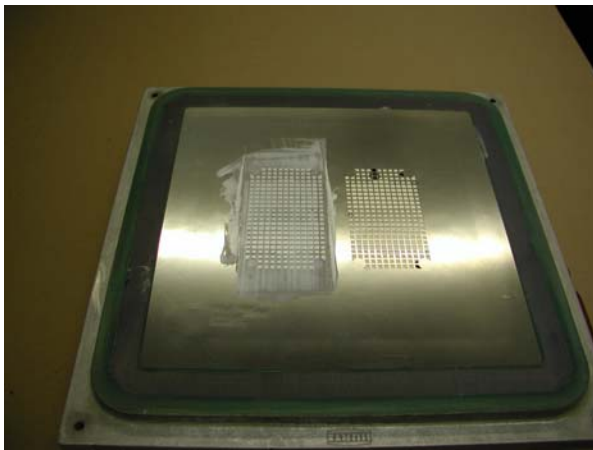


Figure 3

Remove the screen print template vertically carefully from the heat sink. (figure 4)

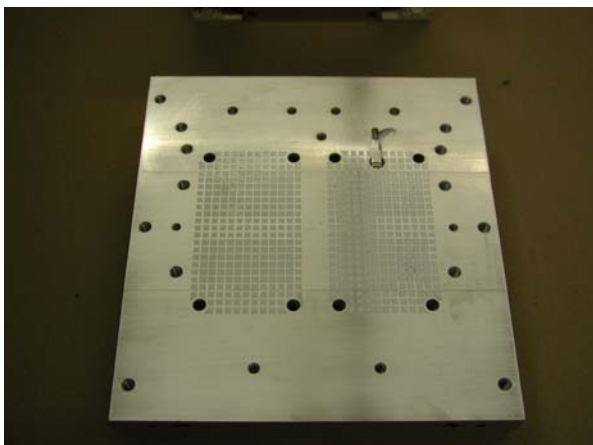


Figure 4



4. step:

At first mount the case on the heat sink.

Wet the temperature sensor with thermal paste. Put the temperature sensor into the borehole and deposit the cable of the sensor into the flute.

Now place PrimeSTACK IPM exactly to the mounting holes M5.

Note: There are pins on the bottom of the AC-case to center and positioning the case. (figure 5)

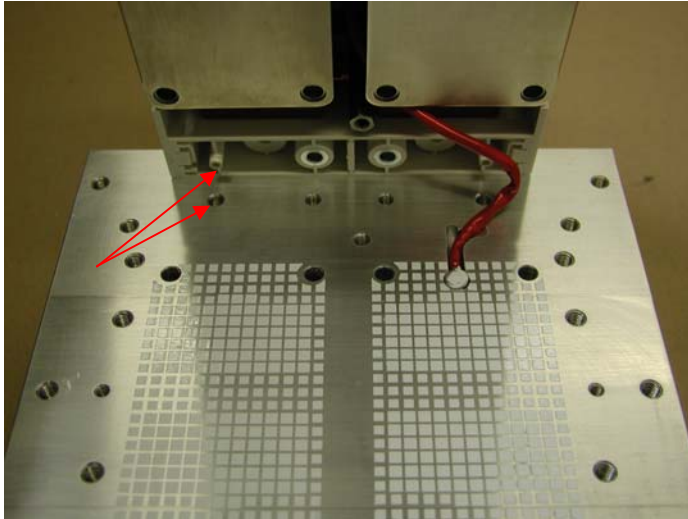


Figure 5

Use DIN912-M5x14 8.8 screws and safety washers to fix the case.

Put in all screws and tighten them by hand. ( 0.5-1.0Nm )

Now tighten these screws by 5Nm with the aid of a torque wrench. (figure 6)

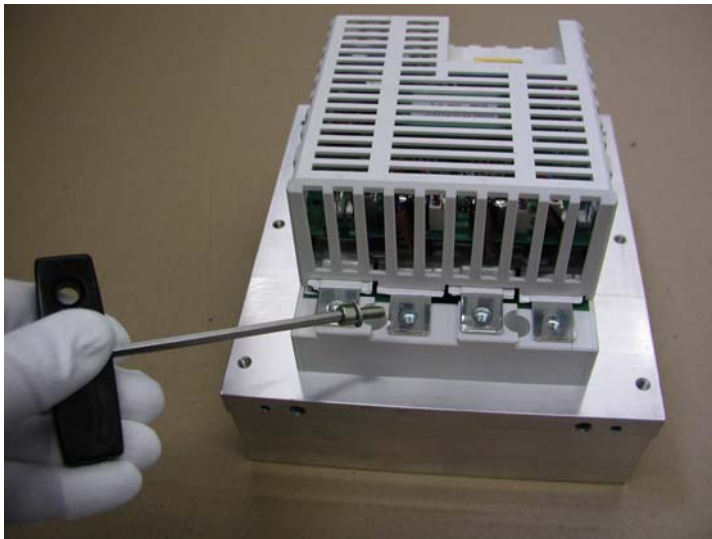


Figure 6

5. step:

Mount the 62mm Modules from the bottom side of the heat sink.

Only use the recommended screws and safety washers. ( see 1.1)

The length of the screw is exactly if its overlaps 2-3mm of the female screw thread.

Mount all screws by hand 0.5 – 1.0Nm +/-10% crosswise of each 62mm module.

Tighten the same screws crosswise 5Nm +/-10% using a torque wrench. (figure 7)



Figure 7

## 4.0 Verification

- Make sure that there is enough thermal grease between baseplate and heat sink .

Depending on the paste viscosity a homogeneous stripe of paste should form in a time frame of few minutes (low viscous paste) to several hours (high viscous paste) .

Using **DC340 thermal grease** you will see within 10 minutes these results. (figure 8)



Figure 8

- If you are mounting converters the first time as described, you should demount the converter after 10 minutes and compare the print image with the print image below. (fig.9,10,11)

The heat sink with the belonging modules, show a good distribution of paste.

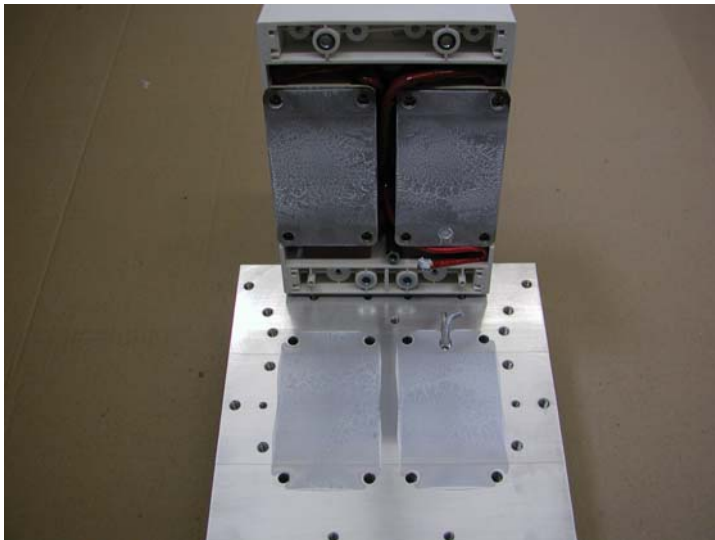


Figure 9

- Print image of cooler. (figure 10)

There is enough thermal paste if there is a continuous stripe of excessive paste along the edges.

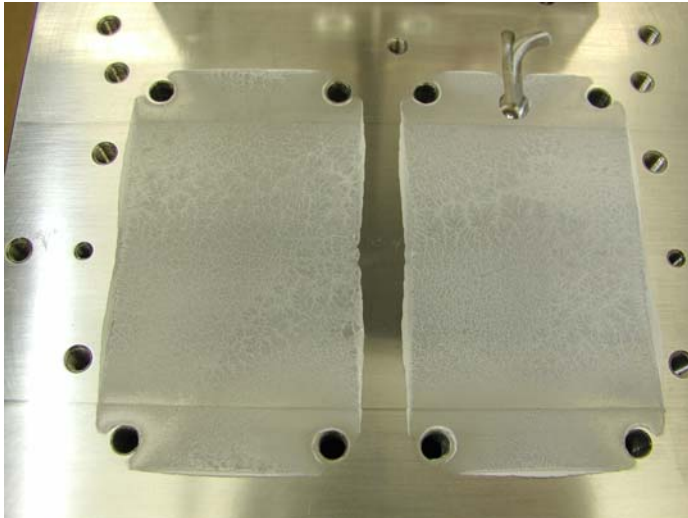


Figure 10

- Print image of the IPM baseplate. (figure 11)

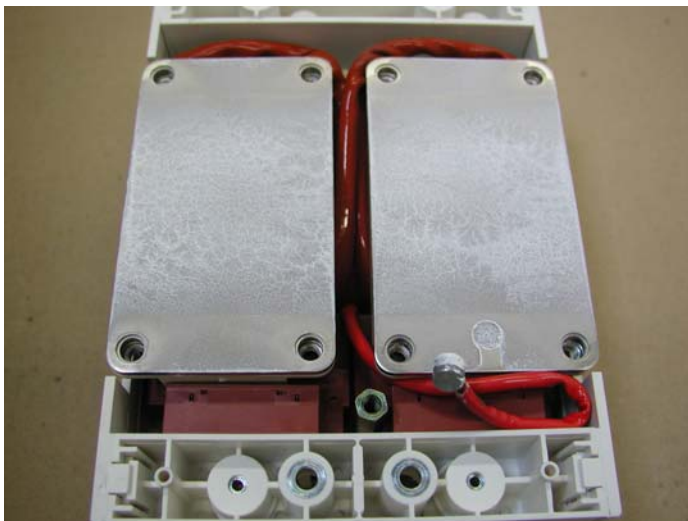


Figure 11

### Mounting:

To avoid unnecessary strain and tension of the baseplate, the heat sink has to show sufficient stiffness and has to be handled distortion free during assembly and transport.