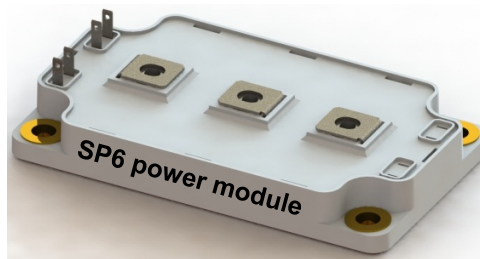


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## Mounting instruction for SP6 power module

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Pierre-Laurent Doumergue  
R&D Engineer  
Microsemi Power Module Products  
26 rue de Campilleau  
33 520 Bruges, France



### Introduction:

This application note gives the main recommendations to appropriately mount the SP6 power module onto the heat sink, and connect the bus bars, wires or PCB.

It is very important to follow the mounting instructions to limit both the thermal and mechanical stresses.

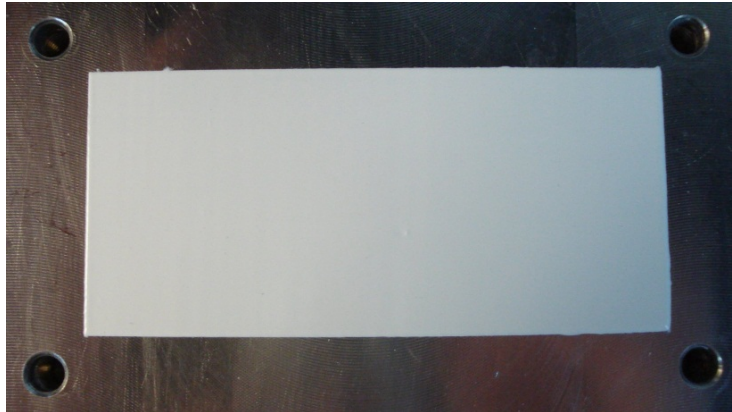
### 1. Power module mounting onto the heat sink.

Proper mounting of the module base plate onto the heat sink is essential to guarantee good heat transfer. The heat sink and the power module contact surface must be flat (recommended flatness  $<50\mu\text{m}$  for 100mm continuous, recommended roughness Rz 10) and clean (no dirt, no corrosion, no damage) in order to avoid mechanical stress when the power module is mounted, and to avoid an increase in thermal resistance.

- **Thermal grease application**

To achieve the lowest case to heat sink thermal resistance, a thin layer of thermal grease must be applied between the power module and the heat sink.

It is recommended to use screen printing technique to ensure a uniform deposition of a minimum thickness of  $100\mu\text{m}$  (3.9 mils) on the heat sink (see picture 1). The thermal interface between the module and the heat sink can also be made with other type of conductive thermal interface material such as phase change compound (screen-printed or adhesive layer).



Picture 1: Grease on the heat sink before assembly.

- **Mounting the power module onto the heat sink.**

Place the power module above heat sink holes, and apply a small pressure to it. Insert the M6 screw with lock and flat washers in each mounting hole (a #12 screw can be used instead of M6). The screw length must be at least 16 mm (0.6”).

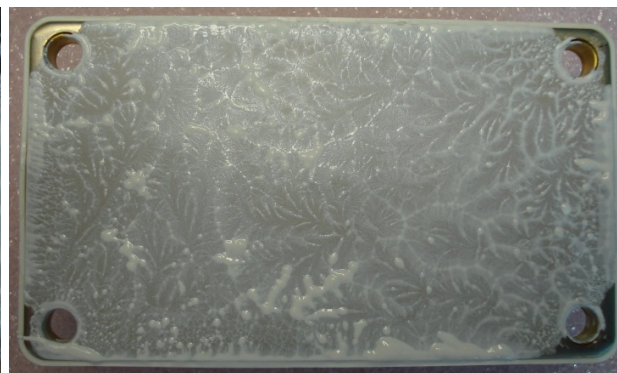
First lightly tighten the four mounting screws. Tighten alternatively the screws until their final torque value is reached (See the product datasheet for the maximum torque allowed).

It is recommended to use a screwdriver with controlled torque for this operation. If possible, screws can be tightened again after three hours.

The quantity of thermal grease is correct when a small amount of grease appears around the power module once it is bolted down onto the heat sink with the appropriate mounting torque. In any case, the module bottom surface must be completely wetted with thermal grease. (See pictures 2 & 3).



Picture 2: Grease on the heat sink after removing the module



Picture 3: Grease on the module after disassembling

## 2. Assembly with Bus bar for power connections and wires for signal connections

- **Power connections**

The bus bars must be mounted onto the power module and screwed onto the power terminals. Put M5 screw with a M5 flat washer in each power terminal.

The screw length depends on the bus bar thickness and the washers. See the product datasheet for the maximum torque and max length into the power terminal allowed.

To reduce switching over voltages, decoupling capacitors must be placed as close as possible of the power terminals VBUS & 0VBUS. (See figures 4 & 5).

Be careful with the heavy components like electrolytic or polypropylene capacitors. If these components are located in the same area, it is recommended to add spacers such that the weight of these components on the board is not handled by the power module but by the spacers.

Additional spacers must be also added to avoid vibration and shock issues. (See the product datasheet for the spacer dimension).

- **Signal connections**

Wires should be plugged onto the signal terminals via a lug. (See product datasheet for signal connection dimensions). In order to reduce the stray inductance, the gate and the emitter wires must be as short as possible and twisted.

Additional spacers must be necessary to avoid a deformation of the PCB and to avoid some mechanical stress on the components, tracks and signal terminals. (See pictures 4 & 5).

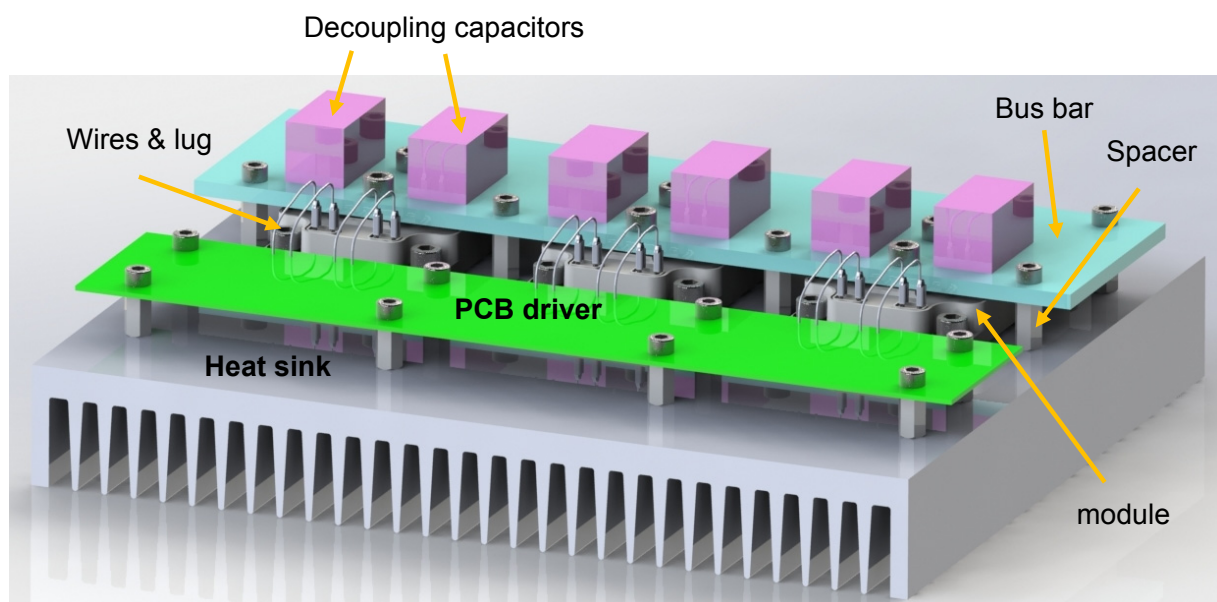


Figure 4: General assembly view in a 3 phase bridge configuration

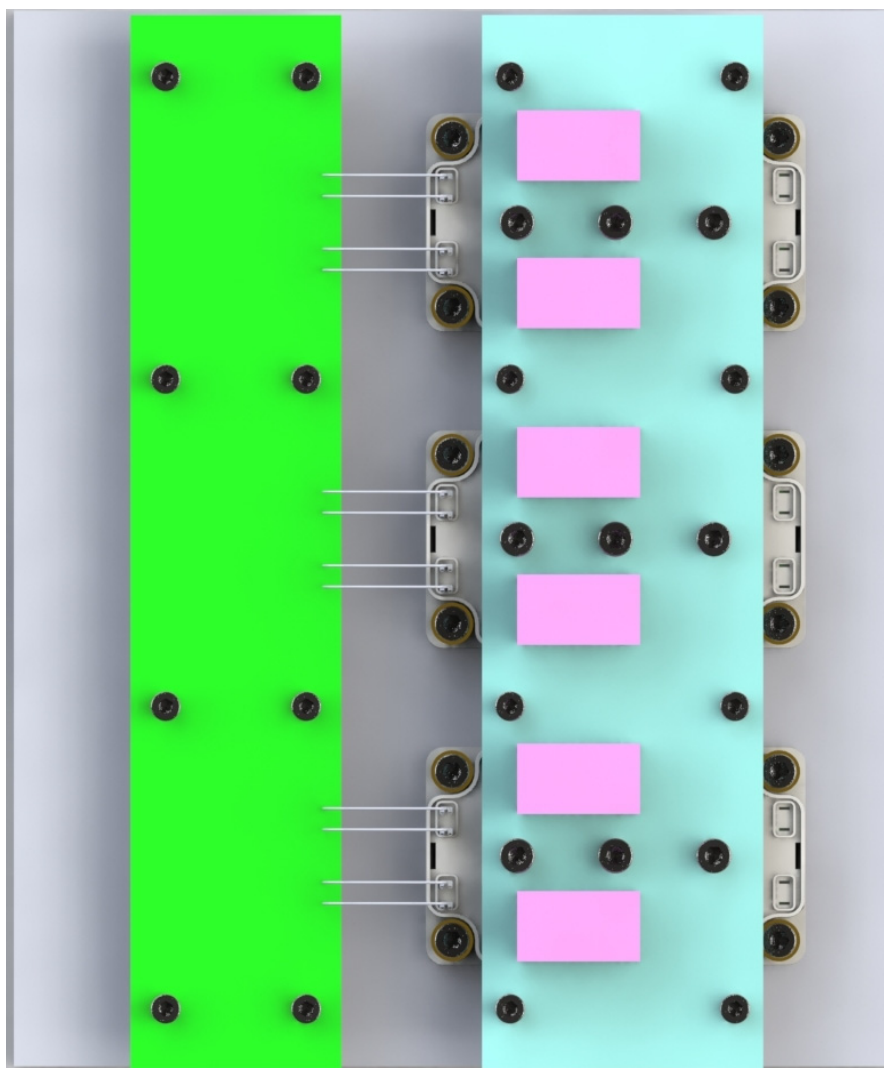


Figure 5: General assembly view in a 3 phase bridge configuration

Each application, bus bar and PCB are different; the spacers placement must be evaluated on a case-by-case basis. In any case, the power module must not handle the components weight.

#### **Conclusion:**

This application note gives the main recommendations regarding the mounting of the SP6 power module. Applying these instructions will help decreasing the mechanical stress both on bus bar, PCB and power module and therefore will ensure long term operation of the system. Mounting instructions to the heat sink must also be followed to achieve the lowest thermal resistance from the power chips down to the cooler. All these operations are essential to guarantee the best system reliability.



**Microsemi Corporate Headquarters**  
One Enterprise, Aliso Viejo CA 92656 USA  
Within the USA: +1(949) 380-6100  
Sales: +1 (949) 380-6136  
Fax: +1 (949) 215-4996

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