Mounting instructions SEMIPONT5&6

ESD protection
IGBT circuit in SEMIPONT 6 modules are sensitive to electrostatic charges. All SEMIPONT 6 modules are ESD protected during transport, storage and mounting process with an ESD cover.
During the modules handling and assembly, use conductive grounded wristlet and a conductive grounded working place.

Heat sink specification
The mechanical specifications for the heatsink are:

- Flatness: 50 µm per 100 mm
- Roughness Rz : 6,3 µm
- Machined without overlaps

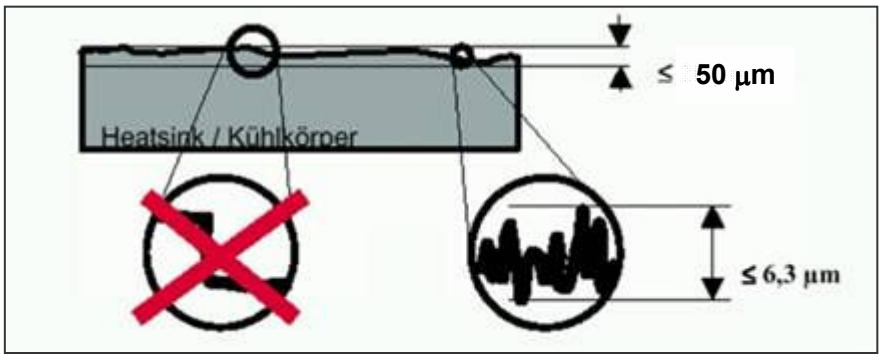

Figure 1 - Heatsink specifications

Mounting surface

- The mounting surface of SEMIPONT5&6 module must be free from grease and particles.
- Fingerprints or on the bottom side do not affect the thermal behaviour.
- Due to the manufacturing process, the bottom side of the SEMIPONT5&6 may exhibits scratches, holes or similar marks.
- Discoloration on the bottom side do not affect the thermal behaviour
- The figure 2 defines surface characteristics, which do not affect the thermal behaviour.

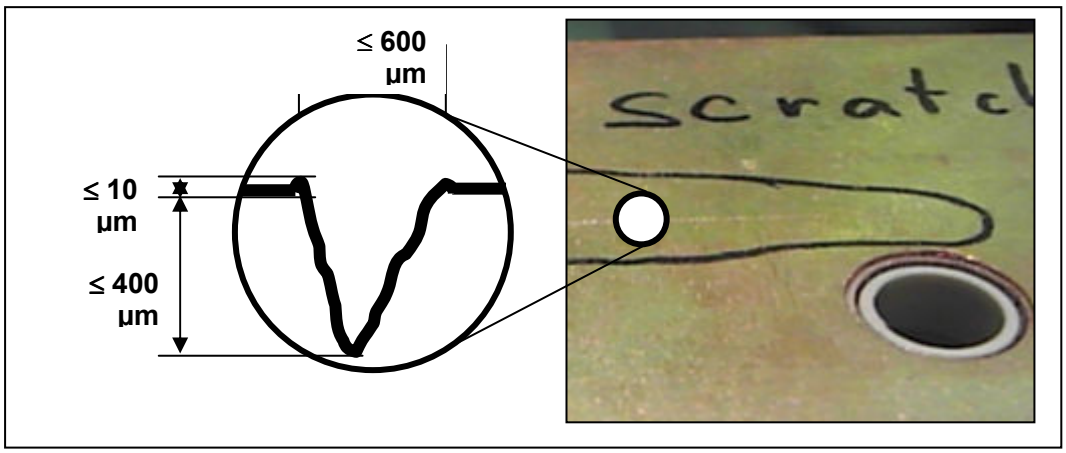

Figure 2 - Scratches on the SEMIPONT bottom surface that don't affect thermal behaviour

Application of thermal grease
In order to avoid air gaps at the interface between the module and the heat sink a thermal grease must be applied.
The function of the grease is to flow according to the shape of the interface, allowing a metal-to-metal contact where it is possible, and filling the remaining gaps.
Recommended thermal grease material is Wacker-Chemie P 12.

SEMIKRON recommends to use an hard rubber roller or a screen print for an even distribution of the grease.

The thickness of the applied grease layer should be:

Module	Thermal Grease Thickness
SEMIPONT 5	50-55 µm (Wacker P12)
SEMIPONT 6	50-55 µm (Wacker P12)

Has to be observed that an increase of the thermal grease thickness over the suggested limits, doesn't improve the thermal contact but drastically increase the thermal resistance junction to heatsink.
This could lead to the chip junction overheating, for this reason it is very important to properly check the thermal grease thickness.

The thickness of the applied grease can be checked by a measuring gauge (e.g. Fa. ELCOMETER Instruments GmbH, Himmlingstr. 18, 73434 Aalen, Tel. +49-7366-919283: Sechseck-Kamm 5 - 150 µm).

Assembly on heatsink
After applying the recommended thickness of thermal grease on the heatsink, tighten the screws applying first a 0.5 Nm torque to each one, in order to lean the module against the heatsink, and then tighten each screw with the corresponding mounting torque:

Module	Mounting Torque	Screw	Washer
SEMIPONT 5	2,5 Nm +0/-10%	DIN 912-M-4x20	DIN 6798 Form A + DIN 125
SEMIPONT 6	3 Nm +15/-15%	DIN 912-M-4x20	DIN 6798 Form A + DIN 125

SEMIKRON recommends:

- to use a torque wrench with automatic control;
- to tighten the screws only once. After the mounting do not re-tighten the screws to the nominal mounting torque value.
  Due to relaxation of the housing and flow of thermal paste, the loosening torque is lower than the mounting torque. However the construction of the housing, the washers and the adhesion of the thermal paste still ensure sufficient thermal coupling of the module to the heatsink.
- Do not exceed the mounting torque because a further increase of the maximum mounting torque will not improve the thermal contact but could only damage the module.

Connections SEMIPONT5&6 – PCB
The PCB has to be placed on the plastic posts present in each corner on the top of the SEMIPONT 5&6 modules (figure 3).
The module could be additionally fixed to the PCB by means of UNI EN ISO 7049 M2,9 self tapping screws.
The maximum penetration depth must not exceed 6 mm.
The minimum penetration depth has to be 4 mm.

In order to avoid mechanical stress to the solder pins, the PCB has to be additionally supported (e.g. using spacers).

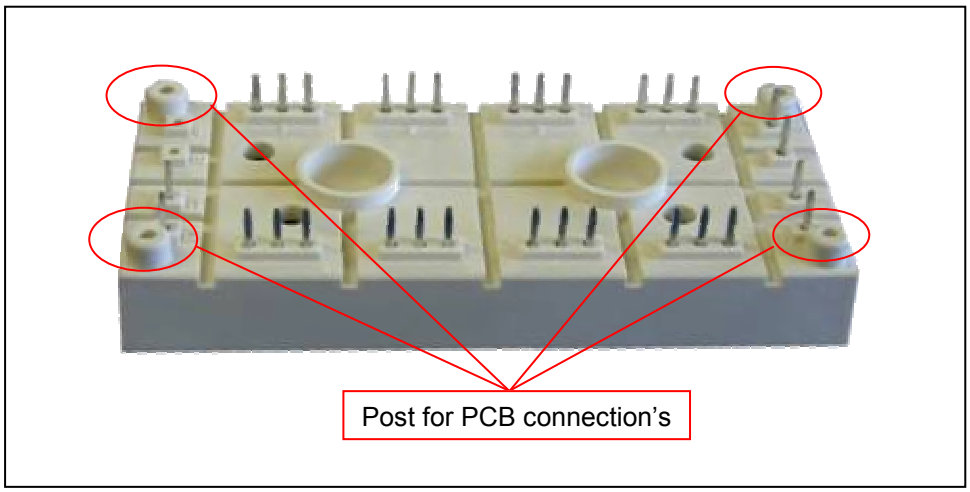

Figure 3 – Mounting post details

The suggested hole diameter for the soldering signal and power pins in the PCB is 2mm.

Soldering on PCB

SEMIPONT5&6 modules could be soldered to the PCB using the most common soldering process:

- Hand iron;
- Wave soldering process.

Independent of the soldering process used to solder SEMIPONT5&6 modules to the PCB, SEMIKRON recommends a thorough evaluation of the solder joints to ensure an optimal connection between power module and the PCB.

The time required to create a robust connection depends on several parameters:
a) PCB thickness: When increasing the PCB thickness, the heat dissipation capability of the PCB itself will be the higher, and thus it will require a longer soldering time.

b) Copper wire area: Pins require large copper wire to minimize resistive power losses during the current flowing. Since copper has a good heat transmission coefficient, the size of these copper wires directly affects the soldering time necessary to heat the PCB pad.

c) Hand iron power: power, tip size and working temperature of the hand iron affect the soldering time. These parameters have to be adjusted in order to keep the maximum temperature within the specified limit.

SEMIKRON recommends that the soldering joints should be thoroughly checked to ensure a high quality soldering joint. If necessary, different parameters should be adjusted in order to optimise the process.

Hand Soldering
SEMIKRON recommends to not exceed the maximum temperature of 260°C for a soldering time of 10seconds.

Wave Soldering Profile
SEMIKRON recommends:

- do not exceed the maximum wave soldering profile of figure 4;
- the maximum preheating temperature has to be kept under or equal to the maximum storage temperature (125°C);
- do not exceed the maximum preheating time of 100 seconds;
- during the soldering phase, do not exceed the maximum soldering time of 10 seconds at the maximum temperature of 260°.

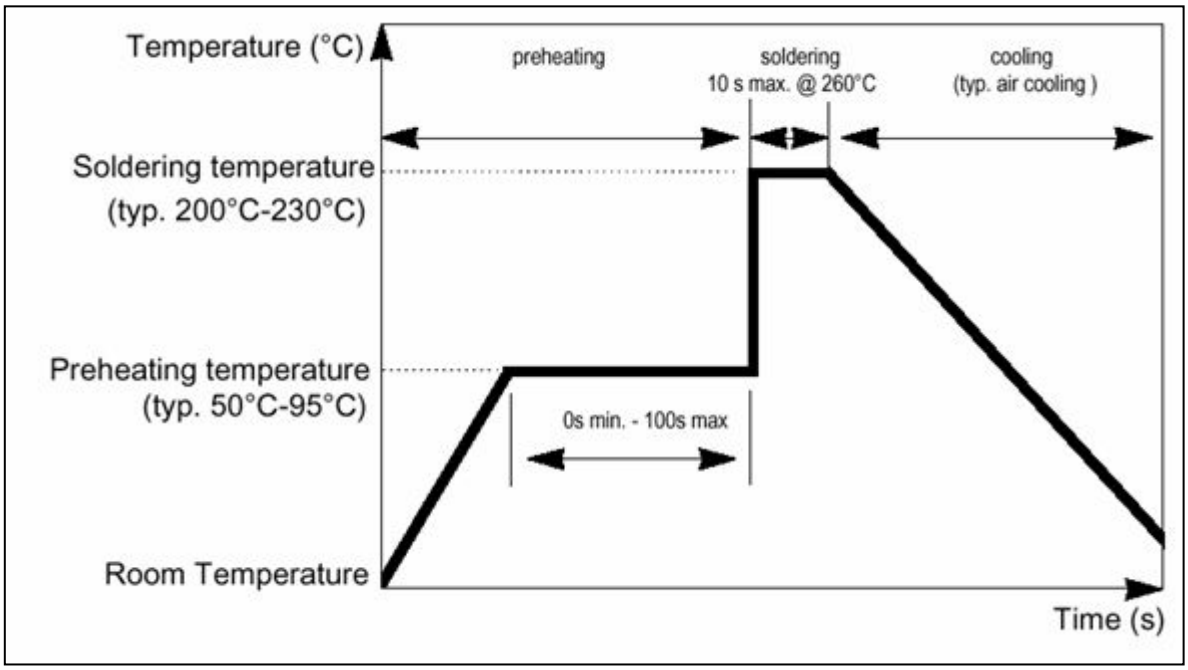

Figure 4 – Wave soldering profile