

Package Footprint and Reflow Soldering

Soldering of the XEN-1210 is possible in two orientations: horizontal and vertical. The following two subsections advise in the horizontal and vertical mounting respectively.

Horizontal Orientation

Figure 1 (left) shows the layout of the footprint for a horizontal orientation. It shows the necessary copper pads for the footprint. The paste stencil should cover only the small pads, not the large central plate of the package. The measurements needed to design a footprint in your CAD program are shown on the left, while the pin names are shown on the right.

Stencil design and paste coverage should be chosen as standard for a 0.5mm pitch QFN package for your own soldering process.

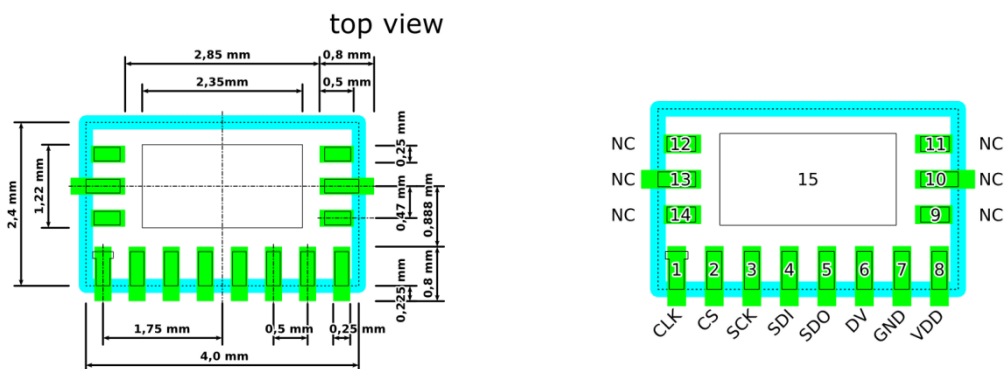


Figure 1: Measurements and layout of a footprint for horizontal soldering.

Vertical Orientation

The pad layout of the footprint for vertical soldering is shown in Figure 2. On the left the measurements for the creation of a footprint in your CAD program are shown, while in the middle the pin names are indicated. The right most picture shows how the solder paste will make the vertical 90° angle with the pads of the package and PCB.

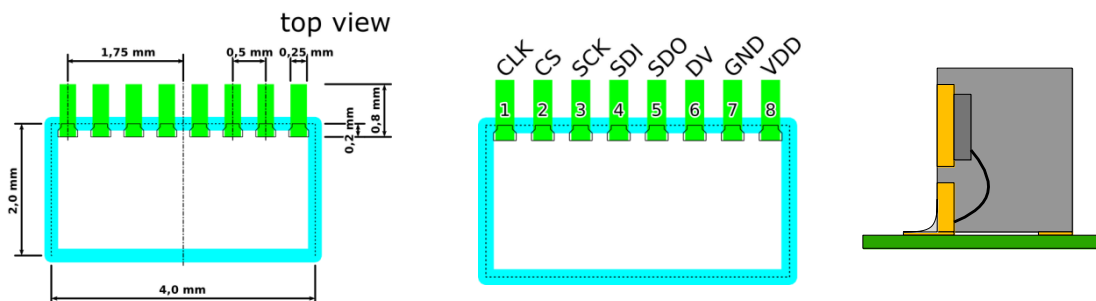


Figure 2: Measurements and layout of a footprint for vertical soldering.

For the vertical mounting of the XEN-1210, several considerations are important in order to obtain accurate vertical orientation. To help you with the decision making three situations are considered: a simple footprint without additional copper through the footprint, a bus routing footprint on a copper bus, and an unrelated routing footprint, which consists of a simple footprint with additional copper (Figure 3 Row 1). The second row shows the required paste stencils and the third row the advised solder masks. The unrelated routing footprint is not advised, and should only be used if absolutely necessary.

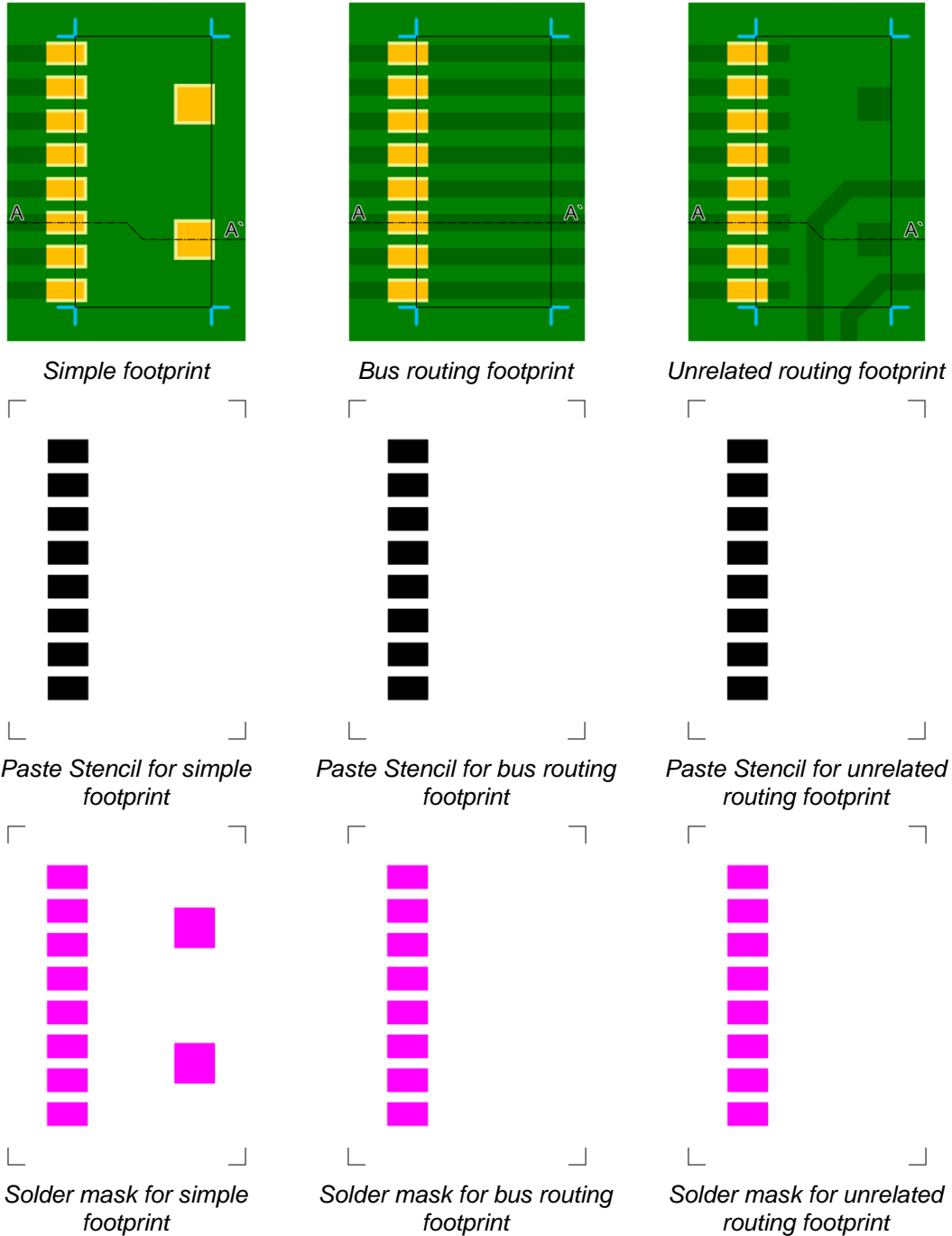


Figure 3: Three possible situations for vertical mounting of the XEN-1210: simple footprint (first row left), footprint on straight bus (first row middle), and simple footprint with additional copper tracks (first row right). The second row shows the paste stencils, while the third row shows the solder masks.

Simple Footprint

The simple footprint uses 8 contact pads and 2 copper alignment pads for level orientation. Figure 4 shows the correct and incorrect solder masks, on the left and right sides respectively, for the simple footprint layout. In the top row a solder mask thinner than the copper layer is shown, while the bottom row shows a thicker solder mask. When the copper alignment pads are covered with solder mask then an error due to sensor tilting can occur.

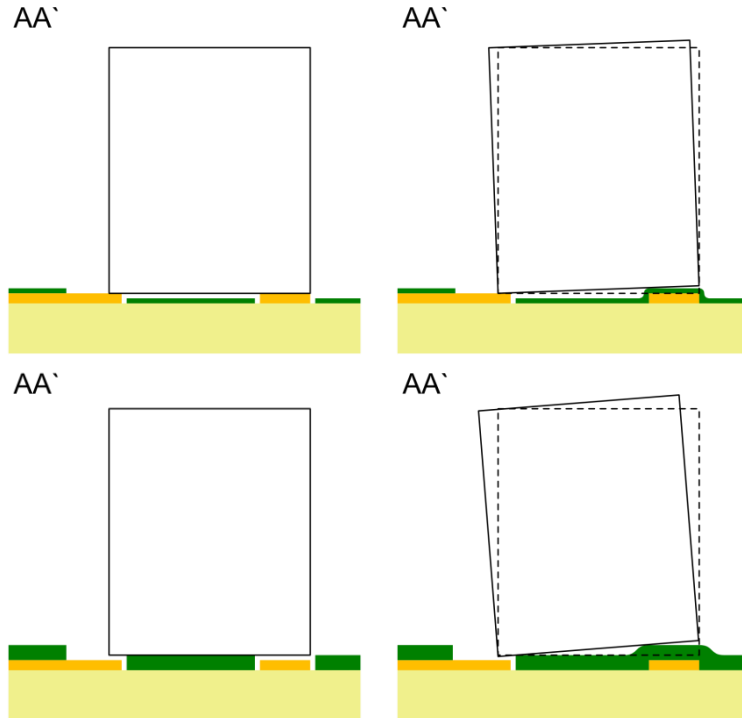


Figure 4: Correct(left) and wrong(right) layout of copper and solder mask for solder masks both thinner(top) and thicker(bottom) than the copper layer when no additional copper is routed through the footprint.

Bus Routing Footprint

In the bus routing footprint the level orientation is guaranteed by the copper bus. No additional pads are needed. Figure 5 shows that not much can go wrong with the bus routing footprint layout regardless of the solder mask thickness.

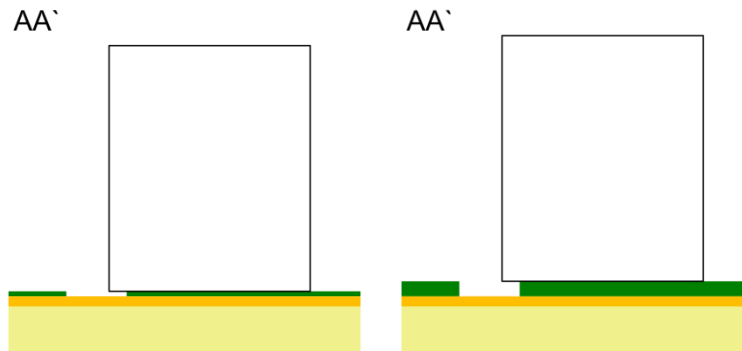


Figure 5: Layout of copper and solder mask for solder masks both thinner(left) and thicker(right) than the copper layer when copper pads are fully extended below the package.

Unrelated Routing Footprint

Figure 6 shows the situation of the unrelated routing footprint layout. Be sure the solder mask covers the alignment pads, so that device can now align on top of the solder mask.

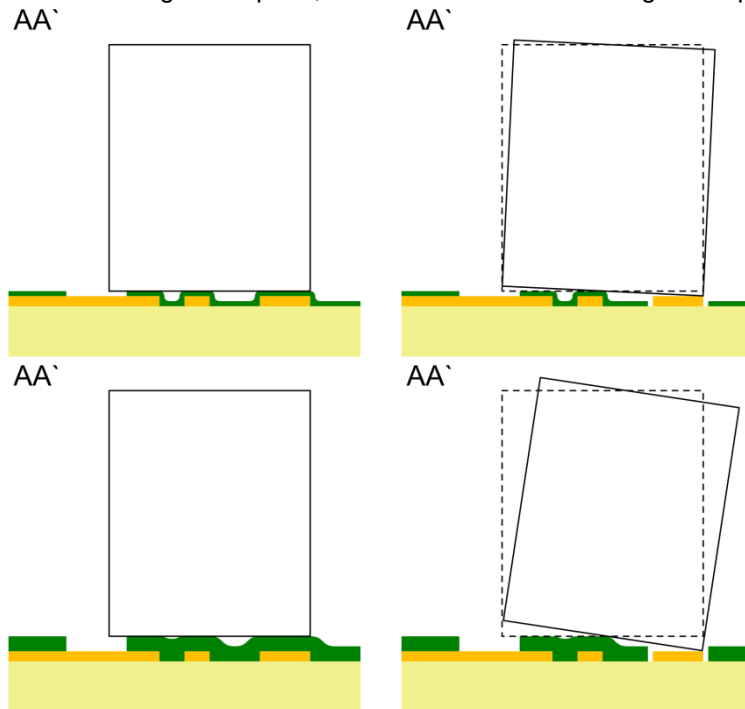


Figure 6: Correct(left) and wrong(right) layout of copper and solder mask for solder masks both thinner(top) and thicker(bottom) than the copper layer when additional copper is routed through the footprint.

Naturally, it is possible that you will encounter a different situation in your own layout. Be sure to consider the layout precisely for the alignment of the sensor, using the abovementioned considerations.

Stencil Design

The size of your paste stencil openings depends off course on your stencil thickness, the type of solder paste used, and amount of solder paste needed. Be sure to have enough paste for both electrical contact and mechanical strength. A drop of glue may also be used to secure the device.

Pick & Place

Placement force should be enough to squeeze the paste out from under the package. In this way an accurate vertical positioning is assured. Accurate rotational positioning is assured by the natural reflow process. However, if the rotational accuracy of the pick & place is within specifications of the application, then a glue mask can be added to glue the sensor in position, adding stability



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