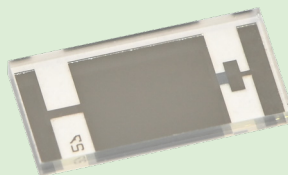
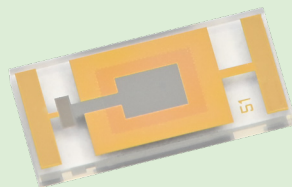




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+ Handling Instructions

HC103M2/HMC03M Humidity Sensing Element

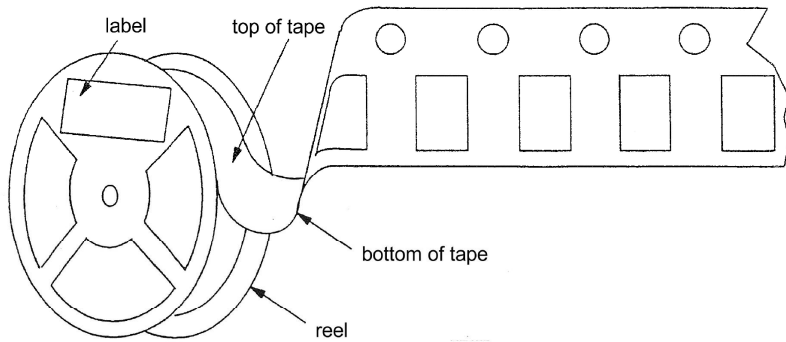


1 The Sensor Element

HC103M2 and HMC03M are capacitive humidity sensing elements optimized for meteorological radiosondes. They are manufactured using state of the art thin-film technology and feature very fast response times even at low temperatures.

2 Tape and Reel Package and Storage

The tape and reel packaging complies with the IEC 60286-3 standard and is designed for automatic pick and place machines. The sensing elements are placed in the tape with the backside up, which can be used for suction hold.



Store the HC103M2 / HMC03M in the original tape and reel only, which optimally protects the sensing elements against environment influences such as chemical pollution or accumulations of dust and dirt. In order to avoid condensation, allow sufficient acclimatization time before unpacking after storage at low temperature

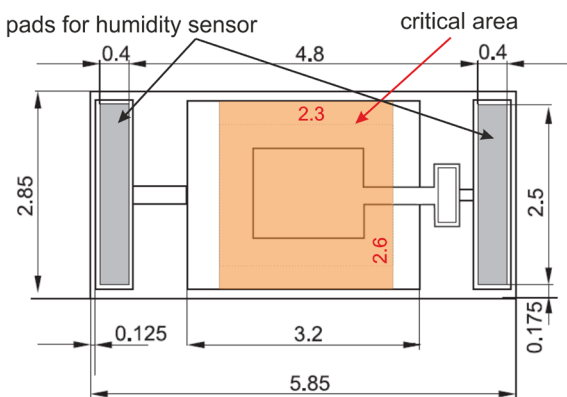
A sensing element removed from the tape may not be put back onto the tape.

	HC103M2	HMC03M
Storage temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)	-20 °C ... +50 °C (-4 °F ... 122 °F)

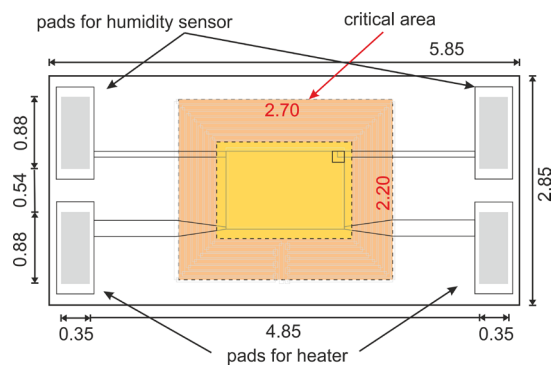
3 Sensing Element Construction

Dimensions in [mm]

HC103M2



HMC03M

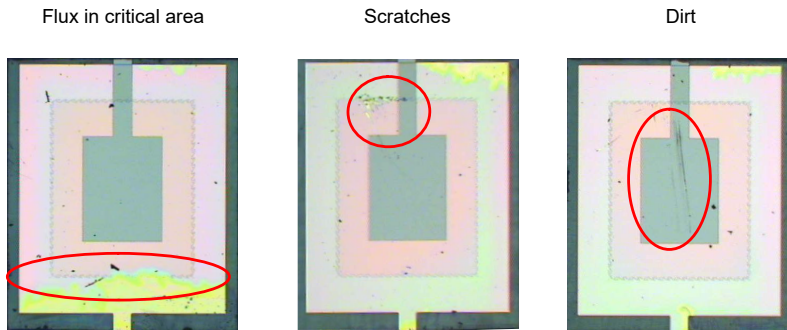


4 Processing Information

4.1 Handling

The sensing element must be handled with utmost care to avoid contamination (solder flux residues, solder splashes, fingerprints) and damage (scratches) of the active area.

Examples of critical contamination and damage of the active sensor area



Please note the following handling guidelines:

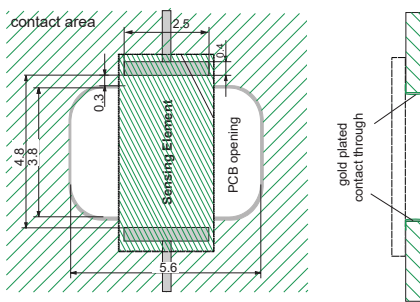
- Any damage or contamination of the critical area of the sensing element surface has to be avoided. Especially contaminations like grease, fingerprints, flux, etc. are not allowed. This should be considered as well when shipping printed circuit boards (e.g. no damping foam, boards stacked on top of each other, etc.).
- Slight discolorations of the active area of the sensing element result from production steps and do not influence the sensing performance.
- Do not touch the active area during handling and operation. This must be strictly observed also for sensing elements already mounted onto the final measurement device.
- Pick-and-place SMD machinery (e.g. suction nozzle) may only touch the sensing element on the back side, the contact pads or on the outer edges of the chip, but never the active surface.
- The sensing elements have to be stored in the original packaging. It has to be taken into account that the parts should always be covered with the original top foil. This prevents contamination of the sensing elements.
- Loose dust particles even on the active area have no impact on the sensing element performance.
- Only use water-soluble flux. Residues of soldering flux or slight scratches outside the active area have no impact on the performance of the sensing element.
- Certain foams and plastics may release chemicals which can contaminate the humidity sensing elements and change the sensor characteristics. Packaging materials used for the device fabricated with HC103M2/HMC03M must be carefully tested with respect to their influence on the sensing element.
- It is recommended to position the sensing elements so that the contact pad which is on the side of the feedthrough lies on the same potential (e.g. GND) as the metallization of the circuit board opening over which the sensing element is placed.

NOTICE

For typical HC103M2/HMC03M applications it is mandatory, that the whole board or flex, to which the sensing element is mounted, is absolutely clean.

4.2 Mounting onto a Printed Circuit Board

Dimensions in [mm]



For shortest response time, HC103M2/HMC03M shall be positioned over an opening in the circuit board to allow sufficient air circulation around the sensing element. For best accuracy, it is important to avoid moisture accumulation in areas such as at the edge of the PCB close to the sensing element by selecting appropriate board materials or gold-plating the edge of the opening.

It is recommended to contact the solder pad 2 to the same potential (e.g. GND) as the plating of the PCB opening.

4.3 Soldering Instruction

Recommended soldering paste: SC BLF06 Sn96.5/Ag3.5 (Solder Chemistry) or Sn95.7/Ag3.5/Cu0.75.

For mechanical as well as electrical connection the pads must be soldered to the PCB.

For soldering, a standard convection reflow soldering oven may be used (no vapour phase and no wave soldering). For this purpose, a lead-free, air, and nitrogen reflowable no-clean type 3 solder paste, which meets the requirements of the European RoHS regulation 2011/65/EU and (EU) 2015/863, as well as the standards by J STD 004 is recommended.

Figure 1 below shows a typical soldering profile.

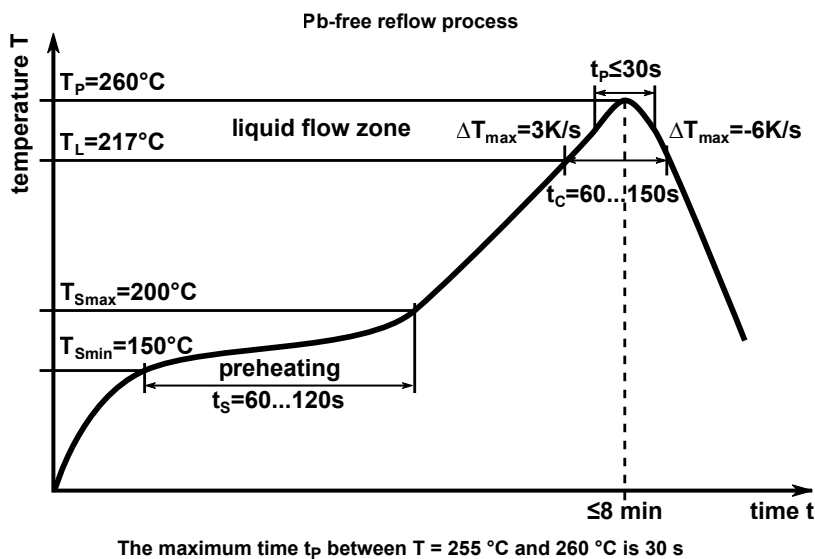


Figure 1: Recommended reflow profile using a standard reflow soldering oven

NOTICE

Please make sure that if there is more than 1 soldering cycle, the sensor is soldered in the last one to avoid contamination of the active surface.

If this is not possible (e.g., selective soldering after the reflow soldering process), the humidity sensor must be covered in such a way that no liquid or gaseous fluxing agents can get onto the humidity sensor

i PLEASE NOTE

Please note that the sensor itself is qualified to withstand the profile given in JEDEC J STD-020 for lead-free soldering with a peak temperature of 260 °C and a time in the critical zone above ($T_{\text{peak}} - 5 \text{ °C}$) of up to 30 seconds

NOTICE

The sensors must not be submerged in a cleaning solution.

In case of using a soldering process with a lower temperature profile than the one mentioned above, the soldered humidity sensor(s) need to be stored at a temperature of at least 150 °C (302 °F) for at least two hours to reach the full sensor performance.

4.4 Sensing Element Cleaning

- Loose particles can be blown off the sensing element with oil-free filtered compressed air or nitrogen.
- For removing sticky dirt or dust deposits wash the sensing elements for 30 seconds in an ultrasound cleaner with isopropanol at 23 °C (73.4 °F), then rinse with clean (hot) tap (better deionized) water and let them dry in open air. See also the Cleaning Instructions at www.epluse.com. Hot deionized water with about 60°C (140°F) in an ultrasonic cleaner maybe work better, depending on the dirt.

NOTICE

Never touch the active area of the sensing element.

4.5 Post Reflow Treatment

We strongly recommend high humidity storage of the boards including the sensor packages after reflow soldering. 4 - 6 hours at 90 %RH (room temperature) is advisable (see also "Moistening", item 4 in chapter 4.6.4 Performance Measurement). Measurement should be done after a short further rest (>1 hour) at room conditions.

4.6 General Information

During the whole transportation and manufacturing process it should be avoided to expose the sensor to high concentrations of chemical solvents for extended periods of time. Otherwise, the reconditioning procedure (see chapter 2.4.3) must be followed.

Furthermore, the instructions given in chapter 4.6.3 and 4.6.4 shall be considered. It must be ensured that the sensor is processed according to state of the art electronic manufacturing services.

4.6.1 Recommended Packaging Materials

The best packaging is the original manufacturer packaging. If the sensor has to be removed from this packaging ESD trays made from PS (Polystyrene) or sealed ESD bags are recommended.

4.6.2 Forbidden Packaging Materials

The use of certain outgassing packaging materials such as foams (e.g.: Type MOS 2200) glues, adhesive tapes and foils shall be avoided since it may change the sensor characteristics.

4.6.3 Reconditioning Procedure

After exposure to extreme conditions or chemical solvents or storage time of several months, the sensor characteristic curve may offset. Exposure to higher temperature will reset the offset (e.g. 125 °C, >6 hours). For further instructions, see chapter 4.6.4.

If heating up to 125 °C is not possible, the following is suggested:

Store the sensor at 70±5 °C, 75±5 %RH for min. 8 hours to complete the reconditioning process.

Measurements should be done after a short further rest (>1 hour) at room conditions.

4.6.4 Performance Measurement

In order to obtain precise, repeatable and meaningful measurement results, it is absolutely necessary to subject the test samples to a defined procedure consisting of a defined heating and reconditioning step before a characteristic curve can be measured. The following procedure must be followed:

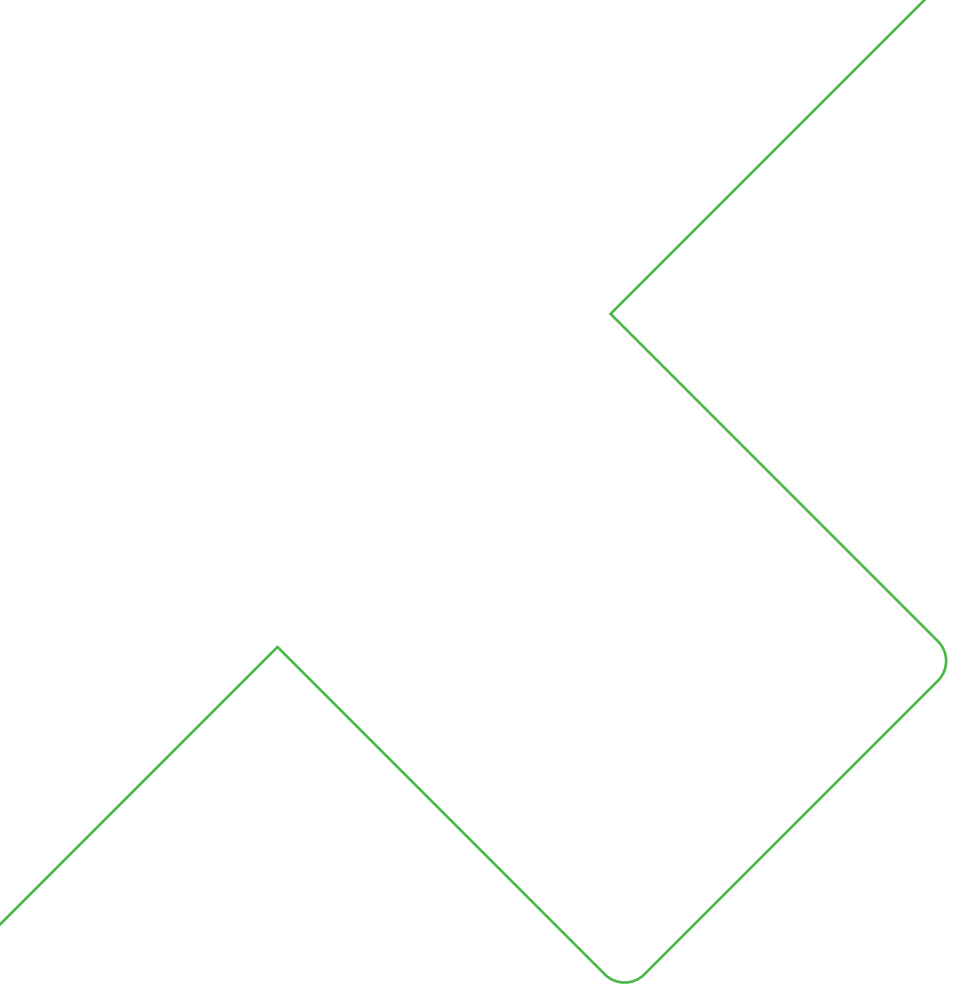
1. Heat the sensor from room temperature to 125 °C
2. Store them at 125 °C \pm 5 °C for at least 6 hours.
3. Allow the sensor to cool down to room conditions.
4. Moistening:
 - a. Store sensor at 23 °C and 90 %RH between 4 and 6 hours
 - b. Take 2 measurements at 23 °C and relative humidity between 15 %RH and 95 %RH
5. Perform your characteristic curve measurement.

4.6.5 Sensing Element Adhesiveness

After the sensing element has been mounted on the circuit board, the solder joints of the humidity sensing element are no longer visible and the adhesion cannot be assessed visually. Therefore, a destructive tear-off test on dummy parts is recommended. The tear-off force must be at least 10 N (HC103M2) / 5 N (HMC03M) to guarantee quality adhesion.

4.6.6 Subsequent Handling

A humidity sensing element should no longer be used after it is unsoldered from the circuit board. When soldering a new sensing element to the circuit board, the same handling guidelines as described must be followed. Generally, the solder from the previous soldering should be removed as best as possible and as little soldering paste as possible should be applied.



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