# SF1 Filter Cap

## Filter Cap for Humidity & Temperature Sensors SHT1x

_ Protection against dust and other contaminants
_ Water proof, IP67 protection class
_ Easy mounting of sensor into housing

## SF1 Filter Cap Product Summary

The SF1 Filter Cap provides IP67 protection against water, dust and other contaminants for the humidity and temperature sensors SHT11 and SHT15. It is a low cost part and very easy to use. The Filter Cap consists of a single piece of polypropylene including a filter membrane. It fits the outer dimensions of the SHT1x sensors and allows for compact system design. It also serves as an adaptor for mounting the sensor directly into the wall of a housing. Using a sealing ring, this results in a waterproof mounting solution.

## Applications

- HVAC
- Automotive
- Test & Measurement
- Data Logging
- Automation
- White Goods
- Medical

## Ordering Information

| | Part Number |
|---|---|
| Filter Cap | 1-100188-01 |

## 1 Filter Cap Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Body material | | | Polypropylene (PP) | | |
| Filter material | | | PTFE with polyester scrim (PP) | | |
| Temperature Range | | -40 | | 100 | °C |
| Mullen Hydrostatic (water resistance pressure) | | | 70 | | kPa |
| | | | 7 | | meter water column |
| Response Time RH | 1/e (63%) slowly moving air[1] | | 30 | | s |
| Oleophobicity Rating[2] | | | 6 | | (Scale from 0-10) |
| Filtration Efficiency[3] | 0.1 µm particles @ 0.05 m/s air velocity | | 99.99 | | % |
| Filter pore size | | | 1.5 | | micron |
| Protection class[4] | | | IP67 | | |

Table 1 Filter Cap Specifications

[1] Slowly moving air: 0.03m/s
[2] Repellence of oil and hydrocarbons according to AATCC (American Association of Textile Chemists and Colorists) standard. Rating 6 means n-decane is repelled.
[3] Percentage of particles with size 0.1µm filtered at given air flow
[4] IP67 requires to be "dust tight" and "protected against the effects of temporary immersion".

# 2 Application Information

Using the Filter Cap, a separation can be made between the environment, in which relative humidity is to be measured and the readout electronics. Such a separation is needed mainly in areas with a lot of dust particles in the air: in HVAC applications, where large volumes of airflow are passing the sensor, or in appliances (e.g. lints in garment dryers) or in agricultural environments, where dust and dirt are present. Furthermore, consistent and reliable humidity measurements are enabled by protection against water immersion.
Another important issue addressed by the Filter Cap is how to mount the sensor in a housing. It provides a simple, easy-to-apply possibility to mount the sensor in e.g. HVAC transmitters, data loggers, air ducts etc. The filter membrane allows for waterproof mounting up to 7 m water column when the sealing ring is used in addition.

# 3 Mounting Information

There are three possibilities to mount the through hole Filter Cap:

- Fixed between PCB and housing wall by small pressure
- Glued to the PCB and/or housing wall
- The two pins of the Filter Cap are heated up to at least 160°C with a heating tool to melt and form a robust fastening.

## 3.1 Mounting against housing wall

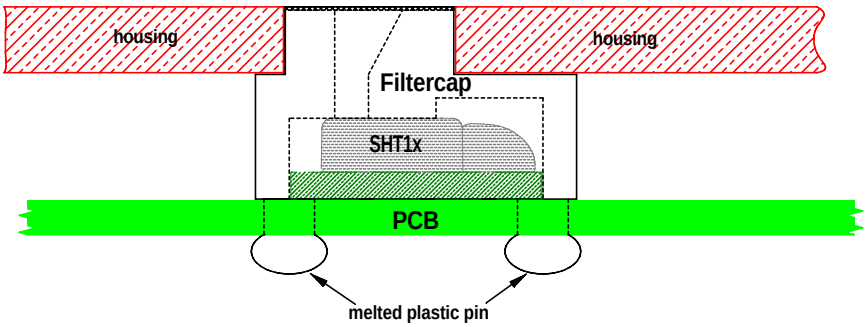


Figure 1 The PCB with the Filter Cap is pressed against the housing wall and the plastic pins are melted.

## 3.2 Waterproof mounting

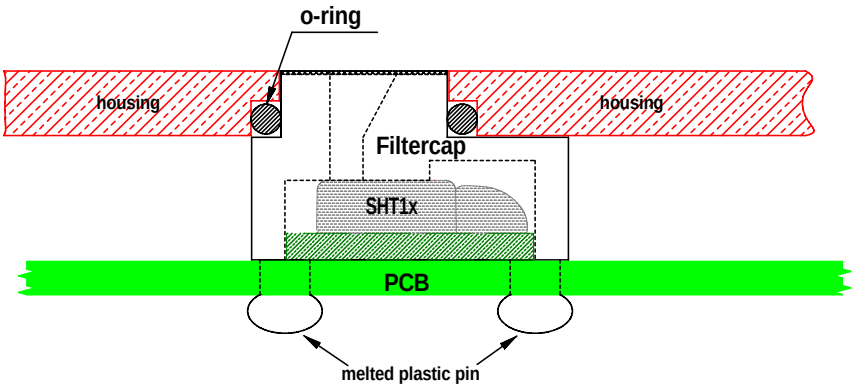


Figure 2 Waterproof mounting by using an O-ring for sealing

The o-ring, which is not provided by Sensirion, should meet the following specifications:

- Inner diameter: 6 mm (0.236 inch)
- Cross section: 1 mm (0.04 inch)
- Material: NBR

This o-ring can be sourced worldwide at Busak + Shamban: http://www.busakshamban.com, Part. No. OR1000600

Note: To absolutely avoid leakage of high humidity or condensation into the housing and to avoid corrosion of the soldering pads of the sensor, it is necessary to put glue between the Filter Cap and the sensor. This can be done by applying glue on the FR4 substrate of the sensor around the black cap before mounting the Filter Cap.
Sensirion recommends the following two glue types:
- Epoxy EE8016F-EB0363 from Loctite: http://content.loctite-europe.com/tds/EE8016F-EB0363.pdf
- SMA10SL from Electrolube: http://www.electrolube.co.uk/docs/tds/SMA.pdf

# 4 Dimensions, footprint and delivery

## 4.1 Dimensions

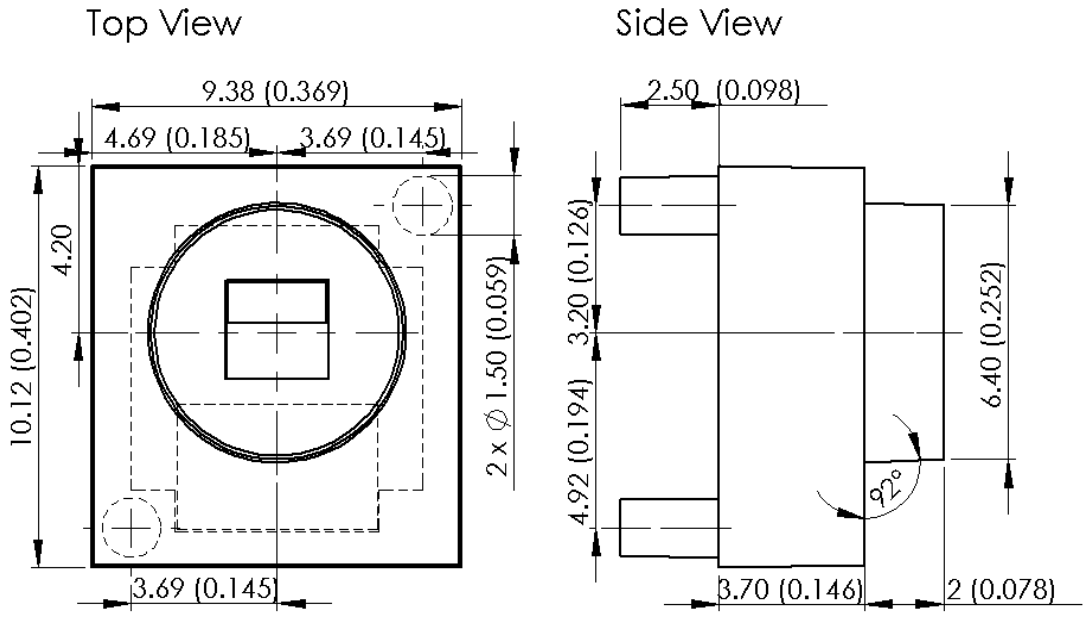


Figure 3 Dimensions of the Filter Cap in mm (inch), tolerances: +/- 0.03 mm

## 4.2 Footprint

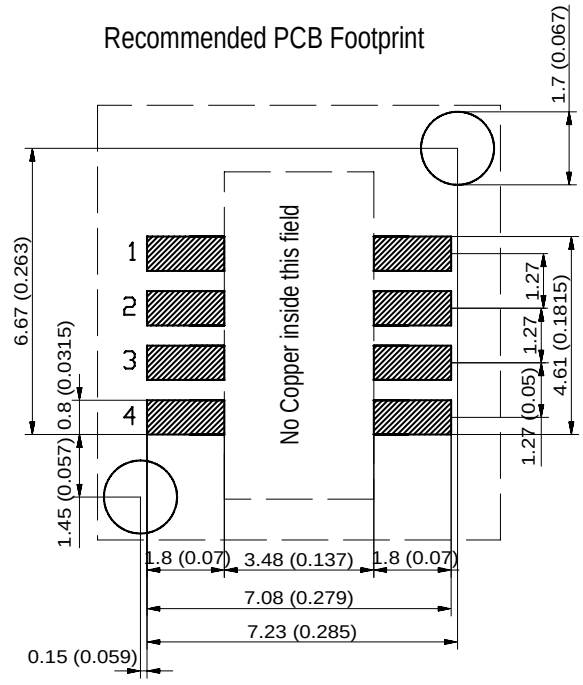


Figure 4 Footprint dimensions are in mm (inch)

### 4.3 Delivery Condition

Package containing 4 packs, each holding 100 pcs.

## 5 Revision history

| Date | Version | Page(s) | Changes |
|---|---|---|---|
| September 2003 | Preliminary | 1-5 | First release |
| March 2004 | 1.01 | 1-5 | Reworked release, preliminary |
| November 2004 | 1.04 | 3 | Added glue type for sealing and corrosion protection |
| February 2005 | 1.05 | 2 | Changed specification for o-ring, added sourcing information for o-ring |
| May 25, 2005 | 1.06 | | Changed company address |
| October 2, 2006 | 1.1 | | Sensirion Inc. address added, disclaimer modified |

The latest version of this document and all application notes can be found at:
http://www.sensirion.com/humidity

## 6 Important Notices

### 6.1 Warning, personal injury

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.
If the Buyer shall purchase or use SENSIRION products for any unintended or unauthorized application, Buyer shall defend, indemnify and hold harmless SENSIRION and its officers, employees, subsidiaries, affiliates and distributors against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if SENSIRION shall be allegedly negligent with respect to the design or the manufacture of the product.

### 6.2 ESD Precautions

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product.
See application note “ESD, Latchup and EMC” for more information.

### 6.3 Warranty

SENSIRION warrants solely to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product shall be of the quality, material and workmanship defined in SENSIRION’s published specifications of the product. Within such period, if proven to be defective, SENSIRION shall repair and/or replace this product, in SENSIRION’s discretion, free of charge to the Buyer, provided that:

- notice in writing describing the defects shall be given to SENSIRION within fourteen (14) days after their appearance;
- such defects shall be found, to SENSIRION’s reasonable satisfaction, to have arisen from SENSIRION’s faulty design, material, or workmanship;
- the defective product shall be returned to SENSIRION’s factory at the Buyer’s expense; and
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

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Sensirion humidity sensors and filter caps are available from:

find your local representative at:
www.sensirion.com/reps