Datasheet Filter Cap SF2
For Humidity and Temperature Sensor SHT2x

- Protection against dust and particles
- Protection against water immersion
- Designed to match on SHT2x DFN type sensors
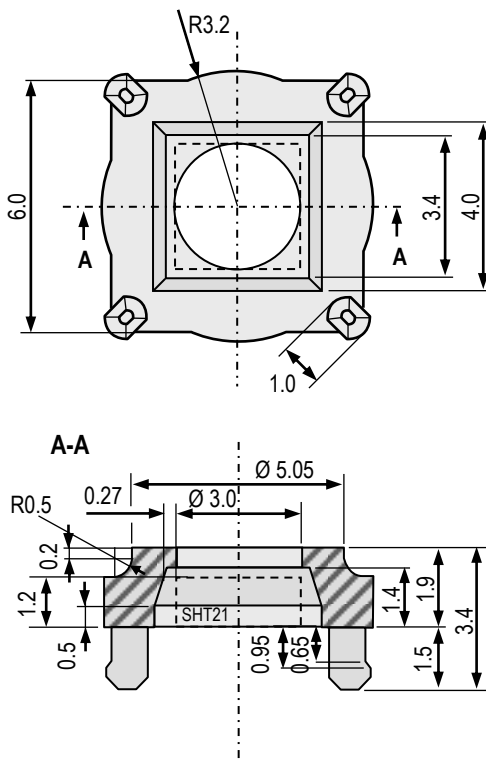- Optimized for response time of sensor

Product Summary

The filter cap SF2 protects SHT2x humidity and temperature sensors against dust, water immersion as well as against contamination by particles. The cavity inside is made such that the volume between membrane and sensor is kept minimal and hence the impact on response time for humidity measurements is reduced to a minimum. The filter cap SF2 is available in black color with a black filter membrane.

The filter cap SF2 is made of a single piece of Polybutylene Terephthalate (PBT) with a filter membrane welded on it. The SF2 filter cap is designed to be mounted after soldering by clipping the four pins into openings in the PCB. Together with the sensor it provides a compact entity which may serve as an adaptor to the device housing. Adding adhesive for seal to PCB and using an o-ring it serves for a waterproof mounting solution.

Dimensions

Figure 1: Drawing of the filter cap SF2 (body only). Dimensions are given in mm (1mm = 0.039inch), tolerances are ±0.1mm. Add 0.15 to total height due to the filter membrane. The cavity inside the cap fits to SHT2x sensors. Additional space for solder joints are left open around the sensor.

Technical Specifications

Parameter	Value
Operating Range	-40 … 125°C
IP[1]	IP67
RoHS	Compliant
Body material	Polybutylene Terephthalate (PBT)
Body Color	Black
UL94 (Body material only)	UL94 V-0 (0.73mm)
Filter material	PTFE with polyester scrim
Filter Color	Black
Filter Thickness	0.13 mm
Filter pore size	1.5 µm
Filtration efficiency [2]	99.99%
Oleophobic Rating (Filter)[3]	8
Mullen Hydrostatic	>100mbar (>1m water)

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[1] IP67: dust tight, protected against harmful water immersion up to 1m water column. (http://en.wikipedia.org/wiki/IP67) .
To achieve IP67 at the connections between the housing or the PCB and the SF2 is up to the customer.

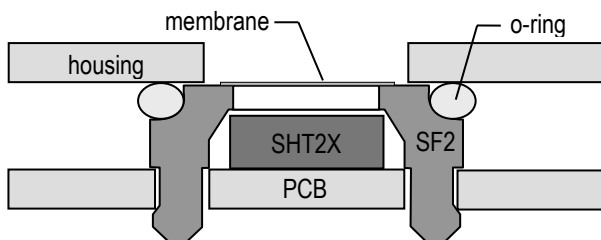[2] 0.1µm particles at 0.05m/s air flow.

[3] Repellence of oil and hydrocarbons according to AATCC 118-1992 standard. Rating goes from 0 – 8 while 8 is most repellent.

User's Guide Filter Cap SF2
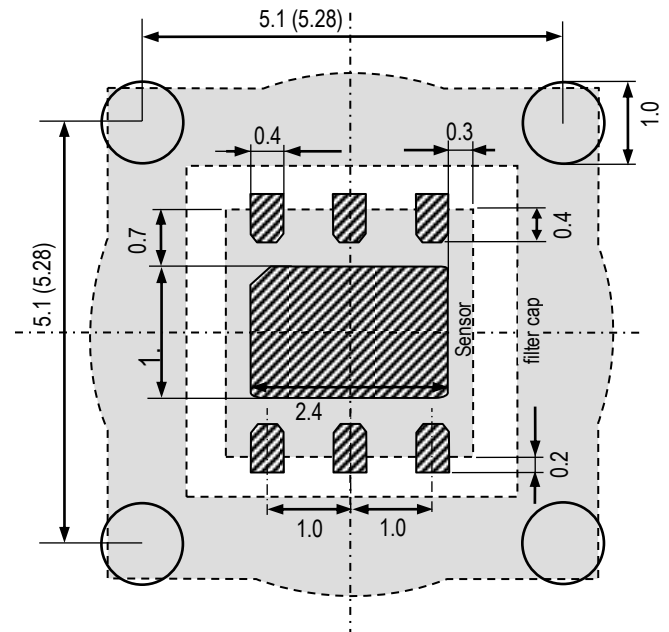
Mounting Instruction

The filter cap SF2 is mounted to the PCB after soldering the SHT2x sensor by clipping the four pins into the openings in the PCB. The filter cap may be fixed by adhesive or by the force of the pins itself – compare Figure 2. By choosing different distances between the openings the SF2 either clips itself on the PCB by mechanical force or the pins can be used for positioning only – compare Figure 3. The recommended PCB thickness for mounting with clips is ≥ 0.8mm. Please note that when mounting the filter cap with clips, a hermetic seal between filter cap and PCB cannot be guaranteed. This should be considered for applications in which the filter cap is used to seal the volume around the sensor against surrounding volume which is enclosed by a housing (compare Figure 2). In addition, the membrane or any part of the SF2 must be protected from external forces or contact, so that no mechanical stress is put on the SF2, which could result in shifting or breaking. This could be realized in a design as in Figure 2, where the membrane is protected behind the housing, i.e. no part of the SF2 is exposed or sticks out of the housing. For further information on handling and assembly of SF2 filter caps please refer to the application Note "Handling and Assembly of SF2 Filter Cap".

Figure 2: Side view of SF2 filter cap mounted between PCB and housing wall. The volume below membrane is kept minimal and the is separated from surrounding volume enclosed by housing.

Measures for higher protection

For hermetic seal, adhesive must be added between filter cap and PCB. Such seal provides higher security against water leakage, condensation inside the housing, and corrosion of the soldering pads of the sensor. If corrosion of the solder contacts is a potential problem, it is recommended to cover the solder joints with adhesive as well. For further information on application of adhesives with SF2 filter caps, please refer to the application Note "Handling and Assembly of SF2 Filter Cap".

Figure 3: PCB layout of SHT2x and filter cap SF2. Dimensions are given in mm (1mm = 0.039 inch). The distance of the openings is 5.1mm ±0.05mm if the sensor should clip on the PCB and 5.28mm if the pins are used for adjustment only. By varying the openings distance about ±0.05mm the clipping force may be adjusted.

Mounting against housing wall

The filter cap SF2 not only protects against dust and water immersion, it also helps to mount the sensor to the housing wall. If mounted to a housing wall towards the outside, the sensor is perfectly exposed to the environment of which humidity and temperature shall be measured.

In order to protect the inside of the device housing against water immersion it is recommended to place an o-ring between filter cap and housing wall – compare Figure 2.

For such o-rings Sensirion recommends the following specifications:

- Inner diameter: 5mm
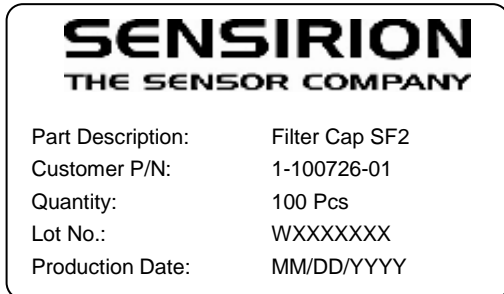- Cross section: 1mm
- Material: NBR

Important: Please ensure that the air path to the measured volume is not blocked by another membrane. This may increase response time of the sensor dramatically.

Labeling of the shipment

Each shipment is labeled with product and tracking information – compare Figure 4.

SENSIRION THE SENSOR COMPANY	
Part Description:	Filter Cap SF2
Customer P/N:	1-100726-01
Quantity:	100 Pcs
Lot No.:	WXXXXXXX
Production Date:	MM/DD/YYYY

Figure 4: Label on shipment packaging: Customer P/N refers to the Sensirion product number, Lot No. refers to suppliers tracking information. Production Date is given as MM = month, DD = day, YYYY = year.

Shipping Package

The SF2 are provided in trays of 100 pieces per tray.

Revision History

Date	Version	Page(s)	Changes
August 2010	1.0	1 – 3	Changed front picture, completed technical spec. and labeling (DBO)
December 2011	2	2	More detailed information to mounting of filter cap, reference to application note.
September 2020	3	2, 5	Modified mounting instructions to ensure protection from mechanical stress. Updated important notices.

Important Notices

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.

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.

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.

This warranty does not apply to any equipment which has not been installed and used within the specifications recommended by SENSIRION for the intended and proper use of the equipment. EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH HEREIN, SENSIRION MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE PRODUCT. ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED AND DECLINED.

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SENSIRION does not assume any liability arising out of any application or use of any product or circuit and specifically disclaims any and all liability, including without limitation consequential or incidental damages. All operating parameters, including without limitation recommended parameters, must be validated for each customer's applications by customer's technical experts. Recommended parameters can and do vary in different applications.

SENSIRION reserves the right, without further notice, (i) to change the product specifications and/or the information in this document and (ii) to improve reliability, functions and design of this product.

Headquarters and Subsidiaries

Sensirion AG
Laubisruetistr. 50
CH-8712 Staefa ZH
Switzerland

phone: +41 44 306 40 00
fax: +41 44 306 40 30
info@sensirion.com
www.sensirion.com

Sensirion Taiwan Co. Ltd
phone: +886 3 5506701
info@sensirion.com
www.sensirion.com

Sensirion Inc., USA
phone: +1 312 690 5858
info-us@sensirion.com
www.sensirion.com

Sensirion Japan Co. Ltd.
phone: +81 3 3444 4940
info-jp@sensirion.com
www.sensirion.com/jp

Sensirion Korea Co. Ltd.
phone: +82 31 337 7700~3
info-kr@sensirion.com
www.sensirion.com/kr

Sensirion China Co. Ltd.
phone: +86 755 8252 1501
info-cn@sensirion.com
www.sensirion.com/cn

To find your local representative, please visit www.sensirion.com/distributors