# 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
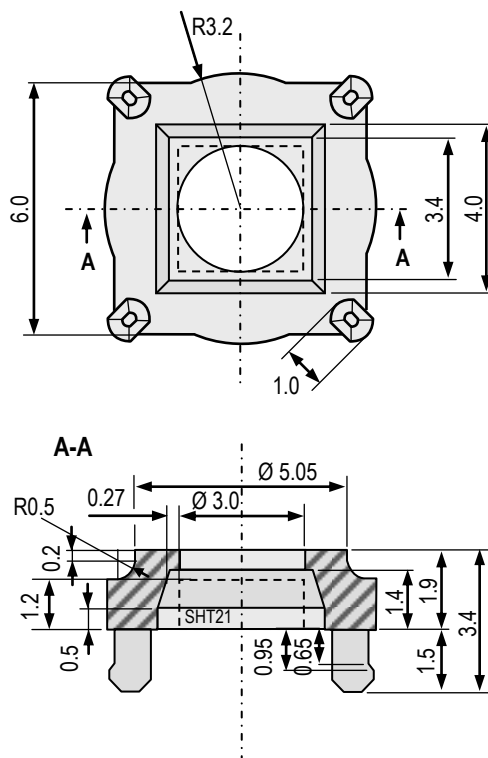- Optimized for response time of sensor

### 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) .
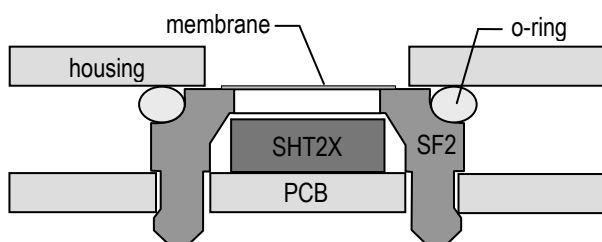To achieve IP67 at the connections between the housing or the PCB and the SF2 is up to the customer.

[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.

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# User's Guide Filter Cap SF2
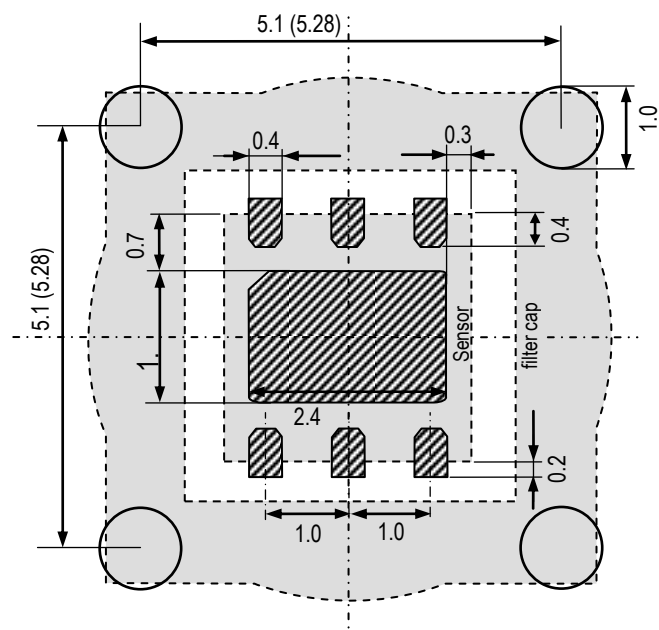
## Mounting Instruction

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). 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.
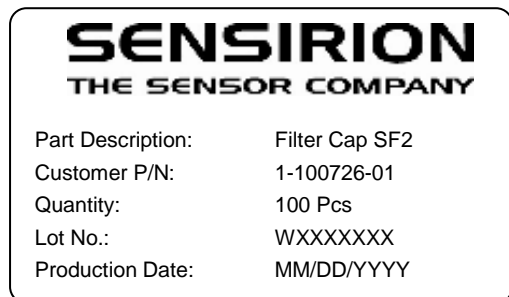
For such o-rings Sensirion recommends the following specifications:

- 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.

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## 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. |

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# 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.

### 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 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

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面向物联传感应用，公司长期致力于室内环境空气品质及有害气体监控产品的技术开发，并提供相关配套的传感器、IC、模块、设备以及行业应用方案支持，技术应用涉及温湿度传感、压力传感、气体传感、加速度传感等监测领域，产品涵盖 Freescale、TI、Sharp、GE(Amphenol)安费诺、Silicon Labs、PLX、Micron、Sensirion、SenseAir、ST、City、Honeywell、Measurement(Humirel)精量等国际知名品牌，服务客户遍及石油化工、电力电子、汽车智能、空气净化、楼宇暖通、医药监测、食品安全、现代农业等众多终端。

| 产品及子类 | | 重点品牌及代表性物料型号 |
|---|---|---|
| 环 境 传 感 器 | 温湿度传感器 | Sensirion/Silicon Labs/MEAS/ST/TI 等公司的 SHT1X/2X/7X 温湿一体系列,SI7020/21 系列,HTU20/21D,HTS221、HDC1000/1008 系列， HYT221/271/939，铂电阻/NTC 热电阻/湿敏电阻等 |
| | PM2.5 粉尘颗粒物传感器 | SHARP 公司的 GP2Y1010AU0F/GP2Y1050AU0F/GP2Y1051AU0F 及 GE 公司 SM-PWM-01A 等模块 |
| | CO2 二氧化碳传感器 | GE 公司 T6613\T6615 二氧化碳模块、SenseAir 公司 K30/S8 模块、ELT 公司 B530 系列等模块 |
| | 多参数环境传感器模块 | MSM-1401/1403/1405/1408/1411/1413/1415/1418 等集合温湿度、粉尘颗粒物、二氧化碳和 VOC 空气质量传感器的含 RS232/485/WIFI 接口的多参数环境传感器模块 |
| | 差压传感器 | Sensirion /FSL 公司的 SDP600/1000/2000/1108/2108 系列, MPL 系列 MEMS 压力传感器系列 |
| | 电化学毒气传感器 | 美国高顿公司的 CO2 传感器、CO 气体传感器、H2S 传感器、H2S 气体传感器、O2 传感器、氨气传感器、氯气传感器、毒气传感器、有毒气体传感器、电化学气体传感器、电化学传感器等 |
| 半 导 体 元 器 件 | CPU/MCU/ARM/DSP 微处理器 | KINETIS 微控制器(MK60DN512)，MSP430 系列，C8051 系列，LPC 系列，STC 系列，PIC 系列 |
| | | Freescale 公司的 IMX 处理器（MCIMX536），STM32 系列，LPC2000/3000 系列嵌入式处理器 |
| | 数据转换器 ADC | TI/ADI 公司数据转换器全系列产品，典型的如 AFE5805ZCF、AD600 等 |
| | 存储器 SDRAM | 镁光/HYNIX 公司的 MT29F256/128/64 系列，H5DU 系列，FIFO 系列 |
| | PCI-E 接口 | PCI9054\PEX8112\8619\8632\8648, TL16C550/552/554/S5920/S5933 系列 |
| | 无线连接 | TI 公司 CC3000\CC2530F256\CC2591\CC2540\CC1101 系列 WIFI 及 ZIGBEE 无线技术 |
| | | SIMCOM 公司的 SIM900B\900A\900D\900S 等 GSM/GPRS 通讯模块 |
| | 以太网口 | MARVELL 公司 88E 系列 PHY(以太网)收发器，88W 系列无线连接 |
| | | DM9000\DM9161 系列、CS8900 系列、RTL8019\8139\8201 系列、LXT970/971 等 PHY 收发器 |
| | USB 并口 | CY7C63001/68013/SL811, USBN9603/9604 及 PDIUSBD12 系列 USB 接口器件 |
| | RS232/485 | RS232/422/485 系列接口器件,FT232 等串口产品 |
| | 电源芯片(可编程) | Micrel 全系列电源芯片;DIALOG 公司 DA9053-3HHA1/FHA1 系列可编程电源，与 FSL 的 IMX515/535/536 系列处理器搭配使用 |

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