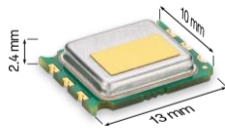


Design-In Guidelines

For SFA40 Formaldehyde Sensors



SFA40 is Sensirion’s miniature formaldehyde sensor designed for easy integration into indoor air quality monitors, air purifiers and air conditioners. The performance specified in the SFA40 datasheet refers to the stand-alone sensors and does not guarantee the performance of the module or the whole device. To achieve optimum performance of the SFA40, several design-in rules need to be considered. This document provides instructions and recommendations for the optimal PCBA and housing designs.

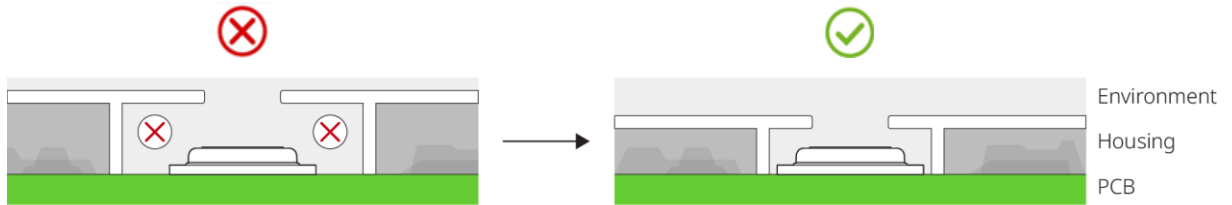
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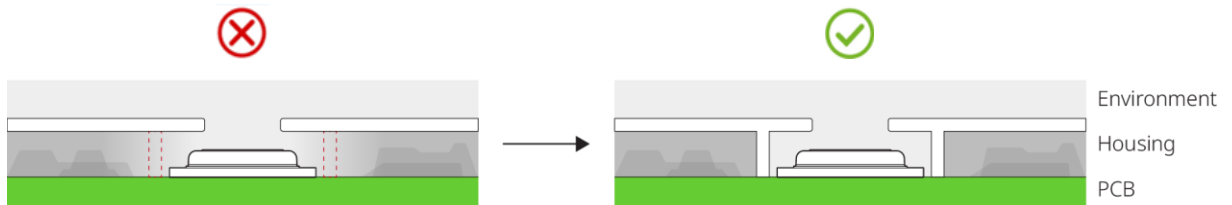
1 Most Important Design-in Instructions

For the optimal design-in, it is recommended to adhere to the following instructions:

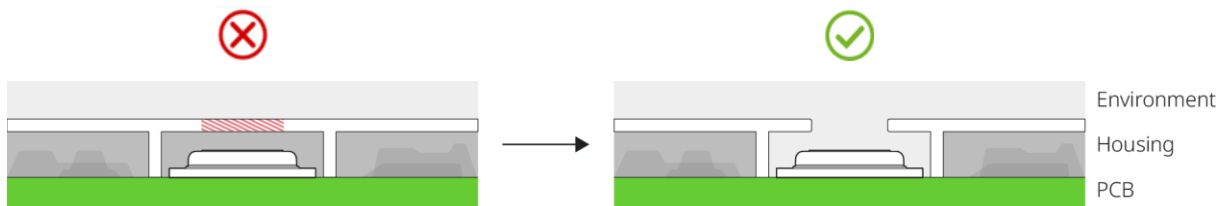
1. **Place the sensor in a location that is representative of the environment of interest and minimize the dead volume.** Dead volume is defined as the volume of air that must be fully exchanged before equilibrium with the target environment is reached.



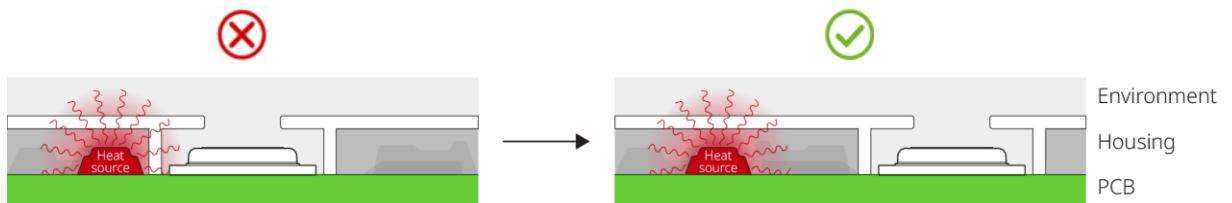
2. **Physically shield the sensor from the surrounding electronic components.** This minimizes the dead volume, improves thermal decoupling and prevents exposure to volatile organic compounds (VOCs) that may outgas from the nearby components.



3. **Design the device with large openings and consider using ambient air flow** for faster exchange of air and therefore better formaldehyde response times. An opening refers to the connection between the environment and the sensor. Recommended air flow range is between 100 and 4'000 ml/min. Ensure that the membrane on top of the metal cap of the SFA40 is unobstructed and exposed to the ambient environment.



4. **Ensure sufficient distance between the heat sources or sinks and the sensor.** Common heat sources include power electronics, microprocessors, resistors and displays. Avoid air flow that originates from heated surfaces.



5. **Condensation at the sensor location must be avoided.** SFA40 is not designed to operate in condensing environments.

6. **Avoid direct exposure to sunlight**, as it may lead to high local temperature and strong outgassing of VOCs, which may not be representative of the ambient environment.
7. **Avoid confined environments with materials that strongly outgas VOCs in proximity to the sensor.** Common examples include adhesives, plastics and foams. Beware that some polymers, such as polyoxymethylene (POM), outgas formaldehyde, which may lead to high local formaldehyde concentrations.
8. **To prevent mechanical and electrostatic discharge (ESD) damage, protect the sensor from direct mechanical access.** This can be achieved by, for example, covering the sensor with a wide-meshed structure.

2 Electrical and Communication Considerations

For the electrical integration requirements, please carefully read **Section 2** of the SFA40 datasheet, available on the Sensirion website.

1. **Ensure that all devices on the I2C bus are appropriately grounded.** Signal integrity can be enhanced by using high-quality cables and connectors, keeping the traces short and avoiding sharp bends.
2. **I2C cables should be kept as short as possible.** Long cable lengths can lead to signal degradation and may require signal buffering or repeaters. If long cable lengths cannot be avoided, consider using I2C bus extenders or I2C isolators to maintain signal integrity and protect against noise.
3. **Ensure that the controller (master) device can handle clock stretching to avoid data corruption.** Some I2C devices may need additional time to process data, resulting in clock stretching.

3 Revision History

Date	Version	Pages	Changes
June 2026	1.0	all	Initial release

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 (including death). 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 purchases or uses 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 is 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 solely warrants to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product is 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 as sole and exclusive remedy, in SENSIRION's discretion, repair this product or send a replacement product, 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 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.

The Buyer shall at its own expense arrange for any dismantling and reassembly that is necessary to repair or replace the defective product. This warranty does not apply to any product which has not been installed or used within the specifications recommended by SENSIRION. 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 indirect, consequential, and incidental damages, and loss of profit. No obligation or liability shall arise or grow out of SENSIRION's rendering of technical advice, consulting, or implementation instructions or guidelines. All operating parameters, including without limitation recommended parameters, must be validated for each Buyer's applications by Buyer'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.

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