SENSIRION STS3x Temperature Sensors

Contents [hide]

Handling Instructions

For STSxx Temperature Sensors

Sens Irion's temperature sensors STSxx (where xx serves as placeholder) offer best in class performance in a broad range of applications. To ensure optimal performance, it is important to follow certain guidelines during storage, assembly, and packaging. This document should be reviewed during the design-in phase and before production release. Therefore, proper handling to mitigate any risks and correct material selection is crucial to ensure highest performance.

Key Instructions

- Protection against ESD is mandatory.
- Do not apply board wash that could damage the sensors' packaging.
- Store the sensors under the recommended conditions.
- Follow the assembly guidelines.

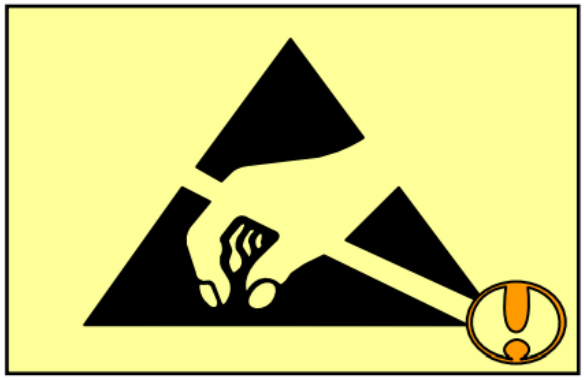
This document is applicable to all Sensirion STS3x and STS4x temperature sensors.

General

ESD

To ensure proper functioning of the sensor, it must be always protected from Electrostatic Discharge (ESD).
Handling of the sensor should take place exclusively in Electrostatic Discharge Protected Areas (EPAs) that have been properly set up to minimize the risk of ESD. This includes grounding personnel with wrist-straps or similar measures, grounding all conductive objects and excluding insulating materials from the EPA. Additionally, all operations should be conducted on a grounded conductive floor. To further protect the sensor, it should be packaged using ESD protective materials when not being handled within an EPA.

Instruction 1. Protection against ESD is mandatory.

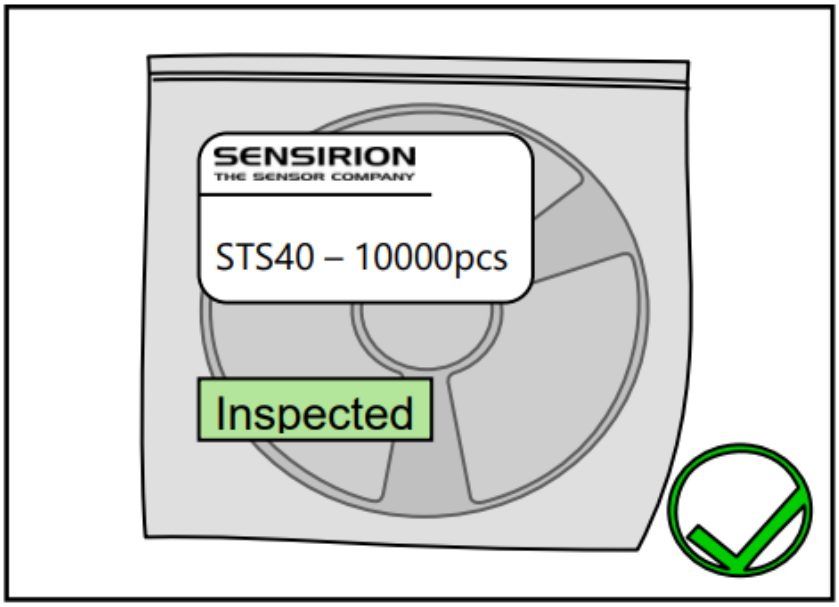


Storage

To ensure optimal performance of the sensors, we recommend storing them in the original sealed ESD bag prior to assembly. The ideal storage conditions for the sensors are as follows:

- **Temperature:** 10 °C-50 °C (0…125 °C for a limited time)
- **Humidity:** 20-60 %RH (sensors that are not stored in ESD bags).

These guidelines ensure that the sensors are in optimal condition for assembly and use.



Instruction 2. Store sensors in original, unopened ESD bag. Place additional stickers only on the outside of the ESD bag.

To ensure longevity and accuracy of the sensors, it is recommended to store them in metal-in antistatic shielded ESD bags once they have been removed from their original

packaging. This will help protect the sensors from electrostatic discharge and other external influences.1 The ESD bags listed in Table 1 are recommended for this purpose, although other alternatives can be considered.

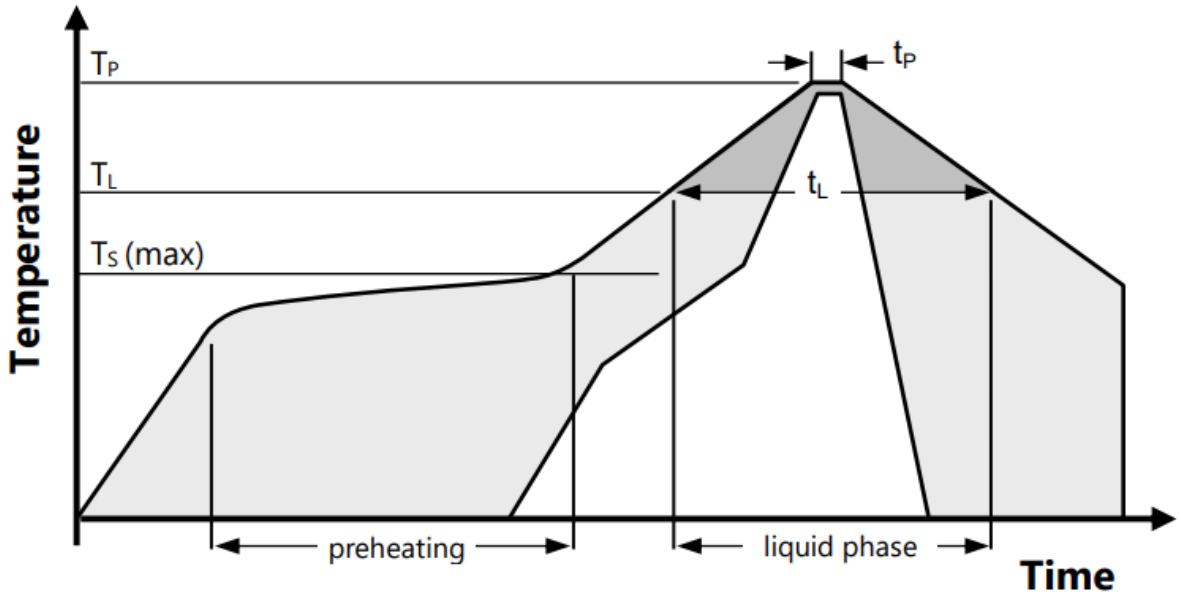
Manufacturer	**Product**
Strobel	Top shield Bags

Table 1. ESD Bag compatibility, the validity of these recommendations might change without prior notification if the manufacturer changes the formulation of the product.

1 This recommendation also applies to devices with assembled sensors.

Assembly

For soldering, standard reflow soldering ovens may be used. The sensors are designed to withstand soldering profile according to IPC/JEDEC J-STD-020 with peak temperatures at 260°C during up to 30sec for Pb-free assembly in IR/Convection reflow ovens (**see Figure 1**).



Make sure that maximum temperatures and exposure times are respected. In case the PCB passes through multiple solder cycles (as is the case for e.g. PCBs that are assembled on top and bottom side), it is recommended to assemble the STSxx only in the last solder cycle.

The use of “no clean” type ≥3 solder paste2 is recommended, yet not mandatory. An appropriate amount of solder paste shall be used, to result in a stand-off height (clearance between the package body and any part of the substrate) of 50µm to 75µm. Please consult the appropriate sensor data sheet for device specific information on the metal land pattern and recommendations on solder paste printing stencils.

Standard pick & place equipment and vacuum nozzles for standard QFN packages may be used for assembly STSxx sensors. Manual soldering is not recommended. For rework in the soldering, contact time must be limited to 5 seconds up to 350°C.

It is important to note that the diced edge or side faces of the I/O pads may oxidase over time, therefore a solder fillet may or may not form. Hence there is no guarantee for solder joint fillet heights of any kind. Sensors in SMT packages are classified as Moisture Sensitivity Level 1 (IPC/JEDEC J-STD-020). It is recommended to process the sensors within 1 year after date of delivery.

Before developing the assembly process, please read the User’s Guide and the Datasheets carefully. In the following, crucial items are underlined plus additional items are given.

- The maximum mechanical force to be applied to the sensor during assembly or usage may not exceed 20 N/cm2.
- For application in corrosive environment – such as condensed water or corrosive gases – it may be necessary to protect the electronic assembly including the soldered contacts of the sensor with a passivation. Such passivation may be achieved by conformal coating or by applying adhesive.
- Coating thickness and curing times shall be chosen according to respective datasheets and application notes of the manufacturer. Please note that the tack-free state of the coating is no indication of full curing. For full curing refer to application notes of the manufacturer. Ensure process stability for coating thickness and apply corresponding safety margins for curing times.

Figure 1 Soldering profile according to JEDEC standard. TP ≤ 260°C and tP ≤ 30sec above 255°C for Pb-free assembly.
TL < 220°C and tL < 150sec. Ramp-up rate <3°C and ramp-down rate < 6°C/sec for

temperatures > TL.

2 Solder types are based on the solder paste particle size: Type 3 covers the size range of 25 – 45 µm as specified in IPC J-STD-005A.

Application In Extreme Environments

Some applications require exposing temperature sensors to harsh environments. These harsh environments are divided into high temperature and humidity, and chemically aggressive environments. The limits for high and low temperature and humidity exposure are detailed in the datasheet of the respective product. The application of Sensirion temperature sensors in a chemically harsh environment must be carefully tested and qualified. Sensirion qualifies its temperature sensors to work properly in ambient conditions and within the specified ranges for each datasheet.

- Exposure to harsh environments requires careful testing and qualification.
- Exposure to acids, bases or etching substances in high concentrations can lead to corrosion of exposed materials and be critical to the sensor. Most substances at very low concentrations are innocuous to the sensor itself. However, they may attack the solder contacts. Therefore, the contacts must be well protected (passivated).
- Sensors can be exposed to high temperatures with high humidities, when this is the case, please stay within the limits indicated in the datasheet.

Disclaimer

The above-mentioned restrictions, recommendations, materials, etc. do not cover all possible cases and items.
The material recommendations have been compiled with our best knowledge at the time of writing. This document is not to be considered complete and is subject to change without prior notice.

Revision History

Date	Revision	Pages	Changes

June 2025	1	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, Latch up 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.
SENSIRION is only liable for defects of this product arising under the conditions of operation provided for in the data sheet and proper use of the goods. SENSIRION explicitly disclaims all warranties, express or implied, if the goods are operated or stored not in accordance with the technical specifications.
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.

Headquarters And Subsidiaries

Sensirion AG Laubisruetistr. 50 CH-8712 Staffa ZH Switzerland

phone: +41 44 306 40 00

fax: +41 44 306 40 30

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 45 270 4506

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

Sensirion Taiwan Co. Ltd

phone: +886 2 2218-6779

info@sensirion.com

www.sensirion.com

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

www.sensirion.com

Documents / Resources

	SENSIRION STS3x Temperature Sensors [pdf] User Guide STS3x, STS4x, STS3x Temperature Sensors, STS3x, Temperature Sensors, Sensors

References

- User Manual

SENSIRION

SENSIRION, Sensors, STS3x, STS3x Temperature Sensors, STS4x, Temperature Sensors

Leave a comment

Your email address will not be published. Required fields are marked *

Comment *

Name

Email

Website

Save my name, email, and website in this browser for the next time I comment.

Post Comment

Search:

e.g. whirlpool wrf535swhz

Search