
Recommendations for assembling dToF sensors without liners in an environmentally clean place

Introduction

STMicroelectronics customers regularly use their supply chain to assemble sensors on a small PCB (printed circuit board) or FPC (flexible printed circuit). However, some precautions need to be followed regarding dust, especially when sensors without liners are being assembled. This short technical note provides recommendations for assembling dToF (direct Time-of-Flight) sensors without liners in an environmentally clean place.

1 Recommendations

Follow the recommendations below when assembling dToF sensors without liners to achieve environmental cleanliness. Note that environmental cleanliness is a customer decision.

1. Mount the STMicroelectronics sensor in a class 1000 environment. This is especially important when dealing with sensors without liners.
2. When dealing with any PCB or FPC on which a ToF sensor is attached, perform some dry cleaning. In particular, take special care to avoid particle deposition in the critical optical areas. Note that **current designs are not suitable for wet cleaning or coating.**

3. Respect the dust size specifications below. Note that they are sensor-dependent.
 - a. **VL53L0, VL53L3, and VL53L4:** The foreign material (FM) acceptance criteria of both the emitter and receiver is $7850 \mu\text{m}^2$. Inspect the optical element glass (red areas) in Figure 1. VL53L0 and Figure 2. VL53L3 and VL53L4.

Figure 1. VL53L0

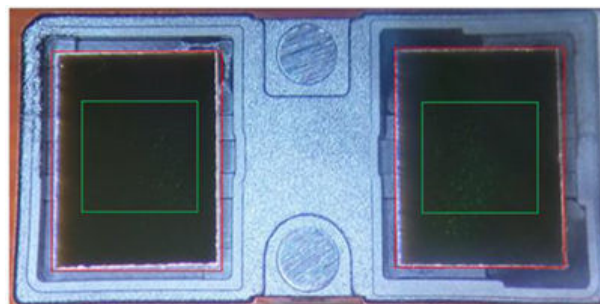


Figure 2. VL53L3 and VL53L4



- b. **VL53L1:** Inspect the optical element glass (red areas) in Figure 3. VL53L1. Within this area, the ROI is the green area, and the nonROI is the area between the green and the red areas.
 - i. The acceptance criteria of the ROI for both the emitter and receiver is $20000 \mu\text{m}^2$.
 - ii. The acceptance criteria of the nonROI for both the emitter and receiver is $45000 \mu\text{m}^2$.

Figure 3. VL53L1



- c. **VL53L5, VL53L7, and VL53L8:** Inspect the optical element glass and the “pool” in Figure 4. VL53L5.
 - i. The acceptance criteria of the green area is:
 - $9220 \mu\text{m}^2$ for both the emitter and the receiver of the VL53L5 and VL53L8.
 - $9220 \mu\text{m}^2$ for the VL53L7 transmitter.
 - $6250 \mu\text{m}^2$ for the VL53L7 receiver.
 - ii. The acceptance criteria of the pool is $9220 \mu\text{m}^2$ for the VL53L5, VL53L7, and VL53L8.
 - iii. The acceptance criteria of the cap surface outside the green area and the pool is $50000 \mu\text{m}^2$ for the VL53L5, VL53L7, and VL53L8.

Figure 4. VL53L5



Revision history

Table 1. Document revision history

Date	Version	Changes
08-Jul-2024	1	Initial release

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2024 STMicroelectronics – All rights reserved