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.**

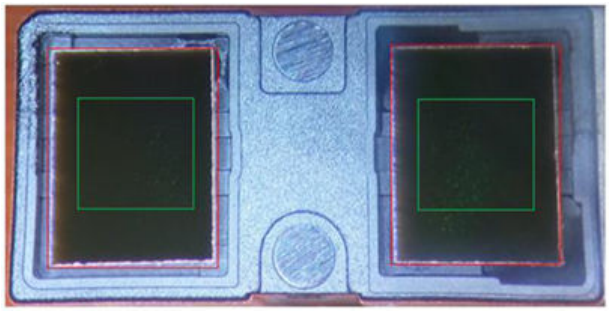
3. Respect the dust size specifications below. Note that they are sensor-dependent.
   a. **VL53L0, VL53L3, and VL53L4:** The foreign material (FM) acceptance criteria of both the emitter and receiver is 7850 um². Inspect the optical element glass (red areas) in Figure 1. VL53L0 and Figure 2. VL53L3 and VL53L4.

Figure 1. VL53L0

Figure 2. VL53L3 and VL53L4

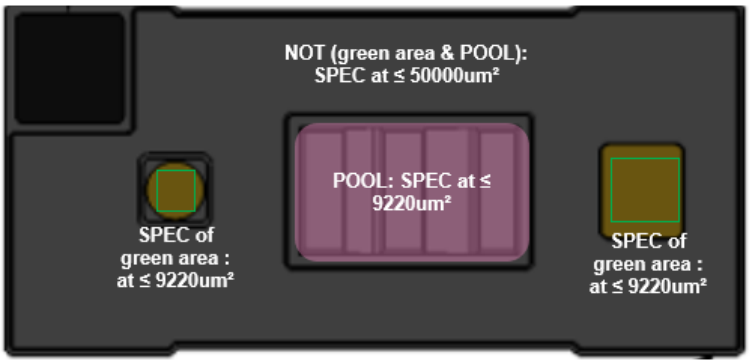
   b. **VL53L1:** Inspect the optical element glass (red areas) in Figure 3. VL53L1. Within this area, the ROI is the green area, and the nonROI is the area between the green and the red areas.
      i. The acceptance criteria of the ROI for both the emitter and receiver is 20000 µm².
      ii. The acceptance criteria of the nonROI for both the emitter and receiver is 45000 µm².

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 µm² for both the emitter and the receiver of the VL53L5 and VL53L8.
         - 9220 µm² for the VL53L7 transmitter.
         - 6250 µm² for the VL53L7 receiver.
      ii. The acceptance criteria of the pool is 9220 µm² for the VL53L5, VL53L7, and VL53L8.
      iii. The acceptance criteria of the cap surface outside the green area and the pool is 50000 µm² 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