VL53L7CX

Data brief

Time-of-Flight 8x8 multizone ranging sensor with 90° FoV



Product status link
VL53L7CX

Features

- Fast and accurate multizone distance ranging sensor with 90° wide FoV
  - 60° x 60° square field of view (FoV) (90° diagonal)
  - Multizone ranging output with either 4x4 or 8x8 separate zones
  - Autonomous Low-power mode with interrupt programmable threshold to wake up the host
  - Up to 350 cm ranging
  - Multitarget detection and distance measurement in each zone
  - 60 Hz frame rate capability
  - Histogram processing and algorithmic compensation minimizes or removes impact of cover glass crosstalk
  - Motion indicator for each zone to show if targets have moved and how they have moved
- Fully integrated miniature module
  - Emitter: 940 nm invisible light vertical cavity surface emitting laser (VCSEL) and integrated analog driver
  - Diffractive optical elements (DOE) on both transmitter and receiver enabling square FoV
  - Receiving array of single photon avalanche diodes (SPADs)
  - Low-power microcontroller running firmware
  - Size: 6.4 x 3.0 x 1.6 mm
- Easy integration
  - Single reflowable component
  - Flexible power supply options, single 3.3 V or 2.8 V operation or combination of either 3.3 V or 2.8 V AVDD with 1.8 V IOVDD
  - Compatible with wide range of cover glass materials
  - Pin-to-pin and driver compatible with VL53L5CX

Applications

- Ultrawide FoV and multizone scanning allows content management (load in trucks, tanks, waste bins)
- Applications requiring ultrawide FoV, like smart speakers, vacuum cleaners (three sensors can cover 180° x 60° FoV)
- Gesture recognition with wide field of detection
- Devices requiring ultrawide FoV for user detection to wake-up devices (smart buildings, smart lighting)
- Keystone correction for video projectors
- Robotics applications (SLAM, wall tracking, small object detection, cliff prediction, floor type recognition)
- Augmented reality/virtual reality (AR/VR) enhancement. Dual camera stereoscopy and 3D depth assistance thanks to multizone distance measurement
- IoT (user and object detection)
- Video focus tracking. 60 Hz ranging allows optimization of continuous focus algorithm

Description

Specially designed for applications requiring an ultrawide FoV, the VL53L7CX Time-of-Flight sensor offers a 90° diagonal FoV. Based on ST's FlightSense technology, the VL53L7CX incorporates an efficient metasurface lens (DOE) placed on the laser emitter enabling the projection of a 60° x 60° square FoV onto the scene.

Its multizone capability provides a matrix of 8x8 zones (64 zones) and can work at fast speeds (60 Hz) up to 350 cm.

Thanks to the autonomous mode with programmable distance threshold combined to the ultrawide FoV, the VL53L7CX is perfect for any application requiring low-power user detection. ST's patented algorithms and innovative module construction allow the VL53L7CX to detect, in each zone, multiple objects within the FoV with depth understanding. ST histogram algorithms ensure cover glass crosstalk immunity beyond 60 cm.

Derived from the VL53L5CX, the pinouts and drivers of both sensors are compatible, which ensures a simple migration from one sensor to the other.

Like all Time-of-Flight (ToF) sensors based on ST's FlightSense technology, the VL53L7CX records, in each zone, an absolute distance regardless of the target color and reflectance.

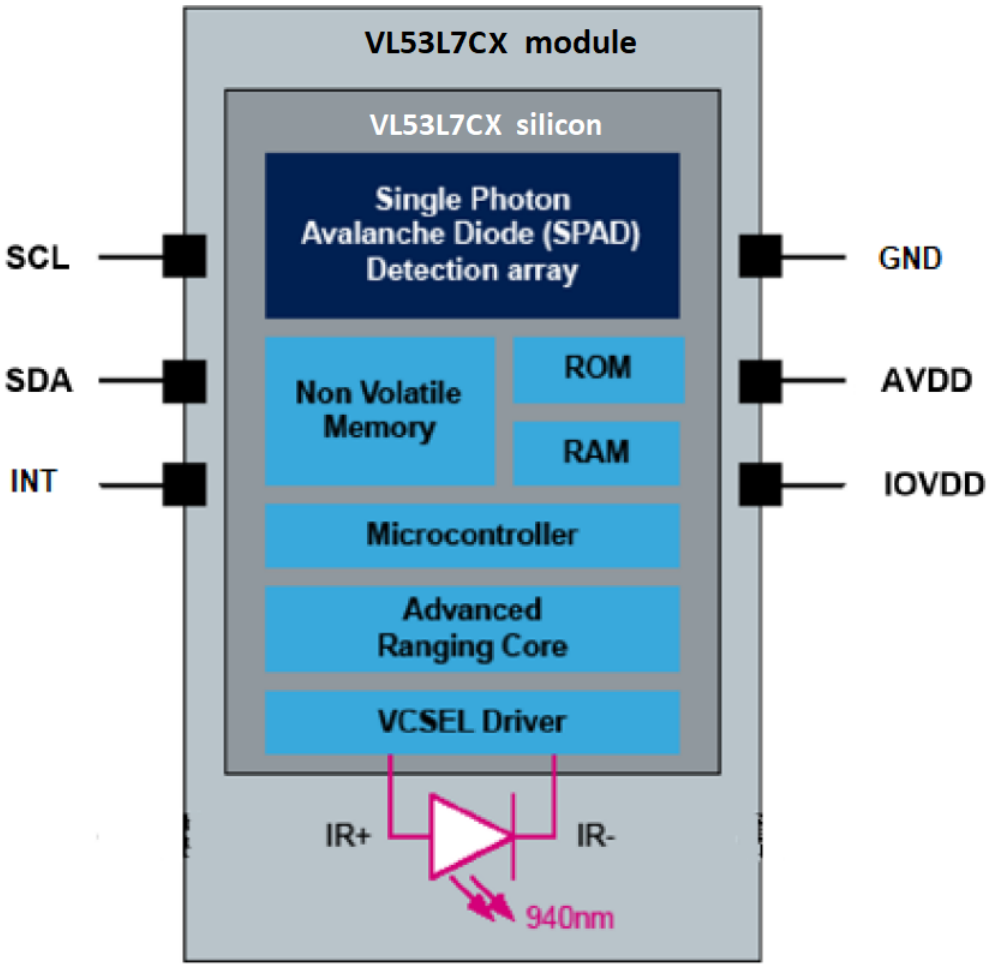
Housed in a miniature reflowable package that integrates a SPAD array, the VL53L7CX achieves the best ranging performance in various ambient lighting conditions, and for a wide range of cover glass materials.

All of ST's ToF sensors integrate a VCSEL that emits a fully invisible 940 nm IR light, which is totally safe for the eyes (Class 1 certification).

The VL53L7CX is the perfect sensor for any application requiring ultrawide FoV like robotics, smart speakers, video projectors, content management. The combination of the multizone capability and the 90° FoV can enhance new use-cases like gesture recognition, SLAM for robotics, and low power system activation for smart building.

1 System block diagram

Figure 1. **VL53L7CX block diagram**



Revision history

Table 1. **Document revision history**

Date	Version	Changes
19-Aug-2022	1	Initial release

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