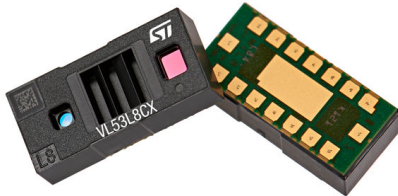


Low-power high-performance 8x8 multizone Time-of-Flight sensor



Product status link

[VL53L8CX](#)

Features

- New generation, multizone ToF (Time-of-Flight) sensor with low-power and enhanced distance ranging performance
 - Multizone distance measurement capability with either 4x4 or 8x8 separate zones
 - Autonomous low-power mode with interrupt programmable threshold to wake up the host
 - Ranging up to 400 cm, with enhanced performance under ambient light
 - Multitarget detection and distance measurement in each zone
 - Histogram processing and algorithmic compensation to minimize or remove the impact of cover glass crosstalk
 - Motion indicator for each zone to show if targets have moved and how they have moved
 - Frame rate capability of 60 Hz
- Fully integrated miniature module with wide FoV (field of view)
 - New generation, high-power emitter: 940 nm invisible light VCSEL (vertical-cavity surface-emitting laser) and integrated analog driver
 - 65° diagonal square FoV using DOEs (diffractive optical elements) on both transmitter and receiver
 - Receiving array of SPADS (single photon avalanche diodes)
 - Low-power microcontroller running firmware
 - Size: 6.4 x 3.0 x 1.75 mm
- Easy integration
 - Single reflowable component
 - 1.8 V core supply and 3.3 V AVDD supply required
 - Optional 1.2 V or 1.8 V IOVDD interface voltage levels
 - I²C (up to 1 MHz) or SPI (up to 20 MHz) interface
 - Compatible with wide range of cover glass materials
 - Can be hidden behind a dark cover glass

Applications

- Robotic applications in difficult environments including SLAM, wall tracking, small object detection, cliff prediction, and floor type recognition
- System activation under ambient light for smart buildings and smart lighting. For example: user detection to wake up devices
- Content management for tanks, loads in trucks, and waste bins
- Liquid level monitoring
- Gesture recognition
- Keystone correction for video projectors
- Devices requiring better ambient light immunity
- Augmented reality/Virtual reality enhancement. Dual camera stereoscopy and 3D depth assistance thanks to multizone distance measurements
- IoT and battery powered devices for user and object detection
- LAF (laser assisted autofocus), which enhances the camera AF system speed and robustness, especially in difficult low light or low contrast scenes.

Description

The VL53L8CX is an 8x8 multizone, ToF ranging sensor, which enhances performance under ambient light with a reduced power consumption. Based on STMicroelectronics FlightSense technology, the sensor is designed to provide accurate ranging up to 400 cm with a 65° diagonal FoV.

The VL53L8CX integrates a powerful new generation VCSEL, and two advanced meta-surface lenses. The hardware is housed in an innovative "all in one" module. This enables a wider variety of high-performance use-cases, such as low-power system activation, gesture recognition, SLAM for robotics, liquid level monitoring, and many more.

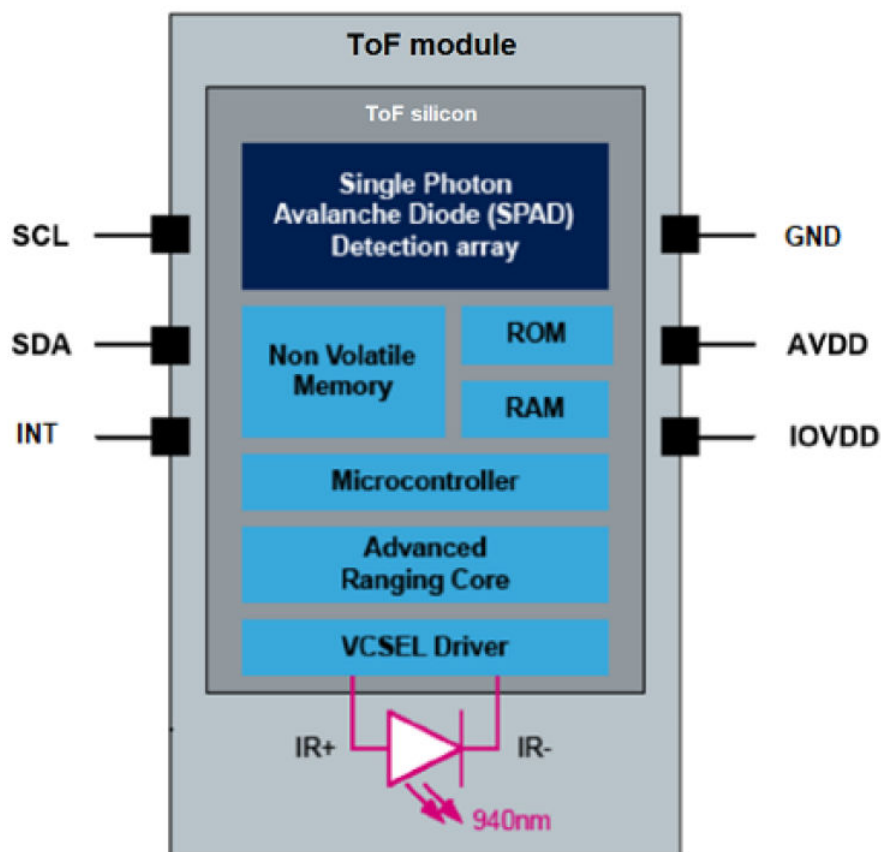
Thanks to STMicroelectronics' patented algorithms, the VL53L8CX can detect and track multiple targets within the FoV with a 64-zone depth measurement. The STMicroelectronics' histograms ensure that the cover glass crosstalk immunity is above 60 cm. Like all ToF sensors based on STMicroelectronics' FlightSense technology, the VL53L8CX measures an absolute distance regardless of the target color and reflectance.

The VL53L8CX supports SPI and I²C interfaces for high frequency framerates and short boot times.

The VCSEL of the VL53L8CX emits fully invisible 940 nm IR light. Such VCSEL has a Class 1 certification that is safe for the eyes.

1 System block diagram

Figure 1. VL53L8CX block diagram



Revision history

Table 1. Document revision history

| Date | Version | Changes |
|-------------|---------|------------------------------|
| 21-Dec-2022 | 1 | Initial release |
| 29-Jul-2025 | 2 | Updated <i>cover image</i> . |

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