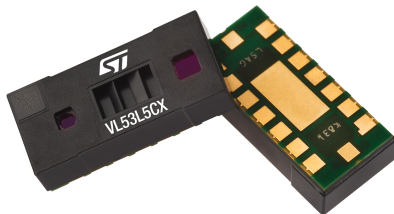


Time-of-Flight 8x8 multizone ranging sensor with wide field of view



Features

- Fast and accurate multizone distance ranging sensor
 - 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 400 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 with wide field of view (FoV)
 - Emitter: 940 nm invisible light vertical cavity surface emitting laser (VCSEL) and integrated analog driver
 - 63 ° diagonal square FoV using diffractive optical elements (DOE) on both transmitter and receiver
 - Receiving array of single photon avalanche diodes (SPADs)
 - Low-power microcontroller running Firmware
 - Size: 6.4 x 3.0 x 1.5 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

Product status link

[VL53L5CX](#)

Applications

- Scene understanding. Multizone and multi-object distance detection enables 3D room mapping and obstacle detection for robotics applications
- Wide FoV and multizone scanning allows content management (load in trucks, tanks, waste bins)
- Gesture recognition
- Liquid level control
- Keystone correction for video projectors
- Laser assisted autofocus (LAF). Enhances the camera AF system speed and robustness especially in difficult low light or low contrast scenes
- Augmented reality/virtual reality (AR/VR) enhancement. Dual camera stereoscopy and 3D depth assistance thanks to multizone distance measurement
- Smart buildings and smart lighting (user detection to wake up devices)
- IoT (user and object detection)
- Video focus tracking. 60 Hz ranging allows optimization of continuous focus algorithm

Description

The VL53L5CX is a state of the art, ToF, laser-ranging sensor enhancing the ST FlightSense product family. Housed in a miniature reflowable package, it integrates a SPAD (single photon avalanche diode) array, physical infrared filters, and diffractive optics (DOE) to achieve the best ranging performance in various ambient lighting conditions with a range of cover glass materials

The use of a DOE above the vertical cavity surface emitting laser (VCSEL) allows a square FoV to be projected onto the scene. The reflection of this light is focused by the receiver lens onto a SPAD array

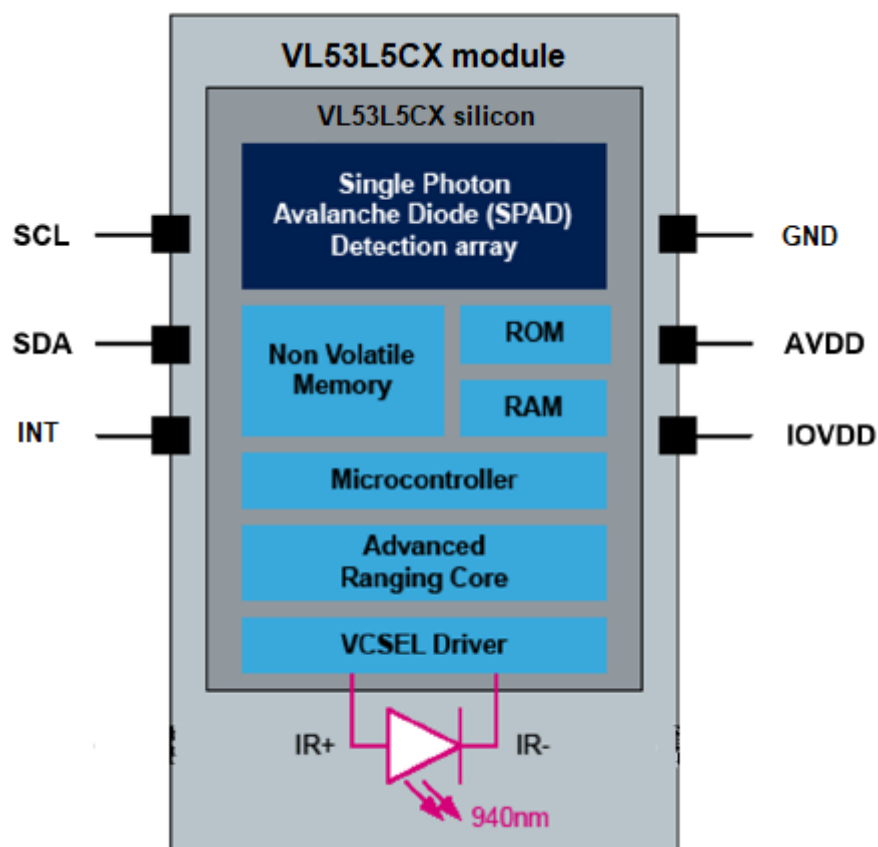
Unlike conventional IR sensors, the VL53L5CX uses ST's latest generation, direct ToF technology which allows absolute distance measurement whatever the target color and reflectance. It provides accurate ranging up to 400 cm and can work at fast speeds (60 Hz), which makes it the fastest, multizone, miniature ToF sensor on the market.

Thanks to ST Histogram patented algorithms, the VL53L5CX is able to detect different objects within the FoV with a distance information range up to 60 Hz. The Histogram also provides immunity to cover glass crosstalk beyond 60 cm.

Multizone distance measurements are possible up to 8x8 zones with a wide 63 ° diagonal FoV which can be reduced by software.

1 System block diagram

Figure 1. VL53L5CX block diagram



Revision history

Table 1. Document revision history

Date	Version	Changes
10-Jun-2021	1	Initial release

IMPORTANT NOTICE – PLEASE 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 acknowledgement.

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, please 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.

© 2021 STMicroelectronics – All rights reserved