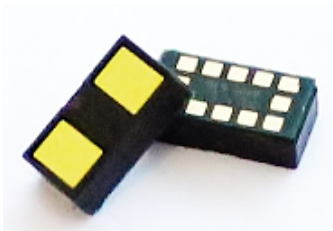# New generation Time-of-Flight ranging sensor with advanced multizone and multi-object detection

Features

- Fully integrated miniature module
    - Emitter: 940 nm invisible laser (VCSEL) and its analog driver
    - Receiving array with integrated lens
    - Low-power microcontroller running advanced digital firmware
    - Size: 4.9 x 2.5 x 1.56 mm
- Fast, accurate distance ranging
    - 8 m detection with full field of view (FoV)
    - 60 Hz ranging capable up to 300 cm
    - Immune to cover glass crosstalk and fingerprint smudge at long distance with patented algorithms (direct ToF)
    - Multi-object detection capable
    - Multizone scanning with selectable array (2x2, 3x3, 4x4, or defined by user through software)
- Easy integration
    - Single reflowable component
    - Single power supply 2v8
    - Works with many types of cover glass material
    - I²C interface (up to 1 MHz)
    - Xshutdown (Reset) and interrupt GPIO
    - Full set of software driver (Linux and Android compatible) for turnkey ranging

Product summary

Product summary	
Order code	VL53L1CBV0FY/1
Package	Optical LGA12 with liner
Packing	Tape and reel (with liner)

Applications

- Laser assisted autofocus: enhances the camera AF system speed and robustness, especially in difficult scenes (low light and low contrast). Ideal companion for PDAF sensors.
- Video focus tracking assistance at 60 Hz
- Scene understanding with multi-object detection: "choose the focus point"
- Dual camera stereoscopy and 3D depth assistance thanks to multizone measurement
- Presence detection (autonomous timed mode), typically to lock/unlock and power on/off devices like notebooks, tablets or white goods

Description

The VL53L1 is a state of the art Time-of-Flight (ToF) laser-ranging miniature sensor, enhancing the ST Flight Sense product family. Housed in a miniature and reflowable package, it integrates a Single Photon Avalanche Diodes (SPAD) array, physical infrared filters and optics to achieve the best ranging performance in various ambient lighting conditions, with range of cover glass options.

Unlike conventional IR sensors, VL53L1 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 8 m and can work at fast speed (60 Hz), which makes it the fastest miniature ToF sensor on the market.

DB3195 - Rev 3 - October 2020
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With patented algorithms and ingenious module construction, VL53L1 is also able to detect different objects within the field of view (FoV) with depth information (histogram) at 60 Hz.

Scene browsing and multi-zone detection is now possible with VL53L1, thanks to software customizable detection array for quicker "touch to focus" or mini depth map use cases.

1 Technical specification

Figure 1. VL53L1 block diagram
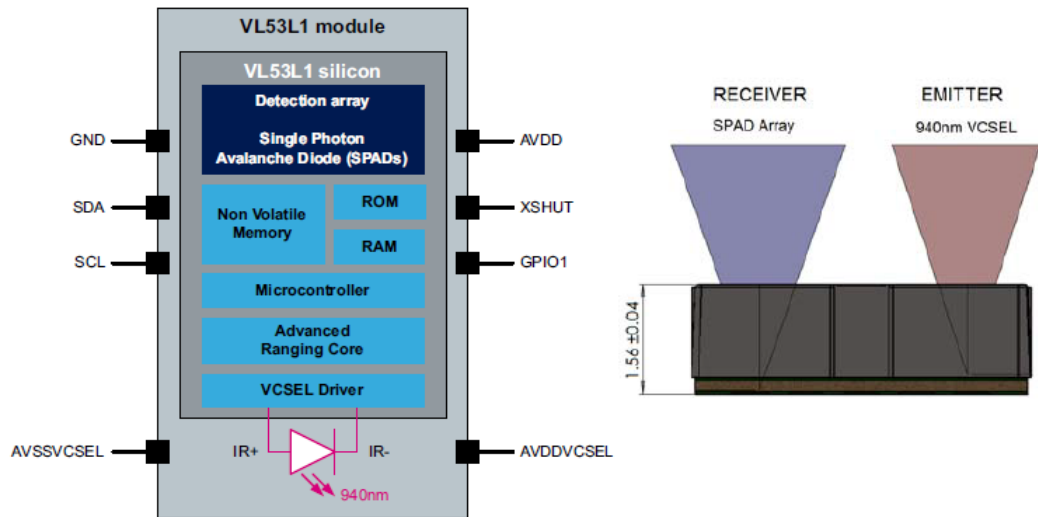
Revision history

Table 1. Document revision history

Date	Version	Changes
14-Fev-2017	1	Initial release
17-Fev-2017	2	update Table 1: Ordering information
30-Oct-2020	3	Increase ranging distance from 4 m to 8 m Remove Eco-Pack section

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