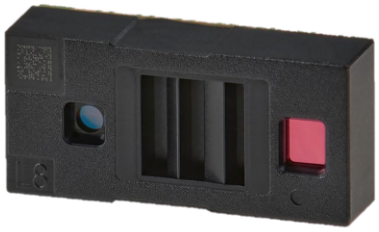
VL53L8 a FlightSense™ product

Data brief

2nd generation multi-zone time-of-flight ranging sensor



Features

- Fully integrated miniature module
  - Emitter: 940 nm invisible vertical cavity surface emitting laser (VCSEL) and integrated analog driver
  - 43.5 ° x 43.5 ° square (61°diagonal) system field of view (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 1.75 mm
- Fast, accurate distance ranging
  - Parallel multi-zone output; either 16 (4x4) or 64 (8x8) discrete regions of interest (ROI)
  - Up to 400 cm ranging
  - 60 Hz frame rate capability in 4x4 mode
  - Histogram processing and algorithmic compensation minimizes or removes impact of cover glass crosstalk
  - 50% power consumption vs previous generation device
  - 2x ranging performance in ambient light levels with lower power consumption vs previous generation device
- Easy system integration
  - Single reflowable component
  - Optional 1.2 V or 1.8 V IOVDD interface voltage levels
  - 1.8 V Core supply and 3.3V AVDD supply required
  - Compatible with wide range of cover glass materials
  - I²C (up to 1MHz) or SPI (up to 20MHz) interface
  - Interrupt output pin for efficient host control
  - Full set of software drivers (Linux and Android compatible) for turnkey ranging

Application

- Laser assisted autofocus (LAF). Enhances the camera AF system speed and robustness especially in difficult low light or low contrast scenes. Ideal companion for phase detection autofocus (PDAF) sensors.
- Scene understanding. Multi-zone and multi-object distance detection enables touch-to-focus or focus bracketing for best shot selection.
- Camera selection. Allows quick, automatic selection of optimal camera in today's multi-camera smartphones.
- Scene understanding. Multi-zone and multi-object distance detection enables touch-to-focus or focus bracketing for best shot selection.
- Camera assist. Further camera assistance by enabling flash dimming, indoor/outdoor detection and background removal assist. Additional algorithm support for detecting planar surfaces and spectral surfaces such as glass.
- Augmented reality/virtual reality (AR/VR) enhancement. Dual camera stereoscopy and 3D depth assistance thanks to multi zone distance measurement.

- Video focus tracking. 60 Hz ranging allows optimization of continuous focus algorithm.
- Enhances camera bokeh performance through captured scene depth data.

Description

The VL53L8 is a state of the art, 2nd generation, multi-zone Time-of-Flight (ToF), laser-ranging sensor enhancing the ST FlightSense™ product family. Housed in a miniature reflowable package, it integrates a SPAD array, enhanced VCSEL, physical infrared filters, and ST's latest meta-surface optical technology to achieve the best ranging performance in various ambient lighting conditions with a range of cover glass materials. The use of a diffractive optical element above the 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.

This 2nd generation product offers half the typical power consumption or twice the ranging performance compared to the previous generation.

Unlike conventional IR sensors, the VL53L8 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). The enhanced design makes it the most power efficient, high performance, multi-point, miniature ToF sensor on the market.

With patented algorithms and ingenious module construction, the VL53L8 is also able to detect multiple objects within the FoV with depth information for quicker touch-to-focus or mini depth map creation.

Ordering information

VL53L8 is currently available in the formats below. More detailed information is available on request.

Table 1. Order codes

Order codes	Package	Packing	Minimum order quantity
VL53L8CAV0GC/1	Optical LGA16 without liner	Tape and reel	3600 pcs

Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

Revision history

Table 2. Document revision history

Date	Version	Changes
18-May-2022	1	Initial release.
7-Jun-2022	2	Updated features file

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