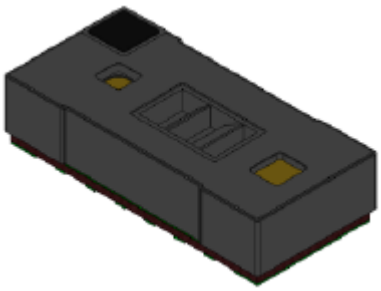
VL53L5CP

Data brief

Time-of-Flight ranging sensor for advanced human presence detection



Product status link
VL53L5CP

Features

- Fully integrated miniature module
  - Emitter: 940 nm invisible VCSEL (vertical-cavity surface-emitting laser) and integrated analog driver
  - 61° diagonal, square system, FoV (field of view) using DOEs (diffractive optical elements) on both transmitter and receiver
  - Receiving SPAD (single-photon avalanche diode) array
  - Low power microcontroller running firmware
  - Size: 6.4 x 3.0 x 1.5 mm
- Fast, accurate distance ranging with
  - Parallel multizone output, and either 4x4 or 8x8 separate ROIs (regions of interest)
  - Ranging up to 400 cm
  - Frame rate capability of 60 Hz
  - Histogram processing and algorithmic compensation that minimize or remove the impact of cover glass crosstalk
- Autonomous mode
  - Special mode for low power user detection
- Easy integration
  - Single reflowable component
  - Flexible power supply options
    - IOVDD: 1.8 or 2.8 V or 3.3 V
    - AVDD: 2.8 V or 3.3 V
  - Compatible with wide range of cover glass materials
  - I²C interface
  - Low power pin and two GPIOs (general purpose input/outputs) for interrupt and synchronization
  - Full set of software drivers for turnkey presence solution

Description

The VL53L5CP is a state of the art, ToF (Time-of-Flight), laser-ranging sensor, enhancing ST's FlightSense family. It is housed in a miniature and reflowable package, which integrates a SPAD array, physical infrared filters, and DOEs. Consequently, this sensor achieves outstanding ranging performances, in various ambient lighting conditions, with a range of cover glass options.

The use of DOEs above the VCSEL allows a wide square FoV (61°) to be projected onto the scene. A receiver lens focuses the reflection of this light onto a SPAD array.

Unlike conventional IR sensors, the VL53L5CP uses ST's latest generation, direct ToF technology, which allows absolute distance measurement whatever the target color and reflectance. This technology also provides accurate ranging up to 400 cm. In addition, it enables the sensor to work at fast speeds (60 Hz). All this makes the VL53L5CP the fastest, 64-point, miniature ToF sensor on the market.

With patented algorithms and ingenious module construction, the VL53L5CP can also detect different objects within the FoV. Depth information is possible at 60 Hz.

Additionally, the VL53L5CP can browse scenes and detect multizones. This is due to a software customizable detection array, which detects low power and fast human presence, or a mini depth map.

This device is ideal for multizone ranging, multi-object detection, and scene understanding. It controls wake-up and sleep functions. Consequently, it is particularly suited for human presence detection in front of a PC or a control panel. Special algorithms are available to distinguish humans from inanimate objects. The device enables countless applications, including reading distance monitoring and gesture.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
30-Jun-2022	1	Initial release

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