

Time-of-Flight high accuracy proximity sensor with extended temperature capability

Features



High accuracy proximity ranging

- High performance proximity sensor
- Short distance linearity down to 1 mm
- From 0 to 1300 mm with full field of view (FoV)
- Extended effective temperature range of -40°C to 105°C
- Up to 800 mm ranging under 5 klx
- FoV of 18°
- Autonomous low power mode with interrupt programmable threshold to wake up the host
- Fast ranging frequency up to 100 Hz

Fully integrated miniature module

- 940 nm invisible laser emitter (VCSEL) and analog driver
- Low power microcontroller running advanced digital firmware
- 4.4 x 2.4 x 1 mm size
- Pin-to-pin compatible with VL53L4CD

Easy integration

- Reflowable component
- Single power supply 2v8
- It can be hidden behind the cover glass
- I²C interface (up to 1 MHz)
- Full set of C software drivers (Linux compatible) for turnkey ranging
- Embedded processing for a very low memory footprint

Application

Proximity ranging applications under strong light conditions such as:

- Robotic and industrial applications including collision avoidance.
- System activation, occupancy, and presence detection (public buildings and car parks).
- Smart lighting systems for outdoor lighting control.
- Biometric distance measurement (security systems and health monitoring).

High temperature range for extreme environment applications:

- Industrial automation and security systems.
- Touchless button for industrial tools.
- Industrial manufacturing assistance.
- Liquid level monitoring (container and tank).

Product status link

[VL53L4ED](#)

Description

The VL53L4ED is specifically designed for high-accuracy, short-range measurements requiring extended temperature capability. It offers an 18° field of view for measurements from 1 mm up to 1300 mm in standard conditions, and up to 1150 mm under its extended temperature. Special settings also provide an accurate distance measurement up to 800 mm under ambient light conditions (5 klx).

This sensor has an effective temperature range of -40°C to 105°C, ensuring reliable measurement, even in extreme temperature conditions. It is the ideal product for industrial devices requiring proximity sensing. Examples include presence detection and system activation applications. The VL53L4ED is a direct derivative of the VL53L4CD with which it is pin-to-pin compatible. Its fully embedded on-chip processing helps to reduce design complexity and BOM cost because less powerful and less expensive microcontrollers can be used.

Like all Time-of-Flight (ToF) sensors based on STMicroelectronics' FlightSense technology, the VL53L4ED records an absolute distance measurement regardless of the target color and reflectance.

The VL53L4ED is housed in a miniature reflowable package. It integrates a SPAD (single photon avalanche diode) array, and consequently achieves the best ranging performance in various ambient lighting conditions, for a wide range of cover glass materials.

This sensor integrates a VCSEL (vertical-cavity surface-emitting laser). It emits a fully invisible 940 nm IR light that is totally safe for eyes (Class 1 certification).

Revision history

Table 1. Document revision history

Date	Version	Changes
14-Dec-2023	1	Initial release

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