VL53L0X

World's smallest time-of-flight (ToF) ranging sensor

The VL53L0X is the second-generation laser-ranging sensor based on ST's patented FlightSense™ technology

The VL53L0X is the smallest time-of-flight (ToF) sensor on the market today. It is fully integrated and embeds an infrared, eye-safe laser, advanced filters and an ultra-fast photon detection array.
It enhances the ST FlightSense™ product family by enabling measurements of much longer distances with a fast, accurate and robust solution, opening the door to new applications.

KEY BENEFITS

- Absolute distance provided (in mm) up to 2 meters in less than 30 ms
- Fast mode: quick ranging operation at 50 Hz
- High accuracy
- Low power
- 4.4 x 2.4 x 1 mm reflowable package
- Advanced ambient light rejection
- 940 nm invisible light emission
- Works with cover glass

TARGETED APPLICATIONS

- Camera assist (ultra-fast autofocus and depth map)
- User detection for power saving in smartphones or laptops
- Gesture control
- Drones
- Robotic and industrial control
- IoT
- Domestic appliances

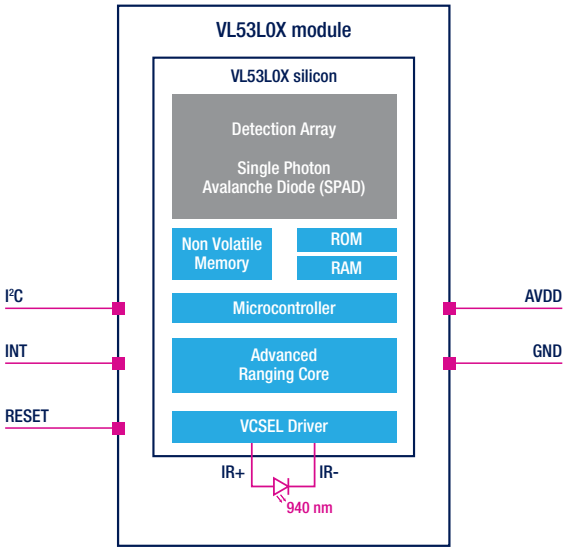
TECHNOLOGY

The VL53L0X contains an array of SPAD (single photon avalanche diode) detectors and an integrated 940 nm light source based on an eye-safe Class 1 VCSEL (vertical cavity surface-emitting laser) which, when used with algorithms running on an embedded microcontroller, can directly determine the distance to a target object in millimeters, even in challenging operating conditions and independent of target reflectivity.
The VL53L0X is designed with an ultra-low-power system architecture, which is ideally suited for wireless and IoT use cases. The VL53L0X is supplied with a complete documentation package, example source code and a software API (application programming interface) which is compatible with a range of microcontrollers and processors.

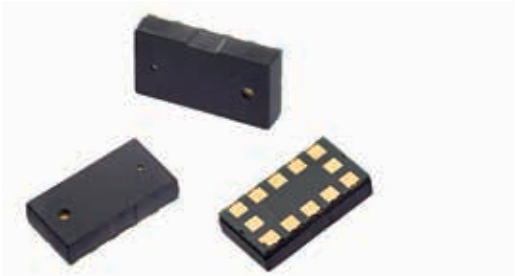
MODULE DESIGN

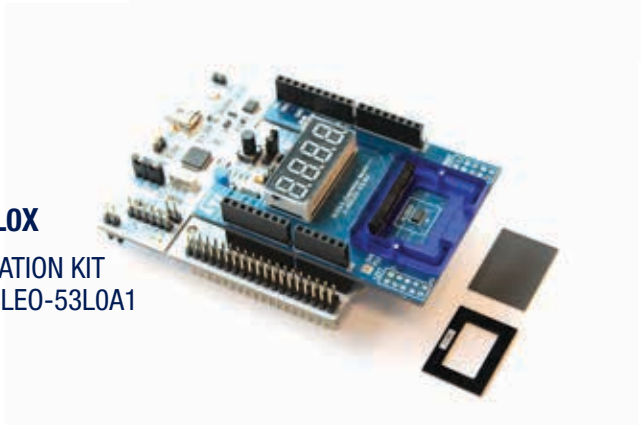
With its small form factor of 4.4 x 2.4 x 1 mm and reflow compatibility, the VL53L0X is easy to integrate on a product's main PCB or on a flex PCB and can then be hidden behind a wide variety of cover glass materials. Currently the VL53L0X is the only product to integrate a 940 nm wavelength VCSEL, making it invisible to the human eye and more immune to background ambient lighting.

SYSTEM BLOCK DIAGRAM



VL53L0X MODULE





VL53L0X

EVALUATION KIT
X-NUCLEO-53L0A1

PRODUCT DETAILS

Part number	Package size	Operating range	Power consumption	Supply voltage	Optimum operating temperature
VL53L0CXV0DH/1	4.4 x 2.4 x 1mm	up to 2 meters	HW standby (typ) : 5uA Ranging : < 20mW (*)	2.6 to 3.5 V	-20 to +70 °C

* Average power consumption at 10Hz, with 33ms ranging operation

Need more details?
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