VL53L3CX

Time-of-Flight ranging sensor with multi-target detection

STMicroelectronics' latest Time-of-Flight sensor enables multi-object ranging based on ST's patented FlightSense™ technology

The VL53L3CX measures the range to objects from 2.5cm to 5m, the result is unaffected by the target color or reflectance, unlike conventional infrared sensors. The ST Histogram algorithm allows designers to introduce powerful new features to their products, such as enabling occupancy detectors to provide error-free sensing by ignoring unwanted background or foreground objects, or reporting the exact distances to multiple targets within the sensor field-of-view.

KEY FEATURES & BENEFITS

- Long range: up to 5m absolute distance measurement
- Fast, accurate distance ranging
- Excellent short distance linearity
- Multi target detection and distance measurement thanks to the ST Histogram algorithm
- Immunity to cover glass cross-talk beyond 80cm
- Automatic fingerprint smudge compensation
- Fully integrated miniature module for easy integration

KEY APPLICATIONS

- Service robots and vacuum cleaners (wall tracking and fast obstacle detection)
- Sanitary products (robust user detection whatever the target reflectance)
- Smart buildings and smart lighting (user detection to wake up devices)
- IoT (user and object detection)
- Laser assisted autofocus
- Video focus tracking assistance

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Technology

The VL53L3CX is the latest Time-of-Flight (ToF) product from STMicroelectronics and embeds ST's third generation FlightSense™ patented technology. It combines a high performance proximity and ranging sensor, with multi-target distance measurements and automatic smudge correction. The miniature reflowable package integrates a single photon avalanche diode (SPAD) array and physical infrared filters to achieve the best ranging performance in various ambient lighting conditions, with a wide range of cover glass windows.

The VL53L3CX combines the benefits of a high-performance proximity sensor, with excellent short distance linearity, together with ranging capability up to 5m.
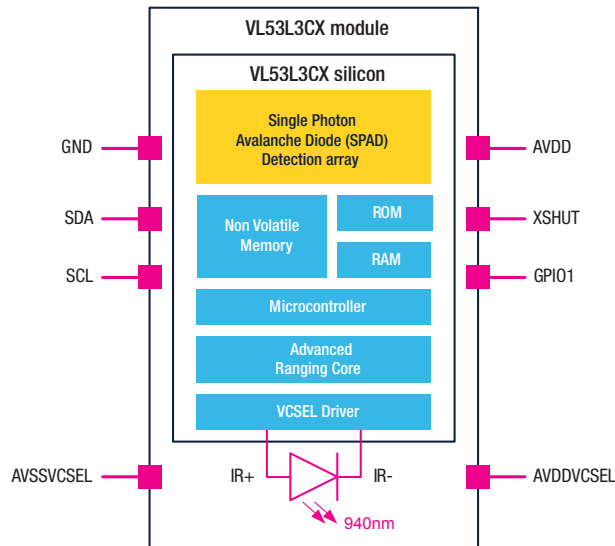
With patented algorithms and innovative module construction, the VL53L3CX is also able to detect different objects within the field-of-view (FoV) with depth understanding. The ST histogram algorithms allow cover glass crosstalk immunity beyond 80cm, and dynamic smudge compensation.

Module design

Stand-alone, all-in-one ultra small form factor module of 4.4 x 2.4 x 1mm, the VL53L3CX can be hidden behind a wide variety of cover windows and reflowed on a motherboard or a flex PCB. The VL53L3CX is also pin-to-pin compatible with previous generation VL53L0X and VL53L1X.

System Block Diagram

Product details

Part number	Package size	Operating range	Power consumption	Supply voltage	Optimum operating temperature
VL53L3CXV0DH/1	4.4 x 2.4 x 1mm	Up to 5m	Hardware standby (typ.): 6µA Ranging: <1mW*	2.6 to 3.5 V	+20 to +85°C

* Power consumption for Presence detection, no target, 1Hz, 30ms ranging operation

Order code: FLVL53L3CXV0DH10910

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