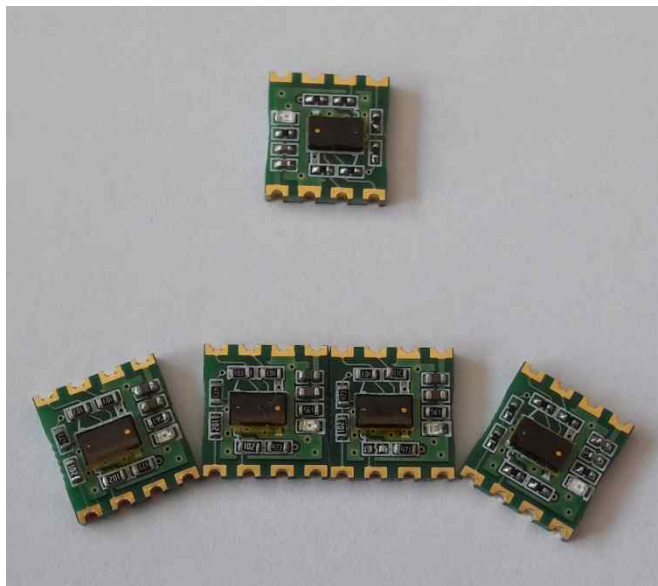


# OSTSen-53LOX User Guide



**Ver 1.0**

**Onsystemch**

## 1. OSTSen-53L0X Overview

OSTSen-VL53L0X is a Time-of-Flight laser-ranging module, which is based on STMicroelectronics VL53L0X. The VL53L0X is a new generation Time-of-Flight(ToF) laser-ranging module housed in the smallest today, providing accurate distance measurement whatever the target reflectances. It can measure absolute distances up to 2m, setting a new benchmark in ranging performance levels, opening the door to various new applications. The VL53L0X integrates a leading-edge SPAD array (Single Photon Avalanche Diodes) and embeds ST's second generation FlightSense™ patented technology.

The VL53L0X's 940nm VCSEL emitter (Vertical Cavity Surface-Emitting Laser), is totally invisible to the human eye, coupled with internal physical infrared filters, it enables longer ranging distance, higher immunity to ambient light and better robustness to cover-glass optical cross-talk.

## 2. Application

- User detection for Personal Computers/Laptops/Tablets and IoT(Energy saving)
- Robotics (obstacle detection)
- White Goods (hand detection in automatic faucet, soap dispensers etc)
- 1D gesture recognition
- Laser assisted Auto-Focus. Enhances and speeds-up camera AF system performance, especially in difficult scenes (low light levels, low contrast) or fast moving video mode

## 3. Features

### 3.1 Fully integrated miniature module

- 940nm Laser VCSEL
- VCSEL driver
- Ranging sensor with advanced embedded micro controller
- 4.4 x 2.4 x 1.0 mm

### 3.2 Fast, accurate distance ranging

- Measures absolute range up to 2m
- Reported range is independent of the target reflectance
- Operates in high infrared ambient light levels
- Advanced embedded optical cross-talk compensation to simplify cover glass selection

### 3.3 Easy safe

- Class 1 laser device compliant with latest standard IEC 60825-1:2014-3<sup>rd</sup> edition

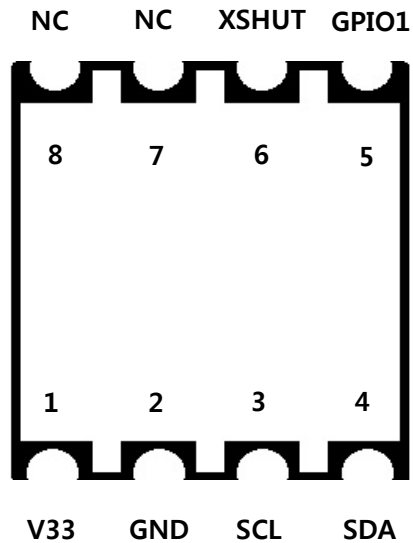
### 3.4 Easy integration

- Single reflowable component
- No additional optics
- Single power supply
- I2C interface for device control and data transfer
- Xshutdown(Reset) and interrupt GPIO
- Programmable I2C address

## 4. Application Information

### 4.1 Module Pin Out and Signal Description

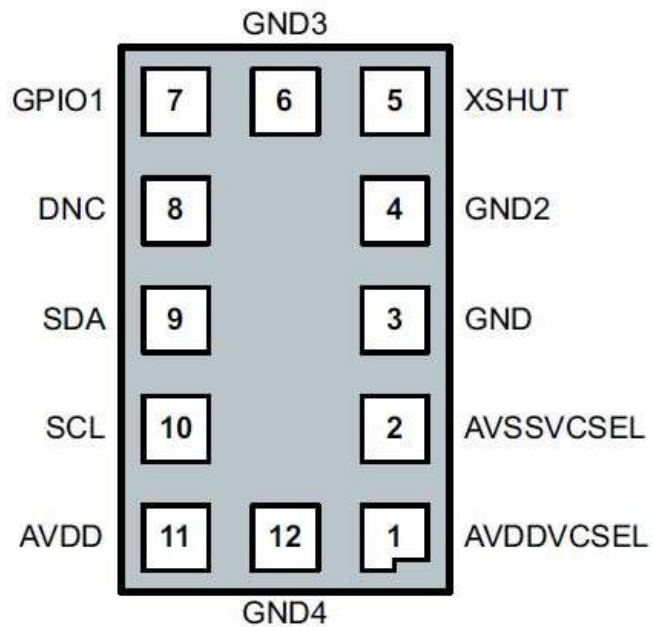
Pin Number	Pin Name	Pin Description
1	V33	Power supply voltage (2.6V ~ 3.5V)
2	GND	Power supply ground
3	SCL	I2C serial clock (SCL) 7bit device address : 0x29
4	SDA	I2C serial data (SDA)
5	GPIO1	Interrupt output. Open drain output
6	XSHUT	Xshuttdown pin, Active LOW
7, 8	NC	Not Connect



< Top View >

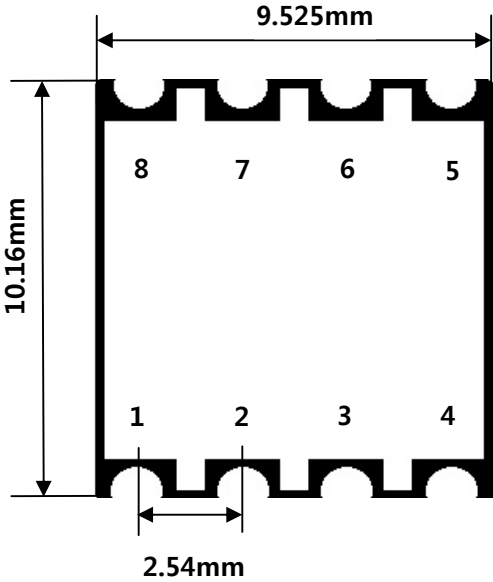
## 4.2 VL53L0X Pin out and Signal Description

Pin Number	Pin Name	Pin Description
1	AVDDVCSEL	VCSEL supply, to be connected to main supply
2	AVSSCSEL	VCSEL Ground, to be connected to main ground
3	GND	To be connected to main ground
4	GND2	To be connected to main ground
5	XSHUT	Xshutdown pin, Active LOW
6	GND3	To be connected to main ground
7	GPIO1	Interrupt output, Open drain output
8	DNC	Do Not Connect, must be left floating
9	SDA	I2C serial data
10	SCL	I2C serial clock
11	AVDD	Supply, to be connected to main supply
12	GND4	To be connected to main ground



VL53L0X pinout (bottom view)

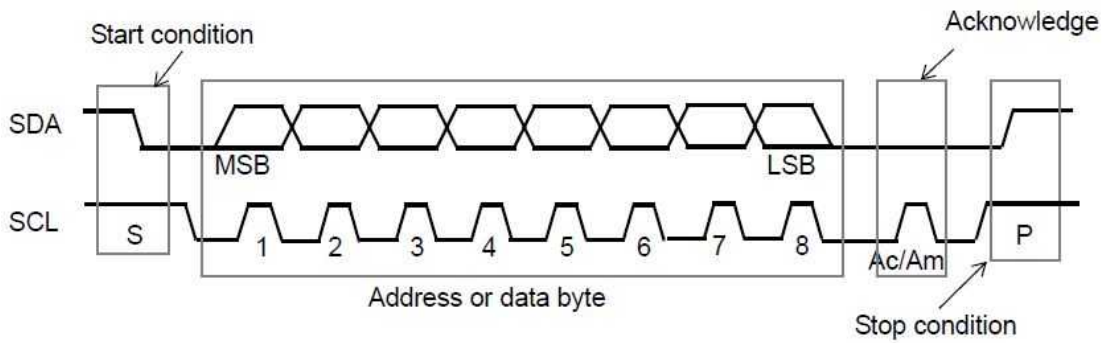
5. Module Dimension



< OSTSen-53L0X module >

## 6. I2C Communications

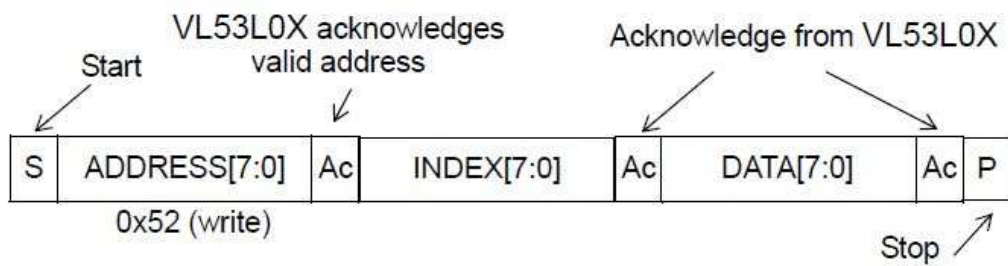
### Data transfer protocol



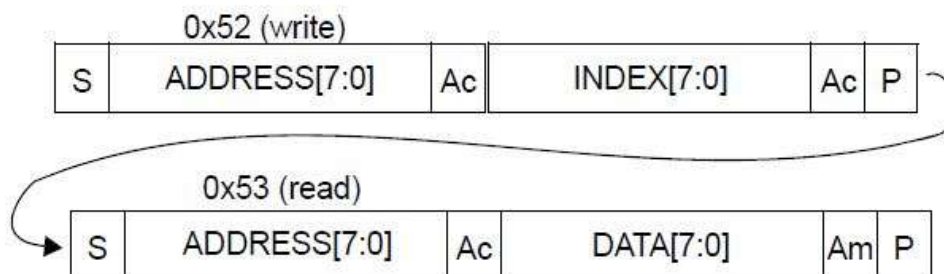
### VL53L0X I2C 7bit device address : 0x29

MSBit							LSBit
0	1	0	1	0	0	1	R/W

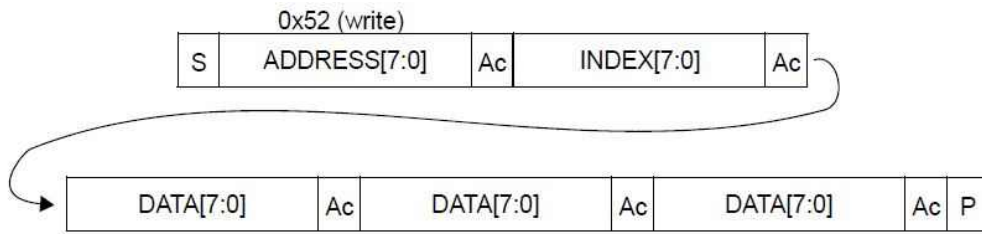
### VL53L0X data format (write)



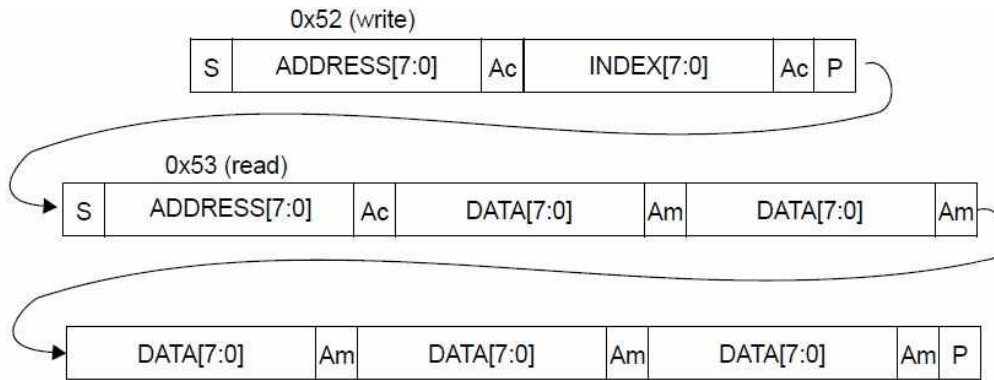
### VL53L0X data format (read)



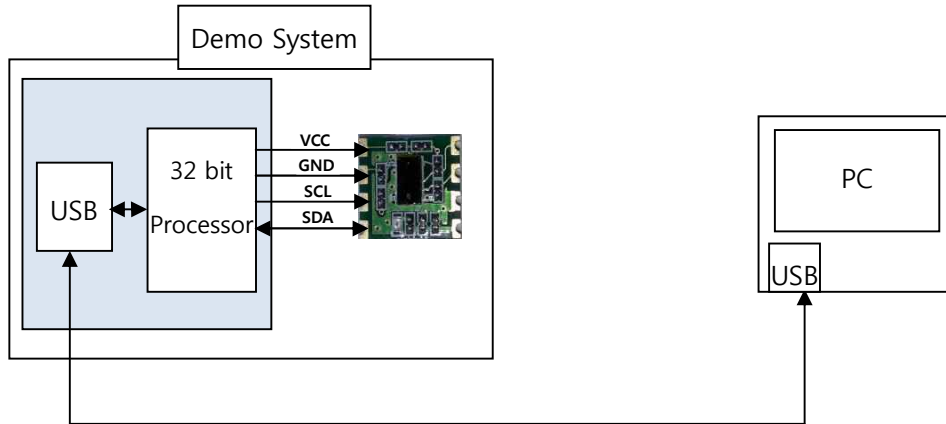
### VL53L0X data format (sequential write)



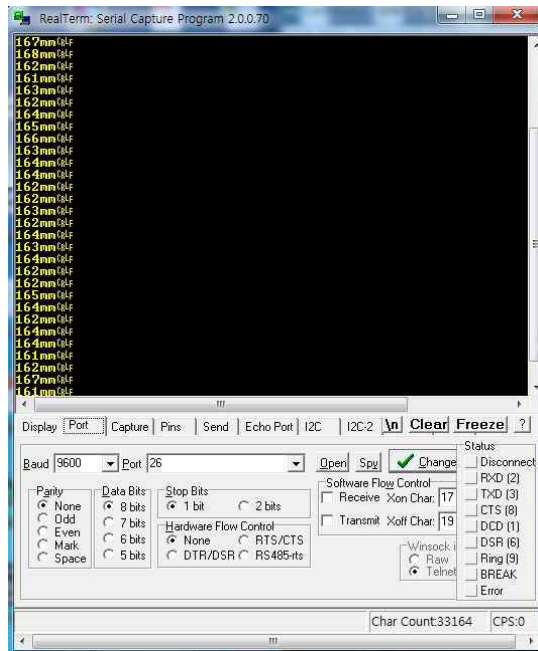
### VL53L0X data format (sequential read)



## 7. Demo System



### OSTSen-53L0X Data Display on PC





## 8. Reference

- 1) [http://www.st.com/content/st\\_com/en/products/imaging-and-photonics-solutions/proximity-sensors/vl53l0x.html](http://www.st.com/content/st_com/en/products/imaging-and-photonics-solutions/proximity-sensors/vl53l0x.html)
  - 2) <http://www.st.com/content/ccc/resource/technical/document/datasheet/group3/b2/1e/33/77/c6/92/47/6b/DM00279086/files/DM00279086.pdf/jcr:content/translations/en.DM00279086.pdf>
  - 3) <https://github.com/pololu/vl53l0x-arduino>
  - 4) <https://github.com/adafruit/Fritzing-Library>
  - 5) [https://github.com/adafruit/Adafruit\\_VL53L0X](https://github.com/adafruit/Adafruit_VL53L0X)
- If you need more information about OSTSen-53L0X, contact [ostsen@naver.com](mailto:ostsen@naver.com).