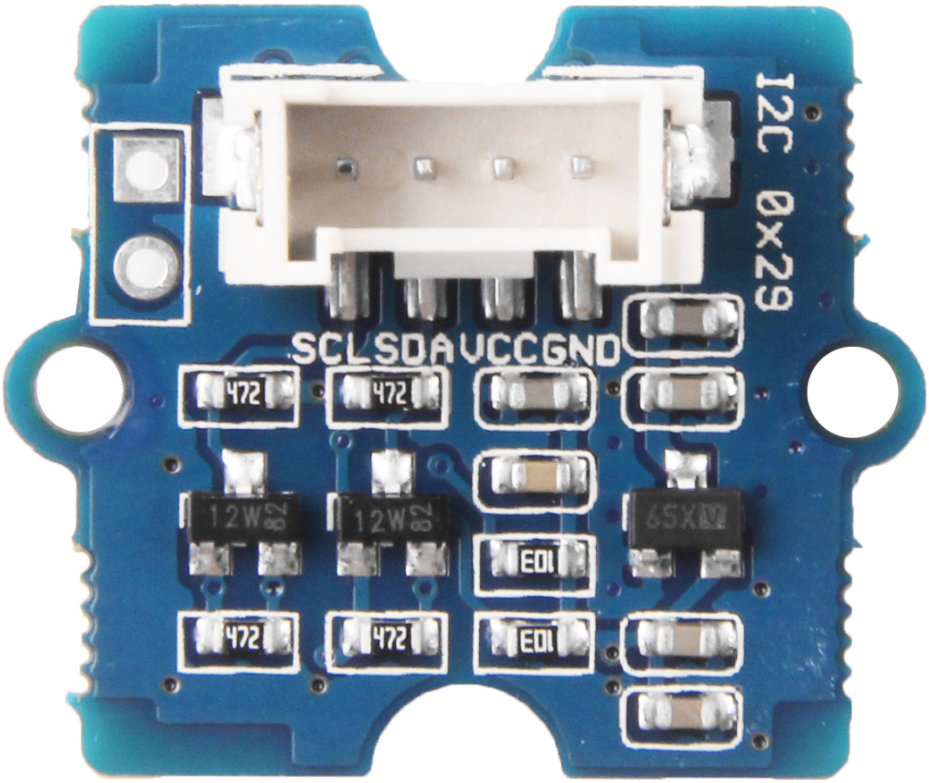
Grove - Time of Flight Distance Sensor VL53L0X



Grove - Time of Flight Distance Sensor-VL53L0X is a high speed, high accurary and long range distance sensor based on VL53L0X.

The VL53L0X is a new generation Time-of-Flight (ToF) laser-ranging module housed in the smallest package on the market today, providing accurate distance measurement whatever the target reflectances unlike conventional technologies. 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 FlightSenseTM patented technology.

The VL53L0X's 940 nm VCSEL emitter (VerticalCavity Surface-Emitting Laser), is totally invisible to the human

eye, coupled with internal physical infrared filters, it enables longer ranging distances, higher immunity to ambient light, and better robustness to cover glass optical crosstalk.

Get One Now

Features

- **Fully integrated miniature module**
  - 940 nm laser VCSEL
  - VCSEL driver
  - Ranging sensor with advanced embedded micro controller
- **Fast, accurate distance ranging**
  - Measures absolute range up to 2 m
  - Reported range is independent of the target reflectance
  - Advanced embedded optical cross-talk compensation to simplify cover glass selection
- **Eye safe**
  - Class 1 laser device compliant with latest standard IEC 60825-1:2014 - 3rd edition
- **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

Specification

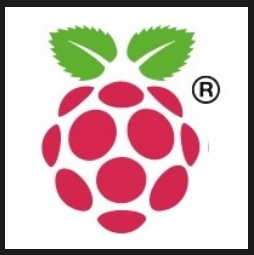
Feature	Detail
Operating voltage	3.3V/5V
Operating temperature	-20°C - 70°C
Recommed measure distance	30mm-1000mm
Resolution	1mm
Infrared emitter	940 nm

Feature	Detail
Bus rate	Up to 400 kHz (FAST mode) serial bus
IIC Address	0x29

Applications

- User detection for personal computers/laptops/tablets and IoT (energy saving)
- Robotics (obstacle detection)
- White goods (hand detection in automatic faucets, soap dispensers etc.)
- 1D gesture recognition.
- Laser assisted autofocus. Enhances and speeds up camera autofocus system performance, especially in difficult scenes (low light levels, low contrast) or fast moving video mode.

Platforms Supported

Arduino	Raspberry Pi			
				

CAUTION

```
The platforms mentioned above as supported is/are an indication of the module's softwa
```

Getting Started

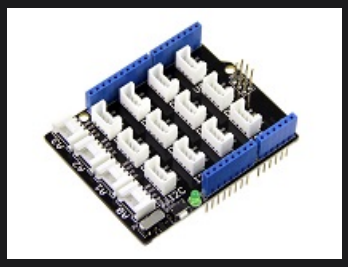
NOTE

```
If this is the first time you work with Arduino, we strongly recommend you to see [Get
```

Play With Arduino

Hardware

Materials required

Seeeduino V4.2	Base Shield	Grove - Time of Flight Distance Sensor
		
Get One Now	Get One Now	Get One Now

> **NOTE**
>
> **1** Please plug the USB cable gently, otherwise you may damage the port. Please use
>
> **2** Each Grove module comes with a Grove cable when you buy. In case you lose the Gr

- **Step 1.** Connect Grove - Time of Flight Distance Sensor to port **IIC** of Grove-Base Shield.
- **Step 2.** Plug Grove - Base Shield into Seeeduino.
- **Step 3.** Connect Seeeduino to PC via a USB cable.

> **NOTE**
>
> If we don't have Grove Base Shield, We also can directly connect Grove - Temperature and Humidity Sensor Pro to Seeeduino as below.

Seeeduino	Grove - Time of Flight Distance Sensor
5V	Red
GND	Black
SDA	White
SCL	Yellow

Software

- **Step 1.** Download the VL53L0X Library from Github.

- **Step 2.** Extract the `Grove-Ranging-sensor-VL53L0X-master.zip` file into the `Arduino library folder`.

> **NOTE**
>
> For example, I download this library into `D:\Software\WorkWork\arduino-1.8.5\libraries`,so only need to extract the zip file here. All in all, please make sure the `Grove-Ranging-sensor-VL53L0X-master` folder is in your Arduino library folder, like the picture below.

- **Step 3.** Open the `Grove-Ranging-sensor-VL53L0X-master\examples` folder you've just extracted, you will see five subfolders:

Choose different example according to your own needs. Then double click the `xxx.ino` file to open the Arduino IDE.

> **NOTE**
>
> We use `high_accuracy_ranging.ino` in this demo.

- **Step 4.** Upload the demo. If you do not know how to upload the code, please check How to upload code.

- **Step 5.** Open the **Serial Monitor** of Arduino IDE by click **Tool-> Serial Monitor**. Or tap the ++ctrl+shift+m++ key at the same time. if every thing goes well, you will get the result.

The result should be like:

```
time of mesurement: 205
Measured distance:115 mm
time of mesurement: 205
Measured distance:117 mm
time of mesurement: 205
Measured distance:120 mm
time of mesurement: 205
Measured distance:125 mm
time of mesurement: 204
Measured distance:130 mm
time of mesurement: 205
Measured distance:138 mm
time of mesurement: 205
Measured distance:143 mm
time of mesurement: 205
Measured distance:144 mm
time of mesurement: 205
Measured distance:152 mm
```

Schematic Online Viewer

className="altium-ecad-viewer" data-project-src="https://files.seeedstudio.com/wiki/Grove-Time_of_Flight_Distance_Sensor-VL53L0X-/res/Grove%20-%20Time%20of%20Flight%20Distance%20Sensor%20(VL53L0X).zip" style={{borderRadius: '0px 0px 4px 4px', height: 500, borderStyle: 'solid', borderWidth: 1, borderColor: 'rgb(241, 241, 241)', overflow: 'hidden', maxWidth: 1280, maxHeight: 700, boxSizing: 'border-box'}}>

Resources

- **[ZIP]** Grove-Time of Flight Distance Sensor VL53L0X Eagle files
- **[PDF]** VL53L0X User Manual
- **[PDF]** VL53L0X Datasheet

Tech Support & Product Discussion

Thank you for choosing our products! We are here to provide you with different support to ensure that your experience with our products is as smooth as possible. We offer several communication channels to cater to different preferences and needs.

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Last updated on ***Mar 1, 2023*** *by* ***gunengyu***

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