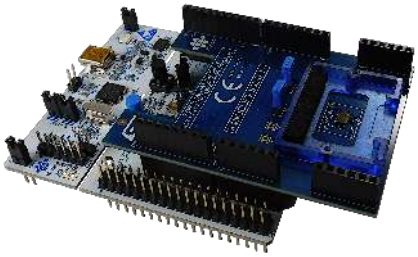
P-NUCLEO-53L4A1

Data brief

VL53L4CD STM32 Nucleo pack with X-NUCLEO-53L4A1 expansion board and NUCLEO-F401RE development board



Features

- VL53L4CD Time-of-Flight high-accuracy proximity sensor expansion board (X-NUCLEO-53L4A1)
- NUCLEO-F401RE development board
- 0.25, 0.5, and 1 mm spacers to simulate air gaps
- Two different cover glasses to protect the sensor from the dust
- Equipped with Arduino UNO R3 connectors
- Full system software supplied, including code examples and graphical user interface
- RoHS, CE, UKCA, and China RoHS compliant

Description

The P-NUCLEO-53L4A1 is a complete evaluation kit that allows you to learn, evaluate, and develop applications using the VL53L4CD Time-of-Flight high-accuracy proximity sensor.

Specifically designed for proximity and short-range measurements, the VL53L4CD provides very accurate distance measurements from 1 mm up to 1300 mm.

A new generation laser emitter with 18° FoV improves the performance under the ambient light, with a ranging speed of up to 100 Hz.

With a very low-power consumption, thanks to an autonomous mode with a programmable distance threshold, the VL53L4CD is ideal for use in battery-powered devices. Its fully embedded on-chip processing helps to reduce design complexity as well as BOM cost, since less powerful and less expensive microcontrollers can be used.

Like all Time-of-Flight (ToF) sensors based on ST FlightSense technology, the VL53L4CD records an absolute distance measurement, regardless of the target color and reflectance.

The NUCLEO-F401RE STM32 Nucleo development board provides an affordable and flexible way for users to try out new ideas and build prototypes with any STM32 microcontroller, choosing from the various combinations of performance, power consumption, and features.

Product summary	
VL53L4CD STM32 Nucleo pack with X-NUCLEO-53L4A1 expansion board and NUCLEO-F401RE development board	P-NUCLEO-53L4A1
P-NUCLEO-53L4A1 pack graphical user interface (GUI)	STSW-IMG027
Time-of-Flight high accuracy proximity sensor	VL53L4CDV0DH/1
STM32 Nucleo-64 development board with STM32F401RE MCU	NUCLEO-F401RE
Time-of-Flight high-accuracy proximity sensor expansion board based on the VL53L4CD for STM32 Nucleo	X-NUCLEO-53L4A1
Applications	Personal Electronics - Audio and Video/Gaming and Drones/Virtual - Augmented Reality/Wearable

1 Laser safety considerations

The VL53L4CD contains a laser emitter and the corresponding drive circuitry.

The laser output is designed to remain within Class 1 laser safety limits under all reasonable foreseeable conditions, including single faults, in compliance with the IEC 60825-1:2014 (third edition).

The laser output remains within Class 1 limits as long as you use the STMicroelectronics recommended device settings and respect the operating conditions specified in the data sheet.

The laser output power must not be increased and no optics should be used with the intention of focusing the laser beam.

Figure 1. Class 1 laser product label

2 X-NUCLEO-53L4A1 expansion board

The X-NUCLEO-53L4A1 expansion board allows you to test the VL53L4CD functionality and to program it, to understand how to develop an application using the VL53L4CD. It integrates a 3.3 V voltage regulator to supply the VL53L4CD on the expansion board and the necessary connectivity for the application.

You have to program the NUCLEO-F401RE to control the X-NUCLEO-53L4A1 expansion board.

The X-NUCLEO-53L4A1 expansion board and the NUCLEO-F401RE are connected through the Arduino compatible connectors CN5, CN6, CN8, and CN9.

The Arduino connectors on the NUCLEO-F401RE board support the Arduino Uno revision 3.

3 Optional VL53L4CD breakout board

The SATEL-VL53L4CD is designed to connect remotely the VL53L4CD sensor to any type of electronic controller.

The VL53L4CD breakout boards can be directly plugged onto the VL53L4CD expansion board through two 6-pin connectors or can be connected to the VL53L4CD expansion board through flying wires.

Breakout boards can be purchased separately using the reference: SATEL-VL53L4CD. In this pack, two breakout boards are provided.

4 Schematic diagrams

The P-NUCLEO-53L4A1 kit consists of an X-NUCLEO-53L4A1 expansion board and a NUCLEO-F401RE development board.

You can find the related schematic diagrams at the following links:

- X-NUCLEO-53L4A1 schematic diagrams
- NUCLEO-F401RE schematic diagrams

Revision history

Table 1. **Document revision history**

Date	Revision	Changes
28-Jun-2022	1	Initial release.