

Data brief

# Breakout boards based on the VL53L1 Time-of-Flight ranging sensor with multi object detection and field of view programming



#### **Features**

- · Two breakout boards, integrating:
  - VL53L1 ranging Time-of-Flight (ToF) sensor
  - Regulator: 5 to 2.8 V range input voltage (output voltage: 2.8 V)
- · True distance measurement independent of target size and reflectance
- Divisible board enabling use as mini PCB breakout board, easy to integrate in customer device

### **Description**

The VL53L1-SATEL breakout boards can be used for easy integration into customer devices.

Thanks to the voltage regulator and level shifters, the VL53L1 breakout boards can be used in any application with a 2.8 V to 5 V supply.

The PCB section supporting the VL53L1 module is perforated so that developers can break off the mini PCB for use in a 2.8 V supply application using flying leads. This makes it easier to integrate the VL53L1-SATEL breakout boards into development and evaluation devices due to their small size.

Product status link

VL53L1-SATEL



#### 1 VL53L1 overview

The VL53L1 is a state-of-the-art, ToF, laser-ranging, miniature sensor enhancing STMicroelectronics' Flight Sense product family. Housed in a miniature and reflowable package, it integrates a SPAD (single photon avalanche diode) array, physical IR filters, and optics to achieve the best ranging performance in various ambient lighting conditions, with a wide range of cover windows.

Unlike conventional IR sensors, the VL53L1 uses ST's latest ToF technology which allows absolute distance measurement whatever the target color and reflectance. It provides accurate ranging up to 8 m and can work at fast speeds (60 Hz), which makes it the fastest miniature ToF sensor on the market.

With patented algorithms and ingenious module construction, the VL53L1 is also able to detect different objects within the FoV (field of view) with depth understanding at 60 Hz.

Scene browsing and multi zone detection is now possible with the VL53L1, thanks to a software customizable detection array for quicker "touch-to-focus" or mini depth map use cases.

Note:

The VL53L1 is delivered with a liner, to prevent potential foreign material penetrating the module holes during the assembly process. The liner must be removed at the latest possible step during final assembly and before module calibration.

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## 2 Breakable board

For 2.8 V supply applications, the breakout boards can be broken along the red dotted line as shown in the figure below, to use the "mini PCB". This set up is easier to integrate into a customer device due to its small size.

INT 5V to 2.8V HC1 ( supply SDA application VDD GND XSDN 2.8V NC3 Mini supply application PCB VDD=

Figure 1. Breakout board layout

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## 3 Schematic and list of materials

XC6222B281MR-G VL53L1 breakout board VIN VOUT VL53L1 v... 2 VSS CE \_\_c1 AVDDVCSEL 1 1 2 GND4 AVSSVCSEL 2 11 AVDD GND 3 10 SCL GND2 4 9 SDA XSHUT 5 8 DNC GND3\* 6 7 GPI01 NC  $\frac{4}{\sqrt{10\mu}}$ U2 R18 2 1 XSDN\_I 4 3 VDD R19 N/F \* Could be or N.C. or Grounded SDA\_I TXS0108EPWR 20 B1 A1 R2 1k VL53L1 Mini PCB INT XSDN 19 R8 [ VCCB VCCA 18 B2 3 100nF сз∐ A2 NC1 NC0 R5 N/F 17 B3 4 100nF А3 R7\_[ 16 B4 10 A4 15 B5 A5 6 SDA 9 VL53L1 R4 1k SCL 14 B6 A6 7 R12 0R NC1 A7 8 13 <sub>B7</sub> OR XSDN GND A8 9 12 В8 N/F 6 J2 OE 10 \_\_\_\_\_C5 R1 GND T100nF T4.7μF 0R U1 R14 R20 N/F OR OR R11 NC0 R17 N/F R10 SDA R16 N/F 0R SCL R9 N/F R15

Figure 2. Satellite schematic and list of materials

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## 4 Ordering information

**Table 1. Ordering information** 

Order code	Description	
VL53L1-SATEL	Two VL53L1 breakout boards	

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## **Revision history**

Table 2. Document revision history

Date	Version	Changes
23-Jul-2020	1	Initial release
29-Sep-2020	2	Update the ranging value in Section 1 VL53L1 overview

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