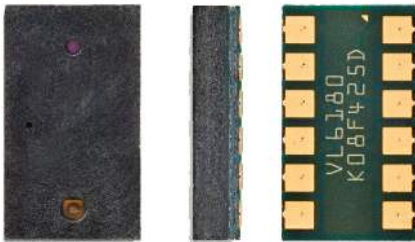


Time-of-Flight proximity sensor and IR emitter two-in-one module



Features

- Two-in-one smart optical module
 - Proximity sensor
 - VCSEL IR light source (850 μm)
- Fast, accurate distance ranging
 - Measures absolute range from 0 to 62 cm max (depending on conditions)
 - Independent of object reflectance
 - Ambient light rejection
 - Crosstalk compensation for cover glass
- Easy integration
 - Single reflowable component
 - No additional optics or gasket
 - Single power supply
- Low power
- I2C interface for device control and data
- Two programmable GPIO
 - Window and thresholding functions for both rangings

Application

- Obstacle and user detection
- Domestic appliances e.g. robotics
- Smart buildings e.g. access control and smart faucets
- Tablet and gaming devices
- Smart phones and portable touchscreen devices

Product status link

[VL6180](#)

Description

The VL6180 is a proximity sensor based on ST's patented FlightSense technology. This is a ground-breaking technology allowing absolute distance to be measured independent of target reflectance. Instead of estimating the distance by measuring the amount of light reflected back from the object (which is significantly influenced by color and surface), the VL6180 precisely measures the time the light takes to travel to the nearest object and reflect back to the sensor (Time-of-Flight).

Combining an IR emitter and a proximity sensor in a two-in-one ready-to-use reflowable package, the VL6180 is easy to integrate and saves the end-product maker long and costly optical and mechanical design optimizations.

The module is designed for low-power operation. Ranging measurements can be automatically performed at user-defined intervals. Multiple threshold and interrupt schemes are supported through two programmable GPIO pins which minimize host operations.

Host control and result reading is performed using an I2C interface.

1 Technical specification

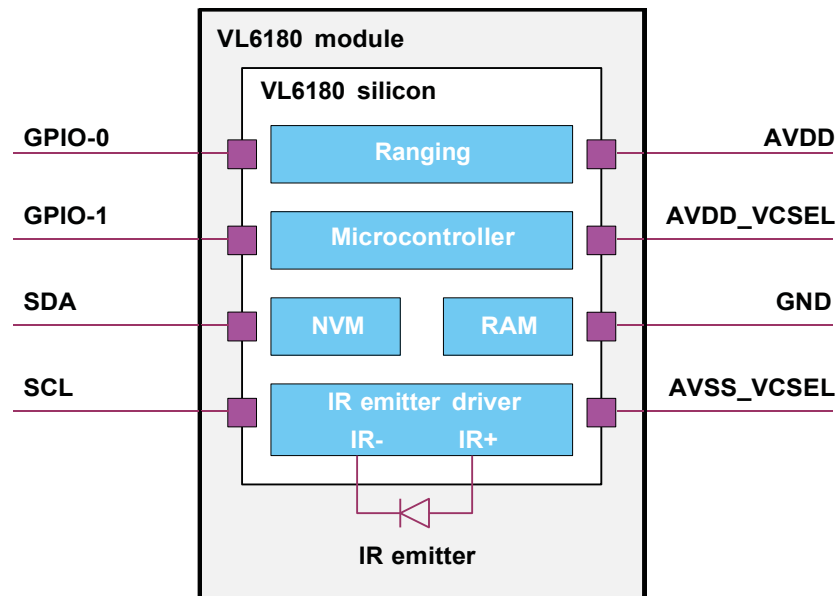
Table 1. Technical specification

Feature	Detail
Package	Optical LGA12
Size	4.8 x 2.8 x 1.0 mm
Ranging	0 to 62 cm maximum ⁽¹⁾
Functional operating voltage	2.6 to 3.0 V
Typical power consumption	Hardware standby (GPIO0 = 0): < 1 μ A ⁽²⁾ Software standby: < 1 μ A ⁽²⁾ Ranging: 1.7 mA (typical average) ⁽³⁾
Functional operating temperature	-20 to 70 °C
IR emitter	850 nm
I2C	400 kHz serial bus Address: 0x29 (7-bit)

1. Maximum ranging distance is dependent on target reflectance and external conditions (ambient light level, temperature, and voltage).
2. GPIO0, GPIO1, SCL, and SDA are pulled up to AVDD (2.8 V).
3. Assumes 10 Hz sampling rate and 17 % reflective target at 50 mm

2 System block diagram

Figure 1. VL6180 block diagram



3 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

4 Ordering information

The VL6180 is currently available in the format below. More detailed information is available on request.

Table 2. Order codes

Order code	Description
VL6180V1NR/1	Tape and reel, MOQ 5000 pieces
X-NUCLEO-6180A1	Nucleo expansion board
P-NUCLEO-6180A1	Nucleo pack (X-NUCLEO-6180A1 and STM32 F401 nucleo board)
VL6180-SATEL	Breakout boards (two boards included)

Revision history

Table 3. Document revision history

Date	Version	Changes
20-Feb-2013	1	Initial release
21-Mar-2013	2	Updates to Section 1 Technical specification
11-Dec-2013	3	Corrected drawing on page 1
07-Jan-2014	4	Updates to Section 1 Technical specification
28-Oct-2019	5	Updated cover image, Features, Applications, Description, Section 1 Technical specification , Section 2 System block diagram and Section 4 Ordering information . Renamed "ECOPack" → Section 3 Package information .

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