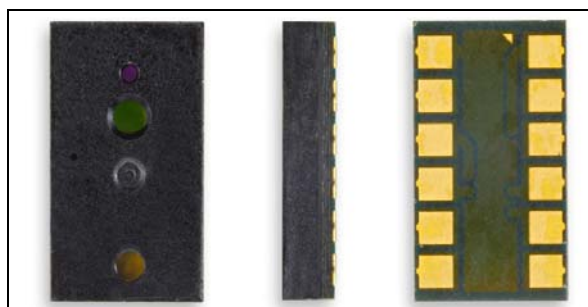


Proximity and ambient light sensing (ALS) module

Data brief



- Window and thresholding functions for both ranging and ALS

Description

The VL6180X is the latest product 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 VL6180X 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, a range sensor and an ambient light sensor in a three-in-one ready-to-use reflowable package, the VL6180X is easy to integrate and saves the end-product maker long and costly optical and mechanical design optimizations.

The module is designed for ultra low power operation. Ranging and ALS measurements can be automatically performed at user defined intervals. Multiple threshold and interrupt schemes are supported to minimize host operations.

Host control and result reading is performed using an I²C interface. Optional additional functions, such as measurement ready and threshold interrupts, are provided by two programmable GPIO pins.

Applications

- Smartphones/portable touchscreen devices
- Tablet/laptop/gaming devices
- Domestic appliances/industrial devices

Features

- Three-in-one smart optical module
 - Proximity sensor
 - Ambient Light Sensor
 - VCSEL light source
- Fast, accurate distance ranging
 - Measures absolute range from 0 to above 10 cm
 - Independent of object reflectance
 - Ambient rejection
 - Crosstalk compensation for cover glass
- Gesture recognition
 - Distance and signal level can be used by host system to implement gesture recognition
 - Demo systems (implemented on Android smartphone platform) available.
- Ambient light sensor
 - High dynamic range
 - Accurate/sensitive in ultra-low light
 - Calibrated output value in lux
- Easy integration
 - Single reflowable component
 - No additional optics or gasket
 - Single power supply
 - I²C interface for device control and data
- Two programmable GPIO

Technical specification

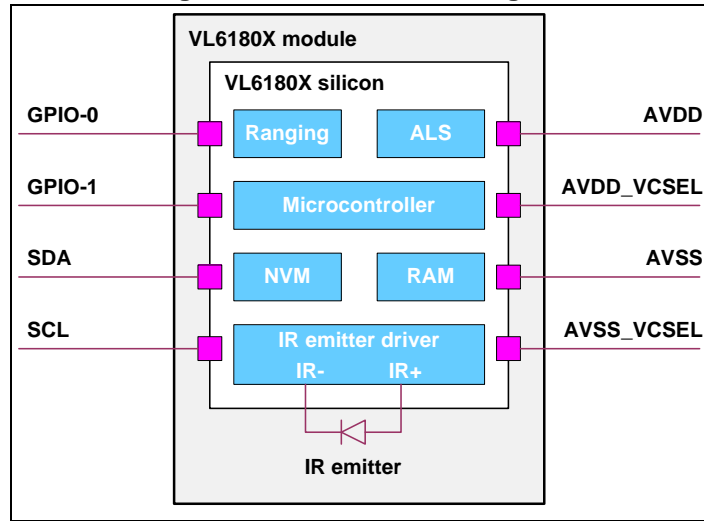
Table 1. Technical specification

Feature	Detail
Package	Optical LGA12
Size	4.8 x 2.8 x 1.0 mm
Ranging	0 to above 100 mm ⁽¹⁾
Ambient light sensor	< 1 Lux up to 100 kLux ⁽²⁾ 16-bit output ⁽³⁾ 8 manual gain settings
Functional operating voltage	2.6 to 3.0 V
Optimum operating voltage	2.7 to 2.9 V ⁽⁴⁾
Typical power consumption	Hardware standby (GPIO0 = 0): < 1 μ A Software standby: < 1 μ A ALS: 300 μ A Ranging: 1.7 mA (typical average) ⁽⁵⁾
Functional operating temperature	-20 to 70°C
Optimum operating temperature	-10 to 60°C ⁽⁴⁾
IR emitter	850 nm
I ² C	400 kHz serial bus Address: 0x29 (7-bit)

1. Ranging beyond 100mm is possible with certain target reflectivities and ambient conditions but not guaranteed.
2. When used under a cover glass with 10% transmission in the visible spectrum
3. Digital output easily converted to Lux
4. Please refer to full datasheet for ranging specification
5. Assumes 10 Hz sampling rate, 17% reflective target at 50 mm

System block diagram

Figure 1. VL6180X block diagram



Ordering information

VL6180X is currently available in the following format. More detailed information is available on request.

Table 2. Delivery format

Order code	Description
VL6180XV0NR/1	Tape and reel (5000 units in a reel)

ECOPACK®

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.

Revision history

Table 3. Document revision history

Date	Revision	Changes
16-May-2014	1	Initial release.

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