VL6180

Time-of-Flight (ToF) proximity sensor, Ambient Light Sensor (ALS) and IR emitter, 3-in-1 module

Data brief - preliminary data

Features

- Three-in-one smart optical module
  - VCSEL light source
  - Ambient Light Sensor
  - Proximity sensor
- Fast, accurate distance ranging
  - Measures absolute range up to 50cm
  - 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
- I^2C interface for device control and data
- Two programmable GPIO
  - Window and thresholding functions for both ranging and ALS

Description

The VL6180 is the latest product based on ST's patented F**light**Sense™ 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, a range sensor and an ambient light sensor in a three-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 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 I^2C 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

Technical specification

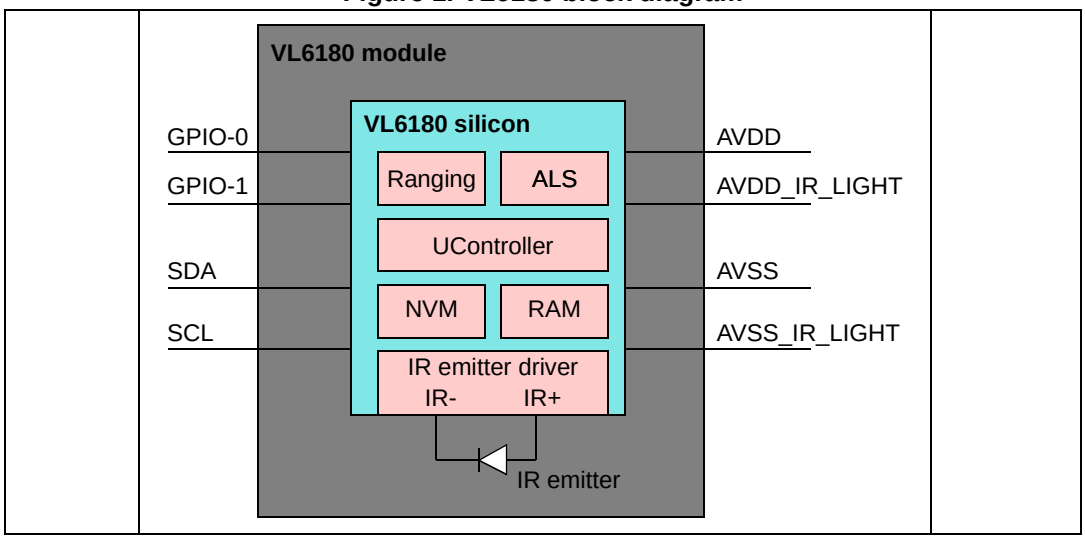
Table 1. Technical specification

Feature	Detail
Package	Optical LGA12
Size	4.8 x 2.8 x 1.0 mm
Ranging	0 to 50 cm(1)
Ambient light sensor	0.038 to 50klux(2) 16-bit output(3)
Operating voltage	2.5 to 3.0V
Typical current consumption	Hardware standby: <1 uA Software standby: <1uA ALS: 280uA (typical) Ranging: < 1.5mA (typical)
Operating temperature	-20 to 70°C
IR emitter	850nm
I^2C address	0x29 (7-bit)

1. Maximum ranging distance dependent on target and ambient light conditions
2. Light level at module (if used, cover glass transmission must be taken into account)
3. Output in counts, which can be converted to Lux.

System block diagram

Figure 1. VL6180 block diagram



Ordering information

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

Table 2. Delivery format

Order code	Description
VL6180V0NR/1	Tape and reel, MOQ 5000 pieces
MOB-EVK2-180-01	Evaluation kit
PCB1453-00C	VL6180 on plug-in PCB

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
20-Feb-2013	1	Initial release.
21-Mar-2013	2	Updates to *Technical specification on page 2*.
11-Dec-2013	3	Corrected drawing on page 1
07-Jan-2014	4	Updates to *Table 1.: Technical specification on page 2* and order codes

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