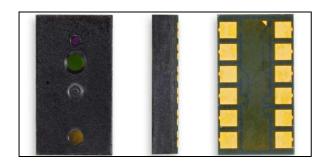


Time-of-Flight (ToF) proximity sensor, Ambient Light Sensor (ALS) and IR emitter, 3-in-1 module

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
- I²C 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 FlightSenseTM 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 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

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 ² C 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

VL6180 module VL6180 silicon GPIO-0 AVDD Ranging **ALS** GPIO-1 AVDD_IR_LIGHT **UController** SDA AVSS NVMRAM SCL AVSS_IR_LIGHT IR emitter driver IR-IR+ IR emitter

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
ı	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

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries. Information in this document supersedes and replaces all information previously supplied. The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com



