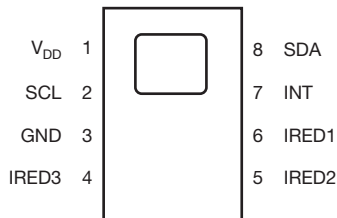


# Fully Integrated Proximity and Ambient Light Sensor with I<sup>2</sup>C Interface and Interrupt Function for Gesture Applications



## DESCRIPTION

VCNL4035X01 integrates a proximity sensor (PS), ambient light sensor (ALS), a mux, and a driver for up to 3 external IREDs / LEDs into one small package. It incorporates photodiodes, amplifiers, and analog to digital converting circuits into a single chip by CMOS process. The 16-bit high resolution ALS offers excellent sensing capabilities with sufficient selections to fulfill most applications whether dark or high transparency lens design. Both ALS and PS programmable interrupt features of individual high and low thresholds offers the best utilization of resource and power saving on the microcontroller.

The proximity sensor features an intelligent cancellation scheme, so that cross talk phenomenon is eliminated effectively. To accelerate the PS response time, smart persistence prevents the misjudgment of proximity sensing but also keeps a fast response time. Active force mode, one time trigger by one instruction, is another good approach for more design flexibility to fulfill different kinds of applications with more power saving.

The adoption of patented Filtron™ technology achieves the closest ambient light spectral sensitivity to real human eye responses and offers the best background light cancellation capability (including sunlight) without utilizing the microcontrollers' resources. VCNL4035X01 provides an excellent temperature compensation capability for keeping output stable under various temperature configurations. ALS and PS functions are easily operated via the simple command format of I<sup>2</sup>C (SMBus compatible) interface protocol. Operating voltage ranges from 2.5 V to 3.6 V. VCNL4035X01 is packaged in a lead-free 8-pin molding package, which offers the best market-proven reliability quality.

## FEATURES

- Package type: surface mount
- Dimensions (L x W x H in mm): 4.0 x 2.36 x 0.75
- AEC-Q101 qualified
- Integrated modules: ambient light sensor (ALS), proximity sensor (PS), and signal conditioning IC
- Operates ALS and PS in parallel structure
- Filtron™ technology adoption for robust background light cancellation
- Temperature compensation: -40 °C to +105 °C
- Low power consumption I<sup>2</sup>C (SMBus compatible) interface
- Output type: I<sup>2</sup>C bus (ALS / PS)
- Operation voltage: 2.5 V to 3.6 V
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
**GREEN**  
(5-2008)

## PROXIMITY FUNCTION

- Immunity to red glow ( $\geq 890$  nm IREDs)
- Programmable IRED sink current
- Intelligent cancellation to reduce cross talk phenomenon
- Smart persistence scheme to reduce PS response time
- Selectable for 12- / 16- bit PS output data

## AMBIENT LIGHT FUNCTION

- High accuracy of ALS  $\pm 10$  %
- Fluorescent light flicker immunity
- Spectrum close to real human eye responses
- Selectable maximum detection range (262 / 524 / 1048 / 2096 / 4192) lux with highest sensitivity 0.004 lux/step

## INTERRUPT

- Programmable interrupt function for ALS and PS with upper and lower thresholds
- Adjustable persistence to prevent false triggers for ALS and PS

## APPLICATIONS

- Handheld device
- Notebook, tablet PC
- Consumer device
- Industrial application

## GESTURE APPLICATION

- 2D and 3D gesture function supported

**PRODUCT SUMMARY**

PART NUMBER	OPERATING RANGE (mm)	OPERATING VOLTAGE RANGE (V)	I <sup>2</sup> C BUS VOLTAGE RANGE (V)	IREP PULSE CURRENT (mA) <sup>(2)</sup>	AMBIENT LIGHT RANGE (lx)	AMBIENT LIGHT RESOLUTION (lx)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VCNL4035X01	0 to 500 <sup>(1)</sup>	2.5 to 3.6	1.8 to 5	200	0.004 to 4192	0.004	16 bit, I <sup>2</sup> C	16 bit / 16 bit

**Notes**

- (1) Depending on external IRED  
(2) Adjustable through I<sup>2</sup>C interface

**ORDERING INFORMATION**

ORDERING CODE	PACKAGING	VOLUME <sup>(1)</sup>	REMARKS
VCNL4035X01-GS08	Tape and reel	MOQ: 1800 pcs	4.0 mm x 2.36 mm x 0.75 mm
VCNL4035X01-GS18		MOQ: 7000 pcs	
Sensors demokit <sup>(2)</sup>	-	MOQ: 1 pc	-

**Notes**

- (1) MOQ: minimum order quantity  
(2) Vishay sensor demokit provides USB dongle, basic software including Vishay license. The VCNL4035X01 sensor board could be ordered free of charge. For your order please contact [sensortechnsupport@vishay.com](mailto:sensortechnsupport@vishay.com). Software updates for VCNL4035X01 could be downloaded from web site: [www.vishay.com/optical-sensors/list/product-84###/](http://www.vishay.com/optical-sensors/list/product-84###/)

**ABSOLUTE MAXIMUM RATINGS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Supply voltage		V <sub>DD</sub>	2.5	3.6	V
Operation temperature range		T <sub>amb</sub>	-40	+105	°C
Storage temperature range		T <sub>stg</sub>	-40	+110	°C

**RECOMMENDED OPERATING CONDITIONS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Supply voltage		V <sub>DD</sub>	2.5	3.6	V
Operation temperature range		T <sub>amb</sub>	-40	+105	°C
I <sup>2</sup> C bus operating frequency		f <sub>(I2CCLK)</sub>	10	400	kHz

**PIN DESCRIPTIONS**

PIN ASSIGNMENT	SYMBOL	TYPE	FUNCTION
1	V <sub>DD</sub>	I	Power supply input
2	SCL	I	I <sup>2</sup> C digital bus clock input
3	GND	I	Ground
4	IREP3	I	Cathode (IREP3) connection
5	IREP2	I	Cathode (IREP2) connection
6	IREP1	I	Cathode (IREP1) connection
7	INT	O	Interrupt pin
8	SDA	I / O (open drain)	I <sup>2</sup> C data bus data input / output