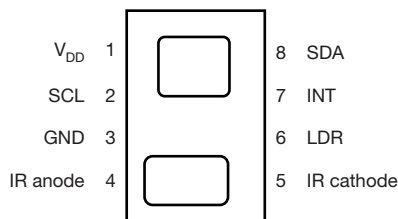


Fully Integrated Proximity and Ambient Light Sensor With Infrared Emitter, I²C Interface, and Interrupt Function (with multiple slave addresses)



LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

[Design Tools](#)

[Related Documents](#)

DESCRIPTION

VCNL4030X01 integrates a proximity sensor (PS), ambient light sensor (ALS), and a high power IRED 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 for excellent sensing capabilities with sufficient selections to fulfill most applications whether dark or high transparency lens design. Both ALS and PS offer a programmable interrupt with individual high and low thresholds offers the power savings on the microcontroller.

The proximity sensor features an intelligent cancellation scheme, so that cross talk is eliminated effectively. The proximity's smart persistence feature prevents the misjudgment of proximity sensing with a fast response time. Active force mode, one time trigger by one instruction, offers more design flexibility to fulfill different kinds of applications with more power savings.

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. VCNL4030X01 provides an excellent temperature compensation capability for keeping the output stable over temperature. ALS and PS functions are easily operated via the simple command format of I²C (SMBus compatible) interface protocol. Operating voltage ranges from 2.5 V to 3.6 V. VCNL4030X01 is packaged in a lead-free 8-pin QFN 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: infrared emitter (IRED), 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
- Low power consumption I²C (SMBus compatible) interface
- Orderable in four different slave addresses
- Output type: I²C bus (ALS / PS)
- Operation voltage: 2.5 V to 3.6 V
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

PROXIMITY FUNCTION

- Immunity to red glow (940 nm IRED)
- 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

INTERRUPT

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

APPLICATIONS

- Proximity sensor for
 - Mobile devices (e.g. smart phones, tablets) for touch screen locking, power saving etc.
 - Automotive for presence detection
- Integrated ambient light function for display / keypad contrast control and dimming of mobile devices
- Collision detection in robots and toys
- Proximity / optical switch for consumer, computing, automotive and industrial devices, and displays (like notebooks, tablet PCs, and automotive touch panels)
- Dimming control for consumer, computing, industrial, and automotive displays

**PRODUCT SUMMARY**

PART NUMBER	OPERATING RANGE (mm)	OPERATING VOLTAGE RANGE (V)	I ² C BUS VOLTAGE RANGE (V)	IRED PULSE CURRENT ⁽¹⁾ (mA)	AMBIENT LIGHT RANGE (lx)	AMBIENT LIGHT RESOLUTION (lx)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VCNL4030X01	0 to 300	2.5 to 3.6	1.8 to 5.5	200	0.004 to 16 768	0.004	16 bit, I ² C	16 bit / 16 bit

Note

⁽¹⁾ Adjustable through I²C interface

ORDERING INFORMATION

ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
VCNL4030X01-GS08	Tape and reel	MOQ: 3300 pcs	4.0 mm x 2.36 mm x 0.75 mm
VCNL4030X01-GS18		MOQ: 13 000 pcs	
VCNL40301X01-GS08		MOQ: 3300 pcs	
VCNL40301X01-GS18		MOQ: 13 000 pcs	
VCNL40302X01-GS08		MOQ: 3300 pcs	
VCNL40302X01-GS18		MOQ: 13 000 pcs	
VCNL40303X01-GS08		MOQ: 3300 pcs	
VCNL40303X01-GS18		MOQ: 13 000 pcs	

Note

⁽¹⁾ MOQ: minimum order quantity

SLAVE ADDRESS OPTIONS

ORDERING CODE	SLAVE ADDRESS (7 bit)
VCNL4030X01-GS08	0x60
VCNL4030X01-GS18	
VCNL40301X01-GS08	0x51
VCNL40301X01-GS18	
VCNL40302X01-GS08	0x40
VCNL40302X01-GS18	
VCNL40303X01-GS08	0x41
VCNL40303X01-GS18	

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

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

RECOMMENDED OPERATING CONDITIONS (T_{amb} = 25 °C, unless otherwise specified)

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