

## Fully Integrated Proximity and Ambient Light Sensors



The VCNL4010, VCNL4020, and VCNL4020X01 are fully integrated proximity and ambient light sensors. Fully integrated means they contain the infrared emitter and photo detector for proximity, an ambient light sensor, a signal processing IC, and I<sup>2</sup>C communication interface. The VCNL3020 supports only proximity sensing; it does not contain an ambient light sensor. With full 16-bit resolution for both the proximity and ambient features, user-defined interrupt levels, and multiple packaging options, the VCNL portfolio will fulfill your requirements.

### FEATURES

- Proximity function
  - 16-bit resolution
  - Excellent crosstalk immunity
  - Programmable LED drive current from 10 mA to 200 mA in 10 mA steps
  - Programmable measurement rate from 1 Hz to 250 Hz
  - Proximity distance up to 20 cm (8 in.)
  - Includes driver for an external emitter for increased range
- Ambient light function
  - Built-in ambient light PIN photodiode with close to human eye sensitivity characteristic
  - 16-bit dynamic range for ambient light detection from 0.25 lx to 16 klx
  - 100 Hz and 120 Hz flicker noise rejection

### RESOURCES

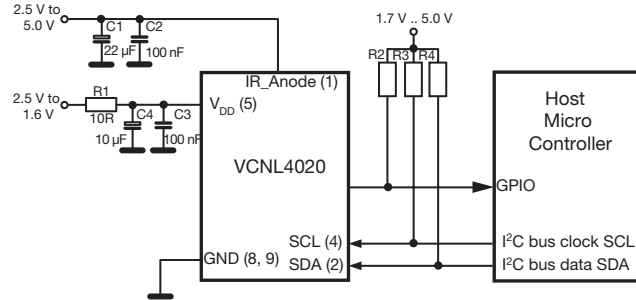
- Datasheets: [VCNL4010](#), [VCNL4020](#), [VCNL3020](#), [VCNL4020X01](#)
- VCNL product family: <http://www.vishay.com/optoelectronics/moreinfo/vcnlfamily>
- For technical questions, contact [sensorstechsupport@vishay.com](mailto:sensorstechsupport@vishay.com)
- Sales contacts: <http://www.vishay.com/doc?99914>



### APPLICATIONS

- Mobile devices (smart phones, touch phones, PDA, GPS)
- Consumer (white goods, cameras, game systems)
- Computing devices (notebooks, tablet PCs)
- Automotive and industrial devices (presence detection and displays)

### APPLICATION CIRCUIT

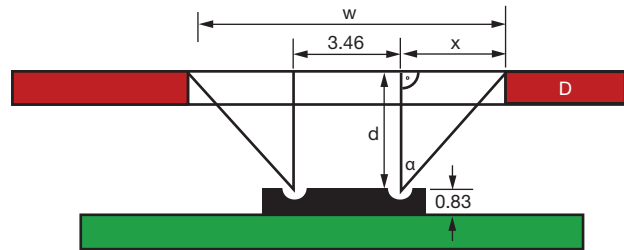


PART NUMBER	PACKAGE		INTEGRATED COMPONENTS			OPERATING TEMP RANGE (°C)	AEC-Q101
	L X W (mm)	HEIGHT (mm)	INFRARED EMITTER	PROXIMITY DETECTOR	AMBIENT LIGHT SENSOR		
<a href="#">VCNL4020X01</a>	4.90 x 2.40	0.83	•	•	•	-40 to 105	•
<a href="#">VCNL3020</a>	4.90 x 2.40	0.83	•	•	x	-25 to 85	x
<a href="#">VCNL4010</a>	3.95 x 3.95	0.75	•	•	•	-25 to 85	x
<a href="#">VCNL4020</a>	4.90 x 2.40	0.83	•	•	•	-25 to 85	x

### WINDOW SIZE

The ideal window sizes for the VCNL4020X01/VCNL4020/VCNL3020 based on the depth of the sensor are shown in the table below. Different shapes and smaller sizes are possible but performance may be impacted.

d (mm)	x (0.84 d)	w (3.46 + 2x)
0.5	0.42	4.30
1.0	0.84	5.14
1.5	1.26	6.02
2.0	1.68	6.82
2.5	2.10	7.66
3.0	2.52	8.50

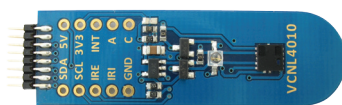


### CURRENT CONSUMPTION

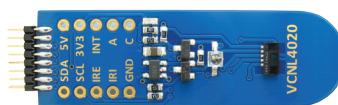
When only the I<sup>2</sup>C interface is active, the current consumption is only 1.5 µA. When proximity is active, the current consumption is a function of the emitter current and the measurements per second. A current calculator is available at <http://www.vishay.com/optoelectronics/opto-sensors-calculator/>.

### EVALUATION KITS

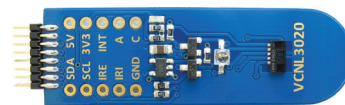
An evaluation kit is available for each of the sensors. Contact any catalog distributor or a local Vishay sales representative to purchase the Sensor Starter Kit and contact [sensorstechsupport@vishay.com](mailto:sensorstechsupport@vishay.com) for kits with the VCNL4010, VCNL4020X01, or VCNL3020.



VCNL4010



VCNL4020



VCNL3020