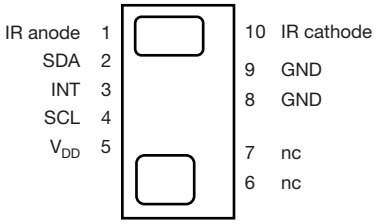
Fully Integrated Proximity Sensor with Infrared Emitter, I²C Interface, and Interrupt Function



FEATURES

- Package type: surface mount
- Dimensions (L x W x H in mm): 4.90 x 2.40 x 0.83
- Integrated modules: infrared emitter (IRED), proximity sensor (PD), and signal conditioning IC
- Interrupt function
- Supply voltage range V_{DD}: 2.5 V to 3.6 V
- Supply voltage range IR anode: 2.5 V to 5 V
- Communication via I²C interface
- I²C bus H-level range: 1.7 V to 5 V
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Low stand by current consumption: 1.5 µA
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

The VCNL3020 is a fully integrated proximity sensor. Fully integrated means that the infrared emitter is included in the package. It has 16 bit resolution. It includes a signal processing IC and features standard I²C communication interface. It features an interrupt function.

APPLICATIONS

- Proximity sensor for mobile devices (e.g. smart phones, touch phones, PDA, GPS) for touch screen locking, power saving, etc.
- Proximity / optical switch for consumer, computing and industrial devices and displays

PROXIMITY FUNCTION

- Built-in infrared emitter and photo-pin-diode for proximity function
- 16 bit effective resolution for proximity detection range ensures excellent cross talk immunity
- Programmable LED drive current from 10 mA to 200 mA in 10 mA steps
- Excellent ambient light suppression by signal modulation
- Proximity distance up to 200 mm

PRODUCT SUMMARY

PART NUMBER	OPERATING RANGE (mm)	OPERATING VOLTAGE RANGE (V)	I²C BUS VOLTAGE RANGE (V)	LED PULSE CURRENT (1) (mA)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VCNL3020	1 to 200	2.5 to 3.6	1.7 to 5	10 to 200	16 bit, I²C	16 bit / -

Note

(1) Adjustable through I²C interface

ORDERING INFORMATION

ORDERING CODE	PACKAGING	VOLUME (1)	REMARKS
VCNL3020-GS08	Tape and reel	MOQ: 3300 pcs	4.90 mm x 2.40 mm x 0.83 mm
VCNL3020-GS18		MOQ: 13 300 pcs	
Sensor starter kit (2)	-	MOQ: 1 pc	-

Notes

(1) MOQ: minimum order quantity

(2) A sensor starter kit is available, along with an add-on demo board for each of the sensors.
Please visit www.vishay.com/moreinfo/vcnldemokit/ for more information.
Contact any catalog distributor or a local Vishay sales representative to purchase the sensor starter kit and contact sensorstechsupport@vishay.com to receive an add-on sensor board.

For technical questions, contact: sensorstechsupport@vishay.com
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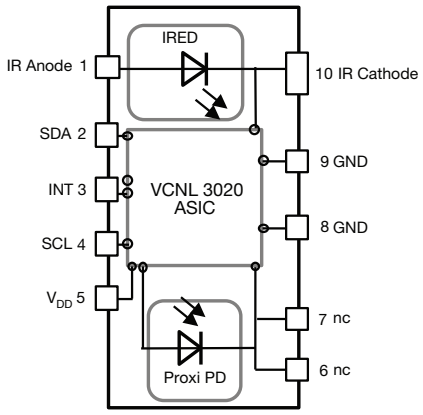
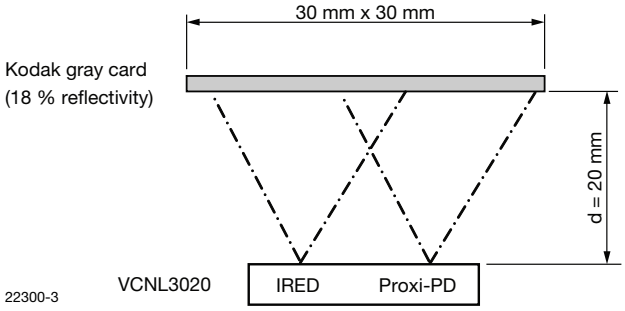
ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)					
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**MAX.**	**UNIT**
Supply voltage		V_{DD}	-0.3	5.5	V
Operation temperature range		T_{amb}	-25	+85	°C
Storage temperature range		T_{stg}	-25	+85	°C
Total power dissipation	$T_{amb} \leq 25$ °C	P_{tot}		50	mW
Junction temperature		T_j		100	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Supply voltage V_{DD}			2.5		3.6	V
Supply voltage IR anode			2.5		5	V
I^2C Bus H-level range			1.7		5	V
INT H-level range			1.7		5	V
INT low voltage	3 mA sink current				0.4	V
Current consumption	Standby current, no IRED-operation			1.5	2	µA
Current consumption proximity mode incl. IRED (averaged)	2 measurements per second, IRED current 20 mA			5		µA
	250 measurements per second, IRED current 20 mA			520		µA
	2 measurements per second, IRED current 200 mA			35		µA
	250 measurements per second, IRED current 200 mA			4		mA
I^2C clock rate range		f_{SCL}			3400	kHz

CIRCUIT BLOCK DIAGRAM



TEST CIRCUIT



Note

- nc must not be electrically connected
  Pads 6 and 7 are only considered as solder pads

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