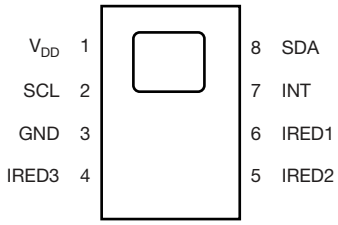
High Resolution Digital Proximity Sensor With I²C Interface



LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Technical Notes

DESCRIPTION

VCNL3036X01 integrates a proximity sensor (PS), a mux, and a driver for up to 3 external IREDs into one small package. It incorporates photodiodes, amplifiers, and analog to digital converting circuits into a single chip by CMOS process. PS programmable interrupt features of individual high and low thresholds offers the best utilization of resource and power saving on the microcontroller.

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: proximity sensor (PS) and signal conditioning IC
- Temperature compensation: -40 °C to +105 °C
- Low power consumption I²C (SMBus compatible) interface
- Output type: I²C bus
- 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

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

PROXIMITY FUNCTION

- Programmable IRED sink current
- Intelligent cancellation to reduce cross talk phenomenon
- Smart persistence scheme to reduce PS response time
- Selectable for 12-bit / 16-bit PS output data

INTERRUPT

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

APPLICATIONS

- Force feedback applications
- Proximity / optical switch for consumer, computing, automotive, and industrial devices

PRODUCT SUMMARY

PART NUMBER	OPERATING RANGE (1) (mm)	OPERATING VOLTAGE RANGE (V)	I²C BUS VOLTAGE RANGE (V)	IRED PULSE CURRENT (2) (mA)	SPECTRAL BANDWIDTH RANGE $\lambda_{0.5}$ (nm)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VCNL3036X01	0 to 500	2.5 to 3.6	1.8 to 5.5	200	500 to 910	16 bit, I²C	16 bit / -

Notes

(1) Part should be operated in dark condition (not in direct sunlight)

(2) Adjustable through I²C interface

ORDERING INFORMATION

ORDERING CODE	PACKAGING	VOLUME (1)	REMARKS
VCNL3036X01-GS08	Tape and reel	MOQ: 3300 pcs	4.0 mm x 2.36 mm x 0.75 mm
VCNL3036X01-GS18		MOQ: 13 000 pcs	

Note

(1) MOQ: minimum order quantity

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^2C bus operating frequency		$f_{(I2CCLK)}$	10	400	kHz

PIN DESCRIPTIONS			
PIN ASSIGNMENT	**SYMBOL**	**TYPE**	**FUNCTION**
1	V_{DD}	-	Power supply input
2	SCL	I	I^2C digital bus clock input
3	GND	-	Ground
4	IRED3	I	Cathode (IRED3) connection
5	IRED2	I	Cathode (IRED2) connection
6	IRED1	I	Cathode (IRED1) connection
7	INT	O	Interrupt pin
8	SDA	I / O (open drain)	I^2C data bus data input / output

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 current		Excluded LED driving	I_{DD}	-	300	-	µA
		Light condition = dark, V_{DD} = 3.3 V	I_{DD} (SD)	-	0.2	-	µA
I^2C supply voltage			$V_{PULL\ UP}$	1.8	-	5.5	V
PS enable			I_{PSSD}	-	200	-	µA
I^2C signal input	Logic high	V_{DD} = 3.3 V	V_{IH}	1.55	-	-	V
	Logic low		V_{IL}	-	-	0.4	
	Logic high	V_{DD} = 2.6 V	V_{IH}	1.4	-	-	V
	Logic low		V_{IL}	-	-	0.4	
Full PS counts		12-bit / 16-bit resolution		-	-	4096 / 65 535	steps
PS detection range		Kodak gray card (1)(2)		0	-	500	mm
Operating temperature range			T_{amb}	-40	-	+105	°C
LED anode voltage				-	-	5.5	V
IRED driving current				-	-	200	mA

Notes

(1) Depending on external IRED

(2) Part should be operated in dark condition (not in direct sunlight)