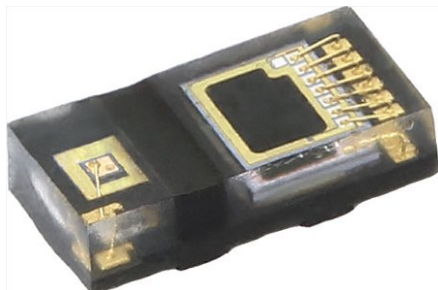# A Small Package Proximity Sensor With a VCSEL, Low Idle Current, I²C Interface, and Smart Dual Slave Address

DESCRIPTION

The VCNL36828P is a fully integrated proximity sensor. It combines a vertical-cavity surface-emitting laser (VCSEL), photodiode, and application-specific integrated circuit (ASIC) within a single package. The VCNL36828P has been developed for proximity detection applications that require a dual slave address, low power consumption, small package size, small window size, and short range operation. In addition, given the typical rated supply voltage of 1.8 V to reduce power consumption, the sensor is intended for battery-powered applications.

FEATURES

- Package type: surface-mount
- Dimensions (L x W x H in mm): 2.0 x 1.0 x 0.5
- Integrated modules: vertical-cavity surface-emitting laser (VCSEL), photodiode, and application-specific integrated circuit (ASIC)
- 1.8 V rated power supply and I²C bus
- Low power consumption with 5 µA idle current
- A small package allows a design with a small window size
- Smart dual I²C slave address in one package
- Immunity to red glow (940 nm VCSEL)
- Programmable I_{VCSEL} sink current
- Intelligent cancellation to reduce cross talk phenomenon
- Smart persistence scheme to reduce measurement response time
- Interrupt functionality
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

APPLICATIONS

- Smartphones and true wireless stereo (TWS) earbuds
- VR / AR headsets and smart glasses
- Smartwatches
- Touchless button / dispensing

PRODUCT SUMMARY

PART NUMBER	OPERATING RANGE (mm)	OPERATING VOLTAGE RANGE (V)	I²C BUS VOLTAGE RANGE (V)	MAX. VCSEL DRIVING CURRENT (mA)	OUTPUT CODE	ADC RESOLUTION PROXIMITY / AMBIENT LIGHT
VCNL36828P	200	1.65 to 2.00	1.2 to 3.6	20	12 bit / 16 bit, I²C	16 bit / -

ORDERING INFORMATION

ORDERING CODE	PACKAGING	VOLUME [1]	REMARKS
VCNL36828P	Tape and reel	MOQ: 5000 pcs, 5000 pcs/reel	2.0 mm x 1.0 mm x 0.5 mm

Note

[1] MOQ: minimum order quantity

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PIN DEFINITION
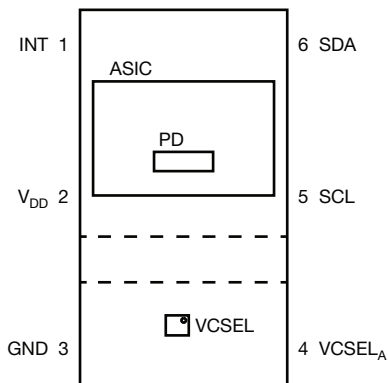
| PIN DESCRIPTION			
PIN NUMBER	PIN NAME	TYPE	DESCRIPTION
1	INT	O (open drain)	Interrupt
2	V_{DD}	I	Supply voltage
3	GND	I	Ground
4	$VCSEL_A$	I	VCSEL anode
5	SCL [1]	I / O (open drain)	I²C serial clock
6	SDA [1]	I / O (open drain)	I²C serial data

Note

[1] Pin 5 (SCL) and pin 6 (SDA) can be swapped to change the slave address from 0x60 to 0x51; please refer to Table 1

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Supply voltage		V_{DD}	0	2	V
Ambient temperature range		T_{amb}	-40	+85	°C
Storage temperature range		T_{stg}	-40	+100	°C

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

| PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
ASIC						
Supply voltage		V_{DD}	1.65	1.80	2.00	V
Supply current [1]	Shutdown state; light condition = dark; V_{DD} = 1.8 V	I_{DD}	-	1	-	µA
	Idle state [2]; V_{DD} = 1.8 V		-	5	-	
	Active state [2]; V_{DD} = 1.8 V		-	330	-	
I²C supply voltage		$V_{PULL\ UP}$	1.2	1.8	3.6	V
I²C signal input, logic high	V_{DD} = 1.8 V	V_{IH}	1	-	-	V
I²C signal input, logic low	V_{DD} = 1.8 V	V_{IL}	-	-	0.5	V
VCSEL						
Supply voltage of the VCSEL [3]		V_{VCSEL}	2.62	-	3.60	V
Forward voltage	I_F = 9 mA	V_F	-	1.92	-	V
Forward current		I_F	7	-	20	mA
Angle of half intensity		φ	-	± 4.5	-	°
Peak wavelength	I_F = 9 mA	λ_p	-	940	-	nm
Spectral bandwidth	I_F = 9 mA	$\Delta\lambda$	-	3	-	nm
PHOTODIODE						
Angle of half sensitivity	X-axis [4]	φ	-	± 60	-	°
	Y-axis [4]		-	± 45	-	
Peak sensitivity wavelength		λ_p	-	850	-	nm

Notes

[1] Actual current consumption depends on the register settings. Please refer to the application note on the current consumption

[2] Excluding VCSEL driving current

[3] V_{VCSEL} should at least match the minimum required supply voltage for the VCSEL $V_{VCSEL,\ min}$. Please refer to the $V_{VCSEL,\ min}$ table

[4] Cross section of the package
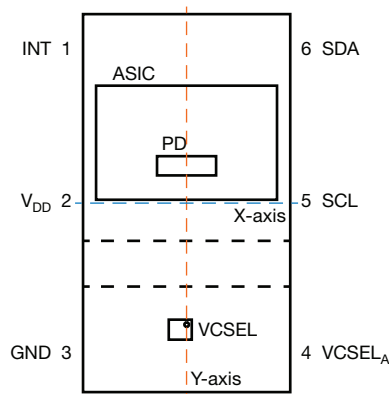
$V_{VCSEL,\ MIN.}$

I_VCSEL (I_F)	7 mA	9 mA	11 mA	12 mA	15 mA	17 mA	19 mA	20 mA
$V_{VCSEL,\ min.}$	2.62 V	2.74 V	2.86 V	2.91 V	3.08 V	3.19 V	3.3 V	3.36 V
$V_{VCSEL,\ max.}$	3.6 V							

LASER CLASS
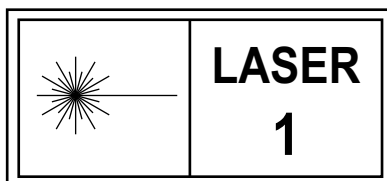
Note
- Product specification with IEC / EN 60825-1:2014 compliance and above label

BLOCK DIAGRAM
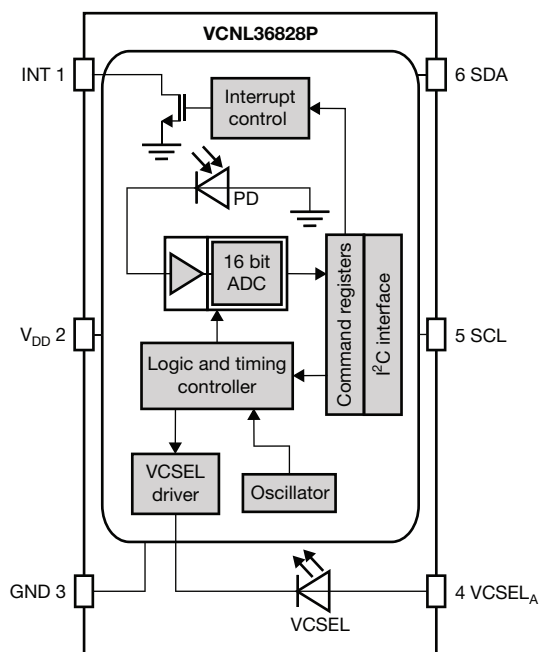
I²C BUS TIMING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	SYMBOL	STANDARD MODE		FAST MODE		UNIT
		MIN.	MAX.	MIN.	MAX.	
Clock frequency	$f_{(I2CCLK)}$	10	100	10	400	kHz
Bus free time between start and stop condition	$t_{(BUF)}$	4.7	-	1.3	-	µs
Hold time after (repeated) start condition; after this period, the first clock is generated	$t_{(HDSTA)}$	4.0	-	0.6	-	µs
Repeated start condition setup time	$t_{(SUSTA)}$	4.7	-	0.6	-	µs
Stop condition setup time	$t_{(SUSTO)}$	4.0	-	0.6	-	µs
Data hold time	$t_{(HDDAT)}$	0	3450	0	900	ns
Data setup time	$t_{(SUDAT)}$	250	-	100	-	ns
I²C clock (SCL) low period	$t_{(LOW)}$	4.7	-	1.3	-	µs
I²C clock (SCL) high period	$t_{(HIGH)}$	4.0	-	0.6	-	µs
Clock / data fall time	$t_{(f)}$	-	300	-	300	ns
Clock / data rise time	$t_{(r)}$	-	1000	-	300	ns

Note

• Data based on standard I²C protocol requirement, not tested in production
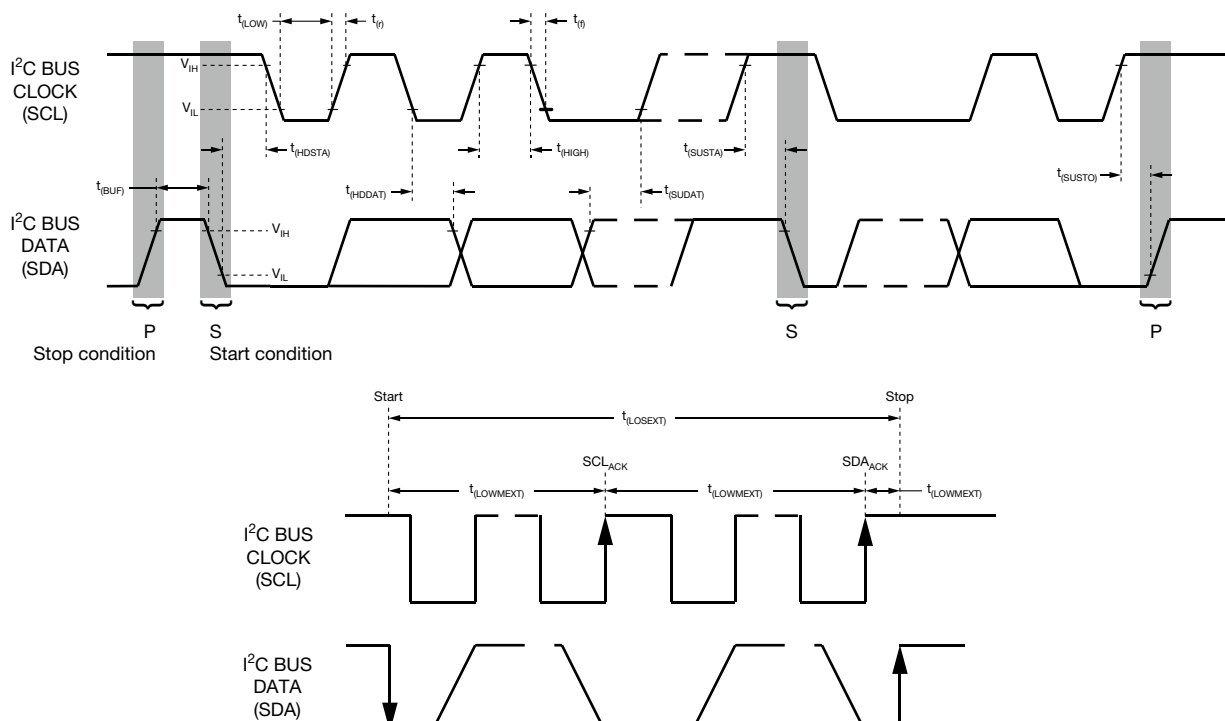
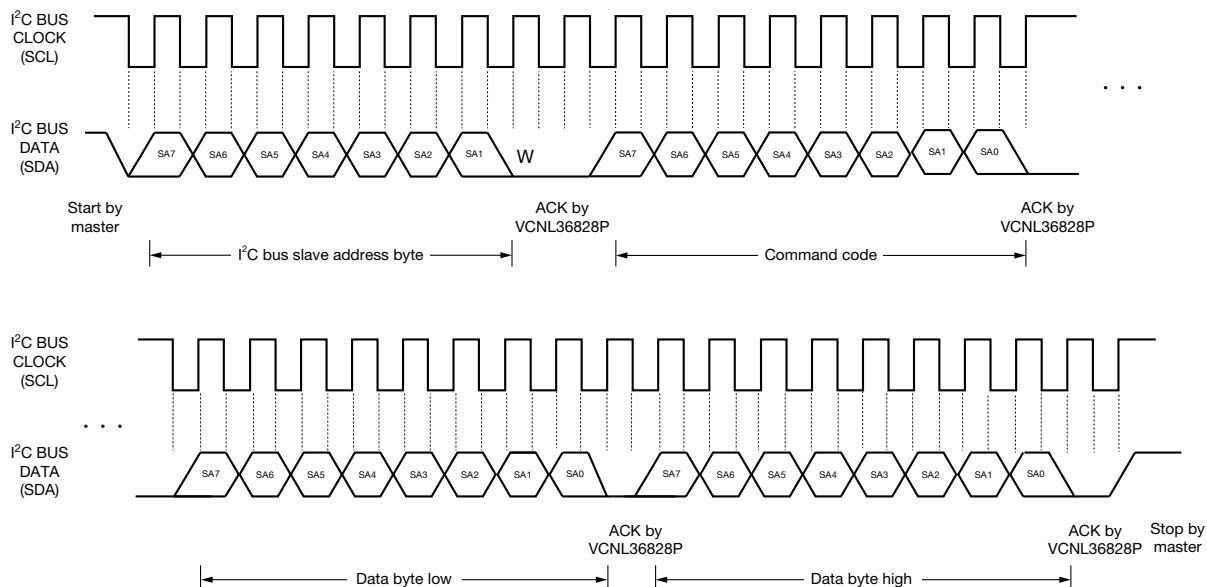Fig. 1 - I²C Bus Timing Diagram

PARAMETER TIMING INFORMATION
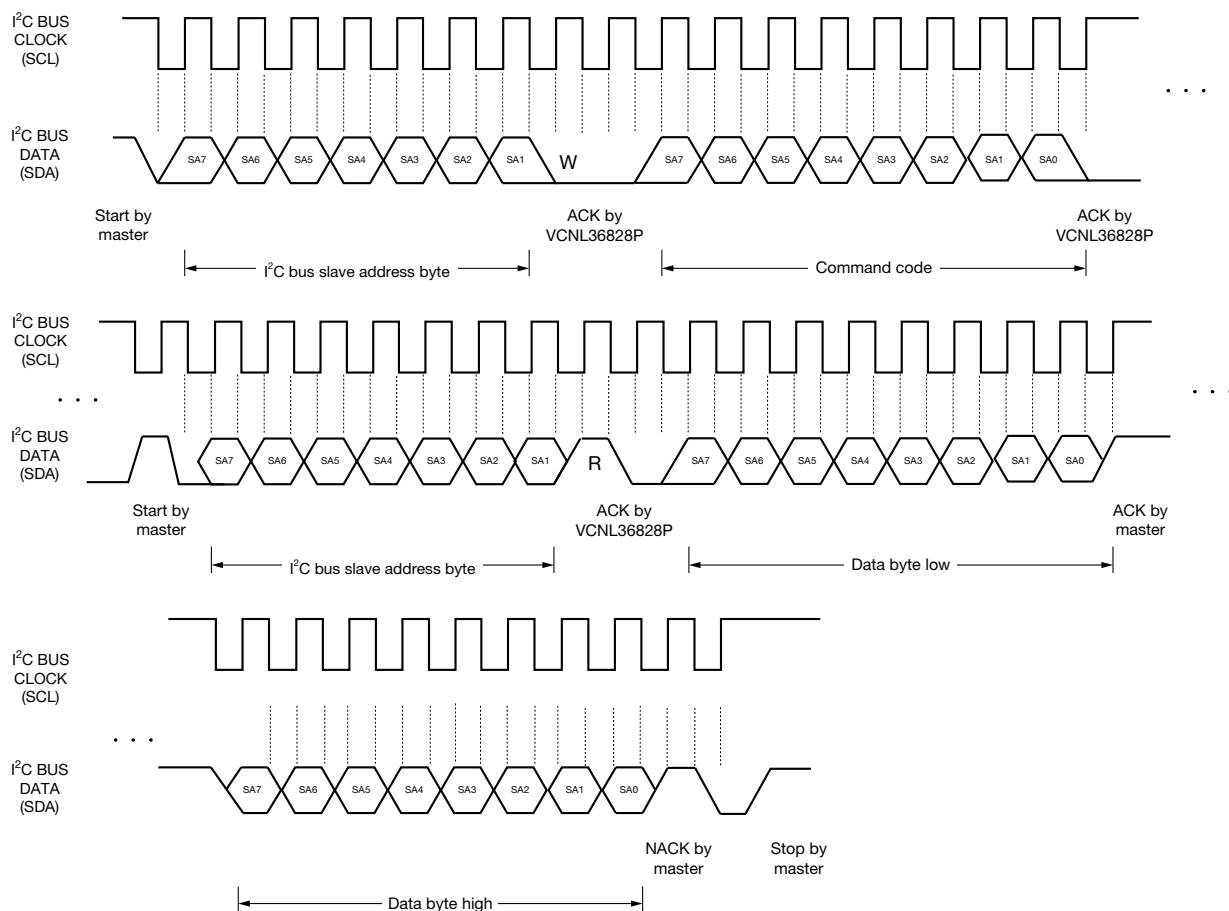

Fig. 2 - I²C Bus Timing for Sending Word Command Format
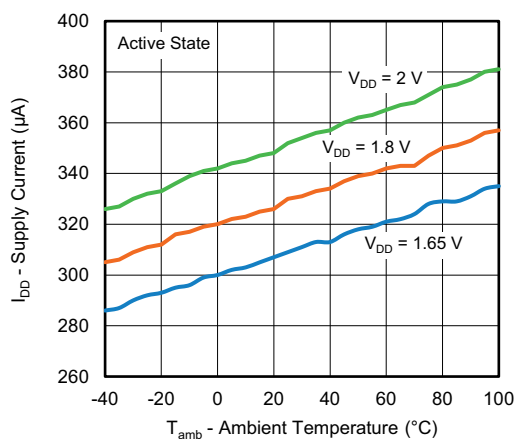

Fig. 3 - I²C Bus Timing for Receiving Word Command Format

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TYPICAL PERFORMANCE CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

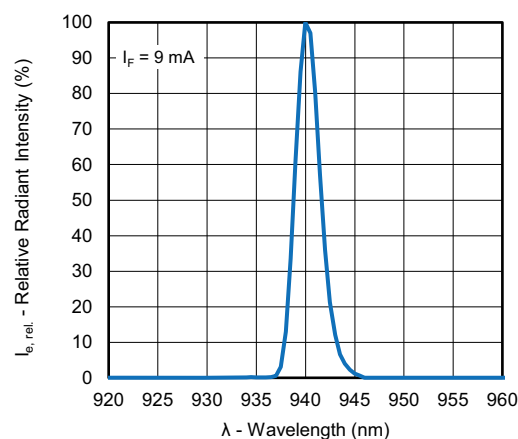Fig. 4 - Supply Current vs. Ambient Temperature

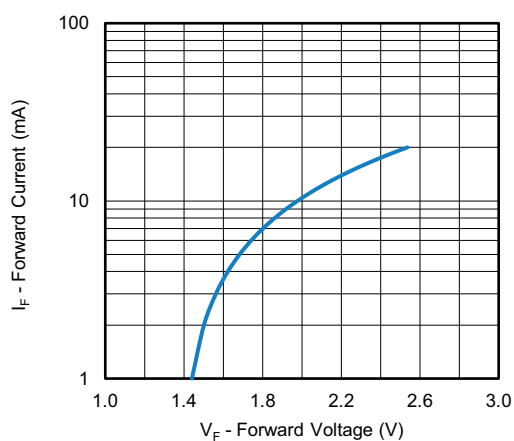Fig. 7 - Relative Radiant Intensity vs. Wavelength of the VCSEL

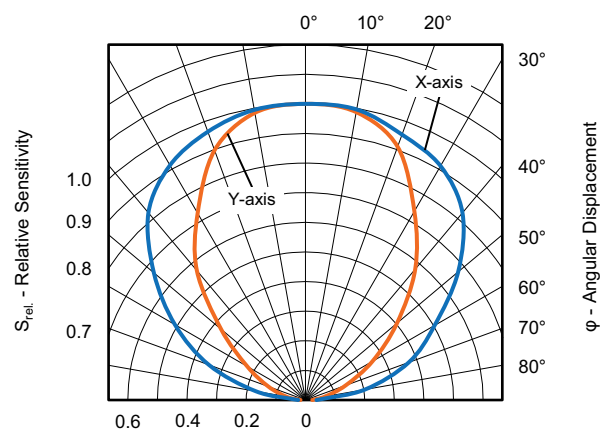Fig. 5 - Forward Current vs. Forward Voltage of the VCSEL

Fig. 8 - Relative Sensitivity vs.
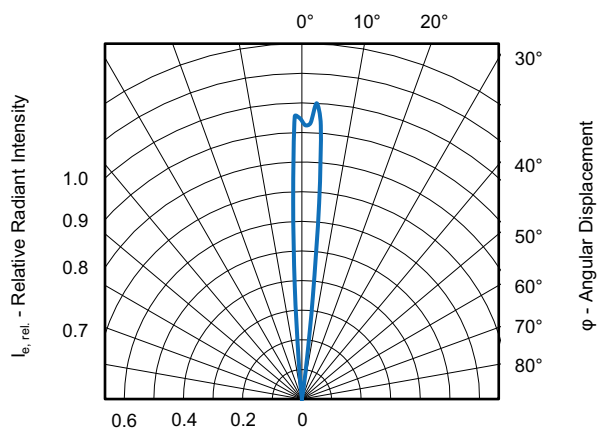Angular Displacement of the Photodiode

Fig. 6 - Relative Radiant Intensity vs.
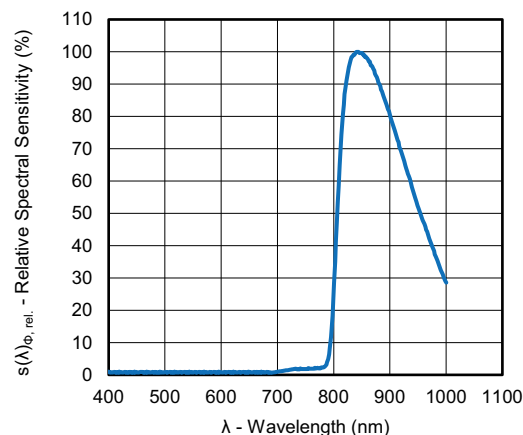Angular Displacement of the VCSEL

Fig. 9 - Relative Spectral Sensitivity vs.
Wavelength of the Photodiode
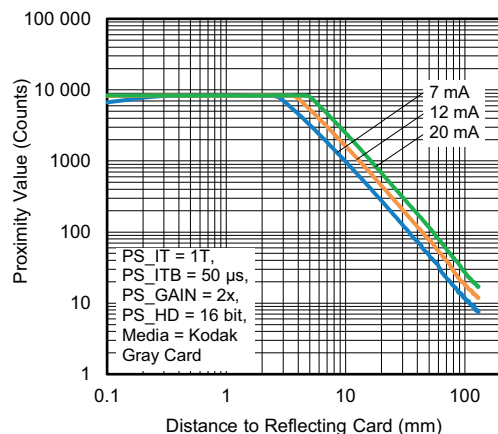
Fig. 10 - Proximity Value vs. Distance
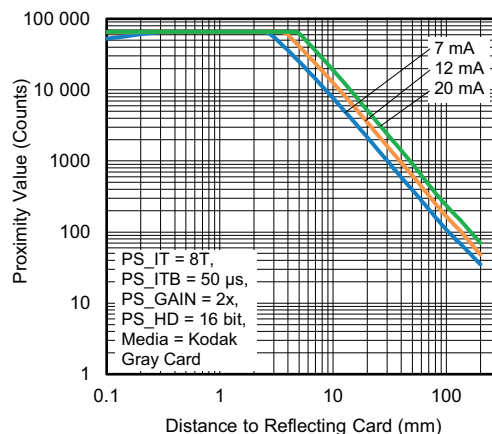
Fig. 11 - Proximity Value vs. Distance

APPLICATION INFORMATION

7 Bit Slave Address Selection

The VCNL36828P supports a smart dual slave address where the designer can change the 7 bit slave address by swapping the SCL and SDA pins, as shown in Table 1.

TABLE 1 - SLAVE ADDRESS TABLE		
PIN 5	**PIN 6**	**7 BIT SLAVE ADDRESS**
SCL	SDA	0x60
SDA	SCL	0x51

A smart dual slave address provides the flexibility for the designer to connect two devices from two different slave addresses on the same I^{2}C bus. Besides that, the two slave address options allow designers to select a different slave address if one is used by the other slave devices on the same I^{2}C bus in a single device application.

Application Circuit With a Single Device - Slave Address 0x60

Fig. 12 shows an application circuit example with a single device. As described in Table 1, when pins 5 and 6 are connected to the clock and data signal from the microcontroller, as shown in Fig. 12, they will then be configured as an SCL pin and SDA pin, respectively. The 7 bit slave address option of 0x60 will be automatically selected.

Fig. 12 - Application Circuit Example for a Single VCNL36828P - Slave Address 0x60

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Application Circuit With a Single Device - Slave Address 0x51

On the other hand, when pins 5 and 6 are connected to the data and clock signal from the microcontroller, as shown in Fig. 13, they will then be configured as an SDA pin and SCL pin, respectively. The 7 bit slave address option of 0x51 will be automatically selected.
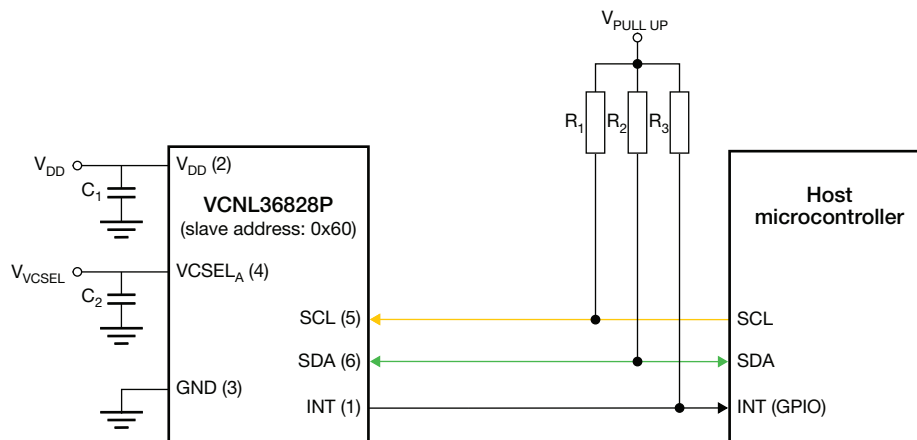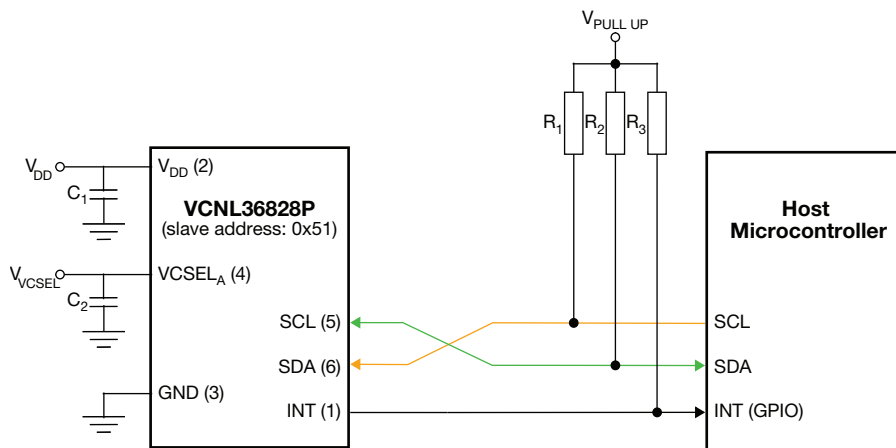

Fig. 13 - Application Circuit Example for a Single VCNL36828P - Slave Address 0x51

Table 2 shows the required values and the explanation for the individual application circuit parameters.

TABLE 2 - APPLICATION CIRCUIT PARAMETERS		
CIRCUIT PARAMETER	**VALUE**	**DESCRIPTION**
V_{DD}	1.65 V to 2.00 V	A stable power supply such as a low dropout regulator or a switching regulator is required; the power supply isolation can be further improved with a decoupling capacitor C_1
V_{VCSEL}	2.62 V to 3.60 V	A stable power supply such as a low dropout regulator or a switching regulator that can supply an adequate amount of power (max. VCSEL pulse driving current of 20 mA) is required; the power supply isolation can be further improved with a decoupling capacitor C_2; the minimum voltage depends on the selected driving current of the VCSEL; please refer to Table $V_{VCSEL, min.}$ for reference
$V_{PULL\ UP}$	1.2 V to 3.6 V	A stable power supply such as a low dropout regulator or a switching regulator is required; a voltage level shifter is required if the I²C bus voltage from the microcontroller is higher than 3.6 V
$C_1 - C_4$	100 nF to 1 µF	Decoupling capacitors are recommended to reduce the noise in the supply voltage
$R_1 - R_2$	2.2 kΩ to 4.7 kΩ	Pull-up resistors within the range of 2.2 kΩ to 4.7 kΩ are recommended; any increase in bus capacitance or resistance will increase the logic high transition time
R_3	4.7 kΩ to 22 kΩ	Pull-up resistor within the range of 4.7 kΩ to 22 kΩ is recommended

Application Circuit With a Smart Dual Slave Address

Fig. 14 shows an application circuit example with a smart dual slave address. By swapping the SCL and SDA pins of the second device, as shown in Table 1, the designer can change the 7 bit slave address of the VCNL36828P. This provides the flexibility for the designer to connect two devices from two different slave addresses on the same I²C bus.
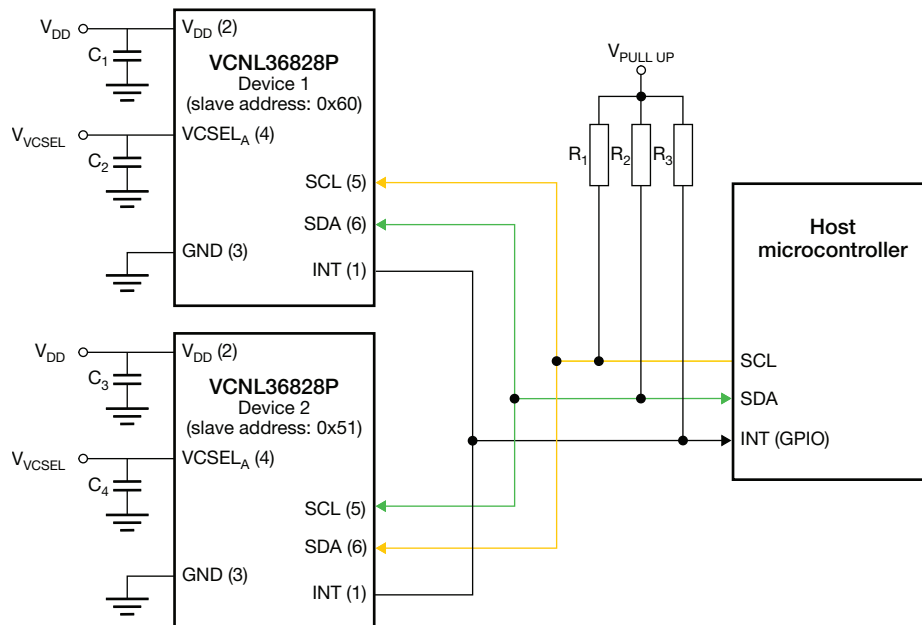
Fig. 14 - Application Circuit Example for Two VCNL36828Ps - Smart Dual Slave Address
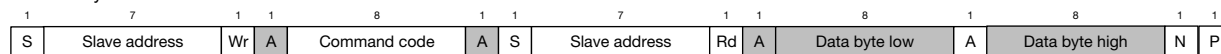
I²C Write and Read Protocol

The communication with the VCNL36828P can be performed via I²C. The I²C write and read protocol when communicating with the proximity sensor is shown in Fig. 15.
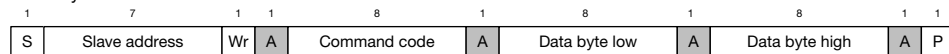
Fig. 15 - I²C Write and Read Protocol

It is imperative that only the restart condition for the I²C read is implemented instead of the stop and restart condition.

Function Description

TABLE 3 - COMMAND CODE AND REGISTER DESCRIPTION					
COMMAND CODE	DATA BYTE LOW / HIGH	REGISTER NAME	DEFAULT VALUE	FUNCTION	ACCESS
0x00	L	PS_CONF1_L	0x00	Internal calibration setting	Write and read
				Switch the sensor on / off	
	H	PS_CONF1_H	0x00	High dynamic range setting	
				Persistence setting	
				Interrupt setting	
0x01	L	PS_CONF2_L	0x00	Measurement period setting	
				Signal strength setting (Integration time and multi-pulse)	
				High gain setting	
	H	PS_CONF2_H	0x00	Sensitivity of the ADC setting	
				Internal crosstalk cancellation setting	
				VCSEL driving current setting	
0x02	L	PS_CONF3_L	0x00	Sensor mode setting	
				Active force mode trigger setting	
	H	PS_CONF3_H	0x00	Short measurement period setting	
				Sunlight cancellation setting	
0x03	L	PS_THDL_L	0x00	Low threshold interrupt value setting (low byte)	
	H	PS_THDL_H	0x00	Low threshold interrupt value setting (high byte)	
0x04	L	PS_THDH_L	0x00	High threshold interrupt value setting (low byte)	
	H	PS_THDH_H	0x00	High threshold interrupt value setting (high byte)	
0x05	L	PS_CANC_L	0x00	Offset count cancellation value setting (low byte)	
	H	PS_CANC_H	0x00	Offset count cancellation value setting (high byte)	
0xF8	L	PS_DATA_L	0x00	Proximity output data (low byte)	Read only
	H	PS_DATA_H	0x00	Proximity output data (high byte)	
0xF9	L	Reserved	0x00 - 0xFF	Reserved	
	H	INT_FLAG	0x00	Interrupt flag	
0xFA	L	ID_L	0x28 / 0x29	Device ID Slave address: 0x60; ID = 0x28 Slave address: 0x51; ID = 0x29	
	H	ID_H	0x01	Device ID	

Notes

- All of the reserved registers are used for internal test. These values must be kept constant
- (1) The default ID depends on the connection of the SCL and SDA pins on the VCNL36828P with the SCL and SDA pins on the host MCU. If pins 5 and 6 on the VCNL36828P are connected to the SCL and SDA pins on the host, the default value will be 0x28. On the other hand, if pins 5 and 6 on the VCNL36828P are connected to the SDA and SCL pins on the host, the default value will be 0x29. Please refer to Fig. 13

Command Register Format

TABLE 4 - REGISTER NAME: PS_CONF1_L							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_CAL	Reserved						PS_ON
COMMAND CODE					**0x00**		
Bit Name	**Function**		**Bit**	**Value**	**Description**		
PS_CAL	Enable / disable the internal calibration		7	0 (0b0)	Disable (default)		
				1 (0b1)	Enable		
Reserved	Reserved		6 : 1	0 (0b000000)	Should be kept default		
PS_ON	Switch the sensor on / off		0	0 (0b0)	Turn off the sensor (shutdown) (default)		
				1 (0b1)	Turn on the sensor		

TABLE 5 - REGISTER NAME: PS_CONF1_H							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Reserved	PS_HD	PS_SP_INT	PS_SMART_PERS	PS_PERS		PS_INT	
COMMAND CODE					**0x00**		
Bit Name	**Function**		**Bit**	**Value**	**Description**		
Reserved	Reserved		15	0 (0b0)	Should be kept default		
PS_HD	Enable / disable high dynamic range (12 bit / 16 bit) ADC output setting		14	0 (0b0)	Disable (12 bit) (default)		
				1 (0b1)	Enable (16 bit)		
PS_SP_INT	Enable / disable the sunlight protection mode interrupt setting		13	0 (0b0)	Disable (default)		
				1 (0b1)	Enable		
PS_SMART_PERS	Enable / disable the smart persistence setting when the interrupt event is triggered		12	0 (0b0)	Disable (default)		
				1 (0b1)	Enable		
PS_PERS	Set the amount of consecutive threshold crossing events necessary to trigger interrupt		11 : 10	0 (0b00)	1 time (default)		
				1 (0b01)	2 times		
				2 (0b10)	3 times		
				3 (0b11)	4 times		
PS_INT	Set the interrupt mode setting		9 : 8	0 (0b00)	Interrupt disable (default)		
				1 (0b01)	Logic high / low mode		
				2 (0b10)	Trigger by the first high threshold event and subsequently by each high / low threshold event		
				3 (0b11)	Trigger by each high / low threshold event		

TABLE 6 - REGISTER NAME: PS_CONF2_L

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_PERIOD		PS_IT		PS_MPS		PS_ITB	PS_GAIN
COMMAND CODE							0x01

Bit Name	Function	Bit	Value	Description
PS_PERIOD	Set the measurement period	7 : 6	0 (0b00)	50 ms, which translates into 20 measurement/s (default)
			1 (0b01)	100 ms, which translates into 10 measurements/s
			2 (0b10)	200 ms, which translates into 5 measurements/s
			3 (0b11)	400 ms, which translates into 2.5 measurements/s
PS_IT	Set the integration time for one measurement; the pulse length "T" is determined by PS_ITB	5 : 4	0 (0b00)	1 T (default)
			1 (0b01)	2 T
			2 (0b10)	4 T
			3 (0b11)	8 T
PS_MPS	Set the number of infrared signal pulses per measurement	3 : 2	0 (0b00)	1 pulse (default)
			1 (0b01)	2 pulses
			2 (0b10)	4 pulses
			3 (0b11)	8 pulses
PS_ITB	Set the pulse length "T" for PS_IT	1	0 (0b0)	T = 25 µs (default)
			1 (0b1)	T = 50 µs
PS_GAIN	Set the gain of the ADC	0	0 (0b0)	x 1 gain (default)
			1 (0b1)	x 2 gain

TABLE 7 - REGISTER NAME: PS_CONF2_H

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Reserved		PS_SENS	PS_OFFSET	Reserved	I_VCSEL		
COMMAND CODE							0x01

Bit Name	Function	Bit	Value	Description
Reserved	Reserved	15 : 14	0 (0b00)	Should be kept default
PS_SENS	Set the sensitivity of the ADC	13	0 (0b0)	Normal sensitivity (default)
			1 (0b1)	High sensitivity
PS_OFFSET	Enable / disable the internal crosstalk cancellation	12	0 (0b0)	Disable (default)
			1 (0b1)	Enable
Reserved	Reserved	11	0 (0b0)	Should be kept default
I_VCSEL	Set the VCSEL driving current	10 : 8	0 (0b000)	7 mA (default)
			1 (0b001)	9 mA
			2 (0b010)	11 mA
			3 (0b011)	12 mA
			4 (0b100)	15 mA
			5 (0b101)	17 mA
			6 (0b110)	19 mA
			7 (0b111)	20 mA

TABLE 8 - MAXIMUM BIT RESOLUTION AND DIGITAL OUTPUT COUNTS

BIT NAME		PS_IT = 1T	PS_IT = 2T	PS_IT = 4T	PS_IT = 8T
PS_HD = 0 (12 bit)	PS_GAIN = 0 (x1 gain)	12 bit / 4095 counts			
	PS_GAIN = 1 (x2 gain)				
PS_HD = 1 (16 bit)	PS_GAIN = 0 (x1 gain)	12 bit / 4095 counts	13 bit / 8191 counts	14 bit / 16 383 counts	15 bit / 32 767 counts
	PS_GAIN = 1 (x2 gain)	13 bit / 8191 counts	14 bit / 16 383 counts	15 bit / 32 767 counts	16 bit / 65 535 counts

TABLE 9 - REGISTER NAME: PS_CONF3_L

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved		PS_TRIG	PS_MODE	Reserved			

COMMAND CODE			0x02		
Bit Name	**Function**	**Bit**	**Value**	**Description**	
Reserved	Reserved	7 : 6	0 (0b00)	Should be kept default	
PS_TRIG	Set the active force mode trigger; This bit will be reset to 0 after the measurement cycle	5	0 (0b0)	Off (default)	
			1 (0b1)	Trigger	
PS_MODE	Set the measurement mode of the sensor	4	0 (0b0)	Auto mode (default)	
			1 (0b1)	Active force mode	
Reserved	Reserved	3 : 0	0 (0b0000)	Should be kept default	

TABLE 10 - REGISTER NAME: PS_CONF3_H

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
PS_SHORT_PERIOD		Reserved	PS_SC			Reserved	

COMMAND CODE			0x02		
Bit Name	**Function**	**Bit**	**Value**	**Description**	
PS_SHORT_PERIOD	Set the short measurement period	15 : 14	0 (0b00)	Disable the short period (follow PS_PERIOD setting) (default)	
			1 (0b01)	6.25 ms, which translates into 160 measurements/s	
			2 (0b10)	12.5 ms, which translates into 80 measurements/s	
			3 (0b11)	25 ms, which translates into 40 measurements/s	
Reserved	Reserved	13	0 (0b0)	Should be kept default	
PS_SC	Enable / disable the sunlight cancellation	12 : 10	0 (0b000)	Disable (default)	
			7 (0b111)	Enable	
Reserved	Reserved	9 : 8	0 (0b00)	Should be kept default	

TABLE 11 - REGISTER NAME: PS_THDL

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_THDL_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
PS_THDL_H							
COMMAND CODE				0x03			
Bit Name	Function		Bit	Value	Description		
PS_THDL_L	Set the low threshold interrupt value		7 : 0	0 to 65 535	Low byte		
PS_THDL_H			15 : 8		High byte		

TABLE 12 - REGISTER NAME: PS_THDH

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_THDH_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
PS_THDH_H							
COMMAND CODE				0x04			
Bit Name	Function		Bit	Value	Description		
PS_THDH_L	Set the high threshold interrupt value		7 : 0	0 to 65 535	Low byte		
PS_THDH_H			15 : 8		High byte		

TABLE 13 - REGISTER NAME: PS_CANC

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_CANC_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Reserved				PS_CANC_H			
COMMAND CODE				0x05			
Bit Name	Function		Bit	Value	Description		
PS_CANC_L	Set the offset count cancellation value		7 : 0	0 to 4095	Low byte		
PS_CANC_H			11 : 8		High byte		
Reserved	Reserved		15 : 12	0 (0b0000)	Should be kept default		

TABLE 14 - REGISTER NAME: PS_DATA

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PS_DATA_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
PS_DATA_H							
COMMAND CODE				0xF8			
Bit Name	Function		Bit	Value	Description		
PS_DATA_L	Read the proximity output data		7 : 0	0 to 65 535	Low byte		
PS_DATA_H			15 : 8		High byte		

TABLE 15 - REGISTER NAME: INT_FLAG							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Reserved			PS_SPFLAG	Reserved		PS_IF_CLOSE	PS_IF_AWAY

COMMAND CODE				0xF9	
Bit Name	**Function**	**Bit**	**Value**	**Description**	
Reserved	Reserved	7 : 0	0x00 - 0xFF (0b00000000 - 0b11111111)	Should be kept default	
Reserved	Reserved	15 : 13	0 (0b000)	Should be kept default	
PS_SPFLAG	Read the sunlight protection mode interrupt event flag	12	0 (0b0)	No sunlight protection mode interrupt event flag	
			1 (0b1)	Sunlight protection mode interrupt event flag	
Reserved	Reserved	11 : 10	0 (0b00)	Should be kept default	
PS_IF_CLOSE	Read the high threshold crossing interrupt event flag	9	0 (0b0)	No high threshold crossing interrupt event flag	
			1 (0b1)	High threshold crossing interrupt event flag	
PS_IF_AWAY	Read the low threshold crossing interrupt event flag	8	0 (0b0)	No low threshold crossing interrupt event flag	
			1 (0b1)	Low threshold crossing interrupt event flag	

TABLE 16 - REGISTER NAME: ID							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
ID_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
ID_H							

COMMAND CODE				0xFA	
Bit Name	**Function**	**Bit**	**Value**	**Description**	
ID_L	Read the device ID	7 : 0	0x28 (0b00101000)	Device with a slave address of 0x60	
			0x29 (0b00101001)	Device with a slave address of 0x51	
ID_H		15 : 8	0x01 (0b00000001)	Should be kept default	

PACKAGE INFORMATION in millimeters

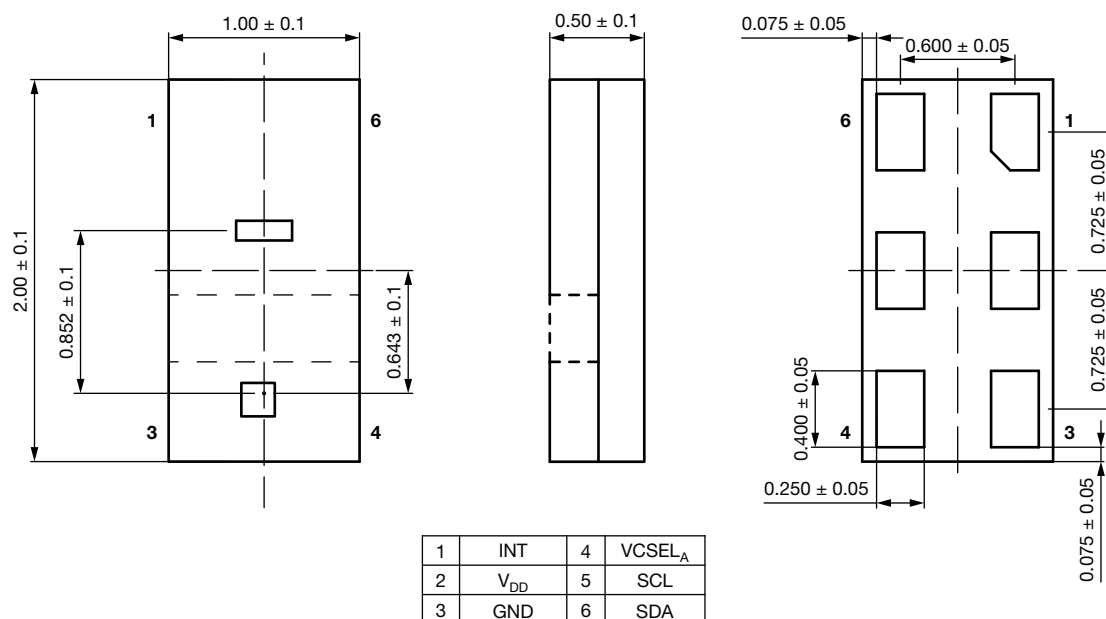| 1	INT	4	VCSEL$_A$
2	V$_{DD}$	5	SCL
3	GND	6	SDA

Fig. 16 - VCNL36828P Package Dimensions

RECOMMENDED LAYOUT PAD INFORMATION in millimeters
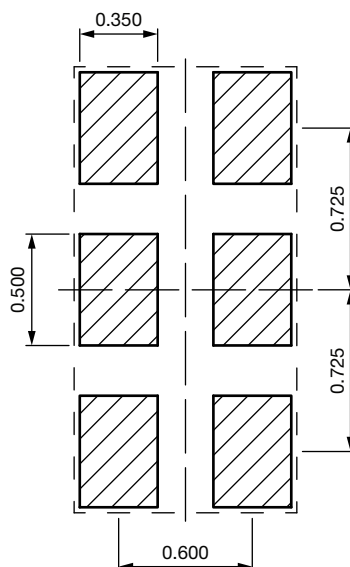
Fig. 17 - VCNL36828P PCB Layout Footprint

For technical questions, contact: sensorstechsupport@vishay.com

RECOMMENDED INFRARED REFLOW

Soldering conditions which are based on J-STD-020C

IR REFLOW PROFILE CONDITION			
PARAMETER	CONDITIONS	TEMPERATURE	TIME
Peak temperature		260 °C + 5 °C / - 5 °C (max.: 265 °C)	10 s
Preheat temperature range and timing		150 °C to 200 °C	60 s to 180 s
Timing within 5 °C to peak temperature		-	10 s to 30 s
Timing maintained above temperature / time		217 °C	60 s to 150 s
Timing from 25 °C to peak temperature		-	8 min (max.)
Ramp-up rate		3 °C/s (max.)	-
Ramp-down rate		6 °C/s (max.)	-

Recommend Normal Solder Reflow is 235 °C to 265 °C
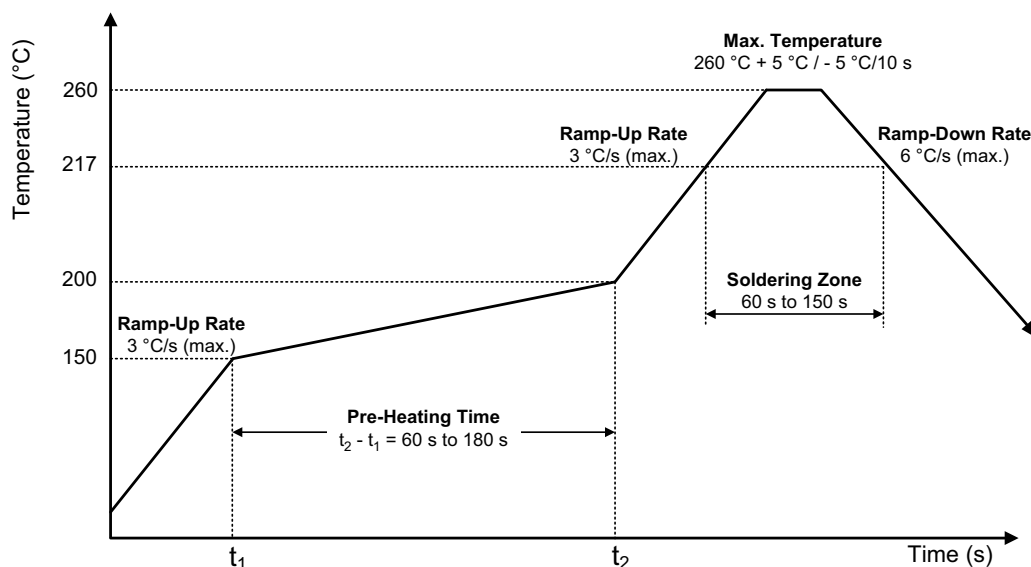
Fig. 18 - VCNL36828P Solder Reflow Profile Chart

TAPE PACKAGING INFORMATION in millimeters

Bottom View

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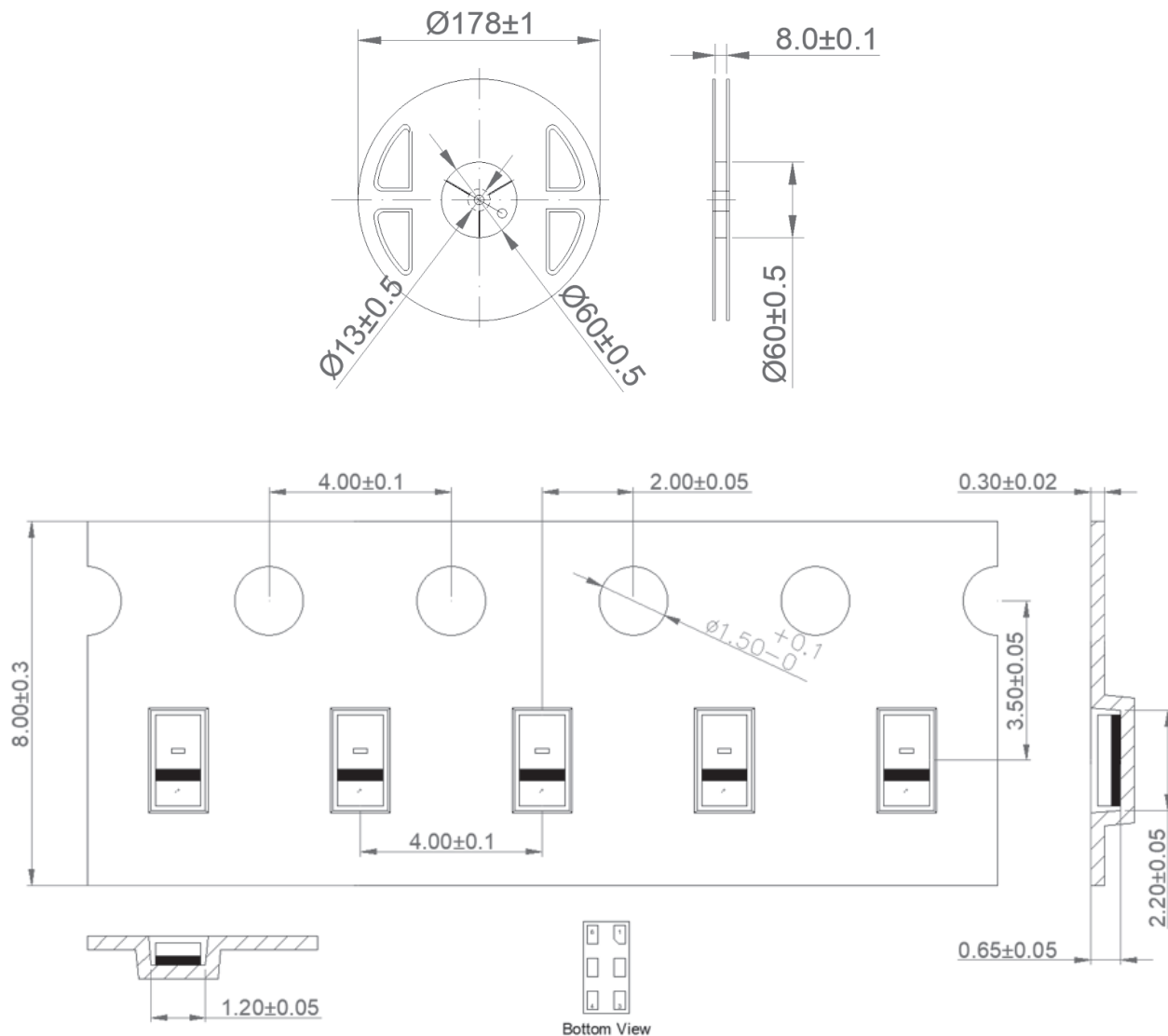
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