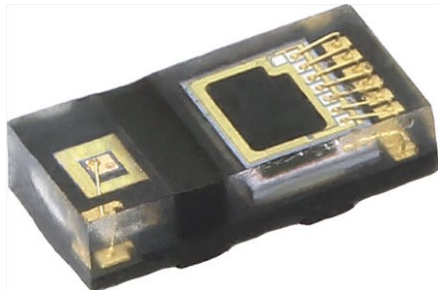


## A Small Package Proximity Sensor With a VCSEL, Low Idle Current, I<sup>2</sup>C Interface, and Smart Dual Slave Address



### LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

[Application Notes](#)

### 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 I<sup>2</sup>C bus
- Low power consumption with 5  $\mu$ A idle current
- A small package allows a design with a small window size
- Smart dual I<sup>2</sup>C slave address in one package
- Immunity to red glow (940 nm VCSEL)
- Programmable I<sub>VCSEL</sub> 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

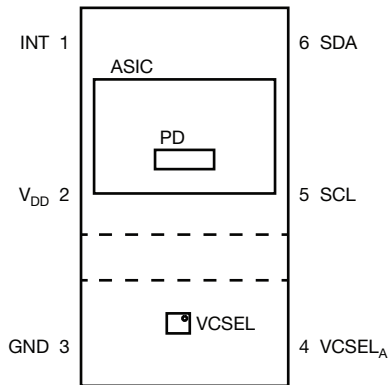
- Smartphones and true wireless stereo (TWS) earbuds
- VR / AR headsets and smart glasses
- Smartwatches
- Touchless button / dispensing

PRODUCT SUMMARY						
PART NUMBER	OPERATING RANGE (mm)	OPERATING VOLTAGE RANGE (V)	I <sup>2</sup> C 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, I <sup>2</sup> C	16 bit / -

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME <sup>(1)</sup>	REMARKS
VCNL36828P	Tape and reel	MOQ: 5000 pcs, 5000 pcs/reel	2.0 mm x 1.0 mm x 0.5 mm

#### Note

<sup>(1)</sup> MOQ: minimum order quantity

**PIN DEFINITION**


PIN DESCRIPTION			
PIN NUMBER	PIN NAME	TYPE	DESCRIPTION
1	INT	O (open drain)	Interrupt
2	V <sub>DD</sub>	I	Supply voltage
3	GND	I	Ground
4	VCSEL <sub>A</sub>	I	VCSEL anode
5	SCL <sup>(1)</sup>	I / O (open drain)	I <sup>2</sup> C serial clock
6	SDA <sup>(1)</sup>	I / O (open drain)	I <sup>2</sup> C serial data

**Note**

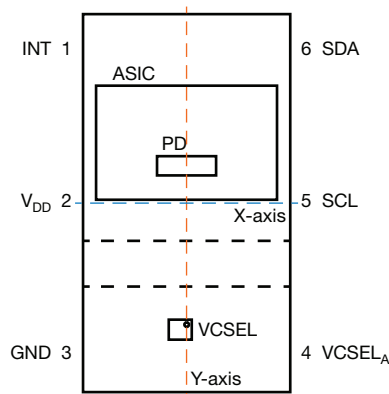
<sup>(1)</sup> Pin 5 (SCL) and pin 6 (SDA) can be swapped to change the slave address from 0x60 to 0x51; please refer to Table 1

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

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>ASIC</b>						
Supply voltage		$V_{DD}$	1.65	1.80	2.00	V
Supply current <sup>(1)</sup>	Shutdown state; light condition = dark; $V_{DD} = 1.8\text{ V}$	$I_{DD}$	-	1	-	$\mu\text{A}$
	Idle state <sup>(2)</sup> ; $V_{DD} = 1.8\text{ V}$		-	5	-	
	Active state <sup>(2)</sup> ; $V_{DD} = 1.8\text{ V}$		-	330	-	
I <sup>2</sup> C supply voltage		$V_{PULL\ UP}$	1.2	1.8	3.6	V
I <sup>2</sup> C signal input, logic high	$V_{DD} = 1.8\text{ V}$	$V_{IH}$	1	-	-	V
I <sup>2</sup> C signal input, logic low	$V_{DD} = 1.8\text{ V}$	$V_{IL}$	-	-	0.5	V
<b>VCSEL</b>						
Supply voltage of the VCSEL <sup>(3)</sup>		$V_{VCSEL}$	2.62	-	3.60	V
Forward voltage	$I_F = 9\text{ mA}$	$V_F$	-	1.92	-	V
Forward current		$I_F$	7	-	20	mA
Angle of half intensity		$\phi$	-	$\pm 4.5$	-	$^{\circ}$
Peak wavelength	$I_F = 9\text{ mA}$	$\lambda_p$	-	940	-	nm
Spectral bandwidth	$I_F = 9\text{ mA}$	$\Delta\lambda$	-	3	-	nm
<b>PHOTODIODE</b>						
Angle of half sensitivity	X-axis <sup>(4)</sup>	$\phi$	-	$\pm 60$	-	$^{\circ}$
	Y-axis <sup>(4)</sup>		-	$\pm 45$	-	
Peak sensitivity wavelength		$\lambda_p$	-	850	-	nm

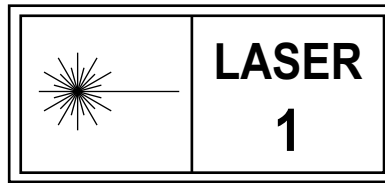
**Notes**

- (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



<b><math>V_{VCSEL, MIN.}</math></b>								
<b>PS_CURRENT (<math>I_F</math>)</b>	7 mA	9 mA	11 mA	12 mA	15 mA	17 mA	19 mA	20 mA
<b><math>V_{VCSEL, min.}</math></b>	2.62 V	2.74 V	2.86 V	2.91 V	3.08 V	3.19 V	3.3 V	3.36 V
<b><math>V_{VCSEL, max.}</math></b>	3.6 V							

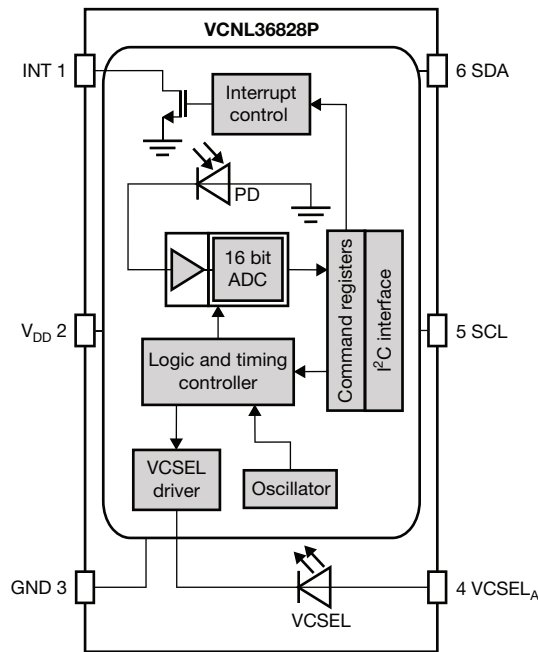
**LASER CLASS**



**Note**

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

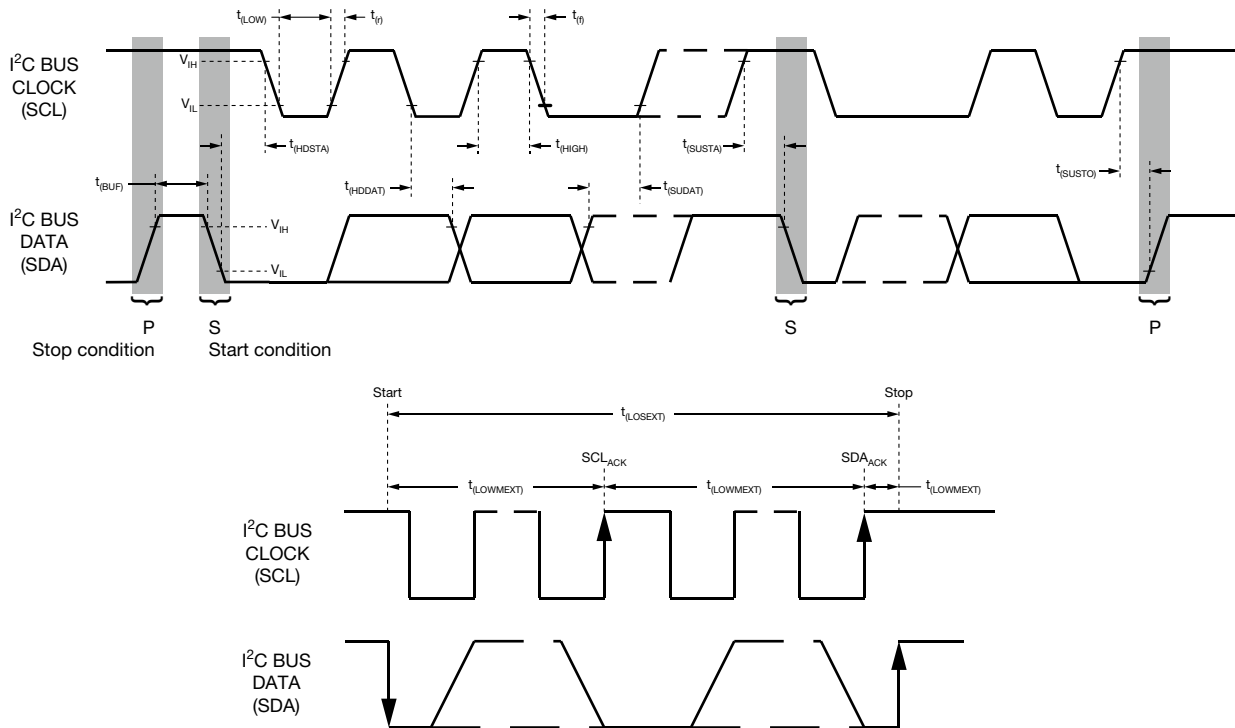
**BLOCK DIAGRAM**



<b>I<sup>2</sup>C BUS TIMING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	-	$\mu\text{s}$
Hold time after (repeated) start condition; after this period, the first clock is generated	$t_{(HDSTA)}$	4.0	-	0.6	-	$\mu\text{s}$
Repeated start condition setup time	$t_{(SUSTA)}$	4.7	-	0.6	-	$\mu\text{s}$
Stop condition setup time	$t_{(SUSTO)}$	4.0	-	0.6	-	$\mu\text{s}$
Data hold time	$t_{(HDDAT)}$	0	3450	0	900	ns
Data setup time	$t_{(SUDAT)}$	250	-	100	-	ns
I <sup>2</sup> C clock (SCL) low period	$t_{(LOW)}$	4.7	-	1.3	-	$\mu\text{s}$
I <sup>2</sup> C clock (SCL) high period	$t_{(HIGH)}$	4.0	-	0.6	-	$\mu\text{s}$
Clock / data fall time	$t_{(f)}$	-	300	-	300	ns
Clock / data rise time	$t_{(r)}$	-	1000	-	300	ns

**Note**

- Data based on standard I<sup>2</sup>C protocol requirement, not tested in production


 Fig. 1 - I<sup>2</sup>C Bus Timing Diagram

**PARAMETER TIMING INFORMATION**

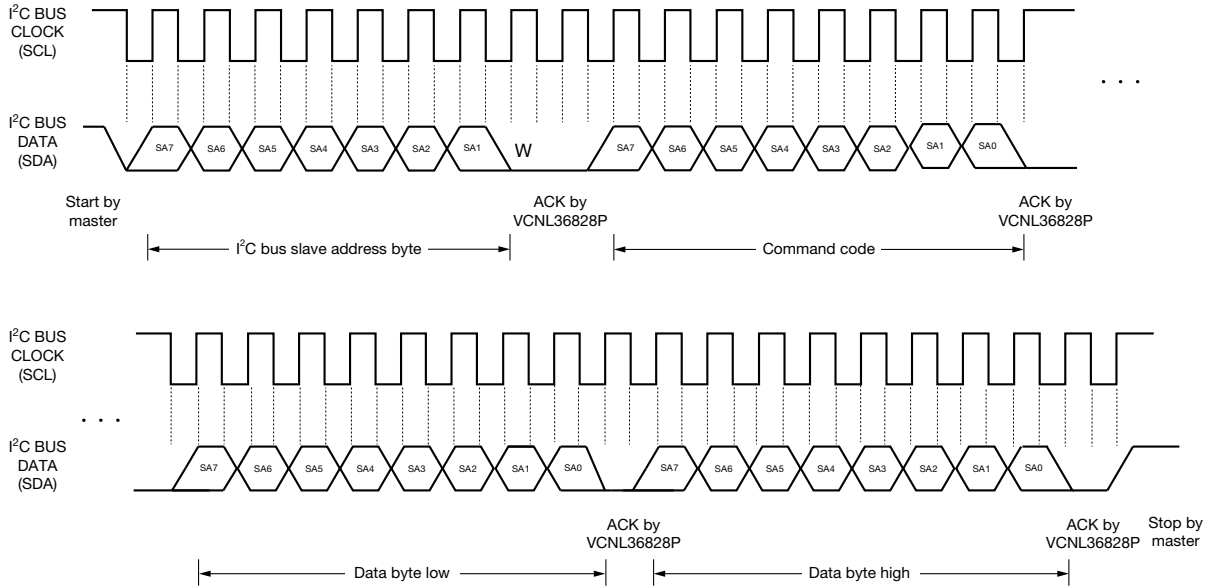


Fig. 2 - I<sup>2</sup>C Bus Timing for Sending Word Command Format

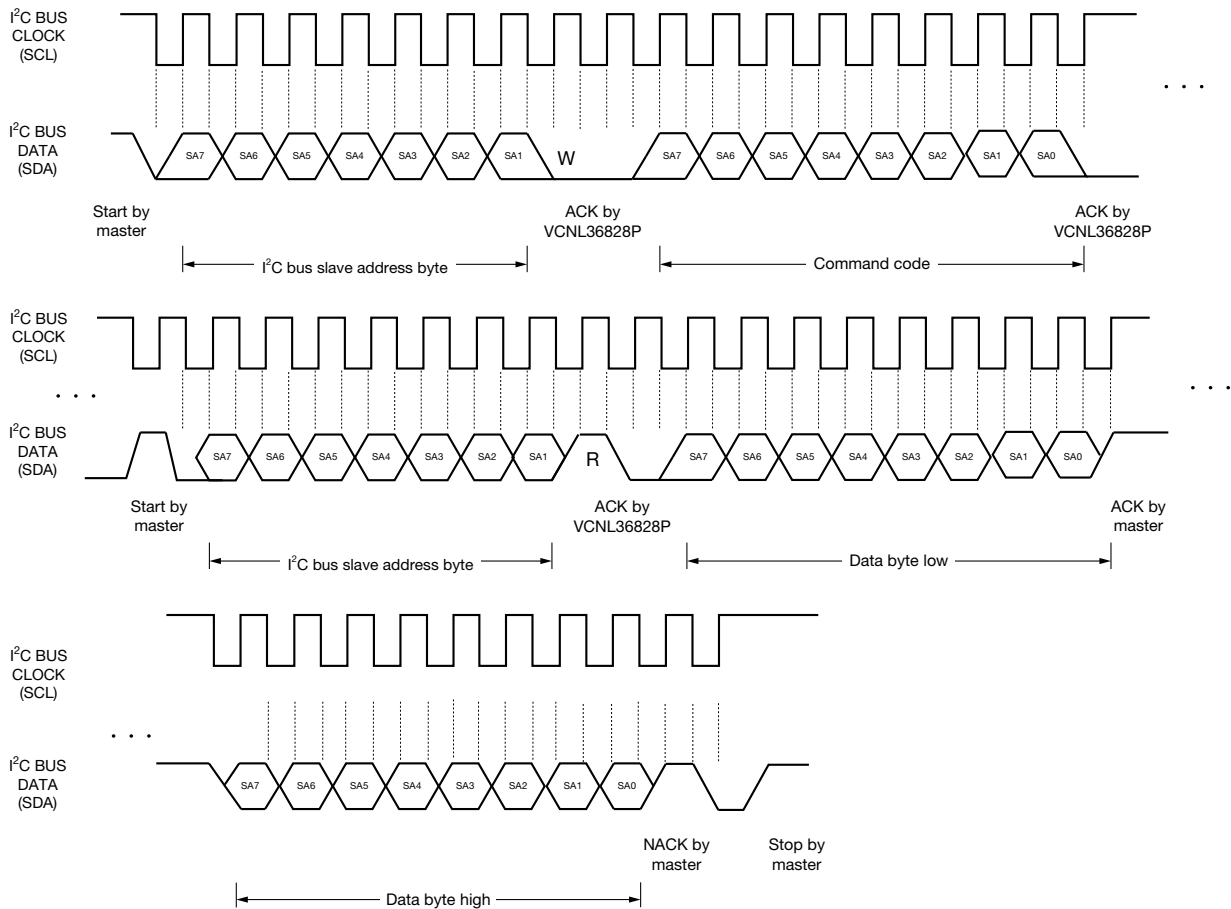


Fig. 3 - I<sup>2</sup>C Bus Timing for Receiving Word Command Format

**TYPICAL PERFORMANCE CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

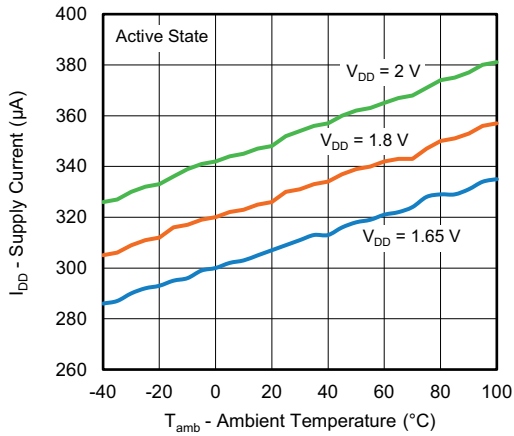


Fig. 4 - Supply Current vs. Ambient Temperature

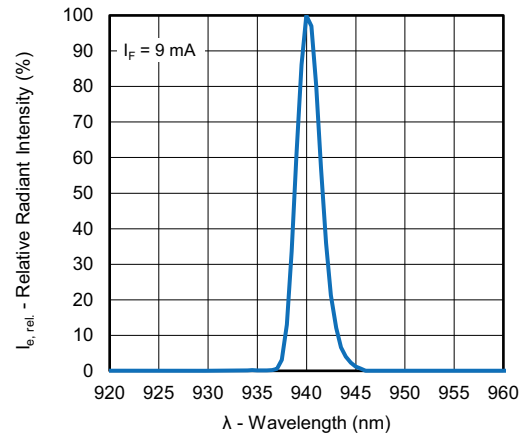


Fig. 7 - Relative Radiant Intensity vs. Wavelength of the VCSEL

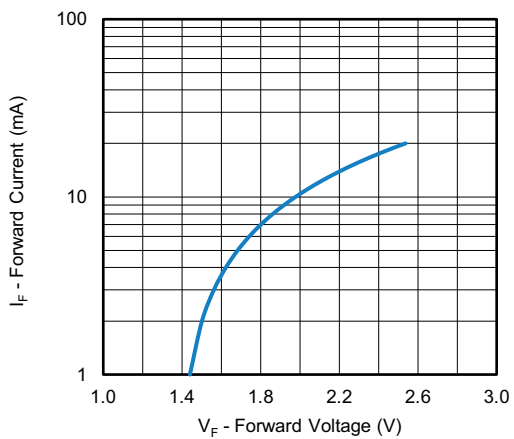


Fig. 5 - Forward Current vs. Forward Voltage of the VCSEL

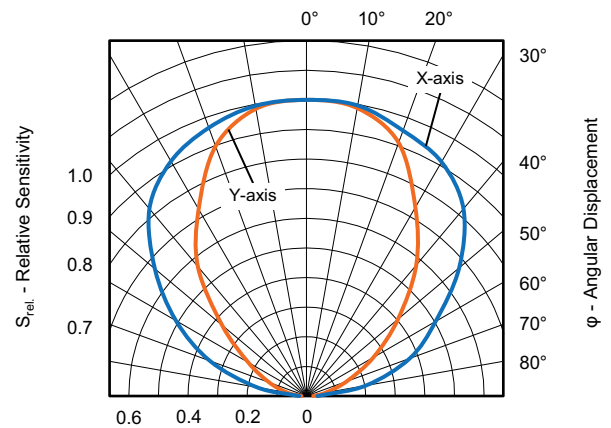


Fig. 8 - Relative Sensitivity vs. Angular Displacement of the Photodiode

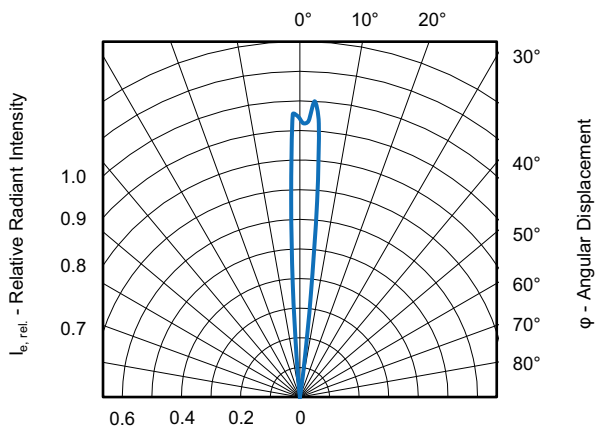


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement of the VCSEL

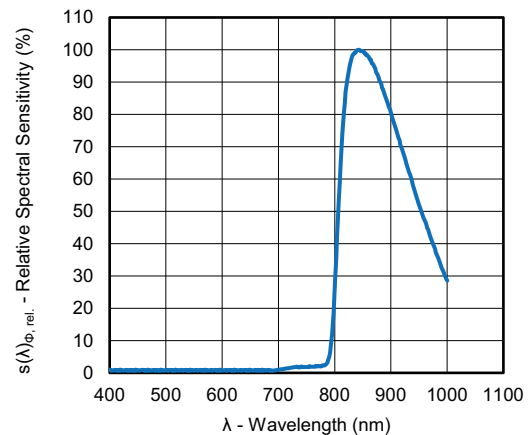


Fig. 9 - Relative Spectral Sensitivity vs. Wavelength of the Photodiode

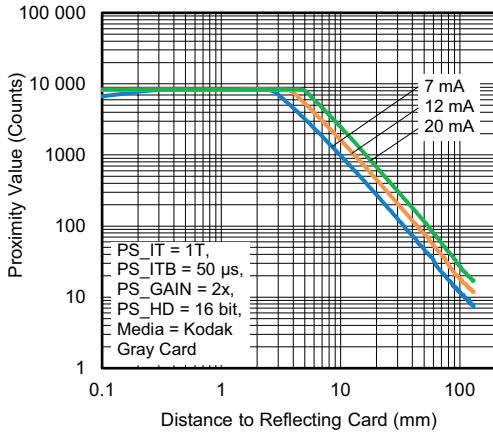


Fig. 10 - Proximity Value vs. Distance

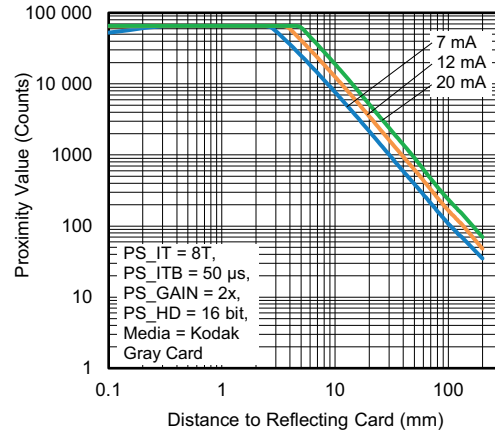


Fig. 11 - Proximity Value vs. Distance

**APPLICATION INFORMATION**

**Slave Address Selection**

The VCNL36828P supports a smart dual slave address where the designer can change the 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	8 BIT SLAVE ADDRESS (WRITE)	8 BIT SLAVE ADDRESS (READ)	
SCL	SDA	0x60		0xC0	0xC1
SDA	SCL	0x51		0xA2	0xA3

A smart dual slave address provides the flexibility for the designer to connect two devices from two different slave addresses on the same I<sup>2</sup>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<sup>2</sup>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.

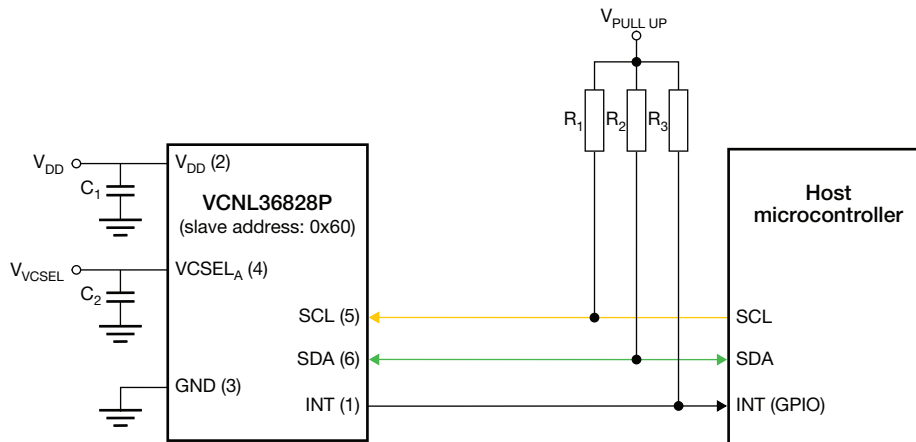


Fig. 12 - Application Circuit Example for a Single VCNL36828P - Slave Address 0x60



**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.

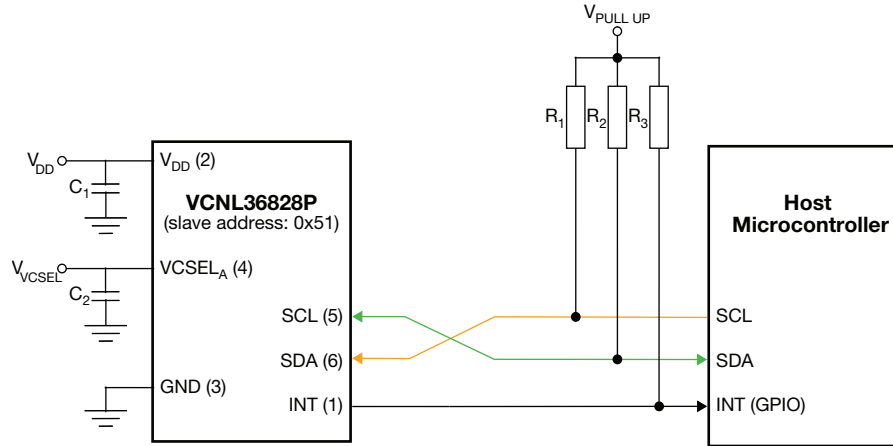


Fig. 13 - Application Circuit Example for a Single VCNL36828P - Slave Address 0x51

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 I <sup>2</sup> C bus voltage from the microcontroller is higher than 3.6 V
$C_1 - C_4$	100 nF to 1 $\mu$ F	Decoupling capacitors are recommended to reduce the noise in the supply voltage
$R_1 - R_2$	2.2 k $\Omega$ to 4.7 k $\Omega$	Pull-up resistors within the range of 2.2 k $\Omega$ to 4.7 k $\Omega$ are recommended; any increase in bus capacitance or resistance will increase the logic high transition time
$R_3$	4.7 k $\Omega$ to 22 k $\Omega$	Pull-up resistor within the range of 4.7 k $\Omega$ to 22 k $\Omega$ 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 I<sup>2</sup>C bus.

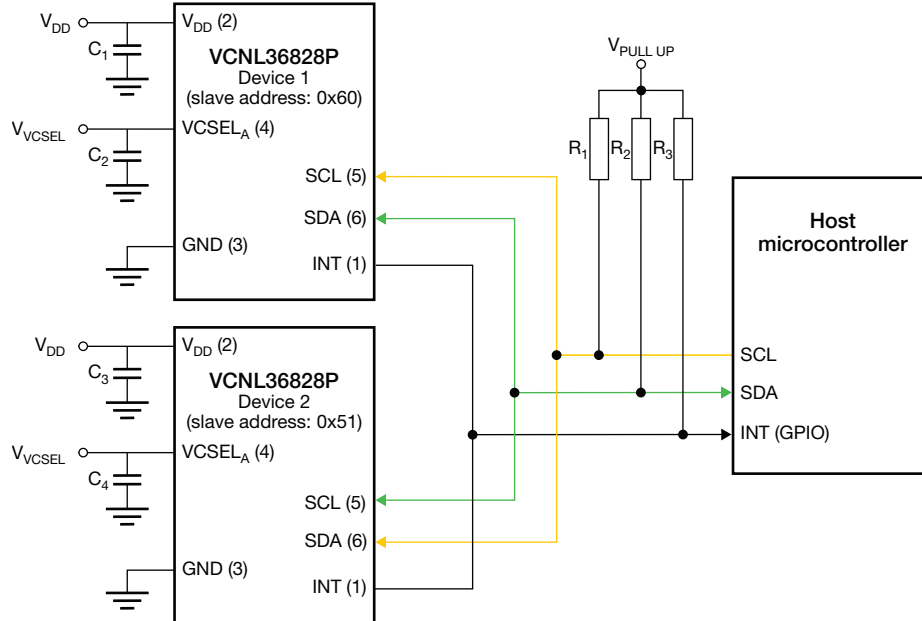
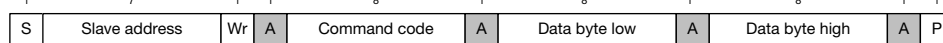


Fig. 14 - Application Circuit Example for Two VCNL36828Ps - Smart Dual Slave Address

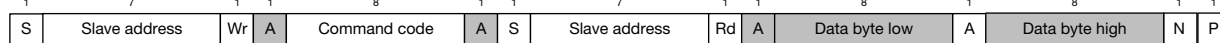
**I<sup>2</sup>C Write and Read Protocol**

The communication with the VCNL36828P can be performed via I<sup>2</sup>C. The I<sup>2</sup>C write and read protocol when communicating with the proximity sensor is shown in Fig. 15.

Send byte → write command to VCNL36828P



Receive byte → read data from VCNL36828P



S = start condition  
 P = stop condition  
 A = acknowledge  
 N = not acknowledge

Host action  
 VCNL36828P response

Fig. 15 - I<sup>2</sup>C Write and Read Protocol

It is imperative that only the restart condition for the I<sup>2</sup>C 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	
0x01	L	PS_CONF2_L	0x00	Interrupt setting	
				Measurement period setting	
				Signal strength setting (Integration time and multi-pulse)	
	H	PS_CONF2_H	0x00	High gain setting	
				Sensitivity of the ADC setting	
				Internal crosstalk cancellation setting	
0x02	L	PS_CONF3_L	0x00	VCCSEL driving current setting	
				Sensor mode setting	
	H	PS_CONF3_H	0x00	Active force mode trigger setting	
				Short measurement period 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	VCNL36828P_ID_L	0x28 / 0x29	Device ID Slave address: 0x60; ID = 0x28 Slave address: 0x51; ID = 0x29	
	H	VCNL36828P_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	0x0 (0b0)	Disable (default)	
					0x1 (0b1)	Enable	
Reserved	Reserved			6 : 1	0x00 (0b000000)	Should be kept default	
PS_ON	Switch the sensor on / off			0	0x0 (0b0)	Turn off the sensor (shutdown) (default)	
					0x1 (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	0x0 (0b0)	Should be kept default	
PS_HD	Enable / disable high dynamic range (12 bit / 16 bit) ADC output setting			14	0x0 (0b0)	Disable (12 bit) (default)	
					0x1 (0b1)	Enable (16 bit)	
PS_SP_INT	Enable / disable the sunlight protection mode interrupt setting			13	0x0 (0b0)	Disable (default)	
					0x1 (0b1)	Enable	
PS_SMART_PERS	Enable / disable the smart persistence setting when the interrupt event is triggered			12	0x0 (0b0)	Disable (default)	
					0x1 (0b1)	Enable	
PS_PERS	Set the amount of consecutive threshold crossing events necessary to trigger interrupt			11 : 10	0x0 (0b00)	1 time (default)	
					0x1 (0b01)	2 times	
					0x2 (0b10)	3 times	
					0x3 (0b11)	4 times	
PS_INT	Set the interrupt mode setting			9 : 8	0x0 (0b00)	Interrupt disable (default)	
					0x1 (0b01)	Logic high / low mode	
					0x3 (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	0x0 (0b00)	50 ms, which translates into 20 measurement/s (default)			
			0x1 (0b01)	100 ms, which translates into 10 measurements/s			
			0x2 (0b10)	200 ms, which translates into 5 measurements/s			
			0x3 (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	0x0 (0b00)	1 T (default)			
			0x1 (0b01)	2 T			
			0x2 (0b10)	4 T			
			0x3 (0b11)	8 T			
PS_MPS	Set the number of infrared signal pulses per measurement	3 : 2	0x0 (0b00)	1 pulse (default)			
			0x1 (0b01)	2 pulses			
			0x2 (0b10)	4 pulses			
			0x3 (0b11)	8 pulses			
PS_ITB	Set the pulse length "T" for PS_IT	1	0x0 (0b0)	T = 25 μs (default)			
			0x1 (0b1)	T = 50 μs			
PS_GAIN	Set the gain of the ADC	0	0x0 (0b0)	x 1 gain (default)			
			0x1 (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	PS_CURRENT		
COMMAND CODE				0x01			
Bit Name	Function	Bit	Value	Description			
Reserved	Reserved	15 : 14	0x0 (0b00)	Should be kept default			
PS_SENS	Set the sensitivity of the ADC	13	0x0 (0b0)	Normal sensitivity (default)			
			0x1 (0b1)	High sensitivity			
PS_OFFSET	Enable / disable the internal crosstalk cancellation	12	0x0 (0b0)	Disable (default)			
			0x1 (0b1)	Enable			
Reserved	Reserved	11	0x0 (0b0)	Should be kept default			
PS_CURRENT	Set the VCSEL driving current	10 : 8	0x0 (0b000)	7 mA (default)			
			0x1 (0b001)	9 mA			
			0x2 (0b010)	11 mA			
			0x3 (0b011)	12 mA			
			0x4 (0b100)	15 mA			
			0x5 (0b101)	17 mA			
			0x6 (0b110)	19 mA			
			0x7 (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	0x0 (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	0x0 (0b0)	Off (default)		
				0x1 (0b1)	Trigger		
PS_MODE	Set the measurement mode of the sensor		4	0x0 (0b0)	Auto mode (default)		
				0x1 (0b1)	Active force mode		
Reserved	Reserved		3 : 0	0x0 (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_SPERIOD		Reserved	PS_SC			Reserved	
COMMAND CODE				0x02			
Bit Name	Function		Bit	Value	Description		
PS_SPERIOD	Set the short measurement period		15 : 14	0x0 (0b00)	Disable the short period (follow PS_PERIOD setting) (default)		
				0x1 (0b01)	6.25 ms, which translates into 160 measurements/s		
				0x2 (0b10)	12.5 ms, which translates into 80 measurements/s		
				0x3 (0b11)	25 ms, which translates into 40 measurements/s		
Reserved	Reserved		13	0x0 (0b0)	Should be kept default		
PS_SC	Enable / disable the sunlight cancellation		12 : 10	0x0 (0b000)	Disable (default)		
				0x7 (0b111)	Enable		
Reserved	Reserved		9 : 8	0x0 (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	0x0 (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	0x0 (0b000)	Should be kept default			
PS_SPFLAG	Read the sunlight protection mode interrupt event flag	12	0x0 (0b0)	No sunlight protection mode interrupt event flag			
			0x1 (0b1)	Sunlight protection mode interrupt event flag			
Reserved	Reserved	11 : 10	0x0 (0b00)	Should be kept default			
PS_IF_CLOSE	Read the high threshold crossing interrupt event flag	9	0x0 (0b0)	No high threshold crossing interrupt event flag			
			0x1 (0b1)	High threshold crossing interrupt event flag			
PS_IF_AWAY	Read the low threshold crossing interrupt event flag	8	0x0 (0b0)	No low threshold crossing interrupt event flag			
			0x1 (0b1)	Low threshold crossing interrupt event flag			

TABLE 16 - REGISTER NAME: VCNL36828P_ID							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VCNL36828P_ID_L							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
VCNL36828P_ID_H							
COMMAND CODE				0xFA			
Bit Name	Function	Bit	Value	Description			
VCNL36828P_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			
VCNL36828P_ID_H		15 : 8	0x01 (0b00000001)	Should be kept default			



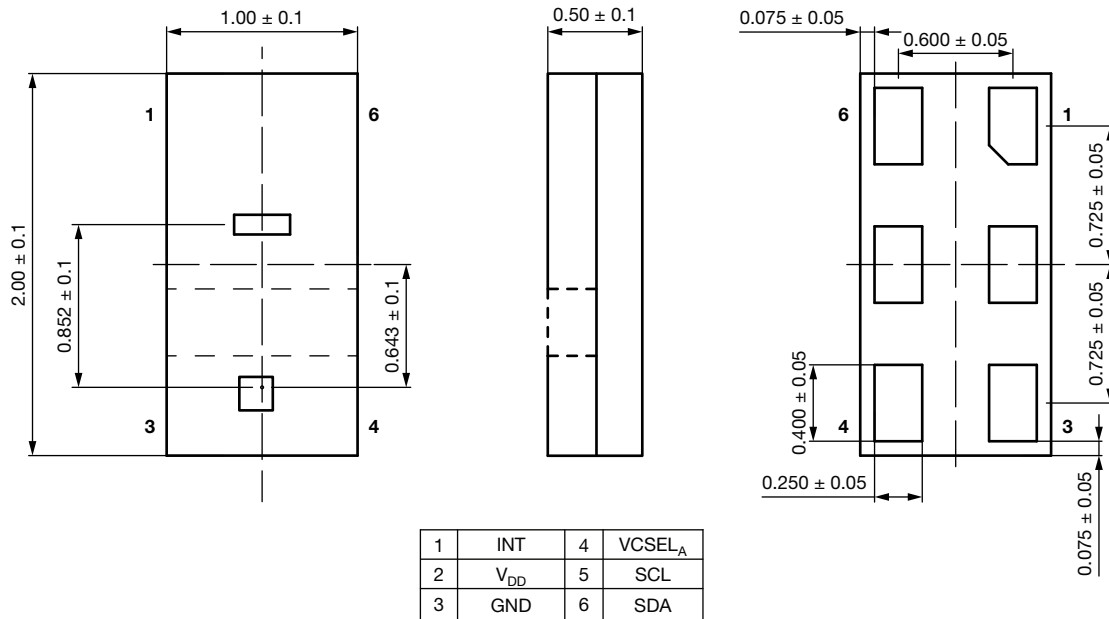
**PACKAGE INFORMATION** in millimeters


Fig. 16 - VCNL36828P Package Dimensions

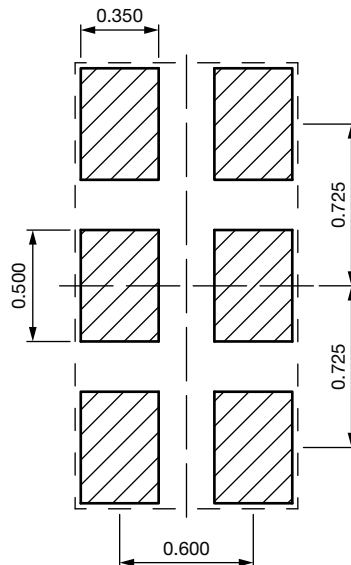
**RECOMMENDED LAYOUT PAD INFORMATION** in millimeters


Fig. 17 - VCNL36828P PCB Layout Footprint



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

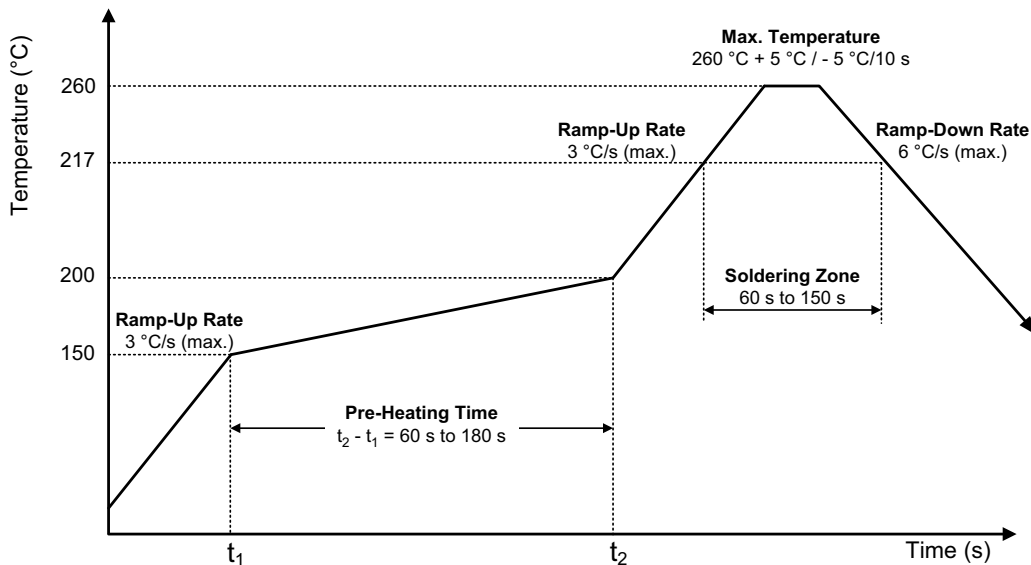
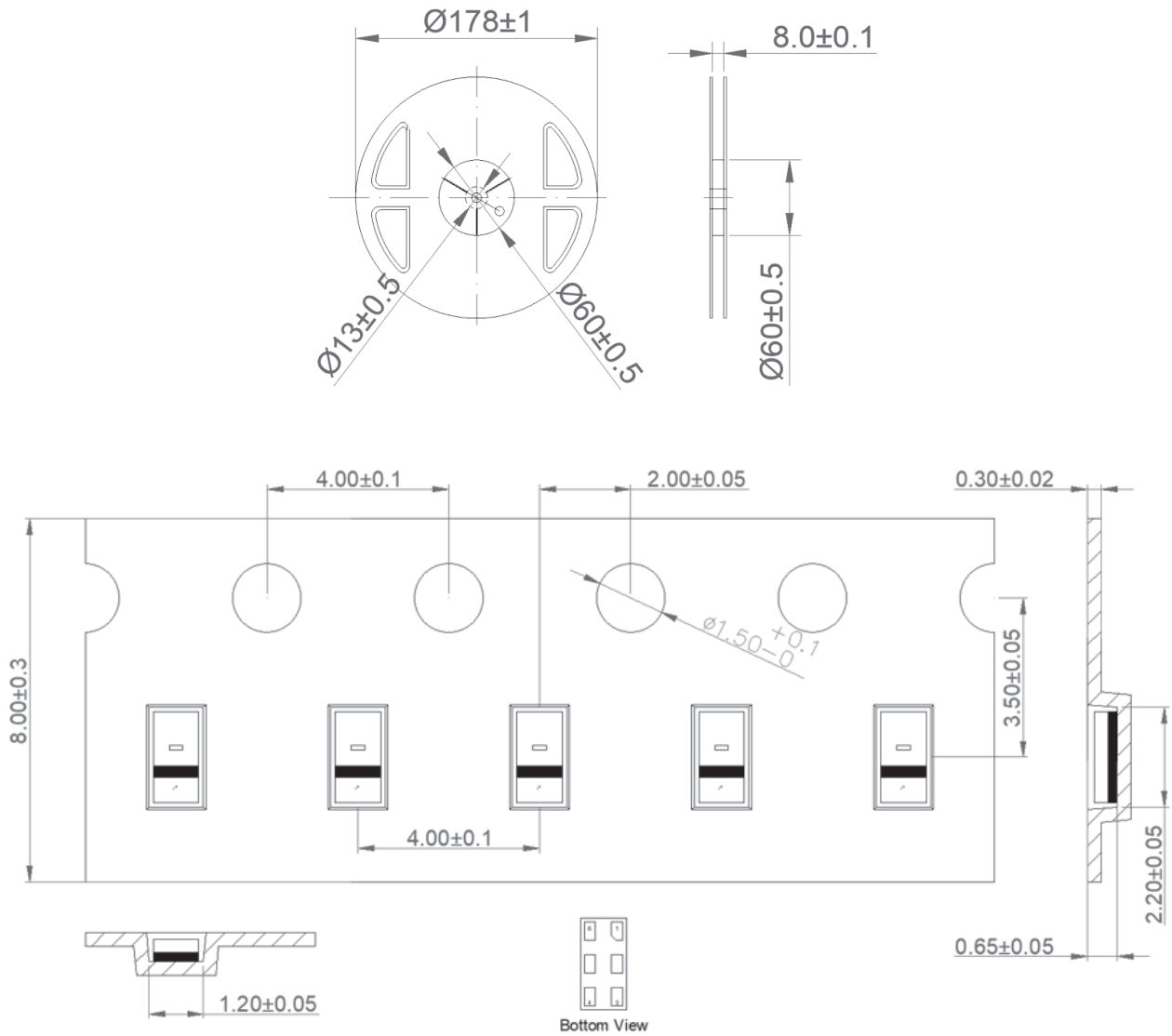


Fig. 18 - VCNL36828P Solder Reflow Profile Chart

**TAPE PACKAGING INFORMATION** in millimeters





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

单击下面可查看定价，库存，交付和生命周期等信息

[>>Vishay\(威世\)](#)