

# Infineon Arduino Library Documentation

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**Date:** September 11, 2018

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# 1 Arduino Library for the proximity and ambient light sensor PALS-2

## 1.1 Introduction

The Infineon PALS-2 (packaged by Vishay as VCNL4135X01) is a proximity and ambient light sensor. It offers proximity and ambient light readings with 16-bit resolution. I2C protocol is used to communicate with the host microcontroller. It can be used for gesture recognition, touch screen locking and dimming of displays.

For the proximity function there are a built-in IRED driver and photo-pin-diode. LED driver current can be programmed and up to 3 external IREDs can be connected. Offset compensation can be enabled for the proximity measurement; with this feature the sensor writes the difference between the normal proximity value and the estimated offset into the corresponding register.

For the ambient light function there a one photo-pin-diode. Two additional photodiodes can receive light in the blue area.

Other features include: readouts either periodically or on-demand; interrupts for both functions, with adjustable lower/upper thresholds and persistence.

## 2 Bug List

### File [Pals2.cpp](#)

no Blue-PD value updates -> getIlluminance() not working;

update very slow (1 measurement/s) when periodic measurement is enabled, changing measurement rates in config register has no effect

in register 83h sensor measurement freezes if IRED output is not default(0): due to missing IREDs?

## 3 Class Index

### 3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

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## 4 Class Documentation

### 4.1 Pals2 Class Reference

#### Public Member Functions

- void **begin** (void)  
*Starts the sensor.*
- void **enablePeriodicMeasurements** (void)  
*Enables periodic measurements of proximity and ambient light values.*
- void **updateData** (void)  
*Updates measurement data. Needed to be called in each measurement cycle.*
- uint16\_t **getRawProximity** (void)  
*Gets sensor measurement updates. Should be called after **updateData(void)** **updateData()**.*
- uint16\_t **getRawAmbientLight** (void)  
*Gets sensor measurement updates. Should be called after **updateData(void)** **updateData()**.*
- uint16\_t **getRawProximityOnDemand** (void)  
*Enables on-demand measurement of raw proximity values. Busy waiting is used for the values to be ready.*
- uint16\_t **getRawAmbientLightOnDemand** (void)
- float **getIlluminance** (void)
- void **enableProximityOffsetCompensation** (void)  
*Enables proximity offset compensation. The raw proximity values read will be the difference between the actual measured value and the estimated offset value, thus 2 measurements are taken in each cycle. Works for both periodic and on-demand measurement.*
- void **disableProximityOffsetCompensation** (void)  
*Disables proximity offset compensation.*
- void **setProximityMeasurementRate** (uint16\_t rate)  
*Sets the measurement rate of proximity measurement.*
- void **setInterruptPersistence** (uint8\_t persistence)  
*Sets the number of consecutive measurements needed above/below the threshold for an interrupt to be generated.*
- void **enableProximityInterrupt** (uint16\_t topThreshold=0xFF, uint16\_t bottomThreshold=0x00)  
*Enables interrupts for proximity measurement and sets the lower/upper thresholds.*
- void **disableProximityInterrupt** (void)  
*Disables interrupts for proximity measurement.*
- void **enableAmbientLightInterrupt** (uint16\_t topThreshold=0xFF, uint16\_t bottomThreshold=0x00)  
*Enables interrupts for ambient light measurement and sets the lower/upper thresholds.*

- void **disableAmbientLightInterrupt** (void)  
*Disables interrupts for ambient light measurement.*
- void **enableColorCompensation** (bool colorCompPeriod=0)  
*For light sources with high intensity color compensation should be enabled (additional reading of blue PD will be conducted).*
- void **setADCGain** (uint16\_t adcGain)  
*Sets the ADC gain, which affects the calculation of illuminance. A higher ADC gain leads to a higher illuminance value.*
- void **setAmbientLightMeasurementRate** (uint8\_t alsRate)  
*Sets the rate of ambient light measurement. Number of measurements per second, which is an integer from 1 to 8.*
- void **resetSensor** (void)

#### 4.1.1 Member Function Documentation

##### 4.1.1.1 void Pals2::enableAmbientLightInterrupt ( uint16\_t topThreshold = 0xFF, uint16\_t bottomThreshold = 0x00 )

Enables interrupts for ambient light measurement and sets the lower/upper thresholds.

###### Parameters

<i>topThreshold</i>	Upper threshold. By default 65536
<i>bottomThreshold</i>	Lower threshold. By default 0

##### 4.1.1.2 void Pals2::enableColorCompensation ( bool colorCompPeriod = 0 )

For light sources with high intensity color compensation should be enabled (additional reading of blue PD will be conducted).

###### Parameters

<i>colorCompPeriod</i>	The period of color compensation measurement; 0 for a shorter period (0 to 10ms) and 1 for a longer period (10 to 100ms)
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##### 4.1.1.3 void Pals2::enableProximityInterrupt ( uint16\_t topThreshold = 0xFF, uint16\_t bottomThreshold = 0x00 )

Enables interrupts for proximity measurement and sets the lower/upper thresholds.

###### Parameters

<i>topThreshold</i>	Upper threshold. By default 65536
<i>bottomThreshold</i>	Lower threshold. By default 0

##### 4.1.1.4 float Pals2::getIlluminance ( void )

## Returns

the illuminance value computed from ALS and blue photodiode values.

### 4.1.1.5 uint16\_t Pals2::getRawAmbientLight ( void )

Gets sensor measurement updates. Should be called after [updateData\(void\) updateData\(\)](#)

## Returns

raw ambient light value as an integer from 0 to 65536.

### 4.1.1.6 uint16\_t Pals2::getRawAmbientLightOnDemand ( void )

## Returns

a single raw ambient light value measured on demand.

### 4.1.1.7 uint16\_t Pals2::getRawProximity ( void )

Gets sensor measurement updates. Should be called after [updateData\(void\) updateData\(\)](#).

## Returns

raw proximity value as an integer from 0 to 65536.

### 4.1.1.8 uint16\_t Pals2::getRawProximityOnDemand ( void )

Enables on-demand measurement of raw proximity values. Busy waiting is used for the values to be ready.

## Returns

a single raw proximity value measured on demand.

### 4.1.1.9 void Pals2::setADCGain ( uint16\_t adcGain )

Sets the ADC gain, which affects the calculation of illuminance. A higher ADC gain leads to a higher illuminance value.

## Parameters

<i>adcGain</i>	ADC gain in fA, can be 200/800/3200/25600; for any other value the default (200 fA) is taken
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### 4.1.1.10 void Pals2::setInterruptPersistence ( uint8\_t persistence )

Sets the number of consecutive measurements needed above/below the threshold for an interrupt to be generated.

## Parameters

<i>persistence</i>	Number of valid measurements needed, which is one of the numbers from [1, 2, 4, 8, 16, 32, 64, 128].
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#### 4.1.1.11 void Pals2::setProximityMeasurementRate ( uint16\_t *rate* )

Sets the measurement rate of proximity measurement.

##### Parameters

<i>rate</i>	Number of measurements per second. Can be one of the numbers from [2, 4, 8, 16, 32, 64, 128, 256].
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