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Ambient 23 Click

PID: MIKROE-5701

Ambient 23 Click is a compact add-on board that measures the intensity of visible light. This board features the VEML3235SL, an advanced ambient light sensor designed by the CMOS process from Vishay Semiconductors that transforms light intensity to a 16-bit digital signal output that can be directly communicated via an I2C interface. The VEML3235SL has a flexible and wide operating range of up to 17.867lx with a maximum resolution of 0.0021lux/count, providing excellent responsivity close to a human eyes' response. It also has excellent temperature compensation and provides Software shutdown mode, which reduces its power consumption. This Click board™ is suitable for various applications, including handheld and consumer gadgets, industrial and medical equipment, computing systems, and more, providing real-time information about the surrounding environment to enhance operational efficiency and user experience.

How does it work?

Ambient 23 Click is based on the VEML3235SL, a high-accuracy light-to-digital converter from Vishay Semiconductors that transforms light intensity into a digital output signal. The VEML3235SL includes a highly sensitive photodiode, low noise amplifier, and 16-bit A/D converter and supports an easy-to-use serial communication interface. The ambient light read-out is available as a digital value, and the built-in photodiode response is near the human eye's. The 16-bit dynamic range for ambient light detection is from 0.0021 to 17.867lx, with resolution down to 0.0021lx/counts. The sensor's remarkable sensitivity of 0.0021lx enables it to operate even when placed behind dark cover glass that significantly blocks light. Still, it can also function behind transparent cover glass, as it can handle high illumination levels up to approximately 18klx without saturation.

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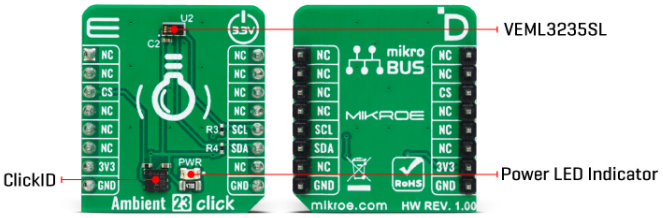

This Click board™ communicates with the host MCU using the standard I2C 2-Wire interface supporting Standard Mode operation with a clock frequency of 100kHz and Fast Mode up to 400kHz. All operations are controlled by the command register, allowing users to easily program the operation setting and latch the light data from VEML3235SL. In addition to its outstanding temperature compensation capabilities, the VEML3235SL also offers the added benefit of software shutdown mode control, allowing for random measurements, such as once per second, during which the sensor can be switched to shutdown mode to minimize power consumption.

This Click board™ can only be operated with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Optical
Applications	Can be used for various applications, including handheld and consumer gadgets, industrial and medical equipment, computing systems, and more
On-board modules	VEML3235SL - ambient light sensor from Vishay Semiconductors
Key Features	Low power consumption, high sensitivity, high accuracy, I2C interface, excellent temperature compensation, high dynamic detection resolution, software shutdown mode control, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

This table shows how the pinout on Ambient 23 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Ambient 23 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Ambient Light Range	0.0021	-	17.867	lx
Peak Wavelength	-	550	-	nm
Ambient Light Resolution	-	0.0021	-	lx/cnt
Data Resolution	-	16	-	bit

Software Support

We provide a library for the Ambient 23 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Ambient 23 Click driver.

Key functions

- ambient23_reg_read Ambient 23 register reading function.
- ambient23_calculate_res Ambient 23 get conversion data function.
- ambient23_read_light_data Ambient 23 get light data function.

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Example Description

This example demonstrates the use of Ambient 23 Click board™ by measuring the ambient light level in Lux.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Ambient23

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - Mikroe Software Development Kit, that needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

Ambient 23 click example on Libstock

VEML3235SL datasheet

Ambient 23 click 2D and 3D files v100

Ambient 23 click schematic v100

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