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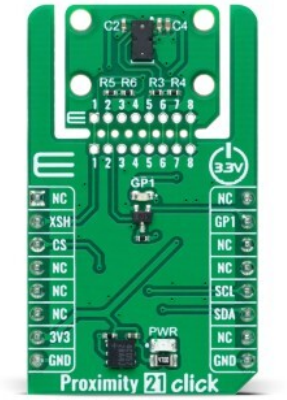
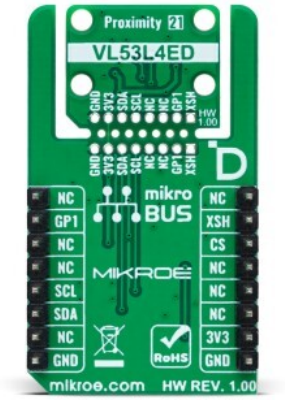
Proximity 21 Click





PID: MIKROE-6286

Proximity 21 Click is a compact add-on board for high-precision proximity sensing and short-range distance measurements. This board features the VL53L4ED, a Time-of-Flight (ToF) proximity sensor from STMicroelectronics, known for its extended temperature capability and accuracy. This sensor provides a field of view (FoV) of 18°, measuring distances from 1mm up to 1300mm in standard conditions and up to 1150mm in extended temperature environments, with reliable performance even in ambient light conditions up to 5klx. The Click board™ features a unique Click Snap design, making the main IC area movable for versatile implementation. This Click board™ is ideal for applications such as industrial automation, security systems, robotics, smart lighting, and biometric distance measurements, where precise proximity sensing is essential.

How does it work?

Proximity 21 Click is based on the VL53L4ED, a high-precision Time-of-Flight (ToF) proximity sensor from STMicroelectronics, known for its extended temperature capability. This sensor is made for accurate short-range measurements, offering a field of view (FoV) of 18° and measuring distances from 1mm up to 1300mm under standard conditions and up to 1150mm in extended temperature environments. The VL53L4ED operates effectively in temperatures ranging from -40°C to 105°C, ensuring consistent performance even in harsh industrial settings. Additionally, it provides reliable distance measurements up to 800mm even in ambient light conditions of 5klx, making it ideal for applications requiring precise proximity sensing such as industrial automation, security systems, robotics, smart lighting, and biometric distance measurements.

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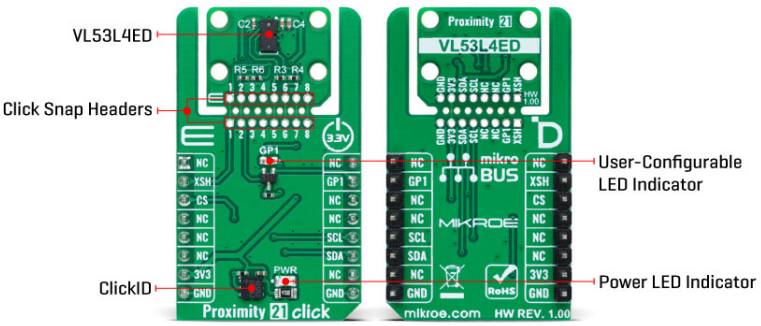

The VL53L4ED uses STMicroelectronics' FlightSense technology, allowing it to measure absolute distances regardless of target color or reflectance. It includes a SPAD (single photon avalanche diode) array, enhancing its performance across ambient lighting conditions and various cover glass materials. Additionally, the sensor integrates a VCSEL (vertical-cavity surface-emitting laser) that emits an invisible 940nm IR light, certified as Class 1 eye-safe.

Proximity 21 Click is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main IC area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the VL53L4ED can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

This Click board™ uses a standard 2-wire I2C interface for communication with the host MCU, supporting Fast Mode Plus with a clock frequency of up to 1MHz. In addition to the interface pins, the sensor also uses the XSH shutdown pin from the mikroBUS™ socket for device power-up and boot sequence. The device can be fully powered down when not in use and then reactivated by the host MCU using the XSH pin. It also uses the GP1 pin from the mikroBUS™ socket as a hardware interrupt, along with a red GP1 LED indicator, to signal and visually indicate various conditions.

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

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

Specifications

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Type	Proximity
Applications	Ideal for industrial automation, security systems, robotics, smart lighting, and biometric distance measurements
On-board modules	VL53L4ED - Time-of-Flight (ToF) proximity sensor from STMicroelectronics
Key Features	High-precision proximity sensing, based on FlightSense technology, up to 1300mm standard range, ambient light tolerance, 18° field of view (FoV), hardware interrupt with LED indication, Click Snap feature, low power consumption, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Proximity 21 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	
Shutdown	**XSH**	2	RST	INT	15	**GP1**	Interrupt
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
GP1	GP1	-	User-Configurable LED Indicator

Proximity 21 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Distance Range	1	-	1300	mm
Field of View (FoV)	-	18	-	deg

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Software Support

We provide a library for the Proximity 21 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 Proximity 21 Click driver.

Key functions

- proximity21_get_gpio1_pin This function returns the GPIO1 (interrupt) pin logic state.
- proximity21_get_result This function gets the results reported by the sensor.
- proximity21_clear_interrupt This function clears the data ready interrupt.

Example Description

This example demonstrates the use of Proximity 21 Click by reading and displaying the target distance in millimeters on the USB UART.

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.Proximity21

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. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

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mikroBUS™

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Click board™ Catalog

Click boards™

ClickID

Downloads

Proximity 21 click example on Libstock

Proximity 21 click 2D and 3D files v100

VL53L4ED datasheet

Proximity 21 click schematic v100

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