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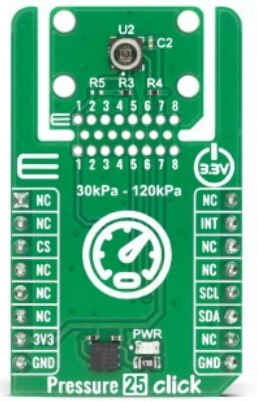
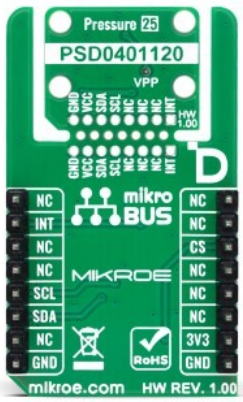
Pressure 25 Click





PID: MIKROE-6937

Pressure 25 Click is a compact add-on board designed for high-resolution absolute pressure and temperature sensing. This board is based on the PSD0401120, a high-resolution pressure sensor from PUI Audio. It measures absolute pressure from 30kPa to 120kPa using a MEMS piezoresistive sensing element, a low-noise two-state programmable-gain preamplifier, and a 24-bit delta-sigma ADC with digital filtering, temperature compensation, and linearity correction. The sensor is factory calibrated and includes an integrated temperature sensor with 0.1°C nominal resolution. It communicates through an I2C interface with a default 7-bit address of 0x78 and uses an INT pin as an End-of-Conversion indicator. It also supports the Click Snap feature for flexible sensor placement. This Click board is suitable for barometers, mobile altimeters, floor detection, indoor and outdoor navigation, weather stations, and pressure and temperature logging systems.

For more information about **Pressure 25 Click** visit the official product page.

How does it work?

Pressure 25 Click is based on the PSD0401120, a high-resolution pressure sensor from PUI Audio, which provides pressure measurement across a 30kPa to 120kPa absolute pressure range while maintaining high accuracy and low current consumption. The PSD0401120 uses a MEMS piezoresistive absolute pressure sensor as its pressure-detecting element, allowing it to convert local ambient atmospheric pressure into an electrical signal that is further conditioned and digitized inside the sensor. The analog pressure output is first amplified by a two-state programmable-gain preamplifier, which provides flexible signal conditioning while maintaining very low noise magnitude in the low-frequency signal bandwidth. This board is well suited for barometers, mobile altimeters, indoor navigation systems, floor detection in buildings, outdoor

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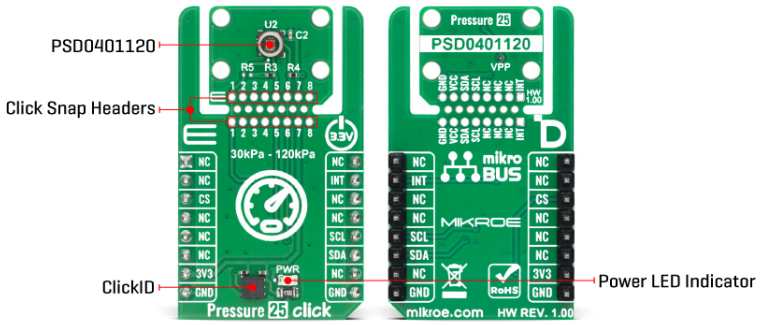
navigation systems, industrial pressure and temperature sensing systems, pressure and temperature logging systems, adventure and sports watches, and weather stations.



To improve stability and reduce measurement error, the preamplifier minimizes input offset voltage through chopper-stabilization and auto-zeroing techniques, helping the sensor preserve reliable performance in precision pressure-sensing applications. After amplification, the signal is driven into a 24-bit delta-sigma analog-to-digital converter, where the pressure information is converted into a high-resolution digital value. The converter output is then processed by an integrated digital filter and DSP state machine, which work together to filter noise and apply the required temperature and linearity compensation before the final data is made available to the host system. The sensor is factory calibrated, with calibration coefficients stored in onboard memory and used during signal processing to compensate the sensor’s analog output and improve the accuracy of the final pressure reading.

In addition to pressure measurement, the PSD0401120 also includes an integrated temperature sensor with a nominal resolution of 0.1°C, enabling the board to provide both pressure and temperature information from a single sensing device. This Click board™ 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 sensor/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the PSD0401120 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.

Pressure 25 Click communicates with the target MCU through the I2C interface, operating as a peripheral device with a default 7-bit device address of 0x78. The measured and compensated pressure data is delivered as a serial I2C data bit stream proportional to the local ambient atmospheric pressure. Besides the standard communication interface pins, the board also uses the INT pin as an End-of-Conversion indicator. When a measurement command is sent through the I2C interface, the sensor automatically generates an interrupt after the conversion is completed, signaling that new pressure and temperature data is ready to be read by the host MCU.

This Click board™ can be operated only with a 3.3V logic voltage level. Appropriate logic voltage level conversion must be performed before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as

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a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	Pressure
Applications	Ideal for barometers, mobile altimeters, floor detection, indoor and outdoor navigation, weather stations, and pressure and temperature logging systems
On-board modules	PSD0401120 - high-resolution pressure sensor from PUI Audio
Key Features	High-resolution absolute pressure sensing, integrated temperature sensing with 0.1°C nominal resolution, MEMS piezoresistive pressure sensing element, low current consumption, two-state programmable-gain preamplifier, low-noise analog signal conditioning, chopper-stabilization and auto-zeroing techniques, 24-bit delta-sigma ADC, digital filtering and DSP-based compensation, temperature and linearity compensation, factory calibration with onboard calibration coefficients, 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 Pressure 25 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	**INT**	End-of-Conversion Indicator
ID COMM	**CS**	3	CS	RX	14	NC	

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	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

Pressure 25 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Pressure Range	30	-	120	kPa
Temperature Sensor Resolution	-	0.1	-	°C
ADC Resolution	-	24	-	bit

Software Support

Pressure 25 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the Pressure 25 Click board for measuring pressure and temperature data. The application reads sensor values via the I2C interface and displays the measured results on the serial terminal.

Key Functions

- pressure25_cfg_setup This function initializes Click configuration structure to initial values.
- pressure25_init This function initializes all necessary pins and peripherals used for this Click board.
- pressure25_send_cmd This function sends a command byte over the I2C interface.
- pressure25_get_int_pin This function reads the current logic level of the INT pin.
- pressure25_get_press_temp This function triggers a compensated pressure and temperature acquisition and converts values to kPa and degC.

Application Init

Initializes the logger and Pressure 25 Click driver.

Application Task

Periodically reads pressure and temperature values from the sensor and logs the results to the serial terminal.

Application Output

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This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

Pressure 25 click example package

Pressure 25 click 2D and 3D files v100

Pressure 25 click schematic v100

PSD0401120 datasheet