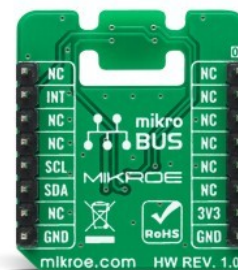


Thermo 18 Click



PID: MIKROE-4829

Thermo 18 Click is a compact add-on board that provides an accurate temperature measurement. This board features the [WSEN-TIDS](#), a silicon-based, high-precision digital temperature sensor with embedded analog and digital signal processing unit from [Würth Elektronik](#). This temperature sensor, characterized by its high accuracy (up to ± 0.25 °C typical) and high resolution, provides factory-calibrated 16-bit temperature data to the host controller with a configurable I2C interface. It also comes with a programmable temperature threshold and an interrupt feature. This Click board™ is appropriate for industrial control, environmental monitoring, domestic appliances, HVAC systems, or other temperature measurement applications.

Thermo 18 Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

How does it work?

Thermo 18 Click as its foundation uses the WSEN-TIDS (2521020222501), a silicon-based, high-resolution digital temperature sensor from Würth Elektronik. This temperature sensor is characterized by high accuracy; temperature range of -40°C to +125°C provides ± 0.5 °C accuracy, while a range of -10°C to +60°C it goes down to ± 0.25 °C. WSEN-TIDS sensor is factory-calibrated and can be used without time-consuming re-measurements. It features a 16-bit output signal that can be read out via an I2C serial interface with output data rates up to a maximum of 200Hz.

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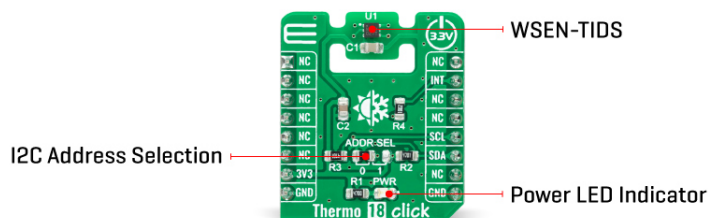
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ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).



This Click board™ can be configured in the three following operational modes: Power-down mode, Single conversion mode, and Continuous mode. In Power-down mode, the digital chain that samples the temperature data is turned off, and the current consumption is at its minimum. Before going into this mode, the temperature data registers retain the last sampled temperature value. However, serial communication with the host controller via the I2C bus is still possible, allowing the user to configure the device by accessing the control registers and temperature threshold registers.

The Single conversion mode can activate when the sensor is still in a Power-down mode allowing a single temperature measurement to be performed according to the request of the host controller, while the continuous mode constantly samples new temperature measurements and writes the data to the temperature data registers. Once the device is configured in one of the operating modes, temperature values are sampled and stored in the temperature data registers, available for the user to read.

Thermo 18 Click communicates with MCU using the standard I2C 2-Wire interface with a frequency of 400kHz in Fast Mode and up to 1MHz in Fast Mode Plus. Also, the WSEN-TIDS features an interrupt signal routed on the INT pin of the mikroBUS™ socket, which indicates when a new set of measured temperature data are available, simplifying data synchronization in the digital system that uses the device. Besides, it also allows the choice of the least significant bit of its I2C slave address by positioning the SMD jumper labeled as ADDR SEL to an appropriate position marked as 0 and 1.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with 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	Temperature & humidity
Applications	Can be used for industrial control, environmental monitoring, domestic appliances, HVAC systems, or other temperature measurement applications
On-board modules	WSEN-TIDS - silicon-based, high-resolution

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	digital temperature sensor from Würth Elektronik
Key Features	Low power consumption, high accuracy, high resolution, output data rate up to 200Hz, programmable temperature threshold, and more
Interface	I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Thermo 18 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro [®] BUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	INT	Interrupt
	NC	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
JP1	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Thermo 18 Click electrical specifications

Description	Min	Typ	Max	Unit
Absolute Accuracy	-	3.3	-	V
Absolute Accuracy	-	±0.25	-	°C
Resolution	-	16	-	bit
Output Data Rate	25	-	200	Hz
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the Thermo 18 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

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

Library Description

This library contains API for Thermo 18 Click driver.

Key functions:

- thermo18_read_temperature - Reads and calculates temperature value.
- thermo18_set_temperature_threshold - Sets temperature threshold.
- thermo18_reset - Resets device.

Example description

The example application showcases ability of device to read temperature and detect and assert interrupt on undertemperature or overtemperature thresholds.

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

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Thermo18

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. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika 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

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

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Downloads

[Thermo 18 click 2D and 3D files](#)

[WSEN-TIDS datasheet](#)

[Thermo 18 Click schematic](#)

[Thermo 18 click example on Libstock](#)

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