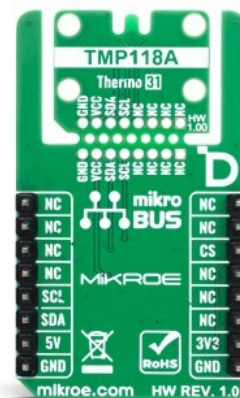
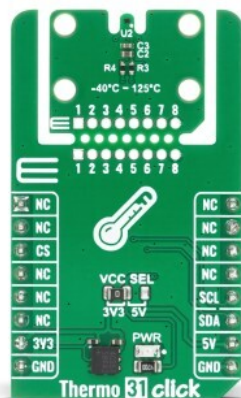


Thermo 31 Click



PID: MIKROE-6902

Thermo 31 Click is a compact add-on board designed for high-accuracy temperature measurement. It is based on the [TMP118](#), a digital temperature sensor from [Texas Instruments](#). This sensor features 16-bit resolution with an LSB of 0.0078125°C, delivering accuracy down to $\pm 0.1^\circ\text{C}$ without the need for calibration, while supporting a wide temperature range from -40°C to 125°C . Key features include an I2C- and SMBus-compatible interface with I3C coexistence support, programmable alert functionality, low-voltage operation down to 1.2V without level shifting, and a unique device ID enabling NIST traceability. It also incorporates the MIKROE Click Snap feature, allowing the sensor section to be physically separated for flexible integration and standalone use. This Click board™ is ideal for mobile devices, wearables, smart trackers, tablets, and medical sensor patches requiring precise temperature sensing.

For more information about **Thermo 31 Click** visit the official [product page](#).

How does it work?

Thermo 31 Click is based on the TMP118, a high-accuracy digital temperature sensor from Texas Instruments, featuring an ultra-small and ultra-thin PicoStar™ package. The TMP118 provides 16-bit resolution with an LSB of 0.0078125°C, enabling extremely fine temperature measurements and achieving outstanding accuracy performance without requiring additional calibration. It delivers a typical accuracy of $\pm 0.05^\circ\text{C}$ in the 0°C to 50°C range and a maximum accuracy of $\pm 0.1^\circ\text{C}$ from 20°C to 50°C , while maintaining reliable performance across a wider temperature span from -40°C to 125°C , ensuring suitability for both consumer and industrial environments. This level of precision allows the device to meet stringent system-level standards such as ASTM E1112 and ISO 80601 for medical-grade electronic thermometers, making it particularly well suited for healthcare and wearable applications.

Mikroe produces entire development toolchains for all major microcontroller architectures.

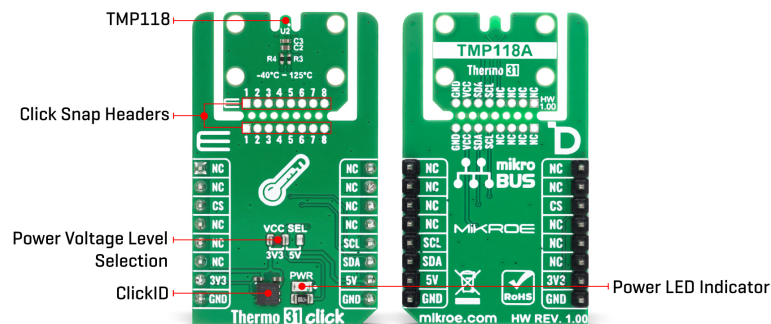
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ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.



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



This Click board™ 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 TMP118 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.

The TMP118 communicates with the host MCU through an I2C- and SMBus-compatible interface with support for I3C mixed bus coexistence, operating at a default address of 0x48, and includes programmable alert functionality for flexible system integration. Its ability to support logic levels down to 1.2V without the need for external level shifting simplifies direct interfacing with modern low-voltage MCUs, reducing design complexity and component count. Each TMP118 device is equipped with a unique device ID that enables NIST traceability, which is essential for calibration-sensitive and regulatory-compliant systems.

Additionally, the sensor supports configurable measurement averaging options including 0, 4, and 8 samples, allowing designers to optimize between response time and measurement stability depending on application requirements. Thermo 31 Click is an excellent solution for a wide range of use cases including mobile phones, smartwatches, smart trackers, tablets, and medical sensor patches, where it provides reliable, accurate, and efficient temperature monitoring in compact and portable electronic systems.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use 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, 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

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Type	Temperature & humidity
Applications	Ideal for mobile devices, wearables, smart trackers, tablets, and medical sensor patches requiring precise temperature sensing
On-board modules	TMP118 - $\pm 0.1^{\circ}\text{C}$ I2C digital temperature sensor from Texas Instruments
Key Features	High-accuracy temperature measurement up to $\pm 0.1^{\circ}\text{C}$ without calibration, 16-bit resolution, wide operating temperature range, ultra-small and ultra-thin PicoStar™ package, I2C- and SMBus-compatible interface with I3C mixed bus support, programmable alert functionality, support for low logic levels down to 1.2V without level shifting, unique device ID enabling NIST traceability, Click Snap feature, and more
Interface	I2C,I3C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Thermo 31 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					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	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

Thermo 31 Click electrical specifications

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Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Temperature Range	-40	-	+125	°C
Temperature Accuracy (0°C to 50°C)	-	±0.05	±0.15	°C
Temperature Accuracy (20°C to 50°C)	-	-	±0.1	°C
Temperature Accuracy (-40°C to 125°C)	-	-	±0.4	°C
Resolution	-	0.00781 25	-	°C

Software Support

[Thermo 31 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 Thermo 31 Click board for temperature measurement. The application reads temperature data via the I2C interface and displays the measured value on the serial terminal.

Key Functions

- `thermo31_cfg_setup` This function initializes Click configuration structure to initial values.
- `thermo31_init` This function initializes all necessary pins and peripherals used for this Click board.
- `thermo31_default_cfg` This function executes a default configuration of Thermo 31 Click board.
- `thermo31_read_unique_id` This function reads the three 16-bit words of the device unique ID and stores them in the provided buffer.
- `thermo31_read_temperature` This function reads the raw temperature result register and converts it to temperature in degrees Celsius.

Application Init

Initializes the logger and Thermo 31 Click driver, applies the default configuration, and reads the device unique identifier.

Application Task

Periodically reads the temperature value from the sensor and logs the result to the serial terminal.

Application Output

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](#).

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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

[Thermo 31 click example package](#)

[Thermo 31 click 2D and 3D files v100](#)

[Thermo 31 click schematic v100](#)

[TMP118 datasheet](#)

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