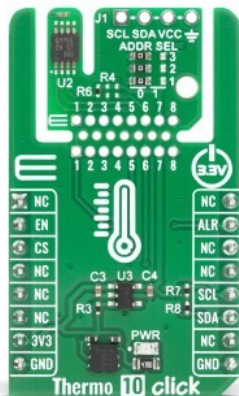


Thermo 10 Click



PID: MIKROE-6771

Thermo 10 Click is a compact add-on board for ambient temperature measurement and environmental sensing across a wide range of applications. It is based on the [P3T1755](#), a high-accuracy digital temperature sensor from [NXP](#), featuring an integrated bandgap temperature sensing element with analog-to-digital conversion and built-in overtemperature detection. This Click board supports both high-speed I3C communication up to 12.5MHz and backward-compatible I2C communication up to 3.4MHz, while delivering 12-bit temperature data with a resolution of 0.0625°C and accuracy up to ±0.5°C. Key features include configurable operating modes for periodic monitoring or low-power shutdown operation, programmable alert functionality with selectable comparator or interrupt modes, and supports the MIKROE Click Snap feature for flexible integration. This Click board is ideal for IoT devices, portable electronics, SSD thermal monitoring, industrial controllers, servers, and PC or notebook thermal management systems.

For more information about **Thermo 10 Click** visit the official [product page](#).

How does it work?

Thermo 10 Click is based on the P3T1755, a high-accuracy digital temperature sensor from NXP that integrates an on-chip bandgap temperature sensing element combined with an analog-to-digital conversion architecture and built-in overtemperature detection functionality. The device operates across a wide temperature range from −40°C to +125°C, delivering measurement accuracy of up to ±0.5°C (for range from −20°C to +80°C), making it suitable for demanding environments where stable temperature monitoring is essential such as IoT devices, portable electronics, solid-state drives, industrial controllers, servers, and PC or notebook thermal management systems.

Mikroe produces entire development toolchains for all major microcontroller architectures.

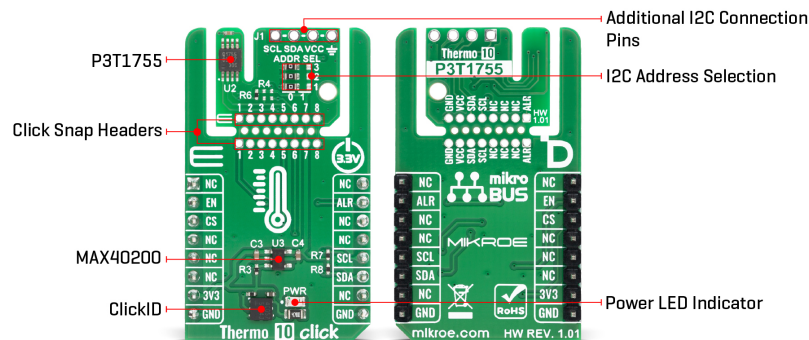
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ISO 27001: 2013 certification of informational security management system.
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ISO 9001: 2015 certification of quality management system (QMS).



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 P3T1755 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.

Communication with the host MCU is performed through a high-speed two-wire serial interface supporting both I3C communication at speeds up to 12.5MHz and backward-compatible I2C communication up to 3.4MHz. The device includes multiple configuration and data registers that allow flexible system customization, including selectable operating modes and programmable device behavior made for specific application requirements. The P3T1755 continuously converts temperature data into a digital format stored in an internal temperature register using a 12-bit two's complement representation, providing a fine resolution of 0.0625°C. Its I2C address can be easily configured via onboard jumpers marked ADDR SEL in the Snap area, allowing multiple devices to coexist on the same bus.

The P3T1755 can operate in normal mode for periodic ambient temperature monitoring or be placed into shutdown mode to reduce power consumption in energy-sensitive designs. Advanced interrupt functionality is enabled through the I3C In-Band Interrupt (IBI) feature, allowing the P3T1755 to signal events directly over the communication bus by transmitting its address within the arbitrated address header, eliminating the need for an interrupt pin. In addition, the ALR output pin supports two selectable operating schemes, functioning either as an alert comparator or as an interrupt output, with configurable active polarity and programmable fault queue settings that define the number of consecutive fault conditions required before triggering an alert, along with adjustable temperature set-point thresholds for precise thermal event management.

To optimize power control and operational management, Thermo 10 Click integrates the [MAX40200](#) ideal diode controller from Analog Devices, which enables or disables the P3T1755 through a device enable pin (EN), providing power switching and protection. Also, this Click includes an unsoldered header labeled J1 that exposes the SCL and SDA communication lines together with VCC and GND pins, providing users with convenient access to the sensor's interface signals directly from the integrated circuit for evaluation, signal routing, external monitoring, or custom system expansion purposes.

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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. It also comes equipped with a library containing functions and 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

Type	Temperature & humidity
Applications	Ideal for IoT devices, portable electronics, SSD thermal monitoring, industrial controllers, servers, and PC or notebook thermal management systems
On-board modules	P3T1755 - 0.5°C accuracy digital temperature sensor from NXP
Key Features	Digital temperature sensing with $\pm 0.5^\circ\text{C}$ accuracy, wide operating temperature range, 12-bit temperature measurement with 0.0625°C resolution, integrated bandgap temperature sensor with on-chip A/D conversion, built-in overtemperature detection functionality, I3C/I2C interface, configurable operating modes, Click Snap feature, programmable alert, 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

Pinout diagram

This table shows how the pinout on Thermo 10 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	
Device Enable	EN	2	RST	INT	15	ALR	Alert
ID COMM	CS	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	

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	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-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Thermo 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Temperature Range	-40	-	+125	°C
Temperature Accuracy	±0.5	-	±1	°C
Temperature Resolution	-	0.0625	-	°C

Software Support

[Thermo 10 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 how to read temperature data and detect ALERT events using the Thermo 10 Click board.

Key Functions

- `thermo10_cfg_setup` This function initializes Click configuration structure to initial values.
- `thermo10_init` This function initializes all necessary pins and peripherals used for this Click board.
- `thermo10_default_cfg` This function executes a default configuration of Thermo 10 Click board.
- `thermo10_get_alert_pin` This function reads the digital state of the ALERT pin.
- `thermo10_get_temp` This function reads the temperature and converts it to degrees Celsius.

Application Init

Initializes the driver and configures the Thermo 10 Click for temperature measurement.

Application Task

Reads the temperature value periodically and logs an ALERT message when the alert pin becomes active.

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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](#).

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 10 click example package](#)

[Thermo 10 click 2D and 3D files v101](#)

[Thermo 10 click schematic v101](#)

[P3T1755 datasheet](#)

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