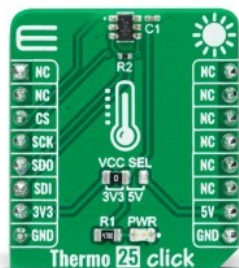


Thermo 25 Click



PID: MIKROE-5335

Thermo 25 Click is a compact add-on board that accurately measures temperature. This board features the [TMP127-Q1](#), a high-precision digital temperature sensor from [Texas Instruments](#). This SPI-configurable factory-calibrated temperature sensor has a high accuracy of 0.8°C, supporting an ambient temperature range from -55°C to 175°C. It features a 14-bit signed temperature resolution (0.03125 °C per LSB) while operating over a supply range. This Click board™ is appropriate for thermal management of various automotive, industrial, and environmental applications.

Thermo 25 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 25 Click, as its foundation, uses the TMP127-Q1, a factory-calibrated digital output temperature sensor designed for thermal management and thermal protection applications from Texas Instruments. This sensor is characterized by high accuracy; a temperature range of -55°C to +150°C provides typical ±0.8°C accuracy, also containing a 14-bit ADC to monitor and digitize the temperature reading to a resolution of 0.03125°C per LSB. The wide supply voltage range, low supply current, and SPI-compatible interface make it ideal for various applications, including process control, environmental monitoring, domestic appliances, and many more.

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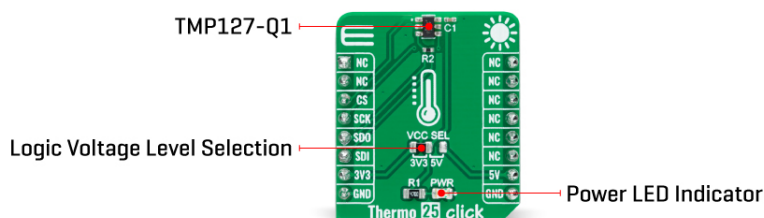
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OHSAS 18001: 2008 certification of occupational health and safety management system.



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



The TMP127-Q1 possesses two operational modes: Continuous-Conversion (CC) and Shutdown Mode. In the CC mode, ADC performs continuous temperature conversions and stores each result to the temperature register, overwriting the result from the previous conversion, while the Shutdown mode reduces power consumption in the TMP127-Q1 when continuous temperature monitoring is not required. The TMP127-Q1 always powers up in the Continuous-Conversion mode, while the Shutdown mode can optimize current consumption for low-power applications.

This Click board™ communicates with MCU through a standard SPI interface (compatible with SPI or MICROWIRE bus specifications) supporting the two most common SPI modes, SPI Mode 0 and 3, with a maximum frequency of 10MHz. The SPI interface features a simplified no register map protocol with a read-write 4-wire configuration. Writing to the TMP127-Q1 will allow the system to use the Shutdown mode and read the device ID.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the 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.

Specifications

Type	Temperature & humidity
Applications	Can be used for thermal management of various automotive, industrial, and environmental applications
On-board modules	TMP127-Q1 - digital output temperature sensor from Texas Instruments
Key Features	Low power consumption, high precision and accuracy, factory-calibrated, 14-bit temperature-to-digital converter, 0.03125°C temperature resolution, SPI compatible serial interface, Shutdown mode, and more
Interface	SPI
ClickID	No

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Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Thermo 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	NC	
SPI Chip Select	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
SPI Data OUT	SDO	5	MISO	SCL	12	NC	
SPI Data IN	SDI	6	MOSI	SDA	11	NC	
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	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Thermo 25 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Temperature Accuracy	-	±0.8	±1	°C
Temperature Resolution (LSB)	-	0.03125	-	°C
Temperature Resolution (Sign Bit)	-	14	-	bits
Operating Temperature Range	-40	+25	+120	°C

Software Support

We provide a library for the Thermo 25 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

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 25 Click driver.

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Key functions

- `thermo25_check_communication` This function sets the operating mode to shutdown, then reads and verifies the device ID, and switches back to the continuous mode.
- `thermo25_read_temperature` This function reads the temperature measurements in degrees Celsius.
- `thermo25_set_mode` This function sets the device operating mode to shutdown or continuous mode by using SPI serial interface.

Example Description

This example demonstrates the use of Thermo 25 Click board™ by reading and displaying the temperature measurements.

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.Thermo25

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 MikroElektronika [compilers](#).

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™](#)

Downloads

[Thermo 25 click example on Libstock](#)

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[TMP127-Q1 datasheet](#)

[Thermo 25 click 2D and 3D files](#)

[Thermo 25 click schematic](#)

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