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Thermo 3 Click

PID: MIKROE-1885

Thermo 3 Click is a compact add-on board that accurately measures temperature. This board features the TMP102, a high-accuracy digital temperature sensor from Texas Instruments. The TMP102 is ideal for NTC/PTC thermistor replacement, offering a high accuracy of ±0.5°C without requiring calibration or external component signal conditioning and 12-bit ADC with resolution down to 0.0625°C. It provides temperature data to the host controller through a compatible I2C interface, reliability, user-selectable I2C addresses, and up to 2.85MHz communication speeds. This Click board™ is suitable for extended temperature measurement in various communication, computer, consumer, environmental, industrial, and instrumentation applications.

How does it work?

Thermo 3 Click is based on the TMP102, a digital temperature sensor from Texas Instruments with increased reliability and improved accuracy specifications optimal for thermal management and protection applications. It integrates a digital temperature sensor with a 12-bit analog-to-digital converter (ADC), a data processing circuit, and serial interface logic functions in one package. The voltage is digitized and converted to a 12-bit temperature result in degrees Celsius, with a resolution of 0.0625°C.

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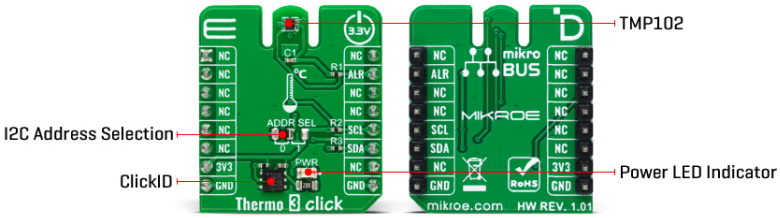

The TMP102 temperature sensor is highly linear and does not require complex calculations or lookup tables to derive the temperature. It gives a fully calibrated digital output with outstanding accuracy of up to ±0.5°C typical over a temperature range of -25°C to +85°C.

Thermo 3 Click communicates with an MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting High-Speed Mode up to 2.85MHz. Also, the TMP102 allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled ADD. It also possesses an additional interrupt alert signal, routed on the INT pin of the mikroBUS™ socket labeled as AL, indicating when a specific interrupt event occurs that depends on the temperature reading value relative to programmable limits (overtemperature alert).

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. 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 extended temperature measurement in various communication, computer, consumer, environmental, industrial, and instrumentation applications
On-board modules	TMP102 - digital temperature sensor from Texas Instruments
Key Features	Low power consumption, high precision, I2C interface, temperature sensor in the TMP102 is the chip itself, resolution of 0.0625°C, high accuracy, high reliability and long-term stability, and more
Interface	I2C
Feature	ClickID Manifest,No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)

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Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Thermo 3 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	**AL**	Overtemperature Alert
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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	ADD	Right	I2C Address Selection 1/0: Left position 1, Right position 0

Thermo 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Temperature Accuracy	-	±0.5	-	°C
Temperature Resolution	-	0.0625	-	°C
ADC Resolution	-	12	-	bit
Operating Temperature Range	-25	+25	+85	°C

Software Support

We provide a library for the Thermo 3 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 3 Click driver.

Key functions

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- Gets temperature.

Example Description

This application read the temperature.

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.Thermo3

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 3 click example on Libstock

TMP102 datasheet

Thermo 3 click schematic v101

Thermo 3 click 2D and 3D files v101

Thermo 3 click 2D and 3D files v101ID

Thermo 3 click schematic v101ID