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Thermo 29 Click

PID: MIKROE-5586

Thermo 29 Click is a compact add-on board for accurate temperature measurements. This board features the TMP126, a high-accuracy SPI-configurable digital temperature sensor from Texas Instruments. The TMP126 consists of an internal thermal BJT factory-calibrated sensor, 14-bit ADC, and a digital signal processor, offering a high accuracy of ±0.25°C and a temperature resolution of 0.03125°C per LSB. It also has a programmable alarm function that outputs an interrupt signal to the MCU when a specific temperature event occurs. This Click board™ is appropriate for the thermal management of portable electronics and industrial, consumer, and environmental applications.

How does it work?

Thermo 29 Click is based on the TMP126, a digital output temperature sensor from Texas Instruments with increased reliability and improved accuracy specifications optimal for thermal management and protection applications. The TMP126 consists of an internal thermal BJT (factory calibrated on a NIST traceable setup), a high-resolution 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 14-bit temperature result in degrees Celsius, giving a fully calibrated digital output with outstanding accuracy of up to ±0.25°C and temperature resolution of 0.03125°C per LSB, typical over a temperature range of 20°C to 30°C.

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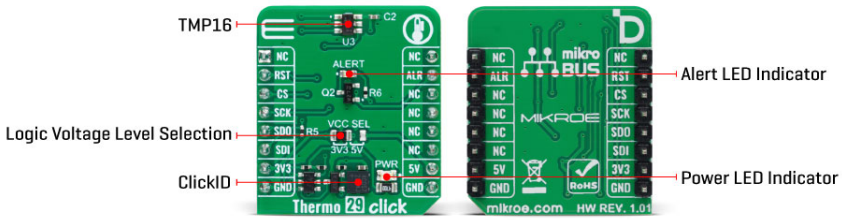

This Click board™ communicates with MCU using a 3-wire SPI-compatible interface with a maximum frequency of 10MHz, for data transfer and configuration of the TMP126. Using the Mode bit in the configuration register, the TMP126 can be configured to operate in various conversion modes, including continuous, one-shot, and shutdown modes. These modes provide flexibility to use the board in the most power-efficient way necessary for the intended application.

The TMP126 also includes advanced features for increased reliability in harsh environments. These include an optional CRC checksum for data integrity, programmable alert limits, a temperature slew rate warning, and an enhanced operating temperature range. An alarm (interrupt) signal, marked as ALR and routed to the interrupt pin of the mikroBUS™ socket, is alarming when a specific temperature event occurs that depends on the value of the temperature reading relative to programmable limits. In addition to the ALR pin, this function can be visually identified by a red LED marked as ALERT.

This Click board™ can operate with either 3.3V or 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 the thermal management of portable electronics and industrial, consumer, and environmental applications
On-board modules	TMP126 - digital output temperature sensor from Texas Instruments
Key Features	High accuracy, broad temperature range, high resolution, SPI interface, fast measurement intervals with no self-heating, advanced features for increased reliability, programmable alert, factory-calibrated, low power consumption, and more
Interface	SPI

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Feature	ClickID
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 29 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	
ID SEL	**RST**	2	RST	INT	15	**ALR**	Alert Interrupt
SPI Select / ID COMM	**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
LD2	ALERT	-	Alert LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Thermo 29 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Temperature Accuracy	-0.3	-	0.3	deg
Temperature Resolution	-	0.03125	-	°C/LSB
Temperature Range	-20	+25	+85	°C

Software Support

We provide a library for the Thermo 29 Click as well as a demo application (example), developed using Mikroe compilers. The demo can run on all the main Mikroe development boards.

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

Library Description

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This library contains API for Thermo 29 Click driver.

Key functions

- thermo29_read_unique_id This function reads the device unique ID words (6 bytes in total).
- thermo29_get_alert_pin This function returns the alert pin logic state.
- thermo29_read_temperature This function reads the temperature measurement in degrees Celsius.

Example Description

This example demonstrates the use of Thermo 29 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), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Thermo29

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 Mikroe compilers.

mikroSDK

This Click board™ is supported with mikroSDK - Mikroe Software Development Kit, which needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

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Downloads

Thermo 29 click example on Libstock

Thermo 29 click 2D and 3D files v101

TMP126 datasheet

Thermo 29 click schematic v101

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