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Thermo 22 Click

PID: MIKROE-5068

Thermo 22 Click is a compact add-on board that provides an accurate temperature measurement. This board features the TMP75C, a high-precision digital temperature sensor from Texas Instruments. The TMP75C houses an integrated digital temperature sensor with a 12-bit analog-to-digital converter (ADC), a reference circuit, and serial interface logic functions in one package. Characterized by its high accuracy (up to ±0.25°C typical) and high resolution of 0.0625°C, this temperature sensor provides temperature data to the host controller with a configurable I2C interface. This Click board™ is appropriate for thermal management and protection of various consumer, industrial, and environmental applications.

Thermo 22 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 22 Click as its foundation uses the TMP75C, a digital temperature sensor optimal for thermal management and thermal protection applications from Texas Instruments. This temperature sensor is characterized by high accuracy; temperature range of 0°C to +70°C provides typical ±0.25°C accuracy. The temperature sensing device for the TMP75C is the chip itself. A bipolar junction transistor inside the chip is used in a band-gap configuration to produce a voltage proportional to the chip temperature. 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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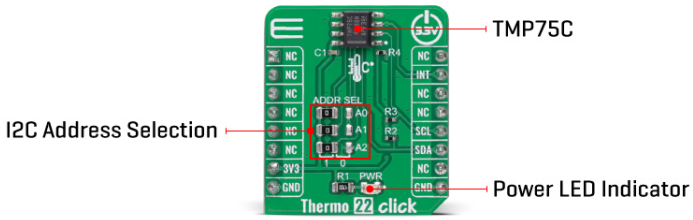

The default operational mode of the TMP75C is Continuous-Conversion mode (CC), where the ADC performs continuous temperature conversions and stores each result to the temperature register, overwriting the result from the previous conversion. After the Power-Up cycle, the TMP75C immediately starts a conversion. Alongside CC mode, it also has Shutdown and One-shot modes, which reduces power consumption in the TMP75C when continuous temperature monitoring is not required, typically less than 0.3µA.

Thermo 22 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings. Besides, it also allows the choice of the least significant bit of its I2C slave address by positioning the SMD jumpers labeled as ADDR SEL to an appropriate position marked as 0 and 1. This way, the TMP75C provides the opportunity of the eight possible different I2C addresses by positioning the SMD jumper to an appropriate position. In addition to I2C communication, it also uses an interrupt pin routed to the INT pin of the mikroBUS™ socket, representing the programmable temperature limit feature and alert that allows the sensor to operate as a stand-alone thermostat or an overtemperature alarm for system shutdown.

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 thermal management and protection of various consumer, industrial, and environmental applications
On-board modules	TMP75C - digital temperature sensor from Texas Instruments
Key Features	Low power consumption, high precision, overtemperature alert with programmable trip values, shutdown and one-shot mode, high accuracy, and more
Interface	I2C

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Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Thermo 22 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	**INT**	Interrupt
	NC	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-JP3	ADDR SEL	Left	I2C Address Selection 1/0: Left position 1, Right position 0

Thermo 22 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Temperature Accuracy	-	±0.25	±1	°C
Temperature Resolution	-	0.0625	-	°C
Operating Temperature Range	-55	+25	+120	°C

Software Support

We provide a library for the Thermo 22 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 22 Click driver.

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Key functions

- thermo22_read_temperature This function reads the temperature data in Celsius.
- thermo22_set_temperature_high_limit This function sets the temperature high limit at which the overtemperature alert flag is being set.
- thermo22_get_int_pin This function returns the INT pin logic state which indicates the overtemperature alert.

Example Description

This example demonstrates the use of Thermo 22 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.Thermo22

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 22 click example on Libstock

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[TMP75C datasheet]

[Thermo 22 click 2D and 3D files]

[Thermo 22 click schematic]