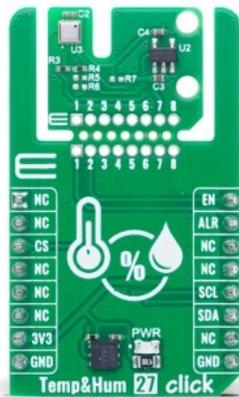


## Temp&Hum 27 Click



PID: MIKROE-6689

**Temp&Hum 27 Click** is a compact add-on board designed for measurement of temperature and relative humidity in both industrial and automotive environments. It is based on the [HS4001](#) from [Renesas](#), a high-performance MEMS sensor with fully calibrated and temperature-compensated digital output. This sensor features NIST-traceable calibration, ISO/IEC 17025-compliant testing, and sensor-level protection for excellent long-term stability and resistance to environmental stress and aging. It offers fast response time, typical accuracy of  $\pm 1.5\%RH$  and  $\pm 0.2^{\circ}C$ , supports multiple programmable resolution settings up to 14-bit, and operates over a wide temperature range. The board also supports I2C communication and incorporates the Click Snap feature for flexible mounting and autonomous sensor operation. Temp&Hum 27 Click is ideal for applications such as climate control systems, HVAC, building automation, medical equipment, weather monitoring, and data logging.

For more information about **Temp&Hum 27 Click** visit the official [product page](#).

### How does it work?

Temp&Hum 27 Click is based on the HS4001, a high-performance MEMS-based relative humidity and temperature sensor from Renesas, which delivers fully calibrated and temperature-compensated digital output over a standard I2C interface. This board offers highly accurate and reliable temperature and humidity sensing for a wide range of industrial and automotive applications. Designed to meet demanding environmental requirements, the HS4001 features integrated NIST-traceable calibration, ISO/IEC 17025-compliant production testing, and exceptional sensor-level protection that ensures long-term stability and resistance to environmental stress, aging, and volatile compounds.

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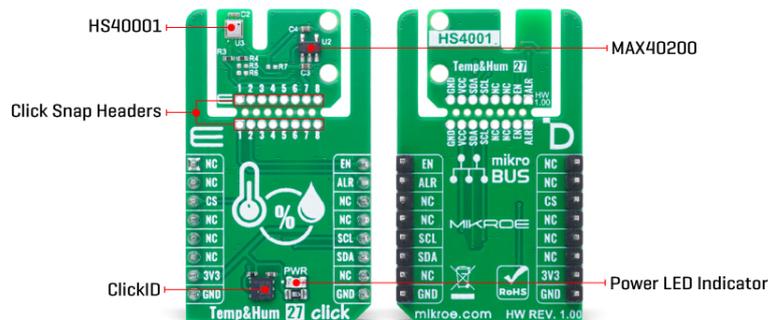
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With a wide operating temperature range from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  for industrial use and  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$  for automotive applications, this sensor achieves typical accuracy levels of  $\pm 1.5\% \text{RH}$  for humidity and  $\pm 0.2^{\circ}\text{C}$  for temperature within the critical range of  $-10^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ . It supports multiple programmable resolution settings, up to 14-bit resolution with a typical RH resolution of 0.04%, and enables a fast typical humidity response time of just 4 seconds. These features make Temp&Hum 27 Click a solution for climate control systems, HVAC equipment, building automation, medical instrumentation, weather stations, home appliances, and various portable or data logging devices operating in both controlled and harsh environments.

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 area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the HS4001 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.

This Click board™ uses an I2C interface with clock speeds of up to 400kHz, ensuring fast communication with the host MCU. Beyond communication pins, this board is also equipped with alert (ALR) pin to indicate when a measurement is active in periodic measurement mode or to be used to trigger an interrupt on the host MCU so an appropriate action can be taken if the temperature or humidity is outside of the desired limits. To manage the operation of the HS4001 sensor, Temp&Hum 27 Click integrates the MAX40200 from Analog Devices that enables or disables the sensor through the EN pin.

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.

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## Specifications

Type	Temperature & humidity
Applications	Ideal for applications such as climate control systems, HVAC, building automation, medical equipment, weather monitoring, and data logging
On-board modules	HS4001 - high-performance relative humidity and temperature sensor with digital output from Renesas
Key Features	Fully calibrated and temperature-compensated digital output, NIST-traceable calibration, ISO/IEC 17025-compliant production testing, fast 4-second humidity response time, programmable resolution up to 14 bits, sensor-level protection against environmental stress and aging, I2C interface, Click Snap support, and more
Interface	I2C
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 Temp&Hum 27 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	<b>EN</b>	Device Enable
	NC	2	RST	INT	15	<b>ALR</b>	Alert Interrupt
ID COMM	<b>CS</b>	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	NC	
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

## Temp&Hum 27 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V

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Humidity Measurement Range	0	-	100	%RH
Humidity Accuracy	-	±1.5	-	%RH
Humidity Resolution	-	0.04	-	%RH
Temperature Measurement Range	-40	-	+125	°C
Temperature Accuracy	-	±0.2	-	°C

## Software Support

[TempHum 27 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 the use of the TempHum 27 Click board by reading ambient temperature and relative humidity values using periodic measurements. After initializing the device and starting the periodic mode at 1 Hz, the application waits for the ALERT pin to indicate data readiness and then logs the measurements to the USB UART terminal.

## Key Functions

- `temphum27_cfg_setup` This function initializes Click configuration structure to initial values.
- `temphum27_init` This function initializes all necessary pins and peripherals used for this Click board.
- `temphum27_get_alert_pin` This function reads the logic level of the ALR (alert) pin.
- `temphum27_start_periodic_meas` This function configures and starts periodic measurement mode at the specified frequency.
- `temphum27_read_data_periodic` This function reads temperature and/or humidity data in periodic measurement mode.
- `temphum27_read_sensor_id` This function reads the unique 32-bit sensor ID.

## Application Init

Initializes the logger and the Click driver, resets the device, reads and logs the sensor ID, and starts periodic measurements with a 1-second output rate.

## Application Task

Waits for the ALERT pin to go low indicating new measurement data is available, then reads and logs the temperature and humidity values.

## 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

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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

[Temp&Hum 27 click example package](#)

[Temp&Hum 27 click 2D and 3D files v100](#)

[HS40xx datasheet](#)

[Temp&Hum 27 click schematic v100](#)

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