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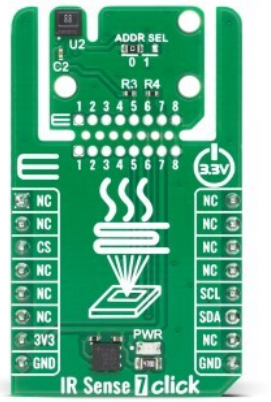
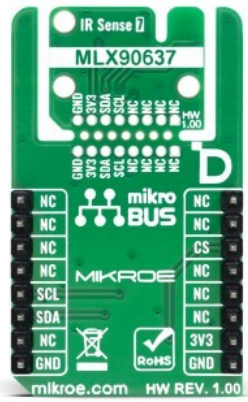
IR Sense 7 Click





PID: MIKROE-6993

IR Sense 7 Click is a compact add-on board designed for non-contact infrared temperature measurement of objects and ambient conditions. It is based on the MLX90637, an AEC-Q100 qualified far infrared non-contact temperature sensor from Melexis. This sensor features a factory-calibrated sensor with calibration constants stored in internal EEPROM, a thermopile sensing element with amplified and digitized output, integrated ambient sensor measurement, digital filtering, RAM data storage, and I2C communication for easy access to conversion results. It also offers strong resistance to environmental temperature fluctuations, ambient light immunity through an integrated optical filter with a 2 to 20µm pass band, a standard measurement resolution of 0.02°C, a 50° field of view, and an operating temperature range from -40°C to 125°C. It is especially suitable for high-precision non-contact temperature measurements, HVAC systems, EV inverter and motor temperature monitoring, and other thermally sensitive systems.

For more information about **IR Sense 7 Click** visit the official product page.

How does it work?

IR Sense 7 Click is based on the MLX90637, an AEC-Q100 qualified far infrared non-contact temperature sensor from Melexis, intended for accurate object and ambient temperature monitoring in demanding environments. The sensor is factory calibrated for high accuracy, with all calibration constants stored in its internal EEPROM memory. Its thermopile sensing element detects infrared radiation, while the resulting voltage signal is amplified and digitized, then digitally filtered and stored in RAM as raw measurement data. In addition to object temperature sensing, the MLX90637 also integrates a dedicated sensor for measuring its own temperature, with this processed raw data likewise stored in RAM. All sensor functions are managed by an

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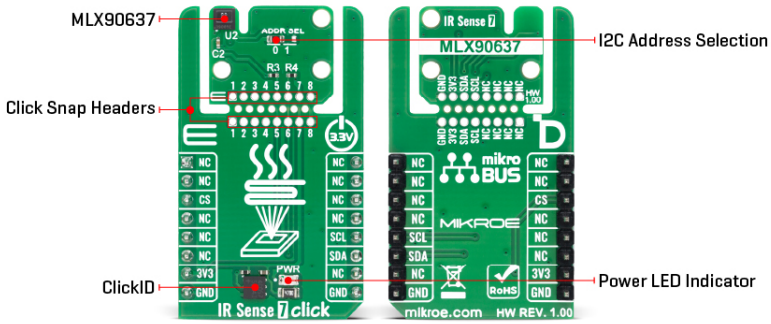
internal state machine, and the result of each measurement conversion is accessible via the I2C interface. Based on the stored calibration constants and measurement data, both ambient and object temperatures can be calculated externally.



The MLX90637 also features strong resistance to environmental temperature fluctuations, allowing it to maintain measurement stability even in the presence of localized thermal disturbances such as air turbulence, which do not affect the thermopile output signal. An integrated optical filter provides immunity to ambient light and allows a wavelength pass band from 2 to 20µm, making the sensor suitable for reliable infrared sensing under various lighting conditions. The device offers a standard measurement resolution of 0.02°C, while the calculated ambient temperature achieves an accuracy of ±0.5°C in the 0°C to 60°C ambient range and ±1°C outside of this range. With a 50° field of view and an ambient operating temperature range from -40°C to 125°C, IR Sense 7 Click is well suited for high-precision non-contact temperature measurements in applications such as HVAC systems, EV inverter and motor temperature monitoring, and other thermally sensitive systems where stable infrared sensing is required.

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.

Specifications

Type	Temperature & humidity
Applications	Ideal for high-precision non-contact temperature measurements, HVAC systems, EV inverter and motor temperature

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	monitoring, and other thermally sensitive systems
On-board modules	MLX90637 - non-contact infrared (IR) temperature sensor from Melexis
Key Features	AEC-Q100 qualified far infrared non-contact temperature sensor, factory-calibrated high-accuracy measurement with calibration constants stored in EEPROM, thermopile sensing element with amplified and digitized output, integrated sensor for internal temperature measurement, digital filtering with raw data storage in RAM, internal state machine control, I2C interface communication, external calculation of ambient and object temperature, 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 IR Sense 7 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	
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	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

IR Sense 7 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Ambient Operating Temperature	-40	-	+125	°C

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Ambient Temperature Accuracy (0°C to 60°C)	±0.5	-	±1	°C
Measurement Resolution	-	0.02	-	°C
Field of View	-	50	-	deg

Software Support

IR Sense 7 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 IR Sense 7 Click board for measuring ambient and object temperature using an infrared sensor. The application reads sensor data from RAM and calculates temperature values.

Key Functions

- irsense7_cfg_setup This function initializes Click configuration structure to initial values.
- irsense7_init This function initializes all necessary pins and peripherals used for this Click board.
- irsense7_default_cfg This function executes a default configuration of IR Sense 7 Click board.
- irsense7_read_ram This function reads measurement data from RAM.
- irsense7_calculate_amb_temp This function calculates the ambient temperature using RAM data and calibration constants.
- irsense7_calculate_obj_temp This function calculates the object temperature using RAM data, calibration constants, and iterative correction.

Application Init

Initializes the logger and IR Sense 7 Click driver, applies the default configuration, and reads device identification and EEPROM data.

Application Task

Periodically reads sensor data and calculates ambient and object temperatures, then logs the results to the serial terminal.

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

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

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also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

IR Sense 7 click example package

IR Sense 7 click 2D and 3D files v100

IR Sense 7 click schematic v100

MLX90637 datasheet