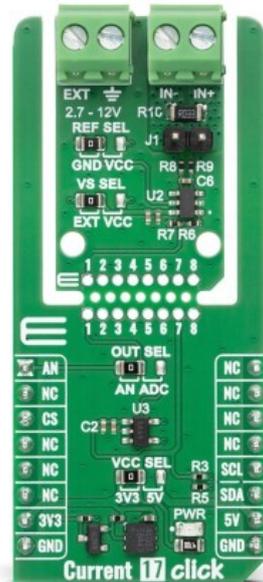


## Current 17 Click



PID: MIKROE-6819

**Current 17 Click** is a compact add-on board for bidirectional current measurement, providing monitoring of current flow through a low-value shunt resistor for protection, control, and power-management applications. It is based on the [INA299A1](#), a current sense amplifier from [Texas Instruments](#) that operates across a wide common-mode range with low offset, minimal gain error, and fast response characteristics. The board integrates a 33mΩ shunt resistor with optional bypass, supports output reading through either the mikroBUS analog pin or the onboard 12-bit ADC, and includes selectable jumpers for supply source and reference configuration. It includes MIKROE's unique Click Snap feature, allowing the IC section to be detached and positioned independently for flexible implementation. Current 17 Click is ideal for applications such as power monitoring, overcurrent protection, transient detection, load analysis, and high-side or low-side current-sensing systems.

For more information about **Current 17 Click** visit the official [product page](#).

### How does it work?

Current 17 Click is based on the INA299A1, a current sense amplifier from Texas Instruments that provides bidirectional current measurement by combining a 33mΩ shunt resistor. Designed to measure voltage drops across a low-value shunt over a wide common-mode range, the INA299A1 delivers accurate results regardless of the supply voltage, ensuring performance in both low-side and high-side current-sensing configurations. Its low offset voltage, minimal gain error, and excellent DC common-mode rejection ratio of typically 120dB allow stable and repeatable readings, while its 20V/V gain and 650kHz signal bandwidth make the device suitable not only for DC current monitoring but also for high-speed applications such

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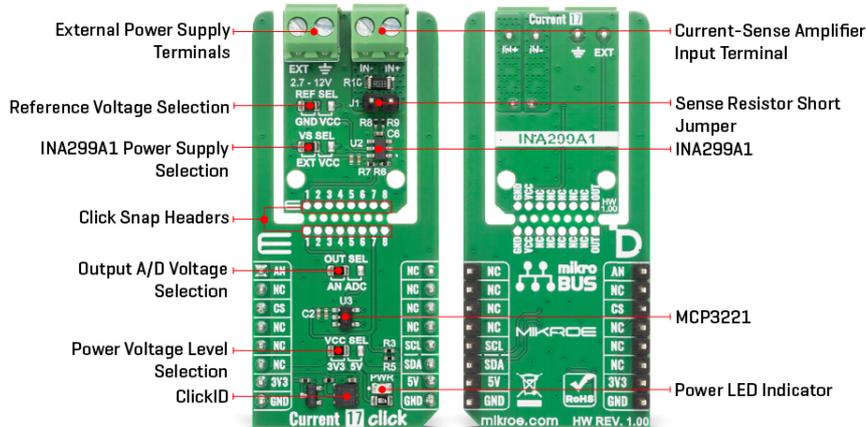


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as transient detection, fast overcurrent response, and dynamic load profiling.



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/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the INA299A1 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.

On the board, the INA299A1 operates as a differential amplifier that monitors the voltage drop across the onboard 33mΩ sense resistor, with an optional J1 jumper that can short this resistor when direct line continuity is required. The amplifier produces an output voltage proportional to the measured current, which can be read directly via the mikroBUS AN pin or digitized through the [MCP3221](#), a successive approximation A/D converter with a 12-bit resolution from Microchip, offering flexibility depending on the host MCU's available peripherals. Selection can be performed via an onboard jumper OUT SEL, placing it in an appropriate position marked as AN or ADC.

Current 17 Click also supports a wide input voltage range by allowing the INA299A1 to be supplied either from an external 2.7V to 12V source through the EXT terminal or from the mikroBUS power rails, selectable via the VS SEL jumper that assigns the amplifier supply to EXT or VCC as required. The board also includes a REF SEL jumper to define the INA299A1 reference voltage and establish the output baseline for zero current. By selecting either GND or VCC on this jumper, the amplifier can be configured for the required measurement mode. When set to GND, the output drops to 0V at zero differential input, supporting unidirectional, ground-referenced operation. When set to VCC, the output rests at the supply voltage at zero current, enabling operation in applications where the measured current may include a negative component.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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.

## Click Snap

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**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	Current sensor
Applications	Ideal for applications such as power monitoring, overcurrent protection, transient detection, load analysis, and high-side or low-side current-sensing systems
On-board modules	INA299A1 - current sense amplifier from Texas Instruments
Key Features	Bidirectional current sensing, high-accuracy differential amplification, wide common-mode input range, fast 650kHz bandwidth, selectable analog or 12-bit ADC output, flexible supply input, reference-voltage configuration Click Snap format, and more
Interface	Analog, I2C
Feature	Click Snap, ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V, External

## Pinout diagram

This table shows how the pinout on Current 17 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Analog Output	<b>AN</b>	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
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	<b>5V</b>	Power Supply
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
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left

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			position 3V3, Right position 5V
JP2	OUT SEL	Left	Output A/D Voltage Selection AN/ADC: Left position AN, Right position ADC
JP3	REF SEL	Left	Reference Voltage Selection GND/VCC: Left position GND, Right position VCC
JP4	VS SEL	Left	INA299A1 Power Supply Selection EXT/VCC: Left position EXT, Right position VCC

## Current 17 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	2.7	-	12	V
Gain	-	20	-	V/V
Bandwidth	-	650	-	kHz

## Software Support

[Current 17 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 Current 17 Click board by reading and displaying the input current measurements.

### Key Functions

- `current17_cfg_setup` This function initializes Click configuration structure to initial values.
- `current17_init` This function initializes all necessary pins and peripherals used for this Click board.
- `current17_calib_offset` This function calibrates the zero current offset value.
- `current17_calib_resolution` This function calibrates the data resolution at the known load current.
- `current17_read_current` This function reads the input current level [A].

### Application Init

Initializes the driver and calibrates the zero current offset and data resolution at 2A load current.

### Application Task

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Reads the input current measurements and displays the results on the USB UART approximately once per second.

## 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 also be found on the MIKROE [GitHub](#) account.

## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[Current 17 click example package](#)

[Current 17 click 2D and 3D files v100](#)

[Current 17 click schematic v100](#)

[INA299 datasheet](#)

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