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Current 10 Click

PID: MIKROE-6385

Current 10 Click is a compact add-on board designed for contactless current measurements. This board features the CT455, an XtremeSense™ TMR coreless current sensor from Allegro Microsystems, with a wide 1MHz bandwidth and a sensitivity of 333.3mV/mT, capable of detecting both positive and negative current flows (±6mT). It translates magnetic fields into a linear analog output with less than ±1.0% error across temperature and supply voltage variations. This Click board™ is ideal for applications such as solar power inverters, battery management systems, industrial equipment, and power utility meters.

How does it work?

Current 10 Click is based on the CT455 (CT455-H06B5-TS08), an XtremeSense™ TMR (Tunnel Magnetoresistance) coreless current sensor from Allegro Microsystems, featuring a wide bandwidth of 1MHz. This sensor uses Allegro's patented XtremeSense™ technology, ensuring highly accurate current measurements with extremely low noise. With its high accuracy and robust features, Current 10 Click is an excellent solution for applications requiring reliable current sensing in consumer, industrial, and enterprise applications, such as solar power inverters, battery management systems, DC/DC converters, industrial equipment, and power utility meters.

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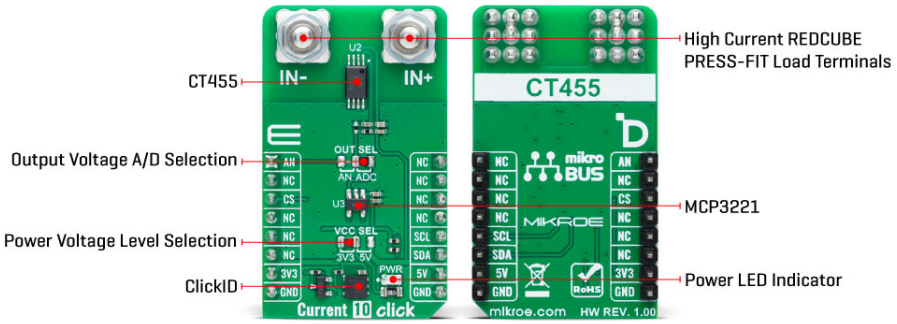

The CT455 sensor operates in a bipolar mode, detecting both positive and negative current flows, and it offers a sensitivity of 333.3mV/mT, providing precise measurement capability. Powered by a 5V supply, the CT455 can sense magnetic fields in two standard ranges of ±6mT, translated into a linear analog output voltage. This allows the board to accurately capture current changes with less than ±1.0% error over varying temperatures and supply voltages, ensuring reliable performance across various operational conditions.

The CT455's output signal can be converted to a digital value using MCP3221, a successive approximation A/D converter with a 12-bit resolution from Microchip, using a 2-wire I2C compatible interface, or sent directly to an analog pin of the mikroBUS™ socket labeled as AN. Selection can be performed via an onboard SMD jumper labeled OUT SEL, placing it in an appropriate position marked as AN and ADC.

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.

Specifications

Type	Current sensor
Applications	Ideal for applications such as solar power inverters, battery management systems, industrial equipment, and power utility meters
On-board modules	CT455 - XtremeSense™ TMR coreless current sensor with 1MHz bandwidth from Allegro Microsystems
Key Features	Based on XtremeSense™ TMR technology, 1MHz bandwidth, bipolar operation, high sensitivity, linear analog output with less than ±1.0% error over temperature and supply voltage, analog and digital output options, and more
Interface	Analog,I2C
Feature	ClickID

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Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Current 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Output	**AN**	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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	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 position 3V3, Right position 5V
JP2	OUT SEL	Right	Output Voltage A/D Selection AN/ADC: Left position AN, Right position ADC

Current 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Range	-6	-	+6	mT
Sensitivity	-	333.3	-	mV/mT

Software Support

We provide a library for the Current 10 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 Current 10 Click driver.

Key functions

- current10_calib_offset This function calibrates the zero current offset value.
- current10_calib_resolution This function calibrates the data resolution at the known load current.
- current10_read_current This function reads the input current level [A].

Example Description

This example demonstrates the use of Current 10 Click by reading and displaying the input current 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.Current10

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. 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™

ClickID

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Downloads

Current 10 click example on Libstock

Current 10 click 2D and 3D files v100

Current 10 click schematic v100

CT455 datasheet

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MIKROE-6385