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Current 12 Click

PID: MIKROE-6065

Current 12 Click is a compact add-on board designed for high-precision monitoring of current, voltage, power, and temperature in various applications. This board features the TSC1641, a 60V 16-bit power monitor with an I2C interface from STMicroelectronics. The TSC1641 consist of a high-precision 16-bit dual-channel sigma-delta ADC, capable of measuring high-side, low-side, and bidirectional currents with a programmable conversion time ranging from 128µs to 32.7ms. It supports 2-wire I2C communication with clock frequencies up to 1MHz, and includes an alert interrupt pin for setting thresholds on voltage, current, power, and temperature. This Click board™ is ideal for use in industrial battery packs, power inverters, DC power supplies, data centers, telecom equipment, and power tools.

How does it work?

Current 12 Click is based on the TSC1641, a 60V 16-bit high-precision power monitor with an I2C interface from STMicroelectronics. The TSC1641 is a high-precision analog front-end (AFE) that monitors current, voltage, power, and temperature. It measures current through a shunt resistor and load voltage from 0V up to 60V in a synchronized manner. The current measurement can be high-side, low-side, and bidirectional. The device integrates a high-precision 16-bit resolution dual-channel sigma-delta ADC with a programmable conversion time ranging from 128µs to 32.7ms. This board makes it ideal for applications such as industrial battery packs, power inverters, DC power supplies, data centers, telecom equipment, power tools, and more.

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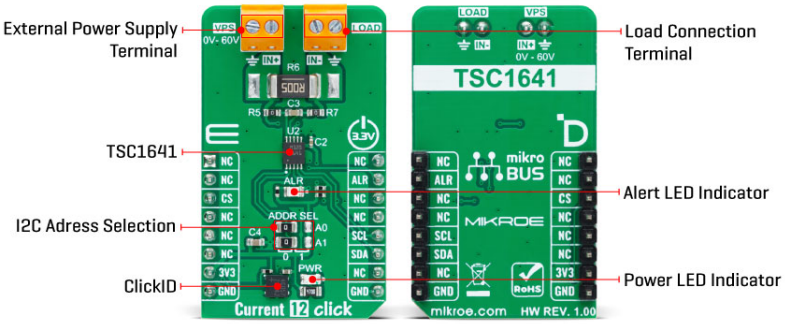

Current 12 Click uses a standard 2-wire I2C communication protocol to enable the host MCU to control the TSC1641. The I2C interface supports clock frequencies of up to 1MHz, with the I2C address selectable via the ADDR SEL jumpers. The alert interrupt ALR pin allows the assertion of several alerts regarding voltage, current, power, and temperature, with thresholds that can be set for each parameter in a specific register.

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. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Current sensor,Measurements
Applications	Ideal for use in industrial battery packs, power inverters, DC power supplies, data centers, telecom equipment, and power tools
On-board modules	TSC1641 - 60V high-precision power monitor from STMicroelectronics
Key Features	High-precision power monitor, supports high-side, low-side, and bidirectional current measurements, voltage range from 0V to 60V, adjustable conversion time, I2C interface with selectable address, alert signal on voltage, current, power, and temperature, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V,External

Pinout diagram

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This table shows how the pinout on Current 12 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	**ALR**	Alarm Interrupt
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
LD2	ALR	-	Alert LED Indicator
JP1-JP2	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Current 12 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
External Power Supply	0	-	60	V

Software Support

We provide a library for the Current 12 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

This library contains API for Current 12 Click driver.

Key functions

- current12_get_load_voltage This function reads the load voltage measurement values [V].
- current12_get_dc_power This function reads the DC power measurement values [W].
- current12_get_current This function reads the current measurement values [mA].

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Example Description

This example demonstrates the use of the Current 12 Click board™ 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.Current12

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

Downloads

Current 12 Click example on Libstock

Current 12 Click 2D and 3D files v100

TSC1641 Datasheet

Current 12 Click schematic v100