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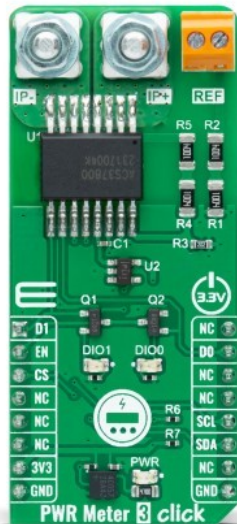www.mikroe.com

PWR Meter 3 Click - 30A

PID: MIKROE-6257

PWR Meter 3 Click is a compact add-on board that measures voltage and current through the connected load. This board features the ACS37800KMACTR-030B3-I2C, an I2C-configurable power monitoring solution from Allegro Microsystems, which simplifies the addition of power monitoring to many AC/DC powered systems. The ACS37800KMACLU-030B3-I2C's Hall-effect-based current sensing technology achieves reinforced isolation ratings (4800 VRMS) alongside a reliable ±30A bidirectional current sensing. It also has two LED indicators for the realization of visual detection of some anomalies in operation, such as under/overvoltage and fast overcurrent fault detection. This Click board™ is suitable for many monitoring applications, such as power metering in information and communication equipment, embedded electronic applications, and similar.

.DO NOT TOUCH THE BOARD WHILE THE LOAD IS CONNECTED!

Note: This Click board™ needs to be used by trained personnel only while applying high voltages. Special care should be taken when working with hazardous voltage levels.

How does it work?

PWR Meter 3 Click is based on the ACS37800KMACTR-030B3-I2C, a simple solution for voltage, current, and power monitoring from Allegro Microsystems, which simplifies the addition of power monitoring in 60Hz to many AC/DC applications. The ACS37800KMACTR-030B3-I2C

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includes a copper conduction path that generates a magnetic field proportional to the applied current, sensed differentially to reject errors introduced by common mode fields. It is particularly well suited for high isolation, achieving reinforced isolation ratings of 4800VRMS and a reliable ±30A bidirectional current sensing range. With high configurability and integrated features, this Click board™ can fit most power monitoring applications.
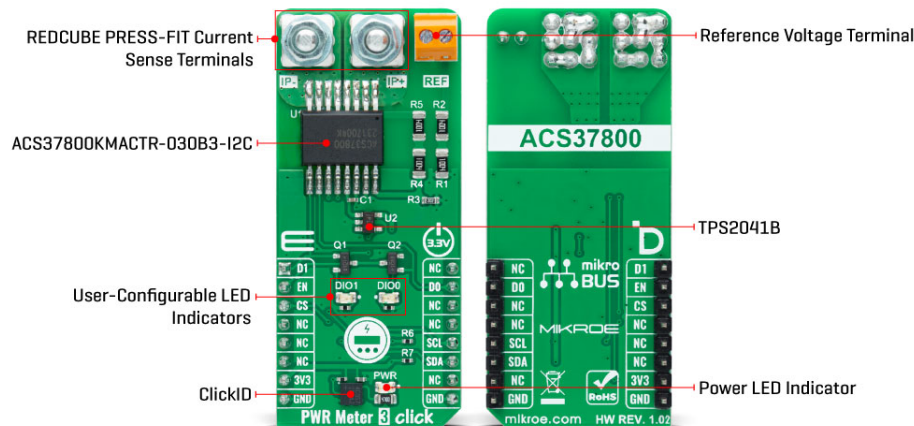
The ACS37800KMACTR-030B3-I2C measures the voltage applied to the REF terminal, in the range from 9.5 to 27V, by resistor dividing it down to fit the input range of the onboard voltage sense amplifier and add isolation. On the other hand, the current applied to the current sensing terminals is measured using the integrated current loop and galvanically isolated Hall sensor. Both analog signals are then sampled using integrated high-accuracy ADCs before entering the digital system. The metrology engine later determines the frequency, calculates RMS values of current, voltage, and power, and provides a range of averaging and configuration options.

PWR Meter 3 Click communicates with an MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Standard Mode operation with a clock frequency of 100kHz and Fast Mode up to 400kHz. The ACS37800KMACTR-030B3-I2C can be enabled or disabled through the EN pin routed to the RST pin of the mikroBUS™ socket, hence, offering a switch operation to turn ON/OFF power delivery to the ACS37800KMACTR-030B3-I2C via TPS2041B.

Along with the ability to measure current and voltage, it also has two LED indicators, DIO0 and DIO1, for the realization of visual detection of some anomalies in operation, such as undervoltage and overvoltage reporting, and fast overcurrent fault detection. The DIO0 LED default state application is for zero crossing, while DIO1 stands for overcurrent detection. In addition to the LEDs, this information can also be detected through the INT and AN pins of the mikroBUS™ socket, marked as D0 and D1.

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. However, the Click board™ comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Measurements
Applications	Can be used for power metering in information

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	and communication equipment, embedded electronic applications, and more
On-board modules	ACS37800KMACTR-030B3-I2C - power monitoring solution from Allegro Microsystems
Key Features	High accuracy power monitoring for AC and DC applications, certified for high reinforced isolation, Hall-effect based, anomaly detection, I2C interface, user-programmable thresholds, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on PWR Meter 3 Click - 30A corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin		mikro™ BUS			Pin	Notes
Overcurrent Fault	D1	1	AN	PWM	16	NC	
Device Enable	EN	2	RST	INT	15	D0	Zero Crossing
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	DIO1	-	User-Configurable LED Indicator
LD3	DIO0	-	User-Configurable LED Indicator

PWR Meter 3 Click - 30A electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Current Range	-30	-	+30	A
Operating Voltage Range	9.5	-	27	VRMS
Sensitivity	-	916.7	-	LSB/A

Software Support

We provide a library for the PWR Meter 3 Click - 30A 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 PWR Meter 3 Click - 30A driver.

Key functions

- pwrmeter330a_get_dio0_pin This function returns the DIO0 pin logic state.

- pwrmeter330a_get_dio1_pin This function returns the DIO1 pin logic state.

- pwrmeter330a_read_average_rms This function reads the voltage and current RMS measurements averaged from a specified number of samples.

Example Description

This example demonstrates the use of PWR Meter 3 Click - 30A by reading and displaying the voltage, current, and power RMS 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.PWRMeter330A

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

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

ISO 9001: 2015 certification of quality management system (QMS).

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

ACS37800 datasheet

PWR Meter 3 click - 30A 2D and 3D files v102

PWR Meter 3 click - 30A example on Libstock

PWR Meter 3 Click - 30A schematic v102

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