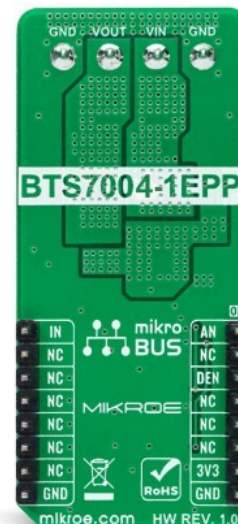


PROFET Click - 15A



PID: MIKROE-4701

PROFET Click is a compact add-on board that contains a smart high-side power switch. This board features the [BTS70041EPPXUMA1](#), a single-channel, high-side power switch with embedded protection and diagnosis feature from [Infineon Technologies](#). This switch has a driving capability suitable for 15A loads featuring a ReverseSave™, which causes the power transistor to switch on in case of reverse polarity. Besides its protection features, it also has pin-configurable diagnosis features such as proportional load current sense, open Load in ON and OFF state, and short circuit to ground and battery. This Click board™ is suitable for resistive, inductive, and capacitive loads, replaces electromechanical relays, fuses and discrete circuits, and many more.

PROFET Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

How does it work?

PROFET Click as its foundation uses the BTS70041EPPXUMA1, a single-channel, smart high-side power switch with embedded protection and diagnosis feature from Infineon Technologies. The BTS70041EPPXUMA1 has a driving capability suitable for 15A loads and comes equipped with "ReverseON" functionality which causes the power transistor to switch on in case of reverse polarity. It also offers outstanding energy efficiency with reduced current consumption, state-of-art current sense accuracy, and faster switching/slew rate with no impact on EMC, making it suitable for resistive, inductive, and capacitive loads, replacement of electromechanical relays, fuses, and discrete circuits, and many more.

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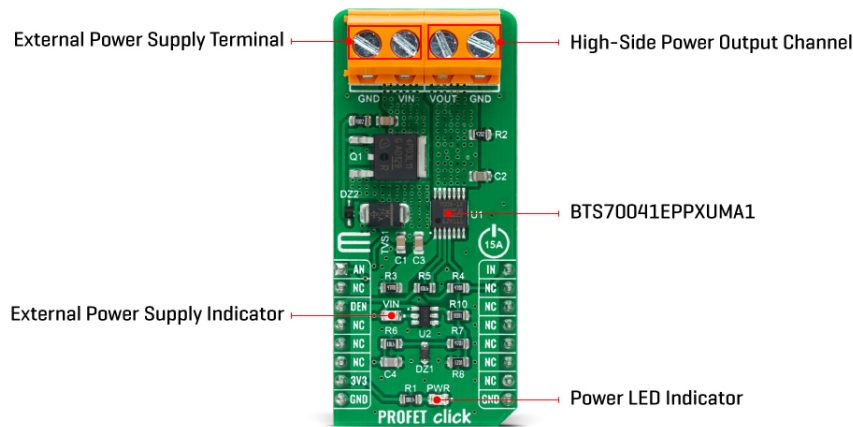
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ISO 9001: 2015 certification of quality management system (QMS).



This Click board™ uses three digital pins for direct control. The input pin marked as IN routed to the PWM pin of the mikroBUS™ socket activates the corresponding output channel labeled VOUT. Also, the Diagnosis Enable (DEN) pin routed to the CS pin of the mikroBUS™ socket controls the diagnosis and protection circuitry, and in combination with IN pins, it enables the selection of appropriate operating states: Sleep, Stand-by, and Active Mode.

The BTS70041EPPXUMA1 is protected against overtemperature, overload, reverse power supply (GND and VIN are reverse supplied), and overvoltage. Overtemperature and overload protection work when the device is not in Sleep mode, while overvoltage protection works in all operation modes. For diagnosis purposes, the BTS70041EPPXUMA1 provides a combination of digital and analog signals at the AN pin of the mikroBUS™ socket.

The PROFET Click supports an external power supply for the BTS70041EPPXUMA1, which can be connected to the input terminal labeled as VIN and should be within the range of 6V to 18V. VIN has an undervoltage detection circuit, which prevents the activation of the power output stages and diagnosis if the applied voltage is below the undervoltage threshold. A power supply indication, red LED labeled as VIN, indicates the presence of an external power supply.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with 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	Power Switch
Applications	Can be used for resistive, inductive, and capacitive loads, replaces electromechanical relays, fuses and discrete circuits, and many more
On-board modules	BTS70041EPPXUMA1 - single-channel, smart high-side power switch with embedded protection and diagnosis feature from Infineon Technologies
Key Features	High-side switch with diagnosis and embedded protection, reverseON for low power

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	dissipation in reverse polarity, UVLO/OVLO, wide external power supply range with LED indication, and more
Interface	Analog,GPIO
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V,External

Pinout diagram

This table shows how the pinout on PROFET Click - 15A corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Diagnosis Signal	AN	1	AN	PWM	16	IN	Output Channel Activation
	NC	2	RST	INT	15	NC	
Diagnosis Enable	DEN	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
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	VIN	-	External Power Supply LED Indicator

PROFET Click - 15A electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	-	3.3	-	V
External Supply Voltage VIN	6	-	18	V
Output Current	-	-	15	A
ON Resistance	-	-	8	mΩ

Software Support

We provide a library for the PROFET Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github](#)

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Library Description

This library contains API for PROFET Click driver.

Key functions

- profet_read_an_pin_voltage PROFET read AN pin voltage level function.
- profet_set_mode PROFET set mode.

Example Description

This example showcases the ability of the PROFET Click board™. It configures Host MCU for communication and then enables and disables output channel. Besides that, it reads the voltage of IS pin and calculates current on output.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.PROFET

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 MikroElektronika [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika 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™](#)

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Downloads

[BTS7004-1EPP datasheet](#)

[PROFET Click - 15A 2D and 3D files](#)

[PROFET click - 15A schematic](#)

[PROFET Click - 15A example on Libstock](#)

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