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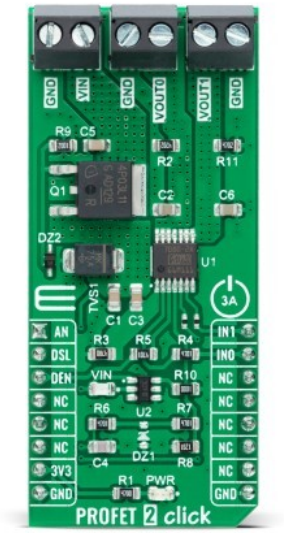
PROFET 2 Click - 3A





PID: MIKROE-4818

PROFET 2 Click is a compact add-on board that contains a smart high-side power switch. This board features the BTS7080-2EP, a dual-channel, high-side power switch with embedded protection and diagnosis feature from Infineon Technologies. This switch has a driving capability suitable for 3A loads and high inrush current loads and features a ReverSave™, which causes the power transistor to switch on in case of reverse polarity. Besides its protection features, it also has several 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 2 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 2 Click as its foundation uses the BTS7080-2EP, a dual-channel, smart high-side power switch with embedded protection and diagnosis feature from Infineon Technologies. The BTS7080-2EP has a driving capability suitable for 3A 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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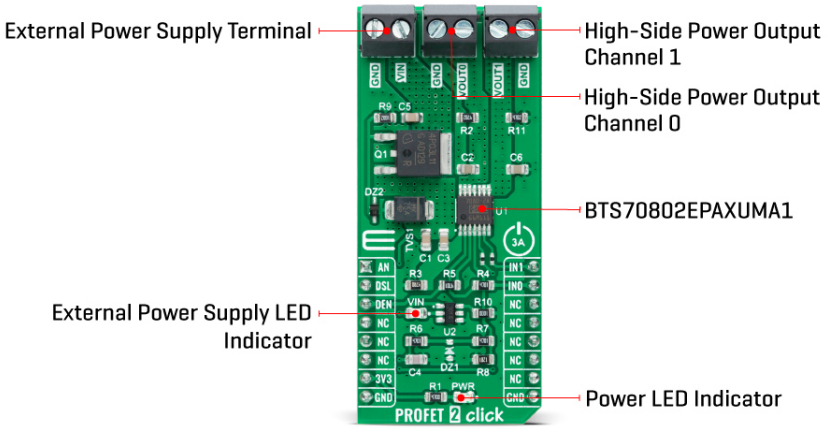

This Click board™ uses five digital pins for direct control. The input pins IN0 and IN1, routed to the PWM and INT pins of the mikroBUS™ socket, activate the corresponding output channels labeled VOUT0 and VOUT1. Also, the Diagnosis Enable (DEN) pin routed to the CS pin of the mikroBUS™ socket controls 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 BTS7080-2EP 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 BTS7080-2EP provides a combination of digital and analog signals at the AN pin of the mikroBUS™ socket. Besides, the Diagnosis Selection DSEL pin, routed to the RST pin of the mikroBUS™ socket, selects the channel on which a diagnosis will be performed.

The PROFET 2 Click supports an external power supply for the BTS7080-2EP, which can be connected to the input terminal labeled as VIN and should be within the range of 4.1V to 28V. 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	BTS70802EPAXUMA1 - dual-channel, smart high-side power switch with embedded protection and diagnosis feature from Infineon

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	Technologies
Key Features	High-side switch with diagnosis and embedded protection, reverseON for low power dissipation in reverse polarity, UVLO/OVLO, wide external power supply range with LED indication, and more
Interface	Analog,GPIO
ClickID	No
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 2 Click - 3A corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Diagnosis Signal	**AN**	1	AN	PWM	16	**IN1**	Output Channel 1 Activation
Diagnosis Selection	**DSL**	2	RST	INT	15	**IN0**	Output Channel 0 Activation
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 2 Click - 3A electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	-	3.3	-	V
External Supply Voltage VIN	4.1	-	28	V
Output Current	-	-	3	A
ON Resistance	-	-	20.9	mΩ
Operating Temperature Range	-40	+25	+150	°C

Software Support

We provide a library for the PROFET 2 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika

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development boards.

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

Library Description

This library contains API for PROFET 2 Click driver.

Key functions

- profet2_set_mode Set mode device mode for specific channel channel.
- profet2_read_an_pin_voltage Read AN pin voltage level function.
- profet2_set_den Set diagnostic enable pin state.

Example Description

This example showcases the ability of the PROFET 2 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 for the channel 0.

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.PROFET2

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™

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mikroSDK

Click board™ Catalog

Click boards™

Downloads

BTS7080-2EPA datasheet

PROFET 2 Click - 3A - 2D and 3D files

PROFET 2 Click - 3A schematic

PROFET 2 Click - 3A example on Libstock

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