

eFuse 5 Click



PID: MIKROE-5599

eFuse 5 Click is a compact add-on board with a power path protection solution that limits circuit currents and voltages to safe levels during fault conditions. This board features the [TPS16530](#), an easy-to-use, positive 58V, 4.5A eFuse with a 31mΩ integrated FET from [Texas Instruments](#). This industrial eFuse has programmable undervoltage, overcurrent, inrush current protection, and output current monitoring features. Besides, it allows flexibility to configure the device between the two current-limiting fault responses (latch off and auto-retry). This Click board™ provides robust protection for multiple faults on the system rail and current limiting for systems such as telecom radios and industrial printers.

eFuse 5 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?

eFuse 5 Click is based on the TPS16530, an industrial eFuse from Texas Instruments. The TPS25940 provides robust protection for all systems and applications powered by an external power supply from 4.5V to 58V. Load, source, and device protections are provided with many programmable features, including undervoltage lockout selectable via UVLO SEL jumper and the fast response short circuit protection that immediately isolates the faulty load from the input supply when a short circuit is detected. The TPS16530 also allows users to program the overcurrent limit threshold between 0.6A and 4.5A via an external I2C-configurable digital potentiometer, the [AD5171](#) from [Analog Devices](#).

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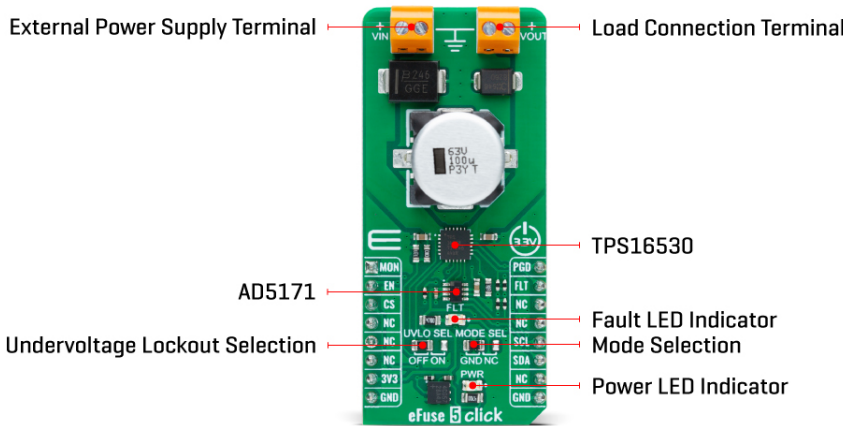
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The TPS16530 can be put in low-power Shutdown mode using the EN pin of the mikroBUS™ socket, offering a switch operation to turn ON/OFF the eFuse. It also allows flexibility to configure the device between the two current-limiting fault responses (latch off and auto-retry). Selection is made by positioning SMD jumpers marked MODE SEL to the appropriate position marked GND or NC (GND is for automatic restart mode response during current limit and thermal fault, while NC is for latch off).

For system status monitoring and downstream load control, the TPS16530 provides one fault signal, which can be visually detected via the red FLT LED or the FLT pin on the mikroBUS™ socket, and a precise current monitor output available on the MON pin of the mikroBUS™ socket. Besides, the TPS16530 also features an open drain Power good (PGDD) indicator output, which can control downstream loads like DC/DC converters.

This Click board™ can only be operated 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	Power Switch
Applications	Can be used to provides robust protection for multiple faults on the system rail and current limiting for systems such as telecom radios and industrial printers
On-board modules	TPS16530 - industrial eFuse from Texas Instruments
Key Features	Wide operating voltage, adjustable current limit, protection features, power-good indicator, shutdown mode control, adjustable UVLO, selectable overcurrent fault response between Auto-Retry and Latch OFF, and more
Interface	GPIO,I2C
Feature	ClickID
Compatibility	mikroBUS™

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Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on eFuse 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Current Monitor	MON	1	AN	PWM	16	PGD	Power-Good Indicator
Shutdown	EN	2	RST	INT	15	FLT	Fault Indicator
	NC	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	FLT	-	Fault LED Indicator
JP1	MODE SEL	Left	Mode Selection GND/NC: Left position GND, Right position NC
JP2	UVLO SEL	Left	Undervoltage Lockout Selection OFF/ON: Left position OFF, Right position ON

eFuse 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
External Power Supply	4.5	-	58	V
Current Limit	0.6	-	4.5	A

Software Support

We provide a library for the eFuse 5 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 eFuse 5 Click driver.

Key functions

- efuse5_set_current_limit eFuse 5 set the current limit function.
- efuse5_set_resistance eFuse 5 set the resistance function.
- efuse5_get_fault eFuse 5 gets fault condition state function.

Example Description

This library contains API for the eFuse 5 Click driver. This driver provides the functions to set the current limiting conditions to provide the threshold of the fault conditions.

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.eFuse5

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, which needs to be downloaded from the [LibStock](#) and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the [official page](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

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[eFuse 5 click example on Libstock](#)

[eFuse 5 click 2D and 3D files](#)

[TPS16530 datasheet](#)

[AD5171 datasheet](#)

[eFuse 5 click schematic](#)

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