

## eFuse 7 Click



PID: MIKROE-5738

**eFuse 7 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 [LS12052BD33](#), an eFuse with over-voltage protection and blocking FET control from [Littelfuse](#). This industrial eFuse has a wide input voltage from 2.7V up to 18V, external programmable soft-start time, and current limit, and supports reverse current blocking. Besides, it features short-circuit protection, thermal shutdown protection, and auto recovery. This Click board™ makes the perfect solution for the development of robust protection for multiple faults on the system rail and current limiting for systems such as telecom radios and industrial printers.

### How does it work?

eFuse 7 Click is based on the LS12052BD33, an eFuse with over-voltage protection and blocking FET control from Littelfuse. It is a current limit load switch with an integrated power load switch designed to manage current/voltage/start-up voltage ramp to the connected load. The internal MOSFET of the device will start conducting and allowing current to flow from IN to OUT as VIN rises by enabling the eFuse with an accurate ON/OFF threshold of 1.29V and 1.19V, respectively. After a Start-Up sequence, the eFuse will actively monitor its load current and input voltage. The eFuse will ensure that any harmful spikes are safely clamped to a pre-determined level at the output. The eFuse will shut down its internal MOSFET if the overload of the current limit is exceeded or the device's temperature exceeds its threshold.

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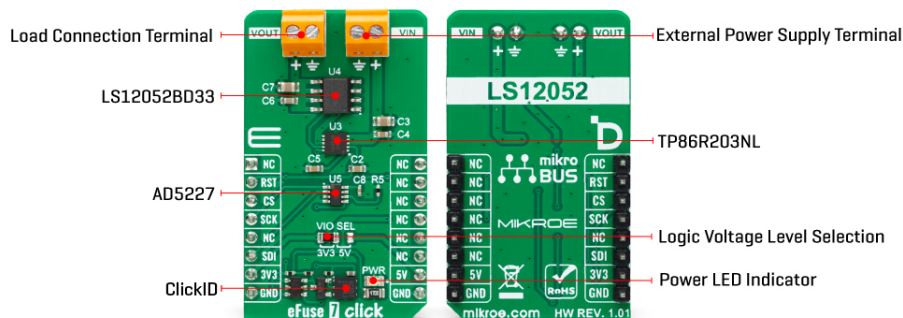
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ISO 27001: 2013 certification of informational security management system.  
ISO 14001: 2015 certification of environmental management system.  
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ISO 9001: 2015 certification of quality management system (QMS).



The eFuse uses the [TP86R203NL](#), an N-channel MOS from Toshiba, as a gate to the output screw terminal. The current limit on this eFuse 7 Click can be programmed. For this purpose, there is the AD5227, a 64-position up/down control digital potentiometer from Analog Devices. This 10K end-to-end potentiometer, in variable resistor configuration, is used to feed the current limit program pin of the eFuse.

eFuse 7 Click uses a simple 3-Wire serial interface of the digital potentiometer to allow the host MCU to set the current limit to this Click board™. Over the RST pin, you can enable the eFuse with the logic HIGH.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VIO SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. However, the Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

## Specifications

Type	Power Switch
Applications	Can be used for the development of robust protection for multiple faults on the system rail and current limiting for systems such as telecom radios and industrial printers
On-board modules	LS12052BD33 - eFuse with over-voltage protection and blocking FET control from Littelfuse
Key Features	Wide operating voltage, adjusting current limit, short-circuit protection features, thermal shutdown protection, and auto recovery, reverse current blocking and more
Interface	GPIO
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

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## Pinout diagram

This table shows how the pinout on eFuse 7 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset / ID SEL	<b>RST</b>	2	RST	INT	15	NC	
SPI Select / ID COMM	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VIO SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

## eFuse 7 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	2.7	-	18	V
Current-Limit Program Range	1	-	5	A

## Software Support

We provide a library for the eFuse 7 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 eFuse 7 Click driver.

### Key functions

- efuse7\_enable\_output eFuse 7 output enable function.
- efuse7\_wiper\_inc eFuse 7 wiper position increase function.
- efuse7\_set\_limit eFuse 7 set current limit function.

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## Example Description

This library contains API for the eFuse 7 Click driver. This driver provides the functions to set the current limiting conditions in order 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.eFuse7

## 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

[eFuse 7 click example on Libstock](#)

[TP86R203NL datasheet](#)

[LS12052BD33 datasheet](#)

[eFuse 7 click 2D and 3D files](#)

[eFuse 7 click schematic](#)

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