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Current Limit 4 Click

PID: MIKROE-5900

Current Limit 4 Click is a compact add-on board designed for circuit protection and power management, safeguarding systems from overloads, short circuits, voltage surges, and excessive inrush current while ensuring uninterrupted operation during normal line and load transients. It is based on the TPS259807O, a 3mΩ smart eFuse from Texas Instruments, operating over a wide input voltage range from 2.7V to 24V with a circuit-breaker-type overcurrent response. The board also integrates the MCP4561 digital potentiometer for precise output current limit adjustment from 2A to 8A and fast-trip short-circuit threshold configuration via the I2C interface. Additional features include a load current monitoring and a Power Good indication. This Click board is ideal for protecting hot-swap and hot-plug interfaces, server standby rails, PCIe risers, networking equipment, and industrial PCs.

For more information about **Current Limit 4 Click** visit the official product page.

How does it work?

Current Limit 4 Click is based on the TPS259807O, a 3mΩ smart eFuse from Texas Instruments that provides advanced circuit protection and power management for various electronic applications. It is designed to safeguard systems from overloads, short circuits, voltage surges, and excessive inrush current while maintaining uninterrupted operation during normal line and load transients. Operating over a wide input voltage range from 2.7V to 24V at the VIN terminal, this device offers a circuit breaker–type overcurrent response without OVLO functionality, intelligently distinguishing between transient conditions and true fault events. This capability ensures that brief current spikes do not cause unnecessary shutdowns while still providing robust fault isolation when needed.

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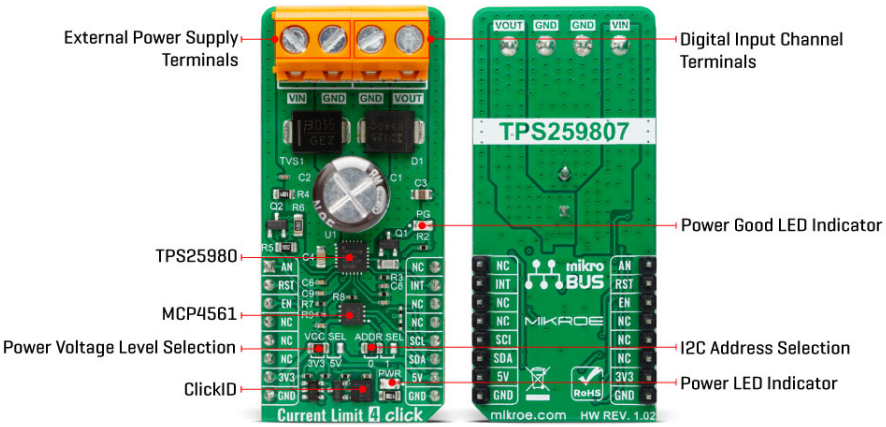

The TPS259807O can be configured to either remain latched off after a fault or automatically retry, enabling remote and autonomous recovery in applications where temporary faults may occur, thus preventing unnecessary downtime and reducing the need for manual intervention. Such flexibility makes Current Limit 4 Click an excellent choice for protecting hot-swap and hot-plug interfaces, server standby rails, PCIe risers, add-on cards, fan modules, routers, switches, optical modules, and industrial PCs, among other sensitive and high-availability systems that require both reliable protection and operational continuity.

Current Limit 4 Click incorporates the MCP4561 digital potentiometer to precisely set the output current limit threshold in the range from 2A to 8A, as well as to adjust the fast-trip threshold for short-circuit protection. The MCP4561 communicates with the host MCU via an I2C interface and features an ADDR SEL jumper for selecting the I2C address, enabling flexibility in multi-device systems. In addition to the I2C pins, the board also uses several control and monitoring lines.

The EN pin serves as the device enable input, allowing the user or system controller to activate or disable the circuit; the AN pin provides an analog output load current monitor, sourcing a current proportional to the actual load current for real-time measurement or feedback; and the INT pin functions as an active-high Power Good indication signal, asserted when the internal FET is fully enhanced and the output has reached its maximum voltage. This Power Good status can also be monitored visually through the onboard PG green LED, offering an immediate and convenient indication of system readiness.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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	Ideal for protecting hot-swap and hot-plug interfaces, server standby rails, PCIe risers, networking equipment, and industrial PCs
On-board modules	TPS259807O - 3mΩ smart eFuse from Texas Instruments

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Key Features	Wide input voltage range, 3mΩ smart eFuse circuit protection, circuit breaker–type overcurrent response, adjustable output current limit, configurable fast-trip short-circuit threshold, I2C communication interface, device enable control, load current monitoring, active-high Power Good indication, and more
Interface	Analog,I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on Current Limit 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Load Current Monitor	**AN**	1	AN	PWM	16	NC	
ID SEL	**RST**	2	RST	INT	15	**INT**	Power Good Indication
Device Enable / ID COMM	**EN**	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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	PG	-	Power Good LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

Current Limit 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	2.7	-	24	V
Current Limit	2	-	8	A
On-Resistance	-	3	-	mΩ

Software Support

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Current Limit 4 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This library contains API for the Current Limit 4 Click driver for the current limiting to a certain value and displays the sources a current proportional to the load current [A].

Key Functions

- currentlimit4_cfg_setup Config Object Initialization function.
- currentlimit4_init Initialization function.
- currentlimit4_default_cfg Click Default Configuration function.
- currentlimit4_set_limit Current Limit 4 set current limit function.
- currentlimit4_get_current Current Limit 4 get current function.
- currentlimit4_get_power_good Current Limit 4 power good indication function.

Application Init

Initialization of I2C and ADC module and log UART. After driver initialization, the app executes a default configuration and set the minimum current limit threshold to 1.0 [A].

Application Task

This example demonstrates the use of the Current Limit 4 Click board™. The demo application displays the source current proportional to the load current and an appropriate message when the current reaches the limit. Results are being sent to the UART Terminal, where you can track their changes.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

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Click boards™

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Downloads

MCP4561 datasheet

Current Limit 4 click example package

Current Limit 4 click 2D and 3D files v102

TPS25980 datasheet

Current Limit 4 click schematic v102

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