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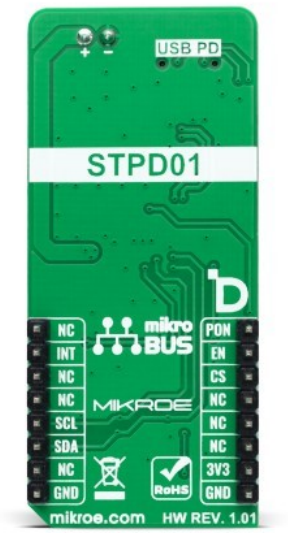
Buck 19 Click



PID: MIKROE-5451

Buck 19 Click is a compact add-on board that steps down the voltage from its input (supply) to its output (load). This board features the STPD01, a programmable synchronous buck converter from STMicroelectronics, providing power supply in applications following USB power delivery specifications. The STPD01 provides the desired voltage levels required by USB power delivery systems (USB PD 3.0) via I2C serial interface up to 60W output power, more precisely voltages in the range of 3V to 20V with a step of 20mV minimum, and currents from 0.1A to 3A with a minimum in steps of 50mA. It also offers advanced protection features such as overvoltage, overcurrent, and overtemperature detections. This Click board™ is used to derive the required input voltage from a higher voltage source for AC adapters, USB hubs, USB-PD power distribution, and many more.

Buck 19 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?

Buck 19 Click is based on the STPD01, a programmable synchronous buck converter from STMicroelectronics, suitable to provide power supply in applications following USB power delivery specifications. This STPD01 features internal power MOS synch rectification, internal compensation, cable drop compensation, and two programmable switching frequencies with an optional clock dithering. It provides the desired voltage levels over the input voltage range from the VIN terminal from 6 up to 26V required by USB power delivery systems (USB PD 3.0) via I2C serial interface up to 60W output power, more precisely voltages in the range of 3V to 20V with a step of 20mV minimum, and currents from 0.1A to 3A with a minimum in steps of

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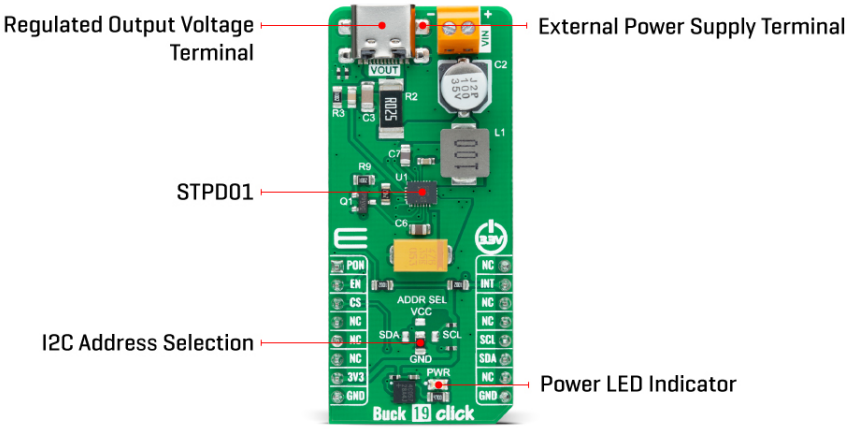
50mA.



The STPD01 includes extensive protection against overvoltage, overcurrent, and overtemperature, alongside additional built-in features, including embedded discharge circuitry, soft-start, undervoltage lockout, and a programmable watchdog timer that helps ensure a robust and safe system.

This Click board™ communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting a Fast Mode operation up to 400kHz. Besides, it also allows the choice of the three least significant bits of its I2C slave address by positioning the SMD jumper labeled ADDR SEL to an appropriate position providing the user with a selection of four slave addresses. In addition to communication signals, the STPD01 uses a few other signals necessary for its operation.

It can be enabled or disabled through the EN pin routed to the CS pin of the mikroBUS™ socket, hence, offering a switch operation to turn ON/OFF power delivery to the STPD01. The PON pin, routed on the AN pin of the mikroBUS™ socket, provides information on the Start-up of the device; more precisely, it serves the user as an interface that indicates when VOUT reaches the regulation value after the Start-Up condition. And the last signal it uses is a standard interrupt signal, routed to the INT pin of the mikroBUS™ socket, to indicate different fault condition occurrences.

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	Buck
Applications	Can be used for AC adapters, USB hubs, USB-PD power distribution, and more
On-board modules	STPD01 - programmable synchronous buck converter from STMicroelectronics
Key Features	Wide input voltage range, internal power MOS synch rectification, configurable output

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	voltage and current, embedded discharge function, I2C interface, protection features, and more
Interface	I2C
ClickID	Yes
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Buck 19 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Power-On Indicator	**PON**	1	AN	PWM	16	NC	
Enable	**EN**	2	RST	INT	15	**INT**	Interrupt
	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
JP1	ADDR SEL	Lower	I2C Address Selection: Left position SDA, Right position SCL, Upper position VCC, Lower position GND

Buck 19 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
External Power Supply	6	24	26	V
Output Voltage Range	3	-	20	V
Output Current Range	0.1	-	3	A

Software Support

We provide a library for the Buck 19 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.

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Library Description

This library contains API for Buck 19 Click driver.

Key functions

- buck19_write_register This function writes a desired data to the selected register by using I2C serial interface.
- buck19_set_vout This function sets the voltage output.
- buck19_set_ilimit This function sets the current limit.

Example Description

This example demonstrates the use of Buck 19 click board by iterating through the entire output voltage range.

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.Buck19

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, if no UART to USB interface is available on your development board. A 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™

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ClickID

Downloads

Buck 19 click example on Libstock

STPD01 datasheet

Buck 19 click 2D and 3D files

Buck 19 click schematic

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