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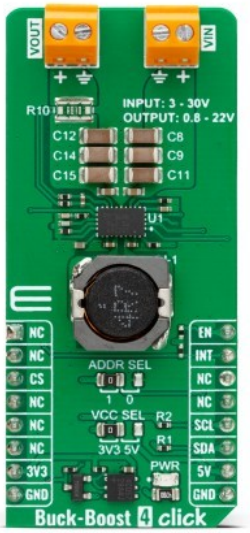
Buck-Boost 4 Click



PID: MIKROE-5924

Buck-Boost 4 Click is a compact add-on board that contains a buck-boost DC/DC converter with four integrated MOSFETs. This board features the TPS55289, a buck-boost converter from Texas Instruments. It can deliver on its output voltages from 0.8 up to 22V, from the input voltage in a range of 3 up to 30V. The output voltage can be programmed in 10mV steps. This Click board™ makes the perfect solution for the development of wireless chargers, USB PD chargers, docking stations, industrial equipment, and more.

Buck-Boost 4 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

Buck-Boost 4 Click is based on the TPS55289, a buck-boost converter from Texas Instruments. It can smoothly transition between buck mode, buck-boost mode, and boost mode according to the input voltage and the set output voltage. It operates in buck mode when the input voltage exceeds the output voltage and in boost mode when the input voltage is less than the input voltage. When the input voltage is close to the output voltage, it alternates between one-cycle buck mode and one-cycle boost mode. Depending on the load currents, the converter can work in PWM or PFM mode. The switching frequency is set with a resistor to a little less than 1MHz.

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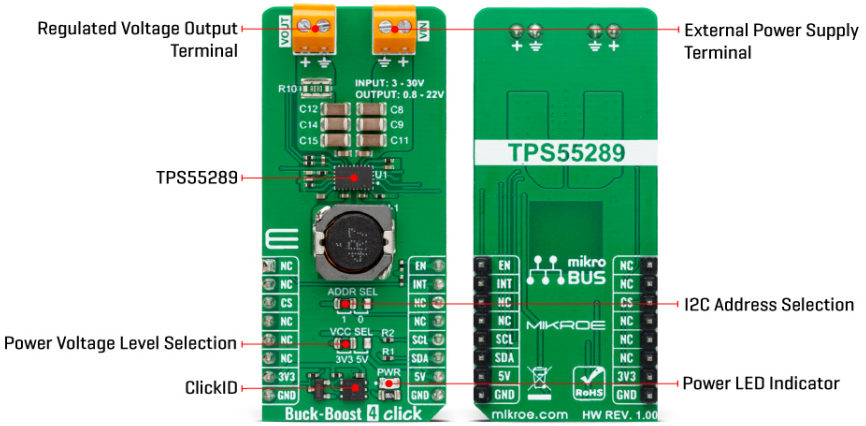

Buck-Boost 4 Click uses a standard 2-wire I2C interface to communicate with the host MCU supporting clock frequency of up to 1MHz. The I2C address can be selected over the ADDR SEL jumper. You can turn off the device by setting the EN pin to a LOW logic state. The fault indication is available over the INT pin.

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	Buck-Boost
Applications	Can be used for the development of wireless chargers, USB PD chargers, docking stations, industrial equipment, and more
On-board modules	TPS55289 - buck-boost converter from Texas Instruments
Key Features	Wide input voltage range, wide output voltage range, support for USB PD, high efficiency over the entire load range, rich protection features, EMI mitigation, PFM and FPWM mode, and more
Interface	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 Buck-Boost 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

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Notes	Pin	mikro™ BUS				Pin	Notes
	NC	1	AN	PWM	16	**EN**	Device Enable
	NC	2	RST	INT	15	**INT**	Interrupt
ID COMM	**CS**	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
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Buck-Boost 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	5	5	V
External Power Supply	3	-	30	V
Output Voltage Range	0.8	-	22	V

Software Support

We provide a library for the Buck-Boost 4 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 Buck-Boost 4 Click driver.

Key functions

- buckboost4_set_vout Buck-Boost 4 set the output voltage function.
- buckboost4_set_vref Buck-Boost 4 set internal reference voltage function.
- buckboost4_fault_indicator Buck-Boost 4 check fault indicator function.

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Example Description

This example demonstrates the use of the Buck-Boost 4 Click board™. This driver provides functions for device configurations and for the output voltage setting.

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.BuckBoost4

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

Buck-Boost 4 click example on Libstock

Buck-Boost 4 click 2D and 3D files

Buck-Boost 4 click schematic

TPS55289 datasheet

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