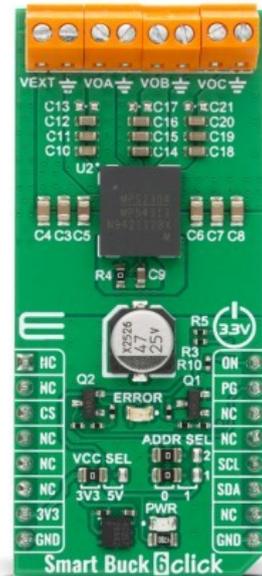


Smart Buck 6 Click



PID: MIKROE-6707

Smart Buck 6 Click is a compact add-on board that provides a multi-rail power management solution designed to supply embedded systems with stable and configurable power outputs. It is based on the [MPM54313](#), a triple 3A power module from [MPS](#), which integrates three independent buck converters, each capable of delivering up to 3A of output current. The module supports a wide 4V to 16V input range, with output voltages adjustable from 0.4V to 5.5V through the I2C interface or multiple-time programmable memory. It incorporates advanced features such as power-on/off sequencing, configurable soft-start, constant-on-time control for ultra-fast transient response, active voltage positioning, and the ability to parallel channels for higher current demands up to 6A. The Smart Buck 6 Click is ideally suited for powering FPGAs, ASICs, networking equipment, telecommunications devices, and optical communication modules.

For more information about **Smart Buck 6 Click** visit the official [product page](#).

How does it work?

Smart Buck 6 Click is based on the MPM54313, a triple 3A power module from MPS that provides a highly integrated power management solution for a wide range of embedded applications. This module offers three independent buck converters, each capable of delivering up to 3A of continuous output current, with flexible configuration through the I2C interface. It supports a wide input voltage range from 4V to 16V at the VEXT terminal, while the output voltages can be adjusted digitally via I2C or set through multiple-time programmable memory in the range of 0.4V to 5.5V on all VOx outputs, ensuring adaptability to different system requirements.

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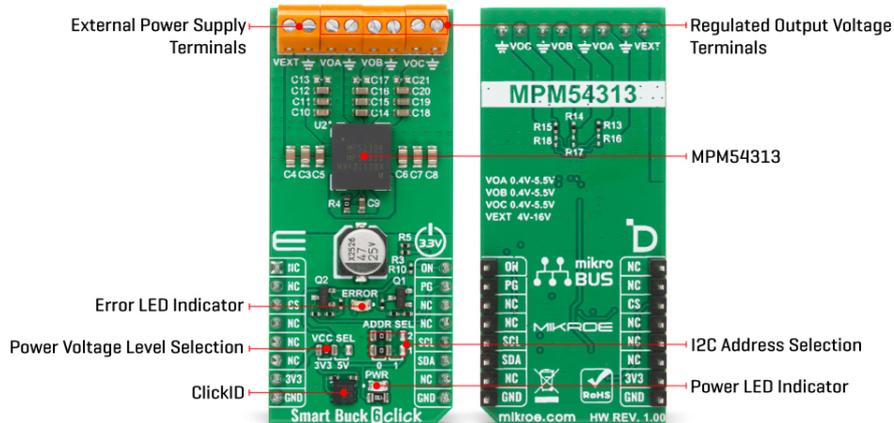
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The device integrates sophisticated power-on and power-off sequencing, configurable soft-start, compensation, and comprehensive protection features including under-voltage lockout, over-voltage, under-voltage, over-current protection, and thermal shutdown, ensuring safe and reliable operation. Its constant-on-time control architecture enables ultra-fast transient response, making it ideal for powering sensitive digital systems such as FPGAs, ASICs, and optical communication modules.

For higher current demands, Buck channels A and B can operate in parallel in interleaving mode, supporting up to 6A with active current balancing, while configurable active voltage positioning allows up to three outputs to be paralleled with passive current sharing. This level of integration and flexibility makes Smart Buck 6 Click an excellent choice for networking, telecommunications, and other complex embedded systems requiring compact and programmable multi-rail power supplies.

The MPM54313 interfaces with the host MCU via an I2C-compatible serial interface operating at standard (100kHz) or fast mode (400kHz) clock speeds, enabling control and monitoring of output voltages and status registers. The I2C address of the MPM54313 can be easily configured via onboard jumpers marked ADDR SEL, allowing multiple devices to coexist on the same bus.

A dedicated ON pin allows for external enable/disable control of the entire power module, supporting power domain management in software-controlled power sequencing scenarios. Additionally, the MPM54313 features a Power Good (PG pin) output that is also routed to an onboard red LED labeled ERROR, which provides real-time visual indication of any voltage irregularities or faults - indicate valid and stable output voltages.

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
Applications	Ideal for powering FPGAs, ASICs, networking equipment, telecommunications devices, and optical communication modules

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On-board modules	MPM54313 - triple 3A power module from MPS
Key Features	Three independent buck converters, adjustable output voltage via I2C interface or MTP memory, power-on and power-off sequencing, configurable soft-start, constant-on-time control for ultra-fast transient response, active voltage positioning with passive current sharing, parallel operation of buck channels up to 6A with interleaving mode and active current balancing, protection, Power Good output, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V, External

Pinout diagram

This table shows how the pinout on Smart Buck 6 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	ON	Device Enable
	NC	2	RST	INT	15	PG	Power-Good Indicator
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	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD3	ERROR	-	Error LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Smart Buck 6 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

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External Power Supply	4	-	16	V
Output Voltage	0.4	-	5.5	V
Output Current	-	-	3	A

Software Support

[Smart Buck 6 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 example demonstrates the use of the Smart Buck 6 Click board. The application changes the output voltage of all three buck converters (A, B, and C) in a periodic manner and logs the output current of each. It also monitors the PG (Power Good) pin to detect and log any fault conditions such as over-temperature, overvoltage, undervoltage, or overcurrent.

Key Functions

- `smartbuck6_cfg_setup` This function initializes Click configuration structure to initial values.
- `smartbuck6_init` This function initializes all necessary pins and peripherals used for this Click board.
- `smartbuck6_default_cfg` This function executes a default configuration of Smart Buck 6 Click board.
- `smartbuck6_set_buck_vout` This function sets the output voltage for one or more buck regulators.
- `smartbuck6_read_buck_current` This function reads and returns the output current of the selected buck regulator.
- `smartbuck6_get_pg_pin` This function reads the logic level of the PG pin.

Application Init

Initializes the logger and the Smart Buck 6 Click driver and applies the default configuration.

Application Task

Periodically increases or decreases the output voltage, reads and logs the output current for each buck channel, and checks for any fault conditions indicated via the PG pin and status registers.

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

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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](#)

[Click boards™](#)

[ClickID](#)

Downloads

[Smart Buck 6 click example package](#)

[Smart Buck 6 click 2D and 3D files v100](#)

[MPM54313 datasheet](#)

[Smart Buck 6 click schematic v100](#)

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