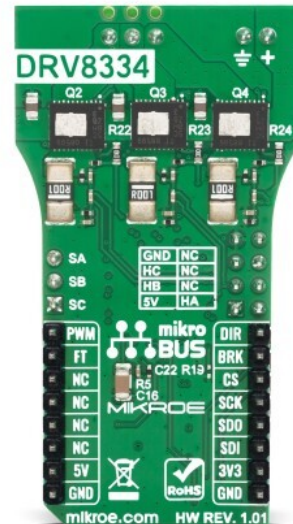


Brushless 28 Click



PID: MIKROE-6919

Brushless 28 Click is a compact add-on board for three-phase BLDC motor control in automotive and industrial motor-drive applications. It is based on the [DRV8334-Q1](#), an automotive 3-phase gate driver with current sensing and diagnostics from [Texas Instruments](#). It features three half-bridge gate drivers for onboard [CSD88599Q5DC](#) N-channel power MOSFETs, a 5V to 45V power supply range, integrated bootstrap diode and GVDD charge pump, and 1x PWM control with internally stored 6-step block commutation tables for simplified BLDC motor driving. It also supports resistor-based low-side current sensing, SPI-based configuration and diagnostics, fault indication, direction and brake control, plus switches for driver disable and low-power operation. It is suitable for fuel, water, and oil pumps, automotive fans and blowers, body motors, transmission actuators, and BLDC or PMSM motor systems.

For more information about **Brushless 28 Click** visit the official [product page](#).

How does it work?

Brushless 28 Click is based on the DRV8334-Q1, an automotive 3-phase gate driver with current sensing and diagnostics from Texas Instruments. This integrated smart gate driver is intended for 12V and 24V automotive BLDC applications, providing three half-bridge gate drivers capable of driving onboard N-channel power MOSFETs, the CSD88599Q5DC also from Texas Instruments. The device generates the required gate drive voltages through an integrated bootstrap diode and GVDD charge pump, enabling MOSFET driving from a single VIN power supply terminal. With a wide input voltage operating range from 5V to 45V, Brushless 28 Click is suitable for a broad range of motor-control environments, including fuel, water, and oil pumps, automotive fans and blowers, automotive body motors, transmission actuators, and BLDC or PMSM motor control systems.

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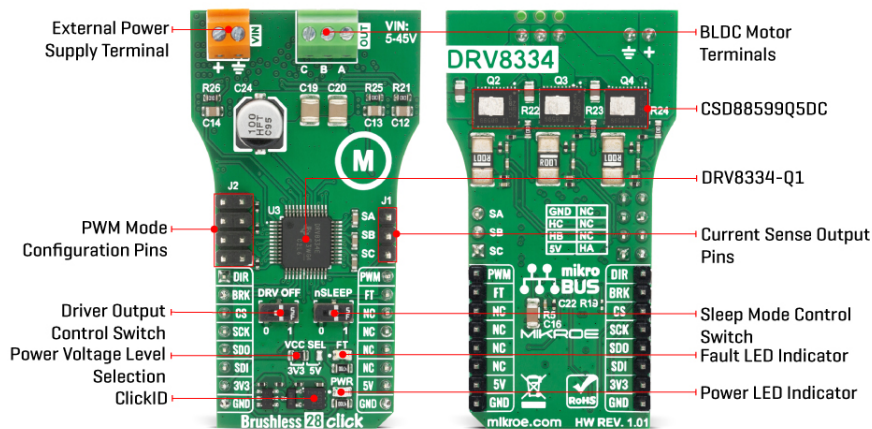
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The DRV8334-Q1 supports 1x PWM control mode, where the device uses internally stored 6-step block commutation tables to simplify three-phase BLDC motor control. This allows the motor to be controlled using only one PWM signal from a simple host controller, with the PWM signal defining the output frequency and duty cycle of the half-bridges. For motor feedback and monitoring, the board supports resistor-based low-side current sensing through the J1 header, using the DRV8334-Q1's integrated low-side current sense amplifiers. Their low offset enables accurate motor current measurement, making the board suitable for applications where precise current monitoring, protection, and control feedback are required.

Brushless 28 Click also benefits from the DRV8334-Q1's extensive diagnostic and protection features, including power supply undervoltage lockout, regulator undervoltage lockout, overcurrent monitoring, and overtemperature shutdown. Detailed configuration and diagnostics are available through an SPI interface, while additional control and status signals further improve system flexibility. Alongside the main interface pins, the board uses the FT pin as a fault condition indicator, with the same status visually indicated through the onboard red FT LED. It also includes a DIR pin for motor direction control and a BRK pin for brake control. A DRV OFF switch allows the driver to be disabled independently, while an nSLEEP switch provides control over the device's low-power Sleep mode.

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	Brushless
Applications	Ideal for fuel, water, and oil pumps, automotive fans and blowers, body motors, transmission actuators, and BLDC or PMSM motor systems
On-board modules	DRV8334-Q1 - automotive 3-phase gate driver with current sensing and diagnostics from Texas Instruments
Key Features	Automotive 3-phase BLDC gate driving, 12V and 24V automotive BLDC support, integrated

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	bootstrap diode, GVDD charge pump, three half-bridge gate drivers, 1x PWM control mode, internally stored 6-step block commutation tables, simplified BLDC motor control from a single PWM signal, resistor-based low-side current sensing, integrated low-side current sense amplifiers, SPI-based configuration and diagnostics, and more
Interface	PWM,SPI
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 Brushless 28 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Direction Control	DIR	1	AN	PWM	16	PWM	PWM Signal
Brake / ID SEL	BRK	2	RST	INT	15	FT	Fault Indicator
SPI Select / ID COMM	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
SPI Data OUT	SDO	5	MISO	SCL	12	NC	
SPI Data IN	SDI	6	MOSI	SDA	11	NC	
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	FT	-	Fault LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
SW1	DRV OFF	-	Driver Output Control Switch
SW2	nSLEEP	-	Sleep Mode Control Switch

Brushless 28 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	5	-	45	V

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Software Support

[Brushless 28 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 Brushless 28 Click board by driving the motor in both directions at different speeds.

Key Functions

- `brushless28_cfg_setup` This function initializes Click configuration structure to initial values.
- `brushless28_init` This function initializes all necessary pins and peripherals used for this Click board.
- `brushless28_default_cfg` This function executes a default configuration of Brushless 28 Click board.
- `brushless28_set_duty_cycle` This function sets the PWM duty cycle in percentages (Range[0..1]).
- `brushless28_switch_direction` This function switches the direction of motor rotation by toggling the DIR pin logic state.
- `brushless28_release_brake` This function releases brake by setting the BRAKE pin to high logic state.

Application Init

Initializes the driver and performs the Click default configuration.

Application Task

Controls the motor speed by changing the PWM duty cycle every 500 milliseconds. The duty cycle ranges from 0% to 100%. At the minimal speed, the motor switches direction. Each step will be logged on the USB UART where you can track the program flow.

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

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[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[Brushless 28 click example package](#)

[Brushless 28 click 2D and 3D files v101](#)

[Brushless 28 click schematic v101](#)

[DRV8334-Q1 datasheet](#)

[CSD88599Q5DC datasheet](#)

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