

STSPIN motor drivers

The best things come in small packages



New low-voltage monolithic motor drivers deliver best-in-class performance for battery-operated systems

ST's new STSPIN low-voltage monolithic motor drivers, with their 3 x 3 mm QFN package are the smallest ICs in the world that integrate a power stage to drive stepper, single and double DC as well as 3-phase brushless DC motors.

Furthermore, they are optimized for the requirements of battery-operated systems in terms of low input voltage, low noise, and minimal power consumption at full load as well as in standby conditions.

Moreover, they provide a fully integrated, 3-shunt, 3-phase BLDC motor driver solution allowing IoT applications to benefit from the FOC algorithm.

KEY FEATURES AND BENEFITS

- Extremely low operating voltage from 1.8 to 10 V, ideal for low-voltage, battery-operated motors
- High output current up to 1.3 A_{RMS} for each full-bridge or half-bridge, depending on driver
- Energy saving and long battery life with best-in-class standby consumption down to 80 nA
- Extreme position accuracy and motion smoothness with up to 256 microsteps per full step (STSPIN220)
- 3-phase BLDC sensorless FOC algorithm supported (STSPIN233)
- High current up to 2.6 ARMS for single brushed DC motors (STSPIN250)

- Maximum reliability UVLO, over-current and thermal protection
- Ultra-miniaturized 3 x 3 mm QFN package

TARGETED APPLICATIONS

Battery-powered stepper, DC, 3-phase brushless (BLDC) motors in applications such as:

- Toys
- Portable printers
- Robotics
- Point of sale (POS) devices
- Portable medical equipment
- Healthcare and wellness devices (shavers and toothbrushes)
- Drones and portable gimbals

STSPIN MOTOR DRIVERS

ST's STSPIN monolithic motor drivers are now optimized for low-voltage, battery-powered, portable applications.

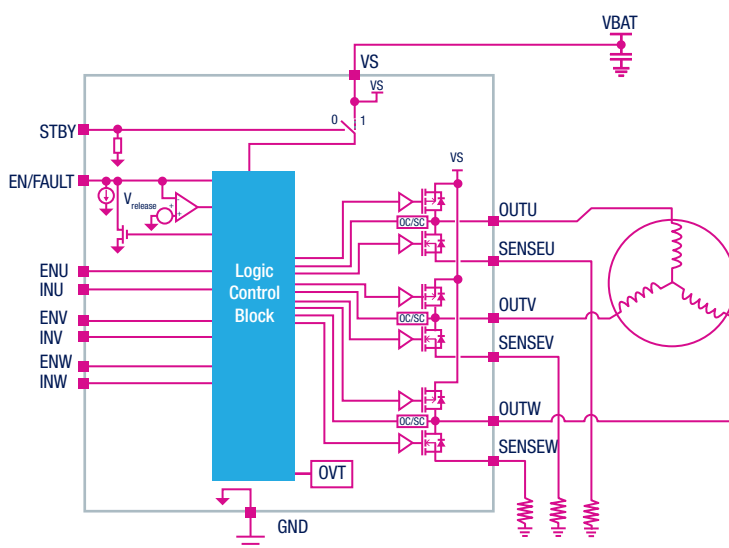
ST's excellence in motor control is now packed into a tiny IC, integrating both the control logic and a high-efficiency, low $R_{DS(ON)}$ power stage. Thanks to the STSPIN233's high level of integration and allowed 3-shunt topology and 3 independent inputs, it's now possible to use FOC sensorless algorithms in portable IoT applications. This innovation will further improve the quality and user experience of modern IoT applications such as portable smartphone gimbals or healthcare equipment.

The devices are designed to operate at low input voltages down to 1.8 V, over a wider current and temperature range, and can be forced in a zero consumption state – with quiescent current down to 80 nA – which allows significant power saving and makes these ICs ideal for battery-operated applications with an extended battery lifetime.

A complete set of protection features is present including over-current, over-temperature and short-circuit, thus making a bullet-proof solution for demanding applications, especially in harsh industrial environments, and further reducing the number of external components, the cost and complexity.

All this comes in a miniaturized 3 x 3 mm QFN package that perfectly fits into compact portable devices thanks to its miniscule footprint.

STSPIN233 MAIN INTERNAL BLOCKS



PRODUCT TABLE

Part number	Description	Typical $R_{DS(ON)}$ (Ω)	Minimum supply voltage (V)	Maximum supply voltage (V)	Maximum output current (A_{RMS})	Maximum peak output current- (A)	Expansion board for STM32 nucleo board
STSPIN220	Monolithic microstepping driver with up to 256 μ steps / step	0.2	1.8	10	1.3	2	X-NUCLEO-IHM06A1
STSPIN230	Monolithic driver for 3-phase brushless DC (BLDC) motors	0.2	1.8	10	1.3	2	X-NUCLEO-IHM11M1
STSPIN233	Monolithic driver for 3-phase brushless DC (BLDC) motors optimized for 3 shunts configuration	0.2	1.8	10	1.3	2	X-NUCLEO-IHM17M1
STSPIN240	Monolithic driver for two DC motors	0.2	1.8	10	1.3	2	X-NUCLEO-IHM12A1
STSPIN250	Monolithic driver for single DC motors	0.1	1.8	10	2.6	4	X-NUCLEO-IHM13A1

