STSPIN32F0

32-bit MCU based motor driver IC

New STSPIN motor driver IC integrates an advanced BLDC controller and a 32-bit MCU in a 7x7 mm footprint

Smart Industry or Industry 4.0, often referred to as the fourth industrial revolution, is bringing more intelligence into everything and motor control is no exception: distributed intelligence, decentralized diagnostics, communication and flexibility to adapt in real-time to external events are a must, not forgetting the relentless pursuit of energy efficiency.

ST squeezes all these capabilities, together with its expertise in motor control and embedded processing, in a new 7x7 mm STSPIN motor driver IC.

With STSPIN32F0, the fourth industrial revolution arrives in motor control!

KEY FEATURES & BENEFITS

Three-phase gate driver for high performance

- 600 mA current capability to drive a wide range of power MOSFETs
- Real-time programmable over-current
- Integrated bootstrap diodes
- Cross-conduction, under-voltage and temperature protections

Integrated 32-bit STM32F0 MCU with ARM® Cortex®-M0 core

- 48 MHz, 4-Kbyte SRAM and 32-Kbyte Flash memories
- 12-bit ADC
- 1 to 3 shunt FOC supported
- Communication interfaces: I2C, UART, and SPI
- Complete development ecosystem available

Operational amplifiers and comparator

- Sensorless or Hall-effect sensors supported for accurate control of 3-phase motors, with high efficiency

On-chip generated supplies for MCU, driver and external circuitry

- For maximum efficiency and flexibility

7x7 mm QFN package

- For a compact design

IDEAL FOR

3-phase BLDC motors in applications up to 45 V such as:

- Portable vacuum cleaners
- Fans
- Drones and aeromodelling
- Power tools
- Air purifiers
- Industrial and educational robots

MORE INTELLIGENT STSPIN MOTOR DRIVERS

The demand for more intelligent highly specialized ICs is growing rapidly, fueled by the needs of Smart Industry, Cities and Homes. Leveraging STMicroelectronics' core technologies, the STSPIN motor driver family accelerates the trend by bringing the high computational power of STM32 32-bit microcontroller together in the same IC with a 3-phase gate driver for N-channel power MOSFETs. This enables designers to realize very precise field-oriented control of the electric motor, 6-step sensorless or other advanced driving algorithms, including the speed control loop.

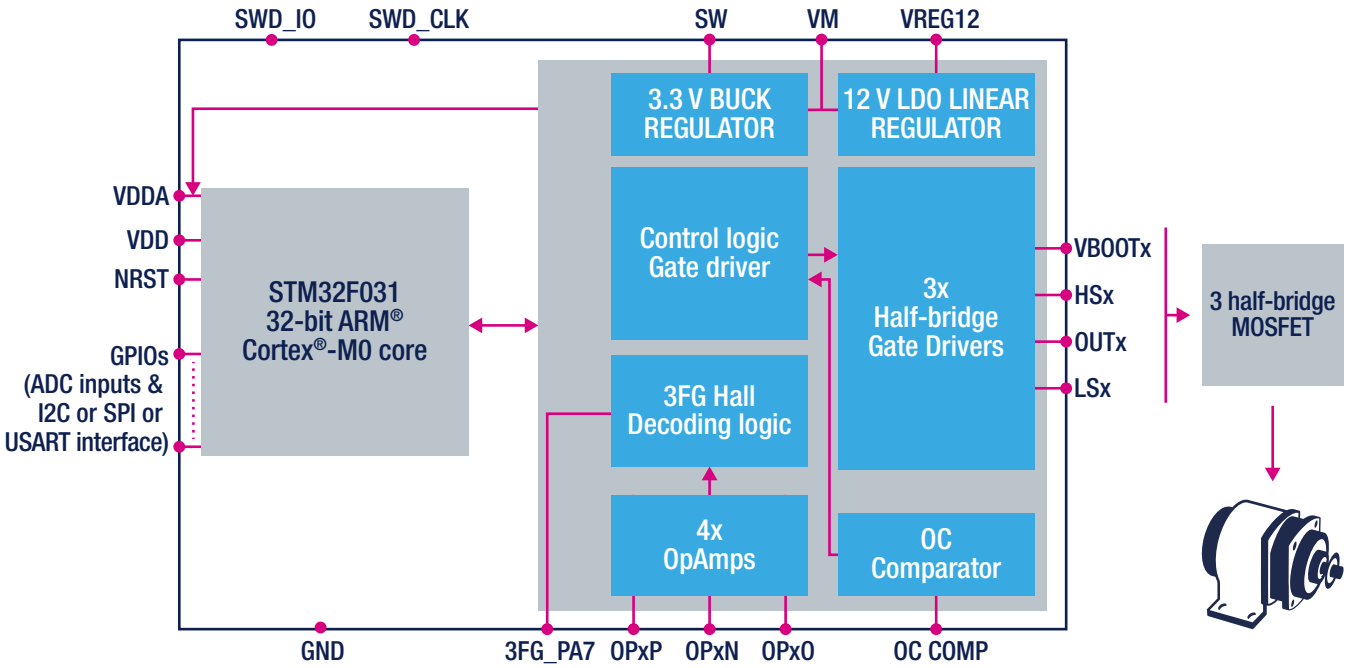
The integrated operational amplifiers allow maximum flexibility to design cost-effective sensorless or Hall-effect sensor feedback systems.

An internal 3.3 V DC-DC buck converter and 12 V LDO linear regulator provide the voltage rails to supply the MCU, the external circuitry and the gate drivers, further reducing the bill of materials and enhancing efficiency. The IC can be put into standby mode to disable all the internal circuitry apart from the DC-DC converter that supplies the MCU, thus reducing power consumption to a minimum.

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

All this comes in a miniaturized 7x7 mm QFN package that perfectly fits into compact devices and ensures a minimal footprint.

STSPIN32F0 MAIN INTERNAL BLOCKS



PRODUCT TABLE

Part number	Supply voltage range (V)	Output current (mA)	Development environment
STSPIN32F0	8 - 45	600 mA sink/source	STEVAL –SPIN3201 product evaluation board, STSW-SPIN3201 firmware for fast and easy evaluation of BLDC field oriented control