

Motor driver ICs based on 32-bit MCU in tiny 7x7 mm QFN



New STSPIN motor driver ICs integrate 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 7x7 mm footprint.

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

KEY FEATURES & BENEFITS

Three-phase gate driver

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

Integrated STM32F0 MCU with ARM® Cortex®-M0 core

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

Operational amplifiers and comparators

- Suitable for the signal conditioning of current sensing or analog Hall-effect sensors

In the field FW bootloading capability (STSPIN32F0A)

- Flexible FW upgrade as per application needs

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 from 6.7 V to 45 V such as:

- Portable home appliances
 - Vacuum cleaners
 - Air purifiers
 - Fans
 - Small fridges
- Drones and aeromodelling
 - ESC
 - Gimbals
- Power tools
- Industrial and educational robots
- Server cooling fans

MORE INTELLIGENT STSPIN MOTOR DRIVERS

The demand for more intelligent, highly specialized ICs is growing rapidly, fueled by the needs of the Industrial IoT. 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 sensored/sensorless or other advanced driving algorithms, including the speed control loop.

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.

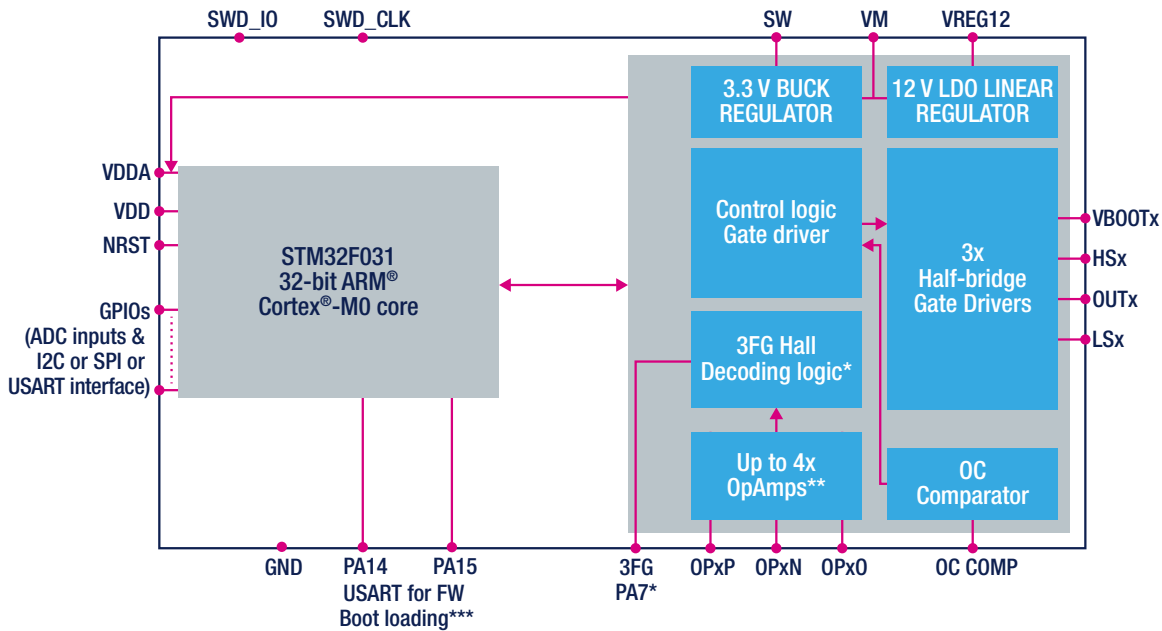
The STSPIN32F0A, with an operating voltage down to 6.7 V, corresponding to two LiPo cells, perfectly fits into portable applications such as drones, gimbals and educational robots. Moreover, users can access the embedded STM32 boot-loader, gaining flexibility to upgrade the FW over the air.

The STSPIN32F0, with its four integrated operational amplifiers allows maximum flexibility to design cost-effective sensorless or Hall-effect sensor feedback systems.

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 the industrial ones, and 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/A MAIN INTERNAL BLOCKS



* STSPIN32F0 only

** STSPIN32F0: 4 OpAmps; STSPIN32F0A: 3 OpAmps

*** STSPIN32F0A only

PRODUCT TABLE

| Part number | Supply voltage range (V) | Output current (mA) | Operational Amplifiers | Development environment |
|-------------|--------------------------|---------------------|------------------------|---|
| STSPIN32F0 | 8 - 45 | 600 mA sink/source | 4 | STEVAL –SPIN3201 product evaluation board, STSW-SPIN3201 firmware for fast and easy evaluation of BLDC field oriented control |
| STSPIN32F0A | 6.7 - 45 | | 3 | STEVAL-SPIN3202 product evaluation board STSW-SPIN3202, firmware for fast and easy evaluation of 6-step sensored/sensorless BLDC motors |



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