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STSPIN32Fxx portfolio

Industrial
Motor Control
Competence Center





STSPIN32 family from analog to digital motor control



Power Transistors



Motor Control



Microcontroller

For
Smart Industry and High-End Consumer



- Highly integrated systems-in-package:
 - 7x7 mm QFN, 10x10 mm QFP, ...
- Complete ST ecosystem: tools, FWs, SWs (motor-control algorithms)

High integration

embedded 32-bit STM32F0
ARM Cortex-M0

High performance 3-phase gate driver

0.6A and 45V
0.35 / 1A and up to 600V

Versatile Control

cost-effective sensorless
or accurate Hall sensors

Maximum efficiency

on-chip supplies for MCU,
driver and external circuitry



STSPIN32F0 Series Overview

3phase BLDC



+



Low Voltage

6.7 – 45 V

STSPIN32F0/A/B

- 0.6A FOC/6-step gate drivers
- 12V / 3.3V V reg embedded
- 1 and 3 shunt topologies



High Voltage

9 – 250 V

STSPIN32F0251/2

- 0.3A / 1A FOC/6-step gate drivers
- Smart ShutDown protection
- Outstanding below-gnd robustness
- 1 and 3 shunt topologies



pin to pin



9 – 600 V

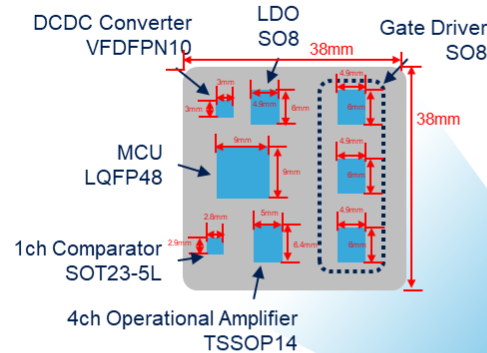
STSPIN32F0601/2

- 0.3A / 1A FOC/6-step gate drivers
- Smart ShutDown protection
- Outstanding below-gnd robustness
- 1 and 3 shunt topologies

Main Applications

- Compressors, pumps and fans
- Power tools
- Vacuum cleaners
- Industrial automation and control
- Home Appliances
- Drones (gimbal and ESC control)

STSPIN32F0 vs discrete solution



Area reduction
up to **80%**

STSPIN32F0/A/B
VFQFPN48L

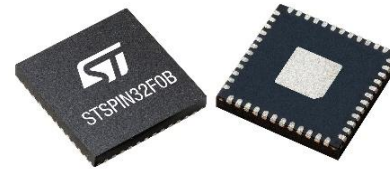
We sell in





STSPIN32F0 LV Series Overview

Advanced 3-phase BLDC Drivers with embedded STM32 MCU



KEY BENEFITS & FEATURES

Flexible and compact

- VS = 6.6V - 45 V, I = 600mA capability
- 48 MHz, 32k Flash, 4k SRAM & 12 bit ADC
- Up to 4 Op-Amps, 1 Comp; up to 20 GPIOs

Self-supplied

- 12V LDO and 3.3V DC-DC buck regulators on board

Exhaustive ecosystem for fast design

- 6step & FOC sensorless / sensored algorithms
- FW examples available on st.com

Very reliable and robust

- UVLO, OCP and thermal shutdown
- Extended temperature range: -40 to 125°C

Extremely compact

- QFN package 7 x 7 mm

Product	Description	Vin min (V)	Vin max (V)	I _{GATE} (A)	OpAmps	#GPIOs
STSPIN32F0	FOC & 6-step gate drivers	8	45	0.6	4	15
STSPIN32F0A	Embedded 3.3V / 12V Vregulators 1 shunt and 3 shunt architectures	6.6			3	16
STSPIN32F0B	Bootloader for FW on-the-field upgrade	6.6			1	20



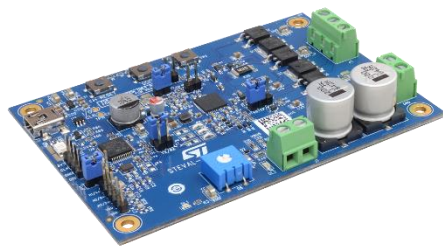
STSPIN32F0/A/B easy comparison

Feature	STSPIN32F0	STSPIN32F0A	STSPIN32F0B
Operating voltage	7.9 V to 45 V	6.6 to 45 V	6.6 to 45 V
Embedded MCU	STM32F031x6 with extended temp range	STM32F031x6 with extended temp range	STM32F031x6 with extended temp range
Gate drivers	600 mA triple half-bridge	600 mA triple half-bridge	600 mA triple half-bridge
3.3 V DC/DC buck conv	Embedded	Embedded	Embedded
12 V LDO	Embedded	Embedded	Embedded
OpAmps	4	3	1
3FG decoding logic	Embedded	Not embedded	Not embedded
Comparator	Embedded	Embedded	Embedded
# of GPIOs	15	16	20
OC protection via comparator	Available	Available	Available
Current control via comparator	Not available	Available	Available
Standby	Available	Available	Available
UVLO	Available	Available	Available
Firmware upgrade on the field	Not available	Available	Available



STSPIN32F0/A/B Ecosystem

Board	Firmware	Ecosystem	Documentation	Availability
STEVAL-SPIN3201 (STSPIN32F0) 3-shunts dev board with ST-LINKV2-1	STSW-SPIN3201 FOC library (X-CUBE-MCSDK)	SDK 5.1	Eval board manual (UM2154) FW manual (UM2152) Overcurrent AN (AN4999) MC Workbench guidelines (UM2168)	On stock
STEVAL-SPIN3202 (STSPIN32F0A) 1 shunt dev board with ST-LINKV2-1	STSW-SPIN3202 FOC library (*) (X-CUBE-MCSDK)	SDK 5.1	Eval board manual (UM2278) FW manual (UM2310) Overcurrent AN (AN4999)	On stock
STEVAL-ESC002V1 (STSPIN32F0A) Drones ESC 6-step reference design	High speed 6-step Firmware		Eval board manual FW manual	On stock
STEVAL-SPIN3204 (STSPIN32F0B) 1 shunt dev board with ST-LINKV2-1	STSW-SPIN3204 6-step FW example (X-CUBE-MCSDK)	Will be integrated in SDK	Eval board manual FW manual	On stock
EVALKIT-ROBOT-1 (STSPIN32F0A & 3-ph BLDC motor from maxon) Servo control kit	STSW-ROBOT-1 Flashed into STSPIN32F032A	Communication SW based on MODBUS protocol	user manual (UM2653)	On stock



25 mm x 40 mm



40 mm x 40 mm



Download the STSW-SPIN3201 FW example on PC and run your BLDC motor

USB



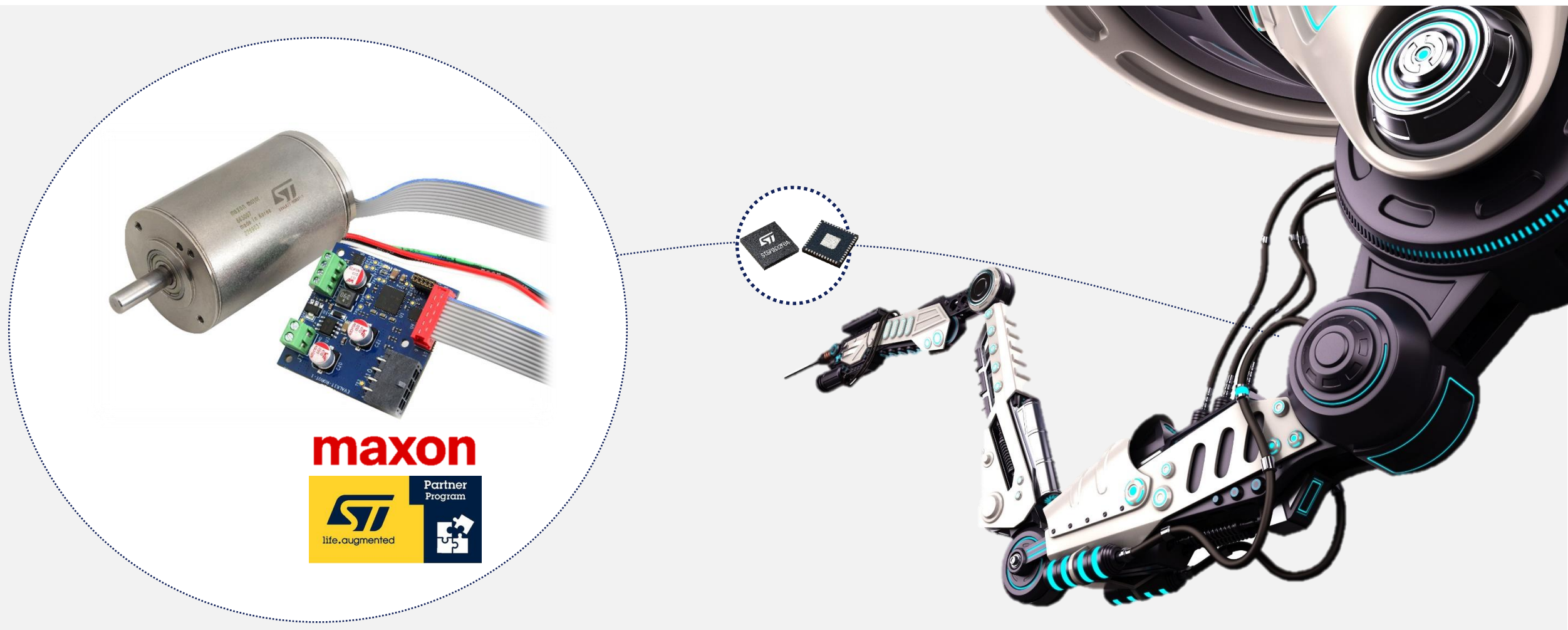
STEVAL-SPIN3201





EVALKIT-ROBOT-1

Compact Brushless Servo Control Kit





NEW

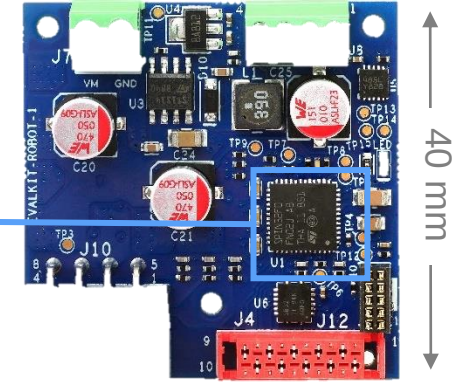
EVALKIT-ROBOT-1

Compact Brushless Servo Control Kit

- 36 V and 6 A_{PEAK} power stage
- Maxon EC-i40 100 W 3-phase BLDC
- **STSPIN32F0A** advanced 3-phase motor controller embedding Cortex-M0 MCU
- **STL7DN6LF3** 60V, 35 mΩ Dual N-channel MOSFETs
- 1024 pulses incremental encoder
- Hall sensors
- Position control loop based on Field Oriented Control
- MODBUS communication protocol through RS-485
- Extremely compact footprint (40mm x 40mm)

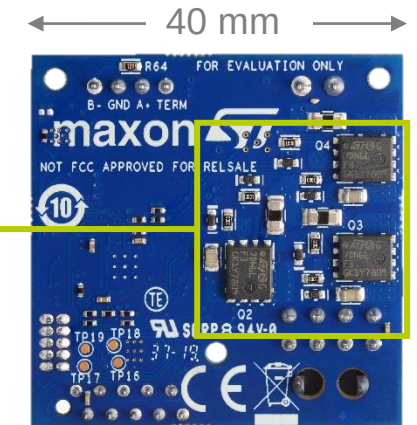
STSPIN32F0A

45V fully integrated
3phase BLDC driver (600mA)



STL7DN6LF3

60V, 35mΩ MOSFET



Maxon EC-i40

100 W 3-phase BLDC

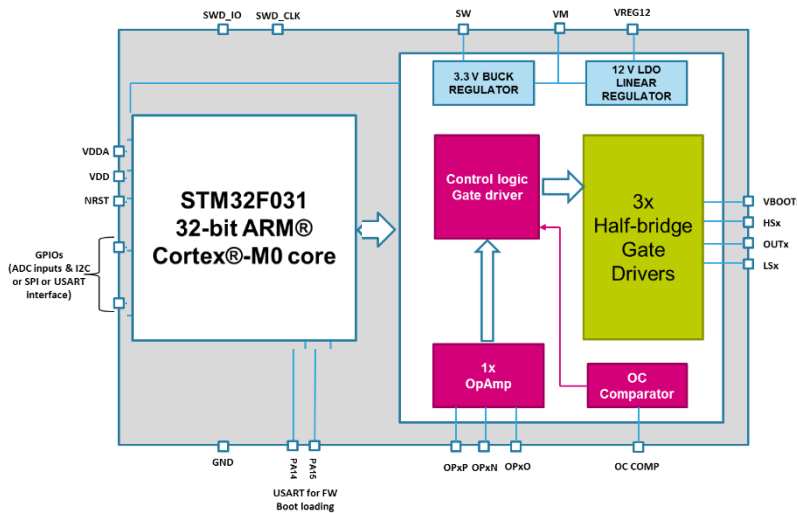




STSPIN32 Technology, from LV to HV

STSPIN32 evolution: from 45V to High Voltage advanced 3-phase BLDC Driver

45V STSPIN32F0/A/B



High integration with
embedded 32-bit
STM32F0 MCU with
ARM® Cortex®-M0

High immunity
Extremely robust
Full protection

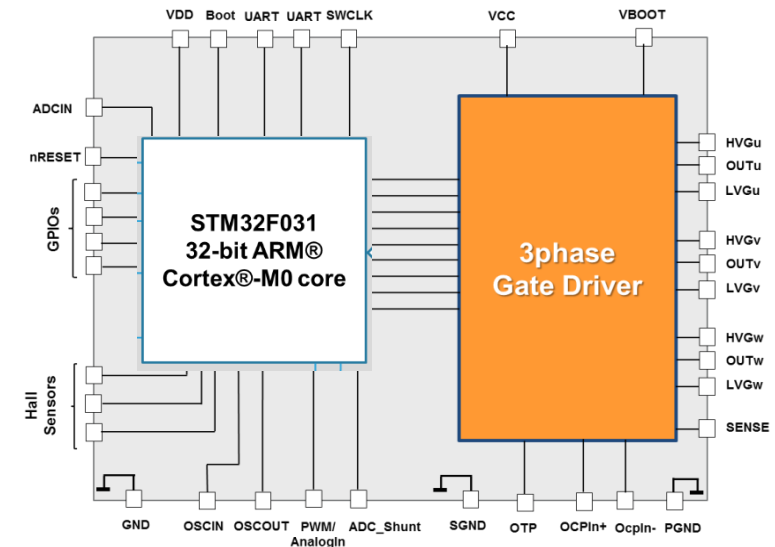
Exhaustive STSPIN
Ecosystem
X-CUBE Firmware for
STM32

KEY APPLICATIONS:

- Industrial automation
- Robotics
- Fans
- Battery powered Home Appliances
- Drones and aeromodelling
- Power tools



250V & 600V STSPIN32F0H



KEY APPLICATIONS

- Home Appliances
- Air conditioning
- Home and Industrial refrigerators
- Industrial Pumps
- High-end power tools
- Industrial automation





STSPIN32F0 HV Series Overview

250V/600V Advanced 3-phase BLDC Drivers with embedded STM32 MCU



KEY BENEFITS & FEATURES

All devices are P2P to allow maximum HW & FW reuse

Flexible and compact solution (MCU + 3-phase Driver)

- 250V and 600V gate drivers with integrated bootstrap Diodes
- I_{GATE} up to 0.35 A and 1 A
- STM32 Cortex-M0, 48 MHz, 32k Flash & 4k SRAM
- FOC & 6-step FW support, sensored and sensorless

High energy efficiency

- Standby mode to minimize power consumption

Very reliable and robust

- Outstanding below-ground robustness
- UVLO, Short-Circuit, over current with smart shutdown
- Extended temperature range: -40 to 125°C

TQFP package 10 x 10 mm

Product	Description	Vin min (V)	Vin max (V)	Vout max (V)	I _{GATE} (A)
STSPIN32F0251	250V 3-phase driver with STM32	9	20	250V	0.35
STSPIN32F0252					1
STSPIN32F0601	600V 3-phase driver with STM32	9	20	600V	0.35
STSPIN32F0602					1

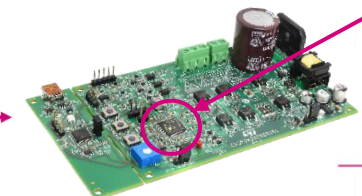
STSPIN32F0 HV Ecosystem

Board	Firmware	Ecosystem	Documentation	Availability
EVSPIN32F0601s1 (STSPIN32F0601) 1-shunts dev board with ST-LINKV2-1	SW-SPIN32F0601S1 FOC library (X-CUBE-MCSDK)	SDK 5.4.1	Eval board manual FW manual	On stock
EVSPIN32F0601s3 (STSPIN32F0601) 3-shunts dev board with ST-LINKV2-1	SW-SPIN32F0601S3 FOC library (X-CUBE-MCSDK)	SDK 5.4.1	Eval board manual FW manual	On stock
EVSPIN32F0602s1 (STSPIN32F0602) 1-shunts dev board with ST-LINKV2-1	SW-SPIN32F0602S1 FOC library (X-CUBE-MCSDK)	SDK 5.4.1	Eval board manual FW manual	On stock
EVSPIN32F0251s1 (STSPIN32F0251) 1-shunts dev board with ST-LINKV2-1	SW-SPIN32F0251S1 FOC library (X-CUBE-MCSDK)	SDK 5.4.1	Eval board manual FW manual	On stock



Download the FW example on PC
and run your BLDC motor

USB



EVSPIN32F0601s1





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and Stay Tune with Us.



PDSA Wechat Subscription



Power & SPIN Microsite

