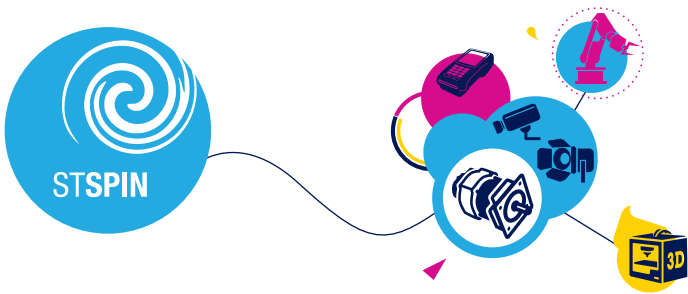


# STSPIN

## Motor Drivers



### Selection guide



ST, a pioneer in the field of motor and motion control, offers a wide selection of ICs to best match an application spectrum covering a wide range of power ratings and motor types, as well as varied system partitioning.

**STSPIN motor drivers** embed all the functions needed to drive motors efficiently and with the highest accuracy, and include an advanced motion profile generator to relieve the host microcontroller, while ensuring robustness and reliability thanks to a comprehensive set of protection and diagnostic features.

Particularly noteworthy are the **adaptive current decay control** scheme used in many of the STSPIN motor driver ICs as well as the innovative **voltage mode driving used** in micro-stepping motor drivers that provides enhanced torque control accuracy and thus motion smoothness.

Our line-up of STSPIN motor control ICs has been developed with the objectives of modularity, scalability and robustness to provide designers a wide choice of solutions to fit different requirements and system architectures.

All products have comprehensive built-in protection and diagnostic schemes to help attain the level of long term reliability and robustness requested to cope with harsh factory automation environments.

Available in a wide selection of space-saving, thermally-optimized packages, you are sure to find a device in our STSPIN line-up that addresses your motor or motion control system requirements.

## MAIN APPLICATIONS:

- Industrial, robotics
- Textile, sewing and pick and place machines
- Stage lighting
- Printers, 3D printers
- Point-of-sale, ATM and vending machines
- Medical equipment
- Security and surveillance
- Drones

### Stepper motor drivers



Scalable and robust portfolio featuring accurate positioning and smooth motion profile with up to 256 micro-steps per step

### Brushed DC motor drivers



Simple, reliable and cost-effective solution to drive one or more brushed DC motors over a wide current and voltage range

### Brushless DC motor drivers



Extensive diagnostics and fully-protected to reduce the number of external components, cost and complexity

# Stepper motor drivers and controllers

Part number	Package	General description	R <sub>DS(on)</sub> (Ω)	Supply voltage (V)		Output Current-Max (A) RMS max	Operating temperature		
				Min.	Max.		Min. (°C)	Max. (°C)	
<b>PoweStep01</b>	VFQFPN 11x14x1	System-in-package integrating microstepping controller and 10 A power MOSFETs	0.016	7.5	85	10	-40	150	
<b>STSPIN220</b>	VFQFPN 16 3x3x1.0	Low Voltage Motor driver with up to 256 microsteps and embedded PWM current control	0.2	1.8	10	1.3			
<b>L6474</b>	HTSSOP28; PowerSO 36	Motor driver up to 16 microsteps with SPI and advanced current control	0.3	8	45	3			
<b>L6472</b>	HTSSOP28; PowerSO 36	Full features motor driver up to 128 microsteps with SPI, motion engine and advanced current control							
<b>L6470</b>					52	2.8			
<b>L6208</b>	PDIP24, PowerSO 36, S024	Stepper motor driver with embedded current control							
<b>L6208Q</b>	VFQFPN 48 7x7x1.0								
<b>STSPIN820</b>	TFQFPN 4x4x1.05 - 24L	Compact advanced 256 microsteps motor driver with step-clock and direction interface	0.5	7	45	1.5			
<b>L6258</b>	PowerSO36	PWM controlled high current DMOS universal motor driver	0.6	12	34	1.2			0/-40*
<b>L6228</b>	PDIP24, PowerSO 36, S024	Stepper motor driver with embedded current control	0.7	8	52	1.4			-40
<b>L6228Q</b>	VFQFPN 32 5x5x1.0								
<b>L6219</b>	S024, PDIP 24	Stepper motor driver	-	10	46	0.75	-20	85	
<b>L6482</b>	HTSSOP38	Stepper controller with SPI, motion engine, gate drivers and advanced current control featuring 128 microsteps	-	7.5	85	-	-40	150	
<b>L6480</b>			-			-			
<b>L297</b>	PDIP 20; S0-20	Stepper motor controller	-	4.75	7	-			

Note \* Extended to -40 in EA version

## Brushed DC motor drivers and controllers

Part number	Package	General description	$R_{DS(on)}$ ( $\Omega$ )	Supply voltage (V)		Output Current-Max (A) RMS max	Output Current-Max (A) max peak	Operating temperature	
				Min.	Max.			Min. ( $^{\circ}\text{C}$ )	Max. ( $^{\circ}\text{C}$ )
<b>PWD13F60</b>	VFQFPN 10x13x1.0	High voltage full bridge with integrated smart driver	0.3	6.5	600	8	32	-40	150
<b>STSPIN240</b>	VFQFPN 16 3x3x1.0	Low voltage dual brushed DC motor driver	0.2	1.8	10	1.3	2		
<b>STSPIN250</b>		Low voltage brushed DC motor driver	0.1	1.8	10	2.6	4		
<b>L6205</b>	PDIP20; PowerSO-20; SO20	Versatile DMOS dual full bridge motor drivers with embedded PWM current control	0.3	8	52	2.8	7.1		
<b>L6206</b>	PDIP24; PowerSO 36; SO24								
<b>L6206Q</b>	VFQFPN 48 7x7x1.0								
<b>L6207</b>	PDIP24; PowerSO 36; SO24								
<b>L6207Q</b>	VFQFPN 48 7x7x1.0								
<b>STSPIN840*</b>	TFQFPN 4x4x1.05 - 24L	Compact dual brushed DC motor driver with embedded PWM current control	0.5	7	45	1.5	2.5		
<b>L6225</b>	PDIP; PowerSO-20; SO20	Versatile DMOS dual full bridge motor drivers with embedded PWM current control	0.7	8	52	1.4	3.55		
<b>L6226</b>	PDIP24; PowerSO 36; SO24								
<b>L6226Q</b>	VFQFPN 32 5x5x1.0								
<b>L6227</b>	PDIP24; PowerSO 36; SO24								
<b>L6227Q</b>	VFQFPN 32 5x5x1.0								
<b>L6201</b>	PowerSO-20; SO-20	DMOS full bridge motor driver	0.3	12	48	1	5		
<b>L6202</b>	PDIP 18						10		
<b>L6203</b>	MW 11L								
<b>L2293Q</b>	VFQFPN 32 5x5x1.0	Push-pull four channels motor driver with diodes	-	4.5	36	0.6	1.2		
<b>L293D</b>	PDIP 16; SO-20								
<b>L293B</b>	PDIP 16								
<b>L293E</b>	PDIP 20								
<b>L298</b>	MW 15L; PowerSO-20	Dual full bridge motor driver				2	-		

Note \* Coming soon

## Brushless DC motor drivers and controllers

Part number	Package	General description	R <sub>DS(on)</sub> (Ω)	Supply voltage (V)		Output Current-Max (A) RMS max	Output Current-Max (A) max peak	Operating temperature	
				Min.	Max.			Min. (°C)	Max. (°C)
<b>STSPIN32F0</b>	VFQFPN 48 7x7x1.0	Advanced BLDC controller with embedded STM32 MCU, DC-DC and optimized for FOC	-	8	45	-	600	-40	150
<b>STSPIN32FOA</b>		Advanced BLDC controller with embedded STM32 MCU, DC-DC , extended V Range and optimized for 6-step control		6.7					
<b>STSPIN230</b>	VFQFPN 16 3x3x1.0	Low voltage 3-phase integrated motor driver	0.2	1.8	10	1.3	2		
<b>STSPIN233*</b>		Low voltage 3-phase integrated motor driver optimized for 3 shunts configuration							
<b>L6234</b>	PDIP20; PowerSO-20	Triple half bridge integrated motor driver	0.3	7	52	2.8	5		
<b>L6235</b>	PDIP24; PowerSO-36; SO24	3-phase 6-step integrated motor drivers with embedded Hall sensors decoding logic	0.3	8	52	2.8	7.1		
<b>L6235Q</b>	VFQFPN 48 7x7x1.0					2.5			
<b>STSPIN830*</b>	TFQFPN 4x4x1.05 - 24L	Compact 3-phase integrated motor driver optimized for 3 shunts configuration	0.5	7	45	1.5	2.5		
<b>L6229</b>	PDIP24; PowerSO-36; SO24	3-phase 6-step integrated motor drivers with embedded Hall sensors decoding logic	0.7	8	52	1.4	3.55		
<b>L6229Q</b>	VFQFPN 32 5x5x1.0								
<b>L6230</b>	PowerSO 36; VFQFPN 32 5x5x1.0							Triple half bridge integrated motor driver optimized for 3 shunts configuration	

Note \* Coming soon

## A complete ecosystem is provided to support design-in and shorten time-to-market

Designing motor control applications becomes much easier with the outstanding performance, features and full support of STSPIN motor driver ICs that make brushed DC, stepper and brushless motor control designs more efficient in a variety of applications.

A wide range of **evaluation boards** is provided, together with low-cost plug-and-play **discovery kits**: an ideal development tool for both beginners and experienced users that is autonomous and can be used with a software interface or with a custom firmware thanks to the embedded microcontroller.

Schematics, BOMs and gerber files are available to give you a headstart with your hardware design together with comprehensive technical documentation.

Software suites are also provided to enable quick and easy development of motor driving solutions.

In addition, STSPIN motor drivers can be easily evaluated in combination with an STM32 32-bit microcontroller in an open, flexible and affordable development environment to enable fast prototyping that can quickly be transformed into final designs.

The comprehensive development environment includes:

STM32 Nucleo development boards: a comprehensive range of affordable development boards for all STM32 microcontroller series.

**STM32 Nucleo expansion boards**: based on STSPIN motor drivers, the expansion boards can be plugged on top of the STM32 Nucleo development boards. More complex functionalities can be achieved by stacking additional expansion boards.

The expansion boards are equipped with standardized interconnections such as an Arduino Uno R3 connector or a morpho connector for a higher level of connectivity.

Each expansion board is supported by STM32-based software modules.

## Ecosystem for stepper motor drivers and controllers

Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
<b>X-NUCLEO-IHM14A1</b>	Expansion board for STM32 nucleo board	STSPIN820	-	X-CUBE-SPN14	NUCLEO-F030R8, NUCLEO-F334R8, NUCLEO-F401RE, NUCLEO-L053R8
<b>X-NUCLEO-IHM06A1</b>	Expansion board for STM32 nucleo board	STSPIN220	STSW-SPIN002	X-CUBE-SPN6	STM32 Nucleo board F4, F0 or L0 series
<b>EVLPOWERSTEP01</b>	Evaluation board	POWERSTEP01	STSW-SPIN002	X-CUBE-SPN3	STEVAL-PCC009V2 interface board
<b>X-NUCLEO-IHM03A1</b>	Expansion board for STM32 nucleo board	POWERSTEP01	STSW-SPIN002	X-CUBE-SPN3	STM32 Nucleo board F4, F0 or L0 series
<b>EVAL6482H-DISC</b>	Discovery kit	L6482	STSW-SPIN002	STSW-SPIN005, STSW-SPINDISC01	-
<b>EVAL6482H</b>	Evaluation board	L6482	STSW-SPIN002	STSW-SPIN005	STEVAL-PCC009V2 interface board
<b>EVAL6480H-DISC</b>	Discovery kit	L6480	STSW-SPIN002	STSW-SPIN005, STSW-SPINDISC01	-
<b>EVAL6480H</b>	Evaluation board	L6480	STSW-SPIN002	STSW-SPIN005	STEVAL-PCC009V2 interface board
<b>STEVAL-3DP001V1</b>	Reference design	L6474	STSW-3DP001	-	-
<b>EVAL6474H</b>	Evaluation board	L6474	STSW-SPIN002	X-CUBE-SPN1	STEVAL-PCC009V2 interface board
<b>EVAL6474PD</b>	Evaluation board	L6474	STSW-SPIN002	X-CUBE-SPN1	STEVAL-PCC009V2 interface board
<b>X-NUCLEO-IHM01A1</b>	Expansion board for STM32 nucleo board	L6474	STSW-SPIN002	X-CUBE-SPN1	STM32 Nucleo board F4, F0 or L0 series
<b>EVAL6472H-DISC</b>	Discovery kit	L6472	STSW-SPIN002	STSW-SPIN004, STSW-SPINDISC01	-
<b>EVAL6472H</b>	Evaluation board	L6472	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
<b>EVAL6472PD</b>	Evaluation board	L6472	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
<b>EVAL6470H-DISC</b>	Discovery kit	L6470	STSW-SPIN002	STSW-SPIN004, STSW-SPINDISC01	-
<b>EVAL6470H</b>	Evaluation board	L6470	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
<b>EVAL6470PD</b>	Evaluation board	L6470	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
<b>X-NUCLEO-IHM02A1</b>	Expansion board for STM32 nucleo board	L6470	-	X-CUBE-SPN2	STM32 Nucleo board F4, F0 or L0 series
<b>STEVAL-IKM001V1</b>	Evaluation kit EVAL6470H and STEVAL-PCC009V2	L6470	STSW-IKM001V1S	STSW-IKM001V1	-
<b>X-NUCLEO-IHM05A1</b>	Expansion board for STM32 nucleo board	L6208	STSW-SPIN002	STSW-SPIN005	STM32 Nucleo board F4, F0 or L0 series
<b>EVAL6208Q</b>	Evaluation board	L6208Q	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
<b>EVAL6208N</b>	Evaluation board	L6208	-	-	-
<b>EVAL6228QR</b>	Evaluation board	L6228Q	-	-	-

## Ecosystem for brushed DC motor drivers and controllers

Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
<b>X-NUCLEO-IHM12A1</b>	Expansion board for STM32 nucleo board	STSPIN240	STSW-SPIN002	X-CUBE-SPN12	STM32 Nucleo board F4, F0 or L0 series
<b>X-NUCLEO-IHM13A1</b>	Expansion board for STM32 nucleo board	STSPIN250	STSW-SPIN002	X-CUBE-SPN13	STM32 Nucleo board F4, F0 or L0 series
<b>X-NUCLEO-IHM15A1*</b>	Expansion board for STM32 nucleo board	STSPIN840	-	X-CUBE-SPN14	L0, F0, F3, F4
<b>EVALPWD13F60</b>	Evaluation board	PWD13F60	-	-	-
<b>EVAL6227QR</b>	Evaluation board	L6227Q	-	-	-
<b>EVAL6227PD</b>	Evaluation board	L6227	-	-	-
<b>EVAL6225PD</b>	Evaluation board	L6225	-	-	-
<b>EVAL6207Q</b>	Evaluation board	L6207Q	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
<b>X-NUCLEO-IHM04A1</b>	Expansion board for STM32 nucleo board	L6206	STSW-SPIN002	X-CUBE-SPN4	STM32 Nucleo board F4, F0 or L0 series
<b>EVAL6206Q</b>	Evaluation board	L6206Q	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
<b>EVAL6206N</b>	Evaluation board	L6206	-	-	-
<b>EVAL6205N</b>	Evaluation board	L6205	-	-	-
<b>EVAL2293Q</b>	Evaluation Board	L2293Q	-	-	-

Note \* Coming soon



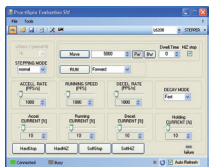
## Ecosystem for brushless DC motor drivers and controllers

Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
<b>STEVAL-SPIN3201</b>	Evaluation board	STSPIN32F0	-	STSW-SPIN3201	-
<b>X-NUCLEO-IHM11M1</b>	Expansion board for STM32 nucleo board	STSPIN230	-	X-CUBE-SPN11	STM32 Nucleo board F4, F0 or L0 series
<b>STEVAL-SPIN3202</b>	Evaluation Board	STSPIN32FOA	STSW-SPIN3202	-	NUCLEO-F030R8, NUCLEO-F103RB, NUCLEO-F302R8
<b>X-NUCLEO-IHM16M1*</b>	Expansion board for STM32 nucleo board	STSPIN830	-	X-CUBE-SPIN16	-
<b>X-NUCLEO-IHM17M1*</b>	Expansion board for STM32 nucleo board	STSPIN233	-	X-CUBE-SPIN17	NUCLEO-F030R8, NUCLEO-F103RB, NUCLEO-F302R8
<b>P-NUCLEO-IHM001</b>	Nucleo Pack with NUCLEO-F302R8 and X-NUCLEO-IHM07M1	L6230	-	X-CUBE-SPN7, STSW-STM32100	-
<b>X-NUCLEO-IHM07M1</b>	Expansion board for STM32 nucleo board	L6230	-	X-CUBE-SPN7, STSW-STM32100	STM32 Nucleo board F4, F0 or L0 series
<b>STEVAL-IHM042V1</b>	Evaluation board	L6230	-	STSW-STM32100	-
<b>STEVAL-IHM043V1</b>	Evaluation board	L6234	-	STSW-STM32100	-
<b>EVAL6230QR</b>	Evaluation board	L6230	-	-	-
<b>EVAL6235Q</b>	Evaluation board	L6235Q	STSW-SPIN003	-	STEVAL-PCC009V2
<b>EVAL6229PD</b>	Evaluation board	L6229	-	-	-

Note \* Coming soon

## Evaluation board setup

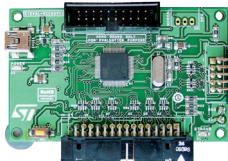
Evaluation software



USB



STEVAL-PCC009V2 Interface board (if needed)



10 or 30 poles connector



Evaluation board



## Discovery kit setup

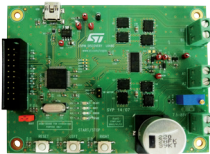
Evaluation software



USB

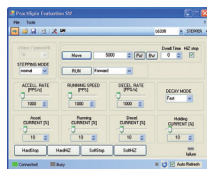


Discovery kit



## Nucleo board setup

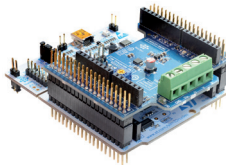
Evaluation software



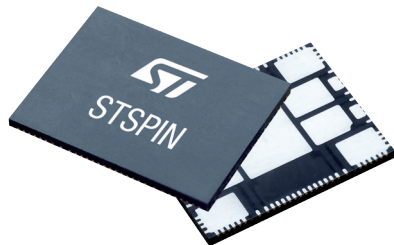
USB



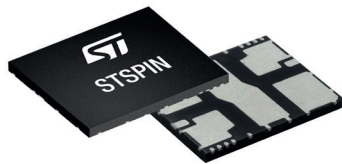
Expansion board plugged on the Nucleo board



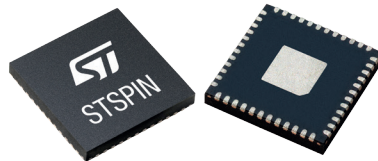
# STSPIN package options examples



QFN 11x14



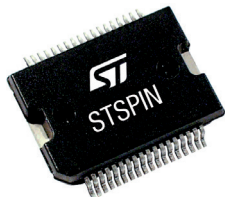
VFQFPN 10x13



QFN 7x7 48L



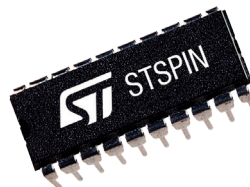
QFN 3x3



POWERS036



HTSSOP38



Dip20



S024

# life.augmented



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