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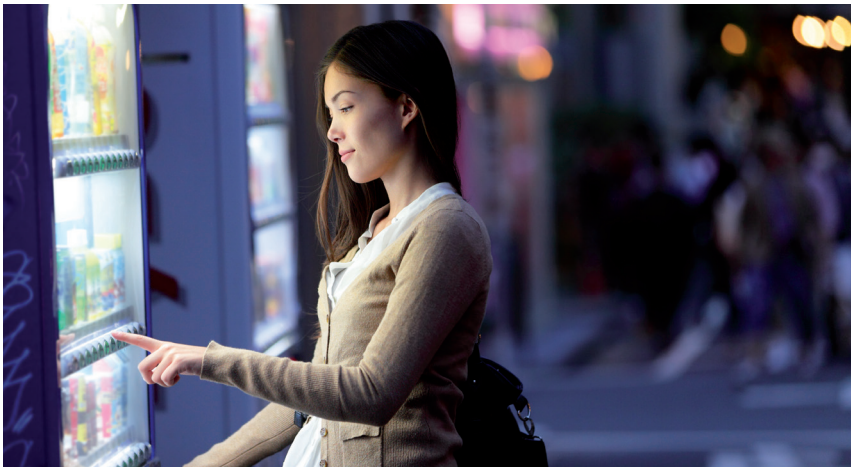
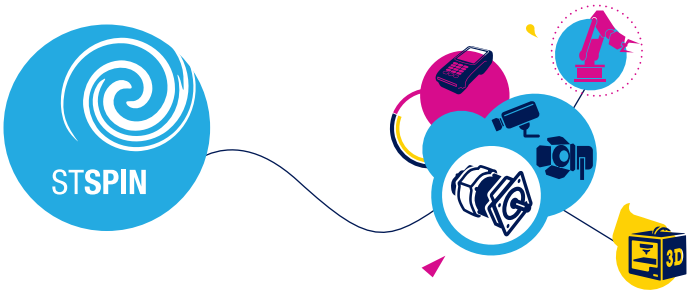
STSPIN
Motor Drivers



Selection guide



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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.

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

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.

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

Part number	Package	General description	$R_{DS(on)}$ (Ω)	Supply voltage (V)		Output Current-Max (A) RMS max	Operating temperature	
				Min.	Max.		Min. (°C)	Max. (°C)
STSPIN220	VFQFPN 16 3x3x1.0	Low voltage driver up to 256 microsteps	0.2	1.8	10	1.3	-40	150
L6472	HTSSOP28; PowerSO 36	Full features driver up to 16 microsteps with SPI, motion engine and advanced current control	0.3	8	45	3		
L6470	HTSSOP28; PowerSO 36	Full features driver up to 128 microsteps with SPI, motion engine and voltage mode driving	0.3	8	45	3		
L6474	HTSSOP28; PowerSO 36	Driver up to 16 microsteps with SPI and advanced current control	0.3	8	45	3		
L6228Q	VFQFPN 32 5x5x1.0	Driver with embedded current control	0.7	8	52	1.4		
L6228	PDIP24; PowerSO 36; SO-24,		0.7	8	52	1.4		
L6208Q	VFQFPN 48 7x7x1.0		0.3	8	52	2.8		
L6208	PDIP24; PowerSO 36; SO-24		0.3	8	52	2.8		
powerSTEP01	QFN 11x14	System-in-package integrating and 10 A power MOSFETs	0.016	7.5	85	10		
L6482	HTSSOP38	Controller with SPI, motion engine, gate drivers and advanced current control featuring 16 microsteps	-	7.5	85	-		
L6480	HTSSOP38	Controller with SPI, motion engine, gate drivers and voltage mode control featuring 128 microsteps	-	7.5	85	-		
L6506	PDIP 18; SO-20	Stepper motor controller	-	4.5	7	-		
L297	PDIP 20; SO-20		-	4.75	7	-		

Brushed DC motor drivers

Part number	Package	General description	$R_{DS(on)}$ (Ω)	Supply voltage (V)		Output Current-Max (A) RMS max	Output Current-Max (A) max peak	Operating temperature	
				Min.	Max.			Min. (°C)	Max. (°C)
STSPIN240	VFQFPN 16 3x3x1.0	Low voltage dual brushed DC motor driver	0.2	1.8	10	1.3	-	-40	150
STSPIN250	VFQFPN 16 3x3x1.0	Low voltage brushed DC motor driver	0.2	1.8	10	2.6	-		
L6227Q	VFQFPN 32 5x5x1.0	DMOS dual full bridge driver with PWM current controller	0.7	8	52	1.4	3.55		
L6227	PDIP24; PowerSO 36; SO-24		0.7	8	52	1.4	3.55		
L6226Q	VFQFPN 32 5x5x1.0		0.7	8	52	1.4	3.55		
L6226	PDIP24; PowerSO 36; SO-24		0.7	8	52	1.4	3.55		
L6225	PDIP 20; PowerSO-20; SO-20		0.7	8	52	1.4	3.55		
L6207Q	VFQFPN 48 7x7x1.0		0.3	8	52	2.8	7.1		
L6207	PDIP24; PowerSO 36; SO-24		0.3	8	52	2.8	7.1		
L6206Q	VFQFPN 48 7x7x1.0		0.3	8	52	2.5	7.1		
L6206	PDIP24; PowerSO 36; SO-24		0.3	8	52	2.8	7.1		
L6205	PDIP 20; PowerSO-20; SO-20		0.3	8	52	2.8	7.1		
L6203	MW 11L	DMOS Full Bridge Driver	0.3	12	48	1	10		
L6202	PDIP 18		0.3	12	48	1	10		
L6201	PowerSO-20; SO-20		0.3	12	48	1	5		
L298	MW 15L; PowerSO-20	Dual Full bridge	-	4.5	36	2	-		
L293E	PDIP 20	Push-pull four channel driver with diodes	-	4.5	36	1	2		
L293D	PDIP 16; SO-20		-	4.5	36	0.6	1.2		
L293B	PDIP 16		-	4.5	36	1	2		
L2293Q	VFQFPN 32 5x5x1.0		-	2.8	36	0.6	1.2		

Brushless DC motor drivers

Part number	Package	General description	$R_{DS(on)}$ (Ω)	Supply voltage (V)		Output Current-Max (A) RMS max	Output Current-Max (A) max peak	Operating temperature	
				Min.	Max.			Min. (°C)	Max. (°C)
STSPIN230	VFQFPN 16 3x3x1.0	Low voltage triple half-bridge motor driver	0.2	1.8	10	1.3	-	-40	150
L6229	PDIP24; PowerSO 36; SO-24	6 step brushless motor driver with Hall decoding	0.7	8	52	1.4	3.55		
L6229Q	VFQFPN 32 5x5x1.0		0.7	8	52	1.4	3.55		
L6235	PDIP24; PowerSO 36; SO-24		0.3	8	52	2.8	7.1		
L6235Q	VFQFPN 48 7x7x1.0		0.3	8	52	2.5	7.1		
L6230	PowerSO 36; VFQFPN 32 5x5x1.0	Triple half-bridge motor driver	0.7	8	52	1.4	3.55		
L6234	PDIP 20; PowerSO-20		0.3	7	52	2.8	5		
STSPIN32F0	VFQFPN 48 7x7x1.0	Three-phase controller with MCU (STM32F0), DC-DC and smart gate drive	-	8	45	-	0.6		

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

Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
X-NUCLEO-IHM06A1	Expansion board for STM32 nucleo board	STSPIN220	STSW-SPIN002	X-CUBE-SPN6	STM32 Nucleo board F4, F0 or L0 series
EVLPOWERSTEP01	Evaluation board	POWERSTEP01	STSW-SPIN002	X-CUBE-SPN3	STEVAL-PCC009V2 interface board
X-NUCLEO-IHM03A1	Expansion board for STM32 nucleo board	POWERSTEP01	STSW-SPIN002	X-CUBE-SPN3	STM32 Nucleo board F4, F0 or L0 series
EVAL6482H-DISC	Discovery kit	L6482	STSW-SPIN002	STSW-SPIN005, STSW-SPINDISC01	-
EVAL6482H	Evaluation board	L6482	STSW-SPIN002	STSW-SPIN005	STEVAL-PCC009V2 interface board
EVAL6480H-DISC	Discovery kit	L6480	STSW-SPIN002	STSW-SPIN005, STSW-SPINDISC01	-
EVAL6480H	Evaluation board	L6480	STSW-SPIN002	STSW-SPIN005	STEVAL-PCC009V2 interface board
STEVAL-3DP001V1	Reference design	L6474	STSW-3DP001	-	-
EVAL6474H	Evaluation board	L6474	STSW-SPIN002	X-CUBE-SPN1	STEVAL-PCC009V2 interface board
EVAL6474PD	Evaluation board	L6474	STSW-SPIN002	X-CUBE-SPN1	STEVAL-PCC009V2 interface board
X-NUCLEO-IHM01A1	Expansion board for STM32 nucleo board	L6474	STSW-SPIN002	X-CUBE-SPN1	STM32 Nucleo board F4, F0 or L0 series
EVAL6472H-DISC	Discovery kit	L6472	STSW-SPIN002	STSW-SPIN004, STSW-SPINDISC01	-
EVAL6472H	Evaluation board	L6472	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
EVAL6472PD	Evaluation board	L6472	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
EVAL6470H-DISC	Discovery kit	L6470	STSW-SPIN002	STSW-SPIN004, STSW-SPINDISC01	-
EVAL6470H	Evaluation board	L6470	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
EVAL6470PD	Evaluation board	L6470	STSW-SPIN002	STSW-SPIN004	STEVAL-PCC009V2 interface board
X-NUCLEO-IHM02A1	Expansion board for STM32 nucleo board	L6470	-	X-CUBE-SPN2	STM32 Nucleo board F4, F0 or L0 series
STEVAL-IKM001V1	Evaluation kit EVAL6470H and STEVAL-PCC009V2	L6470	STSW-IKM001V1S	STSW-IKM001V1	-
X-NUCLEO-IHM05A1	Expansion board for STM32 nucleo board	L6208	STSW-SPIN002	STSW-SPIN005	STM32 Nucleo board F4, F0 or L0 series
EVAL6208Q	Evaluation board	L6208	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
EVAL6208PD	Evaluation board	L6208	-	-	-
EVAL6208N	Evaluation board	L6208	-	-	-
EVAL6228QR	Evaluation board	L6228	-	-	-

Ecosystem for brushed DC motor drivers

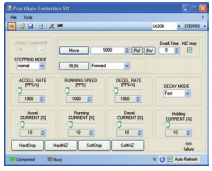
Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
X-NUCLEO-IHM12A1	Expansion board for STM32 nucleo board	STSPIN240	STSW-SPIN002	X-CUBE-SPN12	STM32 Nucleo board F4, F0 or L0 series
X-NUCLEO-IHM13A1	Expansion board for STM32 nucleo board	STSPIN250	STSW-SPIN002	X-CUBE-SPN13	STM32 Nucleo board F4, F0 or L0 series
EVAL6227QR	Evaluation board	L6227	-	-	-
EVAL6227PD	Evaluation board	L6227	-	-	-
EVAL6225PD	Evaluation board	L6225	-	-	-
EVAL6207Q	Evaluation board	L6207	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
EVAL6207N	Evaluation board	L6207	-	-	-
X-NUCLEO-IHM04A1	Expansion board for STM32 nucleo board	L6206	STSW-SPIN002	X-CUBE-SPN4	STM32 Nucleo board F4, F0 or L0 series
EVAL6206Q	Evaluation board	L6206	STSW-SPIN003	-	STEVAL-PCC009V2 interface board
EVAL6206PD	Evaluation board	L6206	-	-	-
EVAL6206N	Evaluation board	L6206	-	-	-
EVAL6205N	Evaluation board	L6205	-	-	-

Ecosystem for brushless DC motor drivers

Part number	Tool type	Core product	Evaluation software	Firmware	Companion board
X-NUCLEO-IHM11M1	Expansion board for STM32 nucleo board	STSPIN230	-	X-CUBE-SPN11	STM32 Nucleo board F4, F0 or L0 series
P-NUCLEO-IHM001	Nucleo Pack with NUCLEO-F302R8 and X-NUCLEO-IHM07M1	L6230	-	X-CUBE-SPN7, STSW-STM32100	-
X-NUCLEO-IHM07M1	Expansion board for STM32 nucleo board	L6230	-	X-CUBE-SPN7, STSW-STM32100	STM32 Nucleo board F4, F0 or L0 series
STEVAL-IHM042V1	Evaluation board	L6230	-	STSW-STM32100	-
EVAL6230QR	Evaluation board	L6230	-	-	-
EVAL6235Q	Evaluation board	L6235	STSW-SPIN003	-	STEVAL-PCC009V2
EVAL6235PD	Evaluation board	L6235	-	-	-
EVAL6235N	Evaluation board	L6235	-	-	-
EVAL6229PD	Evaluation board	L6229	-	-	-
STEVAL-SPIN32001	Evaluation board	STSPIN32F0	-	STSW-SPIN32001	-

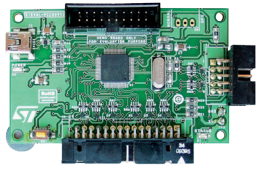
Evaluation board setup

Evaluation software



USB

STEVAL-PCC009V2 Interface board (if needed)



10 or 30 poles connector

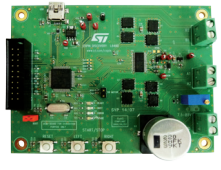
Evaluation board

Discovery kit setup

Evaluation software

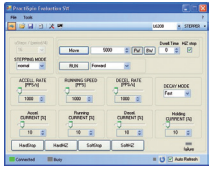
USB

Discovery kit



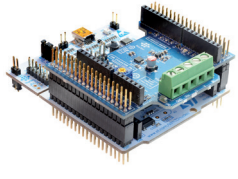
Nucleo board setup

Evaluation software

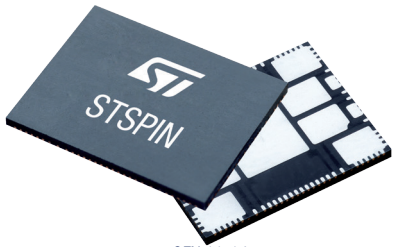


USB

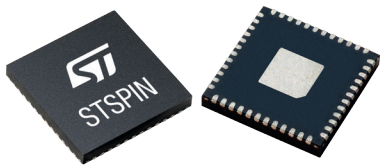
Expansion board plugged on the Nucleo board



STSPIN package options examples

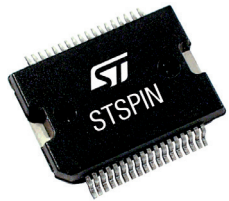


QFN 11x14



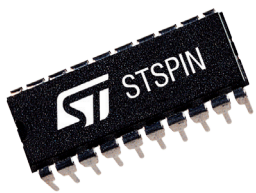
QFN 7x7 48L

QFN 3x3



POWERSO36

HTSSOP38



Dip20

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