powerSTEP™
Compact, powerful, accurate

STSPIN

Integrated stepper motor driver delivers up to 10 A with superior smoothness and accurate positioning

powerSTEP widens ST's motor control ICs offer with a highly integrated system-in-package for stepper motors.

The power section, rated 85 V and 10 ARMS, is built with eight N channel, low $R_{DS(on)}$, 16-mΩ MOSFETs and is protected against over current and motor stall.

An advanced digital controller ensures smooth motion and accurate positioning with 1/128 step resolution and speed profile generation programmable through SPI-accessible registers.

KEY FEATURES

- Dual full bridge with $R_{DS(on)}$ = 16 mΩ
- 10 A_{RMS} maximum output current
- Smoothness with up to 1/128 micro-steps/step
- Operating voltage: 7.5 V - 85 V
- Easily programmable with SPI
- Programmable speed profile and positioning
- Adjustable output slew rate
- Sensorless stall detection
- Full set of protection functions

KEY APPLICATIONS

- High-power bipolar stepper motors for:
  - Stage lighting
  - Surveillance systems
  - Textile and sewing machines
  - Pick-and-place machines
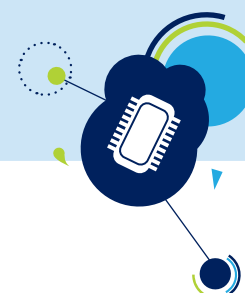
INNOVATION IN MOTION

powerSTEP is an innovative system-in-package that integrates a fully digital programmable microstepping controller (1/128 micro-steps) and 8 N-channel 16 mΩ discrete MOSFETs in dual full bridge configuration. It is hosted in a small 11 x 14 mm² VQFN package and it is suitable for stepper motor applications requiring up to 85 V and 10 A.

The controller can autonomously generate motion profiles with acceleration/deceleration ramps and velocity and position targets; all programmable through a set of commands and registers accessible via a standard 5-Mbit/s SPI. Support for daisy-chain operations in multi-motor applications helps save resources and I/Os on the host microcontroller.

Similarly, analog parameters setting – such as current protection trip point, dead-time, slew-rate, PWM frequency - can be performed on-the-fly just by changing the content of the appropriate register.

powerSTEP supports both current and voltage control modes to help optimize the design within a wider range of application requirements. The voltage control mode does not require external sense resistors and provides a smoother motion.

An extensive set of diagnostic features and protections, including thermal, low bus voltage, non-dissipative overcurrent and motor stall protection, makes the powerSTEP "bullet proof" as required by the most demanding motor control applications.

BLOCK DIAGRAM
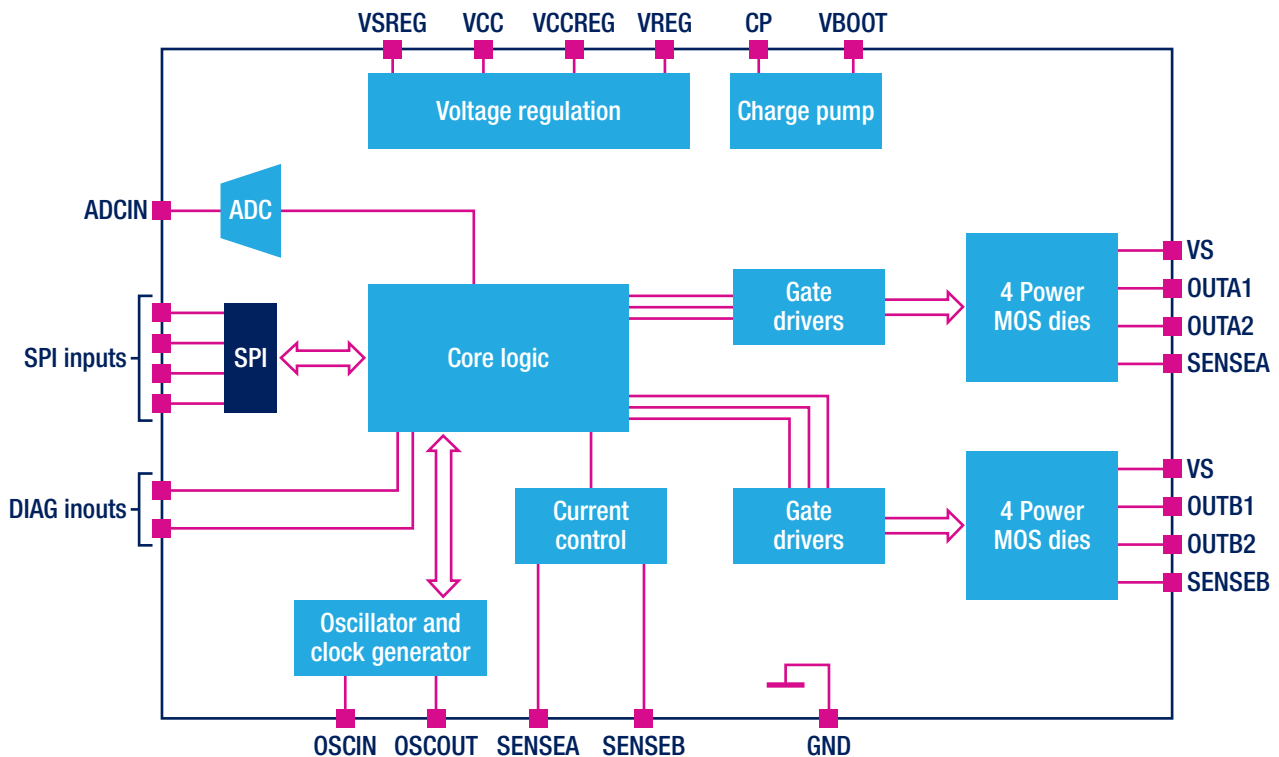
DEVICE SUMMARY

Order code	Package	Packing	Evaluation board
POWERSTEP01/POWERSTEP01TR	VFQFPN 11 x 14 x 1.0 mm	Tube/Tape & reel	EVLPOWERSTEP01