powerSTEP™
Compact, powerful, accurate

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\textsubscript{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\textsubscript{DS(on)} = 16 mΩ
- 10 A\textsubscript{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

<table>
<thead>
<tr>
<th>Order code</th>
<th>Package</th>
<th>Packing</th>
<th>Evaluation board</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWERSTEP01/POWERSTEP01TR</td>
<td>VFQFN 11 x 14 x 1.0 mm</td>
<td>Tube/Tape &amp; reel</td>
<td>EVLPOWERSTEP01</td>
</tr>
</tbody>
</table>