SPI Stepper Driver

E523.39

Preliminary Information - Sep 21, 2020

RoHS compliant

Features

- Bipolar stepper motor driver (alternatively driving 1 or 2 brushed DC motors)
- “Stop/Start” & “cold crank” compliant
- 5V..28V motor run; VBAT,max 40V (42V for 500ms)
- 3.3V or 5V SPI interface (16bit & 24bit mode)
- <10µA sleep mode current on high voltage supply
- 1/1, 1/2, 1/4, 1/8, 1/16, 1/32 stepping resolution
- 1.2A / 0,8A / 0,4A programmable coil current-ranges
- 8 bit current resolution / 6 bit waveform scaling
- 32 * 8 bit waveform: sinus or “free programmable”
- 500 mΩ $R_{DS,on\_(typ.)}$ per output driver
- Diagnosis features with interrupt enable functionality
- 8kV HBM motor pin ESD (with external capacitor)
- $T_{junct,\ peak}$: -40°C .. +170°C; AEC-Q 100 Grade 0

Added value factors:

- Feature-set to keep motor silent during run & hold
- Feature-set for low-BOM EMC optimization

Top features:

- Stall-Detection
- Fail-Current-Detection
- Adaptive-Holding and Running-Torque supported
- Custom Current Waveform: increase of speed and peak power at high temperatures or low VBAT

Applications

- Automotive, High-Temperature, Industrial
- 4-phase positioning actuators, fans, pumps

General Description

E523.39 is a high-precision automotive bipolar stepper motor driver for up to Tjunc.=170°C and phase currents up to 1.2A, with SPI interface and <10µA sleep current on high voltage supply. Very low acoustical noise emission features are down to 1/32 micro-stepping and 1.5+8 bit current resolution. With the custom waveform feature it is possible to increase motor power and maximum speed. Motor run is possible down to 5V. Low BOM cost can be realized with the set of EMC parameters and an ESD resistivity of up to 8kV(HBM).

The unique integrated “Stall-Detection” module performs the complete stall-analysis. No calculations with external controllers are necessary. Influences from gearboxes can be compensated by adjusting IC parameters.

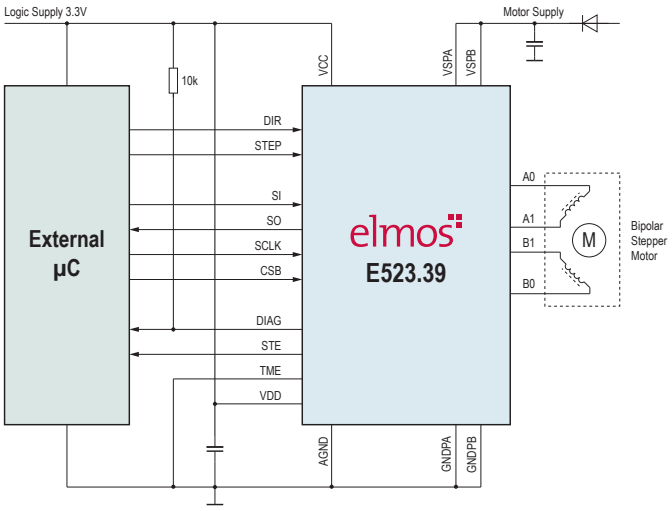
An additional true position indicator offers an improved position information after stall situations. The integrated “Fail-Current-Detection” detects even small fail-currents in the motor or wiring system. For increasing the sensitivity, it is possible, to compensate system asymmetries end-of-line.

E523.39 supports an “Adaptive Holding Torque” functionality, which is able to significantly reduce the lifetime holding current energy consumption and the system CO_2 emission. E523.39 also supports an “Adaptive Run Current” functionality, which reduces the power dissipation in the motor, the motor heat up and so leads to a higher motor peak torque, when it is really needed.

Ordering Information

Ordering-No.:	Temp. Range	Package
E52339A62C	-40°C to +170°C	QFN20L5
E52339A77B	-40°C to +170°C	QFN32L6

Typical Application Circuit



This document contains information on a product under development. Elmos Semiconductor SE reserves the right to change or discontinue this product without notice.

Elmos Support

Headquarters
Elmos Semiconductor SE
Heinrich-Hertz-Str. 1
44227 Dortmund (Germany)
Phone: +49 (0) 231 / 75 49-100
Fax: +49 (0) 231 / 75 49-149
sales-germany@elmos.com
www.elmos.com

Sales and Application Support Office North America
Elmos NA. Inc.
sales-usa@elmos.com

Sales and Application Support Office China
Elmos Semiconductor Technology (Shanghai) Co., Ltd.
sales-china@elmos.com

Sales and Application Support Office Korea
Elmos Korea
sales-korea@elmos.com

Sales and Application Support Office Japan
Elmos Japan K.K.
sales-japan@elmos.com

Sales and Application Support Office Singapore
Elmos Semiconductor Singapore Pte Ltd.
sales-singapore@elmos.com