# Product Overview

## NCV70501: Microstepping Motor Driver for Bipolar Stepper Motors

**For complete documentation, see the data sheet**

## Product Description

NCV70501 is a microstepping stepper motor driver for bipolar stepper motors. The chip is connected through I/O pins and an SPI interface with an external microcontroller.
The NCV70501 contains a current-translation table and takes the next micro-step depending on the clock signal on the NXT input pin and the status of the DIR (direction) register or input pin.
The chip provides an error message if stall, an electrical error or an elevated junction temperature is detected. It is using a proprietary PWM algorithm for reliable current control.
NCV70501 is fully compatible with the automotive voltage requirements and is ideally suited for general-purpose low current range stepper motor applications in the automotive, industrial, medical, and marine environment.

| Features | Benefits |
|---|---|
| • Programmable Peak-Current Up to 300 mA | • Tailored for medium/low current applications like automotive HVAC flap |
| • On-Chip Current Translator | • Off-loads microcontroller |
| • SPI Interface With Daisy Chain Capability | • Improves PCB connectivity in case of multi-axis control |
| • Fully Integrated CurrentSensing and CurrentRegulation. PWM Current Control with Automatic Selection of Fast and Slow Decay | • Off-loads microcontroller |
| • Fully Integrated CurrentSensing and CurrentRegulation. Active FlyBack Diodes | • Simplifies PCB Bill of Material |
| • On chip sensor-less stall detection | • Off-loads microcontroller |
| • Dual H-Bridge for 2-Phase Stepper Motors | |
| • 6 Modes from FullStep up to 1/16 micro-stepping mode | |
| • Full Protection and Diagnosis. Thermal (Warning and) Shutdown | |
| • Compatible with 3.3 V Microcontrollers, 5 V Tolerant Inputs, 5 V Tolerant Open Drain Outputs | |

| Applications | End Products |
|---|---|
| • Automotive | • HVAC, air-duct valves, radiator water-flow valves |
| • Production automation | • Robots, inspection tools, assembly, testing tools, dispensers, valves, pumps, feeders, printers |
| • Building automation | • Vending machines, sorting machines, warehouse automation |
| | • Micro-dosing pumps |

## Part Electrical Specifications

| Product | Compliance | Status | Type | $V_M$ Min (V) | $V_M$ Max (V) | $V_{CC}$ Min (V) | $V_{CC}$ Max (V) | $I_O$ Max (A) | $I_O$ Peak Max (A) | Step Resolution | Control Type | Feedback Method | Current Sense | Regulator Output | Fault Detection | Flyback Protection | $R_{DS(on)}$ Typ (Ω) | Package Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NCV70501DW002G | AEC Qualified<br>PPAP Capable<br>Pb-free<br>Halide free | Active | | | | | | | 0.3 | | Parallel<br>SPI | Back EMF/Sensorless | Fully Integrated | | Open Coil<br>Over-Current<br>Thermal<br>UVLO | Integrated Active | | SOIC-16 |
| NCV70501DW002R2G | AEC Qualified<br>PPAP Capable<br>Pb-free<br>Halide free | Active | | | | | | | 0.3 | | Parallel<br>SPI | Back EMF/Sensorless | Fully Integrated | | Open Coil<br>Over-Current<br>Thermal<br>UVLO | Integrated Active | | SOIC-16 |

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