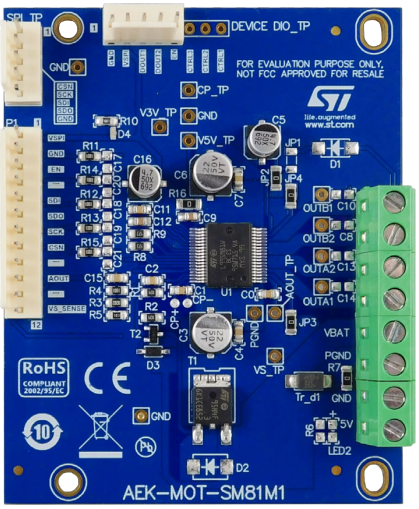
AEK-MOT-SM81M1

Data brief

Stepper motor driver evaluation board based on the L99SM81V for automotive applications



Product summary	
AutoDevKit stepper motor driver board for automotive applications	AEK-MOT-SM81M1
programmable stepper motor driver for automotive applications	L99SM81V
Development environment	SPC5-Studio addon for Eclipse (with AutoDevKit plugin extension)
Suggested microcontroller	SPC5 family MCUs
Applications	Automotive bipolar stepper motor; e.g.: - adaptive vehicle front lighting systems - vehicle HUD projectors

Features

- Board functionality based on L99SM81V programmable stepper motor driver for automotive applications:
  - with micro-stepping and hold functions
  - BEMF monitoring for stall detection
  - programmable configuration via SPI
  - 5 V internal linear voltage regulator (output available on board connector)
- Board reverse battery protection with STD95N4F3 MOSFET, which can be substituted with two optionally mounted diodes and a jumper
- Input operating voltage range from 6 V to 28 V
- Output current up to 1.35 A
- Board size: 65 mm length x 81 mm width x 11 mm maximum component height
- WEEE and RoHS compliant
- All ST components are qualified Automotive grade
- Part of the AutoDevKit™ initiative
- Applications: automotive bipolar stepper motor

Description

The AEK-MOT-SM81M1 evaluation board is designed to drive a bipolar stepper motor in micro-stepping mode, with coil voltage monitoring for stall detection.

This application board features the automotive-grade L99SM81V stepper motor driver with embedded power MOSFETs and a comprehensive set of I/Os for MCU control and feedback signaling using SPI communication through a 12-pin male connector or two 5-pin connectors on the board.

The board is developed as part of the AutoDevKit initiative, and evaluation firmware is available for suitable microcontrollers such as the automotive-grade SPC5 series MCU on the AEK-MCU-C4MLIT1 control board.

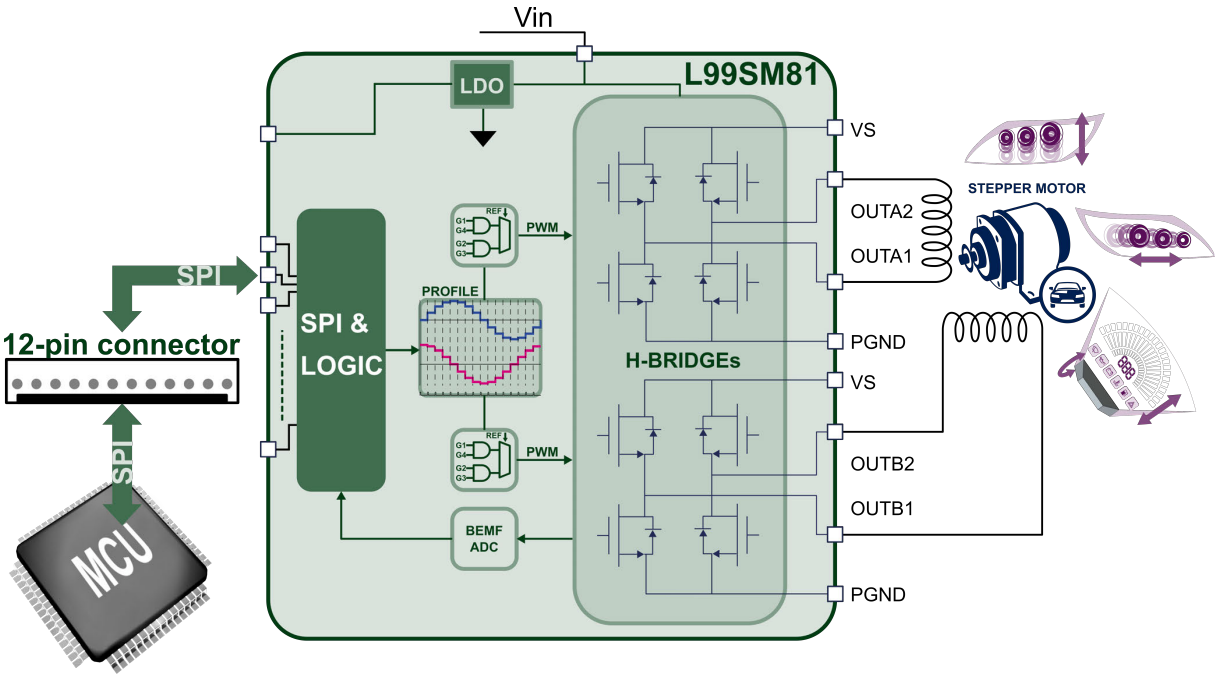
1 Overview

The AEK-MOT-SM81M1 board targets automotive applications such as adaptive front lighting systems and HUD projectors, with stepping resolution ranging from 4 full steps to 64 micro steps for the finest possible positional control.

The L99SM81V driver logically manages timers, counters, reference tables and mode or status registers that are read or set by the external microcontroller to drive the two coil phases of a bipolar stepper motor, with separate RUN and HOLD profiles for moving the rotor or keeping it stationary.

Apart from supply voltage and driver current diagnostics, the driver also monitors the output voltages across the phase terminals in order to detect and flag critical motor stall events that can compromise motor operation and control.

Figure 1. Car stepper motor application diagram



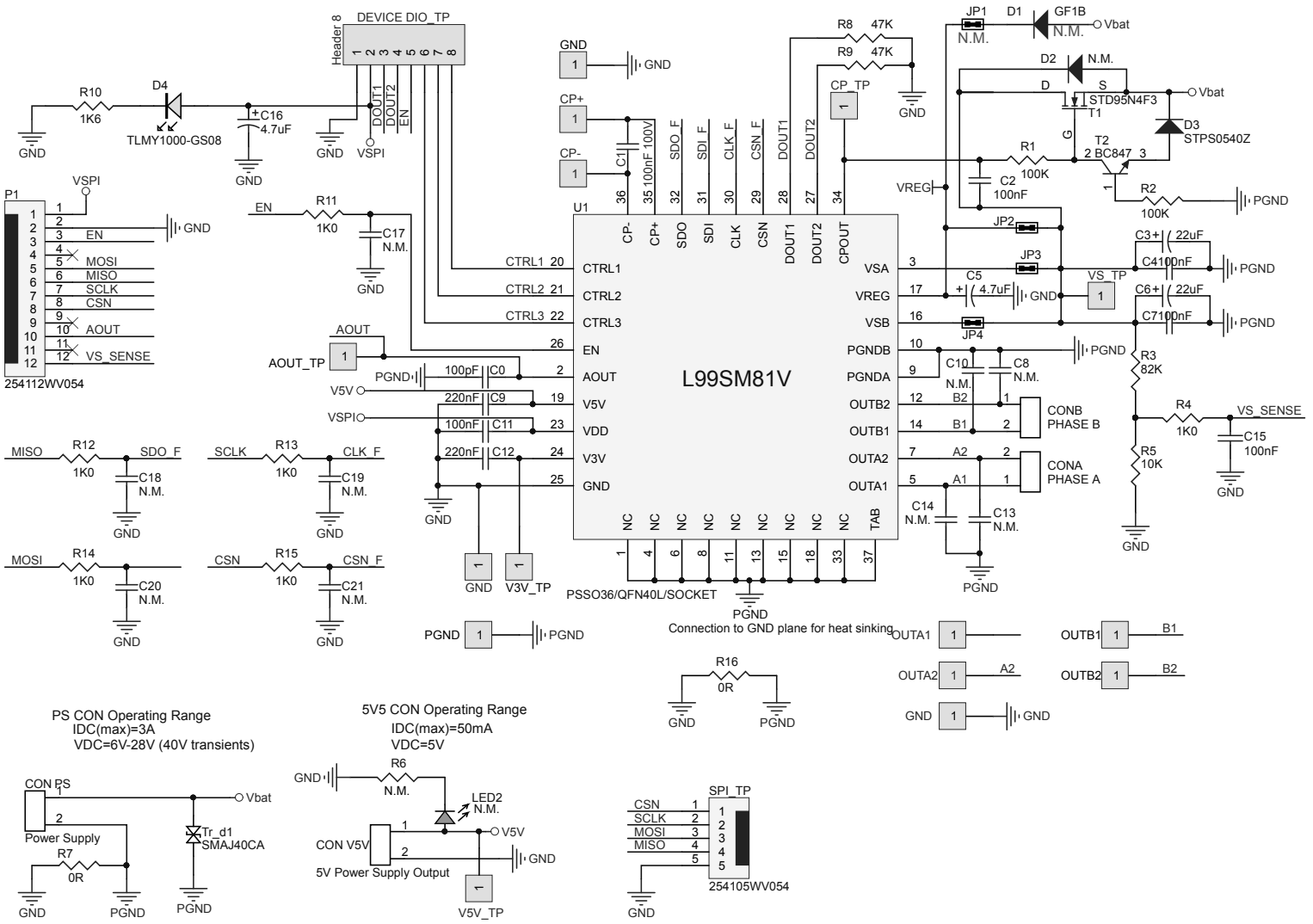
RELATED LINKS

Visit the Automotive Bipolar Stepper Motor page on the ST website for further relevant application and design information

AutoDevKit: Adaptive Front Lighting demonstration kit video on YouTube

2 Schematic diagrams

Figure 2. AEK-MOT-SM81M1 schematic diagram



Revision history

Table 1. **Document revision history**

Date	Version	Changes
08-Jul-2019	1	Initial release.