

Automotive power management IC evaluation board with LIN and CAN-FD



Product summary	
Automotive power management IC evaluation board with LIN and CAN-FD	AEK-POW-SPSB081
Automotive Power Management IC with LIN and CAN-FD	SPSB0815-TR
AutoDevKit Studio for 32-bit power architecture MCUs	STSW-AUTODEVKIT
Code Generator, Quick resources configurator and Eclipse development environment for SPC5 MCUs	SPC5-Studio
Application	Power Distribution/ Digital Power

Features

- SPSB0815 power management IC is AEC-Q100 qualified
- One 5 V low drop voltage regulator (V1) for the microcontroller and peripheral supply, with a current regulation of 250 mA maximum
- One configurable via SPI low drop voltage regulator (V2) for 5 or 3.3 V, also used as tracker for V1, and with off-board protection, with a current limitation of 100 mA maximum
- Configurable window watchdog from microcontroller
- Debug mode available with watchdog disablement
- ISO 17987-4/2016 compliant LIN transceiver
- ISO 11898-2/2016 and SAE J2284 compliant CAN-FD transceiver with local failure and bus failure diagnosis
- 4 high-side drivers (0.14 A, $R_{ON} = 7 \Omega$) configurable in four different modes (OFF, ON, TIMED, and PWM) suitable to drive external LED modules or supply external contacts
- WU1 wake-up pin with programmable cyclic sense functionality
- DIR pin to drive HS outputs (OUT 1 to OUT 4) manually
- Programmable periodic system wake-up feature
- DIAGN output pin to notify system error conditions
- Current monitoring for all internal high-side drivers
- Open-load diagnosis for all outputs
- V1 overvoltage detection and protection
- Device temperature warning and protection

Description

The AEK-POW-SPSB081 is a power management IC evaluation board with enhanced power management functionalities, such as various standby modes to minimize power consumption with programmable local and remote wake-up capability.

The board is based on the SPSB081 power management system IC, which embeds one low-drop voltage regulator (V1) to supply the system microcontroller and another voltage regulator (V2) to be used as a voltage tracker of V1 or to supply external peripheral loads such as sensors.

V1 has a fixed rail of 5 V and features an overvoltage detection and protection solution, while V2 can work in two different ways: as a voltage tracker of V1, or as an independent voltage regulator programmable via SPI with 5 or 3.3 V.

Four high-side drivers allow supplying and driving LEDs and sensors. These high-side drivers are driven via SPI and can be configured in four different modes: OFF, ON, TIMED (with programmable time), and PWM (configurable via device registers).

Moreover, you can set the high-side driver output to be driven by the DIR pin. This functionality allows the user to generate custom PWM signals for the high-side outputs.

All outputs are short-circuit protected and detect open-load.

The communication protocol used to configure SPSB0815 registers is the SPI, implemented with four wires (MISO, MOSI, CSN, and CLK).

The [AEK-POW-SPSB081](#) also exploits the LIN and CAN transceivers embedded in the IC, allowing the use of the board as a bridge between the microcontroller and the CAN or LIN communication lines.

An external microcontroller (for example, when using an [AEK-MCU-C1MLIT1](#)) has to refresh periodically a watchdog TRIG bit in the [SPSB081](#) register via SPI, to maintain the device in active mode.

In case of watchdog failure, the device enters the V1_standby (for energy saving). To wake it up, send a pulse to the WU1_IN pin or just press the S1 button.

By placing a jumper on JP1, the device enters the debug mode where the watchdog is inactive.

Three demos are available in the AutoDevKit ecosystem, each of them based on a different SPC58 microcontroller evaluation board plus an [AEK-POW-SPSB081](#).

The demos show how to use the outputs, configuring them in four different modes: OUT 1 for ON, OUT 2 for TIMED, OUT 3 for PWM and OUT 4 for DIR.

V2 is configured as a linear regulator and changes settings alternatively every 2.5 seconds between 3.3 and 5 V.

CAN connector and CAN_rx/CAN_tx pins are then connected to the microcontroller board.

The CAN test signals transmitted from the microcontroller every five seconds can be effectively decoded through CAN_H/CAN_L pins.

1 Block diagram

Figure 1. Block diagram

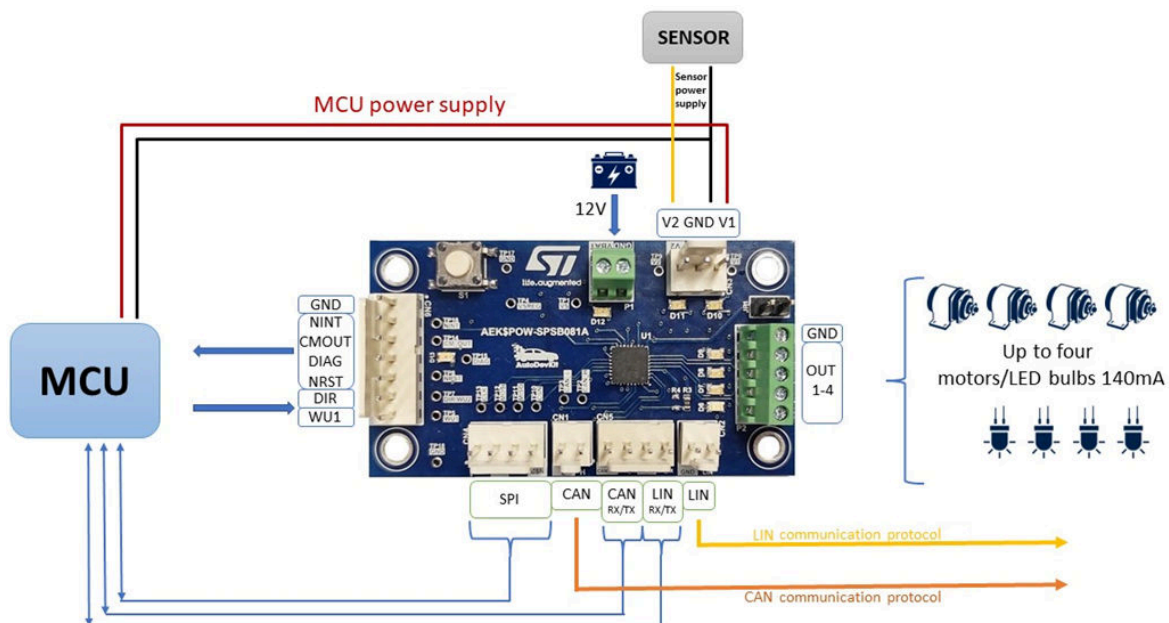
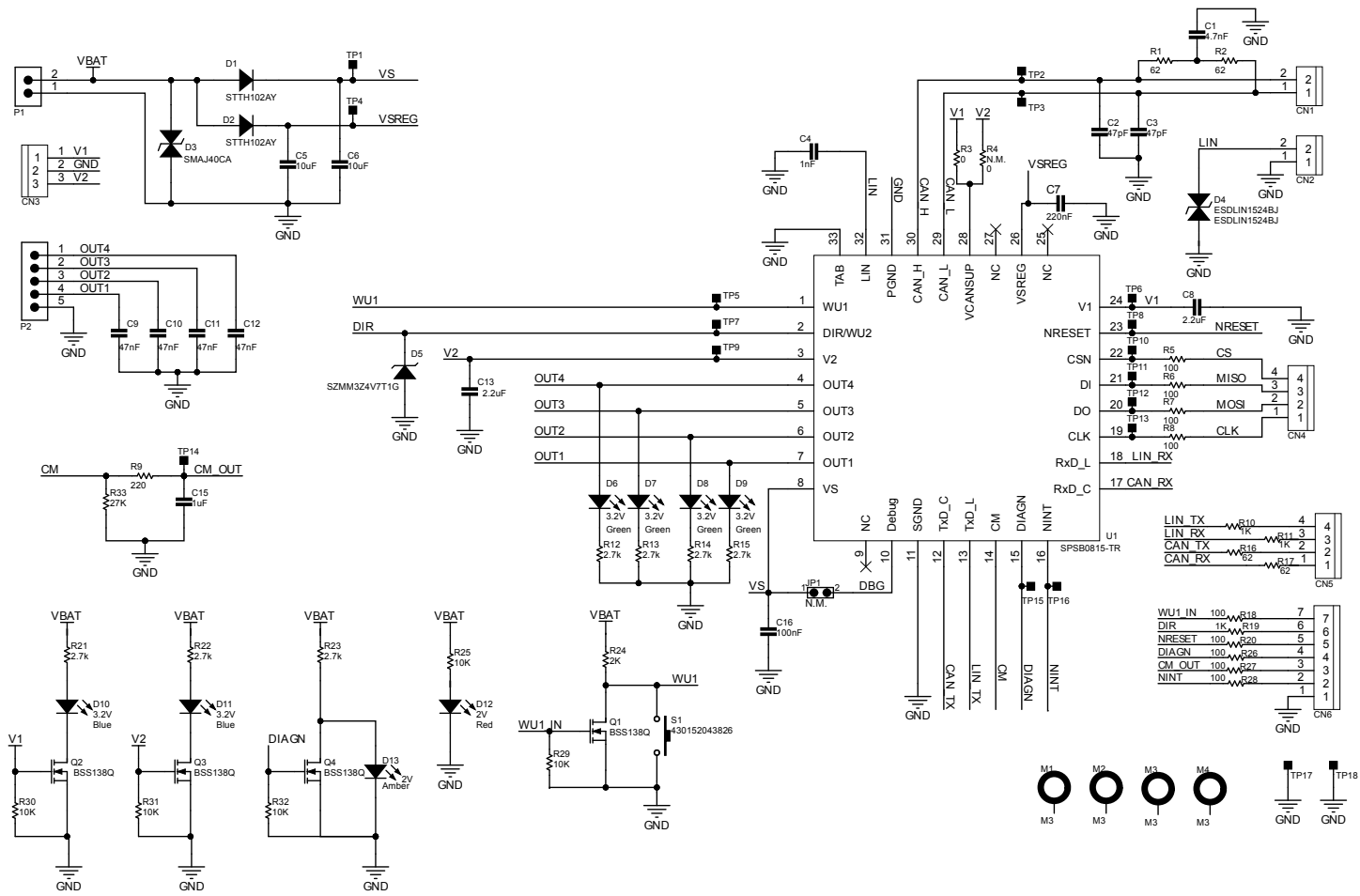


Figure 2. AEK-POW-SPSB081 circuit schematic



3 Board versions

Table 1. AEK-POW-SPSB081 versions

PCB version	Schematic diagrams	Bill of materials
AEK\$POW-SPSB081A ⁽¹⁾	AEK\$POW-SPSB081A schematic diagrams	AEK\$POW-SPSB081A bill of materials

1. This code identifies the AEK-POW-SPSB081 evaluation board first version. It is printed on the board PCB.

Revision history

Table 2. Document revision history

Date	Revision	Changes
09-Oct-2023	1	Initial release.

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2023 STMicroelectronics – All rights reserved

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[AEK-POW-SPSB081](#)