Analog, Mixed Signal and Power Management

MC33910
LIN System Basis Chip with High Side Drivers

Applications

- Window Lift
- Sunroof
- Steering wheel
- Climate Control
- Seat Position

Overview

The 33910G5 is a Serial Peripheral Interface (SPI) controlled System Basis Chip (SBC), combining many frequently used functions in an MCU based system, plus a Local Interconnect Network (LIN) transceiver. The 33910G5 has a 5.0 V, 50 mA low dropout regulator with full protection and reporting features. The device provides full SPI readable diagnostics and a selectable timing watchdog for detecting errant operation. The LIN Protocol Specification 2.0 and 2.1 compliant LIN transceiver has waveshaping circuitry that can be disabled for higher data rates. The LIN Physical Layer included inside the 33910G5 is also compliant with the SAEJ2602 Rev. 2, protocol specification approved at many car OEMs.

Two 50 mA high side switches with optional pulse-width modulated (PWM) are implemented to drive small loads. One high voltage input is available for use in contact monitoring, or as external wake-up input. This input can be used as high voltage Analog Input. The voltage on this pin is divided by a selectable ratio and available via an analog multiplexer.

MC33910 Simplified Application Drawing
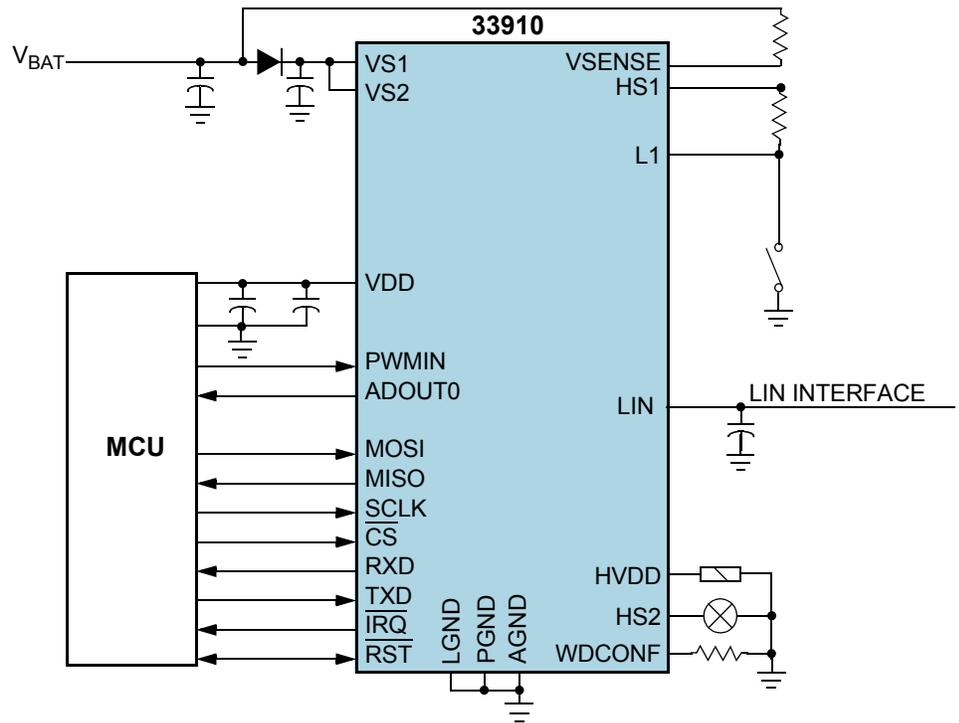
Features

- Full-duplex SPI interface at frequencies up to 4.0 MHz
- LIN transceiver capable of up to 100 kbps with wave shaping
- Two 50 mA high side switches
- One high voltage analog/logic Input
- Configurable window watchdog
- 5.0 V low drop regulator with fault detection and low voltage reset (LVR) circuitry
- Switched/protected 5.0 V output (used for Hall sensors)

Questions

- Q: What are the 33910G5 key functions?
- A: The device integrates a 5.0 V, 50 mA voltage regulator, a SPI interface for diagnostics and low power management, a LIN module, two High Sides, and one Wake-up input.
- Q: What are the key features?
- A: The 33910G5 offers a configurable window watchdog, a low power mode with cyclic wake-up feature, and a selectable LIN slew rate. The high sides have PWM capability up to 10 kHz, and over-temperature and current limitation protection. The device allows the monitoring of the battery voltage, wake-up pins voltage, and the die temperature.
- Q: What is the compliancy of the device?
- A: The product is LIN2.1 and SAEJ2602-2 compliant.
- Q: What are the EMC performances of the device?
- A: The 33910G5 successfully passes the "Common EMC requirements on LIN interfaces" specification defined by Audi, BMW, Daimler, Porsche, and Volkswagen. The LIN module shows a high robustness against ESD-61000-4-2 ($\pm$11kV) without a bus capacitor, and a very low level in emission (50 dBµV max at low frequency).

Parametric Table

Part Number	Max Input Voltage	Output Current	Temperature Range	Package
MC33910G5AC	40 V	Internally Limited (thermal protection)	-40°C to 125°C	32 LQFP
MC34910G5AC			-40°C to 85°C	

Development Tools

Part Number	Description
KIT33912G5DGEVME	Easy to use kit that includes a friendly graphical interface, an MC33912G5EVB, and a USB to SPI adaptor.

Documentation

Document Number	Title	Description
MC33910	Data Sheet	Presents the specifications for the product
SG1002	Selector Guide	Analog and power management device comparison
SG187	Selector Guide	Automotive device comparison

Benefits

- Reduced usage of external components due to the high EMI and ESD performance
- Very low emissive device
- Official release at many car OEMs
- Internal 5.0 V regulator to supply microcontroller
- Fail Safe protection
- Low Power Management to minimize the battery discharge

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