

MC33689

System Basis Chip with LIN Transceiver

Applications

- Aircraft Systems
- Automotive Systems
- Robotic Systems
- Farm Equipment
- Industrial Actuator Control
- Marine Applications

Overview

The 33689 is a serial peripheral interface (SPI) controlled system basis chip (SBC) that combines many frequently used functions in an MCU-based system plus a local interconnect network (LIN) transceiver. Applications include power window, mirror, and seat controls. The 33689 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.

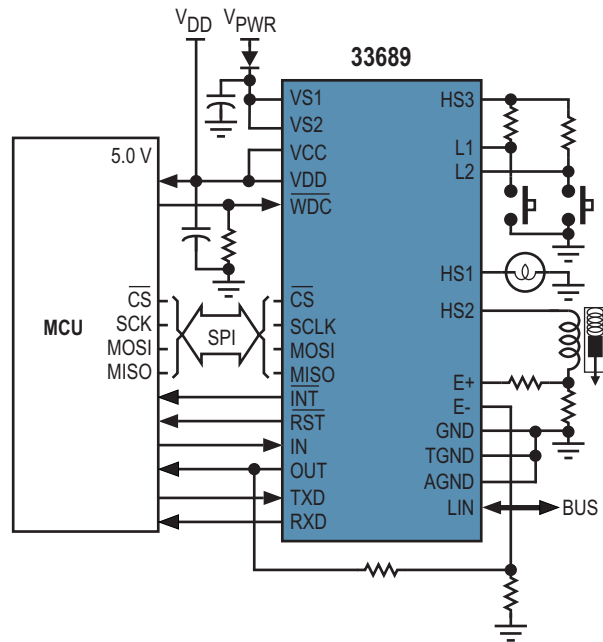
The LIN transceiver waveshaping circuitry can be disabled for higher data rates. One 50 mA and two 150 mA high side switches with output protection are available to drive inductive or resistive loads. The 150 mA switches can be pulse-width modulated (PWM).

Two high voltage inputs are available for contact monitoring or as external wake-up inputs. A current sense operational amplifier is available for load current monitoring.

The 33689 has three operational modes:

- Normal (all functions available)
- Sleep (V_{DD} OFF, wake-up via LIN bus or wake-up inputs)
- Stop (V_{DD} ON, wake-up via MCU, LIN bus, or wake-up inputs)

MC33689 Simplified Application Diagram



Performance	Typical Values
Operating Voltage	5.5 V to 27 V
Data Rate	10 kbps to 100 kbps
Internal 5.0 V Regulator	50 mA
Max HS1 and HS2 Protected Current	150 mA
Sleep/Stop Current	35/60 μ A
Ambient Operating Temperature	$-40^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$

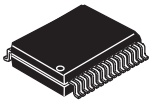
Features

- Full-duplex SPI interface at frequencies up to 4.0 MHz
- LIN transceiver capable of up to 100 kbps with waveshaping capability
- 5.0 V low dropout regulator full fault detection and protection
- One 50 mA and two 150 mA protected high side switches
- Current sense operational amplifier
- Additional devices available for comparison in Analog Product Selector Guide - SG1002 and Automotive Product Selector Guide - SG187

Freescale Semiconductor is a leading provider for over 25 years of high performance products that use SMARTMOS technology that combines digital, power and standard analog functions. The company supplies analog and power management ICs for the automotive, consumer, networking and industrial markets.

Freescale's analog and power ICs complement our broad portfolio of microcontrollers, microprocessors, ZigBee® technology, digital signal processors, sensors and development tools. Freescale offers superior support for system solutions to help customers.

32 SOICW



98ARH99137A
32-PIN SOICW

Ordering Information

Device (add R2 suffix for tape and reel)	Temperature Range	Package
MC33689DPEW	-40 to 125 °C	32 SOICW
Documentation	Description	
MC33689	System Basis Chip with LIN Transceiver	
SG1002	Analog Product Selector Guide	
SG187	Automotive Product Selector Guide	

PROTECTION	DETECT	SHUT DOWN	LIMITING	STATUS REPORTING
VS1, VS2: • Over-voltage • Under-voltage	• •			SPI SPI and Interrupt
VDD: • Under-voltage • Over-current Limiting • Over-temperature Pre-warning • Over-temperature Shutdown	• • • •		•	Reset SPI and Interrupt
HS1, HS2, and HS3: • Over-current • Over-temperature	• •	•	•	SPI and Interrupt
LIN BUS • Over-temperature • Bus Short	• •	•	•	

Customer Benefits

- Provides complete MCU power management solution with few components
- Low-power stop mode regulator with monitoring
- Supports operation with input supply voltage down to 5.0 V
- Low-power mode flexibility and wake-up options
- LIN and SPI interfaces
- Software watchdog function and external safe circuitry for automatic activation
- Two wake-up inputs for system use
- Reduced PC board space resulting in enhanced application reliability
- Freescale offers a complete line of compatible System Basis Chips with transceivers

Questions

- Are you using a LIN communication system?
- Do you need a LIN transceiver with microcontroller support features in a single package?
- Do you need a design solution for a LIN node capable of high-side PWM controlling loads in addition to providing power management functions for the microcontroller?
- Do you need a LIN transceiver, with watchdog and wake-up inputs in support of the microcontroller?

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