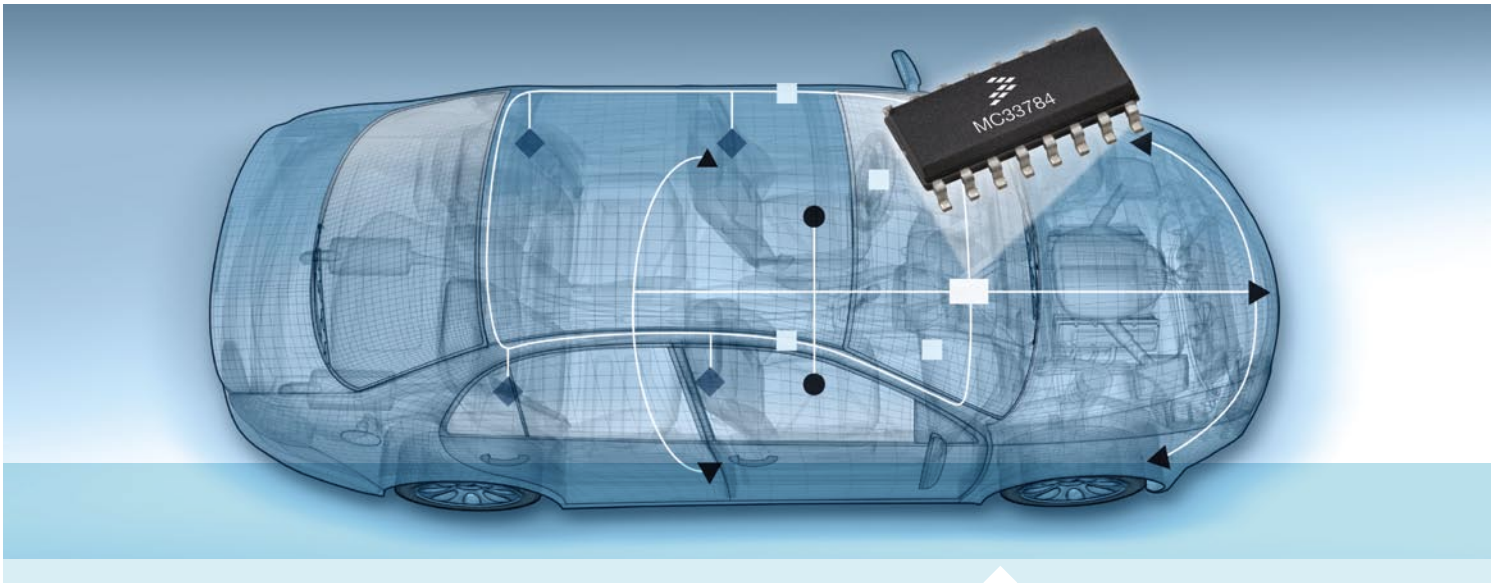


Analog, Mixed Signal and Power Management

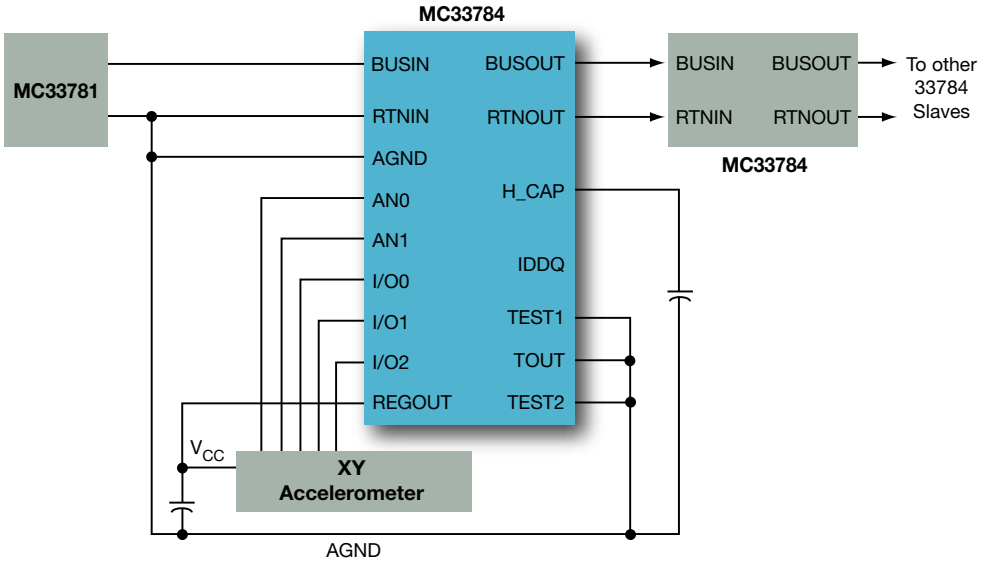
MC33784
DSI 2.02 sensor interface

SMARTMOS® device based on the DSI standard is designed to enhance safety bus performance and reduce the cost of airbag safety systems

The MC33784 is a slave device optimized as a sensor interface that incorporates the next-generation Distributed Systems Interface (DSI) version 2.02 protocol with differential drive, also known as DBUS. The device contains circuits which power a sensor, such as a two-axis accelerometer, and digitize the analog levels from the sensor. It is controlled by commands sent across the bus, and returns measured data and other information over the same bus.

Each MC33784 slave device has two 10-bit analog inputs, three configurable logic inputs or outputs, and a regulated 5V output for powering remotely placed crash and occupant detection sensors.

MC33784 Simplified Application Diagram



freescale semiconductor

In combination with the MC33781 master interface device, the MC33784 allows airbag manufacturers to add more collision sensors while reducing system cost and enhancing performance. The device is designed for airbag safety systems that use the widely adopted DSI standard to connect remotely placed pressure, acceleration, occupant and buckle sensors to the main airbag electronic control unit.

The leading automotive safety bus standard, DSI supports point-to-point, parallel and daisy chain networks. The MC33784 is designed in collaboration with a leading airbag system supplier.

In combination with the master interface, this device offers more channels at a lower cost per channel, improved electromagnetic compatibility (EMC) performance and higher top-end bus speed.

The MC33784 contains the circuits to provide power and A/D conversion for a device such as the Freescale MMA1200EG micro-machined +/-250G accelerometer.

MC33784 Applications

- Airbag safety systems that use the DSI standard to connect the main airbag electronic control unit to remote:
  - Acceleration sensors
  - Pressure sensors
  - Occupant sensors
  - Buckle sensors

Selector Guide

Part Number	Temp. Ranges	Package	Speed
MCZ33784EF/R2	-40˚C to +125˚C	16-pin SOICN	5 to 200 Kbps

Documentation

Freescale Document Number	Title	Description
MC33784	DSI 2.02 sensor interface	Data Sheet
SG1002	Analog, mixed signal and power management	Selector Guide
SG187	Automotive	Selector Guide
AN3760	Implementing a DSI network using the MC33781 and the MC33784	Application Note

MC33784 Satellite Sensor Slave Interface Product Features

- Sensor interface
  - 2-channel, 10-bit analog-to-digital converter
  - Three pins configurable as logic inputs or outputs
  - Regulated 5V output
- Bus interface
  - Single-ended or differential receiver
  - High- and low-side bus switches for improved common-mode noise rejection
  - 10 MHz internal clock with dithering for improved EMI performance
  - DSI daisy chain device
- Under-voltage detection
- CRC generation and checking

Comprehensive Silicon Solutions for Airbag Systems

Freescale is a leading supplier of semiconductor products for airbag applications, including the main electronic control unit (ECU) to satellite airbag modules. The company's offerings for airbag systems include 16-bit S12 and 32-bit Power Architecture® MCUs, pressure and acceleration sensors, and analog devices based on SMARTMOS technology. Freescale is well positioned to supply the critical semiconductor elements of today's and tomorrow's airbag systems.

Freescale has been supplying innovative semiconductors to the automotive market for the past 50 years and will continue collaborating with key business partners to develop safer, lighter and more fuel-efficient vehicles.

Learn More: For more information about Freescale products, please visit **www.freescale.com**.

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