Analog, MCUs, Sensors

Electronic Stability Control

Automotive safety systems

Overview

Numerous studies confirm the effectiveness of electronic stability control (ESC) in helping the driver maintain control of the car under difficult driving conditions and saving lives by reducing a crash's severity. ESC enhances passenger safety by detecting a difference between the driver's control input and vehicle response. When a difference is detected, the system intervenes by providing braking forces to the appropriate wheels to correct the vehicle's path. This automatic reaction is engineered to improve vehicle stability. ESC is standard on higher end vehicles, and is now increasingly found in those within the low and mid range. ESC is notably beneficial to sport utility vehicles due to higher rollover rates.

Freescale is a leading semiconductor supplier of next-generation ESC safety applications, providing custom and standard MCUs, analog and sensor products. Our portfolio offers an array of solutions addressing the most challenging system designs, while providing quality solutions from entry-level to high-end. In addition to ESC, a subset of vehicle dynamic control, our automotive safety solutions extend to electric parking brake and hill monitoring applications.

Electronic Stability Control Module
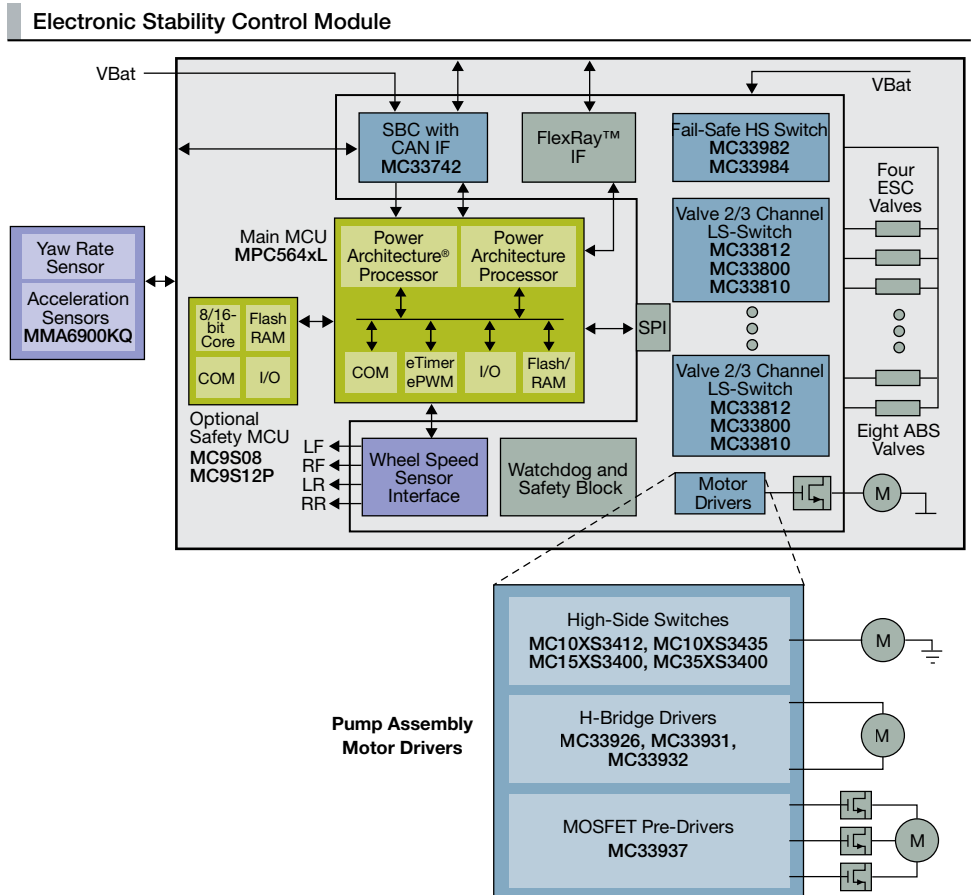
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Typical Applications

- ESC
- Anti-lock braking system
- Electric parking brake
- Active suspension

Features and Benefits

- ESC provides overall control and monitoring of chassis systems.

- Freescale portfolio: Our MCUs, analog and sensor products expand the functionality customers can combine with a next-generation performance progression path.

- Quality commitment: Our automotive qualified product portfolio provides world-class quality solutions from entry-level to high-end through compliance with the automotive electronics council (AEC) AEC-Q100 qualification, the ISO/TS 16949 quality standard as well as other critical automotive standards.

- Cost-effective solutions: Customers are able to reduce system costs and enhance passenger safety by integrating MCUs, analog and sensors into central modules.

- Integration: As vehicles continue to use more MCUs, analog and sensors, emerging safety systems move toward increased levels of integration within a single system with increased system complexity, driving the need for partition optimization.

- Proven standards: Freescale and its customers work with carmakers to ultilize proven ESC standards as well as functional state-of-the-art braking and steering safety standards.

- The development of advanced braking systems, such as electromechanical braking systems and electrohydraulic braking systems offers additional functionality.

Electronic Stability Control Product Table

Product	Description	Main Characteristics
MCUs		
Main MCU (MPC564xL)	The Qorivva MPC564xL family consists of an array of package options for systems performance needs and embedded flash requirements. These devices are SafeAssure solutions.	Program flash range of 192 KB to 1 MB is suitable for safety applications. The ADC includes dual 13-ch., 12-bit capability.
Optional safety MCU (MC9S08)	Multiple stop, wait and standby modes for low-power operation	The S08 families help save cost, reduce board space, increase performance and improve quality by having everything on chip. No external components are required. Features on-chip emulation and debug.
Analog Components		
MC33982, MC33984, MC10XS3412, MC10XS3435, MC15XS3400, MC35XS3400	Fail-safe high-side switch	Overcurrent, over temperature, short circuit, under voltage lock out
MC33937	Three-phase field effect transistor pre-driver	Triple high-side and low-side FET pre-drivers with parallel and SPI control and programmable dead time (shoot-through protect)
MC33926, MC33931, MC33932	H-bridge drivers	H-bridge and configurable switches are a selection of devices that provide half-bridge, full H-bridge and configurable high- and low-side switch capabilities
MC33800, MC33810, MC33812	Valve 2/3-channel low-side switch	Low-side switches provide load control switching to ground for resistive and inductive loads. Each of the devices provide multiple channels of open-drain MOSFET output switching.
MC33742	SBC and high-speed CAN interface	Device contains a combination of low drop out voltage regulator(s), high-side switches and a physical layer CAN transceiver
Sensors		
MMA6900KQ	Xtrinsic MMA6900Q XY-axis accelerometers feature digital signal processing for filtering, trim and data formatting plus the next-generation HARMEMS over-damped transducer. These devices are SafeAssure solutions.	Available in ±3.5/3.5g or ±5/5g, versions. The part has 11-bit digital data output. This accelerometer is SPI compatible.
MMA22xxEG wheel speed sensor interface	The MMA22xxEG series includes X-axis accelerometers	Available in ±1.5, ±40/40g, ±50/50g, or ±100/100g versions

Freescale: A Leader in Automotive Semiconductors

Freescale is a leading supplier of automotive semiconductors, with more than 30 years of experience in the automotive industry.
Our sensors, analog products and 8-, 16- and 32-bit MCU families provide intelligence and connectivity for advanced safety, body electronics, chassis, engine control, powertrain, driver information and telematics. Freescale is a pioneer in FlexRay™ technology and was the first supplier to integrate CAN, LIN and flash memory technologies on automotive MCUs. Contact your Freescale sales representative about our complete product portfolio.

SafeAssure Program: Functional Safety. Simplified.

The Freescale SafeAssure functional safety program is designed to help system manufacturers more easily achieve system compliance with functional safety standards: International Standards Organization (ISO) 26262 and IEC 61508. The program highlights Freescale solutions—hardware and software—that are optimally designed to support functional safety implementations and come with a rich set of enablement collateral. For more information, visit **freescale.com/SafeAssure**.

For more information, visit freescale.com/autosafety

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