Analog, MCUs, Sensors

Airbag Systems

Automotive safety systems

Overview

Automotive airbag systems continue to enhance passenger safety through the incorporation of increasingly sophisticated features. Automotive suppliers face continuing pressure from the market to improve performance while reducing costs. Both of these trends are expected to continue as the focus on safety remains in the forefront.

Freescale is a leading semiconductor supplier for next-generation airbag applications, with custom and standard MCUs, analog and sensor products. We offer solutions for point-to-point and bus-based satellite interface architectures with the established distributed system interface (DSI) as well as the emerging peripheral sensor interface (PSI5) architectures. Our airbag system portfolio offers an array of technology solutions that help you with even your most challenging airbag system designs, while providing quality solutions from entry-level to high-end applications.

Within our broad portfolio, the Xtrinsic accelerometers in the low-, mid- and high-g range cover local and satellite sensor needs (XY-, X- and Z-axis). For system control, a range of 16- and 32-bit MCU solutions addresses low- to high-end system requirements, as well as 8- and 16-bit MCU solutions for the safing functions. Freescale also provides SMARTMOS-based analog and mixed signal standard product solutions for integrating power supply, satellite interfaces, buckle switch sensors, squib drivers and controller area network (CAN) and local interconnect network (LIN) physical layers.

Airbag System-PS15 Protocol

Airbag System-DSI Protocol
Typical Applications
- Crash detection
- Front crash detection
- Side crash detection
- Rollover sensing

Features and Benefits
- Freescale portfolio: Our airbag system solution strategy with MCUs, analog and Xtrinsic sensor products expands the functionality customers can combine for cost effectiveness with a next-generation performance progression path.
- Quality commitment: Our airbag system portfolio provides world-class quality solutions for entry-level to high-end applications through compliance with the ISO/TS 16949 quality standard as well as other critical automotive standards.
- Cost reduction: Customers can reduce system costs while enhancing passenger safety. For example, customers can place multiple satellite sensors on a single bus.
- Integration: Emerging safety systems will continue to be clustered into the airbag ECU and other areas, driving system complexity and increasing the need to optimize partitioning.
- Proven standards: Freescale and its customers work with car makers to utilize proven standards, such as DSI and the emerging PSI5 architectures.

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 International Electrotechnical Commission (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.

Ordering Information

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC33789</td>
<td>PSIS Airbag SBC. MC33789 is a SafeAssure solution.</td>
<td>Airbag control module monitors battery voltage, satellite sensor status and supplies various voltages to the airbag system using SPI for communication.</td>
</tr>
<tr>
<td>MC33780</td>
<td>Dual DSI 2.02 master with differential drive</td>
<td>Bus controller for two differential DSI channels. SPI port for MCU interface. Variable CRC generation and detection, thermal protection, frequency spreading.</td>
</tr>
<tr>
<td>MC33781</td>
<td>Quad DSI 2.02 master with differential drive</td>
<td>Bus controller for four differential DSI channels. Dual SPI ports for MCU and safing interfaces. Variable CRC generation and detection, comprehensive fault detection, thermal protection, frequency spreading.</td>
</tr>
<tr>
<td>MC33784</td>
<td>DSI 2.02 sensor interface</td>
<td>DSI slave device optimized as a sensor interface. Differential bus capability and dual bus switches for improved EMC performance, 2-channel 10-bit ADC, 5 V regulated output, three configurable logic pins, CRC generation and checking.</td>
</tr>
<tr>
<td>MC33793</td>
<td>DSI 2.02 sensor interface</td>
<td>DSI slave device; 5 V regulated output, four configurable I/O pins (logic I/O or 8-bit ADC), fault tolerant, logic output high current buffer.</td>
</tr>
</tbody>
</table>

For more information, visit freescale.com/automotive