Freescale accelerates automotive safety with advanced airbag sensors

I-Micronews

The development of safer vehicles is a key technology driver for the automotive industry, with airbag safety systems leading the charge. The U.S. National Highway Traffic Safety Administration (NHTSA) estimates that frontal air bags alone saved more than 25,780 lives between 1987 and 2008. As automotive suppliers continue to incorporate critical safety features in their designs, they must continue improving performance, while at the same time reducing cost to gain a competitive edge.

To address these demands, Freescale Semiconductor today unveiled two additions to its Xtrinsic line of intelligent sensing solutions specifically designed for enhanced automotive passenger safety. Freescale developed the MMA16xxW and MMA26xxW for airbag safety systems that use the widely adopted Distributed Systems Interface (DSI) 2.5 standard to connect remotely placed pressure, acceleration, occupant and buckle sensors to the main airbag electronic control unit (ECU). The DSI protocol supports point-to-point, parallel and daisy-chain networks. Pioneered by Freescale, Denso and TRW, the DSI protocol has been adopted by the world's leading manufacturers of supplemental restraint system (SRS) airbags.

“As advancements are made in vehicle safety design, the importance of sensors in the vehicle is growing,” said **Demetre Kondylis**, vice president and general manager of Freescale’s Sensor & Actuator Solutions Division. *“By incorporating sensors into their designs, our automotive customers continue to bring to market vehicles with leading-edge safety features. Adding support for the DSI 2.5 protocol to our Xtrinsic line of sensors is one more way we’re providing the automotive solutions our customers need.”*

The Xtrinsic MMA16xxW and MMA26xxW products are prominent additions to Freescale’s portfolio of next-generation airbag solutions, which includes products that support the Peripheral Sensor Interface 5 (PSI5) protocol. The Xtrinsic MMA16xxW and MMA26xxW accelerometers have integrated features that enable higher levels of system integration and intelligence to provide a more instant and intuitive crash response. The inertial satellite sensors are positioned around the car to collect sensing inputs and integrate signals for optimal front and side crash detection.

Freescale is one of the only suppliers with both X- and Z-axis over-damped inertial satellite sensors housed in a quad flat no-lead (QFN) package, which provide a smaller footprint and more flexibility for module orientation in vehicles. The over-damped response of the inertial sensor minimizes signal distortion when subjected to high magnitude and high-frequency shocks that are present during vehicle crashes. An accurate signal allows the system to properly calculate the need for airbag deployment during a crash.

The Xtrinsic MMA16xxW and MMA26xxW sensors enable a 2 kHz or higher output data rate and up to four sensors on the same bus. These features allow designers to incorporate more functionality while decreasing the bill of materials. The MMA26xxW also supports a bus switch, which enables the airbag system to reconfigure in case of satellite module failure to help ensure an always-connected safety environment.

Feature Summary:

- ±50 g to ±312.5 g, nominal full-scale range, X-axis, or Z-axis
- Selectable 180 Hz, two pole, 400 Hz, four pole, or 800 Hz, four pole low-pass filter
- DSI 2.5 compliant, with full support of mandatory commands
- 16 us internal sample rate, with interpolation to 1 us
- -40 degrees C to +125 degrees C operating temperature range
- QFN 6x6 mm 16-pin package
- Qualified AEC-Q100, Revision G, Grade 1 (-40 degrees C to +125 degrees C)

Development support, price and availability

The Xtrinsic MMA16xxW and MMA26xxW accelerometers are available now for a suggested resale price (USD) starting at $2.99 in 10,000-piece quantities.

Freescale's Tower Sensor Development Tool offers a modular, reconfigurable demonstration and development platform to provide an easier development cycle. It provides expansion cards plugged into backplane boards called the elevator and hosts a single MCU/MPU story as the main control board. The swappable plug-ins allows designers to rapidly evaluate and compare the Xtrinsic MMA16xxW and MMA26xxW inertial satellite accelerometers. The TWRPI-DSI2.5 plug-in accelerometer boards are available for a suggested resale price of $15.00 (USD).

The Xtrinsic MMA16xxW and MMA26xxW accelerometers are included in Freescale's product longevity program, with assured supply for a minimum of 15 years. See www.freescale.com/productlongevity for details, terms and conditions.

"Sense the World" Video Contest

Freescale's "How Do You Make 'Sense' of the World?" video contest invites engineers to create an original video of three minutes or less to demonstrate a revolutionary way in which Freescale's sensing technology can be applied to an application in any market. Entries may be submitted through Nov. 5, 2010 at 11:59 p.m. CST with the Grand Prize winner receiving $10,000 (USD). For more information on how to submit, please visit the "Sense the World" contest homepage or Facebook page.

Freescale: A Leader in Automotive Semiconductors

Freescale has offered MEMS-based sensors for more than 30 years. Building on our heritage of sensor innovation, Freescale'sXtrinsic sensing solutions offer the right combination of intelligent integration, logic and customizable software to deliver smarter, more differentiated applications. Freescale's 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. For more information, visit www.freescale.com/sensors.

About DSI Consortium
The Distributed Systems Interface (DSI) is a flexible and powerful bus protocol designed to interconnect multiple remote sensor and actuator devices to a central control module. The principal target application for the network is automotive airbag systems.

The DSI Consortium is an organization dedicated to the promotion and development of DSI in both automotive and non-automotive applications. The founding members of the Consortium are TRW Automotive, DENSO CORPORATION, and Freescale Semiconductor.

To learn more about the DSI Consortium, membership requirements and to gain access to the latest specifications, product links, application notes and contacts, visit www.dsiconsortium.org.

About Freescale Semiconductor
Freescale Semiconductor is a global leader in the design and manufacture of embedded semiconductors for the automotive, consumer, industrial and networking markets. The privately held company is based in Austin, Texas, and has design, research and development, manufacturing or sales operations around the world.

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