

Automotive powertrain MCU helps simplify compliance with stringent safety standards



Freescale Semiconductor announced sampling of the multicore Qorivva MPC5746M microcontroller (MCU), designed to address the growing global demand for improved performance in automotive powertrain systems while meeting the latest safety and application security requirements. This 32-bit MCU is built on a new 200-MHz quad-core Power Architecture platform. The new design helps optimize software and safety strategies on a multicore platform with integrated safety checker and a parallel I/O processor. Suitable for internal combustion engines, hybrid systems and transmission systems, the MCU also helps recognize and prevent electronics system faults while protecting against potential software hacks as vehicles become more connected. The Qorivva MPC5746M MCU is positioned to increase the computational and memory capabilities available to the automotive industry, including 4 MB of embedded flash memory. The device provides more than twice the performance of Freescale's benchmark-setting MPC5674F MCU, while maintaining the same power budget and capability of running in harsh automotive under-hood environments. The device is implemented in the company's 55 nm non-volatile memory (NVM) technology and is expected to be joined later this year by a new 300 MHz quad-core platform with 8 MB of flash memory.

The Qorivva MPC5746M is a SafeAssure functional safety solution that has been defined and developed from the ground up to address the ISO 26262 standard. The architecture and design process for the MPC5746M help reduce the design time and complexity of developing ISO 26262-compliant automotive safety applications. The MPC5746M targets safety applications at ASIL-D, the most stringent automotive safety integrity level, by incorporating such features as a delayed lock-step core and end-to-end data and code correction to prevent against critical faults, leveraging Freescale's proven expertise in multicore safety platforms with innovative memory safety concepts. Memory and logic built-in self tests are included to avoid the accumulation of latent faults in the functional logic as well as the safety integrity mechanisms. Clock and power generation and distribution are supervised by dedicated monitors to further enhance the safety-oriented capabilities of the MPC5746M.

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Electronics are increasingly managing the core functions of automotive systems, and Freescale's SafeAssure program is intended to enable the design of electronic systems that can prevent dangerous failures, or at least sufficiently control them when they occur, in accordance with ISO 26262. The MPC5746M MCU is the newest offering under Freescale's SafeAssure program, which includes a broad solution set of MCUs, sensors and analog ICs as well as support for functional safety application design that includes training, safety documentation and technical support.

With the tremendous amount of data streaming through today's vehicles, security has become a necessity for automakers to protect consumers from malicious and potentially catastrophic attacks on powertrain systems. Freescale's Qorivva MPC5746M MCU includes comprehensive on-chip security features such as a customer-programmable hardware security module with a dedicated core, dedicated SRAM and a cryptographic module, flash memory security features such as flash censorship support, advanced debug access control and secure boot modes. This high level of integration allows customers to take advantage of the on-chip security features and eliminates the need for external components to perform the same function, thus lowering system cost.

An extensive ecosystem of development support distinguishes the MPC5746M from its competition. A comprehensive suite of flexible enablement software and features includes industry-leading debuggers, compilers and an advanced emulation and calibration environment called eCal that allows customers to use the same hardware for development and calibration. The MPC5746M is supported by the AUTOSAR real-time operating system and AUTOSAR MCAL 4.0 drivers, the first to support multicore automotive MCUs. Access to this ecosystem of Freescale and third-party tools helps reduce application development complexity and debugging/validation time during prototyping and software integration.

The MPC5746M is the first device in Freescale's Qorivva MPC57XX family for advanced automotive control applications. The Qorivva portfolio includes a full line of advanced chassis and safety, body, powertrain and hybrid MCUs. The Qorivva MPC57XX powertrain MCUs are designed for the full range of powertrain applications, including internal combustion engines (gasoline and diesel), advanced hybrid systems (including motor control as well as charging and battery control) and advanced automatic transmission control.

Freescale Semiconductor

512-895-7675, www.freescale.com [1]

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