Silicon Labs Microcontrollers Deliver Best-in-Class Temperature Sensing Accuracy

Exceptional Analog Integration Makes C8051F39x/7x MCUs Ideal for Optical Transceiver Modules, Motor Control and Sensor Interfaces

AUSTIN, Texas--(BUSINESS WIRE)-- Silicon Laboratories Inc. (NASDAQ: SLAB), a leader in high-performance, analog-intensive, mixed-signal ICs, today introduced a family of high-performance 8-bit microcontrollers (MCUs) featuring the company's latest mixed-signal breakthrough, an integrated temperature sensor with best-in-class accuracy over an extended temperature range and without the need for calibration. Offering a unique mix of integrated high-performance analog peripherals and a very fast 8051 CPU in a compact package, the new C8051F39x/7x MCU family provides an optimal solution for optical transceiver modules, sensor interfaces and brushless dc motor applications for fans, dryers, vacuum cleaners and remote control toy vehicles.

Many consumer and industrial applications require highly accurate temperature sensors to adjust for behavior shifts over temperature for on-board components such as sensors, lasers or power sources. The C8051F39x/7x MCUs' on-chip temperature sensor provides ± 2 $^\circ$C accuracy through an extended temperature range (up to 105 $^\circ$C) without the need for calibration. Providing five times higher accuracy than competing in-class MCUs, the C8051F39x/7x family improves temperature compensation routines, resulting in better end-product reliability. In addition, the temperature sensor reduces manufacturing cost by eliminating the need for the factory calibration step required by competing MCUs.

C8051F39x/7x MCUs are more than 30 percent smaller than competing solutions, making them an excellent choice for space-constrained applications such as optical transceiver modules. The MCU family's exceptional integration eliminates the need for external components such as a temperature sensor, a crystal, a differential analog-to-digital converter (ADC), a voltage reference and two digital-to-analog converters (DACs), further reducing bill-of-materials (BOM) cost and PCB footprint. These on-chip analog peripherals enable developers to minimize discrete components and reduce the BOM cost by more than $0.30 (USD). In addition, the MCU family's innovative crossbar technology gives developers the flexibility to assign peripherals to specific pin locations, thereby easing system layout and eliminating pin conflicts.

The C8051F39x/7x MCUs are based on a patented, pipeline 8051 core that provides 2.5x faster CPU performance (up to 50 MIPS) than competing devices. Finer resolution pulse-width modulation (PWM) offers the ability to execute more complex algorithms, enabling a greater range of motor speeds and higher efficiency in motor control applications. Support for four interrupt priorities allows fast interrupt handling for real-time applications.

Addressing the industry need for low-power operation and green energy compliance, the C8051F39x/7x MCUs are designed to consume an ultra-low 160 µA/MHz in active mode, enabling up to an 80 percent power savings compared to competing devices. Low-power active mode is vital for portable applications to extend battery life and for space-constrained and enclosed applications such as optical transceiver modules to minimize self-heating.

The C8051F37x devices are the first Silicon Labs MCUs with 512B of EEPROM, supporting ten times more write/erase cycles (1M vs. 100k typical) and faster programming times (3.5 ms vs. 112 ms) compared to standard flash implementations. These increased write/erase cycles are useful for applications such as wireless sensor nodes and data loggers that must constantly write to memory. The faster programming times often are needed for applications such as industrial controls and optical modules that require tight calibration loops.

"The new C8051F39x/7x MCUs leverage our mixed-signal capabilities to provide enhanced on-chip analog peripherals such as our high-precision temperature sensor without compromising product cost, performance or size," said Mike Salas, vice president and general manager of Silicon Labs' microcontroller products. "Our customers are faced with the need to pack more functionality in smaller footprints, and we excel at architecting MCUs that deliver the utmost in computational throughput, integration, power efficiency and analog performance."

Comprehensive Development Kits

Silicon Labs' development kits for the C8051F39x/7x MCU family provide everything embedded developers need to evaluate hardware and develop code including C8051F390 or C8051F370 target boards, USB debug adaptor/programmer, power supply, cables, quick-start guide and complimentary downloadable software tools. Silicon Labs' TOOLSTICK370-A-DC daughter card provides a cost-effective, easy-to-use development system that enables designers to develop and debug application firmware directly on the target C8051F39x/7x MCU using the Silicon Labs Integrated Development Environment (IDE).

Pricing and Availability

Production quantities of Silicon Labs' C8051F39x/7x MCUs are available now in 4 mm x 4 mm 20-pin and 24-pin QFN packages with 4 to 16 kB flash sizes, as well as 1 kB RAM. The F39x/7x devices are footprint and code compatible with Silicon Labs' C8051F33x MCUs. Product pricing for the C8051F39x/7x family in 10,000-unit quantities begins at $0.98 (USD). The C8051F390-A-DK and C8051F370-A-DK development kits are available for $69.00 (USD MSRP). The TOOLSTICK370-A-DC is available for $9.90 (USD MSRP).

For additional C8051F39x/7x MCU product information, samples and development tools, please visit www.silabs.com/8bit-mcu.

Silicon Laboratories Inc.

Silicon Laboratories is an industry leader in the innovation of high-performance, analog-intensive, mixed-signal ICs. Developed by a world-class engineering team with unsurpassed expertise in mixed-signal design, Silicon Labs' diverse portfolio of patented semiconductor solutions offers customers significant advantages in performance, size and power consumption. For more information about Silicon Labs, please visit www.silabs.com.

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Silicon Laboratories Inc.
Dale Weisman, +1-512-532-5871
dale.weisman@silabs.com

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