8-bit HCS08 Embedded Controllers

MC9S08SF4
8-bit microcontrollers

Target Applications

- Power tools
- Robotic systems
- Small appliances (ACIM, BLDC)
- Battery chargers

Overview

The powerful 8-bit MC9S08SF4 (SF4) MCU family is optimized to provide precise, quiet and safe control for simple motor control applications. An integrated, advanced set of features, including six timers and up to 18 general purpose input/output (GPIO) pins, provides highly accurate control and helps simplify overall system design. Enhanced protection circuit design and a wide operating temperature range (-40°C to +125°C) help systems run safely and reliably under variable conditions.

Features	Benefits
8-bit HCS08 Central Processing Unit (CPU)	
• Up to 40 MHz HCS08 core frequency with 2.7V to 5.5V operation across temperature range of -40°C to +125°C	• Offers reliable performance across the entire voltage range
On-Chip Memory	
• 4K flash read/program/erase across entire operating voltage and temperature ranges	• Allows user to take full advantage of in-application re-programmability benefits in virtually any environment
• 128 bytes random access memory (RAM)	• Reduces development time by providing more RAM for programming
• Security circuitry	• Protects data/code in flash and RAM from unauthorized access
Power-Saving Modes	
• Two low-power stop modes, reduced-power wait mode	• Allows uninterrupted sampling application in a reduced-power state, which cuts overall system power consumption
Clock Source Options	
• Internal clock source (ICS) module	• Provides accurate on-chip clock source and saves cost by eliminating the need for external components
Peripherals	
• Interrupt priority controller (IPC)	• Provides hardware-based nested interrupt capability to simplify software design
• Analog-to-digital converter (ADC)—Up to 8-channel, 10-bit resolution, 2.5 us conversion time	• Provides fast and easy conversion of analog inputs • Featues integrated on-chip temperature sensor and bandgap
• Timer/pulse-width modulator module (TPM)—One 40 MHz 6-ch. and one 40 MHz 1-ch. TPM	• PWM output can run up to 40 MHz for precision control and lower noise
• MTIM16—Two 16-bit modulo timers	• Supports precise and fast sensing and control
• Pulse width timers (PWT)—Two 16-bit PWT, selectable driving clock, positive/negative/period capture	• Supports precise and fast sensing and control

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Cost-Effective Development Tools
DEMO9S08SF4 ($49 USD*)

This demonstration kit comes with everything required to complete an entire project using the SF4 family. Complimentary** built-in OSBDM circuitry is available for debugging and programming. A getting-started DVD includes necessary software, documents and resources to jump start new product development.

CodeWarrior™ Development Studio for Microcontrollers v6.2

Special Edition (complimentary**) CodeWarrior Development Studio for Microcontrollers is an integrated tool suite that supports software development for Freescale's microcontrollers. Designers can further accelerate application development with the help of the award-winning Processor Expert™ tool in the CodeWarrior tool suite.

* Prices indicated are MSRP

** Subject to license agreement

Package Options

MC9S08SF4MTJ

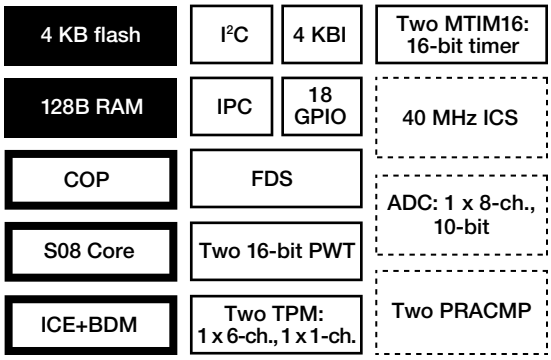
Temp Range: -40°C to +125°C
Package: 20 TSSOP

MC9S08SF4MTG

Temp Range: -40°C to +125°C
Package: 16 TSSOP

Features (continued)	Benefits
• Two 5-bit programmable reference analog comparators (PRACMP) with eight optional inputs for both positive and negative inputs	• Enables faster and more efficient response to analog signals
• I^2C module capable of operation up to 100 kbps operation with maximum bus loading	• Delivers fast communication to and from peripheral devices
• Fault detection shut down (FDS)—Shut down output pin upon fault detection	• The hardware FDS circuit with programmable trigger protects device when errors occur
Input/Output	
• Up to 18 GPIO pins including one input-only pin and one output-only pin	• Improves flexibility by allowing interfacing to a large number of pins that are capable of generating interrupts
• KBI—4-pin keyboard interrupt module	• Offers flexibility to generate interrupts
System Protection	
• Watchdog computer operating properly (COP) module can be reset with option to run from dedicated 1 kHz internal clock source or bus clock	• Provides system protection using backup oscillator by resetting the MCU to a known state
• Low-voltage detection with reset or interrupt, selectable trip points	• Built-in system protection to help secure data and warn of possible voltage loss conditions
• Illegal opcode detection with reset	• Allows the device to recognize erroneous code and to reset the processor to help avoid lock-up states
• Illegal address detection with reset	• Resets the MCU to a known state following inadvertent access
• Flash block protection	• Helps provide security by protecting code from unauthorized or unintentional access
Development Support	
• Single-wire background debug interface	• Allows developers to use the same interface for multiple platforms
• Breakpoint setting capability	• Allows single breakpoint setting during in-circuit debugging, helping simplify software development and debugging
• On-chip in-circuit emulator (ICE) debug module containing two comparators and nine trigger points	• Reduces development time by enabling real-time, on-chip emulation without the added expense of traditional emulator hardware

MC9S08SF4 Block Diagram



Learn more: For more information about the SF4 family, please visit **www.freescale.com/8bit**.

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