Signal Controllers

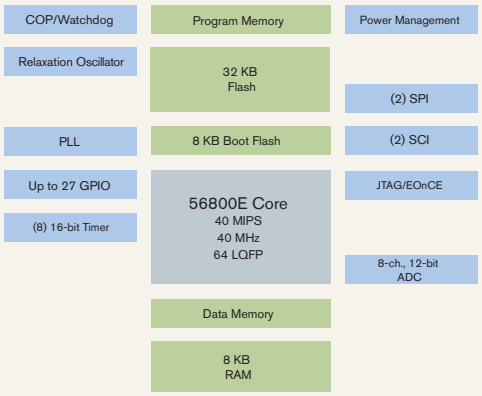
56F8123

Target Applications

- > Polyphase metering
- > UPS
- > Electric vehicles
- > Currency validation
- > Industrial control/ networking
- > Home appliances
- > Smart sensors
- > Fire and security systems
- > Medical monitoring

Overview

Freescale Semiconductor's 56F8123 extends the capabilities introduced by the 56F8122 by adding additional analog-to-digital converter (ADC) inputs and timer input/output pins, among other enhancements. This device also features 40 MIPS (at 40 MHz) performance and 40 KB of on-chip Flash memory, and a comprehensive assortment of sophisticated peripherals, all in a 64-pin LQFP package. The 56F8123 is perfectly suited for applications requiring the computational power of a signal processor and the knack for "bit banging" of an embedded controller. The 56F8123 can operate at extended temperatures (up to +105°C) without losing a step. In other words, you now have at your disposal the performance and functionality demanded by an application that may be used in a harsh environment.



56800E Core Features	Benefits
> Up to 40 MIPS at a guaranteed 40 MHz core frequency	> Hybrid architecture facilitates implementation of both control and signal processing functions in a single device
> DSP and microcontroller (MCU) functionality in a unified, C-efficient architecture	> High-performance, secured Flash memory eliminates the need for external storage devices
> JTAG/enhanced on-chip emulation (EOnCE™) for unobtrusive, real-time debugging	> Extended temperature range up to +105°C allows for operation of nonvolatile memory in industrial applications
> Four 36-bit accumulators	> Flash memory emulation of EEPROM eliminates the need for external nonvolatile memory
> 16- and 32-bit bidirectional barrel shifter	> 32-bit performance with 16-bit code density
> Parallel instruction set with unique addressing modes	> On-chip voltage regulator and power management reduce overall system cost
> Hardware DO and REP loops available	> Internal relaxation oscillator eliminates the need for an external crystal
> Three internal address buses	> This device boots directly from Flash, providing additional application flexibility
> Four internal data buses	> ADC modules are tightly coupled to reduce processing overhead
> Architectural support for 8-, 16- and 32-bit single-cycle data fetches	> Low-voltage interrupts (LVIs) protect the system from brownout or power failure
> MCU-style software stack support	> Simple in-application Flash memory programming via EOnCE or serial communication
> Controller-style addressing modes and instructions	
> Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)	
> Proven to deliver more control functionality with a smaller memory footprint than competing architectures	

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Memory Features

> Architecture permits as many as three simultaneous accesses to program and data memory

> On-chip memory includes high-speed volatile and nonvolatile components

- 32 KB of Program Flash
- 8 KB of Data RAM
- 8 KB of Boot Flash

> All memories operate at 40 MHz (zero wait states) over temperature range (-40°C to +105°C), with no software tricks or hardware accelerators required

> Flash security feature prevents unauthorized accesses to its content

56F8123 Peripheral Circuit Features

> Two serial peripheral interfaces (SPIs)

> Two serial communications interfaces (SCIs)

> Eight 16-bit timers with input and output compare capability

> On-chip 3.3V to 2.6V voltage regulator

> Software-programmable Phase-Lock Loop (PLL)

> On-chip relaxation oscillator

> 12-bit ADCs with eight inputs, self-calibration and current injection capability

> Up to 27 general-purpose input/output (GPIO) pins

> External reset input pin for hardware reset

> Computer operating properly (COP)

> Integrated power-on reset and LVI module

> I^2C communications master mode (emulated)

Award-Winning Development Environment

> Processor Expert™ (PE) technology provides a rapid application design (RAD) tool that combines easy-to-use, component-based software application creation with an expert knowledge system.

> The CodeWarrior™ Integrated Development Environment is a sophisticated tool for code navigation, compiling and debugging. A complete set of evaluation modules (EVMs) and development system cards will support concurrent engineering. Together, PE technology, CodeWarrior tools and EVMs create a complete, scalable tools solution for easy, fast and efficient development.

Product Documentation

56F8300 Peripherals Manual	Detailed peripheral description of the 56F8300 family of devices ***Order Number:*** MC56F8300UM
56F8323/ 56F8123 Technical Data Sheet	Electrical and timing specifications, device-specific peripheral information and package and pin descriptions ***Order Number:*** MC56F8323
56F8123 Product Brief	Summary description and block diagram of the core, memory, peripherals and interfaces ***Order Number:*** MC56F8123PB
DSP56800E Reference Manual	Detailed description of the DSP56800E architecture, 16-bit core processor and the instruction set ***Order Number:*** DSP56800ERM

Ordering Information

Part	MC56F8123
Package Type	Low-Profile Quad Flat Pack (LQFP)
Pin Count	64
Temperature Range	-40°C to +105°C
Order Number	MC56F8123VFB

Learn More: For more information about Freescale products, please visit **www.freescale.com**.

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