

# 56F8322

## 16-bit Hybrid Controller

### EXAMPLE APPLICATIONS

- Automotive control
- Industrial control/networking
- Motion control
- Home appliances
- General-purpose inverters
- Smart sensors
- Fire and security systems
- Power management
- Medical monitoring
- General-purpose inverters

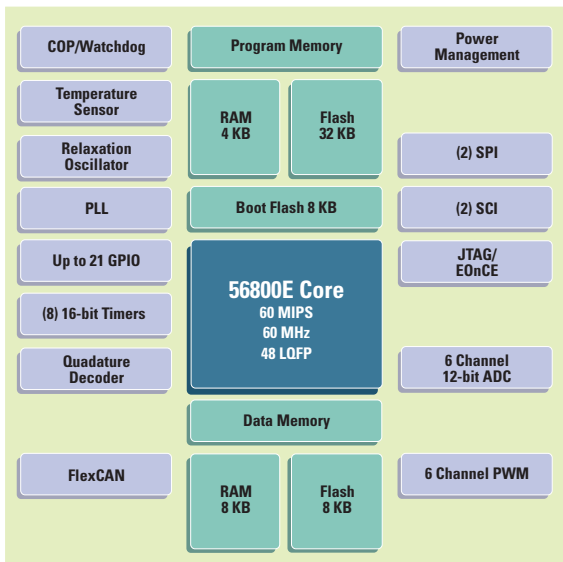
The 56F8322 is further proof that good things come in small packages. Inside a compact 48-pin LQFP, this device packs 60 MIPS performance (at 60 MHz), along with 48 KB of on-chip Flash memory, a comprehensive assortment of sophisticated peripherals and more. Perfectly suited for applications requiring the computational power of a signal processor and the knack for “bit banging” of an embedded controller, the 56F8322 can satisfy all these needs and leave room for more. An extension of the industry-leading 56800E Family, the 56F8322 provides enhanced capabilities and an extensive upward migration path. The perfect device to get acquainted with a family destined to become the platform of choice for high-performance embedded applications.

### BENEFITS

- Hybrid architecture facilitates implementation of both control and signal processing functions in a single device
- High-performance, secured Flash memory helps eliminate the need for external storage devices
- Extended temperature range allows for operation of nonvolatile memory in harsh environments
- Flash memory emulation of EEPROM helps eliminate the need for external nonvolatile memory
- 32-bit performance with 16-bit code density
- On-chip voltage regulator and power management help reduce overall system cost
- Internal relaxation oscillator helps eliminate the need for external crystal
- This device boots directly from Flash, providing additional application flexibility
- High-performance pulse width modulation (PWM) with programmable fault capability simplifies design and promotes compliance with safety regulations
- PWM and ADC modules are tightly coupled to help reduce processing overhead
- Low-voltage interrupts (LVIs) help protect the system from brownout or power failure
- Simple in-application Flash memory programming via Enhanced On-Chip Emulation (EOnCE) or serial communication

### 56800E CORE FEATURES

- Up to 60 MIPS at 60 MHz execution frequency
- DSP and MCU functionality in a unified, C-efficient architecture
- JTAG/EOnCE for unobtrusive, real-time debugging
- Four 36-bit accumulators
- 16- and 32-bit bidirectional barrel shifter
- Parallel instruction set with unique addressing modes
- Hardware DO and REP loops available
- Three internal address buses
- Four internal data buses
- Architectural support for 8-, 16- and 32-bit single-cycle data fetches
- MCU-style software stack support
- 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



## HYBRID FLASH SOLUTION

# 56F8322

### PRODUCT DOCUMENTATION

**56F8300**  
*Peripheral User Manual*

Detailed peripheral descriptions of the 56F8300 family of devices

**Order Number:** MC56F8300UM/D

**56F8322**  
*Technical Data Sheet*

Electrical and timing specifications, device-specific peripheral information, and package and pin descriptions

**Order Number:** MC56F8322/D

**56F8322**  
*Product Brief*

Summary description and block diagram of the 56F8322 core, memory, peripherals and interfaces

**Order Number:** MC56F8322PB/D

**DSP56800E**  
*Reference Manual*

Detailed description of the DSP56800E architecture, 16-bit core processor and the instruction set

**Order Number:** DSP56800ERM/D

### 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 (IDE) is a sophisticated tool for code navigation, compiling and debugging. A comprehensive set of evaluation modules (EVMs) and development system cards will support concurrent engineering. Together, PE, the CodeWarrior tool suite and EVMs create a comprehensive, scalable tools solution for easy, fast and efficient development.

### 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
  - 4 KB of Program RAM
  - 8 KB of Data Flash
  - 8 KB of Data RAM
  - 8 KB of Boot Flash
- Memories operate at 60 MHz (zero wait-states) over temperature range (-40°C to +125°C) with no software tricks or hardware accelerators required.
- Flash security feature helps prevent unauthorized accesses to its content.

### 56F8322 PERIPHERAL CIRCUIT FEATURES

- One PWM module with six outputs and a programmable fault input
- Two serial peripheral interfaces (SPIs)
- Two serial communication interfaces (SCIs)
- I<sup>2</sup>C communications master mode (emulated)
- Eight 16-bit timers with input and output compare capability
- One four-input quadrature decoder
- FlexCAN module, 2.0 A/B compatible
- Temperature sense diode to monitor the on-chip temperature
- On-chip 3.3V to 2.6V voltage regulator
- Software-programmable Phase Lock Loop (PLL)
- On-chip relaxation oscillator
- 12-bit ADCs with six inputs, self-calibration and current injection capability
- Up to 21 general-purpose I/O (GPIO) pins
- External reset input pin for hardware reset
- Computer operating properly (COP)
- Integrated power-on reset and LVI module

### ORDERING INFORMATION

PART	PACKAGE	ORDER NUMBER	TEMPERATURE RANGE
MC56F8322	48 LQFP	MC56F8322VFA60	-40°C to +105°C
MC56F8322	48 LQFP	MC56F8322MFA60	-40°C to +125°C



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