**Signal Controllers**

**56F8356**

**Target Applications**
- Automotive control
- Industrial control/connectivity
- Advanced motion control
- Home appliances
- General-purpose inverters
- Smart relays
- Fire and security systems
- Power management
- Medical monitoring
- Multiphase inverters

**Overview**
You no longer need to compromise or make tradeoffs when selecting an embedded processor platform for your embedded designs. The 56F8356 offers you the same memory as the 56F8355, but includes an external memory interface, should you wish to add even more memory to your system.

Furthermore, the 56F8356 comes in the same package and package pin-out as the 56F8346, so you can migrate your 56F8346 design to the 56F8356 with minimal effort. How’s that for a migration strategy?

Moving to this 144-pin LQFP package allows you to take advantage of the included external memory interface and additional on-chip memory to satisfy the growing functional needs of your design.

**56800E Core Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
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<tr>
<td>Up to 60 MIPS at 60 MHz</td>
<td>Hybrid architecture facilitates implementation of both control and signal processing functions in a single device</td>
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<td>DSP and microcontroller (MCU)</td>
<td>High-performance, secured Flash memory helps eliminate the need for external storage devices</td>
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<td>functionality in a unified,</td>
<td>Extended temperature range allows for operation of nonvolatile memory in harsh environments</td>
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<td>C-efficient architecture</td>
<td>Flash memory emulation of EEPROM helps eliminate the need for external nonvolatile memory</td>
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<td>JTAG/enhanced on-chip emulation (EOnCE™) for unobtrusive,</td>
<td>32-bit performance with 16-bit code density</td>
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<td>real-time debugging</td>
<td>On-chip voltage regulator and power management help reduce overall system cost</td>
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<td>Four 36-bit accumulators</td>
<td>Off-chip memory expansion capabilities allow for glueless interfacing with the additional memory of external devices without sacrificing performance</td>
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<td>16- and 32-bit bidirectional barrel shifter</td>
<td>This device boots directly from Flash, providing additional application flexibility</td>
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<td>Parallel instruction set with unique addressing modes</td>
<td>High-performance pulse-width modulation (PWM) with programmable fault capability helps to simplify design and promotes compliance with safety regulations</td>
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<td>Hardware DO and REP loops available</td>
<td>PWM and analog-to-digital converter (ADC) modules are tightly coupled to help reduce processing overhead</td>
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<td>Three internal address buses</td>
<td>Low-voltage interrupts (LVIs) help protect the system from brownout or power failure</td>
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<td>Four internal data buses</td>
<td>Simple in-application Flash memory programming via EOonCE or serial communication</td>
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<td>Architectural support for 8-, 16- and 32-bit single-cycle data fetches</td>
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<td>MCU-style software stack support</td>
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<td>Controller-style addressing modes and instructions</td>
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<td>Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)</td>
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<td>Proven to deliver more control functionality with a smaller memory footprint than competing architectures</td>
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**56F8356 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:
  - 280 KB On-chip Flash
  - 256 KB of Program Flash
  - 8 KB of Data Flash
  - 16 KB of Boot Flash
  - 4 KB of Program RAM
  - 16 KB of Data RAM
- 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 prevents unauthorized accesses to its content
- Off-chip memory expansion capabilities provide a simple method for interfacing additional external memory and/or peripheral devices
  - Access up to 1 MB of external program memory or 1 MB of external data memory
  - External accesses supported at up to 60 MHz (zero wait states)

**56F8356 Peripheral Circuit Features**
- Two PWM modules with 12 outputs and seven programmable fault inputs
- Two serial peripheral interfaces (SPIs)
- Two serial communications interfaces (SCI)
- I²C communications master mode (emulated)
- Sixteen 16-bit timers with input and output compare capability
- Two four-input quadrature decoders
- 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 16 inputs, self-calibration and current injection capability
- Up to 62 general-purpose input/output (GPIO) pins
- External reset input pin for hardware reset
- Computer operating properly (COP)
- Integrated power-on reset and LVI module

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**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 technology, the CodeWarrior tool suite and EVMs create a comprehensive, scalable tools solution for easy, fast and efficient development.

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