



Half the Power,  
Twice the  
Performance

# MC56F82xxx DSC Family

MC5682xxx is an entry level 32-bit Digital Signal Controllers (DSC) family, providing high performance for digital power and motor control applications with best-in-class power efficiency

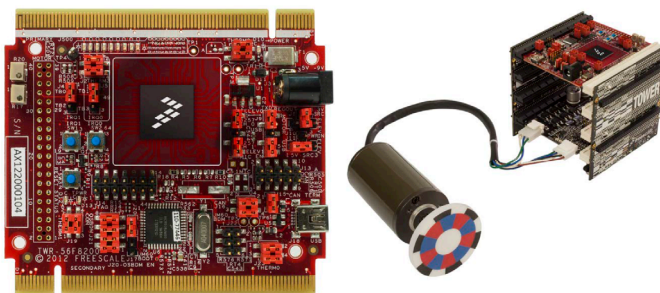
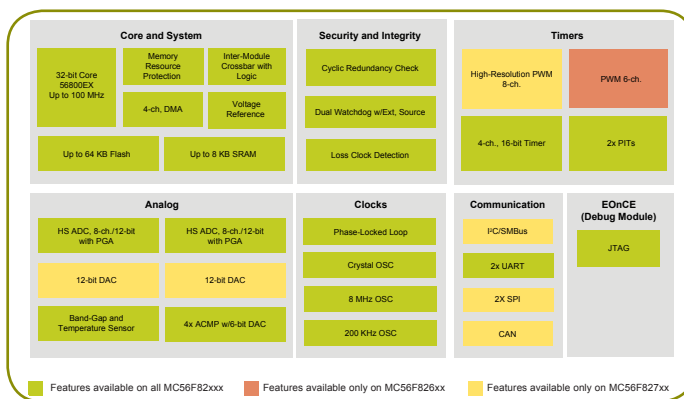
## TARGET APPLICATIONS

- ▶ Switched mode power supply
- ▶ Advanced motor control
- ▶ Smart appliances
- ▶ Uninterruptable power supply
- ▶ Photovoltaic systems
- ▶ Wireless charging
- ▶ Advanced lighting

## OVERVIEW

The MC56F82xxx is a low-power DSP MCU family, offering outstanding power consumption at run time in a compact 5 x 5 mm package with exceptional performance, precision and control for high-efficiency digital power conversion (MC56F827xx) and advanced motor control (MC56F826xx) applications. The MC56F827xx includes advanced high-speed and high-accuracy peripherals such as high-resolution pulse width modulation (PWM) with 312 pico-second resolution, dual high-speed 12-bit analog-to-digital converters (ADCs) with built-in PGA sampling up to 1.25 mega samples per second (MSPS) at 12 bits. Faster application-specific control loops are driven via a 32-bit DSP core with single-cycle math computation, fractional arithmetic support and parallel moves.

## MC56F82XXX BLOCK DIAGRAM



## FEATURES AND BENEFITS

- ▶ Low-power operation enables higher system efficiency due to lower power losses
- ▶ 5 mm x 5 mm package option enables compact PCB design for space-constrained applications while still providing the precision and control needed
- ▶ 50/100 MHz 32-bit core provides math capabilities needed for advanced power efficiency and motor control applications
- ▶ Single-cycle math computations, fractional arithmetic support and parallel moves improve performance, driving tighter and faster control loops
- ▶ High-resolution PWM with 312 picosecond resolution enables higher switching frequencies, reducing cost and increasing efficiency
- ▶ Two 12-bit high-speed (HS) ADCs with up to 1.25 MSPS resolution improve system accuracy by reducing jitter on input values
- ▶ 32 KB to 64 KB flash memory provides scalability needed for key digital power and motor control applications
- ▶ Pin to pin compatible with the MC56F84xxx and MC56F824x/5x families for performance and peripheral scalability
- ▶ 5 V-tolerant I/O provides design flexibility and system cost reduction
- ▶ Direct memory access (DMA) controller reduces core interruption, increasing performance
- ▶ Four analog comparators with integrated 6-bit DACs speed system event identification and emergency shutdown of the PWM outputs
- ▶ Memory protection capability increases system safety by restricting user code from accessing key memory locations and peripherals reserved for supervisor access

## DEVELOPMENT TOOLS

### TWR-56F8200

A cost-effective development board that is part of the Freescale Tower System—a modular development platform that enables rapid prototyping and re-use through reconfigurable hardware. The TWR system comes complete with the TWR-56F8200 MCU board, P&E MultiLink Universal development interface, USB cable, software and instructions on how to control the TWR-MC-LV3PH motor via the Tower System and FreeMASTER.

### TWR-MC-LV3PH

Turns your Tower System development tool into a complete motor control reference design kit that includes a BLDC motor. This three-phase low-voltage motor control peripheral module for the TWR-56F8200 is used to develop DC, BLDC and PMSM motor control solutions using various algorithms provided by Freescale. BLDC motor control demonstration software is included with the TWR-MC-LV3PH. For more information on the TWR-MC-LV3PH, visit [www.nxp.com/TWR-MC-LV3PH](http://www.nxp.com/TWR-MC-LV3PH).

### CodeWarrior Development Studio for Microcontrollers V11

Complimentary Special Edition Eclipse-based CodeWarrior Development Studio for Microcontrollers V11 is a complete integrated development environment that provides a highly visual and automated framework to accelerate the development of the most complex embedded applications.

### Processor Expert Software Modeling Tool

Complimentary rapid application design tool that combines easy-to-use, component-based application creation with an expert knowledge system, delivering source code for the MC56F827xx.

### FreeMASTER

Complimentary user-friendly, real-time debug monitor and data visualization tool for application development and information management. Supporting nonintrusive variable monitoring on a running system, FreeMASTER allows the data from multiple variables to be viewed in an evolving oscilloscope-like display or in a common text format.

For more information on DSC development tools, visit: [www.nxp.com/dsc/developer](http://www.nxp.com/dsc/developer).

## PACKAGE OPTIONS

Part Number	Package	Speed	Flash Size	SRAM Size	Key Features
MC56F82748	64-pin LQFP	100/50 MHz	64 KB	8 KB	High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82746	48-pin LQFP				High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82743	32-pin QFN 32-pin LQFP				High-Res PWM, 12-bit DAC, HS ADC
MC56F82738	64-pin LQFP		48 KB	8 KB	High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82736	48-pin LQFP				High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82733	32-pin LQFP 32-pin QFN		High-Res PWM, 12-bit DAC, HS ADC		
MC56F82728	64-pin LQFP		32 KB	6 KB	High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82726	48-pin LQFP				High-Res PWM, 12-bit DAC, HS ADC, MSCAN
MC56F82723	32-pin LQFP 32-pin QFN				High-Res PWM, 12-bit DAC, HS ADC
MC56F82646	48-pin LQFP		64 KB	8 KB	Motor Control PWM, HS ADC
MC56F82643	32-pin LQFP		Motor Control PWM, HS ADC		
MC56F82623	32-pin LQFP		32 KB		Motor Control PWM, HS ADC

[www.nxp.com/dsc](http://www.nxp.com/dsc)

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