Performance-level digital signal controllers (DSCs)

MC56F83xxx DSC Family

The NXP NC56F83xxx family of performance-level DSCs features peripheral enhancements for high-performance digital power conversion and advanced motor control applications.

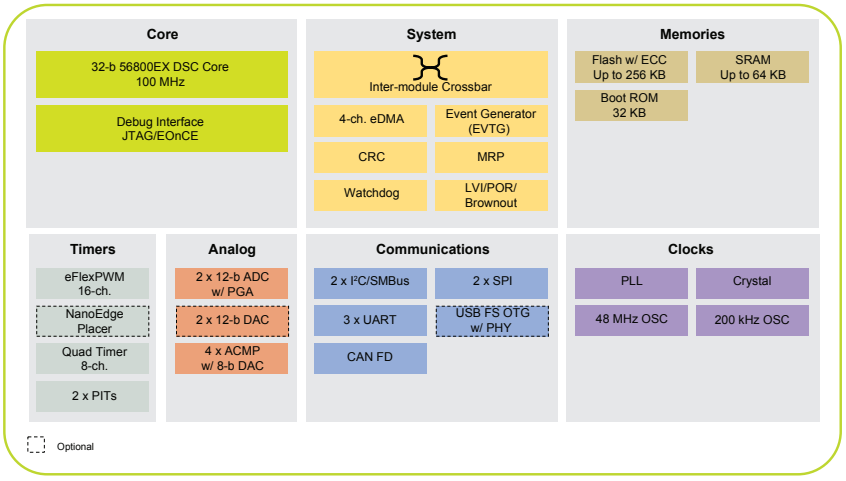
KEY FEATURES

The MC56F83xxx performance-level DSC family is based on the 32-bit 56800EX DSP core, with both core and BUS frequency up to 100 MHz. The features of this product family now include support for dual-partition flash, flash ECC, USB FS OTG, CAN FD and boot ROM. In addition, the MC56F83xxx family offers enhanced DMA function (eDMA), an inter-module crossbar (XBAR) with more flexible event generator, (EVTG), low-power high-speed ADC, extended RAM size and up to 16-channel high-resolution PWM, all for high-performance digital power conversion and advanced motor control applications.

TARGET APPLICATIONS

- Switched-mode power supply
- Uninterruptable power supply
- Power distribution systems
- Photovoltaic systems
- Wireless charging
- Advanced lighting
- Motor control (ACIM, BLDC, PMSM, SR, stepper)
- Home appliances
- Industrial control
- onboard charger (OBC)
- EV charging station

MC56F83xxx DSC FAMILY BLOCK DIAGRAM

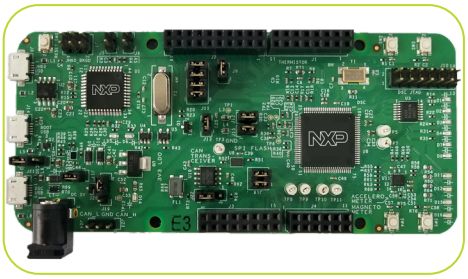


FEATURE AND BENEFITS

- 100 MHz 32-bit core provides math capabilities needed for advanced power conversion and motor control applications
- Single-cycle math computations, fractional arithmetic support and parallel moves help improve performance, driving tighter and faster control loops
- Up to 16-channel high-resolution PWM with 312 picosecond resolution enables higher switching frequencies, reducing cost and increasing efficiency
- Two 12-bit high-speed low-power ADCs each with up to 3 MSPS sampling rate improve system accuracy by reducing jitter on input values
- 128 KB to 256 KB flash memory provides scalability needed for performance-level digital power and motor control applications
- 64 KB SRAM allows more code to execute from SRAM for faster speed
- 32 KB boot ROM support code update through I²C, UART and CAN, no need to use the flash memory to store the bootloader; more flash can be used for program and data
- Pin-to-pin compatible with the MC56F84xxx and MC56F82xxx DSC families for performance and peripheral scalability
- 5V-tolerant I/O provides design flexibility and system cost reduction
- Enhanced direct memory access (eDMA) controller provides more flexible two-level loop control, further reducing core interruption and increasing performance
- Four analog comparators with integrated 8-bit DACs speed system event identification and emergency shutdown of PWM outputs
- Memory protection capability increases system safety by restricting user code from accessing key memory locations and peripherals reserved for supervisor access
- One USB FS/LS 2.0 OTG controller supporting crystal-less operation helps to save on BOM cost
- One FlexCAN module supporting Flexible Data Rate (CAN FD) and CAN 2.0 B protocol helps enable real-time and cost-effective field communication

DEVELOPMENT TOOLS

MC56F83000-EVK Development Board



The MC56F83000-EVK is an ultra-low-cost development platform for the MC56F83xxx DSC family allowing rapid prototyping and application development.

CodeWarrior® Development Studio for Microcontrollers V11

The 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.

FreeMASTER

FreeMASTER is a complimentary, user-friendly, real-time debug monitor and data visualization tool for application development and information management. Supporting non-intrusive 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.

MC56F83XXX DSC FAMILY OPTIONS

Part Number	CPU Freq. (MHz)	Flash	SRAM	Flash Swap	High-Resolution PWM	12-b 3MSPS ADC	12-b DAC	CAN FD	USB FS	Package	Temperature	AEC-Q100
MC56F83789VLL	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100	-40 °C to 105 °C	No
MC56F83769VLL	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100	-40 °C to 105 °C	No
MC56F83786VLK	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP80	-40 °C to 105 °C	No
MC56F83766VLK	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP80	-40 °C to 105 °C	No
MC56F83783VLH	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64	-40 °C to 105 °C	No
MC56F83763VLH	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64	-40 °C to 105 °C	No
MC56F83689VLL	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	Yes	LQFP100	-40 °C to 105 °C	No
MC56F83686VLK	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	No	LQFP80	-40 °C to 105 °C	No
MC56F83683VLH	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	No	LQFP64	-40 °C to 105 °C	No
MC56F83663VLH	100 MHz	128 KB	48 KB	No	No	Yes	No	Yes	No	LQFP64	-40 °C to 105 °C	No
MC56F83789AVLLA	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100	-40 °C to 105 °C	Yes
MC56F83769AVLLA	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100	-40 °C to 105 °C	Yes
MC56F83783AVLHA	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64	-40 °C to 105 °C	Yes
MC56F83763AVLHA	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64	-40 °C to 105 °C	Yes

www.nxp.com/MC56F83xxx

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