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.

OVERVIEW

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

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

MC56F83xxx DSC FAMILY BLOCK DIAGRAM
• 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.

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

<table>
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<tr>
<th>Part Number</th>
<th>CPU Freq. (MHz)</th>
<th>Flash</th>
<th>SRAM</th>
<th>Flash Swap</th>
<th>High-Resolution PWM</th>
<th>12-b 3MSPS ADC</th>
<th>12-b DAC</th>
<th>CAN FD</th>
<th>USB FS</th>
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