

# NXP 32-bit DIGITAL SIGNAL CONTROLLERS (DSC)

Digital Signal Controllers (DSC) combine the best features of microcontrollers (MCU) and powerful digital signal processing (DSP) capabilities in one single chip. We offer a range of solutions for digital signal processing and controlling optimized for applications ranging from general embedded markets to motor control and power conversion. This selection guide is a starting point for choosing a specific device. We offer pin-to-pin compatibility among the 32-bit DSC product families. For the latest product information, visit [www.nxp.com/DSC](http://www.nxp.com/DSC).

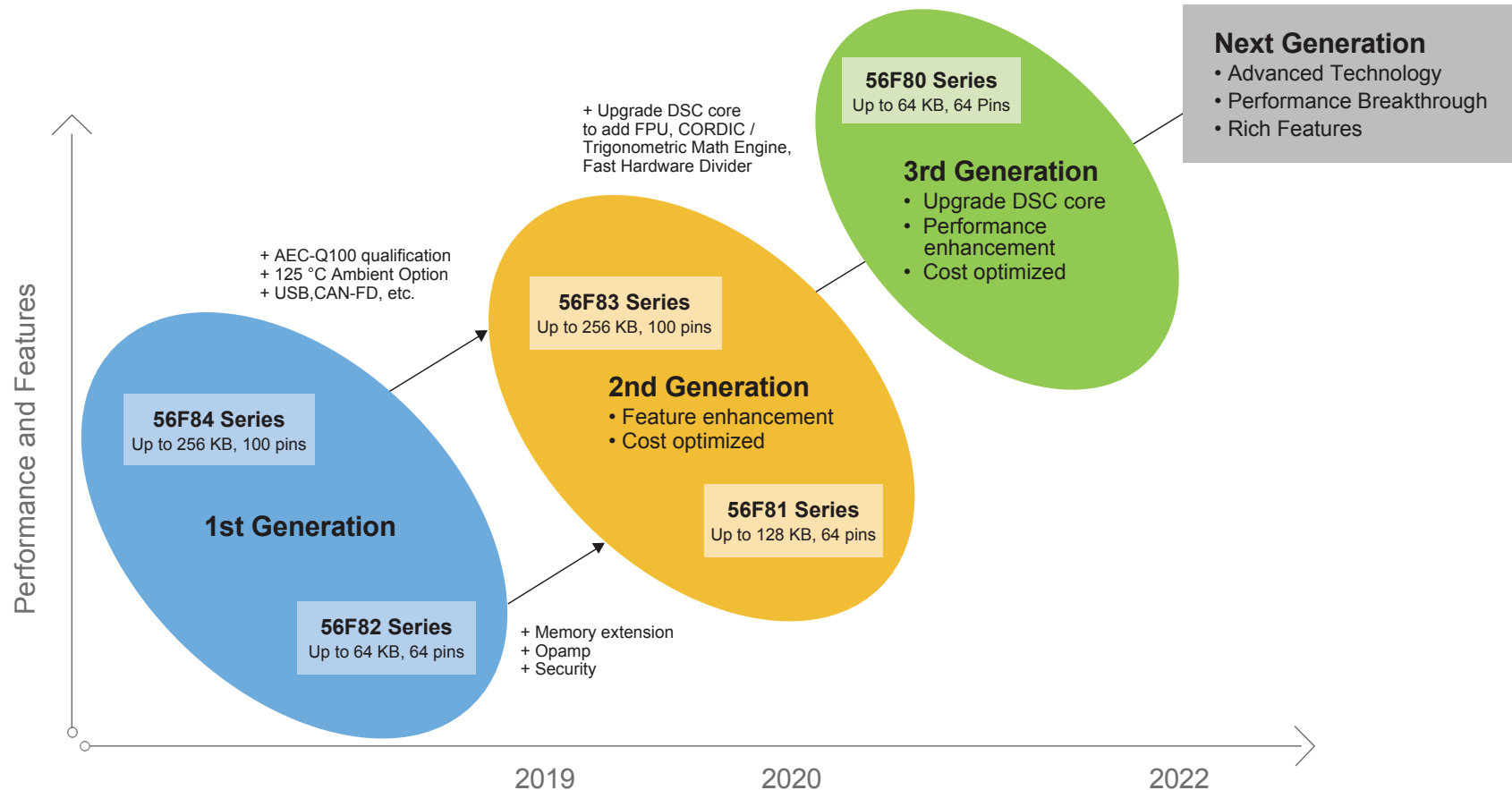
SERIES	CPU	MEMORY	KEY FEATURES	APPLICATIONS
<b>MC56F80xxx</b> Performance-level Motor control and smart power	56800EF 32-bit DSC Core With integrated FPU and CORDIC 100 MHz	32 to 64 KB Flash 6 to 8 KB RAM	High-resolution PWM Dual 12-bit ADC, ACMP, Opamp Quadrature Decoder AEC-Q100 -40 to 105C/125C 32 to 64 pins	<b>Digital Power:</b> Switched-mode power supply (SMPS) Uninterruptible power supplies (UPS) Power distribution systems Photovoltaic systems  <b>Motor Control:</b> Industrial motor Appliance motor  <b>Automotive:</b> EV/HEV on-board charger (OBC) EV/HEV DC-DC converter EV/HEV charging station EV/HEV motor and compressor  <b>Others:</b> Smart lighting Circuit breaker
<b>MC56F81xxx</b> Entry-level Motor control and smart power	56800EX 32-bit DSC Core 100/50 MHz	4 to 128 KB Flash 12 to 20 KB RAM Boot ROM	High-resolution PWM Dual 12-bit ADC ACMP, 12-bit DAC DSASS, Opamp Quadrature Decoder AEC-Q100 -40 to 105C/125C 32 to 64 pins	
<b>MC56F82xxx</b> Entry-level Motor control and smart power	56800EX 32-bit DSC Core 100/50 MHz	32 to 64 KB Flash 6 to 8 KB RAM	High-resolution PWM Dual 12-bit ADC ACMP, 12-bit DAC MSCAN -40 to 105C/125C 32 to 64 pins	
<b>MC56F83xxx</b> Performance-level Motor control and smart power	56800EX 32-bit DSC Core 100 MHz	128 to 256 KB Flash w/ ECC, read while write support 48 to 64KB RAM Boot ROM	High-resolution PWM Dual 12-bit ADC ACMP, 12-bit DAC CAN FD, USB FS OTG AEC-Q100 -40 to 105C/125C 48 to 100 pins	
<b>MC56F84xxx</b> Performance-level Motor control and smart power	56800EX 32-bit DSC Core 60 to 100 MHz	64 to 256 KB Flash 8 to 32KB RAM 32 KB FlexMem	High-resolution PWM Dual 12-bit ADC 16-bit ADC, ACMP, 12-bit DAC FlexCAN Quadrature Decoder -40 to 105C 48 to 100 pins	



# NXP 32-bit DSC EVOLUTION MAP

NXP has been delivering high quality digital signal controllers (DSC) products for more than twenty years. A broad base of chips have been shipped to end customers around the world and in different segments. Although the original DSCs are built based on a 16-bit 56800E core, the latest products have all migrated to a 32-bit CPU design, i.e. 56800EX and 56800EF cores. Meanwhile, lots of new features have been continuously added to these products, e.g. USB, CAN FD, operational amplifier, encryption, etc. With the launch of new 56F80, 56F83, and 56F81 products in recent years, the 32-bit DSC portfolio has become broader and meets the growing demand in the digital power and motor control world.

## NXP 32-bit DSC Evolution Map

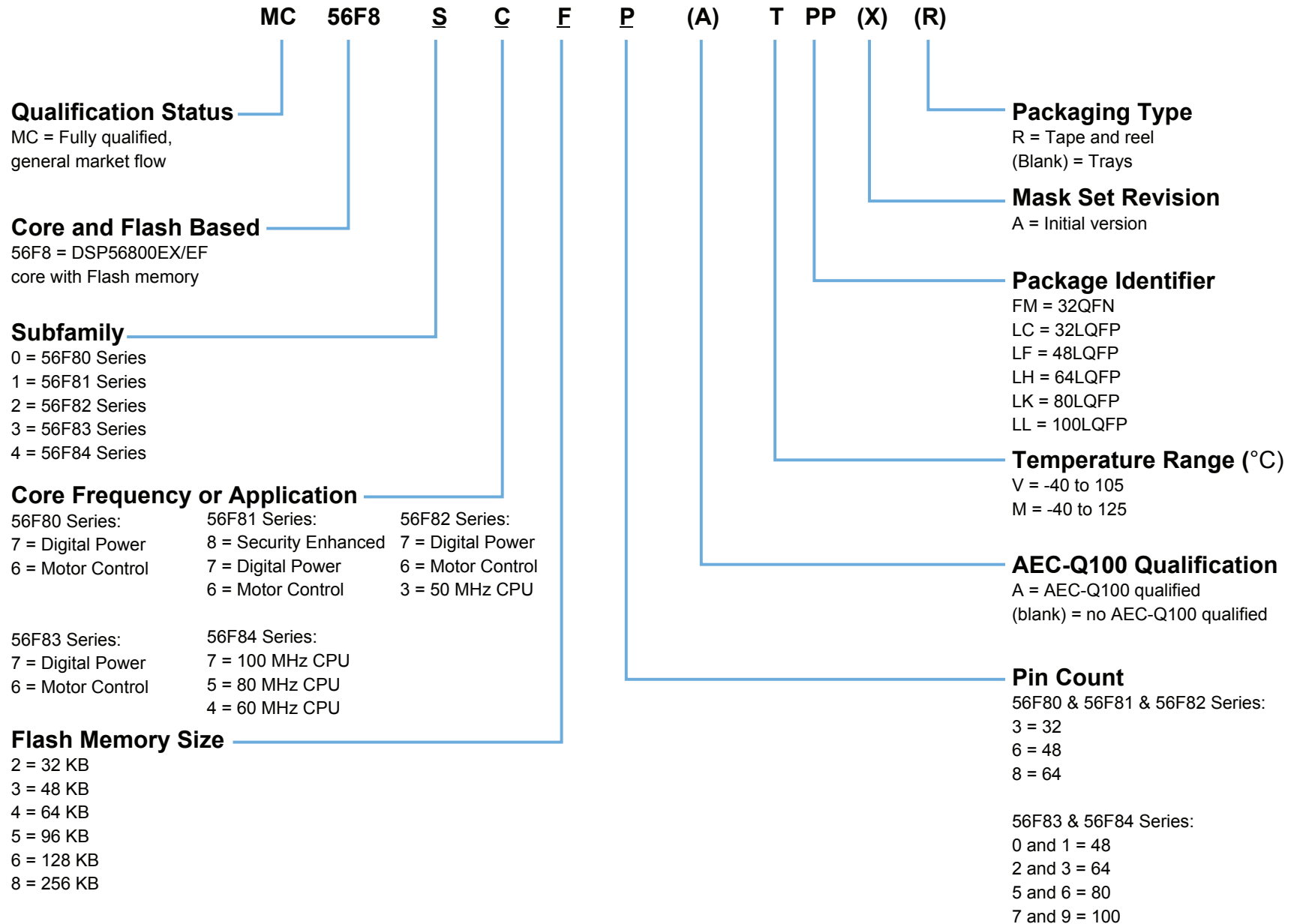


# SUBFAMILY HIGH LEVEL FEATURE COMPARISON

Digital Signal Controllers (DSC) combine the best features of microcontrollers (MCU) and powerful digital signal processing (DSP) capabilities in one single chip. We offer a range of solutions for digital signal processing and controlling optimized for applications ranging from general embedded markets to motor control and power conversion. This selection guide is a starting point for choosing a specific device. We offer pin-to-pin compatibility among the 32-bit DSC product families. For the latest product information, visit [www.nxp.com/DSC](http://www.nxp.com/DSC).

FEATURE	MC56F80xxx	MC56F81xxx	MC56F82xxx	MC56F83xxx	MC56F84xxx
<b>Core</b>	32-bit 56800EF	32-bit 56800EX	32-bit 56800EX	32-bit 56800EX	32-bit 56800EX
<b>Speed (Core/Peripherals)</b>	100MHz	100/50MHz	100/50MHz	100MHz	100MHz
<b>Flash</b>	32 to 64KB	64 to 128KB	32 to 64KB	128 to 256KB	128 to 256KB
<b>RAM</b>	6 to 8KB	12 to 20KB	6 to 8KB	48 to 64KB	8 to 32KB
<b>EEPROM</b>	–	–	–	–	Yes
<b>Boot ROM</b>	–	Yes (I2C, UART)	–	Yes (I2C, UART, CAN)	–
<b>DMA</b>	4-ch	4-ch.	4-ch.	4-ch.	4-ch.
<b>High resolution PWM</b>	8-ch, 312ps	8-ch., 312ps	8-ch., 312ps	16-ch., 312ps	8-ch., 312ps
<b>Total PWM channels</b>	12-ch.	12-ch.	12-ch.	24-ch.	24-ch.
<b>12-bit ADC (w/ PGA)</b>	2x 14-ch., 1.56MSPS	2x 8-ch., 1.56MSPS	2x 8-ch., 1.25MSPS	2x 8-ch., 3.33MSPS	2x 8-ch., 3.33MSPS
<b>16-bit ADC</b>	–	–	–	–	1x 16-ch.
<b>Comparator (w/ ref. DAC)</b>	3 (8-b DAC)	4 (8-b DAC)	4 (6-b DAC)	4 (8-b DAC)	4 (6-b DAC)
<b>12-bit DAC</b>	–	1	2	2	1
<b>Operational Amplifier</b>	2	2	–	–	–
<b>UART</b>	2	2	2	3	3
<b>SPI</b>	1	1	2	2	3
<b>I2C</b>	1	2	1	2	2
<b>CAN</b>	–	–	CAN 2.0 A/B	CAN FD	CAN 2.0 A/B
<b>USB</b>	–	–	–	USB 2.0 FS OTG (LQFP100 only)	–
<b>Quadrature Decoder</b>	1	1	–	–	1
<b>Quad Timer/PWM</b>	4-ch.	4-ch.	4-ch.	8-ch.	8-ch.
<b>Configurable Logic</b>	XBAR, EVTG	XBAR, EVTG	XBAR, AOI	XBAR, EVTG	XBAR, AOI
<b>Encryption</b>	No	DSASS	–	–	–
<b>5V tolerant I/O</b>	No	No	Yes	Yes	Yes
<b>Package</b>	LQFP64, LQFP48, LQFP32, QFN32	LQFP64, LQFP48, LQFP32, QFN32	LQFP64, LQFP48, LQFP32, QFN32	LQFP100, LQFP80, LQFP64, LQFP48	LQFP100, LQFP80, LQFP64, LQFP48
<b>Ambient Temperature</b>	-40-105C and -40-125C	-40-105C and -40-125C	-40-105C and -40-125C	-40-105C and -40-125C	-40-105C
<b>AEC-Q100</b>	Yes	Yes	No	Yes	No

# ORDERING INFORMATION



# POWER AND MOTOR EXPERTISE

Signal-processing microcontroller for efficient digital power conversion and advanced motor control applications.

## KEY BENEFITS

### High-Performance DSC Core

High performance 32-bit 56800EX / 56800EF core, up to 100 MHz core speed, 100 MIPS performance; with 2x data bus and 1x instruction bus, able to fetch 2x data per cycle, enable superfast MAC (Multiply and Accumulate) instruction. Suitable for digital power conversion and motor control applications.

### Ultra Low Power DSC

The ultra-low-power 56F80xxx and 56F81xxx series support up to 100 MIPS performance and consumes less than 300uA/MHz at full speed run mode. It has built-in concurrent operations offering best-in-class execution times and overall low power run rates.

### AEC-Q100 for Automotive Applications

AEC-Q100 qualified, temperature up to 125C. DSCs can be used for automotive applications including EV on-board chargers, EV compressors, EV chargers, and wireless charging.

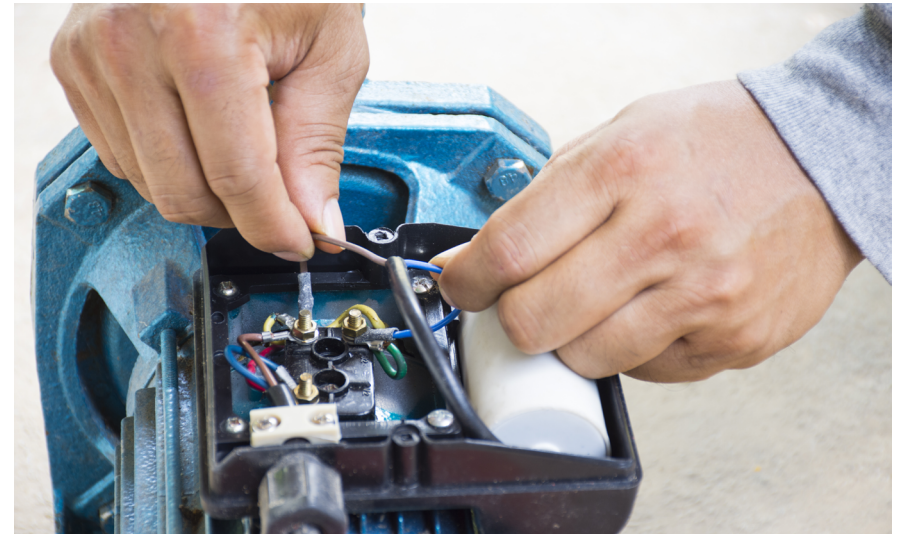
### Intelligent Peripherals, Advanced Integration

NXP's 32-bit DSC integrated enhanced digital and analog peripherals are customized for power and motor applications.

- eFlexPWM – Advanced timer for Digital Power Conversion with 312ps resolution
- Cross-Bar – Directly connecting any input and/or output with logic functions and event generator. Flexible configuration to support all kinds of applications.
- ADC – High speed, high impedance, ultra-low-power cyclic ADCs to capture events real time. 300ns conversion rate.
- Quad Timer – Supports multiple working modes include timer, capture, PWM, decoder, etc.

### Flexible and Multi-Functional

FlexMEM supports flexible configuration to work as different functions, including Flash, RAM and EEPROM. On MC56F84789, 32K FlexMEM is integrated and can work as 32KB Flash, or 2KB EEPROM. Take advantage of one design to suite your versatile needs.



# ADVANCED HARDWARE AND SOFTWARE TOOLS

## CodeWarrior Development Studio (IDE)

NXP's CodeWarrior embedded software development studio is a complete integrated development environment (IDE) that provides a highly visual and automated framework to accelerate development of the most complex embedded applications.

## Processor Expert: Integrated with CodeWarrior Tool

Processor Expert® technology is a development system to create, configure, optimize, migrate, and deliver software components for our silicon. This technology is integrated into NXP's CodeWarrior® products supporting S08/RS08, S12(X), Coldfire, Coldfire+, Kinetis®, DSC 56800EX, and some Power Architecture processors.

## Software Development Kit (SDK) and Config Tools

Comprehensive software enablement package designed to simplify and accelerate application development. Config tools allow developers to quickly build a custom SDK and leverage pins, clocks and peripheral tools to generate initialization C code for custom board support.

## QuickStart: Quick Start Initialization and Development Tool

The QuickStart helps users to accelerate the application development, to become quickly familiar with the target device and to create real-time applications rapidly and efficiently while retaining complete control over each portion of the underlying hardware.

## FreeMASTER Run-Time Debugging Tool

FreeMASTER is a user-friendly real-time debug monitor and data visualization tool that you can use for application development and information management. Supports non-intrusive monitoring of variables on a running system.

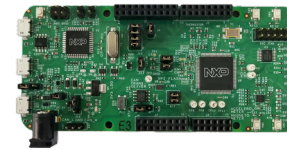
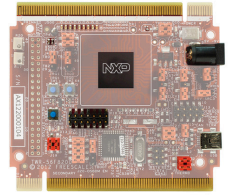
## RTCESL: Real Time Control Embedded Software Motor Control and Power Conversion Libraries

This NXP real-time control embedded software libraries is a group of algorithms ranging from basic mathematics operations to advanced transformations and observers, which can be easily incorporated into complex real-time control applications, and used in our motor control reference designs.

Learn more about DSC development tools at [www.nxp.com/DSC/developer](http://www.nxp.com/DSC/developer).

## Development Boards

The NXP® TWR-56F8400 and TWR-56F8200 are standalone development boards ideally suited for Motor and Digital Power control applications. It can be used in conjunction with the Tower® System peripheral boards, including the LV3PH motor control kit TWR-MC-LV3PH module.



The MC56F83000-EVK, MC56F81000-EVK and MC56F80000-EVK are designed as ultra-low cost development platforms for the MC56F83xxx, MC56F81xxx and MC56F80xxx DSC families allowing for rapid prototyping and application development.

NXP provides plenty of reference designs for DSC products, to exceed customers' success in motor control and power conversion applications. Our comprehensive portfolio, tools and expert support enable cost-effective and energy-efficient motor and power applications.

## Third-party tools

NXP brings together world-class development platforms, tools, boards, and software from NXP and partners to get you started developing on NXP DSC products in just minutes. With advanced yet low-cost ways to evaluate, develop, and debug with DSC products and a choice of toolchains that support the entire DSC portfolio, the DSC developer ecosystem gives you a familiar set of tools no matter which DSC you choose. Learn more on [www.nxp.com/DSC/ecosystem](http://www.nxp.com/DSC/ecosystem).

## The 10/15-year promise: the NXP Product Longevity program

The NXP Product Longevity program ensures a stable supply of microcontrollers for your design. Longevity products are available for a minimum of ten years after product launch, and are supported by our standard end-of-life notification policy. Most products in the DSC categories are covered by the program.



### 56F806xx SERIES | Performance-level, Motor Control

100 MHz 56800EF Core, 32 to 64 KB Flash, dual 12-bit ADC, operational amplifier, motor control PWM, 32-64 pins LQFP package

PART NO.	PROCESSOR			MEMORY			CONTROL						COMMUNICATION			QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION					
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	OPAMP	HSCMP WITH 8-BIT DAC	12-b DAC	UART (QSCI)	SPI (QSPI)					I <sup>2</sup> C	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	PACKAGE
56F80623	32-b	100	100	32	6	4-ch.	-	6-ch.	2x 14-ch.	640ns	1	3	-	1	-	1	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F80626	32-b	100	100	32	6	4-ch.	-	6-ch.	2x 14-ch.	640ns	2	3	-	2	-	1	-	4	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F80643	32-b	100	100	64	8	4-ch.	-	6-ch.	2x 14-ch.	640ns	1	3	-	1	-	1	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F80646	32-b	100	100	64	8	4-ch.	-	6-ch.	2x 14-ch.	640ns	2	3	-	2	-	1	-	4	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F80648	32-b	100	100	64	8	4-ch.	-	8-ch.	2x 14-ch.	640ns	2	3	-	2	-	1	-	4	2	54	Y	-	-	2.7-3.6 V	64LQFP

### 56F816xx SERIES | Entry-level, Motor Control

100 MHz 56800EX Core, 64 to 128 KB Flash, dual 12-bit ADC, operational amplifier, motor control PWM, 32-64 pins LQFP package

PART NO.	PROCESSOR			MEMORY				CONTROL						COMMUNICATION				QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	BOOT ROM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	OPAMP	6-BIT DAC 8-BIT DAC	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C					CAN	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE
56F81643	32-b	100	100	64	12	64	4-ch.	-	6-ch.	2x 3-ch.	640ns	1	3	-	1	-	1	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F81646	32-b	100	100	64	12	64	4-ch.	-	6-ch.	2x 5-ch.	640ns	2	4	-	2	-	1	-	4	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F81648	32-b	100	100	64	12	64	4-ch.	-	12-ch.	2x 8-ch.	640ns	2	4	-	2	-	1	-	4	2	54	Y	-	-	2.7-3.6 V	64LQFP
56F81663	32-b	100	100	128	20	64	4-ch.	-	6-ch.	2x 3-ch.	640ns	1	3	-	1	-	1	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F81666	32-b	100	100	128	20	64	4-ch.	-	6-ch.	2x 5-ch.	640ns	2	4	-	2	-	1	-	4	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F81668	32-b	100	100	128	20	64	4-ch.	-	12-ch.	2x 8-ch.	640ns	2	4	-	2	-	1	-	4	2	54	Y	-	-	2.7-3.6 V	64LQFP

### 56F826xx SERIES | Entry-level, Motor Control

100/50 MHz 56800EX Core, 32 to 64 KB Flash, dual 12-bit ADC, motor control PWM, 32-48 pins LQFP package.

PART NO.	PROCESSOR			MEMORY				CONTROL						COMMUNICATION				QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	FLEXNVM/EEPROM	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 6-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C					CAN	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE
56F82623	32-b	100/50	100	32	8	-	4-ch.	-	6-ch.	2x 3-ch.	800ns	-	3	-	1	-	-	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F82643	32-b	100/50	100	64	8	-	4-ch.	-	6-ch.	2x 3-ch.	800ns	-	3	-	1	-	-	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP
56F82646	32-b	100/50	100	64	8	-	4-ch.	-	6-ch.	2x 5-ch.	800ns	-	4	-	2	-	-	-	4	2	39	Y	-	-	2.7-3.6 V	48LQFP

### 56F836xx SERIES | Performance-level, Motor Control

100 MHz 56800EX Core, 256 KB Flash, dual 12-bit ADC, motor control PWM, boot ROM, USB FS OTG, 64-100 pins LQFP package.

PART NO.	PROCESSOR			MEMORY				CONTROL							COMMUNICATION					QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				PACKAGE
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	BOOT ROM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 8-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	USB FS OTG	CAN FD					-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	
56F83663	32-b	100	100	128	48	32	4-ch.	-	18-ch.	2x 8-ch.	320ns	-	4	-	2	1	2	-	1	-	8	2	54	Y	-	-	2.7-3.6 V	64LQFP
56F83683	32-b	100	100	256	64	32	4-ch.	-	18-ch.	2x 8-ch.	320ns	-	4	-	2	1	2	-	1	-	8	2	54	Y	-	-	2.7-3.6 V	64LQFP
56F83686	32-b	100	100	256	64	32	4-ch.	-	21-ch.	2x 8-ch.	320ns	-	4	-	3	2	2	-	1	-	8	2	68	Y	-	-	2.7-3.6 V	80LQFP
56F83689	32-b	100	100	256	64	32	4-ch.	-	24-ch.	2x 8-ch.	320ns	-	4	-	3	2	2	1	1	-	8	2	82	Y	-	-	2.7-3.6 V	100LQFP

### 56F844xx SERIES | Performance-level, Motor Control

60 MHz 56800EX Core, 64 to 128 KB Flash, dual 12-bit ADC, motor control PWM, 48-64 pins LQFP package.

PART NO.	PROCESSOR			MEMORY				CONTROL							COMMUNICATION					QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				PACKAGE
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	FLEXNVM/EEPROM	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 6-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	CAN	-40 °C TO +105 °C					-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE		
56F84441	32-b	60	60	64	8	32/2	4-ch.	-	6-ch.	2x 5-ch.	600ns	-	3	-	2	1	2	-	1	8	2	39	Y	-	-	2.7-3.6 V	48LQFP	
56F84442	32-b	60	60	64	8	32/2	4-ch.	-	9-ch.	2x 8-ch.	600ns	1x 8-ch.	4	-	2	1	2	-	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP	
56F84451	32-b	60	60	96	16	32/2	4-ch.	-	6-ch.	2x 5-ch.	600ns	-	3	-	2	1	2	1	1	8	2	39	Y	-	-	2.7-3.6 V	48LQFP	
56F84452	32-b	60	60	96	16	32/2	4-ch.	-	9-ch.	2x 8-ch.	600ns	1x 8-ch.	4	-	2	1	2	1	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP	
56F84462	32-b	60	60	128	24	32/2	4-ch.	-	9-ch.	2x 8-ch.	600ns	-	4	1	2	1	2	1	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP	

### 56F8458x/6x SERIES | Performance-level, Motor Control

80 MHz 56800EX Core, 128 to 256 KB Flash, dual 12-bit ADC, motor control PWM, 80-100 pins LQFP package.

PART NO.	PROCESSOR			MEMORY				CONTROL							COMMUNICATION					QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				PACKAGE
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	FLEXNVM/EEPROM	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC	12-b ADC TIME	16-b ADC	ANALOG COMPARATOR (+ 6-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	CAN	-40 °C TO +105 °C					-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE		
56F84565	32-b	80	80	128	24	32/2	4-ch.	-	21-ch.	2x 8-ch.	600ns	1x 10-ch.	4	-	3	2	2	1	1	8	2	68	Y	-	-	2.7-3.6 V	80LQFP	
56F84567	32-b	80	80	128	24	32/2	4-ch.	-	24-ch.	2x 8-ch.	600ns	1x 16-ch.	4	-	3	3	2	1	1	8	2	86	Y	-	-	2.7-3.6 V	100LQFP	
56F84585	32-b	80	80	256	32	32/2	4-ch.	-	21-ch.	2x 8-ch.	600ns	1x 10-ch.	4	1	3	2	2	1	1	8	2	68	Y	-	-	2.7-3.6 V	80LQFP	
56F84587	32-b	80	80	256	32	32/2	4-ch.	-	24-ch.	2x 8-ch.	600ns	1x 16-ch.	4	1	3	3	2	1	1	8	2	86	Y	-	-	2.7-3.6 V	100LQFP	



### 56F807xx SERIES | Performance-level, Smart Power

100 MHz 56800EF Core, 32 to 64 KB Flash, dual 12-bit ADC, operational amplifier, high-resolution PWM, 32-64 pins LQFP/QFN package, 125C

PART NO.	PROCESSOR			MEMORY			CONTROL						COMMUNICATION			QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION					
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	OPAMP	HSCM WITH 8-BIT	12-b DAC	UART (QSCI)	SPI (QSPI)					I <sup>2</sup> C	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	PACKAGE
56F80723	32-b	100	100	32	6	4-ch.	6-ch. (312ps)	6-ch.	2x 14-ch.	640ns	1	3	-	1	1	1	1	4	3	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F80726	32-b	100	100	32	6	4-ch.	6-ch. (312ps)	8-ch.	2x 14-ch.	640ns	2	3	-	2	1	1	1	4	3	39	Y	Y	-	2.7-3.6 V	48LQFP
56F80733	32-b	100	100	48	8	4-ch.	6-ch. (312ps)	6-ch.	2x 14-ch.	640ns	1	3	-	1	1	1	1	4	3	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F80736	32-b	100	100	48	8	4-ch.	6-ch. (312ps)	8-ch.	2x 14-ch.	640ns	2	3	-	2	1	1	1	4	3	39	Y	Y	-	2.7-3.6 V	48LQFP
56F80738	32-b	100	100	48	8	4-ch.	8-ch. (312ps)	12-ch.	2x 14-ch.	640ns	2	3	-	2	1	1	1	4	3	54	Y	Y	-	2.7-3.6 V	64LQFP
56F80743	32-b	100	100	64	8	4-ch.	6-ch. (312ps)	6-ch.	2x 14-ch.	640ns	1	3	-	1	1	1	1	4	3	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F80746	32-b	100	100	64	8	4-ch.	6-ch. (312ps)	8-ch.	2x 14-ch.	640ns	2	3	-	2	1	1	1	4	3	39	Y	Y	Y	2.7-3.6 V	48LQFP
56F80748	32-b	100	100	64	8	4-ch.	8-ch. (312ps)	12-ch.	2x 14-ch.	640ns	2	3	-	2	1	1	1	4	3	54	Y	Y	Y	2.7-3.6 V	64LQFP

### 56F817xx & 56F818xx SERIES | Entry-level, Smart Power

100 MHz 56800EX Core, 64 to 128 KB Flash, dual 12-bit ADC, operational amplifier, high-resolution PWM, 32-64 pins LQFP package, 125C

PART NO.	PROCESSOR			MEMORY				CONTROL						COMMUNICATION				QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION					
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	BOOT ROM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	OPAMP	6-BIT DAC 8-BIT DAC	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C					ENCRYPTION	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	PACKAGE
56F81743	32-b	100	100	64	12	64	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	640ns	1	3	1	1	1	1	-	-	4	2	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F81746	32-b	100	100	64	12	64	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	640ns	2	4	1	2	1	2	-	1	4	2	39	Y	Y	-	2.7-3.6 V	48LQFP
56F81748	32-b	100	100	64	12	64	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	640ns	2	4	1	2	1	2	-	1	4	2	54	Y	Y	-	2.7-3.6 V	64LQFP
56F81763	32-b	100	100	128	20	64	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	640ns	1	3	1	1	1	1	-	-	4	2	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F81766	32-b	100	100	128	20	64	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	640ns	2	4	1	2	1	2	-	1	4	2	39	Y	Y	-	2.7-3.6 V	48LQFP
56F81768	32-b	100	100	128	20	64	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	640ns	2	4	1	2	1	2	-	1	4	2	54	Y	Y	-	2.7-3.6 V	64LQFP
56F81863	32-b	100	100	128	20	64	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	640ns	1	3	1	1	1	1	DSASS	-	4	2	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F81866	32-b	100	100	128	20	64	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	640ns	2	4	1	2	1	2	DSASS	1	4	2	39	Y	Y	-	2.7-3.6 V	48LQFP
56F81868	32-b	100	100	128	20	64	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	640ns	2	4	1	2	1	2	DSASS	1	4	2	54	Y	Y	-	2.7-3.6 V	64LQFP

**56F827xx SERIES | Entry-level, Smart Power**

100/50 MHz 56800EX Core, 32 to 64 KB Flash, dual 12-bit ADC, high-resolution PWM, 32-48 pins LQFP/QFN package, 125C, qualification align to AEC-Q100.

PART NO.	PROCESSOR			MEMORY				CONTROL						COMMUNICATION				QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION					
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	FLEXNVM/EEPROM	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 6-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C					CAN	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	PACKAGE
56F82723	32-b	100/50	100	32	6	-	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	800ns	-	3	2	1	1	1	-	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP, 32QFN
56F82726	32-b	100/50	100	32	6	-	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	800ns	-	4	2	2	1	1	1	-	4	2	39	Y	-	Y	2.7-3.6 V	48LQFP
56F82728	32-b	100/50	100	32	6	-	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	800ns	-	4	2	2	2	1	1	-	4	2	54	Y	-	Y	2.7-3.6 V	64LQFP
56F82733	32-b	100/50	100	48	8	-	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	800ns	-	3	2	1	1	1	-	-	4	2	26	Y	Y	-	2.7-3.6 V	32LQFP, 32QFN
56F82736	32-b	100/50	100	48	8	-	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	800ns	-	4	2	2	1	1	1	-	4	2	39	Y	-	Y	2.7-3.6 V	48LQFP
56F82738	32-b	100/50	100	48	8	-	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	800ns	-	4	2	2	2	1	1	-	4	2	54	Y	-	Y	2.7-3.6 V	64LQFP
56F82743	32-b	100/50	100	64	8	-	4-ch.	6-ch. (312ps)	6-ch.	2x 3-ch.	800ns	-	3	2	1	1	1	-	-	4	2	26	Y	-	-	2.7-3.6 V	32LQFP, 32QFN
56F82746	32-b	100/50	100	64	8	-	4-ch.	6-ch. (312ps)	6-ch.	2x 5-ch.	800ns	-	4	2	2	1	1	1	-	4	2	39	Y	Y	Y	2.7-3.6 V	48LQFP
56F82748	32-b	100/50	100	64	8	-	4-ch.	8-ch. (312ps)	12-ch.	2x 8-ch.	800ns	-	4	2	2	2	1	1	-	4	2	54	Y	-	Y	2.7-3.6 V	64LQFP

### 56F837xx SERIES | Performance-level, Smart Power

100 MHz 56800EX Core, 256 KB Flash, dual 12-bit ADC, high-resolution PWM, boot ROM, USB FS OTG, 64-100 pins LQFP package.

PART NO.*	PROCESSOR			MEMORY				CONTROL						COMMUNICATION					QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				PACKAGE	
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	BOOT ROM (KB)	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 8-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	USB FS OTG					CAN FD	-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100		OPERATION VOLTAGE
56F83763 (A)	32-b	100	100	128	48	32	4-ch.	14-ch. (312ps)	18-ch.	2x 8-ch.	320ns	-	4	2	2	1	2	-	1	-	8	2	54	Y	Y*	Y*	2.7-3.6 V	64LQFP
56F83766	32-b	100	100	128	48	32	4-ch.	16-ch. (312ps)	21-ch.	2x 8-ch.	320ns	-	4	2	3	2	2	-	1	-	8	2	68	Y	Y*	-	2.7-3.6 V	80LQFP
56F83769 (A)	32-b	100	100	128	48	32	4-ch.	16-ch. (312ps)	24-ch.	2x 8-ch.	320ns	-	4	2	3	2	2	1	1	-	8	2	82	Y	Y*	Y*	2.7-3.6 V	100LQFP
56F83783 (A)	32-b	100	100	256	64	32	4-ch.	14-ch. (312ps)	18-ch.	2x 8-ch.	320ns	-	4	2	2	1	2	-	1	-	8	2	54	Y	Y*	Y*	2.7-3.6 V	64LQFP
56F83786	32-b	100	100	256	64	32	4-ch.	16-ch. (312ps)	21-ch.	2x 8-ch.	320ns	-	4	2	3	2	2	-	1	-	8	2	68	Y	Y*	-	2.7-3.6 V	80LQFP
56F83789 (A)	32-b	100	100	256	64	32	4-ch.	16-ch. (312ps)	24-ch.	2x 8-ch.	320ns	-	4	2	3	2	2	1	1	-	8	2	82	Y	Y*	Y*	2.7-3.6 V	100LQFP

\* The letter A means AEC-Q100 qualified

### 56F8455x/4x SERIES | Performance-level, Smart Power

80 MHz 56800EX Core, 64 to 96 KB Flash, dual high speed 12-bit ADC, high-resolution PWM, 48-64 pins LQFP package.

Part no.	Processor			Memory				Control						Communication					Quad Decoder	16-b Timers	PIT	Maximum GPIO	Qualification				Package
	DSC Core	Frequency (MHz)	Performance (MIPS)	Flash (KB)	RAM (KB)	FlexNVM/EEPROM	DMA	High Resolution PWM	Total PWM	12-b ADC with PGA	12-b ADC Conversion Time	16-b ADC	Analog Comparator (+ 6-bit DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	CAN					-40 °C to +105 °C	-40 °C to +125 °C	AEC-Q100	Operation Voltage	
56F84540	32-b	80	80	64	8	32/2	4-ch.	6-ch. (390ps)	6-ch.	2x 5-ch.	300ns	-	3	1	2	1	2	1	1	8	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F84543	32-b	80	80	64	8	32/2	4-ch.	8-ch. (390ps)	9-ch.	2x 8-ch.	300ns	1x 8-ch.	4	1	2	1	2	1	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP
56F84550	32-b	80	80	96	16	32/2	4-ch.	6-ch. (390ps)	6-ch.	2x 5-ch.	300ns	-	3	1	2	1	2	1	1	8	2	39	Y	-	-	2.7-3.6 V	48LQFP
56F84553	32-b	80	80	96	16	32/2	4-ch.	8-ch. (390ps)	9-ch.	2x 8-ch.	300ns	1x 8-ch.	4	1	2	1	2	1	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP

### 56F847xx SERIES | Performance-level, Smart Power

100 MHz 56800EX Core, 128 to 256 KB Flash, dual high speed 12-bit ADC, high-resolution PWM, 64-100 pins LQFP package.

PART NO.	PROCESSOR			MEMORY				CONTROL						COMMUNICATION					QUAD DECODER	16-b TIMERS	PIT	MAXIMUM GPIO	QUALIFICATION				PACKAGE
	DSC CORE	FREQUENCY (MHZ)	PERFORMANCE (MIPS)	FLASH (KB)	RAM (KB)	FLEXNVM/EEPROM	DMA	HIGH RESOLUTION PWM	TOTAL PWM	12-b ADC WITH PGA	12-b ADC CONVERSION TIME	16-b ADC	ANALOG COMPARATOR (+ 6-BIT DAC)	12-b DAC	UART (QSCI)	SPI (QSPI)	I <sup>2</sup> C	CAN					-40 °C TO +105 °C	-40 °C TO +125 °C	AEC-Q100	OPERATION VOLTAGE	
56F84763	32-b	100	100	128	24	32/2	4-ch.	8-ch. (312ps)	9-ch.	2x 8-ch.	300ns	1x 8-ch.	4	1	2	1	2	1	1	8	2	54	Y	-	-	2.7-3.6 V	64LQFP
56F84766	32-b	100	100	128	24	32/2	4-ch.	8-ch. (312ps)	18-ch.	2x 8-ch.	300ns	1x 10-ch.	4	1	3	2	2	1	1	8	2	68	Y	-	-	2.7-3.6 V	80LQFP
56F84769	32-b	100	100	128	24	32/2	4-ch.	8-ch. (312ps)	24-ch.	2x 8-ch.	300ns	1x 16-ch.	4	1	3	3	2	1	1	8	2	86	Y	-	-	2.7-3.6 V	100LQFP
56F84786	32-b	100	100	256	32	32/2	4-ch.	8-ch. (312ps)	18-ch.	2x 8-ch.	300ns	1x 10-ch.	4	1	3	2	2	1	1	8	2	68	Y	-	-	2.7-3.6 V	80LQFP
56F84789	32-b	100	100	256	32	32/2	4-ch.	8-ch. (312ps)	24-ch.	2x 8-ch.	300ns	1x 16-ch.	4	1	3	3	2	1	1	8	2	86	Y	-	-	2.7-3.6 V	100LQFP

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