Building the Most Trusted MCU Solutions

5-Volt 8-bit S08P MCU Family

The scalable S08P family provides a wide range of feature/price options for product differentiation. Choose between the full-featured TSI-enabled PT class, the equally full-featured PA class, or the cost-effective PL class.

TARGET APPLICATIONS

▸ Appliances (large and small)

▸ Metering

▸ HVAC

▸ UPS

▸ Electric motors

▸ Power tools

▸ Battery chargers

▸ Lighting controls
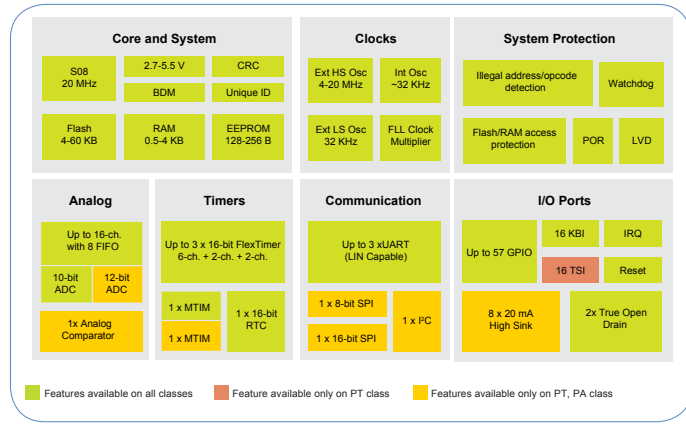
▸ Circuit breakers

OVERVIEW

The 8-bit S08P MCU family gives your designs more durability and reliability in both harsh industrial and user interface environments while meeting appliance safety standard, IEC 60730. The S08P family is simple, yet powerful, and offers exceptional EFT/ESD performance. This scalable and pin-compatible MCU family reuses the existing S08 core, IP and tools for easy migration from existing 8-bit S08 products.

DIFFERENTIATED FEATURES

S08P MCUs integrate key features, including a touch-sensing interface (TSI), EEPROM and motor control FlexTimer to simplify designs and help reduce system costs. Integrated peripherals simplify PCB design, and combined with a broad portfolio of device options, result in reduced BOM costs. In addition, the S08P family is supported by our cost-effective Tower System development platform.

S08P MCU FAMILY BLOCK DIAGRAM

Core and System			Clocks		System Protection	
S08 20 MHz	2.7-5.5 V	CRC	Ext HS Osc 4-20 MHz	Int Osc ~32 KHz	Illegal address/opcode detection	Watchdog
	BDM	Unique ID				
Flash 4-60 KB	RAM 0.5-4 KB	EEPROM 128-256 B	Ext LS Osc 32 KHz	FLL Clock Multiplier	Flash/RAM access protection	POR / LVD

Analog	Timers	Communication	I/O Ports		
Up to 16-ch. with 8 FIFO	Up to 3 x 16-bit FlexTimer 6-ch. + 2-ch. + 2-ch.	Up to 3 xUART (LIN Capable)	Up to 57 GPIO	16 KBI	IRQ
10-bit ADC / 12-bit ADC	1 x MTIM / 1 x 16-bit RTC	1 x 8-bit SPI		16 TSI	Reset
1x Analog Comparator	1 x MTIM	1 x 16-bit SPI / 1 x I²C	8 x 20 mA High Sink	2x True Open Drain	

☐ Features available on all classes   ☐ Feature available only on PT class   ☐ Features available only on PT, PA class

S08P MCU FAMILY FEATURES AND BENEFITS

Features	Benefits
Memory Combination	
Increased flash/RAM ratio (4 KB RAM in PT/PA/PL60)	Easy for C coding
On-chip EEPROM with 500K~1M write/erase cycle	Simplifies the system design for data logging and recording
Robust GPIO and High Drive Capability	
Up to 57 GPIO with filtering in 64-pin	Simplifies external circuit design
Up to eight pins with 20 mA sink drive capability (only on PT/PA)	Saves external components for high current drive, including TRIAC or LED
Two pins with true open drain	Provides design flexibility for different voltage levels
16-ch., 12/10-bit SAR ADC	
Linear successive approximation algorithm with up to 12-bit resolution (10-bit for PL)	Enables fast and accurate analog measurement
Up to 16-ch. single-ended external analog inputs	Flexible routine of input signals to improve overall EFT performance
12-bit, 10-bit and 8-bit modes, eight-deep result FIFO	Improves MCU core efficiency with ADC FIFO
Single or continuous conversion (automatic return to idle after single conversion)	Increases options for software implementation with less intervention
16-ch. Touch-Sensing Interface on PT Class	
Dedicated hardware module to sense touch input, minimum software intervention	Simplifies external circuit on touch-sensing design
Functional in all power modes (run, wait and low-power stop), wake up capable from stop	Low-power touch-sensing capability
Designed for operation in harsh environments with high sensitivity	Provides robustness and reliability
Highly configurable through hardware and software	Ease of use for tuning and customization
Feature-Rich Integration	
6-ch. + 2-ch. + 2-ch. FlexTimer: 2 x MTIM	PWM for motor control and power applications, provides ADC auto triggering
Real-time counter	Helpful for any task scheduling functions, periodic wake up MCU from stop mode
3 x SCI, 2 x SPI, I²C	Choice of various communication interfaces
Enhanced watchdog and programmable CRC	Meets IEC60730 standard
High accuracy internal clock	Eliminates external clock source

S08P MCU FAMILY TOOL OPTIONS

Controller Module	Price (USD)	Features
TWR-S08PT60	$99	S08PT60 development module functional stand-alone or in conjunction with the full modular Tower System

Complete Kit	Price (USD)	Includes
TWR-S08PT60-KIT	$139	TWR-S08PT60, TWR-PROTO, TWR-ELEV modules

Daughter Card	Price (USD)	Includes
TWR-S08DC-PT60	$14	Functional in stand-alone mode or mounted to the TWR-S08UNIV module to gain access to the Tower System ecosystem

S08P MCU FAMILY

| Class	Memory	Differentiated Features	Package Options
PT Class	8-60 KB Flash 2-4 KB RAM 256 B EEPROM	Touch Sensing Input (TSI) 12-bit ADC, ACMP Motor control PWM Excellent ESD performance UART, SPI, I²C -40 to 105°C/125°C	LQFP 64, LQFP 48 (0.5 mm pitch) QFP 64, LQFP 44, LQFP32 (0.8 mm pitch) TSSOP20, SOIC20 TSSOP16
PA Class	4-60 KB Flash 512B-4 KB RAM 128-256 B EEPROM	12-bit ADC, ACMP Motor control PWM Excellent ESD performance UART, SPI, I²C -40 to 105°C/125°C	LQFP 64, LQFP 48 (0.5 mm pitch) QFP 64, LQFP 44, LQFP 32 (0.8 mm pitch) TSSOP20, SOIC20, TSSOP16 SOIC8, DFN8
PL Class	4-60 KB Flash 512 B-4 KB RAM 128-256 B EEPROM	10-bit ADC Up to 3x UART Excellent ESD performance Rich timer resources -40 to 85°C	QFP 64, LQFP 44, LQFP 32 (0.8 mm pitch) TSSOP20, TSSOP16 SOIC8

HARDWARE DEVELOPMENT TOOLS

TWR-S08PT60 Module/KIT

The cost-effective TWR-S08PT60 development tool is part of the Tower System and features the rugged new 5-volt MC9S08PT60, combining exceptional EFT/ESD performance with integrated touch sensing and EEPROM. The TWR-S08PT60 provides everything you need to develop and evaluate application code. The integrated OSBDM enables communication with the board and target device via USB cable and the board highlights the MCU's touch sensing and motor control features.

Features

▸ MC9S08PT60 MCU

▸ 8 MHz crystal for system clock

▸ Potentiometer for ADC input

▸ Low-G sensor (MA8451) through I²C connection

▸ Infra-red Tx/Rx through SCI

▸ RS232 port

▸ Four touch pads, each with LED indicator

▸ Reset button and three functional switches

▸ Sockets for touch sensing and motor control daughter card expansion

▸ On-board OSBDM debug support with Mini-B USB connector

TWR-S08PT60 MODULE/KIT
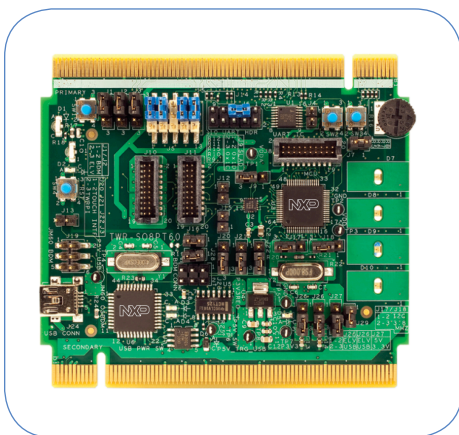

TWR-S08DC-PT60 Daughter Card

The cost-effective TWR-S08DC-PT60 daughter card is a stand-alone demo board with on-board debugger designed to demonstrate the capabilities of the MC9S08P family. It comes pre-programmed with a potentiometer demo, accelerometer demo with orientation/shake/tap/transient modes, flash and EEPROM demo, and a BDM debugger demo.

The TWR-S08DC-PT60 daughter card enables quick, cost-effective, product evaluation and application development, and can be used in stand-alone mode or mounted to theTWR-S08UNIV module to gain access to the full breadth of our Tower System ecosystem.

Features

▸ GPIO output through LEDs

▸ TSI with one touch pad

▸ ADC from potentiometer input

▸ I²C to low-g inertial sensor (accelerometer)

▸ Flash/EEPROM operation on silicon

▸ Additional functionality in conjunction with TWR-S08UNIV module

TWR-S08DC-PT60 DAUGHTER CARD
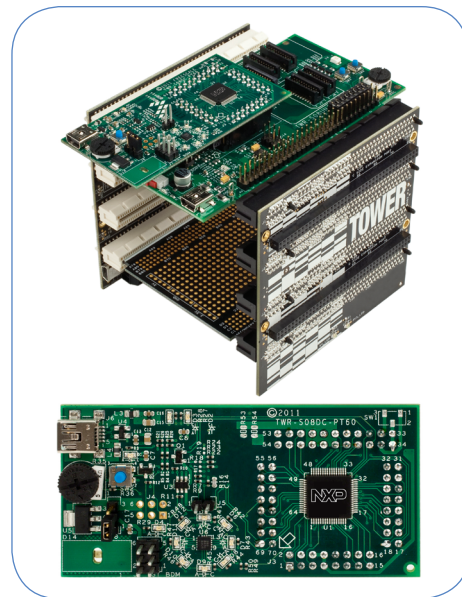
SOFTWARE DEVELOPMENT TOOLS

CodeWarrior Development Studio V10.x

CodeWarrior Development Studio for Microcontrollers is a suite of tools that supports software development for Freescale S08, ColdFire and Kinetis families. To learn more, visit freescale.com/CodeWarrior

Processor Expert

Designers can further accelerate application development with the help of Processor Expert, an award-winning rapid application development tool integrated into the CodeWarrior tool suite. To learn more, visit **www.nxp.com/ProcessorExpert**