

# NXP® 8-bit S08 MCUs

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The 8-bit S08 MCU portfolio includes more than 30 product families, providing a wide range of feature and price options for product differentiation, to cover all kinds of automotive, industrial and consumer applications. This selection guide is a starting point for choosing a specific device. For the latest product information, visit [www.nxp.com/s08](http://www.nxp.com/s08).

## 8-bit S08 MCUs

| Series   | CPU                      | Memory  | Key Features  | Applications  |
|--|--------------------------|---|---|---|
| <b>S08PA</b><br>5V Full-Featured                 | 8-bit S08 Core<br>20 MHz | 4 to 60 KB Flash<br>512 B to 4 KB RAM<br>EEPROM<br>8 to 64 pins | 12-bit ADC, ACMP<br>UART, SPI, I <sup>2</sup> C<br>Motor control FlexTimer, RTC<br>2.7 to 5.5V                            | Appliances (large and small)<br>Electric motors<br>Uninterruptible power supplies<br>General purpose industrial control           |
| <b>S08PT</b><br>5V Full-Featured and touch       | 8-bit S08 Core<br>20 MHz | 8 to 60 KB Flash<br>2 to 4 KB RAM<br>EEPROM<br>16 to 64 pins    | 12-bit ADC, ACMP<br>UART, SPI, I <sup>2</sup> C<br>Motor control FlexTimer, RTC<br>Touch sensing interface<br>2.7 to 5.5V | Appliance (large and small)<br>Battery powered touch applications   |
| <b>S08PB</b><br>5V Full-Featured and Rich Analog | 8-bit S08 Core<br>20 MHz | 8 to 16 KB Flash<br>1 KB RAM<br>16 to 20 pins                   | 12-bit ADC, ACMP, Opamp<br>UART, I2C<br>FlexTimer, RTC<br>2.7 to 5.5V   | Small appliances<br>Electric motors<br>Power tools  |
| <b>S08PL</b><br>5V Cost Effective                | 8-bit S08 Core<br>20 MHz | 4 to 60 KB Flash<br>512 B to 4 KB RAM<br>EEPROM<br>8 to 64 pins | 10-bit ADC, ACMP<br>UART<br>FlexTimer, RTC<br>2.7 to 5.5V   | Appliances (large and small)<br>Uninterruptible power supplies<br>General purpose consumer electronics                            |
| <b>S08PLS</b><br>5V Cost Effective               | 8-bit S08 Core<br>20 MHz | 8 to 16 KB Flash<br>1 KB RAM<br>16 to 20 pins                   | 10-bit ADC, ACMP,<br>UART,<br>FlexTimer, RTC<br>2.7 to 5.5V   | Small appliances<br>Electric motors<br>Smoke detectors<br>Power tools<br>Uninterruptible power supplies                           |
| <b>S08SU</b><br>Ultra High Voltage Motor Control | 8-bit S08 Core<br>40 MHz | 8 to 16 KB Flash<br>768 B RAM<br>QFN24                          | Gate Driver Unit (GDU)<br>12-bit ADC, ACMP<br>PWT, MCPWM<br>4.5 to 18V  | BLDC motors<br>Power tools<br>3-phase DC fan<br>Drones<br>Robots  |
| <b>S08QL</b><br>3V Low Power                     | 8-bit S08 Core<br>20 MHz | 4 to 8 KB Flash<br>256 to 512 B RAM<br>16 to 20 pins            | 12-bit ADC, ACMP<br>SCI, TPM<br>1.8 to 3.6V   | Battery Powered Applications<br>Low power applications<br>Smoke detector  |
| <b>S08LL</b><br>3V Segment LCD                   | 8-bit S08 Core<br>20 MHz | 8 to 16 KB Flash<br>2 KB RAM<br>48 to 64 pins                   | 12-bit ADC, ACMP<br>UART, SPI, I <sup>2</sup> C<br>Segment LCD driver<br>Timer/PWM, TOD<br>1.8 to 3.6V                    | Small appliances<br>Battery-operated handheld devices<br>Portable health care devices<br>Scrolling text displays<br>Alarms/clocks |



### S08PA Series | 5V Full-Featured

20 MHz S08 Core, 4 to 60 KB Flash, 12-bit ADC, motor control PWM, 8-64 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages                               |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|--|
| PA60     | 8-bit    | 20/20                    | 60         | 4        | 256        | 6-ch                       | 4-ch                     | 1x 16-ch | -        | 1    | 3          | 2   | 1                | -             | 2             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | QFP64, LQFP64, LQFP48, LQFP44, LQFP32  |
| PA32     | 8-bit    | 20/20                    | 32         | 4        | 256        | 6-ch                       | 4-ch                     | 1x 16-ch | -        | 1    | 3          | 2   | 1                | -             | 2             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | QFP64, LQFP64, LQFP48, LQFP44, LQFP32  |
| PA16     | 8-bit    | 20/20                    | 16         | 2        | 256        | 6-ch                       | 2-ch                     | 1x 12-ch | -        | 1    | 2          | 1   | 1                | -             | 1             | Y   | -                | -           | -            | Y             | Y             | 2.7-5.5V          | LQFP44, LQFP32, SO20, TSSOP20, TSSOP16 |
| PA8      | 8-bit    | 20/20                    | 8          | 2        | 256        | 6-ch                       | 2-ch                     | 1x 12-ch | -        | 1    | 2          | 1   | 1                | -             | 1             | Y   | -                | -           | -            | Y             | Y             | 2.7-5.5V          | LQFP44, LQFP32, SO20, TSSOP20, TSSOP16 |
| PA4      | 8-bit    | 20/20                    | 4          | 0.5      | 128        | -                          | 6-ch                     | 1x 8-ch  | -        | 1    | 1          | -   | -                | -             | -             | Y   | -                | -           | -            | Y             | Y             | 2.7-5.5V          | SO20, TSSOP20, TSSOP16, SO8, DFN8      |

### S08PT Series | 5V Full-Featured and Touch

20 MHz S08 Core, 8 to 60 KB Flash, 12-bit ADC, motor control PWM, touch sensing interface, 16-64 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages                               |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|--|
| PT60     | 8-bit    | 20/20                    | 60         | 4        | 256        | 6-ch                       | 4-ch                     | 1x 16-ch | -        | 1    | 3          | 2   | 1                | 16            | 2             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | QFP64, LQFP64, LQFP48, LQFP44, LQFP32  |
| PT32     | 8-bit    | 20/20                    | 32         | 4        | 256        | 6-ch                       | 4-ch                     | 1x 16-ch | -        | 1    | 3          | 2   | 1                | 16            | 2             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | QFP64, LQFP64, LQFP48, LQFP44, LQFP32  |
| PT16     | 8-bit    | 20/20                    | 16         | 2        | 256        | 6-ch                       | 2-ch                     | 1x 12-ch | -        | 1    | 2          | 1   | 1                | 16            | 1             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | LQFP44, LQFP32, SO20, TSSOP20, TSSOP16 |
| PT8      | 8-bit    | 20/20                    | 8          | 2        | 256        | 6-ch                       | 2-ch                     | 1x 12-ch | -        | 1    | 2          | 1   | 1                | 16            | 1             | Y   | -                | -           | -            | Y             | -             | 2.7-5.5V          | LQFP44, LQFP32, SO20, TSSOP20, TSSOP16 |

### S08PB Series | 5V Full-Featured and Rich Analog

20 MHz S08 Core, 8 to 16 KB Flash, 12-bit ADC, dual analog comparators, opamp, 16-20 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP/Opamp | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages         |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|------------------|
| PB16     | 8-bit    | 20/20                    | 16         | 1        | -          | -                          | 8-ch                     | 1x 12-ch | -        | 2/1        | 1          | -   | 1                | -             | 2             | Y   | -                | -           | -            | Y             | Y             | 2.7-5.5V          | TSSOP20, TSSOP16 |
| PB8      | 8-bit    | 20/20                    | 8          | 1        | -          | -                          | 8-ch                     | 1x 12-ch | -        | 2/1        | 1          | -   | 1                | -             | 2             | Y   | -                | -           | -            | Y             | Y             | 2.7-5.5V          | TSSOP20, TSSOP16 |

### S08PL Series | 5V Cost Effective

20 MHz S08 Core, 4 to 60 KB Flash, 10-bit ADC, basic Timer/PWM, 8-64 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages                 |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|--------------------------|
| PL60     | 8-bit    | 20/20                    | 60         | 4        | 256        | -                          | 10-ch                    | -        | 1x 16-ch | 1    | 3          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | QFP64, LQFP44, LQFP32    |
| PL32     | 8-bit    | 20/20                    | 32         | 4        | 256        | -                          | 10-ch                    | -        | 1x 16-ch | 1    | 3          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | QFP64, LQFP44, LQFP32    |
| PL16     | 8-bit    | 20/20                    | 16         | 2        | 256        | -                          | 8-ch                     | -        | 1x 12-ch | 1    | 2          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | LQFP32, TSSOP20, TSSOP16 |
| PL8      | 8-bit    | 20/20                    | 8          | 2        | 256        | -                          | 8-ch                     | -        | 1x 12-ch | 1    | 2          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | LQFP32, TSSOP20, TSSOP16 |
| PL4      | 8-bit    | 20/20                    | 4          | 0.5      | 128        | -                          | 6-ch                     | -        | 1x 8-ch  | 1    | 1          | -   | -                | -             | -             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | TSSOP20, TSSOP16, S08    |

### S08PLS Series | 5V Cost Effective

20MHz S08 Core, 8 to 16 KB Flash, 10-bit ADC, basic Timer/PWM, 8-20 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages              |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|-----------------------|
| PL16S    | 8-bit    | 20/20                    | 16         | 1        | -          | -                          | 8-ch                     | -        | 1x 12-ch | 1    | 1          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | TSSOP20, TSSOP16, S08 |
| PL8S     | 8-bit    | 20/20                    | 8          | 1        | -          | -                          | 8-ch                     | -        | 1x 12-ch | 1    | 1          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 2.7-5.5V          | TSSOP20, TSSOP16, S08 |

### S08SU Series | Ultra High Voltage Motor Control

20 MHz S08 Core, 4 to 60 KB Flash, 10-bit ADC, basic Timer/PWM, 8-64 pins package.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Inter Crossbar | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|----------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|----------|
| SU16     | 8-bit    | 40/20                    | 16         | 768      | -          | 6-ch                       | 2-ch                     | 2x 8-ch  | -        | 1    | 3          | 2   | 1                | -             | Y              | 1             | -   | 3-ph             | -           | -            | Y             | -             | 4.5-18V           | QFN24    |
| SU8      | 8-bit    | 40/20                    | 8          | 768      | -          | 6-ch                       | 2-ch                     | 2x 8-ch  | -        | 1    | 3          | 2   | 1                | -             | Y              | 1             | -   | 3-ph             | -           | -            | Y             | -             | 4.5-18V           | QFN24    |

**S08QL Series | 3V Low Power**

20 MHz S08 Core, 4 to 8 KB Flash, 12-bit ADC, ultra low power, 16 to 20 TSSOP.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Motor control PWM channels | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages         |
|----------|----------|--------------------------|------------|----------|------------|----------------------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|-------------|--------------|---------------|---------------|-------------------|------------------|
| QL8      | 8-bit    | 20/10                    | 8          | 512      | -          | -                          | 1-ch                     | 1x 8-ch  | -        | 1    | 1          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 1.8-3.6V          | TSSOP20, TSSOP16 |
| QL4      | 8-bit    | 20/10                    | 4          | 256      | -          | -                          | 1-ch                     | 1x 8-ch  | -        | 1    | 1          | -   | -                | -             | 1             | Y   | -                | -           | Y            | -             | -             | 1.8-3.6V          | TSSOP20, TSSOP16 |

**S08LL Series | 3V Segment LCD**

20MHz S08 Core, 8 to 16KB Flash, 12-bit ADC, ultra low power, segment LCD driver, 48 to 64 pins.

| Part no. | S08 Core | Core/Bus Frequency (MHz) | Flash (KB) | RAM (KB) | EEPROM (B) | Basic Timer/PWM channels | 12-b ADC | 10-b ADC | ACMP | UART (SCI) | SPI | I <sup>2</sup> C | Touch Sensing | Modulo Timers | RTC | Gate Driver Unit | Segment LCD  | -40° to +85° | -40° to +105° | -40° to +125° | Operation Voltage | Packages              |
|----------|----------|--------------------------|------------|----------|------------|--------------------------|----------|----------|------|------------|-----|------------------|---------------|---------------|-----|------------------|--------------|--------------|---------------|---------------|-------------------|-----------------------|
| LL16     | 8-bit    | 20/10                    | 16         | 2        | -          | 4-ch                     | 1x 8-ch  | -        | 1    | 1          | 1   | 1                | -             | -             | Y   | -                | 8x24 or 4x28 | Y            | -             | -             | 1.8-3.6V          | LQFP64, LQFP48, QFN48 |
| LL8      | 8-bit    | 20/10                    | 8          | 2        | -          | 2-ch                     | 1x 8-ch  | -        | 1    | 1          | 1   | 1                | -             | -             | Y   | -                | 8x16 or 4x20 | Y            | -             | -             | 1.8-3.6V          | LQFP48, QFN48         |

## SOFTWARE TOOLS AND LIBRARIES

### 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.

For more information, please visit [nxp.com/CodeWarrior](http://nxp.com/CodeWarrior)

### 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. For more information, please visit [nxp.com/ProcessorExpert](http://nxp.com/ProcessorExpert)

### 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. For more information, please visit [nxp.com/FreeMASTER](http://nxp.com/FreeMASTER)

### IEC 60730 Safety Standard for Household Appliances

The IEC60730 safety standard defines the test and diagnostic methods that ensure the safe operation of embedded control hardware and software for household appliances. NXP provide IEC60730 class B Safety routines and certification for S08 MCUs, please visit [nxp.com/IEC60730](http://nxp.com/IEC60730)

### Get Help on NXP Community

NXP's global community provides a space that NXP users can get technical support for their products. Any technical support need or experience sharing with other S08 users, please visit [community.nxp.com/community/8bit](http://community.nxp.com/community/8bit)

## HARDWARE BOARDS AND LONGEVITY AND COMMUNITY INFO

### Hardware Development Boards (EVK)

NXP provide full-featured and cost-effective hardware boards to support our S08 MCUs. These boards integrate rich on-board resources which can cover all the on-chip peripheral functions evaluation. Common features of S08 EVKs include:

— Integrated on-board debugger (OSBDM) to support flash program and run-control debug without an external debug tool

— Arduino® compatible extension interface provides a broad range of expansion board options, including FRDM-MC-LVBLDC for motor control and FRDM-TOUCH for touch sensing applications.

| EVKs        | Supported Device                         | Resale  |
|-------------|--|---------|
| S08PT60-EVK | S08PT series, S08PA series, S08PL series | \$23.99 |
| S08PB16-EVK | S08PB series, S08PLS series              | \$23.99 |
| S08SU16-EVK | S08SU Series                             | \$30.00 |

### 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 S08 categories are covered by the program. Longevity products remain in the program even if the manufacturing site changes. We manufacture through a number of resources, including our own factories and qualified outside vendors. If we transfer a longevity product to another facility, we re-qualify the product to maintain its status in the longevity program. For a complete, up-to-date list of longevity products.



[www.nxp.com/s08](http://www.nxp.com/s08)

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