

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Renesas MCUs

H8SX Family



H8SX

Opening new doors to meet the needs of customers, the H8SX Family is the new world standard in MCUs.

The Renesas H8SX Family are high-performance MCUs that represent an evolutionary advance over the industry standard H8 architecture. These MCUs provide leading-edge functions to support a variety of applications and are available in a wide range of versions. These are the new world standard in MCUs and aim to meet our customer's ideals at a high level.

High Performance

High-performance CPU
The internal bus is 32 bits wide, the maximum operating frequency is 50 MHz, and basic instructions execute in a single state.

Two or three high-speed A/D converter units
Simultaneous and independent triggering as well as continuous operation are supported.

High Functionality

Improved peripheral functionality

- Two TPU/PPG units
- 16-bit $\Delta\Sigma$ A/D converter
- EXDMAC
- High-speed SCI/I²C bus support
- USB 2.0 support
- CAN

Variations

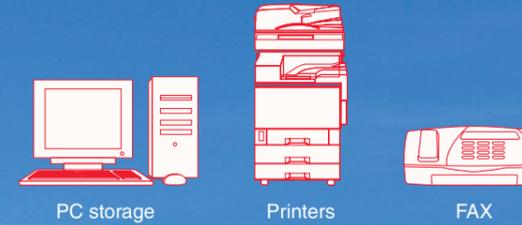
Improved peripheral functionality

- Flash memory variations: 256 KB to 1 MB
- RAM variations: 24 KB to 64 KB
- Package variations: QFP: 120/144, BGA: 176, LGA: 145



PC Peripherals and OA Equipment

These MCUs provide the high performance and high functionality required to stay one step ahead in the world of PCs and OA, where new technologies are adopted one after another.



Commercial Equipment

Applications range from POS terminals and readers that provide convenience to game machines for recreation.



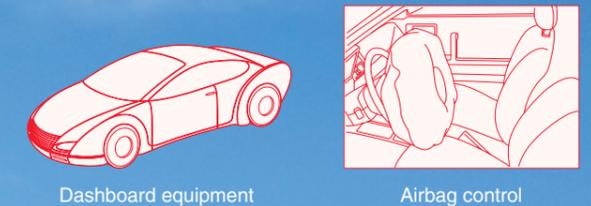
Consumer Electronics

These MCUs further enhance the level of entertainment provided by digital home electronics, AV equipment, and mobile equipment.



Automotive Equipment

These MCUs allow for safe and comfortable cars as well as environment friendliness and functionality in an ideal single unit.



H8SX Series Features

H8SX /1668R Group H8SX /1658R Group	<ul style="list-style-type: none"> • Support for USB 2.0 (Hi-Speed), which is indispensable for PC connection • Built-in EXDMAC for efficient program processing and data transfers • DRAM and SDRAM interface support
H8SX /1648 Group H8SX /1638 Group	<ul style="list-style-type: none"> • Up to three high-speed A/D converter units • Built-in flash/RAM capacities from 256 KB/24 KB to 1024 KB/56 KB • Improved 8 and 16-bit timer and PPG* units for unified pulse control
H8SX /1622 Group	<ul style="list-style-type: none"> • Both high-precision 16-bit $\Delta\Sigma$A/D and successive approximation A/D converters • 145-pin, 9 mm square miniature LGA package
H8SX /1568 Group H8SX /1558 Group	<ul style="list-style-type: none"> • Pin compatible with the H8SX/1638, 1648 group • Up to three high-speed A/D converter units • Improved 8 and 16-bit timer and PPG* units for unified pulse control
H8SX /1544 Group H8SX /1527R Group	<ul style="list-style-type: none"> • Built-in RCAN-ET for CAN control for real-time communication

* Programmable Pulse Generator



The H8SX Family Strives to Meet Our Customers' Idea

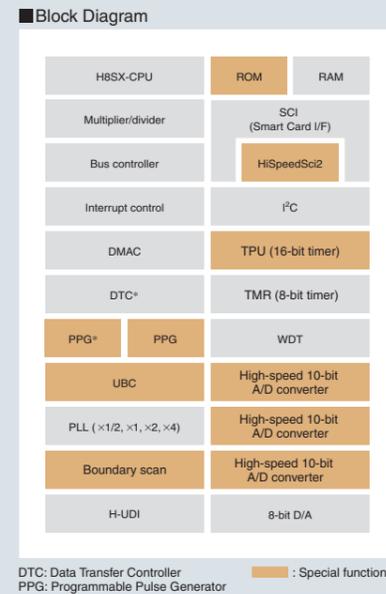


These new product groups added to the H8SX Family provide 256 KB to 1024 KB of built-in flash memory. All products in this new group support as standard a new standby mode (deep software standby mode) that reduces power consumption during standby, and the cost efficient E10A USB debugging tool. These products also feature many new functions that improve ease of use, such as an EXDMAC, which can operate the internal and external buses independently, and a 16-bit $\Delta\Sigma$ A/D converter that is capable of high-precision analog conversion, while the H8SX core improves the system's processing performance. These products represent the next step in the evolution of the H8SX family.

H8SX/1648 Group and H8SX/1638 Group

These products achieve a maximum operating frequency of 50 MHz and provide strengthened peripheral functionality by including two TPU and two PPG units.

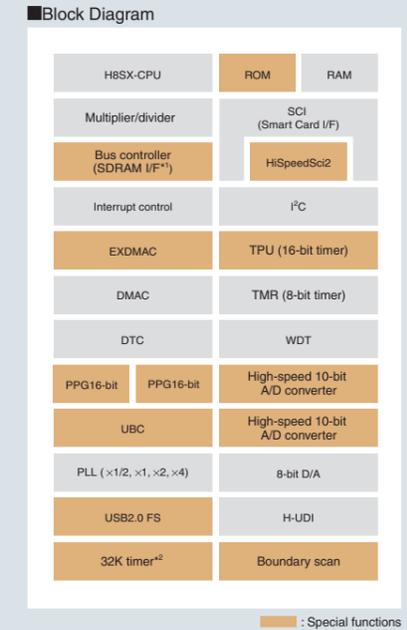
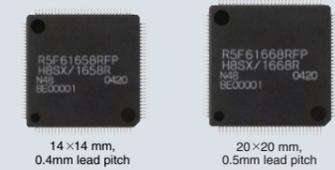
- H8SX CPU: 50 MHz at 3.0 to 3.6 V
- Built-in multiplier and divider: 16 bits \times 16 bits
Basic instructions execute in 1 state
- MCU operating modes: External expansion and single chip
- Internal memory (flash ROM and RAM)
H8SX/1648F, H8SX/1638F = 1024 KB/56 KB
H8SX/1644F, H8SX/1634F = 512 KB/40 KB
H8SX/1642F, H8SX/1632F = 256 KB/24 KB
- Bus interface functions
Basic bus, Burst ROM, Byte control SRAM, Separate/Multiplex SCI \times 7ch, I²C \times 4ch^{*1}, HSC12 \times 2ch
- Special functions
Two TPU units: total of 12 channels
Two 16-bit PPG units: total of 32 output bits
High-speed A/D converters 4ch \times 3 units: total of 12 channels (conversion time: 2.7 μ s)^{*1}
Boundary scan
UBC (user break controller)
- Packages
H8SX/1648 Group: PLQP0144KA-A (FP-144L), 20 \times 20 mm, 0.5 mm lead pitch, 1.7 mm thickness
H8SX/1648 Group: PLBG0176GA-A (BP-176V), 13 \times 13 mm, 0.8 mm lead pitch, 1.4 mm thickness
H8SX/1638 Group: PLQP0120LA-A (FP-120B), 14 \times 14 mm, 0.4 mm lead pitch, 1.7 mm thickness
^{*1}: H8SX/1638 Group: Two I²C channels and two 4-channel high-speed A/D converters



H8SX/1668 Group and H8SX/1658 Group

These products provide strengthened peripheral functionality by including two TPU and two PPG units. They also achieve improved processing performance by including a built-in EXDMAC.

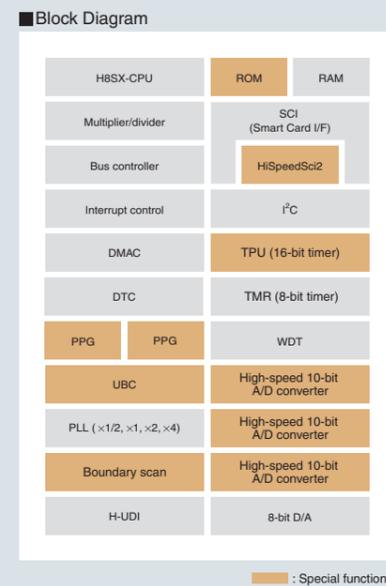
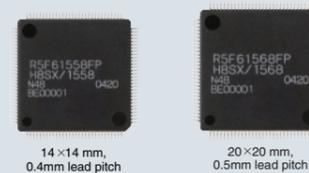
- H8SX CPU: 50 MHz at 3.0 to 3.6 V
- Built-in multiplier and divider: 16 bits \times 16 bits
Basic instructions execute in 1 state
- MCU operating modes: External expansion and single chip
- Internal memory (flash ROM and RAM)
H8SX/1668RF, H8SX/1658RF = 1024 KB/56 KB
H8SX/1664RF, H8SX/1654RF = 512 KB/40 KB
H8SX/1663RF, H8SX/1653RF = 384 KB/40 KB
- Bus interface functions
Basic bus, Burst ROM, Byte control SRAM, Separate/Multiplex SDRAM^{*1}, SCI \times 6ch (HSC12 \times 2ch), I²C \times 2ch
- Special functions
USB Ver2.0 Full-Speed Function: 12Mbps
• Transfer mode: 3 modes
• Endpoint: 4 points (Control \times 1, Interrupt \times 1, Bulk \times 2)
• FIFO Total 288bytes (Max \times 64bytes)
EXDMAC \times 4ch^{*1}
Two TPU units: total of 12 channels
Two 16-bit PPG units: total of 32 output bits
32K timer and 32 kHz sub-clock input ^{*1}
High-speed A/D converters 4ch \times 2 units: total of 12 channels (conversion time: 2.7 μ s)^{*1}
SCI/USB boot mode support
- Packages
H8SX/1668 Group: PLQP0144KA-A (FP-144L), 20 \times 20 mm, 0.5 mm lead pitch, 1.7 mm thickness
H8SX/1658 Group: PLQP0120LA-A (FP-120B), 14 \times 14 mm, 0.4 mm lead pitch, 1.7 mm thickness
^{*1}: H8SX/1658 Group: SDRAM interface, the 32 kHz sub-clock is not supported, two EXDMAC channels, and 24 bits of PPG output



H8SX/1568 Group and H8SX/1558 Group

These products achieve a maximum operating frequency of 40 MHz and provide strengthened peripheral functionality by including two TPU and two PPG units.

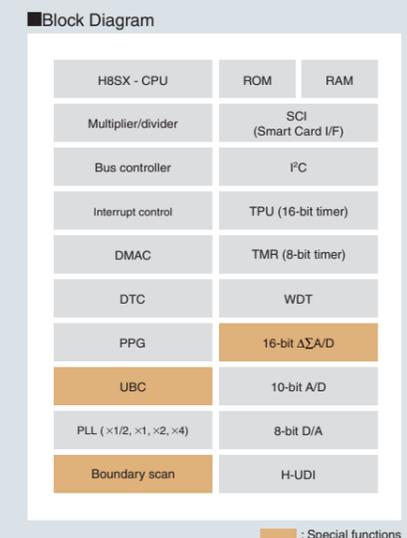
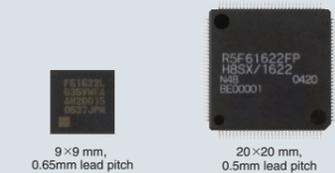
- H8SX CPU: 40 MHz at 4.5 to 5.5 V
- Built-in multiplier and divider: 16 bits \times 16 bits
Basic instructions execute in 1 state
- MCU operating modes: Single chip
- Internal memory (flash ROM and RAM)
H8SX/1568F, H8SX/1558F = 1024 KB/56 KB
H8SX/1564F, H8SX/1554F = 512 KB/40 KB
H8SX/1562F, H8SX/1552F = 256 KB/24 KB
- Bus interface functions
Basic bus, Burst ROM, Byte control SRAM, Separate/Multiplex SCI \times 7ch, I²C \times 4ch^{*1}, HSC12 \times 2ch
- Special functions
Two TPU units: total of 12 channels
Two 16-bit PPG units: total of 32 output bits
High-speed A/D converters 4ch \times 3 units: total of 12 channels (conversion time: 2.7 μ s)^{*1}
Boundary scan
UBC (user break controller)
- Packages
H8SX/1568 Group: PLQP0144KA-A (FP-144L), 20 \times 20 mm, 0.5 mm lead pitch, 1.7 mm thickness
H8SX/1558 Group: PLQP0120LA-A (FP-120B), 14 \times 14 mm, 0.4 mm lead pitch, 1.7 mm thickness
^{*1}: H8SX/1558 Group: Two I²C channels and two 4-channel high-speed A/D converters



H8SX/1622 Group

These devices include a 16-bit $\Delta\Sigma$ A/D converter and are optimal for sensor applications that require high-precision measurement.

- H8SX CPU: 50 MHz at 3.0 to 3.6 V
- Built-in multiplier and divider: 16 bits \times 16 bits
Basic instructions execute in 1 state
- MCU operating modes: External expansion and single chip
- Internal memory (flash ROM and RAM)
H8SX/1622F = 256 KB/ 24 KB
- Bus interface functions
Basic bus, Burst ROM, Byte control SRAM, Separate/Multiplex SCI \times 5ch (HSC12 \times 2ch), I²C \times 2ch
- Peripheral functions
TPU (16-bit timer): 6 channels, DMAC: 2 channels, DTC, 8-bit timer, D/A converter: 2 channels.
- Special functions
Improved analog modules
16-bit $\Delta\Sigma$ A/D converter: 6 channels (conversion time: 91.5 μ s at 25 MHz)
Single ended inputs: 4 channels
Differential inputs: 2 channels
Successive approximation 10-bit A/D converter: 8 channels
- Packages
PTLG0145JB-A (TLP-145V): 9 \times 9 mm, 0.65 mm lead pitch, 1.2 mm thickness
PLQP0144KA-A (FP-144L): 20 \times 20 mm, 0.5 mm lead pitch, 1.7 mm thickness



Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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Renesas Technology America, Inc.

450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.

7th Fl., North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.

10th Fl., No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510