To our customers,

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Renesas Electronics website: [http://www.renesas.com](http://www.renesas.com)

April 1st, 2010
Renesas Electronics Corporation

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Issued by: Renesas Electronics Corporation ([http://www.renesas.com](http://www.renesas.com))


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[RENESEAS]
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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/PC bus support
  - USB 2.0 support
  - CAN
  - Flash memory variations: 256 KB to 1 MB
  - RAM variations: 24 KB to 64 KB
  - Package variations: QFP: 120/144, BGA: 176, LGA: 145

**Variations**
- Improved peripheral functionality
  - Two TPU/PPG units
  - 16-bit \( \Delta \Sigma \) A/D converter
  - EXDMAC
  - High-speed SCI/PC bus support
  - USB 2.0 support
  - CAN

**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.

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**H8SX Series Features**

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<tr>
<th>H8SX Series</th>
<th>Features</th>
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<tr>
<td>H8SX /1668R Group</td>
<td>Support for USB 2.0 (Hi-Speed), which is indispensable for PC connection</td>
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<tr>
<td>H8SX /1658R Group</td>
<td>Built-in EXDMAC for efficient program processing and data transfers</td>
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<tr>
<td>H8SX /1648 Group</td>
<td>DRAM and SDRAM interface support</td>
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<tr>
<td>H8SX /1638 Group</td>
<td>Up to three high-speed A/D converter units</td>
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<tr>
<td>H8SX /1622 Group</td>
<td>Built-in flash/RAM capacities from 256 KB/24 KB to 1024 KB/38 KB</td>
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<tr>
<td>H8SX /1627R Group</td>
<td>Improved 8 and 16-bit timer and PPG* units for unified pulse control</td>
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<tr>
<td>H8SX /1568 Group</td>
<td>Both high-precision 16-bit ( \Delta \Sigma ) A/D and successive approximation A/D converters</td>
</tr>
<tr>
<td>H8SX /1558 Group</td>
<td>145-pin, 9 mm square miniature LGA package</td>
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<td>H8SX /1544 Group</td>
<td>Pin compatible with the H8SX/1638, 1648 group</td>
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<tr>
<td>H8SX /1527R Group</td>
<td>Up to three high-speed A/D converter units</td>
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<tr>
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</tr>
<tr>
<td>H8SX /1527R Group</td>
<td>Built-in RCAN-ET for CAN control for real-time communication</td>
</tr>
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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 ∆Σ 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 x 16 bits
- **Basic instructions execute in 1 state**
- **MCU operating modes**: External expansion and single chip
- **Internal memory (flash ROM and RAM)**
  - H8SX1648R/1648R-G5: 256 KB ROM
  - H8SX1648R/1648R-G5: 512 KB ROM
  - H8SX1638R/1638R-G5: 256 KB ROM
  - H8SX1638R/1638R-G5: 512 KB ROM
- **Bus interface functions**
  - Basic bus, Burst ROM, Style control SRAM, Separate/Multiplex
  - SCI/USB boot mode support
- **Special functions**
  - Two TPU units: total of 12 channels
  - Two 16-bit PPG units: total of 32 output bits
  - High-speed 10-bit A/D converter: 6 channels (conversion time: 91.5 µs at 25 MHz)
  - Multiplier/divider: 16 bits x 16 bits
- **Packages**
  - PLQP0144KA-A (FP-144L): 20 x 20 mm, 0.5 mm lead pitch, 1.7 mm thickness
  - PTLG0145JB-A (TLP-145V): 9 x 9 mm, 0.65 mm lead pitch, 1.2 mm thickness

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 two EXDMACs.

- **H8SX CPU**: 50 MHz at 3.0 to 3.6 V
- **Built-in multiplier and divider**: 16 bits x 16 bits
- **Basic instructions execute in 1 state**
- **MCU operating modes**: External expansion and single chip
- **Internal memory (flash ROM and RAM)**
  - H8SX1668R/1668R-G5: 256 KB ROM
  - H8SX1658R/1658R-G5: 512 KB ROM
  - H8SX1668R/1668R-G5: 1.7 mm thickness
- **Bus interface functions**
  - Basic bus, Burst ROM, Style control SRAM, Separate/Multiplex
  - SCI/USB boot mode support
- **Special functions**
  - USB Ver2.0 Full-Speed Function: 12Mbps
  - Transfer mode: 3 modes
  - Endpoints: 4 ports (Control x1, Interrupt x1, Bulk x2)
  - FIFO Total 32Kbyte (Max 64Kbyte)
  - EXDMAC, µ
- **Packages**
  - H8SX1664RF, H8SX1654RF = 512 KB ROM
  - H8SX1663RF, H8SX1653RF = 384 KB ROM

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 3.0 to 3.6 V
- **Built-in multiplier and divider**: 16 bits x 16 bits
- **Basic instructions execute in 1 state**
- **MCU operating modes**: External expansion and single chip
- **Internal memory (flash ROM and RAM)**
  - H8SX1568R/1568R-G5: 256 KB ROM
  - H8SX1558R/1558R-G5: 512 KB ROM
- **Bus interface functions**
  - Basic bus, Burst ROM, Style control SRAM, Separate/Multiplex
  - SCI/USB boot mode support
- **Special functions**
  - Two TPU units: total of 12 channels
  - Two 16-bit PPG units: total of 32 output bits
  - High-speed 10-bit A/D converter: 6 channels (conversion time: 91.5 µs at 25 MHz)
  - Multiplier/divider: 16 bits x 16 bits
- **Packages**
  - PLQP0130LA-A (FP-130B): 14 x 14 mm, 0.4 mm lead pitch, 1.7 mm thickness
  - PTLG0130JB-A (TLP-130V): 9 x 9 mm, 0.65 mm lead pitch, 1.2 mm thickness

H8SX/1662 Group

These devices include a 16-bit ∆Σ 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 x 16 bits
- **Basic instructions execute in 1 state**
- **MCU operating modes**: External expansion and single chip
- **Internal memory (flash ROM and RAM)**
  - H8SX1662F = 256 KB ROM
  - H8SX1632F = 256 KB ROM
  - H8SX1644F = 512 KB ROM
  - H8SX1634F = 512 KB ROM
- **Bus interface functions**
  - Basic bus, Burst ROM, Style control SRAM, Separate/Multiplex
  - SCI/USB boot mode support
  - USB Ver2.0 Full-Speed Function: 12Mbps
  - Transfer mode: 3 modes
  - Endpoints: 4 ports (Control x1, Interrupt x1, Bulk x2)
  - FIFO Total 32Kbyte (Max 64Kbyte)
  - EXDMAC, µ
- **Packages**
  - H8SX1664RF, H8SX1654RF = 512 KB ROM
  - H8SX1663RF, H8SX1653RF = 384 KB ROM

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The H8SX Family Strives to Meet Our Customers’ Idea
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