To our customers,

# Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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April 1st, 2010
Renesas Electronics Corporation

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# RENESAS TECHNICAL UPDATE

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Renesas Technology Corp.

| Product Category | MPU/MCU | | Document No. | TN-H8*-A416A/E | Rev. | 1.00 |
|---|---|---|---|---|---|---|
| Title | Restrictions on usage of A/D converter for H8S/2200 Series | | Information Category | Technical Notification | | |
| Applicable Product | H8S/2215 Group<br>H8S/2227 Group<br>H8S/2239 Group<br>H8S/2264 Group<br>H8S/2268 Group<br>H8S/2236R<br>H8S/2238R | Lot No.<br>All lots | Reference Document | H8S/2215 Group Hardware Manual (REJ09B0140-0800)<br>H8S/2258, H8S/2239, H8S/2238, H8S/2237, H8S/2227 Group Hardware Manual (REJ09B0054-0500)<br>H8S/2268 Group, H8S/2264 Group Hardware Manual (REJ09B0071-0400) | | |

We will set restrictions on usage of A/D converter for some products of H8S/2200 Series. Furthermore we would like to inform you of corrections due to the restrictions in the relevant Hardware Manuals. Refer to the followings for detail.

- H8S/2215 Group Hardware Manual

**[**Correction**]**

Table 16.1 Pin Configurations in 16.2 Input/Output Pins of section 16, A/D Converter has been revised as follows.

[Before Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | AVCC | Input | Analog block power supply and reference voltage |
| Analog ground pin | AVSS | Input | Analog block ground and reference voltage |
| Analog reference voltage pin | Vref | Input | Analog input pins |
| Analog input pin 0 | AN0 | Input | |
| Analog input pin 1 | AN1 | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |
| Analog input pin 14 | AN14 | Input | |
| Analog input pin 15 | AN15 | Input | |
| A/D external trigger input pin | $\overline{\text{ADTRG}}$ | Input | External trigger input pin for starting A/D conversion |

[After Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | AVCC | Input | Analog block power supply and reference voltage |
| Analog ground pin | AVSS | Input | Analog block ground and reference voltage |
| Analog reference voltage pin | Vref | Input | Analog input pins |
| Analog input pin 0 | AN0* | Input | |
| Analog input pin 1 | AN1* | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |
| Analog input pin 14 | AN14 | Input | |
| Analog input pin 15 | AN15 | Input | |
| A/D external trigger input pin | $\overline{\text{ADTRG}}$ | Input | External trigger input pin for starting A/D conversion |

Note: *AN0 and AN1 can be used only when VCC = AVCC.

16.8.3 Range of Analog Power Supply and Other Pin Settings in section 16, A/D Converter has been revised as follows.

[Before Change]

- Relationship between AVcc, AVss and Vcc, Vss

  Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter is not used, the AVcc and AVss pins must not be left open.

[After Change]

- Relationship between AVcc, AVss and Vcc, Vss

  Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter is not used, the AVcc and AVss pins must not be left open. In addition, analog inputs AN0 and AN1 can be used when Vcc = AVcc.

Table 24.2 DC Characteristics in 24.3 DC Characteristics of section 24, Electrical Characteristics (H8S/2215) has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*6 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*6 | V | |

Notes: 6. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

24.6 A/D Conversion Characteristics in section 24, Electrical Characteristics (H8S/2215) has been changed as follows.

[Before Change]

Conditions: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 2.7 V to 3.6 V, $AV_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to $AV_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 13 MHz to 16 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Conditions: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 2.7 V to 3.6 V*, $AV_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$= 13 MHz to 16 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

Note: *AN0 and AN1 can be used only when Vcc = AVcc.

Table 25.2 DC Characteristics in 25.3 DC Characteristics of section 25, Electrical Characteristics (H8S/2215R) has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*5 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*5 | V | |

Notes: 5. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

25.6 A/D Conversion Characteristics in Section 25, Electrical Characteristics (H8S/2215R) has been revised as follows.

[Before Change]

Condition A: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 2.7 V to 3.6 V, AV$_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$ = 13 MHz to 16 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

Condition B: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V, AV$_{CC}$ = 3.0 V to 3.6 V, $V_{ref}$ = 3.0 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$ = 13 MHz to 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Condition A: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 2.7 V to 3.6 V*, AV$_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$ = 13 MHz to 16 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

Condition B: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V*, AV$_{CC}$ = 3.0 V to 3.6 V*, $V_{ref}$ = 3.0 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$= 13 MHz to 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

Note:* AN0 and AN1 can be used only when Vcc = AVcc.

Table 26.2 DC Characteristics in 26.3 DC Characteristics of section 26, Electrical Characteristics (H8S/2215T) has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*6 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*6 | V | |

Notes: 6. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

26.6 A/D Conversion Characteristics in section 26, Electrical Characteristics (H8S/2215T) has been revised as follows.

[Before Change]

Conditions: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V, AV$_{CC}$ = 3.0 V to 3.6 V, $V_{ref}$ = 3.0 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$ = 16 MHz to, 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Conditions: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V*, AV$_{CC}$ = 3.0 V to 3.6 V*, $V_{ref}$ = 3.0 V to AV$_{CC}$,
$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = AV$_{SS}$ = 0 V, $\phi$ = 16 MHz to, 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),
$T_a$ = –40°C to +85°C (wide-range specifications)

Note: *AN0 and AN1 can be used only when Vcc = AVcc.

Table 27.2 DC Characteristics in 27.3 DC Characteristics of section 27, Electrical Characteristics (H8S/2215C) has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*6 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*6 | V | |

Notes: 6. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

27.6 A/D Conversion Characteristics in Section 27 Electrical Characteristics (H8S/2215C) has been revised as follows.

[Before Change]

Condition: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V, $AV_{CC}$ = 3.0 V to 3.6 V, $V_{ref}$ = 3.0 V to $AV_{CC}$,

$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 16 MHz to 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),

$T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Condition: $V_{CC}$ = PLL$V_{CC}$ = Dr$V_{CC}$ = 3.0 V to 3.6 V*, $AV_{CC}$ = 3.0 V to 3.6 V*, $V_{ref}$ = 3.0 V to $AV_{CC}$,

$V_{SS}$ = PLL$V_{SS}$ = Dr$V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 16 MHz to 24 MHz, $T_a$ = –20°C to +75°C (regular specifications),

$T_a$ = –40°C to +85°C (wide-range specifications)

Note:* AN0 and AN1 can be used only when Vcc = AVcc .

• H8S/2258, H8S/2239, H8S/2238, H8S/2237, H8S/2227 Group Hardware Manual

**[**Correction**]**

Table 17.1 Pin Configuration in 17.2 Input/Output Pins of section 17, A/D Converter has been revised as follows.

[Before Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | $AV_{CC}$ | Input | Analog power supply voltage |
| Analog ground pin | $AV_{SS}$ | Input | Analog block ground and reference voltage |
| Reference voltage pin | Vref | Input | Reference voltage for A/D conversion |
| Analog input pin 0 | AN0 | Input | Group 0 analog input pins |
| Analog input pin 1 | AN1 | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |

[After Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | $AV_{CC}$ | Input | Analog power supply voltage |
| Analog ground pin | $AV_{SS}$ | Input | Analog block ground and reference voltage |
| Reference voltage pin | Vref | Input | Reference voltage for A/D conversion |
| Analog input pin 0 | AN0* | Input | Group 0 analog input pins |
| Analog input pin 1 | AN1* | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |

Note: AN0 and AN1 for *H8S/2239 Group, H8S/2227 Group, H8S/2238R, and H8S/2236R can be used only when Vcc = AVcc.

17.8.4 Range of Analog Power Supply and Other Pin Settings in section 17, A/D Converter has been reviewed as follows.

[Before Change]

- Relationship between AVcc, AVss and Vcc, Vss

  Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter is not used, the AVcc and AVss pins must not be left open.

[After Change]

- Relationship between AVcc, AVss and Vcc, Vss

  Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter is not used, the AVcc and AVss pins must not be left open. In addition, analog inputs AN0 and AN1 for H8S/2239 Group, H8S/2227 Group, H8S/2238R, and H8S/2236R can be used only when Vcc = AVcc.

Table 27.14 DC Characteristics(1) in 27.3.2 DC Characteristics of section 27, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*5 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*5 | V | |

Notes: 5. Max of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

27.3.4 A/D Conversion Characteristics in section 27, Electrical Characteristics has been revised as follows.

[Before Change]

Condition A (F-ZTAT version and masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V, $AV_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 16.0 MHz,

$T_a$ = –20°C to +75°C (regular specifications)

Condition B (Masked ROM version):

$V_{CC}$ = 2.2 V to 3.6 V, $AV_{CC}$ = 2.2 V to 3.6 V, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V,

$\phi$ = 2 to 6.25 MHz, $T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

Condition C (F-ZTAT version and masked ROM version):

$V_{CC}$ = 3.0 V to 3.6 V, $AV_{CC}$ = 3.0 V to 3.6 V, $V_{ref}$ = 3.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 10.0 to 20.0 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

[After Change]

Condition A (F-ZTAT version and masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V*, $AV_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 16.0 MHz,

$T_a$ = –20°C to +75°C (regular specifications)

Condition B (Masked ROM version):

$V_{CC}$ = 2.2 V to 3.6 V*, $AV_{CC}$ = 2.2 V to 3.6 V*, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V,

$\phi$ = 2 to 6.25 MHz, $T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition C (F-ZTAT version and masked ROM version):

$V_{CC}$ = 3.0 V to 3.6 V*, $AV_{CC}$ = 3.0 V to 3.6 V*, $V_{ref}$ = 3.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 10.0 to 20.0 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to + 85°C (wide-range specifications)

Note:* AN0 and AN1 can be used only when Vcc = AVcc.

Table 27.39 DC Characteristics(1) in 27.5.2 DC Characteristics of section 27, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*5 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*5 | V | |

Notes: 5. Max of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

27.5.4 A/D Conversion Characteristics in section 27, Electrical Characteristics has been revised as follows.

[Before Change]

Condition A (F-ZTAT version and masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V, $AV_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ =$AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5 MHz,

$T_a$ = –20°C to + 75°C (regular specifications), $T_a$ =–40°C to + 85°C (wide-range specifications)

Condition B (F-ZTAT version): $V_{CC}$ = 2.2 V to 3.6 V, $AV_{CC}$ = 2.2 V to 3.6 V, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ =$AV_{SS}$ = 0 V,

$\phi$= 2 to 6.25 MHz, $T_a$ =–20°C to +75°C (regular specifications)

Condition C (Masked ROM version): $V_{CC}$ = 2.2 V to 3.6 V, $AV_{CC}$ = 2.2 V to 3.6 V, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V,

$\phi$ = 2 to 6.25 MHz, $T_a$ = –20°C to + 75°C (regular specifications), $T_a$ = –40°C to + 85°C (wide-range specifications)

[After Change]

Condition A (F-ZTAT version and masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V*, $AV_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ =$AV_{SS}$ = 0 V, $\phi$= 2 to 13.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

Condition B (F-ZTAT version): $V_{CC}$ = 2.2 V to 3.6 V*, $AV_{CC}$ = 2.2 V to 3.6 V*, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ =$AV_{SS}$ = 0 V,

$\phi$ = 2 to 6.25 MHz, $T_a$ =–20°C to +75°C (regular specifications)

Condition C (Masked ROM version): $V_{CC}$ = 2.2 V to 3.6 V*, $AV_{CC}$ = 2.2 V to 3.6 V*, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V,

$\phi$ = 2 to 6.25 MHz, $T_a$ =–20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Note: *AN0 and AN1 can be used only when Vcc = AVcc.

Table 27.51 DC Characteristics(1) in 27.6.2 DC Characteristics of section 27, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4 and 9*5 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*5 | V | |

Notes: 5. Max of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

27.6.4 A/D Conversion Characteristics in section 27, Electrical Characteristics has been revised as follows.

[Before Change]

Condition A (ZTAT version):

$V_{CC}$ = 2.7 V to 3.6 V, $AV_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 10 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition B (F-ZTAT version, Masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V, $AV_{CC}$ = 2.7 V to 3.6 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

Condition C (Masked ROM version):

$V_{CC}$ = 2.2 V to 3.6 V, $AV_{CC}$ = 2.2 V to 3.6 V, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 6.25 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Condition A (ZTAT version):

$V_{CC}$ = 2.7 V to 3.6 V*, $AV_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 10 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition B (F-ZTAT version, Masked ROM version):

$V_{CC}$ = 2.7 V to 3.6 V*, $AV_{CC}$ = 2.7 V to 3.6 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to + 85°C (wide-range specifications)

Condition C (Masked ROM version):

$V_{CC}$ = 2.2 V to 3.6 V*, $AV_{CC}$ = 2.2 V to 3.6 V*, $V_{ref}$ = 2.2 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$= 2 to 6.25 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Note: *AN0 and AN1 can be used only when Vcc = AVcc.

• H8S/2268 Group, H8S/2264 Group Hardware Manual

[Correction]

Table 15.1 Pin Configuration in 15.2 Input/Output Pins of section 15, A/D Converter has been revised as follows.

[Before Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | AVcc | Input | Analog power supply voltage |
| Analog ground pin | AVss | Input | Analog block ground and reference voltage |
| Reference voltage pin | Vref | Input | Reference voltage for A/D conversion |
| Analog input pin 0 | AN0 | Input | Group 0 analog input pins |
| Analog input pin 1 | AN1 | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |

[After Change]

| Pin Name | Symbol | I/O | Function |
|---|---|---|---|
| Analog power supply pin | AVcc | Input | Analog power supply voltage |
| Analog ground pin | AVss | Input | Analog block ground and reference voltage |
| Reference voltage pin | Vref | Input | Reference voltage for A/D conversion |
| Analog input pin 0 | AN0* | Input | Group 0 analog input pins |
| Analog input pin 1 | AN1* | Input | |
| Analog input pin 2 | AN2 | Input | |
| Analog input pin 3 | AN3 | Input | |

Note: *AN0 and AN1 can be used only when Vcc = AVcc.

15.8.4 Range of Analog Power Supply and Other Pin Settings in section 15, A/D Converter has been revised as follows.

[Before Change]

• Relationship between AVcc, AVss and Vcc, Vss

Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter is not used, the AVcc and AVss pins must not be left open.

[After Change]

• Relationship between AVcc, AVss and Vcc, Vss

Set AVss = Vss as the relationship between AVcc, AVss and Vcc, Vss. If the A/D converter isnot used, the AVcc and AVss pins must not be left open. In addition, analog inputs AN0 and AN1 can be used only when Vcc = AVcc.

Table 25.2 DC Characteristics(1) in 25.2.2 DC Characteristics of section 25, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9,PH7 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9,PH7*4 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*4 | V | |

Notes: 4. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

Table 25.2 DC Characteristics(2) in 25.2.2 DC Characteristics of section 25, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9,PH7 | $V_{IH}$ | Vcc×0.8 | - | Vcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9,PH7*4 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*4 | V | |

Notes: 4. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

25.2.4 A/D Conversion Characteristics in section 25, Electrical Characteristics has been revised as follows.

[Before Change]

Condition A (F-ZTAT version):

$V_{CC}$ = 3.0 V to 5.5 V, $AV_{CC}$ = 2.7 V to 5.5 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition C (F-ZTAT version):

$V_{CC}$ = 4.0 V to 5.5 V, $AV_{CC}$ = 4.0 V to 5.5 V, $V_{ref}$ = 4.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 10 to 20.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

[After Change]

Condition A (F-ZTAT version):

$V_{CC}$ = 3.0 V to 5.5 V*, $AV_{CC}$ = 2.7 V to 5.5 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition C (F-ZTAT version):

$V_{CC}$ = 4.0 V to 5.5 V*, $AV_{CC}$ = 4.0 V to 5.5 V*, $V_{ref}$ = 4.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$= 10 to 20.5 MHz,

$T_a$ =–20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

Note:* AN0 and AN1 can be used only when Vcc = AVcc.

Table 25.15 DC Characteristics(1) in 25.3.2 DC Characteristics of section 25, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9*4 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*4 | V | |

Notes: 4. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

Table 25.15 DC Characteristics(2) in 25.3.2 DC Characteristics of section 25, Electrical Characteristics has been revised as follows.

[Before Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3 | V | |

[After Change]

| Item | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Input high voltage | Ports 4,9*4 | $V_{IH}$ | Vcc×0.8 | - | AVcc+0.3*4 | V | |

Notes: 4. Max. of P40 and P41 becomes Vcc+0.3V when Vcc < AVcc.

25.3.4 A/D Conversion Characteristics in section 25, Electrical Characteristics has been revised as follows.

[Before Change]

Condition B (Masked-ROM version):

$V_{CC}$ = 2.7 V to 5.5 V, $AV_{CC}$ = 2.7 V to 5.5 V, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Condition D (Masked-ROM version):

$V_{CC}$ = 4.0 V to 5.5 V, $AV_{CC}$ = 4.0 V to 5.5 V, $V_{ref}$ = 4.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 10 to 20.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

[After Change]

Condition B (Masked-ROM version):

$V_{CC}$ = 2.7 V to 5.5 V*, $AV_{CC}$ = 2.7 V to 5.5 V*, $V_{ref}$ = 2.7 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 2 to 13.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ =–40°C to +85°C (wide-range specifications)

Condition D (Masked-ROM version):

$V_{CC}$ = 4.0 V to 5.5 V*, $AV_{CC}$ = 4.0 V to 5.5 V*, $V_{ref}$ = 4.0 V to $AV_{CC}$, $V_{SS}$ = $AV_{SS}$ = 0 V, $\phi$ = 10 to 20.5 MHz,

$T_a$ = –20°C to +75°C (regular specifications), $T_a$ = –40°C to +85°C (wide-range specifications)

Note: *AN0 and AN1 can be used only when Vcc = AVcc.