



REAL TIME CLOCK MODULE (SPI-Bus)

Built-in SRAM

RX-4581 NB

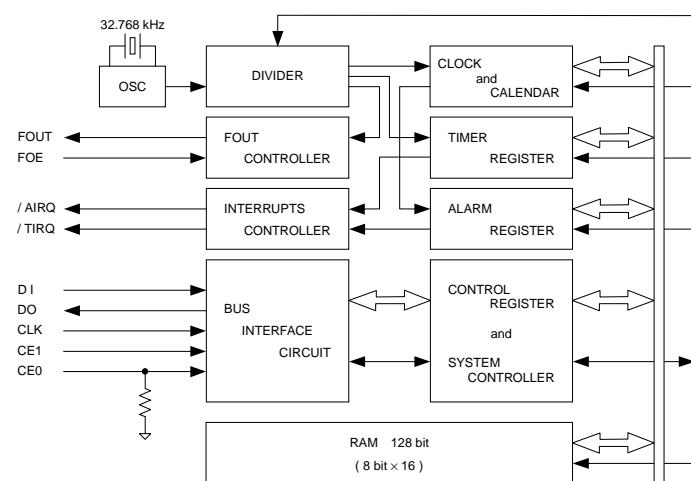
- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : 4-wire serial interface
- Operating voltage range : 1.6 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- Low backup current : 0.4 μ A / 3 V (Typ.)
- Built-in SRAM : Built-in 128 bit (8 bit \times 16) RAM.
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.

Product Number (Please contact us)
RX-4581NB : Q41458191000200

Actual size

RX-4581
E1234A

Block diagram



Overview

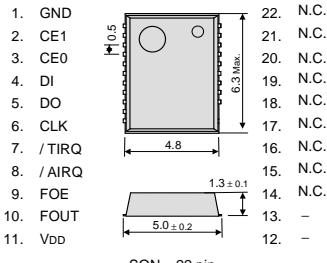
- Built-in SRAM**
 - Include 128 bit (8 bit \times 16) RAM.
- Interface Type**
 - Serial interface in 4 lines form.
 - It is possible to make it to 3 lines by wired-OR connecting DI and DO pins.
- 32.768 kHz frequency output function**
 - FOUT pin output (C-MOS output), CL=30 pF
 - FOE pin enables output on/off control.
- Timer function**
 - Timer function can be set up between 1/4096 second and 4095 minutes.
 - It is recorded automatic to TF-bit at the time of event occurrence, and possible to output with /TIRQ pin output (open-drain output).
- Interrupt function**
 - Alarm interrupt function, and timer interrupt function.

Pin Function

Terminal connection / External dimensions (Unit:mm)

| Signal Name | Input/Output | Function |
|-------------|--------------|--|
| CE0 | Input | The chip enabled input pin 0. (It has a built-in pull-down resistance) |
| CE1 | Input | The chip enabled input pin 1. (It does not have a built-in pull-down resistance) |
| CLK | Input | The shift clock input pin for serial data transfer. |
| DI | Input | The data input pin for serial data transfer. |
| DO | Output | The data output pin for serial data transfer. |
| FOUT | Output | This pin outputs the reference clock signal at 32.768 kHz (CMOS output). High impedance at the time of output off. |
| FOE | Input | The input pin for the FOUT output control. |
| /AIRQ | Output | The open drain output pin for alarm and time update interrupts. |
| /TIRQ | Output | The open drain output pin for timer interrupt. |
| VDD | — | Connected to a positive power supply. |
| GND | — | Connected to a ground. |

RX-4581 NB



The metal case inside of the molding compound may be exposed on the top or bottom of this product.
This purely cosmetic and does not have any effect on quality, reliability or electrical specs.

Specifications (characteristics)

* Refer to application manual for details.

■ Recommended Operating Conditions

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--------|------------|------|------|------|------|
| Power voltage | VDD | — | 1.6 | 3.0 | 5.5 | V |
| Clock voltage | VCLK | — | 1.6 | 3.0 | 5.5 | V |
| Operating temperature | TOPR | — | -40 | +25 | +85 | °C |

■ Frequency characteristics

| Item | Symbol | Conditions | Rating | Unit |
|---------------------------|--------------|----------------------------|---------------------------------|------|
| Frequency tolerance | $\Delta f/f$ | Ta = +25 °C VDD = 3.0 V | B: 5 ± 23 * $\times 10^{-6}$ | |
| Oscillation start-up time | tSTA | Ta = +25 °C VDD = 3.0 V | 3 Max. | s |

* Please ask for tighter tolerance. (Equivalent to 1 minute of monthly deviation)

■ Current consumption characteristics

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--------|--|-----------|------|------|--------------|
| | | | VDD = 5 V | - | 0.6 | |
| Current Consumption | IBK | CE0, CE1 = GND FOE = GND FOUT ; output OFF (Hi - z) | VDD = 3 V | - | 0.4 | 0.8 μ A |
| | | CE0, CE1 = GND FOE = VDD FOUT ; 32.768 kHz output ON CL = 30 pF | VDD = 5 V | - | 8.0 | 20.0 μ A |
| Current Consumption | I32k | CE0, CE1 = GND FOE = VDD FOUT ; 32.768 kHz output ON CL = 30 pF | VDD = 3 V | - | 5.0 | 12.0 μ A |

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At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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| | |
|---|---|
|  | ► Pb free. |
|  | ► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.) |
|  | ► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc. |
|  | ► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc). |

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