

REAL TIME CLOCK MODULE (SPI-Bus)  
LOW BACKUP VOLTAGE



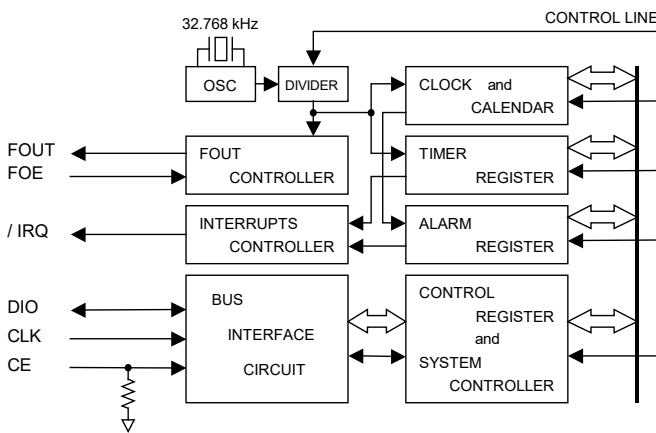
Product Number  
**RX-4571LC : Q414571C2000100**  
**RX-4571SA : Q41457152000100**

**RX-4571LC / SA**

- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : 3-wire serial interface
- Operating voltage range : 1.6 V to 5.5 V
- The wide voltage for time keeping. : 1.0 V to 5.5 V / T<sub>a</sub> = +25 °C
- Low backup current : 0.32 μA (Typ.) / 3 V
- 32.768 kHz frequency output function : C-MOS output With OE pin.
- Real-time clock function  
 Clock/calendar function, auto leap year correction function, alarm and Timer interrupt function, etc.



**Block diagram**



**Overview**

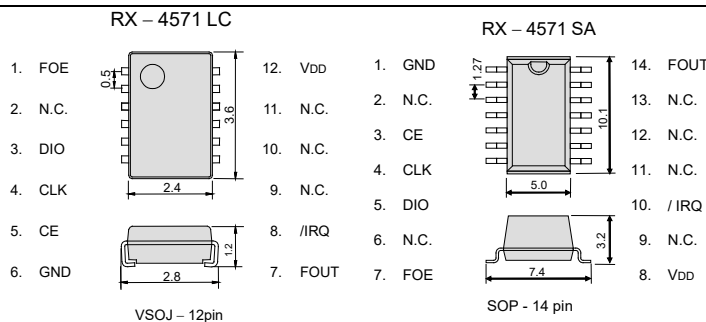
- **32.768 kHz frequency output function**
  - FOUT pin output ( C-MOS output ), CL=30 pF
- **Timer function**
  - Timer function which can be set up between 1/4096 second and 4095 minutes.
- **Alarm function**
  - Alarm function can be set to any combination of day, day of week, hour, or minute.

• **Pin Function**

| Signal Name | Input / Output | Function                                                                  |
|-------------|----------------|---------------------------------------------------------------------------|
| CE          | Input          | The chip enabled input pin 0. ( It has a built -in pull-down resistance ) |
| CLK         | Input          | The shift clock input pin for serial data transfer.                       |
| DIO         | Bi-directional | The data input / output pin for serial data transfer.                     |
| FOUT        | Output         | 32.768 kHz clock output pin with the output control function. ( C-MOS )   |
| FOE         | Input          | FOE pin control the condition of FOUT with FSEL1-bit, FSEL0-bit, etc.     |
| / IRQ       | Output         | Interrupt output ( N-ch open drain )                                      |
| VDD         | —              | Connected to a positive power supply.                                     |
| GND         | —              | Connected to a ground.                                                    |

**Terminal connection / External dimensions**

(Unit:mm)



**\*Stop using the glue**  
 Any glue must never use it after soldering LC-package to a circuit board. This product has glass on the back side of a package. When glue invasions between circuit board side and glass side, then glass cracks by thermal expansion of glue. In this case a crystal oscillation stops. Consider glue abolition or glue do not touch to LC-package

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             | T <sub>a</sub> = +25 °C        | 1.0  | 3.0  | 5.5  | V    |
|                       |                  | T <sub>a</sub> = -40 to +85 °C | 1.1  | 3.0  | 5.5  | V    |
| Operating temperature | T <sub>OPR</sub> | —                              | -40  | +25  | +85  | °C   |

■ Frequency characteristics

| Item                      | Symbol           | Conditions                             | Rating      | Unit               |
|---------------------------|------------------|----------------------------------------|-------------|--------------------|
| Frequency tolerance       | Δ f / f          | T <sub>a</sub> = +25 °C<br>VDD = 3.0 V | B: 5 ± 23 * | × 10 <sup>-6</sup> |
| Oscillation start-up time | t <sub>STA</sub> | T <sub>a</sub> = +25 °C<br>VDD = 1.6 V | 1 Max.      | s                  |

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

■ Current consumption characteristics

T<sub>a</sub> = -40 °C to +85 °C

| Symbol           | Conditions                                      | Min.      | Typ. | Max. | Unit |    |
|------------------|-------------------------------------------------|-----------|------|------|------|----|
| I <sub>BK</sub>  | CE = GND<br>/IRQ = OFF                          | VDD = 5 V | -    | 0.40 | 1.00 | μA |
|                  | FOUT ;<br>output OFF ( Hi - z )                 | VDD = 3 V | -    | 0.32 | 0.95 |    |
| I <sub>32k</sub> | CE = GND<br>/IRQ = OFF                          | VDD = 5 V | -    | 8.0  | 14.0 | μA |
|                  | FOUT ;<br>32.768 kHz output<br>ON<br>CL = 30 pF | VDD = 3 V | -    | 5.0  | 8.5  |    |

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.<br>*About the products without the Pb-free mark.<br>Contains Pb in products exempted by EU RoHS directive.<br>(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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