

# REAL TIME CLOCK MODULE (I<sup>2</sup>C-Bus)

## High-Stability Frequency with Built in Timestamp and Power Switching

# RX-8035 SA/LC

- Built-in 32.768 kHz crystal unit : Frequency adjusted for high accuracy. ( $\pm 5 \times 10^{-6} / T_a = +25^\circ\text{C}$ )
- Interface Type : I<sup>2</sup>C-Bus Interface (400kHz)
- Operating voltage range : 2.4 V to 5.5 V
- Wide voltage for Timekeeping. : 1.0 V to 5.5 V
- Low backup current : 350 nA (SA) 400 nA (LC) / 3 V (Typ.)
- Event detection and Time stamp : One-shot full timestamp and interrupt.
- Dual event detection ports : Each terminal has a de-bounce circuit.
- Auto power switching functions : It switches VDD and VBAT, automatically.
- Dual Alarm, Periodic interruption.

Epson prepared Linux driver for development.

([http://www5.epsondevice.com/en/information/support/linux\\_rtc/](http://www5.epsondevice.com/en/information/support/linux_rtc/))

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The I<sup>2</sup>C-Bus is a trademark of NXP Semiconductors.



Product Number (Please contact us)  
 RX-8035SA B : X1B000172000100  
 RX-8035SA AC : X1B000172000200  
 RX-8035SA AA : X1B000172000300  
 RX-8035LC B : X1B000182000100  
 RX-8035LC AC : X1B000182000200  
 RX-8035LC AA : X1B000182000300



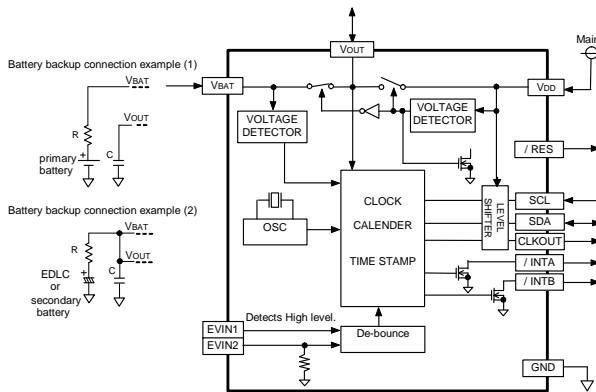
Actual size

RX-8035SA

RX-8035LC



### Block diagram



### Overview

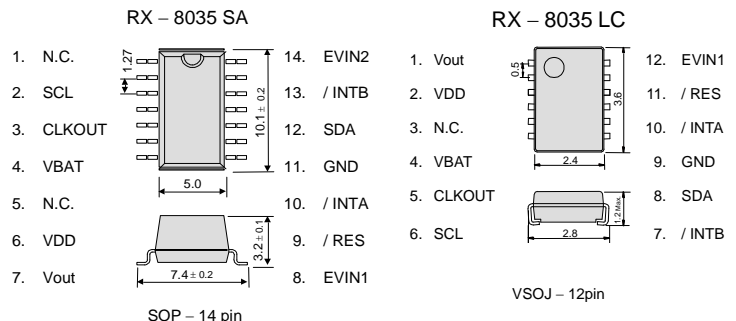
- **The event detection and Timestamp function**  
Dual event detection terminals.  
Selectable de-bounce time 35ms or 2s.  
Available event detection interrupt output.
- **Power switching functions.**
  - An external diode is unnecessary to have a reverse current prevention switch built-in in the VBAT side to connect a primary cell to.
  - When VDD is less than 2.4V, an internal source is switched to VBAT, and /RES is Low level. When VDD voltage rises to higher than 2.52V, an internal source is switched to VDD, and /RES is released with 105ms delay.
  - Note: When the supply from VBAT, SCL and SDA are disabled.
- **Alarm, Periodic interrupt, 32.768kHz clock output.**
  - Available monthly-alarm and weekly- Dual alarm.
  - Interrupt period are selectable from 2Hz to Monthly.
  - CLKOUT outputs 32.768kHz, it powered from VDD.

### Pin function

| Signal Name | Input / Output | Function  |
|-------------|----------------|---|
| SCL         | Input          | I <sup>2</sup> C serial clock.                    |
| SDA         | In/Out         | I <sup>2</sup> C data in/out.                     |
| VDD         | —              | Main power supply.                                |
| VBAT        | —              | Power supply for backup.                          |
| Vout        | Output         | Switched power out. (maximum output current 20mA) |
| / RES       | Output         | VDD voltage state.                                |
| GND         | —              | Ground  |
| EVIN1       | Input          | Event detection input 1                           |
| EVIN2       | Input          | Event detection input 2                           |
| / INTA      | Output         | Interrupt out A.                                  |
| / INTB      | Output         | Interrupt out B.                                  |
| CLKOUT      | Output         | 32.768kHz output. (CMOS. Can not inhibit.)        |
| N.C.        | —              | Do not connect.                                   |

### Terminal connection / External dimensions

(Unit:mm)



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.

#### \*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

### Specifications (characteristics)

\* Refer to application manual for details.

#### Recommended Operating Conditions

| Item                  | Symbol  | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|---------|------------|------|------|------|------|
| Operating voltage     | VACCESS | VDD        | 2.4  | 3.0  | 5.5  | V    |
| Time keeping voltage  | VCLK    | VBAT       | 1.0  | 3.0  | 5.5  | V    |
| Operating temperature | TOPR    | —          | -40  | +25  | +85  | °C   |
| Storage temperature   | TSTG    | —          | -55  | —    | +125 | °C   |

#### Frequency characteristics

| Item                                | Symbol           | Conditions   | Rating  | Unit               |
|-------------------------------------|------------------|--|---|--------------------|
| Frequency tolerance                 | $\Delta f / f$   | T <sub>a</sub> = +25°C<br>V <sub>BAT</sub> = 3.0 V         | B: 5 ± 23 <sup>(*)1</sup><br>AA: 5 ± 5 <sup>(*)2</sup><br>AC: 0 ± 5 <sup>(*)2</sup> | × 10 <sup>-6</sup> |
| Oscillation start-up time           | t <sub>STA</sub> | T <sub>a</sub> = +25°C<br>V <sub>DD</sub> = 3.0 V          | 1 Max.  | s                  |
| Frequency / voltage characteristics | f / V            | T <sub>a</sub> = +25°C<br>V <sub>DD</sub> = 2.4 V to 5.5 V | ± 1 Max.  | × 10 <sup>-6</sup> |

\*1) Equivalent to ±1 minute of monthly deviation (excluding offset).  
 \*2) Equivalent to ±13 seconds of monthly deviation (excluding offset).

#### Current consumption characteristics

T<sub>a</sub> = -40 °C to +85 °C

| Item                | Symbol           | Conditions  | Min. | Typ. | Max. | Unit |
|---------------------|------------------|---|------|------|------|------|
| Current Consumption | I <sub>BAT</sub> | RX-8035SA<br>V <sub>BAT</sub> = 3.0V, V <sub>DD</sub> = 0.0V<br>SCL=SDA = GND | -    | 350  | 1200 | nA   |
|                     |                  | RX-8035LC<br>V <sub>BAT</sub> = 3.0V, V <sub>DD</sub> = 0.0V<br>SCL=SDA = GND | -    | 400  | -    | -    |
|                     | I <sub>DD</sub>  | V <sub>DD</sub> = 3.0V<br>SCL=SDA = GND<br>CLKOUT = open                      | -    | 1.40 | 2.50 | μA   |

#### Power supply detection voltage

T<sub>a</sub> = -40 °C to +85 °C

| Item                                  | Symbol           | Conditions | Min.  | Typ. | Max.  | Unit |
|---------------------------------------|------------------|------------|-------|------|-------|------|
| Voltage of low battery voltage.       | V <sub>LOW</sub> | -          | 1.10  | 1.25 | 1.40  | V    |
| Power switching voltage (VDD to VBAT) | V <sub>D2B</sub> | +25 °C     | 2.328 | 2.40 | 2.472 | V    |

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|   |   |
|---|---|
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|  | ► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.  |
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