

# 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
- Timekeeping voltage range : 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 : When  $V_{DD}$  deteriorates than 2.4V, internal source is switched to  $V_{BAT}$ .

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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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



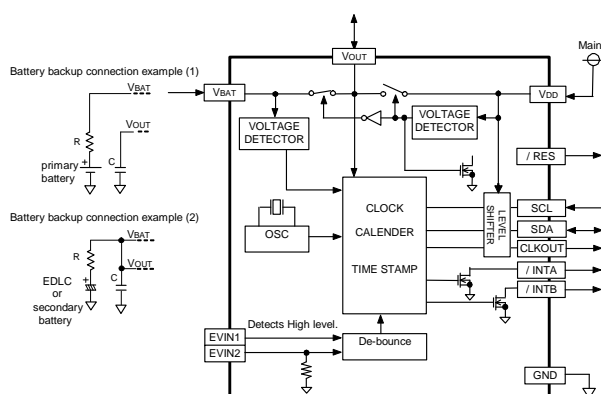
Actual size

RX-8035SA

RX-8035LC



### Block diagram



### Overview

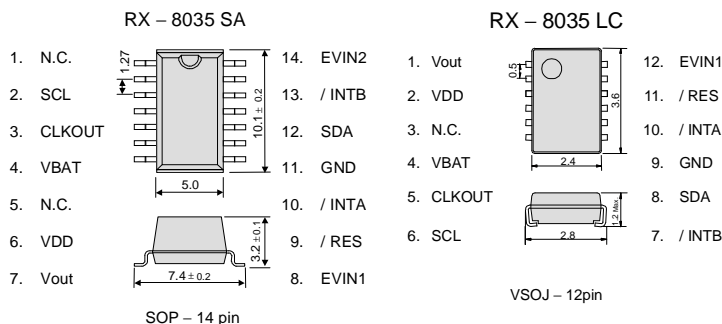
- **The event detection and Timestamp function**  
 Dual event detection terminals.  
 Selectable de-bounce time 35ms or 2s.  
 Available event detection interrupt output.
- **Power switching functions.**
  - An external diode is unnecessary to have a reverse current prevention switch built-in in the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

### 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.
$V_{DD}$	—	Main power supply.
$V_{BAT}$	—	Power supply for backup.
$V_{out}$	Output	Switched power out. (maximum output current 20mA)
$/RES$	Output	$V_{DD}$ 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	$V_{ACCESS}$	$V_{DD}$	2.4	3.0	5.5	V
Time keeping voltage	$V_{CLK}$	$V_{BAT}$	1.0	3.0	5.5	V
Operating temperature	$T_{OPR}$	—	-40	+25	+85	°C
Storage temperature	$T_{STG}$	—	-55	—	+125	°C

#### Frequency characteristics

Item	Symbol	Conditions	Rating	Unit
Frequency tolerance	$\Delta f / f$	$T_a = +25^\circ\text{C}$ $V_{BAT} = 3.0 \text{ V}$	B: $5 \pm 23^{*1}$ AA: $5 \pm 5^{*2}$ AC: $0 \pm 5^{*2}$	$\times 10^{-6}$
Oscillation start-up time	$t_{STA}$	$T_a = +25^\circ\text{C}$ $V_{DD} = 3.0 \text{ V}$	1 Max.	s
Frequency / voltage characteristics	$f / V$	$T_a = +25^\circ\text{C}$ $V_{DD} = 2.4 \text{ V to } 5.5 \text{ V}$	$\pm 1 \text{ Max.}$	$\times 10^{-6}$

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

#### Current consumption characteristics

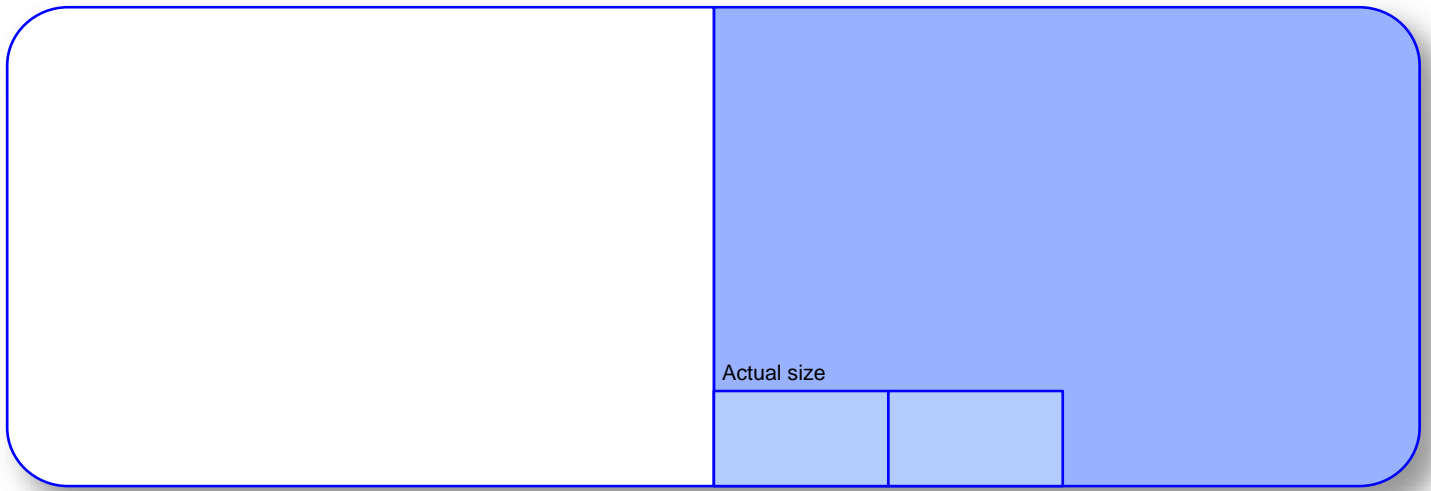
$T_a = -40^\circ\text{C to } +85^\circ\text{C}$

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Consumption	$I_{BAT}$	RX-8035SA $V_{BAT} = 3.0 \text{ V}$ , $V_{DD} = 0.0 \text{ V}$ $SCL = SDA = GND$	-	350	1200	nA
	$I_{DD}$	RX-8035LC $V_{BAT} = 3.0 \text{ V}$ , $V_{DD} = 0.0 \text{ V}$ $SCL = SDA = GND$	-	400	1200	nA
		$V_{DD} = 3.0 \text{ V}$ $SCL = SDA = GND$ $CLKOUT = \text{open}$	-	1.40	2.50	$\mu\text{A}$

#### Power supply detection voltage

$T_a = -40^\circ\text{C to } +85^\circ\text{C}$

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Voltage of low battery voltage.	$V_{LOW}$	-	1.10	1.25	1.40	V
Power switching voltage ( $V_{DD}$ to $V_{BAT}$ )	$V_{D2B}$	$+25^\circ\text{C}$	2.328	2.40	2.472	V



## 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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	► 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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