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Real time clock module

SEIKO EPSON CORPORATION

Pb Free

RoHS Compliant

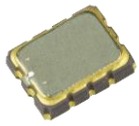
Product Number (2,000 pcs / Reel)
RX8901CE XS A0 : X1B000481000115
RX8901CE XB A0 : X1B000481000215
RX8901CE XS B0 : X1B000481000315
RX8901CE XB B0 : X1B000481000415

REAL TIME CLOCK MODULE (I²C-Bus)

Built-in 32.768 kHz-DTCXO, +105°C operating temperature,
Low current consumption, Built-in power supply switching circuit and
Time stamp function up to 32 records

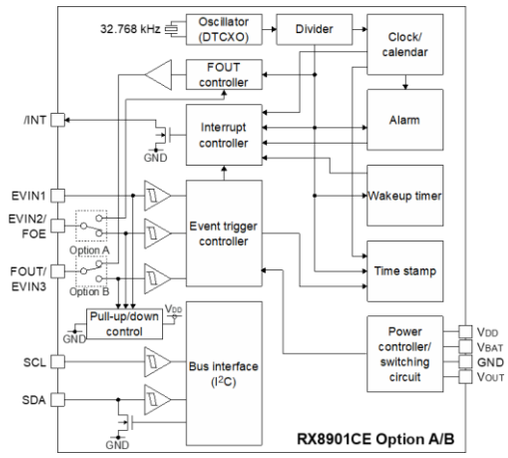
RX8901CE

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : I²C-Bus
- Current consumption : 240 nA / 3 V (Typ.)
- Auto power switching function : Automatically switches to backup power supply by monitoring the V_{DD} / V_{BAT} voltage
- Time stamp function : Maximum 32 time stamps
- Interrupt output : Wake up every hour or every minute or every second
- Alarm interruption : Day, date, hour, minute, second
- Auto repeat wakeup timer interruption
- Self-monitoring interruption : Crystal oscillation stop, V_{BAT} low, V_{DD} low



RX8901CE
(3.2 × 2.5 mm, t = 1.0 mm Max.)

Block diagram



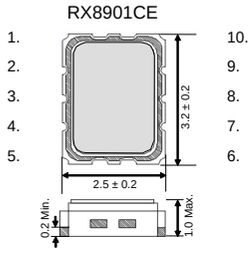
Overview

- Interface type
  I²C-Bus interface Fast-Mode 400 kHz
- High stability
  XS : ±3.0 x 10^{-6} / -40 ºC to +85 ºC (Monthly rate: ±8 seconds)
  : ±5.0 x 10^{-6} / +85 ºC to +105 ºC (Monthly rate: ±13 seconds)
  XB : ±5.0 x 10^{-6} / -40 ºC to +85 ºC (Monthly rate: ±13 seconds)
  : ±8.0 x 10^{-6} / +85 ºC to +105 ºC (Monthly rate: ±21 seconds)
- Time stamp function
  Trigger source: External event (EVIN) input, voltage drop/oscillation stop status detected, command input from the host
  Record data: 1/1024 seconds to 1 second, seconds, minutes, hours, days, months, years
  Number of recordable events: Maximum 32 events
- Backup power supply switching function
  The V_{DD} and V_{BAT} voltages are monitored to switch between Normal mode (V_{DD} operation) and Backup mode (V_{BAT} operation).
- Clock output (FOUT)
  Selectable from 32.768 kHz, 1024 Hz and 1 Hz outputs
  Output can be controlled by a register or FOE input (selectable with a register).

Pin Function

Signal Name	I / O	Function
EVIN1,2,3	Input	External event input pins. Detectable even in Backup mode. Pull-up and pull-down is configurable by the resisters
SCL	Input	Serial clock input pin
SDA	Input / Output	Serial data input and output pin
FOUT	Output	Frequency output pin (CMOS). 32.768 kHz (default), 1024 Hz or 1 Hz clock output is selectable. This pin can be switched to the wakeup timer interrupt output (CMOS)
/INT	Output	Interrupt output pin (N-ch. open drain). The wakeup timer, time update, alarm, and/or event detection interrupt signals can be selected to output from this pin. When two or more signals are selected, they are NORed before being output. This pin is effective even in Backup mode.
V_{DD}	-	Power-supply pin
V_{OUT}	-	Internal operating voltage output pin Connect a 1 µF bypass capacitor to this pin
V_{BAT}	-	Backup power supply pin Connect a backup power supply such as a large-size capacitor, secondary battery, or primary battery. The operating power voltage is supplied from this pin to the internal circuits in Backup mode.
GND	-	Ground pin

Terminal connection / External dimensions (Unit: mm)



Pin	Connection	
	Option A	Option B
1	V_{DD}	
2	V_{OUT}	
3	V_{BAT}	
4	FOUT	EVIN3
5	SCL	
6	EVIN1	
7	SDA	
8	/INT	
9	GND	
10	EVIN2	

Specifications (characteristics)

∗ Refer to application manual for details

■ Recommended Operating Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	unit
Operating voltage	V_{DD}	-	1.6	3.0	5.5	V
Clock supply voltage	V_{CLK}	-	1.1	3.0	5.5	V
Operating Temperature	Ta	-	-40	+25	+105	ºC
V_{DD} detection voltage	$-V_{DET1}$	V_{DD}, Fall	1.35	1.45	1.55	V

■ Frequency Characteristics

Item	Symbol	Condition		Min.	Typ.	Max.	unit
Frequency tolerance	Δf / f	XS	Ta = -40 to +85 °C	-3	-	+3	× 10^{-6}
			Ta = +85 to +105 °C	-5	-	+5	
		XB	Ta = -40 to +85 °C	-5	-	+5	
			Ta = +85 to +105 °C	-8	-	+8	
start-up time	tSTA	Ta = +25 °C, V_{DD} = 1.6 V ~ 5.5 V		-	0.5	1.0	s

■ Current consumption

Ta = -40 °C to +105 °C

Item	Symbol	Condition	Min.	Typ.	Max.	unit
I_{DD}	I_{BAT}	V_{BAT} = 3.0 V, /INT= Hi-Z, FOUT: Output OFF (Hi-Z), Temperature compensation interval: 2 s, FSEL1= FSEL0 = 1, INIEN = 1, CHGEN = 0, SCL = SDA = L	-	240	1500	nA
	I_{32k}	V_{DD} = 3.0 V, /INT= Hi-Z, FOUT: 32 kHz output, C_L = 0 pF, Temperature compensation interval: 2 s, FSEL1 = FSEL0 = 1, INIEN = 1, CHGEN = 0, SCL = SDA = H	-	1.0	3.0	µA

■ Option

I/F	Option	EVIN pin Number	/INTpin Number	FOUT	Number of time stamps recorded by EVIN pin trigge	
					FIFO Mode	Direct Mode
I²C	A	2	1	Yes	32 times	22 times
	B	3	1	-	32times	32 times

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Product name

RX8901CE ① XS ② A0 ③

① Model CE type package 3.2 x 2.5 x 1.0 mm
② Frequency tolerance
XS: ±3.0 x 10^{-6} / -40 ºC to +85 ºC (Monthly rate: ±8 seconds)
±5.0 x 10^{-6} / +85 ºC to +105 ºC (Monthly rate: ±13 seconds)
XB: ±5.0 x 10^{-6} / -40 ºC to +85 ºC (Monthly rate: ±13 seconds)
±8.0 x 10^{-6} / +85 ºC to +105 ºC (Monthly rate: ±21 seconds)
③ Pin Option
A: Option A
B: Option B

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