

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

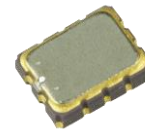
Time stamp function and Low current consumption



Product Number (2,000 pcs / Reel)  
**RX8111CE (A grade): X1B000421000115**  
**RX8111CE (B grade): X1B000421000215**

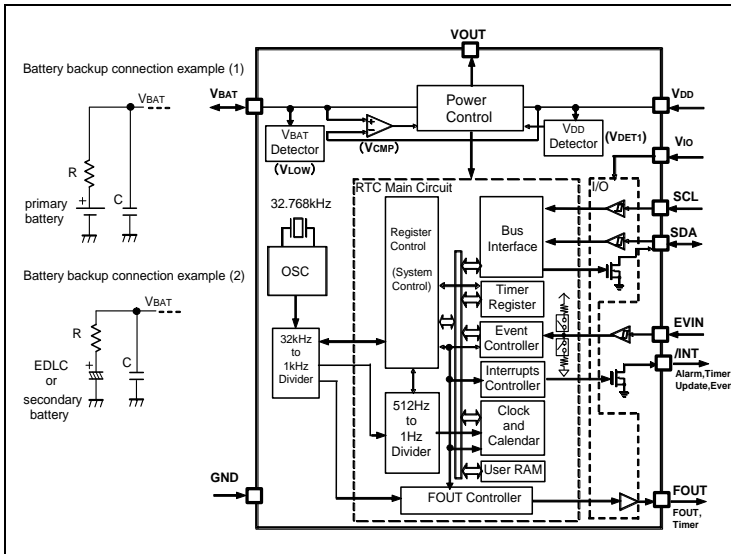
# RX8111CE

- Built in frequency adjusted 32.768 kHz crystal unit
- Operating Temperature : -40 °C to +105 °C
- Interface Type : I<sup>2</sup>C -Bus
- Low backup current : 100 nA Typ. / 3 V
- Auto power switching function : Automatically switches to backup power supply by monitoring the V<sub>DD</sub> voltage.
- Time stamp function : 8 times stamped from year to 1/256 seconds
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute, second
- Auto repeat wakeup timer interruption
- Self-monitoring interruption : Crystal oscillation stop, V<sub>BAT</sub> low, V<sub>DD</sub> low



RX8111CE  
 ( 3.2 x 2.5 mm , t = 1.0 mm Max. )

## Block diagram



## Overview

- Interface type  
I<sup>2</sup>C-Bus interface Fast-Mode 400 kHz
- Auto power switch function  
The V<sub>DD</sub> voltage is monitored and it switches to the backup power supply by the automatic operation  
Backup power supply switching voltage 1.2V Min.
- Clock output function  
Output frequency is selectable from 32.768 kHz, 1024 Hz, 1 Hz
- Wakeup timer function  
Selectable from 244 μs to 32 years (24 bit 1 ch.)  
Timer source clock selectable from 1/60 Hz, 1 Hz, 64 Hz, 4096 Hz  
Auto release after interrupt output from /INT pin at timer completes  
This operation is auto repeat with a selected cycle, it can be used like a watchdog timer
- Time stamp function  
8 times stamped from year to 1/256 seconds  
The time stamp trigger inputs from EVIN pin, self-monitoring and I<sup>2</sup>C software command  
EVIN pin has function of chattering-cancel
- Alarm function  
It is possible program from year to second
- Self-monitoring interruption  
Crystal oscillation stop, V<sub>BAT</sub> low, V<sub>DD</sub> low

## Pin Functin

Signal Name	I / O	Function
EVIN	Input	External event input pin (Pull up/down and polarity are selectable by software)
SCL	Input	Serial clock input pin
SDA	Input / Output	Data input and output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/INT	Output	Interrupts output by Alarm and Timer events (N-ch. open drain)
VDD	-	Power-supply pin Possible to supply different voltage from V <sub>IO</sub>
V <sub>IO</sub>	-	Interface power supply pin Input to supply the voltage same as a host
V <sub>OUT</sub>	-	Internal voltage output pin Connect bypass capacitor of 1.0 μF surely
V <sub>BAT</sub>	-	This is a power supply pin for backup battery Connect an EDLC, a secondary battery, a primary battery In the backup voltage range, supplied to IC, from this pin
GND	-	Ground pin

## Terminal connection / External dimensions (Unit: mm)

RX8111CE

Dimensions: 2.5 ± 0.2 mm (width), 3.2 ± 0.2 mm (length), 1.0 mm Max. (height), 0.2 Min. (pin height).

Pin	Connection
1	V <sub>DD</sub>
2	V <sub>OUT</sub>
3	V <sub>BAT</sub>
4	F <sub>OUT</sub>
5	SCL
6	EVIN
7	SDA
8	V <sub>IO</sub>
9	GND
10	/INT

## Specifications (characteristics)

\* Refer to application manual for details

### Recommended Operating Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating supply voltage	V <sub>DD</sub>	-	1.6	3.0	5.5	V
Clock supply voltage	V <sub>CLK</sub>	-	1.1	3.0	5.5	V
Operating temperature	T <sub>a</sub>	-	-40	+25	+105	°C
V <sub>DD</sub> detect voltage	-VDET1	V <sub>DD</sub> , Fall	1.20	1.40	1.60	V

### Frequency characteristics

Item	Grade	Symbol	Conditions	Min.	Typ.	Max.	Unit
Frequency tolerance	A	Δf / f	T <sub>a</sub> = +25 °C V <sub>DD</sub> = 3.0 V	-11.5	-	+11.5	× 10 <sup>-6</sup>
	B			-23	-	+23	
Oscillation start-up time		t <sub>STA</sub>	V <sub>DD</sub> = 2.75 V to 5.5 V	-	0.3	1.0	s

### Current consumption characteristics

T<sub>a</sub> = -40 °C to +105 °C

Symbol	Conditions	T <sub>a</sub> (°C)	Typ.	Max.	Unit
I <sub>DD</sub>	Input pins = "L", F <sub>OUT</sub> = OFF, /INT = OFF, V <sub>DD</sub> = V <sub>IO</sub> = 3.0 V, CHGEN = 0b, INIEN = 0b,	-40 ~ +85	100	450	nA
		-40 ~ +105	100	1000	
I <sub>32k</sub>	Input pins = "L", F <sub>OUT</sub> = 32.768 kHz, /INT = OFF, V <sub>DD</sub> = V <sub>IO</sub> = 3.0 V, F <sub>OUT</sub> pin CL = 15 pF, CHGEN = 0b, INIEN = 1b	-40 ~ +85	2.0	3.0	μA
		-40 ~ +105	2.0	3.5	

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