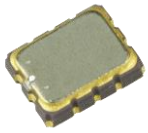
REAL TIME CLOCK MODULE (SPI-Bus)

Time stamp function and Low current consumption

RX4111CE

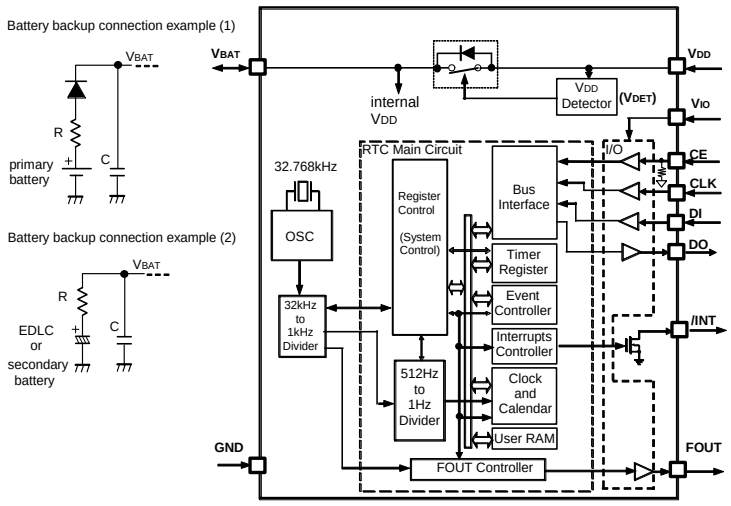
Product Number (2,000 pcs / Reel)
RX4111CE (A grade): X1B000431000115
RX4111CE (B grade): X1B000431000215

- Built in frequency adjusted 32.768 kHz crystal unit
- Operating Temperature : -40 °C to +105 °C
- Interface Type : SPI -Bus 4 wire
- Low backup current : 100 nA Typ. / 3 V
- Auto power switching function: Automatically switches to backup power supply by monitoring the V_{DD} 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_{BAT} low, V_{DD} low



RX4111CE
(3.2 x 2.5 mm , t = 1.0 mm Max.)

Block diagram



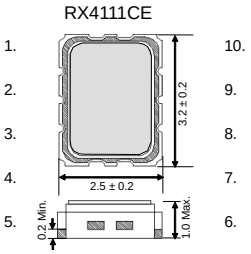
Overview

- Interface type
  SPI-Bus interface (4 wire, 1 MHz)
- Auto power switch function
  The V_{DD} 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 self-monitoring and SPI command
- Alarm function
  It is possible program from year to second
- Self-monitoring interruption
  Crystal oscillation stop, V_{BAT} low, V_{DD} low

Pin Functin

Signal Name	I / O	Function
CE	Input	Chip enables input pin
CLK	Input	Serial clock input pin
DI	Input	Data input pin
DO	Output	Data output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/INT	Open-Drain Output	Interrupts output by Alarm and Timer events. (N-ch. open drain)
V_{DD}	–	Power supply pin Possible to supply different voltage from V_{IO}
V_{IO}	–	Interface power supply pin Input to supply the voltage same as a host
V_{BAT}	–	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）



Pin	Connection
1	V_{DD}
2	V_{BAT}
3	DI
4	FOUT
5	CLK
6	DO
7	CE
8	V_{IO}
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_{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	°C
VDD detect voltage	-V_{DET1}	V_{DD}, Fall	1.20	1.40	1.60	V

■ Frequency characteristics

Item	Grade	Symbol	Conditions	Min.	Typ.	Max.	Unit
Frequency tolerance	A	Δ f / f	Ta = +25 °C V_{DD} = 3.0 V	-11.5	-	+11.5	× 10^{-6}
	B			-23	-	+23	
Oscillation start-up time		tSTA	V_{DD} = 2.75 V to 5.5 V	-	0.3	1.0	s

Current consumption characteristics　Ta = -40 °C to +105 °C

Symbol	Conditions	Ta (°C)	Typ.	Max.	Unit
I_{DD}	Input pins = "L", FOUT = OFF, /INT = OFF, V_{DD} = V_{IO} = 3.0 V, CHGEN = 0b, INIEN = 0b,	-40 ~ +85	100	450	nA
		-40 ~ +105	100	1000	
I_{32k}	Input pins = "L", FOUT = 32.768 kHz, /INT = OFF, V_{DD} = V_{IO} = 3.0 V, FOUT 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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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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In order provide high quality and reliable products and services than meet customer needs, Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

IATF 16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

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For Automotive	►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
Automotive Safety	►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).