REAL TIME CLOCK MODULE (SPI-Bus)

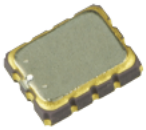
Time stamp function and Low current consumption

RX4111CE

Pb Free
RoHS Compliant

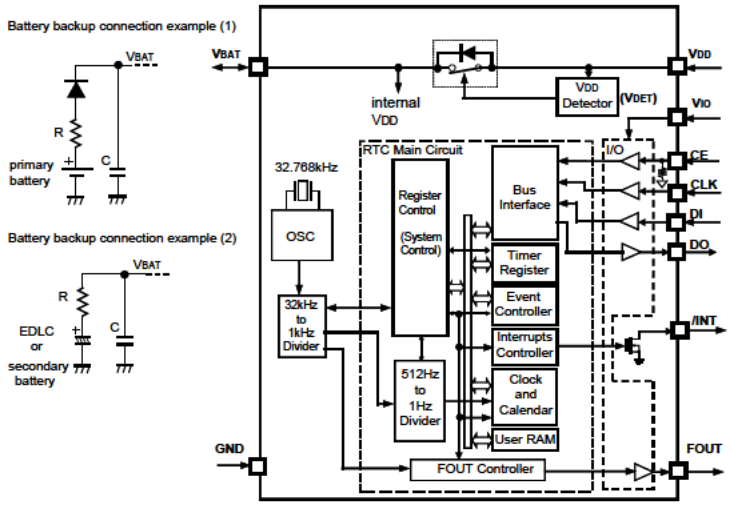
Product Number (2,000 pcs / Reel)
RX4111CE A : X1B000431000115
RX4111CE B : X1B000431000215

- Built in frequency adjusted 32.768 kHz crystal unit
- 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



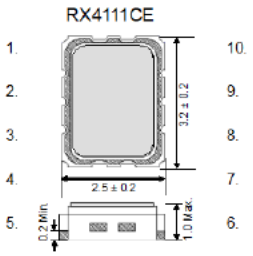
Overview

- Interface type
  SPI-Bus interface (4 wire, 4 MHz Max.)
- 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
  When the clock output is not used, the FOUT pin can be used as a timer output pin (CMOS)
- Wakeup timer function
  Selectable from 244 µs to 32 years (24 bit x 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	Serial data input pin
DO	Output	Serial data output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/ NT	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	T_a	-	-40	+25	+85	°C
V_{DD} detect voltage	-V_{DET1}	V_{DD}, Fall	1.20	1.40	1.60	V

■ Frequency characteristics

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

■ Current consumption characteristics

T_a = -40 °C to +85 °C

tem	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption	I_{BAT}	Input pins = "L", FOUT = OFF, / NT = OFF, V_{BAT} = 3.0 V, V_{DD} = V_{IO} = 0.0 V, CHGEN = 0b, N EN = 0b, SWSEL0 = 1, SWSEL1 = 0	-	100	450	nA
	I_{32k}	Input pins = "L", FOUT = 32.768 kHz, / NT = OFF, V_{DD} = V_{IO} = 3.0 V, FOUT pin CL = 15 pF, CHGEN = 0b, N EN = 1b	-	2.0	3.0	µA

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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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	►Pb free.
	►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.
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