

Real Time Clock module comparison

Interface	Product name	Status	Specifications & conditions									Functions					
			Size [mm]	Operating temperature Ta [°C]		Frequency tolerance [x 10 ⁻⁶]				Backup current consumption [µA]		Time stamp	Power switch	Event pin	Memory	Timer	Others
				Min.	Max.	+25 °C	-40 to +85 °C	-40 to +105 °C	-40 to +125 °C	Typ. (3.0 V)	Max. (Ta)						
SPI 4 wire & I ² C	RX6110SA	MP	10.1 x 7.4	-40	+85	5±23	-	-	-	0.13	0.25	-	✓	-	SRAM 128 bit	16 bit x 1 ch. to 7.5 years	-
I ² C	RX8111CE	Sample available	3.2 x 2.5	-40	+85	±11.5 ±23	-	-	-	0.1	0.45	8	✓	1	SRAM 512 bit	24 bit x 1 ch. to 32 years	-
	RX8804CE	MP		-40	+105	-	±3.4 ±5.0	±8.0	-	0.35	1.5	1	-	1	-	16 bit x 1 ch. to 7.5 years	SOUT
	RX8130CE	MP		-40	+85	5±23	-	-	-	0.3	0.5	-	✓	-	-	16 bit x 1 ch. to 7.5 years	Battery charge control, Reset with a delay
	RX8900CE	MP		-40	+85	-	±3.4 ±5.0	-	-	0.7	1.4	-	✓	-	-	12 bit x 1 ch. to 2.8 days	Temp. sensor
SPI 4 wire	RX4111CE	Sample available	3.2 x 2.5	-40	+85	±11.5 ±23	-	-	-	0.1	0.45	8	✓	-	SRAM 512 bit	24 bit x 1 ch. to 32 years	-

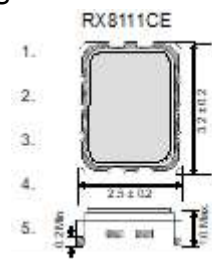


For Automotive

I ² C	RA8804CE (AEC-Q100)	MP	3.2 x 2.5	-40	+105	-	±3.4 ±5.0	±8.0	-	0.35	1.5	1	-	1	-	16 bit x 1 ch. to 7.5 years	SOUT
	RA8900CE (AEC-Q200)	MP		-40	+85	-	±3.4 ±5.0	-	-	0.7	1.4	-	✓	-	-	12 bit x 1 ch. to 2.8 days	Temp. sensor
SPI 4 wire	RA4803SA (AEC-Q200)	MP	10.1 x 7.4	-40	+85	-	±3.4 ±5.0	-	-	0.75	2.1	-	-	1	-	12 bit x 1 ch. to 2.8 days	-
	RA-4565SA (AEC-Q200)	MP		-40	+125	5±23	-	-	-	0.5	1.0	-	-	-	-	8 bit x 1 ch. to 4.25 hours	-

Time stamp function and Low current consumption

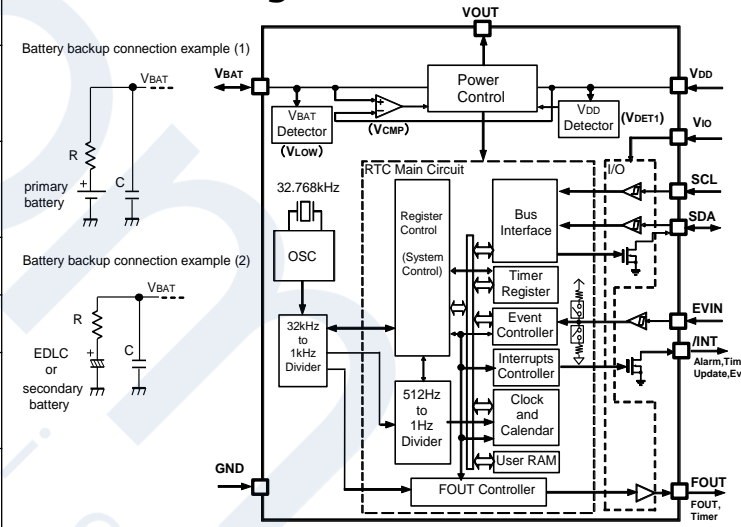
- Built in frequency adjusted 32.768 kHz crystal unit
- Interface Type : I²C-Bus
- Low backup current : **100 nA Typ.** / 3 V
- Auto power switching function : Automatically switches to backup power supply by monitoring the V_{DD} voltage
- Time stamp function : **8 times stamped** from year to 1/256 seconds
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute, second
- Auto repeat wakeup timer interruption (24 bit x 1 ch.)
- Self-monitoring interruption : Crystal oscillation stop, V_{BAT} low, V_{DD} low



Pin	Connection
1	VDD
2	VOUT
3	VBAT
4	FOUT
5	SCL
6	EVIN
7	SDA
8	VIO
9	GND
10	/INT

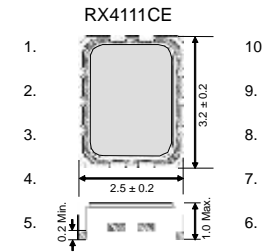
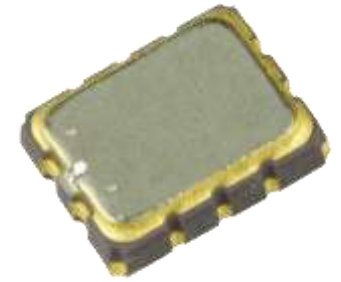
Item	Symbol	Specs
Operating Conditions	Operating supply voltage	V _{DD} 1.6 V to 5.5 V
	Operating temperature	T _a -40 °C to +85 °C
	V _{DD} detect voltage	-V _{DET1} 1.2 V to 1.6 V (V _{DD} , Fall)
Characteristics	Frequency tolerance	A ±11.5 × 10 ⁻⁶ (+25 °C) B ±23 × 10 ⁻⁶ (+25 °C)
	Oscillation start-up time	t _{STA} 0.3 s Typ. / 1 s Max. (V _{DD} = 2.75 V to 5.5 V)
	Current consumption	I _{BAT} 100 nA / Typ. 3 V 450 nA / Max. 3 V (T _a = -40 °C to +85 °C)

■ Block diagram



SPI, Time stamp function and Low current consumption

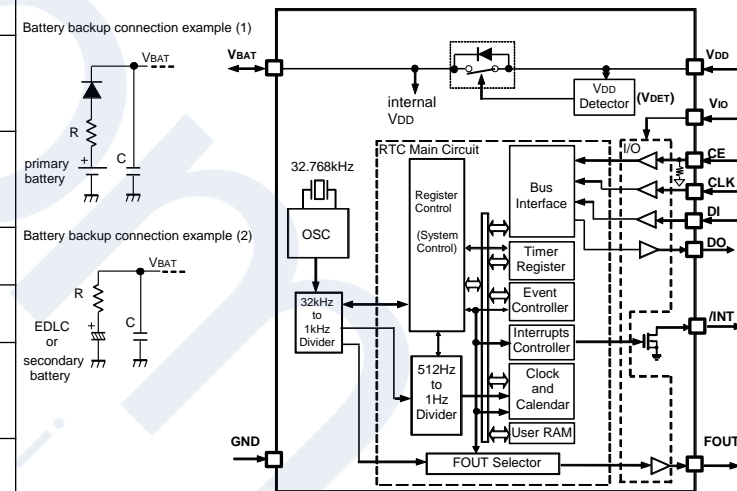
- Built in frequency adjusted 32.768 kHz crystal unit
- Interface Type : SPI-Bus (4 wire, 1 MHz)
- Low backup current : **100 nA Typ.** / 3 V
- Auto power switching function : Automatically switches to backup power supply by monitoring the V_{DD} voltage
- Time stamp function : **8 times stamped** from 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 (24 bit x 1 ch.)
- Self-monitoring interruption : Crystal oscillation stop, V_{BAT} low, V_{DD} low



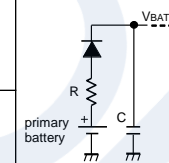
Pin	Connection
1	V_{DD}
2	V_{BAT}
3	DI
4	FOUT
5	CLK
6	DO
7	CE
8	V_{IO}
9	GND
10	/INT

Item	Symbol	Specs
Operating Conditions	Operating supply voltage	V_{DD} 1.6 V to 5.5 V
	Operating temperature	T_a -40 °C to +85 °C
	V_{DD} detect voltage	$-V_{DET1}$ 1.2 V to 1.6 V (V_{DD} , Fall)
Characteristics	Frequency tolerance	A $\pm 11.5 \times 10^{-6}$ (+25 °C)
		B $\pm 23 \times 10^{-6}$ (+25 °C)
	Oscillation start-up time	t_{STA} 0.3 s Typ. / 1 s Max. ($V_{DD} = 2.75$ V to 5.5 V)
Current consumption	I_{BAT} 100 nA / Typ. 3 V 450 nA / Max. 3 V ($T_a = -40$ °C to +85 °C)	

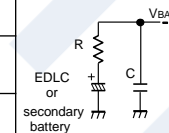
■ Block diagram



Battery backup connection example (1)

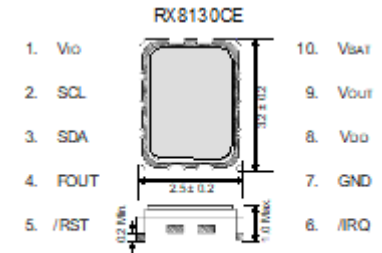


Battery backup connection example (2)

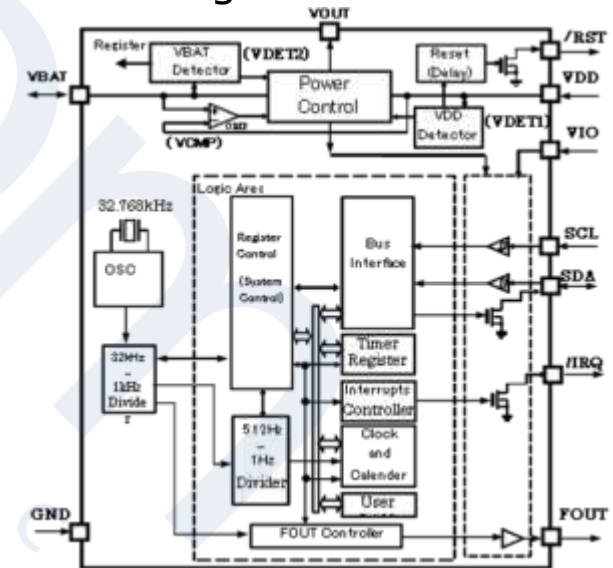


Built-in backup battery charge control function

- Built in frequency adjusted 32.768 kHz crystal unit
- Interface Type : I²C-Bus
- Low backup current : 300 nA Typ. / 3 V
- Auto power switching function : Automatically switches to backup power supply by monitoring the V_{DD} voltage
- **Backup battery charge control function : For the rechargeable battery**
- **Reset functions with a delay : Detect a main power supply and remove the reset**
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute, second
- Auto repeat wakeup timer interruption (16 bit x 1 ch.)
- Self-monitoring interruption : Crystal oscillation stop, V_{BAT} low, V_{DD} low



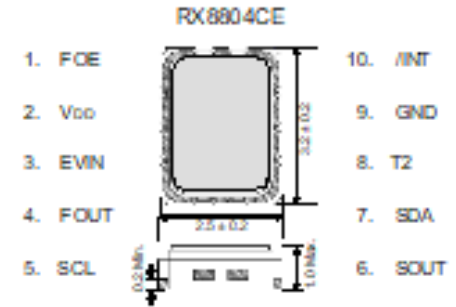
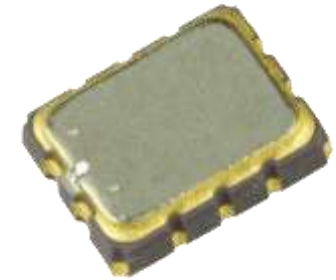
■ Block diagram



Item		Symbol	Specs
Operating Conditions	Operating supply voltage	V _{DD}	1.25 V to 5.5 V
	Operating temperature	T _a	-40 °C to +85 °C
	V _{DD} detect voltage	-V _{DET2}	1.2 V to 1.4 V (V _{DD} , Fall)
Characteristics	Frequency tolerance	Δf/f	B: +5±23 x 10 ⁻⁶ / +25 °C
	Oscillation start-up time	t _{STA}	1 s Max. (V _{DD} = 2.75 V to 5.5 V)
	Current consumption	I _{BAT}	300 nA / Typ. 3 V 500 nA / Max. 3 V (T _a = -40 °C to +85 °C)

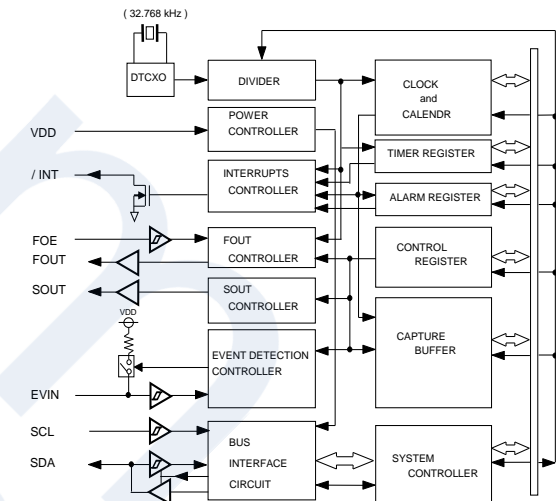
Built-in 32.768 kHz DTCXO, High Stability, up to +105 °C

- Built-in frequency adjusted 32.768 kHz crystal unit and **DTCXO**
- Interface Type : I²C-Bus
- Selectable clock output : 32.768 kHz, 1024 Hz, 1 Hz
- Time stamp function : **1 time stamped** from year to second
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute
- Auto repeat wakeup timer interruption (24 bit x 1 ch.)
- Self-monitoring interruption : Crystal oscillation stop, V_{BAT} low, V_{DD} low
- SOUT pin outputs that selected flag bit value (H or L)
- Automotive grade available (RA8804CE)



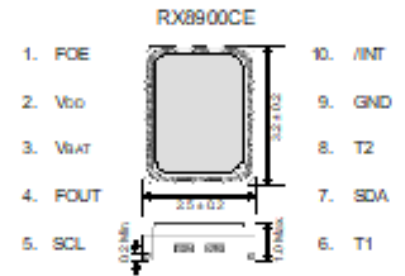
Item		Symbol	Specs	
Operating Conditions	Operating supply voltage	V _{DD}	1.6 V to 5.5 V	
	Operating temperature	T _a	-40 °C to +105 °C	
Characteristics	Stability	Δf/f	XA	±3.4 x 10 ⁻⁶ (-40 °C to 85 °C) *equiv. to ±9 s of mo. deviation ±8 x 10 ⁻⁶ (-40 °C to 105 °C)
			XB	±5 x 10 ⁻⁶ (-40 °C to 85 °C) *equiv. to ±13 s of mo. deviation ±8 x 10 ⁻⁶ (-40 °C to 105 °C)
	Current consumption	I _{DD2}	350 nA / Typ. 3 V 1,500 nA / Max. 3 V (Temp. Compensation interval: 2.0 s)	

■ Block diagram



Built-in 32.768 kHz DTCXO, High Stability, Power switching

- Built-in frequency adjusted 32.768 kHz crystal unit and **DTCXO**
- Interface Type : I²C-Bus
- Selectable clock output : 32.768 kHz, 1024 Hz, 1 Hz
- **Auto power switching function** : Automatically switches to backup power supply by monitoring the VDD voltage
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute
- Auto repeat wakeup timer interruption (12 bit x 1ch.)
- Automotive grade available (RA8900CE)



Item		Symbol	Specs	
Operating Conditions	Operating supply voltage	V _{DD}	2.5 V to 5.5 V	
	V _{DD} detect voltage	V _{DET3}	2.3 V to 2.5 V	
	Operating temperature	T _a	-40 °C to +85 °C	
Characteristics	Stability	Δf/f	UA	±3.4 × 10 ⁻⁶ (-40 °C to 85 °C) *equiv. to ±9 s of mo. deviation
			UB	±5 × 10 ⁻⁶ (-40 °C to 85 °C) *equiv. to ±13 s of mo. deviation
	Current consumption	I _{DD2}	700 nA / Typ. 3 V 1,400 nA / Max. 3 V (Temp. Compensation interval: 2.0 s)	

■ Block diagram

