# REAL TIME CLOCK MODULE (I²C-Bus)

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

# RX8900SA / RX8900CE

- Built-in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : I²C-Bus
- Interface voltage range : 2.5 V to 5.5 V
- Temp. compensated voltage range : 2.0 V to 5.5 V
- Timekeeping voltage range : 1.6 V to 5.5 V
- Auto power switching func ion : Automatically switches to backup power
  supply by monitoring the $V_{DD}$ voltage
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute
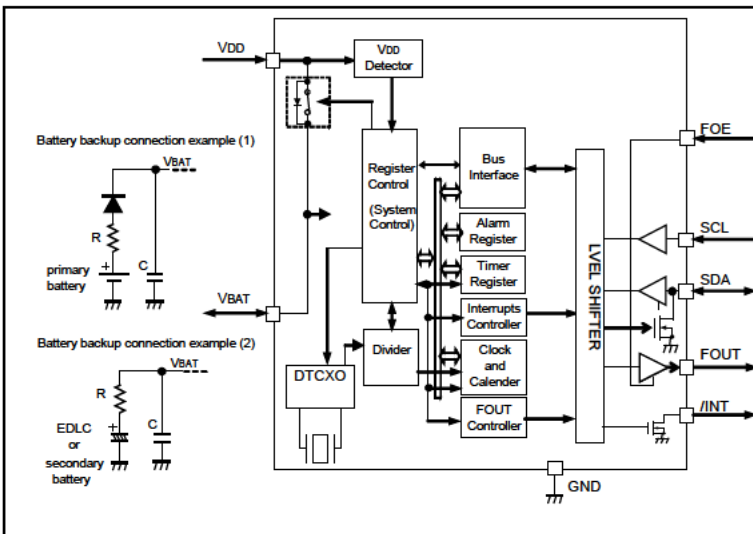- Auto repeat wakeup timer interruption

The I²C-Bus is a trademark of NXP Semiconductors

**Pb Free**   **RoHS Compliant**

Product Number
1,000 pcs / Reel
RX8900SA UA: X1B000292000100
RX8900SA UB: X1B000292000200
RX8900SA UC: X1B000292000300

2,000 pcs / Reel
RX8900CE UA: X1B000301000100
RX8900CE UB: X1B000301000200
RX8900CE UC: X1B000301000300

RX8900SA          RX8900CE
( 10.1 x 7.4 mm , t = 3.3 mm Max. )   ( 3.2 x 2.5 mm , t = 1.0 mm Max. )
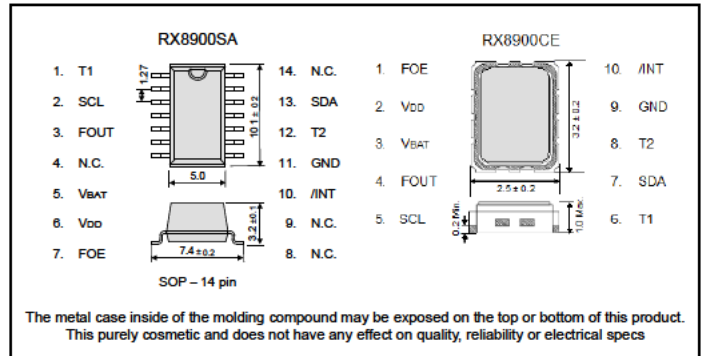
## Block diagram



## Overview

- Interface type
  I²C-Bus interface Fast-Mode 400 kHz
- High stability
  UA: ± 3.4 x $10^{-6}$ / -40 ℃ to +85 ℃ (equiv. to ±9 s of mo. deviation)
  UB: ± 5.0 x $10^{-6}$ / -40 ℃ to +85 ℃ (equiv. to ±13 s of mo. deviation)
  UC: ± 5 0 x $10^{-6}$ / -30 ℃ to +70 ℃ (equiv. to ±13 s of mo. deviation)
- 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 1.9 V Min.
- Clock output function
  Output frequency is selectable from 32.768 kHz, 1024 Hz, 1 Hz
- Wakeup timer function
  Selectable from 244 µs to 2.8 days (12 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
- Alarm function
  It is possible program from day to minute
- Temp. sensor function
  Available readout temperature data from embedded temp sensor

## Pin Function

| Signal Name | I / O | Function |
|---|---|---|
| T1 | - | Test pin in the factory (Do not connect externally) |
| SCL | Input | Serial clock input pin |
| FOUT | Output | Frequency output pin (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz) |
| VBAT | - | 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 |
| VDD | - | Power-supply pin |
| FOE | Input | The FOUT output control pin |
| /INT | Output | Interrupt output (N-ch. open drain). |
| GND | - | Ground pin |
| T2 | - | Test pin in the factory (Do not connect externally) |
| SDA | Input / Output | Serial data input and output pin |

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



**RX8900SA**

| 1. | T1 | | 14. | N.C. |
| 2. | SCL | | 13. | SDA |
| 3. | FOUT | | 12. | T2 |
| 4. | N.C. | | 11. | GND |
| 5. | VBAT | | 10. | /INT |
| 6. | VDD | | 9. | N.C. |
| 7. | FOE | | 8. | N.C. |

SOP – 14 pin

**RX8900CE**

| 1. | FOE | | 10. | /INT |
| 2. | VDD | | 9. | GND |
| 3. | VBAT | | 8. | T2 |
| 4. | FOUT | | 7. | SDA |
| 5. | SCL | | 6. | T1 |

The metal case inside of the molding compound may be exposed on the top or bottom of this product. This purely cosmetic and does not have any effect on quality, reliability or electrical specs
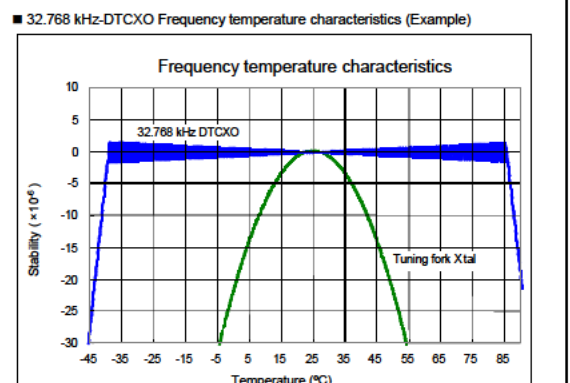
## Specifications (characteristics)                    * Refer to application manual for details

■ Electrical Characteristics

| item | Symbol | Conditions | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| Operating voltage | $V_{DD}$ | - | | | 2 5 | 3.0 | 5.5 | V |
| Temp. compensated Voltage | $V_{TEM}$ | - | | | 2 0 | 3.0 | 5.5 | V |
| Clock supply voltage | $V_{CLK}$ | - | | | 1 6 | 3.0 | 5.5 | V |
| $V_{DD}$ detect voltage (3) | $V_{DET3}$ | - | | | 2 3 | 2.4 | 2.5 | V |
| Operating temperature | $T_a$ | - | | | -40 | +25 | +85 | ℃ |
| Stability | $\Delta f / f$ | UA | $T_a$ = -40 ℃ to +85 ℃ | | | ±3.4 | | x 10⁻⁶ |
| | | UB | $T_a$ = -40 ℃ to +85 ℃ | | | ±5.0 | | |
| | | UC | $T_a$ = -30 ℃ to +70 ℃ | | | | | |
| Current consumption (1) | $I_{DD1}$ | fSCL = 0 Hz, /INT = $V_{DD}$, FOE = GND, $V_{DD}$ = $V_{BAT}$, FOUT: OFF, Temp. Compensation interval 2 0 s | $V_{DD}$ = 5 V | | - | 0.72 | 1.5 | µA |
| Current consumption (2) | $I_{DD2}$ | | $V_{DD}$ = 3 V | | - | 0.70 | 1.4 | |

■ 32.768 kHz-DTCXO Frequency temperature characteristics (Example)



Frequency temperature characteristics

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