

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

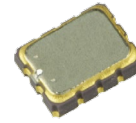
For Automotive, Power switching,  
Built-in 32.768 kHz DTCXO, High Stability



Product Number (2,000 pcs / Reel)  
**RA8900CE UA: X1B000271A00400**  
**RA8900CE UB: X1B000271A00500**

**RA8900CE**

- Built-in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : I<sup>2</sup>C-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 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
- Conforms to AEC-Q200

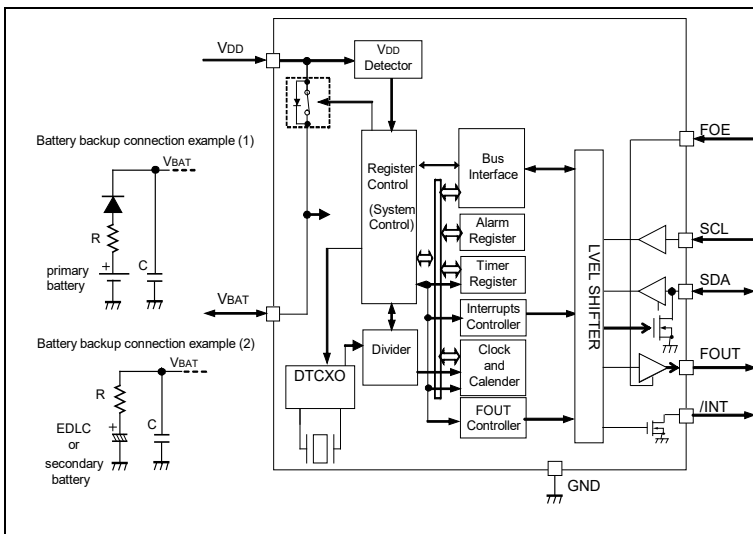


**RA8900CE**  
( 3.2 x 2.5 mm, t = 1.0 mm Max. )

The I<sup>2</sup>C-Bus is a trademark of NXP Semiconductors

**Block diagram**

**Overview**

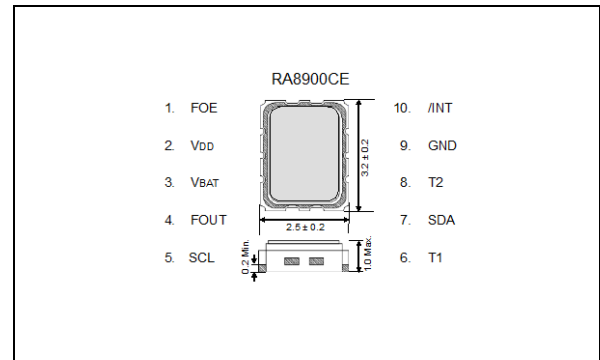


- Interface type  
I<sup>2</sup>C-Bus interface Fast-Mode 400 kHz
- High stability  
UA:  $\pm 3.4 \times 10^{-6}$  / -40 °C to +85 °C (equiv. to  $\pm 9$  s of mo. deviation)  
UB:  $\pm 5.0 \times 10^{-6}$  / -40 °C to +85 °C (equiv. to  $\pm 13$  s of mo. deviation)
- Auto power switch function  
The VDD 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  $\mu$ s 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**

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

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



**Specifications (characteristics)**

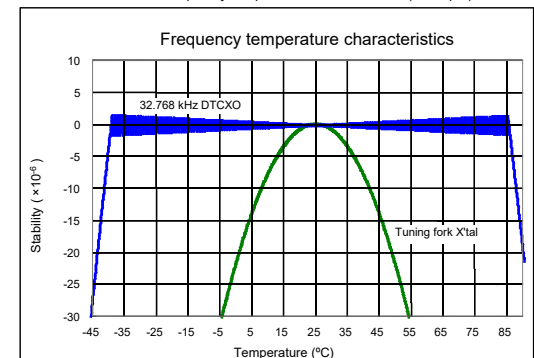
\* Refer to application manual for details

**Electrical Characteristics**

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Operating voltage	VDD	-	2.5	3.0	5.5	V	
Temp. compensated Voltage	VTEM	-	2.0	3.0	5.5	V	
Clock supply voltage	VCLK	-	1.6	3.0	5.5	V	
VDD detect voltage (3)	VDET3	-	2.3	2.4	2.5	V	
Operating temperature	Ta	-	-40	+25	+85 <sup>*1</sup>	°C	
Stability	$\Delta f / f$	UA	Ta = -40 °C to +85 °C		$\pm 3.4$	$\times 10^{-6}$	
		UB	Ta = -40 °C to +85 °C		$\pm 5.0$		
		UC	Ta = -30 °C to +70 °C				
Current consumption (1)	I <sub>DD1</sub>	fSCL = 0 Hz, /INT = VDD, FOE = GND, VDD = VBAT, FOUT: OFF, Temp. Compensation interval 2.0 s	VDD = 5 V	-	0.72	1.5	$\mu$ A
Current consumption (2)	I <sub>DD2</sub>		VDD = 3 V	-	0.70	1.4	$\mu$ A

\*1) Please contact us about +85 °C < Ta

**32.768 kHz-DTCXO Frequency temperature characteristics (Example)**



## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.

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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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