

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

For Automotive  
Built-in 32.768 kHz DTCXO, High Stability

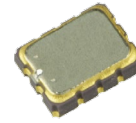


Product Number (2,000 pcs / Reel)  
**RA8804CE XA: X1B000381A00100**  
**RA8804CE XB: X1B000381A00200**

**RA8804CE**

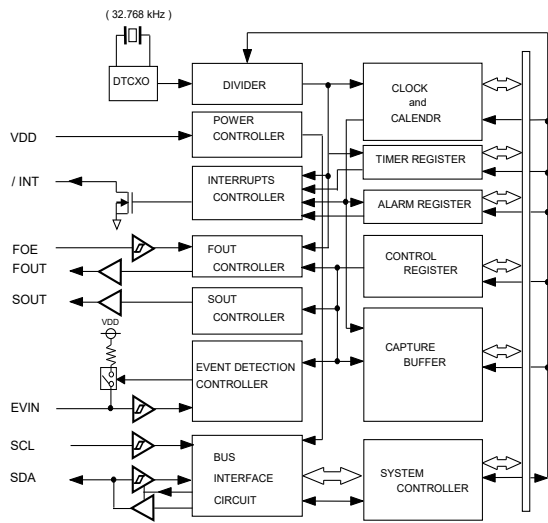
- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : I<sup>2</sup>C-Bus
- Selectable clock output : 32.768 kHz, 1024 Hz, 1 Hz
- Time stamp function : 1 time stamped from year to second
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute
- Auto repeat wakeup timer interruption
- Self-monitoring interruption : Crystal oscillation stop, V<sub>BAT</sub> low, V<sub>DD</sub> low
- SOUT pin outputs that selected flag bit value
- Conforms to AEC-Q100

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



**RA8804CE**  
( 3.2 × 2.5 mm, t = 1.0 mm Max. )

**Block diagram**



**Overview**

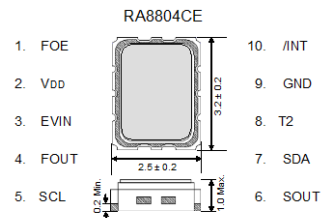
- Interface type  
I<sup>2</sup>C-Bus interface Fast-Mode 400 kHz
- High stability  
XA: ± 3.4 × 10<sup>-6</sup> / -40 °C to +85 °C (equivalent to ±9 s of mo. deviation)  
± 8.0 × 10<sup>-6</sup> / +85 °C to +105 °C (equivalent to ±21 s of mo. deviation)  
XB: ± 5.0 × 10<sup>-6</sup> / -40 °C to +85 °C (equivalent to ±13 s of mo. deviation)  
± 8.0 × 10<sup>-6</sup> / +85 °C to +105 °C (equivalent to ±21 s of mo. deviation)
- 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  
1 time stamped from year to second  
The time stamp trigger inputs from EVIN pin, self-monitoring and I<sup>2</sup>C software command  
EVIN pin has function of chattering-cancel
- Alarm function  
It is possible program from day to minute
- Internal state output function  
SOUT pin outputs selected flag-bit value or specified value (H or L)

**Pin Function**

Signal Name	I / O	Function
SOUT	Output	Internal state output pin
SCL	Input	Serial clock input pin
FOUT	Output	Frequency output pin (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
EVIN	Input	Event input pin
V <sub>DD</sub>	-	Power-supply pin
FOE	Input	The FOUT output control pin
/INT	Output	Interrupts output by Alarm and Timer events (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)



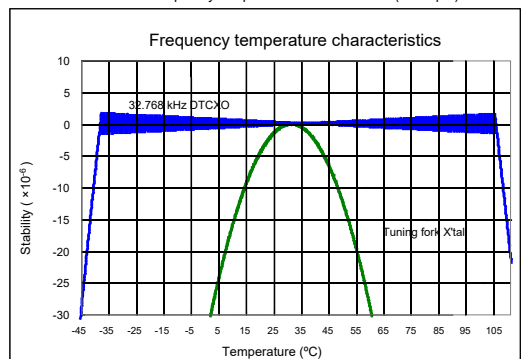
**Specifications (characteristics)**

\* Refer to application manual for details

**Electrical Characteristics**

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Operating voltage	V <sub>DD</sub>	-	1.6	3.0	5.5	V	
Temp. compensated Voltage	V <sub>TEM</sub>	-	1.5	3.0	5.5	V	
Clock supply voltage	V <sub>CLK</sub>	-	1.5	3.0	5.5	V	
Operating temperature	T <sub>a</sub>	-	-40	+25	+105	°C	
Stability	Δ f / f	XA	T <sub>a</sub> = -40 °C to +85 °C	±3.4		x 10 <sup>-6</sup>	
			T <sub>a</sub> = +85 °C to +105 °C	±8.0			
		XB	T <sub>a</sub> = -40 °C to +85 °C	±5.0			
			T <sub>a</sub> = +85 °C to +105 °C	±8.0			
Current consumption (1)	I <sub>DD1</sub>	fSCL = 0 Hz, /INT = V <sub>DD</sub> , FOE = GND, FOUT: OFF,	V <sub>DD</sub> = 5 V	-	0.4	1.6	μA
Current consumption (2)	I <sub>DD2</sub>	Temp. Compensation interval 2.0 s	V <sub>DD</sub> = 3 V	-	0.35	1.5	μA

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



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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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	► 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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