REAL TIME CLOCK MODULE (I²C-Bus)

For Automotive

Built-in 32.768 kHz-DTCXO

RA 8804CE

Pb Free

RoHS Compliant

For Automotive

Product Number (Please contact us)
**RA8804CE : X1B000381Axxx00**

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO.
- Interface Type : I²C-Bus interface (400kHz)
- Interface voltage range : 1.6 V to 5.5 V
- Temp. compensated voltage range : 1.5 V to 5.5 V
- Timekeeping voltage range : 1.5 V to 5.5 V
- Selectable clock output (32.768 kHz, 1024 Hz, 1 Hz)
- The various functions full calendar, alarm, timer, event detection.
- The time-stamp synchronizing to the event detection of EVIN-pin.
- The SOUT-pin outputs that selected flag bit value.
- Applications: Car audio, Car navigation system, Clock
- Conforms to AEC-Q100   *The I²C-BUS is a trademark of NXP Semiconductors.
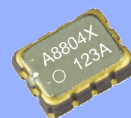
RA8804CE
(3.2 × 2.5 × 1.0 mm)

Actual size
RA8804CE

Block diagram
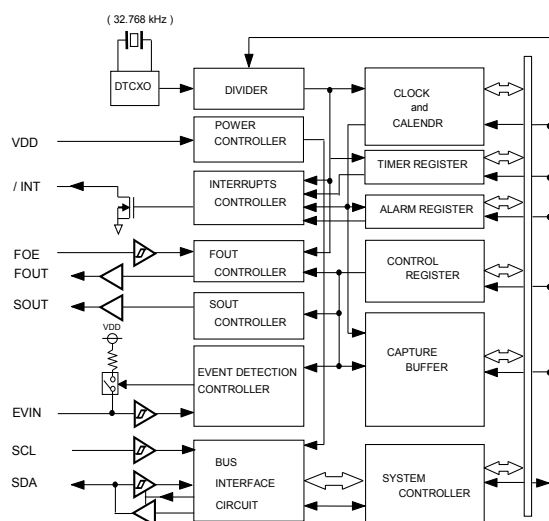
Overview

- **Stability**
  - XA
  - ± 3.4 x 10⁻⁶ / -40 °C to +85 °C (Equivalent to ±9 seconds of month deviation)
  - ± 8.0 x 10⁻⁶ / +85 °C to +105 °C (Equivalent to ±21 seconds of month deviation)
  - XB
  - ± 5.0 x 10⁻⁶ / -40 °C to +85 °C (Equivalent to ±13 seconds of month deviation)
  - ± 8.0 x 10⁻⁶ / +85 °C to +105 °C (Equivalent to ±21 seconds of month deviation)
- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output), CL=30 pF
  - Output selectable: 32.768 kHz, 1024 Hz, 1 Hz
- **Event detection function**
  - When trigger input to EVIN-pin or specified by program, time and date is recorded. The EVIN-pin with pull-up resistor that is releasable.
- **Timer function**
  - Timer source clock are 1min., 1sec., 64Hz, 4096Hz.
  - 24-bit-presettable counter (244us to about 32years.)
- **Alarm function**
  - Alarm function can be set to day of week, day, hour, and minute.
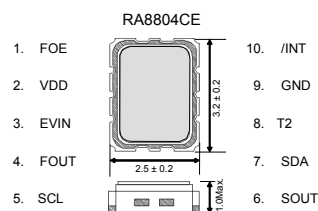- **Internal state output function**
  - SOUT pin output (C-MOS output),
  - It outputs selected flag-bit value or specified value(H or L).

Pin Function

Signal Name	I / O	Function
SOUT	Output	Internal state output pin.
SCL	Input	Serial clock input pin.
FOUT	Output	The pin outputs the reference clock signal. (CMOS output)
EVIN	Input	Event input pin
V_DD	-	Connected to a positive power supply
FOE	Input	The input pin for the FOUT output control.
/ INT	Output	Interrupt output (N-ch. open drain).
GND	-	Connected to a ground
T2	-	Use only for testing in the factory. (Do not connect externally.)
SDA	I/O	Data input and output pin.

Terminal connection / External dimensions   (Unit:mm)

RA8804CE

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

3.2 ± 0.2
2.5 ± 0.2
1.0Max.

Specifications (characteristics)   ∗ **Refer to application manual for details.**

■ Electrical Characteristics

Item	Symbol	Conditions		Min.	Typ.	Max.	Unit
Operating voltage	V_DD	Interface voltage		1.6	3.0	5.5	V
Temp. compensated Voltage	V_TEM	Temp. compensated voltage		1.5	3.0	5.5	V
Clock supply voltage	V_CLK	Internal clock		1.5	3.0	5.5	V
Operating temperature	T_OPR	No condensation		-40	+25	+105	°C
Stability	Δf / f	XA	Ta = -40 °C ~ +85 °C		±3.4 *¹		× 10⁻⁶
			Ta = +85 °C ~ +105 °C		±8.0 *²		
		XB	Ta = -40 °C ~ +85 °C		±5.0 *³		
			Ta = +85 °C ~ +105 °C		±8.0 *²		
Current consumption (1)	I_DD1	fSCL=0Hz, /INT=V_DD, FOE =GND,FOUT: OFF	V_DD = 5V	-	0.4	1.6	μA
Current consumption (2)	I_DD2	Temp. Compensation interval 2.0 s.	V_DD = 3V	-	0.35	1.5	

*¹) Equivalent to ±9 seconds of month deviation.   *²) Equivalent to ±21 seconds of month deviation.   *³) Equivalent to ±13 seconds of month deviation.

■ 32.768 kHz-DTCXO Frequency temperature characteristics (Example)

Frequency temperature characteristics
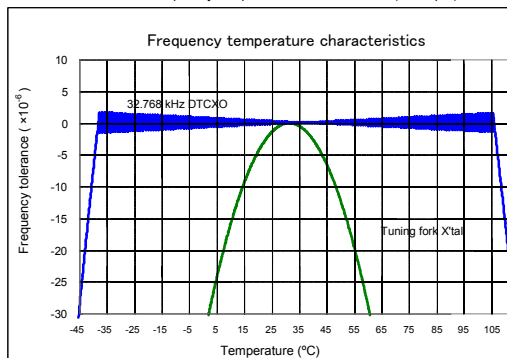
PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.

> 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.

WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

> ISO/TS16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

►**Explanation of the mark that are using it for the catalog**

Pb Free	►Pb free.
RoHS Compliant	►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.)
For Automotive	►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
Automotive Safety	►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

Notice