REAL TIME CLOCK MODULE (I2C-Bus)
For Automotive
Built-in 32.768 kHz-DTCXO, High Stability

RA8803SA

Product Number
RA8803SA UA: X1B000262A00100
RA8803SA UB: X1B000262A00200
RA8803SA UC: X1B000262A00300
**RA8803SA AA: X1B000262A00600**

For Automotive RoHS Compliant

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO.
- 1/100s resolution Time register
- Interface Type : I2C-Bus interface (400kHz)
- Interface voltage range : 1.6 V to 5.5 V
- Temp. compensated voltage range : 2.2 V to 5.5 V
- Timekeeping voltage range : 1.6 V to 5.5 V
- Selectable clock output (32.768 kHz, 1024 Hz, 1 Hz)
- The various functions include full calendar, alarm, timer, EVIN input.
- Applications : Car audio, Car navigation system, Clock
- Conforms to AEC-Q200
- *The I2C-BUS is a trademark of NXP Semiconductors.

Block diagram
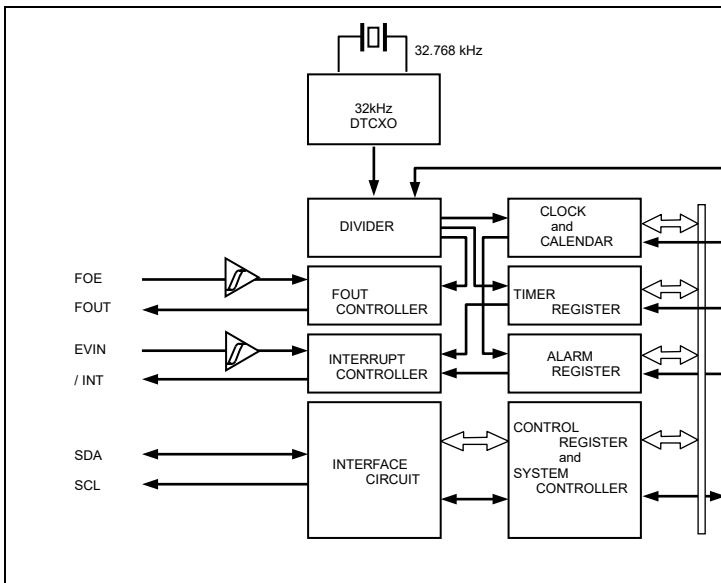
Overview

- **High Stability**
  - UA ± 3.4 x 10^-6 / -40 ºC to +85 ºC
    (Equivalent to ±9 seconds of month deviation)
  - UB ± 5.0 x 10^-6 / -40 ºC to +85 ºC
    (Equivalent to ±13 seconds of month deviation)
  - UC ± 5.0 x 10^-6 / -30 ºC to +70 ºC
  - AA (+5 ± 5.0) x 10^-6 / +25 ºC

- **High Resolution:** 1/100s Time register with capture buffer

- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output), CL=30 pF
  - Output selectable: 32.768 kHz, 1024 Hz, 1 Hz

- **The various interrupt**
  - Timer Function can be set between 1/ 4096 second and 4095 minutes.
  - Alarm Function can be set to day of week, day, hour, or minute.
  - EVIN input.

- **Time synchronize function with 1PPS signal input**

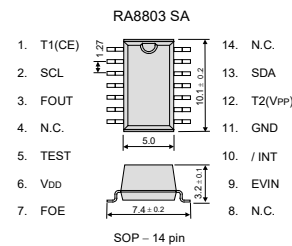- **Register compatibility:** upper compatible with RX-8801.

*It is possible to use it by the terminal connection as 32.768 kHz-DTCXO.

Pin Function

Signal Name	I / O	Function
T1(CE)	input	Use by the manufacture for testing. (Do not connect externally.)
SCL	input	Serial clock input pin.
FOUT	Output	The pin outputs the reference clock signal. (CMOS output)
TEST	input	Use by the manufacture for testing.
VDD	-	Connected to a positive power supply
FOE	input	The input pin for the FOUT output control.
EVIN	input	External event input. Open is Prohibited.
/ INT	Output	Interrupt output (N-ch. open drain).
GND	-	Connected to a ground
T2(VPP)	-	Use by the manufacture for testing. (Do not connect externally.)
SDA	I/O	Data input and output pin.

Terminal connection / External dimensions   (Unit:mm)

RA8803 SA

1. T1(CE)		14. N.C.
2. SCL		13. SDA
3. FOUT		12. T2(VPP)
4. N.C.		11. GND
5. TEST		10. / INT
6. VDD		9. EVIN
7. FOE		8. N.C.

SOP – 14 pin

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}	Interface voltage		1.6	3.0	5.5	V
Temp. compensated Voltage	V_{TEM}	Temp. compensated voltage		2.2	3.0	5.5	V
Clock supply voltage	V_{CLK}	-		1.6	3.0	5.5	V
Operating temperature	T_{OPR}	-		-40	+25	+85	ºC
Stability	$\Delta f / f$	UA	Ta = -40 ºC to +85 ºC		±3.4 *1		× 10^-6
		UB	Ta = -40 ºC to +85 ºC		±5.0 *2		
		UC	Ta = -30 ºC to +70 ºC				
		AA	Ta = +25 ºC		5 ±5.0 *3		
Current consumption (1)	I_{DD1}	Backup Mode FOE = GND, /INT = V_{DD} FOUT output : OFF	V_{DD} = 5V	-	0.75	3.4	µA
Current consumption (2)	I_{DD2}		V_{DD} = 3V	-	0.75	2.1	

*1) Equivalent to ±9 seconds of month deviation. *2) Equivalent to ±13 seconds of month deviation.
*3) Equivalent to ±13 seconds of month deviation. (excluding offset)

■ 32.768 kHz-DTCXO Frequency temperature characteristics (Example)

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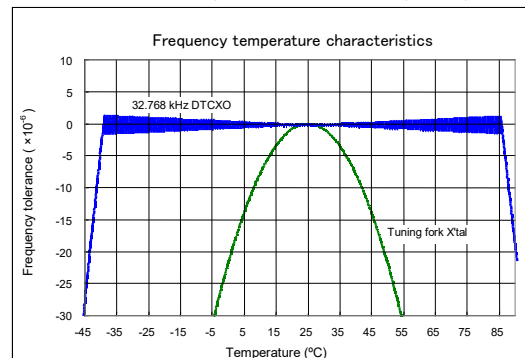
PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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 IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

> IATF 16949 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).