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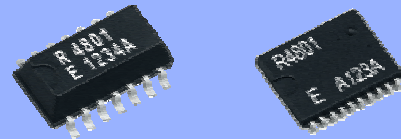
Built-in 32.768 kHz-DTCXO, High Stability
SERIAL-INTERFACE REAL TIME CLOCK MODULE

RX - 4801 SA / JE

RoHS Compliant

Product Number (Please contact us)
RX-4801SA : X1B000021xxxx00
RX-4801JE : X1B000041xxxx00

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO.
- Interface Type : 4-wire serial interface
- Interface voltage range : 1.6 V to 5.5 V
- Temp.compensated voltage range: 2.2 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.

Actual size

| RX-4801SA | RX-4801JE |

Block diagram

32.768 kHz

32kHz DTCXO

DIVIDER — CLOCK and CALENDAR

FOUT — FOUT CONTROLLER — TIMER REGISTER
FOE

/ INT — INTERRUPT CONTROLLER — ALARM REGISTER

D I — INTERFACE CIRCUIT — CONTROL REGISTER and SYSTEM CONTROLLER
DO
CLK
CE
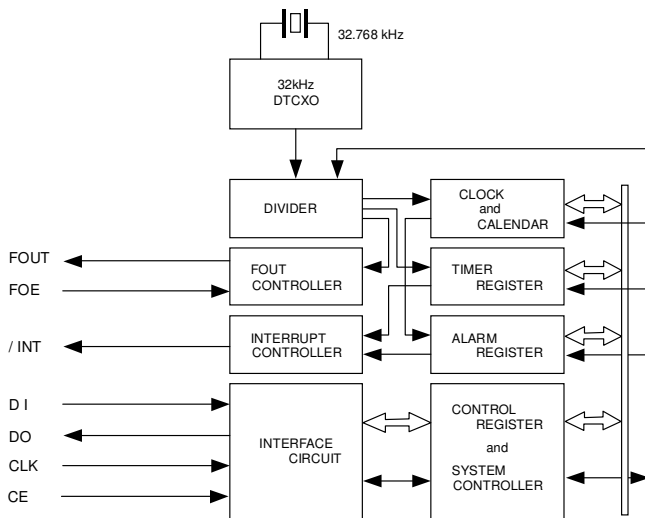
Overview

- High Stability
  - UA
    ± 1.9 x 10⁻⁶ / 0 ºC to +40 ºC
    (Equivalent to 5 seconds of month deviation)
    ± 3.4 x 10⁻⁶ / -40 ºC to +85 ºC
    (Equivalent to 9 seconds of month deviation)
  - UB
    ± 3.8 x 10⁻⁶ / 0 ºC to +50 ºC
    (Equivalent to 10 seconds of month deviation)
    ± 5.0 x 10⁻⁶ / -40 ºC to +85 ºC
    (Equivalent to 13 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 >

- The various interrupt
  - Timer Function can be set up between
    1/ 4096 second and 255 minutes.
  - Alarm Function can be set to day of week,
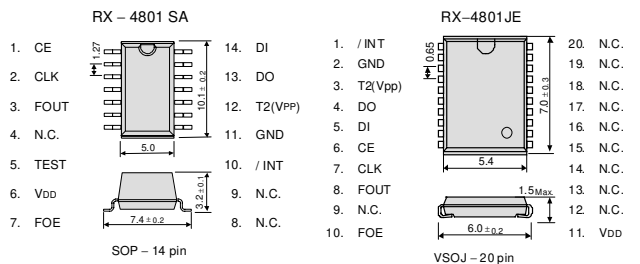   day, hour, or minute.

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

Pin Function

Signal Name	I / O	Function
/ INT	Output	The open drain output for interrupt.
GND	-	Connected to a ground
T2(VPP)	-	* Use by the manufacture for testing. (Do not connect externally.)
DO	Output	The data output pin for serial data transfer.
D I	input	The data input pin for serial data transfer.
CE	input	The chip enable input pin.
CLK	input	The shift clock input pin for serial data transfer.
FOUT	Output	The pin outputs the reference clock signal. (CMOS output)
FOE	input	The input pin for the FOUT output control.
VDD	-	Connected to a positive power supply

Terminal connection / External dimensions
(Unit:mm)

RX – 4801 SA
1. CE
2. CLK
3. FOUT
4. N.C.
5. TEST
6. VDD
7. FOE
14. DI
13. DO
12. T2(VPP)
11. GND
10. / INT
9. N.C.
8. N.C.

SOP – 14 pin
1.27 10.11 ±0.2 5.0 7.4 ±0.2 3.2 ±0.1

RX–4801JE
1. / INT
2. GND
3. T2(Vpp)
4. DO
5. DI
6. CE
7. CLK
8. FOUT
9. N.C.
10. FOE
20. N.C.
19. N.C.
18. N.C.
17. N.C.
16. N.C.
15. N.C.
14. N.C.
13. N.C.
12. N.C.
11. VDD

VSOJ – 20 pin
0.65 7.0 ±0.3 5.4 6.0 ±0.2 1.5 Max.

Metal may be exposed on the top or bottom of this product.
This will not affect any quality, reliability or electrical spec.

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

■ Electrical Characteristics

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Interface voltage	VDD	Interface voltage		1.6	3.0	5.5	V
Temp. compensated Voltage	VTEM	Temp. compensated voltage		2.2	3.0	5.5	V
Clock voltage	VCLK	-		1.6	3.0	5.5	V
Operating temperature	TOPR			−40	+25	+85	ºC
Stability	Δf / f	UA	Ta = 0 ºC to +40 ºC		±1.9 *1		×10⁻⁶
			Ta = -40 ºC to +85 ºC		±3.4 *2		
		UB	Ta = 0 ºC to +50 ºC		±3.8 *3		
			Ta = -40 ºC to +85 ºC		±5.0 *4		
Current consumption (1)	IBK1	Backup Mode FOE = GND, /INT = VDD FOUT output : OFF	VDD = 5V	-	1.2	3.4	μA
Current consumption (2)	IBK2		VDD = 3V	-	0.8	2.1	

*1) Equivalent to 5 seconds of month deviation. *2) Equivalent to 9 seconds of month deviation.
*3) Equivalent to 10 seconds of month deviation. *4) Equivalent to 13 seconds of month deviation.

■ 32.768 kHz-DTCXO Frequency temperature characteristics (Example)

Frequency temperature characteristics

32.768 kHz DTCXO

Tuning fork X'tal

Frequency tolerance (×10⁻⁶)
Temperature (ºC)
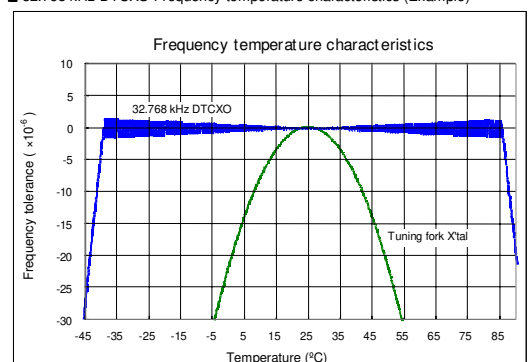
"QMEMS" EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a "3D (three device) strategy" designed to drive both horizontal and vertical growth. We will to grow our three device categories of "Timing Devices", "Sensing Devices" and "Optical Devices", and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers "Digital Convergence" solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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,
Epson Toyocom 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/TS 16949 is a global standard based on QS-9001, a severe standard corresponding to the requirements from the automobile industry.

►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	►**The products have been designed for high reliability applications such as Automotive.**

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/ Medical instruments to sustain life   / Submarine transmitters   / Power stations and related / Fire work equipment and security equipment
/ traffic control equipment / and others requiring equivalent reliability.

● In this new crystal master for Epson Toyocom, product codes and markings will remain as previously identified prior to the merger.
 Due to the on-going strategy of gradual unification of part numbers, please review product codes and markings, as they will change during the course of the coming months.

 We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom that will be user friendly.