High-Stability
I²C-Bus INTERFACE REAL TIME CLOCK MODULE

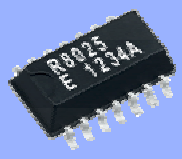
RX - 8025 SA / NB

- Built-in 32.768 kHz crystal unit : Frequency adjusted for high accuracy ($\pm 5 \times 10^{-6}$ / Ta = +25 °C)
- Interface Type : I²C-Bus Interface (400 kHz)
- Operating voltage range: 1.70 V to 5.5 V
- Wide Timekeeper voltage range : 1.15 V to 5.5 V
- Various detection Functions : Ex. Oscillation stop detection function
- Low backup current : 0.48 µA / 3 V (Typ.)
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.

* The I²C-Bus is a trademark of NXP Semiconductors

RoHS Compliant

Product Number (Please contact us)
RX-8025SA : Q41802551xxxx00
RX-8025NB : Q41802591xxxx00

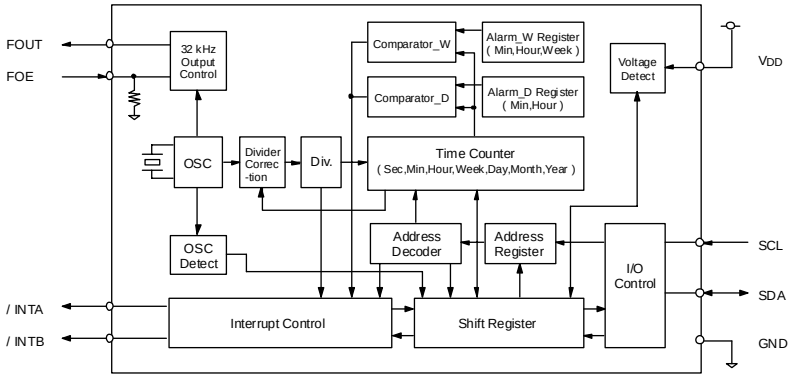


Actual size

RX-8025SA

RX-8025NB

Block diagram



Overview

- **Features built-in 32.768 kHz crystal unit**
  - Frequency adjusted for high accuracy. ($\pm 5 \times 10^{-6}$ / Ta = +25 °C) (Equivalent to 13 seconds of monthly deviation)
- **The various detection function**
  - Power supply voltage monitoring function (with selectable detection threshold)
  - Stop detection function
  - Power-on reset detection function
- **Alarm function and Timer function**
  - Timer function produces a periodic interruption signal. As for the Alarm function an optional combination is produced. (Date of the week , time , minute)

Pin Function

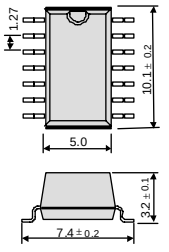
Signal Name	Input / output	Function
SCL	Input	Serial clock input pin
SDA	Bi-directional	Data input and output pin
FOUT	Output	32.768 kHz clock output pin with the output control function. (C-MOS)
FOE	Input	(see table below)
/ INTA	Output	Interrupt output A pin (N-ch open drain)
/ INTB	Output	Interrupt output B pin (N-ch open drain)
TEST	—	* Used by the manufacture for testing. (Do not connect externally.)
VDD	—	Connected to a positive power supply.
GND	—	Connected to a ground.

FOE input	/CLEN1 bit	/CLEN2 bit	FOUT output
L	X	X	OFF (LOW)
H	0	0	32.768 kHz
	0	1	32.768 kHz
	1	0	32.768 kHz
	1	1	OFF(LOW)

Terminal connection / External dimensions (Unit:mm)

RX – 8025 SA

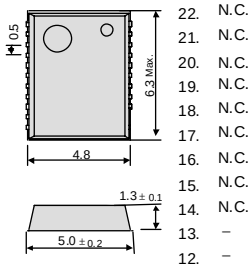
1. N.C.
2. SCL
3. FOUT
4. N.C.
5. TEST
6. VDD
7. FOE
14. N.C.
13. SDA
12. / INTB
11. GND
10. / INTA
9. N.C.
8. N.C.



SOP – 14 pin

RX – 8025 NB

1. FOE
2. VDD
3. (GND)
4. TEST
5. FOUT
6. SCL
7. SDA
8. / INTB
9. GND
10. / INTA
11. N.C.
22. N.C.
21. N.C.
20. N.C.
19. N.C.
18. N.C.
17. N.C.
16. N.C.
15. N.C.
14. N.C.
13. –
12. –



SON – 22 pin

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.

■ Recommended Operating Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	VDD	—	1.7	3.0	5.5	V
Clock voltage	VCLK	—	1.15	3.0	5.5	V
Operating temperature	TOPR	—	−40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Condition	Range	Unit
Frequency tolerance	Δf / f	Ta = +25 °C VDD = 3.0 V	AA: ±5 *1) AC: ±5 *2)	×10⁻⁶
Oscillation start-up time	tSTA	Ta = +25 °C VDD = 2.0 V	1 Max.	s
Frequency voltage characteristics	f / V	Ta = +25 °C VDD = 2.0 V to 5.5 V	±1 Max.	×10⁻⁶

*1) *2) Equivalent to 13 seconds of monthly deviation (excluding offset).

■ Current consumption characteristics

Ta = −40 °C to +85 °C

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Curent Consumption	IBK	fSCL = 0Hz FOE = GND FOUT ; output OFF(LOW)	VDD = 5 V		0.60	1.80	µA
			VDD = 3 V		0.48	1.20	
	I32k	fSCL = 0Hz VDD, FOE = 5.5 V FOUT ; output ON (Output=OPEN; CL = 0 pF)	VDD = 5.5 V		3.0	6.5	µA

■ Power supply detection voltage

Ta = −30 °C to +70 °C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
High-voltage mode	VDETH	VDD pin	1.90	2.10	2.30	V
Low-voltage mode	VDETL	VDD pin	1.15	1.30	1.45	V

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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.
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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.

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QMEMS

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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.

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ISO/TS 16949 is a global standard based on QS-9000, 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.** **►Complies with EU RoHS directive.**
RoHS Compliant	**►Pb free terminal designed. Contains Pb in products exempted by RoHS directive.** **(Contains Pb in sealing glass, high melting temperature type solder or other.)** **►Complies with EU RoHS directive.**
For Automotive	**►The products have been designed for high reliability applications such as Automotive.**

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  / 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.

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Epson:
RX-8025SA:AA0

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