

REAL TIME CLOCK MODULE (I²C-Bus)

High-Stability

RX-8025SA/NB

- Built-in 32.768 kHz crystal unit : Frequency adjusted for high accuracy ($\pm 5 \times 10^{-6}$ / $T_a = +25^\circ\text{C}$)
- Interface Type : I²C-Bus Interface (400 kHz)
- Operating voltage range : 1.70 V to 5.5 V
- Wide voltage for timekeeping : 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 OE pin.
- The various functions include full calendar, Dual alarm, Periodic interruption.

* The I²C-Bus is a trademark of NXP Semiconductors



Product Number (Please contact us)
 RX-8025SA AA : Q41802552000100
 RX-8025SA AC : Q41802551000200
 RX-8025NB AA : Q41802592000100
 RX-8025NB AC : Q41802592000200



Actual size

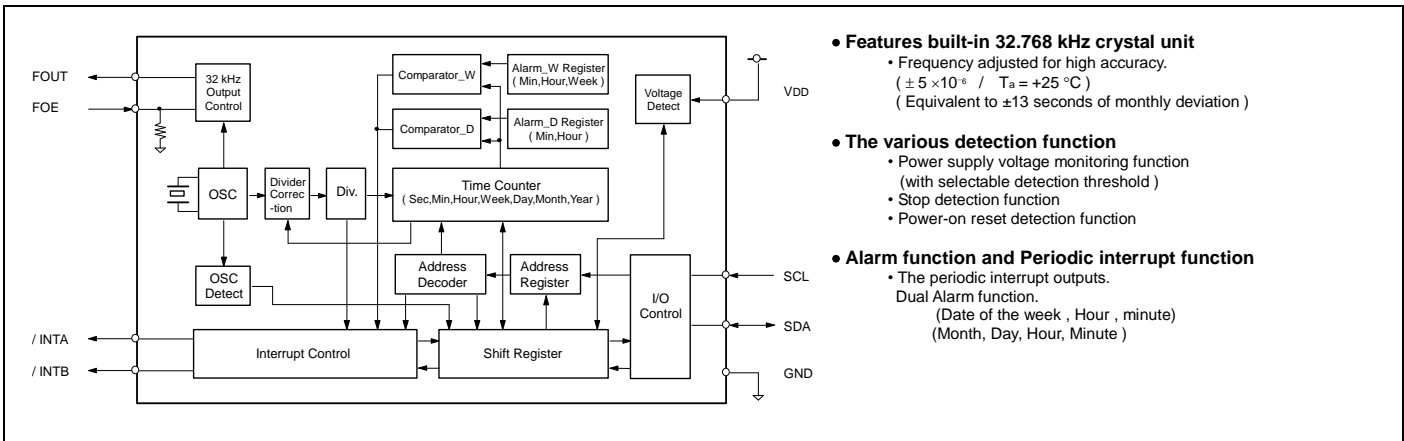
RX-8025SA

RX-8025NB



Block diagram

Overview



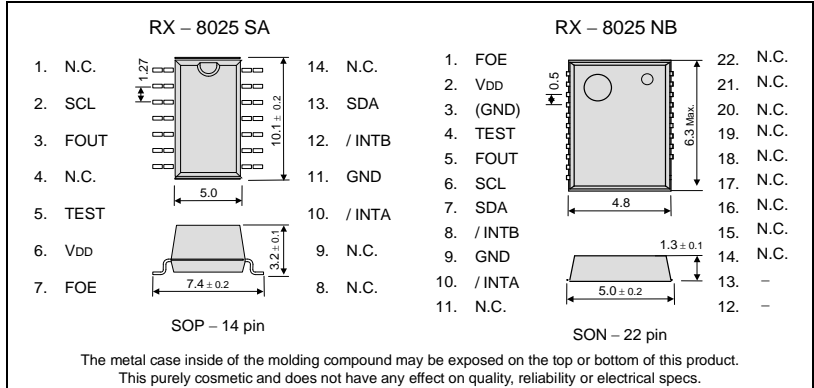
- **Features built-in 32.768 kHz crystal unit**
 - Frequency adjusted for high accuracy. ($\pm 5 \times 10^{-6}$ / $T_a = +25^\circ\text{C}$) (Equivalent to ± 13 seconds of monthly deviation)
- **The various detection function**
 - Power supply voltage monitoring function (with selectable detection threshold)
 - Stop detection function
 - Power-on reset detection function
- **Alarm function and Periodic interrupt function**
 - The periodic interrupt outputs. Dual Alarm function. (Date of the week, Hour, minute) (Month, Day, Hour, Minute)

Pin Function

Terminal connection / External dimensions

(Unit:mm)

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	<table border="1"> <thead> <tr> <th>FOE input</th> <th>/CLEN1 bit</th> <th>/CLEN2 bit</th> <th>FOUT output</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>X</td> <td>X</td> <td>OFF (LOW)</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>32.768 kHz</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>OFF (LOW)</td> </tr> </tbody> </table>	FOE input	/CLEN1 bit	/CLEN2 bit	FOUT output	L	X	X	OFF (LOW)	0	0	0	32.768 kHz	1	0	1	32.768 kHz	1	1	1	OFF (LOW)
		FOE input	/CLEN1 bit	/CLEN2 bit	FOUT output																	
		L	X	X	OFF (LOW)																	
		0	0	0	32.768 kHz																	
1	0	1	32.768 kHz																			
1	1	1	OFF (LOW)																			
/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.																				



Specifications (characteristics)

* Refer to application manual for details.

Recommended Operating Conditions

Item	Symbol	Conditions	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	Conditions	Range	Unit
Frequency tolerance	$\Delta f / f$	$T_a = +25^\circ\text{C}$ VDD = 3.0 V	AA: 5 ± 5 ^{*1)} AC: 0 ± 5 ^{*2)}	$\times 10^{-6}$
Oscillation start-up time	t _{STA}	$T_a = +25^\circ\text{C}$ VDD = 2.0 V	1 Max.	s
Frequency voltage characteristics	f / V	$T_a = +25^\circ\text{C}$ VDD = 2.0 V to 5.5 V	± 1 Max.	$\times 10^{-6}$

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

Current consumption characteristics

Item	Symbol	Conditions	$T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$				
			Min.	Typ.	Max.	Unit	
Current Consumption	I _{BK}	f _{SCL} = 0Hz FOE = GND FOUT ; output OFF (LOW)	VDD = 5 V	-	0.60	1.80	μA
		VDD = 3 V	-	0.48	1.20	μA	
Current Consumption	I _{32k}	f _{SCL} = 0Hz VDD, FOE = 5.5 V FOUT ; output ON (Output=OPEN; CL = 0 pF)	VDD = 5.5 V	-	3.0	6.5	μA
		VDD = 3 V	-	3.0	6.5	μA	

Power supply detection voltage

Item	Symbol	Conditions	$T_a = -30^\circ\text{C}$ to $+70^\circ\text{C}$			
			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

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.

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	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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