

# REAL TIME CLOCK MODULE (I<sup>2</sup>C-Bus)

High-Stability

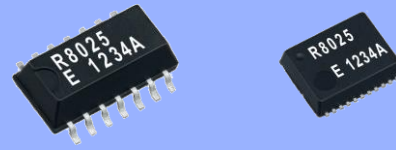
## RX-8025SA/NB

- 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 : I<sup>2</sup>C-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  $\mu\text{A}$  / 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 I<sup>2</sup>C-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

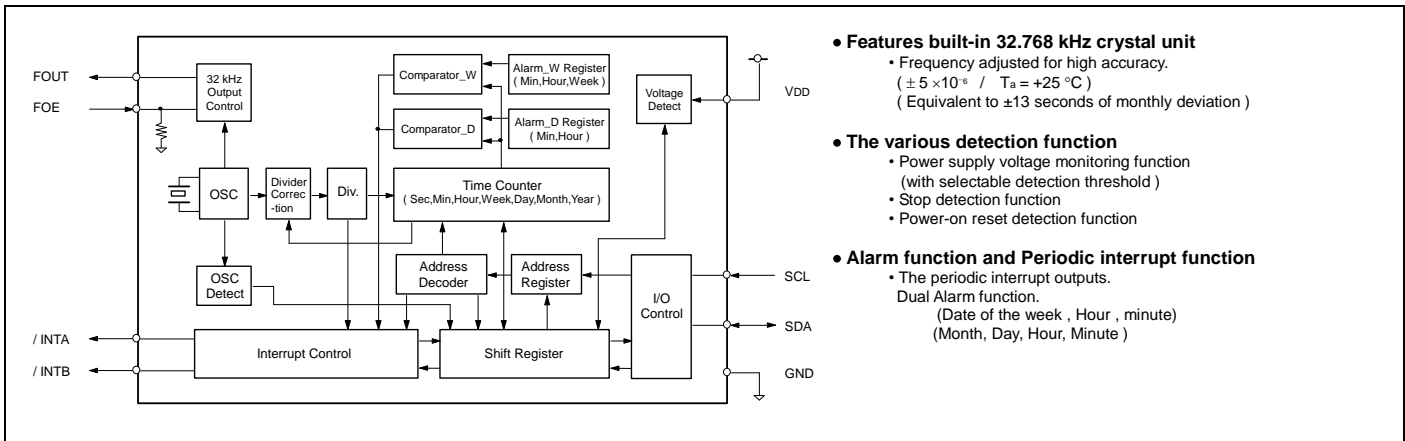
RX-8025SA

RX-8025NB



### Block diagram

### Overview



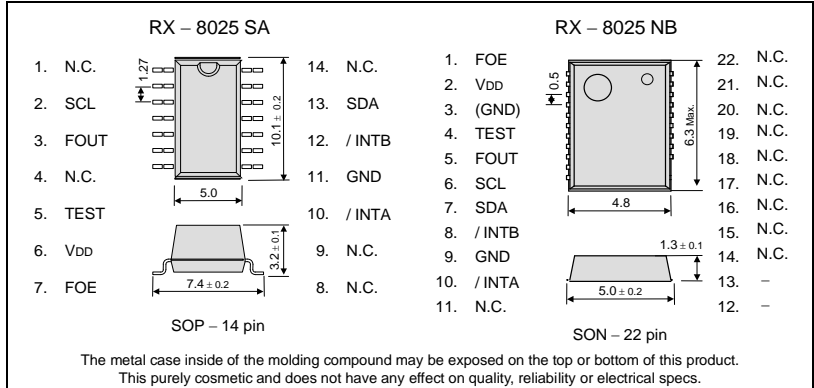
- **Features built-in 32.768 kHz crystal unit**
  - Frequency adjusted for high accuracy. ( $\pm 5 \times 10^{-6}$  /  $T_a = +25^\circ\text{C}$ ) (Equivalent to  $\pm 13$  seconds of monthly deviation)
- **The various detection function**
  - Power supply voltage monitoring function (with selectable 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 rowspan="3">H</td> <td>0</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <td>0</td> <td>1</td> <td>32.768 kHz</td> </tr> <tr> <td>1</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <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)	H	0	0	32.768 kHz	0	1	32.768 kHz	1	0	32.768 kHz	1	1	OFF(LOW)
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)																					
/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: $5 \pm 5$ <sup>*1)</sup> AC: $0 \pm 5$ <sup>*2)</sup>	$\times 10^{-6}$
Oscillation start-up time	t <sub>STA</sub>	$T_a = +25^\circ\text{C}$ 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	$\pm 1$ Max.	$\times 10^{-6}$

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

#### Current consumption characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Current Consumption	I <sub>BK</sub>	f <sub>SCL</sub> = 0Hz FOE = GND FOUT ; output OFF(LOW)	VDD = 5 V	-	0.60	1.80	$\mu\text{A}$
		VDD = 3 V	-	0.48	1.20	$\mu\text{A}$	
Current Consumption	I <sub>32k</sub>	f <sub>SCL</sub> = 0Hz VDD, FOE = 5.5 V FOUT ; output ON ( Output=OPEN; CL = 0 pF )	VDD = 5.5 V	-	3.0	6.5	$\mu\text{A}$
		VDD = 3 V	-	3.0	6.5	$\mu\text{A}$	

#### Power supply detection voltage

Item	Symbol	Conditions	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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	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
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