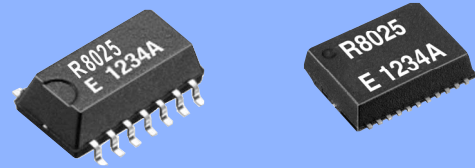


# High-Stability I<sup>2</sup>C-Bus INTERFACE REAL TIME CLOCK MODULE

## RX - 8025 SA / NB

- Built-in 32.768 kHz quartz oscillator : Frequency adjusted for high accuracy ( $\pm 5 \times 10^{-6}$  / Ta = +25 °C)
  - Interface Type : I<sup>2</sup>C-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  $\mu$ A / 3 V (Typ.)
  - 32.768 kHz frequency output function : C-MOS output With Control Pin
  - The various functions include full calendar, alarm, timer.
  - Lead(Pb)-free : Contains high melting temperature type solder (Pb85 %) exempted by RoHS directive.
- \* The I<sup>2</sup>C-Bus is a trademark of Philips Electronics N.V.



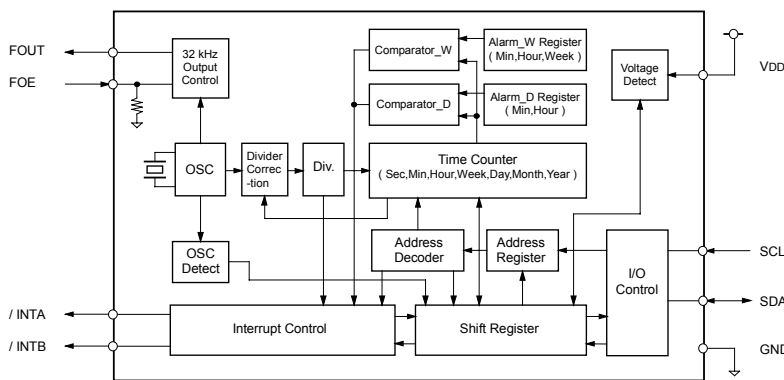
Actual size

RX-8025SA

RX-8025NB



### Block diagram



### Overview

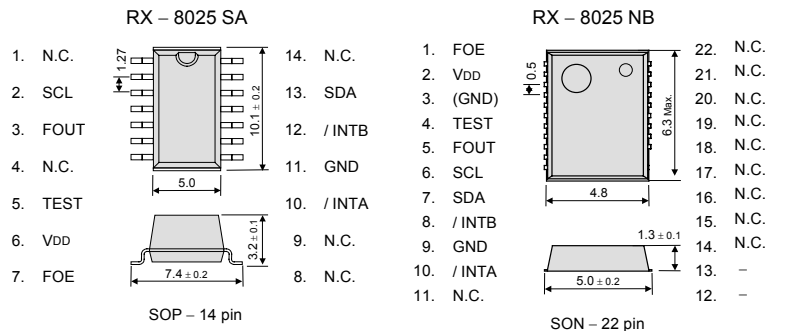
- **Features built-in 32.768 kHz quartz oscillator**
  - Frequency adjusted for high accuracy. ( $\pm 5 \times 10^{-6}$  / Ta = +25 °C) (Equivalent to 13 seconds of monthly deviation)
- **The various detection function**
  - Power supply voltage monitoring function (with selectable detection threshold)
  - 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	FOUT pin is 32.768 kHz clock output pin (C-MOS) that output control is possible.																					
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.																					

### Terminal connection / External dimensions

(Unit:mm)



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	$\Delta f / f$	Ta = +25 °C VDD = 3.0 V	AA: $5 \pm 5$ *1) AC: $0 \pm 5$ *2)	$\times 10^{-6}$
Oscillation start-up time	t <sub>STA</sub>	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	$\pm 1$ Max.	$\times 10^{-6}$

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

#### DC characteristics

Item	Symbol	Condition	Ta = -40 °C to +85 °C			
			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	$\mu$ A
		VDD = 3 V	0.48	1.20		
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	$\mu$ A
		VDD = 3 V	—	—		

#### Power supply detection voltage

Item	Symbol	Condition	Ta = -30 °C to +70 °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