

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

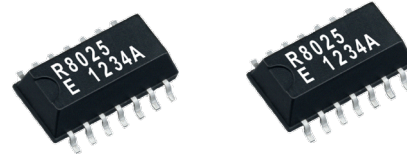
High-Stability

## RX-8025SA

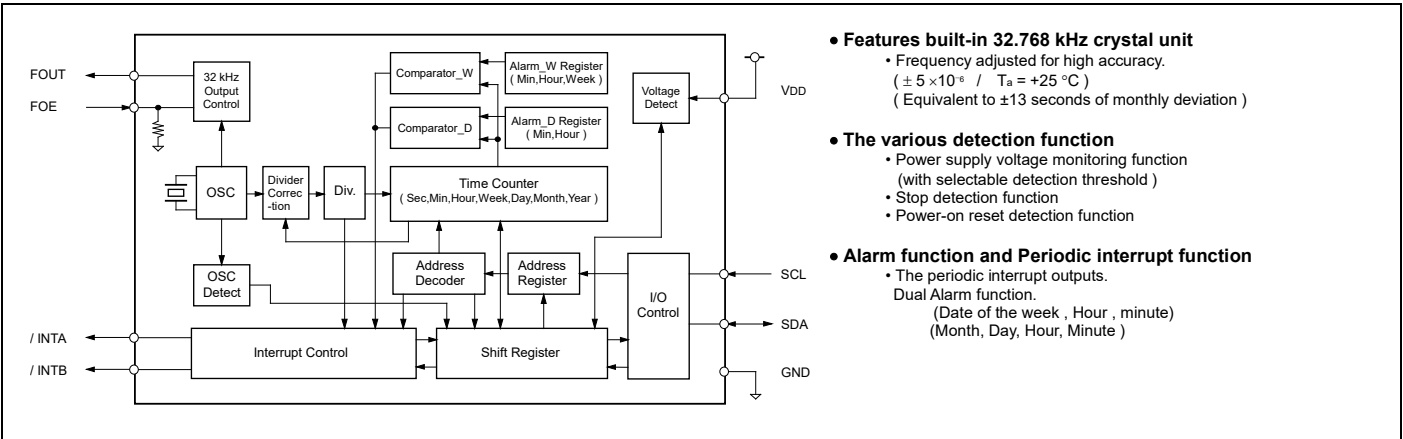
Product Number  
**RX-8025SA AA : Q41802552000100**  
**RX-8025SA AC : Q41802551000200**

- 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



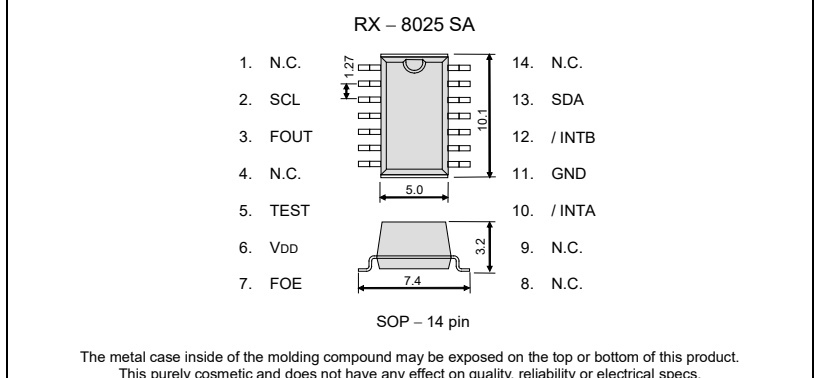
### Block diagram Overview



- **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></td> <td>0</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <td>H</td> <td>0</td> <td>1</td> <td>32.768 kHz</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <td></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	32.768 kHz	H	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)																							
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H	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: $5 \pm 5^{*1}$ AC: $0 \pm 5^{*2}$	$\times 10^{-6}$
Oscillation start-up time	tSTA	$T_a = +25^\circ\text{C}$ 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 $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$							
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Current Consumption	IBK	fSCL = 0Hz FOE = GND FOUT ; output OFF (LOW)	VDD = 5 V	-	0.60	1.80	$\mu\text{A}$
	I32k	fSCL = 0Hz VDD, FOE = 5.5 V FOUT ; output ON (Output=OPEN; CL = 0 pF)	VDD = 5.5 V	-	3.0	6.5	$\mu\text{A}$

Power supply detection voltage $T_a = -30^\circ\text{C}$ to $+70^\circ\text{C}$						
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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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.

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