

High-Stability
I²C-Bus INTERFACE REAL TIME CLOCK MODULE

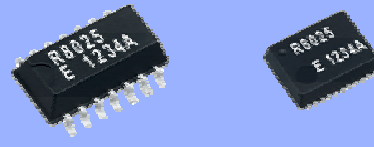
RX - 8025 SA / NB

- Built-in 32.768 kHz crystal unit : Frequency adjusted for high accuracy ($\pm 5 \times 10^{-6}$ / $T_a = +25^\circ\text{C}$)
- 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



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

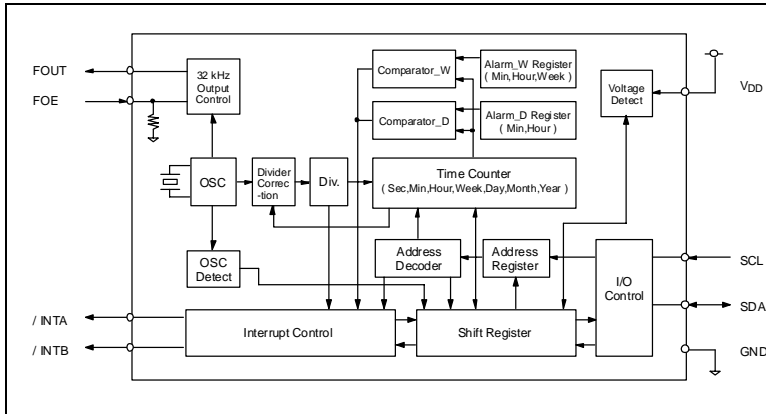


Actual size

RX-8025SA

RX-8025NB

Block diagram



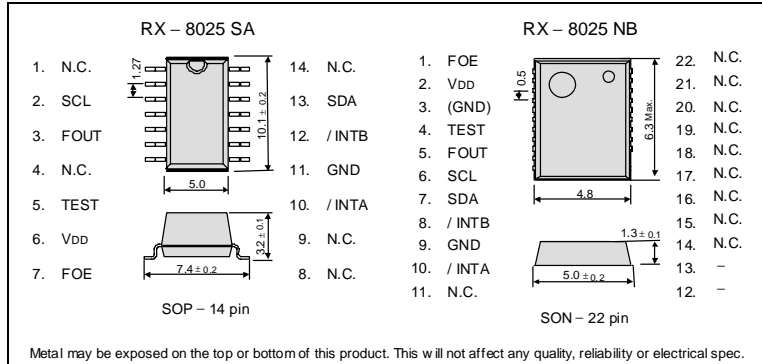
Overview

- Features built-in 32.768 kHz crystal unit
 - Frequency adjusted for high accuracy ($\pm 5 \times 10^{-6}$ / $T_a = +25^\circ\text{C}$) (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 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 | <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.) | | | | | | | | | | | | | | | | | | | | |
| V _{DD} | — | Connected to a positive power supply. | | | | | | | | | | | | | | | | | | | | |
| GND | — | Connected to a ground. | | | | | | | | | | | | | | | | | | | | |

Terminal connection / External dimensions (Unit:mm)



Specifications (characteristics)

* Refer to application manual for details.

Recommended Operating Conditions

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------------------|------------------|-----------|------|------|------|------|
| Power voltage | V _{DD} | — | 1.7 | 3.0 | 5.5 | V |
| Clock voltage | V _{CLK} | — | 1.15 | 3.0 | 5.5 | V |
| Operating temperature | T _{OPR} | — | -40 | +25 | +85 | °C |

Frequency characteristics

| Item | Symbol | Condition | Range | Unit |
|-----------------------------------|------------------|---|--|--------------------|
| Frequency tolerance | $\Delta f / f$ | T _a = +25 °C V _{DD} = 3.0 V | AA: 5 ± 5 ^(*) AC: 0 ± 5 ^(*) | × 10 ⁻⁶ |
| Oscillation start-up time | t _{STA} | T _a = +25 °C V _{DD} = 2.0 V | 1 Max. | s |
| Frequency voltage characteristics | f / V | T _a = +25 °C V _{DD} = 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

| Item | Symbol | Condition | T _a = -40 °C to +85 °C | | | |
|---------------------|------------------|---|-----------------------------------|------|------|------|
| | | | Min. | Typ. | Max. | Unit |
| Current Consumption | I _{BK} | f _{SCL} = 0Hz FOE = GND FOUT; output OFF (LOW) | V _{DD} = 5 V | 0.60 | 1.80 | μA |
| | I _{32k} | f _{SCL} = 0Hz V _{DD} , FOE = 5.5 V FOUT; output ON (Output=OPEN; CL = 0 pF) | V _{DD} = 5.5 V | 3.0 | 6.5 | |

Power supply detection voltage

| Item | Symbol | Condition | T _a = -30 °C to +70 °C | | | |
|-------------------|-------------------|---------------------|-----------------------------------|------|------|------|
| | | | Min. | Typ. | Max. | Unit |
| High-voltage mode | V _{DETH} | V _{DD} pin | 1.90 | 2.10 | 2.30 | V |
| Low-voltage mode | V _{DETL} | V _{DD} pin | 1.15 | 1.30 | 1.45 | V |

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| | |
|--|---|
| | <ul style="list-style-type: none"> ► Pb free. ► Complies with EU RoHS directive. |
| | <ul style="list-style-type: none"> ► 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. |
| | <ul style="list-style-type: none"> ► The products have been designed for high reliability applications such as Automotive. |

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