

High-Stability
I²C-Bus INTERFACE REAL TIME CLOCK MODULE

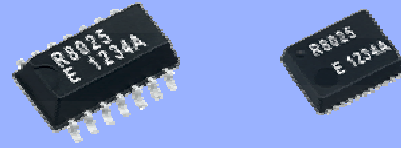
RX - 8025 SA / NB

- 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



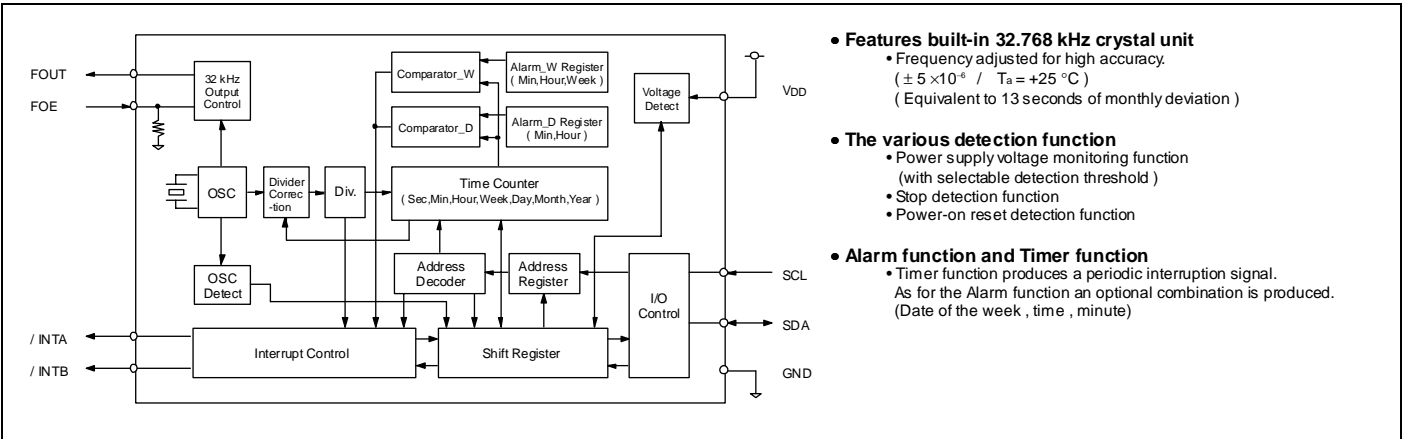
Product Number (Please contact us)
RX-8025SA : Q41802551xxxx00
RX-8025NB : Q41802591xxxx00



Actual size



Block diagram Overview

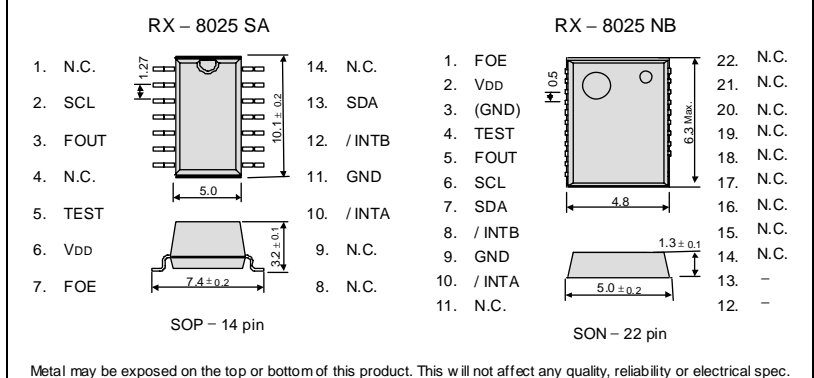


- **Features built-in 32.768 kHz crystal unit**
 - Frequency adjusted for high accuracy ($\pm 5 \times 10^{-6}$ / $T_a = +25^\circ\text{C}$) (Equivalent to 13 seconds of monthly deviation)
- **The various detection function**
 - Power supply voltage monitoring function (with selectable detection threshold)
 - 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></td> <td>0</td> <td>0</td> <td>32.768 kHz</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>32.768 kHz</td> </tr> <tr> <td>H</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		0	1	32.768 kHz	H	1	0	32.768 kHz		1	1	OFF (LOW)
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/ 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)



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 ^{*1)} AC: 0 ± 5 ^{*2)}	× 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 T_a = -40 °C to +85 °C

Item	Symbol	Condition	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	μA

■ Power supply detection voltage T_a = -30 °C to +70 °C

Item	Symbol	Condition	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

“QMEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.



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At Epson Toyocom, 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.

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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In order to provide high quality and reliable products and services than meet customer needs, Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

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ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

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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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