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High-Stability I²C-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 : 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.
- Lead(Pb)-free : Contains high melting temperature type solder (Pb85 %) exempted by RoHS directive.

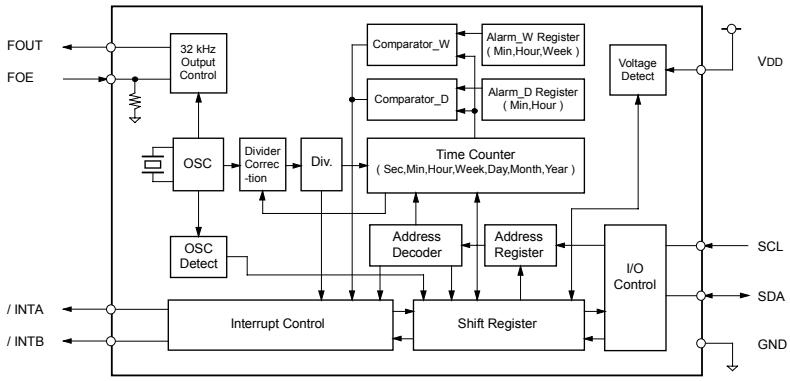
* The I²C-Bus is a trademark of Philips Electronics N.V.

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

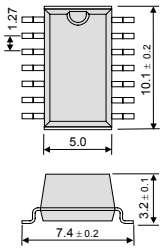
Signal Name	Input / output	Function
SCL	Input	Serial clock input pin
SDA	Bi-directional	Data input and output pin
FOUT	Output	FOUT pin is 32.768 kHz clock output pin (C-MOS) that output control is possible.
FOE	Input	FOE input: L — X / X / OFF (LOW); H — 0 / 0 / 32.768 kHz; 0 / 1 / 32.768 kHz; 1 / 0 / 32.768 kHz; 1 / 1 / OFF(LOW) (/CLEN1 bit, /CLEN2 bit, FOUT output)
/ 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)

RX – 8025 SA

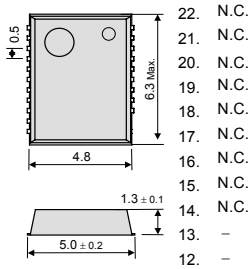
1.	N.C.	14.	N.C.
2.	SCL	13.	SDA
3.	FOUT	12.	/ INTB
4.	N.C.	11.	GND
5.	TEST	10.	/ INTA
6.	VDD	9.	N.C.
7.	FOE	8.	N.C.



SOP – 14 pin

RX – 8025 NB

1.	FOE	22.	N.C.
2.	VDD	21.	N.C.
3.	(GND)	20.	N.C.
4.	TEST	19.	N.C.
5.	FOUT	18.	N.C.
6.	SCL	17.	N.C.
7.	SDA	16.	N.C.
8.	/ INTB	15.	N.C.
9.	GND	14.	N.C.
10.	/ INTA	13.	–
11.	N.C.	12.	–



SON – 22 pin

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	Δ f / f	Ta = +25 °C, VDD = 3.0 V	AA: ± 5 *1), AC: ± 5 *2)	× 10^{-6}
Oscillation start-up time	tSTA	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	± 1 Max.	× 10^{-6}

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

■ DC characteristics

Ta = –40 °C to +85 °C

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Curent Consumption	IBK	fSCL = 0Hz, FOE = GND, FOUT ; output OFF(LOW)	VDD = 5 V		0.60	1.80	µA
			VDD = 3 V		0.48	1.20	
	I32k	fSCL = 0Hz, VDD, FOE = 5.5 V, FOUT ; output ON (Output=OPEN; CL = 0 pF)	VDD = 5.5 V		3.0	6.5	µA

■ Power supply detection voltage

Ta = –30 °C to +70 °C

Item	Symbol	Condition	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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