

High-Stability Frequency

SERIAL-INTERFACE REAL TIME CLOCK MODULE

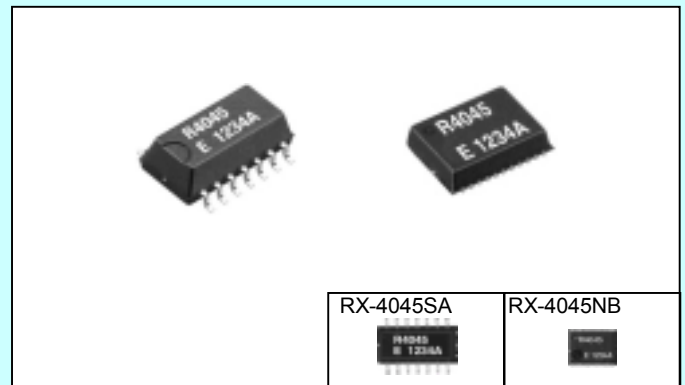
RX-4045 SA / NB

Product Number (please contact us)

RX-4045 SA : Q41404551xxxx00

RX-4045 NB : Q41404591xxxx00

- Built-in 32.768 kHz quartz oscillator : Frequency adjusted for high accuracy. ( $\pm 5 \times 10^{-6} / T_a = +25^\circ\text{C}$ )
- Interface Type : 4 wire high accuracy serial interface
- Operating voltage range : 1.7 V to 5.5 V
- Wide Timekeeper voltage range : 1.15 V to 5.5 V
- Various detection Functions : Oscillation stop detection function etc.
- Low backup current : 0.48  $\mu\text{A}$  / 3 V (Typ.)
- 32.768kHz clock frequency output : Open drain output
- Function of time and calendar, the various detection function, and interrupt function etc.
- Comply with EU RoHS directive

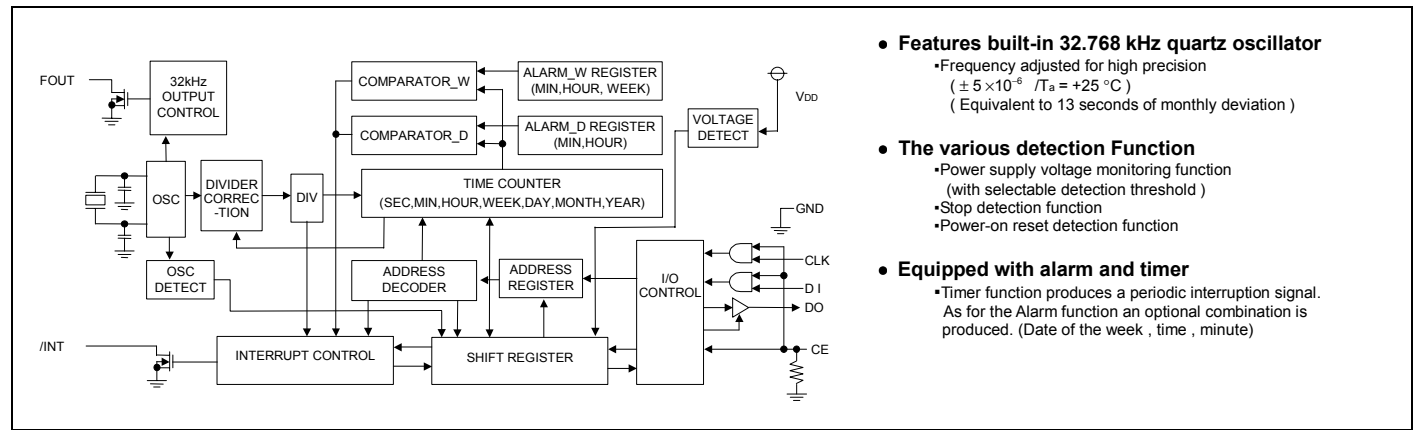


Actual size

\* The details are mentioned in the application manual.

<http://www.epsondevice.com>

Block diagram



Overview

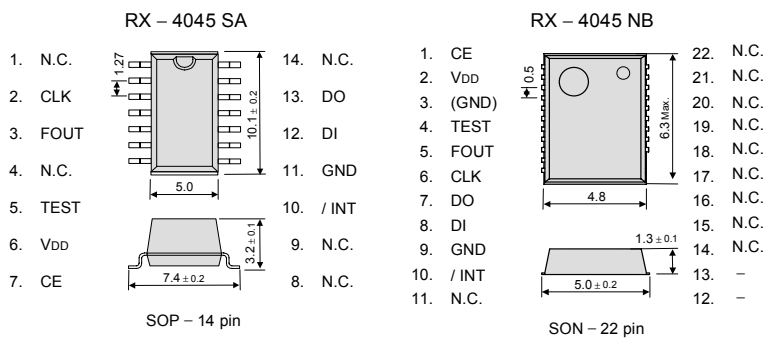
- **Features built-in 32.768 kHz quartz oscillator**
  - Frequency adjusted for high precision ( $\pm 5 \times 10^{-6} / T_a = +25^\circ\text{C}$ ) (Equivalent to 13 seconds of monthly deviation)
- **The various detection Function**
  - Power supply voltage monitoring function (with selectable detection threshold)
  - Stop detection function
  - Power-on reset detection function
- **Equipped with alarm and timer**
  - 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

Terminal connection / External dimensions

(Unit:mm)

Signal Name	Input / Output	Function
CE	Input	The chip enabled input pin. (built-in pull-down resistance) At the "H" level, access becomes possible.
CLK	Input	The shift clock input pin for serial data transfer.
DI	Input	The data input pin for serial data transfer.
DO	Output	The data output pin for serial data transfer.
FOUT	Output	FOUT pin is 32.768 kHz clock output pin that output control is possible. (N-ch open drain) High impedance at the time of output off.
/INT	Output	Interrupt output (N-ch open drain)
TEST	—	* Used by the manufacturer for testing. (Do not connect externally.)
VDD	—	Connected to a positive power supply.
GND	—	Connected to a ground.



Metal may be exposed on the top or bottom of this product. This won't affect any quality, reliability or electrical spec.

Specifications (characteristics)

**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	Rating	Unit
Frequency tolerance	$\Delta f / f$	T <sub>a</sub> = +25°C VDD = 3.0 V	5 ± 5 <sup>*1)</sup> 0 ± 5 <sup>*2)</sup>	× 10 <sup>-6</sup>
Oscillation start-up time	t <sub>STA</sub>	T <sub>a</sub> = +25°C VDD = 2.0 V	1 Max.	s
Frequency / voltage characteristics	f / V	T <sub>a</sub> = +25°C VDD = 2.0 V to 5.5 V	± 1 Max.	× 10 <sup>-6</sup>

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

**DC characteristics** T<sub>a</sub> = -40°C to +85°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Current Consumption	I <sub>BK</sub>	CE = GND FOUT ; output OFF (Hi-Z)	VDD = 5 V	0.60	1.80	μA
			VDD = 3 V	0.48	1.20	
	I <sub>32k</sub>	CE = GND FOUT ; 32.768 kHz output ON	VDD = 3 V	0.65	2.00	μA

**Power supply detection voltage** T<sub>a</sub> = -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