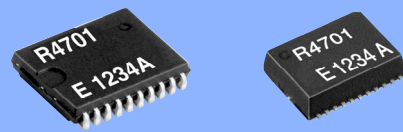


Built-in Temperature Sensor SERIAL-INTERFACE REAL TIME CLOCK MODULE

RTC - 4701 JE / NB

- Built-in 32.768 kHz quartz oscillator : Frequency adjusted for high accuracy. ($5 \pm 23 \times 10^{-6}$)
- Interface Type : Serial interface in 3 lines form.
- Operating voltage range : 1.6 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- Built-in temperature sensor : Detects temperature. Convert of output to analog voltage
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- Function of time and calendar, the various interrupt function etc.
- Lead(Pb)-free : Contains high melting temperature type solder (Pb85 %) exempted by RoHS directive.



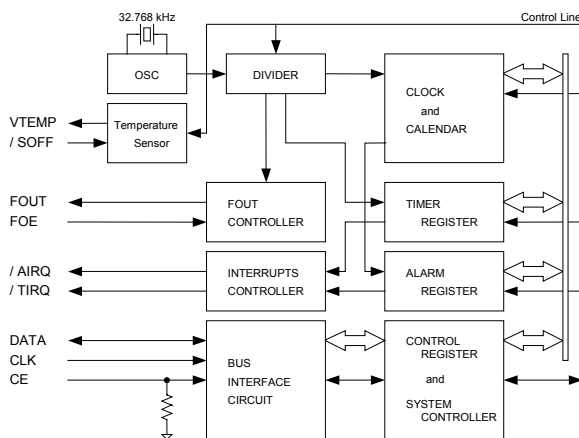
Actual size

RTC-4701JE

RTC-4701NB



Block diagram



Overview

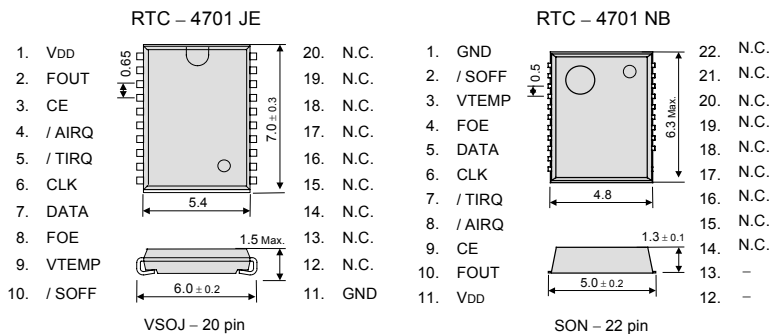
- **Built-in temperature sensor**
 - Diode temperature sensor (analog voltage output)
 - * temperature sensor operating voltage : 2.7 V to 5.5 V
 - * temperature sensor tolerance : $\pm 5^\circ\text{C}$ ($T_a = +25^\circ\text{C}$)
 - * voltage output (analog): $-7.6 \text{ mV} / ^\circ\text{C}$ Typ.
- **32.768 kHz frequency output function**
 - FOUT pin output (C-MOS output), $CL=30 \text{ pF}$
 - FOE pin enables output on/off control.
- **The various interrupt function**
 - 12 bit additional counter. (to 4095 count)
 - Timer function can be set up between 1/4096 second and 255 minutes.
 - Alarm function can be set to day of week, hour, or minute.

Pin Function

Signal Name	Input / Output	Function						
CE	Input	The chip enabled input pin. (Built-in pull-down resistance)						
CLK	Input	The shift clock input pin for serial data transfer.						
DATA	Bi-directional	The data input / output pin for serial data transfer.						
FOUT	Output	<table border="1"> <thead> <tr> <th>FOE input</th> <th>FOUT output</th> </tr> </thead> <tbody> <tr> <td>HIGH</td> <td>32.768 kHz output + C-MOS output</td> </tr> <tr> <td>LOW</td> <td>output OFF * Hi-z</td> </tr> </tbody> </table>	FOE input	FOUT output	HIGH	32.768 kHz output + C-MOS output	LOW	output OFF * Hi-z
FOE input	FOUT output							
HIGH	32.768 kHz output + C-MOS output							
LOW	output OFF * Hi-z							
FOE	Input							
VTEMP	Output	The voltage output pin for the temperature sensor (analog).						
/SOFF	Input	The input pin for the temperature sensor control.						
/AIRQ	Output	Output 1 pin (N-ch open drain)						
/TIRQ	Output	Output 2 pin (N-ch open drain)						
VDD	—	Connected to a positive power supply.						
GND	—	Connected to a ground.						

Terminal connection / External dimensions

(Unit:mm)



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

Temperature sensor characteristics

* Refer to application manual for details.

* If not specifically indicated, GND = 0 V, VDD = 2.7 V to 5.5 V, Ta = -40 °C to +85 °C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Temperature output voltage	VTEMP	VTEMP pin, Ta = +25 °C GND based output voltage		1.480		V
Output tolerance	TACR	Ta = +25 °C			± 5.0	°C
Temperature sensitivity	VSE	$-40^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	-7.1	-7.6	-8.1	mV / °C
Linearity	ΔNL	$-40^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$			± 2.0	%
Temperature detection range	TSOP	$\Delta\text{NL} \leq \pm 2.0\%$	-40		+ 85	°C
Output resistance	Ro	VTEMP pin, Ta = +25 °C GND standard and VDD standard		1.0	3.0	kΩ

* Temperature sensitivity $VSE = (V(+85^\circ\text{C}) - V(-40^\circ\text{C})) / 125 [\text{mV} / ^\circ\text{C}]$

* Linearity $\Delta\text{NL} = \frac{a}{b} \times 100 [\%]$

* Output resistance (Ro) $Ro = \frac{\Delta V}{\Delta I} [\Omega]$

a : Maximum deviation between the measured value of VTEMP and approximate straight line.
b : Difference between the measured values at -40 °C and +85 °C.

