

Built-in EEPROM
SERIAL-INTERFACE REAL TIME CLOCK MODULE

RTC - 9701 JE

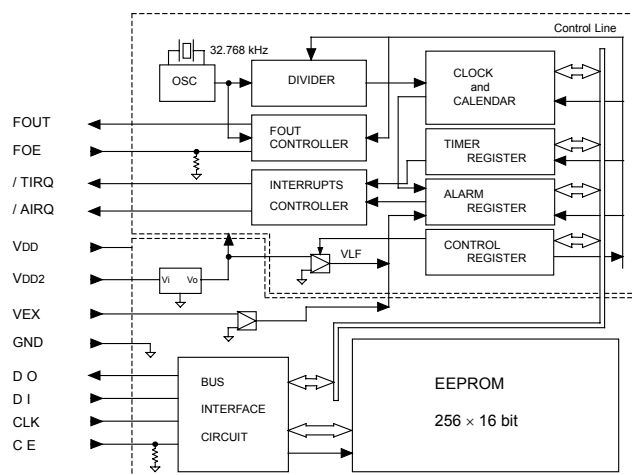
- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : Serial interface in 4 lines form.
- Operating voltage range : 2.7 V to 3.6 V
- Wide Timekeeper voltage range : 1.8 V to 5.5 V
- Include EEPROM : 4 kbit (256 × 16 bit)
- Various detection Functions : Ex.Power supply voltage monitoring function
- 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.



Actual size



Block diagram



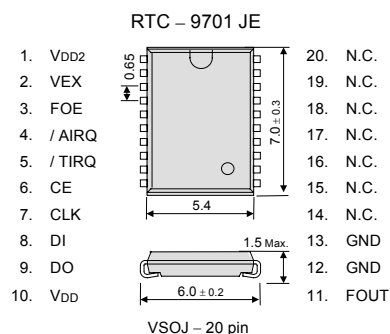
Overview

- **Include EEPROM**
 - 4 kbit (256 × 16 bit) User Memory.
- **The various Power supply voltage monitoring function**
 - VEX input pin : Power supply voltage monitoring function
 - VDD2 pin : Low voltage detection function
 - Oscillation circuit : Low voltage detection function
- **Interface Type**
 - Serial interface in 4 lines form.
 - * It is possible to make it to 3 lines by wired-OR connecting DI and DO pins.
- **32.768 kHz frequency output function**
 - FOUT pin output (C-MOS output)
 - FOE pin enables output on/off control.
- **The various interrupt function**
 - Alarm interrupt function,
Time-update interrupt function, timer function.

Pin Function

Signal Name	Input / Output	Function
VDD	—	Connected to a positive power supply.
VDD2	—	RTC power. * Always supply the power irrespective of action situation to this terminal.
VEX	—	External voltage detection input pin
CE	Input	The chip enabled input pin. (built -in pull-down resistance)
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	This pin outputs the reference clock signal at 32.768 kHz (CMOS output). High impedance at the time of output off.
FOE	Input	The input pin for the FOUT output control.
/ AIRQ	Output	Open drain output pin for alarm and time update interrupts.
/ TIRQ	Output	Open drain output pin for timer interpt.
GND	—	Connected to a ground.

Terminal connection / External dimensions	(Unit:mm)
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Metal may be exposed on the top or bottom of this product.
This will not affect any quality, reliability or electrical spec.

Specifications (characteristics)

* If not specifically indicated, $V_{DD} = 2.7\text{ V}$ to 3.6 V , $V_{DD2} = 1.8\text{ V}$ to 5.5 V , $T_a = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$

* Refer to application manual for details.

■ Recommended Operating Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	VDD	VDD pin	2.7	3.0	3.6	V
Clock voltage	VDD2	VDD2 pin	1.8	3.0	5.5	V
Analog voltage	VEX	VEX pin	1.4		5.5	V
Operating temperature	TOPR	—	−40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Condition	Rating	Unit
Frequency tolerance	$\Delta f/f$	Ta = +25 °C VDD = 3.0 V	5 ± 23 *	× 10 ⁻⁶

* Please ask for tighter tolerance. (Equivalent to 1 minute of monthly deviation)

■ EEPROM Memory characteristics

Item	Min.	Typ.	Max.	Unit
Memory contents	4 kbit	(256 × 16 bit)		—
Program/Erase cycle	10 ⁵			times
Current consumption (write to EEPROM)		1	3	mA
Access time		5	10	ms
CLK clock cycle VDD = 3.0 V ± 0.3 V	1000			ns
Cl K clock cycle VDD = 3.3 V ± 0.3 V	900			ns

■ AC characteristics

Item	Min.	Typ.	Max.	Unit
CLK clock cycle	500			ns