

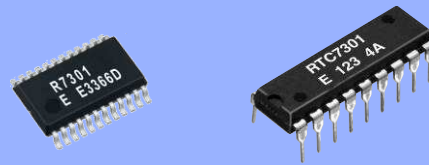
4-bit REAL TIME CLOCK MODULE

RTC - 7301SF / DG

- Built-in crystal unit 32.768 kHz with frequency adjusted
- Frequency selectable clock output (32.768 kHz to 1/30 Hz)
- Built-in 30 second adjustment function, digital pace adjustment function (Max. adjustment: $\pm 192 \times 10^{-6}$)
- Built-in alarm and timer interrupt functions.
- Built-in semiconductor temperature sensor (Voltage output: -7.8 mV / °C, RTC-7301SF)
- Operating voltage range: 2.4 V to 5.5 V, time keeping voltage range: 1.6 V to 5.5 V
- Low current consumption (0.6 μ A / 3 V Typ.)
- High speed parallel interface compatible with SRAM



Product Number (Please contact us)
 RTC-7301SF : Q42730182000200
 RTC-7301DG : Q42730112000200



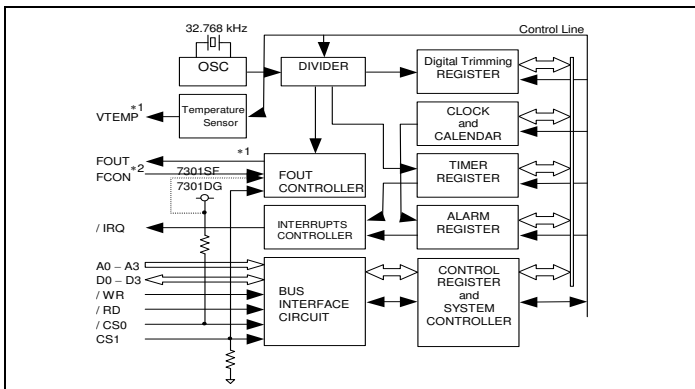
Actual size

RTC-7301SF

RTC-7301DG



Block diagram



This is a block diagram for RTC-7301SF.

Be aware that RTC-7301DG differs according to the following 2 points.

- *1) The VTEMP output is not connected to an external pin.
- *2) The FCON input pin is not connected to an external pin, but is fixed at "H" internally.

External dimensions/Terminal connection

(Unit:mm)

● RTC-7301SF (SSOP 24-pin)

| No. | Pin terminal | No. | Pin terminal |
|-----|--------------|-----|--------------|
| 1 | /CS0 | 24 | VDD |
| 2 | FCON | 23 | (VDD) |
| 3 | FOUT | 22 | (VDD) |
| 4 | VTEMP | 21 | (VDD) |
| 5 | (VDD) | 20 | (VDD) |
| 6 | /IRQ | 19 | (VDD) |
| 7 | A0 | 18 | CS1 |
| 8 | A1 | 17 | D0 |
| 9 | A2 | 16 | D1 |
| 10 | A3 | 15 | D2 |
| 11 | /RD | 14 | D3 |
| 12 | GND | 13 | /WR |

● RTC-7301DG (DIP 18-pin)

| No. | Pin terminal | No. | Pin terminal |
|-----|--------------|-----|--------------|
| 1 | /CS0 | 18 | VDD |
| 2 | FOUT | 17 | (VDD) |
| 3 | /IRQ | 16 | (VDD) |
| 4 | A0 | 15 | CS1 |
| 5 | A1 | 14 | D0 |
| 6 | A2 | 13 | D1 |
| 7 | A3 | 12 | D2 |
| 8 | /RD | 11 | D3 |
| 9 | GND | 10 | /WR |

Specifications (characteristics)

*Refer to application manual for details.

Absolute Max. rating

GND=0 V

| Item | Symbol | Conditions | Min. | Max. | Unit |
|---------------------|-------------------|---|---------|----------------------|------|
| Supply voltage | V _{DD} | V _{DD} to GND | -0.3 | +7.0 | |
| Input voltage | V _{IN} | Input terminal, D ₀ to D ₃ pins | GND-0.3 | V _{DD} +0.3 | V |
| Output voltage(1) | V _{OUT1} | /IRQ pin | | +8.0 | |
| Output voltage(2) | V _{OUT2} | FOUT, D ₀ -D ₃ , VTEMP pin | | V _{DD} +0.3 | |
| Storage temperature | T _{STG} | Stored as bare product. | -55 | +125 | °C |

DC characteristics

(GND=0 V, V_{DD}=1.6 V to 5.5 V, T_a=-40 °C to +85 °C)

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|------------------|--|----------------------|------|------|---------|
| Current consumption (When non-accessed) FOUT=Output OFF VTEMP=Output OFF | I _{DD1} | /CS ₀ , /RD, /WR=V _{DD} A ₀ -A ₃ , CS ₁ =GND D ₀ -D ₃ , /IRQ=Hi-z | | 1.0 | 2.0 | μ A |
| | I _{DD2} | FOUT=Hi-z(OFF) VTEMP=Hi-z(OFF) | V _{DD} =5 V | — | 0.6 | |

Note) There is no VTEMP pin on the RTC-7301DG so standards for the VTEMP pin within the conditions described above do not apply.

Operating range

GND = 0 V

| Item | Symbol | Conditions | Min. | Max. | Unit |
|-----------------------|------------------|-----------------|------|------|------|
| Power voltage | V _{DD} | — | 2.4 | 5.5 | V |
| Clock voltage | V _{CLK} | — | 1.6 | 5.5 | |
| Operating temperature | T _{OPR} | No condensation | -40 | +85 | °C |

Temperature sensor characteristics

GND=0 V, T_a=-40 °C to +85 °C

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|-------------------|---|------|-------|------|---------|
| Temperature output voltage | V _{TEMP} | T _a =+25 °C, GND based output voltage VTEMP pins, V _{DD} =2.7 V to 5.5 V | | 1.470 | | V |
| Output precision | T _{ACR} | T _a =+25 °C, V _{DD} =2.7 V to 5.5 V | | | ±5.0 | °C |
| Temperature sensitivity | V _{SE} | -40 °C ≤ T _a ≤ +85 °C, V _{DD} =2.7 V to 5.5 V | -7.3 | -7.8 | -8.3 | mV / °C |
| Linearity | ΔNL | -40 °C ≤ T _a ≤ +85 °C, V _{DD} =2.7 V to 5.5 V | | | ±2.0 | % |
| Temperature detection range | T _{SOP} | ΔNL ≤ ±2.0 %, V _{DD} =2.7 V to 5.5 V | -40 | | +85 | °C |
| Output resistance | R ₀ | T _a =25 °C, VTEMP pins, V _{DD} =2.7 V to 5.5 V GND standard and V _{DD} standard | | 1.0 | 3.0 | kΩ |
| Load condition | C _L | V _{DD} =2.7 V to 5.5 V | | | 100 | pF |
| | R _L | V _{DD} =2.7 V to 5.5 V | | 500 | | kΩ |
| Response time | t _{RSP} | V _{DD} =3.3 V C _L =50 pF, R _L =500 kΩ, Max. ±1 °C | | | 200 | μs |

Note) There is no temperature sensor function on the RTC-7301DG.

Frequency characteristics

| Item | Symbol | Conditions | Range | Unit |
|---------------------------------------|------------------|--|------------------------|-------------------------|
| Frequency precision | Δf / f | T _a =+25 °C, V _{DD} =3.0 V | B:5±23 ^{(*)1} | ×10 ⁻⁶ |
| Oscillation Start up time | t _{STA} | T _a =+25 °C, V _{DD} =2.4 V | 3.0 Max. | s |
| Frequency temperature characteristics | T _{OP} | T _a =-10 °C to +70 °C V _{DD} =3.0 V, +25 °C | +10 / -120 | ×10 ⁻⁶ |
| Frequency voltage characteristics | f/V | T _a =+25 °C, V _{DD} =1.6 V to 5.5 V | ±2.0 Max. | ×10 ⁻⁶ /V |
| Aging | f _a | T _a =+25 °C, V _{DD} =3.0 V First year | ±5.0 Max. | ×10 ⁻⁶ /year |

(*)1 Please ask tighter tolerance