

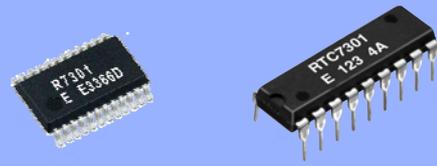
REAL TIME CLOCK MODULE (4-bit)

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: $-7.8 \text{ mV} / ^\circ\text{C}$, 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 $\mu\text{A} / 3 \text{ V}$ Typ.)
- High speed parallel interface compatible with SRAM



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



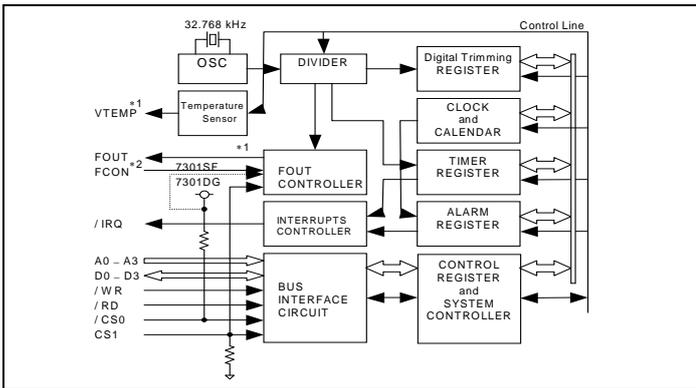
Actual size

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 | VDD | VDD to GND | -0.3 | +7.0 | |
| Input voltage | VIN | Input terminal, Do to D3 pins | GND-0.3 | VDD+0.3 | V |
| Output voltage(1) | VOUT1 | /IRQ pin | | +8.0 | |
| Output voltage(2) | VOUT2 | FOUT, D0-D3, VTEMP pin | | VDD+0.3 | |
| Storage temperature | TSTG | Stored as bare product. | -55 | +125 | °C |

DC characteristics

(GND=0 V, VDD=1.6 V to 5.5 V, Ta=-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} | /CS0, /RD, /WR=VDD A0-A3, CS1=GND D0-D3, /IRQ=Hi-z | VDD=5 V | — | 1.0 | 2.0 |
| | I _{DD2} | FOUT=Hi-z(OFF) VTEMP=Hi-z(OFF) | | | | |

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 | VDD | — | 2.4 | 5.5 | V |
| Clock voltage | VCLK | — | 1.6 | 5.5 | V |
| Operating temperature | T _{OPR} | No condensation | -40 | +85 | °C |

Temperature sensor characteristics

GND=0 V, Ta=-40 °C to +85 °C

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|------------------|---------------------------------------------------------------------------|------|-------|------|-------|
| Temperature output voltage | VTEMP | Ta=+25 °C, GND based output voltage VTEMP pins, VDD=2.7 V to 5.5 V | - | 1.470 | - | V |
| Output precision | T _{ACR} | Ta=+25 °C, VDD=2.7 V to 5.5 V | - | - | ±5.0 | °C |
| Temperature sensitivity | VSE | -40 °C ≤ Ta ≤ +85 °C, VDD=2.7 V to 5.5 V | -7.3 | -7.8 | -8.3 | mV/°C |
| Linearity | ΔNL | -40 °C ≤ Ta ≤ +85 °C, VDD=2.7 V to 5.5 V | - | - | ±2.0 | % |
| Temperature detection range | T _{SOP} | ΔNL ≤ ±2.0 %, VDD=2.7 V to 5.5 V | -40 | - | +85 | °C |
| Output resistance | R _O | Ta=25 °C, VTEMP pins, VDD=2.7 V to 5.5 V GND standard and VDD standard | - | 1.0 | 3.0 | kΩ |
| Load condition | CL | VDD=2.7 V to 5.5 V | - | - | 100 | pF |
| | RL | VDD=2.7 V to 5.5 V | 500 | - | - | kΩ |
| Response time | t _{RSP} | VDD=3.3 V CL=50 pF, RL=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 | Ta=+25 °C, VDD=3.0 V | B: 5±23 ^{(*)1} | ×10 ⁻⁶ |
| Oscillation Start up time | t _{STA} | Ta=+25 °C, VDD=2.4 V | 3.0 Max. | s |
| Frequency temperature characteristics | T _{OP} | Ta=-10 °C to +70 °C VDD=3.0 V, +25 °C | +10 / -120 | ×10 ⁻⁶ |
| Frequency voltage characteristics | f/V | Ta=+25 °C, VDD=1.6 V to 5.5 V | ±2.0 Max. | ×10 ⁻⁶ /V |
| Aging | fa | Ta=+25 °C, VDD=3.0 V First year | ±5.0 Max. | ×10 ⁻⁶ /year |

(*)1 Please ask tighter tolerance

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| | |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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|  | ► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.) |
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