

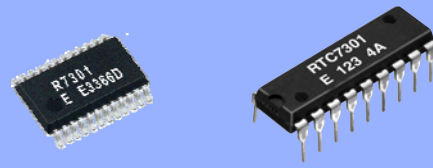
# 4-bit REAL TIME CLOCK MODULE

## 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:  $-7.8 \text{ mV} / ^\circ\text{C}$ , 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



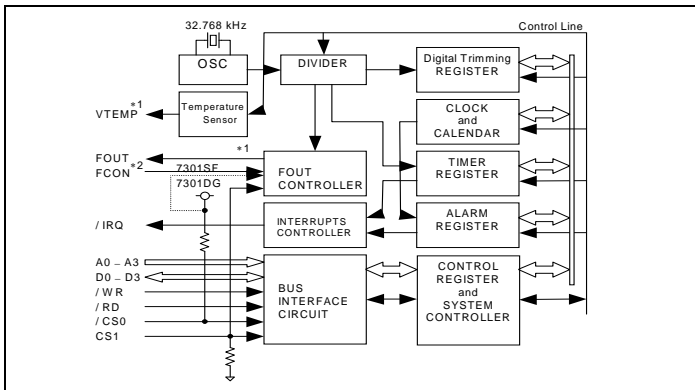
Actual size

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 <sub>DD1</sub>	/CS0, /RD, /WR=VDD A0-A3, CS1=GND D0-D3, /IRQ=Hi-z	VDD=5 V			μA
	I <sub>DD2</sub>	FOUT=Hi-z(OFF) VTEMP=Hi-z(OFF)	VDD=3 V			

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 <sub>OPR</sub>	No condensation	-40	+85	°C

#### Frequency characteristics

Item	Symbol	Conditions	Range	Unit
Frequency precision	$\Delta f / f$	Ta=+25 °C, VDD=3.0 V	B: 5±23 (*1)	$\times 10^{-6}$
Oscillation Start up time	t <sub>STA</sub>	Ta=+25 °C, VDD=2.4 V	3.0 Max.	s
Frequency temperature characteristics	T <sub>OP</sub>	Ta=-10 °C to +70 °C VDD=3.0 V, +25 °C	+10 / -120	$\times 10^{-6}$
Frequency voltage characteristics	f/V	Ta=+25 °C, VDD=1.6 V to 5.5 V	±2.0 Max.	$\times 10^{-6}/\text{V}$
Aging	f <sub>a</sub>	Ta=+25 °C, VDD=3.0 V First year	±5.0 Max.	$\times 10^{-6}/\text{year}$

(\*1) Please ask tighter tolerance

#### 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 <sub>ACR</sub>	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 <sub>SOP</sub>	ΔNL ≤ ±2.0 %, VDD=2.7 V to 5.5 V	-40	+85		°C
Output resistance	R <sub>O</sub>	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 <sub>RSP</sub>	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.

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	<p>► 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.)</p>
	<p>► The products have been designed for high reliability applications such as Automotive.</p>

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