

4-bit REAL TIME CLOCK MODULE

RTC - 7301SF / DG

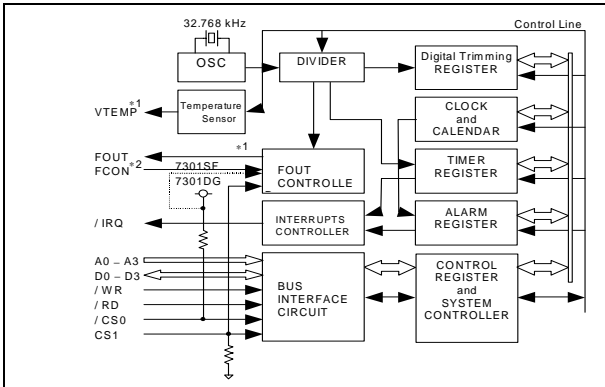
- Built-in crystal oscillator 32.768 kHz with frequency adjusted
- Frequency selectable clock output (32.768 kHz to 1/30 Hz)
- Built-in 30 second adjustment function, digital pace adjustment function (Max. adjustment: $\pm 192 \times 10^{-6}$)
- Built-in alarm and timer interrupt functions.
- Built-in 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



Actual size



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	A3	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	Condition	Min.	Max.	Unit
Supply voltage	V _{DD}	V _{DD} to GND	-0.3	+7.0	
Input voltage	V _{IN}	Input terminal, Do to D3 pins	GND-0.3	V _{DD} +0.3	V
Output voltage(1)	V _{OUT1}	/IRQ pin		+8.0	
Output voltage(2)	V _{OUT2}	FOUT, D0-D3, VTEMP pin		V _{DD} +0.3	
Storage temperature	T _{STG}	Stored as bare product after unpacking	-55	+125	°C

DC characteristics

(GND=0 V, VDD=1.6 V to 5.5 V, Ta=-40 °C to +85 °C)

Item	Symbol	Condition	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 FOUT = Hi-Z (OFF) VTEMP = Hi-Z (OFF)		1.0	2.0	μ A
	I _{DD2}	VDD=3 V		0.6	1.0	

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

Frequency characteristics

Item	Symbol	Condition	Range	Unit
Frequency precision	$\Delta f / f$	Ta = +25 °C, VDD = 3.0 V	B: $5 \pm 23^{(*)1}$	$\times 10^{-6}$
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	$\times 10^{-6}$
Frequency voltage characteristics	f/V	Ta = +25 °C, VDD = 1.6 V to 5.5 V	± 2.0 Max.	$\times 10^{-6}/V$
Aging	fa	Ta = +25 °C, VDD = 3.0 V First year	± 5.0 Max.	$\times 10^{-6}/year$

(*)1 Please ask tighter tolerance

Temperature sensor characteristics

GND=0 V, Ta=-40 °C to +85 °C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Temperature output voltage	V _{TEMP}	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	V _{SE}	-40 °C \leq Ta \leq +85 °C, VDD = 2.7 V to 5.5 V	-7.3	-7.8	-8.3	mV / °C
Linearity	ΔNL	-40 °C \leq Ta \leq +85 °C, VDD = 2.7 V to 5.5 V			± 2.0	%
Temperature detection range	T _{SOP}	$\Delta NL \leq \pm 2.0\%$, VDD = 2.7 V to 5.5 V	-40		+85	°C
Output resistance	R ₀	Ta = 25 °C, VTEMP pins, VDD = 2.7 V to 5.5 V GND standard and VDD standard		1.0	3.0	k Ω
Load condition	CL	VDD = 2.7 V to 5.5 V			100	pF
	RL	VDD = 2.7 V to 5.5 V		500		k Ω
Response time	t _{RSP}	VDD = 3.3 V CL = 50 pF, RL = 500 k Ω , Max. ± 1 °C			200	μ s

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

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