

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

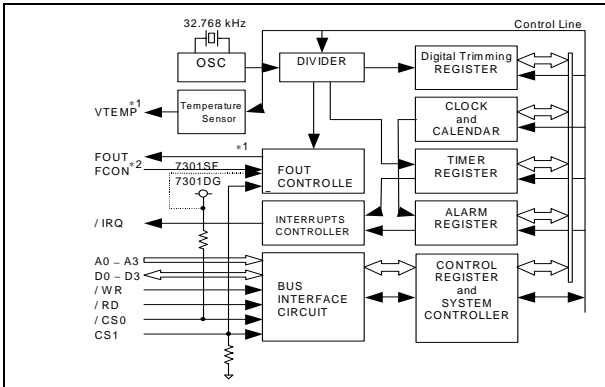
RTC-7301SF



RTC-7301DG



Block diagram



This is a block diagram for RTC-7301SF.

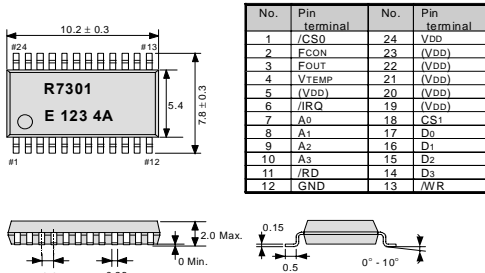
Be aware that RTC-7301DG differs according to the following 2 points.

- *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.

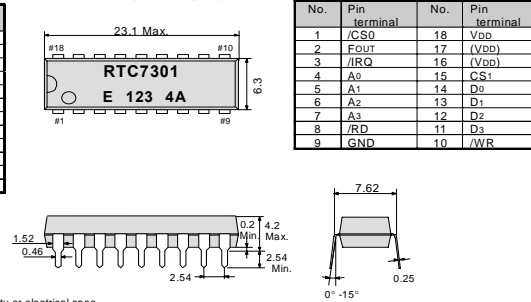
External dimensions/Terminal connection

(Unit:mm)

● RTC-7301SF (SSOP 24-pin)



● RTC-7301DG (DIP 18-pin)



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, 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}	F _{OUT} , D ₀ -D ₃ , V _{TEMP} pin		V _{DD} +0.3	
Storage temperature	T _{STG}	Stored as bare product after unpacking	-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	Condition	Min.	Typ.	Max.	Unit
Current consumption (When non-accessed) F _{OUT} =Output OFF V _{TEMP} =Output OFF	I _{DD1}	/CS ₀ , /RD, /WR=V _{DD} A ₀ -A ₃ , CS ₁ =GND D ₀ -D ₃ , /IRQ=Hi-Z F _{OUT} =Hi-Z(OFF) V _{TEMP} =Hi-Z(OFF)		1.0	2.0	μA
	I _{DD2}	V _{DD} =3 V		0.6	1.0	

Note) There is no V_{TEMP} pin on the RTC-7301DG so standards for the V_{TEMP} 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	Δf/f	T _a =+25 °C, V _{DD} =3.0 V	B:5±23 ^(*)	×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

(*) Please ask tighter tolerance

Temperature sensor characteristics

GND=0 V, T_a=-40 °C to +85 °C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Temperature output voltage	V _{TEMP}	T _a =+25 °C, GND based output voltage V _{TEMP} 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, V _{TEMP} pins, V _{DD} =2.7 V to 5.5 V GND standard and V _{DD} standard		1.0	3.0	kΩ
Load condition	CL	V _{DD} =2.7 V to 5.5 V			100	pF
	RL	V _{DD} =2.7 V to 5.5 V		500		kΩ
Response time	t _{RSP}	V _{DD} =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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In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

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At Epson Toyocom, all environmental initiatives operate under the Plan-Do-Check-Action(PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard. All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification. In the future, new group companies will be expected to acquire the certification around the third year of operations.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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Epson Toyocom has acquired QS-9000 certification, which is of a higher level. Also, TS 16949 certification, which is also of a higher level, has been acquired.

QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

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