REAL TIME CLOCK MODULE (SPI-Bus)

For Automotive

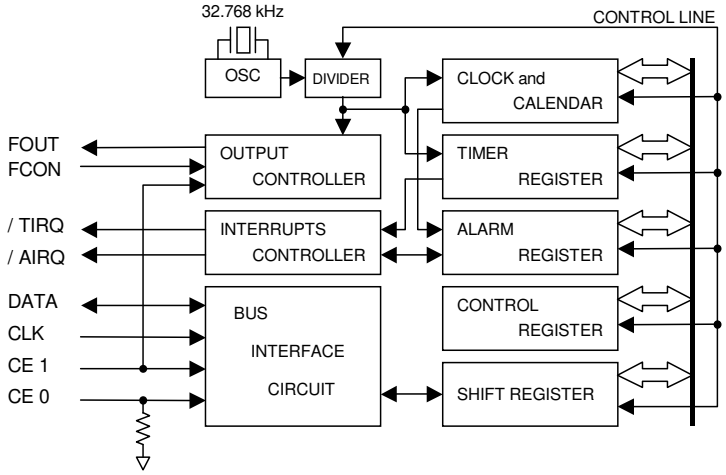
RA - 4574 SA

- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : 3-wire serial interface
- Operating voltage range : 1.6 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- Low backup current : 0.5 μA / 3 V (Typ.)
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.
- Applications : Car audio, Car navigation system, Clock, ECU sub clock
- Conforms to AEC-Q200

Product Number (Please contact us)
RA-4574SA : Q41A47452xxxx00

Actual size

Block diagram



Overview

- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output), CL=30 pF
  - Output frequency selectable from 1/30 Hz to 32.768 kHz(32 Values)
- **Timer function**
  - Timer function can be set between 1/4096 second and 255 minutes.
  - It is recorded automatically to TF-bit at the time of event occurrence, and it's possible to output with /TIRQ pin output (open-drain output).
  - Selectable one time mode or repeat mode.
- **Alarm function**
  - Alarm function can be set to any combination of day of week, hour, or minute.
  - It is recorded automatically to AF-bit at the time of event occurrence, and it's possible to output with /AIRQ pin output (open-drain output).

Pin Function

Signal Name	Input / Output	Function
CE0	Input	The chip enabled input pin 0. (Built-in pull-down resistance) When both CE0 and CE1 pins are at the "H" level , access to this Real time clock module becomes possible.
CE1	Input	The chip enabled input pin 1. When the CE1 pin is at the HIGH level, the FOUT pin is in the output state.
CLK	Input	The shift clock input pin for serial data transfer.
DATA	Bi-directional	The data input / output pin for serial data transfer.
FOUT	Output	This pin outputs the reference clock signal at 32.768 kHz (C-MOS output). High impedance at the time of output off.
FCON	Input	The input pin for the FOUT output control.
/ AIRQ	Output	The open drain output pin for alarm and time update interrupts.
/ TIRQ	Output	The open drain output pin for timer interrupt.
V_{DD}	—	Connected to a positive power supply.
GND	—	Connected to a ground.

Terminal connection / External dimensions (Unit:mm)

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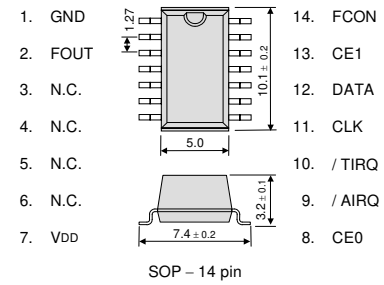

SOP – 14 pin

The metal case inside of the molding compound may be exposed on the top or bottom of this product. This purely cosmetic and does not have any effect on quality, reliability or electrical specs.

Specifications (characteristics)

∗ Refer to application manual for details.

■ Recommended Operating Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power voltage	V_{DD}	—	1.6	3.0	5.5	V
Clock voltage	V_{CLK}	—	1.6	3.0	5.5	V
Operating temperature	T_{OPR}	—	-40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Conditions	Rating	Unit
Frequency tolerance	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} = 1.6 V	3 Max.	s

∗ Equivalent to 1 minute of monthly deviation

■ Current consumption characteristics

T_a = -40 °C to +85 °C

Item	Symbol	Conditions		Min.	Typ.	Max.	Unit
Current Consumption	I_{BK}	CE0, CE1 = GND FOUT ;Output OFF (Hi - z)	V_{DD} = 5 V	-	1.0	2.0	μA
			V_{DD} = 3 V	-	0.5	1.0	
	I_{32k}	CE0 = GND CE1 = V_{DD} FOUT ; 32.768 kHz output ON CL = 30 pF	V_{DD} = 5 V	-	8.0	20.0	μA
			V_{DD} = 3 V	-	5.0	12.0	

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At Seiko Epson, 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.

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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For Automotive	►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
Automotive Safety	►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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