REAL TIME CLOCK MODULE (I²C-Bus)

For Automotive

RA - 8581 SA

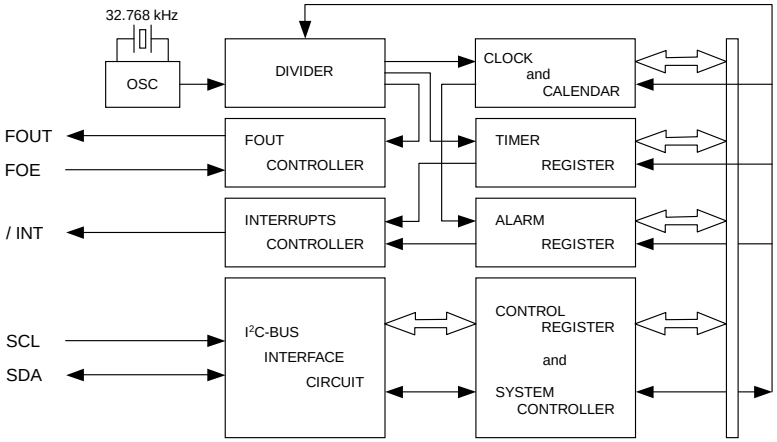
- Built-in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : I²C-Bus Interface (400 kHz)
- Operating voltage range : 1.8 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- Low backup current : 0.45 µA / 3 V (Typ.)
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.
- Applications : Car audio, Car navigation system, Clock, ECU sub clock
- Conforms to AEC-Q200

* The I²C-Bus is a trademark of NXP Semiconductors

Product Number (Please contact us)
RA-8581SA : Q41A88152xxxx00

Actual size

Block diagram



Overview

- **Interface Type**
  - I²C-Bus interface. (Hi-speed bus specifications 400 kHz)
  - * I²C-Bus slave address : read A3h and write A2h
- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output), CL=30 pF
  - 32.768 kHz clock frequency output. (Duty 50 ±5%)
- **Timer function**
  - Timer interrupt function can be set up between 1/4096 second and 4095 minutes.
  - It is recorded automatic to TF-bit at the time of event occurrence,and possible to output with /TIRQ pin output (N-ch open-drain output).
- **Interrupt function**
  - Alarm interrupt function, Time update interrupt function.

Pin Function

Signal Name	Input / Output	Function
SCL	Input	Serial clock input pin
SDA	Bi-directional	Data input and output pin
FOUT	Output	FOUT pin outputs the reference clock signal at 32.768 kHz. FOE pin inputs the FOUT output control.
FOE	Input	
/INT	Output	Interrupt output (N-ch open drain)
VDD	—	Connected to a positive power supply.
GND	—	Connected to a ground.

FOE pin input	FOUT pin output	
HIGH	Output	(C-MOS)
LOW	OFF	(LOW)

Terminal connection / External dimensions (Unit:mm)

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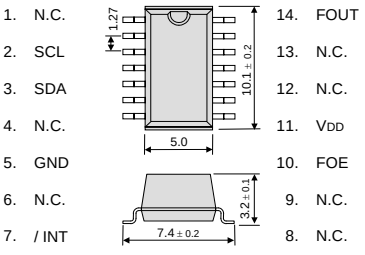

SOP – 14 pin

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	VDD	—	1.8	3.0	5.5	V
Clock voltage	VCLK	—	1.6	3.0	5.5	V
Operating temperature	TOPR	—	-40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Conditions	Rating	Unit
Frequency tolerance	Δf / f	Ta = +25 °C VDD = 3.0 V	B: 5 ± 23 *	× 10⁻⁶
FOUT output Duty	tw / t	Ta = -40 °C to +85 °C VDD = 2.4 V to 5.5 V	50 ± 5	%

* Equivalent to 1 minute of monthly deviation

■ Current consumption characteristics

Ta = -40 °C to +85 °C

Item	Symbol	Conditions		Min.	Typ.	Max.	Unit
Current Consumption	IBK	fSCL = 0 Hz FOE = GND FOUT ;Output OFF (LOW)	VDD = 5 V	-	0.65	1.2	µA
			VDD = 3 V	-	0.45	0.8	
	I32k	fSCL = 0 Hz FOE = VDD FOUT ; 32.768 kHz Output ON CL = 30 pF	VDD = 5 V	-	8.0	20.0	µA
			VDD = 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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