For Automotive

I²C-Bus INTERFACE REAL TIME CLOCK MODULE

RA - 8581 SA

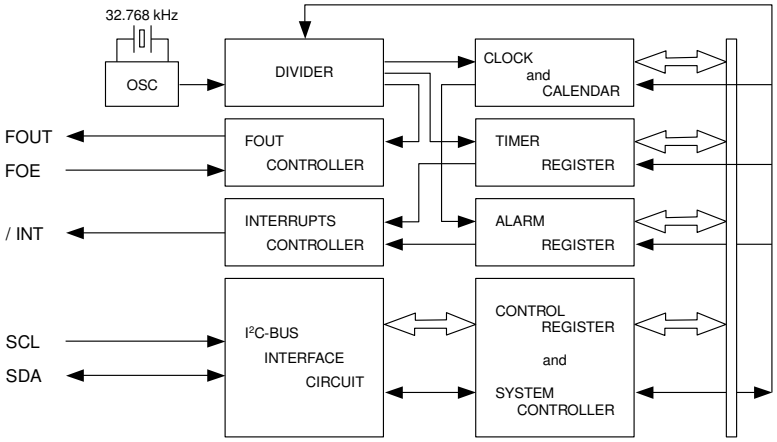
- Built-in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : I²C-Bus Interface (400 kHz)
- Operating voltage range : 1.8 V to 5.5 V
- Wide Timekeeper voltage range : 1.6 V to 5.5 V
- Low backup current : 0.45 µA / 3 V (Typ.)
- 32.768 kHz frequency output function : C-MOS output With Control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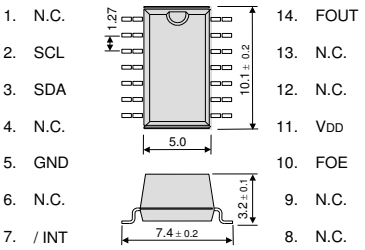

SOP – 14 pin

Metal may be exposed on the top or bottom of this product.
This will not affect any quality, reliability or electrical spec.

Specifications (characteristics)

* Refer to application manual for details.

■ Recommended Operating Conditions

Item	Symbol	Condition	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	Condition	Rating	Unit
Frequency tolerance	Δ f / f	Ta = +25 °C VDD = 3.0 V	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	Condition		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	