

REAL TIME CLOCK MODULE (I²C-Bus)
For Automotive



Product Number
RA-8581SA : Q41A88152xxxx00

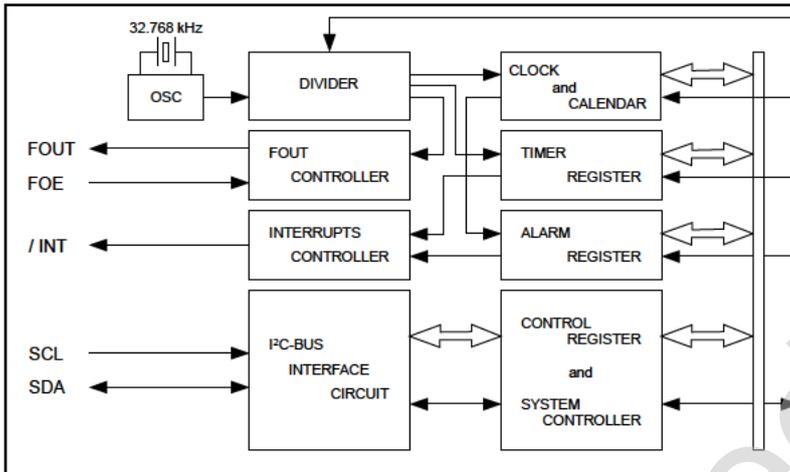
RA-8581SA

- 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

Block diagram



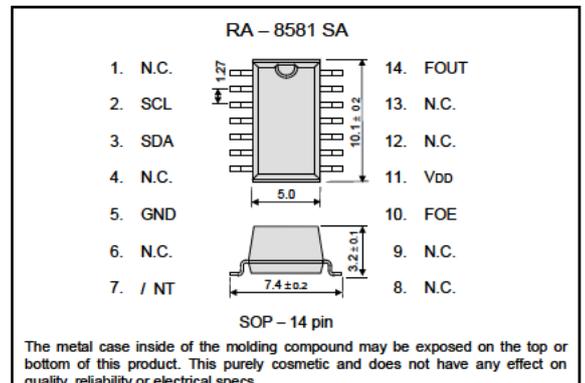
Overview

- **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.
 - t is recorded automatic to TF-bit at the time of event occurrence, and possible to output with /T RQ 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	<table border="1"> <thead> <tr> <th>FOE pin input</th> <th>FOUT pin output</th> </tr> </thead> <tbody> <tr> <td>HIGH</td> <td>Output (C-MOS)</td> </tr> <tr> <td>LOW</td> <td>OFF (LOW)</td> </tr> </tbody> </table>	FOE pin input	FOUT pin output	HIGH	Output (C-MOS)	LOW	OFF (LOW)
		FOE pin input	FOUT pin output					
		HIGH	Output (C-MOS)					
LOW	OFF (LOW)							
/INT	Output	Interrupt output (N-ch open drain)						
VDD	—	Connected to a positive power supply.						
GND	—	Connected to a ground.						

Terminal connection / External dimensions (Unit:mm)



Specifications (characteristics)

* Refer to application manual for details.

Recommended Operating Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power voltage	V _{DD}	—	1.8	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
FOUT output Duty	tw/t	T _a = -40 °C to +85 °C V _{DD} = 2.4 V to 5.5 V	50 ± 5	%

* 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}	f _{SCL} = 0 Hz FOE = GND FOUT ; Output OFF (LOW)	V _{DD} = 5 V	-	0.65	1.2	μA
		V _{DD} = 3 V	-	0.45	0.8		
Current Consumption	I _{32k}	f _{SCL} = 0 Hz FOE = 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		