

REAL TIME CLOCK MODULE (SPI-Bus)
For Automotive
Extended operating temperature range (+125°C)



Product Number
RA-4565SA : Q41A46552xxxx00

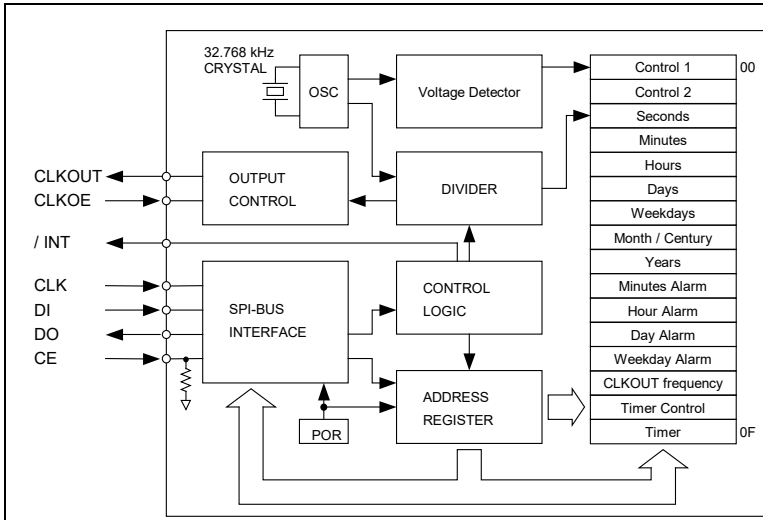
RA-4565SA

- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : 4-wire serial interface
- Wide operating voltage range : 1.6 V to 5.5 V
- Wide voltage for long time keeping. : 1.5 V to 5.5 V
- Extended operating temperature range: -40 °C to +125 °C
- 32.768 kHz Clock/calendar function, auto leap year correction function,
- Applications : Car audio, Car navigation system, Clock, ECU sub clock
- Conforms to AEC-Q200



Block diagram

Overview

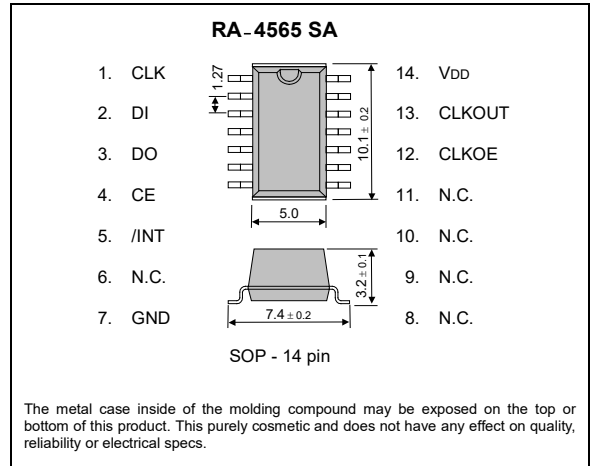


- **Wide operating temperature range**
 - -40 °C to +125 °C
- **Clocking-status detection function**
 - It can judge the validity of data after backup operation return by a status of VL-bit.
- **32.768 kHz frequency output function**
 - CLKOUT pin output (Open Drain output)
 - Output frequency can be selected as 32.768 kHz, 1024 Hz, 32 Hz, or 1 Hz.
- **The various interrupt function**
 - Timer function can be set up between 1/4096 second and 255 minutes.

Pin Function

Terminal connection / External dimensions (Unit:mm)

Signal Name	Directions	Functions
CE	Input	Chip enabled input.
CLK	Input	Serial clock input.
DI	Input	Data input.
DO	Output	Data output.
CLKOUT	Output	The CLKOUT pin is a clock output (open drain output) pin with control output. (Output frequency can be selected as 32.768 kHz, 1024 Hz, 32 Hz, or 1 Hz.)
CLKOE	Input	The CLKOE pin is an input pin used to control the output mode of the CLKOUT output pin. During the initial power-on (when power is applied from 0 V), if the CLKOE input pin is at high level (= H), the power-on reset function selects 32.768 kHz as the frequency.
/INT	Output	Interrupts output by Alarm and Timer events. (Open drain output)
VDD	-	VDD
GND	-	GND



Specifications (characteristics)

* Refer to application manual for details.

■ Recommended Operating Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	unit
Operating voltage	VDD	-	1.6	3.0	5.5	V
Timekeeper voltage	VCLK	-	1.5	3.0	5.5	V
Operating temperature	TOPR	-	-40	+25	+125	°C

■ Frequency characteristics

Item	Symbol	Conditions	Rating	unit
Frequency stability	$\Delta f / f$	Ta = +25 °C VDD = 3.0 V	B: 5 ± 23 *1	× 10 ⁻⁶
Oscillation start up time	tSTA	Ta = +25 °C VDD = 1.6 V	1.5 Max.	s
		Ta = -40 °C to +125 °C VDD = 3.0 V	3.0 Max.	s

■ Current consumption under backup mode.

Item	Symbol	Conditions	Min.	Typ.	Max.	unit	
Standby current.	IBK	fSCL = 0 Hz CLKOE = "L" VDD = 5 V	+125 °C	-	1.0	2.0	μA
			-40 to +85 °C	-	0.6	1.2	
		fSCL = 0 Hz CLKOE = "L" VDD = 3 V	+125 °C	-	0.8	1.6	μA
			-40 to +85 °C	-	0.5	1.0	

*1) Equivalent to ±1 minutes of monthly deviation.

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