

REAL TIME CLOCK MODULE (SPI & I²C-Bus)

Power Switching and Low current consumption



Product Number
RX6110SA B : X1B000232000100

RX6110SA B

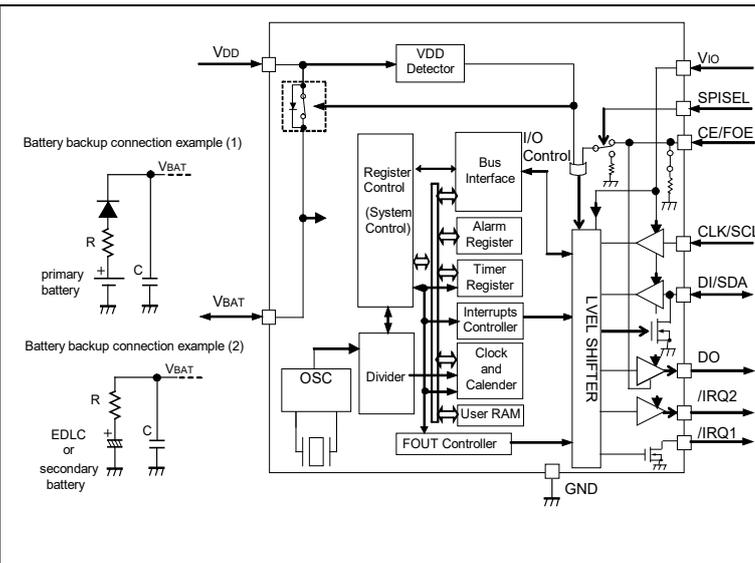
- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : SPI & I²C -Bus
- Operating voltage range : 1.6 V to 5.5 V
- The wide voltage for time keeping : 1.1 V to 5.5 V
- Low backup current : 130 nA / 3 V (Typ.)
- Built-in user RAM : 128 bit (8 bit × 16, SRAM)
- Auto power switching functions : When VDD deteriorates than 1.6V, internal source is switched to VBAT.

•The various functions include full calendar, alarm, timer.
Epson prepared Linux driver for development.
(http://www5.epsondevice.com/en/information/support/linux_rtc/)

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Block diagram



Overview

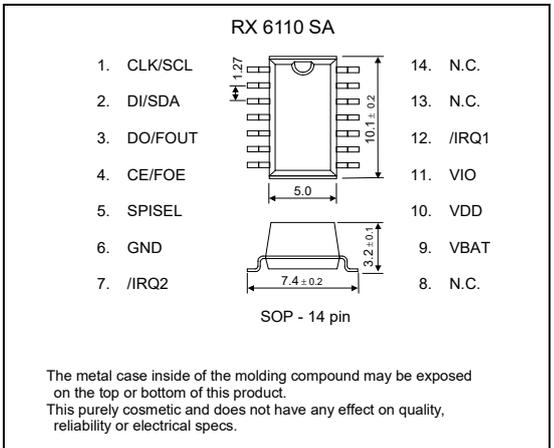
- Interface type.
 - SPI-Bus and I²C-Bus interface.
 - By a terminal, a switchover of the interface is possible.
- Built-in auto power switching function
 - To efficiently charge from VDD to backup battery (Secondary battery, Large capacitor) connected to VBAT is possible. Detects VDD voltage drop(VDET-) and automatically switches to the backup battery.
- Frequency output function
 - Output frequency is selectable from 32.768kHz, 1024Hz, 1Hz.
- Timer function
 - Timer function is selectable in 1/4096 second from 65535 hours.
- Timer source clock are 1hour, 1min, 64Hz, 4096Hz.
 - It is recorded automatic to TF-bit at the time of event occurrence, and possible to output with /IRQ1 or /IRQ2 pin.
- Alarm function
 - Alarm function can be set to day of week, day, hour, and minute.
 - It is recorded automatic to AF-bit at the alarm occurrence, and possible to output with /IRQ1 pin output.
- User RAM
 - 128 bit (8 bit × 16, SRAM)

Pin Function

Signal Name	Input/Output	Function
SPISEL	Input	The interface select pin. SPI is chosen at a "H" level (Vio voltage) / I ² C is chosen at a "L" level (GND voltage).
CE/FOE	Input	SPI: Should be held high to allow access to the CPU. Incorporates a pull-down resistor. I ² C: It is an input pin for controlling the DO/FOUT output. When the frequency output from a DO/FOUT pin does not need, CE/FOE pin must be connected to GND.
CLK/SCL	Input	This is a shift clock input pin for serial data transmission.
DI/SDA	Input / Output	SPI: This is the data input pin for serial data transfer. I ² C: This is the data input/output pin for serial data transfer.
DO/FOUT	Output	SPI: This is the data output pin for serial data transfer. I ² C: This is the C-MOS output pin with output control provided via the CE/FOE pin. (frequency selection: 32.768 kHz / 1024 Hz / 1Hz / Hi-z)
/IRQ1	Output	This pin outputs interrupt signals ("L" level) for alarm, timer, time update, and FOUT. This is an N-ch open-drain output. This pin can output even a backup mode.
/IRQ2	Output	This pin outputs interrupt signals ("L" level) for timer and FOUT. This is an C-MOS output. This pin becomes Hi-z in less than VDD=1.6V.
VDD	-	This is a power-supply pin. It can impress the voltage unlike Vio.
Vio	-	This pin is a power supply for input and the output and input / output pins. Connected to a positive power supply.
VBAT	-	Connect a secondary battery or capacitor for backup power supply. If a backup power supply is not present, this pin connect to VDD.
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	VDD	—	1.6	3.0	5.5	V
Clock voltage	VCLK	—	1.1	3.0	5.5	V
Operating temperature	TOPR	—	-40	+25	+85	°C

Frequency characteristics

Item	Symbol	Conditions	Rating	Unit
Frequency tolerance	$\Delta f / f$	T _A = +25 °C VDD = 3.0 V	B: 5 ± 23 *1	× 10 ⁻⁶
Oscillation start-up time	t _{STA}	T _A = +25 °C VDD = 1.6 V	1 Max.	s

*1) Equivalent to ±1 minute of monthly deviation (excluding offset.) / Standard product

Current consumption characteristics

T_A = -40 °C to +85 °C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current Consumption	I _{BK}	V _{BAT} = 3.0 V Input pins are "L", V _{DD} = 0 V DO/FOUT=OFF, f _{CLK} = 0 Hz, /IRQ1,2 = OFF, TSEL2="1" It include an OFF leak current of SW between the power supply (VBAT-VDD)	-	130	250	nA
	I _{32k}	V _{DD} = 3.0 V f _{CLK} = 0 Hz, /IRQ1,2 = OFF, CE/FOE = VIO, DO/FOUT : 32.768 kHz ON, CL = 0 pF	-	1.5	2.1	μA

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