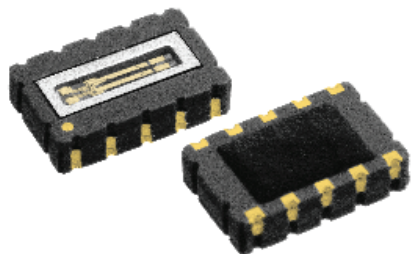


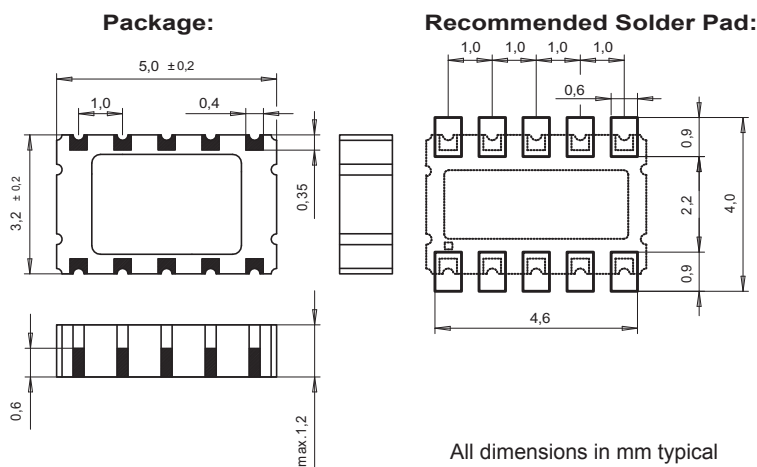
# RV-2123-C2

Real Time Clock Module with SPI Bus



100% leadfree, RoHS - compliant

## DIMENSIONS



Ultra low power consumption 130nA  
Automotive qualified, according to AEC-Q200 Rev. C  
Xtal integrated solution.  
Frequency-Offset Trimming Register  
Miniature SMT ceramic package  
Very tight frequency tolerance  
SPI Bus Interface (SCL up to 8 MHz)  
Programmable Clock-output  
Low aging  
Time keeping mode down to 1.1 V  
Programmable alarm, timer and interrupt functions

## DESCRIPTION:

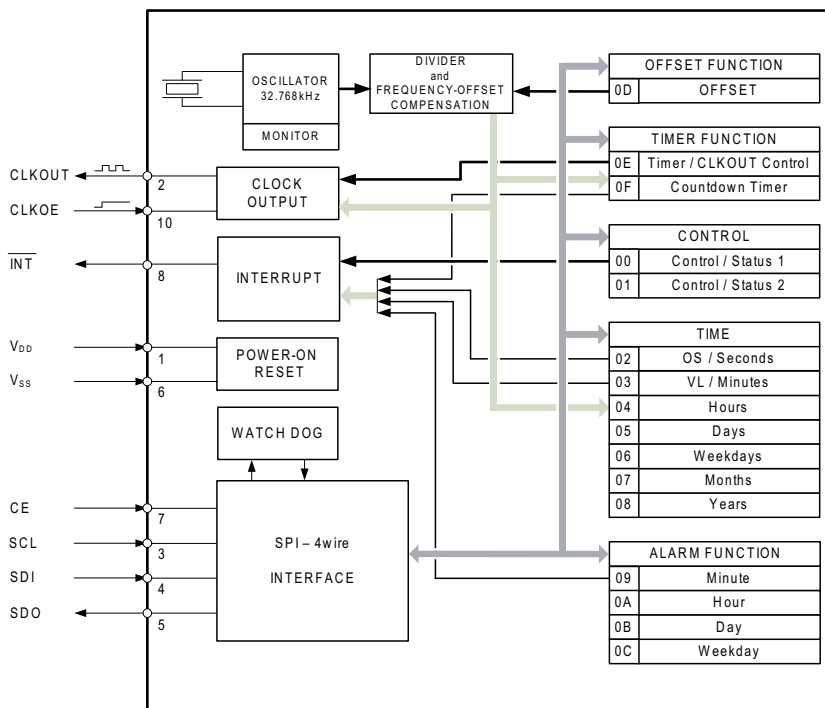
This RTC IC has been specially designed to achieve an ultra-low power consumption of typically 130nA @  $V_{DD}$  3.0V in time-keeping mode. The very small SMT ceramic-package combines the 32.768 kHz crystal unit with the CMOS-based oscillator and real-time-clock circuitry. The calendar function tracks year, month, date, and day-of-the-week with built-in century and leap-year flags. The clock function tracks minute and second in 24-hour format. Programmable alarm setting and universal timer functions increase flexibility.

For pick-and-place equipment, the parts are available in 12 mm tape:

7" (178 mm) reel with 1'000 parts

13" (330 mm) reel with 5'000 parts

## BLOCK DIAGRAM:



## ELECTRICAL CHARACTERISTICS AT 25°C:

|                                       | Symbol         | Condition                 | Min.                                                            | Typ. | Max | Unit    |
|---------------------------------------|----------------|---------------------------|-----------------------------------------------------------------|------|-----|---------|
| Supply voltage                        | $V_{DD}$       | SPI Bus Active            | 1.6                                                             |      | 5.5 | V       |
| Supply voltage                        | $V_{DD}$       | Time keeping              | 1.1                                                             |      | 5.5 | V       |
| Current consumption during access     | $I_{DD}$       | fsc1=1 MHz $V_{DD}$ 3 V   |                                                                 | 30   | 80  | $\mu$ A |
|                                       |                | fsc1=4.5 MHz $V_{DD}$ 3 V |                                                                 | 250  | 400 | $\mu$ A |
| Current consumption Time keeping mode | $I_{DDO}$      | fsc1=0 Hz, $V_{DD}$ 3 V   |                                                                 | 130  | 180 | nA      |
|                                       |                | fsc1=0 Hz, $V_{DD}$ 1 V   |                                                                 | 110  | 160 | nA      |
| CLKOUT frequency                      |                | Programmable              | 32768...to...1                                                  |      |     | Hz      |
| Frequency tolerance                   | $\Delta F/F$   | @ 25°C                    | $\pm 10 / \pm 20$ <sup>1)</sup>                                 |      |     | ppm     |
| Aging first year max.                 | $\Delta F/F$   | @ 25°C                    | $\pm 3$                                                         |      |     | ppm     |
| Frequency vs. temp.                   | $\Delta F/F_O$ | $20 \leq T_0 \leq 30$     | $-0.035 \text{ ppm}/^\circ\text{C} \times (T - T_0)^2 \pm 10\%$ |      |     | ppm     |

1) Tighter and wider frequency tolerances on request.

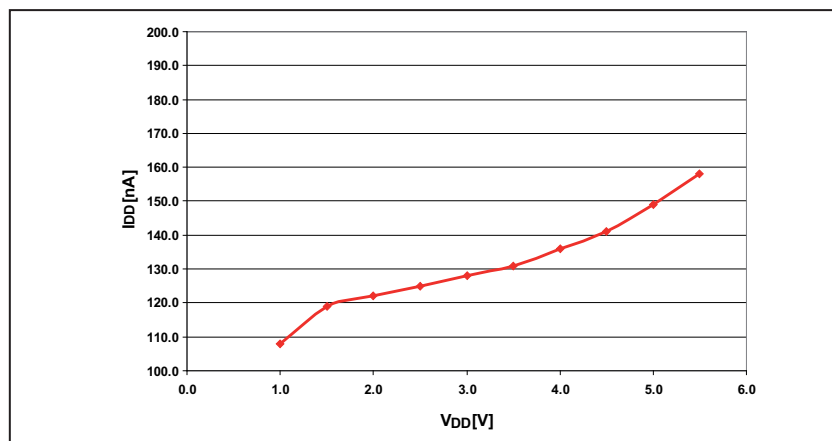
## ENVIRONMENTAL CHARACTERISTICS:

|                                |              | Conditions               | Max. Dev. |
|--------------------------------|--------------|--------------------------|-----------|
| Storage temp. range            |              | -55 to +125°C            |           |
| TA Operating temperature range |              | -40 to +85°C             |           |
| Shock resistance               | $\Delta F/F$ | 5000 g, 0.3 ms, 1/2 sine | +/-5 ppm  |
| Vibration resistance           | $\Delta F/F$ | 20 g / 10-2000 Hz        | +/-5 ppm  |

## TERMINATIONS AND PROCESSING:

| Package-Type | Termination                        | Processing                            |
|--------------|------------------------------------|---------------------------------------|
| SON 10-pin   | For SMD mounting<br>Au plated pads | Reflow soldering<br>260°C / 20 s max. |

## CURRENT CONSUMPTION vs. POWER SUPPLY VOLTAGE:



## PIN CONNECTIONS TOP VIEW:

| Pin | Connection                               |
|-----|------------------------------------------|
| 1   | $V_{DD}$ Power Supply Voltage            |
| 2   | CLKOUT Frequency output                  |
| 3   | SCL Serial clock input                   |
| 4   | SDI Serial Data In                       |
| 5   | SDO Serial Data Out                      |
| 6   | $V_{SS}$ Ground                          |
| 7   | CE Chip Enable                           |
| 8   | $\overline{\text{INT}}$ Interrupt output |
| 9   | NC not connected                         |
| 10  | CLKOE CLK output enable                  |

All specifications subject to change without notice.



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