



NXP ultra-low-power RTC with electronic frequency tuning PCF2123

NXP Real-time clock sets new record in power efficiency

This compact, highly efficient real-time clock (RTC) cuts power demand in half. It fits nearly anywhere, can be powered by a very small battery cell or a small super-cap, and performs vital functions like time keeping, process control, and other time-critical tasks.

Key features

- ▶ 32.768-kHz quartz crystal
- ▶ Low backup current: typical 0.10 μA at $V_{\text{DD}} = 2.0\text{ V}$ and $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$
- ▶ Resolution: seconds to years
- ▶ Clock operating voltage: 1.1 to 5.5 V
- ▶ 3-line SPI with separate, combinable data I/O
- ▶ Serial interface (at $V_{\text{DD}} = 1.6$ to 5.5 V)
- ▶ Interrupt output: 1 second or 1 minute
- ▶ Freely programmable timer with interrupt
- ▶ Freely programmable alarm function with interrupt
- ▶ Integrated oscillator load capacitors for $CL = 7\text{ pF}$
- ▶ Programmable offset register for frequency adjustment

Key applications

- ▶ Very accurate time references
- ▶ Timing
- ▶ Time measurements
- ▶ Clock/calendar
- ▶ Industrial control
- ▶ Power management unit (PMU)
- ▶ Metering
- ▶ Time reference
- ▶ Watchdog timer

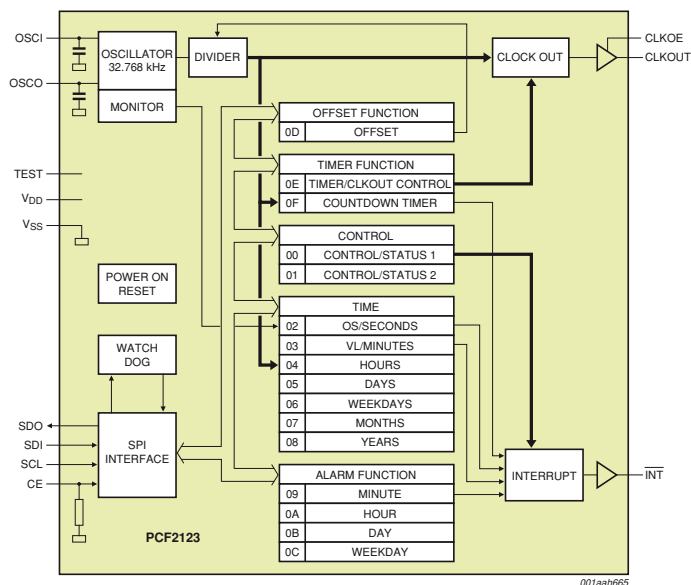
The NXP PCF2123 is an industry-leading CMOS RTC and calendar optimized for low power consumption. It operates at a current of less than 100 nanoAmperes (0.10 μA) with a 1.5-V power supply and consumes less than 0.15 μW of power.

Housed in a tiny (3 x 3 x 1 mm) package, it is well suited to a range of handheld and battery-operated applications, including blood-pressure monitors and other home-use medical devices, pocket calculators, portable phones, and PDAs. It is also an ideal component for white goods, metering units, and other industrial systems.

The highly accurate Watchdog function can be used to wake the microcontroller from hibernation mode or for independent monitoring of microcontroller tasks. The calendar functions track year, month, date, and day with built-in Leap Year flags. There is a freely programmable alarm and timer function, so designers have the option to generate a wake-up signal on an interrupt pin.



Block diagram PCF2123



Comparison of PCF2123, PCA2125 and PCF8563

Characteristics	PCF2123	PCA2125	PCF8563
Interface	SPI	SPI	I2C
Temperature range	-40° to +85 °C	-40° to +125 °C	-40° to +85 °C
Supply voltage VDD	1.6 V to 5.5 V	1.6 to 5.5 V	1.8 to 5.5 V
Supply current @ VDD = 2 V	100 nA	550 nA	225 nA
Electronic tuning	yes	no	no

Ordering Information

Type	Package tape and reel	Type	Version
PCF2123TS/1	TSSOP14, plastic thin shrink small outline package; 14 leads; body width 4.4 mm	SOT402-1	1
PCF2123BS/1	HVQFN16, plastic thermal enhanced very thin quad flat package; no leads; 16 terminals; body 3 × 3 × 0.85 mm	SOT758-1	1
PCF2123U/10AA/1	Bare die on film frame carrier for chip-on-board		1

www.nxp.com

founded by

PHILIPS

© 2009 NXP B.V.

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: May 2009

Document order number: 9397 750 16658

Printed in the Netherlands