

# LOW-POWER, COMPACT SOLUTION FOR TEMPERATURE LOGGING WITH NFC



This cost-effective, small-form-factor solution enables long-lasting time-temperature integrators (TTIs). Equipped with an RTC, NFC, and on-chip memory, it is an easy-to-configure solution for cold-chain applications, helping to ensure the quality of temperature-sensitive products like vaccines, biologics, and more.

## KEY FEATURES

- Temperature sensor with 0.3 °C absolute accuracy between 0 °C and +45 °C and with 0.5 °C absolute accuracy for the range -40 °C to +85 °C
- Arm®-based Cortex-M0+ microcontroller
- Arm Serial Wire debug
- SRAM, on-chip Flash and on-chip EEPROM
- Fast-mode I<sup>2</sup>C-bus interface (400 Kbit/s) with multiple address recognition and monitor mode
- 8 MHz internal RC oscillator trimmed to 1% accuracy (used as system clock)

- Multiple timers, including Watchdog timer
- Integrated power-management unit
- Reduced power modes for Cortex-M0+ MCU
- NFC
- Small-footprint packages: WL-CSP, HVQFN24

## APPLICATIONS

- TTIs for cold-chain monitoring
- Temperature patches
- Temperature loggers
- Therapy Adherence monitoring

This highly integrated, low power NHS3100 combines a battery and an antenna coil to create a fully integrated TTI solution. This approach enables a fast time-to-market for development. In this way it becomes easier to support temperature-controlled supply chains, known as cold chains. Cold chains ensure the viability of temperature-sensitive products like biologics and vaccines.

As an electronic solution, the NHS3100 differs from chemical TTIs in that it can use firmware to implement a specific temperature profile for a specific product. This provides manufacturers with an effective way to monitor the factors that could cause a malfunction resulting from exposure to higher temperatures.

An NFC tag, integrated in the NHS3100, allows the integrity of the parcel to be checked and the resulting data to be logged. Before using the drug, a pharmacist or patient can use a standalone NFC reader or an NFC-enabled smartphone, loaded with a smartphone app provided by the drug manufacturer, to check the drug's status.

Because the NHS3100 is equipped with an accurate real-time clock (RTC), the TTI system can achieve a date/time accuracy of 0.1% over the period of one year.

To improve the TTI's shelf life, the NHS3100 is started with an NFC command that turns on the battery. Other information can be programmed into the NHS3100 in

parallel, including the expiration data and the production lot number. The NHS3100 includes Flash and EEPROM memory that can be used for data, event logging, and the TTI algorithm.

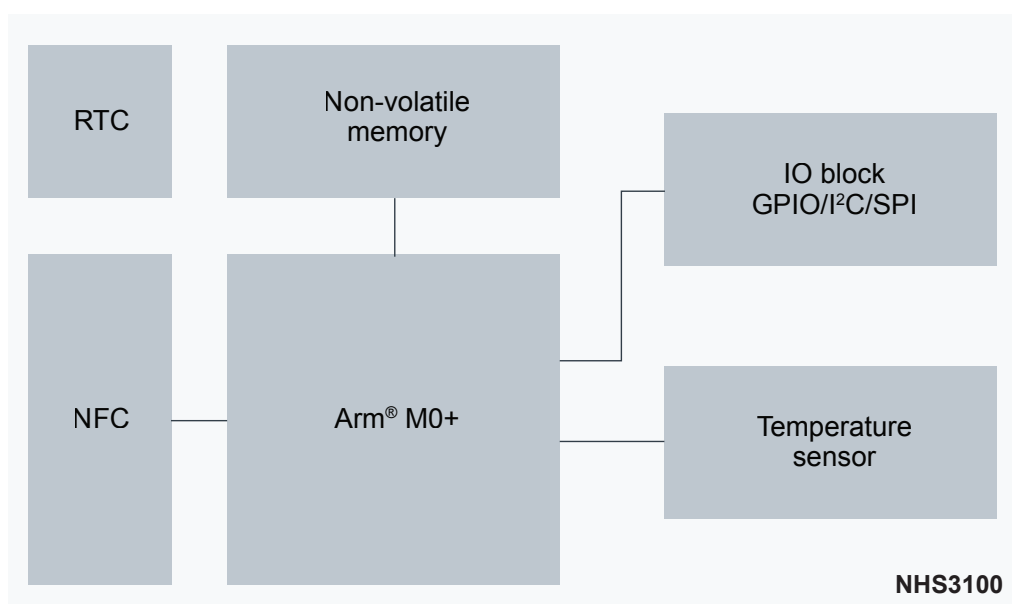
The NHS3100 can be used as a passive NFC tag to provide readings from the integrated temperature sensor. This passive mode also allows the logged temperature readings to be read on the NFC reader device or smartphone without involving the TTI's battery. This helps extend the TTI's shelf life even further.

### DEVELOPMENT PLATFORM

To help developers save time and effort, the NHS3100 is available in a complete design platform that includes the necessary coin battery and NFC antenna.

The NHS3100 is equipped with an ARM-based Cortex-M0+ microcontroller. The MCU is supported by the LPCXpresso Integrated Development Environment (IDE), and is compatible with the software ecosystem associated with all industry standard ARM cores.

### NHS3100 BLOCK DIAGRAM



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