

NHS2634: Multi-Channel Electrochemical Analog Front-End with NFC support



The NHS2634 is a hosted analog front-end (AFE) device for electrochemical sensors for measurements and diagnosis. It is built for Potentiostat, Voltage, and Temperature measurements.

The NHS2634 works in 2 or 3 terminal mode and supports up to 4 channel measurements. The ultra-low power operation enables continuous biasing to obtain accurate measurements.

It is optimized for low-capacity batteries and has a battery switch enabling longer shelf life.

It integrates NFC with the ISO Data Exchange Protocol (ISO-DEP), operating at 1.5 V or 3 V. The integrated NFC interface enables device activation, data read/write functionality and helps with out of band BLE pairing. The device also supports an external thermistor that allows for temperature measurements.

The NHS2634 is an ultra-small package (WLCSP) 1.92 mm x 1.79 mm with 25 bumps die size which supports design of compact, small form factor end products. ultra-low leakage current of 15nA ensures the longevity of the device in shelf life and conserves battery lifetime during its active usage.

An SPI interface is provided for command and control by an external MCU, supporting self timed

operation and an optional interrupt to alert the host when new data becomes available. The product is also designed to be used with MCXW23 to enable a low power system design.

Features

AFE Features

- Amperometric measurement via Potentiostat supporting three-terminal and two-terminal modes
- Flexible configurability of four work electrodes
- Dual buffering modes: high accuracy, low bandwidth buffers or high speed, high bandwidth buffers
- Support for chronoamperometry, voltage measurements and external thermistor for temperature measurements
- Self-timed sensing operations interrupt the host process when new sensor data is available in an integrated RAM buffer

NFC subsystem

- NFC-Type 4 tag, ISO14443 / NFC Forum-compliant.
- Support for device activation
- Flexible ISO-DEP Protocol interface to the host processor

Power supply

- Low Voltage Supply Mode supporting a voltage range of 1.2 V to 1.95 V
- High Voltage Supply Mode supporting a voltage range of 1.8 V to 3.6 V

Current consumption

- Shelf-mode current: 15 nA
- Bias voltage generation for one Potentiostat channel using low bandwidth buffers is 2.5 μ A
- Single work electrode (WE) electrode sensing-mode current is 5 μ A during the measurement using LBW buffers, including the bias voltage generation

Applications

- Electrochemical Sensors
- Continuous Glucose Monitors
- Temperature Sensors
- Sweat Patches
- Blood Glucose Monitors
- Wearable Patches

Evaluation Kit (HW & SW)

The evaluation kit includes the NHS2634 EVK board bundle and associated software, which consist of:

- **NHS2634-EXP:** NHS2634 Expansion board with Sensor Interface Connector & thermistor.

- **NHS2x34-PIN:** Pin header board
 - Jumper connector enables access to WE0, WE1, WE2, WE3, RE, CE, GND and THERM
- **NHS2x34-TRIM-2:** Trimpot Version 2 board
 - Resistor on WE0
 - Sensor model on WE1, WE2 and WE3 to measure current in pstat mode and chromapero functionality
 - Thermistor to measure temperature
- NHS2634 Software enablement running on FRDM-MCXW23 (to be purchased separately)

Evaluation setup

- NHS2634-EXP board plugs into mikroBUS™ connector of the MCXW23 FRDM board.
- Driver and sample code available on the FRDM-MCXW23 (to be purchased separately)
- NHS2x34-PIN board provides easy connectivity to external electrochemical biosensors for fast prototyping
- NHS2x34-TRIM-2 Trimpot board version 2 provides configurable sensor emulation for evaluation of measurement modalities.

(CGM) Disposable Continuous Glucose Meter Block Diagram

