NPZG1S

The nPZero power-saving IC targets power-constrained sensor applications, reducing system power by autonomously managing sensor communication and selectively powering up the MCU and sensors only when needed.

Key Benefits

- Reduce power consumption by up to 90%
- Power the MCU and sensors only when needed
- Handle sensors autonomously without an active MCU
- Compatible with a wide range of MCUs and I2C or SPI-based sensors

Main Features

- **Ultra-low-power standalone operation**
  - Power-cycling: turns off MCU and sensors when they are not needed

- **Autonomous operation of up to 4 sensors**
  - MCU is powered off
  - Polling of sensors with threshold-based wake-up triggers
  - Communication over I^2C or SPI
  - Flexible I/O pins for interrupt inputs or trigger outputs

- **Supports MCU via I^2C**
  - Configuration via I^2C commands
  - nPZero IC wakes MCU when required

- **Integrated power switches for the MCU and 4 sensors**
  - Can be changed to logic output to control external switches for higher currents

- **128-byte SRAM**
  - Initialization commands for the sensors
  - General purpose data

- **Optional crystal oscillator**
  - Improved timing accuracy
  - Programmable clock output
  - External 32.768 kHz crystal for higher precision timing

Key Specifications

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Supply voltage	1.5 - 3.6 V
Idle current @ 3.0V and 22°C	100 nA
Polling current @ 3.0V and 22°C	1.0 µA
Host switch max current	10 mA
Sensor switch max current (×4)	1 mA
I^2C / SPI frequency	100 kHz
Temperature range	-20°C to +85°C
Package options	QFN32, 5×5 mm; WLCSP30, 2.45×2.45 mm

Functional Block Diagram
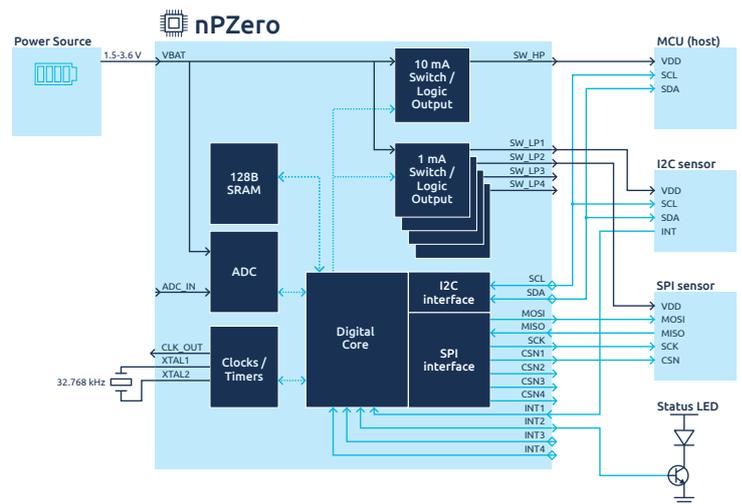
Energy Savings: use case

It has been empirically measured that the nPZero IC can reduce current consumption for peripheral polling by 89% as compared to a baseline system without the nPZero. The system considered includes a Nordic Semiconductor™ nRF52840 devkit, an AMS™ temperature sensor and an ST™ 3-axis accelerometer.*

* All product names, logos and brands are property of their respective owners and are used for identification purposes only.

Peripheral polling current consumption, µA

89% energy saved

Baseline system without nPZero

Optimized system with nPZero
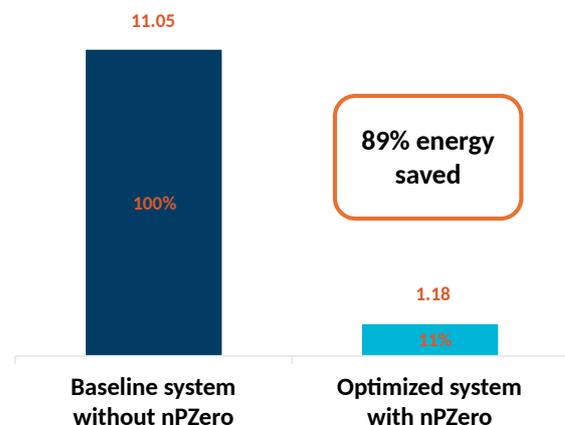
Typical Applications

- Battery-powered and energy-harvesting-powered IoT devices
- Smart Buildings/Cities/Agriculture
- Tracking, Logging, Monitoring ++