Low Power Analog Front End IC saves battery life

✓ Maximized battery life through intermittent operation

Average current consumption example: 5µA typ.

✓ Flexible sensor application design

High-end analog signal conditioning by usage of on chip resources such as an instrumentation amplifier with gain and offset calibration, a temperature sensor, a 16bit ADC, a reference voltage, and an I^2C interface

✓ High EMI immunity

Highly efficient EMI suppression enabling precision signal conditioning in RF connected sensors and IoT systems

■ Why does the above matter?

If you want to design a system with long battery operation such as a portable multi gas leak detector, a gas alarm, an alarm siren safety device or a portable detector, then low power consumption really matters. These applications operate at low-power for maximized battery life, and the low current consumption of this **NJU9101** is the best solution.

The **NJU9101** has built-in low current OPAmps (OPA/OPB) and an ADC both can achieve 5µA of average system current, and 3.5 years lifetime when using a 3V coin battery (based on 1 time per second sensing interval - its lifetime can be extended by using longer interval times).

Fig. 5 shows how easy various types of sensors can be used to maximize the usability of such a system. It measures multiple analog signals in parallel with high accuracy of measurement and individual signal conditioning for each sensor (Fig. 3, Fig. 4).

Imagine you want to connect the sensor wirelessly to a host or you operate the sensor near a RF transmitting device, then **NJU9101** still delivers accurate measurement results because of its integrated EMI immunity amplifier. This improves the overall quality of your sensor while supporting cost down efforts by minimizing the number of external filter components

■ Features

- Low Current Consumption:
  4µA (OPA, OPB in Fig. 2), 150µA (ADC)
- Low Noise OPAmp: 1.3µVp-p typ. (0.1 to 10Hz)
- Low Offset Voltage OPAmp: 300µV max.
- Two simultaneous inputs (via OPA/OPB and AUX) for precise measurements of two analog signals
- EMI immunity
- Programmable Gain Pre-Amplifier: 1 to 8V/V
- High resolution delta-sigma ADC:
  1 to 8V/V, 16-Bit (NFB), 32sps to 2ksps
- System calibration for offset & gain drift
- Operating Voltage: +2.4 to +3.6V
- Operating temperature range: -40 to 85°C
- Package: EQFN-24-LE (4mm*4mm)
- datasheet Link

■ Application Example & Block Diagram

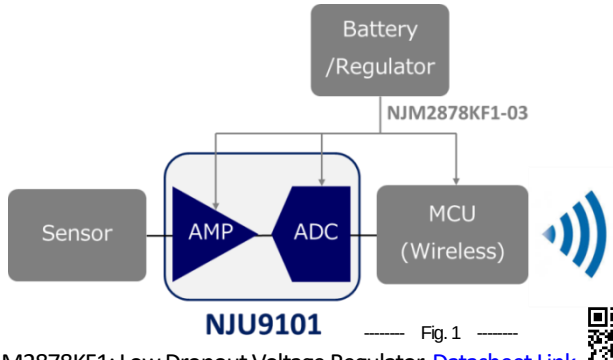


Fig. 1

NJM2878KF1: Low Dropout Voltage Regulator, Datasheet Link

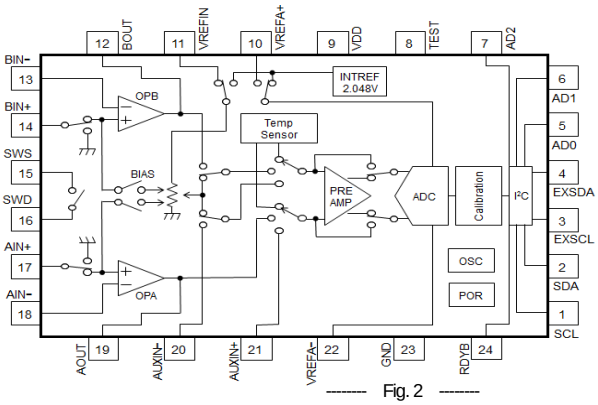


Fig. 2

✓ Maximized battery life through intermittent operation

Average current consumption example: 5µA typ.

Example application: Gas Detector

- Working Conditions:
  - 8 hours/day @operation, 16 hours/day @standby
  - Only OPB is ON state at standby
- Measurement intervals:
  - Sensor: 1 time per second
  - External: 1 time per minute
  - Temperature: 1 time per minute
  - Data Rate: about 16.6ms

Item	Standby	Sensor Bias	Sensor Meas.	AUX Meas.	Temp. Meas.	Total
Current [µA]	0.5	10.5	215.5	160.5	250.5	-
Time [h, sec]	16h	8h	480s	8s	8s	-
Ratio [%]	66.6	33.3	0.556	0.009	0.009	-
Avg. [µA]	0.33	3.5	1.2	0.01	0.02	5.06

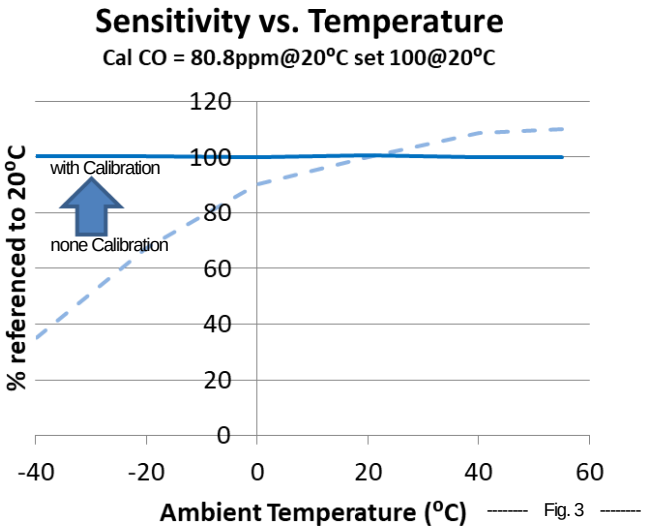
Battery life example driven by one 3V coin battery

220mAh / 5.06µA *0.70 = 30,434 hours =1,268 days = about **3.5 years**

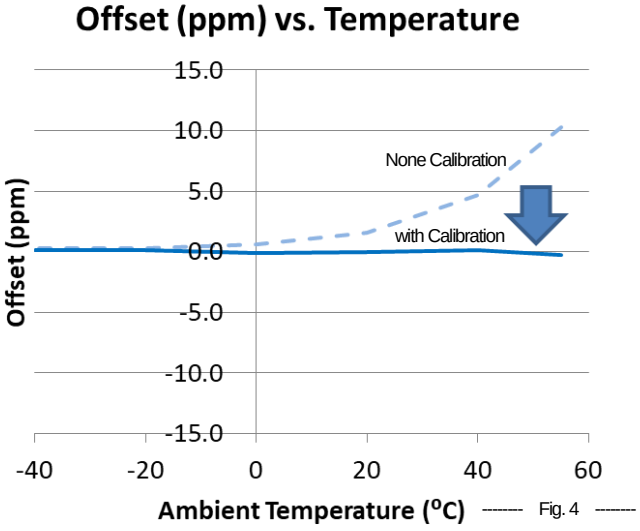
✓ Flexible design for sensor application

Programmable gain amplifier: PGA (1 to 8V/V), ADC (1 to 8V/V)

Sensor calibration function: Temperature compensation for sensitivity/offset of sensor output

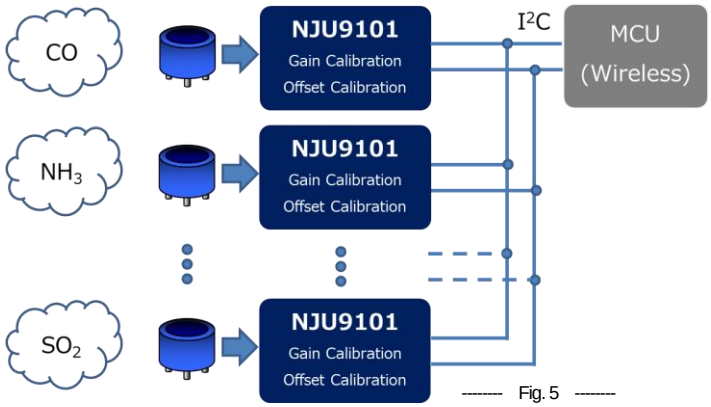


------- Fig. 3 -------



------- Fig. 4 -------

✓ Easy to integrate with various type of sensors



------- Fig. 5 -------

* All information, specifications and product descriptions in this document are subject to change at any time, without prior notice.
* Contact your local NJR office or your distributor to obtain the latest specifications before placing your product order.

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