

Analog Front End



New Japan Radio Co., Ltd.





Agenda

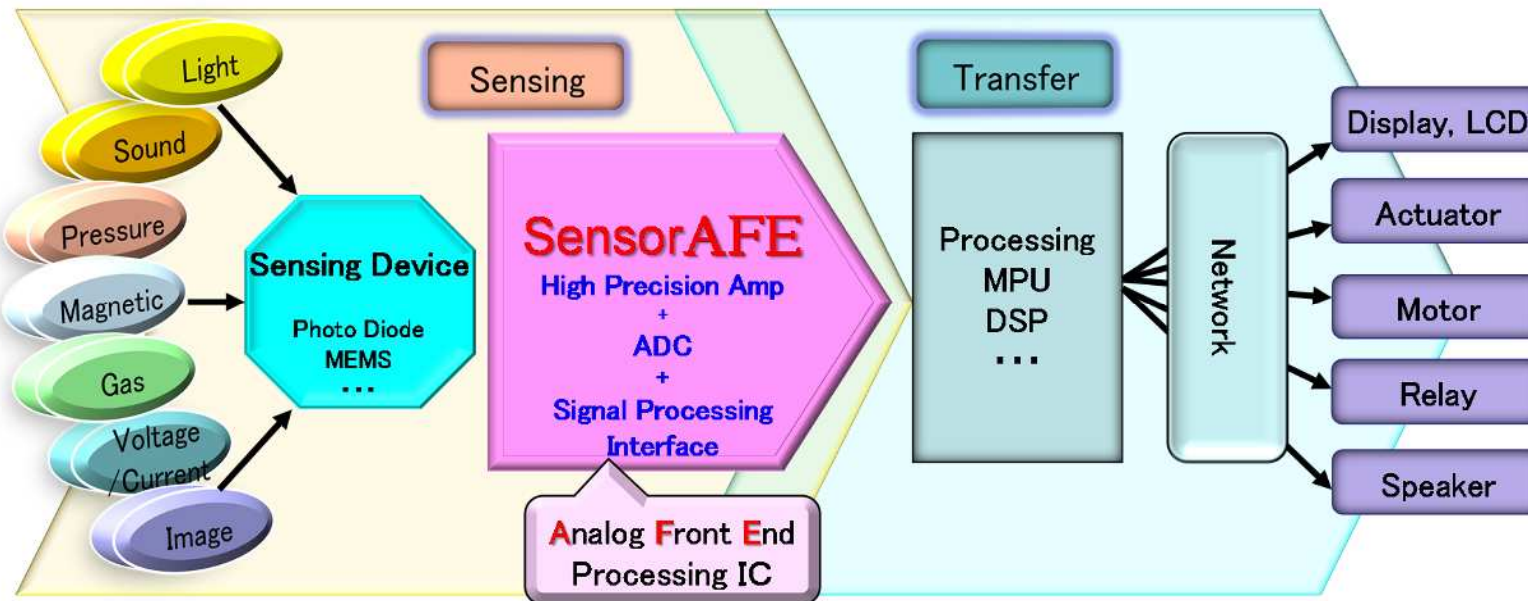
- What is AFE ?
- Chemical Sensor Analog Front End(NJU9101) [MP'15]
- General Purpose AFE(for Measurement) [PLAN]
- General Purpose AFE (for Measurement) [Feature]

What is AFE?

- Analog Front End (AFE) is analog processor which combines sensing device (sensor) and digital signal processor (MCU, DSP).

- AFE is composed to Amplifier, Filter, A/D Convertor.

In case of AFE processes slight analog signal from sensor, PGA (Programmable Gain Amplifier) is set before A/D Convertor, amplifies analog signal, inputs to A/D Convertor.

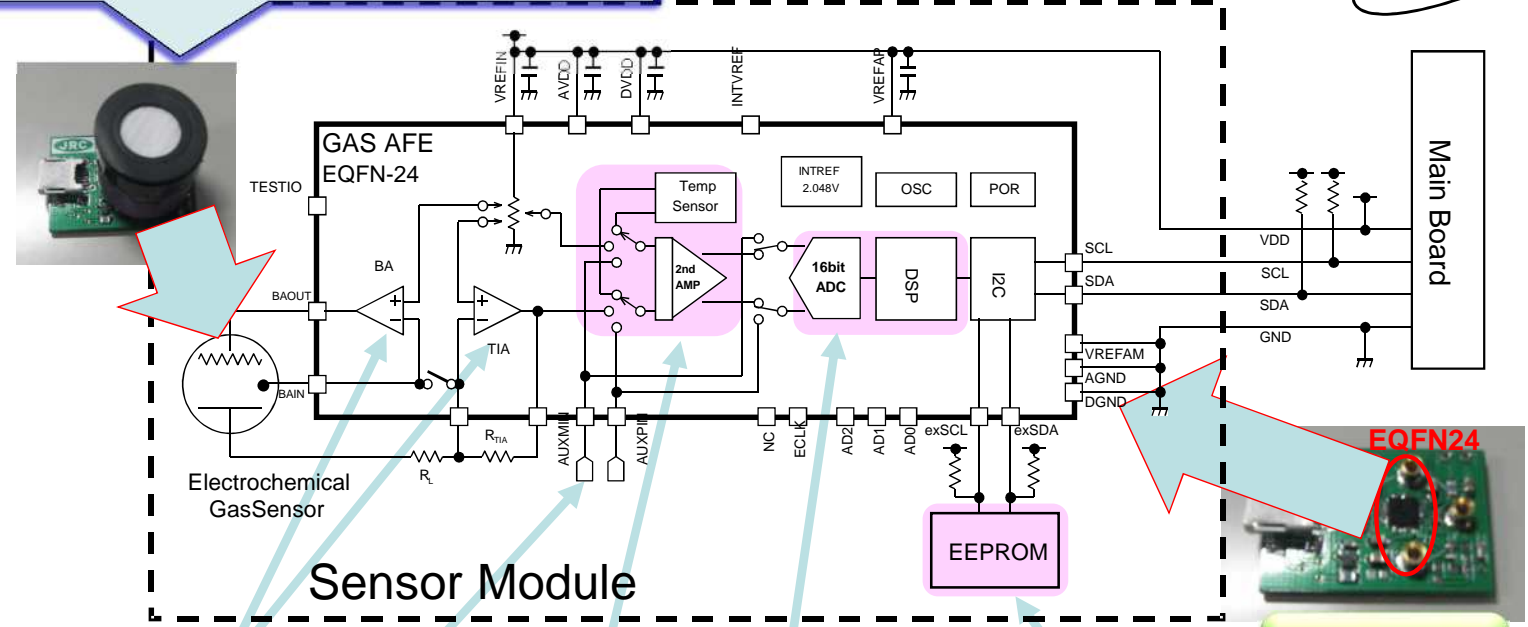


Chemical Gas Sensor AFE : NJU9101

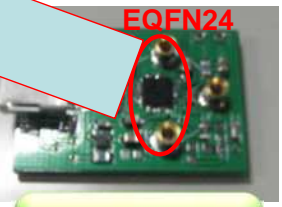
UD

- Automotive
- Fuel cell / Alcohol, etc
- Industry
- Flammable Gas / Poisonous Gas, etc
- Farming, Stockbreeding
- Photosynthesis / Stench, etc
- Medical care, Health care
- Expiration / Body odor analysis, etc

Electrochemical Gas Sensor Element

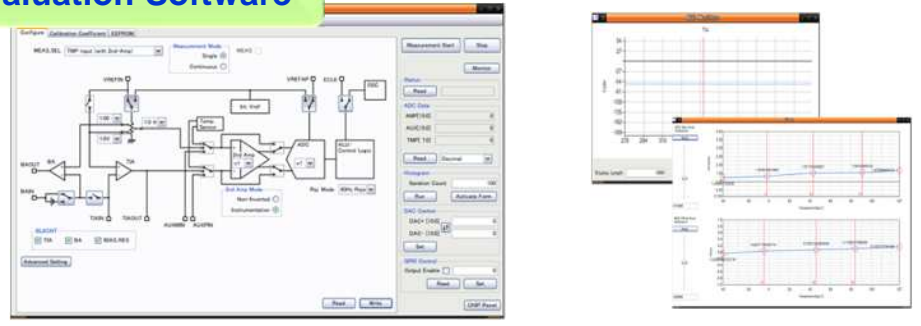


- Low Power 4uA
Low offset Opamp
- Auxiliary Inputs
- Temperature measurement
Variable gain (X1 to X8)
- High precision 16bit ADC
- External EEPROM
Built-in control circuit



Evaluation Board

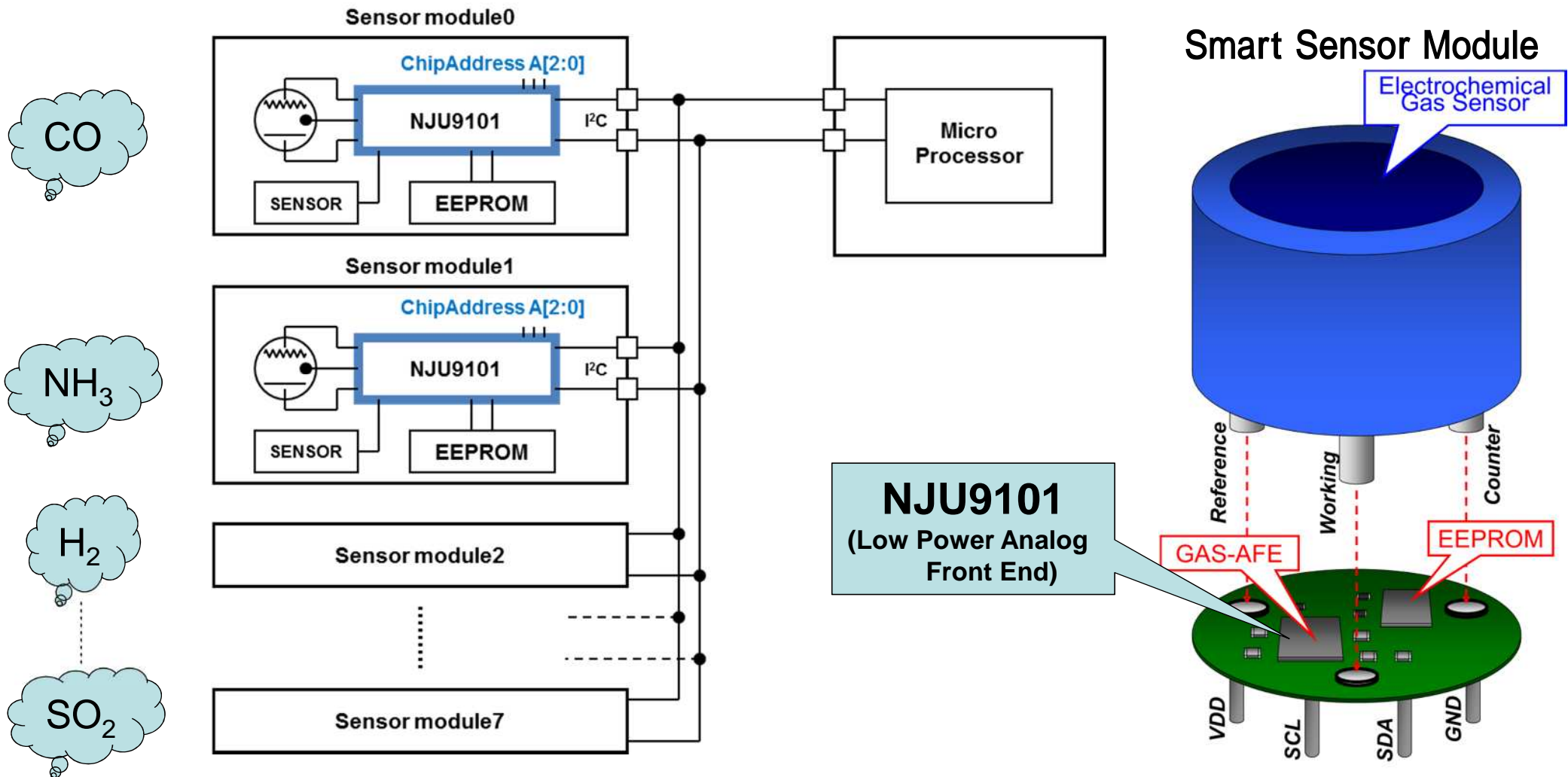
Evaluation Software



Chemical Gas Sensor AFE : NJU9101

UD

The NJU9101 corresponds to multi-gas detectors by 3bit chip address selection.



General purpose AFE (for Measurement)

PLAN

Target Application

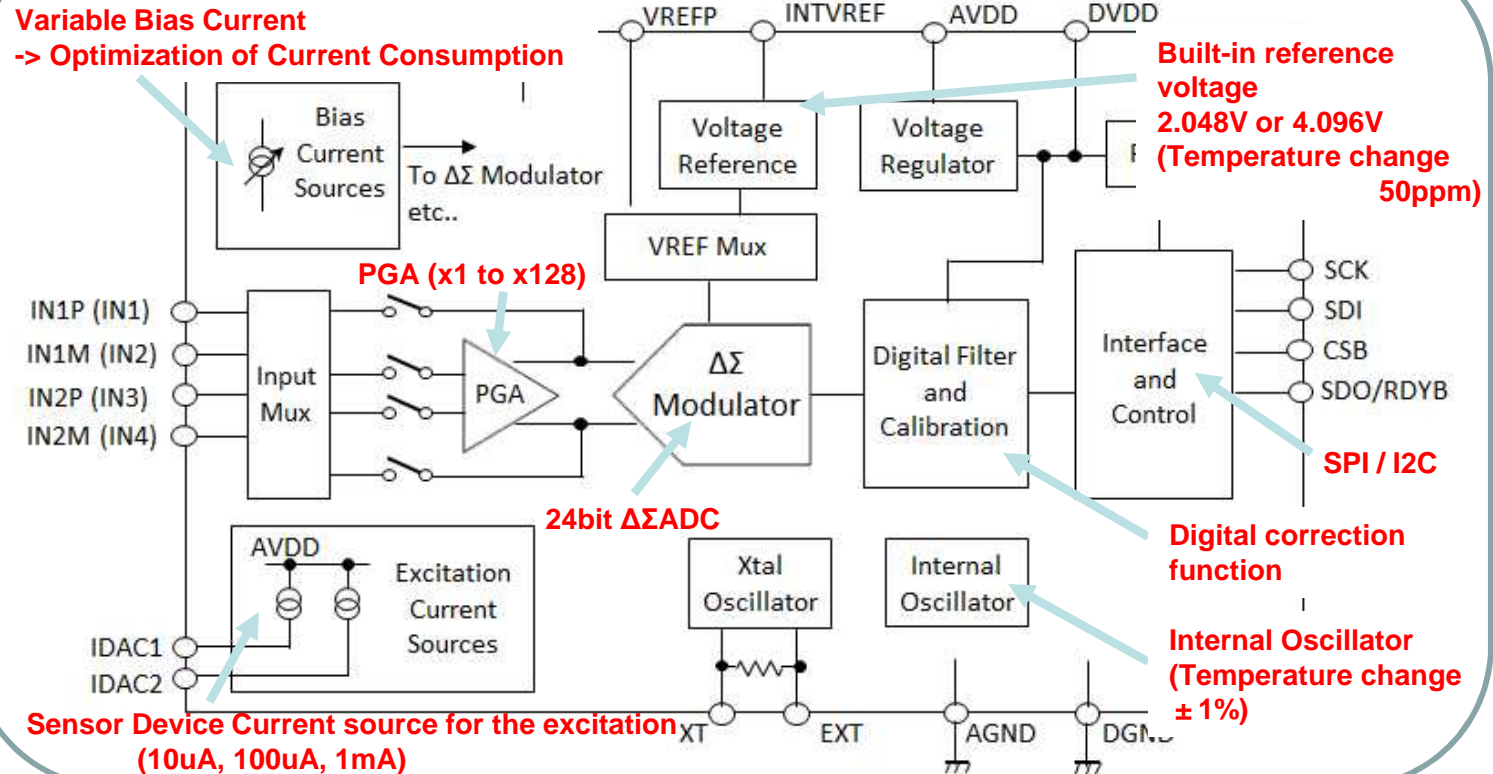
Thermometer

Pressure and Flow Sensors

Illuminance Sensor

Blood Pressure Gauge

Block Diagram of General Purpose AFE (PKG : EQFN24 or SSOP20)



Advantage of General Purpose AFE

- (1) Wide range convert rate(DC to 16ksps) -> Thermometer (DC neighborhood), Flow Sensor (few ksps)
- (2) Wide range "Low Noise" and "Optimization of Current Consumption"
 - > 1. NFB=21bit@20sps, IDD<1mA 2. NFB18bit@2ksps, IDD<3mA

ADS1247: 1. NFB=19bit@20sps, IDD=0.5mA 2. NFB=15bit@2ksps, IDD=0.8mA

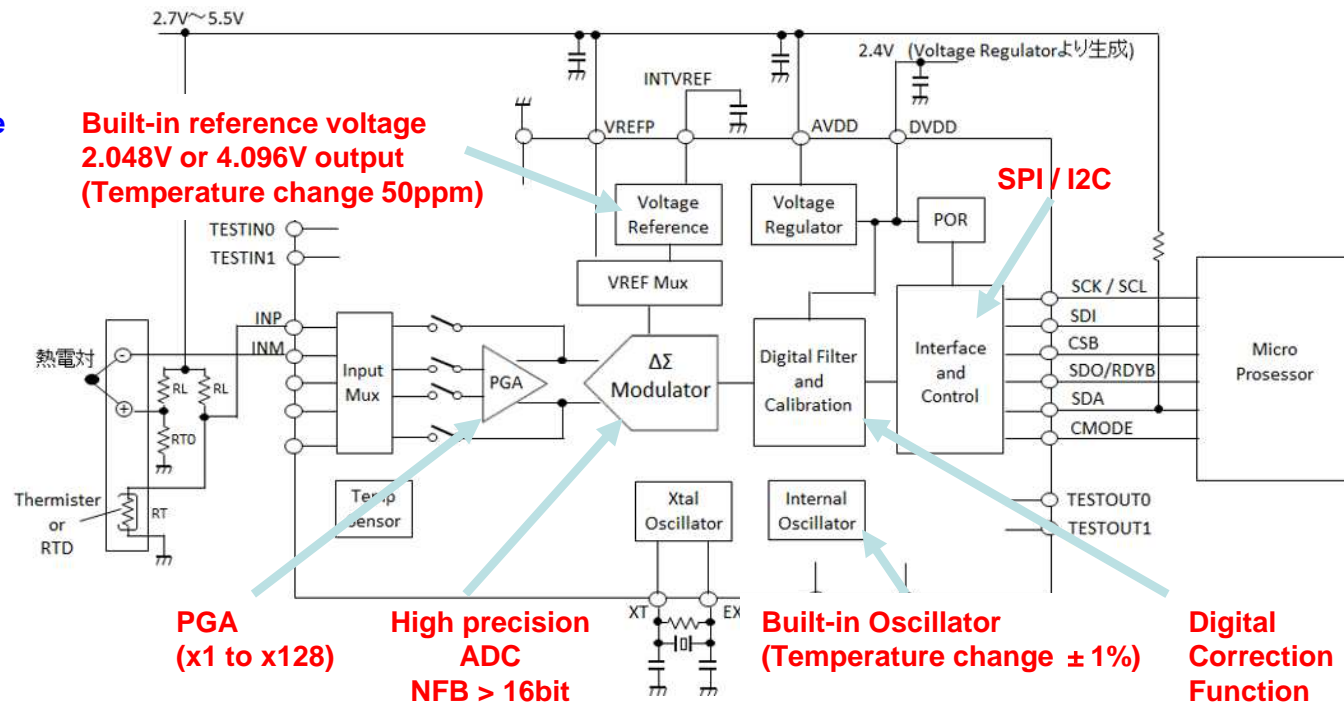
ADS1256: 1. NFB=21bit@20sps, IDD=13mA 2. NFB=18bit@2ksps, IDD=13mA

General Purpose AFE (for Measurement) -1-

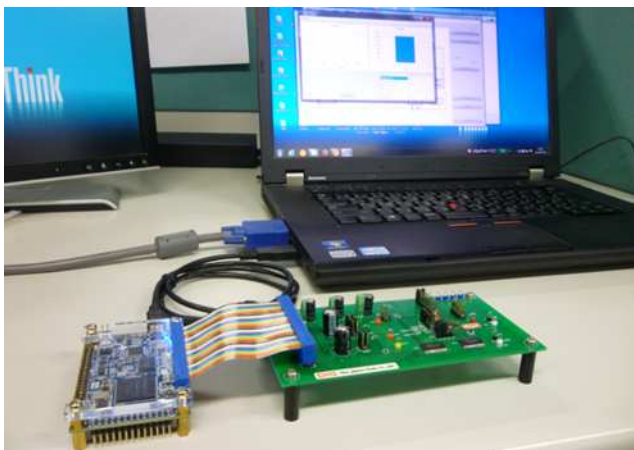
Convert Speed: 2 type
 1. 16.7 to 480sps
 2. 666.7 to 16ksps

Resolution: 16bit

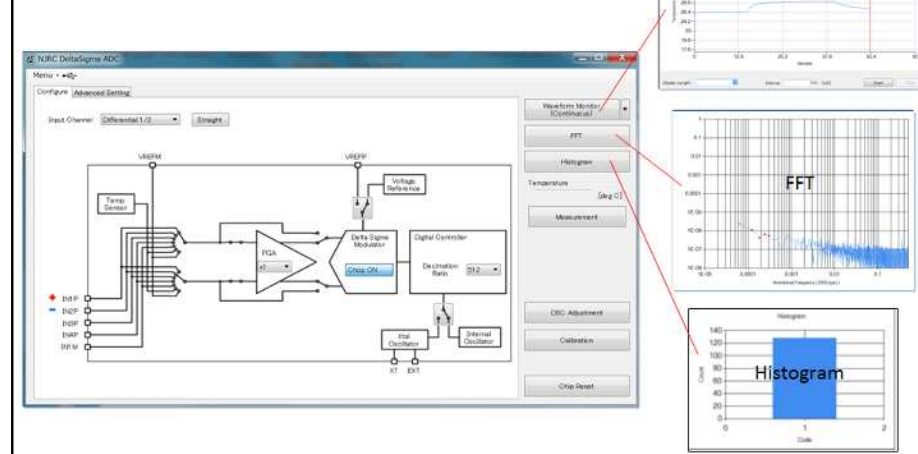
PKG: EQFN24



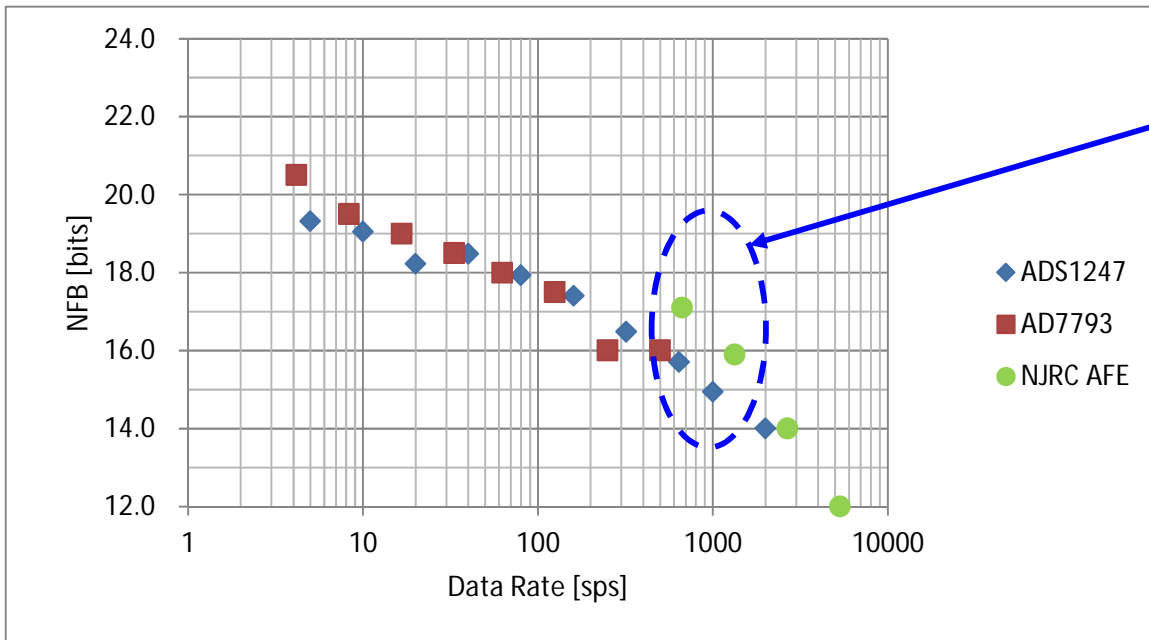
Evaluation Board



Evaluation Software

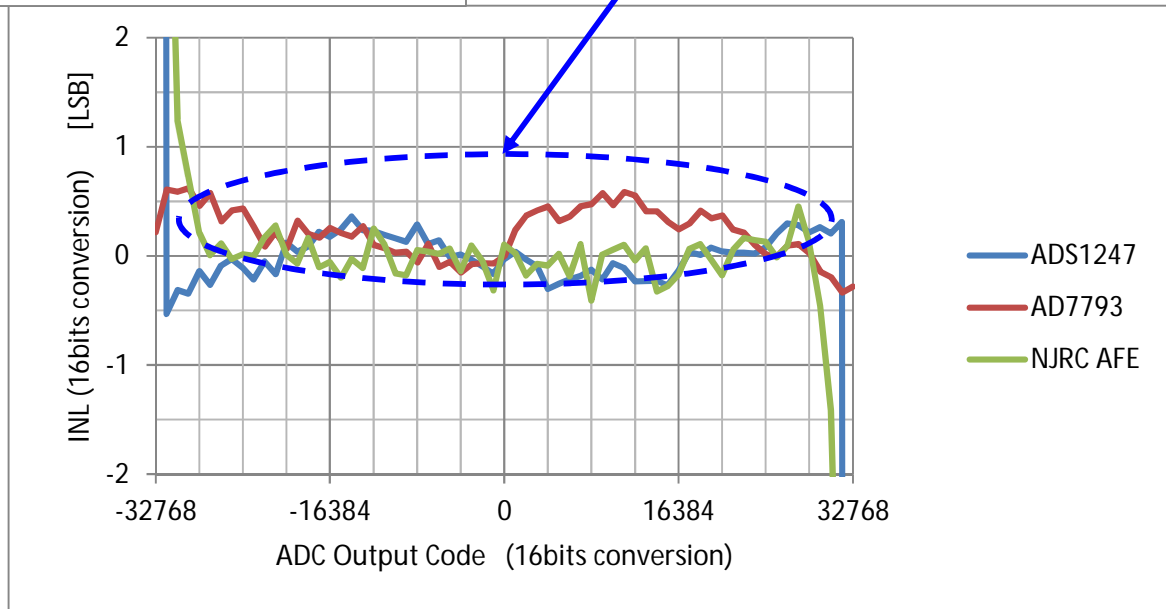


General Purpose AFE (for Measurement) -2-



Feature 1
High NFB at 1ksps: NFB > 18bit
(Competitor: NFB < 16bit)

Feature 2
Good linearity: INL = ± 0.5LSB or less
Level same as Competitors





Enquiries

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