

Brief Description

The ZSSC3018 is a sensor signal conditioner (SSC) integrated circuit for high-accuracy amplification and analog-to-digital conversion of differential or pseudo-differential input signals. Designed for high-resolution sensor module applications, the ZSSC3018 can perform offset, span, and 1st and 2nd order temperature compensation of the measured signal. Developed for correction of resistive bridge or absolute voltage sensors, it can also provide a corrected temperature output measured with an internal sensor.

The measured and corrected sensor values are provided at the digital output pins, which can be configured as I²C ($\leq 3.4\text{MHz}$) or SPI ($\leq 10\text{MHz}$). Digital compensation of signal offset, sensitivity, temperature, and non-linearity is accomplished via a 26-bit internal digital signal processor (DSP) running a correction algorithm. Calibration coefficients are stored on-chip in a highly reliable, non-volatile, multiple-time programmable (MTP) memory. Programming the ZSSC3018 is simple via the serial interface. The interface is used for the PC-controlled calibration procedure, which programs the set of calibration coefficients in memory. The ZSSC3018 provides accelerated signal processing, increased resolution, and improved noise immunity in order to support high-speed control, safety, and real-time sensing applications with the highest requirements for energy efficiency.

Features

- Flexible, programmable analog front-end design; up to 18-bit analog-to-digital converter (ADC)
- Fully programmable gain amplifier with gain range from 6.6 to 216 (linear)
- Internal auto-compensated temperature sensor
- Digital compensation of individual sensor offset; 1st and 2nd order digital compensation of sensor gain as well as of 1st and 2nd order temperature gain and offset drift
- Programmable interrupt operation
- High-speed sensing: e.g., 16-bit conditioned sensor signal measurement rate $>500\text{s}^{-1}$
- Typical sensor system can achieve an accuracy of better than $\pm 0.10\% \text{ FSO}^* @ -40 \text{ to } 125^\circ\text{C}$

Benefits

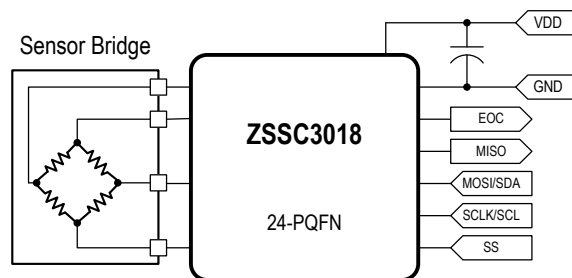
- Integrated 26-bit calibration math DSP
- Fully corrected signal at digital output
- Layout customized for die-die bonding with sensor for high-density chip-on-board assembly
- One-pass calibration minimizes calibration costs
- No external trimming, filter, or buffering components required
- Highly integrated CMOS design
- Integrated reprogrammable non-volatile memory
- Excellent for low-voltage and low-power battery applications
- Optimized for operation in calibrated resistive sensor (e.g., pressure) or calibrated absolute voltage sensor (e.g., thermopile) modules

Physical Characteristics

- Supply voltage range: 1.68V to 3.6V
- Current consumption: $\sim 1.0\text{mA}$ (typical) in operating mode
- Sleep Mode current: 50nA (typical) at $\leq 125^\circ\text{C}$; 20nA (typical) at $\leq 85^\circ\text{C}$
- Temperature resolution: $< 0.003\text{K/LSB}$
- Best-in-class energy-efficiency:
 - with 16-bit resolution: $< 140\text{pJ/step}$
 - with 18-bit resolution: $< 50\text{pJ/step}$
- Operation temperature: -40°C to $+125^\circ\text{C}$
- Delivery options: die or 24-PQFN (4 x 4 mm) package

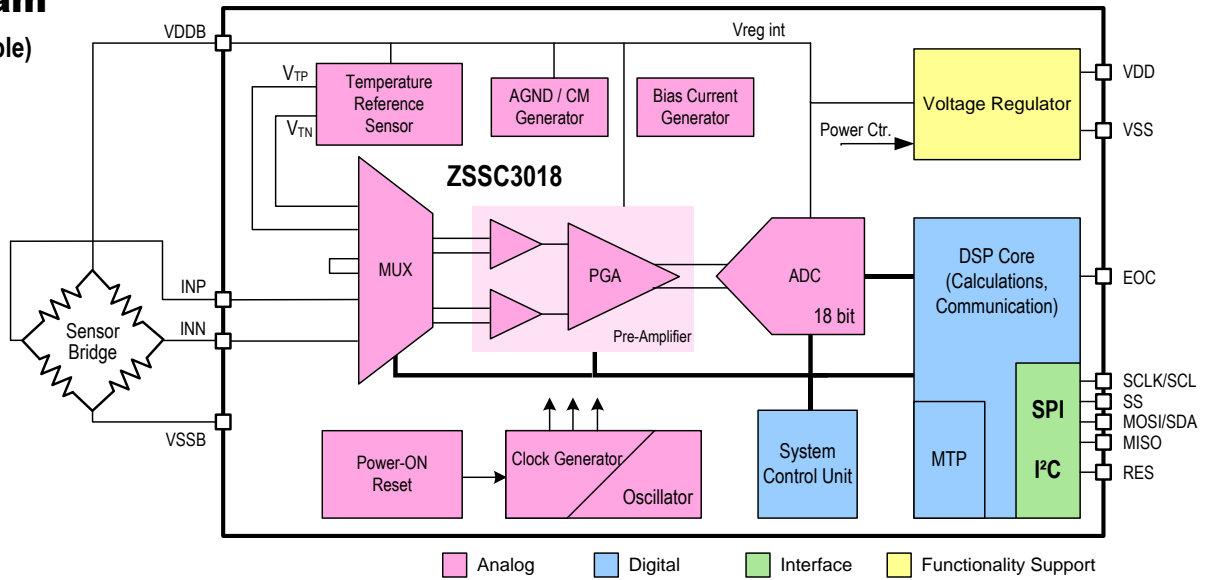
* FSO = Full Scale Output.

ZSSC3018 Application Example



Block Diagram

(Bridge Sensor Example)



Applications

- Barometric altitude measurement for portable navigation or emergency call systems
- Altitude measurement for car navigation
- Weather forecast
- Fan control
- Industrial, pneumatic, and liquid pressure
- High-resolution temperature measurements
- Object-temperature radiation (via thermopile)

Ordering Information

Product Sales Code	Description	Package
ZSSC3018BA3W	ZSSC3018 24-PQFN – temperature range: –40°C to +125°C	7" Reel
ZSSC3018BA2B	ZSSC3018 Die – temperature range: –40°C to +125°C	Unsawn on Wafer (725µm)
ZSSC3018BA2C	ZSSC3018 Die – temperature range: –40°C to +125°C	Sawn on Wafer Frame

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