

Brief Description

The ZSSC3016 is a sensor signal conditioner (SSC) integrated circuit for high-accuracy amplification and analog-to-digital conversion of a differential input signal. Designed for high-resolution altimeter module applications, the ZSSC3016 can perform offset, span, and 1st and 2nd order temperature compensation of the measured signal. Developed for correction of resistive bridge sensors, it can also provide a corrected temperature output measured with an internal sensor.

The measured and corrected bridge values are provided at the digital output pins, which can be configured as I²C™* ($\leq 3.4\text{MHz}$) or SPI ($\leq 20\text{MHz}$). Digital compensation of signal offset, sensitivity, temperature, and non-linearity is accomplished via an 18-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 ZSSC3016 is simple via the serial interface and the PC-controlled calibration software provided in the IDT Development Kit. The interface is used for the PC-controlled calibration procedure, which programs the set of calibration coefficients in memory. The digital mating is fast and precise, eliminating the overhead normally associated with trimming external components and multi-pass calibration routines.

Features

- Flexible, programmable analog front-end design; up to 16-bit scalable, charge-balancing, two-segment analog-to-digital converter (ADC)
- Fully programmable gain amplifier for optimizing sensor signals: gain range 14 to 72 (linear factor)
- Internal auto-compensated temperature sensor
- Digital compensation of individual sensor offset; 1st and 2nd order digital compensation of sensor gain
- Digital compensation of 1st and 2nd order temperature gain and offset drift
- Intelligent power management unit
- Typical sensor elements can achieve accuracy of better than $\pm 0.10\%$ FSO @ -40 to 85 °C

Benefits

- Integrated 18-bit calibration math DSP
- Fully corrected signal at digital output
- Minimize calibration costs through the one-pass calibration concept
- No external trimming components required
- Highly integrated CMOS design
- Layout customized for die-die bonding with sensor for high-density chip-on-board assembly
- Excellent for low-voltage and low-power battery applications

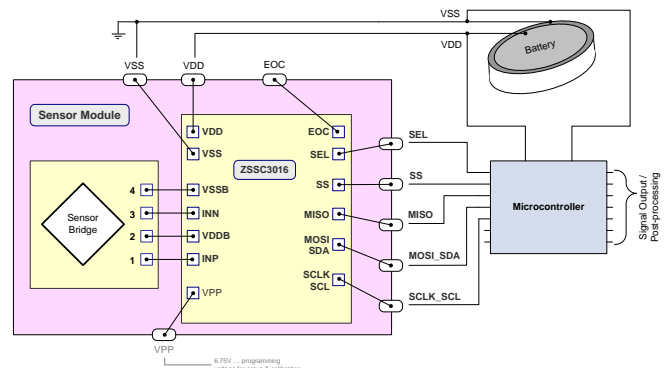
Support

- Evaluation Kit

Physical Characteristics

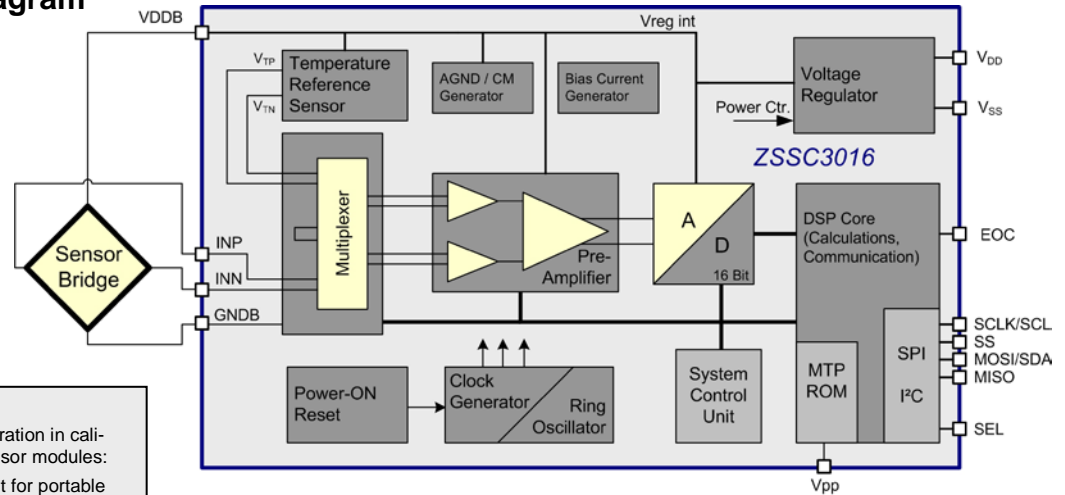
- Supply voltage range: 1.8 to 3.6V
- Current consumption: 1mA (operating mode)
- Sleep State current: 70nA (25°C)
- Temperature resolution: $< 0.003\text{K/LSB}$
- Operation temperature: -40°C to $+85^\circ\text{C}$
- Small die size
- Delivery options: die for wafer bonding

ZSSC3016 Application Example



* I²C™ is a trademark of NXP.

ZSSC3016 Block Diagram



Applications
The ZSSC3016 is designed for operation in calibrated resistive (e.g., pressure) sensor modules:

- ❖ Barometric altitude measurement for portable navigation
- ❖ Altitude measurement for emergency call systems and car navigation
- ❖ Inside hard disk pressure measurement
- ❖ Weather forecast
- ❖ Fan control

Ordering Information *(Contact IDT Sales for additional options.)*

Ordering Examples	Description	Package
ZSSC3016CC1B	Temperature range: -40°C to +85°C, consumer-level parameters according to section 1 of the data sheet	Wafer (304µm) unsawn
ZSSC3016CI1B	Temperature range: -40°C to +85°C, industrial-level parameters according to section 1 of the data sheet, 10 years MTP data retention	Wafer (304µm) unsawn
ZSSC3016CI1D ES	Engineering samples, temperature range: -40°C to +85°C	Dice in waffle pack
ZSSC3016KIT	ZSSC3016 Evaluation Kit, including sample and modular evaluation board (Evaluation Software is downloadable from www.IDT.com/ZSSC3016)	Kit



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