

## 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 1<sup>st</sup> and 2<sup>nd</sup> 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 I<sup>2</sup>C™\* (≤ 3.4MHz) or SPI (≤ 20MHz). 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; 1<sup>st</sup> and 2<sup>nd</sup> order digital compensation of sensor gain
- Digital compensation of 1<sup>st</sup> and 2<sup>nd</sup> order temperature gain and offset drift
- Intelligent power management unit
- Typical sensor elements can achieve accuracy of better than ±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

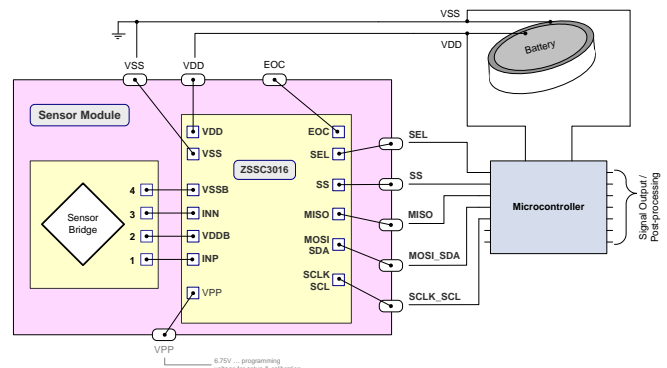
## Support

- Evaluation Kit

## Physical Characteristics

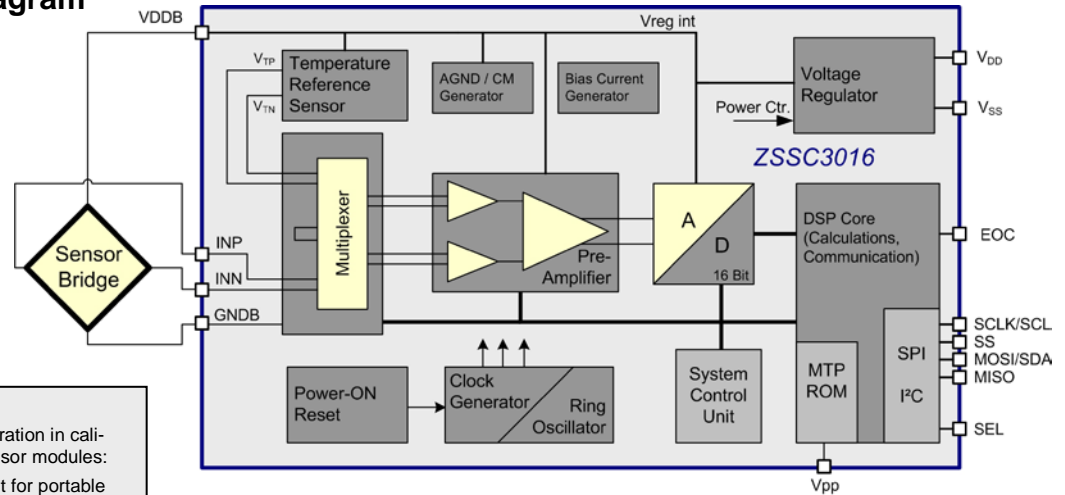
- Supply voltage range: 1.8 to 3.6V
- Current consumption: 1mA (operating mode)
- Sleep State current: 70nA (25°C)
- Temperature resolution: <0.003K/LSB
- Operation temperature: -40°C to +85 °C
- Small die size
- Delivery options: die for wafer bonding

## ZSSC3016 Application Example



\* I<sup>2</sup>C™ 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 <a href="http://www.IDT.com/ZSSC3016">www.IDT.com/ZSSC3016</a> )	Kit

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