

## Brief Description

The ZSSC3027 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 ZSSC3027 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™\* ( $\leq 3.4\text{MHz}$ ) 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 ZSSC3027 is simple via the serial interface. The IC-internal charge pump provides the MTP programming voltage. The interface is used for the PC-controlled calibration procedure, which programs the set of calibration coefficients in memory.

The ZSSC3027 provides accelerated signal processing in order to support high-speed control, safety, and real-time sensing applications. It complements IDT's ZSSC30x6 products.

## 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 accepting sensors from 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 as well as of 1<sup>st</sup> and 2<sup>nd</sup> order temperature gain and offset drift
- Layout optimized for stacked-die bonding for high-density chip-on-board assembly
- 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
- One-pass calibration minimizes calibration costs
- No external trimming, filter, or buffering components required
- Highly integrated CMOS design
- Excellent for low-voltage and low-power battery applications
- Optimized for operation in calibrated resistive sensor modules

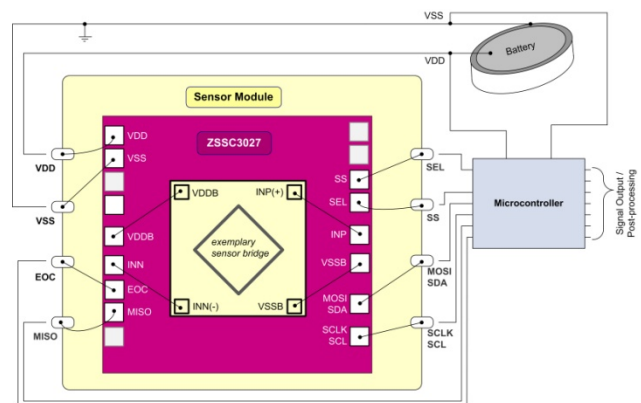
## Physical Characteristics

- Supply voltage range: 1.7 to 3.6V
- Operating mode current consumption: 930 $\mu\text{A}$  (typical)
- Sleep State current: 20nA (typical)
- Temperature resolution:  $<0.003\text{K/LSB}$
- Operation temperatures:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Small die size
- Delivery options: die for wafer bonding

## Available Support

- ZSSC3026 Evaluation Kit can be used to evaluate ZSSC3027 capabilities
- Support Documentation

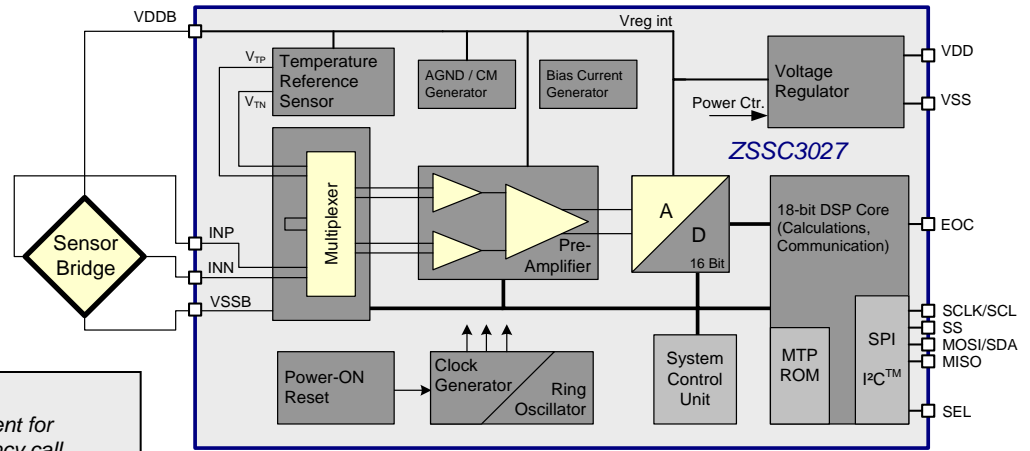
## ZSSC3027 Application Example



\* I<sup>2</sup>C™ is a trademark of NXP.

\*\* FSO = Full Scale Output.

**ZSSC3027  
Block Diagram**



- Applications**
- ❖ Barometric altitude measurement for portable navigation or emergency call systems
  - ❖ Altitude measurement for car navigation
  - ❖ Inside hard disk pressure measurement
  - ❖ Weather forecast
  - ❖ Fan control
  - ❖ Industrial, pneumatic, and liquid pressure
  - ❖ High-resolution temperature measurements

**Ordering Information** (See section 6 in the data sheet for additional options for delivery)

Sales Code	Description	Delivery Package
ZSSC3027AC1B	Die—temperature range: -40°C to +85 °C	Wafer (304µm) unsawn, tested
ZSSC3027AC6B	Die—temperature range: -40°C to +85 °C	Wafer (725µm) unsawn, tested
ZSSC3027AC7B	Die—temperature range: -40°C to +85°C	Wafer (200µm) unsawn, tested
ZSSC3026-KIT	Evaluation Kit for ZSSC3026, including boards, cable, software, and 1 ZSSC3026 PQFN24 sample (equivalent to ZSSC3027—kit is recommended for evaluation of the capabilities of the ZSSC3027)	



Corporate Headquarters  
6024 Silver Creek Valley Road  
San Jose, CA 95138  
[www.IDT.com](http://www.IDT.com)

Sales  
1-800-345-7015 or 408-284-8200  
Fax: 408-284-2775  
[www.IDT.com/go/sales](http://www.IDT.com/go/sales)

Tech Support  
[www.IDT.com/go/support](http://www.IDT.com/go/support)

DISCLAIMER Integrated Device Technology, Inc. (IDT) reserves the right to modify the products and/or specifications described herein at any time, without notice, at IDT's sole discretion. Performance specifications and operating parameters of the described products are determined in an independent state and are not guaranteed to perform the same way when installed in customer products. The information contained herein is provided without representation or warranty of any kind, whether express or implied, including, but not limited to, the suitability of IDT's products for any particular purpose, an implied warranty of merchantability, or non-infringement of the intellectual property rights of others. This document is presented only as a guide and does not convey any license under intellectual property rights of IDT or any third parties.

IDT's products are not intended for use in applications involving extreme environmental conditions or in life support systems or similar devices where the failure or malfunction of an IDT product can be reasonably expected to significantly affect the health or safety of users. Anyone using an IDT product in such a manner does so at their own risk, absent an express, written agreement by IDT.

Integrated Device Technology, IDT and the IDT logo are trademarks or registered trademarks of IDT and its subsidiaries in the United States and other countries. Other trademarks used herein are the property of IDT or their respective third party owners. For datasheet type definitions and a glossary of common terms, visit [www.idt.com/go/glossary](http://www.idt.com/go/glossary). All contents of this document are copyright of Integrated Device Technology, Inc. All rights reserved.