# ZSC31014

## RBic$_{iLite}$™ Digital Output Sensor Signal Conditioner

**ZMDI®**
The Analog Mixed Signal Company

## Brief Description

The ZSC31014 RBic$_{iLite}$™ is a CMOS integrated circuit for highly accurate amplification and analog-to-digital conversion of differential and half-bridge input signals. The RBic$_{iLite}$™ can compensate the measured signal for offset, 1$^{st}$ and 2$^{nd}$ order span, and 1$^{st}$ and 2$^{nd}$ order temperature (Tco and Tcg). It is well-suited for sensor-specific correction of bridge sensors. Digital compensation of signal offset, sensitivity, temperature drift, and non-linearity is accomplished via an internal digital signal processor running a correction algorithm with calibration coefficients stored in a non-volatile EEPROM.

The RBic$_{iLite}$™ is adjustable to nearly all piezo-resistive bridge sensors. Measured and corrected bridge values are provided at digital output pins, which can be configured as I$^2$C™* or SPI. The digital I$^2$C™ interface can be used for a simple PC-controlled calibration procedure to program calibration coefficients into an on-chip EEPROM. The calibrated RBic$_{iLite}$™ and a specific sensor are mated digitally: fast, precise, and without the cost overhead associated with trimming by external devices or laser trimming.

Integrated diagnostics functions make the RBic$_{iLite}$™ particularly well-suited for safety-critical applications.

## Features

- High accuracy (±0.1% FSO @ -25 to +85°C; ±0.25% FSO @ -40 to +125°C)
- 2$^{nd}$ order charge-balancing analog-to-digital converter provides low noise, 14-bit data at sample rates exceeding 2kHz
- Fast power-up to data output response: 3ms at 4MHz
- Digital compensation of sensor offset, sensitivity, temperature drift, and non-linearity
- Eight programmable analog gain settings combine with a digital gain term; accommodates bridges with spans <1mV/V and high offset
- Internal or optional external temperature compensation for sensor correction and for corrected temperature output
- 48-bit customer ID field for module traceability

## Benefits

- Simple PC-controlled configuration and single-pass digital calibration via I$^2$C™ interface – quick and precise; SPI option for measurement mode
- Eliminates need for external trimming components
- On-chip diagnostic features add safety to the application (e.g., EEPROM signature, bridge connection checks, bridge short detection).
- Low-power Sleep Mode lengthens battery life
- Enables multiple sensor networks

## Available Support

- Evaluation Kit
- Application Notes
- Mass Calibration Solution

## Physical Characteristics

- Wide supply voltage capability: 2.7V to 5.5V
- Current consumption as low as 70µA depending on programmed sample rate
- Low-power Sleep Mode (<2µA @ 25°C)
- Operation temperature: -40°C to +125°C
- Small SOP8 package

### *ZSC31014 Application: I$^2$C™ Interface, Low-Power Bsink Option, Internal Temperature Correction*
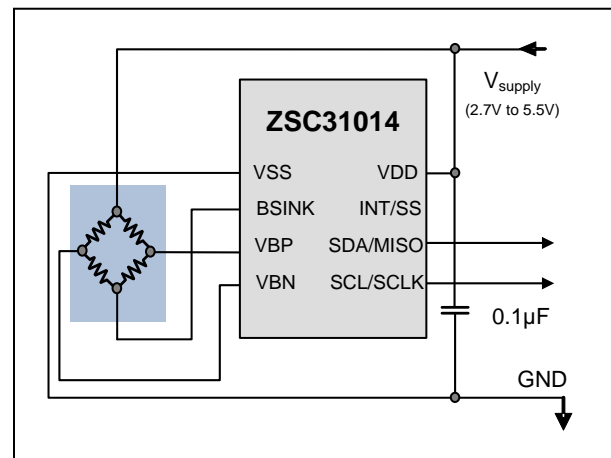
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## ZSC31014 Block Diagram



**Applications:**

**Industrial:** building automation, dataloggers, pressure meters, leak detection monitoring
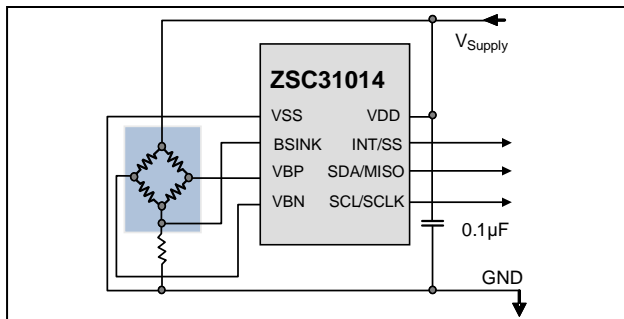
**Medical:** infusion pumps, blood pressure meters, air mattresses, apnea monitors

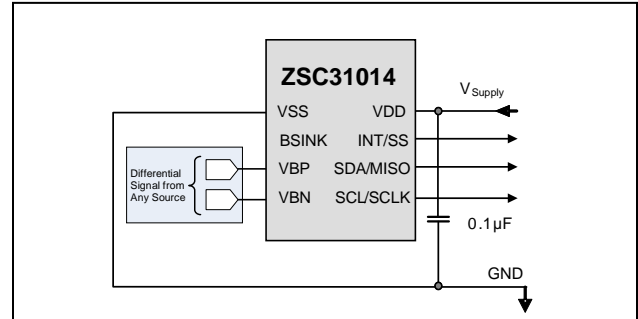**White Goods / Appliances:** fluid level, refrigerant

**Consumer:** body monitors, portable monitors, desktop weather stations, bathroom scales, toys/games
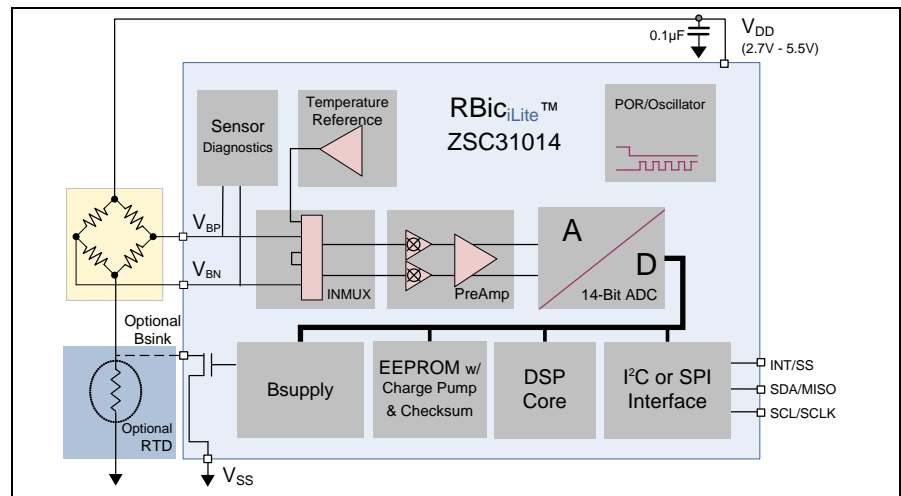
**Application**: *Bridge TC Used for External Temperature*



**Application**: *Generic Differential A2D Converter*



## Ordering Examples *(Please refer to section 10 in the data sheet for additional options.)*

| Sales Code | Description | Package |
|---|---|---|
| *ZSC31014DAB* | ZSC31014 RBic_iLite™ Die — Temperature range: -40°C to +125°C | Unsawn on Wafer |
| *ZSC31014DAC* | ZSC31014 RBic_iLite™ Die — Temperature range: -40°C to +125°C | Sawn on Wafer Frame |
| *ZSC31014DAD* | ZSC31014 RBic_iLite™ Die — Temperature range: -40°C to +125°C | Waffle Pack |
| *ZSC31014DAG1* | ZSC31014 RBic_iLite™ SOP8 (150 mil) — Temperature range: -40° to +125°C | Tube: add "-T" to sales code Reel: add "-R" |
| *ZSC31014KIT* | ZSC31014 SSC Evaluation Kit: Communication Board, SSC Board, Sensor Replacement Board, Software, USB Cable, 5 IC Samples | Kit |

## Sales and Further Information

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