

ZMD31014

ZMDI[®]

The Analog Mixed Signal Company

RBic_{iLite}[™] Low-Cost Sensor Signal Conditioner with I²C & SPI



Brief Description

The 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, 1st and 2nd order span, and 1st and 2nd 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 I²C or SPI. The digital I²C 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 ($\pm 0.1\%$ FSO @ -25 to +85°C; $\pm 0.25\%$ FSO @ -40 to +125°C)
- 2nd 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 I2C interface – quick, precise, and low cost; SPI option for measurement
- Eliminates need for external trimming
- Comprehensive 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

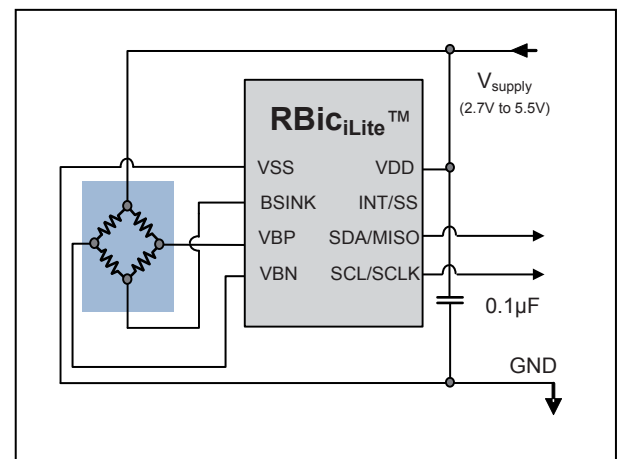
Available Support

- 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

ZMD31014 Application: I²C Interface, Low Power Bsink Option, Internal Temperature Correction



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ZMD31014 Block Diagram

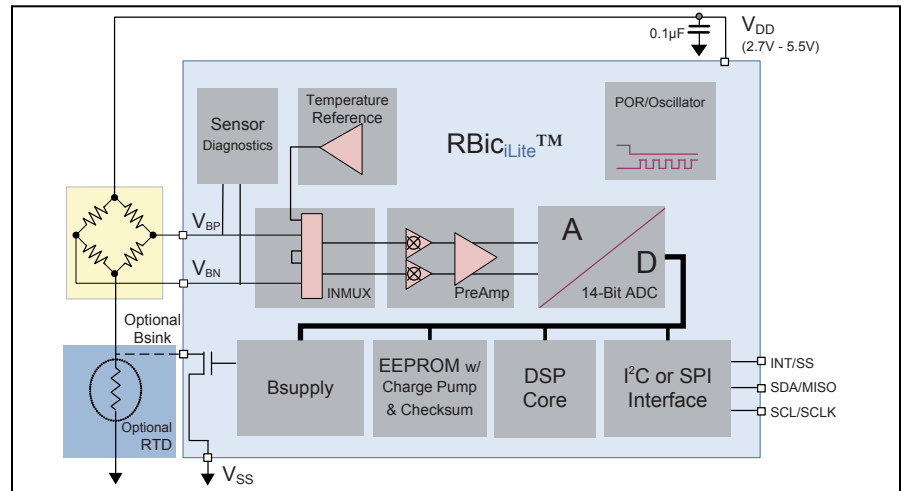
Applications

Industrial: building automation, dataloggers, pressure meters, leak detection monitoring

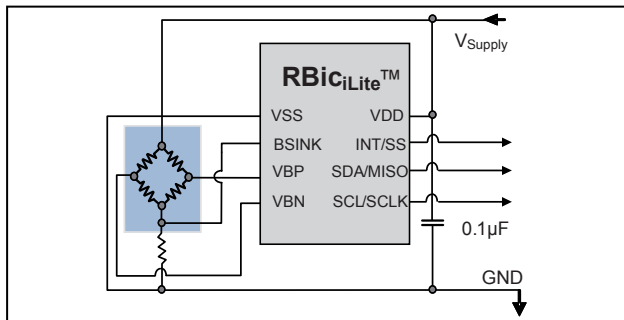
Medical: infusion pumps, blood pressure meters, air mattresses, apnea monitors

White Goods / Appliances: fluid level, refrigerant

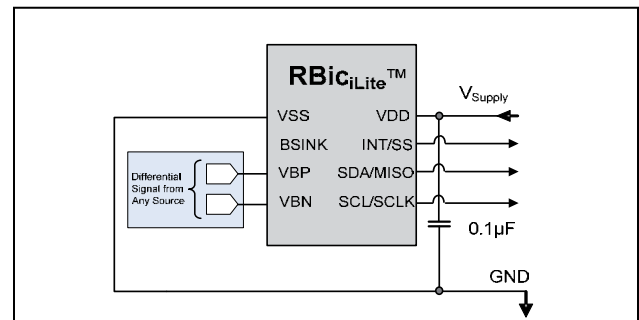
Consumer: body monitors, portable monitors, desktop weather stations, bathroom scales, toys/games



Application: Bridge TC Used for External Temperature



Application: Generic Differential A2D Converter



Ordering Information

Sales Code	Description	Package
ZMD31014DAB	ZMD31014 RBiCiLite™ Die — Temperature range: -40°C to +125°C	Unsawn on Wafer
ZMD31014DAC	ZMD31014 RBiCiLite™ Die — Temperature range: -40°C to +125°C	Sawn on Wafer Frame
ZMD31014DAD	ZMD31014 RBiCiLite™ Die — Temperature range: -40°C to +125°C	Waffle Pack
ZMD31014DAG1	ZMD31014 RBiCiLite™ SOP8 (150 mil) — Temperature range: -40° to +125°C	Tube: add "-T" to sales code Reel: add "-R"
ZMD31014KIT	ZMD31014 SSC Evaluation Kit: Communication Board, SSC Board, Sensor Replacement Board, Software, USB Cable, 5 IC Samples	Kit

Sales and Further Information		www.zmdi.com	sales@zmdi.com
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