Brief Description

The ZSSC3138 is a member of the ZSSC313x product family of CMOS integrated circuits designed for automotive/ industrial sensor applications. All family members are well suited for highly accurate amplification and sensor-specific correction of resistive bridge sensor signals. An internal 16-bit RISC microcontroller running a correction algorithm compensates sensor offset, sensitivity, temperature drift, and non-linearity of the connected sensor element. The required calibration coefficients are stored by the one-pass calibration procedure on chip (EEPROM).

The ZSSC3138 offers a maximum analog gain of 420 and two offset compensation features. These fit perfectly with the requirements of ceramic thick-film-based sensor elements as well as strain gauges. The high amplification in combination with the offset compensation offers the capability to set up ceramic thick-film-based sensor applications without laser trimming, which leads to better long-term stability.

Features

- Adjustable to nearly all resistive bridge sensor types, analog gain of 420, maximum overall gain of 1680
- Enhanced sample rate: 7.8 kHz maximum
- High ADC resolution 15/16 bit
- Safety functionality sensor connection
- Internal temperature compensation
- Digital compensation of sensor offset, sensitivity, temperature drift, and non-linearity
- Output options: ratiometric analog voltage output (5 - 95% maximum, 12.4 bit resolution) or ZACwire^{TM} (digital One-Wire Interface (OWI))
- Sensor biasing by voltage
- High voltage protection up to 33 V
- Supply current: 5.5mA maximum
- Reverse polarity and short circuit protection
- Wide operation temperature range between -40 to +150°C
- Traceability by user-defined EEPROM entries

* Note: I^{2}C™ is a trademark of NXP.

** FSO = Full Scale Output.

Benefits

- Family approach offers the best fitting IC selection to build cost-optimized applications
- No external trimming components required
- Low number of external components needed
- PC-controlled configuration and one-pass/ end-of-line calibration via I²C™* or ZACwire™ interface: simple, cost efficient, quick, and precise
- High accuracy (0.25% FSO** @ -25 to +85°C; 0.5% FSO @ -40 to +125°C)
- Optimized for automotive/industrial environments due to robust protection circuitries, excellent electromagnetic compatibility and AEC-Q100 qualification
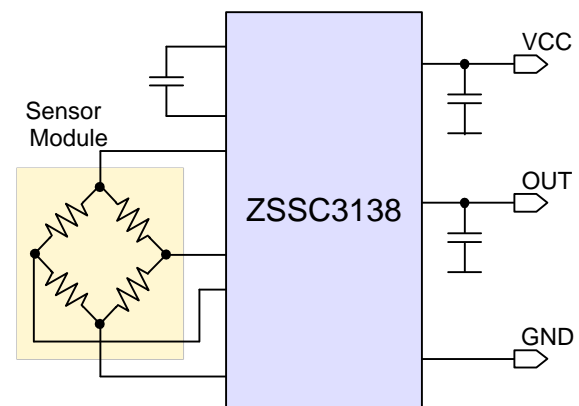
Available Support

- Evaluation Kits
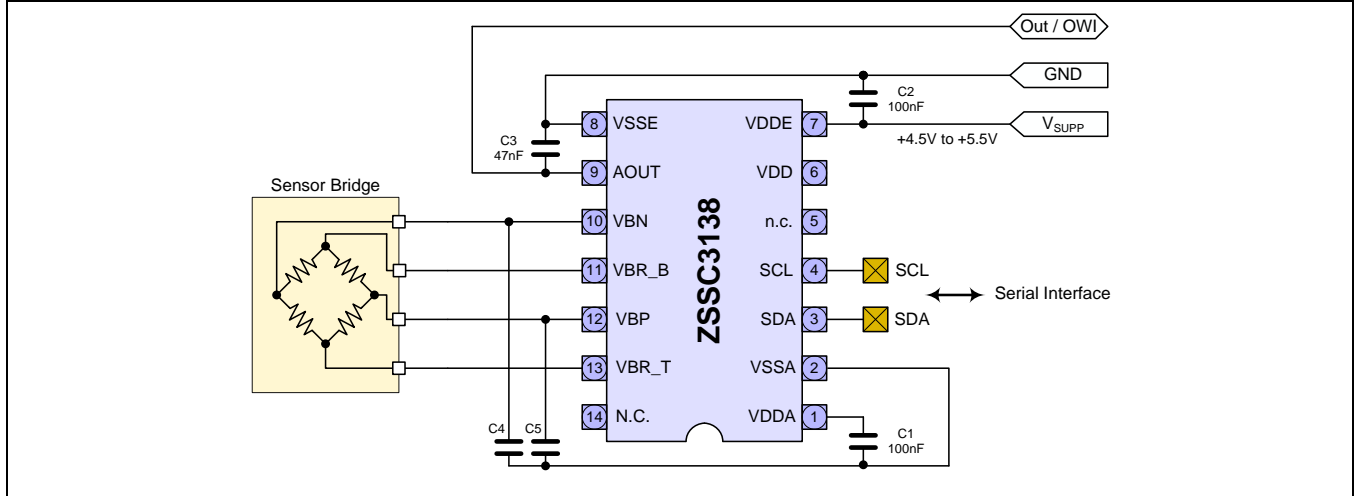- Application Notes
- Mass Calibration System

Physical Characteristics

- Supply voltage 4.5 to 5.5 V
- Operation temperature: -40°C to +125°C (-40°C to +150°C extended temperature range depending on product version)
- Available in RoHS-compliant JEDEC-SSOP14 package or delivery as die

ZSSC3138 Minimum Application Requirements

ZSSC3138 Application Example

Ordering Information *(See data sheet section 8 for complete delivery options.)*

Product Sales Code	Description	Package
ZSSC3138BE1	ZSSC3138 die – tested; temperature range -40 to +150°C	Unsawn wafer: add "B" to sales code Die on frame: add "C" to sales code
ZSSC3138BA1	ZSSC3138 die – tested; temperature range -40 to +125°C	Unsawn wafer: add "B" to sales code Die on frame: add "C" to sales code
ZSSC3138BE2	ZSSC3138 SSOP14 – temperature range -40 to +150°C	Tube: add "T" to sales code Tape & Reel: add "R"
ZSSC3138BA2	ZSSC3138 SSOP14 – temperature range -40 to +125°C	Tube: add "T" to sales code Tape & Reel: add "R"
ZSSC313xKITV1.1	ZSSC313x Evaluation Kit, version 1.1, including Evaluation Board, ZSSC3138 IC samples, USB cable	Kit
ZSSC313x Mass Calibration System V1.1	Modular Mass Calibration System (MSC) for ZSSC313x including MCS boards, cable, connectors	Kit

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