

## Brief Description

The ZSSC5101 is a CMOS integrated circuit for converting sine and cosine signals obtained from magnetoresistive bridge sensors into a ratiometric analog voltage with a user-programmable range of travel and clamping levels.

The ZSSC5101 accepts sensor bridge arrangements for both rotational as well as linear movement. Depending on the type of sensor bridge, a full-scale travel range of up to 360 mechanical degrees can be obtained.

Programming of the device is performed through the output pin, allowing in-line programming of fully assembled 3-wire sensors. Programming parameters are stored in an EEPROM and can be re-programmed multiple times.

The ZSSC5101 is fully automotive-qualified with an ambient temperature range up to 160°C.

## Features

- Ratiometric analog output
- Up to 4608 analog steps
- Step size as small as 0.022°
- Programming through output pin via one-wire interface
- Offset calibration of the bridge input signals
- Programmable linear transfer characteristic:
  - Zero position
  - Angular range
  - Upper and lower clamping levels
  - Rising or falling slope
- Loss of magnet indication with programmable threshold level
- Accepts anisotropic, giant, and tunnel magnetoresistive bridge sensors (AMR, GMR and TMR)
- Programmable 32-bit user ID
- CRC, error detection, and error correction on EEPROM data
- Diagnostics: broken-wire detection
- Automotive-qualified to AEC-Q100, grade 0

## Benefits

- No external trimming components required
- PC-controlled configuration and single-pass calibration via one-wire interface allows programming of fully assembled sensors
- Can be used with low-cost ferrite magnets
- Allows large air gaps between sensors and magnets
- Optimized for automotive environments with extended temperature range and special protection circuitry with excellent electro-magnetic compatibility
- Power supply monitoring
- Sensor monitoring
- Detection of EEPROM memory failure
- Connection failure management
- High accuracy:  $\pm 0.15^\circ$  integral nonlinearity (INL) after calibration

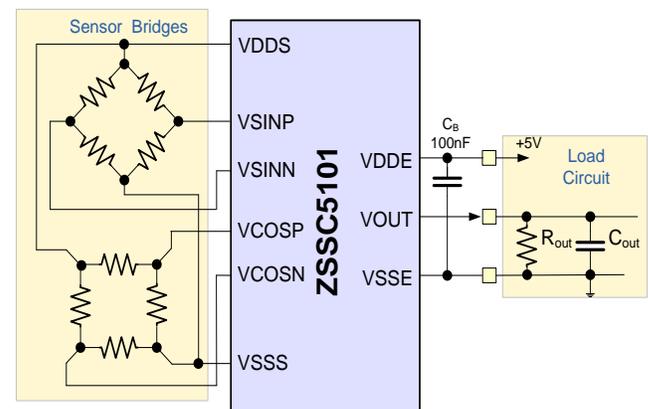
## Available Support

- Evaluation Kit
- Application Notes

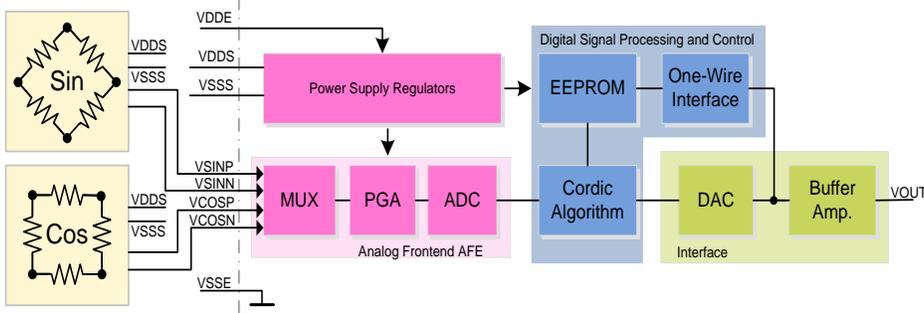
## Physical Characteristics

- Wide operation temperature: -40 C to +160 C (die)
- Supply voltage: 4.5V to 5.5V
- SSOP-14 package, bare die, or unsawn wafer

## ZSSC5101 Typical Application Circuit



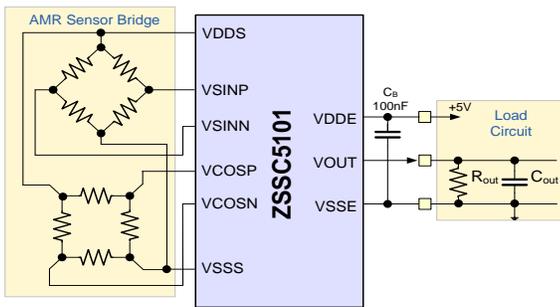
**ZSSC5101 Block Diagram**



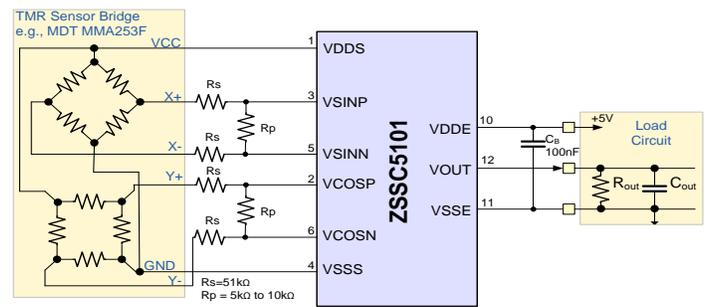
**Applications**

- Absolute Rotary Position Sensor
- Steering Wheel Position Sensor
- Pedal Position Sensor
- Throttle Position Sensor
- Float-Level Sensor
- Ride Height Position Sensor
- Non-Contacting Potentiometer
- Rotary Dial

**Application Circuit for AMR Sensors**



**Application Circuit for TMR Sensors**



**Ordering Information**

| Sales Code   | Description   | Delivery Package                                      |
|--------------|---|---|
| ZSSC5101BE1B | ZSSC5101 Die – Temperature range: -40°C to +160°C   | 8" tested wafer, unsawn, thickness = 390 ±15µm        |
| ZSSC5101BE2B | ZSSC5101 Die – Temperature range: -40°C to +160°C   | 8" tested wafer, unsawn, thickness = 725 ±15µm        |
| ZSSC5101BE3B | ZSSC5101 Die – Temperature range: -40°C to +160°C   | 8" tested wafer, unsawn, thickness = 250 ±15µm        |
| ZSSC5101BE1C | ZSSC5101 Die – Temperature range: -40°C to +160°C   | 8" tested wafer, sawn on frame, thickness = 390 ±15µm |
| ZSSC5101BE4R | ZSSC5101 SSOP-14 – Temperature range: -40°C to +150°C   | 13" tape and reel                                     |
| ZSSC5101BE4T | ZSSC5101 SSOP-14 – Temperature range: -40°C to +150°C   | Tube  |
| ZSSC5101 KIT | Evaluation Kit: USB Communication Board, ZSSC5101 AMR board, adapters. Software is downloaded (see data sheet). |   |

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