ZMD31150

Fast Automotive Sensor Signal Conditioner

PRELIMINARY

Features

- Digital compensation of sensor offset, sensitivity, temperature drift and non-linearity
- Adjustable to nearly all bridge sensors types
- Output options: analog voltage (0 to +5V), ZACwire™ (digital one-wire-interface) or I²C serial bus
- Selectable temperature compensation reference: Internal/external diode, bridge resistance, thermistor
- Sensor biasing by voltage or constant current
- Sample rate up to 7.8kHz
- High voltage protection (+33V without time limit)
- Reverse polarity and short circuit protection
- Wide operation temperature range: -40 to +150°C
- Supply voltage: +4.5 to +5.5V
- Several safety and diagnosis functions
- Product traceability by user-defined EEPROM entries
- Available in SSOP14 package or as die

Benefits

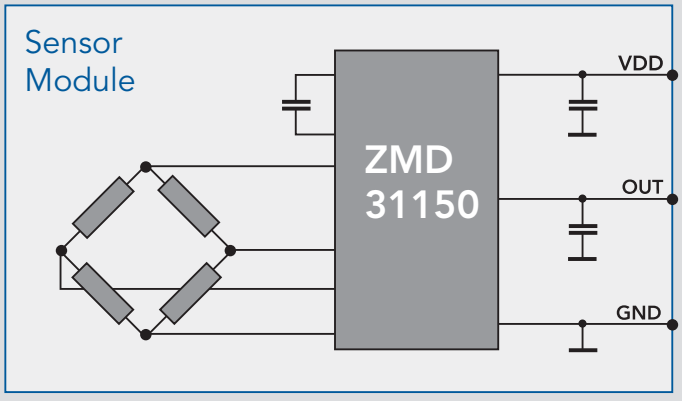
- No external trimming components required
- Only a few external protection devices needed
- PC-controlled configuration and "one-shot" calibration via I²C or ZACwire™ interface:
  Simple, cost-efficient, quick and precise
- High accuracy: ±0.1% FSO @ -25 to +85°C;
  ±0.25% FSO @ -40 to +125°C;
  ±0.5% FSO @ -40 to +150°C
  (all numbers for digital output)

Brief Description

ZMD31150 is a CMOS integrated circuit for high-accurate amplification and sensor-specific correction of bridge sensor signals. Digital compensation of offset, sensitivity, temperature drift and non-linearity is accomplished via a 16-bit RISC micro-controller running a correction algorithm.
The ZMD31150 is adjustable to nearly all resistive bridge sensor types, e.g. piezo-resistive, metal-thinfilm, ceramic-thickfilm, etc. Measured values are provided at the analog voltage output or at one of the digital serial interfaces (ZACwire™, I²C).
The serial interfaces can also be used for a simple PC-controlled calibration procedure, in order to program a set of calibration coefficients into the on-chip EEPROM. Thus a specific transducer and a ZMD31150 are mated digitally: Simply, fast, precisely and without the cost overhead associated with trimming by external devices or laser.
The ZMD31150 is optimized for automotive environments by its protection circuitry and excellent electromagnetic compatibility.

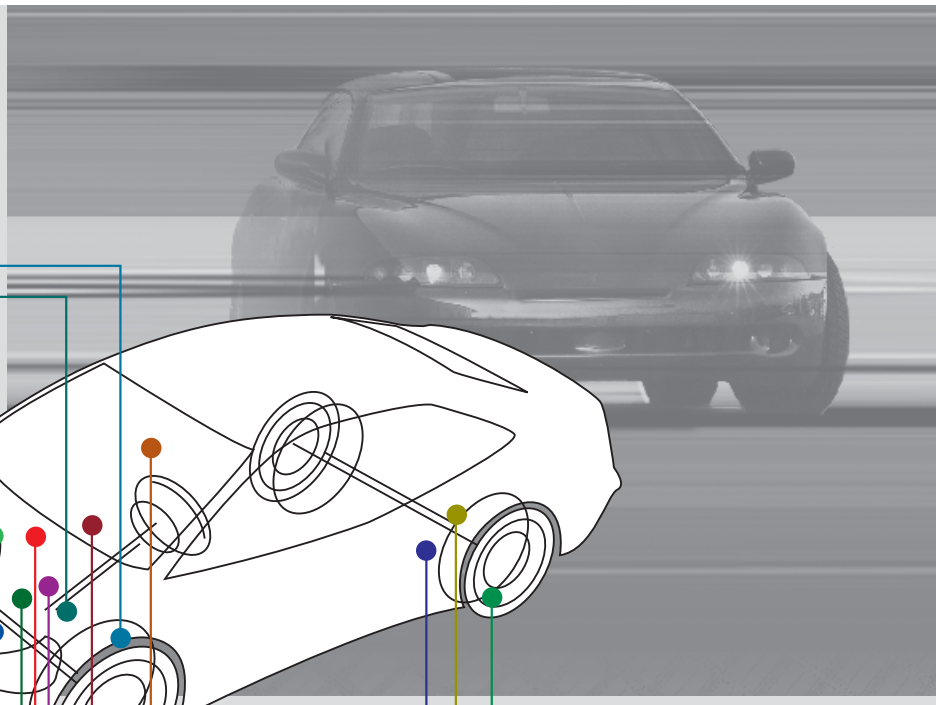
Support

- Evaluation kit available
  (containing PCBs, samples, software, documentation)
- Support for industrial mass calibration available
- Quick circuit customization possible for large production volumes



Application Circuit Example

Application Examples



High-Pressure Sensors

- Diesel common-rail pressure sensors
- Gas rail pressure sensors
- Hydraulic reservoir pressure sensors for ABS and power steering

Low-Pressure Sensors

- MAP sensors (intake manifold press., charging air press.)
- Atmospheric reference pressure sensors for charging air and exhaust-gas recirculation
- Absolute oil pressure sensors for service displays
- Refrigerant pressure monitoring in air conditioning systems
- Differential pressure sensors for fuel filter contamination
- Tire pressure sensors (combined with wireless transmitters)
- Low-/overpressure sensors in fuel tanks
- Occupant classification (OC) pressure sensors

Application Support

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