LX3302

Key Features

- Embedded 32-bit processing engine with 12 KB program memory
- Two sensor input channels with integrated demodulator
- Internal oscillator with frequency range of 1 to 5 MHz
- Dual 13-bit ADC with sample rates to 2kHz
- User-programmable 32 x 16-bit non-volatile configuration memory
- Linearization algorithm with:
  - Eight user-defined linearization points
  - Programmable origin and end points
  - Programmable low and high plateau levels
- Multiple diagnostics features (ISO26262 compliant)
- Host interface: analog , PWM, PSI5, and SENT (J2716 JAN2010)
- 8kV ESD protection (HBM) on power, ground, Mux-Pins
- 4.5V to 5.6V input voltage; 10mA (typical) operating current
- -40 to 150 °C operation, AEC-Q100 grade 0 certified

Description

The LX3302 is the second member of Microsemi's new family of smart sensor interface products. Designed to process inductive sensors which are based upon linear variable differential transformer (LVDT) principles, this new dee integrates two complete analog channels, oscillator/exciter, 32-bit RISC processor, non-volatile configuration memory, and four programmable I/O which support a variety of interface options. In addition, the LX3302 provides internal 8kV (HBM) ESD protection on the power, ground, and system interface pins, eliminating the need for external protection components.

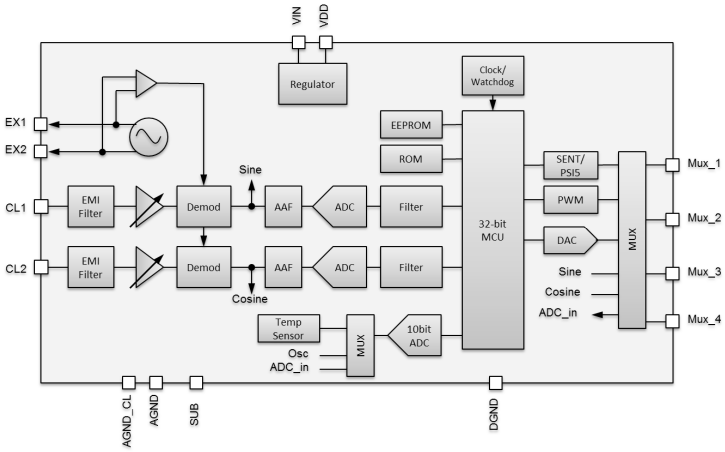


Figure 1: Top-level Block Diagram

In typical operation, inputs from the inductive sensor are conditioned, demodulated, and converted into 13-bit values. The MCU processes these values to produce a linearized measurement value with either 12-bit accuracy (analog, PSI5, or SENT output) or 13-bit accuracy (PWM output.) Internal non-volatile memory allows the user to configure various parameters within the IC, including eight calibration points, origin/end points, and low and high plateau levels. The internal non-volatile memory is configured via the VIN power pin, which allows a sensor assembly to be configured without the need for additional programming pins.

In addition to the traditional analog and PWM outputs, the LX3302 includes a fully compliant Singe Edge Nibble Transmission (SENT) interface and a Peripheral Serial Interface (PSI5) interface to support next generation automotive controllers.

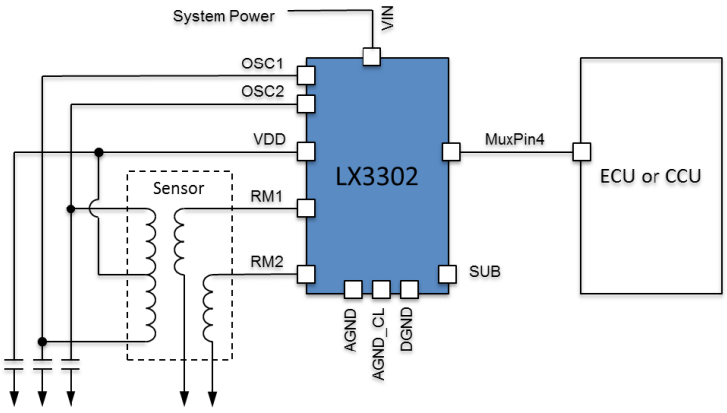


Figure 2: LVDT/Inductive Sensor Configuration

The LX3302 includes integrated diagnostics features which regularly monitor various functions within the IC and report conditions which are outside of specified parameters. In the event of a detected failure, the device drives the output to a pre-defined diagnostics level. The internal diagnostics information can also be output via SENT-compatible protocol for system development and debug purposes.

The LX3302 is compliant with ISO26262 and rated for ASIL C applications. Packaged in a 14-TSSOP package, the device is designed for harsh environments supporting operation (to specification) from -40 to 150 °C while maintaining full functionality to 175 °C. The LX3302 is certified to AEC-Q100 grade 0.

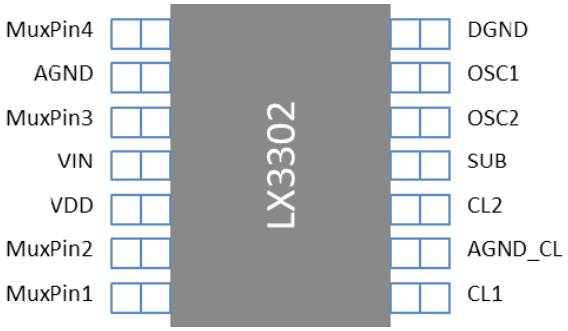


Figure 3: 14-TSSOP Pion Assignments

Target Applications

The LX3302 is an ideal solution for measuring mechanical movement (linear, angular/rotation and proximity) in a wide variety of applications in automotive, industrial, aerospace, and commercial applications including:

- Rotor position sensing (brushless DC motors)
- Robotic arm positioning
- Fluid level sensing
- Proximity detection (industrial automation)
- Gear position/travel (automotive)

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