HAL 880

Sept/2008

HAL® 880
Programmable Linear Hall-Effect Sensor

The HAL 880 complements the existing Hall-effect sensor family HAL 8xy to the lower end. It is designed to fulfil the requirements of today's state-of-the-art applications for linear and angular measurements that require programmability to compensate system tolerances.

Due to its good drift performance and programmability, the sensor can easily replace non-programmable, standard linear sensors in a wide variety of applications. Due to its programmability, it also offers the additional advantage of compensation of system tolerances. This is mandatory for applications like accelerator pedal sensing, current measurement, bending light, or head light adjustment.

The sensor provides a linear, ratiometric analog output signal with implemented wire-break detection working with pull-up or pull-down resistor.

Major characteristics like magnetic-field range, sensitivity, VOQ (output voltage at zero magnetic field), and the temperature coefficients can easily be adjusted to the magnetic circuit (linear and quadratic) by programming the non-volatile memory.

The HAL 880 is available in the very small leaded package TO92UT.

Main Features

- Sensitivity drift over temperature less than ±6%
- Offset drift over temperature less than ±15 µT/K
- Integral non-linearity error of output signal ±1% of V_{DD}
- Ratiometric error of output signal ±1%
- Low output noise of 25 mV peak-peak
- Wire-break detection with 5 kΩ pull-up or pull-down resistor
- Four programmable magnetic ranges: ±30, ±60, ±80, and ±100 mT
- Two programmable 3 dB filter frequencies: 500 Hz and 1 kHz
- Programmable sensitivity and offset (VOQ)
- 12-bit ratiometric analog output
- Digital signal processing
- Temperature characteristics programmable to match all common magnetic materials
- 13 customer data bits
- Programming by modulation of the supply voltage
- Operates from –40 °C up to 140 °C junction temperature
- Operates from 4.5 V up to 5.5 V supply voltage
- Magnetic characteristics extremely robust against mechanical stress

Major Applications

- Due to the sensor's versatile programming characteristics, the HAL 880 is the optimal system solution for applications such as:
  - Contactless potentiometers
  - Rotary position measurement
  - Linear movement
  - Current measurements

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Development Tools

Programming of the EEPROM memory and calculation of the individual sensor characteristics can easily be done with a PC and the application kit from Micronas:

- Micronas programmer board (hardware version 5.x)
- Visual Basic® programming software for Windows® 9x/2000/XP
- Visual Basic source code

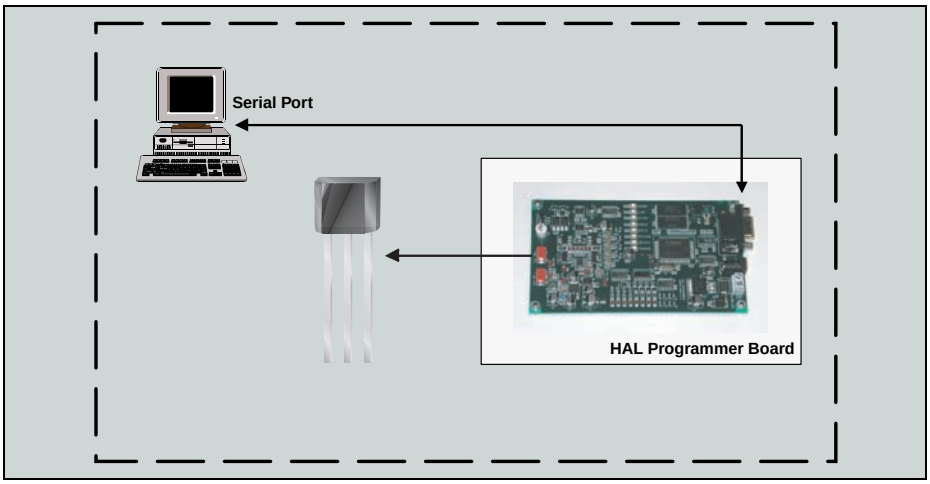

Fig. 1: Development tool setup

System Architecture

The HAL 880 sensors are produced in a proven submicron CMOS technology.

The HAL 880 features a temperature-compensated Hall plate with choppered offset compensation, an A/D converter, digital signal processing, a push-pull output, an EEPROM memory with redundancy and lock function for the calibration data and the data register information, a serial interface for programming the EEPROM, and protection devices on all pins.

The HAL 880 is programmable by modulating the supply voltage. No additional programming pin is needed.

The internal digital signal processing is of great benefit because analog offsets, temperature shifts, and mechanical stress do not degrade the sensor accuracy.

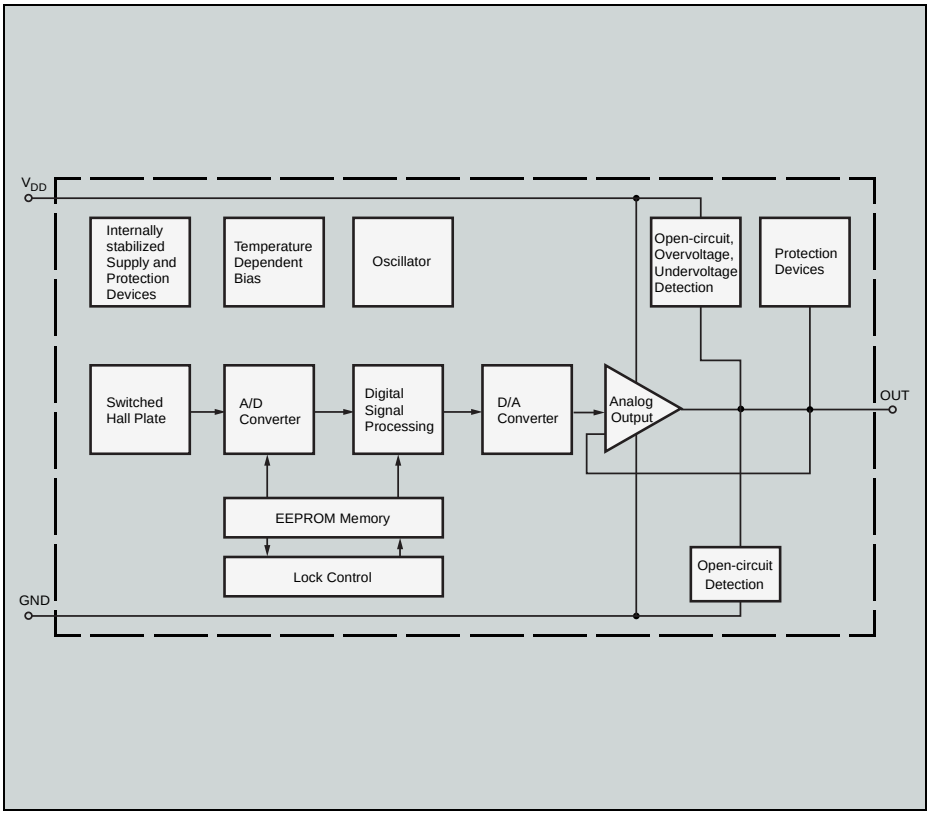

Fig. 2: Block diagram of the HAL 880

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