MICRONAS

HAL 82x

April/2007

HAL® 82x
High-Precision Programmable Hall-Effect Sensors

The HAL 824 and the HAL 825 complement the existing Hall-effect sensor family HAL 8xy. Both high-precision magnetic field sensors provide a ratiometric, linear output signal. This sensor family is designed to fulfill high requirements in respect of low temperature drifts of sensitivity and offset.

Due to the very low drifts of this sensor family, it can be used for applications with very high requirements on offset and sensitivity drift stability. This is mandatory for applications like throttle position detection, accelerator pedal sensing, or current measurement.

The sensors provide either a ratiometric analog output signal or a multiplexed analog output. In multiplex analog output mode, the sensor transmits LSN and MSN of the output value separately. This enables the sensor to transmit a signal with 14-bit accuracy.

Major characteristics like magnetic field range, output format, 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.

Both sensors are available in the very small leaded package TO-92UT.

Features

- Sensitivity drift over temperature less than ±1% (HAL 825 less than ±2%)
- Offset drift over temperature less than ±0.2% (HAL 825 less than ±0.3%) of VDD
- DNL of analog output ±0.9 LSB (±2 LSB for HAL 825)
- 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
- 14-bit signal path
- Digital signal processing
- Temperature characteristics programmable to match all common magnetic materials
- 52 customer data bits
- Programming by modulation of the supply voltage
- Operates from –40 °C up to 150 °C ambient 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 and low drifts, the HAL 82x is the optimal system solution for applications such as:
- Contactless potentiometers
- Rotary position measurement, like throttle position or accelerator pedal
- 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

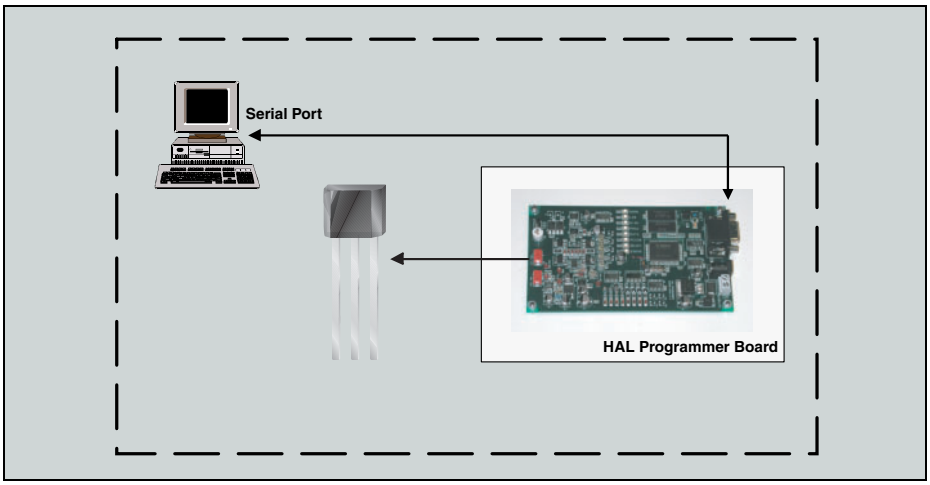

Fig. 1: Development tool setup

System Architecture

The HAL 82x sensors are produced in a proven automotive submicron CMOS technology.

The HAL 82x 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 82x is programmable by modulating the supply voltage. No additional programming pin is needed.

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

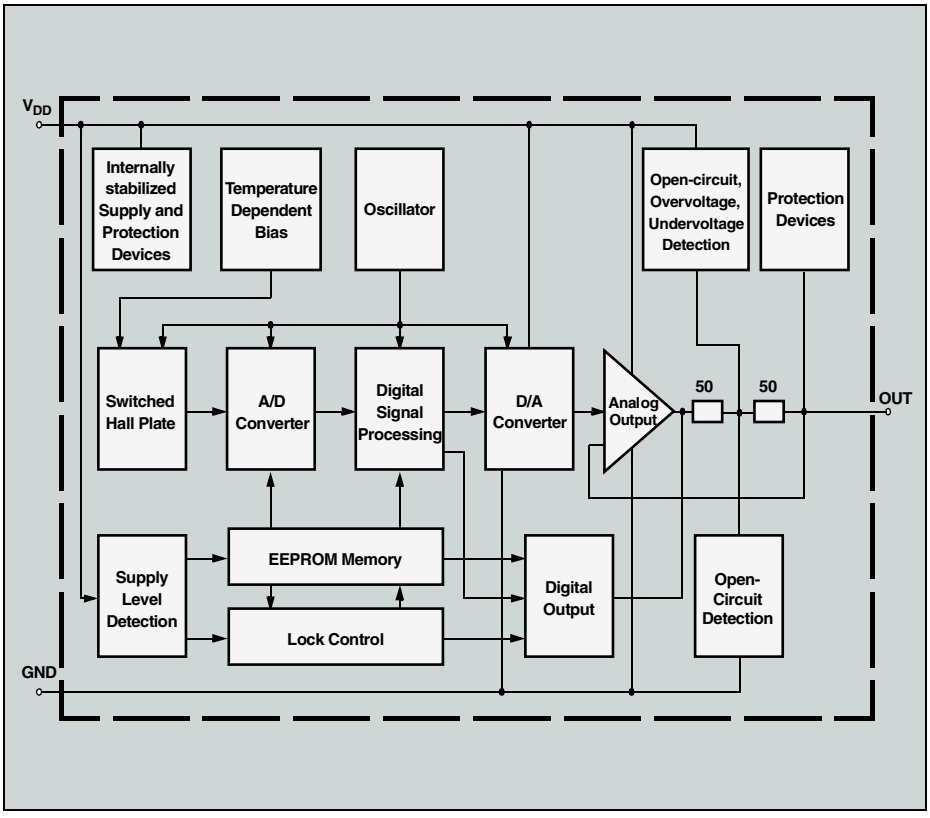

Fig. 2: Block diagram of the HAL 82x

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