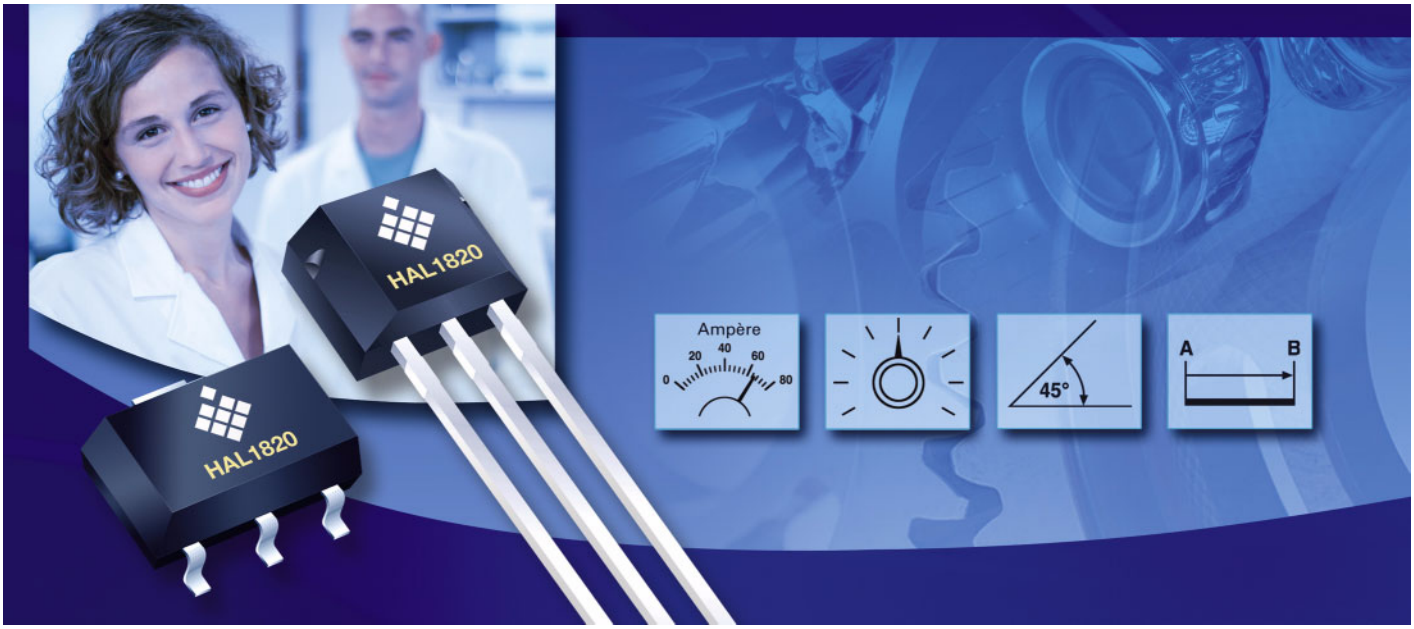
HAL 1820

July/2009



HAL® 1820
Programmable Linear Hall-Effect Sensor Family

The HAL 1820 is a new member of the Micronas family of programmable linear Hall sensors.

The HAL 1820 is a universal magnetic field sensor with a linear analog output based on the Hall effect. The IC can be used for angle and linear measurements if combined with a rotating or moving magnet. The major characteristics like magnetic field range, sensitivity, offset (output voltage at zero magnetic field), and the temperature coefficients are programmable in a non-volatile memory.

The HAL 1820 is programmable by modulating the supply voltage of the sensor. No additional programming pin is needed. The easy programmability allows a 2-point calibration by adjusting the output signal directly to the input signal (like mechanical angle, distance, or current). Individual adjustment of each sensor during the customer's manufacturing process is possible. With this calibration procedure, the tolerances of the sensor, the magnet, and the mechanical positioning can be compensated in the final assembly. This offers a low-cost alternative for all applications that presently need mechanical adjustment or laser trimming for calibrating the system.

The sensor is designed to be used in automotive or industrial applications. It operates in a wide junction temperature range from –40 °C up to 170 °C. The HAL 1820 is available in the very small leaded package TO92UA and in the small SMD package SOT89B.

Features

- Linear Hall-effect sensor with ratiometric analog output
- Various programmable magnetic characteristics with non-volatile memory
- Digital signal processing
- Continuous measurement ranges from ±20 mT to ±160 mT
- Temperature characteristics programmable for matching all common magnetic materials
- Programming via supply voltage
- Lock function and built-in redundancy for EEPROM memory
- Operates from –40 °C up to 170 °C junction temperature
- Operates from 4.5 V up to 5.5 V supply voltage
- Operates with static magnetic fields and dynamic magnetic fields up to 1 kHz
- Overvoltage and reverse-voltage protection on V_{DD} pin
- Magnetic characteristics extremely robust against mechanical stress.
- Short-circuit protected output

Major Applications

- Due to the sensor's versatile programming characteristics and its high accuracy, the HAL 1820 is the optimal system solution for applications such as:
  - Contactless potentiometers
  - Rotary position measurement
  - Linear movement
  - Current measurements
  - Level measurements

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Development Tools

For engineering and production purposes, Micronas offers an easy-to-use application kit:

- Micronas programmer board (HAL-APB V 1.3)
- LabVIEW™ programming software for Windows® 9x/2000/XP/Vista
- LabVIEW Sub VIs

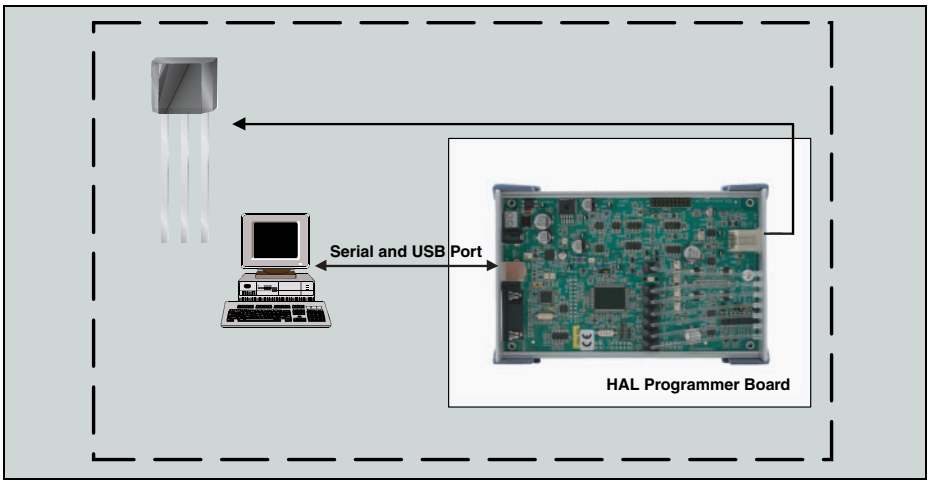

Fig. 1: Development tool setup

System Architecture

The HAL 1820 sensor is produced in a proven submicron CMOS technology.

The HAL 1820 features a temperature-compensated Hall plate with choppered offset compensation, an A/D converter, digital signal processing, an analog 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 1820 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.

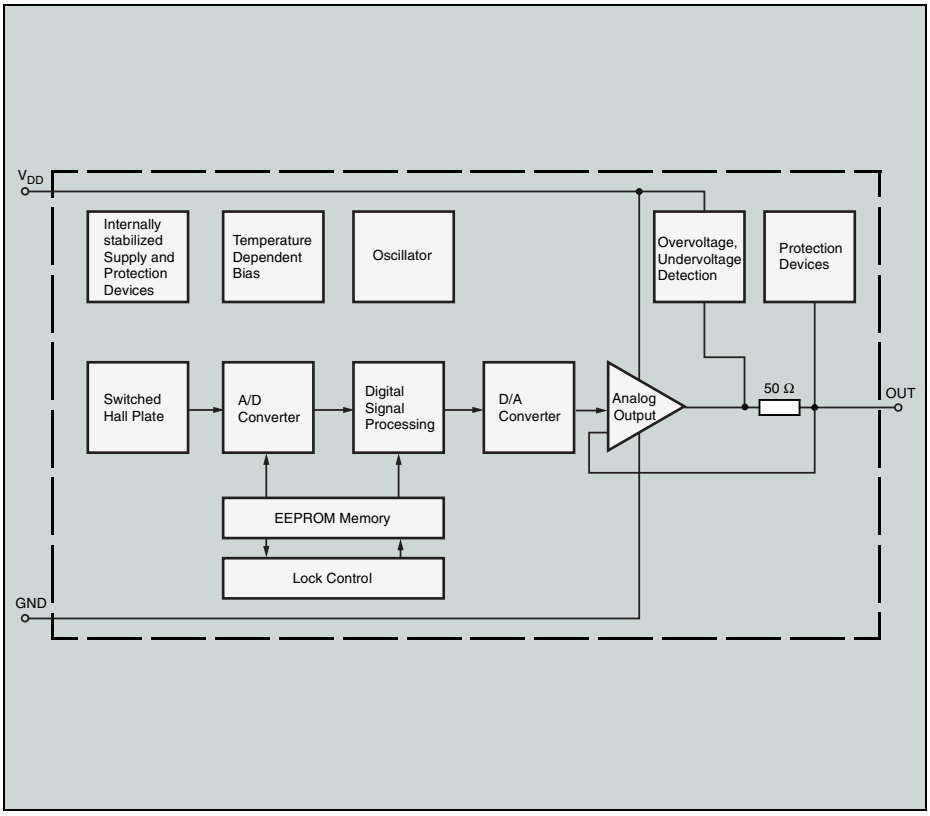

Fig. 2: Block diagram of the HAL 1820

Edition July 7, 2009; Order No. PI000129_002EN

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