MICRONAS

HAL 2850

May/2008



HAL® 2850
Linear Hall-Effect Sensor with PWM Output

The HAL 2850 is a new member of the Micronas varioHAL (HAL 28xy) family of programmable linear Hall-effect sensors.

It features a digital PWM output with slew-rate control, that enables a fast and robust data transfer in harsh environments. The PWM signal can be directly decoded by any unit measuring a duty cycle of a rectangular signal (usually a timer/capture unit in a microcontroller).

The highest available PWM frequency is 2 kHz with 12-bit resolution. The PWM frequency is customer-programmable in a range between 30 Hz and 2 kHz, with a certain resolution. The open-drain output with programmable slew rates enables an excellent EMI performance of the total system.

The HAL 2850 features a Hall-plate with spinning current offset compensation technique and a precise temperature sensor which is used for temperature compensation of both the Hall-sensors sensitivity and offset.

The sensor provides digital signal processing. This is of great benefit because analog offsets, temperature shifts, and mechanical stress do not degrade digital signals.

Major characteristics, such as magnetic field range, sensitivity, offset, output polarity, clamping levels, PWM frequency, and the temperature coefficients of sensitivity and offset, can easily be adjusted to the magnetic circuit by programming the non-volatile memory.

The HAL 2850 is available in the very small leaded package TO-92UT.

Features

- High-precision linear Hall-effect sensor
- Spinning-current offset compensation
- Built-in temperature sensor
- On-board diagnostics (over temperature, over current, etc.)
- Customer-programmable temperature compensation of output sensitivity (2^{nd} order) and output offset (1^{st} order)
- Operating junction temperature range: –40 °C…170 °C.
- Magnetic characteristics are extremely robust against mechanical stress.
- Digital signal processing
- 12-bit resolution
- Sampling rate up to 2 kHz with internal low-pass filter
- Sample accurate transmission (each PWM period transmits a new Hall sample)
- Programmable PWM frequency in a range between 30 Hz and 2 kHz
- Non-volatile EEPROM with redundancy and lock function
- Open-drain output with slew-rate control
- Individual serial number for each sensor
- 12-bit customer serial number

Major Applications

Due to the sensor's versatile programming characteristics and low drifts, the HAL 2850 is the optimal system solution for applications such as:

- Contactless potentiometers
- Angular measurements (e.g. valve, pedal position)
- Linear movement (e.g. seat track position)
- Linear force or torque measurements
- Current sensing (e.g. battery management)
- Leveling (e.g. fuel level, suspension control or headlight leveling)

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Development Tools

For engineering 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™ VIs

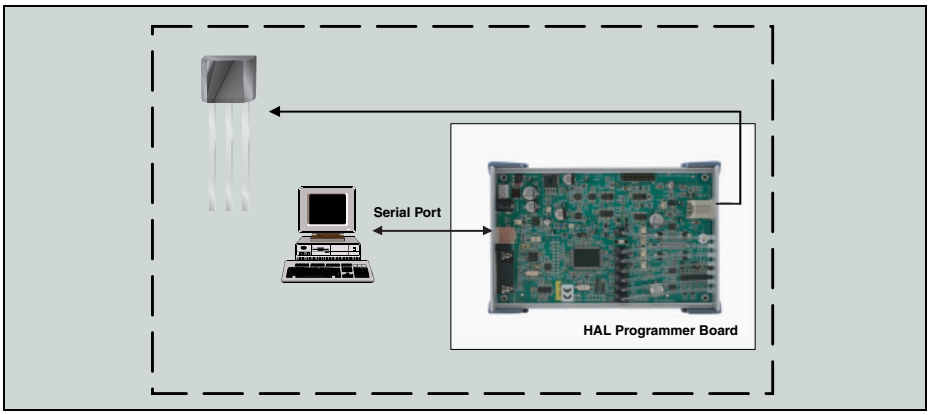


Fig. 1: Development tool setup

System Architecture

The HAL 2850 sensors are produced in a proven automotive submicron CMOS technology.

The HAL 2850 features a temperature-compensated Hall plate with spinning-current offset compensation, an A/D converter for the Hall-plate, an A/D converter for the temperature sensor, digital signal processing (RISC processor), a digital PWM interface, an EEPROM memory with redundancy and lock function for the calibration data and the PWM output configuration, and protection devices on all pins.

The HAL 2850 is programmable by means of BiPhase-M telegrams. No additional programming pin is needed. The sensor is programmed through its output pin.

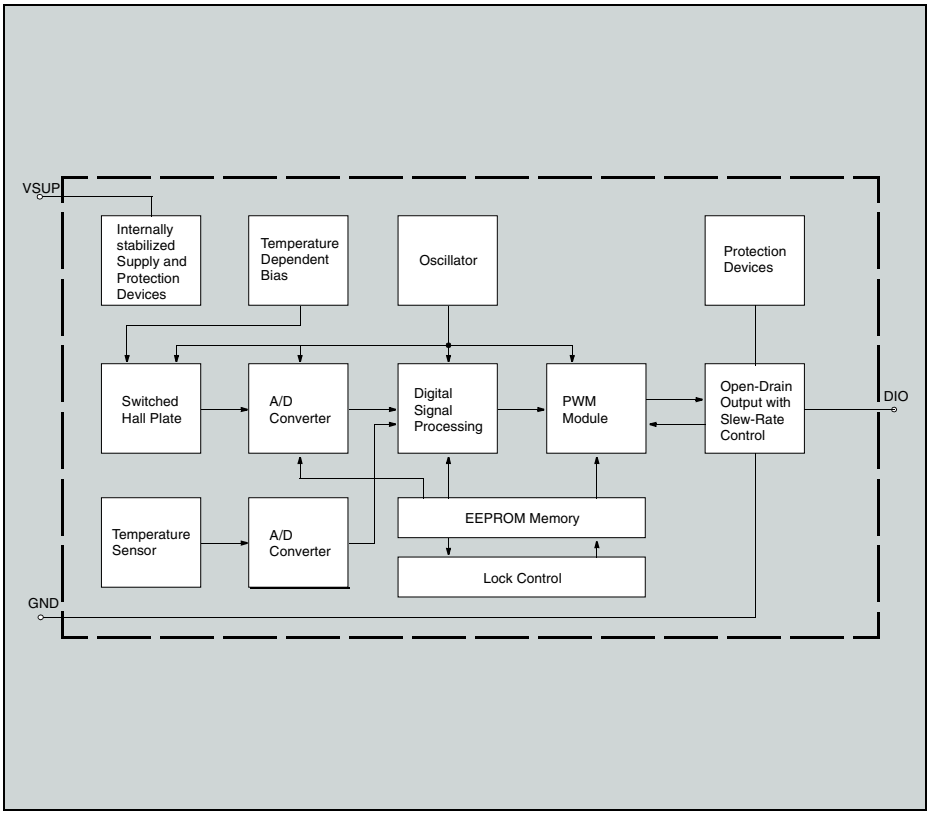


Fig. 2: Block diagram of the HAL 2850

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