HAL 2830

May/2008

HAL® 2830
Linear Hall-Effect Sensor with SENT Output

The HAL 2830 is a new member of the Micronas varioHAL (HAL 28xy) family of programmable linear Hall-effect sensors.

It features a digital SENT interface (SingleEdgeNibbleTransmission) that enables a fast and robust data transfer in harsh automotive environments.

The implementation of the interface complies with the SAE J2716 SENT standard. Each message consists of a sequence of pulses. In one protocol, the sensor transmits the magnetic field information, a status information of the sensor, and for safety reasons a CRC checksum.

The HAL 2830 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 like magnetic field range, sensitivity, offset, and the temperature coefficients of sensitivity and offset can easily be adjusted to the magnetic circuit by programming the non-volatile memory.

The HAL 2830 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 (overtemperature, overcurrent, etc.)
- Customer-programmable temperature compensation of output sensitivity (2nd order) and output offset (1st order)
- Operating junction temperature range: –40 °C…170 °C.
- Magnetic characteristics extremely robust against mechanical stress
- Digital signal processing
- Sampling rates up to 2 kHz with internal low-pass filter
- SENT output according to SAE J2716 standard
- Message tick time customer-programmable between 2 µs and 17 µs
- Low time customer-programmable between 3 and 7 clock ticks
- Three data nibbles for magnetic field information
- Sample accurate transmission
- Telegram length less than 360 µs at 2 µs tick time
- 12-bit resolution
- Non-volatile EEPROM with redundancy and lock function
- Open-drain output with slew rate control
- Transmission of temperature information
- 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 2830 is the optimal system solution for applications such as:

- Contactless potentiometers
- Angular measurements (e.g. valve, throttle, pedal position)
- Linear movement (e.g. seat track position)
- Linear force or torque measurements
- Current sensing (e.g. battery management)

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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 VIs

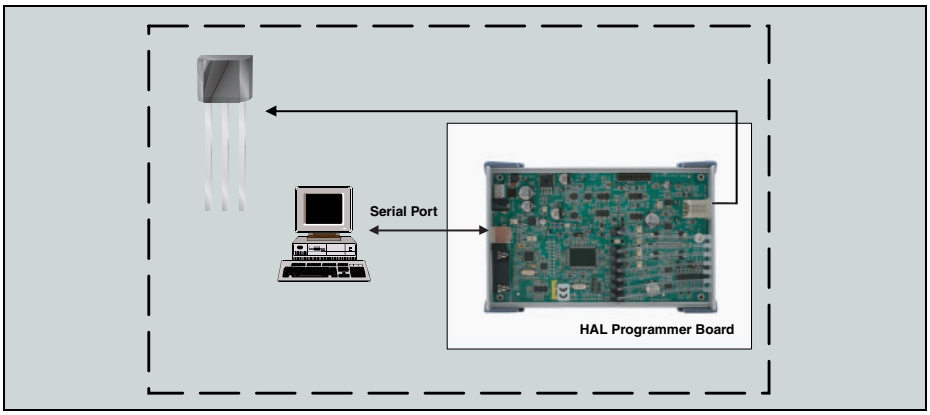

Fig. 1: Development tool setup

System Architecture

The HAL 2830 sensors are produced in a proven automotive submicron CMOS technology.

The HAL 2830 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 SENT interface, an EEPROM memory with redundancy and lock function for the calibration data and the SENT output configuration, and protection devices on all pins.

The HAL 2830 is programmable by means of BiPhase-M telegrams. No additional programming pin is needed. The sensor is programmed through its output pin.

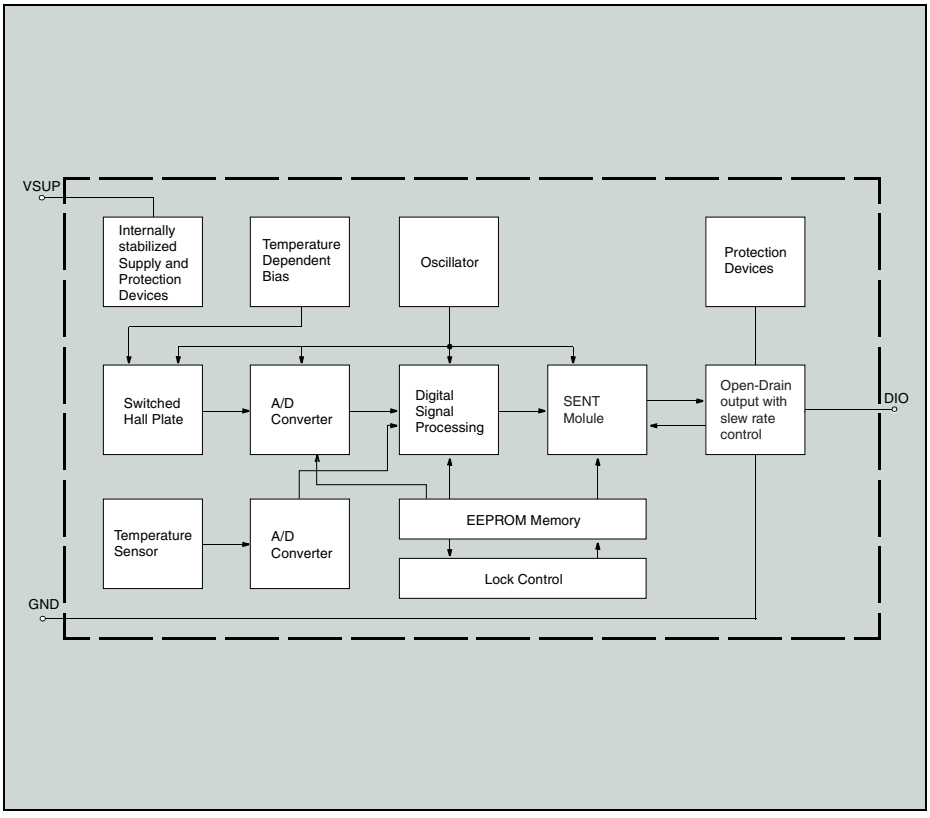

Fig. 2: Block diagram of the HAL 2830

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Micronas GmbH · Hans-Bunte-Strasse 19 · D-79108 Freiburg (Germany) · P.O. Box 840 · D-79008 Freiburg (Germany)
Tel. +49-761-517-0 · Fax +49-761-517-2174 · E-mail: docservice@micronas.com · www.micronas.com