HAL 28xy

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HAL® 28xy
Linear Hall-Effect Sensor Family with Digital Interfaces

The HAL 28xy family is a new generation of programmable Hall-effect sensors.

It consists of members with different digital interfaces, like LIN, PWM, and SENT (SAE J2716). Due to its internal structure, it is possible to easily generate new family members. The built-in RISC processor allows a fast implementation of new output formats or customer-specific signal processing. All members within this family can be programmed without any additional programming pin. Programming is done via LIN frames or BiPhase-M telegrams depending on the family member.

The HAL 28xy family 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 sensors' signal path is handled by the RISC processor. This is of great benefit because analog offsets, temperature shifts, and mechanical stress do not degrade the 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 28xy family 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
- Built-in RISC processor
- Digital signal processing
- Up to 12 bit resolution
- Customer-programmable temperature compensation of Hall sensitivity (2nd order) and Hall offset (1st order)
- Operating junction temperature range: –40 °C up to 170 °C
- Different interface options:
  - LIN 2.0
  - SENT
  - PWM output up to 2 kHz
- Magnetic characteristics extremely robust against mechanical stress
- Non-volatile EEPROM with redundancy and lock function

Major Applications

Due to the sensors' versatile programming characteristics and low drifts, the HAL 28xy family is the optimal system solution for applications such as

- Contactless potentiometers
- Angular measurements (e.g. for fuel-level sensing)
- Linear movement (e.g. seat track position)
- Linear force or torque measurements
- Current sensing

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Development Tools

All communication is done by means of LIN frames or BiPhase-M telegrams depending on the sensor type. For engineering purposes, Micronas offers an easy-to-use application kit:

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

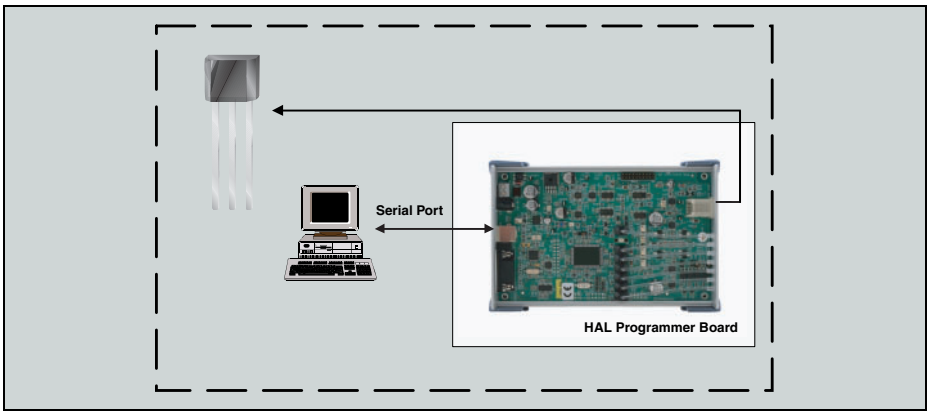

Fig. 1: Development tool setup

System Architecture

The HAL 28xy sensors are produced in a proven automotive submicron CMOS technology.

The HAL 28xy family 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), different fully integrated digital interfaces including the physical layer, an EEPROM memory with redundancy and lock function for the calibration data, and protection devices on all pins.

The HAL 28xy family is programmable by means of LIN frames or by a BiPhase-M telegram. No additional programming pin is needed.

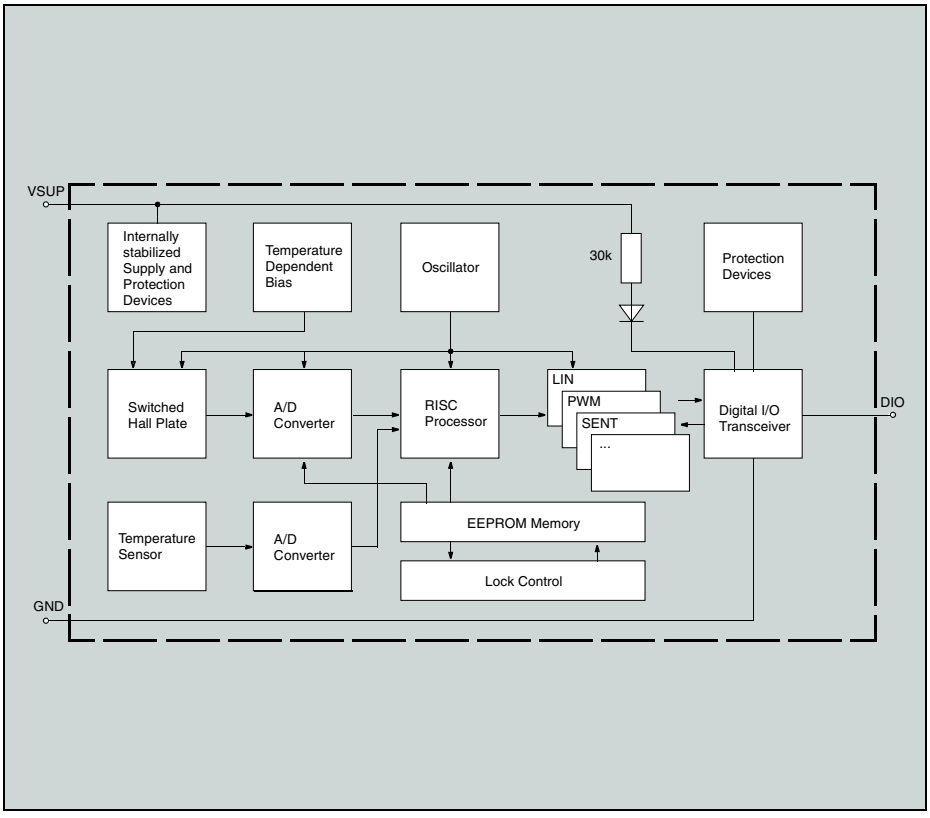

Fig. 2: Block diagram of the HAL 28xy family

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