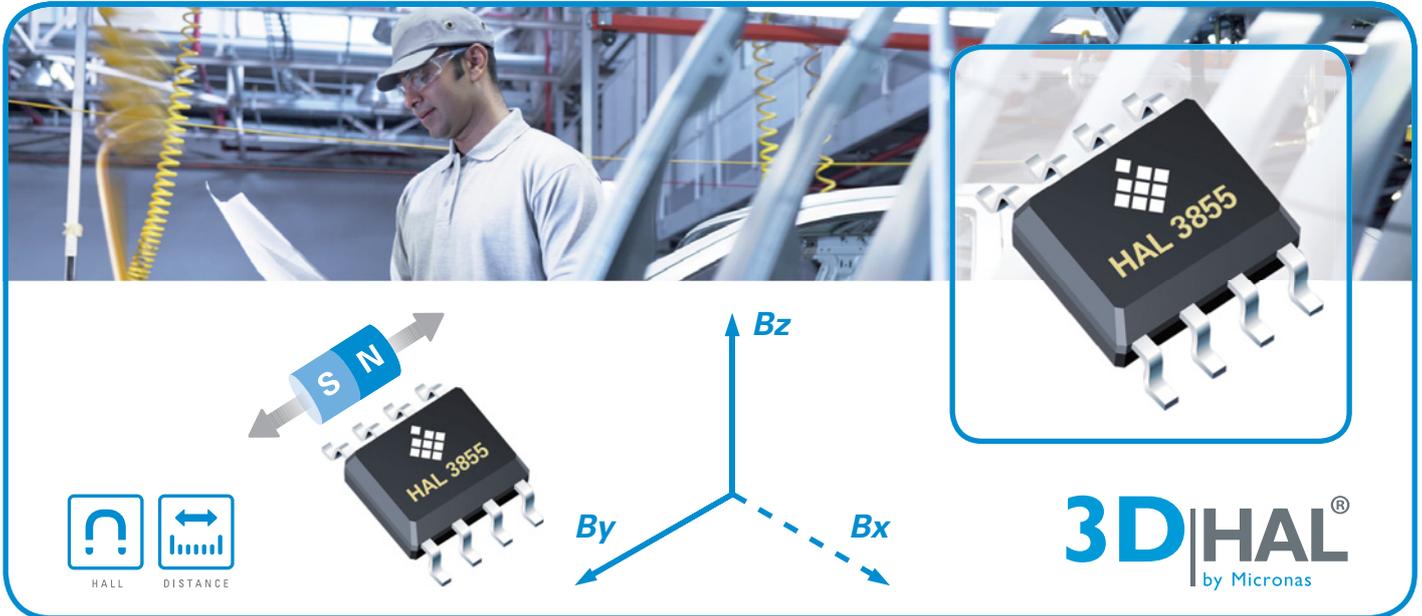


# HAL 3855

June/2011



## HAL 3855 Programmable Linear Movement Sensor

The HAL 38xy family is a new generation of Hall-effect sensors based on the 3D HAL technology. Due to its advanced vertical Hall plate technology in combination with a horizontal Hall plate it enables the possibility to measure magnetic fields additionally in the chip plane. With this technology it is possible to detect linear movements up to 40 mm. The first member of this family is the HAL 3855.

The sensor can measure the magnetic field components  $B_y$  and  $B_z$ . This enables a new set of potential applications for linear movement detection.

The sensor provides a linear, ratiometric analog output signal with implemented wire-break detection working with a pull-up or pull-down resistor.

Major characteristics like gain and offset of Y- and Z-channel, zero-angle position, phase shift between Y- and Z-channel, output slope and offset and clamping levels can be adjusted to the magnetic circuit by programming the non-volatile memory.

The HAL 3855 is available in the very small SOIC8 SMD package.

### Main Features

- ◆ Linear movement sensor with high accuracy
- ◆ 12 bit ratiometric linear analog output is proportional to the measured distance
- ◆ Integral non-linearity error of output signal  $\pm 0.1\%$  of  $V_{SUP}$
- ◆ Ratiometric error of output signal  $\pm 0.2\%$
- ◆ Output response time typ. 315  $\mu s$
- ◆ Low output noise of typ. 3 mV
- ◆ Wire-break detection with pull-up or pull-down resistor
- ◆ Over- and undervoltage detection
- ◆ Programmable characteristics in a non-volatile memory with redundancy and lock function
- ◆ Programming of the sensor via its output with TTL level
- ◆ Programmable output slope and offset
- ◆ Linearization of the output signal via 32 programmable set points
- ◆ Y- and Z-channel gain and offset of signal path programmable
- ◆ Phase shift between Y- and Z-channel programmable
- ◆ Programmable output clamping voltages for error band definition
- ◆ Programmable magnet lost detection
- ◆ 32 bit identification number for customer
- ◆ Operates from  $-40^\circ C$  up to  $170^\circ C$  junction temperature
- ◆ Operates from 4.5 V up to 5.5 V supply voltage
- ◆ Short-circuit protected push-pull output
- ◆ Over- and reverse-voltage protection at  $V_{SUP}$  pin
- ◆ On-board diagnostic functions

### Major Applications

Due to the sensor's versatile programming characteristics and its high accuracy, the HAL 3855 is the optimal system solution for applications such as:

- Linear movement detection (e.g. EGR valve position, clutch pedal position)

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## Development Tools

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

- ◆ Micronas programmer board (HAL-APB V 1.5)
- ◆ LabVIEW™ programming software for Windows® 9x/2000/XP/Vista/7
- ◆ LabVIEW VIs

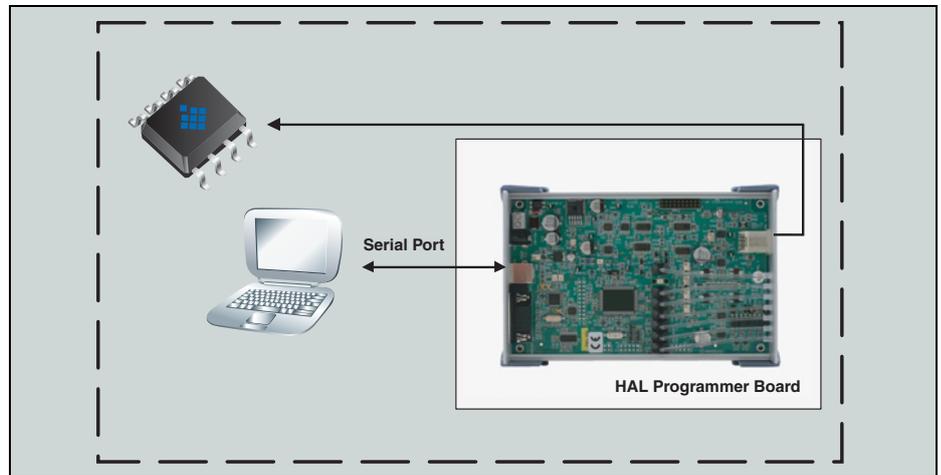


Fig. 1: Development tool setup

## System Architecture

The HAL 3855 sensor is produced in a proven submicron CMOS technology.

The HAL 3855 features temperature-compensated Hall plates with choppered offset compensation, two A/D converters for the magnetic field information, a temperature sensor with 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 3855 is programmable by modulating the output voltage. No additional programming pin is needed.

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

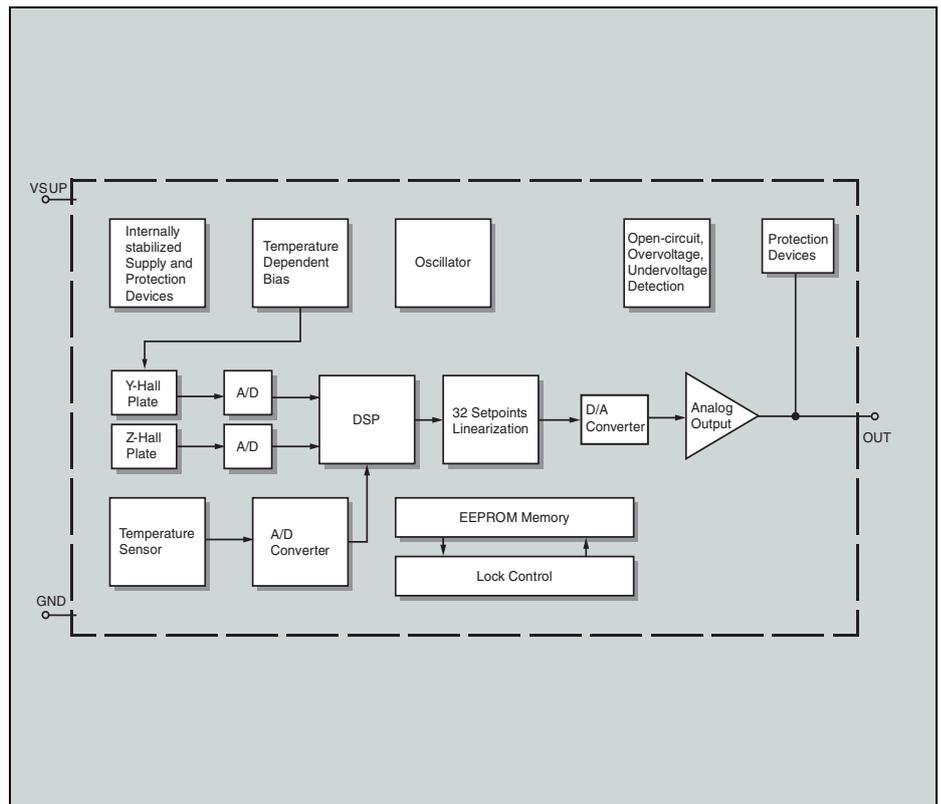


Fig. 2: Block diagram of the HAL 3855

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