Product Overview

HAL® 39xy – 3D Position Hall Sensor Product Line with unique Stray-Field Compensation

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The Hall-sensor family HAL 39xy features stray-field compensation capability built on the highly flexible architecture for multidimensional magnetic-field measurements.This article clearly describes and explains information valuable for our customers related to the features of TDK's HAL 39xy of Direct Angle Sensors.

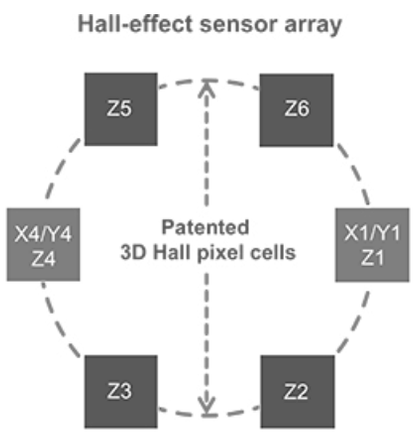
Contents

Product Description

The Hall-sensor family HAL 39xy features stray-field compensation capability built on the highly flexible architecture for multidimensional magnetic-field measurements. The sensors meet today's and tomorrow's automotive and industrial market needs and offer four different measurement modes in a single device: Linear position detection, rotary 360°angle detection and rotary 180°angle detection with stray-field compensation including gradient fields as well as the capability for real 3D magnetic-field measurement (BX, BY, BZ). HAL 39xy supports various digital interfaces (SPI, PWM, SENT according to SAE J2716 rev. 2016 and PSI5 rev. 2.x).

The heart of the HAL 39xy sensors is the patented 3D HAL® pixel cell technology, which enables the direct measurement of magnetic fields in three directions X, Y, and Z. It helps not only to measure magnetic fields very accurately, but it is also insensitive to stray fields. The unique concept is based on an array of Hall plates. Each measurement mode uses a different combination of them to enable best performance in each mode. The highly flexible sensor array of the masterHAL® sensor line helps design engineers to select the best operation mode for any given measurement task. The HAL 39xy is the only solution available on the market that integrates all four modes in a single device. This offers a clear benefit to customers: They only have to qualify one device instead of various different hardware versions. The new sensors are ideal for a wide range of applications, including all kind of valves and actuators, selectors and gear shifters, pedal-position detection, position detection in transmission systems, steering-angle detection, or chassis-position detection.

Figure 1 : 3D HAL® pixel cell



Thanks to its flexible architecture, the HAL 39xy sensor family offers a wide range of configuration possibilities. It features a powerful DSP and an embedded microcontroller. The DSP is responsible for fast signal processing, while the microcontroller performs the interface configuration and supervision of the functional safety related tasks. TDK-Micronas offers the development of customized firmware for the DSP and the microcontroller. Together with the flexible Hall sensor front-end, this enables customers to realize new kinds of applications. The innovative architecture of the HAL 39xy sensors makes it easy for customers to develop new solutions using fast prototyping techniques. It also enables quick and easy adaptation to changes in interface standards such as SENT, SPI, and PSI5.
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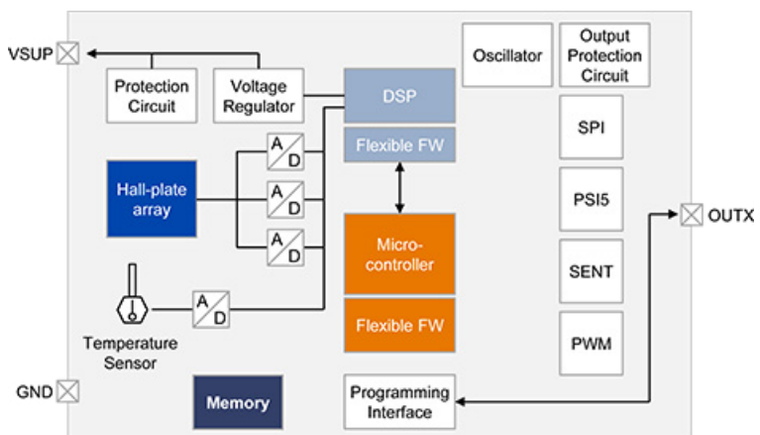
Figure 2 : Hal 39xy Block diagram



Main Applications

- All kind of valves and actuators (e.g. cooling valves, EGR, turbocharger actuators)
- Selectors and gear shifters
- Pedal-position detection
- Position detection in transmission systems
- Steering-angle detection
- Chassis position detection

Main Features and Benefits

- Stray-field robust position detection (linear and rotary up to 360°) covering ISO 11452-8 requirements
- Compensation of stray fields with gradients for applications with 180° rotation
- Real 3D magnetic field measurement of BX, BY and BZ
- Transmission of temperature compensated magnetic raw values (BX, BY, BZ), up to two calculated angles, angle velocity, magnetic field amplitude and/or chip temperature
- SEooC according to ISO 26262 to support functional safety applications
- Additional switch output
- Wide supply voltage range: 3.0 V … 16 V
- Suitable for automotive applications, thanks to a wide ambient temperature range from -40 °C up to max. 160 °C

Key data

Type	HAL3900	HAL3930	HAL3980
Package		SOIC-8	
Digital output formats	SPI	PWM, SENT	PSI5
Angular error		±0.6° @ 10 mT for rotary setups	
Magnetic field amplitude range		10 mT… 130 mT. Down to 5 mT with reduced accuracy	
Safety		ASIL-B ready development according to ISO 26262	

Contact Information

Inquiries on products, sales, or technical matters

Related Links

Product Portal

Direct Angle Sensors product Information
A comprehensive guide to information on Direct Angele sensors from the TDK Group.