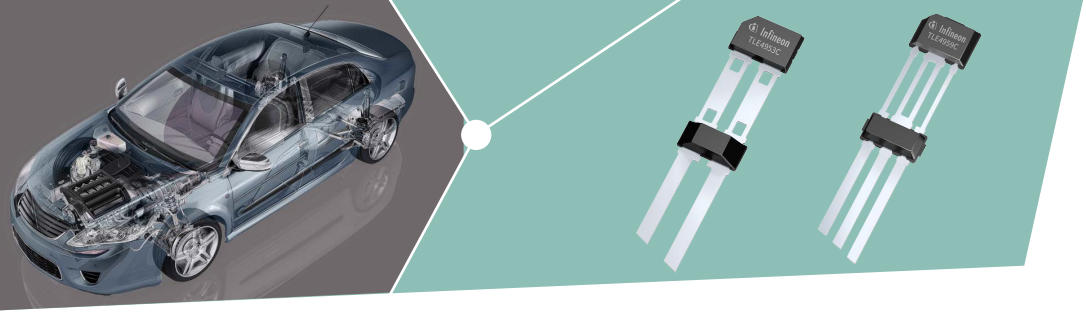


Application brief

Efficient automatic transmission systems

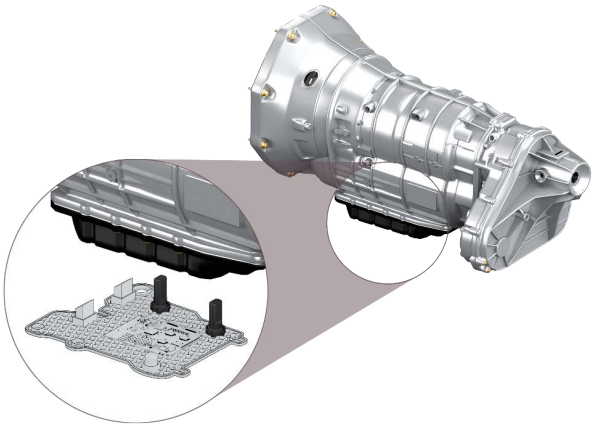
with robust, accurate and reliable XENSIV™ magnetic speed sensors

Continuous efforts to improve efficiency in transmission development have led to the increased the accuracy and robustness of the transmission speed sensors, which enable the slip control of clutches (or pulleys in case of CVT) for comfortable gear shifting and economic driving.

Infineon's transmission speed sensors address all automatic transmission systems (DCT, ECAT, CVT, AMT) as well as hybrid concepts, DHT, and new EVs. Sensors support the achievement of the highest ASIL on system level providing ISO ready and ISO compliant versions.

The basic function of transmission speed sensors is to provide information about rotational speed and direction of rotation to the transmission control unit. Speed sensors detect the motion of permanent magnet wheels or ferromagnetic gears, which are part of the transmission, by measuring the differential flux density of the magnetic field. To detect the motion of ferromagnetic objects the magnetic field must be provided by a back-biasing permanent magnet. The sensor triggers an output pulse according to each rising and/or falling magnetic edge of the magnetic input signal. The pulse length of the output is generated according to the rotational speed and the direction of rotation.

One of the main challenges for transmission speed sensors is that they must cope with rotational vibration and variation in the air-gap caused by eccentricity or air-gap shock. The amplitude of the magnetic signal and the direction information are used by the sensor to detect parasitic magnetic signals. Magnetic signals caused by air-gap vibration or rotational vibration are identified by the sensor algorithm and the output pulse is suppressed. Infineon XENSIV™ speed sensors provide accurate and reliable output signals.



System benefits

- Accuracy to enable comfortable gear shifting and economic driving
- Robust and reliable sensor designs
- Easy-to-use
- Extremely compact systems
- Long term availability
- Support system Safety requirements

IFX speed sensor benefits

- Large air-gap capability
- Direction detection available
- Active vibration suppression
- Robust to large sudden air-gap jump
- Stray fields robustness
- Suitable for all transmission gear geometries
- Stable switching points at long tooth/long notch target wheels

www.infineon.com/magnetic-position

Efficient automatic transmission systems

with robust, accurate and reliable XENSIV™ magnetic speed sensors

Reliable, robust and easy-to use Infineon transmission speed sensors combine high sensitivity and excellent jitter performance. Our sensors optimize performance on a large spectrum of target wheels and long pitch pole, and offer high reliability of the output signals thanks to an advanced signal processing and a sophisticated vibration suppression algorithm.

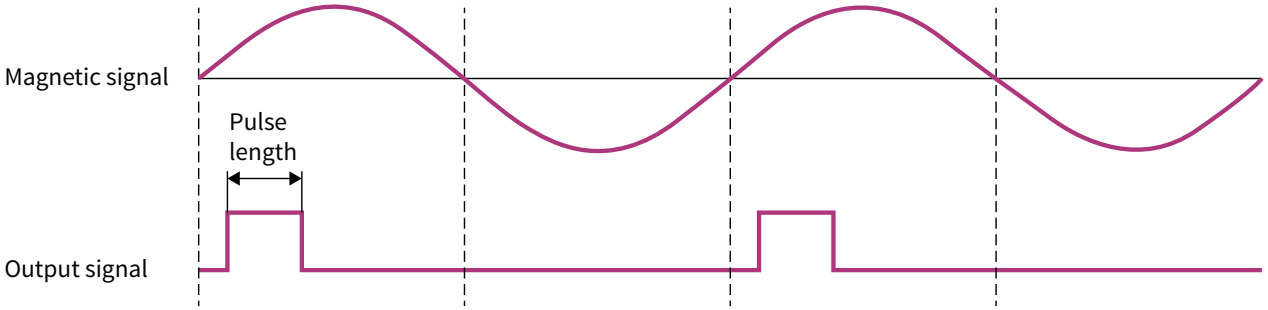
Sensor operates without external components and combines a fast power-up time with a wide frequency range. The stray field robustness is guaranty by the differential principle common to all transmission speed sensors.

Our broad and stable transmission speed sensors portfolio offers two-wire current interface and three-wire voltage interface output protocol.

Different Pulse Width Modulation (PWM) output protocols cover the market requirements for direction detection.

Infineon is the perfect partner, and its wide-ranging magnetic sensor portfolio is the perfect choice to meet future market requirements, ensuring sustainable growth. To learn more about transmission systems and how to solve today's challenges, have a look into Infineon's "Efficient transmission systems" whitepaper available for download at www.infineon.com/magnetic-position

PWM output protocol



Product name	Ordering code	Description
TLE4953C	SP001952920	Two-wire current interface differential speed sensor family with direction detection and active vibration suppression. **Additional product derivatives available**
TLE4955C	SP001952972	Two-wire current interface differential speed sensor with direction detection and the highest active vibration suppression. **Additional product derivatives available**
TLE4959C	SP001671650	Three-wire voltage interface differential speed sensor family with and without direction detection and active vibration suppression **Additional product derivatives available**

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Published by
Infineon Technologies AG
Am Campeon 1-15, 85579 Neubiberg
Germany

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Date: 01 / 2022

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