

Application brief

Efficient position sensing – gear stick

Robust and reliable gear stick position sensing with XENSIV™ position sensors

The gear selector lever is the Human-Machine-Interface (HMI) between the driver and the transmission system. By moving the lever, the gear is selected. Independent of the transmission type and also in electric vehicles, a gear lever detection is necessary to define the driving mode (PNRD), turn on the reverse lights or activate the rear view camera. Today's systems follow a shift-by-wire approach without the mechanical linkage between the gear selector lever and the transmission. The driving states are changed via electronic controls, making a sensing solution to detect each position of the gear selector lever mandatory.

Classical gear selector lever design



The classical look and feel of a gear selector lever is not mandatory anymore. Different realizations, ranging from turning wheels to switches located in the center console or the top column module, can be found in the market. Based on the mechanical implementation, various sensing solutions are possible. Common for all of them is a detection of discrete positions.

As the driving mode selection is safety critical, redundant implementations are commonly used and mandatory to move towards autonomous driving. Contactless sensing solutions with magnetic position sensors are today state-of-the-art to fulfill all reliability and safety requirements.

www.infineon.com/magnetic-position

System benefits

- > Robust and reliable designs
- > High quality user experience
- > Extremely compact systems

Hall switch benefits

- > The highest accuracy and proven quality
- > Easy drop-in replacement
- > Low power consumption enabling energy-efficient systems
- > High supply voltage range and load dump capability to ensure cost-effective designs

3D magnetic sensor benefits

- > Component reduction due to 3D magnetic measurement principle
- > Best accuracy-package size fit
- > Very low power consumption and extended battery lifetime
- > Supporting platform approach due to high flexibility and configurability
- > ISO 26262-ready

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Independent of the mechanical concept for the gear selector lever, Infineon's XENSIV™ sensor, ensuring the highest accuracy and reliability, are a perfect fit. Usually, Hall switch arrays or 3D Hall solutions are applied.

TLE496x-xM are integrated Hall-effect sensors which ensure an easy-to-use and cost-effective solution for position sensing applications. Especially when high temperature stability of the magnetic threshold is required.

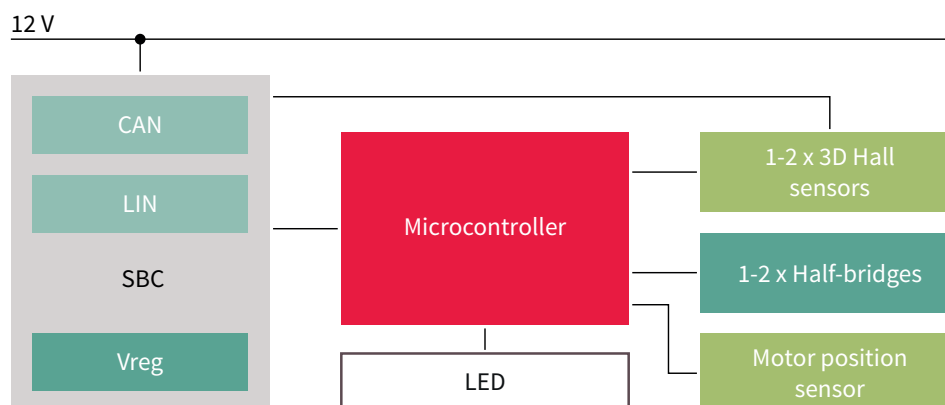
Our innovative 3D Hall sensor family TLx493D senses the magnetic field in three dimensions allowing to build a gear stick system using only two 3D Hall sensors instead of an array of Hall switches. The benefit of the 3D Hall technology together with the high

accuracy and the small package enables for extremely compact system designs.

The automotive industries challenges are multidimensional. CO₂ regulations, increased safety requirements, varying customer needs and the need to adapt to electric vehicles. An innovation driven and reliable partner fulfilling highest quality standards is mandatory to succeed in the long term.

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

Gear selection system example



Product name	Ordering code	Description
TLE4964-2M	SP000923330	Integrated highly accurate Hall effect switch with superior supply voltage capability, additional product derivatives available
TLE493D-P2B6 A0	SP005557415	High accuracy low power 3D magnetic Hall sensor with I ² C interface, 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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