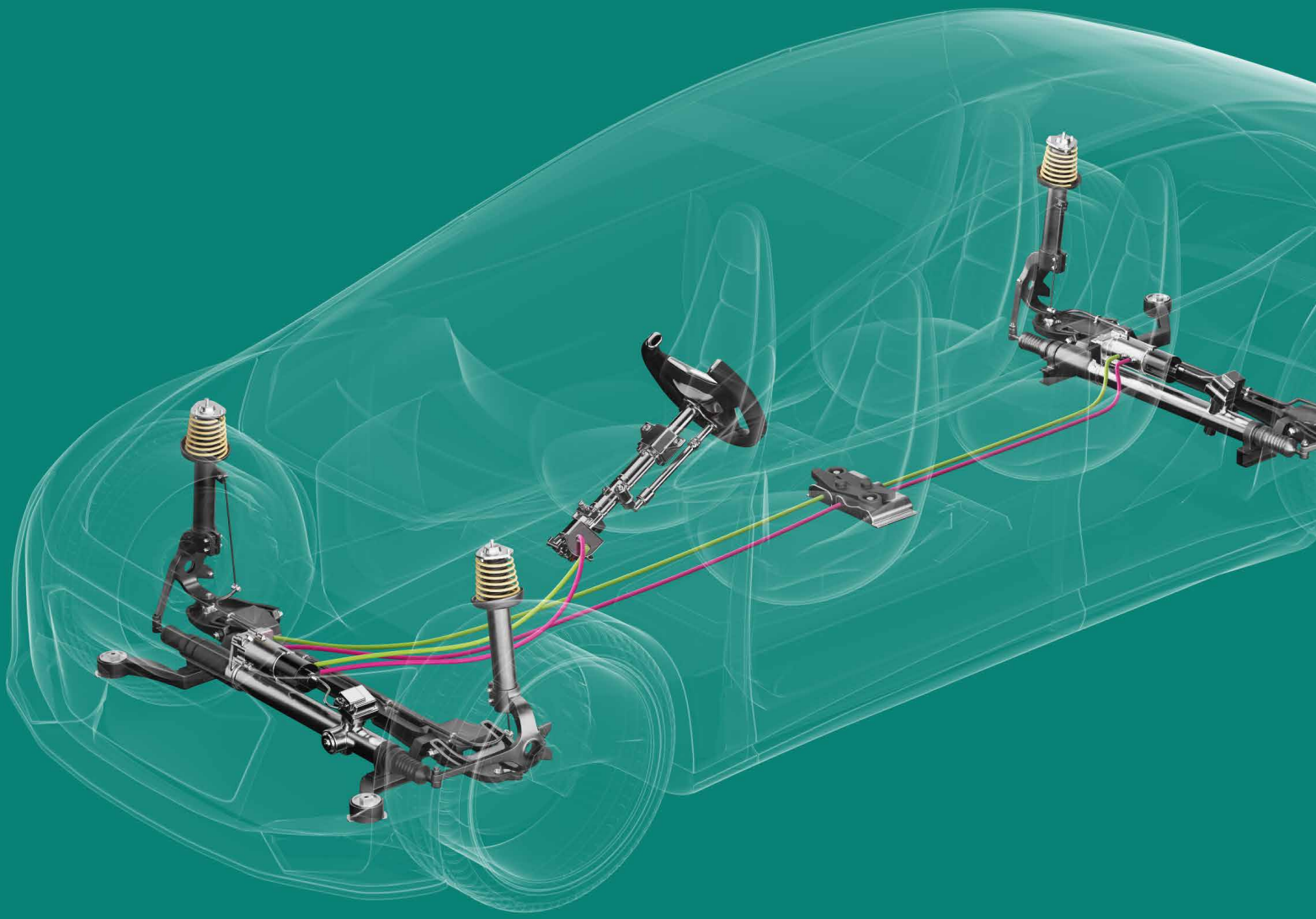


XENSIV™ inductive position sensors

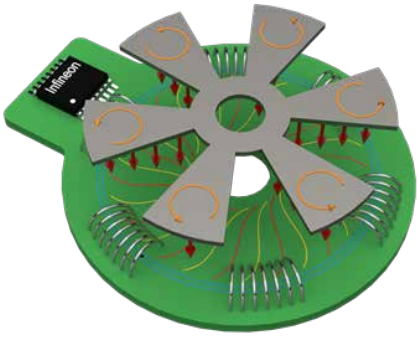
Intrinsic stray field robustness at highest safety and accuracy

www.infineon.com/inductive-position-sensors

XENSIV™ inductive position sensors

High accuracy and stray field robustness with TLE480x family

Inductive sensing operates on the electromagnetic coupling principle between a printed circuit board coil and a metal target positioned above it. When the metal target enters the electromagnetic field generated by the sensor coil, a portion of the electromagnetic energy is transferred to the metal target, inducing eddy currents. These eddy currents, in turn, create a reverse electromagnetic field in the sensor coil that alters the effective inductance of the sensor coil. By measuring this change, the position of the target can be accurately determined.



The iTAS products generate an alternating current (AC) through the transmitter coils via TX outputs, creating an alternating magnetic field. This magnetic field induces voltages in the receiving coils. When a metallic rotor is placed above these coils, eddy currents are induced on the rotor surface, which generates a magnetic field that counteracts the flux density below. The amplitude of the voltages in the receiving coils changes according to the rotor's position. TLE480x products then demodulate these output voltages and compute the angle using the tangent inverse function.

Click here to learn more:
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TLE480x
XENSIV™ inductive position sensor, stay field robust with high accuracy

The increasing trend of car electrification, including both the conversion of internal combustion engine vehicles and the introduction of electric main drives in electric vehicles, is raising the potential for electromagnetic interference (EMI). This can have a detrimental impact on electronic subsystems. The TLE480x family has been developed to address this challenge, explicitly targeting electric power steering systems, including torque angle sensors, steering angle sensors, and pedal and suspension applications. These devices employ the inductive measurement principle and inherently offer robustness against stray fields, eliminating the need for additional shielding against electromagnetic disturbances.

Furthermore, the TLE480x family meets the increasing demands of passengers for enhanced convenience, boasting an impressive angle error of 0.1 percent full scale (FS) and exceptional accuracy. The monolithic design of these devices enables system cost savings through reduced device count, as they have been developed in accordance with ISO 26262 and fully support system design up to Automotive Safety Integrity Level (ASIL) D, ensuring a high level of safety and reliability.



Inductive torque angle sensor (TLE4801/2)

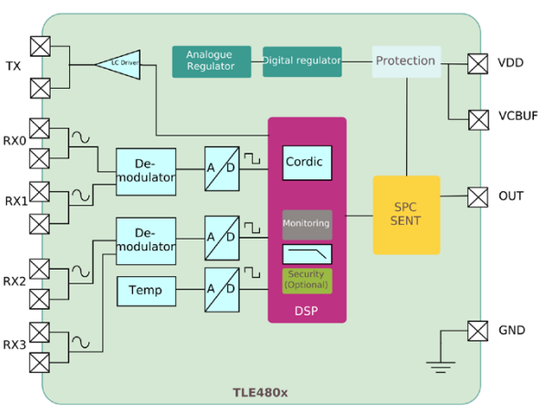


Inductive steering angle sensor (TLE4803)

Features and benefits

Key features	Key benefits
– Stray field robust accordance with ISO 11452-8:2015	– Saves cost of shielding with intrinsic stray field robustness
– ISO 26262:2018 (SEooC) meets ASIL D	– Enables for cost efficient designs with high functional safety rating
– Cyber security (optional) accordance with ISO 21434	– Prevents threats of cyber attacks
– High accuracy angle error (electrical) 0.1% of full scale	– Easy to use high precision sensing

The TLE480x products include a coil system driver, signal conditioning circuits, and a DSP for torque and angle calculation within a single device.
The single-chip is designed according to ISO 26262 Safety Element out of Context (SEooC). It enables safety levels up to ASIL D, which is crucial for meeting future failed operational system safety requirements.



Inductive torque and angle sensors product portfolio

Product	Description	Package	ISO26262 (Functional safety)	ISO11452-8:2015 (Stray field robust)	Ordering code
TLE4801C16-S0000	16-pin SMD package, digital torque, and angle information	TDSO-16	ASIL D	Yes	SP006068554
TLE4801S16-S0000	16-pin SMD package, digital torque, and angle information	TDSO-16	ASIL D	Yes	SP006068552
TLE4802SC16-S0000	16-pin SMD package, digital torque, and angle information	TDSO-16	ASIL D	Yes	SP006068556
TLE4803C16-S0000	16-pin SMD package, digital angle 1, angle 2 information	TDSO-16	ASIL D	Yes	SP006068564
TLE4803S16-S0000	16-pin SMD package, digital angle 1, angle 2 information	TDSO-16	ASIL D	Yes	SP006068562

Click here to learn more:
www.infineon.com/inductive-position-sensors

ISO 26262 – Functional Safety (FuSa)

Dependable electronics based on Functional Safety

Automotive Functional Safety – we simplify the process of integrating safety features with our safety guidelines and services.

Infineon provides dependable electronics to support today's safety-relevant systems and future fail-operational solutions, serving as essential components that allow customers to meet their safety requirements at the application level. Highly integrated systems equipped with reliable electronic semiconductors play a crucial role in key application areas like connectivity, electromobility, and advanced levels of automated driving. The ISO 26262 standard establishes requirements and provides guidance for integrating products into automotive safety applications.

Discover Infineon's products with ISO 26262 classification

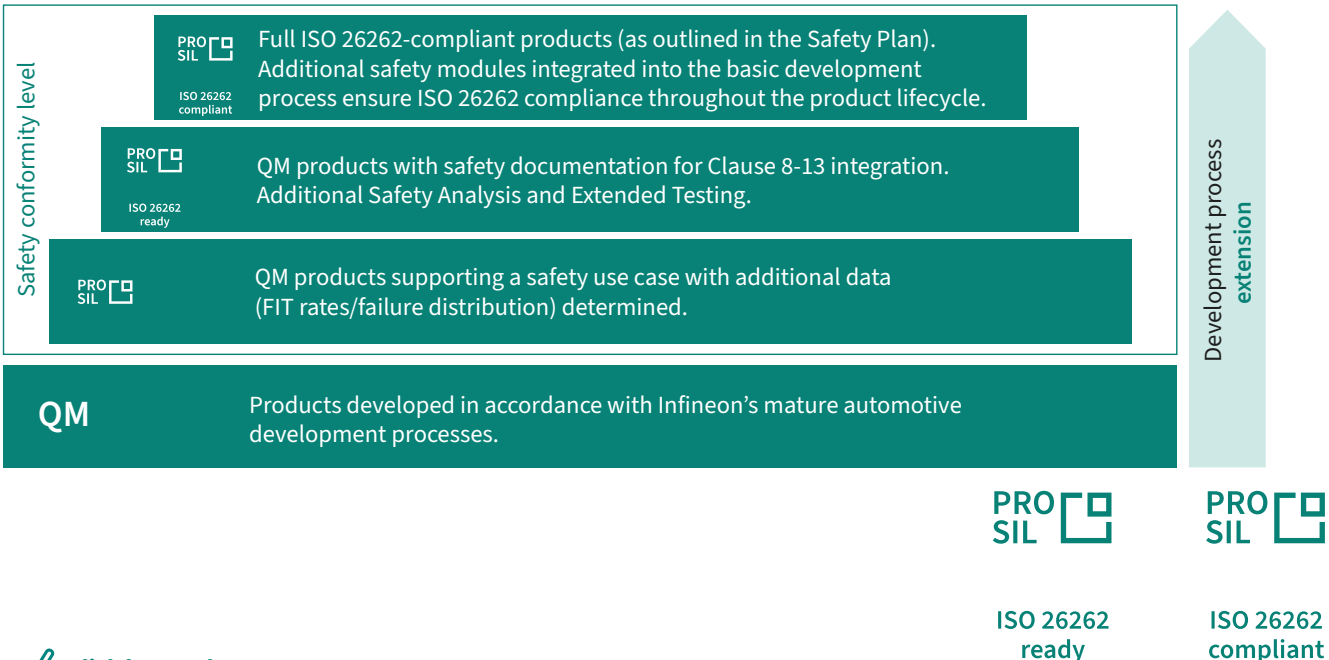
With our holistic approach to functional safety, Infineon is addressing the increased complexity and stringent requirements that make functional safety projects costly and time-consuming. We provide the necessary products, including documentation and supporting information, to ease integration and reduce efforts for system integrators.

Benefit from:

- Innovative solutions for automotive safety-related applications
- Improved time-to-market through comprehensive safety documentation for ISO 26262-compliant products
- Reduced integrators' efforts with ISO 26262-compliant and ready-to-use products
- A broad portfolio of ISO 26262-compliant products already available
- Newly developed automotive parts that will primarily follow an ISO 26262-compliant development flow

Safety conformity levels:

- PRO-SIL™ ISO 26262-compliant devices meet all relevant requirements for semiconductors as defined in the ISO 26262 series of standards for automotive functional safety
- The PRO-SIL™ ISO 26262-ready marking designates QM devices that can be integrated into a safety-related application by utilizing the ISO 26262:2018 Clause 8-13, Class II hardware evaluation framework
- The Infineon Automotive Ensured Compliance process framework was certified by SGS-TÜV Saar for compliance with ISO 26262:2018 as of April 2022. This certification reinforces our commitment to automotive functional safety



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Dependability is the key driver for the megatrend towards autonomous driving

The future car will be fully connected and always online. It will be all-electric and autonomous. At Infineon, we believe that realizing this vision requires both technology and trust.

The growing demand for safe electronic systems in vehicles that drivers and passengers can rely on lays the foundation for trust and drives progress toward higher levels of automated driving.

Earning the trust of tomorrow's passengers begins with dependable electronics that enable highly available, reliable, robust, safe, and secure systems, capable of operating in all conditions.

Infineon is your trusted partner, offering all the essential components for your dependable systems – automotive quality, functional safety, cybersecurity, innovative products, system expertise, and operational excellence.

Dependable electronics for safer, smarter vehicles

As vehicles become increasingly reliant on electronic components, demand for safe, reliable systems continues to grow. Rising levels of automated driving especially depend on drivers' and passengers' trust in the quality and reliability of each component. The complexity and requirements in the automotive industry are expected to increase further, particularly in terms of quality and dependability, to ensure vehicles operate safely and smoothly throughout their 15-year lifespan.

Infineon's commitment to delivering high-quality, dependable products has resulted in a portfolio that offers superior performance and unmatched durability, driven by our zero-defect mentality. We go beyond industry standards to meet the real-world requirements of applications.

Enhance your automotive systems and applications with our high-quality semiconductor components designed for your needs.

Dependable electronics based on quality
Automotive quality beyond the standards with a zero-defect mindset.
Vehicle complexity and functionality will continue to grow, driving the need for dependable electronics, with quality being one of its key ingredients. Our passion for quality creates a product portfolio that meets high standards and delivers highly reliable, robust products.

How Infineon differentiates as a quality leader:

1. Our goal is to go beyond standards to better meet real application requirements: from intensive screening methods to detect production defects, to advanced AEC Q100/101 tests (where required), to sub-1 dpm validation aimed at achieving ultralow defect rates.
2. Our track record of achievements, including multiple quality awards from customers such as Toyota (Honor Quality Award in 2020) and Continental (Supplier of the Year in 2019), demonstrates that we consistently meet and exceed outstanding quality targets in the automotive industry.
3. Infineon offers best-in-class customer service, supported by a regional network of failure analysis labs, strong localized expertise, technical training programs, and state-of-the-art regional quality analysis labs equipped for advanced failure analysis.
4. We meet customer needs through industry-leading product requirements, design, manufacturing, and testing practices. Quality is integrated into our development processes (e.g., RDDF), design rules (e.g., ADeGo), materials, manufacturing processes, process controls, proprietary testing, and screening methods.

Infineon's Zero Defect mentality is built upon:

- Producing 24/7/365 at sub-dpm levels: Translated into a year's timeline, this means we deliver zero defects for all but the last three seconds of the year.
- Delivering sub-ppm quality levels.
- Achieving Zero Defect status for 90 percent of our products.

We go beyond the standards to better meet real application requirements.

Click here to learn more:

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Infineon support for sensors

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Further information, datasheets, and documents

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Infineon customized solutions

Your specific needs, realized

A customized solution (commonly known in the industry as an ASIC — Application Specific IC, or CSP — Customer Specific Product) is designed, planned, developed, and used for a specific purpose. Its mission is to be optimized and efficient, with all the required functionalities and features for a specific application for a single customer.

Infineon as your one-stop-shop from design to delivery

Infineon, as a market leader in customized solutions, believes innovation comes through collaboration and exploring new paths. Working closely with our customers, understanding their needs, and combining their needs with our cutting-edge solutions, we know there is always a benefit for every customer and application. Whether the challenge is related to IP or BOM constraints or requires higher integration, an ASIC can be the solution. Furthermore, customers benefit from Infineon's trusted quality, supply guarantee, and experience, combined with additional advantages such as IP protection and a well-established partner network.

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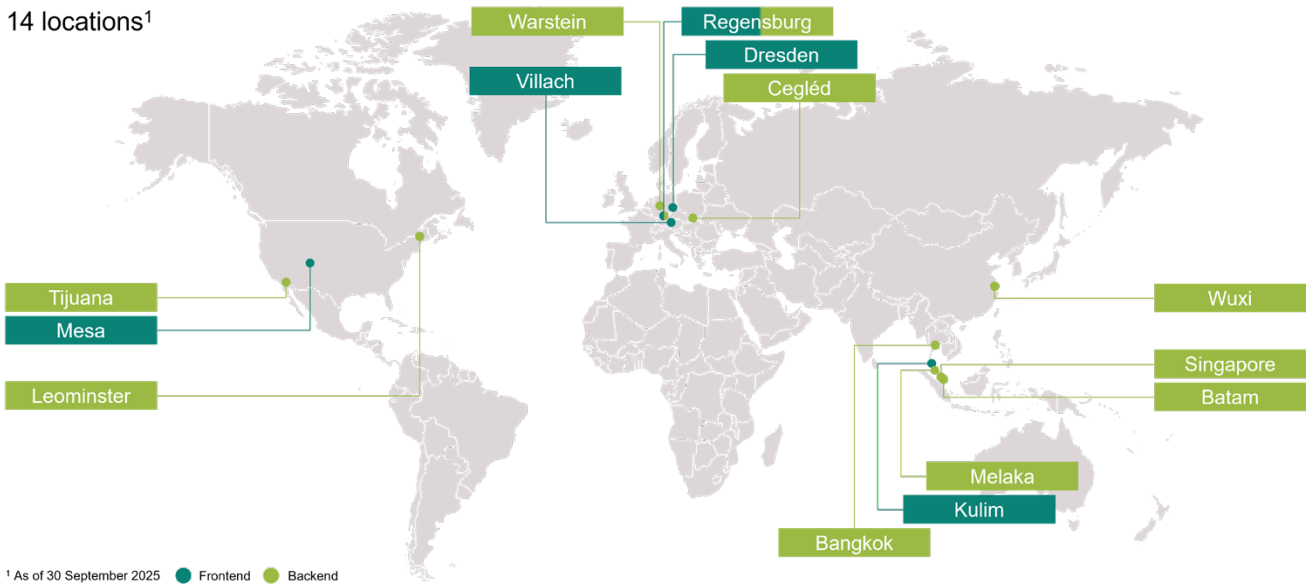
A process streamlined through efficiency, expertise, and experience

The journey starts with you and a focus on feasibility – we match your needs early on with our 40 years of expertise in building world-class, industry-leading semiconductors and ensure the successful implementation of your requirements.

From technology advantage to supply stability

Whether it is digital, analog, or mixed-signal devices, an embedded processor, or integrated sensors, we have the experience and product know-how. Being one of the largest semiconductor companies, we also have a vast array of IPs. We can integrate almost anything into your chip from our wide variety of sensors, discrete devices, drivers, and many more, including support for higher voltage levels. Our in-house fabrication facilities and design centers around the globe are known for the highest quality standards. We also have well-established partnerships with all major silicon foundries and assembly test fabs to complement our in-house technologies. At every step along the way, we take pride in the highest quality Infineon is known for.

If you are interested and would like to find out further information, visit **www.infineon.com/asic**



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Together we create and innovate for our customers' success

Find solutions from our partners to accelerate your next business opportunity. Infineon's global network of partners is an expert in designing products, solutions, and services leveraging Infineon components in 5 key domains: software, hardware, services, tools, and end applications.

The Infineon Partner Program is a global ecosystem of qualified companies, offering knowledge and experience to enable and implement Infineon products. Our associated, preferred, and premium partners help design your device and application based on our components. They have been carefully selected by us on the basis of their competence and ability to design and deliver strong and trustworthy solutions, especially for new technologies and use cases.

Hardware	Software	Tools	Services	End applications
Partners manufacturing electronic components, demo boards, and turnkey modules	Partners programming various types of software, algorithms, and operating systems	Partners designing computer programs for the development of embedded systems	Partners providing cloud and engineering services, application support or trainings	Partners creating end products and related applications
... jointly we create and commercialize value-added solutions, while reaching new buyers	... jointly we enhance our portfolio with complementary components and expand technology know-how	... jointly we enable a complete and immersive development experience for customers	... jointly we build up engineering capabilities and offer them to a world class customer network	... jointly we provide customers with state-of-the-art solutions and innovative use cases

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