

XENSIV™ TLx49012

Hall angle sensor

Digital angle sensor family based on Hall technology for automotive and industrial applications

The XENSIV™ TLx49012 is Infineon's next-generation digital angle sensor family, part of the magnetic position sensors portfolio, designed for automotive (TLE49012) and industrial (TLI49012) motor control applications. Built on proven Vertical Hall technology, the TLx49012 sensor delivers high-accuracy angle measurement with exceptional cost-to-performance ratio.

The sensor family features **multiple interface options** including SPI, ABZ, PWM, and UVW, providing maximum flexibility for system integration across diverse applications. With an industry-leading **signal latency of just 1.5 µs and update rate of 1 µs**, the TLx49012 enables highly responsive motor control systems that improve energy efficiency and reduce commutation noise.

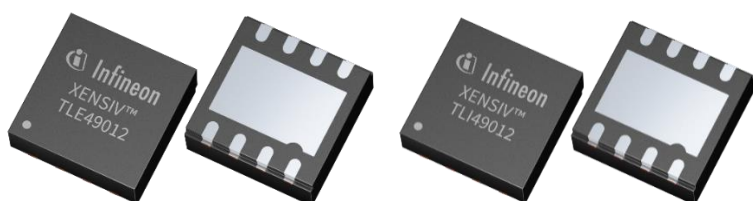
A key differentiator is the integrated **system self-calibration** feature, which significantly reduces external calibration requirements during manufacturing and simplifies the production process. This unique capability, combined with **off-axis measurement support**, enables versatile mechanical designs and reduces total system cost.

Achieving an **angle error of just 0.1° across a magnetic field range of 30 to 120 mT**, the TLE49012 angle sensor is an excellent choice for demanding applications such as automotive environments, including steering systems, xEV thermal management, and motor-driven actuators in body electronics.

The TLI49012 angle sensor is optimized for industrial and consumer motor control systems such as drives, automation equipment, robotics, and general BLDC applications.

The TLE49012 is automotive-qualified to **AEC-Q100 Grade 0** for operation from -40°C to 150°C, with **ASIL B functional safety compliance** according to ISO 26262. The TLI49012 meets **AEC-Q100 Grade 1** requirements and supports QM-level safety for industrial environments. The compact **PG-VSON-8-2 package** enables high integration density in space-constrained applications across both segments.

With their combination of high accuracy, low latency, flexible interfaces, and unique self-calibration capability, the TLx49012 family is positioned between entry-level and premium solutions, delivering maximum value for a wide variety of motor drive systems in automotive, industrial, and consumer markets.



Key features

- Unique system self-calibration feature
- Multiple interface options: SPI, ABZ, PWM, UVW
- Extremely low latency of 1.5 µs
- Off-axis/out-of-shaft capability
- High accuracy: angle error of 0.1°
- Magnetic field range 20-120 mT
- Small form factor in VSON-8-2 package

Key benefits

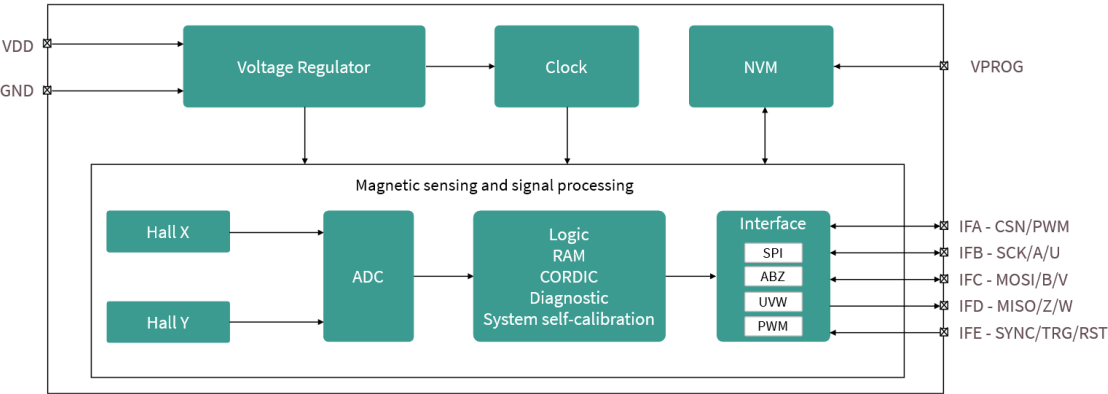
- Ease of use through on-chip system self-calibration
- Design flexibility with freedom to position the sensor as you like
- High-speed signal processing - suitable for very fast applications
- Excellent cost-to-performance ratio

PRODUCT BRIEF

Potential applications:

- Automotive pumps
 - Automotive valves/flaps/actuators
 - Window cleaning and transparency
 - Electric power steering (EPS)
 - Electromechanical break (EMB)
 - Suspension ride control
- Robotics (e.g.humanoids, dexterous hands)
 - Durable medical equipment (DME)
 - Electric forklift
 - Industrial drives
 - PC and gaming accessories
 - e-motorbikes/scooter and pedelecs

Block diagram



Product table

Product	Interfaces	Resolution	Qualification	Temperature range	Package
TLI49012-E0001	SPI, ABZ, UVW, PWM	16 bit	JEDEC-JESD47	-40°C to 125°C	PG-VSON-8-2
TLE49012-S0001	SPI, ABZ, UVW, PWM	16 bit	AEC-Q100, ISO 26262 ASIL B	-40°C to 150°C	PG-VSON-8-2
TLE49012-S0002	ABZ, PWM	14 bit	AEC-Q100, ISO 26262 ASIL B	-40°C to 150°C	PG-VSON-8-2
TLE49012-E0001	UVW, PWM	16 pole pairs	AEC-Q100	-40°C to 125°C	PG-VSON-8-2

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