

## Product brief

# TLE5501 E0001 and E0002

XENSIV™ magnetic position sensor – analog TMR-based angle sensors for any kind of angular position sensing

Infineon's new TLE5501 products are fast analog TMR-based angle sensors. Their application fields range from steering angle applications with the highest functional safety requirements to motors for wipers, pumps and actuators and electric motors in general. TLE5501 is dedicated to any automotive but also industrial and consumer applications like robotics or gimbal.

Our TLE5501 family is available in with two different qualification levels and two different pin outs:

- > TLE5501 E0001: automotive qualified
- > TLE5501 E0002: ISO 26262 ASIL D compliant (requires use of external safety mechanisms)

The TLE5501 E0001 is qualified according to AEC-Q100. This version is pin-compatible to Infineon's established and market-proven TLE5009 – but can realize more cost-efficient systems as no additional amplifier is necessary.

The other version TLE5501 E0002 has been developed according to ISO 26262 Standards. This is a milestone with regards to functional safety, making Infineon the first supplier in the market to reach the highest automotive functional safety grade ASIL D for angle sensors - with only one single sensor chip. TLE5501 E0002 incorporates decoupled bridges for redundant external angle calculation and also offers highest diagnostic coverage.

One major benefit of the Infineon TMR technology is its high sensing sensitivity coming with a high output voltage. So unlike other technologies, a TMR based sensor does not require any additional internal amplifier. Thus the sensor can be connected directly to the microcontroller without any further amplification – saving costs for the end customer. There is yet another cost saving aspect of Infineon's TMR technology. TMR shows a very low temperature drift reducing external calibration and compensation efforts. In addition, the TMR technology is also well known for its low current consumption.

### Key features

- > Large output signals of up to 0.37 V/V for direct micro controller connection
- > Discrete bridge with differential sine and cosine output
- > Very low supply current < 2.5 mA
- > Magnetic field range 20 mT to 100 mT
- > Typ. angle error < 1.0° (over the whole temperature and lifetime profile)
- > Designed for safety
- > DSO-8 package
- > Automotive qualified acc. to AEC-Q100, grade 0
- > For TLE5501 E0002: ISO 26262 compliance at level ASIL D, safety manual and safety analysis summary report available on request

### Applications

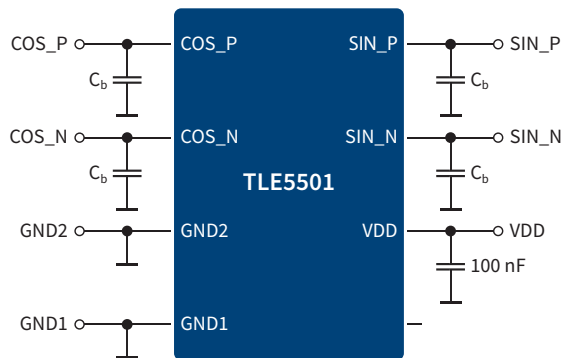
- > Steering angle sensing
- > BLDC motor commutation (e.g. wipers, pumps and actuators)
- > Angular position sensing
- > Electric motors
- > Automotive safety applications
- > Industrial applications like automation, robotics or gimbal



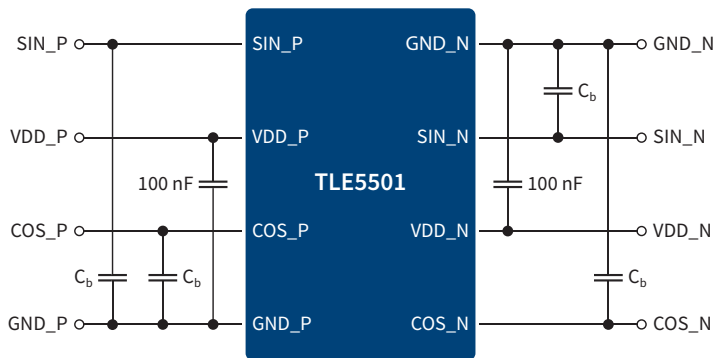
# TLE5501 E0001 and E0002

XENSIV™ magnetic position sensor – analog TMR-based angle sensors for any kind of angular position sensing

Application circuit TLE5501 E0001



Application circuit TLE5501 E0002



Parameter	TLE5501 E0001	TLE5501 E0002
Technology	TMR, passive bridge	
Qualification	Automotive qualified Q100, grade 0: T <sub>A</sub> = -40°C to 150°C	
Functional safety	N.A.	ISO 26262 compliance
Package	DSO-8, pin-compatible to TLE5009	DSO-8, ISO 26262-compliant pinning
Interface	Differential sine and cosine output	
Output amplitude @ 5 V (differential)	1.35 V ... 1.85 V	
Supply current @ 5 V	2 mA	
Magnetic field range (@RT)	20 mT ... 100 mT (ext. range 130 mT)	
X/Y offset @ 5 V (differential)	< 25 mV	
Residual angle error <sup>1)</sup> 0 h at 25°C	0.8°	
Residual angle error <sup>1)</sup> over temperature and lifetime	1.5° @150°C 1.2° @ 125°C	

1) Including hysteresis

## Product table

Sales name	Description	Product status	SP#
TLE5501 E0001	Analog TMR-based angle sensor, pin-compatible to TLE5009	Active and preferred	SP001621824
TLE5501 E0002	Analog TMR-based angle sensor, ISO 26262-compliant, ASIL D	Active and preferred	SP001621828

Published by  
Infineon Technologies AG  
81726 Munich, Germany

© 2018 Infineon Technologies AG.  
All Rights Reserved.

### Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

### Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com)).

### Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.