

High speed rotary position sensor from ams ideal for use in safety-critical automotive applications

New AS5147P position sensor IC offers magnetic stray field immunity and supports ISO26262 compliance programmes

Unterpremstaetten, Austria (9 June, 2015), ams AG (SIX: AMS), a leading provider of high performance sensors and analog ICs, today released the AS5147P, an ultra-high speed magnetic rotary position sensor which offers reliable performance in automotive applications compatible with the requirements of the ISO26262 functional safety standard.

Providing accurate absolute and incremental measurement outputs at speeds up to 28,000 revolutions per minute (rpm), the AS5147P is ideal for safety-critical applications such as electric power steering (EPS), brake and accelerator pedals, pumps, double-clutch transmissions, starter motors, alternators and windscreen wiper motors.

Its appeal to automotive system designers rests on a combination of high measurement accuracy at high rotation speeds, high reliability, low system cost and support for standards compliance.

The AS5147P draws on patented DAEC™ (Dynamic Angle Error Correction) technology to deliver accurate position measurements even at extremely high rotation speeds. The DAEC compensation scheme reduces the propagation delay inherent in the sensor's signal chain to almost zero. As a result, the AS5147P's angle error is a negligible 0.02° at 1.7krpm, 0.17° at 14.5krpm and 0.34° at 28krpm. The DAEC function also enables the device to refresh its measurement output every 1.9µs.

High reliability and low system cost in automotive applications are assured by the AS5147P's intrinsic immunity to stray magnetic fields. Strong stray magnetic fields are present in vehicles, particularly those with a partially or wholly electric drivetrain, which contain powerful electric motors and high current-carrying conductors. These stray magnetic fields are much stronger than that of the small target magnet with which a magnetic position sensor is paired.

The unique differential sensing principle of the magnetic position sensors from ams makes them immune by design to stray magnetism. This means that automotive system designers can avoid the need to incorporate bulky and expensive magnetic shielding into their products, reducing their size, weight and cost when compared to designs based on competing magnetic position sensor ICs. The high sensitivity of the AS5147P also enables the use of a small (6mm diameter), low-cost target magnet.

In addition, the AS5147P supports automotive OEMs' ISO26262 compliance programmes in various ways:

- the AS5147P was developed in accordance with the ISO26262 flow, following the SEooC (Safety Element out of Context) and AoU (Assumption of Use) guidelines specified in the standard, thus helping manufacturers to achieve the requirements of any ASIL grade
- ams provides a safety manual and failure mode effects diagnostic analysis (FMEDA) document for the AS5147P, guiding customers on the way to achieve their target ASIL grade in various applications
- evidence – safety case, certifications and the AECQ-100 qualification (PPAP) – is ready to provide the documentation of the AS5147P's development process
- the complete SEooC process according to the ISO26262 and the documentation supporting it are certified by an independent third party
- the AS5147P provides internal diagnostic functions supporting ISO26262 processes, including magnetic field strength threshold detection, and detection of loss of magnet

The AS5147P provides both absolute and incremental angle measurements of a continuously rotating shaft, with a zero-position setting. A standard four-wire serial peripheral interface allows a host microcontroller to read 14-bit absolute angle position data and to program non-volatile settings without a dedicated programmer.

Incremental movements are indicated by a set of ABI signals with a maximum resolution of 4,096 steps/1,024 pulses per revolution. The resolution of the ABI signal is programmable to 4,096 steps/1,024 pulses per revolution, 2,048 steps/512 pulses per revolution or 1,024 steps/256 pulses per revolution. Brushless DC (BLDC) motors may be controlled through a standard UVW commutation interface with a programmable number of pole pairs from 1 to 7. The absolute angle position is also provided as a PWM-encoded output signal.

'Offering a combination of high accuracy, compact size and low system cost, magnetic position sensors are widely regarded as the best solution for rotary position sensing in vehicles. Now with the AS5147P, ams has made a magnetic position sensor which fits seamlessly into OEMs' ISO26262 compliance programmes, and which also eliminates any concerns over the effect of stray magnetic fields', said Heinz Oyrer, senior marketing manager at ams.

The AS5147P is available now in production volumes in a TSSOP-14 package. Unit pricing is \$5.31 in 1,000-unit quantities.

A demonstration board for the AS5147P is available from the ams ICdirect online shop. For sample requests and for more technical information, please go to www.ams.com/Magnetic-Position-Sensors/AS5147P.



About ams

ams is a global leader in the design and manufacture of advanced sensor solutions and analog ICs. Our mission is to shape the world with sensor solutions by providing a seamless interface between humans and technology. ams' high-performance analog products drive applications requiring extreme precision, dynamic range, sensitivity, and ultra-low power consumption. Products include sensors, sensor interfaces, power management and wireless ICs for consumer, communications, industrial, medical, and automotive markets.

With headquarters in Austria, ams employs over 1,700 people globally and serves more than 8,000 customers worldwide. ams is listed on the SIX Swiss stock exchange (ticker symbol: AMS). More information about ams can be found at www.ams.com.

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