

Magnetic sensors

TDK presents new redundant analog TMR angle sensor for safety-relevant applications

- TAS8240 is a compact, cost-effective, redundant TMR-based sensor consisting of 4 x Wheatstone bridges for angle detection
- High angle accuracy of $\pm 1.0^\circ$ in an ambient temperature range of -40°C to $+150^\circ\text{C}$
- High stability over temperature, magnetic-field range, and lifetime
- Provides accurate and redundant rotor position measurement needed in safety-relevant applications like power steering motors

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TDK Corporation (TSE:6762) expands its tunnel-magnetoresistance (TMR) angle sensor portfolio with the launch of the TAS8240 sensor for automotive and industrial applications. This latest addition, available in both compact QFN16 (3 x 3 mm²) and TSSOP16 (5 x 6.4 mm²) packages, offers four redundant analog single-ended SIN/COS outputs and low power consumption. This sensor facilitates precise angle measurements, delivering high performance within constrained spatial environments. As a 360° angle sensor, the TAS8240 is suited to accurately measure the rotor position of BLDC motors used in safety critical applications such as power steering, brake boosters, or traction motors. * Mass production of the TAS8240 has started, and samples are already available.

The sensor contains four pairs of TMR half bridges and provides four separated SIN/COS outputs by applied magnetic field in the x-y plane. Higher system safety levels up to ASIL D can be achieved while offering higher availability of position information, even in case of a failure of one of the output signals.

The QFN16 package, a surface mount technology (SMT) solution, provides a significantly smaller footprint compared to TSSOP16, making it ideal for applications where space is limited. Wettable flank contributes to ensuring soldering quality suitable for automotive grade. Depending on system architectures, fail-operational concepts can also be supported by the new sensor.

TDK's state-of-the-art TMR technology benefits from the company's long-term expertise in magnetic-sensor technology and optimizes its sensors by successfully integrating sophisticated TMR technology into small packages. The angle accuracy of the sensor remains stable at different temperatures and over the sensor's lifetime. The deterministic behavior of the TAS8240 in extended magnetic-field ranges opens up new application possibilities, even in demanding environments.

Glossary

- TMR: Tunnel magneto-resistance
- SMT: Surface mount technology

Main applications*

- Absolute rotary angle sensor
- EPS motor-shaft angle sensor
- Steering wheel angle sensor
- E-brake motor angle sensor
- Resolver replacement for e-axle / traction motor

Main features and benefits

- Contactless 360° angle measurement
- High angle accuracy of $\pm 1.0^\circ$ in an ambient temperature range of -40°C to $+150^\circ\text{C}$
- Redundancy: 4 x single-ended sin/cos output pairs
- Safety Level: ASIL D ready
- Low power consumption
- Supports radial sensing concepts
- Optimized for automotive (AEC-Q100) and industrial applications

Type	Package	Package dimensions	Angle accuracy (after compensation)	Operating temperature range	Analog output	Bridge resistance	Magnetic-field measuring range
TAS8240-BAAA	TSSOP16	WxHxD: 5 x 6.4 x 1.1 mm	± 1.0 degrees or less (over temperature) ± 0.3 degrees ($T_A = 25^\circ\text{C}$, typical)	-40°C up to 150°C (ambient)	Single-ended, redundant, $1.5\text{ V}_{\text{p-p}}$ (at $V_{\text{CC}} 5.0\text{ V}$, ratiometric)	5 k Ω	Nominal: 20 to 80 mT (recommended)
TAS8240-HAAA	QFN16 (Wettable Flank)	WxHxD: 3 x 3 x 0.75 mm					

* Any mention of target applications for our products are made without a claim for fit for purpose as this has to be checked at system level.

** All operating parameters must be validated for each customer application by customers' technical experts.

About TDK Corporation

TDK Corporation is a world leader in electronic solutions for the smart society based in Tokyo, Japan. Built on a foundation of material sciences mastery, TDK welcomes societal transformation by resolutely remaining at the forefront of technological evolution and deliberately “Attracting Tomorrow.” It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK’s comprehensive, innovation-driven portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. TDK focuses on demanding markets in automotive, industrial and consumer electronics, and information and communication technology. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2024, TDK posted total sales of USD 14.6 billion and employed about 101,000 people worldwide.

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