A broad portfolio of solutions

TDK is successful in the field of magnetic sensors and offers a wide range of products for a large variety of applications – including current sensors, gear tooth sensors and TMR angle sensors.

TDK current sensors are based on high-performance TDK ferrite materials and play a key role, for example, in energy management systems and Industry 4.0 applications. Special types, for example, are designed for demanding applications in a high current range from 30 A to 600 A. TDK gear tooth sensors, on the other hand, are highly sensitive rotation sensors. These enable the use of more efficient fuel injection systems in vehicles and thus help to improve engine performance. TMR angle sensors are also gaining importance.

Figure 1:
The CCT series of clamp AC current sensors with its new CCT406393-600-36 type for 600 A can meet the high-current sensing needs of energy management systems (EMS) for buildings, factories, stores and communities.
TMR angle sensors for maximum precision and reliability

Of all magnetoresistive effects, the TMR effect is characterized by its high output voltage, low temperature drift and high precision. Originally, TDK employed this technology for the manufacture of read/write heads for hard disks, establishing extensive and globally recognized competence in TMR products.

On this basis, the company has developed a host of innovative sensors for automotive applications. In the series production of TMR magnetic field sensors, which has been running since 2015, different layers are separated and structured on a silicon wafer – comparable with a CMOS production process. By this process, TMR elements are linked in a series connection to form one resistor element. Such resistors are usually connected in groups of four to form a Wheatstone bridge.

Figure 2:
The TDK TMR angle sensors comply with ASIL-D and can thus also be used in safety-related applications such as electric power steering or brake systems.

At a supply voltage of 5 V the differential output voltage can be as high as 3 V, enabling it to be fed directly to a microcontroller with integral ADC. The number of structural elements needed for the signal conditioning is significantly reduced due to the absence of amplifiers, resistors and capacitors. In view of the growing demands on functional safety this is a huge advantage, since the monitoring of the sensors is greatly simplified.

TMR sensors can be used in systems that meet the requirements of ASIL-D (Automotive Safety Integrity Level D, the highest safety requirements) according to the ISO 26262 standard. They are can be used up to therefore suitable for such safety-related applications as electric assisted steering and braking. A further outstanding feature of the TMR sensors is their high angle precision, which is adjustable. Depending on the magnetic field strength, residual angle errors of less than 0.2 degrees can be achieved over the vehicle service life (17 years) and a temperature range (-40°C to 175°C).

The current TDK TMR sensor product range covers simple angle sensors, rotational speed sensors and linear sensors for power steering systems, wipers, clutch and gearbox positioners, pedals and throttle valves and many other applications.

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