PRODUCT BRIEF

XENSIV™ TLE5571 TMR magnetic current sensor

A cost-efficient, compact-sized current sensor with high bandwidth and an ultra-fast protection feature for high power density applications

The XENSIV™ TLE5571 is a Tunnel Magneto-Resistance (TMR)-based coreless current sensor with an ultra-fast, single-ended analog output and Over-Current Detection (OCD), suitable for protection and high-frequency switching applications that require current sensing with an extremely small input-to-output delay.

Our revolutionary and robust, linear monolithic TMR technology enables accurate current measurement with a high signal-to-noise ratio (SNR). With a differential measurement through two integrated TMR full bridges, the TLE5571 is immune to external stray fields without the need for any magnetic shield. With a minimum bandwidth of 2.5 MHz, the sensor is well-suited for SiC and GaN applications, enabling high-power density in compact designs. Due to the ultra-fast, integrated OCD, applications, circuits, and even dedicated sensitive components can be protected from over-current events.

The sensor's external current rail (eCR) design allows for measurement of currents above 2 kA with high resolution and precision, ensured by minimal noise on the analog output. The TLE5571 family consists of four distinct, pre-calibrated sensitivity ranges. All sensors are shipped with pre-calibrated offset and sensitivity over temperature, thereby offering high accuracy and reducing system temperature compensation. System-level offset and sensitivity calibration further enhance the measurement accuracy of the sensor.

The TLE5571 current sensor directly converts the sensed magnetic field on the eCR and amplifies it internally with a high bandwidth. The single-ended output signal can be directly fed into the ADC of a microcontroller. The OCD threshold can be configured via an external voltage applied to the THR pin. Over-current events are internally detected and signaled at the OCD pin with ultra-fast response time. The additional Wire-On-Chip (WOC) test capability and separate fault pin provide advanced sensor diagnostic features that are decoupled from the analog output and the OCD pin, thereby preventing false system shutdown.



Key features

- Fully isolated measurement of currents up to >2 kA
- 5 V supply voltage
- Bandwidth >2.5 MHz
- Ultra-low-noise analog output
- Operating temperature range -40°C to 150°C
- Magnetic measurement ranges from ±5 mT to ±30 mT
- Product qualification compliant with JEDEC JESD47 standards
- Ultra-fast over-current detection (<150 ns)
- Adjustable over-current detection threshold using an external voltage

Key benefits

- Cost-efficient TMR current sensor for protection
- Small design footprint with minimal PCB area consumption
- System-level space and cost savings
- Isolated current measurement for enhanced safety
- High ampacity of ±2000 A
- Highly robust system design
- Ideal for SiC & GaN-based high-power density applications
- Optimized for extreme operating conditions

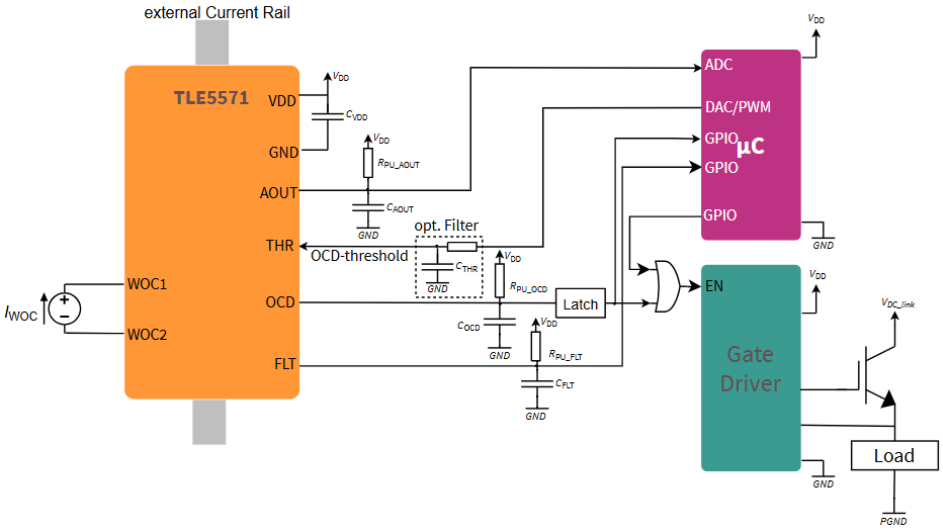
AEC Qualified

PRO SIL ISO 26262 ready

www.infineon.com/current-sensors

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Application diagram



The reference block diagram above illustrates the minimal impact on the bill of materials (BOM) in the application. The device measures a magnetic field via two fully differential TMR bridges and provides a single-ended output signal on the AOUT pin. A fast comparator (delay < 150 ns) is used to generate an over-current detection signal on the OCD pin. The threshold for the over-current detection is configured externally using the THR pin. In case of internal failures, the sensor provides fault information on the FLT pin. The WOC pins offer testing capabilities for verifying the device in the application.

Product table

Product	Typ. accuracy over temperature	Field range [mT]	Bandwidth [MHz]	Typ. sensitivity [mV/mT]	Automotive/ Industrial	Package
TLE5571-AE36O5-I-S0001	3.4%	±30	2.5	72	Industrial	PG-TDSO-16-10
TLE5571-AE24O5-I-S0001	3.5%	±20	2.5	108	Industrial	PG-TDSO-16-10
TLE5571-AE12O5-I-S0001	3.9%	±10	2.5	216	Industrial	PG-TDSO-16-10
TLE5571-AE06O5-I-S0001	4.6%	±5	2.5	432	Industrial	PG-TDSO-16-10

[1)]outside operating range

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