PRODUCT BRIEF

XENSIV™ - TLE5045iC, TLE5046SIC

Magnetic speed sensors – ISO 26262-compliant wheel speed sensor family

The TLE5045iC and TLE5046SiC is Infineon's next generation wheel speed senor family based on GMR technology. The family consists of a designed-to-cost speed-only TLE5045iC, and a high-end TLE5046SiC providing not only direction detection but also offering true "zero-speed" capability as well as possibilities of self-diagnostics. The sensor has a newly developed GMR structure which is designed for higher sensitivity, lower jitter and improved duty cycle. TLE5045iC and TLE5046SiC is an all-purpose sensor, being a perfect match with virtually all pole wheels used by the industry. Special attention has been given to support accurate speed measurements especially for ultra-low speeds ("zero speed" capability) to enable applications such as e.g. automated parking. TLE5045iC and TLE5046SiC are developed according to ISO 26262 to fulfill ASIL B, supporting ASIL D systems. The TLE5046SiC with direction detection is available with PWM or AK protocol. Additional self-diagnostics are implemented in the AK-ERR variant: safety relevant parameters as e.g. air gap, temperature, and internal errors are monitored and deviations are communicated via an error flag to the ECU in order to support safety goals at system level.

The TLE5045iC and TLE5046SiC was developed using an ISO 26262-compliant process: A V-model based requirement capturing and verification process ensures the fulfillment of ASIL B rated safety requirements. Extensive functional safety analysis has been conducted for various application use cases by means of FMEDA (Failure Mode Effects and Diagnostic Analysis), DFA (Dependent Failure Analysis) and FTA (Fault Tree Analysis). Resulting FIT rates and safety-related judgments are summarized in Safety Analysis Summary Reports (SASR). These reports are provided to customers to serve as building block for their system level safety concept. The preferred implementation of the ISO 26262-compliant sensors is described in a dedicated safety manual.



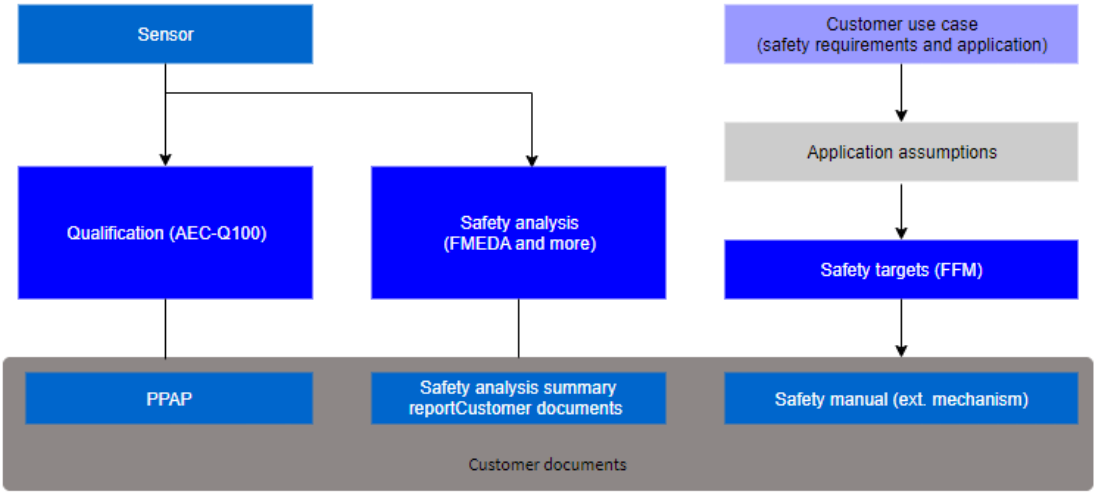
Key features

- One family of speed sensors for all wheel speed sensing applications in the same package
- Best in class in sensitivity, jitter and duty cycle, independent from magnetic target wheel
- "Zero speed" capability
- ISO 26262-compliant ASIL B development, supporting system ASIL D
- Extended safe operating area allows for larger system tolerances
- Multiple protocol variants with and without self-diagnosis functionality
- Improved robustness due to capacitor-less design
- Single die concept using monolithically integrated GMR sensor on Infineon's highest quality field proven automotive technologies

Key benefits

- Small sensor package 5x3mm without need of external capacitor saves module size
- Advanced EMC concept maximizes the availability of the sensor signal
- New micro break feature designed against disturbances on supply line

Block diagram



Product summary

Product type	Description	Ordering code	Package
TLE5045iC-R050	Speed only sensor to be used with load resistor 15 Ω ≤ Rm ≤ 50 Ω	SP001649080	SSO-2-1
TLE5045iC-R100	Speed only sensor to be used with load resistor 50 Ω ≤ Rm ≤ 100 Ω	SP001216864	SSO-2-1
TLE5046SiC-PWM2-R050	Speed sensor with direction detection and PWM protocol, to be used with load resistor 15 Ω ≤ Rm ≤ 50 Ω	SP005965728	SSO-2-1
TLE5046SiC-PWM2-R100	Speed sensor with direction detection and PWM protocol, to be used with load resistor 50 Ω ≤ Rm ≤ 100 Ω	SP005965719	SSO-2-1
TLE5046SiC-AK-LR	Speed sensor with direction detection and AK protocol	SP005947803	SSO-2-1
TLE5046SiC-AK-ERR	Speed sensor with direction detection, additional self-diagnostics, and AK protocol	SP005965436	SSO-2-1

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