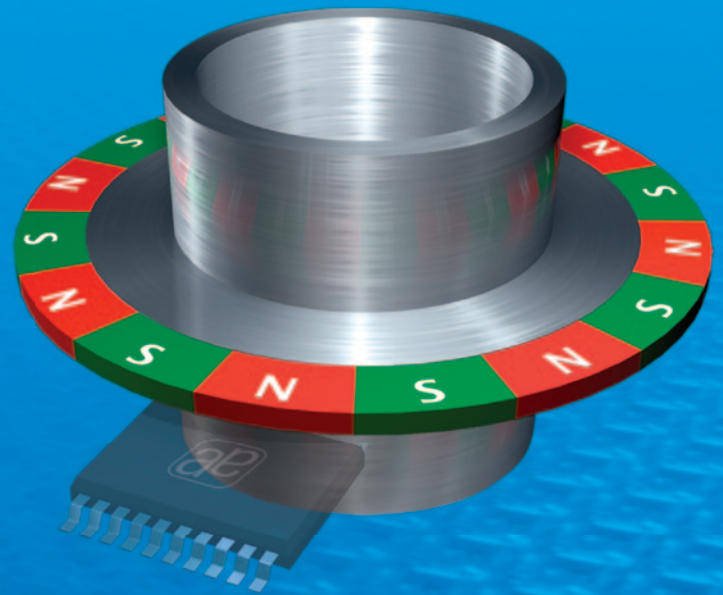


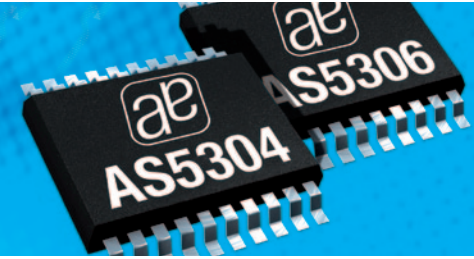
Linear and Off-Axis Magnetic Encoder ICs

start & play



- ▶ **High resolution**
25 μm – AS5304
15 μm – AS5306
- ▶ **High speed**
20m/s – AS5304
12m/s – AS5306
- ▶ **Optical encoder compatible user interface**





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General Description

The AS5304 and AS5306 devices are high performance fixed resolution encoder options containing on-chip hall sensor elements and signal processing for measuring linear and off axis rotary motion. Due to the fixed resolutions, the AS5304 and AS5306 devices do not require any register configuration by the host controller at start up or during operation.

The AS5304 and AS5306 devices allow system designers to develop rotary encoder applications in mechanical systems where the sensor IC cannot be mounted at the end of a rotating device (e.g. at hollow shafts). Instead, the IC is mounted off-axis underneath a multi-pole single strip magnetized ring. Both devices can also be used in linear encoder applications where the IC is mounted directly underneath a single strip linear multi-pole magnet. Communication to the host controller is made using an index output and incremental A/B quadrature outputs providing 40 quadrature pulses (160 steps) per magnet pole period.

Using, for example, a 32pole-pair circular magnetic ring, the AS5304 and AS5306 can provide a resolution of 1280 pulses/rev, which is equivalent to 5120 positions/rev or 12,3 bit. The maximum speed at this configuration is 9375 rpm.

The AS5304 requires a multipole magnet with a pole pair length of 4mm and the AS5306 requires 2.4mm pole pair length. A pole pair consists of one magnetic north and one magnetic south pole with equal length.

The AS5304 and AS5306 are both 5V operating devices available in a small 20-pin TSSOP package and specified for an operating ambient temperature of -40° to +125°C.

Key Features

- On-chip automatic gain and offset correction
- High sensitivity: supports as low as 5mT magnet field amplitudes
- Single track system allows for lower magnet costs
- High magnet to IC air gap tolerance
- High immunity to external magnetic fields
- Magnetic field strength alarm indicator (AO output)

Applications

Ideal for any high speed linear motion and off-axis rotation measurement in applications such as:

- Electrical motors
- Linear X-Y-stages
- Rotation knobs
- Industrial drives

Benefits

- Complete system-on-chip
- Lower cost solution compared to traditional optical encoders
- No register configuration by host at start up or during operation
- High reliability due to non-contact sensing
- Extended temperature range
- Suitable for the use in harsh environments
- Robust against external magnetic stray fields

Ordering Guideline

Device	Resolution	Magnet Pole Length	Digital Outputs (A/B & Index Outputs)
	µm	mm	
AS5304A	25	2	Push Pull
AS5304B	25	2	Open Drain
AS5306A	15	1.2	Push Pull
AS5306B	15	1.2	Open Drain

Block Diagram

