AS5305
Integrated Hall IC for Linear and Off-Axis Rotary Motion Detection

PRELIMINARY FACT SHEET

1 General Description

The AS5305 is a single-chip IC with integrated Hall elements for measuring linear or rotary motion using multi-pole magnetic strips or rings.

This allows the usage of the AS5305 in applications where the Sensor IC cannot be mounted at the end of a rotating device (e.g. at hollow shafts). Instead, the AS5305 is mounted off-axis underneath a multi-pole magnetized ring or strip and provides a quadrature incremental output with 40 pulses per period at speeds of up to 20m/sec.

Using, for example, a 32pole-pair magnetic ring, the AS5305 can provide a resolution of 1280 pulses/rev, which is equivalent to 5120 positions/rev or 12,3bit. The maximum speed at this configuration is 9375 rpm.

The default pole pair length is 4mm (2mm north pole / 2mm south pole). However, the chip accepts a wide range of multi-pole magnetic strips or rings with pole pair lengths between 2.26 and 5.91mm and magnetic field strengths down to 5mT. The pole pair length can be adjusted by programming. A minimum pole pair length of 2,26mm allows a resolution of 14,125µm per position step.

In addition to the multi-pole high-resolution track, the AS5305 can read a second multi-pole reference track that generates a single or multiple reference index pulse per revolution, for absolute position identification.

The AS5305 is available in a small 20-pin TSSOP package and specified for an operating ambient temperature of -40° to +125°C.

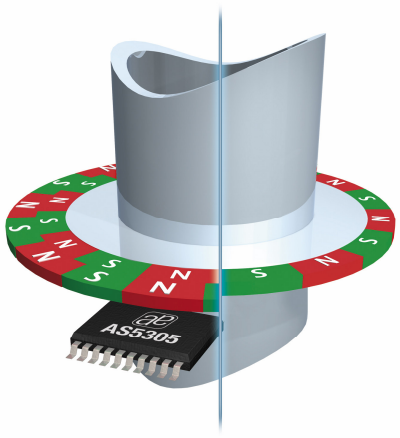

Figure 1: Two different configurations of AS5305 with single or double track multipole ring magnet

2 Benefits

- Complete system-on-chip
- High reliability due to non-contact sensing
- Extended temperature range
- Suitable for the use in harsh environments
- Robust against external magnetic stray fields

3 Key Features

- High speed, up to 20m/s
- Down to 14µm resolution per position step
- User programmable pole length
- Single index pulse per revolution for absolute position measurement using a second magnetic track
- 40 pulses per magnetic period.
- Linear movement measurement using multi-pole magnetic strips
- Circular off-axis movement measurement using multi-pole magnetic rings
- 4.5 to 5.5V operating voltage
- Magnetic field strength indicator

4 Applications

The AS5305 is ideal for high speed linear motion and off-axis rotation measurement in applications such as

- electrical motors
- X-Y-stages
- rotation knobs
- industrial drives

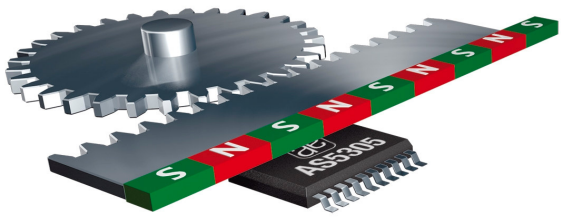

Figure 2: AS5305 with magnetic multipole strip for linear motion measurement

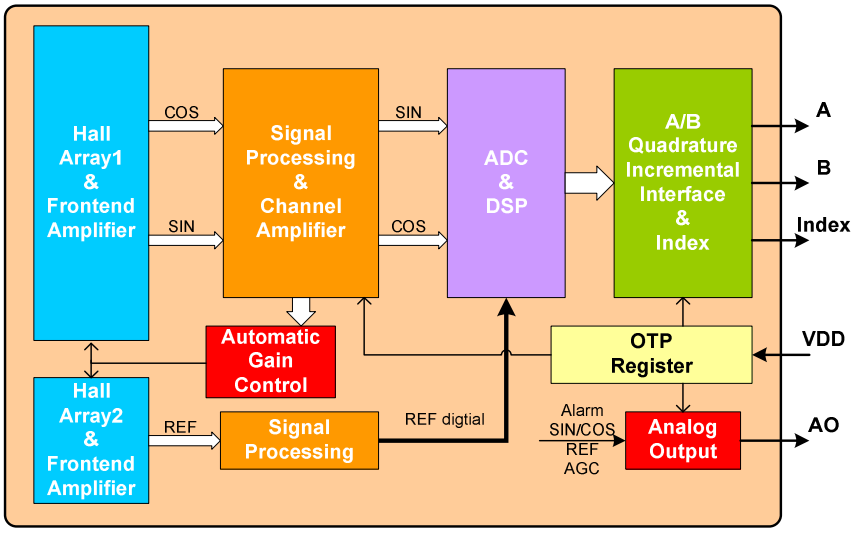

Figure 3 AS5305 Block Diagram

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