

**Product Brief****AK7454****Zero Latency Angle Sensor IC****1. General Description**

The AK7454 is a Silicon monolithic Hall-Effect sensor IC that specializes in detecting rotation angle. A contactless absolute magnetic rotary encoder is easily designed with the AK7454 and a magnet.

The AK7454 is only sensitive to the magnetic flux density applied parallel to the IC surface. This is obtained through a magnetic concentrator which is mounted on the Hall-Effect elements. It is advantageous to accurate angular measurements against mechanical displacement.

The AK7454 has built-in EEPROMs for angle INL error calibration function. It is possible to reduce the error caused by mounting misalignment etc. by writing the calibration value obtained by external calculation into them.

By using these EEPROMs calibration function, it is possible to use not only in the Shaft-End configuration (end of shaft) but also in the Off-Axis configuration (side of shaft).

The AK7454 is the zero latency rotary angle sensor to follow rotation speed up to 25,000rpm by tracking servo architecture. It is suitable for motor controlled applications with an encoder.

**2. Applications**

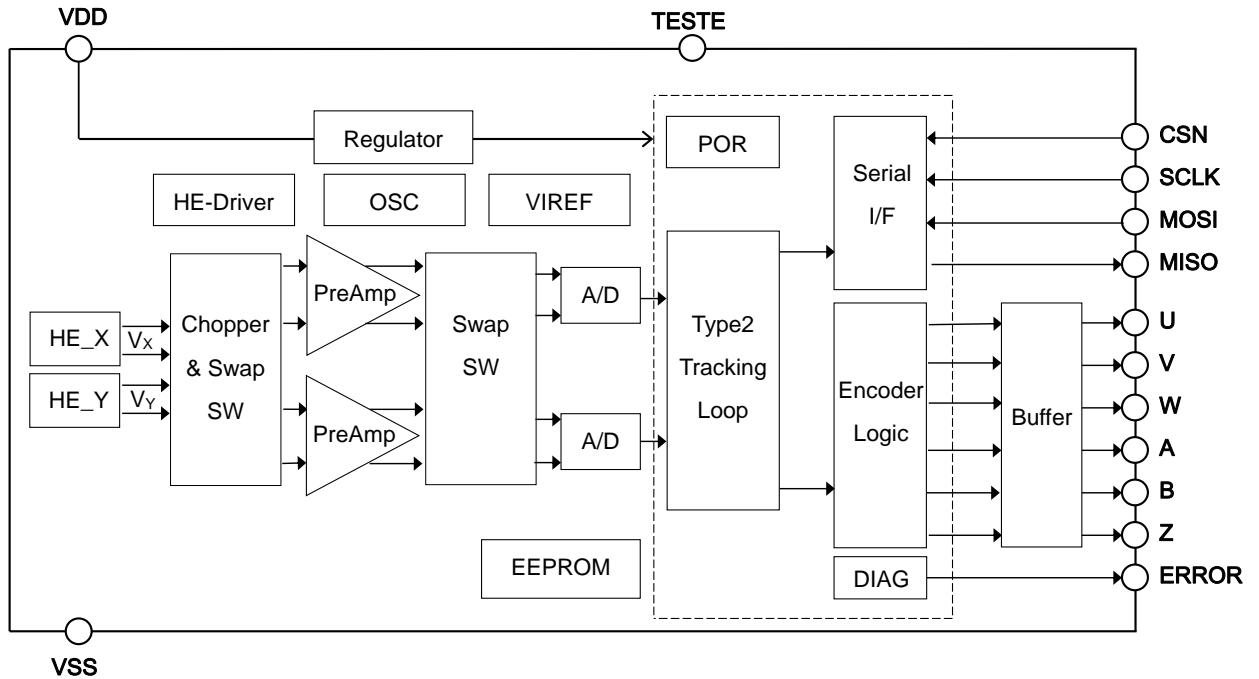
Motor Controlled Applications (Robot, Machine tools, Stepping motor, DC brushless motor etc.)  
Optical Encoder Replacement

**3. Features**

- 360° Contactless Angle Sensor
- Shaft-End (end of shaft) and Off-Axis (side of shaft) Configuration Available
- Operating Temperature : -40 to +125°C
- Supply Voltage : 3.0 to 5.5V
- Magnetic Field Range : 30 to 70mT (Shaft-End), 10 to 70mT (Off-Axis)
- Angle Resolution : 14-bit
- Maximum Tracking Rotation Speed : 25,000 rpm
- INL :  $\pm 0.5^\circ$  (25°C, w/o calibration, Shaft-End),  $\pm 0.1^\circ$  (25°C, w/ calibration typ. value)
- Output Delay : 1.2 $\mu$ s (ABZ Hysteresis "OFF" setting)
- Self-diagnostic Functions
  - Under Magnetic Flux Density Detection
  - Tracking Lost Detection
- Interfaces
  - 4-wire SPI : Absolute Angle Data & User Programming
  - ABZ Incremental Output
  - UVW Commutation Output
- User Programming Functions
  - ABZ (SPI) / UVW Independently Settable Zero Point
  - Magnet Rotation Direction : CCW / CW
  - ABZ Incremental Output Resolution : up to 4096ppr
  - Z-phase Signal Phase Setting : 4 Edges Selectable
  - Z-phase Pulse Width : 1 to 16384 LSB
  - UVW Commutation Output Resolution : up to 64poles (32 pole pairs)
  - Angle INL Error Calibration Function

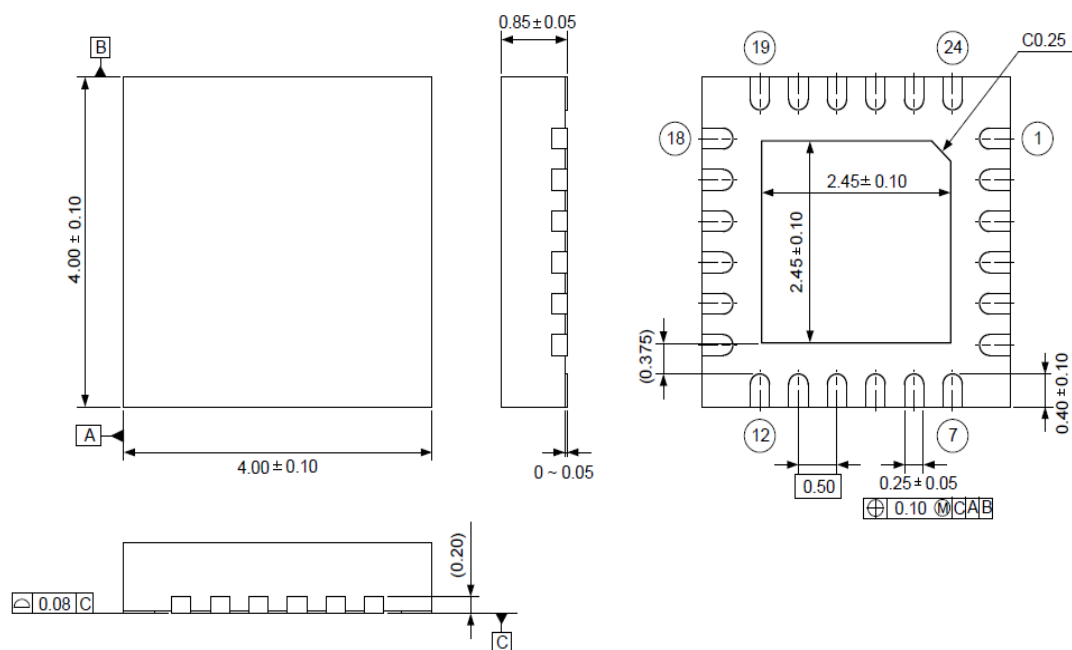
- Package
  - 24pin - QFN 4.0mm x 4.0mm x 0.85mm (typ)
- Environmental Friendly (RoHS Compliant)
  - Lead free
  - Halogen free

**4. Block Diagram**



**5. Package Information**

24pin - QFN Package Dimension



<b>6. Pin List and Functional Description</b>
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No.	Pin Name	I/O	Type	Functional Description
1	W	O	Digital	W-phase Commutation Output
2	V	O	Digital	V-phase Commutation Output
3	U	O	Digital	U-phase Commutation Output
4	MISO	O	Digital	Serial I/F Data Output
5	MOSI	I	Digital	Serial I/F Data Input
6	SCLK	I	Digital	Serial I/F Clock Input
7	CSN	I	Digital	Serial I/F Chip Select
8	NC	-	-	No Connection (Note1)
9	NC	-	-	No Connection (Note1)
10	NC	-	-	No Connection (Note1)
11	VDD	-	Power	Power Supply
12	NC	-	-	No Connection (Note1)
13	TESTE	I	-	Test (Note2)
14	VSS	-	Power	Ground
15	ERROR	O	Digital	Error Output
16	Z	O	Digital	Z-phase Incremental Output
17	B	O	Digital	B-phase Incremental Output
18	A	O	Digital	A-phase Incremental Output
19	NC			No Connection (Note1)
20	NC			No Connection (Note1)
21	NC			No Connection (Note1)
22	NC			No Connection (Note1)
23	NC			No Connection (Note1)
24	NC			No Connection (Note1)
TAB	TAB			Back Tab (Note3)

Note1: NC pins must be open.

Note2: TESTE pin must be connected to VSS.

Note3: Back Tab must be open.

**Important Notice**

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