

## 1. General Description

AK09940A is ultrahigh precision 3-axis electronic magnetometer IC with ultrahigh sensitive TMR sensor technology. Small package of AK09940A incorporates magnetic sensors for detecting magnetic field in the X-axis, Y-axis, and Z-axis, a sensor driving circuit, signal amplifier chain, and an arithmetic circuit for processing the signal from each sensor. Self-test function is also incorporated.

## 2. Features

Functions:

- Upward compatible with AK09940
- 3-axis magnetometer device
- Built-in A to D Converter for magnetometer data out
- 18-bit data out for each 3-axis magnetic component
  - Sensitivity: 10 nT/LSB (typ.)
  - Range:  $\pm 1200 \mu\text{T}$  (max.)
- Serial interface
  - I<sup>2</sup>C bus interface  
Standard and Fast modes compliant with Philips I<sup>2</sup>C specification Ver.2.1
  - 4-wire SPI
- Operation mode
  - Power-down, Single measurement, Continuous measurement, External trigger measurement and Self-test
- DRDY function for measurement data ready
- Magnetic sensor overflow monitor function
- Built-in oscillator for internal clock source
- Power on Reset circuit
- Self-test function with internal magnetic source
- Built-in temperature sensor
- Built-in magnetic sensitivity adjustment circuit
- 8 FIFO data buffer
- Selectable sensor drive
  - Low power drive / Low noise drive / Ultra low power drive

Operating temperatures:

- $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

Operating supply voltage:

- Analog power supply  $+1.7 \text{ V}$  to  $+1.98 \text{ V}$
- Digital Interface supply  $+1.65 \text{ V}$  to  $+3.6 \text{ V}$

Current consumption:

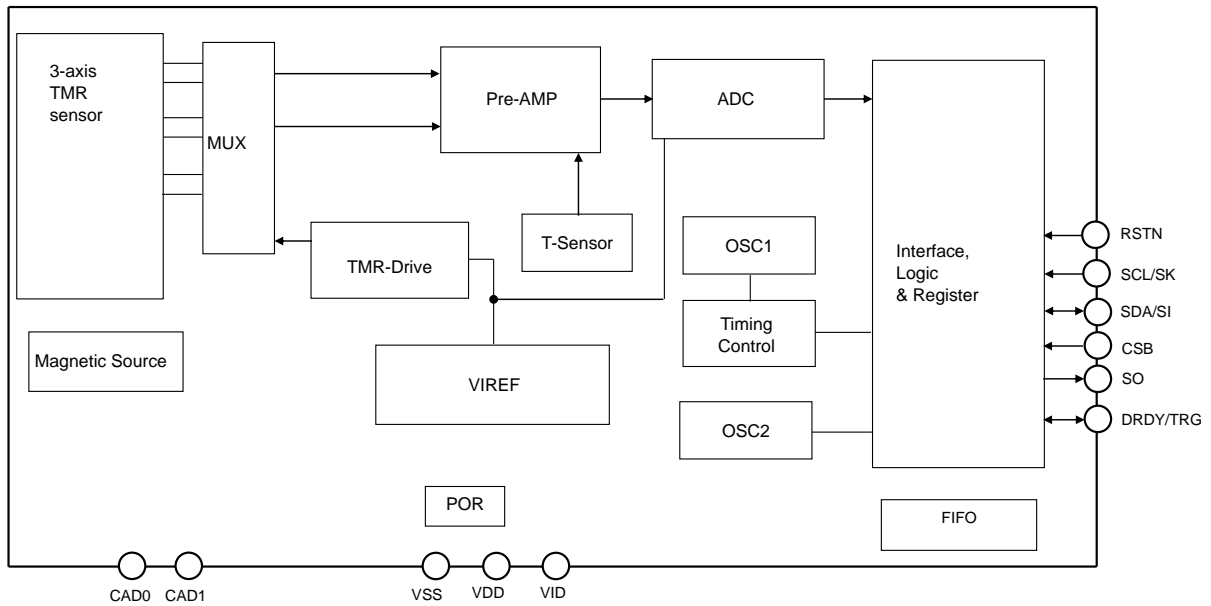
- Power-down:  $1.0 \mu\text{A}$  (typ.)
- Measurement:
  - Average current consumption at 100 Hz repetition rate
    - ✧ Ultra low power drive:  $16 \mu\text{A}$  (typ.)
    - ✧ Low power drive 1:  $30 \mu\text{A}$  (typ.)
    - ✧ Low power drive 2:  $60 \mu\text{A}$  (typ.)
    - ✧ Low noise drive 1:  $100 \mu\text{A}$  (typ.)
    - ✧ Low noise drive 2:  $200 \mu\text{A}$  (typ.)

Package:

- AK09940A 11-pin LGA:  $1.6 \text{ mm} \times 1.6 \text{ mm} \times 0.58 \text{ mm}$  (typ.)

**1. Block Diagram and Functions**

**1.1. Block Diagram**



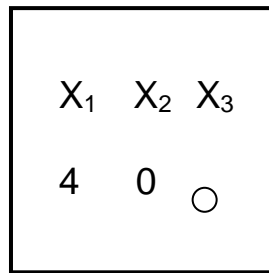
**2. Package**

**2.1. Marking**

Product name: 40

Date code: X<sub>1</sub>X<sub>2</sub>X<sub>3</sub>

- X<sub>1</sub> = Year code
- X<sub>2</sub> = Month code
- X<sub>3</sub> = Lot



<Top view>

**2.2. Pin Assignment**

	4	3	2	1
D	RSTN	/	CAD1	CAD0
C	VID	/	/	VSS
B	SO	/	/	VDD
A	SDA/SI	SCL/SK	CSB	DRDY/TRG

<Top view>

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