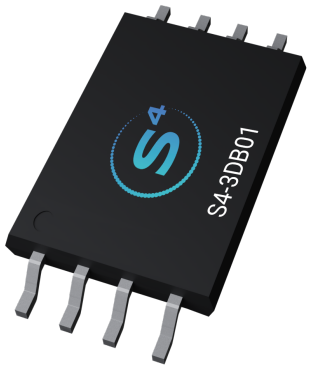


S4-3DB01

3D Linear Hall-Effect Sensor IC with SFI Capabilities & Wake-Up Function

Description

The S4-3DB01 is a Hall-effect based sensor measuring all three dimensions of the magnetic field. It is assembled in a small TSSOP-8L package. The IC outputs raw data representing the three Br (residual magnetic flux destiny) field dimensions X, Y and Z and the actual temperature over the I²C interface. Sensitivity and operation modes are user selectable by I²C interface.

It features three different power modes and three different measurement modes with parameters selectable via I²C. This enables a large variety of possible applications, using an external CPU controlling the device.

Features

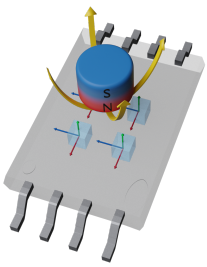
- Unique backside Hall-effect sensor technology for sensing of all three dimensions of magnetic fields from four sensor clusters
- User selectable operation modes, sensitivity and conversion rate
- I²C interface with up to 1MHz data rate
- 16 bit data output for magnetic field strength and temperature
- Ultra-low power consumption in sleep mode
- Nine user selectable slave addresses
- Supply under voltage detection
- Operating temperature range: -40°C – +125°C
- Supply voltage range: 2.7V – 3.6V
- AEC-Q100 qualified

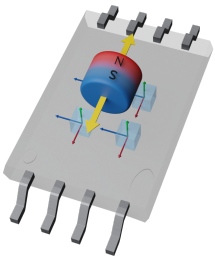
Applications

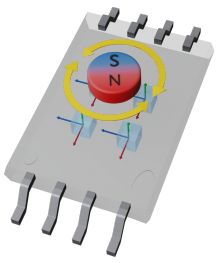
· SFI joysticks
· HMI applications, knobs, levers, shifter position
· Door handle, door lock, window position
· Robotics, automation

Application Example

The S4-3DB01 has four set of true 3D Hall-effect sensor clusters in a small SMD package that can independently do measurements of magnetic flux density in X/Y/Z axles and output 12 bit raw data via I²C interface. Therefore, by simple calculation in MCU or CPU, user has ability to do SFI measurement of all kinds of 3D magnet motions.

Joystick 

Linear 

Rotary 

salesteam@s4sensors.com
www.s4sensors.com

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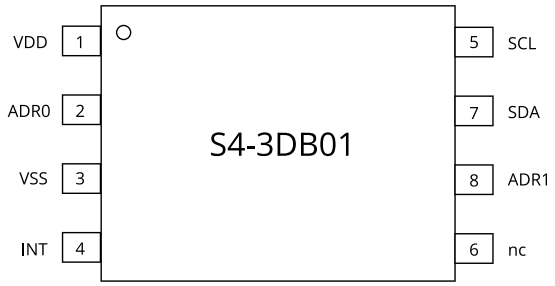
Key Specifications

General	
Supply Voltage Range	2.7 – 3.6V
Supply Current	3.5 mA Measurement mode 6.0μA Inactive mode 10.0nA Sleep mode
Magnetic Field Range	20 – 200mT
Measure cycle Duration	175 – 1100μs
Power On Time	500μs typical
Operating temp.Range	-40°C – +125°C

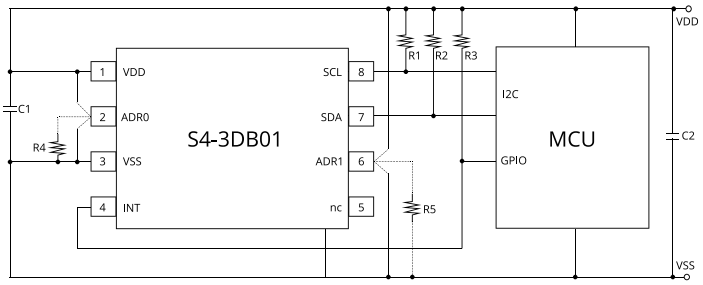
Performance	
Linearity Error	+/- 1.0%
Sensitivity Initial Error	+/- 5.0%
Sensitivity Temp. Drift	+/- 3.0%
Sensitivity mismatch	+/- 5.0%
Sensitivity mismatch Temp. Drift	+/- 3.0%
Zero Field Output	+/- 1.0%
Zero Field Output Temp. plus Supply Drift	+/- 2.0%
Cross-sensitivity	+/- 3.0%
Noise (RMS)	0.125% typical

Pin Assignment



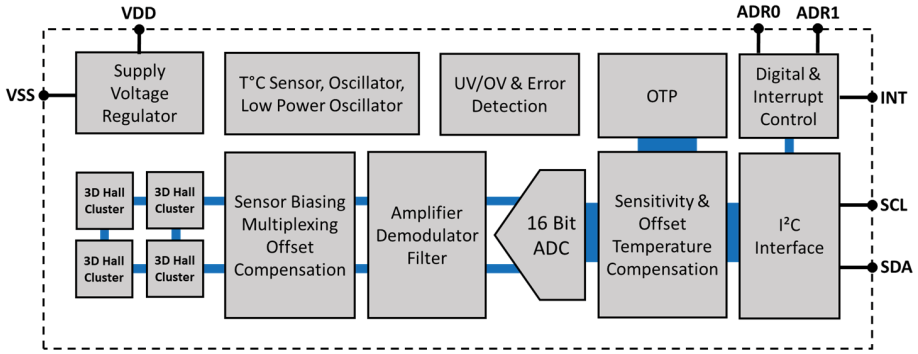
TSSOP-8L Package

Recommended Application Circuit



Recommended component values:
C1, C2:100nF; **R1, R2, R3**: 10 kΩ; **R4, R5**: ≥ 100kΩ

Block Diagram



Highlights

· Customer programmable Br sensor configurations
· Very high magnetic system design flexibility
· Stray field immunity even for the joystick function
· Wake-up function triggered by external signal or by magnetic & temperature event
· Customer programmable wake-up function relative and absolute threshold value
· Customer programmable pause time
· Small SMD package

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