S4-3DB01

Srayfield immune 3D linear Hall - effect sensor with 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 I^2C interface. Sensitivity and operation modes are user selectable by I^2C interface. It features three different power modes and three different measurement modes with parameters selectable via I^2C. This enables a large variety of possible applications, using an external CPU controlling the device.

Applications

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

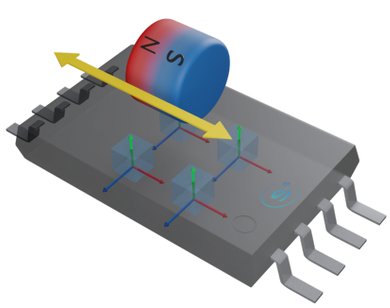
Key Features

- Unique backside Hall sensor technology for sensing of all three dimensions of magnetic fields from four sensor clusters
- User selectable operation modes, sensitivity and conversion rate
- I^2C interface with up to 1 MHz 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

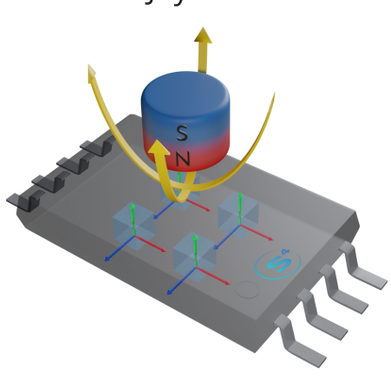
Application Example

The S4-3DB01 has four set of true 3D Hall clusters in a small SMD package that can independently do measurements of magnetic flux density in X/Y/Z axles and output 12bits 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.

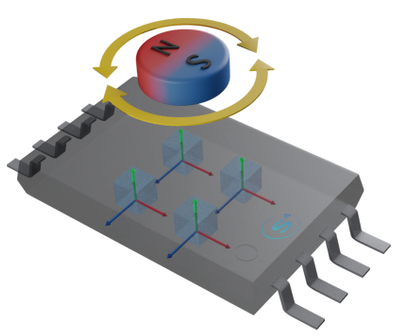
Linear



Joystick



Rotary



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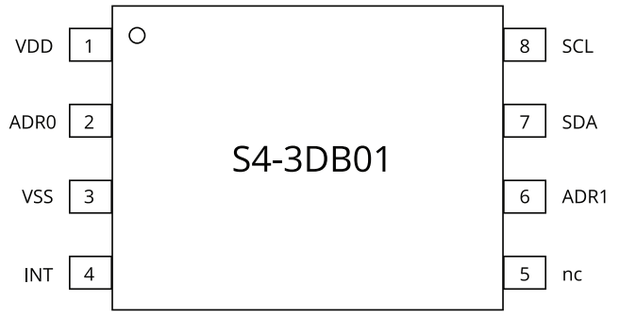
Key Specifications

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

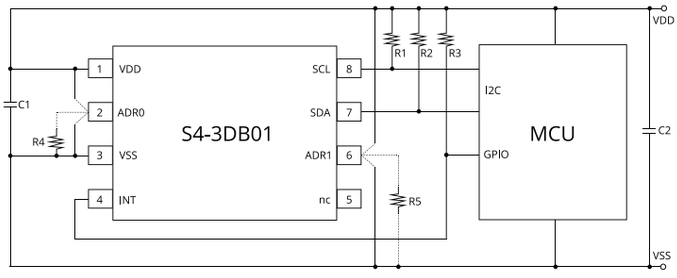
Performance	
Linearity Error	+/- 1.0%
Sensitivity Initial Error	+/- 5.0%
Sensitivity Temp. Drift	+/- 3.0%
Sensitivity mismatch	+/- 5.0%
Sensitivity mismatch Temp. Drift	+/- 3.0%
Zero Field Output	+/- 1.0%
Zero Field Output Temp. plus Supply Drift	+/- 2.0%
Cross-sensitivity	+/- 3.0%
Noise (RMS)	0.125%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

Pin Assignment



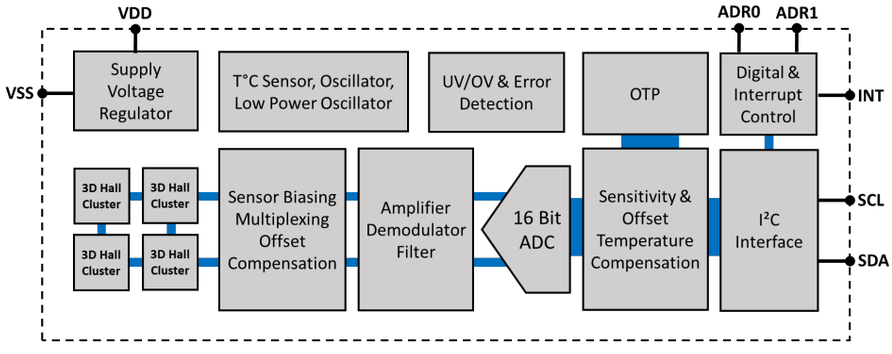
TSSOP-8L Package

Recommended Application Circuit



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