

# 3D Magnetic Sensors – Innovative Solutions

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# 3D Magnetic Sensor from Infineon – An Innovative Concept



## Lower Power Concept

**7 nanoAmp**

current consumption

## Cost Optimized Design

**New Price Level**

for magnetic 3D sensors



**Can run 39.100 years on  
two AA batteries\***

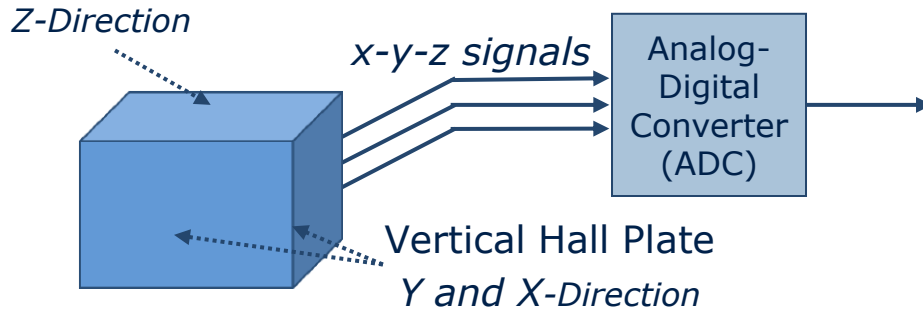
**System cost cheaper than  
with three discrete Hall  
sensors**

**Opens new applications for 3D sensor**

\*in Power Down Mode with a 2400mAh battery

# Product Description

## Horizontal Hall Plate



Vertical and horizontal Hall plates lead to:

- High magnetic accuracy
- Low offset
- Low x/z mismatch
- High linear measurement range



Rotation Movement



3D Movement



Linear Movement

# Key Features of TLV493D-A1B6 Sensor

## 3D Sensing

- 3D magnetic sensing
- 12bit data resolution for each measurement direction (Resolution  $98\mu\text{T}$  / bit LSB)
- Bx, By and Bz linear field measurement up to  $\pm 150\text{mT}$

## Low Power

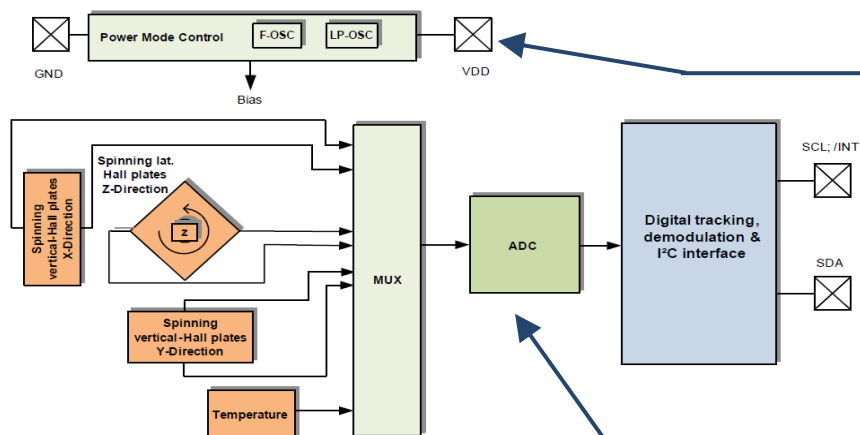
- Very low power consumption ( $10\mu\text{A}$  in Ultra Low Power Mode)
- Power down mode with ca.  $0.007\mu\text{A}$  power consumption

## Flexibility

- Integrated temperature sensing
- Digital output via 2-wire standard I<sup>2</sup>C interface / able to operate in an I<sup>2</sup>C bus
- Power modes configurable during operation
- Small, industrial 6 pin TSOP package
- Triggering by external microcontroller possible

# Block Diagram

## 3 Main Function Units



### Power mode control unit

- Responsible for power distribution
- Handling the start-up

### Sensing unit

- Performs measurement of magnetic field (X,Y & Z) and temperature
- Each Hall-plate is connected sequentially to a multiplexer

### Communication unit

- Can be accessed by microcontroller
- Able to operate in an I<sup>2</sup>C bus
- Each measurement is stored in separate registers

# Possible Industrial Applications for Low Power 3D Sensors



## Control Elements



## Joystick



## E-Meters (anti-tampering)



# TLV493D-A1B6 Offers Great Advantages to E-Meter Customers



## E-Meters (anti-tampering)



Cost Optimized  
Design

Three Dimensional  
Sensing  
Integrated temperature sensing

Energy Efficiency

### ■ Replacement of three Hall Switches:

- Less components
- Less PCB space
- Less testing

### ■ Measurement of holistic external magnetic field

### ■ Efficient E-Meter for low energy cost measurements

# Infineon Provides Extensive Documentation, Tools and Application Notes for Design Support



## Documentation

All documentation and tools are available as download @ [www.infineon.com/3Dmagnetic](http://www.infineon.com/3Dmagnetic)

Data Sheet

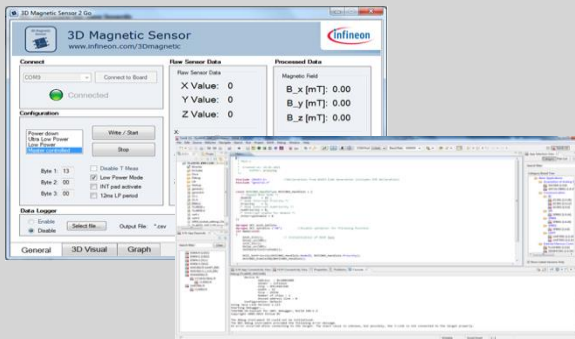


Product Brief



## Tools

3D Magnetic 2Go Eval Board



## Application Notes

Getting started Guide

E-Meter (anti-tampering)

Multi-function-knob

Joystick







# ENERGY EFFICIENCY MOBILITY SECURITY

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