HC3503

Linear Hall Effect IC

Features

-Extremely Sensitive
-Flat Response to 23 kHz
-Low-Noise Output
-4.5 V to 6 V Operation
-Magnetically Optimized Package

Applications

- Current Sensing
- Motor Control
- Position Sensing
- Magnetic Code Reading
- Ferrous Metal Detector
- Vibration Sensing
- Liquid Level Sensing
- Weight Sensing

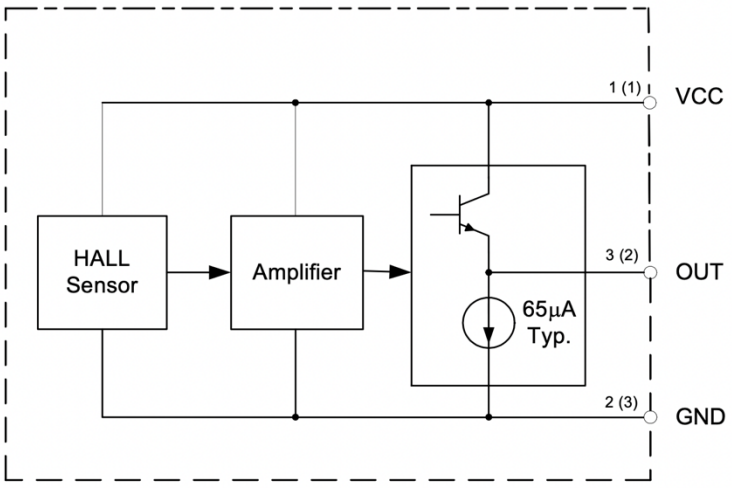
General Description

The HC3503 Hall-effect sensors accurately track extremely small changes in magnetic flux density—changes generally too small to operate Hall-effect switches.

As motion detectors, gear tooth sensors, and proximity detectors, they are magnetically driven mirrors of mechanical events. As sensitive monitors of electromagnets, they can effectively measure a system's performance with negligible system loading while providing isolation from contaminated and electrically noisy environments.

Each Hall-effect integrated circuit includes a Hall sensing element, linear amplifier, and emitter-follower output stage. Problems associated with handling tiny analog signals are minimized by having the Hall cell and amplifier on a single chip.

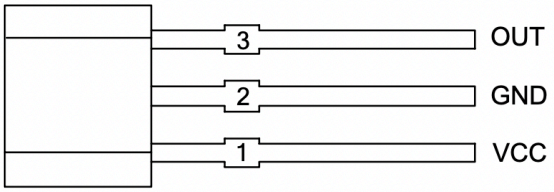
Block Diagram



A (B)
A for TO-92S
B for SOT-23-3

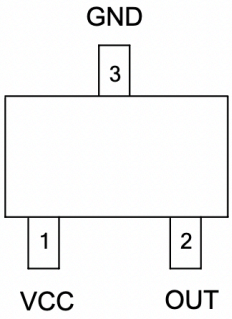
Pin Assignment

Z3 Package
(TO-92S)



(Front View)

N Package
(SOT-23-3)



(Top View)

Pin Number		Pin Name	Function
TO-92S	SOT-23-3		
1	1	VCC	Supply voltage
2	3	GND	Ground pin
3	2	OUT	Output

Absolute Maximum Ratings (at Ta=25°C)

Characteristics	Symbol	Values	Unit
Supply voltage	V_{CC}	6	V
Output Current	Io	9	mA
Operating temperature range	T_a	-40~+100	°C
Storage temperature range	T_s	-50~+150	°C
ESD (Human Body Model)		3000	V

Electrical Characteristics (T=+25°C Vcc = 5V)

Characteristic	Symbol	Conditions	Min	Typ	Max	Units
Supply Current	I_{CC}			9	13	mA
Quiescent Output Voltage	V_{NULL}	@ B=0GS	2.25	2.5	2.75	V
Output Voltage Sensitivity		B=0GS to ±1000GS	0.75	1.3	1.75	mV/GS

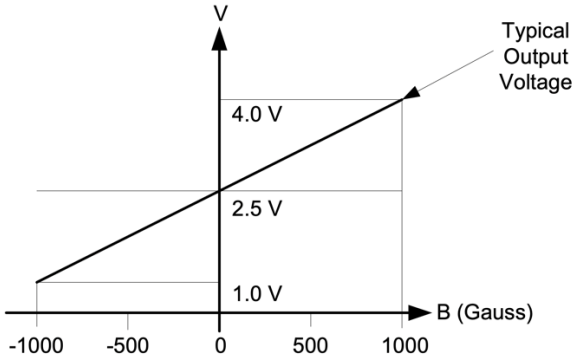
Output Voltage Span	V_{OS}		1.0 to (V_{CC}-1.0)	0.8 to (V_{CC}-0.8)		V
Output Resistor	R_O			60	120	Ω
Magnetic Field Range	B		±650	±1000		GS
Linearity of Span				0.7		%
Output Noise		BW=10Hz to 10kHz		90		μV

Transfer Characteristics (Vcc=5V)

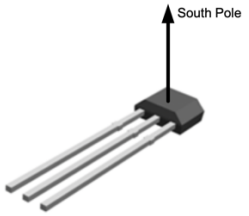
When there is no outside magnetic field (B=0GS), the quiescent output voltage is one-half the supply voltage in general.

For TO-92S package, if a south magnetic pole approches to the front face (the side with marking ID) of the Hall effect sensor, the circuit will drive the output voltage higher. Contrary, a north magnetic pole will drive the output voltage lower. The variations of voltage level up or down are symmetrical. Due to SOT-23-3 is reversed packaging with TO-92S, so the magnetic performance is also reversed. Therefor, if the reversed magnetic pole approches to the front face (the side with marking ID), the output is the same as TO-92S package.

Greatest magnetic sensitivity is obtained with a supply voltage of 6V, but at the cost of increased supply current and a slight loss of output symmetry. So, it is not recommended to work in such condition unless the output voltage magnitude is a main issue. The output signal can be capacitively coupled to an amplifier for boosting further if the changing frequency of the magnetic field is high.



The Transfer Characteristics of HC3503

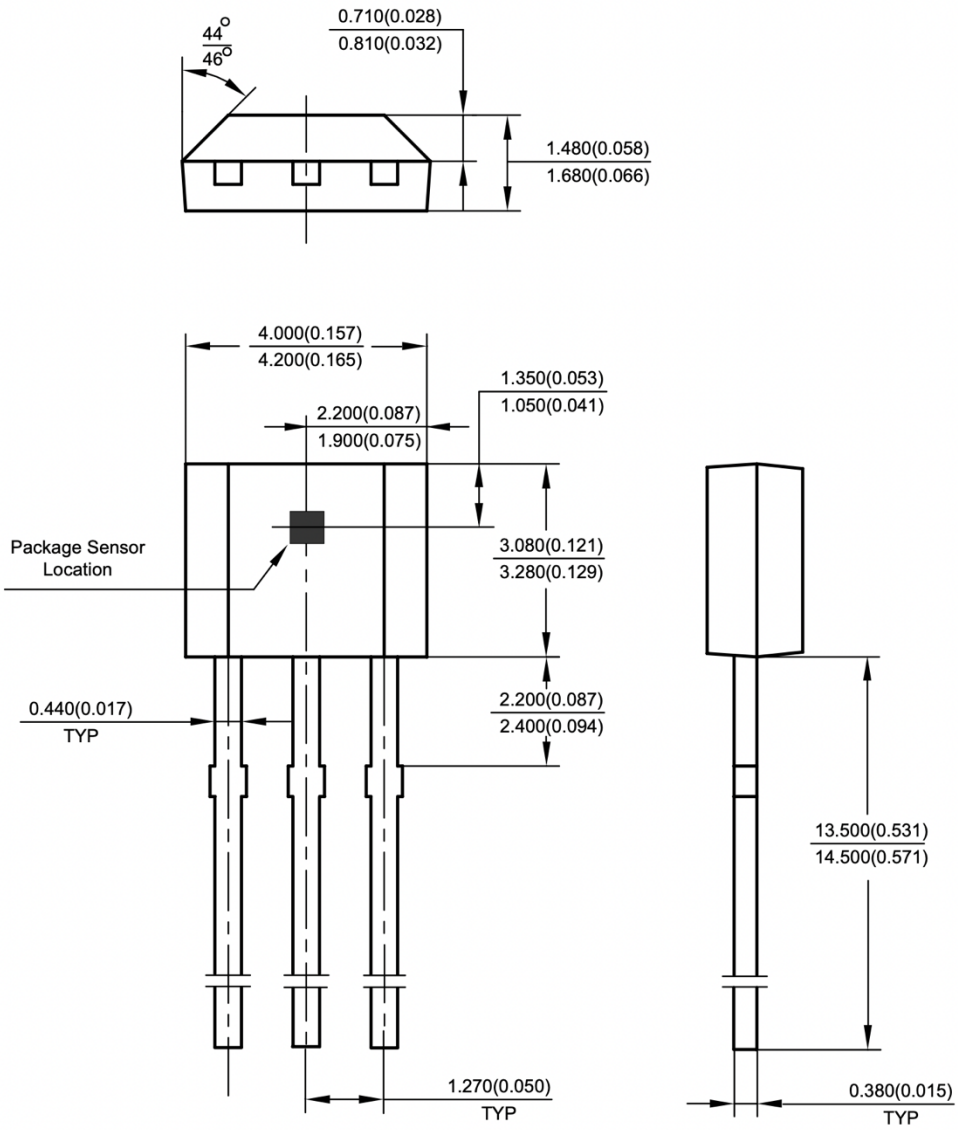


TO-92S Package

SOT-23-3 Package

Package Information

TO-92S **Unit: mm(inch)**



SOT-23-3 **Unit: mm(inch)**