

HC49E

Linear Hall Effect IC

Features

- Miniature Construction
- Power Consumption of 3.5mA at $V_{CC}=5V$ for Energy Efficiency
- Single Current Sourcing Output
- Linear Output for Circuit Design Flexibility
- Low Noise Output Virtually Eliminates the Need for Filtering
- A Stable and Accurate Output
- Temperature Range of $-40^{\circ}C$ to $85^{\circ}C$
- Responds to Either Positive or Negative Gauss

Applications

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

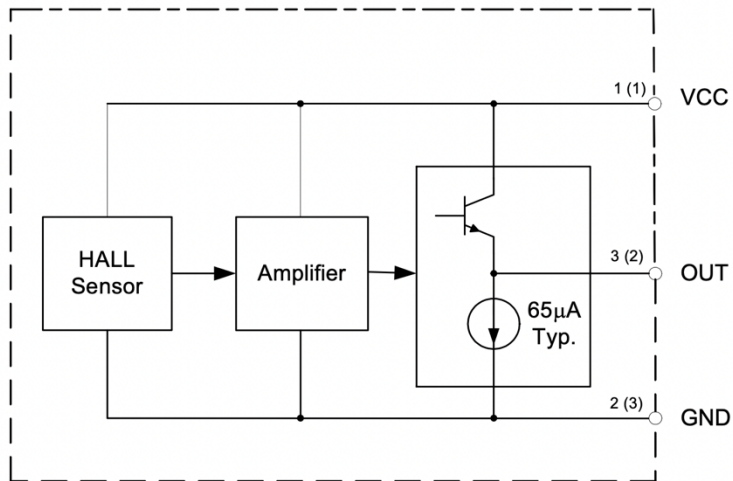
General Description

The HC49E is a small, versatile linear Hall-effect device that is operated by the magnetic field from a permanent magnet or an electromagnet. The output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field.

The integrated circuitry features low noise output, which makes it unnecessary to use external filtering. It also includes precision resistors to provide increased temperature stability and accuracy. The operating temperature range of these linear Hall sensors is $-40^{\circ}C$ to $85^{\circ}C$, appropriate for commercial, consumer and industrial applications.

The HC49E is available in standard TO-92S and SOT-23-3 packages.

Block Diagram

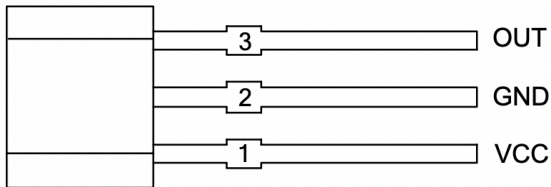


A (B)
A for TO-92S
B for SOT-23-3

Pin Assignment

Z3 Package

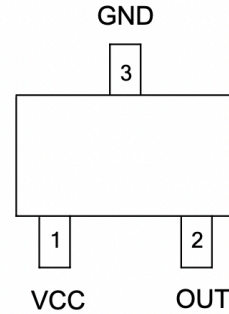
(TO-92S)



(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}	8	V
Output Current	I _O	10	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 V_{CC} = 5V)

Characteristic	Symbol	Conditions	Min	Typ	Max	Units
Supply Current	I _{CC}			3.5	4.5	mA
Quiescent Output Voltage	V _{NULL}	@ B=0GS	2.25	2.5	2.75	V
Output Voltage Sensitivity		B=0GS to ±1000GS	1.1	1.6	2.1	mV/GS

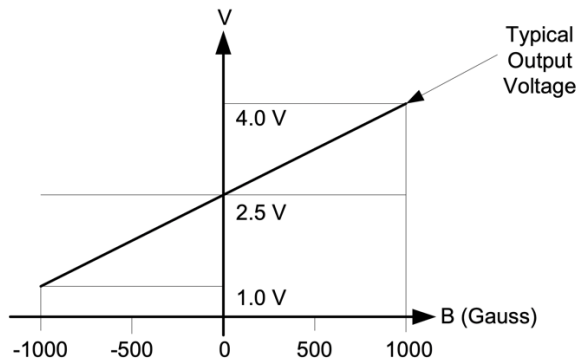
Output Voltage Span	V_{OS}		1.0 to ($V_{CC}-1.0$)	0.8 to ($V_{CC}-0.8$)		V
Output Resistor	R_O			60	120	Ω
Magnetic Field Range	B		± 650	± 1000		GS
Linearity of Span				0.7		%
Output Noise		BW=10Hz to 10kHz		90		μV

Transfer Characteristics ($V_{CC}=5V$)

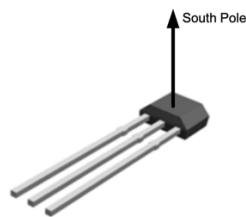
When there is no outside magnetic field ($B=0GS$), the quiescent output voltage is one-half the supply voltage in general.

For TO-92S package, if a south magnetic pole approaches 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. Therefore, if the reversed magnetic pole approaches to the front face (the side with marking ID), the output is the same as TO-92S package.

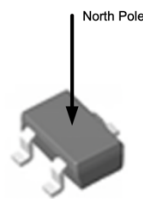
Greatest magnetic sensitivity is obtained with a supply voltage of 6V, but at the cost of increased supply current and a slight loss of output symmetry. So, it is not recommended to work in such condition unless the output voltage magnitude is a main issue. The output signal can be capacitively coupled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



The Transfer Characteristics of HC49E



TO-92S Package

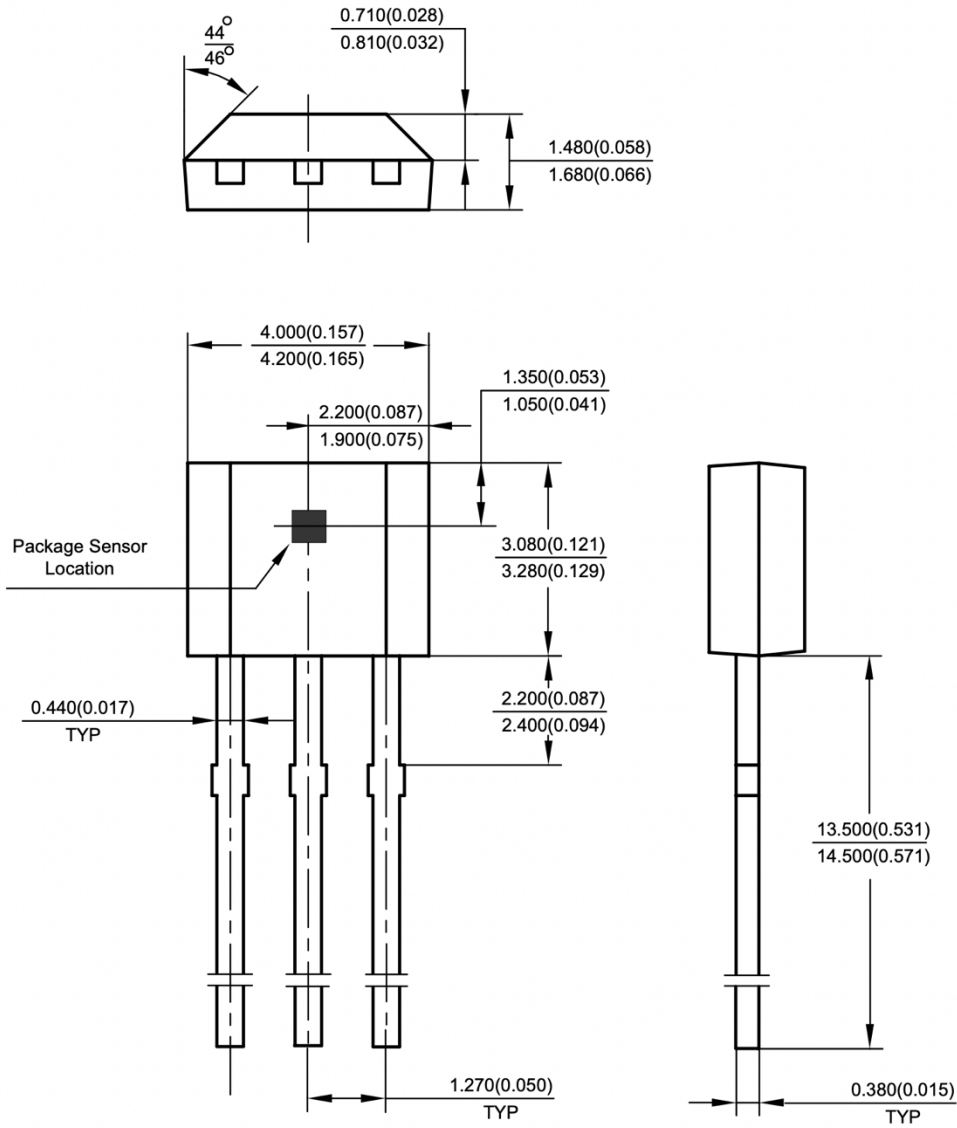


SOT-23-3 Package

Package Information

TO-92S

Unit: mm(inch)



SOT-23-3

Unit: mm(inch)

