Version 1
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CYSJ106DFN GaAs Hall Effect Element

CYSJ106DFN series Hall-effect element is an ion-implanted magnetic field sensor made of mono-crystal gallium arsenide (GaAs) semiconductor material group Ⅲ-V using ion-implanted technology. It can convert a magnetic flux density signal linearly into voltage output.

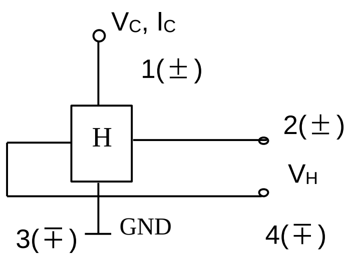
FEATURES

- High Linearity
- Superior Temperature Stability
- Miniature Package
- Wide measuring range 0-3T

TYPICAL APPLICATION

- Magnetic Field Measurement
- DC Brushless Motor
- Current Sensor
- Non-contact Switch
- Position Control
- Detection Of Revolution

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Value	Unit
Max. Input Current/Voltage	I_C/V_C	11mA / 9.5V	mA/V
Max. Input Power	P_D	105	mW
Operating temperature range	T_A	-40~125	°C
Storage temperature range	T_S	-40~150	°C

ELECTRICAL CHARACTERISTICS（T_A=25°C）

Parameter	Symbol	Test conditions	Value	Unit
Hall output voltage	V_H	B=100mT, I_C=8mA/V_C=6V	110 ~150	mV
Offset voltage	Vos(Vu)	V_C=6V, B=0mT	±5	mV
Input resistance	R_{in}	B=0mT, I_C=0.1mA	650~850	Ω
Output resistance	R_{out}	B=0mT, I_C=0.1mA	650~850	Ω
Temperature coefficient of Hall output voltage	αV_H	I_C=5mA , B=50mT (Ta=25°C ~ 125°C)	-0.06	%/°C
Temperature coefficient of input and output resistance	αR_{in} αR_{out}	I_C=0.1mA , B=0mT (Ta=25°C ~ 125°C)	0.3	%/°C
Linearity	ΔK_H	I_C=5mA B=0.1/0.5T	±2	%

Notes:

$V_H = V_{H\text{-}M} - V_{os}$, where $V_{H\text{-}M}$ is the output voltage of Hall element, V_H is the Hall voltage and V_{os} is the offset voltage under the identical electrical stimuli.

$$\alpha V_H = \frac{1}{V_H(T_1)} x \frac{V_H(T_2) - V_H(T_1)}{T_2 - T_1} x100 ,\qquad \alpha R_{in} = \frac{1}{R_{in}(T_1)} x \frac{R_{in}(T_2) - R_{in}(T_1)}{T_2 - T_1} x100$$

$$\Delta K_H = \frac{K(B_1) - K(B_2)}{[K(B_1) + K(B_2)]} x200 \qquad K_H = \frac{V_H}{I_C B}$$

T_1=25°C, T_2=125°C, B_1=0.5T, B_2=0.1T

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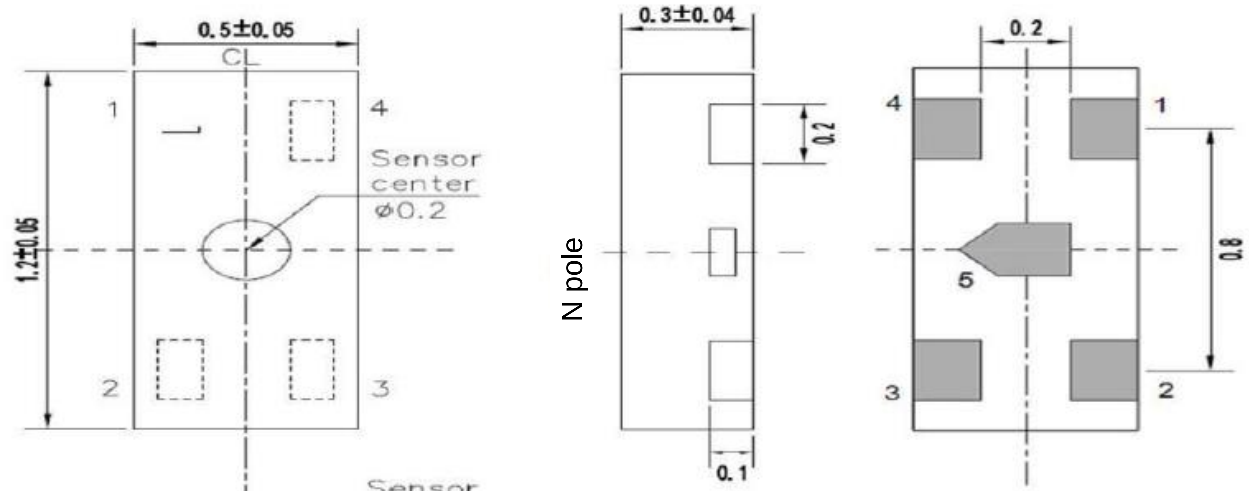
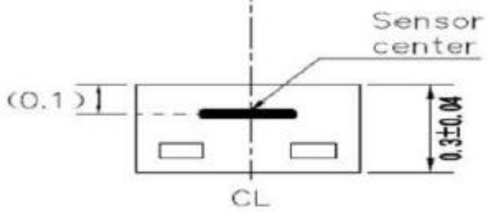
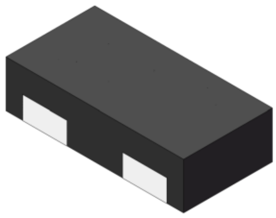
Package Outline Drawing (Unit: mm)

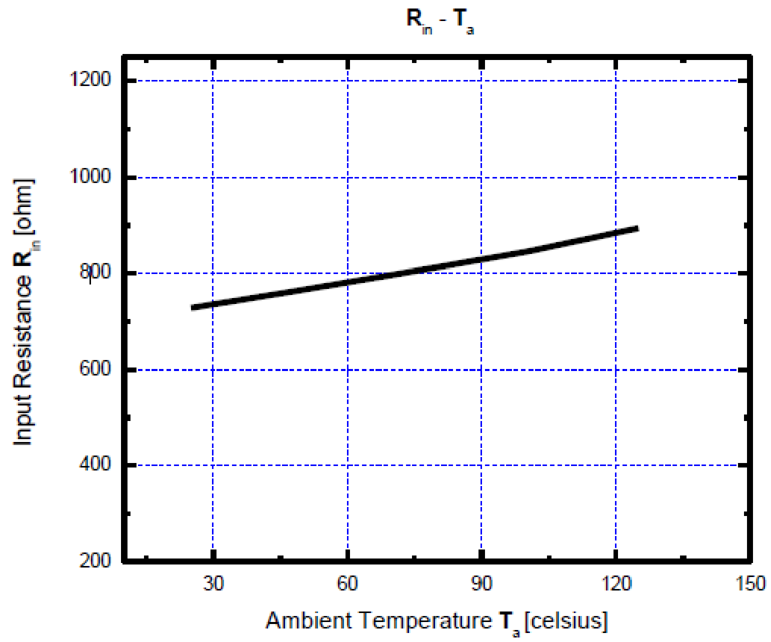




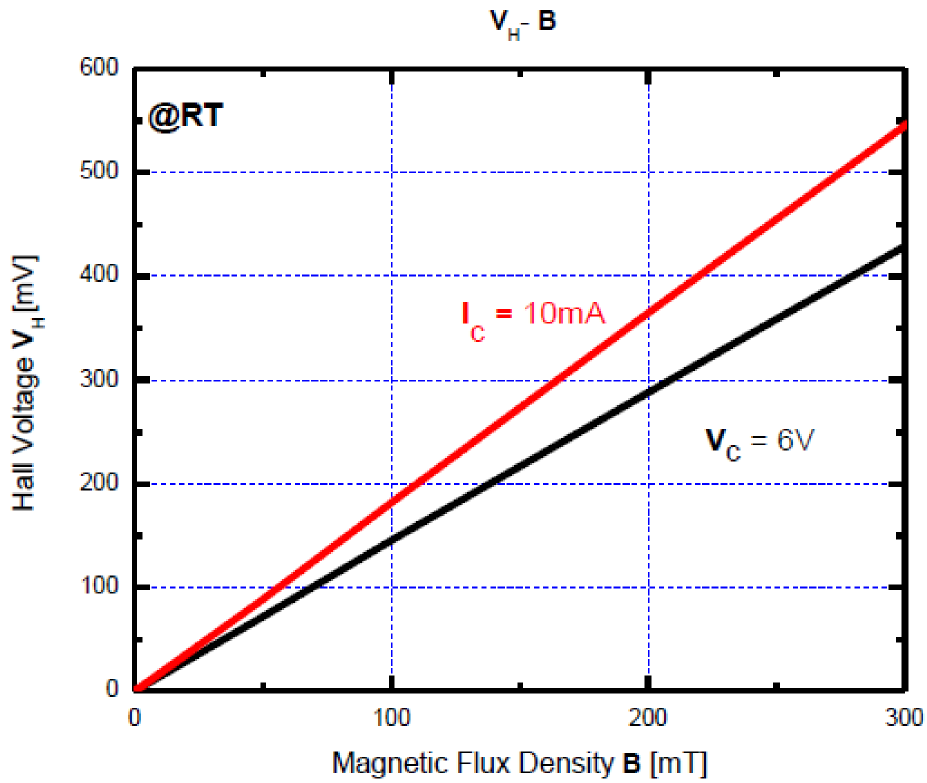


Pinning		
INPUT	1 +/−	3 −/+
OUTPUT	2 +/−	4 -/+

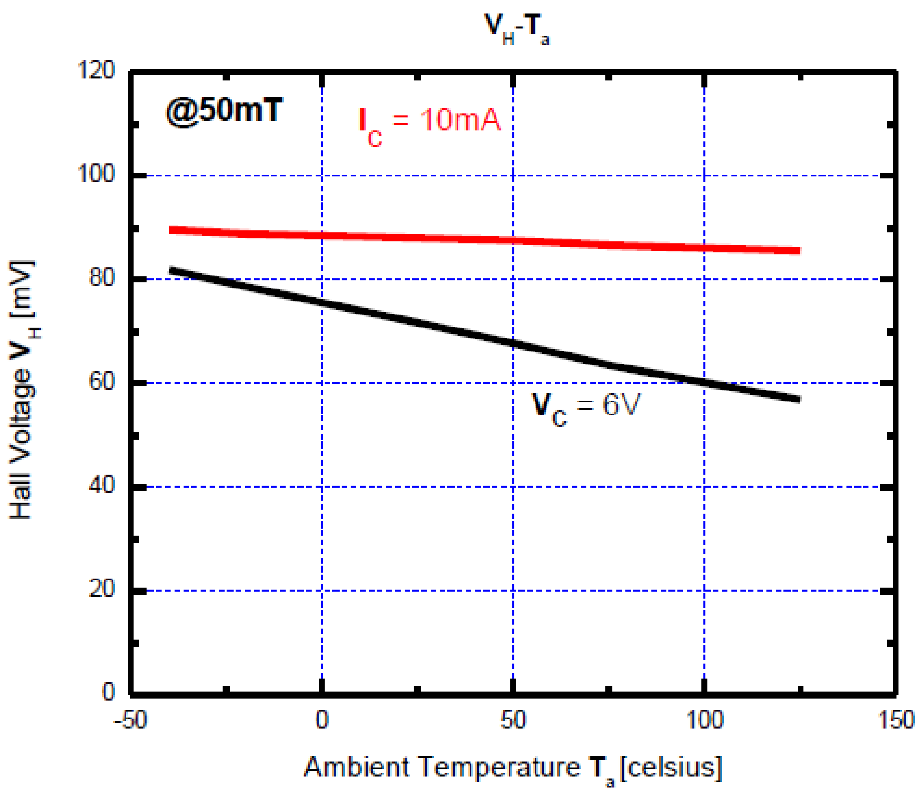
Characteristic Curves



Input resistance R_{in} as a function of ambient temperature T_a .



. Hall voltage V_H as a function of magnetic flux density ***B.***



. Hall voltage V_H as a function of ambient temperature T_a.

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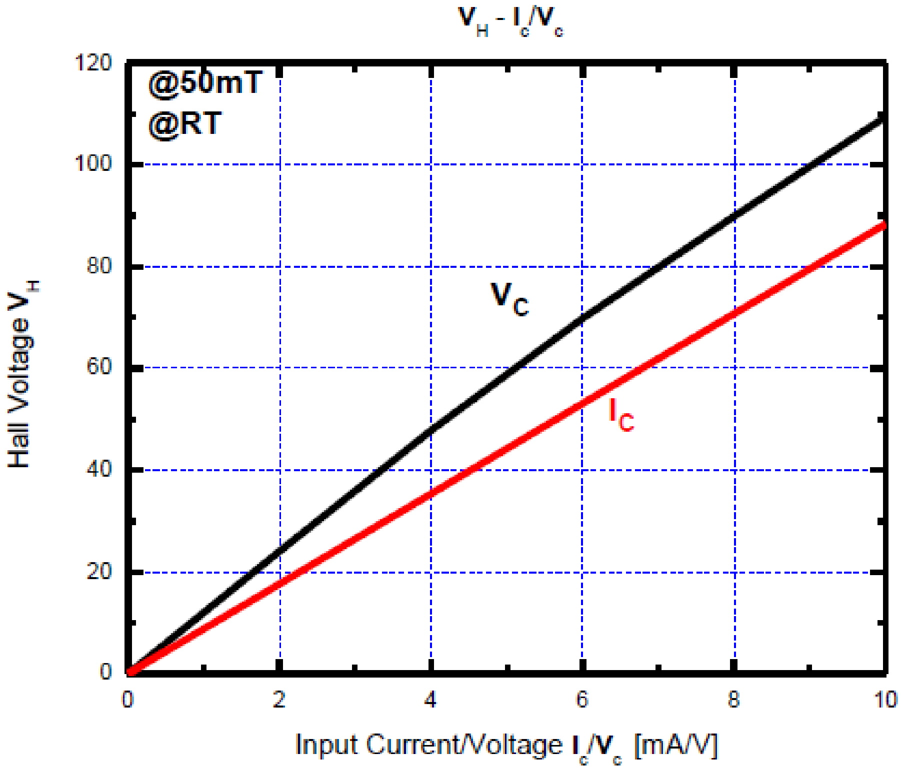


Hall voltage V_H as a function of electrical stimuli I_c/ V_c.

Precautions for ESD

This product is the device that is sensitive to ESD (Electrostatic Discharge). Handling Hall Elements with the ESD-Caution mark under the environment in which

- Static electrical charge is unlikely to arise. (Ex; Relative Humidity; over 40%RH).
- Wearing the antistatic suit and wristband when handling the devices.
- Implementing measures against ESD as for containers that directly touch the devices.

Precautions for Storage

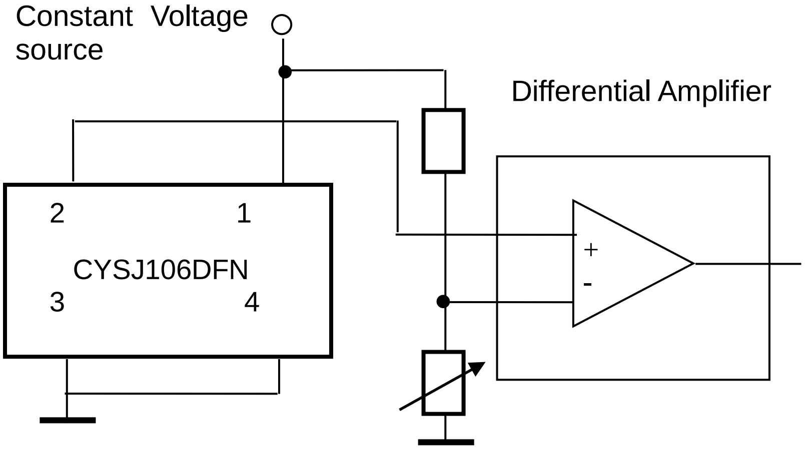
- Products should be stored at an appropriate temperature and humidity (5 to 35°C, 40 to 60%RH) after the unsealing of MBB. Keeping products away from chlorine and corrosive gas.
- Long-term storage: products are sealed in MBB.
- For storage longer than 2 years, it is recommended to store in nitrogen atmosphere with MBB sealed. Oxygen and H_2O of atmosphere oxidizes leads of products and lead solder ability get worse.

Precautions for Safety

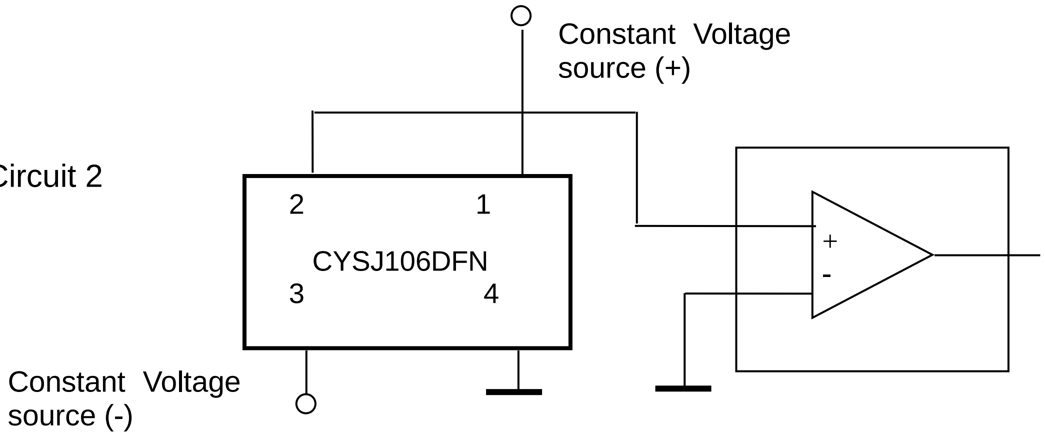
- Do not alter the form of this product into a gas, powder or liquid through burning, crushing or chemical processing.
- Observe laws and company regulations when discarding this product.

Connection

Circuit 1



Circuit 2



Application Notes

The Hall voltage V_H can be positive and negative. But if one connects the sensor as follows (circuit 1):

Pin 1:	positive input voltage V+, for instance +5VDC.
Pin 3:	GND
Pin 2:	OUTPUT
Pin 4:	GND

One can only measure the positive voltage at the pin 2. This means that the output voltage at zero magnetic field is not zero. This voltage is called as offset voltage. The output voltage in this case is not equal to the Hall voltage. The output voltage is equal to the sum of offset voltage and Hall voltage.

The offset voltage will be zero if you connect double power supplies V+ and V- to the sensor (circuit 2):

Pin 1:	positive input voltage V+, for instance +5VDC.
Pin 3:	negative input voltage V-, for instance -5VDC
Pin 2:	OUTPUT
Pin 4:	GND

In this case the output voltage is equal to the Hall Voltage.