

CYSJ106C GaAs Hall Effect Element

CYSJ106C series Hall-effect element is a 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.

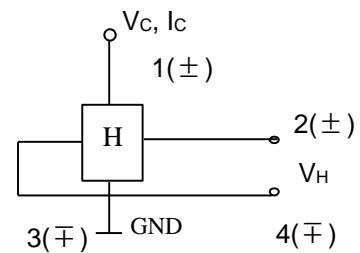
FEATURES

- 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	13mA / 10V	mA/V
Max. Input Power	P _D	150	mW
Operating temperature range	T _A	-40~125	°C
Storage temperature range	T _S	-55~150	°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	V _{os} (V _u)	V _c =6V, B=0mT	±11	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=100mT (T _a =25°C ~ 125°C)	-0.06	%/°C
Temperature coefficient of input and output resistance	αR _{in} αR _{out}	I _c =0.1mA, B=0mT (T _a =25°C ~ 125°C)	0.3	%/°C
Linearity	ΔK _H	I _c =5mA B=0.1/0.5T	2	%

Notes:

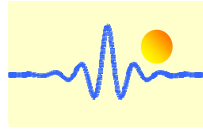
$$\alpha V_H = \frac{1}{V_H(T_1)} \times \frac{V_H(T_2) - V_H(T_1)}{T_2 - T_1} \times 100,$$

$$\Delta K_H = \frac{K(B_1) - K(B_2)}{[K(B_1) + K(B_2)]} \times 200$$

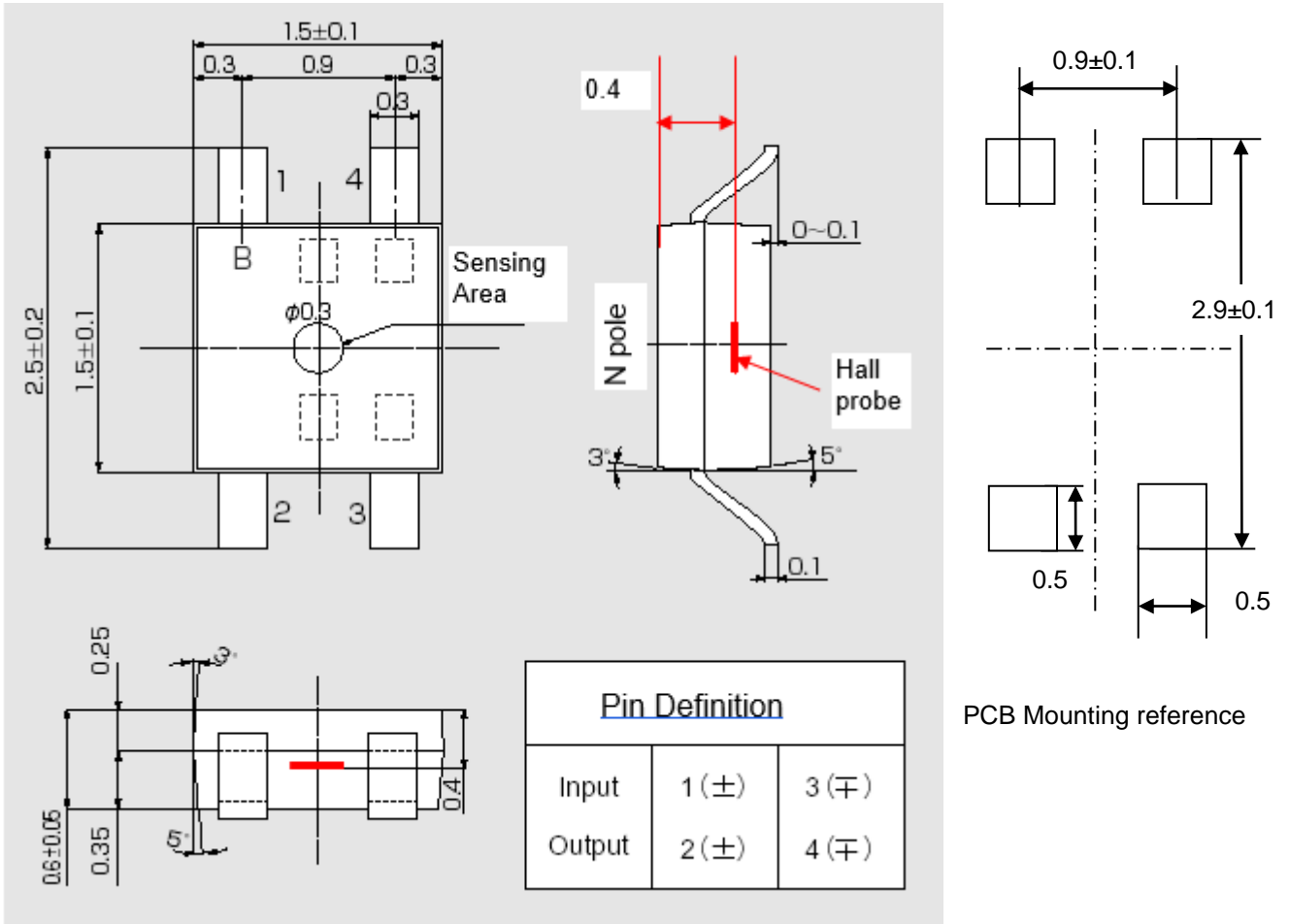
$$T_1=25^\circ\text{C}, T_2=125^\circ\text{C}, \quad B_1=0.5\text{T}, B_2=0.1\text{T}$$

$$\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_2) - R_{in}(T_1)}{T_2 - T_1} \times 100$$

$$K_H = \frac{V_H}{I_C B}$$

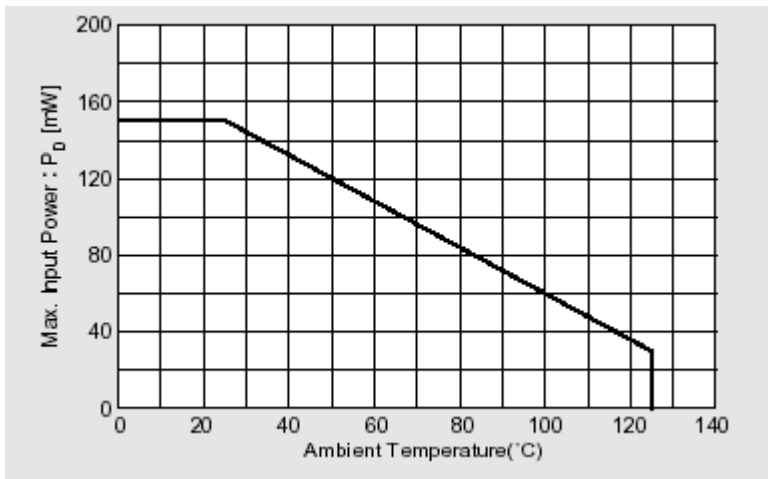


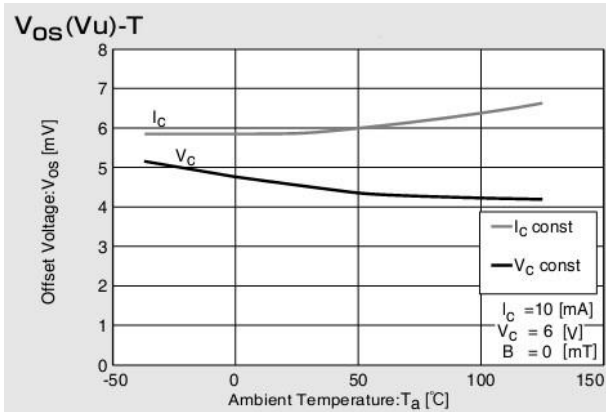
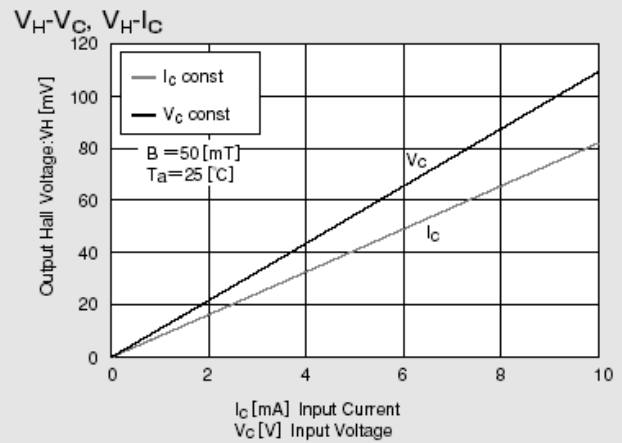
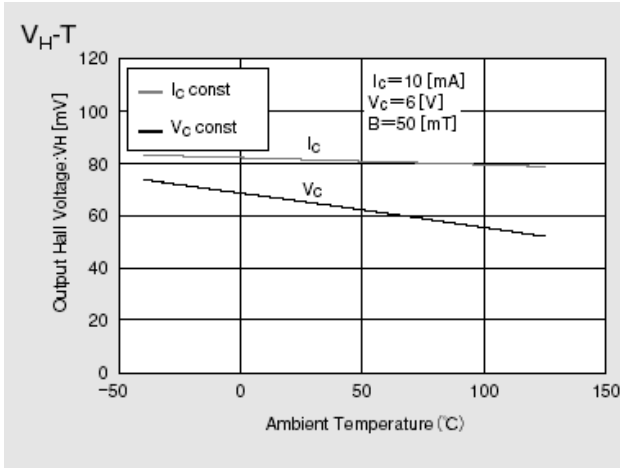
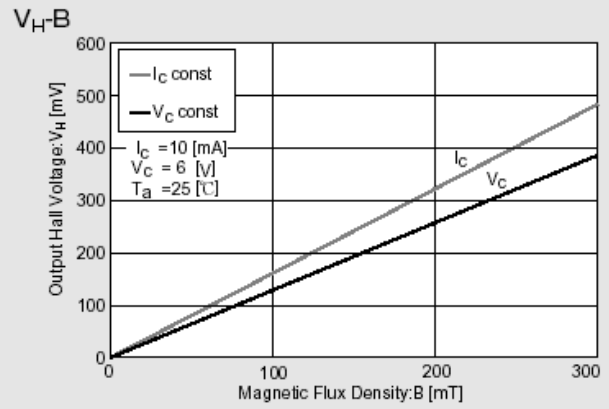
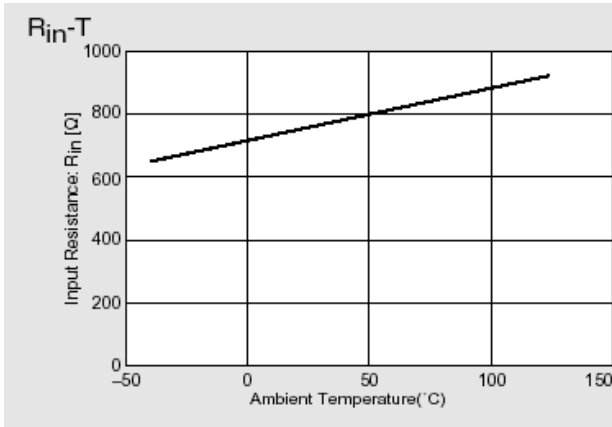
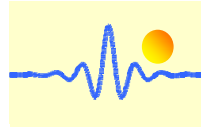
Package Outline Drawing (Unit: mm)



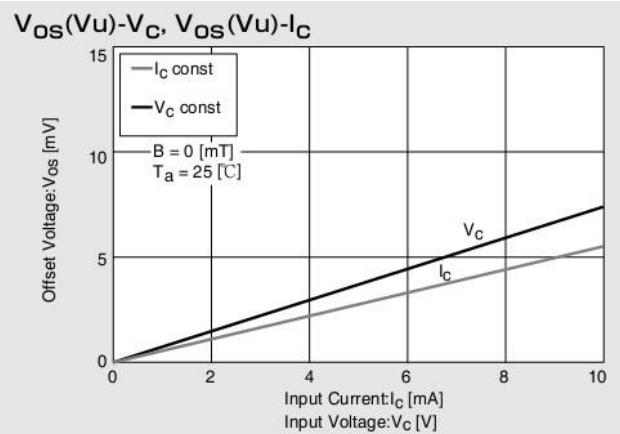
Characteristic Curves

Allowable Package Power Dissipation

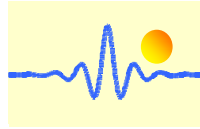




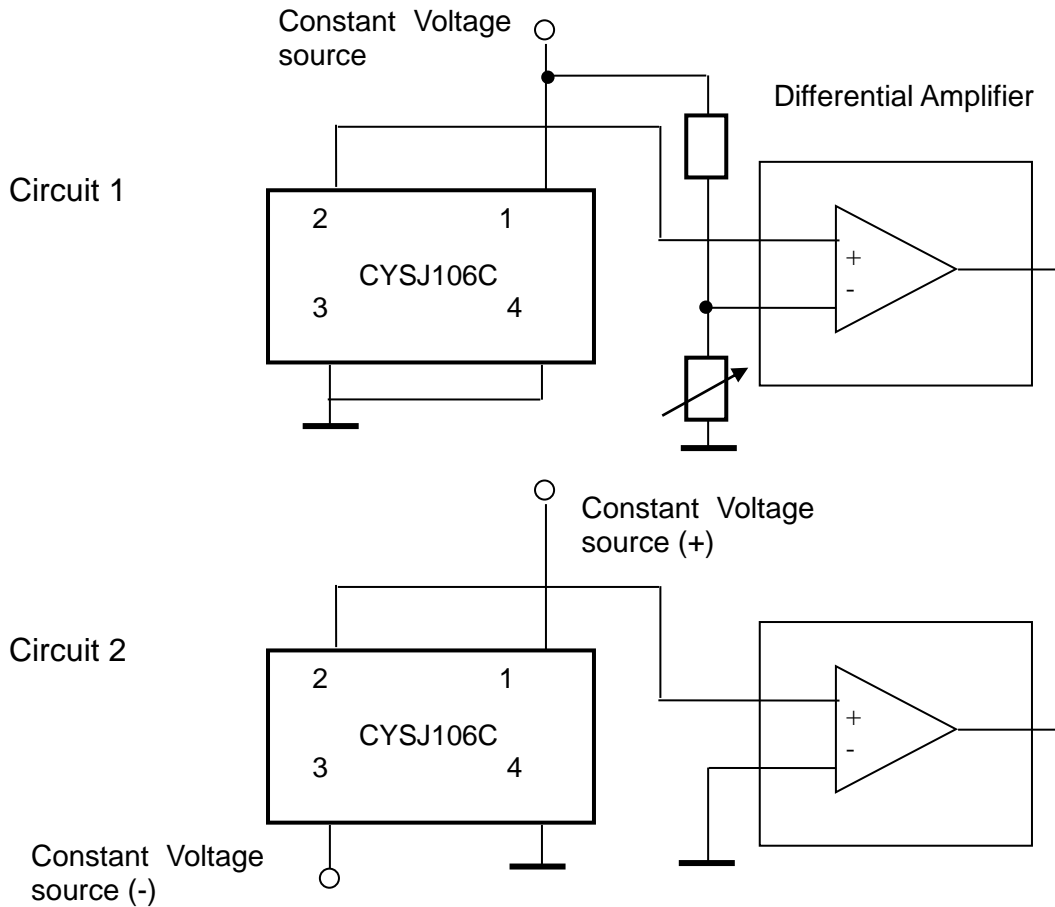
※Magnetic Flux Density
1[mT]=10[G]



In This Example : $R_{in}=750$ [Ω] , $V_{OS}=4.6$ [mV] , $V_C=6$ [V]



Connection



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.