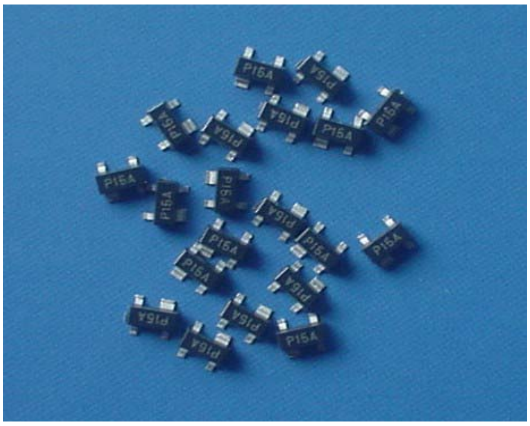
ChenYang
Technologies GmbH & Co. KG

Hall Effect Sensor CY-P15A

CY-P15A Hall Effect Sensor is outstanding for its Ultra-High sensitivity and its low temperature coefficients. This sensor is made by using the technique of Molecular Beam Epitaxy (MBE), which provides excellent uniformity and reproducibility.

Features:

- Ultra-High Sensitivity (1000V/AT)
- Low current requirement
- Very low power consumption
- Extended operating temperature range
- Small linearity error of the Hall voltage
- Plastic miniature package SOT-143 for surface mounting
- Wide measuring range (0.1μT-2T)



Applications:

- Magnetic field measurement
- Low temperature applications
- Current and power measurement
- Control of brushless DC motors
- Microswitches
- Position sensors

1. Model

CY-P15A Hall Sensor is fabricated from AlGaAs/InGaAs/GaAs-2DEG (two-dimensional electron gas) heterojunction semiconductor.

2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Control Voltage	V_c	6	V
Control Current	I_c	1.5	mA
Power Dissipation	P_D	9	mW
Operating Temperature	T_{op}	-100 ~ +180	^oC
Storage Temperature	T_s	-100 ~ +180	^oC
Soldering Temperature#	T_{sol}	260	^oC

#Soldering time: 10 seconds

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3. Electrical Characteristics

Parameter	Symbol	Test Condition	MIN	TYP	MAX	Unit
Output Hall Voltage	V_H	Ic=1mA, B=100mT	-	100	-	mV
Residual Ratio*[1]	V_{HO}/V_H	Ic=1mA	-10	-	+10	%
Residual Ratio*[1]	V_{HO}/V_H	Ic=0.5mA	-4	-	+4	%
Input Resistance	R_{IN}	Ic=0.1mA, B=0 mT	3.9	4	4.4	kΩ
Output Resistance	R_{OUT}	Ic=0.1mA, B=0 mT	3.9	4	4.4	kΩ
Temperature Coefficient of Hall Voltage*[2]	α	Ic=1mA, B=100mT (T_1= -100 °C,T_2=180 °C)	-0.05	-0.1	-0.13	%/ °C
Temperature Coefficient of Input Resistance*[3]	β	Ic=1mA, B=0 mT (T_1= -100 °C,T_2=180 °C)	-	0.3	0.4	%/ °C
Linearity of Hall Voltage*[4]	γ	Ic= 1mA, B_1=60mT,B_2=500mT	-	1	1.5	%

*1 $$Residual\ Ratio = \frac{V_{Ho}(B = 0mT)}{V_H(B = 100mT)}$$

*2 $$\alpha = \frac{1}{V_H(T_1)} \times \frac{V_H(T_2) - V_H(T_1)}{T_2 - T_1} \times 100$$

*3 $$\beta = \frac{1}{R_{IN}(T_1)} \times \frac{R_{IN}(T_2) - R_{IN}(T_1)}{T_2 - T_1} \times 100$$

*4 $$\gamma = \frac{K_H(B_2) - K_H(B_1)}{\frac{1}{2}[K_H(B_2) + K_H(B_1)]} \times 100$$ $$K_H = \frac{V_H}{IB}$$

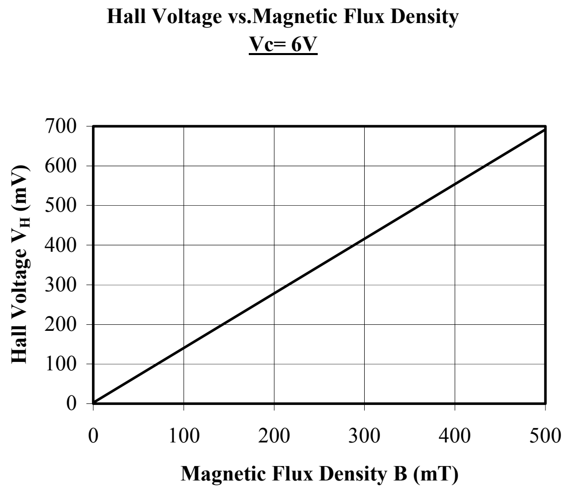
V_{Ho}: Offset Voltage

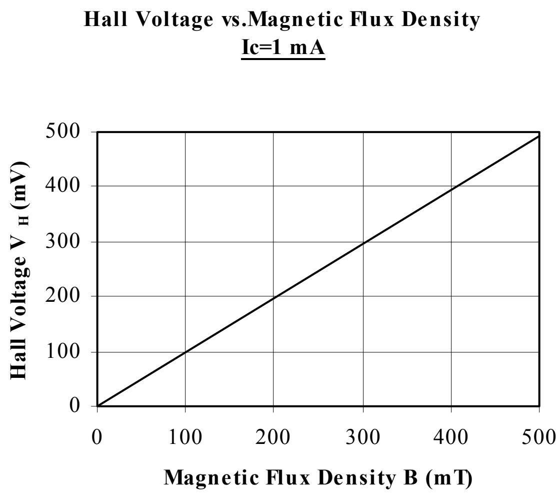
B: Magnetic Flux Density

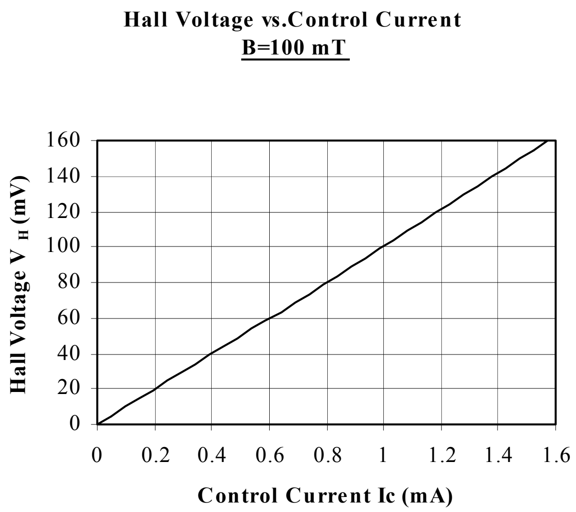
T_1, T_2: Ambient Temperature

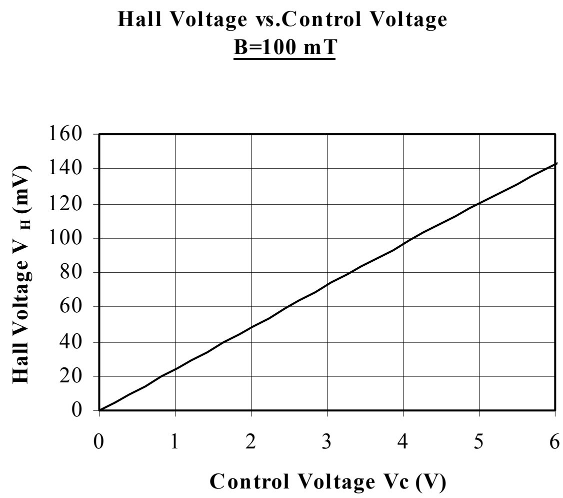
K_H: Current Sensitivity

4. Typical Characteristics

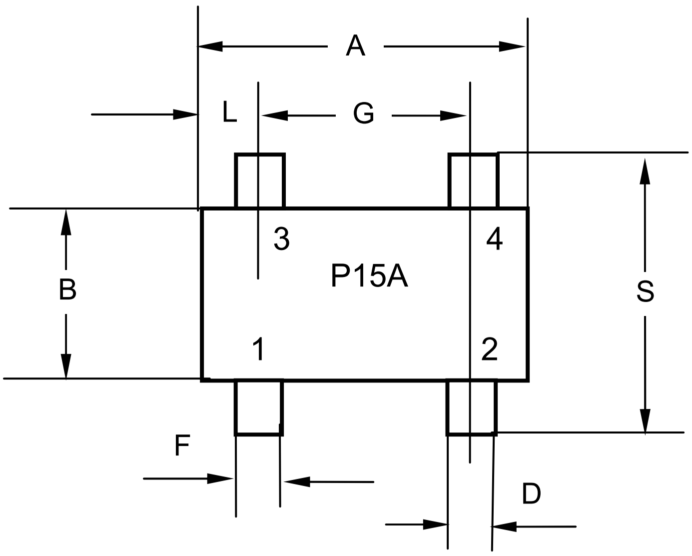




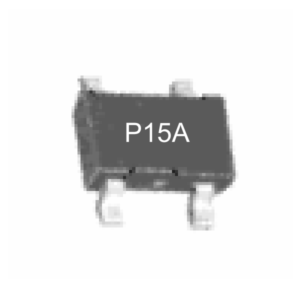


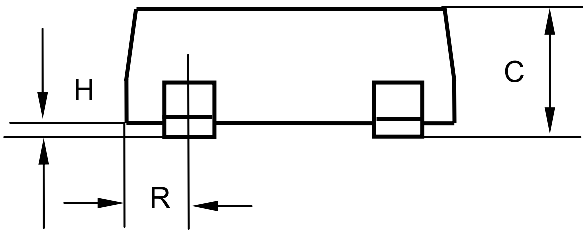


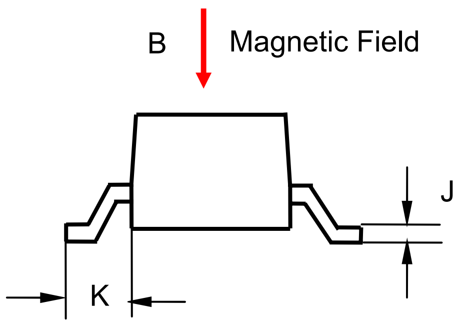
5. Outline drawings (unit: mm)



SOT 143 packaged Hall Sensor







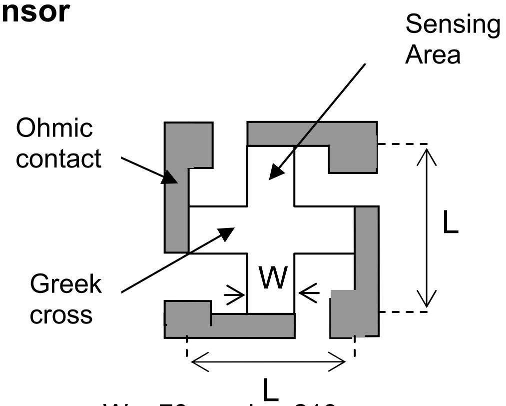
Terminal Connection

Terminal No.		Polarity
1	Input	(+)
2	Output	(-)
3	Output	(+)
4	Input	(-)

SOT 143 Package Dimensions

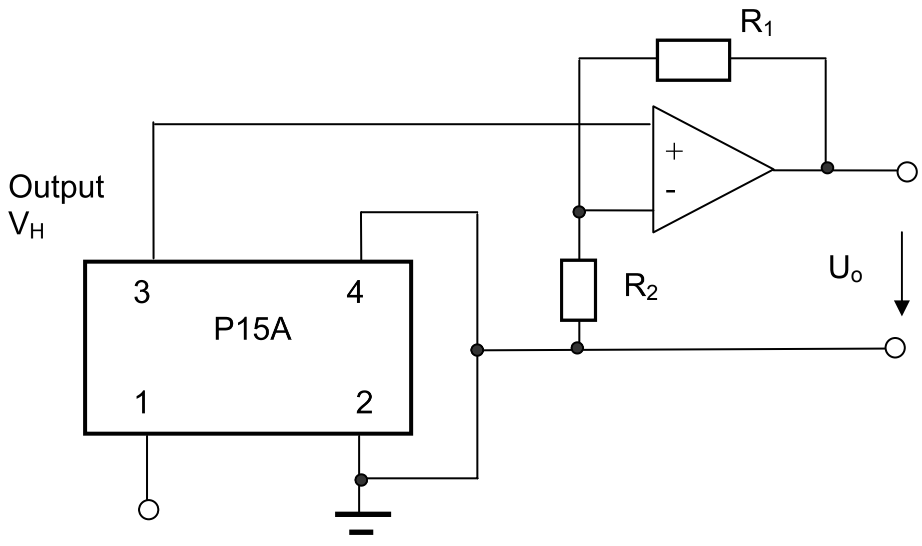
	Min (mm)	Max (mm)
A	2.8	3.04
B	1.2	1.39
C	0.89	1.14
D	0.39	0.5
F	0.39	0.5
G	1.78	2.03
H	0.013	0.1
J	0.08	0.15
K	0.46	0.6
L	0.45	0.6
R	0.45	0.6
S	2.11	2.48

Shape of the 2DEG Hall sensor



W = 70 µm, L = 210 µm

Example Circuit



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