CYTHS124 GaAs Hall Effect Element

CYTHS124 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.

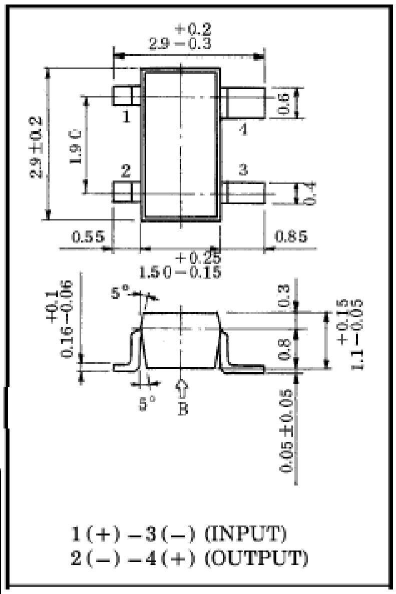
HIGH STABILITY MOTOR CONTROL.

DIGITAL TACHOMETER.

CRANK SHAFT POSITION SENSOR.

- Excellent Temperature Characteristics.
- Wide Operating Temperature Range. (; −55~125°C)
- Excellent Output Voltage Linearity.
- High Internal Resistance. : R_d = 1000Ω (Min.)
- Low Residual Voltage Ratio. : V_{HO}/V_H = ±5% (Max.)

Unit in mm



Unit weight: 0.013g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Control Voltage	V_C	12	V
Power Dissipation	P_D	150	mW
Operating Temperature Range	T_{opr}	−55~125	°C
Storage Temperature Range	T_{stg}	−55~150	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Internal Resistance (Input)	R_d	I_C=1mA	1000	1250	1500	Ω
Residual Voltage Ratio	V_{HO}/V_H	V_C=5V, B=0/B=0.1T	—	—	±5	%
Hall Voltage (Note 1)	V_H	V_C=5V, B=0.1T	130	150	170	mV
Temperature Coefficient (Note 2)	V_{HT}	I_C=5mA, B=0.1T T1=25°C, T2=125°C	—	—	−0.06	%/°C
Linearity (Note 3)	ΔK_H	V_C=5V, B1=0.05T, B2=0.1T	—	—	2	%
Specific Sensitivity (Note 4)	K*	V_C=5V, B=0.1T	—	30	—	×10⁻²/T
Internal Resistance (Output)	R_{OUT}	I_C=1mA	1800	2375	3000	Ω

Note 1 : $V_H = V_{HM} - V_{HO}$ (V_{HM} is meter indication)

Note 2 : $V_{HT} = \frac{1}{V_{H(T1)}} \cdot \frac{V_{H(T2)} - V_{H(T1)}}{T2 - T1} \times 100\ (\%/°C)$ V_{HO} : Residual Voltage

Note 3 : $\Delta K_H = \frac{K_{H(B2)} - K_{H(B1)}}{1/2\{K_{H(B1)} + K_{H(B2)}\}} \times 100\ (\%)$, $K_H = \frac{V_H}{I_C \cdot B}$ K_H : Product Sensitivity

Note 4 : $K^* = V_H / (R_d \times I_C \times B) = K_H / R_d$

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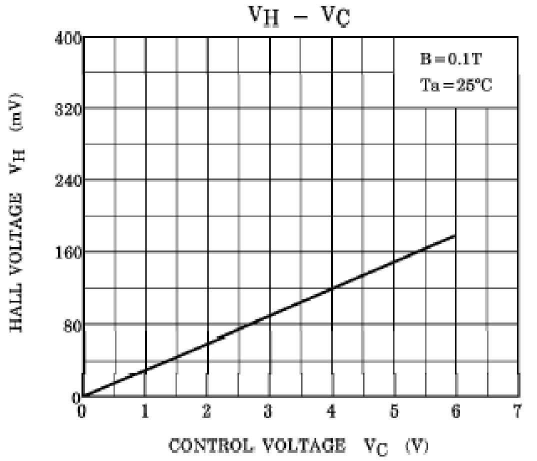
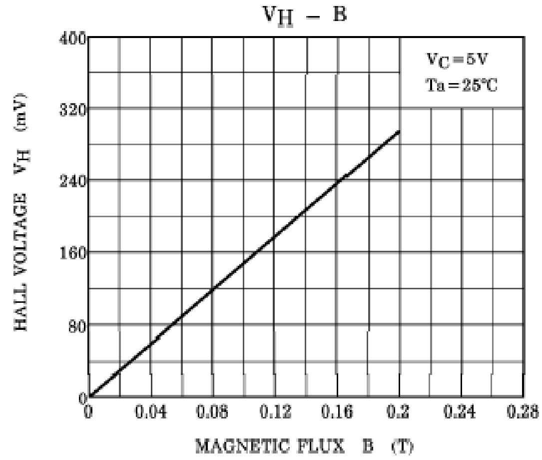
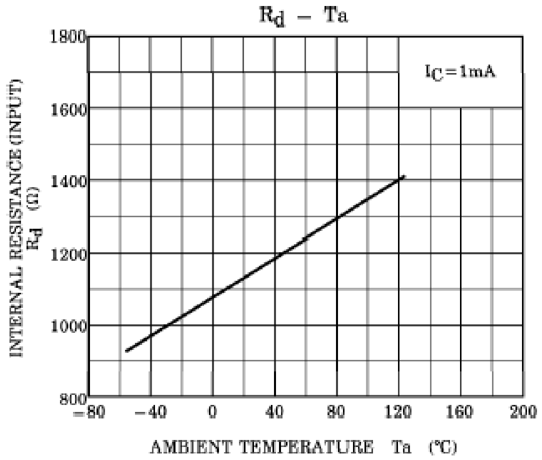
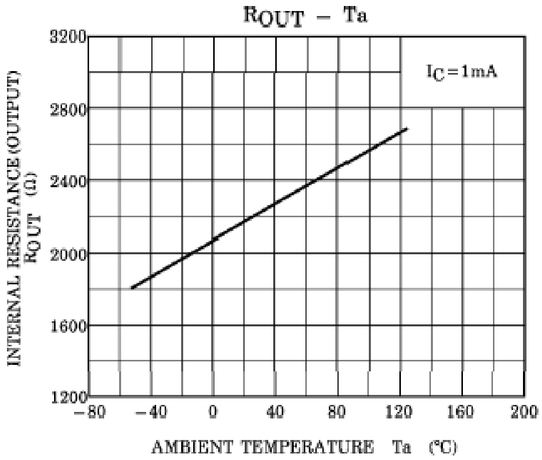
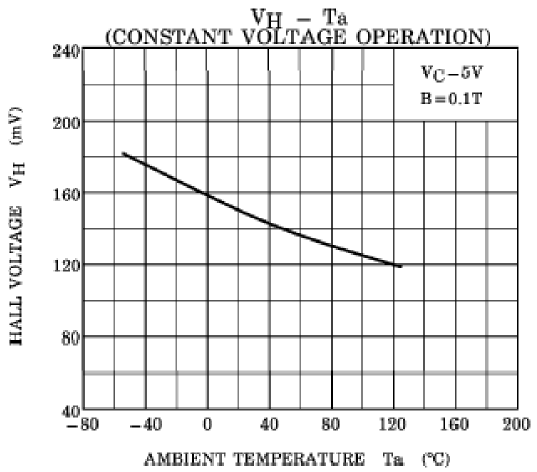
Characteristics Curves











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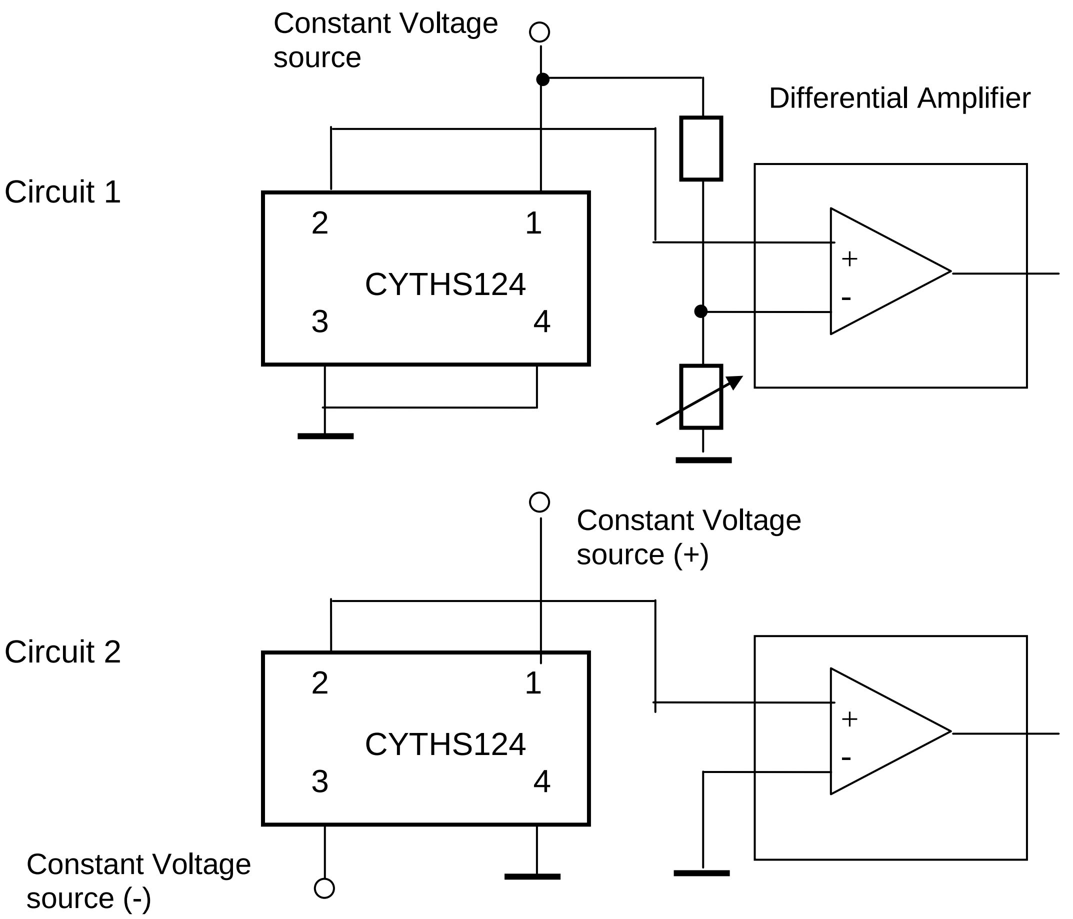
Connection



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.

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