Panasonic

OH10004

GaAs Hall Device

Magnetic sensor

■ Features

- Hall voltage: typ. 150 mV ($V_C = 6$ V, B = 0.1 T)
- Input resistance: typ. 0.85 kΩ
- Satisfactory linearity of GaAs hall voltage with respect to the magnetic field
- Small temperature coefficient of the hall voltage: $\beta \leq -0.06\%/°C$
- Mini type (4-pin) package with positioning projection. Allowing automatic insertion through the magazine package.

■ Applications

- Various hall motor (VCR, phonograph, VD, CD, and FDD)
- Automotive equipment
- Industrial equipment

■ Absolute Maximum Ratings $T_a = 25°C$

Parameter	Symbol	Rating	Unit
Control voltage	V_C	12	V
Power dissipation	P_D	150	mW
Operating ambient temperature	T_{opr}	−30 to +125	°C
Storage temperature	T_{stg}	−55 to +125	°C

Unit : mm

1 : V_H Output (−) side
2 : V_C Input   (−) side
3 : V_H Output (+) side
4 : V_C Input   (+) side

Mini Type Package (4-pin) with positioning projection

Marking Symbol: 4

■ Electrical Characteristics $T_a = 25°C$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Hall voltage[*1, 4]	V_H	$V_C = 6$ V, B = 0.1 T	130	150	170	mV
Unequilibrium ratio[*2, 4]	V_{HO}/V_H	$V_C = 6$ V, B = 0 T/B = 0.1 T			±12	%
Input resistance	R_{IN}	$I_C = 1$ mA, B = 0 T	0.50	0.85		kΩ
Output resistance	R_{OUT}	$I_C = 1$ mA, B = 0 T			5	kΩ
Temperature coefficient of hall voltage	β	$I_C = 6$ mA, B = 0.1 T			−0.06	%/°C
Temperature coefficient of input resistance	α	$I_C = 1$ mA, B = 0 T			0.3	%/°C
Linearity of hall voltage[*3]	γ	$I_C = 6$ mA, B = 0.1 T/0.5 T			2	%

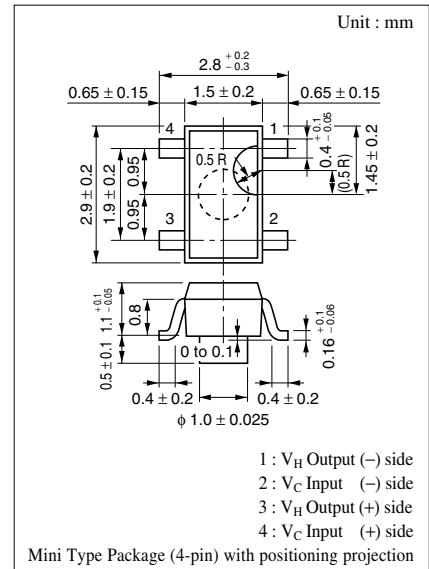Note) *1 : $V_H = \dfrac{|V_H{}^+| + |V_H{}^-|}{2}$

  *2 : Unequilibrium ratio is a percentage of V_{HO} with respect to V_H.

  *3 : The linearity γ of V_H is a percentage of a difference between cumulative sensitivity of K_{H1} and K_{H5} which are measured respectively at B = 0.1 T and 0.5 T to their average. That is,

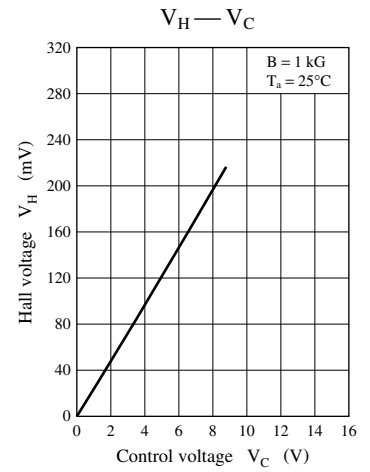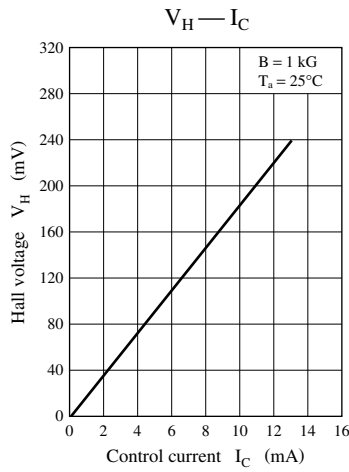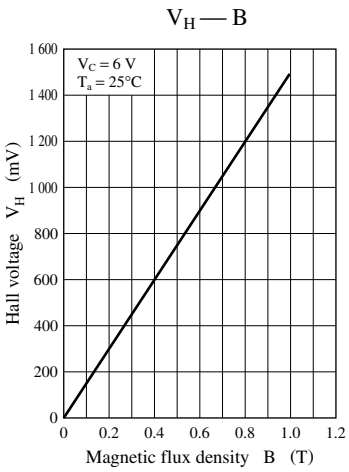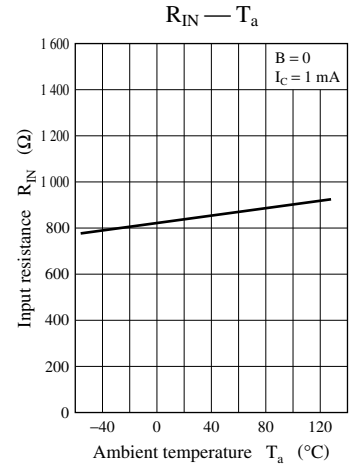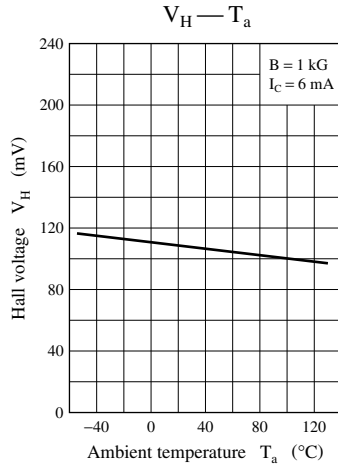 $\gamma = \dfrac{K_{H5} - K_{H1}}{1/2(K_{H1} + K_{H5})}$ (the cumulative sensitivity $K_H = \dfrac{V_H}{I_C \cdot B}$)

  *4 : V_H, V_{HO}/V_H rank classification

Class	HQ	HR	IQ	IR	KQ	KR
V_H (mV)	130 to 158	142 to 170	130 to 158	142 to 170	130 to 158	142 to 170
V_{HO}/V_H (%)	−5 to +5		+2 to +12		−2 to −12	
Marking Symbol	4HQ	4HR	4IQ	4IR	4KQ	4KR

P_D — T_a

Power dissipation P_D (mW) vs Ambient temperature T_a (°C)

V_H — T_a

Hall voltage V_H (mV) vs Ambient temperature T_a (°C)

B = 1 kG
I_C = 6 mA

R_{IN} — T_a

Input resistance R_{IN} (Ω) vs Ambient temperature T_a (°C)

B = 0
I_C = 1 mA

V_H — B

Hall voltage V_H (mV) vs Magnetic flux density B (T)

V_C = 6 V
T_a = 25°C

V_H — I_C

Hall voltage V_H (mV) vs Control current I_C (mA)

B = 1 kG
T_a = 25°C

V_H — V_C

Hall voltage V_H (mV) vs Control voltage V_C (V)

B = 1 kG
T_a = 25°C

■ Typical Drive Circuit