

# LT140A

Hall Voltage 160mV Thin-Type Package GaAs Hall Device

## Features

- Small temperature coefficient of the Hall voltage
- Good linearity of the Hall voltage
- Small imbalanced voltage
- Directly DC voltage applicable

## Applications

- Brushless motors  
VCR, CD, CD-ROM, FDD
- Measuring equipment  
Gauss meters, magnetic substance detectors
- Noncontact sensors  
Microswitches, tape-end detection
- Other magnetic detection

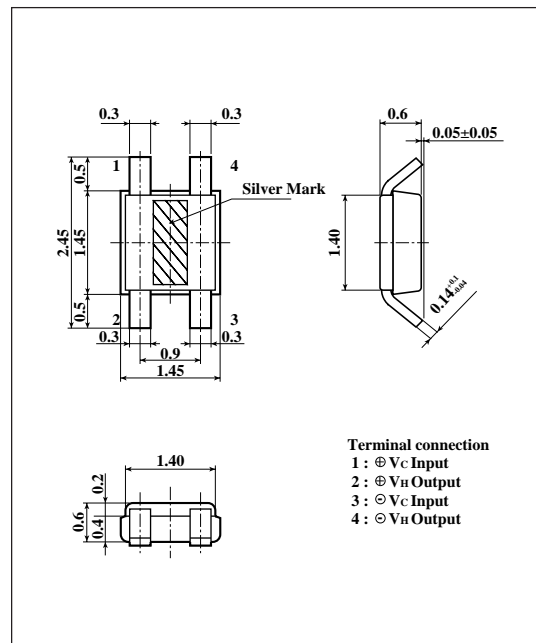
## Absolute Maximum Ratings (T<sub>a</sub>=25°C)

Parameter	Symbol	Rating	Unit
Control voltage	V <sub>C</sub>	12	V
Control current	I <sub>C</sub>	15	mA
Power dissipation	P <sub>D</sub>	150	mW
Operating temperature	T <sub>opr</sub>	-20 to +125	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C
Soldering temperature <sup>*1</sup>	T <sub>sol</sub>	260	°C

<sup>\*1</sup> Soldering time : 10 seconds

## Outline Dimensions

(Unit : mm)



As for dimensions of tape-packaged products, refer to page 44 .

## Electrical Characteristics (T<sub>a</sub>=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
No-load Hall voltage <sup>*1</sup>	V <sub>H</sub>	V <sub>C</sub> =6V, B=100mT	145	160	175	mV
Imbalanced ratio <sup>*2</sup>	Rank A	V <sub>HO</sub> /V <sub>H</sub> V <sub>C</sub> =6V, (B=0)/(B=100mT)	2	-	12	%
	Rank B		-5	-	5	
	Rank C		-2	-	-12	
Input resistance	R <sub>IN</sub>	I <sub>M</sub> =1mA, B=0mT	650	800	950	Ω
Output resistance	R <sub>OUT</sub>	I <sub>M</sub> =1mA, B=0mT	1 300	1 600	1 900	Ω
Drift of imbalanced voltage vs. temperature	ΔV <sub>HO</sub>	V <sub>C</sub> =6V, B=0mT, T <sub>a</sub> =-20°C to 25°C	-	5	-	mV
		V <sub>C</sub> =6V, B=0mT, T <sub>a</sub> =25°C to 125°C	-	-	-	
Temperature coefficient of Hall voltage	β	I <sub>C</sub> =6mA, B=100mT, T <sub>1</sub> =-20°C, T <sub>2</sub> =125°C	-	-0.04	-	%/°C
Temperature coefficient of input resistance	α	I <sub>M</sub> =1mA, B=0mT, T <sub>1</sub> =-20°C, T <sub>2</sub> =125°C	-	0.2	-	%/°C
Linearity of Hall voltage	γ	I <sub>C</sub> =6mA, B <sub>1</sub> =50mT, B <sub>2</sub> =100mT	-	0.3	-	%

<sup>\*1</sup> No-load Hall voltage is nearly proportional to V<sub>C</sub> (within the range of 1 to 6V) at temperatures of -20°C to +125°C.

Keep the voltage within the allowable power dissipation range.

<sup>\*2</sup> Imbalanced ratio is in +/-12% within the range of V<sub>C</sub>=1 to 6V.

$$V_H = V_M - V_{HO}$$

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

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

$$\gamma = \frac{\{K_H(B_2) - K_H(B_1)\}}{\{K_H(B_1) + K_H(B_2)\}} \times 2 \times 100, \quad K_H = \frac{V_H}{(I_C \times B)}$$

V<sub>M</sub>: Observed Hall voltage

V<sub>HO</sub>: Imbalanced voltage

K<sub>H</sub>: Sensitivity

**SHARP**

Fig. 1 Hall Voltage vs. Ambient Temperature

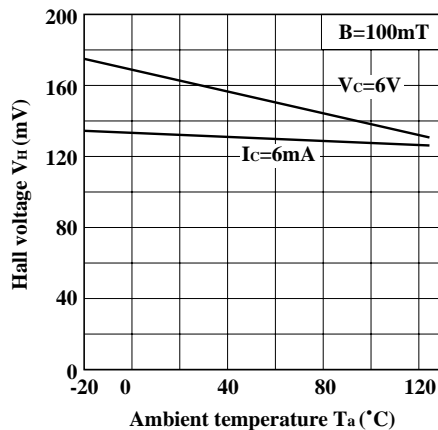


Fig. 2 Input Resistance vs. Ambient Temperature

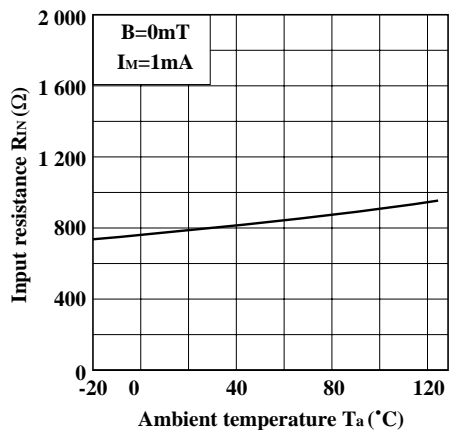


Fig. 3 Hall Voltage vs. Magnetic Flux Density

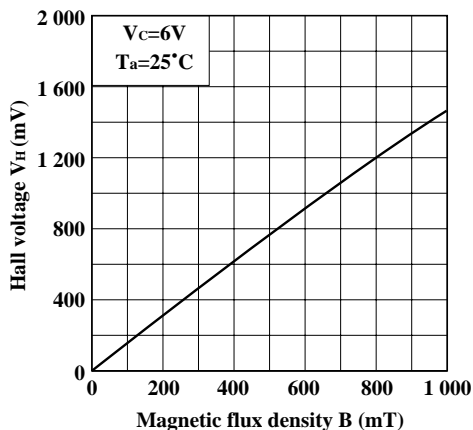


Fig. 4 Hall Voltage vs. Control Current

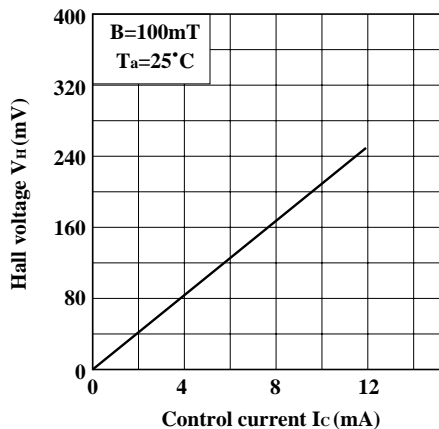


Fig. 5 Hall Voltage vs. Control Voltage

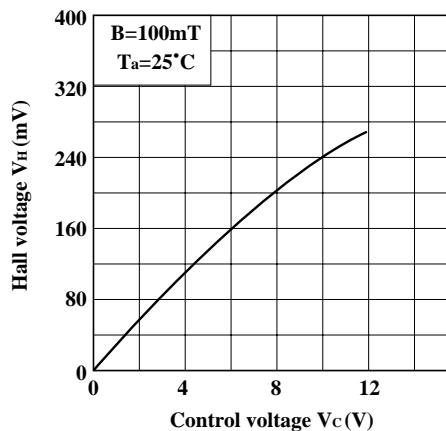


Fig. 6 Power Dissipation vs. Ambient Temperature

