

LT140SA

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

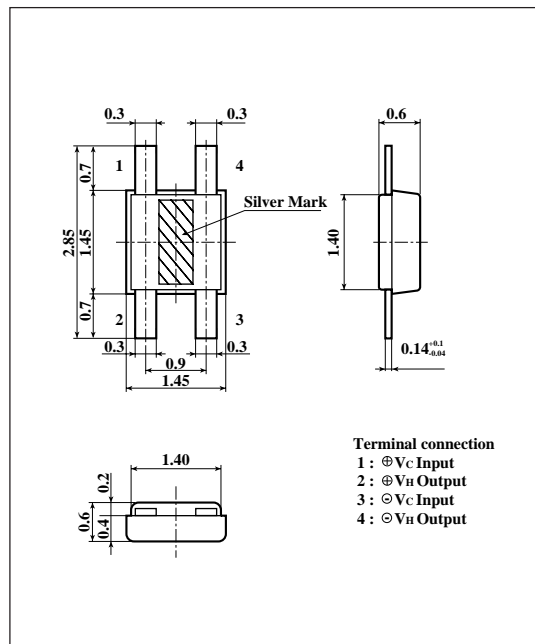
(T_a=25°C)

Parameter	Symbol	Rating	Unit
Control voltage	V _C	12	V
Control current	I _C	15	mA
Power dissipation	P _D	150	mW
Operating temperature	T _{opr}	-20 to +125	°C
Storage temperature	T _{stg}	-55 to +150	°C
Soldering temperature ^{*1}	T _{sol}	260	°C

*1 Soldering time:10 seconds

■ Outline Dimensions

(Unit : mm)



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

■ Electrical Characteristics

(T_a=25°C)

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

*1 No-load Hall voltage is nearly proportional to V_C (within the range of 1 to 6V) at temperatures of -20°C to +125°C.

Keep the voltage within the allowable power dissipation range.

*2 Imbalanced ratio is in +/-12% within the range of V_C=1 to 6V.

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

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

V_M: Observed Hall voltage

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

V_{HO}: Imbalanced voltage

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

K_H: Sensitivity

SHARP

Fig. 1 Hall Voltage vs. Ambient Temperature

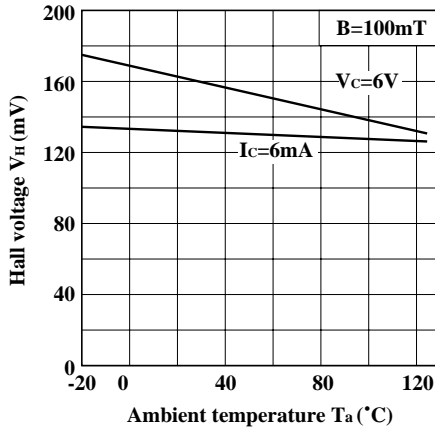


Fig. 2 Input Resistance vs. Ambient Temperature

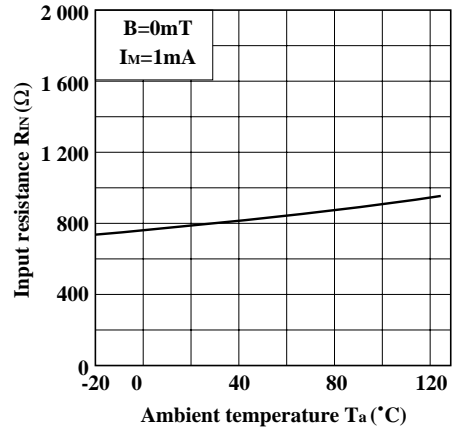


Fig. 3 Hall Voltage vs. Magnetic Flux Density

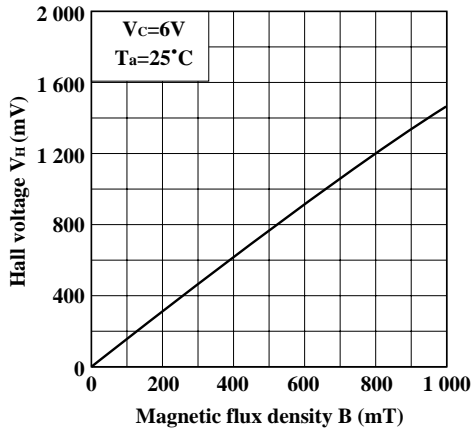


Fig. 4 Hall Voltage vs. Control Current

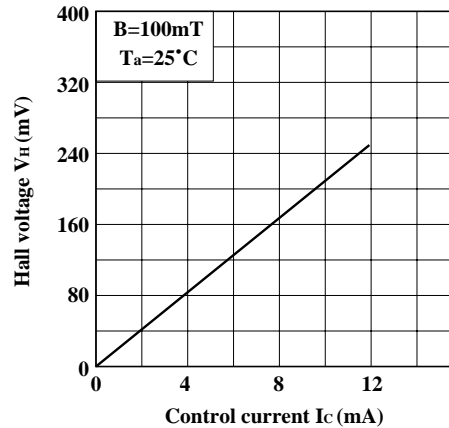


Fig. 5 Hall Voltage vs. Control Voltage

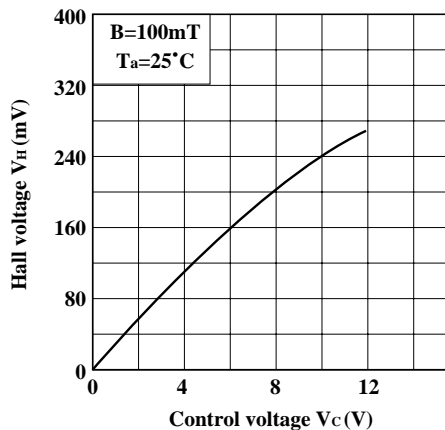


Fig. 6 Power Dissipation vs. Ambient Temperature

