LT140SA

Hall Voltage 160mV Thin-Type Package GaAs Hall Device

■ Features

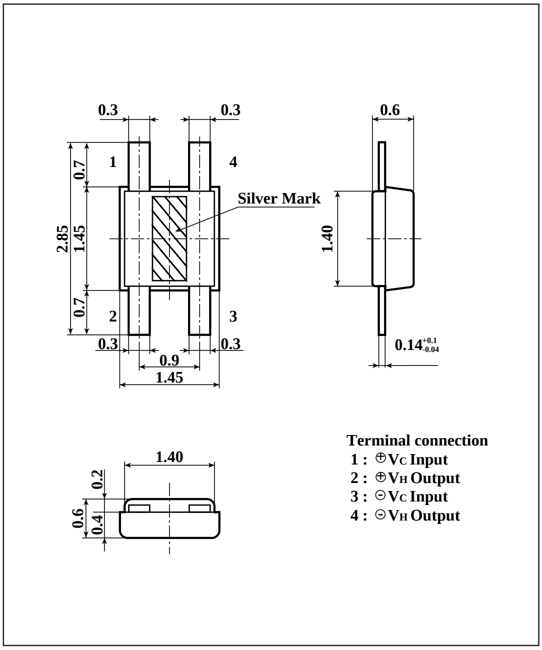
- Small temperature coefficient of the Hall voltage
- Good linearity of the Hall voltage
- Small imbalanced voltage
- Directly DC voltage applicable

■ Applications

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

■ Outline Dimensions

(Unit : mm)



Terminal connection
1 : ⊕V_C Input
2 : ⊕V_H Output
3 : ⊖V_C Input
4 : ⊖V_H Output

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

■ 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

■ 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_{HO}/V_H	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		$\lvert\Delta V_{HO}\rvert$	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 Vc (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 Vc=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

Fig. 1 Hall Voltage vs. Ambient Temperature

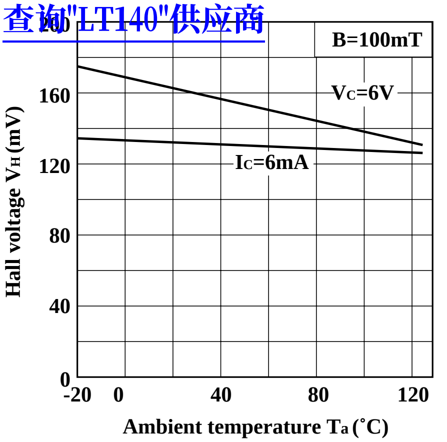


Fig. 2 Input Resistance vs. Ambient Temperature

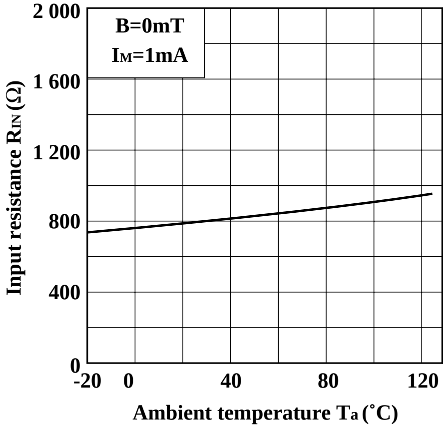


Fig. 3 Hall Voltage vs. Magnetic Flux Density

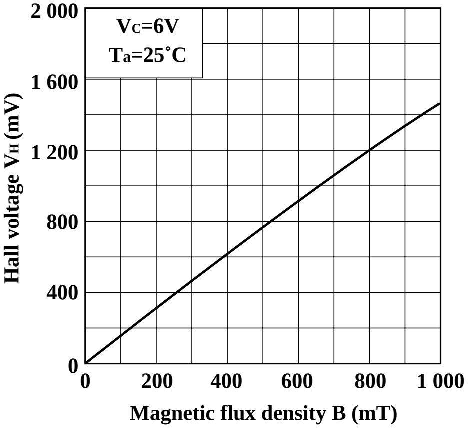


Fig. 4 Hall Voltage vs. Control Current

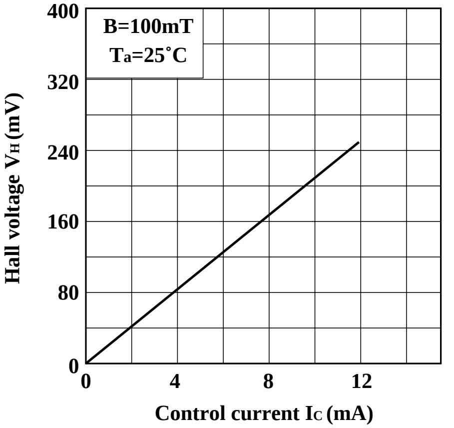


Fig. 5 Hall Voltage vs. Control Voltage

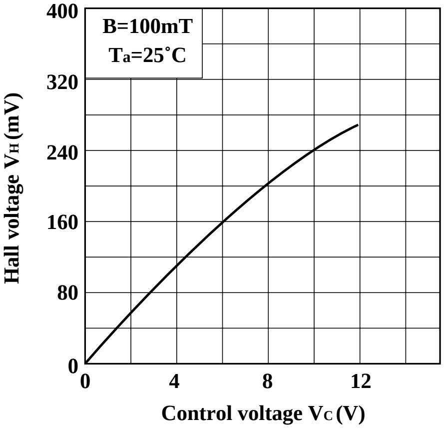


Fig. 6 Power Dissipation vs. Ambient Temperature