MG970 GaAs Hall Element

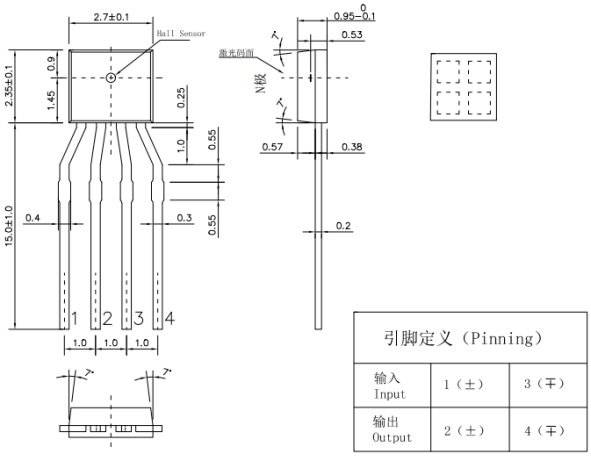
Linear GaAs Hall Element

Excellent Thermal Characteristics

Thin-type SIP Package

Shipped in Bulk by Pack (500pcs devices per pack)

Dimensional Drawing (Unit: mm)



引脚定义（Pinning）		
输入 Input	1（±）	3（干）
输出 Output	2（±）	4（干）

Absolute Maximum Rating

Operating Temperature Range	-40℃ ~ 125℃
Storage Temperature Range	-40℃ ~ 150℃
Maximum Input Current I_{cmax}	11mA

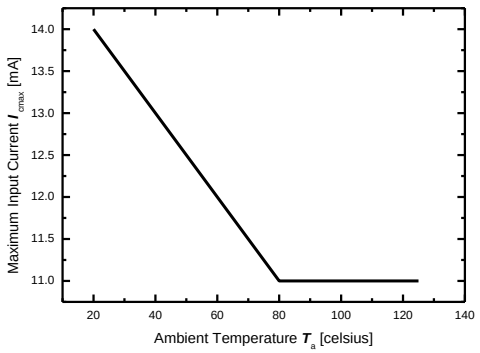


Figure 1. Maximum input current I_{cmax}

Electrical Characteristics （RT=25℃）

Table 1. Electrical Characteristics of MG970.

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	V_H	B = 50mT, I_C=5mA T_a = RT	82	92	102	mV
Input Resist.	R_{in}	B = 0mT, I_C = 0.1mA T_a = RT	1000	1250	1500	Ω
Output Resist.	R_{out}	B = 0mT, I_C = 0.1mA T_a = RT	1800	2500	3000	Ω
Offset Voltage	V_{os}	B = 0mT, I_C = 5mA T_a = RT	-6		+6	mV
Temp. Coeffi. of V_H	$\|\alpha V_H\|$	B = 50mT, I_C =1mA, T_a = 25℃ ~ 125℃			0.06	%/℃
Temp. Coeffi. of R_{in}	αR_{in}	B = 0mT, I_C =0.1mA, T_a = 25℃ ~ 125℃			0.3	%/℃
Linearity of V_H	ΔK	B = 0.1 - 0.5T, I_C =1mA T_a = RT	-2		+2	%

Note:

1. $\boldsymbol{V}_{\mathrm{H}} = \boldsymbol{V}_{\mathrm{H-M}} - \boldsymbol{V}_{\mathrm{os}}$

   In which $\boldsymbol{V}_{\mathrm{H\text{-}M}}$ is the Output Hall Voltage, $\boldsymbol{V}_{\mathrm{H}}$ is the Hall Voltage and $\boldsymbol{V}_{\mathrm{os}}$ is the offset Voltage under the identical electrical stimuli.

2. $\alpha \boldsymbol{V}_{\mathrm{H}} = \frac{1}{\boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a1})} \times \frac{\boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a2}) - \boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a1})}{\boldsymbol{T}_{a2} - \boldsymbol{T}_{a1}} \times 100$

   $\boldsymbol{T}_{a1} = 25℃, \quad \boldsymbol{T}_{a2} = 125℃$

3. $\alpha \boldsymbol{R}_{\mathrm{in}} = \frac{1}{\boldsymbol{R}_{\mathrm{in}}(\boldsymbol{T}_{a1})} \times \frac{\boldsymbol{R}_{\mathrm{in}}(\boldsymbol{T}_{a2}) - \boldsymbol{R}_{\mathrm{in}}(\boldsymbol{T}_{a1})}{\boldsymbol{T}_{a2} - \boldsymbol{T}_{a1}} \times 100$

   $\boldsymbol{T}_{a1} = 25℃, \quad \boldsymbol{T}_{a2} = 125℃$

4. $\Delta \boldsymbol{K} = \frac{\boldsymbol{K}(\boldsymbol{B}_1) - \boldsymbol{K}(\boldsymbol{B}_2)}{\frac{\boldsymbol{K}(\boldsymbol{B}_1) + \boldsymbol{K}(\boldsymbol{B}_2)}{2}} \times 100 \quad \boldsymbol{K} = \frac{\boldsymbol{V}_{\mathrm{H}}}{\boldsymbol{I}_c \times \boldsymbol{B}}$

   $\boldsymbol{B}_1 = 0.5\mathrm{T}, \quad \boldsymbol{B}_2 = 0.1\mathrm{T}$

Characteristic Curves

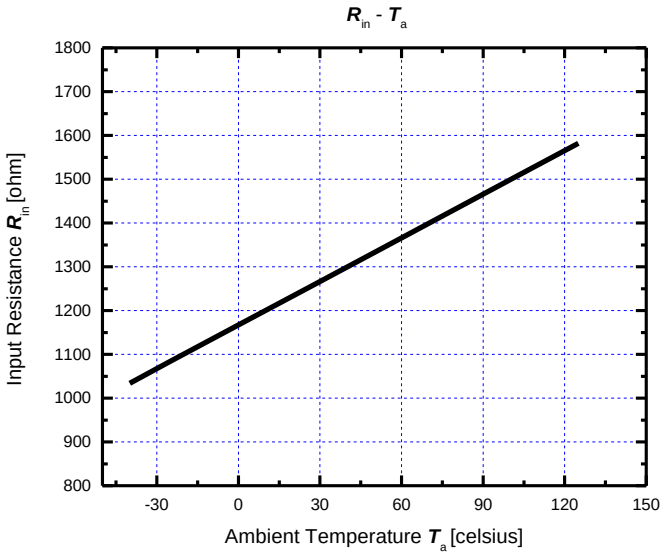


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a.

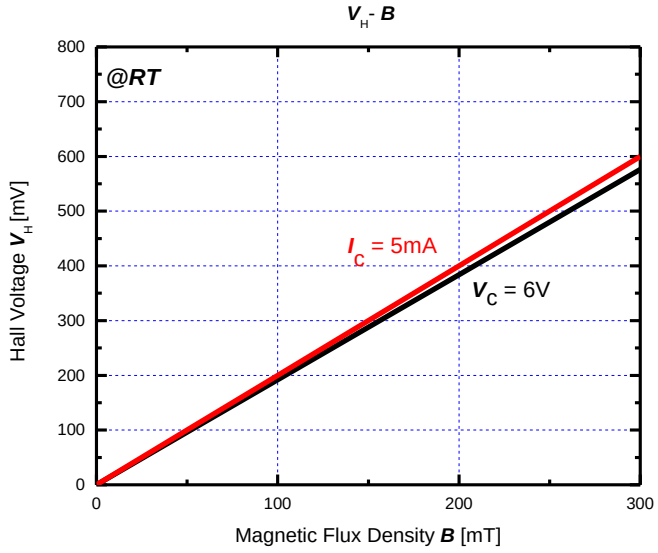


Figure 3. Hall voltage V_H as a function of magnetic flux density B.

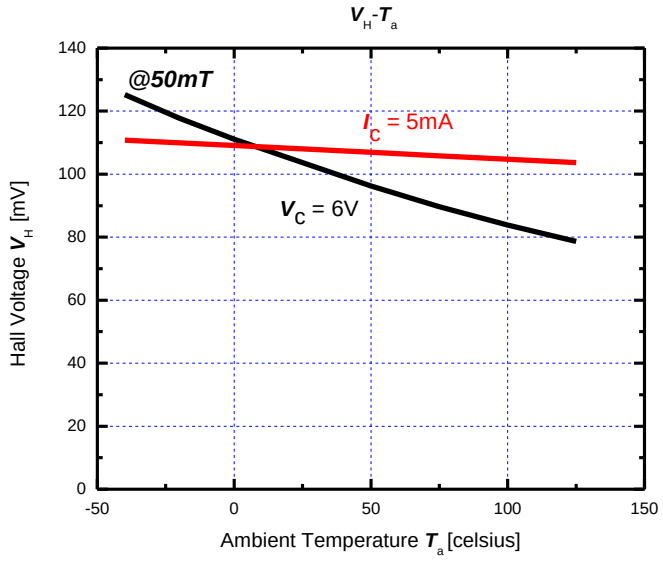


Figure 4. Hall voltage V_H as a function of ambient temperature T_a.

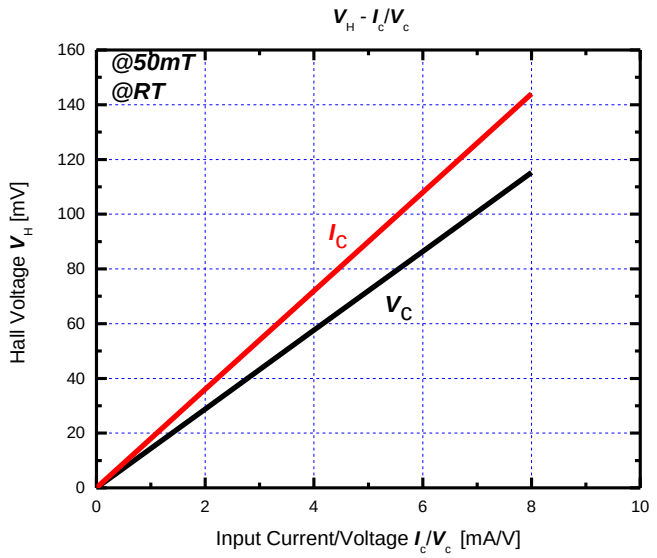


Figure 5. Hall voltage V_H as a function of electrical stimuli I_c/V_c.

Reliability Test Terms

Table 2. Reliability Test Terms, Conditions and Duration.

No.	Terms	Conditions	Duration
1	High Temperature Storage (HTS)	【JEITA EIAJ ED-4701】 T_a =150 (0 ~ +10) ℃	1000 hrs
2	Heat Cycle (HC)	【JEITA EIAJ ED-4701】 T_a=-55℃~150 ℃ high temp. - normal temp. - low temp. 30 min - 5 min - 30 min	50 cycles
3	Temp. Humidity Storage (THS)	【JEITA EIAJ ED-4701】 T_a =85±3 ℃ , R_H =85±5 %	1000 hrs
4	Resist. to Hand Soldering Heat (RHSH)	【JEITA EIAJ ED-4701】 Dipped in the 300±5 ℃ solder up to the 1 mm part from the body	5 sec
5	High Temp. Operating (HTO)	T_a =125 ℃ , V_c =7.5V	1000 hrs

Criteria:

- Variation of Hall Voltage V_H and input/output resistances $R_{in/out}$ are less than 20%.

- Variation of offset voltage V_{os} is less than ±16mV.

- Other parameters in **Table 1**. are still within their ranges stated in **Table 1**.

Soldering Conditions

The following conditions should be preserved. Solder ability should be checked by yourself, because it is depend on solder paste material and other parameters.

Material of solder flux

- Use the resin based flux and refrain from using organic or inorganic acid based and water-soluble one.

Cleansing of solder flux conditions

- Use Ethanol or Isopropyl alcohol as cleansing material.
- Process temperature should be 50 ℃ or less.
- Duration should be 5 minutes or less.

Hand soldering conditions

- Apart from the mold resin more than 1mm.
- Solder at temperature 300 ℃ for less than 5s.

Wave soldering conditions

- Temperature in Pre-heating zone should be lower than 150℃.
- Temperature in Soldering zone should be lower than 280℃.

Precautions for ESD

This product is the device that is sensitive to ESD (Electrostatic Discharge). Handling Hall Elements with the ESD-Caution mark under the environment in which

- Static electrical charge is unlikely to arise (Ex: Relative Humidity over 40%RH).
- Wearing the anti-static suit and wristband when handling the devices.
- Implementing measures against ESD as for containers that directly touch the devices.

Precautions for Storage

- Products should be stored at an appropriate temperature and humidity (5°C to 35°C, 40%RH to 60%RH) after the unsealing of the MBB. Keeping products away from chlorine and corrosive gas.
- **For storage longer than 2 years**

  Products are sealed in MBB with a desiccant. It is recommended to store in nitrogen atmosphere with MBB sealed. Oxygen and H_2O of atmosphere oxidizes leads of products and lead solder ability get worse.

Precautions for Safety

- Do not alter the form of this product into a gas, powder or liquid through burning, crushing or chemical processing.
- Observe laws and company regulations when discarding this product.