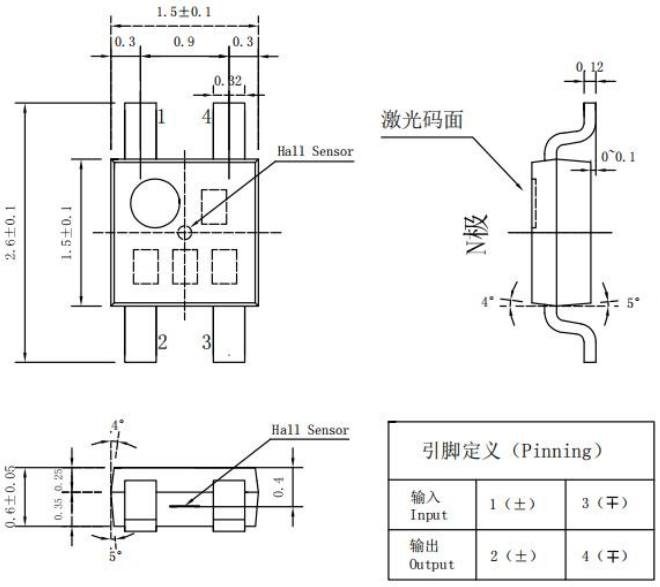
MG610 GaAs Hall Element

Linear GaAs Hall Element with Excellent thermal characteristics

SSOT-4 package

Shipped in Packet-tape Reel (4000pcs devices per Reel)

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}	13mA

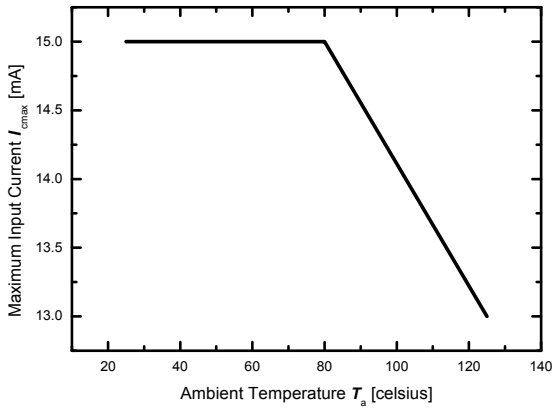


Figure 1. Maximum input current I_{cmax}

Electrical Characteristics （RT=25℃）

Table 1. Electrical Characteristics of MG610.

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	V_H	B = 50mT, I_C= 5mA T_a = RT	36	45	54	mV
Input/Output Resist.	$R_{in/out}$	B = 0mT, I_C = 0.1mA T_a = RT	650	750	850	Ω
Offset Voltage	V_{os}	B = 0mT, I_C = 5mA T_a = RT	-5		+5	mV
Temp. Coeffi. of V_H	$\|\alpha V_H\|$	B = 50mT, I_C = 5mA, 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 = 5mA 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. $\alpha \boldsymbol{V}_{\mathrm{H}} = \frac{1}{\boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a1})} \times \frac{\boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a2}) - \boldsymbol{V}_{\mathrm{H}}(\boldsymbol{T}_{a1})}{\boldsymbol{T}_{a2} - \boldsymbol{T}_{a1}} \times 100$

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

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

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

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

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

Characteristic Curves

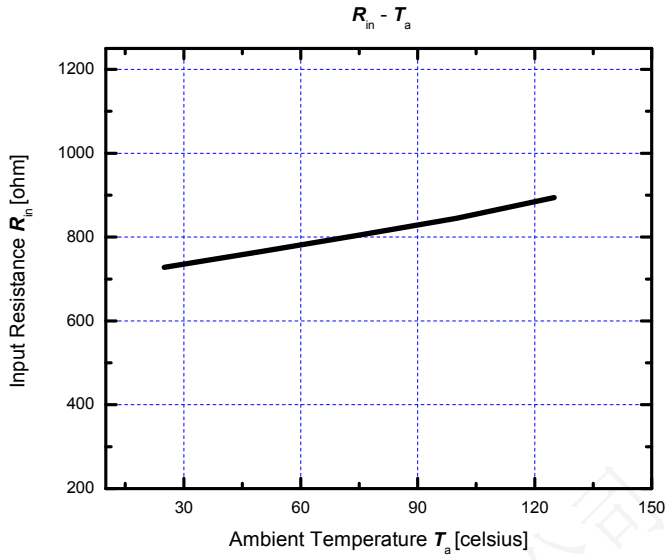


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a.

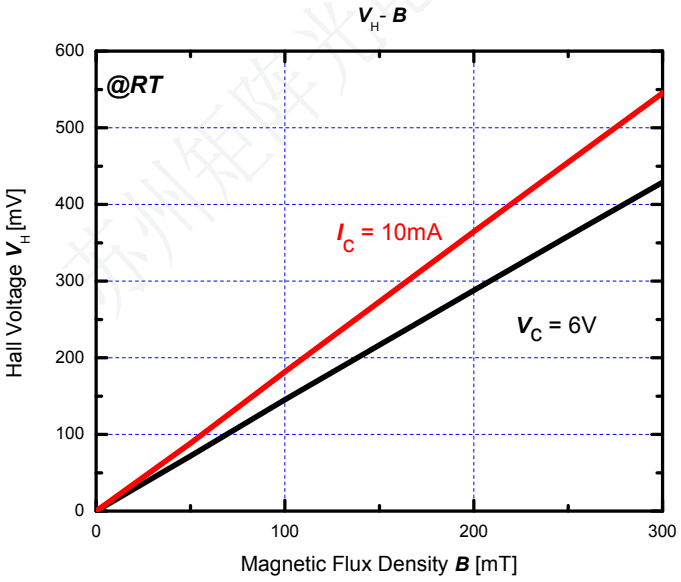


Figure 3. Hall voltage V_H as a function of magnetic flux density B .

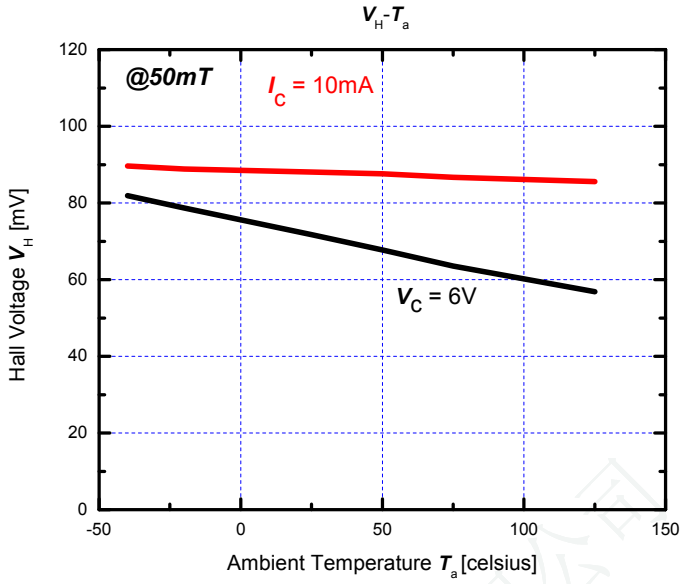


Figure 4. Hall voltage V_H as a function of ambient temperature T_a.

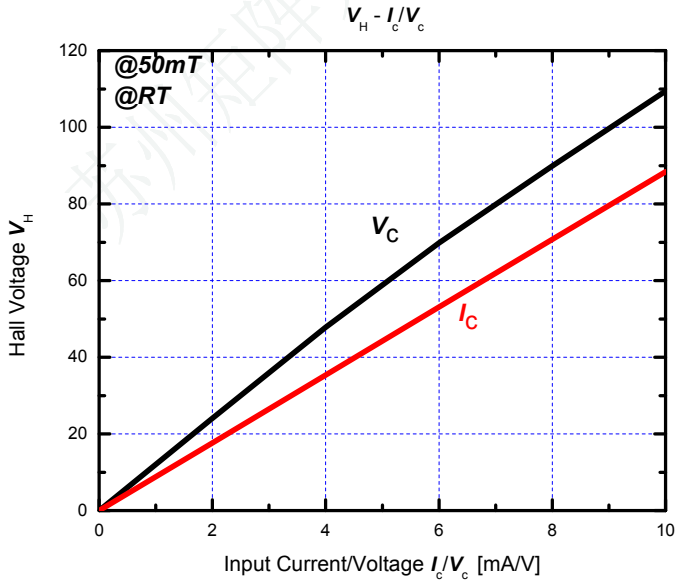


Figure 5. Hall voltage V_H as a function of electrical stimuli I_c/ V_c.

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	Reflow Soldering (RS)	【JEITA EIAJ ED-4701】 260±5 ℃	10 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 min or less.

Hand soldering conditions

- Solder at temperature 300 ℃ for less than 3s.

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 antistatic 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 to 35°C, 40 to 85%RH). Keep products away from chlorine and corrosive gas.
- **Long-term storage** may result in poor lead solder ability and degraded electrical performance even under proper conditions. For those parts, which stored long –term shall be check solder ability before it is used.
- **For storage longer than 2 years**, it is recommended to store in nitrogen atmosphere. Oxygen 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.