



Matrix Opto Co., Ltd

-MG910 GaAs Hall Element-

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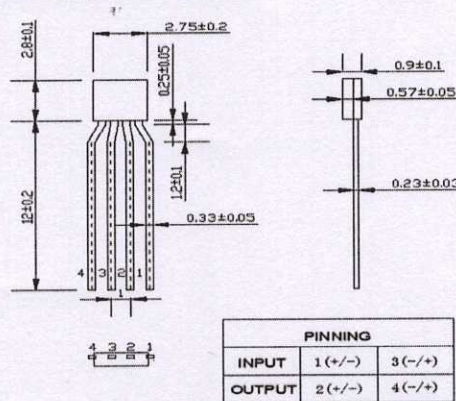
Linear GaAs Hall Element

Excellent Thermal Characteristics

Thin-type SIP Package

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

Dimensional Drawing (Unit MM)



Absolute Maximum Rating

Operating Temperature Range -40°C ~ 125°C
 Storage Temperature Range -45°C ~ 150°C
 Maximum Input Current I_{cmax} [mA] 13mA

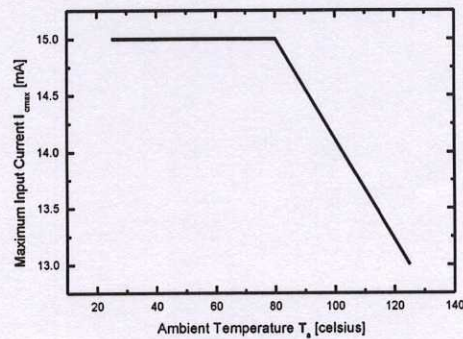


Figure 1. Maximum input current I_{cmax}



Electrical Characteristics (RT=25°C)

Table 1. Electrical Characteristics of MG910.

| Item | Symbol | Test Condi. | Min. | Typ. | Max. | Unit |
|----------------------------------|------------------------|--|------|------|------|---------------------|
| Hall Voltage | V_H | $B = 50\text{mT}, I_c = 5\text{mA}$ $T_a = \text{RT}$ | 36 | 45 | 54 | mV |
| Input/Output Resist. | $R_{\text{in/out}}$ | $B = 0\text{mT}, I_c = 0.1\text{mA}$ $T_a = \text{RT}$ | 650 | 750 | 850 | Ω |
| Offset Voltage | V_{os} | $B = 0\text{mT}, I_c = 5\text{mA}$ $T_a = \text{RT}$ | -5 | | +5 | mV |
| Temp. Coeffi. of V_H | $ \alpha V_H $ | $B = 50\text{mT}, I_c = 5\text{mA},$ $T_a = 25^\circ\text{C} \sim 125^\circ\text{C}$ | | | 0.06 | %/ $^\circ\text{C}$ |
| Temp. Coeffi. of R_{in} | αR_{in} | $B = 0\text{mT}, I_c = 0.1\text{mA},$ $T_a = 25^\circ\text{C} \sim 125^\circ\text{C}$ | | | 0.3 | %/ $^\circ\text{C}$ |
| Linearity of V_H | ΔK | $B = 0.1 - 0.4\text{T}, I_c = 5\text{mA}$ $T_a = \text{RT}$ | -1 | | +1 | % |

Note:

1. $V_H = V_{H-M} - V_{\text{os}}$

in which V_{H-M} is the Output Hall Voltage, V_H is the Hall Voltage and V_{os} is the offset Voltage

under the identical electrical stimuli.

2.
$$\alpha V_H = \frac{1}{V_H(T_{a1})} \times \frac{V_H(T_{a2}) - V_H(T_{a1})}{T_{a2} - T_{a1}} \times 100$$

$T_{a1} = 25^\circ\text{C}, \quad T_{a2} = 125^\circ\text{C}$

3.
$$\alpha R_{\text{in}} = \frac{1}{R_{\text{in}}(T_{a1})} \times \frac{R_{\text{in}}(T_{a2}) - R_{\text{in}}(T_{a1})}{T_{a2} - T_{a1}} \times 100$$

$T_{a1} = 25^\circ\text{C}, \quad T_{a2} = 125^\circ\text{C}$

4.
$$\Delta K = \frac{K(B_1) - K(B_2)}{\frac{K(B_1) + K(B_2)}{2}} \times 100 \quad K = \frac{V_H}{I_c \times B}$$



Characteristic Curves

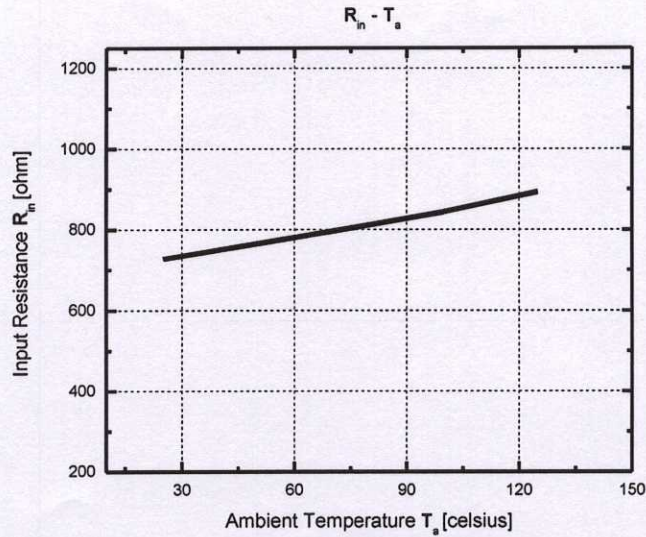


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a .

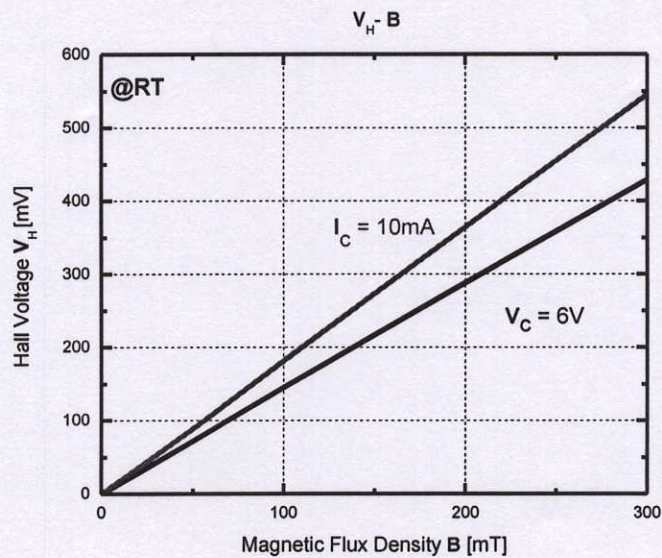


Figure 3. Hall voltage V_H as a function of magnetic flux density B .

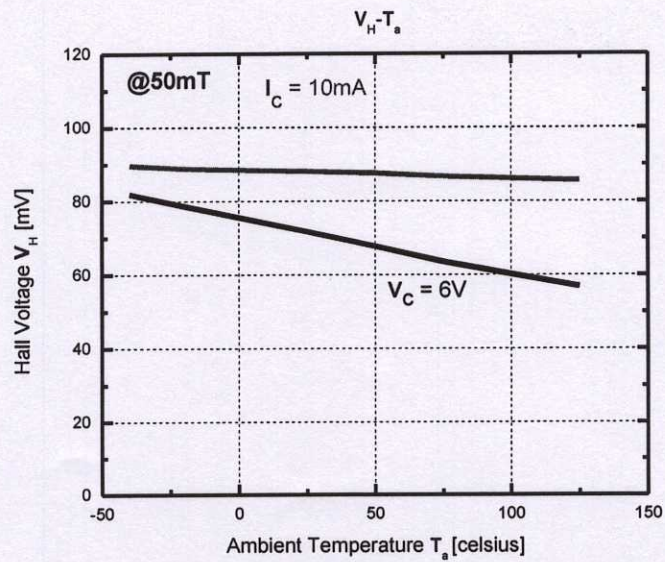


Figure 4. Hall voltage V_H as a function of ambient temperature T_a .

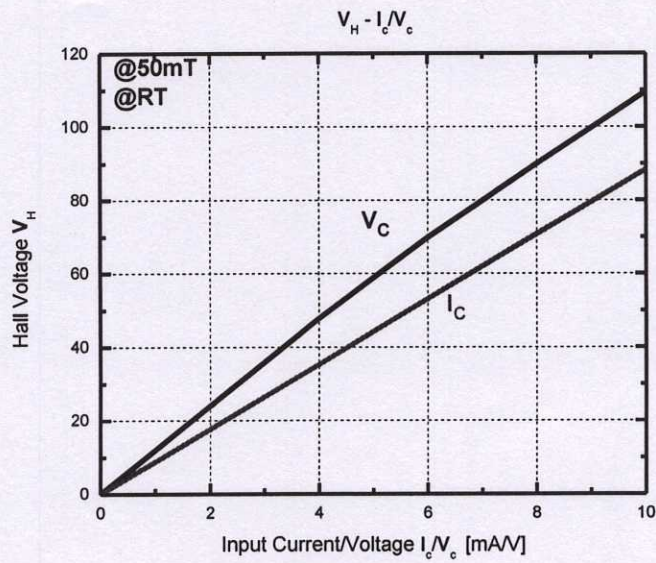


Figure 5. Hall voltage V_H as a function of electrical stimuli I_C/V_C .



Reliability Test Terms

Table 2. Reliability Test Terms, Conditions and Durations.

| No. | Terms | Conditions | Duration |
|-----|--|--|----------|
| 1 | High Temperature Storage (HTS) | 【JEITA EIAJ ED-4701】 $T_a = 150 (0 \sim +10) \text{ } ^\circ\text{C}$ | 1000 h |
| 2 | Heat Cycle (HC) | 【JEITA EIAJ ED-4701】 $T_a = -55^\circ\text{C} \sim 150 \text{ } ^\circ\text{C}$ high temp. - normal temp. - low temp. 30 min - 5 min - 30 min | 50 clcs |
| 3 | Temp. Humidity Storage (THS) | 【JEITA EIAJ ED-4701】 $T_a = 85 \pm 3 \text{ } ^\circ\text{C}$, $R_H = 85 \pm 5 \%$ | 1000 h |
| 4 | Resist. to Hand Soldering Heat (RSHS) | 【JEITA EIAJ ED-4701】 Dipped in the $300 \pm 5 \text{ } ^\circ\text{C}$ solder up to the 1 mm part from the body | 5sec |
| 5 | High Temp. Operating (HTO) | $T_a = 125 \text{ } ^\circ\text{C}$, $V_c = 7.5\text{V}$ | 1000 h |

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 1 mV.
- 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 °C or less.
- Duration should be 5 min or less.

Hand soldering conditions

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

Wave soldering conditions

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



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 60%RH) after the unsealing of MBB. **Using self-sealer is highly recommended.** Keeping products away from chlorine and corrosive gas.

- Long-term storage

Products are sealed in MBB with a desiccant and a moisture indicator. The moisture indicator should be checked right after the unsealing of MBB. **If the moisture indicator reveals the internal moisture is above 50%RH, please contact the local distributor.**

- **For storage longer than 2 years**, it is recommended to store in nitrogen atmosphere with MBB sealed. Oxygen and H₂O 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.