

MG911 GaAs Hall Element

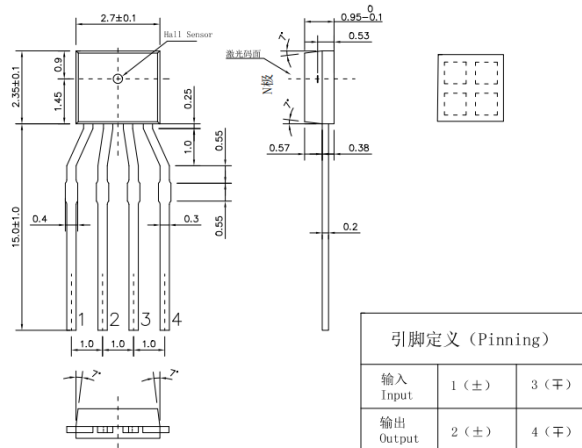
High Sensitive GaAs Hall Element

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 -40°C ~ 150°C
Maximum Input Current I_{cmax} 12mA

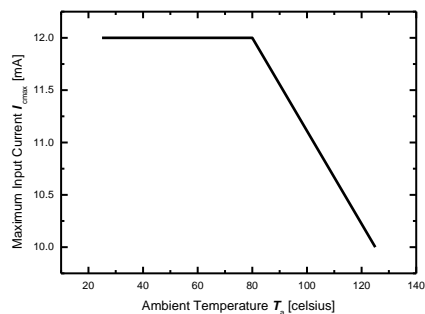


Figure 1. Maximum input current I_{cmax}

Electrical Characteristics (RT=25°C)

Table 1. Electrical Characteristics of MG911.

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	V_H	$B = 50\text{mT}, I_c = 5\text{mA}$ $T_a = \text{RT}$	72	90	108	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	$B = 0.01 - 0.05\text{T}, I_c = 5\text{mA}$ $T_a = \text{RT}$	-2		+2	%

Note:

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

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.

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

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

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

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

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

$$B_1 = 0.05\text{T}, \quad B_2 = 0.01\text{T}$$

Characteristic Curves

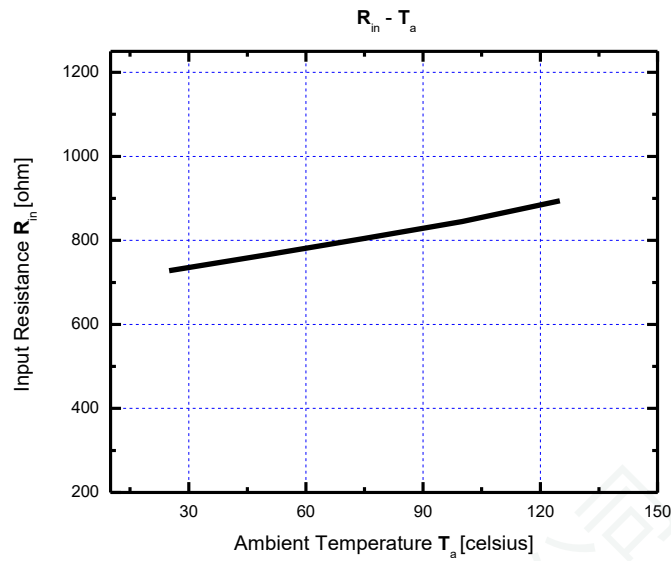


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a .

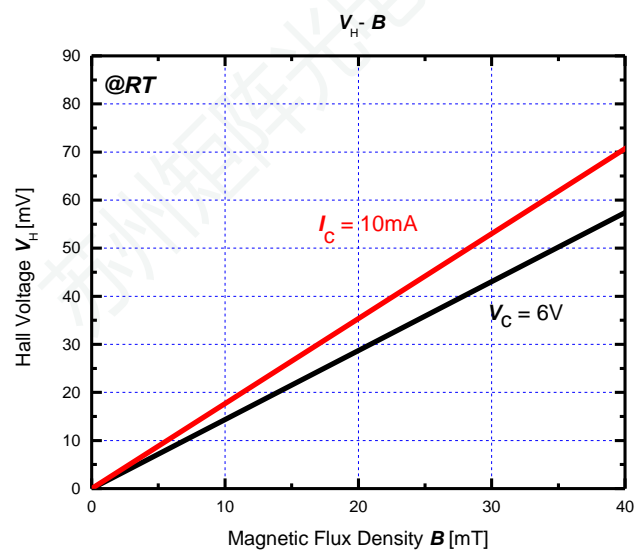


Figure 3. Hall voltage V_H as a function of magnetic flux density B .

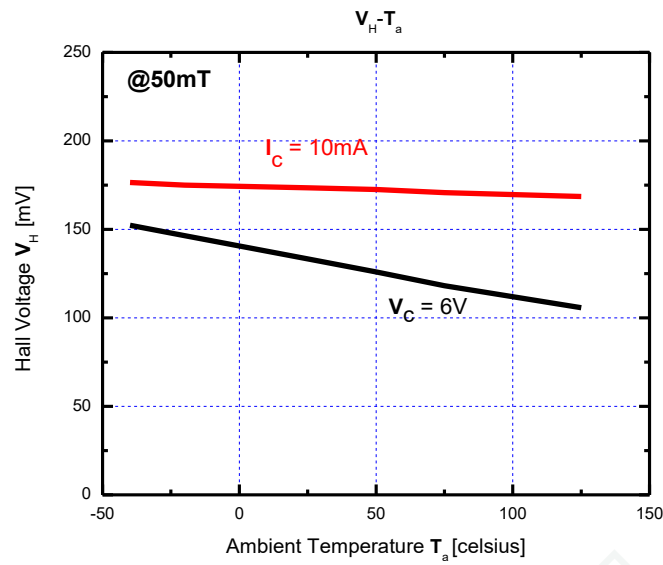


Figure 4. Hall voltage V_H as a function of ambient temperature T_a .

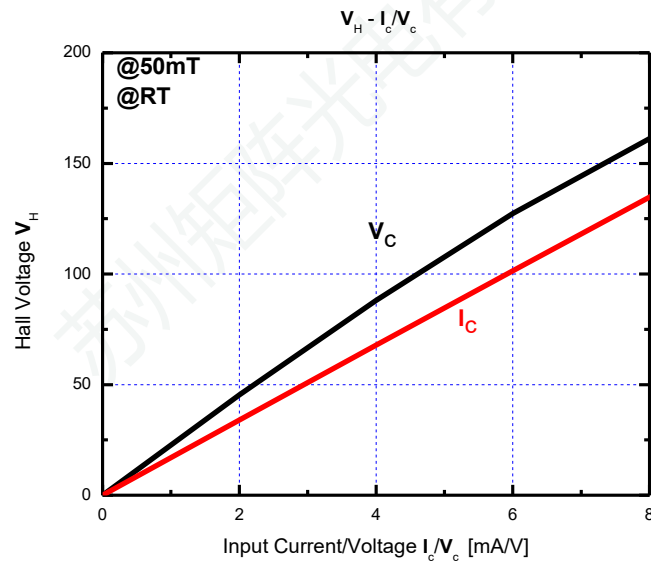


Figure 5. Hall voltage V_H as a function of electrical stimuli I_c/V_c .

Reliability Test Terms

Table 2. Reliability Test Terms, Conditions and Duration.

No.	Terms	Conditions	Duration
1	High Temperature Storage (HTS)	【JEITA EIAJ ED-4701】 $T_a = 150 (0 \sim +10) \text{ } ^\circ\text{C}$	1000 hrs
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 cycles
3	Temp. Humidity Storage (THS)	【JEITA EIAJ ED-4701】 $T_a = 85 \pm 3 \text{ } ^\circ\text{C}$, $R_H = 85 \pm 5 \%$	1000 hrs
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	5 sec
5	High Temp. Operating (HTO)	$T_a = 125 \text{ } ^\circ\text{C}$, $V_c = 7.5\text{V}$	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 $\pm 16\text{mV}$.
- 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 minutes 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 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 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.