

## HG-166A GaAs Hall Element

- Linear GaAs Hall Element with excellent thermal characteristics
- SSOT-4 package
- Shipped in packet-tape reel (4000pcs devices per reel)

### Absolute Maximum Rating

Item	Symbol	Conditions	Limit	Unit
Maximum Input Current	$I_{cmax}$	$T_a = 25^\circ\text{C}$	14	mA
Operating Temperature Range	$T_{opr}$		-40 ~ +125	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$		-40 ~ +150	$^\circ\text{C}$

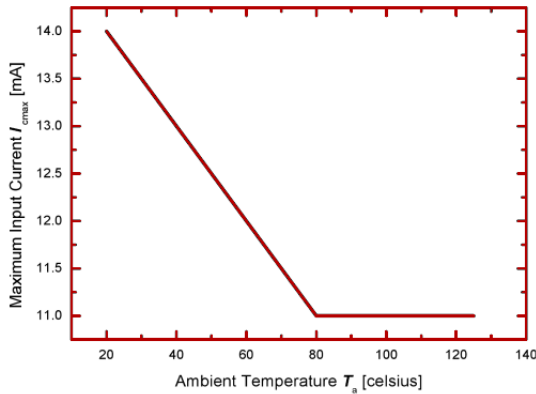
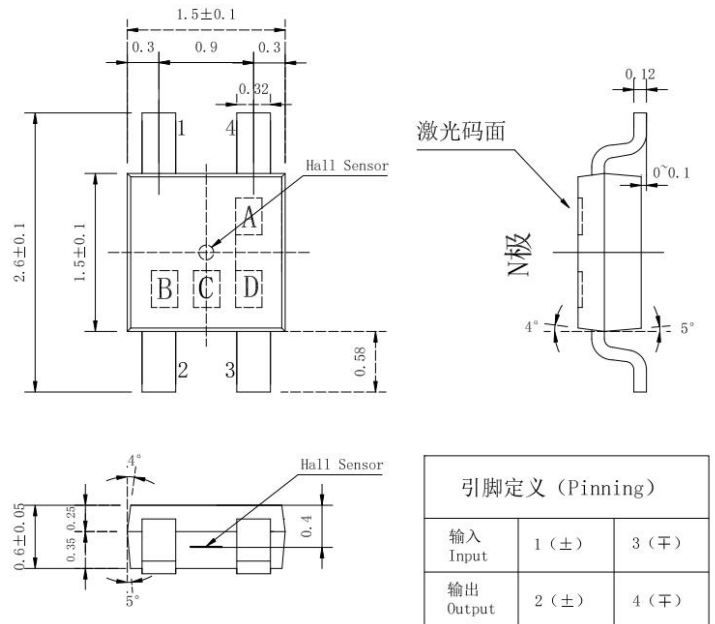


Figure 1. Maximum input current  $I_{cmax}$ -Ambient Temperature  $T_a$

### Dimensional Drawing (Unit: mm)



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

### Electrical Characteristics (RT=25°C)

Table 1. Electrical Characteristics of HG-166A

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	$V_H$	$B = 50\text{mT}, I_C = 5\text{mA}$ $T_a = \text{RT}$	80		110	mV
Input Resist.	$R_{in}$	$B = 0\text{mT}, I_C = 0.1\text{mA}$ $T_a = \text{RT}$	1000	1250	1500	$\Omega$
Output Resist.	$R_{out}$	$B = 0\text{mT}, I_C = 0.1\text{mA}$ $T_a = \text{RT}$	1800	2500	3000	$\Omega$
Offset Voltage	$V_{os}$	$B = 0\text{mT}, I_C = 5\text{mA}$ $T_a = \text{RT}$	-8		+8	mV
Temp. Coeffi. of $V_H$	$ \alpha V_H $	$B = 50\text{mT}, I_C = 1\text{mA}$ $T_a = 25^\circ\text{C} \sim 125^\circ\text{C}$			0.06	$\%/^\circ\text{C}$
Temp. Coeffi. of $R_{in}$	$\alpha R_{in}$	$B = 0\text{mT}, I_C = 0.1\text{mA}$ $T_a = 25^\circ\text{C} \sim 125^\circ\text{C}$			0.3	$\%/^\circ\text{C}$
Linearity of $V_H$	$\Delta K$	$B = 0.1 - 0.5\text{T}, I_C = 1\text{mA}$ $T_a = \text{RT}$	-2		+2	%

Note:

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

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.

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

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

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

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

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

$B_1 = 0.5\text{T}, B_2 = 0.1\text{T}$

## Characteristic Curves

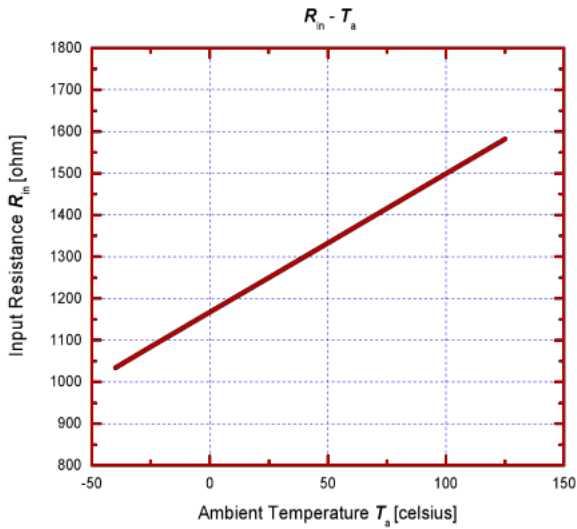


Figure 2. Input resistance  $R_{in}$  as a function of ambient temperature  $T_a$

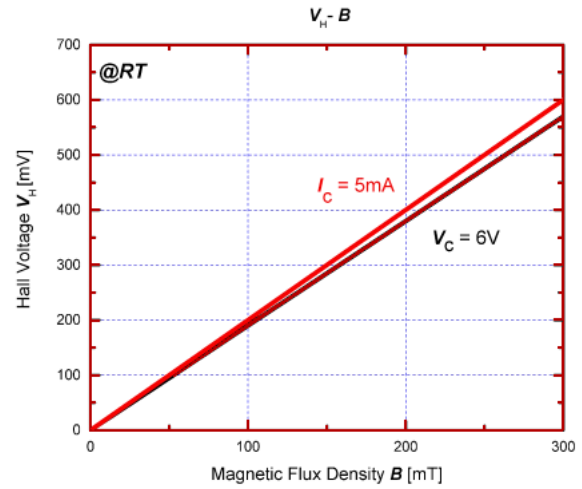


Figure 3. Hall voltage  $V_H$  as a function of magnetic flux density  $B$ .

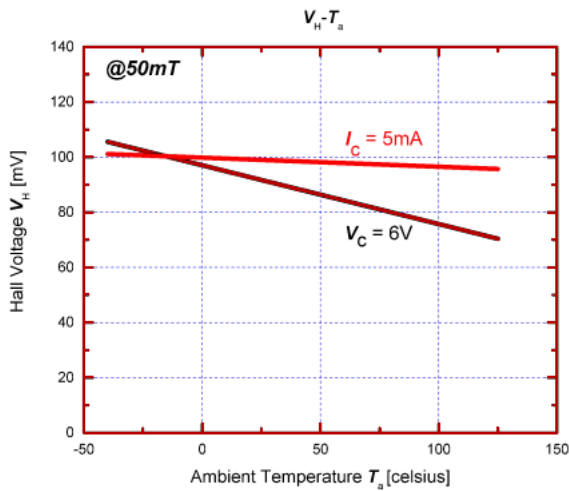


Figure 4. Hall voltage  $V_H$  as a function of ambient temperature  $T_a$ .

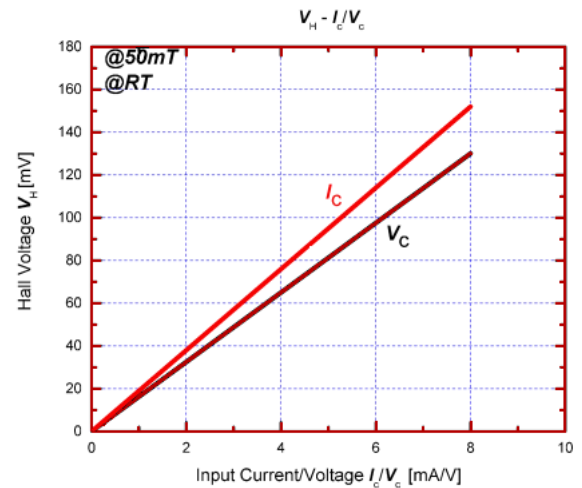


Figure 5. Hall voltage  $V_H$  as a function of electrical stimuli  $I_c/V_c$ .

## 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	Reflow Soldering (RS)	[JEITA EIAJ ED-4701] $260 \pm 5 \text{ }^\circ\text{C}$	10 sec
5	High Temp. Operating (HTO)	$T_a = 125 \text{ }^\circ\text{C}$ , $I_c = 8\text{mA}$	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 within  $\pm 8\text{mV}$ .
- 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 5min or less.

### Hand-Soldering

- Solder the leads to PC board at the point(part from the body) at 260°C for 10 seconds or 350°C for less than 3 seconds.

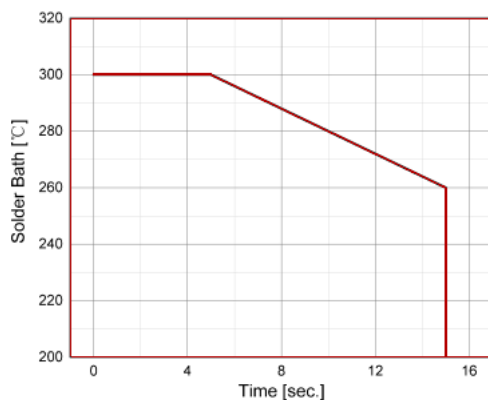


Figure 6. (Reference) Conditions of Dip Soldering

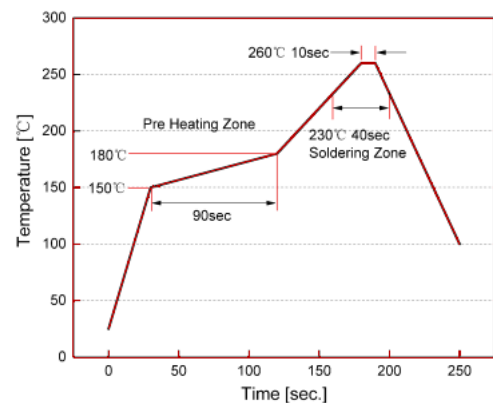


Figure 7. (Reference) Conditions of Reflow Profile



## Precautions for ESD

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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

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- 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

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- 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.