具有高线性度与优异温度特性的砷化镓霍尔元件

Linear GaAs Hall element with excellent thermal characteristics

超小型 DFN 封装

Thin-type DFN Package

编带包装（每载盘 10,000 颗）

Shipped in packet-tape reel(10,000pcs per reel)

绝对最大额定值 Absolute Maximum Ratings

Table 1. 绝对最大额定值 Absolute Maximum Ratings

项目 Item	符号 Symbol	条件 Conditions	范围 Limit	单位 Unit
最大输入功率 Maximum Input Power	P_D	T_a=25℃	105	mW
最大输入电压 Maximum Input Voltage	V_C		8	V
工作温度 Operating Temperature Range	T_{opr}		-40~+125	℃
保存温度 Storage Temperature Range	T_{STG}		-40~+150	℃

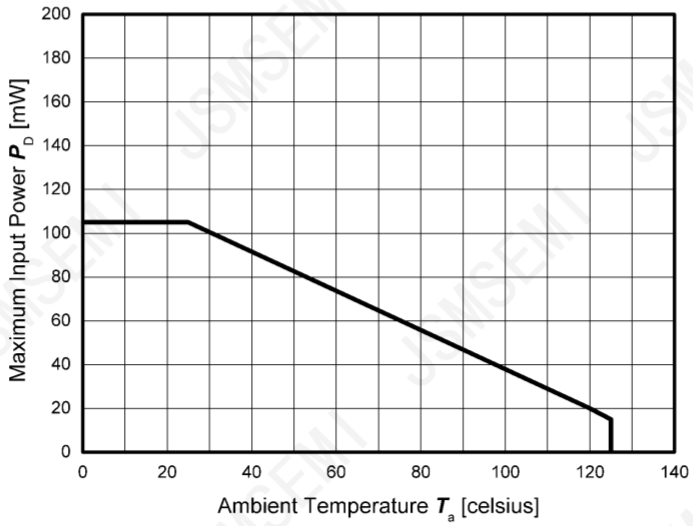


Figure 1. 最大输入功率-环境温度

Maximum input power P_D as a function of ambient temperature T_a

电气特性 Electrical Characteristics（RT=25℃）

Table 2. 电气特性表 Electrical Characteristics

项目 Item	符号 Symbol	测试环境 TestCondi.	最小 Min.	标准 Typ.	最大 Max.	单位 Unit
霍尔电压 HallVoltage	VH	B=50mT,IC=1mA Ta=RT	24		40	mV
输入电阻 InputResist.	Rin	B=0mT,IC=0.1mA Ta=RT	1600		2400	Ω
输出电阻 OutputResist.	Rout	B=0mT,IC=0.1mA Ta=RT	3400		5000	Ω
非平衡电压 OffsetVoltage	Vos	B=0mT,IC=1mA Ta=RT	-3		+3	mV
霍尔电压温度系数 Temp.Coeffi.ofVH	$\|\alpha V_H\|$	B=50mT,IC=1mA, Ta=25℃ ~125℃			0.07	%/℃
输入电阻温度系数 Temp.Coeffi.ofRin	αRin	B=0mT,IC=0.1mA, Ta=25℃ ~125℃			0.3	%/℃
霍尔电压线性度 LinearityofVH	ΔK	B=0.1-0.5T,IC=1mA Ta=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. $\Delta \boldsymbol{K} = \frac{\boldsymbol{K}(\boldsymbol{B}_1) - \boldsymbol{K}(\boldsymbol{B}_2)}{\frac{\boldsymbol{K}(\boldsymbol{B}_1) + \boldsymbol{K}(\boldsymbol{B}_2)}{2}} \times 100 \quad \boldsymbol{K} = \frac{\boldsymbol{V}_{\mathrm{H}}}{\boldsymbol{I}_c \times \boldsymbol{B}}$

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

特性曲线图 Characteristic Curves

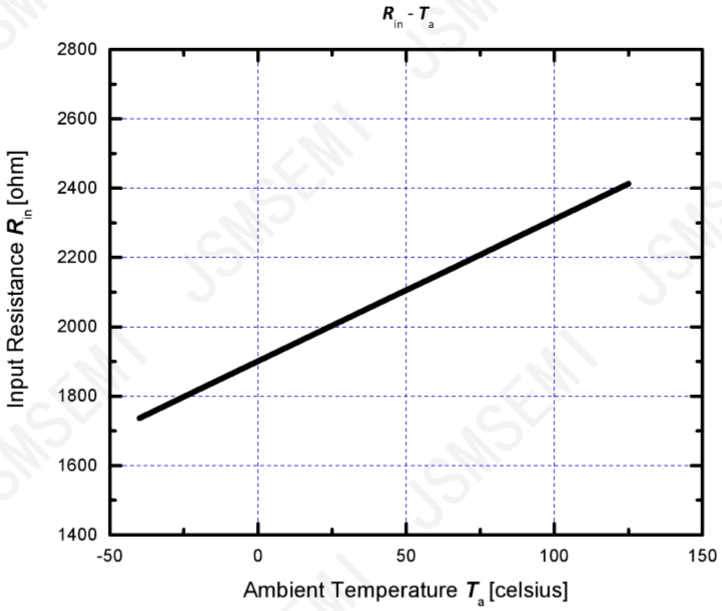


Figure 2. 输入电阻-环境温度

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

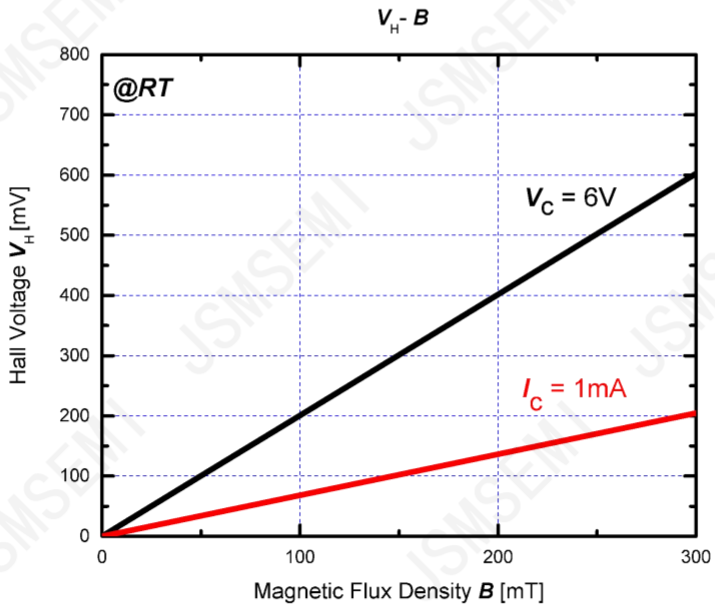


Figure 3. 霍尔电压-磁感应强度

Hall voltage V_H as a function of magnetic flux density B

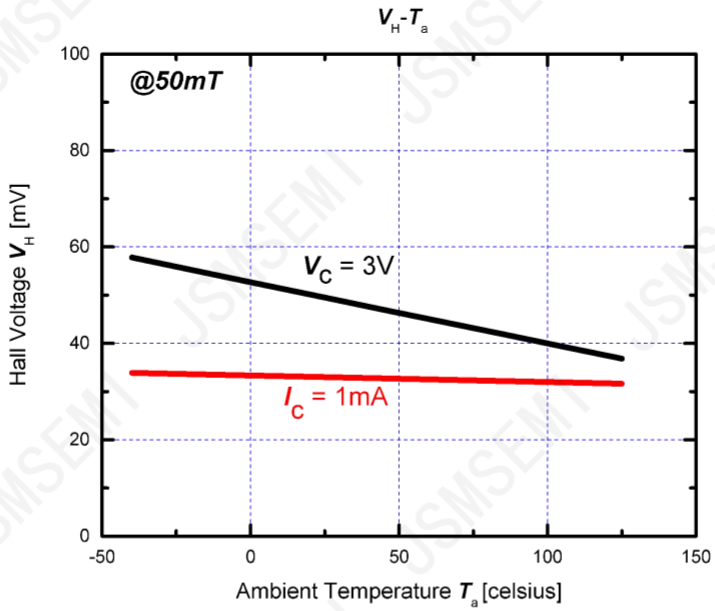


Figure 4. 霍尔电压-环境温度

Hall voltage V_H as a function of ambient temperature T_a

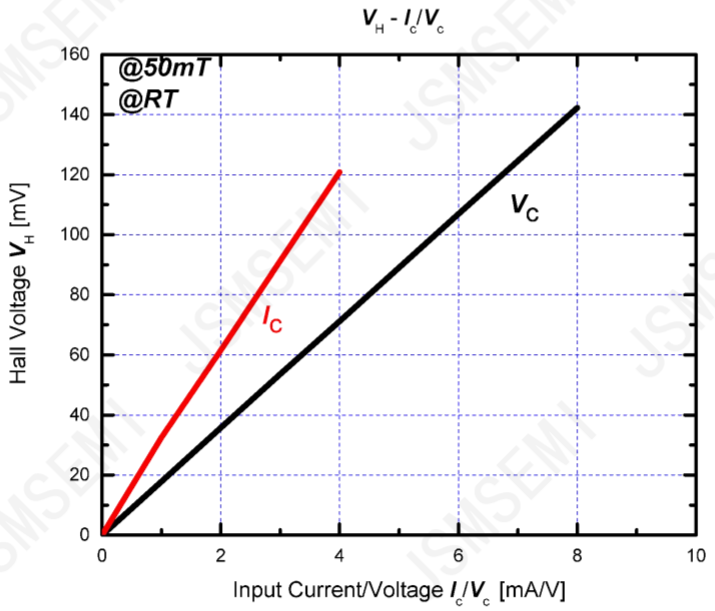


Figure 5. 霍尔电压-驱动电流/驱动电压

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

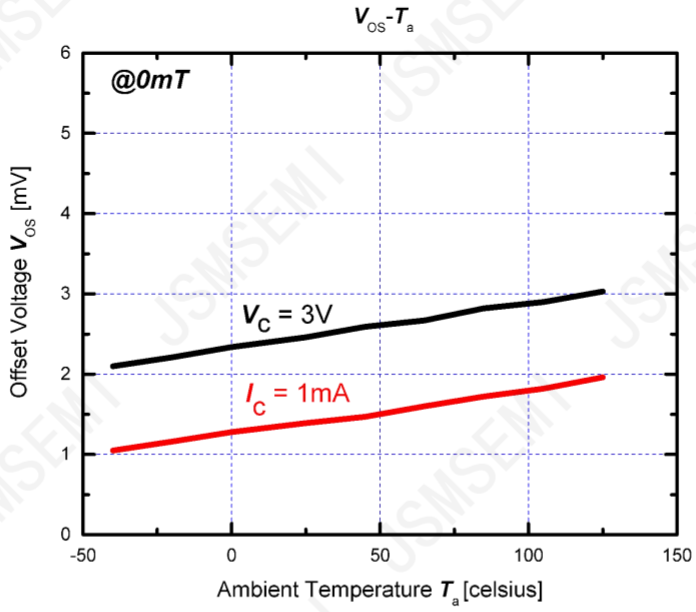


Figure 6. 非平衡电压-环境温度

Offset voltage V_{OS} as a function of ambient temperature T_a

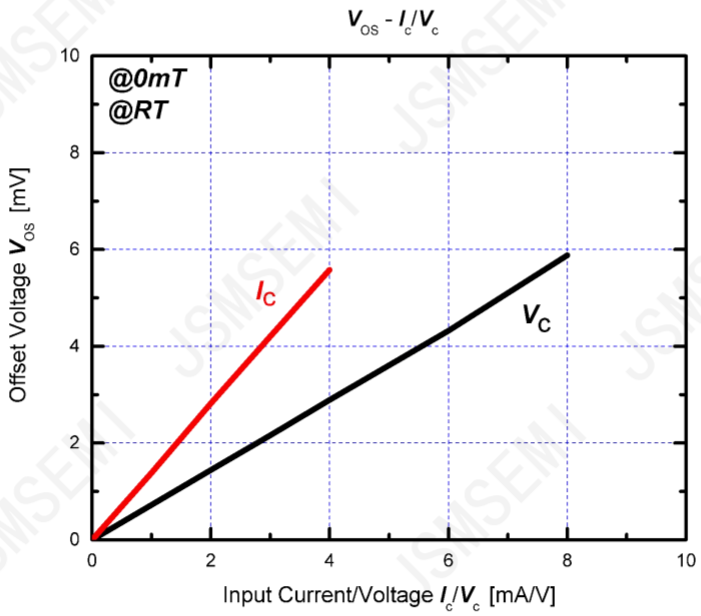


Figure 7. 非平衡电压-驱动电流/驱动电压

Offset voltage V_{OS} as a function of electrical stimuli I_c/V_c

焊接条件

助焊剂材料

- 使用树脂基助焊剂，避免使用有机或无机酸基及水溶性助焊剂。

助焊剂的清洗条件

- 使用乙醇或异丙醇作为清洗溶剂。

- 工艺温度≤50℃。

- 持续时间不超过 5 分钟。

焊接方法

焊接方法	焊接方法说明	焊接温度
回流法	在高温下进行焊接的方法	最高 260℃，10 秒以内
波峰焊	在镀锡缸中完成焊接的方法	最高 260℃，10 秒以内
烙铁法	使用烙铁修正引脚焊接部分的方法	最高 350℃，3 秒以内

焊接温度范围

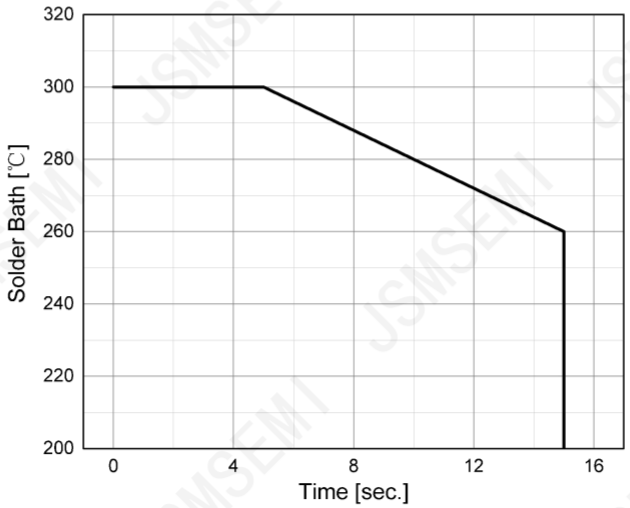


Figure 8. （参考）浸入焊接条件

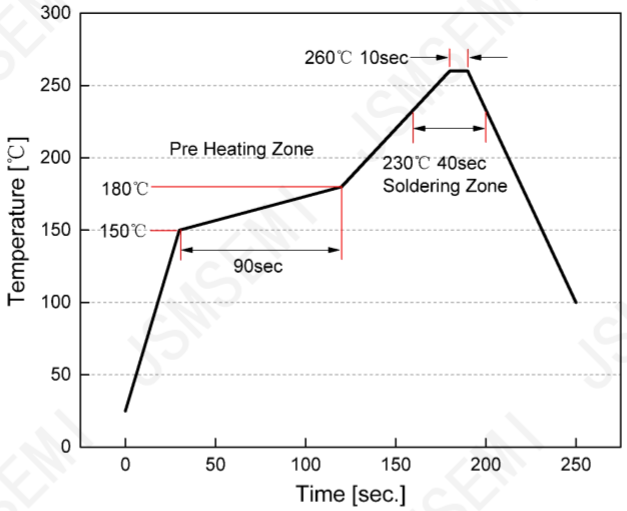


Figure 9. （参考）回流焊条件

ESD防护

本产品对 ESD（静电放电）敏感，接触带有 ESD-Caution标记的霍尔元件时，环境要求如下：

- 环境不太可能出现静电荷（例如，相对湿度超过 40%RH）。
- 接触产品时应该穿戴防静电服和腕带。
- 对直接接触产品的设备或容器实施防静电措施。

存储防护

- 产品应储存在适当的温度和湿度环境下（5 至 35°C，40%至 85%RH），且使产品远离氯和腐蚀性气体。
- 即使在适当的条件下，长期存放也可能导致产品的可焊接性和电气性能降低。针对长期存放的产品，应该在使用前应检查其可焊性。
- 如果储存超过 2 年，建议储存在氮气环境中。大气中的氧气会氧化产品的引线，导致引线可焊接性变差。

安全防护

- 请勿通过燃烧，粉碎或化学处理等方式将本产品变成气体，粉末或液体。
- 丢弃本产品时，请遵守法律和公司规定。

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 5min or less.

Hand-Soldering

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

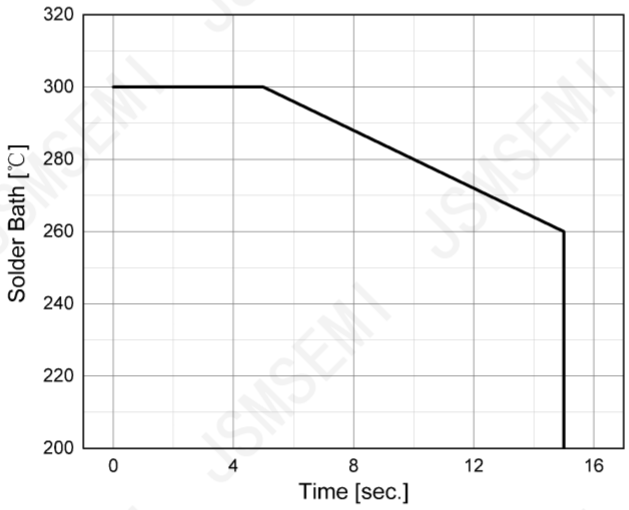


Figure 8. (Reference) Conditions of Dip Soldering

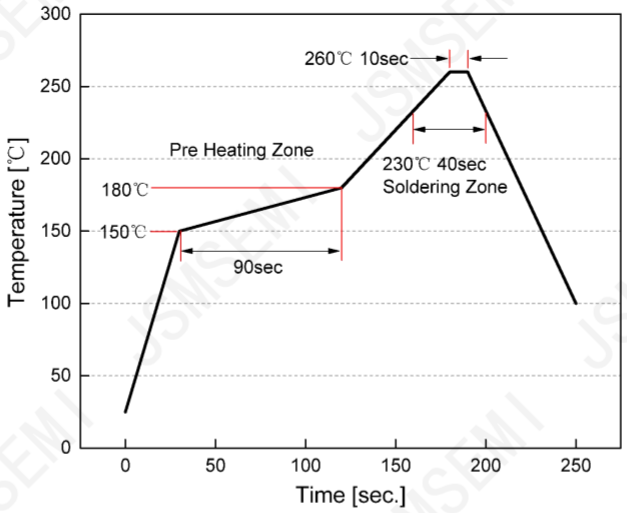


Figure 9. (Reference) Conditions of Reflow Profile

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.

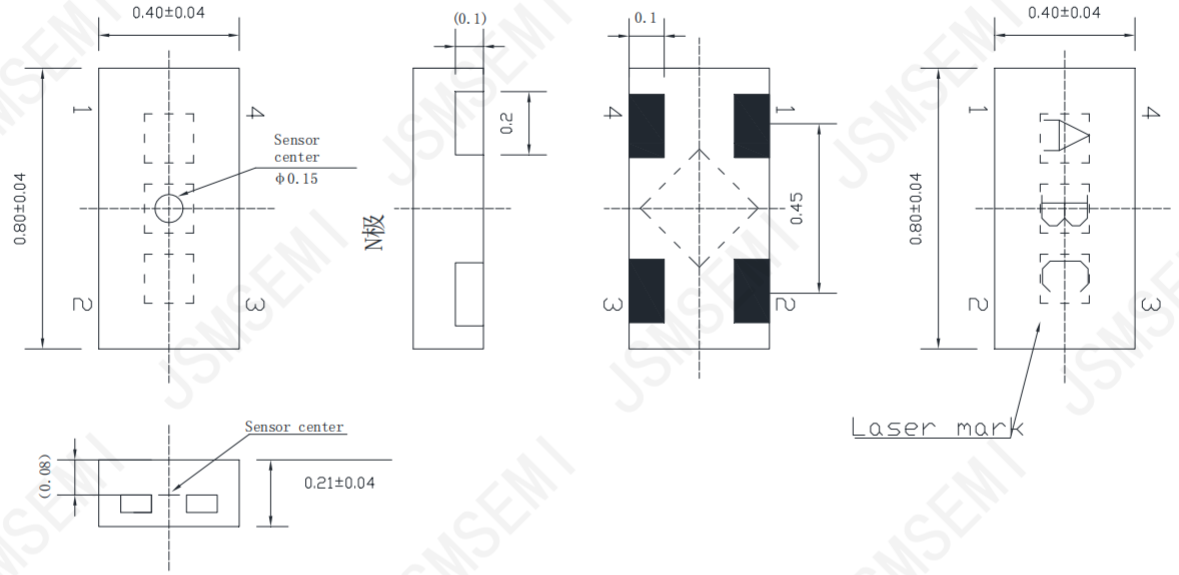
Precautions for Storage

- 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.

外形尺寸图Dimensiona lDrawing(Unit:mm)



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

Revision History

Rev.	Change	Date
V1.0	Initial version	2/23/2024

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