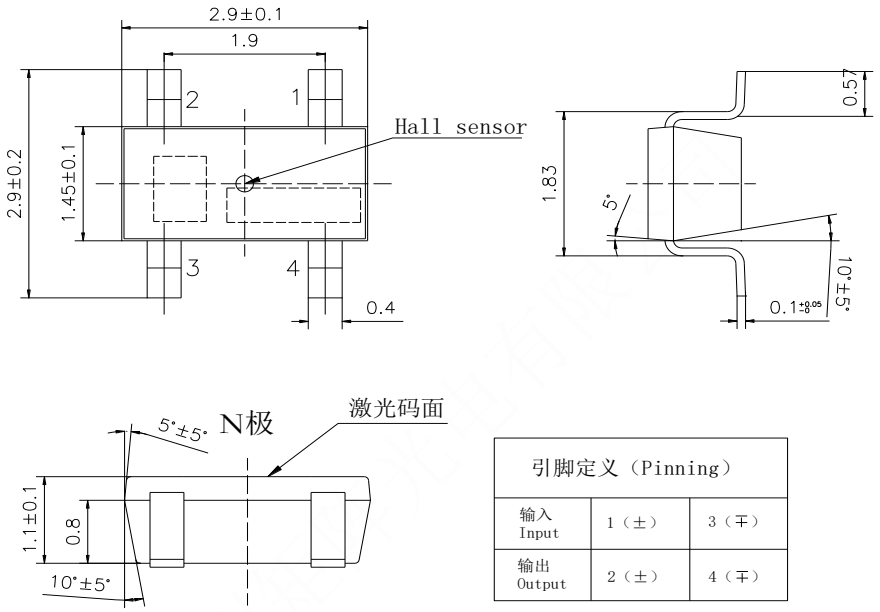
MW601 InSb Hall Element

Ultra High-sensitivity InSb Hall element

Classic SOT Package

Shipped in packet-tape reel (3,000pcs per reel)

Dimensional Drawing (Unit: mm)



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

Absolute Maximum Rating

Operating Temperature Range	-40℃ ~ 125℃
Storage Temperature Range	-55℃ ~ 150℃
Maximum Input Current I_{cmax}	20mA
Maximum Input Voltage V_{cmax}	2V

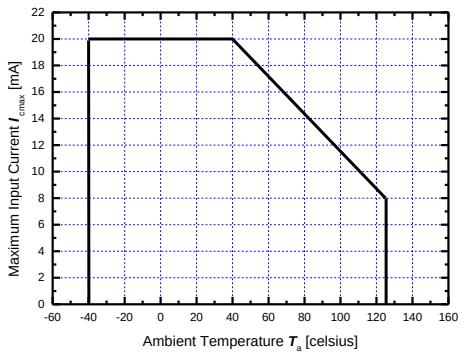


Figure 1. 1 Maximum input current I_{cmax}

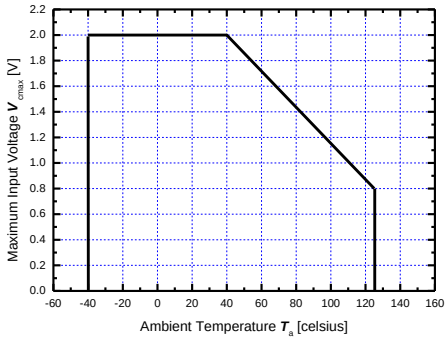


Figure 1. 2 Maximum input Voltage V_{cmax}

Electrical Characteristics （RT=25℃）

Table 1. Electrical Characteristics of MW601.

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	V_H	B = 50mT, V_C=1V T_a = RT	168		516	mV
Input Resistance	R_{in}	B = 0mT, I_C = 0.1mA T_a = RT	240		550	Ω
Output Resistance	R_{out}	B = 0mT, I_C = 0.1mA T_a = RT	240		550	Ω
Offset Voltage	V_{os}	B = 0mT, V_C = 1V T_a = RT	-5		+5	mV
Temp. Coeffi. of V_H	αV_H	B = 50mT, I_C =5mA, T_a = 0℃ ~ 40℃		-1.8		%/℃
Temp. Coeffi. of R_{in}	αR_{in}	B = 0mT, I_C =0.1mA, T_a = 0℃ ~ 40℃		-1.8		%/℃

Note:

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

   In which $\boldsymbol{V_{H\text{-}M}}$ is the Output Hall Voltage, $\boldsymbol{V_H}$ is the Hall Voltage and $\boldsymbol{V_{os}}$ is the offset Voltage under the identical electrical stimuli.

2. $\alpha V_H = \frac{1}{V_H(T_1)} \times \frac{V_H(T_3) - V_H(T_2)}{(T_3 - T_2)} \times 100$

3. $\alpha R_{in} = \frac{1}{R_{in}(T_1)} \times \frac{R_{in}(T_3) - R_{in}(T_2)}{(T_3 - T_2)} \times 100$

   $\boldsymbol{T_1 = 20℃}$, $\boldsymbol{T_2 = 0℃}$, $\boldsymbol{T_3 = 40℃}$

Classification of Output Hall Voltage (V_H)

Table 2. Classification of Hall Voltage

Rank	V_H [mV]	Conditions
C	168 ~ 204	B=50mT, V_C=1V
D	196 ~ 236	
E	228 ~ 274	
F	266 ~ 320	
G	310 ~ 370	
H	360 ~ 415	
I	405 ~ 465	
J	454 ~ 516	

Characteristic Curves

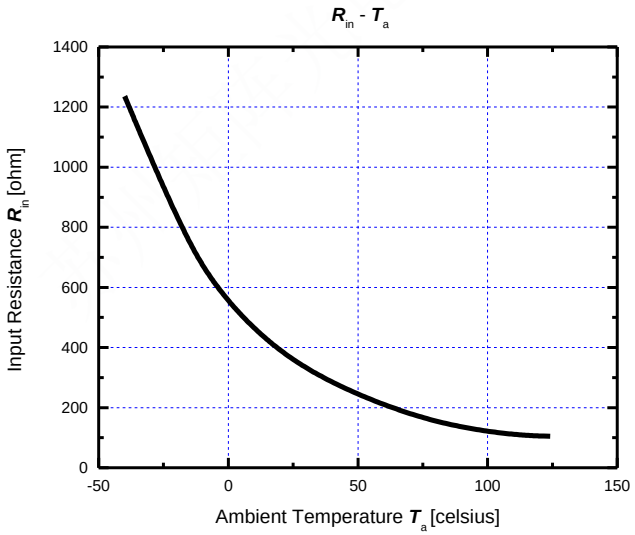


Figure 2. Input resistance R_{in} as a function of ambient temperature T_a.

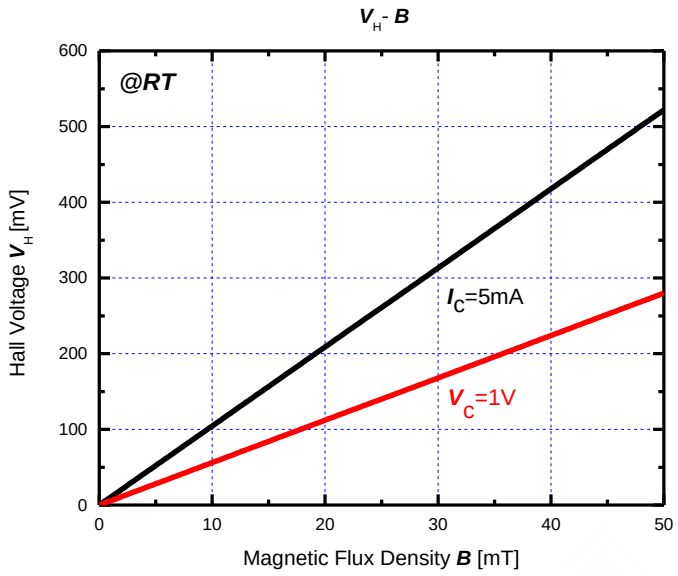


Figure 3. Hall voltage $\boldsymbol{V}_H$ as a function of magnetic flux density $\boldsymbol{B}$.

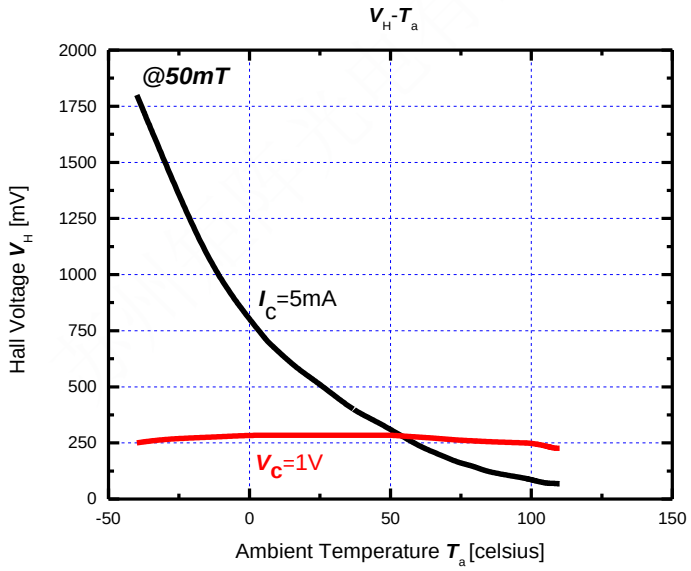


Figure 4. Hall voltage $\boldsymbol{V}_H$ as a function of ambient temperature $\boldsymbol{T}_a$.

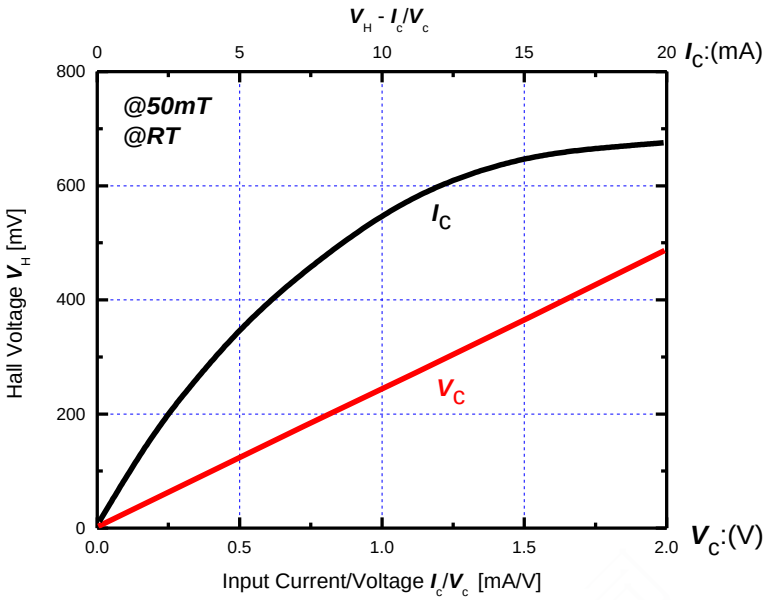


Figure 5. Hall voltage V_H as a function of electrical stimuli I_c/V_c.

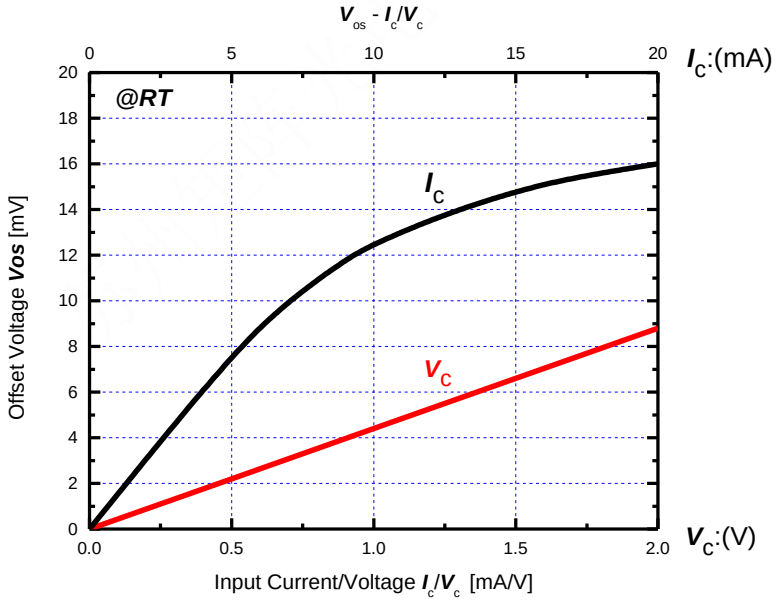


Figure 6. Offset voltage V_{os} as a function of electrical stimuli I_c/ V_c.

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	30 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 =1V	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 minutes or less.

Hand soldering conditions

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

Wave soldering conditions

- Temperature in Pre-heating zone should be lower than 150℃.
- Temperature in Soldering zone should be lower than 270℃.

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 H_2O 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.

文件履历表

版本	日期	描述
1.0	2021.02.06	初始版本发行
2.0	2021.07.16	引脚顺序由原先可变化脚序变为固定顺时针脚序

3.0	2022.02.28	引脚顺序定义变更，顺时针变成逆时针。
3.1	2022.04.21	修订了工作温度和存储温度
3.2	2022.11.01	修订特性图点位缺失及极限电流工作范围图，增大至125℃。
4.0	2023.06.06	POD图纸变更，由有肩宽引脚变更为无肩宽引脚
4.1	2023.09.13	增加极限电压和对应曲线，调整电阻温度曲线，调整Logo图标