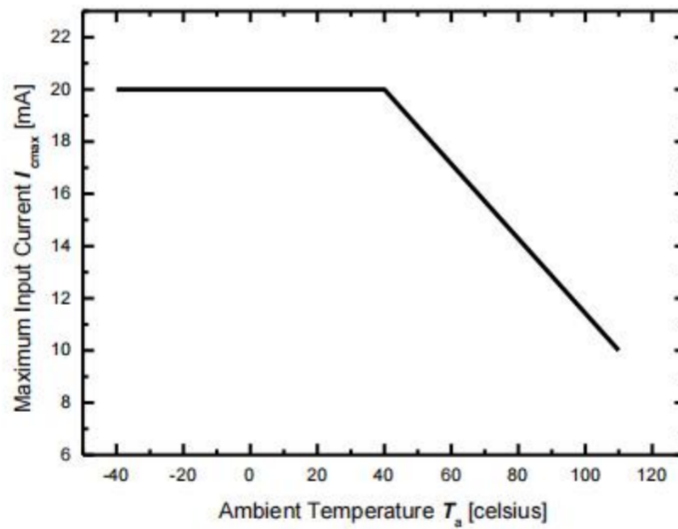


### 1. Electrical Characteristics

#### 1.1 Maximum Ratings

Parameter	Symbol	Rating	Unit
Maximum Input Current	$I_{max}$	20 (at 25°C)	mA
Maximum Power Dissipation	$P_{max}$	150 (at 25°C)	mW
Operating Temperature Range	$T_{op}$	-40 ~ +120	°C
Storage Temperature Range	$T_{st}$	-40 ~ +150	°C



**Figure 1.** Maximum input current  $I_{cmax}$

**Insb Hall Element**
**1.2 Electrical Characteristics (Measured at 25°C)**

Item	Symbol	Test Condi.	Min.	Typ.	Max.	Unit
Hall Voltage	$V_H$	$B = 50\text{mT}$ , $V_C = 1\text{V}$ $I_a = RT$	168		516	mV
Input Resistance	$R_{in}$	$B = 0\text{mT}$ , $I_C = 0.1\text{mA}$ $I_a = RT$	240		550	$\Omega$
Output Resistance	$R_{out}$	$B = 0\text{mT}$ , $I_C = 0.1\text{mA}$ $I_a = RT$	240		550	$\Omega$
Offset Voltage	$V_{os}$	$B = 0\text{mT}$ , $V_C = 1\text{V}$ $I_a = RT$	-5		+5	mV
Temp. Coeffi. of $V_H$	$\alpha V_H$	$B = 50\text{mT}$ , $I_C = 5\text{mA}$ , $I_a = 0^\circ\text{C} \sim 40^\circ\text{C}$		-1.8		%/ $^\circ\text{C}$
Temp. Coeffi. of $R_{in}$	$\alpha R_{in}$	$B = 0\text{mT}$ , $I_C = 0.1\text{mA}$ , $I_a = 0^\circ\text{C} \sim 40^\circ\text{C}$		-1.8		%/ $^\circ\text{C}$
Dielectric strength		100V D.C	1.0			M $\Omega$

Note:

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

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.

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

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

$$T_1 = 20^\circ\text{C}, \quad T_2 = 0^\circ\text{C}, \quad T_3 = 40^\circ\text{C}$$

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### 1.3 Rank Classification and Mark on Output 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	

### 1.4 Characteristic Curves

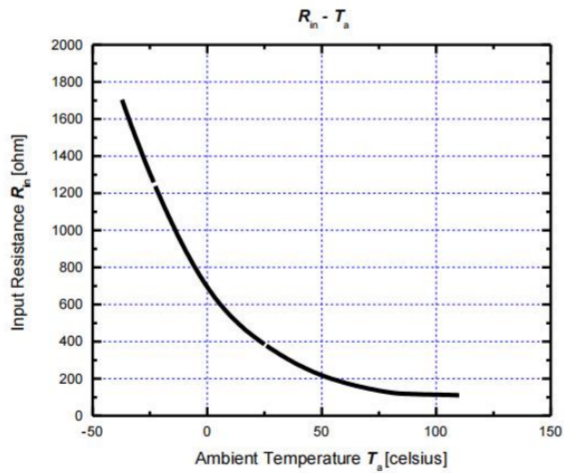
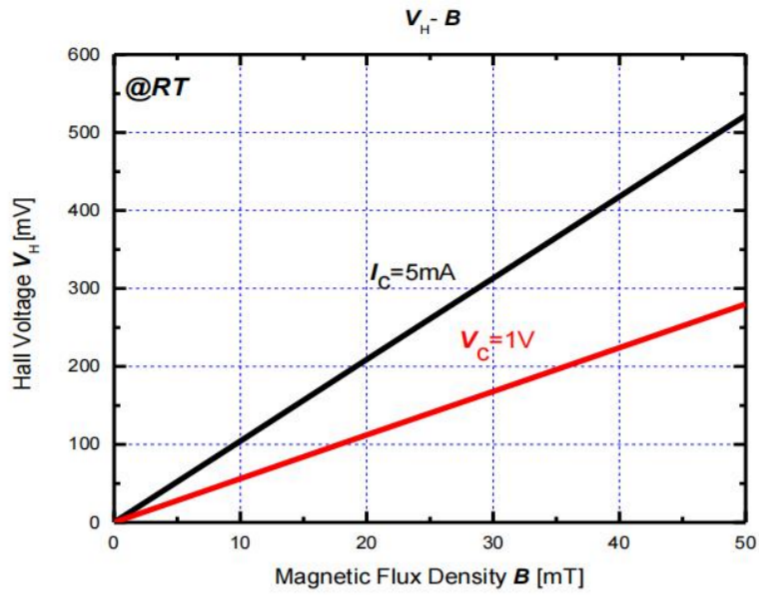
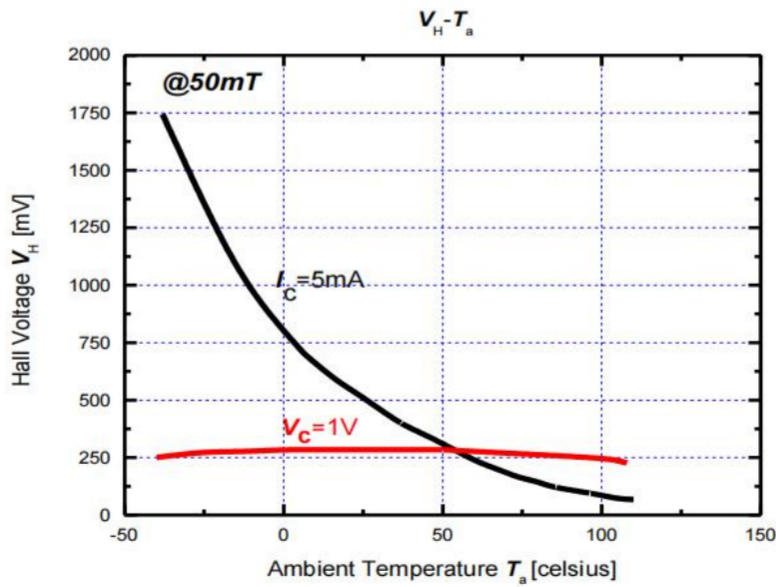


Figure 2. Input resistance  $R_{in}$  as a function of ambient temperature  $T_a$ .

**Insb Hall Element**

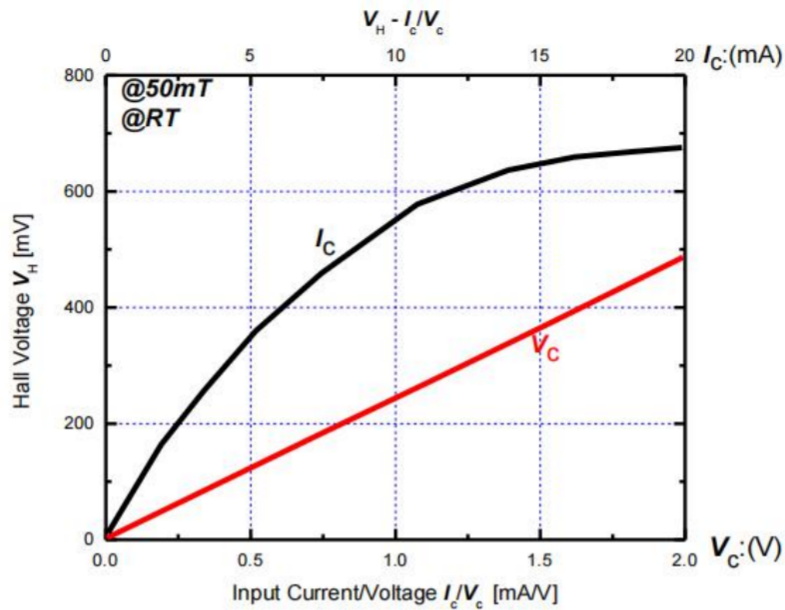


**Figure 3.** Hall voltage  $V_H$  as a function of magnetic flux density  $B$ .

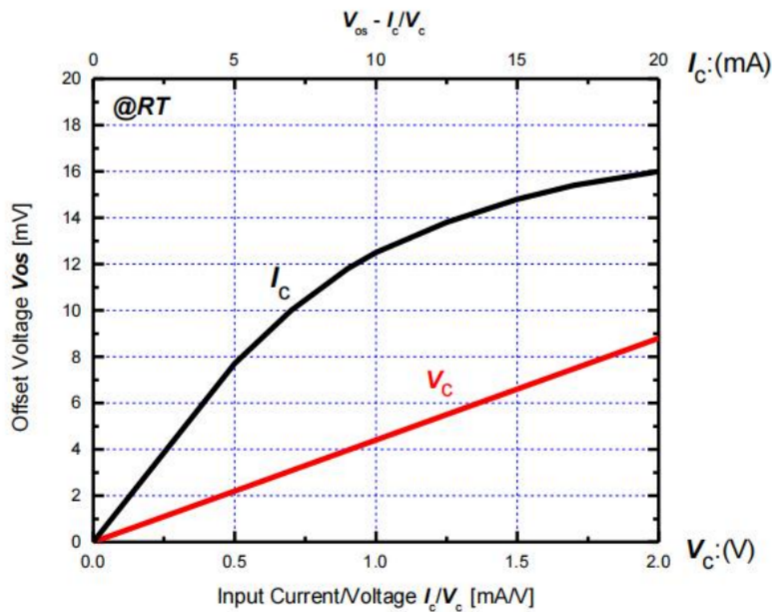


**Figure 4.** Hall voltage  $V_H$  as a function of ambient temperature  $T_a$ .

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**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  $I_c/V_c$ .

**2. Method for Mounting**

**2.1 Lead Frame**

- 1、 The material of lead frame is phosphor bronze alloy and the die bonded surface is plated by silver. The minimum thickness of plating is 3.0

**Insb Hall Element**

μm.

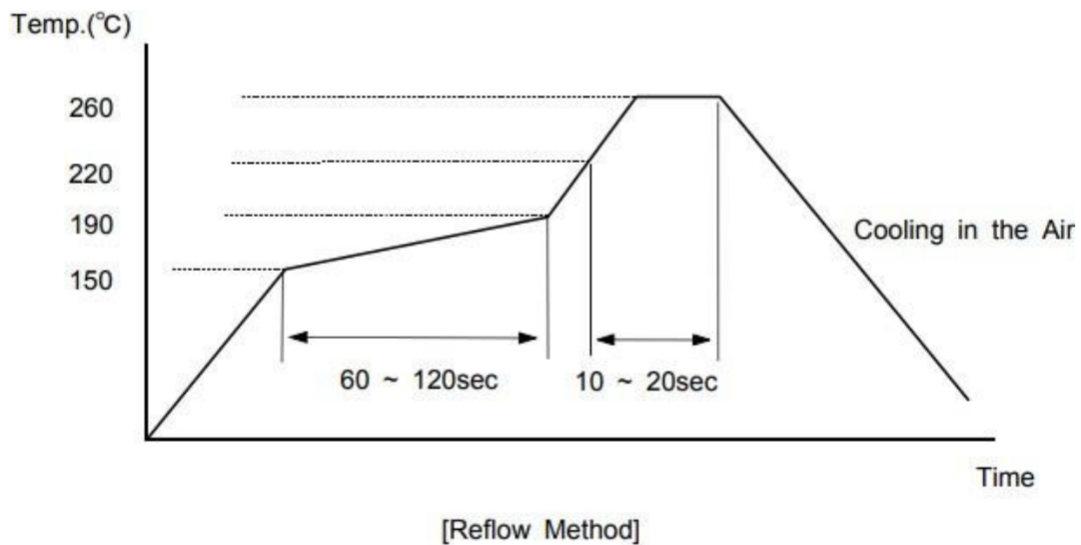
2、Lead Frame is plated by pure Sn and the thickness is controlled by 4-12 μm.

2.2 Soldering Conditions on PCB

- 1、No rapid heating and cooling is desired.
- 2、Preheating is recommended for 1~2minutes at 150~190°C.
- 3、Reflowing is recommended for 10~20seconds at 220~260°C.

2.3 Soldering Method and Temperature

Items	Methods	Temperature
Reflow	Soldering by passing the heated zone	Max 260°C in 10sec
Solder Iron	Soldering by solder-iron	Max 350°C in 3sec



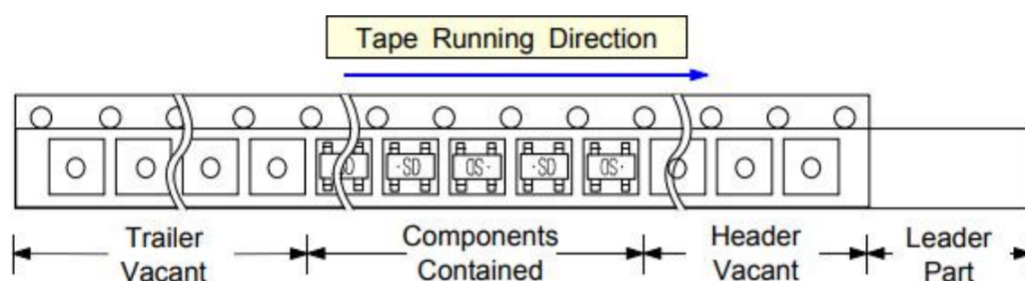
## Insb Hall Element

### 3. Packaging

#### 3.1 Taping

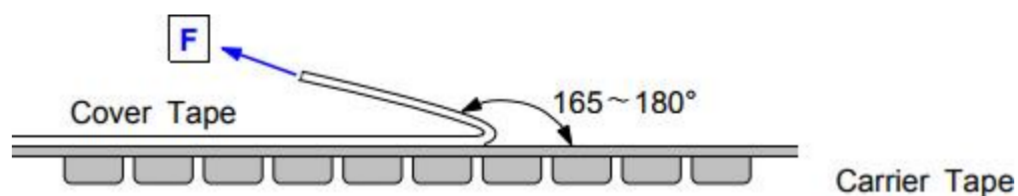
1、HAL101 should be packed marking side to cover tape side and put long side to tape running direction. 180° rotation has no effect on the application.

2、At least, 40mm vacant parts are made both front and rear side of tape.



#### 3.2 Handling Methods of Tape

1、Pull Strength(F) = 20~70g



2、Devices should not run out of a pocket when tape is bent down 15mm curvature.

3、Devices should not stick to cover tape.

4、Devices should be kept below 40°C and below RH80% in the shade.

5、Tape has no joint.

#### 3.3 Packing Unit

1、3,000pcs of devices are packed in one reel.

2、Five reels are packed in one inner box.

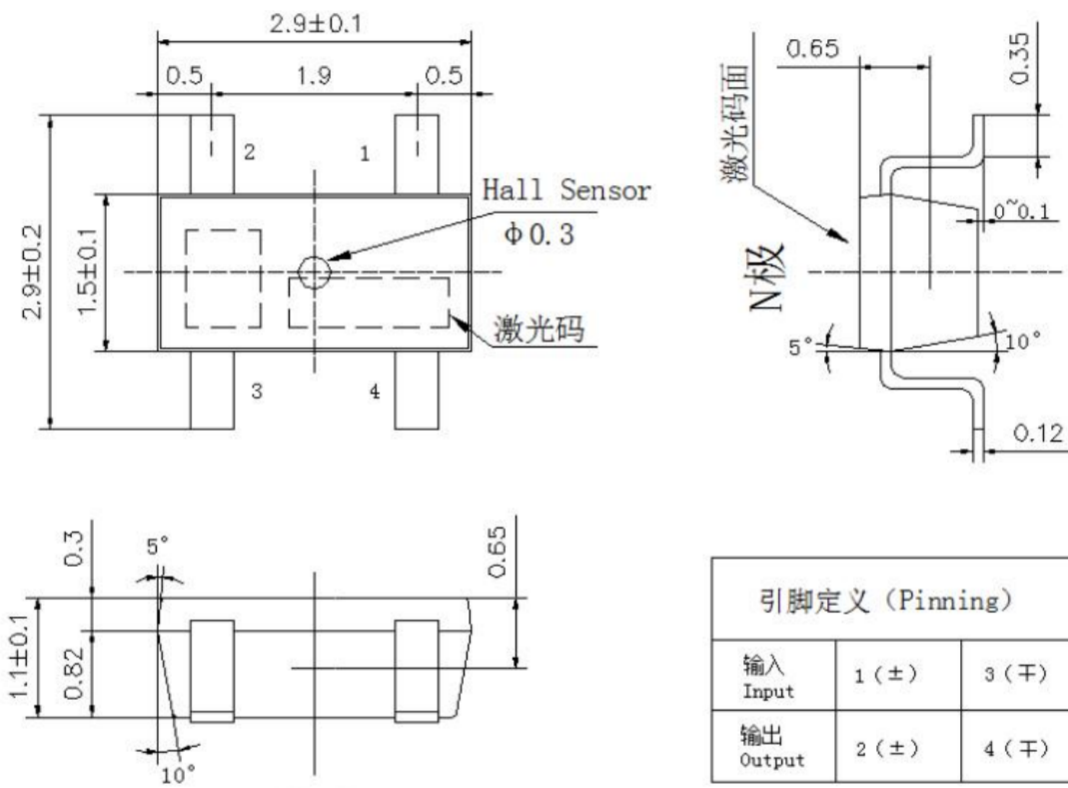
3、Four inner boxes, 60,000pcs of devices, are packed in one outer box.

## Insb Hall Element

### 4. External Dimensions and Appearance

#### 4.1 External Dimensions (Unit:mm)

Four leads of input · output terminals are designed in the diagonally symmetric mode and are equal in dimensions. HAL101 could be used without considering on the rotation of 180° .





**Insb Hall Element**
**5. Reliability Test Terms**

No.	Terms	Conditions	Duration
1	High Temperature storage (HTS)	【JEITA EIAJ ED-4701】 $T_a=150$ (0 ~ +10) °C	1000 hrs
2	Heat Cycle (HC)	【JEITA EIAJ ED-4701】 $T_a=-55^{\circ}\text{C}\sim 150^{\circ}\text{C}$ high temp. - normal temp. - low temp. 30 min - 5 min - 30 min	30 cycles
3	Temp. Humidity Storage (THS)	【JEITA EIAJ ED-4701】 $T_{\theta}=85\pm 3^{\circ}\text{C}$ , $R_H=85\pm 5\%$	1000 hrs
4	Reflow Soldering (RS)	【JEITA EIAJ ED-4701】 $260\pm 5^{\circ}\text{C}$	10 sec
5	High Temp. Operating (HTO)	$T_a=110^{\circ}\text{C}$ , $V_c=1\text{V}$	1000 hrs

**6. Ordering Information**

Part No.	Lead Type	Rank	Tape
HAL101	A:Gull wing type	C、D、E、F、 G、H、I、J	U: upward
	B: Straight type		D: downward