SPECIFICATION

MODEL : SH-12AL (Forward Taping)

Part Number : HE12A*1U12L (* : Rank)

Halogen Free

InSb Hall Element

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Tianjin, China

1. Application

This specification sheet is applied to Hall sensor that NANOS supplies.

2. Electrical Characteristics

2.1 Maximum Ratings

[Ta=25℃]

Parameter	Symbol	Rating	Unit
Maximum Input Voltage	Imax	20 (at 25℃)	mA
Operating Temperature Range	Top	-40 ~ +120	℃
Storage Temperature Range	Tst	-40 ~ +150	℃

2.2 General electrical specifications

[Ta=25℃]

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Hall Voltage	Vh	Vin＝1V, B＝50mT	196	-	320	mV
Input Resistance	Rin	I＝0.1mA, B＝0mT	240	-	550	Ω
Output Resistance	Rout	I＝0.1mA, B＝0mT	240	-	550	Ω
Offset Voltage	Vo	Vin＝1V, B＝0mT	-7	-	+7	mV
Temp. Coeff. Of Vh	αVh	Average on 0 ~ +40℃, B=50mT, Ic =5mA	-	-1.8	-	%/℃
Temp. Coeff. Of Rin	αRin	Average on 0 ~ +40℃, B=0mT, Ic =0.1mA	-	-1.8	-	%/℃

※ Note.

1) Vh = Vhm - Vo (Vhm : measured at 50mT)

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

3) $\alpha Rin = \frac{1}{Rin(T_1)} \times \frac{Rin(T_3) - Rin(T_2)}{(T_3 - T_2)} \times 100\%$

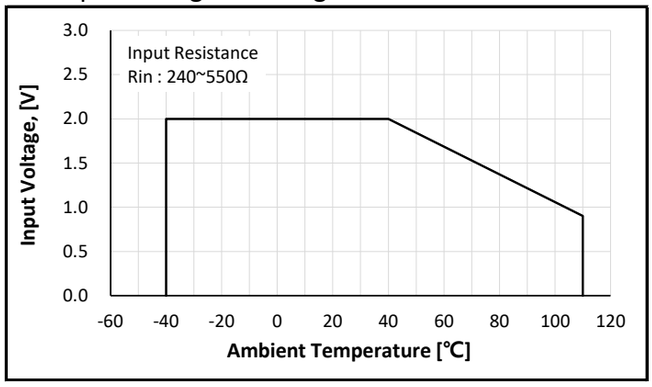
4) T_1 = 20℃, T_2 = 0℃, T_3 = 40℃

2.3 Rank Classification and Mark on Output Hall Voltage

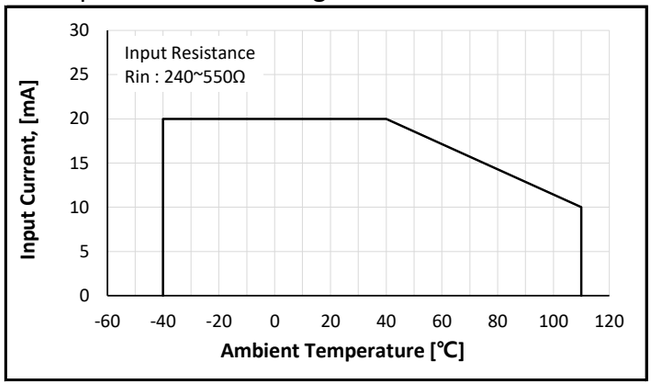
Rank	Output Hall Voltage Vh (mV)	Measurement Conditions
D	196 ~ 236	Vin=1V, B=50mT (Constant Voltage)
E	228 ~ 274	
F	266 ~ 320	

2.4 Characteristic Curves

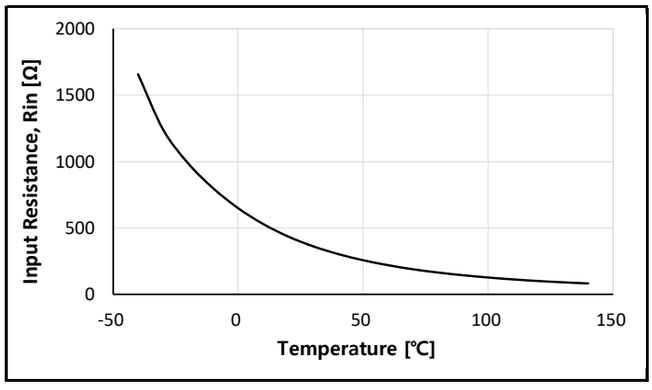
■ Input Voltage Derating Curve



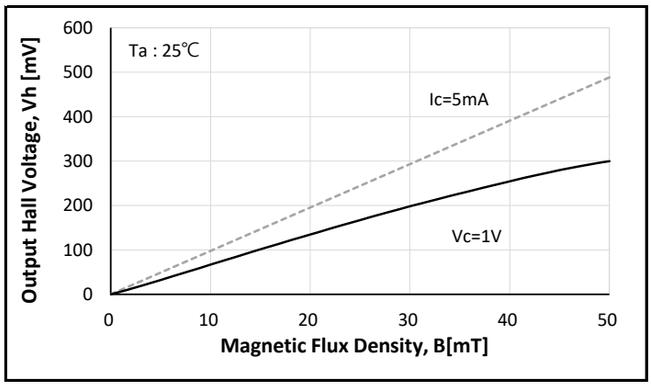
■ Input Current Derating Curve



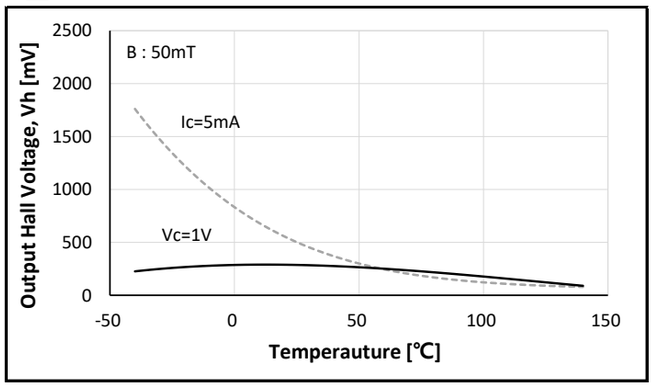
■ Rin-T



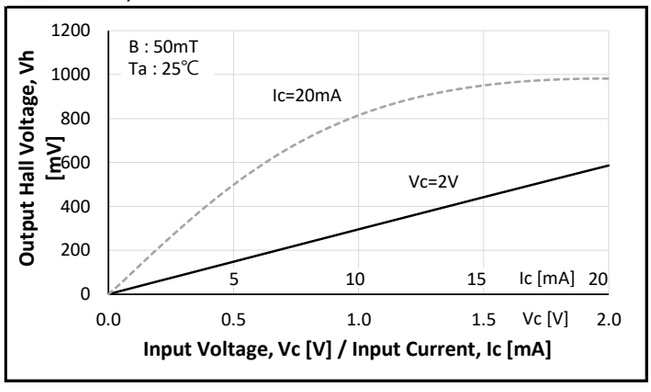
■ Vh-B



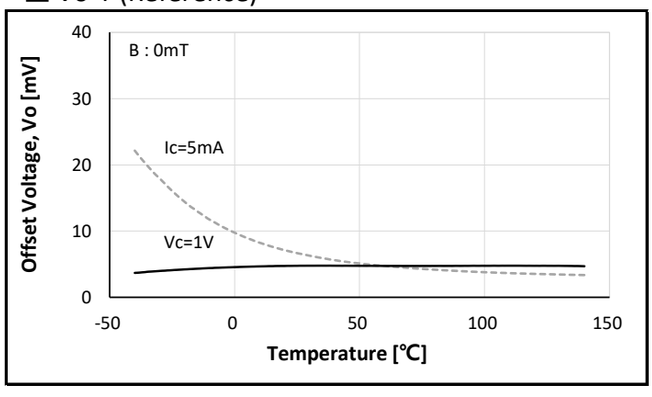
■ Vh-T



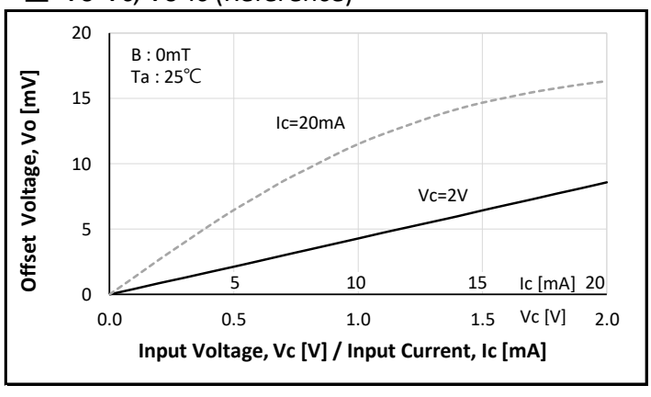
■ Vh-Vc, Vh-Ic



■ Vo-T (Reference)



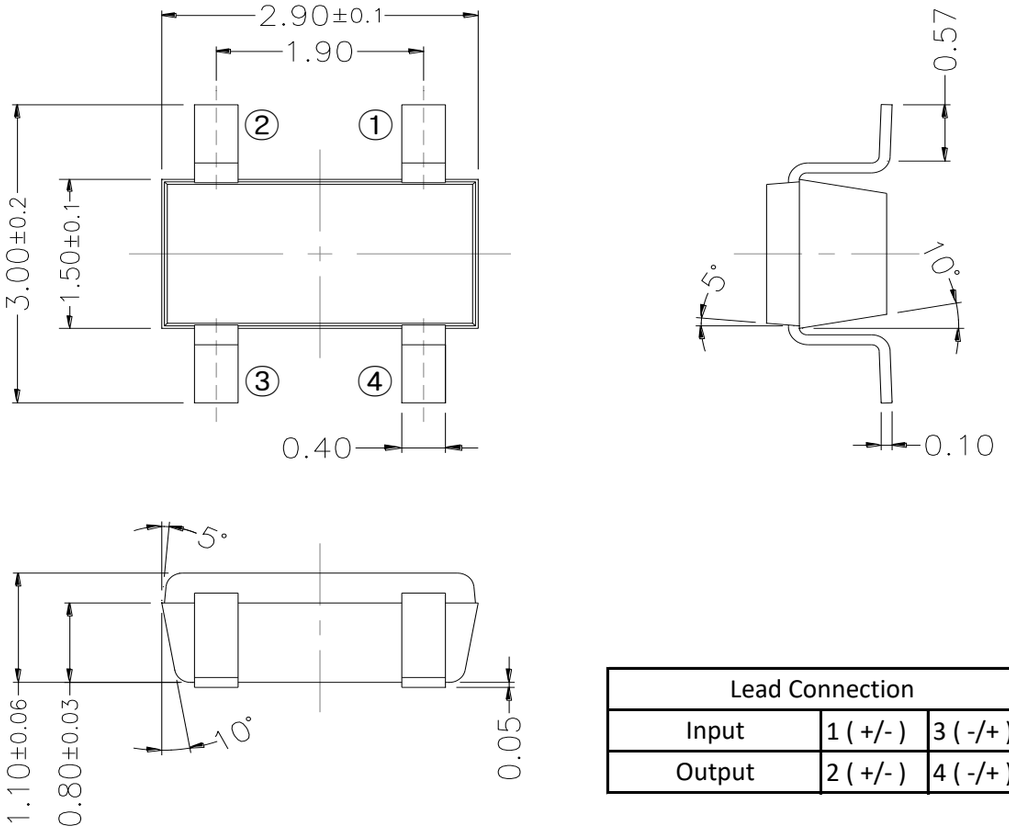
■ Vo-Vc, Vo-Ic (Reference)



3. External Dimensions and Appearance

3.1 External Dimensions (Unit : mm)

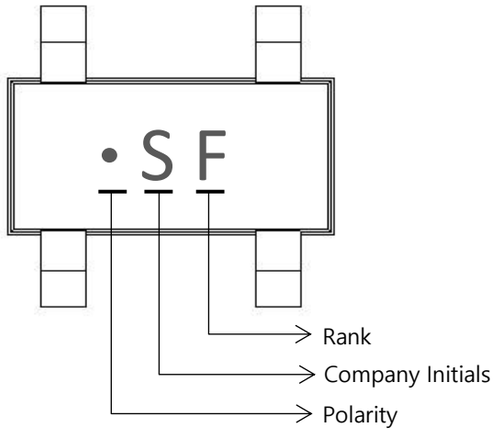
Four leads of input·output terminals are designed in the diagonally symmetric mode and are equal in dimensions. SH-12AL(Forward taping) could be used without considering on the rotation of 180°.



Lead Connection		
Input	1 (+/-)	3 (-/+)
Output	2 (+/-)	4 (-/+)

3.2 Marking Method

Devices should be marked by LASER beam in the form of 「• S + 'Rank' 」



4. Method for Mounting

4.1 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㎛.
2) Lead is plated by pure Sn and the thickness is controlled by 4~12㎛.

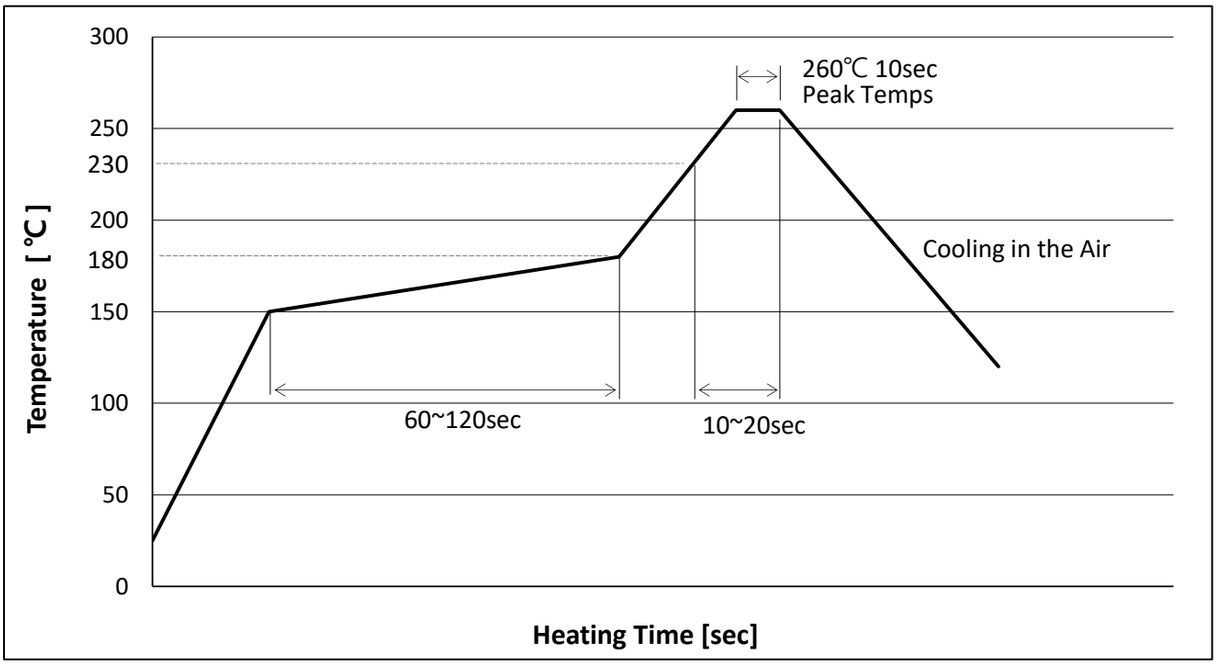
4.2 Soldering Conditions on PCB

1) No rapid heating and cooling is desired.
2) Preheating is recommended for 1～2minutes at 150～180℃.
3) Reflowing is recommended for 10～20seconds at 220～260℃.
4) The number of times of reflow soldering should be two or less.
5) Solderability should be checked by yourself, because it is depend on solder paste material and other parameters.

4.3 Soldering Method and Temperature

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

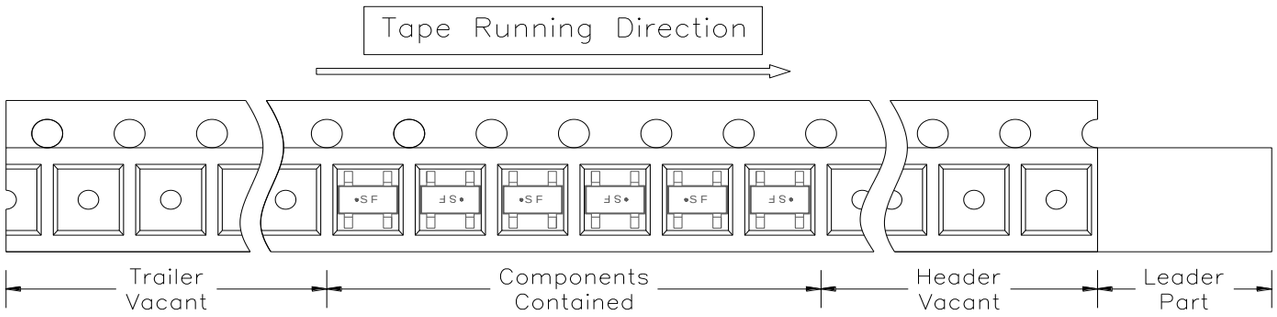
4.4 Reflow Profile (Reference)

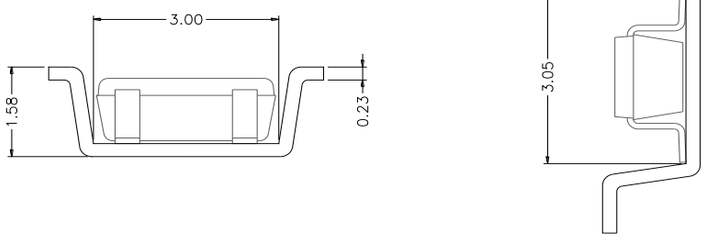


5. Packaging

5.1 Taping

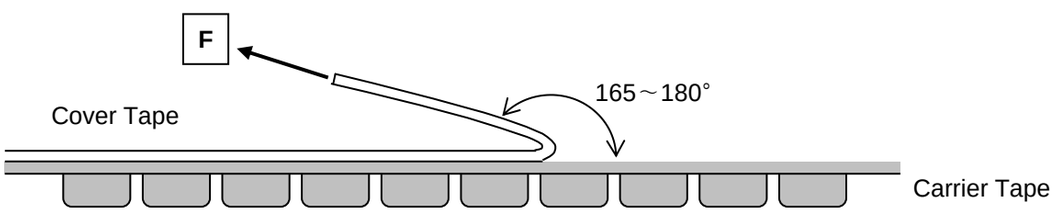
1) SH-12AL (Forward taping) should be packed marking side to cover tape side
   and put long side to running direction. 180° rotation has no effect on the application.
2) At least, 40mm vacant parts are made both front and rear side of tape.





7.2 Handling Methods of Tape

1) Pull Strength(F) = 20～70g

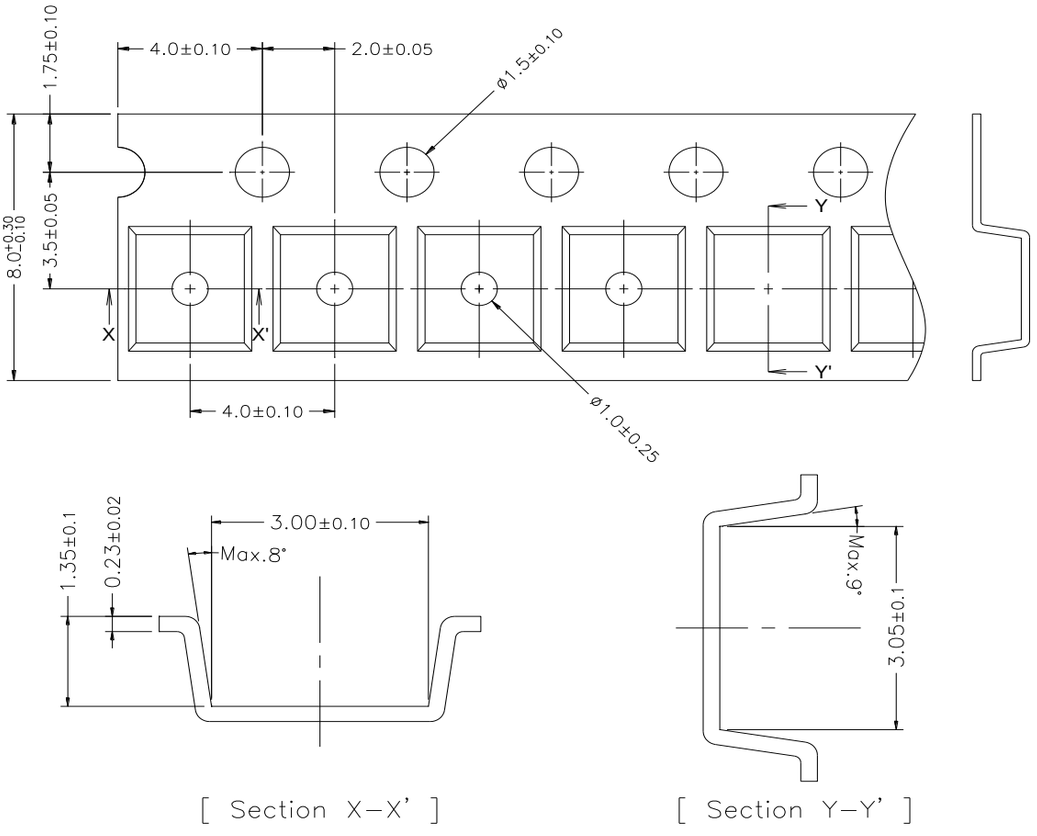


2) Devices should not run out of a pocket when tape is bent down 15mm curvature.
3) Devices should not stick to cover tape.
4) Devices should be kept below 30℃ and below RH80% in the shade.
5) Tape has no joint

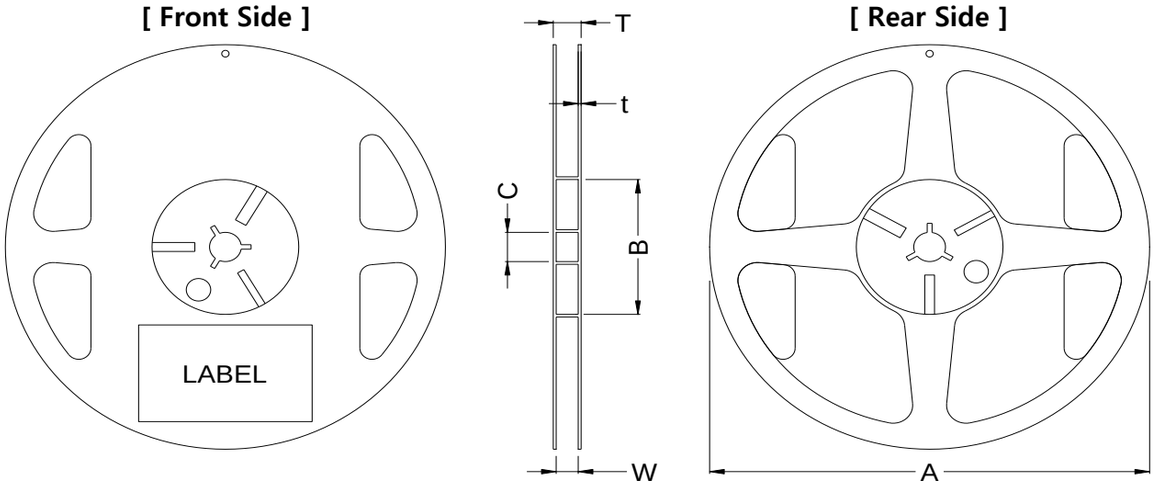
5.3 Packing Unit

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.
4) Dummy could be packed for safe dealing.

5.4 External Dimensions of Carrier Tape (Unit : mm)



5.5 External Dimensions of Reel (Unit : mm)



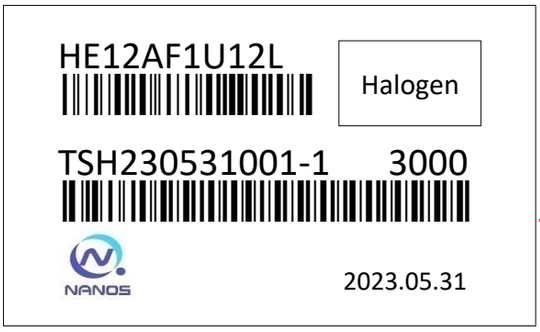
[Unit : mm]

Symbol	A	B	C	W	T	t
Spec.	Ø180 +0 -3	Ø60 +1 -0	Ø13±0.3	9±0.3	11.4±1.0	2.0 max.

※ The above reel is made of plastic and is recyclable.

5.6 Reel Packing Structure

■ **Example**



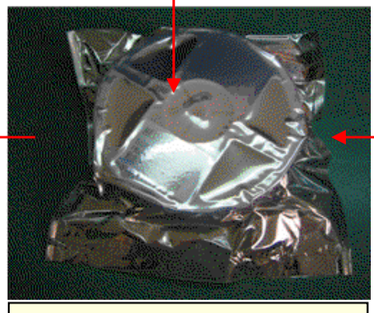
Manufacturing Lot Number

Halogen Free Label

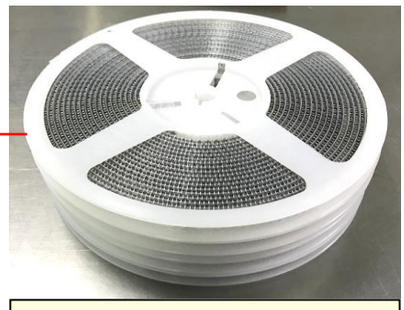
1 Reel : 3,000 EA

Dry Pack.

1 Inner Box : 15,000 EA



Vacuum Packing



5 Reel

Inspection Sheet

Outer Box : 60,000 EA

Packing Finished

6. Reliability

6.1 Test Item and Condition

No.	Test Item	Test condition
1	High Temp. Storage	Ta = 150℃, t = 1000hr
2	High Temp. Operation	Ta = 120℃, Iopr = 10mA, t = 1000hr
3	Low Temp. Operation	Ta = -40℃, Iopr = 6mA, t = 1000hr
4	High Temp. High Humidity Operation	Ta = 85℃, HR = 85%, Iopr = 9mA, t = 1000hr
5	PCT	Ta = 121℃, HR = 100%, Pv = 2atm, t = 24hr
6	Thermal Shock	T(L) = -55℃, T(H) = 150℃, t(L,H) = 30min, M = 30cycle
7	High Humidity Temperature Cycle	T(L) = -20℃, T(H)= 85℃, t(L,H) = 30min, HR = 95%, M = 40Cycle
8	Soldering Heat Resistance	Peak Temp = 260℃, t = 10sec, Reflow
9	ESD(MM)	V = 500V, C = 200pF, R = 0Ω, 1sec, 1Time, Pin#1~Pin#3(EIAJ Condition)

6.2 Criterion For Judging

After each reliability test, samples should be during at least 24 hrs in room Temp. & Humidity, and then measure.
The change rates should be in the values as below.

Item	OK Spec	NG / OK
Rin	Under Initial ±20%	OK (Spec. Sastisfying)
Rout		
Vh		
Vo	Max. ±5%	

* Vo change ratio calculation method

Vo change ratio = (Vo-after - Vo-before) / Vh-before x 100%

7. The Analysis of RoHS(Restriction of Hazardous Substances)

It is guaranteed that there are no RoHS materials in Hall Sensor by specific analysis results

- References : RoHs 10 Materials
  1) Cadmium(Cd)
  2) Lead(Pb)
  3) Mercury(Hg)
  4) Hexavalent Chromium(CrⅥ)
  5) PBBs(Polybrominated Biphenyls)
  6) PBDEs(Polybrominated Diphenyl Ethers)
  7) DBP(Dibutyl phthalate)
  8) BBP(Butyl benzyl phthalate)
  9) DEHP(Bis(2-ethylhexyl) phthalate)
  10) DIBP(Diisobutyl Phthalates)

8. Halogen Free

NANOS Hall sensor guarantees that it contains no Halogenated materials.
That is Halogen Free product and is confirmed by specific analysis results.

- References : Halogen Materials
  1) Fluorine(F)
  2) Chlorine(Cl)
  3) Bromine(Br)
  4) Iodine (I)
- Halogen- free limitation(unit: ppm)
  Br : 900 ppm, Cl : 900 ppm, Br+Cl : 1,500 ppm

9. Important Precautions

1) Reprinting or reproducing this document in whole or in part without our prior written consent is prohibited.

2) The storage period of the product before use is one year in vacuum packaging, and the storage period of the product after opening is one year in a sealed state.
※ Product storage environment recommendation: N2 Gas & Temperature 30℃ or less, Humidity 60%Rh

3) The quality and performance of the product are guaranteed for one year based on the date of manufacture.
(This is based on the storage environment)

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