



# SPECIFICATION

## (Approval sheet of GaAs Hall Sensor)

Part Name	GaAs Hall Sensor	Image
Product No.	HE72DX3U23	A photograph showing two small, dark, rectangular GaAs Hall sensors. The sensor on the left is tilted and has the letters "EIG" printed on it. The sensor on the right is also tilted and shows its electrical contacts.
User Code		
Revision	Rev.1	
Manufacturer	NANOS Co., Ltd.	

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1. Revision History

Date	Rev. No	Contents revised	Design	Approval
0	2015.3.30	Establishment	K.I.Jun	J.H.Lee
1	2017.3.18	Marking Change : Page 11	C.S.Kim	K.C.Cho

## 2. Electrical Characteristic

### 2.1 Absolute maximum ratings

[Ta=25°C]

Parameter	Symbol	Rating	Unit
Maximum Input Voltage	Vc	10	V
Maximum Power Dissipation	Pmax	150	mW
Operating Temperature Range	Top	-40 ~ +125	°C
Storage Temperature Range	Tst	-40 ~ +150	°C

### 2.2 General electrical specifications

[Ta=25°C]

Parameter	Symbol	Conditions	Min	Max	Unit
Output Hall Voltage	Vh	Vin=6V, B=50mT	55	75	mV
Input Resistance	Rin	Ic = 0.1mA	650	850	Ω
Output Resistance	Rout	Ic = 0.1mA	650	850	Ω
Offset Voltage	Vo	Vin = 6V, B = 0mT	-8	+8	mV

※ Vh = Vhm - Vo ( Vhm : The output voltage measured at 50mT)

### 2.3 Other electrical specifications (For reference only)

[Ta=25°C]

Parameter	Symbol	Conditions	Min	Max	Unit
Temp. Coeff. of VH	αVh	Average value between Ta = 25~125°C, B=50mT, Ic=5mA	-	-0.06	%/°C
Temp. Coeff. of Rin	αRin	Average value between Ta = 25~125°C, B=0mT, Ic=0.1mA	-	0.3	%/°C
Linearity	ΔK	B=0.1TG/0.5T Ic=5mA	-	2	%

$$\text{※ } \alpha_{Rin} : \frac{1}{Rin[T1]} \times \frac{Rin[T2] - Rin[T1]}{[T2 - T1]} \times 100$$

$$\text{※ } \Delta K : \frac{K[B1] - K[B2]}{[K(B1) + K(B2)]/2} \times 100$$

$$\text{※ } \alpha_{Vh} : \frac{1}{Vh[T1]} \times \frac{Vh[T2] - Vh[T1]}{[T2 - T1]} \times 100$$

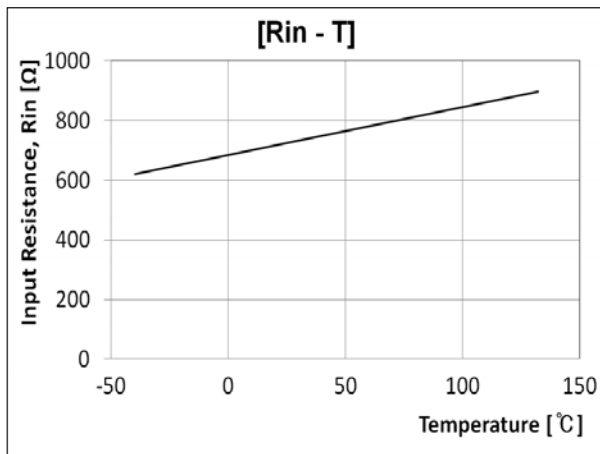
$$T1 = 25^\circ\text{C}, T2 = 125^\circ\text{C}$$

$$K = Vh / (Ic \cdot B)$$

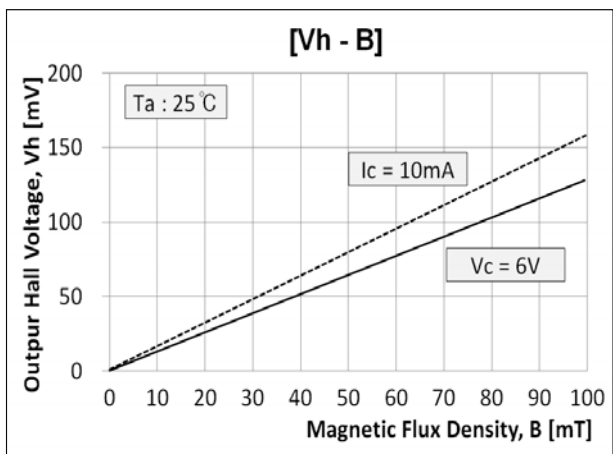
$$B1 = 0.5T, B2 = 0.1T$$

## 2.4 Characteristic graphs

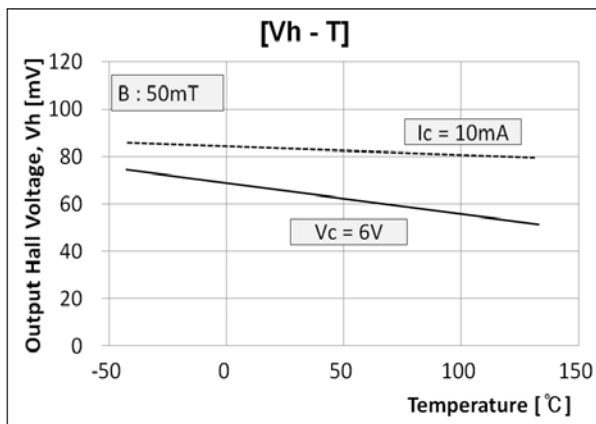
### ■ Rin-T



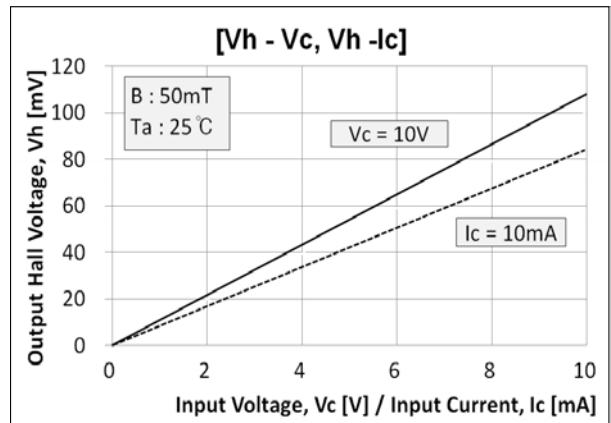
### ■ Vh-B



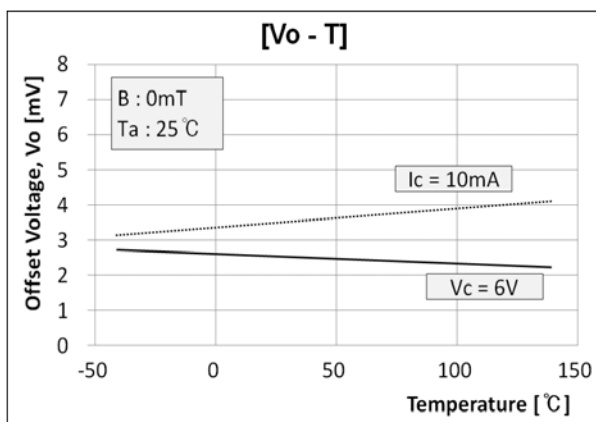
### ■ Vh-T



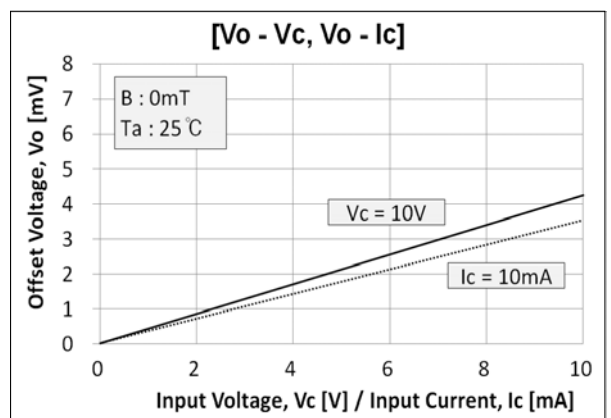
### ■ Vh-Vc, Vh-Ic



### ■ Vo-T [For reference only]



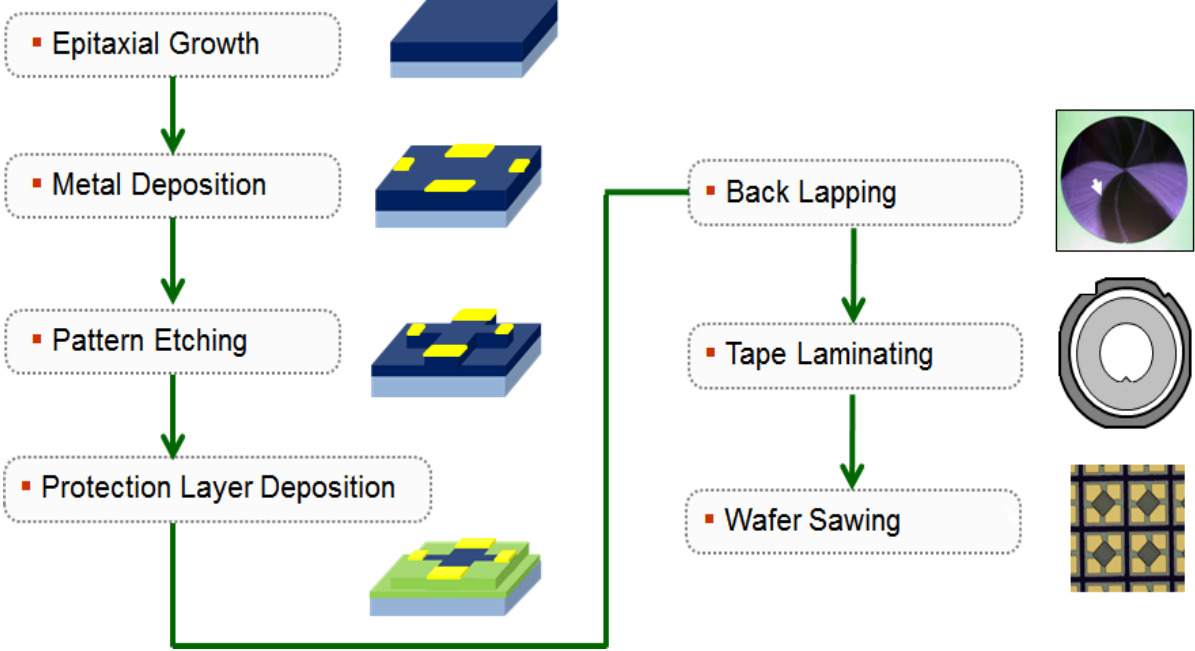
### ■ Vo-Vc, Vo-Ic [For reference only]



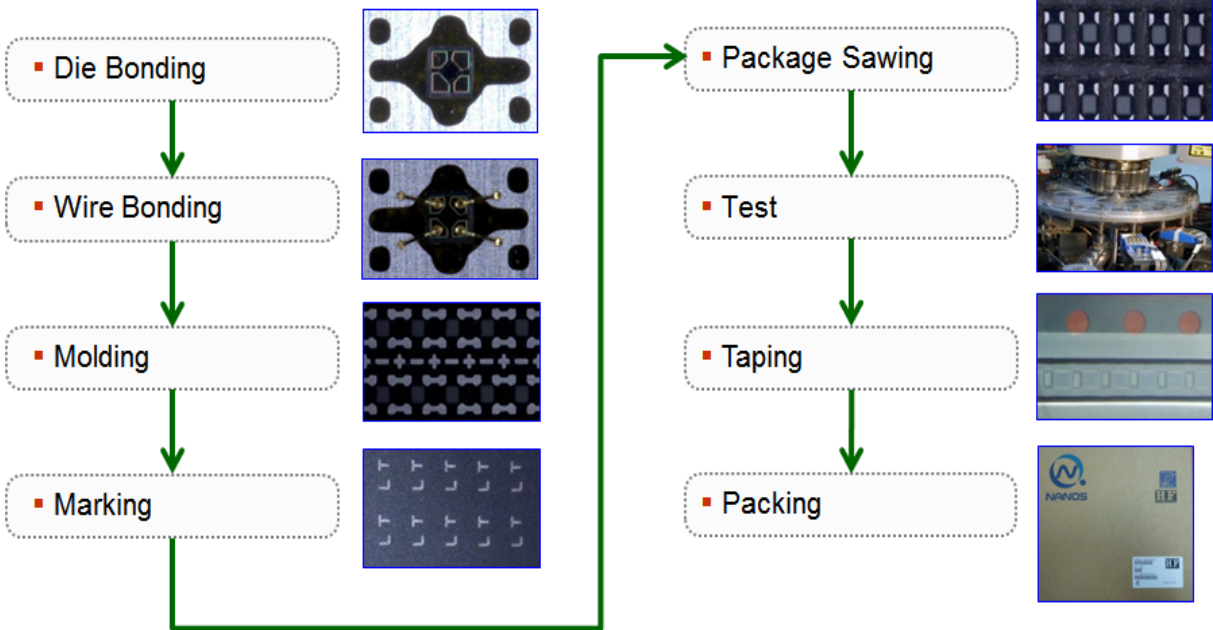
※ Magnetic Flux Density 1[mT] = 10 [G]

### 3. Manufacturing Process

#### FAB

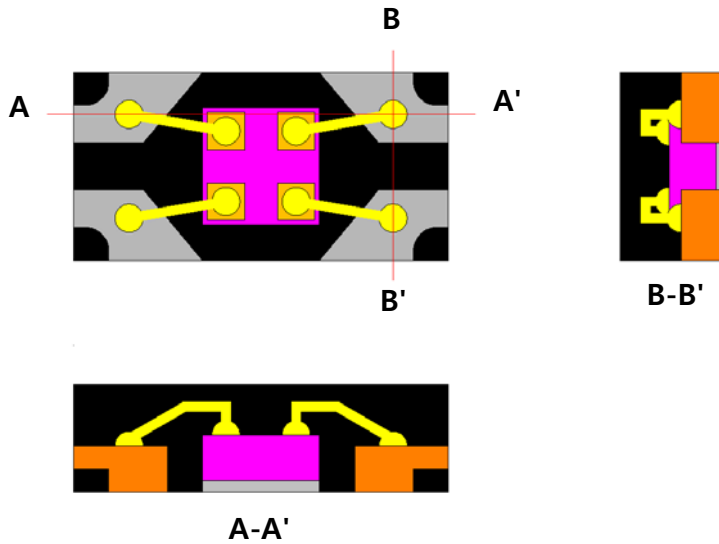


#### Package

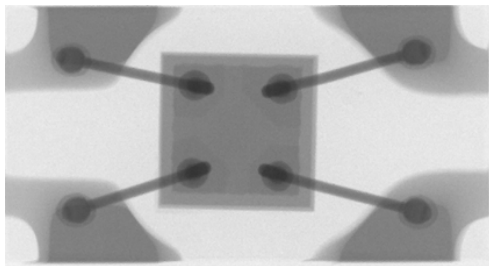


## 4. Internal Structure and X-Ray Image

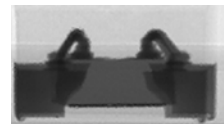
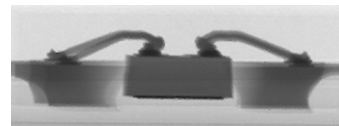
### 4.1 Internal Structure



### 4.2 X-Ray Image



[Top View]



[Side View]

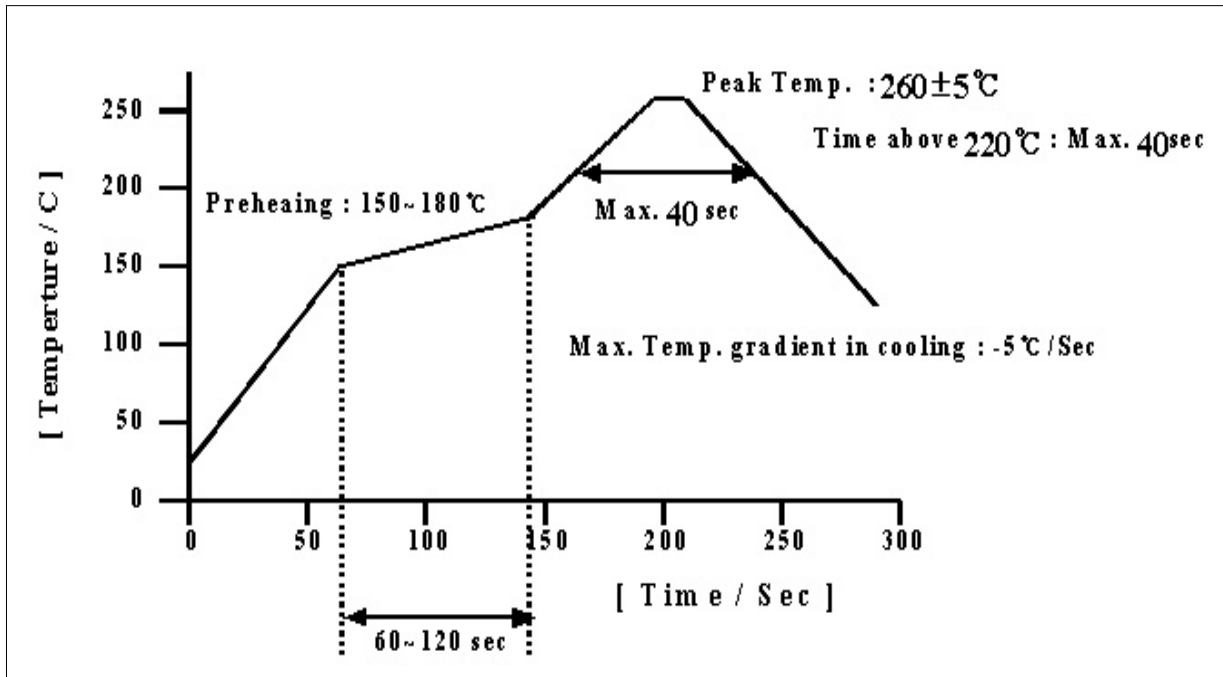
## 5. Part List

Part	Material
Chip	GaAs
Au Wire	4N-Au
Epoxy Molding Compound	Silica, Epoxy etc.
Lead Frame	Cu Alloy
DAF	Epoxy Resin, Silica

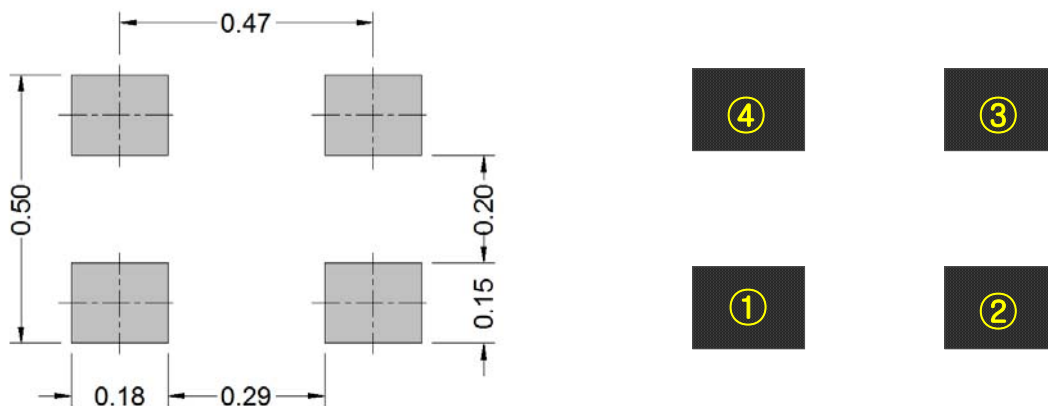
## 6. Reflow Profile

### 6.1 Reflow Condition

- 1) No rapid heating and cooling is desired.
- 2) Preheating is recommended for 1~2minutes at 150~180°C.
- 3) Reflowing is recommended for 10~20seconds at 220~260°C.



### 6.2 PCB Land Pattern [unit : mm]



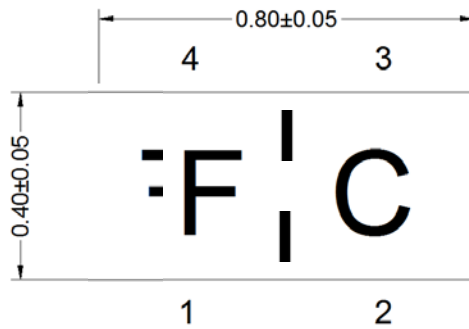


### 7. Package Specification

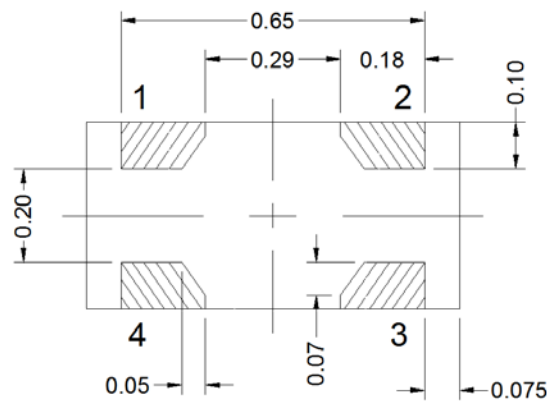
#### 7.1 Package Dimensions [unit : mm]

W x L x H = 0.80±0.05[mm] x 0.40±0.05[mm] x 0.23±0.04[mm]

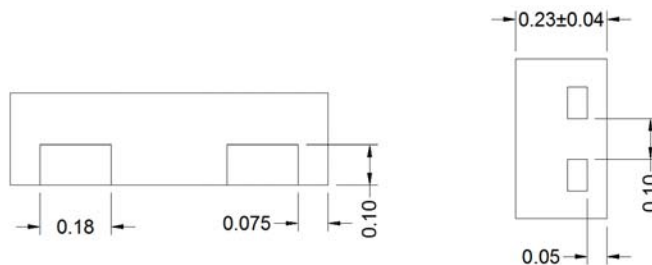
1) Top View



2) Bottom View



3) Side View

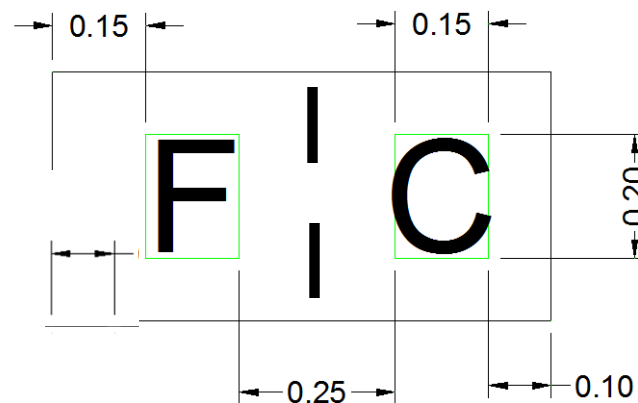


## 7.2 Pin Description

Pin No.	Description
1	Input +/-
2	Output +/-
3	Input -/+
4	Output -/+

## 7.3 Marking (Date Code) Specifications

### 1) Marking Position & Size [unit : mm]



### 2) Marking (Production Code)

- Ⓐ 1'st Character & Bar : Production Year/Month
- Ⓑ 2'nd Character : Production Date

## 7.4 Marking Method : Laser Marking

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DATE : 2017.03.18

## 7.5 Marking Table

## 1) 1'st Character &amp; Bar : Production Year/Month

Y/M	17/1	17/2	17/3	17/4	17/5	17/6	17/7	17/8
Mark	D <sub>1</sub> <sup>1</sup>	E <sub>1</sub> <sup>1</sup>	F <sub>1</sub> <sup>1</sup>	H <sub>1</sub> <sup>1</sup>	I <sub>1</sub> <sup>1</sup>	J <sub>1</sub> <sup>1</sup>	L <sub>1</sub> <sup>1</sup>	N <sub>1</sub> <sup>1</sup>
Y/M	17/9	17/10	17/11	17/12	18/1	18/2	18/3	18/4
Mark	T <sub>1</sub> <sup>1</sup>	U <sub>1</sub> <sup>1</sup>	V <sub>1</sub> <sup>1</sup>	X <sub>1</sub> <sup>1</sup>	Y <sub>1</sub> <sup>1</sup>	Z <sub>1</sub> <sup>1</sup>	1 <sub>1</sub> <sup>1</sup>	2 <sub>1</sub> <sup>1</sup>
Y/M	18/5	18/6	18/7	18/8	18/9	18/10	18/11	18/12
Mark	5 <sub>1</sub> <sup>1</sup>	7 <sub>1</sub> <sup>1</sup>	C <sub>1</sub> <sup>1</sup>	E <sub>1</sub> <sup>1</sup>	F <sub>1</sub> <sup>1</sup>	H <sub>1</sub> <sup>1</sup>	I <sub>1</sub> <sup>1</sup>	J <sub>1</sub> <sup>1</sup>
Y/M	19/1	19/2	19/3	19/4	19/5	19/6	19/7	19/8
Mark	L <sub>1</sub> <sup>1</sup>	N <sub>1</sub> <sup>1</sup>	T <sub>1</sub> <sup>1</sup>	U <sub>1</sub> <sup>1</sup>	V <sub>1</sub> <sup>1</sup>	X <sub>1</sub> <sup>1</sup>	Y <sub>1</sub> <sup>1</sup>	Z <sub>1</sub> <sup>1</sup>
Y/M	19/9	19/10	19/11	19/12	20/1	20/2	20/3	20/4
Mark	1 <sub>1</sub> <sup>1</sup>	2 <sub>1</sub> <sup>1</sup>	5 <sub>1</sub> <sup>1</sup>	7 <sub>1</sub> <sup>1</sup>	C <sub>1</sub> <sup>1</sup>	E <sub>1</sub> <sup>1</sup>	F <sub>1</sub> <sup>1</sup>	H <sub>1</sub> <sup>1</sup>
Y/M	20/5	20/6	20/7	20/8	20/9	20/10	20/11	20/12
Mark	I <sub>1</sub> <sup>1</sup>	J <sub>1</sub> <sup>1</sup>	L <sub>1</sub> <sup>1</sup>	N <sub>1</sub> <sup>1</sup>	T <sub>1</sub> <sup>1</sup>	U <sub>1</sub> <sup>1</sup>	V <sub>1</sub> <sup>1</sup>	X <sub>1</sub> <sup>1</sup>

## 2) 2'nd Character: Production Date

Date	1	2	3	4	5	6	7	8
Mark	1	2	3	4	5	C	D	E
Date	9	10	11	12	13	14	15	16
Mark	F	G	H	I	J	K	L	M
Date	17	18	19	20	21	22	23	24
Mark	N	O	P	Q	7	R	S	T
Date	25	26	27	28	29	30	31	
Mark	U	V	W	X	Y	Z	No Mark	

Model : HE72DX3U23 (SH-72D)

Revision

1

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### 8. Packing Specification

#### 8.1 Packing Method

1) Reel + Humidity Card + Absorbent



- Reel Taping Q'ty : 10kpcs/reel
- Humidity Card : 1ea/reel
- Absorbent : 1ea/reel
- Barcode Label : Print the HF Mark

+



2) 1Reel +1Humidity Card +1Absorbent → 1Al Bag



- Al Bag : 1reel/bag
- Contents : 1Reel +1Humidity Card +1Absorbent
- Barcode Label : Print the HF Mark

Model : HE72DX3U23 (SH-72D)	Revision	1
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3) 1Al Bag → 1Reel Box



- 1Reel Box : 1Al Bag / 1Reel Box
- Contents : 1Al Bag (1Reel +1Humidity Card + 1Absorbent)
- Q'ty : 10kpcs
- Barcode Label : Print the HF Mark

4) 1Reel Box x 5EA → 1Inner Box



- 1Inner Box : (1Reel Box x 5EA) / 1Inner Box
- Contents : 1Reel Box x 5EA
- Q'ty : 50kpcs
- Barcode Label : Print the HF Mark

5) 1Inner Box x 4EA → Outer Box



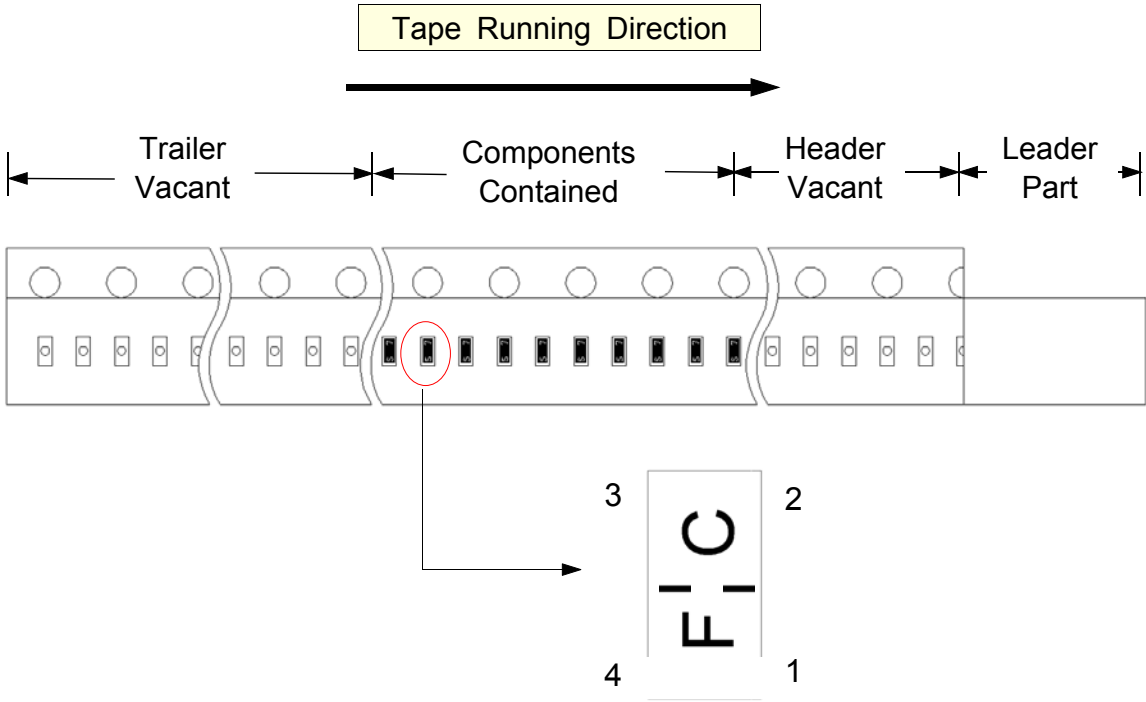
- Outer Box : 1Inner Box x 4EA / Outer Box
- Contents : 1Inner Box x 4EA
- Q'ty : 200kpcs
- Barcode Label : Print the HF Mark

8.2 Packing Unit

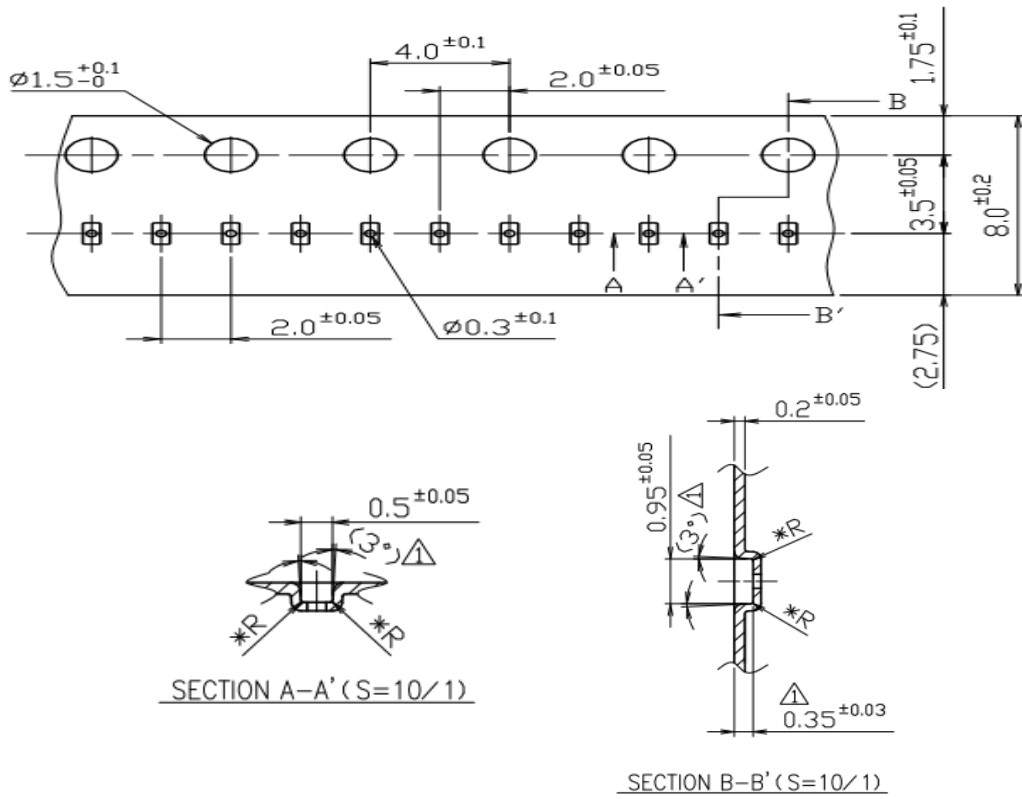
- 1) 10,000pcs of devices are packed in one reel.
- 2) 1reel is packed in one Al bag and 1reel box.
- 3) Five 1reel boxes are packed in one inner box.
- 4) Four inner boxes, 200,000pcs of devices, are packed in one outer box.
- 5) Dummy could be packed for safe dealing.

8.3 Taping

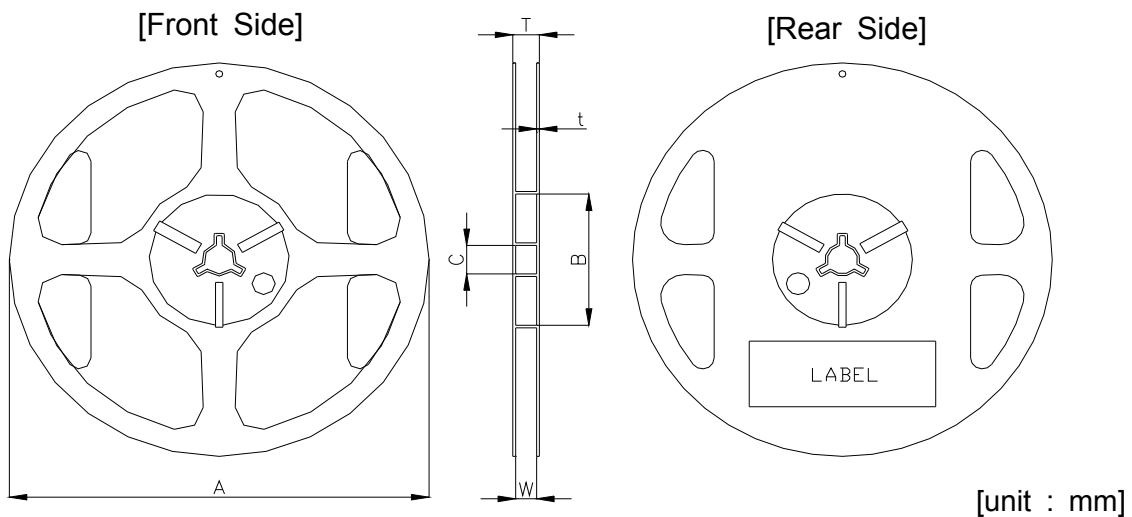
- 1) SH-72D should be packed and marking is possible to see through cover tape.
- 2) At least, 100mm vacant parts are made both front and rear side of tape.



8.3 Carrier Tape Drawing [unit : mm]



8.4 Reel Drawing [unit : mm]



SYMBOL	A	B	C	W	T	t
Spec.	$\phi 180^{+0}$ -3	$\phi 60^{+1}$ -0	$\phi 13^{+0.3}$	$9^{+0.3}$	$11.4^{+1.0}$	2.0 max.

## 9. Reliability Test Specification

### 9.1 Test item and condition

No	Test item	Test condition	Quantity	Time
1	High Temp. High Humidity	Ta=85±5℃, Relative Humidity=85±5%RH	22pcs	1,000HR
2	High Temp. Operating	Ta=125±5℃, Vc=6.0V±10%	22pcs	1,000HR
3	Preconditioning	Preconditioning : Ta=150±5℃, 24HR Moisture Absorption : Ta=85±5℃, 85±5%RH, 168HR Reflow : Ta=260±5℃, 10sec	22pcs	2Cycle
4	High Temp. Storage	Ta=150±5℃	22pcs	1,000HR
5	Temp. Cycle	-55±5℃, 30min ↔ 25℃, 5min ↔ 150±5℃, 30min	22pcs	50Cycle

### 9.2 Criterion for judging

After each reliability test, samples should be store at least 24hrs in room temp. & humidity, and then measure.

Item	Specification
Rin	Change rate[%] : ±20%↓
Rout	
Vh	
Vo	Max. ±16mV