

**DVD
Player**



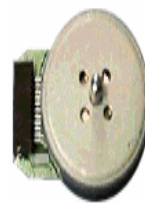
CD-ROM



VCR



Laser Printer



Hall Sensor

Widely Used in BLDC Motors

SPECIFICATION

MODEL : SH12AL

P/N : HE12A*1D12L (*:Rank)

Halogen Free

HALL ELEMENT

--- Index ---

1. Application
2. Electrical Characteristics
3. Method for Mounting
4. Packaging
5. External Dimensions and Appearance
6. Reliability
7. Caution on treating
8. The Analysis of RoHS
9. Halogen Free

Sentronix Electronics Co., Ltd

1. Application

This specification Sheet is applied to Hall sensor that Sentronix supplies.

2. Electrical Characteristics

2.1 Maximum Ratings

($T_a=25^{\circ}\text{C}$)

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}	$-40 \sim +120$	$^{\circ}\text{C}$
Storage Temperature Range	T_{st}	$-40 \sim +150$	$^{\circ}\text{C}$

2.2 Electrical Characteristics (Measured at 25°C)

Parameter	Symbol	Measurement Conditions	Min	Max	Unit
Output Hall Voltage	V_H	$V_{\text{in}} = 1\text{V}$, $B = 500\text{G}$	196	320	mV
Input Resistance	R_{in}	$I = 0.1\text{mA}$	240	390	Ω
Output Resistance	R_{out}	$I = 0.1\text{mA}$	240	390	Ω
Offset Voltage	V_O	$V_{\text{in}} = 1\text{V}$, $B = 0\text{G}$	-7	+7	mV
Temp. Coeff. of V_H	α	$T_a = 0 \sim +40^{\circ}\text{C}$	-	-1.8	% / $^{\circ}\text{C}$
Temp. Coeff. of R_{in} , R_{out}	β	$T_a = 0 \sim +40^{\circ}\text{C}$	-	-1.8	% / $^{\circ}\text{C}$

※ $V_H = V_{\text{HM}} - V_O$ (V_{HM} : The output voltage measured at 500G.)

2.3 Rank Classification and Mark on Output Hall Voltage

Output Hall Voltage, V_H (mV)	Rank	Mark	Measurement Conditions
196 ~ 236	D	• SD	$V_{\text{in}} = 1\text{V}$, $B = 500\text{G}$ (Constant Voltage)
228 ~ 274	E	• SE	
266 ~ 320	F	• SF	

3. Method for Mounting

3.1 Lead Frame

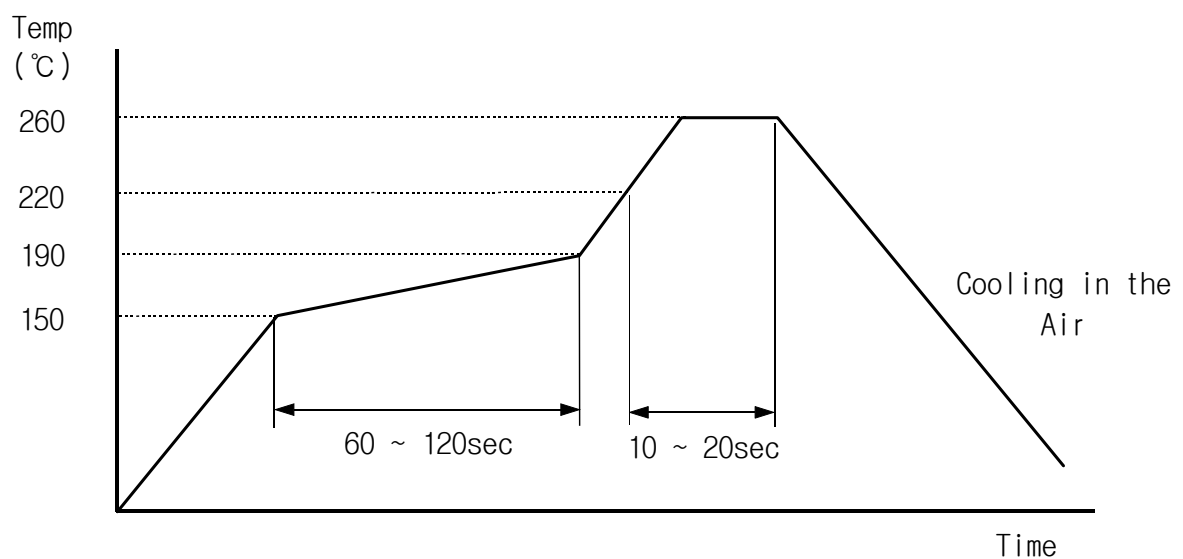
- 1) The material of lead frame is phosphor bronze alloy and the die bonded surface is plated by copper and silver. The minimum thickness of plating is $3.0\mu\text{m}$.
- 2) Lead Frame is plated by pure Sn and the thickness is controlled by $4\sim 12\mu\text{m}$.

3.2 Soldering Conditions on PCB

- 1) No rapid heating and cooling is desired.
- 2) Preheating is recommended for 1~2minutes at $150\sim 190^{\circ}\text{C}$.
- 3) Reflowing is recommended for 10~20seconds at $220\sim 260^{\circ}\text{C}$.

3.3 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

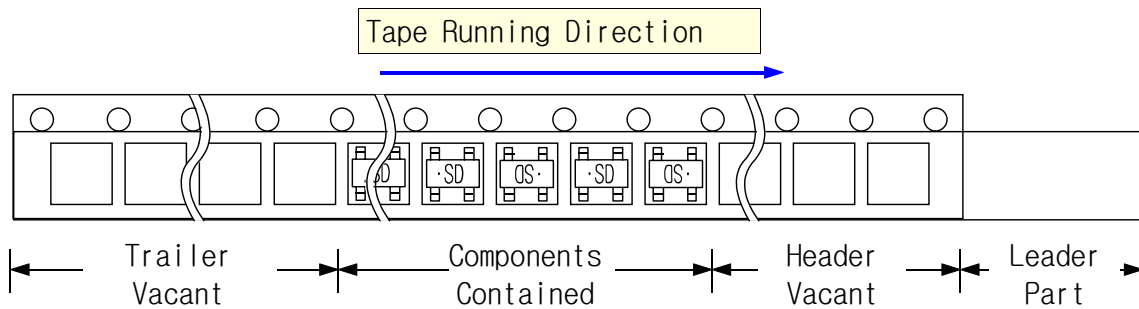


Reflow Method

4. Packaging

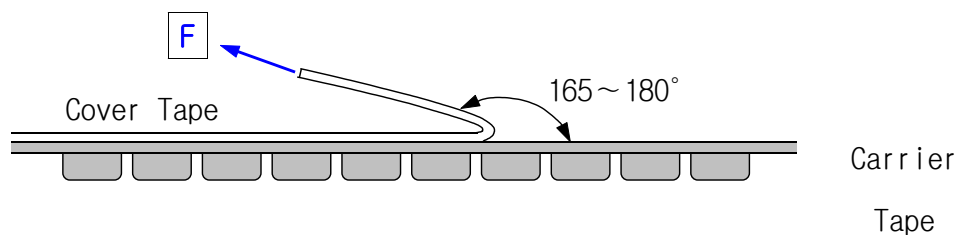
4.1 Taping

- 1) SH12A 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.



4.2 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.

4.3 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.

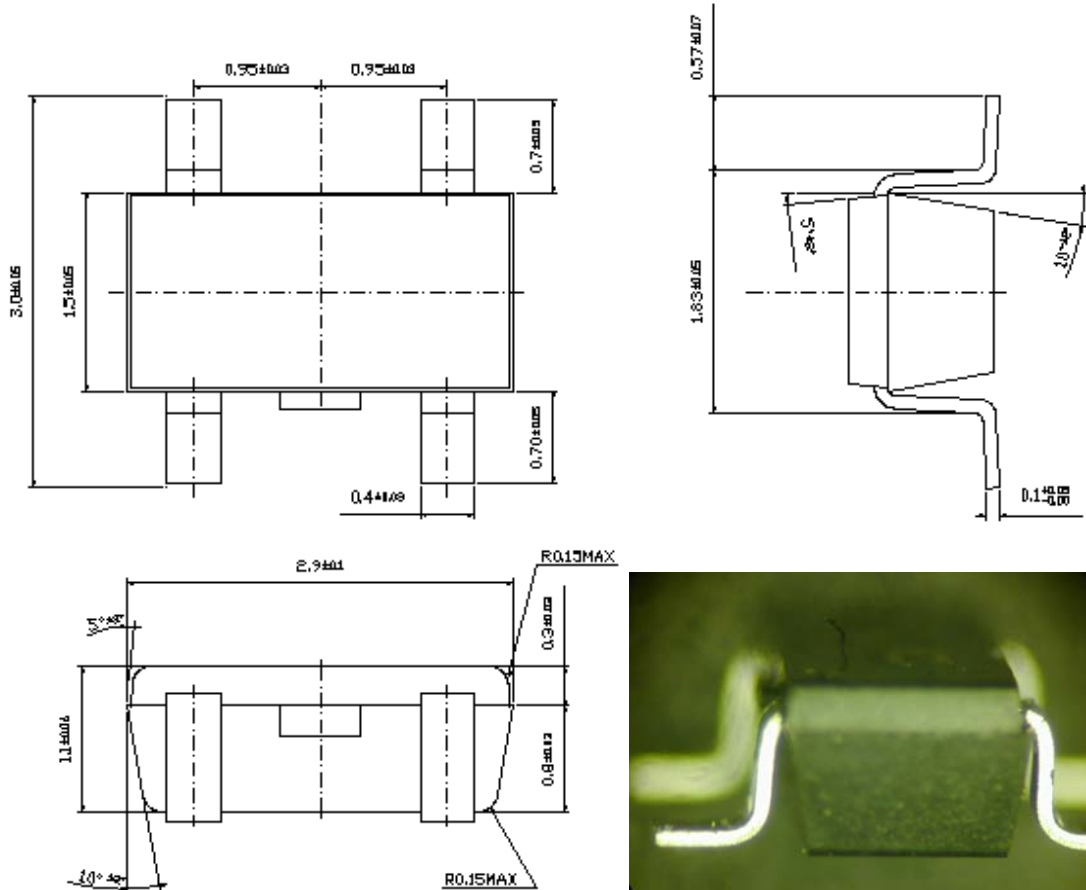
5. External Dimensions and Appearance

5.1 External Dimensions (Unit:mm)

Four leads of input · output terminals are designed in the diagonally symmetric mode and are equal in dimensions.

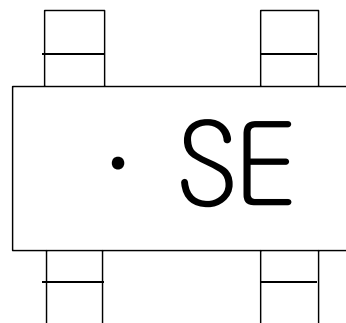
SH12A could be used without considering on the rotation of 180° .

SH12A-L Type Package Dimensions

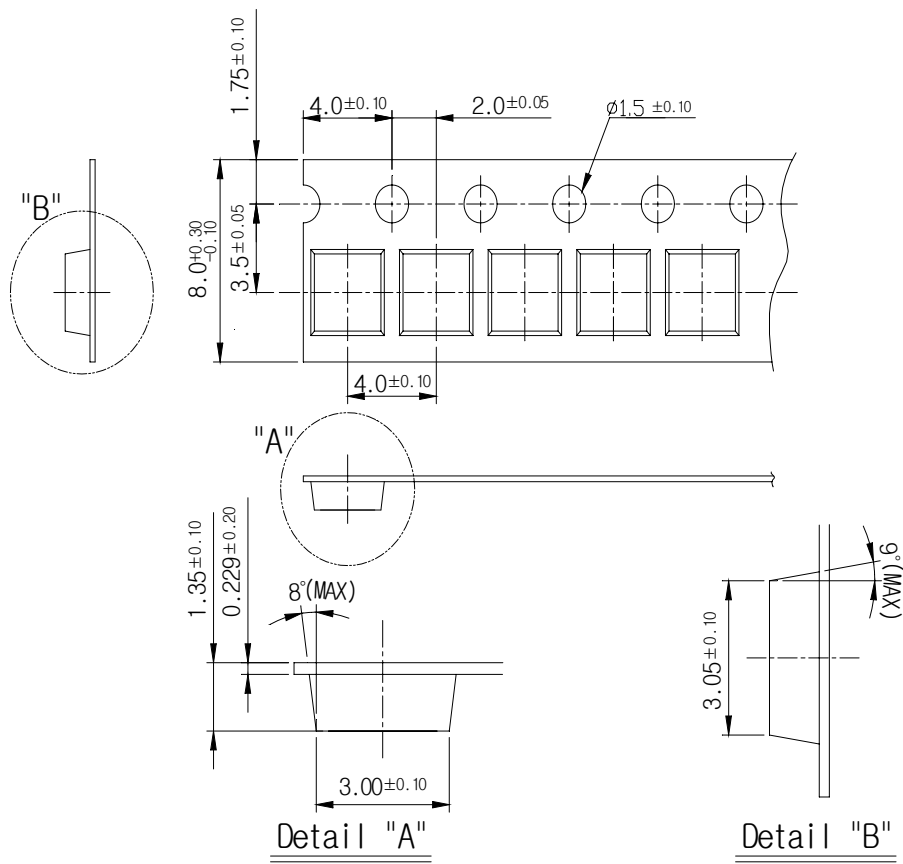


5.2 Marking Method

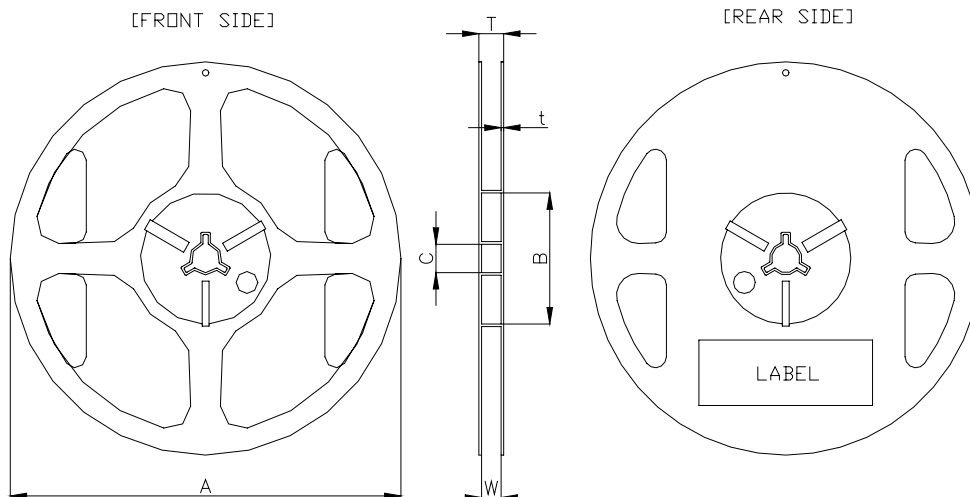
Devices should be marked by LASER beam in the form of 「 · S + 'Rank' 」 .



5.3 External Dimensions of Carrier Tape (Unit:mm)



5.4 External Dimensions of Reel (Unit:mm)



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

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

5.5 Reel Packing Structure

Halogen Free Label



Manufacturing Lot Number



1 Reel: 3,000EA
Hall Sensor

DryPack



Inner Box :
15,000EA Hall Sensor



Vacuum Packing



5 Reel

Inspection Sheet



Outer Box: 60,000EA Hall Sensor



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	SOLDERABILITY	Peak Temp=260℃ , t=5sec, REFLOW
10	ESD(MM)	V=500V, C=200pF, R=0Ω (EIAJ TEST CONDITION)
11	VIBRATION TEST	Frequency: 10~55 Hz, Amplitude: 1.5mm(p-p), Sweep Time 1min, X, Y, Z Each Direction 2HR
12	IMPACT TEST	1500G, 0.5ms, Half Sine Wave Pulse, 4 Impacts Per Axis
13	BENDING TEST	Speed: 30mm/min, Push: 3mm, Hold: 5sec, 3 Times
14	BOARD SHEAR TEST	Push Speed 30mm/min, Over 0.5Kg

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 $\pm 20\%$	OK (Spec. Satisfying)
Rout		
VH		
Vo	Under Initial $\pm 5\%$	

7. Caution on treating

Please care for storage conditions as on shipping list.

Furthermore, on surface mounting, please keep the statements written by mounting conditions.

Safekeeping Period is 6 month at room temperature in condition of being packed

8. 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 6 Materials

- 1)Cadmium(Cd)
- 2)Lead(Pb)
- 3)Mercury(Hg)
- 4)Hexavalent Chromium(Cr VI)
- 5)PBBs(Polybrominated Biphenyls)
- 6)PBDEs(Polybrominated Diphenyl Ethers)

9. Halogen Free

Sentronix's 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)