



# SPECIFICATION

## Surface Acoustic Wave Filter

USER



USER PART No.

SEMCO PART No. **SFHG60PA002**

DOC. No. SMS-51-L-SFT FX-31

DATE June 24, 2013

REVISION 000

WISOL					
ISSUED BY	Kim, Kyung-Sik 	APPROVED BY (R&D)	Song, Jin-Baek J. B. SONG	APPROVED BY (QC)	Jeon. Hyeon Cheol 
User					
ISSUED BY		CHECKED BY		APPROVED BY	

WISOL CO., LTD.  
373-7, GAJANG-DONG, OSAN-SI,  
GYUNGGI-DO, KOREA, 447-210  
<http://www.wisol.co.kr>

▶ **A TABLE OF CONTENTS**

<b>1. REVISION HISTORY</b> .....	3
<b>2. DEFINITION</b> .....	4
<b>3. PRECAUTIONS</b> .....	4
<b>4. OUTLINE DRAWING &amp; DIMENSIONS</b> .....	5
<b>5. MARKING</b> .....	6
<b>6. PERFORMANCE</b> .....	7
6-1. MAXIMUM RATINGS .....	7
6-2. ELECTRICAL CHARACTERISTICS .....	8
<b>7. RELIABILITY</b> .....	10
7-1. ENGINEERING SAMPLE FLOW CHART .....	10
7-2. TEST ITEM & CONDITION .....	11
<b>8. REFLOW CONDITION</b> .....	12
<b>9. RECOMMENDED PCB DIMENSIONS</b> .....	12
<b>11. PACKING</b> .....	14
11-1. DIMENSIONS .....	14
11-2. REELING QUANTITY .....	15
11-3. TAPING STRUCTURE .....	15
11-4. INNER BOX(Reel Packing) STRUCTURE .....	16
11-5. OUTER BOX STRUCTURE .....	17
<b>12. TAPE SPECIFICATIONS</b> .....	18
<b>13. RoHS DATA</b> .....	19

## 1. REVISION HISTORY

000	June 24, 2013	All Page	Make specification
-----	---------------	----------	--------------------

## 2. DEFINITION

2-1. PART No.

**SFHG60PA002**

①      ②      ③      ④      ⑤      ⑥

No.	EXPLANATION
①	SAW Filter
②	Design Type
③	Center Frequency :1960.0MHz(1930 ~ 1990)
④	Input:50ohm,Output:150ohm
⑤	Package size: 1.1×0.9mm <sup>2</sup>
⑥	Design Revision (02 : MOLDING Type)

2-2. APPLICATION : Band-Pass Filter for GSM1900 Rx etc (UMTS Band II)

## 3. PRECAUTIONS

3-1. This device should not be used in any type of fluid such as water, oil, organic solvent, etc.

3-2. This is a hermetic device.

MSL(Moisture Sensitive Level) is the '2a' level.

3-3. Ultrasonic cleaning shall be avoided.

3-4. Isopropyl Alcohol and Ethyl Alcohol can be used for cleaning. Contact us before using other cleaning solvents than above

3-5. This is an electrostatic sensitive device.

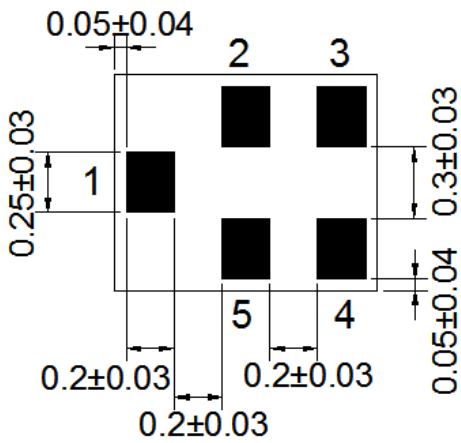
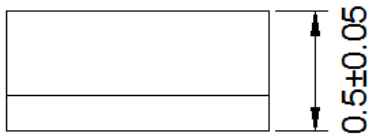
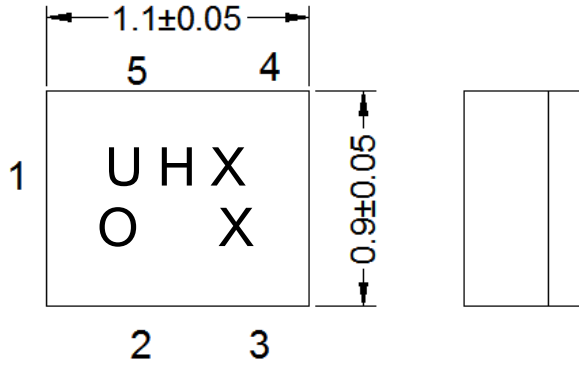
Please avoid static voltage during operation and storage.

3-6. Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.

3-7. If any malfunction due to designing or manufacturing which is out of specification occurs within one year after the products have been delivered, the maker should exchange the defective products.

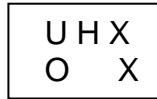
4. OUTLINE DRAWING & DIMENSIONS

[Unit: mm]



No.	Function
2, 5	Ground
1	Unbalanced Input
3,4	Balanced Output

## 5. MARKING



### 5-1. U H X X

- The 1<sup>st</sup> 2<sup>nd</sup> character 'UH' indicates the model name of SAW Filter SFHG60PA002.
- The 3<sup>rd</sup> character 'X' indicates the year and the month of manufacture.

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>2013</b>	P	Q	R	S	T	U	V	W	X	Y	Z	a
<b>2014</b>	1	2	3	4	5	6	7	8	9	A	B	C
<b>2015</b>	D	E	F	G	H	I	J	K	L	M	N	O
<b>2016</b>	P	Q	R	S	T	U	V	W	X	Y	Z	a

※ This rotates by the 3 years.

- The 4<sup>th</sup>, 5<sup>th</sup> character 'X' indicates Lot No.

### 5-2. ○

- This symbol indicates input pin 1.
- This indicates the producing center
  - : China, ●: Korea

### 5-3. Marking: Laser Marking

## 6. PERFORMANCE

### 6-1. MAXIMUM RATINGS

CHARACTERISTICS	RATINGS	UNITS
DC Permissive Voltage	5	V
Maximum Input Power	15	dBm
Operating Temperature Range	- 30 ~ +85	°C
Storage Temperature Range	- 40 ~ +85	°C

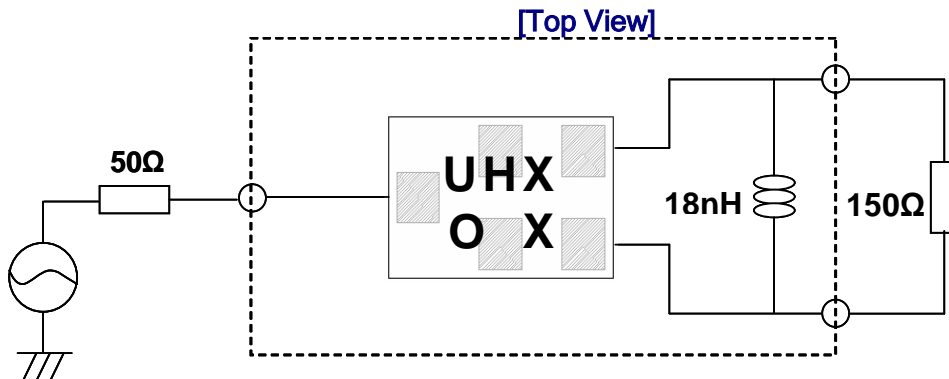
6-2. ELECTRICAL CHARACTERISTICS

6-2-1. TABLE

Ta = - 30 ~ +85°C

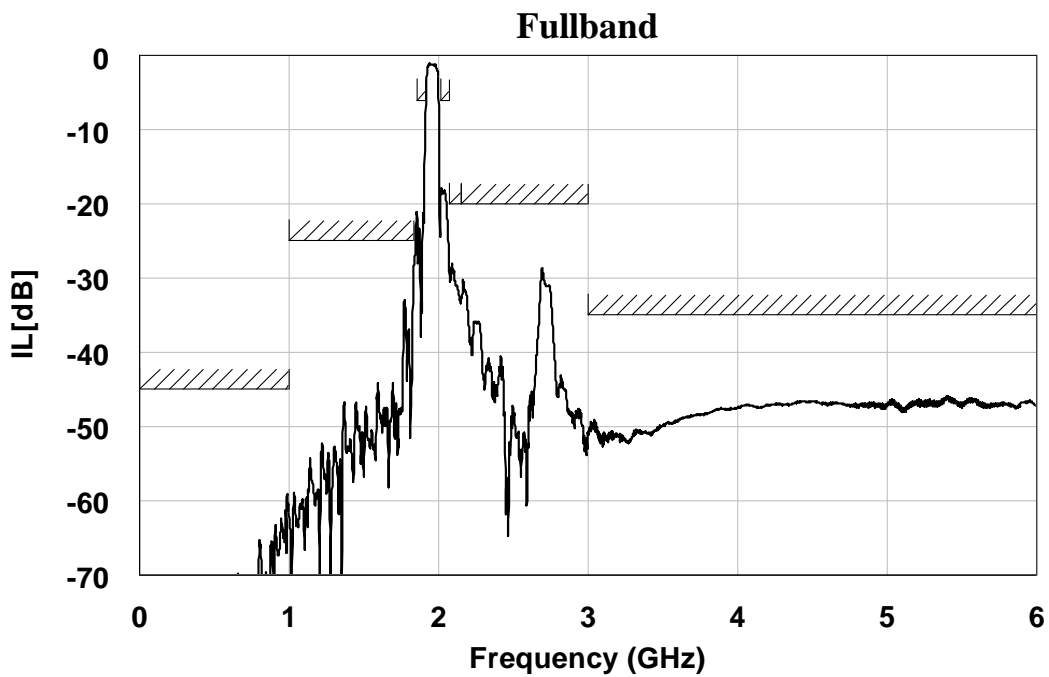
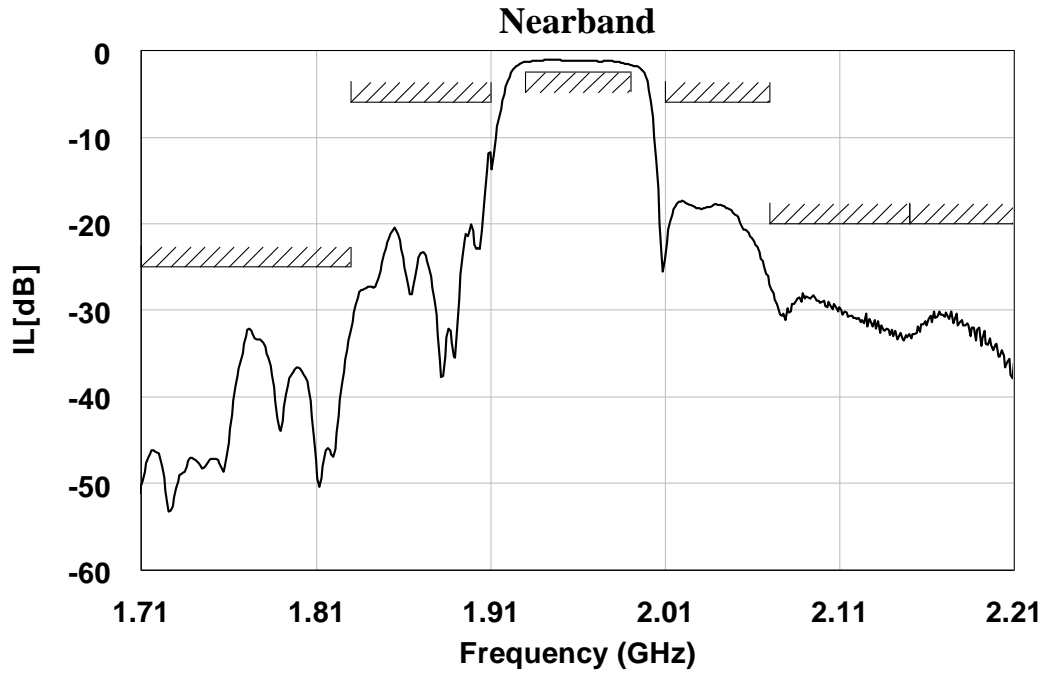
Item	FREQUENCY RANGE [MHz]	UNIT	SPECIFICATION		
			Min.	Typ. (25°C)	Max.
Insertion Loss	1930 ~ 1990	dB	-	1.5	2.5
Inband Ripple	1930 ~ 1990	dB	-	0.5	1.5
Input VSWR	1930 ~ 1990	-	-	1.6	2.2
Output VSWR	1930 ~ 1990	-	-	1.6	2.2
Amplitude Imbalance	1930 ~ 1990	dB	-2.0.	-	+2.0
Phase Imbalance	1930 ~ 1990	degree	-20	-	+20
Absolute Attenuation	DC ~ 1000	dB	45	59	-
	1000 ~ 1830	dB	25	32	-
	1830 ~ 1910	dB	6	15	-
	2010 ~ 2070	dB	6	17	-
	2070 ~ 2150	dB	20	25	-
	2150 ~ 3000	dB	20	28	-
	3000 ~ 6000	dB	35	45	-
Termination Impedance		Input: Unbalanced 50 ohm Output: Balanced 150 ohm // 18nH			

6-2-2. TEST FIXTURE



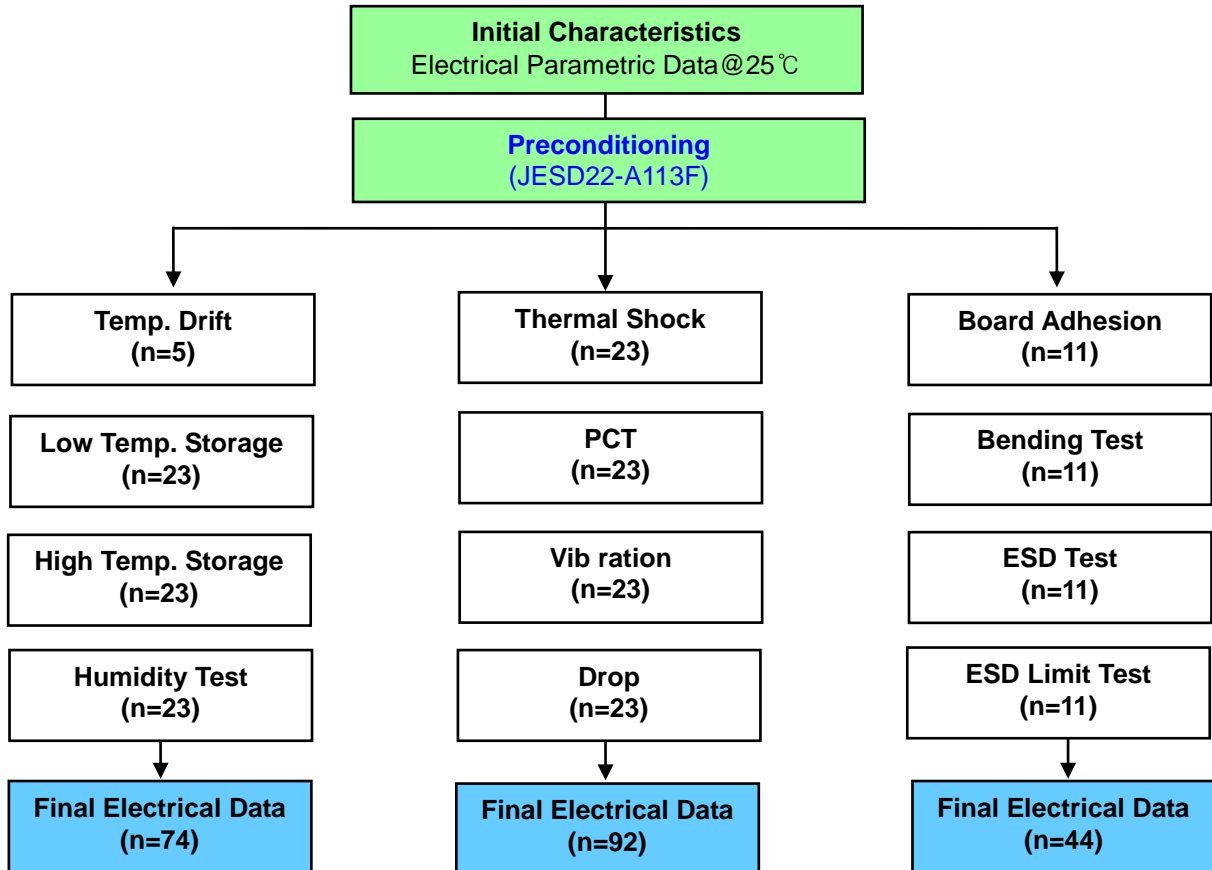


6-2-3. GRAPH



## 7. RELIABILITY

### 7-1. ENGINEERING SAMPLE FLOW CHART



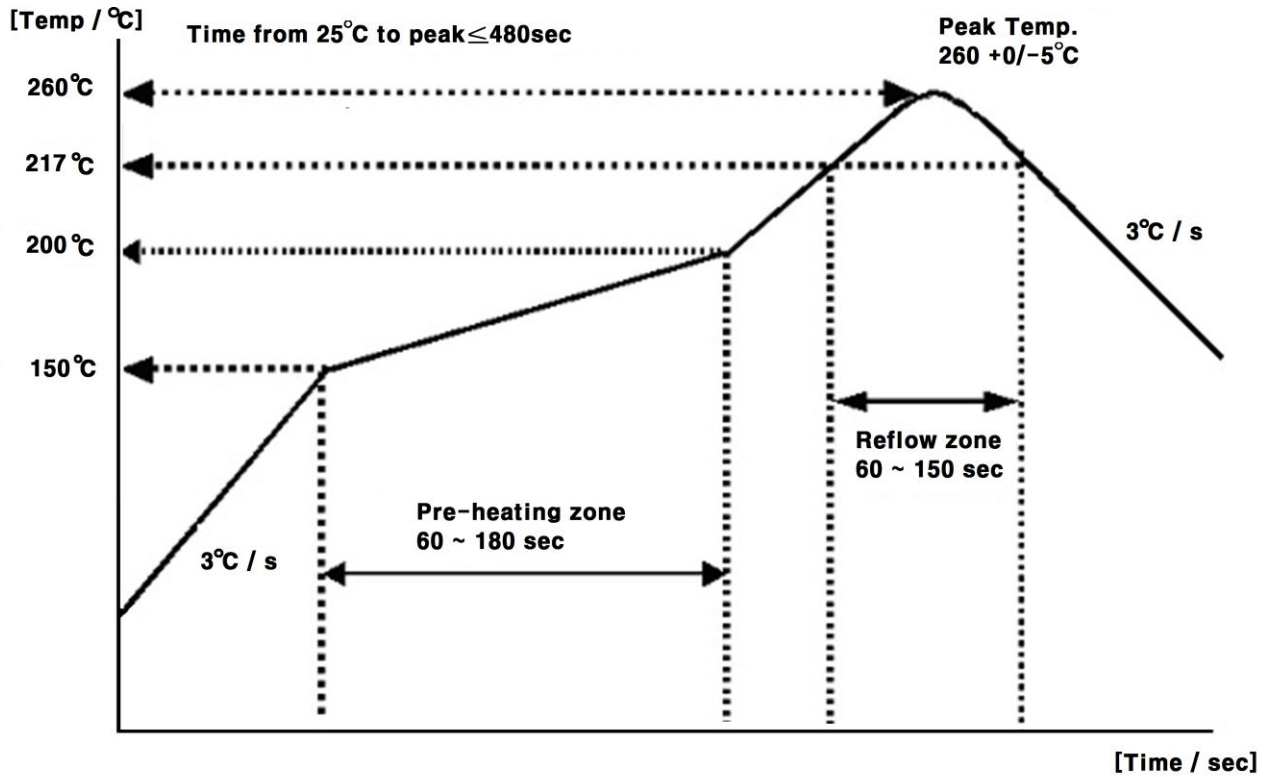
**7-2. TEST ITEM & CONDITION**

CATEGORY	TEST ITEM	TEST CONDITION	REMARK
	Preconditioning	+125℃ 24hr Baking → +60℃ 60%RH 120hr → Reflow Test(3times)	JESD22A113F

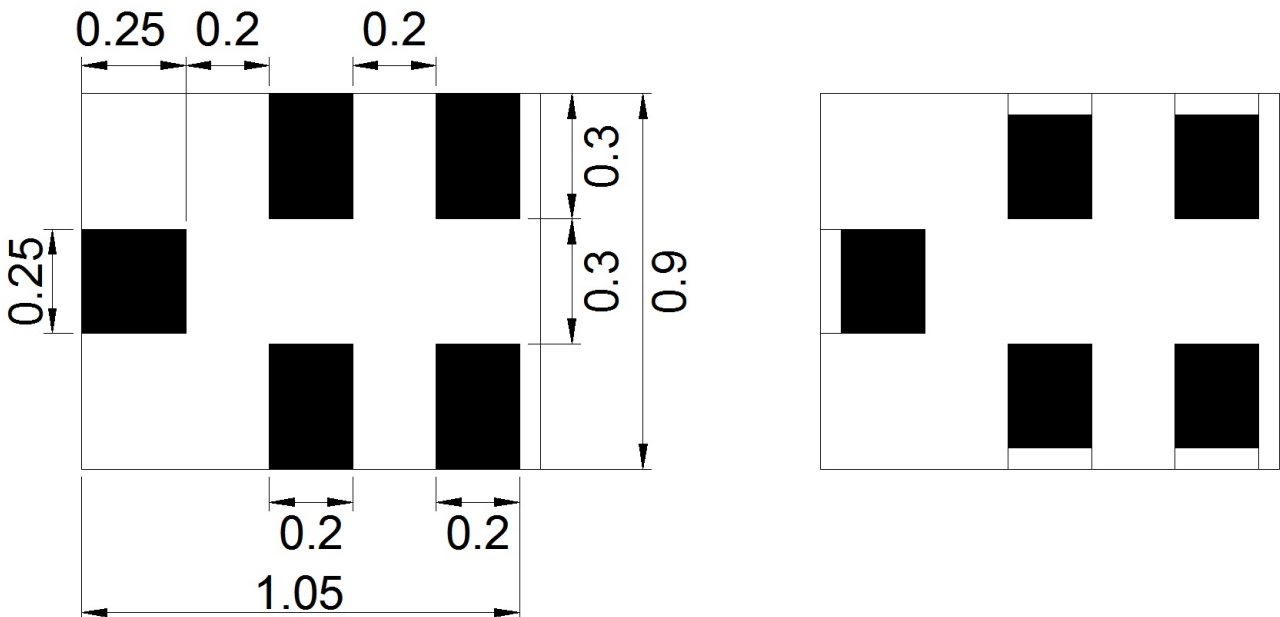


Environment Test	Temp. Drift	-30℃ → +25℃ → +85℃	description
	High Temp. Storage	+85℃ 240hr	JESD22-A103C
	Low Temp. Storage	-40℃ 240hr	JESD22-A119
	High Temp. High Humidity Storage	+85℃ 85%RH 240hr	JESD22-A106B
	Thermal Shock	-40℃/30min ⇔ +85℃/30min , 100cycle	JESD22-A106A
	High Temp. Operating	+121℃ 100%RH 96hr	JESD22-A102C
Mechanical Test	Vibration Test (Random)	20 Hz~2000 Hz,0.053G <sup>2</sup> /Hz or 8g's RMS,15min/plane	IEC 68-2-36 Fdb
	Drop Test	152 cm 12times Steel floor JIG(110g~150g)	IEC 1178-1.4.8.9
	Board Adhesion	0.5 mm/sec 1point push	IEC 68-2-21 Ue3
	Bending Test	0.5 mm/sec 3times -PCB : FR4 , PCB SIZE : 100*40 mm	IEC 68-2-21 Ue3
Physical Test	Solder Heat Resistance	±250V,C=100pF,R=1.5 kΩ,1times	IEC 68-2-21 Ue3
	static marginal test	C=100pF,R=1.5 kΩ,1times(demand of customer)	JESD22-A114F

### 8. REFLOW CONDITION



### 9. RECOMMENDED PCB DIMENSIONS



## 10. CAUTION

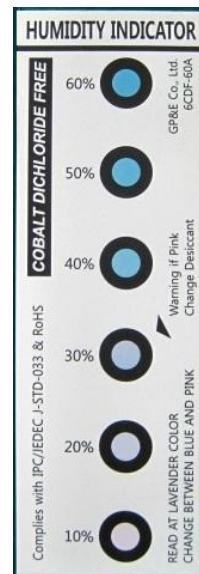
### Moisture Sensitivity Device Caution (MSL LEVEL=2a)

1. Calculated shelf life in sealed bag : 12 month at < 40°C and < 90% relative Humidity(RH)
  2. Peak package body temperature : **260°C**
  3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be
    - (a) Mounted within : 672 hours of factory conditions ≤30°C/60% RH, or
    - (b) Stored per J-STD-033
  4. Device require bake, before mounting, if :
    - (a) Humidity Indicator Card reads > 60% when read at 23±5°C
    - (b) 3(a) or 3(b) are not met
  5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure
- Note : Level and body temperature defined by IPC/JEDEC J-STD-020

Aluminum Pack (310mmX370mm)



HIC(Humidity Indication Card)

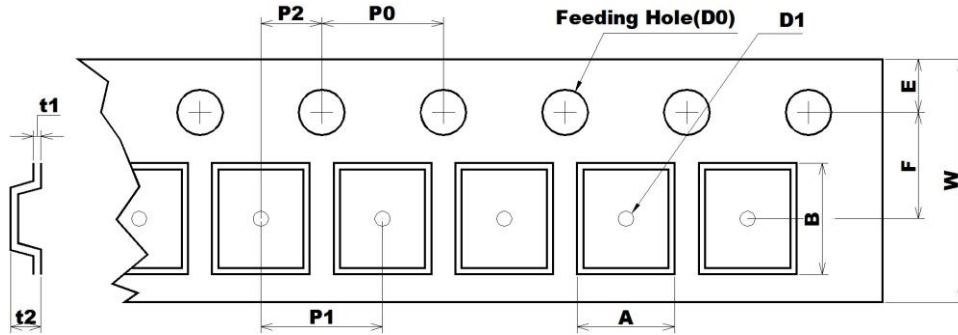


10 to 60% RH

11. PACKING

11-1. DIMENSIONS

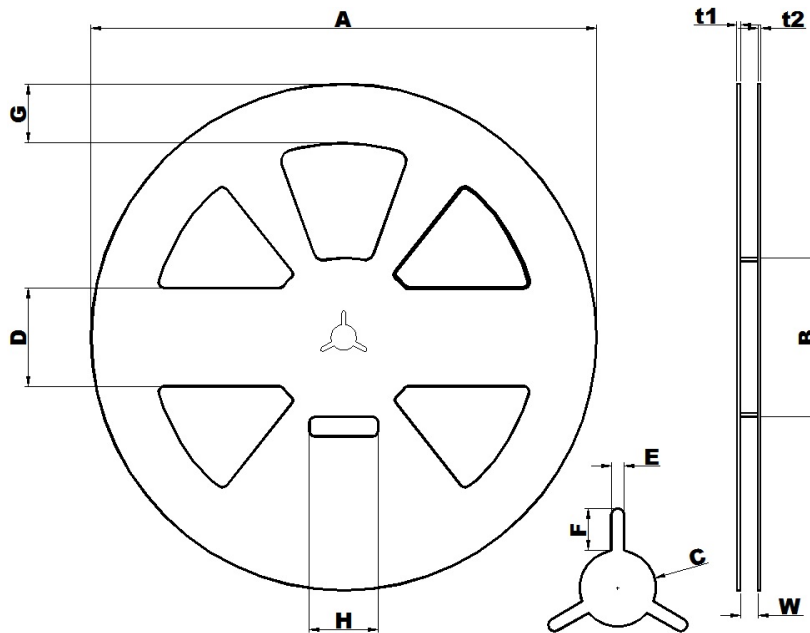
- Carrier Tape



[Unit: mm]

A	B	D0	D1	E	F	P0	P1	P2	t1	t2	W
1.1	1.35	Ø1.50	Ø0.50	1.75	3.5	4	4	2	0.25	0.7	8
0.05	0.05	+0.10	0.05	0.10	0.05	0.10	0.10	0.05	0.02	0.07	+0.30
		-0.00									-0.10

- Reel



[Unit: mm]

A	B	C	D	E	F	G	H	t1	t2	W
Ø258.0	Ø81.0	Ø13.0	50.0	2.2	7.0	30.0	35.0	1.8	1.5	9.0
+1.0	1.0	0.5	0.8	0.3	0.5	0.8	1.0	0.5	0.5	+1.0
-0.5										-0.5

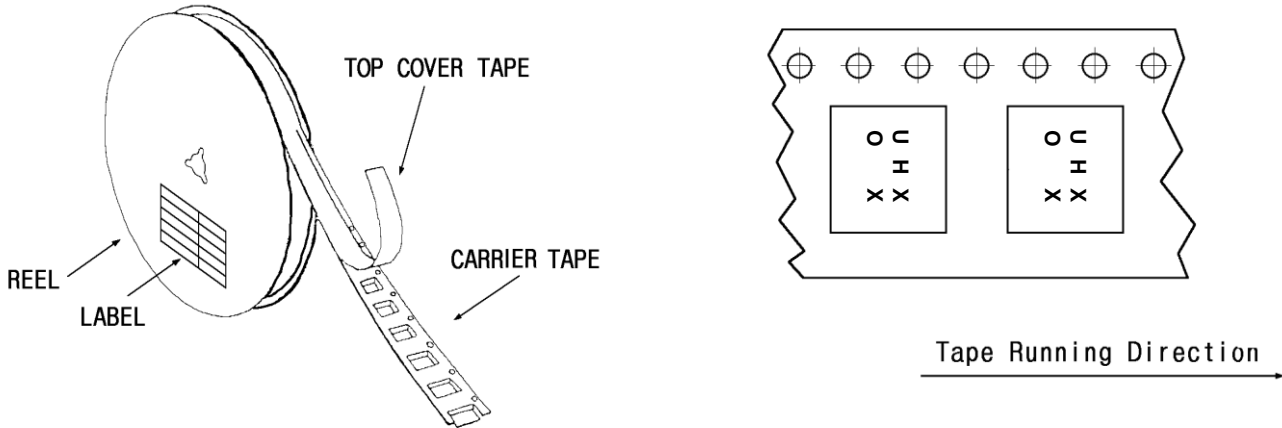
- The product shall be packed properly not to damaged during transportation and storage.

11-2. REELING QUANTITY

10 inch reel : 8,000 pcs/reel


11-3. TAPING STRUCTURE

11-3-1. The tape shall be wound around the reel in direction shown below.

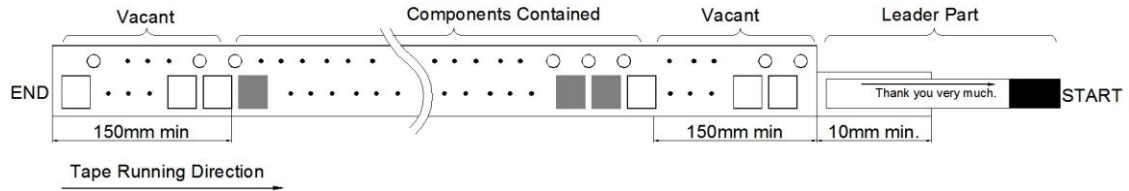


11-3-2. BAR CODE LABEL



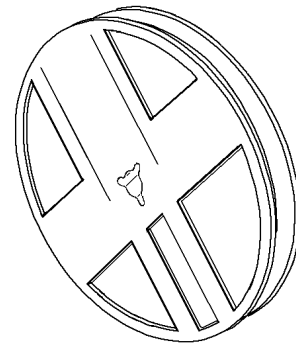
- |   |   |                    |
|---|---|--------------------|
| ① |  | MODEL NAME BARCODE |
| ② | SFH836AQ101   | Model Name         |
| ③ | RLYC12563   | Reel number        |
| ④ | 8000 / qAFYU  | Quantity / Marking |

1-3-3. Leader part and vacant position specifications.



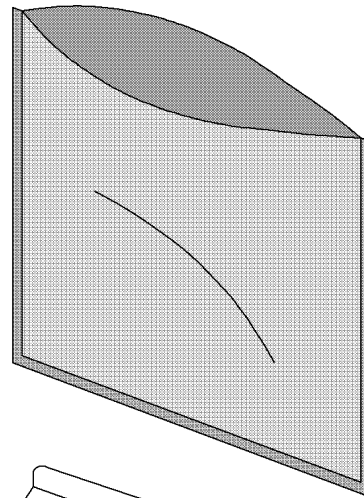
11-4. INNER BOX(Reel Packing) STRUCTURE

Material: Polycarbonate



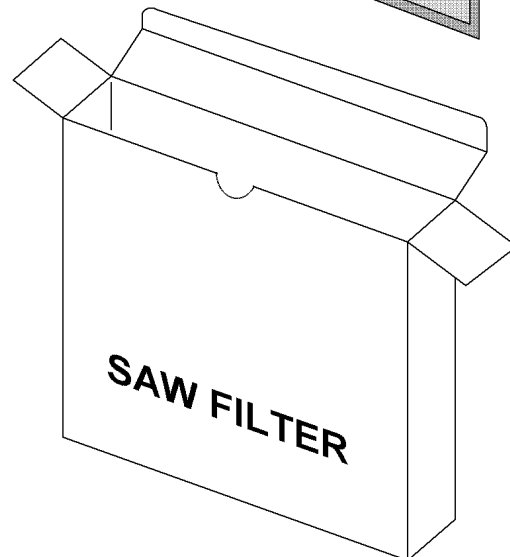
Material: Polyethylene + Aluminium

Size: 310×370mm<sup>2</sup>



Material: Paper

Size: (D)260×(W)37×(H)265mm<sup>3</sup>

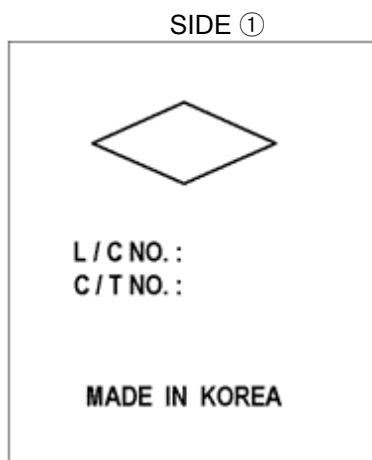
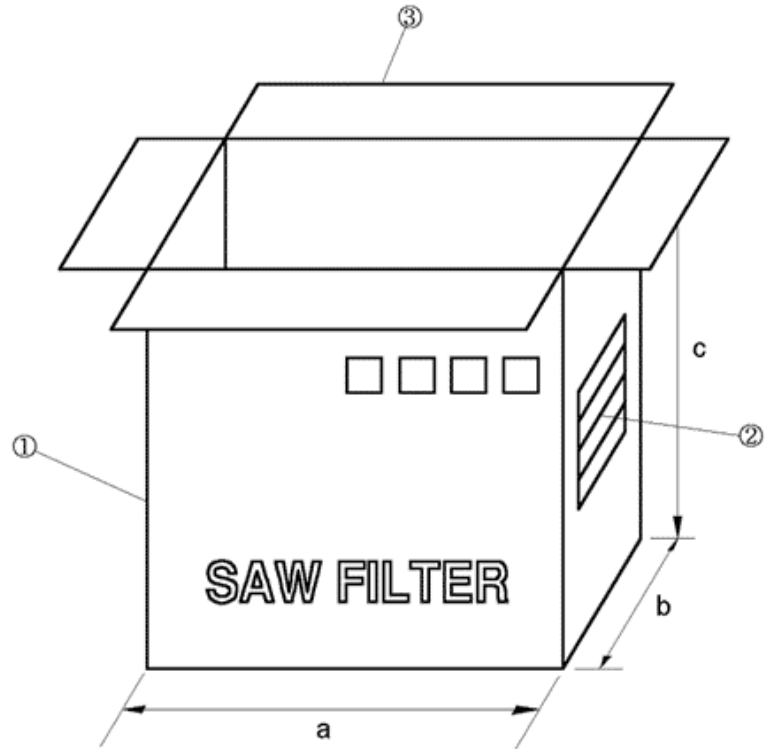




11-5. OUTER BOX STRUCTURE

Material: Paper

TYPE	SIZE(mm)			Inner Box #
	a	b	c	
A	270	240	275	6 boxes



SIDE ②

MODEL	
Q'TY	EA
USER	
DATE	

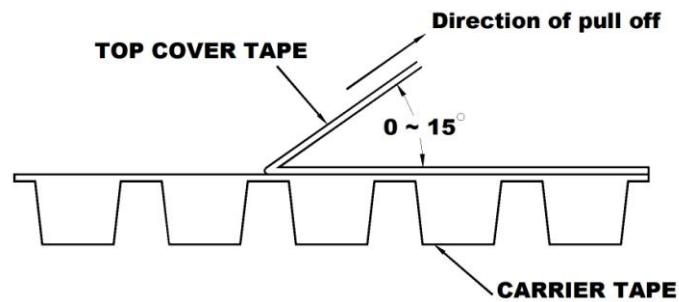
- SIDE is the same as front side.

## 12. TAPE SPECIFICATIONS

12-1. Tensile Strength of Carrier Tape: 4.4N/mm width

12-2. Top Cover Tape Adhesion (See the below figure)

- pull of angle: 0~15 degree
- speed: 300mm/min.
- force: 20~70g



13. RoHS DATA



**Test Report No.** F690101/LF-CTSAYAA11-28285

Issued Date: 2011. 09. 06 Page 1 of 2

To: **WISOL CO., LTD.**  
373-7  
Gajang-dong  
Osan-si  
Gyeonggi-do  
Korea

The following merchandise was submitted and identified by the client as :

**SGS File No.** : AYAA11-28285  
**Product Name** : SAW FILTER  
**Item No./Part No.** : N/A  
**Received Date** : 2011. 08. 31  
**Test Period** : 2011. 09. 01 to 2011. 09. 06  
**Test Results** : For further details, please refer to following page(s)  
**Test Performed** : SGS Korea tested the sample(s) selected by applicant with following results.  
**Test Comments** : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.

SGS Korea Co. Ltd.



Jeff Jang / Chemical Lab Mgr

Timothy Jeon  
Jinhee Kim  
Cindy Park  
Jerry Jung/ Testing Person

This document is issued by the Company subject to its General Conditions of Service printed on request or available at [www.sgs.com/terms\\_and\\_conditions](http://www.sgs.com/terms_and_conditions) and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_and\\_conditions\\_electronic](http://www.sgs.com/terms_and_conditions_electronic). Attention is drawn to the limitation of liability, indemnification and jurisdiction clause defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its issuance only and within the limits of Client's instructions. It is the Client's sole responsibility to its Client and this document does not constitute a warranty or other legal obligations under the trademark documents. The document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated, the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

F052 Version4

SGS Korea Co., Ltd.

322, The O valley, 55F-9, Hogeje-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080  
t +82 (0)31 4608 000 f +82 (0)31 4608 959 <http://www.sgslab.co.kr> [www.kr.sgs.com/greenlab](http://www.kr.sgs.com/greenlab)

Member of the SGS Group (Société Générale de Surveillance)



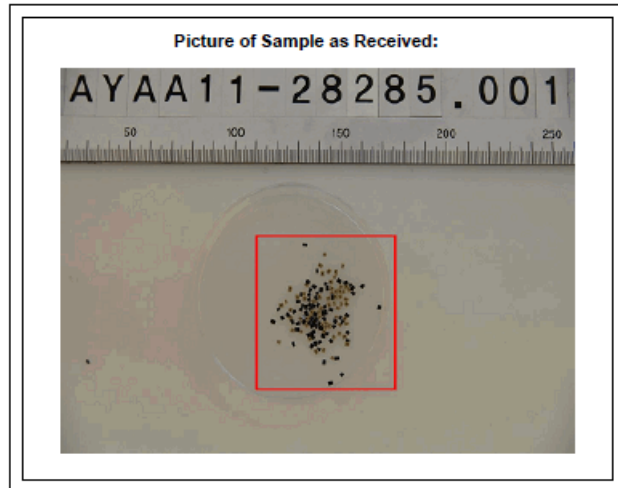
**Test Report No.** F690101/LF-CTSAYAA11-28285

Issued Date: 2011. 09. 06 Page 2 of 2

**Sample No.** : AYAA11-28285.001  
**Sample Description** : SAW FILTER  
**Item No./Part No.** : N/A  
**Materials** : N/A

**Heavy Metals**

Test Items	Unit	Test Method	MDL	Results
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.



\*\*\* End \*\*\*

- NOTE: (1) N.D. = Not detected. (<MDL)  
 (2) mg/kg = ppm  
 (3) MDL = Method Detection Limit  
 (4) - = No regulation  
 (5) \*\* = Qualitative analysis (No Unit)  
 (6) \* = Boiling-water-extraction:  
 Negative = Absence of CrVI coating  
 Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

This document is issued by the Company subject to its General Conditions of Service printed hereon, available on request or accessible at [www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm) and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e-document.htm](http://www.sgs.com/terms_e-document.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction laws defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions. Finally, the Company's sole responsibility is to its Client and this document does not constitute parties to a transaction from assuming all their rights and obligations under the transaction documents. This document cannot be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the specific tested and each sample(s) are retained for 90 days only.

F052 Version4

SGS Korea Co., Ltd.

322, The O valley, 555-9, Hoge-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080  
 t+82 (0)31 4608 000 f+82 (0)31 4608 059 <http://www.sgstab.co.kr> [www.kr.sgs.com/greenlab](http://www.kr.sgs.com/greenlab)

Member of the SGS Group (Société Générale de Surveillance)