# SPECIFICATION

**Surface Acoustic Wave Filter**

**USER**
**USER PART No.**
**WISOL PART No.**  SFHG89GA002
**DOC. No.**  SMS–51–L–SFT FX–14
**DATE**  March 19, 2013
**REVISION**  000

<table>
<thead>
<tr>
<th>WISOL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ISSUED BY</td>
<td>Hong, Byung-Chul</td>
</tr>
<tr>
<td>APPROVED BY (R&amp;D)</td>
<td>Hong, Seong-Su</td>
</tr>
<tr>
<td>APPROVED BY (QC)</td>
<td>Jeon. Hyeon Cheol</td>
</tr>
<tr>
<td>User</td>
<td></td>
</tr>
<tr>
<td>ISSUED BY</td>
<td></td>
</tr>
<tr>
<td>CHECKED BY</td>
<td></td>
</tr>
<tr>
<td>APPROVED BY</td>
<td></td>
</tr>
</tbody>
</table>

**WISOL CO., LTD.**
373-7, GAJANG-DONG, OSAN-SI, GYUNGGI-DO, KOREA, 447-210
http://www.wisol.co.kr
Surface Acoustic Wave Filter
SFHG89GA002

COMPASS Rx  1561.10MHz
GPS Rx  1575.42MHz  1.1×0.9×0.5mm³  5pin lay-out  Version : 000
GLONASS Rx  1601.72MHz

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1. REVISION HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>March 19, 2013</td>
<td>All</td>
<td>Make specification</td>
</tr>
</tbody>
</table>
2. DEFINITION

2-1. PART No.

S F H G 8 9 G A 0 0 2

(1) (2) (3) (4) (5) (6)

<table>
<thead>
<tr>
<th>No.</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>SAW Filter</td>
</tr>
<tr>
<td>(2)</td>
<td>Design Type</td>
</tr>
<tr>
<td>(3)</td>
<td>Center Frequency:</td>
</tr>
<tr>
<td></td>
<td>1561.10MHz(1559.10 ~ 1563.10)</td>
</tr>
<tr>
<td></td>
<td>1575.42MHz(1574.42 ~ 1576.42)</td>
</tr>
<tr>
<td></td>
<td>1601.72MHz(1597.55 ~ 1605.89)</td>
</tr>
<tr>
<td>(4)</td>
<td>Input:50ohm, Output:50ohm</td>
</tr>
<tr>
<td>(5)</td>
<td>Package size: 1.1×0.9mm</td>
</tr>
<tr>
<td>(6)</td>
<td>Design Revision (02: Molding type)</td>
</tr>
</tbody>
</table>

2-2. APPLICATION : Band-Pass Filter for COMPSS & GPS & GNSS Rx etc

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]

<table>
<thead>
<tr>
<th>No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2, 3, 5</td>
<td>Ground</td>
</tr>
<tr>
<td>1</td>
<td>Unbalanced Input</td>
</tr>
<tr>
<td>4</td>
<td>Unbalanced Output</td>
</tr>
</tbody>
</table>
5. MARKING

5-1. DVXX
- The 1st, 2nd character 'DV' indicates the model name of SAW Filter ‘SFHG89GA002’.
- The 3rd character 'X' indicates the year and the month of manufacture.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2013</td>
<td>P</td>
</tr>
<tr>
<td>2014</td>
<td>1</td>
</tr>
<tr>
<td>2015</td>
<td>D</td>
</tr>
<tr>
<td>2016</td>
<td>P</td>
</tr>
</tbody>
</table>

※ This rotates by the 3 years.
- The 4th character 'X' indicates day of manufacture.

5-2. ○
- This symbol indicates input pin 1.
- This indicates the producing center
  ○: China

5-3. Marking: Laser Marking
6. PERFORMANCE

6-1. MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>RATINGS</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Permissive Voltage</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Maximum Input Power</td>
<td>15</td>
<td>dBm</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-30 ~ +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-40 ~ +85</td>
<td>°C</td>
</tr>
</tbody>
</table>
## 6-2. ELECTRICAL CHARACTERISTICS

### 6-2-1. TABLE

<table>
<thead>
<tr>
<th>Item</th>
<th>FREQUENCY RANGE [MHz]</th>
<th>UNIT</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>1559.10 ~ 1563.10</td>
<td>dB</td>
<td>-</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>1574.42 ~ 1576.42</td>
<td>dB</td>
<td>-</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>1597.55 ~ 1605.89</td>
<td>dB</td>
<td>-</td>
</tr>
<tr>
<td>VSWR(IN/OUT)</td>
<td>1559.10 ~ 1563.10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VSWR(IN/OUT)</td>
<td>1574.42 ~ 1576.42</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VSWR(IN/OUT)</td>
<td>1597.55 ~ 1605.89</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Absolute Attenuation</td>
<td>DC ~ 960</td>
<td>dB</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>1427 ~ 1463</td>
<td>dB</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>1710 ~ 1785</td>
<td>dB</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1850 ~ 1910</td>
<td>dB</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1920 ~ 1980</td>
<td>dB</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>2400 ~ 2483</td>
<td>dB</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>2500 ~ 2570</td>
<td>dB</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>2570 ~ 3000</td>
<td>dB</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>4900 ~ 6000</td>
<td>dB</td>
<td>23</td>
</tr>
</tbody>
</table>

### Terminating impedance
- Input: Unbalanced 50 ohm
- Output: Unbalanced 50 ohm

### 6-2-2. TEST FIXTURE

[X-Ray Top View]
6-2-3. GRAPH

Nearband

Passband

Wideband
7. RELIABILITY
7-1. ENGINEERING SAMPLE FLOW CHART
Surface Acoustic Wave Filter
SFHG89GA002
COMPASS Rx  1561.10MHz
GPS Rx      1575.42MHz  1.1×0.9×0.5mm³  5pin lay-out
GLONASS Rx  1601.72MHz
Version : 000

7-2. TEST ITEM & CONDITION

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>TEST ITEM</th>
<th>TEST CONDITION</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preconditioning</td>
<td>+125℃ 24hr Baking  →  +60℃ 60%RH 120hr  →  Reflow Test(3times)</td>
<td>JESD22A113F</td>
</tr>
</tbody>
</table>

- **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, 0.05G~3Hz, 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

- Time from 25°C to peak ≤ 480 sec
- Peak Temp. 260 ±0.5°C
- Pre-heating zone 60~150 sec
- Reflow zone 60~180 sec

9. RECOMMENDED PCB DIMENSIONS

[unit:mm]

[SAW, X-ray Top View]  
[PCB, X-ray Top View]
10. CAUTION

Moisture Sensitivity Device Caution (MSL LEVEL=2a)

1. Calculated shelf life in sealed bag: 12 month at $\leq 40 \degree C$ and $\leq 90\%$ relative Humidity(RH)
2. Peak package body temperature: $260\degree C$
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 $\leq 30 \degree C/60\%$ RH, or
   (b) Stored per J-STD-033
4. Device require bake, before mounting, if:
   (a) Humidity Indicator Card reads $\geq 60\%$ when read at $23 \pm 5 \degree C$
   (b) 3(a) or 3(b) are not met
5. If baking is requied, refer to IPC/JEDEC J-STD-033 for bake procedure
Note: Level and body temperature defined by IPC/JEDEC J-STD-020

Aluminum Pack & Lavel (310mm X 370mm)  HIC(Humidity Indication Card)

10 to 60% RH
11. PACKING

11-1. DIMENSIONS

- Carrier Tape

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>D0</th>
<th>D1</th>
<th>E</th>
<th>F</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>t1</th>
<th>t2</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>1.35</td>
<td>Ø1.50</td>
<td>Ø0.50</td>
<td>1.75</td>
<td>3.5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>0.25</td>
<td>0.7</td>
<td>8</td>
</tr>
<tr>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.05</td>
<td>0.02</td>
<td>0.07</td>
<td></td>
<td>+0.30</td>
</tr>
</tbody>
</table>

- Reel

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>t1</th>
<th>t2</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø258.0</td>
<td>Ø81.0</td>
<td>Ø13.0</td>
<td>50.0</td>
<td>2.2</td>
<td>7.0</td>
<td>30.0</td>
<td>35.0</td>
<td>1.8</td>
<td>1.5</td>
<td>9.0</td>
</tr>
<tr>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
<td>+1.0</td>
</tr>
</tbody>
</table>

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

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March 19, 2013
11-2. REELING QUANTITY
10 inch reel: 10,000 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
11-3-3. Leader part and vacant position specifications.

![Diagram showing leader part and vacant position specifications]

11-4. INNER BOX(Reel Packing) STRUCTURE

**Material:** Plastic Reel

**Size:** $310 \times 340 \text{mm}^2$

**Material:** Antistatic Vinyl Bag

**Size:** $260 \times 37 \times 265 \text{mm}^3$

**Material:** Paper(SW1D(E))

**Size:** $260 \times 37 \times 265 \text{mm}^3$
11-5. OUTER BOX STRUCTURE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SIZE (mm)</th>
<th>Inner Box #</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>a = 270</td>
<td>b = 240</td>
</tr>
</tbody>
</table>

- SIDE ①

- SIDE ②

- 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
Surface Acoustic Wave Filter

SFHG89GA002

COMPASS Rx  1561.10MHz
GPS Rx     1575.42MHz  1.1×0.9×0.5mm³  5pin lay-out  Version : 000
GLONASS Rx 1601.72MHz

13. RoHS DATA

SGS

Test Report No. F691011/LF-CSAYA11-28285

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

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

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

<table>
<thead>
<tr>
<th>SGS File No.</th>
<th>Product Name</th>
<th>Item No./Part No.</th>
<th>Received Date</th>
<th>Test Period</th>
<th>Test Results</th>
<th>Test Performed</th>
<th>Test Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>AYA11-28285</td>
<td>SAW FILTER</td>
<td>N/A</td>
<td>2011. 08. 31</td>
<td>2011. 09. 01 to 2011. 09. 06</td>
<td>For further details, please refer to following page(s)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By the applicant’s specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.

Timothy Jeon
Jihye Kwon
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr
Surface Acoustic Wave Filter

SFHG89GA002

COMPASS Rx  1561.10MHz
GPS Rx  1575.42MHz  1.1x0.9x0.5mm³  5 pin lay-out  Version: 000
GLONASS Rx  1601.72MHz

Test Report No.  F6961040LF-CTSAYAA11-28285

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

Heavy Metals

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Unit</th>
<th>Test Method</th>
<th>MDL</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony (Sb)</td>
<td>mg/kg</td>
<td>With reference to EPA 3052 (1995), US EPA 6010B (1985), ICP</td>
<td>10</td>
<td>N.D.</td>
</tr>
</tbody>
</table>

Picture of Sample as Received:

AYAA11-28285.001

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 Cr6+ coating
  Positive = Presence of Cr6+ coating; the detected concentration in boiling-water-extraction
  solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

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wisol.co.kr代理商联系方式:
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邮件:dwin100@dwintech.com
手机:156-2521-4151
网址: http://www.dwintech.com/wisol.html
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D-Win Technology (HongKong) Co., Ltd