# Approval Sheet

**SMD type UV Sensor**

**GUVA-S12SD**

**Date:** 2010. 4

## PREPARED BY: Genicom Co. Ltd.

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>P. M.</th>
<th>Q.A.</th>
<th>Sales</th>
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## APPROVED BY:

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</table>
SPECIFICATIONS

SMD Type UV Sensor
GUVA-S12SD

Genicom Co., Ltd.
5F, Daehan Bldg., #1018 Dunsan-dong, Seo-gu, Daejeon 302-120, Korea
Tel. 82-42-472-7462, Fax. 82-42-472-7459
1. Features

- GaN-based Schottky Photodiode
- Photovoltaic Mode Operation
- Good Visible Blindness
- $3.5 \times 2.8 \times 1.9$ (L x W x H) Small Size Surface Mount Type

2. Applications

- UVA Lamp Monitoring
- UV Index Monitoring

3. Outline Diagrams and Dimensions

![Outline Diagrams and Dimensions](image)

Fig. 1. Outline Diagrams and Dimensions

![Component and Its Material](image)

Fig. 2. Component and Its Material

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Plastic PKG</td>
<td>PPA</td>
</tr>
<tr>
<td>②</td>
<td>Paste</td>
<td>Ag</td>
</tr>
<tr>
<td>③</td>
<td>UV Sensor Chip</td>
<td>GaN/Al$_2$O$_3$</td>
</tr>
<tr>
<td>④</td>
<td>Wire</td>
<td>Au</td>
</tr>
<tr>
<td>⑤</td>
<td>Window</td>
<td>Si-Encapsulant</td>
</tr>
</tbody>
</table>
### 4. Electro-Optical Characteristics

#### 1) Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse Voltage</td>
<td>$V_R$</td>
<td></td>
<td>5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>Top</td>
<td>-30</td>
<td>85</td>
<td>℃</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>Ts</td>
<td>-40</td>
<td>90</td>
<td>℃</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>Tsol</td>
<td></td>
<td>260</td>
<td>℃</td>
<td>&lt; 10 sec</td>
</tr>
</tbody>
</table>

#### 2) Electro-Optical Characteristics (at 25 ℃)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark Current</td>
<td>Id</td>
<td></td>
<td>1</td>
<td>nA</td>
<td></td>
<td>$V_R = 0.1$ V</td>
</tr>
<tr>
<td>Photo Current</td>
<td>Iph</td>
<td>111</td>
<td>136</td>
<td>nA</td>
<td></td>
<td>UVA Power : 1 mW/in²</td>
</tr>
<tr>
<td>Peak Responsivity</td>
<td>Rp</td>
<td>0.15</td>
<td></td>
<td>A/W</td>
<td></td>
<td>$\lambda_p = 350$ nm, $V_R = 0$ V</td>
</tr>
<tr>
<td>Cutoff Wavelength</td>
<td>$\lambda_{\text{cutoff}}$</td>
<td>370</td>
<td></td>
<td>nm</td>
<td></td>
<td>10 % of Rp</td>
</tr>
<tr>
<td>Spectral Detection Range</td>
<td>$\lambda$</td>
<td>240</td>
<td>370</td>
<td>nm</td>
<td></td>
<td>Monochromator Scan</td>
</tr>
<tr>
<td>Sensitivity Area</td>
<td>A</td>
<td>0.076</td>
<td></td>
<td>mm²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3) Responsivity Curve (at 25 ℃)

![Fig. 3. Typical Spectral Responsivity](image)

GNF-722-10(0)  
(주)제니컴  
A4(210 × 297)mm
5. Reliability

1) Criterion for Judging

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark Current</td>
<td>Id</td>
<td>-</td>
<td>1</td>
<td>nA</td>
<td>$V_r = 0.1V$</td>
</tr>
<tr>
<td>Photo Current</td>
<td>Iph</td>
<td>90</td>
<td>110</td>
<td>%</td>
<td>$V_r = 0 V$</td>
</tr>
</tbody>
</table>

2) Test Results

<table>
<thead>
<tr>
<th>Classification / Item</th>
<th>Test Conditions</th>
<th>Fail / Pass</th>
<th>Reference standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temperature Storage</td>
<td>90 °C, 1000 hrs</td>
<td>0 / 100</td>
<td>JIS-C-7021:B-10</td>
</tr>
<tr>
<td>Low Temperature Storage</td>
<td>-40 °C, 1000 hrs</td>
<td>0 / 100</td>
<td>JIS-C-7021:B-12</td>
</tr>
<tr>
<td>High Temperature &amp; High Humidity Storage</td>
<td>60 °C, 95 % RH, 240 hrs</td>
<td>0 / 100</td>
<td>MIL-STD-202:103B</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>-40 °C / 90 °C (15 cycles)</td>
<td>0 / 100</td>
<td>MIL-STD-750:1056</td>
</tr>
<tr>
<td></td>
<td>Transfer Time &lt; 10 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Cycling</td>
<td>-40 °C / 90 °C (10 cycles)</td>
<td>0 / 100</td>
<td>MIL-STD-750:1051</td>
</tr>
<tr>
<td></td>
<td>Transfer Time &lt; 1 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holding Time = 10 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure Cooker Test (PCT)</td>
<td>120 °C, 100 % RH, 2 atm (4 hrs)</td>
<td>0 / 100</td>
<td>JESD22-A102-C</td>
</tr>
<tr>
<td>Soldering Resistance</td>
<td>$T_{sol} = 260 \pm 5 , ^{\circ}$</td>
<td>0 / 100</td>
<td>MIL-STD-750:2031</td>
</tr>
<tr>
<td></td>
<td>Dwell time = 10\pm1 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESD (HBM)</td>
<td>Class 1A : 300 V</td>
<td>0 / 100</td>
<td>JESD22-A114-B</td>
</tr>
<tr>
<td>UV Exposure</td>
<td>100 UVI, 500 hrs (UVB Lamp)</td>
<td>0 / 100</td>
<td></td>
</tr>
</tbody>
</table>
6. Soldering

1) Soldering Pattern

![Soldering Pattern Diagram]

Unit: [mm]

Fig. 4. Recommended Soldering Pattern

2) Reflow Soldering Profile

![Reflow Soldering Profile Diagram]

Fig. 5. Recommended Reflow Soldering Profile

3) Manual Soldering Conditions

- Temperature: Max. 260 °C
- Time: Max. 10 s
- Caution: You must put to earth and shield the package from ESD damage.
  (ex.: wrist strap or anti-electrostatic gloves )
7. Taping

Fig. 6. Standardization of Carrier Tape

Fig. 7. Diagram and Standardization of Reel

- Quantity : Max. 2000EA/reel
- Label : Model Name, Lot Number, Quantity
- The packing materials such as reel, carrier tape, cover tape and shielding bag are antistatic.
8. Packing

1) Reel

UV Sensor

Model No. : GUVA-S12SD
Lot No. : UAS-1001-001
Q'TY : 2,000 EA

2) Al Shielding Bag

UV Sensor

Model No. : GUVA-S12SD
Lot No. : UAS-1001-001
Q'TY : 2,000 EA

3) Outer Box

Name of Goods
Model No.
Order No.
Quantity: EA
C/T No.

Size : 280 x 300 x 250 mm³

4) Definition of Lot No.

[EX.] : UAS - 1001 - 001

UAS : Product Model (UVA Sensor with Si-Encapsulant)
1001 : Product Year and Month
001 : Consecutive Number
9. Cautions For Use UV Detector

- In case of cleaning, use only IPA.

- To be kept under clean environment.
  For more than 3months storage, put in sealed containers

- It should be soldered within 7days after opening a seal.

- Use a wrist strap or anti-electrostatic gloves for handling, to protect from a static electricity and surge

- If you operate it over the absolute maximum ratings, that may cause a permanent damage.

- It can be damaged by working environment which is not shielded from a static electricity.

- Damaged products show unusual characteristics such as large leakage current, or do not work.
### Appendix 1. Visual Inspection of Microscope (Defect limited sample)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Image</th>
<th>Criterion of Judging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Foreign Object (To apply same Criterion inside and outside Package)</td>
<td>&lt; Top View &gt;</td>
<td>Fixed Foreign Object : &lt; 0.3 mm&lt;br&gt;•Not to be Foreign Objects on the Chip and Si-Encapsulant directly above Chip</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Air Bubble</td>
<td></td>
<td>•Not to be Air Bubble in PKG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2. QC Flowchart

Incoming Inspection (Substrate)
Epi Wafer Growth
Test of Epi Wafer
Ohmic Contact Formation
Schottky Contact Formation
Pad Metal Formation
Scribe / Break
Performance Test 1 (Id, Iph)
Visual Inspection
Incoming Inspection (UV Detector chip, Package, Si-Encapsulant)
Die / Wire Bond
Si-Encapsulant Mold
Performance Test 2 (Id, Iph, Responsivity)
Visual Inspection
Trimming
Taping
Final Visual Inspection
Shipping
Appendix 3. UV sensor measurement method & caution

1) Equipment for measurement
   - Jig for SMD3528 measure
   - Picoammeter (Low current measuring instrument) (Ex. Keithley 6485)
   - UV Lamp (Ex. Sankyo Denki UVA lamp, F4T5BLB)
   - Standard sample (Genicom can offer about 10 samples)

2) Measurement method
   - Turn on the UV Lamp and hold down about 10 minutes.
   - Fixed regular distance between UV Lamp and Jig.
   - Confirm the Photocurrent of standard sample.
     Photocurrent of standard sample vary according optical power of UV lamp (distance from
     UV Lamp). For example, photocurrent is 200 $\mu$A.
   - UV sensor (you should measure) put up the jig and read the photocurrent.

3) Precaution when measuring
   - Distance between UV Lamp and UV sensor must be constant.
   - When changing UV sensor, jig do not move.
   - If there have vibration or movement, photocurrent may measure differently.
   - We recommend you wear antistatic glove or wrist strip in order to protect UV sensor
     from static electricity.

4) Precaution when use the UV Lamp
   - Limit coming and going to place UV Lamp is used & set up warning sign at entrance.
   - Wearing a sunglass & glove. (UV cut off ratio : 99 ~ 100 %)
   - Be careful that your body are not exposure to UV directly & limit time to exposure to UV.
   - Do not watch the UV lamp without any protective outfit.
   - If you do not use UV lamp, set up shutter can suspend UV and then attend to not
     exposure to outside.