

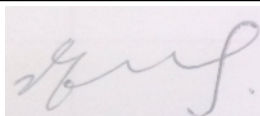
N6SC40

Technical data sheet

Supplier : LG Chem, Ltd.

Issued date : July 15, 2013

Product : OLED panel

| | Technology Team | Production Team | QA Team |
|----------|---|-----------------|---------|
| Approval |  | | |
| | 2013.07.15 | | |

[Type 1] Bare panel (Panel without PCB)

1. Ordering Information

| Model | Description | Efficacy | CCT | Product Code |
|----------|-------------|----------|-------|-----------------|
| N6SC40-B | Bare Panel | 55lm/W | 4000K | OR03SCC9HBAAF00 |

2. General Conditions

| Parameter | Sym | Unit | Min. | Typ. | Max | Condition |
|-----------------------------|-----------------|------|------|------|-----|-----------|
| Operating temperature range | T _{OP} | °C | -30 | +25 | +40 | |
| Storage temperature range | T _J | °C | -40 | +25 | +60 | |

3. Maximum Ratings

| Parameter | Sym | Unit | Max. | Condition |
|--------------------|----------------|------|------|----------------------|
| DC Forward Voltage | V _F | V | 7.0 | T _A =25°C |
| DC Forward Current | I _F | mA | 750 | T _A =25°C |

Disclaimer: Device reliability may be affected if product is operated beyond the given conditions for an extended period of time

4. Electrical & Optical Characteristics

Operation @ 150lm

| Parameter | | unit | Min. | Typ. | Max. |
|-----------------|---|-----------------------------|--------|----------------------------------|-------|
| Electrical data | Forward voltage | V | 5.7 | 6.0 | 6.3 |
| | DC forward current (Current density) | mA (mA/cm ²) | | 460 (2.76mA/cm ²) | |
| | Power consumption | W | 2.62 | 2.76 | 2.90 |
| Optical data | CCT (integrated) | K | 3750 | 4000 | 4250 |
| | CRI | Ra | 88 | 90 | |
| | Duv | | -0.005 | | 0.005 |
| | Spatial uniformity* | % | 85 | | |
| | Efficacy | lm/W | 50 | 55 | 60 |
| | Flux | lm | 140 | 150 | 160 |
| Lifetime** | LT70, @ 2.76mA/cm ² | Hrs. | 12000 | | |

* Luminous uniformity calculation formula: $U = [1 - (L_{max} - L_{min}) / (L_{max} + L_{min})] \times 100\%$

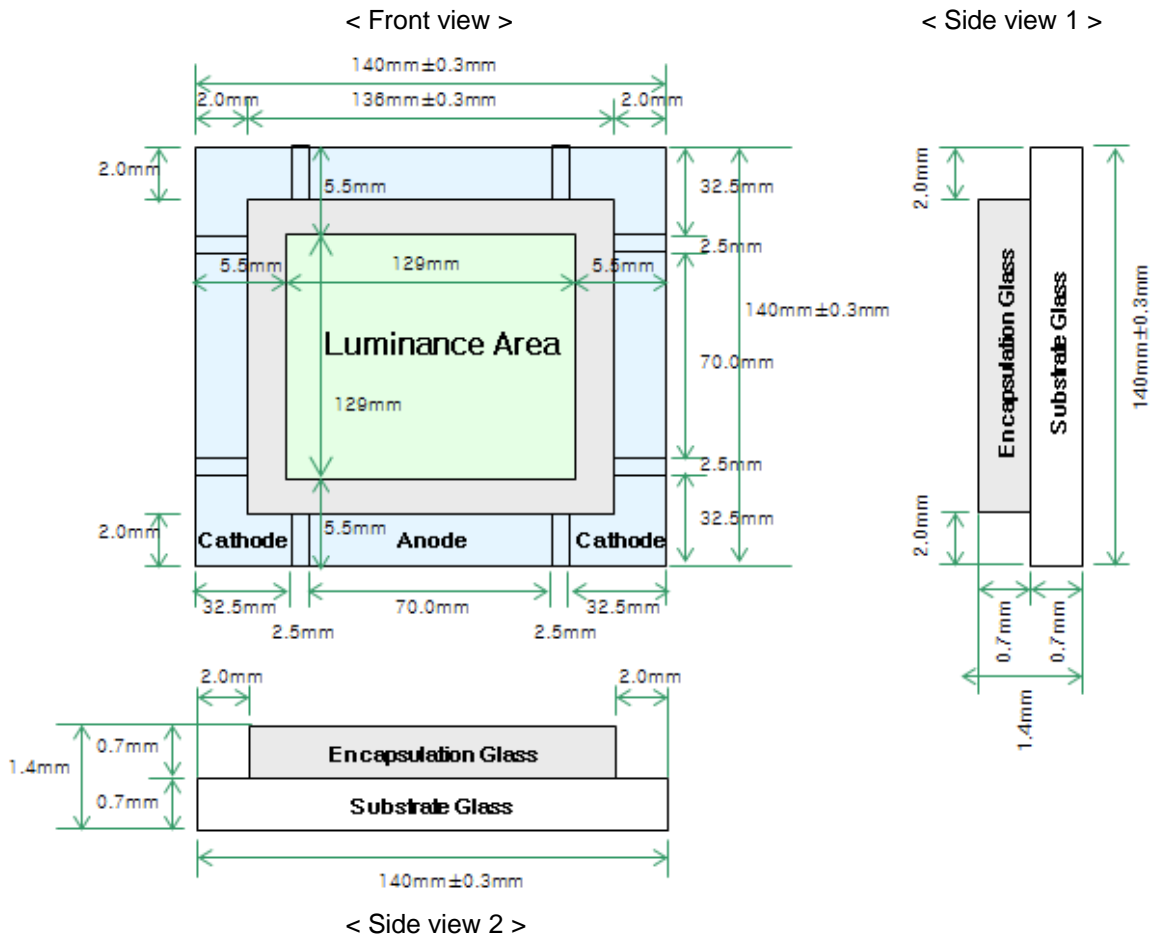
** Operating Lifetime is from the beginning of operation until brightness reaches 70% of the initial luminance.
(Assumed Operating Condition: 25 °C at typical brightness level)

5. Mechanical Dimensions

| | Parameter | Sym | Unit | Bare panel |
|-------|--------------------|-----|-----------------|------------|
| Outer | Length | L | mm | 140 |
| | Width | W | mm | 140 |
| | Thickness* | T | mm | 1.17 |
| | Shape | | | Square |
| | Weight | | g | |
| Inner | Encapsulation area | | mm ² | 136x136 |
| | Luminance area | | mm ² | 129x129 |

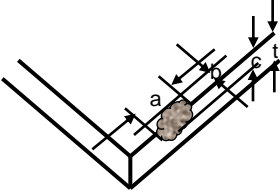
* Thickness with out-coupling film

6. Drawings



※ Refer to the Appendix1 for detailed drawing

7. Appearance Criteria

| Items | Criteria | | | | | | | | |
|--|--|----------|-------------------|------------------|-------------|-----------------------|------------|--|----------------------------|
| Dark spot | Defects are judged by the size of each item in the active area and based on the criteria below | | | | | | | | |
| Particle | <table border="1" data-bbox="491 336 1158 529"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable number</th> </tr> </thead> <tbody> <tr> <td>$\Phi < 0.3$</td> <td>Not counted</td> </tr> <tr> <td>$0.3 \leq \Phi < 0.5$</td> <td>Not over 5</td> </tr> <tr> <td>$0.5 < \Phi$</td> <td>Not allowed</td> </tr> </tbody> </table> | Size(mm) | Acceptable number | $\Phi < 0.3$ | Not counted | $0.3 \leq \Phi < 0.5$ | Not over 5 | $0.5 < \Phi$ | Not allowed |
| Size(mm) | Acceptable number | | | | | | | | |
| $\Phi < 0.3$ | Not counted | | | | | | | | |
| $0.3 \leq \Phi < 0.5$ | Not over 5 | | | | | | | | |
| $0.5 < \Phi$ | Not allowed | | | | | | | | |
| Pinhole | | | | | | | | | |
| Dent on surface | Note : Φ =Diameter of each item | | | | | | | | |
| White spot | White spot in active area is not allowed | | | | | | | | |
| Scratch or line on emitting surface | Defects are judged by the size of each item in the active area and based on the criteria below <table border="1" data-bbox="491 726 1158 950"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable number</th> </tr> </thead> <tbody> <tr> <td>Width ≤ 0.1</td> <td>Not counted</td> </tr> <tr> <td>$0.1 < \text{Width}$</td> <td>Not over 5</td> </tr> <tr> <td>$0.2 < \text{Width or } 2 < \text{Length}$</td> <td>Not allowed in active area</td> </tr> </tbody> </table> | Size(mm) | Acceptable number | Width ≤ 0.1 | Not counted | $0.1 < \text{Width}$ | Not over 5 | $0.2 < \text{Width or } 2 < \text{Length}$ | Not allowed in active area |
| Size(mm) | Acceptable number | | | | | | | | |
| Width ≤ 0.1 | Not counted | | | | | | | | |
| $0.1 < \text{Width}$ | Not over 5 | | | | | | | | |
| $0.2 < \text{Width or } 2 < \text{Length}$ | Not allowed in active area | | | | | | | | |
| Bubble | Bubbles that are visible in the active area through the naked eye at a distance of 30cm are not allowed | | | | | | | | |
| Chip | Defects are judged based on the criteria below <ul style="list-style-type: none"> * Corner chip : Not allowed if $a > 2\text{mm}$ or $b > 2\text{mm}$ * Edge chip : Not allowed if $a > 2\text{mm}$ or $b > 2\text{mm}$ or $c > 0.33t$ <div style="text-align: center;">  </div> <p>Note : t= Thickness of glass (Substrate or Encapsulation)</p> | | | | | | | | |

8. Reliability

- Evaluation criteria : Luminance change within +/- 10% of initial value

| Items | Condition |
|-------------------------------------|--|
| High temperature/humidity operation | 60°C, 90% RH / IF=Typ.mA,96Hrs |
| Thermal shock | -45°C,15min ↔ 85°C,15min 1cycle ,200cycles |
| High temperature /humidity storage | +85°C, 85% / 500Hrs |
| Life time | Room Temp. / IF=Typ.mA, 2,000Hrs |

9. Guideline to OLED Handling

A. Handling and Safety

1. Unpack packing box with care. Remove packing trays gently and carefully from packing box.
2. During unloading and handling, gloves are required to prevent finger cuts or possible shocks. Gloves are also required to avoid fingerprints being left on the glass, and to keep moisture from causing corrosion to the metal traces.
3. Handle panels with caution. Mechanical stress such as shocks and pressures on the panel surface (active area, encapsulation glass cavity area) must be avoided to prevent cracking of the glass, delamination, scratching of the film, and internal structure damage. Do not press or drop the panel.
4. During unloading and handling, panels should always be held from the side. Avoid direct contact with metal contact pads or connector traces.
5. Protect the panel surface from scratches. Avoid direct contact on panel surface and do not stack panels on top of each other.
6. Protect the corners and edges during handling, assembly or installation to prevent chipping or breakage of glass.
7. Avoid contact with chemicals such as solvents.
8. Contact with water must be avoided to prevent damage of films and corrosion of metal traces. Water drops must be wiped immediately.
9. To remove particle/foreign materials and surface stains, gently wipe the surface of the panel with non-abrasive cloth.
10. In case of breakage, avoid direct contact with bare hands. Do not swallow particles, chips, or materials.
11. For interconnections, spring contacts are recommended. Soldering and other interconnecting technologies which apply heat to the panel may cause damage, and are therefore not recommended.
12. Do not hold the panel on the surface. Hold the panel from the edge.
13. In case of connecting multiple panels, series connection is highly recommended. Panel to panel uniformity problem can occur by parallel connection.

B. Storage and Operation

1. Store and operate OLED panels within the ranges specified in the product specifications on page 1. Recommended temperature is at 25°C; Recommended relative humidity is below 60% (RH). (High temperature and humidity can cause film degradation, bubble generation, and film delamination)
2. Store panels in the trays and ESD pouches as delivered from LG Chem.

C. Disposition

Dispose OLED materials/panels/modules in accordance with each region's environmental laws and regulations. If necessary, consult qualified agencies on industrial waste treatment.

[Type 2] Panel with flexible PCB

Note) Items which correspond with Bare panel are not specified to avoid redundancy

1. Ordering Information

| Model | Description | Efficacy | CCT | Product Code |
|----------|-------------------------|----------|-------|-----------------|
| N6SC40-F | Panel with flexible PCB | 55lm/W | 4000K | OR03SCC9HBCAF00 |

4. Electrical & Optical Characteristics

Operation @ 150lm

| Parameter | | unit | Min. | Typ. | Max. |
|-----------------|---|-----------------------------|--------|----------------------------------|-------|
| Electrical data | Forward voltage* | V | 5.7 | 6.0 | 6.3 |
| | DC forward current (Current density) | mA (mA/cm ²) | | 460 (2.76mA/cm ²) | |
| | Power consumption* | W | 2.62 | 2.76 | 2.90 |
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| | Flux | lm | 140 | 150 | 160 |
| Lifetime*** | LT70, @ 2.76mA/cm ² | Hrs. | 12000 | | |

* Different value from Bare panel

** Luminous uniformity calculation formula: $U = [1 - (L_{max} - L_{min}) / (L_{max} + L_{min})] \times 100\%$

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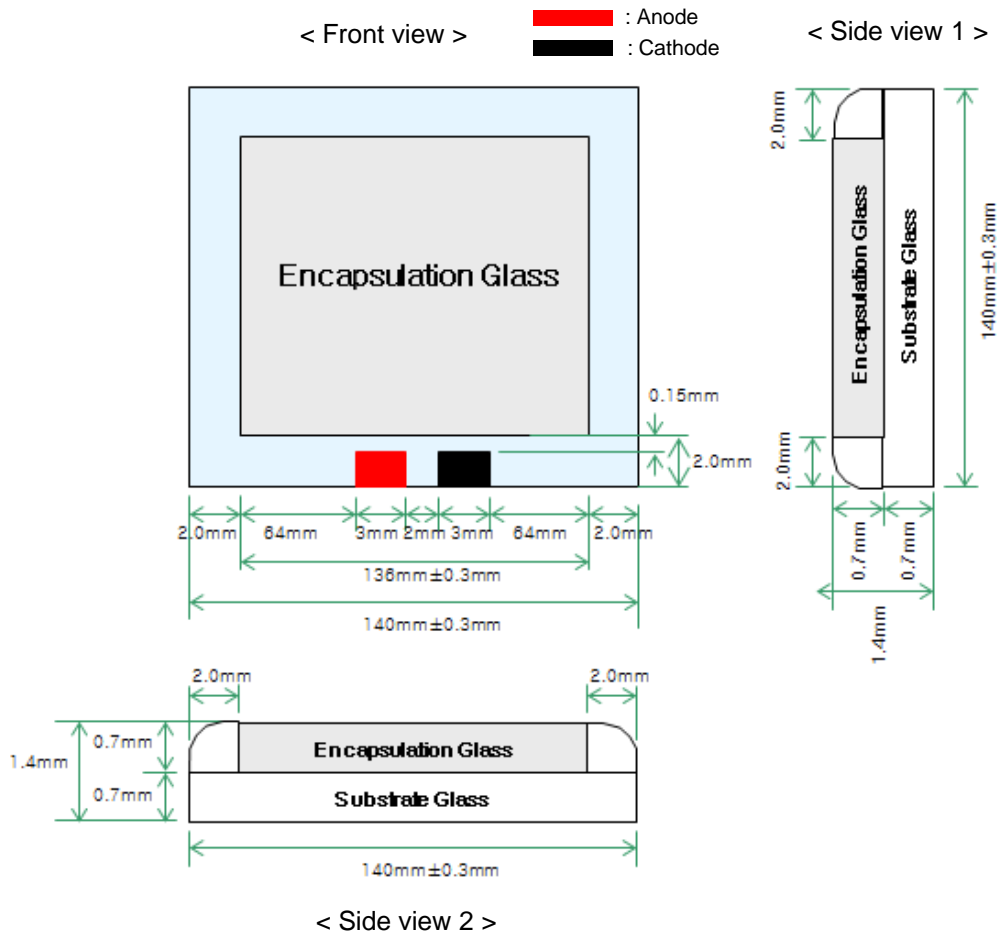
5. Mechanical Dimensions

| | Parameter | Sym | Unit | Bare panel |
|-------|--------------------|-----|-----------------|------------|
| Outer | Length | L | mm | 140 |
| | Width | W | mm | 140 |
| | Thickness* | T | mm | 1.17 |
| | Shape | | | Square |
| | Weight | | g | |
| Inner | Encapsulation area | | mm ² | 136x136 |
| | Luminance area | | mm ² | 129x129 |

* Thickness with out-coupling film

6. Drawings

* Front view is same with Bare panel



※ Refer to the Appendix2 for detailed drawing

