



# SPECIFICATION FOR TFT LCD MODULE

CUSTOMER : \_\_\_\_\_

CUSTOMER MODULE : \_\_\_\_\_

HL MODEL :     HG101WX053    

Preliminary Specification

Final Specification

Customer Confirmation column:

Approved by : \_\_\_\_\_ Dept. : \_\_\_\_\_ Data : \_\_\_\_\_

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| Designed by | Checked by | Approved by |
|-------------|------------|-------------|
|             |            |             |



## REVISION STATUS

| Version | Revise Date | Page | Content       | Modified by |
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## 1. GENERAL DESCRIPTION

### 1.1 DESCRIPTION

HG101WX053 is a color active matrix thin film transistor (TFT) IPS liquid crystal display(LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel,DriverIC, FPC and Backlight, This TFT LCD has a 10.1-inch diagonally measured active display area with WSVGA resolution (800 vertical by 1280 horizontal pixel array).

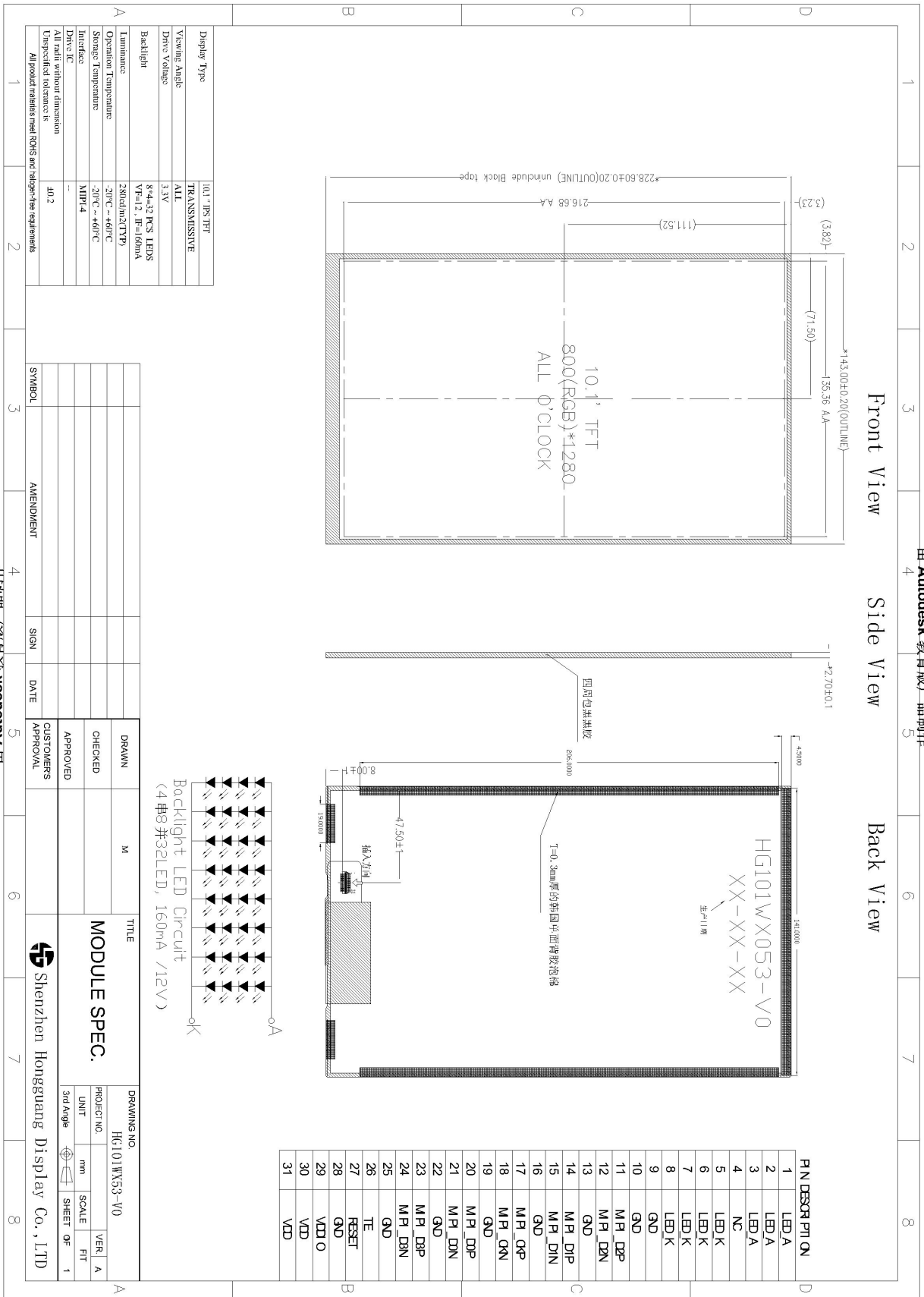
### 1.2 FEATURES:

| No. | Item                           | Specification          | Unit   |
|-----|--------------------------------|------------------------|--------|
| 1   | Panel Size                     | 10.1"                  | inch   |
| 2   | Number of Pixels               | 800×RGB (3) ×1280      | pixels |
| 3   | Active Area                    | 135.36(H)×216.576(V)   | mm     |
| 4   | Outline Dimension              | 143(W)×228.6(H)×2.7(D) | mm     |
| 5   | Number of Colors               | 16.7M                  | -      |
| 6   | Viewing Direction              | ALL                    | -      |
| 7   | Luminance (cd/m <sup>2</sup> ) | 250(TYP.)              | nit    |
| 8   | Interface                      | MIPI                   | -      |
| 9   | Backlight                      | 32-LEDs (White)        | -      |
| 10  | Operation Temperature          | -20~60                 | °C     |
| 11  | Storage Temperature            | -20~60                 | °C     |
| 12  | Weight                         | TBD                    | g      |
| 13  | 推荐 Source IC                   | JD9365DA               |        |



## 2. MECHANICAL SPECIFICATION

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## 3. PIN DESCRIPTION

| No. | Symbol | Function                      |
|-----|--------|-------------------------------|
| 1   | LEDA   | LED Anode                     |
| 2   | LEDA   | LED Anode                     |
| 3   | LEDA   | LED Anode                     |
| 4   | NC     | No connection                 |
| 5   | LEDK   | LED Cathode                   |
| 6   | LEDK   | LED Cathode                   |
| 7   | LEDK   | LED Cathode                   |
| 8   | LEDK   | LED Cathode                   |
| 9   | GND    | Ground                        |
| 10  | GND    | Ground                        |
| 11  | D2P    | MIPI differential data input  |
| 12  | D2N    | MIPI differential data input  |
| 13  | GND    | Ground                        |
| 14  | D1P    | MIPI differential data input  |
| 15  | D1N    | MIPI differential data input  |
| 16  | GND    | Ground                        |
| 17  | DCLKP  | MIPI differential clock input |
| 18  | DCLKN  | MIPI differential clock input |
| 19  | GND    | Ground                        |
| 20  | D0P    | MIPI differential data input  |
| 21  | D0N    | MIPI differential data input  |
| 22  | GND    | Ground                        |
| 23  | D3P    | MIPI differential data input  |
| 24  | D3N    | MIPI differential data input  |
| 25  | GND    | Ground                        |
| 26  | TE     | NC                            |
| 27  | RESET  | Global reset pin, Active low  |
| 28  | GND    | Ground                        |
| 29  | VDDIO  | Power supply 1.8V             |
| 30  | VDD    | Power supply 3.3V             |
| 31  | VDD    | Power supply 3.3V             |



## 4. Electrical Characteristics

### 4.1 TFT LCD MODULE

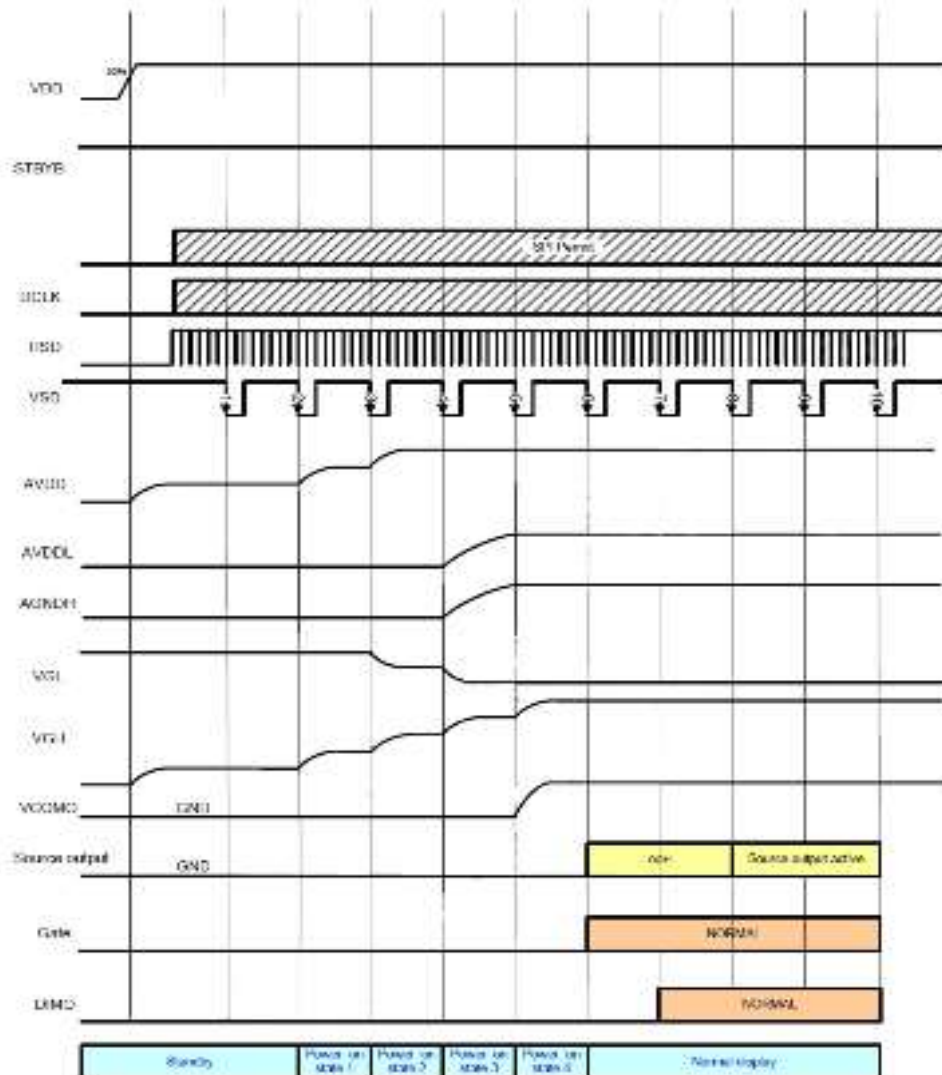
| Parameter                   | Symbol | Min. | Typ.  | Max.  | Unit |
|-----------------------------|--------|------|-------|-------|------|
| power supply voltage        | VDD    |      | 3.3   | 3.6   | V    |
| power supply ripple voltage | VRP    |      |       | 350   | mV   |
| power supply current        | IDD    | --   | 225   | 251   | mA   |
| Power consumption           | PD     | --   | 0.735 | 0.830 | w    |

### 4.2 POWER ON/OFF SEQUENCE

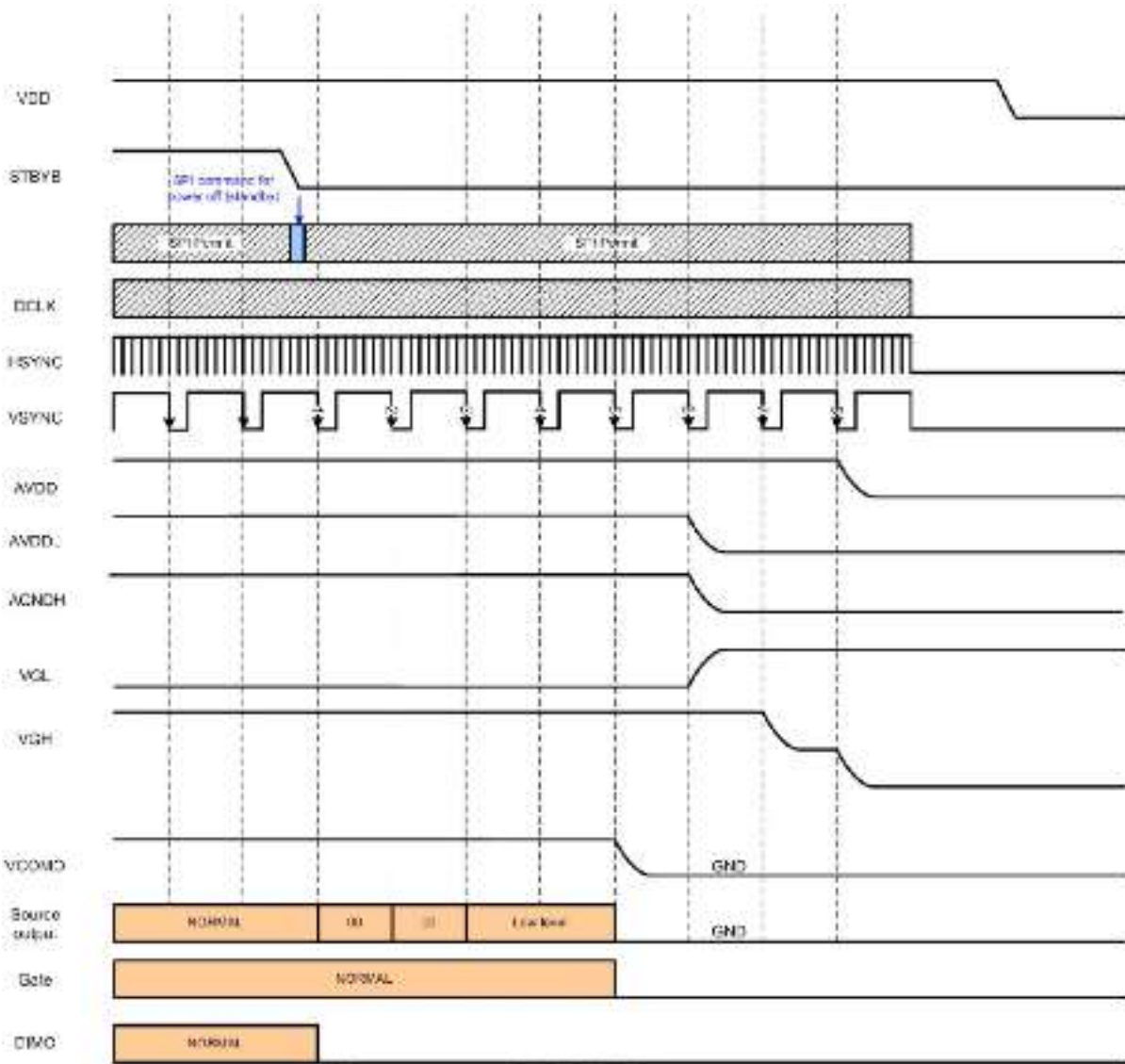
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND → AVDD, AGND → V1 to V14

Power off: V1 to V14 → AVDD, AGND → VDD, GND



Power on timing sequence



Power off timing sequence

Note: Low level=3FH, when NBW=L (Normally white)

Low level=00H, when NBW=H (Normally black)

## 4.3 BACK LIGHT UNIT

Ta=25°C

| Item              | Symbol           | Min. | Typ. | Max. | Unit | Remark                          |
|-------------------|------------------|------|------|------|------|---------------------------------|
| LED current       | I <sub>LED</sub> |      | 160  |      | mA   | 32LEDS                          |
| Forward voltage   | V <sub>F</sub>   | 10.8 | 12.0 | 13.2 | V    | I <sub>F</sub> =160mA<br>32LEDS |
| Reverse current   | I <sub>R</sub>   |      |      | 50   | μA   | V <sub>R</sub> =10V, 1LED       |
| Power dissipation | P <sub>d</sub>   |      | 1920 |      | mW   | 27LEDS                          |
| Reverse Voltage   | V <sub>R</sub>   |      | 10   |      | V    | 1LED                            |



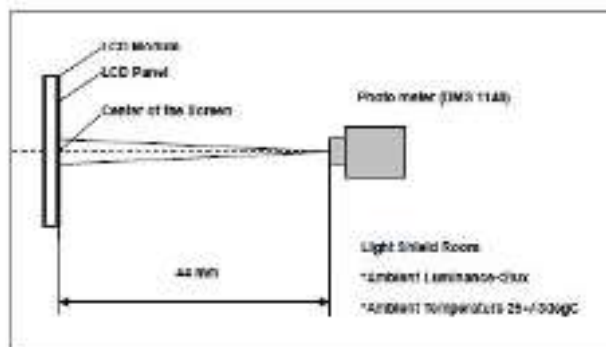


## 5. OPTICAL CHARACTERISTICS

| Item  | Symbol           | Min. | Typ.  | Max.  | Unit   | Note           |
|---|------------------|------|-------|-------|--------|----------------|
| Contrast Ratio                                | CR               | 800  | 1000  | -     |        | Note1<br>Note3 |
| Luminance                                     | YL               | -    | 250   | -     | cd/m2  | Note1<br>Note5 |
| Luminous tolerance                            | I IV-M point5    | 75   |       |       | %      | Note1<br>Note6 |
|   | IV-M point13     | 70   |       |       |        |                |
| Response Time                                 | Rising + Falling | -    | 30    | -     | ms     | Note1<br>Note4 |
| Viewing Angle[degrees]<br>K=Contrast Ratio>10 | Horizontal       | 75   | 80    |       | degree | Note1<br>Note2 |
|   | Vertical         | 75   | 80    |       |        |                |
| Color Chromaticity                            | Red              | x    | 0.588 | 0.618 | 0.648  | Note1          |
|   |                  | y    | 0.338 | 0.368 | 0.398  |                |
|   | Green            | x    | 0.295 | 0.325 | 0.355  |                |
|   |                  | y    | 0.573 | 0.603 | 0.633  |                |
|   | Blue             | x    | 0.128 | 0.158 | 0.188  |                |
|   |                  | y    | 0.066 | 0.096 | 0.126  |                |
|   | White            | x    | 0.274 | 0.304 | 0.334  |                |
|   |                  | y    | 0.29  | 0.32  | 0.35   |                |

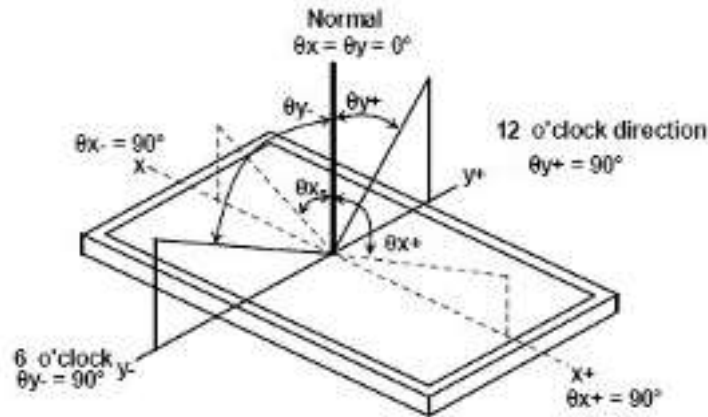
Note1: Measurement Setup

The LCD module should be stabilized at given temperature for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.





## Note2: Definition of Viewing Angle



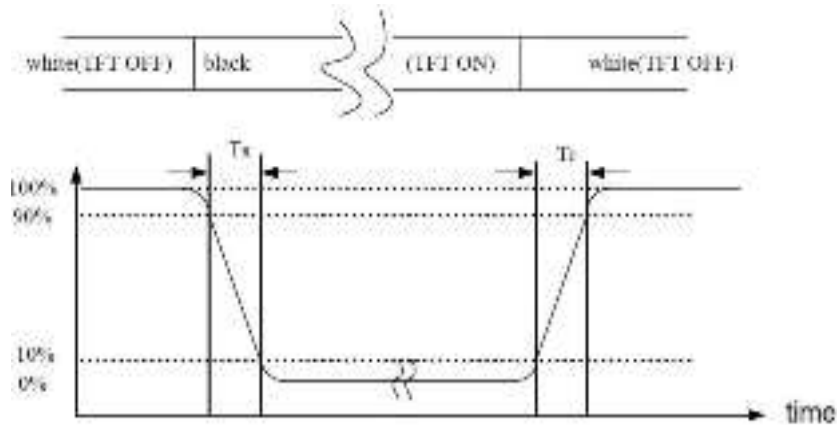
## Note3: Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

$$\text{Contrast Ratio (CR)} = L63 / L0$$

L63: Luminance of gray level 63, L0: Luminance of gray level 0

## Note4: Definition of Response Time (TR, TF)



## Note5: Definition of Luminance White

Measure the luminance of gray level 63 at center point and 5 points.

Center of Luminance = Y1

$$\text{Average Luminance of 5 points} = \frac{Y_1 + Y_2 + Y_3 + Y_4 + Y_5}{5}$$

## Note6: Definition of Luminance Uniformity (Variation)

Measure the luminance of gray level 63 at 13 points.

$$\text{Uniformity of 13 points} = \frac{\text{Min Luminance of } Y_1 \sim Y_{13}}{\text{Max Luminance of } Y_1 \sim Y_{13}} \times 100\%$$

$$\text{Uniformity of 5 points} = \frac{\text{Min Luminance of } Y_1 \sim Y_5}{\text{Max Luminance of } Y_1 \sim Y_5} \times 100\%$$



## 6. RELIABILITY TEST ITEMS

### 6.1 TEMPERATURE AND HUMIDITY

| No | Test Item                           | Test condition  | Criterion  |
|----|-------------------------------------|---|--|
| 1  | High Temperature Storage            | 60°C±2°C 96H<br>Restore 2H at 25°C<br>Power off                                     | 1. After testing, cosmetic and electrical defects should not happen.<br>2. Total current consumption should not be more than twice of initial value. |
| 2  | Low Temperature Storage             | -10°C±2°C 96H<br>Restore 2H at 25°C<br>Power off                                    |  |
| 3  | High Temperature Operation          | 50°C±2°C 96H<br>Restore 2H at 25°C<br>Power on                                      |  |
| 4  | Low Temperature Operation           | 0°C±2°C 96H<br>Restore 4H at 25°C<br>Power on                                       |  |
| 5  | High Temperature/Humidity Operation | 40°C±2°C 90%RH 96H<br>Power on  |  |
| 6  | Temperature Cycle                   | - 10°C----->50°C<br>30min 5min 30min<br>after 5 cycle, Restore 2H at 25°C Power off |  |
| 7  | Vibration Test                      | 10Hz~150Hz, 100m/s <sup>2</sup> , 120min  | Not allowed cosmetic and electrical defects.   |
| 8  | Shock Test                          | Half- sine wave, 300m/s <sup>2</sup> , 11ms   |  |
| 9  | ESD Test                            | Air discharge: +/-6KV,<br>Contact discharge: 2KV                                    |  |

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

|            |                   |
|------------|-------------------|
| ITEM       | Inspection        |
| Contrast   | CR>50%            |
| IDD        | IDD<200%          |
| Brightness | Brightness>60%    |
| Color Tone | Color Tone+/-0,05 |



## 7. GENERAL PRECAUTION

### 7.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

### 7.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is  $23\pm 5^{\circ}\text{C}$  and The humidity is below  $50\pm 20\%\text{RH}$ .
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

### 7.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

### 7.4 WARRANTY

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repaired or modified the LCM. It may cause function to lose efficacy, Starry does not warrant the LCM.
- (3) All process and material comply ROHS.