

## 规格书

## Product Specification

|                                  |                                                         |
|----------------------------------|---------------------------------------------------------|
| 客户名称<br>Customer                 |                                                         |
| 客户项目号<br>Part NO                 |                                                         |
| 产品型号<br>Part NO                  | H0400S002AM V1                                          |
| 产品内容<br>Product type             | Mode:<br>AMOLED<br>LCD Module: 4.0"1080RGB*1240Dot MIPI |
| 客户确认签章<br>Signature by Customer: |                                                         |

| PREPARED BY | CHECKED BY | APPROVED BY |
|-------------|------------|-------------|
|             |            |             |
|             |            |             |

[illegible]

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## 1 General Description 规格简介

4.0 inch 1080x1240 is a color active matrix AMOLED module.

This module has a 4.0 inch diagonally measured active area with 1080x1240 resolutions (1080 horizontal by 1240 vertical pixel arrays). Each pixel is divided into RED, GREEN, BLUE dots and this module can display 16.7M colors.

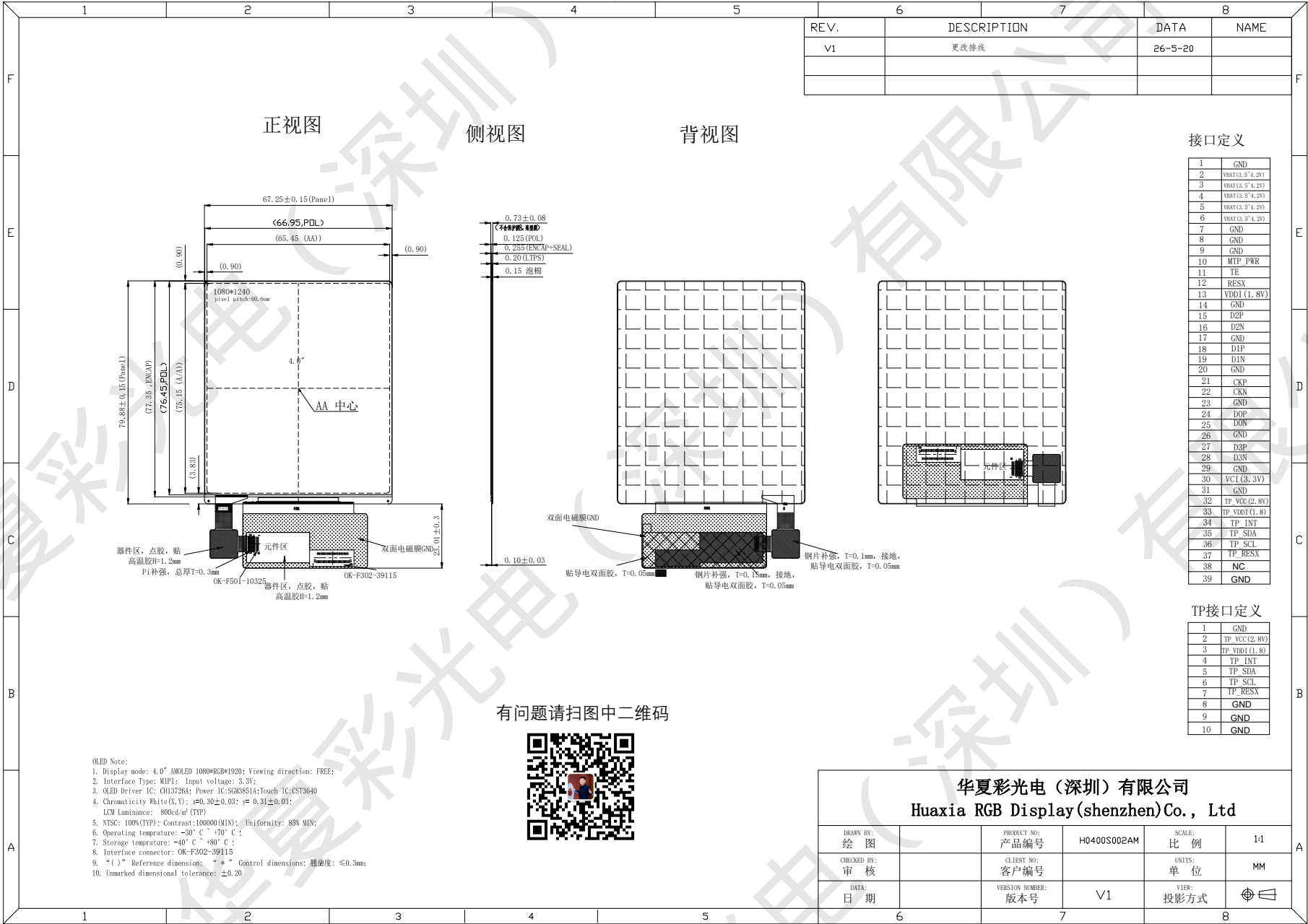
4.0 英寸 1080x1240 是一个彩色有源矩阵 AMOLED 模块。该模块有一个 4.0 英寸的对角线测量的活动区域，分辨率为 1080x1240（1080 水平和 1240 垂直像素数组）。每个像素被分为红色、绿色、蓝点，该模块可以显示 16.7M 的颜色。

## 2 Module Parameter 模组参数

| Features                          | Details                       | Unit              |
|-----------------------------------|-------------------------------|-------------------|
| Display Size(Diagonal) 显示尺寸(对角线)  | 4.0                           | inch              |
| 显示屏类型                             | AMOLED                        | -                 |
| Display Mode 显示模式                 | Transmissive OLED             | -                 |
| Resolution 分辨率                    | 1080RGB x 1240                | -                 |
| Active Area 显示区                   | 65.45(H) × 75.15(V)           | mm                |
| Module Outline 模组外形               | 67.25(H) × 79.88(V) × 0.73(T) | mm                |
| Display Colors 显示颜色               | 16.7M                         | -                 |
| Interface 接口                      | MIPI                          | -                 |
| Driver IC 驱动 IC                   | CH13726                       | -                 |
| TP Viewing Area TP 视窗             | /                             | mm                |
| TP Outline(assembly) TP 外形        | /                             | mm                |
| Touch IC                          | CST3640                       |                   |
| Luminance on surface 亮度           | 800                           | cd/m <sup>2</sup> |
| View Direction 视角方向               | All                           | Best image        |
| Contrast ratio 对比度                | 100000:1                      |                   |
| Color gamut 色域                    | 100%                          |                   |
| PPI 图像点密集度                        | 419                           | -                 |
| Window effect 视窗效果                | 无一体黑                          | -                 |
| Cover plate surface effect 盖板表面效果 | 无 AF/AG                       | -                 |
| Operating Temperature 工作温度        | -30~70                        | °C                |
| Storage Temperature 储存温度          | -40~80                        | °C                |
| Weight 重量                         | TBD                           | g                 |

Note 1: Excluding hooks, posts , FPC/FPC tail etc.

## 3 Mechanical Drawings 结构图



## 4 Module Interface 模组接口定义

| NO | SYMBOL     | FUNCTION                                                                                                          |
|----|------------|-------------------------------------------------------------------------------------------------------------------|
| 1  | GND        | Power Ground                                                                                                      |
| 2  | VBAT       | Power Input for SIBO VBAT=3.5~4.2V                                                                                |
| 3  | VBAT       | Power Input for SIBO VBAT=3.5~4.2V                                                                                |
| 4  | VBAT       | Power Input for SIBO VBAT=3.5~4.2V                                                                                |
| 5  | VBAT       | Power Input for SIBO VBAT=3.5~4.2V                                                                                |
| 6  | VBAT       | Power Input for SIBO VBAT=3.5~4.2V                                                                                |
| 7  | GND        | Power Ground                                                                                                      |
| 8  | GND        | Power Ground                                                                                                      |
| 9  | GND        | Power Ground                                                                                                      |
| 10 | MTP_PWR    | MTP programming power supply pin. (8V typical)<br>- Must be left open or connected to VSSD in normal condition.   |
| 11 | TE         | Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command                           |
| 12 | RESX       | - This signal will reset the device and must be applied to properly initialize the chip.<br>Signal is active low. |
| 13 | VDDI(1.8V) | Power Supply for IO, VDDI=1.65V~1.95V.                                                                            |
| 14 | GND        | Power Ground                                                                                                      |
| 15 | D2P        | MIPI DSI differential data pair. (Data lane 2 positive polarity)                                                  |
| 16 | D2N        | MIPI DSI differential data pair. (Data lane 2 negative polarity)                                                  |
| 17 | GND        | Power Ground                                                                                                      |
| 18 | D1P        | MIPI DSI differential data pair. (Data lane 1 positive polarity)                                                  |
| 19 | D1N        | MIPI DSI differential data pair. (Data lane 1 negative polarity)                                                  |
| 20 | GND        | Power Ground                                                                                                      |
| 21 | CKP        | CLKP                                                                                                              |
| 22 | CKN        | CLKN                                                                                                              |
| 23 | GND        | Power Ground                                                                                                      |
| 24 | D0P        | MIPI DSI differential data pair. (Data lane 0 positive polarity)                                                  |
| 25 | D0N        | MIPI DSI differential data pair. (Data lane 0 negative polarity)                                                  |
| 26 | GND        | Power Ground                                                                                                      |
| 27 | D3P        | MIPI DSI differential data pair. (Data lane 3 positive polarity)                                                  |
| 28 | D3N        | MIPI DSI differential data pair. (Data lane 3 negative polarity)                                                  |
| 29 | GND        | Power Ground                                                                                                      |
| 30 | VCI(3.3V)  | Power Supply for Analog, VCI=2.5~3.6V                                                                             |
| 31 | GND        | Power Ground                                                                                                      |
| 32 | TP_VCC     | Connect to voltage source between 3.0V to 3.6V                                                                    |
| 33 | TP_VDDI    | Connect to voltage source between 1.65V to 1.95V                                                                  |
| 34 | TP_INT     | Touch panel interrupt output                                                                                      |

|    |         |                       |
|----|---------|-----------------------|
| 35 | TP_SDA  | Touch panel I2C data  |
| 36 | TP_SCL  | Touch panel I2C clock |
| 37 | TP_RESX | Touch panel reset     |
| 38 | NC      | OPEN                  |
| 39 | GND     | Power Ground          |

## 5 Application Circuit 应用电路

TBD

## 6 Absolute Maximum Ratings 绝对最大额定值

VSS=0V, Ta=25°C

Note 1: 90%RH max, If Ta is below 50°C; 60%RH max, If Ta is over 60°C.

| Item 项目                    |                   | Symbol    | Min.最小 | Max.最大    | Unit 单位 |
|----------------------------|-------------------|-----------|--------|-----------|---------|
| Supply Voltage 电源电压        | Power supply 电力供应 | VDD       | -0.3   | +5.5      | V       |
|                            | Analog 模拟         | -         | -      | -         | V       |
|                            | IO                | IOVDD     | -0.3   | +5.5      | V       |
| Input Voltage 输入电压         |                   | $V_i$     | -0.3   | IOVDD+0.3 | V       |
| Storage temperature 储存温度   |                   | $T_{stg}$ | -30    | +70       | °C      |
| Operating temperature 工作温度 |                   | $T_{op}$  | -20    | +60       | °C      |
| Storage humidity 存储湿度      |                   | $H_{stg}$ | 10     | Note 1    | %RH     |
| Operating humidity 操作湿度    |                   | $H_{op}$  | 10     | Note 1    | %RH     |

## 7 Electrical Specification 电性规格

DC Characteristics 直流特性

| Item 项目                         |                         | Symbol          | Min.最小    | Typ.中间 | Max.最大   | Unit 单位 |
|---------------------------------|-------------------------|-----------------|-----------|--------|----------|---------|
| Supply Voltage 电源电压             | Powersupply<br>电力供应     | VDD             | 2.5       | 3.0    | 3.6      | V       |
|                                 | Analog                  | -               | -         | -      | -        | V       |
|                                 | IO                      | IOVDD           | 1.65      | -      | 1.95     | V       |
| Logic Low input voltage 输入电压低   |                         | V <sub>IL</sub> | -0.3IOVDD | -      | 0.3IOVDD | V       |
| Logic High input voltage 输入电压高  |                         | V <sub>IH</sub> | 0.7IOVDD  | -      | IOVDD    | V       |
| Logic Low output voltage 输出电压低  |                         | V <sub>OL</sub> | -         | -      | 0.2IOVDD | V       |
| Logic High output voltage 输出电压高 |                         | V <sub>OH</sub> | 0.8IOVDD  | -      | -        | V       |
| Current Consumption 电<br>流消耗    | Normal display<br>正常的显示 | Ivdd            | -         | -      | -        | mA      |
|                                 | Standby mode<br>待机模式    | Ivdd            | -         | -      | -        | uA      |
| Frame Frequency 帧频              |                         | f <sub>FR</sub> | -         | 60     | -        | Hz      |

## 8 Initialization Code 初始化代码

TBD

## 9 Optical Specifications 光学规格

### 9.1 Optical Specifications 光学规格

Ta=25°C, VDD=2.8V,

| Backlight On (Transmissive Mode) | Item<br>项目                              |            | Symbol<br>标志 | Condition<br>条件             | Specification 规范 |        |            | Unit<br>单位        |
|----------------------------------|-----------------------------------------|------------|--------------|-----------------------------|------------------|--------|------------|-------------------|
|                                  |                                         |            |              |                             | Min.<br>最小       | Typ.中间 | Max.<br>最大 |                   |
|                                  | Luminance on surface( $I_f$ =20mA) 表面亮度 |            | $L_v$        | Normally viewing angle      |                  | 800    | -          | cd/m <sup>2</sup> |
|                                  | Contrast ratio 对比度                      |            | $CR$         | $\theta_x=\theta_y=0^\circ$ | 90000            | 100000 | -          | -                 |
|                                  | Response time 响应时间                      |            | $TR+TF$      |                             | -                | -      | 3          | ms                |
|                                  | Chromaticity Transmissive 色度            | Red 红      | $XR$         | -                           | 0.650            | 0.680  | 0.710      | -                 |
|                                  |                                         |            | $YR$         |                             | 0.285            | 0.315  | 0.345      | -                 |
|                                  |                                         | Green 绿    | $XG$         |                             | 0.210            | 0.250  | 0.290      | -                 |
|                                  |                                         |            | $YG$         |                             | 0.670            | 0.710  | 0.750      | -                 |
|                                  |                                         | Blue 蓝     | $XB$         |                             | 0.110            | 0.140  | 0.170      | -                 |
|                                  |                                         |            | $YB$         |                             | 0.017            | 0.047  | 0.077      | -                 |
|                                  |                                         | White 白    | $XW$         |                             | 0.289            | 0.299  | 0.309      | -                 |
|                                  |                                         |            | $YW$         |                             | 0.3052           | 0.3152 | 0.3252     | -                 |
|                                  | Viewing Angle 视角                        | Horizontal | $\theta X+$  | Center<br>$CR\geq 10$       | 85               | -      | -          | Deg.              |
|                                  |                                         |            | $\theta X-$  |                             | 85               | -      | -          |                   |
|                                  |                                         | Vertical   | $\theta Y+$  |                             | 85               | -      | -          |                   |
| $\theta Y-$                      |                                         |            | 85           |                             | -                | -      |            |                   |
| NTSC Ratio(Gamut)                |                                         | -          | -            | -                           | 100              | -      | %          |                   |

## 9.2 The power on/off sequence is illustrated below 电源启动/关闭顺序

The Power on sequence has been applied following Fig1, otherwise correct functionality is not guaranteed.

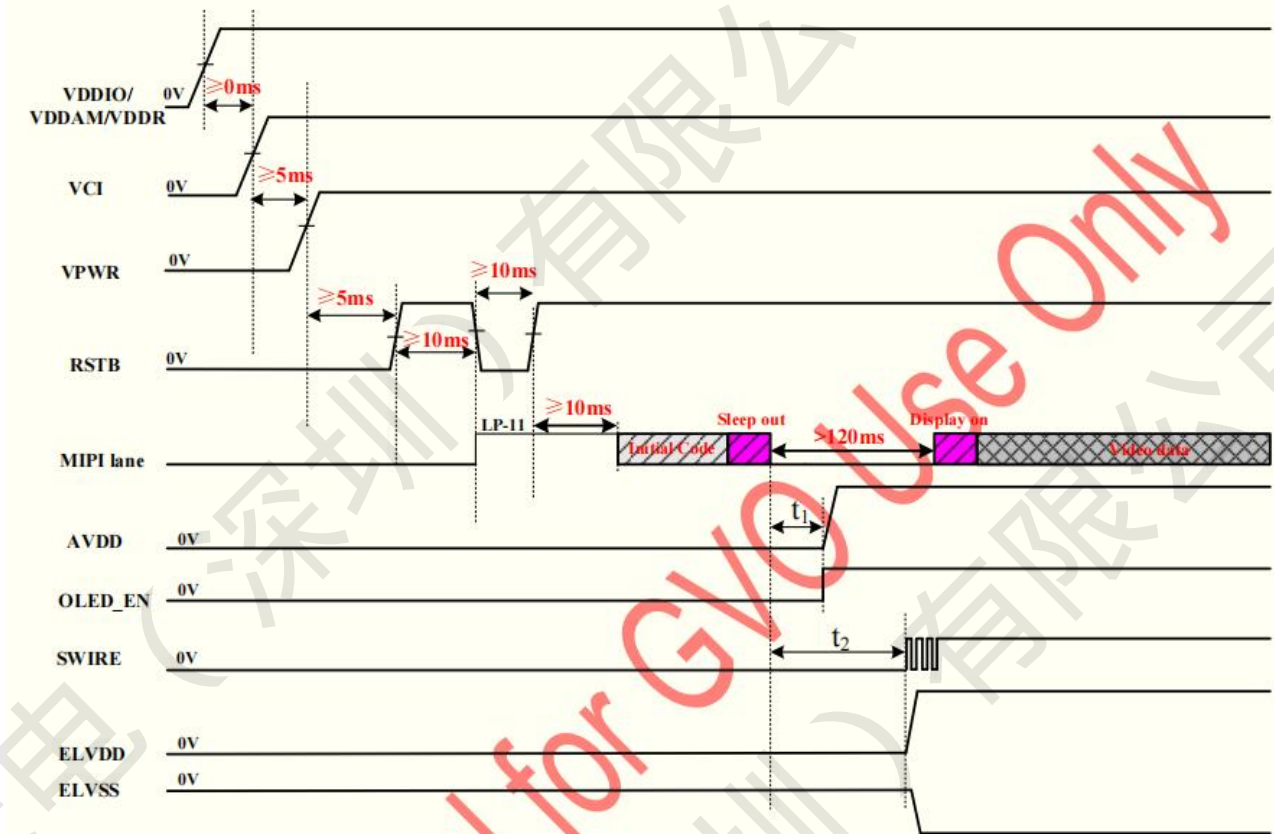


Fig 1 Power on sequence

The Power off sequence have been applied following Fig2, otherwise correct functionality is not guaranteed.

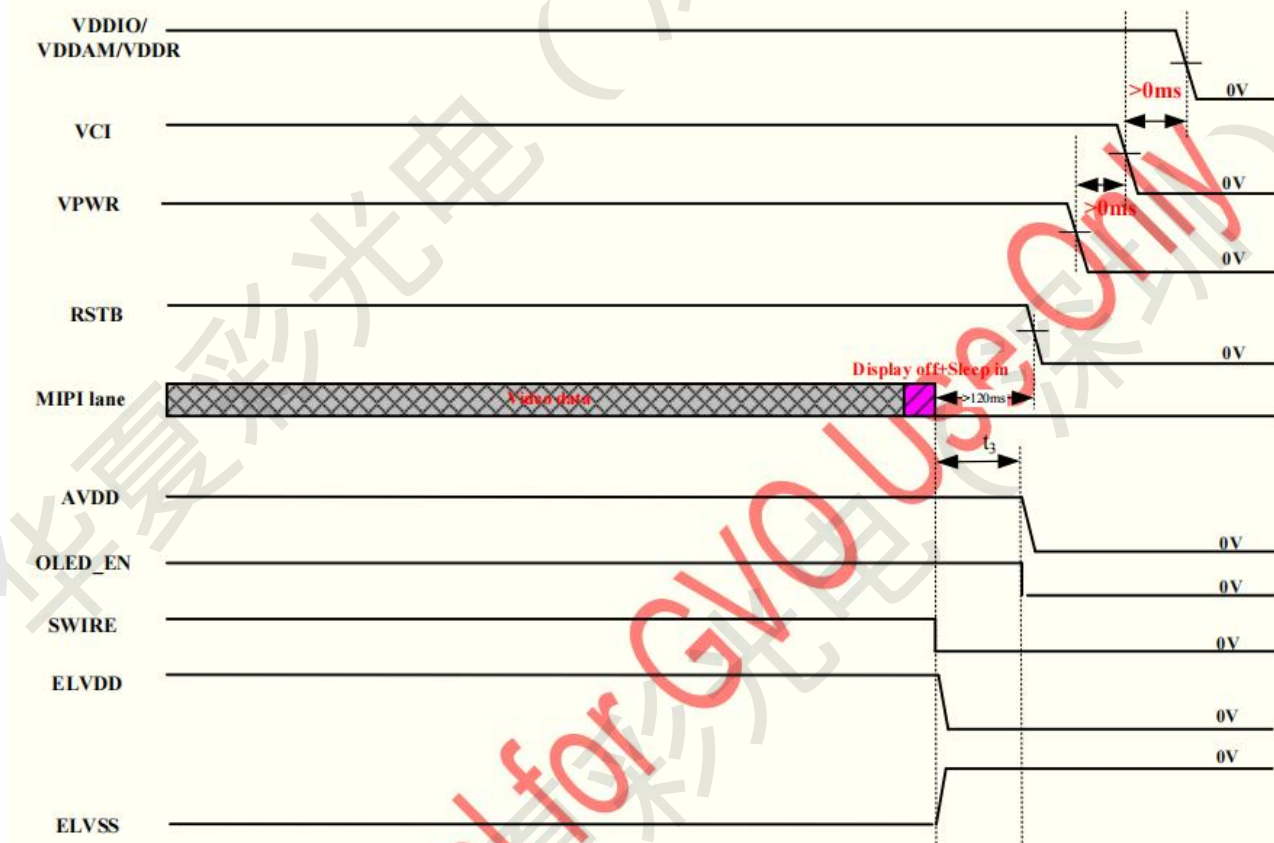


Fig 2 Power off sequence

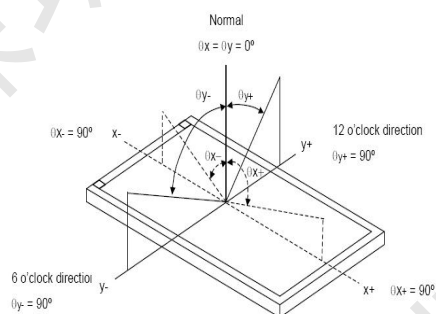
### 9.3 Definition of Contrast Ratio 对比度的定义

Contrast is measured perpendicular to display surface in reflective and transmissive mode. The measurement condition is:

| Measuring Equipment 测量设备      | BM-7 or EQUI             |
|-------------------------------|--------------------------|
| Measuring Point Diameter 测点直径 | 3mm//1mm                 |
| Measuring Point Location 测点位置 | Active Area centre point |
| Test pattern 测试模式             | A: All Pixels white      |
|                               | B: All Pixel black       |
| Contrast setting              | Maximum                  |

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

### 9.4 Definition of Viewing Angles 视角的定义



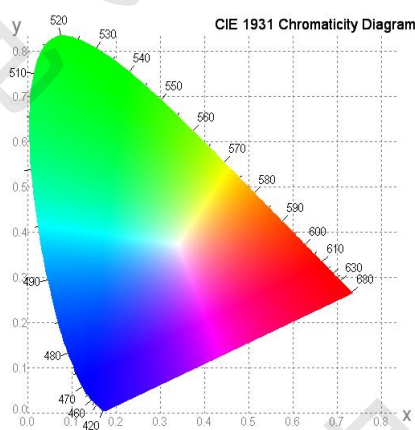
Measuring machine: LCD-5100 or EQUI

### 9.5 Definition of Color Appearance 色域的定义

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7)



### 9.6 Definition of Surface Luminance, Uniformity and Transmittance

表面亮度、均匀性和透光率的定义

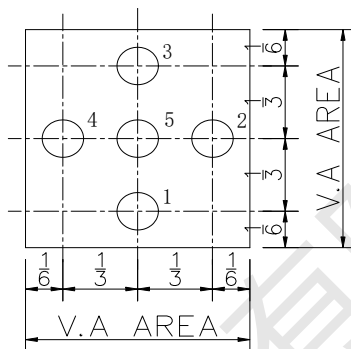
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

9.6.1 Surface Luminance: LV = average (LP1:LP5)

9.6.2 Uniformity = Minimal (LP1:LP5) / Maximal (LP1:LP5) \* 100%

9.6.3 Transmittance = LV on LCD / LV on Backlight \* 100%

Note :Measuring machine:BM-7



## 10 Quality Assurance 质量标准

### 10.1 Purpose 目的

This standard for Quality Assurance assures the quality of LCD module products supplied to customer by HuaXia RGB Display.

### 10.2 Agreement Items 协议项目

HuaXia RGB Display and customer shall negotiate if the following situation occurs:

10.2.1 Discrepancies between HuaXia RGB Display's QA standards and customer's QA standards.

10.2.2 Additional requirement to be added in product specification.

10.2.3 Any other special problem.

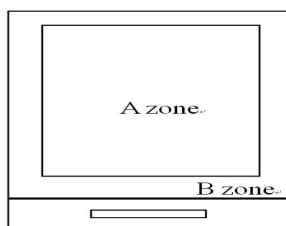
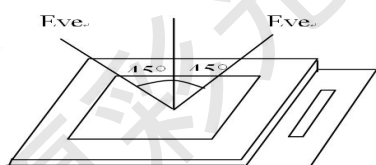
### 10.3 Standard of the Product Visual Inspection 产品外观检验标准

10.3.1 Appearance inspection:

10.3.1.1 The inspection must be under illumination about 1000 – 1500 lx, and the distance of view must be at 30cm  $\pm$  2cm.

10.3.1.2 The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

10.3.1.3 Definition of area: A Zone: Active Area, B Zone: Viewing Area.



10.3.2 Basic principle: A set of sample to indicate the limit of acceptable quality level must be discussed by both HuaXia RGB Display and customer when there is any dispute happened.

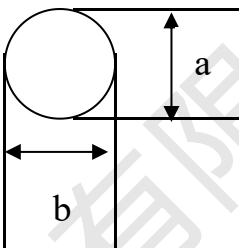
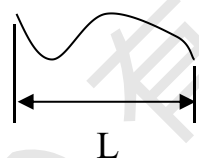
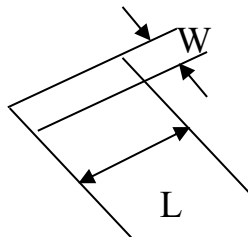
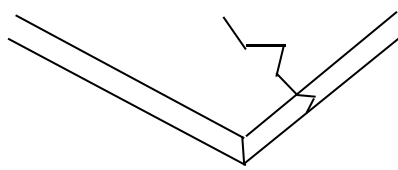
### 10.4 Inspection Specification 检验标准

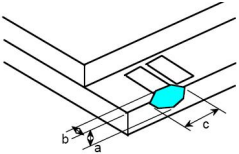
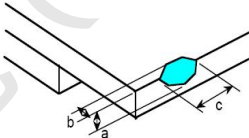
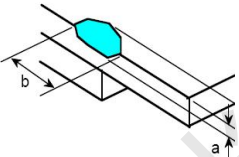
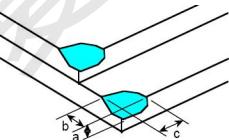
Sampling plan according to GB/T2828.1-2012/ISO 2859-1: 1999 and ANSI/ASQC

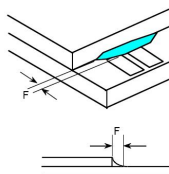
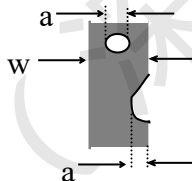
Z1.4-1993, normal level 2 and based on:

Major defect: AQL 0.4

Minor defect: AQL 1.0

| No.                       | Item 项目                                                                                                                                               | Criteria (Unit: mm) 标准                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|--------------------|---------------------|---------------|--------|---------------------------|----------------------|---|-----------------|------------|---|-------|--|-------------------------------------------------|
| 01                        | Black / White spot<br>Foreign material<br>(Round type)<br>Pinholes Stain<br>Particles inside cell.<br>(Minor defect) 黑/白斑/异物<br>(圆类型)细胞内的针孔染色颗粒。(小瑕疵) | <div><math display="block">\varphi = (a + b) / 2</math></div> <p>Distance between 2 defects should more than10mm apart.</p> <table><tr><th>Size</th><th>Area</th><th>Acc. Qty</th></tr><tr><td><math>\varphi \leq 0.10</math></td><td></td><td>Ignore</td></tr><tr><td><math>0.10 &lt; \varphi \leq 0.2</math></td><td></td><td>2</td></tr><tr><td><math>0.2 &lt; \varphi</math></td><td></td><td>0</td></tr><tr><td>Total</td><td></td><td><math>N \leq 3</math><br/>NO include<br/><math>\varphi \leq 0.10</math></td></tr></table>                                                                        | Size             | Area     | Acc. Qty           | $\varphi \leq 0.10$ |               | Ignore | $0.10 < \varphi \leq 0.2$ |                      | 2 | $0.2 < \varphi$ |            | 0 | Total |  | $N \leq 3$<br>NO include<br>$\varphi \leq 0.10$ |
| Size                      | Area                                                                                                                                                  | Acc. Qty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| $\varphi \leq 0.10$       |                                                                                                                                                       | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| $0.10 < \varphi \leq 0.2$ |                                                                                                                                                       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| $0.2 < \varphi$           |                                                                                                                                                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| Total                     |                                                                                                                                                       | $N \leq 3$<br>NO include<br>$\varphi \leq 0.10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| 02                        | Black and White line<br>Scratch<br>Foreign material<br>(Line type)<br>(Minor defect) 黑白线刮伤异物(类型)行(小瑕疵)                                                | <div></div> <table><tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr><tr><td>/</td><td><math>W \leq 0.03</math></td><td>Ignore</td></tr><tr><td><math>L \leq 3</math></td><td><math>0.05 &lt; W \leq 0.08</math></td><td>2</td></tr><tr><td>/</td><td><math>0.08 &lt; W</math></td><td>0</td></tr><tr><td colspan="2">Total</td><td><math>N \leq 2</math></td></tr></table> <p>Distance between 2 defects should more than 10mm apart.<br/>Scratches not viewable through the back of the display are acceptable.</p> | Length           | Width    | Acc. Qty           | /                   | $W \leq 0.03$ | Ignore | $L \leq 3$                | $0.05 < W \leq 0.08$ | 2 | /               | $0.08 < W$ | 0 | Total |  | $N \leq 2$                                      |
| Length                    | Width                                                                                                                                                 | Acc. Qty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| /                         | $W \leq 0.03$                                                                                                                                         | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| $L \leq 3$                | $0.05 < W \leq 0.08$                                                                                                                                  | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| /                         | $0.08 < W$                                                                                                                                            | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| Total                     |                                                                                                                                                       | $N \leq 2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| 03                        | Glass Crack<br>(Minor defect) 玻璃裂纹(小瑕疵)                                                                                                               | <div></div> <p>LCD with extensible crack line is unacceptable(When press the cracked LCD area, the line will expand, we define it is extensible crack line)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| 04                        | Glass Chipping Pad<br>Area: (Minor defect)<br>玻璃碎片面积:(轻微缺陷)                                                                                           | <table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td><math>c &lt; 5.0, b &lt; 0.4</math></td><td>Ignore</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Length and Width | Acc. Qty | $c < 5.0, b < 0.4$ | Ignore              |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| Length and Width          | Acc. Qty                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |
| $c < 5.0, b < 0.4$        | Ignore                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |          |                    |                     |               |        |                           |                      |   |                 |            |   |       |  |                                                 |

| No.                          | Item 项目                                                                                                                                                   | Criteria (Unit: mm) 标准                                                                                                                                                                                                                                                                                                                  |                  |          |                       |        |                              |        |                              |   |                              |  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|-----------------------|--------|------------------------------|--------|------------------------------|---|------------------------------|--|
|                              |                                                                          |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| 05                           | <p>Glass Chipping Rear of PadArea:(Minordefect ) 玻璃切屑垫区后方: (小瑕疵)</p>     | <table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td><math>c &gt; 3.0, b &lt; 1.0</math></td><td>1</td></tr><tr><td><math>c &lt; 3.0, b &lt; 1.0</math></td><td>2</td></tr><tr><td><math>c &lt; 3.0, b &lt; 0.5</math></td><td>4</td></tr><tr><td colspan="2"><math>a &lt; \text{Glass Thickness}</math></td></tr></table> | Length and Width | Acc. Qty | $c > 3.0, b < 1.0$    | 1      | $c < 3.0, b < 1.0$           | 2      | $c < 3.0, b < 0.5$           | 4 | $a < \text{Glass Thickness}$ |  |
| Length and Width             | Acc. Qty                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c > 3.0, b < 1.0$           | 1                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c < 3.0, b < 1.0$           | 2                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c < 3.0, b < 0.5$           | 4                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $a < \text{Glass Thickness}$ |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| 06                           | <p>Glass Chipping Except Pad Area: (Minor defect) 除垫区外的玻璃切屑:(小瑕疵)</p>  | <table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td><math>c \leq 0.6, b &lt; 5.0</math></td><td>Ignore</td></tr><tr><td colspan="2"><math>a &lt; \text{Glass Thickness}</math></td></tr></table>                                                                                                                          | Length and Width | Acc. Qty | $c \leq 0.6, b < 5.0$ | Ignore | $a < \text{Glass Thickness}$ |        |                              |   |                              |  |
| Length and Width             | Acc. Qty                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c \leq 0.6, b < 5.0$        | Ignore                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $a < \text{Glass Thickness}$ |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| 07                           | <p>Glass Corner Chipping: (Minor defect) 玻璃切角:(小瑕疵)</p>                | <table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td><math>c &lt; 2.0, b &lt; 1.5</math></td><td>Ignore</td></tr><tr><td><math>c &lt; 1.5, b &lt; 2</math></td><td>Ignore</td></tr><tr><td colspan="2"><math>a &lt; \text{Glass Thickness}</math></td></tr></table>                                                        | Length and Width | Acc. Qty | $c < 2.0, b < 1.5$    | Ignore | $c < 1.5, b < 2$             | Ignore | $a < \text{Glass Thickness}$ |   |                              |  |
| Length and Width             | Acc. Qty                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c < 2.0, b < 1.5$           | Ignore                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $c < 1.5, b < 2$             | Ignore                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |
| $a < \text{Glass Thickness}$ |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                         |                  |          |                       |        |                              |        |                              |   |                              |  |

| No.          | Item 项目                                                                                                                         | Criteria (Unit: mm) 标准                                                                                                                                                                                                       |          |          |         |        |              |   |              |   |         |   |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|---------|--------|--------------|---|--------------|---|---------|---|
| 08           | Glass Burr:<br>(Minor defect) 玻璃磨:(小瑕疵)<br>    | Glass burr don't affect assemble and module dimension. <table><tr><td>Length</td><td>Acc. Qty</td></tr><tr><td>F &lt; 0.5</td><td>Ignore</td></tr></table>                                                                   | Length   | Acc. Qty | F < 0.5 | Ignore |              |   |              |   |         |   |
| Length       | Acc. Qty                                                                                                                        |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| F < 0.5      | Ignore                                                                                                                          |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 09           | FPC Defect:<br>(Minor defect) FPC 缺陷:(小瑕疵)<br> | 9.1 Dent, pinhole width a<w/3.<br>(w: circuitry width.)<br>9.2 Open circuit is unacceptable.<br>9.3 No oxidation, contamination and distortion.                                                                              |          |          |         |        |              |   |              |   |         |   |
| 10           | Screen deformation 屏幕上的变形<br>                | Test for insertion of plug gauge at highest warping point:<br>(3.1-6.0inches)<br>H≦0.3MM<br>The client has special requirements,according to drawing                                                                         |          |          |         |        |              |   |              |   |         |   |
| 11           | Bubble on Polarizer<br>(Minor defect) 偏光片上的气泡(小瑕疵)                                                                              | <table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.15</td><td>Ignore</td></tr><tr><td>0.15 &lt;φ≤0.25</td><td>2</td></tr><tr><td>0.25 &lt;φ≤0.3</td><td>1</td></tr><tr><td>0.3 &lt; φ</td><td>0</td></tr></table> | Diameter | Acc. Qty | φ≤0.15  | Ignore | 0.15 <φ≤0.25 | 2 | 0.25 <φ≤0.3  | 1 | 0.3 < φ | 0 |
| Diameter     | Acc. Qty                                                                                                                        |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| φ≤0.15       | Ignore                                                                                                                          |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.15 <φ≤0.25 | 2                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.25 <φ≤0.3  | 1                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.3 < φ      | 0                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 12           | Dent on Polarizer<br>(Minor defect) 偏光片上的凹痕(小瑕疵)                                                                                | <table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.15</td><td>Ignore</td></tr><tr><td>0.15 &lt;φ≤0.25</td><td>2</td></tr><tr><td>0.2 5&lt;φ≤0.30</td><td>1</td></tr><tr><td>0.3&lt; φ</td><td>0</td></tr></table> | Diameter | Acc. Qty | φ≤0.15  | Ignore | 0.15 <φ≤0.25 | 2 | 0.2 5<φ≤0.30 | 1 | 0.3< φ  | 0 |
| Diameter     | Acc. Qty                                                                                                                        |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| φ≤0.15       | Ignore                                                                                                                          |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.15 <φ≤0.25 | 2                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.2 5<φ≤0.30 | 1                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 0.3< φ       | 0                                                                                                                               |                                                                                                                                                                                                                              |          |          |         |        |              |   |              |   |         |   |
| 13           | Bezel 边框                                                                                                                        | 13.1 No rust, distortion on the Bezel.                                                                                                                                                                                       |          |          |         |        |              |   |              |   |         |   |

| No. | Item 项目                                        | Criteria (Unit: mm) 标准                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14  | Touch Panel 触控面板                               | <p>D: Diameter W: width L: length</p> <p>14.1 Spot: <math>D \leq 0.20</math> is acceptable<br/> <math>0.20 &lt; D \leq 0.3</math>, acceptable QTY, 3<br/> <math>D &gt; 0.3</math> is unacceptable</p> <p>14.2 Dent (dot):<br/> <math>D \leq 0.20</math> is acceptable<br/> <math>0.20 &lt; D \leq 0.3</math>, acceptable QTY, 3<br/> <math>D &gt; 0.30</math> is unacceptable<br/> 2dots are acceptable and the distance between defects should more than 10 mm.</p> <p>Dent (line) According to the limit sample</p> <p>14.3 Scratch: <math>W \leq 0.03</math>, <math>L \leq 10</math> is acceptable,<br/> <math>0.03 &lt; W \leq 0.10</math>, <math>L \leq 10</math>, acceptable QTY, 3<br/> <math>W &gt; 0.10</math> is unacceptable.<br/> Distance between 2 defects should more than 10 mm.</p> |
| 15  | PCB                                            | <p>15.1 No distortion or contamination on PCB terminals.</p> <p>15.2 All components on PCB must same as documented on the BOM/component layout.</p> <p>15.3 Follow IPC-A-600F.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 16  | Soldering 焊接                                   | Follow IPC-A-610C standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 17  | Electrical Defect<br>(Major defect) 电气缺陷(主要缺陷) | <p>The below defects must be rejected.</p> <p>17.1 Missing vertical / horizontal segment,</p> <p>17.2 Abnormal Display.</p> <p>17.3 No function or no display.</p> <p>17.4 Current exceeds product specifications.</p> <p>17.5 LCD viewing angle defect.</p> <p>17.6 No Backlight.</p> <p>17.7 Dark Backlight.</p> <p>17.8 Touch Panel no function.</p> <p>17.9 Dark Dot –one Allowed.</p> <p>17.10 Bright Dot – one Allowed.</p> <p>Remark:</p> <p>1. A pixel defect is acceptable if one color is none functional and causes a bright dot. The display may have one case where one color is out and cause a dark dot.</p> <p>2. Bright dot caused by scratch and foreign object accords to item1.</p>                                                                                              |
| 18  | Light leak 漏光                                  | Yellow light OK; White light, According to the limit sample                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Remark: Visual and cosmetic defects are rejectable only if these fall within the LCD viewing area.

## 10.5 Classification of Defects 缺陷的分类

Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

## 10.6 Identification/marketing criteria 识别/评分标准

Any unit with illegible / wrong /double or no marking/ label shall be rejected.

## 10.7 Packing 包装

10.7.1 There should be no damage of the outside carton box, each packaging box should has label in the correct location per packing drawing requirement.

10.7.2 All direct package materials shall offer ESD protection.

# 11 Reliability Specification 可靠性规范

| Item<br>项目                                                      | Condition<br>条件                                                       | Cycle Time<br>周期时间 | Quantity<br>数量      | Remark<br>备注 |
|-----------------------------------------------------------------|-----------------------------------------------------------------------|--------------------|---------------------|--------------|
| Constant Temp. and Constant Humidity Operation Test<br>恒温恒湿运行试验 | 60°C,90%RH                                                            | 128hrs             | --                  | *1           |
| High Temp. Operation Test<br>高温操作试验                             | +70 °C                                                                | 128hrs             | --                  |              |
| Low Temp. Operation Test<br>低温操作试验                              | -30 °C                                                                | 128hrs             | --                  |              |
| High Temp. Storage Test<br>高温存储试验                               | +80 °C                                                                | 128hrs             | --                  |              |
| Low Temp. Storage Test<br>低温存储试验                                | -40 °C                                                                | 128hrs             | --                  |              |
| Thermal Shock Test 热冲击试验<br>(Non-operation)                     | -40 ~+80 °C<br>dwell time=0.5hr                                       | 50cycles           | --                  | *2, *3       |
| ESD Test(end product)<br>ESD 测试(最终产品)                           | 150pF, 330Ω,<br>±2KV,Contact<br>150pF, 330Ω, ±6KV, Air                | 10times            | --                  |              |
| Vibration Test(for packaging) 振动<br>测试(包装)                      | Frequency: 10Hz to 55Hz<br>to10Hz,Swing:1.5mm,time:<br>X,Y,Z each 2H. | 6hrs               | One inner<br>carton | *4           |

Note 1. For humidity test, DI water should be used.

Inspection Standard: Inspect after 1-2hrs storage at room temperature, the sample shall be free from the following defects:

- Air bubble in the LCD
- Seal Leakage
- Non-display
- Missing Segment
- Glass Crack
- IDD is greater than twice initial value.

- Others as per QA Inspection Criteria

Note 2. No defect is allowed after testing

The End Product ESD value is only indicative and depends on customer ESD protection design for the whole system.

Note 3. ESD should be applied to LCD glass panel, not other areas (such as on IC and so on) IDD should be within twice initial value.

In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

Note 4. Only upon request.

## 12 Precautions and Warranty 注意事项和保证

### 12.1 Safety 安全

12.1.1 The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

12.1.2 Since the liquid crystal cells are made of glass, do not apply strong impact on them.

Handle with care.

### 12.2 Handling 处理

12.2.1 Reverse and use within ratings in order to keep performance and prevent damage.

12.2.2 Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

### 12.3 Operation 操作

12.3.1 Do not drive LCD with DC voltage

12.3.2 Response time will increase below lower temperature

12.3.3 Display may change color with different temperature

12.3.4 Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

### 12.4 Static Electricity 静电

12.4.1 CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.

12.4.2 The normal static prevention measures should be observed for work clothes and benches.

12.4.3 The module should be kept into anti-static bags or other containers resistant to static for storage.

### 12.5 Limited Warranty 有限质量保证

12.5.1 Unless otherwise agreed between HuaXia RGB Display and customer, HuaXia RGB Display will replace or repair any of its LCD and LCM which HuaXia RGB Display found to be defective electrically and visually when inspected in accordance with HuaXia RGB Display Quality Standards, for a period of one year from date of shipment.

12.5.2 The warranty liability of HuaXia RGB Display is limited to repair and/or replacement. HuaXia RGB Display will not be responsible for any consequential loss.

12.5.3 If possible, we suggest you use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

## 13 Packaging 包装

TBD

## 14 Prior Consult Matter 免责声明

1. For HuaXia RGB Display standard products, we keep the right to change material, process for improving the product property without prior notice to our customer.

2. For OEM products, if any changes are needed which may affect the product property, we will consult with our customer in advance.

3. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

### Reference 参考

| Item 项目               | Description 描述       | Revision 修订 |
|-----------------------|----------------------|-------------|
| CH13726               | IC Data sheet        | V0          |
| CST3640               | IC Data sheet        | V1          |
| Panel 4.0 寸 1080X1240 | LCM assembly drawing | V1          |