Request information

# PRODUCT SPECIFICATION

# TFT-LCD MODULE

## Module No: 1000048-01

☑ Preliminary Specification

☐ Approval Specification

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

## Final Approval by Customer

| Approved by | Comment |
|---|---|
| | |

For more information, contact us:

**WWW.DCLTEK.COM | 1-800-407-8917 | SALES@DCLTEK.COM**

※The specification of “TBD” should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

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# 1.Document Revision History

| Version | Contents | Date | Note |
|---|---|---|---|
| V0 | Original | 2023.11.06 | |
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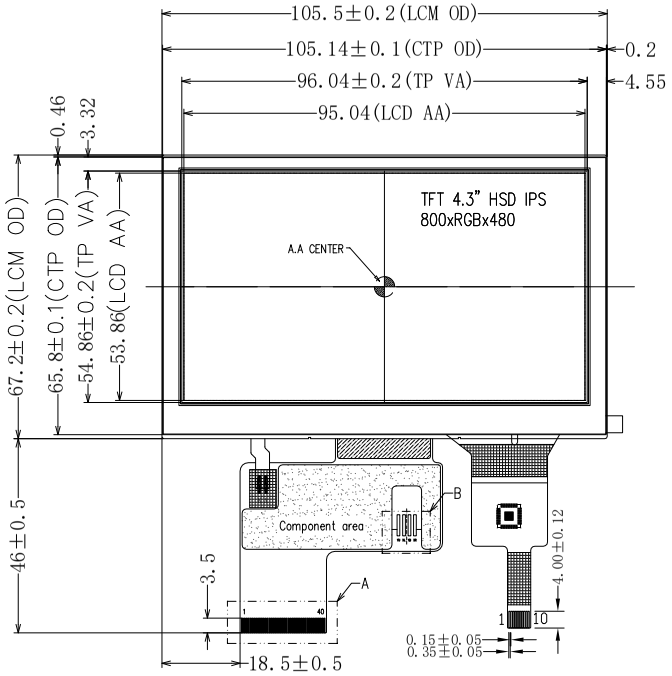
## 2. General Description

| No | Item | Specification | Unit |
|---|---|---|---|
| 1 | Screen Size | 4.3 | inch |
| 2 | LCD Type | TFT | |
| 3 | LCD manufacturer | - | |
| 4 | Viewing Direction | ALL | Best Image |
| 5 | Display Mode | 800RGB（H）X480 （V） | |
| 6 | Resolution | Normally Black | Pixel |
| 7 | Active Area | 95.04（H）*53.86（V） | mm |
| 8 | Outline Dimension | 105.5*67.2*3.85 | mm |
| 9 | Driver IC | - | |
| 10 | Interface | RGB | |
| 11 | Back Light | White Led*16 | |
| 12 | With or Without Touch Panel | Without | |

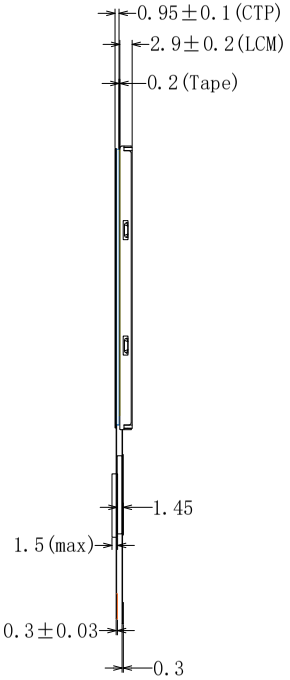
## 3. Outline Dimension

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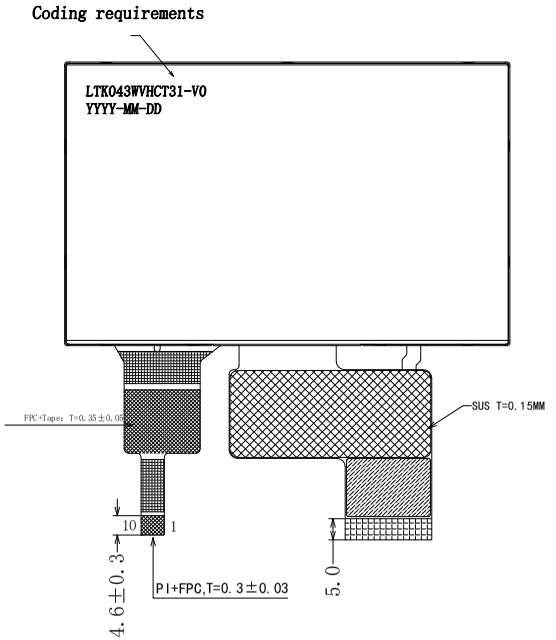
# Front View




# Side View




# Back View

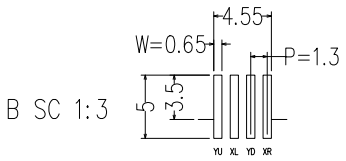



| PIN NO | DINFINATION |
|---|---|
| 1 | VSS |
| 2 | VDD |
| 3 | SCL |
| 4 | NC |
| 5 | SDA |
| 6 | NC |
| 7 | /RESET |
| 8 | NC |
| 9 | /INT |
| 10 | VSS |

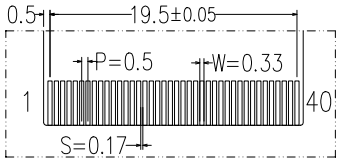
| Property | Requirement |
|---|---|
| IC | FT5436iGQQ |
| Glass Thickness | 0.25(PC) |
| Sensor Thickness | 0.55 |
| Surface Hardness | 2H |
| Light Transmission | ≥85% |
| Operating Temperature | -10~60℃ |
| Storage Temperature | -20~70℃ |
| Operating Humidty | 45~85%RH |
| Storage Humidity | 45~95%RH |

Technical parameters:
1. IC model: FT5436iGQQ
2. Working voltage: 2.8V-3.3 V;
I2C communication voltage 2.8V-3.3 V
3. Transmittance: ≥ 80%
4. Structure: P+G, surface hardness: 2H
5. Working environment: -10 ℃~+60 ℃, ≤ 90% RH
6. Storage environment: -20 ℃~+70 ℃, ≤ 90% RH
7. Unmarked dimensional tolerance is ± 0.2mm
8. Comply with ROHS environmental requirements.

Notes:
1. Display : 4.3″, TFT
2. Resolution: 800xRGBx480
3. LCD Viewing Direction: ALL,
5. Display Mode: Normally Black/Transmissive
6. LCM+CTP Bringhtness: 650cd/㎡(TYP),uniformity≥80%
7. unmark Tolerance:±0.2
8. OPERATING TEMP: -10° C~ +60° C
9. STORAGE TEMP: -20° C~ +70° C
10. Requirements on Environmental Protection: ROHS




B SC 1:3




A SC 1:3




CURRENT IF=40mA
8c*2b=16LED

*Display Pin interface*

| | |
|---|---|
| 1 | LEDK |
| 2 | LEDA |
| 3 | GND |
| 4 | VCC |
| 5-12 | R0-R7 |
| 13-20 | G0-G7 |
| 21-28 | B0-B7 |
| 29 | GND |
| 30 | CLK |
| 31 | DISP |
| 32 | HSYNC |
| 33 | VSYNC |
| 34 | DEN |
| 35 | NC |
| 36 | GND |
| 37 | XR |
| 38 | YD |
| 39 | XL |
| 40 | YU |

| REV | DESCRIPTION | DATE | NAME |
|---|---|---|---|
| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | NEW | 2023.11.07 | |

| | | | | | |
|---|---|---|---|---|---|
| SCALE:1/1 | UNIT:mm | PAGE:1/1 | | Approve | Check | Drawn |
| Part No: | 1000048-01 | | VER:V0 | | | |
| Customer No: | | | | | | |

# 4. Interface Specification

| NO. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | LEDK | Backlight LED Cathode | |
| 2 | LEDA | Backlight LED anode | |
| 3 | GND | System Ground | |
| 4 | VCC | Power supply for logic operation | |
| 5~12 | R0~R7 | Data bus | |
| 13~20 | G0~G7 | Data bus | |
| 21~28 | B0~B7 | Data bus | |
| 29 | GND | System Ground | |
| 30 | CLK | Pixel clock signal | |
| 31 | DISP | Display on/off control | |
| 32 | HSYNC | Horizontal Sync signal | |
| 33 | VSYNC | Vertical Sync signal | |
| 34 | DEN | Data Enable | |
| 35 | NC | NC | |
| 36 | GND | System Ground | |
| 37 | XR | Touch Panel Control Pin | |
| 38 | YD | Touch Panel Control Pin | |
| 39 | XL | Touch Panel Control Pin | |
| 40 | YU | Touch Panel Control Pin | |

# 5. Absolute Maximum Ratings

5.1 Electrical Absolute Rating

| Item | Symbol | Min. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Power supply voltage | $DV_{DD}$ | -0.3 | 5 | V | GND=0 |
| Logic Signal Input Level | $V_I$ | -0.3 | $DV_{DD}$ +0.3 | V | |

Note (1) Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device.

These are stress ratings only. Functional operation of this device at indicated in the operational sections(6.1) of this specification.

# 6.LED Backlight Specification

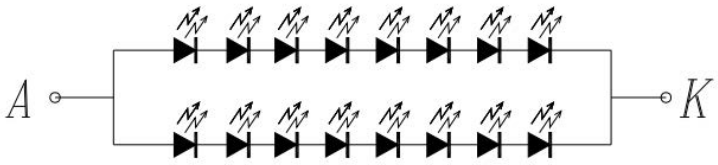
| Item | Symbol | Min | Typ | Max | Unit | Test Condition | Note |
|---|---|---|---|---|---|---|---|
| LED Current | IF | - | 40 | – | mA | - | - |
| LED Voltage | VF | - | 25.4 | – | V | IF=40mA | - |
| Luminance | LV | - | 650 | – | cd/m2 | IF=40mA | - |
| Life Time | | | 25000 | – | Hr. | IF 40mA | - |
| Color | WHITE | | | | | | |

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation

should be restricted to the conditions described under normal operating conditions.

(2)Ta=25±2℃

(3)Test condition: LED Current 40mA




CURRENT IF=40mA
8c*2b=16 LED

# 7.Optical Specification

| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Response time | Tr+Tf | Θ=0O Ø=0o Ta=25˚C | - | 30 | - | ms | |
| Contrast ratio | Cr | | 640 | 800 | | | |
| Color gamut | S（%） | | - | - | | % | |
| Luminance uniformity | WHITE | | 80 | | | % | |
| Viewing angle range | Θx+ | CR≧10 Ta=25˚C | 70 | 80 | | deg | |
| | Θx- | | 70 | 80 | | deg | |
| | Θy+ | | 70 | 80 | | deg | |
| | Θy- | | 70 | 80 | | deg | |
| LCM Luminance | LV | Θ=0o Ø=0o Ta=25˚C | - | 650 | - | | |
| CIE(X,Y)Chromaticity | White(X) | | 0.285 | 0.325 | 0.365 | | |
| | White(Y) | | 0.305 | 0.345 | 0.385 | | |

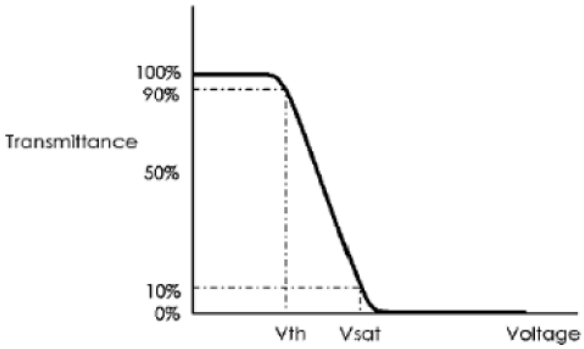
## 7.1 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2℃
- 30min. warm-up time.

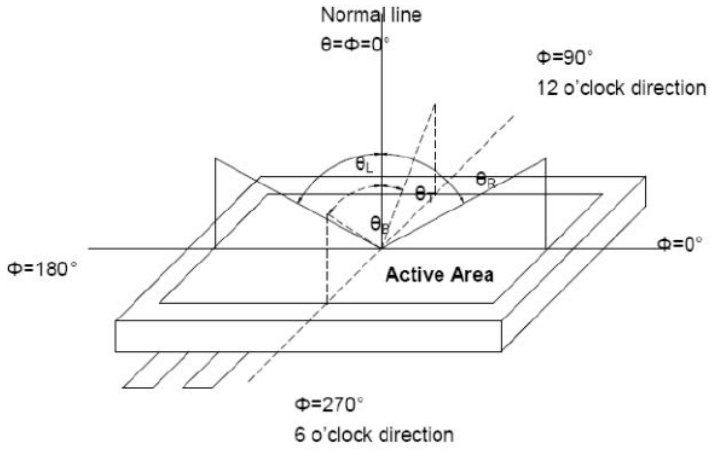
## 7.2 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

Note (1) Definition of Vsat and Vth (at 20℃)

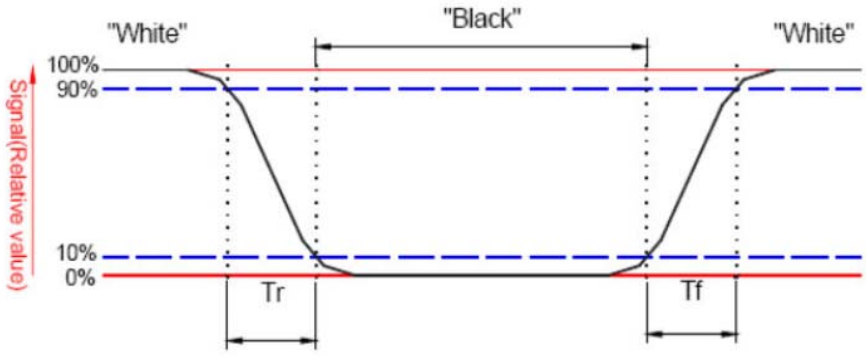



Note (2) Definition of Viewing Angle :




Note 3: Definition of response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.




Note 4: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

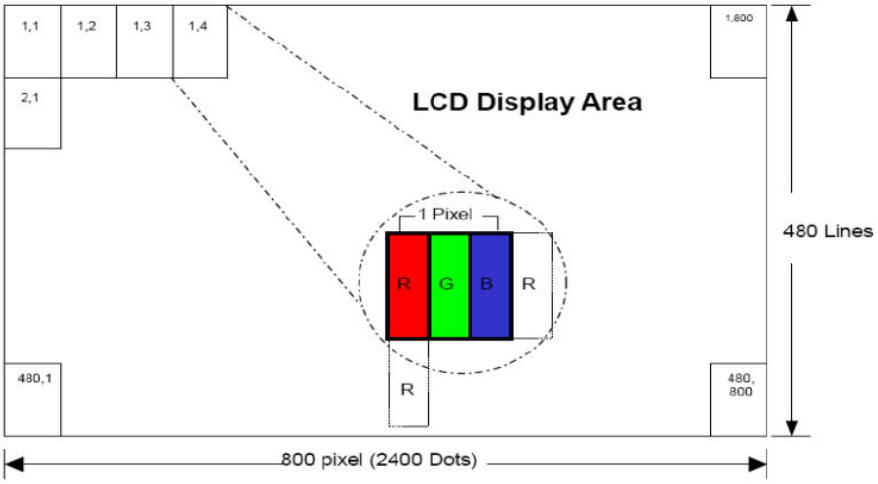
$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Note 5: Definition of color chromaticity (CIE 1931)

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.

## 7.3 Block Diagram

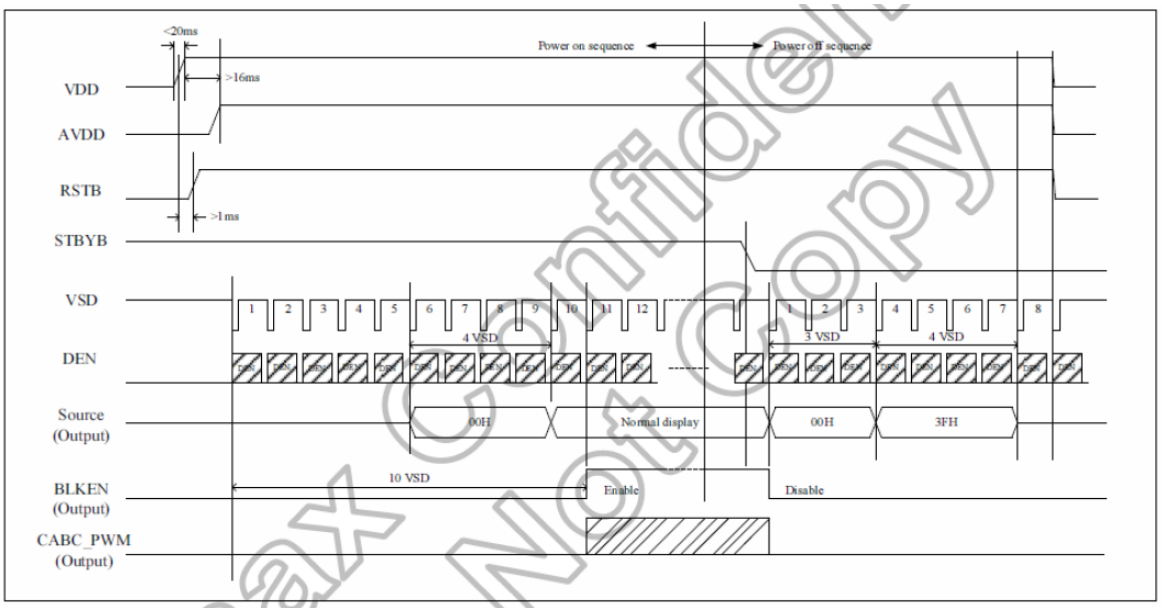
### TFT-LCD Module




## 8. Electrical Characteristics

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Supply Voltage | DVDD | 3.0 | 3.3 | 3.6 | V | |

### 8.1 TFT-LCD Power on/off Timing Sequence




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8.2 Timing Diagram of Interface Signal

AC Electrical Characteristics

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| HS setup time | $T_{hst}$ | 8 | - | - | ns |
| HS hold time | $T_{hhd}$ | 8 | - | - | ns |
| VS setup time | $T_{vst}$ | 8 | - | - | ns |
| VS hold time | $T_{vhd}$ | 8 | - | - | ns |
| Data setup time | $T_{dsu}$ | 8 | - | - | ns |
| Data hold time | $T_{dhd}$ | 8 | - | - | ns |
| DE setup time | $T_{esu}$ | 8 | - | - | ns |
| DE hold time | $T_{ehd}$ | 8 | - | - | ns |
| VDD Power On Slew rate | $T_{POR}$ | - | - | 20 | ms |
| RSTB pulse width | $T_{Rst}$ | 10 | - | - | us |
| CLKIN cycle time | $T_{cph}$ | 20 | - | - | ns |
| CLKIN pulse duty | $T_{cwh}$ | 40 | 50 | 60 | % |
| Output stable time | $T_{sst}$ | - | - | 6 | us |

8.3Data Input format

- **Horizontal timing**

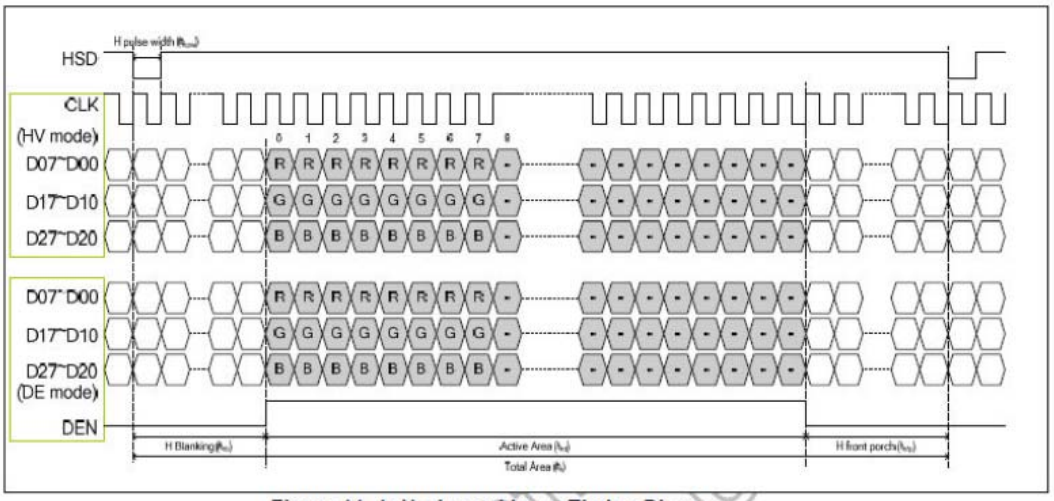



**Figure 11. 1: Horizontal Input Timing Diagram**

- **Vertical timing**

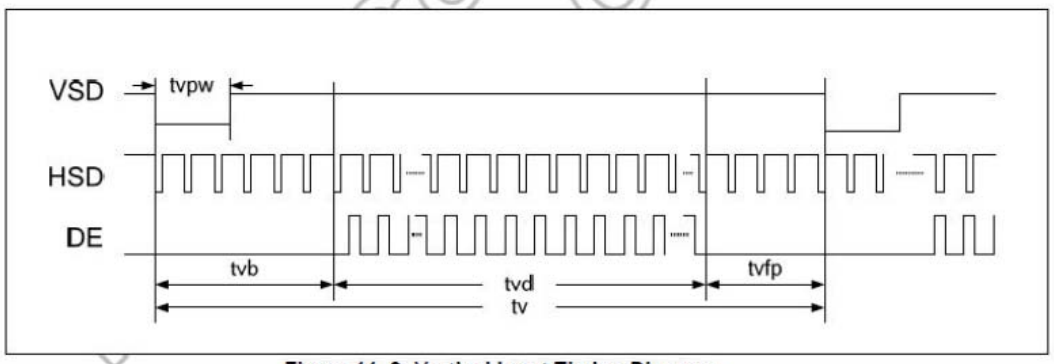



**Figure 11. 2: Vertical Input Timing Diagram**

8.4 Timing

- **Horizontal timing**

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Horizontal Display Area | thd | | 800 | | DCLK |
| DCLK frequency | fclk | - | 30 | 50 | MHz |
| One Horizontal Line | th | 889 | 928 | 1143 | DCLK |
| HS pulse width | thpw | 1 | 48 | 255 | DCLK |
| HS Back Porch (Blanking) | thb | | 88 | | DCLK |
| HS Front Porch | thfp | 1 | 40 | 255 | DCLK |
| DE mode Blanking | th-thd | 85 | 128 | 512 | DCLK |

- **Vertical timing**

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Vertical Display Area | tvd | | 480 | | $T_H$ |
| VS period time | tv | 513 | 525 | 767 | $T_H$ |
| VS pulse width | tvpw | 3 | 3 | 255 | $T_H$ |
| VS Back Porch (Blanking) | tvb | | 32 | | $T_H$ |
| VS Front Porch | tvfp | 1 | 13 | 255 | $T_H$ |
| DE mode Blanking | tv-tvd | 4 | 45 | 255 | $T_H$ |

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# 9.Reliability Test Items

| Item | Test Condition | Criterion |
|---|---|---|
| High Temperature Operation | +60 ℃, 48 hrs | Note1，Note2 |
| High Temperature Operation | -10 ℃, 48 hrs | |
| High Temperature Storage | -70 ℃, 48 hrs | |
| Low Temperature Storage | -20 ℃, 48 hrs | |
| High Temp. & High Humidity Storage | 40 ℃, 90％ RH, 48hrs | |
| Thermal Shock (Static) | -20℃, 30 min /60℃, 30 min, 100 cycles | |

Note1:Evaluation should be tested after storage at room temperature for two hours.

Note2:

Pass: Normal display image no line defect.

Fail: No display image, or line defects.

Partial transformation of the module parts should be ignored.

# 10.Precautions

Please pay attentions to the followings as using the LCD module.

**Handling**

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display s urface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean t he display surface. It might damage the touch panel surface permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(i) Do not disassemble the LCD module.

(j) Do not lift the FPC of Touch Panel.

**Storage**

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive w eight will cause deformation and damage of carton box.

Operation (a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms stated above should always obeyed to avoid damaging the LSI an d electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cau se non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

(h) Most of the touch screens have air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the liq uid is accumulated near the air vent.

(i) For the fragility of ITO film, it should avoid to use too tapering pen as the input material.

**Touch Panel Mounting Notes**

(a) If a cushion is used between bezel/housing and film must be choose as free as enough to absorb t he expansion and contraction to avoid the distortion of film.

(b) The cushion must be placed out of the Viewing Area.

(c) Bezel/Housing edge must be posited between Key Area and Viewing Area. The edge enters the Ke y Area may cause unexpected input if the gap is too narrow or foreign particles like dusts exist be tween Bezel/Housing and ITO film.

(d) Mounting example:

The corner part has conductivity. Do not touch any metal part after mounting.

**Others**

a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the di splay surface.

c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic c harge can be minimized

# 11.HSF Requirements

☑ RoHS( Restriction of the use of certain Hazardous Substances)

☐HF (Halogen Free)

☐REACH (Regulation the Registration, Evaluaton, Authorization and Restricton of Chemicals)

☐ Other regulations

# 12.Packaging diagram

TBD

## 1. PCBA Product introduction and picture :

LUA-UT31-A1-V0 based 4.3-inch 800×480 pixel lattice, 16.2M screen, capacitive touch screen, standard instruction set. (Based on LUA-UT31-A1-V0 4.3 Inches, 800xRGBx480, 16.2M Colors,IPS screen CTP, Standard instruction.)

## 2 . Record of Revision :

| Revise Date | Content | Ver. |
|---|---|---|
| 2023-010-25 | First Edition | 1.0 |

## 3. Display performance parameter

| parameter Item | data Paramete r | Instructions Description |
|---|---|---|
| **Backlight mode** | LED | ≥ 10000H (Continuous working with maximum brightness, time of brightness halves ) |
| **Display mode** | Normally black | |
| **Viewing direction** | ALL ' Clock | |
| **Color** | 16.2M | 24 bit color 8R8G8B |
| **Brightness** | TBD | 64 levels adjustment; (It's not recommend to set brightness to 1%~30% of the maximum,which may lead LCD flicker) |
| **Display size ( A.A )** | 95.04(L)*53.86(W) | 800*480 Pixel |
| **( LCM Size )** | 105.5(L)*67.2(W) | |
| **Resolution** | 800*480 | |

Note: Displaying of high-contrast still images for more than 30 minutes may result in residual images. Please add animation to avoid this problem.

## 4 .Voltage & Current:

| Item | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Power Voltage** | - | 6.5 | 12 | 36 | V |
| **Operation Current** | VCC = +12V，大 VCC = +12V, Backlight on | - | TBD | - | mA |
| | VCC = +12V，VCC = +12V, Backlight off | - | 65 | - | mA |
| Recommended power supply: 12V 1A DC | | | | | |

## 5. Reliability Test

| Item | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Working Temperature** | Humidity 60% at 12V voltage 60%RH at 5V voltage | -10 | 25 | 60 | ℃ |
| **Storage Temperature** | - | -20 | 25 | 70 | ℃ |
| **Working Humidity** | 25℃ | 10% | 60% | 90% | RH |
| **Protective Paint** | - | - | Option | - | - |

## 6． Interface

| Item | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **UserBaudrate** | User Set | 2400 | 115200 | 115200 | bps |
| **Output Voltage ( TXD )** | Output , I out = 1mA | 3.0 | 3.3 | - | V |
| **Input Voltage ( RXD )** | Input 1 , I in=1mA | 2.4 | 3.3 | 5.0 | V |
| | Input 0 , I in=-1mA | 0 | - | 0.5 | V |
| **Interface** | UART1：8N1，3.3V & 5V TTL/CMOS/485/232 | | | | |
| **Socket** | 232 | 5Pin_2.54mm 5Pin_2.54mm Socket | | 1PCS | |
| **UART Data format** | 1bit start bit -8bit data -1bit end bit 1 start bit -8 data bits- 1 stop bit | | | | |
| **USB** | Yes | | | | |

## 7． Memory

| Item | Typical value | Features | Description |
|---|---|---|---|
| FLASH | Max 1G Bits | Space of Font | Store font, icon libraries,and other binary files |
| | | Picture Storage | 262Kbytes ) Store picture(Picture quantity relate to picture size ，size of a single image file should not exceed 262Kbytes) |
| RAM | 256Kbytes | Program Variable Storage Space | Data is not saved when power down |

## 8． UI & Peripheral

| UI & Peripheral | |
|---|---|
| UI Version | Customer UI pre-installed |
| Peripheral | Resistive/Capacitive touch screen(Option) |

## 9． Packing Capacity & Dimension

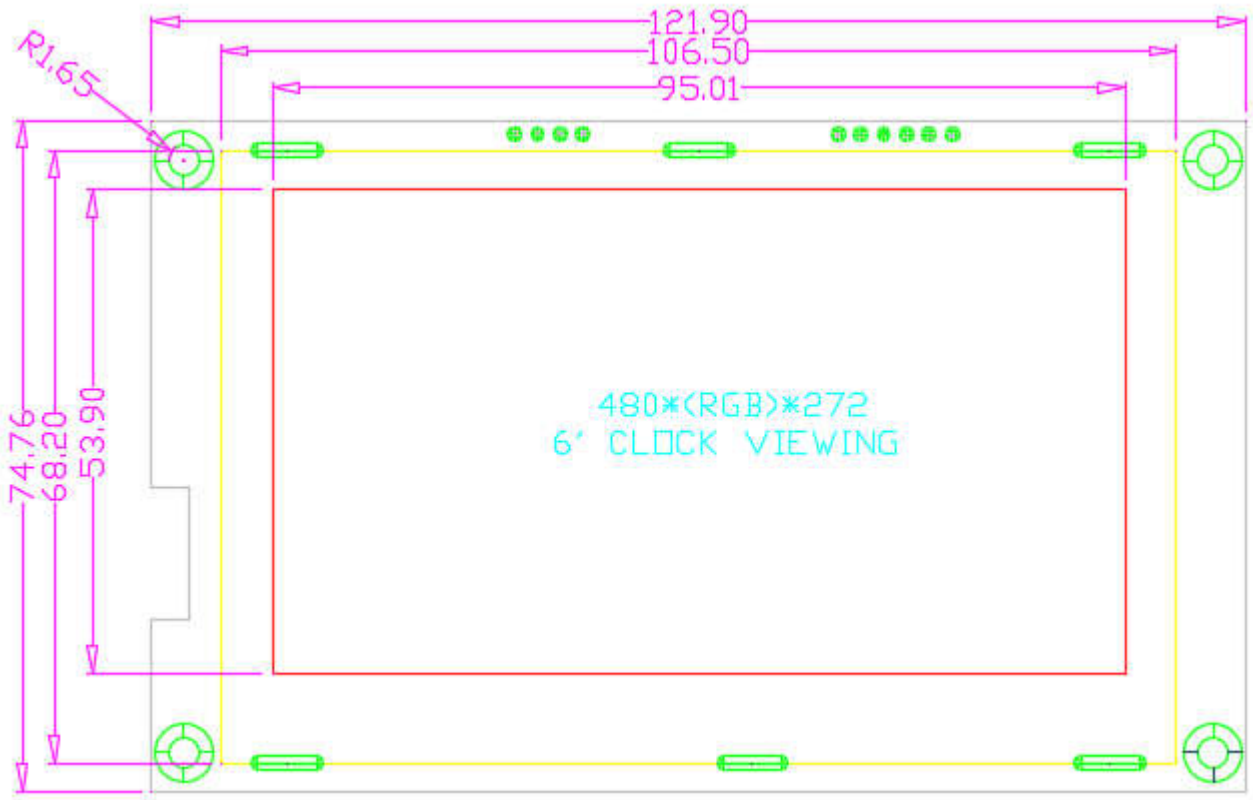
| Dimension | |
|---|---|
| Dimension | 121.9(W) ×74.76(H) × 16.1(T) mm |
| Net Weight | TBD |

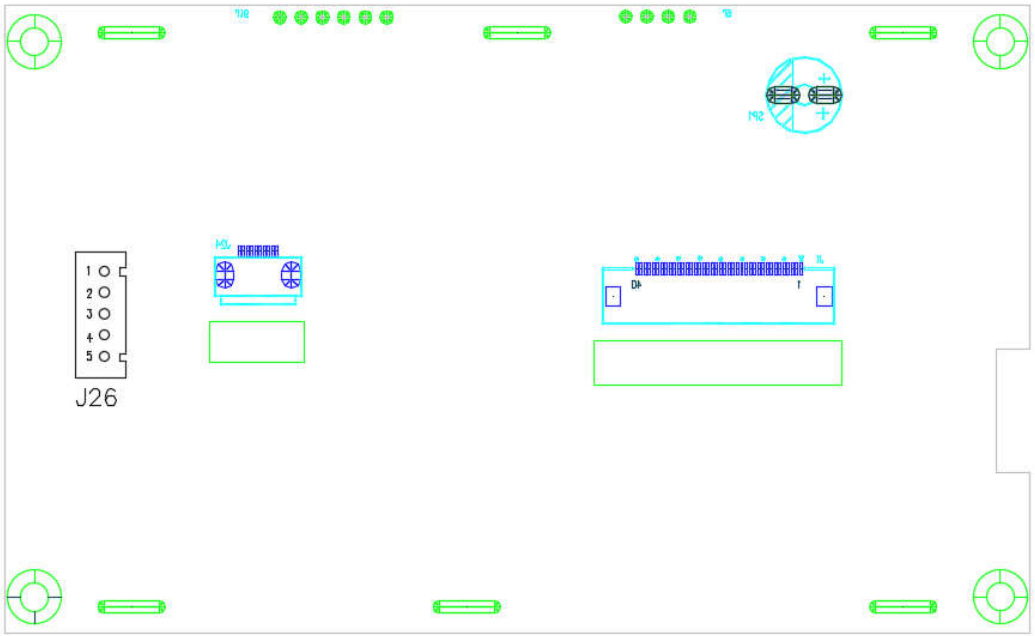
## 10． UART Pin Description：

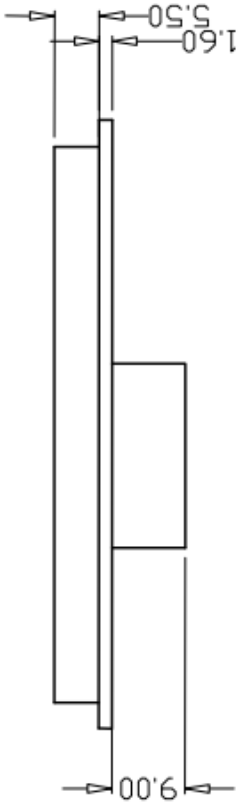
| J26(TTL) | | | |
|---|---|---|---|
| **Pin number** | **Name** | **Type** | **Description** |
| **1** | +12V | VIN | Positive |
| **2** | GND | VSS | Negative |
| **3** | GND | VSS | Negative |
| **4** | DOUT | OUT | 232 OUT |
| **5** | DIN | IN | RS232 IN |

info: the new design changes of the product will be added as time gose by, do not affect performance parameters or use without prior notice.

## 11.Outline Dimension






| Pin Assignment | |
|---|---|
| NO. | SYMBOL(J26) |
| 1 | VIN |
| 2 | GND |
| 3 | GND |
| 4 | DOUT |
| 5 | DIN |

# 深圳市丽台电子有限公司

# Quality inspection standards

# 品质允收标准

**MODEL No. / 产品型号：** **Applies 0.95~5.0 TFT-LCD Panel**
**UPDATED DATE / 生效日期：** **2022-05-20**
**VERSION / 版 本：** **A0**
**Customer Signature/客户签字：** _____

**RECORD OF REVISION/修订履历：**

| Version<br>版本 | Revision Record<br>修订内容 | Compile<br>修订者 | Date of Revision<br>修订日期 |
|---|---|---|---|
| V0 | 首发/Starting | Green | 2022.05.20 |
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## 1.Scope 1适用范围

This document shall be applied to 0.95~5.0 TFT-LCD Panel.

本文件适用于0.95~5.0 TFT-LCD Panel.

## 2.Inspection and Environment onditions/检查条件与环境

### 2. 1 Inspection Conditions 检查条件:

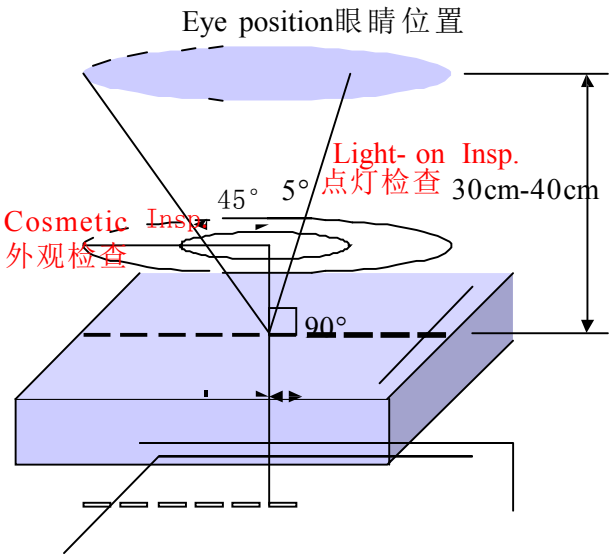
(1) Inspection Distance检测距离: 35 cm±5cm

(2) Each picture /每个画面：2~3 secs/秒，Cosmetic Inspection/外观10~12 secs/秒

(3) View Angle观看角度:

Light-on Inspection Angle点灯检验角度 ： ±45°

Cosmetic Inspection Angle外观检验角度 ： ±45°




(Perpendicular to LCD panel surface垂直于液晶显示表面)

### 2.2 Environment Conditions环境条件:

| | | |
|---|---|---|
| Ambient Temperature<br>温度 | | 25℃±5℃ |
| Ambient Humidity<br>湿度 | | 55±5%RH |
| Ambient Illumination<br>亮度 | Cosmetic Inspection<br>外观检验 | 800-1000 Lux |
| | Functional Inspection<br>点灯检验 | 200~300Lux |

### 2.3 Sampling Conditions 抽样条件:

(1) Lot Size： Quantity of shipment lot per model/.

批量：单次运送单一机型数量

(2) Sampling Method ：
抽样方法：

| Sampling Plan 抽样计划 | | GB2828/2003 |
|---|---|---|
| | | Normal Inspection, Single Sampling 正常检验、单次抽样 |
| | | Geneal II Inspection 普通二级 |
| AQL | Major Defect 主要缺点 | 0.25 |
| | Minor Defect 次要缺点 | 0.65 |

(3) The classification of Major(MA) and Minor(MI) defects is shown as 3. Inspection Criteria.
主缺(MA)及次缺(MI)定义于”3.检查标准”

## 3.Terms and Definitions/术语和定义

3.1 Classification of defects缺陷的分类:

Major defects: A major defect is a defect that is likely to result in failure, or to reduce materially the usability of the product for its intended purpose.

主要缺陷：会导致产品功能失效或减少产品可用性的缺陷。

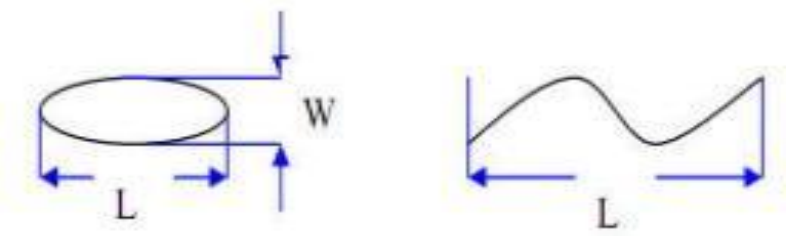
Minor defects: A minor defect either is a defect that is not likely to reduce materially the usability of the product for its intended purpose, or is a departure from an established having little bearing on the effective use or operation of the product.

次要缺陷：不会导致产品功能失效，不会减少产品的有效使用和操作。

3.2 Extraneous substances that can be wiped out ,like Finger point,Particles are not cnsidered as a defect . 可以被擦拭干净的表面物质不视为缺陷 (如手指印，尘粒) 。

3.3 Defects on the Black Matraix(outside ofActive Area) are not considered as a defect . BM 区域 (AA 区以外) 的缺陷不视为缺陷。

3.4 Size of circular defect,is defined by diameter”D” 。The defect average diameter D=1/2(W+L) 圆形缺陷的大小是由直径 D 定义的。缺陷的平均直径 D=1/2(W+L)



3.5 When defect size L≥2W,the defect count as liner type defect.Size of linear defect is defined by length(L) and the maximum width(W).

当缺陷尺寸 L≥2W 时，被视为线状缺陷。线状缺陷是由长度 (L) 和最大宽度 (W) 定义的。 3.6 3.6 Mura criteria :judged by ND filter6%,and can't be seen under at ND filter 6% .

3.6 MURA 判断标准：使用 ND6%判定，且透过 ND6%，遮住不可见.

3.7 Dot defect is defind as the defective area of the dot is larger than 50% of the dot area and is visible through 6% ND filter

DOT 定义为点缺陷面积大于 50% DOT 面积, 且透过 ND6%遮住是可见的.

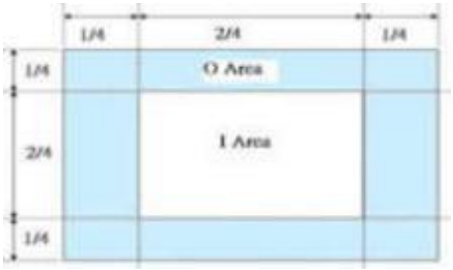
The drawing of 1/2 area sub-pixel definition: The 1/2 area sub-pixel can be defined as below one or more of specific shapes

1/2 面积的子像素定义绘图：1 / 2 面积的子像素可以定义为如下一个或多个特定形状图：



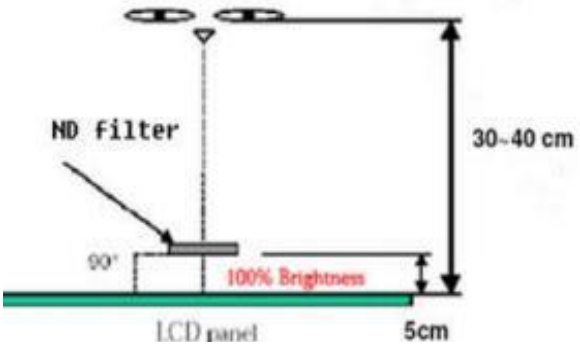
3.8 A dot defect that is smaller than the defined dot defect will be treated as small bright dot. 细碎亮点：小于"DOT 定义"的点缺陷视为细碎亮点。

I 区与 O 区比例：1：2：1




3.9 Inspection method of ND Filter - holding ND filter in front of the panel around 5cm and examine the panel from 35±5 cm in the front view for 2~3 second.

ND 卡的检查方法：在面板上方大约 5CM 处握住 ND 卡，眼睛距离面板 30-40CM，通过 2~3 秒观察。



## 4. Inspection Criteria 检验标准

4.1 Appearance Inspection specification 外观检查规格:

| Judge area 区域 | Judge item 项目 | Specification inspection 检查规格 | Judge criterion | |
|---|---|---|---|---|
| | | | Major | Minor |
| Silicone 硅胶 | Silicone spread 硅胶涂布 | The height can't over C/F , color filter , or gomu 高度不能过超 C/F | | MI |
| | Silicone residue 硅胶残余 | Can't cover polarizer, FPC …etc. 不能覆盖 POL, FPC 等 | | MI |
| LCD 玻璃 | Wire(on Array) 线路 | No damage 不能损伤 | MA | |
| | Edge 边缘 | No extended crack 不可有延伸性裂纹 | MA | |
| PCBA Connector FPC/FFC | Appearance 外观 | Scratch or damage result in copper expose is not allowed 划伤或损伤不允许导致出现露铜 | | MI |
| | Component 零件 | No damage 不能损伤 | MA | |
| | Connection status 连接状况 | Need correct connection 需要正确连接 | MA | |
| | Broken 破裂 | Not allowable 不允许 | MA | |
| | Folding sign 对位记号折叠 | Not allowable 不允许 | MA | |
| POL 偏光片 | Scract on the polarizer 偏光片划伤 | 1.W≤0.05mm; L≤5mm, Ignore (忽略) | | MI |
| | | 2.0.05mm<W≦0.10mm ; L≤5mm ; N≤3 ; DS≥10mm | | |
| | | 3.0. 10mm＜W; 5mm＜ L , Not allowable不允许 | | |

| Judge area<br>区域 | Judge item<br>项目 | Specification inspection<br>检查规格 | Judge criterion | |
|---|---|---|---|---|
| | | | Major | Minor |
| POL<br>偏光片 | Dent on the polarizer<br>偏光片凹痕 | 1.D＜0. 15mm，Ignore（忽略） | | MI |
| | | 2.0.15mm＜D≤0.30mm；N≤3；DS≥10mm | | |
| | | 3.0.30mm＜D，Not allowable不允许 | | |
| | POL Linear bubble<br>线状气泡 | 1.W≤0.05mm；L≤5mm，Ignore（忽略） | | MI |
| | | 2.0.05mm<W≦0.10mm ; L≤5mm ; N≤3 ; DS≥10mm | | |
| | | 3.0. 10mm＜W；5mm＜ L ，Not allowable不允许 | | |
| | POL dot bubble<br>点状气泡 | 1.D＜0. 15mm，Ignore（忽略） | | MI |
| | | 2.0.15mm＜D≤0.30mm；N≤3；DS≥10mm | | |
| | | 3.0.30mm＜D，Not allowable不允许 | | |
| | POL edge bubble<br>片边缘气泡 | 1. The display area is 1/2BM outside，Not allowable<br>显示区往外 1/2BM 区域内，不允许<br>2. The display area is outside the outer 1/2BM area，Not allowable<br>显示区往外1/2BM区域以外，不管控 | | MI |

| Judge area<br>区域 | Judge item<br>项目 | Specification inspection<br>检查规格 | Judge criterion | |
|---|---|---|---|---|
| | | | Major | Minor |
| TP&CG | Foreign Material in spot shape<br>点状异物 | 1.D≤0.15mm；Ignored（忽略）<br>2.0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3.D＞0.30mm；Not allowable不允许 | | MI |
| | Fisheye/bubbles<br>鱼眼/气泡 | 1.D≤0.15mm；Ignored（忽略）<br>2.0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3.D＞0.30mm；Not allowable不允许 | | MI |
| | Scratches on the surface<br>表面划伤 | 1.W≤0.05mm；Ignored（忽略）<br>2.0.05mm<W≤0.10mm，L≤5mm；N≤3；DS≥10mm<br>3.W＞0.10mm，L＞5mm；Not allowable不允许 | | MI |
| | Collapse corner、Crash edge<br>崩角、崩边 | Product front:/产品正面：<br>collapse corners, collapsed edges are not allowed<br>崩角、崩边不允许；<br>Product back/产品背面：<br>X≤ 0.5 , Y≤0.5，Z≤1/2T；N≤2；DS≥10mm | MA | |
| | Printed fonts/LOGO<br>丝印/LOGO | Printed fonts/LOGO clarity、complete、content right<br>字体/LOGO丝印清晰、完整、内容正确 | | MI |
| | Broken<br>破损 | Not allowable不允许 | MA | |
| | Dirty surfaces<br>表面脏污 | Dirt cannot be wiped， Not allowable<br>不可擦拭的脏污，不允许 | | MI |
| | IR hole<br>IR孔 | Black spots/黑点：<br>W ≤0.15mm，N≤2，Not visible against a black background/黑色背景下不可见 | | MI |
| | | IR hole Scratches：<br>1.W＜0.03mm，Ignored（忽略）<br>（Dense points Not allowable 不允许密集）；<br>2.0.03mm＜W≤0.08mm；L≤2mm；N≤2；<br>3.W＞0.08mm，L＞2mm，Not allowable 不允许 | | MI |

4.2 Electrical Inspection specification电性检查规格:

| Item<br>项目 | Judgment Criteria<br>判定标准 | Judge criterion | |
|---|---|---|---|
| | | Major | Minor |
| LCD Bright /Dark dot<br>玻璃亮点/暗点 | 1.D≦0. 15mm， Ignored（忽略），Not dense（不可密集）<br>2.0.15mm<D≦0.30mm ； N≦3 ； DS≥10mm<br>3.D＞0.30mm ，Not allowed/不允许 | | MI |
| Mura | Invisible through 6% ND filter，200~300Lux<br>透过ND6% 遮住 ， 目测不可见即为OK， 200~300Lux | | MI |
| Small bright dot<br>细碎亮点 | Not allowed if it can be observed<br>through ND Filter6%<br>透过ND6%目测看得见，不允许 | | MI |
| ZBD Rate<br>玻璃亮点比率 | 90:10 | | MI |
| Light Leakage<br>漏光 | Invisible through 6% ND filter，OK<br>透过ND6%遮住目测不可见即为OK<br>If necessary,set up set up Limit Sample.<br>如果有必要，可制订限度样品 | | MI |
| Bubble in Cell (LC Bubble/Actice Area)<br>CELL气泡<br>(AA区LCD气泡) | Eyes should not find it .<br>目视观察不可见，视为 OK | MA | |

| Item<br>项目 | Judgment Criteria<br>判定标准 | Judge criterion | |
|---|---|---|---|
| | | Major | Minor |
| Foreign Material in spot shape<br>点状异物 | 1.D≦0.15mm， Ignored（忽略）<br>2.0.15mm<D≦0.30mm ； N≦3； DS≥10mm<br>3.D＞0.30mm ， Not allowable/不允许 | | MI |
| Foreign Material in line or spiral shape<br>线状异物 | 1.W≦0.05mm ， Ignored（忽略）<br>2. L≤5mm ； 0.05mm<W≦0.10mm ； N≦3<br>3.W＞0.10mm ； L＞5mm ， Not allowable/不允许 | | MI |
| White dot in back-light<br>白点 | 1.D≦0. 15mm，Ignored（忽略）<br>2.0.15mm<D≦0.30mm ； N≦3 ； DS≥10mm<br>3.D＞0.30mm ， Not allowed/不允许 | | MI |
| TP no touch<br>无触摸 | Not allowable<br>不允许 | MA | |
| Abnormal Disply<br>显示异常 | Not Allowed<br>不允许 | MA | |
| NO display<br>无显示 | Not Allowed<br>不允许 | MA | |
| Line Defect<br>缺线 | Not Allowed<br>不允许 | MA | |
| Angle of view error<br>视角错误 | Not Allowed<br>不允许 | MA | |
| Tect crostalk<br>不消失的残影 | Not Allowed<br>不允许 | MA | |