Request information

# PRODUCT SPECIFICATION

# TFT-LCD MODULE

## Module No: 312254-01

☑ 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 | Initial version | 2022.12.21 | |
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## 2. General Description

| N0 | Item | Specification | Unit | Remark |
|---|---|---|---|---|
| 1 | LCD Size | TFT"3.97 | inch | - |
| 2 | Panel Type | TN | - | - |
| 4 | Display Resolution | 480(H) x(RGB)800 (V) | pixel | - |
| 5 | Display mode | Normally White | - | - |
| 6 | Display colors | 16.7M | - | - |
| 7 | Viewing Direction | 6. O'CLOCK | - | - |
| 8 | CTP+LCM Outline Dimension | 67.51(H) x 110.55(V) x3.7 (T) | mm | Note |
| 9 | Active Area | 51.84(H) x 86.40 (V) | mm | Note |
| 10 | Pixel Pitch | 0.108(H) x(RGB)x 0.108 (V) | mm | - |
| 11 | Weight | TBD | g | - |
| 12 | Driver IC | - | bit | - |
| 13 | Light Source | White LED | - | - |
| 14 | Interface | 2 lines MIPI | - | - |

## 3.Mechanical Drawing

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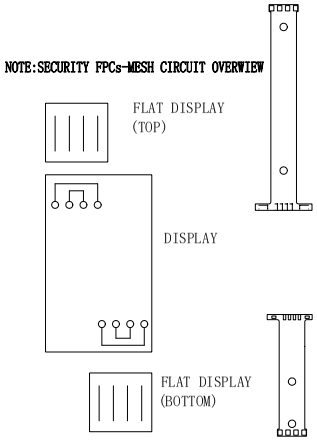
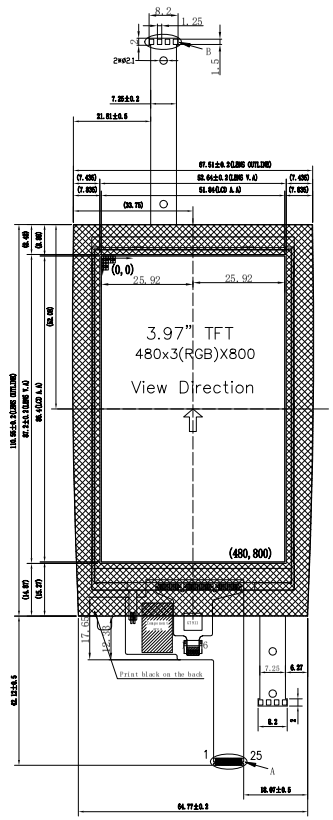
# LCM+CTP

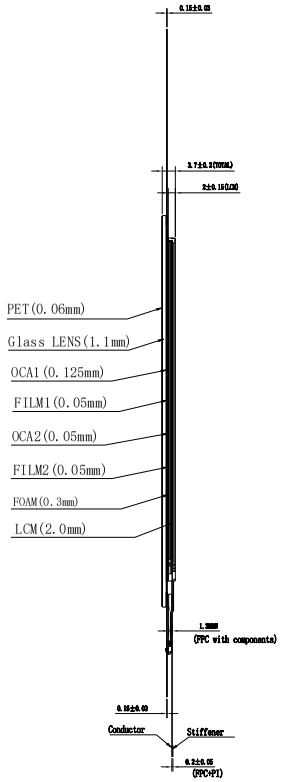
NOTE:SECURITY FPCs-MESH CIRCUIT OVERWIEW



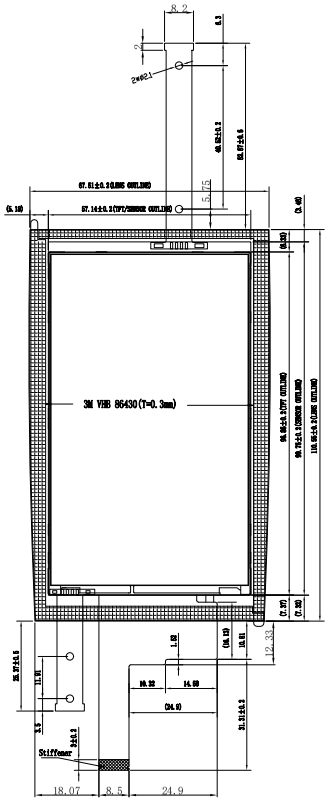

## Front View




## Side View



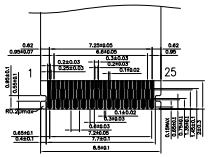

## Back View




| PIN | SYMBOL |
|---|---|
| 1 | CTP_GND |
| 2 | CTP_VDD_3.3V |
| 3 | CTP_SCL |
| 4 | CTP_SDA |
| 5 | CTP_INT |
| 6 | CTP_RST |
| 7 | GND |
| 8 | GND |
| 9 | MIPI_DON |
| 10 | MIPI_DOP |
| 11 | GND |
| 12 | MIPI_CLKN |
| 13 | MIPI_CLKP |
| 14 | GND |
| 15 | MIPI_D1N |
| 16 | MIPI_D1P |
| 17 | GND |
| 18 | /RESET |
| 19 | TE |
| 20 | VDDIO_1.8V |
| 21 | VCC_3.3V |
| 22 | NC |
| 23 | LEDA |
| 24 | NC |
| 25 | LEDK |

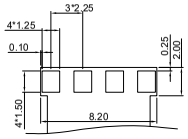
CTP+LCM:Air bonding structure

| Property | Requirement |
|---|---|
| IC | GT911 |
| LENS Thickness | Glass1.1mm |
| Sensor Thickness | 0.275mm (ITO-FILM) |
| Surface Hardness | 6H |
| Transmittance | ≥80% |
| Operating Temperature | -10~60℃ |
| Storage Temperature | -20~70℃ |

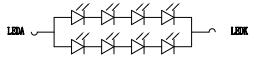



DETAIL A
SCALE 4:1

CONNECTION:reference model is the Molex 504754-2540




DETAIL B
SCALE 4:1




BACKLIGHT CIRCUIT
If=40mA Vf=12.8V

CTP-FPC:I2C (SDA&SCL)has a pull-up resistor 2k(ohm)

| PIN# | Assignment |
|---|---|
| 1 | RST_3.3V |
| 2 | INT_3.3V |
| 3 | SDA_3.3V |
| 4 | SCL_3.3V |
| 5 | VDD_3.3V |
| 6 | GND |

NOTES:
1. DISPLAY TYPE: 3.97″ TFT-TN
2. VIEWING DIRECTION: 6 o'clock
   Gray Scale Inversion Direction: 12 o'clock
3. LCD DRIVE IC: ILI9806E
4. POLARIZER MODE: TRANSMISSIVE/POSITIVE
5. OPERATING TEMP: -10° C~+60° C
6. STORAGE TEMP: -20° C~+70° C
7. UNMARKER TOLERANCE: ±0.20
8. REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

| REV | DESCRIPTION | DATE | NAME |
|---|---|---|---|
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | new drawing | 2022.12.08 | |

DCLTEK

| SCALE:1/1 | UNIT:mm | PAGE:1/1 | | Approve | Check | Drawn |
|---|---|---|---|---|---|---|
| Part No: | 312254-01 | | VER:V0 | | | |
| Customer No: | | | | | | |

# 4. Interface Specification

| NO. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | CPT-GND | Touch Ground | |
| 2 | CTP-VDD | Touch panel Power supply 2.8~3.3V | |
| 3 | CTP-SCL | Touch panel I2C clock | |
| 4 | CTP-SDA | Touch panel I2C data | |
| 5 | CTP-INT | Touch panel interrupt output | |
| 6 | CTP-RES | Touch panel reset | |
| 7 | GND | Power Ground | |
| 8 | GND | Power Ground | |
| 9 | MIPI_D0N | MIPI_DP0- are differential data signal line | |
| 10 | MIPI_D0P | MIPI_DP0+ are differential data signal line | |
| 11 | GND | Power Ground | |
| 12 | MIPI_CLKN | MIPI_CLKN Lane positive-end input pin | |
| 13 | MIPI_CLKP | MIPI_CLKP Lane engative-end input pin | |
| 14 | GND | Power Ground | |
| 15 | MIPI_D1N | MIPI_DP1- are differential data signal line | |
| 16 | MIPI_D1P | MIPI_DP1+ are differential data signal line | |
| 17 | GND | Power Ground | |
| 18 | RESET | Reset signal input terminal. Active at ‘L’. | |
| 19 | TE | Tearing effect output pin is used to synchronize MCU | |
| 20 | IOVCC | Power supply for interface logic circuits(1.65~3.3V) | |

| | | | |
|---|---|---|---|
| **21** | **VCI** | **LCM Analog supply voltage (2.8~3.3V)** | |
| **22** | **NC** | **Not connect** | |
| **23** | **LEDA** | **LED anode.** | |
| **24** | **NC** | **Not connect** | |
| **25** | **LEDK** | **LED cathode** | |

# 5.Electrical Characteristics

## 5.1TFT DC Characteristics

| Characteristics | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Supply Voltage for I/O** | IOVCC | 1.65 | 1.8 | 3.3 | V |
| **Supply Voltage for(DC/DC)** | VCC | 2.6 | 2.8 | 3.6 | V |

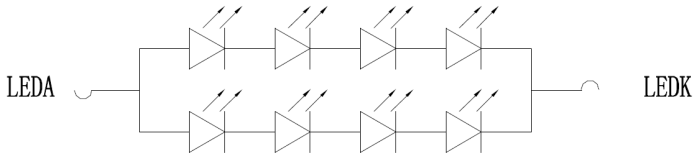
## 5.2 LED Backlight Specification

The back-light system is an edge-lighting type with 8 white LEDs. The characteristics of the back-light are shown in the following tables.

| Item | Symbol | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| Backlight voltage | Vf | -- | 12.8 | -- | V | -- |
| Forward current | IF | -- | 40 | -- | mA | -- |
| CTP+LCM Luminance(With LCD) | Lv | -- | 300 | -- | $cd/m^2$ | -- |
| LED life time | N/A | -- | 30000 | -- | Hr | Note 1 |

Note:(1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at IL=20mA/LED. The LED life time could be decreased if operating IL is larger than 40mA/LED.

**LED circuit:**




BACKLIGHT CIRCUIT

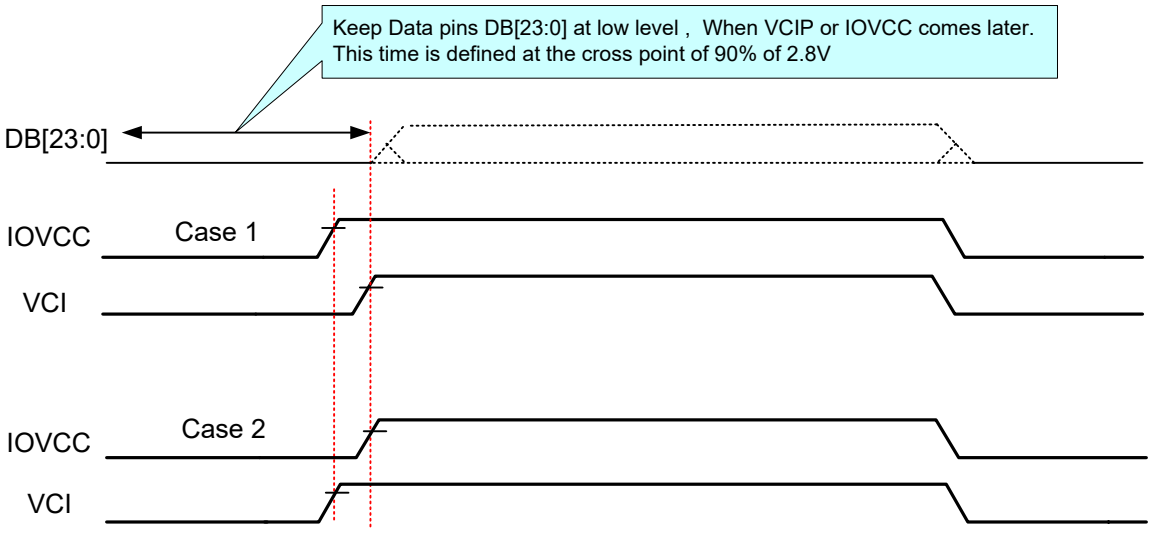
If=40mA Vf=12.8V

# 6. Powe ON/OFF Sequence

IOVCC and VCI can be applied (or powered down) in any order. During the power off sequences, if LCD is in the Sleep Out mode, VCI and IOVCC must be powered down with minimum 120msec, and if LCD is in the Sleep In mode, VCI and IOVCC can be powered down with minimum 0msec after RESX has been released.
CSX can be applied at any timing or can be permanently grounded. RESX has priority over CSX.

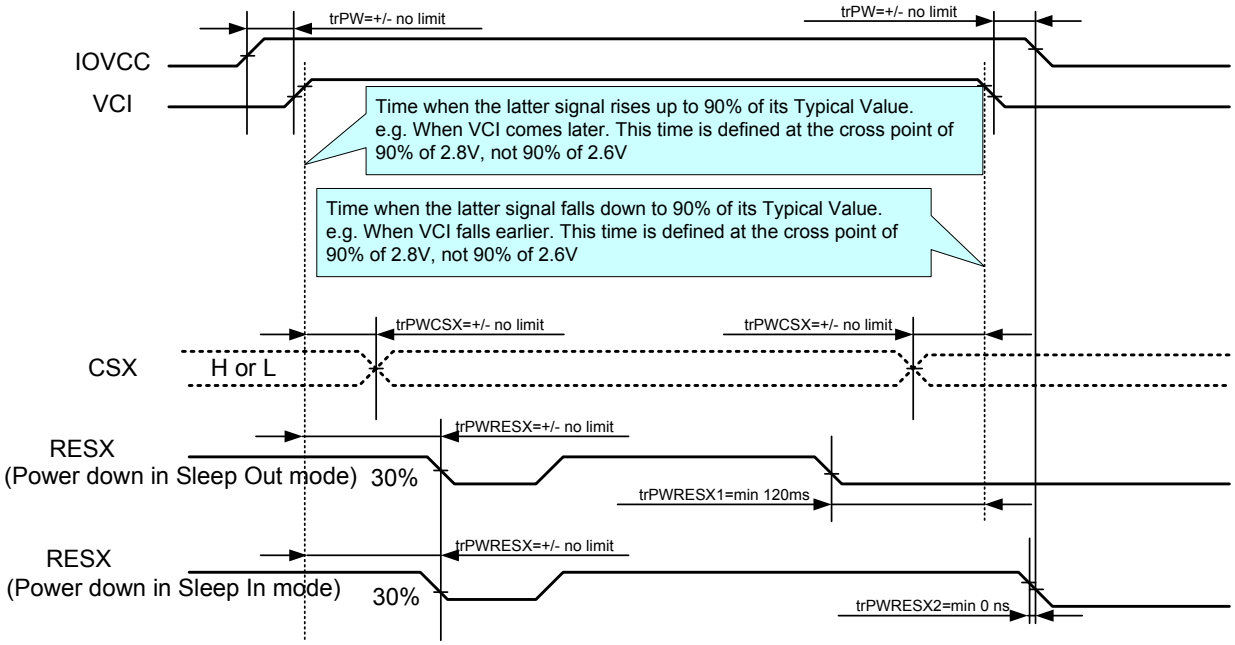
Note:

1. Ther will be no damage to ILI9806E if the power sequences are not met.
2. Ther will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
3. Ther will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.
4. If RESX l e is not held stable by host during Power On Sequence as defined in Sections 7.1 and 7.2, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.
5. Keep dat pins DB[23:0] at low level, when VCIP or IOVCC comes later



## 6.1. Case 1 –RESX line is held High or Unstable by Host at Power ON

If the RESX line is held high or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and IOVCC have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.




trPWRESX1 is applied to RESX falling in the Sleep Out Mode

trPWRESX2 is applied to RESX falling in the Sleep In Mode

## 7.0 DSI Timing Characteristics

### 7.1 High Speed Mode – Clock Channel Timing

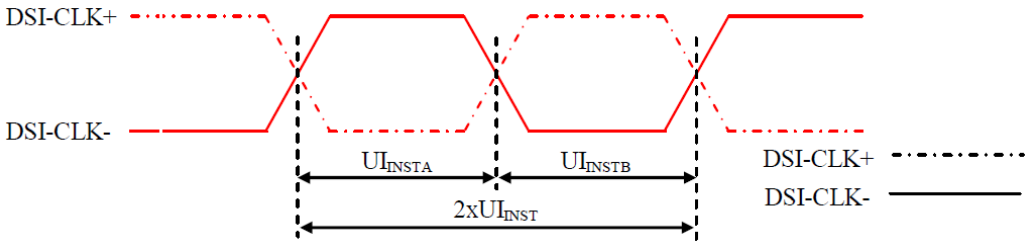



**Figure 114 DSI Clock Channel Timing**

**Table 45 DSI Clock Channel Timing**

| Signal | Symbol | Parameter | Min | Max | Unit |
|---|---|---|---|---|---|
| DSI-CLK+/- | $2xUI_{INST}$ | Double UI instantaneous | 4 | 2 | ns |
| DSI-CLK+/- | $UI_{INSTA}$,$UI_{INSTB}$ | UI instantaneous Half | 2 | 12.5 | ns |

Note: UI = $UI_{INSTA}$ = $UI_{INSTB}$

### 7.2 High Speed Mode – Data Clock Channel Timing

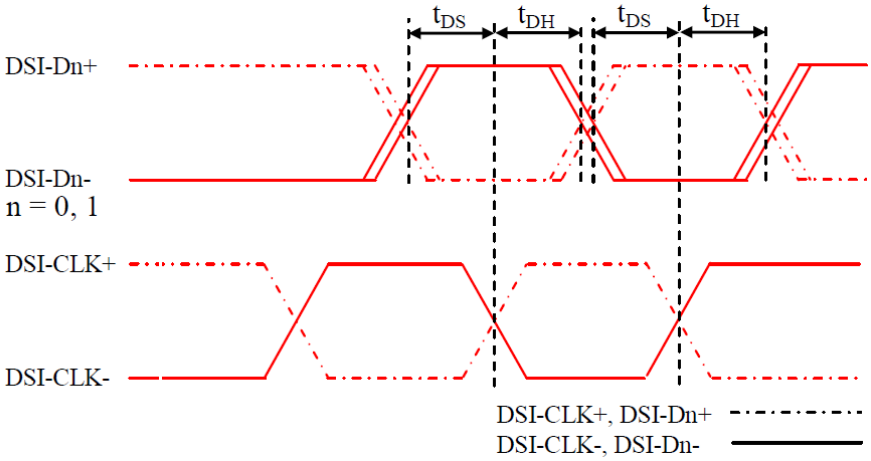



**Figure 115 DSI Data to Clock Channel Timings**

**Table 46 DSI Data to Clock Channel Timings**

| Signal | Symbol | Parameter | Min | Max |
|---|---|---|---|---|
| DSI-Dn+/- , n=0 and 1 | $t_{DS}$ | Data to Clock Setup time | 0.15xUI | - |
| | $t_{DH}$ | Clock to Data Hold Time | 0.15xUI | - |

## 7.3 High Speed Mode – Rise and Fall Timings

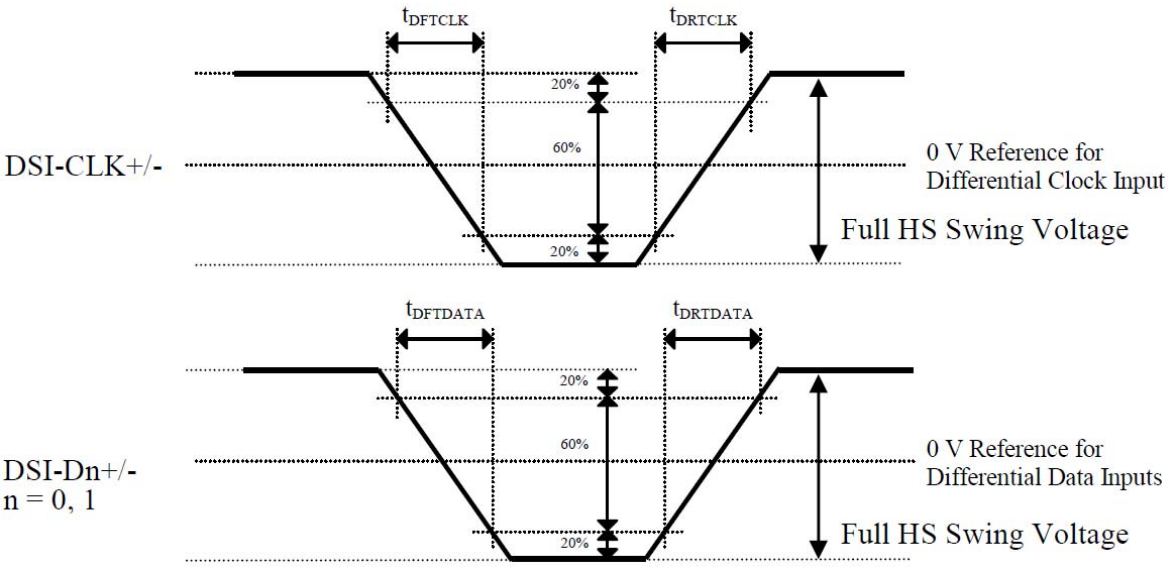



**Figure 116 Rise and Fall Timings on Clock and Data Channels**

**Table 47 Rise and Fall Timings on Clock and Data Channels**

| Parameter | Symbol | Condition | Specification | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| Differential Rise Time for Clock | $t_{DRTCLK}$ | DSI-CLK+/- | - | - | 150 (Note ) | ps |
| Differential Rise Time for Data | $t_{DRTDATA}$ | DSI-Dn+/- n=0 and 1 | - | - | 150 (Note ) | ps |
| Differential Fall Time for Clock | $t_{DFTCLK}$ | DSI-CLK+/- | - | - | 150 (Note ) | ps |
| Differential Fall Time for Data | $t_{DFTDATA}$ | DSI-Dn+/- n=0 and 1 | - | - | 150 (Note ) | ps |

Note:The display module has to meet timing requirements, what are defined for the transmitter (MPU) on MIPI D-Phy standard

## 7.4. Low Speed Mode – Bus Turn Around

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the MPU to the Display Module (ILI9806E) sequence below.

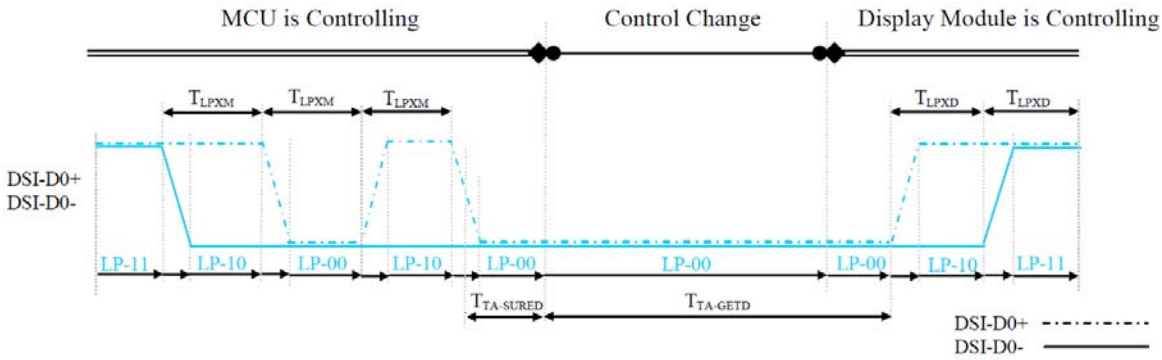



**Figure 117 BTA from the MPU to the Display Module**

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the Display Module (ILI9806E) to the MPU sequence below.

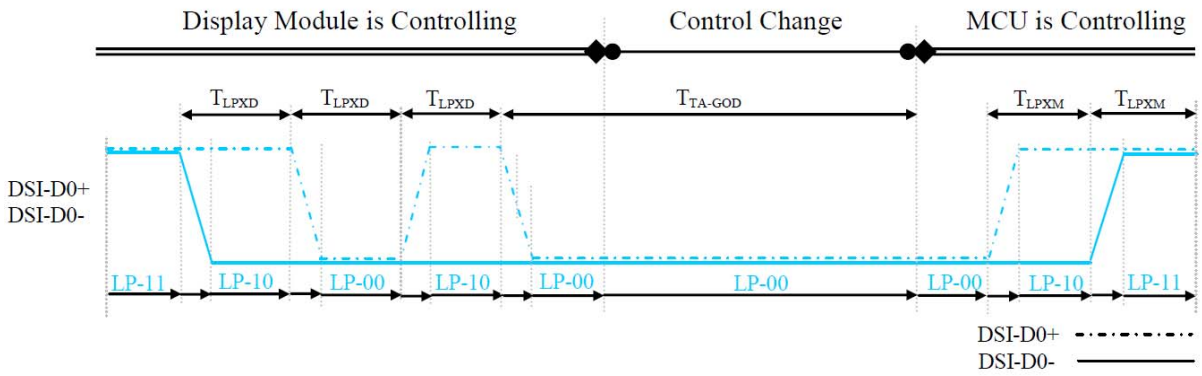



**Figure 118 BTA from the Display Module to the MPU**

**Table 48 Low Power State Period Timings – A**

| Signal | Symbol | Description | Min | Max | Unit |
|---|---|---|---|---|---|
| DSI-D0+/- | $T_{LPXM}$ | Length of LP-00, LP-01, LP-10 or LP-11 periods MPU ➔ Display Module (ILI9806E) | 50 | 75 | ns |
| DSI-D0+/- | $T_{LPXD}$ | Length of LP-00, LP-01, LP-10 or LP-11 periods Display Module (ILI9806E) ➔ MPU | 50 | 75 | ns |
| DSI-D0+/- | $T_{TA\text{-}SURED}$ | Time-out before the Display Module (ILI9806E) starts driving | $T_{LPXD}$ | $2\times T_{LPXD}$ | ns |

**Table 49 Low Power State Period Timings – B**

| Signal | Symbol | Description | Time | Unit |
|---|---|---|---|---|
| DSI-D0+/- | $T_{TA\text{-}GETD}$ | Time to drive LP-00 by Display Module (ILI9806E) | $5\times T_{LPXD}$ | ns |
| DSI-D0+/- | $T_{TA\text{-}GOD}$ | Time to drive LP-00 after turnaround request – MPU | $4\times T_{LPXD}$ | ns |

## 7.5 Data Lanes from Low Power Mode to High Speed Mode

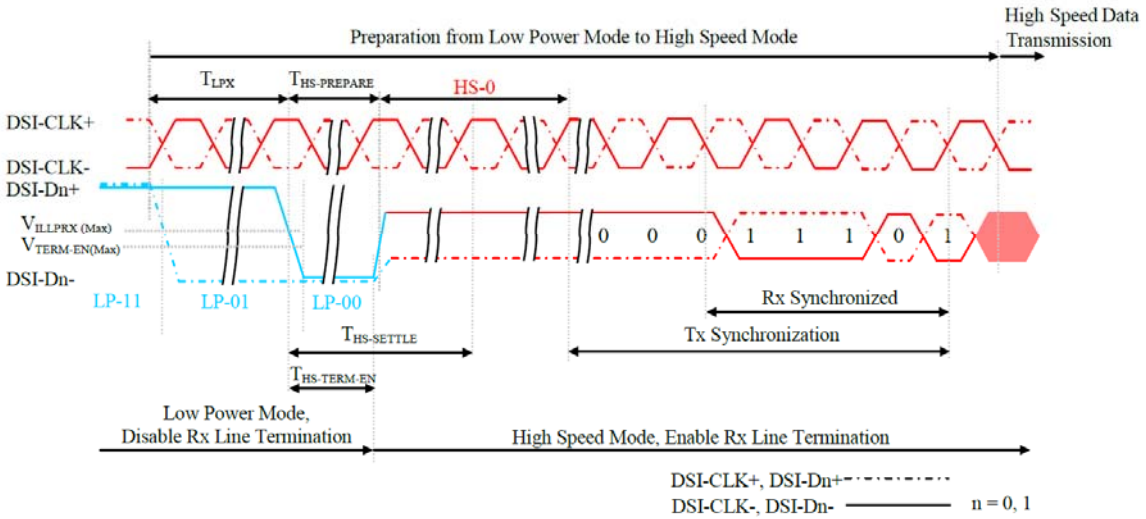



**Figure 119 Data Lanes – Low Power Mode to High Speed Mode Timings**

**Table 50 Data Lanes – Low Power Mode to High Speed Mode Timings**

| Signal | Symbol | Description | Min | Max | Unit |
|---|---|---|---|---|---|
| DSI-Dn+/-, n=0 and 1 | $T_{LPX}$ | Length of any Low Power State Period | 50 | - | ns |
| DSI-Dn+/-, n=0 and 1 | $T_{HS\text{-}PREPARE}$ | Time to drive LP-00 to prepare for HS Transmission | 40+4xUI | 85+6xUI | ns |
| DSI-Dn+/-, n=0 and 1 | $T_{HS\text{-}TERM\text{-}EN}$ | Time to enable Data Lane Receiver line termination measured from when Dn crosses VILMAX | - | 35+4xUI | ns |

## 7.6. Data Lanes from High Speed Mode to Low Power Mode

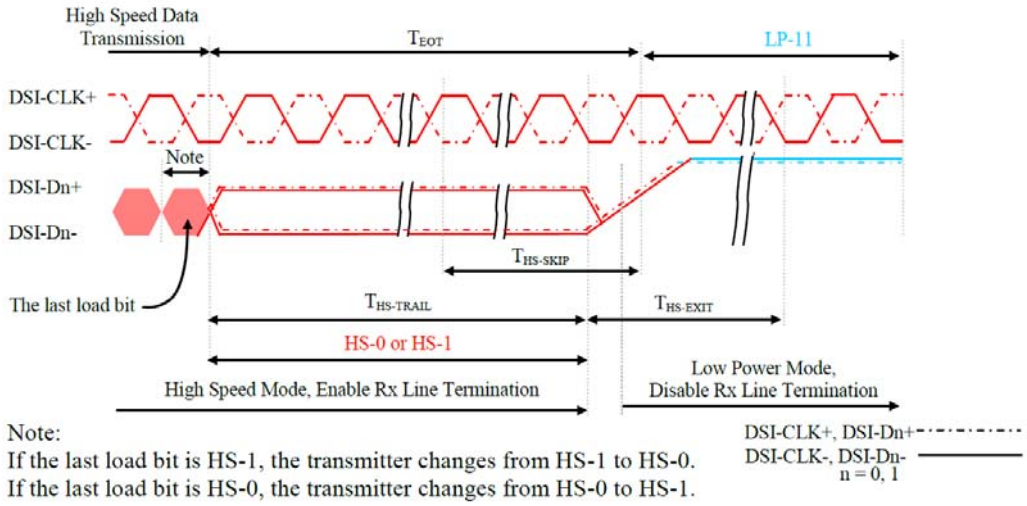



**Figure 120 Data Lanes – High Speed Mode to Low Power Mode Timings**

**Table 51 Data Lanes – High Speed Mode to Low Power Mode Timings**

| Signal | Symbol | Description | Min | Max | Unit |
|---|---|---|---|---|---|
| DSI-Dn+/-, n=0 and 1 | $T_{HS\text{-}SKIP}$ | Time-Out at Display Module (ILI9806E) to ignore transition period of EoT | 40 | 55+4xUI | ns |
| DSI-Dn+/-, n=0 and 1 | $T_{HS\text{-}EXIT}$ | Time to driver LP-11 after HS burst | 100 | - | n |

## 7.7 DSI Clock Burst – High Speed Mode to/from Low Power Mode

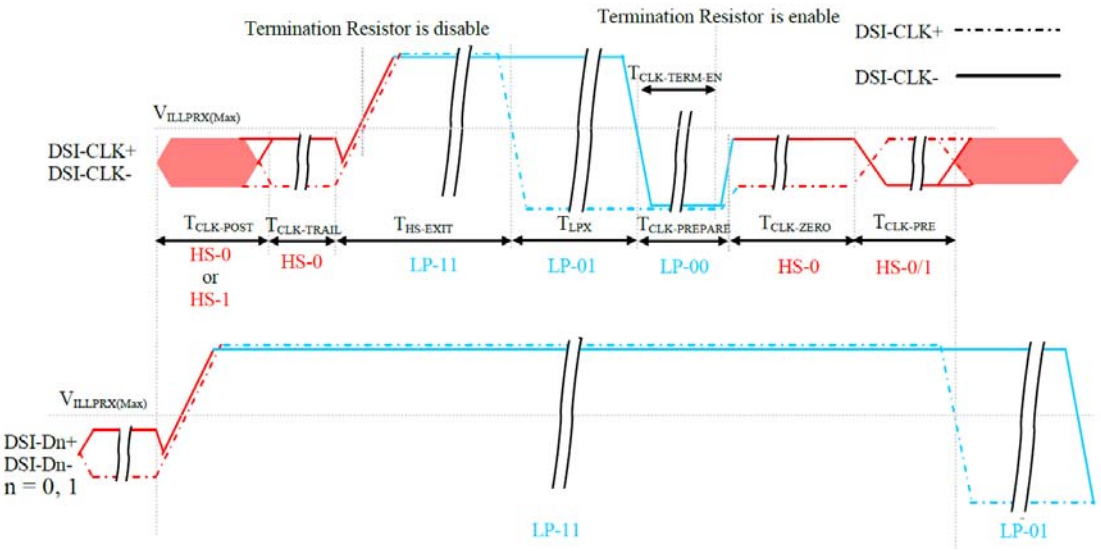



**Figure 121 Clock Lanes – High Speed Mode to/from Low Power Mode Timings**

**Table 52 Clock Lanes – High Speed Mode to/from Low Power Mode Timings**

| Signal | Symbol | Description | Min | Max | Unit |
|---|---|---|---|---|---|
| DSI-CLK+/- | $T_{CLK-POST}$ | Time that the MPU shall continue sending HS clock after the last associated Data Lanes has transitioned to LP mode | 60+52xUI | - | n |
| DSI-CLK+/- | $T_{CLK-TRAIL}$ | Time to drive HS differential state after last payload clock bit of a HS transmission burst | 60 | - | n |
| DSI-CLK+/- | $T_{HS-EXIT}$ | Time to drive LP-11 after HS burst | 100 | - | n |
| DSI-CLK+/- | $T_{CLK-PREPARE}$ | Time to drive LP-00 to prepare for HS transmission | 38 | 95 | ns |
| DSI-CLK+/- | $T_{CLK-TERM-EN}$ | Time-out at Clock Lane to enable HS termination | - | 38 | ns |
| DSI-CLK+/- | $T_{CLK-PREPARE}$ | Minimum lead HS-0 drive period before starting Clock | 300 | - | n |
| DSI-CLK+/- | $T_{CLK-PRE}$ | Time that the HS clock shall be driven prior to any associated Data Lane beginning the transition from LP to HS mode | 8xUI | - | n |

# 8.0 OPTICAL SPECIFICATION

## 8.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. The center of the measuring spot on the Display surface shall stay fixed.

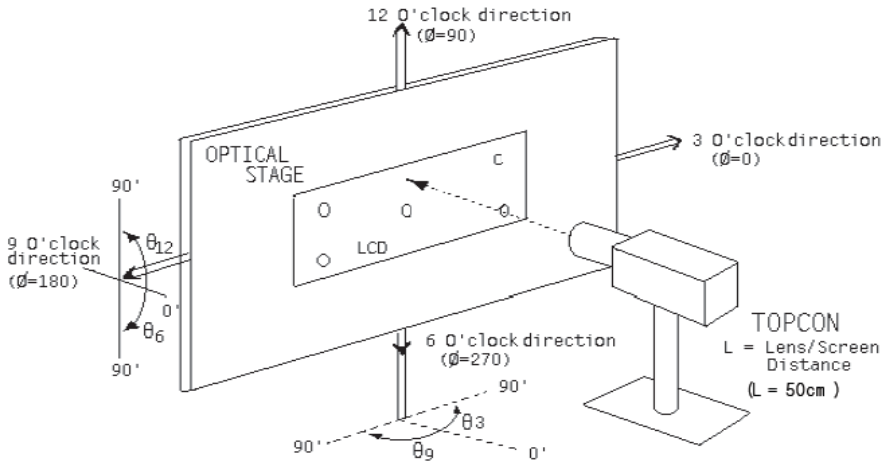
The backlight should be operating for 30 minutes prior to measurement.

## 8.2 Optical Specifications

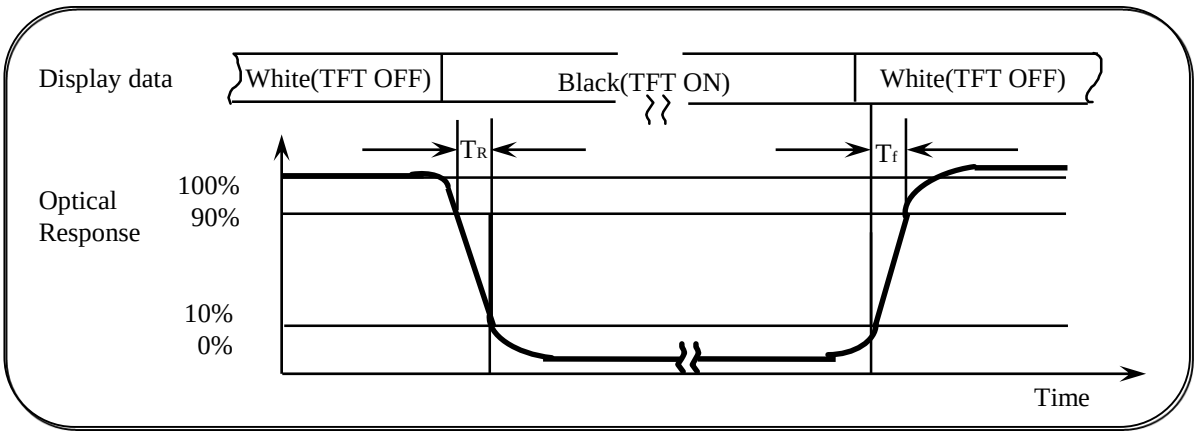
**<Table 6. Optical Specifications >**

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Viewing Angle Range | Horizontal | Θ3 | CR>10 | 60 | 70 | - | Deg. | Note1 |
| | | Θ9 | | 60 | 70 | - | Deg. | |
| | Vertical | Θ12 | | 60 | 70 | - | Deg. | |
| | | Θ6 | | 50 | 60 | - | Deg. | |
| Contrast ratio | | CR | Θ = 0° | 500 | 700 | - | | Note2 |
| Transmittance | | Tr | | 3.6 | 4.0 | | % | Note3 |
| Reproduction of color | Red | Rx | Θ = 0° | 0.603 | 0.632 | 0.662 | | Note4 (Based on C Light) |
| | | Ry | | 0.301 | 0.331 | 0.361 | | |
| | Green | Gx | | 0.247 | 0.277 | 0.307 | | |
| | | Gy | | 0.515 | 0.545 | 0.575 | | |
| | Blue | Bx | | 0.109 | 0.139 | 0.169 | | |
| | | By | | 0.106 | 0.136 | 0.166 | | |

## Figure1 Measurement Set Up




## Figure2 Response Time Testing



## 9.0 Reliability test items

| No. | Test Item | Test Condition | Notes |
|---|---|---|---|
| 1 | High Temp. Storage | +70°C / 48H | 1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed.<br>2. No low temperature bubbles,end seal loose andfall, frame rainbow. |
| 2 | Low Temp. Storage | -20°C / 48H | |
| 3 | High Tempe. Operating | +60°C / 48H | |
| 4 | Low Tempe. Operating | -10°C / 48H | |
| 5 | High Temperature /Humidity storage | 50°C x 90%RH /48H | |
| 6 | Thermal and cold shock | Static state， -10℃（30min）~50℃（30min），50 cycles | |
| 7 | ESD test | ± 2KV,Human Body Mode, 150pF/330Ω; ±4KV, Air Mode, 150pF/330Ω; | |

Note: All tests above are practiced at module type.

There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

# 10.0 General Precaution

## 10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

## 10.2 Asembly Precaytton

1、Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.

2、Please design display housing in accordance with the following guide lines.

3、Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.

4、Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.

5、 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. ( Polarizer film, surface of LCD panel is easy to be flawed.)

6、Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.

7、Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.

8、 Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change. 11.2.7 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

## 10.3 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. does not warrant the module, if customers disassemble or modify the module.

## 10.4 Breakage of LCD Panel

1 、If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

2、 If liquid crystal contacts mouth or eyes, rinse out with water immediately.

3、 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

4、 Handle carefully with chips of glass that may cause injury, when the glass is broken.

## 10.5 Absolute Maximum Ratings and Power Protection Circuit

1、Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

2、 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

3、 It's recommended employing protection circuit for power supply.

11.6 Operation

1 、Do not touch, push or rub the polarizer with anything harder than HB pencil lead.Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

2、 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

3 、Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

4 、When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

## 10.6 Static Electricity

1 、Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

2、 Because LCD module uses CMOS-IC on TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.

3 、Persons who handle the module should be grounded through adequate methods.

## 10.7 Disposal

When disposing LCD module, obey the local environmental regulations.

## 10.8 OTHERS

1 、A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight land strong UV rays.

2、 Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.

3、 For the packaging box, please pay attention to the followings:

4、Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.

5、 Please do not pile them up more than 6 boxes. (They are not designed so.) And please do not turn over.

6、 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

7、Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

## 11.0 Packing form-TBD

DCLTEK

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 Inch Touch Display Screen**
**Updated Date /生效日期:** **2022-05-20**
**Version / 版 本:** **A0**
**Customer confirmation :** _____

Record of Revision /修订履历

| Version /版本 | Revision Record /修订内容 | Reviser /修订人 | Revision Date /修订日期 |
|---|---|---|---|
| V0 | 首发 / Starting | | 2022.05.20 |
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1.Scope of application /适用范围.

This document shall be applied to 0.95~5.0 inch touch display screen.

本文件适用于0.95~5.0 寸触摸显示屏.

2.Inspection conditions and environment /检验条件与环境.

2. 1 Inspection Conditions /检验条件:

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

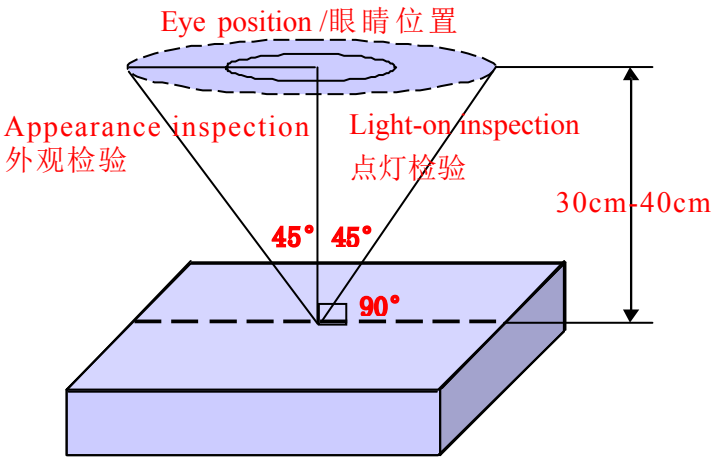
(2) Check time /检验时间：

Displays performance test /功能测试：2~3S /Image，Cosmetic Inspection /外观检验:10~12S.

(3) Check the viewing angle /检验视角:

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LCD表面)

2.2 Inspection environment /检验环境:

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

2.3 Sampling Conditions /抽样条件:

（1）Quantity to be inspected /批量：Quantity of shipment lot per model /单次运送单一型号数量.

（2）Sampling method /抽样方法：

| Sampling Plan /抽样计划 | | GB/T 2828.1- 2003 |
|---|---|---|
| | | Normal Inspection ， Single Sampling<br>正常检验、单次抽样 |
| | | General inspection level： Ⅱ<br>一般检验水平：二级 |
| AQL | Major Defect /主要缺陷 | 0.65 |
| | Minor Defect /次要缺陷 | 1.0 |

（3）The classification of Major(MA) and Minor(MI) defects is shown as “3.1 Classification of defects”.

主缺（MA）及次缺（MI）定义于”3.1缺陷分类”.

## 3.Terms And Definitions /术语和定义

### 3.1 Classification of defects / 缺陷分类 :

（1）Major defects /主要缺陷:

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 .

可导致产品功能失效或减少产品可用性的缺陷.

（2）Minor defects /次要缺陷:

It will not cause the product to fail and reduce the defects in the effective use and operation of the product.

不会导致产品功能失效和减少产品的有效使用与操作的缺陷.

### 3.2 Point defects /点状缺陷：

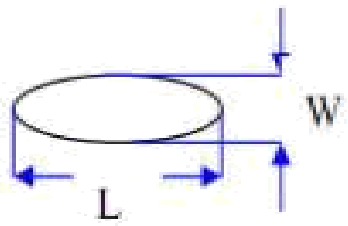
The size of the point defect is defined by the diameter D, and the average diameter of the defect is D=1/2（W+L）.

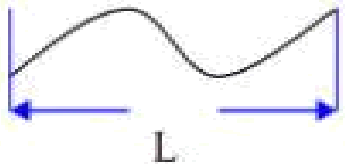
点状缺陷的大小是由直径 D 定义的，缺陷的平均直径 D=1/2(W+L).

### 3.3 Linear defects /线状缺陷：

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.



3.4 LCD sub-pixel dot /LCD子像素点

（1）Definition /定义：The point defect area is greater than 50% of the LCD sub-pixel area, and is visible through ND5% filter masking .

子像素点缺陷面积大于 50% LCD子像素面积, 且透过 ND5%遮盖是可见的.

（2）The drawing of 1/2 area sub-pixel definition / 1/2 面积的子像素定义绘图:

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

1/2 面积的子像素可以定义为如下一个或多个特定形状图：

3.5 Small bright dot /细碎亮点：

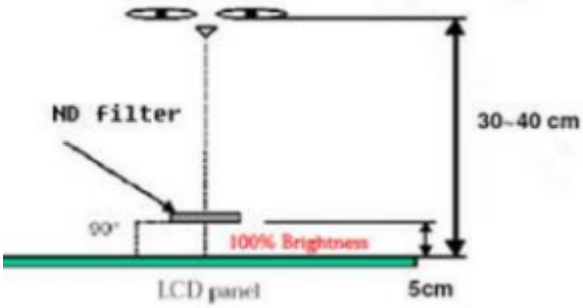
Point defects smaller than "LCD sub-pixels" /小于“LCD子像素点”的点缺陷.

（Ratio of Zone I to Zone O /I 区与 O 区比例：1：2：1）

3.6 ND filter inspection method /ND卡的检验方法：

Hold the ND filter about 5cm above the display area, with your eyes 30-40cm away from the panel, and observe for 2~3 seconds.

在显示区域上方大约 5cm 处握住 ND 卡，眼睛距离面板 30-40cm，观察2~3 秒.




3.7 Any FPC surface problems that do not leak copper on the surface and do not cause functional failure are acceptable.
任何 FPC 表面问题，表面未露铜和不造成功能失效是可以接受的.

3.8 Extraneous substances that can be wiped out，like Finger point,Particles are not considered 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) .

3.9 Defects that are covered by the material and are not visible to the eye and do not affect the function and use are not considered defects.

会被物料覆盖目视不可见，且不影响功能与使用的缺陷不视为缺陷.

3.10 Panel damage /面板损伤：

Glass damage outside the AA display area that does not affect the effective wiring is acceptable.

AA 显示区域以外的玻璃损伤，不影响有效线路是可以接受的.

3.11 Issues not specified or defined in this acceptance standard shall be handled through friendly negotiation between the two parties.

本允收标准中未规定或定义的问题，双方友好协商处理.

## 4. Inspection standards /检验标准

### 4.1 Structural Dimensions /结构尺寸规格

| Serial Number 序号 | Measurement items /测量项目 | | Specification /规格 | Remark /备注 |
|---|---|---|---|---|
| | 名称 /Name | Unit /单位 | Tolerance /公差 | |
| 1 | Outside dimension：Length 尺寸：长 | mm /毫米 | 0.10mm~0.20mm | Please refer to the product specification for detailed dimensions and tolerances 详细的尺寸规格和公差请参考产品规格书 |
| 2 | Outside dimension：Width 尺寸：宽 | mm /毫米 | 0.10mm~0.2mm | |
| 3 | Outside dimension：Thickness 尺寸：厚 | mm /毫米 | 0.20mm~0.30mm | |

### 4.2 Appearance Inspection Specification /外观检验规格

( D： diameter, W： width, L： length, N： quantity, DS： spacing )

| Inspection area 检验区域 | Inspection items 检验项目 | Inspection specifications 检验规格 | Defect category 缺陷类别 | |
|---|---|---|---|---|
| Glass 玻璃 | Wire(on Array) 线路 | Can't be damaged 不能损伤 | MA | |
| | Chipping/corner breaking 崩边/破角 | Can't affect the effective lines and functions 不能影响有效线路和功能 | MA | |
| | Edge 边缘 | There must be no extensional cracks 不可有延伸性裂纹 | MA | |
| Silicone 硅胶 | Silicone coating 硅胶涂布 | The height must not exceed the LCD CF surface 高度不能超过LCD CF面 | | MI |
| | Glue overflow 溢胶 | Can't cover FPC, POL, etc 不能覆盖到FPC、POL等 | | MI |

| Inspection area<br>检验区域 | Inspection items<br>检验项目 | Inspection specifications<br>检验规格 | Defect category<br>缺陷类别 | |
|---|---|---|---|---|
| PCBA<br>FPC<br>Connector<br>连接器 | Appearance<br>外观 | Scratches or injuries are not allowed to cause copper exposure<br>划伤或损伤不允许表面出现露铜 | | MI |
| | Component<br>元器件 | Can't be damaged and lack<br>不能损伤和缺少 | MA | |
| | Gold finger oxidation<br>金手指氧化 | Not allowed<br>不允许 | | MI |
| | Connection status<br>连接状况 | The connection must be accurate and stable<br>必须准确稳定连接 | MA | |
| | Break<br>破裂 | Not allowed<br>不允许 | MA | |
| | Soldering,: false soldering/tinning/tin beads<br>假焊/连锡/锡珠 | Not allowed<br>不允许 | MA | |
| POL<br>偏光片 | Scratches<br>划伤 | 1. W≤0.05mm；L≤5mm，Ignore（忽略）<br>2. 0.05mm＜W≤0.10mm ; L≤5mm ; N≤3 ; DS≥10mm<br>3. 0.10mm＜W；5mm＜ L， Not allowable（不允许） | | MI |
| | Dent<br>凹凸印 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| | Bubbles<br>气泡 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| | Point defects<br>点状不良 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| | Edge bubbles<br>边缘气泡 | 1. Within 1/2BM of the display area, it is not allowed<br>显示区往外 1/2BM 区域内，不允许<br>2. The display area is 1/2 outside the BM area, and it is not controlled<br>显示区往外1/2BM区域以外，不管控 | | MI |
| | Dirty/watermarked<br>脏污/水印 | No dirt/water lines/finger marks are allowed, and must be wiped clean<br>不允许有脏污/水印/手指印，须擦拭干净方可 | | MI |
| | Warping<br>起翘 | Not allowed<br>不允许 | | MI |
| | Attaching offset<br>贴偏 | It is necessary to completely cover the display area outward, within the 1/2BM area, or without leaking POL edges after TP is attached<br>需完整覆盖显示区往外、1/2BM区以内或贴合TP后不会出现漏偏光片边缘 | | MI |
| | Mixture<br>混料 | Mixing different types of POL or not using POL as required by the BOM，not allowed<br>不允许混贴不同型号的POL或未按BOM要求使用POL | MA | |

| Inspection area<br>检验区域 | Inspection items<br>检验项目 | Inspection specifications<br>检验规格 | Defect category<br>缺陷类别 | |
|---|---|---|---|---|
| TP&CG | Point defects<br>点状不良 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| | Scratches<br>划伤 | 1. W≤0.05mm；L≤5mm，Ignore（忽略）<br>2. 0.05mm＜W≤0.10mm ; L≤5mm ; N≤3 ; DS≥10mm<br>3. 0.10mm＜W；5mm＜ L， Not allowable（不允许）<br>4. There is a feeling scratch，Not allowable 有感划伤，不允许 | | MI |
| | Edges and corners cracked<br>崩角/崩边 | 1. Product front /产品正面： Edge and corner chipping is not allowed 崩角、崩边不允许<br>2. Product back /产品背面:<br>X≤ 0.5 , Y≤0.5，Z≤1/2T；N≤3；DS≥10mm | | MI |
| | Silk screen<br>丝印 | The silk screen is clear, complete and correct<br>丝印清晰、完整、内容正确 | | MI |
| | Dirty<br>脏污 | Non-wipeable dirt, not allowed<br>不可擦拭的脏污，不允许 | | MI |
| | Broken<br>破损 | Not allowable<br>不允许 | MA | |
| | Ink color aberration<br>油墨色差 | ΔE>1，Not allowable（不允许） | | MI |
| | Cover pinholes<br>针孔 | 1. D≤0.10mm , N≤3 , DS≥10mm，allowable<br>2. D＞0.10mm，intensive pinholes（密集型针孔），Not allowable（不允许） | | MI |
| | IR holes<br>IR孔 | Dirt, deviation, color difference, etc. are not allowed<br>不允许脏污、偏位、色差等 | | MI |
| BL<br>背光 | Backlight separation<br>背光分离 | Not allowable<br>不允许 | | MI |
| | Deformation of rubber iron and rubber frame<br>胶铁、胶框变形 | Use the plug gauge 0.3mm on the flat surface and can snap in and judge NG<br>在平面上使用塞规0.3mm卡翘曲位置，能卡进判定NG | | MI |
| | The iron frame is oxidized and not tightened<br>铁框氧化、卡不紧 | Not allowable<br>不允许 | | MI |
| | Backlight sticky solder beads, glue, etc<br>背面粘锡珠、残胶等 | Not allowable<br>不允许 | | MI |
| | Lnkjet coding，Barcode， QR code<br>喷码/条码/二维码 | The lnkjet coding is clear and complete, the barcode and QR code can be scanned normally, and the content and format match<br>喷码清晰完整、条码和二维码可正常扫描，内容和格式相符 | | MI |
| | Accessories (protective film, double-sided tape, insulating adhesive, etc.)<br>辅料（保护膜、双面胶、绝缘胶等） | Defects such as missing pastes, sticking deviations, defects, and fractures are not allowed<br>不允许有漏贴、贴偏、残缺、断裂等缺陷 | | MI |

4.3 Electrical test specifications /电性检查规格
( D： diameter, W： width, L： length, N： quantity, DS： spacing )

| Inspection items<br>检验项目 | Inspection specifications<br>检验规格 | Defect category<br>缺陷类别 | |
|---|---|---|---|
| Glass bright spots/dark spots<br>玻璃亮点/暗点 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| Mura | Use ND5% filter masking, visual invisibility is OK, 200~300Lux<br>使用ND5%遮盖，目视不可见即为OK，200~300Lux | | MI |
| Small bright dot<br>细碎亮点 | Use ND5% filter masking, visual invisibility is OK<br>使用ND5%遮盖，目视不可见即为OK | | MI |
| Light leakage<br>漏光 | 1. Use ND5% filter masking, visual invisibility is OK<br>使用ND5%遮盖，目视不可见即为OK<br>2. If necessary, sign off on the sample<br>必要时，签限定样 | | MI |
| Backlight black/white dots<br>背光黑点/白点 | 1. D≤0.15mm，Ignore（忽略）<br>2. 0.15mm＜D≤0.30mm；N≤3；DS≥10mm<br>3. 0.30mm＜D，Not allowable（不允许） | | MI |
| Linear foreign bodies<br>线状异物（异物毛丝等） | 1. W≤0.05mm；L≤5mm，Ignore（忽略）<br>2. 0.05mm＜W≤0.10mm ; L≤5mm ; N≤3 ; DS≥10mm<br>3. 0.10mm＜W；5mm＜ L， Not allowable（不允许） | | MI |
| Black/White Print<br>黑印/白印 | Use ND5% filter masking, visual invisibility is OK<br>使用ND5%遮盖，目视不可见即为OK | | MI |
| The display is uneven<br>显示不均匀 | Use ND5% filter masking, visual invisibility is OK<br>使用ND5%遮盖，目视不可见即为OK | | MI |
| The brightness is uneven<br>亮度不均匀 | Brightness uniformity＜85.0%，Not allowable<br>亮度均匀性＜85.0%，不允许 | | MI |
| Displacement of the membrane<br>膜材移位 | Not allowable<br>不允许 | | MI |
| Interference pattern/Newtonian pattern<br>干涉纹/牛顿纹 | Not allowable<br>不允许 | | MI |
| Display abnormal<br>显示异常 | Not allowable<br>不允许 | MA | |
| No display<br>无显示 | Not allowable<br>不允许 | MA | |
| Line/Missing Drawing<br>线条/缺画 | Not allowable<br>不允许 | MA | |
| Splash screen<br>闪屏 | Not allowable<br>不允许 | MA | |
| LCD grid<br>LCD网格 | Not allowable<br>不允许 | MA | |
| Afterimage<br>残影 | Not allowable<br>不允许 | MA | |
| Wrong viewing angle<br>视角错误 | Not allowable<br>不允许 | MA | |
| No touch<br>无触摸 | Not allowable<br>不允许 | MA | |
| Touch the jump point<br>触摸跳点 | Not allowable<br>不允许 | MA | |
| Not sensitive<br>触摸不灵敏 | Not allowable<br>不允许 | MA | |