# 深圳市正晶浩电子有限公司
## SHENZHEN ZJH DISPLAYER TECHNOLOGYCO.,LTD
**电话TEL:0755-29355801　　传真FAX:0755-29355801**

# APPROVAL　SHEET
## 承　认　书

记录编号：　　　　版本：v0.1

| Customer<br>客户名称 | |
| --- | --- |
| Part NO.<br>产品型号 | **YT180S006** |
| Product type<br>产品内容 | Mode: Transmissive　type .Normally white.<br>　　TFT LCD Module<br>LCD Module: Graphic 128RGB*160Dot-matrix |
| Remarks<br>备注栏 | □APPROVAL FOR SEPCIFICATIONS ONLY<br>■APPROVAL FOR SEPCIFICATIONS AND SAMPLE |
| Signature by Customer:<br>客户确认签章 | |

| 核准 | 审核 | 定制 |
| --- | --- | --- |
| | | |

## 客户确认

| 核准 | 审核 | 审核 |
| --- | --- | --- |
| | | |

# TABLE OF Contents

# 1.General Description

Z180IN006 is a 128RGB*160 dots matrix TFT LCD module. It has a TFT panel composed of 384sources and 128gates. The LCM can be easily accessed by micro-controller.

# 2. Features

| Display Mode | Transmissive |
| --- | --- |
| | a-TFT |
| Display Format | Graphic 128RGB*160 Dot-matrix |
| InputData | MCU 8bit |
| Viewing Direction | 12 o'clock |
| Drive | ST7735S |

# 3. Mechanical Specification

| Item | Specifications | Unit |
| --- | --- | --- |
| Dimensional outline | 34.00(W)*45.83(H)*2.15MAX(T) (FPC not include) | mm |
| Resolution | 128RGB*160 | dots |
| LCD Active area | 28.03 (W)*35.04 (H) | mm |
| Pixel size | 0.219(W)*0.219(H) | mm |

# 4. Mechanical Dimension

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ZJH 正晶浩

| NO. | NAME |
|---|---|
| 1 | LEDK |
| 2 | LEDA |
| 3 | GND |
| 4 | VDD |
| 5 | NC |
| 6 | NC |
| 7 | CS |
| 8 | RESET |
| 9 | RS |
| 10 | WR |
| 11 | RD |
| 12 | DB7 |
| 13 | DB6 |
| 14 | DB5 |
| 15 | DB4 |
| 16 | DB3 |
| 17 | DB2 |
| 18 | DB1 |
| 19 | DB0 |
| 20 | GND |

128*RGB*160
1.8 inch TFT

(12 O'CLOCK)
Viewing Direction

TESA4972(T=0.05)

弯折示意图

NOTES:
1.DISPLAY TYPE:262K/65K TFT TRANSMISSIVE NORMAL WHITE
2.OPERATING TEMP: -10°C~60°C
3.STORAGE TEMP: -20°C~70°C
4.LCD DRIVER: COG(IC:ST7735S);
5.BACKLIGHT: 2 CHIP-WHITE LED(Parellel)
6.GENERAL TOLERANCE:±0.20
7.ROHS

背光电路图:

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SHENZHEN ZJH DISPLAYER TECHNOLOGYCO.,LTD

第三视角:

| 产品型号: | YT180S006 | | |
|---|---|---|---|
| 部品型号: | LCM外形图 | 确认: | |
| 版本: | v01 | 单位: MM | 审核: |
| 日期: | 2014.03.08 | 比例: 1:1 | 设计: |
| UNMRKED TOLERANCE: | ±0.20 mm | | 页码: 1 OF 1 |

版本 | 更改内容 | 拟定 | 日期

| Item | Symbol | Min | Max | Unit | Note |
|---|---|---|---|---|---|
| Supply voltage | V | -0.3 | 4.6 | V | |
| Operating temperature | $V_T$ | -0.3 | Vcc+0.3 | V | |
| Storage temperature | $T_{OPR}$ | -20 | 70 | ℃ | |
| Storage temperature | $T_{STR}$ | -30 | 80 | ℃ | |

## 6.　Electrical Characteristics

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Supply voltage | Logic | $V_{CC}$ | | 2.7 | 2.8 | 3.3 | V |
| Input Voltage | H level | $T_{IH}$ | | 0.8*IOVCC | | IOVCC | V |
| | L level | $T_{IL}$ | | -0.3 | | 0.2* IOVCC | |
| Storage temperature | | $I_{DD}$ | With internal voltage generation $V_{CC}$=2.8V; $T_{emp}$=25℃ | | | TBD | mA |

## 7. Backlight Characteristic

| Item | Symbol | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| LED module Forward voltage | $V_{LED}$ | 3.0 | 3.2 | 3.4 | V |
| LED module current | $V_{LED}$ | | 20 | | mA |
| L/G Surface Luminance ★1 | $L_S$ | 1800 | | | $Cd/m^3$ |
| LCM Surface brightness uniform ★2 | $L_D$ | 80 | | | % |

★　1Test condition is:

　(a)　Center point on active area.

　(b)Best Contrast.

★2Uniform measure condition:

　(1)Measure 9 point. Measure location show below;

　(2)Uniform=(Min. brightness /Max. brightness)*100%

　(3)Best Contrast.
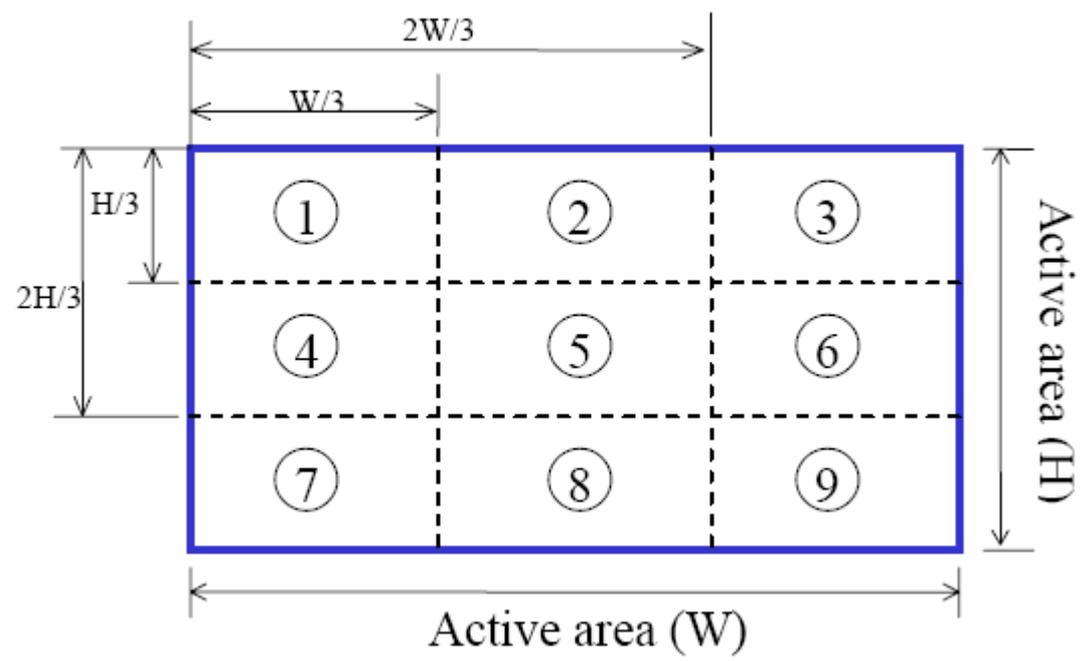
## 8. Module Function Description

### 8.1Pin Descriptions

| 引脚序号<br>PIN No. | 引脚名称<br>Symbol | 作用描述<br>Description | 备注<br>Notes |
|---|---|---|---|
| 1 | LEDK | Cathode of Backlight<br>（背光负极） | |
| 2 | LEDA | Anode of Backlight<br>（背光正极 3.0-3.4 伏供电） | |
| 3 | GND | Ground<br>（接地脚） | |
| 4 | VDD | Power supply for LCM<br>（屏电源供电脚 2.8-3.3V） | |
| 5-6 | NC | No connection<br>（空脚） | |
| 7 | CS | Chip select pin ("Low" enable)<br>（屏驱动芯片片选脚，低电平有效） | |
| 8 | RESET | LCM Reset pin<br>（屏复位脚，低电平复位） | |
| 9 | RS | Register select pin（指令/数据寄存器选择脚）<br>RS='1': Display data.（RS='1':选择数据寄存器） | |
| 10 | WR | Write control pin<br>（写控制脚） | |
| 11 | RD | Read control pin<br>（读控制脚） | |
| 12-19 | DB7-DB0 | Data Bus<br>（8 位数据线） | |
| 20 | GND | Ground<br>（接地脚） | |

## 8.2Timing characteristics.

### I80-System Interface Timing Characteristics

**Normal Wrote Mode(IOVCC=1.65~3.3V,Vcc=2.8~3.3V)**

| Item | | Symbol | Unit | Min. | Typ. | Max. | Test Condition |
|---|---|---|---|---|---|---|---|
| Bus cycle time | Write | $t_{CYCW}$ | ns | 100 | | | |
| | Read | $t_{CYCR}$ | ns | 300 | | | |
| Write low-level pulse width | | $PW_{LM}$ | ns | 50 | | 500 | |
| Write high-level pulse width | | $PW_{HW}$ | ns | 50 | | | |
| Read low-level pulse width | | $PW_{LR}$ | ns | 150 | | | |
| Read high -level pulse width | | $PW_{HR}$ | ns | 150 | | | |
| Write/ Read rise/fall time | | $t_{WRr}$ /$t_{WRt}$ | ns | | | 25 | |
| Setup time | Write(RS to nCS,E/nWR) | ns | ns | 10 | | | |
| | Read (RS to nCS,E/nWR) | ns | ns | 5 | | | |
| Address hold time | | $T_{AH}$ | ns | 5 | | | |
| Write data set up time | | $t_{osw}$ | ns | 10 | | | |
| Write data hold time | | $t_H$ | ns | 15 | | | |
| Read data set up time | | $t_{DDR}$ | ns | | | 100 | |
| Read data hold time | | $t_{OHR}$ | ns | 5 | | | |

## Read Timing Characteristics

**Reset Timing Characteristics(VCC=1.8~3.3V.IOVCC=1.65~3.3V)**

| Item | Symbol | Unit | Min. | Typ.. | Max |
|---|---|---|---|---|---|
| Reset low-level width | $t_{RES}$ | ms | 1 | | |
| Reset rise time | $t_{RES}$ | μs | | | 10 |
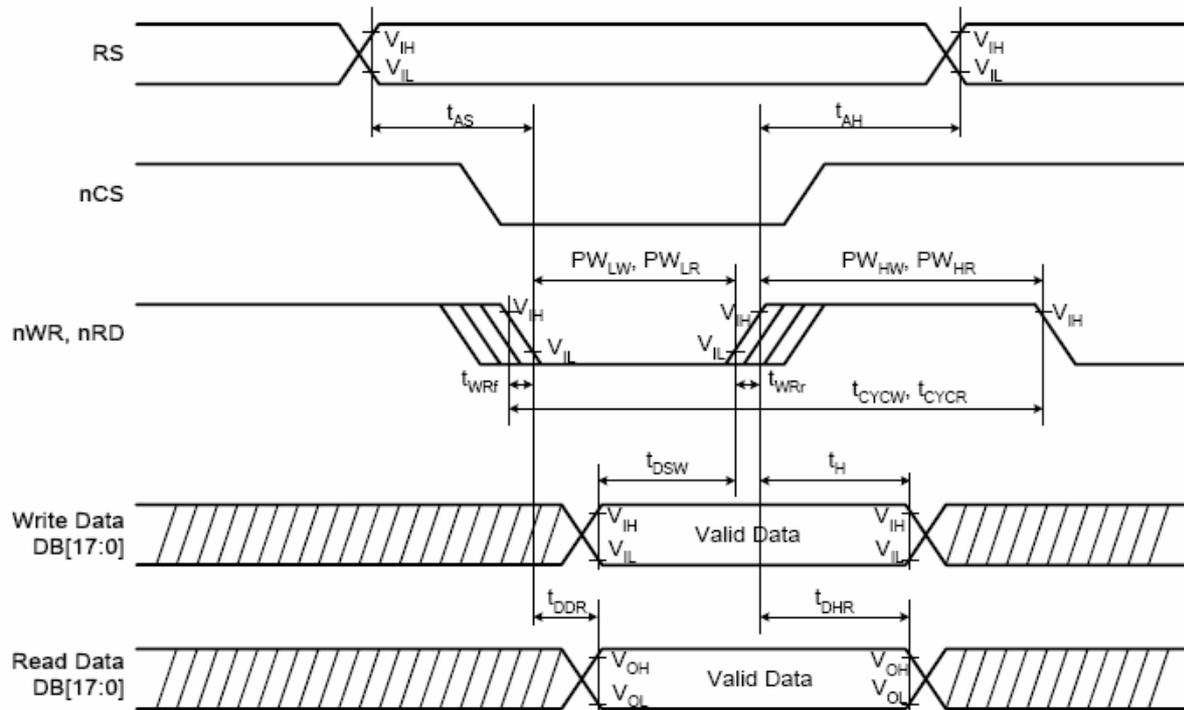
Figure 51 i80-System Bus Timing
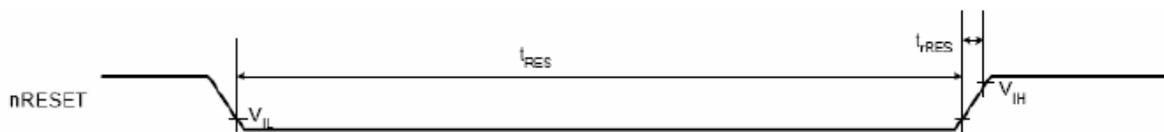


Reset Timing

## 9.Electro-optical Characteristics

| Item | Symbol | Conditions | | Temp | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|---|---|
| Response Time | $T_R$ | $\theta = \phi = 0$ | | 25℃ | | TBD | TBD | msec | NOTE2 |
| | $T_F$ | | | | | TBD | TBD | | |
| Viewing Angle Range | $\phi = 0^0 (6")$ | $\phi = 90^0 (3")$ | | $\phi = 180^0 (12")$ | | $\phi = 270^0 (9")$ | | | NOTE3 |
| $\theta (25℃) CR \geq 10$ | TBD | TBD | | TBD | | TBD | | | NOTE3 |

The above "viewing angle" is the measuring position with the largest contrast ratio. Not for good image quality. Viewing direction for good image quality is 12 O'clock.

●For panel only

●Electro-Optical Characteristics Test Method
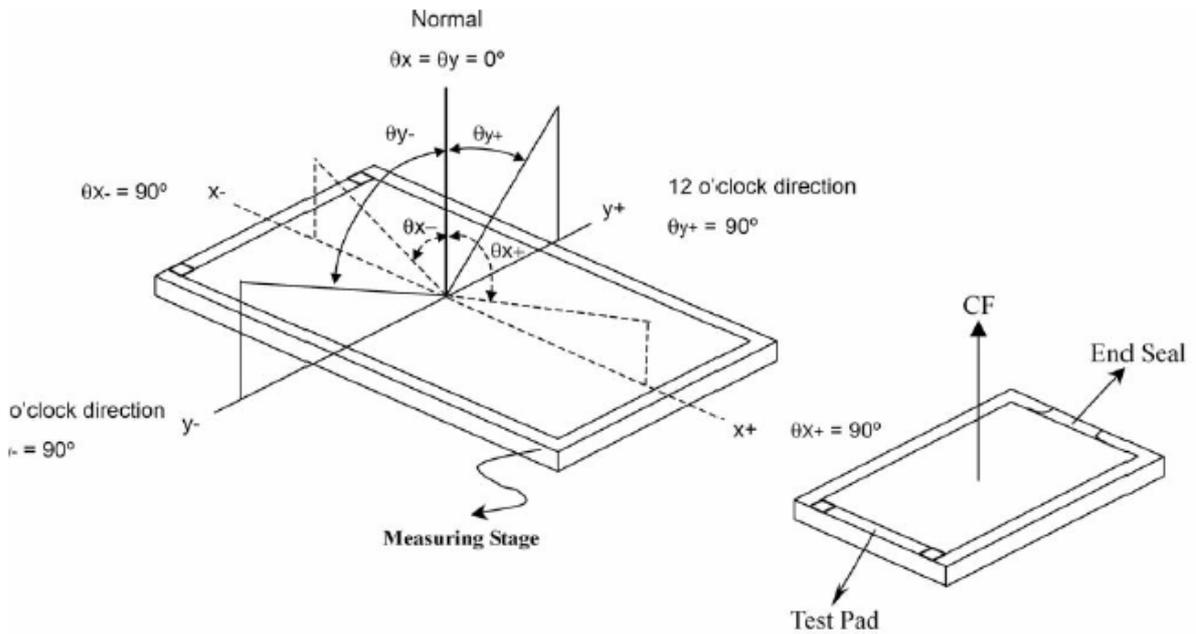


$$Vop = (V_{10, ON} + V_{90, OFF})/2$$
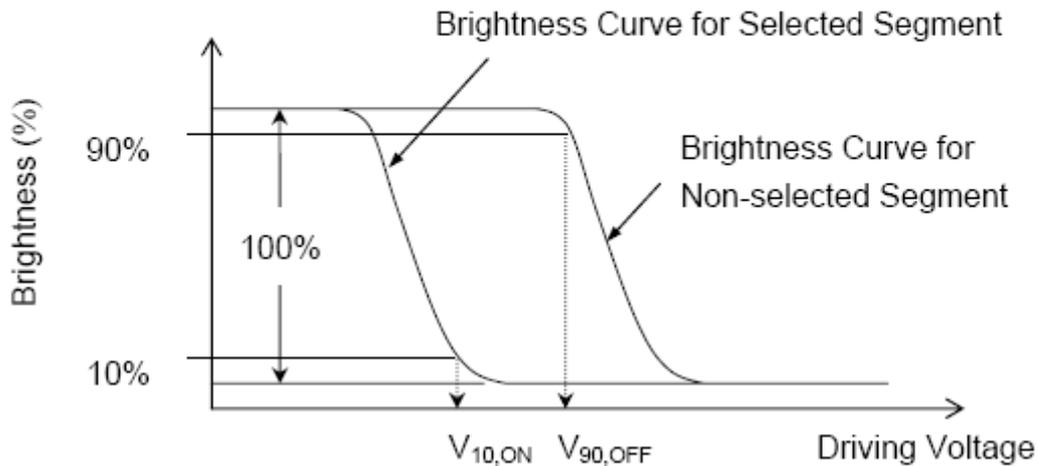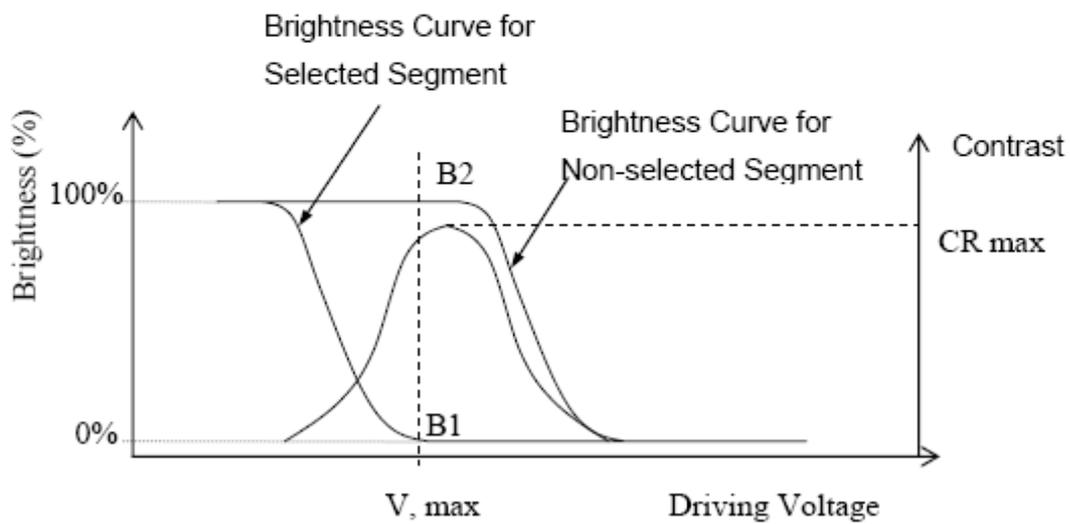


## .Note2.Definition of Optical Response Time:
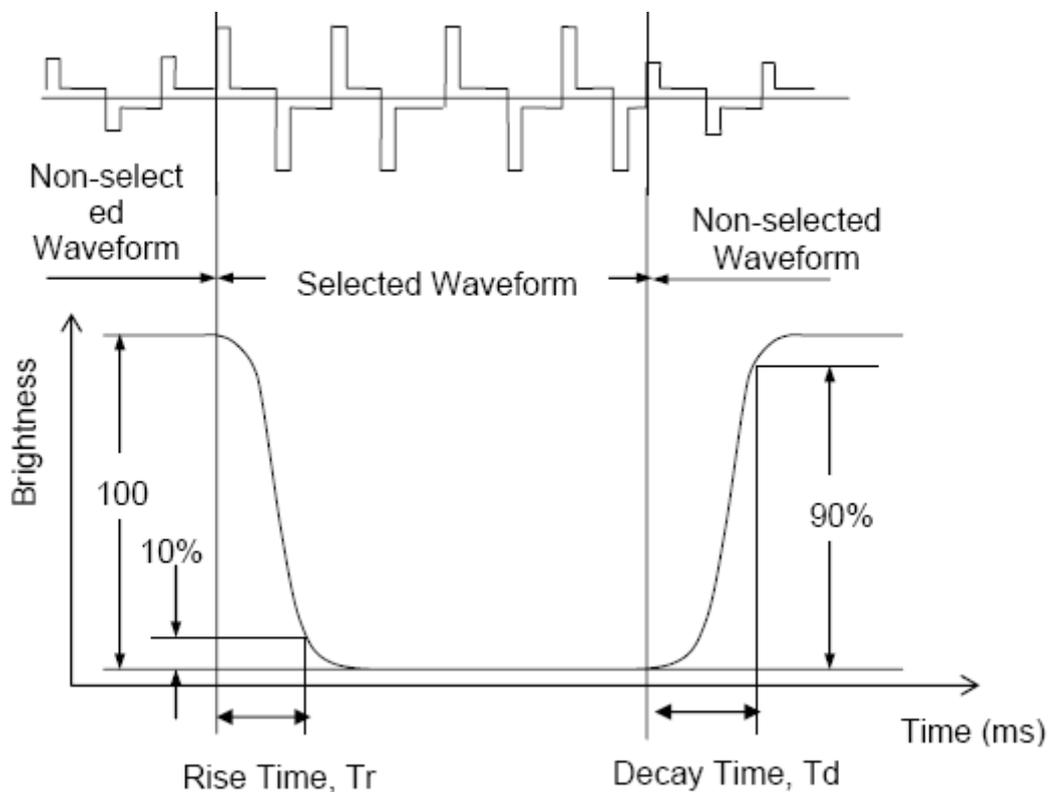
.Note3.Definition of Viewing Angle θ and φ :
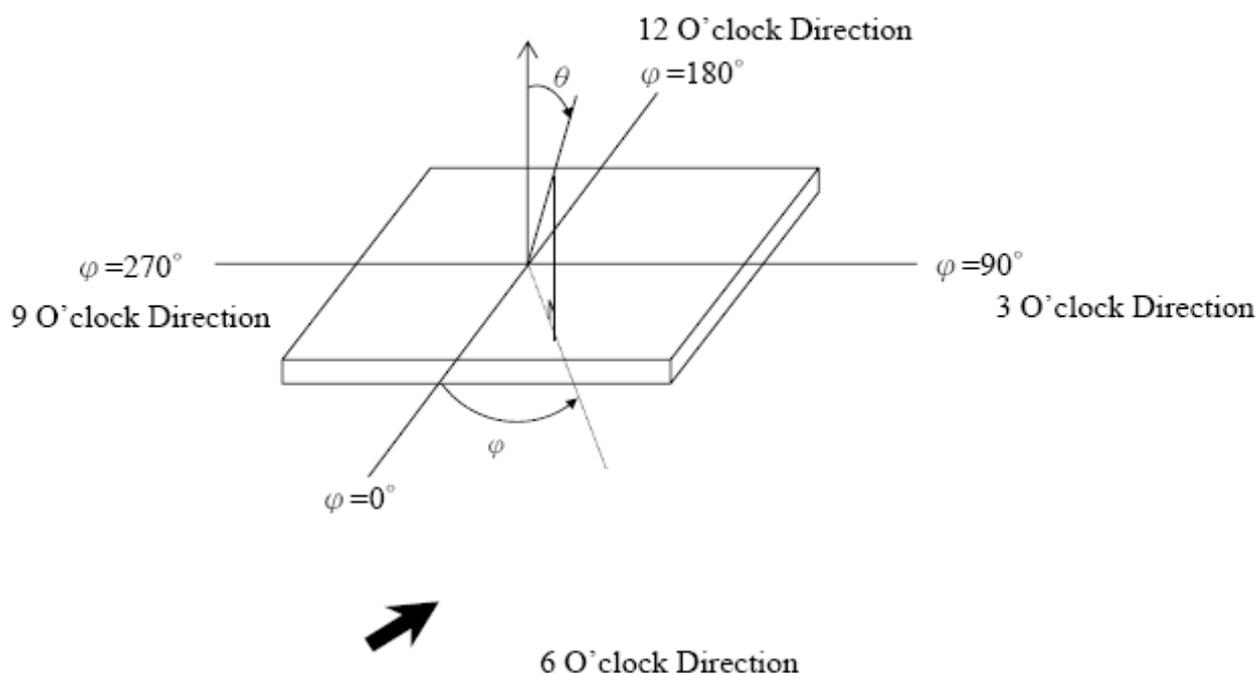
**Note4.Definition of Contrast ratio (CR):**

$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



## 10. Reliability
## 10.1Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal

## 10.2Test condition

| NO. | ITEM | CONDITION | CRITERION |
|-----|------|-----------|-----------|
| 1 | High Temperature Non-Operating Test | 80℃*240Hrs | 。No Defect Of Operational Function In Room Temperature Are Allowable |
| 2 | Low Temperature Non-Operating Test | -30℃*240Hrs | |
| 3 | High Temperature/Humidity Non Operating Test | 60℃*90%RH*240Hrs | |
| 4 | High Temperature Operating Test | 70℃*240Hrs | 。IDD of LCM in Pre-and Post-Test Should Follow Specification |
| 5 | Low Temperature Operating Test | -20℃*240Hrs | |
| 6 | Thermal Shock Test | -20℃(30Min) v 70℃(30Min) *10CYCLES | |

Notes:

1. Judgments should be made after exposure in room temperature for two hours.

2. The distill water is used for the high temperature/humidity test.

3. The sample above is individually for every reliability tests condition.

# 11.Inspection standards

1.AQL(Acceptable Quality Level

AQL of major and minor defect.

|  | MAJOR DEFECT | MINOR DEFECT |
|---|---|---|
| AQL | 0.65 | 1.5 |

## 2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is $1000\pm200$.(Darkroom's lux: $100\pm50$),About an angle of incidence 30,a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!
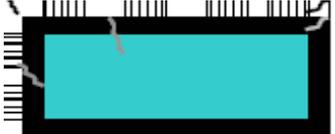
**(As shown below)**
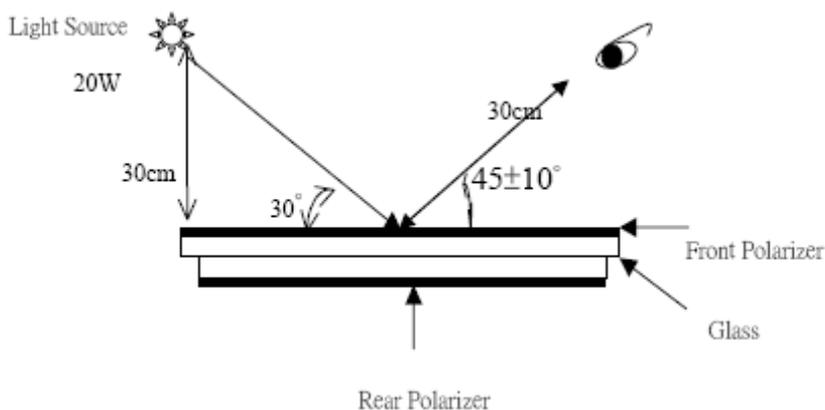


## 3.Inspection item and criteria

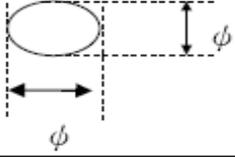## 3.1 Visual inspection criterion in immobility

## 3.1.1Glass defect

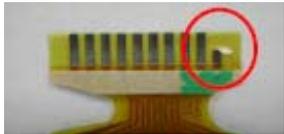| NO | Defect item | Criteria | Remark |
|---|---|---|---|
| 1 | Dimension Unconformity (Major defect) | By Engineering Drawing | |
| 2 | Cracks (Major defect) | 1. Linear cracks panel 【Reject】 <br> 2. Nonlinear crack contrast by limited sample | |
| 3 | Glass extrude the conductive area (minor defect) | a: disregards and no influence assemblage. <br> 1) b≤1/3Pin width(non bonding area) | A: Length, b: Width |

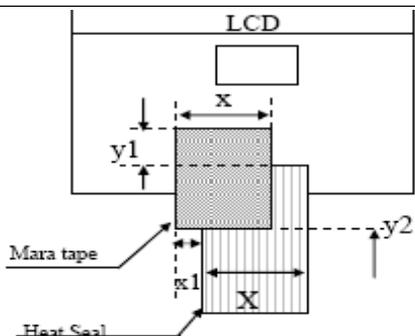| | | 【Accept】<br>2)bonding area≦0.5mm<br>【Accept】 | |
|---|---|---|---|
| 4 | Pin-side ,conductive area damaged<br>(minor defect) | (a c: disregards)<br>b≦1/3of effective length for bonding electrode<br>【Accept】 | a: length, b: Width, c: Thickness<br> |
| 5 | Pin-side,non-conductive area damaged<br>(minor defect) | 1)Damage area don't touch the ITO (Inclueling contraposition mark, except scribing mark)<br>【Accept】<br>2)C<T b≦BM1/3of width<br>【Accept】<br>3)c=T<br>　b not touch the seal glue<br>【Accept】<br>4)a disregards | a: Length, b: Width c: Thickness<br> |
| 6 | Non-pin-side damage<br>(minor defect) | c<T<br>1)b exceeds 1/3Bm<br>【Reject】<br>c=T<br>b not touch the seal glue<br>【Reject】 | c: Thickness b: width of<br><br>damage |

3.1.2LCD appearance defect(View area)

| NO | Defect item | Criteria | | Remark |
|---|---|---|---|---|
| | | Specification | Allowable | note1:L: Length, W: Width |
| 1 | Fiber、glass cratch、polarizer scratch/folded<br>(minor defect) | W≦0.03mm | disregard | note2: disregard if out of AA<br> |
| | | 0.03mm<W≦0.05mm;<br>L≦3.0mm | 2 | |
| | | 0.05mm<W≦0.1mm;<br>L≦3.0mm | 1 | |
| | | W>0.1mm;L>3.0mm | 0 | |
| 2 | Polarizer bubble、concave and convex | Φ≦0.2mm | disregard | note1: Φ=(L+W)/2, L:Length, W :Width |
| | | 0.2mm<Φ≦0.3mm | 2 | |

| | (minor defect) | 0.3mm< φ ≦0.5㎜ | 1 | note2:disregard if out of AA |
| | | 0.5mm< φ | 0 | |
| 3 | Black dots、dirty dots、impurities、eye winker (minor defect) | φ ≦0.15mm | disregard | note2:disregard if out of AA |
| | | 0.15mm< φ ≦0.25㎜ | 2 | |
| | | 0.25mm< φ ≦0.3㎜ | 1 |  |
| | | 0.3mm< φ | 0 | |
| 4 | Polarizer prick (minor defect) | φ ≦0.1mm | disregard | note1: φ=(L+W)/2, L=Length, W=Width |
| | | 0.1mm< φ ≦0.25㎜ | 3 | note2:the distance between two dots>5mm |
| | | φ＞0.25㎜ | 0 | |

### 3.1.3FPC

| NO | Defect item | Criteria | | Remark |
|----|-------------|----------|---|--------|
| 1 | Copper screen peel (minor defect) | Copper screen peel 【Reject】 | |  |
| 2 | No release tape or peel | No release tape or peel 【Reject】 | | |
| 3 | Dirty dot and impurity of FPC for customer using side (minor defect) | Specification | Allowable | Note1: Cannot have stride ITO impurities |
| | | φ ≦0.25mm | 2 | |
| | | φ＞0.25 | 0 | |

### 3.1.4Black tape &Mara tape

| NO | Defect item | Criteria | Remark |
|----|-------------|----------|--------|
| 1 | FPC or H/S black tape (minor defect) | 1. shift spec:<br>1) glue to the polarize 【Reject】<br>2) IC bare 【Reject】<br>2. left-and-right spec:<br>1)exceed of FPC edge or H-S edge 【Reject】<br>2) IC bare 【Reject】 |  |
| 2 | No black tape (major defect) | No black tape 【Reject】 | |
| 3 | Tape position mistake | Not by engineering drawing | |

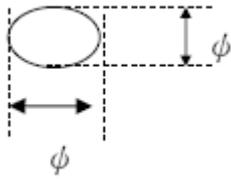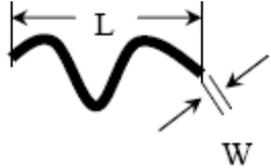| | | | |
|---|---|---|---|
| | (minor defect) | | |
| 4 | Mara tape defect<br>(minor defect) | Peel before pulling the protecting film<br>【Reject】 | |

### 3.1.5 Silicon and Taffy glue

| NO | Defect item | Criteria | Remark |
|---|---|---|---|
| 1 | Quantity of silicon<br>(major defect) | Uncover the ITO and circuit area<br>【Reject】 | note: compared by engineering |
| 2 | Taffy glue<br>(major defect) | 1.Uncover the reveal copper area【Reject】<br>2.Cover layer 0.3mm(Min)~3.0mm(Max)<br>【Reject】 | note: if customer has special requirement, refer to the technical document<br><br>3.0mm(Max) |
| 3 | Depth of glue covering<br>(major defect) | Depth of glue covering overtop front Polarizer 【Reject】 | Except of the special requirement |
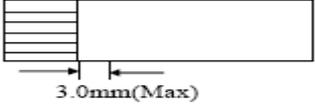
### 3.2 Electrical criteria

| NO | Defect item | Criteria | Remark |
|---|---|---|---|
| 1 | No display<br>(major defect) | No display<br>【Reject】 | |
| 2 | Missing line<br>(major defect) | Missing line<br>【Reject】 | |
| 3 | Seg-com light and dark<br>(major defect) | Seg-com light and dark<br>【Reject】 | ND filter 2% test |
| 4 | No display in immobility<br>(major defect) | No display in immobility<br>【Reject】 | |
| 5 | Flicker of Pattern<br>(major defect) | Flicker of Pattern<br>【Reject】 | |
| 6 | Mura<br>(major defect) | ND filter 2%test | |
| 7 | Over current<br>(major defect) | Over current<br>【Reject】 | |
| 8 | Voltage out of specification<br>(major defect) | Voltage out of specification<br>【Reject】 | |

| 9 | Pattern blur, error code (major defect) | Pattern blur, error code 【Reject】 | | |
|---|---|---|---|---|
| 10 | Dark light, Flicker (major defect) | Dark light, Flicker 【Reject】 | | |
| 11 | Black/white dots 、 Dirty dots、eye winker (major defect) | Specification | Allowable | Note1:disregard if out of AA |
| | | Φ≦0.15mm | disregard | |
| | | 0.15mm<Φ≦0.25mm | 2 | |
| | | 0.25mm<Φ≦0.3mm | 1 | |
| | | 0.3mm<Φ | 0 | |
| 12 | Fiber、glass crutch、Polarizer scratch/folded (major defect) | W≦0.03mm | disregard | Note1:L: Length, W: Width Note2: disregard if out of AA |
| | | 0.03mm<W≦0.05mm L≤3.0mm | 2 | |
| | | 0.05mm<W≦0.1mm L≤3.0mm | 1 | |
| | | W>0.1mm;L>3.0mm | 0 | |

# 12.Precautions for using LCD modules.

## 12.1 Safety

(1)Do mot swallow any liquid crystal ,even if there is no proof that liquid crystal is poisonous.

(2)If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.

(3)If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

## 12.2Srorang Conditions

(4)Store the panel or module in a dark place where the temperature is $23\pm5℃$ and the humidity is below $45\pm20\%$RH.

(5)Store in anti-static electricity container.

(6)Store in clean environment, free from dust, active gas, and solvent.

(7)Do not place the module near organics solvents or corrosive gases.

(8) )Do not crush, shake, or jolt the module.

## 12.3Handling Precautions

(9) Avoid static electricity, which can damage the CMOS LSI.

(10) The polarizing plate of the display is very fragile, please handle if very carefully.

(11) Do not give external shock.

(12) DO mot apply excessive force on the surface.

(13) Bo not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

(14) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.

(15) Do not operate it above the absolute maximum rating.

(16) Do not remove the panel or frame from the module.

## 12.4Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.

## 13.Factory

**FACTORY NAME:**

**FACTORY ADDRESS:**

**FACTORY PHONE:**

## 14.Revision history

| Version | Revise record | Date |
|---------|---------------|------|
| v0.0 | **Original version** | **2014-06-15** |
| v0.1 | **FPC Shortened length of 3 mm** | **2014-06-21** |
| | | |