POWERTIP TECH. CORP.

MATLOG

# SPECIFICATIONS

| | | |
|---|---|---|
| CUSTOMER | : | PTC |
| SAMPLE CODE | : | SH800480T013-IBB01 |
| MASS PRODUCTION CODE | : | PH800480T013-IBB01 |
| SAMPLE VERSION | : | 01 |
| SPECIFICATIONS EDITION | : | 006 |
| DRAWING NO. (Ver.) | : | JLMD-PH800480T013-IBB01_002 |
| PACKAGING NO. (Ver.) | : | JPKG-PH800480T013-IBB01_002 |

## Customer Approved

Date:

| Approved | Checked | Designer |
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| 閆偉 | 劉進 | 任健 |

□ Preliminary specification for design input

■ Specification for sample approval


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## History of Version

| Date (mm / dd / yyyy) | Ver. | Edi. | Description | Page | Design by |
|---|---|---|---|---|---|
| 02/28/2015 | 01 | 001 | New Drawing | - | 張斌 |
| 04/09/2015 | 01 | 002 | New Sample | - | 張斌 |
| 05/19/2015 | 01 | 003 | Modify LCM Drawing | Appendix | 張斌 |
| 08/25/2015 | 01 | 004 | Show Backlight Life Time | 9 | 張斌 |
| 03/30/2018 | 01 | 005 | Modify Backlight Life Time | 9 | 楊威 |
| 09/10/2019 | 01 | 006 | Modify DC Electrical Characteristics<br>Update LCM Packaging | 5<br>Appendix | 任健 |
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# 1. SPECIFICATIONS

## 1.1 Features

| Item | Standard Value |
|---|---|
| Display Type | 800 * (RGB) * 480 |
| LCD Type | a-Si TFT, Normally white, Transmissive type |
| Screen size(inch) | 7.0 inch |
| Viewing Direction | 6 O'clock |
| Backlight Type | LED B/L |
| Weight | - |
| Interface | RGB Interface |
| ROHS | THIS PRODUCT CONFORMS THE ROHS OF PTC<br>Detail information please refer website :<br>http://www.powertip.com.tw/news.php?area_id_view=1085560481/ |

## 1.2 Mechanical Specifications

| Item | Standard Value | Unit |
|---|---|---|
| Outline Dimension | 164.9 (W) * 100.0 (L) *4.95 (H) | mm |

**LCD panel**

| Item | Standard Value | Unit |
|---|---|---|
| Active Area | 154.08 (W) * 85.92 (L) | mm |

Note: For detailed information please refer to LCM drawing.

## 1.3 Absolute Maximum Ratings

**Module**

| Item | Symbol | Condition | Min. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Power Supply Voltage | $DV_{DD}$ | GND=0 | -0.3 | 5.0 | V | - |
| | $AV_{DD}$ | | 6.5 | 13.5 | V | |
| | $V_{GH}$ | | -0.3 | 40 | V | |
| | $V_{GL}$ | AGND=0 | -20 | 0.3 | V | |
| | $V_{GH}$ - $V_{GL}$ | - | 0 | 40 | V | |
| Operating Temperature | $T_{OP}$ | - | -20 | 70 | °C | |
| Storage Temperature | $T_{ST}$ | - | -30 | 80 | °C | |

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

## 1.4 DC Electrical Characteristics

GND = 0V, Ta = 25°C

| Item | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Voltage | $DV_{DD}$ | 3.0 | 3.3 | 3.6 | V | - |
| | $V_{GH}$ | 15.3 | 16.0 | 16.7 | | |
| | $V_{GL}$ | -7.7 | -7.0 | -6.3 | | |
| | $AV_{DD}$ | 10.2 | 10.4 | 10.6 | | |
| VCOM | $V_{COM}$ | - | 4.0 | - | V | |
| Input signal Voltage | $V_{IH}$ | 0.7$DV_{DD}$ | - | $DV_{DD}$ | V | |
| | $V_{IL}$ | 0 | - | 0.3$DV_{DD}$ | | |
| Supply Current | I ($DV_{DD}$) | - | 3.0 | - | mA | Pattern= Full display |
| | | - | 4.0 | 10 | | Pattern= Red *1 |
| | I ($AV_{DD}$) | - | 15 | - | | Pattern= Full display |
| | | - | 20 | 50 | | Pattern= Red |
| | $I_{GH}$ | - | 0..2 | 1.0 | | Pattern= Red |
| | $I_{GL}$ | - | 0.2 | 1.0 | | Pattern= Red |

Note1: Maximum current display.

## 1.5 Optical Characteristics

**TFT LCD Module** $DV_{DD}$ = 3.3 V, Ta=25°C

| Item | | Symbol | Condition | Min. | Typ. | Max. | unit | |
|---|---|---|---|---|---|---|---|---|
| Response time | Rise | Tr | - | - | 10 | 20 | ms | Note 2 |
| | Fall | Tf | | - | 15 | 30 | | |
| Viewing angle | Top | θY+ | CR ≥ 10 | 40 | 50 | - | Deg. | Note 4 |
| | Bottom | θY- | | 60 | 70 | - | | |
| | Left | θX- | | 60 | 70 | - | | |
| | Right | θX+ | | 60 | 70 | - | | |
| Contrast ratio | | CR | - | 400 | 500 | - | | Note 3 |
| Color of CIE Coordinate ( With B/L&TP ) | White | X | If=160mA | 0.25 | 0.30 | 0.35 | - | Note1 |
| | | Y | | 0.29 | 0.34 | 0.39 | | |
| | Red | X | | 0.53 | 0.58 | 0.63 | | |
| | | Y | | 0.30 | 0.35 | 0.40 | | |
| | Green | X | | 0.30 | 0.35 | 0.40 | | |
| | | Y | | 0.54 | 0.59 | 0.64 | | |
| | Blue | X | | 0.10 | 0.15 | 0.20 | | |
| | | Y | | 0.02 | 0.07 | 0.12 | | |
| Average Brightness Pattern=white display (With B/L&TP )*1 | | IV | If=160mA | 260 | 400 | | $cd/m^2$ | Note1 |
| Uniformity (With B/L&TP)*2 | | ΔB | - | 70 | - | - | % | Note1 |

Note 1:

*1：△B=B(min) / B(max) * 100%

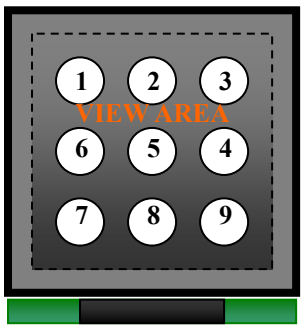
*2：Measurement Condition for Optical Characteristics:

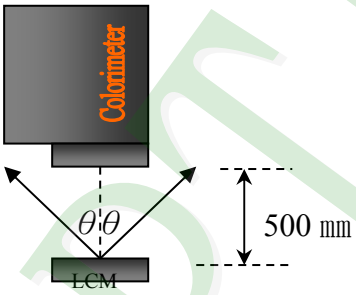
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

c：Equipment: TOPCON BM-7 fast，(field 1°)，after 10 minutes operation.

d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%




Colorimeter=BM-7 fast

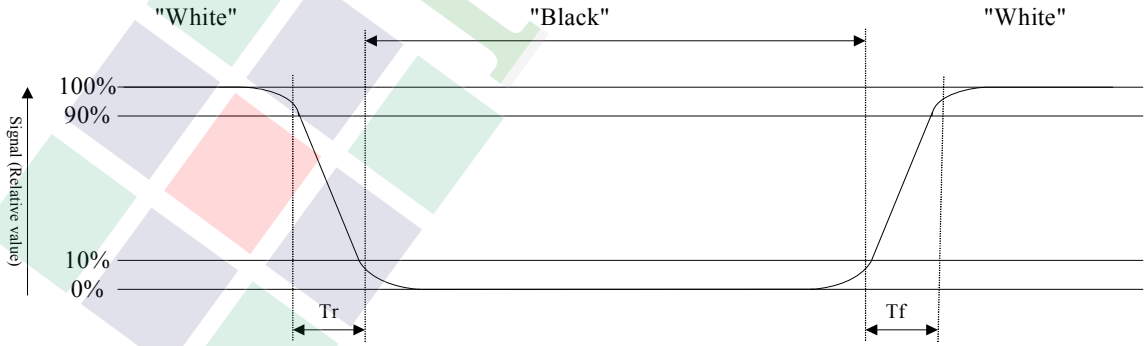
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

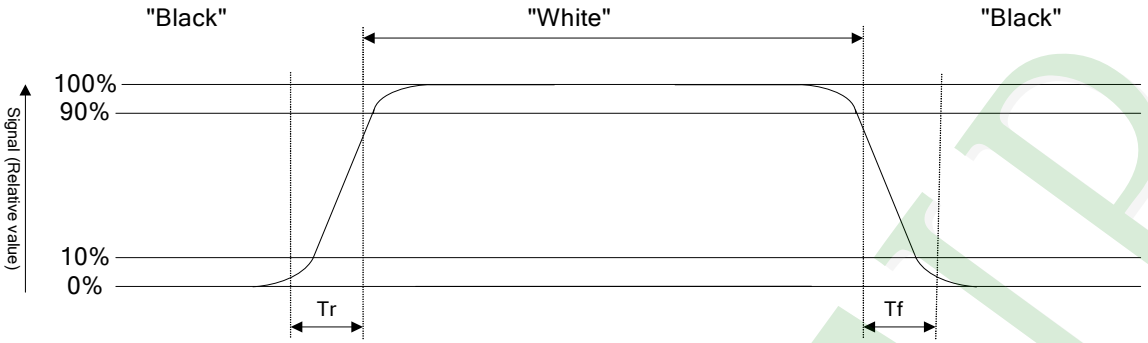
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



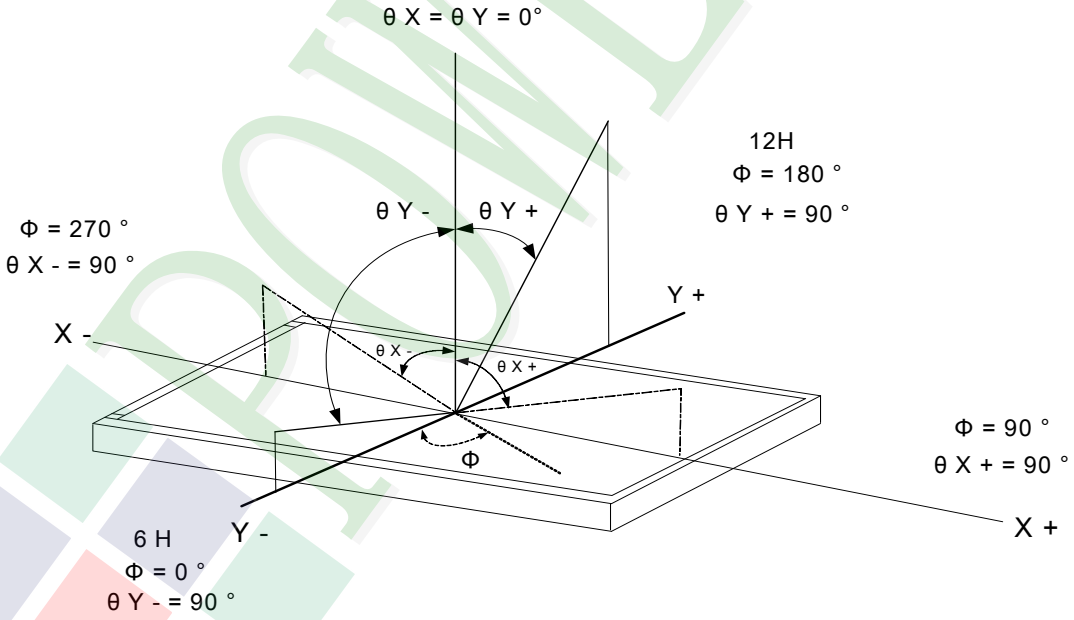

Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:



## 1.6 Backlight Characteristics

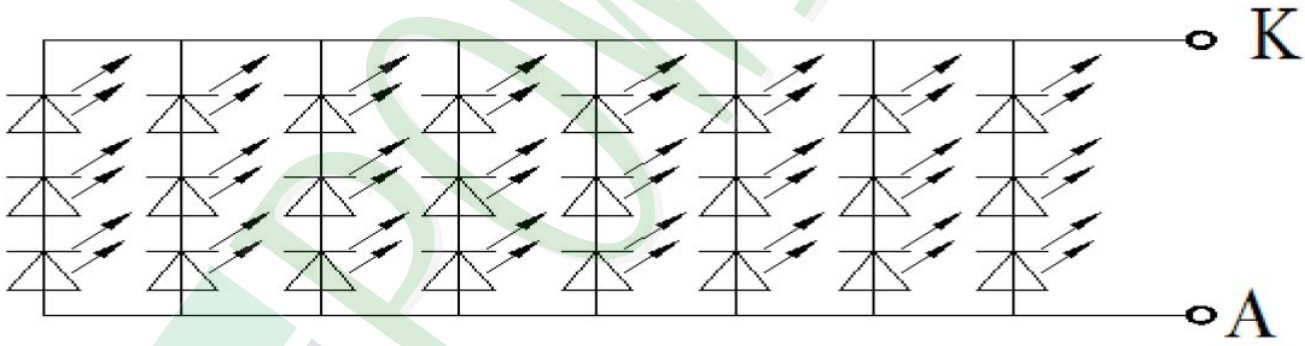
Maximum Ratings

| Item | Symbol | Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| LED Forward Current | IF | Ta =25℃ | - | 30*8 | mA |
| LED Reverse Voltage | VR | | - | 5 | V |
| Power consumption | Pd | | | 90*24 | mW |

Electrical / Optical Characteristics

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | VF | If=160mA | 9.0 | 9.6 | 10.2 | - |
| Average Brightness (Without LCD &T/P ) | IV | | 8600 | 10300 | 13800 | cd/m$^2$ |
| CIE Color Coordinate (Without LCD &T/P) | X | | 0.25 | 0.28 | 0.31 | - |
| | Y | | 0.26 | 0.29 | 0.32 | |
| Color | White | | | | | |

Circuit diagram




Other Description

| Item | Conditions | Description |
|---|---|---|
| Life Time | Ta =25℃<br>IF= 160mA | 50000 hrs |

## 1.7 Touch Panel Characteristics

### 1.7.1 Optical Characteristics

| Item | Specification |
|---|---|
| 1.Transparency | 80% Min |

### 1.7.2 Mechanical Characteristic

| Item | Specification |
|---|---|
| 1.Input Method | Finger or stylus pen |
| 2.Hardness of surface | 3H -pressure 500g of ,45deg. |
| 3.Activation Force | 250gf less individual point with stylus pen(R0.8)<br>Activation force guarantee area:3.0mm inside of Active Area. |
| 4.Linearity Force | 150gf less input with stylus pen(R0.8)<br>Activation force guarantee area:3.0mm inside of Active Area. |

### 1.7.3 Electrical Characteristics

| Item | Specification |
|---|---|
| 1.Rated Voltage | DC 5V(DC 7V Max) |
| 2.Resistance Between Terminals. | Direction X (Glass side): 500Ω~ 1000Ω |
| | Direction Y (Film side): 100Ω~ 500Ω |
| 3.Insulation Resistance | 20 MΩ or more (DC 25Ⅴ 1min) |
| 4.Linearity | ±1.5%.<br>Linearity(%)= ΔV/（EV-SV）*100.<br>ΔV: The difference between the ideal voltage and measured voltage on the each measuring line.<br>SV: Voltage of starting Points.<br>EV: Voltage of Ending Points.<br>(Test condition refers to 1.7.2 item4) |
| 5.Bouncing | <10ms (Tip R 3.75mm, hardness 10°~20° ,silicon rubber ,500gf operation : 40 mm/sec ) |

1.7.4 Reliability Characteristic

| NO | Test Item | Test Condition | Test Result |
|---|---|---|---|
| 1 | Hitting Durability | 1,000,000times min.(R 8 mm Silicon Rubber Hardness 60° 250gf 2times/sec). | Follow 1.7.3 item2 and item4. |
| 2 | Pen Sliding Durability | 100,000 times min(Tip R0.8mm). | Follow 1.7.3 item2 and item4. |
| 3 | Impact Resistance | ψ9mm steel ball is dropped on the surface from 30 cm height at 1 time. | No Crack |
| 4 | Flexible pattern Bending Resistance | Bending 3 times by bending radius R1.0 mm | Follow 1.7.3 item2. |

1.7.5 Touch Panel Design/Handing Guide

(1) Keep the gap, for example 0.2 to 0.3mm, between bezel edge and T/P edge.
The reason is to avoid the bezel edge from contacting T/P surface that may cause “short” with bottom layer

(2) Insertion a cushion material is recommended.

(3) The cushion material should be limited on the busbar insulation paste area. If it is over the transparent insulation paste area, a “short” may be occurred.

(4) Do not to use an adhesive tape to bond it on the front of T/P and hang it to the housing bezel.

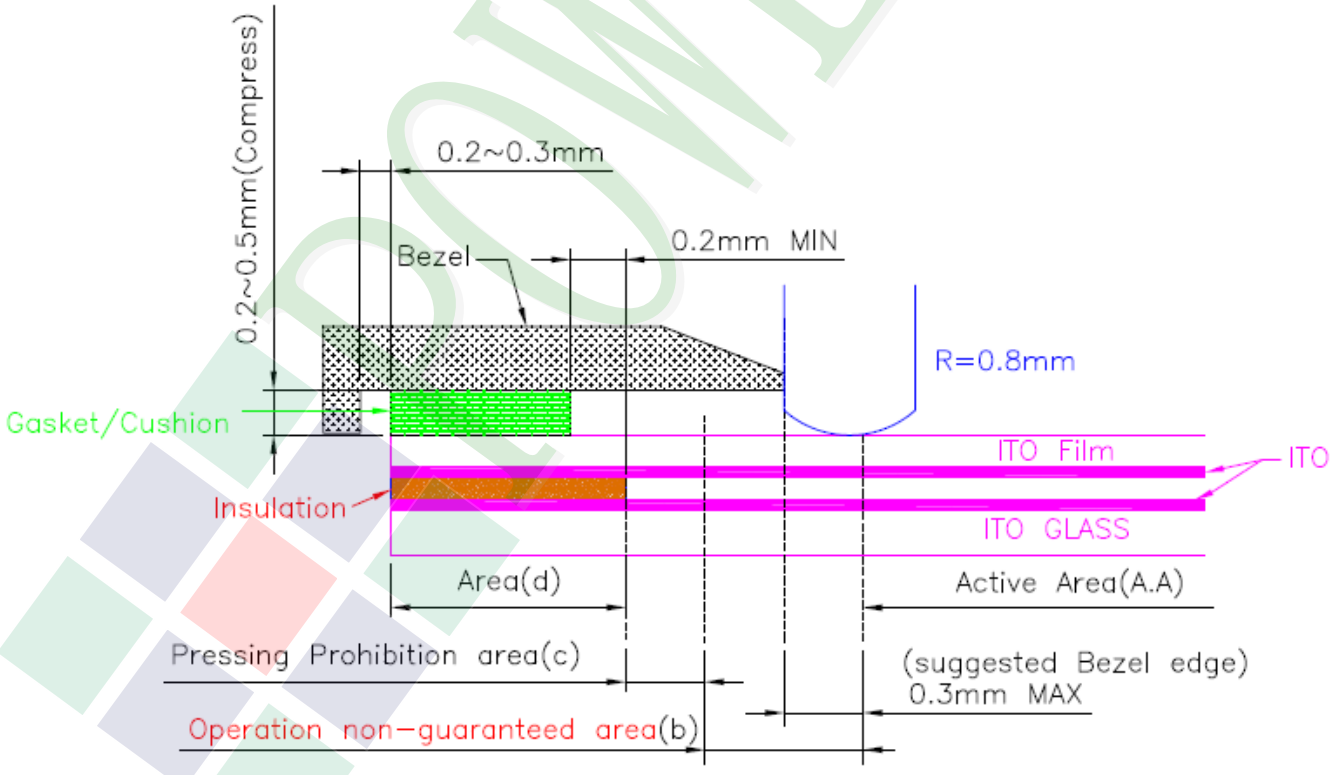
(5) Never expand the T/P top layer (PET Film) like a balloon by internal air pressure. The life of the T/P will extremely decreasing.

(6) Top layer, PET, dimension is changing base on environment temperature and humidity. Please avoid a stress from housing bezel to top layer, because it may cause “waving”.

(7) The input to the Touch Panel sometimes distorts touch panel itself.

(8)To use the stylus pen or fingernail sliding at the edge of the housing is prohibited. It would cause the cracking of the ITO coating and damage the touch panel. It also request not to press this area while assembling

(9) Purpose: In order to prevent accidental use and performance deterioration, please keep the following precautions.




In order to prevent unusual performance degradation and malfunction of a touch panel, please carry out the set case designing and a touch panel assembling method after surely considering the definition of each area illustrated in above figure.

Area(a)：Active area

The active area is guaranteed the position data detectable precision, operation force and other operations. it is strongly recommended to place the operation button or menu keys within the active area. Due to structure, the active area is less durable at the edge or close to the edge.

Area(b)：Operation non-guaranteed area

This area does not guarantee a touch panel operation and its function. When this area is pressed, touch panel shows degradation of its performance and durability such as a pen sliding durability becomes about one-tenth compared with the active area (area-(a) as guaranteed area) and its operation force requires about double. About 0.5 mm outside from a boundary of the active area corresponds to this area.

Area(c)：Pressing prohibition area

The area which forbids pressing, because an excessive load is applied to a transparent electrode (ITO) and a serious damage is given to a touch panel function by pressing. About 0.5 mm outside from Operation non-guaranteed area .

Area(d)：Non-Active area

The area does not activate even if pressed.

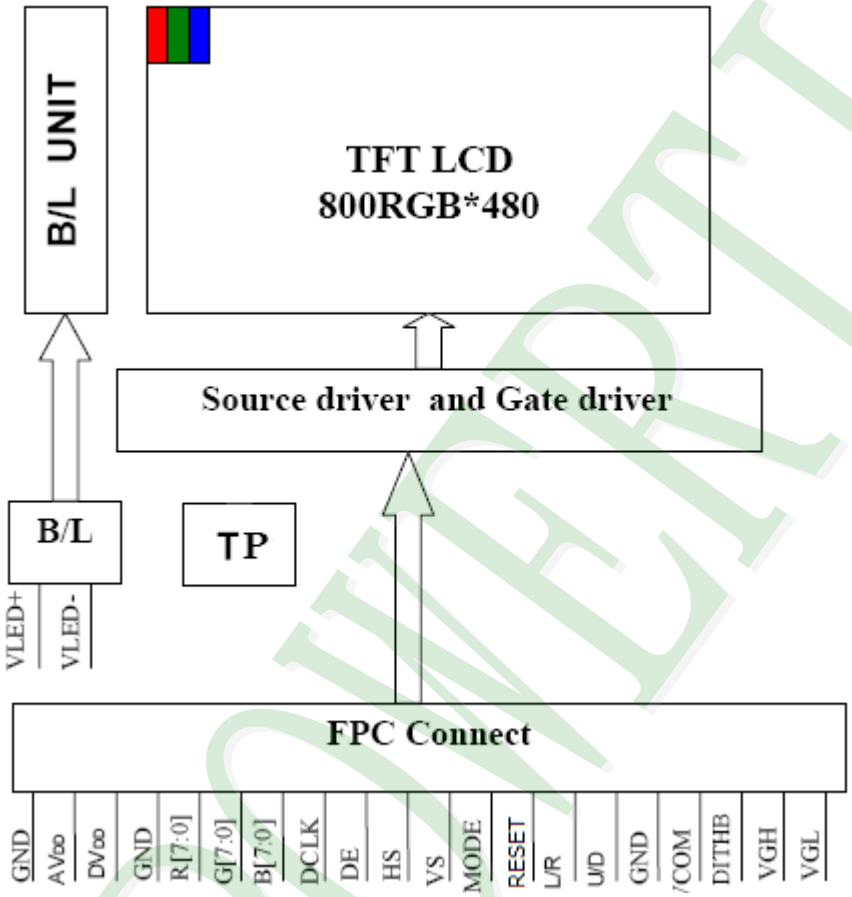
# 2. MODULE STRUCTURE

## 2.1 Counter Drawing

### 2.1.1 LCM Mechanical Diagram

* See Appendix

### 2.1.2 Block Diagram



## 2.2 Interface Pin Description

| Pin NO. | SYMBOL | DESCRIPTION | Type:Remark |
|---|---|---|---|
| 1 | $V_{LED+}$ | Power For LED backlight (+). | Power |
| 2 | $V_{LED+}$ | Power For LED backlight (+). | Power |
| 3 | $V_{LED-}$ | Power For LED backlight (-). | Power |
| 4 | $V_{LED-}$ | Power For LED backlight (-). | Power |
| 5 | GND | Power ground. | Power |
| 6 | $V_{com}$ | Common voltage. | I |
| 7 | $DV_{DD}$ | Power for Digital Circuit. | I |
| 8 | MODE | DE/SYNC mode select. | I,Note 1 |
| 9 | DE | Data Input Enable. | I |
| 10 | VS | Vertical Sync Input. | I |
| 11 | HS | Horizontal Sync Input. | I |
| 12 | B7 | Blue Data(MSB). | I |
| 13 | B6 | Blue Data. | I |
| 14 | B5 | Blue Data. | I |
| 15 | B4 | Blue Data. | I |
| 16 | B3 | Blue Data. | I |
| 17 | B2 | Blue Data. | I |
| 18 | B1 | Blue Data. | I:Note 2 |
| 19 | B0 | Blue Data(LSB). | I:Note 2 |
| 20 | G7 | Green Data(MSB). | I |
| 21 | G6 | Green Data. | I |
| 22 | G5 | Green Data. | I |
| 23 | G4 | Green Data. | I |
| 24 | G3 | Green Data. | I |
| 25 | G2 | Green Data. | I |
| 26 | G1 | Green Data. | I:Note 2 |
| 27 | G0 | Green Data(LSB). | I:Note 2 |
| 28 | R7 | Red Data(MSB). | I |
| 29 | R6 | Red Data. | I |
| 30 | R5 | Red Data. | I |
| 31 | R4 | Red Data. | I |
| 32 | R3 | Red Data. | I |
| 33 | R2 | Red Data. | I |
| 34 | R1 | Red Data. | I:Note 2 |
| 35 | R0 | Red Data(LSB). | I:Note 2 |
| 36 | GND | Power Ground | Power |
| 37 | DCLK | Sample clock | I:Note 3 |

| Pin NO. | SYMBOL | DESCRIPTION | Type:Remark |
|---|---|---|---|
| 38 | GND | Power Ground. | Power |
| 39 | L/R | Left / right selection. | I:Note 4 |
| 40 | U/D | Left / right selection. | I:Note 4 |
| 41 | $V_{GH}$ | Gate On Voltage. | Power |
| 42 | $V_{GL}$ | Gate OFF Voltage. | Power |
| 43 | $AV_{DD}$ | Power for Analog Circuit. | Power |
| 44 | RESET | Global reset pin. | I:Note 5 |
| 45 | NC | No connection. | - |
| 46 | $V_{COM}$ | Common Voltage. | I |
| 47 | DITHB | Dithering Function. | I:Note 6 |
| 48 | GND | Power Ground. | Power |
| 49 | NC | No connection. | - |
| 50 | NC | No connection. | - |

I: input

Note 1: DE/SYNC mode select. Normally pull high.
When select DE mode, MODE=”1”, VS and HS must pull high.
When select SYNC mode, MODE= ”0”, DE must be grounded.

Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode.

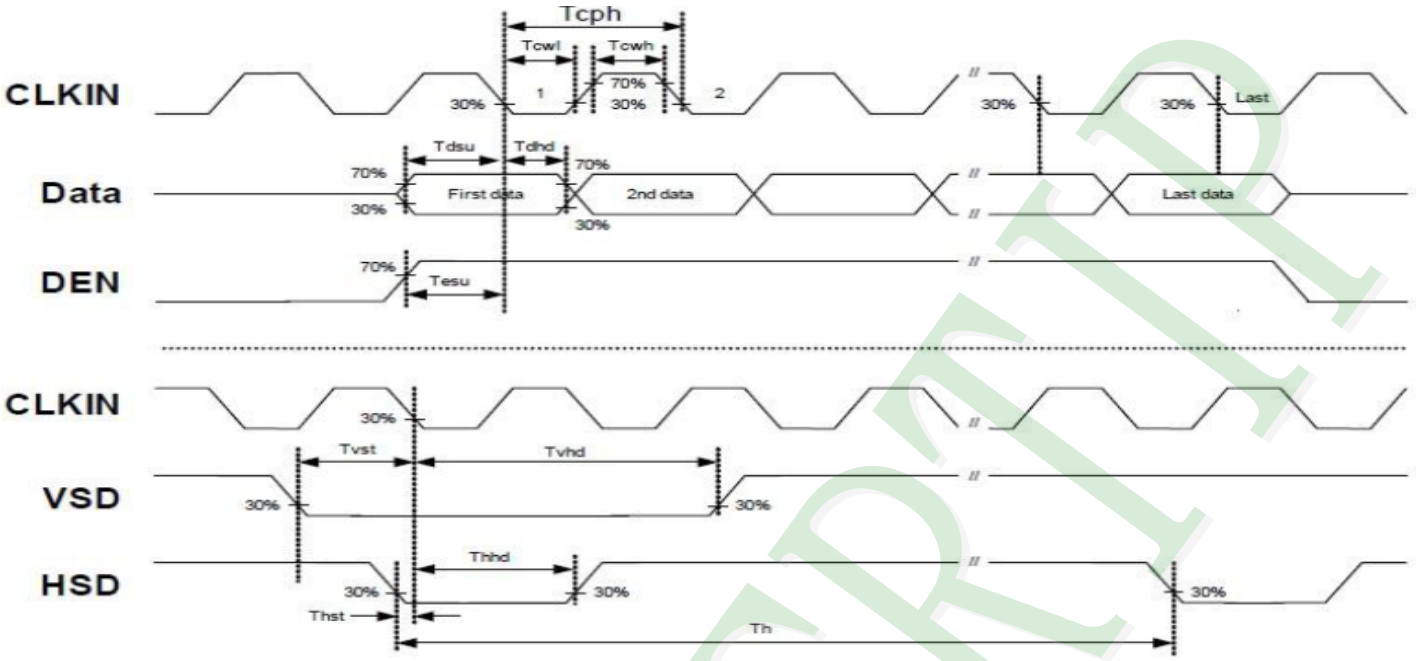
| Setting of scan control input | | Scanning direction |
|---|---|---|
| U/D | L/R | |
| GND | $DV_{DD}$ | Up to down, left to right |
| $DV_{DD}$ | GND | Down to up, right to left |
| GND | GND | Up to down, right to left |
| $DV_{DD}$ | $DV_{DD}$ | Down to up, left to right |

Note 5: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 6: Dithering function enable control, normally pull high.
When DITHB=”1”,Disable internal dithering function.
When DITHB=”0”,Enable internal dithering function.

## 2.3 Timing Characteristics

### 2.3.1 Signal AC Characteristics




| Item | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | 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 setup time | $T_{vhd}$ | 8 | - | - | ns | |
| VS setup time | $T_{dsu}$ | 8 | - | - | ns | |
| VS setup time | $T_{dhd}$ | 8 | - | - | ns | |
| DE setup time | $T_{esu}$ | 8 | - | - | ns | |
| DE hole time | $T_{ehd}$ | 8 | - | - | ns | |
| $DV_{DD}$ Power On Slew rate | $T_{POR}$ | - | - | 20 | ms | From 0 to 90%$DV_{DD}$ |
| RESET pulse width | $T_{Rst}$ | 1 | - | - | ms | |
| DCLK cycle time | $T_{coh}$ | 20 | - | - | ns | |
| DCLK pulse duty | $T_{cwh}$ | 40 | 50 | 60 | % | |

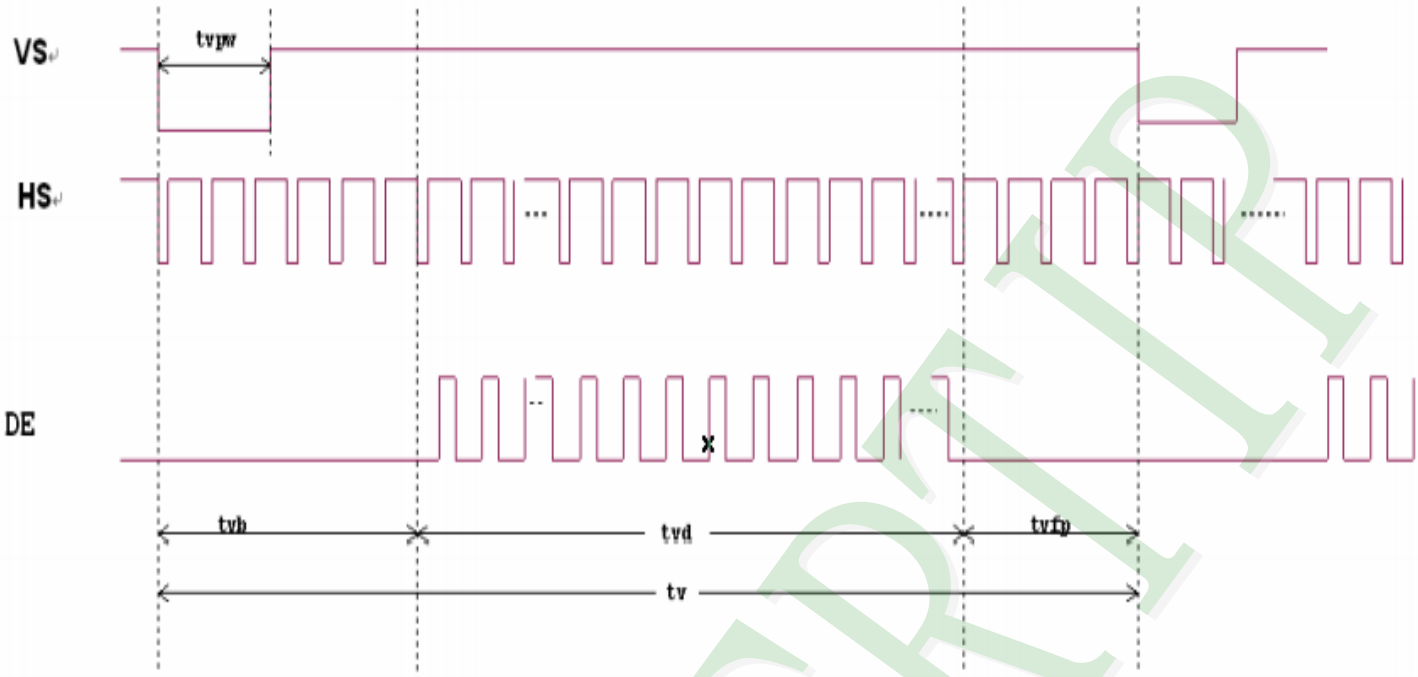
### 2.3.2 Input Timing Setting

| Item | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Horizontal Display Area | Thd | | 800 | | DCLK | |
| DCLK Frequency | Fclk | 26.4 | 33.3 | 46.8 | MHz | |
| One Horizontal Line | Th | 862 | 1056 | 1200 | DCLK | |
| HS pulse width | Thpw | 1 | | 40 | DCLK | |
| HS Blanking | Thb | 46 | 46 | 46 | DCLK | |
| HS Front Porch | Thfp | 16 | 210 | 354 | DCLK | |

| Item | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Vertical Display Area | Tvd | | 480 | | TH | |
| VS period time | Tv | 510 | 525 | 650 | TH | |
| VS pulse width | Tvpw | 1 | | 20 | TH | |
| VS Blanking | Tvb | 23 | 23 | 23 | TH | |
| VS Front Porch | Tvfp | 7 | 22 | 147 | TH | |

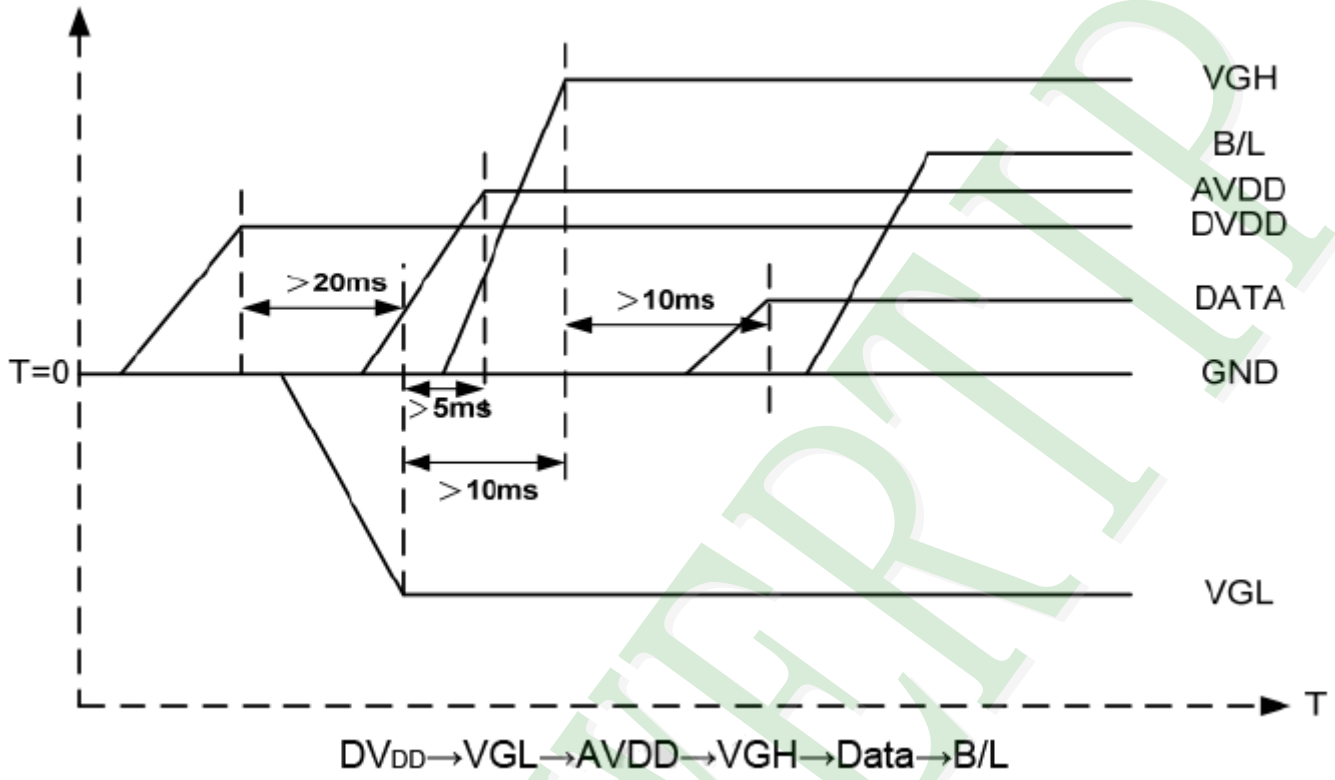
Horizontal input timing diaqram

Vertical input timing diaqram



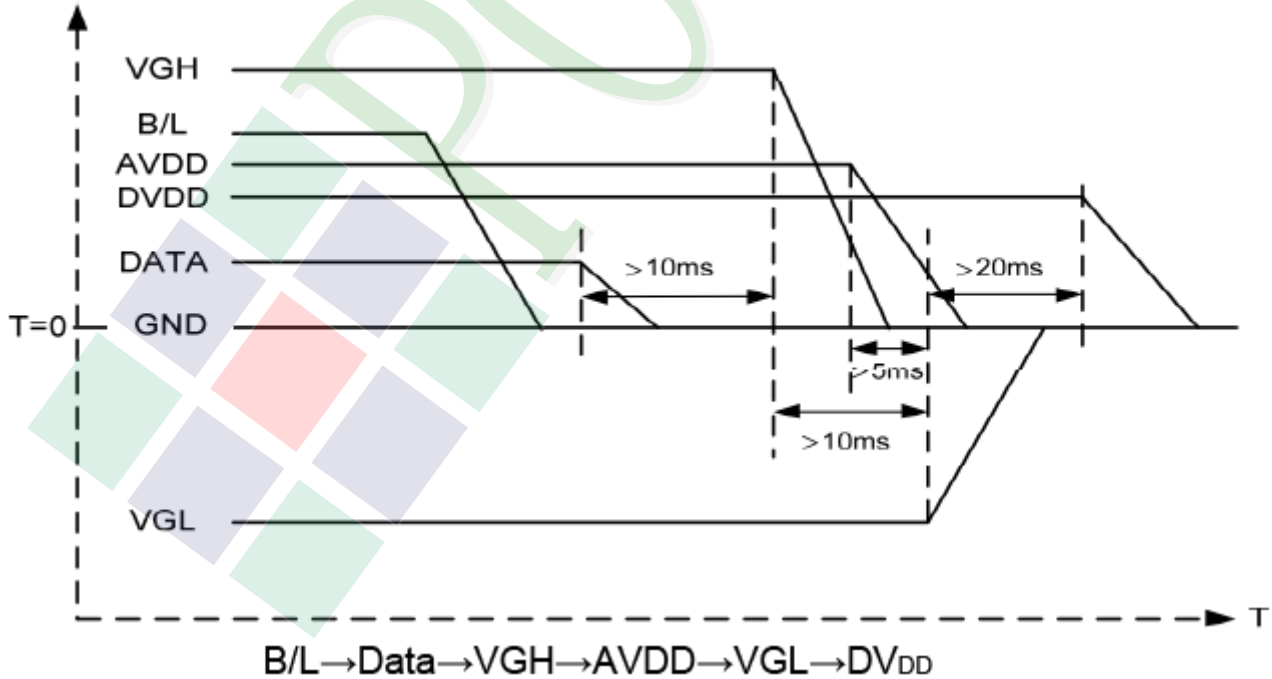
### 2.3.3 Power On/Off Characteristics

a. Power on:




$DV_{DD}$→VGL→AVDD→VGH→Data→B/L

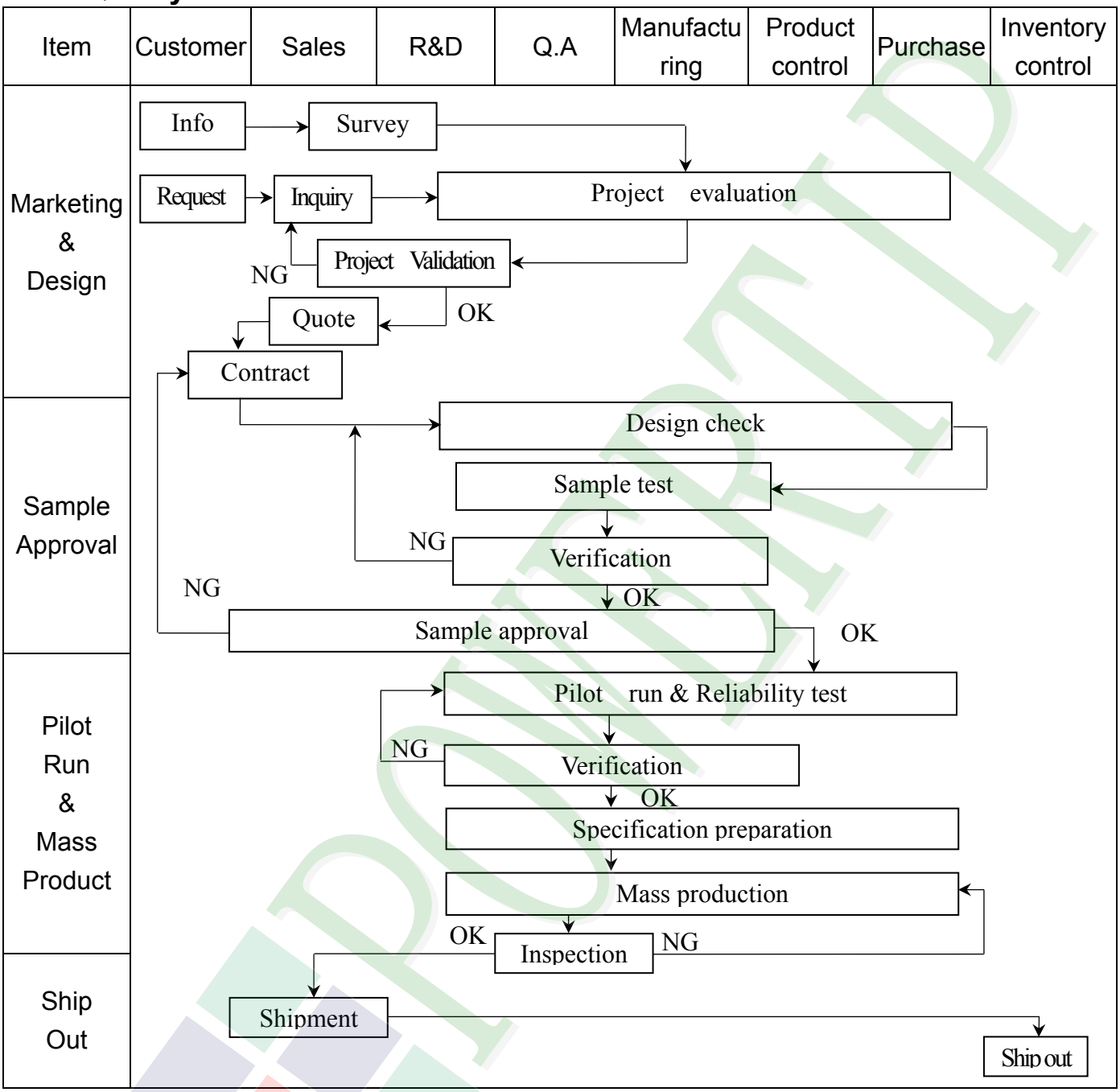
b. Power off:

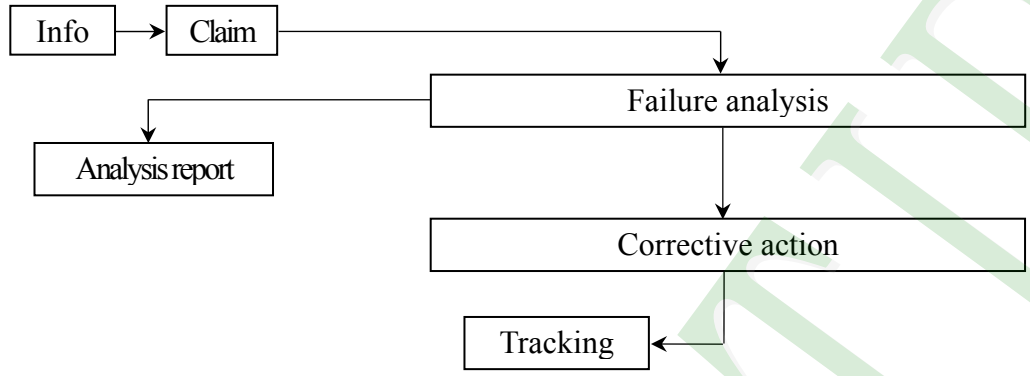



B/L→Data→VGH→AVDD→VGL→$DV_{DD}$

# 3. QUALITY ASSURANCE SYSTEM

## 3.1 Quality Assurance Flow Chart



| Item | Customer | Sales | R&D | Q.A | Manufacturing | Product control | Purchase | Inventory control |
|---|---|---|---|---|---|---|---|---|
| Sales Service |  | | | | | | | |
| Q.A Activity | 1. ISO 9001 Maintenance Activities<br>2. Process improvement proposal<br>3. Equipment calibration<br>4. Education And Training Activities<br>5. Standardization Management | | | | | | | |

## 3.2 Inspection Specification

◆Scope：The document shall be applied to TFT-LCD Module for 3.5″ ~15″ (Ver.B01).

◆Inspection Standard：MIL-STD-105E Table Normal Inspection Single Sampling Level Ⅱ.

◆Equipment：Gauge、MIL-STD、Powertip Tester、Sample

◆Defect Level：Major Defect AQL： 0.4 ； Minor Defect AQL： 1.5

◆OUT Going Defect Level：Sampling.

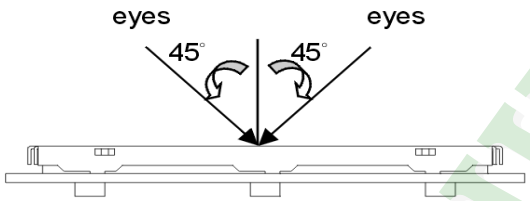
◆Standard of the product appearance test：

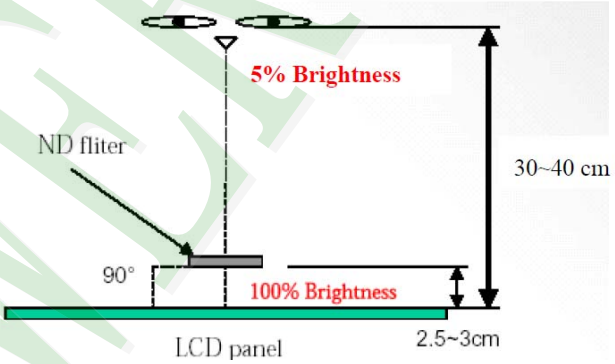
a. Manner of appearance test：

(1). The test best be under 20W×2 fluorescent light(about 300lux ～500lux)

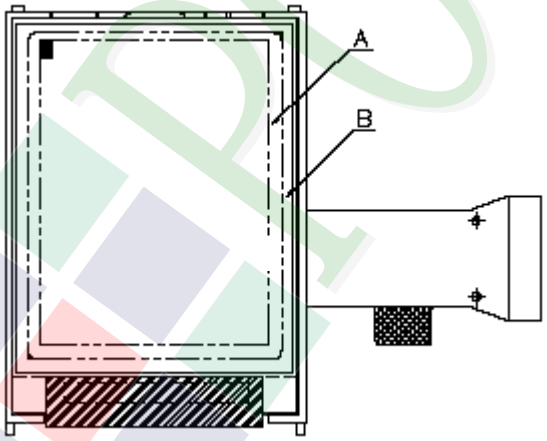
，and distance of view must be at 30~40 cm.

(2). The test direction is base on about around 45° of vertical line.




(3). Definition of area.




*A* area : viewing area

*B* area : Outside of viewing area

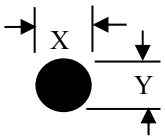
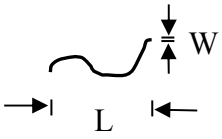
(4). Standard of inspection： (Unit：mm)

◆Specification For TFT-LCD Module 3.5″ ~15″：　(Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2.1The quantity is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>03</td><td>Outline dimension</td><td>3.1 Product dimension and structure must conform to structure diagram.</td><td>Major</td></tr>
<tr><td rowspan="6">04</td><td rowspan="6">Electrical Testing</td><td>4.1 Missing line character and icon.</td><td>Major</td></tr>
<tr><td>4.2 No function or no display.</td><td>Major</td></tr>
<tr><td>4.3 Display malfunction.</td><td>Major</td></tr>
<tr><td>4.4 LCD viewing angle defect.</td><td>Major</td></tr>
<tr><td>4.5 Current consumption exceeds product specifications.</td><td>Major</td></tr>
<tr><td>4.6 Mura can not be seen through 5% ND filter at 50% Gray screen , should be judged by the viewing angle of 90 degree.</td><td>Minor</td></tr>
<tr><td>05</td><td>Dot defect<br><br>(Bright dot、Dark dot)<br><br>On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q’ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 4</td></tr>
<tr><td>Dark Dot</td><td>≦ 5</td></tr>
<tr><td>Joint Dot</td><td>≦ 3</td></tr>
<tr><td>Total</td><td>≦ 7</td></tr>
</table>
5.1 Inspection pattern：full white , full black , Red , Green and blue screens.<br>
5.2 It is defined as dot defect if defect area ＞1/2 dot.<br>
5.3 The distance between two dot defect ≧5 mm.<br>
5.4 Bright dot that can not be seen through 5% ND filter.
</td><td>Minor</td></tr>
</table>

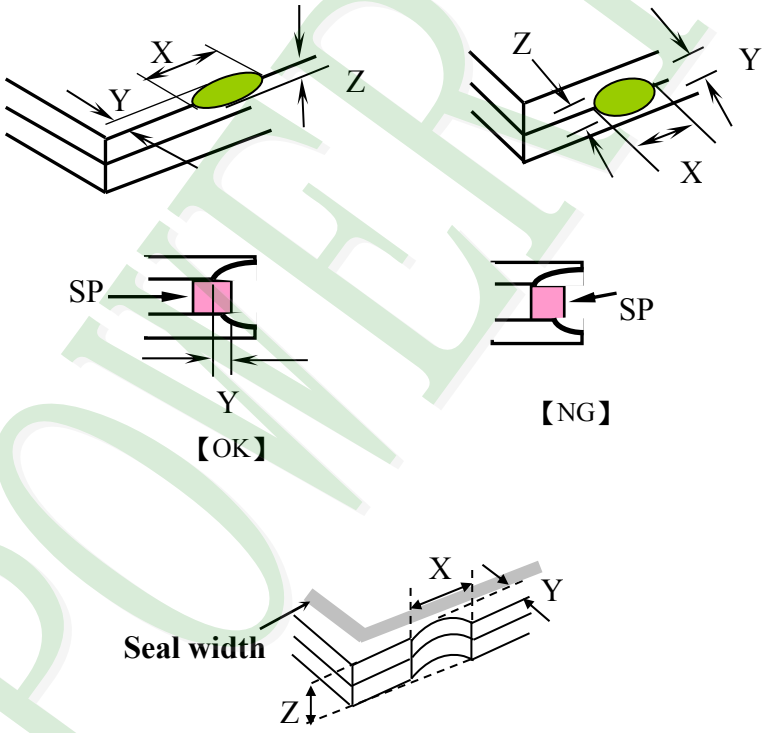
◆Specification For TFT-LCD Module 3.5″ ~15″：

(Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>06</td><td>Black or white dot、scratch、contamination<br><br>Round type<br>  <br><br>Φ＝(x＋y) / 2<br><br>Line type<br>  <br></td><td>6.1 Round type ( Non-display or display)：<br><table><tr><th rowspan="2">Dimension (diameter：Φ)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.25 ＜ Φ ≦ 0.50</td><td>5</td></tr><tr><td>Φ ＞ 0.50</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table><br>6.2 Line type( Non-display or display)：<br><table><tr><th rowspan="2">module size</th><th rowspan="2">Length (L)</th><th rowspan="2">Width (W)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td rowspan="5">3.5” to less 9”</td><td>---</td><td>W ≦ 0.03</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>L ≦10.0</td><td>0.03 ＜W ≦ 0.05</td><td>4</td></tr><tr><td>L ≦5.0</td><td>0.05 ＜W ≦ 0.10</td><td>2</td></tr><tr><td>---</td><td>W ＞0.10</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>5</td></tr><tr><td rowspan="4">9” to 15”</td><td>---</td><td>W ≦ 0.05</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>L ≦10.0</td><td>0.05 ＜W ≦ 0.10</td><td>5</td></tr><tr><td>---</td><td>W ＞0.10</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>5</td></tr></table></td><td>Minor</td></tr>
<tr><td>07</td><td>Polarizer Bubble</td><td><table><tr><th rowspan="2">Dimension (diameter：Φ)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>0.25 ＜ Φ ≦ 0.50</td><td>4</td></tr><tr><td>0.50 ＜ Φ ≦ 0.80</td><td>1</td></tr><tr><td>Φ ＞ 0.80</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table></td><td>Minor</td></tr>
</table>

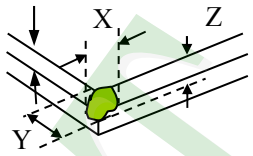
◆Specification For TFT-LCD Module 3.5″ ~15″：

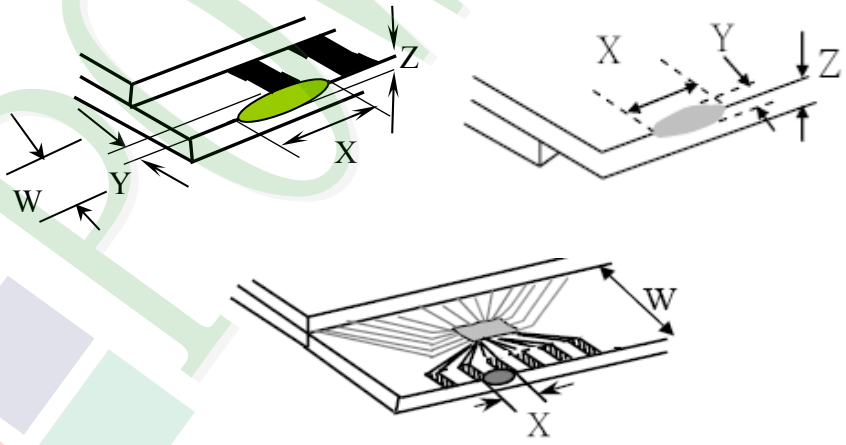
(Ver.B01)

| NO | Item | Criterion | Level |
|---|---|---|---|
| 08 | The crack of glass | Symbols：<br>X : The length of crack　　Y : The width of crack.<br>Z : The thickness of crack　　W : terminal length<br>t : The thickness of glass　　a : LCD side length<br>8.1 General glass chip：<br>8.1.1 Chip on panel surface and crack between panels:<br>  <br> | Minor |

| X | Y | Z |
|---|---|---|
| ≦ a | Crack can't enter viewing area | ≦1/2 t |
| ≦ a | Crack can't exceed the half of SP width. | 1/2 t < Z ≦2 t |

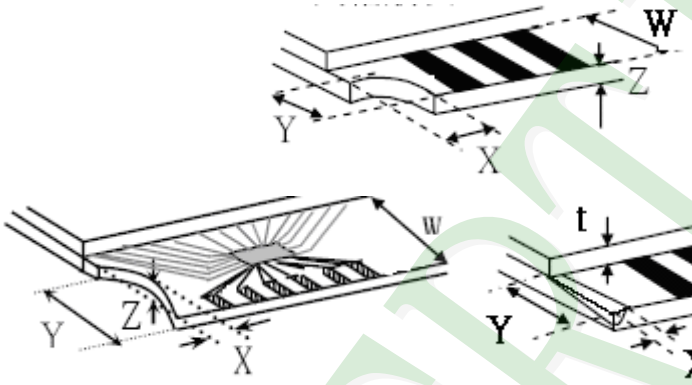
◆Specification For TFT-LCD Module 3.5″ ~15″ : (Ver.B01)

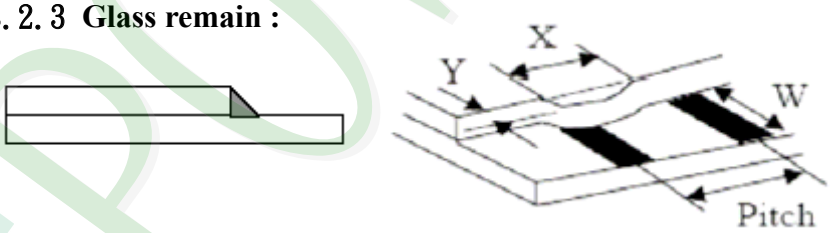
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="2">08</td><td rowspan="2">The crack of glass</td><td>
Symbols :<br><br>
X : The length of crack　　Y : The width of crack.<br>
Z : The thickness of crack　　W : terminal length<br>
t : The thickness of glass　　a : LCD side length<br><br>
8.1.2 Corner crack :<br>


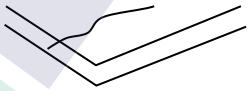
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t ＜ Z ≦ 2 t</td></tr>
</table>
</td><td rowspan="2">Minor</td></tr>
<tr><td>
8.2 Protrusion over terminal :<br>
8.2.1 Chip on electrode pad :<br>


<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table>
</td></tr>
</table>

◆Specification For TFT-LCD Module 3.5″ ~15″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>08</td><td>The crack of glass</td><td>
Symbols :<br><br>
X : The length of crack Y : The width of crack.<br>
Z : The thickness of crack W : terminal length<br>
t : The thickness of glass a : LCD side length<br><br>
8.2.2 Non-conductive portion :<br>


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ 1/3 a</td><td>≦ W</td><td>≦t</td></tr>
</table>
⊙ If the chipped area touches the ITO terminal, over 2/3 of<br>
● the ITO must remain and be inspected according to electrode terminal specifications.<br>
8.2.3 Glass remain :<br>


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦t</td></tr>
</table>
8.2.4 Cracking<br>

Not Allowed
</td><td>Minor</td></tr>
</table>

◆Specification For TFT-LCD Module 3.5″ ~15″：

(Ver.B01)

| NO | Item | Criterion | Level |
|---|---|---|---|
| 09 | Backlight elements | 9.1 Backlight can't work normally. | Major |
| | | 9.2 Backlight doesn't light or color is wrong. | Major |
| | | 9.3 Illumination source flickers when lit. | Major |
| 10 | General appearance | 10.1 Pin type、quantity、dimension must match type in structure diagram. | Major |
| | | 10.2 No short circuits in components on PCB or FPC . | Major |
| | | 10.3 Parts on PCB or FPC must be the same as on the production characteristic chart .There should be no wrong parts , missing parts or excess parts. | Major |
| | | 10.4 Product packaging must the same as specified on packaging specification sheet. | Minor |
| | | 10.5 The folding and peeled off in polarizer are not acceptable. | Minor |
| | | 10.6 The PCB or FPC between B/L assembled distance(PCB or FPC ) is ≦1.5 mm. | Minor |

# 4. RELIABILITY TEST

## 4.1 Reliability Test Condition (Ver.B01)

<table>
<tr><th>NO.</th><th>TEST ITEM</th><th>TEST CONDITION</th></tr>
<tr><td>1</td><td>High Temperature<br>Storage Test</td><td>Keep in +80 ±2℃ 240 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>2</td><td>Low Temperature<br>Storage Test</td><td>Keep in -30 ±2℃ 240 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>3</td><td>High Temperature /<br>High Humidity<br>Storage Test</td><td>Keep in +60℃ / 90% R.H duration for 240 hrs<br>Surrounding temperature, then storage at normal condition 4hrs.<br>(Excluding the polarizer)</td></tr>
<tr><td>4</td><td>Temperature Cycling<br>Storage Test</td><td>-30℃ → +25℃ → +80℃ → +25℃<br>(30mins) (5mins) (30mins) (5mins)<br>20 Cycle<br>Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">ESD Test</td><td>Air Discharge:<br>Apply 2 KV with 5 times<br>Discharge for each polarity +/-<br>Contact Discharge:<br>Apply 250 V with 5 times<br>discharge for each polarity +/-</td></tr>
<tr><td>1. Temperature ambiance : 15℃～35℃<br>2. Humidity relative : 30%～60%<br>3. Energy Storage Capacitance(Cs+Cd) : 150pF±10%<br>4. Discharge Resistance(Rd) : 330Ω±10%<br>5. Discharge, mode of operation :<br>Single Discharge (time between successive discharges at least 1 sec)<br>(Tolerance if the output voltage indication : ±5%)</td></tr>
<tr><td>6</td><td>Vibration Test<br>(Packaged)</td><td>1. Sine wave 10～55 Hz frequency (1 min)<br>2. The amplitude of vibration :1. 5 mm<br>3. Each direction (X、Y、Z) duration for 2 Hrs</td></tr>
<tr><td>7</td><td>Drop Test<br>(Packaged)</td><td>
<table>
<tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr>
<tr><td>0 ~ 45.4</td><td>122</td></tr>
<tr><td>45.4 ~ 90.8</td><td>76</td></tr>
<tr><td>90.8 ~ 454</td><td>61</td></tr>
<tr><td>Over 454</td><td>46</td></tr>
</table>
Drop direction :※1 corner / 3 edges / 6 sides each 1times
</td></tr>
</table>

# 5. PRECAUTION RELATING PRODUCT HANDLING

## 5.1 SAFETY

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

5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

## 5.2 HANDLING

5.2.1 Avoid any strong mechanical shock which can break the glass.

5.2.2 Avoid static electricity which can damage the CMOS LSI—when working with the module, be sure to ground your body and any electrical equipment you may be using.

5.2.3 Do not remove the panel or frame from the module.

5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)

5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

5.2.6 Do not touch the display area with bare hands, this will stain the display area.

5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8 To control temperature and time of soldering is 320±10℃and 3-5 sec.

5.2.9 To avoid liquid (include organic solvent) stained on LCM.

5.2.10 Caution! (LCM products with Capacitive Touch Panel)

Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).

Therefore, the touch needs to be thoroughly tested inside the target application.

## 5.3 STORAGE

5.3.1 Store the panel or module in a dark place where the temperature is 25℃ ±5℃ and the humidity is below 65% RH.

5.3.2 Do not place the module near organics solvents or corrosive gases.

5.3.3 Do not crush, shake, or jolt the module.

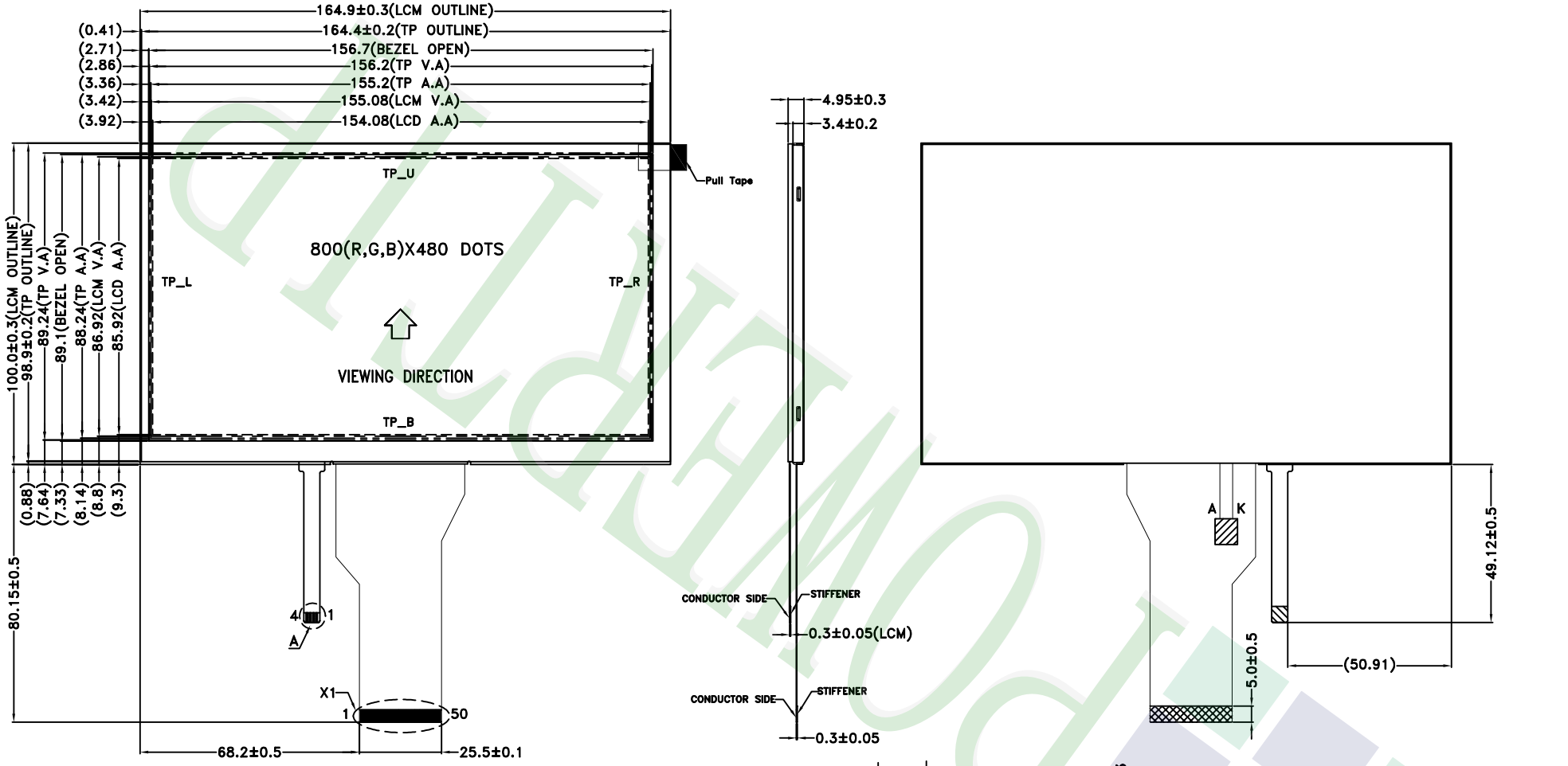
## 5.4 TERMS OF WARRANTY

5.4.1 Applicable warrant period

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

5.4.2 Unaccepted responsibility

This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.




NOTES:

1. LCD TYPE: TFT LCD
2. LCD DISPLAY: POSITIVE/TRANSMISSIVE
3. VIEW DIRECTION: 6 O'CLOCK
4. The tolerance unless classified ±0.2mm
5. FPC suggested connector : HIROSE FH12A-50S-0.5H or compatible
6. TP FPC suggested connector : JST SM06B-SHLS-TF(LF)(SM) or compatible

| Pin | Name |
|---|---|
| 1 | TP_R |
| 2 | TP_B |
| 3 | TP_L |
| 4 | TP_U |

| REV | REV BY | REVISER | DATE |
|---|---|---|---|
| 007 | | | |
| 006 | | | |
| 005 | | | |
| 004 | | | |
| 003 | | | |
| 002 | Add Pull Tape | Sally | 2015/05/18 |
| 001 | NEW DRAWING | Sally | 2015/02/28 |

PART NO: PH800480T013-IBB01

DRAWING NAME : JLMD-PH800480T013-IBB01

TITLE: LCD MODULE DRAWING

久正光電股份有限公司
POWERTIP TECHNOLOGY CORPORATION

| | | | |
|---|---|---|---|
| Design | Sally | (3) | Surface |
| Check | Terry | Unit | MM |
| Approve | Ryan | Scale | 1:1 |
| | | Page | 1/1 |
| | | Material | |
| | | Thickness | |
| | | Quantity | |

| Length(Mm) (mm) \ Tolerance \ Precision | Precision Level |
|---|---|
| 1 ~ 4 | - |
| 4 ~ 16 | - |
| 16 ~ 63 | - |
| 63 ~ 250 | - |
| 250 ~ 1000 | - |

PT-A-054-01

Ver.002

| Documents NO. | JPKG-PH800480T013-IBB01 |
|---|---|

# LCM包裝規格書
## LCM Packaging Specifications

| Approve | Check | Contact |
|---|---|---|
| Ryan | Terry | Sally |

1.包裝材料規格表 (Packaging Material) : (per carton)

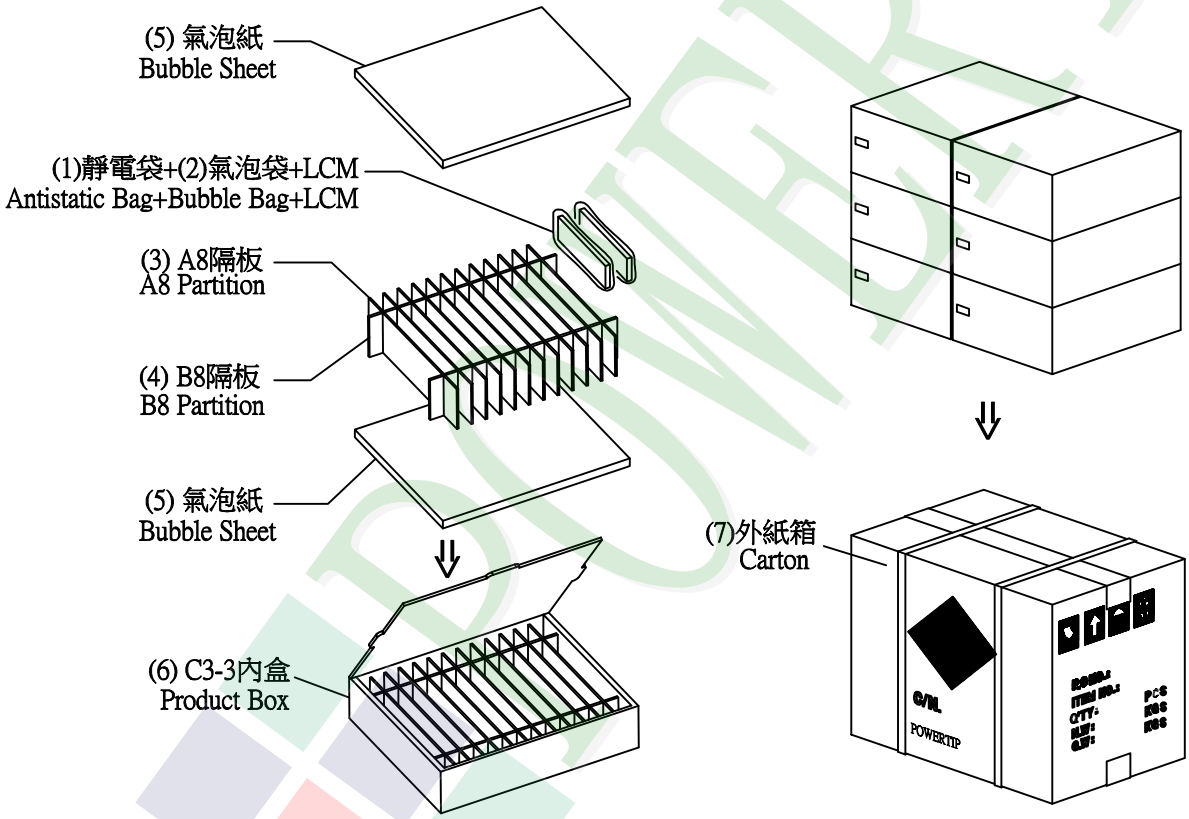
| No. | Item | Model | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|---|---|---|---|---|---|---|
| 1 | 成品 (LCM) | PH800480T013-IBB01 | 164.9 X 100.0 X4.95 | 0.166 | 66 | 10.956 |
| 2 | 靜電袋(1)Antistatic Bag | BAG240170ARABA | 240 X 170 | 0.0048 | 66 | 3.168 |
| 3 | 氣泡袋(2)Bubble Bag | BAG170150BRABA | 170 X 150 | 0.0045 | 66 | 0.297 |
| 4 | A8隔板(3)A8 Partition | BX00000000051 | 245 X 105 X 3 | 0.0135 | 72 | 0.972 |
| 5 | B8隔板(4)B8 Partition | BX00000000050 | 295 X 105 X 3 | 0.0168 | 12 | 0.2016 |
| 6 | 氣泡紙(5)Bubble Sheet | BAG280240BWABA | 280 X 240 | 0.006 | 12 | 0.144 |
| 7 | C3-3內盒(6)Product Box | BX31025511AABA | 310 X 255 X 116 | 0.17 | 6 | 1.02 |
| 8 | 外紙箱(7)Carton | BX52732536CCBA | 527 X 325 X 360 | 0.83 | 1 | 0.83 |
| 9 | | | | | | |

2.一 整箱總重量 (Total LCD Weight in carton ) : 17.59 Kg±10%

3.單箱數量規格表 (Packaging Specifications and Quantity) :

(1)Quantity Of Spacer : A8隔板 X 12 , B8隔板 X 2

(2)Total LCM quantity in carton : quantity per box 11 x no of boxes 6 = 66




特 記 事 項 (REMARK)

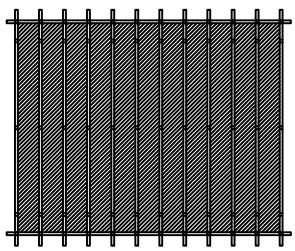
4. Label Specifications :

依廠內標準作業

5. LCM排放示意圖(前後間隔不放置):

5. LCM placed as figure showing:

( First and last slot should be empty)



模組(LCM) X 1pcs.

POWERTIP