

## SPECIFICATIONS

|                        |   |                                  |
|------------------------|---|----------------------------------|
| CUSTOMER               | : |                                  |
| SAMPLE CODE            | : | SH800480T013-IHC08               |
| MASS PRODUCTION CODE   | : | PH800480T013-IHC08               |
| SAMPLE VERSION         | : | 02                               |
| SPECIFICATIONS EDITION | : | 005                              |
| DRAWING NO. (Ver.)     | : | LMD-PH800480T013-IHC08 (Ver.004) |
| PACKAGING NO. (Ver.)   | : | PKG-PH800480T013-IHC08 (Ver.003) |

**Customer Approved**

**Date:**

| Approved            | Checked           | Designer            |
|---------------------|-------------------|---------------------|
| 黃秋源<br>Oliver Huang | 石建莊<br>Stone Shin | 王聖硯<br>Stephen Wang |

- ☐ Preliminary specification for design input  
☒ Specification for sample approval



## POWERTIP TECH. CORP.

### Headquarters:

No.8, 6<sup>th</sup> Road, Taichung Industrial Park,  
Taichung, Taiwan  
台中市 407 工業區六路 8 號

TEL: 886-4-2355-8168  
FAX: 886-4-2355-8166

E-mail: [sales@powertip.com.tw](mailto:sales@powertip.com.tw)  
[Http://www.powertip.com.tw](http://www.powertip.com.tw)

## History of Version

| Date<br>(mm / dd / yyyy) | Ver. | Edi. | Description                                                                                                                                           | Page        | Design by |
|--------------------------|------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| 02/14/2017               | 01   | 001  | New Drawing                                                                                                                                           | -           | Stephen   |
| 05/15/2017               | 01   | 002  | New Sample                                                                                                                                            | -           | Stephen   |
| 06/30/2017               | 01   | 003  | Modify Spec                                                                                                                                           | 4 、 10      | Stephen   |
| 09/17/2019               | 02   | 004  | Second Sample<br>Create the MOSFET for BL circuit                                                                                                     | -           | Stephen   |
| 01/25/2021               | 02   | 005  | Modify Spec<br>1.Update Firmware Version for MCU<br>2.New Description for Backlights<br>3.New Description for LCM Drawing<br>4.New Description for J6 | 4 、 10 、 14 | Stephen   |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |
|                          |      |      |                                                                                                                                                       |             |           |

## Contents

### 1. SPECIFICATIONS

- 1.1 Features
- 1.2 Mechanical Specifications
- 1.3 Absolute Maximum Ratings
- 1.4 DC Electrical Characteristics
- 1.5 Optical Characteristics
- 1.6 Backlight Characteristics
- 1.7 Touch Panel Characteristics

### 2. MODULE STRUCTURE

- 2.1 Counter Drawing
- 2.2 Interface Pin Description
- 2.3 HDMI Characteristics

### 3. QUALITY ASSURANCE SYSTEM

- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

### 4. RELIABILITY TEST

- 4.1 Reliability Test Condition

### 5. PRECAUTION RELATING PRODUCT HANDLING

- 5.1 Safety
- 5.2 Handling
- 5.3 Storage
- 5.4 Terms of Warranty

Appendix : LCM Drawing  
LCM Packaging Specifications

## 1. SPECIFICATIONS

### 1.1 Features

| Item                  | Standard Value                                                                                                                                                                                                            |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display Resolution    | 800 *3 (RGB) * 480 Dots                                                                                                                                                                                                   |
| LCD Type              | a-Si TFT , Normally white , Transmissive type                                                                                                                                                                             |
| Touch Panel           | Projective Capacitive Touch Panel<br>USB HID Touch                                                                                                                                                                        |
| Screen Size(inch)     | 7.0 inch                                                                                                                                                                                                                  |
| Viewing Direction     | 6 O'clock                                                                                                                                                                                                                 |
| LCD Surface Treatment | Anti-Glare                                                                                                                                                                                                                |
| Color Configuration   | R.G.B. Vertical Stripe                                                                                                                                                                                                    |
| Backlight Type        | White LED B/L                                                                                                                                                                                                             |
| MCU Firmware          | 0xb8                                                                                                                                                                                                                      |
| Interface             | HDMI                                                                                                                                                                                                                      |
| ROHS                  | THIS PRODUCT CONFORMS THE ROHS OF PTC<br>Detail information please refer website :<br><a href="http://www.powertip.com.tw/news_detail.php?Key=1&amp;clD=1">http://www.powertip.com.tw/news_detail.php?Key=1&amp;clD=1</a> |

### 1.2 Mechanical Specifications

| Item              | Standard Value                     | Unit |
|-------------------|------------------------------------|------|
| Outline Dimension | 186.8 (W) * 110.56 (L) * 20.45 (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 |
|----------------------------------|----------------------|-----------|-------|-------|------|
| Power Supply for Digital Circuit | V <sub>5V</sub>      | GND=0V    | -0.3  | +6.0  | V    |
| Power Supply for Analog Circuit  | V <sub>12V</sub>     | GND=0V    | -0.3  | +26.0 | V    |
| Gate on – Gate off Voltage       | V <sub>GH-VGL</sub>  |           | -     | +40.0 | V    |
| Gate on Voltage                  | V <sub>GH</sub>      |           | -0.3  | +40.0 | V    |
| Gate off Voltage                 | V <sub>G</sub> L     |           | -20.0 | +0.3  | V    |
| Analog Supply Voltage            | AVDD                 |           | +6.5  | +13.5 | V    |
| Digital Supply Voltage           | DVDD                 |           | -0.3  | +5.0  | V    |
| Operating Temperature            | T <sub>OP</sub> (Ts) | Note 1    | -20   | +70   | °C   |
| Storage Temperature              | T <sub>ST</sub> (Ta) | Note 2    | -30   | +85   | °C   |

Note 1 : Ts is the temperature of panel's surface

Note 2 : Ta is the ambient temperature of samples

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

#### Module

GND = 0V, Ta = 25 °C

| Item                 | Symbol            | Min.     | Typ. | Max.     | Unit | Remark                 |
|----------------------|-------------------|----------|------|----------|------|------------------------|
| Input Signal Voltage | V <sub>12V</sub>  | 11.5     | 12.0 | 12.5     | V    | -                      |
| Supply Current       | I <sub>V12V</sub> | -        | 350  | 750      | mA   | Pattern = Full Display |
| Logic Input Voltage  | V <sub>IH</sub>   | 0.7*DVDD | -    | DVDD     | V    | -                      |
|                      | V <sub>IL</sub>   | GND      | -    | 0.3*DVDD | V    | -                      |

## 1.5 Optical Characteristics

### TFT LCD Module

Ta=25℃

| Item                                                           |        | Symbol | Condition                | Min.                                    | Typ. | Max. | unit |                   |
|----------------------------------------------------------------|--------|--------|--------------------------|-----------------------------------------|------|------|------|-------------------|
| Response Time                                                  | Rise   | Tr     | Ta = 25℃<br>θX, θY = 0°  | -                                       | 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     | Ta = 25℃<br>θX , θY = 0° | 400                                     | 500  | -    | -    | Note 3            |
| Color of CIE<br>Coordinate<br>( With B/L )                     | White  | X      |                          | 0.24                                    | 0.29 | 0.34 | -    | Note1             |
|                                                                |        | Y      |                          | 0.28                                    | 0.33 | 0.38 |      |                   |
|                                                                | Red    | X      |                          | 0.52                                    | 0.57 | 0.62 |      |                   |
|                                                                |        | Y      |                          | 0.30                                    | 0.35 | 0.40 |      |                   |
|                                                                | Green  | X      |                          | 0.29                                    | 0.34 | 0.39 |      |                   |
|                                                                |        | Y      |                          | 0.54                                    | 0.59 | 0.64 |      |                   |
|                                                                | Blue   | X      |                          | 0.09                                    | 0.14 | 0.19 |      |                   |
|                                                                |        | Y      |                          | 0.03                                    | 0.08 | 0.13 |      |                   |
| Average Brightness<br>Pattern=White Display<br>( With LCD ) *1 |        | IV     |                          | V12V=12.0V<br>PWM="High"<br>(Duty=100%) | 680  | 850  | -    | cd/m <sup>2</sup> |
| Uniformity<br>( With LCD ) *2                                  |        | △B     |                          | 70                                      | -    | -    | %    | Note1             |

Note 1:

\*1 :  $\Delta B = B(\min) / B(\max) * 100\%$

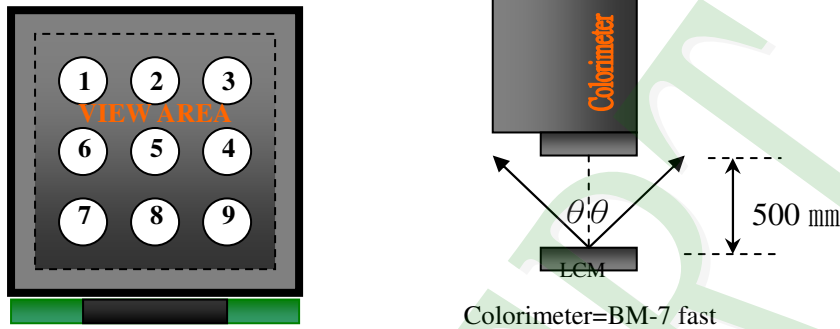
\*2 : Measurement Condition for Optical Characteristics:

a : Environment:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  /  $60 \pm 20\% \text{R.H}$  , no wind , dark room below 10 Lux at typical lamp current and typical operating frequency.

b : Measurement Distance:  $500 \pm 50 \text{ mm}$  , ( $\theta = 0^{\circ}$ )

c : Equipment: TOPCON BM-7 fast , (field  $1^{\circ}$ ) , after 10 minutes operation.

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



To be measured at the center area of panel with a viewing cone of  $1^{\circ}$  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.

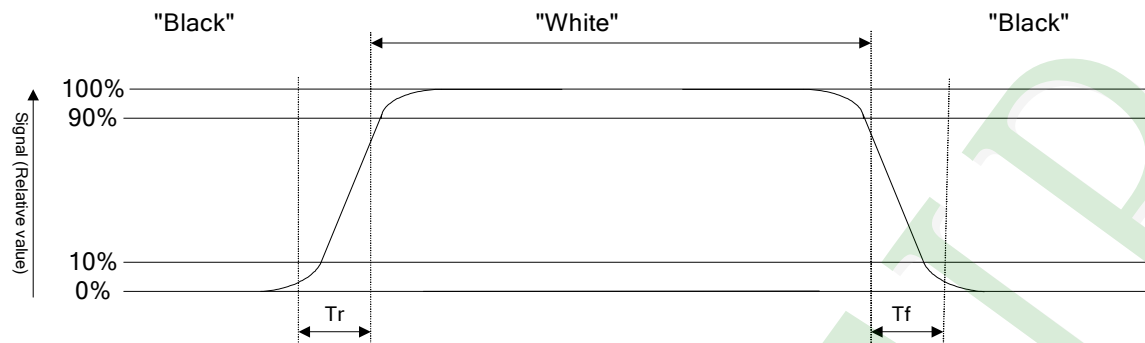
The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



## Normally Black



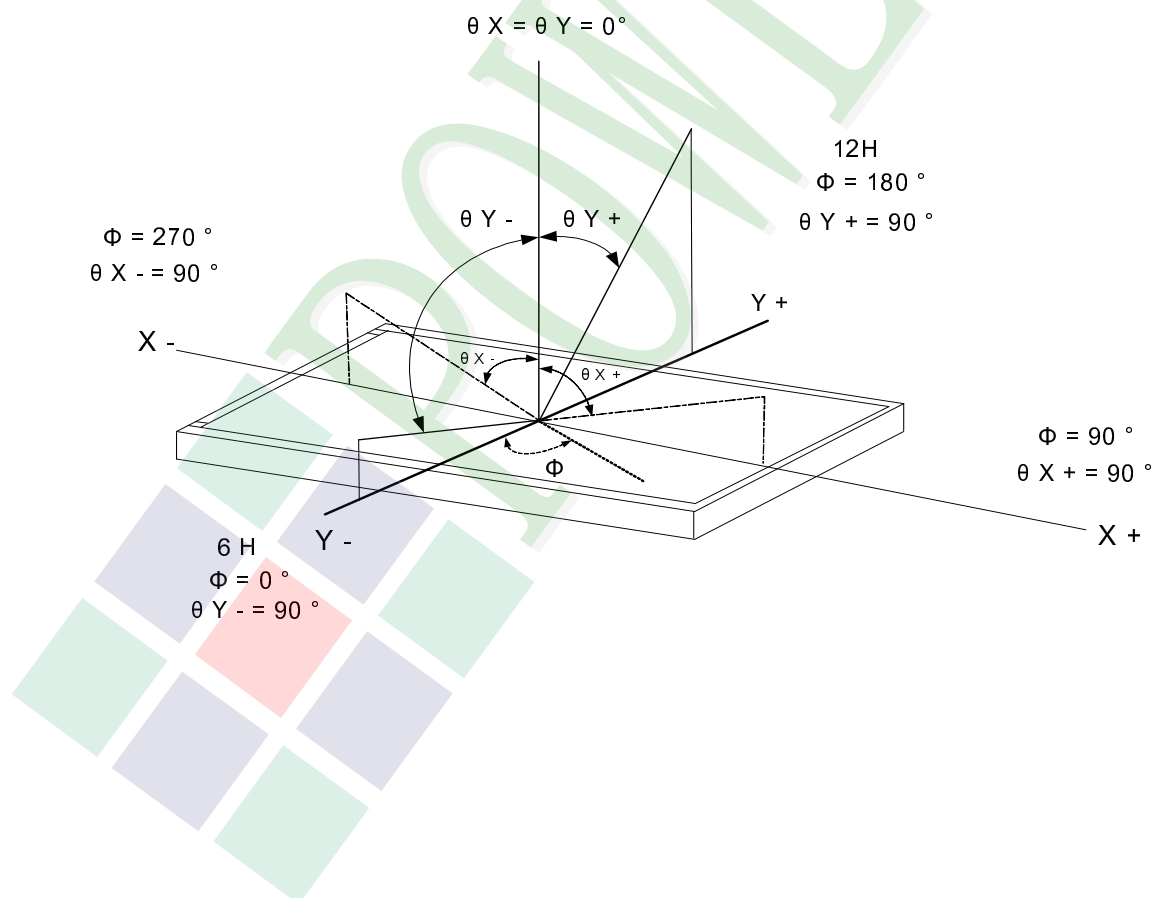
Note3: Definition of contrast ratio:

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

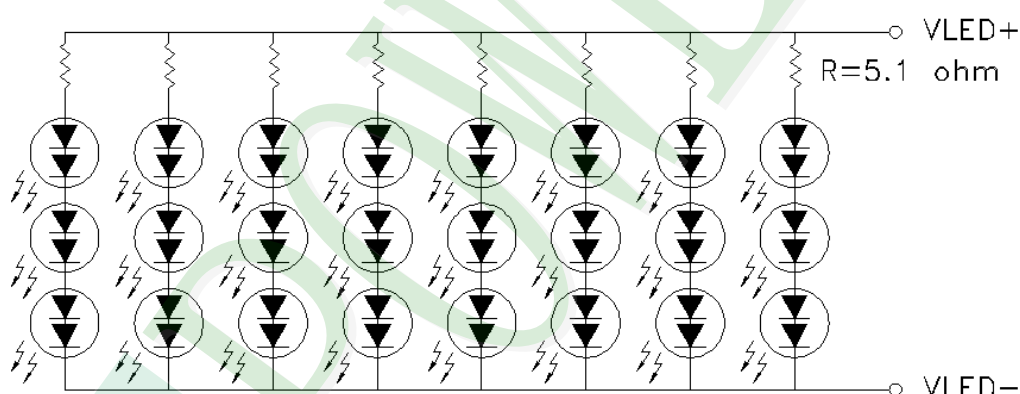
| Item                | Symbol | Min. | Max. | Unit | Remark  |
|---------------------|--------|------|------|------|---------|
| LED Forward Current | $I_F$  |      | 35   | mA   | One LED |
| LED Reverse Voltage | $V_R$  |      | 10   | V    |         |

### Electrical / Optical Characteristics

| Item          | Symbol | Condition          | Min.  | Typ. | Max. | Unit | Remark |
|---------------|--------|--------------------|-------|------|------|------|--------|
| LED Voltage   | $V_L$  | $I_L=140\text{mA}$ | 14.7  | 18.0 | 19.2 | V    | Note1  |
| LED life time | -      |                    | 50000 | -    | -    | hr   | Note2  |

Note 1: The LED Supply Voltage is defined by the number of LED at  $T_a=25\text{ }^{\circ}\text{C}$ .

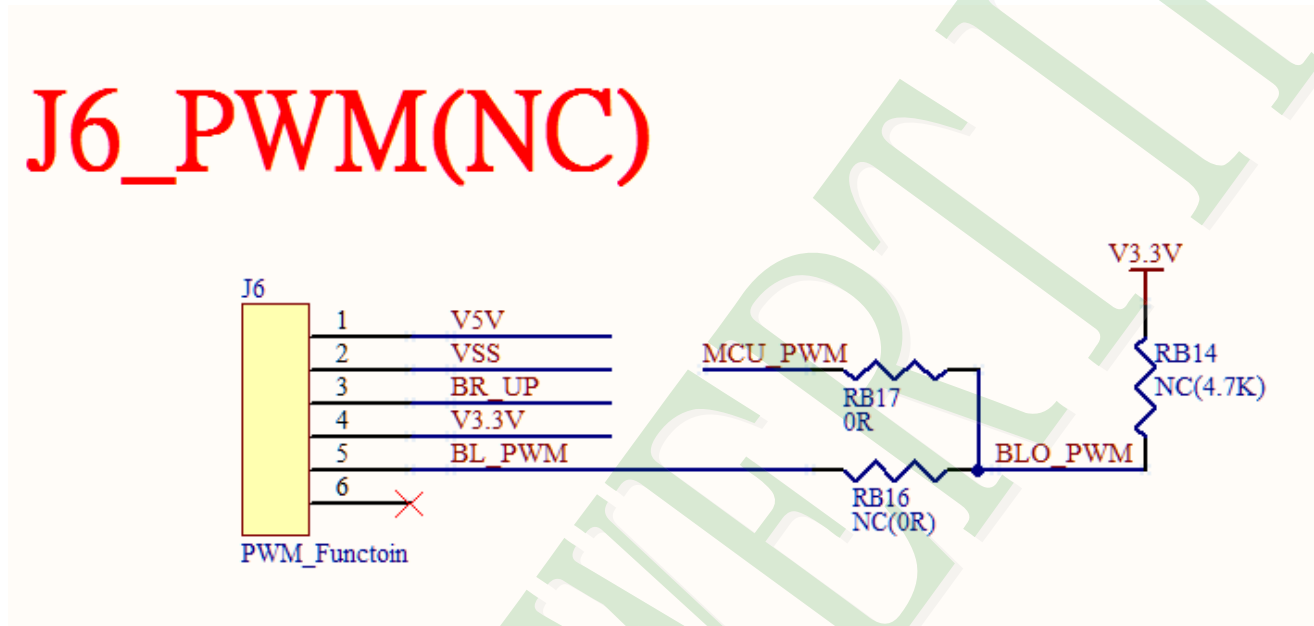
Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $T_a=25\text{ }^{\circ}\text{C}$  and  $I_L=140\text{ mA}$ . The LED life time could be decreased if operating  $I_L$  is larger than 140 mA.



## 1.6.1 Backlight Brightness Control

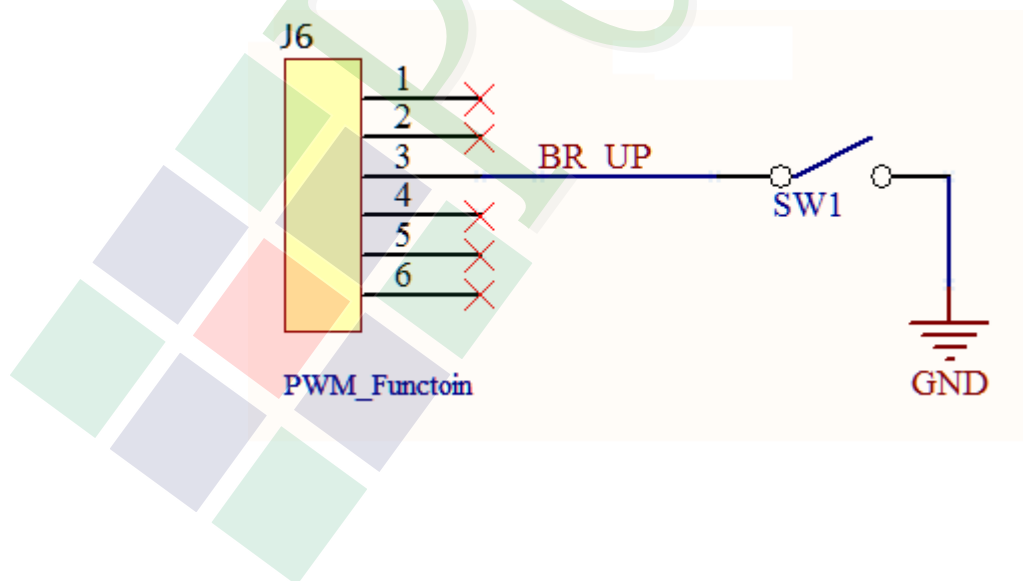
### 1.6.1.1 GPIO\_PWM (Optional)

If you want to control the display brightness, the user should connect an externally generated pulse width for pin #5 of J6. Please modify resistor RB16 and RB17 :RB17 open / RB16 short (zero-ohm resistor).



### 1.6.1.2 Hardware Push Button Switch (Active)

Use switch to setting the backlight brightness, low active for 10 cycles to brightness control.



## 1.7 Touch Panel Characteristics

### Features

| Item             | Standard Value         |
|------------------|------------------------|
| Touch Panel Size | 7"                     |
| Touch Type       | Capacitive Touch Panel |
| Input Method     | Finger                 |
| Interface        | I <sup>2</sup> C       |
| Address          | 0x38 (7-bit)           |

### I<sup>2</sup>C Address

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0     | 1     | 1     | 1     | 0     | 0     | 0     | R/W   |

Bit 0: 0 for Write / 1 for Read

### Mechanical Specifications

| Item                      | Standard Value         | Unit |
|---------------------------|------------------------|------|
| Viewing Area              | 154.88 (W) * 86.72 (L) | mm   |
| Number of Sensing Channel | 28 * 16                |      |

### Absolute Maximum Ratings

| Item                  | Symbol          | Condition | Min. | Max. | Unit |
|-----------------------|-----------------|-----------|------|------|------|
| Supply Voltage        | TP_VDD          | -         | -0.3 | +6.0 | V    |
| Operating Temperature | T <sub>OP</sub> | -         | -20  | +70  | °C   |
| Storage Temperature   | T <sub>ST</sub> | -         | -30  | +80  | °C   |

### DC Electrical Characteristics

| Item                 | Symbol | Condition | Min.         | Typ. | Max.         | Unit |
|----------------------|--------|-----------|--------------|------|--------------|------|
| Power Supply Voltage | TP_VDD | -         | 2.8          | 3.3  | 3.6          | V    |
| Input High Voltage   | VIH    | -         | 0.85 * TPVDD | -    | -            | V    |
| Input Low Voltage    | VIL    | -         | -            | -    | 0.15 * TPVDD | V    |

### Touch Panel IC Read/Write description & Register Mapping

Reference : HYCON Touch Driver Porting Reference Guide.

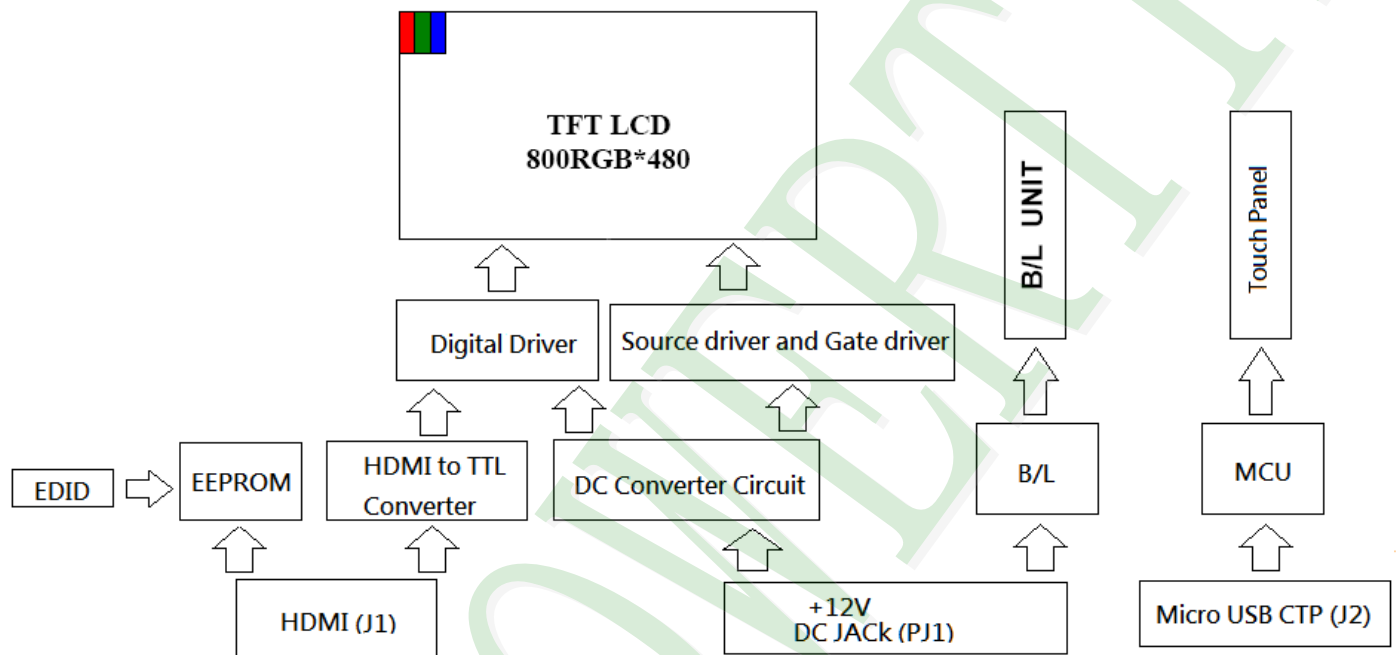
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

#### 2.1.2 Block Diagram



## 2.2 Interface Pin Description

### 2.2.1 (J1:HDMI 1.3 A type Interface)

| Pin# | Name            | Description          |
|------|-----------------|----------------------|
| 1    | TX2+            | TMDS Data 2+         |
| 2    | TX2 Shield      | TMDS Data 2 Shield   |
| 3    | TX2–            | TMDS Data 2-         |
| 4    | TX1+            | TMDS Data 1+         |
| 5    | TX1 Shield      | TMDS Data 1 Shield   |
| 6    | TX1–            | TMDS Data 1-         |
| 7    | TX0+            | TMDS Data 0+         |
| 8    | TX0 Shield      | TMDS Data 0 Shield   |
| 9    | TX0–            | TMDS Data 0-         |
| 10   | TXC+            | TMDS Clock+          |
| 11   | TXC Shield      | TMDS Clock Shield    |
| 12   | TXC–            | TMDS Clock-          |
| 13   | CEC             | CEC                  |
| 14   | NC              | No connection        |
| 15   | SCL             | Serial Clock for DDC |
| 16   | SDA             | Serial Data for DDC  |
| 17   | GND             | Power Ground         |
| 18   | V5V             | +5V Power for HDMI   |
| 19   | Hot Plug Detect | Hot Plug Detect      |

## 2.2.2 (PJ1:POWER DC JACK Interface)

### PJ1



Hold  $\Phi 6.4\text{mm}$  / Center Pin  $\Phi 2.0\text{mm}$

| Pin# | Name | Description  |
|------|------|--------------|
| 1    | V12V | +12V Power   |
| 2    | GND  | Power Ground |

## 2.2.3 (J2:Micro USB Capacitive Touch Panel Interface)

| Pin# | Name | Description                  |
|------|------|------------------------------|
| 1    | V5V  | V <sub>Bus</sub> 4.75V-5.25V |
| 2    | D-   | Data-                        |
| 3    | D+   | Data+                        |
| 4    | ID   | No Connection                |
| 5    | GND  | Power Ground.                |

## 2.2.4 (J6:Backlights Control Interface)

| Pin# | Name  | Description                              |
|------|-------|------------------------------------------|
| 1    | V5V   | Output Voltage: 4.75V~5.25V              |
| 2    | GND   | Power Ground.                            |
| 3    | BR_UP | Brightness control for customer (Note 1) |
| 4    | 3V3   | Output Voltage: 3.0V~3.6V                |
| 5    | BL_EN | a pin as an input of PWM                 |
| 6    | NC    | No Connection                            |

**Note 1:** This function have 10 cycles for brightness control.

## 2.3 HDMI Characteristics

### 2.3.1 Signal DC&AC Characteristics

#### DC ELECTRICAL CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

| PARAMETER                                                                    | TEST CONDITIONS              | MIN                    | TYP | MAX                   | UNIT |
|------------------------------------------------------------------------------|------------------------------|------------------------|-----|-----------------------|------|
| V <sub>ID</sub> Analog input differential voltage <sup>(1)</sup>             |                              | 75                     |     | 1200                  | mV   |
| V <sub>IC</sub> Analog input common-mode voltage <sup>(1)</sup>              |                              | AV <sub>DD</sub> – 300 |     | AV <sub>DD</sub> – 37 | mV   |
| V <sub>I(OC)</sub> Open-circuit analog input voltage                         |                              | AV <sub>DD</sub> – 10  |     | AV <sub>DD</sub> + 10 | mV   |
| I <sub>DD(2PIX)</sub> Normal 2-pix/clock power supply current <sup>(2)</sup> | ODCK = 82.5 MHz, 2-pix/clock |                        |     | 370                   | mA   |
| I <sub>PD</sub> Power-down current <sup>(3)</sup>                            | $\overline{PD}$ = low        |                        |     | 10                    | mA   |
| I <sub>PDO</sub> Output drive power-down current <sup>(3)</sup>              | $\overline{PDO}$ = low       |                        | 35  |                       | mA   |

(1) Specified as dc characteristic with no overshoot or undershoot

(2) Alternating 2-pixel black/2-pixel white pattern. ST = high, STAG = high, QE[23:0] and QO[23:0] C<sub>L</sub> = 10 pF.

(3) Analog inputs are open circuit (transmitter is disconnected from TFP401/401A).

#### AC ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER                                                                                  | TEST CONDITIONS                                          | MIN | TYP | MAX  | UNIT                            |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------|-----|-----|------|---------------------------------|
| V <sub>ID(2)</sub> Differential input sensitivity <sup>(1)</sup>                           |                                                          | 150 |     | 1560 | mV <sub>p-p</sub>               |
| t <sub>ps</sub> Analog input intra-pair (+ to –) differential skew <sup>(2)</sup>          |                                                          |     |     | 0.4  | t <sub>bit</sub> <sup>(3)</sup> |
| t <sub>ccs</sub> Analog input inter-pair or channel-to-channel skew <sup>(2)</sup>         |                                                          |     |     | 1    | t <sub>pix</sub> <sup>(4)</sup> |
| t <sub>jitter</sub> Worst-case differential input clock jitter tolerance <sup>(2)(5)</sup> |                                                          | 50  |     |      | ps                              |
| t <sub>f1</sub> Fall time of data and control signals <sup>(6)(7)</sup>                    | ST = low, C <sub>L</sub> = 5 pF                          |     |     | 2.4  | ns                              |
|                                                                                            | ST = high, C <sub>L</sub> = 10 pF                        |     |     | 1.9  |                                 |
| t <sub>r1</sub> Rise time of data and control signals <sup>(6)(7)</sup>                    | ST = low, C <sub>L</sub> = 5 pF                          |     |     | 2.4  | ns                              |
|                                                                                            | ST = high, C <sub>L</sub> = 10 pF                        |     |     | 1.9  |                                 |
| t <sub>r2</sub> Rise time of ODCK clock <sup>(6)</sup>                                     | ST = low, C <sub>L</sub> = 5 pF                          |     |     | 2.4  | ns                              |
|                                                                                            | ST = high, C <sub>L</sub> = 10 pF                        |     |     | 1.9  |                                 |
| t <sub>f2</sub> Fall time of ODCK clock <sup>(6)</sup>                                     | ST = low, C <sub>L</sub> = 5 pF                          |     |     | 2.4  | ns                              |
|                                                                                            | ST = high, C <sub>L</sub> = 10 pF                        |     |     | 1.9  |                                 |
| t <sub>su1</sub> Setup time, data and control signal to falling edge of ODCK               | 1 pixel/clock, PIXS = low, OCK_INV = low                 | 1.8 |     |      | ns                              |
|                                                                                            | 2 pixel/clock, PIXS = high, STAG = high, OCK_INV = low   | 3.8 |     |      |                                 |
|                                                                                            | 2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = low | 0.7 |     |      |                                 |
| t <sub>h1</sub> Hold time, data and control signal to falling edge of ODCK                 | 1 pixel/clock, PIXS = low, OCK_INV = low                 | 0.6 |     |      | ns                              |
|                                                                                            | 2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = low | 2.5 |     |      |                                 |
|                                                                                            | 2 pixel/clock, PIXS = high, STAG = high, OCK_INV = low   | 2.9 |     |      |                                 |

(1) Specified as ac parameter to include sensitivity to overshoot, undershoot and reflection.

(2) By characterization

(3) t<sub>bit</sub> is 1/10 the pixel time, t<sub>pix</sub>

(4) t<sub>pix</sub> is the pixel time defined as the period of the RxC input clock. The period of ODCK is equal to t<sub>pix</sub> in 1-pixel/clock mode or 2t<sub>pix</sub> when in 2-pixel/clock mode.

(5) Measured differentially at 50% crossing using ODCK output clock as trigger

(6) Rise and fall times measured as time between 20% and 80% of signal amplitude.

(7) Data and control signals are QE[23:0], QO[23:0], DE, HSYNC, VSYNC. and CTL[3:1].

## AC ELECTRICAL CHARACTERISTICS (continued)

over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER      |                                                                   | TEST CONDITIONS                                           | MIN  | TYP  | MAX  | UNIT      |
|----------------|-------------------------------------------------------------------|-----------------------------------------------------------|------|------|------|-----------|
| $t_{su2}$      | Setup time, data and control signal to rising edge of ODCK        | 1 pixel/clock, PIXS = low, OCK_INV = high                 | 2.1  |      |      | ns        |
|                |                                                                   | 2 pixel/clock, PIXS = high, STAG = high, OCK_INV = high   | 4    |      |      |           |
|                |                                                                   | 2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = high | 1.5  |      |      |           |
| $t_{h2}$       | Hold time, data and control signal to rising edge of ODCK         | 1 pixel/clock, PIXS = low, OCK_INV = high                 | 0.5  |      |      | ns        |
|                |                                                                   | 2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = high | 2.4  |      |      |           |
|                |                                                                   | 2 pixel/clock, PIXS = high, STAG = high, OCK_INV = high   | 2.1  |      |      |           |
| $f_{ODCK}$     | ODCK frequency                                                    | PIX = low (1-PIX/CLK)                                     | 25   |      | 165  | MHz       |
|                |                                                                   | PIX = high (2-PIX/CLK)                                    | 12.5 |      | 82.5 |           |
|                | ODCK duty-cycle                                                   |                                                           | 40%  | 50%  | 60%  |           |
| $t_{pd(PDL)}$  | Propagation delay time from $\overline{PD}$ low to Hi-Z outputs   |                                                           |      |      | 9    | ns        |
| $t_{pd(PDOL)}$ | Propagation delay time from $\overline{PDO}$ low to Hi-Z outputs  |                                                           |      |      | 9    | ns        |
| $t_{l(HSC)}$   | Transition time between DE transition to SCDT low <sup>(8)</sup>  |                                                           |      | 1e6  |      | $t_{pix}$ |
| $t_{l(FSC)}$   | Transition time between DE transition to SCDT high <sup>(8)</sup> |                                                           |      | 1600 |      | $t_{pix}$ |
| $t_{d(st)}$    | Delay time, ODCK latching edge to QE[23:0] data output            | STAG = low, PIXS = high                                   |      | 0.25 |      | $t_{pix}$ |

(8) Link active or inactive is determined by amount of time detected between DE transitions. SCDT indicates link activity.

## 2.3.2 Parameter Measurement Information

### PARAMETER MEASUREMENT INFORMATION

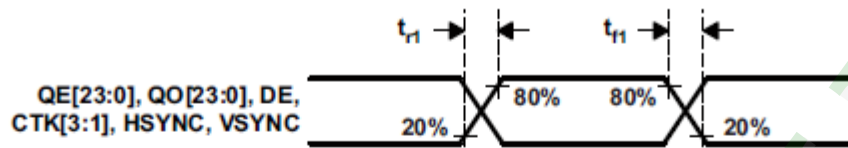


Figure 1. Rise and Fall Times of Data and Control Signals

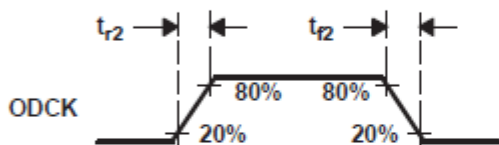


Figure 2. Rise and Fall Times of ODCCK



Figure 3. ODCCK Frequency

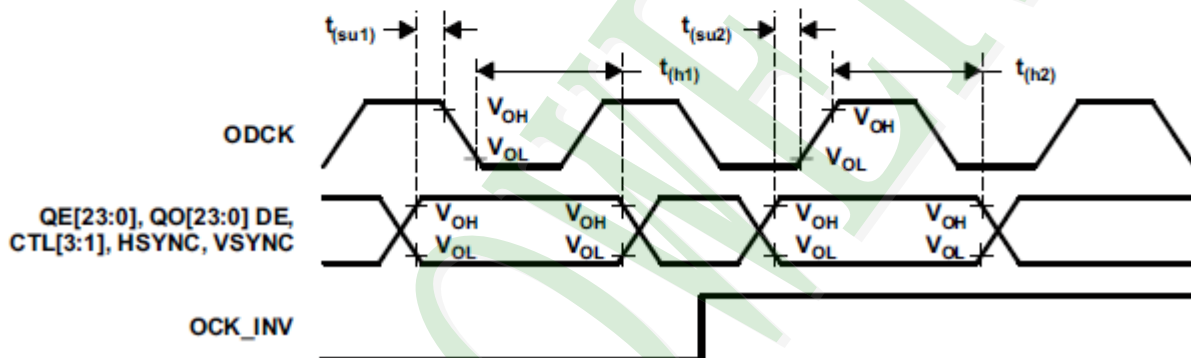


Figure 4. Data Setup and Hold Times to Rising and Falling Edges of ODCCK

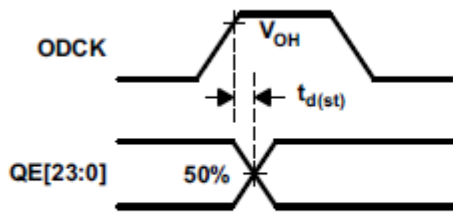


Figure 5. ODCK High to QE[23:0] Staggered Data Output

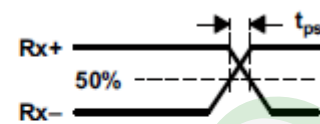


Figure 6. Analog Input Intra-Pair Differential Skew

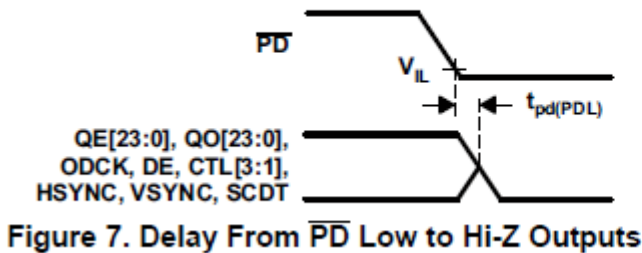


Figure 7. Delay From  $\overline{PD}$  Low to Hi-Z Outputs

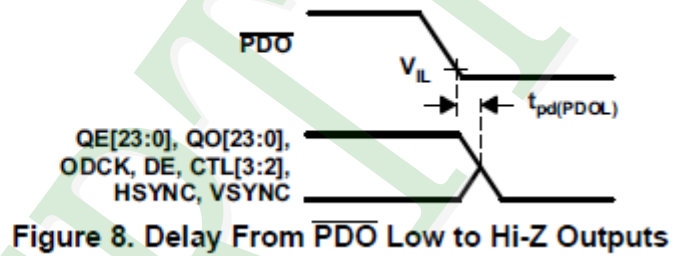


Figure 8. Delay From  $\overline{PDO}$  Low to Hi-Z Outputs

## PARAMETER MEASUREMENT INFORMATION (continued)

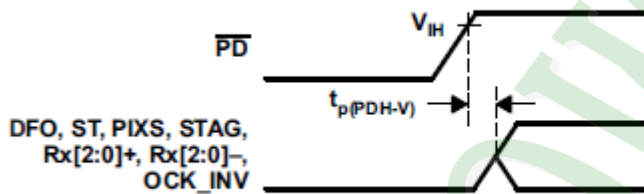


Figure 9. Delay From  $\overline{PD}$  Low to High Before Inputs Are Active

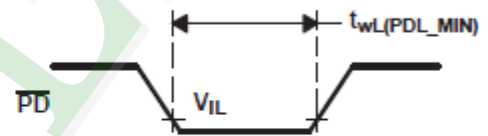


Figure 10. Minimum Time  $\overline{PD}$  Low

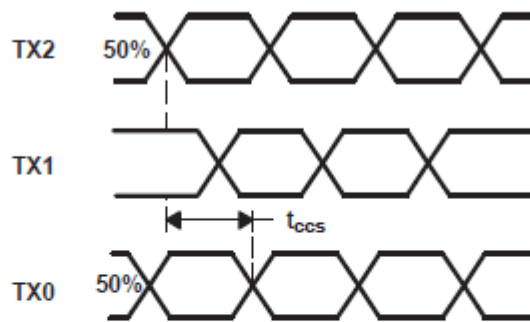


Figure 11. Analog Input Channel-to-Channel Skew

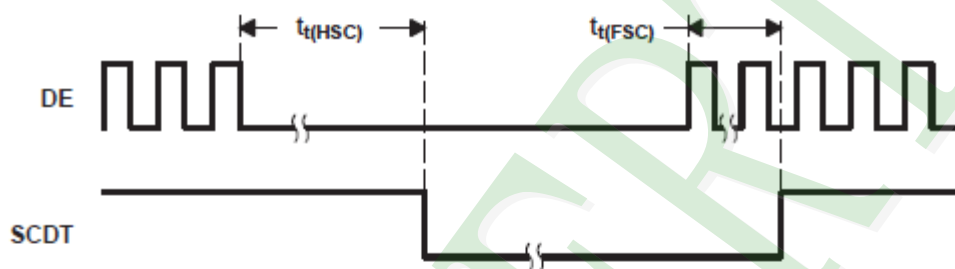


Figure 12. Time Between DE Transitions to SCDT Low and SCDT High

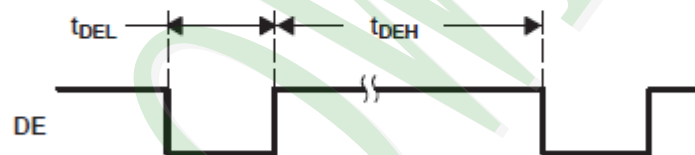


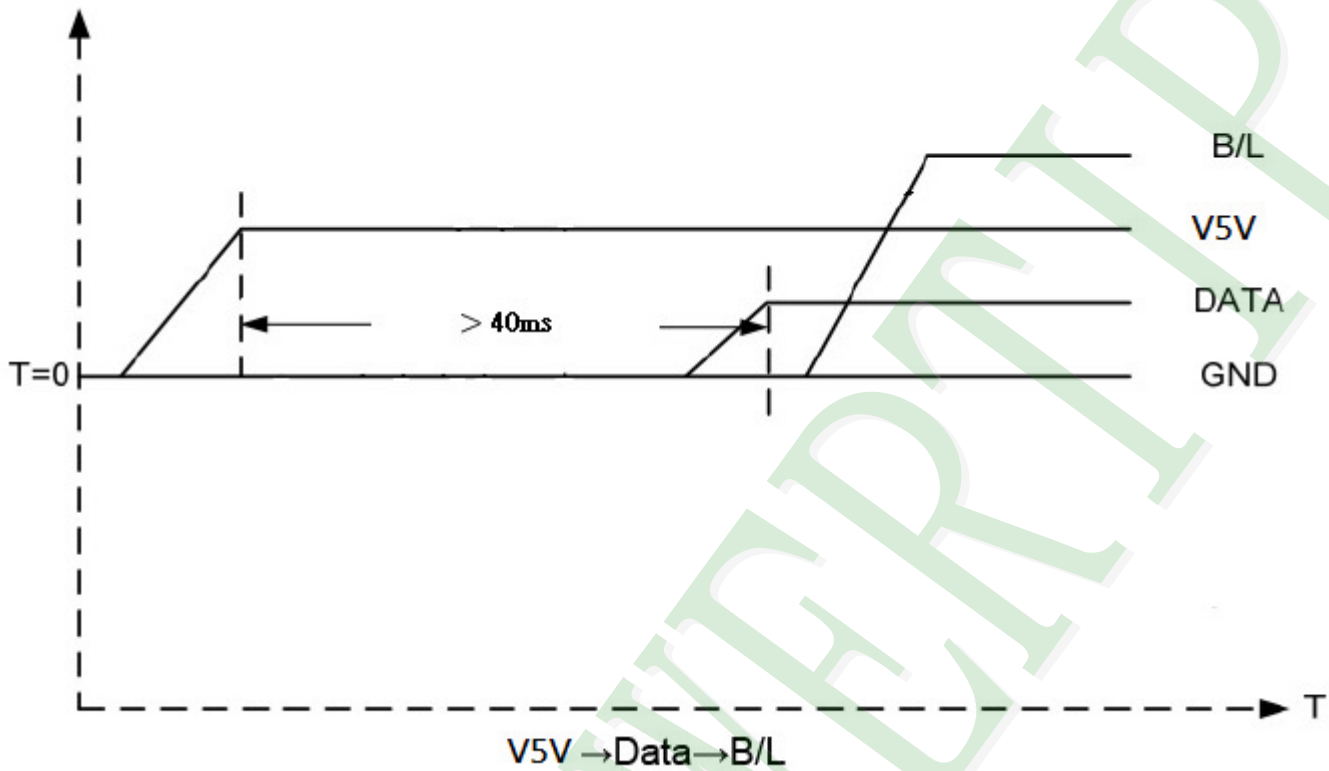
Figure 13. Minimum DE Low and Maximum DE High

## DETAILED DESCRIPTION

## 2.3.3 Power Sequence

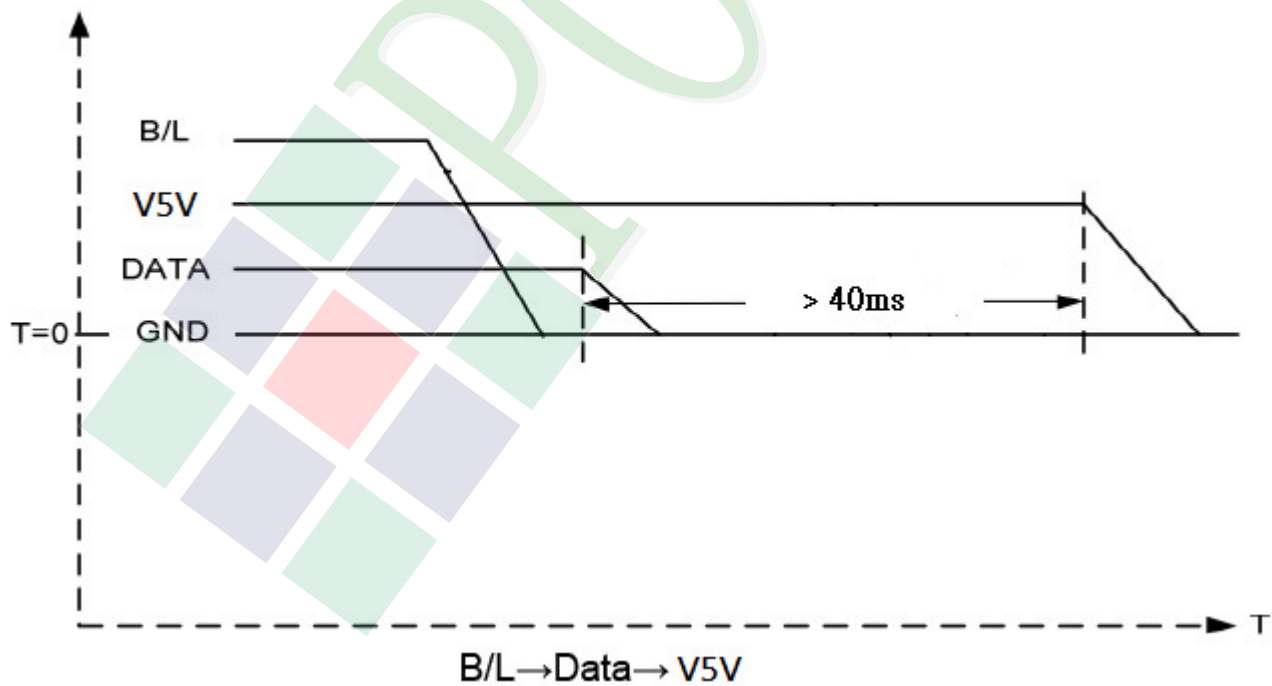
### POWER ON

a. Power on:



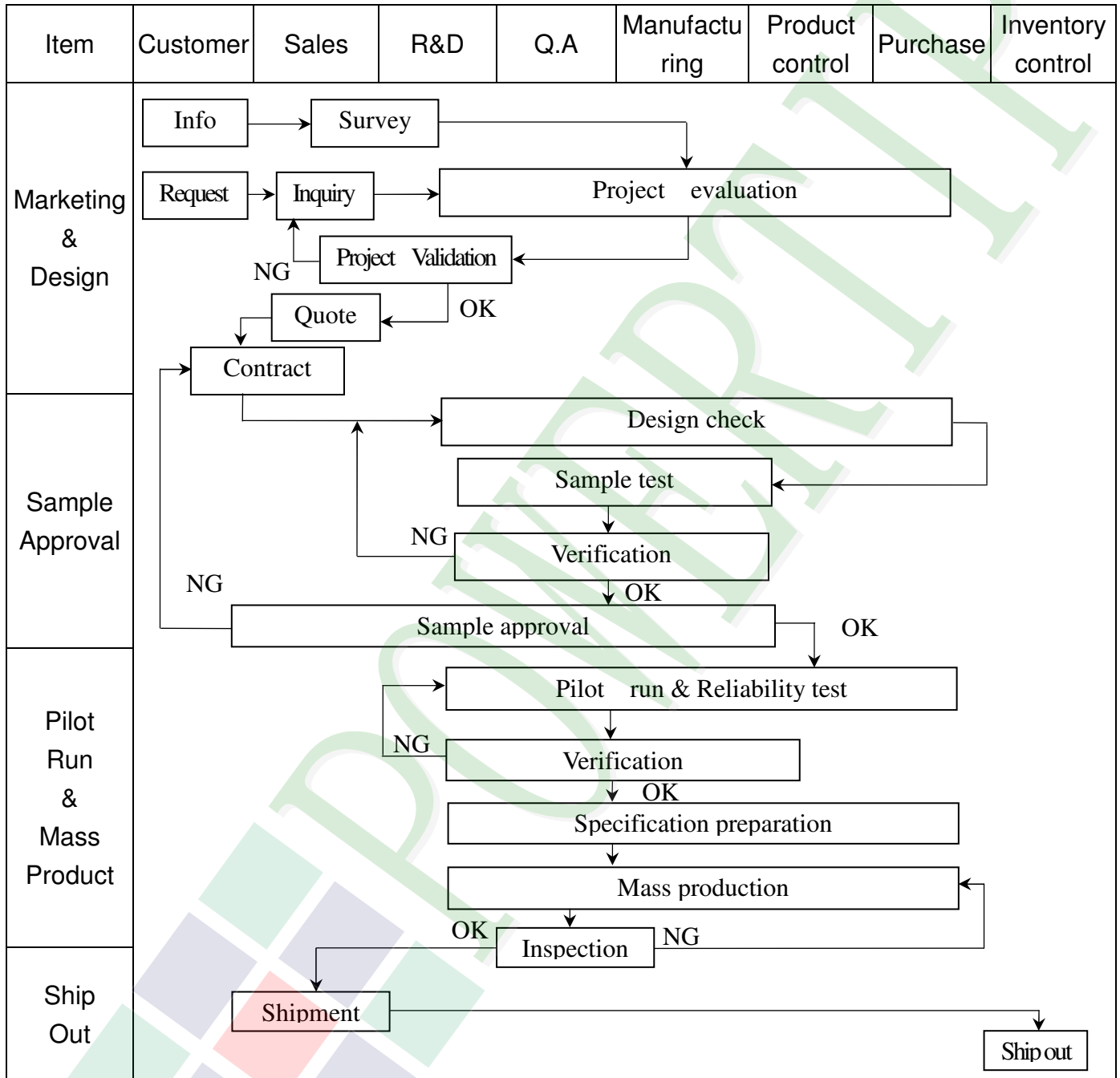
### POWER OFF

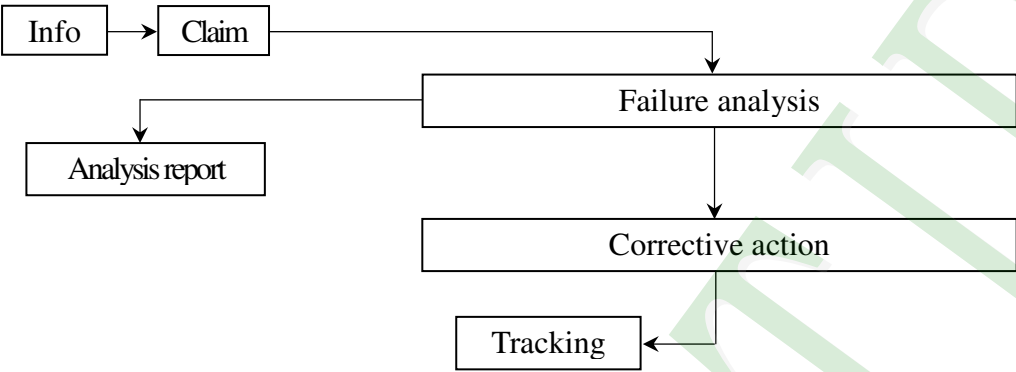
b. Power off:



### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart



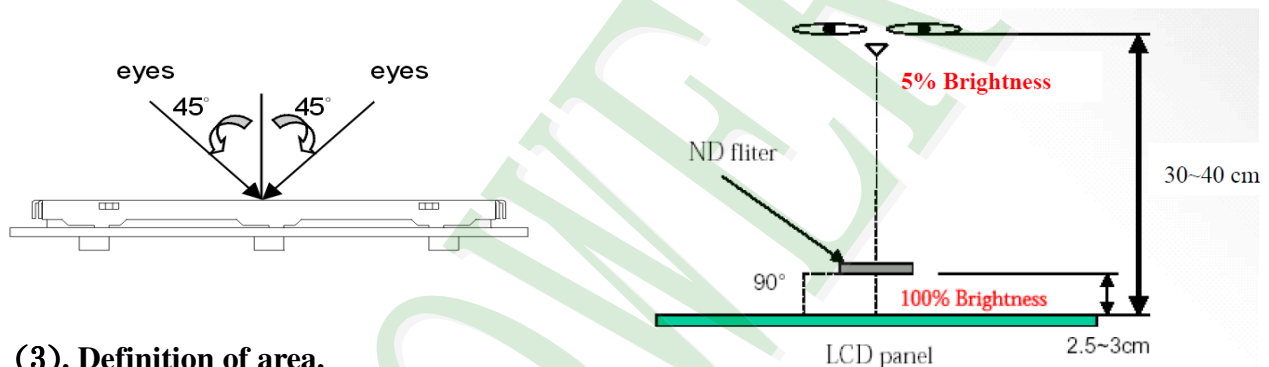
| Item          | Customer                                                                                                                                                                                                                                                                                                                              | Sales | R&D | Q.A | Manufacturing                                                           | Product control | Purchase | Inventory control |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|-------------------------------------------------------------------------|-----------------|----------|-------------------|
| Sales Service |  <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Analysis[Analysis report]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Corrective[Corrective action]     Corrective --&gt; Tracking[Tracking]           </pre> |       |     |     |                                                                         |                 |          |                   |
| Q.A Activity  | 1. ISO 9001 Maintenance Activities<br>3. Equipment calibration<br>5. Standardization Management                                                                                                                                                                                                                                       |       |     |     | 2. Process improvement proposal<br>4. Education And Training Activities |                 |          |                   |

### 3.2. Inspection Specification

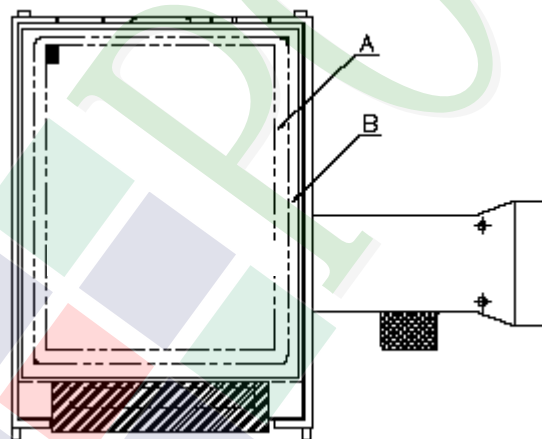
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0.4; Minor Defect AQL: 1.5
- ◆OUT Going Defect 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

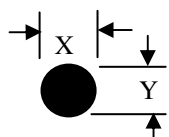
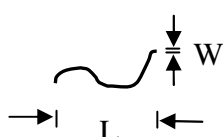
#### (4). Standard of inspection : (Unit : mm)

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

| NO                                                                                                                                                                                                                                                          | Item                                                        | Criterion                                                                                                                                                                                                                                                          | Level |                   |                   |            |            |     |          |     |           |     |       |     |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------|-------------------|------------|------------|-----|----------|-----|-----------|-----|-------|-----|-------|
| 01                                                                                                                                                                                                                                                          | Product condition                                           | 1. 1The part number is inconsistent with work order of production.                                                                                                                                                                                                 | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 1. 2 Mixed product types.                                                                                                                                                                                                                                          | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 1. 3 Assembled in inverse direction.                                                                                                                                                                                                                               | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
| 02                                                                                                                                                                                                                                                          | Quantity                                                    | 2. 1The quantity is inconsistent with work order of production.                                                                                                                                                                                                    | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
| 03                                                                                                                                                                                                                                                          | Outline dimension                                           | 3. 1Product dimension and structure must conform to structure diagram.                                                                                                                                                                                             | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
| 04                                                                                                                                                                                                                                                          | Electrical Testing                                          | 4. 1 Missing line character and icon.                                                                                                                                                                                                                              | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 4. 2 No function or no display.                                                                                                                                                                                                                                    | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 4. 3 Display malfunction.                                                                                                                                                                                                                                          | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 4. 4 LCD viewing angle defect.                                                                                                                                                                                                                                     | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 4. 5 Current consumption exceeds product specifications.                                                                                                                                                                                                           | Major |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             |                                                             | 4. 6Mura cannot be seen through 5% ND filter at 50% Gray , should be judged by the viewing angle of 90 degree.                                                                                                                                                     | Minor |                   |                   |            |            |     |          |     |           |     |       |     |       |
| 05                                                                                                                                                                                                                                                          | Dot defect<br><br>(Bright dot, Dark dot)<br><br>On -display | <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> | Item  |                   | Acceptance (Q'ty) | Dot Defect | Bright Dot | ≤ 4 | Dark Dot | ≤ 5 | Joint Dot | ≤ 3 | Total | ≤ 7 | Minor |
|                                                                                                                                                                                                                                                             |                                                             | Item                                                                                                                                                                                                                                                               |       | Acceptance (Q'ty) |                   |            |            |     |          |     |           |     |       |     |       |
| Dot Defect                                                                                                                                                                                                                                                  | Bright Dot                                                  | ≤ 4                                                                                                                                                                                                                                                                |       |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             | Dark Dot                                                    | ≤ 5                                                                                                                                                                                                                                                                |       |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             | Joint Dot                                                   | ≤ 3                                                                                                                                                                                                                                                                |       |                   |                   |            |            |     |          |     |           |     |       |     |       |
|                                                                                                                                                                                                                                                             | Total                                                       | ≤ 7                                                                                                                                                                                                                                                                |       |                   |                   |            |            |     |          |     |           |     |       |     |       |
| 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. |                                                             |                                                                                                                                                                                                                                                                    |       |                   |                   |            |            |     |          |     |           |     |       |     |       |

**◆Specification For TFT-LCD Module 3.5" ~15" :**

(Ver.B01)

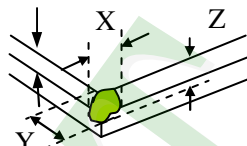
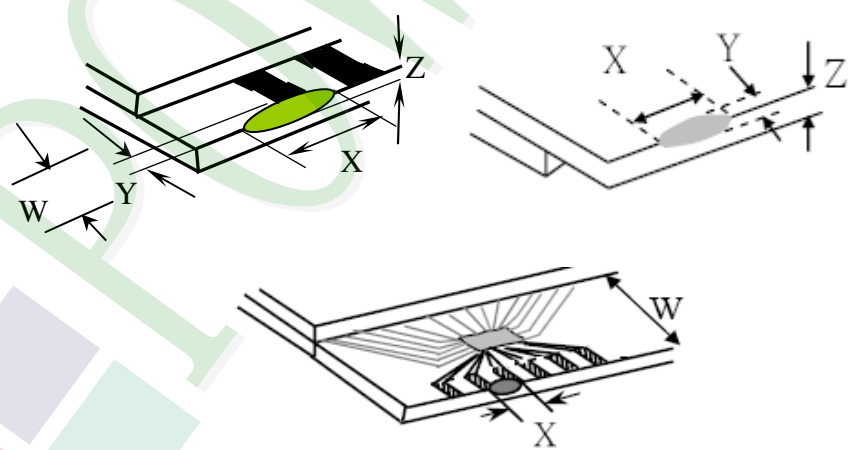
| NO                            | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Criterion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level                          |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------|--------|--------|------------------|------------------|--------|-------------------------|-------------------------|-------------------------|---------------|---------------|-------|-------|-------------|------------|-----------|-------------------|--|--------|--------|-------------------|-----|---------------|--------|--------|---------------|----------------------|---|--------------|----------------------|---|-----|------------|---------------|-------|--|---|-------------|-----|---------------|--------|--------|---------------|----------------------|---|-----|------------|---------------|-------|--|---|-------|
| 06                            | <p>Black or white<br/>Dot, scratch,<br/>contamination</p> <p>Round type</p>  <p><math>\Phi = (x + y) / 2</math></p> <p>Line type</p>                                                                                                                                                                                                       | <p>6. 1 Round type (Non-display or display):</p> <table><tr><th rowspan="2">Dimension (diameter : <math>\Phi</math>)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td><math>\Phi \leq 0.25</math></td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td><math>0.25 &lt; \Phi \leq 0.50</math></td><td>5</td></tr><tr><td><math>\Phi &gt; 0.50</math></td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table> <p>6. 2 Line type(Non-display or display):</p> <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><math>W \leq 0.03</math></td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td><math>L \leq 10.0</math></td><td><math>0.03 &lt; W \leq 0.05</math></td><td>4</td></tr><tr><td><math>L \leq 5.0</math></td><td><math>0.05 &lt; W \leq 0.10</math></td><td>2</td></tr><tr><td>---</td><td><math>W &gt; 0.10</math></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><math>W \leq 0.05</math></td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td><math>L \leq 10.0</math></td><td><math>0.05 &lt; W \leq 0.10</math></td><td>5</td></tr><tr><td>---</td><td><math>W &gt; 0.10</math></td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>5</td></tr></table> | Dimension (diameter : $\Phi$ ) | Acceptance (Q'ty) |        | A area | B area           | $\Phi \leq 0.25$ | Ignore | Ignore                  | $0.25 < \Phi \leq 0.50$ | 5                       | $\Phi > 0.50$ | 0             | Total | 5     | module size | Length (L) | Width (W) | Acceptance (Q'ty) |  | A area | B area | 3.5'' to less 9'' | --- | $W \leq 0.03$ | Ignore | Ignore | $L \leq 10.0$ | $0.03 < W \leq 0.05$ | 4 | $L \leq 5.0$ | $0.05 < W \leq 0.10$ | 2 | --- | $W > 0.10$ | As round type | Total |  | 5 | 9'' to 15'' | --- | $W \leq 0.05$ | Ignore | Ignore | $L \leq 10.0$ | $0.05 < W \leq 0.10$ | 5 | --- | $W > 0.10$ | As round type | Total |  | 5 | Minor |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Dimension (diameter : $\Phi$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                | Acceptance (Q'ty) |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| A area                        | B area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $\Phi \leq 0.25$              | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $0.25 < \Phi \leq 0.50$       | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $\Phi > 0.50$                 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| Total                         | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| module size                   | Length (L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Width (W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Acceptance (Q'ty)              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | A area                         | B area            |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| 3.5'' to less 9''             | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $W \leq 0.03$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ignore                         | Ignore            |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | $L \leq 10.0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $0.03 < W \leq 0.05$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4                              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | $L \leq 5.0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | $0.05 < W \leq 0.10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2                              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $W > 0.10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | As round type                  |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5                              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| 9'' to 15''                   | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $W \leq 0.05$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ignore                         | Ignore            |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | $L \leq 10.0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $0.05 < W \leq 0.10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5                              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $W > 0.10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | As round type                  |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5                              |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| 07                            | <p>Polarizer<br/>Bubble</p> <table><tr><th rowspan="2">Dimension (diameter: <math>\Phi</math>)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td><math>\Phi \leq 0.25</math></td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td><math>0.25 &lt; \Phi \leq 0.50</math></td><td>4</td></tr><tr><td><math>0.50 &lt; \Phi \leq 0.80</math></td><td>1</td></tr><tr><td><math>\Phi &gt; 0.80</math></td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table> | Dimension (diameter: $\Phi$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Acceptance (Q'ty)              |                   | A area | B area | $\Phi \leq 0.25$ | Ignore           | Ignore | $0.25 < \Phi \leq 0.50$ | 4                       | $0.50 < \Phi \leq 0.80$ | 1             | $\Phi > 0.80$ | 0     | Total | 5           | Minor      |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| Dimension (diameter: $\Phi$ ) | Acceptance (Q'ty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
|                               | A area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $\Phi \leq 0.25$              | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ignore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $0.25 < \Phi \leq 0.50$       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $0.50 < \Phi \leq 0.80$       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| $\Phi > 0.80$                 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |
| Total                         | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                   |        |        |                  |                  |        |                         |                         |                         |               |               |       |       |             |            |           |                   |  |        |        |                   |     |               |        |        |               |                      |   |              |                      |   |     |            |               |       |  |   |             |     |               |        |        |               |                      |   |     |            |               |       |  |   |       |

**◆Specification For TFT-LCD Module 3.5" ~15" :**

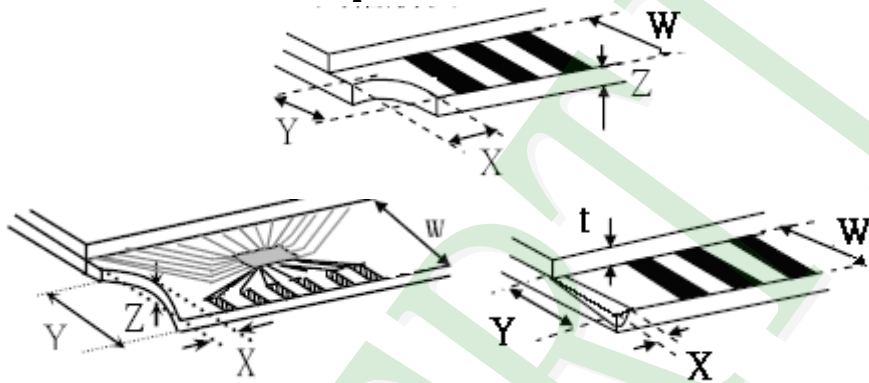
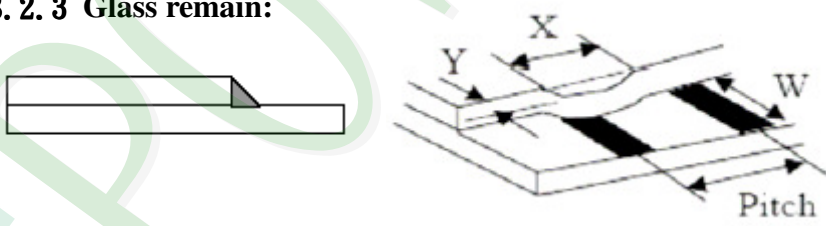
(Ver.B01)

| NO       | Item                                     | Criterion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level |   |   |   |          |                                |              |
|----------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|---|---|----------|--------------------------------|--------------|
| 08       | The crack of glass                       | <p><b>Symbols :</b></p> <p><b>X:</b> The length of crack<br/><b>Z:</b> The thickness of crack<br/><b>t:</b> The thickness of glass</p> <p><b>Y:</b> The width of crack.<br/><b>W:</b> terminal length<br/><b>a:</b> LCD side length</p> <hr/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Minor |   |   |   |          |                                |              |
|          |                                          | <p><b>8.1 General glass chip:</b><br/><b>8.1.1 Chip on panel surface and crack between panels:</b></p> <div><p>The diagrams illustrate three types of glass cracks. The top left shows a surface crack with dimensions X (length), Y (width), and Z (thickness). The top right shows an edge crack with dimensions Z (thickness), Y (width), and X (length). The bottom left shows a crack between panels (SP) with dimension Y (width) and is labeled [OK]. The bottom right shows a crack between panels (SP) with dimension Y (width) and is labeled [NG]. The bottom center shows a crack near the seal with dimensions X (length), Y (width), and Z (thickness), and is labeled Seal width.</p></div> <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td><math>\leq a</math></td><td>Crack can't enter viewing area</td><td><math>\leq 1/2 t</math></td></tr><tr><td><math>\leq a</math></td><td>Crack can't exceed the half of SP width.</td><td><math>1/2 t &lt; Z \leq 2 t</math></td></tr></table> |       | X | Y | Z | $\leq a$ | Crack can't enter viewing area | $\leq 1/2 t$ |
| X        | Y                                        | Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |   |   |   |          |                                |              |
| $\leq a$ | Crack can't enter viewing area           | $\leq 1/2 t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |   |   |   |          |                                |              |
| $\leq a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |   |   |   |          |                                |              |

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

| NO                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Item                                     | Criterion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level        |   |       |              |                                |                |              |                                          |                      |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|-------|--------------|--------------------------------|----------------|--------------|------------------------------------------|----------------------|--------------|
| 08                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The crack of glass                       | <p><b>Symbols :</b></p> <p><b>X:</b> The length of crack<br/><b>Z:</b> The thickness of crack<br/><b>t:</b> The thickness of glass</p> <p><b>Y:</b> The width of crack.<br/><b>W:</b> terminal length<br/><b>a:</b> LCD side length</p> <p>8.1.2 Corner crack:</p>  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td><math>\leq 1/5 a</math></td><td>Crack can't enter viewing area</td><td><math>Z \leq 1/2 t</math></td></tr><tr><td><math>\leq 1/5 a</math></td><td>Crack can't exceed the half of SP width.</td><td><math>1/2 t &lt; Z \leq 2 t</math></td></tr></table> | X            | Y | Z     | $\leq 1/5 a$ | Crack can't enter viewing area | $Z \leq 1/2 t$ | $\leq 1/5 a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$ | Minor        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Y            | Z |       |              |                                |                |              |                                          |                      |              |
| $\leq 1/5 a$                                                                                                                                                                                                                                                                                                                                                                                                                                               | Crack can't enter viewing area           | $Z \leq 1/2 t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |   |       |              |                                |                |              |                                          |                      |              |
| $\leq 1/5 a$                                                                                                                                                                                                                                                                                                                                                                                                                                               | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |   |       |              |                                |                |              |                                          |                      |              |
| <p>8.2 Protrusion over terminal:</p> <p>8.2.1 Chip on electrode pad:</p>  <table><tr><th></th><th>X</th><th>Y</th><th>Z</th></tr><tr><td>Front</td><td><math>\leq a</math></td><td><math>\leq 1/2 W</math></td><td><math>\leq t</math></td></tr><tr><td>Back</td><td><math>\leq a</math></td><td><math>\leq W</math></td><td><math>\leq 1/2 t</math></td></tr></table> |                                          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Y            | Z | Front | $\leq a$     | $\leq 1/2 W$                   | $\leq t$       | Back         | $\leq a$                                 | $\leq W$             | $\leq 1/2 t$ |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                            | X                                        | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Z            |   |       |              |                                |                |              |                                          |                      |              |
| Front                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $\leq a$                                 | $\leq 1/2 W$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq t$     |   |       |              |                                |                |              |                                          |                      |              |
| Back                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\leq a$                                 | $\leq W$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $\leq 1/2 t$ |   |       |              |                                |                |              |                                          |                      |              |

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

| NO           | Item               | Criterion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level |   |   |              |          |          |   |   |   |          |              |          |       |
|--------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|---|--------------|----------|----------|---|---|---|----------|--------------|----------|-------|
| 08           | The crack of glass | <p><b>Symbols:</b></p> <div> <div>X: The length of crack</div> <div>Y: The width of crack.</div> <div>Z: The thickness of crack</div> <div>W: terminal length</div> <div>t: The thickness of glass</div> <div>a: LCD side length</div> </div> <hr/> <p><b>8.2.2 Non-conductive portion:</b></p>  <table border="1"> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> <tr> <td><math>\leq 1/3 a</math></td> <td><math>\leq W</math></td> <td><math>\leq t</math></td> </tr> </table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> <p><b>8.2.3 Glass remain:</b></p>  <table border="1"> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> <tr> <td><math>\leq a</math></td> <td><math>\leq 1/3 W</math></td> <td><math>\leq t</math></td> </tr> </table> <p><b>8.2.4 Cracking:</b></p>  <p><b>Not Allowed</b></p> | X     | Y | Z | $\leq 1/3 a$ | $\leq W$ | $\leq t$ | X | Y | Z | $\leq a$ | $\leq 1/3 W$ | $\leq t$ | Minor |
|              |                    | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Y     | Z |   |              |          |          |   |   |   |          |              |          |       |
| $\leq 1/3 a$ | $\leq W$           | $\leq t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |   |   |              |          |          |   |   |   |          |              |          |       |
| X            | Y                  | Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |   |   |              |          |          |   |   |   |          |              |          |       |
| $\leq a$     | $\leq 1/3 W$       | $\leq t$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |   |   |              |          |          |   |   |   |          |              |          |       |

**◆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: 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 $\leq 1.5$ mm.   | Minor |

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

(Ver.B01)

| NO.      | TEST ITEM                                     | TEST CONDITION                                                                                                                                                                                                                                                                                                                         |                                                                                   |
|----------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1        | High Temperature Storage Test                 | Keep in 80 ±5℃ 240 hrs                                                                                                                                                                                                                                                                                                                 |                                                                                   |
| 2        | Low Temperature Storage Test                  | Keep in -30 ±5℃ 240 hrs                                                                                                                                                                                                                                                                                                                |                                                                                   |
| 3        | High Temperature / High Humidity Storage Test | Keep in 60 ℃ / 90% R.H duration for 240 hrs (Excluding the polarizer)                                                                                                                                                                                                                                                                  |                                                                                   |
| 4        | Temperature Cycling Storage Test              | <div>-30℃ → +25℃ → 80℃ → +25℃</div> <div>(30mins) (5mins) (30mins) (5mins)</div> <div>← 20 Cycle →</div>                                                                                                                                                                                                                               |                                                                                   |
| 5        | ESD Test                                      | Air Discharge:<br>Apply 2 KV with 5 times<br>Discharge for each polarity +/-                                                                                                                                                                                                                                                           | Contact Discharge:<br>Apply 250 V with 5 times<br>discharge for each polarity +/- |
|          |                                               | 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%) |                                                                                   |
| 6        | Vibration Test (Packaged)                     | 1. Sine wave 10~55 Hz frequency (1 min/sweep)<br>2. The amplitude of vibration :1.5 mm<br>3. Each direction (X、Y、Z) duration for 2 Hrs                                                                                                                                                                                                 |                                                                                   |
| 7        | Drop Test (Packaged)                          |                                                                                                                                                                                                                                                                                                                                        |                                                                                   |
|          |                                               | Packing Weight (Kg)                                                                                                                                                                                                                                                                                                                    | Drop Height (cm)                                                                  |
|          |                                               | 0 ~ 45.4                                                                                                                                                                                                                                                                                                                               | 122                                                                               |
|          |                                               | 45.4 ~ 90.8                                                                                                                                                                                                                                                                                                                            | 76                                                                                |
|          |                                               | 90.8 ~ 454                                                                                                                                                                                                                                                                                                                             | 61                                                                                |
| Over 454 | 46                                            |                                                                                                                                                                                                                                                                                                                                        |                                                                                   |
|          |                                               | Drop Direction :※1 corner / 3 edges / 6 sides each 1time                                                                                                                                                                                                                                                                               |                                                                                   |

#### ◎Result Evaluation Criteria :

Under the display quality test conditions with normal operations with normal operation state.  
 Do not change these conditions as such changes may affect practical display function.  
 (Normal operation state)

Temperature :  $+20 \sim 30^{\circ}\text{C}$

Humidity :  $50 \sim 70\%$

Atmospheric pressure :  $86 \sim 106\text{Kpa}$

## 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  $320 \pm 10^{\circ}\text{C}$  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.
- 5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.
- 5.2.12 Double-sided tape designed to be attach with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-sided tape for the attachment operation.

### 5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  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.



|               |                                                        |  |         |       |         |
|---------------|--------------------------------------------------------|--|---------|-------|---------|
| Ver.003       | LCM包裝規格書<br>LCM Packaging Specifications<br>(For Tray) |  | Approve | Check | Contact |
| Documents NO. | PKG-PH800480T013-IHC08                                 |  | Oliver  | Stone | Kevin   |

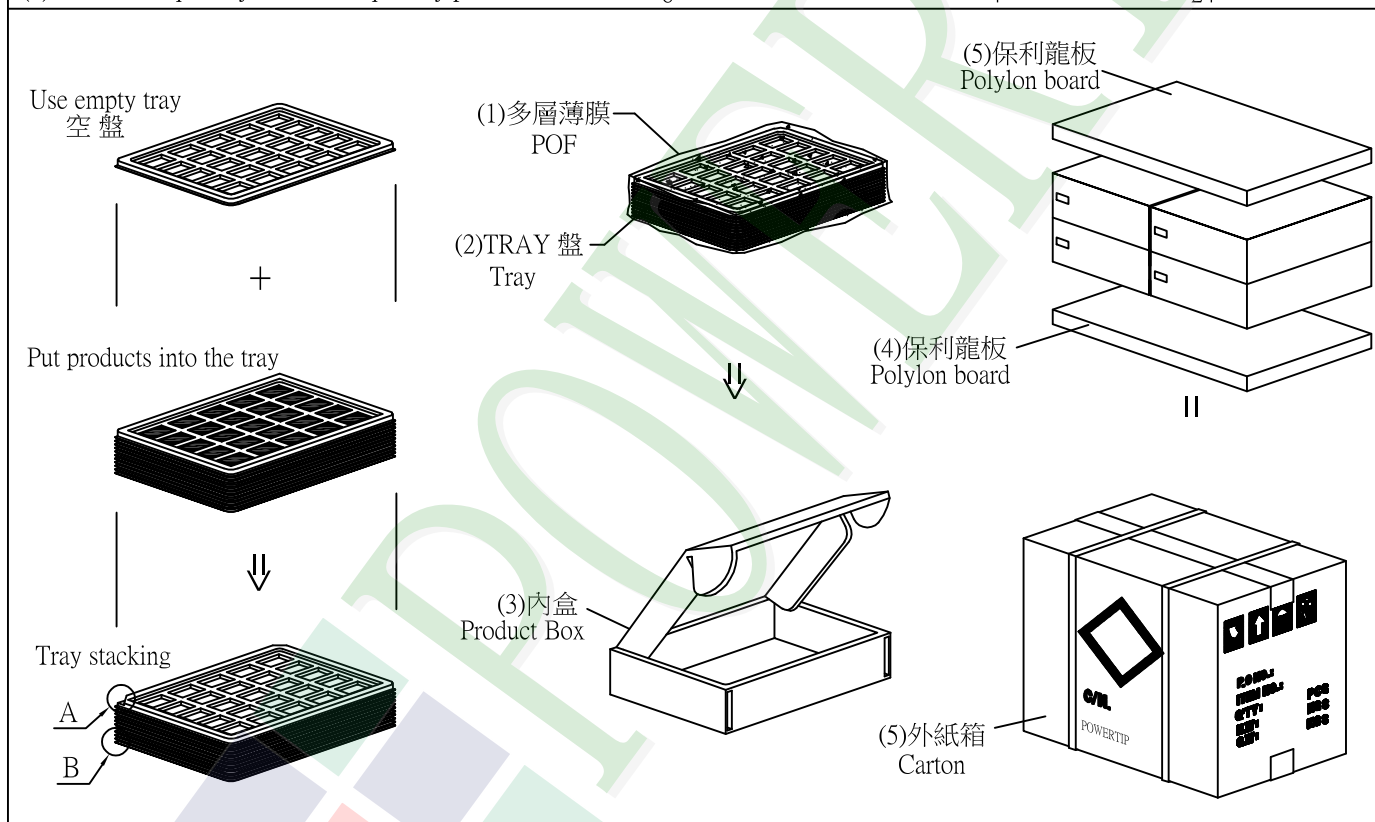
# 1.包裝材料規格表 (Packaging Material) : (per carton)

| No. | Item                 | Model              | Dimensions (mm)  | 1Pcs Weight | Quantity | Total Weight |
|-----|----------------------|--------------------|------------------|-------------|----------|--------------|
| 1   | 成品 (LCM)             | PH800480T013-IHC08 | 186.8 X 110.56   | 0.268       | 24       | 6.432        |
| 2   | 多層薄膜(1)POF           | OTFILM0BA03ABA     | ——               | ——          | 4        | ——           |
| 3   | TRAY 盤 (2)Tray       | TY00000000427      | 352 X 260 X 28.8 | 0.12        | 16       | 1.92         |
| 4   | 內盒(3)Product Box     | BX38327211AABA     | 383 X 272 X 110  | 0.25        | 4        | 1.0          |
| 5   | 保利龍板(4)Polylon board | OTPLB00PL08ABA     | 550 X 393 X 20   | 0.0284      | 2        | 0.0568       |
| 6   | 外紙箱(5)Carton         | BX57041027CCBA     | 570 X 410 X 265  | 1.4208      | 1        | 1.4208       |
| 7   |                      |                    |                  |             |          |              |
| 8   |                      |                    |                  |             |          |              |
| 9   |                      |                    |                  |             |          |              |

2.一整箱總重量 (Total LCD Weight in carton ) : 10.90 Kg±10%

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

|                                                    |   |               |   |   |    |
|----------------------------------------------------|---|---------------|---|---|----|
| (1)LCM quantity per box : no per tray              | 2 | x no of tray  | 3 | = | 6  |
| (2)Total LCM quantity in carton : quantity per box | 6 | x no of boxes | 4 | = | 24 |



## 特 記 事 項 (REMARK)

|                                                                                                                                 |  |
|---------------------------------------------------------------------------------------------------------------------------------|--|
| <p>4. TRAY盤相疊時,需旋轉180度,請詳見B視圖<br/>Rotate tray 180 degrees and place on top of stack.<br/>Check the tray stack using Fig. B.</p> |  |
|---------------------------------------------------------------------------------------------------------------------------------|--|