

SPECIFICATIONS

| | | |
|------------------------|---|---------------------------------|
| CUSTOMER | : | _____ |
| SAMPLE CODE | : | SH800480T033-ICA01 |
| MASS PRODUCTION CODE | : | PH800480T033-ICA01 |
| SAMPLE VERSION | : | 01 |
| SPECIFICATIONS EDITION | : | 002 |
| DRAWING NO. (Ver.) | : | LMD-PH800480T033-ICA01(Ver.001) |
| PACKAGING NO. (Ver.) | : | PKG-PH800480T033-ICA01(Ver.001) |

Customer Approved

Date: _____

| Approved | Checked | Designer |
|-----------------|-------------------|--------------------|
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- Preliminary specification for design input
 Specification for sample approval

POWERTIP TECH. CORP.

| | | | |
|----------------------|---|----------------------|--|
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History of Version

| Date (mm / dd / yyyy) | Ver. | Edi. | Description | Page | Design by |
|--------------------------|-----------|------------|---|-----------|---------------|
| 05/13/2020 | 01 | 001 | New Sample. | - | Howard |
| 07/07/2020 | 01 | 002 | Temperature Cycling Storage Test 10cycle modify to 20cycle | 28 | Howard |
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Appendix : 1.LCM Drawing

2. Packing Specification

Note : For detailed information please refer to IC data sheet :

Primacy(TFT LCD):

ILITEK-- ILI6122 / ILI5960 (Or compatible IC)

1. SPECIFICATIONS

1.1 Features

| Item | Standard Value |
|-----------------------------|---|
| Display Type | 800 * 3 (RGB) * 480 Dots |
| LCD Type | a-Si TFT , Normally white, Transmissive type |
| Screen size(inch) | 5.0 inch |
| Viewing Direction | 6 O'clock (Gray scale Inversion) *1 |
| | 12 O'clock (*2) |
| Color configuration | RGB-Strip |
| Backlight Type | LED B/L |
| Interface | Digital 24-bits RGB |
| Other(controller/driver IC) | Source IC : ILI6122 / Gate IC: ILI5960 (Or Compatible IC) |
| ROHS | THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news_detail.php?Key=1&cID=1 |

Note:

- *1. For saturated color display content (eg. pure-red, pure-green, pure-blue or pure-colors -combinations).
- *2. "For display content based upon multicolor images eg. photos, RGB defined user interfaces"

1.2 Mechanical Specifications

| Item | Standard Value | Unit |
|-------------------|------------------------------|------|
| Outline Dimension | 121.0(W) x 75.9 (L) x 3.1(H) | mm |

LCD panel

| Item | Standard Value | Unit |
|--------------|-----------------------|------|
| Viewing Area | 109.0 (W) * 65.8 (L) | mm |
| Active Area | 108.0 (W) x 64.8 (L) | mm |
| Pixel Size | 0.135 (W) * 0.135 (H) | mm |

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

| Item | Symbol | Condition | Min. | Max. | Unit |
|-----------------------------|----------------------|------------|------|------|------|
| System Power Supply Voltage | VDD | GND=0 | -0.3 | 4.5 | V |
| Operating Temperature | T _{OP} (Ts) | Note 1 | -20 | 70 | °C |
| Storage Temperature | T _{ST} (Ta) | Note 2 | -30 | 80 | °C |
| Storage Humidity | H _D | Ta ≅ 60 °C | 10 | 90 | %RH |

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.

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

Note 2 : Ta is the ambient temperature of samples.

1.4 DC Electrical Characteristics

Module

GND = 0V, Ta = 25°C

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--------------------------|-----------------|------------------------------|---------|------|---------|------|
| Power Supply Voltage | VDD | - | 3.0 | 3.3 | 3.6 | V |
| Input H/L Level Voltage | V _{IH} | - | 0.7VDD | - | VDD | V |
| | V _{IL} | - | GND | - | 0.3VDD | V |
| Output H/L Level Voltage | V _{OH} | - | VDD-0.4 | - | VDD | V |
| | V _{OL} | - | GND | - | GND+0.4 | V |
| Supply Current | I _{DD} | VDD= 3.3 V Pattern=Photo | - | 70 | - | mA |
| | | VDD= 3.3 V Pattern=RGB *1 | - | 90 | 140 | mA |

Note1:Maximum current display

1.5 Optical Characteristics

TFT LCD Module

VDD= 3.3 V, Ta=25°C

| Item | | Symbol | Condition | Min. | Typ. | Max. | unit | - |
|---|--------|-------------|---|------|------|------|-------------------|--------|
| Response time | Tr+Tf | 25°C | - | - | 30 | 45 | ms | - |
| Viewing angle | Top | $\theta Y+$ | CR \geq 10 | | 60 | - | Deg. | Note 4 |
| | Bottom | $\theta Y-$ | | | 60 | - | | |
| | Left | $\theta X-$ | | | 60 | - | | |
| | Right | $\theta X+$ | | | 60 | - | | |
| Contrast ratio | | CR | | 500 | 600 | - | - | Note 3 |
| Color of CIE Coordinate (With B/L & LCD) | White | X | Ta = 25°C $\theta X, \theta Y = 0^\circ$ | 0.24 | 0.29 | 0.34 | - | Note1 |
| | | Y | | 0.26 | 0.31 | 0.36 | | |
| | Red | X | | 0.50 | 0.55 | 0.60 | | |
| | | Y | | 0.27 | 0.32 | 0.37 | | |
| | Green | X | | 0.29 | 0.34 | 0.39 | | |
| | | Y | | 0.54 | 0.59 | 0.64 | | |
| | Blue | X | | 0.08 | 0.13 | 0.18 | | |
| | | Y | | 0.03 | 0.08 | 0.13 | | |
| Average Brightness Pattern=white display (With LCD)*1 | | IV | IF= 40 mA | 500 | 600 | - | cd/m ² | Note1 |
| Uniformity (With LCD)*2 | | ΔB | IF= 40 mA | 70 | - | - | % | Note1 |

Note 1:

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

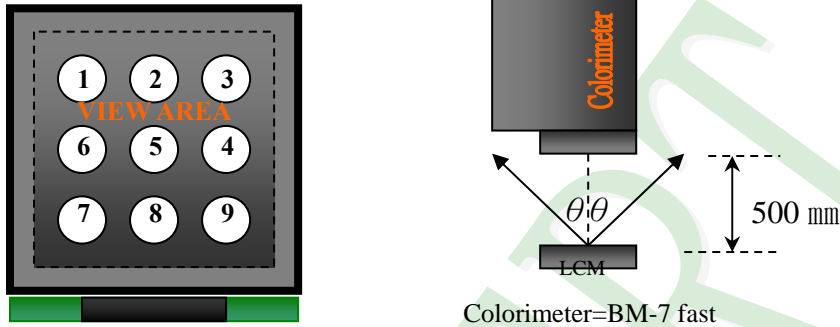
*2 : Measurement Condition for Optical Characteristics:

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

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

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

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



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

Note2: Definition of response time:

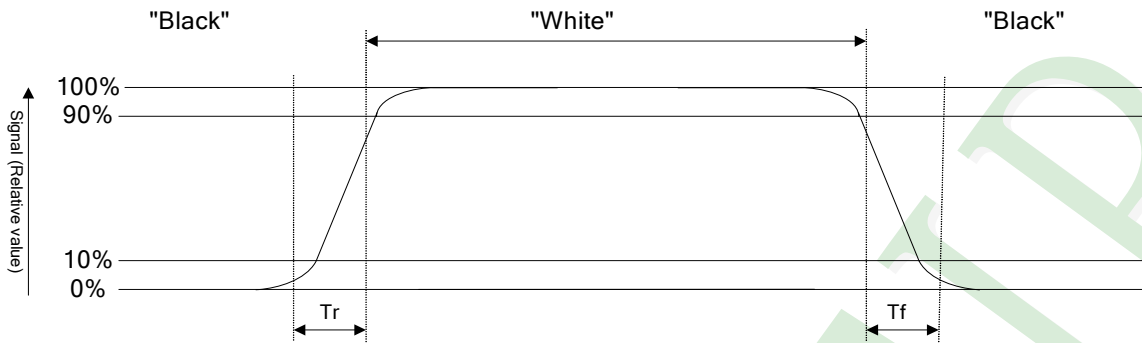
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



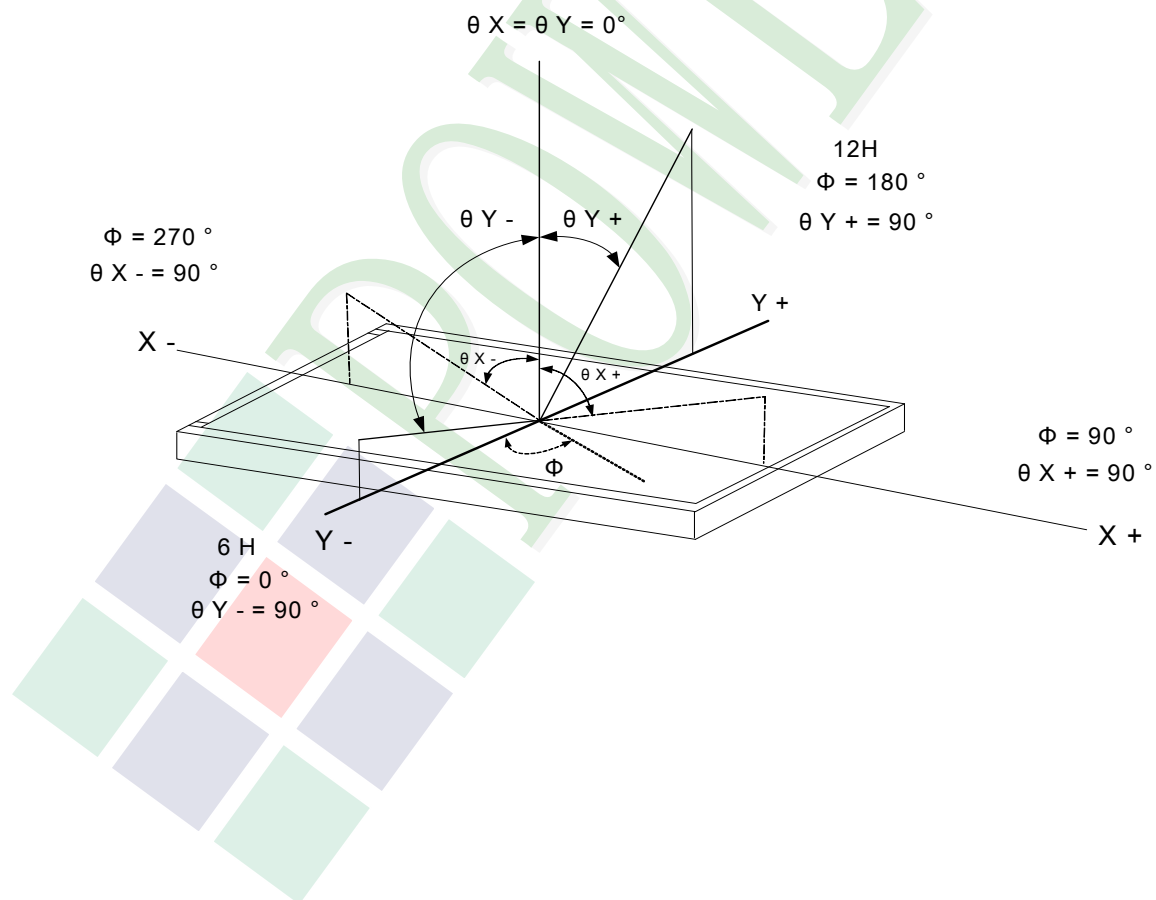
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:

Refer to figure as below:



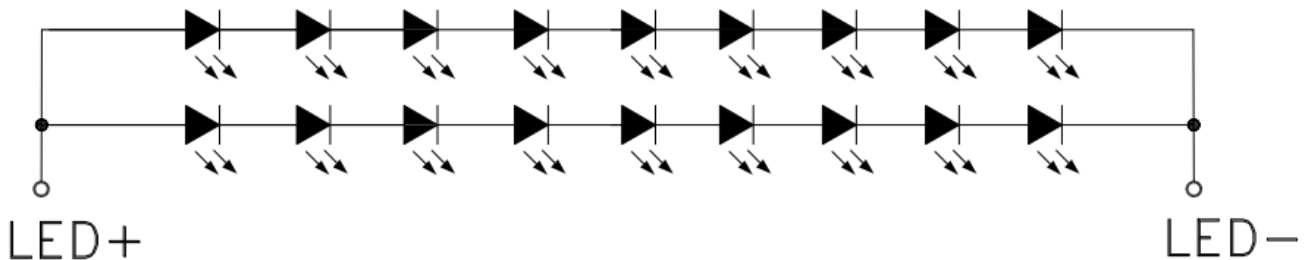
1.6 Backlight Characteristics

Maximum Ratings

| Item | Symbol | Conditions | Min. | Max. | Unit |
|---------------------|--------|------------|------|------|------|
| LED Forward Current | IF | Ta =25°C | - | 60 | mA |
| LED Reverse Voltage | VR | Ta =25°C | - | 7 | V |
| Power Dissipation | PD | Ta =25°C | - | 1782 | mW |

Electrical / Optical Characteristics

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|--------|------------|-------|-------|------|-------------------|
| Forward Voltage | VF | IF=40 mA | 26.1 | 27.9 | - | V |
| Average Brightness (Without LCD) | IV | | 13500 | 15500 | - | cd/m ² |
| CIE Color Coordinate (Without LCD) | X | | 0.25 | 0.28 | 0.31 | - |
| | Y | | 0.25 | 0.28 | 0.31 | |
| Color | | White | | | | |



Other Description

| Item | Conditions | Description |
|-----------|----------------------|-------------|
| Life Time | Ta =25°C IF= 40mA | 50,000 hrs |

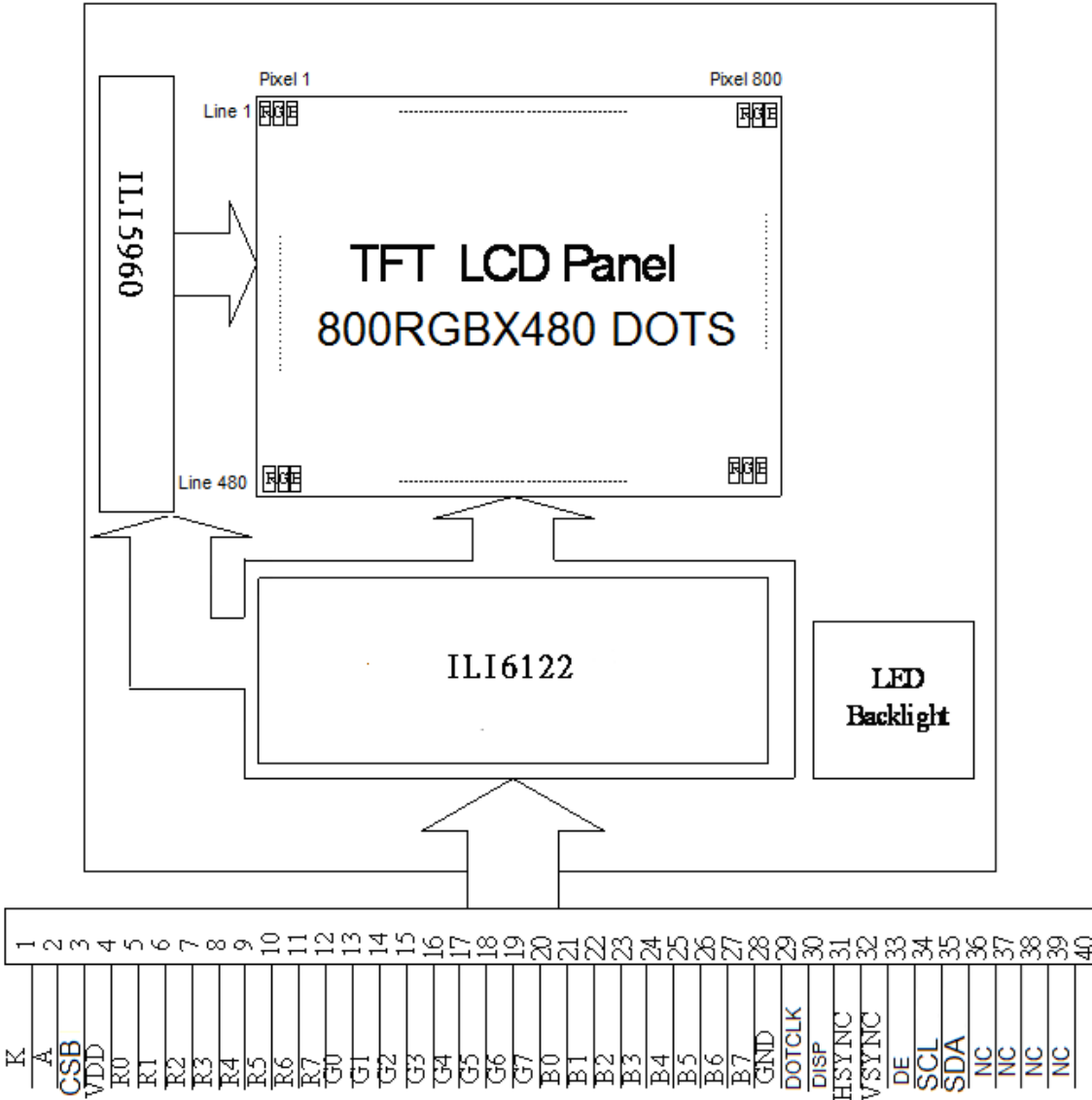
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



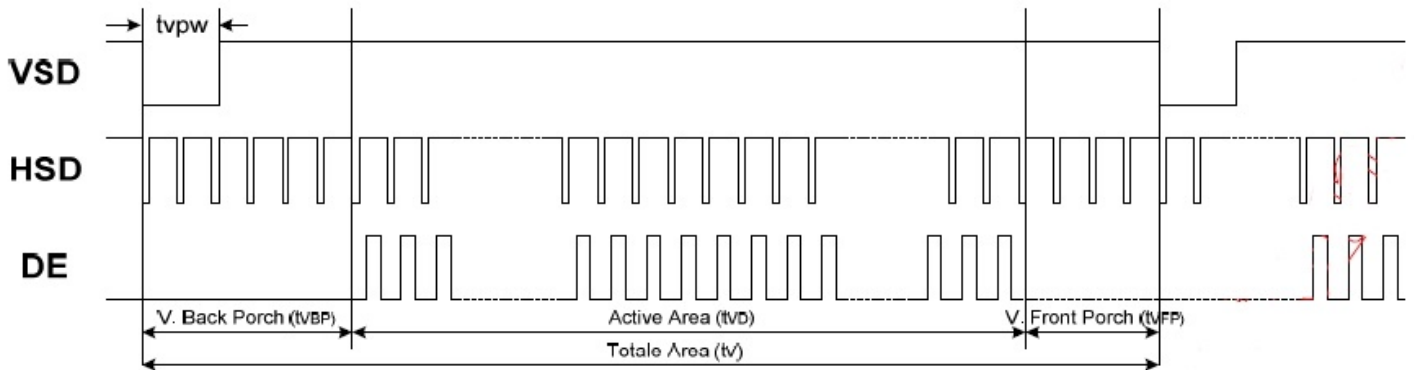
2.2 Interface Pin Description

| Pin No. | Symbol | Function |
|---------|--------|--|
| 1 | LED- | Power supply for LED Backlight cathode input |
| 2 | LED+ | Power supply for LED Backlight anode input |
| 3 | CS(NC) | Chip select pin of serial interface. |
| 4 | VDD | Digital power |
| 5 | R0 | Red data bit 0 |
| 6 | R1 | Red data bit 1 |
| 7 | R2 | Red data bit 2 |
| 8 | R3 | Red data bit 3 |
| 9 | R4 | Red data bit 4 |
| 10 | R5 | Red data bit 5 |
| 11 | R6 | Red data bit 6 |
| 12 | R7 | Red data bit 7 |
| 13 | G0 | Green data bit 0 |
| 14 | G1 | Green data bit 1 |
| 15 | G2 | Green data bit 2 |
| 16 | G3 | Green data bit 3 |
| 17 | G4 | Green data bit 4 |
| 18 | G5 | Green data bit 5 |
| 19 | G6 | Green data bit 6 |
| 20 | G7 | Green data bit 7 |

| Pin No. | Symbol | Function |
|---------|---------|--|
| 21 | B0 | Blue data bit 0 |
| 22 | B1 | Blue data bit 1 |
| 23 | B2 | Blue data bit 2 |
| 24 | B3 | Blue data bit 3 |
| 25 | B4 | Blue data bit 4 |
| 26 | B5 | Blue data bit 5 |
| 27 | B6 | Blue data bit 6 |
| 28 | B7 | Blue data bit 7 |
| 29 | GND | Ground |
| 30 | DOTCLK | Dot data clock, latching data at the rising edge |
| 31 | DISP | Display on/ off |
| 32 | HSYNC | Horizontal sync input, Default DE Mode Please Connect to GND |
| 33 | VSYNC | Vertical sync input, Default DE Mode Please Connect to GND |
| 34 | DE | Data enable |
| 35 | SCL(NC) | Data input and output in Serial communication/No connection when no using serial communication |
| 36 | SDA(NC) | Clock input in Serial communication / No connection when no using serial communication |
| 37 | NC | Not Connect |
| 38 | NC | Not Connect |
| 39 | NC | Not Connect |
| 40 | NC | Not Connect |

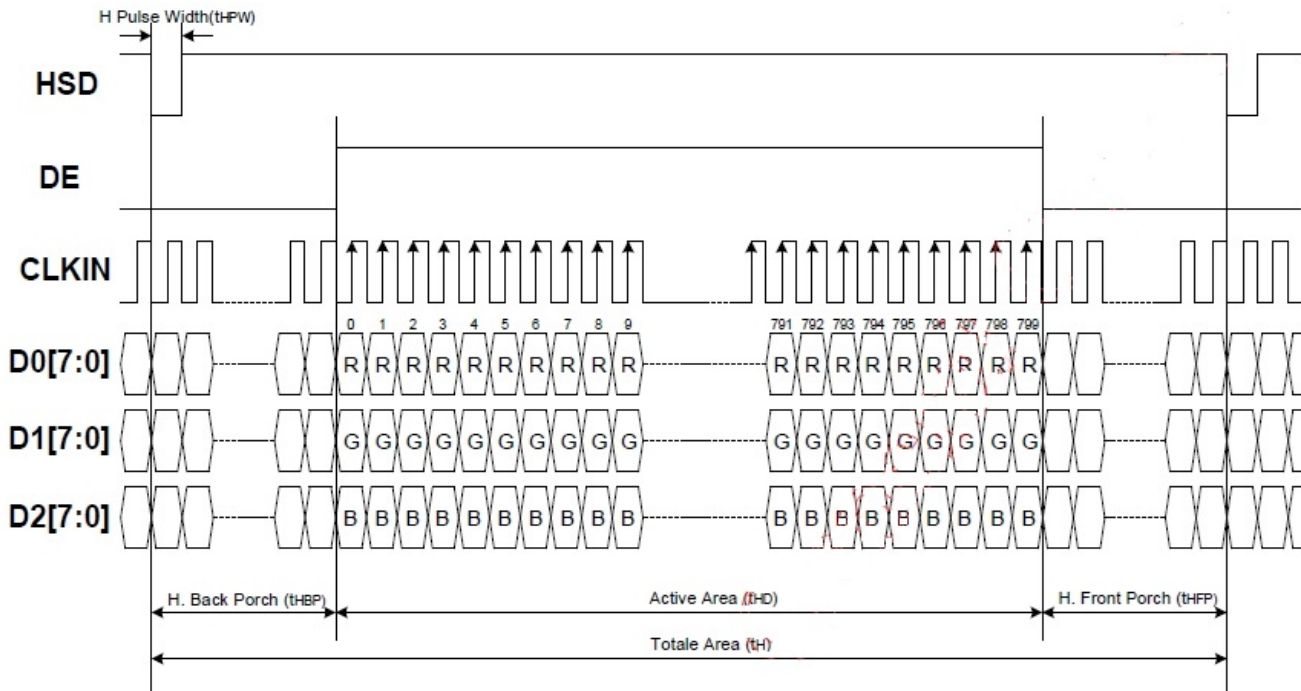
2.3 Timing Characteristics

2.3.1 Vertical input timing



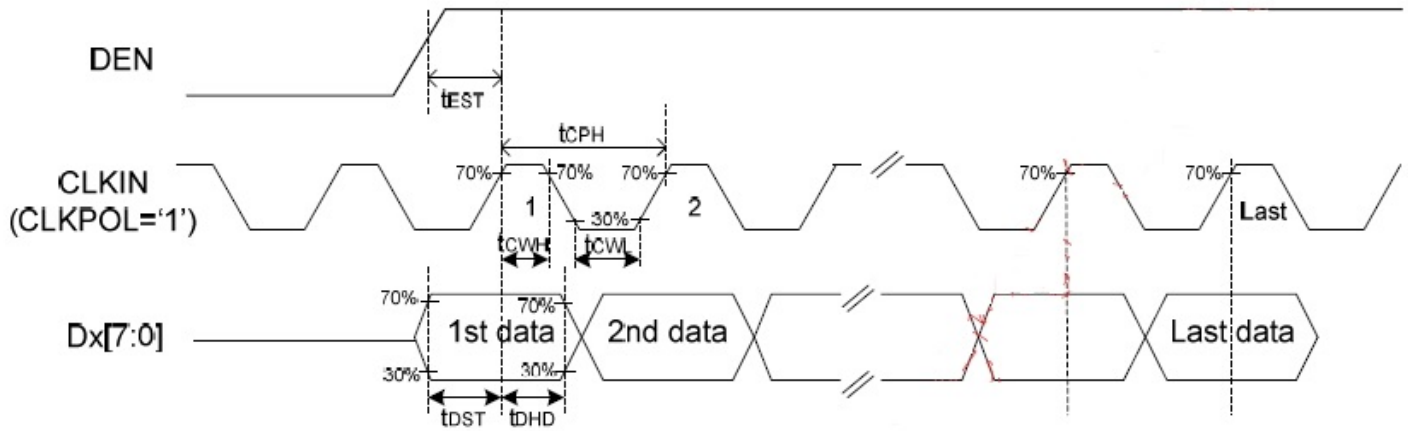
| Parameter | Symbol | Value | | | Unit |
|--------------------------|--------|-------|-----|-----|------|
| | | Min | Typ | Max | |
| Vertical display area | tvd | | 480 | | H |
| VSD period time | tv | 510 | 525 | 650 | H |
| VSD pulse width | tvpw | 1 | - | 20 | H |
| VSD Back Porch(Blanking) | tvb | 23 | 23 | 23 | H |
| VSD Front Proch | tvfb | 7 | 22 | 147 | H |

2.3.2 Horizontal input timing

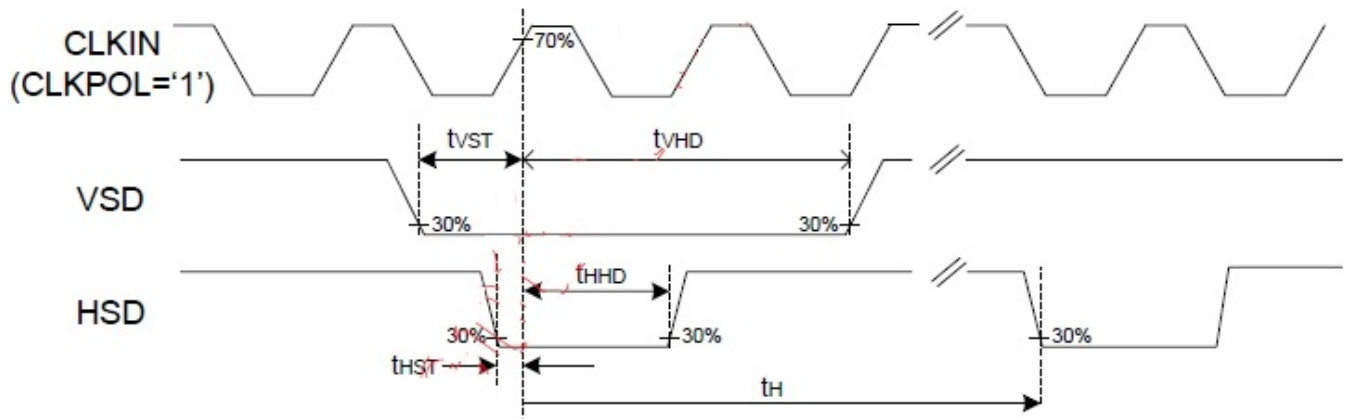


| Parameter | Symbol | Value | | | Unit |
|---------------------------|--------|-------|------|------|------|
| | | Min | Typ | Max | |
| Horizontal display area | thd | | 800 | | DCLK |
| DCLK frequency | fclk | - | 33.3 | 50 | MHz |
| 1 Horizontal Line | th | 862 | 1056 | 1200 | DCLK |
| HSD pulse width | Min | - | 1 | | |
| | Typ | - | - | | |
| | Max | - | 40 | | |
| HSD Back Porch (Blacking) | thp | 46 | 46 | 46 | |
| HSD Front Proch | thfb | 16 | 210 | 354 | |

2.3.3 Input Clock and Data Timing DE Mode



SYNC Mode



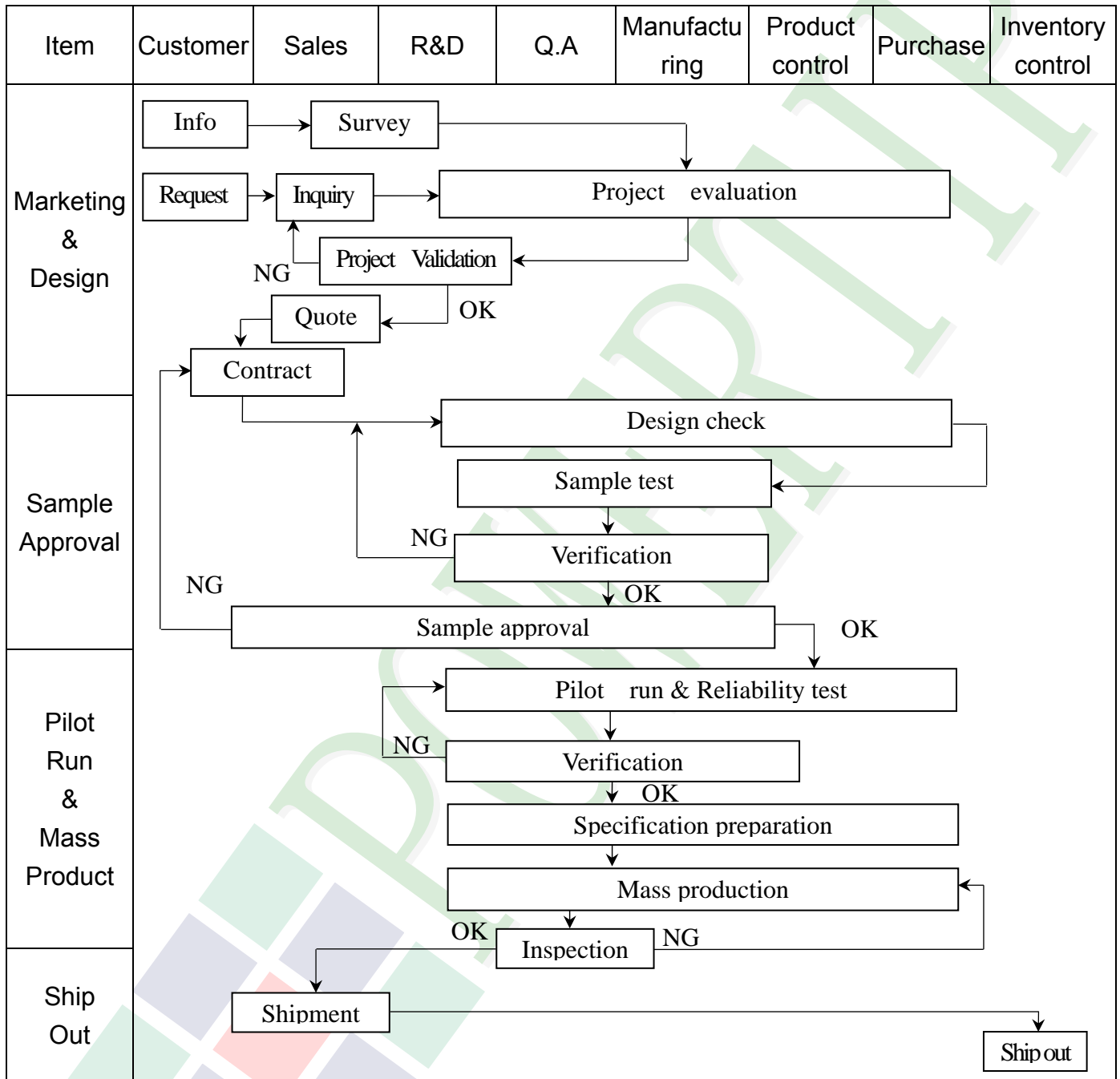
| Parameter | Symbol | SPEC | | | Unit | Conditions |
|--------------------------------|--------|------|------|-----|-------|--|
| | | Min | Typ. | Max | | |
| VDD Power ON slew rate | tPOR | -- | -- | 20 | ms | 0V ~ 0.9VDD |
| RSTB pulse width | tRST | 10 | -- | -- | us | CLKIN=50MHz |
| CLKIN cycle time | tCPH | 20 | -- | -- | ns | |
| CLKIN pulse duty | tCWH | 40 | 50 | 60 | % | |
| VSD setup time | tVST | 8 | -- | -- | ns | |
| VSD hold time | tVHD | 8 | -- | -- | ns | |
| HSD setup time | tHST | 8 | -- | -- | ns | |
| HSD hold time | tHHD | 8 | -- | -- | ns | |
| Data setup time | tDST | 8 | -- | -- | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| Data hold time | tDHD | 8 | -- | -- | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| DE setup time | tEST | 8 | -- | -- | ns | |
| DE hold time | tEHD | 8 | -- | -- | ns | |
| Output stable time | tSST | -- | -- | 6 | us | 10% to 90% target voltage. CL=120pF, R=10KΩ |
| CLKIN frequency | fCLK | -- | 40 | 50 | MHz | VDD=3.0 ~ 3.6V |
| CLKIN cycle time | tCLK | 20 | 25 | -- | ns | |
| CLKIN pulse duty | tCWH | 40 | 50 | 60 | % | TCLK |
| Time from HSD to Source output | tHSO | -- | 20 | -- | CLKIN | |
| Time from HSD to LD | tHLD | -- | 20 | -- | CLKIN | Note (2) |
| Time from HSD to STV | tHSTV | -- | 2 | -- | CLKIN | |
| Time from HSD to CKV | tHCKV | -- | 20 | -- | CLKIN | |
| Time from HSD to OEV | tHOEV | -- | 4 | -- | CLKIN | |
| LD pulse width | tWLD | -- | 10 | -- | CLKIN | Note (2) |
| CKV pulse width | tWCKV | -- | 66 | -- | CLKIN | |
| OEV pulse width | tWEOEV | -- | 74 | -- | CLKIN | |

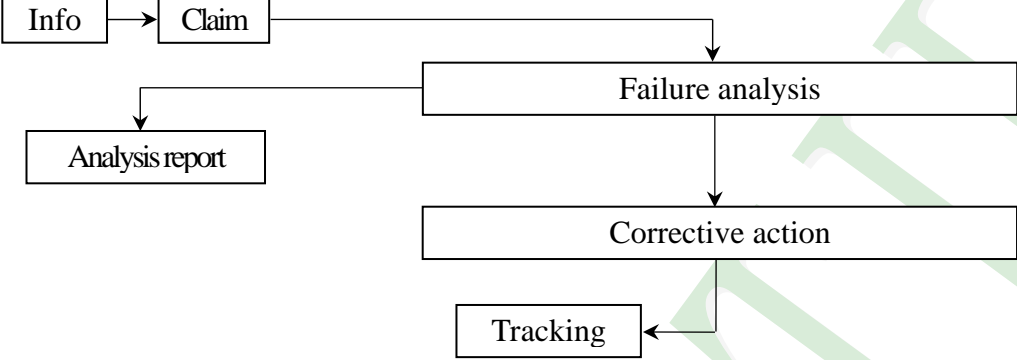
Note: (1) VDD=3.0 ~ 3.6V, VDDA=6.5~13.5V, DGND=AGND=0V, Ta=-20~+85°C

(2) The contents of the data register are transferred to the latch circuit at the rising edge of LD. Then the gray scale voltage is output from the device at the falling edge of LD.

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



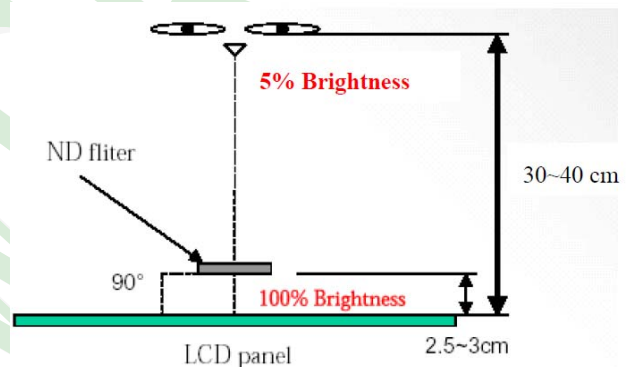
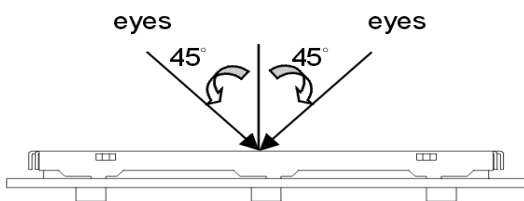
| Item | Customer | Sales | R&D | Q.A | Manufacturing | Product control | Purchase | Inventory control |
|---------------|---|-------|-----|-----|---|-----------------|----------|-------------------|
| Sales Service |  <pre> graph TD Info[Info] --> Claim[Claim] Claim --> FA[Failure analysis] Claim -->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

3.2. Inspection Specification

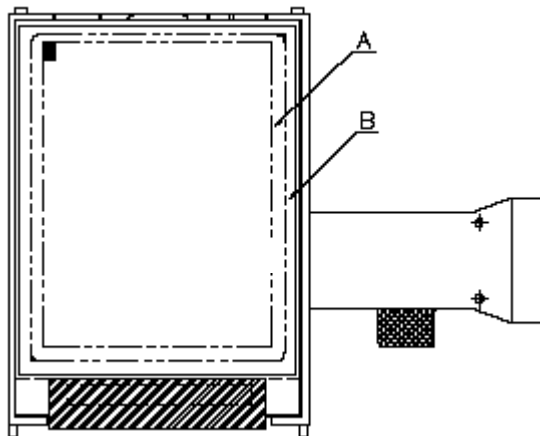
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0. 4; Minor Defect AQL: 1. 5
- ◆OUT Going 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

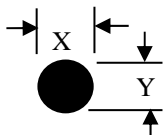
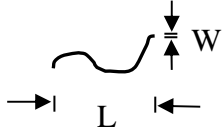
(4). Standard of inspection : (Unit : mm)

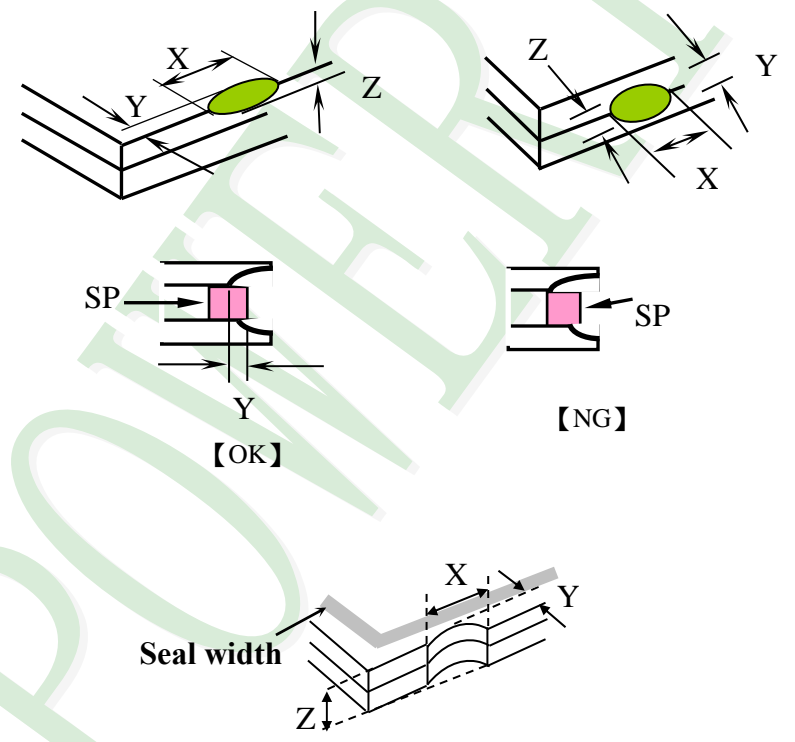
◆Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

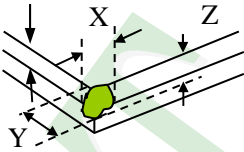
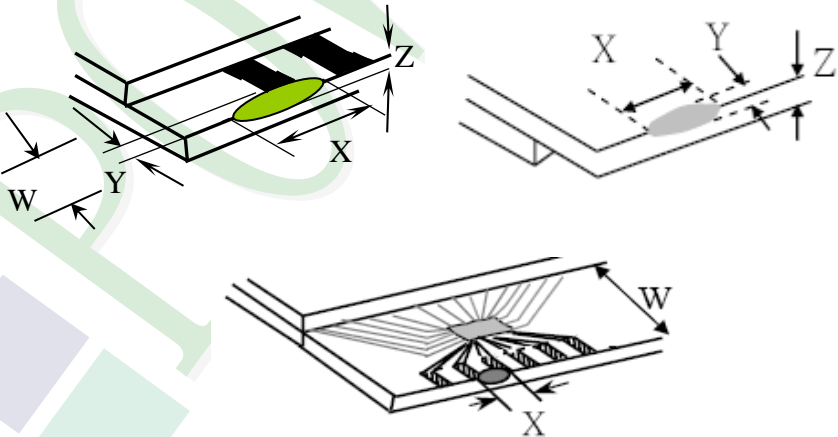
| NO | Item | Criterion | Level | | | | | | | | | | | | |
|--|--|--|-------|-------------------|-------------------|------------|------------|----------|----------|----------|-----------|----------|-------|----------|-------|
| 01 | Product condition | 1. 1The part number is inconsistent with work order 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 (Bright dot, Dark dot) On -display | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">Dot Defect</td> <td style="text-align: center;">Bright Dot</td> <td style="text-align: center;">≤ 4</td> </tr> <tr> <td style="text-align: center;">Dark Dot</td> <td style="text-align: center;">≤ 5</td> </tr> <tr> <td style="text-align: center;">Joint Dot</td> <td style="text-align: center;">≤ 3</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;">≤ 7</td> </tr> </tbody> </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. 5. 2 It is defined as dot defect if defect area $> 1/2$ dot. 5. 3 The distance between two dot defect ≥ 5 mm. 5. 4 Bright dot that can not be seen through 5% ND filter. | | | | | | | | | | | | | | | |

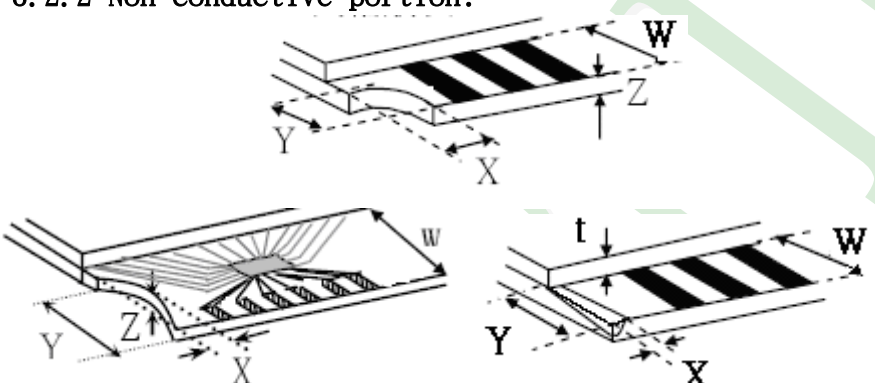
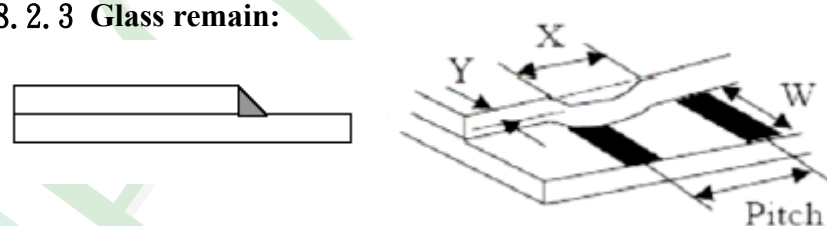
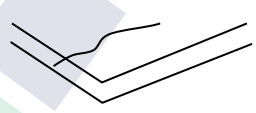
◆Specification For TFT-LCD Module 3.5" ~15" :

(Ver.B01)

| NO | Item | Criterion | Level | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|---|--|--------------------------------|-------------------|----------|--------|--------|------------------|--------|--|-------------------------|---|--------|-------------------------|---|---------------|----------|--------------|------------|-----------|-------------------|--|--------|--------|-----------------|-----|---------------|--------|--|---------------|----------------------|---|--------|--------------|----------------------|---|-----|------------|---------------|--|--------------|--|--|----------|--|-----------|-----|---------------|--------|--|---------------|----------------------|---|--------|-----|------------|---------------|--|--------------|--|--|----------|-------|
| 06 | Black or white Dot, scratch, contamination Round type  $\Phi = (x + y) / 2$ Line type  | 6. 1 Round type (Non-display or display): <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$\Phi > 0.50$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> </tr> </tbody> </table> 6. 2 Line type(Non-display or display): <table border="1"> <thead> <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> </thead> <tbody> <tr> <td rowspan="4">3.5" to less 9"</td> <td>---</td> <td>$W \leq 0.03$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>4</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>2</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> <td></td> </tr> <tr> <td rowspan="4">9" to 15"</td> <td>---</td> <td>$W \leq 0.05$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> </tr> </tbody> </table> | Dimension (diameter : Φ) | Acceptance (Q'ty) | | A area | B area | $\Phi \leq 0.25$ | Ignore | | $0.25 < \Phi \leq 0.50$ | 5 | Ignore | $\Phi > 0.50$ | 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 | | $L \leq 10.0$ | $0.03 < W \leq 0.05$ | 4 | Ignore | $L \leq 5.0$ | $0.05 < W \leq 0.10$ | 2 | --- | $W > 0.10$ | As round type | | Total | | | 5 | | 9" to 15" | --- | $W \leq 0.05$ | Ignore | | $L \leq 10.0$ | $0.05 < W \leq 0.10$ | 5 | Ignore | --- | $W > 0.10$ | As round type | | Total | | | 5 | Minor |
| Dimension (diameter : Φ) | Acceptance (Q'ty) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A area | B area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi \leq 0.25$ | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.25 < \Phi \leq 0.50$ | 5 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi > 0.50$ | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 10.0$ | $0.03 < W \leq 0.05$ | 4 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 5.0$ | $0.05 < W \leq 0.10$ | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | $W > 0.10$ | As round type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9" to 15" | --- | $W \leq 0.05$ | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 10.0$ | $0.05 < W \leq 0.10$ | 5 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | $W > 0.10$ | As round type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07 | Polarizer Bubble | <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter: Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>4</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.50 < \Phi \leq 0.80$</td> <td>1</td> </tr> <tr> <td>$\Phi > 0.80$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> <td></td> </tr> </tbody> </table> | Dimension (diameter: Φ) | Acceptance (Q'ty) | | A area | B area | $\Phi \leq 0.25$ | Ignore | | $0.25 < \Phi \leq 0.50$ | 4 | Ignore | $0.50 < \Phi \leq 0.80$ | 1 | $\Phi > 0.80$ | 0 | Total | 5 | | Minor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimension (diameter: Φ) | Acceptance (Q'ty) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A area | B area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi \leq 0.25$ | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.25 < \Phi \leq 0.50$ | 4 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.50 < \Phi \leq 0.80$ | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi > 0.80$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| NO | Item | Criterion | Level | | | | | | |
|----------|--|---|-------|---|---|---|----------|--------------------------------|--------------|
| 08 | The crack of glass | <p>Symbols :</p> <p>X: The length of crack Z: The thickness of crack t: The thickness of glass</p> <p>Y: The width of crack. W: terminal length a: LCD side length</p> | Minor | | | | | | |
| | | <p>8.1 General glass chip: 8.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="539 1579 1353 1870"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>Crack can't enter viewing area</td> <td>$\leq 1/2 t$</td> </tr> <tr> <td>$\leq a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </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. | $1/2 t < Z \leq 2 t$ | | | | | | | |

| NO | Item | Criterion | Level | | | | | | | | | | |
|---|--|--|--------------|---|-------|--------------|--------------------------------|----------------|--------------|--|----------------------|--------------|-------|
| 08 | The crack of glass | <p>Symbols :</p> <p>X: The length of crack Z: The thickness of crack t: The thickness of glass</p> <p>Y: The width of crack. W: terminal length a: LCD side length</p> <hr/> <p>8.1.2 Corner crack:</p>  <table border="1" data-bbox="520 763 1337 1055"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't enter viewing area</td> <td>$Z \leq 1/2 t$</td> </tr> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </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. | $1/2 t < Z \leq 2 t$ | | |
| | | 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 border="1" data-bbox="560 1697 1347 1872"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td>$\leq a$</td> <td>$\leq 1/2 W$</td> <td>$\leq t$</td> </tr> <tr> <td>Back</td> <td>$\leq a$</td> <td>$\leq W$</td> <td>$\leq 1/2 t$</td> </tr> </tbody> </table> | | X | Y | Z | Front | $\leq a$ | $\leq 1/2 W$ | $\leq t$ | Back | $\leq a$ | $\leq W$ | $\leq 1/2 t$ | Minor |
| | X | Y | Z | | | | | | | | | | |
| Front | $\leq a$ | $\leq 1/2 W$ | $\leq t$ | | | | | | | | | | |
| Back | $\leq a$ | $\leq W$ | $\leq 1/2 t$ | | | | | | | | | | |

| NO | Item | Criterion | Level | | | | | | | | | | | | |
|--------------|--------------------|--|-------|---|---|--------------|----------|----------|---|---|---|----------|--------------|----------|-------|
| 08 | The crack of glass | <p>Symbols:</p> <p>X: The length of crack Y: The width of crack. Z: The thickness of crack W: terminal length t: The thickness of glass a: LCD side length</p> <hr/> <p>8.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="622 963 1260 1086"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</td> </tr> </tbody> </table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of 1. the ITO must remain and be inspected according to electrode terminal specifications.</p> <p>8.2.3 Glass remain:</p>  <table border="1" data-bbox="542 1512 1236 1635"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </tbody> </table> <p>8.2.4 Cracking:</p>  <p style="text-align: center;">Not Allowed</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 ≤ 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 ±2°C 240 hrs | | | | | | | | | | | |
| 2 | Low Temperature Storage Test | Keep in -30 ±2°C 240 hrs | | | | | | | | | | | |
| 3 | High Temperature / High Humidity Storage Test | Keep in +60°C / 90% R.H duration for 240 hrs | | | | | | | | | | | |
| 4 | Temperature Cycling Storage Test | $ \begin{array}{cccc} -30^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} & \rightarrow & +80^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} \\ (30\text{mins}) & & (5\text{mins}) & & (30\text{mins}) & & (5\text{mins}) \\ \leftarrow & & & & & & \rightarrow \\ & & & & \text{20 Cycle} & & \end{array} $ | | | | | | | | | | | |
| 5 | ESD Test | Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/- | Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/- | | | | | | | | | | |
| | | <ol style="list-style-type: none"> Temperature ambience : 15°C ~ 35°C Humidity relative : 30% ~ 60% Energy Storage Capacitance(Cs+Cd) : 150pF±10% Discharge Resistance(Rd) : 330Ω±10% Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%) | | | | | | | | | | | |
| 6 | Vibration Test (Packaged) | <ol style="list-style-type: none"> Sine wave 10~55 Hz frequency (1 min/sweep) The amplitude of vibration : 1.5 mm Each direction (X、Y、Z) duration for 2 Hrs | | | | | | | | | | | |
| 7 | Drop Test (Packaged) | <table border="1"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <tr> <td>0 ~ 45.4</td> <td>122</td> </tr> <tr> <td>45.4 ~ 90.8</td> <td>76</td> </tr> <tr> <td>90.8 ~ 454</td> <td>61</td> </tr> <tr> <td>Over 454</td> <td>46</td> </tr> </tbody> </table> | | Packing Weight (Kg) | Drop Height (cm) | 0 ~ 45.4 | 122 | 45.4 ~ 90.8 | 76 | 90.8 ~ 454 | 61 | Over 454 | 46 |
| | | 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 : +20~30°C

Humidity : 50~70%

Atmospheric pressure : 86~106Kpa

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.

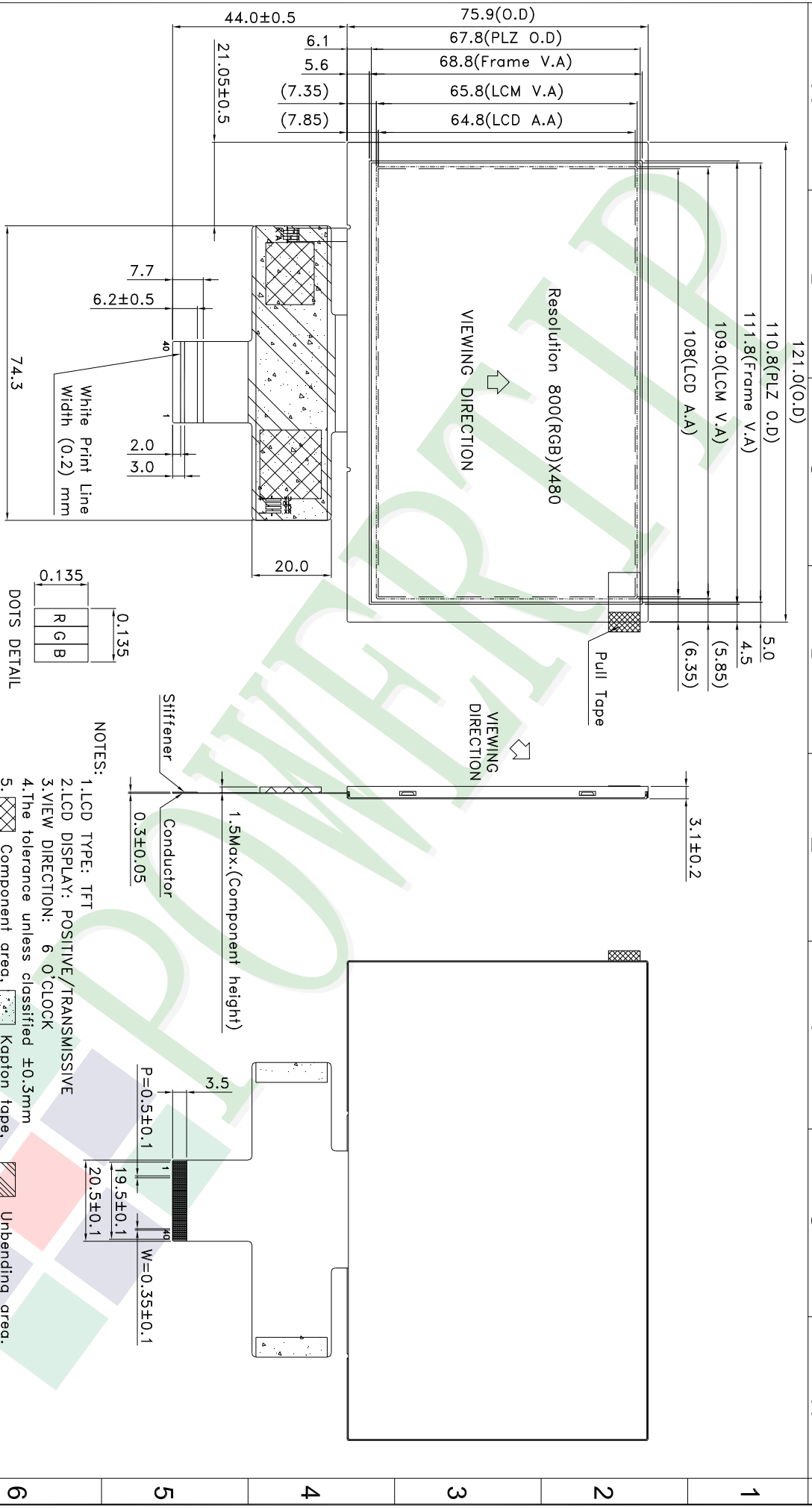
5.3 STORAGE

- 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

A B C D E F G H



| | | | | | | | | | | | |
|-----|-------------|---------------|------------------------|---------|-----------|-------|-----|-----------|--|-------------------|--------------------|
| 007 | | PART NO.: | PH800480T033-ICA01 | Design | Kevin Lin | Unit | MM | Surface | | Tolerance (mm) | Precision Level |
| 006 | | DRAWING NAME: | LMD-PH800480T033-ICA01 | Check | Clare | Scale | FIT | Material | | 1 ~ 4 | - |
| 005 | | TITLE: | LCD MODULE DRAWING | Approve | Rex | Page | 1/1 | Thickness | | 4 ~ 16 | - |
| 004 | | | | | | | | | | 16 ~ 63 | - |
| 003 | | | | | | | | | | 63 ~ 250 | - |
| 002 | | | | | | | | | | 250 ~ 1000 | - |
| 001 | NEW DRAWING | REV BY | Kevin Lin | | | | | | | | |
| REV | | REVISER | 2019/12/19 | | | | | | | | |

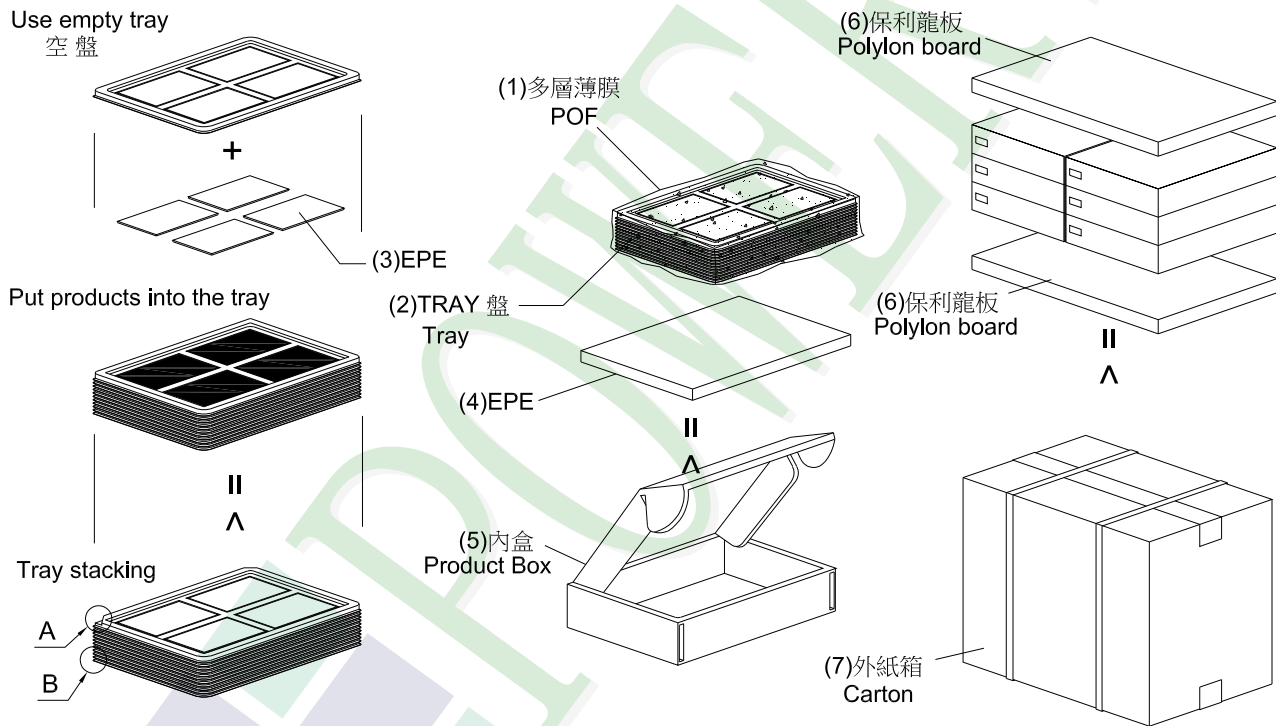
1. 包裝材料規格表 (Packaging Material) : (per carton)

| No. | Item | Model | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|-----|----------------------|--------------------|--------------------|-------------|----------|--------------|
| 1 | 成品 (LCM) | PH800480T033-ICA01 | 121.0 X 75.9 X 3.1 | 0.056 | 144 | 8.064 |
| 2 | 多層薄膜(1)POF | OTFILM0BA03ABA | 19"X350X0.015 | — | 6 | — |
| 3 | 舒美墊(3) EPE | FOAM000000180 | 130.0 X 90.0 X 1 | 0.0002 | 144 | 0.0288 |
| 4 | TRAY 盤 (2)Tray | TYSG000000187 | 352 X 260 X 12.8 | 0.0965 | 42 | 4.053 |
| 5 | 舒美墊(4) EPE | FOAM000000047 | 350 X 255 X 5 | 0.011 | 6 | 0.066 |
| 6 | 內盒(5)Product Box | BX36627063ABBA | 383 X 270 X 66 | 0.182 | 6 | 1.092 |
| 7 | 保利龍板(6)Polylon board | OTPLB00PL08ABA | 550 X 393 X 20 | 0.0284 | 2 | 0.0568 |
| 8 | 外紙箱(7)Carton | BX57041027CCBA | 570 X 410 X 265 | 1.0 | 1 | 1.0 |
| 9 | | | | | | |

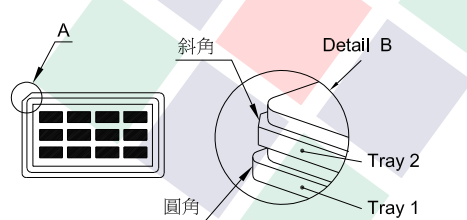
2. 一整箱總重量 (Total LCD Weight in carton) : 14.36 Kg±10%

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

| | | | | | |
|---|----|---------------|---|---|-----|
| (1) LCM quantity per box : no per tray | 4 | x no of tray | 6 | = | 24 |
| (2) Total LCM quantity in carton : quantity per box | 24 | x no of boxes | 6 | = | 144 |



特 記 事 項 (REMARK)



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

5. 外購Tray:TY00000000308
自製Tray:TYSG000000187

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