

SPECIFICATIONS

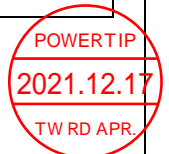
| | | |
|------------------------|---|----------------------------------|
| CUSTOMER | : | _____ |
| SAMPLE CODE | : | SH480272T016-ZAC01 |
| MASS PRODUCTION CODE | : | PH480272T016-ZAC01 |
| SAMPLE VERSION | : | 01 |
| SPECIFICATIONS EDITION | : | 002 |
| DRAWING NO. (Ver.) | : | LMD-PH480272T016-ZAC01 (Ver.001) |
| PACKAGING NO. (Ver.) | : | PKG-PH480272T016-ZAC01 (Ver.001) |

Customer Approved

Date: _____

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



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History of Version

| Date <small>(mm / dd / yyyy)</small> | Ver. | Edi. | Description | Page | Design by |
|-----------------------------------------|------|------|--------------|------|-----------|
| 10/13/2021 | 01 | 001 | New Drawing | - | Yuan |
| 12/15/2021 | 01 | 002 | First Sample | - | Yuan |
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Note: For detailed information please refer to IC data sheet: Sitronix--- SC7283-G4

1. SPECIFICATIONS

1.1 Features

| Item | Standard Value |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display Resolution | 480 *3 (RGB) * 272 Dots |
| LCD Type | Full Viewing Angle , Normally Black , Transmissive type |
| Screen size(inch) | 4.3 inch |
| Surface treatment | Anti-Glare |
| Color configuration | R.G.B. Vertical Stripe |
| Weight | 79.9g |
| Interface | 24 Bits RGB Interface |
| Driver IC | SC7283-G4 |
| 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 |

1.2 Mechanical Specifications

| Item | Standard Value | Unit |
|-------------------|----------------------------------|------|
| Outline Dimension | 115.1 (W) * 78.94 (L) * 5.52 (H) | mm |
| Viewing Area | 96.1 (W) x 54.9 (L) | |
| Active Area | 95.04 (W) * 53.856 (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 TFT Panel | V _{DD} | GND=0V | -0.3 | 4.0 | V |
| Operating Temperature | T _{OP} | T _{OP} (Ts) | -20 | +70 | °C |
| Storage Temperature | T _{ST} | T _{ST} (Ta) | -30 | +80 | °C |
| Storage Humidity | H _D | Ta < 60 °C | 20 | 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 for TFT Panel | V _{DDIO} | GND=0V | 3.0 | 3.3 | 3.6 | V |
| Input Voltage for TFT Panel | V _{IH} | GND=0V | 0.7V _{DDIO} | - | V _{DDIO} | V |
| | V _{IL} | GND=0V | 0 | - | 0.3V _{DDIO} | V |
| Supply Current for TFT Panel | I _{DDIO} | I _{DDIO} @V _{DDIO} =3.3V | - | 30 | 45 | mA |

1.5 Optical Characteristics

VDDIO=3.3V, Ta=25°C

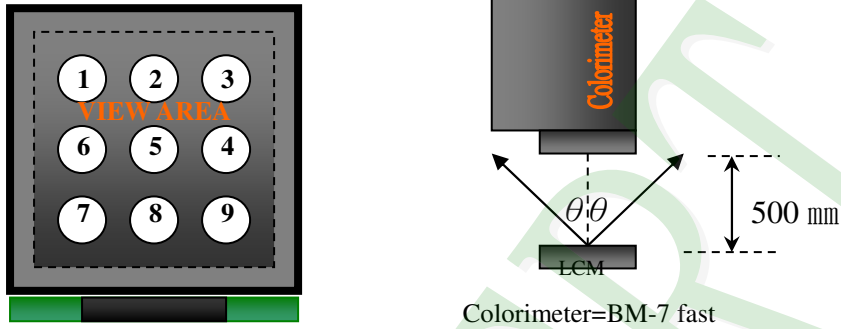
| Item | Symbol | Condition | Min. | Typ. | Max. | unit | - | |
|----------------------------------------------------------------|------------|------------|--------------|------|------|-------------------|-------|-------|
| Response time | Tr + Tf | - | - | 38 | 57 | ms | Note2 | |
| Viewing angle | Top | $\theta+$ | CR \geq 10 | - | 80 | - | Deg. | Note4 |
| | Bottom | $\theta-$ | | - | 80 | - | | |
| | Left | θ_L | | - | 80 | - | | |
| | Right | θ_R | | - | 80 | - | | |
| Contrast ratio | CR | - | 650 | 800 | - | - | Note3 | |
| Color of CIE Coordinate (LCD & BL) | White | X | IF= 20mA | 0.27 | 0.32 | 0.37 | - | Note1 |
| | | Y | | 0.29 | 0.34 | 0.39 | | |
| | Red | X | | 0.58 | 0.63 | 0.68 | | |
| | | Y | | 0.29 | 0.34 | 0.39 | | |
| | Green | X | | 0.32 | 0.37 | 0.42 | | |
| | | Y | | 0.53 | 0.58 | 0.63 | | |
| | Blue | X | | 0.09 | 0.14 | 0.19 | | |
| | | Y | | 0.05 | 0.10 | 0.15 | | |
| Average Brightness Pattern=white display (LCD & BL) *1 | IV | IF= 20mA | 400 | 465 | - | cd/m ² | | |
| Uniformity (LCD & BL) *2 | ΔB | | 70 | - | - | % | | |

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°) , 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:

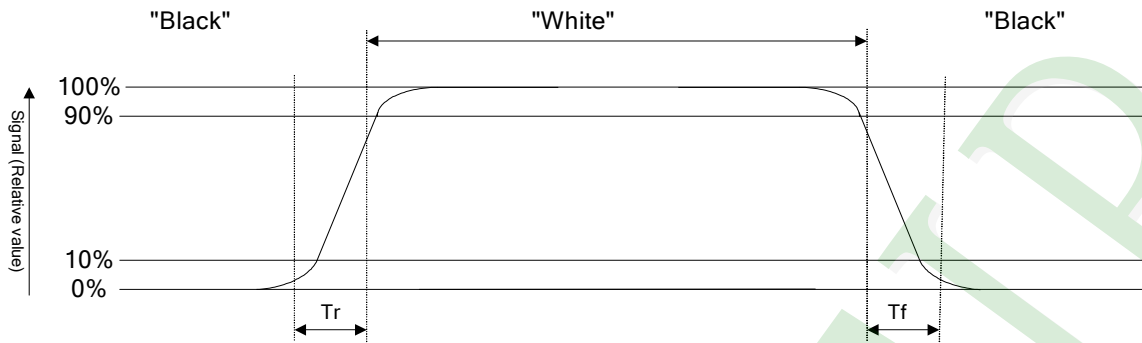
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



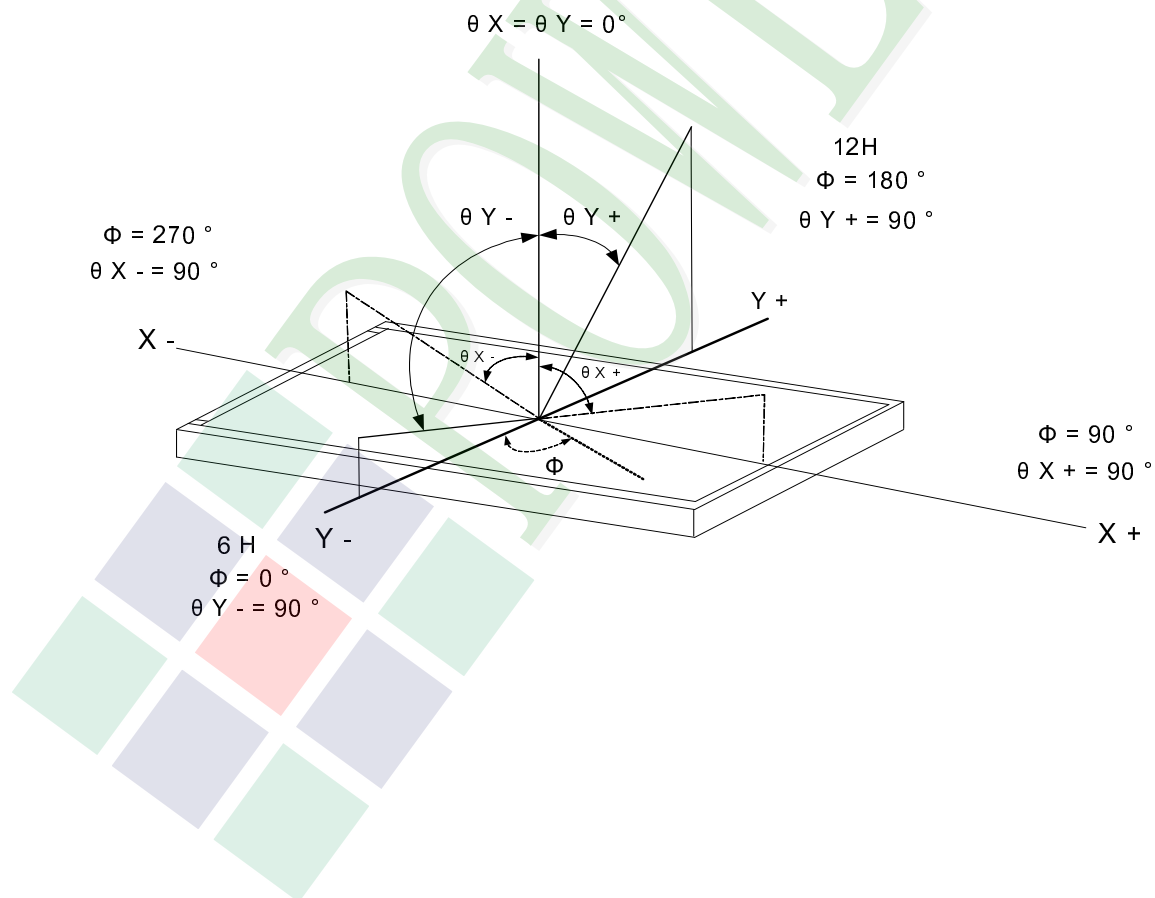
Note3: Definition of contrast ratio:

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

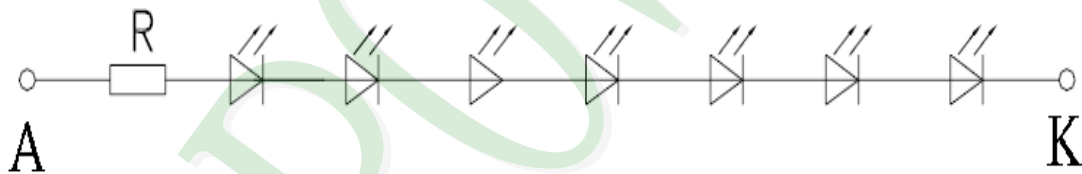
Maximum Ratings

| Item | Symbol | Conditions | Min. | Max. | Unit |
|-----------------------------------|--------|------------|------|------|------|
| LED Forward Current | IF | Ta =25°C | - | 30 | mA |
| LED Reverse Voltage (Each LED) | VR | Ta =25°C | - | 5 | V |
| Power Dissipation | PD | Ta =25°C | - | 490 | mW |

Electrical / Optical Characteristics

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------------------|--------|------------|------|------|------|-------------------|
| Forward Voltage | VF | IF= 20mA | 19.6 | 22.8 | - | V |
| Average Brightness (Without LCD &T/P) | IV | | 6250 | 7500 | - | cd/m ² |
| CIE Color Coordinate (Without LCD &T/P) | X | | 0.23 | 0.28 | 0.30 | - |
| | Y | | 0.23 | 0.28 | 0.30 | |
| Color | | White | | | | |

Circuit diagram:



Other Description

| Item | Conditions | Description |
|-----------|-----------------------|-------------|
| Life Time | Ta =25°C IF= 20 mA | 20000 hrs |

1.7 Touch Panel Characteristics

Features

| Item | Standard Value |
|------------------|------------------------------------------------------------------------|
| Touch Panel Size | 4.3" |
| Touch type | True Multi-Touch Capacitive Touch Panel |
| Input Method | True Multi-touch with up to 5 Points of Absolution X and Y Coordinates |
| Output Interface | I ² C |
| IC | ICNT8952 |

I²C Address

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

Bit 0: 0 for Write / 1 for Read

Absolute Maximum Ratings

| Item | Symbol | Condition | Min. | Max. | Unit |
|-----------------------|-----------------|----------------|------|------|------|
| Supply voltage | TPVDD | - | -0.3 | 3.6 | V |
| Operating Temperature | T _{OP} | Non condensing | -20 | 70 | °C |
| Storage Temperature | T _{ST} | Non condensing | -30 | 80 | °C |

DC Electrical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|----------------------------|-----------------|-----------|-------------|------|-------------|------|
| Supply voltage | TPVDD | 25°C | - | 3.3 | - | V |
| Input high-level voltage | V _{IH} | - | 0.7 x TPVDD | - | TPVDD | V |
| Input low -level voltage | V _{IL} | - | -0.3 | - | 0.3 x TPVDD | V |
| Output high -level voltage | V _{OH} | - | 0.7 x TPVDD | - | - | V |
| Output low -level voltage | V _{OL} | - | - | - | 0.3 x TPVDD | V |

Optical Characteristics

| Item | Standard Value | unit |
|---------------------------|----------------|------|
| Total light transmittance | 85% or more | - |
| Hardness | ≥6H | - |

Touch Panel IC Read/Write description & Register Mapping

Reference: ICNT86xx_Application note_EN_V1.0

Note: Not Support Gesture Function

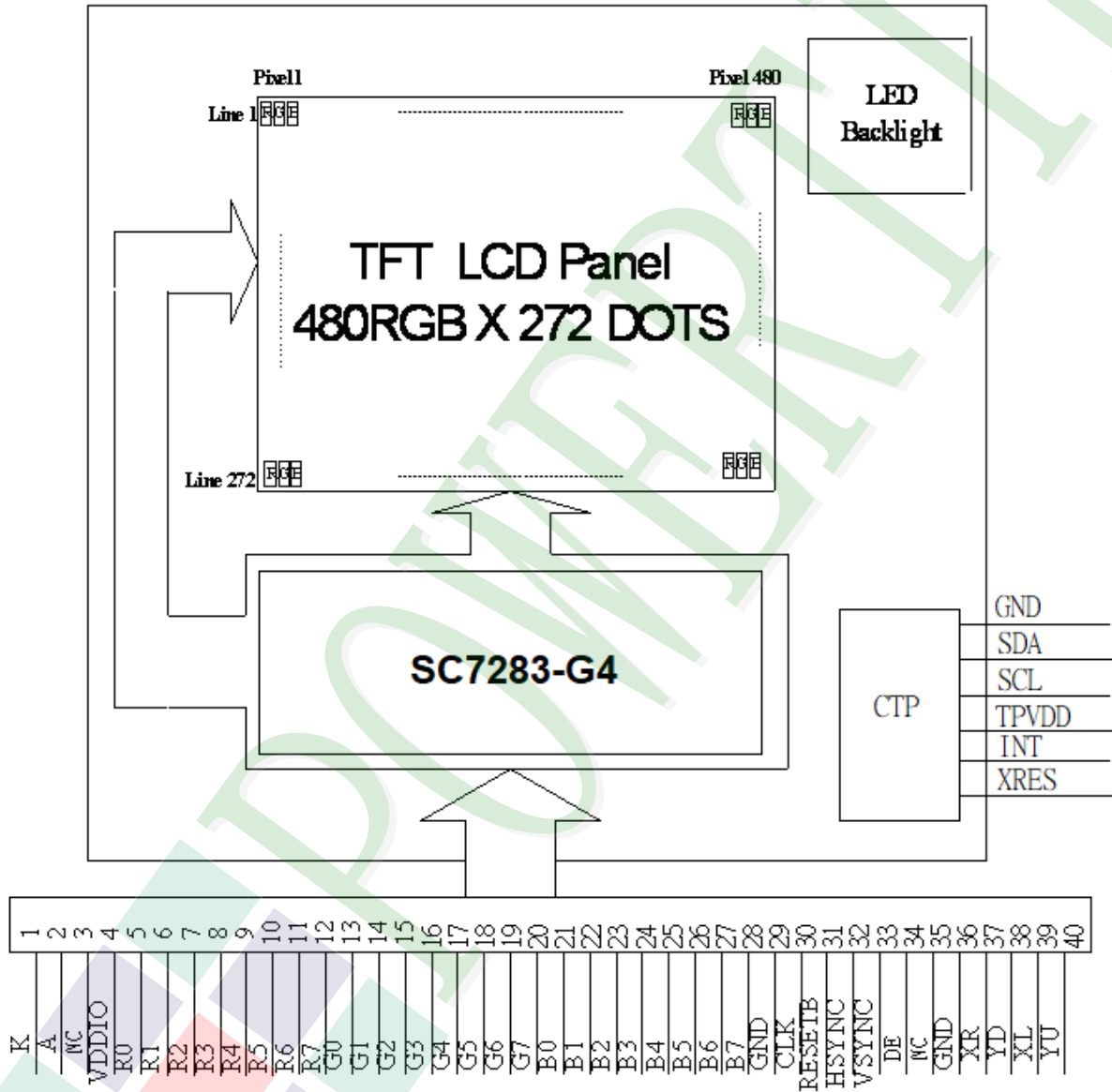
2. MODULE STRUCTURE

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 | K | Power supply for LED Backlight cathode input |
| 2 | A | Power supply for LED Backlight anode input |
| 3 | NC | Not Connect. |
| 4 | VDDIO | 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 |

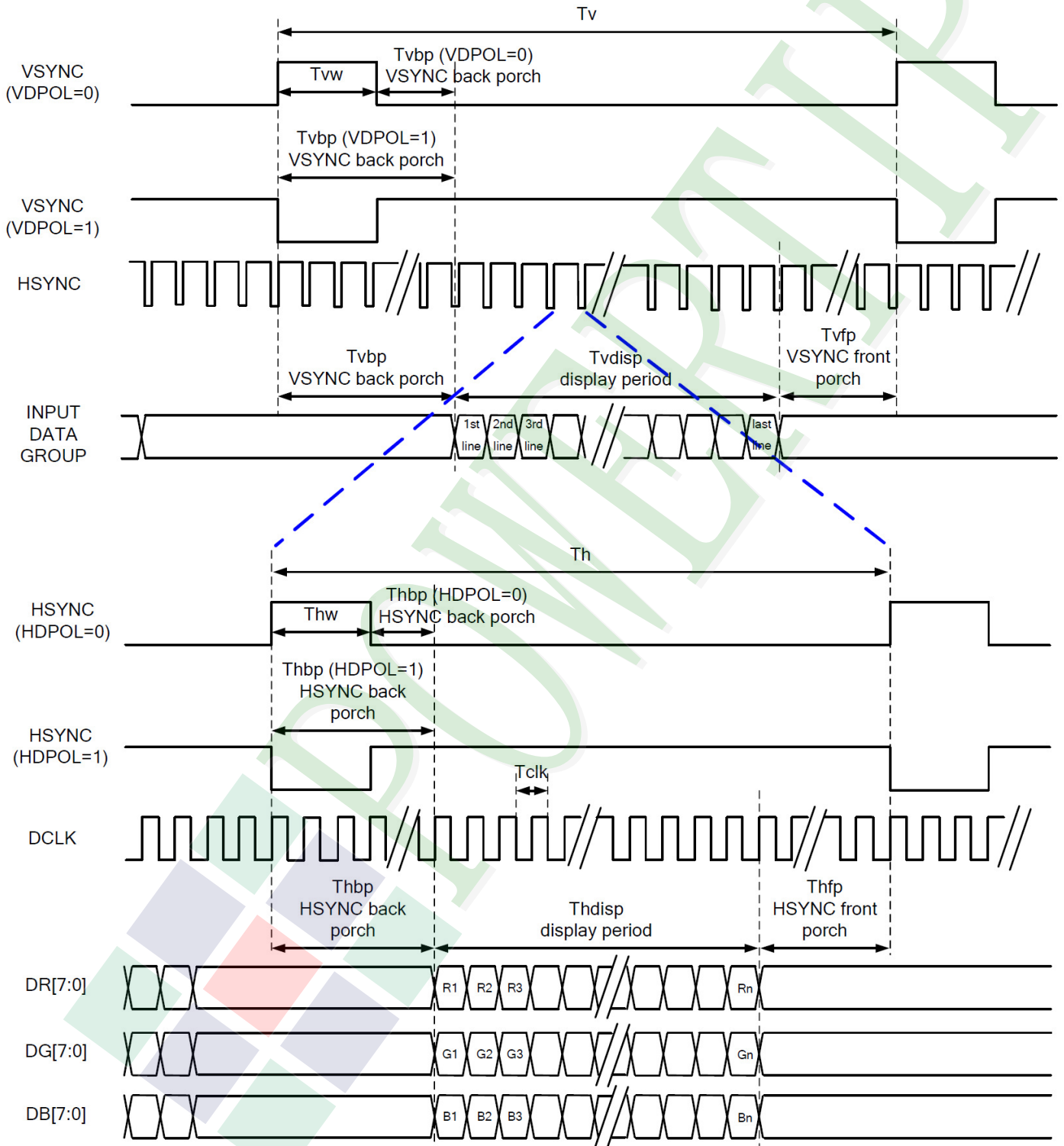
| Pin No. | Symbol | Function |
|---------|--------|----------------------------------------------------------------------------------------------------|
| 21 | B0 | Blue data bit 0 |
| 22 | B1 | Blue data bit 1 |
| 23 | B2 | Blue data bit 2 |
| 24 | B3 | Blue data bit 3 |
| 25 | B4 | Blue data bit 4 |
| 26 | B5 | Blue data bit 5 |
| 27 | B6 | Blue data bit 6 |
| 28 | B7 | Blue data bit 7 |
| 29 | GND | Ground |
| 30 | CLK | Dot data clock |
| 31 | RESETB | Active low global reset signal input. |
| 32 | HSYNC | Horizontal sync input |
| 33 | VSYNC | Vertical sync input |
| 34 | DE | Data input enable. Active High to enable the data input. If not used, please leave it floating. |
| 35 | NC | Not Connect. |
| 36 | GND | Ground |
| 37 | XR | Not Connect. |
| 38 | YD | Not Connect. |
| 39 | XL | Not Connect. |
| 40 | YU | Not Connect. |

Touch Panel Driving

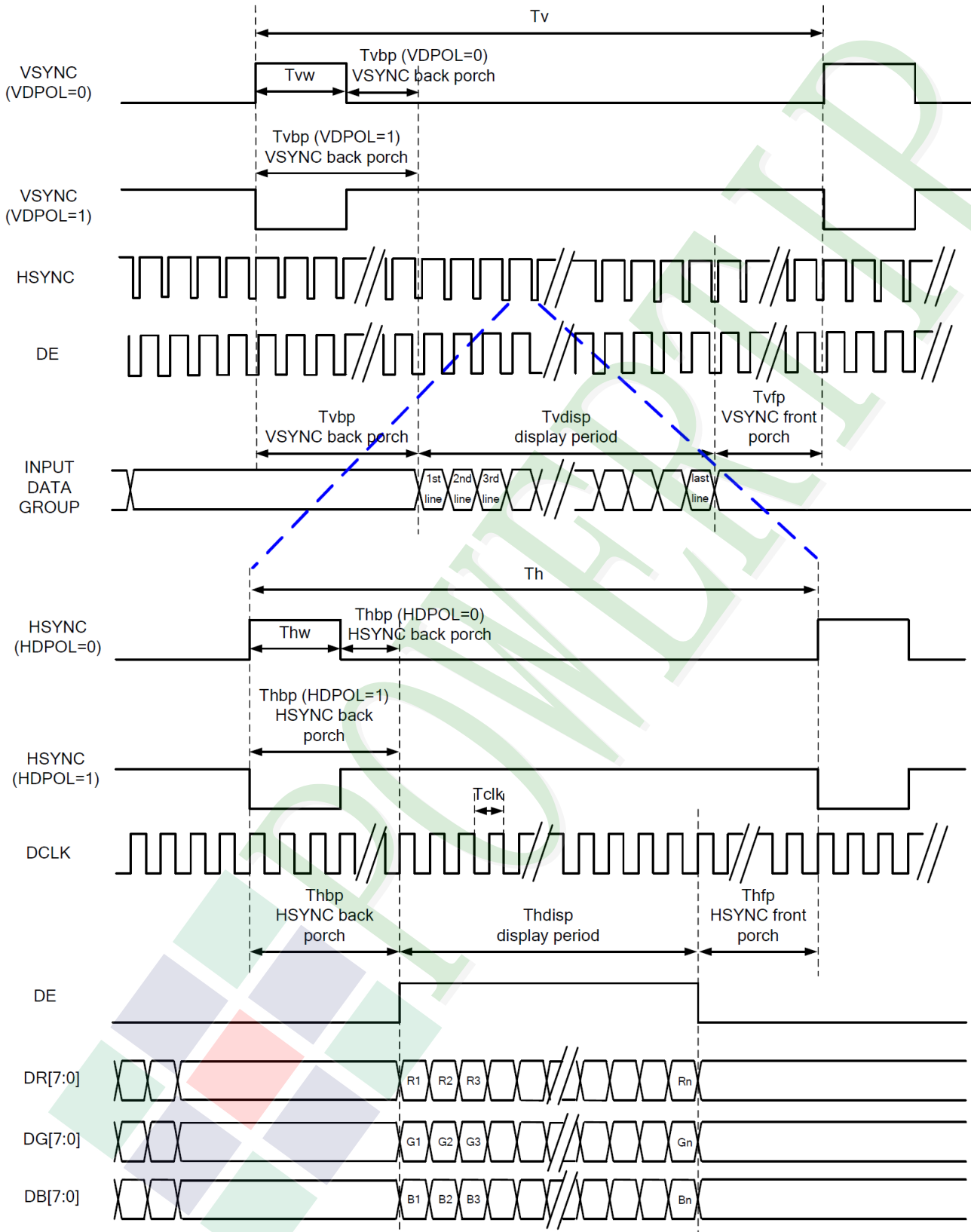
| Pin No. | Symbol | Function |
|---------|--------|---------------------------------------|
| 1 | GND | Touch Panel Ground. |
| 2 | SDA | I2C Data |
| 3 | SCL | I2C Clock |
| 4 | TPVDD | Power Supply Voltage (3.3V) |
| 5 | INT | Active Low |
| 6 | XRES | Active low global reset signal input. |

2.3 Timing Characteristics

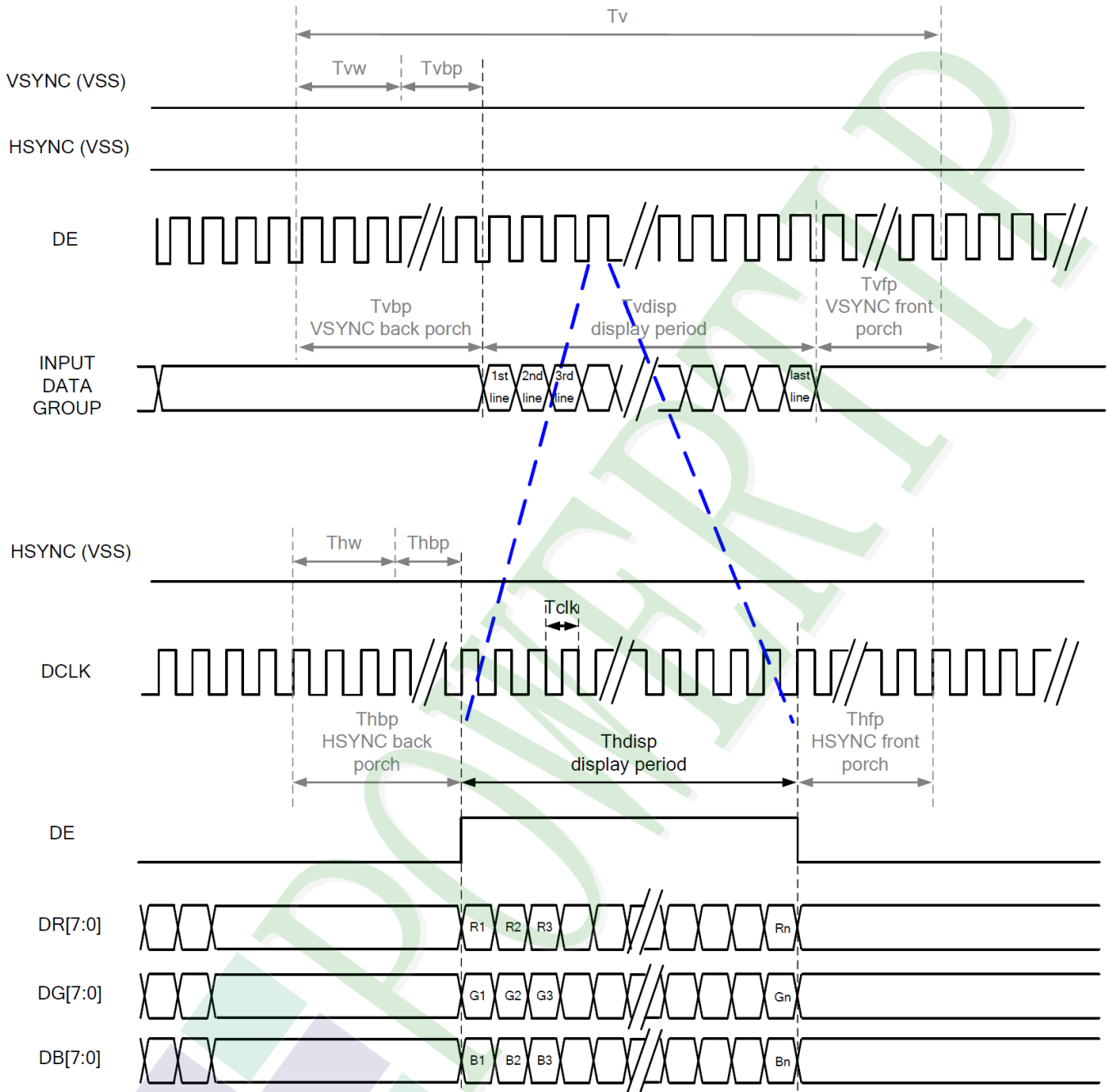
2.3.1 SYNC Mode



2.3.2 SYNC-DE Mode



2.3.3 DE Mode



| RGB Mode Selection Table | DCLK | HSYNC | VSYNC | DE |
|--------------------------|-------|-------|-------|-------|
| SYNC - DE Mode | Input | Input | Input | Input |
| SYNC Mode | Input | Input | Input | GND |
| DE Mode | Input | GND | GND | Input |

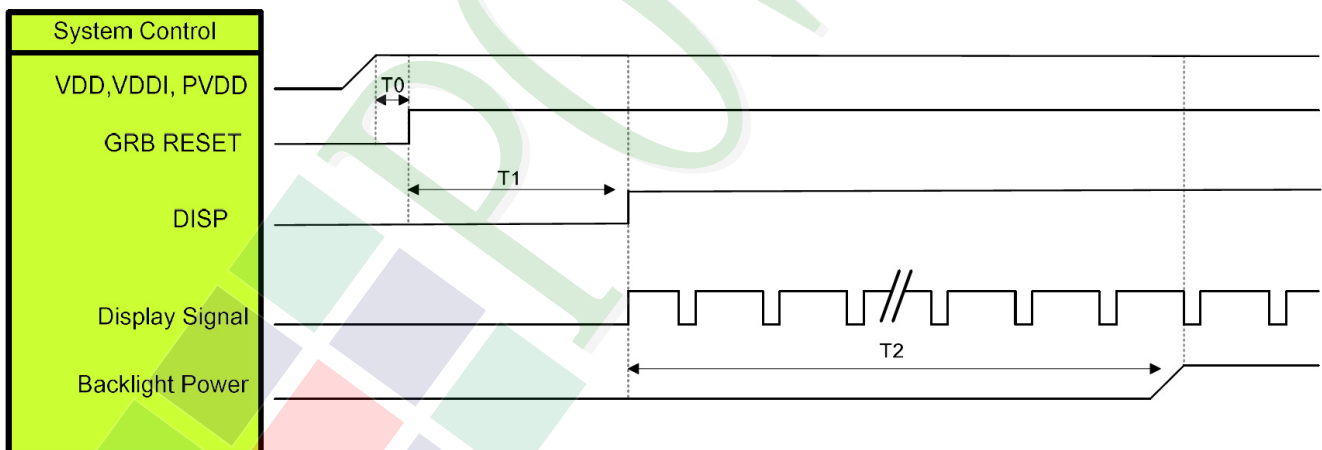
Note: "Input" means these signals are driven by host side.

2.3.4 Parallel 24-bit RGB Input Timing

| 480RGB X 272 Resolution Timing Table | | | | | | | |
|--------------------------------------|----------------|--------|------|------|------|--------|-----------------------|
| Item | Symbol | Min. | Typ. | Max. | Unit | Remark | |
| DCLK Frequency | Fclk | 8 | 9 | 12 | MHz | | |
| DCLK Period | Tclk | 83 | 111 | 125 | ns | | |
| HSYNC | Period Time | Th | 485 | 531 | 598 | DCLK | |
| | Display Period | Thdisp | | 480 | | DCLK | |
| | Back Porch | Thbp | 3 | 43 | 43 | DCLK | By H_BLANKING setting |
| | Front Porch | Thfp | 2 | 8 | 75 | DCLK | |
| | Pulse Width | Thw | 2 | 4 | 43 | DCLK | |
| VSYNC | Period Time | Tv | 276 | 292 | 321 | HSYNC | |
| | Display Period | Tvdisp | | 272 | | HSYNC | |
| | Back Porch | Tvbp | 2 | 12 | 12 | HSYNC | By V_BLANKING setting |
| | Front Porch | Tvfp | 2 | 8 | 37 | HSYNC | |
| | Pulse Width | Tvw | 2 | 4 | 12 | HSYNC | |

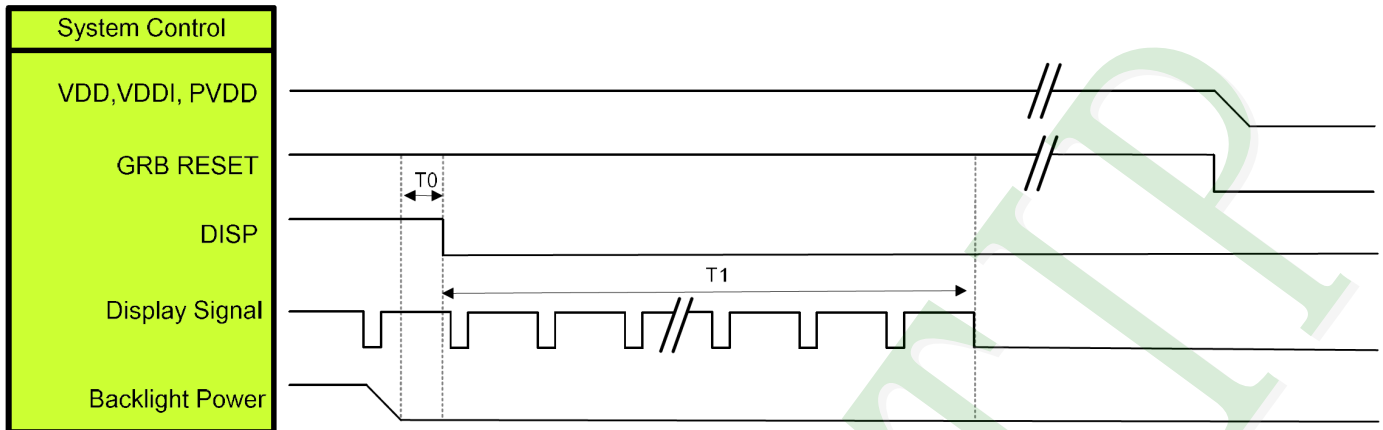
Note: It is necessary to keep $Tvbp = 12$ and $Thbp = 43$ in sync mode. DE mode is unnecessary to keep it.

2.3.5 Power ON Sequence



| Symbol | Description | Min. Time | Unit |
|--------|---------------------------------------------|-----------|------|
| T0 | System power stability to GRB RESET signal | 0 | ms |
| T1 | GRB RESET = "High" to DISP = "High" | 10 | ms |
| T2 | Display Signal output to Backlight Power on | 250 | ms |

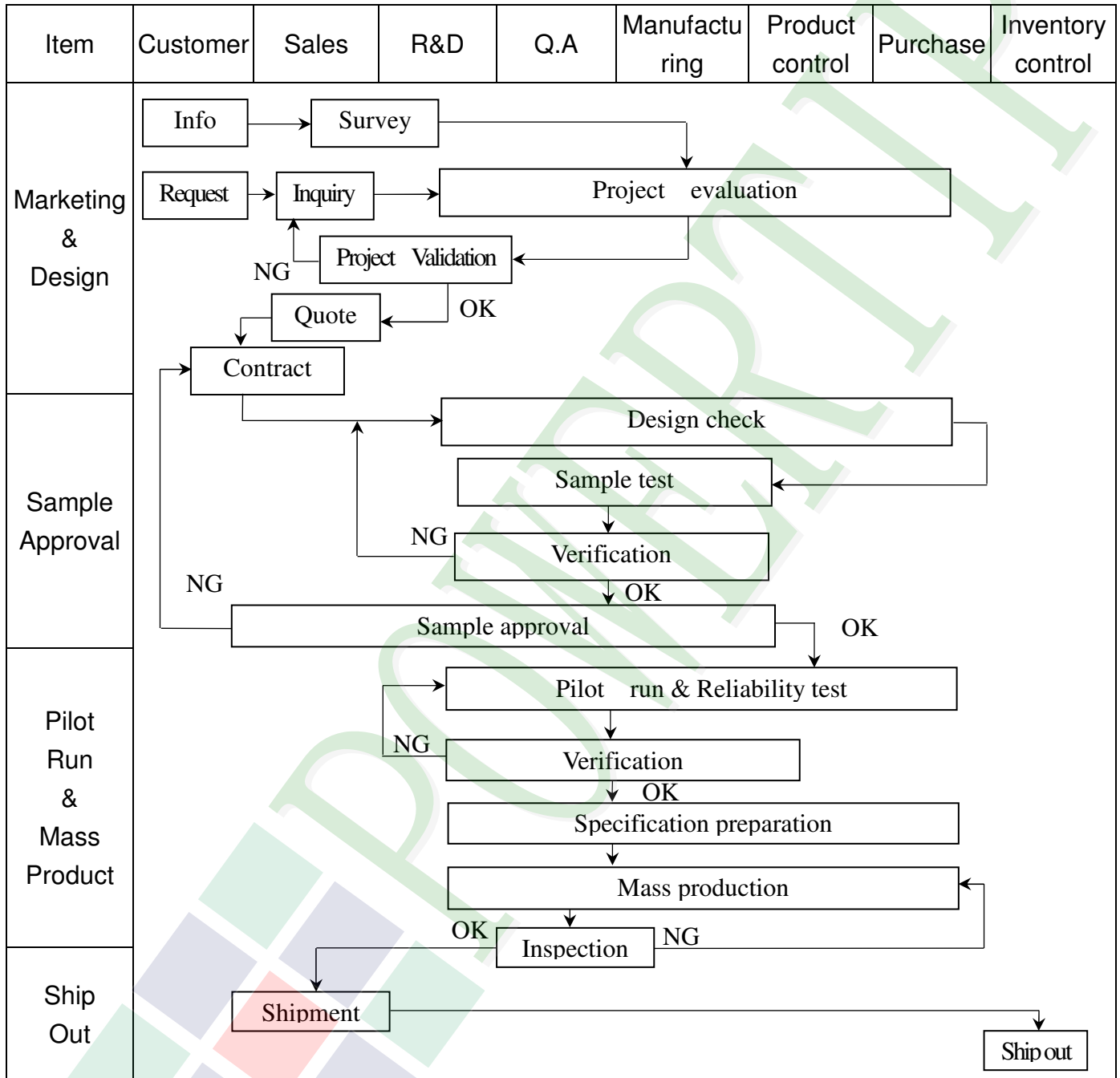
2.3.6 Power Off Sequence

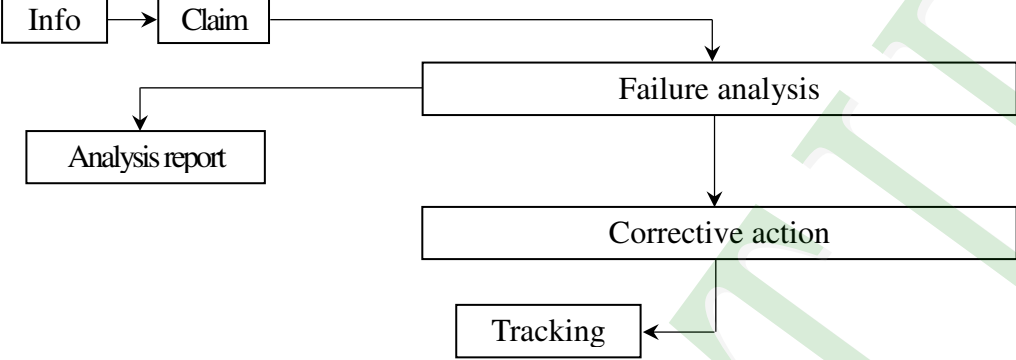


| Symbol | Description | Min. Time | Unit |
|--------|------------------------------------------------------|-----------|------|
| T0 | Backlight Power off to DISP="Low" | 5 | ms |
| T1 | DISP="Low" to IC internal voltage discharge complete | 80 | ms |

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



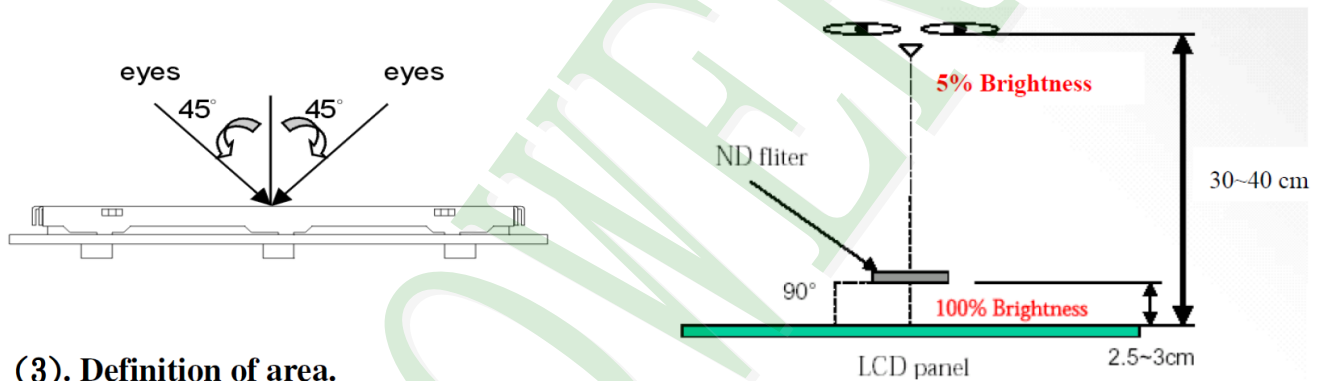
| Item | Customer | Sales | R&D | Q.A | Manufacturing | Product control | Purchase | Inventory control |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|-------------------------------------------------------------------------|-----------------|----------|-------------------|
| 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

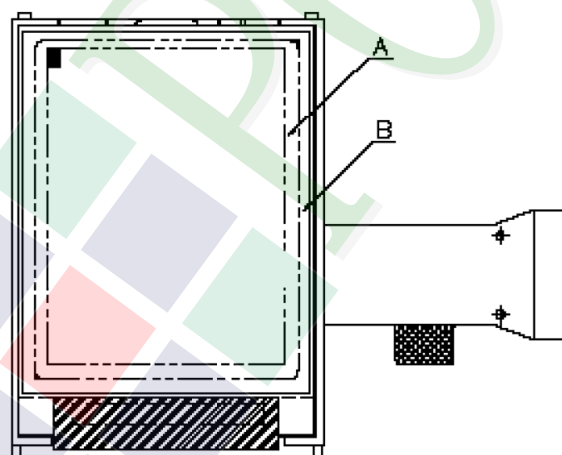
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0.4; Minor Defect AQL: 1.5
- ◆OUT Going Defect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

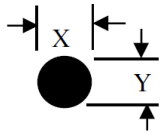
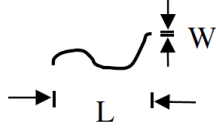
◆Specification For TFT-LCD Module 3.5" ~15" :

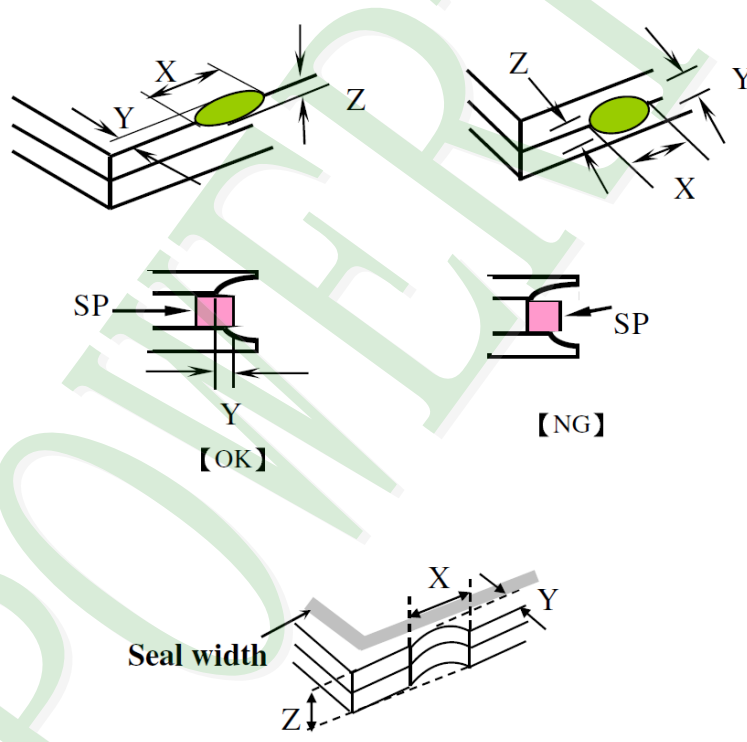
(Ver.B01)

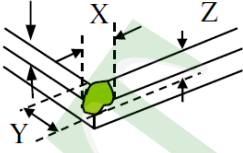
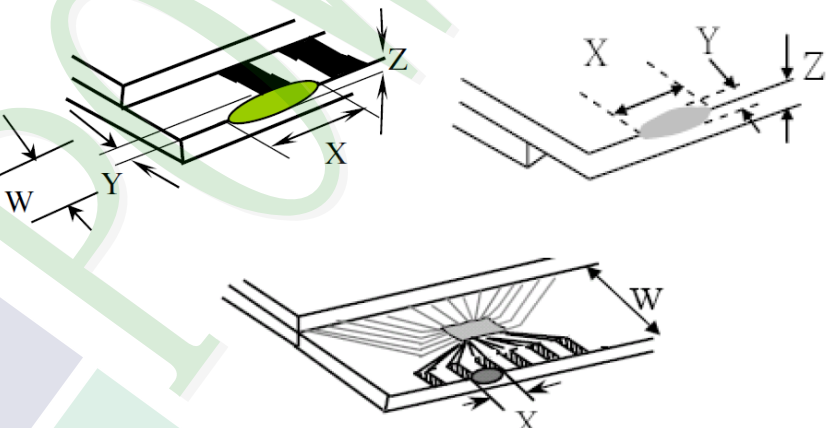
| NO | Item | Criterion | Level | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------|-------------------|------------|------------|----------|----------|----------|-----------|----------|-------|----------|-------|
| 01 | Product condition | 1. 1 The 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. 1 The quantity is inconsistent with work order of production. | Major | | | | | | | | | | | | |
| 03 | Outline dimension | 3. 1 Product 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. 6 Mura can not 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" data-bbox="566 1227 1264 1534"> <thead> <tr> <th colspan="2">Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <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> </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. | | | | | | | | | | | | | | | |

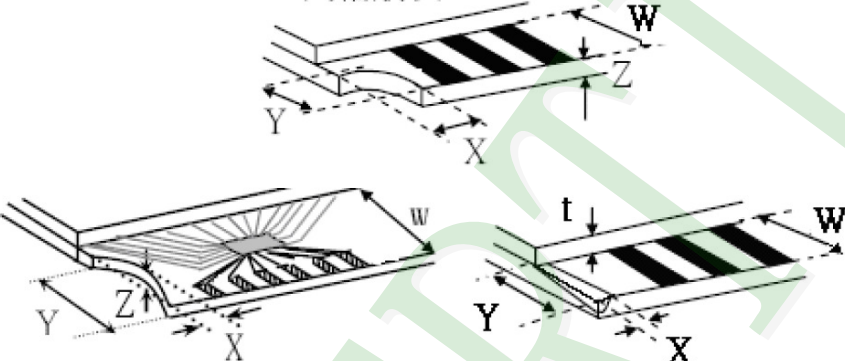
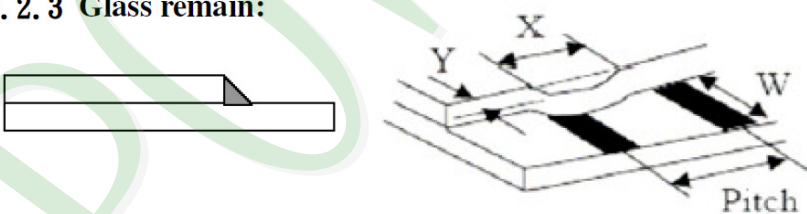
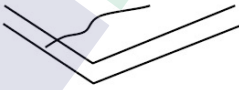
◆ Specification For TFT-LCD Module 3.5" ~15" :

(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> | 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 | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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="5">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> <td></td> </tr> </tbody> </table> | 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 | | |
| 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:</p> <p>8.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="542 1545 1340 1836"> <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="523 757 1332 1048"> <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="561 1675 1343 1854"> <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="635 952 1252 1070"> <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 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="555 1489 1236 1608"> <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>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 the same as on the production characteristic chart .There should be no wrong parts , missing parts or excess parts. | Major |
| | | 10.4 Product packaging must the same as specified on packaging specification sheet. | Minor |
| | | 10.5 The folding and peeled off in polarizer are not acceptable. | Minor |
| | | 10.6 The PCB or FPC between B/L assembled distance(PCB or FPC) is ≤ 1.5 mm. | Minor |

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.

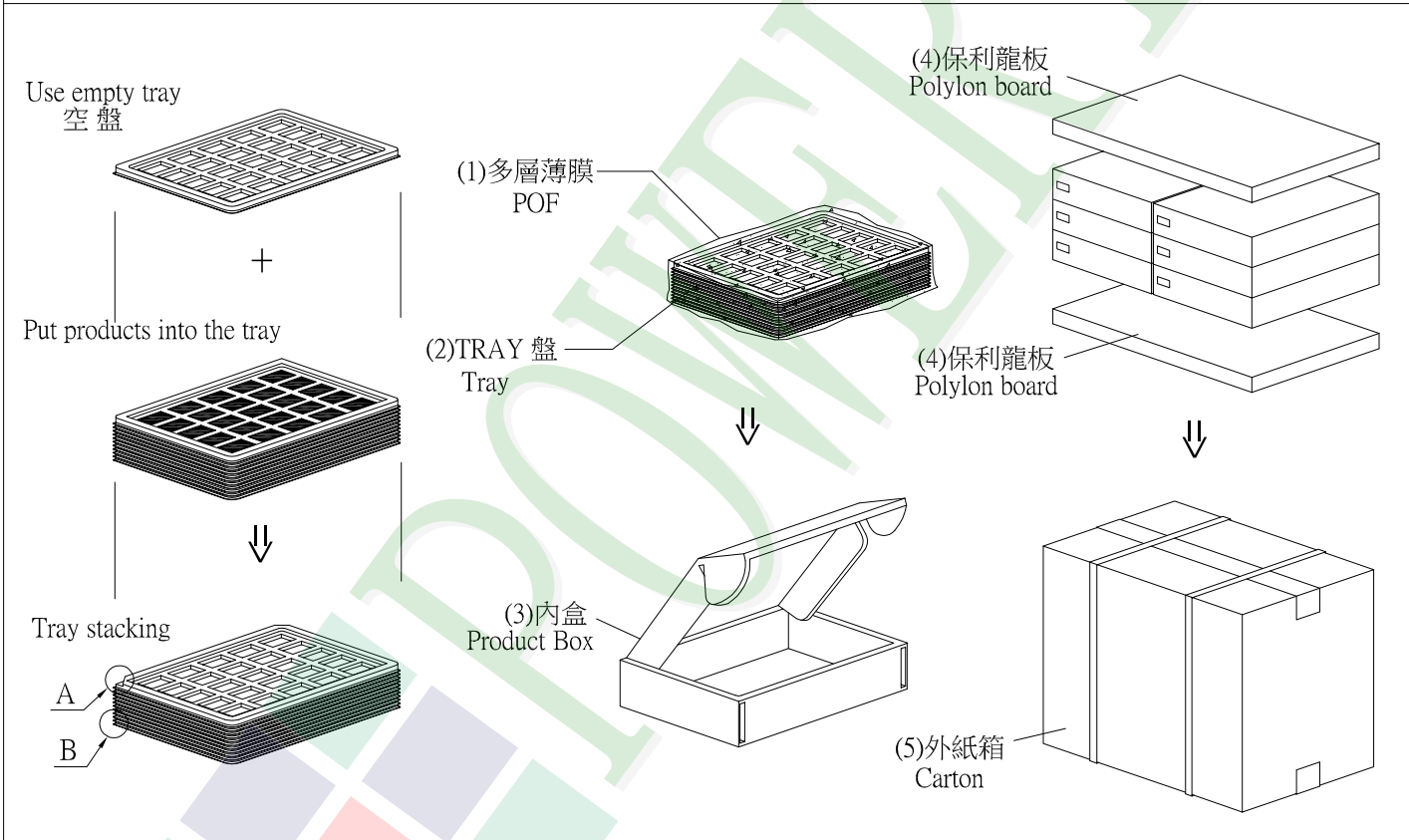
1. 包裝材料規格表 (Packaging Material) : (per carton)

| No. | Item | Model | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|-----|----------------------|--------------------|------------------|-------------|----------|--------------|
| 1 | 成品 (LCM) | PH480272T016-ZAC01 | 115.1X78.94 | 0.080 | 144 | 11.52 |
| 2 | 多層薄膜(1)POF | OTFILM0BA03ABA | 19"X350X0.015 | — | 6 | — |
| 3 | TRAY 盤 (2)Tray | TYSG000000051 | 352 X 260 X 13.5 | 0.1 | 42 | 4.2 |
| 4 | 內盒(3)Product Box | BX36627063ABBA | 383 X 270 X 66 | 0.182 | 6 | 1.092 |
| 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 | 1.0 | 1 | 1.0 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |

2. 一整箱總重量 (Total LCD Weight in carton) : 17.87 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.