

SPECIFICATIONS

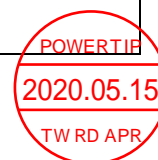
| | | |
|------------------------|---|----------------------------------|
| CUSTOMER | : | |
| SAMPLE CODE | : | SH800480T030-ZHA01 |
| MASS PRODUCTION CODE | : | PH800480T030-ZHA01 |
| SAMPLE VERSION | : | 02 |
| SPECIFICATIONS EDITION | : | 005 |
| DRAWING NO. (Ver.) | : | LMD-PH800480T030-ZHA01(Ver.003) |
| PACKAGING NO. (Ver.) | : | PKG- PH800480T030-ZHA01(Ver.001) |

Customer Approved

Date:

| Approved | Checked | Designer |
|-----------------|-------------------|--------------------|
| 廖志豪 Rex Liao | 張慶源 Yuan Chang | 陳宗淇 Howard Chen |

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



POWERTIP TECH. CORP.

| | | |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Headquarters: No.8, 6 th 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 Http://www.powertip.com.tw |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------|

History of Version

| Date (mm / dd / yyyy) | Ver. | Edi. | Description | Page | Design by |
|--------------------------|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------|
| 05/09/2019 | 01 | 001 | New Drawing. | - | Howard |
| 11/05/2019 | 01 | 002 | Add Surface treatment Modify Backlight Characteristics Modify CS/ID1,SDIN/ID2,SCK/ID3 Description Modify FPC suggested connector | 4 9 12 Appendix | Howard |
| 04/19/2020 | 02 | 003 | Second Sample Modify System Bus Timing for RGB Interface Modify SYNC-DE Mode Add Kapton tape According to customer request modify Contents | 14 16 Appendix - | Howard |
| 04/24/2020 | 02 | 004 | According to customer request modify Contents | Appendix | Howard |
| 05/14/2020 | 02 | 005 | LCD Type From IPS modify to Full Viewing Angle | 4 | Howard |
| | | | | | |
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Note: For detailed information please refer to IC data sheet:

Primacy(TFT LCD):

Sitronix: ST7262

1. SPECIFICATIONS

1.1 Features

| <u>Item</u> | <u>Standard Value</u> |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display Resolution | 800 * 3 (RGB) * 480 Dots |
| LCD Type | Full Viewing Angle, Normally Black , Transmissive type |
| Screen size(inch) | 5.0 inch |
| Surface treatment | Anti-Glare |
| Color configuration | RGB Vertical Strip |
| Backlight Type | White LED B/L |
| Weight | 60g |
| Interface | Parallel RGB (Data), SPI (Configuration) |
| ROHS | THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news_detail.php?Key=1&clD=1 |

1.2 Mechanical Specifications

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

LCD panel

| <u>Item</u> | <u>Standard Value</u> | <u>Unit</u> |
|-------------|-----------------------|-------------|
| Active Area | 108.0 (W) x 64.8(L) | mm |

Note: For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

| Item | Symbol | Condition | Min. | Max. | Unit | Remark |
|---------------------------------|----------------------|-----------|------|-------|------|--------|
| Power Supply for TFT Panel | VDD | GND=0 | -0.3 | 4.5 | V | |
| Power Supply for Backlight Unit | VCC | GND=0 | -0.3 | +20.0 | V | |
| Operating Temperature | T _{OP} (Ts) | Note 1 | -20 | 70 | °C | |
| Storage Temperature | T _{ST} (Ta) | Note 2 | -30 | 80 | °C | |

The absolute maximum rating values of this product are not allowed to be exceeded at any time. 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 | VDD | GND=0V | 3.0 | 3.3 | 3.6 | V |
| Power Supply for Backlight Unit | VCC | GND=0V | 5 | 12 | 15 | V |
| Input Voltage for TFT Panel | V _{IH} | GND=0V | 0.7VDD | - | VDD | V |
| | V _{IL} | GND=0V | 0 | - | 0.3VDD | |
| Supply Current for TFT Panel | IDD | IDD@VDD=3.3V | - | 75 | 110 | mA |
| Supply Current for Backlight Unit | ICC | ICC@VCC=5V | - | 250 | 380 | |
| Supply Current for Backlight Unit | ICC | ICC@VCC=12V | - | 110 | 160 | |
| Input Voltage for PWM Signal | V _{PH} | GND=0V | 1.2 | - | - | V |
| | V _{PL} | GND=0V | - | - | 0.4 | V |
| Dimming Clock Rate | fP | GND=0V | 5 | - | 100 | KHz |

1.5 Optical Characteristics

TFT LCD Module

VDD= 3.3 V, Ta=25°C

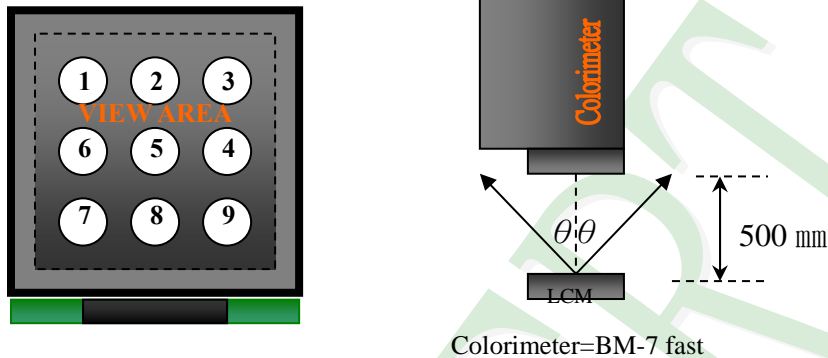
| Item | Symbol | | Condition | Min. | Typ. | Max. | unit | - |
|-------------------------------------------------------------------|------------|-------------|---------------------------------------------|------|------|------|-------|--------|
| Response time | Tr+Tf | | Ta = 25°C $\theta X, \theta Y = 0^\circ$ | - | 37 | 56 | ms | Note 2 |
| Viewing angle | Top | $\theta Y+$ | CR ≥ 10 | | 80 | - | Deg. | Note 4 |
| | Bottom | $\theta Y-$ | | | 80 | - | | |
| | Left | $\theta X-$ | | | 80 | - | | |
| | Right | $\theta X+$ | | | 80 | - | | |
| Contrast ratio | CR | | | 650 | 800 | - | - | Note 3 |
| Color of CIE Coordinate (With B/L) | White | X | Ta = 25°C $\theta X, \theta Y = 0^\circ$ | 0.25 | 0.30 | 0.35 | - | Note1 |
| | | Y | | 0.28 | 0.33 | 0.38 | | |
| | Red | X | | 0.55 | 0.60 | 0.65 | | |
| | | Y | | 0.30 | 0.35 | 0.40 | | |
| | Green | X | | 0.30 | 0.35 | 0.40 | | |
| | | Y | | 0.54 | 0.59 | 0.64 | | |
| | Blue | X | | 0.09 | 0.14 | 0.19 | | |
| | | Y | | 0.05 | 0.10 | 0.15 | | |
| Average Brightness Pattern=white display (With LCD)*1 | IV | | VCC=12.0V PWM="High" (Duty=100%) | 800 | 1000 | - | cd/m2 | Note1 |
| Uniformity (With LCD)*2 | ΔB | | VCC=12.0V PWM="High" (Duty=100%) | 70 | - | - | % | Note1 |

Note 1:

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

*2: Measurement Condition for Optical Characteristics:

- a: Environment: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ / $60 \pm 20\%$ 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)

Note 2: Definition of response time:

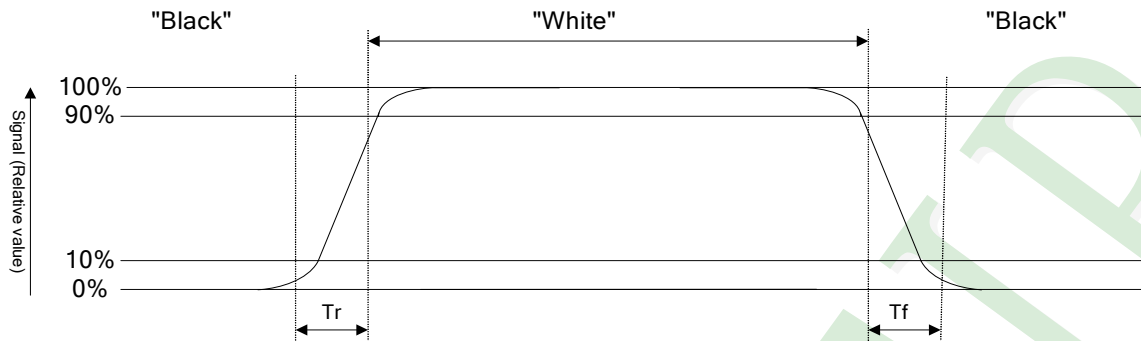
The output signals of photo detector are measured when the input signals are changed from "black" to "white" (falling time) and from "white" to "black" (rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



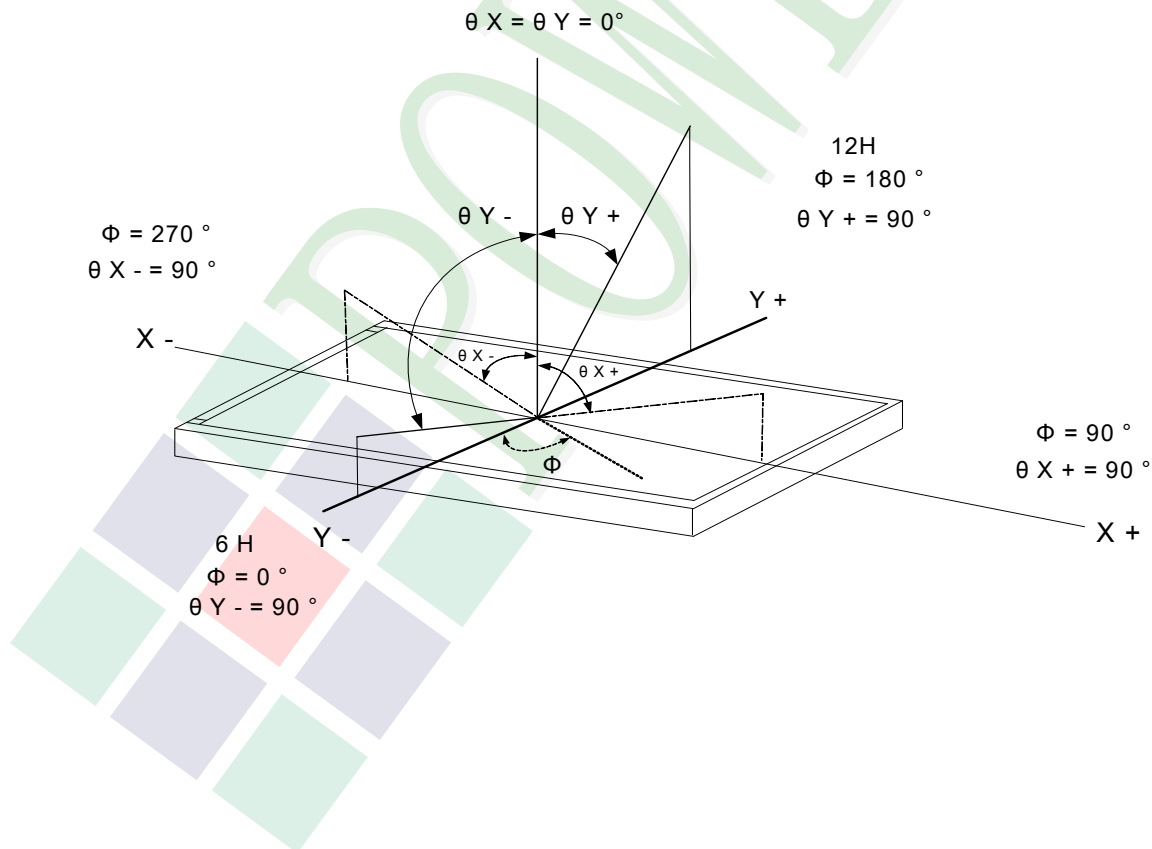
Note 3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note 4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Characteristics

Maximum Ratings

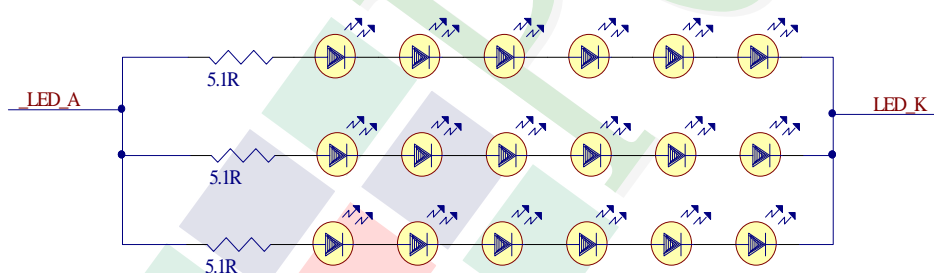
| <u>Item</u> | <u>Symbol</u> | <u>Min.</u> | <u>Max.</u> | <u>Unit</u> | <u>Remark</u> |
|---------------------|---------------|-------------|-------------|-------------|---------------|
| LED Forward Current | I_F | - | 25*3 | mA | - |
| LED Reverse Voltage | V_R | - | 5*6 | V | |
| Power Dissipation | PD | | 1500 | mW | |

Electrical / Optical Characteristics

| <u>Item</u> | <u>Symbol</u> | <u>Min.</u> | <u>Typ.</u> | <u>Max.</u> | <u>Unit</u> | <u>Remark</u> |
|---------------|---------------|-------------|-------------|-------------|-------------|---------------|
| LED Voltage | V_L | 18.0 | 19.0 | - | V | Note1 |
| LED Current | I_L | - | 60 | - | mA | - |
| LED life time | - | 50,000 | - | - | Hr | Note2 |

Note 1: The LED Supply Voltage is defined by the number of LED at $T_a=25^{\circ}\text{C}$ and $I_L=60\text{ mA}$.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=60\text{ mA}$. The LED life time could be decreased if operating I_L is larger than 60 mA.



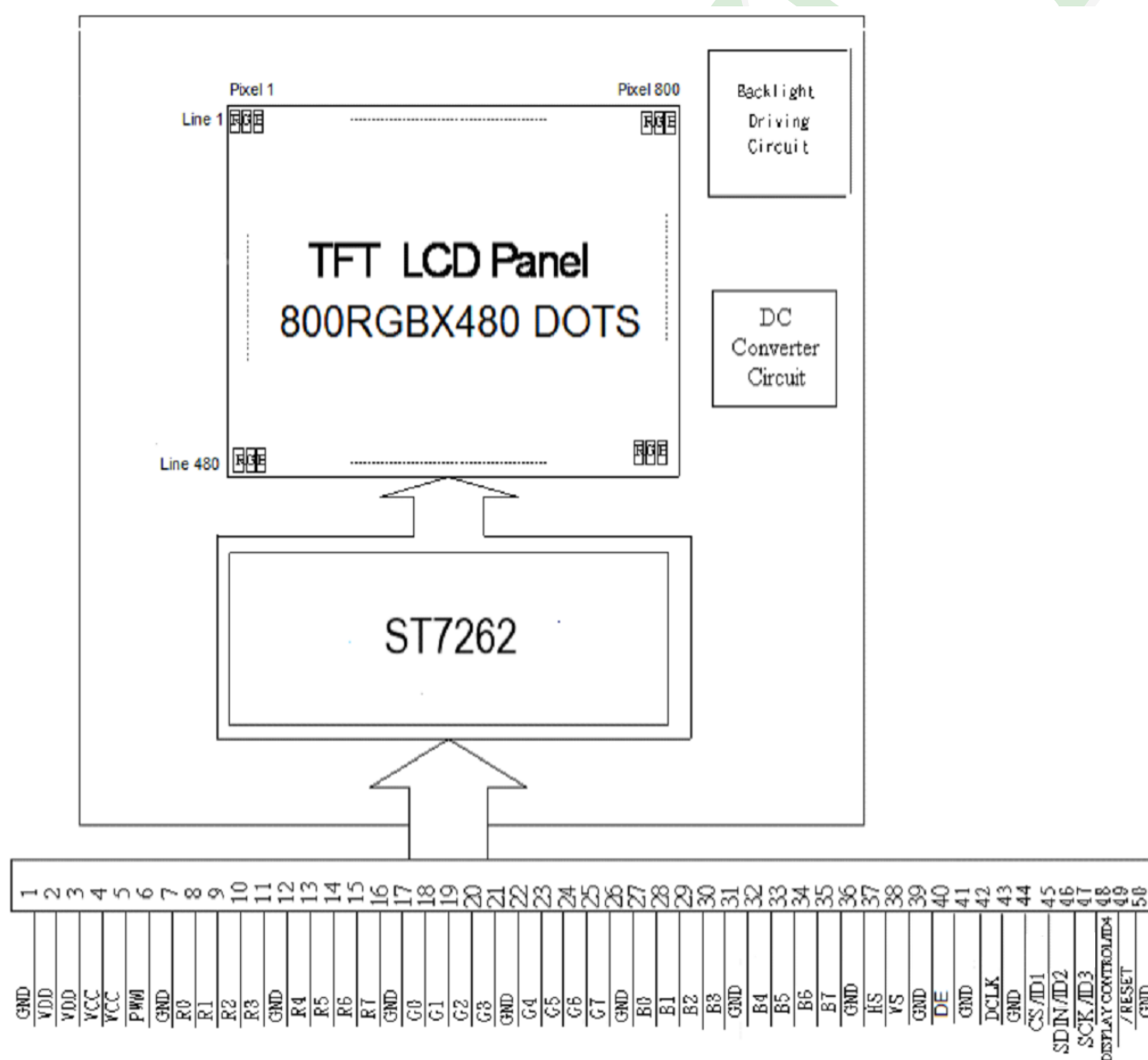
2. Module Structure

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

TFT LCM Interface

| Pin# | Name | Description |
|------|------|---------------------------------------------------------------------------------------------------------|
| 1 | GND | Power ground. |
| 2 | VDD | Power for Digital Circuit. |
| 3 | VDD | Power for Digital Circuit. |
| 4 | VCC | Power For LED backlight. |
| 5 | VCC | Power For LED backlight. |
| 6 | PWM | Shutdown & Dimming control input for backlight. Do not allow this pin to float. "Hi" =100%, "Low" = 0%. |
| 7 | GND | Power ground. |
| 8 | R0 | Red Data. |
| 9 | R1 | Red Data. |
| 10 | R2 | Red Data. |
| 11 | R3 | Red Data. |
| 12 | GND | Power ground. |
| 13 | R4 | Red Data. |
| 14 | R5 | Red Data. |
| 15 | R6 | Red Data. |
| 16 | R7 | Red Data. |
| 17 | GND | Power ground. |
| 18 | G0 | Green Data. |
| 19 | G1 | Green Data. |
| 20 | G2 | Green Data. |
| 21 | G3 | Green Data. |
| 22 | GND | Power ground. |
| 23 | G4 | Green Data. |
| 24 | G5 | Green Data. |
| 25 | G6 | Green Data. |
| 26 | G7 | Green Data. |
| 27 | GND | Power ground. |
| 28 | B0 | Blue Data. |
| 29 | B1 | Blue Data. |

| Pin# | Name | Description |
|------|--------------------------|-------------------------------------------------------------------------------------|
| 30 | B2 | Blue Data. |
| 31 | B3 | Blue Data. |
| 32 | GND | Power ground. |
| 33 | B4 | Blue Data. |
| 34 | B5 | Blue Data. |
| 35 | B6 | Blue Data. |
| 36 | B7 | Blue Data. |
| 37 | GND | Power ground. |
| 38 | HS | Line synchronization signal. Horizontal Sync Input. |
| 39 | VS | Frame synchronization signal. Vertical Sync Input. |
| 40 | GND | Power ground. |
| 41 | DE | Data Enable. |
| 42 | GND | Power ground. |
| 43 | DCLK | Sample clock. Data will be latched at the falling edge of DCLK. |
| 44 | GND | Power ground. |
| 45 | CS/ ID1 | Serial communication chip selection/ID[4:1]These pins select LCM type. See NOTE1 |
| 46 | SDIN/ ID2 | Serial communication data/ ID[4:1]These pins select LCM type. See NOTE1 |
| 47 | SCK/ ID3 | Serial communication clock/ ID[4:1]These pins select LCM type. See NOTE1 |
| 48 | DISPLAY CONTROL / ID4 | Display Enable(Hi Active)./ ID[4:1]These pins select LCM type. See NOTE1 |
| 49 | /RESET | Global Reset (Low Active). |
| 50 | GND | Power ground. |

Note1:

ID Pins Definition:

| | PIN 45 ID1 | PIN 46 ID2 | PIN 47 ID3 | PIN 48 ID3 |
|-------------|------------|------------|------------|------------|
| 3.5" Module | X | 0 | 0 | X |
| 4.3" Module | X | 1 | 0 | X |
| 5.0" Module | X | 0 | 1 | X |
| 7.0" Module | X | 1 | 1 | X |

1. Resistor = 10k ohm

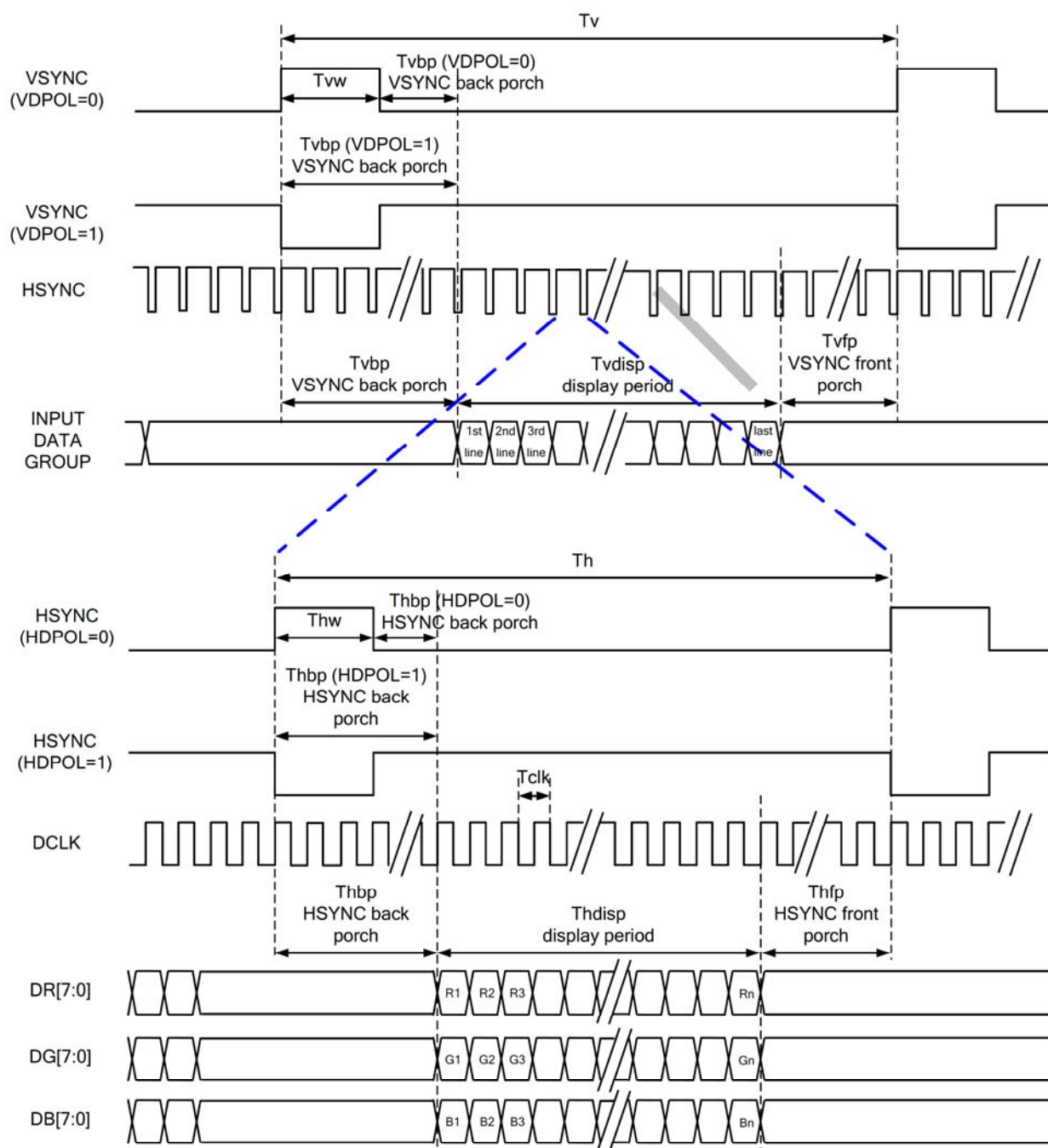
2. "X" = No use

2.3 Timing Characteristics

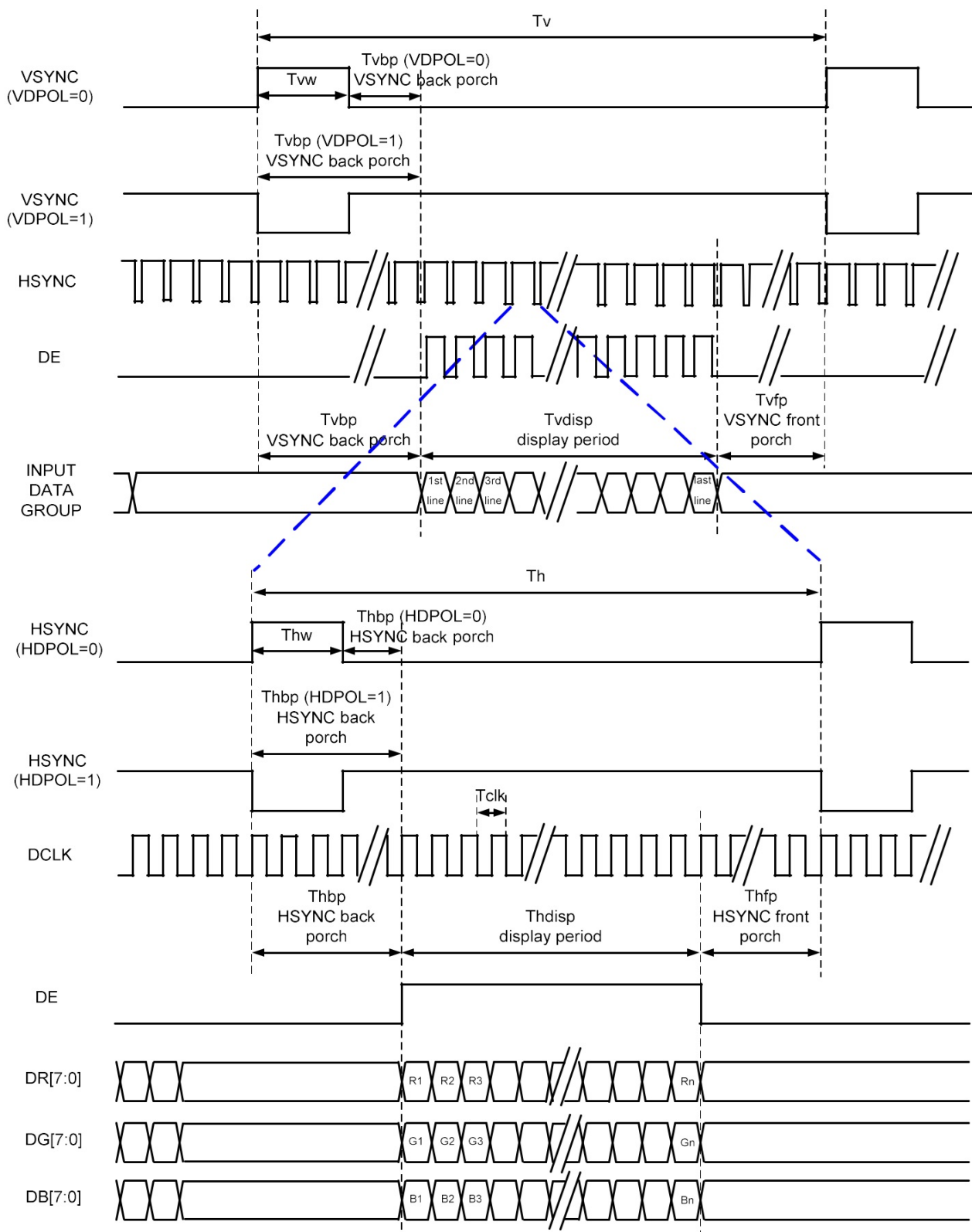
2.3.1 RGB Mode Selection Table

| <u>RGB Mode Selection Table</u> | <u>DCLK</u> | <u>HSYNC</u> | <u>VSNC</u> | <u>DE</u> |
|---------------------------------|-------------|--------------|-------------|-----------|
| SYNC - DE Mode | Input | Input | Input | Input |
| SYNC Mode | Input | Input | Input | GND |
| DE Mode | Input | GND | GND | Input |

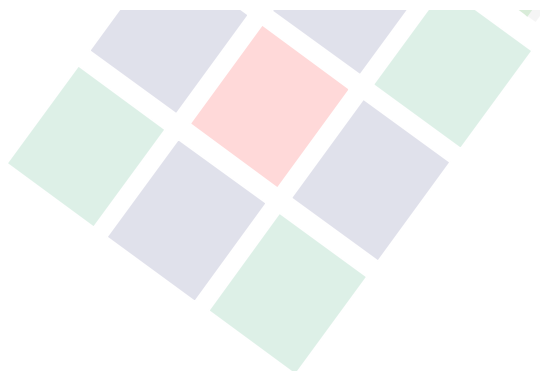
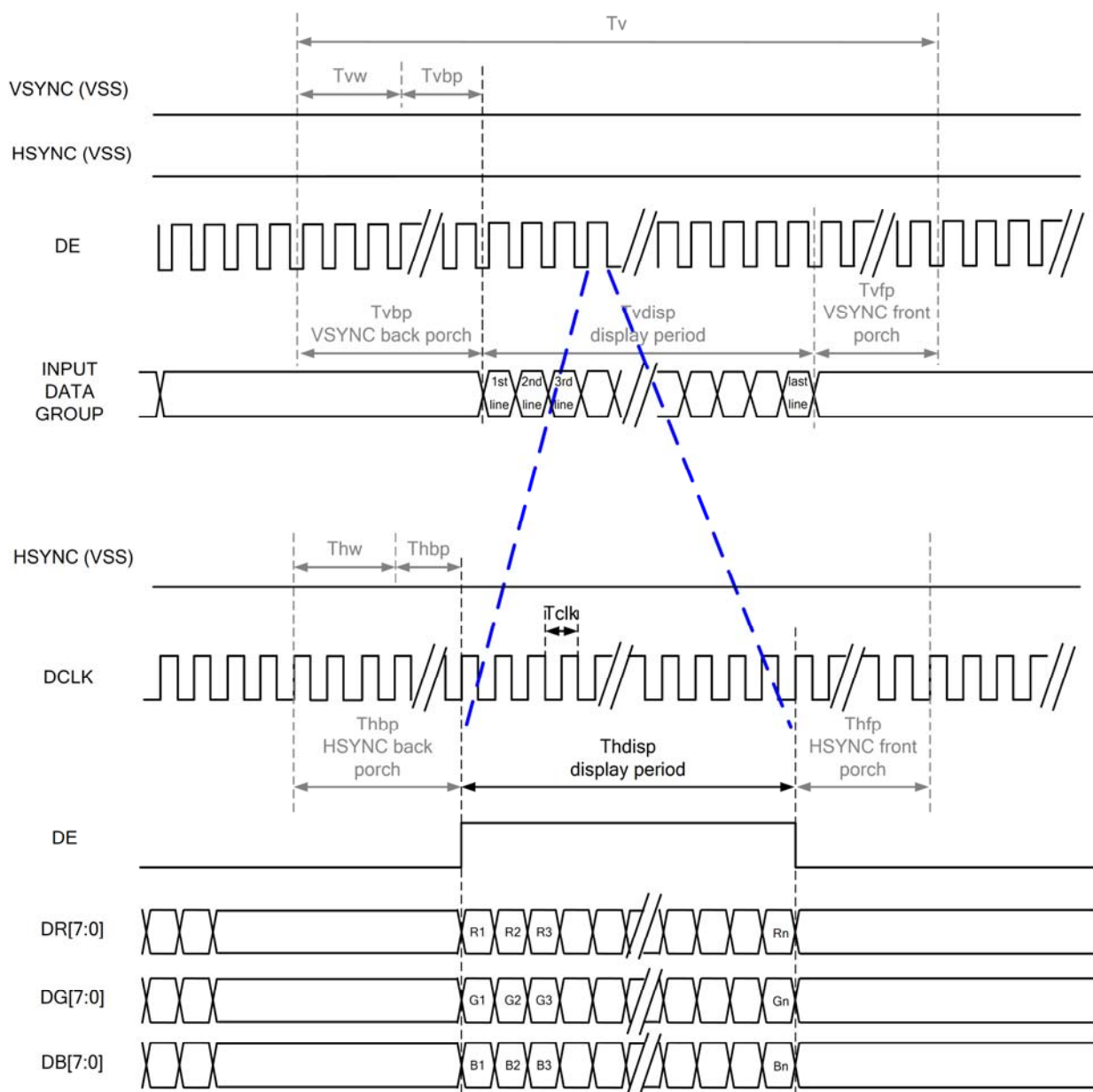
2.3.2 Parallel RGB SYNC Mode



2.3.3 Parallel RGB SYNC-DE Mode



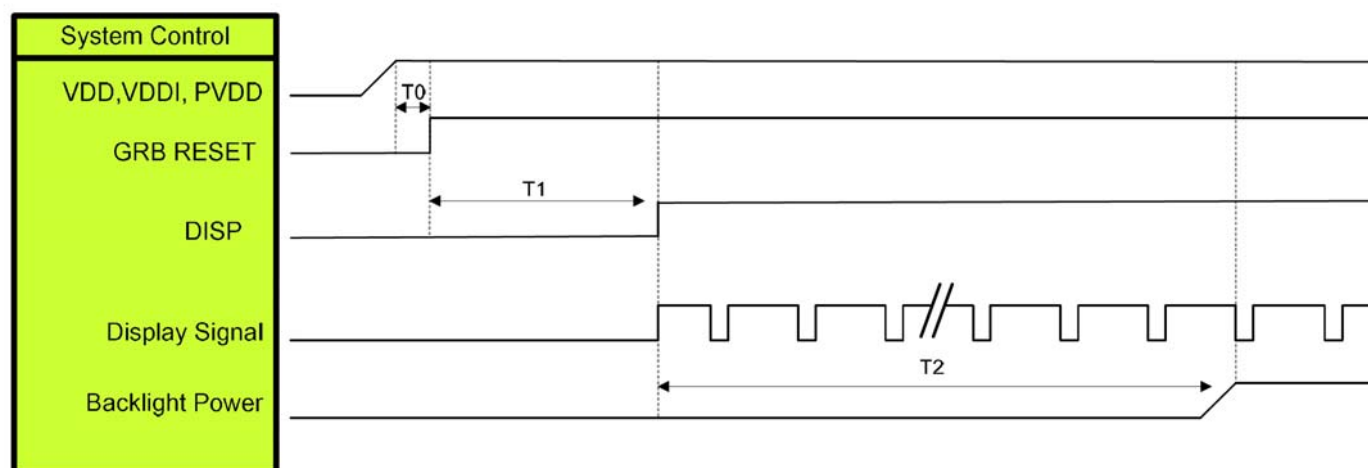
2.3.4 Parallel RGB DE Mode



2.3.5 Parallel 24-bit RGB Input Timing Table

| Parallel 24-bit RGB Interface Timing Table | | | | | | | |
|--------------------------------------------|----------------|--------|------|------|------|-------|--------|
| Item | | Symbol | Min. | Typ. | Max. | Unit | Remark |
| DCLK Frequency | | Fclk | 23 | 25 | 27 | MHz | |
| HSYNC | Period Time | Th | 808 | 816 | 896 | DCLK | |
| | Display Period | Thdisp | 800 | | | DCLK | |
| | Back Porch | Thbp | 4 | 8 | 48 | DCLK | |
| | Front Porch | Thfp | 4 | 8 | 48 | DCLK | |
| | Pulse Width | Thw | 2 | 4 | 8 | DCLK | |
| VSYNC | Period Time | Tv | 488 | 496 | 504 | HSYNC | |
| | Display Period | Tvdisp | 480 | | | HSYNC | |
| | Back Porch | Tvbp | 4 | 8 | 12 | HSYNC | |
| | Front Porch | Tvfp | 4 | 8 | 12 | HSYNC | |
| | Pulse Width | Tvw | 2 | 4 | 8 | HSYNC | |

2.3.6 Power On Sequence

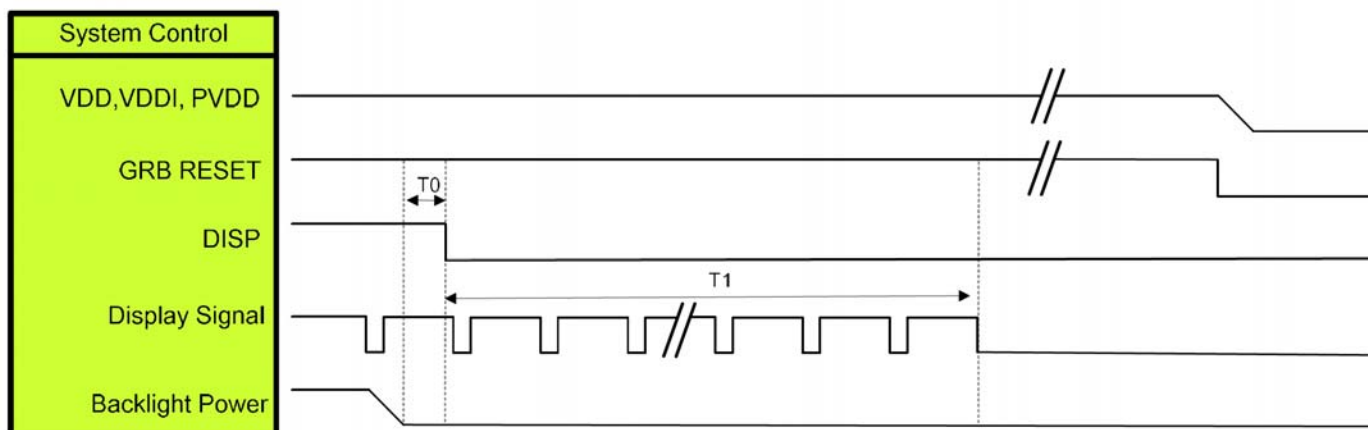


| Symbol | Description | Min. Time | Unit |
|--------|---------------------------------------------|-----------|------|
| T0 | System power stability to GRB RESET signal | 0 | ms |
| T1 | GRB RESET= "High" to DISP="High" | 10 | ms |
| T2 | Display Signal output to Backlight Power on | 250 | ms |

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

2.3.7 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 | 100 | ms |

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

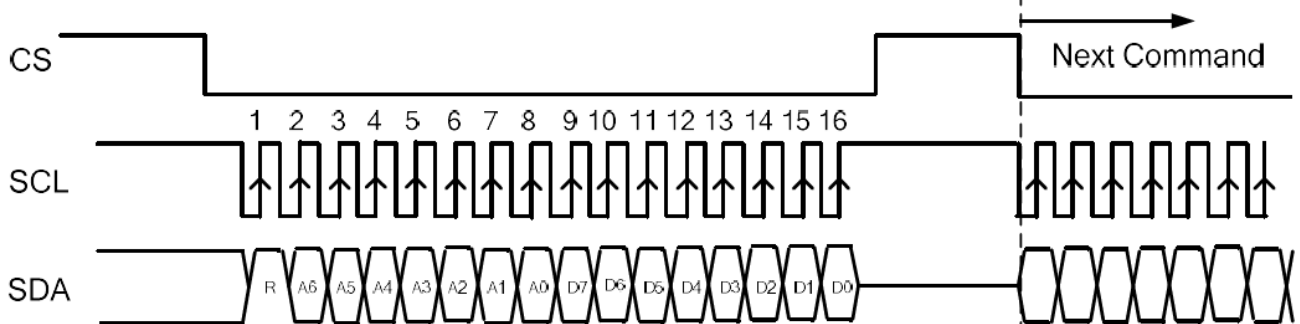
2.4 3-wire Serial Interface (SPI)

R/W: Read/Write mode control bit.

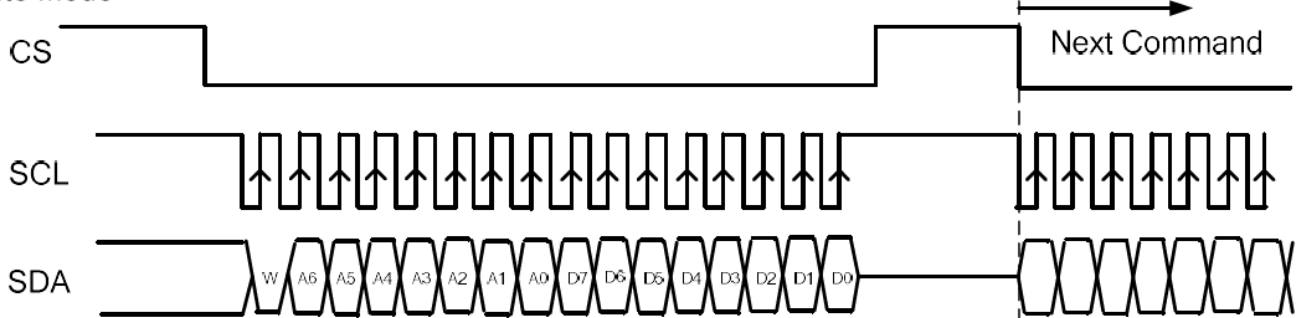
R/W=1: Read mode

R/W=0: Write mode

Read Mode



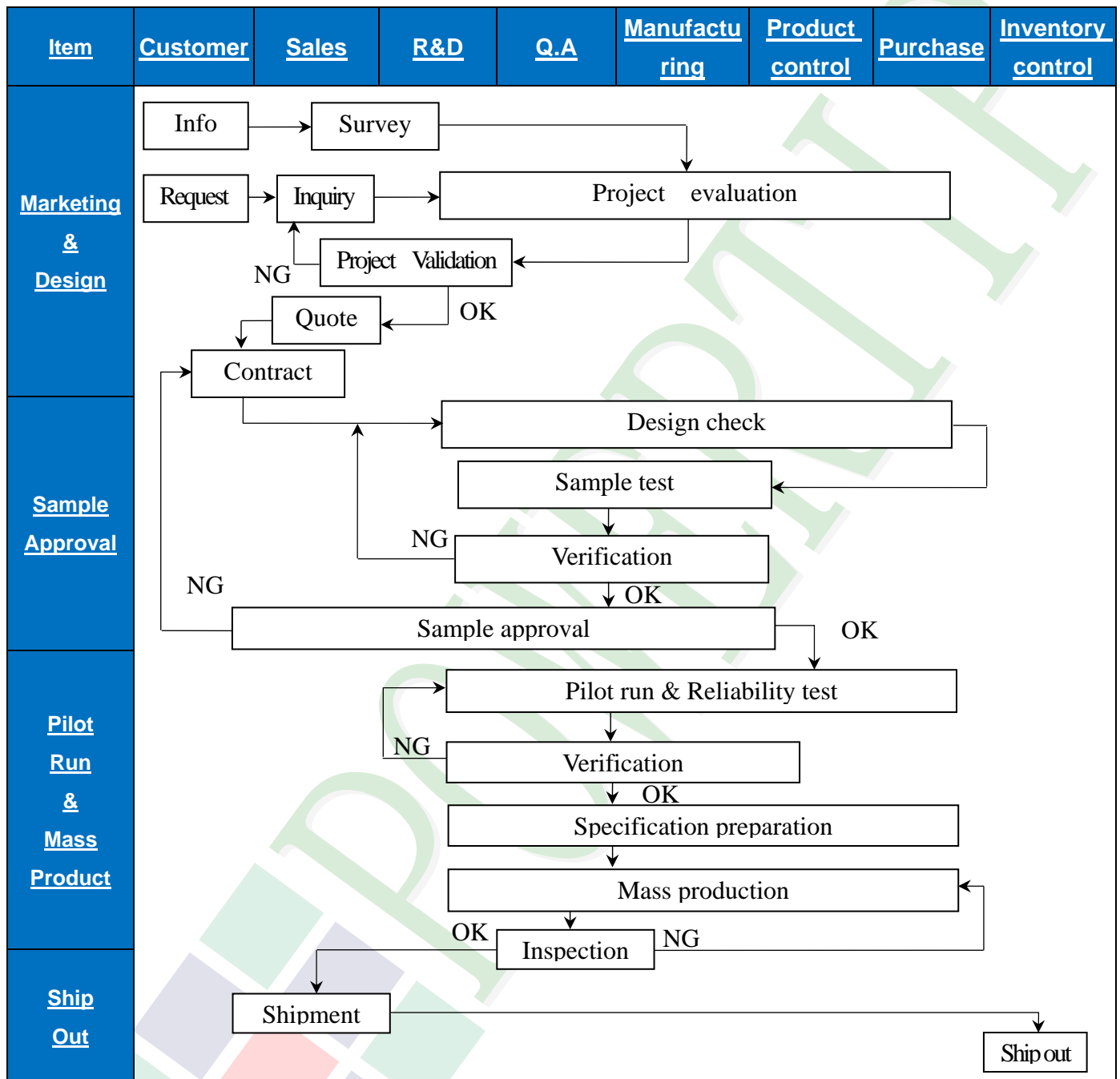
Write Mode

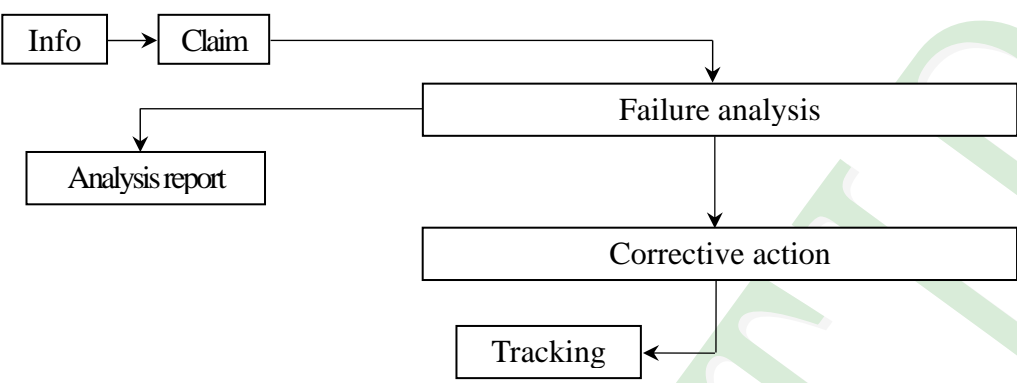


- a. Each serial command consists of 16 bits of data which is loaded one bit a time at the rising edge of serial clock SCL.
- b. Common loading operation starts from the falling edge of CS and is completed at the next rising edge of CS.
- c. The serial control block is operational after power on reset, but commands are established by the VSYNC signal. If command is transferred multiple times for the same register, the last command before the VSYNC signal is valid.
- d. If less than 16 bits of SCL are input while CS is low, the transferred data is ignored.
- e. If 16 bits or more of SCL are input while CS is low, the previous 16 bits of transferred data before then rising edge of CS pulse are valid data.
- f. Serial block operates with SCL clock.
- g. Serial data can be accepted in the power save mode.
- h. After power on reset or GRB reset, it is required 100ms delay to begin SPI communication.

3. Quality Assurance System

3.1 Quality Assurance Flow Chart



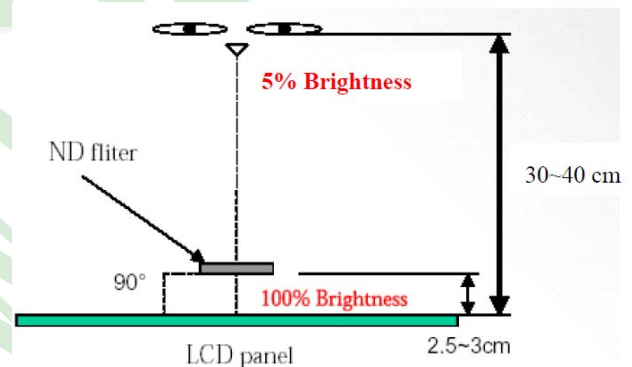
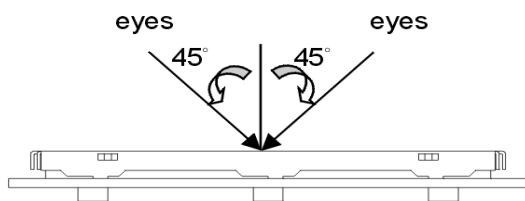
| Item | Customer | Sales | R&D | Q.A | Manufacturing | Product control | Purchase | Inventory control |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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

3.2 Inspection Specification

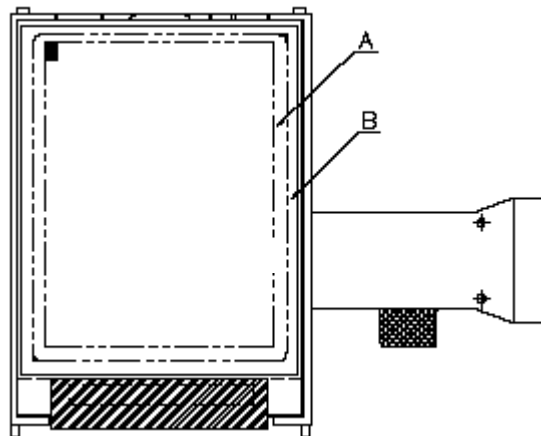
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0.4; Minor Defect AQL: 1.5
- ◆OUT Going Defect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

a. Manner of appearance test:

- (1). The test best be under 20W×2 fluorescent light(about 300lux ~500lux)
and distance of view must be at 30~40 cm.
- (2). The test direction is base on about around 45° of vertical line.



(3). Definition of area.



A area: viewing area

B area: Outside of viewing area

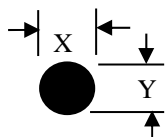
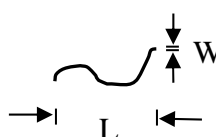
(4). Standard of inspection : (Unit : mm)

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

| 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 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><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. 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. | | | | | | | | | | | | | | | |

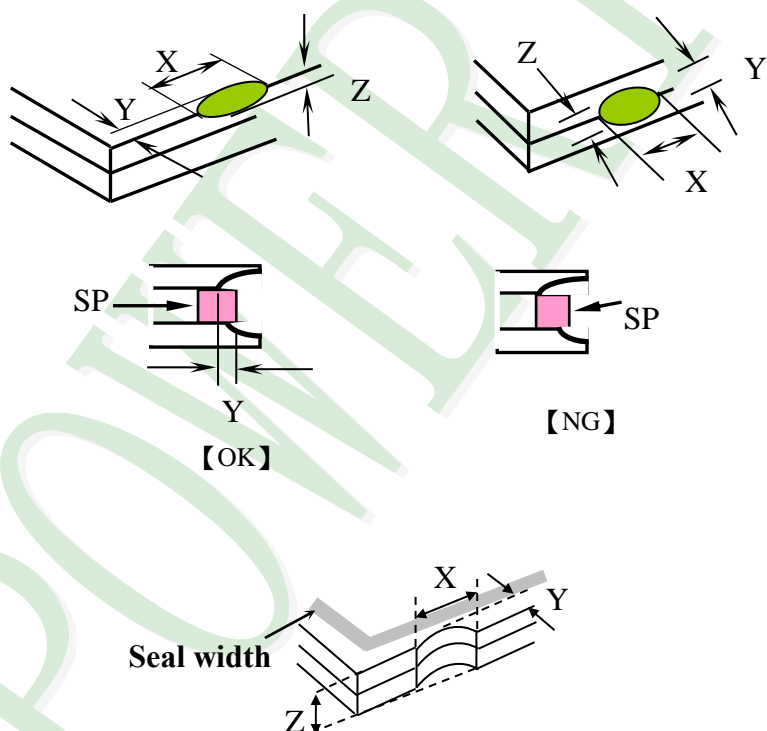
◆ Specification For TFT-LCD Module 3.5" ~15" :

(Ver.B01)

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

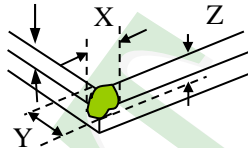
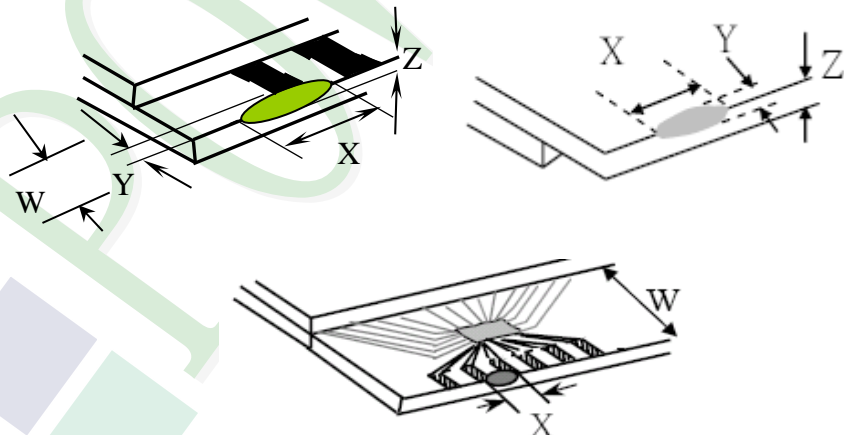
◆Specification For TFT-LCD Module 3.5" ~15" :

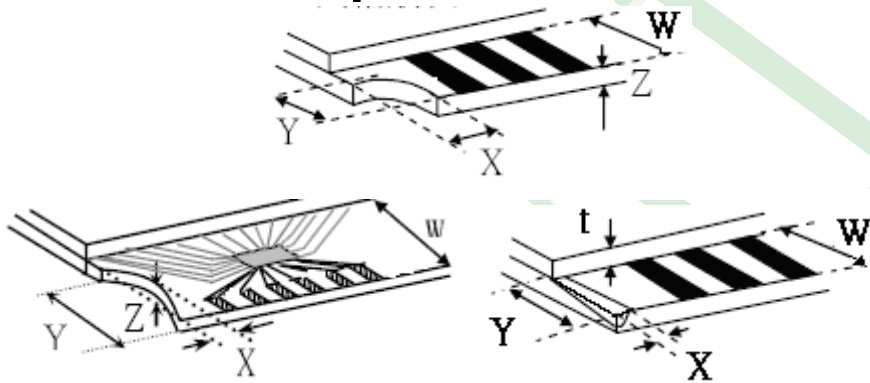
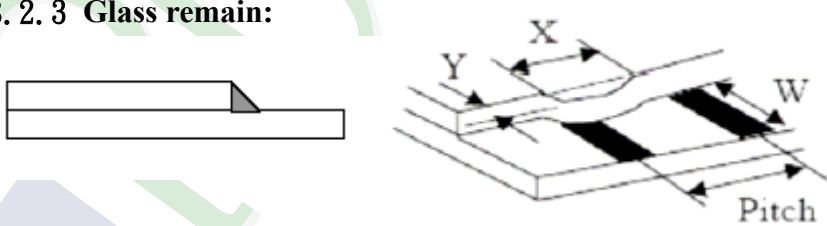
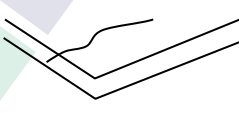
(Ver.B01)

| NO | Item | Criterion | Level | | | | | | |
|----------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|---|---|----------|--------------------------------|--------------|
| 08 | The crack of glass | <p>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><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. | $1/2 t < Z \leq 2 t$ | | | | | | | |

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

(Ver.B01)

| 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> <p>8.1.2 Corner crack:</p>  <table><thead><tr><th><u>X</u></th><th><u>Y</u></th><th><u>Z</u></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> | <u>X</u> | <u>Y</u> | <u>Z</u> | $\leq 1/5 a$ | 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 |
| | | <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | |
| $\leq 1/5 a$ | 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><thead><tr><th></th><th><u>X</u></th><th><u>Y</u></th><th><u>Z</u></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> | | <u>X</u> | <u>Y</u> | <u>Z</u> | Front | $\leq a$ | $\leq 1/2 W$ | $\leq t$ | Back | $\leq a$ | $\leq W$ | $\leq 1/2 t$ |
| | <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | | |
| 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> <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>8.2.2 Non-conductive portion:</p>  <table> <tr> <th><u>X</u></th> <th><u>Y</u></th> <th><u>Z</u></th> </tr> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</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>8.2.3 Glass remain:</p>  <table> <tr> <th><u>X</u></th> <th><u>Y</u></th> <th><u>Z</u></th> </tr> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </table> <p>8.2.4 Cracking:</p>  <p>Not Allowed</p> | <u>X</u> | <u>Y</u> | <u>Z</u> | $\leq 1/3 a$ | $\leq W$ | $\leq t$ | <u>X</u> | <u>Y</u> | <u>Z</u> | $\leq a$ | $\leq 1/3 W$ | $\leq t$ | Minor |
| | | <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | | | | |
| | | $\leq 1/3 a$ | $\leq W$ | $\leq t$ | | | | | | | | | | | |
| <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | | | | | | |
| $\leq a$ | $\leq 1/3 W$ | $\leq t$ | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

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

| <u>NO</u> | <u>Item</u> | <u>Criterion</u> | <u>Level</u> |
|-----------|--------------------|--------------------------------------------------------------------------------------|--------------|
| 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 |

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 high levels of reliability are required.

| | | | | | |
|--------------------------------------|--------------------------------------------------------|--|---------|-------|---------|
| Ver.001 | LCM包裝規格書 LCM Packaging Specifications (For Tray) | | Approve | Check | Contact |
| Documents NO. PKG-PH800480T030-ZHA01 | | | Jimmy | Tina | Clare |

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

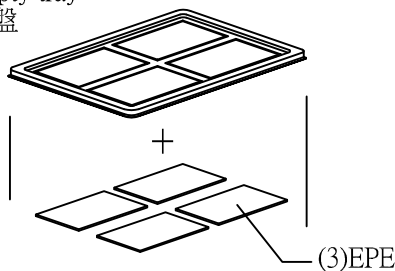
| No. | Item | Model | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|-----|----------------------|--------------------|------------------|-------------|----------|--------------|
| 1 | 成品 (LCM) | PH800480T030-ZHA01 | 121.0 X 75.9 | 0.0537 | 144 | 7.7328 |
| 2 | 多層薄膜(1)POF | OTFILM0BA03ABA | 19"X350X0.015 | — | 6 | — |
| 3 | TRAY 盤 (2)Tray | TYSG000000187 | 352 X 260 X 12.8 | 0.0965 | 42 | 4.053 |
| 4 | 舒美墊(3) EPE | FOAM000000180 | 130.0 X 90.0 X 1 | 0.0002 | 144 | 0.0288 |
| 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) : 14.03 Kg±10%

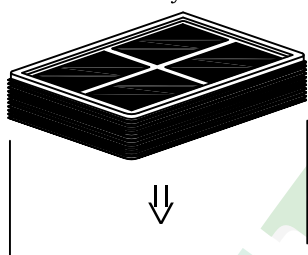
3.單箱數量規格表 (Packaging Specifications and Quantity) :

| | | | | | |
|----------------------------------------------------|----|---------------|---|---|-----|
| (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 |

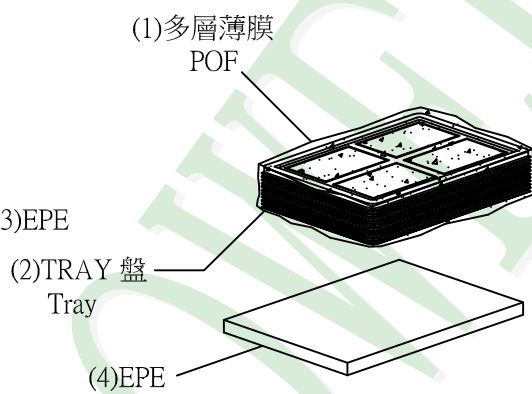
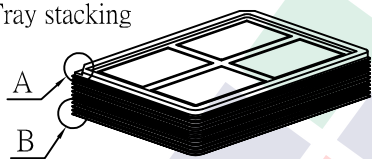
Use empty tray
空盤



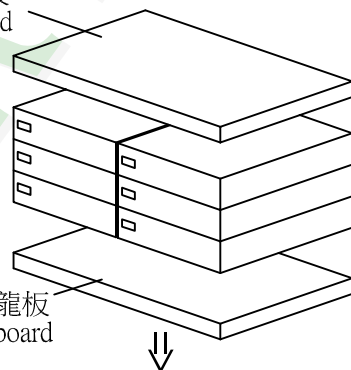
Put products into the tray



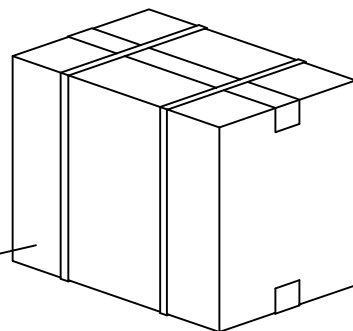
Tray stacking



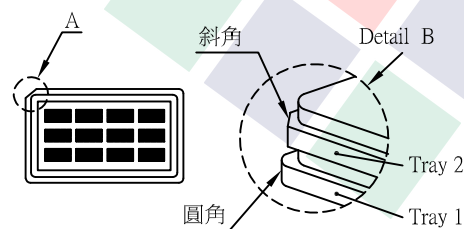
(6)保利龍板
Polylon board



(7)外紙箱
Carton



特 記 事 項 (REMARK)



5.外購tray:TY00000000308
自製tray:TYSG000000187

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.