

Specification

PH800480T013-IBB01

7.0" - 800*480 – RGB

Spec Revision: 007
Revision Date: 08/09/2024

Note: This specification is subject to change without prior notice

Passion Displayed

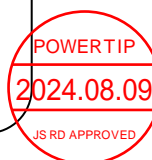


SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH800480T013-IBB01
MASS PRODUCTION CODE	:	PH800480T013-IBB01
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	007
DRAWING NO. (Ver.)	:	JLMD-PH800480T013-IBB01_003
PACKAGING NO. (Ver.)	:	JPKG-PH800480T013-IBB01_002

Customer Approved

Date:



Approved	Checked	Designer
劉進 Jin Liu	陳璐 Lu Chen	王菲 Fei Wang

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

POWERTIP TECH. CORP.

Headquarters:

No.8, 6th 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](http://www.powertip.com.tw)

History of Version

[illegible]

Total: 33 Page

Contents

1. SPECIFICATIONS

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

2. MODULE STRUCTURE

- 2.1 Counter Drawing
 - 2.1.1 LCM Mechanical Diagram
 - 2.1.2 Block Diagram
- 2.2 Interface Pin Description
- 2.3 Timing Characteristics
 - 2.3.1 Signal AC Characteristics
 - 2.3.2 Input Timing Setting
 - 2.3.3 Power On/Off Characteristics

3. QUALITY ASSURANCE SYSTEM

- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

4. RELIABILITY TEST

- 4.1 Reliability Test Condition

5. PRECAUTION RELATING PRODUCT HANDLING

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

Appendix :

- 1.LCM Drawing
- 2.LCM Packaging

1. SPECIFICATIONS

1.1 Features

<u>Item</u>	<u>Standard Value</u>
Display Type	800 * (RGB) * 480
LCD Type	a-Si TFT, Normally white, Transmissive type
Screen size(inch)	7.0 inch
Viewing Direction	6 O'clock
Backlight Type	LED B/L
Weight	-
Interface	RGB Interface
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC 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	164.9 (W) * 100.0 (L) *4.95 (H)	mm

LCD panel

<u>Item</u>	<u>Standard Value</u>	<u>Unit</u>
Active Area	154.08 (W) * 85.92 (L)	mm

Note: For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

<u>Item</u>	<u>Symbol</u>	<u>Condition</u>	<u>Min.</u>	<u>Max.</u>	<u>Unit</u>	<u>Remark</u>
Power Supply Voltage	DV _{DD}	GND=0	-0.3	5.0	V	-
	AV _{DD}		6.5	13.5	V	
	V _{GH}		-0.3	40	V	
	V _{GL}	AGND=0	-20	0.3	V	
	V _{GH} - V _{GL}	-	0	40	V	
Operating Temperature	T _{OP}	Note 1	-20	70	°C	
Storage Temperature	T _{ST}	Note 2	-30	80	°C	
Storage Humidity	H _D	T _a ≤ 60 °C	10	90	%	

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 : T_s is the temperature of panel's surface.

Note 2 : T_a is the ambient temperature of samples.

1.4 DC Electrical Characteristics

GND = 0V, Ta = 25°C

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

Note1: Maximum current display.

1.5 Optical Characteristics

$V_{DD} = 3.3\text{ V}$, $T_a = 25^\circ\text{C}$

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

Note 1:

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

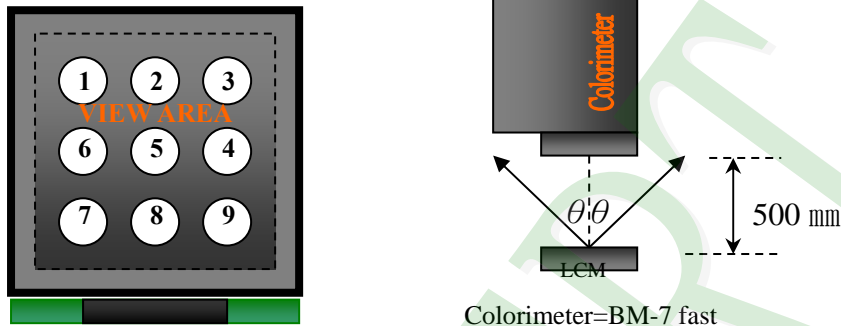
*2 : Measurement Condition for Optical Characteristics:

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

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

c : Equipment: TOPCON BM-7 fast , (field 1°) , 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:

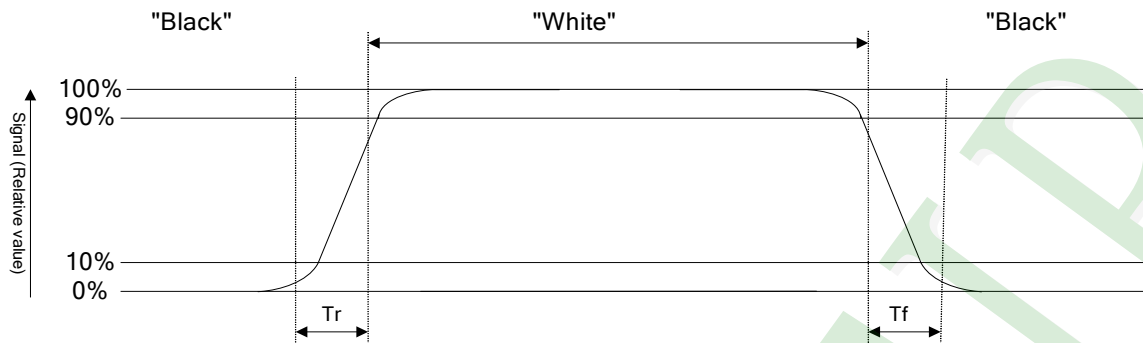
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



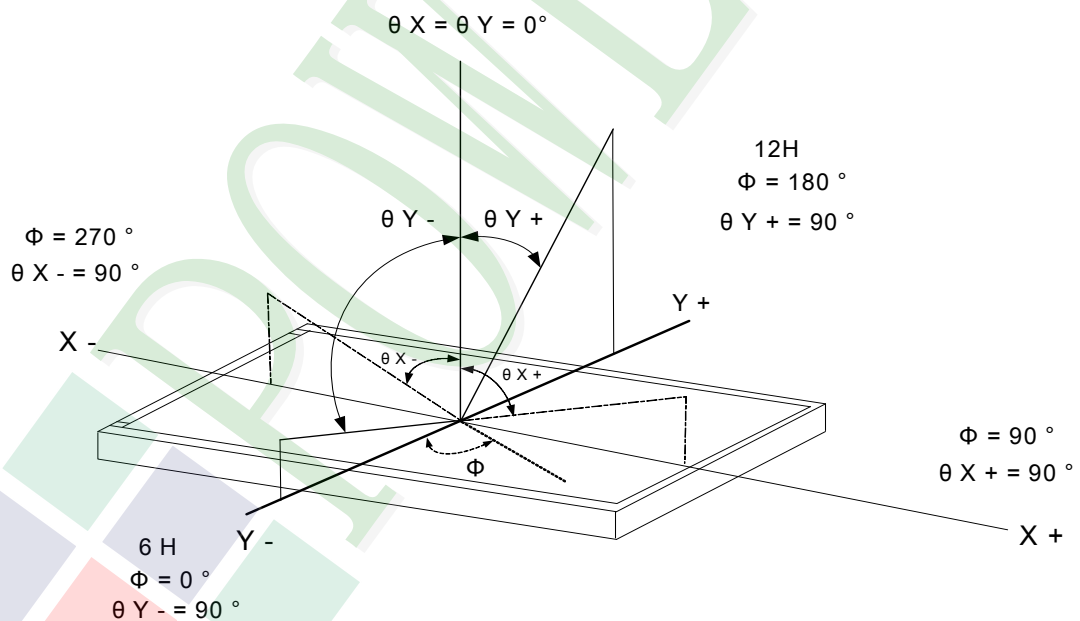
Note3: Definition of contrast ratio:

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 Unit Characteristics

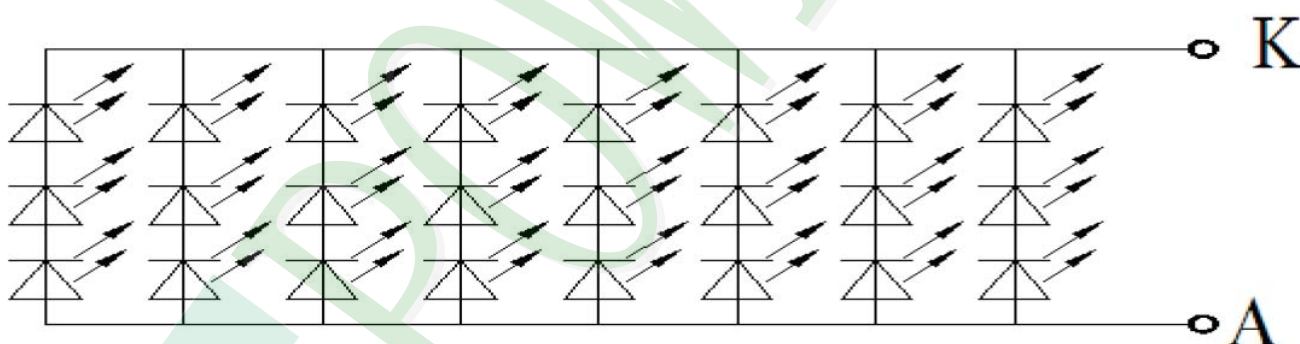
Maximum Ratings

<u>Item</u>	<u>Symbol</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>	<u>Unit</u>
LED Forward Current	IF	Ta =25°C	-	30*8	mA
LED Reverse Voltage	VR		-	5	V
Power consumption	Pd			90*24	mW

Electrical / Optical Characteristics

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

Circuit diagram



Other Description

<u>Item</u>	<u>Conditions</u>	<u>Description</u>
Life Time	Ta =25°C IF= 160mA	50000 hrs

1.7 Touch Panel Characteristics

1.7.1 Optical Characteristics

<u>Item</u>	<u>Specification</u>
1.Transparency	80% Min

1.7.2 Mechanical Characteristic

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

1.7.3 Electrical Characteristics

<u>Item</u>	<u>Specification</u>
1.Rated Voltage	DC 5V(DC 7V Max)
2.Resistance Between Terminals.	Direction X (Glass side): 500Ω~ 1000Ω
	Direction Y (Film side): 100Ω~ 500Ω
3.Insulation Resistance	20 MΩ or more (DC 25 V 1min)
4.Linearity	±1.5%. $\text{Linearity}(\%) = \Delta V / (EV - SV) * 100.$ ΔV : The difference between the ideal voltage and measured voltage on the each measuring line. SV: Voltage of starting Points. EV: Voltage of Ending Points. (Test condition refers to 1.7.2 item4)
5.Bouncing	<10ms (Tip R 3.75mm, hardness 10°~20° ,silicon rubber ,500gf operation : 40 mm/sec)

1.7.4 Reliability Characteristic

NO	Test Item	Test Condition	Test Result
1	Hitting Durability	1,000,000times min.(R 8 mm Silicon Rubber Hardness 60°250gf 2times/sec).	Follow 1.7.3 item2 and item4.
2	Pen Sliding Durability	100,000 times min(Tip R0.8mm).	Follow 1.7.3 item2 and item4.
3	Impact Resistance	φ9mm steel ball is dropped on the surface from 30 cm height at 1 time.	No Crack
4	Flexible pattern Bending Resistance	Bending 3 times by bending radius R1.0 mm	Follow 1.7.3 item2.

1.7.5 Touch Panel Design/Handling Guide

(1) Keep the gap, for example 0.2 to 0.3mm, between bezel edge and T/P edge.

The reason is to avoid the bezel edge from contacting T/P surface that may cause “short” with bottom layer

(2) Insertion a cushion material is recommended.

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

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

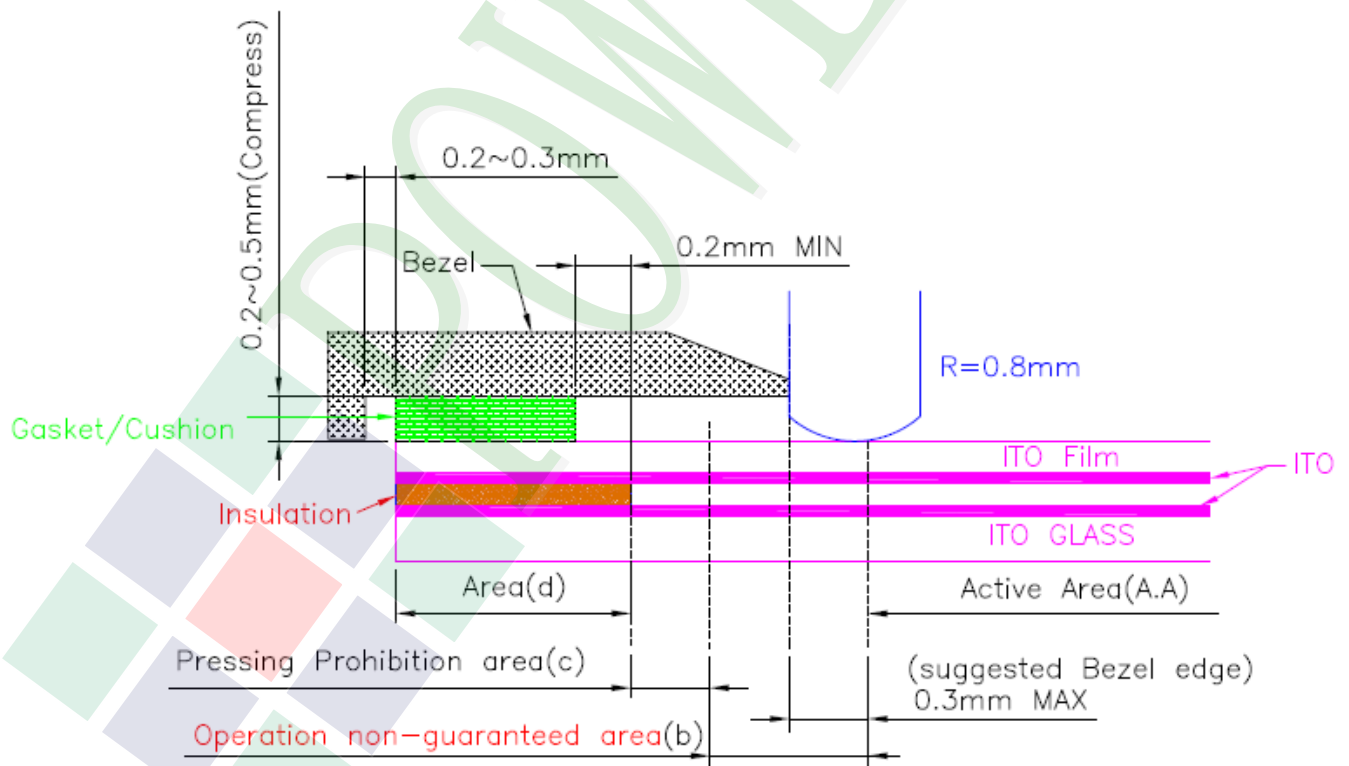
(5) Never expand the T/P top layer (PET Film) like a balloon by internal air pressure. The life of the T/P will extremely decreasing.

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

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

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

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



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

Area(a) : Active area

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

Area(b) : Operation non-guaranteed area

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

Area(c) : Pressing prohibition area

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

Area(d) : Non-Active area

The area does not activate even if pressed.



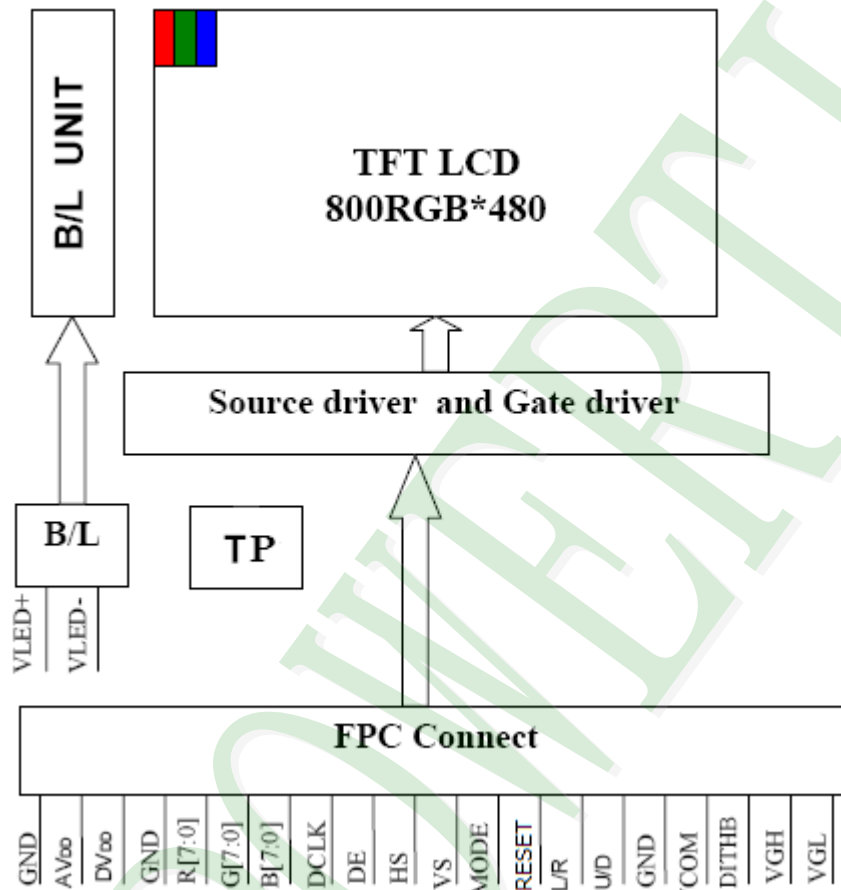
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

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

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

I: input

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE= "0", DE must be grounded.

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

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

Note 4: Selection of scanning mode.

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

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

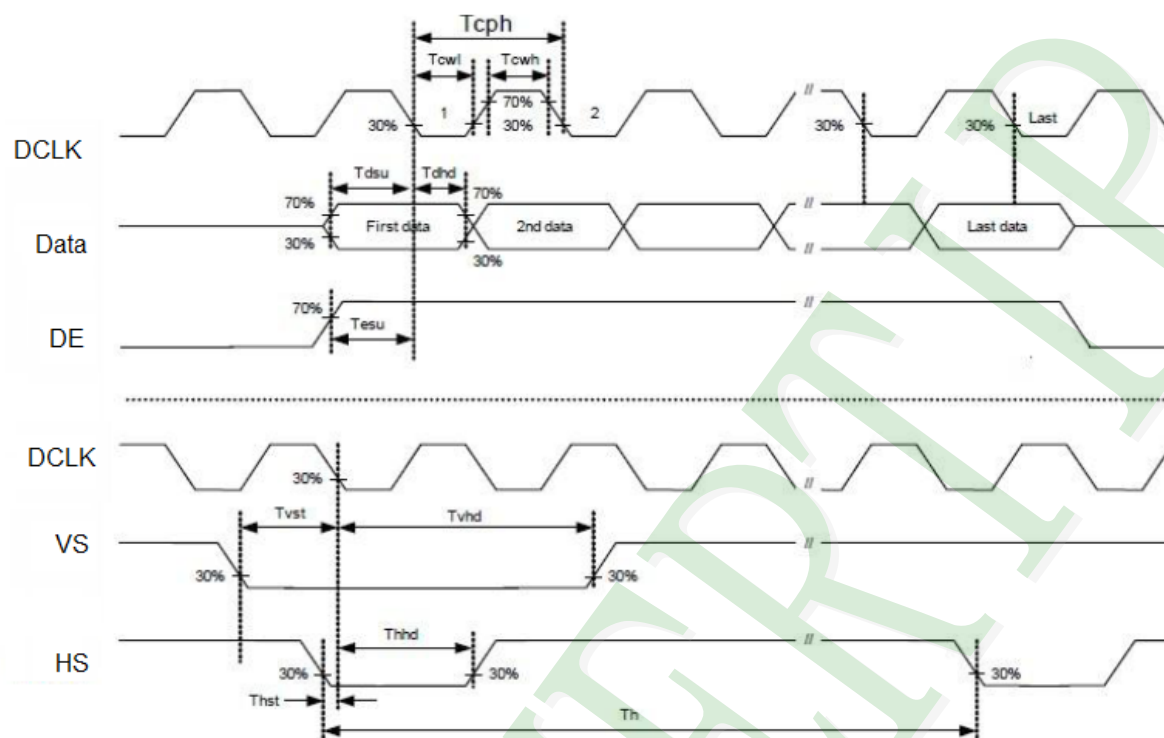
Note 6: Dithering function enable control, normally pull high.

When DITHB="1", Disable internal dithering function.

When DITHB="0", Enable internal dithering function.

2.3 Timing Characteristics

2.3.1 Signal AC Characteristics



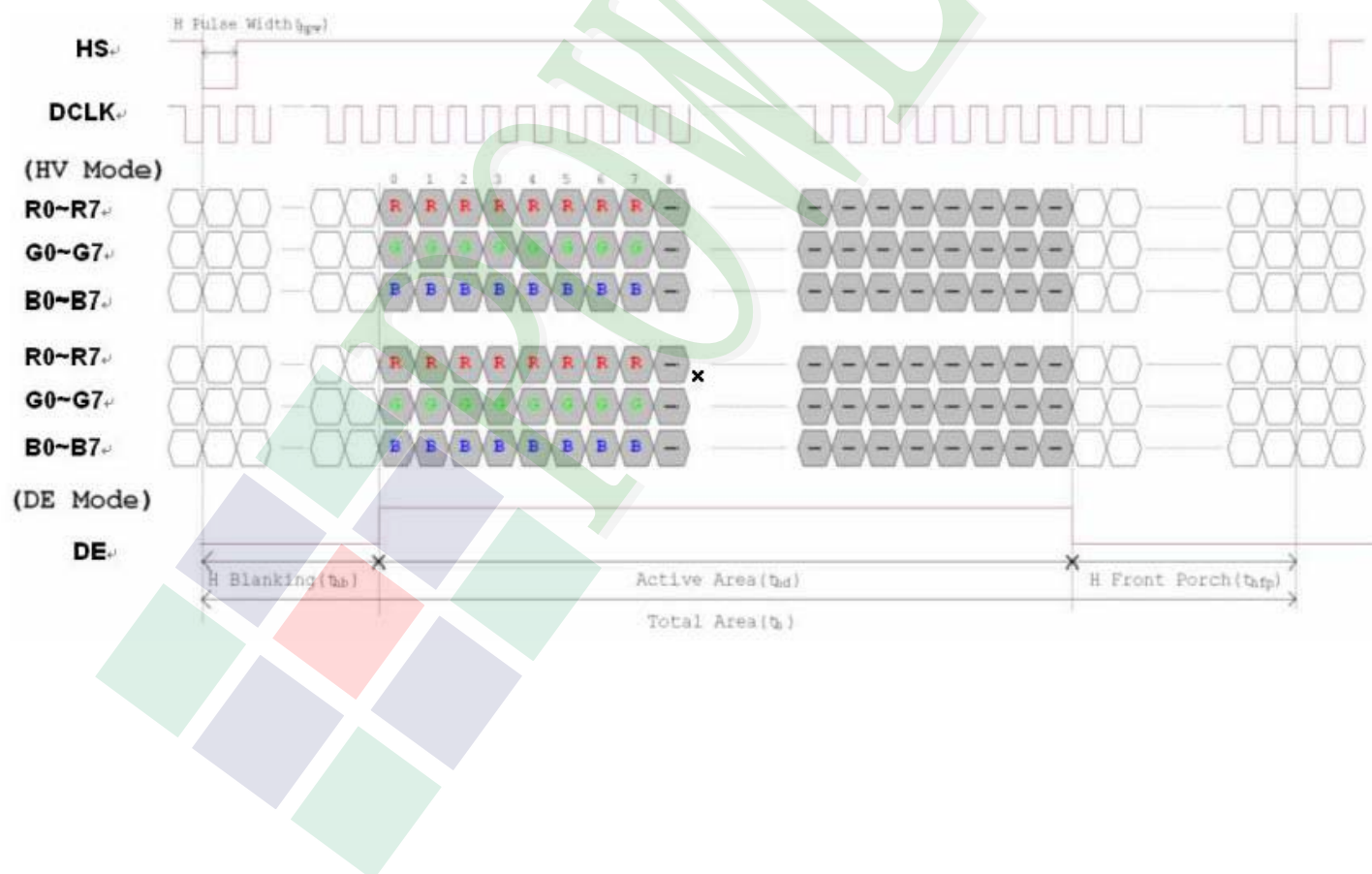
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS setup time	T_{vhd}	8	-	-	ns	
VS setup time	T_{dsu}	8	-	-	ns	
VS setup time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV _{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90%DV _{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

2.3.2 Input Timing Setting

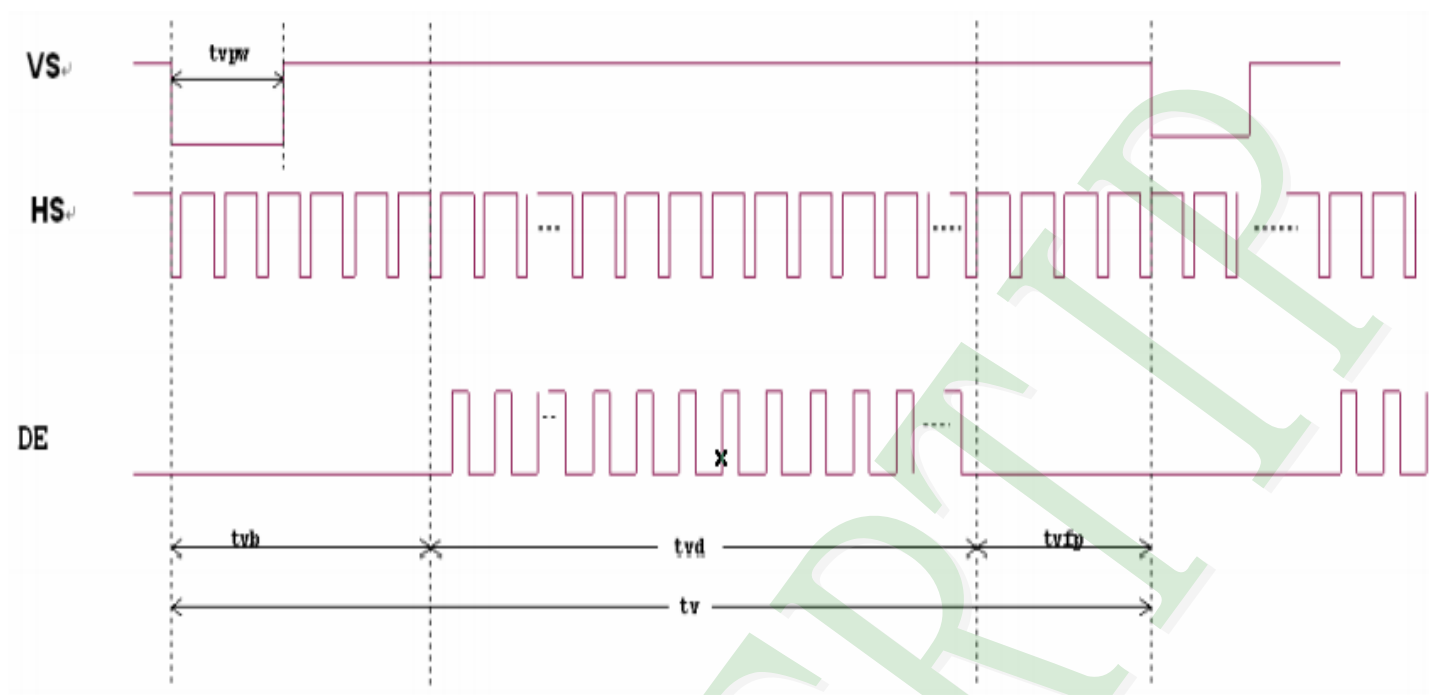
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max		
Horizontal Display Area	Thd		800		DCLK	
DCLK Frequency	Fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	Thpw	1		40	DCLK	
HS Blanking	Thb	46	46	46	DCLK	
HS Front Porch	Thfp	16	210	354	DCLK	

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

Horizontal input timing diagram

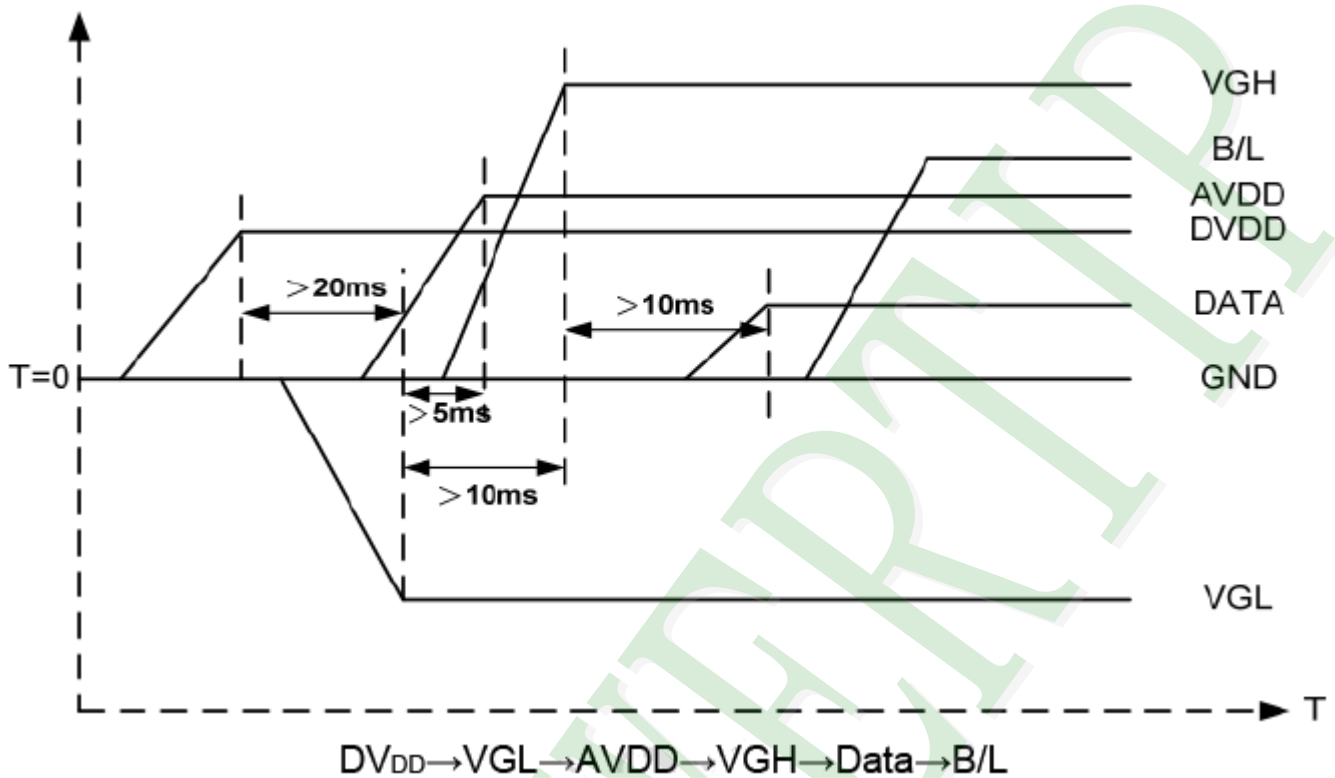


Vertical input timing diagram

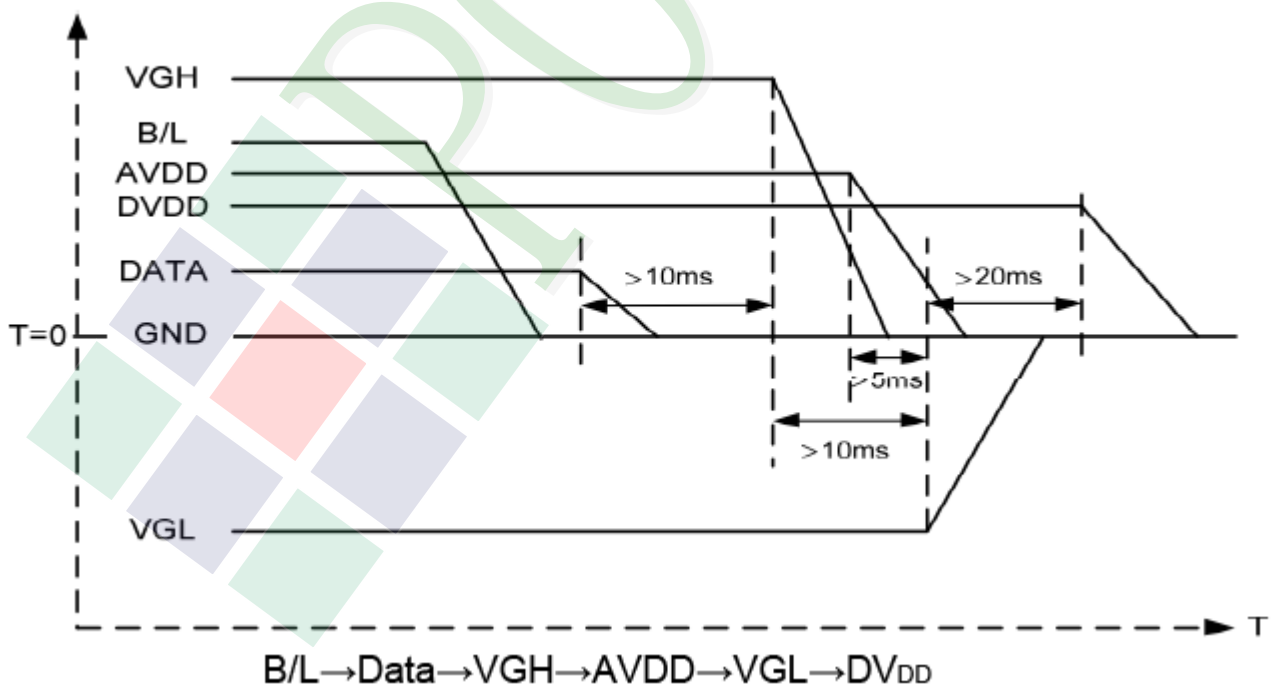


2.3.3 Power On/Off Characteristics

a. Power on:

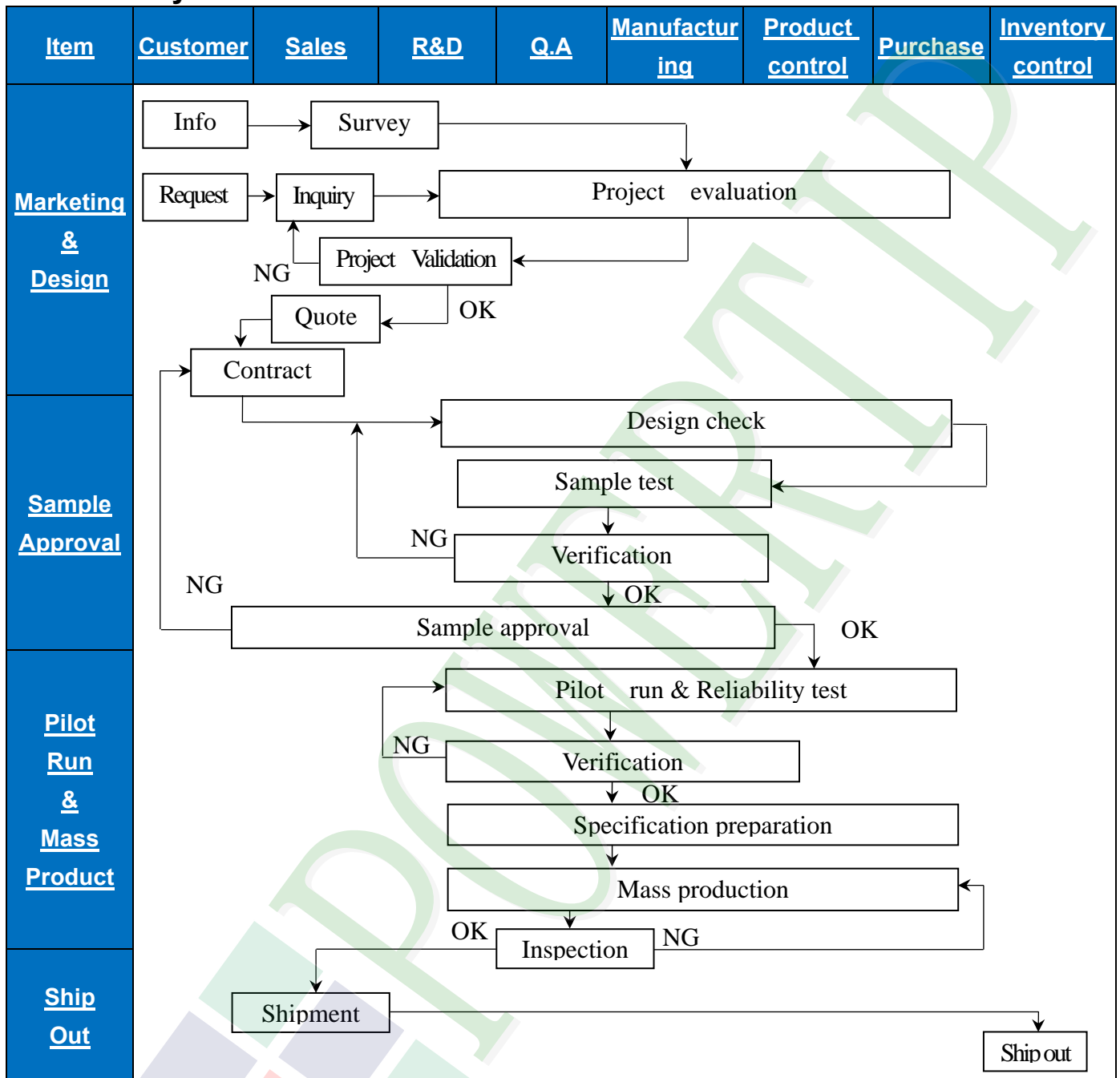


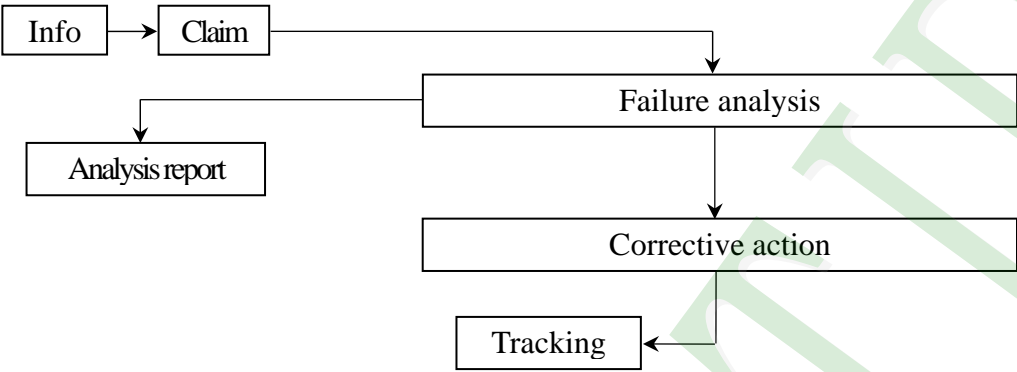
b. Power off:



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



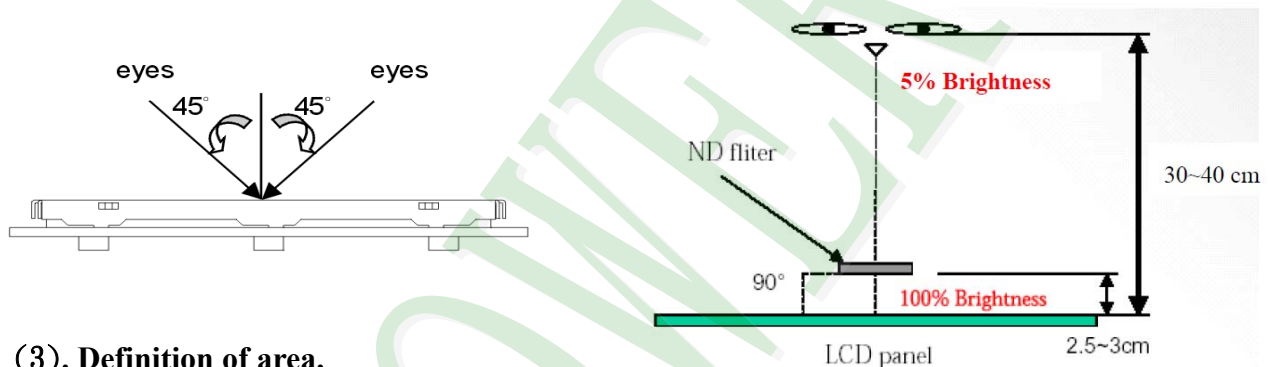
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Claim --> Report[Analysis report] Failure --> Action[Corrective action] Action --> Tracking[Tracking] </pre>							
Q.A Activity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

3.2. Inspection Specification

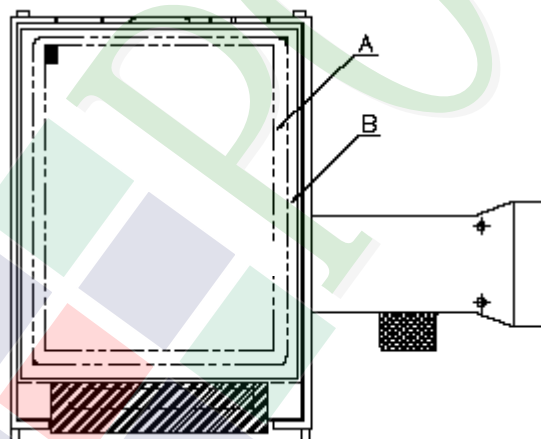
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0.4; Minor Defect AQL: 1.5
- ◆OUT Going Defect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

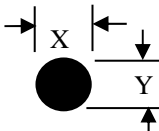
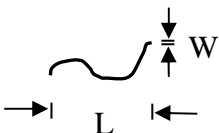
(4). Standard of inspection : (Unit : mm)

◆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 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> 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 : Dots appear bright and unchanged in visible with 5% ND filter is defined. 5.5 Tiny bright dot: bright dot area ≤ 1/2 dot. a. Dots appear bright and unchanged in visible with 5% ND filter is defined defect and is judged in accordance with 6.1 b. Dots invisible with 5% ND Filter is Ignored.	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													

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

(Ver.B01)

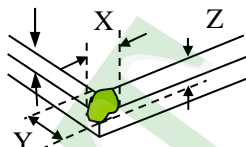
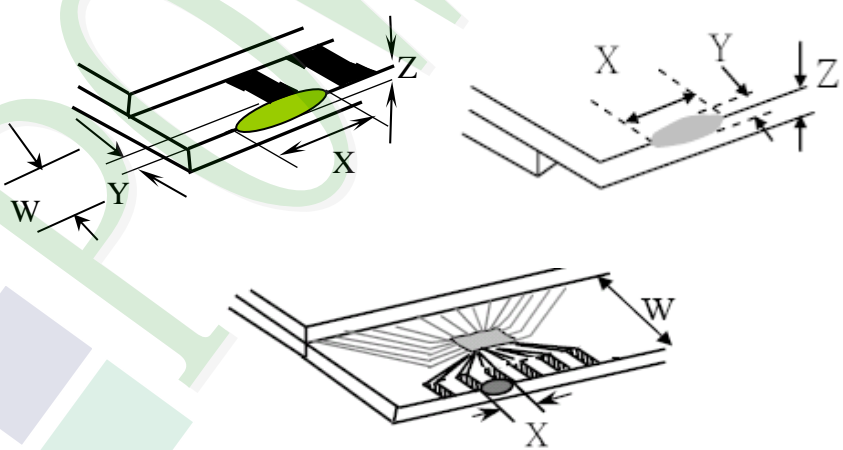
NO	Item	Criterion	Level																																																				
06	<p>Black or white Dot, scratch, contamination</p> <p>Round type</p>  <p>$\Phi = (x + y) / 2$</p> <p>Line type</p> 	<p>6. 1 Round type (Non-display or display):</p> <table><thead><tr><th rowspan="2">Dimension (diameter : Φ)</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>Total</td><td></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>Total</td><td></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																																																				
	07	Polarizer Bubble	<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																																																						

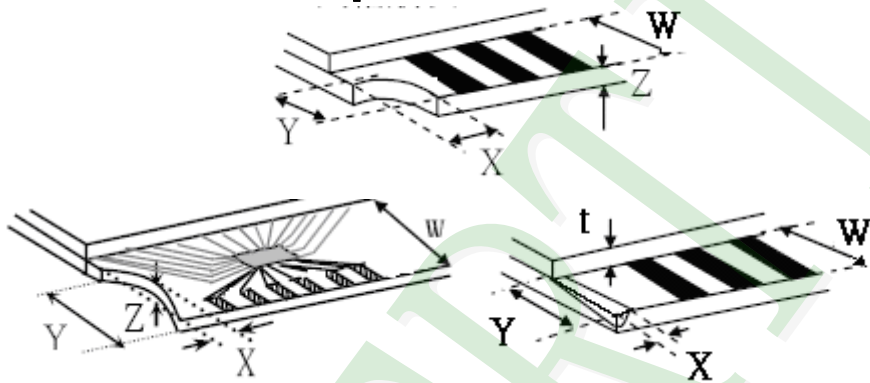
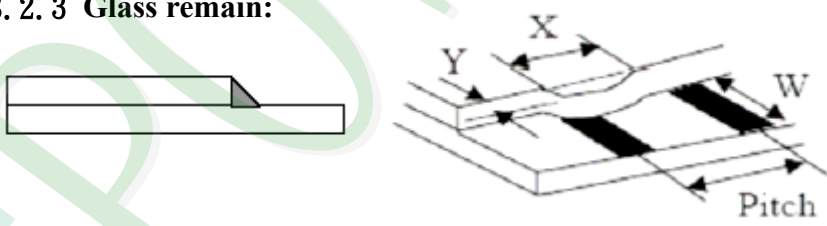

◆Specification For TFT-LCD Module 3.5" ~15" :

(Ver.B01)

NO	Item	Criterion	Level									
08	The crack of glass	<p>Symbols :</p> <div> <div> <p>X: The length of crack</p> <p>Z: The thickness of crack</p> <p>t: The thickness of glass</p> </div> <div> <p>Y: The width of crack.</p> <p>W: terminal length</p> <p>a: LCD side length</p> </div> </div>	Minor									
		<p>8.1 General glass chip:</p> <p>8.1.1 Chip on panel surface and crack between panels:</p> <div> </div>										
		<table> <tr> <th><u>X</u></th> <th><u>Y</u></th> <th><u>Z</u></th> </tr> <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> </table>	<u>X</u>	<u>Y</u>	<u>Z</u>	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$	$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	
<u>X</u>	<u>Y</u>	<u>Z</u>										
$\leq a$	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>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.	$1/2 t < Z \leq 2 t$	Minor
		X	Y	Z								
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$										
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										
<p>8.2 Protrusion over terminal:</p> <p>8.2.1 Chip on electrode pad:</p>  <table><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	$\leq a$	$\leq W$	$\leq 1/2 t$
	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	<div> <div> <p>Symbols:</p> <div> <p>X: The length of crack</p> <p>Z: The thickness of crack</p> <p>t: The thickness of glass</p> </div> <div> <p>Y: The width of crack.</p> <p>W: terminal length</p> <p>a: LCD side length</p> </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> </div>	<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

4. RELIABILITY TEST

4.1 Reliability Test Condition

(Ver.B01)

NO.	TEST ITEM	TEST CONDITION											
1	High Temperature Storage Test	Keep in +80 ±5℃ 240 hrs											
2	High Temperature Operating Test	Keep in +70 ±5℃ 240 hrs											
3	Low Temperature Storage Test	Keep in -30 ±5℃ 240 hrs											
4	Low Temperature Operating Test	Keep in -20 ±5℃ 240 hrs											
5	High Temperature / High Humidity Storage Test	Keep in +60 ℃ / 90% R.H duration for 240 hrs (Excluding the polarizer)											
6	Temperature Cycling Storage Test	<div><div>-30℃ → +25℃ → +80℃ → +25℃</div><div>(30mins) (5mins) (30mins) (5mins)</div><div>← 20 Cycle →</div></div>											
7	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-										
		1. Temperature ambience: 15℃ ~35℃ 2. Humidity relative: 30% ~60% 3. Energy Storage Capacitance(Cs+Cd): 150pF±10% 4. Discharge Resistance(Rd): 330Ω±10% 5. Discharge, mode of operation: Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication: ±5%)											
8	Vibration Test (Packaged)	1. Sine wave 10~55 Hz frequency (1 min/sweep) 2. The amplitude of vibration: 1.5 mm 3. Each direction (X, Y, Z) duration for 2 hrs											
9	Drop Test (Packaged)	<table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
		Packing Weight (Kg)	Drop Height (cm)										
		0 ~ 45.4	122										
		45.4 ~ 90.8	76										
		90.8 ~ 454	61										
Over 454	46												
Drop Direction :※1 corner / 3 edges / 6 sides each 1time													

Result Evaluation Criteria :

Under the display quality test conditions with normal operations with normal operation state.

Do not change these conditions as such changes may affect practical display function.

(Normal operation state)

Temperature : $+20 \sim 30^{\circ}\text{C}$, Humidity : $50 \sim 70\%$, Atmospheric pressure : $86 \sim 106\text{Kpa}$

NOTE:

In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

- 5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

5.2 HANDLING

- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is $320 \pm 10^{\circ}\text{C}$ and 3-5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM
- 5.2.10 Caution!(LCM products with Capacitive Touch Panel)
Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).
Therefore, the touch needs to be thoroughly tested inside the target application.
- 5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.
- 5.2.12 Double-sided tape designed to be attach with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-sided tape for the attachment operation.

5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush, shake, or jolt the module.

5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.

Ver.002	LCM包裝規格書 LCM Packaging Specifications		Approve	Check	Contact
Documents NO. JPKG-PH800480T013-IBB01			Ryan	Terry	Sally

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

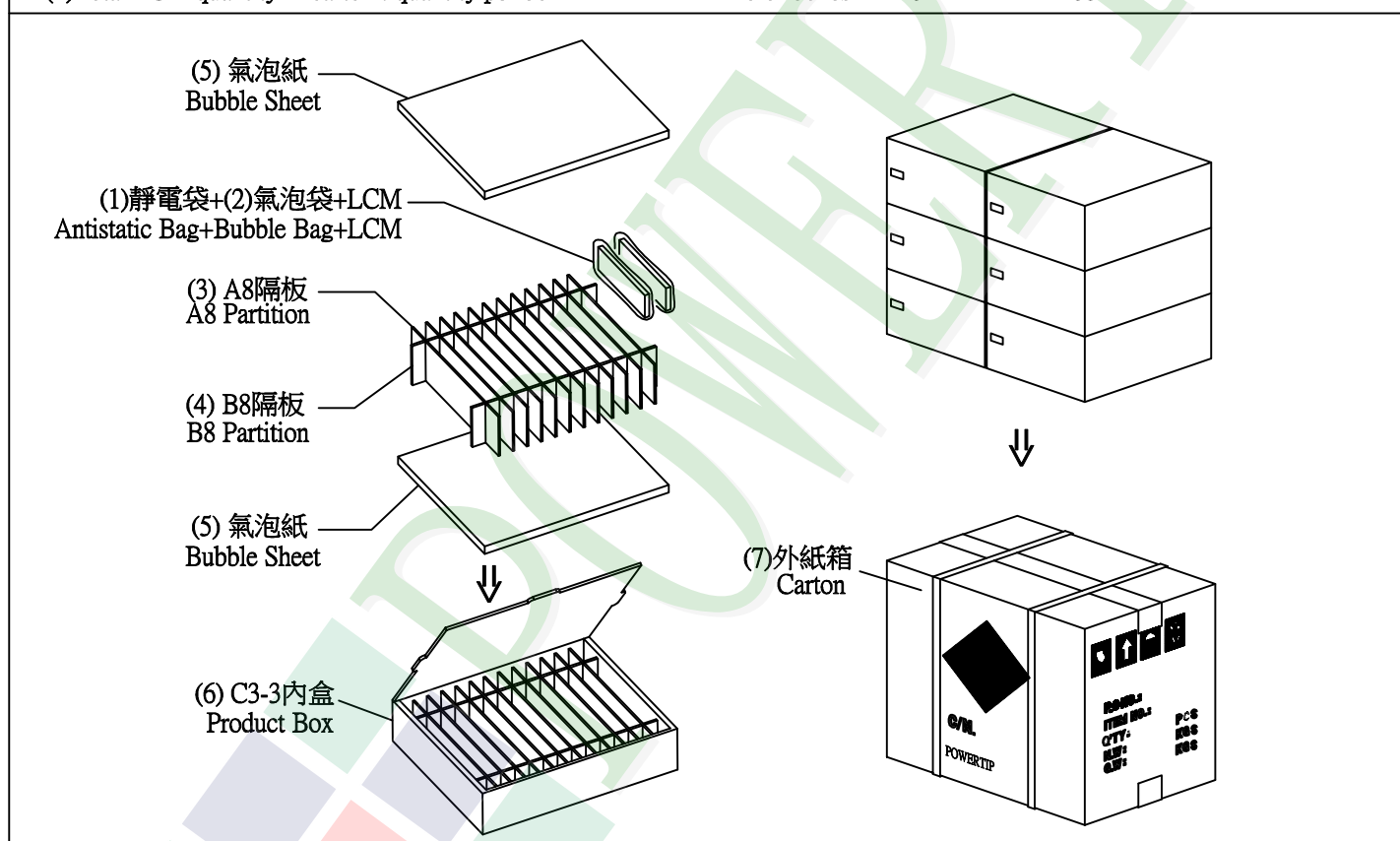
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH800480T013-IBB01	164.9 X 100.0 X4.95	0.166	66	10.956
2	靜電袋(1)Antistatic Bag	BAG240170ARABA	240 X 170	0.0048	66	3.168
3	氣泡袋(2)Bubble Bag	BAG170150BRABA	170 X 150	0.0045	66	0.297
4	A8隔板(3)A8 Partition	BX00000000051	245 X 105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

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

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

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

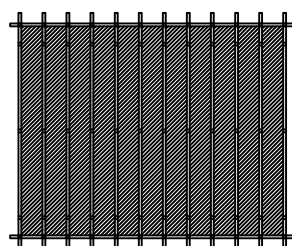
(2)Total LCM quantity in carton : quantity per box 11 x no of boxes 6 = 66



特 記 事 項 (REMARK)

4. Label Specifications :
依廠內標準作業

5. LCM排放示意圖(前後間隔不放置):
5. LCM placed as figure showing:
(First and last slot should be empty)



模組(LCM) X 1pcs.

DATA MODUL

Passion Displayed



All good things come in threes:

With **Hardware**, **Software** and **Services**, we realise unique display solutions that turn your ideas into reality.

www.data-modul.com

