POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	CDE012
SAMPLE CODE	:	SH480272T009-IHB
MASS PRODUCTION CODE	:	PH480272T009-IHB
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	005
DRAWING NO. (Ver.)	:	JLMD-PH480272T009-IHB_003
PACKAGING NO. (Ver.)	:	JPKG-PH480272T009-IHB_001

Customer Approved

Date:

POWERTIP
2023.05.31
JS RD APPROVED

Approved	Checked	Designer
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□ Preliminary specification for design input

■ Specification for sample approval

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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
08/29/2016	01	001	New Drawing	-	徐明菲
09/09/2016	01	002	Modify Specs.(Drawing)	-	徐明菲
12/02/2016	01	003	New Sample	-	徐明菲
12/20/2019	01	004	Add Chromaticity coordinates specifications	9	陳璐
05/17/2023	01	005	Modify ID pins definition	16	王琦

Total: 34 Pages

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1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Resolution	480 *3 (RGB) * 272 Dots
LCD Type	a-Si TFT , Normally white , Transmissive type
Screen size(inch)	4.3 inch
Viewing Direction	6 O'clock
Surface treatment	Anti-Glare
Color configuration	R.G.B. Vertical Stripe
Weight	56.2 g
Interface	24 Bits RGB Interface
Driver IC	ILI6480B
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website: http://www.powertip.com.tw/news_detail.php?Key=1&cID=1

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

ILITEK--- ILI6480B

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	105.5 (W) * 67.2 (L) * 3.85 (H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	95.040 (W) * 53.856 (L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply for TFT Panel	V_{DD}	GND=0V	-0.3	4.5	V
Power Supply for Backlight Unit	V_{CC}	GND=0V	-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
Storage Humidity	HD	Ta ≦ 60 °C	10	90	%RH

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

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

Note 2：Ta is the ambient temperature of samples.

1.4 DC Electrical Characteristics

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply for TFT Panel	V_{DD}	GND=0V	3.0	3.3	3.6	V
Power Supply for Backlight Unit	V_{CC}	GND=0V	5	12	15	V
Input Voltage for TFT Panel	V_{IH}	GND=0V	$0.7V_{DD}$	-	V_{DD}	V
	V_{IL}	GND=0V	0	-	$0.3V_{DD}$	V
Supply Current for TFT Panel	I_{DD}	I_{DD}@V_{DD}=3.3V	-	23	40	mA
Supply Current for Backlight Unit	I_{CC}	I_{CC}@V_{CC}=5V	-	180	300	mA
Supply Current for Backlight Unit	I_{CC}	I_{CC}@V_{CC}=12V	-	70	120	mA
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

VDD=3.3V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time		Tr + Tf	-	-	29	44	ms	Note2
Viewing angle	Top	θ+	CR ≥ 10	-	60	-	Deg.	Note4
	Bottom	θ-		-	60	-		
	Left	θL		-	60	-		
	Right	θR		-	60	-		
Contrast ratio		CR	-	500	600	-	-	Note3
Color of CIE Coordinate	White	X	VCC=12V PWM="High" (Duty=100%)	0.26	0.31	0.36	-	Note1
		Y		0.28	0.33	0.38		
	Red	X		0.52	0.57	0.62		
		Y		0.28	0.33	0.38		
	Green	X		0.29	0.34	0.39		
		Y		0.56	0.61	0.66		
	Blue	X		0.09	0.15	0.19		
		Y		0.02	0.07	0.12		
Average Brightness Pattern=white display (With LCD & TP) *1		IV	VCC=12V PWM="High" (Duty=100%)	620	780	-	cd/m^2	
Uniformity (With LCD & TP) *2		△B		70	-	-	%	

Note 1:

*1：△B=B(min) / B(max) * 100%

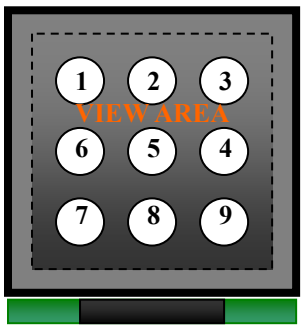
*2：Measurement Condition for Optical Characteristics:

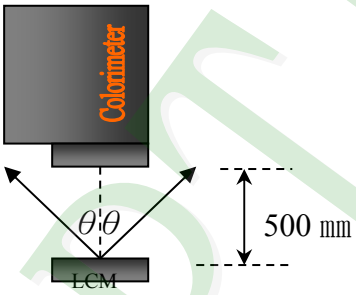
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

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 ± 4%





Colorimeter=BM-7 fast

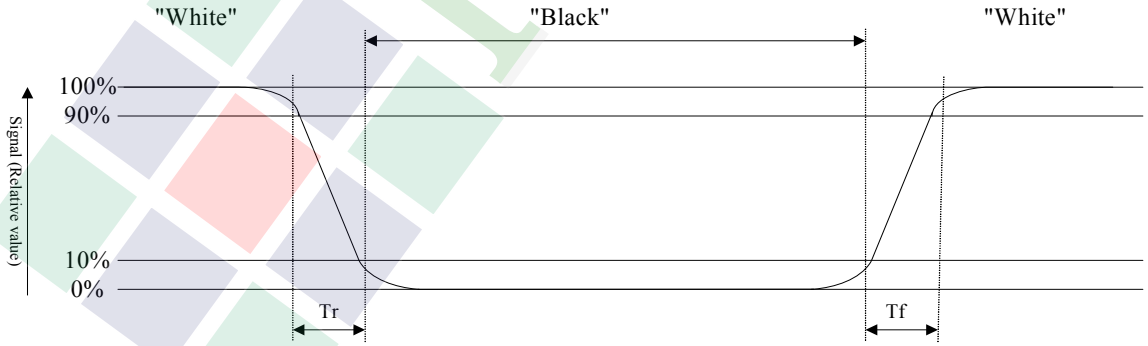
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

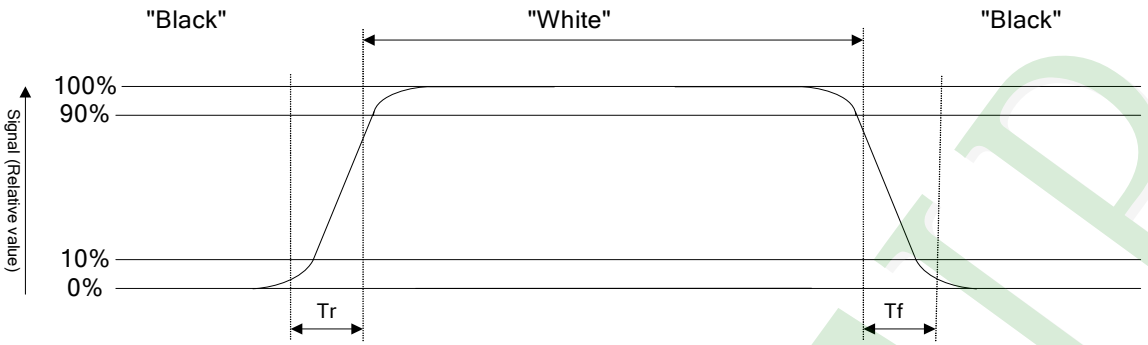
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



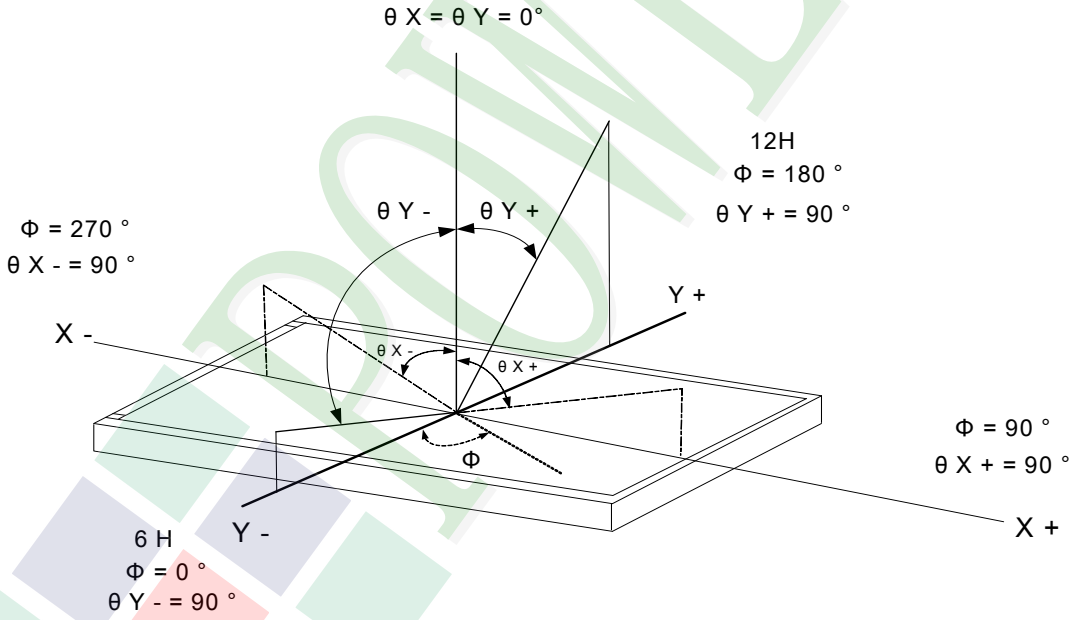
Note3: Definition of contrast ratio:

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

Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I_F	30		mA	One LED
LED Reverse Voltage	V_R	5		V	

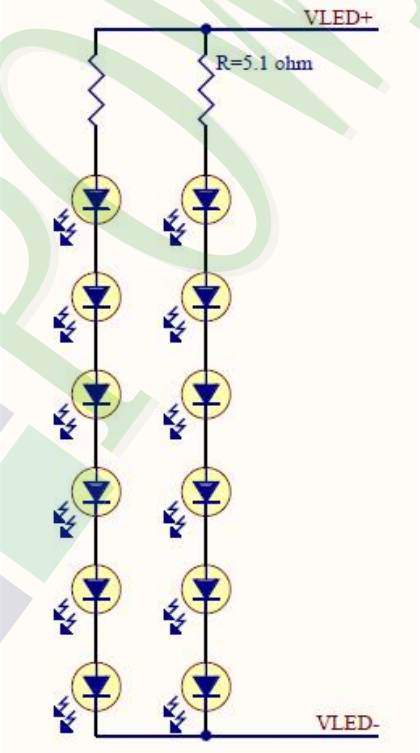
Electrical / Optical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Voltage	V_L	17.6	19.2	20.4	V	Note1
LED Current	I_L	-	40	-	mA	-
LED life time	-	50000		-	HR	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I_L =40 mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I_L =40 mA. The LED life time could be decreased if operating I_L is larger than 40 mA.

3:Chromaticity coordinates are E＆G



1.7 Touch Panel Unit Characteristics

1.7.1 Optical Characteristics

Item	Specification
1.Transparency	80% Min

1.7.2 Mechanical Characteristics

Item	Specification
1.Input Method	Finger or stylus pen
2.Hardness of surface	3H -pressure 500g of ,45deg.
3.Activation Force	50gf（TYP. 20gf）less individual point with stylus pen(R0.8) Activation force guarantee area:5.0mm inside of Active Area.
4.Linearity Force	100gf less input with stylus pen(R0.8) Linearity force guarantee area:3.0mm inside of Active Area.

1.7.3 Electrical Characteristics

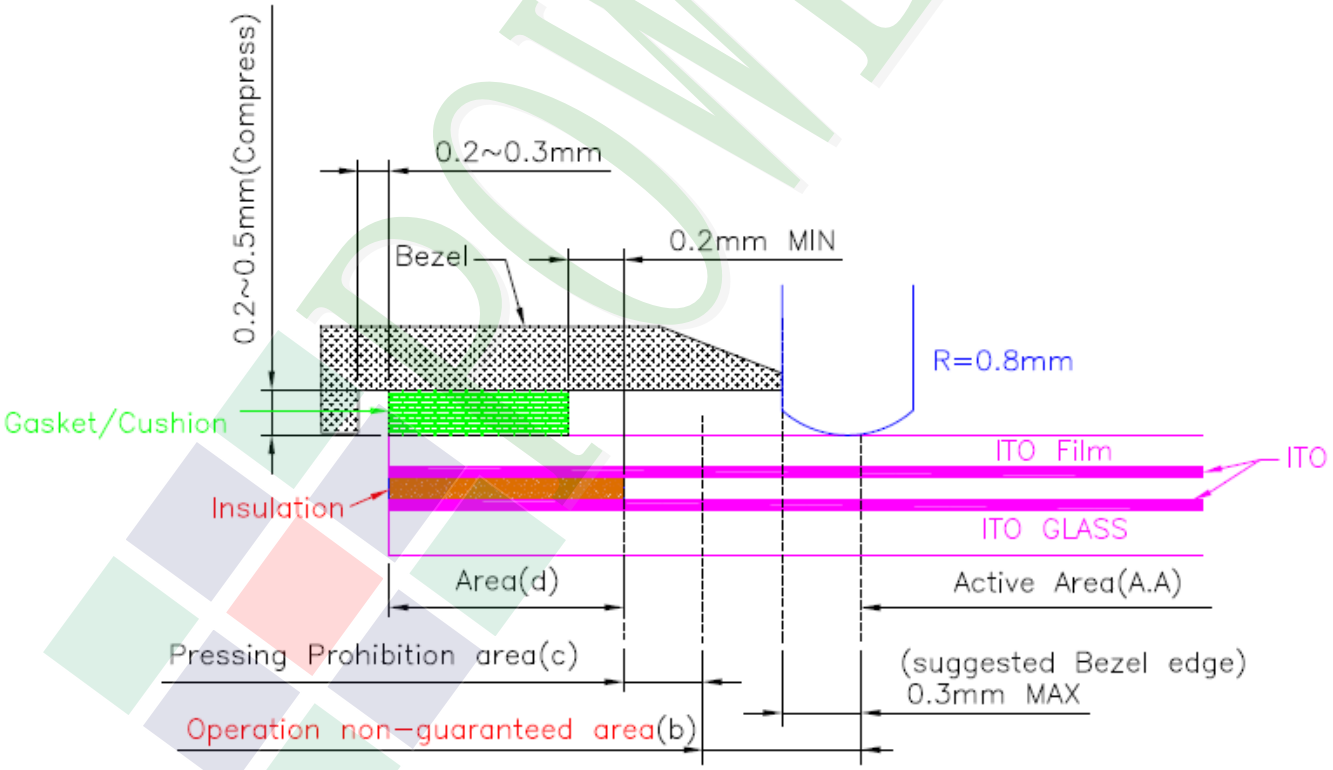
Item	Specification
1.Rated Voltage	DC 5V(DC 7V Max)
2.Resistance Between Terminals.	Direction X (Glass side): 350Ω~1240Ω
	Direction Y (Film side): 160Ω~640Ω
3.Insulation Resistance	20 MΩ or more (DC 25V 1min)
4.Linearity	≤ ± 1.5% Linearity(%)= ΔV/（EV-SV） *100 ΔV: The difference between the ideal voltage and measured voltage on the each measuring line. SV: Voltage of starting Points EV: Voltage of Ending Points
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	ψ9mm 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/Handing 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.

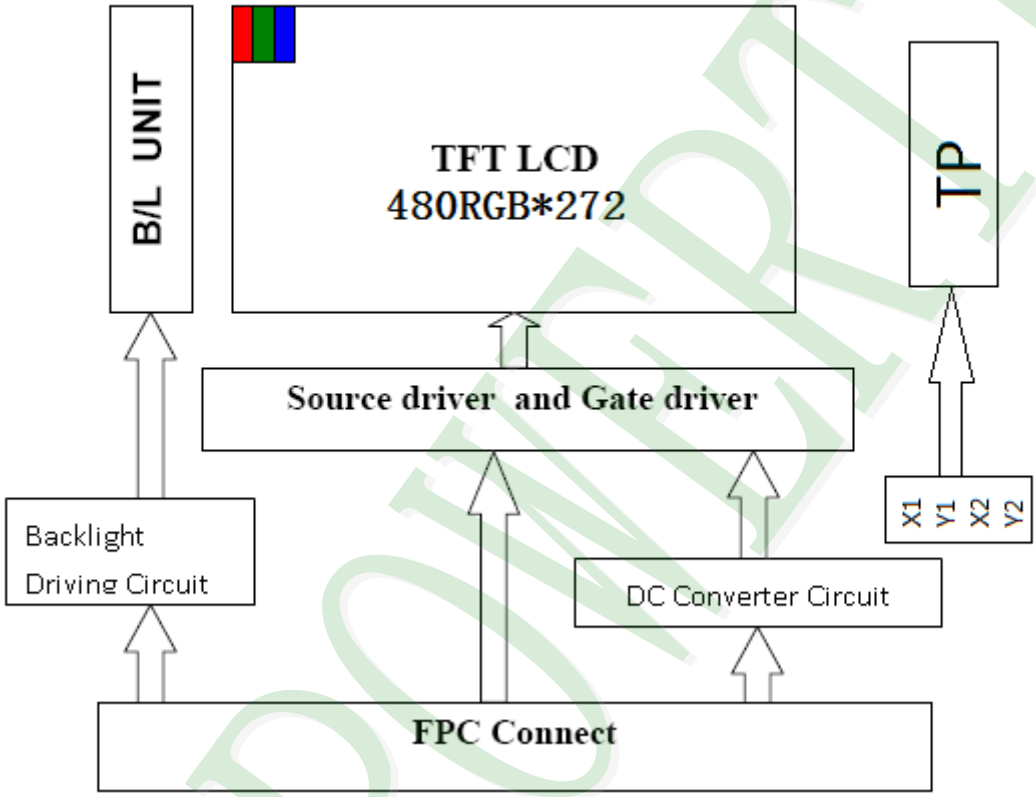
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

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
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	Display enable pin from controller. Data Input 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(NC) / ID1	No Function./ ID[4:1]These pins select LCM type.(See NOTE1)
46	SDIN(NC) / ID2	No Function./ ID[4:1]These pins select LCM type.(See NOTE1)
47	SCK(NC) / ID3	No Function ./ 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 ID4
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

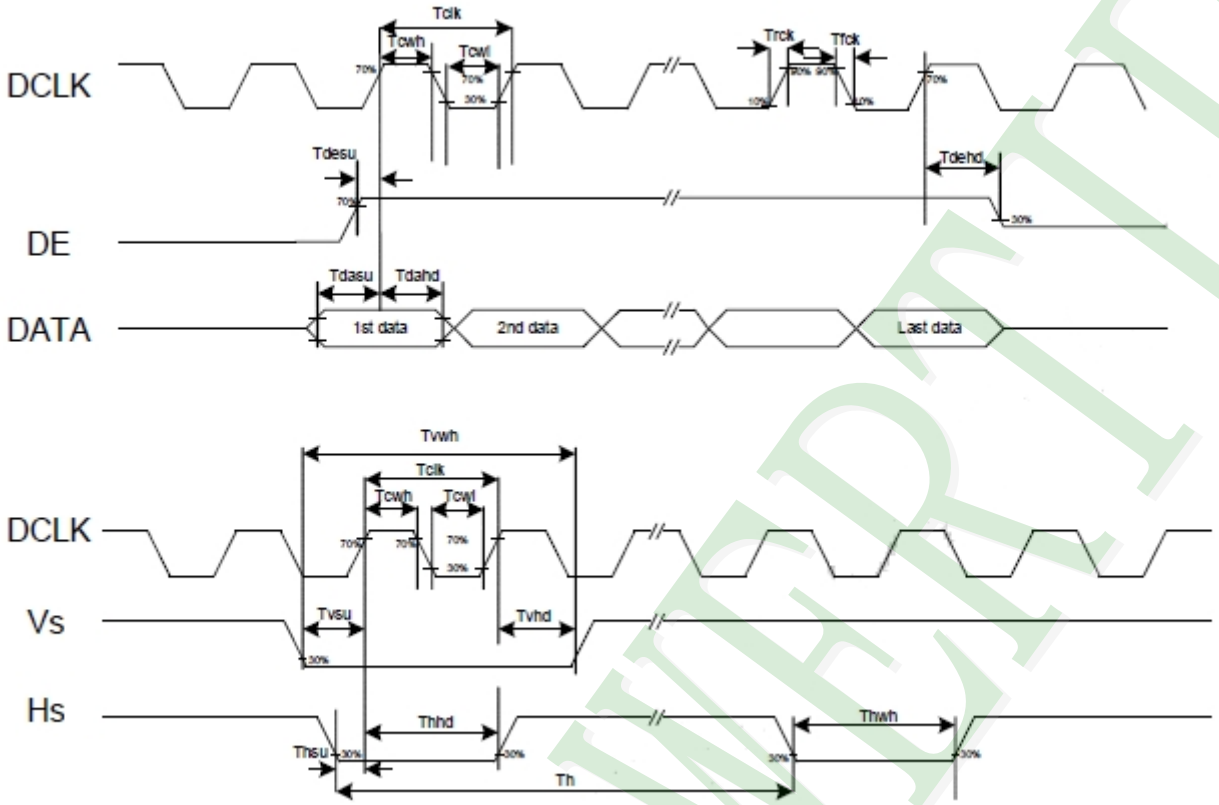
1. Resistor = 10k ohm
2. “X” = No use

4-Wire Resistive Touch Screen (RTP) Interface

Pin#	Name	Description
1	XR	TP:X right
2	YD	TP:Y bottom
3	XL	TP:X left
4	YU	TP:Y top

2.3 Timing Characteristics

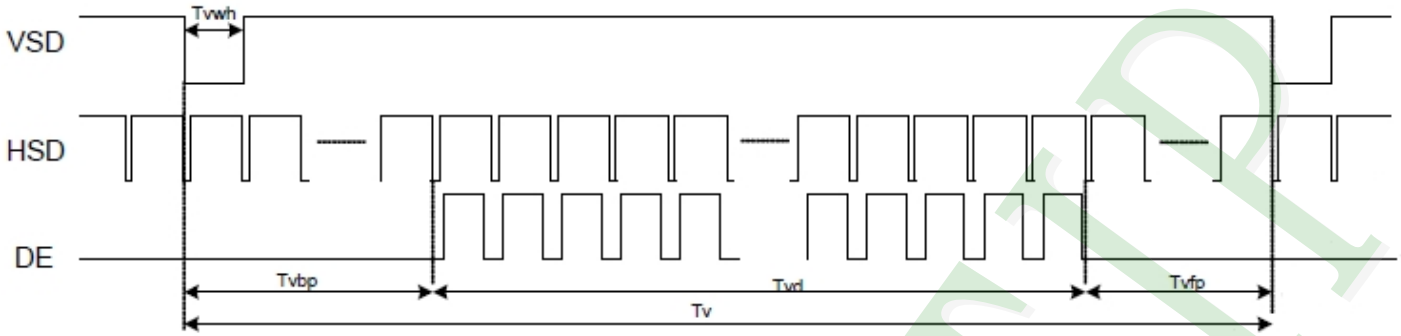
2.3.1 Clock and Data Input Waveforms



Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
Input Output timing						
DCLK clock time	Tclk	33.3	-	-	ns	DCLK=30MHz
DCLK clock low period	Tcwl	40	-	60	%	
DCLK clock high period	Tcwh	40	-	60	%	
Clock rising time	Trck	9	-	-	ns	
Clock falling time	Tfck	9	-	-	ns	
HSD width	Thwh	1	-	-	DCLK	
HSD period time	Th	55	60	65	us	
HSD setup time	Thsu	12	-	-	ns	
HSD hold time	Thhd	12	-	-	ns	
VSD width	Tvwh	1	-	-	Th	
VSD setup time	Tvsu	12	-	-	ns	
VSD hold time	Tvhd	12	-	-	ns	
Data setup time	Tdasu	12	-	-	ns	
Data hold time	Tdahd	12	-	-	ns	
DE setup time	Tdesu	12	-	-	ns	
DE hold time	Tdehd	12	-	-	ns	
Source output setting time	Tsst	-	-	TBD	us	10% to 90% CL=60pF, RL=2Kohm
Gate output setting time	Tgst	-	-	TBD	ns	10% to 90%, CL=60pF
VCOM output setting time	Tcst	-	-	TBD	us	10% to 90%, CL=40nF, RL=50ohm
Time from VSD to 1st line data input	Tvs	3	8	31	Th	HV mode By HDL[4:0] setting

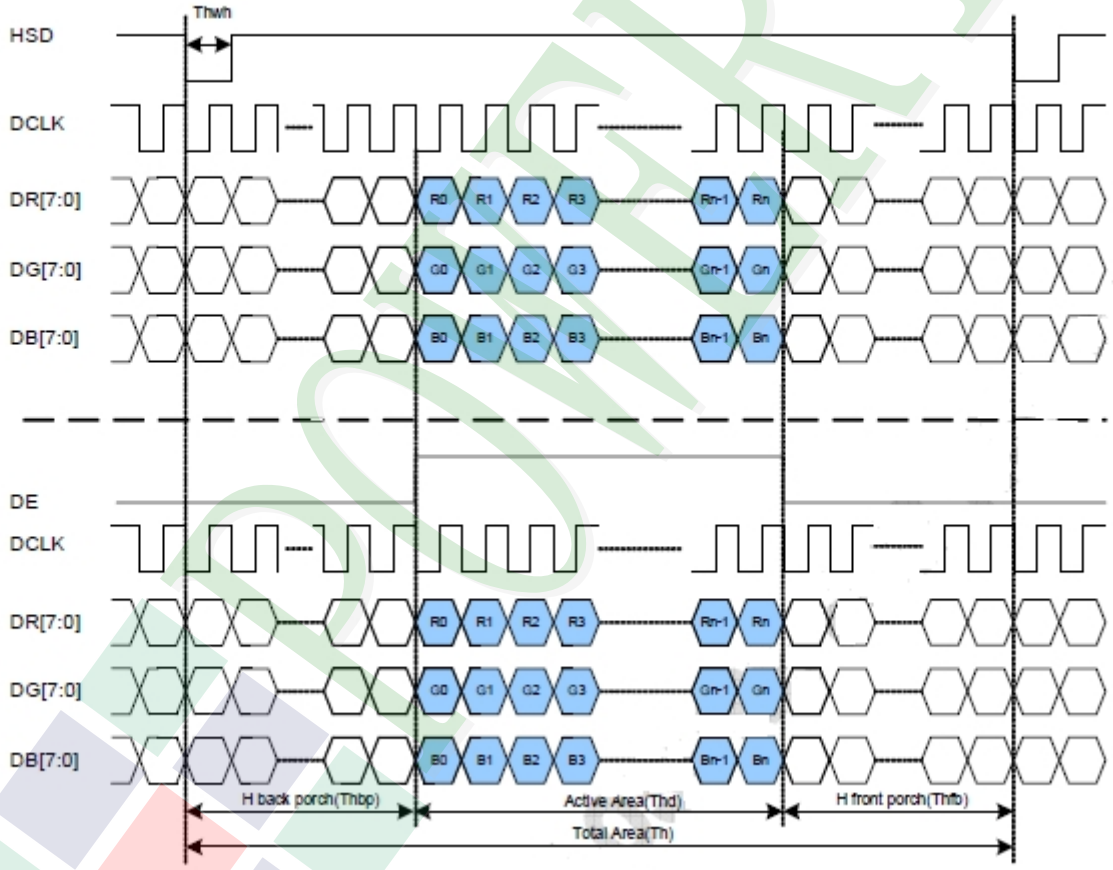
2.3.2 Data Input Format

Vertical input timing



Parallel RGB Mode Data format

(HV Mode)

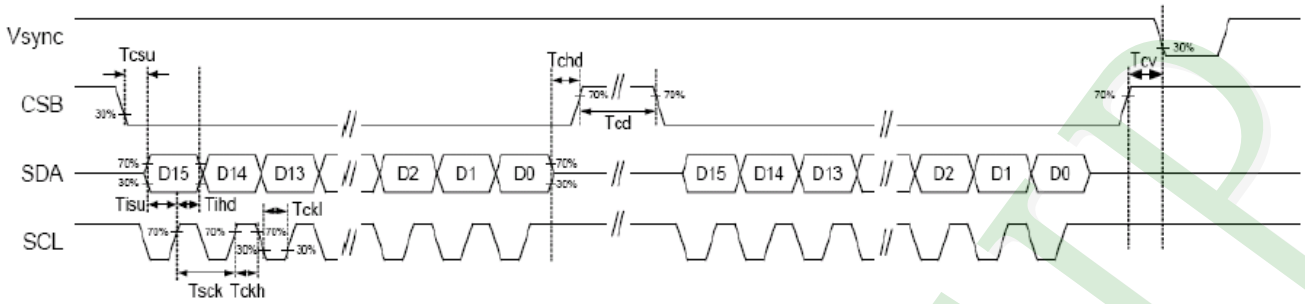


(DE Mode)

Parallel RGB input timing table

Parameters	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	Fclk	5	9	12	MHz
VS period time	Tv	277	288	400	H
VS display area	Tvd		272		H
VS back porch	Tvb	3	8	31	H
VS front porch	Tvfp	2	8	97	H
HS period time	Th	520	525	800	DCLK
HS display area	Thd		480		DCLK
HS back porch	Thbp	36	40	255	DCLK
HS front porch	Thfp	4	5	65	DCLK

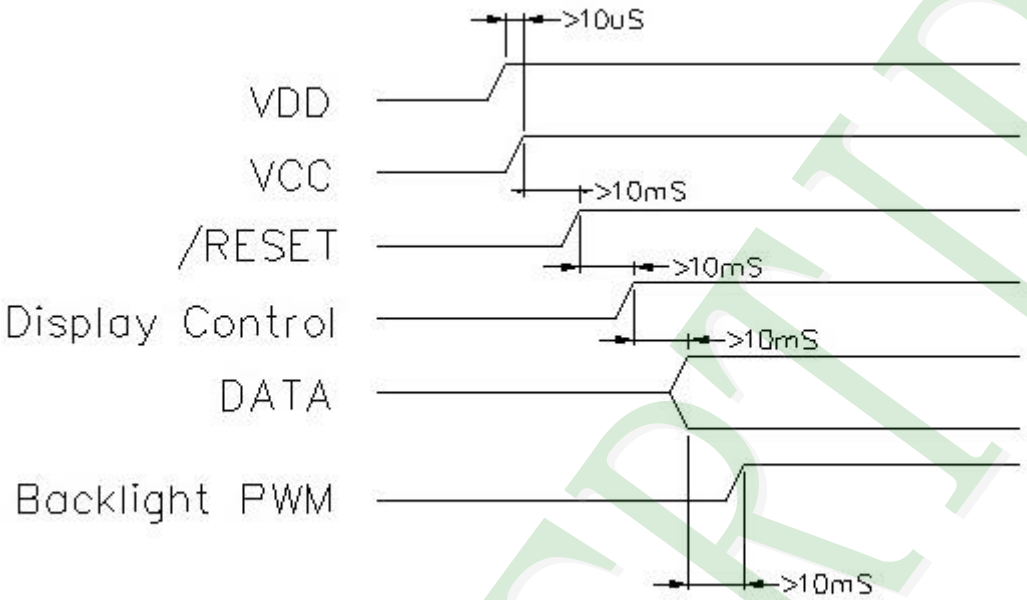
2.3.3 3-wire Timing Diagram



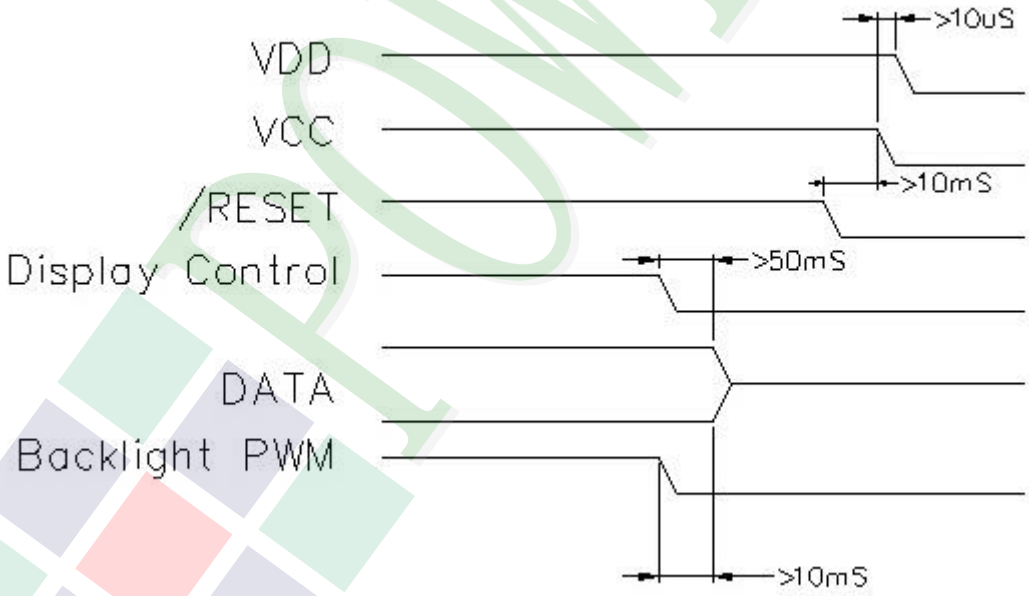
3-wire serial communication AC timing						
Serial clock	Tsck	200	-	-	ns	For SCL Pin
SCL pulse low period	Tckl	40	-	60	%	
SCL pulse high period	Tckh	40	-	60	%	
Serial data setup time	Tisu	50	-	-	ns	
Serial data hold time	Tihd	50	-	-	ns	
Serial clock high/low	Tssw	50	-	-	ns	
CS to VSD	Tcv	1			us	
CS distinguish time	Tcd	400	-	-	ns	
CS input setup time	Tcsu	50	-	-	ns	
CS input hold time	Tchd	50	-	-	ns	

2.3.4 Power Sequence

POWER ON

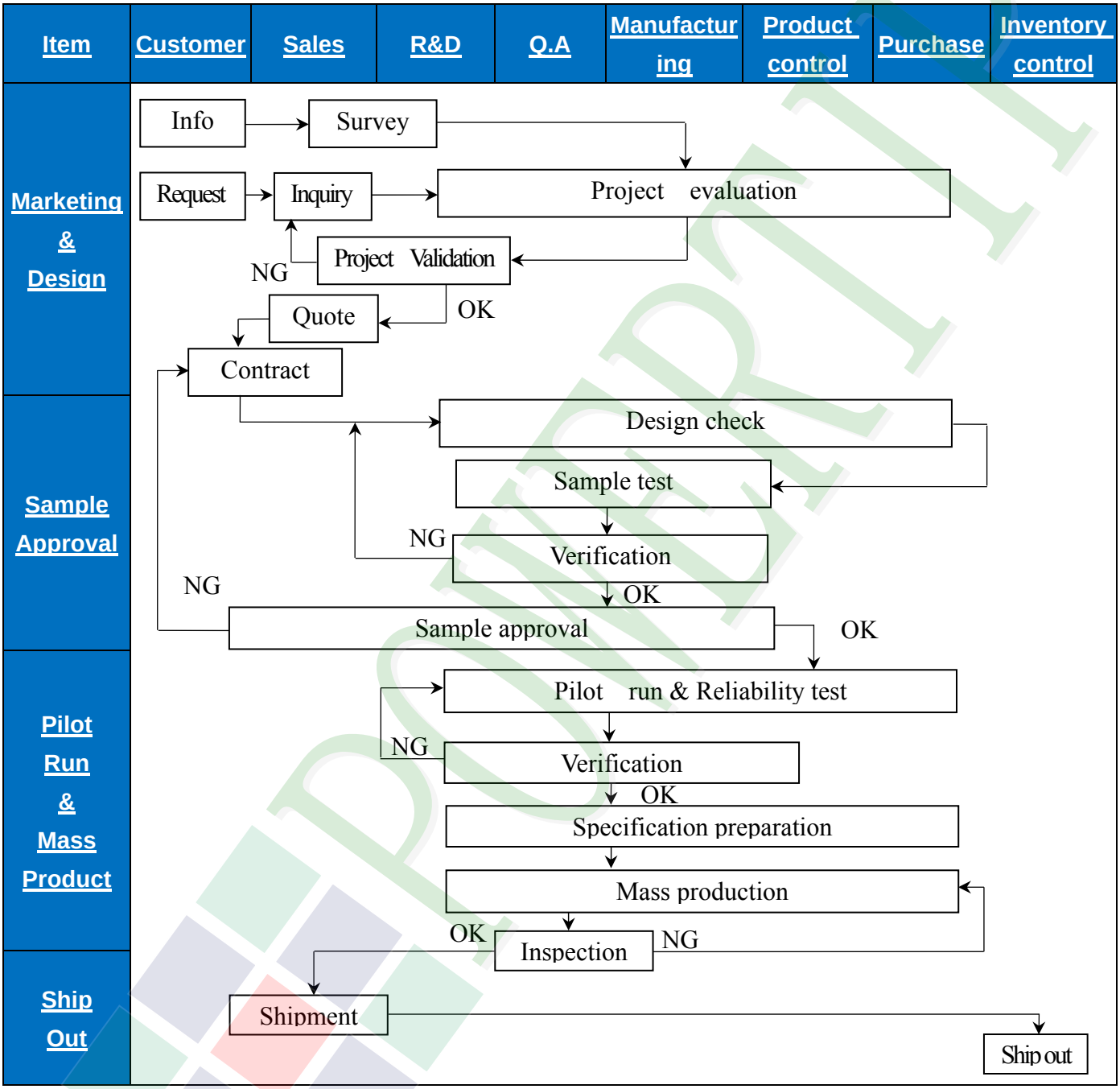


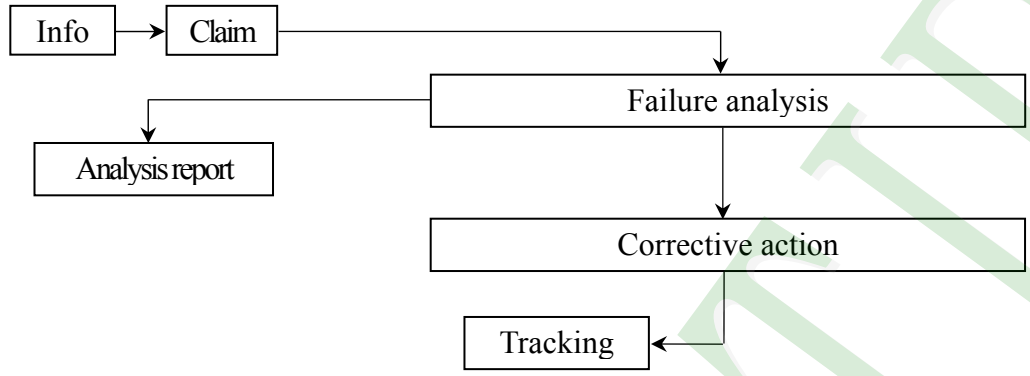
POWER OFF



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								
Q.A Activity	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.

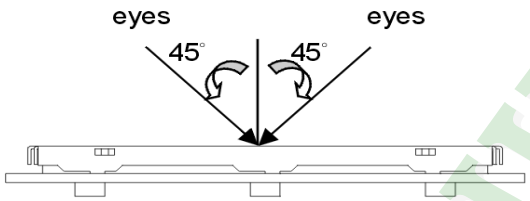
◆Standard of the product appearance test:

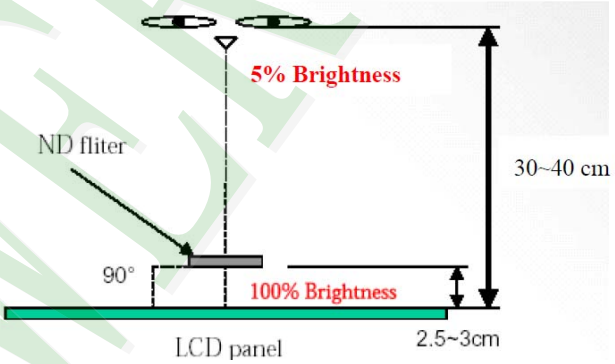
a. Manner of appearance test:

(1). The test best be under 20W×2 fluorescent light(about 300lux ～500lux)

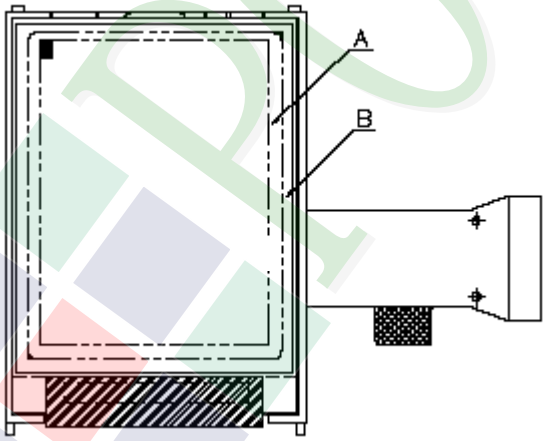
, and distance of view must be at 30~40 cm.

(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)

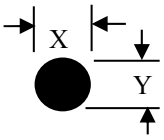
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2.1The quantity is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>03</td><td>Outline dimension</td><td>3.1Product dimension and structure must conform to structure diagram.</td><td>Major</td></tr>
<tr><td rowspan="6">04</td><td rowspan="6">Electrical Testing</td><td>4.1 Missing line character and icon.</td><td>Major</td></tr>
<tr><td>4.2 No function or no display.</td><td>Major</td></tr>
<tr><td>4.3 Display malfunction.</td><td>Major</td></tr>
<tr><td>4.4 LCD viewing angle defect.</td><td>Major</td></tr>
<tr><td>4.5 Current consumption exceeds product specifications.</td><td>Major</td></tr>
<tr><td>4.6Mura cannot be seen through 5% ND filter at 50% Gray , should be judged by the viewing angle of 90 degree.</td><td>Minor</td></tr>
<tr><td>05</td><td>Dot defect

(Bright dot, Dark dot)

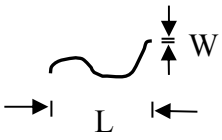
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 4</td></tr>
<tr><td>Dark Dot</td><td>≦ 5</td></tr>
<tr><td>Joint Dot</td><td>≦ 3</td></tr>
<tr><td>Total</td><td>≦ 7</td></tr>
</table>
5.1 Inspection 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.
</td><td>Minor</td></tr>
</table>

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

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>06</td><td>Black or white Dot, scratch, contamination

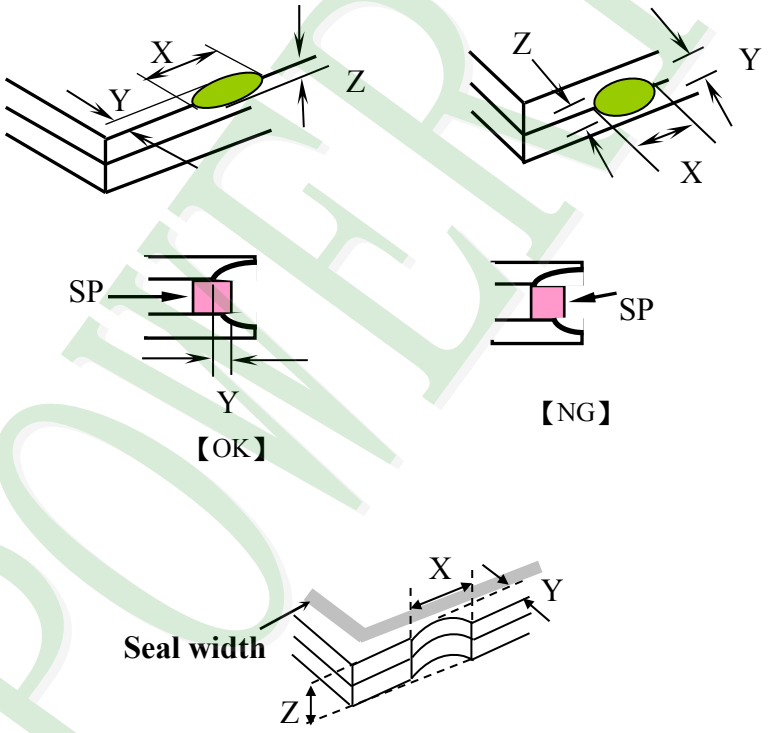
Round type
 

Φ＝(x＋y) / 2

Line type
 
</td><td>6. 1 Round type (Non-display or display):
<table><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><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.25 ＜ Φ ≦ 0.50</td><td>5</td></tr><tr><td>Φ ＞ 0.50</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table>6. 2 Line type(Non-display or display):
<table><tr><th rowspan="2">module size</th><th rowspan="2">Length (L)</th><th rowspan="2">Width (W)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td rowspan="5">3.5” to less 9”</td><td>---</td><td>W ≦ 0.03</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>L ≦10.0</td><td>0.03 ＜W ≦ 0.05</td><td>4</td></tr><tr><td>L ≦5.0</td><td>0.05 ＜W ≦ 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="4">9” to 15”</td><td>---</td><td>W ≦ 0.05</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>L ≦10.0</td><td>0.05 ＜W ≦ 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></table></td><td>Minor</td></tr>
<tr><td>07</td><td>Polarizer Bubble</td><td><table><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><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="5">Ignore</td></tr><tr><td>0.25 ＜ Φ ≦ 0.50</td><td>4</td></tr><tr><td>0.50 ＜ Φ ≦ 0.80</td><td>1</td></tr><tr><td>Φ ＞0.80</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table></td><td>Minor</td></tr>
</table>

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

(Ver.B01)

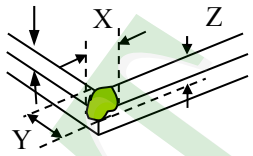
NO	Item	Criterion	Level
08	The crack of glass	Symbols： X: The length of crack　Y: The width of crack. Z: The thickness of crack　W: terminal length t: The thickness of glass　a: LCD side length 8.1 General glass chip: 8.1.1 Chip on panel surface and crack between panels: 	Minor

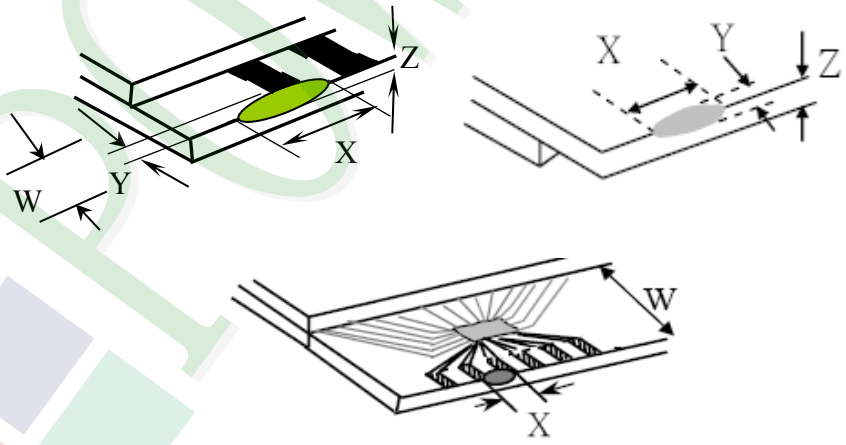
X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦ a	Crack can't exceed the half of SP width.	1/2 t < Z ≦2 t

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

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="2">08</td><td rowspan="2">The crack of glass</td><td>
Symbols :

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

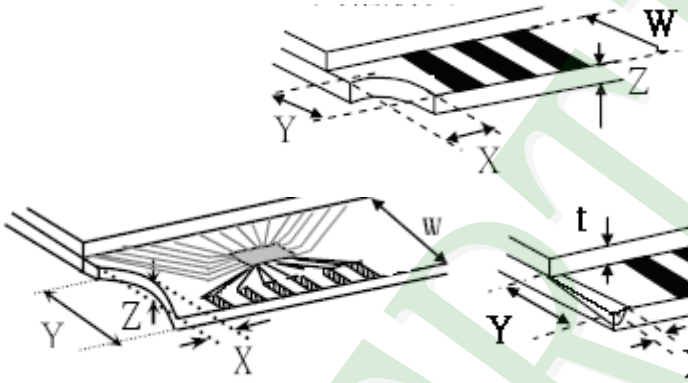
8.1.2 Corner crack:


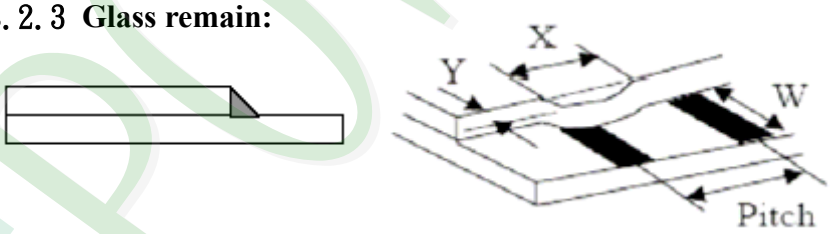
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table>
</td><td rowspan="2">Minor</td></tr>
<tr><td>
8.2 Protrusion over terminal:
8.2.1 Chip on electrode pad:


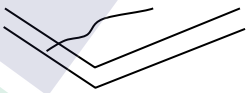
<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table>
</td></tr>
</table>

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

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>08</td><td>The crack of glass</td><td>
Symbols:

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
8.2.2 Non-conductive portion:


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ 1/3 a</td><td>≦ W</td><td>≦t</td></tr>
</table>
⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.
8.2.3 Glass remain:


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦t</td></tr>
</table>
8.2.4 Cracking:

Not Allowed
</td><td>Minor</td></tr>
</table>

◆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	10.1Pin 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)

<table>
<tr><th>NO.</th><th>TEST ITEM</th><th>TEST CONDITION</th></tr>
<tr><td>1</td><td>High Temperature Storage Test</td><td>Keep in +80 ±5℃ 240 hrs</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±5℃ 240 hrs</td></tr>
<tr><td>3</td><td>High Temperature / High Humidity Storage Test</td><td>Keep in +60 ℃ / 90% R.H duration for 240 hrs
(Excluding the polarizer)</td></tr>
<tr><td>4</td><td>Temperature Cycling Storage Test</td><td>-30℃ → +25℃ → +80℃ → +25℃
(30mins) (5mins) (30mins) (5mins)
20 Cycle</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">ESD Test</td><td>Air Discharge:
Apply 2 KV with 5 times
Discharge for each polarity +/-</td><td>Contact Discharge:
Apply 250 V with 5 times
discharge for each polarity +/-</td></tr>
<tr><td colspan="2">1. Temperature ambiance : 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%)</td></tr>
<tr><td>6</td><td>Vibration Test (Packaged)</td><td colspan="2">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</td></tr>
<tr><td>7</td><td>Drop Test (Packaged)</td><td colspan="2"><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>Drop Direction :※1 corner / 3 edges / 6 sides each 1time</td></tr>
</table>

◎Inspection conditions after test:

Temperature：+20~30℃

Humidity：50~70%

Atmospheric pressure：86~106Kpa

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.

5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

5.2 HANDLING

5.2.1 Avoid any strong mechanical shock which can break the glass.

5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.

5.2.3 Do not remove the panel or frame from the module.

5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)

5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

5.2.6 Do not touch the display area with bare hands, this will stain the display area.

5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8 To control temperature and time of soldering is 320 ± 10°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°C ± 5°C and the humidity is below 65% RH.

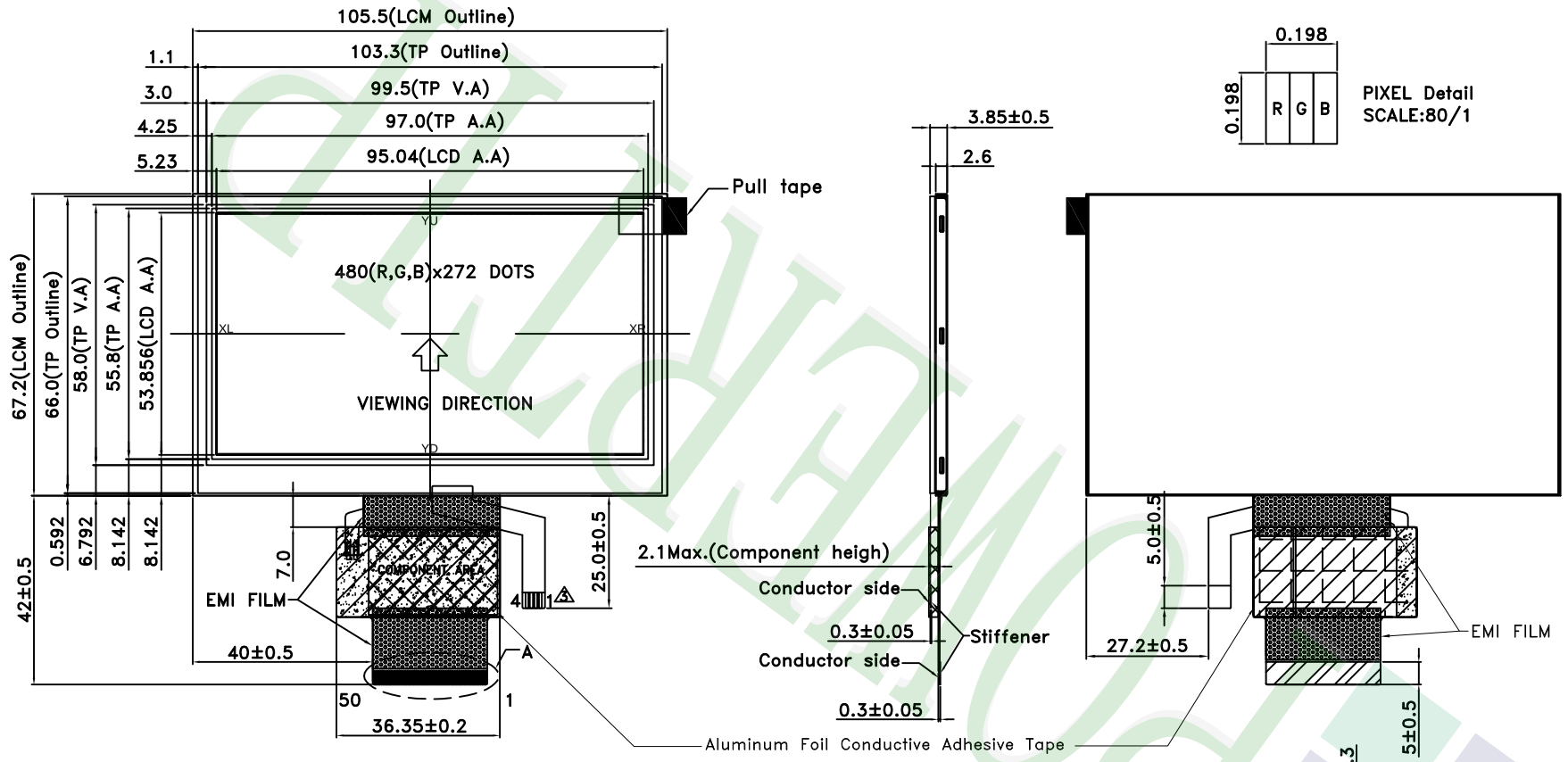
5.3.2 Do not place the module near organics solvents or corrosive gases.

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.



NOTES:

1. LCD TYPE: a-Si TFT
2. LCD DISPLAY:POSITIVE/TRANSMISSIVE
3. VIEW DIRECTION: 6 O'CLOCK
4. The tolerance unless classified ±0.3mm
5. FPC suggested connector : CviLux CF31501D0R2-05-NH or compatible.
6. TP FPC Matching Connector: Kyocera 04 6227 004 100 800+ or compatible.

Touch Panel Pin Assignment

Pin No.	Description
1	XR
2	YD
3	XL
4	YU

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003	MODIFY DRAWING	Sally	2016/11/24
002	MODIFY DRAWING	Sally	2016/09/09
001	NEW DRAWING	Sally	2016/08/26

PART NO: PH480272T009-IHB

DRAWING NAME : JLMD-PH480272T009-IHB

TITLE: LCD Module Drawing

久正光電股份有限公司
POWERTIP TECHNOLOGY CORPORATION

Design	Sally	(3)	Surface		
Check	Terry	Unit	MM	Material	
Approve	Ryan	Scale	1:1	Thickness	
		Page	1/1	Quantity	

Length(Min) (mm) \ Tolerance \ Precision	Precision Level
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

PT-A-054-01

Ver.001

Documents NO.	JPKG-PH480272T009-IHB

LCM包裝規格書
LCM Packaging Specifications
(For Tray)

Approve	Check	Contact
Ryan	Terry	Sally

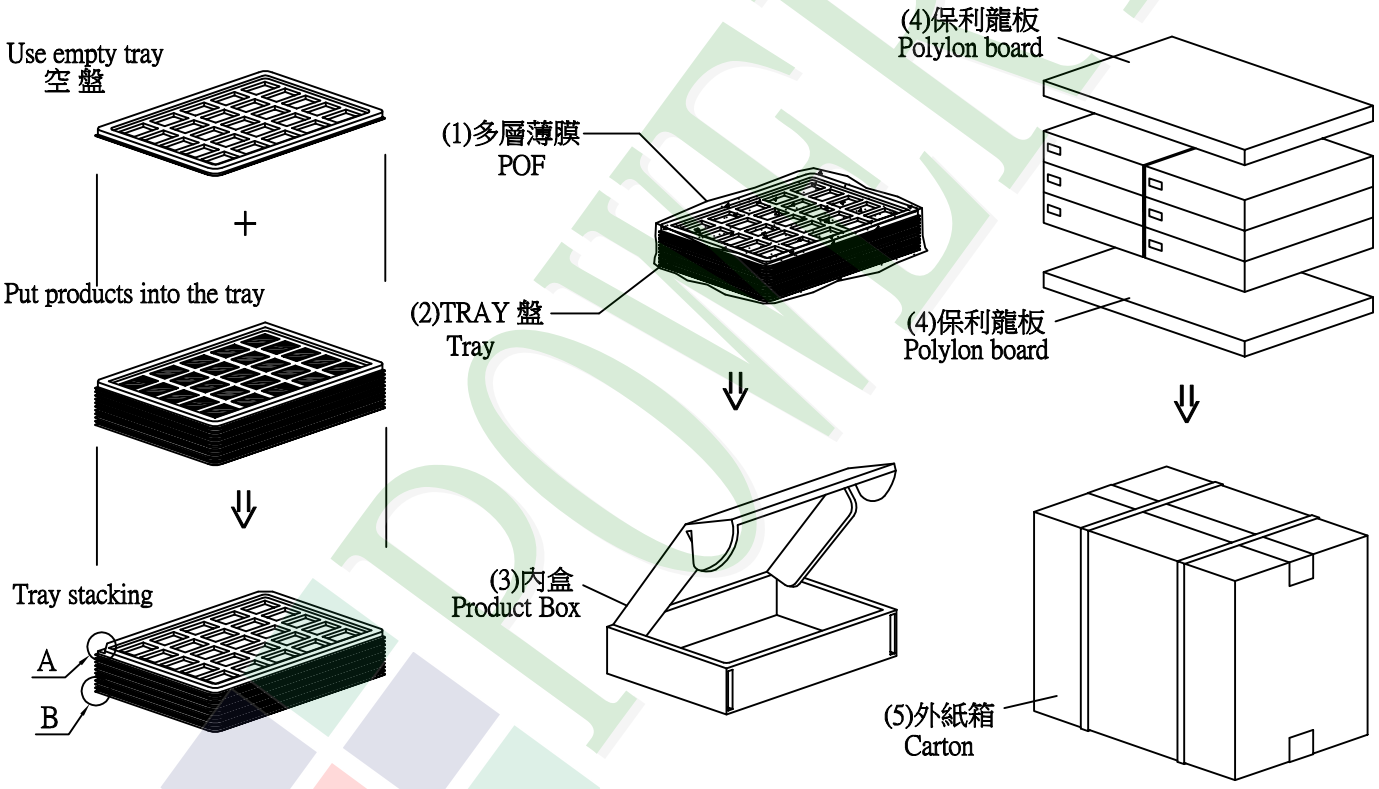
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH480272T009-IHB	105.5 X 67.2 X 3.85	0.057	144	8.208
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TY00000000393	352 X 260 X 12.8	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						

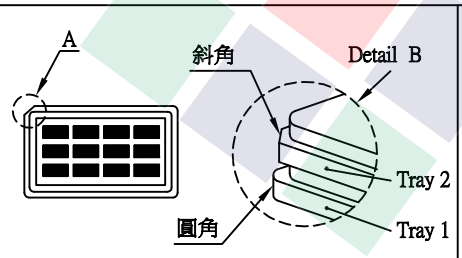
2.一 整箱總重量 (Total LCD Weight in carton) : 14.56 Kg±10%

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.