POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH480272T015-IAB
MASS PRODUCTION CODE	:	PH480272T015-IAB
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	003
DRAWING NO. (Ver.)	:	JLMD-PH480272T015-IAB_001
PACKAGING NO. (Ver.)	:	JPKG-PH480272T015-IAB_002

Customer Approved

Date:

POWERTIP
2019.12.02
IS RD APPROVED

Approved	Checked	Designer
李昀	劉進	陳璐

☐ 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

History of Version

Date	Ver.	Edi.	Description	Page	Design by
06/27/2019	01	001	New Drawing.	-	任健
09/06/2019	01	002	New Sample.	-	任健
12/02/2019	01	003	Modify LCM Packaging	Appendix	陳璐

Total: 34 Page

Contents

Note: For detailed information please refer to IC data sheet: Sitronix --- ST7282-G4

1.1 Features

Item	Standard Value
Display Type	480 * 3 (RGB) * 272 Dots
LCD Type	a-si TFT, Normally white, Transmissive Type
Screen size(inch)	4.3”(Diagonal)
Viewing Direction	6 O’clock (Gray scale Inversion)*1
	12 O’clock *2
Color configuration	R,G, B vertical stripe
Display Interface	Digital 24-bits RGB
Driver IC	ST7282-G4
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

*1. For saturated color display content (e.g. pure-red, pure-green, pure-blue or pure-colors -combinations).

*2. "For display content based upon multicolor images e.g. photos, RGB defined user interfaces"

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	105.5(W) x 67.2 (L) x 4.0(H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	95.04 (W) x 53.856 (L)	mm
Pixel Size	0.198 (W) * 0.198 (H)	mm

Note: For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	V_{DD}	GND=0	-0.3	+4.6	V
Input Voltage Range	V_{IN}	-	-0.3	V_{DD}+0.3	V
Operating Temperature	T_{OP}	-	-20	+70	°C
Storage Temperature	T_{ST}	-	-30	+80	°C
Storage Humidity	H_D	Ta ≦ 60 °C	10	90	%RH

1.4 DC Electrical Characteristics

Module GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply Voltage	V_{DD}	-	3.0	3.3	3.6	V
“H” Input Voltage	V_{IH}	-	0.7*V_{DD}	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	GND	-	0.3*V_{DD}	V
“H” Output Voltage	V_{OH}	-	V_{DD}-0.4	-	V_{DD}	V
“L” Output Voltage	V_{OL}	-	GND	-	GND+0.4	V
Supply Current	I_{DD}	V_{DD}=3.3V	-	20	35	mA

1.5 Optical Characteristics

TFT LCD Panel V_{DD} =3.3V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time		Tr + Tf	-	-	29	44	ms	Note2
Viewing angle	Top	θY+	CR ≥ 10	-	60	-	Deg.	Note4
	Bottom	θY-		-	60	-		
	Left	θX-		-	60	-		
	Right	θX+		-	60	-		
Contrast ratio		CR	-	500	600	-	-	-
Color of CIE Coordinate (B/L & T/P)	White	X	IF= 20 mA	0.23	0.28	0.33	-	Note1
		Y		0.25	0.30	0.35		
	Red	X		0.55	0.60	0.65		
		Y		0.30	0.35	0.40		
	Green	X		0.27	0.32	0.37		
		Y		0.50	0.55	0.60		
	Blue	X		0.10	0.15	0.20		
		Y		0.00	0.05	0.10		
Average Brightness Pattern=white display (B/L & T/P) *1		IV	IF= 20 mA	200	260	-	cd/m^2	Note1
Uniformity (B/L & T/P) *2		△B	IF= 20mA	70	-	-	%	Note1

Note1:

1：△B=B(min) / B(max) × 100%

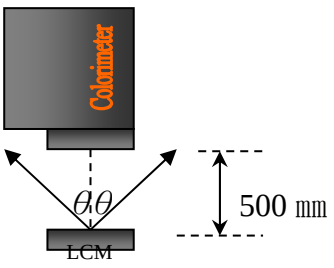
2：Measurement Condition for Optical Characteristics:

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%

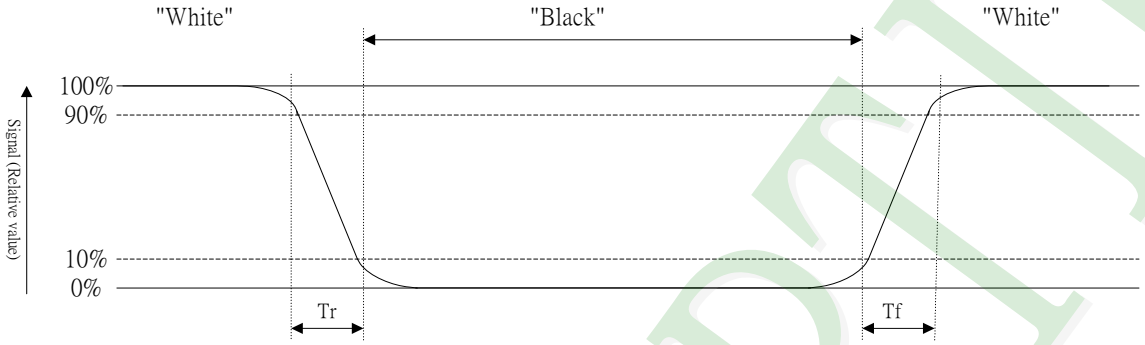


Colorimeter=BM-7 fast

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:



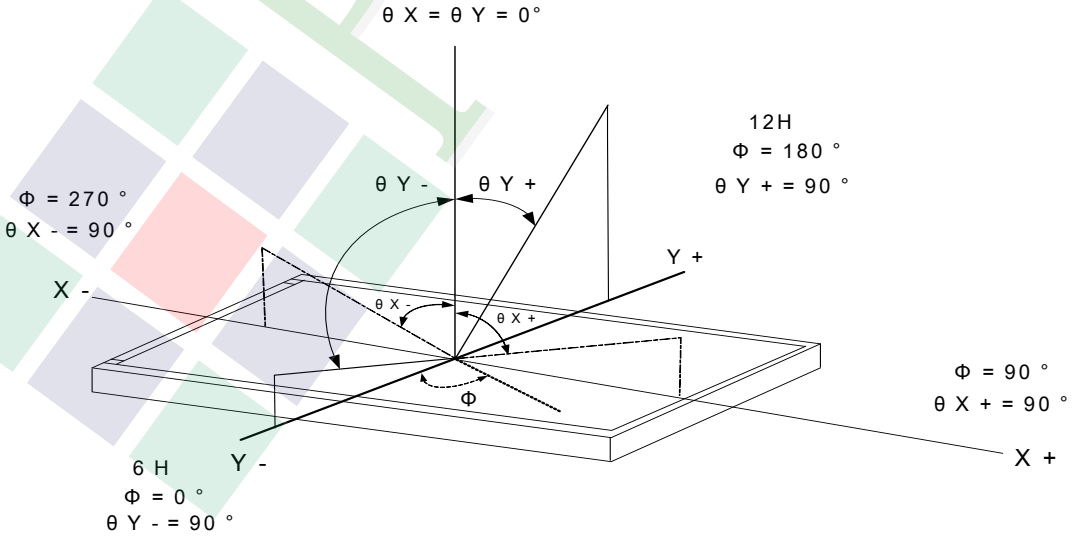
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Characteristics

Maximum Ratings

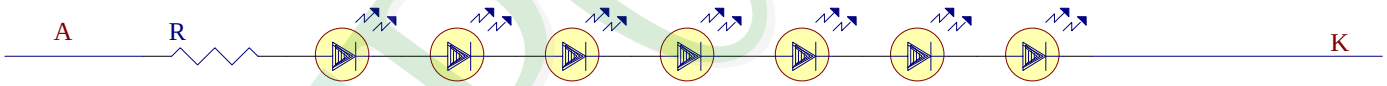
Item	Symbol	Conditions	Min.	Max.	Unit
LED Forward Current (Each one)	IF	Ta =25℃	-	25	mA
LED Reverse Voltage (Each one)	VR	Ta =25℃	-	5	V
Power Dissipation	PD	Ta =25℃	-	595	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=20mA	19.6	22.4	24.5	V
Average Brightness ((Without LCD &T/P)	IV		5500	6000	-	cd/m^2
CIE Color Coordinate ((Without LCD &T/P)	X		0.24	0.27	0.30	-
	Y		0.24	0.27	0.30	
Color	White					

*1 : The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =20mA. The LED lifetime could be decreased if operating I_L is larger than 20 mA.

Internal Circuit Diagram



Other Description

Item	Conditions	Description
Life Time*1	Ta =25℃ IF= 20mA	20,000 hrs

1.7 Touch Panel Characteristics

1.7.1 Optical Characteristics

Item	Specification
1.Transparency	80% Min

1.7.2 Mechanical Characteristic

Item	Specification
1.Input Method	Finger or stylus pen
2.Hardness of surface	3H -pressure 500g of ,45deg.
3.FPC peeling strength	500gf min(Peeling upward by 90°）
4.Activation Force	50gf~120gf individual point with stylus pen(R0.8) Activation force guarantee area: 3.0mm inside of Active Area.
5.Linearity Force	80gf less input with stylus pen(R0.8) Activation 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): 500Ω~ 1250Ω
	Direction Y (Film side): 150Ω~ 450Ω
3.Insulation Resistance	20 MΩ or more (DC 25Ⅴ)
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. (Test condition refers to 1.7.2 item5)
5.Bouncing	<10ms

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.
5	Flexible Pattern Insert/Pull Out Resistance	5times at least.	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.

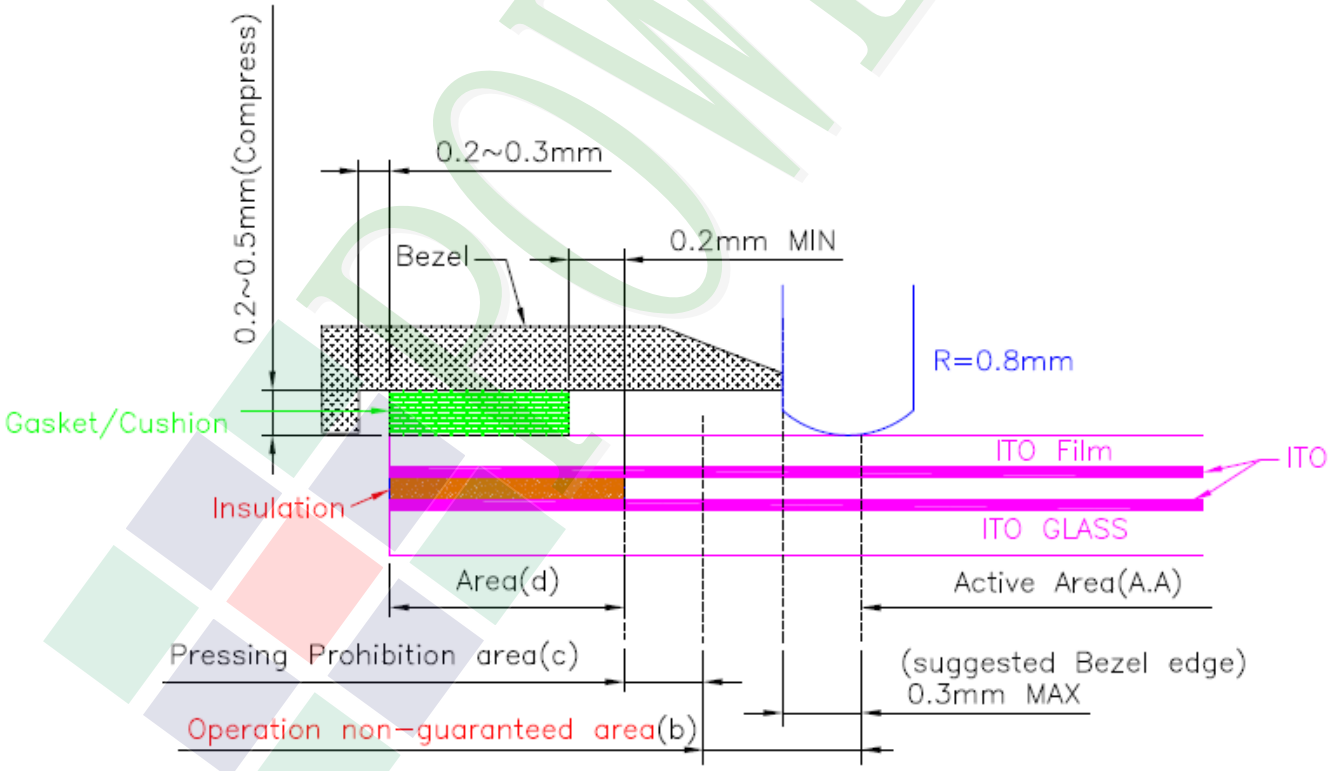
(5) Never expand the T/P top layer (PET Film) like a balloon by internal air pressure. The life of the T/P will extremely decreasing.

(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.

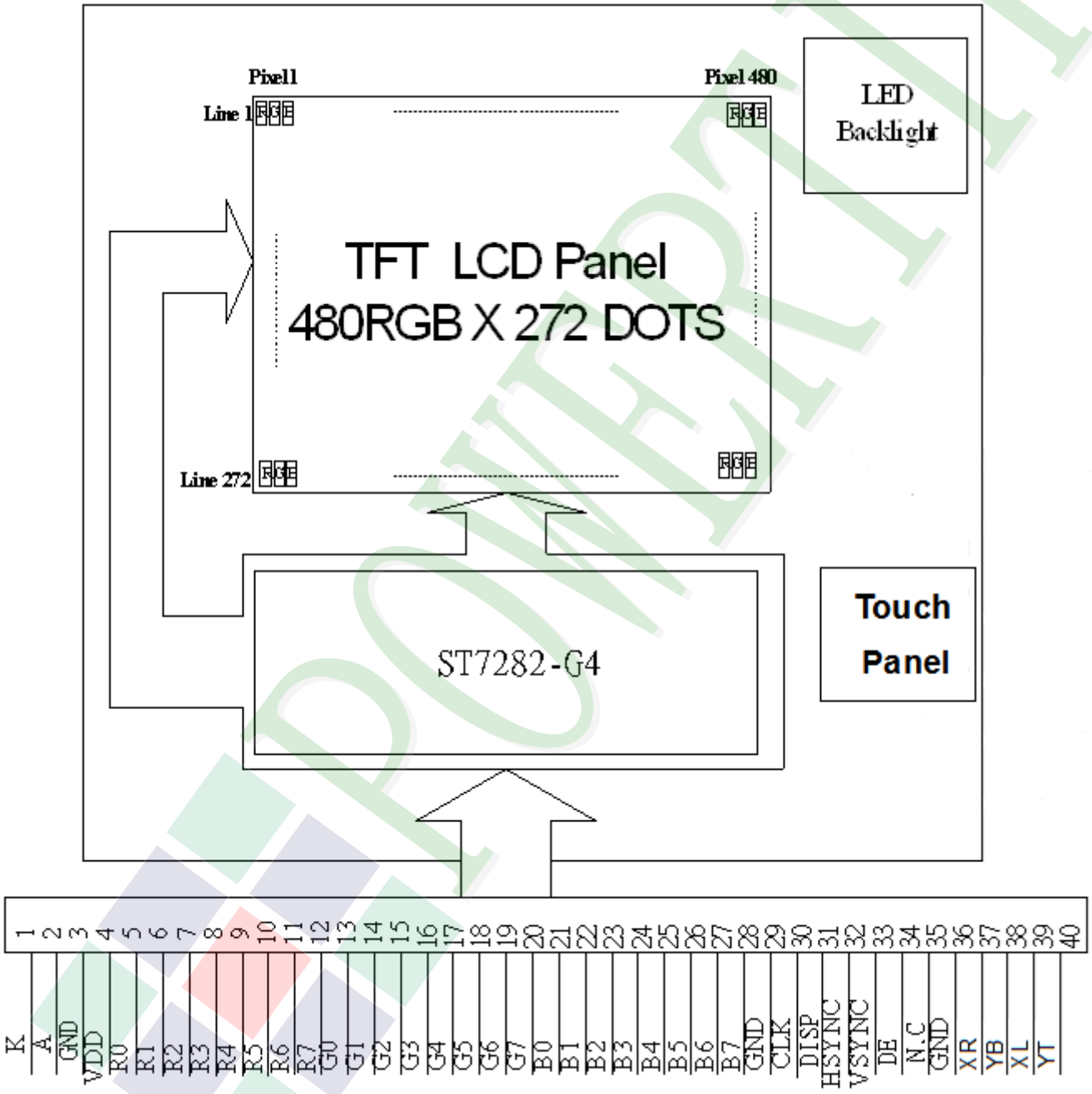
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



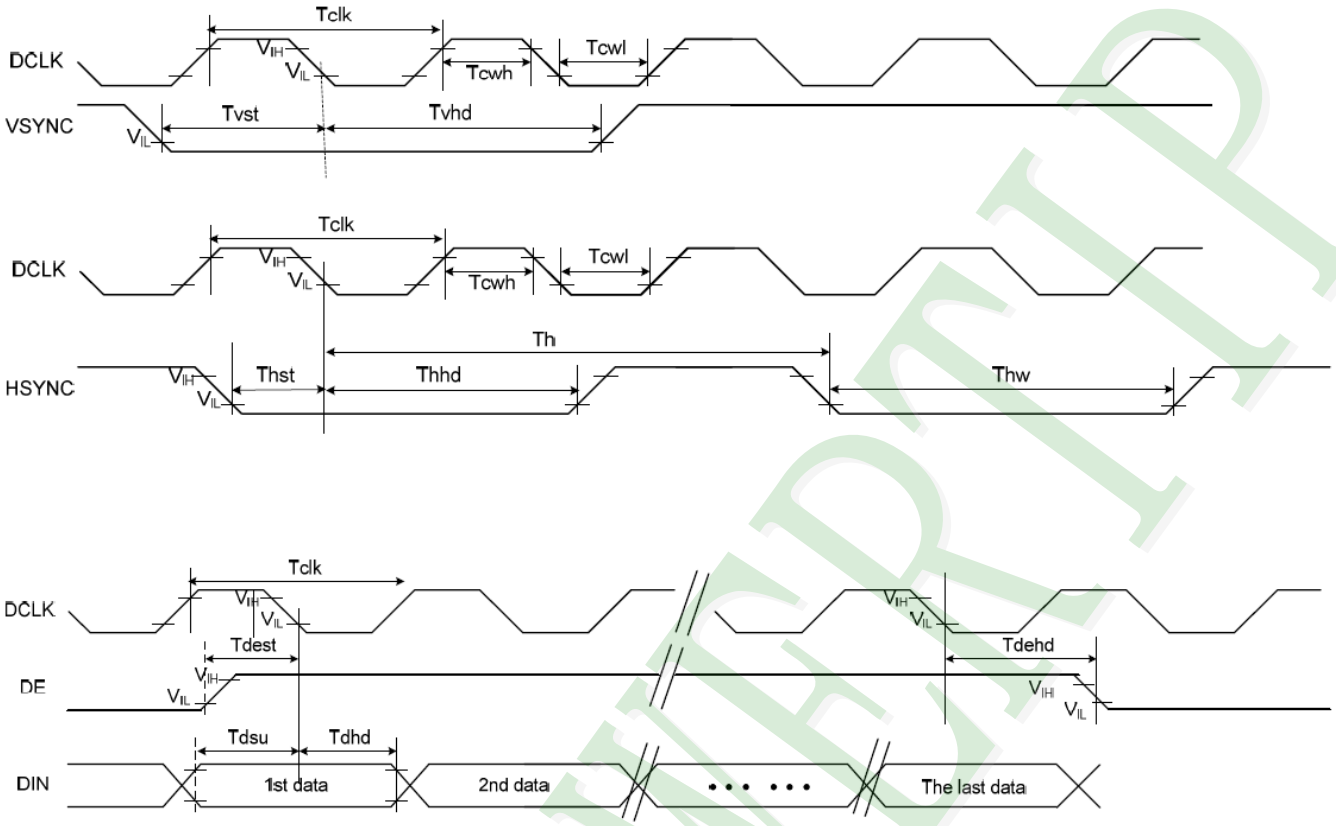
2.2 Interface Pin Description

Pin No.	Symbol	Function
1	K	Power supply for LED Backlight cathode input
2	A	Power supply for LED Backlight anode input
3	GND	Ground
4	VDD	Digital power
5	R0	Red data bit 0
6	R1	Red data bit 1
7	R2	Red data bit 2
8	R3	Red data bit 3
9	R4	Red data bit 4
10	R5	Red data bit 5
11	R6	Red data bit 6
12	R7	Red data bit 7
13	G0	Green data bit 0
14	G1	Green data bit 1
15	G2	Green data bit 2
16	G3	Green data bit 3
17	G4	Green data bit 4
18	G5	Green data bit 5
19	G6	Green data bit 6
20	G7	Green data bit 7

Pin No.	Symbol	Function
21	B0	Blue data bit 0
22	B1	Blue data bit 1
23	B2	Blue data bit 2
24	B3	Blue data bit 3
25	B4	Blue data bit 4
26	B5	Blue data bit 5
27	B6	Blue data bit 6
28	B7	Blue data bit 7
29	GND	Ground
30	CLK	Dot data clock
31	DISP	Display control / standby mode selection “High” : Normal display
32	HSYNC	Horizontal sync input
33	VSYNC	Vertical sync input
34	DE	Data input enable. Active High to enable the data input
35	N.C	Not Connect
36	GND	Ground
37	XR	Right side of touch panel
38	YB	Bottom side of touch panel
39	XL	Left side of touch panel
40	YT	Up side of touch panel

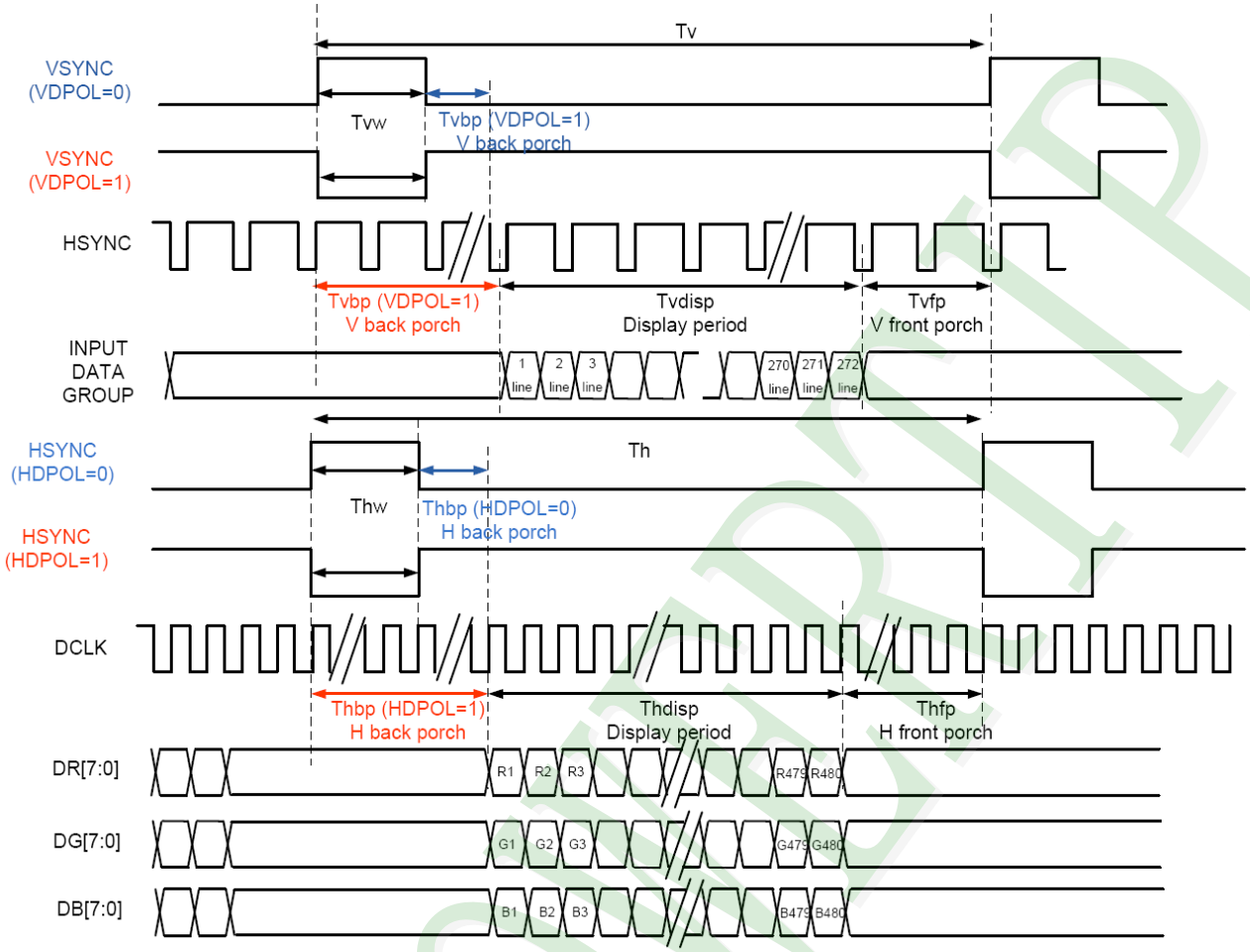
2.3 Timing Characteristics

2.3.1 Clock and Data Input Timing Diagram

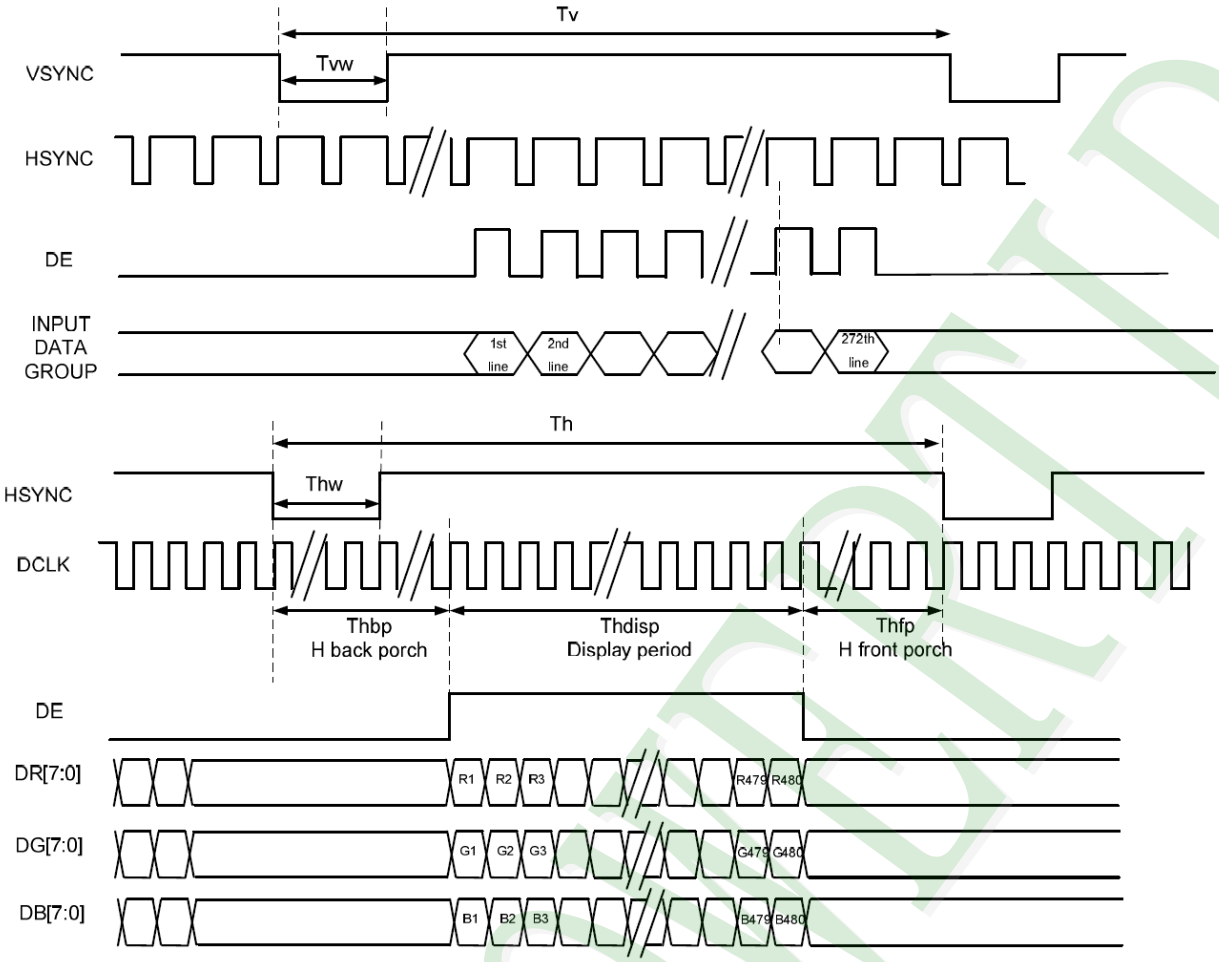


Parameters	Symbol	Spec			Unit	Conditions
		Min.	Typ.	Max.		
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTw	10	50	-	us	R=10Kohm, C=1uF
Input/ Output timing						
CLK pulse duty	TCW	40	50	60	%	-
Hsync width	Thw	2	-	-	DCLK	-
HSYNC period	Th	55	60	65	us	-
VSYNC setup time	Tvst	12	-	-	ns	-
VSYNC hold time	Tvhd	12	-	-	ns	-
HSYNC setup time	Thst	12	-	-	ns	-
HSYNC hold time	Thhd	12	-	-	ns	-
Data setup time	Tdsu	12	-	-	ns	-
Data hold time	Tdhd	12	-	-	ns	-
DE setup time	Tdest	10	-	-	ns	-
DE hold time	Tdehd	10	-	-	ns	-
SD output stable time	Tst	-	-	12	us	Output settled within +20mV Loading=.6.8k+28.2pF
GD output rise and fall time	Tgst	-	-	6	us	Output settled (5%~95%), Loading =4.7k+29.8pF

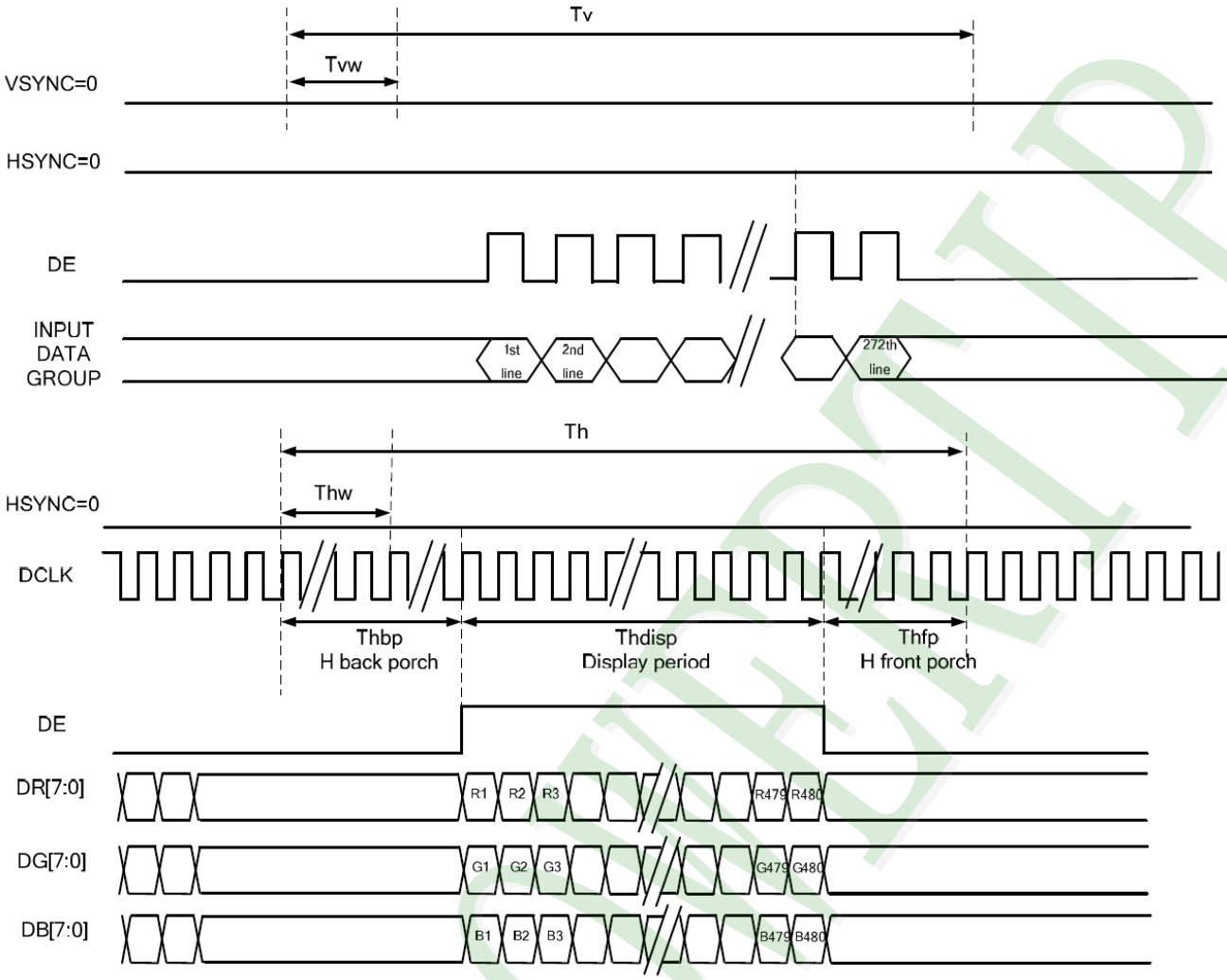
2.3.2 SYNC Mode



2.3.3 SYNC-DE Mode



2.3.4 DE Mode

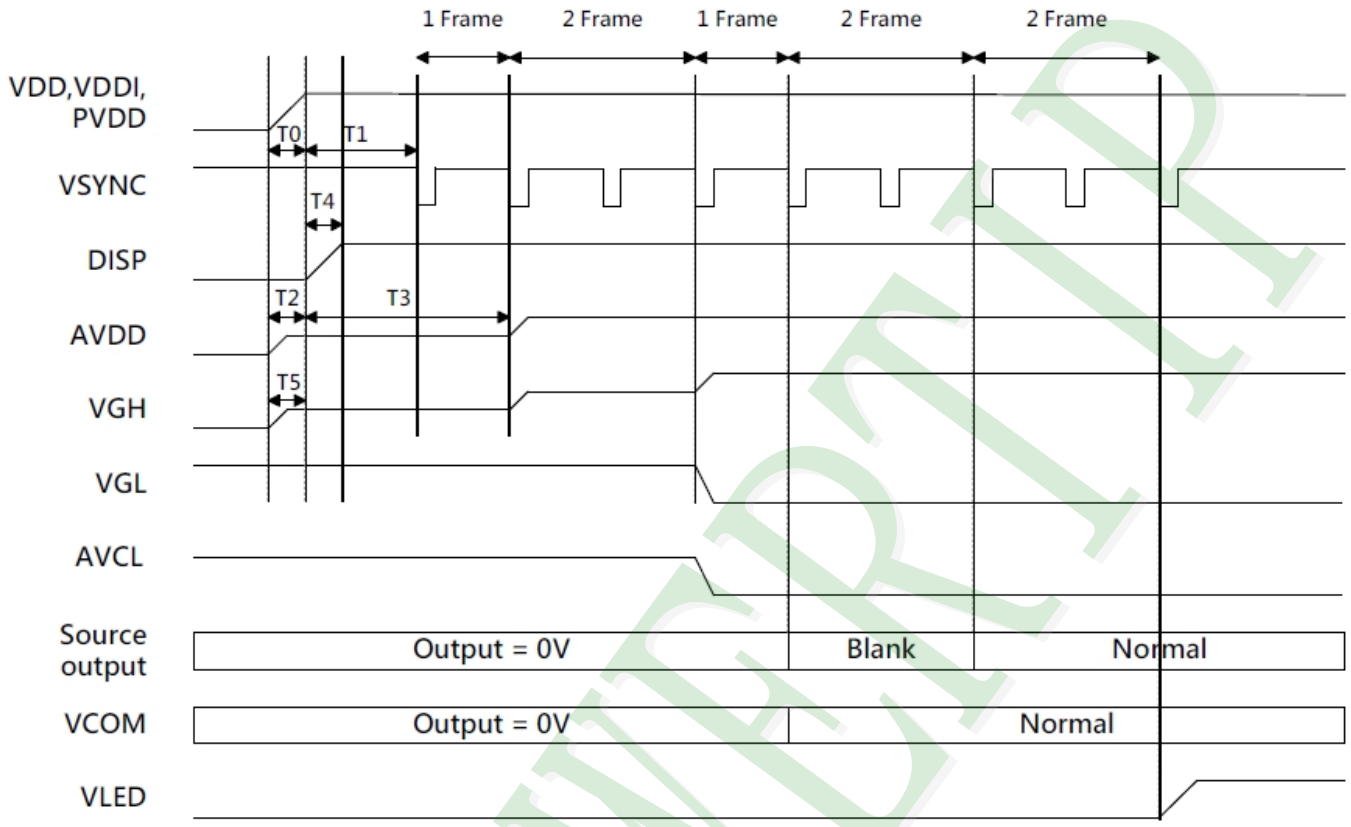

Tv
Tvw
VSYNC=0
HSYNC=0
DE
INPUT
DATA
GROUP
1st
line
2nd
line
272th
line
Th
Thw
HSYNC=0
DCLK
Thbp
H back porch
Thdisp
Display period
Thfp
H front porch
DE
DR[7:0]
R1
R2
R3
R479
R480
DG[7:0]
G1
G2
G3
G479
G480
DB[7:0]
B1
B2
B3
B479
B480

Parallel 24-bit RGB Input Timing Table

Parameters		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency		Fclk	8	9	12	MHz
DCLK Period		Tclk	83	111	125	nS
HSYNC	Period Time	Th	485	531	598	DCLK
	Display Period	Thdisp	-	480	-	DCLK
	Back Porch	Thbp	3	43	43	DCLK
	Front Porch	Thfp	2	8	75	DCLK
	Pulse Width	Thw	2	4	75	DCLK
VSYNC	Period Time	Tvdisp	276	292	321	H
	Display Period	Tvbp	-	272	-	H
	Back Porch	Tvfp	2	12	12	H
	Front Porch	Tvw	2	8	37	H
	Pulse Width	Tvdisp	2	4	37	H

2.4 POWER ON/OFF SEQUENCE

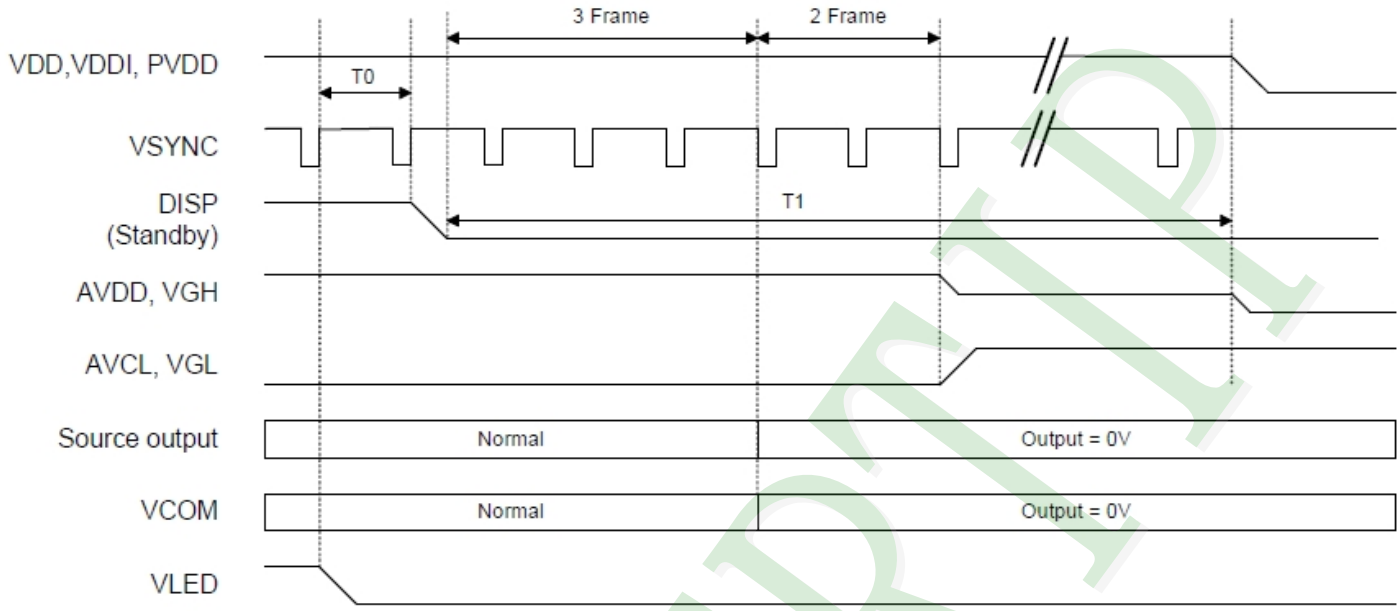
2.4.1 Power On Sequence



Symbol	Description	Min. Time
T0	Determined by the external power	-
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	me from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

Note: Recommend the LCM power on rise time T0= 0~ 1ms.

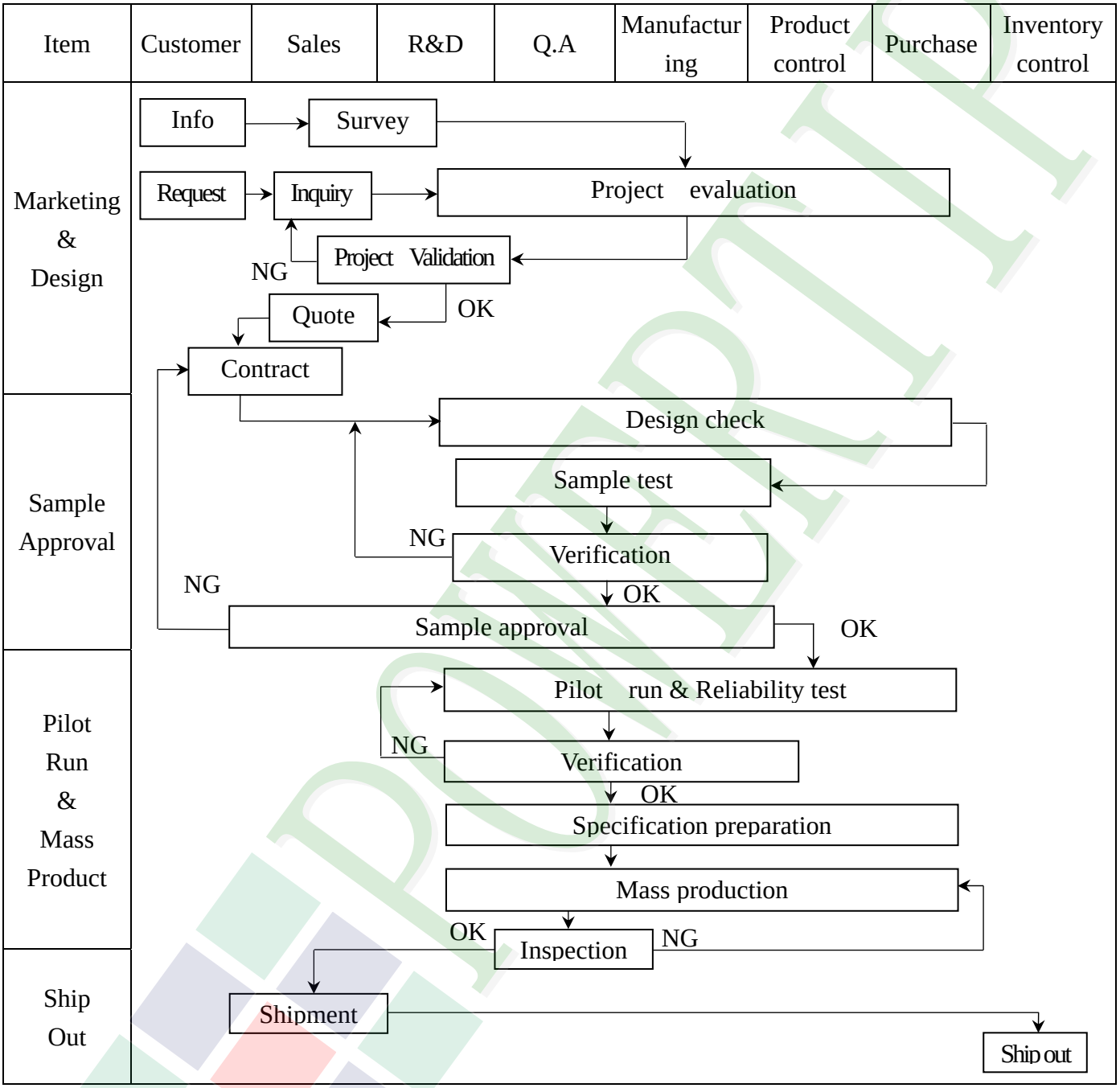
2.4.2 Power Off Sequence

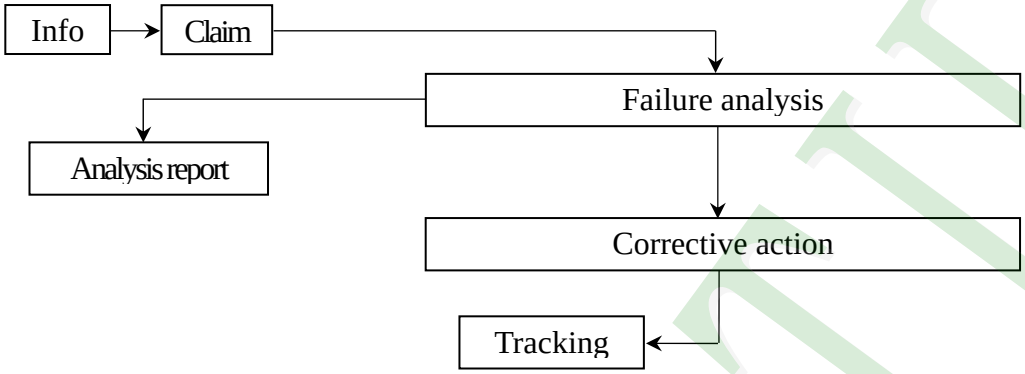


Symbol	Description	Min. Time
T0	Time from backlight power off to DISP="L"	1*Frame
T1	Time from DISP="L" to LCM Power off	5*Frame

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.

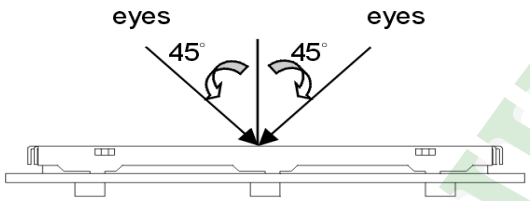
◆Standard of the product appearance test：

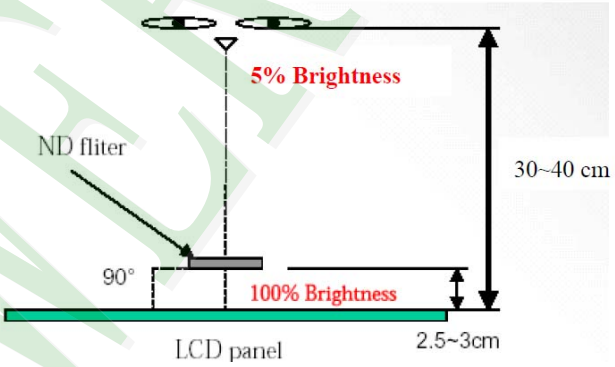
a. Manner of appearance test：

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

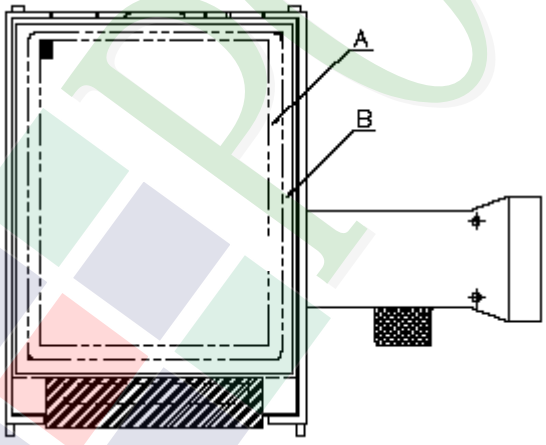
，and distance of view must be at 30~40 cm.

(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>3.1 Product 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 can not be seen through 5% ND filter at 50% Gray screen , should be judged by the viewing angle of 90 degree.</td><td>Minor</td></tr>
<tr><td>05</td><td>Dot defect

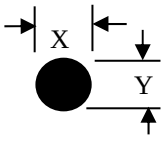
(Bright dot、Dark dot)

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 that can not be seen through 5% ND filter.
</td><td>Minor</td></tr>
</table>

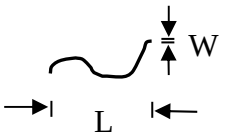
◆Specification For TFT-LCD Module 3.5″ ~15″：

(Ver.B01)

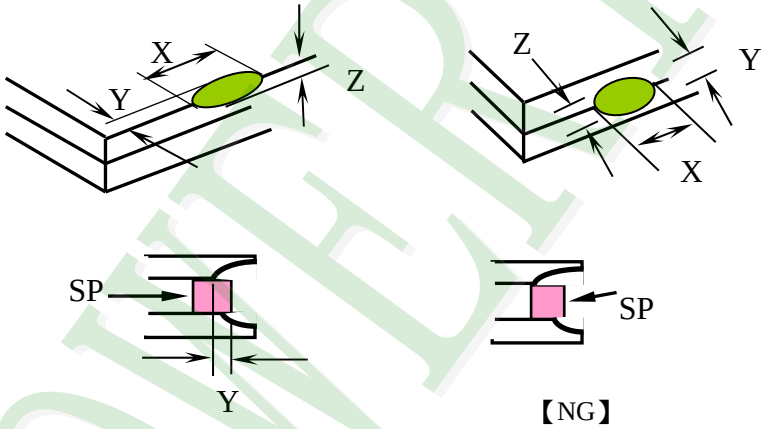
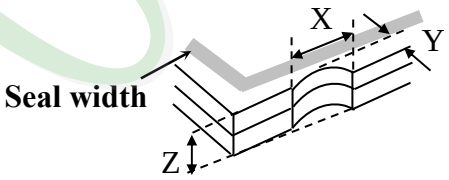
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>06</td><td>Black or white dot、scratch、contamination

Round type
 

Φ=(x+y) / 2

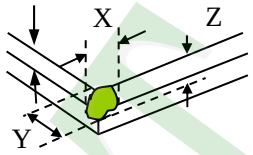
Line type
 
</td><td>6.1 Round type (Non-display or display)：
<table><tr><th rowspan="2">Dimension (diameter：Φ)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.25</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.25 ＜ Φ ≦ 0.50</td><td>5</td></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

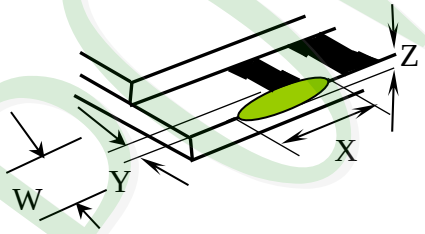
◆Specification For TFT-LCD Module 3.5″ ~15″ : (Ver.B01)

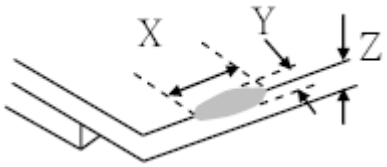
NO	Item	Criterion	Level
08	The crack of glass	Symbols : X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length 8.1.2 Corner crack : 	Minor

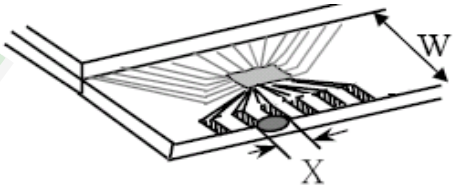
X	Y	Z
≦1/5 a	Crack can't enter viewing area	Z ≦ 1/2 t
≦1/5 a	Crack can't exceed the half of SP width.	1/2 t < Z ≦ 2 t

8.2 Protrusion over terminal :

8.2.1 Chip on electrode pad :





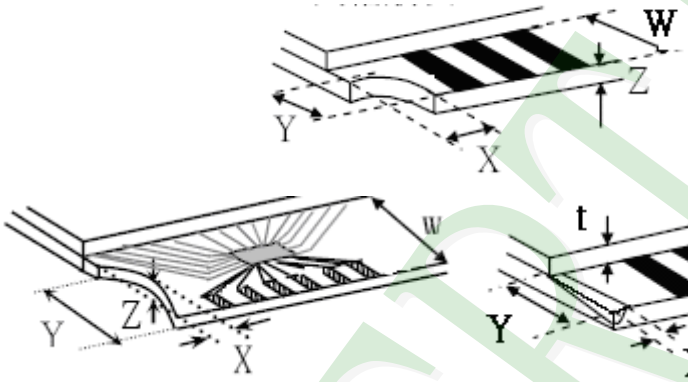


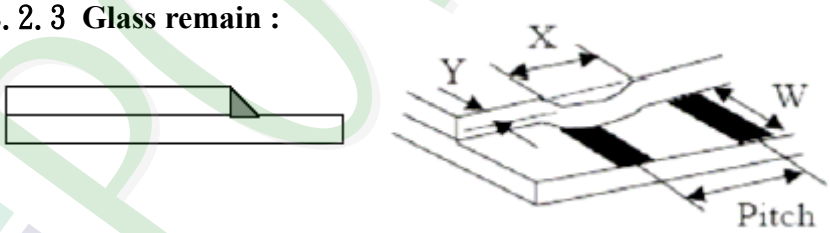
	X	Y	Z
Front	≦ a	≦ 1/2 W	≦ t
Back	≦ a	≦ W	≦ 1/2 t

◆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>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	10.1 Pin type、quantity、dimension must match type in structure diagram.	Major
		10.2 No short circuits in components on PCB or FPC .	Major
		10.3 Parts on PCB or FPC must be the same as on the production characteristic chart .There should be no wrong parts , missing parts or excess parts.	Major
		10.4 Product packaging must the same as specified on packaging specification sheet.	Minor
		10.5 The folding and peeled off in polarizer are not acceptable.	Minor
		10.6 The PCB or FPC between B/L assembled distance(PCB or FPC) is ≦1.5 mm.	Minor

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 ±2℃ 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±2℃ 240 hrs
Surrounding temperature, then storage at normal condition 4hrs.</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
Surrounding temperature, then storage at normal condition 4hrs.
(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
Surrounding temperature, then storage at normal condition 4hrs.</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 +/-
Contact Discharge:
Apply 250 V with 5 times
discharge for each polarity +/-</td></tr>
<tr><td>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>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><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>

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.

5.3 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.

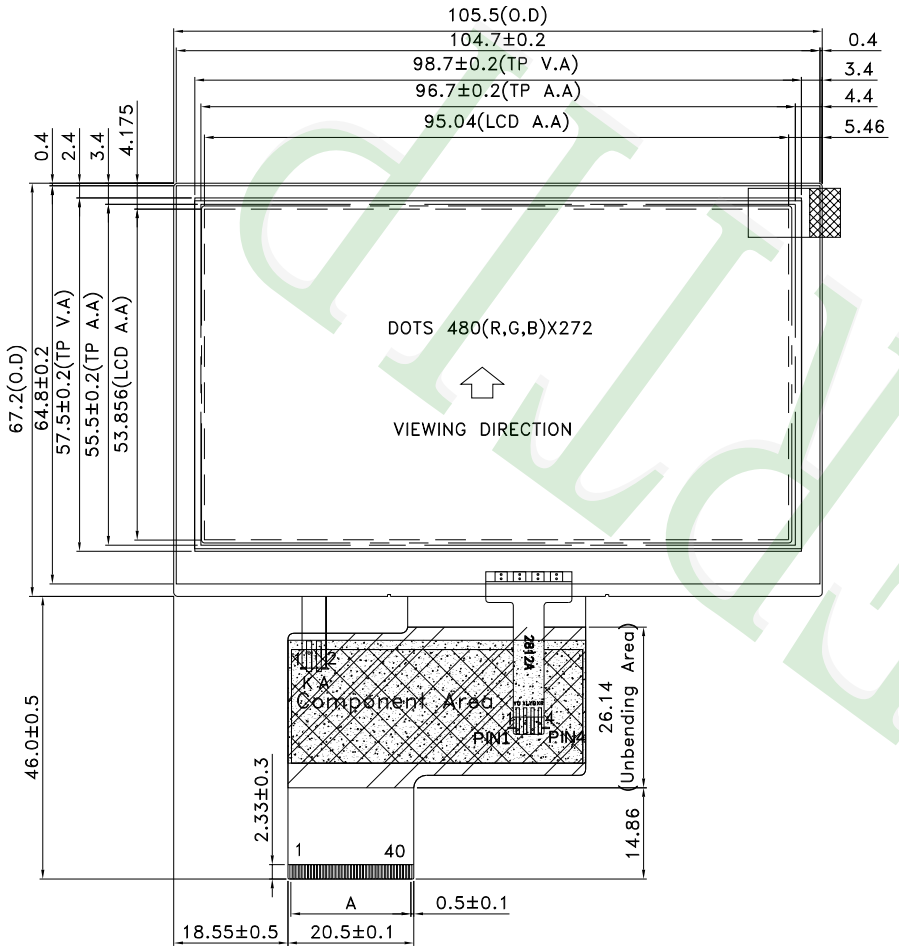
5.4 TERMS OF WARRANTY

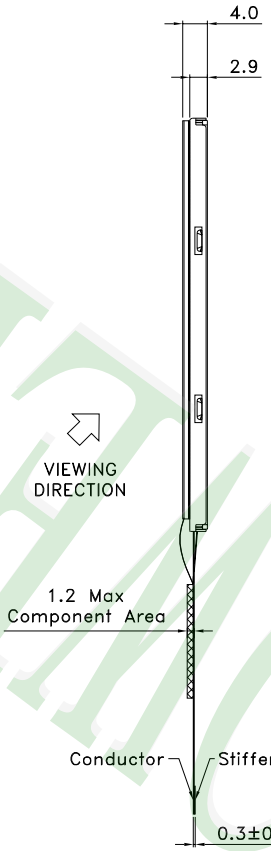
5.4.1 Applicable warrant period

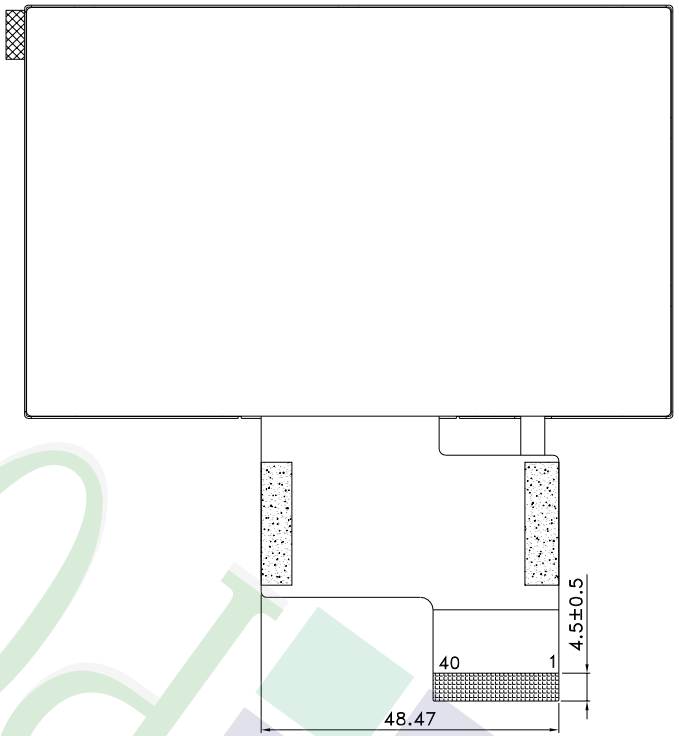
The period is within thirteen months since the date of shipping out under normal using and storage conditions.

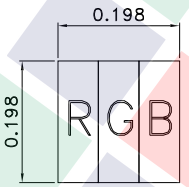
5.4.2 Unaccepted responsibility

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.









Detail Dots
Scale 100X

NOTES:

1.LCD TYPE: TFT
2.LCD DISPLAY:POSITIVE/TRANSMISSIVE
3.VIEW DIRECTION: 6 O'CLOCK
4.The tolerance unless classified ±0.3mm
5.FPC suggested connector : 08 6262 040 340 846+(KYOCERA) or compatible
6. Shielding tape; Unbending Area
7.A=0.5X39=19.5±0.05 , W=0.35±0.05

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Pierre	2019/6/19

PART NO: PH480272T015-IAB

DRAWING NAME : JLMD-PH480272T015-IAB

TITLE: LCD MODULE DRAWING

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

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

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

PT-A-054-01

Ver.002

Documents NO.	JPKG-PH480272T015-IAB

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

Approve	Check	Contact
Terry	Air	Pierre

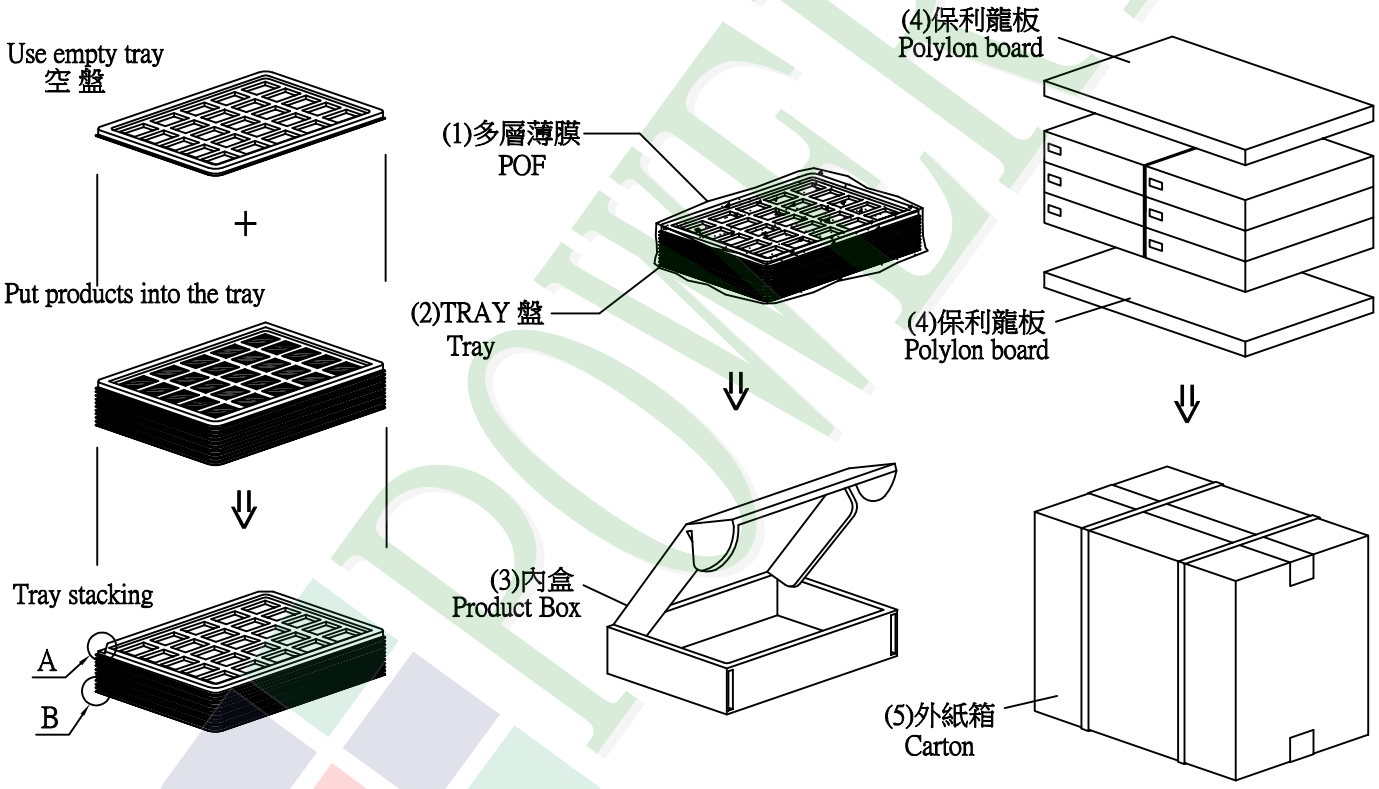
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH480272T015-IAB	105.5 X 67.2X 4.0	0.059	120	7.08
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYSG000000202	352 X 260 X 13.05	0.9358	36	3.369
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						

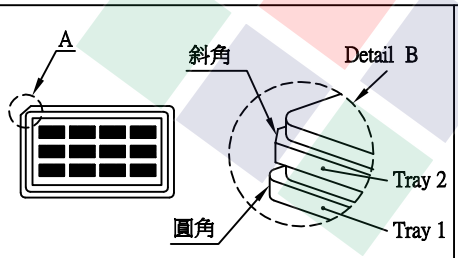
2.一 整箱總重量 (Total LCD Weight in carton) : 12.6 Kg±10%

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	5	=	20
(2)Total LCM quantity in carton : quantity per box	20	x no of boxes	6	=	120



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.