POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH128800T006-ZFA
MASS PRODUCTION CODE	:	PH128800T006-ZFA
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	004
DRAWING NO. (Ver.)	:	LMD-PH128800T006-ZFA (Ver.002)
PACKAGING NO. (Ver.)	:	PKG-PH128800T006-ZFA (Ver.002)

Customer Approved

Date:

Approved	Checked	Designer
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POWERTIP
2023.10.03
TW RD APR

□ 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
11/28/2022	01	001	Preliminary.	-	Ian
05/23/2023	01	002	First Sample Modify Dimension and Add Shading tape	- Appendix	Ian
07/19/2023	01	003	Modify IDD and PVDD maximum	5	Ian
10/02/2023	01	004	Modify Backlight CIE Color Coordinate Modify Packaging Specifications	9 Appendix	Ian

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Resolution	1280 *3 (RGB) * 800 Dots
LCD Type	Full Viewing Angle , Normally Black, Transmissive type
Screen size(inch)	10.1 inch
Color configuration	R.G.B. Vertical Stripe
Weight	283g
Interface	LVDS
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website: http://www.powertip.com.tw/news_detail.php?Key=1&cID=1

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	229.8 (W) * 149.0 (L) * 7.0 max. (H)	mm

LCD panel

Item	Standard Value	Unit
View Area	217.96 (W) * 136.6 (L)	mm
Active Area	216.96 (W) * 135.6 (L)	mm

Note: For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Logic Supply Voltage	V_{DD}	GND=0V	-0.3	+4.0	V	-
Logic Input Signal Voltage	V_{signal}	GND=0V	-0.3	+4.0	V	
Power Supply for Backlight Unit	LED_V_{CC}	LED_GND=0V	-0.3	+24.0	V	
Operating Temperature	T_{OP} (Ts)	Note 1	-20	+70	°C	
Storage Temperature	T_{ST} (Ta)	Note 2	-30	+80	°C	

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

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

Note 2: Ta is the ambient temperature of samples

1.4 DC Electrical Characteristics

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	GND=0V	3.0	3.3	3.6	V
Logic Current	I_{DD}	V_{DD} =3.3V	-	-	0.31	A
Logic Power Consumption	PV_{DD}		-	-	1	W
Power Supply for Backlight Unit	LED_V_{CC}	LED_GND=0V	9.0	12.0	18.0	V
Backlight Unit Power Consumption	PLED_V_{CC}	LED_V_{CC} =12V	-	-	4	W
PWM Signal Voltage	VIH	GND=0V	3.0	-	3.6	V
	VIL		0	0	0.4	
LED Enable Voltage	VIH		3.0	-	3.6	
	VIL		0	0	0.4	
Input PWM Frequency	F_{PWM}		100	-	20k	Hz
PWM Duty Ratio	PWM		5	-	100	%

1.5 Optical Characteristics

VDD=3.3V, Ta=25°C

Item	Symbol		Condition	Min.	Typ.	Max.	unit	
Response time	Tr+Tf		Ta = 25°C θX, θY = 0°	-	25	50	ms	Note 2
Viewing angle	Top	θY+	CR ≥ 10	-	85	-	Deg.	Note 4
	Bottom	θY-		-	85	-		
	Left	θX-		-	85	-		
	Right	θX+		-	85	-		
Contrast ratio		CR	Ta = 25°C θX , θY = 0°	600	800	-		Note 3
Color of CIE Coordinate	White	X		0.25	0.30	0.35	-	Note1
		Y		0.29	0.34	0.39		
	Red	X		0.52	0.57	0.62		
		Y		0.30	0.35	0.40		
	Green	X		0.26	0.31	0.36		
		Y		0.53	0.58	0.63		
	Blue	X		0.09	0.14	0.19		
		Y		0.08	0.13	0.18		
Average Brightness Pattern=white display (With LCD)*1	IF		LED_Vcc =12.0V PWM="High" (Duty=100%)	450	500	-	cd/m^2	Note1
Uniformity (With LCD)*2	△B		LED_Vcc =12.0V PWM="High" (Duty=100%)	70	-	-	%	Note1

Note 1:

*1: △B=B(min) / B(max) * 100%

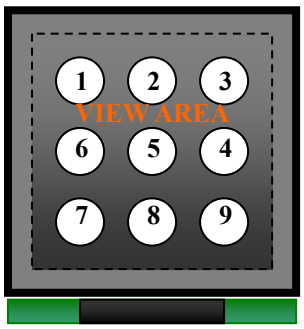
*2: Measurement Condition for Optical Characteristics:

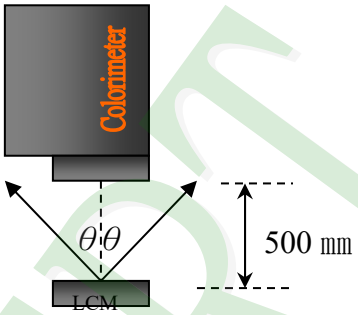
a: Environment: 25℃±5℃ / 60±20%R.H, no wind, dark room below 10 Lux at typical lamp current and typical operating frequency

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)

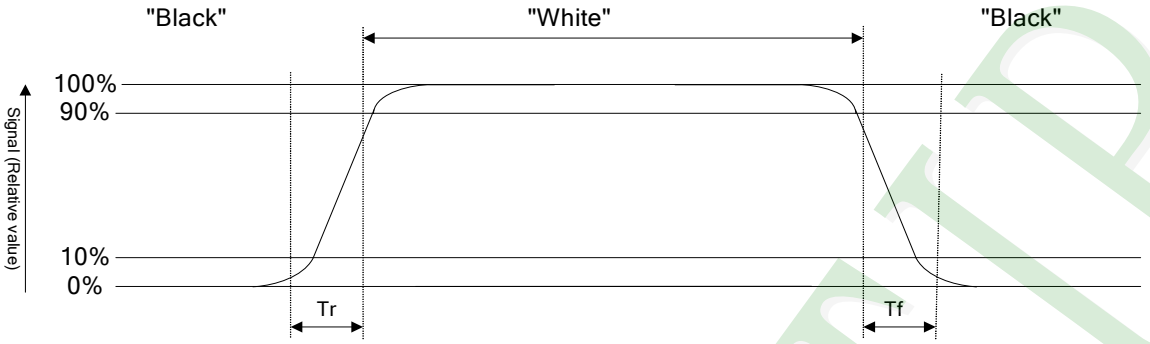
Note 2: Definition of response time:

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

Refer to figure as below:

Normally White

Normally Black



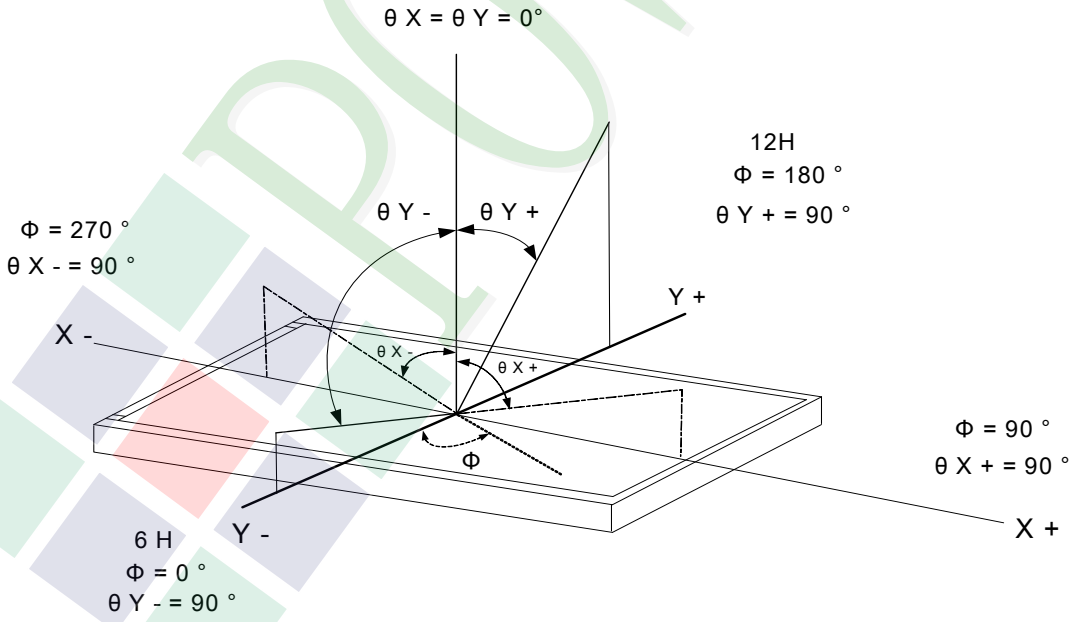
Note 3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note 4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Characteristics

Maximum Ratings

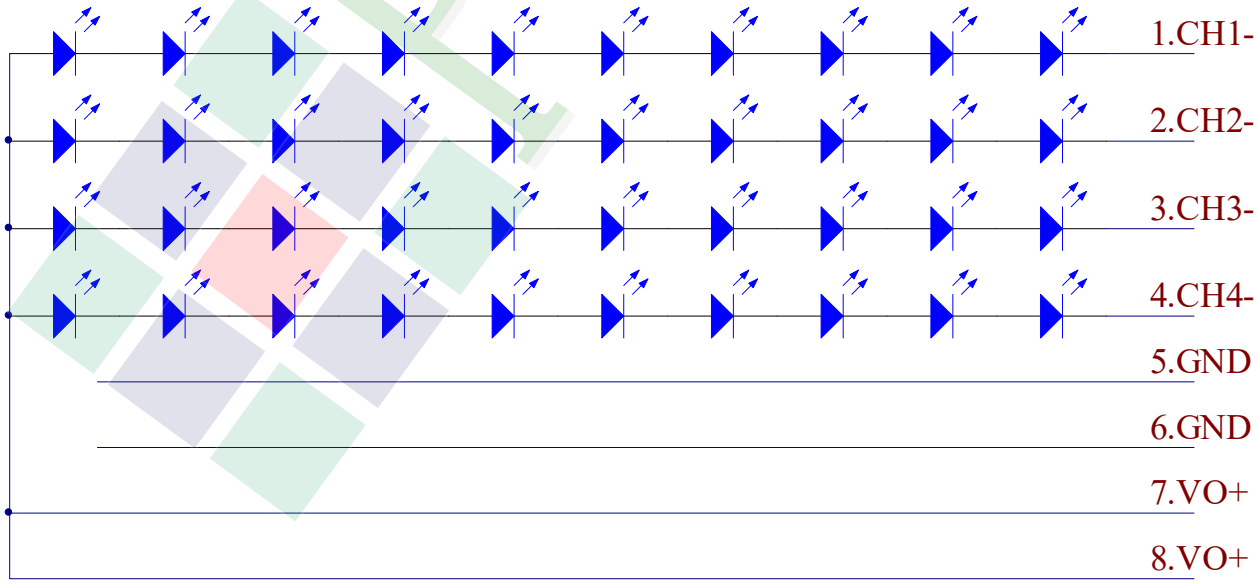
Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I_F	-	30	mA	Per LED
LED Reverse Voltage	V_R	-	1.2	V	

Electrical / Optical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Voltage	V_L	28	30	32	V	Note1
LED Current	I_L	-	20*4	-	mA	-
Average Brightness (without LCD) *1	IV	8000	9000	12000	-	cd/m^2
CIE Color Coordinate (Without LCD)	X	0.25	0.28	0.335		
	Y	0.25	0.28	0.335		
LED life time	-	50,000	-	-	H_r	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L=20*4 mA

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L=20*4 mA. The LED life time could be decreased if operating I_L is larger than 20*4 mA



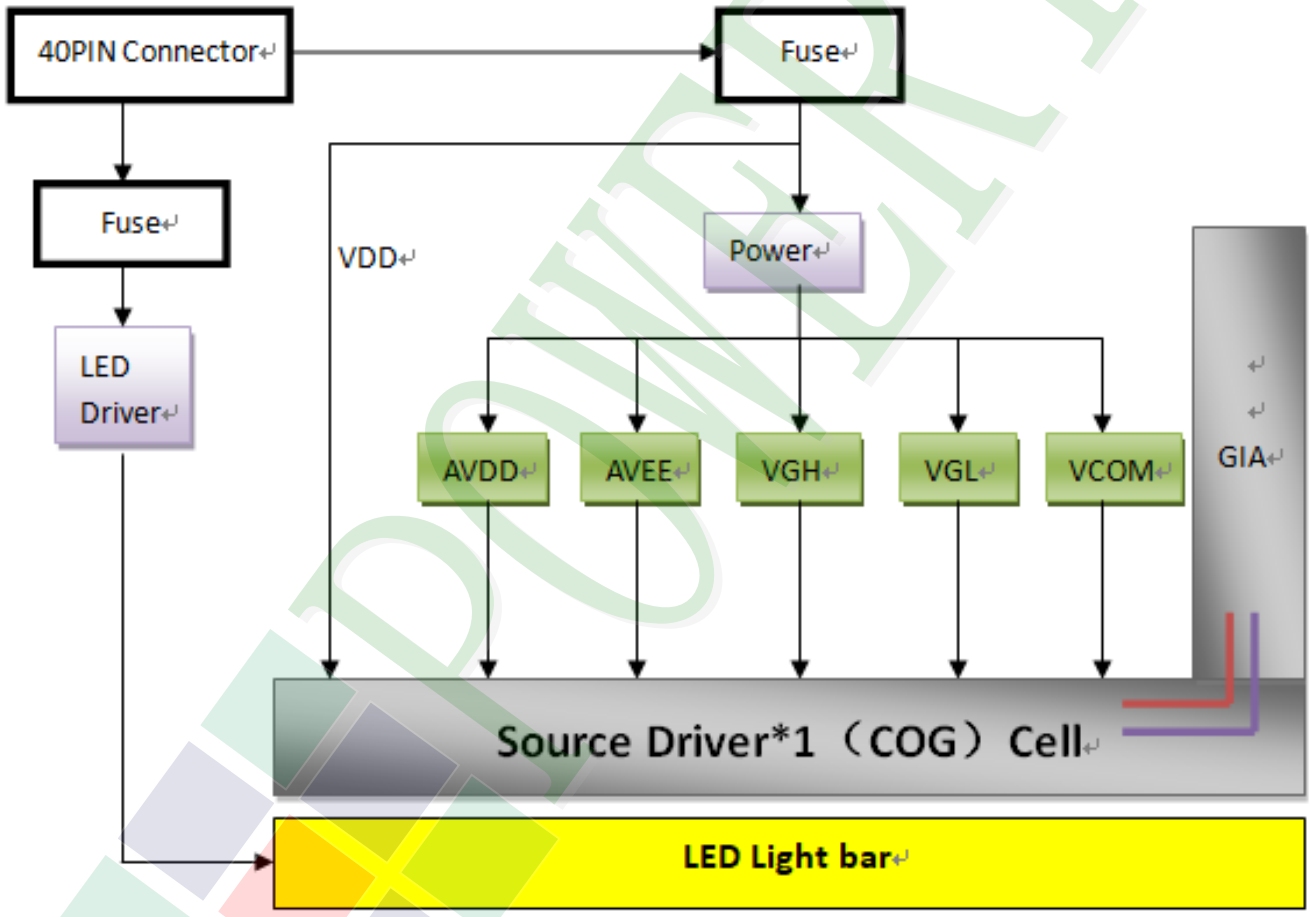
2. Module Structure

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

TFT LCM Interface

Pin#	Name	Description
1	NC	No Connection.
2	VDD	Power Supply.
3	VDD	Power Supply.
4	NC	No Connection.
5	NC	No Connection.
6	NC	No Connection.
7	NC	No Connection.
8	LV0N	-LVDS Differential Data Input.
9	LV0P	+LVDS Differential Data Input.
10	GND	Power ground.
11	LV1N	-LVDS Differential Data Input.
12	LV1P	+LVDS Differential Data Input.
13	GND	Power ground.
14	LV2N	-LVDS Differential Data Input.
15	LV2P	+LVDS Differential Data Input.
16	GND	Power ground.
17	LVCLKN	-LVDS Differential Clock Input.
18	LVCLKP	+LVDS Differential Clock Input.
19	GND	Power ground.
20	LV3N	-LVDS Differential Data Input.
21	LV3P	+LVDS Differential Data Input.
22	GND	Power ground.
23	LED_GND	Ground for LED Driving.
24	LED_GND	Ground for LED Driving.
25	LED_GND	Ground for LED Driving.
26	NC	No Connection.
27	LED_PWM	PWM Input Signal for Backlight Diver.
28	LED_EN	Backlight Enable Pin.
29	NC	No Connection.

Pin#	Name	Description
30	NC	No Connection.
31	LED_VCC	Power Supply for Backlight Diver.
32	LED_VCC	Power Supply for Backlight Diver.
33	LED_VCC	Power Supply for Backlight Diver.
34	NC	No Connection.
35	BIST	Self Test Enable. When it is not used, please don't connect to GND, connecting to Normal High(3.3V) is recommended
36	NC	No Connection.
37	NC	No Connection.
38	NC	No Connection.
39	NC	No Connection.
40	NC	No Connection.

2.3 Timing Characteristics

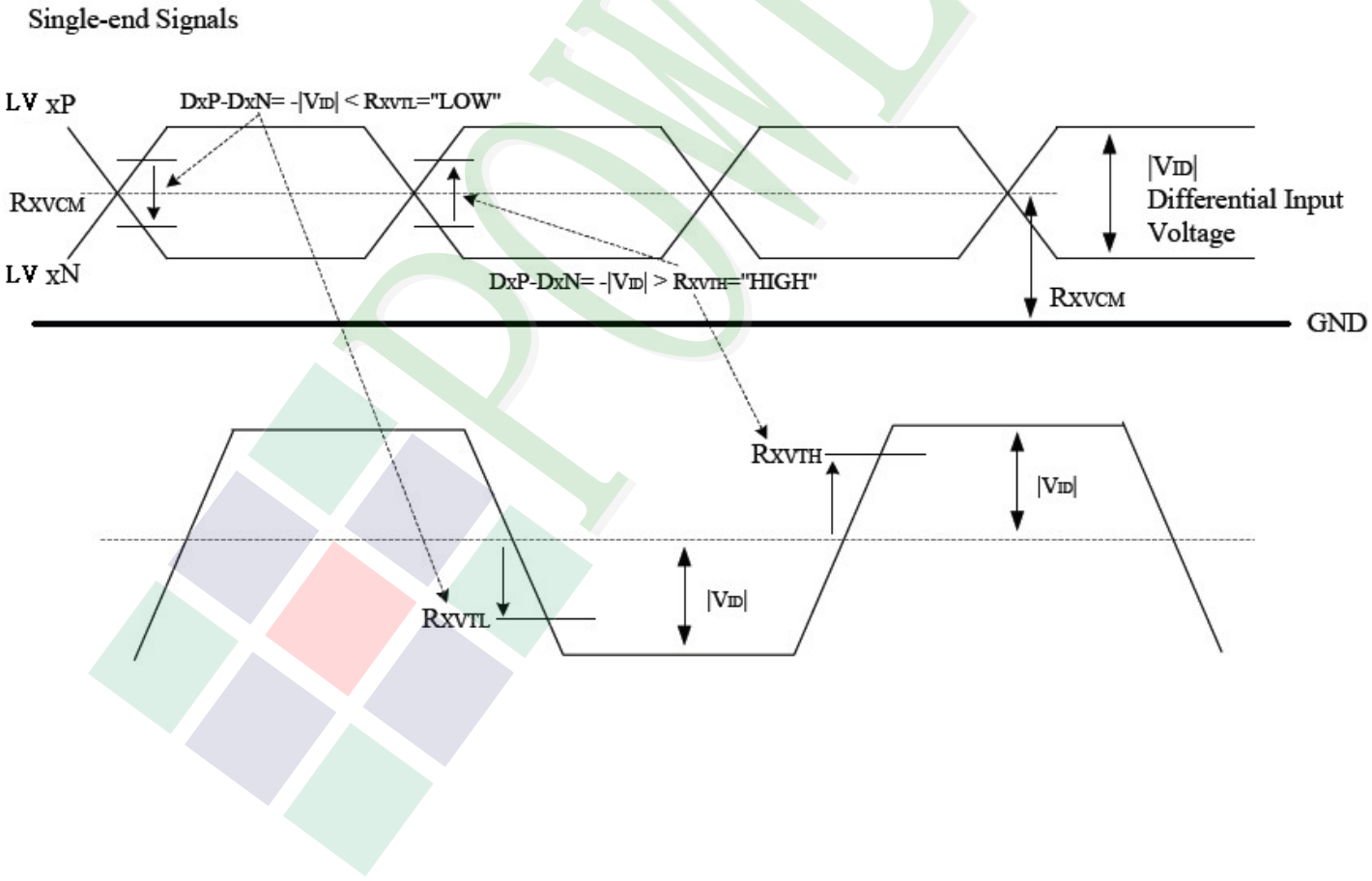
2.3.1 Signal Electrical Characteristics For LVDS Receiver

The built-in LVDS receiver is compatible with (ANSI/TIA/TIA-644) standard.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	-	-	100	mV	V_{CM}=+1.2V
Differential Input Low Threshold	Vtl	-100	-	-	mV	V_{CM}=+1.2V
Input voltage range(singled-end)	RXVIN	0.7		1.7	V	-
Magnitude Differential Input Voltage	$\|V_{ID}\|$	200	-	600	mV	-
Common Mode Voltage	V_{CM}	1	1.2	1.4	V	|VID|=0.2

Note (1) Input signals shall be low or Hi-resistance state when VDD is off.

Note (2) All electrical characteristics for LVDS signal are defined and shall be measured at theinterface connector of LCD.

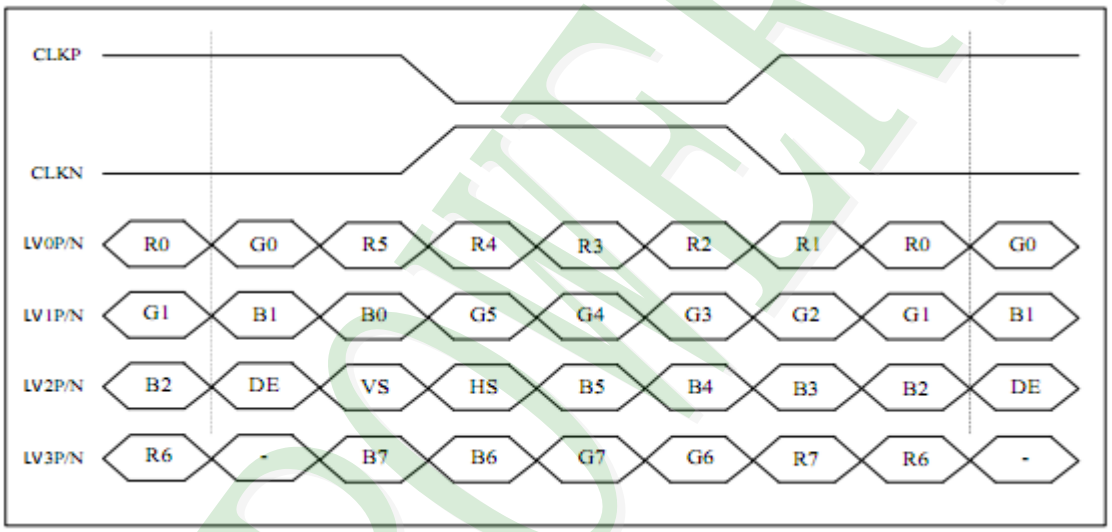


2.3.2 Input Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
LVDS Clock Frequency	Fclk	70.0	72.4	76.6	MHz
H Total Time	HT	1410	1440	1470	Clocks
H Active Time	HA		1280		
V Total Time	VT	828	838	868	Lines
V Active Time	VA		800		
Frame Rate	FV	-	60	-	Hz

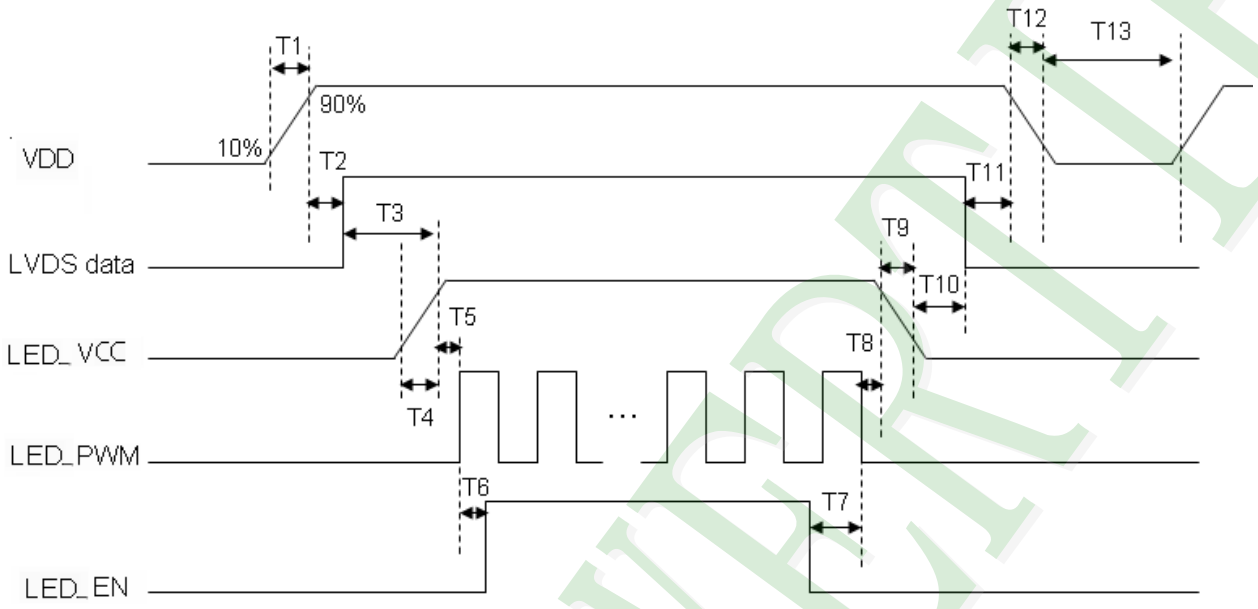
Note1： HT * VT *Frame Frequency ≤ (76.6) MHz

Note2: All reliabilities are specified for timing specification based on refresh rate of 60Hz.



2.3.4 Power ON/OFF Sequence

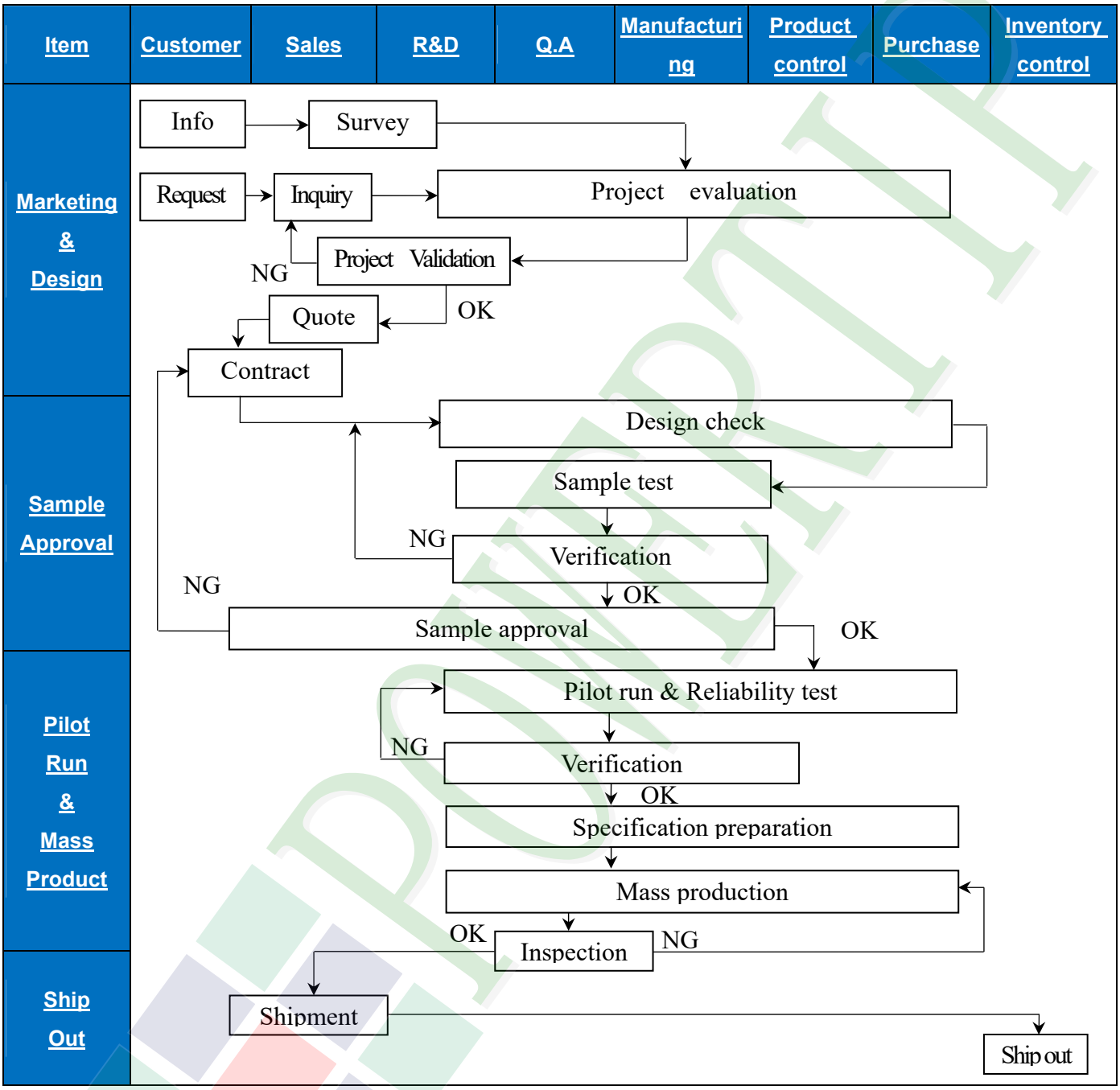
1. Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VDD voltage is off.
2. Please set timing according to the following figures, otherwise it may cause image sticking

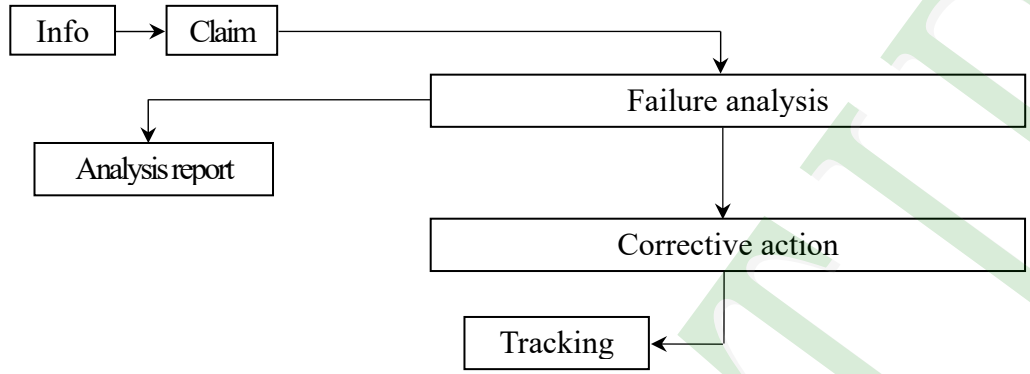


Parameter	Symbol	Unit	Min	Typ.	Max
VDD Rise Time (10% to 90%)	T1	ms	0.5	--	10
VDD Good to Signal Valid	T2	ms	30	--	90
Signal Valid to Backlight On	T3	ms	200	--	--
Backlight Power On Time	T4	ms	0.5	--	--
Backlight LED_VCC Good to System PWM On	T5	ms	10	--	--
System PWM On to Backlight LED_EN On	T6	ms	10	--	--
Backlight LED_ EN Off to System PWM Off	T7	ms	0	--	--
System PWM Off to B/L Power Disable	T8	ms	10	--	--
Backlight Power Off Time	T9	ms	0.5	10	30
Backlight Off to Signal Disable	T10	ms	200	--	--
Signal Disable to Power Down	T11	ms	0	--	50
VDD Fall Time	T12	ms	0.5	10	30
Power Off	T13	ms	500	--	--

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

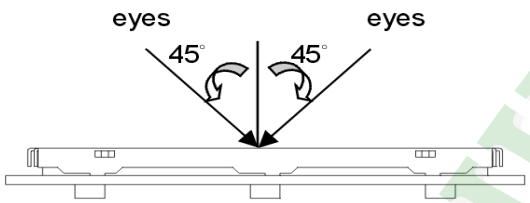
◆OUT Going Defect Level: Sampling

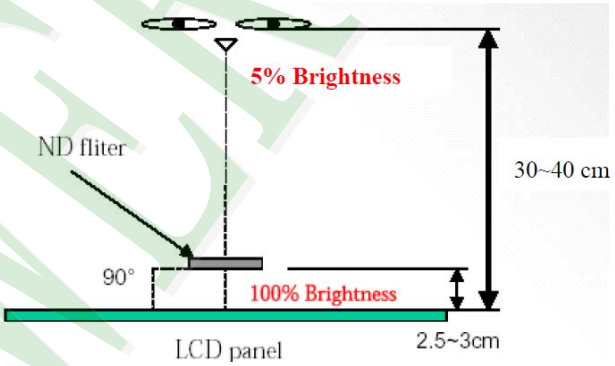
◆Standard of the product appearance test:

a. Manner of appearance test:

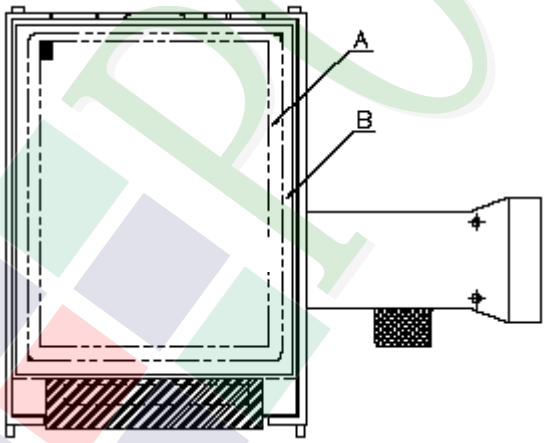
(1). The test best be under 20W×2 fluorescent light(about 300lux ～500lux) and distance of view must be at 30~40 cm.

(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)

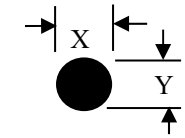
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1 The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2.1 The 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>4.6 Mura 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)

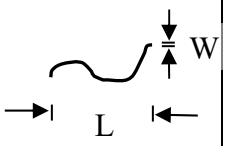
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q’ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 4</td></tr>
<tr><td>Dark Dot</td><td>≦ 5</td></tr>
<tr><td>Joint Dot</td><td>≦ 3</td></tr>
<tr><td>Total</td><td>≦ 7</td></tr>
</table>
5.1 Inspection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

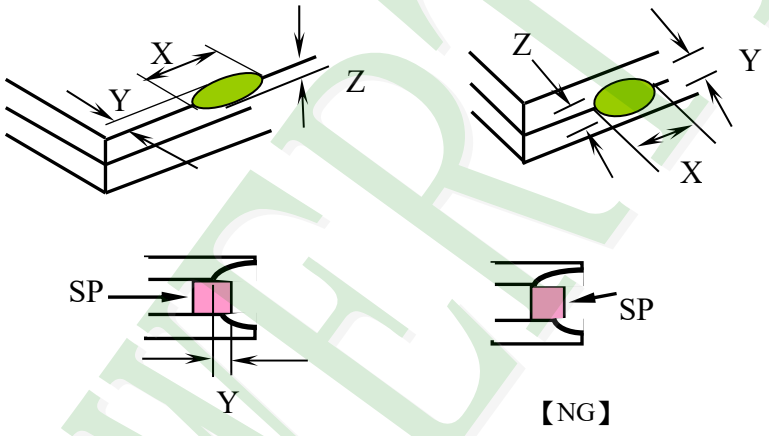
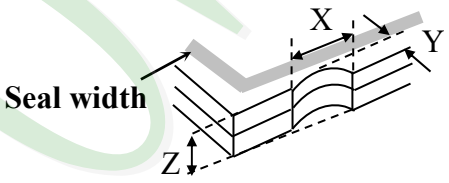
◆Specification For TFT-LCD Module 3.5″ ~15″ : (Ver.B01)

<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>

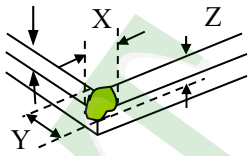
NO	Item	Criterion	Level
08	The crack of glass	Symbols： X: The length of crack Y: The width of crack. Z: The thickness of crack W: terminal length T: The thickness of glass a : LCD side length 8.1 General glass chip: 8.1.1 Chip on panel surface and crack between panels:  	Minor

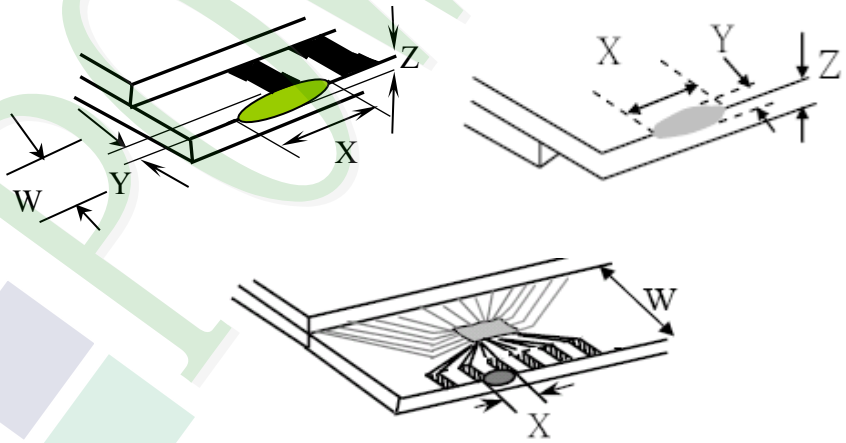
X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦a	Crack can't exceed the half of SP width.	1/2 t ＜ Z ≦2 t

◆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
Z: The thickness of crack
t: The thickness of glass
Y: The width of crack.
W: terminal length
a: LCD side length

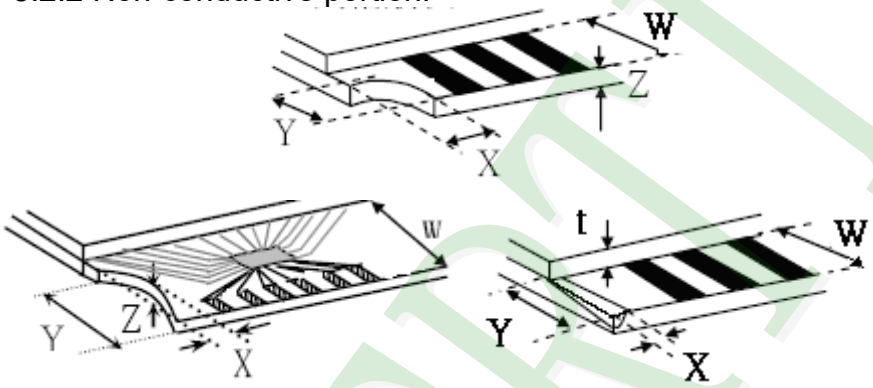
8.1.2 Corner crack:
 

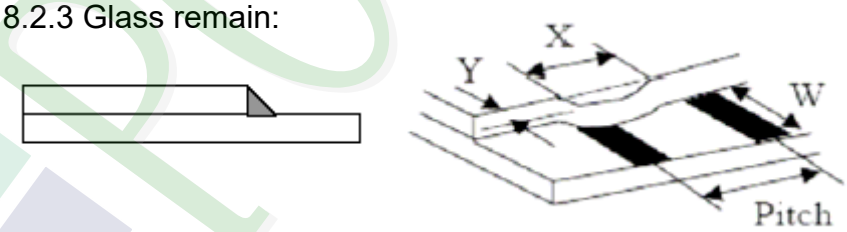
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t ＜ Z ≦ 2 t</td></tr>
</table></td><td></td></tr>
<tr><td>8.2 Protrusion over terminal:
8.2.1 Chip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

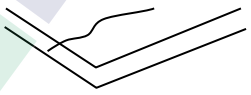
<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table></td><td>Minor</td></tr>
</table>

<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: 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 +/-
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>

◎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：+20~30°C
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.

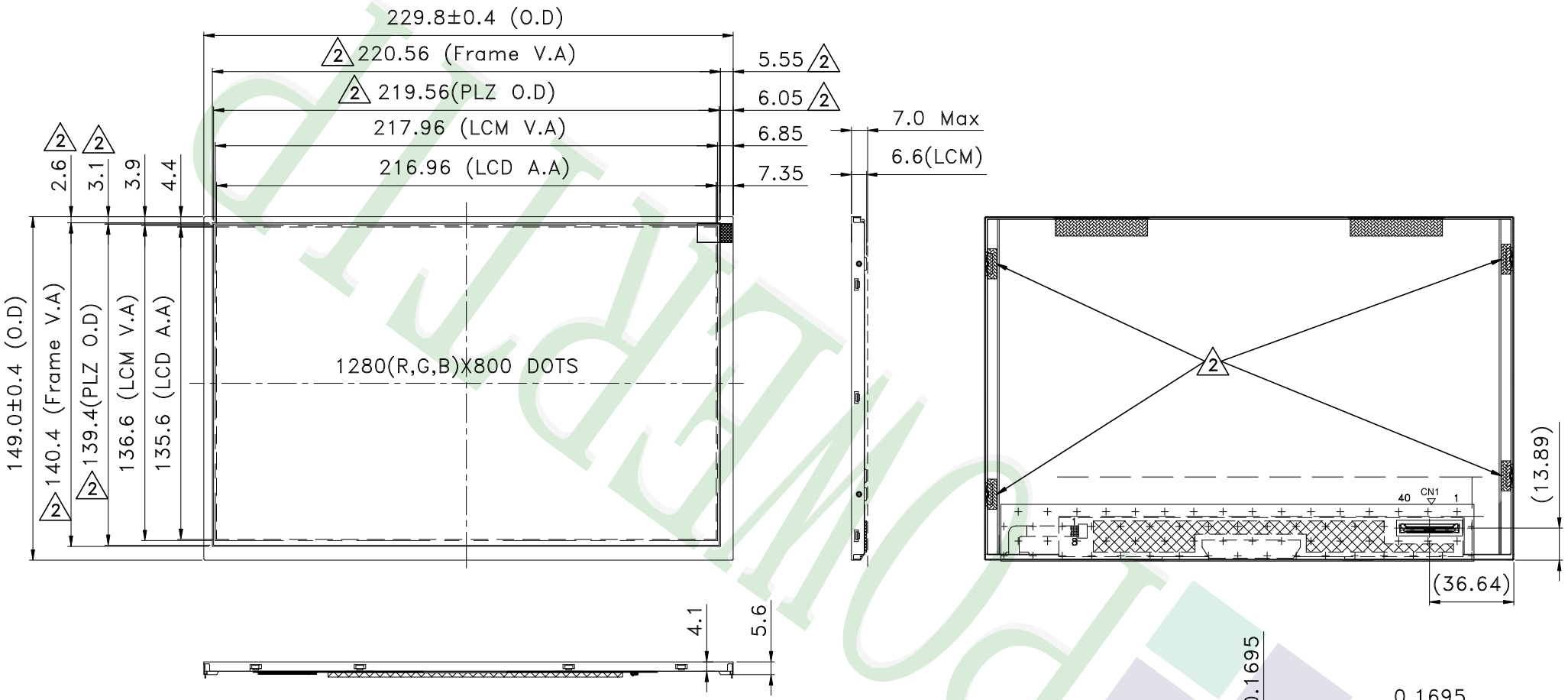
5.3.2 Do not place the module near organics solvents or corrosive gases.

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: TFT
2.LCD DISPLAY: Normally Black/Transmissive
3.The tolerance unless classified ±0.3mm
4. ▨ Component Area; ▩ Insulating Tape; ▨ Shading tape;
5.CN1 connector : Starconn 300E40-0010RA-G3 (0.5pitch ; 40pin) or compatible

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002	Modify Dimension and Add Shading tape	Clare	2023/5/24
001	NEW DRAWING	Clare	2022/11/28

PART NO: PH128800T006-ZFA

DRAWING NAME : LMD-PH128800T006-ZFA

TITLE: LCD MODULE DRAWING

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

Design	Clare	(3)	Surface		
Check	Tina	Unit	MM	Material	
Approve	Bright	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	-

Ver.002

Documents NO.	PKG-PH128800T006-ZFA

Packaging Specifications

Approve	Check	Contact
Bright	Tina	Clare

1.包裝材料規格表(Packaging Material) : (per carton) 2

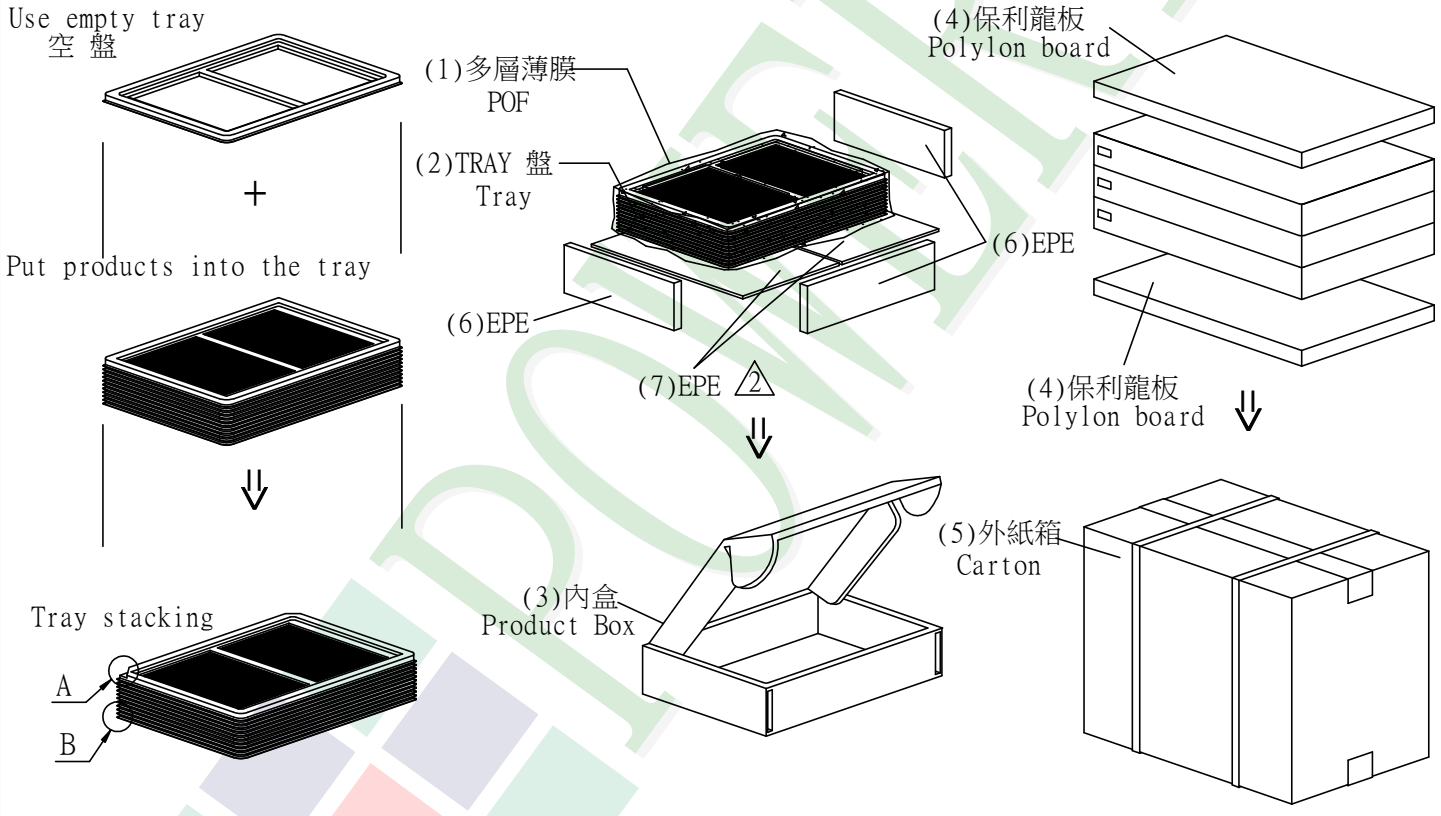
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCD)	PH128800T006-ZFA	229.8 X 149.0	0.2828	2 18	5.0904
2	多層薄膜(1)POF	OTFILM0BA03ABA	————	——	3	——
3	TRAY 盤 (2)Tray	TYSG000000687	517 X 377 X 17.3	0.19	2 12	2.28
4	內盒(3)Product Box	BX00000000071	558 X 393 X 68	0.6	3	1.8
5	保利龍板(4)Polylon 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	EPE(6)EPE	OTFOAMEP0003BA	333 X 218 X 10	0.022	3	0.066
8	EPE(7)EPE	FOAM000000047 2	350 X 255 X 5	0.011	6	0.066
9						

2.一 整箱總重量 (Total LCD Weight in carton) : 10.36 Kg±10% 2

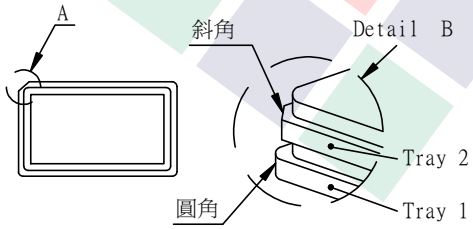
3.單箱數量規格表(Packaging Specifications and Quantity) :

(1)LCD quantity per box : no per tray 2 x no of tray 3 = 6

(2)Total LCD quantity in carton : quantity per box 6 x no of boxes 3 = 18



特 記 事 項 (REMARK)



1. 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.

2.OTFOAMEP0003BA可裁 4 PCS:
尺寸 333.0 X 54.5mm
2.OTFOAMEP0003BA cut 4 PCS:
Size: 333.0 X 54.5mm