POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH128800T008-ZHA
MASS PRODUCTION CODE	:	PH128800T008-ZHA
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	LMD-PH128800T008-ZHA (Ver.002)
PACKAGING NO. (Ver.)	:	PKG-PH128800T008-ZHA (Ver.001)

Customer Approved

Date:

Approved	Checked	Designer
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POWERTIP
2024.05.07
TW RD APR

☐ Preliminary specification for design input

■ Specification for sample approval

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History of Version

Date	Ver.	Edi.	Description	Page	Design by
12/12/2023	01	001	Preliminary.	-	Yuan
04/30/2024	01	002	First Sample Modify Mechanical Specifications Modify Optical Characteristics Modify Backlight Characteristics Modify Reliability Test Condition Modify Drawing	- 4 6 9 27 Appendix	Yuan

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Screen Size(Inch)	12.1(Diagonal)
Resolution	1280* (R、G、B) * 800 Dots
Display Mode	Full Viewing Angle、Transmissive、Normally Black
Color	16.7M
Weight	395g
Interface	8 bit 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	277.7(W) * 180.6(L) * 9.5(H)	mm

LCD Panel

Item	Standard Value	Unit
View Area	264.12(W) * 166.2(L)	mm
Active Area	261.12(W) * 163.2(L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Logic Supply Voltage	V_{DD}	GND=0V	-0.3	3.6	V	-
Operating Temperature	T_{OP} (Ts)	Note 1	-20	+70	°C	
Storage Temperature	T_{ST} (Ta)	Note 2	-30	+80	°C	
Storage Humidity	H_D	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

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage for LCD Driver	VDD	-	3.0	3.3	3.6	V
Power Supply Current	IDD	VDD=3.3V	-	300	450	mA

1.5 Optical Characteristics

TFT LCD Panel VDD=3.3V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	-
Response Time		Tr + Tf	-	-	30	35	ms	Note2
Viewing Angle	Top	ΘY+	CR ≥ 10	-	85	-	Deg.	Note4
	Bottom	ΘY-		-	85	-		
	Left	ΘX-		-	85	-		
	Right	ΘX+		-	85	-		
Contrast Ratio		CR	Ta = 25°C θX , θY = 0°	1000	1200	-	-	Note3
Color of CIE Coordinate	White	X		0.25	0.30	0.35	-	Note1
		Y		0.29	0.34	0.39		
	Red	X		0.59	0.64	0.69		
		Y		0.29	0.34	0.39		
	Green	X		0.24	0.29	0.34		
		Y		0.57	0.62	0.67		
	Blue	X		0.09	0.14	0.19		
		Y		0.01	0.06	0.11		
Average Brightness Pattern=white display (With LCD)*2		IV	If=300mA	850	1000	-	cd/m2	Note1
Luminance Uniformity (With LCD)*1		△B	If=300mA	70	-	-	%	Note1

Note 1:

*1: △B=B(min) / B(max) * 100%

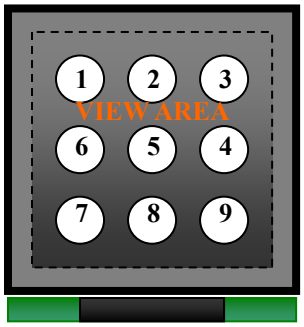
*2: Measurement Condition for Optical Characteristics:

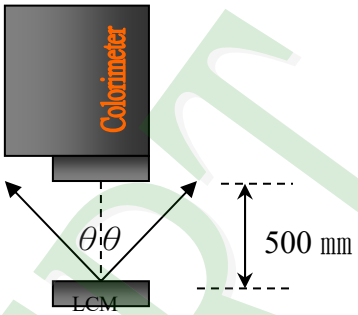
a: Environment: 25℃±5℃ / 60±20%R.H, no wind, dark room below 10 Lux at typical lamp current and typical operating frequency

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)

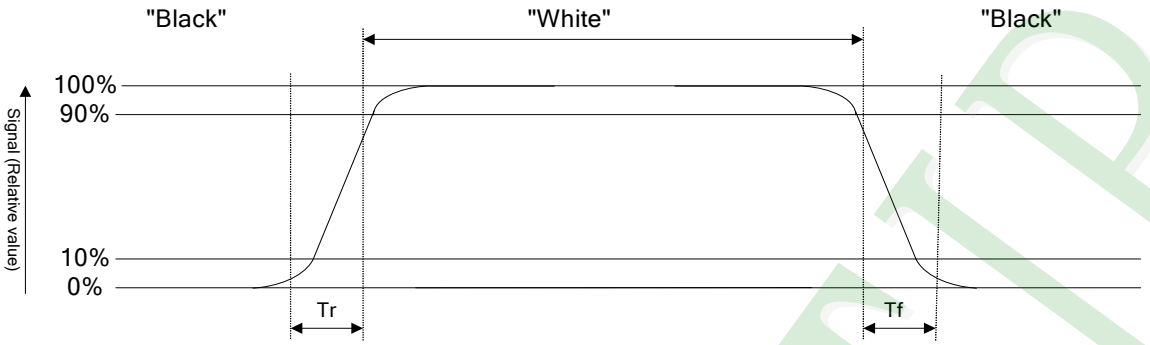
Note 2: Definition of response time:

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



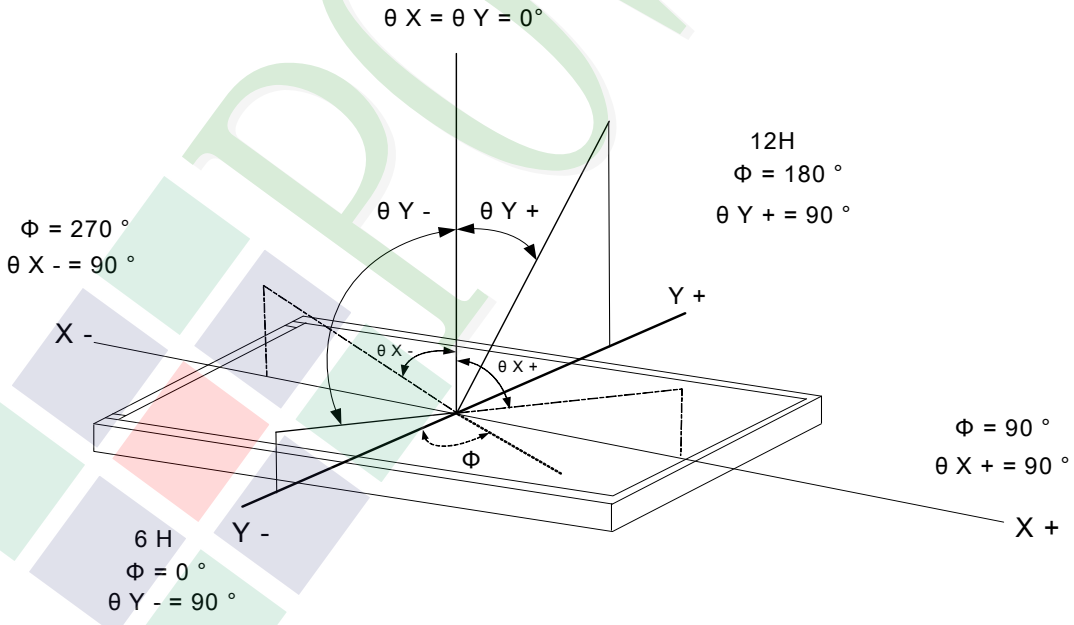
Note 3: Definition of contrast ratio:

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

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	If=300mA	29.7	33.0	36.3	V
Uniformity *1	△B		70			
Color	White					

*1：This value will be changed while mass production.

*2：△B=B(min) / B(max)%

B/L Internal Circuit Diagram

Other Description

Item	Conditions	Description
Life Time	Ta =25℃ If= 300 mA	30000 hrs

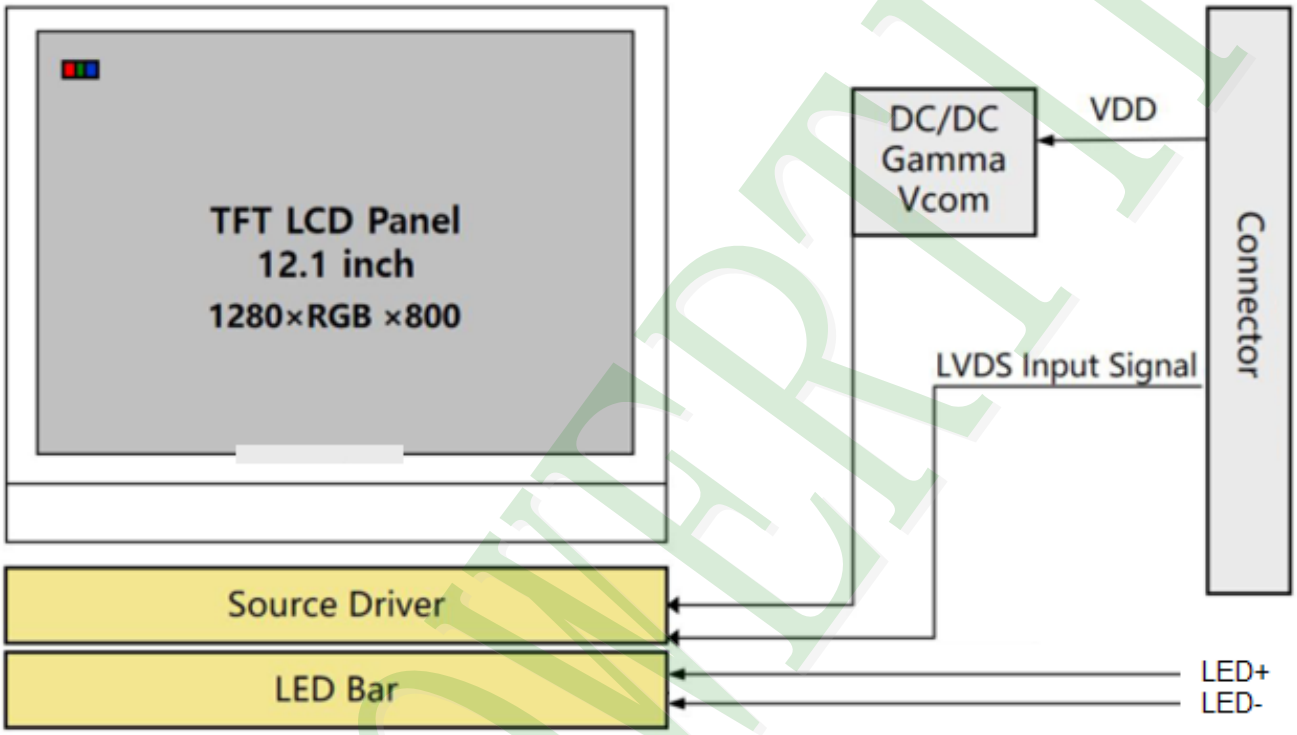
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

LCM Interface

Pin No.	Symbol	Description
1	NC	No Connection.
2	VDD	Power Supply.
3	VDD	Power Supply.
4	VDD	Power Supply.
5	NC	No Connection.
6	GND	Ground.
7	GND	Ground.
8	RIN0-	-LVDS Differential Data Input.
9	RIN0+	+LVDS Differential Data Input.
10	GND	Ground.
11	RIN1-	-LVDS Differential Data Input.
12	RIN1+	+LVDS Differential Data Input.
13	GND	Ground.
14	RIN2-	-LVDS Differential Data Input.
15	RIN2+	+LVDS Differential Data Input.
16	GND	Ground.
17	LVDS_CLK-	-LVDS Differential Clock Input.
18	LVDS_CLK+	+LVDS Differential Clock Input.
19	GND	Ground.
20	RIN3-	-LVDS Differential Data Input.
21	RIN3+	+LVDS Differential Data Input.
22	GND	Ground.
23	NC	No Connection.
24	NC	No Connection.
25	GND	Ground.
26	SDA	Serial data input/output for I2C interface
27	SCL	Clock input for I2C interface

Pin No.	Symbol	Description
28	GND	Ground.
29	NC	No Connection.
30	NC	No Connection.
31	GND	Ground.
32	GND	Ground.
33	GND	Ground.
34	NC	No Connection.
35	NC	No Connection.
36	NC	No Connection.
37	NC	No Connection.
38	NC	No Connection.
39	NC	No Connection.
40	NC	No Connection.

CN1 : LED Backlight Interface

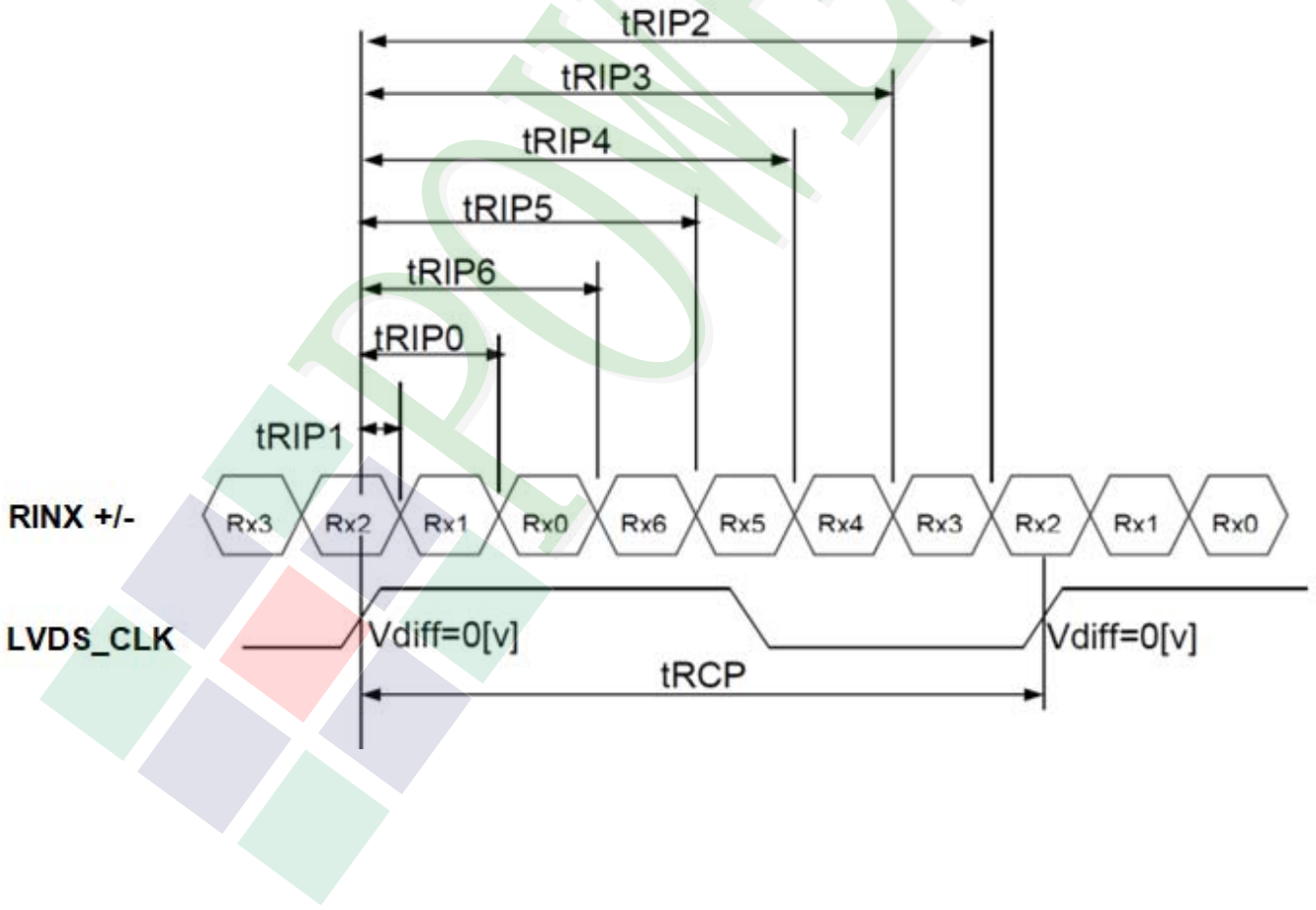
Pin No.	Symbol	Description
1	LED+	Power Supply for LED Backlight anode input
2	LED-	Power Supply for LED Backlight cathode input

2.3 Timing Characteristics

2.3.1 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LVDS_CLK Period	tRCP	10	T	40	nsec	-
Receiver Data Input Margin	tRMG	-0.45	-	+0.45	nsec	fCLKIN=80.9MHz
		-0.60	-	+0.60	nsec	fCLKIN=75MHz
Input Data 0	tRIP1	- | tRMG |	0.0	+ | tRMG |	Clock	-
Input Data 1	tRIP0	T/7- | tRMG |	T/7	T/7+ | tRMG |	Clock	-
Input Data 2	tRIP6	2 T/7- | tRMG |	2T/7	2 T/7+ | tRMG |	Clock	-
Input Data 3	tRIP5	3 T/7- | tRMG |	3T/7	3 T/7+ | tRMG |	Clock	-
Input Data 4	tRIP4	4 T/7- | tRMG |	4T/7	4 T/7+ | tRMG |	Clock	-
Input Data 5	tRIP3	5 T/7- | tRMG |	5T/7	5 T/7+ | tRMG |	Clock	-
Input Data 6	tRIP2	6 T/7- | tRMG |	6T/7	6 T/7+ | tRMG |	Clock	-

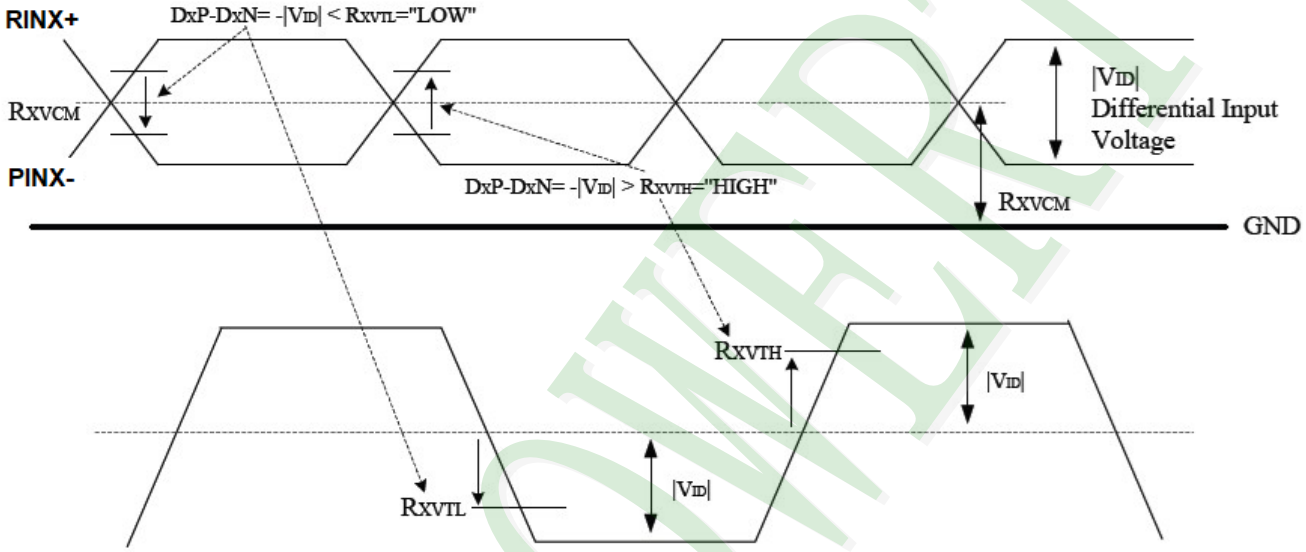


2.3.2 DC Specification

LVDS Receiver Differential Input (DC Characteristics).

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
Differential Input Voltage	$\|V_{ID}\|$	200	-	600	mV	-
Common Mode Voltage	V_{CM}	1	1.2	1.4	V	-

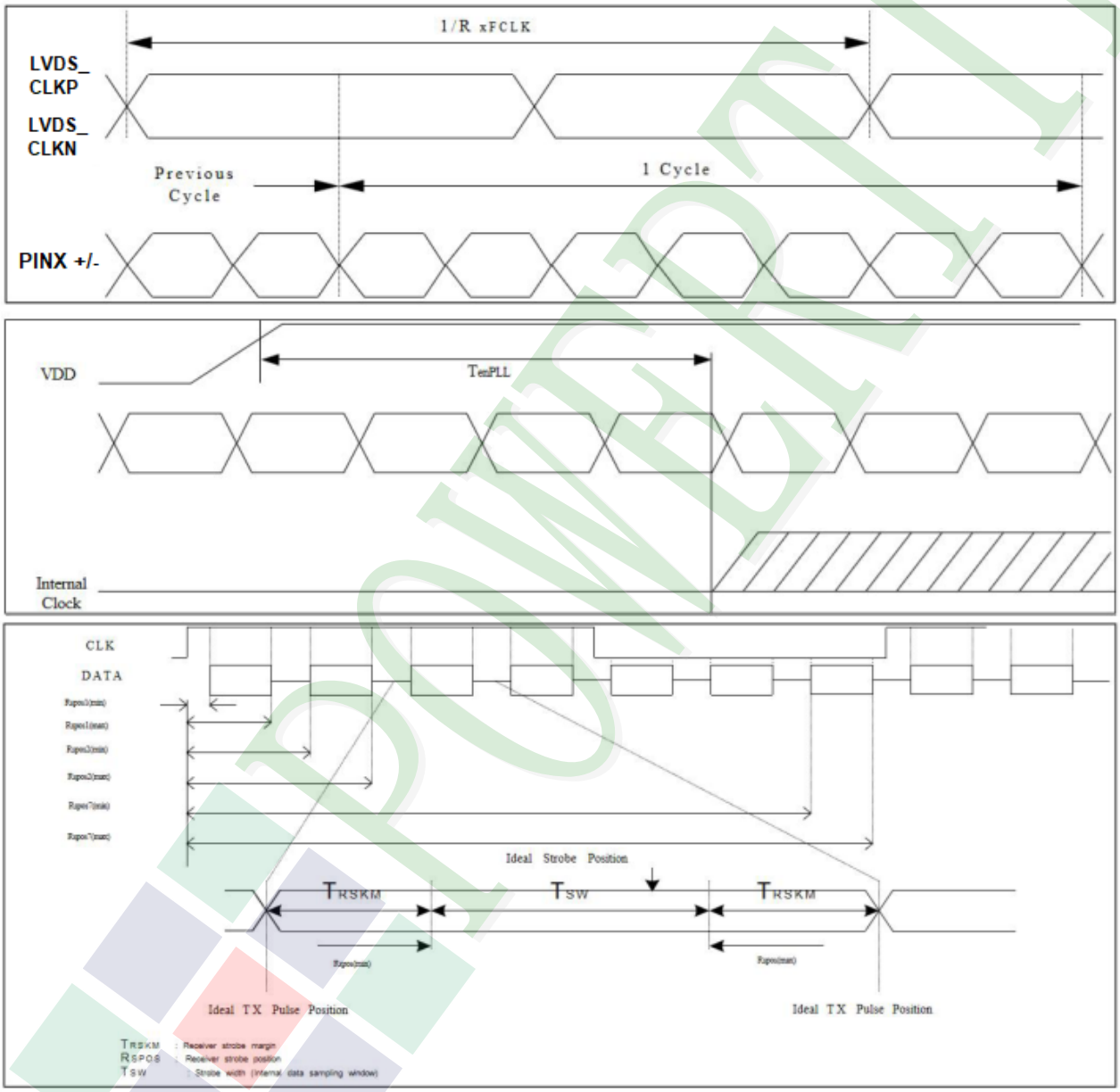
Single-end Signals



2.3.3 AC Specification

LVDS Receiver Differential Input (AC Characteristics)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Strobe Width	tSW	200	-	-	ps	V_{CM}=+1.2V VID = 200mV @81MHz
LVDS Receiver Skew Margin	tRSM	500	-	-	ps	



2.3.4 Input Timing (DE mode only)

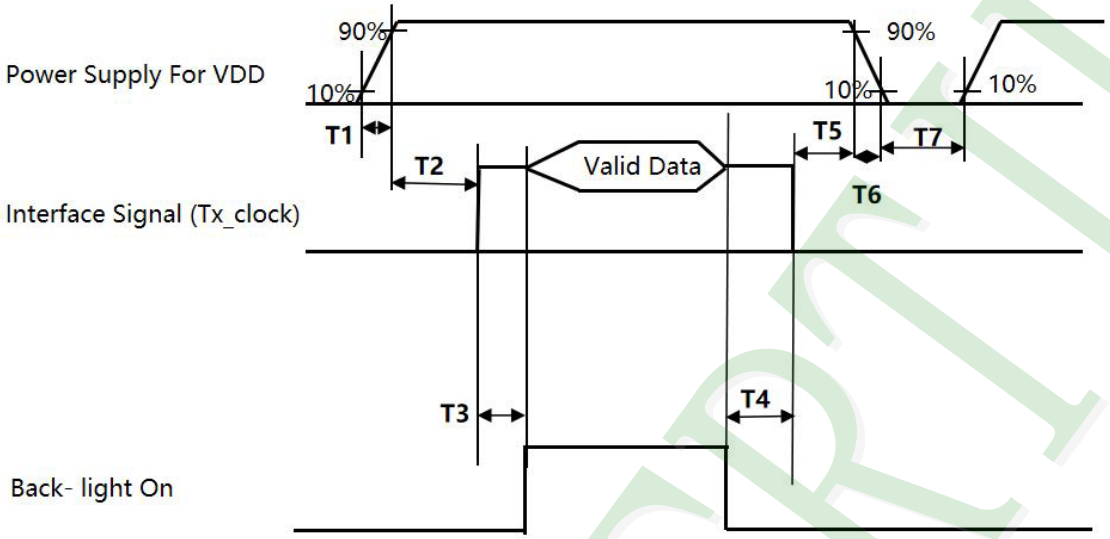
Parameter	Symbol	Min.	Typ.	Max.	Unit
LVDS Frequency@Frame rate=60Hz	Fclk	69.7	75	80.9	MHz
Horizontal display area	THD		1280		DCLK
HSYNC period time	TH	1410	1440	1500	DCLK
HSYNC blanking	THBP+THFP	100	160	220	DCLK
Vertical display area	TVD		800		H
VSYNC period time	TV	842	838	872	H
VSYNC blanking	TVBP+TVFP	24	38	72	H

Note

1. DE Only Mode ， While operation, DE signal should be have the same cycle. The input of HSYNC & VSYNC signal does not have an effect on normal operation.
2. Best operation clock frequency is 75Mhz.
3. Frequency] = [H Total] * [V Total] * [vertical Frame rate]
   H Total, V Total and Frame rate]should operate within the range between Frequency_ Min and Frequency_Max
4. Except Best operation clock frequency, FOS(Flicker & Brightness & Crosstalk, Etc.) are not guaranteed.
5. Main frequency Max is 80.9Mhz MHz without spread spectrum

2.3.4 Power ON/OFF Sequence

To prevent a latch-up or DC operation of the Open Cell, the power on/off sequence shall be as shown in below



Parameter	Min.	Typ.	Max.	Unit
T1	0.1	-	10	ms
T2	0.1	-	50	ms
T3	300	-	-	ms
T4	200	-	-	ms
T5	0.1	-	50	s
T6	0.1	-	10	ms
T7	500	-	-	ms

Note 1: Even though T1 is over the specified value, there is no problem if the rush current is within Spec.

Note 2: When the power supply VDD is 0V, keep the level of input signals on the low or high impedance;

※ Please avoid floating state of interface signal at invalid period.

※ When the power supply for LCD (VDD) is off, be sure to pull down the valid and invalid data to 0V.

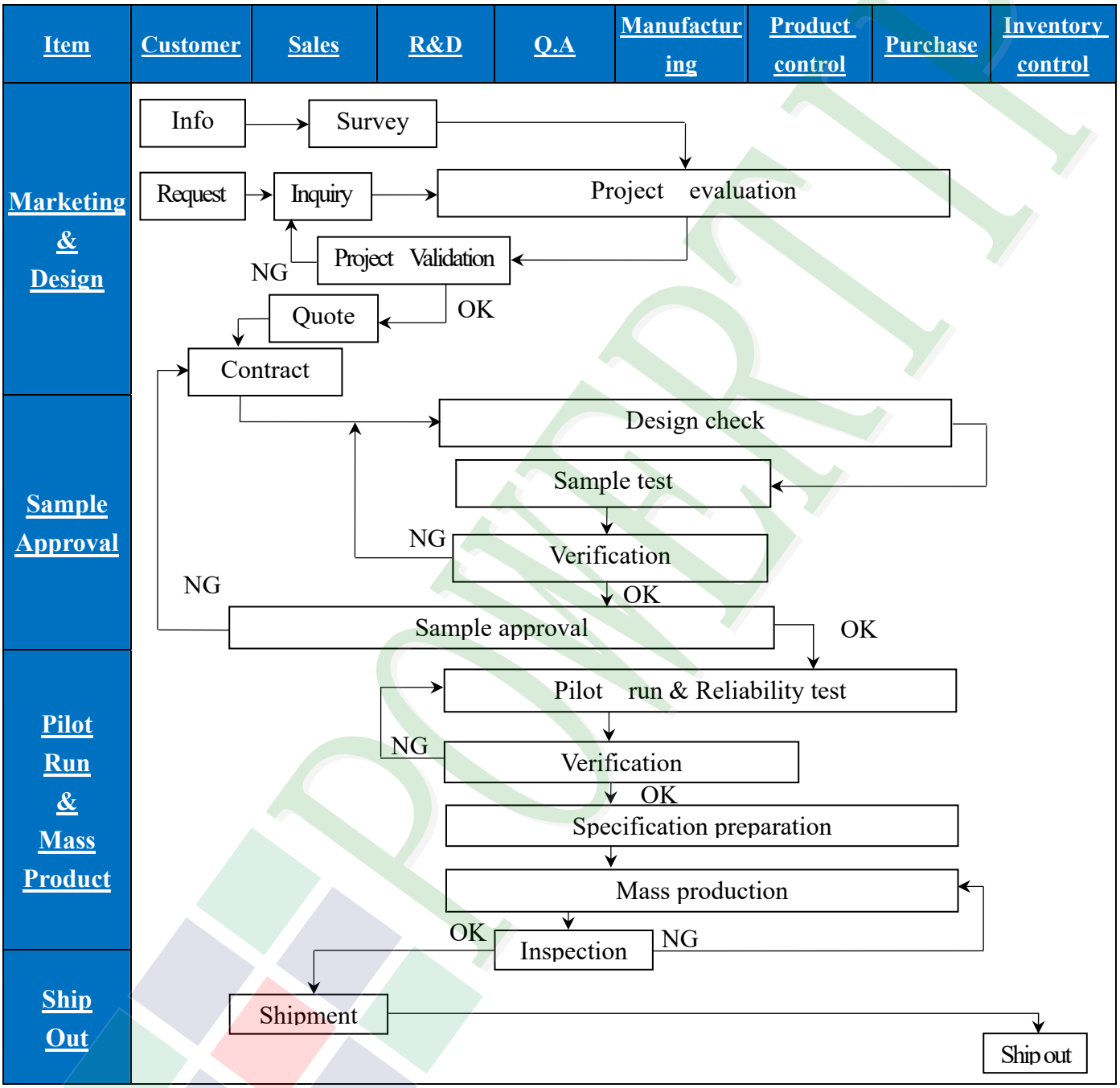
Note 3: The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.

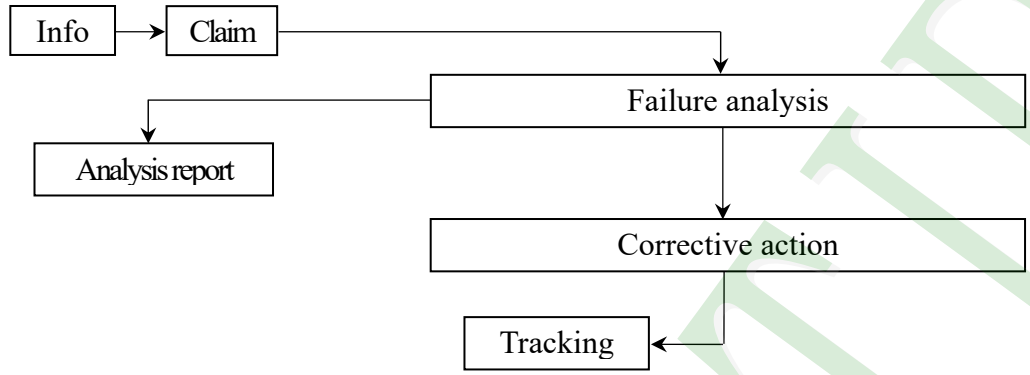
Note 4: T6: Voltage of VDD must decay smoothly after power-off , there should be none re-bounding voltage. (customer system decide this value)

Note 5: T7 should be measured after the Module has been fully discharged between power off and on period

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

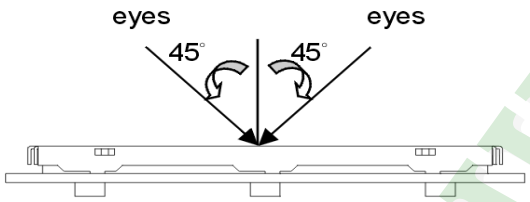
◆ OUT Going Defect Level: Sampling.

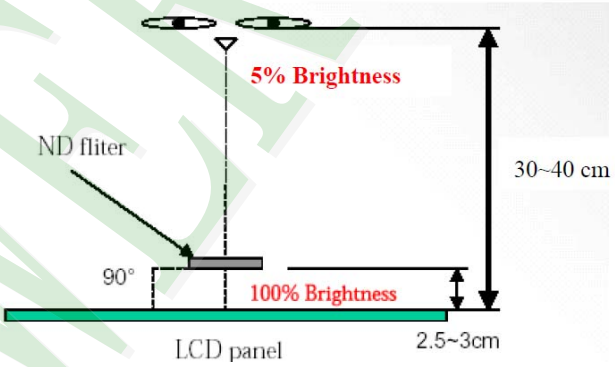
◆ Standard of the product appearance test:

a. Manner of appearance test:

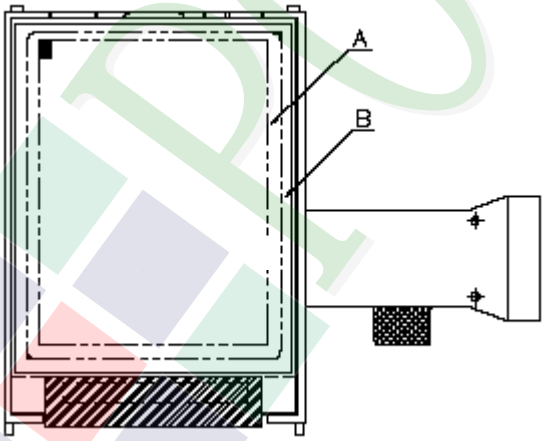
(1). The test best be under 20W×2 fluorescent light(about 300lux ～500lux) , and distance of view must be at 30~40 cm.

(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)

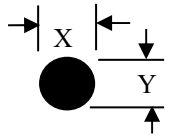
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3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

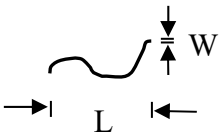
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q’ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 4</td></tr>
<tr><td>Dark Dot</td><td>≦ 5</td></tr>
<tr><td>Joint Dot</td><td>≦ 3</td></tr>
<tr><td>Total</td><td>≦ 7</td></tr>
</table>
5.1 Inspection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

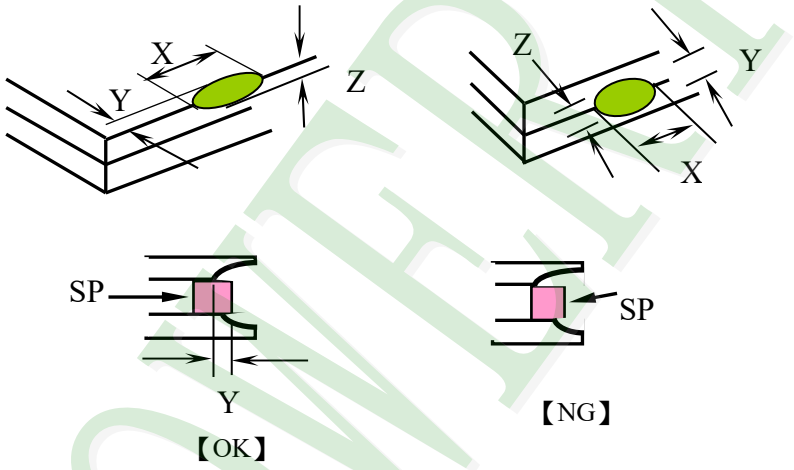
Round type
 

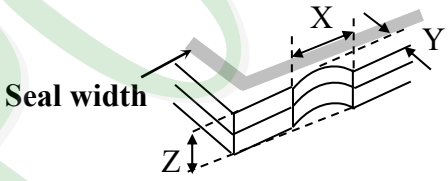
Φ= (x+y) / 2

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="5">9" to 15"</td><td>---</td><td>W ≦ 0.05</td><td>Ignore</td><td rowspan="5">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>

<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

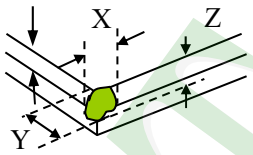
8.1 General glass chip:
8.1.1 Chip on panel surface and crack between panels:


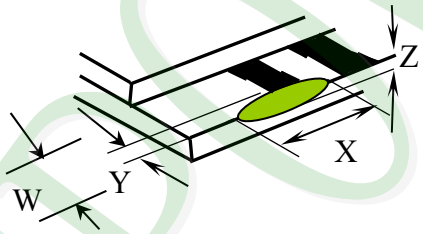


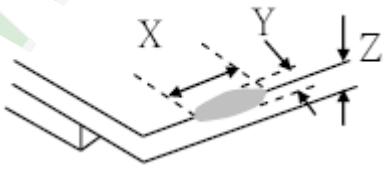
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>Crack can’t enter viewing area</td><td>≦1/2 t</td></tr>
<tr><td>≦a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t ＜ Z ≦2 t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

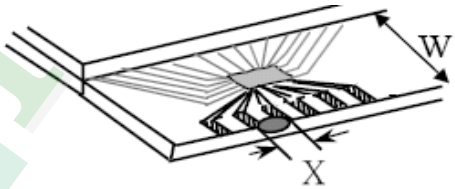
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="2">08</td><td rowspan="2">The crack of glass</td><td>
Symbols：

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></td></tr>
<tr><td>
8.2 Protrusion over terminal:
8.2.1 Chip on electrode pad:


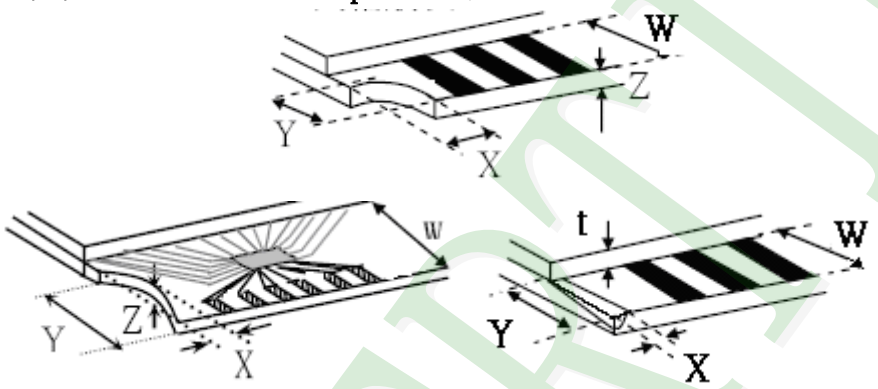


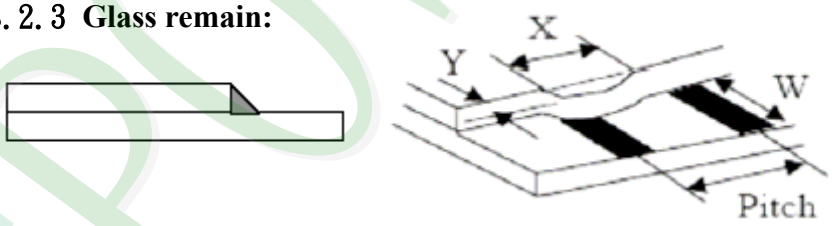


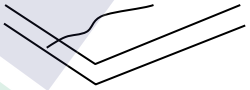
<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

<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>High Temperature Operating Test</td><td>Keep in 70 ±5℃ 240 hrs</td></tr>
<tr><td>3</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±5℃ 240 hrs</td></tr>
<tr><td>4</td><td>Low Temperature Operating Test</td><td>Keep in -20 ±5℃ 240 hrs</td></tr>
<tr><td>5</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>6</td><td>Temperature Cycling Storage Test</td><td>-30℃ → +25℃ → 80℃ → +25℃
(30mins) (5mins) (30mins) (5mins)
20 Cycle</td></tr>
<tr><td rowspan="2">7</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>8</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>9</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.

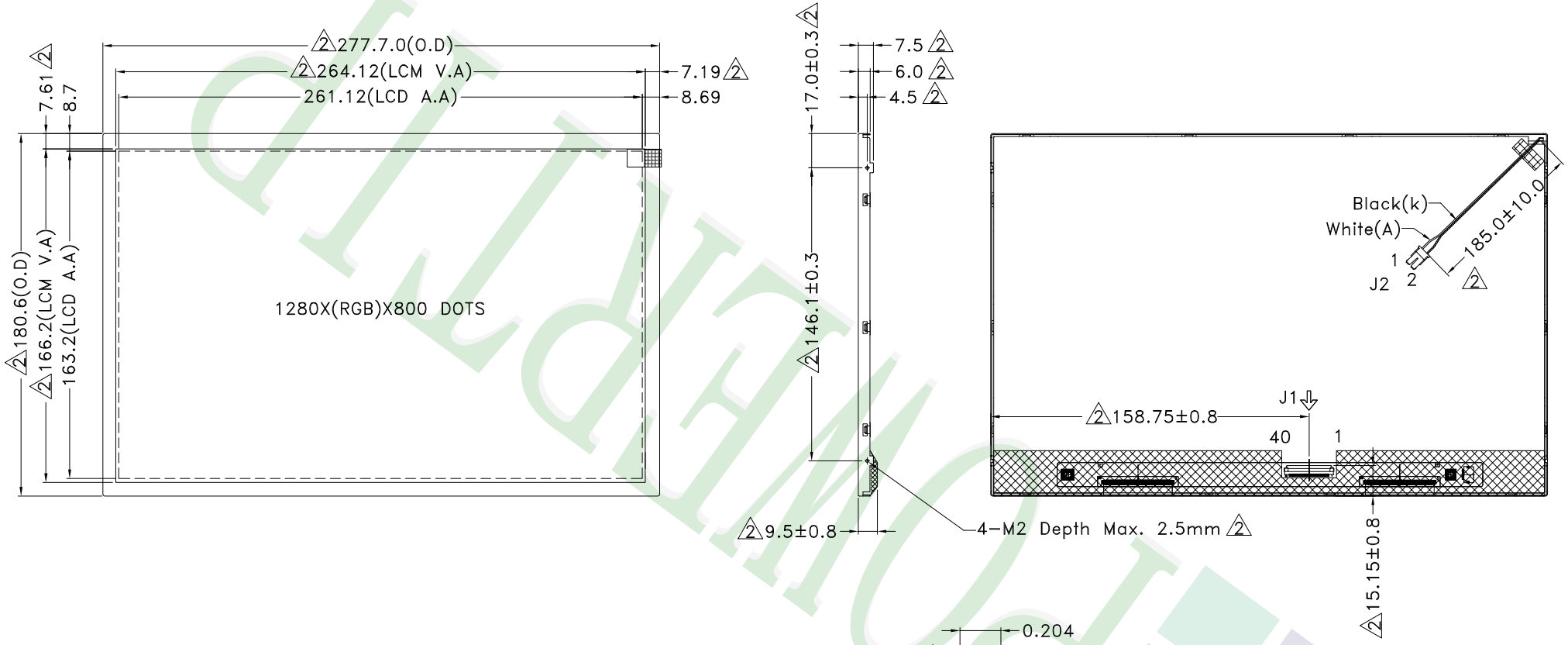
5.3.2 Do not place the module near organics solvents or corrosive gases.

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.



DOTS DETAIL
SCALE: 100/1

NOTE:
1.LCD TYPE: TFT LCD
2.LCD DISPLAY:Normally Black/TRANSMISSIVE
3.VIEW DIRECTION:FULL VIEWING ANGLE
4.The tolerance unless classfle ±0.5mm
5.J1: JS AFC01-S40FCA-00 (0.5pitch ; 40pin) or compatible
6.J2: JST BHSR-02VS-1 or compatible

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002	MODIFY DRAWING	Stone	2024/04/10
001	NEW DRAWING	Stone	2023/12/11

PART NO: PH128800T008-ZHA
DRAWING NAME : LMD-PH128800T008-ZHA
TITLE: LCD MODULE DRAWING

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

Design	Stone	(3)	Surface		
Check	Rex	Unit	MM	Material	
Approve	Rex	Scale	1:1	Thickness	
		Page	1/1	Quantity	

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

PT-A-054-0

Ver.001					
Documents NO.	PKG-PH128800T008-ZHA	Packaging Specifications	Approve	Check	Contact
			Rex	Rex	Stone

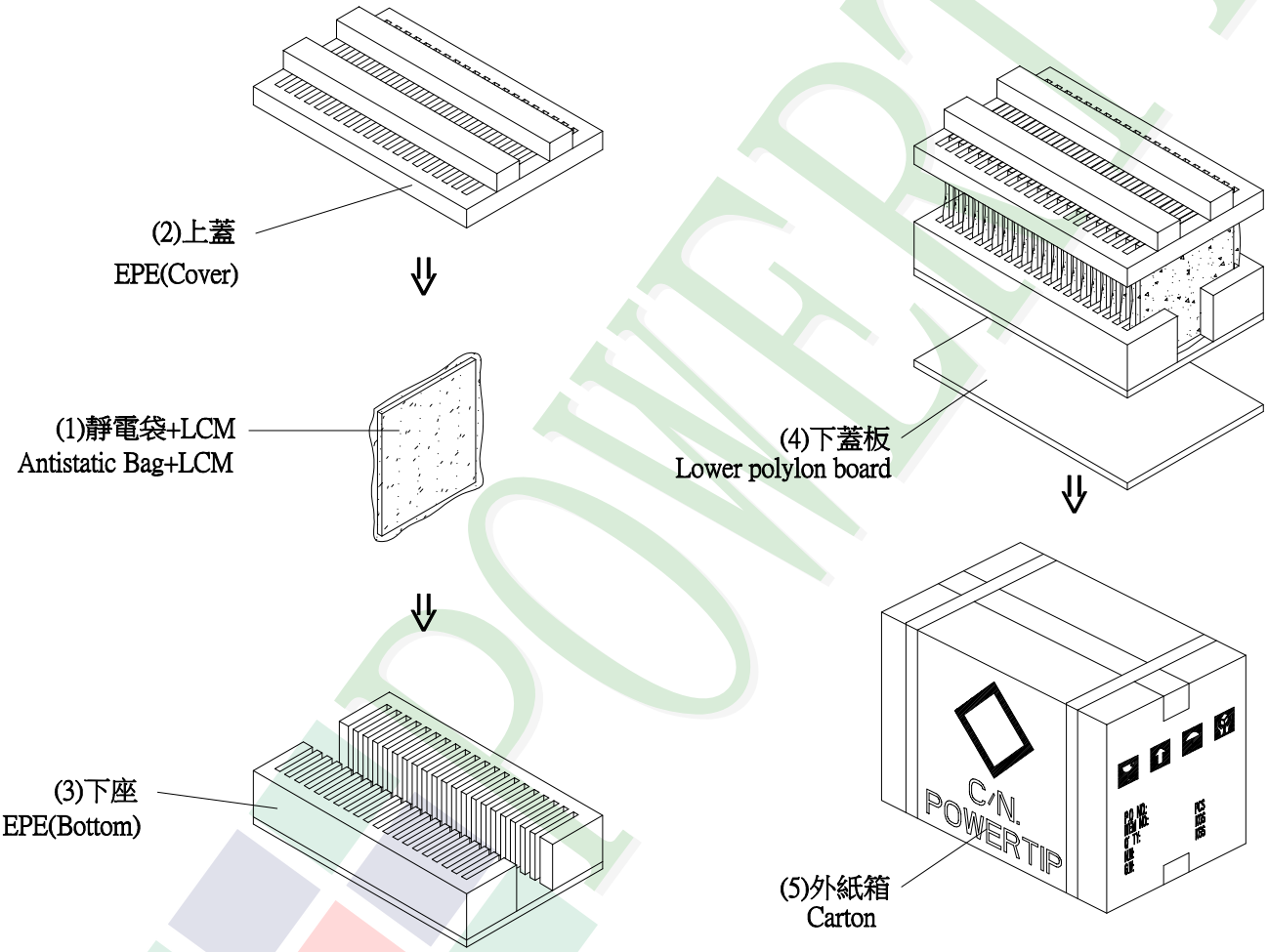
1.Packaging Material : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH128800T008-ZHA	277.7 X 180.6	0.395	18	7.11
2	靜電袋(1)Antistatic Bag	BAG0000000021	240 X 300	0.008	18	0.144
3	上蓋(2)EPE(Cover)	FOAM000000197	510 X 355 X 55	0.16	1	0.16
4	下座(3)EPE(Bottom)	FOAM000000198	510 X 355 X 100	0.34	1	0.34
5	下蓋板(4)Lower polylon board	OTPLB00PL01ABA	500 X 360 X 10	0.012	1	0.012
6	外紙箱(5)Carton	BX53537327CCBA	535 X 373 X 265	1.1624	1	1.1624

2.一 整箱總重量 (Total LCD Weight in carton) : 8.93 Kg±10%

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

Total LCM quantity in carton : quantity per EPE 18 x no of EPE 1 = 18



特 記 事 項 (REMARK)