

# SPECIFICATION FOR LCD MODULE

**MODULE NO: YB-TG800480S28A-N-A0**

**Doc.Version:02**

Customer Approval:

<input type="checkbox"/> Accept	<input type="checkbox"/> Reject
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YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer	張晉輝	2017.8.10
Check	Mechanical Engineer	陳偉章	2017.8.10
Verify		蔡志凱	2017.8.10
Approval		John	2017.8.10

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D



## **2. Table of Contents:**

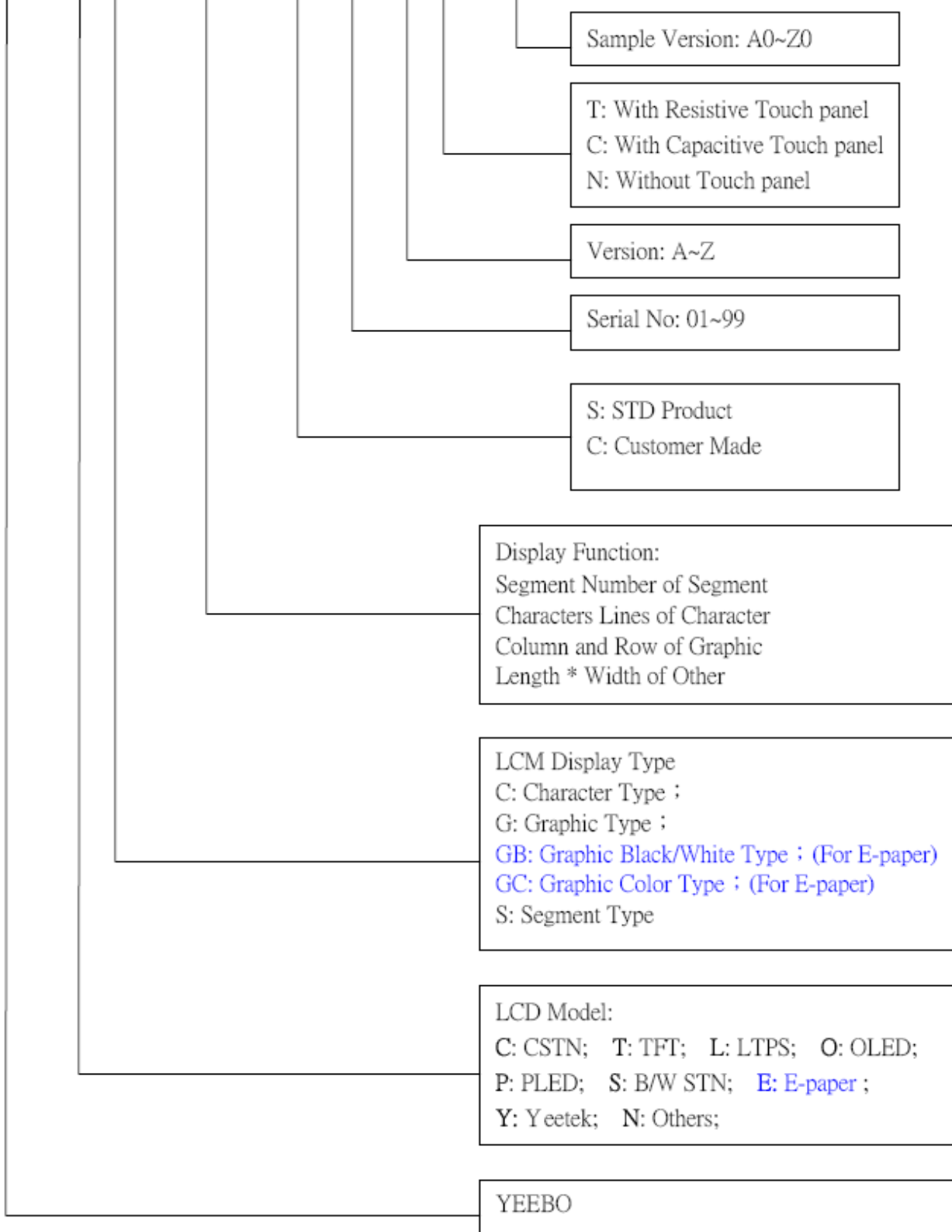
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### 3. Module Numbering System:

(Example)

**YB-TG240320S01D-T-A0**

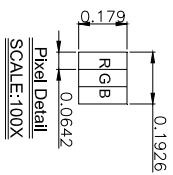
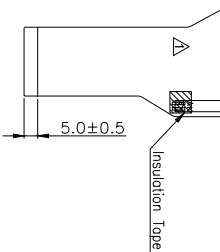
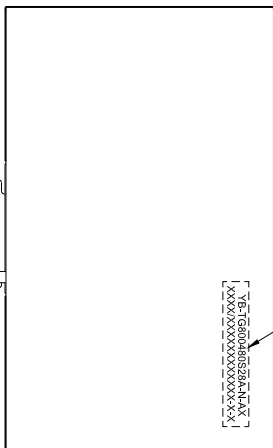
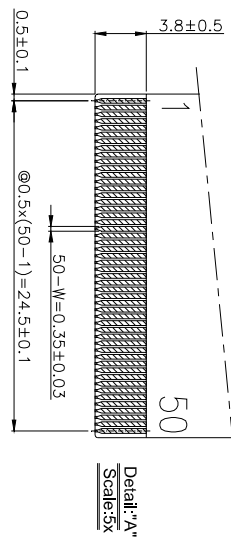
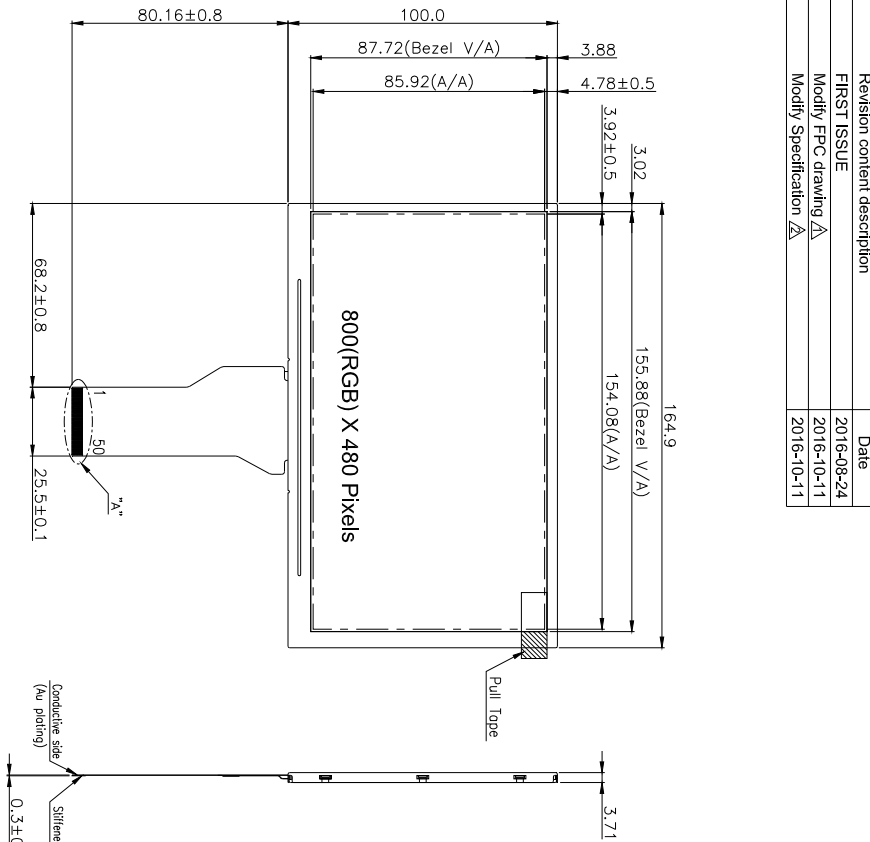


#### **4. General Specification:**

ITEM	CONTENTS
Module Size	164.9 (W) * 100.0 (H) * 3.71(T) mm
Module Size(With FPC)	164.9 (W) * 180.16 (H) * 3.71(T) mm
Display Size (Diagonal)	7.0 inch
Display Format	800(RGB)* 480 Pixels
Active Area	154.08 (W) * 85.92 (H) mm
Dots Pitch	0.1926 * 0.179 mm
LCD Type	TFT (16.7M)/ Transmissive / Normal White
View Angle (Gray Inversion)	6 O'clock
The Best Viewing Direction	12 O'clock
Controller IC	ST5091CA & ST5623CA or Compatible
Weight	121.2g

## 5. LCM drawing:

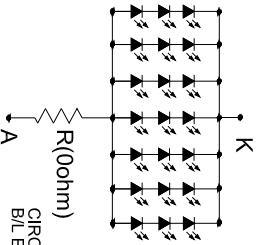
Count drawing & Spec.revision record during discussion with customer		Date
Rec.	Revision content description	
#1	FIRST ISSUE	2016-08-24
#2	Modify FPC drawing	2016-10-11
#3	Modify Specification	2016-10-11




### JET-INK CODE NOTES:

YB-TG800480S28A-N-A-X --- Yeabo P/N.  
XXXXXXXXXXXXXXXXXXXXX-X  
LOT NO. \_\_\_\_\_  
Production Year and week \_\_\_\_\_

- Specification:
1. Display mode: 7.0" TFT/ Transmissive/Normal white
  2. Color depth: 16.7M Colors
  3. Viewing Direction (Gray Inversion): 6 o'clock
  4. Operating temperature: -20°C to +70°C
  5. Backlight: LED White (X21)
  6. Controller IC: ST15091CA & ST15623CA or Compatible
  7. Unspecified tolerance: ±0.30mm.
  8. ROHS compliant



CIRCUIT DIAGRAM  
B/L Electrical Circuit

		UNIT	SIZE	SCALE	DESIGNED	CHECKED	VERIFIED	APPROVED	FILE NAME
		mm	A4	N:1-S	張豐亭 2017-08-10				Count Dwg.
MOD. Name	YB-TG800480S28A-N-A		Sheet	1					
DESIGNED	張豐亭 2017-08-10		Of	1					

## 6. Electrical Characteristics

### 6-1 Absolute Maximum Ratings

TFT IC Parameter ( ST5623CA & ST5091CA)

(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Power Supply voltage	DVDD	-0.3		5.0	Volt	
	VDDA	-0.5	-	13.5	Volt	
	VGH	-0.3		42	Volt	
	VGL	VGG-42		-0.3	Volt	
	VGH-VGL	-0.3	-	40	Volt	DVDD =3.3V
Operating Temperature	Topr	-20	-	+70	°C	
Storage Temperature	Tstg	-30	-	+80	°C	

### 6-2 Operating Conditions

TFT IC Parameter (ST5623CA & ST5091CA)

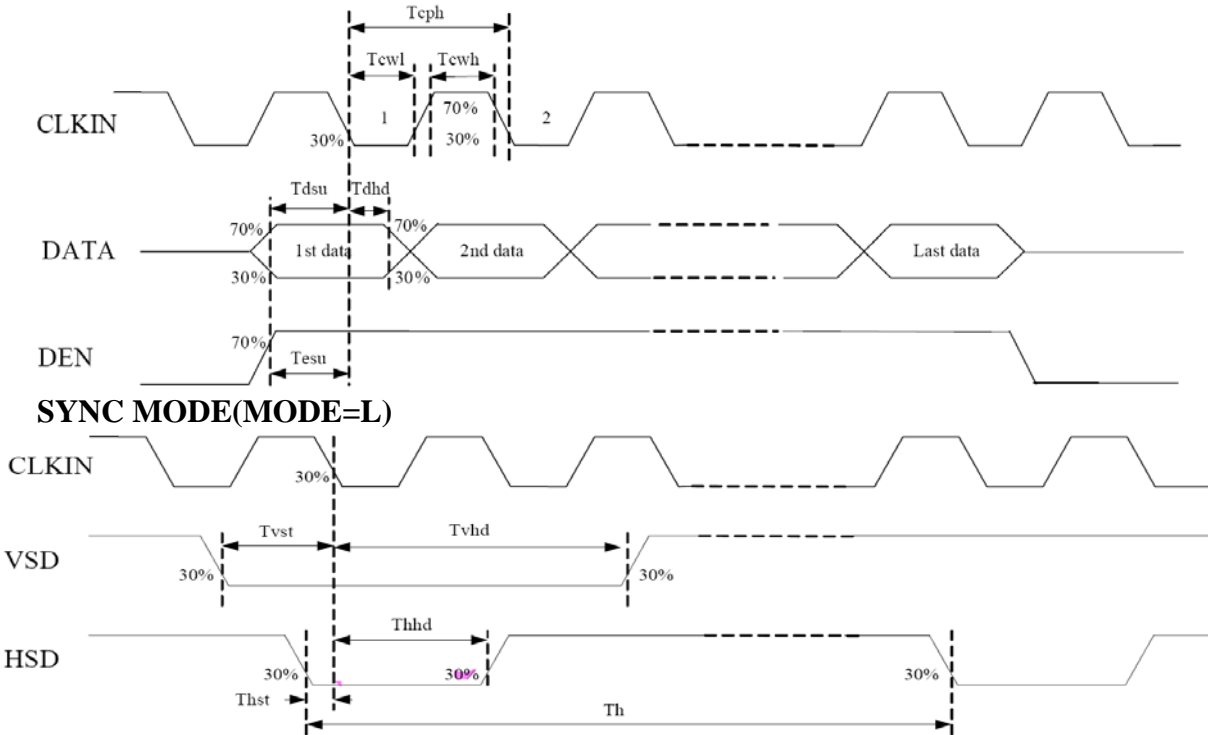
(Ta=25°C )

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	VDD	-	3.1	3.3	3.5	Volt
	AVDD	-	9.4	9.6	9.8	Volt
	VCOM	-	3.7	3.9	4.2	Volt
	VGH		17.8	18.0	18.2	Volt
	VGL	-	-5.8	-6.0	-6.2	Volt
Level Input Voltage (Digital signal)	VIH	-	0.7*VDD	-	VDD	Volt
	VIL	-	GND	-	0.3*VDD	Volt
	VOH	-	VDD-0.4	-	VDD	Volt
	VOL	-	GND	-	GND+0.4	Volt
Power Supply Current for LCM	DVDD_IDD	DVDD=3.3V	-	18.5	27.8	mA
	AVDD_IDD	AVDD=9.6V	-	9.45	14.2	mA

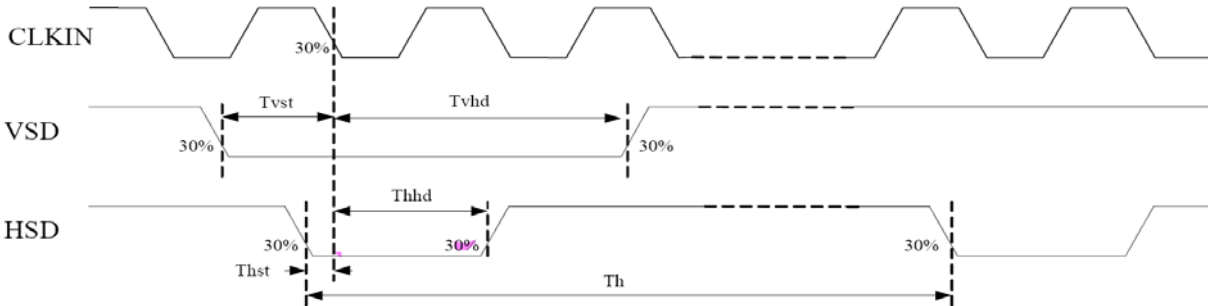
### 6-3 Data Input Timing

#### 6-3-1 TFT Data Input Timing

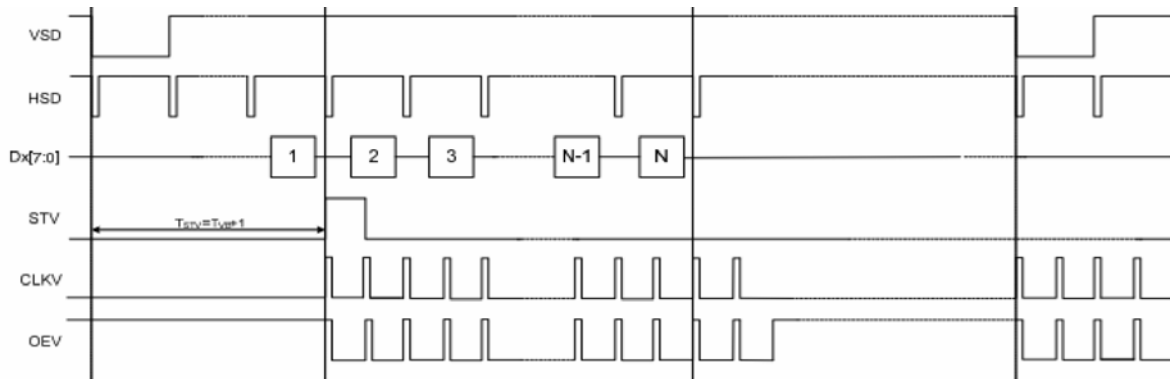
##### DE MODE (MODE=H)



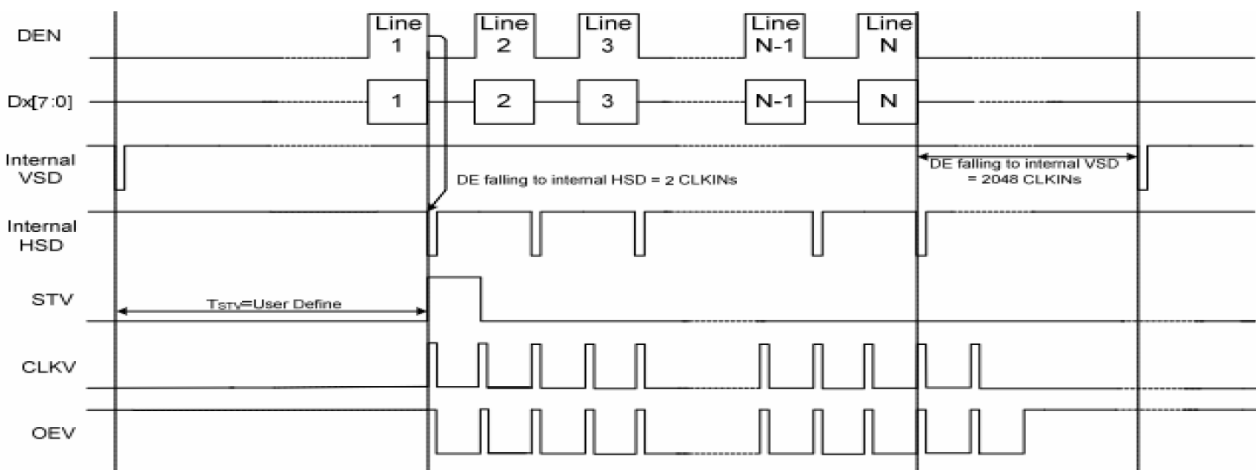
##### SYNC MODE(MODE=L)



Vertical Timing Diagram SYNC (Dual Gate)

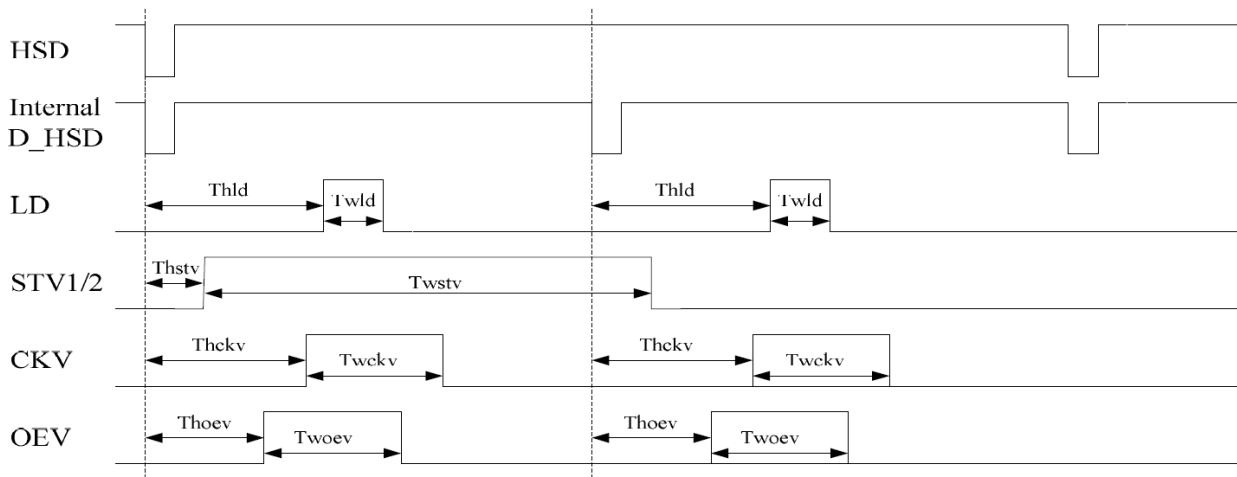


Vertical Timing Diagram DE (Dual Gate)





## Gate output Timing Diagram (Dual Gate)



## AC Electrical Characteristics (VDD =3.0~3.6V, VDDA=6.5~13.5V, AGND=DGND=0V, TA= -20~85 $\geq$ )

Parameter	Symbol	Min	Typ.	Max.	Unit	Conditions
VDD Power on Slew Rate	$T_{POR}$	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width	$T_{RST}$	10	-	-	us	Clkin=50MHz
CLKIN cycle time	$T_{cph}$	20	-	-	ns	
CLKIN pulse duty	$T_{cwh}$	40	50	60	%	
VSD setup time	$T_{vst}$	8	-	-	ns	
VSD hold time	$T_{vhd}$	8	-	-	ns	
HSD setup time	$T_{hst}$	8	-	-	ns	
HSD hold time	$T_{hhd}$	8	-	-	ns	
Data setup time	$T_{dsu}$	8	-	-	ns	D[7:0], D1[7:0], D2[7:0] to clkin
Date hold time	$T_{dhd}$	8	-	-	ns	D[7:0], D1[7:0], D2[7:0] to clkin
DE setup time	$T_{esu}$	8	-	-	ns	
DE hold time	$T_{ehd}$	8	-	-	ns	
Output stable time	$T_{sst}$	-	-	6	us	10% to 90% target voltage. CL=120pF, R=10Kohm
CLKIN Frequency	$F_{clk}$	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	$T_{clk}$	20	25	-	ns	
CLKIN Pulse Duty	$T_{cwh}$	40	50	60	%	Tclk
Time from HSD to Source Output	$T_{hso}$	-	20	-	CLKIN	
Time from HSD to LD	$T_{hld}$	-	20	-	CLKIN	
Time from HSD to STV	$T_{hstv}$	-	2	-	CLKIN	
Time from HSD to CKV	$T_{hckv}$	-	20	-	CLKIN	
Time from HSD to OEV	$T_{hoev}$	-	4	-	CLKIN	
LD pulse width	$T_{wld}$	-	10	-	CLKIN	
CKV pulse width	$T_{wckv}$	-	66	-	CLKIN	
OEV pulse width	$T_{woev}$	-	74	-	CLKIN	

## 7. Optical Characteristics:

Item	Symbol	Conditions	Specifications			Unit	Note	
			Min	Typ	Max			
Transmittance	T(%)	-	4.8	5.1	-	-	-	
Contrast Ratio	CR	$\theta=0$ Normal Viewing angle	320	400	-		(1) (2)	
Response time	TR+TF	-	-	25	-	ms	(1) (3)	
Viewing angle	Hor.	$\Theta_{x+}$	CR $\geq 10$	60	70	-	deg.	-
		$\Theta_{x-}$		60	70	-		
	Ver.	$\Theta_{y+}$		40	50	-		
		$\Theta_{y-}$		50	60	-		

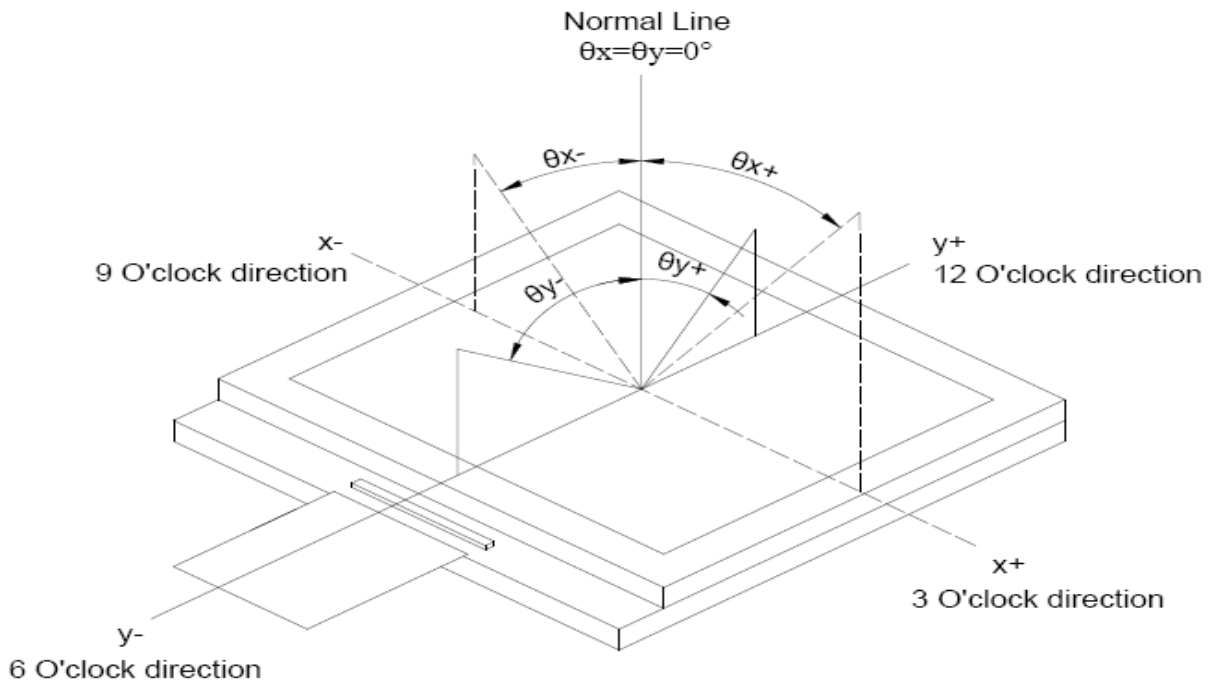
### Measuring Condition

1. Measuring surrounding: dark room
2. Ambient temperature:  $25 \pm 2^{\circ}\text{C}$
3. 30 min. Warm-up time.

### Color of CIE Coordinate:

Item		Symbol	Condition	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red	x	$\theta = \varphi = 0^{\circ}$ LED Backlight Color Degree	0.536	0.586	0.636
		y		0.295	0.345	0.395
	Green	x		0.303	0.353	0.403
		y		0.547	0.597	0.647
	Blue	x		0.097	0.147	0.197
		y		0.061	0.111	0.161
	White	x		0.247	0.297	0.347
		y		0.268	0.318	0.368

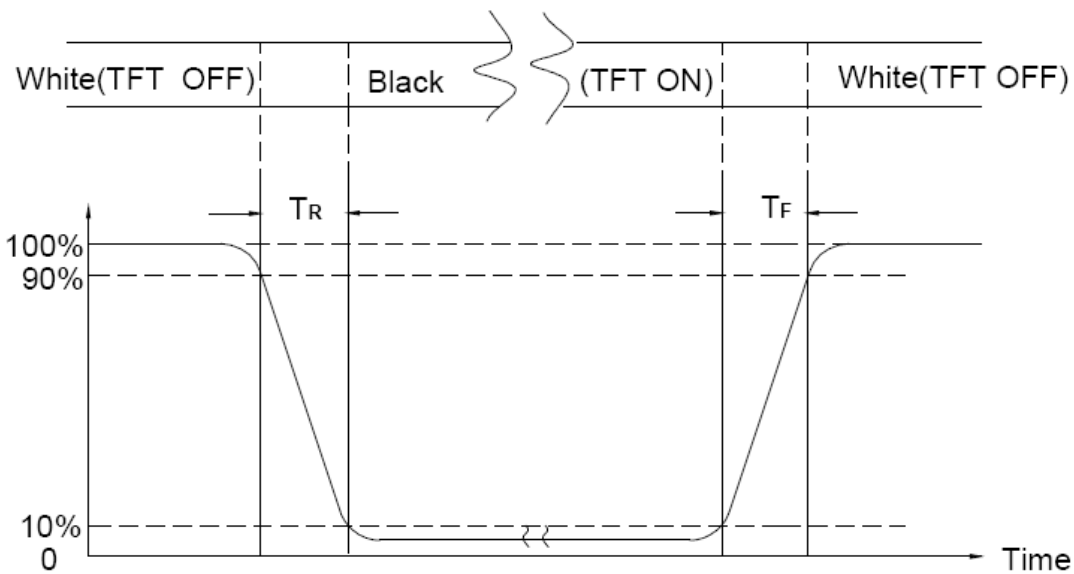
Note (1) Definition of Viewing Angle :



Note (2) Definition of Contrast Ratio(CR) :  
measured at the center point of panel

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

Note (3) Definition of Response Time : Sum of TR and TF

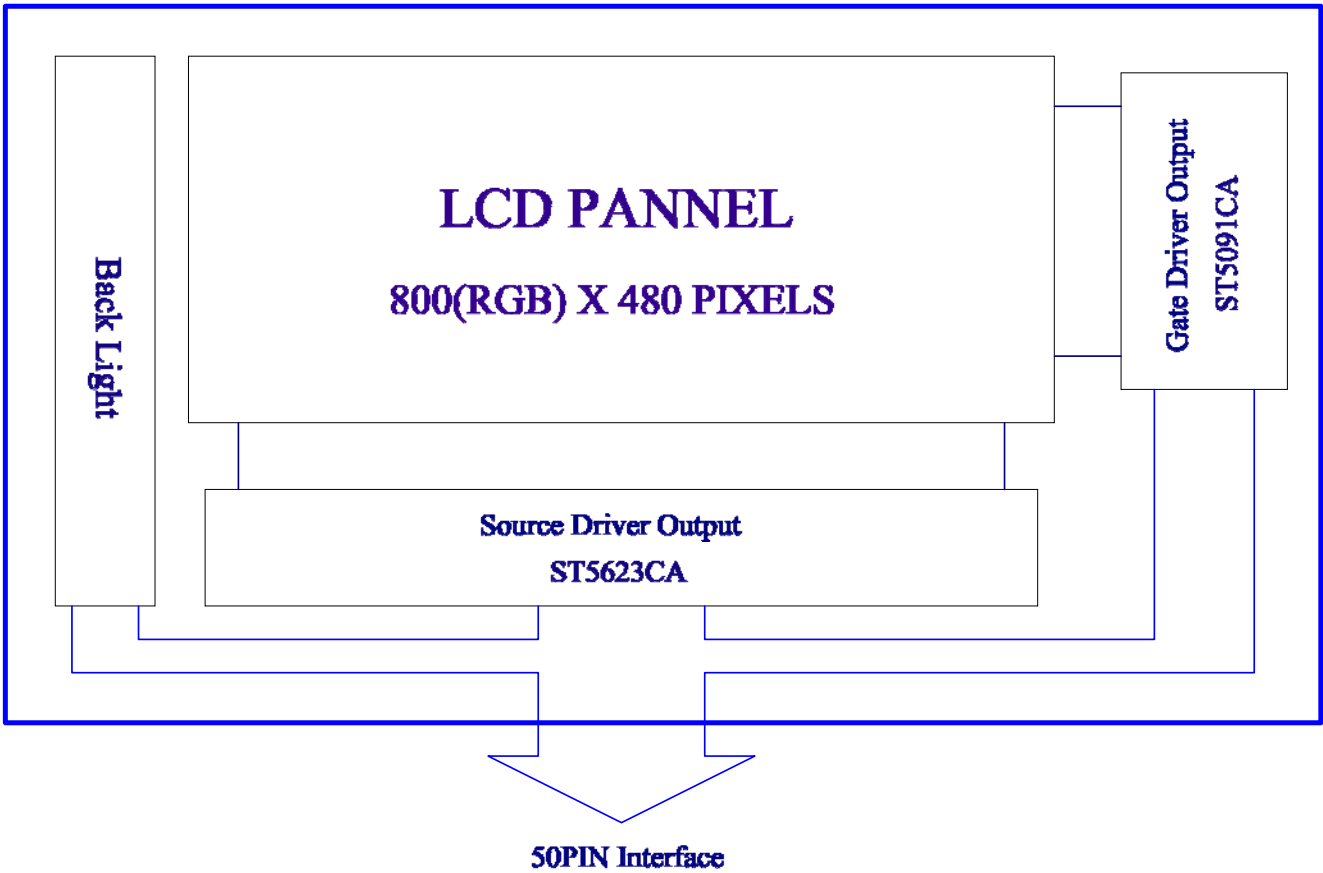


## **8. Interface Pin Assignment:**

### **8-1 LCM FPC Interface**

No.	Symbol	Function
1~2	LED+	Power for LED backlight (Anode)
3~4	LED-	Power for LED backlight (Cathode)
5	GND	Power ground
6	VCOM	Common voltage input.
7	DVDD	Power supply.
8	MODE	DE/SYNC mode select. Normally pull high H:DE mode. L:HSD/VSD mode
9	DE	Data Enable signal
10	VSYNC	Vertical sync input. Negative polarity
11	HSYNC	Horizontal sync input. Negative polarity
12~19	B7~B0	Blue Data Input
20~27	G7~G0	Green Data Input
28~35	R7~R0	Red Data Input
36	GND	Power ground
37	DCLK	Data clock Input
38	GND	Power ground
39	LCD_LR	Left or Right Display Control
40	LCD_UD	Up / Down Display Control
41	VGH	Positive Power for TFT.
42	VGL	Negative Power for TFT.
43	AVDD	Analog Power input.
44	RST_LCD_N	Global reset pin. Active Low to enter Reset State. (Normally pull high.) Suggest to connecting with an RC reset circuit for stability.
45	NC	No connection
46	VCOM	Common voltage input.
47	LCD_DITHB	Dithering function enable control. (Normally pull high ) DITHB = "1", Disable internal dithering function DITHB = "0", Enable internal dithering function
48	GND	Power ground
49	NC	No connection
50	NC	No connection

**9. Block Diagram:**



## 10. Backlight:

1. Standard Lamp Styles (Edge Lighting Type):  
The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:
2. The Main Advantages of the LED Backlight are as following:
  - 2.1 The brightness of the backlight can simply be adjusted.  
By a resistor or a potentiometer.

### 3. Data About LED Backlight:

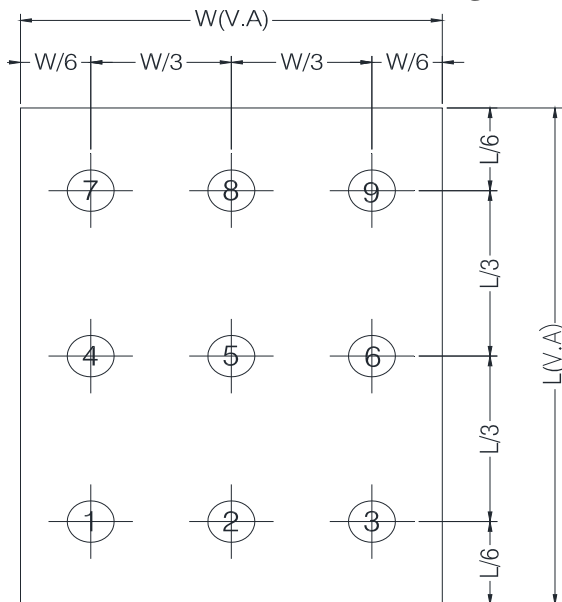
( $T_a=25^\circ$ )

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	140	-	mA	V=9.6V	
Supply Voltage	V	8.7	9.6	10.2	V	If=140mA	
Reverse Voltage	VR	-	-	5.0	V	-	
Luminous Intensity for LCM	IV	300	350	-	Cd/m <sup>2</sup>	If=140mA	2
Uniformity for LCM	-	70	-	-	%		3
Life Time	-	20000	50000	-	Hr.		4
Color	White						

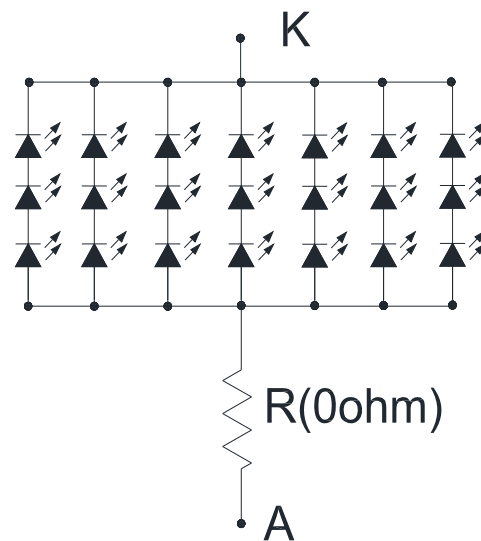
#### NOTE:

1. Backlight Only
2. Average Luminous Intensity of P1-P9
3. Uniformity = Min/Max \* 100%
4. LED life time defined as follow: the final brightness is at 50% of original brightness

#### Measured Method: (X\*Y: Light Area)



#### Internal Circuit Diagram



## **11. Standard Specification for Reliability .:**

### 11-1. Standard Specifications for Reliability of LCD Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80°C for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -30°C for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 60°C,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.
06	Thermal shock storage	The sample should be allowed to stand the following 10 cycles : -30°C for 30 minutes → normal temperature for 5 minutes → +80°C for 30 minutes → normal temperature for 5 minutes, as one cycle.
07	Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm      Sweep time: 12 min X,Y,Z 2 hours for each direction.
08	Packing drop test	According to ISTA 1A 2001.
09	Electrical Static Discharge	Air: ±6KV 150pF/330Ω 5 times
		Contact: ±4KV 150pF/330Ω 5 time

\*Sample size for each test item is 3~5pcs

### 11 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 12.2, Standard specifications for Reliability have been executed in order to ensure stability.

No	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

### 11- 3. MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±5°C), normal humidity (50±10% RH), and in area not exposed to direct sun light.
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## **12. Specification of Quality Assurance:**

### 13-1. Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by YEEBO CORPORATION (Supplier).

### 12-2. Standard for Quality Test

#### a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

#### b. Electro-Optical Characteristics:

According to the individual specification to test the product.

#### c. Test of Appearance Characteristics:

According to the individual specification to test the product.

#### d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

#### e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to **ISO2859-1**.General Inspection Level II take a single time.

(ii) The defects classify of AQL as following:

Major defect: AQL = 0.65%

Minor defect: AQL = 2.5%

Total defects: AQL = 2.5%

### 12-3. Non- conforming Analysis & Deal With Manners

#### a. Non- conforming Analysis:

(i) Purchaser should supply the detail data of non- conforming sample and the non-conforming.

(ii) After accepting the detail data from purchaser, the analysis of non- conforming should be finished in two weeks.

(iii) If supplier can not finish analysis on time, must announce purchaser before 3 days.

#### b. Disposition of non- conforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of non- conforming when the reason of nonconforming is not sure.

### 12-4. Agreement items

Both sides should discuss together when the following problems happen.

a. There is any problem of standard of quality assurance, and both sides should think that must be modified.

b. There is any argument item which does not record in the standard of quality assurance.

c. Any other special problem.

12-5. Standard of The Product Appearance Test

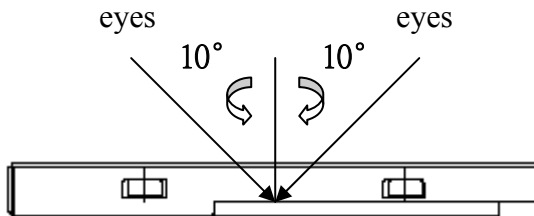
a. Manner of appearance test:

(i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.

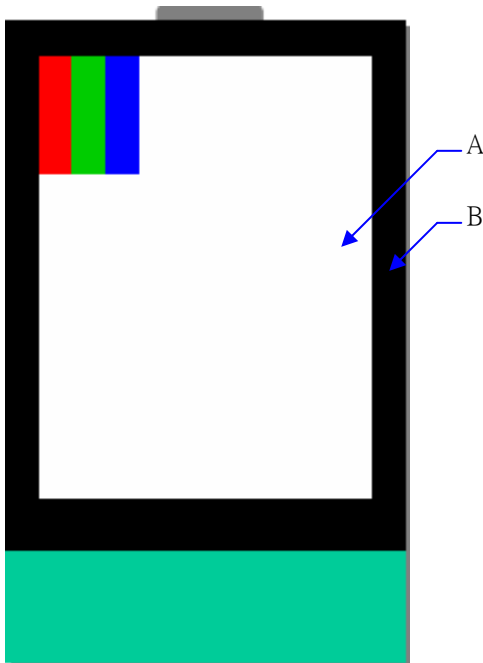
(ii) When test the model of transmissive product must add the reflective plate.

(iii) The test direction is base on around 10° of vertical line.

(iiii) Temperature: 25±5°C Humidity: 60±10%RH



(iv) Definition of area:



A. Area: Viewing area.

B. Area: Out of viewing area.

(Outside viewing area)

b. Basic principle:

(i) It will accord to the AQL when the standard can not be described.

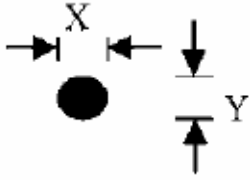
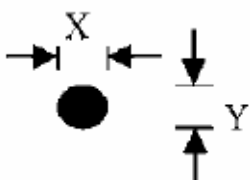
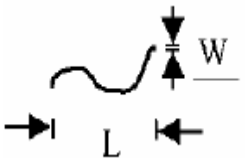
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

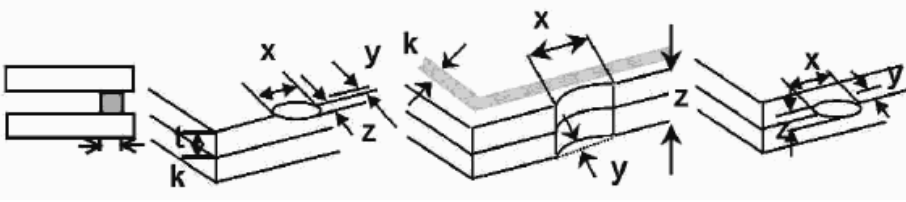
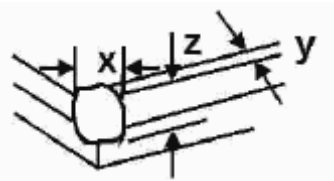
(iii) Must add new item on time when it is necessary.

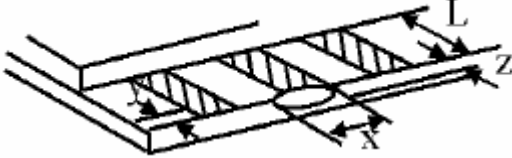
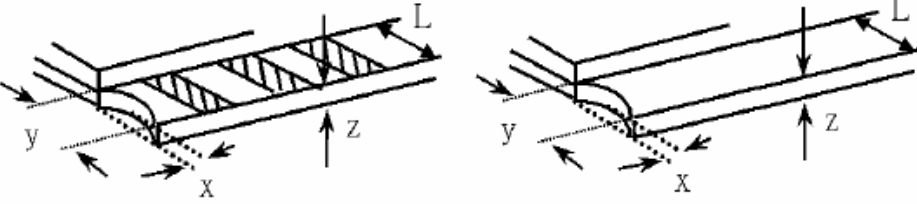
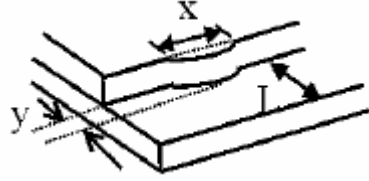
c. Standard of inspection: (Unit: mm)

12-6. Inspection specification

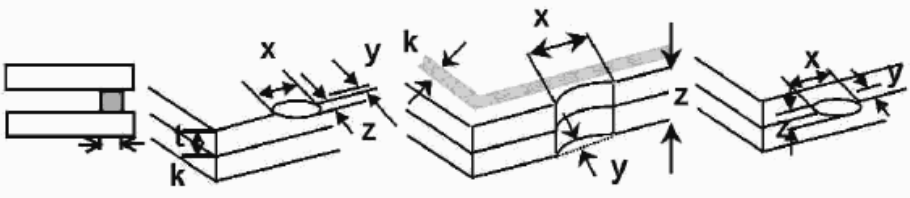
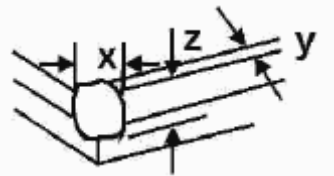
Defect out of viewing area can be neglected.

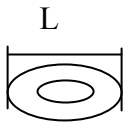
NO	Item	Criterion	AQL																							
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	<b>0.65</b>																							
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 Dot dimension as below drawing: $\Phi = (X+Y) / 2$  <table border="1" data-bbox="758 772 1292 936"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.20</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.40</math></td> <td>5</td> </tr> <tr> <td><math>0.40 &lt; \Phi</math></td> <td>0</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.40$	5	$0.40 < \Phi$	0	<b>2.5</b>															
Size(mm)	Acceptable Q'ty																									
$\Phi \leq 0.20$	Accept no dense																									
$0.20 < \Phi \leq 0.40$	5																									
$0.40 < \Phi$	0																									
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table border="1" data-bbox="758 1153 1292 1317"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.20</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.40</math></td> <td>5</td> </tr> <tr> <td><math>0.40 &lt; \Phi</math></td> <td>0</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p> 3.2 Line type: (As following drawing)  <table border="1" data-bbox="662 1523 1292 1859"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>L \leq 10</math></td> <td><math>W \leq 0.1</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>L \leq 10.0</math></td> <td><math>0.1 &lt; W \leq 0.25</math></td> <td>4</td> </tr> <tr> <td><math>L &gt; 10</math></td> <td>----</td> <td>Rejection</td> </tr> <tr> <td>----</td> <td><math>0.25 &lt; W</math></td> <td>Rejection</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two lines within 3mm.</p>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.40$	5	$0.40 < \Phi$	0	Length(mm)	Width(mm)	Acceptable Q'ty	$L \leq 10$	$W \leq 0.1$	Accept no dense	$L \leq 10.0$	$0.1 < W \leq 0.25$	4	$L > 10$	----	Rejection	----	$0.25 < W$	Rejection	<b>2.5</b>
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$L > 10$	----	Rejection																								
----	$0.25 < W$	Rejection																								

NO	Item	Criterion	AQL																		
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction <table border="1" data-bbox="794 293 1294 533"> <thead> <tr> <th>Size <math>\Phi</math>(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.20</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.50</math></td> <td>4</td> </tr> <tr> <td><math>0.50 &lt; \Phi \leq 1.00</math></td> <td>3</td> </tr> <tr> <td><math>1.00 &lt; \Phi</math></td> <td>0</td> </tr> <tr> <td>Total Q'ty</td> <td>4</td> </tr> </tbody> </table>	Size $\Phi$ (mm)	Acceptable Q'ty	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.50$	4	$0.50 < \Phi \leq 1.00$	3	$1.00 < \Phi$	0	Total Q'ty	4	2.5						
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05	Scratches	Follow NO.3 -2 Line Type.																			
06	Chipped glass	Symbols: x: Chip length      y: Chip width      z: Chip thickness k: Seal width      t: Glass thickness      a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels:  <table border="1" data-bbox="343 1019 1161 1176"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td><math>Z \leq 1/2t</math></td> <td>Not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> <tr> <td><math>1/2t &lt; z \leq 2t</math></td> <td>Not exceed 1/3k</td> <td><math>x \leq 1/8a</math></td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>⊙ Unit: mm</li> <li>⊙ If there are 2 or more chips, x is the total length of each chip</li> </ul> 6.1.2 Corner crack:  <table border="1" data-bbox="343 1534 1161 1691"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td><math>Z \leq 1/2t</math></td> <td>Not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> <tr> <td><math>1/2t &lt; z \leq 2t</math></td> <td>Not exceed 1/3k</td> <td><math>x \leq 1/8a</math></td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>⊙ Unit: mm</li> <li>⊙ If there are 2 or more chips, x is the total length of each chip</li> </ul>	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	2.5
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NO	Item	Criterion	AQL																
07	Glass crack	<p>Symbols:            x: Chip length            y: Chip width            z: Chip thickness            k: Seal width            t: Glass thickness    a: LCD side length            L: Electrode pad length</p> <p>7.2 Protrusion over terminal:            7.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="485 687 1171 844"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td><math>y \leq 0.5\text{mm}</math></td> <td><math>x \leq 1/8a</math></td> <td><math>0 &lt; z \leq t</math></td> </tr> </table> <p>7.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="485 1205 1171 1361"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td><math>y \leq L</math></td> <td><math>x \leq 1/8a</math></td> <td><math>0 &lt; z \leq t</math></td> </tr> </table> <p>⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.            ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged.</p> <p>7.2.3 Substrate protuberance and internal crack</p>  <table border="1" data-bbox="804 1675 1246 1832"> <tr> <td>y: width</td> <td>x: length</td> </tr> <tr> <td><math>y \leq 1/3L</math></td> <td><math>X \leq a</math></td> </tr> </table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq a$	2.5
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$y \leq 1/3L$	$X \leq a$																		

NO	Item	Criterion	AQL
08	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
10	Bezel	Bezel must comply with product specifications.	2.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	2.5 2.5 2.5 2.5 0.65 0.65
12	FPC	12.1 FPC terminal damage $\leq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leq$ 1/2 alignment area and can not affect the function , we judge accept.	2.5 2.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC.	2.5 0.65

NO	Item	Criterion	AQL												
14	Touch Panel Chipped glass	<p>Symbols:  x: Chip length                      y: Chip width                      z: Chip thickness  k: Seal width                      t: Touch Panel Total thickness    a: LCD side length  L: Electrode pad length</p> <p>14.1 General glass chip:  14.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="343 804 1161 1019"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td><math>Z \leq t</math></td> <td><math>\leq 1/2 k</math> and not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> </table> <p>⊙ Unit: mm  ⊙ If there are 2 or more chips, x is the total length of each chip</p> <p>14.1.2 Corner crack:</p>  <table border="1" data-bbox="343 1397 1161 1612"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td><math>z \leq t</math></td> <td><math>\leq 1/2 k</math> and not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> </table> <p>⊙ Unit: mm  ⊙ If there are 2 or more chips, x is the total length of each chip</p>	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	2.5
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NO	Item	Criterion	AQL		
15	Touch Panel(Fish eye)	SIZE(mm)	Acceptable Q'ty		2.5
		$L \leq 0.7$	Accept no dense		
		$L > 0.7\text{mm}$	0		
16	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion( $\leq 2.5\%$ ) , it is acceptable.	2.5		
17	Touch Panel Linearity	Less than 2.5% is acceptable.	2.5		
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	2.5		
19	General appearance	19.1 Pin type must match type in specification sheet.	0.65		
		19.2 LCD pin loose or missing pins.	0.65		
		19.3 Product packaging must the same as specified on packaging specification sheet.	0.65		
		19.4 Product dimension and structure must conform to product specification sheet.	0.65		



## **13. Handling Precaution:**

### 13-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

### 13-2 Storage

- Store in an ambient temperature of  $25\pm 10^{\circ}\text{C}$ , and in a relative humidity of  $50\pm 10\%\text{RH}$ . Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

### 13-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: No higher than  $280\pm 10^{\circ}\text{C}$  and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.

## **14. Guarantee:**

Our products meet requirements of the environment.  
YEEBO ROHS requirement is based on European Union Directive 2011/65/EU (ROHS) Requirements and Update.