

# SPECIFICATION FOR LCD MODULE

**MODULE NO: YB-TG800480S32A-N-A0**

**Doc.Version:00**

Customer Approval:

<input type="checkbox"/> Accept	<input type="checkbox"/> Reject
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YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer	伍廷琛	2019/1/16
Check	Mechanical Engineer	李健強	2019/1/16
Verify		邓茗刚	2019/1/17
Approval		何景益	2019/1/17

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

### **1. Revision History**

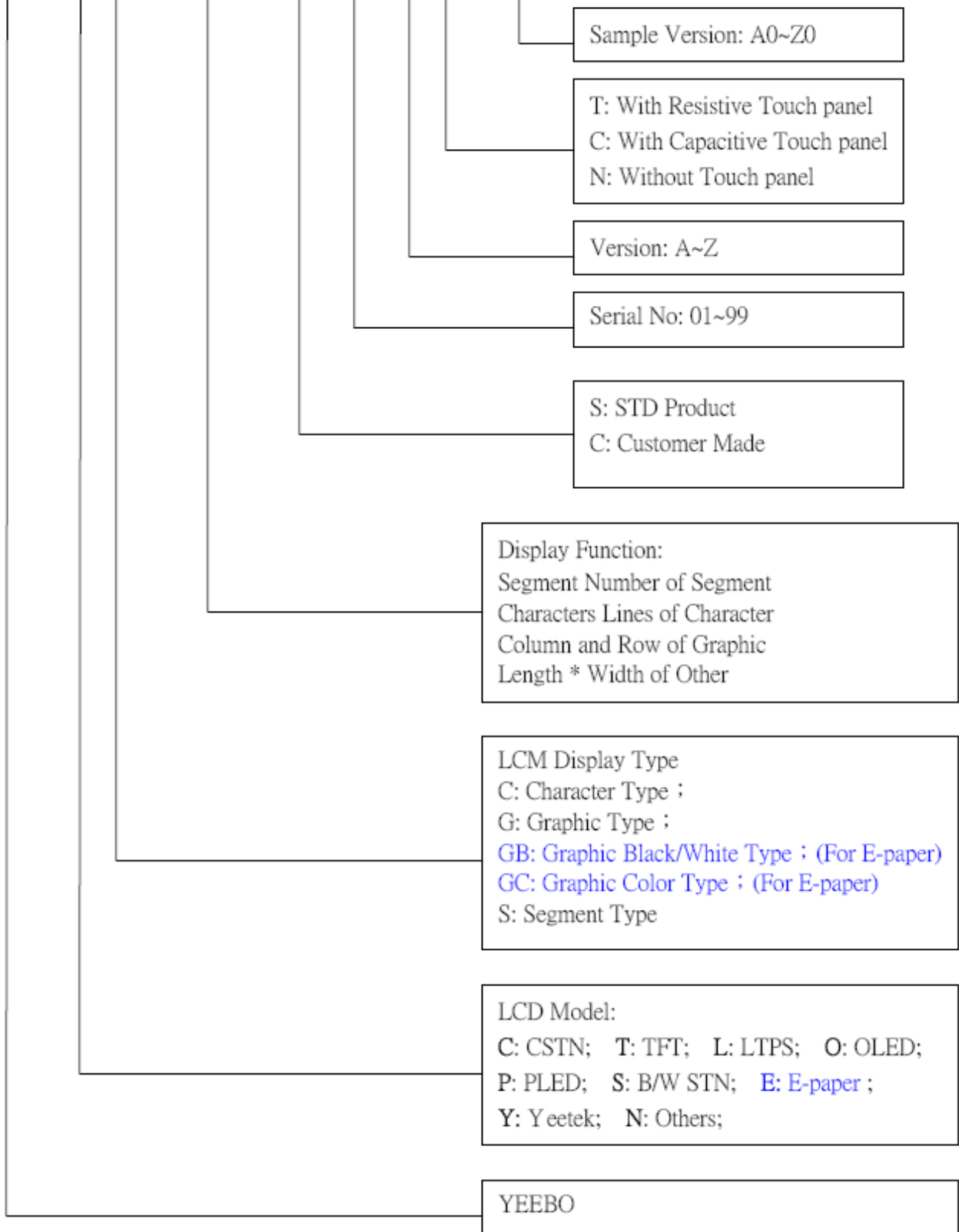
Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A0	00	2019-01-16	Spec Only	First issue	W.J.C/Z.J.Q

## 2. Table of Contents:

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**3. Module Numbering System:**

**YB-TG240320S01D-T-A0**



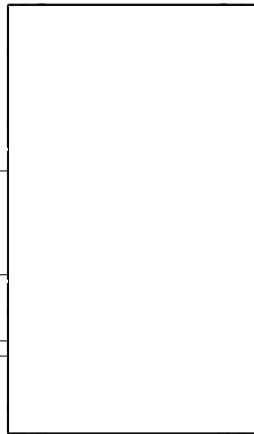
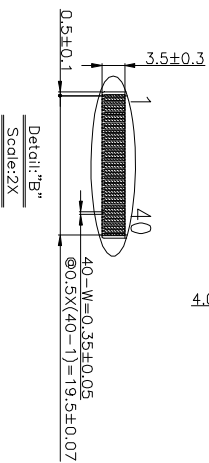
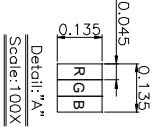
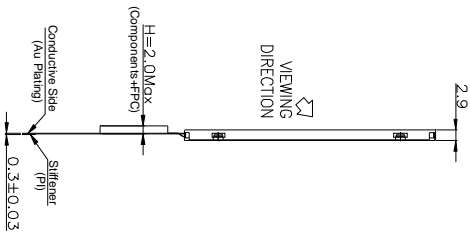
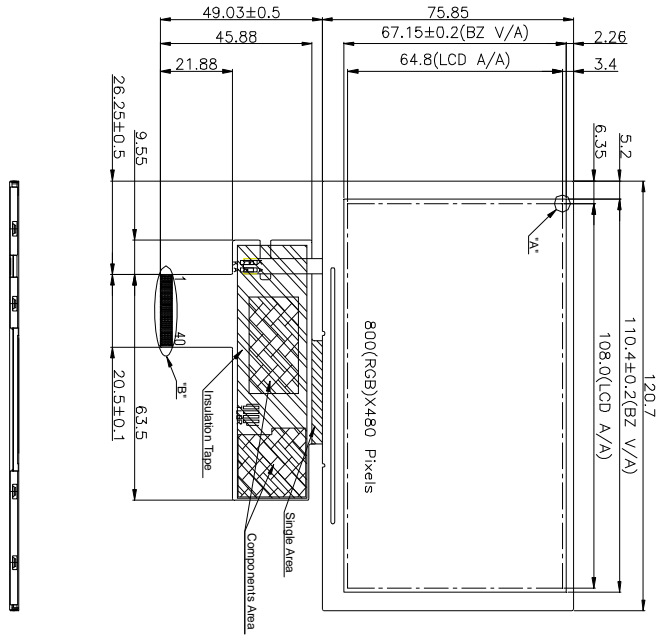
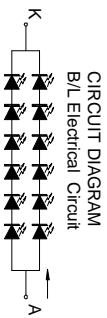
#### **4. General Specification:**


ITEM	CONTENTS
Module Size	120.7 (W) * 75.85(H) * 2.9(T) mm
Module Size(With FPC)	120.7(W) * 124.88(H) * 2.9(T) mm
Display Size	5.0 inch
Display Format	800(RGB)* 480 WVGA
Active Area	108.0(W) *64.8(H) mm
LCD Type	Active matrix TFT/ Transmissive
Input Data	24 bit RGB interface
Viewing Direction (Gray inversion)	6 O'clock
The Best Viewing Direction	12 O'clock
Source Drive IC	HX8264D or Compatible
Gate Drive IC	HX8664B or Compatible
Weight	TBD

## 5. LCM drawing:

Count drawing & Spec.revision record during discussion with customer	
Rec. #1	Revision content description
2019-01-16	Date
FIRST ISSUE	

- Specification:**
1. Display mode: 5.0" TFT/ Transmissive
  2. Display Color: 16M
  3. Viewing Direction: 6 O'clock
  4. Gate Drive IC: HX8664B or Compatible
  5. Source Drive IC: HX8264D or Compatible
  6. Operating temperature: -20°C to +70°C
  7. Storage temperature: -30°C to +80°C
  8. Backlight: LED White (X12)
  9. Unspecified tolerance: ±0.30mm.
  10. ROHS compliant



		UNIT	SIZE	SCALE	DESIGNED	CHECKED	VERIFIED	APPROVED	FILE NAME
mm		A4	N-T-S	2019-01-16	赵健强				Count Dwg.
MOD. Name	YB-TG800480S32A-N-A								
DESIGNED	赵健强								
CHECKED									
VERIFIED									
APPROVED									
Sheet	1								
Of	1								

LCD MODULE FPC PIN OUT NO.	SYMBOL
1	K
2	A
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYNC
33	VSYN/C
34	DE
35	NC
36	GND
37	NC
38	NC
39	NC
40	NC

## 6. Electrical Characteristics:

### 6-1 Absolute Maximum Ratings

#### TFT IC HX8264D+HX8664B

(Ta=25°C)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Power Voltage	VDD	-0.5	-	+3.96	V	Note1 Note2
Operating Temperature	TOPR	-20	-	+70	°C	Note1 Note2
Storage Temperature	TSTR	-30	-	+80	°C	Note1 Note2

Note 1: The driver IC may be permanently damaged if it is used under the condition exceeding the above absolute maximum values. It is also recommended to use the driver IC within the limit of its electric characteristics during normal operation. Exceeding the conditions may lead to malfunction of it and affect its credibility.

Note 2: The voltage from GND.

### 6-2 Electrical Characteristics

#### TFT IC HX8264D+HX8664B

(Ta=25°C)

Item	Symbol	Rating			Unit	Remark
		Min	Typ	Max		
Power Voltage Logic	VDD	3.0	3.3	3.6	V	Note 1
Input voltage L level	VIL	GND	-	0.3*VDD	V	VDD=3.0 ~3.6V
Input voltage H level	VIH	0.7* VDD	-	VDD	V	
LCD Drive Power current	ILCD	-	TBD	-	mA	VDD= 3.3V

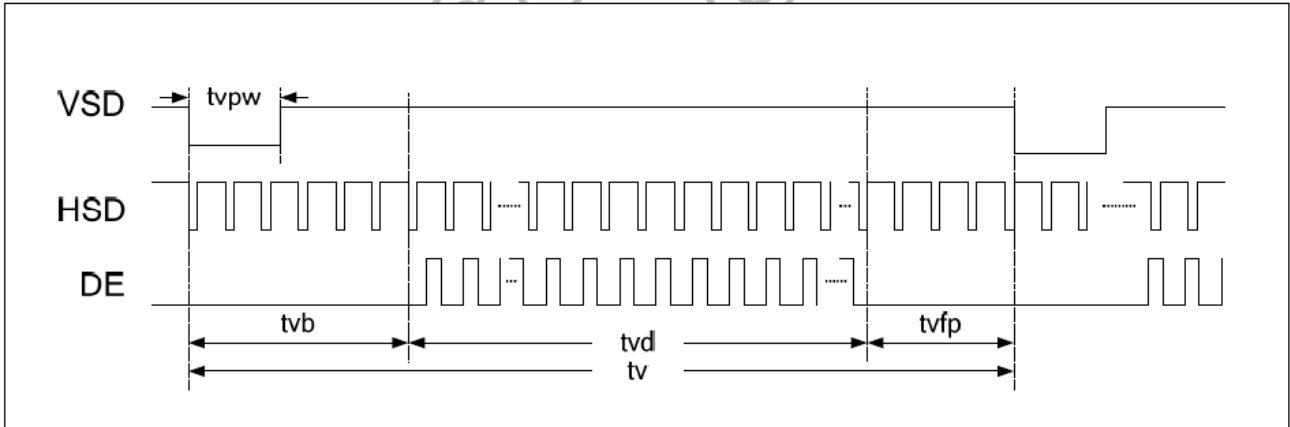
Note1:

Vcom must be adjusted to optimize display quality: Cross-talk, Contrast Ratio and etc.

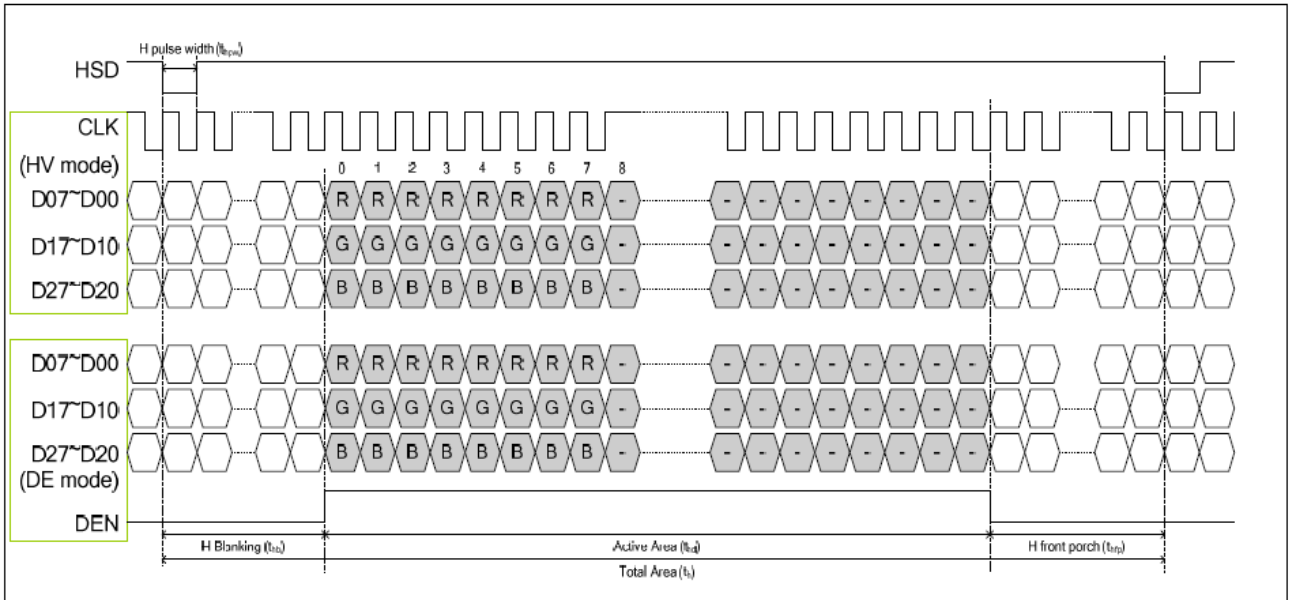
### 6-3 Timing Characteristics

#### 6-3-1 TFT IC HX8264D+HX8664B Data Input Format

##### Vertical input timing



##### Horizontal input timing





### 6-3-2 TFT IC HX8264D+HX8664B Timing Conditions

Resolution : 800x480

- Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	800			DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
HS pulse width	thpw	1	48	255	DCLK
HS Back Porch (Blanking)	thb	88			DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE mode Blanking	th-thd	85	128	512	DCLK

- Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	480			T <sub>H</sub>
VS period time	tv	513	525	767	T <sub>H</sub>
VS pulse width	tvpw	3	3	255	T <sub>H</sub>
VS Back Porch (Blanking)	tvb	32			T <sub>H</sub>
VS Front Porch	tvfp	1	13	255	T <sub>H</sub>
DE mode Blanking	tv-tvd	4	45	255	T <sub>H</sub>

## 7. Optical Characteristics:

Item	Symbol	Conditions	Specifications			Unit	Note	
			Min	Typ	Max			
Transmittance	T(%)	-	4.0	4.3	-	%	-	
Contrast Ratio	CR	$\Theta=0$ Normal Viewing angle	350	500	-		(1) (2)	
Response time	TR+TF	-	-	25	-	ms	(1) (3)	
Viewing angle	Hor.	$\Theta_{x+}$	CR $\geq 10$	-	65	-	deg.	(1)
		$\Theta_{x-}$		-	65	-		
	Ver.	$\Theta_{y+}$		-	50	-		
		$\Theta_{y-}$		-	60	-		

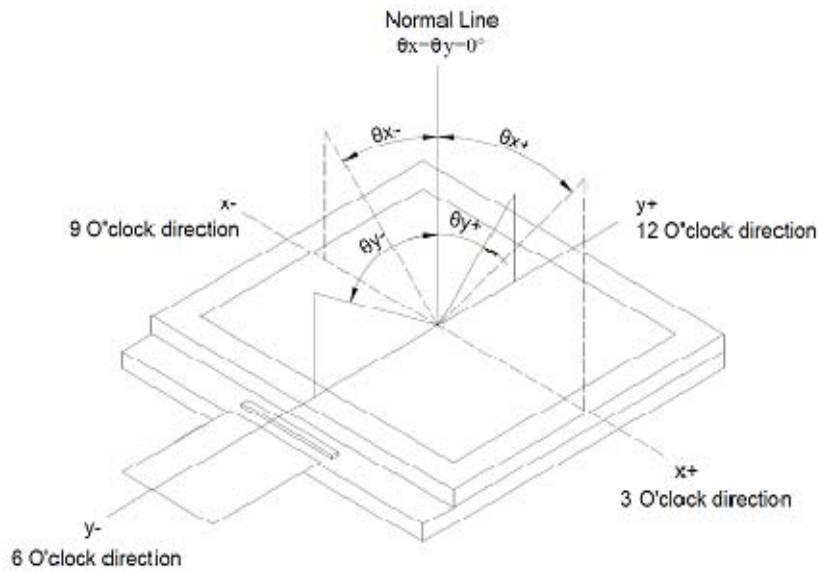
### Measuring Condition

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	$\theta = \phi = 0^\circ$ LED Backlight	TBD	0.625	TBD
		y		TBD	0.308	TBD
	Green	x		TBD	0.293	TBD
		y		TBD	0.517	TBD
	Blue	x		TBD	0.142	TBD
		y		TBD	0.143	TBD
	White	x		TBD	0.291	TBD
		y		TBD	0.323	TBD

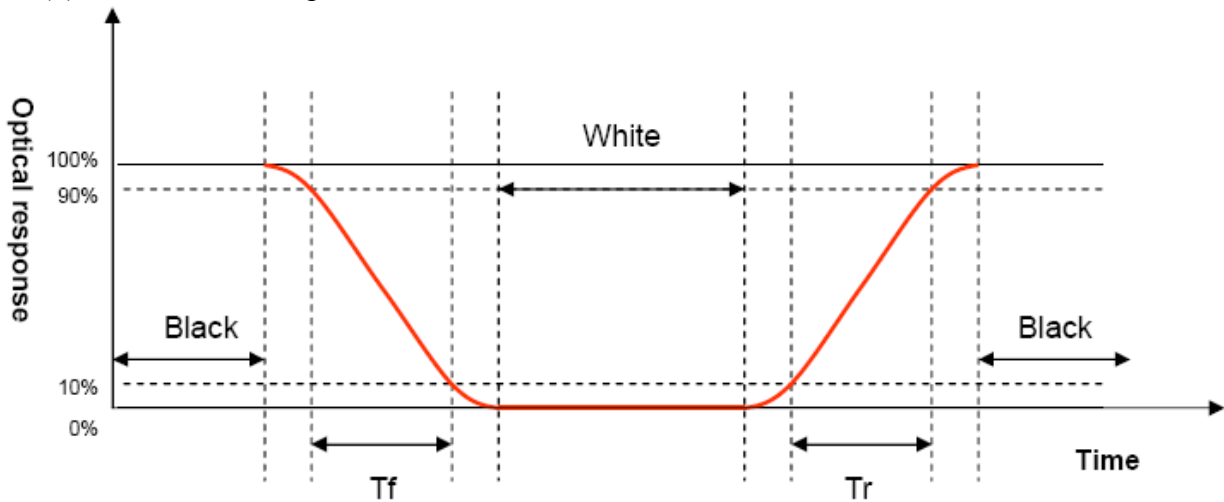
Note (1) Definition of Viewing Angle :



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

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

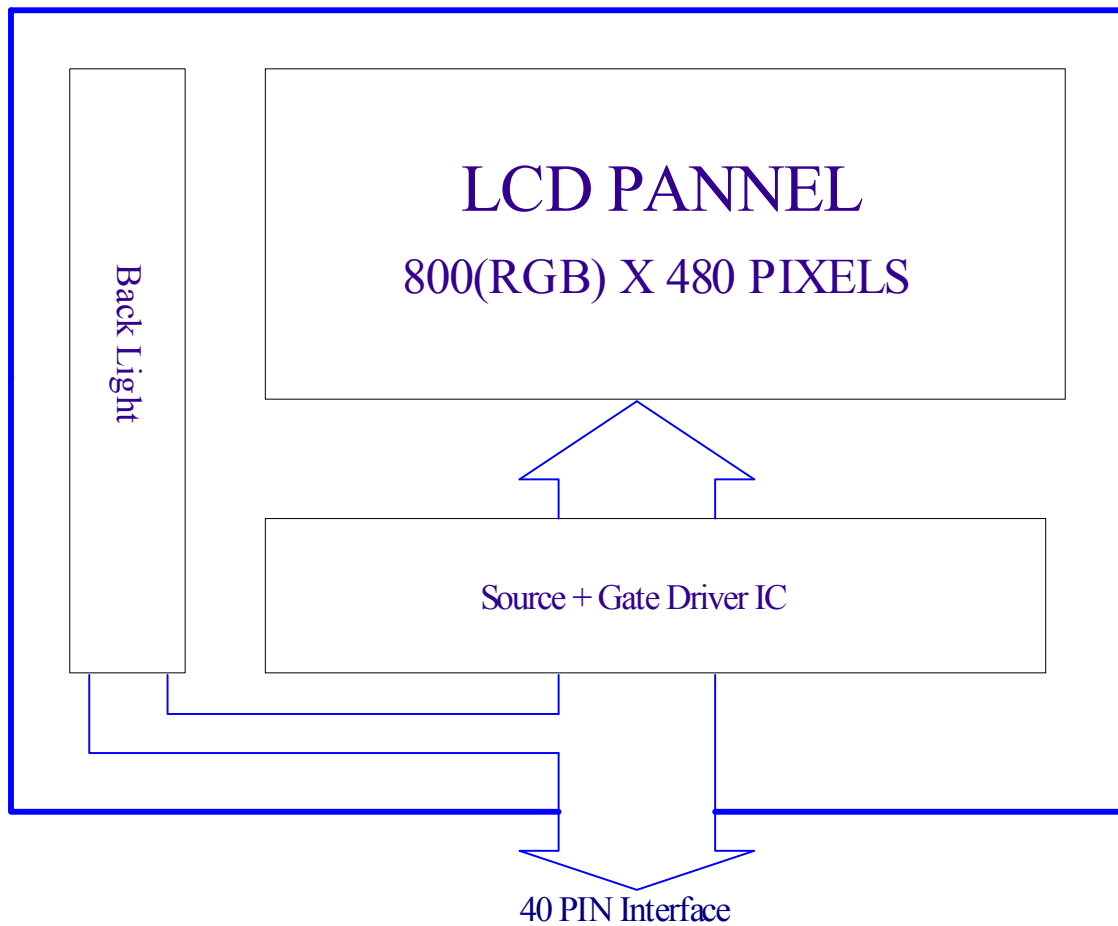
Note (3) Definition of Response Time : Sum of TR and TF



## 8. Interface Pin Assignment:

PIN NO.	Symbol	I/O	Description
1	K	P	Power for LED backlight cathode
2	A	P	Power for LED backlight anode
3	GND	P	Power ground
4	VDD	P	Power voltage
5~12	R0~R7	I	Red data
13~20	G0~G7	I	Green data
21~28	B0~B7	I	Blue data
29	GND	P	Power ground
30	DCLK ( CLK )	I	Pixel clock
31	DISP	I	Display on/off , normally pulled high
32	HSYNC ( HSD )	I	Horizontal sync signal If not used, fix this pin at VDD
33	VSYSN ( VSD )	I	Vertical sync signal If not used, fix this pin at VDD
34	DEN ( DE )	I	Data enable (active High)
35	NC	-	No connect
36	GND	P	Power ground
37	NC	-	No connect
38	NC	-	No connect
39	NC	-	No connect
40	NC	-	No connect

**9. Back 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.

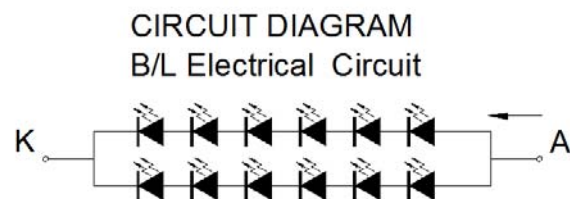
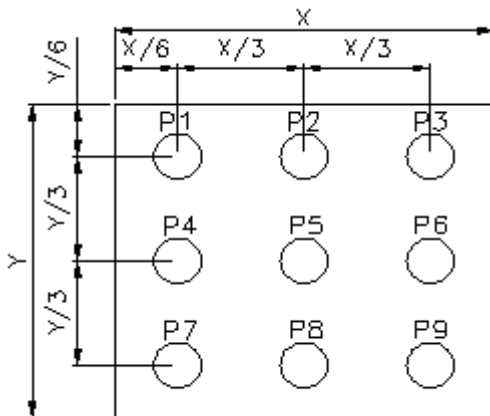
### 3. Data About LED Backlight: (Ta=25°C )

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Voltage	V	16.2	18.6	21.0	V	If=40mA	
Luminous Intensity for LCM	IV	300	350	-	Cd/m <sup>2</sup>	If=40mA	2
Uniformity for LCM	-	70	-	-	%		3
Life Time	-	20000	-	-	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 follows: The final brightness is at 50% of original brightness
5. TYP.80000 is the calculative value of LED life time.

#### Internal Circuit Diagram



#### (Effective spatial Distribution)

Using aperture of 1°, distance 50cm.

## **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:

### 12-1. 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

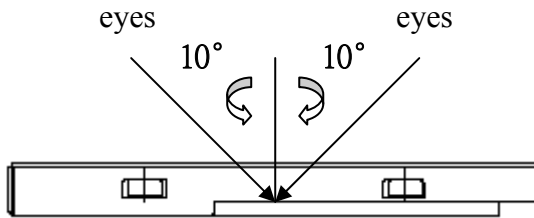
a. Manner of appearance test:

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

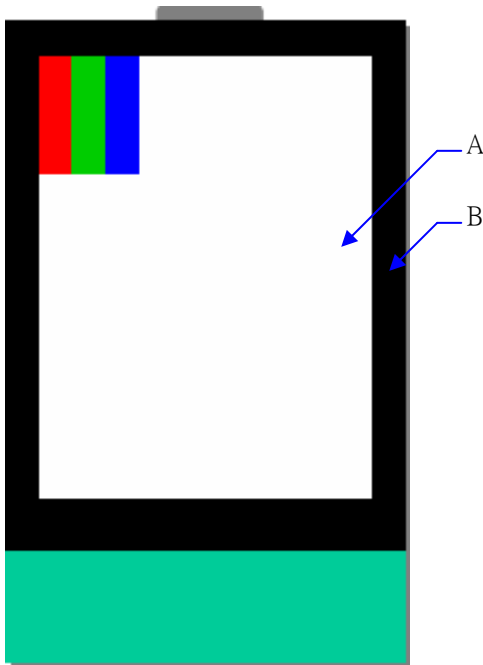
(ii) When test the model of transmissive product must add the reflective plate.

(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:

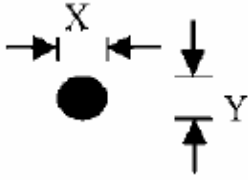
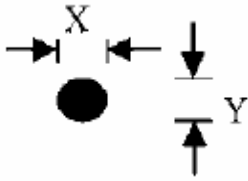
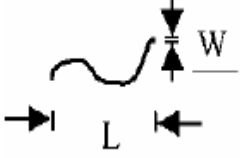
(i) It will accord to the AQL when the standard can not be described.

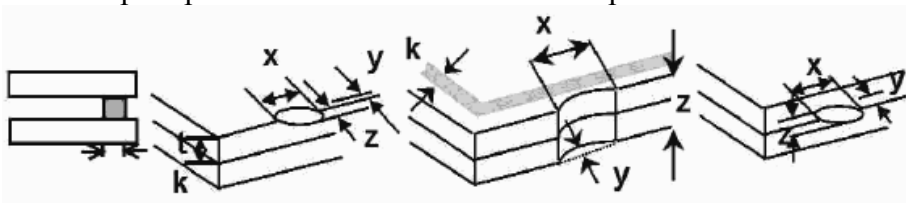
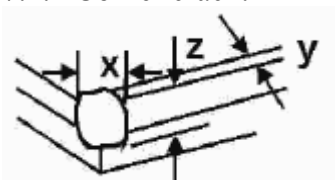
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

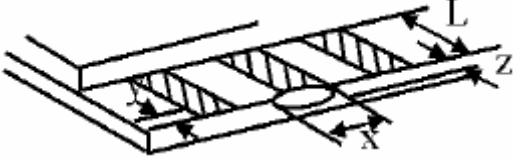
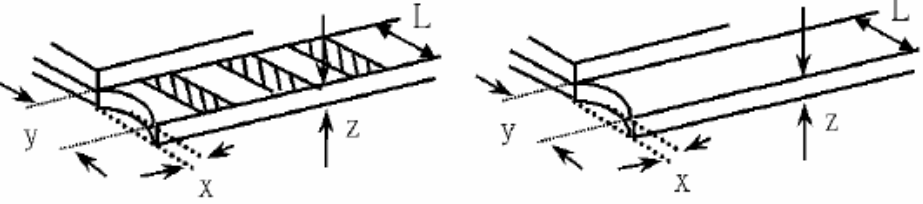
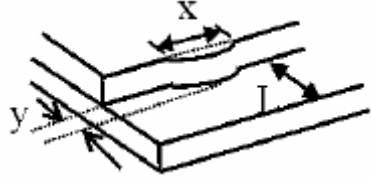
(iii) Must add new item on time when it is necessary.

c. Standard of inspection: (Unit: mm)

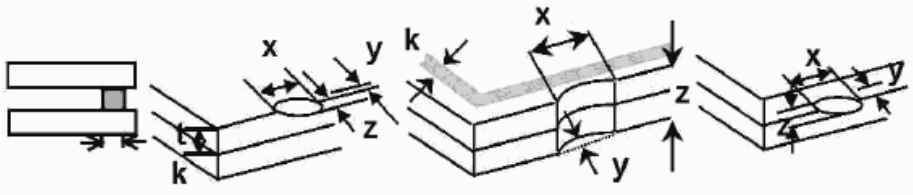
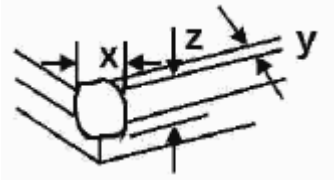
12-6. Inspection specification  
Defect out of viewing area can be neglected.

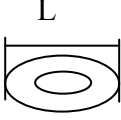
NO	Item	Criterion	AQL													
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 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="817 772 1348 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> 2.2 Not visible through 5% ND filter  * Densely spaced: No more than two spots within 3mm.	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="817 1198 1348 1361"> <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> * Densely spaced: No more than two spots within 3mm.	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															
3.2 Line type: (As following drawing)  <table border="1" data-bbox="721 1563 1348 1899"> <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> * Densely spaced: No more than two lines within 3mm.	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>
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														

NO	Item	Criterion	AQL																		
04	Polarizer bubbles	<p>If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction</p> <table border="1"> <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						
Size $\Phi$ (mm)	Acceptable Q'ty																				
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$0.50 < \Phi \leq 1.00$	3																				
$1.00 < \Phi$	0																				
Total Q'ty	4																				
05	Scratches	Follow NO.3 -2 Line Type.																			
06	Mura	Not visible through 5% ND filter in 50% gray.	2.5																		
07	Chipped glass	<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>7.1 General glass chip:  7.1.1 Chip on panel surface and crack between panels:</p>  <table border="1"> <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> <p>⊙ Unit: mm  ⊙ If there are 2 or more chips, x is the total length of each chip</p> <p>7.1.2 Corner crack:</p>  <table border="1"> <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> <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	$Z \leq 1/2t$	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
z: Chip thickness	y: Chip width	x: Chip length																			
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NO	Item	Criterion	AQL																
08	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>8.1 Protrusion over terminal:  8.1.1 Chip on electrode pad:</p>  <table border="1" data-bbox="544 685 1230 842"> <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>8.1.2  Non-conductive portion:</p>  <table border="1" data-bbox="544 1200 1230 1357"> <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>8.1.3 Substrate protuberance and internal crack</p>  <table border="1" data-bbox="863 1675 1305 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: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		

NO	Item	Criterion	AQL
09	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
10	Backlight elements	10.1 Illumination source flickers when lit. 10.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 10.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
11	Bezel	Bezel must comply with product specifications.	2.5
12	PCB、COB	12.1 COB seal may not have pinholes larger than 0.2mm or contamination. 12.2 COB seal surface may not have pinholes through to the IC. 12.3 The height of the COB should not exceed the height indicated in the assembly diagram. 12.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 12.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 12.6 The jumper on the PCB should conform to the product characteristic chart.	2.5 2.5 2.5 2.5 0.65 0.65
13	FPC	13.1 FPC terminal damage $\leq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 13.2 FPC alignment hole damage $\leq$ 1/2 alignment area and can not affect the function , we judge accept.	2.5 2.5
14	Soldering	14.1 No cold solder joints, missing solder connections, oxidation or icicle. 14.2 No short circuits in components on PCB or FPC.	2.5 0.65

NO	Item	Criterion	AQL												
15	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>15.1 General glass chip:  15.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="400 763 1220 981"> <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>15.1.2 Corner crack:</p>  <table border="1" data-bbox="400 1359 1220 1576"> <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
16	Touch Panel(Fish eye)	SIZE(mm)	Acceptable Q'ty	2.5
		$L \leq 0.7$	Accept no dense	
		$L > 0.7\text{mm}$	0	
				
17	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
18	Touch Panel Linearity	Less than 2.5% is acceptable.		2.5
19	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g		2.5
20	General appearance	20.1 Pin type must match type in specification sheet.		0.65
		20.2 LCD pin loose or missing pins.		0.65
		20.3 Product packaging must the same as specified on packaging specification sheet.		0.65
		20.4 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.