



# SPECIFICATION FOR LCD MODULE

MODULE NO: YB-TG240320S26A-N-A0

Doc.Version:02

Customer Approval:

Accept	<input type="checkbox"/> Reject
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YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer	張 景 璋	2015.2.12
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Approval		陳 志 倫	2015.2.12

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-C





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

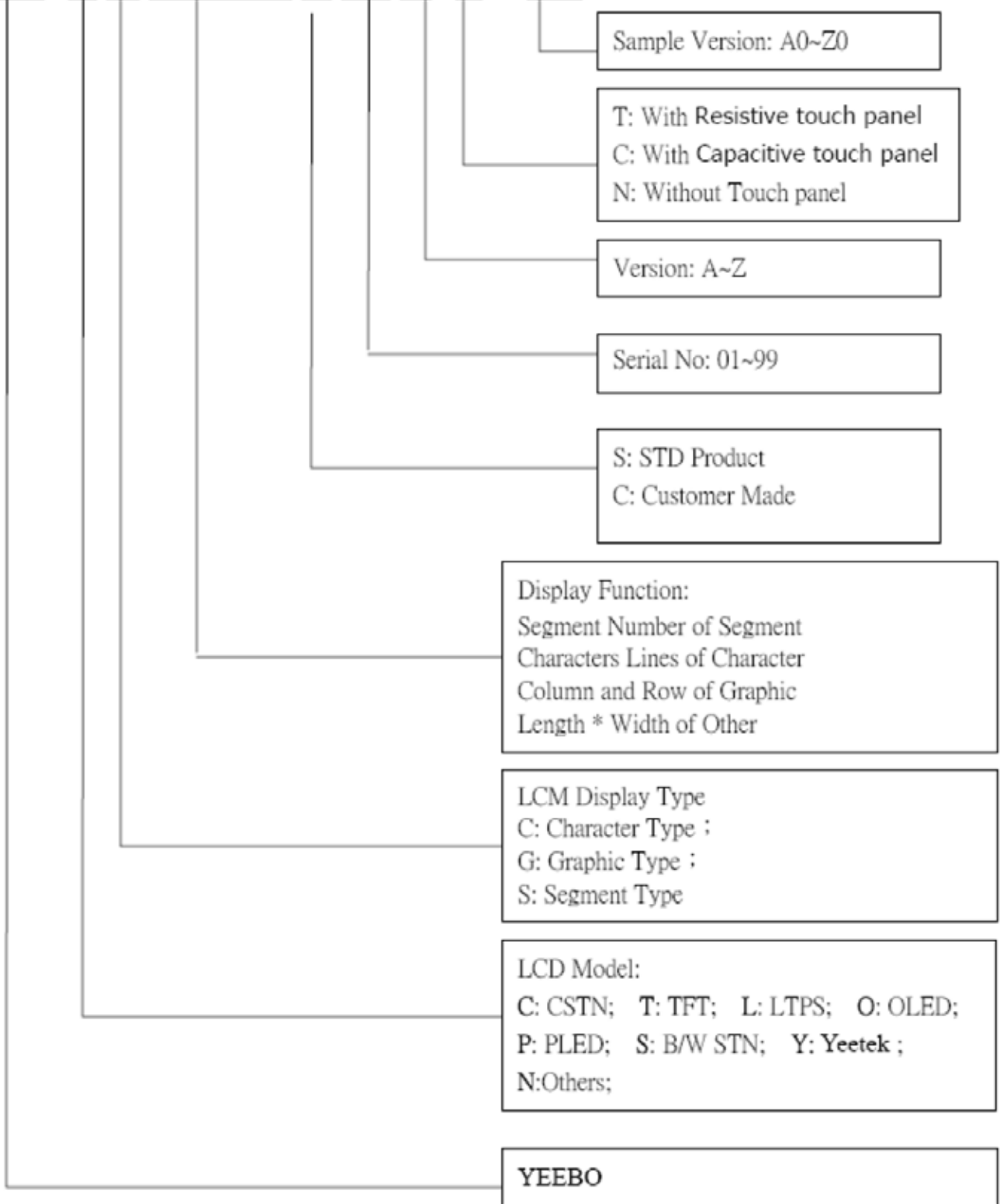
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### 3. Module Numbering System:

(Example)

**YB- T G 240320 S 01 D -T - A0**





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

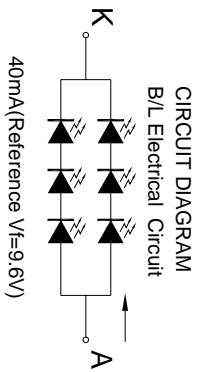
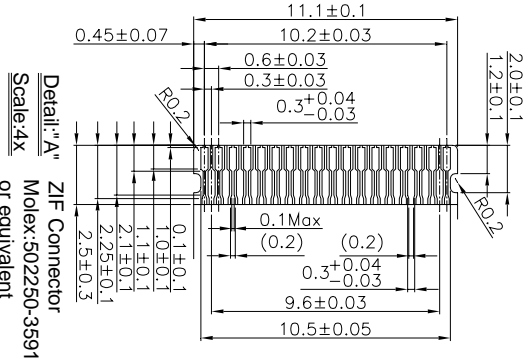
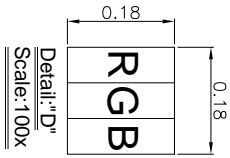
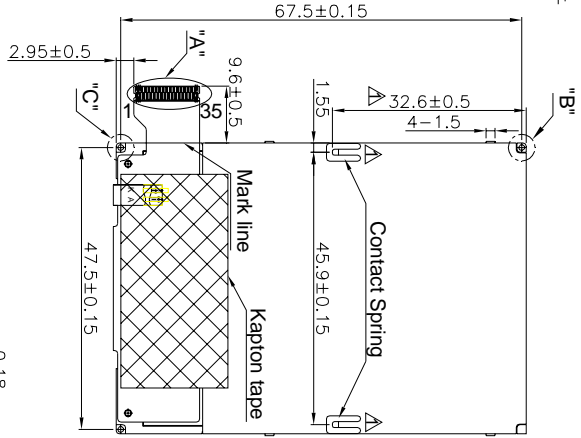
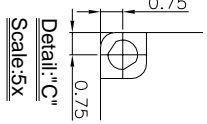
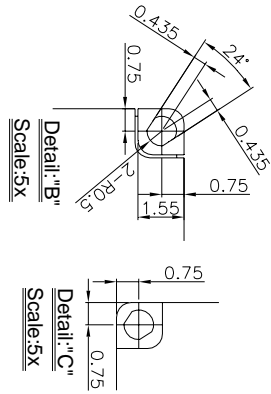
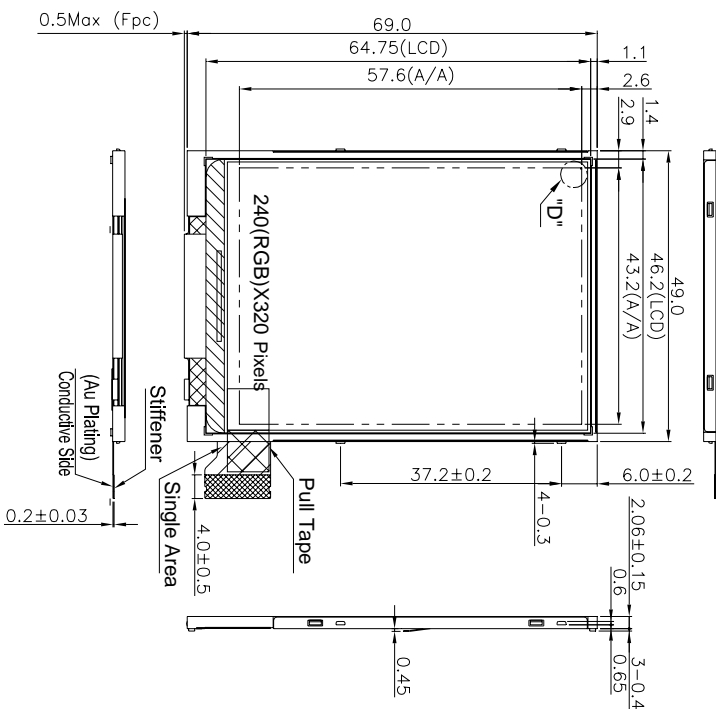
ITEM	CONTENTS
Module Size	49.0 (W) * 69.0 (H) * 2.06 (T) mm
Module Size(With FPC)	58.6 (W) * 69.5 (H) * 2.06 (T) mm
Display Size(Diagonal)	2.8 inch
Display Format	240(RGB)*320 Pixels
Active Area	43.2(W) * 57.6 (H) mm
Pixel Pitch	0.18* 0.18 mm
LCD Type	TFT (262K) / Transmissive / Normally Black
View Direction	Free
Controller IC	ILI9341
Weight	13.6g



### 5. LCM drawing:

Count drawing & Spec. revision record during discussion with customer	
Rec:	Revision content description
#1	FIRST ISSUE
#2	modify the design. $\Delta$
Date	2014-12-17
Date	2014-12-19

- Specification:
1. Display mode: 2.8" TFT/ Transmissive
  2. Display Color: 262K
  3. Viewing Direction: Full View
  4. Controller IC: IL9341
  5. Operating temperature: -20°C to +70°C
  6. Storage temperature: -30°C to +80°C
  7. Backlight: 6chip White LED
  8. Unspecified tolerance:  $\pm 0.30\text{mm}$ .
  8. ROHS compliant



1	GND	FPC PIN OUT
2	IM0	
3	IM1	
4	FMARK	
5	GND	
6	DB17	
7	DB16	
8	DB15	
9	DB14	
10	DB13	
11	DB12	
12	DB11	
13	DB10	
14	DB9	
15	DB8	
16	IOVCC	
17	DB7	
18	DB6	
19	DB5	
20	DB4	
21	DB3	
22	DB2	
23	DB1	
24	DB0	
25	CS	
26	RS	
27	WR	
28	RD	
29	/REST	
30	VCI	
31	GND	
32	LED+	
33	GND	
34	LED-	
35	GND	

		UNIT	SIZE	SCALE	DESIGNED	CHECKED	VERIFIED	APPROVED	FILE NAME
		mm	A4	N-T-S	楊仁豪				Count Dwg.
MOD. Name	YB-TG240320S26A-N-A								
DESIGNED	楊仁豪								
CHECKED									
VERIFIED									
APPROVED									
Sheet	1								
Or	1								

## 6. Electrical Characteristics

### 6-1 Absolute Maximum Ratings

(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Supply Voltage	V <sub>CI</sub>	-0.3	-	+4.6	Volt	Note1
Supply Voltage(Logic)	IOV <sub>CC</sub>	-0.3	-	+4.6	Volt	Note1
Operating Temperature	T <sub>opr</sub>	-20	-	+70		-
Storage Temperature	T <sub>stg</sub>	-30	-	+80		-

Note1: Absolute maximum rating is the limit value beyond which the IC maybe broken.  
They do not assure operations.

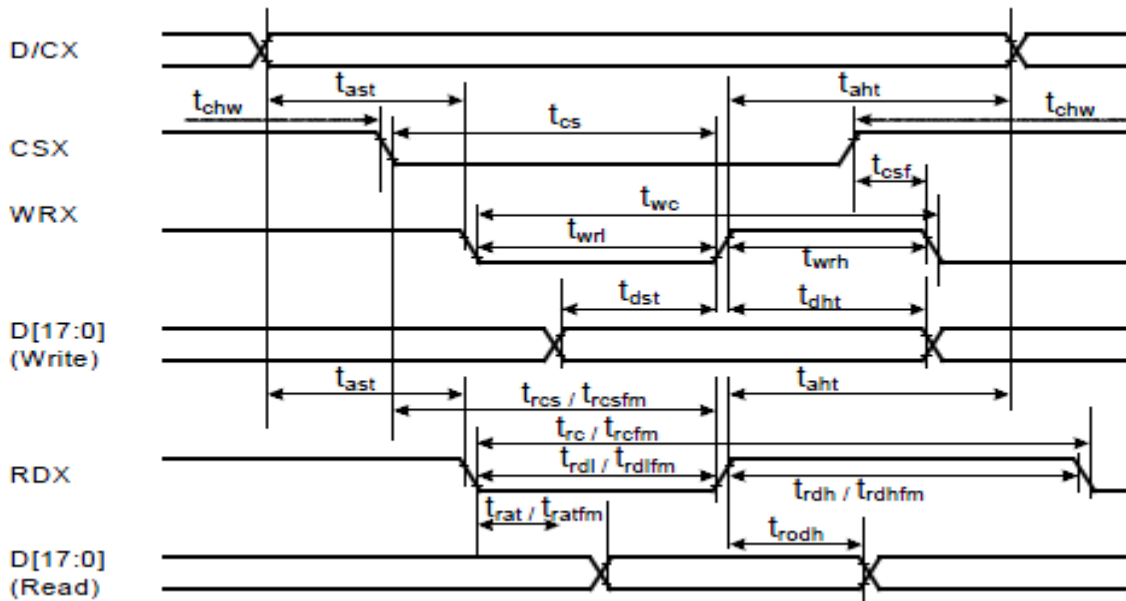
### 6-2 Operating Conditions

(Ta=25°C )

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	V <sub>CI</sub>	-	2.6	2.8	3.0	Volt
Supply voltage for I/O	IOV <sub>CC</sub>	-	1.65	2.8	3.0	Volt
Input Voltage	V <sub>IH</sub>	-	0.7 * IOV <sub>CC</sub>	-	IOV <sub>CC</sub>	V
	V <sub>IL</sub>	-	V <sub>SS</sub>	-	0.3* IOV <sub>CC</sub>	V
Power Supply Current for LCM	I <sub>CC</sub>	V <sub>CI</sub> =2.8V	-	15.6	23.4	mA

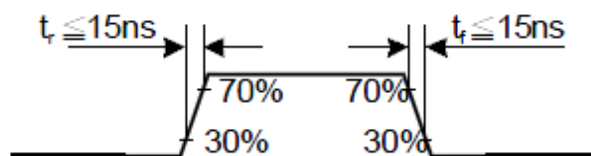
### 6-3 Timing Characteristics

6-3.1 Display Parallel 18/16/9/8-bit Interface Timing Characteristics (8080- II system)



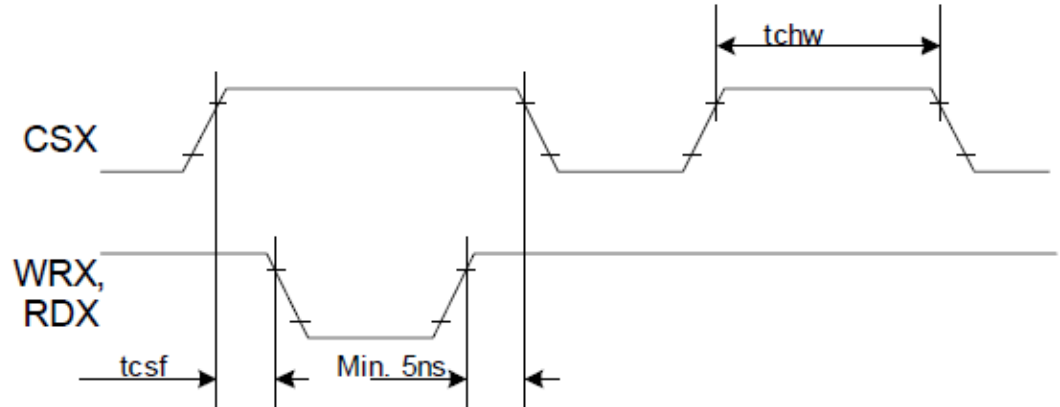
Signal	Symbol	Parameter	min	max	Unit	Description
DCX	t <sub>ast</sub>	Address setup time	0	-	ns	
	t <sub>ah</sub>	Address hold time (Write/Read)	0	-	ns	
CSX	t <sub>chw</sub>	CSX "H" pulse width	0	-	ns	
	t <sub>cs</sub>	Chip Select setup time (Write)	15	-	ns	
	t <sub>rcs</sub>	Chip Select setup time (Read ID)	45	-	ns	
	t <sub>rcsfm</sub>	Chip Select setup time (Read FM)	355	-	ns	
	t <sub>csf</sub>	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	t <sub>wc</sub>	Write cycle	66	-	ns	
	t <sub>wrh</sub>	Write Control pulse H duration	15	-	ns	
	t <sub>wrl</sub>	Write Control pulse L duration	15	-	ns	
RDX (FM)	t <sub>rcfm</sub>	Read Cycle (FM)	450	-	ns	
	t <sub>rdhfm</sub>	Read Control H duration (FM)	90	-	ns	
	t <sub>rdlfm</sub>	Read Control L duration (FM)	355	-	ns	
RDX (ID)	t <sub>rc</sub>	Read cycle (ID)	160	-	ns	
	t <sub>rdh</sub>	Read Control pulse H duration	90	-	ns	
	t <sub>rdl</sub>	Read Control pulse L duration	45	-	ns	
D[17:0], D[17:10]&D[8:1], D[17:10], D[17:9]	t <sub>dst</sub>	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	t <sub>dht</sub>	Write data hold time	10	-	ns	
	t <sub>rat</sub>	Read access time	-	40	ns	
	t <sub>ratfm</sub>	Read access time	-	340	ns	
	t <sub>rod</sub>	Read output disable time	20	80	ns	

Note: Ta = -30 to 70 °C, VDDI=1.65V to 3.3V, VCI=2.5V to 3.3V, VSS=0V.



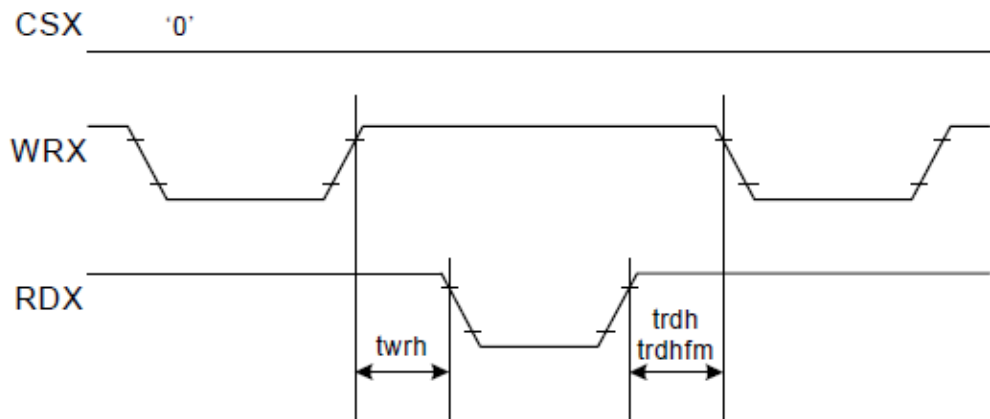


CSX timings :



Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Write to read or read to write timings:



Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

## 7. Optical Characteristics:

Item	Symbol	Conditions	Specifications			Unit	Note	
			Min	Typ	Max			
Transmittance (With PL)	T(%)	-	-	3.9	-	-	-	
Contrast Ratio	CR	=0 Normal Viewing angle	-	800	-		(1) (2)	
Response time	TR+TF	-	-	30	-	ms	(1) (3)	
Viewing angle	Hor	$\Theta_{x+}$	CR 10	-	80	-	deg.	-
		$\Theta_{x-}$		-	80	-		
	Ver	$\Theta_{y+}$		-	80	-		
		$\Theta_{y-}$		-	80	-		

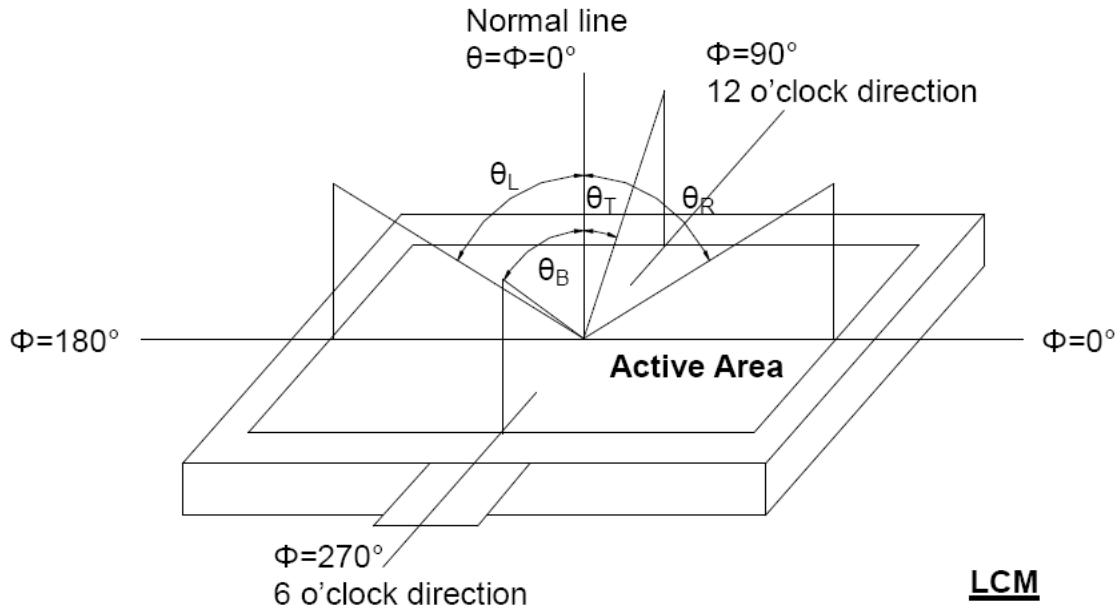
### Measuring Condition

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.	Brightness	
Chromaticity Coordinates (Transmissive)	Red	x	LED Backlight Color Degree x=TBD y=TBD Brightness =7500 cd/m <sup>2</sup>	0.5801	0.6301	0.6801	60 cd/m <sup>2</sup>
		y		0.2825	0.3325	0.3825	
	Green	x		0.2668	0.3168	0.3668	250 cd/m <sup>2</sup>
		y		0.5660	0.6160	0.6660	
	Blue	x		0.0948	0.1448	0.1948	20 cd/m <sup>2</sup>
		y		0.0187	0.0687	0.1187	
	White	x		0.2396	0.2896	0.3396	350 cd/m <sup>2</sup>
		y		0.2574	0.3074	0.3574	

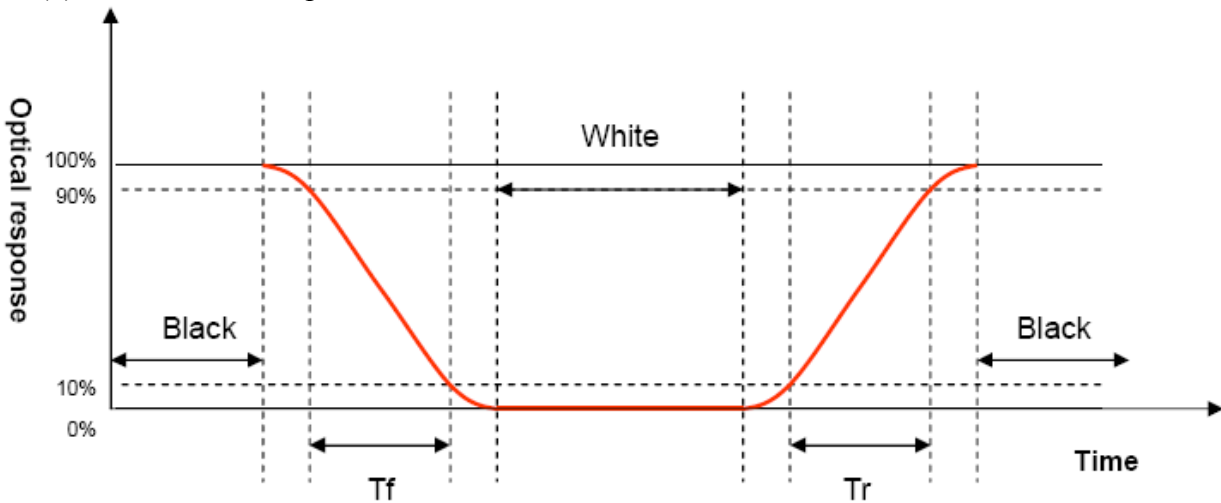
Note (1) Definition of Viewing Angle :



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



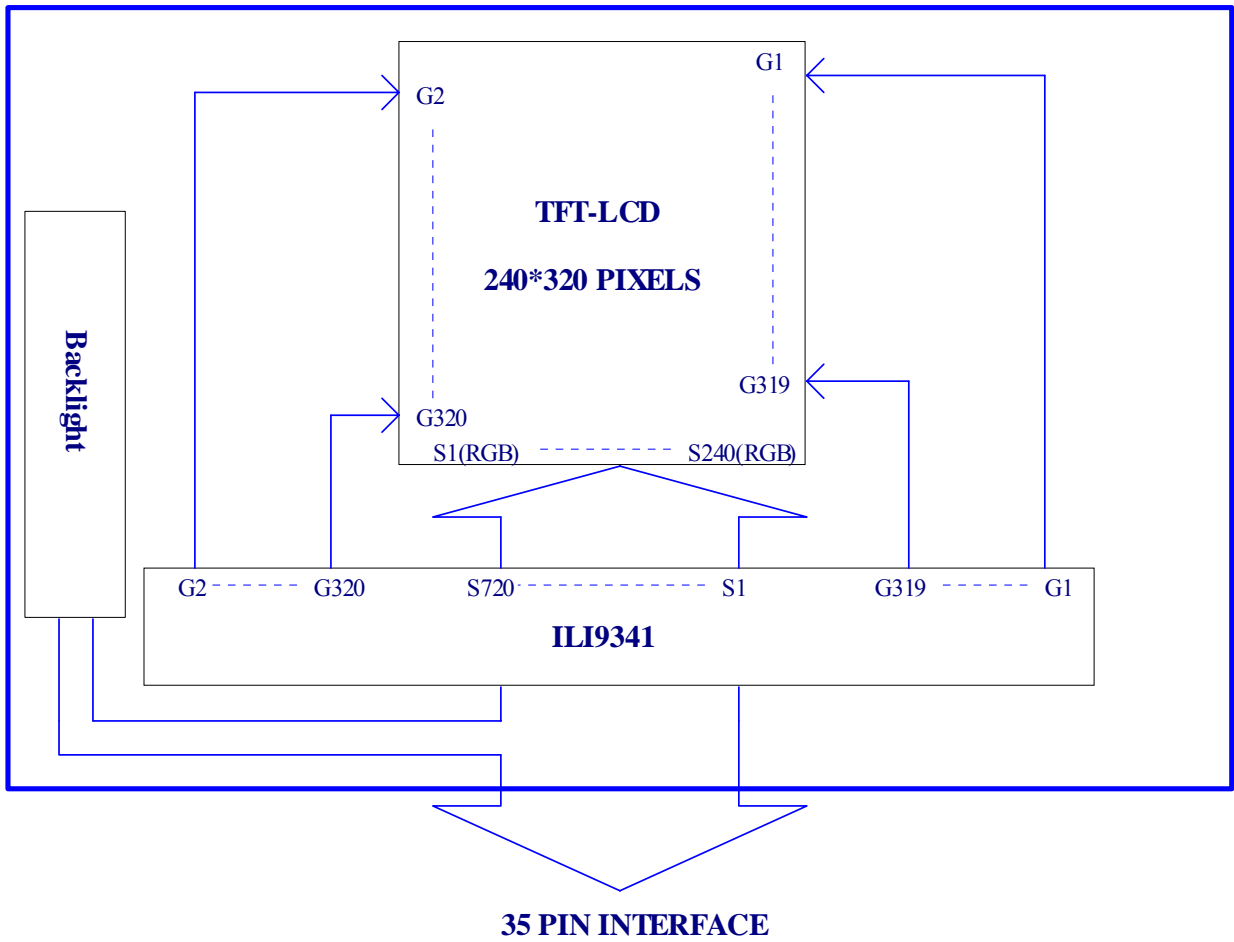
## 8. Interface Pin Assignment:

No.	Symbol	Function																											
1	GND	Ground																											
2	IM0	Select MPU Interface mode <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">IM1</th> <th rowspan="2">IM0</th> <th rowspan="2">MCU-Interface Mode</th> <th colspan="2">DB Pin in use</th> </tr> <tr> <th>Register/content</th> <th>GRAM</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>80 MCU 16-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:10],D[8:1]</td> </tr> <tr> <td>0</td> <td>1</td> <td>80 MCU 8-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:10]</td> </tr> <tr> <td>1</td> <td>0</td> <td>80 MCU 18-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:0]</td> </tr> <tr> <td>1</td> <td>1</td> <td>80 MCU 9-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:9]</td> </tr> </tbody> </table>	IM1	IM0	MCU-Interface Mode	DB Pin in use		Register/content	GRAM	0	0	80 MCU 16-bit bus interface II	D[8:1]	D[17:10],D[8:1]	0	1	80 MCU 8-bit bus interface II	D[17:10]	D[17:10]	1	0	80 MCU 18-bit bus interface II	D[8:1]	D[17:0]	1	1	80 MCU 9-bit bus interface II	D[17:10]	D[17:9]
IM1	IM0					MCU-Interface Mode	DB Pin in use																						
			Register/content	GRAM																									
0	0		80 MCU 16-bit bus interface II	D[8:1]	D[17:10],D[8:1]																								
0	1		80 MCU 8-bit bus interface II	D[17:10]	D[17:10]																								
1	0	80 MCU 18-bit bus interface II	D[8:1]	D[17:0]																									
1	1	80 MCU 9-bit bus interface II	D[17:10]	D[17:9]																									
3	IM1																												
4	FMARK	Frame head pulse signal (leave it Open if not used)																											
5	GND	Ground																											
6	DB17	Data bus																											
7	DB16	Data bus																											
8	DB15	Data bus																											
9	DB14	Data bus																											
10	DB13	Data bus																											
11	DB12	Data bus																											
12	DB11	Data bus																											
13	DB10	Data bus																											
14	DB9	Data bus																											
15	DB8	Data bus																											
16	IOVCC	Digital power supply																											
17	DB7	Data bus																											
18	DB6	Data bus																											
19	DB5	Data bus																											
20	DB4	Data bus																											
21	DB3	Data bus																											
22	DB2	Data bus																											



23	DB1	Data bus
24	DB0	Data bus
25	/CS	Chip select signal active low
26	RS	Display data(RS=H) / Command selection(RS=L)
27	/WR	Write signal active low
28	/RD	Read signal active low
29	/RESET	Reset signal active low
30	VCI	Analog power supply
31	GND	Ground
32	LED+	LED power supply(+)
33	GND	Ground
34	LED-	LED power supply(-)
35	GND	Ground

## 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:

(Ta=25°C)

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	40	-	mA	V=9.6V	
Supply Voltage	V	9.0	9.6	10.2	V	If=40mA	
Reverse Voltage	VR	-	-	TBD	V	-	
Luminous Intensity for LCM	IV	280	350	-	Cd/m <sup>2</sup>	If=40mA	2
Uniformity for LCM	-	70	-	-	%		3
Life Time	-	-	50000	-	Hr.		4
Color	White						

NOTE:

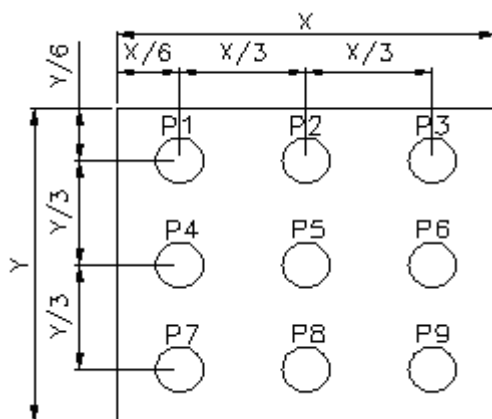
1. Backlight Only

2. Average Luminous Intensity of P1-P9

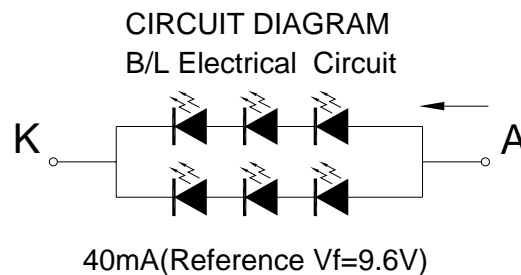
3. Uniformity = Min/Max \* 100%

4. LED life time defined as follows: The final brightness is at 50% of original brightness

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



#### Internal Circuit Diagram



#### (Effective spatial Distribution)

Hole Diameter  $\phi$ 3 mm; 1 to 9 per Position Measured Luminous



## 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: ±4KV 150pF/330Ω 5 times
		Contact: ±2KV 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 11-1, 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 ( $25\pm 5^{\circ}\text{C}$ ), normal humidity ( $50\pm 10\%$ 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 MIL-STD105E.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

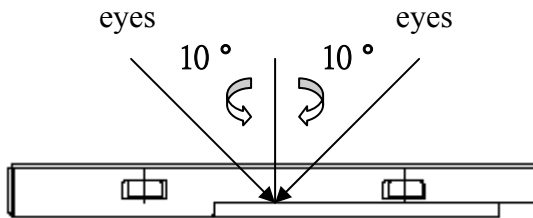
a. Manner of appearance test:

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

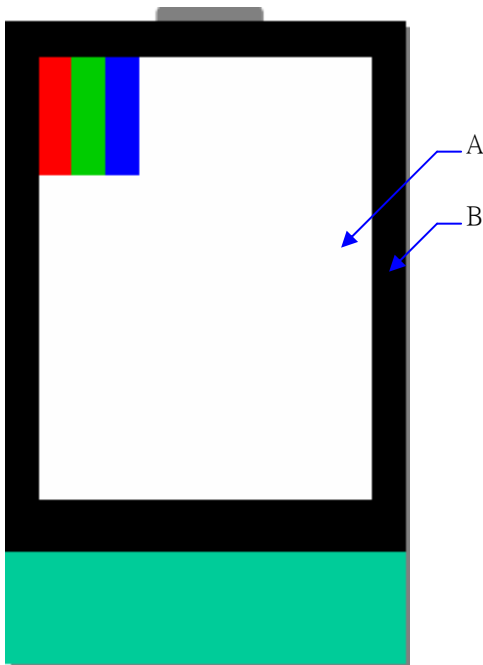
(ii) When test the model of transmissive product must add the reflective plate.

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

(iii) 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.

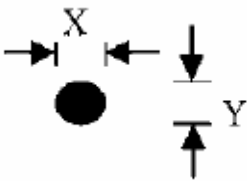
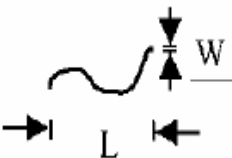
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

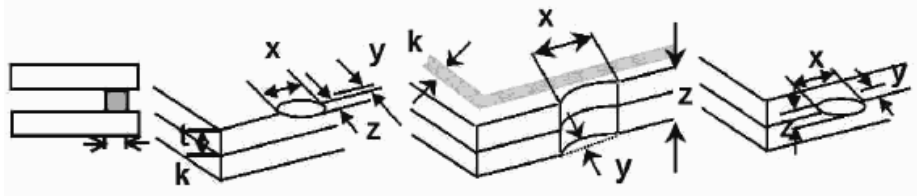
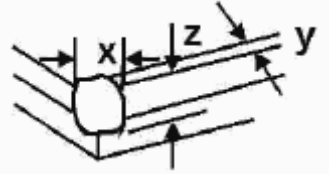
(iii) Must add new item on time when it is necessary.

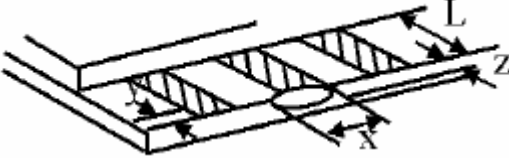
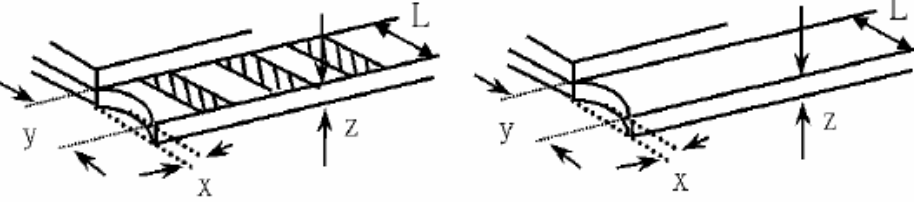
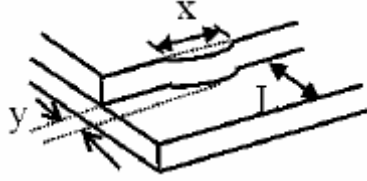
c. Standard of inspection: (Unit: mm)

12-6. Inspection specification

Defect out of viewing area can be neglected.

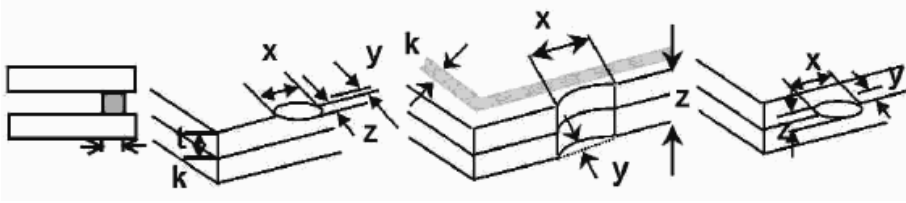
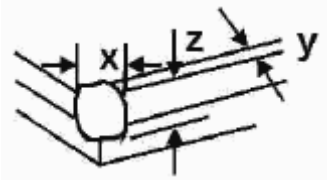
NO	Item	Criterion	AQL												
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 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 White and black or color spots on display $\leq 0.25\text{mm}$ , no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	<b>2.5</b>												
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$ <div style="display: flex; align-items: center; justify-content: center;">  <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.20</math></td> <td>2</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.25</math></td> <td>2</td> </tr> <tr> <td><math>0.25 &lt; \Phi \leq 0.30</math></td> <td>1</td> </tr> <tr> <td><math>0.30 &lt; \Phi</math></td> <td>0</td> </tr> </tbody> </table> </div> <p style="text-align: center;">* Densely spaced: No more than two spots within 3mm.</p>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	<b>2.5</b>
		Size(mm)	Acceptable Q'ty												
$\Phi \leq 0.10$	Accept no dense														
$0.10 < \Phi \leq 0.20$	2														
$0.20 < \Phi \leq 0.25$	2														
$0.25 < \Phi \leq 0.30$	1														
$0.30 < \Phi$	0														
3.2 Line type: (As following drawing) <div style="display: flex; align-items: center; justify-content: center;">  <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>---</td> <td><math>W \leq 0.02</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.02 &lt; W \leq 0.05</math></td> <td rowspan="2">2</td> </tr> <tr> <td><math>L \leq 2.5</math></td> <td><math>0.03 &lt; W \leq 0.08</math></td> </tr> <tr> <td>---</td> <td><math>0.08 &lt; W</math></td> <td>Rejection</td> </tr> </tbody> </table> </div> <p style="text-align: center;">* Densely spaced: No more than two lines within 3mm.</p>	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.08$	---	$0.08 < W$	Rejection	<b>2.5</b>
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$L \leq 2.5$	$0.03 < W \leq 0.08$														
---	$0.08 < W$	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" data-bbox="868 293 1366 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>3</td> </tr> <tr> <td><math>0.50 &lt; \Phi \leq 1.00</math></td> <td>2</td> </tr> <tr> <td><math>1.00 &lt; \Phi</math></td> <td>0</td> </tr> <tr> <td>Total Q'ty</td> <td>3</td> </tr> </tbody> </table>	Size $\Phi$ (mm)	Acceptable Q'ty	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.50$	3	$0.50 < \Phi \leq 1.00$	2	$1.00 < \Phi$	0	Total Q'ty	3	2.5						
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$0.50 < \Phi \leq 1.00$	2																				
$1.00 < \Phi$	0																				
Total Q'ty	3																				
05	Scratches	Follow NO.3 -2 Line Type.																			
06	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>6.1 General glass chip:  6.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="416 1048 1235 1205"> <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>6.1.2 Corner crack:</p>  <table border="1" data-bbox="416 1570 1235 1727"> <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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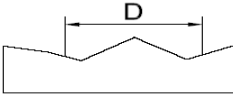
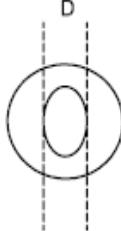
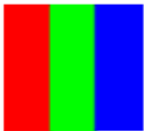
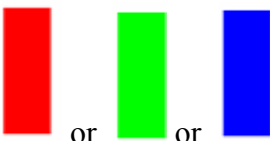
NO	Item	Criterion	AQL																
07	Glass crack	<p>Symbols:            x: Chip length      y: Chip width      z: Chip thickness            k: Seal width      t: Glass thickness      a: LCD side length            L: Electrode pad length</p> <p>7.2 Protrusion over terminal:            7.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="550 683 1225 824"> <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="550 1198 1225 1339"> <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="869 1668 1305 1809"> <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
y: Chip width	x: Chip length	z: Chip thickness																	
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$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		



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="414 795 1236 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="414 1388 1236 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
z: Chip thickness	y: Chip width	x: Chip length													
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$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													



NO	Item	Criterion	AQL										
15	Touch Panel(Fish eye, dent and bubble on film)	<table border="1"> <thead> <tr> <th>SIZE(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.2 &lt; D \leq 0.4</math></td> <td>5</td> </tr> <tr> <td><math>0.4 &lt; D \leq 0.5</math></td> <td>2</td> </tr> <tr> <td><math>0.5 &lt; D</math></td> <td>0</td> </tr> </tbody> </table>  	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	2.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dense												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	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. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 0.65										
20	Definition of Pixel	Pixel : Group of Three Sub-pixels ( Red, Green ,Blue):  Dot : Red or Green or Blue  Dot : Any sub-pixel Bright Dot Defects Dots ( sub-pixels) on display which is bright in the picture and visible at Black Pattern.											

		<p>Dark Dot Defects  Dots( sub-pixels) on display which is dark in the picture and visible at Red/Green/Black/White Pattern.  Neighbour Dot Defects  Two or three neighbour dots ( dot: sub-pixel) cluster( R&amp;G,G&amp;B,B&amp;R,or R&amp;G&amp;B).Dot Defects Inspection Criteria</p> <p>NOTE : Dot out of VA can be ignored.</p> <table border="1" style="width: 100%;"> <thead> <tr> <th rowspan="2">Items</th> <th colspan="2">Inspection Criteria</th> </tr> <tr> <th>Details</th> <th>Allowed quantity</th> </tr> </thead> <tbody> <tr> <td>Bright Dot</td> <td>Not Neighbour Dot</td> <td>2</td> </tr> <tr> <td>Dark Dot</td> <td>Not Neighbour Dot</td> <td>3</td> </tr> <tr> <td colspan="2">Total acceptable Qty</td> <td>5</td> </tr> </tbody> </table> <p>Size of dot defect is larger than half of one sub-pixel.</p>	Items	Inspection Criteria		Details	Allowed quantity	Bright Dot	Not Neighbour Dot	2	Dark Dot	Not Neighbour Dot	3	Total acceptable Qty		5
Items	Inspection Criteria															
	Details	Allowed quantity														
Bright Dot	Not Neighbour Dot	2														
Dark Dot	Not Neighbour Dot	3														
Total acceptable Qty		5														

### **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  $25 \pm 10$  °C, and in a relative humidity of  $50 \pm 10\%$  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  $280 \pm 10$  °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.