



SPECIFICATION FOR LCD MODULE

MODULE NO: YB-TG480800S13A-C-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	袁江敏	2019/5/11
Check	Mechanical Engineer	俞芳	2019/5/13
Verify		陈长吉	2019/5/13
Approval		Sumray	2019/5/14

- APPROVAL FOR SPECIFICATIONS ONLY
- APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-C



1. Revision History

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A0	00	2019-05-08	FULL SPEC	First Sample	Yuan



2. Table of Contents:

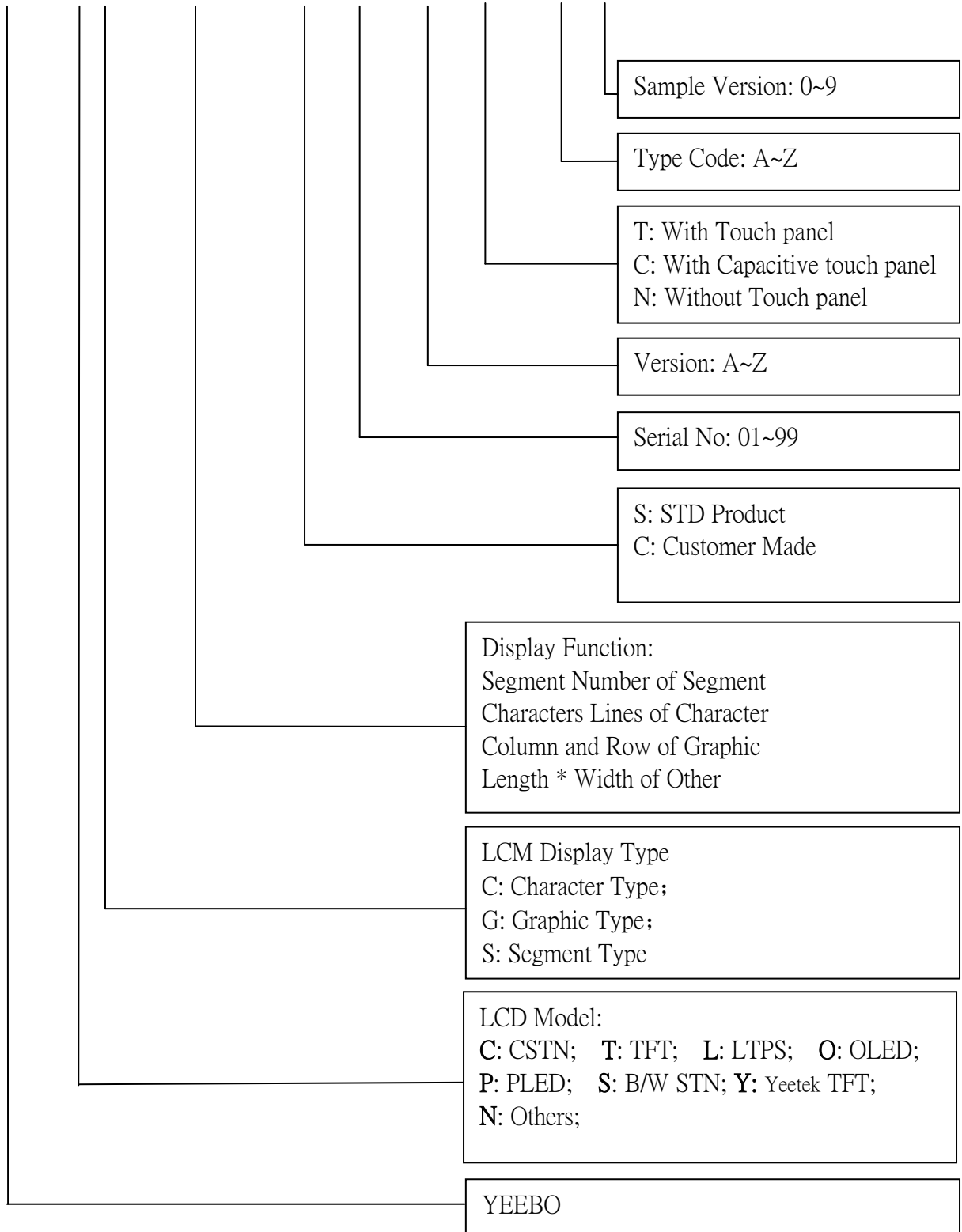
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3. Module Numbering System:

(Example)

YB- TG 480800 S 13 A -C - A 0





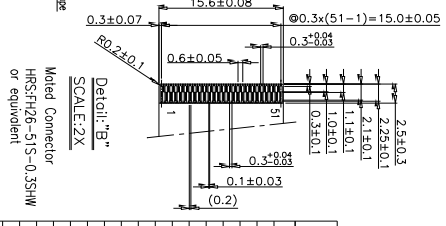
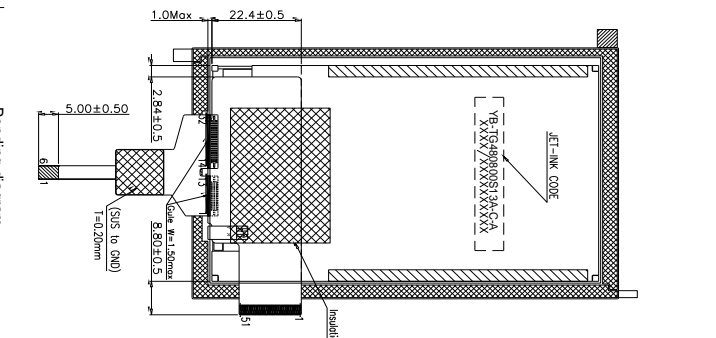
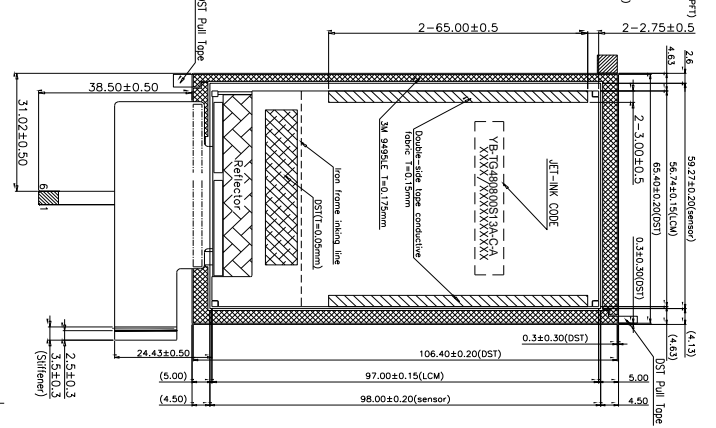
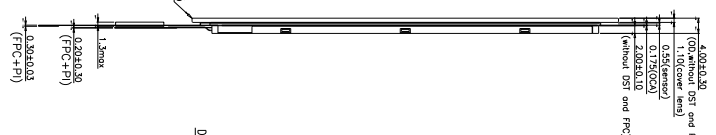
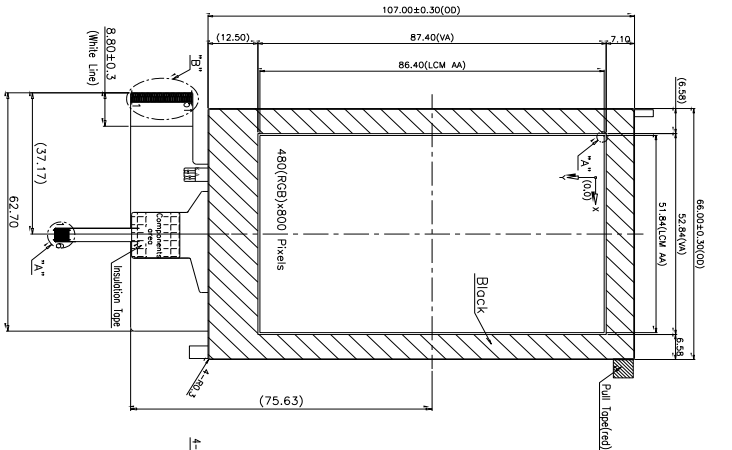
4. General Specification:

ITEM	CONTENTS
Module Size	66.00 (W) * 107.00 (H) * 4.0 (T) mm
Module Size(With FPC)	70.17 (W) * 126.43 (H) * 4.0 (T) mm
Display Size(Diagonal)	3.97inch
Display Format	480(RGB) * 800 Pixels
Active Area	52.84*87.40mm
Piexl Pitch	0.108*0.108 mm
LCD Type	16.7M Color / Transmissive / Normal Black
Viewing Direction	Free
Driver IC	ST7701S
CTP IC	ST1624
CTP Interface	I2C
Weight(g)	≈46.31g
Firmware	8975_20181205.dumo
Test Configuration	FW5238_8975_ZH_20181205_093845.prj



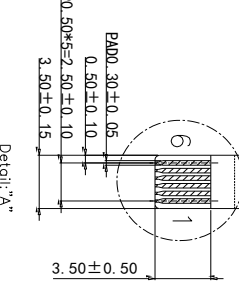
5. LCM drawing:

Count drawing & Spec. revision record during discussion with customer	
Rec.:	Revision content description
#1	FIRST ISSUE
Date	2018-11-01

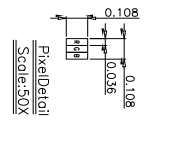


- Specification:**
- Glass Type: G+G
 - Display mode: 3.97" TFT / Normal Black/ Transmissive
 - Driver IC: ST7701S or Compatible
 - Display Color: 16.7M
 - Viewing Direction: Full View
 - Backlight: 8 chips White LED
 - Channel NO.: 915
 - T/P Controller IC: ST1624
 - T/C Address: 0x55
 - Transmittance Rate: >85%
 - Operating temperature: -20°C ~ +70°C
 - Storage temperature: -30°C ~ +80°C
 - Surface hardness: 6H min
 - Unspecified tolerance: ±0.30, (") reference dimension
 - ROHS compliant

CIRCUIT DIAGRAM
B/L Electrical Circuit
LED_A
LED_K



Bending diagram.
Bend the shipment



PIN	SYMBOL	FUNCTION
1	RESET	
2	SIM (3.3V)	
3	SCL (3.3V)	
4	INT (3.3V)	
5	GND	
6	VCC (3.3V)	

UNIT	mm
SIZE	A4
SCALE	N-T-S

MOD. Name	YB-TG480800S13A-C-A
DESIGNED	
CHECKED	
VERIFIED	
APPROVED	
FILE NAME	Count Dwg.

Sheet	1
Of	1
51	LED PWM

6. Electrical Characteristics(TFT)

6-1 Absolute Maximum Ratings

Item	Symbol	Min.	Type	Max.	Unit	Remark
Power Supply Voltage	V _{DD}	-0.3	-	4.8	V	
Supply Voltage(Logic)	V _{DDI}	-0.3	-	4.6	V	
Logic Input Voltage Range	V _{IH}	-0.3	-	V _{DDI} +0.5	V	
Logic Output Voltage Range	V _{OH}	-0.3	-	V _{DDI} +0.5	V	
Operating Temperature	T _{opr}	-20	-	+70	°C	
Storage Temperature	T _{stg}	-30	-	+80	°C	

Note : Even if the absolute maximum rating of one of the above parameters is exceeded only for a short while, the quality of the product may be degraded. Therefore, be sure to use the product within the range of the absolute maximum ratings.

6-2 Operating Conditions

(T_a=25°C)

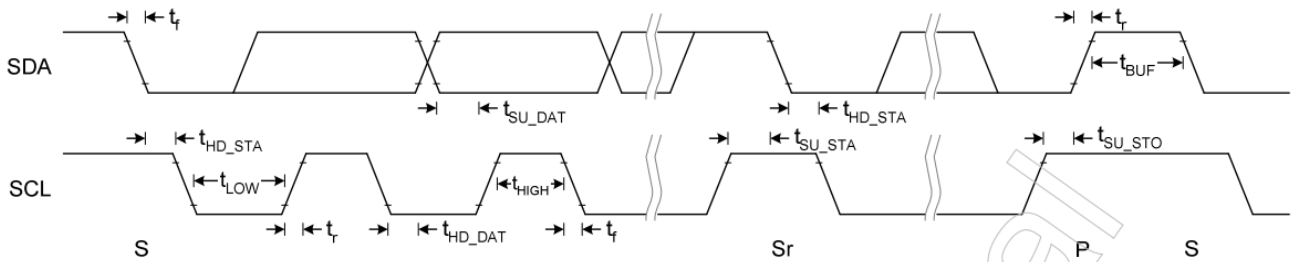
Item	Symbol	Condition	Min.	Type	Max.	Unit	Remark
Power Supply Voltage	V _{DD}	-	2.5	2.8	3.6	V	
Supply Voltage(Logic)	V _{DDI}	-	1.68	2.8	3.3	V	
IO Supply Voltage	V _{IH}	-	0.7 V _{DDI}	-	V _{DDI}	V	
	V _{IL}	-	V _{SS}	-	0.3 V _{DDI}	V	
	V _{OH}	-	0.8 V _{DDI}	-	V _{DDI}	mA	
	V _{OL}	-	V _{SS}	-	0.2 V _{DDI}	V	
Power Supply Current	I _{DD}	V _{DD} =2.8V	-	46.6	69.9	mA	

6-3 Power Supply (CTP)

- **Operation voltage**
 - VDD = 2.7V ~ 3.6V
 - IOVDD = 1.6V ~ 3.6V
- **Operation Temperature: -20°C ~ 80°C**
- **Storage Temperature: -40°C ~ 125°C**

6-4 DC Characteristics (Topr = 25°C)

The timing of I2C Interface



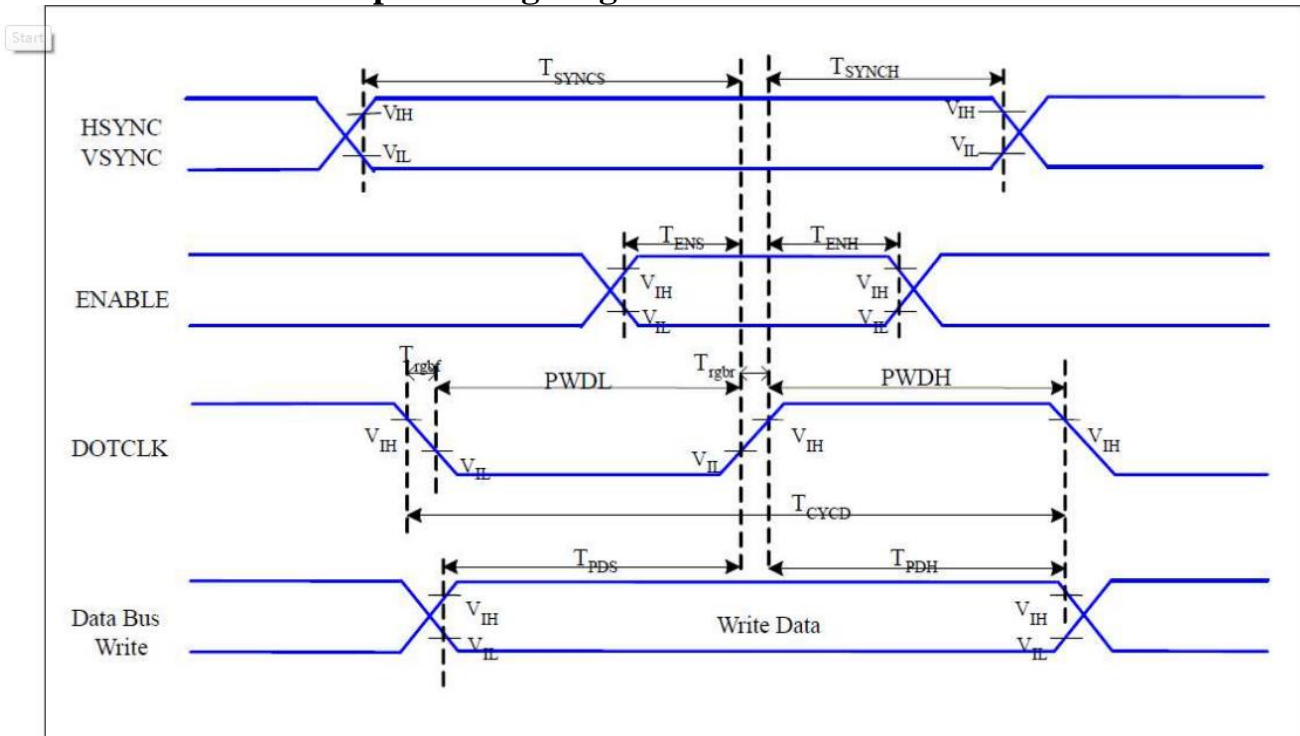
Characteristics of the SDA and SCL bus lines

Condit 1s: VDD = 3.3V, GND = 0V, T_A = 25°C

Symbol	Parameter	Rating			Unit
		Min.	Typ.	Max.	
f _{SCL}	SCL clock frequency	0	-	400	kHz
t _{LOW}	Low period of the SCL clock	1.3	-	-	us
t _{HIGH}	High period of the SCL clock	0.6	-	-	us
t _r	Signal falling time	-	-	300	ns
t _r	Signal rising time	-	-	300	ns
t _{SU_STA}	Set up time for a repeated START condition	0.6	-	-	us
t _{HD_STA}	Hold time (repeated) START condition. After this period, the first clock pulse is generated	0.6	-	-	us
t _{SU_DAT}	Data set up time	100	-	-	ns
t _{HD_DAT}	Data hold time	0	-	0.9	us
t _{SU_STO}	Set up time for STOP condition	0.6	-	-	us
t _{BUF}	Bus free time between a STOP and START condition	1.3	-	-	us
C _b	Capacitive load for each bus line	-	-	400	pF

6-5 Timing Characteristics(TFT)

6-5-1 Clock and data input timing diagram



6-5-2 RGB input timing table

6-5-2-1 Parallel 24-bit RGB timing table

VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25 °C

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYNC, HSYNC Setup Time	5	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	5	-	ns	
	T_{ENH}	Enable Hold Time	5	-	ns	
DOTCLK	PWDH	DOTCLK High-level Pulse Width	13	-	ns	
	PWDL	DOTCLK Low-level Pulse Width	13	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	28	-	ns	
	Trghr, Trghf	DOTCLK Rise/Fall time	-	15	ns	
DB	T_{PDS}	PD Data Setup Time	5	-	ns	
	T_{PDH}	PD Data Hold Time	5	-	ns	

7. Optical Characteristics:

Item	Symbol	Conditions	Specifications			Unit	Note	
			Min	Typ	Max			
Transmittance	T(%)	-	-	4.14	-	-	-	
Contrast Ratio	CR	$\theta=0^\circ$ Normal Viewing Angle	720	900	-		(1) (2)	
Response time	TR+TF		-	35	45	ms	(1) (3)	
NTSC	-	-	-	70	-	%	Note 1	
Viewing Angle	Hor.	θ_{x+}	CR ≥ 10	-	80	-	deg.	(1)
		θ_{x-}		-	80	-		
	Ver.	θ_{y+}		-	80	-		
		θ_{y-}		-	80	-		

Measuring Condition

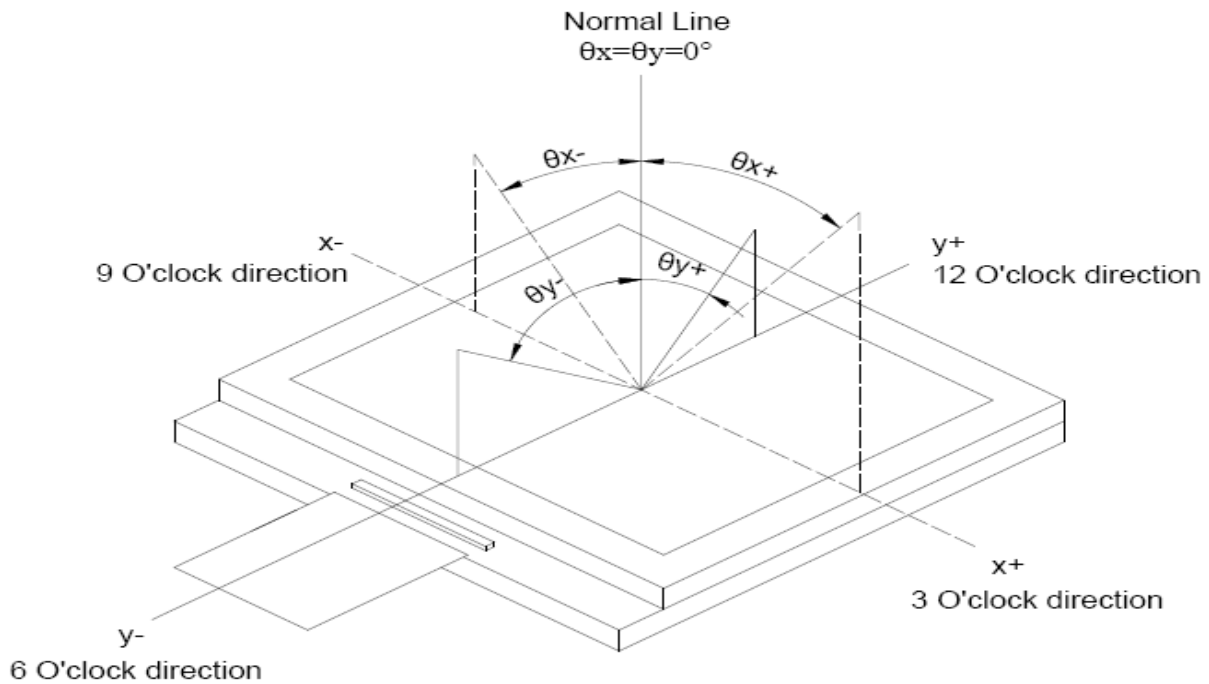
1. Measuring surrounding: dark room
2. Ambient temperature: $25 \pm 2^\circ\text{C}$
3. 30 min. Warm-up time.

Color of CIE Coordinate:

($T_a=25^\circ\text{C}$)

Item	Symbol	Condition	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red	x	0.580	0.630	0.680
		y	0.293	0.343	0.393
	Green	x	0.271	0.321	0.371
		y	0.559	0.609	0.659
	Blue	x	0.092	0.142	0.192
		y	0.050	0.100	0.150
	White	x	0.246	0.296	0.346
		y	0.193	0.243	0.293

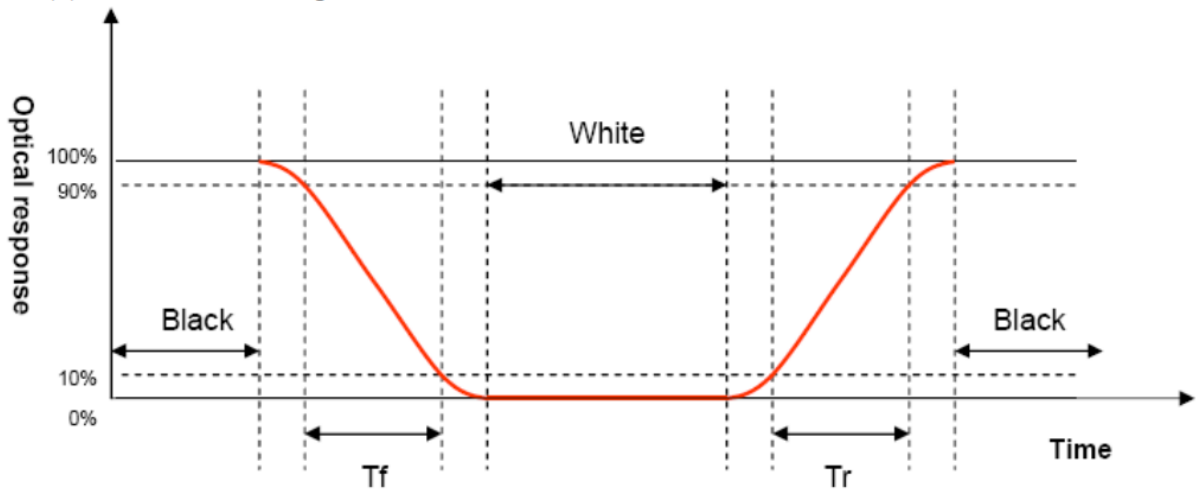
Note (1) Definition of Viewing Angle:



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:

8-1 TFT Pin Description:

No.	Symbol	Function	Remark																																			
1	LED_K	LED cathode																																				
2	LED_A	LED anode																																				
3	NC	Not connect.																																				
4	NC	Not connect.																																				
5	NC	Not connect.																																				
6	NC	Not connect.																																				
7	VDD	Power Supply for analog Voltage																																				
8	VDDI	Power Supply for logic Voltage																																				
9	IM3	<table border="1"> <thead> <tr> <th>IM3</th> <th>IM2</th> <th>IM1</th> <th>IM0</th> <th>MPU Interface Mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>RGB+8b SPI (fall)</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>RGB+9b SPI (fall)</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>RGB+16b SPI (rise)</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>RGB+8b SPI (rise)</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>RGB+9b SPI (rise)</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>RGB+16b SPI (fall)</td> </tr> </tbody> </table>	IM3	IM2	IM1	IM0	MPU Interface Mode	0	0	0	1	RGB+8b SPI (fall)	0	0	1	0	RGB+9b SPI (fall)	0	0	1	1	RGB+16b SPI (rise)	1	0	0	1	RGB+8b SPI (rise)	1	0	1	0	RGB+9b SPI (rise)	1	0	1	1	RGB+16b SPI (fall)	
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1	0	1	1	RGB+16b SPI (fall)																																		
10	IM2																																					
11	IM1																																					
12	IM0																																					
13	SDO	Serial data output pin used the for SPI interface																																				
14	SDA	Serial data input/output bidirectional pin for SPI interface Serial input data for I2C interface.																																				
15	DCX	Data /command select pin.The SPI interface (DCX): The signal for command or parameter select. Low: Command High: Parameter																																				
16	SCL	Write enable clock input pin Serial clock input for SPI interface. Serial input clock for I2C interface.																																				
17	NC	Not connect																																				
18	CSX	Chip select input pin Low: the chip is selected and accessible High: the chip is not selected and not accessible.																																				
19	RESX	Reset pin																																				
20	DB23	Data bus																																				
21	DB22	Data bus																																				
22	DB21	Data bus																																				
23	DB20	Data bus																																				
24	DB19	Data bus																																				
25	DB18	Data bus																																				
26	DB17	Data bus																																				
27	DB16	Data bus																																				
28	DB15	Data bus																																				
29	DB14	Data bus																																				
30	DB13	Data bus																																				
31	DB12	Data bus																																				

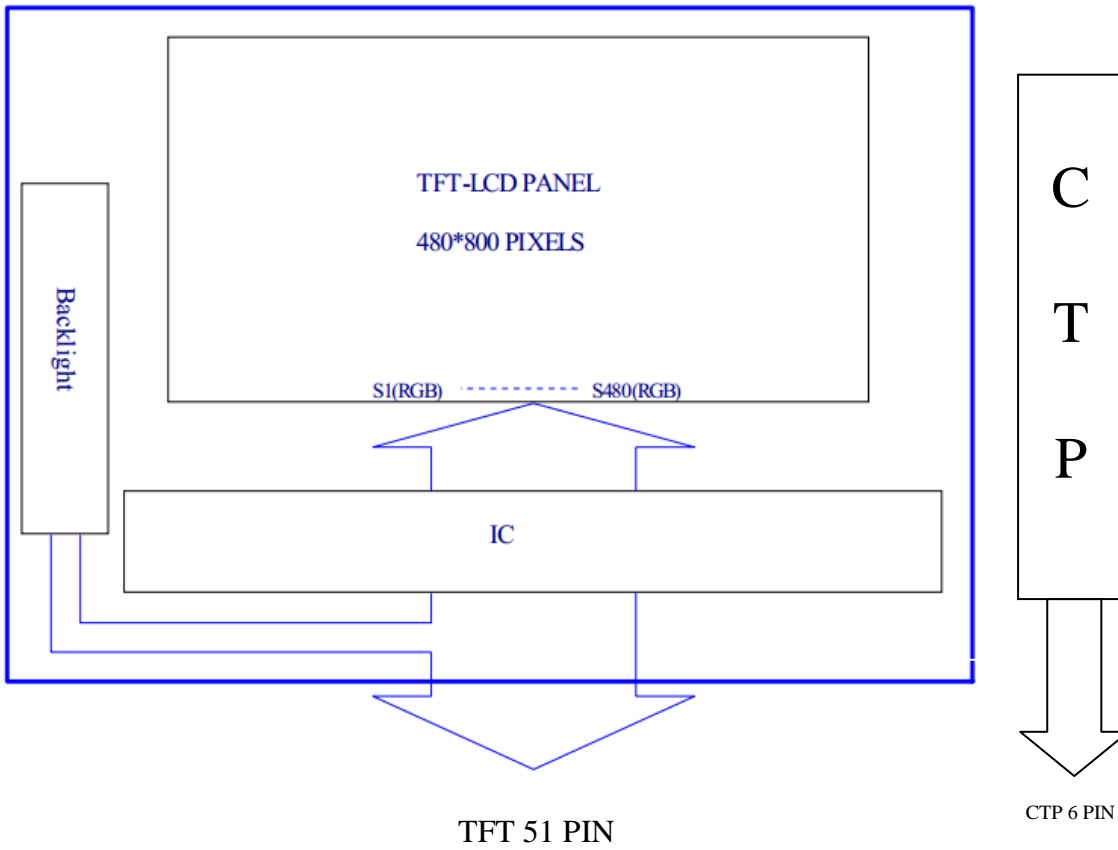


No.	Symbol	Function	Remark
32	DB11	Data bus	
33	DB10	Data bus	
34	DB9	Data bus	
35	DB8	Data bus	
36	DB7	Data bus	
37	DB6	Data bus	
38	DB5	Data bus	
39	DB4	Data bus	
40	DB3	Data bus	
41	DB2	Data bus	
42	DB1	Data bus	
43	DB0	Data bus	
44	DE	Data enable signal in RGB interface.	
45	GND	Ground	
46	PCLK	RGB clock	
47	GND	Ground	
48	HS	Horizontal synchronizing signal in RGB interface.	
49	VS	Vertical synchronizing signal in RGB interface.	
50	TE	Tearing effect pin	
51	LED_PWM	Backlight control	

8-2:Pin Description:

1	RESET	I	Chip Enable
2	SDA	I/O	I ² C Serial Data
3	SCL	I/O	I ² C Serial Clock
4	INT	I/O	Interrupt signal/ Supports output open drain type
5	GND	P	Ground
6	VDD	P	Power Voltage for digital circuit

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)

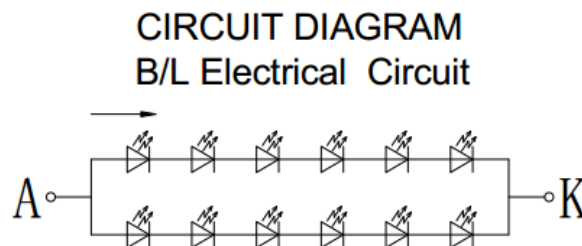
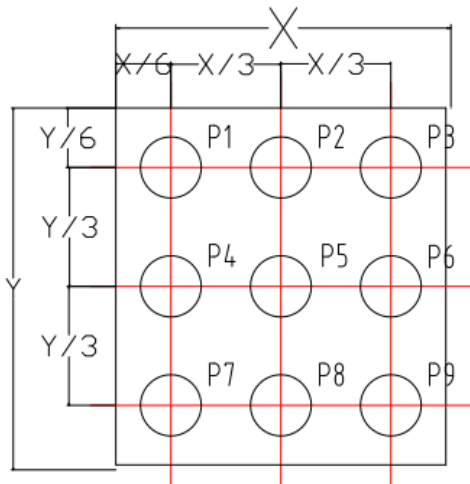
PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	20	-	mA	V=26.4V	
Supply Voltage	V	22.4	26.4	27.2	V	If=20mA	
Luminous Intensity for LCM	IV	-	238	-	cd/m ²		2
Uniformity for LCM	-	80	-	-	%		3
Life Time	-	20000	-	-	Hr.		4
Color	White						

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

Measured Method: (X*Y: Light Area)

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 → +60°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.

*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 11-2, 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 ($25\pm 5^{\circ}\text{C}$), 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 **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

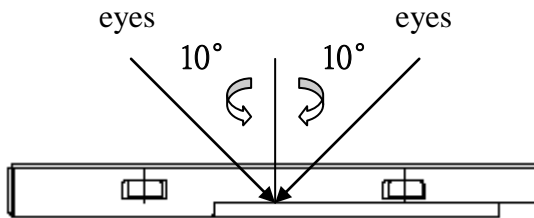
a. Manner of appearance test:

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

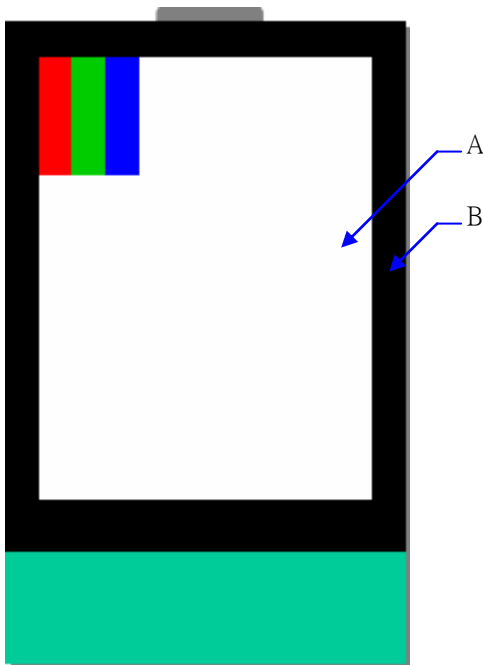
(ii) When test the model of transmissive product must add the reflective plate.

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

(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.

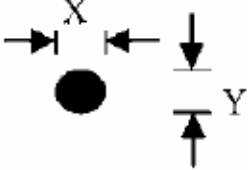
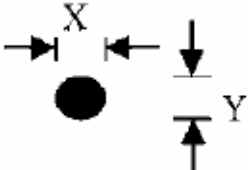
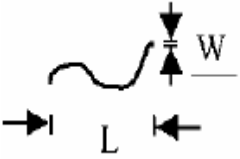
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

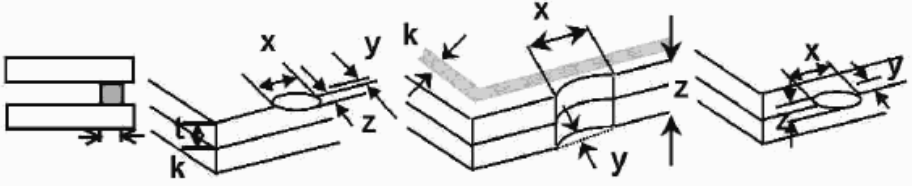
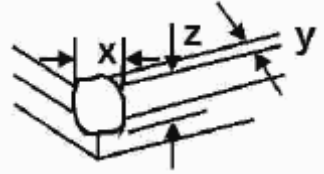
(iii) Must add new item on time when it is necessary.

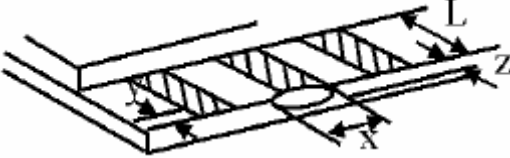
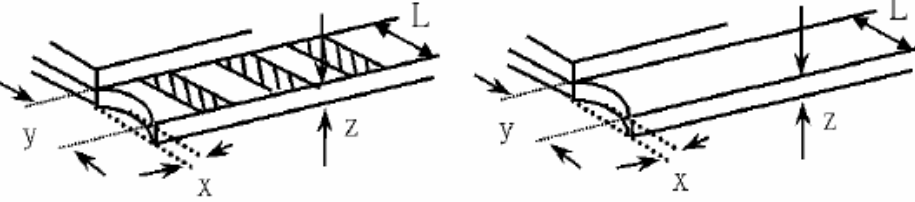
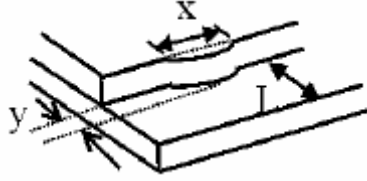
c. Standard of inspection: (Unit: mm)

12-6. Inspection specification

Defect out of viewing area can be neglected.

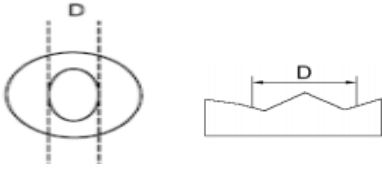
NO	Item	Criterion	AQL										
01	Electrical Testing	1.1 Open 1.2 Short 1.3 T/P failure 1.4 Missing vertical, horizontal segment, segment contrast defect. 1.5 Missing character, dot or icon. 1.6 Display malfunction. 1.7 No function or no display. 1.8 Current consumption exceeds product specifications. 1.9 LCD viewing angle defect. 1.10 Mixed product types. 1.11 Flicker	0.65										
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. $D = (X+Y) / 2$  <table border="1" data-bbox="829 817 1364 1142"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td>ignored (No more than five spots within 5mm)</td> </tr> <tr> <td>$0.15 < D \leq 0.25$</td> <td>3</td> </tr> <tr> <td>$0.25 < D \leq 0.35$</td> <td>2</td> </tr> <tr> <td>$D > 0.35$</td> <td>NG</td> </tr> </tbody> </table>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.15$	ignored (No more than five spots within 5mm)	$0.15 < D \leq 0.25$	3	$0.25 < D \leq 0.35$	2	$D > 0.35$	NG	2.5
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$0.15 < D \leq 0.25$	3												
$0.25 < D \leq 0.35$	2												
$D > 0.35$	NG												
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $D = (X+Y) / 2$  <table border="1" data-bbox="829 1254 1364 1467"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.15$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.15 < D \leq 0.25$</td> <td>3</td> </tr> <tr> <td>$0.25 < D \leq 0.35$</td> <td>2</td> </tr> <tr> <td>$D > 0.35$</td> <td>NG</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p>	Size(mm)	Acceptable Q'ty	$D \leq 0.15$	Accept no dense	$0.15 < D \leq 0.25$	3	$0.25 < D \leq 0.35$	2	$D > 0.35$	NG	2.5
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$D > 0.35$	NG												
3.2 Line type: (As following drawing)  <table border="1" data-bbox="694 1657 1364 1859"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.05$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.15$</td> <td>2</td> </tr> <tr> <td>---</td> <td>$W > 0.15$</td> <td>NG</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two lines within 3mm.</p>	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.05$	Accept no dense	$L \leq 5.0$	$0.05 < W \leq 0.15$	2	---	$W > 0.15$	NG	2.5
Length(mm)	Width(mm)	Acceptable Q'ty											
---	$W \leq 0.05$	Accept no dense											
$L \leq 5.0$	$0.05 < W \leq 0.15$	2											
---	$W > 0.15$	NG											

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 Φ(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.50$</td> <td>4</td> </tr> <tr> <td>$0.50 < \Phi \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$1 < \Phi$</td> <td>0</td> </tr> <tr> <td>Total Q'ty</td> <td>4</td> </tr> </tbody> </table>	Size Φ (mm)	Acceptable Q'ty	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.50$	4	$0.50 < \Phi \leq 1.0$	3	$1 < \Phi$	0	Total Q'ty	4	2.5						
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05	Scratches	Follow NO.3 -2 Line Type.	2.5																		
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>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</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>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</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 828"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq 0.5\text{mm}$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </table> <p>7.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="550 1198 1225 1344"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq L$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</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 1814"> <tr> <td>y: width</td> <td>x: length</td> </tr> <tr> <td>$y \leq 1/3L$</td> <td>$X \leq a$</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: 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="411 797 1233 1014"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$Z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</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="411 1395 1233 1612"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</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)	<table border="1"> <thead> <tr> <th>SIZE(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$D \leq 1.0$</td> <td>Accept no dense</td> </tr> <tr> <td>$1.0 < D$</td> <td>0</td> </tr> </tbody> </table>	SIZE(mm)	Acceptable Q'ty	$D \leq 1.0$	Accept no dense	$1.0 < D$	0	2.5
		SIZE(mm)	Acceptable Q'ty						
$D \leq 1.0$	Accept no dense								
$1.0 < D$	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.	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 $50\pm 10\% \text{RH}$,and must be used within six months after delivery from our factory.
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.
- Appearance,3months;Function,1year;within the validity, failed CTP can be replaced 1 to 1

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.