YB 億 都 集 團
YEEBO GROUP

SPECIFICATION
FOR
LCD MODULE
MODULE NO: YB-YG240320C10A-N-C1

Doc.Version:00

Customer Approval:

☐ Accept ☐ Reject

YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer	張芳瑋	2016.9.29
Check	Mechanical Engineer	楊仁壽 (代)	2016.9.27
Verify		蔡定凱	2016.9.29
Approval		刘振来	2016.9.29

☐ APPROVAL FOR SPECIFICATIONS ONLY

■ APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

1. Revision History

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
C1	00	2016-9-29	Full Spec	First issue	Rannie/Jimmy

2. Table of Contents:

3. Module Numbering System:

(Example)

YB- T G 240320 S 01 D -T – A0

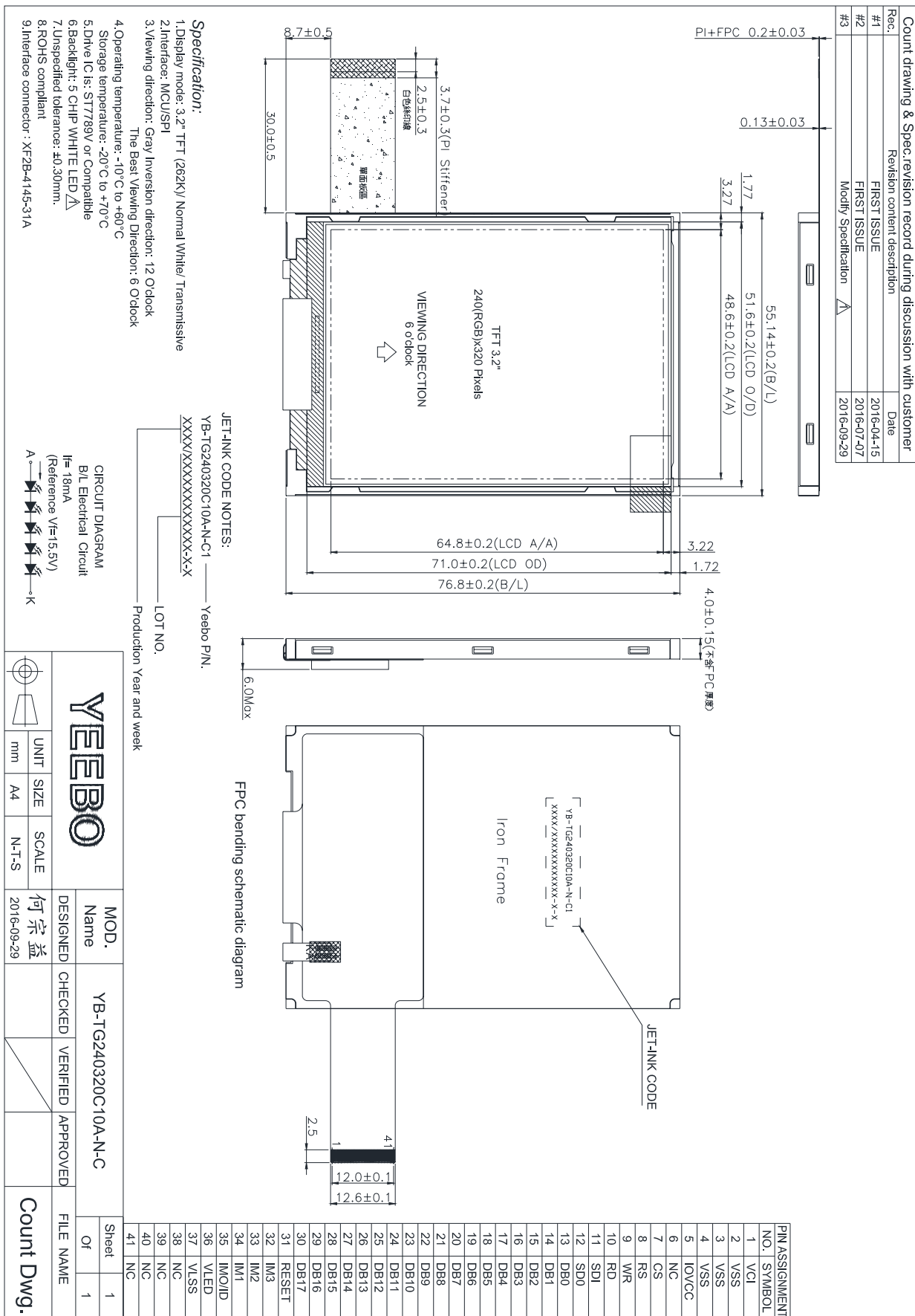| Field	Description
Sample Version: A0~Z0	
T: With Resistive Touch panel C: With Capacitive Touch panel N: Without Touch panel	
Version: A~Z	
Serial No: 01~99	
S: STD Product C: Customer Made	
Display Function: Segment Number of Segment Characters Lines of Character Column and Row of Graphic Length * Width of Other	
LCM Display Type C: Character Type； G: Graphic Type； GB: Graphic Black/White Type；(For E-paper) GC: Graphic Color Type；(For E-paper) S: Segment Type	
LCD Model: C: CSTN;　T: TFT;　L: LTPS;　O: OLED; P: PLED;　S: B/W STN;　E: E-paper； Y: Yeetek;　N: Others;	
YEEBO	

4. General Specification:

ITEM	CONTENTS
Module Size	55.14(W) * 76.80(H) *4.0(T) mm
Display Size(Diagonal)	3.2 inch
Display Format	240(RGB)* 320 Pixels
Active Area	48.60(W) * 64.80(H) mm
Pixel Pitch	0.2025* 0.2025mm
LCD Type	TFT (262K)/ Transmissive / NW
The Best View Angle	6 O'clock
View Angle (Gray Inversion)	12 O'clock
Controller IC	ST7789V
Weight	24.6g

5. LCM drawing:

Specification:
1.Display mode: 3.2" TFT (262K)/ Normal White/ Transmissive
2.Interface: MCU/SPI
3.Viewing direction: Gray Inversion direction: 12 O'clock
  The Best Viewing Direction: 6 O'clock
4.Operating temperature: -10°C to +60°C
  Storage temperature: -20°C to +70°C
5.Drive IC is: ST7789V or Compatible
6.Backlight: 5 CHIP WHITE LED
7.Unspecified tolerance: ±0.30mm.
8.ROHS compliant
9.Interface connector : XF2B-4145-31A

JET-INK CODE NOTES:
YB-TG240320C10A-N-C1 ——— Yeebo P/N.
XXXX/XXXXXXXXXXXXX-X-X
                │   └— LOT NO.
                └— Production Year and week

CIRCUIT DIAGRAM
B/L Electrical Circuit
If= 18mA
(Reference Vf=15.5V)
A ——►|———|◄—|———|◄—|———|◄—|———|◄—|———|◄— K

PI+FPC 0.2±0.03
8.7±0.5
0.13±0.03
30.0±0.5
2.5±0.3
3.7±0.3(PI Stiffener)
1.77
3.27
白色絲印
單面膠區
51.6±0.2(LCD O/D)
48.6±0.2(LCD A/A)
55.14±0.2(B/L)

TFT 3.2"
240(RGB)x320 Pixels
VIEWING DIRECTION
6 o'clock

64.8±0.2(LCD A/A)
71.0±0.2(LCD OD)
76.8±0.2(B/L)
3.22
1.72
4.0±0.15(不含FPC厚度)

6.0Max

FPC bending schematic diagram

Iron Frame

YB-TG240320C10A-N-C1
[XXXX/XXXXXXXXXXXXX-X-X]
JET-INK CODE

2.5
1   41
12.0±0.1
12.6±0.1

PIN ASSIGNMENT	
NO.	SYMBOL
1	VCI
2	VSS
3	VSS
4	VSS
5	IOVCC
6	NC
7	CS
8	RS
9	WR
10	RD
11	SDI
12	SD0
13	DB0
14	DB1
15	DB2
16	DB3
17	DB4
18	DB5
19	DB6
20	DB7
21	DB8
22	DB9
23	DB10
24	DB11
25	DB12
26	DB13
27	DB14
28	DB15
29	DB16
30	DB17
31	RESET
32	IM3
33	IM2
34	IM1
35	IM0/ID
36	IM0/ID
37	VLED
38	VLSS
39	NC
40	NC
41	NC

Rec.	Revision content description	Date
#1	FIRST ISSUE	2016-04-15
#2	FIRST ISSUE	2016-07-07
#3	Modify Specification	2016-09-29

Count drawing & Spec.revision record during discussion with customer

MOD. Name	YB-TG240320C10A-N-C	
DESIGNED	何宗盛	
CHECKED		
VERIFIED		
APPROVED		2016-09-29
FILE NAME		

YEEBO
UNIT mm
SIZE A4
SCALE N-T-S

Sheet 1 Of 1

Count Dwg.

6. Electrical Characteristics

6-1 Absolute Maximum Ratings (Ta=25℃ VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Supply Voltage for Logic circuit	VCC	-0.3	-	4.6	Volt	-
Operating Temperature	Topr	-20	-	+70	℃	-
Storage Temperature	Tstg	-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℃)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	VCC	-	2.5	2.8	3.3	Volt
Normal mode Current consumption	Icc	-	-	8	12	mA
TFT Gate ON Voltage	VGH	-	12.2	-	14.97	V
TFT Gate OFF Voltage	VGL	-	-12.5	-	-7.16	V

6-3 Timing Characteristics

Serial Interface Characteristics (3-line serial)

3-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 to 70 ℃

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	66		ns	
	T_{SHW}	SCL "H" pulse width (Write)	15		ns	
	T_{SLW}	SCL "L" pulse width (Write)	15		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	10		ns	
	T_{SDH}	Data hold time	10		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

3-line serial Interface Characteristics

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Serial Interface Characteristics (4-line serial)

4-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 to 70 ℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	66		ns	-write command & data ram
	T_{SHW}	SCL "H" pulse width (Write)	15		ns	
	T_{SLW}	SCL "L" pulse width (Write)	15		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	-read command & data ram
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
D/CX	T_{DCS}	D/CX setup time	10		ns	
	T_{DCH}	D/CX hold time	10		ns	
SDA (DIN)	T_{SDS}	Data setup time	10		ns	
	T_{SDH}	Data hold time	10		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

4-line serial Interface Characteristics

Note : The rising time and failing time (Tr, Tf) of input signal are specified at 15 ns or less. 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 (Without POL)		T(%)	−	-	18	-	-	-
Contrast Ratio		CR	Θ=0 Normal Viewing Angle	400	500	-		(1) (2)
Response Time		TR+TF	−	-	16	32	ms	(1) (3)
Viewing angle	Hor	Θx+	CR≧10	-	70	-	deg.	-
		Θx-		-	70	-		
	Ver	Θy+		-	70	-		
		Θy-		-	60	-		

Measuring Condition
  1. Measuring surrounding: dark room
  2. Ambient temperature: 25±2℃
  3. 30 min. Warm-up time.

Color of CIE Coordinate:

Item		Symbol	Condition	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red	x	θ = φ = 0° Backlight Color Degree X=0.28 Y=0.28	0.576	0.626	0.676
		y		0.284	0.334	0.384
	Green	x		0.227	0.277	0.327
		y		0.499	0.549	0.599
	Blue	x		0.092	0.142	0.192
		y		0.072	0.122	0.172
	White	x		0.253	0.303	0.353
		y		0.275	0.325	0.375

Note (1) Definition of Viewing Angle :
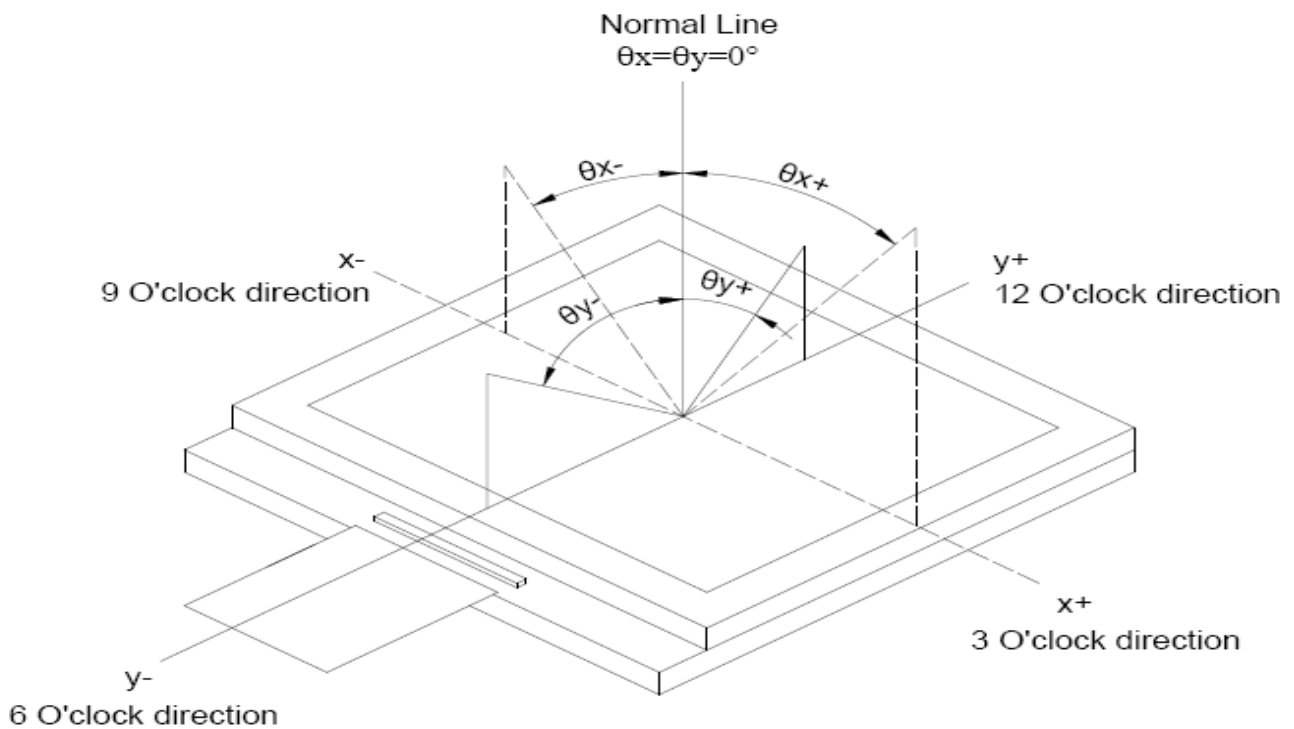
Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

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

Note (3) Definition of Response Time : Sum of TR and TF
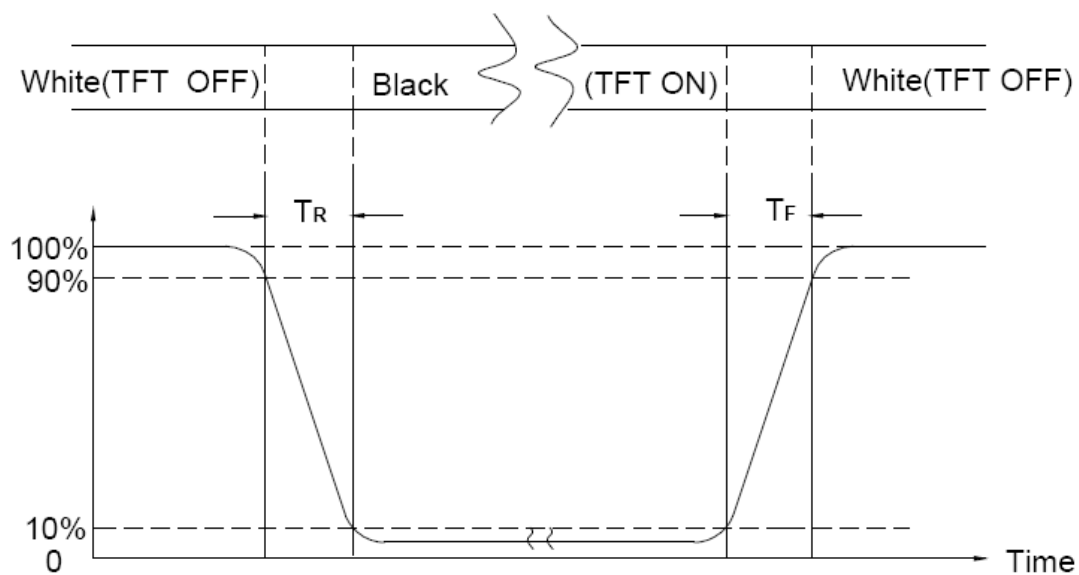
8. Interface Pin Assignment:

Pin NO.	Symbol	Level	Function
1	VCI	H	Power supply
2	VSS	L	Ground
3	VSS	L	Ground
4	VSS	L	Ground
5	IOVCC	H	Power supply
6	NC	/	Not connected
7	CS	H/L	Chip select input pin
8	RS	H/L	A register select signal
9	WR	H/L	Write enable clock input pin
10	RD	H/L	Read enable clock input pin
11	SDI	H/L	SPI interface Intput pin
12	SDO	H/L	SPI interface output pin
13—30	DB0-DB17	H/L	Data Bus D0-D17
31	RESET	H/L	Hardware reset pin
32	IM3	H/L	The MCU interface mode select.
33	IM2	H/L	The MCU interface mode select.
34	IM1	H/L	The MCU interface mode select.
35	IM0	H/L	The MCU interface mode select.
36	A	H	Backlight+
37	K	L	Backlight-
38	NC	/	Not connected
39	NC	/	Not connected
40	NC	/	Not connected
41	NC	/	Not connected

9. 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℃)

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	18	-	mA	-	
Supply Voltage	V	14.5	-	16.5	V	If=18mA	
Reverse Current	IR	-	-	20	uA	Vr=5.0V	
Luminous Intensity for LCM	IV	400	500	-	Cd/m2	If=18mA	2
Uniformity for LCM	-	80	-	-	%		3
Life Time	-	20000	50000	-	Hr.		4
Color	White						

NOTE:
1. Backlight Only
2. Average Luminous Intensity of P1-P5
3. Uniformity = Min/Max * 100%
4. LED life time defined as follows: The final brightness is at 80% of original brightness
At Ta=25℃ and If=20mA.The LED lifetime could be decreased
If is lager than 18mA.The LED can work about 50000 hours.

Measured Method: (X*Y: Light Area)   **Internal Circuit Diagram**
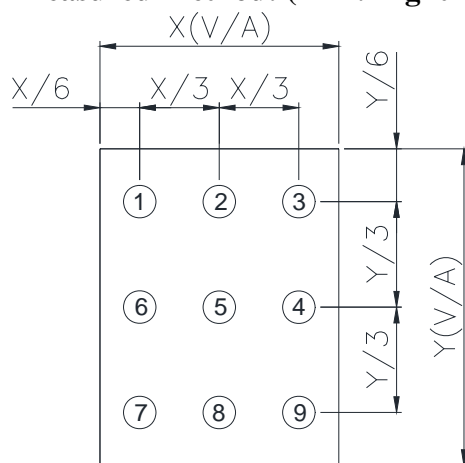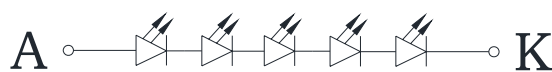
(Effective spatial Distribution)
Hole Diameter ø10 mm; 1 to 5 per Position Measured Luminous

10. Standard Specification for Reliability:

10–1. Standard Specifications for Reliability of LCD Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70℃ 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℃ 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℃ 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℃ 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℃,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℃ for 30 minutes → normal temperature for 5 minutes → +80℃ 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

10 - 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 10-1, 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.

10- 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℃), normal humidity (50±10% RH), and in area not exposed to direct sun light.

11. Specification of Quality Assurance:

11-1. Purpose

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

11-2. 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

11-3. 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.

11-4. 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.

11-5. 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℃   Humidity: 60±10%RH

         eyes   eyes

         10°   10°
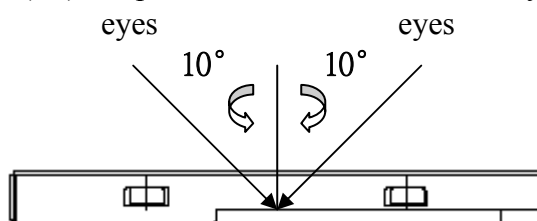
    (iv) Definition of area:
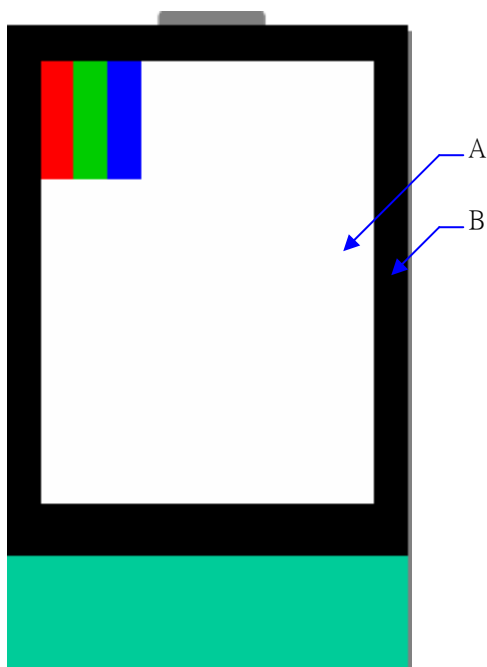
A. Area: Viewing area.

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.
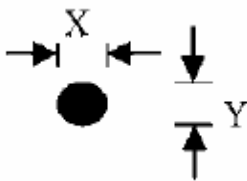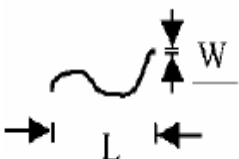
  (ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
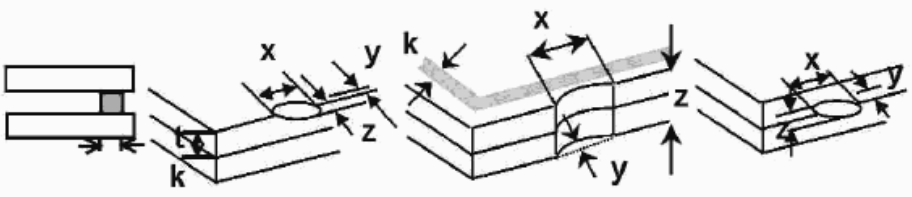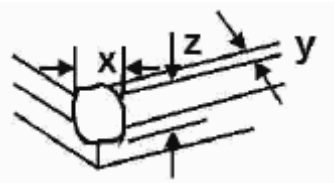
  (iii) Must add new item on time when it is necessary.
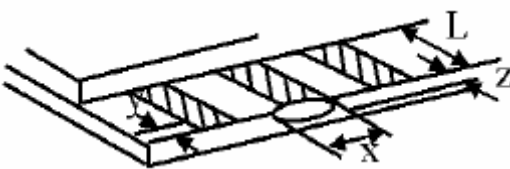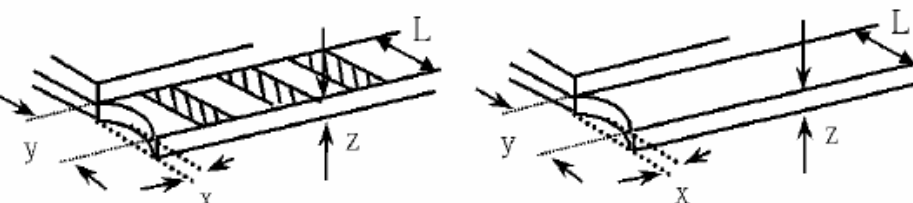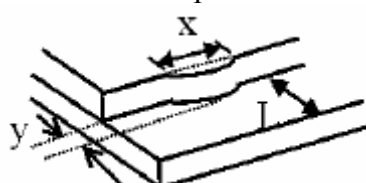
c. Standard of inspection: (Unit: mm)

11-6. Inspection specification
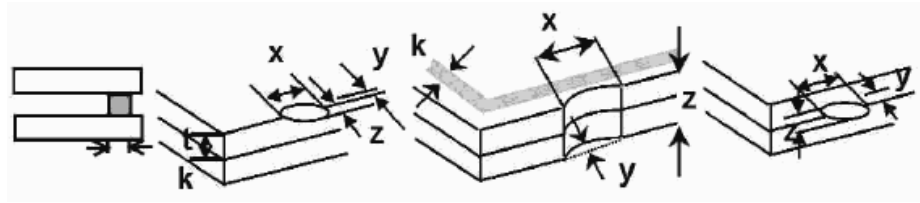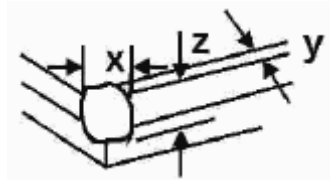
Defect out of viewing area can be neglected.
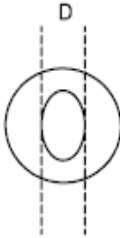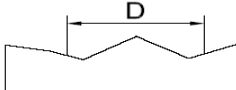
NO	Item	Criterion	AQL
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	**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 $\leqq$ 0.25mm, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	**2.5**
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$ | Size(mm)	Acceptable Q'ty
---	---
$\Phi \leqq 0.10$	Accept no dense
$0.10 < \Phi \leqq 0.20$	2
$0.20 < \Phi \leqq 0.25$	2
$0.25 < \Phi \leqq 0.30$	1
$0.30 < \Phi$	0	 * Densely spaced: No more than two spots within 3mm.	**2.5**
		3.2 Line type: (As following drawing) | Length(mm)	Width(mm)	Acceptable Q'ty
---	---	---
---	$W \leqq 0.02$	Accept no dense
$L \leqq 3.0$	$0.02 < W \leqq 0.05$	2
$L \leqq 2.5$	$0.03 < W \leqq 0.15$	
---	$0.15 < W$	Rejection | * Densely spaced: No more than two lines within 3mm.	**2.5**

NO	Item	Criterion	AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction <table><tr><td>Size Φ(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Φ≦0.20</td><td>Accept no dense</td></tr><tr><td>0.20< Φ≦0.50</td><td>3</td></tr><tr><td>0.50< Φ≦1.00</td><td>2</td></tr><tr><td>1.00< Φ</td><td>0</td></tr><tr><td>Total Q'ty</td><td>3</td></tr></table>	2.5
05	Scratches	Follow NO.3 -2 Line Type.	
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 6.1.2 Corner crack: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	2.5

NO	Item	Criterion	AQL
07	Glass crack	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad: 7.2.2 Non-conductive portion: ⊙ 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 mot be damaged. 7.2.3 Substrate protuberance and internal crack 	2.5

7.2.1 table:

y: Chip width	x: Chip length	z: Chip thickness
y≦0.5mm	x≦1/8a	0< z≦t

7.2.2 table:

y: Chip width	x: Chip length	z: Chip thickness
y≦L	x≦1/8a	0< z≦t

7.2.3 table:

y: width	x: length
y≦1/3L	X≦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 $\leqq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leqq$ 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	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 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels: Table below: 14.1.2 Corner crack: 	2.5

14.1.1 table:

z: Chip thickness	y: Chip width	x: Chip length
Z≦t	≦1/2 k and not over viewing area	x≦1/8a

⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip

14.1.2 Corner crack:

z: Chip thickness	y: Chip width	x: Chip length
z≦t	≦1/2 k and not over viewing area	x≦1/8a

⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip

NO	Item	Criterion	AQL
15	Touch Panel(Fish eye、dent and bubble on film)	SIZE(mm) / Acceptable Q'ty table: Φ≦0.2 → Accept no dense; 0.2< D ≦0.4 → 5; 0.4< D ≦0.5 → 2; 0.5< D → 0	2.5
16	Touch Panel Newton ring	Newton ring dimension ≦ 1/2 touch panel area and not affect font and line distortion(≦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

12. 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±10℃, and in a relative humidity of 50±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±10℃ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.

13. Guarantee:

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