

SPECIFICATION FOR LCD MODULE

MODULE NO: YB-YG19201080C02A-N-A0

Doc.Version:00

Customer Approval:

| | |
|---------------------------------|---------------------------------|
| <input type="checkbox"/> Accept | <input type="checkbox"/> Reject |
|---------------------------------|---------------------------------|

| YEEBO | NAME | SIGNATURE | DATE |
|----------|---------------------|-----------|-----------|
| Prepare | Electronic Engineer | 张子聪 | 2019/1/29 |
| Check | Mechanical Engineer | 郑昊 | 2019/1/29 |
| Verify | | | |
| Approval | | 李世凯 | 2019/1/29 |

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

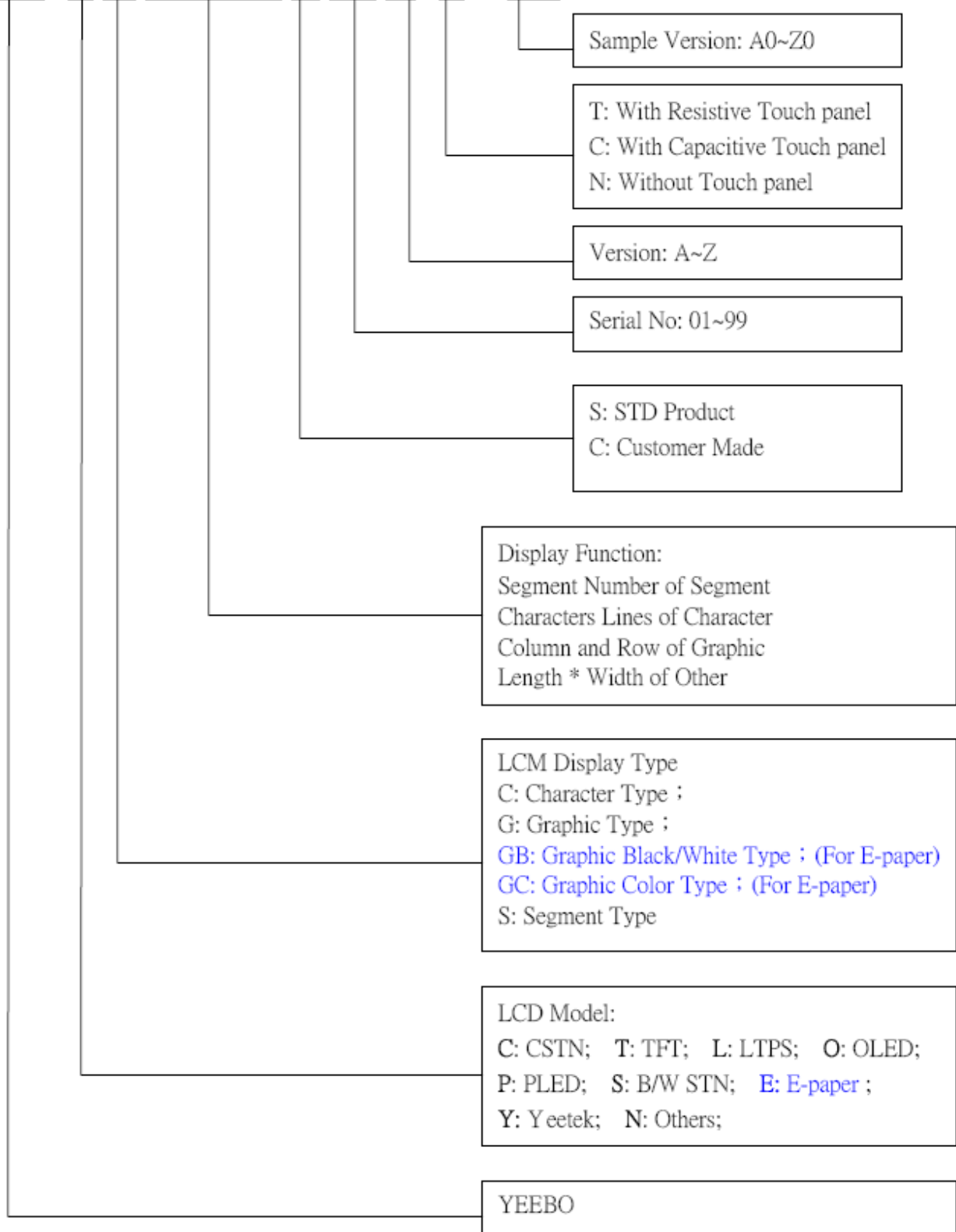
2. Table of Contents:

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3. Module Numbering System:

(Example)

YB-TG240320S01D-T-A0

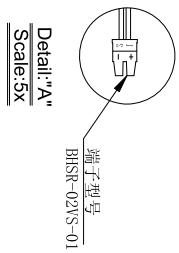
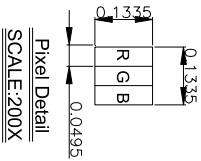
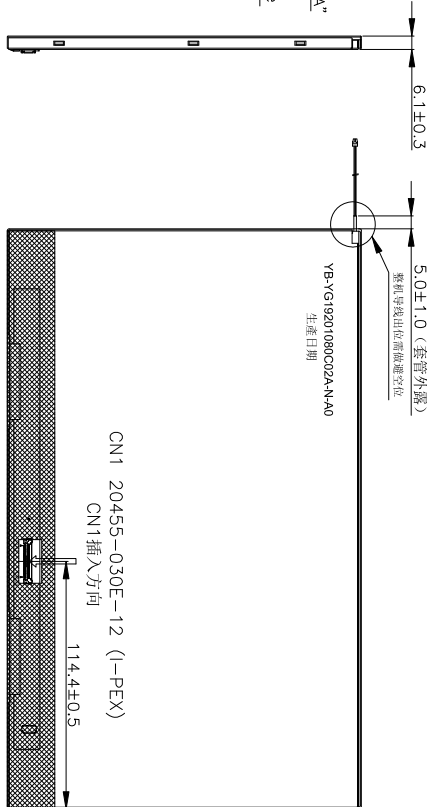
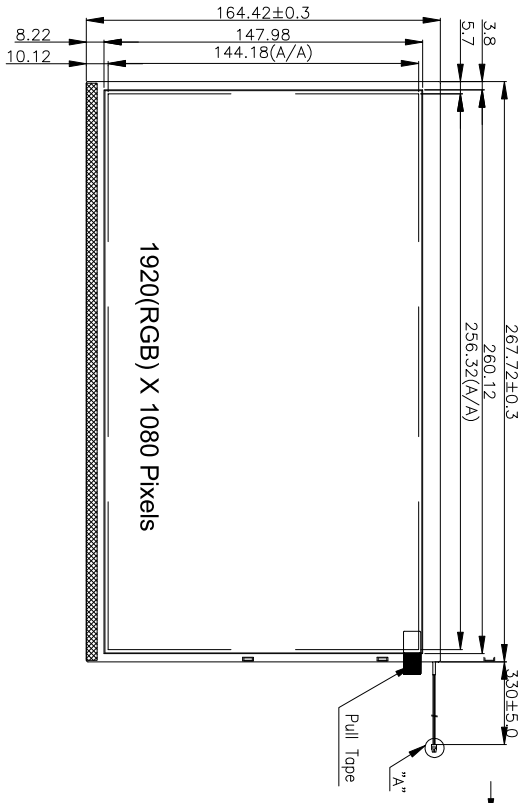


4. General Specification:

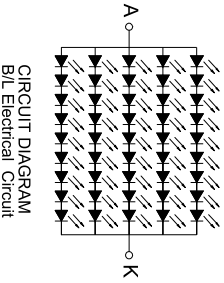
| ITEM | CONTENTS |
|-------------------------|--|
| Module Size | 267.72(W) * 164.42(H) * 6.1(T) mm |
| Display Size (Diagonal) | 11.6 inch |
| Display Format | 1920(RGB)* 1080 Pixels |
| Active Area | 256.32 (W) * 144.18 (H) mm |
| Dots Pitch | 0.1335 * 0.1335 mm |
| LCD Type | TFT (16.7M)/ Transmissive / Normal Black |
| View Angle | Full View |
| Weight | TBD |
| Interface | EDP |

5. LCM drawing:

| | |
|---|---|
| Count drawing & Spec. revision record during discussion with customer | |
| Rec. #1 | Revision content description FIRST ISSUE |
| Date | 2019-01-29 |



- Specification:
1. Display mode: 11.6" TFT/ Transmissive/Normal Black
 2. Color depth: 16.7M Colors
 3. Viewing Direction : Full View
 4. Operating temperature: 0°C to +50°C
 5. Storage temperature: -20°C to +60°C
 6. Backlight: LED White (x45)
 7. ROHS compliant



| | | | | | | | | | |
|-----------|-----------------------|------|------|-------|----------|---------|----------|----------|------------|
| | | UNIT | SIZE | SCALE | DESIGNED | CHECKED | VERIFIED | APPROVED | FILE NAME |
| | | mm | A4 | N-T-S | 張子聰 | | | | Count Dwg. |
| MOD. Name | YB-YG19201080C02A-N-A | | | | | | | | |
| DESIGNED | 2019-01-29 | | | | | | | | |
| Sheet | 1 | | | | | | | | |
| Of | 1 | | | | | | | | |

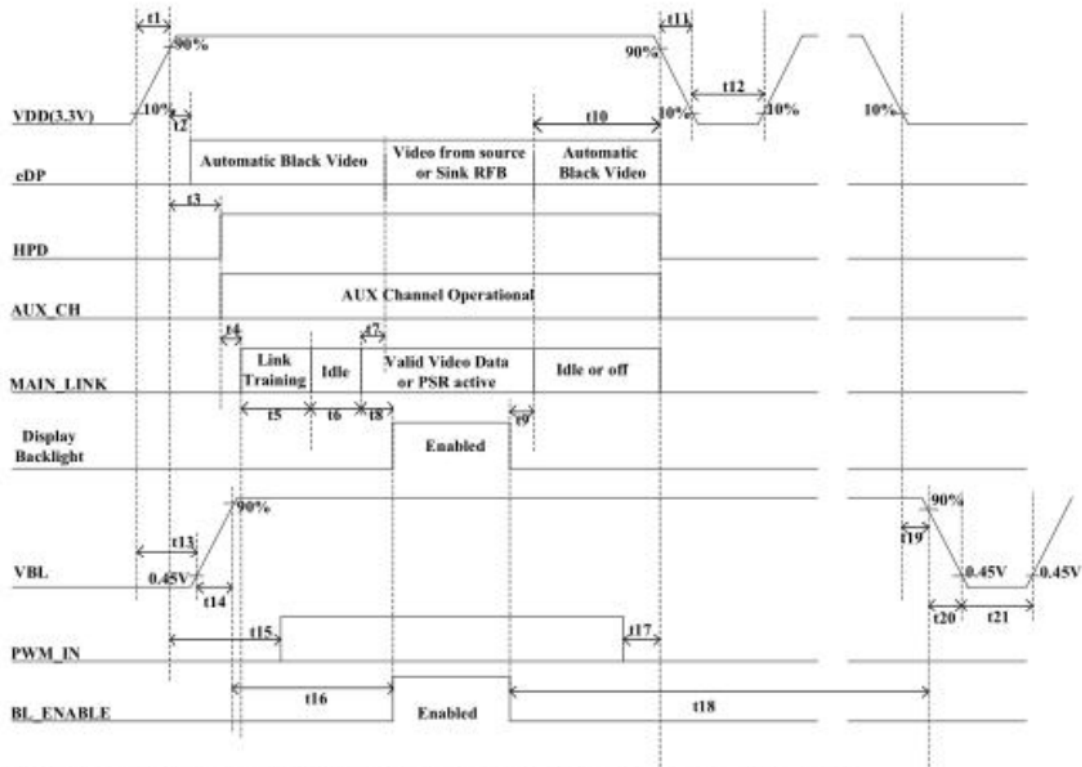
| LCD MODULE | FPC PIN OUT | NO. | SYMBOL |
|------------|-------------|-----|----------|
| 1 | NC | 1 | NC |
| 2 | H GND | 2 | H GND |
| 3 | Lane1 N | 3 | Lane1 N |
| 4 | Lane1 P | 4 | Lane1 P |
| 5 | H GND | 5 | H GND |
| 6 | Lane0 N | 6 | Lane0 N |
| 7 | Lane0 P | 7 | Lane0 P |
| 8 | H GND | 8 | H GND |
| 9 | AUX CH P | 9 | AUX CH P |
| 10 | AUX CH N | 10 | AUX CH N |
| 11 | H GND | 11 | H GND |
| 12 | LOD VDD | 12 | LOD VDD |
| 13 | LOD VDD | 13 | LOD VDD |
| 14 | NC | 14 | NC |
| 15 | LCD GND | 15 | LCD GND |
| 16 | LCD GND | 16 | LCD GND |
| 17 | HPD | 17 | HPD |
| 18 | NC | 18 | NC |
| 19 | NC | 19 | NC |
| 20 | NC | 20 | NC |
| 21 | NC | 21 | NC |
| 22 | NC | 22 | NC |
| 23 | NC | 23 | NC |
| 24 | NC | 24 | NC |
| 25 | NC | 25 | NC |
| 26 | NC | 26 | NC |
| 27 | NC | 27 | NC |
| 28 | NC | 28 | NC |
| 29 | NC | 29 | NC |
| 30 | NC | 30 | NC |

6. Electrical Characteristics

Ta=+25°C

| DC Electrical Characteristics | | | | | | |
|--|--------------------------|------|---------|------|-------|--------------------|
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
| +3.3V supply voltage | VDD | +3.0 | +3.3 | +3.6 | V | [Note 6-1-1] |
| Current dissipation | IDD | - | TBD | | mA | [Note 6-1-2] |
| Inrush Current | Irush | - | - | TBD | A | [Note 6-1-3] |
| Permissible input ripple voltage | V _{RP} | - | - | 100 | mVp-p | VDD=+3.3V |
| eDP HPD Signal Characteristics | | | | | | |
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
| HPD High level output voltage | VOH _{HPD} | | VDD-0.1 | - | | |
| HPD Low level output voltage | VOL _{HPD} | - | 0 | | | |
| eDP AUX Channel Characteristics | | | | | | |
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
| Unit Interval for AUX channel | UI _{AUX} | 0.4 | 0.5 | 0.6 | μS | |
| Peak-to-peak voltage at TP1 | V _{AUX-DIFF-pp} | 0.32 | - | 1.36 | V | |
| AUX DC Common mode Voltage | V _{AUX-DC-CM} | 0 | - | 2.0 | V | |
| AUX Short current limit | I _{AUX_SHORT} | - | - | 90 | mA | |
| AUX CH termination Resistor | R _{AUX_TERM} | - | 100 | - | Ω | Differential input |
| AUX AC coupling capacitor | C _{AUX} | 75 | - | 200 | nF | |
| Number of pre-charge pulses | Pre-charge pulses | 10 | - | 16 | - | |
| eDP Main Link Receiver Characteristics | | | | | | |
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
| Link clock down spreading | Down_Spread_Amplitude | 0 | | 0.5 | % | |
| Differential Peak-to-peak Input Voltage at Rx package pins | V _{RX-DIFFp-p} | 120 | - | 1200 | mV | |
| Differential Return Loss at 1.35GHz at Rx package pins | RL _{RX-DIFF} | 9 | - | - | dB | |
| Differential termination resistance | R _{RX-TERM} | - | 100 | - | Ω | |
| RX short circuit Current Limit | I _{RX-SHORT} | - | - | 50 | mA | |

ON-OFF conditions for supply voltage:

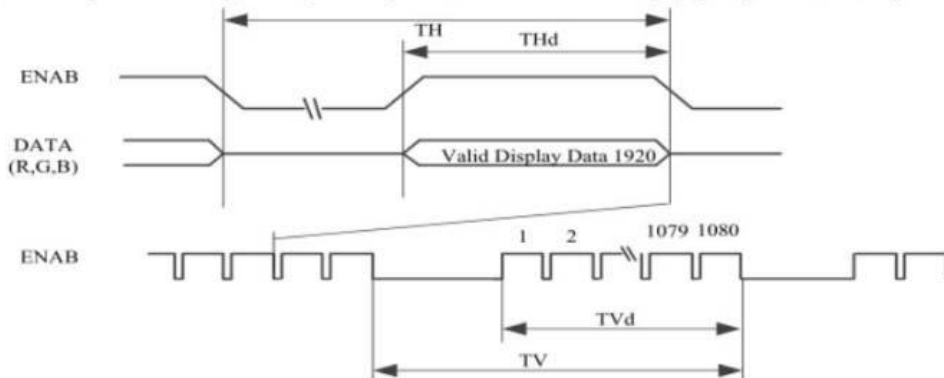


[Note] Do not keep the interface signal high-impedance or unusual signal when power is on.

| Symbol | Min | Max | Unit | Note |
|--------|-------|-------|------|---------|
| t1 | (0.5) | (10) | ms | |
| t2 | 0 | 100 | ms | |
| t3 | 0 | (100) | ms | |
| (t4) | - | - | ms | |
| (t5) | - | - | ms | |
| (t6) | - | - | ms | |
| (t7) | (0) | (50) | ms | |
| (t8) | | | ms | |
| (t9) | | | ms | |
| (t10) | (0) | (500) | ms | |
| t11 | (1) | 50 | ms | [Note1] |
| t12 | 500 | - | ms | |
| (t13) | - | - | ms | |
| t14 | 0.5 | 10 | ms | |
| t15 | (100) | | ms | |
| (t16) | - | - | ms | |
| t17 | 0 | - | ms | |
| (t18) | - | - | ms | |
| t19 | - | - | ms | |
| t20 | (0.1) | - | ms | |
| t21 | (100) | | ms | |

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|--------------------|--------------------------|------|--------|------|---------|-------------|
| Clock | Frequency | - | 138.5 | - | MHz | [Note7-1-1] |
| Data enable signal | Horizontal period | - | 2080 | - | clock | |
| | Horizontal period (High) | - | 15.02 | - | μ s | |
| | Vertical period | - | 1111 | - | line | |
| | Vertical period (High) | - | 16.685 | - | ms | |
| | Vertical period (High) | - | 1080 | - | line | |

[Note 7-1-1] In case of using the long vertical period, the deterioration of display quality, flicker, etc. may occur.



7. Optical Characteristics:

| Item | Symbol | Conditions | Specifications | | | Unit | Note | |
|----------------|--------|------------------------------------|----------------|------|-----|------|---------|---|
| | | | Min | Typ | Max | | | |
| Contrast Ratio | CR | $\theta=0$ Normal Viewing angle | 700 | 1000 | - | | (1) (2) | |
| Response time | TR+TF | - | - | 25 | - | ms | (1) (3) | |
| Viewing angle | Hor. | Θ_{x+} | CR ≥ 10 | 80 | 89 | - | deg. | - |
| | | Θ_{x-} | | 80 | 89 | - | | |
| | Ver. | Θ_{y+} | | 80 | 89 | - | | |
| | | Θ_{y-} | | 80 | 89 | - | | |

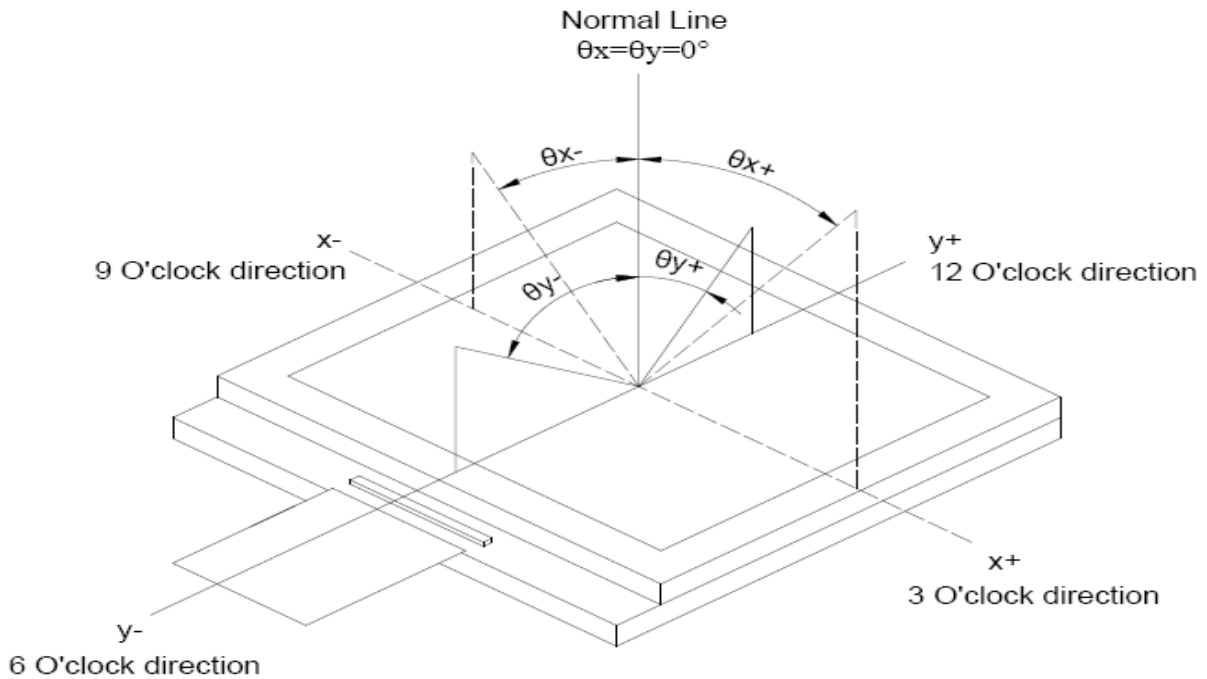
Measuring Condition

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

Color of CIE Coordinate:

| Item | | Symbol | Condition | Min. | Typ. | Max. |
|---|-------|--------|---|------|------|------|
| Chromaticity Coordinates (Transmissive) | Red | x | $\theta = \varphi = 0^{\circ}$ LED Backlight Color Degree | - | TBD | - |
| | | y | | - | TBD | - |
| | Green | x | | - | TBD | - |
| | | y | | - | TBD | - |
| | Blue | x | | - | TBD | - |
| | | y | | - | TBD | - |
| | White | x | | - | TBD | - |
| | | y | | - | TBD | - |

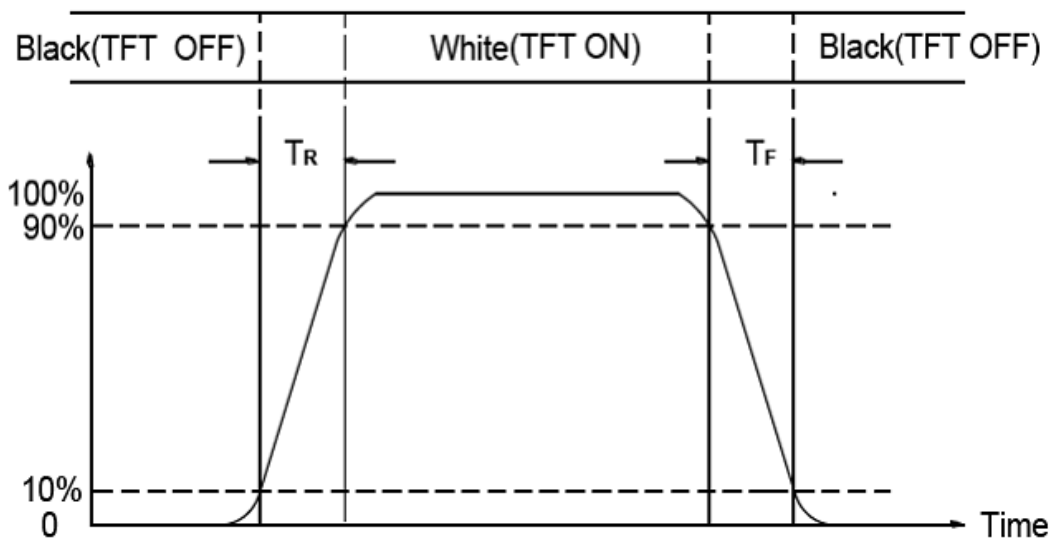
Note (1) Definition of Viewing Angle :



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

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

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



8. Interface Pin Assignment:

LCM Interface

FPC Connector is used for the module electronics interface. The recommended model is 20455-030E-12 (I-PEX) manufactured by Hirose.

8-1 LCM FPC Interface

| Pin | Symbol | I/O | Function |
|-------|----------|-----|-------------------------------------|
| 1 | NC | - | No connect |
| 2 | H_GND | P | High Speed Ground |
| 3 | Lane1_N | I | Complement Signal Link Lane 1 |
| 4 | Lane1_P | I | True Signal Link Lane 1 |
| 5 | H_GND | P | High Speed Ground |
| 6 | Lane0_N | I | Complement Signal Link Lane 0 |
| 7 | Lane0_P | I | True Signal Link Lane 0 |
| 8 | H_GND | P | High Speed Ground |
| 9 | AUX_CH_P | I | True Signal Auxiliary Channel |
| 10 | AUX_CH_N | I | Complement Signal Auxiliary Channel |
| 11 | H_GND | P | High Speed Ground |
| 12-13 | LCD_VCC | P | LCD logic and driver power(3.3V) |
| 14 | NC | - | No connect |
| 15-16 | LCD_GND | P | LCD logic and driver ground |
| 17 | HPD | I | HPD Signal |
| 18-30 | NC | - | No connect |

I: input; O: output; P: Power or Ground(0V).

Note:



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:

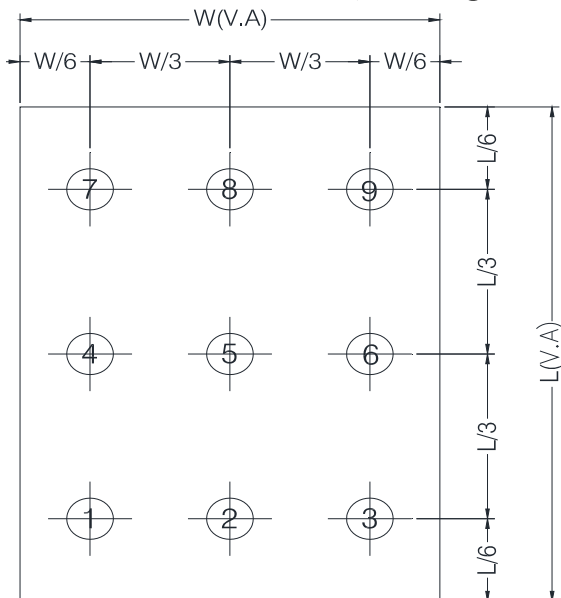
($T_a=25^\circ$)

| PARAMETER | Sym. | Min. | Typ. | Max. | Unit | Test Condition | Note |
|----------------------------|-------|-------|------|------|-------------------|----------------|------|
| Supply Current | I | - | 200 | - | mA | V=27.0V | |
| Supply Voltage | V | 24.5 | 27.0 | 31.0 | V | If=200mA | |
| Luminous Intensity for LCM | IV | 600 | 700 | - | Cd/m ² | If=200mA | 2 |
| Uniformity for LCM | - | 70 | - | - | % | | 3 |
| Life Time | - | 50000 | - | - | Hr. | | 4 |
| Color | White | | | | | | |

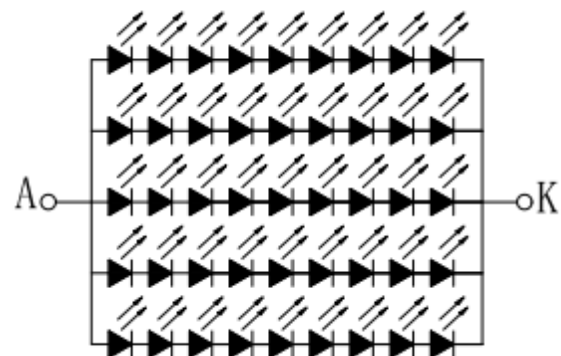
NOTE:

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

Measured Method: (X*Y: Light Area)



Internal Circuit Diagram



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 60°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 50°C for 120 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 0°C for 120 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 50°C,90%RH MAX for 120 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours. |
| 06 | Thermal shock storage | 0°C/30 min ~ +60°C/30 min for a total 10 cycles, Start with cold temperature and end with high temperature. |
| 07 | Packing vibration | Sweep:10Hz~55Hz~10Hz 2G 2 hours for each direction of X. Y. Z. (6 hours for total) |
| 08 | Packing drop test | Height:60 cm 1 corner,3 edges,6 surfaces. |
| 09 | Electrical Static Discharge | Air: ±6KV 150pF/330Ω 5 times |
| | | Contact: ±4KV 150pF/330Ω 5 time |

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

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 12.2, Standard specifications for Reliability have been executed in order to ensure stability.

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

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°C), 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

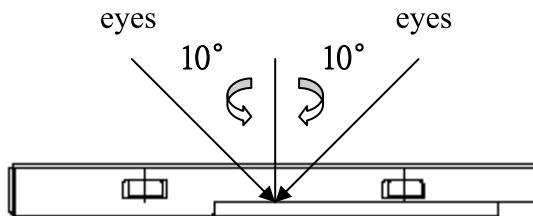
a. Manner of appearance test:

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

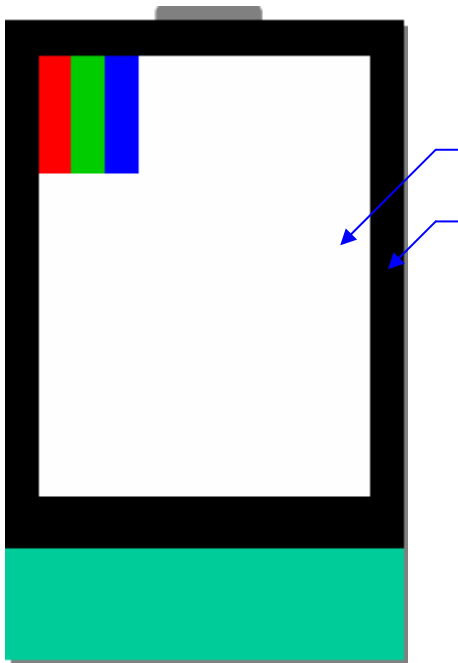
(ii) When test the model of transmissive product must add the reflective plate.

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

(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.

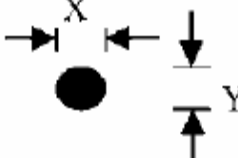
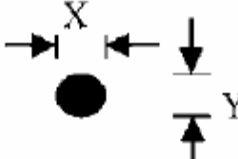

(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

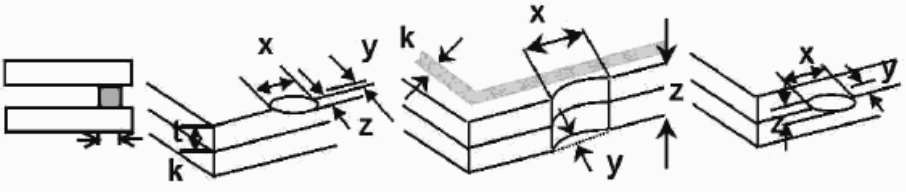
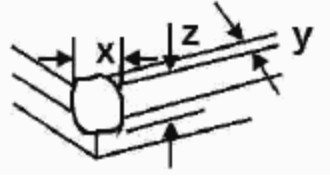
(iii) Must add new item on time when it is necessary.

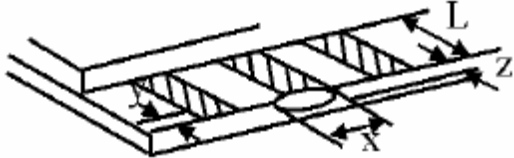
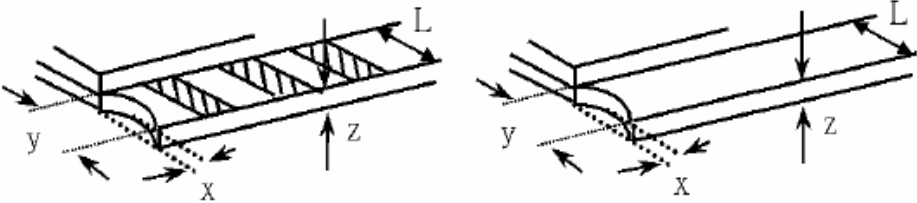
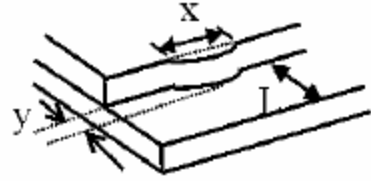
c. Standard of inspection: (Unit: mm)

11-6. Inspection specification

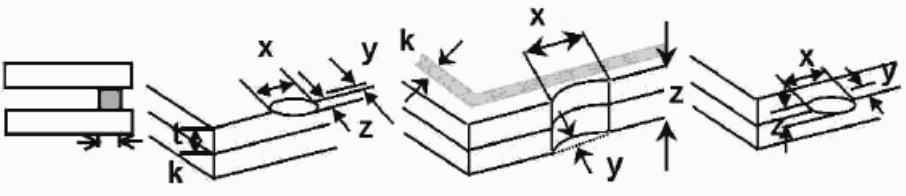
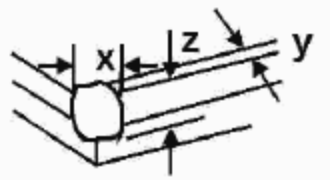
Defect out of viewing area can be neglected.

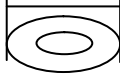
| NO | Item | Criterion | AQL | | | | | | | | | | |
|---|---|---|-----------------|-----------------|------------------|-----------------|-------------------------|---------------------|-------------------------|-----------|---------------|-----------|-----|
| 01 | Electrical Testing | 1.1 Missing vertical, 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 Dot dimension as below drawing: $\Phi = (X+Y) / 2$  <table border="1" data-bbox="758 772 1284 974"> <thead> <tr> <th>Size(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>$0.20 < \Phi \leq 0.40$</td> <td>4</td> </tr> <tr> <td>$0.40 < \Phi \leq 0.80$</td> <td>2</td> </tr> <tr> <td>$0.80 < \Phi$</td> <td>0</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p> | Size(mm) | Acceptable Q'ty | $\Phi \leq 0.20$ | Accept no dense | $0.20 < \Phi \leq 0.40$ | 4 | $0.40 < \Phi \leq 0.80$ | 2 | $0.80 < \Phi$ | 0 | 2.5 |
| Size(mm) | Acceptable Q'ty | | | | | | | | | | | | |
| $\Phi \leq 0.20$ | Accept no dense | | | | | | | | | | | | |
| $0.20 < \Phi \leq 0.40$ | 4 | | | | | | | | | | | | |
| $0.40 < \Phi \leq 0.80$ | 2 | | | | | | | | | | | | |
| $0.80 < \Phi$ | 0 | | | | | | | | | | | | |
| 03 | LCD and Touch Panel black spots, white spots, contamination (non – display) | 3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table border="1" data-bbox="758 1153 1284 1355"> <thead> <tr> <th>Size(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>$0.20 < \Phi \leq 0.40$</td> <td>4</td> </tr> <tr> <td>$0.40 < \Phi \leq 0.80$</td> <td>2</td> </tr> <tr> <td>$0.80 < \Phi$</td> <td>0</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p> | Size(mm) | Acceptable Q'ty | $\Phi \leq 0.20$ | Accept no dense | $0.20 < \Phi \leq 0.40$ | 4 | $0.40 < \Phi \leq 0.80$ | 2 | $0.80 < \Phi$ | 0 | 2.5 |
| | | Size(mm) | Acceptable Q'ty | | | | | | | | | | |
| $\Phi \leq 0.20$ | Accept no dense | | | | | | | | | | | | |
| $0.20 < \Phi \leq 0.40$ | 4 | | | | | | | | | | | | |
| $0.40 < \Phi \leq 0.80$ | 2 | | | | | | | | | | | | |
| $0.80 < \Phi$ | 0 | | | | | | | | | | | | |
| 3.2 Line type: (As following drawing)  <table border="1" data-bbox="662 1523 1284 1780"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$L \leq 8.0$</td> <td>$W \leq 0.05$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 8.0$</td> <td>$0.05 < W \leq 0.3$</td> <td>4</td> </tr> <tr> <td>$L > 8.0$</td> <td>$0.3 < W$</td> <td>Rejection</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two lines within 3mm.</p> | Length(mm) | Width(mm) | Acceptable Q'ty | $L \leq 8.0$ | $W \leq 0.05$ | Accept no dense | $L \leq 8.0$ | $0.05 < W \leq 0.3$ | 4 | $L > 8.0$ | $0.3 < W$ | Rejection | |
| Length(mm) | Width(mm) | Acceptable Q'ty | | | | | | | | | | | |
| $L \leq 8.0$ | $W \leq 0.05$ | Accept no dense | | | | | | | | | | | |
| $L \leq 8.0$ | $0.05 < W \leq 0.3$ | 4 | | | | | | | | | | | |
| $L > 8.0$ | $0.3 < W$ | Rejection | | | | | | | | | | | |

| NO | Item | Criterion | AQL | | | | | | | | | | | | | | | | | | |
|-------------------------|--------------------------|---|-------------------|-----------------|------------------|-----------------|--------------------------|---------------|-------------------------|-----------------|---------------|-------------------|---------------|----------------|---------------|--------------------------|---------------|--------------------|-----------------|---------------|-----|
| 04 | Polarizer bubbles | <p>If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction</p> <table border="1"> <thead> <tr> <th>Size 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>3</td> </tr> <tr> <td>$0.50 < \Phi \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$1.00 < \Phi$</td> <td>0</td> </tr> </tbody> </table> | Size Φ (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 | 2.5 | | | | | | | | |
| Size Φ (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 | | | | | | | | | | | | | | | | | | | | |
| 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"> <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 a ea</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"> <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 a ea | $x \leq 1/8a$ | $1/2t < z \leq 2t$ | 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 | | | | | | | | | | | | | | | | | | | |
| $Z \leq 1/2t$ | Not over viewing a ea | $x \leq 1/8a$ | | | | | | | | | | | | | | | | | | | |
| $1/2t < z \leq 2t$ | 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 | $x \leq 1/8a$ | | | | | | | | | | | | | | | | | | | |

| 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="486 689 1169 842"> <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="486 1200 1169 1352"> <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="804 1671 1241 1823"> <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 | | | | | | | | | | | | | | | | | |
| $y \leq 0.5\text{mm}$ | $x \leq 1/8a$ | $0 < z \leq t$ | | | | | | | | | | | | | | | | | |
| y: Chip width | x: Chip length | z: Chip thickness | | | | | | | | | | | | | | | | | |
| $y \leq L$ | $x \leq 1/8a$ | $0 < z \leq t$ | | | | | | | | | | | | | | | | | |
| y: width | x: length | | | | | | | | | | | | | | | | | | |
| $y \leq 1/3L$ | $X \leq a$ | | | | | | | | | | | | | | | | | | |

| 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="347 801 1161 1019"> <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="347 1400 1161 1617"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$z \leq t$</td> <td>$\leq 1/2$ 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 | $z \leq t$ | $\leq 1/2$ and not over viewing area | $x \leq 1/8a$ | 2.5 |
| 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 | | | | | | | | | | | | | |
| $z \leq t$ | $\leq 1/2$ and not over viewing area | $x \leq 1/8a$ | | | | | | | | | | | | | |

| NO | Item | Criterion | AQL | |
|----|-------------------------|---|-----------------|-----|
| 15 | Touch Panel(Fish eye) | SIZE(mm) | Acceptable Q'ty | 2.5 |
| | | $L \leq 0.7$ | Accept no dense | |
| | | $L > 0.7\text{mm}$ | 0 | |
| | |  | | |
| 16 | Touch Panel Newton ring | Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$) , it is acceptable. | 2.5 | |
| 17 | Touch Panel Linearity | Less than 2.5% is acceptable. | 2.5 | |
| 18 | LCD Ripple | Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g | 2.5 | |
| 19 | General appearance | 19.1 Pin type must match type in specification sheet. | 0.65 | |
| | | 19.2 LCD pin loose or missing pins. | 0.65 | |
| | | 19.3 Product packaging must the same as specified on packaging specification sheet. | 0.65 | |
| | | 19.4 Product dimension and structure must conform to product specification sheet. | 0.65 | |

12. Handling Precaution:

12-1 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.

12-2 Storage

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

12-3 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.

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.