

SPECIFICATION FOR TFT MODULE

MODULE NO: YB-TG168348S01A-N-A0

Doc.Version:02

Customer Approval:

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

YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer	林永泰	2023-02-03
Check	Mechanical Engineer	马超铭	2023-02-03
Verify		任强琛	2023-02-03
Approval		梁锦豪	2023-02-03

■ APPROVAL FOR SPECIFICATIONS ONLY

□ APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

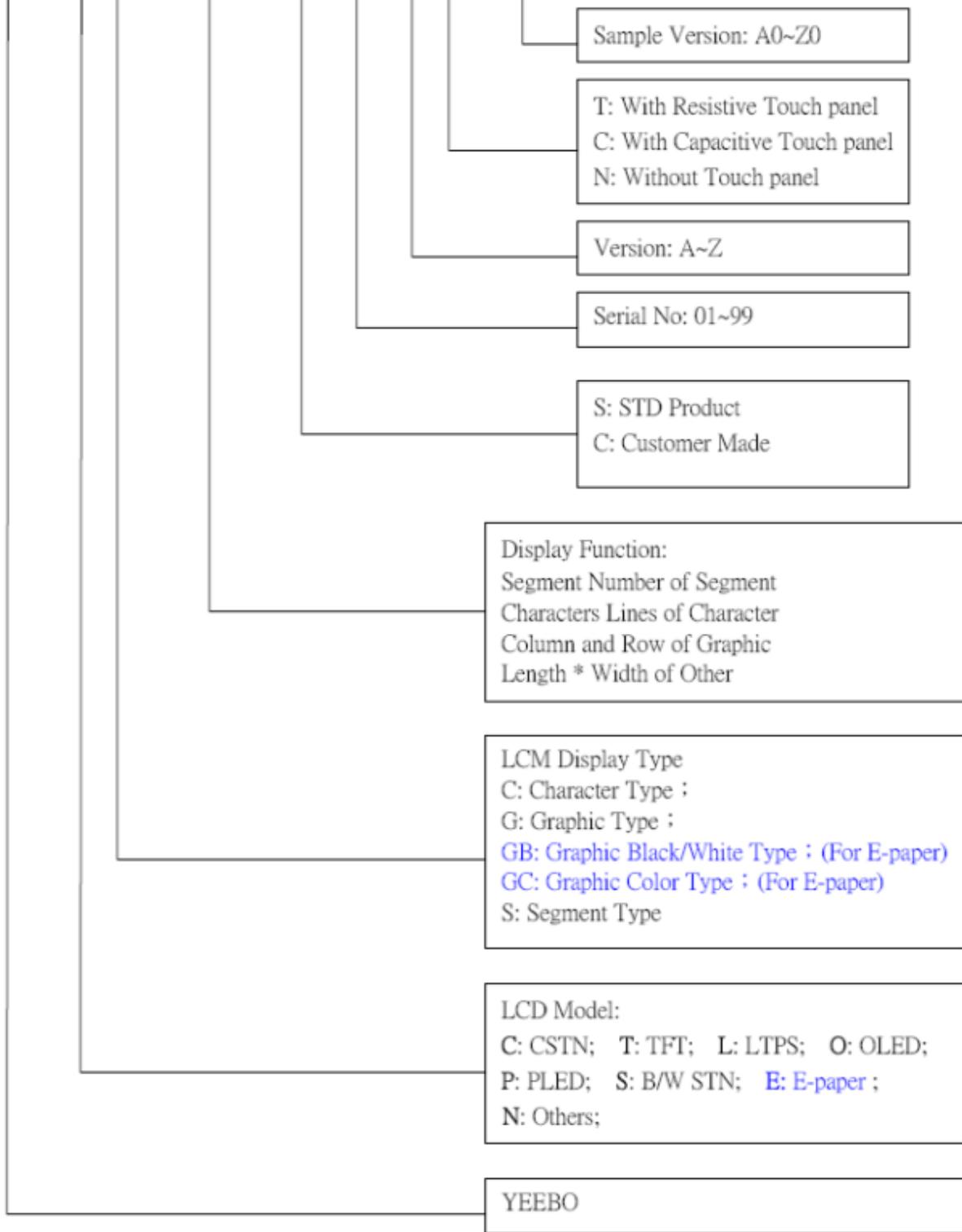
2. Table of Contents

NO	CONTENTS	PAGE
1	Revision History	1
2	Table of Contents	2
3	Module Numbering System	3
4	General Specification	4
5	LCM drawing	5
6	Electrical Characteristics	6
7	Optical Characteristics	11
8	Interface Pin Assignment	14
9	Block Diagram	15
10	Standard Specification for Reliability	16
11	Specification of Quality Assurance	18
12	Handling Precaution	26
13	Warranty	27
14	Guarantee	27

3. Module Numbering System

(Example)

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

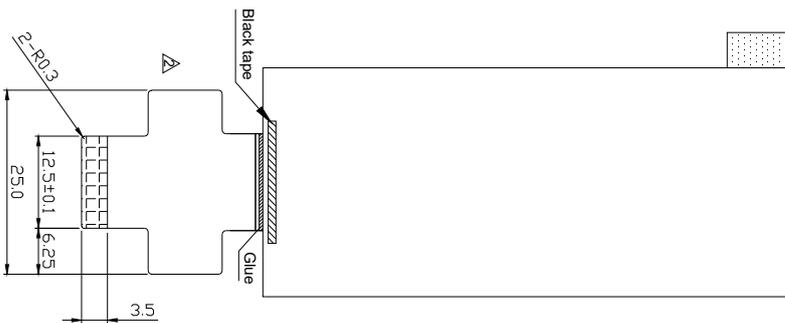
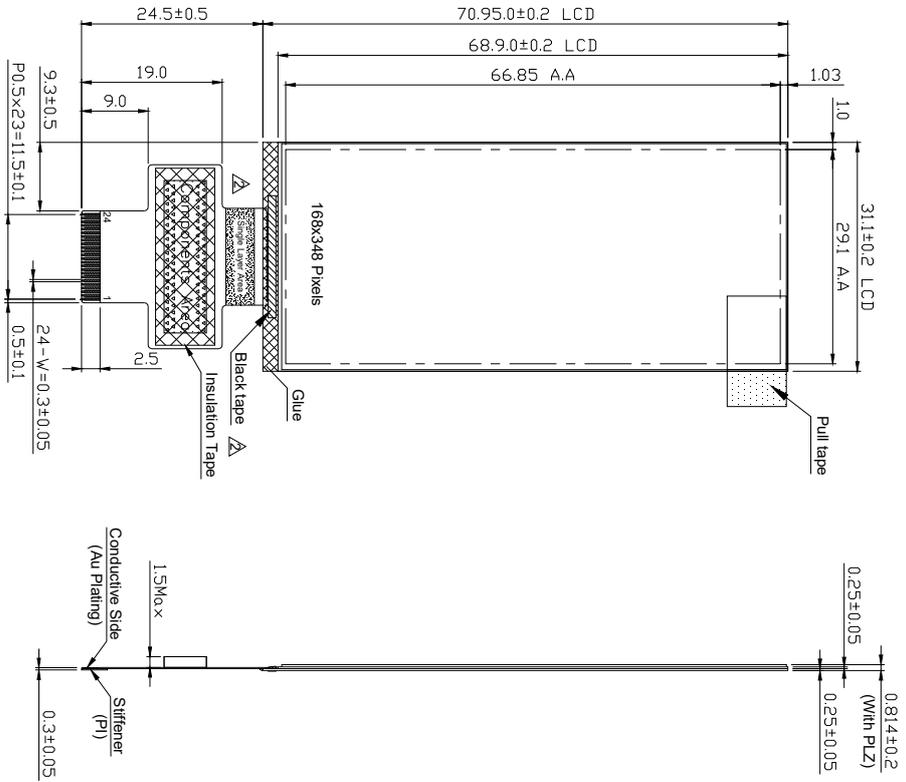


4. General Specification

ITEM	CONTENTS
Module Size	31.1(W)*70.95(H)*0.814(T)mm
Module Size(With FPC)	31.1(W)*95.45(H)*0.814(T)mm
Display Size(Diagonal)	2.9 inch
Display Format	168BWR*348 Pixels
Active Area	29.1(W) * 66.85 (H) mm
Pixel Pitch	0.1732* 0.17408mm
LCD Type	TFT / Reflective/ NW
Driver IC	ST7306
Weight	TBD

5. LCM drawing

Count drawing & Spec revision record during discussion with customer	
Rec.	Revision content description
#1	FIRST ISSUE
#2	Modified display mode & Black tape & FPC
Date	2022-11-23
Date	2023-02-03



Specification:

1. Display mode: 2.9" TFT (Black & White & Red) / Normally White / Reflective
2. Operating temperature: -20°C to +70°C
3. Storage temperature: -30°C to +80°C
4. Driver IC is: ST7306 or Compatible
5. Unspecified tolerance: ±0.30mm
6. ROHS compliant
7. 产品结构: TFT

Detail Pixels
Scale: X50

		MOD. Name	YB-TG168348S01A-N-A			
		DESIGNED	CHECKED	VERIFIED	APPROVED	FILE NAME
UNIT	SIZE	SCALE	Count Dwg.			
mm	A4	N-1-S				
Sheet	1	OF	1			

NO.	Symbol	LCD Module PIN ASSIGNMENT
1	NC	
2	NC	
3	NC	
4	NC	
5	VGL	
6	NC	
7	NC	
8	IF1	
9	TE	
10	RSTB	
11	A0	
12	CSB	
13	SCLK	
14	SDA	
15	VDDI	
16	VDDA	
17	GND	
18	VCC	
19	VPP	
20	VGH	
21	NC	
22	NAVDD	
23	NC	
24	V1V	

6. Electrical Characteristics

6-1 Absolute Maximum Ratings

(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Input Voltage	V _{DD}	-0.3	-	+4.0	Volt	Note1
Supply Voltage(Logic)	V _{DDI}	-0.3	-	+4.0	V	Note1
Logic Input Voltage Range	V _{IN}	-0.3	-	V _{DDI} +0.5	V	Note1
Operating Temperature	T _{opr}	-20	-	+70	°C	-
Storage Temperature	T _{stg}	-30	-	+80	°C	-

Note: *1. At 25±5°C *2. Due to the characteristics of LC Material, the Liquid Crystal driving voltage varies with environmental temperature. *3. Non-condensation. *4. Temp. ≤ 60 ,90%RH Max. °C Temp. > 60 ,Absolute humidity shall be less than 90% °C RH.

6-2 Operating Conditions

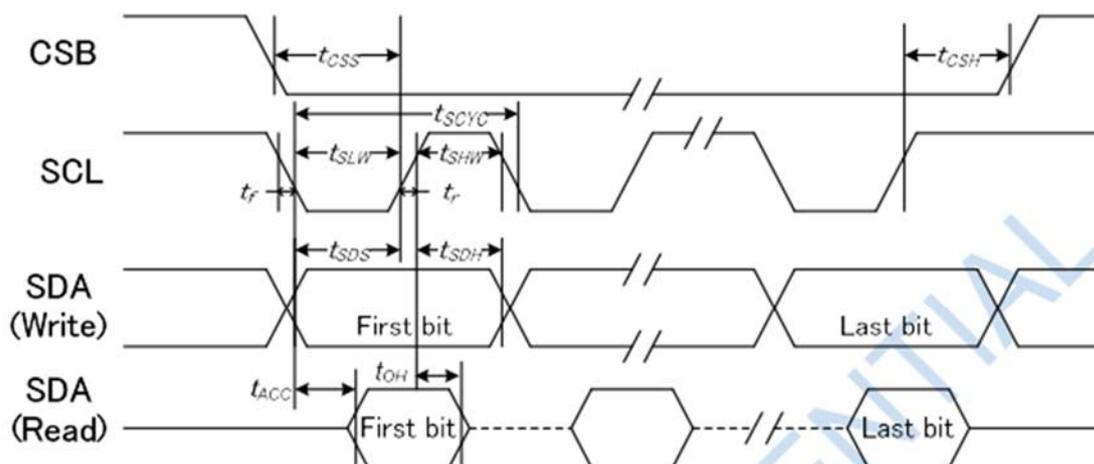
(Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	V _{CC}	-	2.6	3.3	3.6	V
Supply voltage for I/O	V _{DDI}	-	1.7	1.8	1.9	V
Input Voltage	V _{IH}	-	0.7* V _{DDI}	-	V _{DDI}	V
	V _{IL}	-	V _{SS}	-	0.3* V _{DDI}	V
Power Supply Current for LCM	I _{cc}	V _{CC} =3.3V	-	TBD	-	mA

6-3 Timing Characteristics

6.3.1 AD Characteristics

A. Display Serial Interface Timing Characteristics (3-line SPI system)



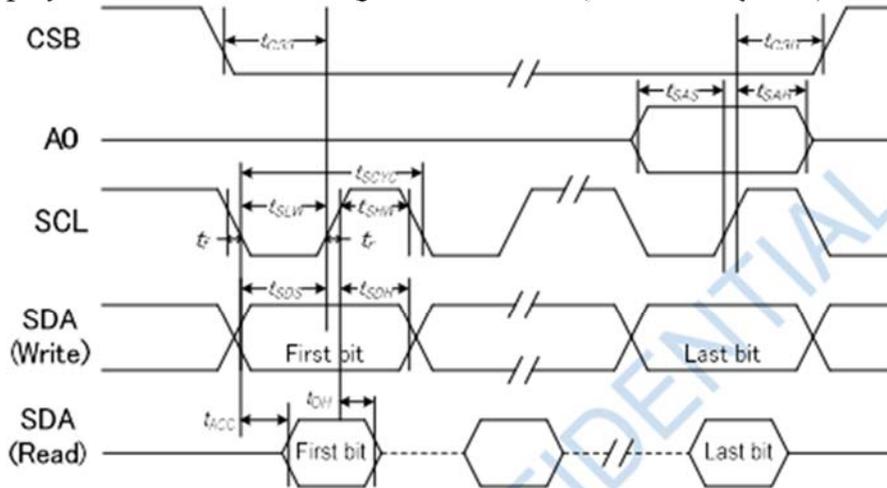
VDDI = 1.8~3.3V, Ta = 25°C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period (Write)	SCL	tSCYC		30	—	ns
Serial clock period (Read)				150		
SCLK "H" pulse width (Write)		tSHW		15	—	
SCLK "H" pulse width (Read)				60		
SCLK "L" pulse width (Write)		tSLW		15	—	
SCLK "L" pulse width (Read)				60		
Data setup time	SDA	tSDS		10	—	
Data hold time	(Write)	tSDH		10	—	
Data setup time	SDA	tACC	For maximum CL=30p	10	50	
Data hold time	(Read)	tOH	For minimum CL=8p	15	50	
CSB-SCLK time	CSB	tCSS		10	—	
CSB-SCLK time		tCSH		10	—	

Note:

1. The input signal rise and fall time (t_r , t_f) are specified at 15 ns or less.
2. All timing is specified using 20% and 80% of VDDI as the standard.

B. Display Serial Interface Timing Characteristics (4-line SPI system)



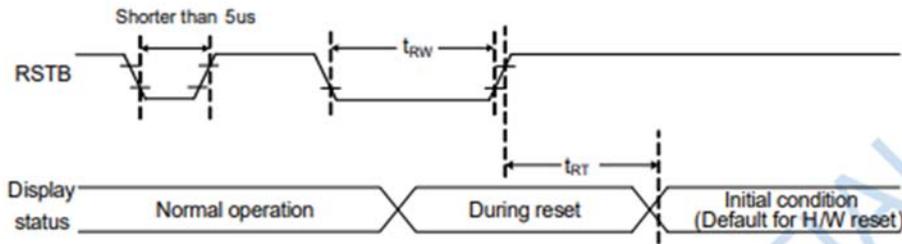
VDDI = 1.8~3.3V, Ta = 25°C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period (Write)	SCL	tSCYC		30	—	ns
Serial clock period (Read)				150		
SCLK "H" pulse width (Write)				15	—	
SCLK "H" pulse width (Read)				60	—	
SCLK "L" pulse width (Write)				15	—	
SCLK "L" pulse width (Read)				60	—	
Address setup time	A0	tSAS		10	—	
Address hold time		tSAH		10	—	
Data setup time	SDA	tSDS		10	—	
Data hold time	(Write)	tSDH		10	—	
Read data access time	SDA	tACC	For maximum CL=30p	10	50	
Read data output disable time	(Read)	tOH	For minimum CL=8p	15	50	
CSB-SCLK time	CSB	tCSS		10	—	
CSB-SCLK time		tCSH		10	—	

Note:

1. The input signal rise and fall time (t_r , t_f) are specified at 15 ns or less.
2. All timing is specified using 20% and 80% of VDDI as the standard.

Reset Timing:



VDDI = 1.8~3.3V, Ta = 25°C

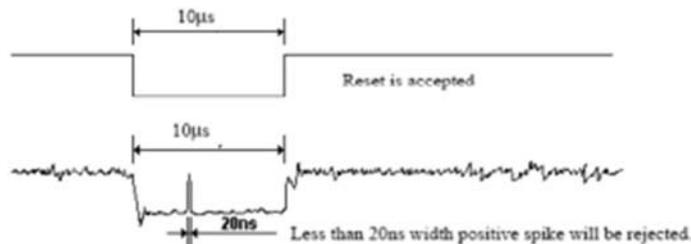
Item	Symbol	Condition	Min.	Max.	Unit
Reset "L" pulse width	t _{RW}		1	—	ms
Reset cancel	t _{RT}	Note1, 5 (sleep-in mode)	—	5	ms
		Note1, 6, 7 (sleep-out mode)	—	120	ms

Notes:

- The reset cancel includes also required time for loading ID bytes, VSource setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (t_{RT}) within 5 ms after a rising edge of RSTB.
- Spike due to an electrostatic discharge on RSTB line does not cause irregular system reset according to the table below:

RSTB Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

- During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out -mode. The display remains the blank state in Sleep In -mode.) and then return to Default condition for Hardware Reset.
- Spike Rejection also applies during a valid reset pulse as shown below:



- When Reset applied during Sleep In Mode.
- When Reset applied during Sleep Out Mode.
- It is necessary to wait 5msec after releasing RSTB before sending commands. Also Sleep Out command cannot be sent for 120msec.

Power ON/OFF Sequence:

VDDI and VDDA can be applied in any order.

VDDA and VDDI can be power down in any order.

During power off, if LCD is in the Sleep Out mode, VDDA and VDDI must be powered down minimum 120msec after RSTB has been released.

During power off, if LCD is in the Sleep In mode, VDDI or VDDA can be powered down minimum 0msec after RSTB has been released.

CSB can be applied at any timing or can be permanently grounded. RSTB has priority over CSB.

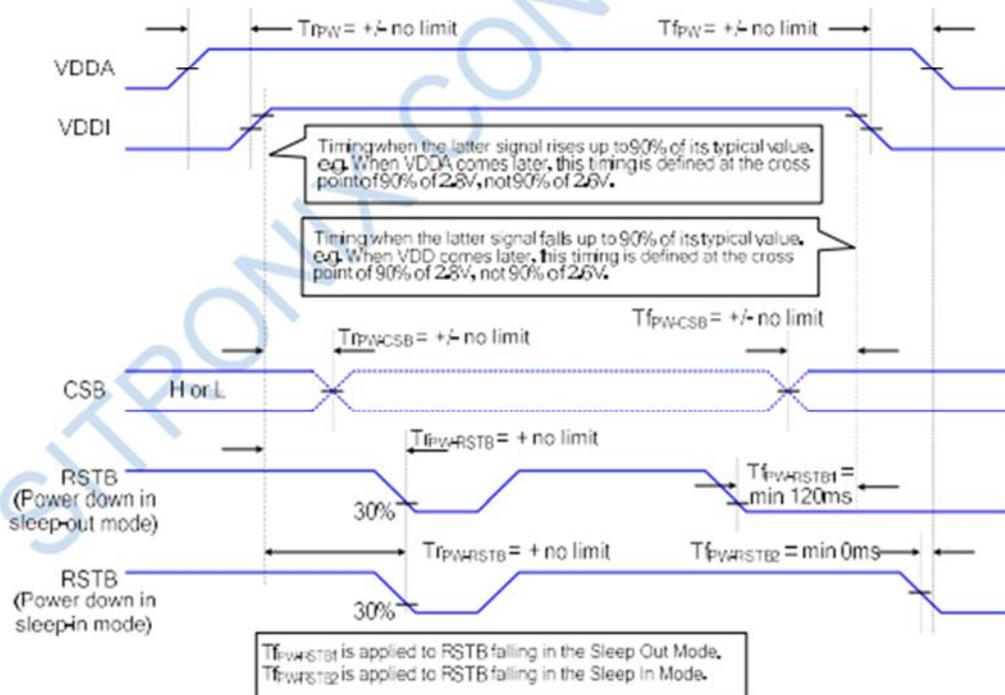
Note 1: There will be no damage to the display module if the power sequences are not met.

Note 2: There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.

Note 3: There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.

Note 4: If RSTB line is not held stable by host during Power On Sequence as defined in the sequence below, then it will be necessary to apply a Hardware Reset (RSTB) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.

The power on/off sequence is illustrated below



7. Optical Characteristics

Item	Symbol	Conditions	Specifications			Unit	Note
			Min	Typ	Max		
White Reflectance (with Polarizer)	Rw (%)	Θ=0 Normal Viewing angle -	-	24.24	-	%	(4) Measuring with HSD polarizer, Reference Only Base on Vop=4.0V
Contrast Ratio	CR		-	15	-	-	(1) (2) Base on Vop=4.0V
Response time	ms		-	5	7	ms	
Color Chromaticity (CIE1931)	White		Wx	-	(0.300)	-	-
		Wy	-	(0.330)	-		
Viewing angle	Hor.	ΘL	-	60	-	-	(1)(4) Measuring with HSD polarizer, Reference Only-
		ΘR	-	60	-		
	Ver.	ΘU	-	60	-		
		ΘD	-	60	-		

Measuring Condition

1. Measuring surrounding: dark room
2. Ambient temperature: 25±2°C
3. 15 min. Warm-up time.

Measuring Equipment

1. DMS (DMS = Display Measurement System) of AUTRONIC-MELCHERS GmbH, motorized goniometer system for comprehensive display characterization

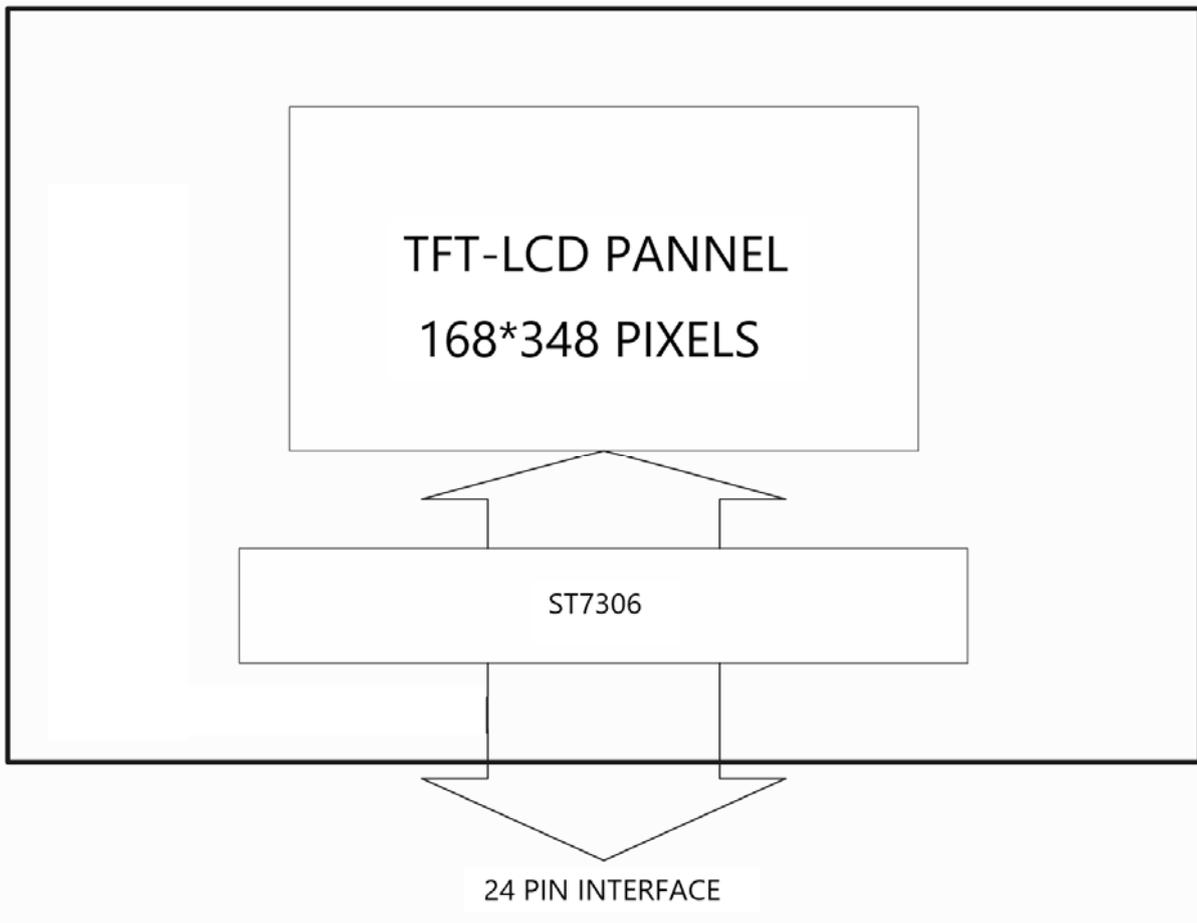
8. Interface Pin Assignment

No.	Symbol	Function															
1	NC	NC															
2	NC	NC															
3	NC	NC															
4	NC	NC															
5	VGL	Power output (negative) pin for gate driver. Connect 1uF/25V 0603.															
6	NC	NC															
7	NC	NC															
8	IF1	<p>These pins select interface operation mode.</p> <table border="1"> <thead> <tr> <th>IF1</th> <th>IF0</th> <th>MPU interface type</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>L</td> <td>8-bit 8080 parallel interface</td> </tr> <tr> <td>L</td> <td>H</td> <td>Single 4-line serial interface</td> </tr> <tr> <td>H</td> <td>L</td> <td>Dual 4-line serial interface</td> </tr> <tr> <td>H</td> <td>H</td> <td>3-line serial interface</td> </tr> </tbody> </table>	IF1	IF0	MPU interface type	L	L	8-bit 8080 parallel interface	L	H	Single 4-line serial interface	H	L	Dual 4-line serial interface	H	H	3-line serial interface
IF1	IF0	MPU interface type															
L	L	8-bit 8080 parallel interface															
L	H	Single 4-line serial interface															
H	L	Dual 4-line serial interface															
H	H	3-line serial interface															
9	TE	Tearing effect signal is used to synchronize MCU to frame memory writing. If not used, please let this pin open.															
10	RSTB	Reset input pin. When RSTB is “L”, internal initialization procedure is executed.															
11	A0	When using 8080, Single 4SPI and Dual 4SPI mode. It determines whether the access is related to data or command. A0 = "H": Indicates that D[7:0] are display data; A0 = "L": Indicates that D[7:0] are control data. When using 3SPI. There is no A0 pin in 3-Line. A0 should be fixed to “H” by VDDI.															
12	CSB	Chip select input pin. CSB=“L”： This chip is selected and the MPU interface is active. CSB=“H”： This chip is not selected and the MPU interface is disabled (D[7:0] are high impedance).															
13	SCLK	For external clock. If CLS=“H”： this pin is open. If CLS=“L”： this pin is the input of oscillator.															

14	SDA	Serial data input signal
15	VDDI	Power Supply (Digital) Connect 1uF/6.3V 0603.
16	VDDA	Power Supply (Analog) Connect 1uF/6.3V 0603.
17	GND	Ground
18	VCC	High voltage power supply for analog circuit blocks (2.5 ~ 3.3 V)
19	VPP	The programming power supply of the built-in NVM. Apply external power 7.5V here when programming (> 8mA for successful programming). If not used, left this pin open.
20	VGH	Power output (positive) pin for gate driver. Connect 1uF/25V 0603.
21	NC	NC
22	NAVDD	Power output pin for analog circuit. Connect 1uF/10V 0603.
23	NC	NC
24	V1V	Power output pin for analog circuit. Connect 1uF/6.3V 0603.

#	Name	Type	#	Name	Type
1	VDDA	1uF/6.3V	11	NAVDD	1uF/10V
2	VGH	1uF/25V	12	CA1N-CA1P	1uF/6.3V
3	VGL	1uF/25V	13	V1V	1uF/6.3V
4	CD1N-CD1P	1uF/16V	14	CF1N-CF1P	1uF/6.3V
5	CC1N-CC1P	1uF/16V	15	CB2N-CB2P	1uF/10V
6	CE1N-CE1P	1uF/10V	16	CA2N-CA2P	1uF/6.3V
7	CB1N-CB1P	1uF/10V	17	AVDD	1uF/10V
8	CE2N-CE2P	1uF/10V	18	VPV	1uF/10V
9	VDDI	1uF/6.3V	19	VNV	1uF/6.3V
10	VCCI-VCCO	1uF/6.3V			

9. Block 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 70°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80°C for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -30°C for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 60°C,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.
06	Thermal shock storage	The sample should be allowed to stand the following 10 cycles : -30°C for 30 minutes → normal temperature for 5 minutes → +80°C for 30 minutes → normal temperature for 5 minutes, as one cycle.
07	Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z 2 hours for each direction.
08	Packing drop test	According to ISTA 1A 2001.
09	Electrical Static Discharge	Air: ±4KV 150pF/330Ω 5 times
		Contact: ±2KV 150pF/330Ω 5 time

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

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 12.1, 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 ($25\pm 5^{\circ}\text{C}$), normal humidity ($50\pm 10\%$ 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

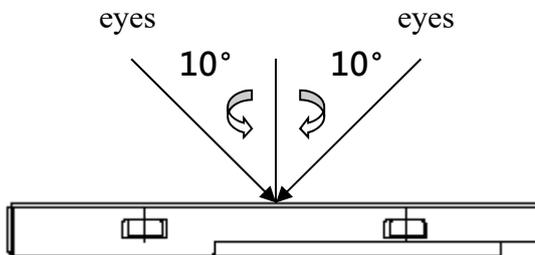
a. Manner of appearance test:

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

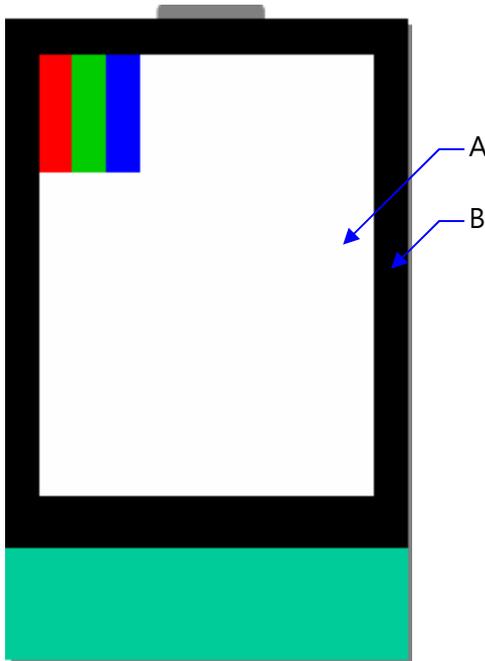
(ii) When test the model of transmissive product must add the reflective plate.

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

(iiii) Temperature: 25±5°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.

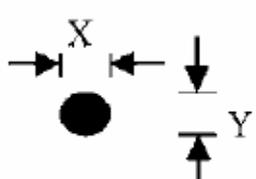
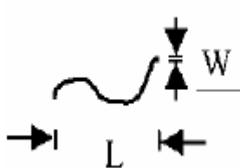
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

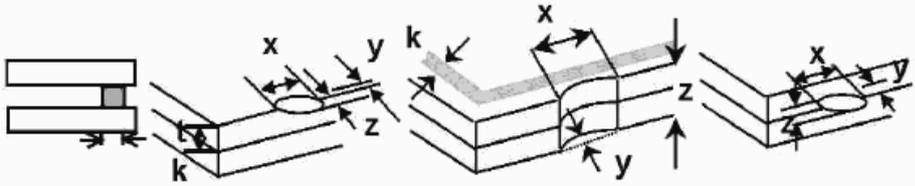
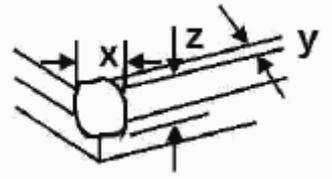
(iii) Must add new item on time when it is necessary.

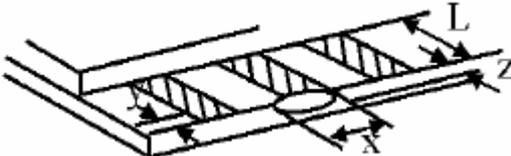
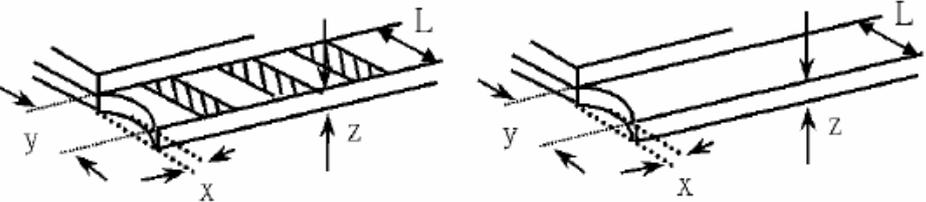
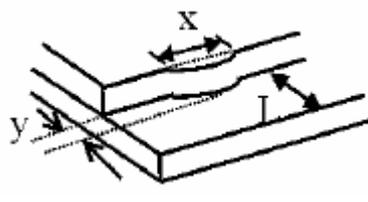
c. Standard of inspection: (Unit: mm)

11-6. Inspection specification

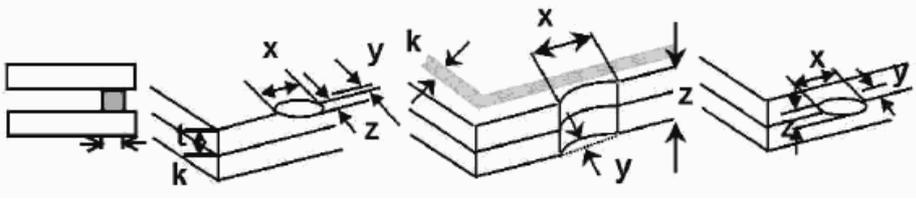
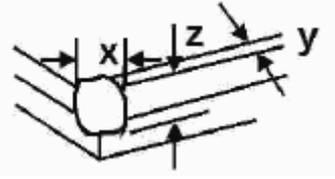
Defect out of viewing area can be neglected.

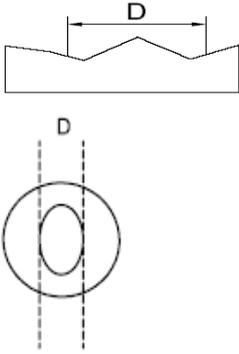
NO	Item	Criterion	AQL												
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 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 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. 2.3 Not visible through 5% ND filter	2.5												
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table border="1" data-bbox="821 996 1364 1310"> <thead> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.25$</td> <td>2</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$0.30 < \Phi$</td> <td>0</td> </tr> </tbody> </table> <p>* Densely spaced: No more than two spots within 3mm.</p>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	2.5
		Size(mm)	Acceptable Q'ty												
$\Phi \leq 0.10$	Accept no dense														
$0.10 < \Phi \leq 0.20$	2														
$0.20 < \Phi \leq 0.25$	2														
$0.25 < \Phi \leq 0.30$	1														
$0.30 < \Phi$	0														
3.2 Line type: (As following drawing)  <table border="1" data-bbox="726 1400 1364 1713"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.02$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.02 < W \leq 0.05$</td> <td rowspan="2">2</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.03 < W \leq 0.08$</td> </tr> <tr> <td>---</td> <td>$0.08 < W$</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	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.08$	---	$0.08 < W$	Rejection	2.5
Length(mm)	Width(mm)	Acceptable Q'ty													
---	$W \leq 0.02$	Accept no dense													
$L \leq 3.0$	$0.02 < W \leq 0.05$	2													
$L \leq 2.5$	$0.03 < W \leq 0.08$														
---	$0.08 < W$	Rejection													

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 border="1" data-bbox="863 255 1362 539"> <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> <tr> <td>Total Q'ty</td> <td>3</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	Total Q'ty	3	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																				
Total Q'ty	3																				
05	Scratches	Follow NO.3 -2 Line Type.																			
06	Mura	Not visible through 5% ND filter in 50% gray.	2.5																		
07	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 7.1 General glass chip: 7.1.1 Chip on panel surface and crack between panels:  <table border="1" data-bbox="411 1066 1230 1234"> <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> 7.1.2 Corner crack:  <table border="1" data-bbox="411 1653 1230 1821"> <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																			
$z \leq 1/2t$	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	$x \leq 1/8a$																			

NO	Item	Criterion	AQL																
08	Glass crack	<p>Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length</p> <p>8.1 Protrusion over terminal: 8.1.1 Chip on electrode pad:</p>  <table border="1" data-bbox="555 705 1241 862"> <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>8.1.2 Non-conductive portion:</p>  <table border="1" data-bbox="555 1220 1241 1377"> <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>8.1.3 Substrate protuberance and internal crack</p>  <table border="1" data-bbox="874 1724 1316 1881"> <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
09	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
10	Backlight elements	10.1 Illumination source flickers when lit. 10.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 10.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
11	Bezel	Bezel must comply with product specifications.	2.5
12	PCB、COB	12.1 COB seal may not have pinholes larger than 0.2mm or contamination. 12.2 COB seal surface may not have pinholes through to the IC. 12.3 The height of the COB should not exceed the height indicated in the assembly diagram. 12.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 12.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 12.6 The jumper on the PCB should conform to the product characteristic chart. 12.7 PCBA cosmetic control base on latest IPC standard,IPC-A-610,acceptable limit of grade 2.	2.5 2.5 2.5 2.5 0.65 0.65 2.5
13	FPC	13.1 FPC terminal damage $\leq 1/2$ FPC terminal width and can not affect the function , we judge accept. 13.2 FPC alignment hole damage $\leq 1/2$ alignment area and can not affect the function , we judge accept.	2.5 2.5
14	Soldering	14.1 No cold solder joints, missing solder connections, oxidation or icicle. 14.2 No short circuits in components on PCB or FPC.	2.5 0.65

NO	Item	Criterion	AQL												
15	Touch Panel Chipped glass	<p>Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length</p> <p>15.1 General glass chip: 15.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="411 770 1232 985"> <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>15.1.2 Corner crack:</p>  <table border="1" data-bbox="411 1397 1232 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													
$Z \leq t$	$\leq 1/2 k$ 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	$x \leq 1/8a$													

NO	Item	Criterion	AQL										
16	Touch Panel(Fish eye、dent and bubble on film)	<table border="1" data-bbox="411 293 943 539"> <thead> <tr> <th data-bbox="411 293 678 333">SIZE(mm)</th> <th data-bbox="678 293 943 333">Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td data-bbox="411 333 678 387">$\Phi \leq 0.2$</td> <td data-bbox="678 333 943 387">Accept no dense</td> </tr> <tr> <td data-bbox="411 387 678 441">$0.2 < D \leq 0.4$</td> <td data-bbox="678 387 943 441">5</td> </tr> <tr> <td data-bbox="411 441 678 495">$0.4 < D \leq 0.5$</td> <td data-bbox="678 441 943 495">2</td> </tr> <tr> <td data-bbox="411 495 678 539">$0.5 < D$</td> <td data-bbox="678 495 943 539">0</td> </tr> </tbody> </table> 	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	2.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dense												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	0												
17	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$) , it is acceptable.	2.5										
18	Touch Panel Linearity	Less than 2.5% is acceptable.	2.5										
19	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	2.5										
20	General appearance	20.1 Pin type must match type in specification sheet. 20.2 LCD pin loose or missing pins. 20.3 Product packaging must the same as specified on packaging specification sheet. 20.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 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 $310\pm 10^{\circ}\text{C}$ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.

13. Warranty

This product has been manufactured to specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other

use apart from general electronic equipment, we will not take responsibility if the product is used in

medical devices, nuclear power control equipment, aerospace equipment, fire and security systems,

or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

1. We cannot accept responsibility for any defect arise after additional process of the product (including disassembly and reassembly), after product delivery.

2. We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.

3. We cannot accept responsibility for any defect, which may arise due to the application of static

electricity after the product has passed your company's acceptance inspection procedures.

4. We can not accept responsibility for industrial property, which may arise through the use of your product , with exception to those issues relating directly to the structure or method of manufacturing of our product within one year from YEEBO shipment.

5. For Heatseal Product which required to heatseal by customer side, parts must be used within three months after delivery from factory.

6. For TAB Product which required to solder by customer side, parts must be used within three months after delivery from factory.

7. The liability of YB is limited to repair or replacement on the terms set forth below. YB will not be responsible for any subsequent or consequential events or injury or damage to any personnel or

user including third party personnel and/or user. Unless otherwise agreed in writing between YB and the customer, YB will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with YB GENERAL LCD INSPECTION STANDARD.

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.