



SPECIFICATION FOR LCD MODULE

MODULE NO: YB-TG240320S27A-C-A

Doc.Version:00

Customer Approval:

<input type="checkbox"/> Accept	<input type="checkbox"/> Reject
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YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer		2017-3-29
Check	Mechanical Engineer		2017-3-29
Verify			
Approval			2017-3-29

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE



1. Revision History

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A1	00	2017-03-28	FULL SPEC	First issue	Jialunlu



2. Table of Contents:

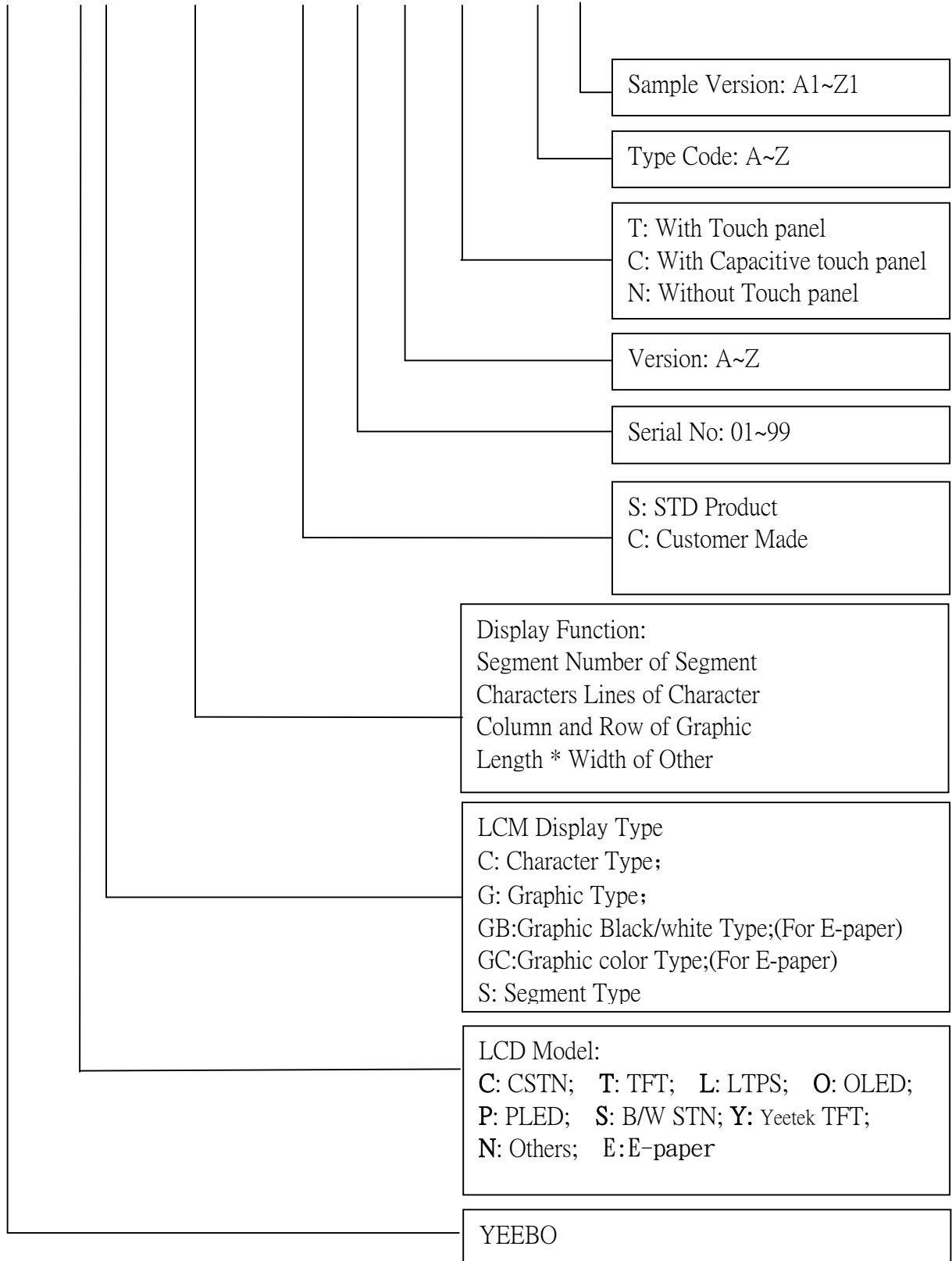
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3. Module Numbering System:

(Example)

YB- TG 240320 S 27 A -C - A A1





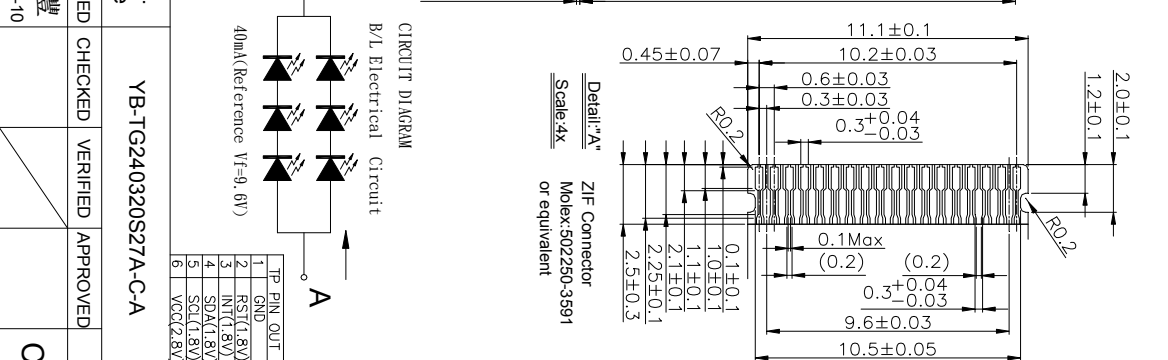
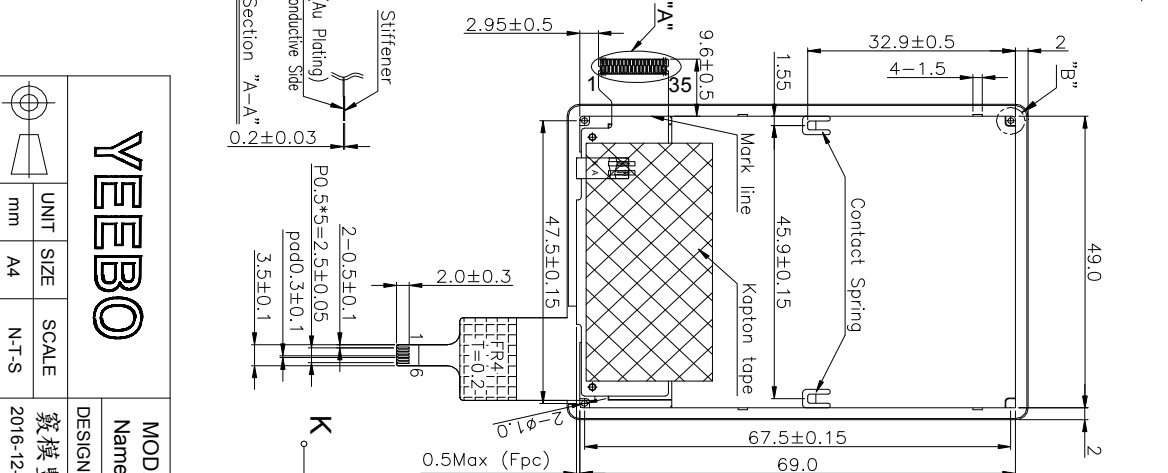
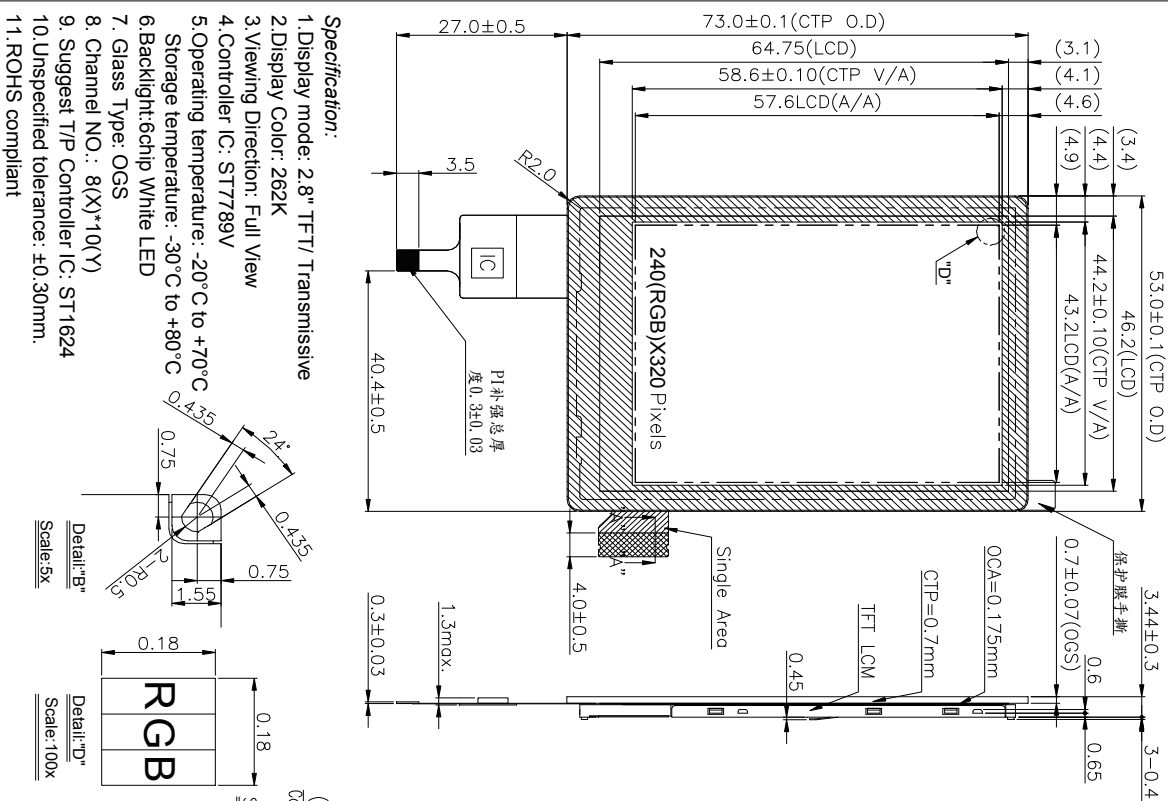
4. General Specification:

ITEM	CONTENTS
Module Size	53.0 (W) * 73.0 (H) * 3.44 (T) mm
Display Size(Diagonal)	2.8 inch
Display Format	240(RGB)*320 Pixels
View Area	44.2(W) * 58.6 (H) mm
Pixel Pitch	0.18* 0.18 mm
LCD Type	TFT (262K) / Transmissive / Normally Black
View Direction	Free
Controller IC	ST7789V
CTP IC	ST1624
Weight	≈21.2g



5. LCM drawing:

Count drawing & Spec. revision record during discussion with customer	Rec:	Date
Revision content description	#1	2016-12-10
FIRST ISSUE		



YEEBO	MOD. Name	YB-TG240320S27A-C-A	DESIGNED	家模豐	2016-12-10	CHECKED	VERIFIED	APPROVED	FILE NAME	Count Dwg.
UNIT	SIZE	SCALE								
mm	A4	N-T-S								
Sheet 1 of 1										



6. Electrical Characteristics

6-1 Absolute Maximum Ratings

(Ta=25°C VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Supply Voltage	V _{CI}	-0.3	-	+4.6	V	Note1
Supply Voltage(Logic)	IOV _{CC}	-0.3		+4.6		Note1
Logic Input Voltage Range	V _{IN}	0.5		IOV _{CC} +0.5	V	Note1
Operating Temperature	Topr	-20	-	+70	°C	-
Storage Temperature	Tstg	-30	-	+80	°C	-

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

6-2 Operating Conditions

(Ta=25°C)

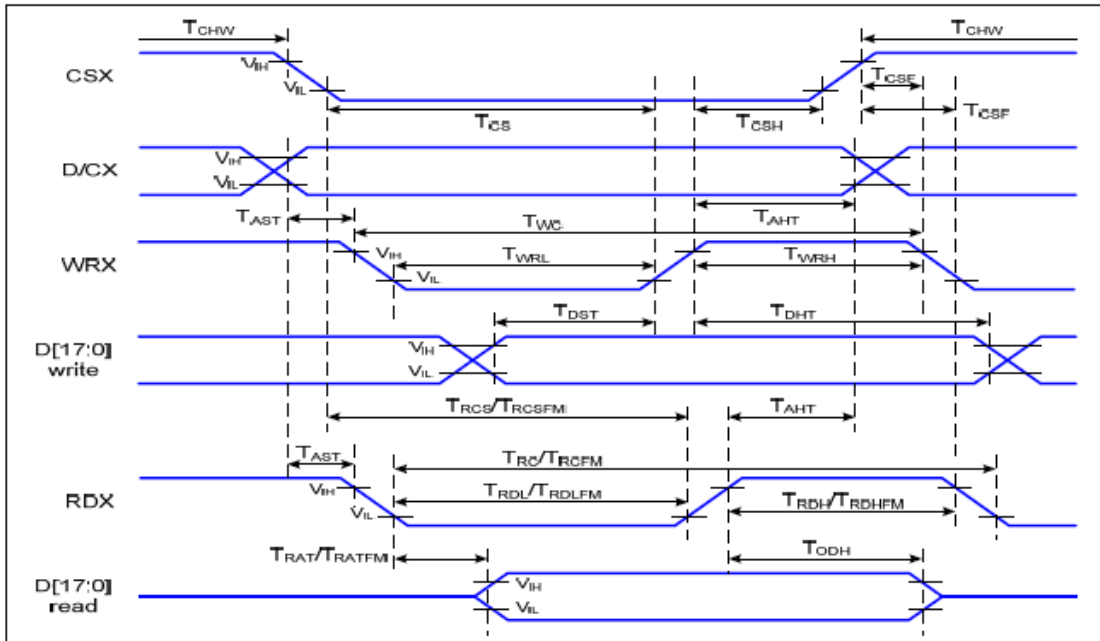
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	V _{CI}	-	2.6	2.8	3.3	Volt
Supply voltage for I/O	IOV _{CC}	-	1.65	2.8	3.3	Volt
Input Voltage	V _{IH}	-	0.7 IOV _{CC}	-	IOV _{CC}	V
	V _{IL}	-	V _{SS}	-	0.3 IOV _{CC}	V
Power Supply Current for LCM	I _{CC}	V _{CI} =2.8V	-	9.25	13.8	mA

6-3 Touch Panel Controller ST1624

Item	Symbol	Min.	Typ.	Max.	Unit
Power Supply	VDD	2.7	-	3.6	Volt

6-4 Timing Characteristics

6-4-1 8080 Series MCU Parallel Interface Characteristics: 18/16/9/8-bit Bus



Parallel Interface Timing Characteristics (8080-Series MCU Interface)

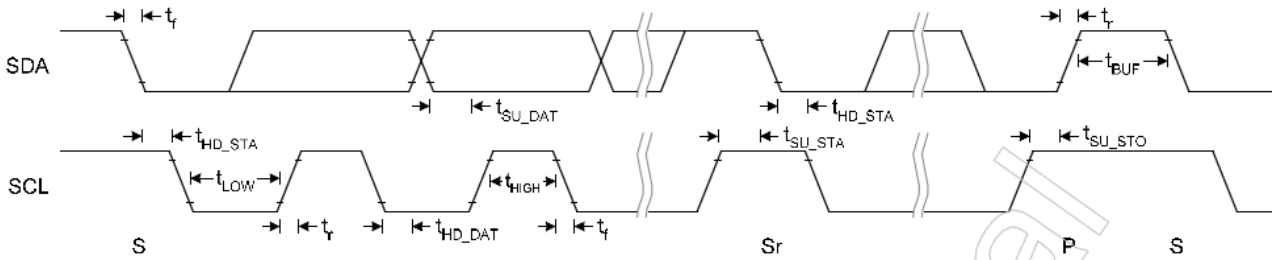
$V_{DD1}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a = -30$ to 70 °C

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	T_{AST}	Address setup time	0		ns	
	T_{AHT}	Address hold time (Write/Read)	10		ns	
CSX	T_{CHW}	Chip select "H" pulse width	0		ns	
	T_{CS}	Chip select setup time (Write)	15		ns	
	T_{RCS}	Chip select setup time (Read ID)	45		ns	
	T_{RCSFM}	Chip select setup time (Read FM)	355		ns	
	T_{CSF}	Chip select wait time (Write/Read)	10		ns	
	T_{CSH}	Chip select hold time	10		ns	
WRX	T_{WC}	Write cycle	66		ns	
	T_{WRH}	Control pulse "H" duration	15		ns	
	T_{WRL}	Control pulse "L" duration	15		ns	
RDX (ID)	T_{RC}	Read cycle (ID)	160		ns	
	T_{RDH}	Control pulse "H" duration (ID)	90		ns	When read ID data
	T_{RDL}	Control pulse "L" duration (ID)	45		ns	
RDX (FM)	T_{RCFM}	Read cycle (FM)	450		ns	
	T_{RDHF}	Control pulse "H" duration (FM)	90		ns	When read from frame memory
	T_{RDLF}	Control pulse "L" duration (FM)	355		ns	
D[17:0]	T_{DST}	Data setup time	10		ns	For $CL=30pF$

	T_{DHT}	Data hold time	10		ns
	T_{RAT}	Read access time (ID)		40	ns
	T_{RATFM}	Read access time (FM)		340	ns
	T_{ODH}	Output disable time	20	80	ns

6-4-2 Touch panel controller ST1624

I2C Interface



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



7. Optical Characteristics:

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

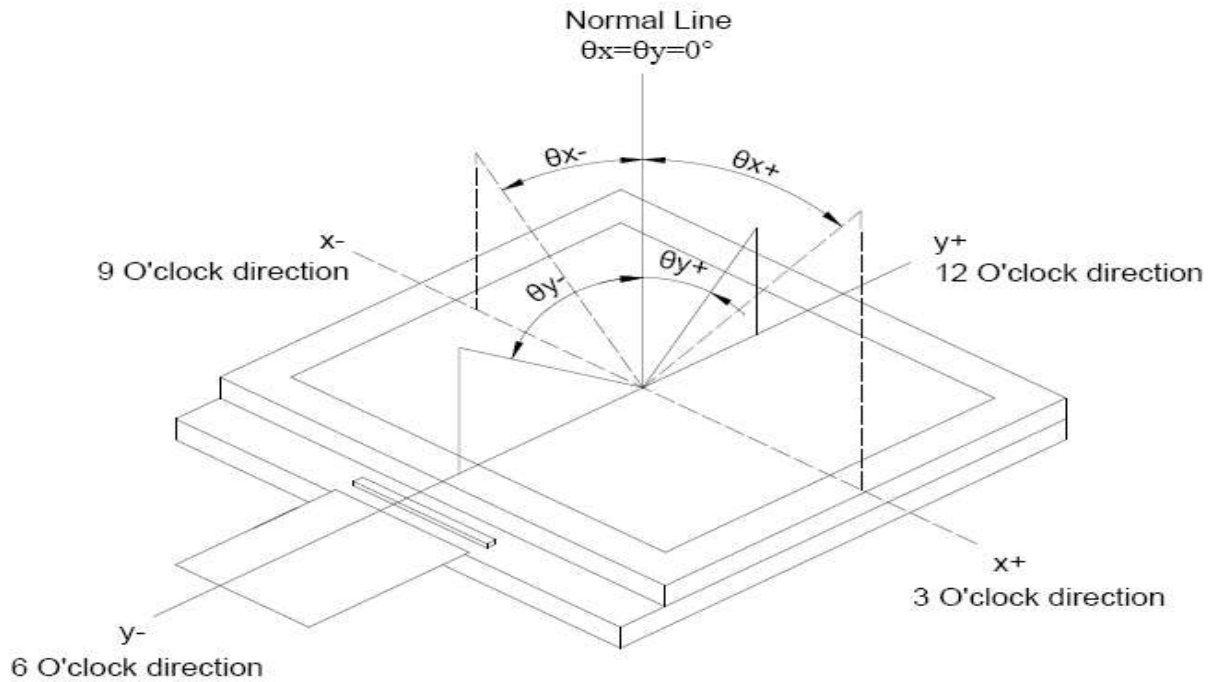
Measuring Condition

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

Color of CIE Coordinate:

Item	Symbol	Condition	Min.	Typ.	Max.	
Chromaticity Coordinates (Transmissive)	Red	x	$\theta = \phi = 0^\circ$ LED Backlight	0.5801	0.6301	0.6801
		y		0.2825	0.3325	0.3825
	Green	x		0.2668	0.3168	0.3668
		y		0.5660	0.6160	0.6660
	Blue	x		0.0948	0.1448	0.1948
		y		0.0187	0.0687	0.1187
	White	x		0.2396	0.2896	0.3396
		y		0.2574	0.3074	0.3574

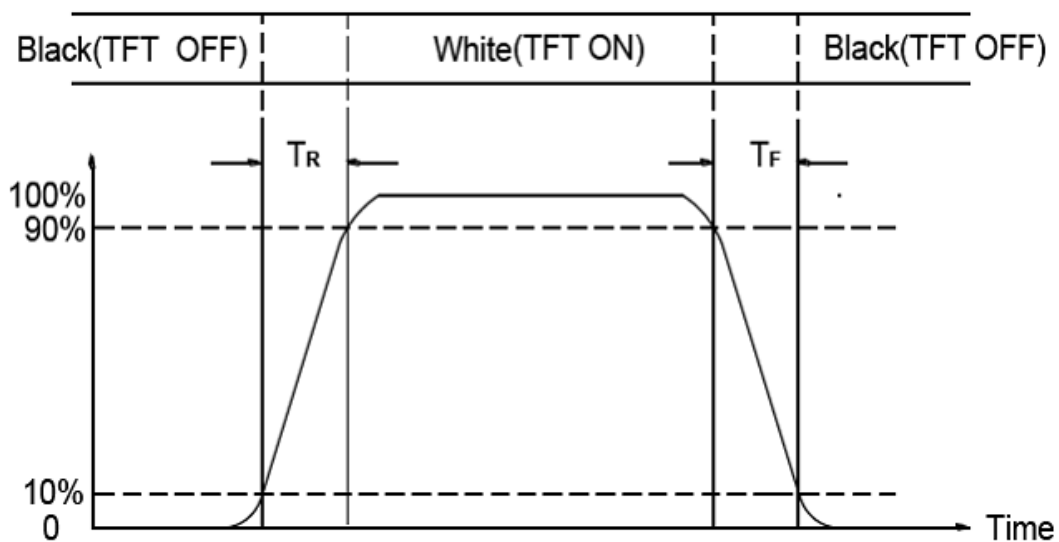
Note (1) Definition of Viewing Angle :



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

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

Note (3) Definition of Response Time : Sum of T_R and T_F



8. Interface Pin Assignment:

8-1 LCD FPC Interface

No.	Symbol	Function																																																																													
1	GND	Ground																																																																													
2	IM0	Select MPU Interface mode <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>IM1</th> <th>IM0</th> <th>MCU-Interface Mode</th> <th>DB Pin in use</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>80 MCU 16-bit bus interface II</td> <td>D[17:10],D[8:1]</td> </tr> <tr> <td>0</td> <td>1</td> <td>80 MCU 8-bit bus interface II</td> <td>D[17:10]</td> </tr> <tr> <td>1</td> <td>0</td> <td>80 MCU 18-bit bus interface II</td> <td>D[17:0]</td> </tr> <tr> <td>3</td> <td>IM1</td> <td> <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>1</td> <td>1</td> <td>80 MCU 9-bit bus interface II</td> <td>D[17:9]</td> </tr> </tbody> </table> </td> </tr> <tr> <td>4</td> <td>TE</td> <td>Tearing effect signal is used to MCU to frame memory writing</td> </tr> <tr> <td>5</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>6</td> <td>DB17</td> <td>Data bus</td> </tr> <tr> <td>7</td> <td>DB16</td> <td>Data bus</td> </tr> <tr> <td>8</td> <td>DB15</td> <td>Data bus</td> </tr> <tr> <td>9</td> <td>DB14</td> <td>Data bus</td> </tr> <tr> <td>10</td> <td>DB13</td> <td>Data bus</td> </tr> <tr> <td>11</td> <td>DB12</td> <td>Data bus</td> </tr> <tr> <td>12</td> <td>DB11</td> <td>Data bus</td> </tr> <tr> <td>13</td> <td>DB10</td> <td>Data bus</td> </tr> <tr> <td>14</td> <td>DB9</td> <td>Data bus</td> </tr> <tr> <td>15</td> <td>DB8</td> <td>Data bus</td> </tr> <tr> <td>16</td> <td>IOVCC</td> <td>Digital power supply</td> </tr> <tr> <td>17</td> <td>DB7</td> <td>Data bus</td> </tr> <tr> <td>18</td> <td>DB6</td> <td>Data bus</td> </tr> <tr> <td>19</td> <td>DB5</td> <td>Data bus</td> </tr> <tr> <td>20</td> <td>DB4</td> <td>Data bus</td> </tr> <tr> <td>21</td> <td>DB3</td> <td>Data bus</td> </tr> </tbody> </table>	IM1	IM0	MCU-Interface Mode	DB Pin in use	0	0	80 MCU 16-bit bus interface II	D[17:10],D[8:1]	0	1	80 MCU 8-bit bus interface II	D[17:10]	1	0	80 MCU 18-bit bus interface II	D[17:0]	3	IM1	<table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>1</td> <td>1</td> <td>80 MCU 9-bit bus interface II</td> <td>D[17:9]</td> </tr> </tbody> </table>	1	1	80 MCU 9-bit bus interface II	D[17:9]	4	TE	Tearing effect signal is used to MCU to frame memory writing	5	GND	Ground	6	DB17	Data bus	7	DB16	Data bus	8	DB15	Data bus	9	DB14	Data bus	10	DB13	Data bus	11	DB12	Data bus	12	DB11	Data bus	13	DB10	Data bus	14	DB9	Data bus	15	DB8	Data bus	16	IOVCC	Digital power supply	17	DB7	Data bus	18	DB6	Data bus	19	DB5	Data bus	20	DB4	Data bus	21	DB3	Data bus
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11	DB12	Data bus																																																																													
12	DB11	Data bus																																																																													
13	DB10	Data bus																																																																													
14	DB9	Data bus																																																																													
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21	DB3	Data bus																																																																													

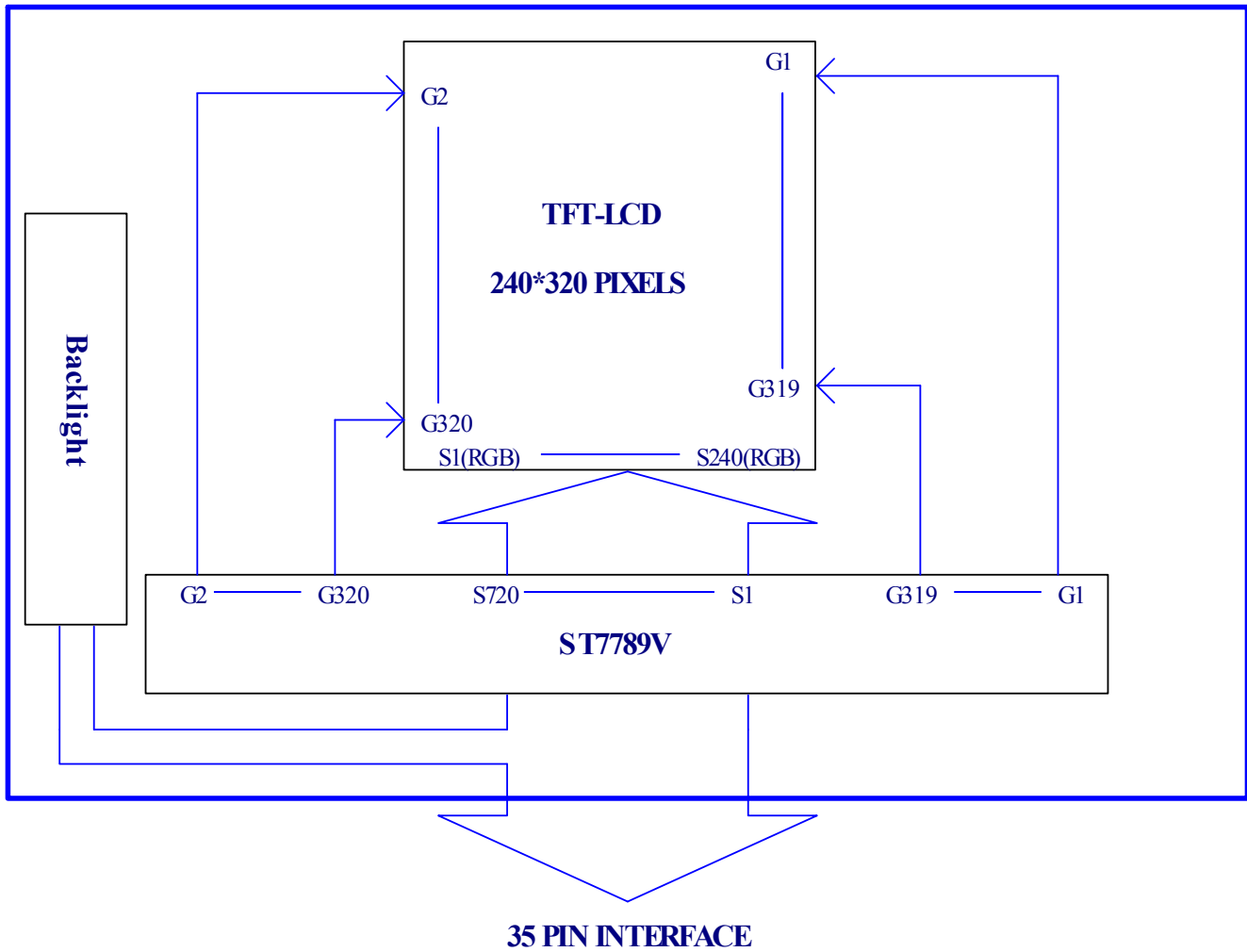


22	DB2	Data bus
23	DB1	Data bus
24	DB0	Data bus
25	/CS	Chip select signal active low
26	RS	Display data/command selection pin in parallel interface. Display data(RS=1) / Command selection(RS=0)
27	WR	Write enable in MCU parallel interface
28	RD	Read enable in MCU parallel interface
29	/RESET	Reset signal active low
30	VCI	Analog power supply
31	GND	Ground
32	LED+	LED power supply(+)
33	GND	Ground
34	LED-	LED power supply(-)
35	GND	Ground

8-2 CTP FPC Interface

No.	Symbol	Function
1	GND	Ground
2	RST	System reset signal input, active low
3	INT	Indicate coordinate data ready
4	SDA	I2C Serial Data
5	SCL	I2C Serial Clock
6	VCC	Digital power supply

9. Block Diagram:



10. Backlight:

1. Standard Lamp Styles (Edge Lighting Type):
The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:
2. The Main Advantages of the LED Backlight are as following:
 - 2.1 The brightness of the backlight can simply be adjusted.
By a resistor or a potentiometer.

3. Data About LED Backlight:

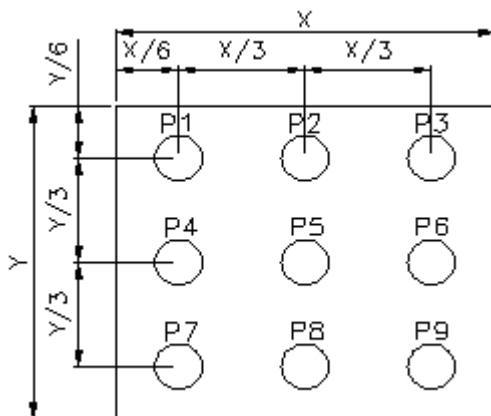
(Ta=25°C)

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	40	-	mA	V=9.6V	
Supply Voltage	V	8.5	9.6	10.2	V	If=40mA	
Reverse Voltage	VR	-	-	5	V	-	
Luminous Intensity for LCM	IV	280	350	-	Cd/m ²	If=40mA	2
Uniformity for LCM	-	70	-	-	%		3
Life Time	-	-	50000	-	Hr.		4
Color	White						

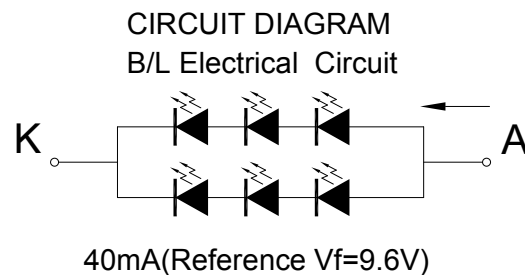
NOTE:

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

Measured Method: (X*Y: Light Area)



Internal Circuit Diagram



(Effective spatial Distribution)

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



11. Standard Specification for Reliability:

11-1. Standard Specifications for Reliability of LCD Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80°C for 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 -30°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 40°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	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.

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



11 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 11-1, Standard specifications for Reliability have been executed in order to ensure stability.

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

11- 3. MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ($25\pm 5^{\circ}\text{C}$), normal humidity ($50\pm 10\%$ RH), and in area not exposed to direct sun light.
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12. Specification of Quality Assurance:

12-1. Purpose

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

12-2. Standard for Quality Test

a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to ISO2859-1. General Inspection Level II take a single time.

(ii) The defects classify of AQL as following:

Major defect: AQL = 0.65

Minor defect: AQL = 2.5

Total defects: AQL = 2.5

12-3. Non- conforming Analysis & Deal With Manners

a. Non- conforming Analysis:

(i) Purchaser should supply the detail data of non- conforming sample and the non- conforming.

(ii) After accepting the detail data from purchaser, the analysis of non- conforming should be finished in two weeks.

(iii) If supplier can not finish analysis on time, must announce purchaser before 3 days.

b. Disposition of non- conforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of non- conforming when the reason of nonconforming is not sure.

12-4. Agreement items

Both sides should discuss together when the following problems happen.

a. There is any problem of standard of quality assurance, and both sides should think that must be modified.

b. There is any argument item which does not record in the standard of quality assurance.

c. Any other special problem.

12-5. Standard of The Product Appearance Test

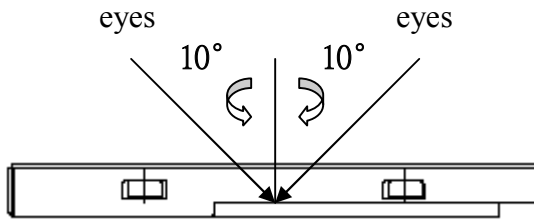
a. Manner of appearance test:

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

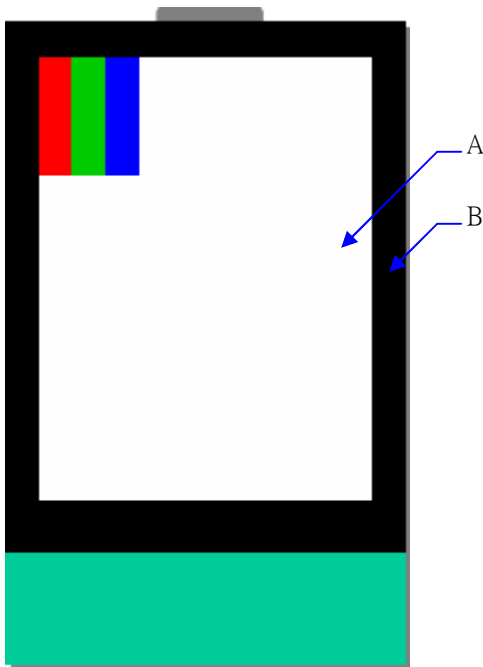
(ii) When test the model of transmissive product must add the reflective plate.

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

(iii) Temperature: 25±5°C Humidity: 60±10%RH



(iv) Definition of area:



A. Area: Viewing area.

B. Area: Out of viewing area.

(Outside viewing area)

b. Basic principle:

(i) It will accord to the AQL when the standard can not be described.

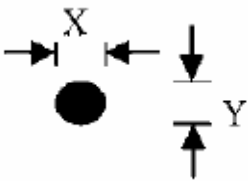
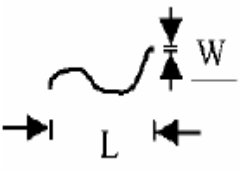
(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

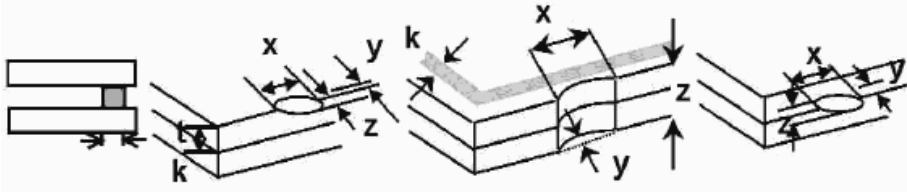
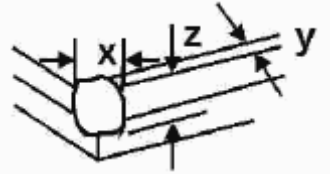
(iii) Must add new item on time when it is necessary.

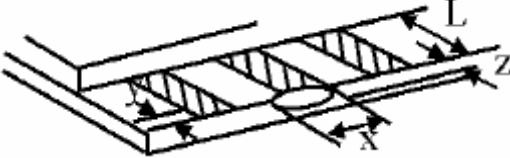
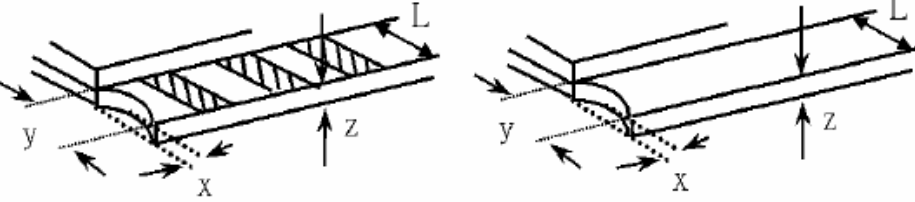
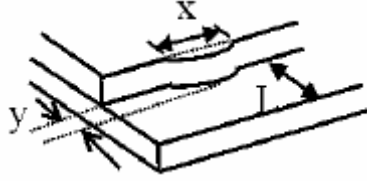
c. Standard of inspection: (Unit: mm)

12-6. Inspection specification

Defect out of viewing area can be neglected.

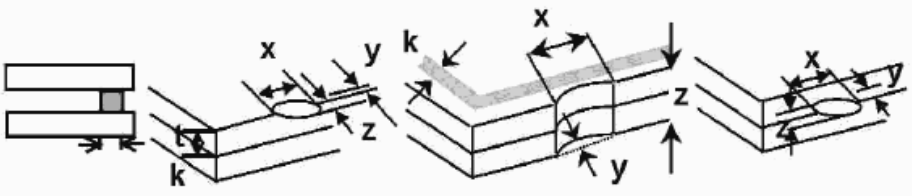
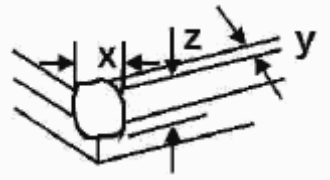
NO	Item	Criterion	AQL												
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	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.	2.5												
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="829 1008 1364 1265"> <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 style="text-align: center;">* Densely spaced: No more than two spots within 3mm.</p>	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	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="694 1411 1364 1646"> <thead> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.05$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.05 < W \leq 0.10$</td> <td rowspan="2">2</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.10 < W \leq 0.20$</td> </tr> <tr> <td>---</td> <td>$0.20 < W$</td> <td>Rejection</td> </tr> </tbody> </table> <p style="text-align: center;">* Densely spaced: No more than two lines within 3mm.</p>	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.05$	Accept no dense	$L \leq 3.0$	$0.05 < W \leq 0.10$	2	$L \leq 2.5$	$0.10 < W \leq 0.20$	---	$0.20 < W$	Rejection	2.5
Length(mm)	Width(mm)	Acceptable Q'ty													
---	$W \leq 0.05$	Accept no dense													
$L \leq 3.0$	$0.05 < W \leq 0.10$	2													
$L \leq 2.5$	$0.10 < W \leq 0.20$														
---	$0.20 < W$	Rejection													

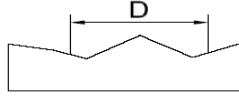
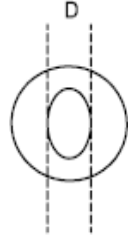
NO	Item	Criterion	AQL																		
04	Polarizer bubbles	<p>If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction</p> <table border="1" data-bbox="868 293 1366 533"> <thead> <tr> <th>Size Φ(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <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																				
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$0.50 < \Phi \leq 1.00$	2																				
$1.00 < \Phi$	0																				
Total Q'ty	3																				
05	Scratches	Follow NO.3 -2 Line Type.																			
06	Chipped glass	<p>Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length</p> <p>6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="416 1048 1235 1205"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</td> </tr> </tbody> </table> <p>⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip</p> <p>6.1.2 Corner crack:</p>  <table border="1" data-bbox="416 1570 1235 1727"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</td> </tr> </tbody> </table> <p>⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip</p>	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length																			
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$																			
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NO	Item	Criterion	AQL																
07	Glass crack	<p>Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length</p> <p>7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="550 683 1225 824"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq 0.5\text{mm}$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </table> <p>7.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="550 1198 1225 1339"> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq L$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </table> <p>⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged.</p> <p>7.2.3 Substrate protuberance and internal crack</p>  <table border="1" data-bbox="869 1668 1305 1809"> <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="416 797 1233 1014"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$Z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> <p>⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip</p> <p>14.1.2 Corner crack:</p>  <table border="1" data-bbox="416 1395 1233 1612"> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> <p>⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip</p>	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length													
$Z \leq t$	$\leq 1/2 k$ 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											
15	Touch Panel(Fish eye、dent and bubble on film)	<table border="1"> <thead> <tr> <th>SIZE(mm)</th> <th>Acceptable Q'ty</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.2 < D \leq 0.4$</td> <td>5</td> </tr> <tr> <td>$0.4 < D \leq 0.5$</td> <td>2</td> </tr> <tr> <td>$0.5 < D$</td> <td>0</td> </tr> </tbody> </table>	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	 	2.5
		SIZE(mm)	Acceptable Q'ty											
		$\Phi \leq 0.2$	Accept no dense											
		$0.2 < D \leq 0.4$	5											
		$0.4 < D \leq 0.5$	2											
$0.5 < D$	0													
16	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$), it is acceptable.	2.5											
17	Touch Panel Linearity	Less than 2.5% is acceptable.	2.5											
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	2.5											
19	General appearance	19.1 Pin type must match type in specification sheet.	0.65											
		19.2 LCD pin loose or missing pins.	0.65											
		19.3 Product packaging must the same as specified on packaging specification sheet.	0.65											
		19.4 Product dimension and structure must conform to product specification sheet.	0.65											



13. Handling Precaution:

13-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

13-2 Storage

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

13-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: No higher than $280\pm 10^{\circ}\text{C}$ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.

14. Guarantee:

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