SPECIFICATION
FOR
LCD MODULE

MODULE NO: BTG-32080C-FBWD-G-G-A0

Doc.Version:01

Customer Approval:

☐ Accept ☐ Reject

YEEBO	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer		2015-11-23
Check	Mechanical Engineer		2015.11.23
Verify			2015-11-23
Approval			2015.11.23

■APPROVAL FOR SPECIFICATIONS ONLY

☐ APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

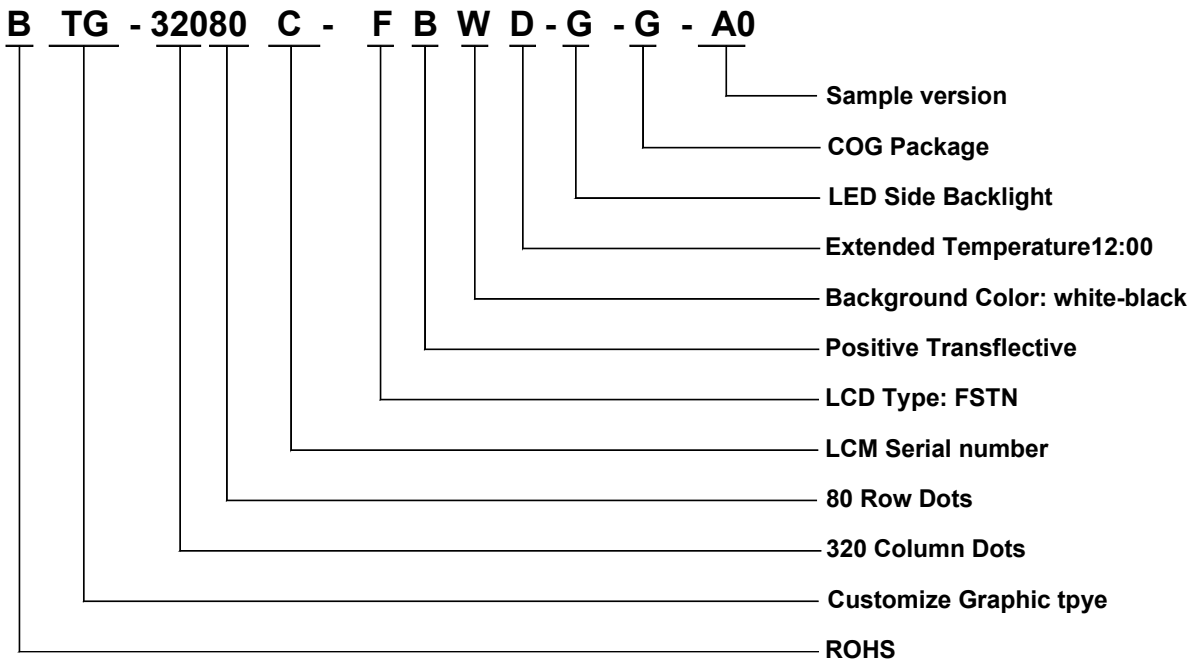
Add: 7/F.,On Dak Industrial Building,2-6 Wah Sing Street, Kwai Chung,H.K.
Tel: +852-2945-6800 ; +852-2945-6885
Fax: +852-2481-0019

DOCUMENT REVISION HISTORY

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A0	00	2015-11-20	SPEC ONLY	First issue	ZHW
A0	01	2015-11-23	SPEC ONLY	Changed FPC length，location and BL frame.(P5)	ZHW

CONTENTS

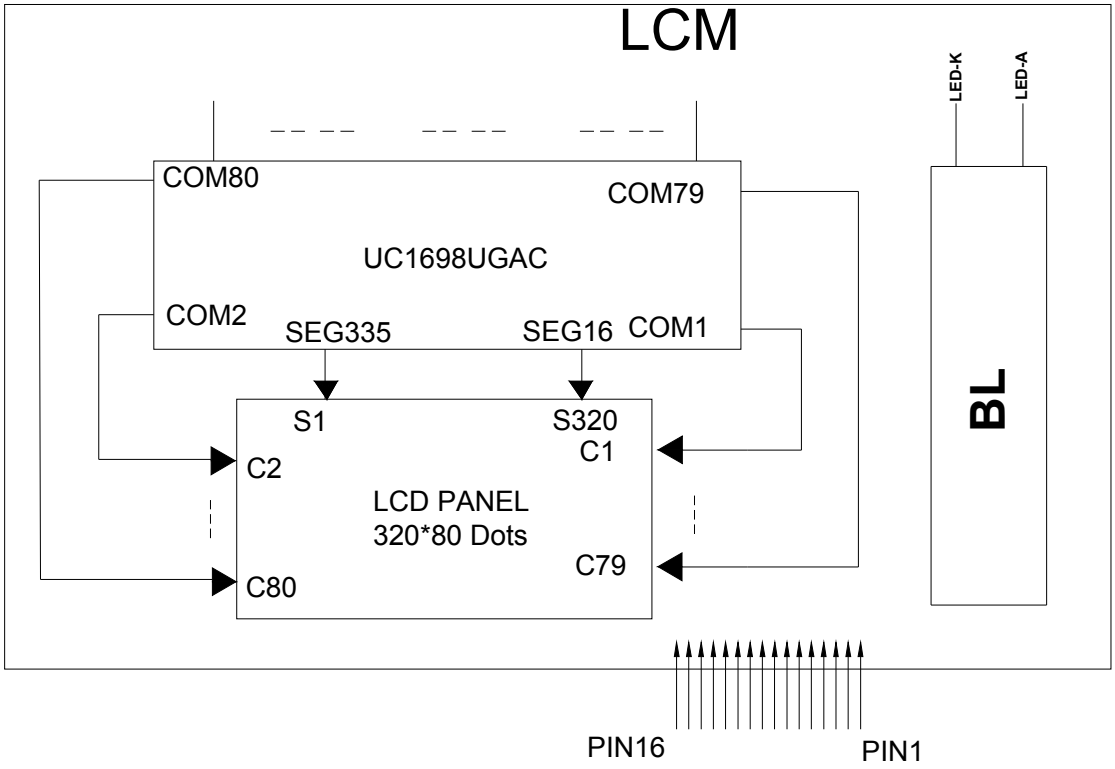
1.NOTATION OF THE MODULE NUMBER:



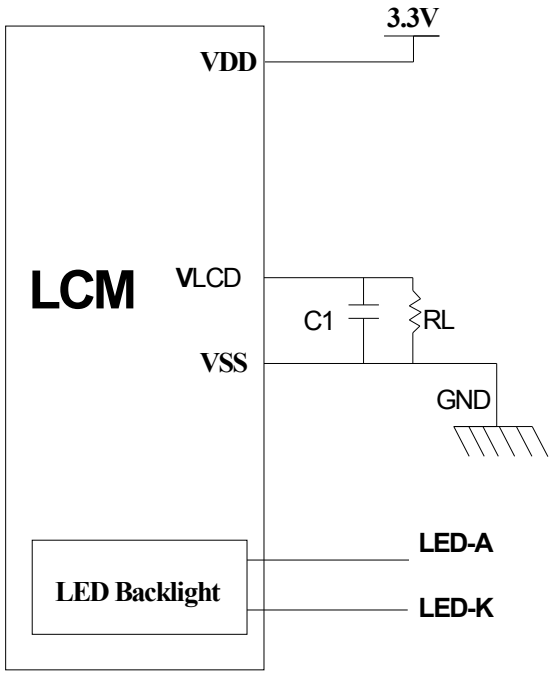
2.MECHANICAL SPECIFICATIONS

ITEM	SPECIFICATION
LCD Description	320*80 Dots
Module dimension	158.00(H) *50.80(W)*5.20 (T)
Viewing area	149.00(MIN)(H) *36.58(MIN)(W)
Active area	143.98(H) *33.58(W)
Dot pitch	0.45(H) *0.42(W)
Dot size	0.43(H) *0.40(W)
Duty/Bias	1/80 Duty,1/10Bias
LCD display mode	FSTN/White-Black mode/ Positive /Transflective (High Transmissive)
Viewing direction	12 o'clock
Driver IC	UC1698UGAC
Module net weight	TBD

3.BLOCK DIAGRAM



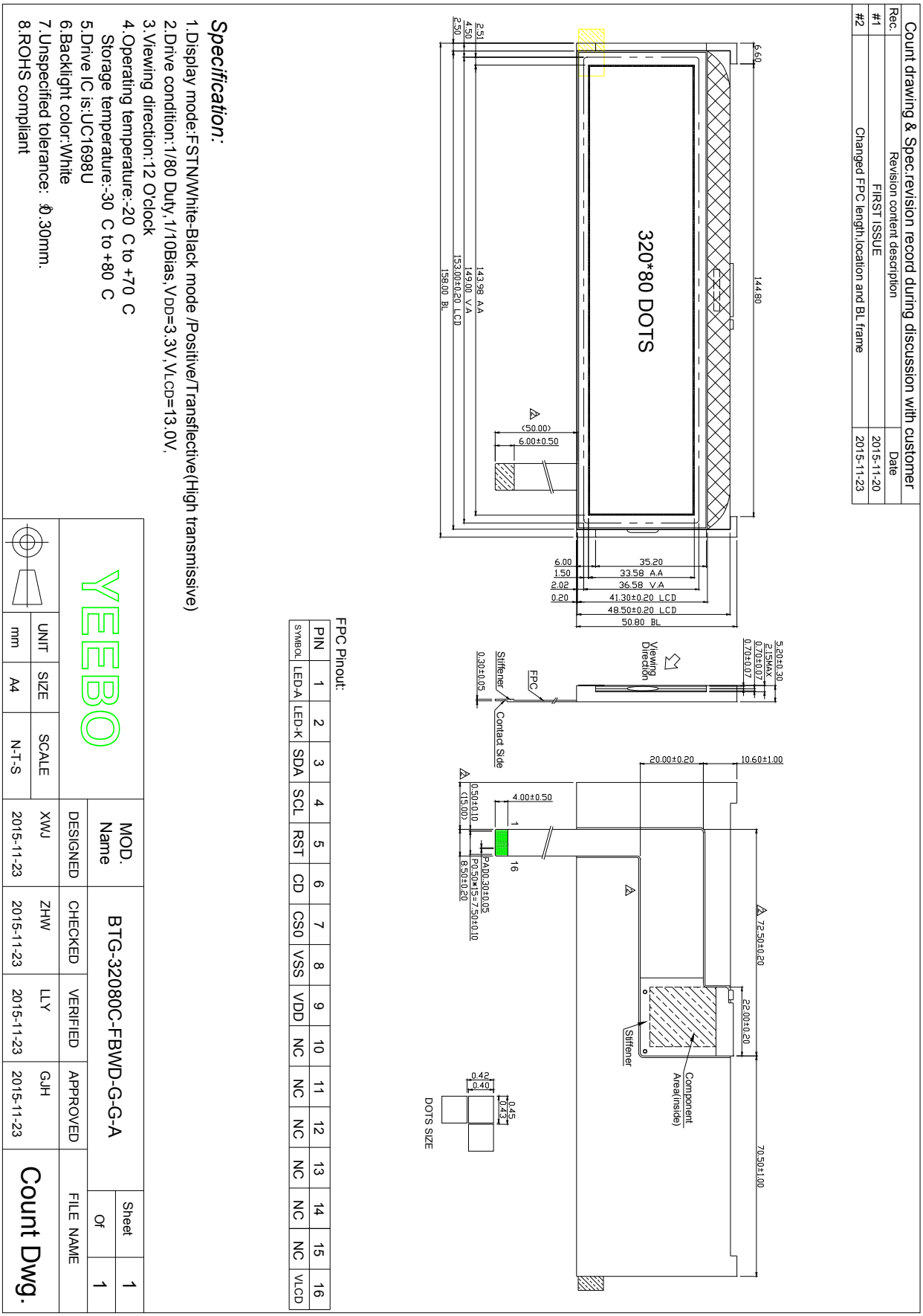
4.POWER SUPPLY



C1=330nF(25~50V);RL=3.3~10M

BM[1:0] =00 , {DB15, DB13}=11 ,Mode:3/4-wire SPI w/ 8-bit token(S8uc: Ultra-Compact)

5. DIMENSIONAL OUTLINE



Specification:

1.Display mode:FSTN/White-Black mode /Positive/Transflective(High transmissive)
2.Drive condition:1/80 Duty,1/10Bias,V_{DD}=3.3V,V_{LCD}=13.0V,
3.Viewing direction:12 O'clock
4.Operating temperature:-20 C to +70 C
Storage temperature:-30 C to +80 C
5.Drive IC is:UC1698U
6.Backlight color:White
7.Unspecified tolerance: ±0.30mm.
8.ROHS compliant

FPC Pinout:

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SYMBOL	LED-A	LED-K	SDA	SCL	RST	CD	CS0	VSS	VDD	NC	NC	NC	NC	NC	NC	VLCD

YEEBO	MOD. Name	BTG-32080C-FBWD-G-G-A		Sheet	1
				Of	1
UNIT	SIZE	SCALE		FILE NAME	
mm	A4	N-T-S			
DESIGNED	CHECKED	VERIFIED	APPROVED	Count Dwg.	
XWJ	ZHW	LLY	GJH		
2015-11-23	2015-11-23	2015-11-23	2015-11-23		

6. PIN DESCRIPTION

Pin no.	Symbol	Function
1	LED-A	Pin “A” is anode
2	LED-K	Pin “K ” is cathode
3	SDA	In serial modes, connect DB[8] to SDA.,DB[0] to SCL, SDA: Serial data input/output. SCL: Serial clock input.
4	SCL	
5	RST	When RST=”L”, all control registers are re-initialized by their default states. Since UC1698u has built-in Power-ON reset and software reset commands, RST pin is not required for proper chip operation.
6	CD	Selects Control data or Display data for read/write operation. In S9 mode, CD pin is not used. Connect to VSS when not used.
7	CS0	Chip Select. Chip is selected when CS1=”H” and CS0 = “L”. When the chip is not selected, D[15:0] will be high impedance.
8	VSS	Ground.
9	VDD	Supply voltage for logic operating.
10~15	NC	NC
16	VLCD	High voltage LCD Power Supply.

7. ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Item	Symbol	Min	Max	Unit
Power supply voltage for logic	V_{DD}	-0.3	+4.0	V
LCD driver voltage	V_{LCD}	-0.3	+19.8	V
Operating temperature	T_{OPR}	-20	+70	°C
Storage temperature	T_{STG}	-30	+80	°C

Note: Voltage greater than above may damage the module
All voltages are specified relative to V_{SS}=0V

8.ELECTRICAL CHARACTERISTICS.

8-1DC Characteristics (Ta=25°C)

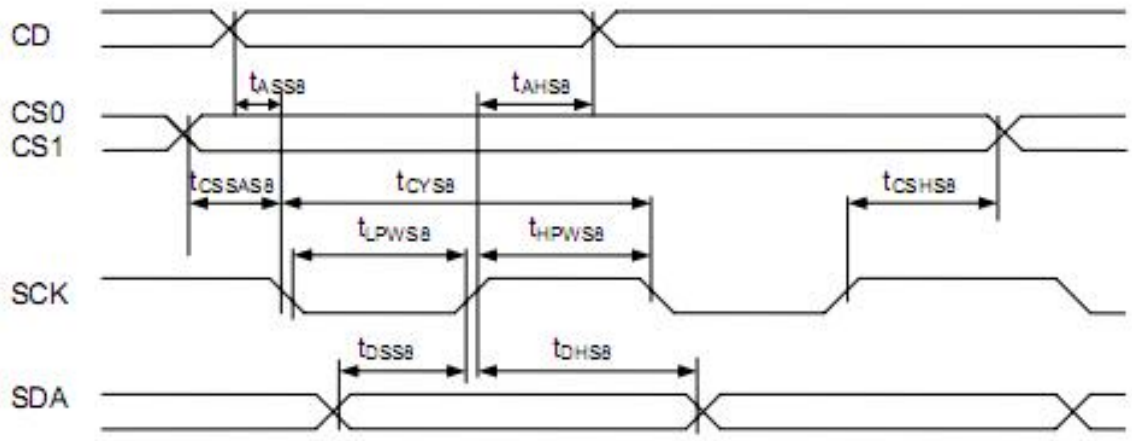
Item	Symbol	Min	Typ	Max	Unit	Applicable terminal	Test condition
Operating voltage	V_{DD}	3.1	3.3	3.465	V	-	-
Supply current	I_{DD}	-	-	1.5	mA	-	-
Input voltage	V_{IL}	-	-	0.2 V_{DD}	V	-	-
	V_{IH}	0.8 V_{DD}	-	-	V		-
Output voltage	V_{OL}	-	-	0.2 V_{DD}	V	-	-
	V_{OH}	0.8 V_{DD}	-	-	V		-
Input leakage current	I_{IL}	-	-	1.5	μA	-	-
LCD driving voltage	V_{LCD}	12.8	13.0	13.2	V	VLCD-V_{SS}	Ta=25°C

Optimum LCD driving voltage will varies and control within the above specified range.

8-2. Backlight Characteristics (Ta=25°C)

Item	Symbol	Min	Typ	Max	Units	Condition
Forward voltage	Vf	3.0	3.3	3.6	V	If=120mA
Colour chromaticity (Central point)	X	0.25	-	0.33	-	
	Y	0.25	-	0.33	-	
Module luminance	Lv	30	-	–	cd/㎡	
Uniformity	Avg	70	-	-	%	
Color	White					

8-3 AC Characteristics (VDD=3.3V, Ta=25°C).



Serial Bus Timing Characteristics (for S8/S8uc)

Symbol	Signal	Description	Condition	Min.	Max.	Unit
(2.5V ≤ V_{DD} < 3.3V, Ta= –30 to +85°C)				(Read / Write)		
t_{ASS8}	CD	Address setup time		0	–	nS
t_{AHS8}		Address hold time		0	–	nS
t_{CSSAS8}	CS1/CS0	Chip select setup time		5		nS
t_{CSHS8}				5		
t_{CYS8}	SCK	System cycle time		70	–	nS
t_{LPWS8}		Low pulse width		20	–	nS
t_{HPWS8}		High pulse width		20	–	nS
t_{DSS8}	SDA	Data setup time		15	–	nS
t_{DHS8}		Data hold time		0		

9. INSTRUCTION DESCRIPTION

1	Write Data Byte	1	0	#	#	#	#	#	#	#	#	Write 1 byte	N/A
2	Read Data Byte	1	1	#	#	#	#	#	#	#	#	Read 1 byte	N/A
3	Get Status & PM	0	1	GE	MX	MY	WA	DE	WS	MD	MS	Get {Status, Ver, PMO, Product Code, PID, MID}	N/A
				Ver	PMO[6:0]								
				Product Code (8h)				PID[1:0]		MID[1:0]			
4	Set Column Address LSB	0	0	0	0	0	0	#	#	#	#	Set CA[3:0]	0
	Set Column Address MSB	0	0	0	0	0	1	0	#	#	#	Set CA[6:4]	0
5	Set Temp. Compensation	0	0	0	0	1	0	0	1	#	#	Set TC[1:0]	0
6	Set Power Control	0	0	0	0	1	0	1	0	#	#	Set PC[1:0]	10b
7	Set Adv. Program Control	0	0	0	0	1	1	0	0	0	R	Set APC[R][7:0], R = 0 or 1	N/A
	(double-byte command)	0	0	#	#	#	#	#	#	#	#		
8	Set Scroll Line LSB	0	0	0	1	0	0	#	#	#	#	Set SL[3:0]	0
	Set Scroll Line MSB	0	0	0	1	0	1	#	#	#	#	Set SL[7:4]	0
9	Set Row Address LSB	0	0	0	1	1	0	#	#	#	#	Set RA[3:0]	0
	Set Row Address MSB	0	0	0	1	1	1	#	#	#	#	Set RA[7:4]	0
10	Set V_{BIAS} Potentiometer	0	0	1	0	0	0	0	0	0	1	Set PM[7:0]	40H
	(double-byte command)	0	0	#	#	#	#	#	#	#	#		
11	Set Partial Display Control	0	0	1	0	0	0	0	1	0	#	Set LC[8]	0
12	Set RAM Address Control	0	0	1	0	0	0	1	#	#	#	Set AC[2:0]	001b
13	Set Fixed Lines	0	0	1	0	0	1	0	0	0	0	Set {FLT, FLB}	0
		0	0	#	#	#	#	#	#	#	#		
14	Set Line Rate	0	0	1	0	1	0	0	0	#	#	Set LC[4:3]	10b
15	Set All-Pixel-ON	0	0	1	0	1	0	0	1	0	#	Set DC[1]	0
16	Set Inverse Display	0	0	1	0	1	0	0	1	1	#	Set DC[0]	0
17	Set Display Enable	0	0	1	0	1	0	1	#	#	#	Set DC[4:2]	110b
18	Set LCD Mapping Control	0	0	1	1	0	0	0	#	#	#	Set LC[2:0]	0
19	Set N-Line Inversion	0	0	1	1	0	0	1	0	0	0	Set NIV[4:0]	1DH
				-	-	-	#	#	#	#	#		
20	Set Color Pattern	0	0	1	1	0	1	0	0	0	#	Set LC[5]	0 (BGR)
21	Set Color Mode	0	0	1	1	0	1	0	1	#	#	Set LC[7:6]	10b
22	Set COM Scan Function	0	0	1	1	0	1	1	#	#	#	Set CSF[2:0]	000b
23	System Reset	0	0	1	1	1	0	0	0	1	0	System Reset	N/A
24	NOP	0	0	1	1	1	0	0	0	1	1	No operation	N/A
25	Set Test Control	0	0	1	1	1	0	0	1	TT		For testing only. Do not use.	N/A
	(double-byte command)	0	0	#	#	#	#	#	#	#	#		
26	Set LCD Bias Ratio	0	0	1	1	1	0	1	0	#	#	Set BR[1:0]	11b: 12
27	Set COM End	0	0	1	1	1	1	0	0	0	1	Set CEN[6:0]	159
		0	0	-	#	#	#	#	#	#	#		
28	Set Partial Display Start	0	0	1	1	1	1	0	0	1	0	Set DST[6:0]	0
		0	0	-	#	#	#	#	#	#	#		
29	Set Partial Display End	0	0	1	1	1	1	0	0	1	1	Set DEN[6:0]	159
		0	0	-	#	#	#	#	#	#	#		
30	Set Window Program Starting Column Address	0	0	1	1	1	1	0	1	0	0	Shared with MTP commands	Set WPC0	0
		0	0	-	#	#	#	#	#	#	#		
31	Set Window Program Starting Row Address	0	0	1	1	1	1	0	1	0	1		Set WPP0	0
		0	0	#	#	#	#	#	#	#	#		
32	Set Window Program Ending Column Address	0	0	1	1	1	1	0	1	1	0		Set WPC1	127
		0	0	-	#	#	#	#	#	#	#		
33	Set Window Program Ending Row Address	0	0	1	1	1	1	0	1	1	1		Set WPP1	159
		0	0	#	#	#	#	#	#	#	#		
34	Window Program Mode	0	0	1	1	1	1	1	0	0	#	Set AC[3]		0: Inside
35	Set MTP Operation control	0	0	1	0	1	1	1	0	0	0	Set MTPC[4:0]		10H
		0	0	-	-	-	#	#	#	#	#			

	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action		Default
36	Set MTP Write Mask	0 0 0	0 0 0	1 - -	0 # -	1 # -	1 # -	1 # -	0 # -	0 # #	1 # #	Set MTPM[6:0] MTPM1[1:0]		0
37	Set V_{MTP1} Potentiometer	0 0	0 0	1 #	1 #	1 #	1 #	0 #	1 #	0 #	0 #	Shared with Window Program commands	Set MTP1	N/A
38	Set V_{MTP2} Potentiometer	0 0	0 0	1 #	1 #	1 #	1 #	0 #	1 #	0 #	1 #		Set MTP2	N/A
39	Set MTP Write Timer	0 0	0 0	1 #	1 #	1 #	1 #	0 #	1 #	1 #	0 #		Set MTP3	N/A
40	Set MTP Read Timer	0 0	0 0	1 #	1 #	1 #	1 #	0 #	1 #	1 #	1 #		Set MTP4	N/A

NOTE:

- All other bit patterns other than commands listed above may result in undefined behavior.
- The interpretation of commands (36)~(40) depends on the setting of register MTPC[3].
  - Commands (37)~(40) are shared with commands (30)~(33). These two sets of commands share exactly the same code and control registers. When MTPC[3]=0, they are interpreted as Window Program commands and registers. When MTPC[3]=1, they function as MTP Control commands and registers.
- After MTP ERASE or PROGRAM operation, before resuming normal operation, please always
  a) Remove TST4 power source,
  b) Do a full V_{DD} ON-OFF-ON cycle.
- Under 16-bit bus mode and CD=0, D[15:8] is ignored and only D[7:0] is used. As a result, the bus cycles for commands under 16-bit bus and 8-bit bus are the same, and double-byte commands still need two bus cycles under 16-bit bus mode.

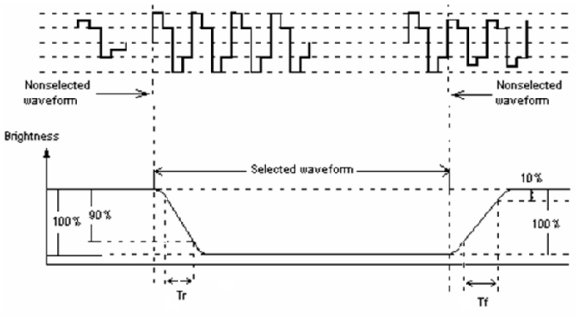
10. PACKAGE

TBD

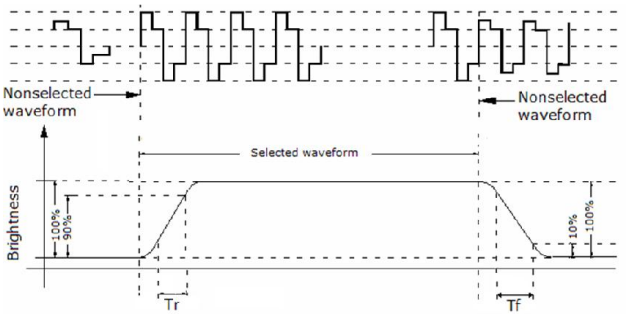
11. ELECTRO-OPTICAL CHARACTERISTICS

NO	ITEM		Symbol	Temp℃	Rating			Unit
					Min	Typ	Max	
1	Response time	Rise time	Tr	25	-	TBD	400	ms
		Fall time	Tf	25	-	TBD	400	
2	Operating Frequency		Fr	25	-	69	-	Hz
3	Contrast Rate		Cr	25	2	TBD	-	-
4	Viewing Direction		12 O'CLOCK					
5	Viewing Angle Cr≧2	12Hϕ=90°	θ1	25	35	TBD	-	Deg
		6Hϕ=270°	θ2		30	TBD	-	
		3Hϕ=0°	θ3		30	TBD	-	
		9Hϕ=180°	θ4		30	TBD	-	
6	Current Consumption		Is	25	-	TBD	-	μA
7	Capacitance		C	25	-	TBD	-	nF

Response Time



Positive

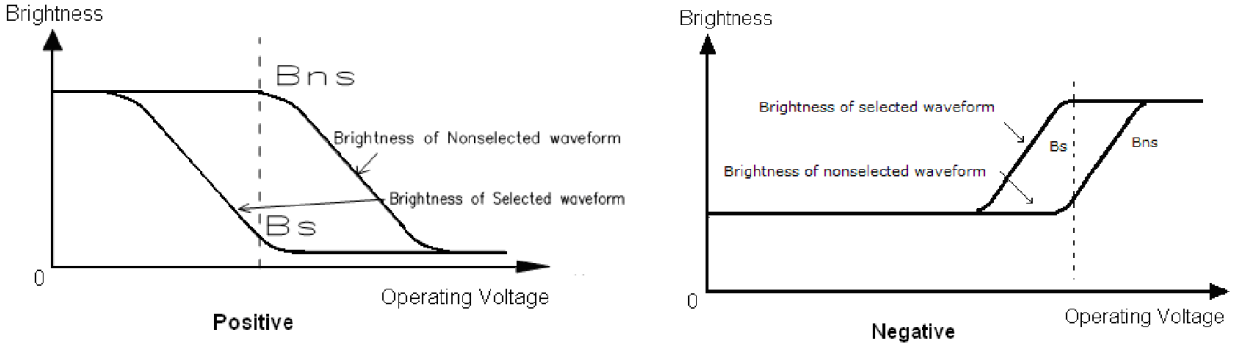


Negative

Measuring Condition:

1. Driving waveform: Duty, Bias selected waveform.
2. Driving Frequency: Typical value in Individual specification.
3. Operating Voltage: LCD driving voltage getting maximum contrast rate.
4. Measuring Angle: See Individual Specification.
5. Measuring Temperature: See Individual Specification.

Contrast Ratio Definition



$$\text{Contrast Ratio(Cr)} = \frac{\text{Brightness of non-selected waveform(Bns)}}{\text{Brightness of selected waveform(Bs)}}$$

Positive

$$\text{Contrast Ratio(Cr)} = \frac{\text{Brightness of selected waveform(Bs)}}{\text{Brightness of non-selected waveform(Bns)}}$$

Negative

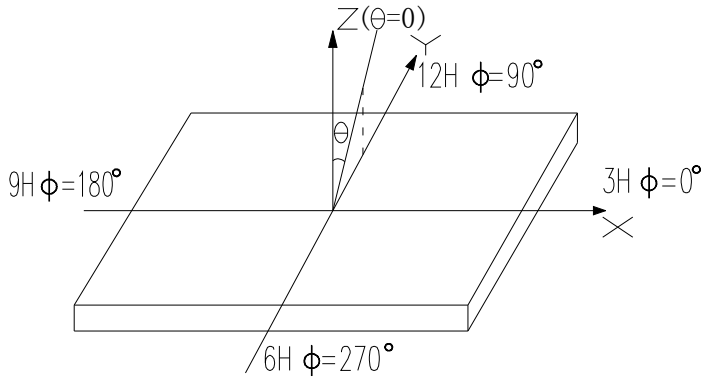
Viewing Angle

θ: Angle between Viewer Direction and Normal.

(-90°≤ θ ≤90°)

ϕ : Angle between Projection of Viewer Direction to X-Y plane and Y axis.

(0°≤ϕ≤360°)



Measuring Condition

1. Driving Voltage: Same as V_{LCD}
2. Driving Frequency: Same as Frame Frequency

Type	Direction	Θ°	Φ°
FSTN/STN	Any one angle	0	0
HTN/TN	6 O' Clock	20	270
	12 O' Clock	20	90
	3 O' Clock	20	0
	9 O' Clock	20	180

12. QUALITY SPECIFICATION

12-1. Specification of quality assurance

12-1-1. Purpose

Standardize the Quality Assurance of LCD module products supply to purchaser by YEEBO CORPORATION (Supplier).

12-1-2. Type of Quality Test

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

b. Electro-Optical Characteristics:
Test the product according to the individual specification.

c. Test of Appearance Characteristics:
Check the product according to the individual specification.

d. Test of Reliability Characteristics:
According to the definition of reliability on the specification for testing products.

e. Delivery Test:
The supplier should take the test for electrical performance & appearance before delivery.

(Ⅰ) Test method: According to ISO 2859-1.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%

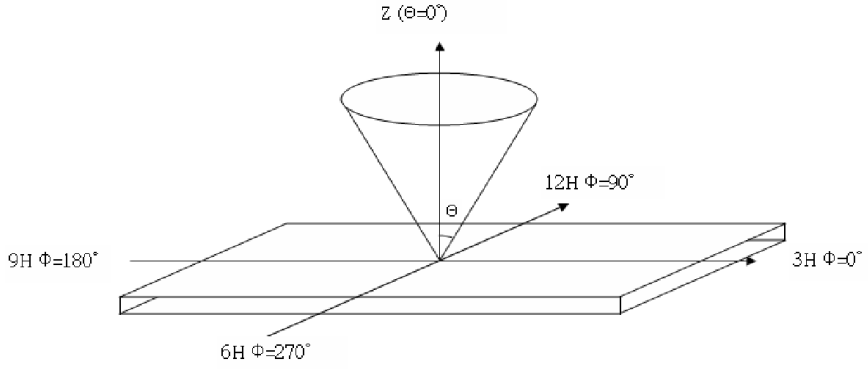
12-1-3. Standard of Product Appearance Inspection

a. Conditions of appearance inspection :

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

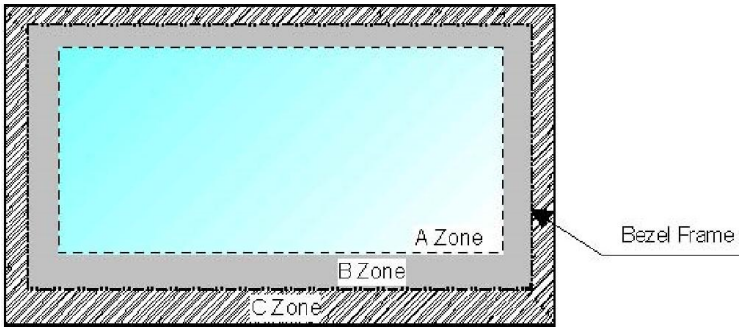
(Ⅱ) When inspecting the model of transmissive product must add the reflective plate.

(Ⅲ) The inspection direction is 30° off vertical line(Θ≦30°).



(Ⅳ) Temperature: 25±5℃ Humidity: 60±10%RH

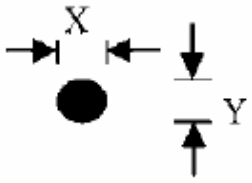
(Ⅴ) Definition of Applicable Zones:



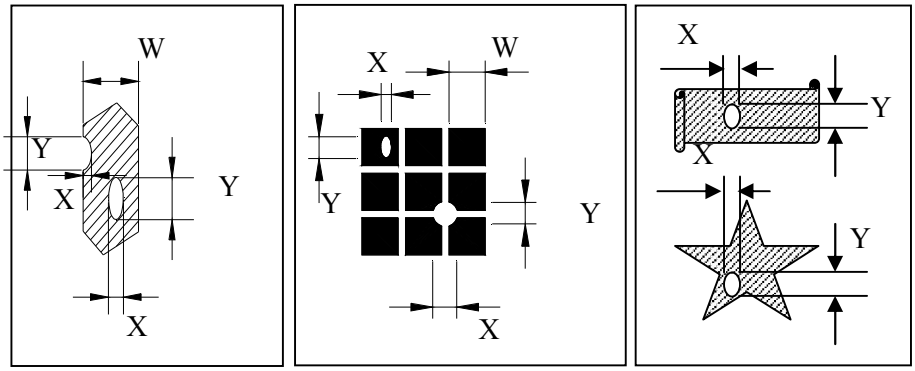
A Zone : Active display area
B Zone : Area from outside of "A Zone" to validity viewing area
C Zone : Rest parts
A Zone + B Zone = Validity viewing area

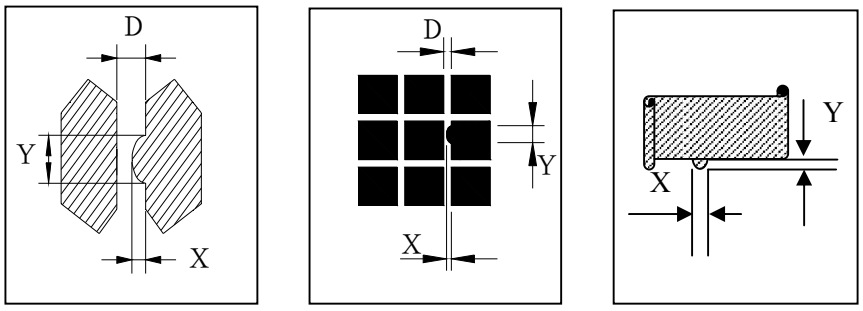
b. Unit of inspection : mm

12-1-4. Defect Inspection Specification

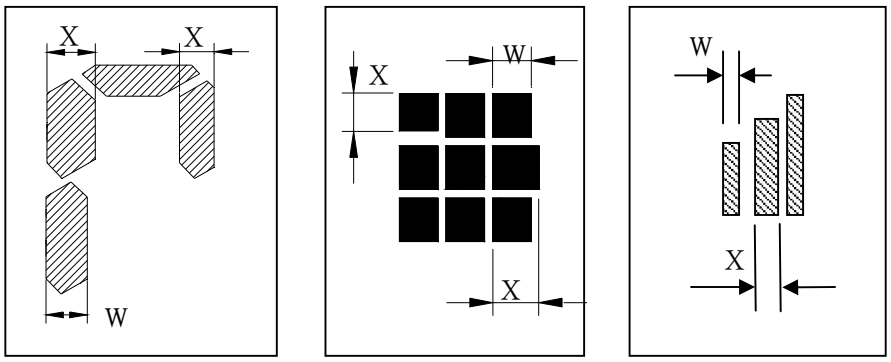
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical Testing</td><td>1.1 Missing line.
1.2 Missing character, dot or icon.
1.3 Display malfunction.
1.4 No function or no display.
1.5 Current consumption exceeds product specifications.
1.6 LCD viewing angle defect.</td><td>0.65</td></tr>
<tr><td>02</td><td>Black or White spots or Bright spots or Color spots on LCD (Display “ON”)</td><td>Φ = (X+Y) / 2
 

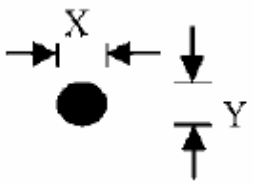
<table><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>Φ≦0.15</td><td>Accept no dense</td></tr><tr><td>0.15< Φ≦0.3</td><td>5</td></tr><tr><td>0.3< Φ</td><td>0</td></tr></table>* For “Accept no Dense”, no more than five spots within 5mm.
* The distance between two defects should more than 5mm.
* Spot during display switching is considered as acceptable.
=</td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td rowspan="2">03</td><td rowspan="2">Pin Hole or
Distortion</td><td>3.1 Pin Hole：
Segment Dot Matrix Pattern
 

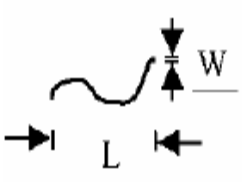
Ø＝(X+Y)/2
<table>
<tr><th>Wide (W)</th><th>Dimension (Ø)</th><th>Acceptable Number</th></tr>
<tr><td>-----</td><td>Ø<0.10</td><td>Accept no dense</td></tr>
<tr><td>W≦0.4</td><td>Ø≦0.15 and X≦1/2W</td><td>2</td></tr>
<tr><td>W>0.4</td><td>Ø≦0.20 and X≦1/3W</td><td>2</td></tr>
</table>
* For “Accept no Dense”, no more than 3 spots within 5mm.
* Shall not more than 2 defects and the distance between two defects should more than 10mm.</td><td>2.5</td></tr>
<tr><td>3.2 Distortion (Dot Shape)
Segment Dot Matrix Pattern
 

D：Space Ø=(X+Y)/2
<table>
<tr><th>Size (Ø)</th><th>Acceptable Qty</th></tr>
<tr><td>Ø<0.10</td><td>Disregard</td></tr>
<tr><td>Ø≦0.20 and X≦1/2D</td><td>2</td></tr>
<tr><td>Ø>0.20 or X>1/2D</td><td>0</td></tr>
<tr><td colspan="2">IF Y>0.5 , follow Item 3.3-</td></tr>
</table></td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>03</td><td>Pin Hole or Distortion</td><td>3.3 Distortion (Thick or Thin)：
Segment Dot Matrix Pattern
 

<table>
<tr><th>Wide(W)</th><th>Distortion Wide (X)</th><th>Acceptable Qty</th></tr>
<tr><td>-----</td><td>|X-W|≦0.10</td><td>Disregard</td></tr>
<tr><td>W≦4mm</td><td>|X-W|≦0.20 and X≧1/2W</td><td>2</td></tr>
<tr><td>W>4mm</td><td>|X-W|≦0.30</td><td>2</td></tr>
</table>
* Total defects shall not exceed 3.
* Distortion thickness cannot over 1/2 width of dot gap.</td><td>2.5</td></tr>
<tr><td>04</td><td>LCD and Touch Panel black spots, white spots, contamination (Display “OFF”)</td><td>4.1 Round type: As following drawing
Φ = (X+Y) / 2
 

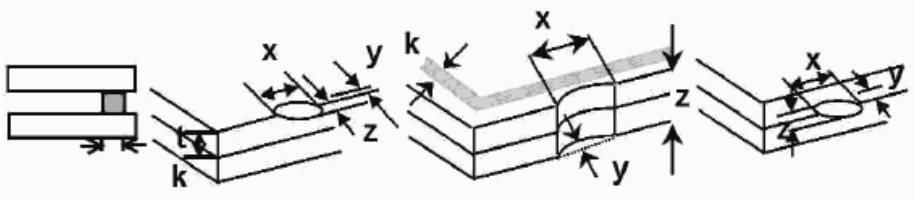
<table>
<tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.1</td><td>Accept no dense</td></tr>
<tr><td>0.1< Φ≦0.2</td><td>3</td></tr>
<tr><td>0.2< Φ≦0.25</td><td>2</td></tr>
<tr><td>0.25< Φ≦0.35</td><td>1</td></tr>
<tr><td>0.35< Φ</td><td>0</td></tr>
</table>
* For “Accept no Dense”, no more than five spots within 5mm.
* The distance between two defects should more than 5mm.
* Outside of the V.A. is disregard.</td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>04</td><td>LCD and Touch Panel black spots, white spots, contamination (Display “OFF”)</td><td>4.2 Line type: (As following drawing)
 

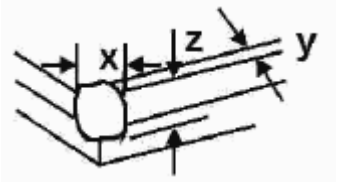
<table>
<tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>---</td><td>W≦0.02</td><td>Accept no dense</td></tr>
<tr><td>L≦3</td><td>0.02<W≦0.05</td><td>2</td></tr>
<tr><td>L≦2</td><td>0.05<W≦0.08</td><td>1</td></tr>
<tr><td>---</td><td>0.08<W</td><td>Rejection</td></tr>
</table>
* For “Accept no Dense”, no more than 2 lines within 5mm.
* The distance between two defects should more than 5mm.
* Outside of the V.A. is disregard.</td><td>2.5</td></tr>
<tr><td>05</td><td>Polarizer bubbles</td><td><table>
<tr><th>Size Φ(mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20< Φ≦0.50</td><td>3</td></tr>
<tr><td>0.50< Φ≦1.00</td><td>2</td></tr>
<tr><td>1.00< Φ</td><td>0</td></tr>
<tr><td>Total Q’ty</td><td>3</td></tr>
</table>
* For “Accept no Dense”, no more than 2 bubbles within 5mm.
* The distance between two defects should more than 5mm.
* Outside of the V.A. is disregard.</td><td>2.5</td></tr>
<tr><td>06</td><td>Polarizer Scratches/ Puncture</td><td>Follow Item 4.</td><td>2.5</td></tr>
<tr><td>07</td><td>Polarizer dirt</td><td>Dirt on polarizer which can be clean or blow away is acceptable.</td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>08</td><td>Chipped glass</td><td>
Symbols:
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Glass thickness a: LCD side length
L: Electrode pad length

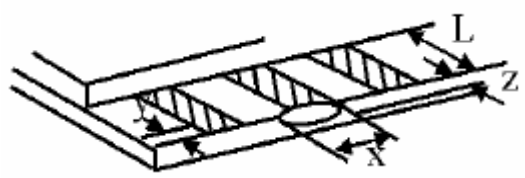
8.1 General glass chip:

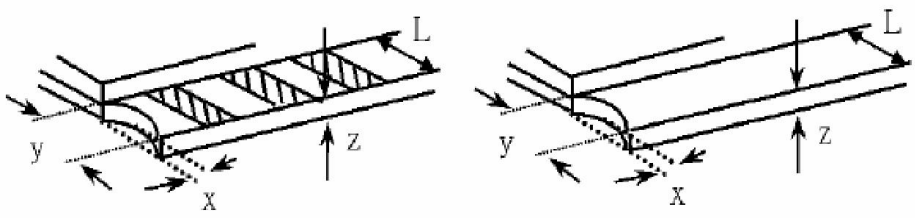
8.1.1 Chip on panel surface and crack between panels:


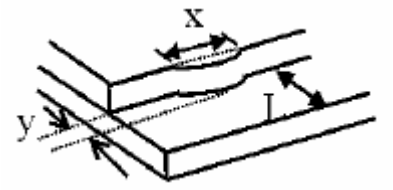
<table>
<tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip

8.1.2 Corner crack:


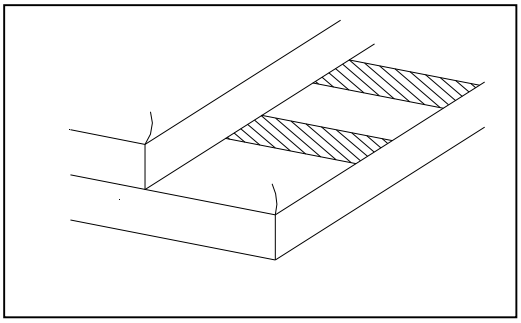
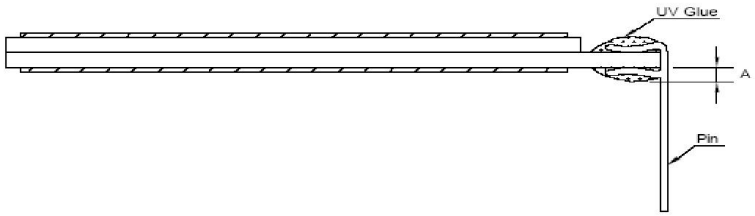
<table>
<tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip
</td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>09</td><td>Glass crack</td><td>
Symbols:
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Glass thickness a: LCD side length
L: Electrode pad length
9.1 Protrusion over terminal:
9.1.1 Chip on electrode pad:


<table>
<tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr>
<tr><td>y≦0.5mm</td><td>x≦1/8a</td><td>0< z≦t</td></tr>
</table>
9.1.2
Non-conductive portion:


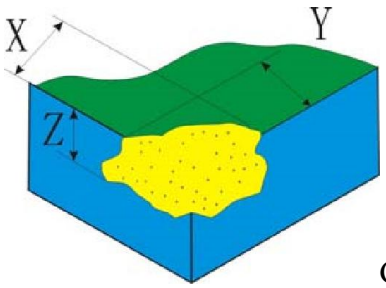
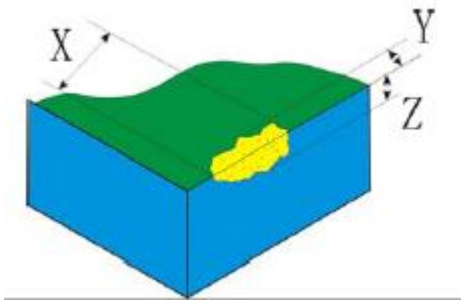
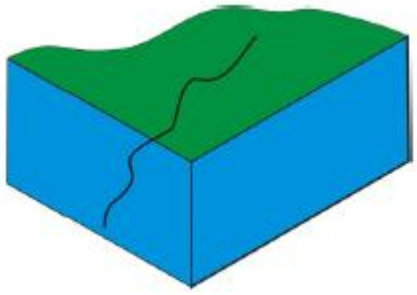
<table>
<tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr>
<tr><td>y≦L</td><td>x≦1/8a</td><td>0< z≦t</td></tr>
</table>
⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.
⊙ Heatseal alignment mark must not be damaged.
9.1.3 Substrate protuberance and internal crack


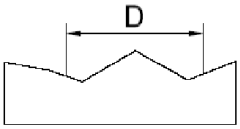
<table>
<tr><td>y: width</td><td>x: length</td></tr>
<tr><td>y≦1/3L</td><td>X≦a</td></tr>
</table>
</td><td>2.5</td></tr>
</table>

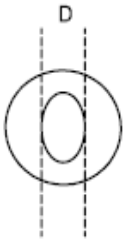
NO	Item	Criterion	AQL
10	Progressive crack line	 10.1 Crack is crack line extend to inner edge . 10.2 Crack round epoxy frame will be rejected. 10.3 Crack on the terminal will be rejected: Z=T length >1mm or Z<T length >2mm 10.4 Crack at ITO will be rejected.	2.5
11	PIN	11.1 PIN slant not per specification. If the specification does not describe this item , the slant of PIN to ITO pad must ≦0.25mm. 11.2 The UV glue of PIN cannot higher than upper polarizer. 11.3 The UV glue height of A shall be ≦2mm  11.4 The terminal of PIN cannot have UV glue. 11.5 Damage of PIN such as scratch affect customer soldering. 11.6 The inclination tolerance of PIN ≦ ±5° unless otherwise stated. 11.7 Pin type not according to specification sheet. 11.8 LCD pin loose or missing pins.	2.5

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>12</td><td>Marking
(Printing &
Silkscreen)</td><td>12.1 The marking pattern different from specification.
12.2 Marking colour wrong or different from colour limit sample
12.3 Marking line not consistence in thickness or broken line
12.4 Marking position deviated. Base on tolerance specified and unspecified tolerance base on ±0.20mm. Marking line should not overlap with display unless otherwise specified.
12.5 Marking Line Width Criteria：
<table>
<tr><th>W： Designed Width</th><th>P： Actual Width</th></tr>
<tr><td>W≦0.40</td><td>|W-P|≦1/2W</td></tr>
<tr><td>W>0.40</td><td>|W-P|≦0.2</td></tr>
</table>
Note: Unless otherwise specified.
12.6 Marking Pinhole or Distortion：
<table>
<tr><th>Size</th><th>Accepted Qty</th></tr>
<tr><td>Ø<0.10</td><td>Disregard</td></tr>
<tr><td>0.10<Ø≦0.20</td><td>2</td></tr>
<tr><td>0.20<Ø</td><td>0</td></tr>
</table>
Note: The distance between two defects should be greater than 5mm
12.7 Marking Black spot or Scratches controlled base on inspection specification Item 4.
12.8 Smear allowed: ≦0.20mm</td><td>2.5</td></tr>
<tr><td>13</td><td>Bezel</td><td>Bezel not complies with product specifications.
Note: Scratch or prick which does not affect customer assembly is considered as acceptable.</td><td>2.5</td></tr>
<tr><td>14</td><td>FPC</td><td>14.1 FPC terminal damage ≦ 1/2 FPC terminal width and does not affect functional is considered acceptable.
14.2 FPC alignment hole damage ≦ 1/2 alignment area and does not affect the functional and assembly of customer are considered acceptable.
14.3 Foreign material or dirt on conductor pads which can be clean and does not affect functional is consider acceptable.</td><td>2.5</td></tr>
</table>

NO	Item	Criterion	AQL
15	SMT、COB	15.1 COB epoxy with pinholes larger than 0.5mm. 15.2 COB epoxy with exposed IC. 15.3 The height of the COB should not exceed the height indicated in the assembly diagram. 15.4 Epoxy encap exceed more than 3mm of the silkscreen printing 15.5 Wrong parts, missing parts or excess parts. 15.6 Jumper on the PCBA not conformed to the product characteristic chart. 15.7 PCBA cosmetic control base on latest IPC standard, IPC-A-610, acceptable limit of grade 2. 15.8 Cold solder joints, missing solder connections. 15.9 Short circuits in components on PCB or FPC. 15.10 Bezel loose assembly Note: Bend angle for bezel assembly should be within the range of 15°~60°	2.5 0.65 2.5 2.5 0.65 0.65 2.5 0.65 0.65 0.65 2.5
16	Backlight	16.1 Spots or scratches that appear when backlight on to be reviewed using Item .4 standards. 16.2 Backlight unable to light-up.	2.5
17	TAB	Oxidation on pin surface that result solderbility issue Note: a) Solderbility condition: 310℃±10℃, 3sec (hand solder) or 280℃±10℃, 3sec (DIP) b) Wrinkles on TAB pin but not broken is consider as acceptable.	2.5

NO	Item	Criterion	AQL
18	Touch Panel Chipped glass	18.1 Chip And Crack Corner crack: X<3.0mm and Y<3.0mm and Z<GT ignored 18.1.1 Corner crack in the golden finger that seriously affects the product function. 18.1.2 Corner crack in the circuit that seriously affects product function .  GT : Glass Thickness 18.2 Side crack: X<4.0mm and Y<2.0mm and Z<GT ignored 18.2.1 Side crack in the golden finger that seriously affects the product function. 18.2.2 Side crack in the circuit that seriously affects product function  18.3 Progressive crack line. 	2.5

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>19</td><td>Touch Panel(Fish eye、dent and bubble on film)</td><td>
<table>
<tr><td>SIZE(mm)</td><td>Acceptable Qty</td></tr>
<tr><td>Φ≦0.2</td><td>Accept no dense</td></tr>
<tr><td>0.2< D ≦0.4</td><td>5</td></tr>
<tr><td>0.4< D ≦0.5</td><td>2</td></tr>
<tr><td>0.5< D</td><td>0</td></tr>
</table>


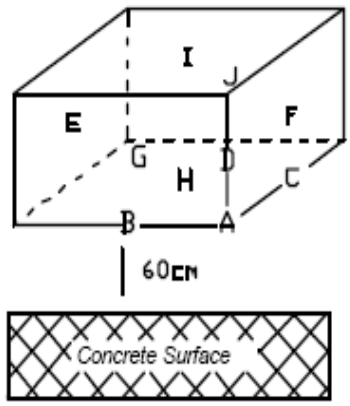


</td><td>2.5</td></tr>
<tr><td>20</td><td>Touch Panel Newton ring</td><td>Newton ring dimension < 1/2 touch panel area and affect font and line distortion(<1.5%).</td><td>2.5</td></tr>
<tr><td>21</td><td>Touch Panel Linearity</td><td>Linearity <2.0% .</td><td>2.5</td></tr>
<tr><td>22</td><td>General appearance</td><td>22.1 Product packaging not the same as the Specification
22.2 Product dimension and structure not conform to product specification sheet.

Note:
a) Wrinkles on protective tape or corner lifted ≦5mm is considered acceptable.
b) Dirt or scratches on protective film which does not transfer to polarizer is consider as acceptable
c) Datecode position unless otherwise specified by customer, Yeebo will decide for it.
d) Datecode on module which is slight blur but still can be differentiated is considered as acceptable.</td><td>2.5</td></tr>
</table>

12.2 Standard Specification for Reliability

12.2 – 1. Standard Specifications for Reliability of LCD Module

Item	Description	
	Condition	Time (hrs)
High temp. (Storage)	80°C	240
High temp. (Operating)	70°C	240
Low temp. (Storage)	-30°C	240
Low temp. (Operating)	-20°C	240
High temp and high humidity .(Storage)	40°C/ 90%RH	240
Thermal shock (Storage)	-30°C → 20°C→ 80°C → 20°C (30 min → 5 min → 30 min →5 min)	10 cycles
Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z direction each 2 hours .	
Packing drop test	To be measured after dropping from 60cm high on the concrete surface in packing state.  Dropping method: Corner dropping : A Corner : once Edge dropping : B,C,D edge : once Face dropping: E, F, G, H, I, J face : once	
Electrical Static Discharge	Air: ±6KV 150pF/330Ω 5 times Contact: ±4KV 150pF/330Ω 5 times	

***Sample size for each test is 5pcs except Packing vibration & Packing drop test.**

12.2 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 4 hours, after the tests listed in Table 12.2-1, 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 ratio must be larger than 2.
03	Appearance	Visual inspection	Defect free.
04	ESD	Function test	After reset, no abnormalities in functions.

12. 2 - 3. MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 100,000 hours under ordinary operating and storage conditions room temperature (25±5℃), normal humidity (50±10% RH), and in area not exposed to direct sun light.

***The half life of EL backlight is 1200hours Min.**

12.3.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 cannot 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 one year from YEEBO production.
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.

12.4 Precautions in Use of LCM

12.4-1 Handling of LCM

- Do not give external shock.
- Do not apply excessive force on the surface.
- Liquid Crystal in LCD is hazardous substance. Do not swallow it and when contact to hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Do not operate it above the absolute maximum rating.
- Do not 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 careful when peeling off this protective film as static electricity may be generated.

12.4-2 Storage

- Store in ambient temperature of 25±5℃, and relative humidity of 50±10%RH. Do not 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.
- Heat-seal must be stored at 25°C or less and 50% R.H. or less in a sealed condition, and must be used within three months after delivery from our factory.

12.4-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Soldering: Not higher than 310±10℃ and less than 3 sec during for hand soldering.
- Resoldering: no more than 2 times.

12.5 Guarantee

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