Thin-Film-Transistor LCD Module
Model:XTPY43SN06-03

Approved and Checked by

Approved by	Checked by		Made by

Revise Records

Rev.	Date	Contents	Written	Approved
01	2017/04/21	Preliminary Specification	GAO	JACK

Special Notes

Note1.	
Note2.	
Note3.	
Note4.	
Note5.	

1.General Description and Features

XTPY43SN06-03 is a TM (Transmissive) type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a driver circuit and a back-light unit . The resolution of a 4.3" contains 480RGBx272 dots and can display up to 16.7M colors. The following table described the features of XTPY43SN06-03.

LCD Module

Item	Specification	Unit
Screen Size	4.3inches	Diagonal
Display Resolution	480RGB(H)x272(V)	Dot
Active Area	95.04(H) x53.86 (V)	mm
Outline Dimension	105.5(W) x 67.2 (H) x 2.92 (D)	mm
Display Mode	Normally white/Transmissive	--
Pixel Arrangement	RGB-Vertical Stripe	--
Display Color	16.7M	--
Viewing Direction	6 o'clock	--
Drive IC	ST7282	--

2.Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	105.5	--	mm	--
	Vertical (V)	--	67.2	--	mm	(1)
	Thickness (T)	--	2.92	--	mm	(2)
Weight		--	N/A	--	g	--

Note (1) Not include FPC.
Refer to the Outline Dimension for further information.
(2) Back-light unit are included.

3.Electrical Specifications

3.1 Absolute Max. Ratings

3.1.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25±2°C, V_{SS}=GND=0)

Item	Symbol	Min.	Max.	Unit	Note
Operating temperature	T_{OPR}	-20	70	°C	(1)
Storage temperature	T_{STG}	-30	80	°C	(1,2,3)

Note (1) 95 % RH Max. (40 °C ≥ Ta). Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C)
No condensation.

Note (2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

Note (3) Only operation is guarantied at operating temperature. Contrast, response time, another display quality are evaluated at +25°C.

3.2 Electrical Absolute Rating

3.2.1 TFT-LCD Module

(Voltage Referenced to VSS)

Item	Symbol	Value		Unit	Condition
		Min.	Max.		
Digital Power Supply Voltage	VDD	VSS-0.3	5.0	V	--

3.2.2 Back-Light Unit

(Ta=25±2°C)

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	VF	13.5	15.0	16.5	V	
LED Current	IF	-	40	-	mA	
Power Consumption	P_{BL}	-	600	-	mW	

4.Input Terminal Pin Assignment

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED-}	P	Power for LED backlight cathode	
2	V_{LED+}	P	Power for LED backlight anode	
3	GND	P	Power ground	
4	V_{DD}	P	Power voltage	
5	R0	I	Red data (LSB)	
6	R1	I	Red data	
7	R2	I	Red data	
8	R3	I	Red data	
9	R4	I	Red data	
10	R5	I	Red data	
11	R6	I	Red data	
12	R7	I	Red data (MSB)	
13	G0	I	Green data (LSB)	
14	G1	I	Green data	
15	G2	I	Green data	
16	G3	I	Green data	
17	G4	I	Green data	
18	G5	I	Green data	
19	G6	I	Green data	
20	G7	I	Green data (MSB)	

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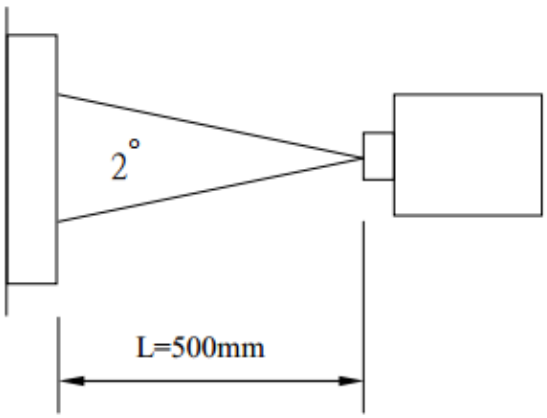
21	B0	I	Blue data (LSB)	
22	B1	I	Blue data	
23	B2	I	Blue data	
24	B3	I	Blue data	
25	B4	I	Blue data	
26	B5	I	Blue data	
27	B6	I	Blue data	
28	B7	I	Blue data (MSB)	
29	GND	P	Power ground	
30	CLK	I	Pixel clock	
31	DISP	I	Display on/off	
32	HSYN	I	Horizontal sync signal	
33	VSYNC	I	Vertical sync signal	
34	DE	I	Data Enable	
35	NC	-	No connection	
36	GND	P	Power ground	
37	NC	-	No connection	
38	NC	-	No connection	
39	NC	-	No connection	
40	NC	-	No connection	

I: input, O: output, P: Power

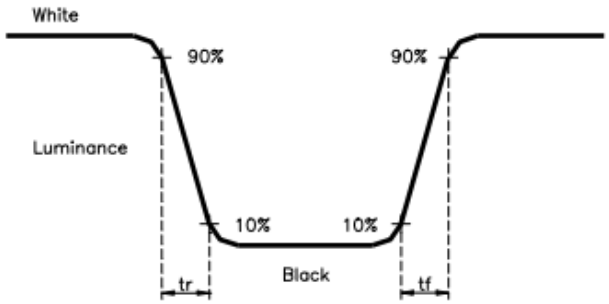
5.Optical Characteristics

Item		Symbol	Condition	Min	Type	Max	Unit	Note
Brightness		B		400	450	--	cd/m^2	
Response time		$T_{r+}T_f$	θ=0° T=25°C	--	30	45	ms	.
Contrast ratio		CR		320	--	--	--	
Color Gamut		NTSC %	--	--	50	--	%	
Luminance Uniformity		∆L		--	80		%	
Color Chromaticity (CIE 1931)	White	Wx	θ=0° Normal Viewing Angle	0.282	0.302	0.322	--	BM-7A
		Wy		0.318	0.338	0.358		
Viewing Angle	Hor.	θ_R	Center CR>10	60	70	--	Degree	
		θ_L		60	70	--		
	Ver.	θ_U		60	70	--		
		θ_D		50	60	--		

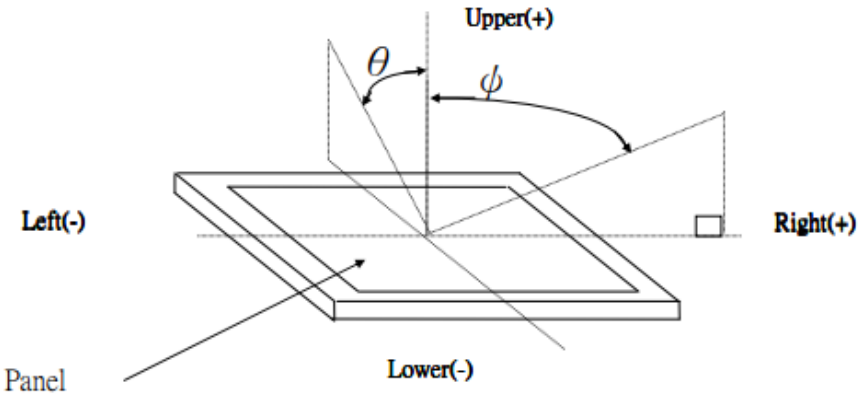


Note 3. Definition of Contrast Ratio :
CR = White Luminance (ON) / Black Luminance (OFF)

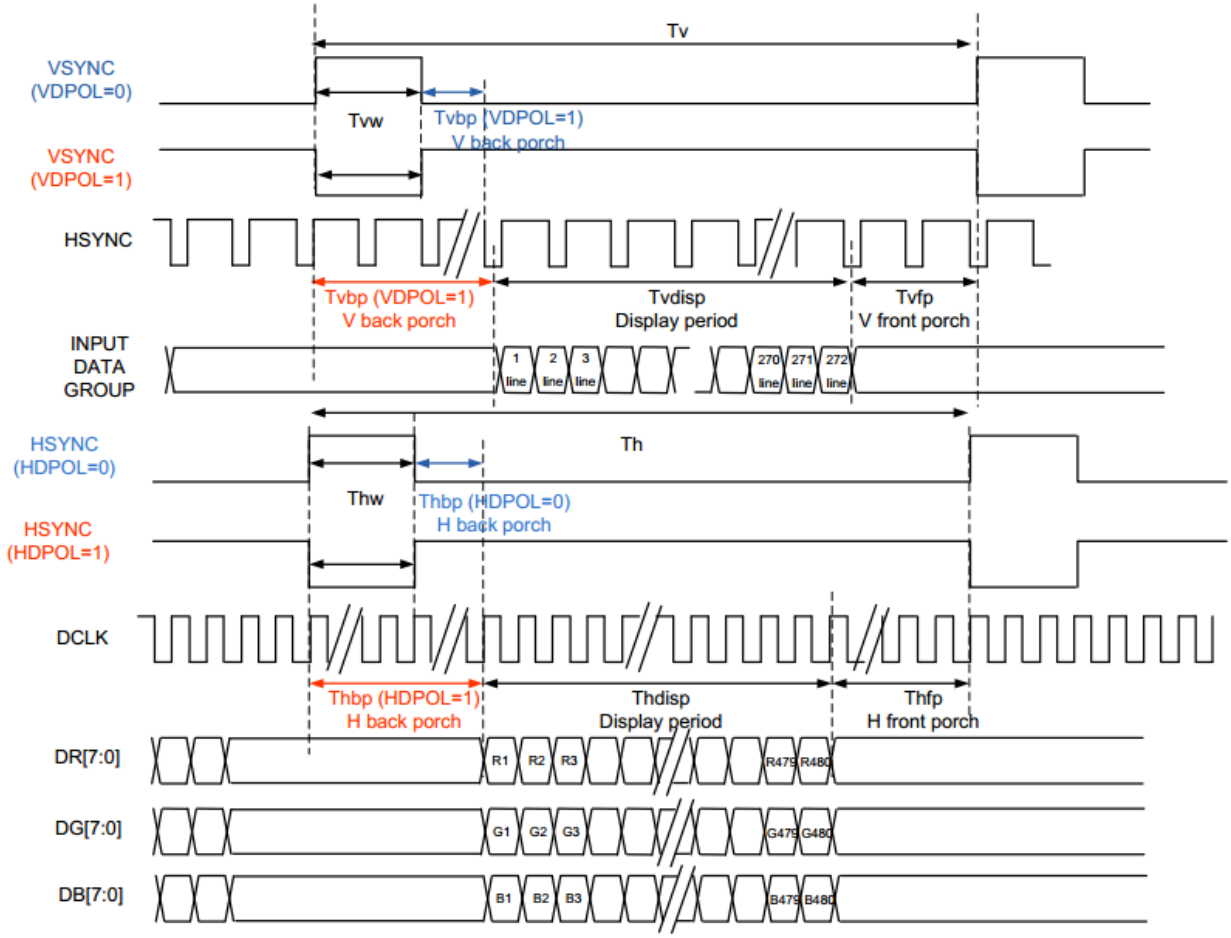
Note 4. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 5. Definition of view angle(θ，ψ)：



6.Interface Timing



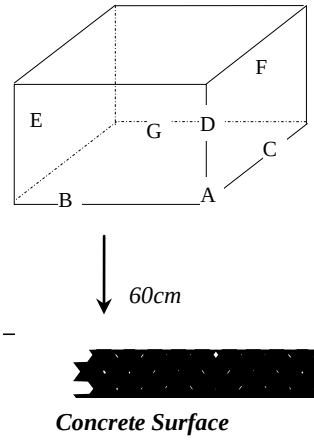
7.Reliability Condition for LCD

No change on display and in operation under the following test condition.

Condition: Unless otherwise specified, tests will be conducted under the following condition.

Temperature: 20±5°C Humidity: 65±5%RH

Tests will be not conducted under functioning state.

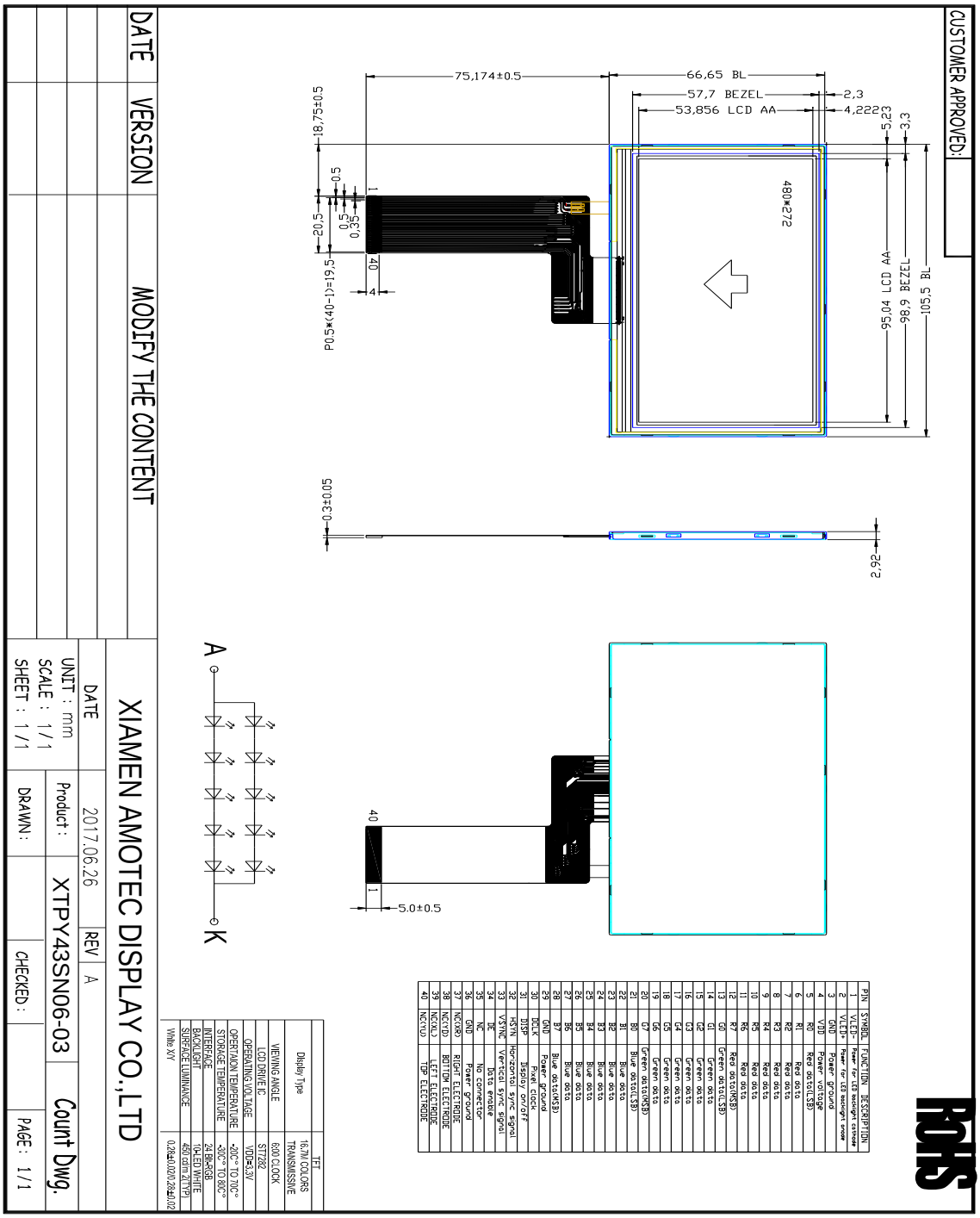
No.	Parameter	Condition	Notes
1	High Temperature Operating	70°C±2°C, 48hrs (Operation state)	--
2	Low Temperature Operating	-20°C±2°C, 48hrs (Operation state)	--
3	High Temperature Storage	80°C±2°C, 240hrs	--
4	Low Temperature Storage	-30°C±2°C, 240hrs	--
5	High Temperature and High Humidity Operation Test	60°C±2°C, 90%, 240hrs	--
6	Vibration Test	Total fixed amplitude: 1.5mm Vibration Frequency: 10~55Hz One cycle 60 seconds to 3 direction of X, Y, Z each 15 minutes.	--
7.	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 face: once*	--

Notes: 1. No dew condensation to be observed.

2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.

3. Vibration test will be conducted to the product itself without putting I in a container.

8.Dimensional outlines



CUSTOMER APPROVED:
75,174±0.5
66,65 BL
57,7 BEZEL
53,856 LCD AA
2,3
4,222
5,23
3,3
18,75±0.5
0.5
0.5
0,35
20,5
P0.5*(40-1)=19,5
40
4
480*272
95,04 LCD AA
98,9 BEZEL
105,5 BL
0.3±0.05
2,92
A
K
40
1
5.0±0.5
DATE
VERSION
MODIFY THE CONTENT
XIAMEN AMOTEC DISPLAY CO.,LTD
DATE
2017.06.26
REV
A
UNIT : mm
SCALE : 1/1
SHEET : 1/1
Product :
XTPY43SN06-03
Count Dwg.
DRAWN :
CHECKED :
PAGE : 1/1
TFT
Display Type
16.7M COLORS
TRANSMISSIVE
VIEWING ANGLE
6:00 CLOCK
LCD DRIVE IC
ST7282
OPERATING VOLTAGE
VDD=3.3V
OPERATION TEMPERATURE
-20C° TO 70C°
STORAGE TEMPERATURE
-30C° TO 80C°
INTERFACE
24 BN-RGB
BACKLIGHT
10-LED WHITE
SURFACE LUMINANCE
450 cd/m 2(TYP)
White XY
0.28±0.02/0.28±0.02
PIN | SYMBOL | FUNCTION | DESCRIPTION
1 | VLED- | Power for LED backlight cathode
2 | VLED+ | Power for LED backlight anode
3 | GND | Power ground
4 | VDD | Power voltage
5 | R0 | Red data(LSB)
6 | R1 | Red data
7 | R2 | Red data
8 | R3 | Red data
9 | R4 | Red data
10 | R5 | Red data
11 | R6 | Red data
12 | R7 | Red data(MSB)
13 | G0 | Green data(LSB)
14 | G1 | Green data
15 | G2 | Green data
16 | G3 | Green data
17 | G4 | Green data
18 | G5 | Green data
19 | G6 | Green data
20 | G7 | Green data(MSB)
21 | B0 | Blue data(LSB)
22 | B1 | Blue data
23 | B2 | Blue data
24 | B3 | Blue data
25 | B4 | Blue data
26 | B5 | Blue data
27 | B6 | Blue data
28 | B7 | Blue data(MSB)
29 | GND | Power ground
30 | DCLK | Pixel clock
31 | DISP | Display on/off
32 | HSYN | Horizontal sync signal
33 | VSYNC | Vertical sync signal
34 | DE | Data enable
35 | NC | No connector
36 | GND | Power ground
37 | NC(XR) | RIGHT ELECTRODE
38 | NC(YD) | BOTTOM ELECTRODE
39 | NC(XL) | LEFT ELECTRODE
40 | NC(YU) | TOP ELECTRODE

9 Incoming Inspection Standards

9.1 VISUAL & FUNCTION INSPECTION STANDARD

9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

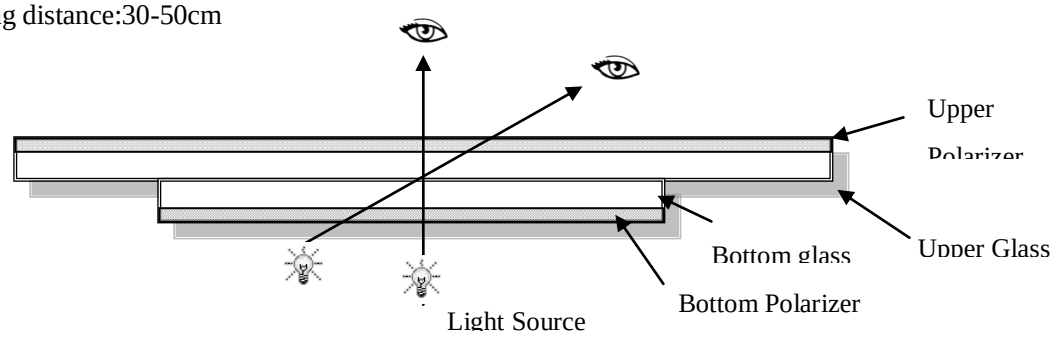
Temperature : 25±5℃

Humidity : 65%±10%RH

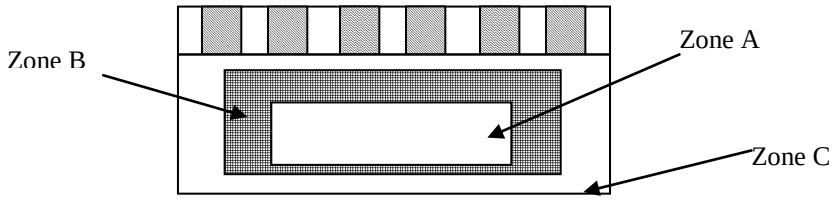
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



9.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

9.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ

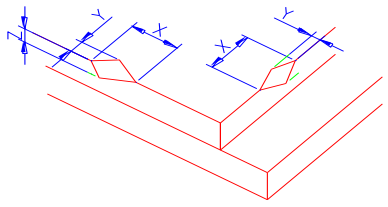
AQL:

Major defect	Minor defect
0.65	1.5

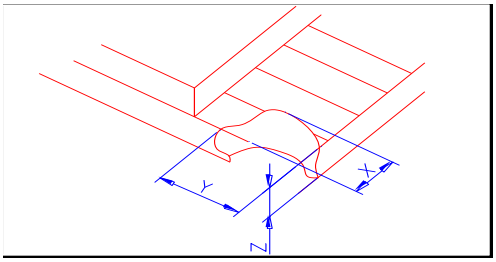
LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

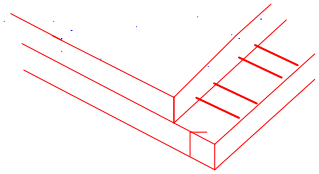
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)
1.0 LCD Crack/Broken NOTE: X: Length Y: Width	(1) The edge of LCD broken	

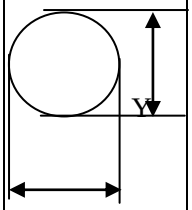
X	Y	Z
≤3.0mm	<Inner border line of the seal	≤T

<table>
<tr><td rowspan="2">Z: Height
L: Length of ITO,
T: Height of LCD</td><td>(2)LCD corner broken</td><td> 

<table>
<tr><td>X</td><td>Y</td><td>Z</td></tr>
<tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr>
</table></td></tr>
<tr><td>(3) LCD crack</td><td> 
Crack
Not allowed</td></tr>
</table>

Number	Items	Criteria (mm)

2.0 Spot defect



X

Φ=(X+Y)/2

① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		Ignore
0.10<Φ≤0.15	3(distance≧10mm)		
0.15<Φ≤0.2	1		
0.2<Φ	0		

②Dim spot（LCD/TP/Polarizer dim dot, light leakage、dark spot）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		Ignore
0.1<Φ≤0.2	2(distance≧10mm)		
0.2<Φ≤0.3	1		
Φ＞0.3	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.5	2(distance≧10mm)		
Φ>0.5	0		

<table>
<tr>
<td></td>
<td>Line defect (LCD/TP /Polarizer black/white line, scratch, stain)</td>
<td>
<table>
<tr><td rowspan="2">Width(mm)</td><td rowspan="2">Length(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.03</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.03<W≤0.05</td><td>L≤3.0</td><td colspan="2">N≤2</td></tr>
<tr><td>0.05<W≤0.08</td><td>L≤2.0</td><td colspan="2">N≤2</td></tr>
<tr><td>0.08<W</td><td colspan="4">Define as spot defect</td></tr>
</table>
</td>
</tr>
<tr>
<td>3.0</td>
<td>Polarizer Bubble</td>
<td>
<table>
<tr><td rowspan="2">Zone
Size (mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ<0.2</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.2<Φ<0.4</td><td colspan="2">2(distance≧10mm)</td></tr>
<tr><td>0.4<Φ≤0.6</td><td colspan="2">1</td></tr>
<tr><td>0.6<Φ</td><td colspan="2">0</td><td></td></tr>
</table>
</td>
</tr>
<tr>
<td>4.0</td>
<td>SMT</td>
<td>According to IPC-A-610C class Ⅱ standard . Function defect and missing part are major defect ,the others are minor defect.</td>
</tr>
</table>