



深圳显昶光电科技有限公司

Shenzhen Xianyang Optoelectronic Technology Co., Ltd

LCD MODULE SPECIFICATION

Customer: _____

Module No.: XY040BS40-LB

Date: 2023-04-01

Version: 2.0

For Customer's Acceptance:

Approved by	Comment

Approved by	Checked by	Prepared by
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1. General Description

* DESCRIPTION

XY040BS40-LB is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 4.0" TFT-LCD contains 480 x 800 pixels, and can display up to 65K colors.

* Features

- Low Input Voltage: IOVCC: 1.65~3.3V;VCC: 2.5~3.3V
- Display Colors of TFT LCD: 65K colors
- Interface: RGB
- Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	51.84(H) x 86.4(V)	mm	—
Driver element	a-Si TFT active matrix	—	—
Display colors	65K	colors	—
Number of pixels	480(RGB) *800	dots	—
Pixel arrangement	RGB vertical stripe	—	—
Pixel pitch	0.108(H) ×0.108(V)	mm	—
Viewing angle	FREE	o'clock	—
Drive IC	ST7701S	—	—
Display mode	Normally Black	—	—
Operating temperature	-10~+60	°C	—
Storage temperature	-20~+70	°C	—

Mechanical Information

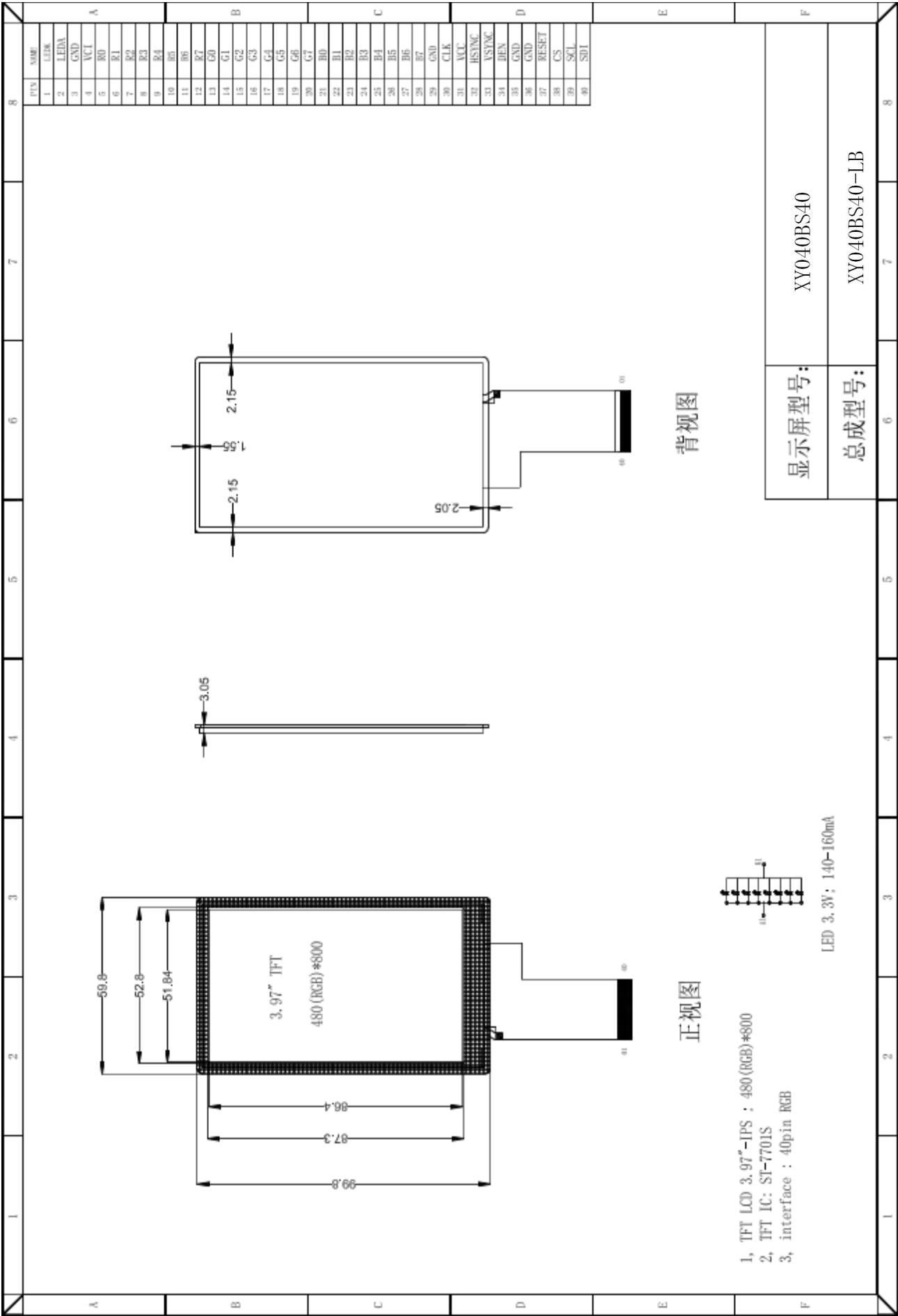
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	—	59.8	—	mm	±0.2
	Vertical(V)	—	99.8	—	mm	±0.2
	Depth(D)	—	3.05	—	mm	±0.1
Weight		—	TBD	—	g	—

2. MECHANICAL SPECIFICATION



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3. PIN DESCRIPTION

[illegible]



4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	VDDIO	1.65	3.0	V	
Supply Voltage for analog circuit	Vcc	2.5	3.3	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 POWER SPECIFICATION

INPUT POWER SPECIFICATIONS ARE AS FOLLOWS:

THE POWER SPECIFICATION ARE MEASURED UNDER 25°C AND FRAME FREQUENCY UNDER 60HZ

Typical Operating Conditions
(Ta=25°C)

Item	Parameter	Values			Unit	Remark
		Min	Typ	Max.		
VCI	Vcc	2.5	2.8	3.3	V	
VDDI	Iovcc	1.65	2.8	3.3	V	
TFT Gate ON Voltage	Pixel turn on voltage	10	13	16	V	
TFT Gate OFF Voltage	Pixel turn off voltage	-16	-12.5	-9	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	Vf	2.8	3.1	3.3	V	
Forward supply Current	If	—	160	—	mA	
LCM Luminance	Lv	180	200	—	cd/m ²	Ib=160mA
Uniformity	/	80	85		%	—

5. OPTICAL CHARACTERISTICS

<Table 5. Optical Specifications>

[Ta=25±2°C]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ_3	CR > 10			-	Deg.	Note 4.1
		Θ_9				-	Deg.	
	Vertical	Θ_{12}				-	Deg.	
		Θ_6				-	Deg.	
Contrast Ratio		CR	$\Theta = 0^\circ$			-		APF Note 4.2/4.3
Cell Transmittance		Tr		4.5	4.8	-	%	
Reproduction of color		Rx	$\Theta = 0^\circ$	0.655	0.658	0.661		With BLU @C Light Note 4.4
		Ry		0.335	0.338	0.341		
		Gx		0.259	0.262	0.265		
		Gy		0.597	0.6	0.603		
		Bx		0.131	0.134	0.137		
		By		0.134	0.137	0.14		
		Wx		0.305	0.308	0.311		
		Wy		0.336	0.339	0.342		
Color Gamut			$\Theta = 0^\circ$	65	70	-	%	
Response Time		Ton + Toff	Ta= 25°C $\Theta = 0^\circ$	-	30	35	ms	Note 4.5

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

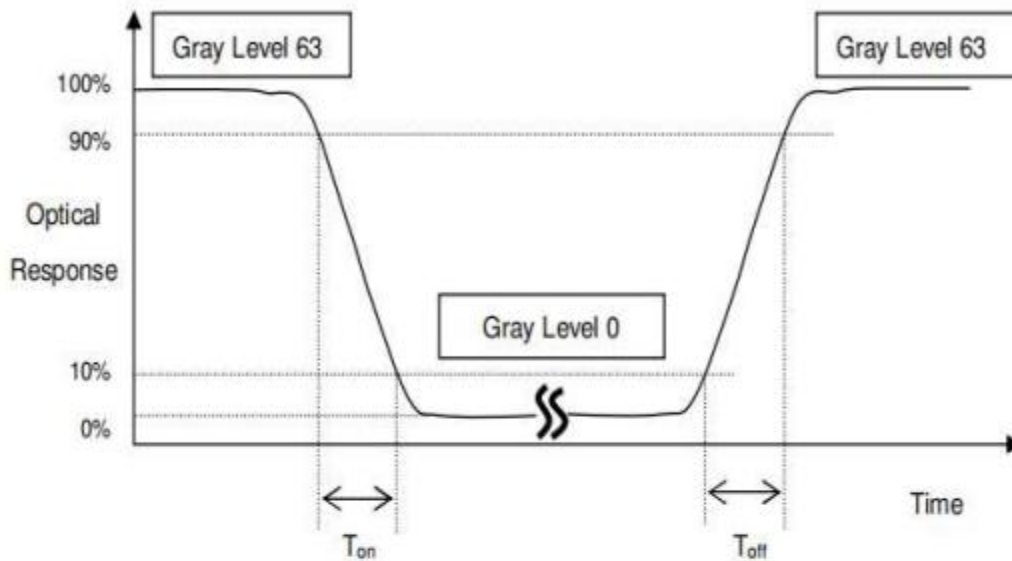
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

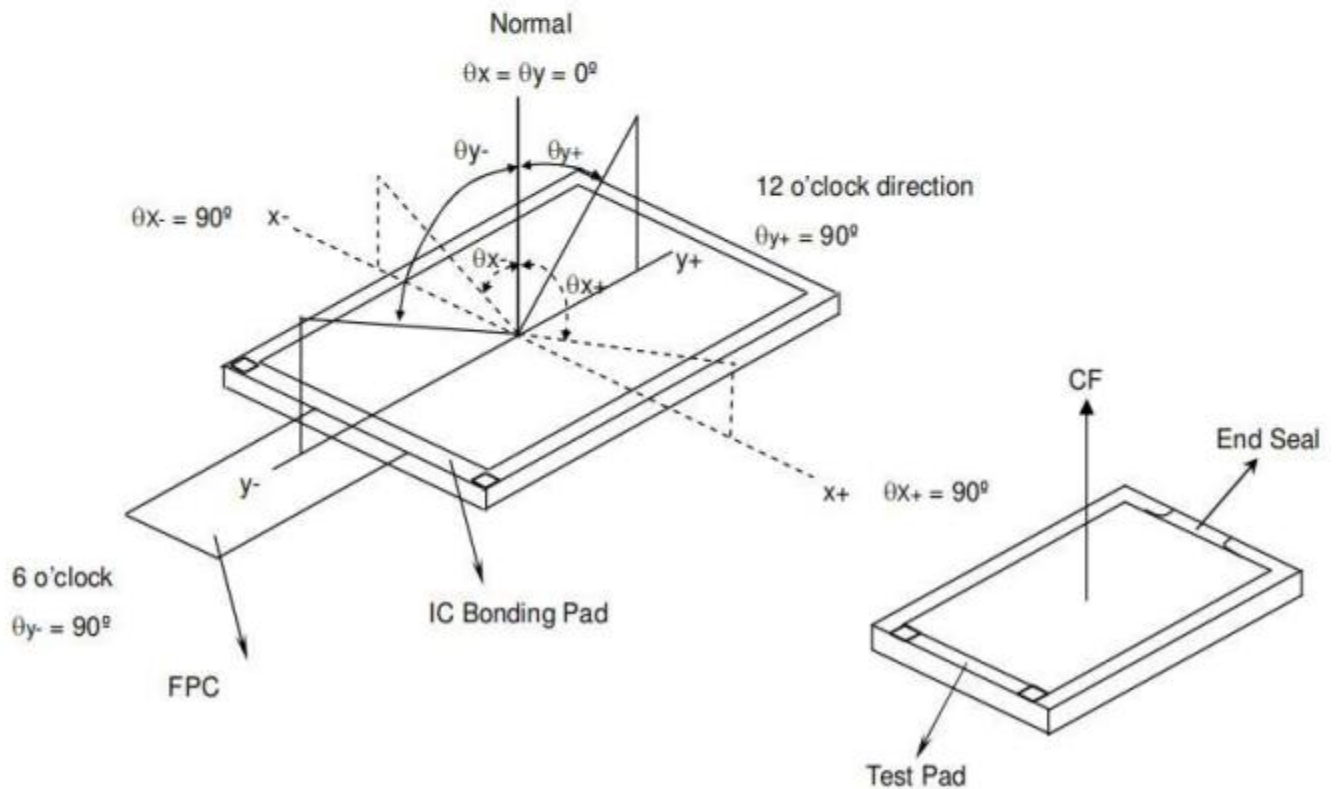
$$CR = CR (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (T_{on} , T_{off}):

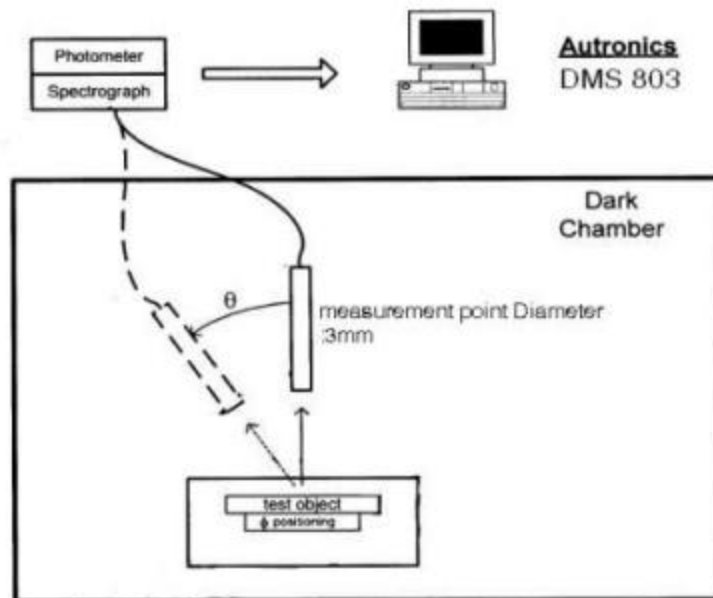


*Note (3) Definition of Viewing Angle

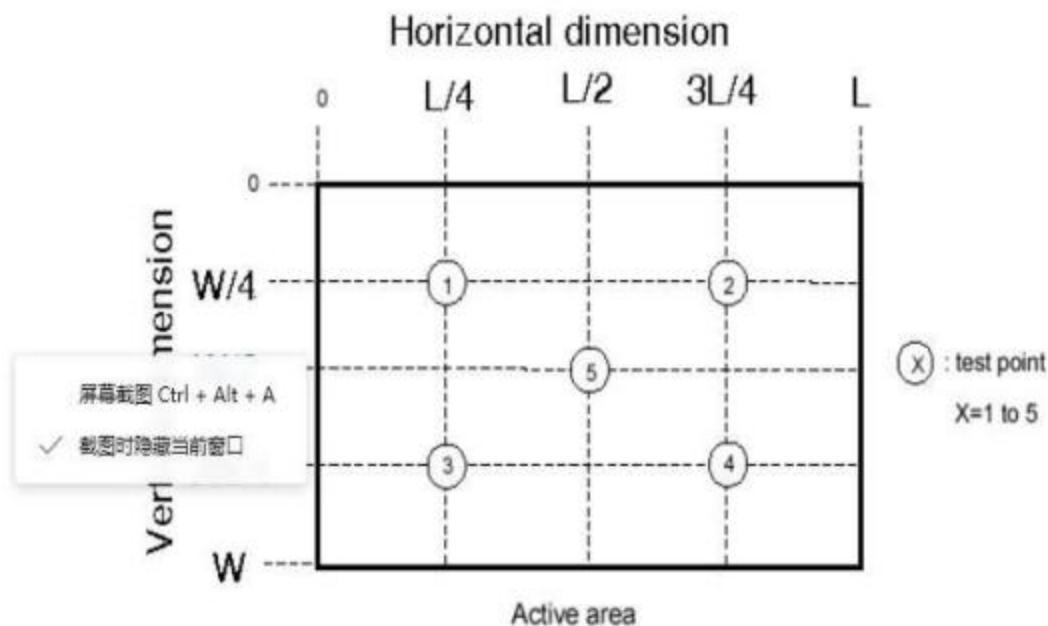


***Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



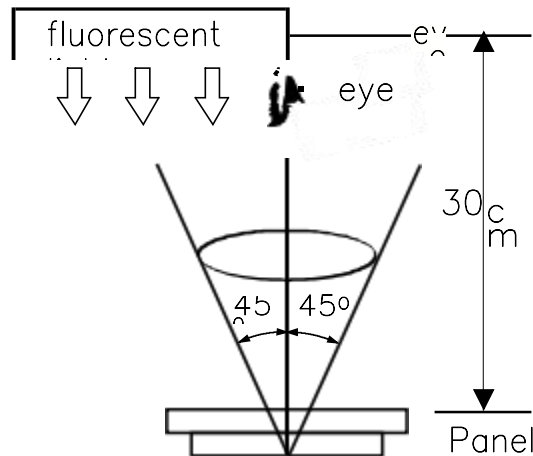
***Note (5)**



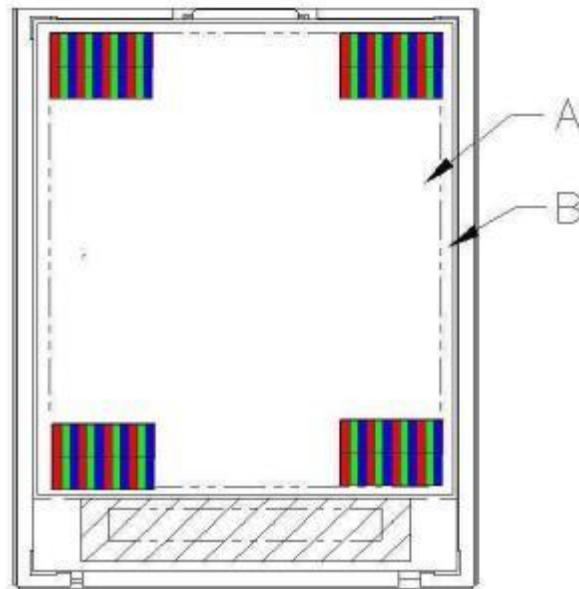
6. QUALITY SPECIFICATIONS

6.1 INSPECTION CONDITION

- (1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
- (2) Inspection condition is $23\pm 5^{\circ}\text{C}$, $50\pm 20\%\text{RH}$ maximum.



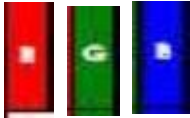
6.2 DEFINITION OF AREA

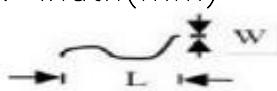
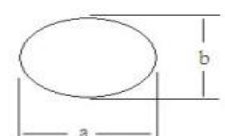


A Area : Viewing area.

B Area : Out of viewing.(outside viewing area)

6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electric al Testing	1-1 sub pixel classification - Sub Pixel: Number of sub pixel doesn't exceed one dot.  Sub Pixel (Dot) a> Dark dot -----one Allowed b> Bright dot ----- one Allowed - Pixel : Three dots link together doesn't exceed ones  Pixel 1-2Leakage to light - Leakage to light be not allowed. 1-3Picture to shake - Picture had shake, twinkle and noise etc. instable of defect that be not allowed. 1-4 Function - No display or No function. - Source Line, Gate Line. - Contrast Ratio - Current consumption exceeds product specifications. - Display malfunction.	$N \leq 1$ $N \leq 0$ $N=0$ $N=0$ $N=0$
2	Mechanical Dimension	2-1 Mechanical Dimension exceeds product specifications. 2-2 Out of frame and boss of plastic changed shape that be not allowed.	$N=0$

NO	Item	Acceptable specification	Judgment Criterion																		
3	Cosmetic Inspection	3-1 Blemish: Line shapes of defect																			
		<table><tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr><tr><td>---</td><td>$W \leq 0.03$</td><td>Ignore</td><td rowspan="3">5 mm</td></tr><tr><td>$L \leq 2.5$</td><td>$0.03 < W \leq 0.05$</td><td>3</td></tr><tr><td>$L \leq 2.5$</td><td>$0.05 < W \leq 0.1$</td><td>2</td></tr><tr><td>--</td><td>$W > 0.1$</td><td>Not allowed</td><td>---</td></tr></table>	Length	Width	Acceptable number	Mini. space	---	$W \leq 0.03$	Ignore	5 mm	$L \leq 2.5$	$0.03 < W \leq 0.05$	3	$L \leq 2.5$	$0.05 < W \leq 0.1$	2	--	$W > 0.1$	Not allowed	---	
		Length	Width	Acceptable number	Mini. space																
		---	$W \leq 0.03$	Ignore	5 mm																
		$L \leq 2.5$	$0.03 < W \leq 0.05$	3																	
		$L \leq 2.5$	$0.05 < W \leq 0.1$	2																	
		--	$W > 0.1$	Not allowed	---																
		L: length(mm) W: width(mm)																			
																					
		3-2 Blemish: dot shapes of defect.																			
<table><tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr><tr><td>$\Phi \leq 0.10$</td><td>Ignore</td><td>---</td></tr><tr><td>$0.10 < \Phi \leq 0.25$</td><td>2</td><td rowspan="2">10 mm</td></tr><tr><td>$0.25 < \Phi \leq 0.3$</td><td>1</td></tr><tr><td>$\Phi > 0.3$</td><td>0</td><td>---</td></tr></table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.10$	Ignore	---	$0.10 < \Phi \leq 0.25$	2	10 mm	$0.25 < \Phi \leq 0.3$	1	$\Phi > 0.3$	0	---							
Dimension	Acceptable number	Mini. Space																			
$\Phi \leq 0.10$	Ignore	---																			
$0.10 < \Phi \leq 0.25$	2	10 mm																			
$0.25 < \Phi \leq 0.3$	1																				
$\Phi > 0.3$	0	---																			
3-3 Polarizer Bubble																					
<table><tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr><tr><td>$\Phi \leq 0.20$</td><td>Ignore</td><td>---</td></tr><tr><td>$0.20 < \Phi \leq 0.30$</td><td>2</td><td>15 mm</td></tr><tr><td>$\Phi > 0.30$</td><td>0</td><td>---</td></tr></table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.20$	Ignore	---	$0.20 < \Phi \leq 0.30$	2	15 mm	$\Phi > 0.30$	0	---									
Dimension	Acceptable number	Mini. Space																			
$\Phi \leq 0.20$	Ignore	---																			
$0.20 < \Phi \leq 0.30$	2	15 mm																			
$\Phi > 0.30$	0	---																			
Foreign Substances																					
	$\Phi = (a+b)/2$																				



NO	Item	Acceptable specification				Judgment Criterion
3	Cosmetic Inspection	3-4 Scratch ● Sensate scratch not allowed. ● Impassive scratch as below. Unit:mm				
		Length	Width	Acceptable number	Mini. space	
		-----	$W \leq 0.03$	Ignore	5 mm	
		$L \leq 2.5$	$0.03 < W \leq 0.05$	3		
		$L \leq 2.5$	$0.05 < W \leq 0.1$	2		
		-----	$0.1 < W$	Not allowed	----	
		$L > 2.5$	-----	Not allowed		
4	Package	4-1 Mixed product types 4-2 Shipping q'ty should be the same as “shipping notice form” q'ty. 4-3 Outer box can't broken.				N=0



7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	60℃ for 24 hours
Low Temperature Operation	-10℃ for 24 hours
High Temperature Storage	70℃ for 24 hours
Low Temperature Storage	-20℃ for 24 hours
High Temperature Operation Humidity Operation	50℃, 90%RH for 48 hours
Thermal Shock	-10°storage one hour, rise to 60° within 15s, high temperature one hour, drop to 30° within 15s, circulate 10 repeatedly
Vibration Test (No Operation)	Frequency: 10~55Hz Amplitude: 1.0mm Sweep Time: 11min Test Period: 6 Cycles for each direction of X, Y, Z
Static electricity test	Touch 6KV, air touch 8KV



8. HANDLING PRECAUTION

8.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $50\pm20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketone solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.

8.4 WARRANTY

The period is within twelve months since the date of shipping out under normal using and storage conditions.