AMERICAN BRIGHT OPTOELECTRONICS CORP.
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13815-C Magnolia Ave. Chino, CA 91710
www.americanbrightled.com

AB-J397-TFV

Approval sheet

Customer: _____

Model name: AB-J397-TFV

Spec NO: _____

Date: _____

Version V1.0

For Customer's Acceptance

Approved by	Content

Approved by	Reviewed by	Prepared by

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CONTENT

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1. Revision history

REV.	DESCRIPTION OF CHANGES	DATE	PREPARED
V1.0	First Draft	2024.03.01	

2. General Specification

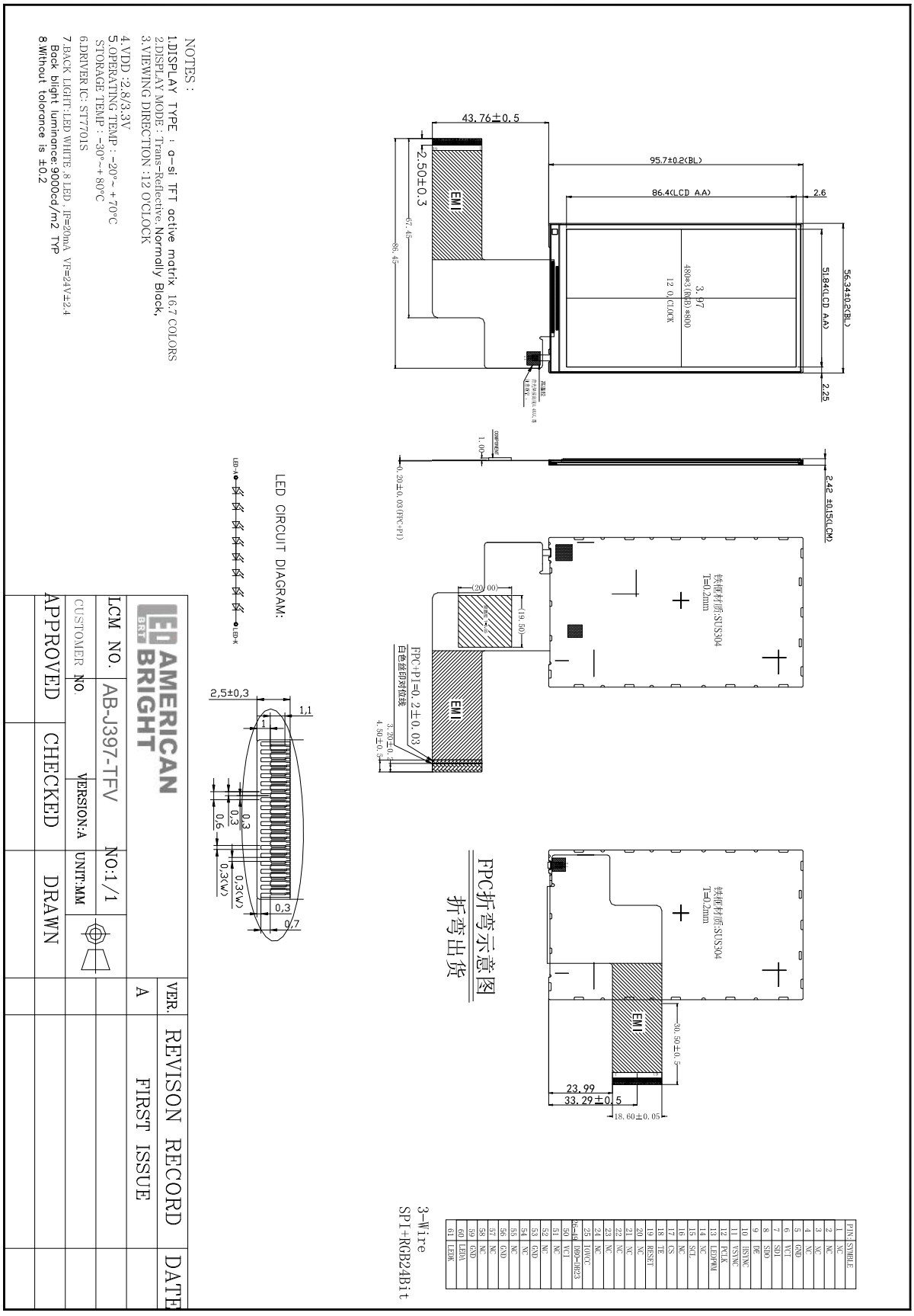
This model is 3.97″color TFT-LCD(Thin Film Liquid Crystal Display) with Polarizer and integral Light Emitting Diode(LED) backlight system. The matrix compose a-Si Thin Film Transistor as a active element. It is a transflective type display operating in the normally Black mode.

No.	Item	Specification	Remark
1	LCD size	3.97 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Display mode	Normally Black, Transflective	
4	View direction	12.00 O 'CLOCK	
5	Resolution	480 × 3(RGB) × 800	
6	Module size	56.34(W) ×95.7(H) ×2.42(D) mm	Note 1
7	Active area	51.84(W) × 86.40(H) mm	
8	Dot pitch	0.108(W) × 0.108(H) mm	
9	LCM Driver IC	ST7701S	
10	Interface Type	3W+RGB24 Bit interface	
11	With/Without RTP/CTP	--	
12	CTP Driver IC	--	
13	Panel power consumption	TBD	
14	Weight	TBD	

Note 1: Refer to Mechanical Drawing of Page 5.

AB-J397-TFV

3. MECHANICAL DRAWING



4. Pin Descriptions

Pin No.	Signal	Description
1-4	NC	NC.
5	GND	Ground.
6	VCI	Power supply.
7	SDI	Serial data input.
8	SDO	Serial data output.
9	DE	Date enable signal.
10	HSYNC	Line synchronizing signal for RGB interface operation.
11	VSYNC	Frame synchronizing signal for RGB interface operation.
12	PCLK	Dot clock signal.
13	LEDPWM	LCD backlight control PWM Signal.
14	NC	NC.
15	SCL	A write strobe signal and enables an operation to write data when thesignal is low/ Serial interface Clock input for RGB Interface.
16	NC	NC.
17	CS	A chip select signal.
18	TE	Tearing effect output pin.
19	RESET	Reset signal.
20-24	NC	NC.
25	IOVCC	Power supply for interface(compatible 1.69V and 3.6V).
26-49	DB0-DB23	DATA BUS.
50	VCI	Power supply.
51	NC	NC.

52	**NC**	NC.
53	**GND**	Ground.
54	**NC**	NC.
55	**NC**	NC.
56	**GND**	Ground.
57	**NC**	NC.
58	**NC**	NC.
59	**GND**	Ground.
60	**LEDA**	Anode for all LED.
61	**LEDK**	Cathode for LEDK.

5. ELECTRICAL SPECIFICATIONS

5.1. LCM DC Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage for logic	IOVCC	--	1.8	3.3	V
Power supply voltage	VCI	--	2.8	3.3	V
Input voltage ′H′ level	VIH	0.7IOVCC	-	IOVCC	V
Input voltage ′L′ level	VIL	VSSD	-	0.3IOVCC	V

5.2 Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V_L	21.6	24	26.4	V	Note 1
Current for LED backlight	I_L	--	20	25	mA	
LED life time	-	20,000		-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L =20mA.

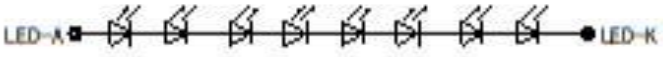
Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =20mA. The LED lifetime could be decreased if operating I_L is larger than 20 mA.

Note 3:Typ.specification:Gray-level test pattern;
Max.specification:Black-level test pattern.

(a) Gray-level test pattern

(b) Black-level test pattern

LED CIRCUIT DIAGRAM:

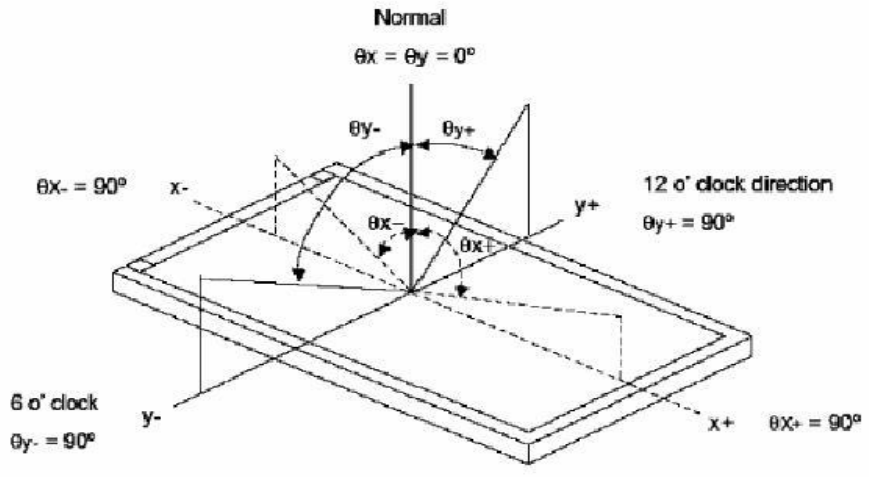


Note 2 : Ta = 25 ℃
Note 3 : Brightness to be decreased to 50% of the initial value
Note 4 : The single LED lamp case

6. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN.	TYP.	MAX		
Brightness		B	Viewing normal angle	--	TBD	-	Cd/m^2	--
Contrast Ratio		CR			800	--	--	
Response Time		Tr+Tf		--	25	30	ms	
Chromaticity Coordinate (Transmissive)	Red	X		0.606	0.626	0.646		
		Y		0.305	0.325	0.345		
	Green	X		0.304	0.342	0.382		
		Y		0.516	0.561	0.601		
	Blue	X		0.105	0.145	0.185		
		Y		0.047	0.087	0.127		
	White	X		0.250	0.300	0.350		
		Y		0.270	0.320	0.370		
Viewing Angle	Hor.	θ_{X+}	Center CR>=10	60	80	--	Deg.	
		θ_{X-}		60	80	--		
	Ver.	θ_{Y+}		60	80	--		
		θ_{Y-}		60	70			
Uniformity	Un			80	--		%	

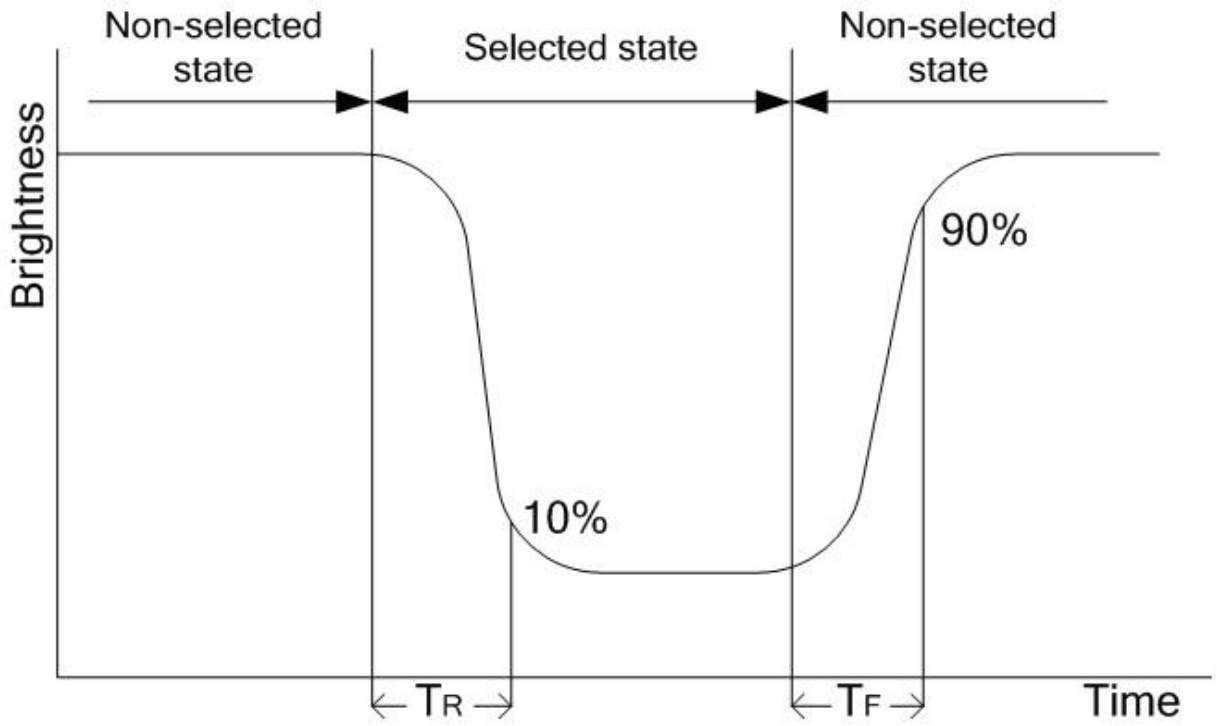
Note 1 : Definition of Viewing Angleθ_x andθ_y :

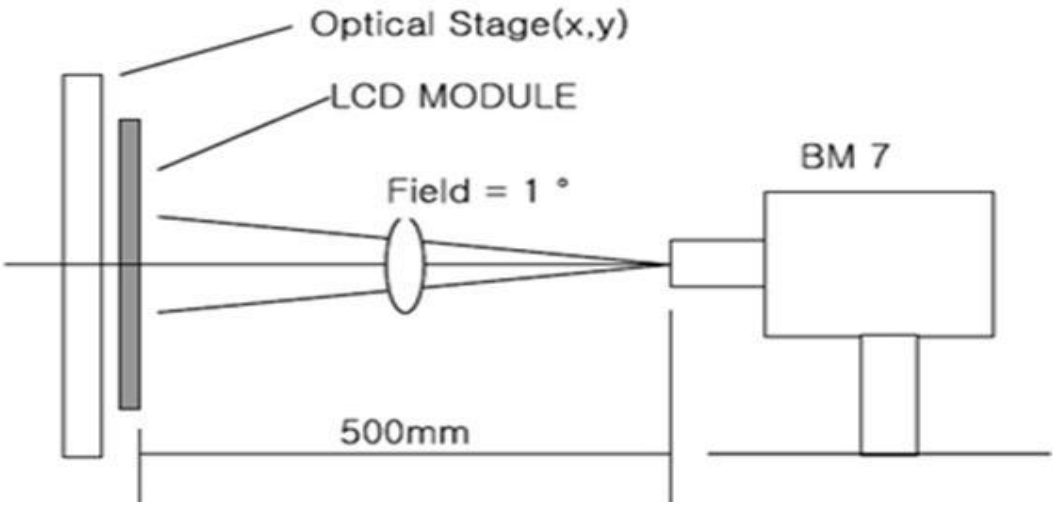


2: Definition of contrast ratio CR:

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

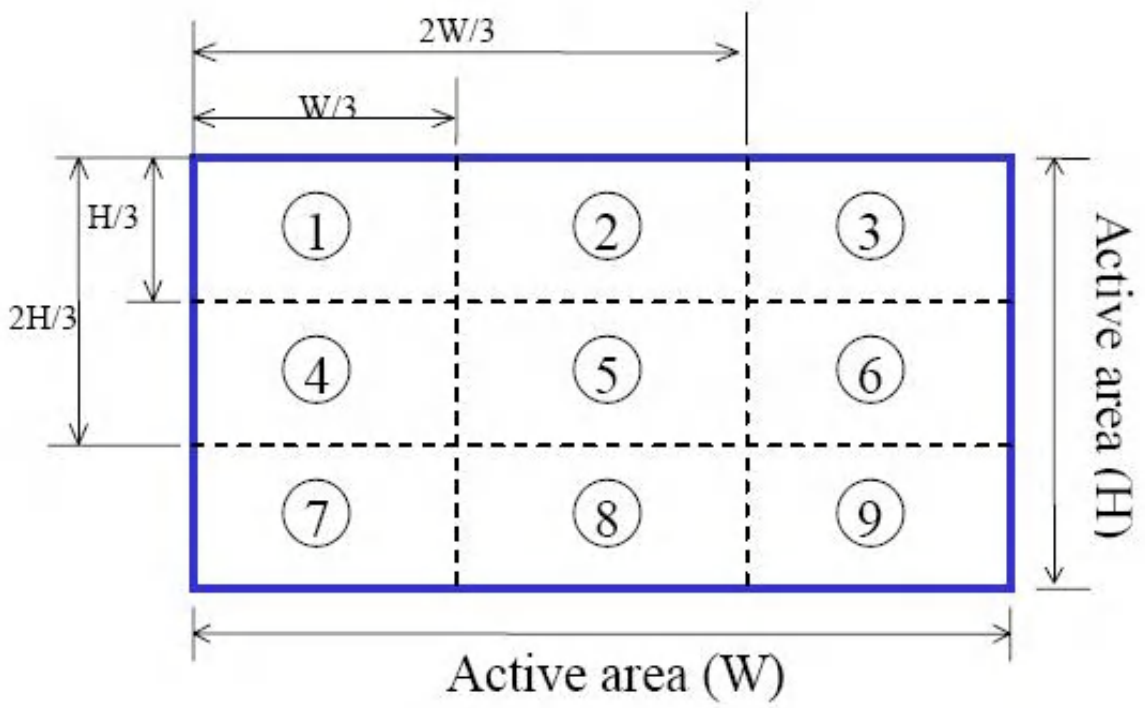
Note 3: Definition of response time (T_R, T_F)





<Transmissive Mode>

Optical Characteristic Measurement Equipment and method

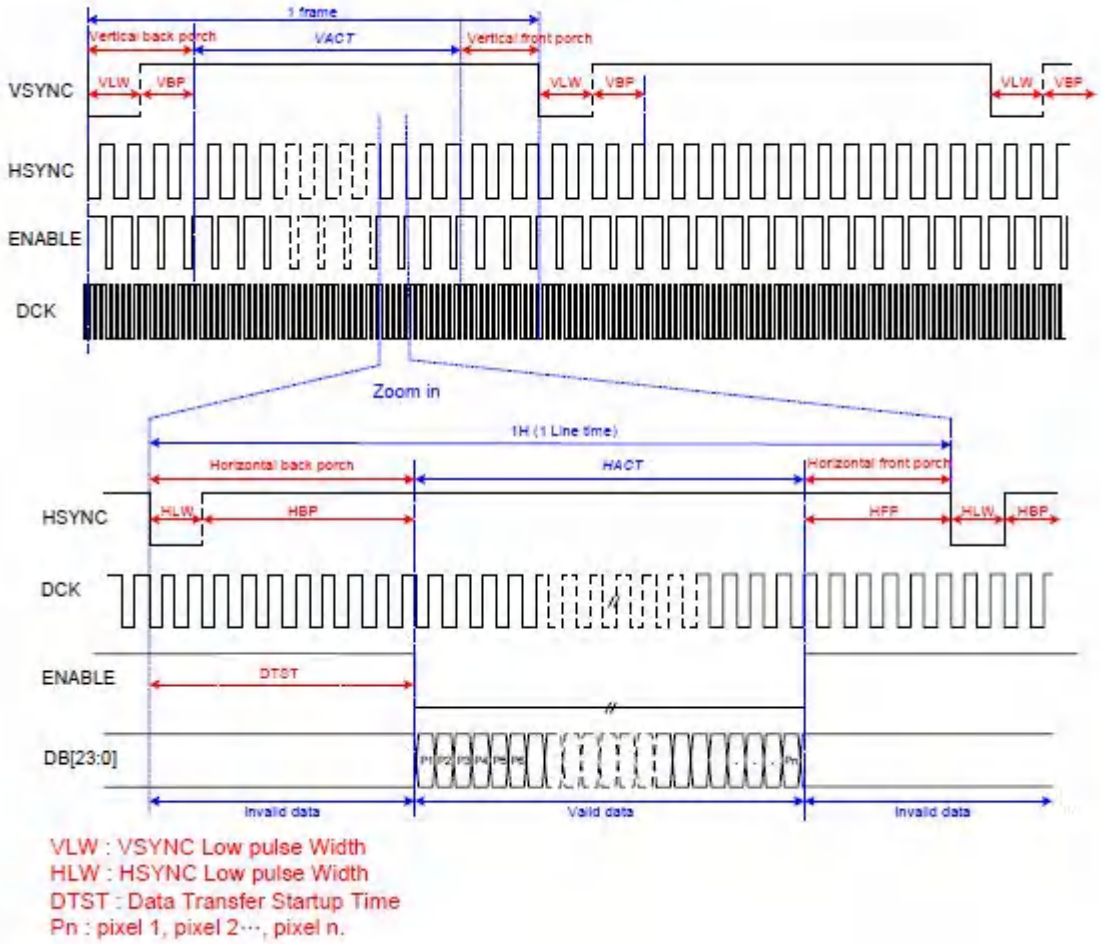


Main Measuring point

7. Timing Characteristics

7.1 DPI interface timing

The timing chart of 24-/18-/16-bit DPI (RGB) interface mode is illustrated in Figure 12.



VLW : VSYNC Low pulse Width
HLW : HSYNC Low pulse Width
DTST : Data Transfer Startup Time
Pn : pixel 1, pixel 2···, pixel n.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Frame Rate	FR		54		66	fps
Horizontal Low Pulse Width	HLW		1		-	DOTCLK
Horizontal Back Porch	HBP		2		125	DOTCLK
Horizontal Address	HACT			480		DOTCLK
Horizontal Front Porch	HFP		2		-	DOTCLK
Vertical Low Pulse width	VLW		1		125	Line
Vertical Back Porch	VBP		1		126	Line
Vertical Address	VACT			854		Line
Vertical Front Porch	VFP		1		255	Line
Data Clock	DCLK		16.6		36.7	MHz

Figure 12 DPI Interface Timing diagram Note1,Note2

Note1. HLW+HBP+HFP >= 4.5us.
Note2. VSPL='0', HSPL='0', DPL='0' and EPL='0' of "(Interface Mode Control 21h of the Page 1)" command.

7.2 SPI Write mode

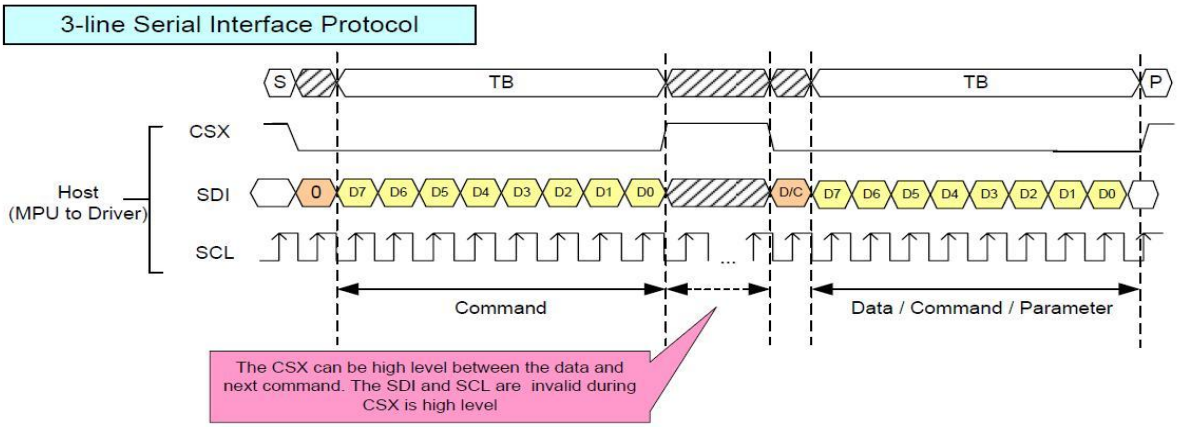


Figure 3 SPI protocol (SCL rising edge example)

7.3 RGB Interface Characteristics

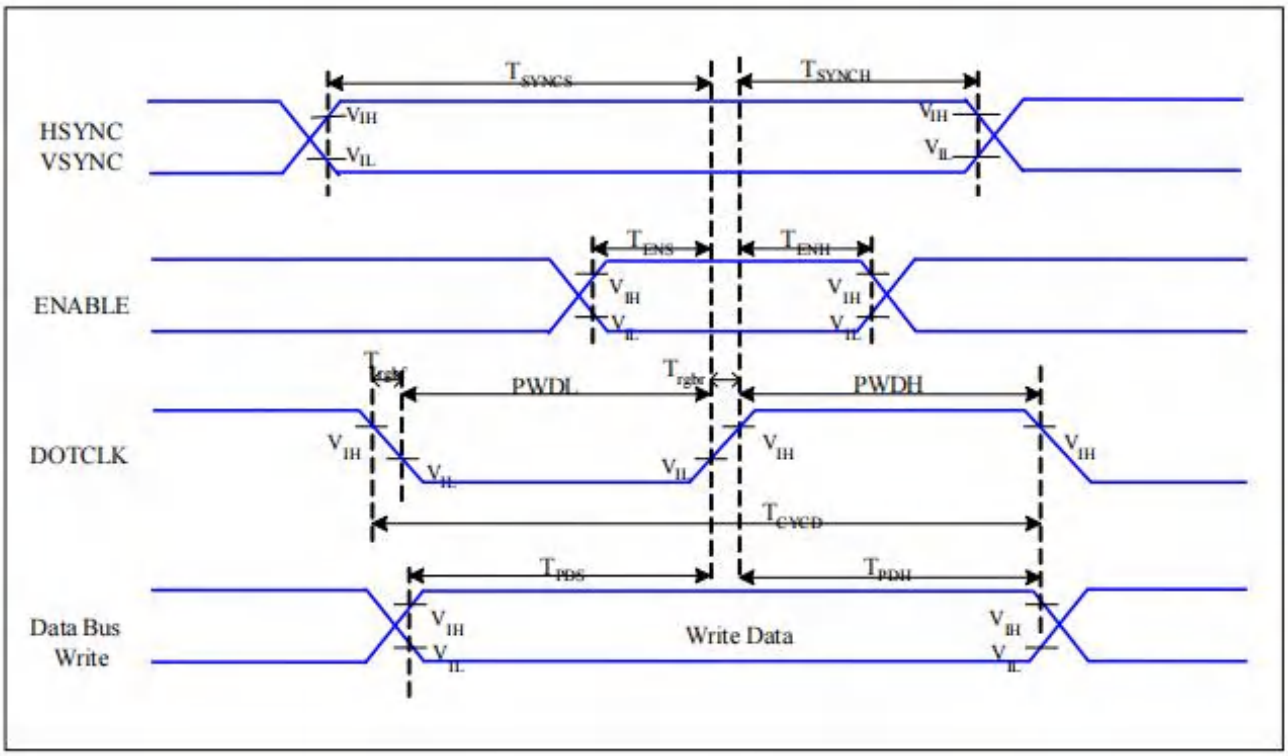


Figure 3 RGB Interface Timing Characteristics

VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25 ℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYNC, HSYNC Setup Time	5	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	5	-	ns	
	T_{ENH}	Enable Hold Time	5	-	ns	
DOTCLK	PWDH	DOTCLK High-level Pulse Width	15	-	ns	
	PWDL	DOTCLK Low-level Pulse Width	15	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	33	-	ns	
	Trghr, Trghf	DOTCLK Rise/Fall time	-	15	ns	
DB	T_{PDS}	PD Data Setup Time	5	-	ns	
	T_{PDH}	PD Data Hold Time	5	-	ns	

Table 6 18/16 Bits RGB Interface Timing Characteristics

8. Reliability Test Items

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±3℃，120 hours	Inspection after 2~4hours storage at room temperature,the sample shall be free from defects: 1.Air bubble in the LCD; 2.Seal leak; 3.Non-display; 4.Glass crack; 5.the surface shall be free from damage. 6.The electrical characteristics requirements shall be satisfied.
2	Low Temperature Storage	-30±3℃，120 hours	
3	High Temperature Operating	70±3℃，120 hours	
4	Low Temperature Operating	-20±3℃，120hours	
5	Temperature Cycle Storage	-30℃(30min)~25℃(5min)~80℃(30min)，50 cycles	
6	Damp proof Test Operating	55℃±3℃，90%RH，120 hours	
7	ESD Test	ESD air requirement：±8KV； ESD contact requirement：±4KV （R: 330Ω C: 150pF，10time）	
8	Vibration test	Test requirements: Simulate the transportation process Test frequency: 10Hz ~ 55Hz ~ 10Hz Test direction: three orthogonal axes; Amplitude: 1.5mm; Test time: 1 hours in each axis direction	package
9	Drop test	Test requirements: Free fall to concrete ground at an initial speed of 0;Drop height: 50cm Number of drops: 10 corners, three sides and six sides, a total of 10 times;	package

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 5~10pcs.

3.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

4.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

9.Inspection standards

9.1 Purpose:

Standardize the inspection items and judgment criteria for LCM color screen products to ensure that the products can meet customer requirements.

9.2 Scope of Application:

This applies to the internal shipment inspection of LCM color screen products.

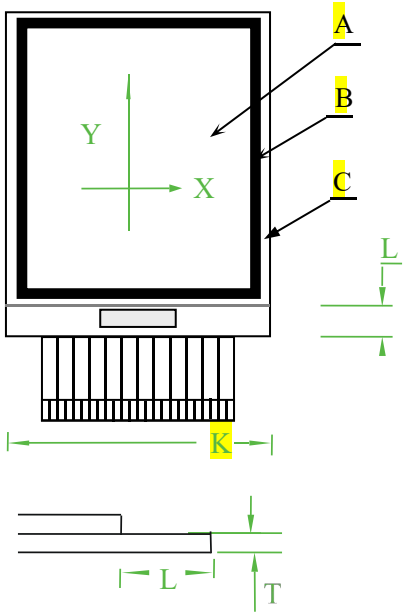
9.3 Responsibilities and Authorities:

summary

9.4Definition: (see Figure 1)

Product area and size definition

Area A indicates the display area (character display area)
Zone B indicates the visible area (excluding Zone A)
C Area backlight
T denotes the thickness of the single-sided glass.
L denotes the glass pin length
K represents the product width
X indicates the short side direction of the glass
Y represents the glass's long edge direction
Z represents the gap thickness
Refer to the product drawings for size specifications.



9.5Tools, equipment, and materials:

Test stand, prototype, sample, limit sample, dot-line film card, visual inspection mirror, multimeter, caliper

9.6 Content:

9.6.1 Visual inspection:

9.6.1.1 Place the product at a distance of approximately 30cm from the 20W fluorescent lamp, with the eye positioned 30cm away from the test object.

9.6.1.2 The inspection perspective is defined as within ±45° of the LCD plane's normal direction; defects are not considered visible from other angles (see Figure 2).

9.6.1.3 The appearance inspection time of each product is 5-10 seconds;

9.6.1.4 For semi-transparent and fully transparent products, the corresponding backlight source or reflector provided by the customer must be used during inspection.

9.6.2 Electrical Inspection

9.6.2.1 Set the electrical test parameters according to the requirements of the "Product Manufacturing Specification Table" corresponding to the tested product for electrical testing;

9.6.2.2 Inspect according to the viewing direction specified in the Product Drawings;

9.6.3 Sampling plan and acceptance level:

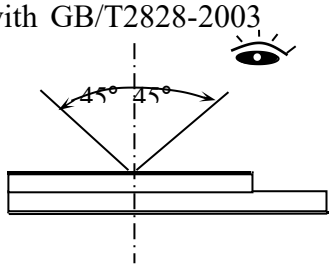
Conduct normal inspection with single sampling, in accordance with GB/T2828-2003 General Inspection Level II

Major defect (MA): AQL 0.25

Minor defect (MI): AQL 0.40

Total defects (MA+MI): AQL 0.40

Special sampling scheme to be determined



9.6.4 Units of measurement

Unless otherwise specified, the following standards are measured in mm. Figure

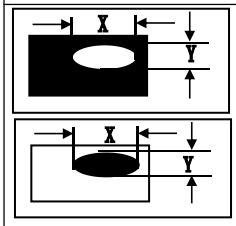
9.6.5 Defect Definition:

Defect category	**Definition**
Severe defects (MA)	The display or functionality is defective, seriously deviates from specifications, and the customer cannot use it normally.
	Severe visual defects and significant deviations from specifications prevent normal use
Minor Injury (MI)	The deviation from specifications is slight, which does not affect the product function, but affects the product appearance.

9.6.6 Inspection criteria:

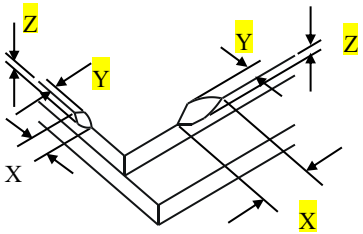
9.6.6.1 Functional inspection criteria:

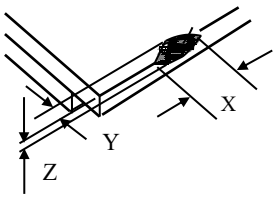
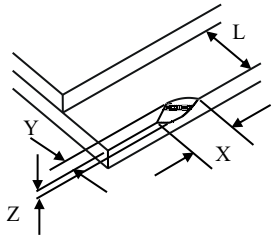
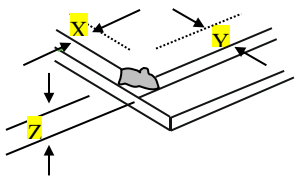
	inspection item	requirement	defect level	decision method
1	display status	No display, garbled text, extra or missing lines, reduced screen, wrong viewing angle, or flickering are not allowed.	Missing	visual
		For phenomena that cannot be described in words, limit templates should be established for reference when necessary. For example: uneven display, varying display intensity, diagonal patterns, etc.		
		The display color effect is determined by development, engineering samples, or limit samples.		
2	voltage current	The current Idd and voltage Vop ranges are specified in the Product Manufacturing Specifications Table. For special cases, the criteria shall be determined by mutual agreement between the client and our party.	Missing	

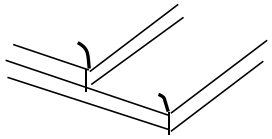
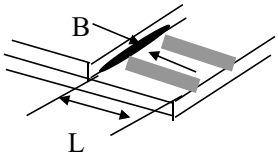
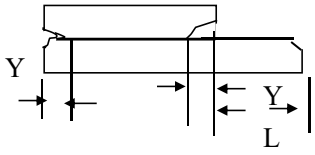
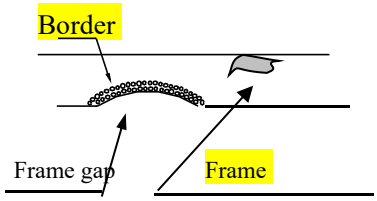
<table>
<tr><td rowspan="4">3</td><td rowspan="4">Be in a poor light</td><td>LED lights are not allowed to be on;</td><td rowspan="2">Missing</td><td rowspan="2">Constant pressure and current limit</td></tr>
<tr><td>Backlight current: exceeds the specification range, not allowed;</td></tr>
<tr><td>No backlight light is allowed. Refer to the required reference limit sample.</td><td>Light deficiency</td><td rowspan="3">visual</td></tr>
<tr><td>Backlight color: determined according to the sample and specification;</td><td>Light deficiency</td></tr>
<tr><td>Brightness and uniformity of light emission are determined by reference to development, engineering, or limit samples.</td><td>Light deficiency</td></tr>
<tr><td>4</td><td>Black dot, white dot, pinhole (When powered)</td><td>
<table>
<tr><th>graphic</th><th>diameter （Φ）</th><th>Total receipts</th></tr>
<tr><td rowspan="5">  </td><td>Φ≤0.1</td><td>disregard</td></tr>
<tr><td>0.1<Φ≤0.15</td><td>2</td></tr>
<tr><td>0.15<Φ≤0.2</td><td>1</td></tr>
<tr><td>Φ>0.3</td><td>0</td></tr>
<tr><td colspan="2">Note: Φ = (X + Y) / 2</td></tr>
</table>
Note: 1. Includes: black spots, white spots, pinhole, foreign body
2、The product is not allowed to exceed 3
3、
4、The number of dots must be at least 5mm apart;
</td><td>Light deficiency</td><td>Visual</td></tr>
<tr><td>5</td><td>Show black lines, white lines</td><td>
<table>
<tr><th colspan="2">size</th><th rowspan="2">Acceptable quantity</th></tr>
<tr><th>L</th><th>W</th></tr>
<tr><td>disregard</td><td>W<0.02</td><td>disregard</td></tr>
<tr><td>L≤2</td><td>0.02≤W≤0.03</td><td>1</td></tr>
<tr><td>-</td><td>W > 0.03</td><td>Judge by point</td></tr>
</table>
Note: 1. Includes: black lines, white lines, and linear foreign objects (L: line length; W: line width)
2. No more than two linear defects are allowed for a single
</td><td>Light deficiency</td><td>Visual
Viewfinder
Filming</td></tr>
</table>

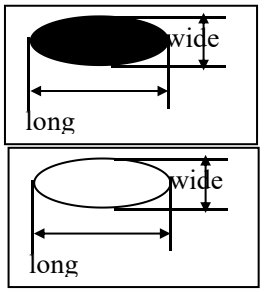
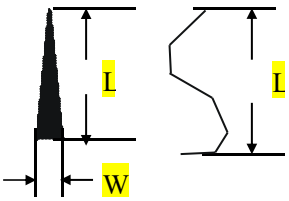
		product, and the distance between defects must be more than 5mm;		
6	touch screen	No conversion is allowed when tapping the touch screen test point	Missing	cotton bud

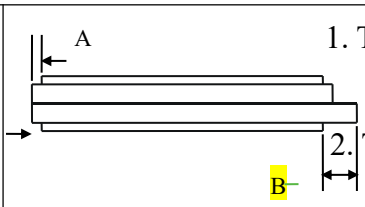
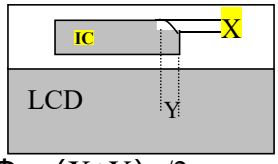
9.6.6.2 Appearance inspection criteria:

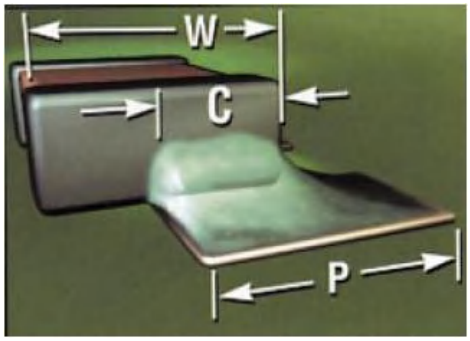
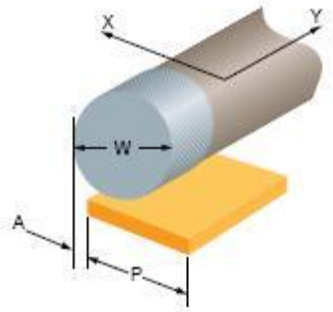
	Inspection item	Requirement	defect level	decision method
1	burst apart	A. Edge Blurring graphic / X / Y / ≤Z T disregard / 1.0 /  Do not touch the border glue Do not affect the patch (bubbles, warping) No crack should expose more than 1/3 of the frame seal	Light deficiency	Visual Viewfinder Filming

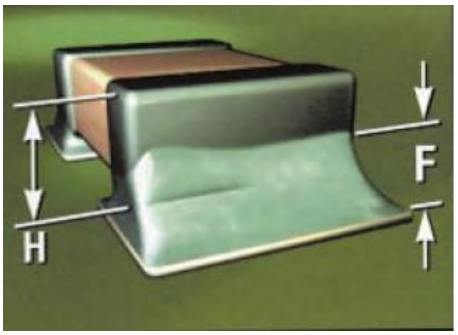
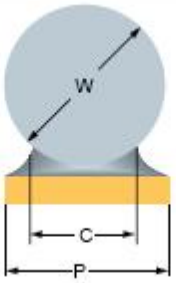
<table>
<tr>
<td></td>
<td></td>
<td>
B. Backside of the pin, pin surface, and ITO lead section
<table>
<tr><th>graphic</th><th>position</th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td> 
</td><td>pin the back</td><td>disregard</td><td>≤L/2</td><td>≤T</td></tr>
<tr><td rowspan="3"> 
</td><td rowspan="3">Pin surface (non-ITO lead)</td><td>disregard</td><td>Conductive tape: ≤L/4 and ≤0.5</td><td>≤T</td></tr>
<tr><td>disregard</td><td>COG glass: ≤1</td><td>≤T</td></tr>
<tr><td>ITO lead wire</td><td>disregard</td><td>≤0.3</td><td>≤T</td></tr>
</table>
Note: When the pin surface is not the ITO lead portion, the distance between the crack location and the nearest ITO lead must exceed the ITO pin width.
</td>
<td>Light deficiency</td>
<td>Visual
Viewfinder
Filming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>
C. Corners
<table>
<tr><th>graphic</th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td rowspan="2"> 
</td><td>≤3</td><td>≤3</td><td>≤T</td></tr>
<tr><td colspan="3">1. Do not touch the frame glue;
2. The silver dot at the lead foot shall not be exposed;
3. Do not affect the patch (bubble, sheet lifting).</td></tr>
</table>
</td>
<td>Light deficiency</td>
<td>Visual
Viewfinder
Filming</td>
</tr>
</table>

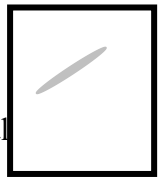
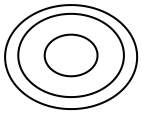
<table>
<tr><td></td><td></td><td>
<table>
<tr><td colspan="2">D、 fissure</td></tr>
<tr><td>graphic</td><td>standard</td></tr>
<tr><td>  </td><td>No area cracks are allowed</td></tr>
</table>
</td><td>Missing</td><td>visual</td></tr>
<tr><td>2</td><td>Poor split</td><td>
<table>
<tr><td>graphic</td><td></td></tr>
<tr><td> 
</td><td>1. The edge length is not counted
2、B≦0.30
3. The protruding edge causes the shape to exceed the specified dimensions.
Note: B stands for width.</td></tr>
<tr><td> 
</td><td>X and Y damage causing more than one-third of the frame adhesive to be exposed is not permitted.</td></tr>
</table>
</td><td>Light deficiency</td><td>Visual Viewfinder Filming</td></tr>
<tr><td>3</td><td>Bubbles in the box</td><td colspan="2">rejection</td><td>Missing</td><td>visual</td></tr>
<tr><td>4</td><td>weeping</td><td colspan="2">rejection</td><td>Missing</td><td>visual</td></tr>
<tr><td>5</td><td>Poor frame seal</td><td>
<table>
<tr><td>graphic</td><td>criterion for judgement</td></tr>
<tr><td> 
</td><td>1. The frame adhesive must not have any gaps, impurities, or bubbles exceeding half of its width.
2. The frame adhesive must not be offset into display area A.</td></tr>
</table>
</td><td>Light deficiency</td><td>Visual Viewfinder Filming</td></tr>
<tr><td>6</td><td>outline dimension</td><td colspan="2">The specified tolerance exceeds the required size</td><td>Missing</td><td>vernier calipers</td></tr>
</table>

<table>
<tr>
<td>7</td>
<td>LCD/polarizer/backlight/touchscreen dot defects (non-powered state)</td>
<td>
<table>
<tr><th>graphic</th><th>Φ price</th><th>Allowed number</th></tr>
<tr><td rowspan="5"> 
</td><td>Φ≤0.1</td><td>disregard</td></tr>
<tr><td>0.1 ﹤ Φ≤0.15</td><td>2</td></tr>
<tr><td>0.15<Φ≤0.2</td><td>1</td></tr>
<tr><td>Φ>0.2</td><td>0</td></tr>
<tr><td colspan="2">Φ= （X+Y） /2</td></tr>
</table>
1. Includes: black spots, color spots, foreign matter, polarizer (A/B zones), bubbles, scratches, abrasions, and impacts
2. The product must not have more than 3 spot defects, and the spacing between 2 defects must be at least 5mm
</td>
<td>Light deficiency</td>
<td>Visual Viewfinder Filming</td>
</tr>
<tr>
<td>8</td>
<td>LCD/polarizer/backlight/touchscreen line defects (non-powered state)</td>
<td>
<table>
<tr><th>graphic</th><th>W</th><th>L</th><th>Acceptable quantity</th></tr>
<tr><td rowspan="3"> 
</td><td>w ﹤ 0.02</td><td>disregard</td><td>disregard</td></tr>
<tr><td>0.02≦w≦0.03</td><td>L≦4.0</td><td>1</td></tr>
<tr><td>w>0.03</td><td colspan="2">Determine by point specifications</td></tr>
</table>
1. Includes: scratches, abrasions, black lines, fine hairs, fibers, etc.
2. For backlight color filter scratches, the condition is deemed acceptable if they remain invisible when the backlight is powered on.
</td>
<td>Light deficiency</td>
<td>Visual Viewfinder Filming</td>
</tr>
<tr>
<td>9</td>
<td>Assembly contaminants and fibers between touch screen and LCD</td>
<td>1. Dirt points: Φ ≤ 0.1 are not counted; 0.2< Φ allows 2 (distance more than 10MM).
2. Fiber: Not allowed.</td>
<td>Light deficiency</td>
<td>Visual Filming</td>
</tr>
</table>

10	Polarizer attachment requirements	 1. The polarizer must cover the frame adhesive 2. The tolerance for the adhesive is ± 0.5mm (Note: All the above conditions are met) 3. Lift the polarizer and check for bubbles	Light deficiency	Visual
11	resist film	1. The protective film is lifted and cannot enter the visible area; 2. The lifting of the polarizer will cause obvious dirt that cannot be wiped off, which is not allowed; 3. The dirt on the protective film must be immovable. If the dirt is movable, it will be rejected; 4. Protective film bubbles with a diameter ≤ 5mm are acceptable, while those exceeding 5mm are rejected.	Light deficiency	Visual
12	IC rounded corner	graphic:  Φ= (X+Y) /2 standard: If electrical performance is acceptable, the IC may have only one corner damaged with a chamfer ≤0.5mm; no cracks are permitted.	Light deficiency	Microscope
13	FPC	1、The external dimensions must meet the engineering drawing requirements. Otherwise, it is not allowed. 2、The gold finger must not be oxidized, dirty, or have creases (refer to the limit sample when necessary) 3、Do not break, scrape, or damage positioning holes 4、Topical injuries and scratches that do not affect the substrate are judged according to the point and line standards 5、The FPC module folds onto the backlight side, causing the backlight/FPC to tear, preventing components from properly fitting into the backlight groove, or resulting in an unacceptable tilt after folding.	Light deficiency	Visual

14	soldered dot	1. The soldering area of the pin and soldering place should not be less than 75% 2. The weld point shall not be smooth, and the surface shall not have white or black residue. 3. The overlap length between the touch screen/backlight FPC gold fingers and module FPC pads during soldering must not exceed 1.0mm.	Light deficiency	visual
15	Surface Mount Components	1. Missing parts, extra parts, missed soldering, damaged or deformed components, or broken parts are not allowed 2. The diode must be assembled in the correct direction	Missing	visual
		The gap between the surface mount component and the board surface must be greater than 0.2mm.	Light deficiency	visual viewfinder
16	Component Offset	 Square component end solder width C; component solderable width W; pad width P If W is greater than P, C≥0.75P is OK. If W is less than P, C≥0.75W is OK.  Cylindrical component side offset A; component diameter W; pad width P If W is greater than P, A≤0.25P is OK.	Missing	Visual Viewfinder Filming

		If W is less than P, A≤0.25W is OK.		
17	Weld height/width	 Minimum solder joint height F; component height H F ≥ 0.25H is OK Minimum solder joint height F; component height H F≥0.25H is OK  End solder width C; component diameter W; pad width P C≥0.5P OK	Missing	Visual Viewfinder
18	assemble	1. The module assembly method does not match the assembly file requirements or sample. 2. Loose connections between assembled components (e.g., normal handling may cause the glass to detach from the backlight) are not allowed 3. LCM assembly tilt or misalignment exceeding specifications is not permitted	Light deficiency	Visual Viewfinder
19	adhesive and dispense	1. The silicone must completely cover the ITO lead. 2. The adhesive application height must not exceed the polarizer surface 3. The sealant must be applied evenly and smoothly, with no continuous bubbles or layers.	Light deficiency	Visual
20	gummed paper	1、The tape must not be lifted, tilted, wrinkled, or torn 2. Colors, sizes, attachment positions, and specifications must	Light deficiency	Visual

		comply with drawing requirements.		
21	tin sweat dross	1. Rosin on the surface of the solder pad is allowed, but solder residue is not allowed. 2. The thickness of tin slag must be ≤0.2mm	Light deficiency	Visual
22	Lipstick	1. Insufficient adhesion to lift the protective film 2. The attachment position does not meet the specification requirements. 3. The angle deviation between the tear-off adhesive and the glass edge from the vertical direction must not exceed 5 degrees.	Light deficiency	Visual
23	Watermark	1. The inkjet content does not meet the file requirements. 2. The inkjet font is not clear and cannot be recognized.	Light deficiency	Visual
24	Perspective Bias	Judge by limit sample	Light deficiency	Visual
25	Touchscreen surface crease	 Surface crease/press mark not al	Missing	Visual
26	Newton's Rings/Interference	 Accept up to 1 item with a maximum of 5mm	Light deficiency	Facing the light, looking

<table>
<tr><td></td><td>Lines</td><td>  </td><td>≤ 1/4 of the touch screen area is acceptable for 1 item</td><td></td><td></td></tr>
<tr><td colspan="3">Regardless of the size of the Newtonian rings or interference lines, text distortion or straight-line deformation is not allowed when backlight is turned on.</td><td></td><td></td></tr>
<tr><td>27</td><td>Touch Drum</td><td colspan="3">Membrane bulge below 0.3mm is acceptable
  </td><td>Light deficiency</td><td>eyepiece male gauge</td></tr>
<tr><td>28</td><td>Film surface: Fish-eye, bubbles</td><td colspan="3"><table>
<tr><th>diameter</th><th>specifications</th><th>remarks</th></tr>
<tr><td>Φ≤0.1</td><td>disregard</td><td rowspan="3">The distance between two bubbles is ≥ 10mm</td></tr>
<tr><td>0.15<Φ≤0.2</td><td>Accept up to 2 items</td></tr>
<tr><td>Φ>0.2</td><td>rejection</td></tr>
</table></td><td>Light deficiency</td><td>Visual Viewfinder Filming</td></tr>
</table>

Note: If the customer has special requirements for the above standards, the agreement between our company and the customer shall prevail.

10.Precautions for using LCD modules.

10.1 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.

10.2Storage Conditions

(4)Store the panel or module in a dark place where the temperature is 23±5℃and the humidity is below 45±20%RH.
(5)Store in anti-static electricity container.
(6)Store in clean environment, free from dust, active gas, and solvent.
(7)Do not place the module near organics solvents or corrosive gases.
(8))Do not crush, shake, or jolt the module.

10.3 Handling Precautions

(9)Avoid static electricity, which can damage the CMOS LSI.
(10)The polarizing plate of the display is very fragile, please handle it very carefully.
(11)Do not give external shock.
(12)Do not apply excessive force on the surface.
(13)Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(14)Do not use tectonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(15)Do not operate it above the absolute maximum rating.
(16)Do not remove the panel or frame from the module.

10.4 Warranty

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

11.Package Drawing

TBD