深圳市希恩凯电子有限公司
SHENZHEN CNK ELECTRONIC CO.,LTD.

Product Specification For LCD Module

Model NO.：CNKT1010-18227A1

CUSTOMERITEM NO.：

REVISION：A

☐APPROVAL FOR SPECIFICATIONS ONLY

■ **APPROVAL FOR SPECIFICATIONS AND SAMPLE**

CUSTOMER：	APPROVED BY：

CNK LCM R&D CENTER

APPROVED BY	CHECKED BY	PREPARED BY
DIRECTOR	MANAGER	Engineer

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Version	DATE	DESCRIPTION	CHANGED BY

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1. Features & Mechanical Specifications

Item	Contents	Unit
	LCD	
LCD Type	TFT / Transmissive / Normally Black	--
Viewing direction	Full view	--
Backlight	White LED x 27	--
Interface	4 Lanes MIPI Interface	--
Outline Dimension	143.0(W) × 228.6(H) × 2.6(T)	mm
Glass area (W×H×T)	139.76× 225.80× 0.8	mm
Active area (W×H)	135.36× 216.58	mm
Number of Dots	800(RGB) ×1280	--
Dot pitch (W×H)	0.0452 × 0.1355	mm
Pixel pitch (W×H)	0.1355 × 0.1355	mm
Operating Temperature	-10 ～ +50	℃
Storage temperature	-20 ～ +60	℃
Polarizer	Top: IPS film	--
	Bottom: IPS film	

2. Dimensional Outline

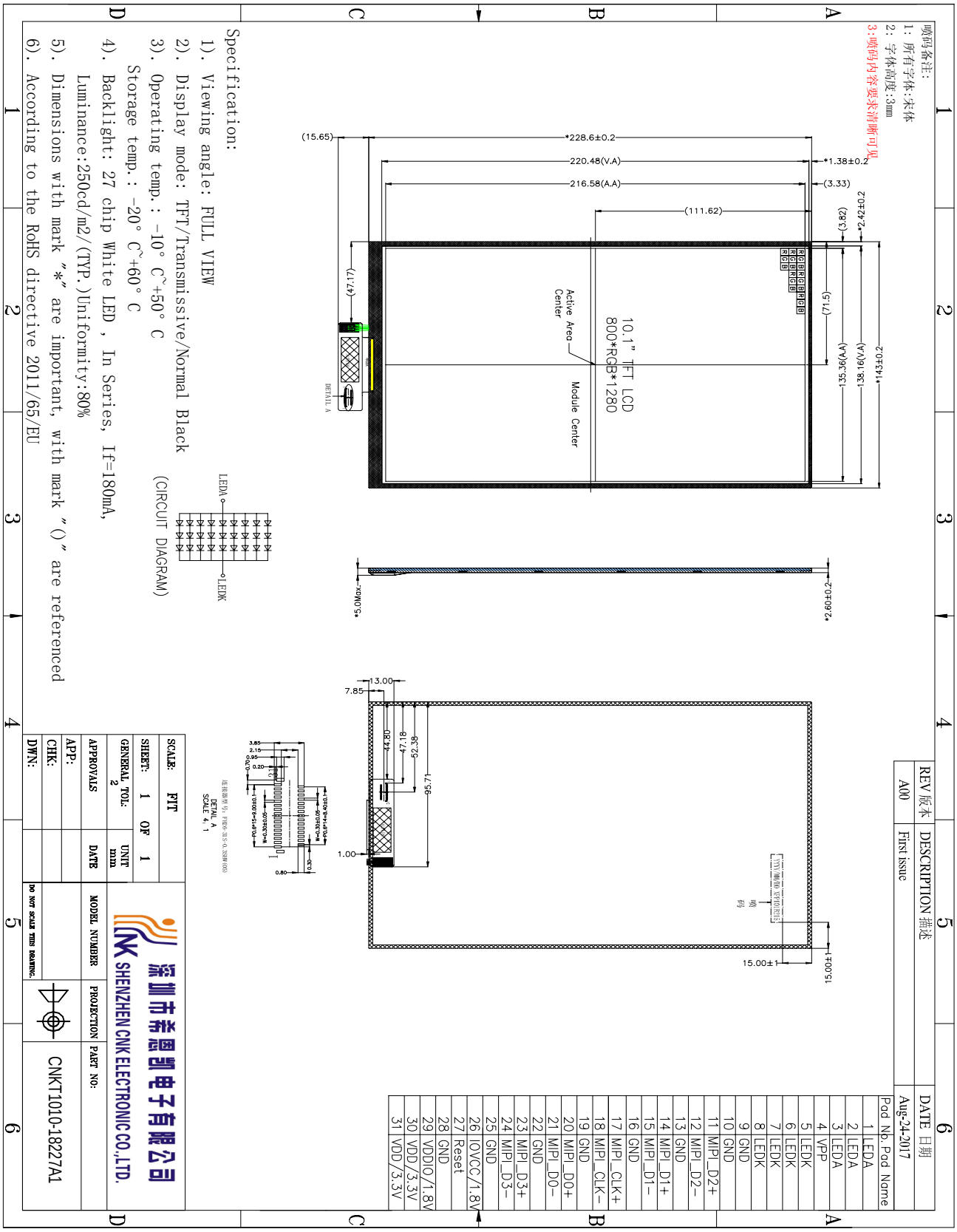


Figure 1. Dimensional outline

3. Pin Description

PIN No.	SYMBOL	Function
1, 2, 3	LEDA	Anode for light bar
4	VPP	OTP PIN
5, 6, 7, 8	LEDK	Cathode for light bar
9	GND	Ground
10	GND	Ground
11	MIPI_D2+	MIPI differential data2 input(Positive)
12	MIPI_D2-	MIPI differential data2 input(Negative)
13	GND	Ground
14	MIPI_D1+	MIPI differential data1 input(Positive)
15	MIPI_D1-	MIPI differential data1 input(Negative)
16	GND	Ground
17	MIPI_CLK+	MIPI differential clock input(Positive)
18	MIPI_CLK-	MIPI differential clock input(Negative)
19	GND	Ground
20	MIPI_D0+	MIPI differential data0 input(Positive)
21	MIPI_D0-	MIPI differential data0 input(Negative)
22	GND	Ground
23	MIPI_D3+	MIPI differential data3 input(Positive)
24	MIPI_D3-	MIPI differential data3 input(Negative)
25	GND	Ground
26	VDDIO 1.8V	1.8V input
27	RESET	Device reset signal
28	GND	Ground
29	VDDIO 1.8V	1.8V input
30	VDD 3.3V	3.3V input
31	VDD 3.3V	3.3V input

4.Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Digital Supply Voltage	IOVCC	-0.3 to +3.6	V
Operating Temperature range	TOP	-10 to +50	℃
Storage Temperature range	TST	-20 to +60	℃

5.Electrical Characteristics

DC Characteristics

Item	Symbol	Min.	Type.	Max.	Unit
Digital Power Supply Voltage	IOVCC	1.7	1.8	1.9	V
	VDD	3.0	3.3	3.6	V
					V

6.Backlight Characteristics

(White LED × 3 in series) × 9 in Parallel **(Ta = 25°C)**

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Forward Voltage	VF	IF=180mA	8.4	9	10.5	V	
Uniformity	△Bp	-	80	-	-	%	
LCM Luminance	Lv	IF=180mA	220	250	-	cd/m^2	280 Center value

7.Electro-Optical Characteristics

The relative measurement methods of optical characteristics are shown as below.

The following items should be measured under the test conditions described in 7.1

Item		Symbol	Condition	Value			Unit	Note
				Min	Typ	Max		
Uniformity		△Bp		70	75		%	Note 4
Viewing Angle	Left	θ L	Cr≥10	75	80		deg	Note 1
	Right	θ R		75	80			
	Top	ψ T		75	80			
	Bottom	ψ B		75	80			
Contrast Ratio		Cr	θ =0 F=0	700	900			Note 2
Response Time		Tr+Tf		--	25	--	ms	
		Tgray					ms	
Color Coordinate of CIE1931	Red	X	θ =0 FF=0					Note 5
		y						
	Green	X						
		y						
	Blue	X						
		y						
	White	X		0.256	0.286	0.316		
		y		0.304	0.334	0.364		

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer

4. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

8.MIPI ELECTRICAL CHARACTERISTICS

8.1DC Characteristics for DSI LP Mode

DC levels of the LP-00, LP-01, LP-10 and LP-11 are defined in the table below: DC Characteristics for the DSI LP mode when LP-RX, LP-CD or LP-TX is mentioned in the condition column. Other logical levels in the table are for MCU interface.

Parameter	Symbol	Condition	Specification			Unit
			Min.	Typ.	Max.	
Logic 1 output voltage	V_{OH}	I_{OUT}=-1mA, Note 2	TBD	-	TBD	V
Logic 0 output voltage	V_{OL}	I_{OUT}=1mA, Note 2	TBD	-	TBD	V
Logic 1 input voltage	V_{IHLPCD}	LP-CD, Note 3	TBD	-	TBD	mV
Logic 0 input voltage	V_{ILLPCD}	LP-CD, Note 3	TBD	-	TBD	mV
Logic 1 input voltage	V_{IHLPRX}	LP-RX (CLK, D0 ,D1, D2, D3), Note 3	TBD	-	TBD	mV
Logic 0 input voltage	V_{ILLPRX}	LP-RX (CLK, D0 ,D1, D2, D3), Note 3	TBD	-	TBD	mV
Logic 0 input voltage	$V_{ILLPRXULP}$	LP-RX (CLK ULP mode), Note 3	TBD	-	TBD	mV
Logic 1 output voltage	V_{OHLPTX}	LP-TX (D0), Note 3	TBD	TBD	TBD	V
Logic 0 output voltage	V_{OLLPTX}	LP-TX (D0), Note 3	TBD	-	TBD	mV
Logic 1 input current	I_{IH}	LP-CD, LP-RX, Note 3	-	-	TBD	uA
Logic 0 input current	I_{IL}	LP-CD, LP-RX, Note 3	TBD	-	-	uA

Notes:

1.Ta = -30℃ to 70℃ (to +85℃ no damage)

2. BC, TE, PANEL_TE

3. DSI High Speed mode is off.

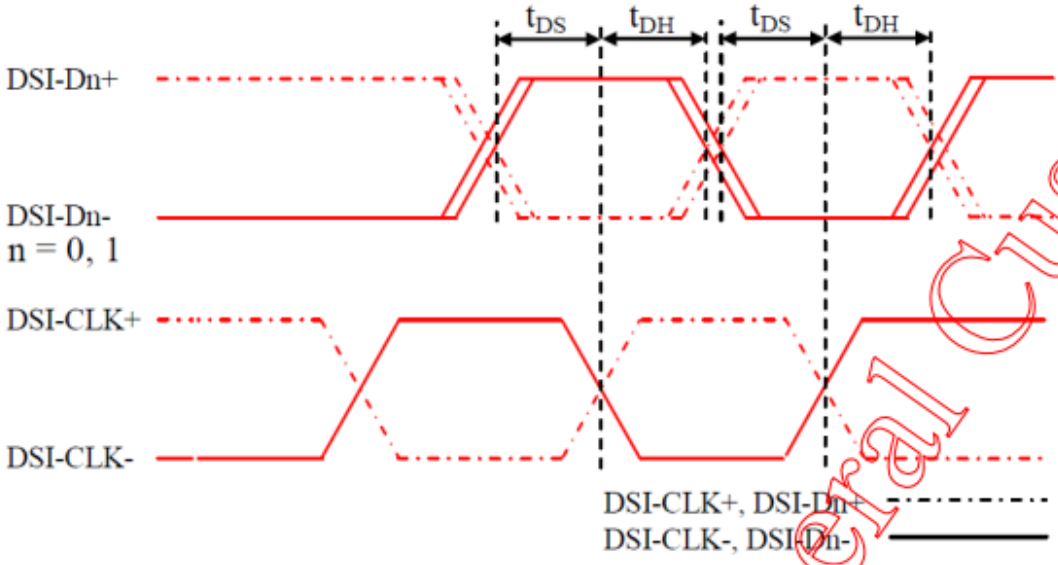
8.2DC Characteristics for DSI HS Mode

Parameter	Symbol	Condition	Specification			Unit
Input Common Mode Voltage for Clock	V_{CMCLK}	CLKP/N Note 2, Note 3	TBD	-	TBD	mV
Input Common Mode Voltage for Data	V_{CMDATA}	DnP/N Note 2, Note 3, Note 5	TBD	-	TBD	mV
Common Mode Ripple for Clock Equal or Less than 450MHz	$V_{CMRCLKL450}$	CLKP/N Note 4	TBD	-	TBD	mV
Common Mode Ripple for Data Equal or Less than 450MHz	$V_{CMRDATAL450}$	DnP/N Note 4, Note 5	TBD	-	TBD	mV
Common Mode Ripple for Clock More than 450MHz (peak sine wave)	$V_{CMRCLKM450}$	CLKP/N	-	-	TBD	mV
Common Mode Ripple for Data More than 450MHz (peak sine wave)	$V_{CMRDATAM450}$	DnP/N Note 5	-	-	TBD	mV
Differential Input Low Level Threshold Voltage for Clock	$V_{THLCLK-}$	CLKP/N	TBD	-	-	mV
Differential Input Low Level Threshold Voltage for Data	$V_{THLDATA-}$	DnP/N Note 5	TBD	-	-	mV
Differential Input High Level Threshold Voltage for Clock	$V_{THHCLK+}$	CLKP/N	-	-	TBD	mV
Differential Input High Level Threshold Voltage for Data	$V_{THHDATA+}$	DnP/N Note 5	-	-	TBD	mV
Single-ended Input Low Voltage	V_{ILHS}	CLKP/N, DnP/N Note 3, Note 5	TBD	-	-	mV
Single-ended Input High Voltage	V_{IHHS}	CLKP/N, DnP/N Note 3, Note 5	-	-	TBD	mV
Differential Termination Resistor	R_{TERM}	CLKP/N, DnP/N Note 5	TBD	TBD	TBD	Ω
Single-ended Threshold Voltage for Termination Enable	V_{TERMEN}	CLKP/N, DnP/N Note 5	-	-	TBD	mV
Termination Capacitor	C_{TERM}	CLKP/N, DnP/N Note 5, Note 6	-	-	TBD	pF

Notes:

1. Ta = -30℃ to 70℃ (to +85℃ no damage) , VCI = 2.5V to 3.3V, VDD3 = VDD3_M = 1.65V to 3.3V
2. Includes 50mV (-50mV to 50mV) ground difference
3. Without VCMRCLKM450/VCMRDATAM450
4. Without 50mV (-50mV to 50mV) ground difference
5. n = 0 and 1
6. For higher bit rates, a 14pF capacitor will be needed to meet the common-mode return loss specification.

8.1High Speed Mode – Data Clock Channel Timing

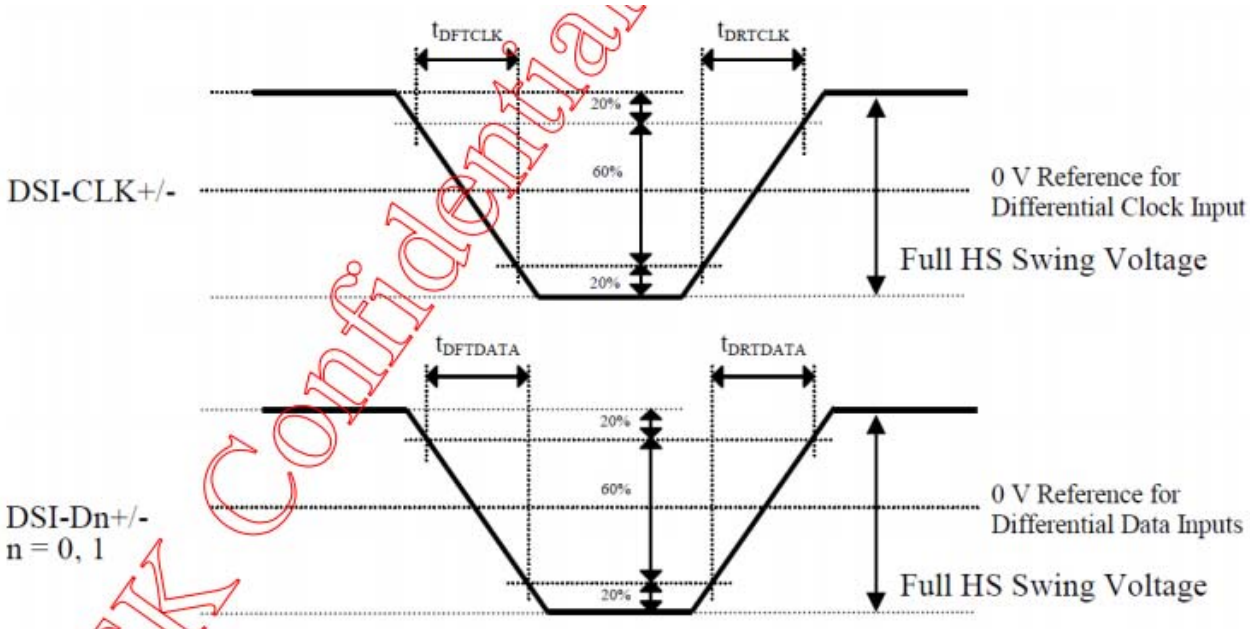


DSI Data to Clock Channel Timings

DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DnP/N , n=0 and 1	t_{DS}	Data to Clock Setup time	TBD	-
	t_{DH}	Clock to Data Hold Time	TBD	-

8.4 High Speed Mode – Rising and Falling Timings



Rising and Falling Timings on Clock and Data Channels

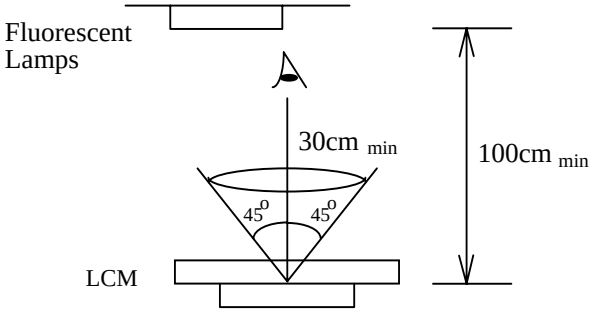
9.Quality Specifications

All The raw material are Rohs complicant.

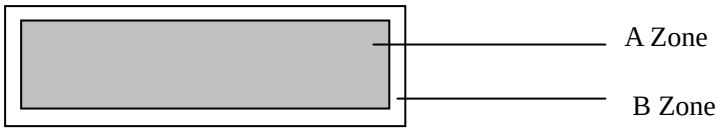
9.1Standard of the product appearance test

Manner of appearance test: The inspection should be performed in using 20W x 2 fluorescent lamps. Distance between LCM and fluorescent lamps should be 100 cm or more. Distance between LCM and inspector eyes should be 30 cm or more.

Viewing direction for inspection is 45° from vertical against LCM.



Definition of zone:



A Zone: viewing area

B Zone: outside viewing area

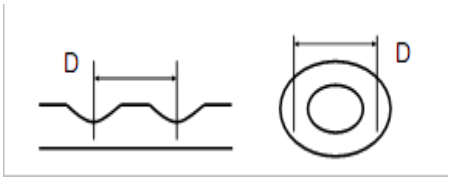
9.2 Specification of quality assurance

AQL inspection standard

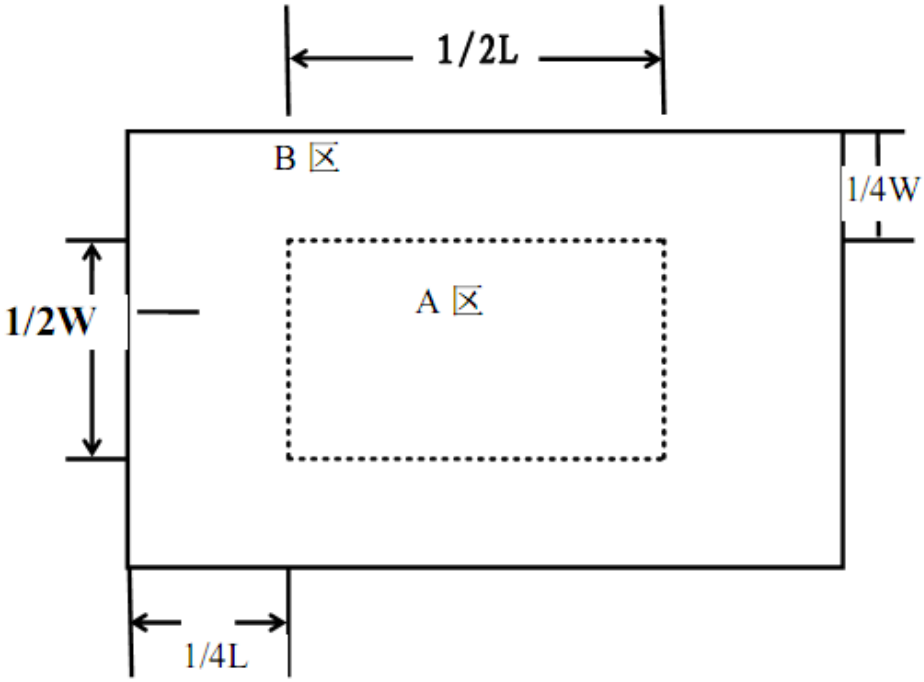
Sampling method: MIL-STD-105E, Level II, single sampling

Defect classification (Note: * is not including)

<table>
<tr><th>NO.</th><th>项目</th><th>标准</th><th></th><th>备注</th></tr>
<tr><td rowspan="6">1</td><td rowspan="6">电测部分</td><td colspan="2">无显示</td><td>主缺</td><td rowspan="6">（D）mm：平均直径=（长径+短径）/2</td></tr>
<tr><td colspan="2">缺行、缺列</td><td>主缺</td></tr>
<tr><td colspan="2">显示异常（花屏、白屏、蓝屏、少画面、乱码）</td><td>主缺</td></tr>
<tr><td colspan="2">背光不亮</td><td>主缺</td></tr>
<tr><td colspan="2">亮暗点判定标准：
<table>
<tr><th>屏幕规格（英寸）</th><th>项目</th><th>判定标准</th></tr>
<tr><td rowspan="3">规格≤5</td><td>亮点</td><td>N≤1</td></tr>
<tr><td>暗点</td><td>N≤4</td></tr>
<tr><td>总数</td><td>N≤4</td></tr>
<tr><td rowspan="3">5 ＜ 规格 ≤10.2</td><td>亮点</td><td>A 区：N=1　B 区：N≤2</td></tr>
<tr><td>暗点</td><td>A 区：N≤2　B 区：N≤4</td></tr>
<tr><td>总数</td><td>N≤5</td></tr>
<tr><td rowspan="3">规格>10.2</td><td>亮点</td><td>A 区：N=1　B 区：N≤2</td></tr>
<tr><td>暗点</td><td>A 区：N≤2　B 区：N≤4</td></tr>
<tr><td>总数</td><td>N≤6</td></tr>
</table>
备注：
1，缺陷大小>0.5dot 定义为点缺陷
2，缺陷大小≤0.5dot 不计
3，微弱亮点透过 6%ND Fillter 仍可视计为点缺陷
背光点状异物不良规格：
<table>
<tr><td>大小（D）mm</td><td>允许数量</td></tr>
<tr><td>D≤0.2</td><td>不计（密集不可）</td></tr>
<tr><td>0.2＜ D ≤0.3</td><td>3</td></tr>
<tr><td>0.3＜ D ≤0.45</td><td>1</td></tr>
<tr><td>D >0.45</td><td>0</td></tr>
</table>
背光线状异物不良规格：
<table>
<tr><td>长 L（mm）</td><td>宽 W（mm）</td><td>允许数量</td></tr>
<tr><td>不计</td><td>W＜0.05</td><td>不计（密集不可）</td></tr>
<tr><td>L≤2.0</td><td>0.05≤W≤0.1</td><td>3</td></tr>
<tr><td>不计</td><td>W>0.1</td><td>不允许</td></tr>
</table>
偏光片点状异物不良规格：
<table>
<tr><td>大小（D）mm</td><td>允许数量</td></tr>
<tr><td>D≤0.3</td><td>不计（密集不可）</td></tr>
<tr><td>0.3＜ D ≤0.5</td><td>3</td></tr>
<tr><td>D >0.5</td><td>0</td></tr>
</table>
偏光片线状异物不良规格：
<table>
<tr><td>长 L（mm）</td><td>宽 W（mm）</td><td>允许数量</td></tr>
<tr><td>L≤2.5</td><td>0.1＜W≤0.2</td><td>4</td></tr>
</table></td><td>次缺</td></tr>
</table>

		L >2.5 / W>0.2 / 不允许		
		偏光片凹、凸点不良规格： 大小（D）mm / 允许数量 D≤0.3 / 不计（密集不可） 0.3≤ D ≤0.5 / 4 0.5≤ D ≤0.7 / 2 D >0.7 / 0 MURA 规格： 不允许任何透过 6%ND Fillter 可视之 MURA		
2	外观部分	偏光片裂痕 A. B区域内不论大小不可存在	次缺	目视
		点状不良（如：凹、凸点等）	次缺	同电性规格
		线状不良（如：脏污、毛线等）	次缺	同电性规格
		偏光片偏移超出要求（依客户要求而定）	次缺	
		贴反	次缺	
		无保护膜、保护膜上无易撕贴	次缺	
		面板 缺角	在不影响外观、线路 性能的情况下视为OK品	次缺
3	FPC	不可“V”字形折痕，折痕处发白	次缺	目视、显微镜
		引角断	次缺	
		断路/短路	次缺	
		产品上有分层	次缺	
		引脚/线路；凹、凸偏斜超过30%	次缺	
		双面胶掉、歪斜且影响使用	次缺	
		引脚非导电异物不可跨越两条线，导电依凹/凸判定	次缺	
		PAD翘起、变形、脱落	次缺	
		刮伤，以不露铜为OK	次缺	
		气泡不能横跨2条线路，且不可超过2个	次缺	
4	Film上的鱼眼、凹痕、气泡		D≤0.3mm	不计（密集不可）
			0.3mm＜ D ≤0.5mm	N≤3(距离在5mm以上)
			0.5≤ D ≤0.7	2
			D >0.7	0
5	牛顿环	满屏的六分之一以内		N≤3
		超过满屏的六分之一		NG

A、B 区域图表说明



判定

允许水准 AQL,严重缺点 CR=0、主要缺点 MA=0.4、次要缺点 MI=1.0

9.3 Reliability of LCM

Reliability test condition:

Item	Condition	Time (hrs)	Assessment
High temp. Storage	60°C	48	No abnormalities in functions and appearance
High temp. Operating	50°C	48	
Low temp. Storage	-20°C	48	
Low temp. Operating	-10°C	48	
Humidity	60°C/ 90%RH	48	
Temp. Cycle	-20°C ← 25°C →60°C (60 min ← 5 min → 60min)	10cycles	

Recovery time should be 24 hours minimum. Moreover, functions, performance and appearance shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (20+8°C), normal humidity (below 65% RH), and in the area not exposed to direct sun light.

9.4 Precaution for using LCD/LCM

LCD/LCM is assembled and adjusted with a high degree of precision. Do not attempt to make any alteration or modification. The followings should be noted.

General Precautions:

1. LCD panel is made of glass. Avoid excessive mechanical shock or applying strong pressure onto the surface of display area.
2. The polarizer used on the display surface is easily scratched and damaged. Extreme care should be taken when handling. To clean dust or dirt off the display surface, wipe gently with cotton, or other soft material soaked with isoproply alcohol, ethyl alcohol or trichlorotriflorothane, do not use water, ketone or aromatics and never scrub hard.
3. Do not tamper in any way with the tabs on the metal frame.
4. Do not made any modification on the PCB without consulting XINPENG.
5. When mounting a LCM, make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
6. Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels and also cause rainbow on the display.
7. Be careful not to touch or swallow liquid crystal that might leak from a damaged cell. Any liquid crystal adheres to skin or clothes, wash it off immediately with soap and water.

Static Electricity Precautions:

1. CMOS-LSI is used for the module circuit; therefore operators should be grounded whenever he/she comes into contact with the module.
2. Do not 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.
3. Do not touch the connection terminals of the display with bare hand; it will cause disconnection or defective insulation of terminals.
4. The modules should be kept in anti-static bags or other containers resistant to static for storage.
5. Only properly grounded soldering irons should be used.
6. If an electric screwdriver is used, it should be grounded and shielded to prevent sparks.
7. The normal static prevention measures should be observed for work clothes and working benches.
8. Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

Soldering Precautions:

1. Soldering should be performed only on the I/O terminals.
2. Use soldering irons with proper grounding and no leakage.
3. Soldering temperature: 280°C$\pm$10°C
4. Soldering time: 3 to 4 second.
5. Use eutectic solder with resin flux filling.
6. If flux is used, the LCD surface should be protected to avoid spattering flux.
7. Flux residue should be removed.

Operation Precautions:

1. The viewing angle can be adjusted by varying the LCD driving voltage Vo.
2. Since applied DC voltage causes electro-chemical reactions, which deteriorate the display, the applied pulse waveform should be a symmetric waveform such that no DC component remains. Be sure to use the specified operating voltage.
3. Driving voltage should be kept within specified range; excess voltage will shorten display life.
4. Response time increases with decrease in temperature.
5. Display color may be affected at temperatures above its operational range.
6. Keep the temperature within the specified range usage and storage. Excessive temperature
7. and humidity could cause polarization degradation, polarizer peel-off or generate bubbles.
8. For long-term storage over 40°C is required, the relative humidity should be kept below 60%,
9. and avoid direct sunlight.

Limited Warranty

XINPENG LCDs and modules are not consumer products, but may be incorporated by XINPENG's customers into consumer products or components thereof, XINPENG does not warrant that its LCDs and components are fit for any such particular purpose.

1. The liability of XINPENG is limited to repair or replacement on the terms set forth below. XINPENG 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 XINPENG and the customer, XINPENG will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with XINPENG general LCD inspection standard. (Copies available on request)

2. No warranty can be granted if any of the precautions state in handling liquid crystal display above has been disregarded. Broken glass, scratches on polarizer mechanical damages as well as defects that are caused accelerated environment tests are excluded from warranty.
3. In returning the LCD/LCM, they must be properly packaged; there should be detailed description of the failures or defect.