DOCUMENT NUMBER AND REVISION
VL-PS-COG-CHSDT003-01 REV.A
(COG-CHSDT003-01)

DOCUMENT TITLE:
PRELIMINARY SPECIFICATION
OF
TFT MODULE TYPE

CUSTOMER	
CUSTOMER REFERENCE NO.	
MODEL NUMBER	COG-CHSDT003-01
REFERENCE NO.	AV103Z7M-N14
CUSTOMER APPROVAL	
DATE	

DISTRIBUTION LIST: MARKETING

B3 AV103Z7M-N14 Product Specification Rev.PD

BUYER	Geely
SUPPLIER	HEFEI BOE Optoelectronics Technology CO., LTD
FG-Code	**AV103Z7M-N14-3850**

ITEM	BUYER SIGNATURE	DATE

ITEM	SUPPLIER SIGNATURE	DATE
Prepared		
Reviewed		
Approved		

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

REVISION HISTORY

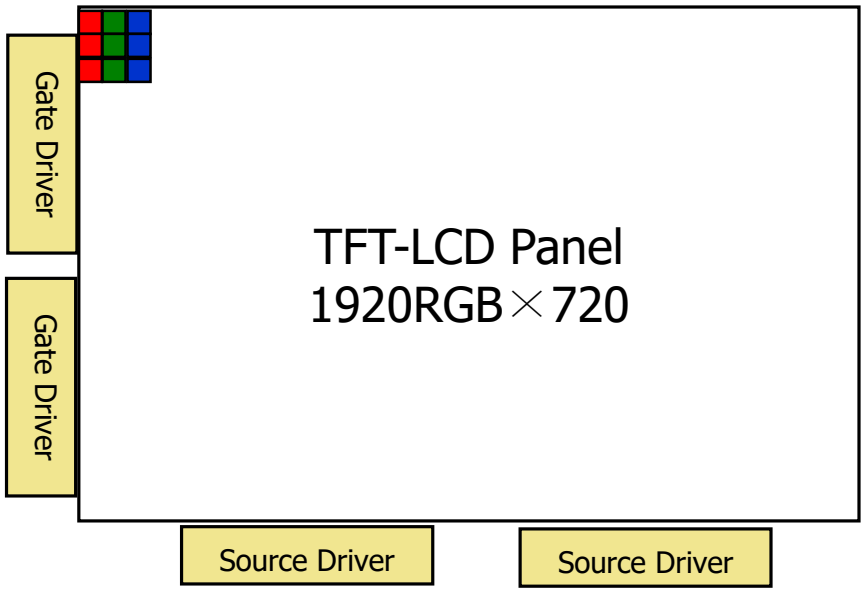
REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0		Initial Release	2019-02-15	彭金宝
PA		M-S图纸更新	2019-02-26	张强
PB		信赖性条件更新/增加POL易撕贴	2019-03-07	彭金宝
PC		增加了connector,更正了BL FPC 的外形	2019-04-22	彭金宝
PD		更新RL,TB的描述，增加背光FPC尺寸	2019-05-29	彭金宝

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

V103Z7M-N13 is a color active matrix TFT LCD Single Cell using amorphous silicon TFT 's (Thin Film Transistors) as an active switching devices. This Single Cell has a 10.25 inch diagonally measured active area with FHD resolutions (1920 horizontal by 720 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.



1.2 Features

- HADS Model (Normally Black)
- 1920(H) × 720(V)
- Green Product (RoHS & Halogen free product)
- Wide viewing angle (U/D/L/R): 85/85/85/85
- Color Gamut: 75%
- Cell thickness: 1.0t
- LVDS Interface

1.3 Application

- For Vehicle

1.4 General Specification

The followings are general specifications at the AV090WVE-N10

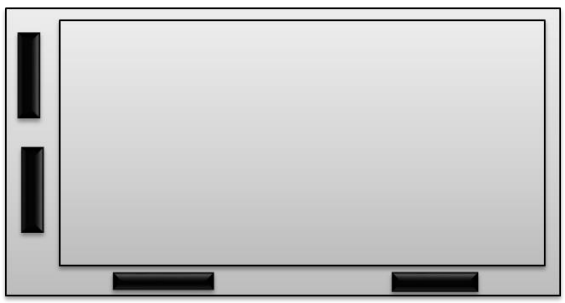
<Table1. General Specifications >

Parameter	Specification	Unit	Remarks
Active Area	243.648x91.368	mm	8:3
Number Of Pixels	1920(H) RGB x 720(V)	pixels	PPI：200
Pixel Pitch	0.1269x0.1269	μm	
Module Outline	256.748*107.688	mm	
Thickness	7.1	mm	
Pixel Arrangement	RGB Vertical Stripe		
Display Mode	Normally Black		
Display Colors	16.7M	colors	
Contrast Ratio	1000:1(Typ.)、900:1(Min)	CR	
Viewing Angle(CR>10)	U/D/L/R 85/85/85/85（Min）	°	
Response Time	25（Typ .）、35（Max）	ms	
Color Gamut	75%(Typ.)、70%(Min）	%	
Source IC	2*HX8272-B-LTP	Ea	
Driver IC	2*HX8695-E01-LT	Ea	

Note:

1.At the U/D/L/R direction, the viewing angle is same;

2.The TFT and CF Align Direction;



2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table2. Absolute Maximum Ratings>

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power supply voltage	VDD	-0.3	4.0	V	
Operating Temperature (Humidity)	T_{OP}	-30	+85	℃	
	RH		90	%	At 60°C
Storage Temperature (Humidity)	T_{ST}	-40	+85	℃	
	RH		90	%	At 60°C

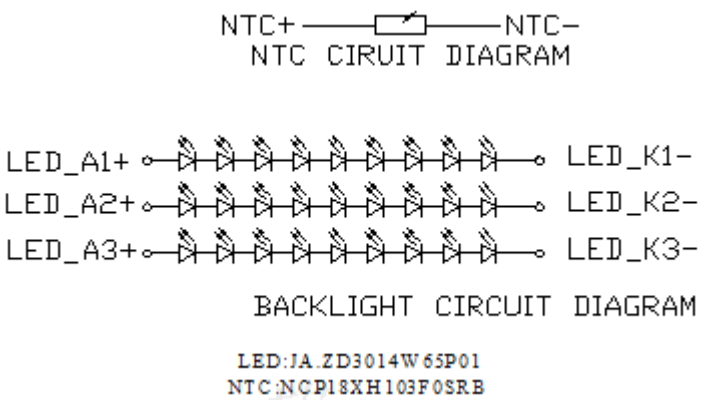
3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table3. Electrical specifications > Ta=25+/-2°C

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
Power Supply Input Voltage	VDD	3.0	3.3	3.6	V	
Power Supply Input Current(White pattern)	Idd	385	480	575	mA	
Inrush Current	Iinrush		2	3	A	
TFT Gate ON Voltage	VGH	17	18	19	V	
TFT Gate OFF Voltage	VGL	-13	-12	-11	V	
TFT Common Electrode Voltage	VCOM	-	-1.35	-	V	
Supply current of LED backlight	Per string	-	80	-	mA	9 LED
Total Supply current of LED Backlight	I_{LED}Total	-	240	-	mA	3 strings
Supply voltage of LED backlight	Per string	23.4	27	30.6	V	3 strings

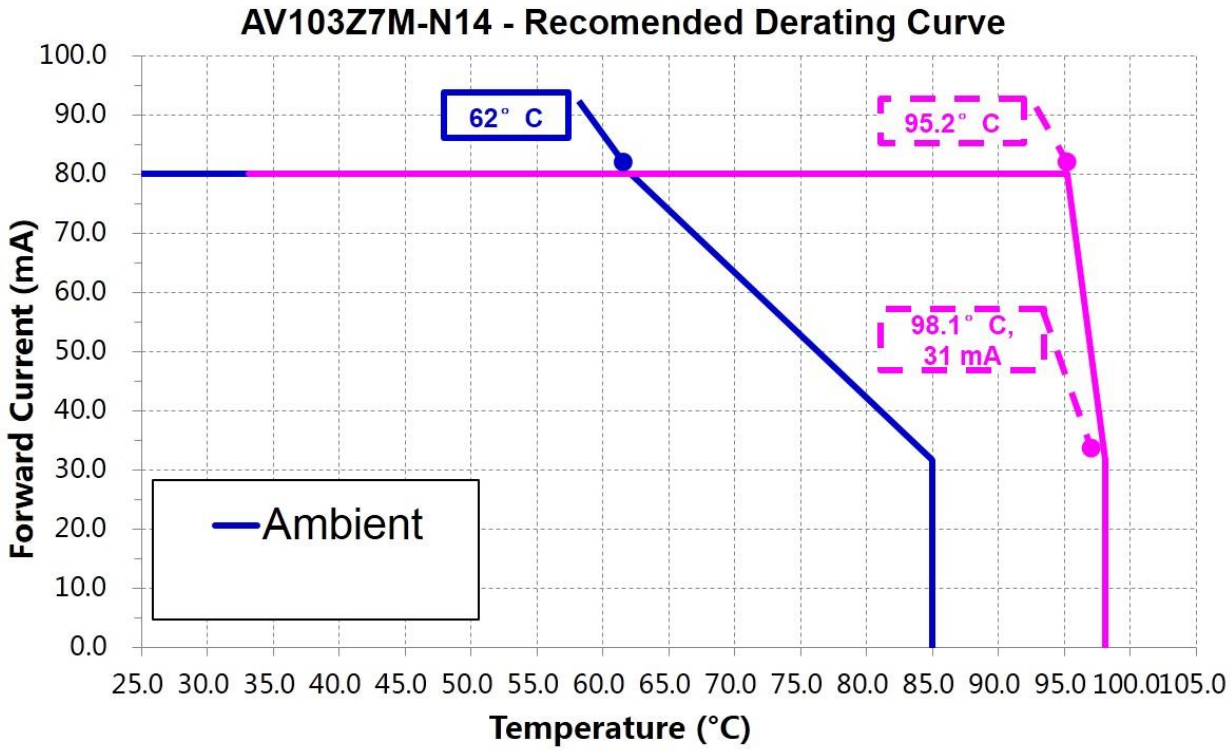
Notes :
1: AVDD should be set to satisfy the characteristic of LC .
2: VGH should be set to satisfy charging ratio of TFT pixel.
3 : VCOM should be adjusted to make the flicker level be minimum and optimize display quality.
4: Frame rate=60HZ
5: BLU LED : 灯共27颗, 3并9串,电流值 240mA, 每串80mA.



LED&NTC Diagram

Notes :

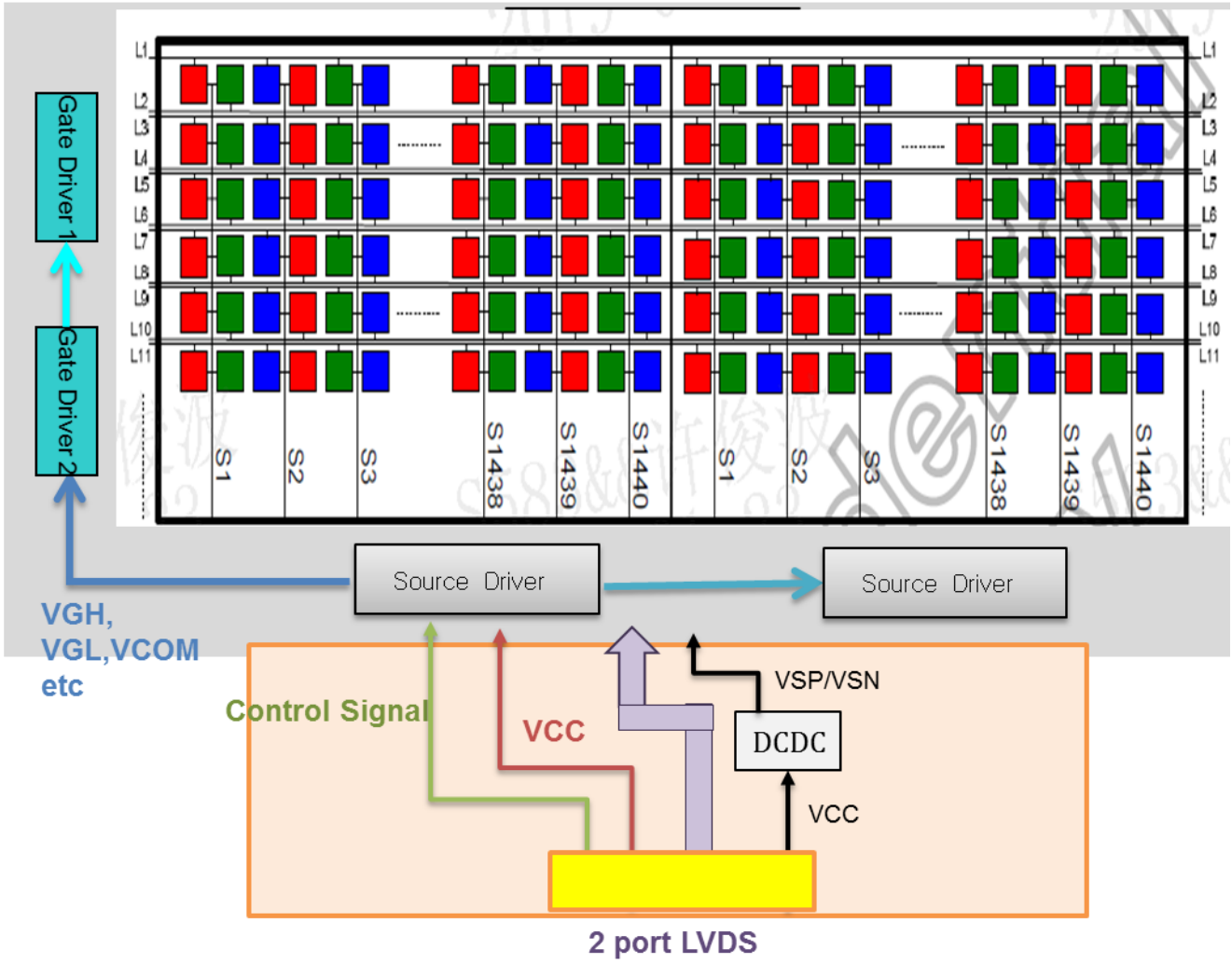
6: The derating curve for the backlight estimate as below.. The following chart is based on only LCD module level without customer system.



3.2 INTERFACE CONNECTION

3.2.1 Block diagram

(1,1)



3.2.2 INPUT I/F Pin map

Signal Interface Connector model: **FH28-50S-0.5SH (HRS)**

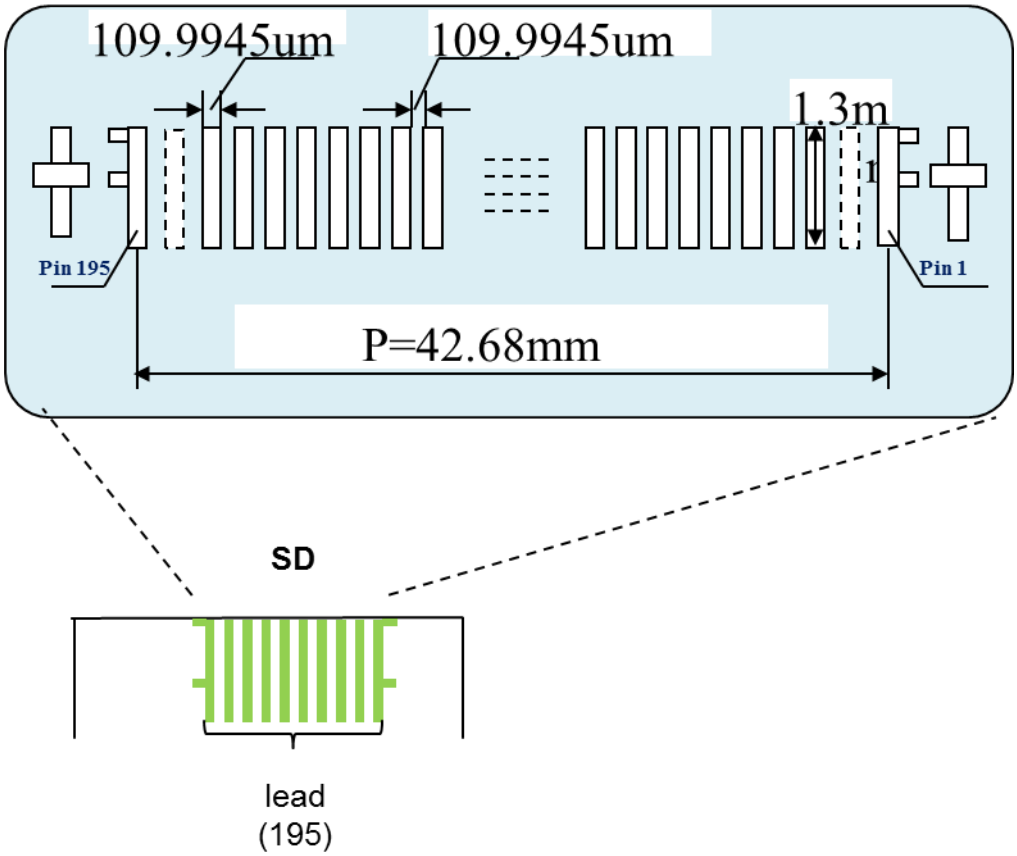
< Table4. INPUT I/F Pin map>

Pin NO.	Symbol	Description	Pin NO.	Symbol	Description
1	GND	Ground	16	ECLKN	LVDS Even Clock channel -
2	VCC	Power	17	ECLKP	LVDS Even Clock channel +
3	VCC	Power	18	GND	Ground
4	VCC	Power	19	ELV3N	LVDS Even Data channel 3 -
5	VCC	Power	20	ELV3P	LVDS Even Data channel 3 +
6	GND	Ground	21	GND	Ground
7	ELV0N	LVDS Even Data channel 0 -	22	OLV0N	LVDS Odd Data channel 0 -
8	ELV0P	LVDS Even Data channel 0 +	23	OLV0P	LVDS Odd Data channel 0 +
9	GND	Ground	24	GND	Ground
10	ELV1N	LVDS Even Data channel 1 -	25	OLV1N	LVDS Odd Data channel 1 -
11	ELV1P	LVDS Even Data channel 1 +	26	OLV1P	LVDS Odd Data channel 1 +
12	GND	Ground	27	GND	Ground
13	ELV2N	LVDS Even Data channel 2 -	28	OLV2N	LVDS Odd Data channel 2 -
14	ELV2P	LVDS Even Data channel 2 +	29	OLV2P	LVDS Odd Data channel 2 +
15	GND	Ground	30	GND	Ground
31	OCLKN	LVDS Odd Clock channel -	41	CSB	Serial Interface chip enable signal
32	OCLKP	LVDS Odd Clock channel +	42	SDA	SPI Data pin
33	GND	Ground	43	ATREN	Enable auto reload signal
34	OLV3N	LVDS Odd Data channel 3 -	44	VOTP	OTP voltage
35	OLV3P	LVDS Odd Data channel 3 +	45	GND	Ground
36	GND	Ground	46	LR	H:Left->Right (Default) L:Right->Left
37	RESET	reset	47	TB	H:Top->Bottom(Default) L:Bottom->Top
38	STBYB	Standy mode setting pin,Active low	48	NC	No connection
39	GND	Ground	49	FAULT	Output for fail detection
40	SCL	SPI Clock pin	50	NC	No connection

3.2.3 FPC OLB Pad Design

Pad pin :195pin， Pad pitch： 0.21989um，Lead : Space = 1: 1

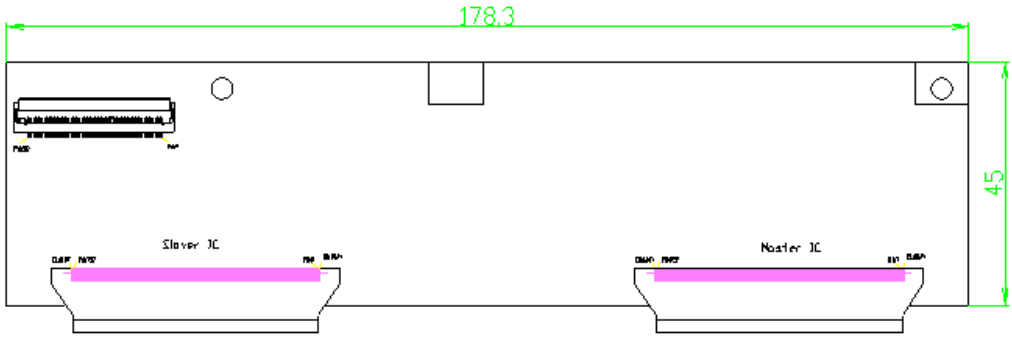
OLB on panel lead pitch: 220um， Lead : Space= 140:80 um



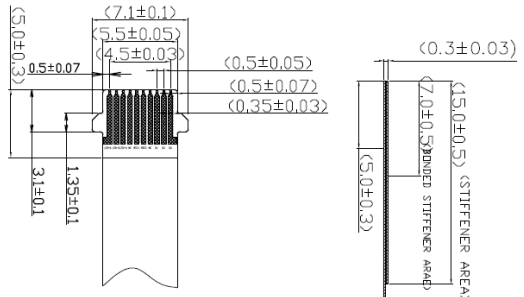
3.2.4 PCB Board Design

2个FOB中线距离108.13mm

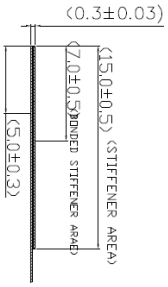
PCB金手指按照PCB中心做整体预缩，预缩量400ppm

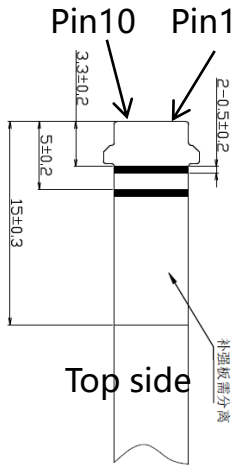


3.2.5 LED Pin Design(Connector:196415-10041-36(P-TWO))



Bottom side





Top side

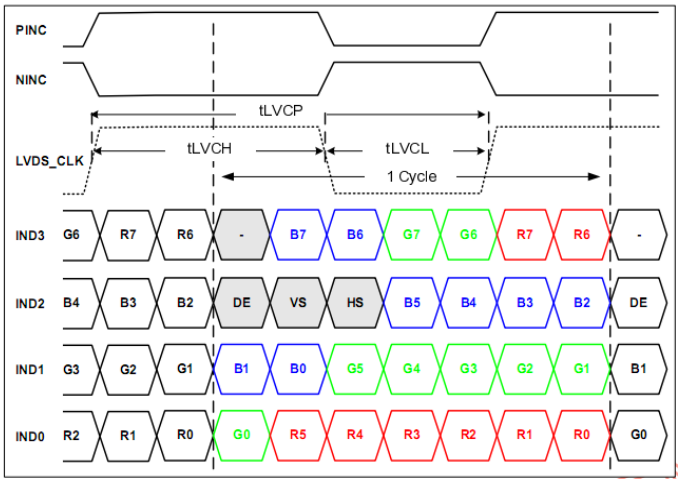
LED Connector Pin map

LED CNT PIN MAP	
1	LED-A
2	LED-A
3	LED-A
4	NC
5	NTC1
6	NTC2
7	NC
8	LED-K1
9	LED-K2
10	LED-K3

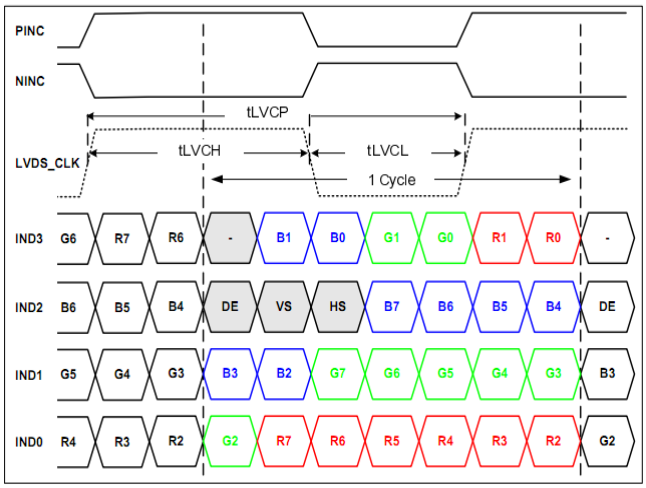
3.3 LVDS Connection Design

3.3.1 LVDS Data map

LVDS采用VESA mode



VESA mode



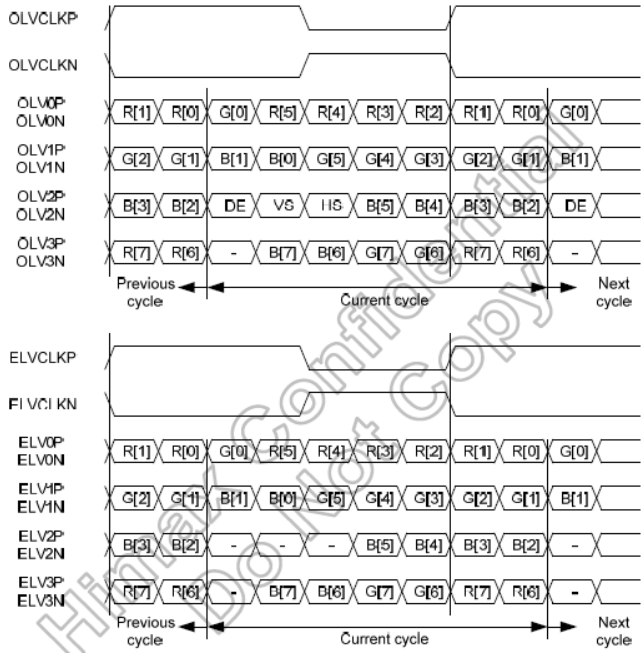
JEIDA mode

3.3.2 LVDS Signal Timing

< Table5. LVDS Signal Timing>

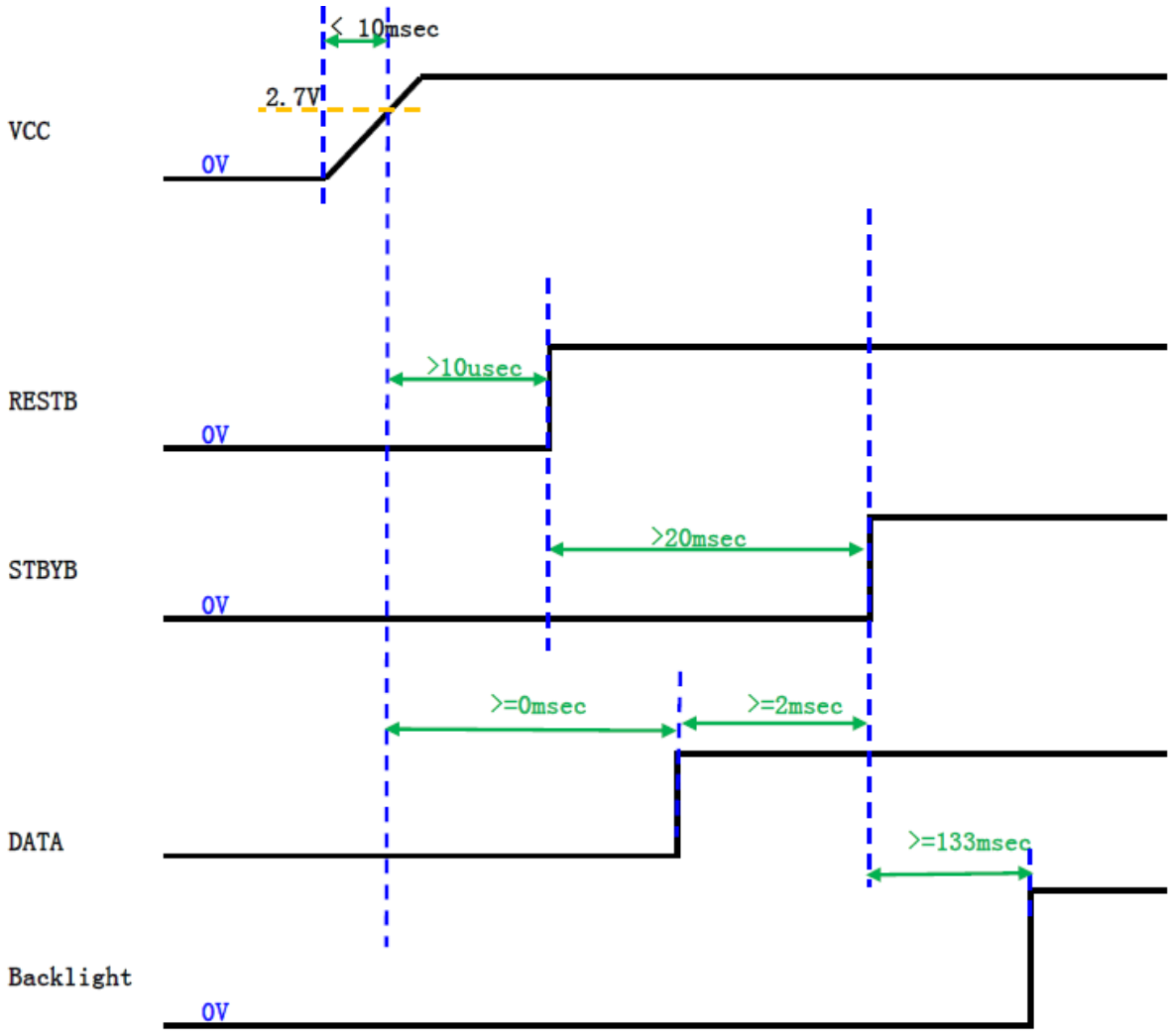
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RxFCLK	44.5	47.06	50	MHz	
Horizontal Display Area	thd		960		DCLK	
HS Period	th	1015	1032	1440	DCLK	
HS Blanking	Thb+thfp	55	72	480	DCLK	
Vertical Display Area	tvd		720		TH	
VS Period	tv	728	760	1080	TH	
VS Blanking	Tvbp+tvfp	8	40	360	TH	
Clock high time	TLVCH	12.84	12.14	11.4	ns	
Clock low time	TLVCL	9.63	9.11	8.6	ns	

3.3.3 LVDS Signal Format

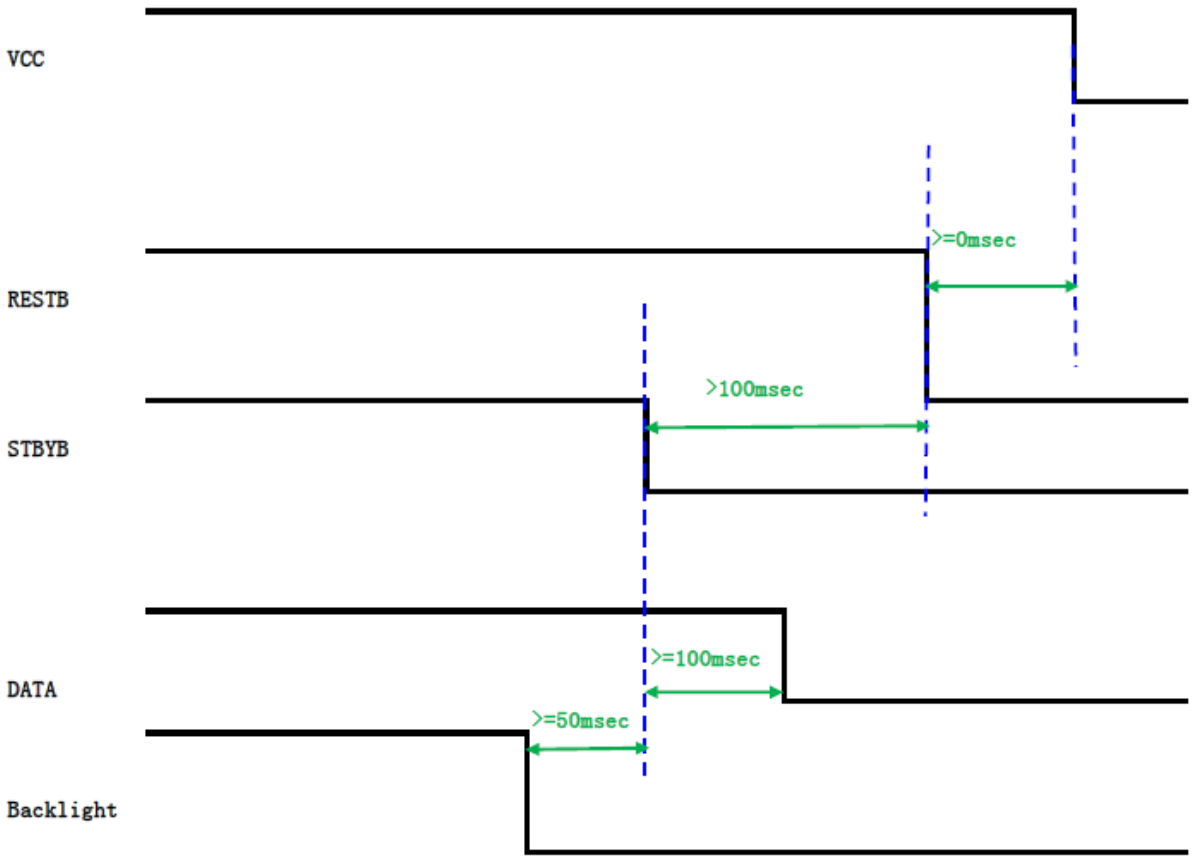


3.4 POWER ON/OFF SEQUENCE

3.4.1 POWER ON SEQUENCE



3.4.2 POWER OFF SEQUENCE



4.0 OPTICAL SPECIFICATIONS

4.1 Overview

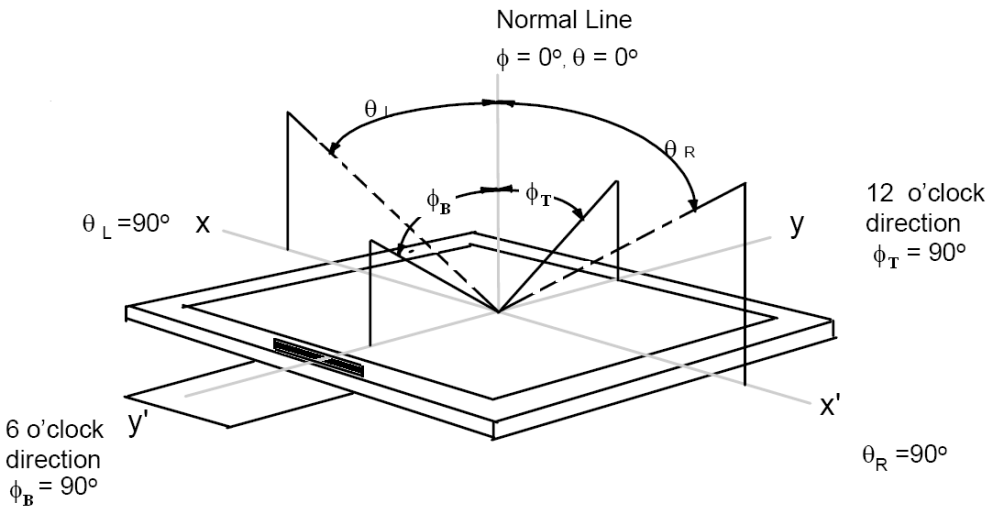
The test of optical specifications shall be measured in a dark room (ambient luminance ≤ 1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Gonio meter system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to θØ =0 (=θ3) as the 3 o′ clock direction (the "right"), θØ=90 (= θ12) as the 12 O′ clock direction ("upward"), θØ=180 (= θ9) as the 9 O′ clock direction ("left") and θØ=270(= θ6) as the 6 O′ clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed.

4.2 Optical Specifications

< Table6. Optical Table >

Item	Symbol	Condition	Min	Typ.	Max	Unit	Note
Viewing Angle	CR>10	U	85	-	-	deg	Note 1
		D	85	-	-		
		L	85	-	-		
		R	85	-	-		
Contrast Ratio	CR	θ=0° FF=0°	900：1	1000：1	-	-	Note 2
Response Time	Tr+Tf	Tp=25deg	-	25	35	ms	Note 3
		Tp=-20deg	-	-	250		
		Tp=-30deg	-	-	600		
Color Coordinate of CIE1931	Rx	θ=0°	Typ-0.03	0.645	Typ+0.03	-	Note 4
	Ry			0.337			
	Gx			0.317			
	Gy			0.627			
	Bx			0.146			
	By			0.063			
	Wx			0.304			
	Wy			0.327			
NTSC Ratio	NTSC	CIE1931	70	75	-	%	Note 5
Luminance Uniformity	ΔY	L0	50	-	-	%	Note 6
		L255	75	-	-		
Luminance	-	L255	700	850	-	nit	-
Flicker	25℃	dot inversion	-	-	-20	dB	Note 7
Gamma	25℃	vertical direction	1.9	2.2	2.5	-	Note 8
Crosstalk	-	-35~80℃	-	-	2.0	%	Note 9
Reflectance Ratio	-	SCI	-	-	6	%	Note 10

Note 1:**The definition of Viewing Angle**
Refer to the graph below marked by θ and Φ.

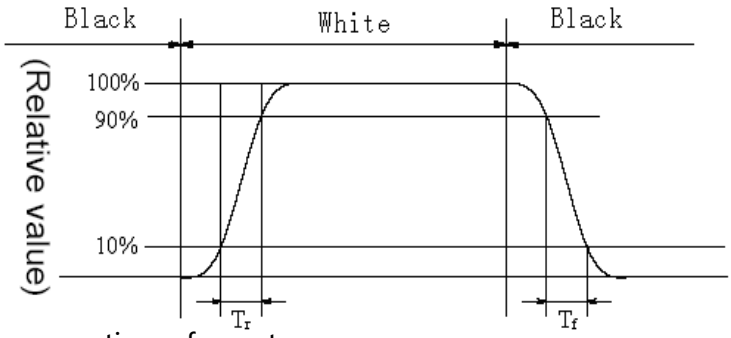


Note2:**ThedefinitionofContrastRatio** (Test LCM using CS2000 or similar equipments):

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is at "White" state}}{\text{Luminance When LCD is at "Black" state}}$$

(Contrast Ratio is measured in optimum common electrode voltage)

Note3: DefinitionofResponse time.(Test LCD using DMS501 or similar equipments):
The output sign also photo detector are measured when the input sign also are changed from "black" to "white" (Voltage falling time)and from "white" to "black" (Voltage rising time), respectively . The response time is defined as the time interval between the 10% and 90% of amplitudes . Refer to figures below.



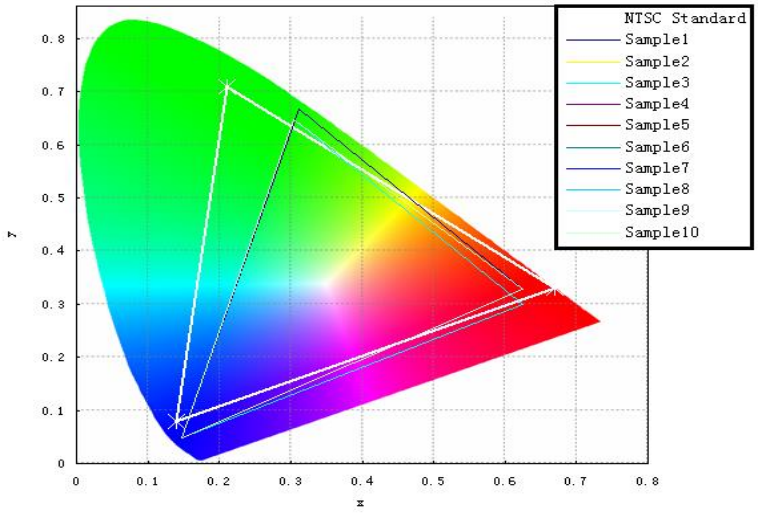
	L0	L1	L2	L3	L4	L5	L6	L7
L0	■							
L1		■						
L2			■					
L3				■				
L4					■			
L5						■		
L6							■	
L7								■

Response time of gray to gray:
Measurement equipment: DMS501 or similar equipments.
Test method: we define 8 grays L0-L7,the grays of L0-L7 were defined as:0,36,73, 109, 146, 182, 219, 255. Theoutputsignalsofphotodetectoraremeasuredwhentheinputsignalsarechanged from "Lx" to "Ly", x, y= [0, 7]. The response time is defined as the time interval between the 10% and 90% of amplitudes. The result of the test can be noted as below:

Note 4: Color Coordinates of CIE 1931
The test condition is at ILED=20mA and measured on the surface of LCD module at 25℃.
Measurement equipment:CS2000 or similar equipments
The Color Coordinate (CIE 1931) is the measurement of the center of the display shown in below figure.

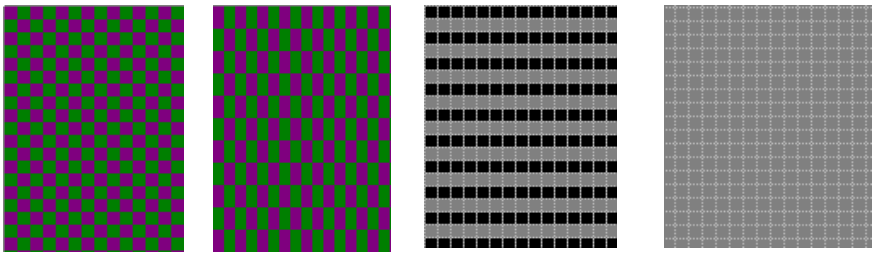
Note 5: Definition of Color of CIE Coordinate and NTSC Ratio.

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



Note 6: The luminance uniformity on LCD surface is then expressed as :
ΔY = (Minimum Luminance of 9points / Maximum Luminance of 9points) * 100**.**

Note 7: Flicker
- Measurement equipment :CA-210 or similar equipments
- Measuring temperature: Ta=25℃.
- Test method: JEITA method
- Test pattern : Refer to below(Test Pattern should be full-fill of display screen)



1 Dot Inversion, 2 Dot Inversion , Line Inversion , Frame Inversion
The point should be marked is, for line and frame inversion, the background of Flicker Test Pattern
- "gray " are defined as middle gray scale .For example, RGB 24bit "gray" defined as below:

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

For Dot inversion, the RGB data for first pixel is (127, 0, 127), the RGB data for the second pixel is (0, 127 , 0).

●Frame Frequency Requirement before test： The LCD must be tuned to more than 65HZ before measu rement.

●Measurement Point: the center of display active area

●Conversion of Flicker ratio:

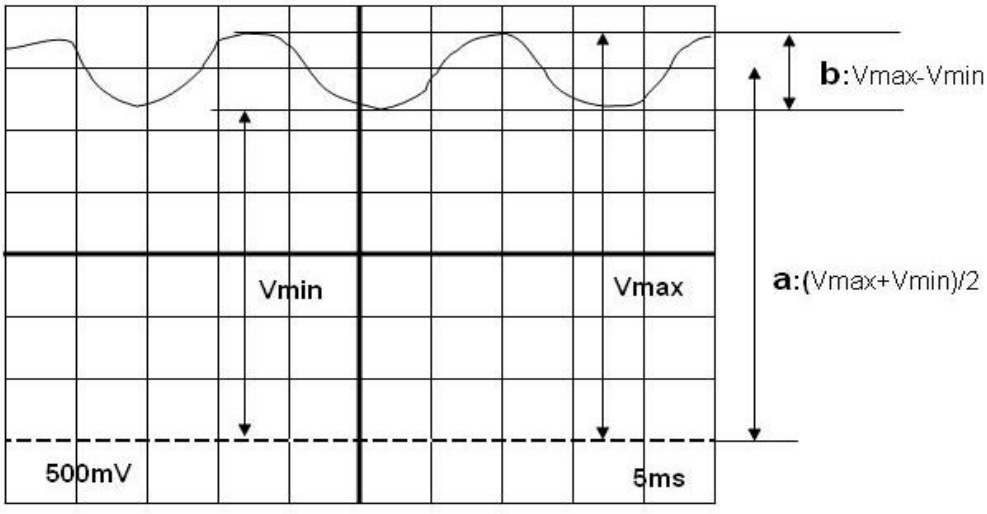
Flicker [dB] = 10 x log[Px/P0]

Where

Px: Maximum power spectrum of AC component after passing through integrator

P0: Power spectrum of DC component after passing through integrator

AC component=b (Refer to below diagram)



Note 8: gamma curve control

●For gamma curve control, HUAWEI’ s request as below:

●1,the whole curve’ s tolerance must control within +/-0.3, HUAWEI will test the gray scale below: 0, 8, 16, 25, 33, 41, 49, 58, 66, 74, 82, 90, 99, 107, 115, 123, 132, 140, 148, 156, 165, 173, 181, 189, 19 7,206, 214, 222, 230, 239, 247, 255

Note 9:Crosstalk

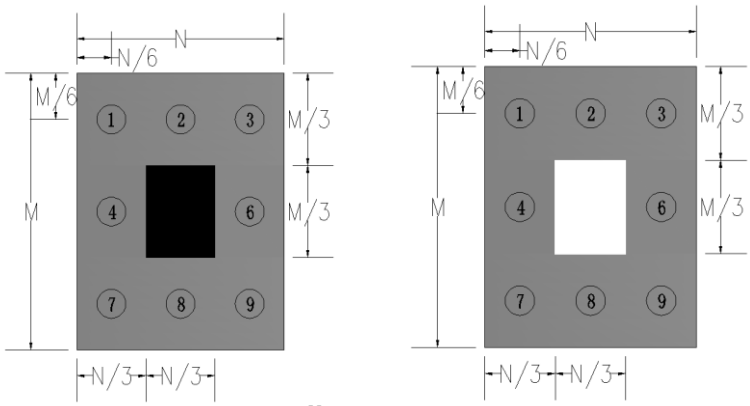
●There should be no visible cross-talk in normal direction of the display when the two ” Cross-talk Test Patterns ” below are loaded.

●Measurement equipment:CS2000 or similar equipments

●The point should be marked is, the background of Cross-talk Test Pattern- “gray ” are defined as middle gray scale . For example, RGB 24bit “gray” defined as below:

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

●▵Bpn = Bpn (gray) / Bpn (white)
Which n means the dot No. In the Cross-talk Test Pattern ;
Bpn (gray) means the brightness of the No.n spots in Cross-talk Test Pattern;
Bpn (white) means the brightness of the No.n spots in Full white Test Pattern;
●▵Bp (Max.) = Maximum value in ▵Bp1~▵Bp9, except the No. 5 spot.
●▵Bp (Min.) = Minimum value in ▵Bp1~▵Bp9, except the No.5 spot.
●▵CT=▵Bp (Max.)/▵Bp(Min.).
●▵CT must be less than 1.10



Cross-talk Test Pattern

Note 10: Reflectance Ratio
●Measurement equipment : X-rite SP64
●Measurement parameter: Reflectance Ratio @550nm

5.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in belo

<Table 7. Reliability Test Parameters >

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 85 ℃, 500 hrs	Note1
2	Low temperature storage test	Ta = -40 ℃, 500 hrs	
3	High temperature operation test	Ta = 85℃, 500 hrs	
4	Low temperature operation test	Ta = -30 ℃, 500 hrs	
5	High temperature & high humidity operation test	Ta = 60 ℃, 90%RH, 500 hrs	
6	Thermal shock	Ta = -30 ℃ ↔ 85 ℃ (0.5 hr), 100 cycle	Non-operation
7	High temp. and endurance test	Ta = 75 ℃, 1500 hrs	
8	Image Sticking	6*8 Pattern, 2hrs 25℃ check pattern Gray 127,Spec:≤L2 after 5 mins, the mura must be disappeared completely	
9	ESD test（operation）	Air Voltage:±15V Contact Voltage:±8KV R: 330Ω C: 150pF 3time	Note2
10	ESD test（non-operation）	Air Voltage:±8KV Contact Voltage:±6KV R: 330Ω C: 150pF 3 time	
11	Vibration Test	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ 8H	

Note 1

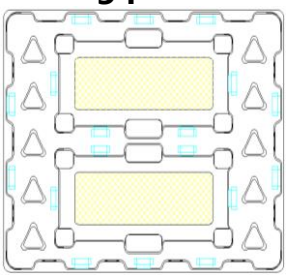
1. -30℃~-40℃保证功能性OK，不保证画质；测试完成2H后，恢复室温25℃点灯。

Note 2

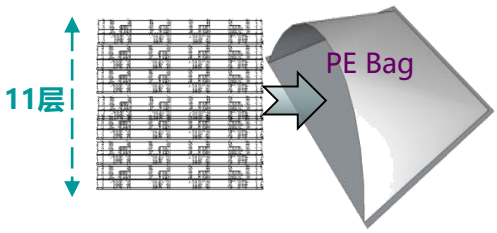
1. 测试时 ， 测试序列按照从低至高 测试序列按照从低至高 、先接触放电 后空气放电的原则 ，依次进行 ， 每个放电等级应执行 3次测试。
2. 因为整机ESD水平不仅与模组相关，也与系统相关。此处承诺配合客户整机达到要求，如需要将进行ESD改善。

6.0 PACKING INFORMATION(产品形态：LCM)

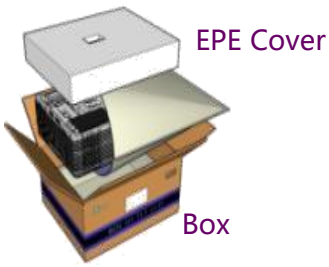
Packing procedure:



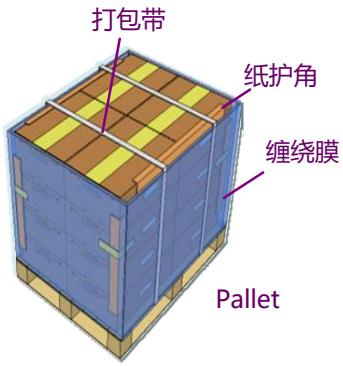
-将 Panel 水平放入Tray 产品定位槽
-Panel CF侧向上放置
-容量: 2pcs Tray



-将11pcs Tray 叠加放置放入PE Bag
-Tray 同向叠加, 顶部1pcs 空Tray



-将PET Tray 整包放入纸箱, 上下放置 EPE Cover 固定
-纸箱一字型胶带封口
-20pcs MDL/Box

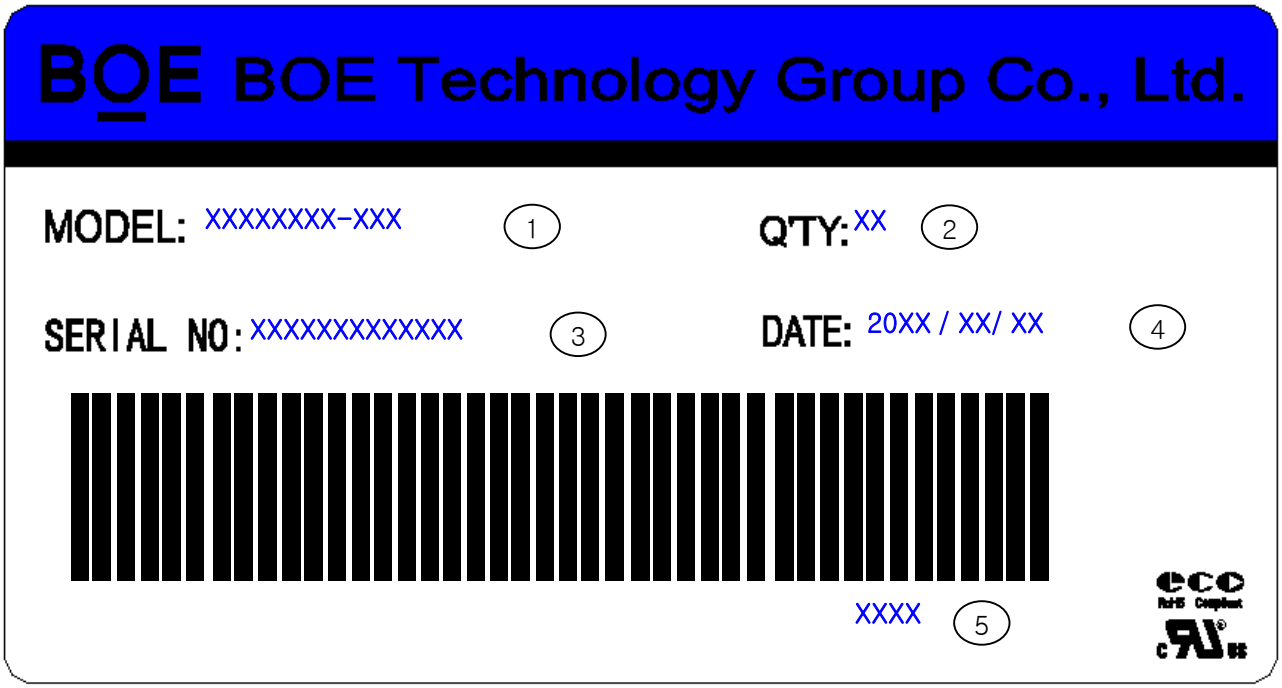


-将Box堆叠于木托上，田字型码拍,
-垂直堆码3层, 每层4Box
-使用纸护角防护，捆扎带固定
-Pallet 缠绕膜包装
-240pcs MDL/Pallet

6.1 Packing Note(产品形态：LCM)

- Box Dimension: 496mm(W) x 396mm(D) x 290mm(H)
- Package Quantity in one Box: 20pcs

7.0 Product Label



110 mm (L) × 56 mm (W), 蓝色字体为后打印标识,

1. **FG-CODE**
2. **Box 产品数量**
3. **Box ID, 编码规则如下**
4. **Box Packing 日期**
5. **FG-CODE 后四位**

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13
代码	X	X	X	3	X	X	X	X	X	X	X	X	X
描述	GBN代码		等级	B3	年份		月	Rev	序列号				

8.0 Handling & Cautions

8.1 Mounting Method

- The panel of the LCD consists of two thin glasses with polarizers which easily get damaged. So extreme care should be taken when handling the LCD.
- Excessive stress or pressure on the glass of the LCD should be avoided. Care must be taken to insure that no torsional or compressive forces are applied to the LCD unit when it is mounted.
- If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
- To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- Mount a LCD module with the specified mounting parts.

8.2 Caution of LCD Handling and Cleaning

- Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration,and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.
- The polarizers on the surface of panel are made from organic substances. Be very careful for chemicals not to touch the polarizers or it leads the polarizers to be deteriorated.
- If the use of a chemical is unavoidable, use soft cloth with solvent （recommended below） to clean the LCD ‘s surface with wipe lightly.
  -IPA(Isopropyl Alcohol), Ethyl Alcohol, Trichlorotriflorothane
- Do not wipe the LCD's surface with dry or hard materials that will damage the polarizers and others. Do not use the following solvent.
  -Water, Ketone, Aromatics
- It is recommended that the LCD be handled with soft gloves during assembly, etc. The polarizers on the LCD's surface are vulnerable to scratch and thus to be damaged by sharp particles.
- Do not drop water or any chemicals onto the LCD's surface.
- A protective film is supplied on the LCD and should be left in place until the LCD is required for operation.
- The ITO pad area needs special careful caution because it could be easily corroded. Do not contact the ITO pad area with HCFC,Soldering flux,Chlorine,Sulfur,saliva or fingerprint. To prevent the ITO corrosion, customers are recommended that the ITO area would be covered by UV or silicon.

8.3 Caution Against Static Charge

- The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.
- Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
- Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
- In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

8.4 Caution For operation

- It is indispensable to drive the LCD within the specified voltage limit since the higher Voltage than the limit causes the shorter LCD's life. An electro-chemical reaction due to DC causes undesirable deterioration of the LCD so that the use of DC drive should avoid.
- Do not connect or disconnect the LCD to or from the system when power is on.
- Never use the LCD under abnormal conditions of high temperature and high humidity.
- When expose to drastic fluctuation of temperature (hot to cold or cold to hot) ,the LCD may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation.
- Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.

8.5 Packaging

- Modules use LCD element, and must be treated as such.
  -Avoid intense shock and falls from a height.
  -To prevent modules from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity for long periods.

8.6 Storage

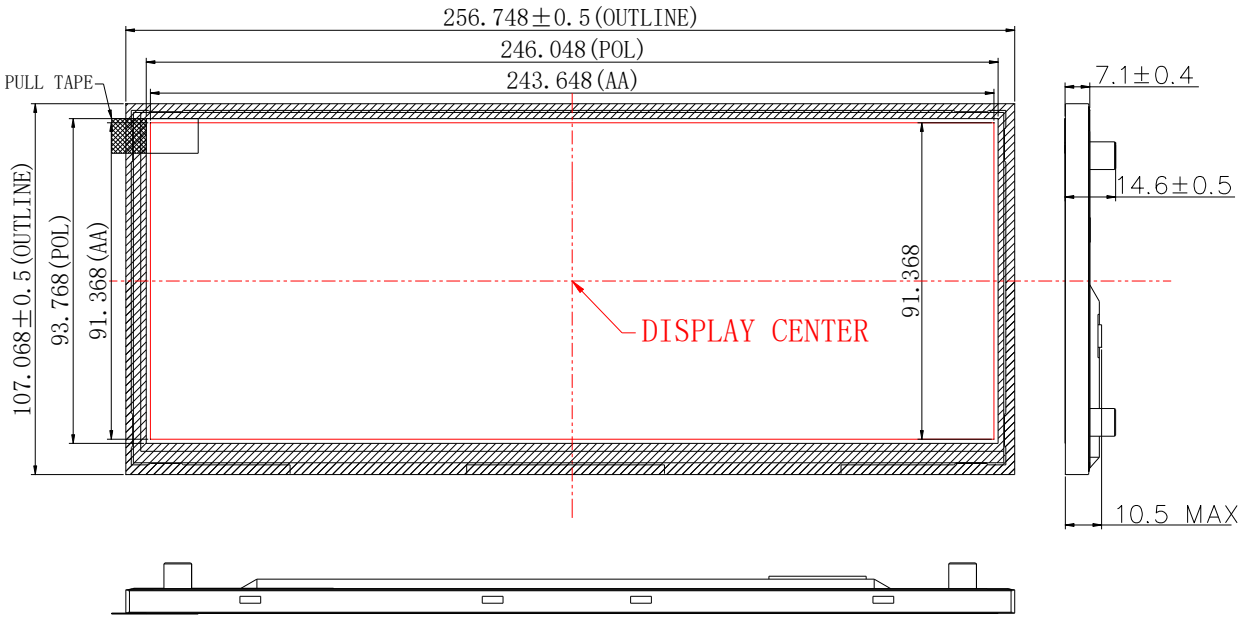
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Relative humidity of the environment should therefore be kept below 60%RH.
- Original protective film should be used on LCD’ s surface (polarizer). Adhesive type protective film should be avoided, because it may change color and/or properties of the polarizers.
- Do not store the LCD near organic solvents or corrosive gasses.
- Keep the LCD safe from vibration, shock and pressure.
- Black or white air-bubbles may be produced if the LCD is stored for long time in the lower temperature or mechanical shocks are applied onto the LCD.
- In the case of storing for a long period of time for the purpose or replacement use, the following ways are recommended.
  -Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.
  -Store in a dark place where neither exposure to direct sunlight nor light is.
  -Keep temperature in the specified storage temperature range.
  -Store with no touch on polarizer surface by the anything else. If possible, store the LCD in the packaging situation LCD when it was delivered.

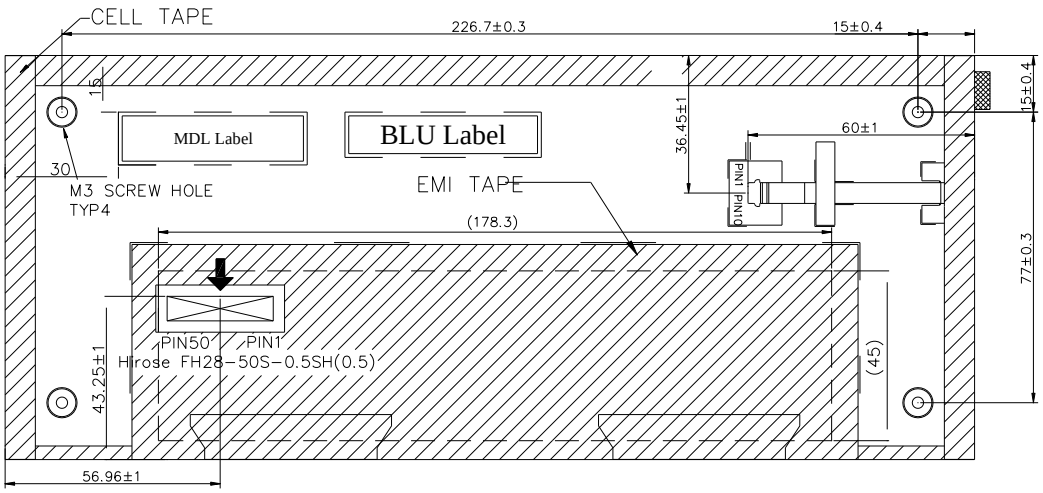
8.7 Safety

- For the crash damaged or unnecessary LCD, it is recommended to wash off liquid crystal by either of solvents such as acetone and ethanol an should be burned up later.
- In the case the LCD is broken, watch out whether liquid crystal leaks out or not. If your hands touch the liquid crystal, wash your hands cleanly with water an soap as soon as possible.
- If you should swallow the liquid crystal, first, wash your mouth thoroughly with water, then drink a lot of water and induce vomiting, and then, consult a physician.
- If the liquid crystal should get in your eyes, flush your eyes with running water for at least fifteen minutes.
- If the liquid crystal touches your skin or clothes, remove it and wash the affected part of your skin or clothes with soap and running water.

9.0 APPENDIX

MDL Outline Dimension





Incoming Inspection Spec Approval Sheet

Product Description：TFT-LCD MDL			
BOEHF Product Name: 10.25FHD_			
Customer :			
Customer Signature	**Date**	**BOE Signature**	**Date**

Record of Revision

Version	Revision Date	Content	Page
1	2019.2.14	Initial Draft	ALL

目录

A: 来料检查基准

1.0 介绍

1.1. 范围

这份 IIS 基准适用于京东方科技集团股份有限公司（下面叫做“供应商”）生产的 TFT-LCD。

1.2. 来料检查权利

买家（顾客）应该在收到 LCD 的 20 天之内（检查期）自费检查。检查结果（接受或是拒绝）应该告知给供应商。 买家在商业允许的拒收程序下才能在检查期内拒绝接受全部的 Lot，根据来料标准来判定拒收的 LCD 数量。如果在检查期间买家没有告知供应商结果，那么买家将失去拒收 LCD 的权利，并且会被供应商默认为已经接受了产品。

1.3. 操作说明

1.3.1 操作手法

- LCD 的 Panel 包括两张薄玻璃，非常容易被损坏，所以在处理 LCD 时应该极其小心。
- 施加过多的压力在 LCD 的 Panel 表面是不允许的，务必确保在组装过程中没有扭转力和压缩力作用在 LCD 上。
- 如果是因为客户压力设置出问题，LCD 可能会出现异显情况，但是这个现象不能说明是 LCD 出现故障，最终结果需要经过双方共同确认。
- 根据视觉角度的规格范围确定每个 MDL 的光学组装角度。
- 组装 LCD MDL 时根据组装规格书来。
- 标注放置温湿度条件。

1.3.2 LCD 处理和清洗注意事项

- LCD 的 Panel 包括两张薄玻璃，非常容易被损坏，所以在处理 LCD 时应该极其小心。LCD 是由玻璃制造而成，因此表面不能承受住强烈的机械撞击或是静态的压力，在处理时避免撞击、振动。粗心对待会严重影响产品，如果 LCD 从高处掉落或是受到强烈的撞击，玻璃可能会碎掉。
- Panel 表面的偏光片是由有机物构成，所以要避免化学品接触到偏光片，否则会导致偏光片的损坏。
- 如果无法避免使用了化学品，需用柔软的布条蘸上下面溶液轻轻擦拭 LCD 表面。
  -IPA(异丙醇),乙醇；不能用干燥、坚硬的材料擦拭 LCD 表面，不然会损坏偏光片和其他部分。不能使用以下溶液擦拭：水、酮类、芳香类溶液。
- LCD 在装配过程中要用柔软的材料包裹运送，因为 LCD 表面的偏光片极易受到坚硬异物的刮伤而损坏。
- 不要让水、化学品掉落在 LCD 表面。
- 对待 ITO pad 区时要特别小心，因为这部分极易被腐蚀，不能让 HCFC、焊剂、氯、硫、唾液或手指接触到 ITO Pad 区。为了保护这个区域，客户要求 ITO 区域要用 UV 胶或是硅胶覆盖。
- 为避免发生线路断开，不要用超声波清洗 LCD。
- 清洗和烘烤温度应低于 80℃。

1.3.3 静电告诫

- LCD 模组使用 C-MOS LSI 驱动，没用信号的输入都会影响到 Vdd 和 Vss，因此建议客户电源开启前不要输入信号，作业时身体要接地，设备要有防静电装置。
- 撕除 LCD 保护膜要慢，角度大约为 30°，不要垂直于 Panel 表面撕膜；可能的话在离子风

机下，湿度 50%下进行以降低静电风险。

- 工作布条应避免使用合成纤维，应使用棉布或是导电纤维布。
- 接触 LCD 前要戴防静电手套和接地的手脚环并穿上接地的防静电鞋。

1.3.4 操作小心事项

- 在规格电压范围内施加工作电压，电压超过会缩短 LCD 寿命，为避免电化学腐蚀应避免使用直流电。
- 不要在电源打开的情况下连接或断开 LCD 与设备。
- 在高温高湿等不正常条件下不要使用 LCD。
- 当 LCD 暴露下强烈气温起伏的环境中（从热到冷或是从冷到热）时可能会受到影响，特别是在从冷到热的强烈气温起伏环境中，产品表面可能会产生水珠并影响偏光片和 LCD 的功能。
- 温度低于规格范围温度时 LCD 响应时间会变长，高于规格温度范围会黑屏，然而这些现象并不意味着 LCD 有故障，回归正常温度范围后 LCD 会变正常。
- 由于 LCD 结构原因，不能长时间显示一个固定模式，会造成残像；如果屏幕显示为多种模式，请添加一个屏幕保护程序。
- ESD 会损坏 Panel，确保作业员在作业过程中佩戴防静电手套，并且在作业过程中工作台和设备要有效接地。
- 将 LCD 放在 BOE Tray 盘中转运，以防止机械损伤。
- LCD 应该被存储在要求的湿度环境下，低湿度会导致静电，高湿度会导致 ITO 腐蚀。
- 使用产品前检查工程说明书。
- 不能将没包装材料覆盖的 LCD 进行堆积重叠。
- LCD 含有液晶，请按当地规定制度处理。
- 不要直接用手触摸 TCP（驱动 IC）、PWB 板。
- 不要触摸玻璃（偏光片）表面。

2.0 概括

2.1. 抽样方法

除非有其他书面的协议，不然抽样检查标准按下面的抽样标准执行；

2.1.1. Lot 大小： 每个型号 1 个托盘；

2.1.2. 抽样类型： 随机抽样

2.1.3. 检查等级： II

2.1.4. 抽样表： MIL-STD-105E

主要不良：AQL=0.65

次要不良：AQL=1.5

2.2. 检查环境

2.2.1.检查环境条件：

a. 室内温度: 23±2℃；

b. 湿度: 60±10% RH；

c. 外部环境光照：300~700LUX（功能测试为150~250LUX）；

2.2.2. 检查距离

Panel和检查者眼睛之间的距离：30CM~50CM；

2.2.3. 检查角度

ADS产品：面向Panel，所有方向45°角内（与垂直线）（参照产品视角）；

TN产品：面向Panel，所有方向10°角内（与垂直线）（参照产品视角）；

2.2.4. 检查区域 ：

显示区域(Active区域) ；

2.3. 主要不良定义

2.3.1. 黑/白点

显示区域显示时在L0/L127/L255画面显示为黑色/白色的点；

2.3.2. 亮/暗线

显示区域显示时在R/G/B画面下可见的明亮/暗色的线，纵向的、横向的、或者是交叉的；

2.3.3. 亮点(Bright Dot)

显示区域显示时在R/G/B画面下可见的明亮的点（sub-pixels）；

2.3.4. 暗点(Dark Dot)

显示区域显示时在R/G/B画面下可见的暗色的点（sub-pixels）；

2.3.5. Mura

显示区域显示时在L0/L127/L255画面可见的发亮程度不均一的现象区域；

2.3.6. 视觉检查

在通电状态下对产品进行检查；

2.3.7. 外观检查

在未通电状态下对产品进行外部检查；

3.0 检查基准

3.1. 视觉检查基准

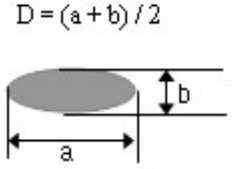
单元尺寸: mm

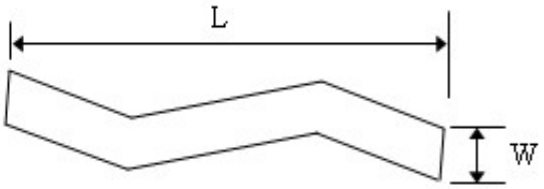
Items		Details	Inspection Criteria		Type
			A Area	B/C Area	
Visual (Function) Inspection	Pixel Defects	亮点（W,R,G,B）	N≤0	Ignore	Minor
		暗点	N≤4		
		连续暗点	N≤0		
	Foreign Material /Dent/ Bubble/ Spots//Extraneous Substances	点状	D < 0.15，Ignore； 0.15<D≤0.35,N≤3； D > 0.35.N=0	Ignore	Minor
		线状	L≤1mm，W≤0.05mm,N≤3; W > 0.05mm, N≤0	Ignore	Minor
	Scratch	线状	W < 0.05mm，Ignore； 0.5mm≤L≤3mm,W≤0.1mm, N≤3； W > 0.1mm,N≤0	Ignore	Minor
	Mura		5%ND 不可见，或参照限度样本	Ignore	Minor
	Total Minor defect		N≤8		
	Abnormal Display		Not Allowed	Ignore	Major
	Line Defect		Not Allowed	Ignore	Major

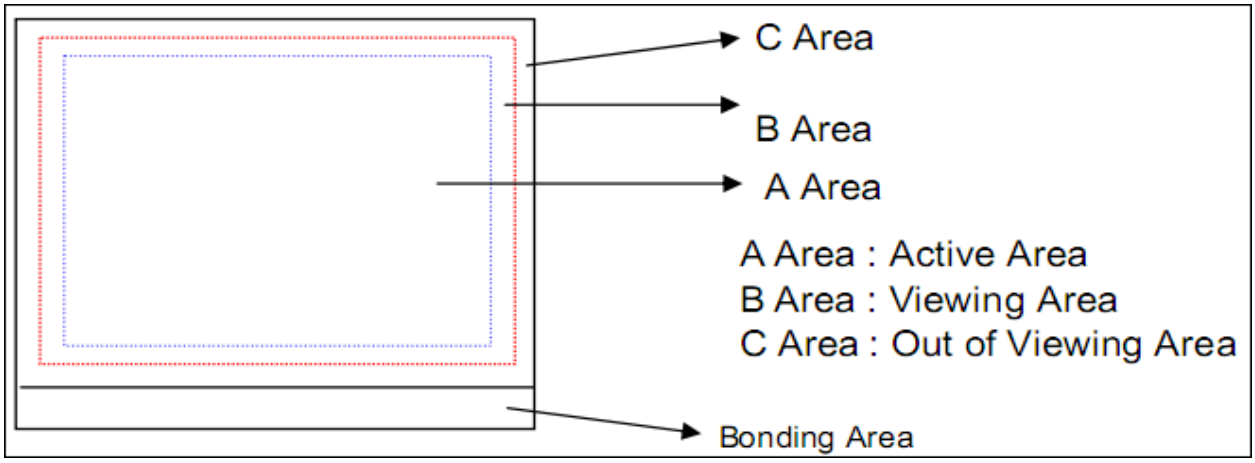
注意: 所有不良的的测定都基于 Panel 上有偏光片

※ 备注 1) D =直径, L = 长度, W = 宽度, N = 数量

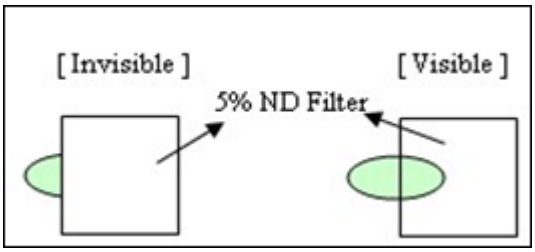
※ 备注 2) 区域定义 A Area:显示区 B/C Area:非显示区





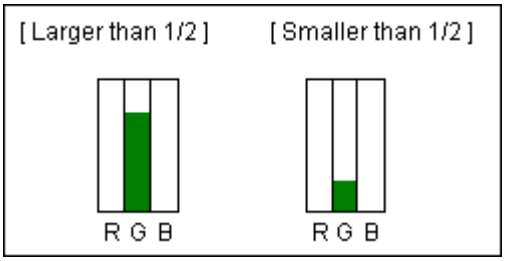


※Note 3) 针对 pixel 的亮点不良，背光正常点亮的条件下，大于 1/2 sub-pixel 的点为亮点；小于 1/2 sub-pixel 的个数不计。若使用 5% ND pixel 亮点/暗点不可见，不计入不良数量。



"No dot defect"
(=ignored)

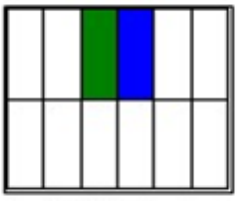
"1 dot defect"
(=counted)



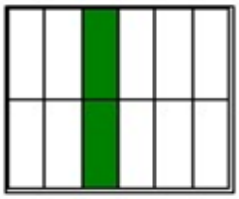
"1 dot defect"
(=counted)

" No dot defect "
(= Not counted)

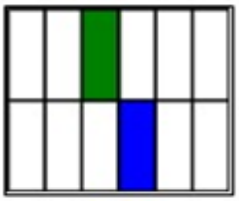
※Note 4) 连续 Pixel 亮点/暗点类型



Type 1



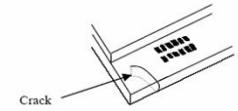
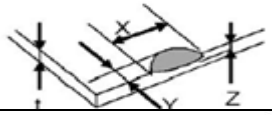
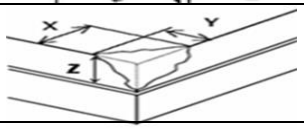
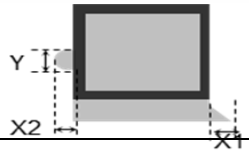
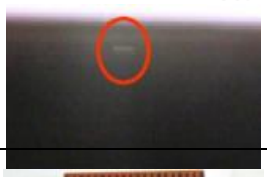
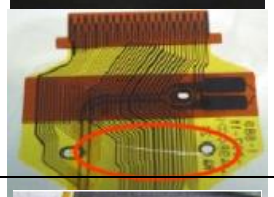
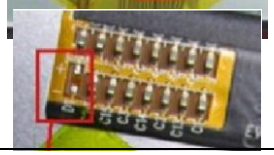
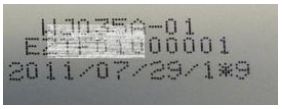
Type 2



Type 3

3.2. 外观检查基准

不良位置	Items	Criterion for Defects	Type	适用范围

All	Stain		可擦拭 OK		All
PNL 相关	Crack		不允许	Major	出货状态为 Single Cell/FOG /MDL 产品适用
	Side Chipping		不影响功能和组装	Minor	
	Corner Chipping		不影响功能和组装	Minor	
	Burr		不影响功能和组装	Minor	
	划伤/凹点		贴 POL 之后，参点状/线状异物（划伤）基准进行判定	Minor	
FPC/PCB 相关	短路/断路		不允许	Major	出货状态为 FOG/MDL 产品适用
	元器件		元器件缺失不允许	Minor	
Backlight 相关	喷码		关键信息可识别 OK	Minor	出货状态为 MDL 产品适用
	划伤		Limit Sample	Minor	
	污渍		可擦拭 OK	Minor	

B：BOE客户质量服务流程

为了提供给客户更好的服务，BOE应该提供如下的售后产品质量服务过程：

- 根据P/O，BOE将产品运送到客户指定地点。
- 客户要对来料产品做IQC检查。
- 检查基准由BOE提供，并由客户确认通过，检查手法和不良按双方达成的基准协议确认。
- 为了保证和客户端及时的产品质量沟通和有效的服务，客户端QA部门每周向BOE CS部门提供周别质量报告。
- 客户使用BOE产品要遵守说明书，对于违反说明书的使用BOE不负责。
- 双方在处理产品质量问题时要遵循友好合作策略，对于责任方归属不明确时，双方要谈判解决。
- 产品保质期为12个月，从交货日期开始算。

质保期失效

在下列情况中，质保期将会失效：

a. 质保时间超期；

b. LCM在没有供应商的允许下交由第三方修复；

c. LCM在没有供应商的允许下，被客户或是客户的代表方拆开或是维修时。