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DOCUMENT TITLE:
SPECIFICATION
OF
TFT MODULE TYPE

CUSTOMER	
CUSTOMER REFERENCE NO.	
MODEL NUMBER	COG-VLBJT038-01
REFERENCE NO.	AV123Z7M-N17
CUSTOMER APPROVAL	
DATE	

DISTRIBUTION LIST: MARKETING

B5 12.3 Inch MDL Final Product Specification

Rev. P0

HEFEI BOE XINSHENG OPTOELECTRONICS TECHNOLOGY

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	2019.1.11	Zhongshan Wang

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

12.3inch module is a color active matrix TFT LCD module using amorphous silicon TFT‘ s (Thin Film Transistors) as an active switching devices. It is a transmissive type display operating in the normal black. The TFT-LCD has a 12.3 inch diagonally measured active area with resolutions (1920 horizontal by 720 vertical pixel arrays). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this panel can display 16.7M colors.

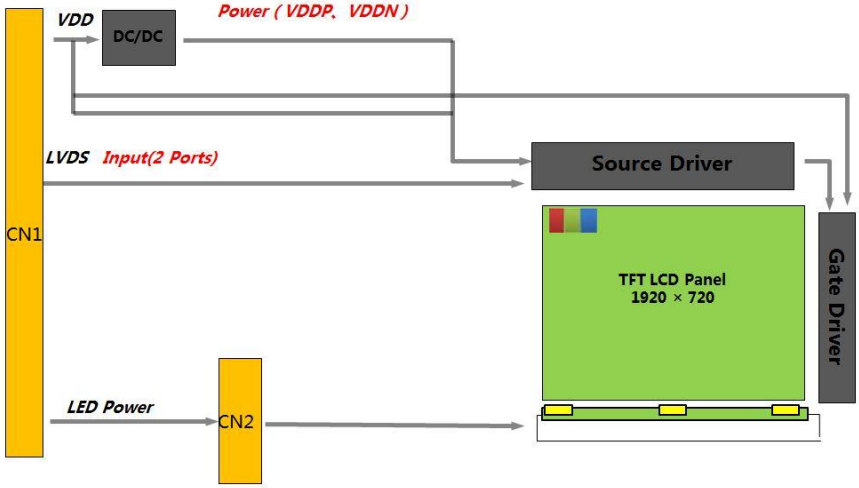


Figure 1-1 Block Diagram

1.2 Features

- Wide viewing angle (U/D/L/R)：88/88/88/88
- Color Gamut：72%
- Cell thickness：1.0t
- LVDS Interface

1.3 Application

- **Vehicle-mounted Production**

1.4 General Specification

<Table 1-1 General Specifications>

Parameter	Specification	Unit	Remarks
Active area	292.032 (H) × 109.512 (V)	mm	8 : 3
Number of pixels	1920(H) ×720(V)	pixels	
Pixel pitch	0.1521(H) ×RGB×0.1521 (V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M	colors	
Color gamut	72%	%	Typ.
Display mode	Normally black		
Surface Treatment	HC		CF POL
Module outline	308(H) x 127 (V)	mm	
Viewing Direction (Human Eye)	U/D/L/R Min 80/80/80/80 Typ 88/88/88/88		
Driver IC	3*HX8290-A-LT 1*HX8695-E-LT		Single gate 3S+1G IC方案

Note:
1.At the U/D/L/R direction, the viewing angle is same;
2.The TFT and CF Align Direction;

Figure 1-2 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 2-1

< Table 2-1 Environment Absolute Maximum Ratings>

Parameter	Symbol	Min.	Max.	Unit	Remarks
LC operating Voltage *1)	V_{OP}	-	5.7	V	Ta=25+/-2°C
Operating Temperature (Humidity)	T_{OP}	-30	+85	℃	
	RH	-	90	%	At 60°C
Storage Temperature (Humidity)	T_{ST}	-40	+90	℃	
	RH	-	90	%	At 60°C

*1)Liquid Crystal driving voltage
Due to the characteristics of LC Material, this voltage varies with environmental temperature.

3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

Ta=25+/-2°C

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
TFT Gate ON Voltage	VGH	16	-	18	V	
TFT Gate OFF Voltage	VGL	-15	-	-10.5	V	
TFT Common Electrode Voltage	VCOM	-3	-	0	V	TBD
Voltage of VCC		3	-	3.5	V	
Current of VCC		150	-	550	mA	
Supply current of LED backlight	Per string			100	mA	9 LED
Total Supply current of LED Backlight	I_{LED}Total			400	mA	4 strings
Supply voltage of LED backlight	Per string	24.3	27.9	30.6	V	4 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 : Total 36 Packages,4 strings(parallel),9 packages(Serial)

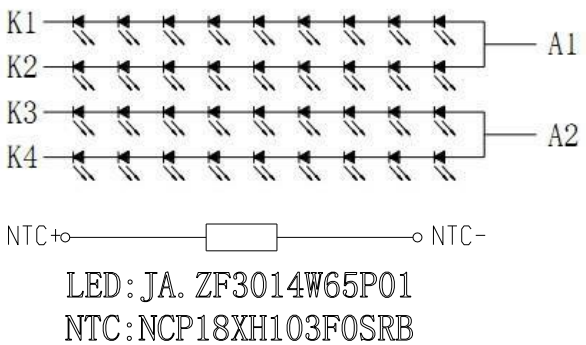


Figure 3-1 LED&NTC Diagram

4.0 OPTICAL SPECIFICATION

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 (Goniometer 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°. The center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

<Table 4-1 Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	80	88	-	Deg.	Note 1
		Θ_9		80	88	-	Deg.	
	Vertical	Θ_{12}		80	88	-	Deg.	
		Θ_6		80	88	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0° (Center) Normal Viewing Angle	-	1100	-		
White luminance uniformity		ΔY		70	80		%	Note 4
NTSC		%			72%			
White Chromaticity		x_w		Typ-0.03	0.2834	Typ+0.03	-	TBD, update after locking spec Note 5
		y_w			0.3104		-	
Reproduction of color	Red	x_R			0.649		-	
		y_R			0.328		-	
	Green	x_G			0.317		-	
		y_G			0.625		-	
	Blue	x_B			0.146		-	
		y_B			0.058		-	
Response Time (Rising / Falling)		T_{RT}	25℃ -20℃ -30℃	-	-	25 200 350	ms	Note 6
BLU Derating		T	70℃	-	-	30%		F 5-4

Parameter	Condition	Min.	Typ.	Max.	Remark
Luminance	Θ = 0° (Center) Normal Viewing Angle	-	1000	-	1 BEF (10°) + 1 DBEF
Flicker		-	-	-20dB	Interval Gray Pattern between L0 and L127, after 30s light up stably

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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.
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 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Center trans of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as :
   ΔY = (Minimum Luminance of 9points / Maximum Luminance of 9points) * 100
5. The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurement condition is C - light source.
6. The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the transmittance to change from 10% to 90% is Tr, and 90% to 10% is Tf.

5.0 OPTICAL TEST APPENDIX

Figure 5-1 The Definition of Vth & Vsat

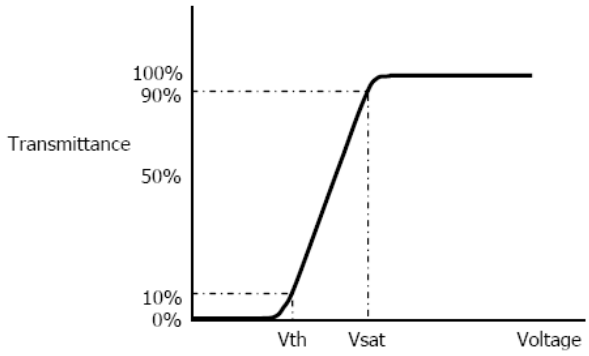


Figure 5-2 Measurement Set Up

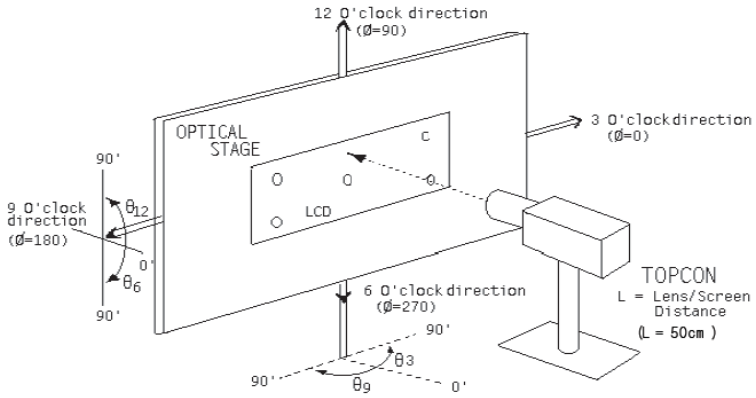


Figure 5-3 Response Time Testing

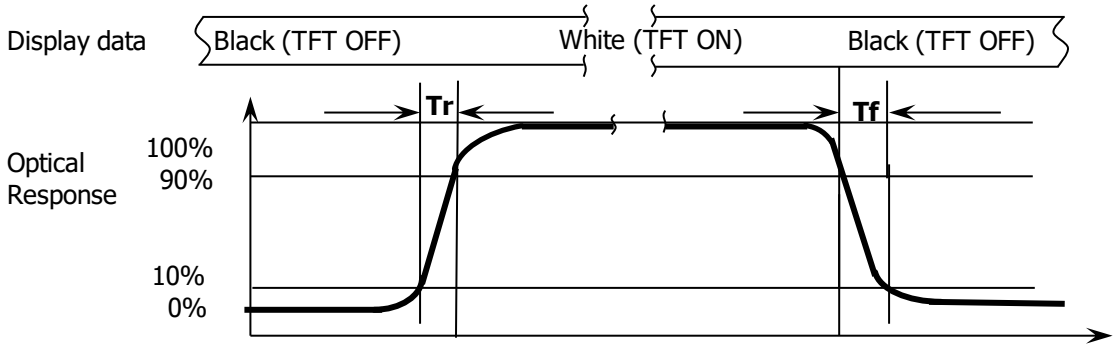
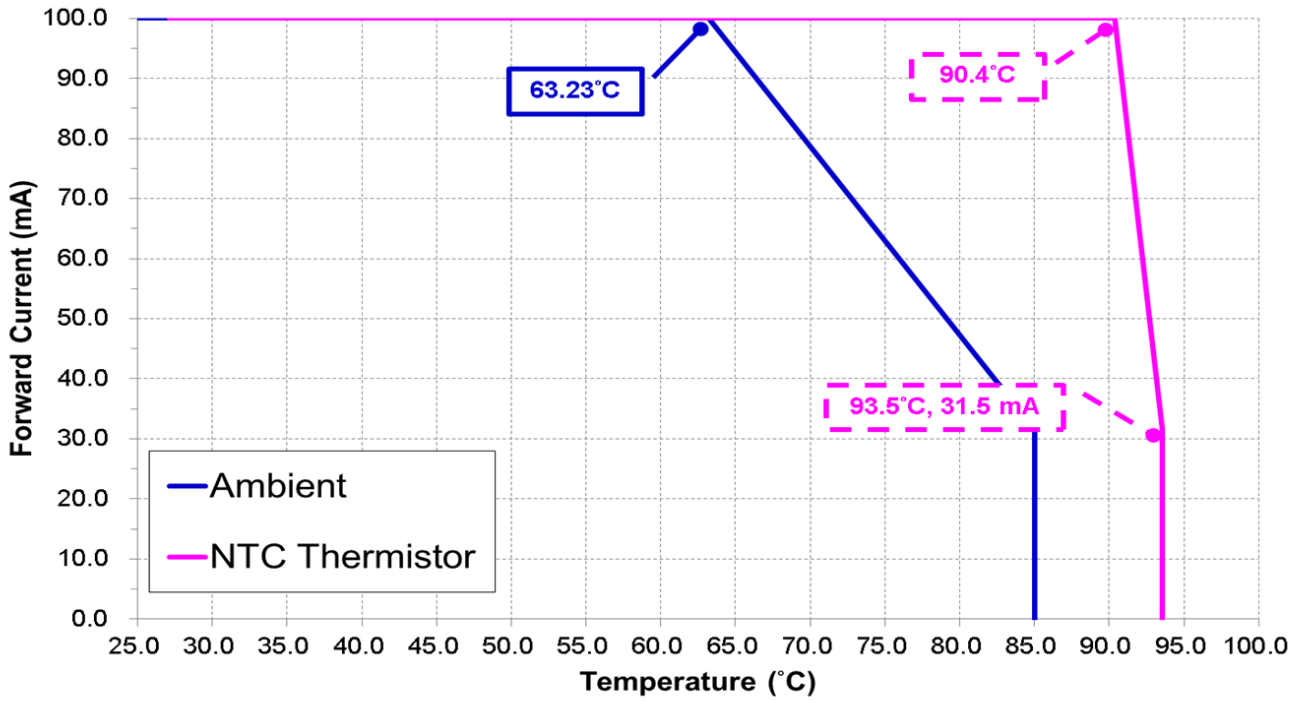


Figure 5-4 Derating.



6.0 MECHANICAL CHARACTERISTICS

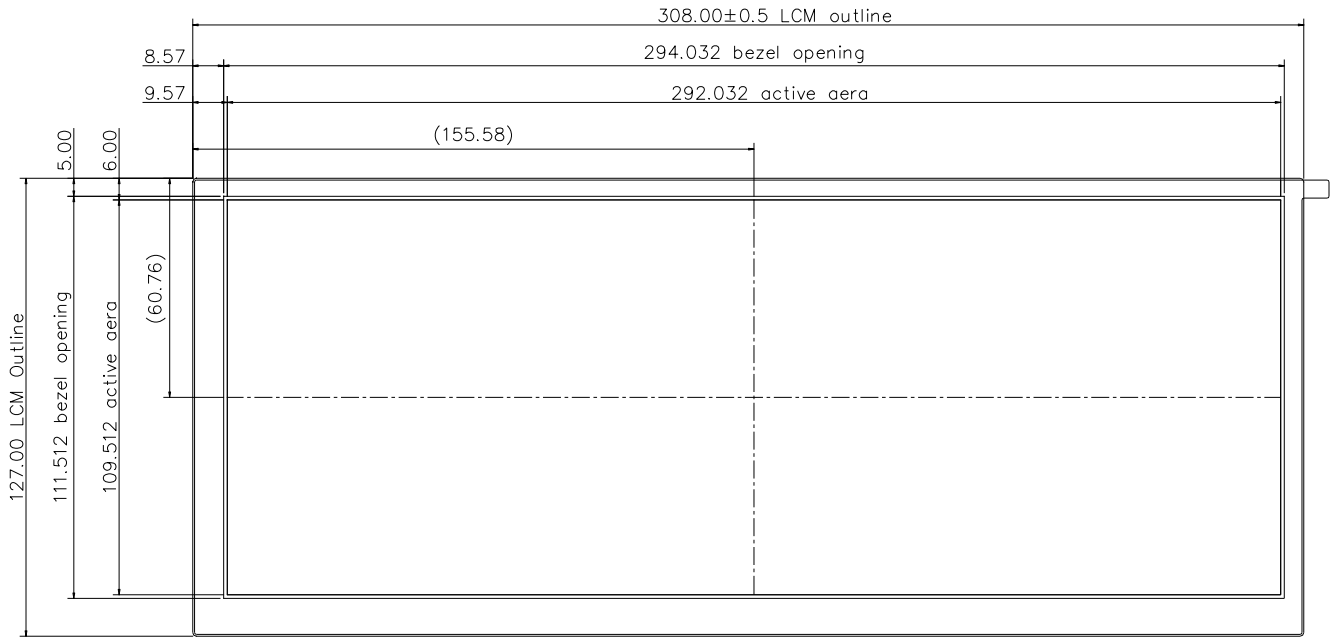
6.1 Dimensional Requirements

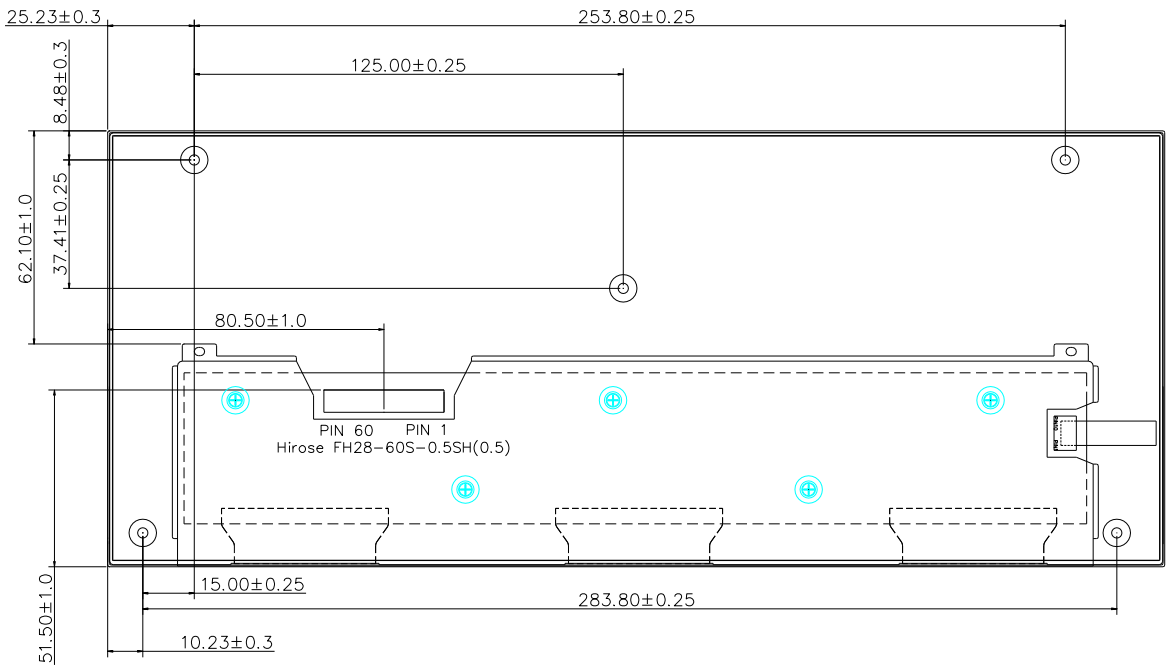
Figure in next page shows mechanical outlines for the panel

<Table 6-1 Dimensional Parameters>

Parameter	Specification	Unit
Active Area	292.032 (H) × 109.512 (V)	mm
Number of pixels	1920(H) ×720(V)	Pixels
Pixel pitch	0.1521(H) ×RGB×0.1521 (V)	mm
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M	colors
Display mode	Normally black	
Module thickness	7.8 / 12.3	mm
Module outline	308x127	mm
AA-MDL outline L/R/U/D	9.568/6.4/6/11.488	mm

7.0 MDL Outline Dimension





Unit : mm

8.0 RELIABILITY TEST

<Table 8-1 Reliability test>

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 90 ℃, 500 hrs	
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 = 65 ℃, 90%RH, 500 hrs	
6	Thermal shock	Ta = -30 ℃ ↔ 85 ℃ (0.5 hr), 100 cycle	Non-operation
7	Image Sticking	5*5 Pattern, 2hrs 25℃ check pattern Gray 127,Spec:≤L2 after 5 mins, the mura must be disappeared completely	
8	ESD test	Air Voltage:±15KV Contact Voltage:±8KV R: 330Ω C: 150pF 5 time	Note
9	Vibration Test	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ 8H	

Note
Class B，有异常而可恢复，比如闪屏
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。

9.0 INTERFACE CONNECTION

9.1 The LCD Module Electrical Interface Connection

The Recommended connector is Hirose FH28-60S-0.5SH(0.5)
The connector interface pin assignments are listed in Table 9-1

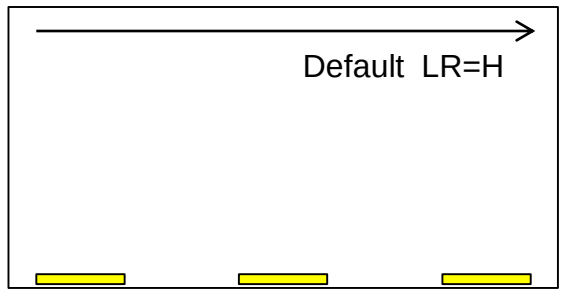
Table 9-1 Pin Assignments for the LCD Connector

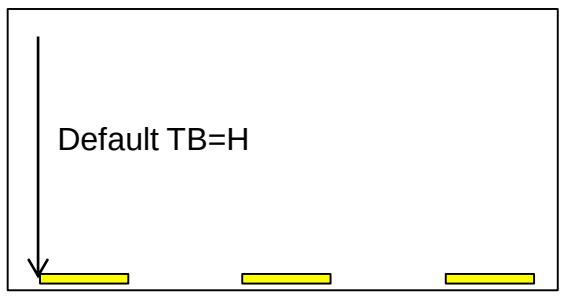
PIN	SYMBOL	Description	Remark
1	GND	Ground	
2	VCC	Power Supply	
3	VCC	Power Supply	
4	GND	Ground	
5	ORXIN0-	LVDS Receiver Signal(-)	
6	ORXIN0+	LVDS Receiver Signal(+)	
7	GND	Ground	
8	ORXIN1-	LVDS Receiver Signal(-)	
9	ORXIN1+	LVDS Receiver Signal(+)	
10	GND	Ground	
11	ORXIN2-	LVDS Receiver Signal(-)	
12	ORXIN2+	LVDS Receiver Signal(+)	
13	GND	Ground	
14	ORXCLKIN-	LVDS Receiver Signal(-)	
15	ORXCLKIN+	LVDS Receiver Signal(+)	
16	GND	Ground	
17	ORXIN3-	LVDS Receiver Signal(-)	
18	ORXIN3+	LVDS Receiver Signal(+)	
19	GND	Ground	
20	ERXIN0-	LVDS Receiver Signal(-)	
21	ERXIN0+	LVDS Receiver Signal(+)	
22	GND	Ground	
23	ERXIN1-	LVDS Receiver Signal(-)	
24	ERXIN1+	LVDS Receiver Signal(+)	
25	GND	Ground	

PIN	SYMBOL	Description	Remark
26	**ERXIN2-**	LVDS Receiver Signal(-)	
27	**ERXIN2+**	LVDS Receiver Signal(+)	
28	**GND**	Ground	
29	**ERXCLKIN-**	LVDS Receiver Signal(-)	
30	**ERXCLKIN+**	LVDS Receiver Signal(+)	
31	**GND**	Ground	
32	**ERXIN3-**	LVDS Receiver Signal(-)	
33	**ERXIN3+**	LVDS Receiver Signal(+)	
34	**GND**	Ground	
35	**NC**	NO CONNECTION	
36	**RESET**	RESET Signal	
37	**STBYB**	STBYB Signal	
38	**SCL**	SPI Signal	
39	**SDA**	SPI Signal	
40	**CSB**	SPI Signal	
41	**ATREN**	Enable auto reload Single	
42	**NC**	NO CONNECTION	
43	**VOTP**	OTP Voltage	
44	**GND**	Ground	
45	**LR**	Horizontal shift direction	Note 1
46	**TB**	Vertical shift direction	Note 1
47	**FAULT**	Fault dection	
48	**NC**	NO CONNECTION	
49	**LEDA**	Power Supply of LED	
50	**LEDA**	Power Supply of LED	

PIN	SYMBOL	Description	Remark
51	**NC**	NO CONNECTION	
52	**NC**	NO CONNECTION	
53	**LEDK1**	Ground of LED	
54	**LEDK2**	Ground of LED	
55	**LEDK3**	Ground of LED	
56	**LEDK4**	Ground of LED	
57	**NC**	NO CONNECTION	
58	**NTC_A**	Thermistor Sensor	
59	**NC**	NO CONNECTION	
60	**NTC_K**	Thermistor Sensor	

Note 1：





10.0 SIGNAL SPECIFICATION

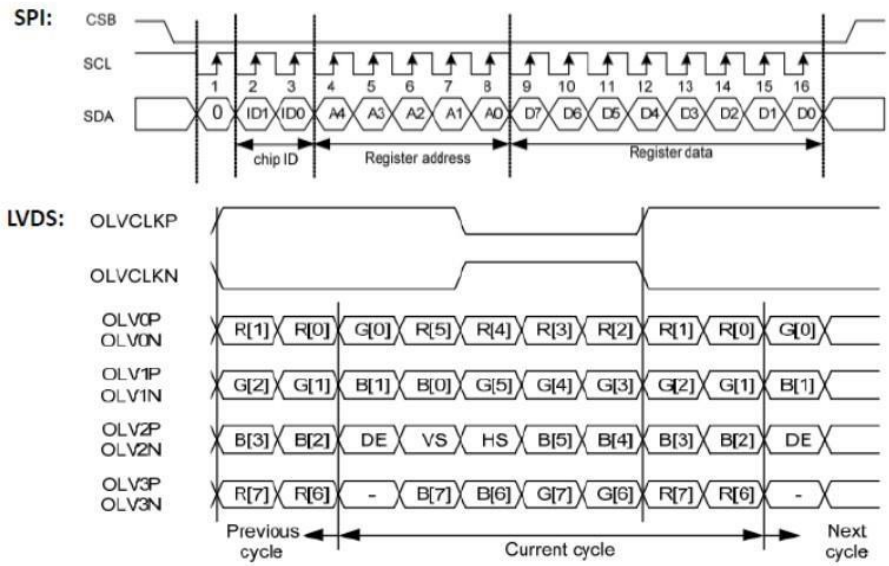
10.1 LVDS Signal Timing

Table 10-1 LVDS Signal Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RxFCLK		44.1		MHz	
Horizontal Display Area	thd		960		DCLK	
HS Period	th	984	992	1005	DCLK	
HS Blanking	Thb+thfp		32		DCLK	
Vertical Display Area	tvd		720		TH	
VS Period	tv	730	741	753	TH	
VS Blanking	Tvbp+tvfp		21		TH	
Input data skew margin	TRSKM	400			ps	
Clock high time	TLVCH	2.45	3	4.55	ns	
Clock low time	TLVCL	2.45	4	4.55	ns	
PLL wake-up time	TenPLL			150	us	

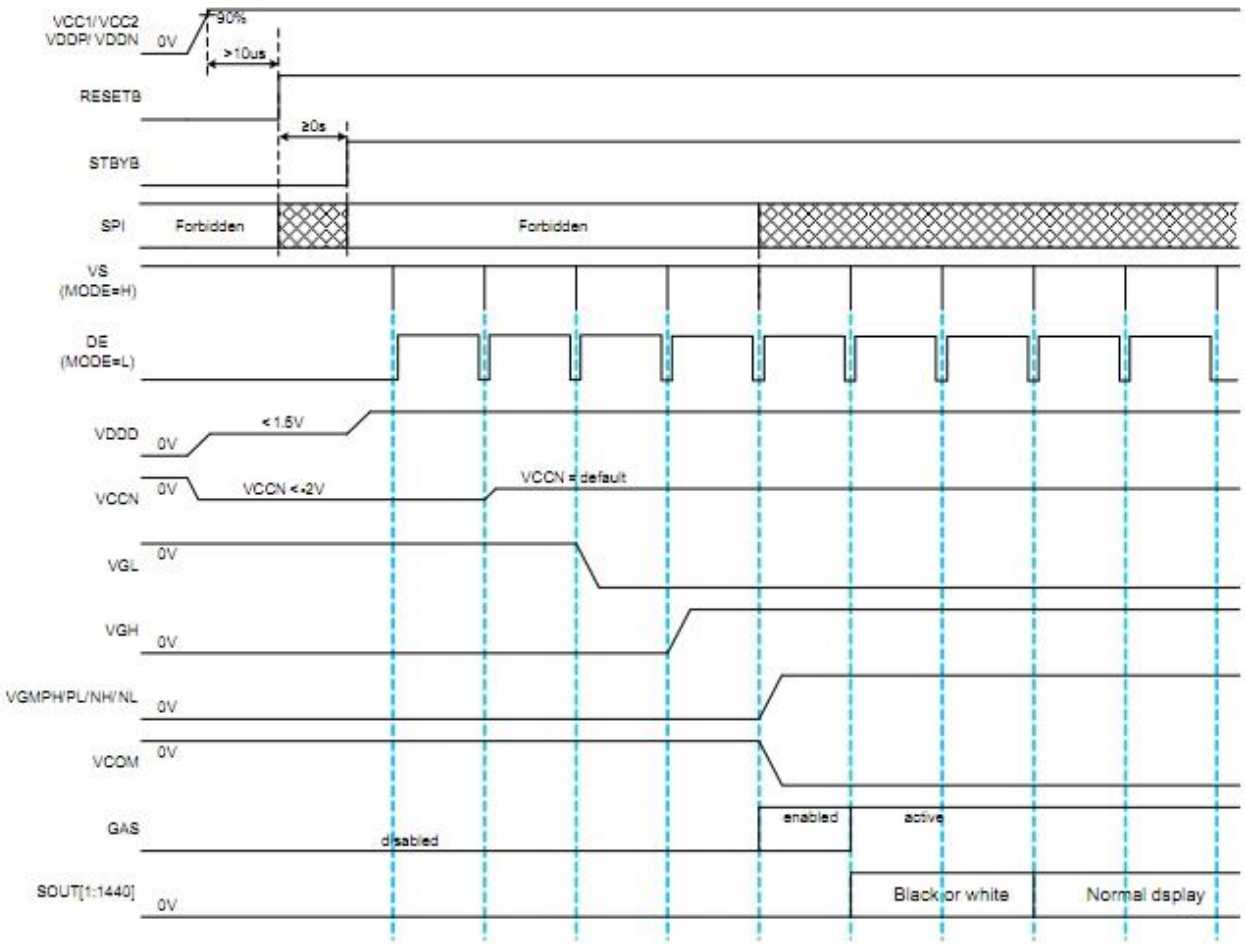
10.2 Signal Format

Table 10-2 Signal Format



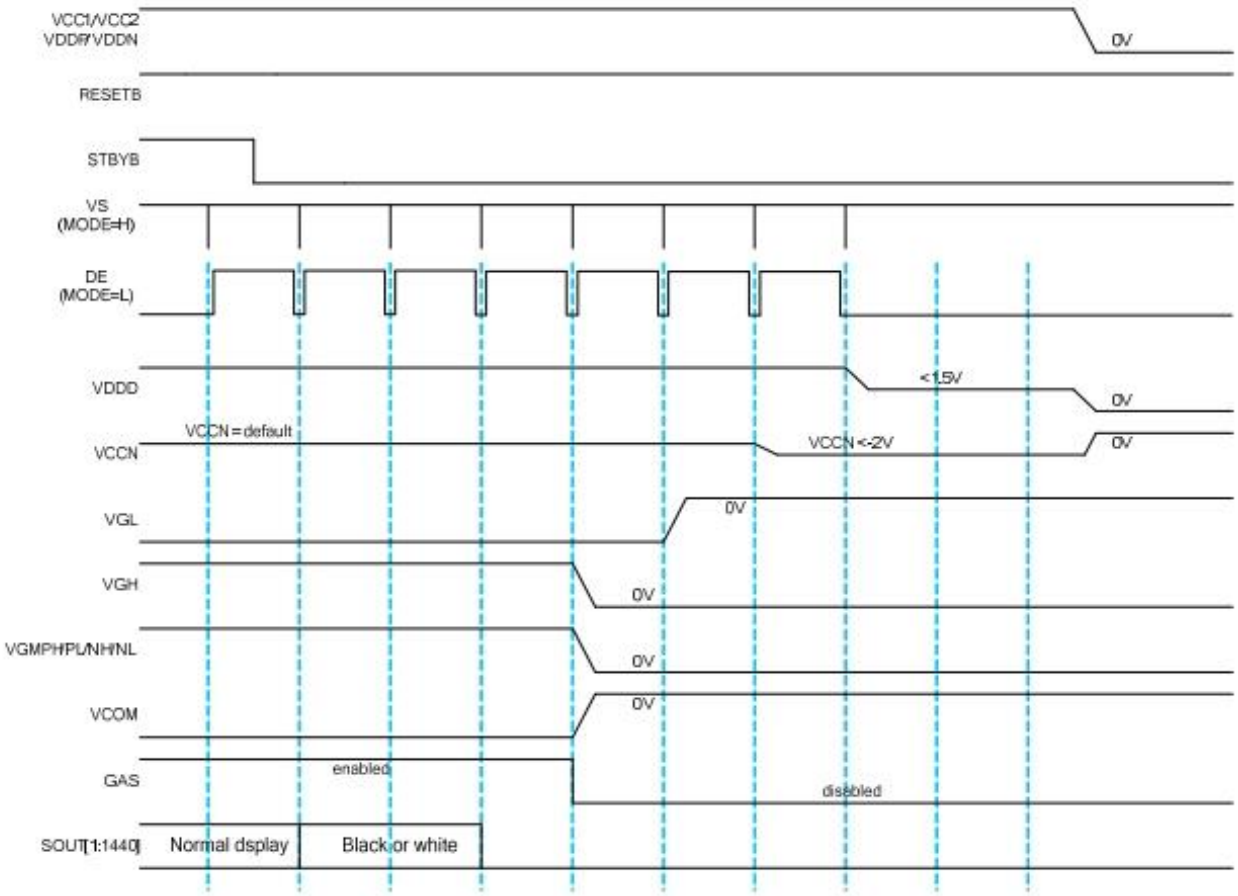
11.0 POWER ON/OFF SEQUENCE

11.1 POWER ON SEQUENCE



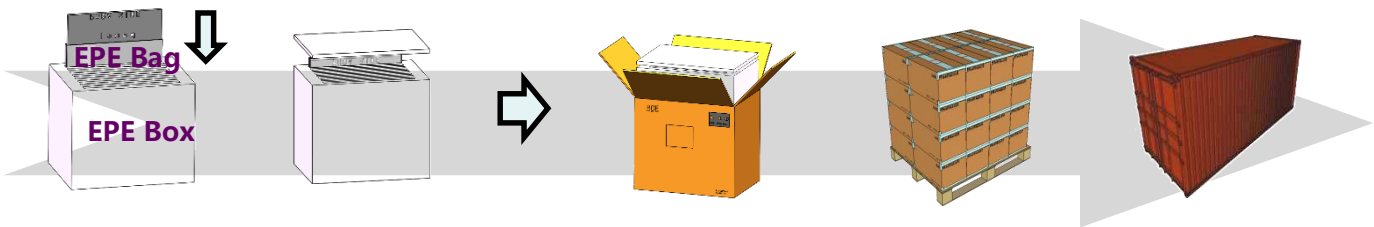
11.0 POWER ON/OFF SEQUENCE

11.2 POWER OFF SEQUENCE



12. Package

12.1. Packing Description



1-. 将1 pcs 贴好硬保的Panel放入PE Bag

注意：1.PCBA侧统一朝上

2.EPE Bag开口向显示面折叠，需避让伸出的FPC，再使用胶纸粘合折叠处

2-. 将1pcs产品横向插入卡槽内

-. 将1pcs EPE Cover盖在 EPE Bottom 上，将整体装入Box

-.容量：7pcs MDL /EPE Box

3-.每个Pallet上4排2列码放，

共堆码4层Box，共计32ea Box

-. Pallet外进行护角&缠膜包装

-. 容量：224pcs Panel / Pallet

4-.双排双层码放

-.容量：52EA Pallet/Truck,

11648 pcs Panel/Truck

Incoming Inspection Spec Approval Sheet

Product Description： TFT-LCD MDL			
BOEXS Product Name: 12.3” 1920*720			
Customer :东风电驱_东风商用车			
Customer Signature	**Date**	**BOE Signature**	**Date**

Record of Revision

Version	Issue Date	Content	Page
1	2019.2.12	Rev.1	ALL

Content

A: Incoming Inspection Specification

1.0 Introduction

1.1. Scope

This incoming Inspection Standard is limited to the TFT-LCD LCD which supplied by BOE Technology Group Co.,Ltd. (hereinafter called the "Supplier") to its Customer.

1.2. Incoming inspection Right

The buyer (customer) shall inspect the LCD within twenty days from receiving as inspection period at its own cost. The results of the inspection, acceptance or rejection shall be notified to Supplier .

The buyer may, under commercially reasonable reject procedures, reject an entire lot within inspection period, define unacceptable LCD number in accordance with incoming inspection standard. Should the buyer fail to notify the result of the inspection to supplier within the inspection period, the buyer's right to reject the LCD shall lapse and whole lot shall be deemed to have been accepted by the buyer.

1.3. Operation Instruction

1.3.1 Mounting Method

- As the panel of LCD which consists of two thin glasses with polarizers was easily get Damaged, please handling LCD cautiously。
- Excessive stress or pressure on the glass of the LCD should be avoided. Please insure that no torsional or compressive forces are applied to the LCD unit when it is mounted.
- Abnormal display may occur under press setting problem from customer, which does not mean the malfunction of the LCD and should be verified by both party.
- Optimum mounting angle was determined based on specified viewing angle range.
- Please assemble LCD module in accordance with the specification.
- Please mark condition of humiture.

1.3.2 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 that not to touch the polarizers or it may 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 material 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.
  LCD should be stored in static-protective & vacuum polythene bag, please assemble it When it expose to the air within 3 days to avoid ITO corrosion
- Please clean the LCD without ultrasonic to avoid line open.
- Temperature of clean and bake should be less than 80℃.

1.3.3 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.

1.3.4 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.
- Static electricity (ESD) will damage the panel,. Please make sure that operators wear static-protective glove effectively and working tables &device are effectively grounded during operation and other ESD protective method
- Please place LCD on the tray provided by BOE while moving it, in order to avoid mechanical damage.
- LCD should be stored in required humidity. Low humidity may add static, while high humidity may corrode the ITO circuit of LCD product.
- Before use the LCD. Please check the Engineering specification.
- Please keep the LCD in the specified, original packing boxes when storage.
- LCD contain a small amount of Liquid Crystal and Mercury. Please follow local ordinances or regulations for disposal.
- DO NOT press the area covered with PET or such materials. These are weak point of LCD since of TCPs (Driver ICs) and PWBs.
- Please DO NOT touch the surface of glass (Polarizer).

2.0 Generals

2.1. Sampling Method

Unless otherwise agreed upon in writing ,the sampling inspection shall be applied to the customer's Incoming inspection.

2.1.1. Lot Size: 1 pallet per same model;

2.1.2. Sampling type: Random sampling;

2.1.3. Inspection level: II

2.1.4. Sampling table: MIL-STD-105E

Major Defect: AQL=0.65

Minor Defect: AQL=1.5

2.2. Inspection Environment

2.2.1.Inspection environment conditions:

a. Room temperature: 23±2 ℃ ;

b. Humidity: 60 ± 10% RH;

c. Inspection Ambient Illumination : 300~700 Lux (150~250 Lux for function test);

2.2.2. Viewing Distance

The distance between the panel and the inspector's eyes shall be at 30CM~50CM;

2.2.3. Viewing Angle

performing in front of the panel All directions for inspecting the sample should be:

ADS Production： within 45º to perpendicular line.；

TN Production： within 10º to perpendicular line.；

2.2.4. Inspection Area :

Display Area (Active Area)

2.3. Main Defect Definitions

2.3.1 Black / White Spots

Points on display which appear Black/ white at L0/L127/L255 .

2.3.2. Dark / Bright Lines

Lines on display which appear dark/bright at R/G/B. such as vertical, horizontal, or cross lines.

2.3.3. Bright Dot Defects

Dots(sub-pixels) on display which appear bright in the display area at R/G/B.

2.3.4. Dark Dot Defects

Dots(sub-pixels) on display which appear dark in the display area at R,G,B Color Pattern.

2.3.5. Mura

Mura on display which appears darker / brighter against background brightness on parts of display area at L0/L127/L255

2.3.6. Visual Inspection

Inspect PNL in operation

2.3.7. Appearance Inspection

External inspection for Panel in Non Operation

3.0 Inspection Criteria

3.1. Visual Inspection Criteria

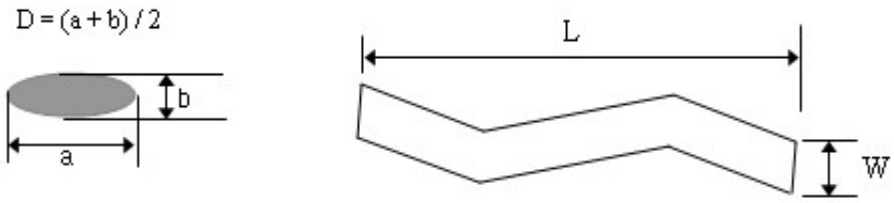
Dimensional unit: mm

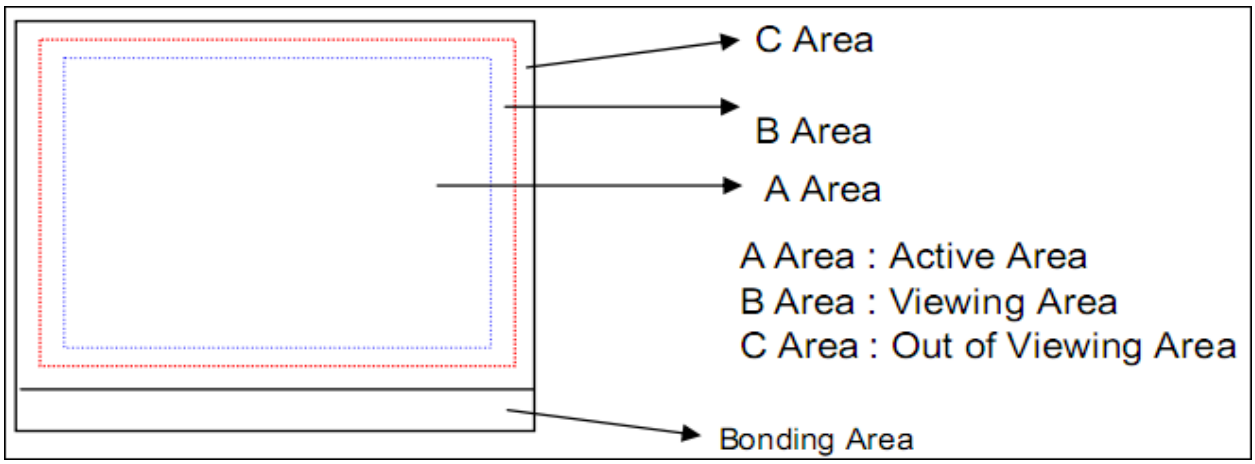
Items		Details	Inspection Criteria		Type
			A Area	B/C Area	
Visual (Function) Inspection	Dent on polarizer / Bubble on polarizer/ Spots/Extraneous Substances	Circular Type	D≤0.2,Ignore; 0.2<D≤0.35,N≤4,DS＞3mm; D＞0.35,N=0	Ignore	Minor
		Linear Type	L≤0.5，refer to circular Type; W≤0.1，Ignore; 0.1<W≤0.20 and 0.5＜L ≤5,N≤4, DS＞3mm；, W＞0.2,refer to circular type;		
	Pixel Defects	Bright Dot	N≤0	Ignore	Major
		Dark Dot	N≤5, DS＞3mm		
		Bright + Dark Dot	N≤5, DS＞3mm		
		Adjacent Dark Dot	N≤1		
	Line Defects	Bright Line, Dark Line	Not Allowed		
	No Display		Not Allowed		
	Abnormal Display		Not Allowed		
	Mura		5%ND not visible, or reference limit samples		Minor

Remark: The determination of all defects is based on the panel with Polarizer.

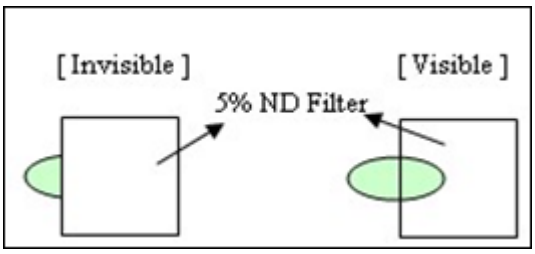
※ Note 1) D = Diameter, L = Length, W = Width, N = Number

※ Note 2) Definition of the Area A Area: Display area B/C Area: No display area



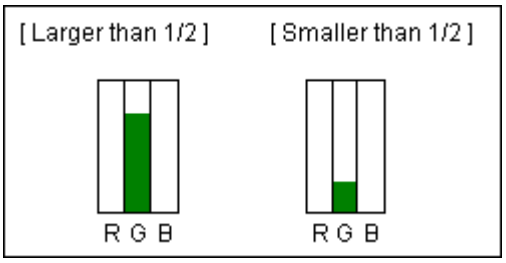


※Note 3) For pixel defect, dot means a sub-pixel. Dot defects should be larger than half size of a sub-pixel. Dot which is invisible through 5% ND filter or smaller than 1/2 of sub-pixel size will not counted as "1 dot" defect.



"No dot defect" (=ignored)

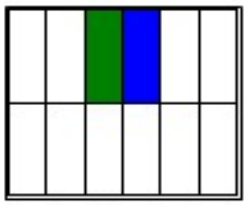
"1 dot defect" (=counted)



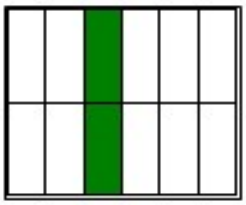
"1 dot defect" (=counted)

"No dot defect" (=ignored)

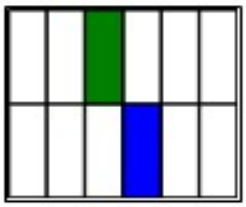
[2 adjacent dots defect]



Type 1

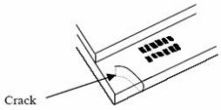
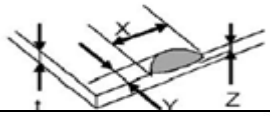
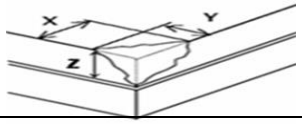
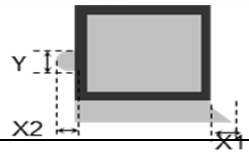
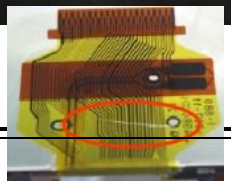


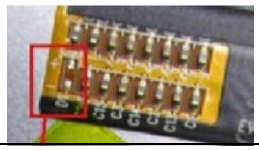
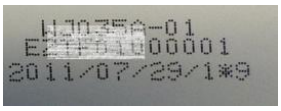
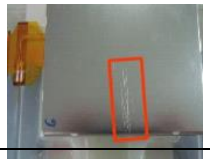
Type 2



Type 3

3.2. Appearance Inspection Criteria

location	Items	Criterion for Defects		Type	scope
All	Stain		Removable stain is OK	-	All
Be related to PNL	Crack		Not Allowed	Major	Shipment status：Single Cell/FOG /MDL Production
	Side Chipping		Y < 1/2BM X ignore Z≤t	Minor	
	Corner Chipping		X+Y≤4mm Z≤t	Minor	
	Burr		Function and assembly are not affected	Minor	
	Scratch		PNL with POL，based on point/line foreign (scratch) standard to determine,	Minor	
Be related to FPC/PCB	short circuit / open circuit		Not Allowed	Major	Shipment status：FOG/MDL

	components and parts		Component missing is not allowed	Minor	Production
Be related to Backlight	Code-spurting		Key information can be identified is OK	Minor	Shipment status： MDL Production
	Scratch		Limit Sample	Minor	
	Connector	Wrinkled symptom	Accept	Minor	
	Stain		Removable stain is OK	Minor	

B : BOE Customer Quality Service Process

In order to provide better service to Customer, BOE shall apply the after-sales product quality service process as below:

1.0. According to the P/O from Customer, BOE should deliver required product to the place appointed by Customer.

2.0. Customer will do IQC for the incoming product.

3.0. Inspection standard should be provided by BOE, and it will be valid after confirmed by Customer. Inspection and Defects determination should be carried out according to the standard agreed by both Parties.

4.0. In order to guarantee in-time communication of product quality information and effective service, QA staff on Customer side should send Weekly Quality Report to the appointed CS staff in BOE.

5.0.. BOE should cooperate with Customer for special quality requirement.

6.0. After confirmed by both side, BOE should be responsible for the defect products which caused by its quality problem.

7.0.. Customer should use the LCD product according to the instruction. BOE will not be responsible for the defect product caused by violation of Users' Instruction.

8.0. Both parties should deal with the quality problem with friendly cooperative policy. And both parties should negotiate to deal with the defect products of which the responsibility is not very clear.

9.0. The warranty of the product is 12 months after the delivery date.

The warranty will be avoided in cases of below:

a. When the warranty period is expired.

b. When the LCMs were repaired by 3rd party without Supplier's approval.

c. When the LCMs were treated like disassemble and rework by the Customer and/or customer's representatives without Supplier's approval.