DOCUMENT NUMBER AND REVISION
VL-PS-COG-VLSZT055-01 REV.A
(COG-VLSZT055-01)

DOCUMENT TITLE:
PRELIMINARY SPECIFICATION
OF
TFT MODULE TYPE

CUSTOMER	柳州航盛
CUSTOMER REFERENCE NO.	
MODEL NUMBER	COG-VLSZT055-01
REFERENCE NO.	
CUSTOMER APPROVAL	
DATE	

DISTRIBUTION LIST: MARKETING

7 inch WV MDL Product Pre-Specification

Rev. P0

TFT LCD BOE Reference No Costmer:

BOE Approved	Customer Accepted

CHENGDU BOE OPTOELECTRONICS TECHNOLOGY Co., Ltd

7 inch WV MDL Product Pre-Specification

Rev. P0

CHENGDU BOE OPTOELECTRONICS TECHNOLOGY Co., Ltd

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	2019.11.08	Ding Xuefeng Pu Shuiqin Liu Lixia
P1	-	P5/P6/P9页更新色域规格为 Min 70% Typ75%	2020.01.07	All

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

7.0 inch 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 7.0 inch diagonally measured active area with resolutions (800 horizontal by 480 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.

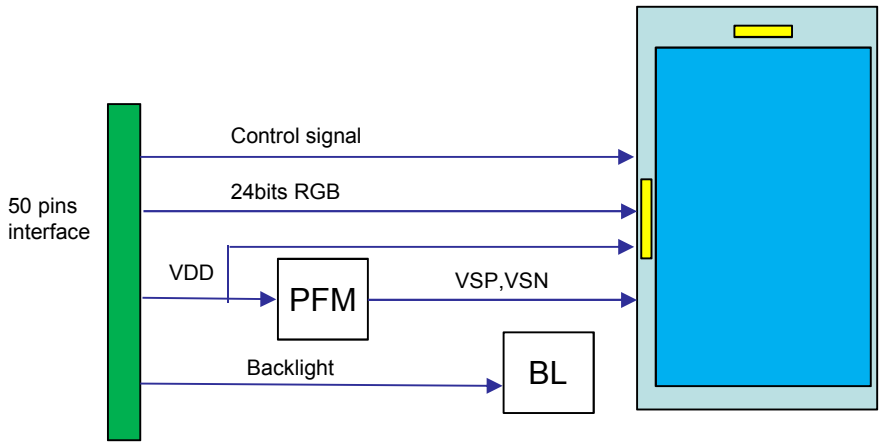


Figure 1-1 Block Diagram

1.2 Features

- Wide viewing angle (U/D/L/R)：Typ 85/85/85/85
- Color Gamut：75% Typ.
- Cell thickness：1.0t
- 24bits RGB Interface
- Surface treatment：AG

1.3 Application

- **Vehicle-mounted Production**

1.4 General Specification

<Table 1-1 General Specifications>

Parameter	Specification	Unit	Remarks
Active area	152.4(H) X 91.44(V)	mm	15：9
Number of pixels	800(H) X 480(V)	pixels	
Pixel pitch	0.1905(H) ×RGB×0.1905 (V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M	colors	
Color gamut	Min 70% Typ75%	%	
Display mode	Normally black		
Module outline	164.3(H) x 106.54(V)	mm	
Viewing Direction (Human Eye)	U/D/L/R Min 80/80/80/80 Typ 85/85/85/85	°	
Driver IC	**Source*1 + Gate*1**		

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

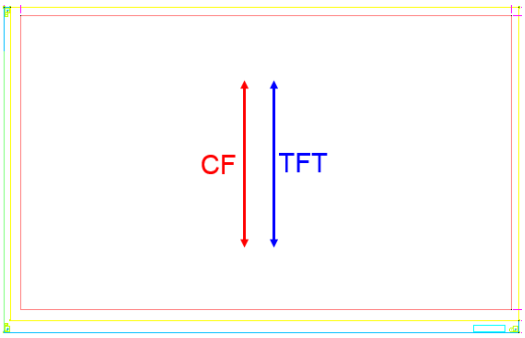


Figure 1-2 The TFT and CF Align Direction

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
Power Supply Voltage	VCC	-0.3	4.0	V	
Operating Temperature (Humidity)	T_{OP}	-40	+85	℃	Note 1
	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.
Note 1. Operating @-40~-30℃, no display function issues.

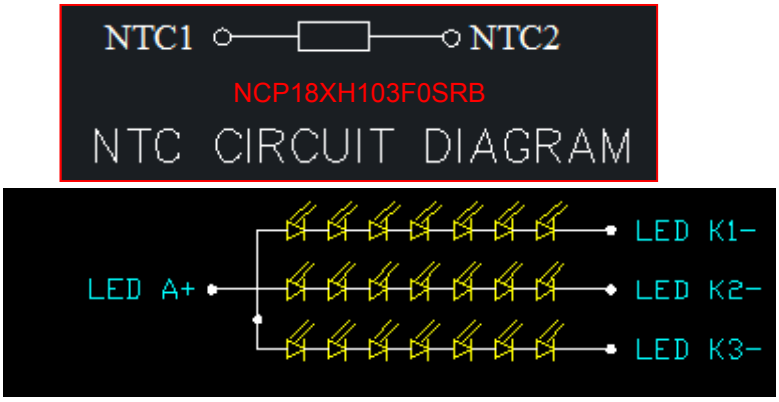
3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

Ta=25+/-2°C

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
Voltage of VCC		3.15	3.3	3.45	V	
Current of VCC(White pattern)			100	150	mA	TBD
Supply current of LED backlight	Per string		**75**		mA	7 LED
Total Supply current of LED Backlight	I_{LED}Total		**225**		mA	3 strings
Supply voltage of LED backlight	Per string	18.9	21	23.1	V	3 strings
LED Life Time	LIFF	30,000			Hrs	Note4

Notes :
1 : VCOM should be adjusted to make the flicker level be minimum and optimize display quality.
2: Frame rate=60HZ
3: BLU LED : Backlight current =**225**mA, Number of LED dies =21pcs
4: The “LED Life Time” is defined as the time period when the brightness decrease to 50% of the initial value under continuous lighting at 25°C



Backlight circuit diagram

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	85	-	Deg.	Note 1
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Contrast ratio @25℃		CR	Perpendicular	800	1000	-	-	Note 2
Luminance		cd/m2	Perpendicular	800	1000	-	nit	
CR over temperature		△CR	-40℃	-	-	50%	-	Center
			-10℃	-	-	20%	-	Center
			45℃	-	-	20%	-	Center
			85℃	-	-	50%	-	Center
White luminance uniformity		ΔY	Θ = 0° (Center) Normal Viewing Angle	70	80		%	Note 3
NTSC		%		70	75			
White Chromaticity		x_w		Typ-0.03	0.304	Typ+0.03	-	Simulation data only for reference , Actual result based on 1st sample Note 4
		y_w			0.324		-	
Reproduction of color	Red	x_R			0.649		-	
		y_R			0.336		-	
	Green	x_G			0.305		-	
		y_G			0.629		-	
	Blue	x_B			0.149		-	
		y_B			0.055		-	

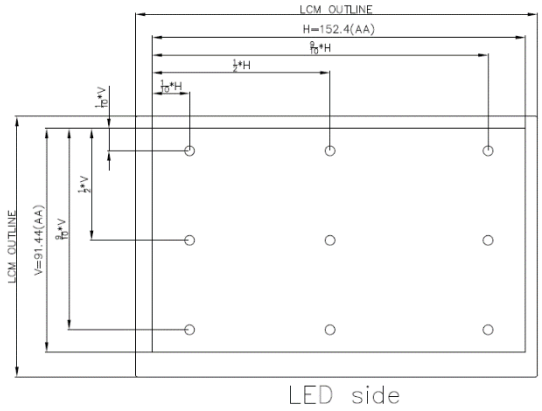
Parameter	Symbol	Condition	Min.	Typ.	Max.	Units	Remark
Response Time (Rising / Falling)	T_{RT}	25℃ 0℃ -10℃ -20℃ -30℃ -40℃	-	-	30 TBD TBD 200 500 800	ms	Note 5
Response Time (G2G,42step)	T_{RT}	25℃ 0℃ -10℃ -20℃ -30℃ -40℃	-	-	30 TBD TBD 200 500 900	ms	Note 6
Liquid Crystal Clearing point	Tc	-	-	101	-	℃	
Surface Reflection Rate	SCI	-	-	-	6.5	%	
BLU Derating	T	**TBD**	-	-	TBD		F 5-4
Backlight LED Forward Current VS. Ambient Temperature	PWM	**85℃**	-	45%	-	%	
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. The White luminance uniformity on LCD surface is then expressed as :
   ΔY = (Minimum Luminance of 9points / Maximum Luminance of 9points) * 100



4. The color chromaticity coordinates specified in table 4-1 is the simulation result from the TFT-LCD and the backlight spectrum. These shall be updated from the spectral data measured with all pixels first in white, red, green, blue and black. Measurements shall be made at the center of the panel.
5. 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.
6. TG2G, 42Gray step, Tij=Tij90%-Tij10%.

5.0 OPTICAL TEST APPENDIX

Figure 5-1 The Definition of Vth & Vsat

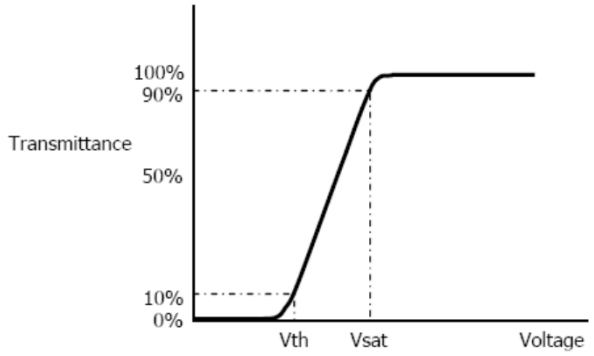


Figure 5-2 Measurement Set Up

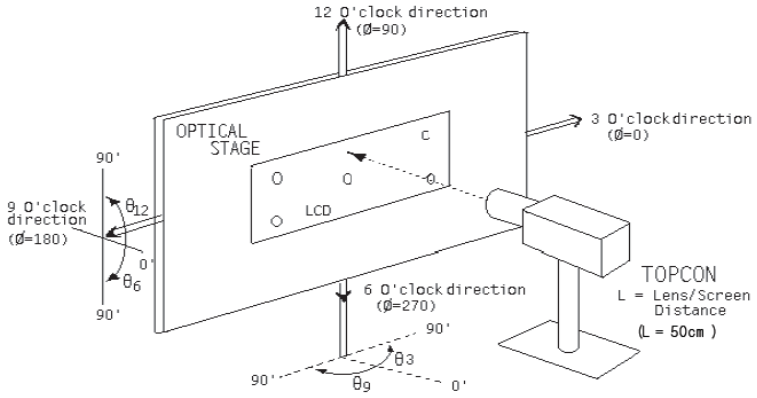


Figure 5-3 Response Time Testing

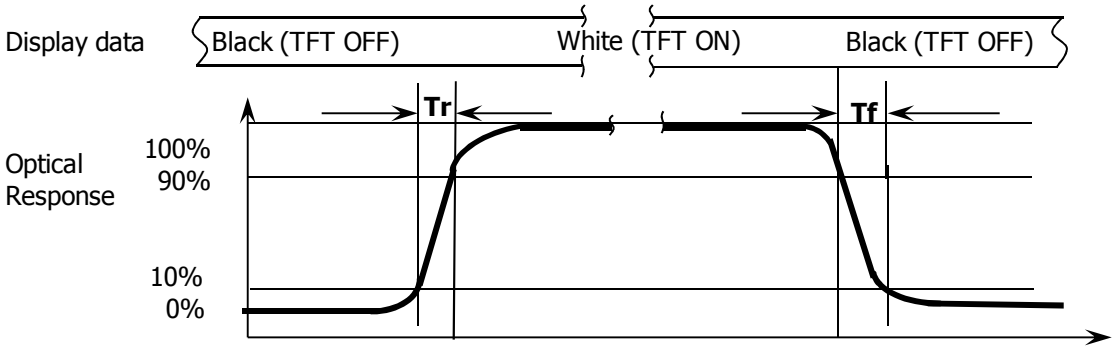


Figure 5-4 Derating.

TBD. Will provide after 1st sample

6.0 MECHANICAL CHARACTERISTICS

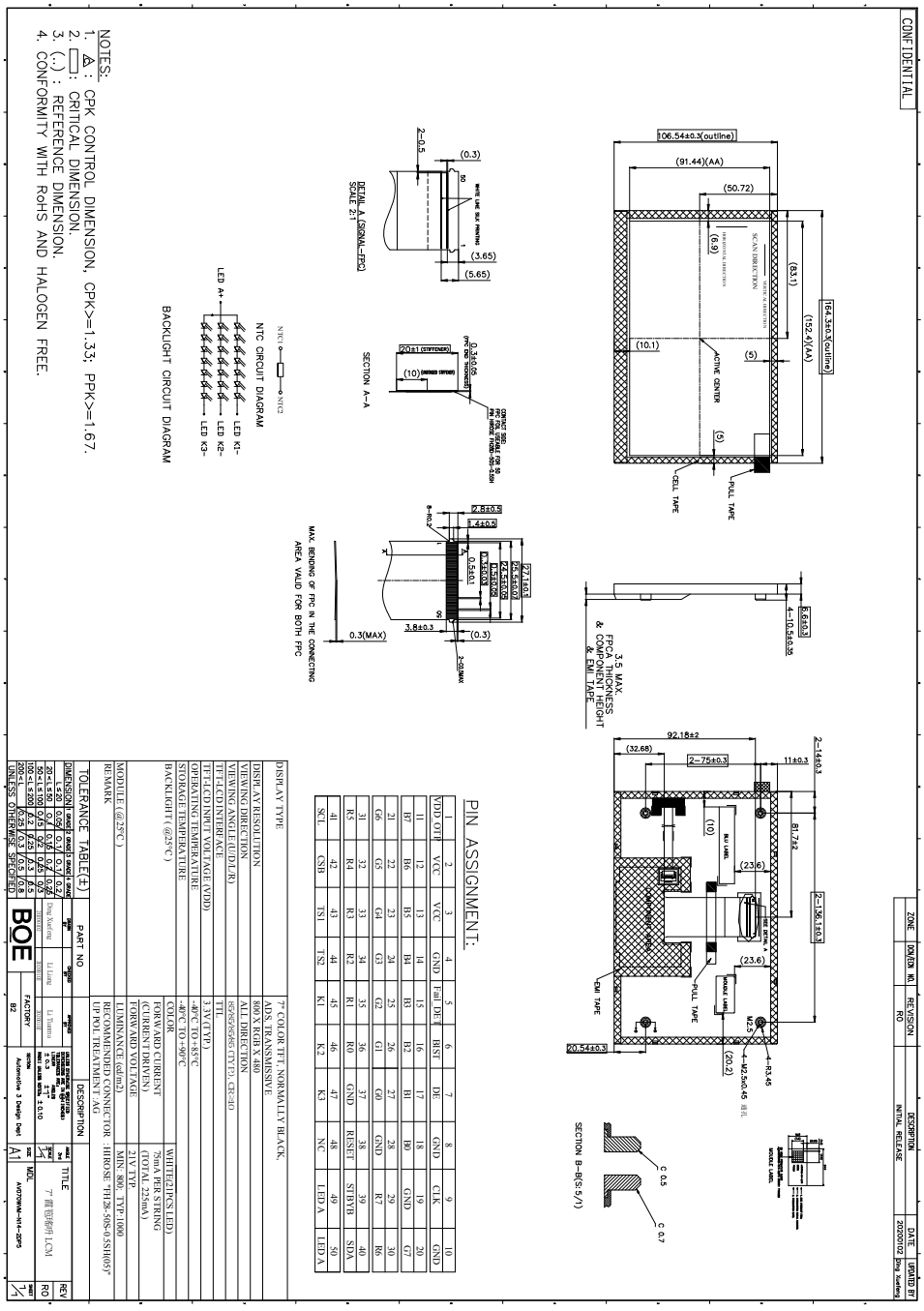
6.1 Dimensional Requirements

Figure in next page shows mechanical outlines for the panel

<Table 6-1 Dimensional Parameters>

Parameter	Specification	Unit
Active Area	152.4(H) X 91.44(V)	mm
Number of pixels	800(H) X 480(V)	Pixels
Pixel pitch	0.1905(H) X RGB X 0.1905 (V)	mm
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M	colors
Display mode	Normally black	
Module thickness	6.6(body)	mm
Module outline	164.3(H) x 106.54(V)	mm
AA-MDL outline L/R/U/D	6.9/5/5/10.1	mm

7.0 MDL Outline Dimension



Unit：mm

8.0 RELIABILITY TEST

8.1 Reliability Test Conditions

No	Test Items	Conditions	Reference
1	High temperature storage test	Ta = 90 ℃, 500 hrs	The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours. These defects can't be accepted: 1.Air bubble 2.Seal leak 3.Non-display 4.Missing segments 5.Glass crack
2	Low temperature storage test	Ta = -40 ℃, 500 hrs	
3	High temperature operation test(Note 1)	Ta = 85℃, 500 hrs	
4	Low temperature operation test	Ta = -40 ℃, 500 hrs	
5	High temperature & high humidity operation test	Ta = 60 ℃, 90%RH, 500 hrs	
6	Thermal shock	Ta = -30 ℃ ↔ 85 ℃ , 30min/10s/30min, 200 cycle, Non-operation	
7	Image Sticking	Burn in: 5x5 Checkerboard, 2h@+25℃ , perpendicular view. Inspection Pattern:50% grey, the mura must disappear completely after 5 min, Burn in: 5x5 Checkerboard, 2h@+65℃ , perpendicular view. Inspection Pattern:50% grey, the mura must disappear completely after 5 min,	The low and high temp. tested with different sample.
9	Mechanical Shock（Note2）	3 directions: X,Y,Z axes Repeats: 6 Peak acc.: 100G Pulse duration: 6 ms(half sine wave) Non-Operating	IEC60068-2-27Ea
10	Mechanical Vibration(Note2)	3 directions: X,Y,Z axes(40 minutes in each direction) Sweep time : 10(1Oct/min) Frequency: 10->150->10Hz 10-58Hz: constant amplitude 0.75 mm peak 58-150Hz: constant acceleration 5 g peak Sinusoidal, Non-Operating	IEC60068-2-6Fc

Note 1、Panel surface temperature should not exceed 85℃.

Note 2、For Module internal structure robustness test purpose only. Customer application cluster design should take care of overall mounting robustness with display module.

Note 3、 Operating @-40~-30℃， no display function issues。

8.2 Electrostatic Discharge（ESD）

Test	Conditions	Method	Remark
ESD	R=330Ω， C=330pF, • Air discharge: ±8 KV(class B), ±15Kv(class C)display surface • Contact discharge: ±8 KV (class B), to metal frame	IEC61000-4-2	Operating

Note 1、The TFT-LCD Panel and IC on module are sensitive to electrostatic discharge. Please make sure equipments and operators are properly ground before during handing.

Note 2、As different customer application have different interfacing designs and assembly processes，the touch panel module has no ESD protection circuitry. Customer is required to take special care on ESD level control in the assembly and test processes.

9.0 INTERFACE CONNECTION

9.1 The LCD Module Electrical Interface Connection

The Recommended connector is Hirose “FH28D-50S-0.5SH”
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	VDD_OTP	Power for OTP	NC for Customer, No need connect
2	VCC	Power supply（3.3V）	
3	VCC	Power supply（3.3V）	
4	GND	Ground	
5	Fail_DET	Fail detection signal output	H:Abnormal L:Normal
6	BIST	L:Normal H:Bist Mode	NC For Customer, Suggest connect to GND
7	DE	Data enable signal	
8	GND	Ground	
9	CLK	Data clock	
10	GND	Ground	
11	B7	Blue data(MSB)	
12	B6	Blue data	
13	B5	Blue data	
14	B4	Blue data	
15	B3	Blue data	
16	B2	Blue data	
17	B1	Blue data	
18	B0	Blue data(LSB)	
19	GND	Ground	
20	G7	Green data(MSB)	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	

PIN	SYMBOL	Description	Remark
24	**G3**	Green data	
25	**G2**	Green data	
26	**G1**	Green data	
27	**G0**	Green data(LSB)	
28	**GND**	Ground	
29	**R7**	Red data(MSB)	
30	**R6**	Red data	
31	**R5**	Red data	
32	**R4**	Red data	
33	**R3**	Red data	
34	**R2**	Red data	
35	**R1**	Red data	
36	**R0**	Red data(LSB)	
37	**GND**	Ground	
38	RESET	reset pin, active low	
39	STBYB	Standby mode setting pin, active low	
40	SDA	Serial interface address and data	NC For Customer,Suggest connect to GND
41	SCL	Serial interface clock input	NC For Customer, Suggest connect to GND
42	CSB	Serial Interface chip enable signal	NC For Customer, Suggest connect to VCC
43	TS1	Thermistor Sensor	
44	TS2	Thermistor Sensor	
45	K1	LED Cathode1	
46	K2	LED Cathode2	
47	K3	LED Cathode3	
48	NC	NO connection	
49	LEDA	LED Anode	
50	LEDA	LED Anode	

10.0 SIGNAL SPECIFICATION

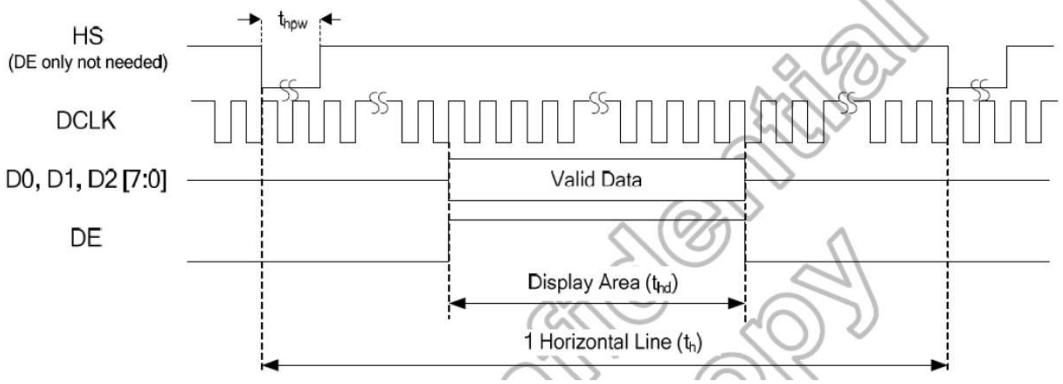
10.1 TTL Signal Timing

Table 10-1 TTL Signal Timing

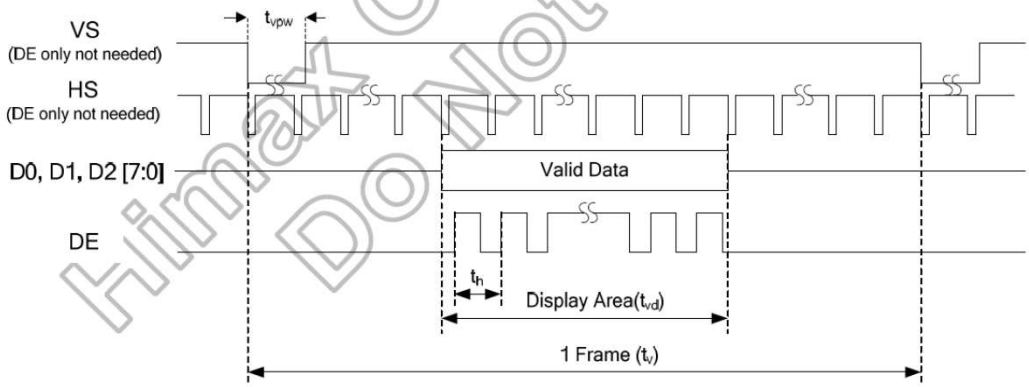
Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	CLK	24.2	24.9	38.9	MHz
Horizontal Display Area	Thd		800		DCLK
1 Horizontal line	Th	829	842	1040	DCLK
Vertical Display Area	Tvd		480		H
1 Vertical Field	Tv	487	493	624	H
Frame Frequency	Fframe		60		Hz

10.2 Signal Format

- **Horizontal**

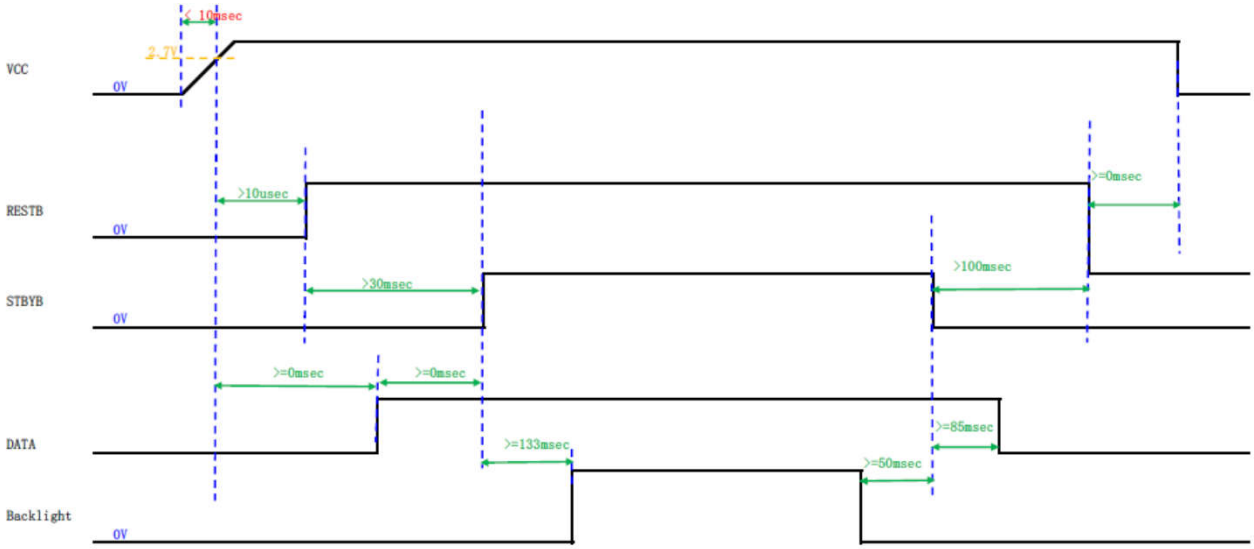


- **Vertical**



11.0 POWER ON/OFF SEQUENCE

11.1 POWER ON SEQUENCE



12. Package

TBD

Remark:
This PS is used in the sample stage. If there is any change point in the follow-up FS, the business and schedule need to be reconfirmed.

Incoming Inspection Spec Approval Sheet

Product Description：TFT-LCD-LCM

BOECD___ Product Name:7WV

Customer : 柳州航盛

Customer Signature	Date	BOE Signature	Date

Record of Revision

Version	Revision Date	Content	Page
1	2019.12.11	第一版	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: 25±3℃；

b. 湿度: RH:65±20%；

c. 外部环境光照：300~700LUX（功能测试为小于100LUX）；

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

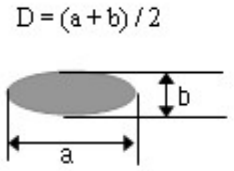
单元尺寸: mm

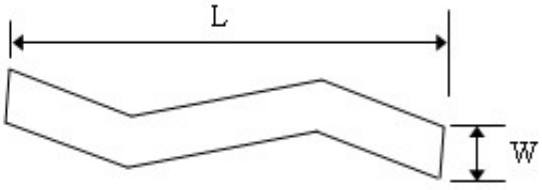
Items		Details	Inspection Criteria		Type
			A Area	B/C Area	
	Pixel Defects	Bright Dot	N≤0	Ignore	Major
		Dark Dot	N≤4		
		Bright + Dark Dot	N≤4		
		2S	N≤1		
	Line Defects	Bright Line, Dark Line	Not Allowed		
	No Display		Not Allowed		
	Abnormal Display		Not Allowed		
	Mura		5%ND 不可见，或参照限度样本		Minor

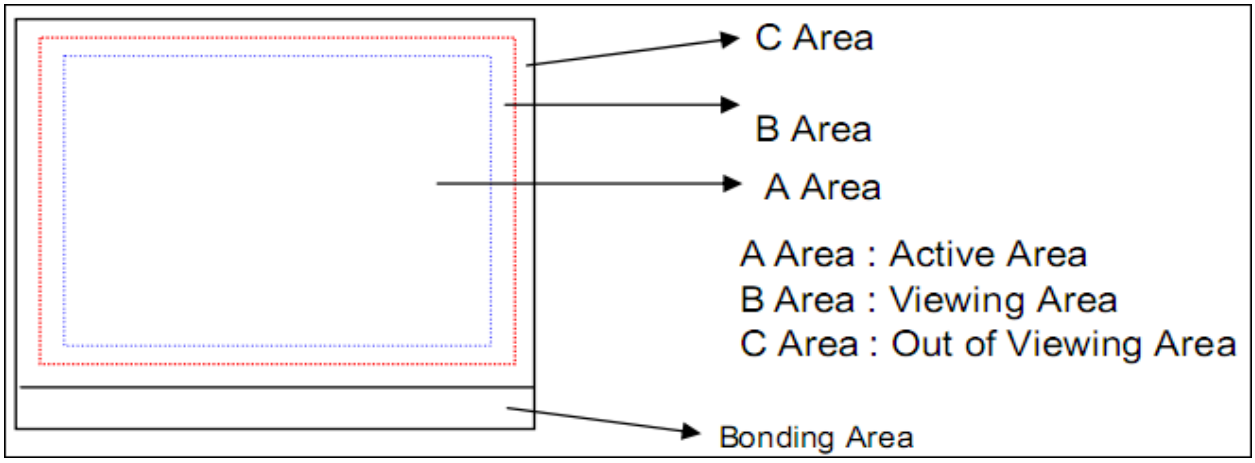
注意: 所有不良的的测定都基于 Panel 上有偏光片

※ 备注 1) D =直径, L = 长度, W = 宽度, N = 数量

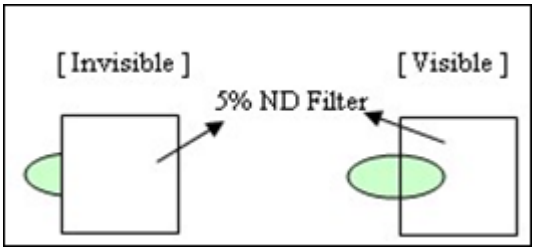
※ 备注 2) 区域定义 A Area:显示区 B/C Area:非显示区





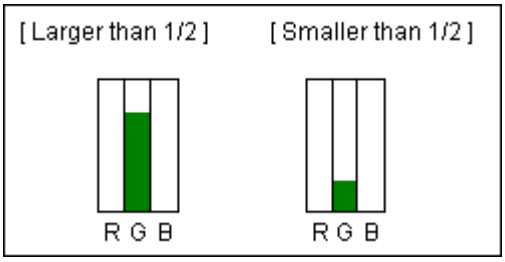


※Note 3) For pixel defect, dot means a sub-pixel. Dot defects should be larger than half size of a sub-pixel. Dot which is invisible through 5% ND filter or smaller than 1/2 of sub-pixel size will not counted as "1 dot" defect.



"No dot defect" (=ignored)

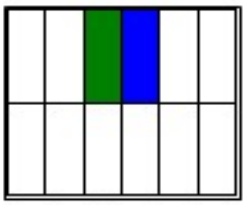
"1 dot defect" (=counted)



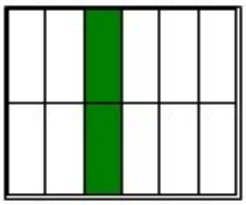
"1 dot defect" (=counted)

"No dot defect" (=ignored)

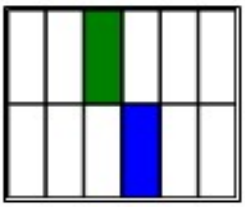
[2 adjacent dots defect]



Type 1



Type 2



Type 3

Note:The black border is the rim between the active area of the display and the metal front cover. The pixel defect counted as 3.1.1, foreign material bright spot counted as 3.2.1

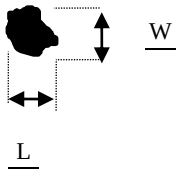
备注：黑边是指屏有效区和前铁框之间的区域. 像素亮点按 3.1.1，异物亮点按 3.2.1

3.2.Inspection Conditions 检查条件

3.2.1Circular defects 圓形狀壞品

TTable 19: Circular defects requirement – LCD

Size 尺寸(mm)	Acceptance number 合格数	
	Active area 有效区域	Black border 黑边区
D ≤ 0.15	No count 不计数	No count 不计数
0.15< D ≤ 0.4	4(with distance 坏点间距 ≥ 10mm)	
D > 0.4	0	

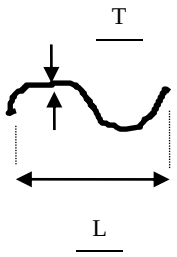


Remark: D = (Length + Width) / 2, for L and W. D = 点状缺陷长加宽再除以 2

3.2.1Long defects 長條狀壞品

Table 20: Long defects

Size 尺寸(mm)		Acceptance number 合格数	
		Active area 有效区域	Black border 黑边区
T ≤ 0.05		No count 不计数	No count 不计数
0.05 < T ≤ 0.1	0.5≤ L ≤ 3.0	3(with distance 缺陷间距≥ 10mm)	
T > 0.1	L>3	0	

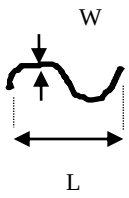


Remark: T = defect thickness, L = defect contour length. T 线状缺陷宽度 L 线状缺陷长度

3.2.1Scratch 划痕

Table 21: Scratch

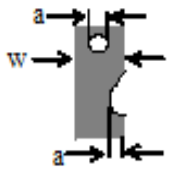
Size 尺寸 (mm)		Acceptance number 合格数	
		Active area 有效区域	Black border 黑边区
W≤ 0.05		No count 不计数	No count 不计数
0.05 < W ≤ 0.1	0.5≤ L ≤ 3.0	3 (with distance 缺陷间距≥ 10mm)	
W > 0.1	-	0	



Remark: W= defect thickness, L = defect contour length. W 线状缺陷宽度 L 线状缺陷长度

3.2.1FPC defects Fpc 缺陷

Table 24: FPC defects

Items	Size (mm)	Acceptance criteria
FPC defect Fpc 缺陷 	Dent, Pinhole a ≤ w/3 凹陷，针孔	No count
	Open circuit 电路断开	0
	Oxidation, contamination and distortion 氧化，脏物和变形	0

3.2.1Bubble in polarizer 偏光片气泡

Item 项目	Acceptance number 验收标准		
	Size 尺寸 (mm)	Active Area 有效区域	Black boarder 黑边区
Bubble in polarizer 偏光片&贴合气泡	D ≤ 0.15	No count 不计数	No count 不计数
	0.15 < D ≤ 0.3	3(with distance 缺陷间距≥ 10mm)	
	D > 0.3	0	

Remark: D = (Length + Width) / 2, for L and W. D = 气泡缺陷长加宽再除以 2

3.2.2Other cosmetic defects 其它缺陷

Table 26: Other cosmetic defects

Item 项目	Criteria of acceptance 验收模式	Inspection pattern 检查模模式
Mura 色均不均匀 (Non-uniformity) 非均匀性	Invisible through a 5% ND filter 在 5% ND filter 下檢查不出來	Pure black and pure white 纯黑和纯白

Other defects refer to QUA-012B 其它缺陷请参考 QUA-012B

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。