SPECIFICATION FOR XRT070CXNE01AA

Module No.（模块型号）	**XRT070CXNE01AA**
Product type（产品类型）	Standard LCD Module 800(RGB)x 480 Pixels 7.0” TFT LCD
Customer（客户）	
Customer Approved(客户核准）:	

Prepared By（制定）	Checked By（审核）	Approved By（核准）

CONTENTS

1.Document revision history:

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
V00	2020.04.15	First Release.	TIGER	

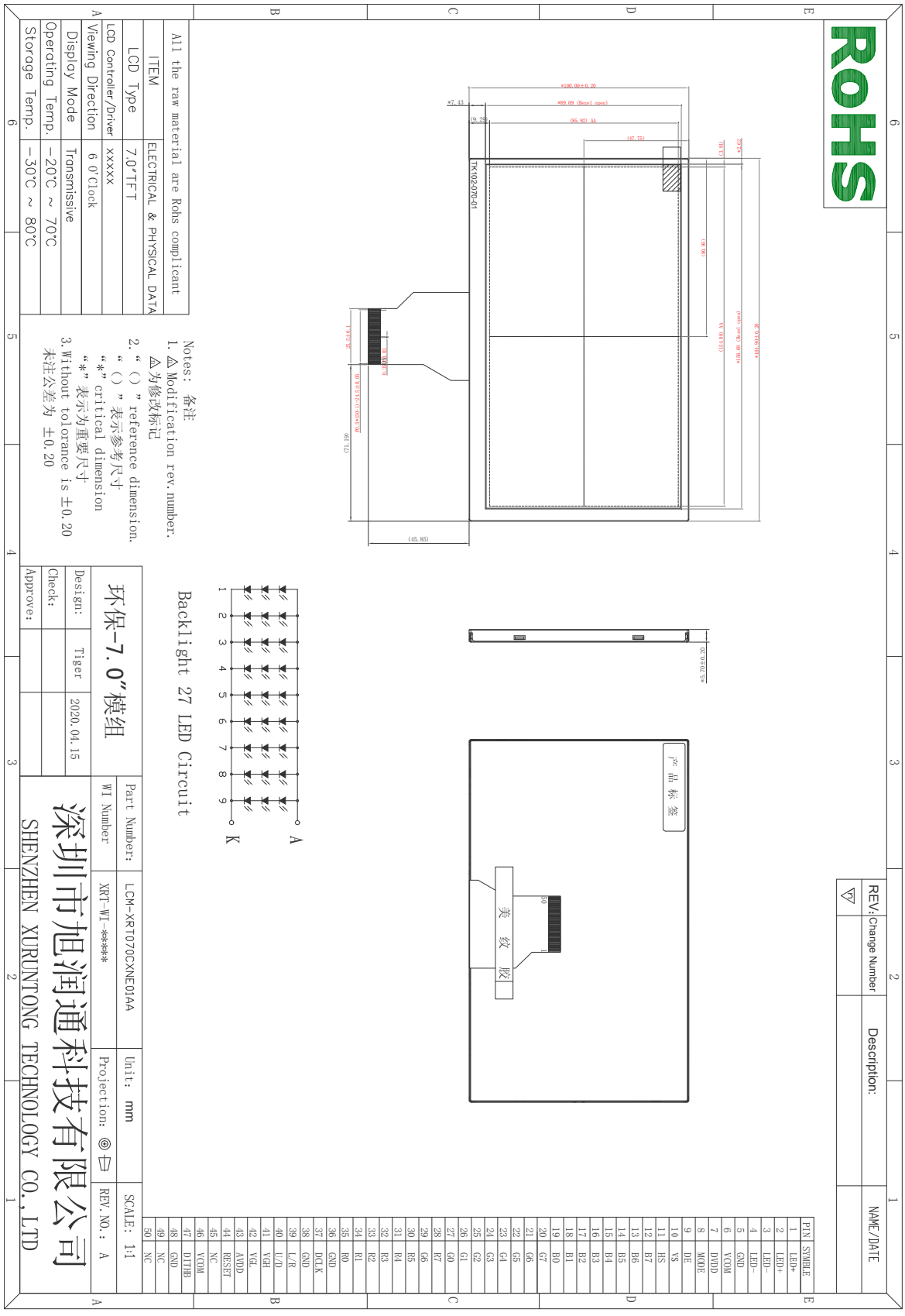
2. General Description

Characteristics	Size	7.0 inch
	Resolution	800(horizontal)X480(Vertical)
	Interface	24-bit RGB
	Connect type	Connector
	Color Depth	16.2M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.1926 x 0.1790
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally White
	Surface Treatment	AG
	Viewing Direction	6 o'clock
Mechanical	LCM (W x H x D) (mm)	164.9x100x5.7
	Active Area(mm)	154.08 x 85.92
	With /Without TSP	Without TSP
	Weight (g)	TBD
	Luminance(cd/m2)	500(Typ.)
	LED Numbers	27 LEDs

Note 1: Viewing direction is follow the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5

3. Mechanical Specifications

Figure 1: Outline Drawing



4. Interface Description 接口定义描述

FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

Table 2: Pin assignment

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED+}	P	Power for LED backlight (Anode)	
2	V_{LED+}	P	Power for LED backlight (Anode)	
3	V_{LED-}	P	Power for LED backlight (Cathode)	
4	V_{LED-}	P	Power for LED backlight (Cathode)	
5	GND	P	Power ground	
6	V_{COM}	I	Common voltage	
7	DV_{DD}	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	Note 1
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	Note 2
19	B0	I	Blue data(LSB)	Note 2
20	G7	I	Green data(MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	

26	G1	I	Green data	Note 2
27	G0	I	Green data(LSB)	Note 2
28	R7	I	Red data(MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	Note 2
35	R0	I	Red data(LSB)	Note 2
36	GND	P	Power Ground	
37	DCLK	I	Sample clock	Note 3
38	GND	P	Power Ground	
39	L/R	I	Left / right selection	Note 4,5
40	U/D	I	Up/down selection	Note 4,5
41	V_{GH}	P	Gate ON Voltage	
42	V_{GL}	P	Gate OFF Voltage	
43	AV_{DD}	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	Note 6
45	NC	-	No connection	
46	V_{COM}	I	Common Voltage	
47	DITHB	I	Dithering function	Note 7
48	GND	P	Power Ground	
49	NC	-	No connection	
50	NC	-	No connection	

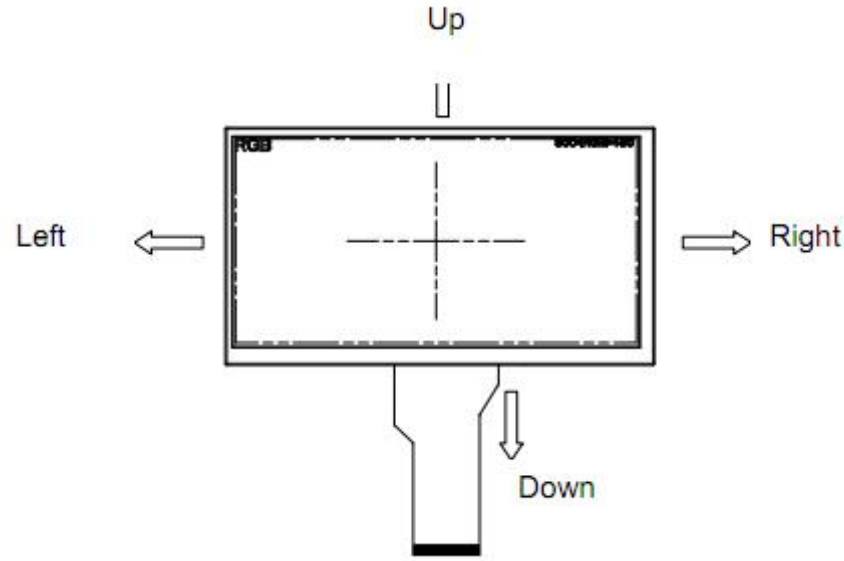
I: input, O: output, P: Power

Note 1: DE/SYNC mode select. Normally pull high.
When select DE mode, MODE=”1”, VS and HS must pull high.
When select SYNC mode, MODE= ”0”, DE must be grounded.
Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.
Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV_{DD}	Up to down, left to right
DV_{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV_{DD}	DV_{DD}	Down to up, left to right

Note 5: Definition of scanning direction.
Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB="1",Disable internal dithering function,
When DITHB="0",Enable internal dithering function,

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

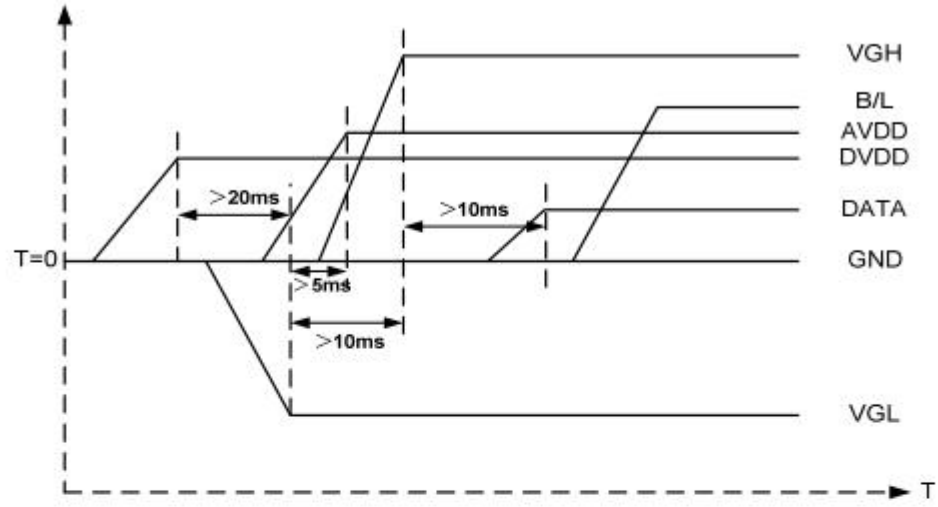
Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VDD)	VCC	-0.3	+3.6	V	1

Note:

1. VCC, GND must be maintained.
2. The modules may be destroyed if they are used beyond the absolute maximum ratings.

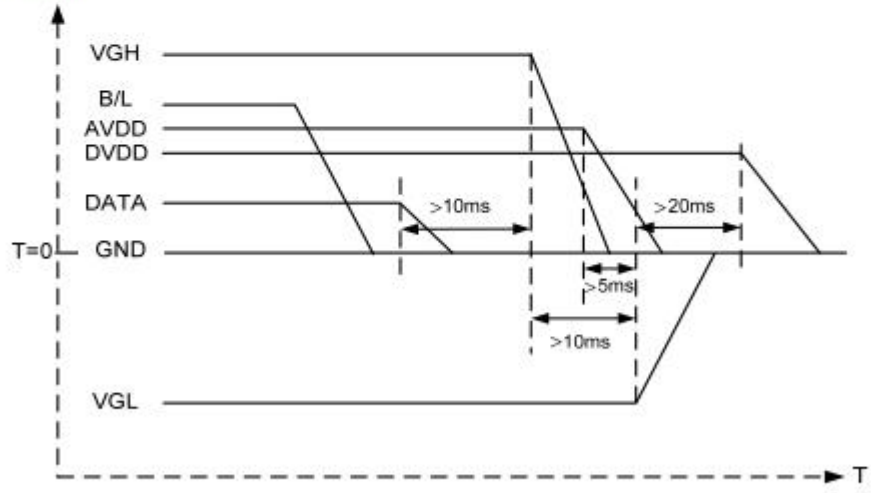
5.2. Power Sequence

a. Power on:



DV_{DD}→VGL→AVDD→VGH→Data→B/L

b. Power off:



B/L→Data→VGH→AVDD→VGL→DV_{DD}

Note: Data include R0~R7, B0~B7, GO~G7, U/D, L/R, DCLK, HS,VS,DE.

6. Electrical Specifications

6.1 Typical Operation Conditions (At Ta = 25 ➡C,)

Table 4

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For	DVDD	3	3.3	3.6	V	-
Analog Power Supply Voltage	AVDD	10.2	10.4	10.6	V	-
Gate On Power Supply Voltage	VGH	15.3	16	16.7	V	-
Gate Off Power Supply Voltage	VGL	-7.7	-7	-6.3	V	-
Common Power Supply Voltage	VCOM	2.6	(3.6)	4.6	V	Note1
Logic Input Voltage	VIH	0.7*DVD	-	DVDD	V	-
	VIL	GND	-	0.3*DVDD	V	

【Note1】Please adjust VCOM to make the flicker level be minimum.

6.2 Backlight Driving Conditions

Table 5

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Forward Current	IF	-	178	180	200	mA	
Forward voltage	VF	IF=180mA	8.4	9.0	10.2	V	Note 1
Uniformity	△	IF=180mA	70	75	-	%	
Luminance (on the module surface,BM-7)	LV	IF=180mA	450	500	-	cd/m^2	
LED life time	-	IF=180mA	20,000	-	-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =180mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL =180mA. The LED lifetime could be decreased if operating IL is lager than 180mA.

7. Optical Characteristics

(Contrast、RT、viewing angle results are using CTC LCD+ EWV Polarizer+ XRT’ s BLU)

Table 6: Optical specifications

Items		Symbol	Condition	Specifications			Unit	Note
				Min.	Typ.	Max.		
Contrast Ratio		CR		400	500	-	-	
Response Time		T_R		-	10	20	ms	
		T_F		-	15	30	ms	
Chromaticity (CIE1931)	White	X_W		0.260	0.310	0.360	-	
		Y_W		0.280	0.330	0.380	-	
Viewing angle	Hor.	Φ1(3 o’clock)	Center CR≥10	60	70	-	deg.	
		Φ2(9 o’clock)		60	70	-		
	Ver.	θ2(12 o’clock)		40	50	-		
		θ1(6 o’clock)		60	70	-		
NTSC ratio					50		%	

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63

L0: Luminance of gray level 0

CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):

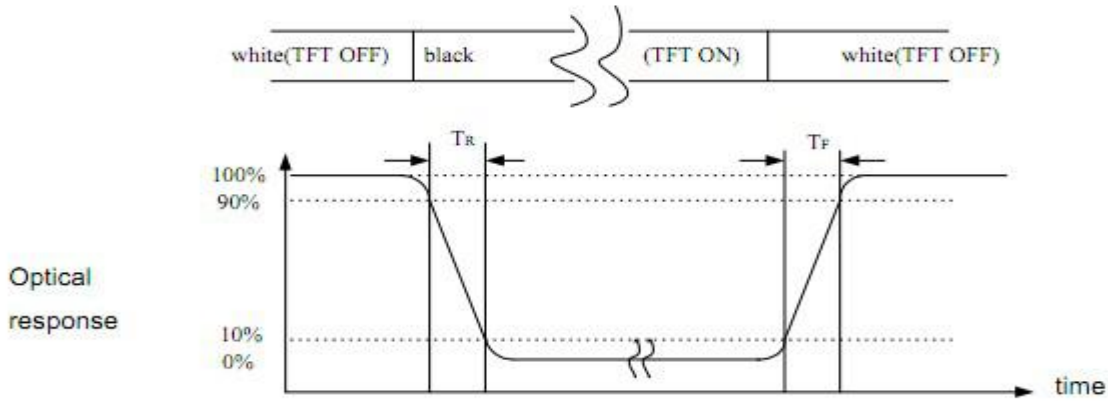


Figure 2

Note 3: Viewing Angle

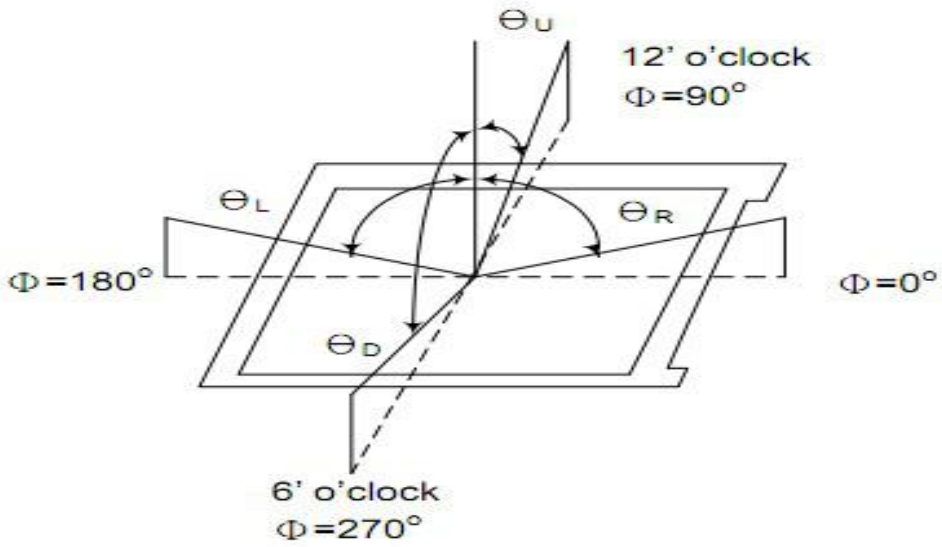


Figure 3

The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is * O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

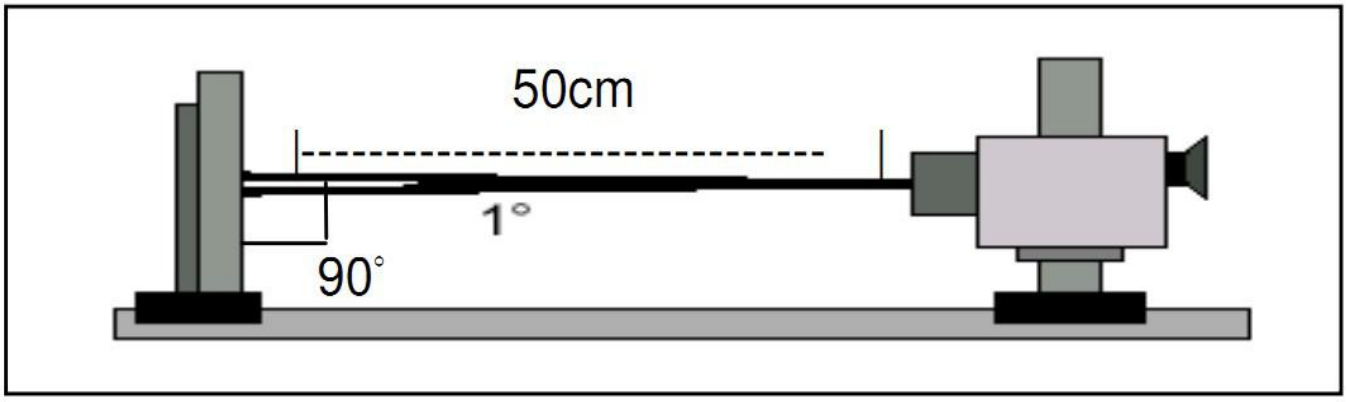


Figure 4

8. Data input Characteristics

8.1 Parallel RGB Interface

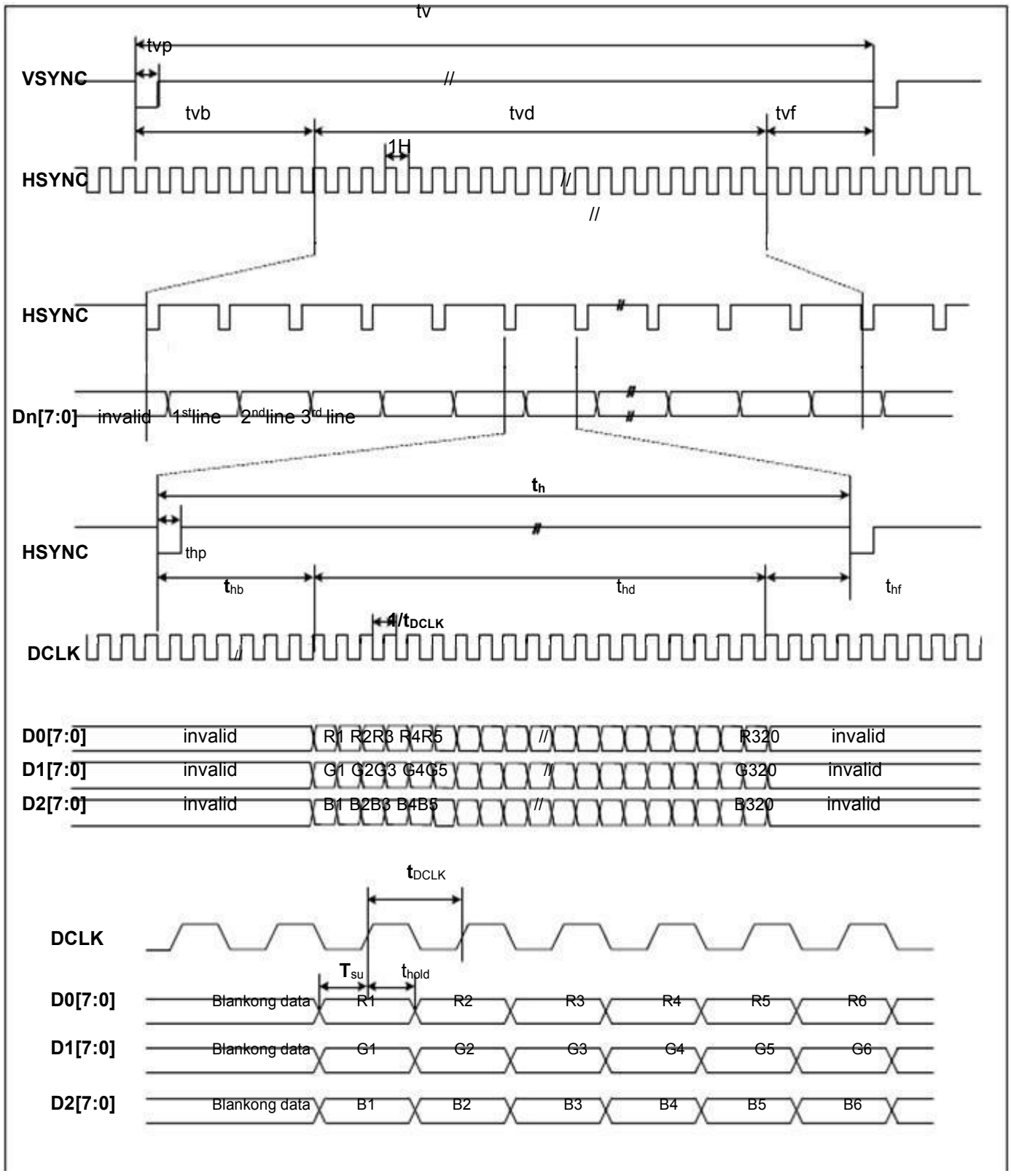


Table 7 Parallel RGB Input Signal Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

9. Environmental / Reliability Test 环境/可靠性测试

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.

2. Ta is the ambient temperature of sample.

10. Inspection Criteria

10.1. Scope

The incoming inspection standards shall be applied to TFT –LCD Modules(hereinafter called "Modules") that supplied by Shenzhen xuruntong Technology Co., Ltd.

10.2. Incoming Inspection

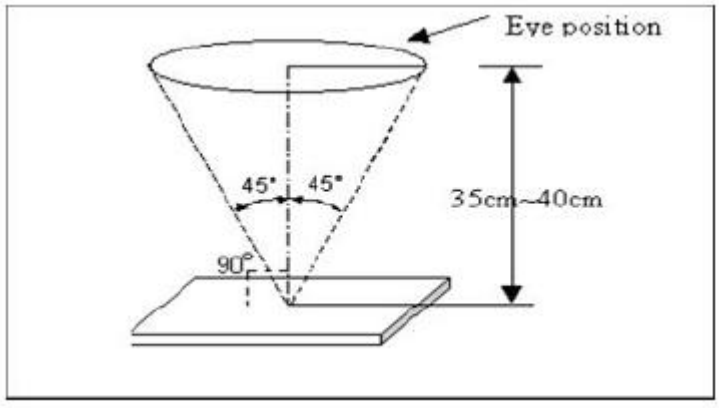
The customer shall inspect the modules within twenty calendar days of the delivery date （the "inspection period)at its own cost. The result of the inspection（acceptance or rejection)shall be recorded in writing,and a copy of this writing will be promptly sent to the seller, If the results of the inspecting from buyer does not send to the seller within twenty calendar days of the delivery date. The modules shall be regards as acceptance.Should the customer fail to notify the seller within the inspection period, the buyers right to reject the modules. Shall be lapsed and the modules shall be deemed to have been accepted by the buyer.

10.3 Inspection Sampling Method

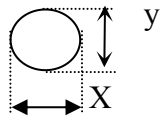
10.3.1. Lot size: Quantity per shipment lot per model
10.3.2. Sampling type: Normal inspection, Single sampling
10.3.3. Inspection level: II
10.3.4. Sampling table: GB/T2828.1-2003
10.3.5. Acceptable quality level （AQL）
Major defect: AQL=0.65
Minor defect: AQL=1.00

10.4 Inspection Conditions:

10.4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) ％RH
c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
10.4.2 Viewing distance
The distance between the LCD and the inspector's eyes shall be at least 35~40㎝.
10.4.3 Viewing Angle
U/D: 45º/45º, L/R: 45º/45º



10.5 Defects are classified as major defects and minor defects according to the degree of defectiveness defined herein.

<table>
<tr><th>No</th><th>Item</th><th>Criterion for defects</th><th>Defect type</th></tr>
<tr><td>1</td><td>Black/white spot defect (in displaying)</td><td>
black/white spot definition
Φ= (x+y)/2


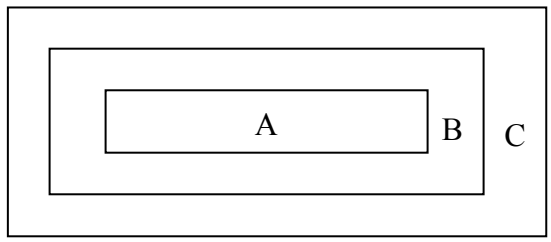
1. black/white spot defect (≤4.0inch)
<table>
<tr><th rowspan="2">area
size（mm）</th><th colspan="3">Acceptable number</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.1＜Φ≤0.15</td><td colspan="2">3</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">2</td></tr>
<tr><td>Φ＞0.25</td><td colspan="2">0</td></tr>
</table>
2. black/white spot defect (>4.0inch)
<table>
<tr><th rowspan="2">area
size（mm）</th><th colspan="3">Acceptable number</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.15</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">2</td></tr>
<tr><td>0.25＜Φ≤0.35</td><td colspan="2">1</td></tr>
<tr><td>Φ＞0.35</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

<table>
<tr>
<td>2</td>
<td>Black/white line defect (in displaying)</td>
<td>1. black/white line defect (All inch)
<table>
<tr><td colspan="2">size（mm）</td><td colspan="3">Acceptable number</td></tr>
<tr><td rowspan="2">L(length)</td><td rowspan="2">W(width)</td><td colspan="3">area</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>10＜L</td><td>0.03＜
W≤0.04</td><td colspan="2">5</td><td rowspan="4">ignore</td></tr>
<tr><td>5.0＜
L≤10</td><td>0.04＜
W≤0.06</td><td colspan="2">3</td></tr>
<tr><td>1.0＜
L≤5.0</td><td>0.06＜
W≤0.07</td><td colspan="2">2</td></tr>
<tr><td>L≤1.0</td><td>0.07＜
W≤0.09</td><td colspan="2">1</td></tr>
</table></td>
<td>Minor</td>
</tr>
<tr>
<td>3</td>
<td>Blemish & foreign matters</td>
<td>1. Dot (≤4.0inch LCD)
<table>
<tr><td rowspan="3">size(mm)</td><td colspan="3">Acceptable number</td></tr>
<tr><td colspan="3">area</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.10＜Φ≤0.15</td><td colspan="2">2</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">1</td></tr>
<tr><td>0.25＜Φ</td><td colspan="2">0</td></tr>
</table>
2. Dot (>4.0inch LCD)
<table>
<tr><td rowspan="3">size(mm)</td><td colspan="3">Acceptable number</td></tr>
<tr><td colspan="3">area</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.15</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>0.15＜Φ≤0.25</td><td colspan="2">2</td></tr>
<tr><td>0.25＜Φ≤0.35</td><td colspan="2">1</td></tr>
<tr><td>Φ＞0.35</td><td colspan="2">0</td></tr>
</table>
3. Blemish(≤4.0inch on touch panle or between touch panel ane LCD)
<table>
<tr><td></td><td>Acceptable number</td></tr>
</table></td>
<td>Minor</td>
</tr>
</table>

		<table><tr><td rowspan="2">size(mm)</td><td colspan="3">AREA</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ≤0.1</td><td colspan="2">ignore</td><td rowspan="3">ignore</td></tr><tr><td>0.10＜Φ≤0.15</td><td colspan="2">1</td></tr><tr><td>0.15＜Φ</td><td colspan="2">0</td></tr></table> 4. Blemish(>4.0inch on touch panle or between touch panel ane LCD) <table><tr><td rowspan="3">size(mm)</td><td colspan="3">Acceptable number</td></tr><tr><td colspan="3">AREA</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ≤0.15</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr><tr><td>0.15＜Φ≤0.25</td><td colspan="2">2</td></tr><tr><td>0.25＜Φ≤0.35</td><td colspan="2">1</td></tr><tr><td>Φ＞0.35</td><td colspan="2">0</td></tr></table> 5.line(All inch LCD/touch panle) <table><tr><td colspan="2">size(mm)</td><td colspan="3">Acceptable number</td></tr><tr><td rowspan="2">L(length)</td><td rowspan="2">W(width)</td><td colspan="3">area</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Ignore</td><td>W≤0.02</td><td colspan="2">5</td><td rowspan="4">ignore</td></tr><tr><td>L≤3.0</td><td>0.02＜ W≤0.03</td><td colspan="2">3</td></tr><tr><td>L≤2.0</td><td>0.03＜ W≤0.05</td><td colspan="2">2</td></tr><tr><td>---</td><td>W＞0.05</td><td colspan="2">Treat with dot</td></tr></table>		
4	Stain on LCD panel surface	Stain which cannot be removed even when wiped lightly with a soft cloth or similar cleaning too are rejectable	Minor

5	Rust in bezel	Rust which is visible in the bezel is rejectable	Minor
6	Defect of land surface contact	Evident crevices which is visble are rejectable	Minor
7	Parts mounting	(1) failure to mount parts (2) parts not in the specification are mounted (3) polarith, for example,is reversed	Major Major Major
8	Parts alignment	(1) LSI,IC lead width is more than 50% beyond pad outline (2) Chip component is off center and more than 50% of the leads is off the pad outline	Minor Minor
9	Conductive foreign matter	(1) on open space(gnd,manual solder)solder ball is allowed up toΦ0.1mm(1EA). (2) In case of shield space is allowed up toΦ0.2mm(1EA)	Major
10	Faculty PWB correction	(1) due to PWB copper foil pattern burnout,the patter is connected,using a jumper wire for repair;2 or more places corrected per PWB (2) short circuited part is cut,and no resist coating has been performed.	Minor Minor

area definition



LCD inspection area

A：active area

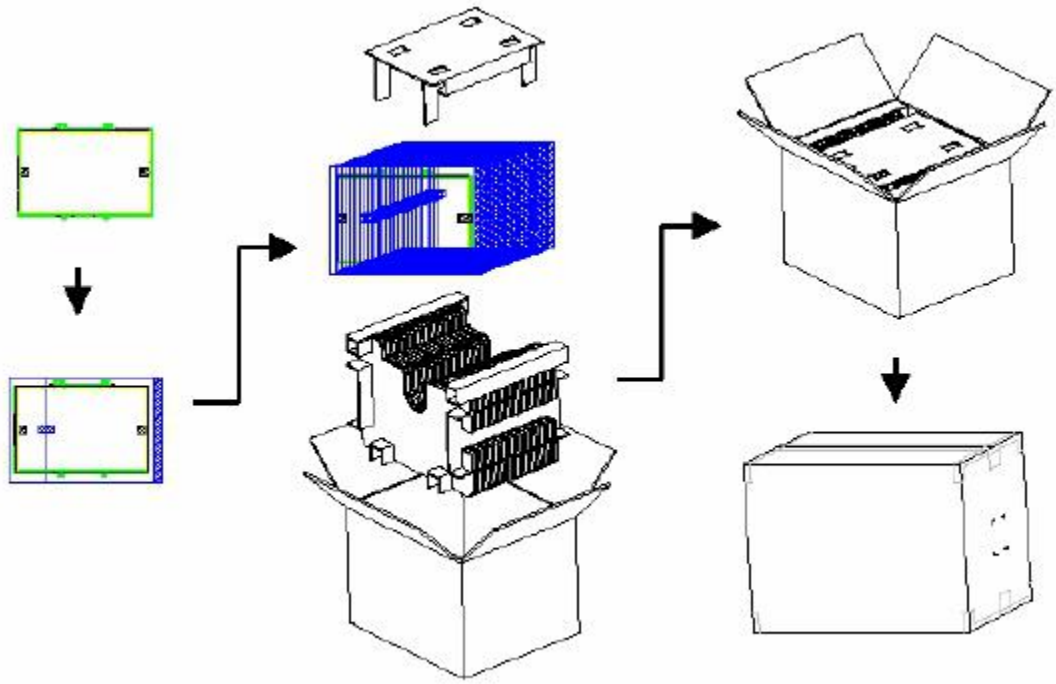
B：visible area

C：outside of visible area（Invisible area after assembling）

Visible Defect in area c，but it cannot affect product's quality ，it is allowed .

11. Packing Specification 包装规格（Reference only 仅供参考)

11.1 Packing Method 包装方式



11.2 Box label

The box label followed by is affixed to a shipped product at the specified location on each packing box.

1) Label Size: ** mm (L) ´ ** mm (W)

2) Contents

- Model : XRT070CXNE01AA
- Q`ty : Quantity in one box
- Date : Packing Date

13. PRIOR CONSULT MATTER 提前商议事项

1 For Xuruntong Technology standard products, we keep the right to change material, process ... for improving the product property without prior notice to our customer.

对于旭润通科技的标准产品，我们保留在不通知客户的情况下,为提高产品性能而改变原材料及加工方法等的权利。

2 For OEM products, if any changes are needed which may affect the product property, we will consult with our customer in advance.

对于 OEM 产品，如果需要做任何会影响到产品性能的改变，我们会提前和客户商议。

3 If you have special requirement about reliability condition, please let us know before you start the design on our samples.

如对可靠性条件有特殊要求，请在模块设计开发前通知我们。