



# PRODUCT SPECIFICATION

MODEL: PV101018TX40R

< ◆ > PRELIMINARY SPECIFICATION

< ◇ > APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED



## REVISION RECORD

<u>REV NO</u>	<u>REV DATE</u>	<u>PAGE</u>	<u>CONTENTS</u>	<u>ISSUER</u>
1.0	2018-11-3	20	First Release	Liqin
1.1	2018-11-21	3-5,11	Modify LCM Luminance	Liqin
1.2	2019-3-13	5,6	Modify DIMENSIONAL DRAWINGPINTERFACE and PIN CONNECTIONS	Chensusu
1.3	2019-6-11	5	Modify DIMENSIONAL DRAWING	Chensusu



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## 1.0 GENERAL SPECIFICATIONS

PV101018TX40R is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver IC, FPC and a backlight unit. The module display area contains 1200x 1920pixels. This product accords with RoHS environmental criterion.

<b>Item</b>	<b>Contents</b>	<b>Unit</b>
Screen Diagonal	10.1”	Inch
Viewing direction	Full View	
Number of Dots	1200(RGB) x1920	/
Shape size	143X228.6X2.5	mm
Display Area	135.36*216.58	mm
Display Mode	Normally Black	/
Sub pixel size	37.6 x 112.8	um
Number of color	16.7M	/
Interface	MIPI	
LCM Luminance	260(typ)	cd/m <sup>2</sup>
Response Time (Tr+Tf)	25ms (typ)	/
Contrast Ratio	800	/



## 2.0 ABSOLUTE MAXIMUM RATINGS

The following are maximum values which if exceeded may cause faulty operation or damage to the unit.

Item	Symbol	Min	Max	Unit	Note
Digital Supply Voltage	VDD	-0.5	5.0	V	
Analog Supply Voltage	AVDD	-0.5	10	V	
Analog Supply Voltage	AVEE	-0.5	-10	V	

## 3.0 ELECTRICAL CHARACTERISTICS

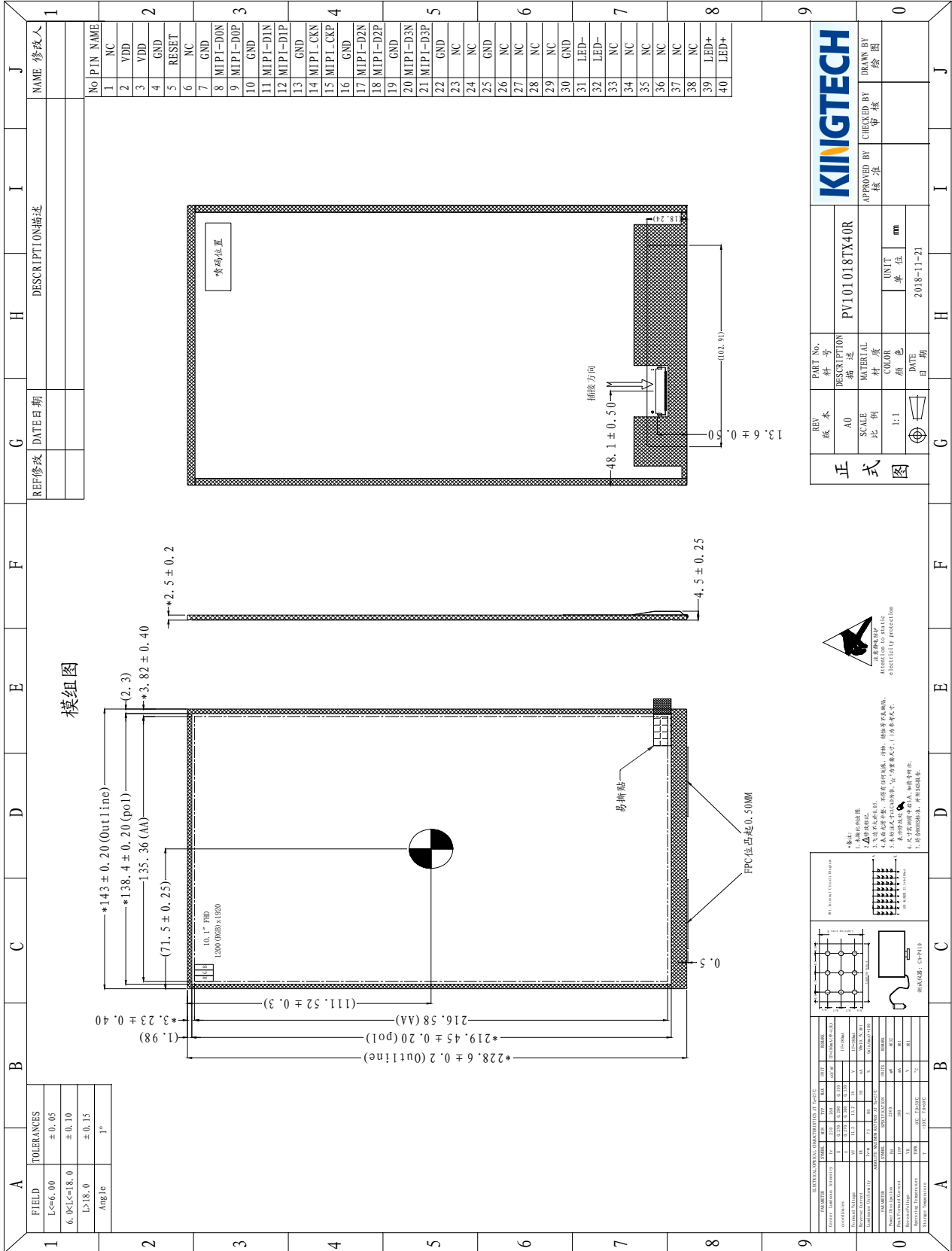
ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	VDD	3.0	3.3	3.6	V	-
Analog Power Supply Voltage	AVDD	5.0	5.5	6.0	V	-
Analog Power Supply Voltage	AVEE	-5.0	-5.5	-6.0	V	-
Current for Driver	IVDDIN		32	55	MA	
	IAVDD		28	50	MA	
	IAVEE		25	45	MA	

### 3.1 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	Vf	11.2	12.0	13.2	V	If=180mA
Luminance	Lv	230	260	-	cd/m <sup>2</sup>	If=180mA
Number of LED	--	32			Piece	--
Connection mode	P	4chips serial *8			--	--



### 4.0 DIMENSIONAL DRAWING





## 5.0 PINTERFACE PIN CONNECTIONS

Pin No.	Symbol	Description	Remarks
1	NC	Not connection	
2, 3	VDD	Power supply for digital/Analog circuits.	
4	GND	Ground	
5	RESET	Global reset pin.	
6	NC	Not connection	
7	GND	Ground	
8	MIPI-DON	Negative MIPI differential data input	
9	MIPI-DOP	Positive MIPI differential data input	
10	GND	Ground	
11	MIPI-D1N	Negative MIPI differential data input	
12	MIPI-D1P	Positive MIPI differential data input	
13	GND	Ground	
14	MIPI_CKN	Negative MIPI differential clock input	
15	MIPI_CKP	Positive MIPI differential clock input	
16	GND	Ground	
17	MIPI-D2N	Negative MIPI differential data input	
18	MIPI-D2P	Positive MIPI differential data input	
19	GND	Ground	
20	MIPI-D3N	Negative MIPI differential data input	
21	MIPI-D3P	Positive MIPI differential data input	
22	GND	Ground	
23, 24	NC	Not connection	
25	GND	Ground	
26-29	NC	Do not connect	
30	GND	Ground	
31, 32	LED-	LED Cathode	
33-38	NC	Not connection	
39, 40	LED+	LED Anode	



## 6.0 TIMING CHARACTERISTICS OF INPUT SIGNAL

### 6.1 Video input timing for multi-Drop type

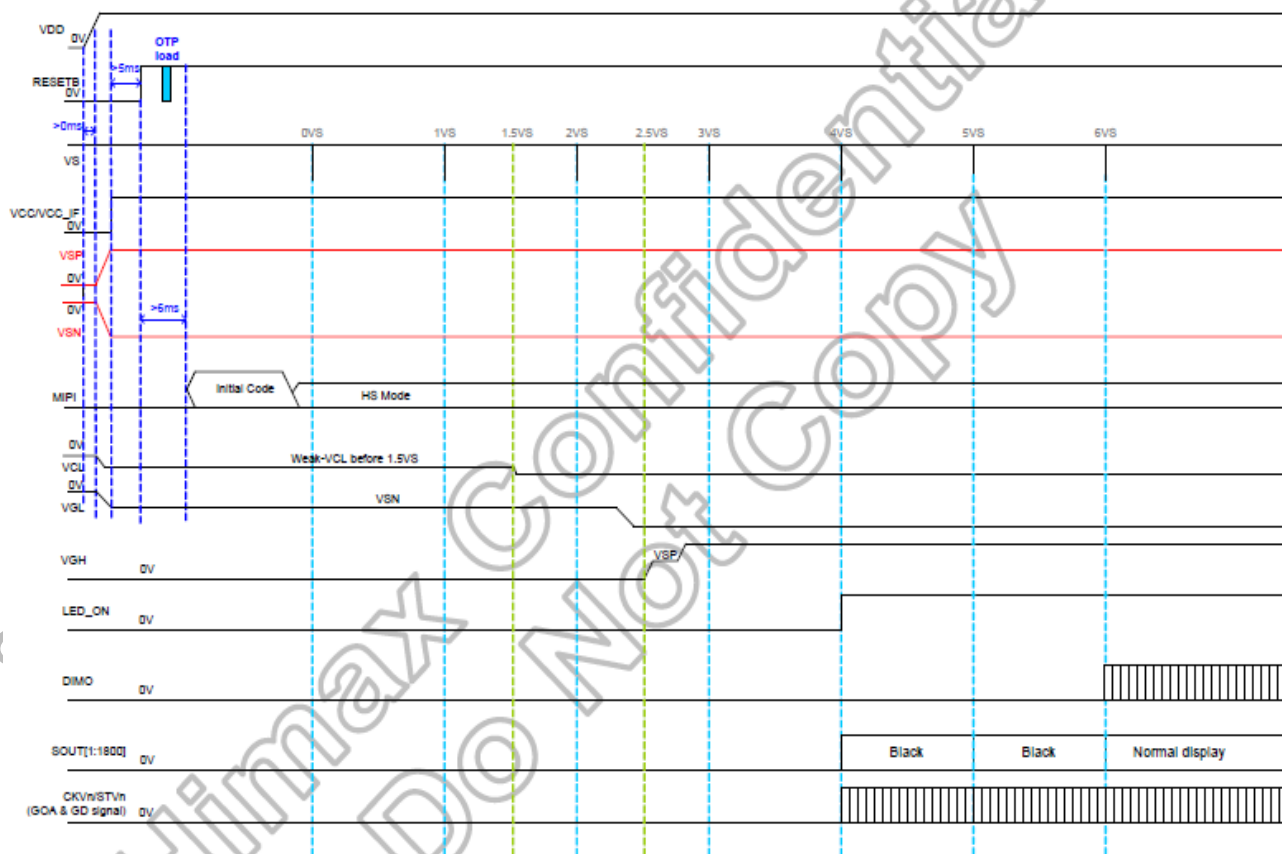
Input Timing	Symbol	1200RGBx1920			1200RGBx1600			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
PCLK Frequency	-	-	156	-	-	131	-	MHz
Horizontal Total	THT	-	1340	2047	-	1340	2047	DCLK
Horizontal Synchronization	THS	-	24	-	-	24	-	DCLK
Horizontal Back Porch	THB	-	80	-	-	80	-	DCLK
Horizontal Address	THA	-	1200	-	-	1200	-	DCLK
Horizontal Front Porch	THF	-	60	-	-	60	-	DCLK
Vertical Frequency	-	-	60	-	-	60	-	Hz
Vertical Total <sup>(1)</sup>	TVT	-	1944	2047	-	1624	1750	THT
Vertical Synchronization	TVS	-	2	-	-	2	-	THT
Vertical Back Porch	TVB	-	10	-	-	10	-	THT
Vertical Address	TVA	-	1920	-	-	1600	-	THT
Vertical Front Porch	TVF	-	14	-	-	14	-	THT

### 6.2 Power on/off sequence

#### 6.2.1 Power on sequence PWRMD=0 → max. Power on time=7VS

After reset state or exit STB mode, the power on sequence will start.

To prevent the device from damage due to latch up, The VGL will be earlier than VGH. At 2.25VS the VGL negative high voltage will be generated via the external charge pump circuit. Then at 2.5VS the VGH positive high voltage can be generated via the external charge pump circuit. One SCHOTTKY diode is necessary between VGL and GND when VDD and VSP start at the same time.



**Note:** (1) Finish to write the GOA MUX (page1 registers) and GOA timing setting (page3 registers) within 50ms after reset pulls to high.





**6.2.1 : Power off sequence PWRMD=0 → max. Power off time=5VS**

When enter STB mode, the STBYB signal will be set to low. The power off sequence will start.

**Power-off sequence  
External VSP/VSN. Internal VGH/VGL.**

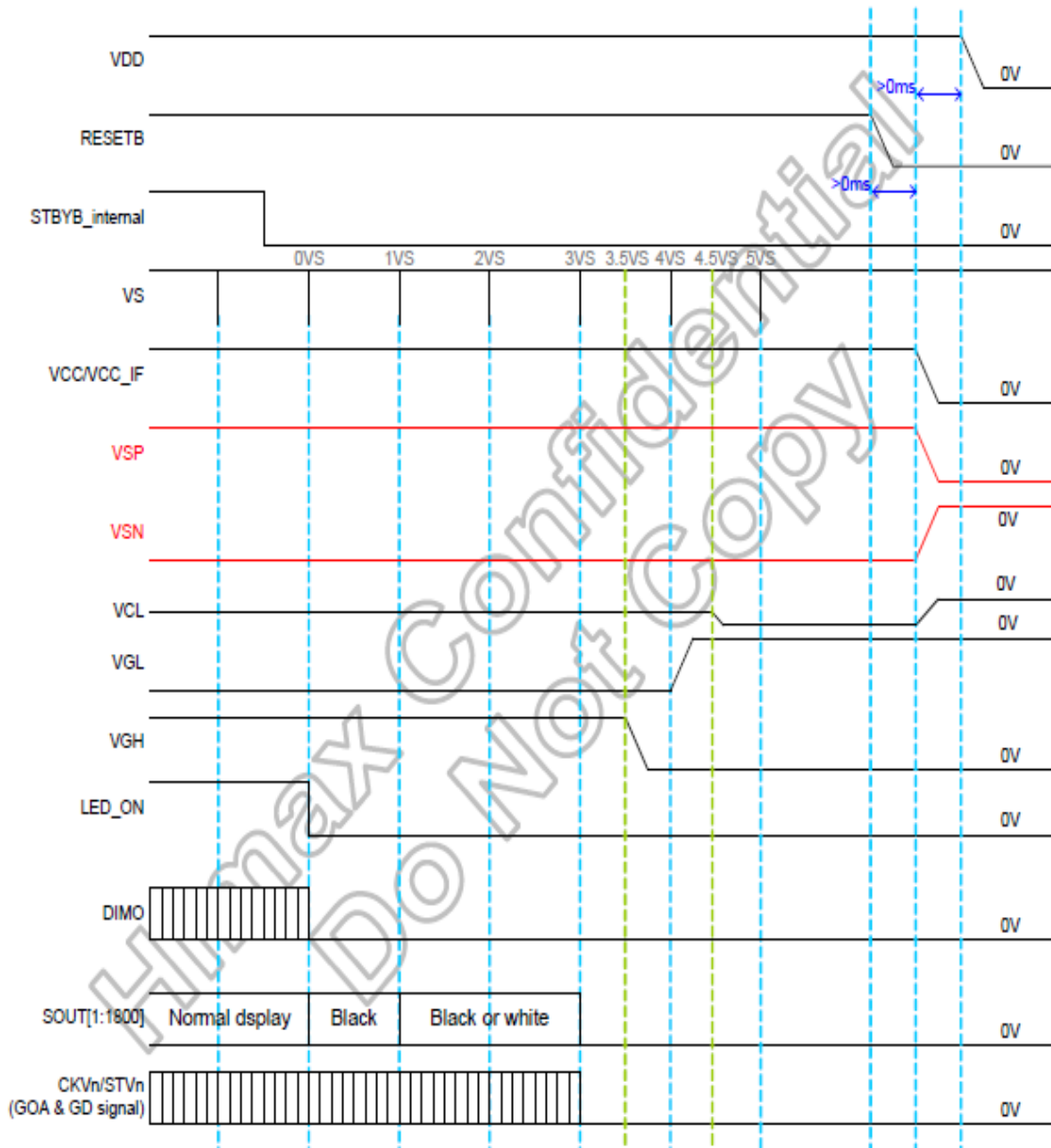
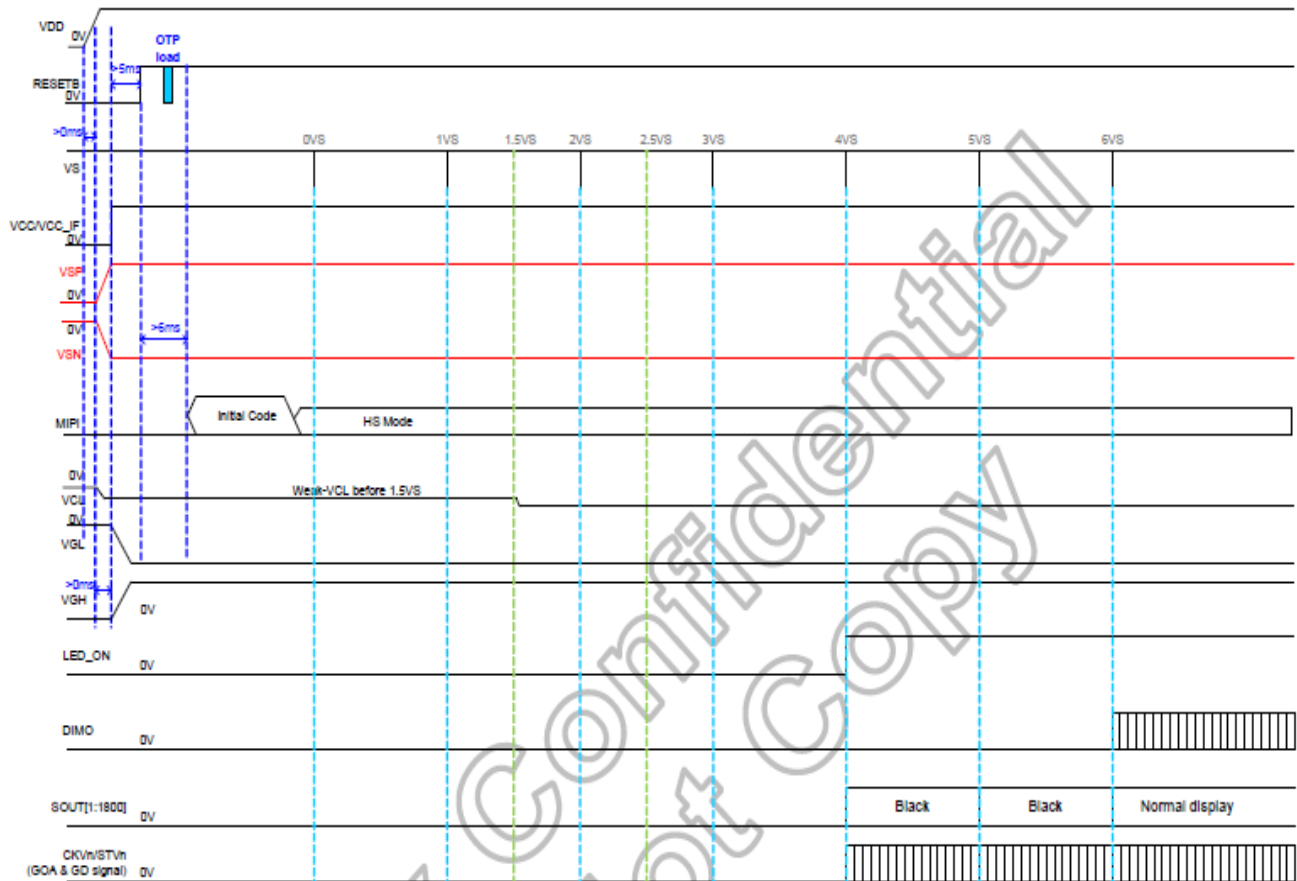


Figure 5.6: Power off sequence with PWRMD=0



### 6.2.2 Power on sequence PWRMD=1 → Max. Power on time=6VS

After reset state or exit STB mode, the power on sequence will start. One SCHOTTKY diode is necessary between VGL and GND when VDD and VSP start at the same time.



**Note:** (1) Finish to write the GOA MUX (page1 registers) and GOA timing setting (page3 registers) within 50ms after reset pulls to high

Figure 5.7: Power on sequence with PWRMD=1 and repair OP disable



### 6.2.3 Power off sequence PWRMD=1 → max. Power off time=4.5VS

When enter STB mode, the STBYB signal will be set to low then the power off sequence will start.

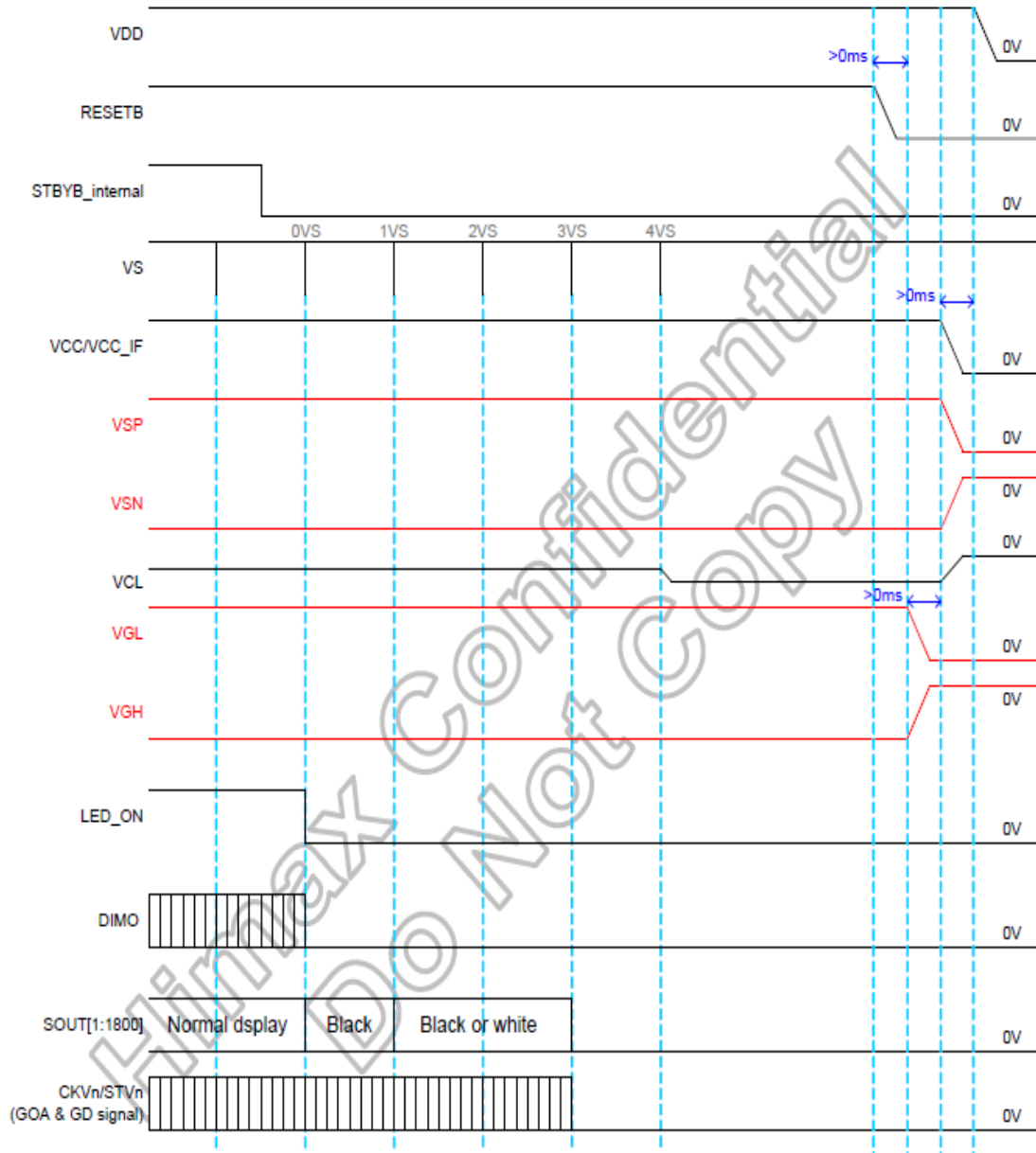


Figure 5.8: Power off sequence with PWRMD=1

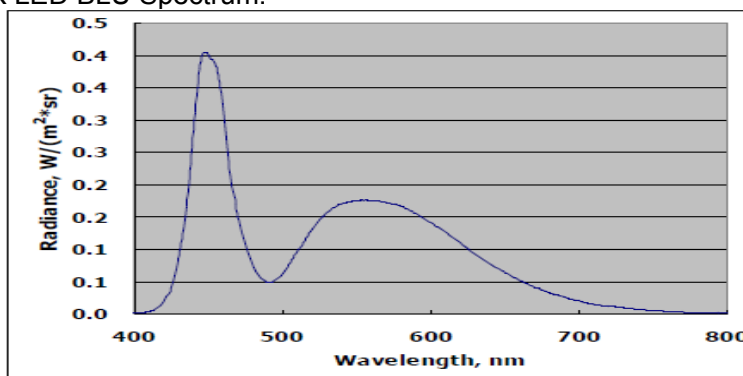


## 7.0 ELECTRO-OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Luminance	L	$\theta = 0^\circ$	230	260	-	cd/m <sup>2</sup>	Note1
Luminance Uniformity	YU	13 Point	75	80	-	%	Note5
Contrast Ratio	CR	$\theta = 0^\circ$	-	800	-	-	Note3
Response Time	Rr+Tf	$\theta = 0^\circ$	-	25	-	ms	Note4
Viewing Angle K=Contrast Ratio>10	Horizontal	$\Theta$ L	CR>10 $\theta = 0^\circ$	-	85	-	Note2
		$\Theta$ R		-	85	-	
	Vertical	$\Theta$ U		-	85	-	
		$\Theta$ D		-	85	-	
Color Filter Chromaticity	White	X	$\theta = 0^\circ$	0.250	0.280	0.310	
		Y		0.270	0.300	0.330	
	Red	X	$\theta = 0^\circ$	0.600	0.630	0.660	Note1
		Y		0.320	0.350	0.380	
	Green	X	$\theta = 0^\circ$	0.280	0.310	0.340	
		Y		0.550	0.580	0.610	
	Blue	X	$\theta = 0^\circ$	0.120	0.150	0.180	
		Y		0.030	0.060	0.090	
Color gamut (NTSC ratio)			-	69	-	%	
Color Temperature			8075	9500	10925		

Note (1)INX LED BLU Spectrum:





**\*Note (2)** Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

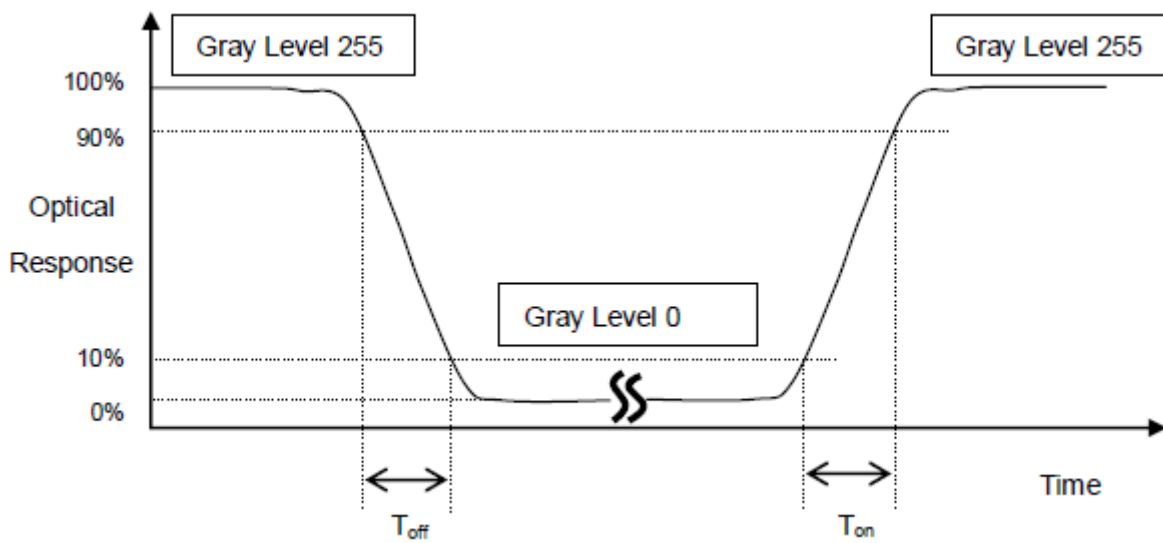
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

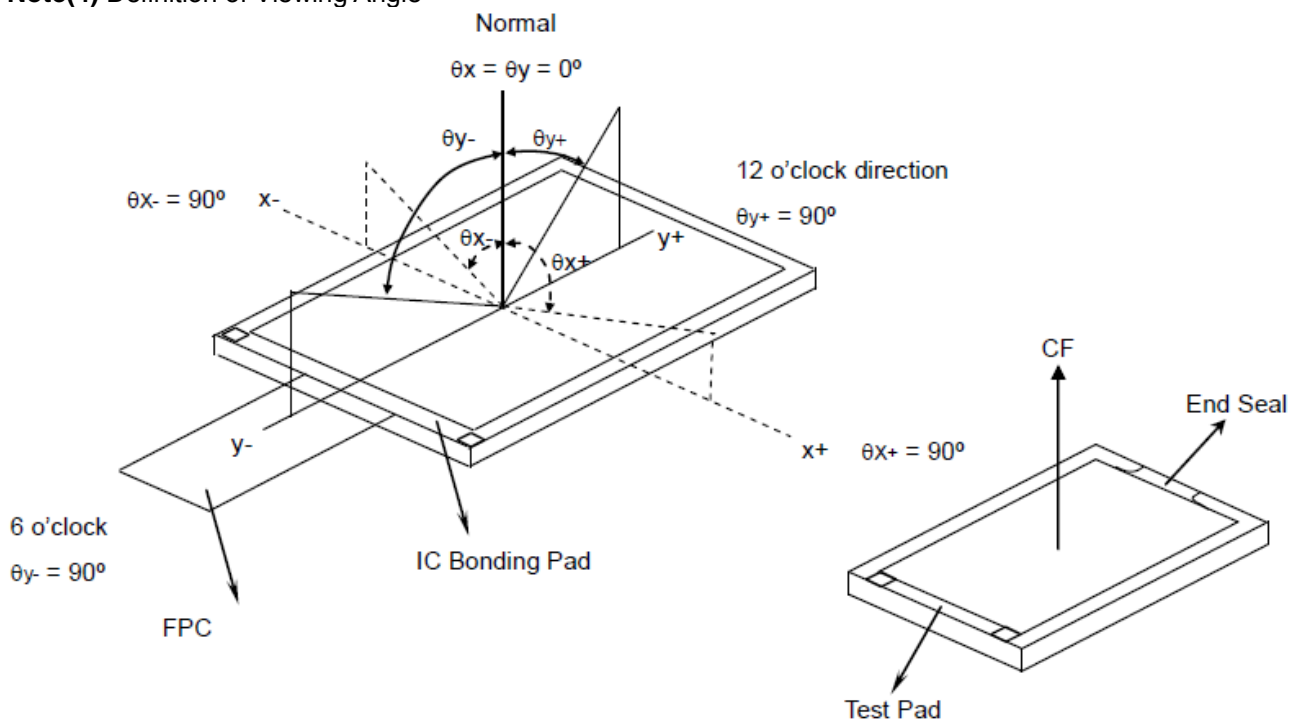
$$\text{CR} = \text{CR} (5)$$

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

**\*Note (3)** Definition of Response Time ( $T_{on}$ ,  $T_{off}$ ):



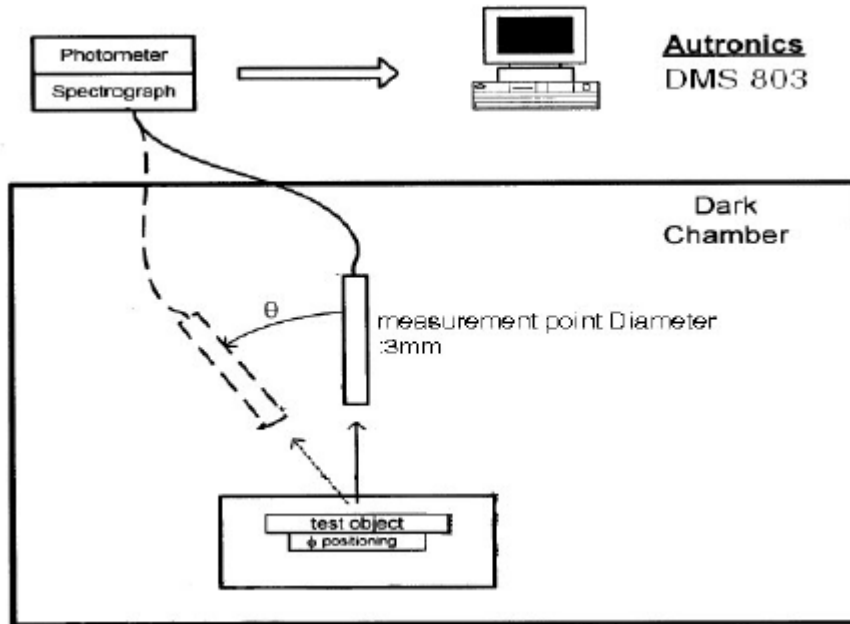
**\*Note(4)** Definition of Viewing Angle



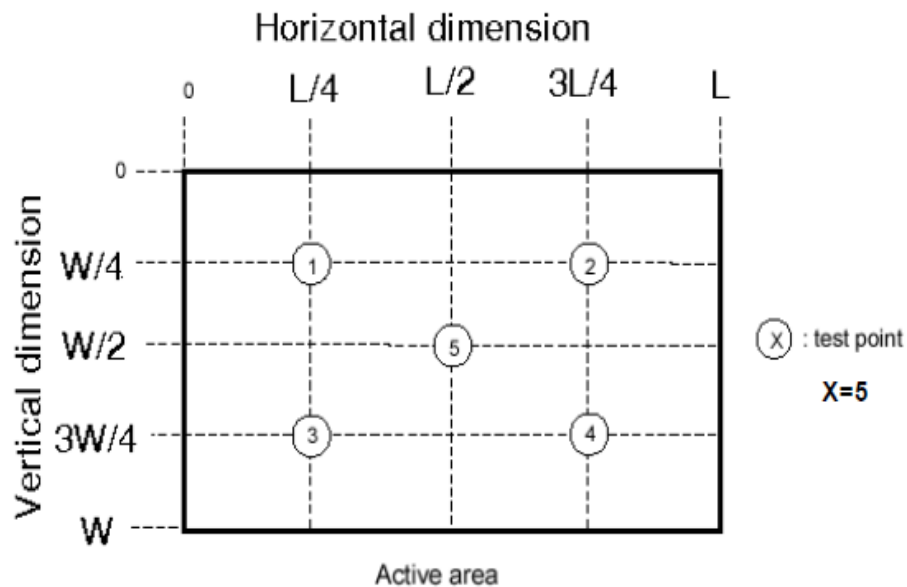


**\*Note (5) Measurement Set-Up:**

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.



**\*Note (6)**





## 8.0 RELIABILITY

### 8.1 MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal. (25°C in the room without sunlight)

### 8.2 Tests

NO.	Test Item	Test condition	Criterion
1	High Temperature Storage	60°C±2°C 96H Restore 2H at 25°C Power off	
2	Low Temperature Storage	-10°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	50°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	0°C±2°C 96H Restore 2H at 25°C Power on	
5	High Temperature & Humidity Operation	40°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-10°C ↔ 60°C 30min 30min after 10cycle, Restore 2H at 25°C Power off	Aftertesting,cosmetic and electrical defects should not happen.
7	Vibration Test	10Hz~45Hz, 100m/s2, 120min	
8	Shock Test	Half-sinewave,300m/s2,11ms	
9	Drop Test(package state)	800mm, concrete floor,1corner, 3edges, 6 sides each time	1.After testing, cosmetic and electrical defects should not happen. 2.the product should remain at initial place 3.Product uncovered or package broken is not permitted.
10	Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact:±4KV,Air:±8KV Measure point :LCD glass and metal bezel 200pF, 0Ω, ±200V contact test Measure point :IF connector pins	IEC61000-4-2: 2001 GB/T17626.2-2006



## 9.0 INSPECTION STANDARDS

### 9.1 Purpose

This incoming inspection standard shall be applied to TFT-LCD supplied by KINGTECH to its customer.

### 9.2 Scope

This inspection standard contains Cosmetic Specifications and Electrical Specifications.

### 9.3 Classification of defects

#### 9.3.1 Major defect.

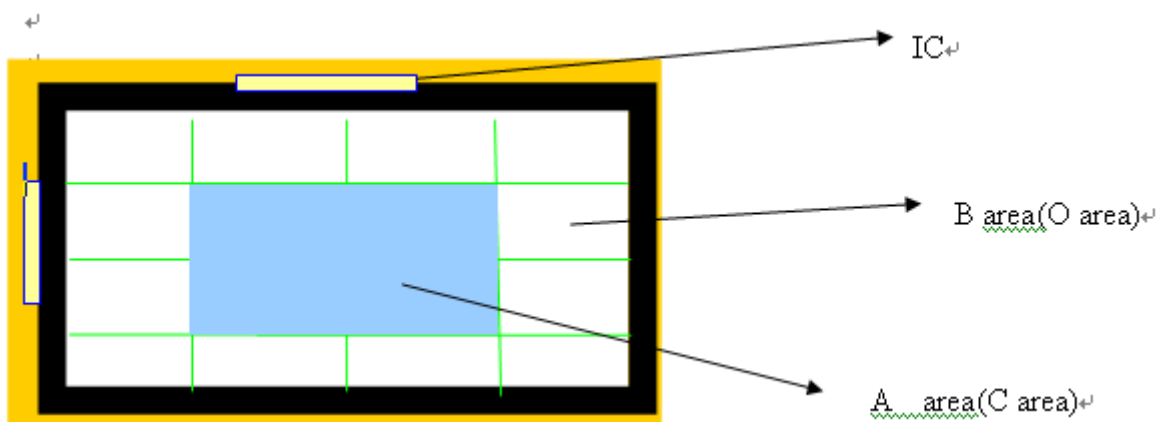
The major defect is a defect that is likely to result in product failure or reduction in Product's intended usage.

#### 9.3.2 Minor defect.

The minor defect is a defect that has little bearing on the effective use or Operation of the product.

### 9.4 Definition

#### 9.4.1 Display area definition

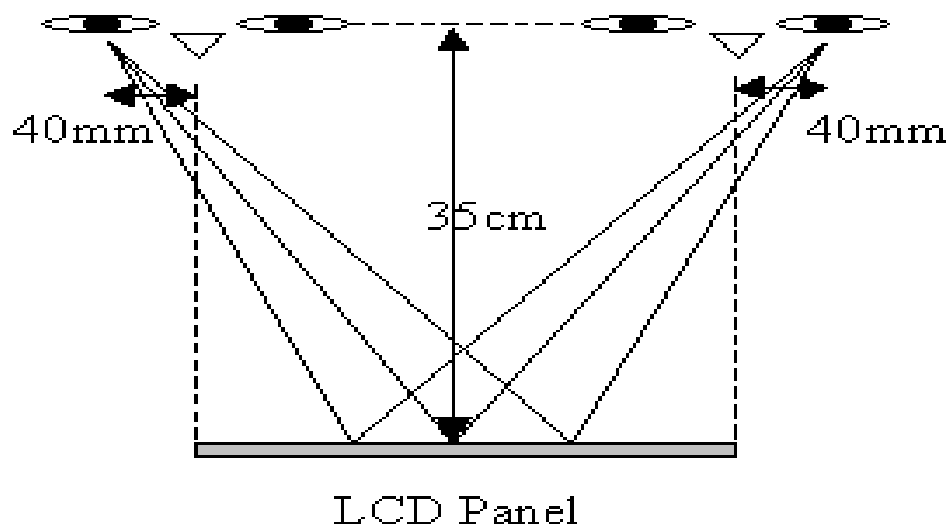
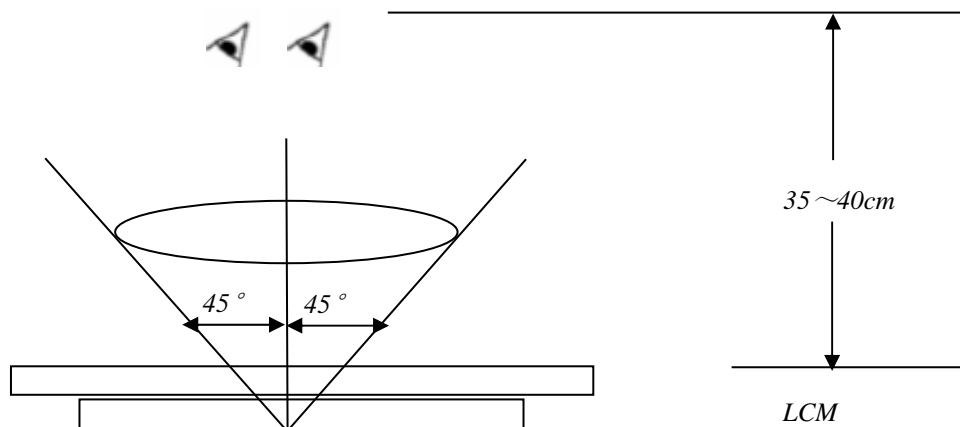






## 9.5 Inspection conditions is as follows

- 9.5.1 Viewing distance is approximately 35-40 cm
- 9.5.2 Viewing angle is normal to the LCD panel as 45°
- 9.5.3 Ambient temperature is approximately 25±5°C
- 9.5.4 Ambient humidity is 60±5% RH
- 9.5.5 Ambient luminance is from 300-500 Lux.
- 9.5.6 Input signal timing should be typical value(3s-5s).
- 9.5.7 Mura & Light leakage inspection at ND-Filter 6%.





## 9.6 Sampling method

9.6.1 According to the MIL-STD-105E general inspection level , II Sampling plan.

9.6.2 AQL: MA 0.65 MI 1.0

## 9.7 Inspection Criteria

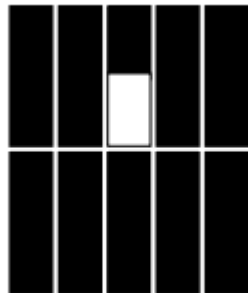
DEFECT TYPE			LIMIT			Defect	Note	
VISUAL DEFECT	SCRATCH		W≤0.05mm and L≤5mm		Ignore	Ma.j	NOTE1	
			0.05mm<W≤0.2mm L≤10mm		N≤4			
			10mm<L, 0.1mm<W		N=0			
	INTERNAL	SPOT		Φ≤0.2mm				Ignore
				0.2mm<Φ≤0.5mm				N≤4
				Φ>0.5mm				N=0
		FIBER		0.1mm≤W≤0.2mm L≤2.5mm				N≤4
				0.2mm<W, 2.5mm<L				N=0
		POLARIZER BUBBLE		Φ≤0.25mm				Ignore
				0.25mm<Φ≤0.5mm				N≤4
				Φ>0.5mm				N=0
		DENT		Φ<0.25mm				Ignore
				0.25mm≤Φ≤0.5mm				N≤4
				Φ>0.5mm				N=0
		ELECTRICAL DEFECT	BRIGHT DOT		C Area			O Area
N≤4 (contain C area and O area)					N≤4			
DARK DOT			N≤5 (contain C area and O area)			N≤5		
TWO ADJACENT DOT			N≤1	N≤2	N≤3			
THREE OR MORE ADJACENT DOT			NOT ALLOWLED					
LINE DEFECT		NOT ALLOWLED						



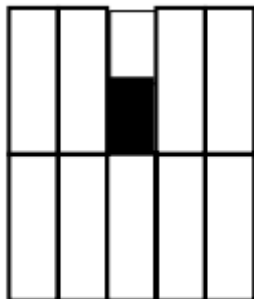
Note1: Minimum distance between dot defects and spot is 5mm;

Note2: The definition of Bright dot and Dark dot

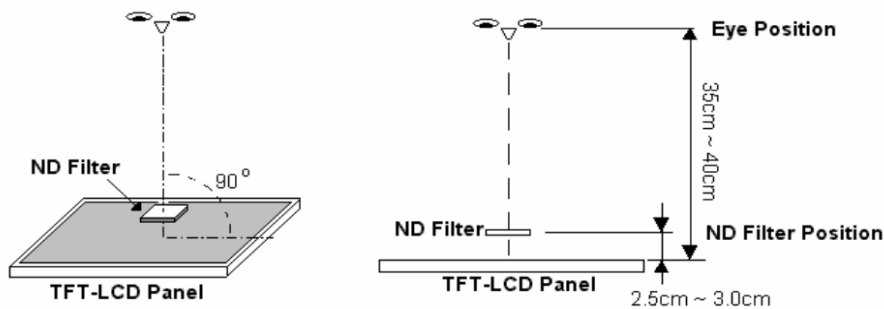
-bright area is more than 50% of one dot



-dark area is more than 50% of one dot



-The bright dot shall be visible under ND-Filter 5% as following:



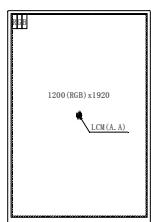
NOTE3:

- A bit rate(bright dot model )  $\leq 10\%$ ;
- Class Chipping but not affect the function of quality OK;
- Polarizing film appearance does not affect the function OK;

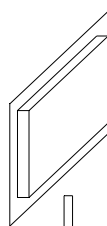


## 10.0 PACKING DRAWING

### 包装图:

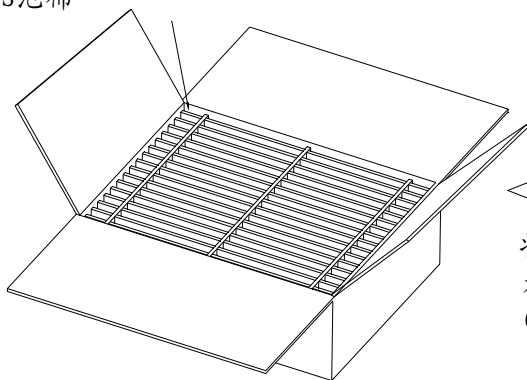


将2PCS模组产品由  
PE袋包



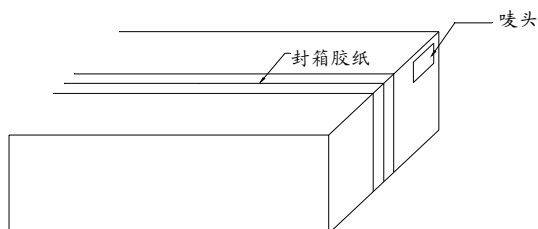
备注: 2PCS产品模组的LCD  
面对面

在纸箱里的卡板上下  
1PCS泡棉



将2PCS产品  
放入小隔里, 共计  
60pcs

使用封口胶封口  
并贴附唛头



REVISION 版本	A0	<input checked="" type="checkbox"/> 正式规格	<input type="checkbox"/> 临时规格	REVISOR 修订人	MODEL NO 产品料号	APPROVED BY 核准	CHECKED BY 审核	DRAWN BY 绘图
DATE 日期	2018-10-25							
PAGE 页码	6/6				客户:			



## 11.0 HANDLING PRECAUTION

- (1) Don't disassemble and reassemble the module by self.  
(禁止自行拆解)
- (2) Acid, alkali, alcohol or touched directly by hand will damage the display.  
(酸性、碱性、酒精或手的直接接触将会损伤显示面)
- (3) Static electricity will damage the module. Please configure grounding device.  
(静电会损伤模组，请装配接地设备)
- (4) The strong vibration, shock, twist or bend will cause material damage, even module broken.  
(强烈的撞击、震动、扭转或弯曲将会造成原材损伤，甚至面板破裂)
- (5) It is easy to cause image sticking while displaying the same pattern for very long time.  
(长期显示同一画面会造成影像残留)
- (6) The response time, brightness and performance will vary from different temperature.  
(响应时间、亮度与均匀性会因温度而有所改变)