PRODUCT SPECIFICATION

MODEL:20810700150310

<◇> PRELIMINARY SPECIFICATION

<◆> APPROVAL SPECIFICATION

CUSTOMER
DATE:

DESIGNED	CHECKED	APPROVED
LCM研发部 2013.02.19 邓安	LCM研发部 2013.02.19 高群	LCM研发部 2013.02.19 王惠奇

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2012.10.22	-	First Issued.	ChenQi
V1.1	2012.11.13	5	Change the module drawing.	ChenQi
V1.2	2013.02.19	9,10	Change the Power on/off control.	DengAn

TABLE OF CONTENTS

1. GENERAL DESCRIPTION

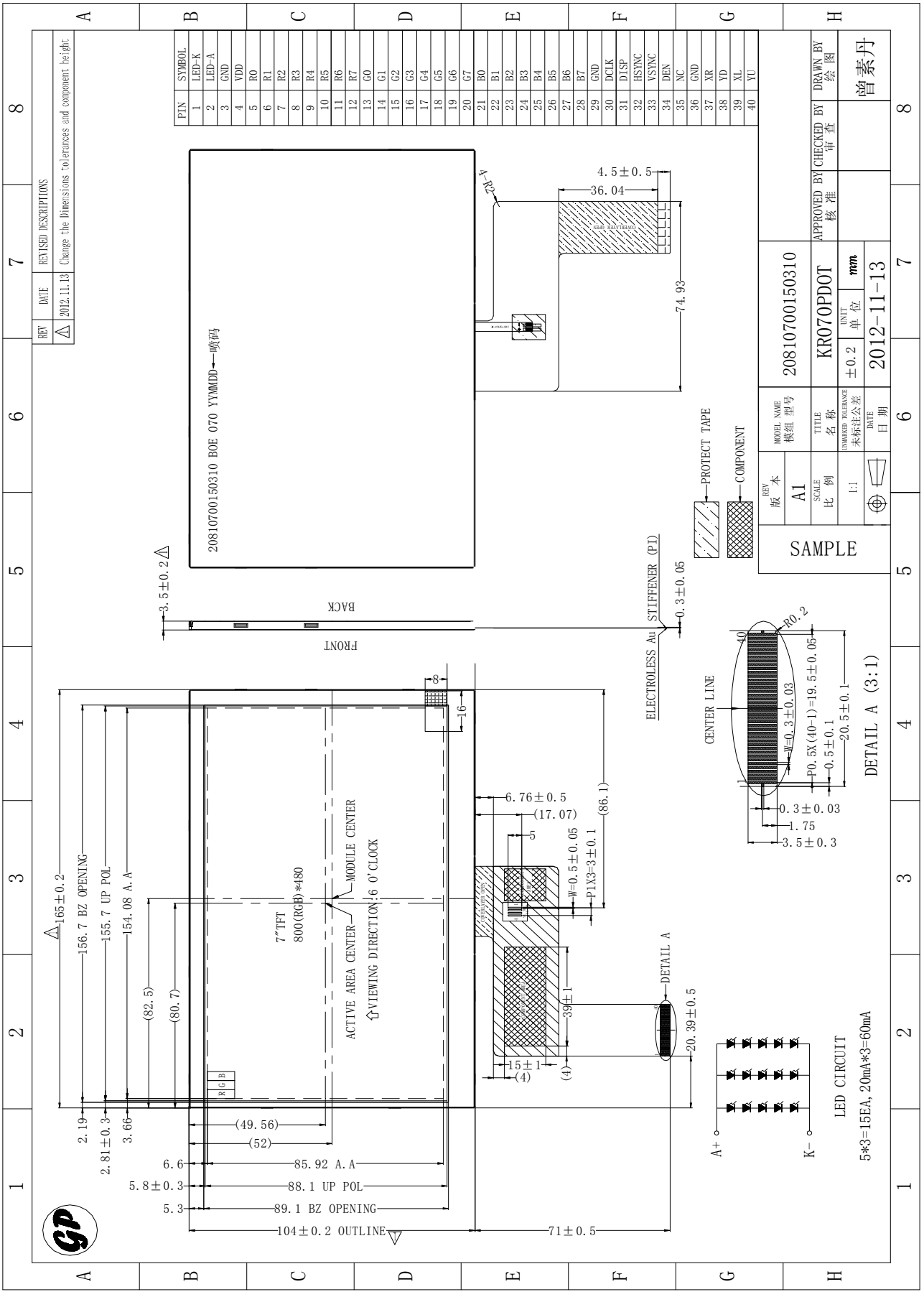
1.1 DESCRIPTION

20810700150310 is a color active matrix thin film transistor(TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This module is composed of a TFT LCD panel, driver ICs, FPC and a Backlight unit.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	7”	inch
2	Number of Pixels	800(H) × 3(RGB) × 480(V)	pixels
3	Active Area	154.08(W) × 85.92(H)	mm
4	Pixel Pitch	0.1926(W) × 0.1790(H)	mm
5	Outline Dimension	3.5(T)	mm
6	Pixel arrangement	RGB vertical stripe	-
7	Display Mode	Normally White	-
8	Viewing Direction		-
9	Display Color		-
10	Luminance(cd/m2)	300(TYP.)	nit
11	Contrast Ratio	400(TYP.)	-
12	Surface Treatment	Anti-Glare	-
13	Interface	24bit-TTL	-
14	Backlight	White LED	-
15	Drive IC	-	-
16	Operation Temperature	-20~70	℃
17	Storage Temperature	-30~80	℃
18	Weight	120.8	g

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

FPC Connector is used for the module electronics interface. The recommended model is 0.5mm 2.0FPC Hinge type 40 PIN manufactured by suntech.

No.	Symbol	Function
1	LED-K	LED backlight(Cathode)
2	LED-A	LED backlight(anode)
3	GND	Ground
4	VDD	Power supply (Digital +3.0V)
5	R0	Red Data
6	R1	Red Data
7	R2	Red Data
8	R3	Red Data
9	R4	Red Data
10	R5	Red Data
11	R6	Red Data
12	R7	Red Data
13	G0	Green Data
14	G1	Green Data
15	G2	Green Data
16	G3	Green Data
17	G4	Green Data
18	G5	Green Data
19	G6	Green Data
20	G7	Green Data
21	B0	Blue Data
22	B1	Blue Data
23	B2	Blue Data
24	B3	Blue Data
25	B4	Blue Data
26	B5	Blue Data
27	B6	Blue Data
28	B7	Blue Data
29	GND	Ground
30	DCLK	Dot data clock
31	DISP	Display on/off
32	HSYNC	Horizontal sync input in RGB mode (short to GND if not used)
33	VSYNC	Vertical sync input in RGB mode (short to GND if not used)
34	DEN	Data Enable

35	NC	NC
36	GND	Ground
37	XR(NC)	T/p X-Right
38	YD(NC)	T/p Y-Bottom
39	XL(NC)	T/p X-Left
40	YU(NC)	T/p Y-Up

Note: I/O definition.
I---Input pin, O---Output pin, P--- Power/Ground, N--- No Connection

4. ELECTRICAL CHARACTERISTICS

4.1 ELECTRICAL CHARACTERISTICS

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Digital Supply Voltage	VDD	-0.3	-	5.0	V	Absolute Maximum Ratings
Digital Supply Voltage	VDD	3	3.3	3.6	V	Operating Conditions
Logic Input Voltage	VIH	0.7 VDD	-	VDD	V	
	VIL	GND	-	0.3 VDD	V	
Digital Current	IVDD	-	124	-	mA	Current Consumption (Note1)
Total Power Consumption	PC	-	TBD	TBD	mW	

Note1: Typ. specification：Gray-level test Pattern
Max. specification：Black test Pattern

(a)Gray-level Pattern

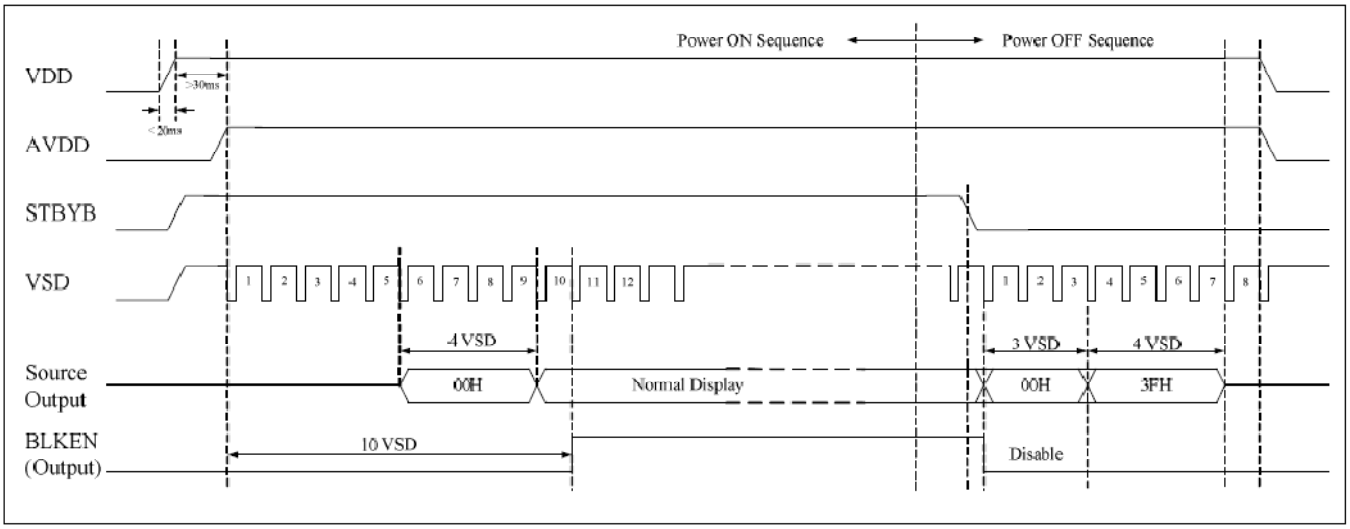
(b)Black Pattern

4.2POWER、SIGNAL SEQUENCE

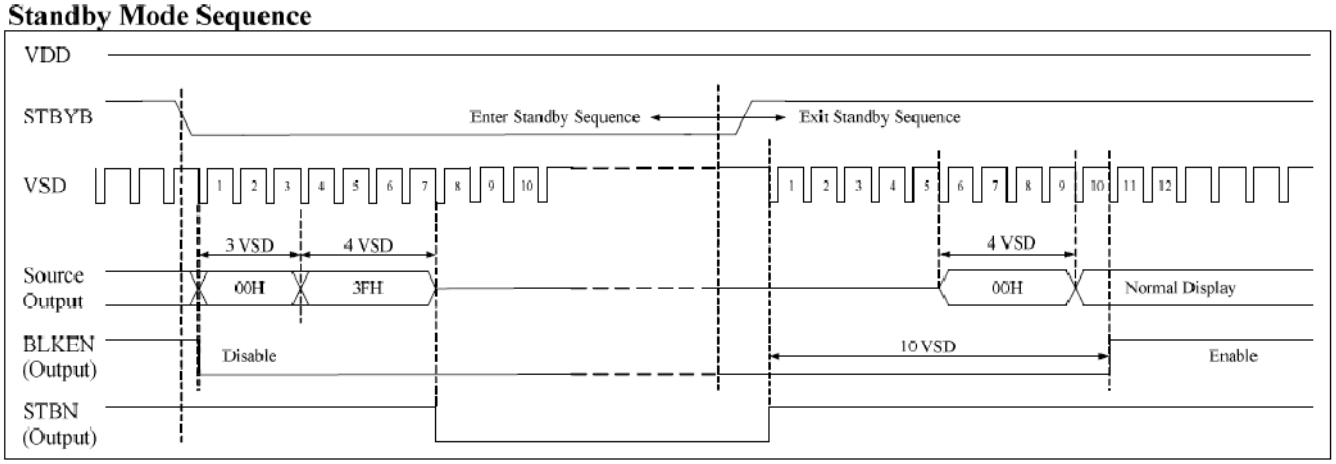
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON: VDD, VSS →VDDA, VSSA→ V1 to V14
Power OFF: V1 to V14→VDDA, VSSA →VDD, VSS

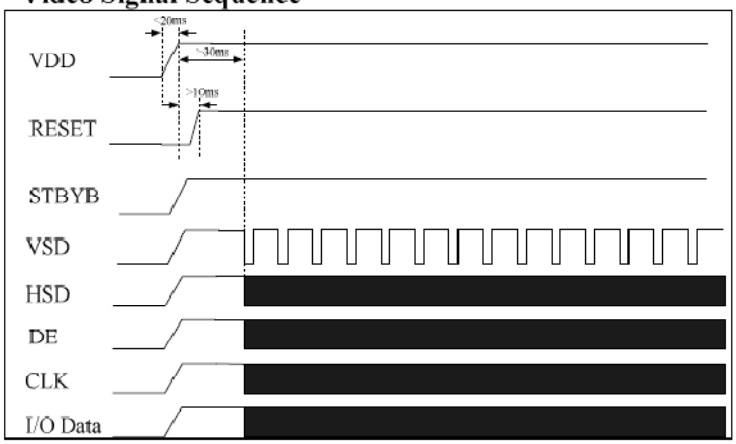
4.2.1Power on/off control



Standby Mode Sequence



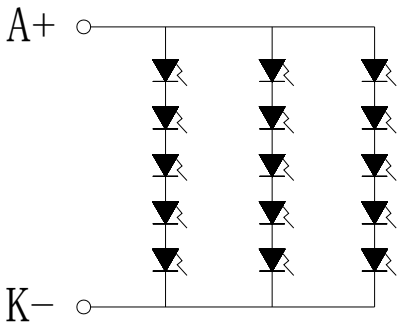
Video Signal Sequence



4.3BACKLIGHT UNIT

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED Current	Iled	-	60	-	mA	15LEDS
Forward voltage	VF	15	16.5	17.5	V	IF=60mA,15LEDS
Reverse current	IR	-	-	50	μA	VR=5V,1LED
Power dissipation	Pd	1050			mW	15LEDS
Peak forward current	IFP	100			mA	1LED
Reverse Voltage	VR	5			V	1LED

4.3.1Internal Circuit Diagram



LED CIRCUIT

5*3=15EA, 20mA*3=60mA

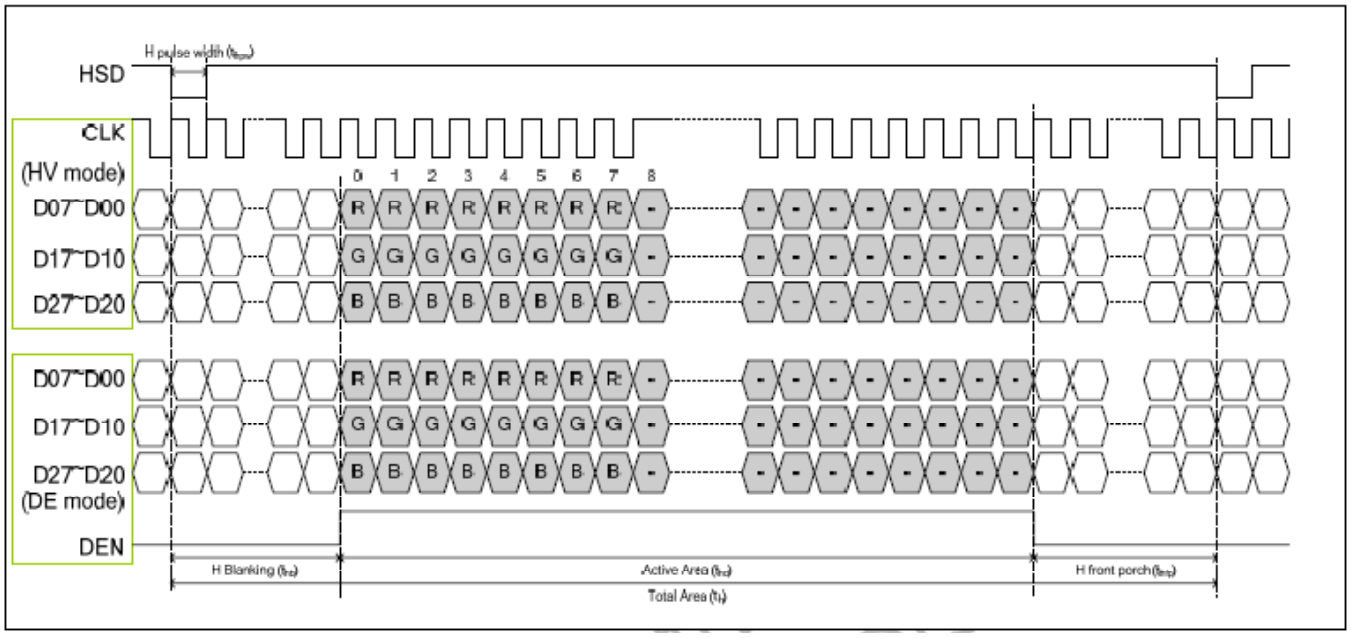
5.INPUT SIGNAL TIMING

5.1TIMING CHARACTERISTICS OF INPUT SIGNALS

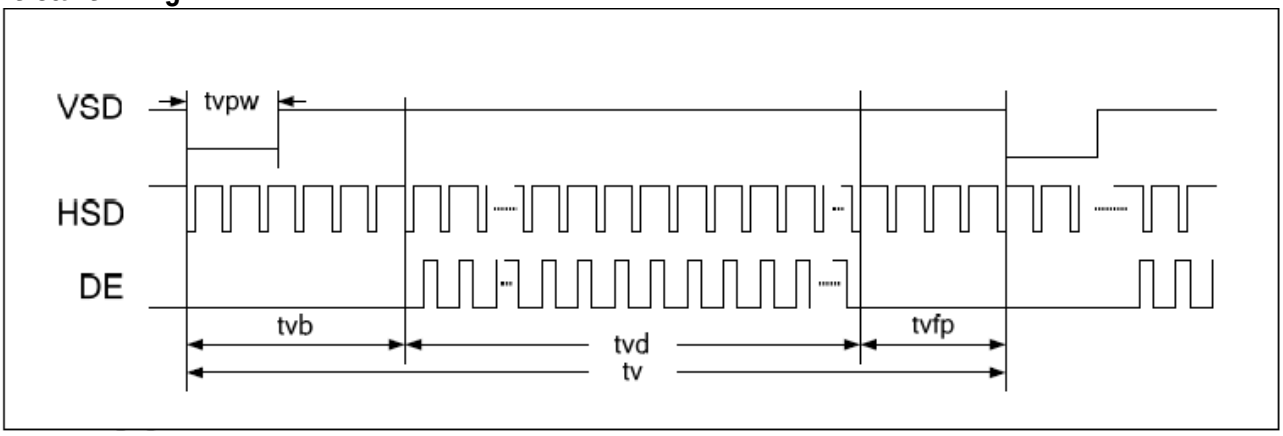
Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
HS setup time	T_{hst}	8	-	-	ns
HS hold time	T_{hhd}	8	-	-	ns
VS setup time	T_{vst}	8	-	-	ns
VS hold time	T_{vhd}	8	-	-	ns
Data setup time	T_{dsu}	8	-	-	ns
Data hold time	T_{dhd}	8	-	-	ns
DE setup time	T_{esu}	8	-	-	ns
DE hold time	T_{ehd}	8	-	-	ns
VDD Power On Slew rate	T_{POR}	-	-	20	ms
RSTB pulse width	T_{Rst}	10	-	-	us
CLKIN cycle time	T_{cph}	20	-	-	ns
CLKIN pulse duty	T_{cwh}	40	50	60	%
Output stable time	T_{sst}	-	-	6	us

5.2DATA INPUT FORMAT

Horizontal timing



Vertical timing



Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	1	-	40	DCLK
HS Back Porch (Blanking)	thb		46		DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	85	256	400	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
Vertical Display Area	tvd		480		T_H
VS period time	tv	513	525	650	T_H
VS pulse width	tvpw	3	-	20	T_H
VS Back Porch (Blanking)	tvb		23		T_H
VS Front Porch	tvfp	7	22	147	T_H
DE mode Blanking	tv-tvd	30	45	170	T_H

6. OPTICAL CHARACTERISTICS

Ta = 25 ± 2℃

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response time		Tr +Tf	Point-5	-	25	35	ms	Note3
Contrast ratio		CR		-	400	-		Note4
Color Chromaticity	White	x	θ=0°	0.260	0.310	0.360		Note2 Note5 Note6
		y		0.280	0.330	0.380		
	Red	x		0.540	0.590	0.640		
		y		0.307	0.357	0.407		
	Green	x		0.287	0.337	0.387		
		y		0.551	0.601	0.651		
	Blue	x		0.102	0.152	0.202		
		y		0.079	0.129	0.179		
Luminance		L		250	300	-	cd/m2	Note6
Luminance uniformity		YU		70	75	-	%	Note6
Viewing Angle	Up.	θ	Point-5 CR≧10	-	20	-	°	Note1
	Down.	θ		-	45	-		
	Left.	Φ		-	45	-		
	Right.	Φ		-	45	-		
NTSC					52		%	

Note1:Definition of viewing angle range

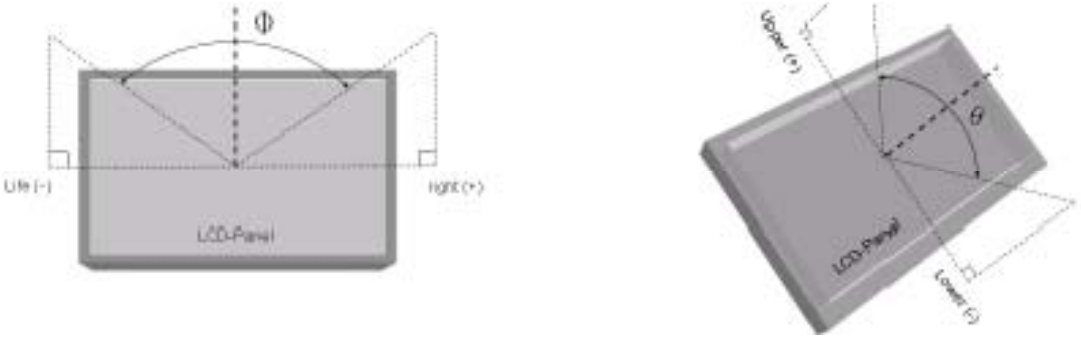


Fig. 6-1 Definition of viewing angle

Note2:Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

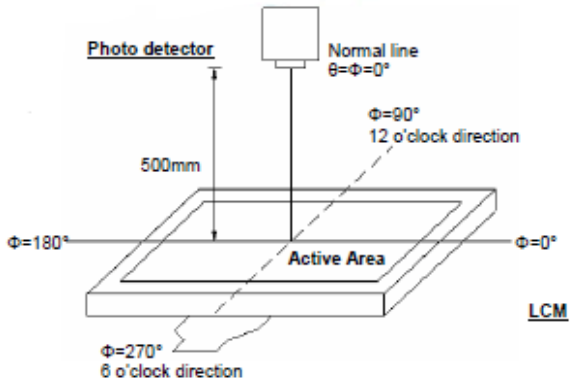


Fig. 6-2 Optical measurement system setup

Note3:Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

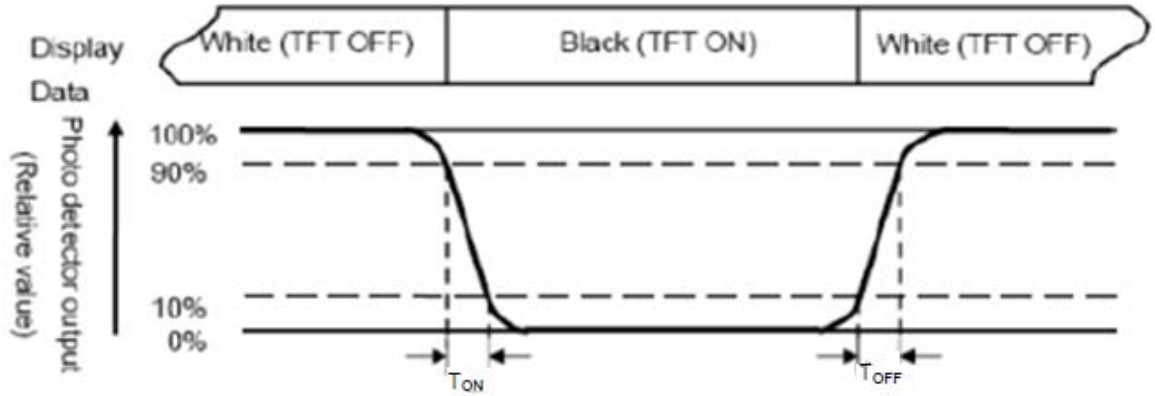


Fig. 6-3 Definition of response time

Note4:Definition of contrast ratio:

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=60mA.

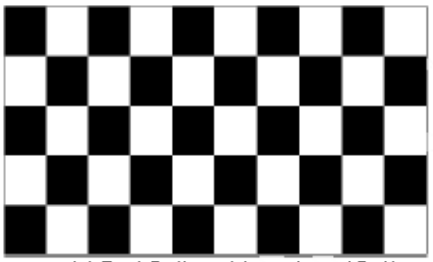
7.QUALITY ASSURANCE SYSTEM

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
HighTemperatureStorage	Ta=80℃; 240hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Storage	Ta=-30℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature Operation	Ta=70℃，240Hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Operation	Ta=-20℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=60℃，90%RH， 240Hrs(no condensation)	IEC60068-2-78：2001 GB/T2423.3-2006
Thermal Shock	-30℃(0.5h) ~ 80℃(0.5h) / 100cycles	Start with cold temperature ， End with high temperature， IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 4hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 4hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)

(b) Gray Pattern

7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s2,6ms, ±x,y,z 3times for direction	IEC60068-2-27：1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32：1990 GB/T2423.8-1995

7.3ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF，330Ω， Contact:±4KV,Air:±8KV	1	IEC61000-4-2：2001 GB/T17626.2-2006
	200pF，0Ω，±200V contact test	2	

Note 1: Pass: Normal display image with no obvious non-uniformity and no line defect.

Fail: No display image, obvious non-uniformity, or line defects.

Partial transformation of the module parts should be ignored.

8. PRECAUTION RELATING PRODUCT HANDLING

8.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal ispoisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is 23±5°C andthe humidity is below 50±20%RH.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

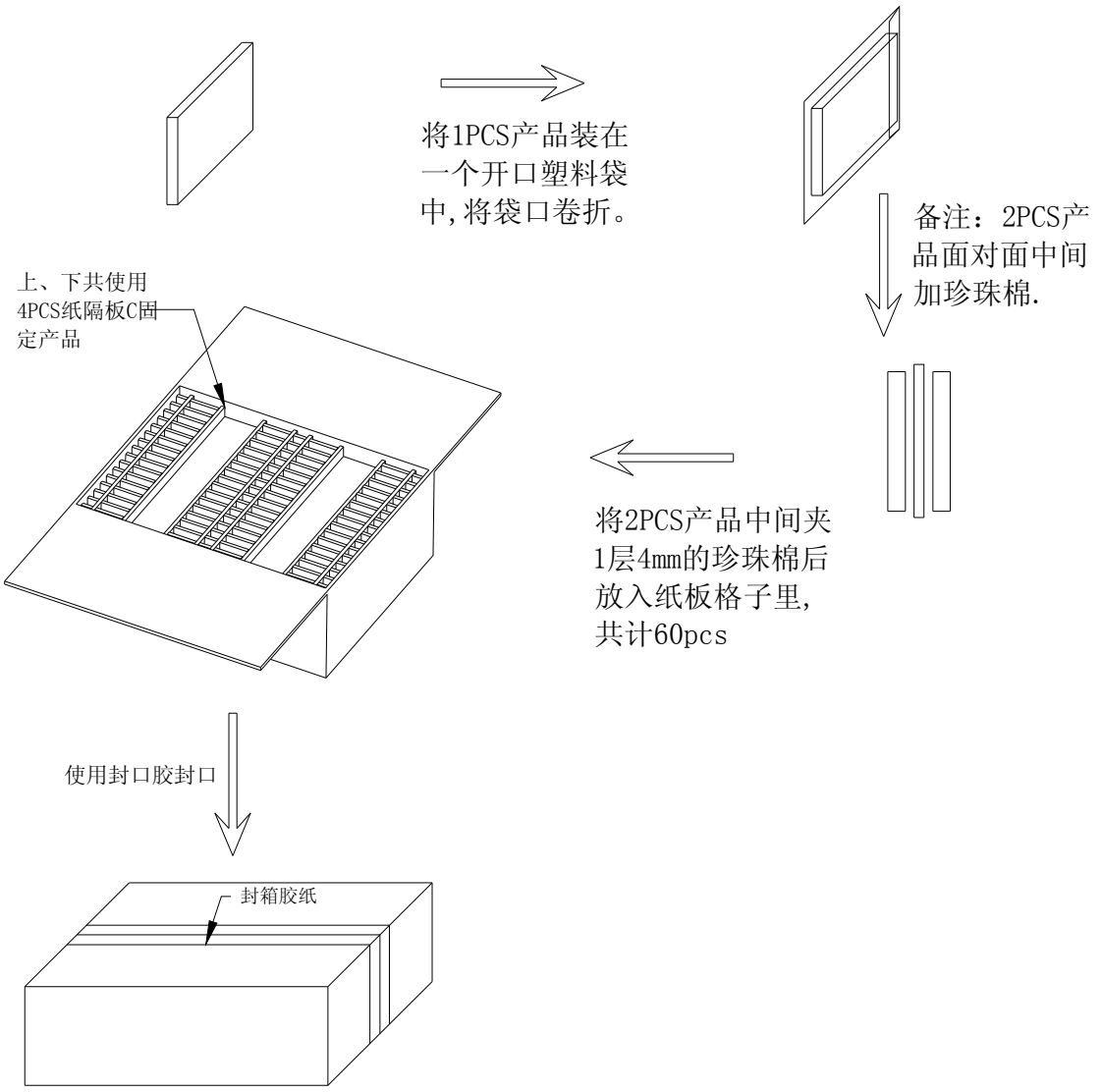
(1) Avoid static electricity which can damage the CMOS LSI.
(2) The polarizing plate of the display is very fragile. So, please handle it verycarefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface.
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch theSurface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9)When the module is assembled, it should be attached to the system firmly,Be careful not to twist and bend the module.
(10)Wipe off water droplets or oil immediately. If you leave the droplets for a longtime, staining and discoloration may occur.
(11) If the liquid crystal material leaks from the panel,it should be kept away from theeyesormouth.In case of contact with hands,legs or clothes, it must be washedaway thoroughly with soap.

8.4 WARRANTY

(1)The period is within twelve months since the date of shipping out under normal using and storage conditions.
(2) Do not repaired or modified the LCM . It may cause function to lose efficacy ,Starry does not warrant the LCM.
(3) All process and material comply ROHS.

9. PACKAGE DRAWING

包装方式示意图：



包材请回收！！

REVSION 版 本	A0	☑ 正式规格 ☐ 临时规格	REVISER 修订人	MODEL NO 产品料号	APPROVED BY 核 准	CHECKED BY 审 核	DRAWN BY 制 作
DATE 日 期	2012-10-16		徐胜建	20810700150310			
PAGE 頁 碼	5/5						

INCOMING INSPECTION STANDARDS

MODEL: 20810700150310

<◇> PRELIMINARY SPECIFICATION

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DESIGNED	CHECKED	APPROVED
LCM研发部 2013.02.19 邓安	LCM研发部 2013.02.19 高群	LCM研发部 2013.02.19 王惠奇

1.INCOMING INSPECTION RIGHT

(1) The Incoming Inspection Standard will be agreed and signed by both sides(Customer and Starry) .

2. INSPECTION CONDITIONS IS AS FOLLOWS:

(1) Viewing distance is approximately 35 ~ 40 cm
(2) Viewing angle is normal to the LCD panel as Fig -1(30°)
(3) Ambient temperature is approximately 25 ± 5℃
(4) Ambient humidity is 60 ± 5% RH
(5) Ambient illuminance is from 300 ~ 500 Lux.
(6) Input signal timing should be typical value.
(7) Mura & Light leakage inspection at ND-Filter 5%

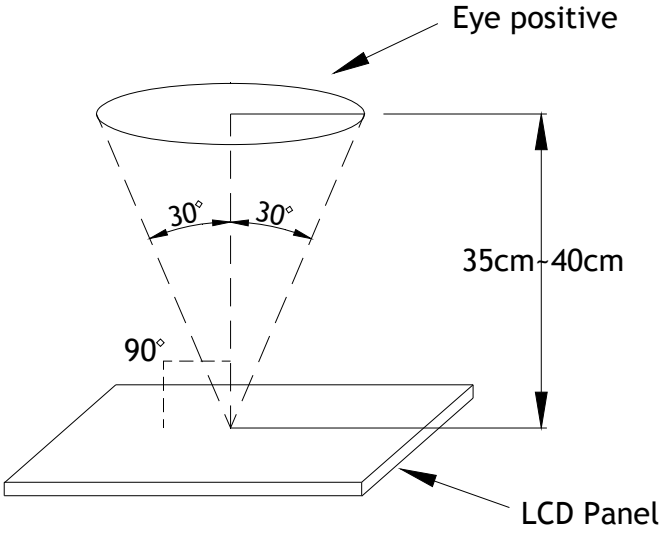


Fig-1

3. SPECIAL CONDITION

(1) Viewing distance is close for inspection of adjacent dots and distance between defect dots.
(2) Viewing condition of "Shot block non-uniformity from oblique angle" is as Fig-2.
(3) Exceptional case: View angle ± 40° while inspected image-sticking.

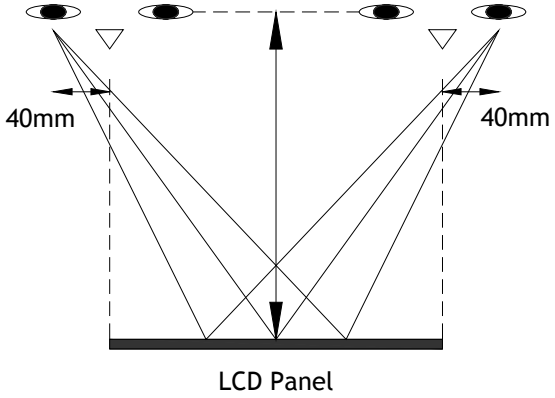
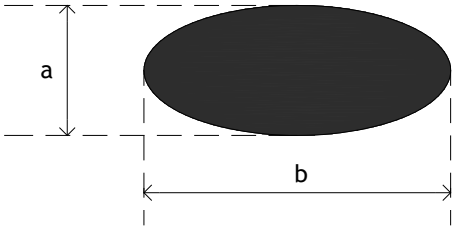


Fig-2

4. INSPECTION CRITERIA

Defecttype			Limit			Note
Visual defect	Scratch		W≦0.05mm		Ignore	Note1
			0.05mm≦w≦0.1mm L≦10mm		N≦3	
			10mm＜l, 0.1mm＜w		N=0	
	Internal	Spot	Φ＜0.2mm		Ignore	Note1
			0.2mm≦φ≦0.4mm		N≦3	
			0.4mm＜φ		N=0	
		Fiber	0.1mm ≦W≦0.2mm, l≦2.5mm		N≦4	Note1
			0.2mm＜w, 2.5mm＜l		N=0	
		Polarizer bubble	Φ＜0.3mm		Ignore	Note1
			0.25mm≦φ≦0.5mm		N≦2	
			0.5mm＜φ		N=0	
		Dent	Φ＜0.25mm		Ignore	Note1
			0.25mm≦φ≦0.5mm		N≦4	
			0.5mm＜φ		N=0	
Electrical Defect	Bright dot		C area	O area	Total	Note2 Note3
			N≦0	N≦2	N≦2	
	Dark dot		N≦2	N≦3	N≦3	
	Total dot		N≦2	N≦3	N≦4	
	Two adjacent dot		N≦0	N≦1	N≦1	Note4
	Three or more adjacent dot		Not allowed			
	Line defect		Not allowed			-
(1) one pixel consists of 3 sub-pixels, including r, g, and b dot. (sub-pixel = dot) (2) panel is acceptable if distance between 2 dot defects are greater or equal to 15mm.						

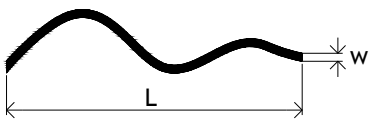
Note1：W : Width[mm], L : Length[mm], N : Number, φ: Average Diameter



∅=**(a+b)/2**

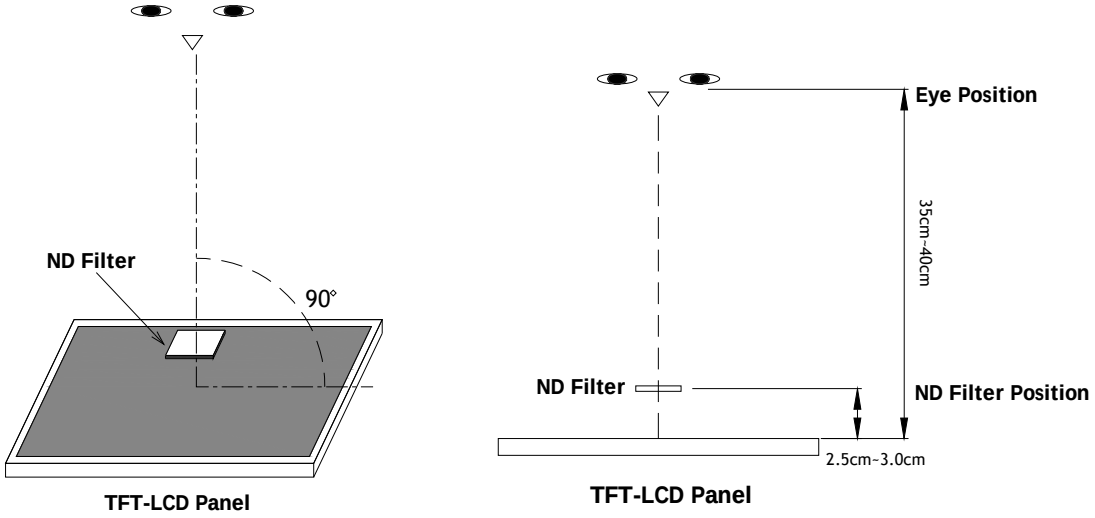
1.(White ,Black) Spot

2.Polarizer Bubble

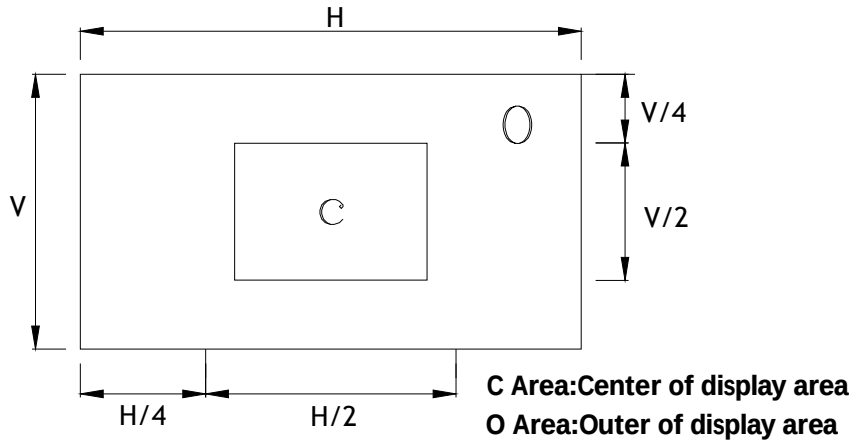


Scratch & Fiber

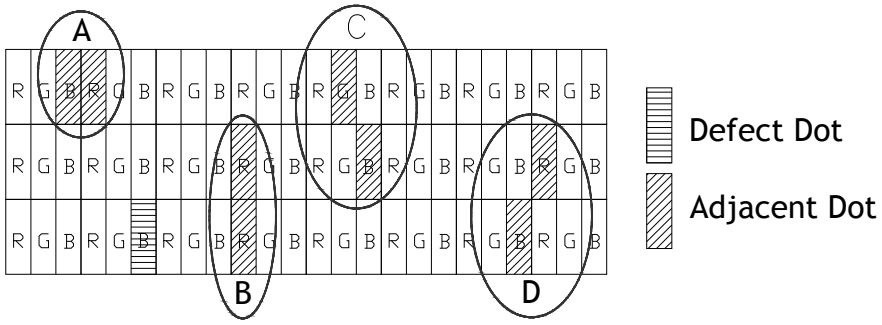
Note2： Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixelarea.



Note3：



Note4：Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dart adjacent dot. And they will be counted 2defect dots in total quantity.



Note5：Other condition

(1) The defects that are not defined above and considered to be problem shall be reviewed anddiscussed by both parties.

(2) Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

5. 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)
(7)12 months of the product term, the starry shipment date began to count.
(从星源出货之日开始产品保质期为 12 个月)