





PRODUCT SPECIFICATION

MODEL: 20810700200052

<◇>PRELIMINARY SPECIFICATION

<◆>APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED
		

PREPARED BY:

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REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2016.10.18	-	First Issued.	Liuchao
V1.1	2018.01.11	-	Change power sequence(T1 and T11 datasheet time)	YJH
V1.2	2018.08.06		Renew the Viewing Angle range	LC
V1.3	2019.04.19		ADD LED life time	YJH



TABLE OF CONTENTS

No.	CONTENTS	PAGE
	REVISION STATUS.....	2
	TABLE OF CONTENTS.....	3
1.	GENERAL DESCRIPTION.....	4
2.	MECHANICAL SPECIFICATION	5
3.	PIN DESCRIPTION.....	6
4.	ELECTRICAL CHARACTERISTICS	7
5.	INPUT SIGNAL TIMING.....	11
6.	OPTICAL CHARACTERISTICS.....	15
7.	RELIABILITY TEST ITEMS.....	17
8.	GENERAL PRECAUTION	18
9.	PACKAGE DRAWING	19



1. GENERAL DESCRIPTION

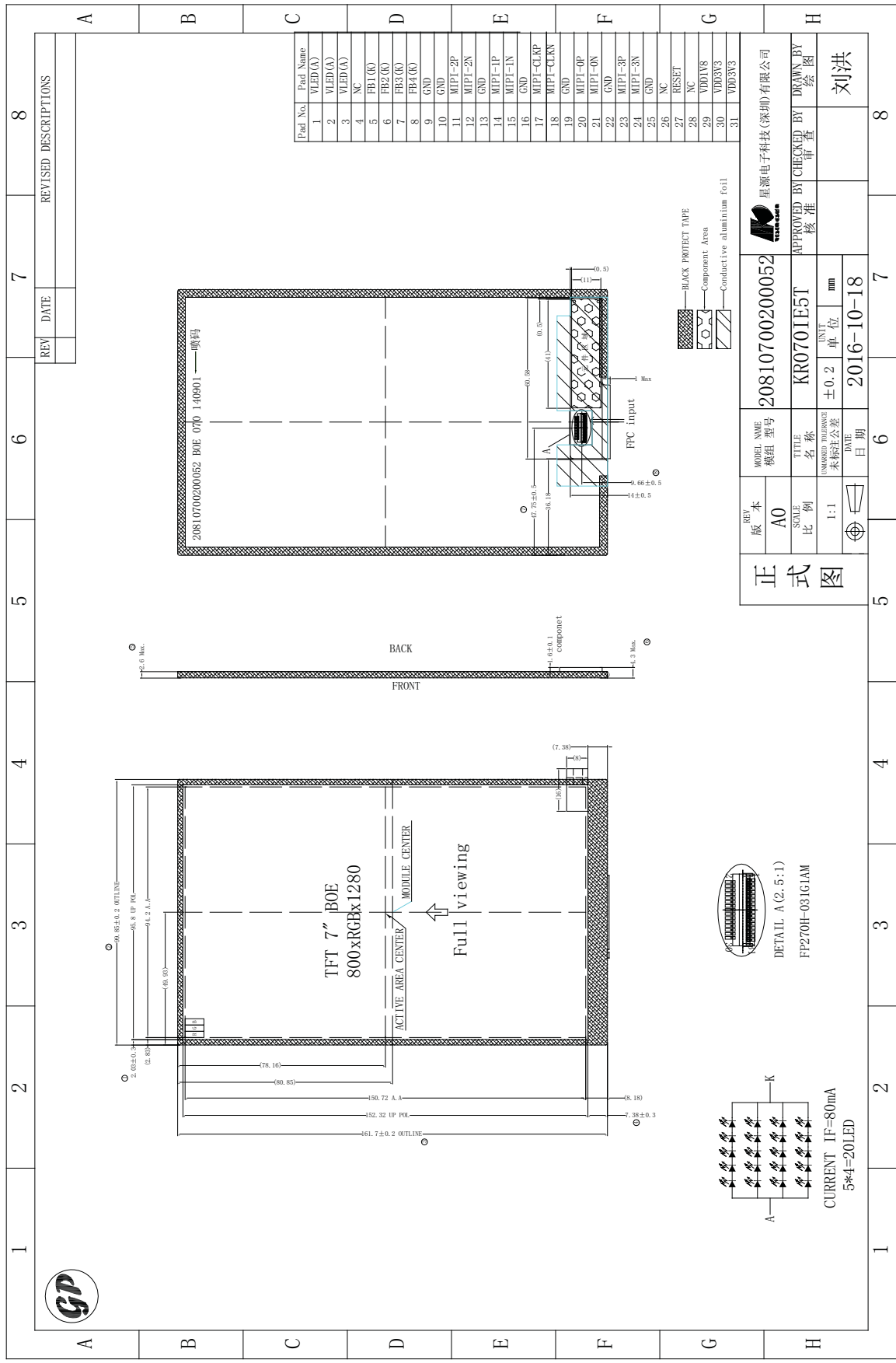
1.1 DESCRIPTION

20810700200052 is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	7"	inch
2	Number of Pixels	800×RGB (3) ×1280	pixels
3	Active Area	94.2(H)×150.72(V)	mm
4	Pixel Pitch	0.11775(H)×0.11775(V)	mm
5	Outline Dimension	99.85(W)×161.7(H)×2.6(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally Black	-
8	Viewing Direction	Full viewing	-
9	Display Format	RGB vertical stripe	-
10	Luminance (cd/m ²)	300(MIN)	nit
11	Contrast Ratio	500(TYP)	
12	Surface Treatment	Anti-Glare	-
13	Interface	MIPI	-
14	Backlight	White LED	-
15	Operation Temperature	0-50	°C
16	Storage Temperature	-20-60	°C
17	Weight	89.56	g

2. MECHANICAL SPECIFICATION



REV 版	A0	MODEL NAME 模组型号	20810700200052	APPROVED BY 核准	刘洪
SCALE 比例	1:1	TITLE 名称	KR0701E5T	CHECKED BY 检查	
UNIT 单位	mm	DATE 日期	2016-10-18	DRAWN BY 绘图	
正式图					



3. PIN DESCRIPTION

No.	Symbol	Function
1	VLED(A)	Power for LED backlight (Anode)
2	VLED(A)	Power for LED backlight (Anode)
3	VLED(A)	Power for LED backlight (Anode)
4	NC	No connection
5	FB1(K)	Power for LED backlight (Cathode)
6	FB2(K)	Power for LED backlight (Cathode)
7	FB3(K)	Power for LED backlight (Cathode)
8	FB4(K)	Power for LED backlight (Cathode)
9	GND	Ground
10	GND	Ground
11	MIPI-2P	MIPI data positive signal
12	MIPI-2N	MIPI data negative signal
13	GND	Ground
14	MIPI-1P	MIPI data positive signal
15	MIPI-1N	MIPI data negative signal
16	GND	Ground
17	MIPI-CLKP	MIPI CLK positive signal
18	MIPI-CLKN	MIPI CLK negative signal
19	GND	Ground
20	MIPI-0P	MIPI data positive signal
21	MIPI-0N	MIPI data negative signal
22	GND	Ground
23	MIPI-3P	MIPI data positive signal
24	MIPI-3N	MIPI data negative signal
25	GND	Ground
26	NC	No connection
27	RESET(1.8V)	Chip reset pin
28	NC	No connection
29	VDD(1.8V)	Power voltage for digital circuit
30	VDD(3.3V)	Power voltage for digital circuit
31	VDD(3.3V)	Power voltage for digital circuit



4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD(3.3V)	-0.3	5	V
Digital Supply Voltage	VDD(1.8V)	-0.3	3.6	V

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Digital Supply Voltage	VDD(3.3V)	3.0	3.3	3.6	V
Digital Supply Voltage	VDD(1.8V)	1.6	1.8	2.0	V

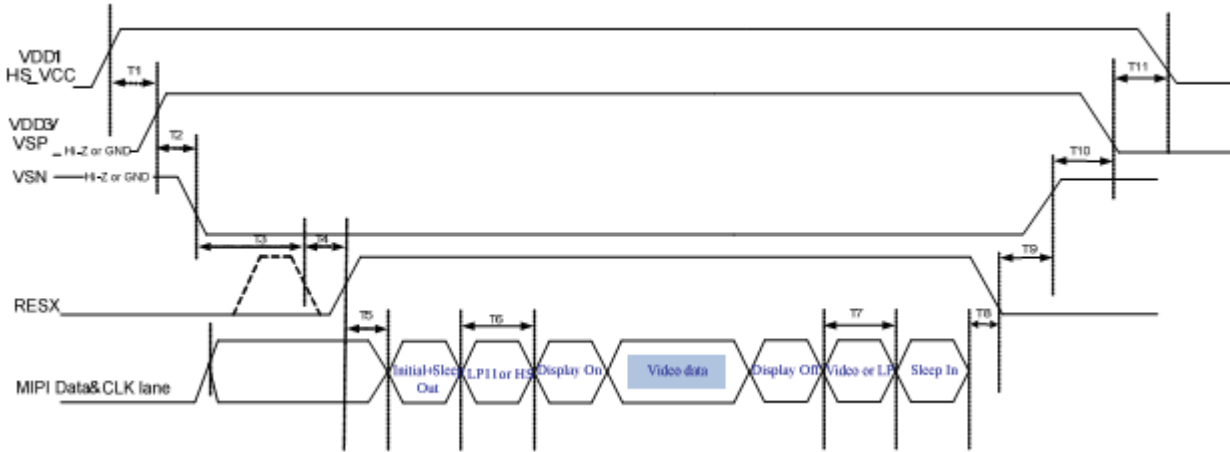
Note1: TYP VCOM is only reference value. It must be optimized according to each LCM. Be sure to use VR and OP buffer on VCOM output. Please adjust VCOM to make the flicker level be minimum for getting excellent image.

4.3 Current Consumption

Item	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Digital Current	IVDD	VDD = 1.8V		10	-	mA
Digital Current	IVDD	VDD = 3.3V	-	97	-	mA

4.4 POWER ON/OFF SEQUENCE

4.4.1 Power On/Off Sequence



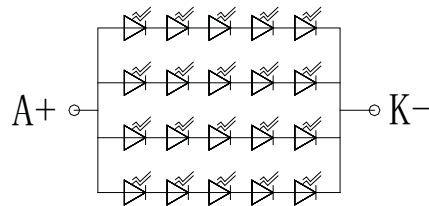
POWRE ON			
	MIN	MAX	UNTI
T1	>0		MS
T2	1		MS
T2	1		MS
T4	10		MS
T5	180		MS
T6	180		MS
POWRE OFF			
	MIN	MAX	UNTI
T7	50		MS
T8	50		MS
T9	50		MS
T10	1		MS
T11	>0		MS

4.5 BACK LIGHT UNIT

Ta=25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I _{LED}		80		mA	Total LED
Forward voltage	V _F	14.5	16.5	17.5	V	I _F =80mA
Reverse current	I _R			50	μA	V _R =5V, 1LED
Power dissipation	P _d	1400			mW	Total LED
Peak forward current	I _{FP}	100			mA	1LED
Reverse Voltage	V _R	5			V	1LED
life time		30000			h	LED

※1. Internal Circuit Diagram



CURRENT I_F=80mA
 5*4=20LED



4.6 INITIAL CODE

RB9 FF 83 94

RB1 64 10 30 44 34 11 F1 81 70 D9 34 80 C0 D2 1F

RB2 45 64 0F 09 40 1C 08 08 1C 4D 00 00

RB4 00 FF 18 60 60 60 00 00 01 30 04 68 18 60 60 60 00 00 01 30 04 68

RB6 40 40

RCC 01

RD3 00 08 00 01 07 00 08 32 10 0A 00 05 00 20 0A 05 09 00 32 10 08 00 11 11 0D 07 23
0D 07 47 0D 08

RD5 01 01 01 01 01 00 00 00 00 03 03 03 03 02 02 02 02 20 20 18 18 18 18 18 18 18 18
18 18 18 21 21 18 18 18 18 18 18 18 18 18 18 18

RE0 01 09 0B 26 2A 2E 14 34 05 09 0B 16 0E 12 14 12 14 07 13 15 17 01 09 0B 26 2A 2E
14 34 05 09 0B 16 0E 11 14 12 14 07 13 15 17

RD9 00 01 02 07 0C

R11

R29



5 INPUT SIGNAL TIMING

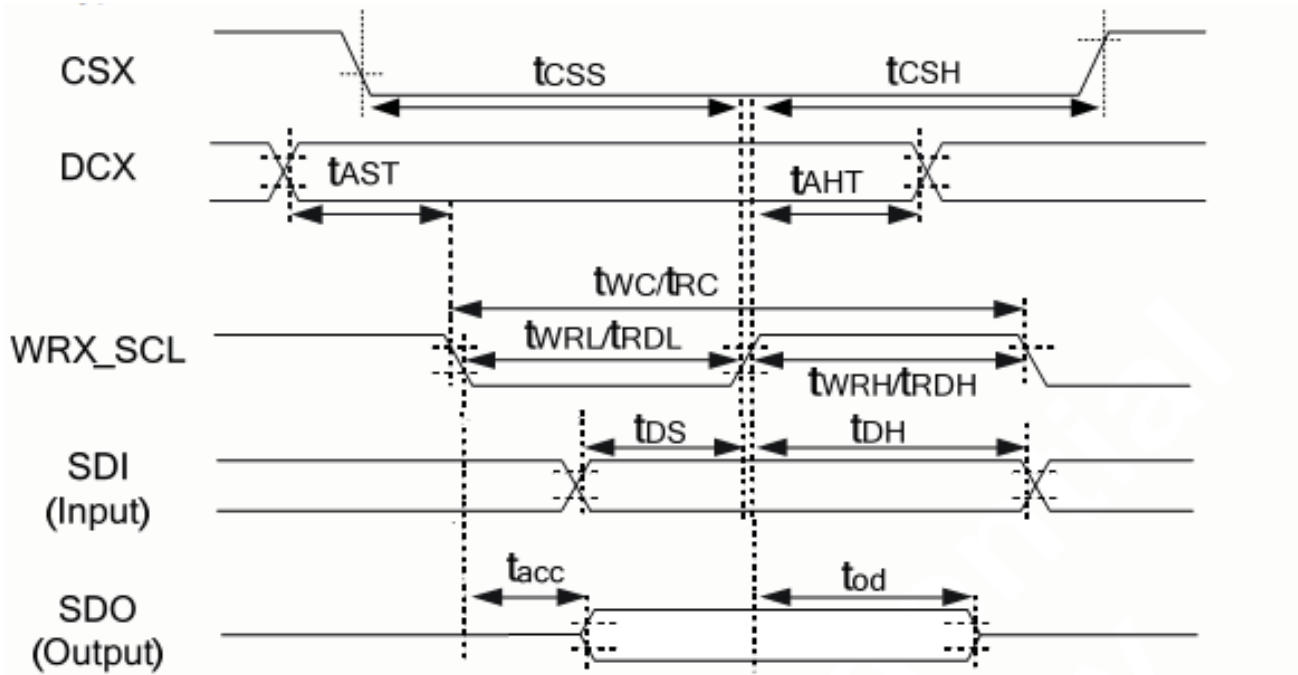
5.1 DC ELECTRICAL CHARACTERISTIC

(VDD3=2.5 ~ 3.6V, VDD1=1.65~3.6V, T=-40 ~ 85°C)

Item	Symbol	Unit	Test Condition	Min.	Typ.	Max.	Note
Input high voltage	V _{IH}	V	VDD1= 1.65 ~ 3.6V	0.7 V _{DD1}	-	VDD1	
Input low voltage	V _{IL}	V	VDD3= 2.5 ~ 3.6V	0	-	0.3 V _{DD1}	
VPP	V _{IH}	V	VPP	7.25	7.5	7.75	Note1
	V _{IL}	V					
Output high voltage (SDO, CABC_PWM_OUT)	V _{OHI}	V	I _{OH} = -1.0 mA	0.8 V _{DD1}	-	VDD1	
Output low voltage (SDO, CABC_PWM_OUT)	V _{OL1}	V	VDD1= 1.65 ~ 3.6V I _{OL} = 1.0 mA	0	-	0.2 V _{DD1}	
Logic High level input current	I _{IH}	μA	VSYNC, HSYNC	-	-	1	
			RESX, DCX, CSX, SCL	-	-	1	
	I _{IHD}	μA	DB[23:0], SDI, DCX	-	-	1	
Logic Low level input current	I _{IL}	μA	VSYNC, HSYNC	-1	-	-	
			RESX, DCX, CSX, SCL	-1	-	-	
	I _{ILD}	μA	DB[23:0], SDI, DCX	-1	-	-	
			DB[23:0]	-1	-	-	
Current consumption standby mode (VDD3-VSSA)	I _{ST(VDD)}	μA	VDD3/HS_VCC=2.8V, VDD1=1.8V T _A =25°C (DSI Ultra Low Power mode)	-	10	30	
Current consumption standby mode (VDD1- VSSD)	I _{ST(VDD1)}	μA		-	10	30	
Current consumption standby mode which include HS_VCC (HS_VCC-HS_VSS)	I _{ST(VDD1)}	μA		-	10	30	
Oscillator tolerance	ΔOSC	%	T _A =25°C	-3	-	3	
			T _A =-40°C~85°C	-5	-	5	

Note1: The VPP pin is open on normal mode and in used while OTP programming condition.

5.2 AC CHARACTERISTICS
 DBI Type C interface characteristics

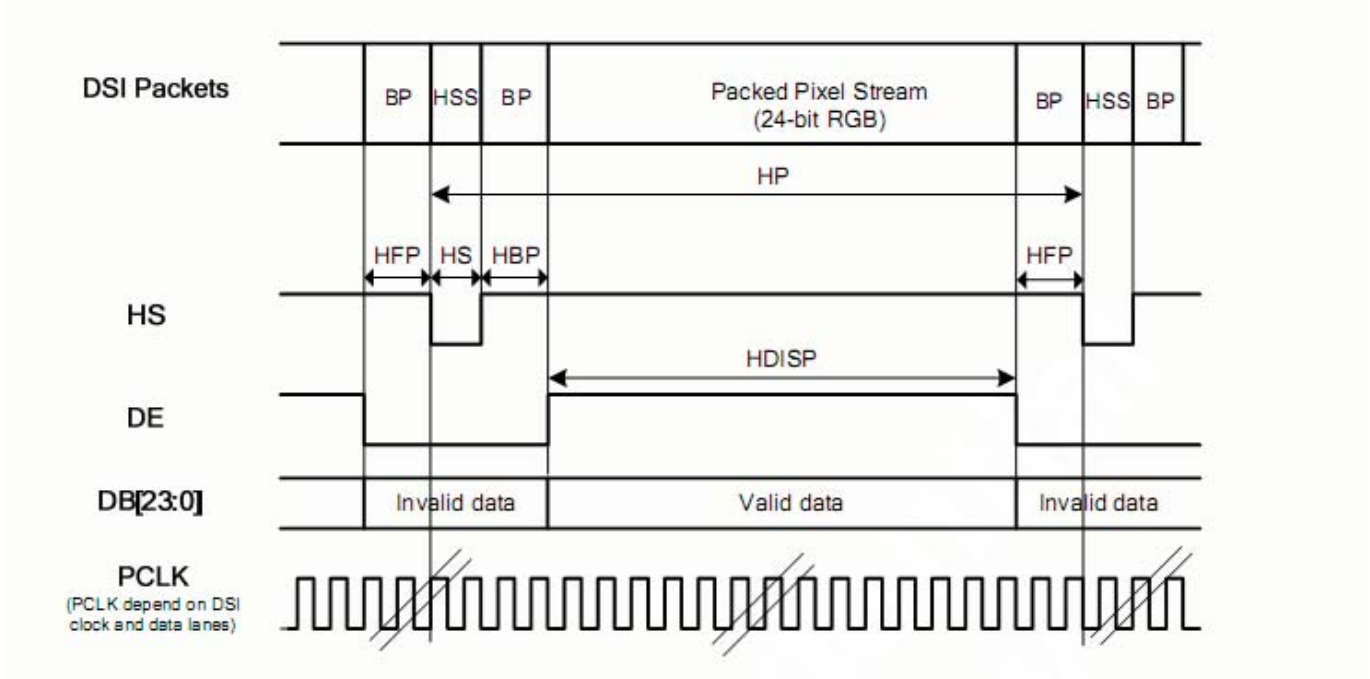


(VSSA=0V, VDD1=1.8V, VDD2=2.8V, VDD3=2.8V, TA = 25°C)

Signal	Symbol	Parameter	Min.	Max.	Unit	Description
CSX	t_{cSS}	Chip select setup time (Write)	40	-	ns	-
	t_{cSH}	Chip select setup time (Read)	40	-	ns	-
DCX	t_{AST}	Address setup time	10	-	ns	-
	t_{AHT}	Address hold time (Write/Read)*	10	-	ns	-
WRX_SCL (Write)	t_{WC}	Write cycle	100	-	ns	-
	t_{WRH}	Control pulse "H" duration	40	-	ns	-
	t_{WRL}	Control pulse "L" duration	40	-	ns	-
WRX_SCL (Read)	t_{RC}	Read cycle	150	-	ns	-
	t_{RDH}	Control pulse "H" duration	60	-	ns	-
	t_{RDL}	Control pulse "L" duration	60	-	ns	-
SDI/SDO (Input)	t_{DS}	Data setup time	30	-	ns	For maximum $C_L=30pF$ For minimum $C_L=8pF$
	t_{DT}	Data hold time	30	-	ns	
SDI/SDO (Output)	t_{RACC}	Read access time	10	-	ns	
	t_{OD}	Output disable time	10	50	ns	

Note: The input signal rise time and fall time (t_r , t_f) is specified at 15 ns or less.
 Logic high and low levels are specified as 30% and 70% of VDD1 for Input signals

Horizontal Timings



Horizontal Timing for DSI Video mode I/F

Resolution=800x1280 (VSSA=0V, VDD1=1.8V, VDD2=VDD3=VCC=2.8V, TA=25 °C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
HS low pulse width	HS	-	0.2	-	-	us
Horizontal back porch	HBP	-	1.0	-	-	us
Horizontal front porch	HFP	-	1.0	-	-	us
Horizontal data start point	-	HS+HBP	1.2	-	-	us
Horizontal blanking period	HBLK	HS+HBP+HFP	2.2	-	-	us
Horizontal active area	HDISP	-	-	800	-	DCK

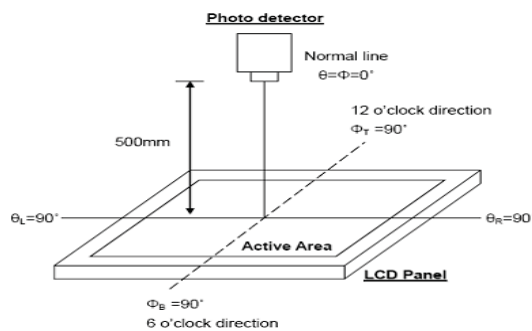
Horizontal Timing for DSI Video mode I/F

6.OPTICAL CHARACTERISTICS

Ta=25°C±2

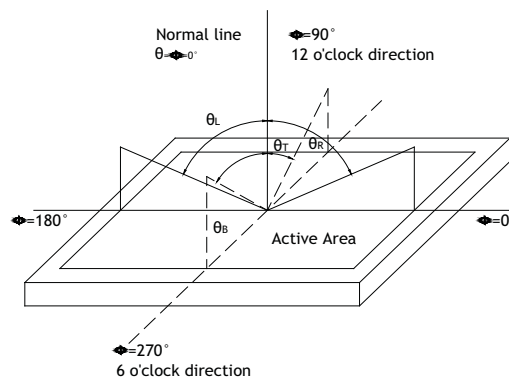
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio	CR	$\theta = 0^\circ$ □	400	500	-		Note1 Note4
Center of Luminance	YL		300	-	-	cd/m2	Note1 Note6 Note7
Luminance Uniformity	IV-M		70	75		%	
Response Time (Rising + Falling)	T _{RT}	Ta= 25°C $\theta = 0^\circ$ □	-	20	-	ms	Note1 Note3
Viewing Angle range	Horizontal	θ_3	CR > 10	85	-	Deg	Note2
		θ_9		85	-		
	Vertical	θ_{12}		85	-		
		θ_6		85	-		
Color Chromaticity	White	x	T	0.242	0.292	0.342	Note1 Note5 Note7
		y	0.287	0.337	0.387		
	Red	x	0.546	0.596	0.646		
		y	0.303	0.353	0.403		
	Green	x	0.258	0.308	0.358		
		y	0.552	0.602	0.652		
	Blue	x	0.100	0.150	0.200		
		y	0.074	0.124	0.174		
NTSC			-	56	-	%	

Note1: Definition of optical measurement system (BM-7)



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



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%.

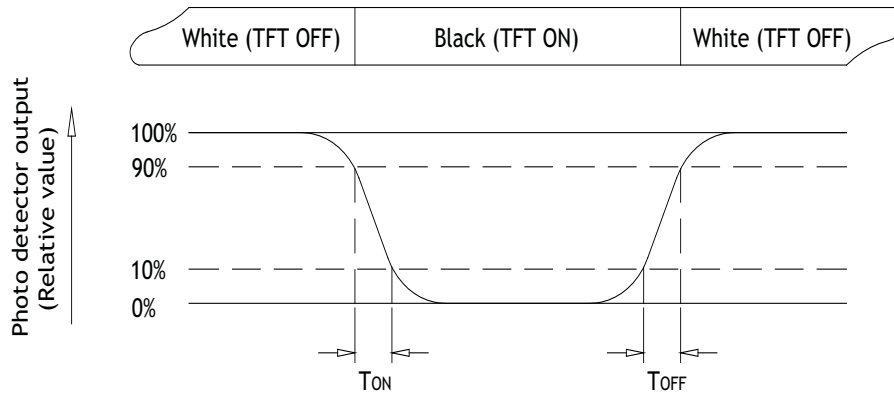


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

$$\text{Contrast ratio(CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

“White state “: The state is that the LCD should drive by Vwhite.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

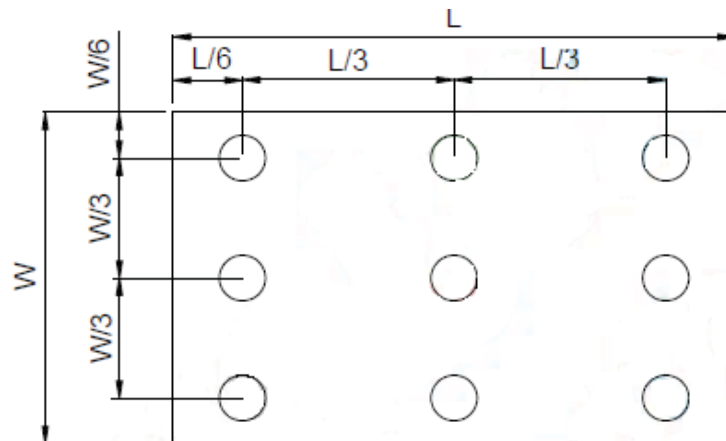
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=80mA

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = \text{Lmin} / \text{Lmax}$$

L----Active area length, W---- Active area width



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

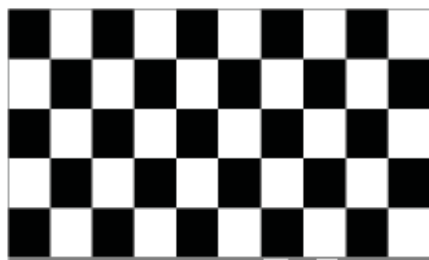
7. RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=60°C; 120hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-20°C; 120hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=50°C , 120Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=0°C; 120hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50°C , 80%RH , 96Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-20°C (0.5h) ~ 60°C (0.5h) / 50cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 4hrs	Note1

Note1:Condition of image sticking test :25°C±2°C

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/s ² ,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	Class B
	200pF , 0Ω , ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins



8. GENERAL PRECAUTION

8.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
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 $23\pm 5^{\circ}\text{C}$ and The humidity is below $50\pm 20\%RH$.
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

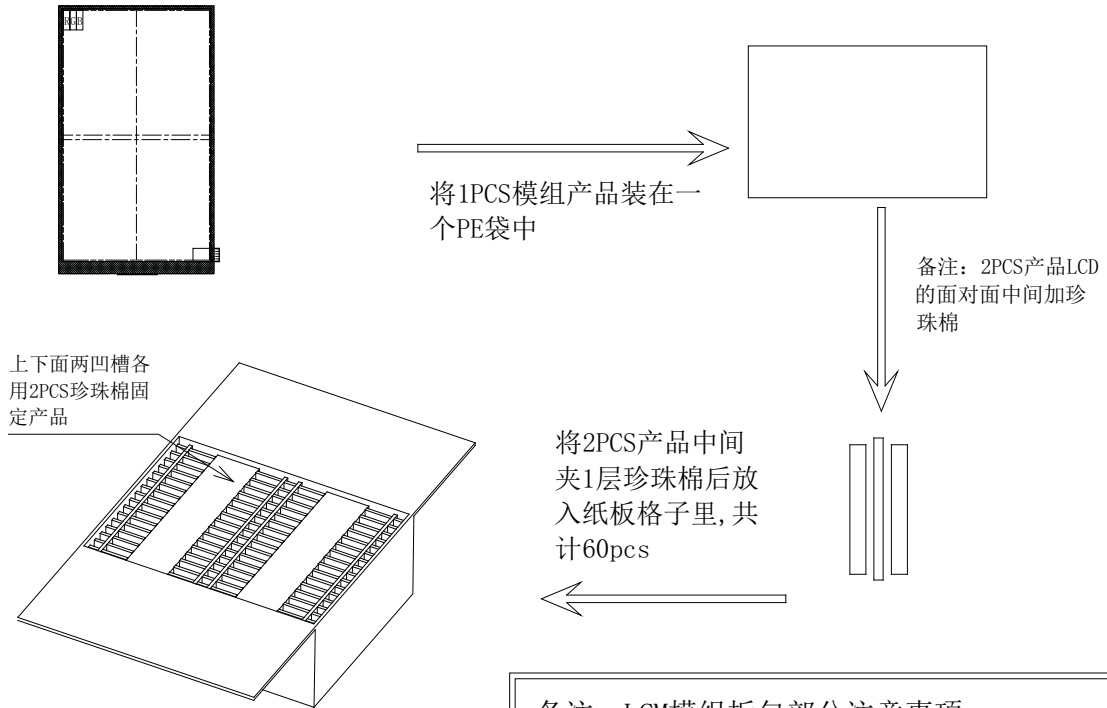
1. Avoid static electricity which can damage the CMOS LSI.
2. The polarizing plate of the display is very fragile. So, please handle it very carefully.
3. Do not give external shock.
4. Do not apply excessive force on the surface.
5. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface 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 long time, staining and discoloration may occur.
11. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth in case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

8.4 WARRANTY

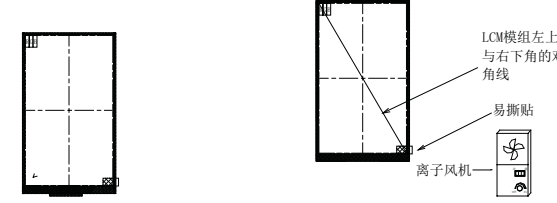
1. The period is within twelve months since the date of shipping out under normal using and storage conditions.
2. Do not repaired or modified the LCM. It may cause function to lose efficacy, Starry does not warrant the LCM.
3. All process and material comply ROHS.

9. PACKAGE DRAWING

包装方式示意图：



备注：LCM模组拆包部分注意事项



LCM模组左上角与右下角的对角线

易撕贴

离子风机

1. 拆开纸箱，拿出一包LCM模组，从袋内取出模组产品
2. 撕取LCM模组表面保护膜：
 - 拿住易撕贴手柄，沿左上角与右下角的对角线方向撕取保护膜，速度约4S/PCS；
 - 同时，撕取时需用离子风机吹模组表面，风向沿撕取方向

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DATE 日期	2014-09-01			付利波	星源:20810700200023			
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