LCD MODULE

SPECIFICATION

Model:	UE097XG-RI30-L001
Version:	V2.0
Date:	20170904

□ **Preliminary Specification 样品规格书**

■ **Final Specification 量产规格书**

Customer Confirmation 客户确认

Approved by	Notes

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VIEWE Confirmation 优奕确认

Prepared by	Reviewed by	Approved by

REVISION HISTORY

Revision 版本号	Date 日期	Contents of Revision Change 修改内容	Remark 备注
V1.0	2017.8.4	Preliminary release	
V2.0	2017.9.4	Change Spec format	All

TABLE of CONTENTS

1. GENERAL INFORMATION

1.1 Features

1) Pixel Arrangement：RGB Vertical Stripe
2) Interface Mode：LVDS
3) Driver IC： EK79001BX(Source)/ EK73203(Gate)
4) Operation Temperature：-20~70℃
5) Storage Temperature：-30~80℃
6) Backlight Type：White LED
7) Display mode： Normally Black, Transmissive
8) Pixel Density：132PPI
9) LED life time：30,000 Hours

1.2 Mechanical Specification

Item 项目	Specification 规格	Unit 单位	Remark 备注
Pixel Driving element	A-Si TFT	-	
Screen Size	9.7	Inch	Diagonal
Resolution	1024(W)*3(RGB)*768(H)	Dots	
Interface	LVDS	-	6BIT
Module Power Consumption	2.762	Watt	Typ.
Active Area	196.61(W)*147.46(H)	mm	
Pixel pitch (W*H)	0.192(W)*0.192(H)	mm	
Module Size (W*H*D)	210.2(W)*166.3H)*3.55(D)	mm	Tolerance:± 0.2
Luminance	350	cd/m^2	Typ.
Viewing Direction	All	O'clock	
Display Color	262K	Colors	18bits

2. ABSOLUTE MAXIMUM RATINGS

Item 项目	Symbol 符号	Min. 最小值	Max. 最大值	Unit 单位	Remark 备注
Power supply voltage	VDD	-0.5	3.96	V	Note1
LED forward current	I_F	-0.001	30	mA	For each led,Note1
LED Reverse Voltage	V_R	-	5	V	For each led,Note1
Operating temperature	T_{op}	-20	70	°C	Note1,2
Storage temperature	T_{st}	-30	80	°C	Note1,2
Humidity	H_{st}	10	90	%RH	Note1,3

(Ta=+25°C,GND=0V)

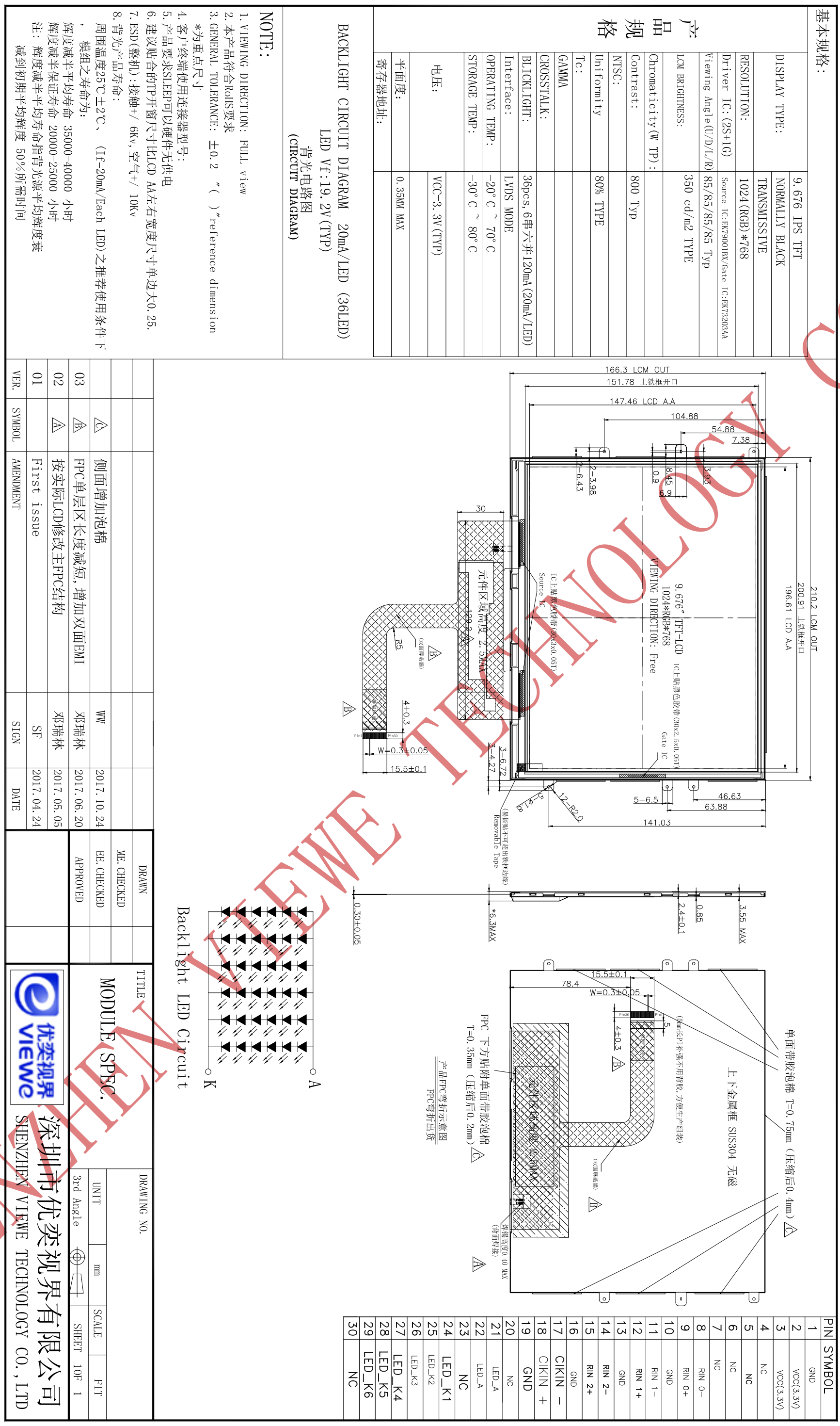
Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

Note2: In case of temperature below 0℃,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60℃ , 90% RH MAX.

Temp. ＞60℃ , Absolute humidity shall be less than 90% RH.

3. MECHANICAL DRAWING



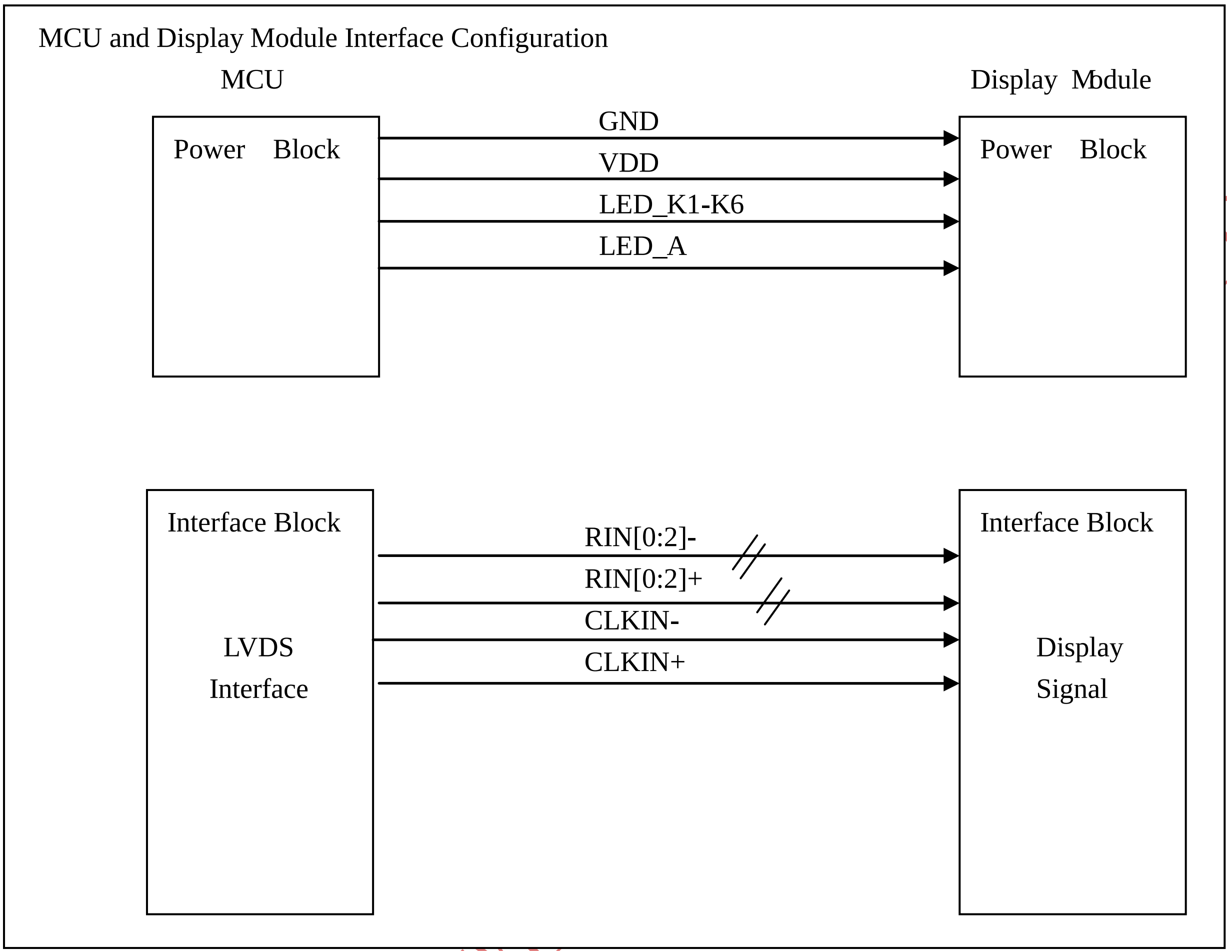
4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1	**NC**	-	Dummy
2-3	**VDD**	P	Power supply to the internal logic &analog power (3.3V)
4-7	**NC**	-	Dummy
8	**RIN0-**	I	LVDS differential data input
9	**RIN 0+**	I	LVDS differential data input
10	**GND**	P	Power Ground
11	**RIN 1-**	I	LVDS differential data input
12	**RIN 1+**	I	LVDS differential data input
13	**GND**	P	Power Ground
14	**RIN 2-**	I	LVDS differential data input
15	**RIN 2+**	I	LVDS differential data input
16	**GND**	P	Power Ground
17	**CLKIN-**	I	LVDS differential clock input
18	**CLKIN+**	I	LVDS differential clock input
19	**GND**	P	Power Ground
20	**NC**	I	LVDS differential data input
21-22	**LED_A**	P	Power supply for backlight anode
23	**NC**	-	Dummy
24-29	**LED_K1- K6**	P	Power supply for backlight cathode
30	**NC**	-	Dummy

I：Input；O：Output；P：Power

4.2 Block Diagram



5. ELECTRICAL CHARACTERISTICS

5.1 TFT-LCD Panel Driving Section

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Power Supply Voltage	VDD	3.0	3.3	3.6	V	-
Power Supply Current	I_{VDD}	-	140	-	mA	Note1
Logic Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	-
Logic Input Low Voltage	V_{IL}	0	-	0.3VDD	V	-
Panel Power Consumption	P_{VDD}	-	0.462	-	Watt	Note1
Module Power Consumption	P_{LCM}	-	2.762	-	Watt	Note1,2

(Ta=+25°C,GND=0V)

Note1:Measurement Conditions (Video Mode): Full Screen Red Pattern,VDD=3.3V,60Hz Refresh.

Note2: P_{LCM}= P_{VDD}+ P_{BL}， About P_{BL} information, inference to 5.2 Back Light Driving Section.

5.2 Back Light Driving Section

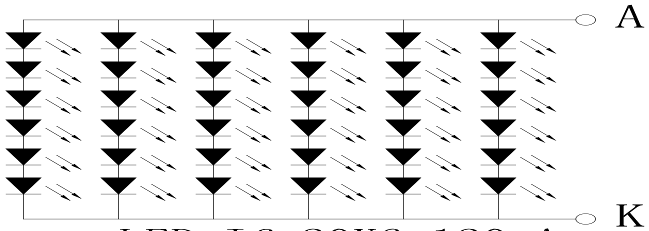
Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V_F	-	19.2	-	V	Note1
Forward Current	I_F	-	120	-	mA	Note1
Backlight Power consumption	P_{BL}	-	2.3	-	Watt	Note1
LED life time	-	30000	-	-	Hrs	Note2
LED Quantity			36		PCS	

(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module (6 LED Serial, 6 LED Parallel)。

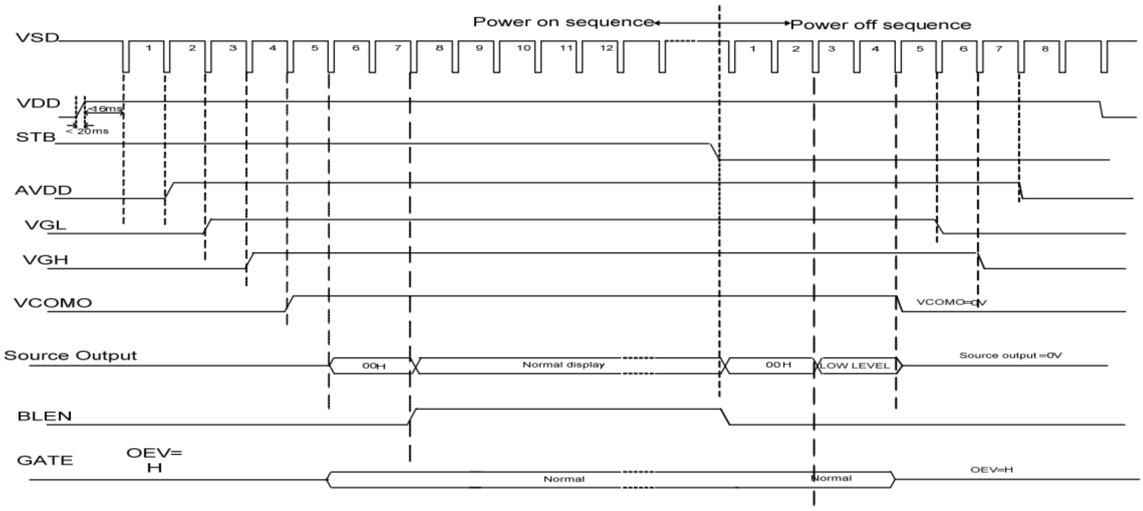
For each LED ： IF=20mA,VF=3.2V(Typ.)/3.4V(Max.),Ta=25℃。

Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



LED If:20X6=120mA
LED Vf:19.2V(TYP)
Backlight LED Circuit

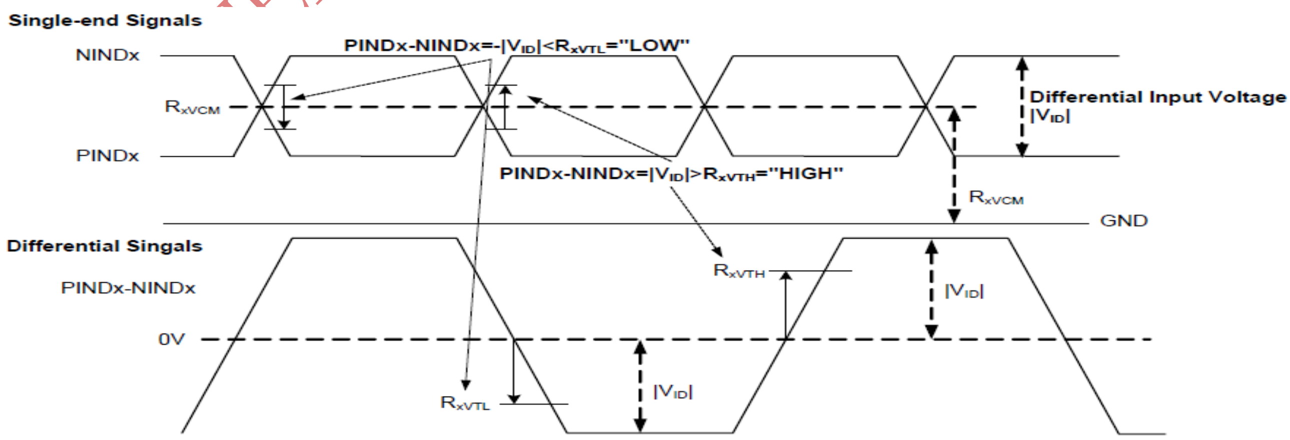
5.3 Power On/Off Sequence



5.4 Timing Characteristics

5.4.1 LVDS DC Timing Characteristics

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Condition
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	VDD-1.2+ $\|V_{ID}\|/2$	V	-
Differential input common Mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	-	VDD-1.2	V	-
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	-
Differential input leakage Current	RV_{xliz}	-10	-	+10	μA	-
LVDS Digital Operating Current	Iddlvds	-	15	30	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	-	10	50	μA	Clock & all Functions are stopped

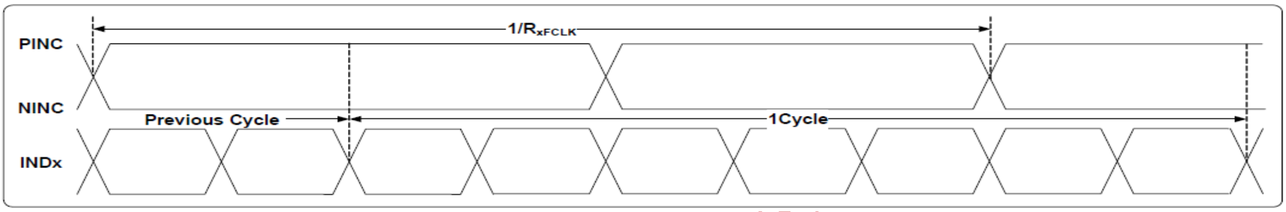


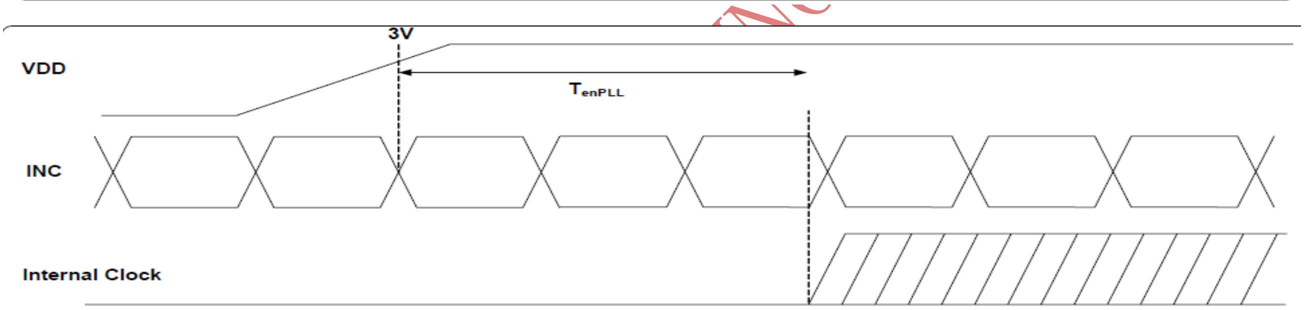
5.4.2 LVDS AC Timing Characteristics

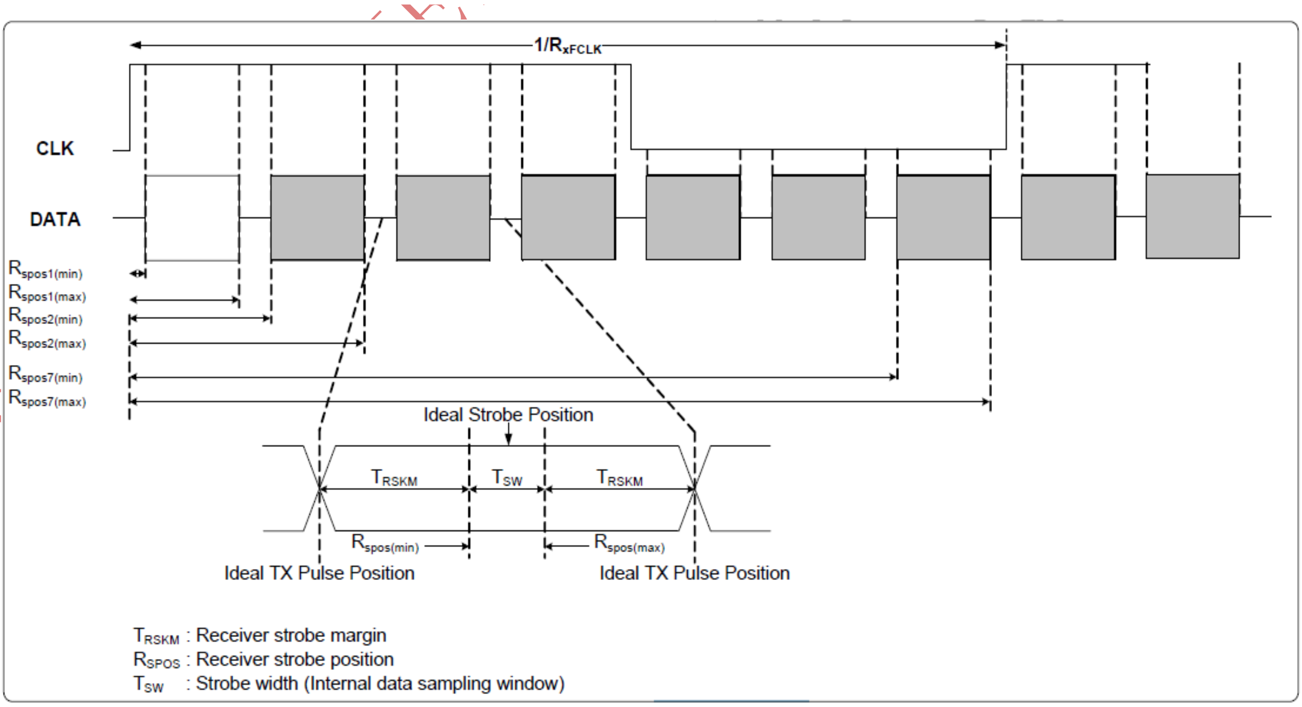
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$\vert V_{ID}\vert$=400mV R_{XVCM}=1.2V R_{XFCLK}=71MHz
Clock high time	T_{LVCH}	-	$4/(7^* R_{XFCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7^* R_{XFCLK})$	-	ns	-
PLL wake-up time	T_{enPLL}	-	-	150	μs	-

(Ta=+25°C,GND=0V)

5.4.3 LVDS AC Timing Figure





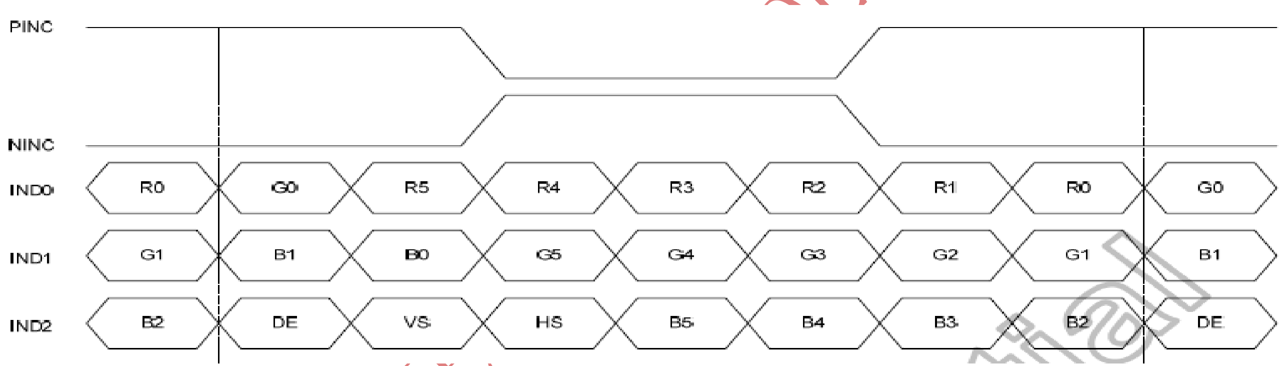


5.4.4 Input Timing Parameters

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	52	65	71	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		768		T_H
VSD Period	tv	778	806	845	T_H
VSD Blanking	tvbp+ tvfp	10	38	77	T_H

5.5 Timing Diagram

5.5.1 6-bit LVDS input data format



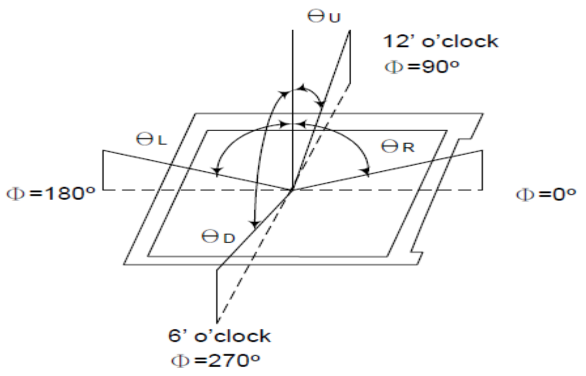
6. OPTICAL CHARACTERISTICS

Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	θ = 0°	-	900	-	-	Note(4)
NTSC Ratio	S	θ =0°	50	-	-	%	Note(7)
Luminance	L	θ =0°	-	350	-	cd/m2	Note(5)
Luminance uniformity	U_W	θ =0°	80	-	-	%	Note(3)
Response Time	$T_R + T_F$	25 °C	-	20	-	ms	Note(2)
Color Coordination	W_X	θ = 0° (Center) Normal viewing angle B/L On	-0.03	0.296	+0.03	NTSC (x,y)	Note(6)
	W_Y			0.336			
	R_X			0.616			
	R_Y			0.329			
	G_X			0.285			
	G_y			0.545			
	B_X			0.139			
	B_Y			0.156			
Viewing Angle	θ_L	C/R>10	-	85	-	Degree	Note(1)
	θ_R		-	85	-		
	θ_U		-	85	-		
	θ_D		-	85	-		

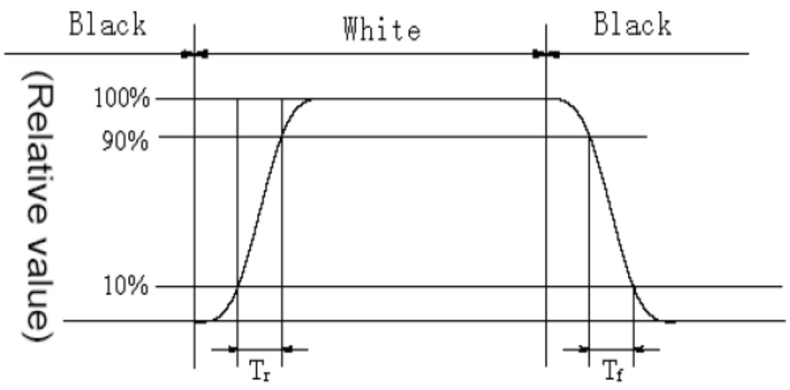
Test Conditions:

1. VDD=3.3V, I_F=120mA (Backlight current), the ambient temperature is+25℃.
2. The test systems refer to Note 8.

Note1: Definition of Viewing Angle: The viewing angle range that the CR>10

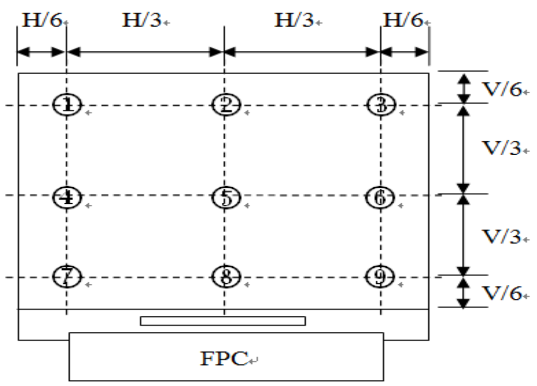


Note2: Definition of Response time: Sum of T_R and T_F



Note 3: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$



Note4: Definition of Contrast Ratio (CR): measured at the center point of panel

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

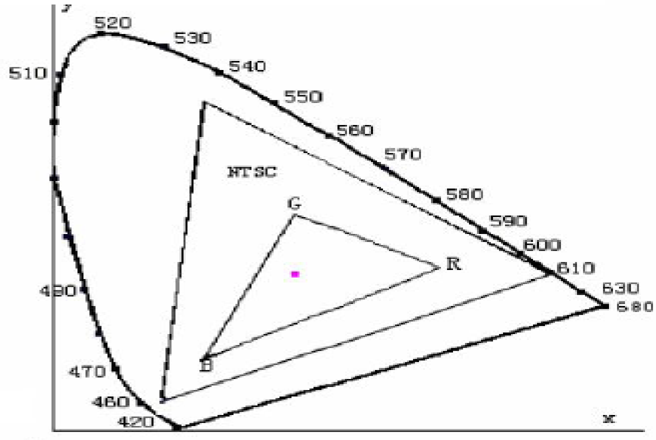
Note 5: Definition of Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

Color coordinates of white & red, green, blue measured at center point of LCD.

Note 7: Definition of NTSC ratio:

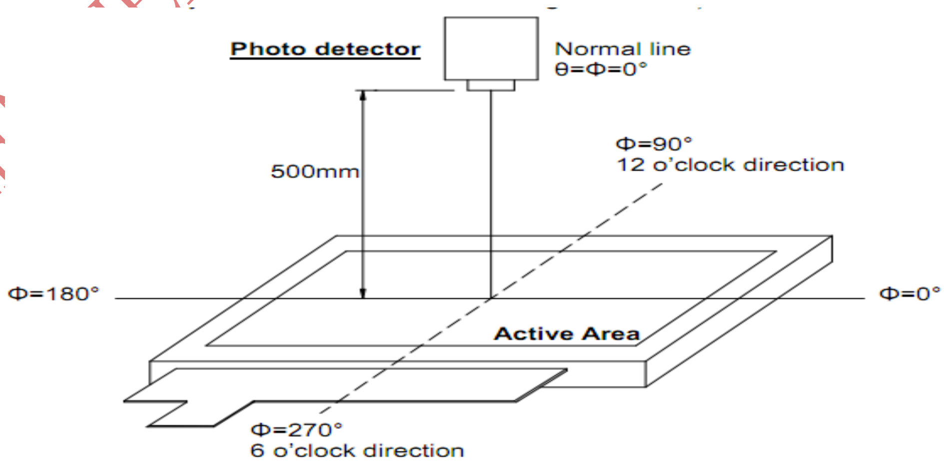
$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



1931 CIE Chromaticity Diagram

Note 8: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 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, Field of view: 1°/Height: 500mm.)



7. RELIABILITY

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage	Ta =+80°C / 240Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 240Hours	Note1,2,3
High Temperature Operating	Ta =+70°C / 240Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 240Hours	Note1,2,3
Temperature Cycle storage Test	-20°C/30min ⇆+70°C /30min for 30cycles,Transfer time less than 5min	Note2,3
Thermal humidity storage Test	60°C x 90%RH / 240Hours	Note2,3
Package Vibration Test	Frequency: 10Hz~55Hz,Amplitude:1.5mm, 1 hrs for each direction of X, Y, Z	Note2
Packing shock test	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces	Note2
ESD(Whole Machine)	Contact: ±8KV,Air: ±12KV 150PF/330Ω,5Points/panel,5times	Note4

Inspection after Test:

Note1:Ta is the ambient temperature of samples.

Note 2: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note 3: Before cosmetic and function tests , the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

Note5: The final interpretation of the above reliability test standard is owned by VIEWE.

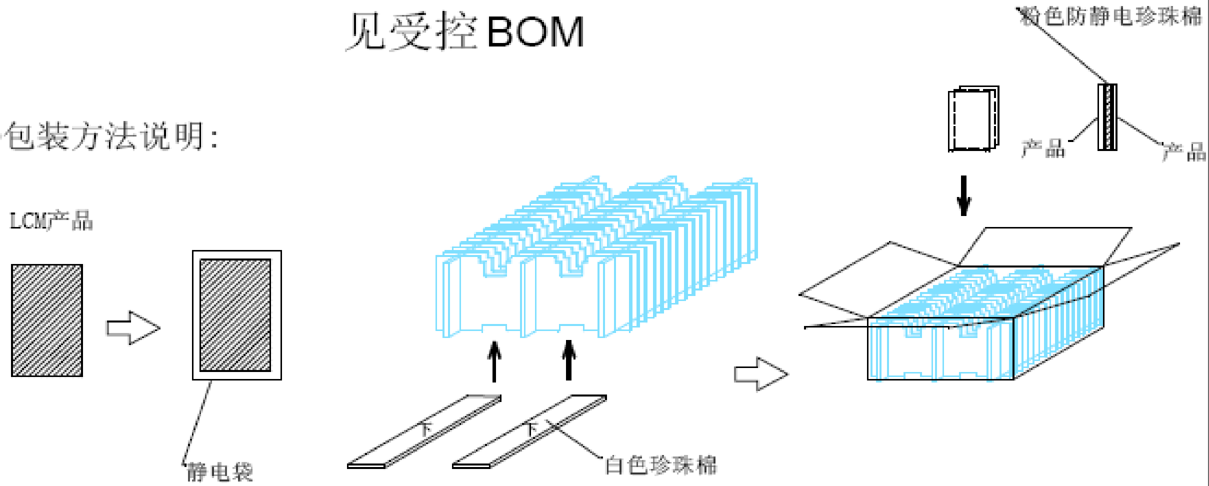
8. PACKAGE DRAWING

LCM产品(刀卡类)包装流程图

1.0包装材料清单：

见受控BOM

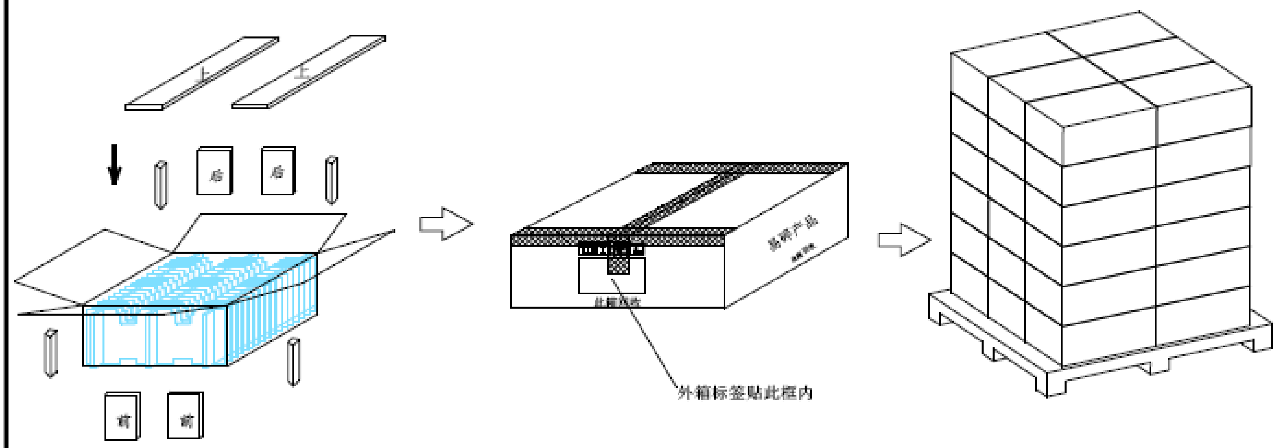
2.0包装方法说明：



第一步：
LCM产品装入静电袋

第二步：
把长卡，短卡组成卡阵（短卡朝向一致）
形状和数量按照BOM实际物料
卡阵底部放对应的白色珍珠棉后装箱

第三步：
放产品，每个卡槽内放两片产品；
2PCS产品显示面相对，
中间加粉色珍珠棉一起放入卡槽内，



第四步：
装箱后，按照BOM实际物料在纸箱内
侧与卡阵避空位置放白色泡棉；

第五步：
最后胶带封箱，贴外箱标签

第六步：
将每箱整齐摆放在栈板上并包裹
最高可堆叠6层