SPECIFICATION

[◉] Preliminary Specification
[ ] Final Specification

Description **19” 1280xRGBx1024 TFT-LCD Module**

Part Number **P1900SXF2MB00**

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Comments:			

* This cover page is for your Comments and Signatures back to TIANMA.

REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2025/5/8	-	Preliminary spec	Chen Ao
1.1	2025/9/5	-	Surface treatment HC - AG	Chen Ao

CONTENTS

1. Summary

1.1 General Description

This is a 19 inch a-Si TFT-LCD module with Normal-Black technology. It is composed of a TFT-LCD panel, a driver circuit, PCB, and a LED backlight unit.

1.2 Features

- Ultra-wide viewing angle
- High resolution
- Interface: LVDS
- LED driver integrated
- This product will comply with UL62368-1/CSA C22.2 No.62368-1-03
- This product will comply with the European RoHS Directive (2011/65/EU) and Delegated Directive (2015/863/EU, Amending Annex II of 2011/65/EU)

2. General Specifications

Feature		Spec	Unit
Display Spec	Size	19 inches	-
	Resolution	1280(RGB)x1024	-
	Pixel Pitch	0.294 x 0.294	mm
	TFT Active Area	376.32 x 301.06	mm
	Technology Type	a-Si	-
	Pixel Configuration	R.G.B Vertical Stripe	-
	Display Mode	SFT, Normally Black	-
	Surface Treatment	AG	-
	Viewing Direction	All	-
	Gray Scale Inversion Direction	No Gray Scale Inversion	-
Mechanical Characteristics	LCM (W x H x D)	396 x 324 x12.88	mm
	Weight	TBD	g
Optical Characteristics	Luminance	500	cd/m^2
	Contrast Ratio	1500:1	-
	NTSC	72 TYP	%
	Viewing Angle	88/88/88/88(SFT)	degree
Electrical Characteristics	Interface	LVDS	-
	Color Depth	16.7 Million	color
	Power Consumption	LCD:TBD Backlight: TBD	mW

Table 2.1 General TFT Specifications

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information	
LCD Module connector	DF14H-30P-1.25H(56)

Table 3.1.1 Connector information

No	Symbol	I/O	Description	Comment
1	DINA0-	I	- LVDS differential data input	
2	DINA0+	I	+ LVDS differential data input	
3	DINA1-	I	- LVDS differential data input	
4	DINA1+	I	+ LVDS differential data input	
5	DINA2-	I	- LVDS differential data input	
6	DINA2+	I	+ LVDS differential data input	
7	GND	P	Ground	
8	CLKINA-	I	- LVDS differential clock input	
9	CLKINA+	I	+ LVDS differential clock input	
10	DINA3-	I	- LVDS differential data input	
11	DINA3+	I	+ LVDS differential data input	
12	DINB0-	I	- LVDS differential data input	
13	DINB0+	I	+ LVDS differential data input	
14	GND	P	Ground	
15	DINB1-	I	- LVDS differential data input	
16	DINB1+	I	+ LVDS differential data input	
17	GND	P	Ground	
18	DINB2-	I	- LVDS differential data input	
19	DINB2+	I	+ LVDS differential data input	
20	CLKINB-	I	- LVDS differential clock input	
21	CLKINB+	I	+ LVDS differential clock input	
22	DINB3-	I	- LVDS differential data input	
23	DINB3+	I	+ LVDS differential data input	
24	GND	P	Ground	
25	GND	P	Ground	
26	GND	P	Ground	
27	GND	P	Ground	
28	VCC	P	Power supply(5V)	
29	VCC	P	Power supply(5V)	
30	VCC	P	Power supply(5V)	

Table 3.1.2 Pin Assignment for LCD Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection
Note2: All of the GND pins should be connected to the system ground.

Table 3.2.1 Connector information

3.2 CN2 Pin assignment (LCD Interface)

Connector Information	
LCD Module connector	SM08B-GHS-TB

Table 3.2.1 Connector information

No	Symbol	I/O	Description	Comment
1	VLED	P	Power supply(12V)	
2	VLED	P	Power supply(12V)	
3	VLED	P	Power supply(12V)	
4	GND	P	Ground	
5	GND	P	Ground	
6	GND	P	Ground	
7	EN	I	Backlight on/off control signal(1:on, 0:off)	
8	PWM	I	Dimming control signal	

Table 3.2.2 Pin Assignment for LCD Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection
Note2: All of the GND pins should be connected to the system ground.

4. Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCCS	0.3	5.5	V	
BL_POWER Input	LED_VCCS	-0.3	13.2	V	
BL_PWM signal input	LED_PWM	-0.3	3.6	V	
BL ENABLE	LED_EN	-0.3	3.6	V	
Operating Temperature	Top	-20	70	℃	
Storage Temperature	Tst	-30	80	℃	
Relative Humidity Note2	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃＜Ta≤50℃
		--	≤55	%	50℃＜Ta≤60℃
Absolute Humidity	AH	--	≤70	g/m³	Ta＞60℃

Table 4.1 Absolute Maximum Ratings

Note1: Ta means the ambient temperature. It is necessary to limit the relative humidity to the specified temperature range. Condensation on the module is not allowed.

Note2: The absolute maximum rating values of this product are not allowed to be exceeded at any times. A module should be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme condition, the module may be permanently destroyed

5. Electrical Characteristics

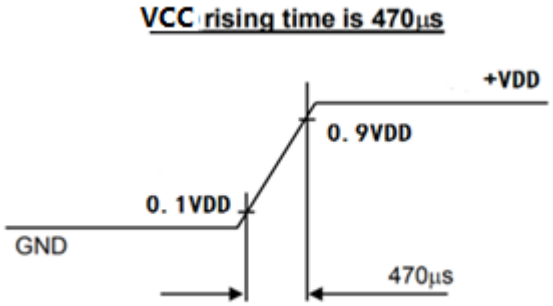
5.1 DC Characteristics for Panel Driving

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		VCC	4.5	5	5.5	V	Include ripple
Input Signal Voltage	Low Level	VIL	0	--	0.3×VCC	V	
	High Level	VIH	0.7×VCC	--	VCC	V	
VDD Current	60Hz	IVCC	--	TBD	TBD	mA	White pattern
Power Consumption	60Hz	PVCC	--	TBD	TBD	mW	
Inrush current		Irush	--	--	1.5	A	Note2

Table 5.1.1 Operating Voltages

Note1: Indicated the subsequent version may be updated.

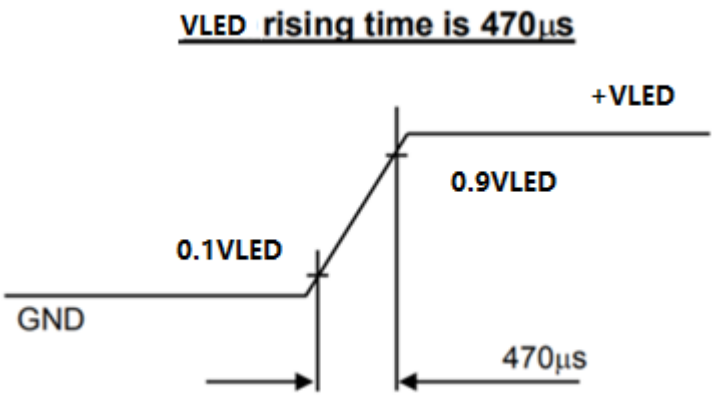
Note2: To test the current dissipation, using the “white pattern” shown



5.2 DC Characteristics for Backlight Driving

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Backlight Driving Input Voltage		VLED	10.8	12	13.2	V	
VCC Current		Ivled	--	TBD	TBD	mA	100% Dimming
Backlight Power Consumption		P	--	TBD	TBD	mW	100% Dimming
PWM frequency		F	100	--	50K	Hz	
PWM duty		D	5	--	100	%	
Enable、Dimming	High level	--	2	-	5.5	V	Enable、Dimming
	Low level	--	-	-	0.8	V	
LED Forward Current		If	-	100	-	mA	
LED life time		--	--	50000	-	Hrs	PWM 100%
Inrush current		Irush	--	--	1.5	A	Note5

Table 5.2.1 LED Backlight Characteristics



Note1: I_F is defined for each channel.

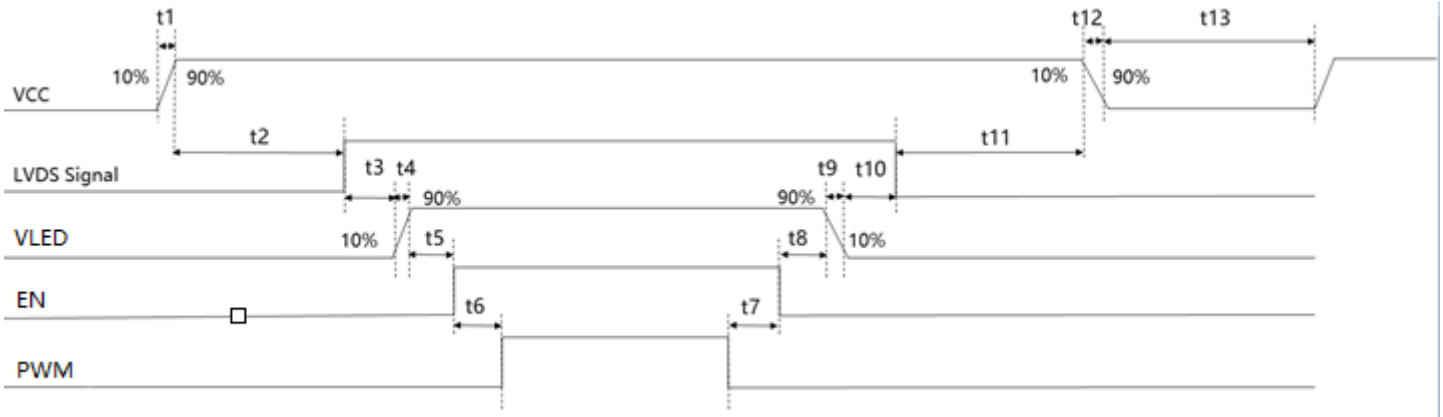
Note2: Optical performance should be evaluated at Ta=25℃ only.

Note3: If LED is driven by high current, high ambient temperature & humidity condition,The life time of LED will be reduced.

Note4: Operating life means brightness goes down to 50% of initial brightness. Typical operating life time is estimated data.

Note5: To test the current dissipation, using the “white pattern” shown

5.3 Recommended Power ON/OFF Sequence



Symbol	Min	Typ	Max	Unit	Remark
t1	0.5	-	10	ms	
t2	100	-	-	ms	
t3	200	-	-	ms	
t4	1	-	-	ms	Note 1
t5	2	-	-	ms	
t6	2	-	-	ms	
t7	2	-	-	ms	
t8	2	-	-	ms	
t9	1	-	-	ms	
t10	200	-	-	ms	
t11	200	-	-	ms	
t12	-	-	200	ms	
t13	1000	-	-	ms	

Note1: The low level of these signals and analog powers are GND level.
Note2: All of the power and signals should be kept at GND level before power on. If there are residual voltages on them, the LCD might not work properly.
Note3: The power on/off sequence is the first version. It will be updated when the design is fixed.
Note4: Keep Enable low level until the display has stabilized.
Note5: Indicated the subsequent version may be updated.

5.4 LCD Module Block Diagram

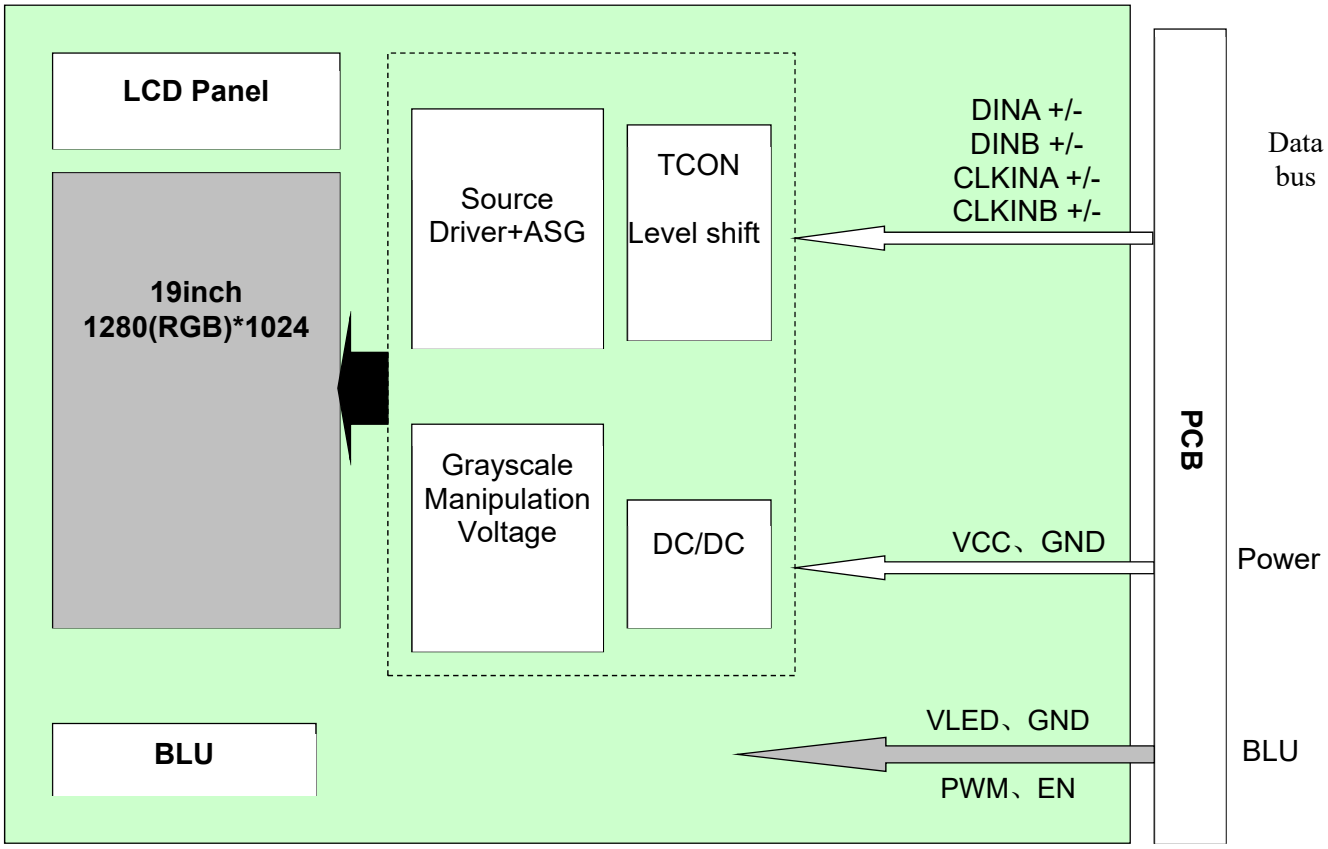


Figure 5.4.1 LCD Module Block Diagram

6. Timing Characteristics

6.1 LVDS DC Electrical Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Differential input high threshold voltage	R_{xVTH}	R_{xVCM} =1.2 V	+100	-	-	mV
Differential input low threshold voltage	R_{xVTL}		-	-	-100	mV
Input voltage range (singled-end)	R_{xVIN}		0	-	2.4	V
Fail safe				0.3		V
Differential input voltage	$\|V_{ID}\|$		100	-	600	mV
Input common mode voltage	R_{xVCM}	V_{DD} = 3.3V	1.0	1.2	2.4 $-\|V_{ID}\|/2$	V
Differential input voltage	$\|V_{ID}\|$		100	-	600	mV
Differential input leakage current	RV_{xLIK}		-10	-	+10	uA
Internal terminate resistor	R_{int}		80	100	120	Ω

Table 6.1.1 LVDS DC Characteristics

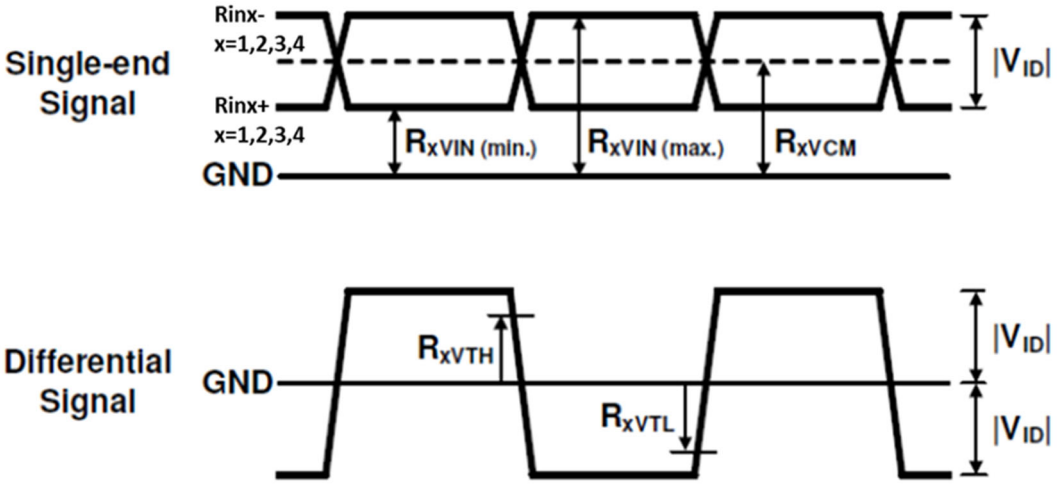
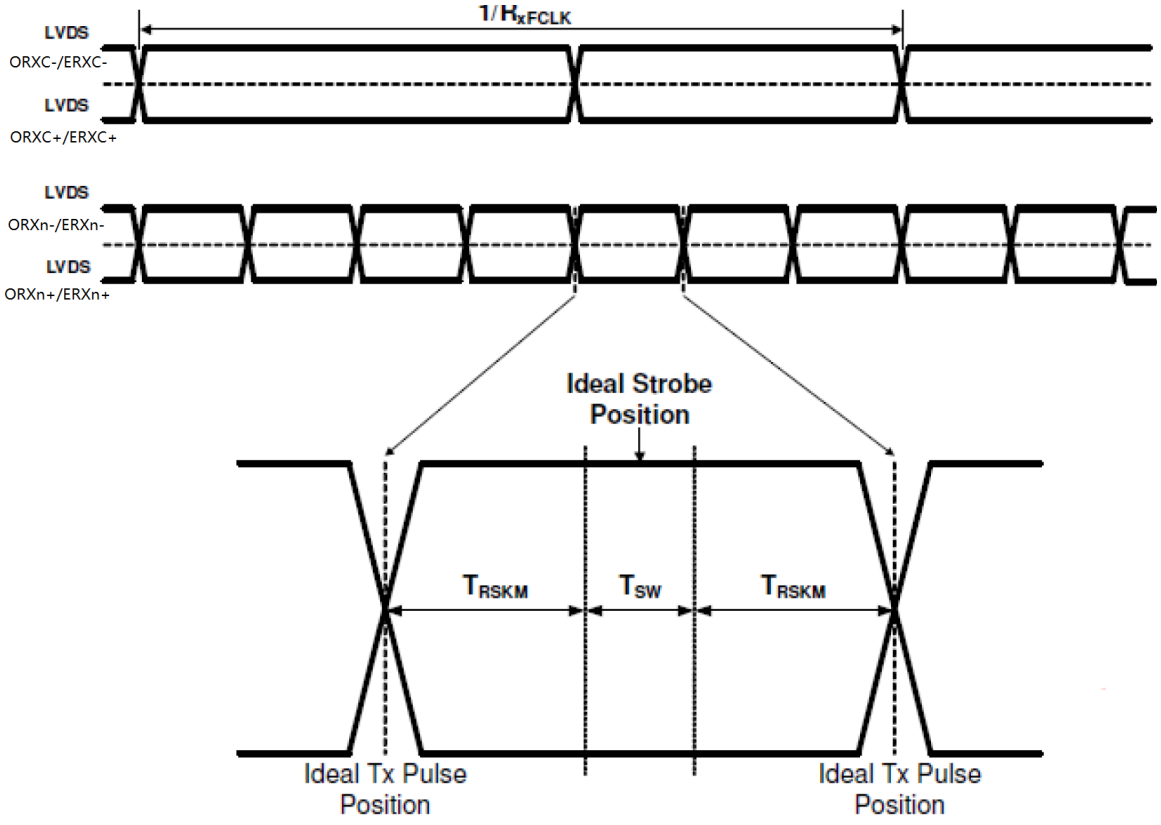


Figure 6.1.1 LVDS DC Characteristics

6.2 LVDS AC Electrical Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock frequency	R_{xFCLK}			74. 25		MHz
Input data Position0	tRIP1		-|tRMG|	0.0	|tRMG|	ns
Input data Position1	tRIP0		T/7-|tRMG|	T/7	T/7+|tRMG|	ns
Input data Position2	tRIP6		2T/7-|tRMG|	2T/7	2T/7+|tRMG|	ns
Input data Position3	tRIP5		3T/7-|tRMG|	3T/7	3T/7+|tRMG|	ns
Input data Position4	tRIP4		4T/7-|tRMG|	4T/7	4T/7+|tRMG|	ns
Input data Position5	tRIP3		5T/7-|tRMG|	5T/7	5T/7+|tRMG|	ns
Input data Position6	tRIP2		6T/7-|tRMG|	6T/7	6T/7+|tRMG|	ns
Input data skew margin	T_{RSKM}	R_{xCLK} = 85MHz $R_{xVIH} - R_{xVIL}$ =200 mV	-450	-	+450	ps
Input spread spectrum ratio	SS_R		-	-	+/-3	%
Input modulation frequency	F_M		-	-	200k	Hz

Table 6.2.1 LVDS AC Characteristics



Note 1: T_{SW} : Strobe width (LVDS IP internal data sampling window)

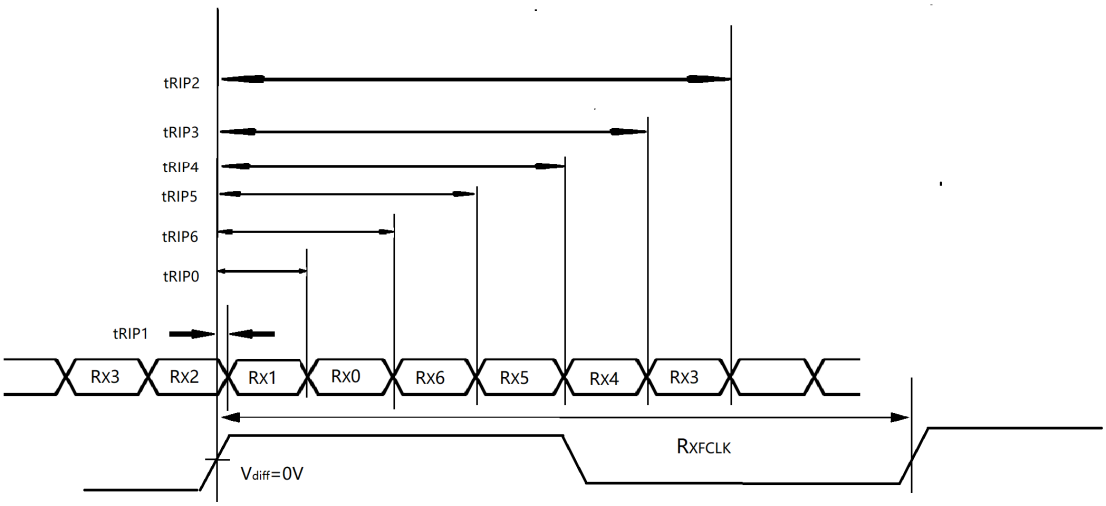


Figure 6.2.1 LVDS AC Characteristics

6.3 LVDS signal timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK frequency		Fclk	TBD	50.4	TBD	MHz	Tclk=1/Fclk
Horizontal section	Horizontal total	Th	TBD	750	TBD	Tclk	
	Horizontal blanking	Thb	TBD	110	TBD	Tclk	
	Valid Data Width	Thd	640			Tclk	
Vertical section	Vertical total	Tv	TBD	1120	TBD	TH	
	Vertical blanking	Tvb	TBD	96	TBD	TH	
	Valid Data Width	Tvd	1024			TH	
Frame Rate		FR	60			Hz	

Table 6.3.1 Input Timing Parameters

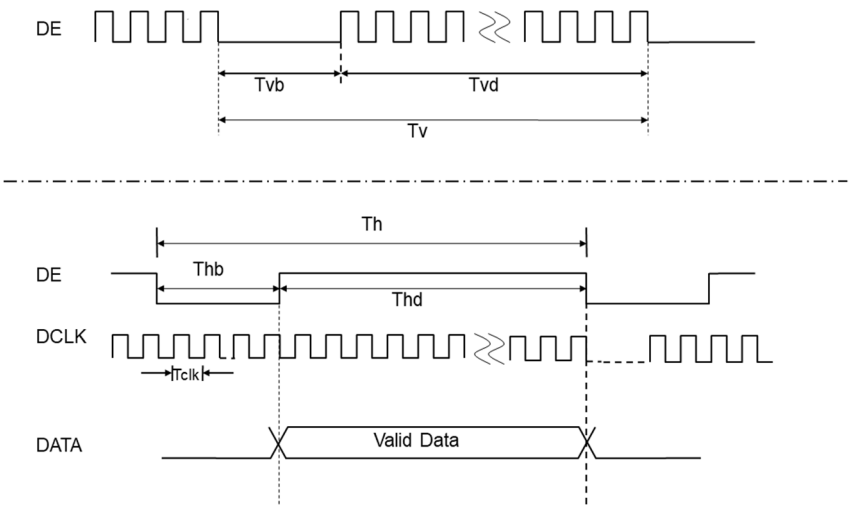


Figure 6.3.2 Clock and Data Input Timing Diagram

6.4 LVDS data mapping

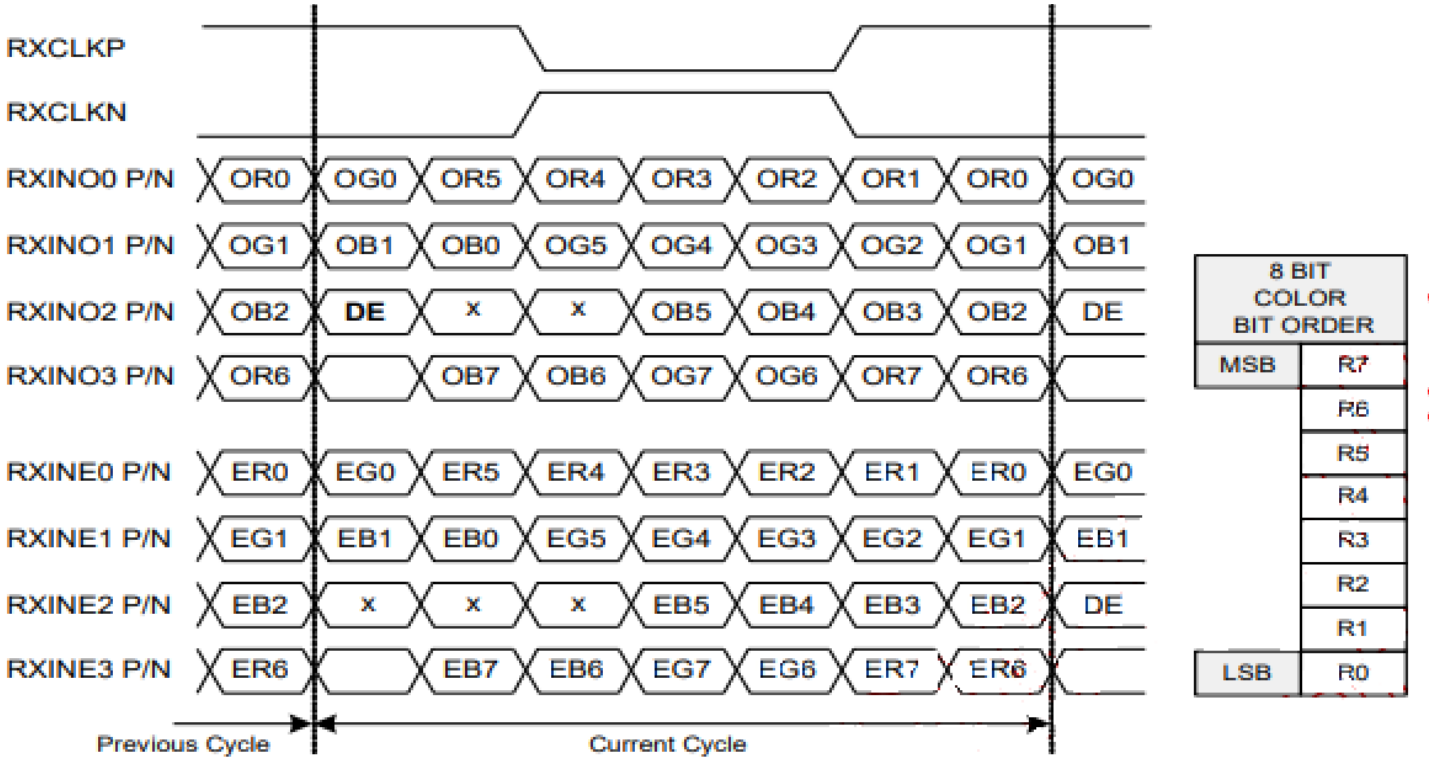


Figure 6.4.1 LVDS data mapping (VESA standard)

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	80	88		degree	Note2,3
		θB		80	88			
		θL		80	88			
		θR		80	88			
Contrast Ratio		CR	θ=0°	1000	1500			Note 3
Response Time		T_{ON}	25℃		25	35	ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	TBD	0.317	TBD		Note 1,5
		y		TBD	0.326	TBD		
	Red	x		TBD	0.645	TBD		Note 1,5
		y		TBD	0.342	TBD		
	Green	x		TBD	0.300	TBD		Note 1,5
		y		TBD	0.623	TBD		
	Blue	x		TBD	0.155	TBD		Note 1,5
		y		TBD	0.082	TBD		
Uniformity		U		75	80		%	Note 6
NTSC		-		67	72		%	Note 5
Luminance		L		400	500		cd/m^2	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. The ambient temperature is 25□.
2. The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. The optical characteristics are measured at the center point of the LCD screen.

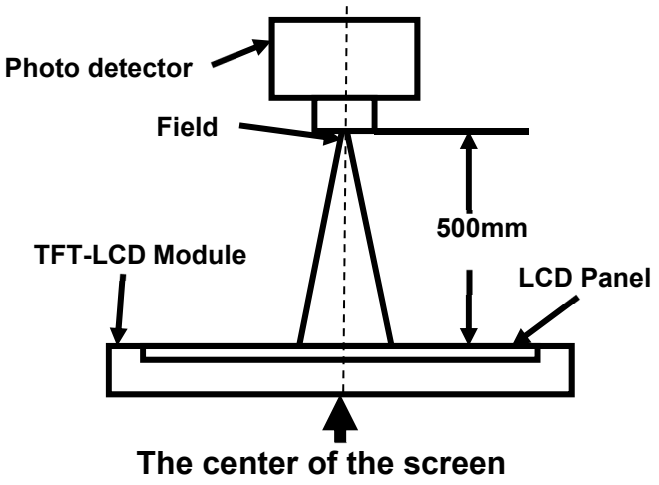


Fig1. Measurement Set Up

Note2: Definition of viewing angle range and measurement system. Viewing angle is measured at the center point of the LCD 。

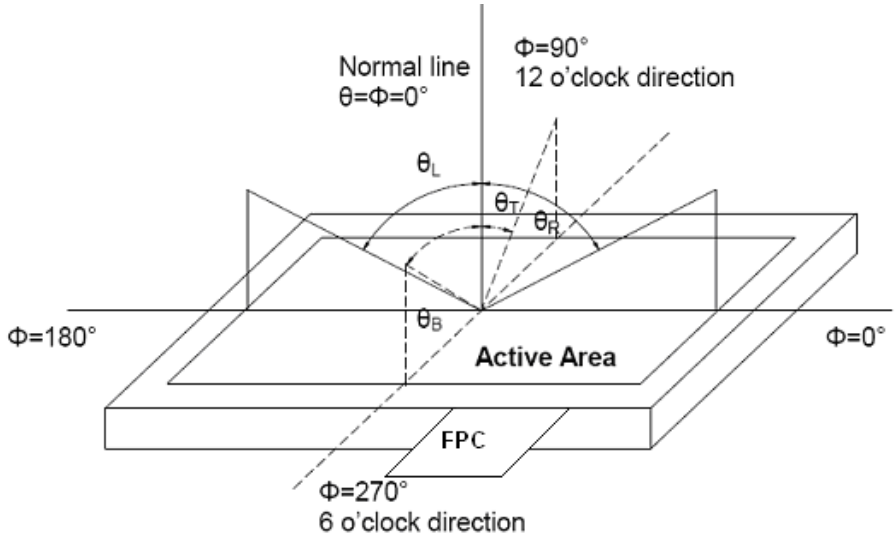


Fig2. Measurement viewing angle

Note3: Definition of contrast ratio

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

Note4: Definition of Response time

For SFT LCM, the response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_r) is the time between photo detector output intensity changed from 10% to 90%. And fall time (T_f) is the time between photo detector output intensity changed from 90% to 10%.

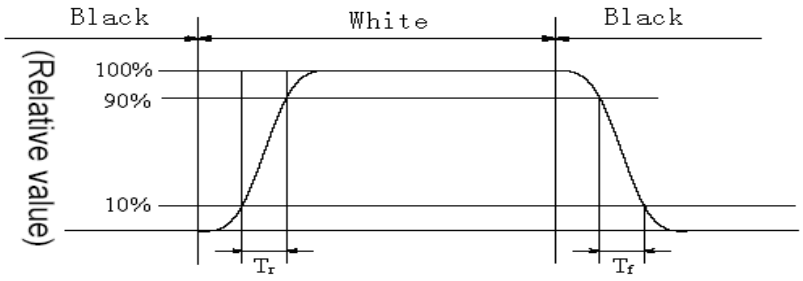


Fig4. Response Time Testing(SFT)

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig.5). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

L-------Active area length; W----- Active area width

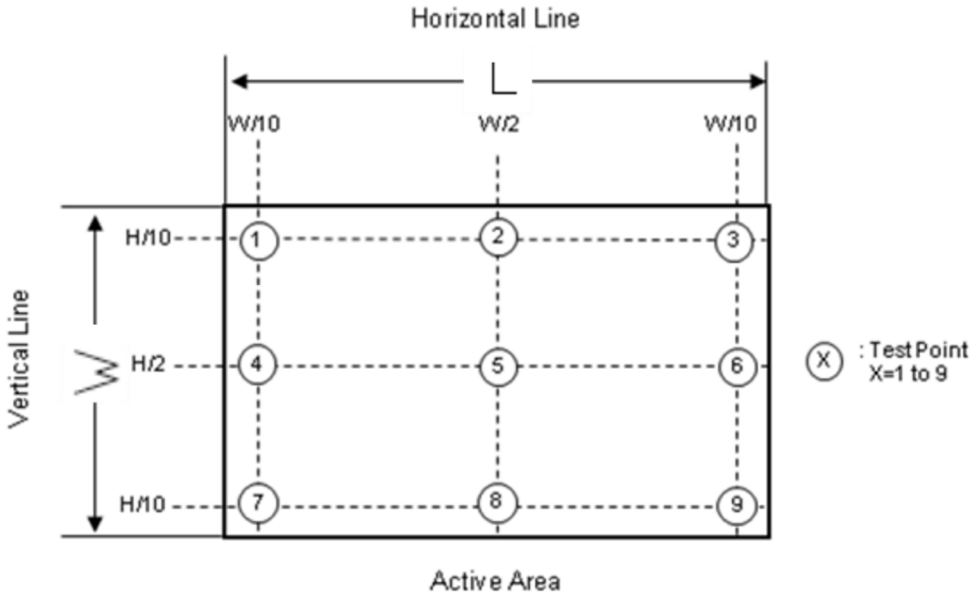


Fig5. Luminance Uniformity Measurement Locations(9 points)

Note7: Definition of Luminance:

Measure the luminance of white state at center point.

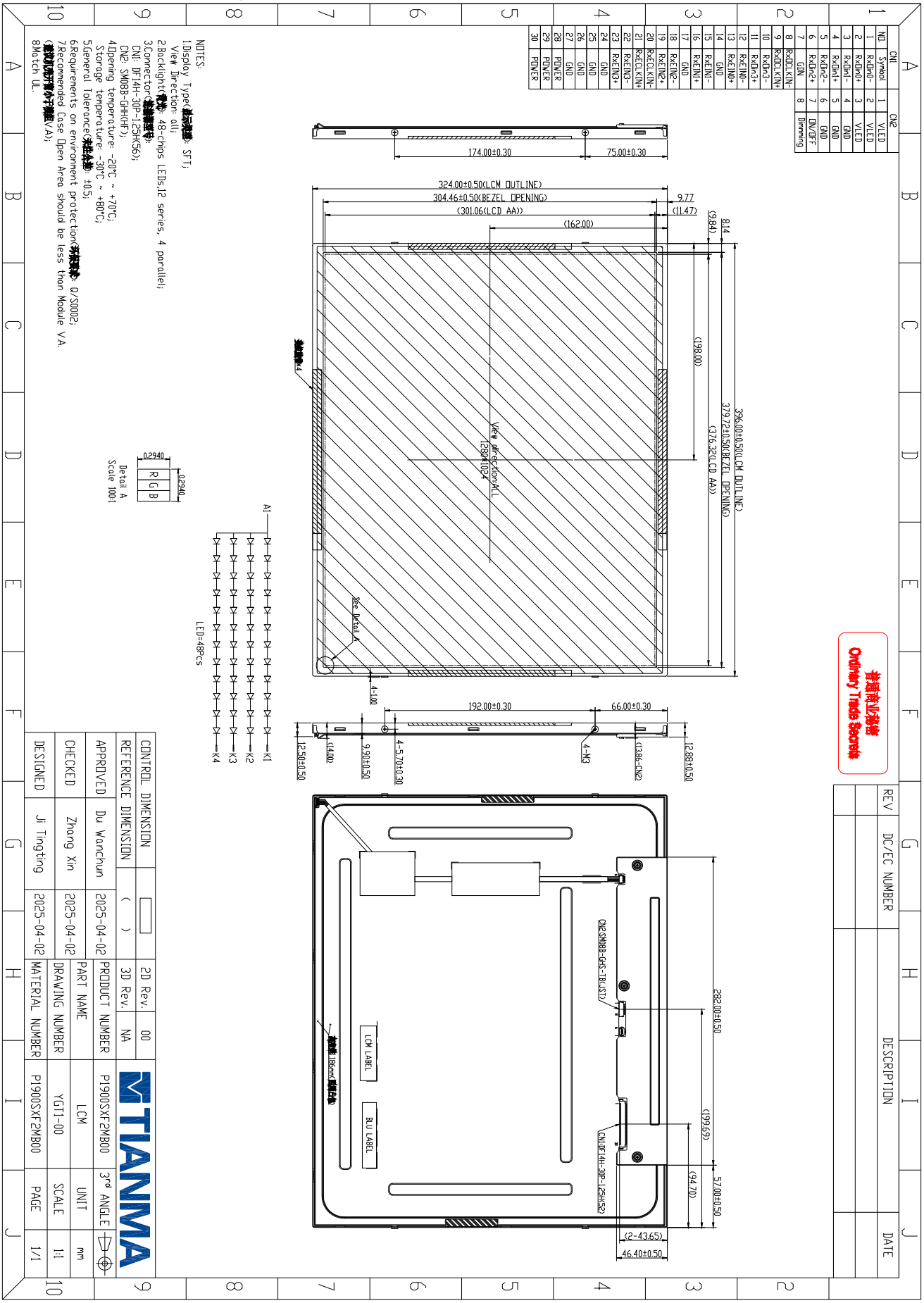
8. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	+70℃，240H	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-20℃，240H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	+80℃，240H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-30℃，240H	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity(non-operation)	+60℃，90%RH，240H	IEC60068-2-78 :2001 GB/T 2423.3-2016
6	Thermal Shock (non-operation)	-20℃，30min~70℃，30min，change time：5min，100cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984, GB/T 2423.22-2012
7	ESD	C=150pF，R=330Ω，5point/panel Air：±15kv，5times； Contact：±8kv，5times； （Environment：15℃~35℃， 30%~60%，86Kpa~106Kpa）	IEC61000-4-2:2001 GB/T 17626.2-2018
8	Vibration (Non-operation)	5 to 100Hz, 11.76m/s2 1 minute/cycle X, Y, Z directions 50 times each direction	GB/T 2423.10-2019
9	Shock (Non-operation)	294m/s2, 11ms ±X, ±Y, ±Z directions 3 times each direction	GB/T 2423.5-2019
10	Package Vibration（包材震动）	5-20-200HZ, PSD: 0.01-0.01-0.001 Total: 0.781g2/HZ, x/y/z every direction 30min）	GB/T 4857.23-2021
11	Package Drop Test	Height: 80cm,1 corner, 3edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Table 8.1 RA test condition

Note1: Temperature is the ambient temperature of sample
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.

9. Mechanical Drawing



10. Packing Instruction

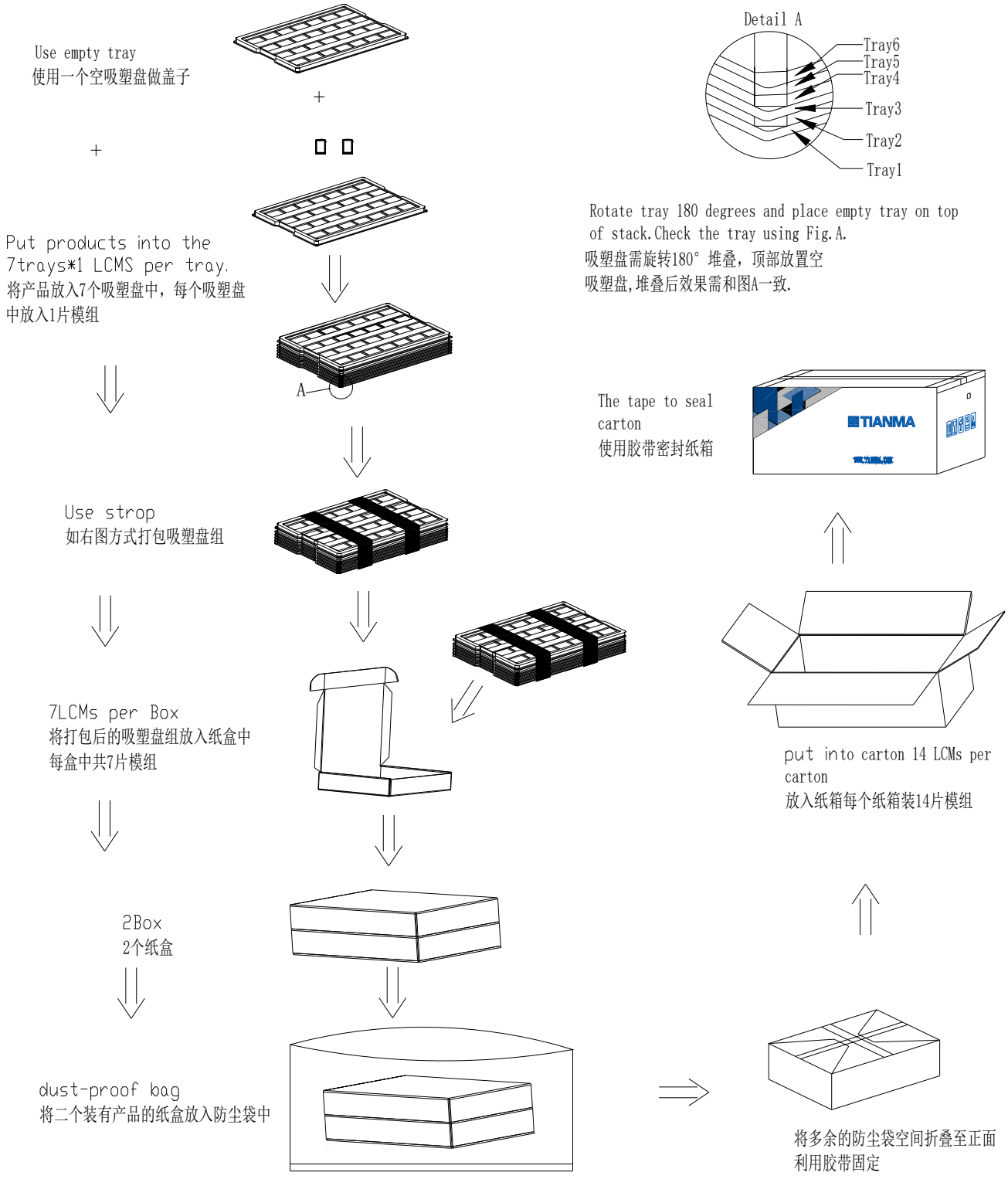
1.包装材料规格表(Packaging Material) Per Carton

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Material Number
1	LCM module 模组	P1900SXF2MB00	396*324*12.88	TBD	TBD	
2	Tray 吸塑盘	PET	TBD	TBD	TBD	
3	Dust-proof Bag 防尘袋	PE	TBD	TBD	TBD	
4	Carton 纸箱	Corrugated Paper	TBD	TBD	TBD	
5	BOX 纸盒	Corrugated Paper	TBD	TBD	TBD	
6	Label 标签	Paper	TBD	TBD	TBD	
7	Total weight	TBDKg				

2.包装数量规格(Packaging Specification and Quantity)

(1) LCM quantity per tray: 1row×1column =1 每个tray装模组的数量：1行×1列 =1
(2) Total LCM quantity in Carton: Number of PET trays 14× quantity per tray1= 14，and 2 empty tray 每箱装模组的数量：装模组的tray数量14×每个tray装模组的数量1=14，另外还有2个空tray
Note: Please refer to the data from “estimated report about the dimension and stack of Carton “ about stacking carton

包装过程示意


Use empty tray
使用一个空吸塑盘做盖子
+
+
Put products into the 7trays*1 LCMS per tray.
将产品放入7个吸塑盘中，每个吸塑盘中放入1片模组
A
Use strop
如右图方式打包吸塑盘组
7LCMs per Box
将打包后的吸塑盘组放入纸盒中
每盒中共7片模组
2Box
2个纸盒
dust-proof bag
将二个装有产品的纸盒放入防尘袋中
Detail A
Tray6
Tray5
Tray4
Tray3
Tray2
Tray1
Rotate tray 180 degrees and place empty tray on top of stack.Check the tray using Fig.A.
吸塑盘需旋转180° 堆叠，顶部放置空吸塑盘,堆叠后效果需和图A一致.
The tape to seal carton
使用胶带密封纸箱
TIANMA
put into carton 14 LCMs per carton
放入纸箱每个纸箱装14片模组
将多余的防尘袋空间折叠至正面
利用胶带固定

堆栈放置

纸箱堆叠数按2*3每层*共5层
栈板尺寸：1100mm*1100mm
栈板代码：PL004

11. Precautions for Use of LCD Modules

11.1 Handling Precautions

(1) The display panel is made of glass. Do not subject it to mechanical shock by dropping it, etc.
(2) If the display panel is damaged and the liquid crystal fluid inside it leaks out be sure not to get any in your mouth. If the fluid comes into contact with your skin or clothes promptly wash it off using soap and water.
(3) Do not apply excessive force to the display surface or the bezel since this may cause the color tone to vary.
(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
(5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear use a moist cloth with one of the following solvents:
   — Isopropyl alcohol
   — Ethyl alcohol
   Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:
   — Water
   — Ketone
   — Aromatic solvents
(6) Do not disassemble the LCD Module.
(7) If powered off, do not apply the input signals.
(8) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
(9) Be sure to ground your body when handling the LCD Modules.
(10) Tools used for assembly, must be properly grounded.
(11) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
(12) The LCD Module is covered with a film to protect the display surface, remove film slowly under the ionizer.

11.2 Storage precautions

(1) When storing the LCD modules avoid exposure to direct sunlight or to the light of fluorescent lamps.
(2) The LCD modules should be stored within the rated storage temperature range. The recommend condition is: Temperature: 0 ~ 35 ℃ at normal humidity.
(3) The LCD modules should be stored in a room without acid, alkali or other harmful gas.

11.3 Transportation Precautions

The LCD modules should not be dropped or subject to violent mechanical shock during transportation. Also they should avoid excessive pressure, water, high humidity and direct sunlight.

11.4 Screen saver Precautions

Not display the fixed pattern for a long time. Use a screen saver, if the fixed pattern is displayed on the screen

11.5 Safety Precautions

(1) When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned
(2) Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.
(3) LED driver should be designed to limit or stop its function when over current is detected on the LED.