SPECIFICATION

[ ] Preliminary Specification
[◉] Final Specification

Description **10.1” 1280xRGBx800 TFT-LCD Module**

Part Number **P1010WXF2ME30**

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

Rev	Date	Page	Revision Items	Editor
1.0	2024-08-12	-	First release	Hongwei Liu
2.0	2025-07-10	-	Final Spec release	Hongwei Liu

CONTENTS

1. Summary

1.1 General Description

This is a 10.1 inch a-Si TFT-LCD module with Normal-black technology. It is composed of a TFT-LCD panel, a driver circuit, FPC , and a LED backlight unit.

1.2 Features

- Ultra-wide viewing angle
- Interface: LVDS

- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03
- Compliant 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	10.1 inch	
	Resolution	1280(RGB)×800	
	Pixel Pitch	0.1695x0.1695	mm
	TFT Active Area	216.96 x 135.60	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	SFT, Normally Black	
	Surface Treatment	Anti-Glare	
	Viewing Direction	All Direction	
	Gray Scale Inversion Direction	NA	
Mechanical Characteristics	LCM (W x H x D)	224.8 x 147.92 x 3.0	mm
	Weight	217±5 %	g
Optical Characteristics	Luminance	400	cd/m^2
	Contrast Ratio	1200:1	
	NTSC	72	%
	Viewing Angle	89/89/89/89	degree
Electrical Characteristics	Interface	LVDS 8-bit	
	Color Depth	16.7 Million	color
	Power Consumption	LCD: 750; Backlight: 2700	mW

Table 2.1 General TFT Specifications

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information	
LCD Module connector	FPC
Matching connector	F62240-H1210A

Table 3.1.1 Connector information

No	Symbol	I/O	Description	Comment
1	NC	N	No connection	
2	VDD	P	Power supply +3.3V	
3	VDD	P	Power supply +3.3V	
4	NC	N	TM used for SPI(CS) signal, keep open	
5	NC	N	TM used for SPI(SDO) signal, keep open	
6	NC	N	TM used for SPI(SDI) signal, keep open	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS differential data input	
9	Rxin0+	I	+LVDS differential data input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS differential data input	
12	Rxin1+	I	+LVDS differential data input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS differential data input	
15	Rxin2+	I	+LVDS differential data input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS differential clock input	
18	RxCLK+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS differential data input	
21	Rxin3+	I	+LVDS differential data input	
22	GND	P	Ground	
23	NC	N	TM used for SPI(SCL) signal, keep open	
24	NC	N	TM used for OTP(VDD_OTP), keep open	
25	GND	P	Ground	
26	NC	N	TM used for OTP(ROM_RLB), keep open	
27	VSN	P	PANEL operating negative voltage	
28	NC	N	TM used for OTP(STBYB), keep open	
29	VSP	P	PANEL operating positive voltage	
30	GND	P	Ground	
31	VLED-	P	Back light cathode	
32	VLED-	P	Back light cathode	

33	NC	N	No Connect	
34	NC	N	No Connect	
35	VGL	P	Gate OFF Voltage	
36	NC	N	No Connect	
37	NC	N	No Connect	
38	VGH	P	Gate ON Voltage	
39	VLED+	P	Back light anode	
40	VLED+	P	Back light anode	

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.

4. Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VDD	-0.3	3.4	V	
Power Voltage	VSP	-0.3	6.4	V	
Power Voltage	VSN	-6.4	-0.3	V	
Power Voltage	VGH	-0.3	18.5	V	
Power Voltage	VGL	-10.5	-0.3	V	
Interface Power supply voltage for LCD	VDDRX	-0.3	3.4	V	Note1
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℃
		--	≤36	%	60℃＜Ta≤70℃
		--	≤24	%	70℃＜Ta≤80℃
Absolute Humidity	AH	--	≤70	g/m³	Ta＞70℃

Table 4.1 Absolute Maximum Ratings

Note1: VDDRX include Rxin0-/+、Rxin1-/+、Rxin2-/+、Rxin3-/+、RxCLK-/+
Note2: 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.
Note3: 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		VDD	3.2	3.3	3.4	V	
		VSP	6.2	6.3	6.4	V	
		VSN	-6.4	-6.3	-6.2	V	
		VGH	17.5	18	18.5	V	
		VGL	-10.5	-10	-9.5	V	
Input Signal Voltage	Low Level	VIL	GND	--	0.2×VDD	V	
	High Level	VIH	0.8×VDD	--	VDD	V	
Output Signal Voltage	Low Level	VOL	GND	--	0.2×VDD	V	
	High Level	VOH	0.8VDD	--	VDD	V	
Power Consumption	60Hz	P	--	750	--	mW	White pattern

Table 5.1.1 Operating Voltages

Note: All display qualities are guaranteed only under the TYP value.

5.2 DC Characteristics for Backlight Driving

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	--	180	--	mA	45 LEDs (9 LED Parallel,5 LED Serial)
Forward Current Voltage	VF	13,5	15	16	V	
Backlight Power Consumption	WBL	--	2700	—	mW	
LED life time	--	20000	30000	-	Hrs	

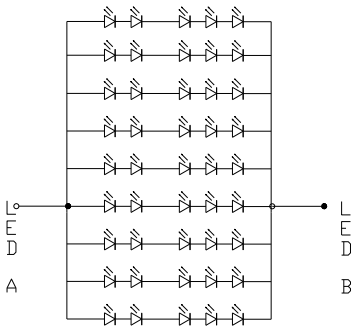
Table 5.2.1 LED Backlight Characteristics

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.



5.3 Recommended Power ON/OFF Sequence

Power ON Sequence

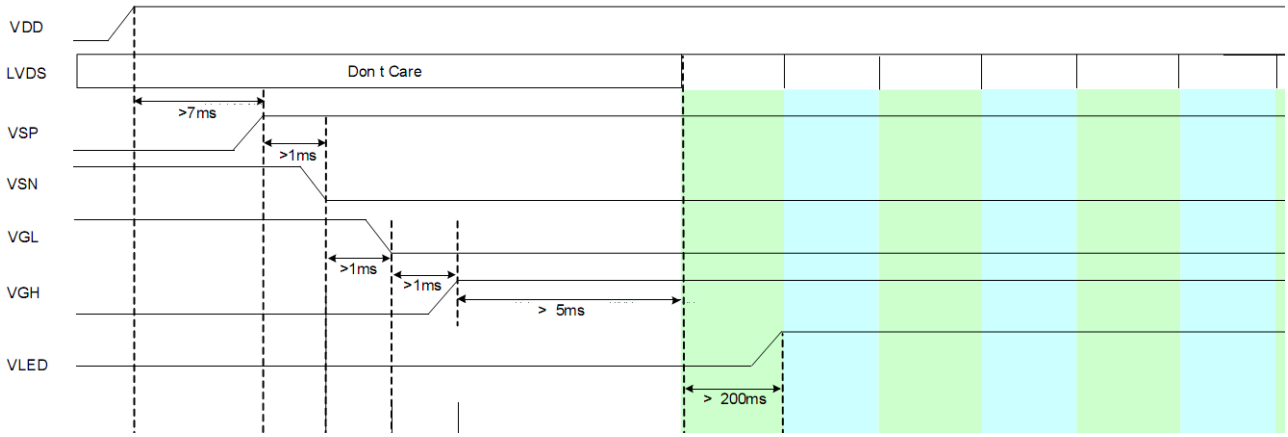


Figure 5.3.1 Power on sequence

Power OFF Sequence

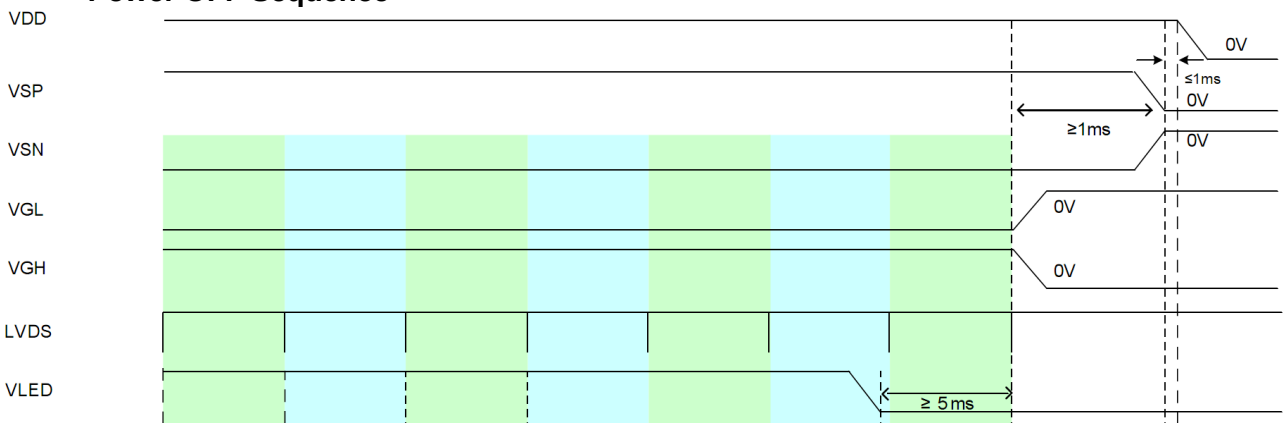


Figure 5.3.2 Power off sequence

Note1: All power drops to 0V to next power on need≥200ms.
Note2: The low level of these signals and analog powers are GND level.
Note3: 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.

5.4 LCD Module Block Diagram

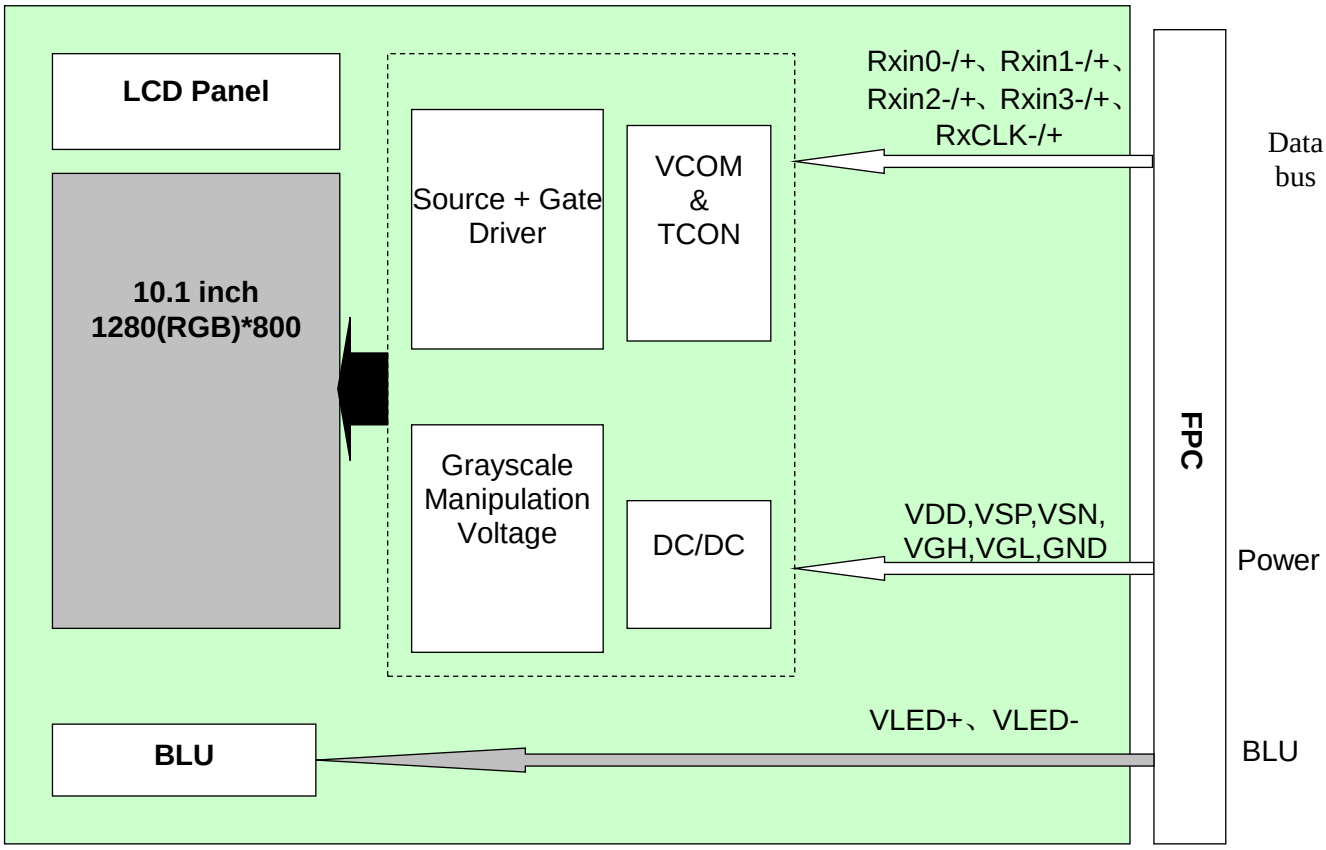


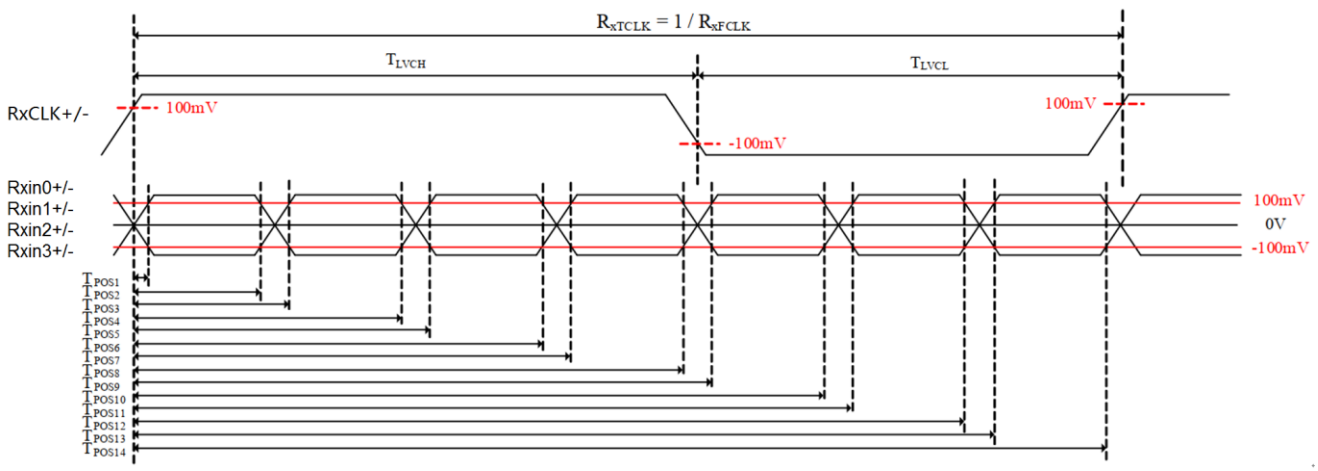
Figure 5.5.1 LCD Module Block Diagram

6. Timing Characteristics

6.1 AC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
1 data bit time	UI	-	1/7	-	R_{xTCLK}	
Clock high time	T_{LVCH}		4		UI	
Clock low time	T_{LVCL}		3		UI	
Position 1	T_{POS1}	-0.25	0	0.25	UI	
Position 2	T_{POS2}	0.75	-	1.25	UI	
Position 3	T_{POS3}	0.75	1	1.25	UI	
Position 4	T_{POS4}	1.75	-	2.25	UI	
Position 5	T_{POS5}	1.75	2	2.25	UI	
Position 6	T_{POS6}	2.75	-	3.25	UI	
Position 7	T_{POS7}	2.75	3	3.25	UI	
Position 8	T_{POS8}	3.75	-	4.25	UI	
Position 9	T_{POS9}	3.75	4	4.25	UI	
Position 10	T_{POS10}	4.75	-	5.25	UI	
Position 11	T_{POS11}	4.75	5	5.25	UI	
Position 12	T_{POS12}	5.75	-	6.25	UI	
Position 13	T_{POS13}	5.75	6	6.25	UI	
Position 14	T_{POS14}	6.75	-	7.25	UI	
Input eye width	T_{EYEW}	0.5	-	-	UI	
Input eye border	T_{EX}	-	-	0.25	UI	

Table 6.1.1 Input Setup Timing Parameters Requirement



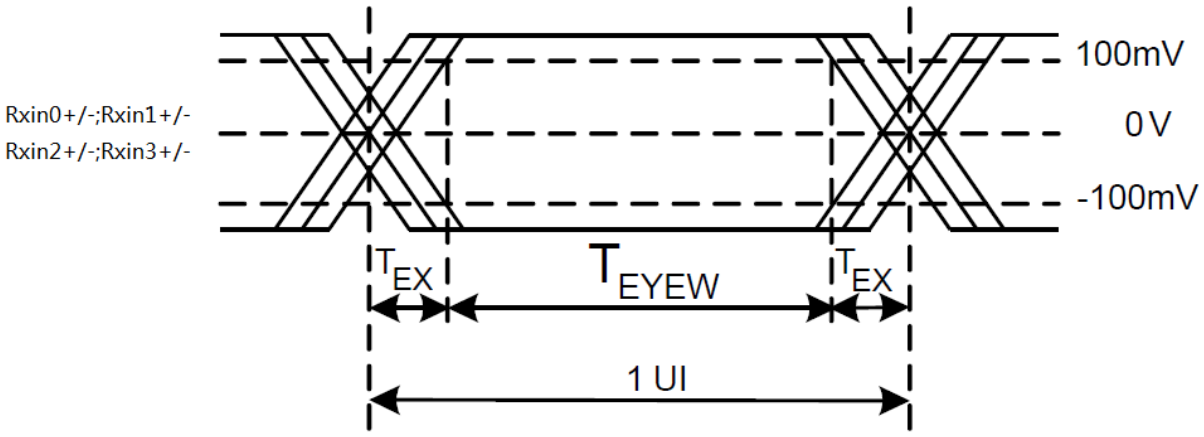
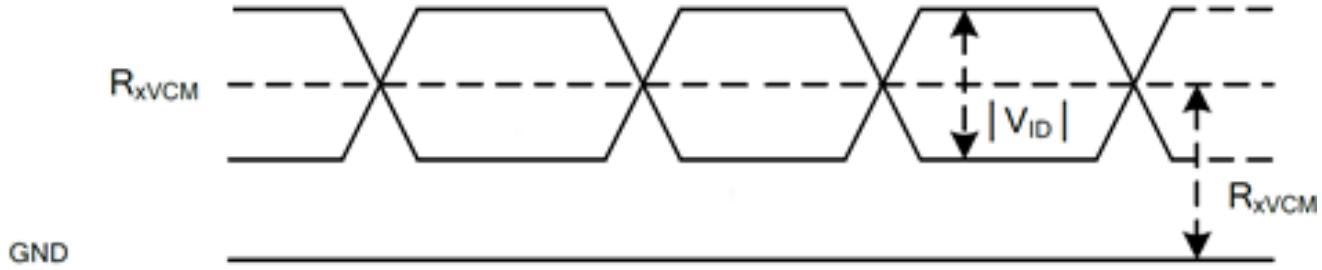


Figure 6.1.1 Clock and Data Input Timing Diagram

6.2 LVDS DC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Differential input high Threshold voltage	R_{XVTH}	-	-	0.1	V	
Differential input Low Threshold voltage	R_{XVTL}	-0.1	-		V	
Input voltage range(single-end)	R_{XVIN}	0	-	VDD-1.0	V	VDD=3.3V
Differential input common Mode voltage	R_{XVCM}	0.6	1.2	2.4-|VID|/2	V	
Differential input voltage	$\|V_{ID}\|$	＞R_{XVT}	0.4	0.6	V	
Differential input leakage current	RVxliz	-10	-	10	uA	

Single end signals



Differential signals

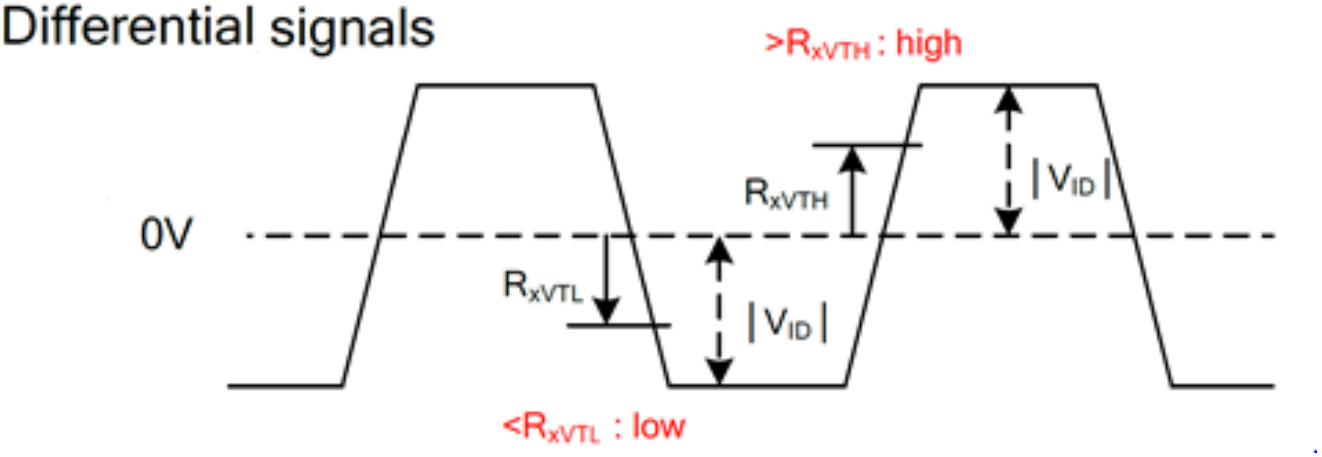


Table 6.2.1 LVDS DC characteristics

6.3 Data Input timing Parameter Setting

Parameter	Symbol	MIN	Typ	MAX	Unit
CLK frequency	tclk	68.1	69.8	71.4	MHz
Horizontal display area	thd	1280			tclk
Horizontal Blanking time	thbt	79	104	129	tclk
HSYNC period	th	1359	1384	1409	tclk
Vertical display area	tvd	800			th
Vertical Blanking time	tvbt	35	40	45	th
VSD period	tv	835	840	845	th
Frame rate	FR	60			Hz

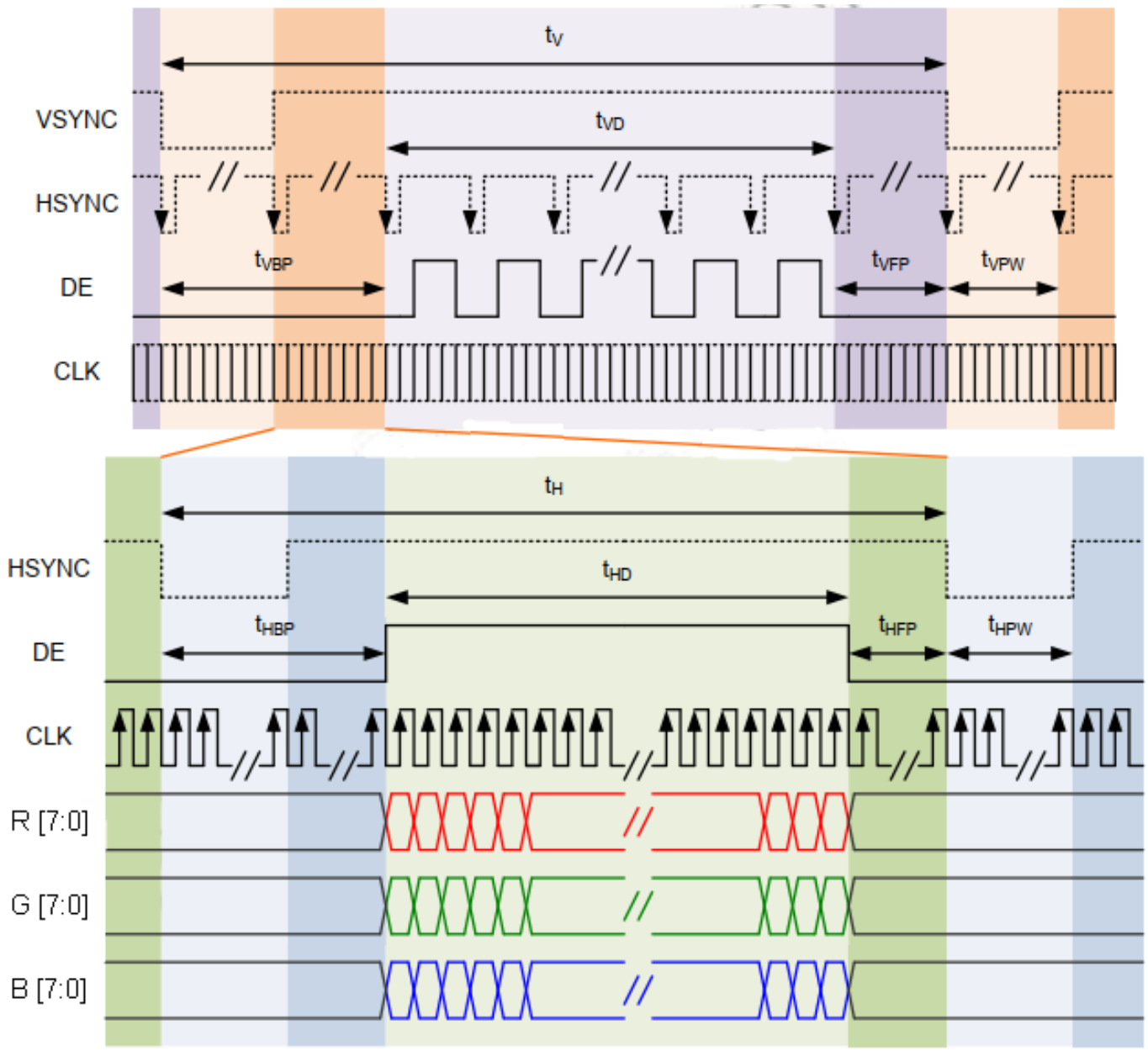


Figure 6.3.1 Data Input timing Parameter Setting

6.4 Data Input Format

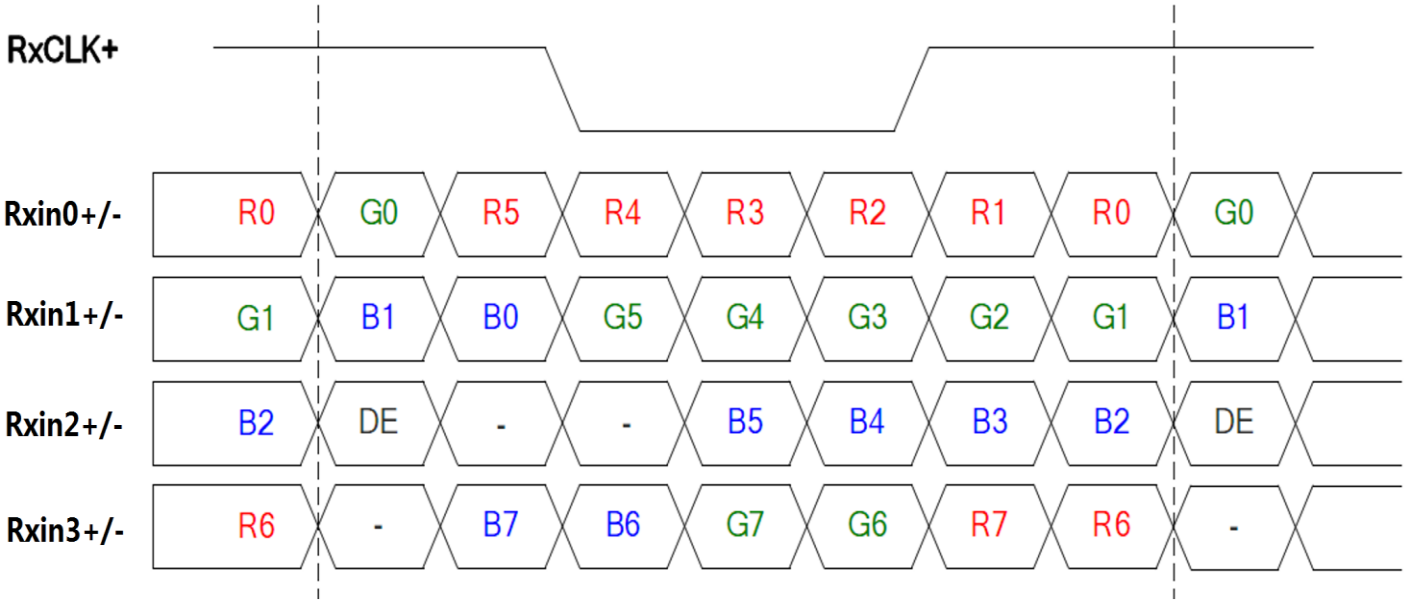


Figure 6.4.1 Data Input Format

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	80	89	-	degree	Note2,3
		θB		80	89	-		
		θL		80	89	-		
		θR		80	89	-		
Contrast Ratio		CR	θ=0°	900	1200	-		Note 3
Response Time		T_{ON}	25℃		35	45	ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	0.254	0.304	0.354	-	Note 1,5
		y		0.284	0.334	0.384		
	Red	x		0.599	0.649	0.699	-	Note 1,5
		y		0.286	0.336	0.386		
	Green	x		0.274	0.324	0.374	-	Note 1,5
		y		0.564	0.614	0.664		
	Blue	x		0.100	0.150	0.200	-	Note 1,5
		y		0.000	0.045	0.095		
Uniformity		U		70	75	-	%	Note 6
NTSC		-		67	72	-	%	Note 5
Luminance		L		320	400	-	cd/m^2	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. I_F= **160** mA, and 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. After 5 Minutes operation, the optical characteristics are measured at the center point of the LCD screen.

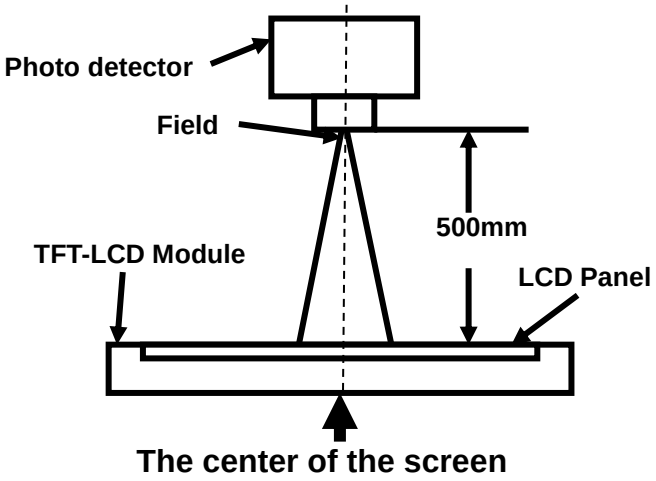


Fig1. Measurement Set Up

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

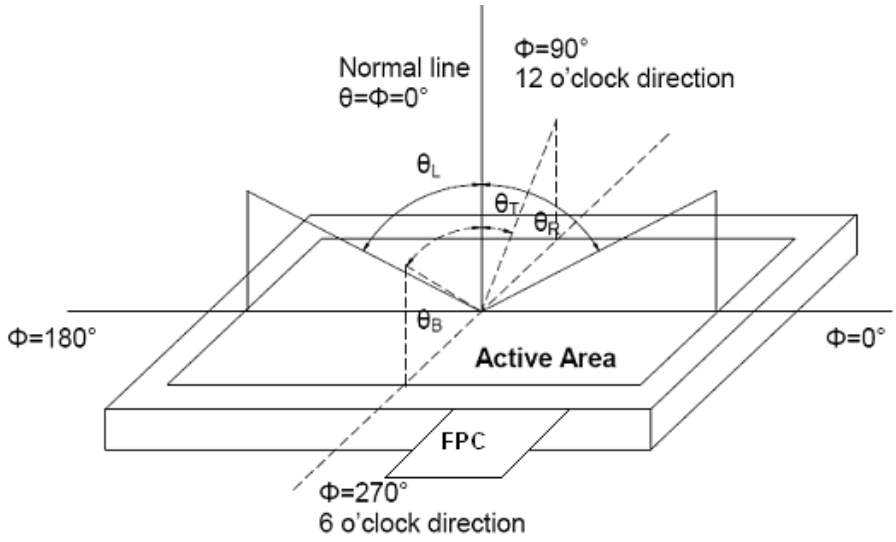


Fig2. Measurement viewing angle

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%.

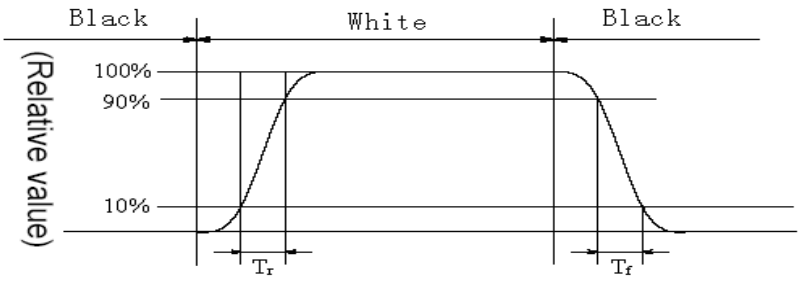


Fig4. Response Time Testing(SFT)

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

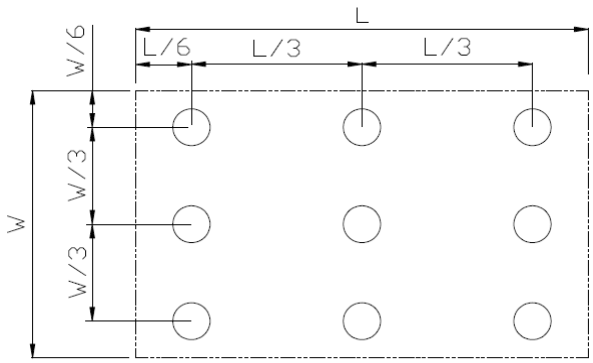


Fig5. Luminance Uniformity Measurement Locations(9 points)

Note7: Definition of Luminance:

Measure the luminance of white state at center point.

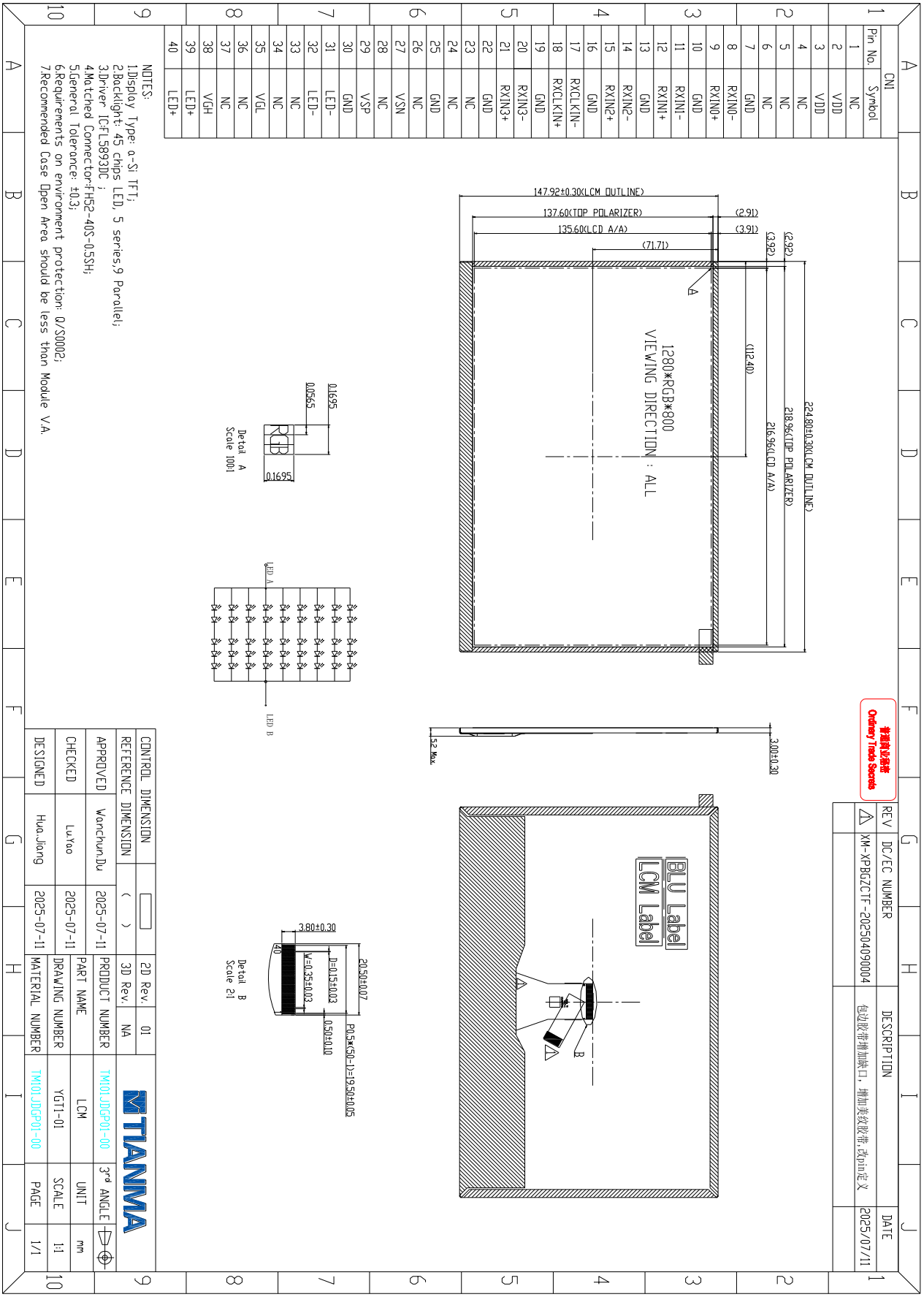
8. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	+70℃，500H	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-20℃，500H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	+80℃，500H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-30℃，500H	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity(Operation)	+60℃，90%RH，500H	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃，30min~80℃，30min，change time：5min，100cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	ESD	C=150pF，R=330Ω，5point/panel Air：±4kv，5times； Contact：±2kv，5times； （Environment：15℃~35℃， 30%~60%，86Kpa~106Kpa）	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	5~100HZ，19.60m/s2 1min/cycle 120times Per X\Y\Z	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	60G，6ms 3times ±X、±Y、±Z	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Vibration	5-20-200HZ，PSD：0.01-0.01-0.001 Total:0.781g2/HZ,x/y/z 30min）	
11	Package Drop Test	Height: X cm,1 corner, 3edges, 6 surfaces Note：X＞10Kg:60cm；≤10Kg:80cm	IEC60068-2-32:1990 GB/T2423.8—1995

Table 8.1 RA test condition

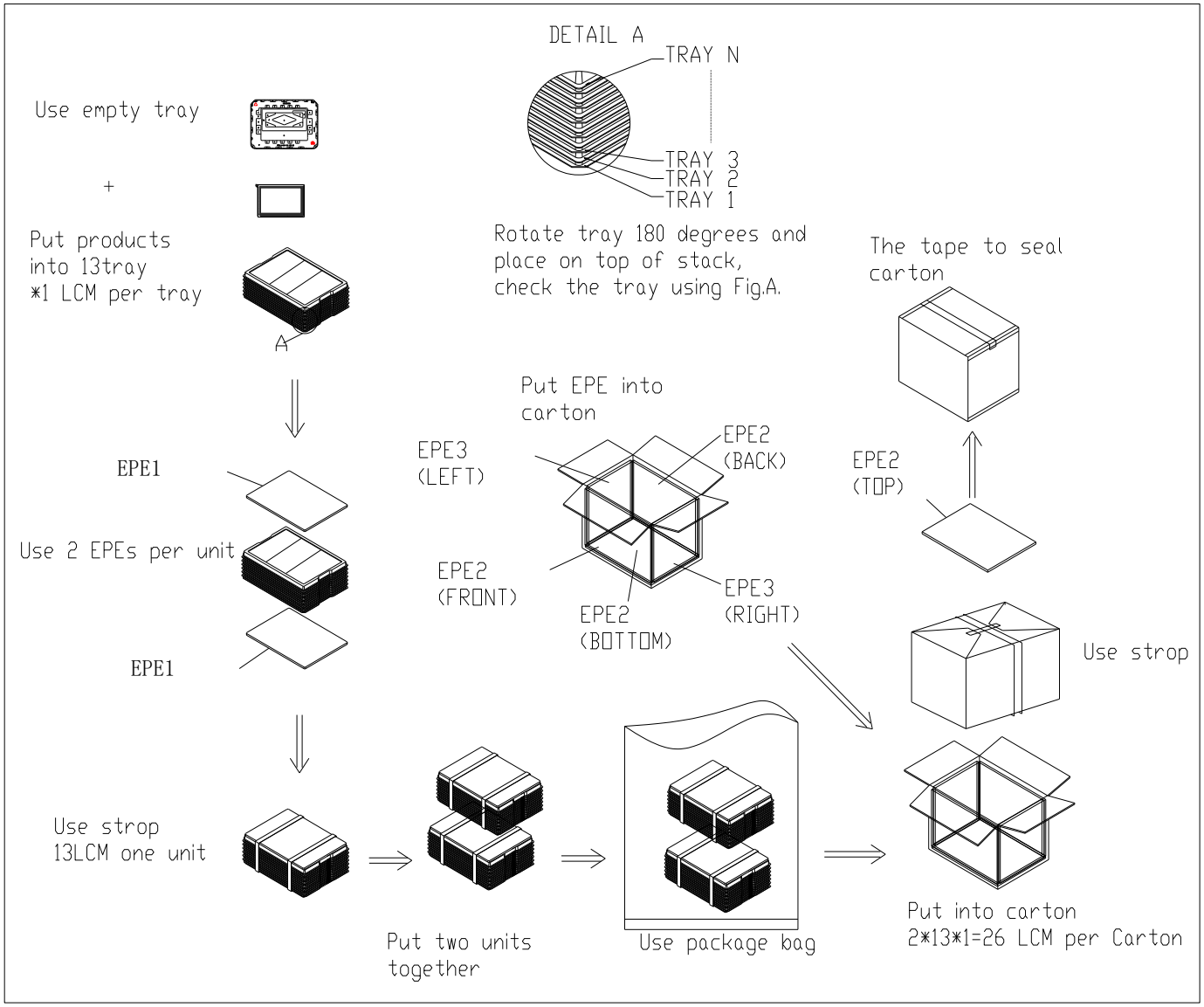
Note1: Temperature is the ambient temperature of sample
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability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

9. Mechanical Drawing



10. Packing Instruction

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Q'ty	Remark
1	LCM	P1010WXF2ME30	224.8×147.92×3	0.217	26	1
2	Tray	PET	356×256×13.5	0.098	28	2
3	EPE1	EPE	336×246×6	0.01	4	3
4	EPE2	EPE	375×275×10	0.014	4	4
5	EPE3	EPE	250×280×12	0.015	2	5
6	Carton	Corrugated Paper	398×290×315	0.75	1	6
7	Package bag	PE	680×520	0.042	1	7
8	Lable	Paper	100×52	0.001	1	8
6	Total weight	9.305±5 %				



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.