SPECIFICATION

[ ] Preliminary Specification
[◉] Final Specification

Description **6.4” 1024xRGBx768 TFT-LCD Module**

Part Number **P0640XGF1MB00**

Customer		Product Dept, PDBU Tianma Microelectronics Co., Ltd.	
Signatures	Date	Approved By	Date
		Kevin Kim	2025/6/26
		Reviewed By Deng Longping	2025/6/26
		Prepared By Huang Jingdan	2025/6/26
Comments:			

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

REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2024/1/18	-	Preliminary spec	Huang Jingdan
1.1	2024/11/13		Update CN1 connector to FH75-60(30)SA-1SH(16) Mechanical drawing update in page 17	Huang Jingdan
2.0	2025/6/26		Final version release	Huang Jingdan

CONTENTS

1. Summary

1.1 General Description

This is a 6.4 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
- Wide temperature range
- Interface: LVDS
- LED driver integrated

- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03 (File number: E333987)
- 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	6.4 inches	
	Resolution	1024(RGB)x768	
	Pixel Pitch	126.75*126.75	um
	TFT Active Area	129.79x97.34	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	SFT, Normally Black	
	Surface Treatment	Anti-Glare	
	Viewing Direction	All	
Mechanical Characteristics	LCM (W x H x D)	140.76×110.52×2.83	mm
	Weight	70	g
Optical Characteristics （typ）	Luminance	400	cd/m^2
	Contrast Ratio	1000:1	
	NTSC	50	%
	Viewing Angle	88/88/88/88	degree
Electrical Characteristics	Interface	1 port LVDS	
	Color Depth	16.7 Million	color
	Power Consumption	LCD:381 Backlight:1260	mW

Table 2.1 General TFT Specifications

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information		Remark
LCD Module connector	FH75-60(30)SA-1SH（16）	

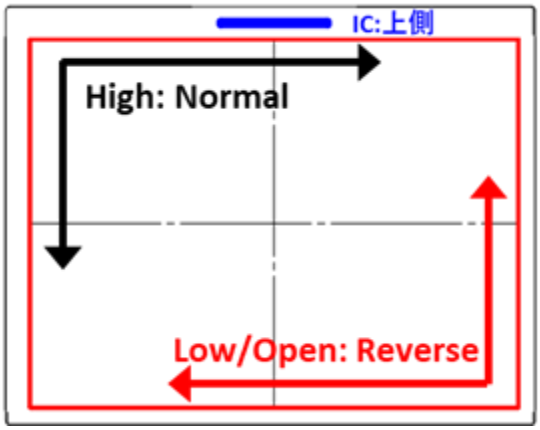
Table 3.1.1 Connector information

Table 3.1.2 Pin Assignment for LCD Interface

No	Symbol	I/O	Description	Comment
1	VLED	P	Power Supply12V	
2	VLED	P	Power Supply12V	
3	GND	I	Ground	
4	GND	P	Ground	
5	PWM	I	Control signal for brightness of the LED backlight(active high)	
6	EN	I	Control signal for brightness of the LED backlight(active high)	
7	GND	P	Ground	
8	GND	P	Ground	
9	VDD	P	Power Supply3.3V	
10	VDD	P	Power Supply3.3V	
11	GND	P	Ground	
12	GND	P	Ground	
13	IN0-	I	LVDS receiver negative signal channel 0	
14	IN0+	I	LVDS receiver positive signal channel 0	
15	GND	P	Ground	
16	IN1-	I	LVDS receiver negative signal channel 1	
17	IN1+	I	LVDS receiver positive signal channel 1	
18	GND	P	Ground	
19	IN2-	I	LVDS receiver negative signal channel 2	
20	IN2+	I	LVDS receiver positive signal channel 2	
21	GND	P	Ground	
22	CLK-	I	LVDS receiver negative signal clock	
23	CLK+	I	LVDS receiver positive signal clock	
24	GND	P	Ground	
25	IN3-	I	LVDS receiver negative signal channel 3	
26	IN3+	I	LVDS receiver positive signal channel 3	
27	CSB	I	Serial Interface chip enable signal.	
28	SC	I	Scan direction control；high：normal；low/open：reverse	Note3
29	SDI	I/O	Serial Interface address and data input/output	
30	SCL	I	Serial Interface clock input.	

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.
Note3：SC definition



4. Absolute Maximum Ratings

Item		Symbol	MIN	MAX	Unit	Remark
Power Supply Voltage	for LCD	VDD	-0.3	3.96	V	Ta=25℃
	for BL	VLED	-0.3	15	V	
Enable signal for BL		EN	-0.3	5.0	V	
Brightness control of BL		PWM	-0.3	5.0	V	
Operating Temperature		Top	-30	80	℃	
Storage Temperature		Tst	-40	90	℃	
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

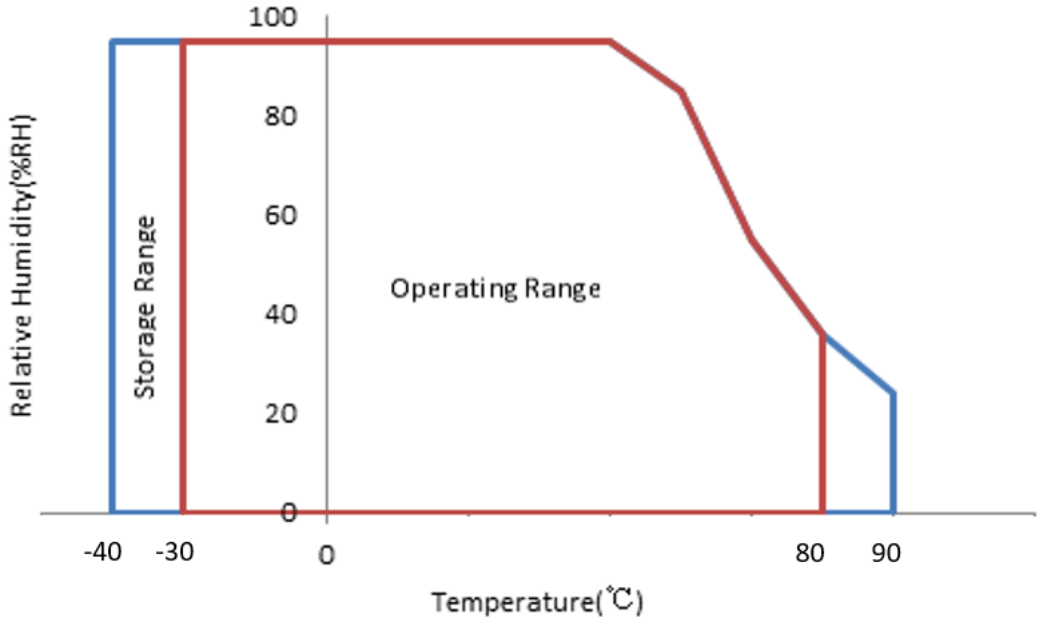


Figure4.1 Absolute Maximum Ratings chart

Note1: Input voltage include all in put data.
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

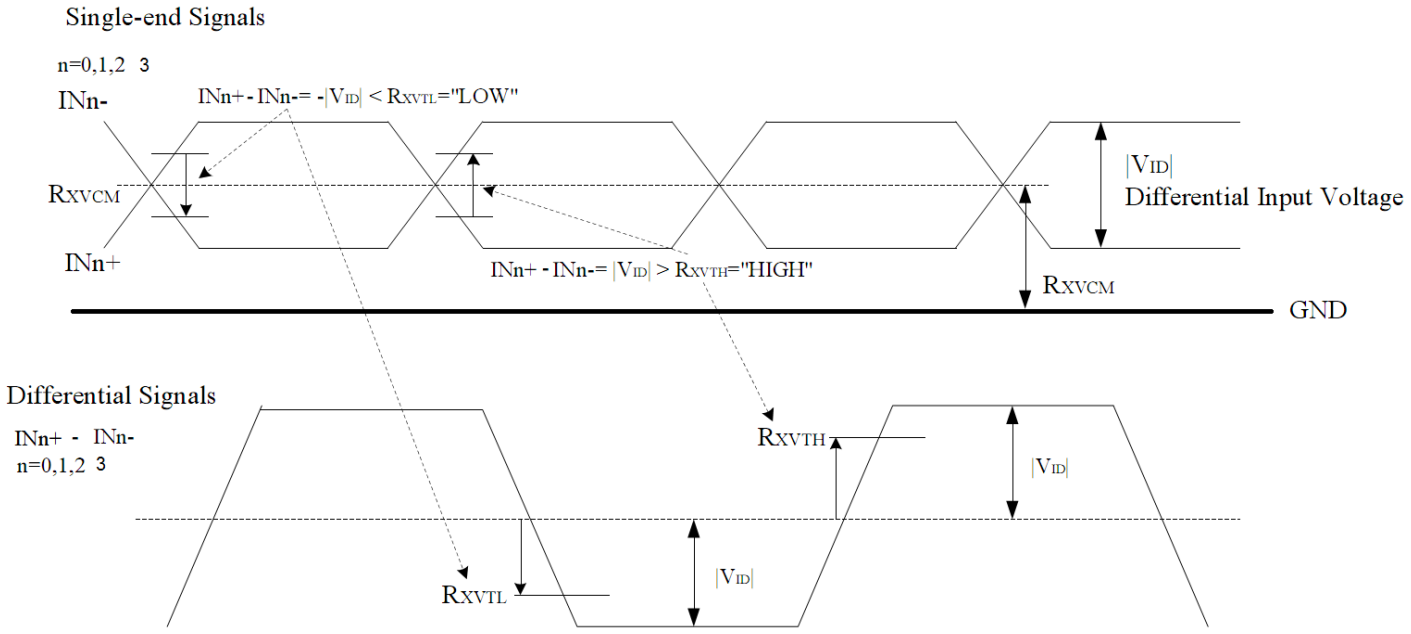
5.1 DC Characteristics for Panel Driving

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		VDD	（3.0）	3.3	（3.6）	V	Include ripple
High level input voltage		VIH	0	-	0.2*VDD		Note 1
Low level input voltage		VIL	0.8*VDD	-	VDD		
LVDS Differential input high threshold		R_{xVTH}	-	-	+37	mV	
LVDS Differential input low threshold		R_{xVTL}	-37	-	-	mV	
Differential input voltage		$\|V_{ID}\|$	0.1	-	0.4	V	
LVDS input common mode voltage		R_{xVCM}	600	1200	1375	mV	$R_{XVCM+1/2*}\|V_{ID}\|$<=1650 mV $R_{XVCM-1/2*}\|V_{ID}\|$>=400mV
Power Consumption	60Hz	P	--	381	571.5	mW	white pattern

Table 5.1.1 Operating Voltages

Note1: Input voltage include SC

Note2: LVDS DC characteristics.



Note3: Inrush current test condition.

5.2 DC Characteristics for Backlight Driving

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Voltage	VLED	11.2	12	12.8	V	
Power Supply current	I_{VLED}	-	105	-	mA	VLED=12V@Duty ratio=100%
Power Consumption	W_{VLED}	-	1260	-	mW	
Logic Signals Input Voltage (EN,)	V_{IH1}	1.9	-	-	V	
	V_{IL1}	-	-	0.8	V	
Logic Signals Input Voltage (PWM)	V_{IH2}	1.9	-	-	V	
	V_{IL2}	0	-	0.8	V	
PWM frequency	f_{PWM}	100	-	30k	Hz	
LED life time	--	50000	-	-	Hrs	

Table 5.2.1 LED Backlight Characteristics

Note1: Optical performance should be evaluated at Ta=25℃only.
Note2: If LED is driven by high current, high ambient temperature & humidity condition, the life time of LED will be reduced.
Note3: Operating life means brightness goes down to 50% of initial brightness. Typical operating life time is estimated data.
Note4: Inrush current should be tested under BL_PWR rising time 470us.

5.3 Recommended Power ON/OFF Sequence

Symbol	Min	Typ	Max	Unit	Remark
t1	1	-	5	ms	
t2	20	-	50	ms	
t3	200	-	-	ms	
t4	1	-	-	ms	
t5	2	-	-	ms	
t6	2	-	-	ms	
t7	2	-	-	ms	
t8	2	-	-	ms	
t9	1	-	-	ms	
t10	200	-	-	ms	
t11	50	-	100	ms	
t12	1	-	5	ms	
t13	2000	-	-	ms	

Table 5.3.1 Power on/off sequence

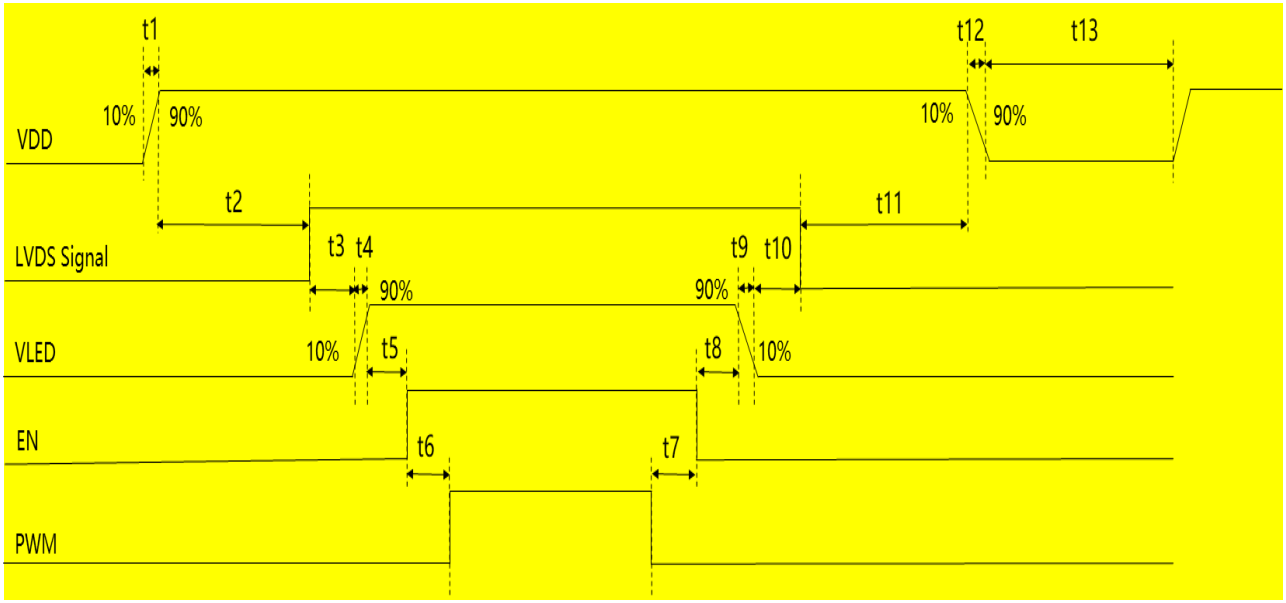


Figure 5.3.1 Power on/off sequence

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.

5.4 LCD Module Block Diagram

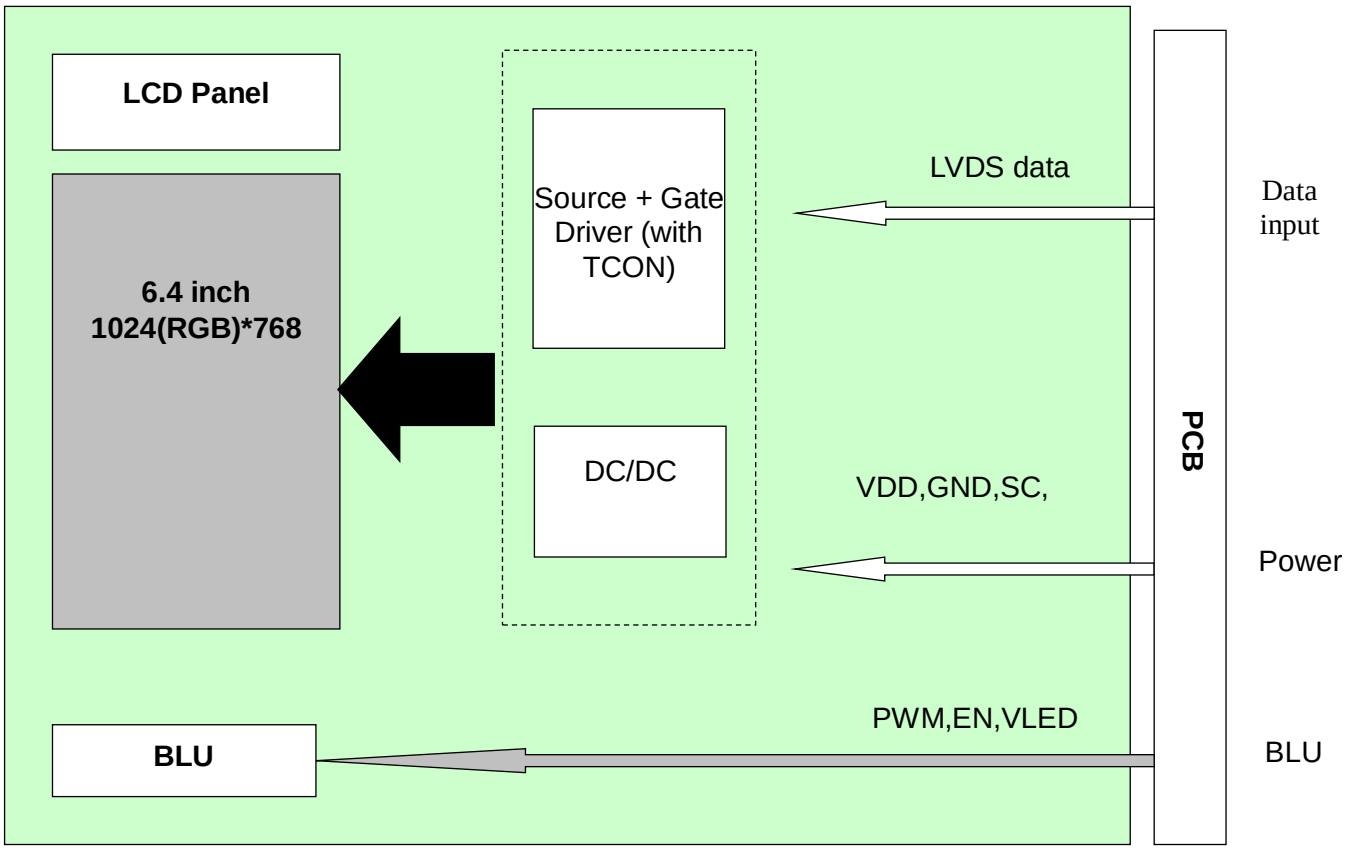


Figure 5.4.1 LCD Module Block Diagram

6. Timing Characteristics

6.1 AC characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Dclk Frequency	RXFCLK	58.7	-	67.9	MHZ	
Input Data Skew Margin	TRSKM	-0.2	-	0.2	UI	|VID| = 200mV RxVCM = 1.2V 1UI=1/(RxFCLKx7)
Clock High Time	TLVCH	-	4/(7*RXFCLK)	-	ns	
Clock Low Time	TLVCL	-	3/(7*RXFCLK)	-	ns	

Table 6.1.1 AC characteristics

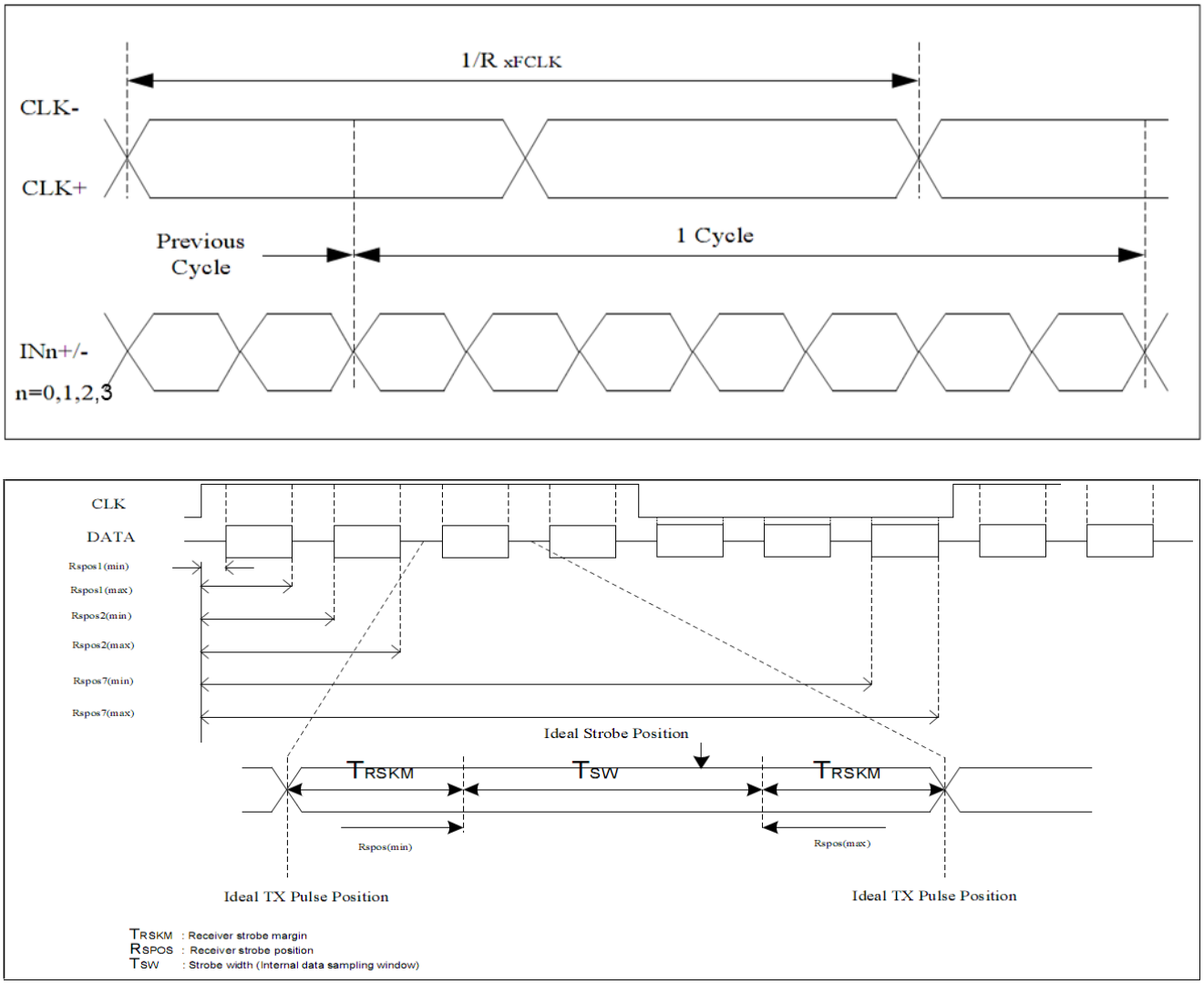


Figure 6.1.1 AC characteristics

6.2 Data Input Timing Parameter Setting

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK frequency		Fclk	58.7	65	67.9	MHz	Tclk=1/Fclk
Horizontal section	Horizontal total	TH	1229	1344	1372	Tclk	
	Horizontal blanking	Thb	205	320	348	Tclk	

	Valid Data Width	Thd	1024			Tclk	
Vertical section	Vertical total	TV	797	806	825	TH	
	Vertical blanking	Tvb	29	38	57	TH	
	Valid Data Width	Tvd	768			TH	
Frame Rate		F	60			HZ	

Table 6.2.1 Data Input Timing Parameters

6.3 DE Mode Timing Diagram

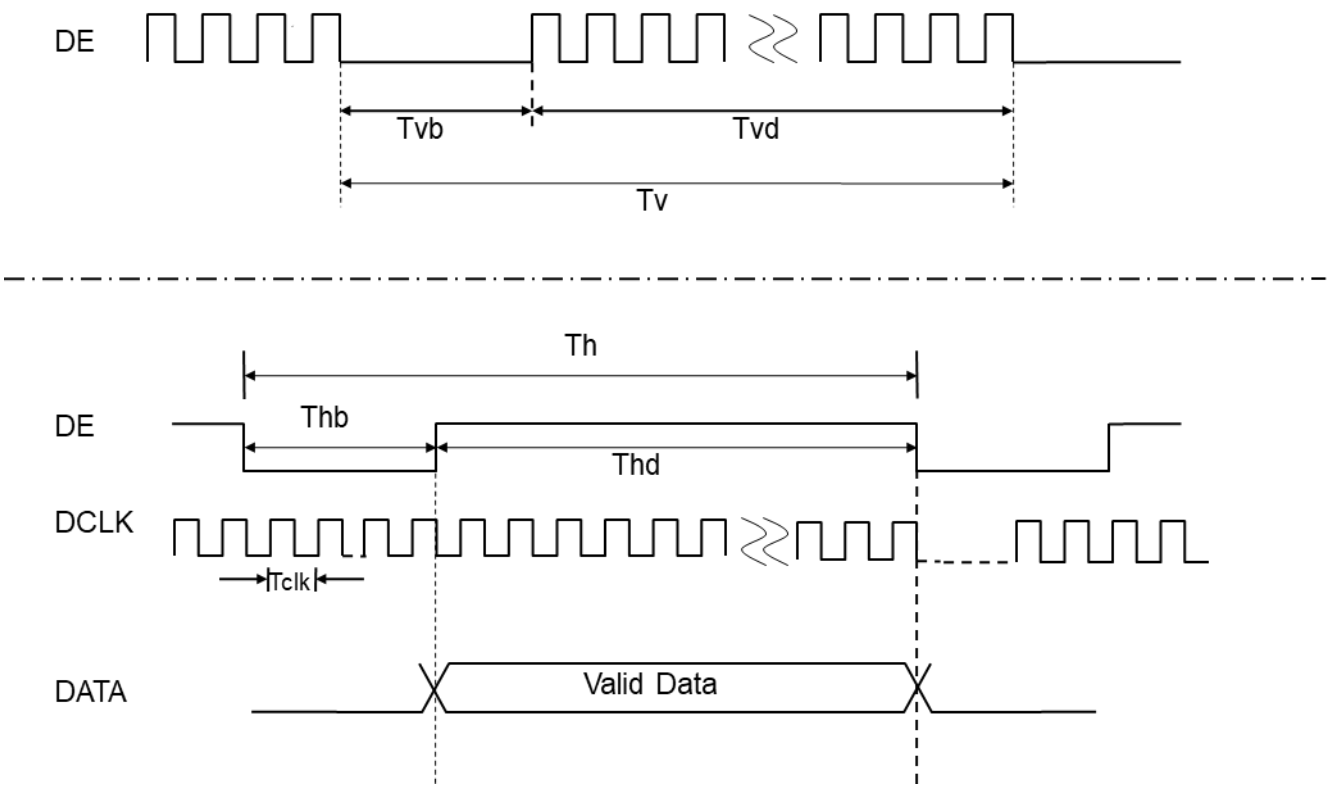


Figure 6.3.1 Data Input Timing Diagram Under DE Mode

6.4 LVDS data mapping

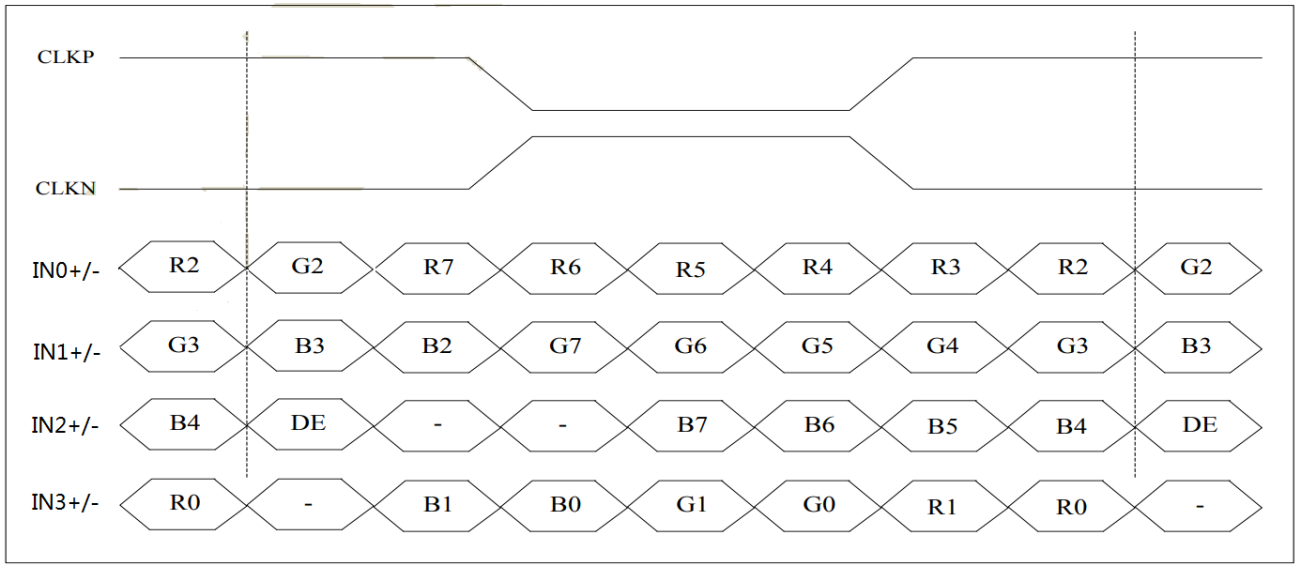


Figure 6.4.1 LVDS data mapping (JEIDA standard)

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	75	88	-	degree	Note2,3
		θB		75	88	-		
		θL		75	88	-		
		θR		75	88	-		
Contrast Ratio		CR	θ=0°	800	1000	-		Note 3
Response Time		T_{ON}	25℃	-	30	40	ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	0.242	0.292	0.342		Note 1,5
		y		0.276	0.326	0.376		
	Red	x		0.541	0.591	0.641		Note 1,5
		y		0.285	0.335	0.385		
	Green	x		0.287	0.337	0.387		Note 1,5
		y		0.534	0.584	0.634		
	Blue	x		0.113	0.163	0.213		Note 1,5
		y		0.083	0.133	0.183		
Uniformity		U		75	80	-	%	Note 6
NTSC		-		45	50	-	%	Note 5
Luminance		L		300	400	-	cd/m^2	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. The ambient temperature is 25±2℃.Humidity is 65±7%.
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.

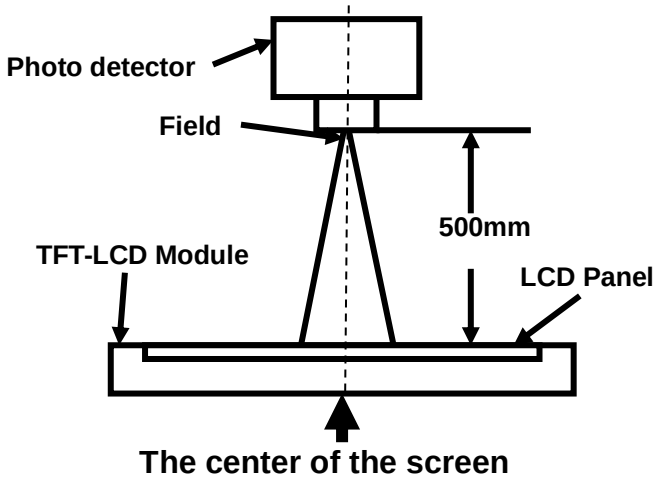


Fig1. Measurement Set Up

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

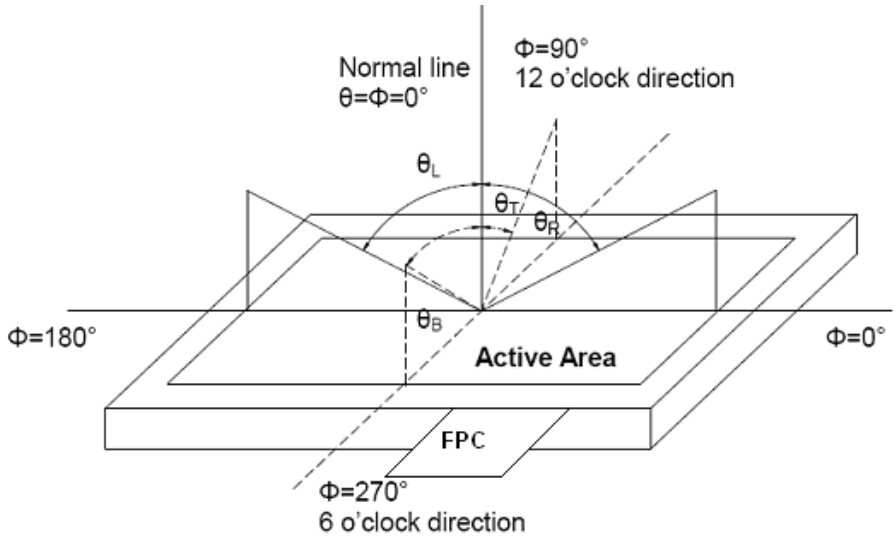


Fig2. Measurement viewing angle

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%.

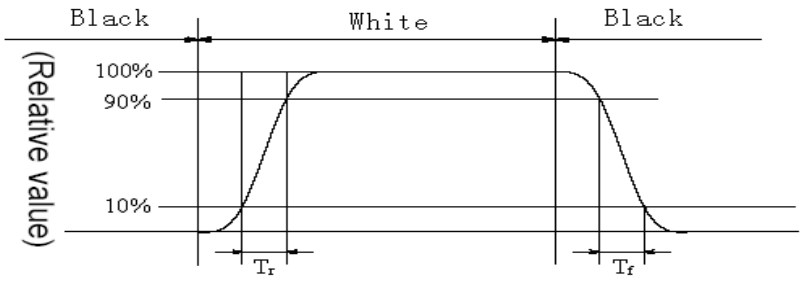


Fig4. Response Time Testing(SFT)

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

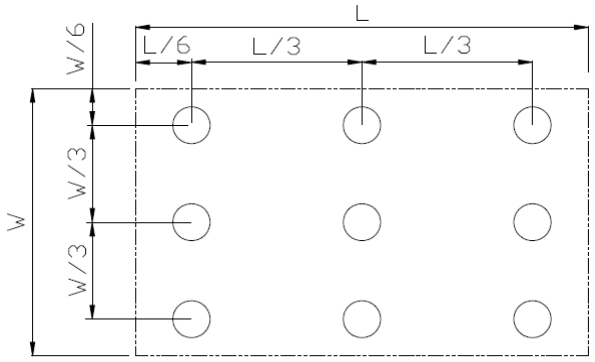


Fig5. Luminance Uniformity Measurement Locations(9 points)

Note7: Definition of Luminance:

Measure the luminance of white state at center point.

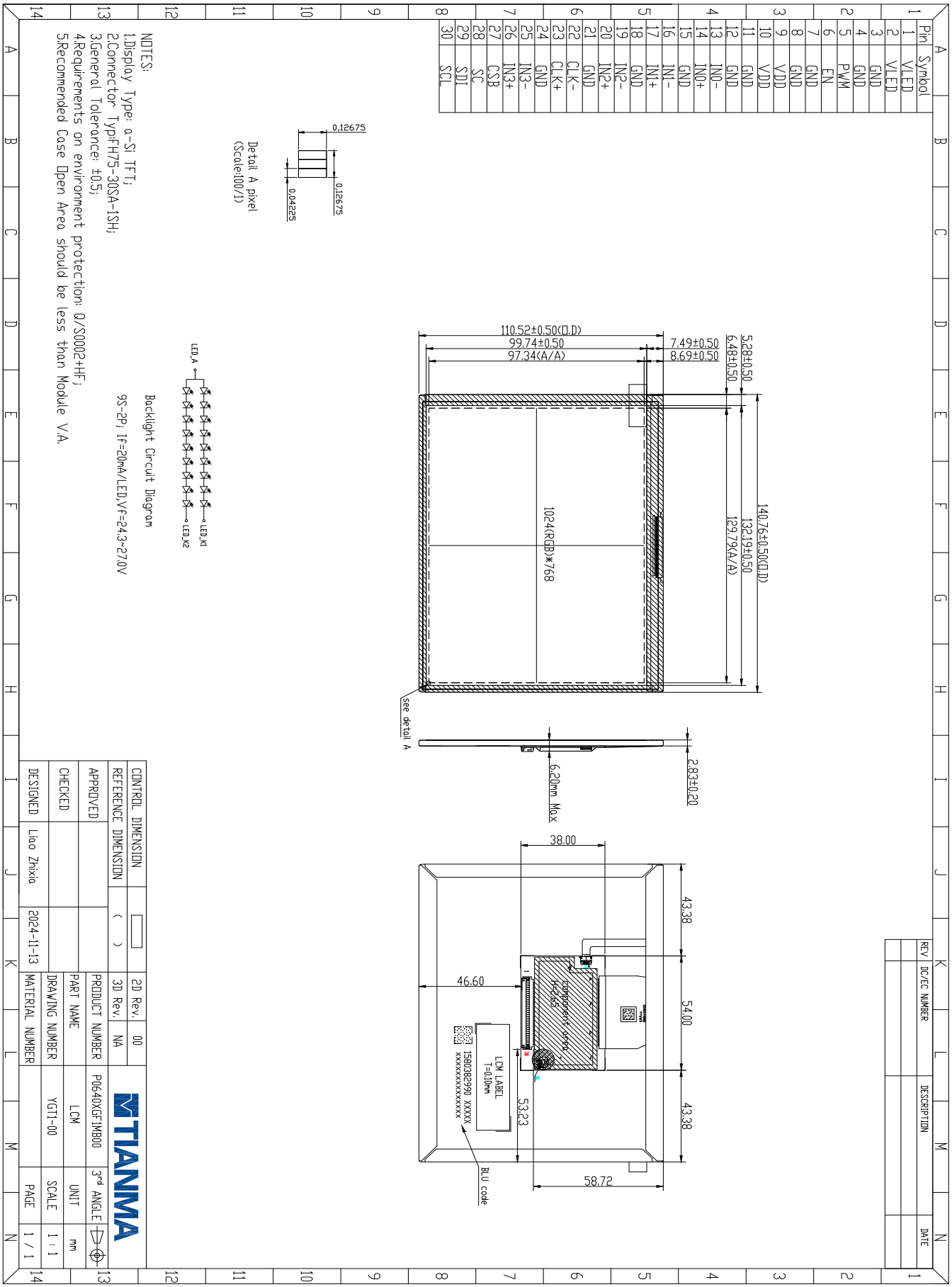
8. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	+80℃，240H	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-30℃，240H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	+90℃，240H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-40℃，240H	IEC60068-2-1:2007 GB2423.1-2008
5	Operation at High Temperature and Humidity	+60℃，90%RH，240H	IEC60068-2-78 :2001 GB/T2423.3—2016
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:±15Kv,5times; Contact:±8Kv,5times	IEC61000-4-2:2001 GB/T17626.2-2006
8	Package Vibration	5-20-200HZ，PSD：0.01-0.01-0.001 Total:0.781g2/HZ,x/y/z 30min)	
9	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

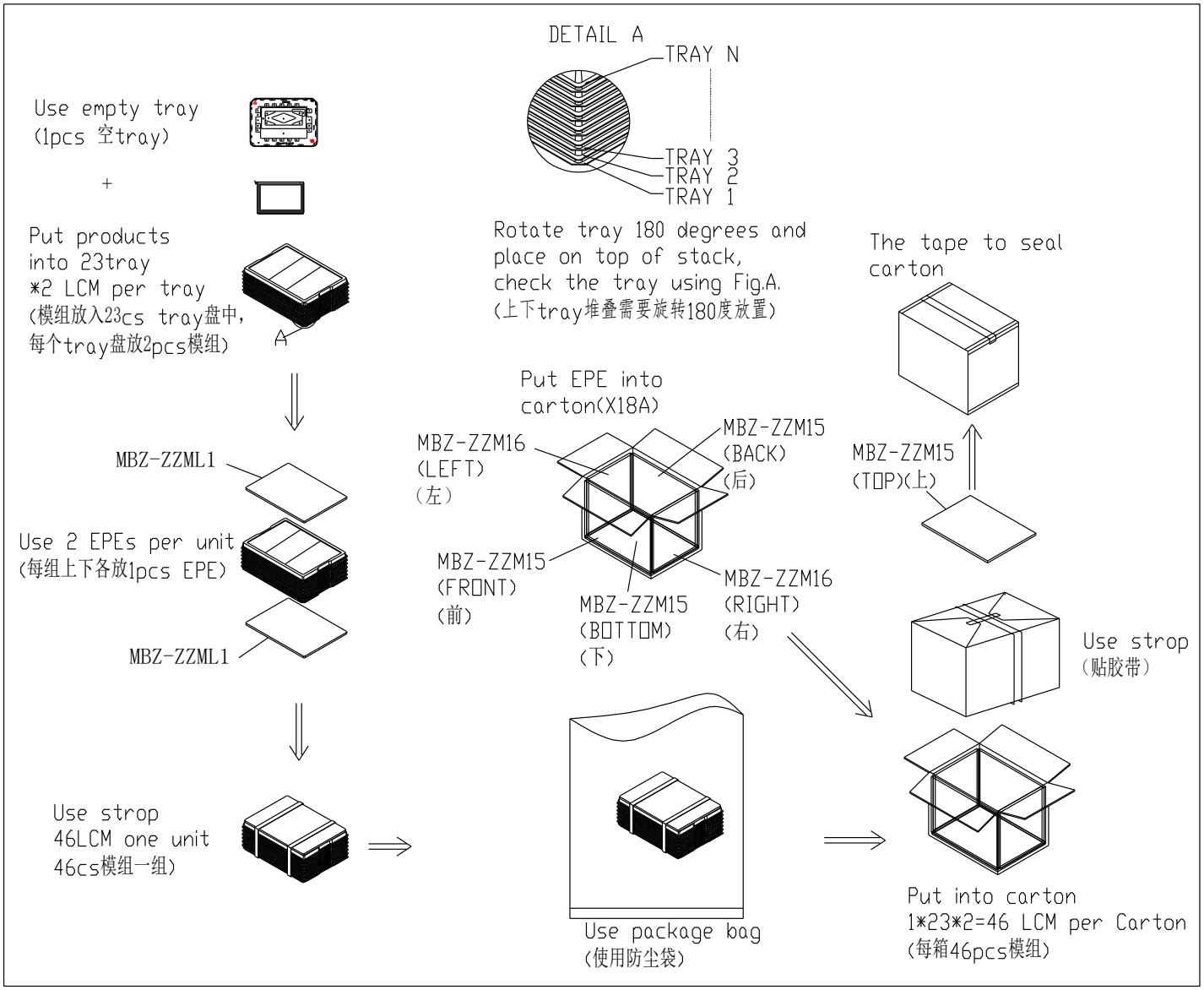
Note1: Temperature is the ambient temperature of sample
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.
Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability 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
1	LCM module	P0640XGF1MB00	140.76×110.52×2.83	0.070	46
2	Tray	PET	356×256×16	0.125	24
3	EPE1（珍珠棉1）	EPE	336×246×6	0.01	2
4	EPE2（珍珠棉2）	EPE	375×275×10	0.014	4
5	EPE3（珍珠棉3）	EPE	250×280×12	0.015	2
6	Package bag	PE	680×520	0.042	1
7	Carton	Corrugated Paper	398×290×315	0.75	1
8	Total weight	7.12kg±10%			



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.