SPECIFICATION

Customer Part Number: …

Tianma Part Number: P0800WVF1MA00

Product Description: **8” 800xRGBx480 TFT-LCD Module**

[ ] Target Specification
[◉] Preliminary Specification
[ ] Final Specification

Customer		Industrial Product Dept, PDBU Tianma Microelectronics Co., Ltd	
Signatures	Date	Approved By	Date
		Product Leader	2021/3
		Reviewed By IPM / Product Manager	2021/3
		Prepared By Xiao Ming Xu FAE	2020/3
Comments:			

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

REVISION HISTORY

Revision	Date	Page	Revision Items	Remark
1.0	2020/3/1	-	First Release	

CONTENTS

1. Summary

This is a 8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module with normal-black technology. It is composed of a TFT-LCD panel, LCD Driver IC with T-con integrated, PCB, and a LED backlight unit. This product is designed for automotive and other high reliability electronic products and complies with *RoHS* directive.

2. General Specification

Items	Specification	Remark
Diagonal Size	8 inch	--
Resolution	800 x RGB x 480	--
Active Area(mm)	174.0 x 104.4	--
Pixel Pitch (mm)	0.2175	--
Pixel Configuration	R.G.B. Vertical Stripe	--
Technology Type	a-Si	--
Display Mode	Normally Black	--
Landscape or Portrait	Landscape	--
Surface Treatment (Top Polarizer)	Hard Coating	--
Interface	LVDS	--
Color Depth	16.7M	--
Dimension (H x V x D) (mm)	192x 122 x 10.5(Typ.)	Note1
Weight (g)	TBD	Note2

Table 2.1 General TFT Specifications

Note1: The dimensions do not include the length of FPC, screw and component height etc.. For detail dimension, please refer to the module outline drawing.
Note2: The weight does not include the weight of protective film.

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Mating connector type: FI-SEB20P-HFE-3000

PIN #	Symbol	P/I/O	Description	Remark
1	VCC	P	+3.3V Power supply	--
2	Reset	I	Reset pin	--
3	Standby	I	Standby mode setting pin	---
4	GND	P	Ground	Note2
5	Link0-	I	LVDS data 0-	--
6	Link0+	I	LVDS data 0+	--
7	GND	P	Ground	Note2
8	Link1-	I	LVDS data 1-	--
9	Link1+	I	LVDS data 1+	--
10	GND	P	Ground	Note2
11	Link2-	I	LVDS data 2-	--
12	Link2+	I	LVDS data 2+	--
13	GND	P	Ground	Note2
14	CLKIN-	I	LVDS clock -	--
15	CLKIN+	I	LVDS clock +	--
16	GND	P	Ground	Note2
17	Link3-	I	LVDS data 3-	--
18	Link3+	I	LVDS data 3+	--
19	MODE	I	Low=LVDS 6 bit High=LVDS 8 bit VESA format	--
20	SC	I	Scan direction control (Low=Normal,High=Reverse)	Note3

Table 3.1.1 Pin Assignment for LCD Interface

Note1: I/O definition

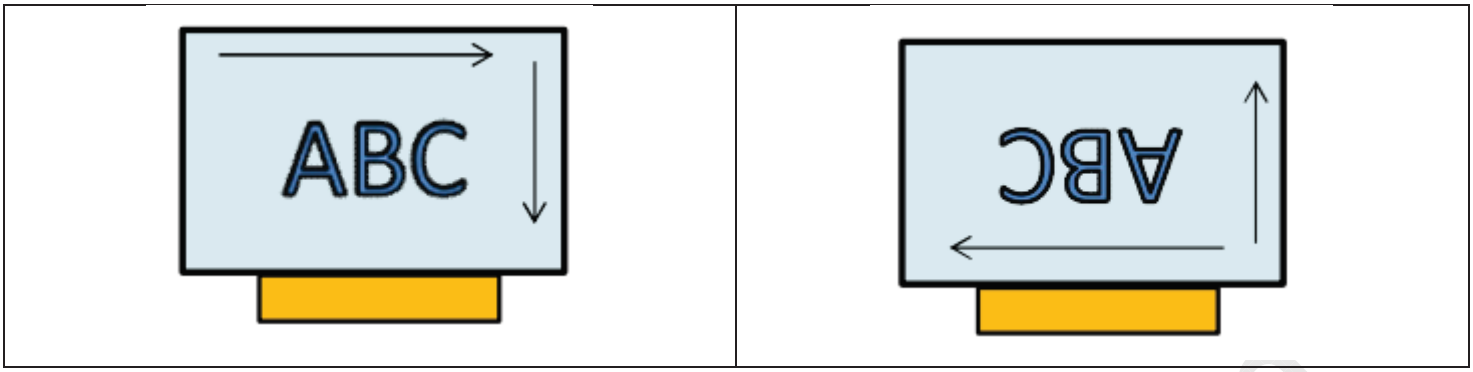
I---Input, O---Output, I/O---input/output P---Power/Ground, N ---No connection

Note2: All of the GND pins should be connected to the system ground.

Note3:

Scan direction control	Scanning Direction
SC	
L	Up to down, Left to right
H	Down to up, Right to left

SC=L	SC=H
from left to right,from up to down	from right to left,from down to up



3.2 CN2 Pin assignment (BL Interface)

Mating connector type: FI-S6P-HFE-E1500

PIN #	Symbol	P/I/O	Description	Remark
1	VL	P	Power Supply Input Voltage	--
2	VL	P	Power Supply Input Voltage	--
3	GNDL	P	Ground	--
4	GNDL	P	Ground	--
5	BLEN	I	Backlight ON-OFF (High:ON, Low:OFF)	--
6	V PDIM	I	Light Dimming Control (PWM) Input Voltage(Hight active)	--

I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

Table 3.2.1 Pin Assignment for BL Interface

4. Absolute Maximum Ratings

GND=0V, Ta = 25℃

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VDD	-0.3	3.96	V	Note1
Input voltage	V_{IN}	-0.3	VCC+0.3	V	

Table 3 Absolute Maximum Ratings

Note1: Input voltage include Mode,SC

5. Electrical Characteristics

5.1 DC Characteristics for Panel Driving

GND=0V, Ta = 25℃

Item		Symbol	MIN	TYP	MAX	Unit	Remark
System Voltage		VCC	3.0	3.3	3.6	V	
Input Signal Voltage	Low Level	VIL	GND-0.3	-	0.3*VCC	V	
	High Level	VIH	0.7*VCC	-	VCC+0.3	V	
Power Consumption		Black Mode (60Hz)	-	TBD	-	mA	

Table 5.1.1 Operating Voltages

5.2 DC Characteristics for Backlight Driving

Item		Symbol	Min	Typ	Max	Unit	Remark
Backlight power supply voltage		VL	11	12	13	V	
Backlight power supply current		I_{VL}	-	TBD	-	mA	
Backlight power consumption		W_{VL}	-	TBD	-	W	
Input voltage for V_{PDIM} signal	High level	-	2.0	-	5.0	V	
	Low level	-	0	-	0.4	V	
Input voltage for BLEN	High level	-	2.0	-	5.0	V	
	Low level	-	0	-	0.4	V	
V_{PDIM} frequency		F_{PDIM}	200	-	10k	HZ	
V_{PDIM} duty		D	5		100	%	Note1
Operating Life Time		--	100,000	-	--	hrs	Note2

Table 5.2.1 LED Backlight Characteristics

Note 1: According to LED driver IC characteristics, the minimum value of V_{PDIM} duty may vary with V_{PDIM} frequency, higher the frequency, bigger the duty.

Note 2: Optical performance should be evaluated at Ta=25℃ only. If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. 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

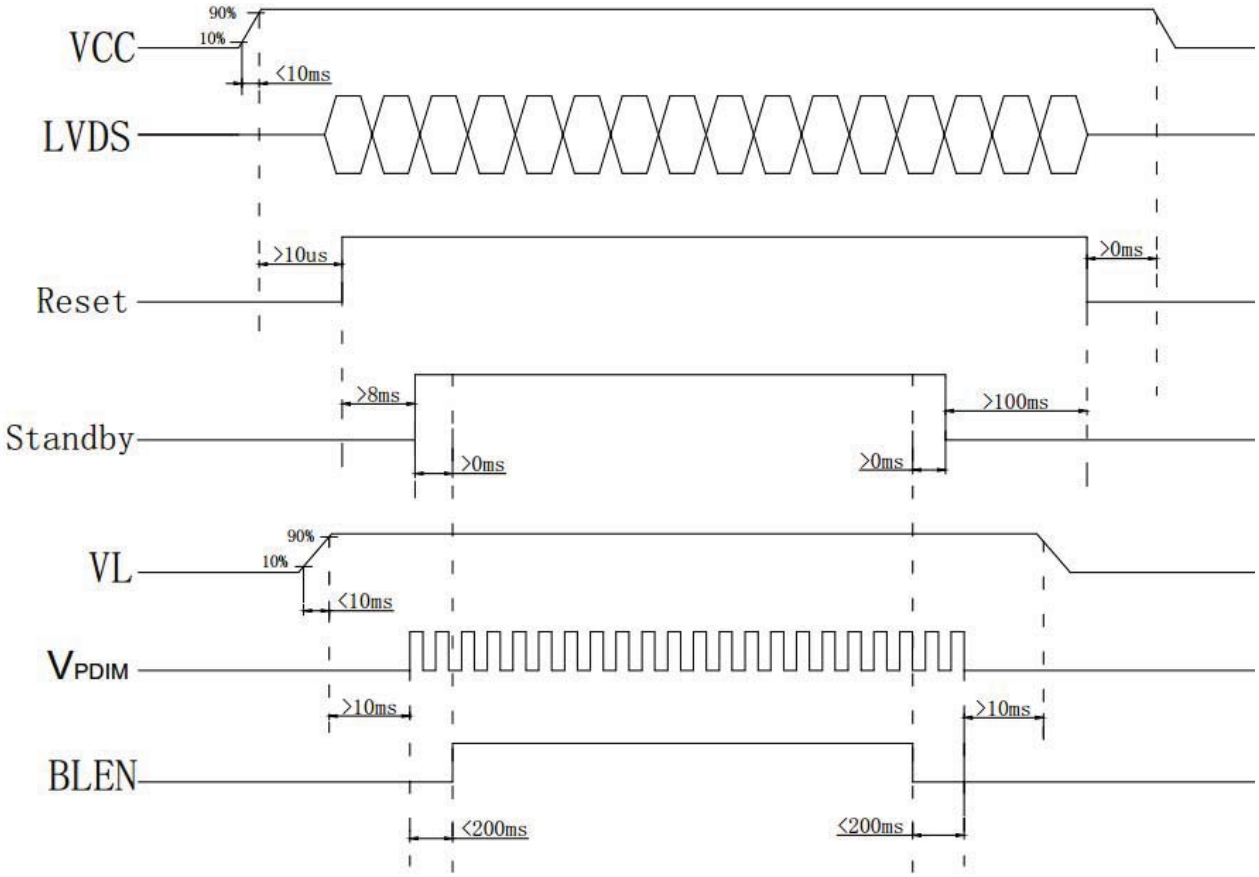


Figure 5.3.1 Power ON/OFF Sequence

5.4 LCD Module Block Diagram

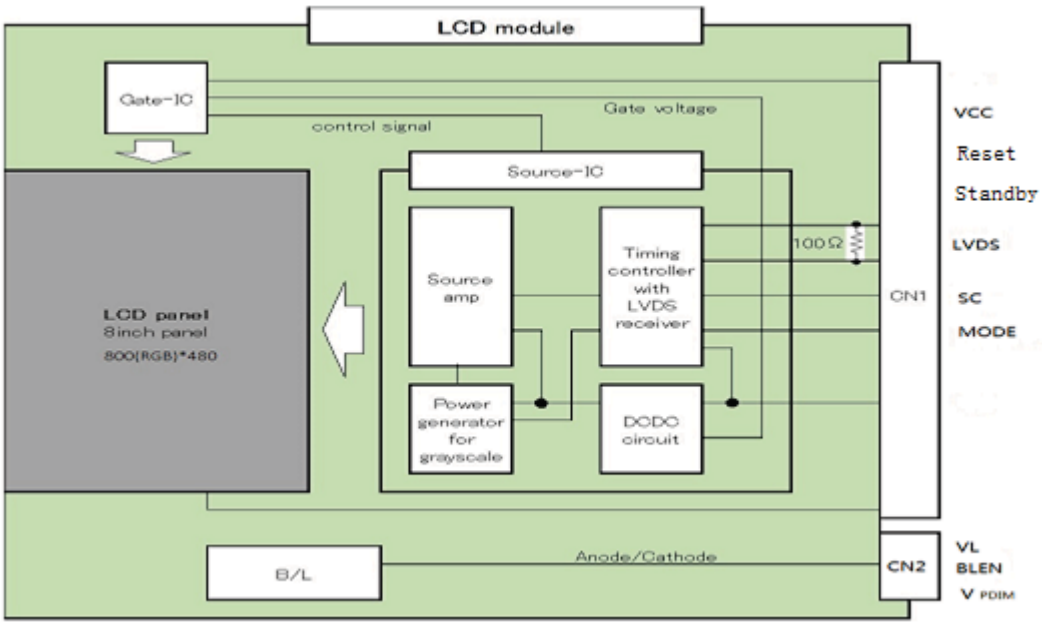


Figure 5.4 LCD Module Block Diagram

6. Interface Timing Characteristics

Parameter		Symbol	Panel Resolution			Unit
			800xRGBx480			
			Min.	Typ.	Max.	
DCLK frequency		FDCLK	28.39	33.26	52.03	MHz
Horizontal section	Horizontal total	Th	910	1056	1138	DCLK
	Horizontal blanking	Thb	110	256	338	DCLK
	Valid Data Width	Thd		800		DCLK
Vertical section	Vertical total	Tv	520	525	762	H
	Vertical blanking	Tvb	40	45	282	H
	Valid Data Width	Tvd		480		H
Frame rate		FR	-	60		Hz

Table 6.1.1 TFT LCD Input Timing

- Horizontal

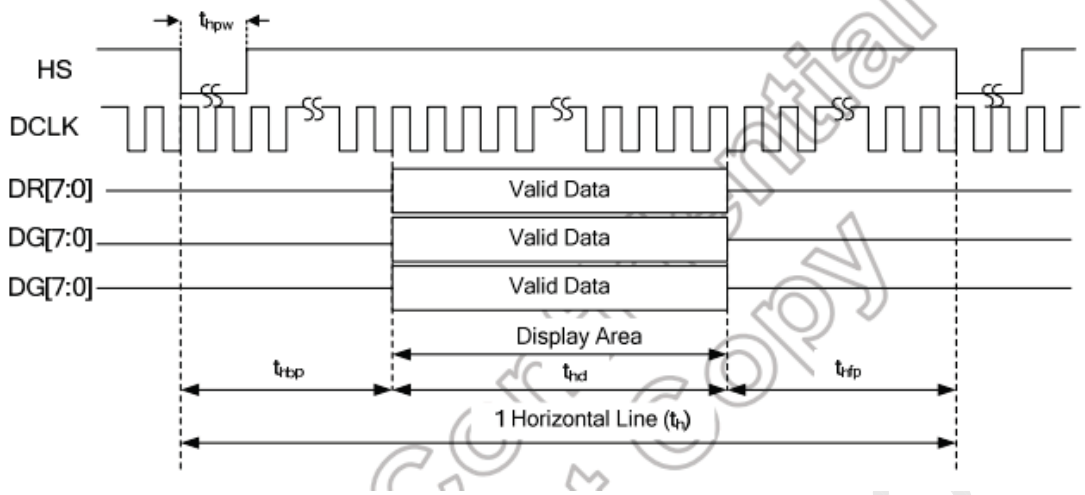


Table 6.1.1 Horizontal Input Timing at Sync mode

- Vertical

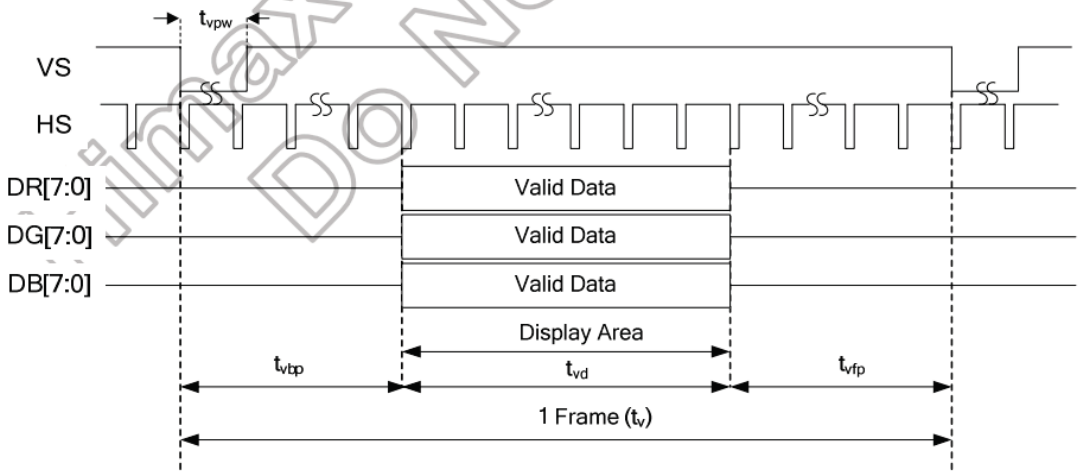


Table 6.1.2 Vertical Input Timing at Sync mode

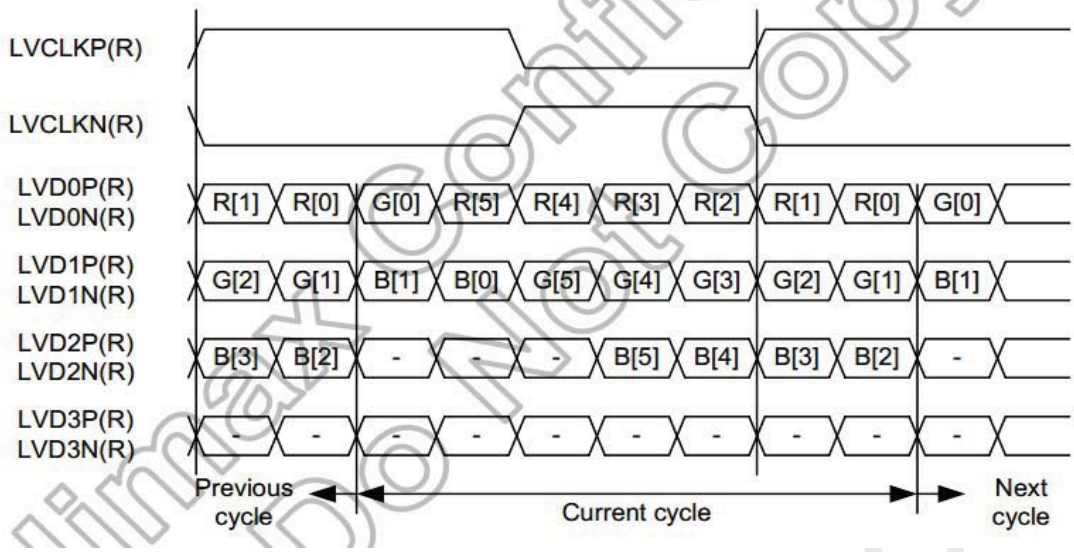


Figure 6.1.3 LVDS 6-bit

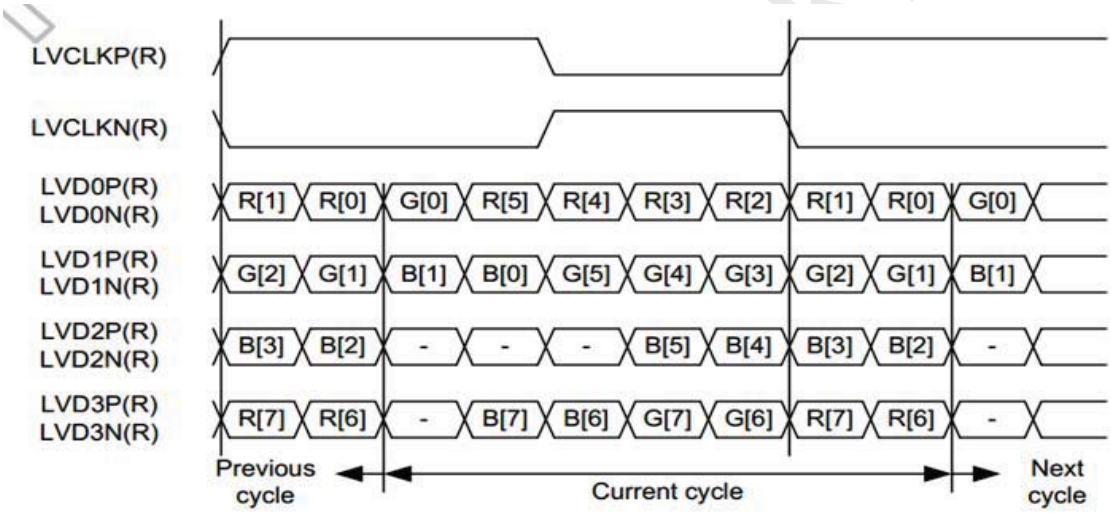


Figure 6.1.4 LVDS 8-bit(VESA format)

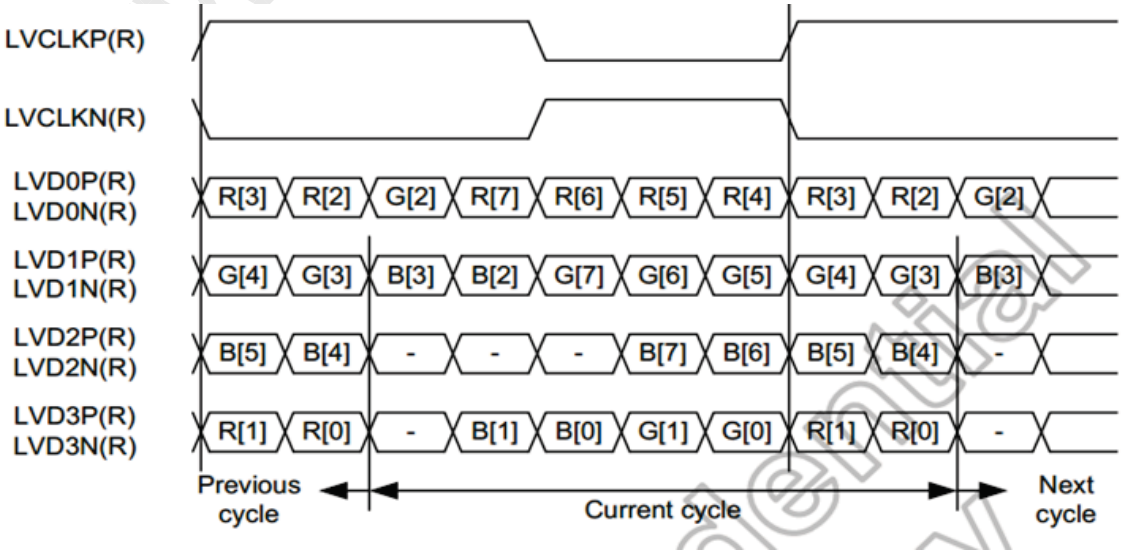


Figure 6.1.5 LVDS 8-bit(JEIDA format)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Differential input high Threshold voltage	V_{th}	Vcm=1.2V	-	-	+0.1	V
Differential input low threshold voltage	V_{tl}	-	-0.1	-	-	V
Differential input common Mode voltage	V_{cm}	-	1	1.2	1.8-|Vid|/2	V
LVDS input voltage	V_{INLV}	-	0.7	-	1.8	V
Differential input voltage	$\|V_{id}\|$	-	0.1	-	0.6	V
Differential input leakage Current	I_{lvleak}	-	-10	-	+10	μA

Table 6.1.6 LVDS Interface

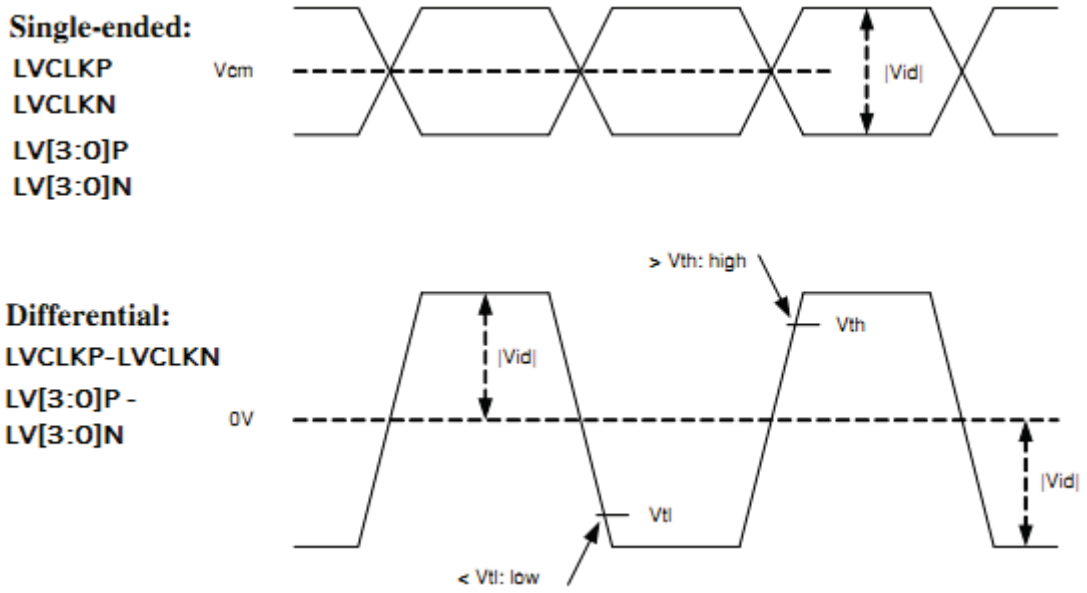


Figure 6.1.7 LVDS Interface

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	FLVCYC	10	-	85	MHz
Clock period	TLVCYC	11.76	-	100	nsec
1 data bit time	UI	-	1/7	-	TLVCYC
Clock high time	LVHW	2.9	4	4.1	UI
Clock low time	LVLW	2.9	3	4.1	UI
Position 1	TPOS1	-0.2	0	0.2	UI
Position 0	TPOS0	0.8	1	1.2	UI
Position 6	TPOS6	1.8	2	2.2	UI
Position 5	TPOS5	2.8	3	3.2	UI
Position 4	TPOS4	3.8	4	4.2	UI
Position 3	TPOS3	4.8	5	5.2	UI
Position 2	TPOS2	5.8	6	6.2	UI
Input eye width	TEYEW	0.6	-	-	UI
Input eye border	TEX	-	-	0.2	UI

Table 6.1.8. LVDS input timing parameters

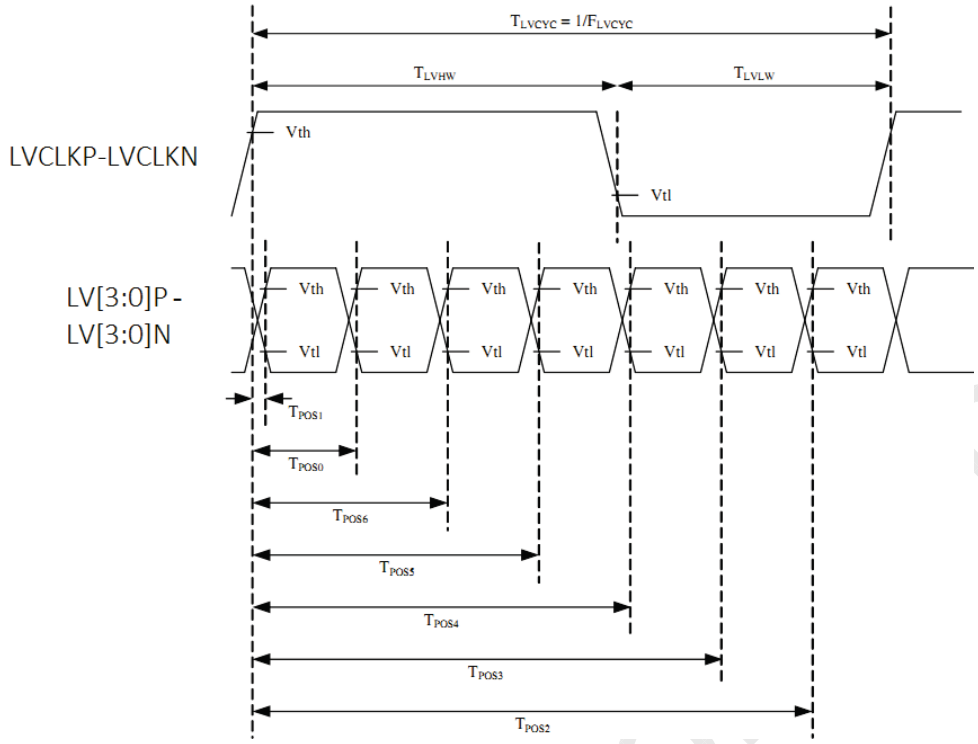


Figure 6.1.9. LVDS input timing

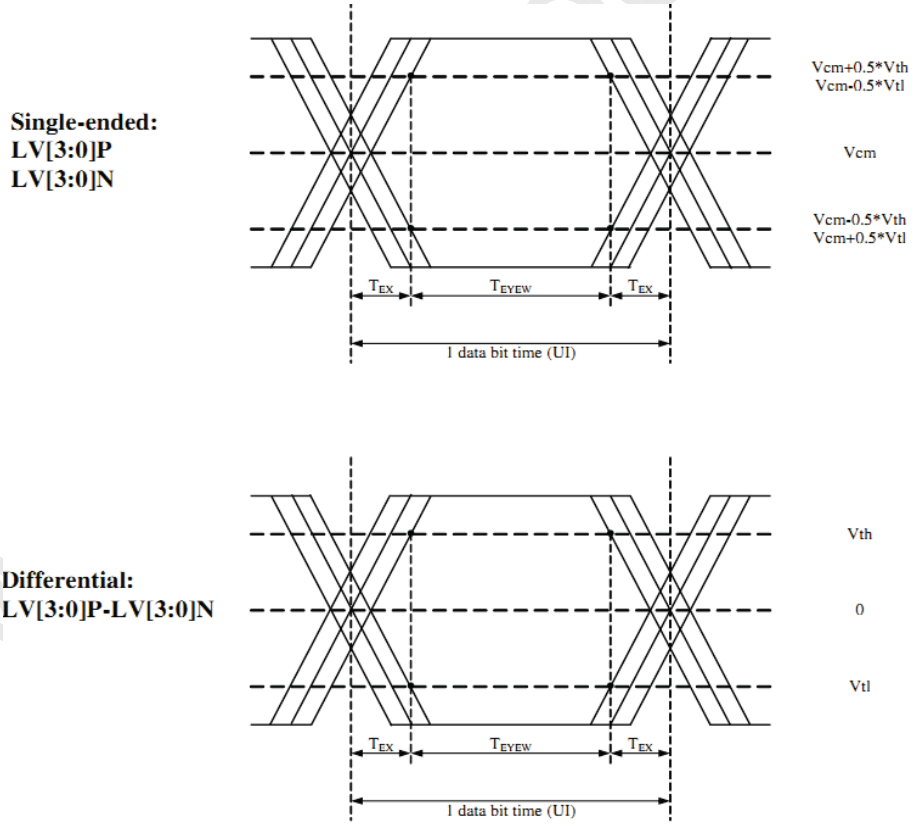


Figure 6.1.10. LVDS input eye diagram

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle		θT	CR≧10		88		°	Note2
		θB			88			
		θL			88			
		θR			88			
Contrast Ratio		CR	Θ=0	800	1000		--	Note 1&3
Response Time		Ton+Toff	25℃		27	30	ms	Note4
Chromaticity	White	X	BL is on		TBD		--	Note 1&5
		Y			TBD			
	Red	X			TBD			
		Y			TBD			
	Green	X			TBD			
		Y			TBD			
	Blue	X			TBD			
		Y			TBD			
	NTSC			65	70		%	
Luminance		L	25℃	800	1000		cd/m^2	
Uniformity		U			70		%	Note 1&5
Gamma		VESA	25℃		2.2		--	Note 1

Test Conditions:

1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 (Excluding viewing angle and response time test).
3. Viewing Angle and Response Time test method follow the normal LCD test method.

Note 1: (1) 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 (Excluding Uniformity test). All input terminals LCD panel must be ground when measuring the center area of the panel.

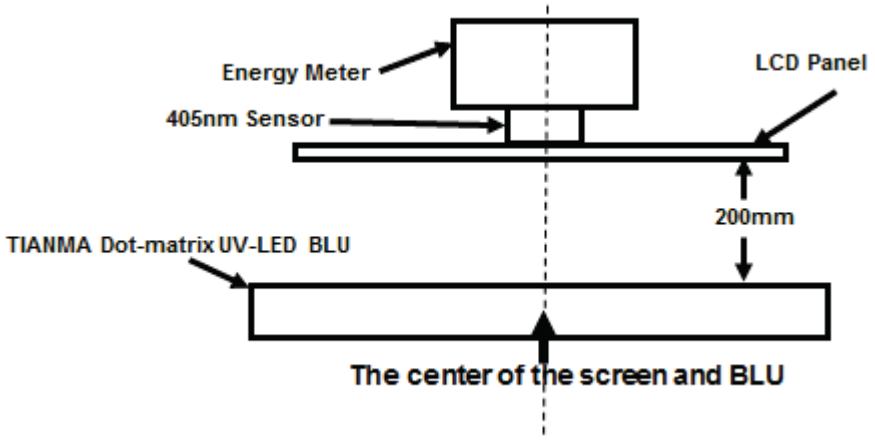


Fig1

(2) Test instrument and recipe.

As shown in the Fig.1, all optics are measured under a collimating dot-matrix LED backlight, which emitting a wave of 405nm. Energy meter AccuMAX™ –XS-405 is used to measure the following mentioned energy value, the LCD panel is 200mm away from the UV-LED surface. The transmissive energy value of LCD at white state is 2mW/cm^2.(Fig.1)

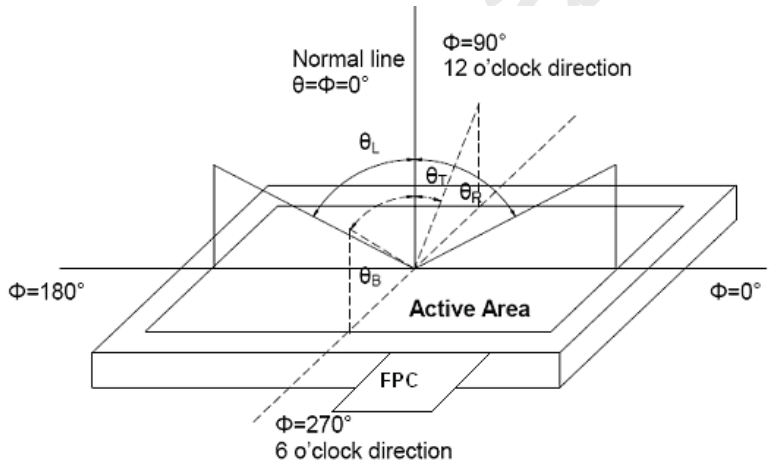
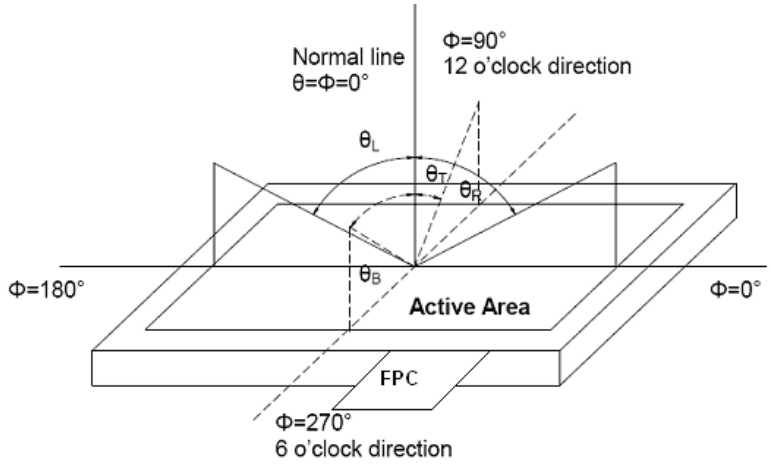


Fig.2

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD.(Fig.2)



Note 3: Definition of contrast ratio

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

"White state ": The state is that the LCD should be driven by Vwhite.

"Black state": The state is that the LCD should be driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.(Fig.3)

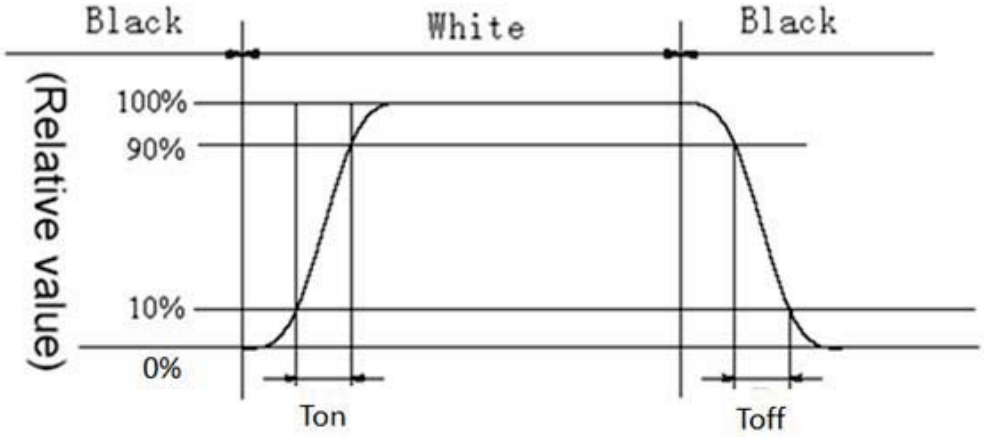


Fig.3

Note 5: Definition of Energy Uniformity

Active area is divided into 9 measuring areas (Fig. 4). Every measuring point is placed at the center of BLU center.

Energy Uniformity (U) = Emin / Emax

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

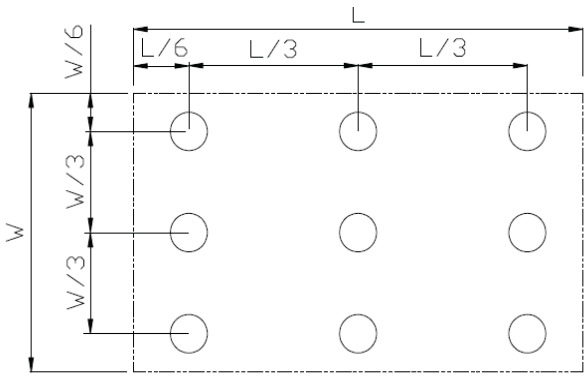


Fig.4

Emax: The measured Maximum Energy value of all the measurement positions.

Emin: The measured Minimum Energy value of all the measurement positions.

Note 6: Definition of transmittance:

$$\text{Transmittance} = \frac{\text{Energy value measured when LCD is on the "White" state}}{\text{Energy value measured from BLU}}$$

8. Reliability Test

Contents of Reliability Test

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃，500hrs	IEC60068-2-1:2007, GB2423.2-2008
2	Low Temperature Storage	-30℃，500hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Operation	80℃，500hrs	IEC60068-2-1:2007 GB2423.1-2008
4	Low Temperature Operation	-30℃，500hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation (operational)	60℃, RH=90%, 240hrs	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operational)	'-30℃/30min、80℃/30min 100cycles、1H/Cycle，5min 完成高低温切换	IEC60068-2-14:1984, GB2423.22-2002
7	Vibration Test (non-operational)	vibration level :9.8m/s2 waveform: sinusoidal Frequency range: 5to 500Hz Frequency sweep rate:0.5 octave/min Duration : one sweep from 5 to 500Hz in each of three mutually perpendicular axis(each x,y,z axis: 1hour, total 3 hours)	IEC60068-2-6:1982 GB/T2423.10—1995
8	Shock Test (non-operational)	shock level :1470m/s2(150G) waveform: half sinusoidal wave ,2ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs	IEC60068-2-27:1987 GB/T2423.5—1995
9	ESD (operational)	C=150PF、R=330Ω Air：±15KV Connect：±8KV	IEC61000-4-2:2001 GB/T17626.2-2006

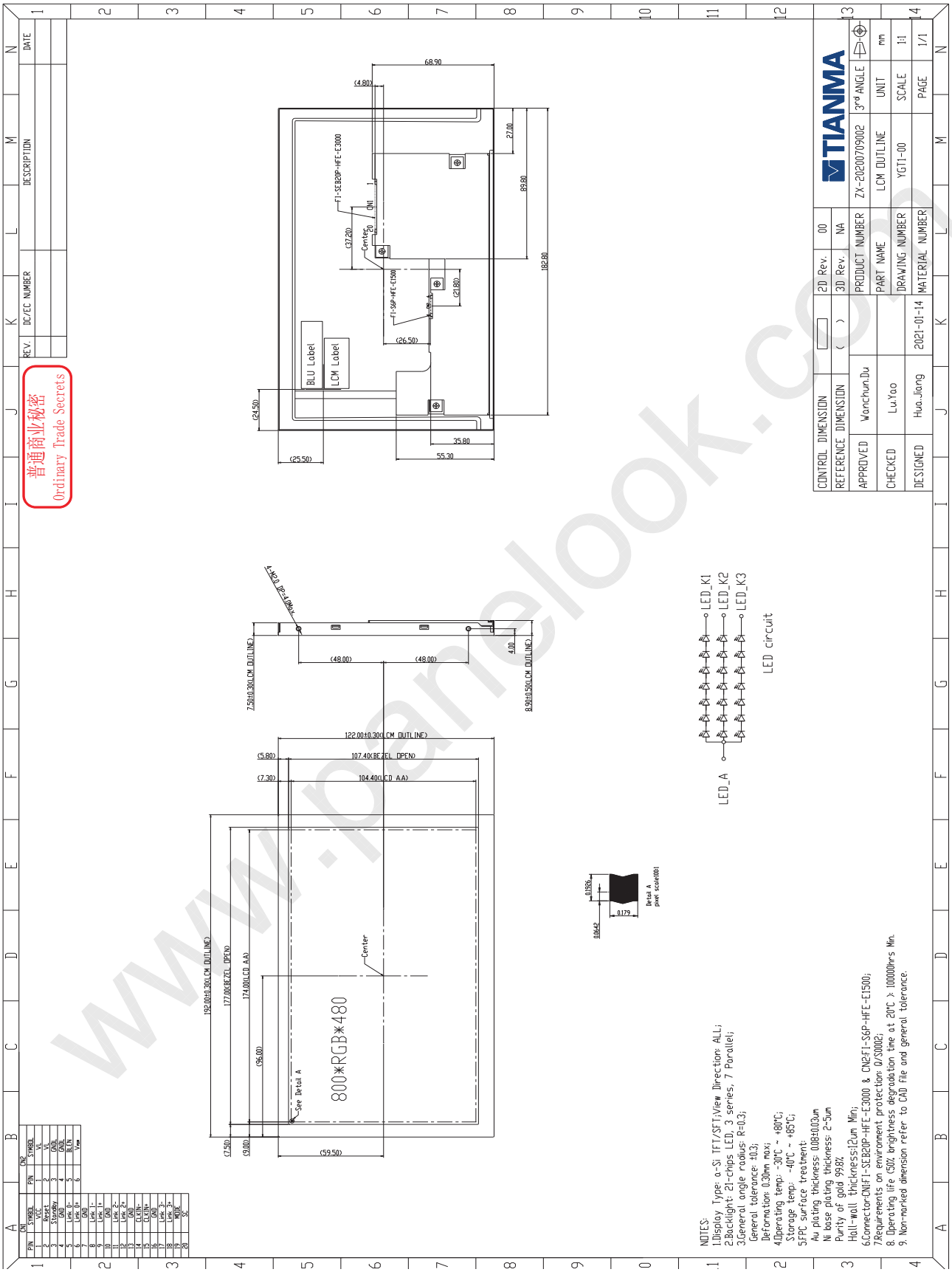
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

Note4: 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 don't guarantee all of the cosmetic specification.

9. Mechanical Drawing



10. Packing Instruction

TBD

11. Precautions for Use of LCD Module

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

Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:

- Water
- Ketone
- Aromatic solvents

(6) POL surface temperature shall not exceed 95℃ when the product is used or tested.
(7) The storage or use environment must not contain an acid or base environment. for example,NH3,SO2…
(8) Do not attempt to disassemble the LCD Module.
(9) If the logic circuitry is powered off, do not apply the input signals.
(10) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
(11) Be sure to ground your body when handling the LCD Modules.
(12) Tools used for assembly, such as soldering irons, must be properly grounded.
(13) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
(14) The LCD Module is covered with a film to protect the display surface. Be careful when peeling off this protective film since static electricity may be generated.

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. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature: 15 ~ 35 degree C (or at least Temp. 10 ~ 40 degree C / Humidity 25% ~ 75%), for National Std. recommendation
(3) The LCD modules should be stored in a room without acid, alkali or other harmful gases.

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.