深圳显旸光电科技有限公司
Shenzhen Xianyang Optoelectronic Technology Co., Ltd

MODEL: XY1561B01-1

Ver. : 2.1

Date: 30.Nov.2021

Customer's Approval		CSOT	
Signature	Date	Approved By R&D Director Name: Signature:	Date
		Reviewed By PM Manager Name: Signature:	Date
		Reviewed By Project Leader Name: Signature:	Date
		Reviewed By PM Name: Signature:	Date

Contents

Revision History

Version	Date	Page	Section	Description	Revision by
Ver.0.1	31.Aug.2021	1-33	All	Tentative Specification was First Issued	Qiao Jiangtao
Ver.1.1	6.Sep.2021	1-33	All	1、 Updated 4.1 Interface Pin Assignment 2、 Updated 6.3 Recommended Operating Condition 3、 Updated 7.2 RGB chromaticity	Qiao Jiangtao
Ver.2.1	30.Nov.2021	1-33	All	1、 Updated 1.3 General Information 2、 Updated3.1 Open Cell Power Consumption, OC Power Consumption 3.7→2.844W; 3、 Updated 3.2 LVDS Characteristics 4、 Updated 3.3 Temperature Specifications 5、 Updated 4.1 Interface Pin Assignment 6、 Updated 5.1 Timing Table 7、 Updated 5.2 Power On/Off Sequence 8、 Updated 6.2 Recommended Operating Condition 9、 Updated 7.1 Measurement Conditions 10、 Updated 8.1 Mechanical Specification	Qiao Jiangtao

1. General Description

1.1 Product Features

- **FHD Resolution (1920 * 1080)**
- **Very High Contrast Ratio: 3000:1**
- **Ultra Wide Viewing Angle: 178°(H)/178°(V) (CR≥10)**
- **DE (Data Enable)Mode**
- **LVDS (Low Voltage Differential Signaling) Interface**

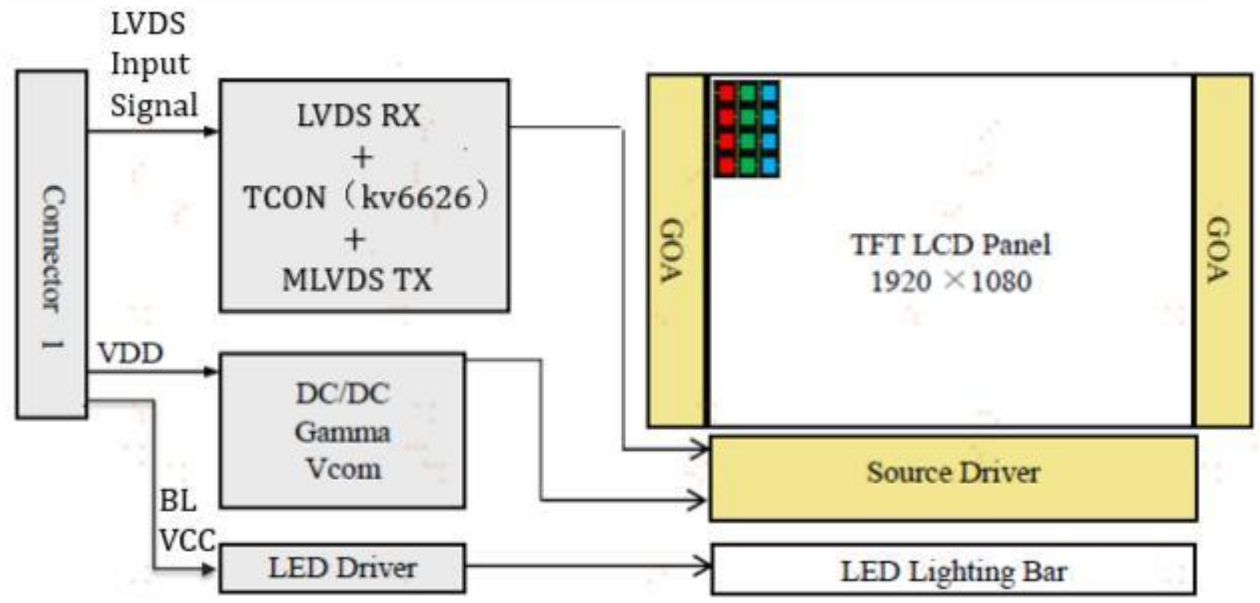


Fig. 1.1 Driver Architecture

1.2 Overview

XY1561B01-1 is a color active matrix liquid crystal display with a light emitting diode (LED) backlight assembly with LED driver. The matrix employs a-Si thin film transistor as the active element. This module is a diagonal 15.6" color active matrix LCD module with 2ch-LVDS interface, which open cell is a transmissive type display operating in the normally black mode. It supports 1920 * 1080 FHD resolution and can display up to 16.7M colors (8bit). Each pixel is divided into Red, Green and Blue sub-pixels which are arranged in vertical stripe.

This module dedicates for Public information display products and provides excellent performance which includes high contrast ratio, high color saturation and high color depth. CSOT open cell comply with RoHS for identification.

1.3 General Information

Item	Specification	Unit	Note
Active Area	344.16 (H) * 193.59 (V)	mm	
Module Size	351.86 (H) *206.33 (V) * 7.03 (D)	mm	With PCB
Module Size	351.86 (H) *206.33 (V) * 3.2(D)	mm	Without PCB
Driving Scheme	a-Si TFT Active Matrix	-	

Number of Pixels	1920 * 1080	pixel	
Pixel Pitch (Sub Pixel)	59.75*179.25	um	
Pixel Arrangement	RGB Vertical Stripe	-	
Display Colors	16.7 M	color	8bit
Display Mode	Transmissive Mode, Normally Black	-	VA Mode
Luminance	250(typ)	cd/m2	
Color Chromaticity	NTSC 72% (typ)		
Contrast Ratio	3000:1(Typ.)		
Weight	0.53	Kg	
View Angle (CR≥10)	+89/-89 (H), +89/-89 (V) (Typ.)		
Surface Treatment	Anti-glare, Haze 25%, Hard Coating (3H)		
BLU Type	E-LED	-	

2. Absolute Maximum Ratings

2.1 Absolute Maximum Ratings (T_A = 25 ± 2 °C)

The followings are maximum values which, if exceeded, may cause damage to the unit.

Item	Symbol	Value		Unit
		Min.	Max.	
Power Supply Voltage	V_{CC}	-0.3	13.2	V
Input Signal Voltage	V_{IN}	-0.3	3.6	V

2.2 Environment Requirement (Based on CSOT's BLU)

(1) Temperature and relative humidity range are shown as below.

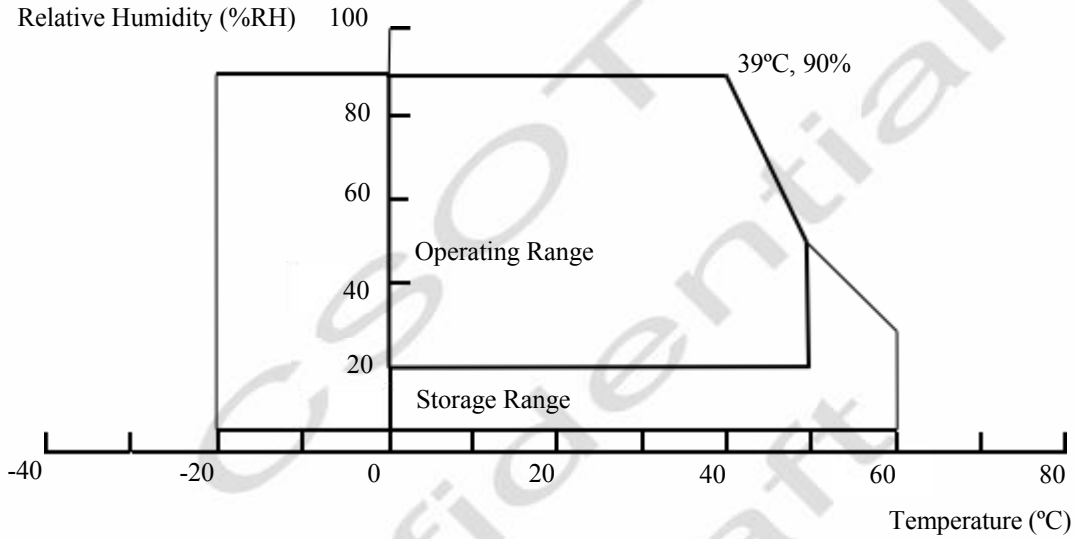


Fig. 2.1 Operating and storage environment

(a) 90%RH maximum ($T_A \leq$ 39 ºC).

(b) Wet-bulb temperature should be 39ºC maximum ($T_A >$ 39 ºC).

(c) No condensation.

(2) The storage temperature is between - 20 ºC to 60 ºC, and the operating ambient temperature is between 0 ºC to 50 ºC

The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65ºC with LCD module in a temperature controlled chamber alone. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 65ºC. The range of operating temperature may degrade in case of improper thermal management in the end product design.

(3) The rating of environment is based on LCD module. Leave LCD cell alone, this environment condition can't be guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.

2.3 Absolute Ratings of Environment

When storing module as spares for a long time, please follow the precaution instructions:

(1) Do not store the module in high temperature and high humidity for a long time. It is highly recommended to store the open cell with temperature from 20ºC to 30ºC in normal humidity (50 ± 10%RH) with shipping package.

(2) The module should be kept within one month shelf life.

3. Electrical Specifications

3.1 Open Cell Power Consumption (TA = 25 ± 2 °C)

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	10.8	12	13.2	V	(1)
Rush Current		Irush	-	-	3	A	(2)
Power Supply Current	White Pattern	Icc	-	0.239	0.299	A	(3) 60Hz
	Horizontal Stripe		-	0.287	0.347	A	
	Black Pattern		-	0.234	0.294	A	
	Mosaic Pattern		-	0.237	0.3	A	
Power Consumption (Mosaic Pattern)		Poc	--	2.844	3.6	Watt	60Hz

Note:

(1) The ripple voltage should be controlled less than 10% of VCC.

(2) Measurement condition: VCC rising time = 470μs.

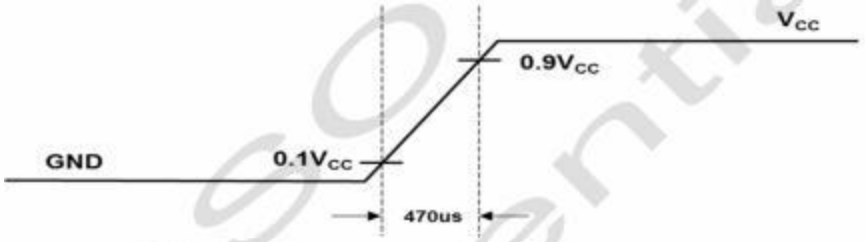
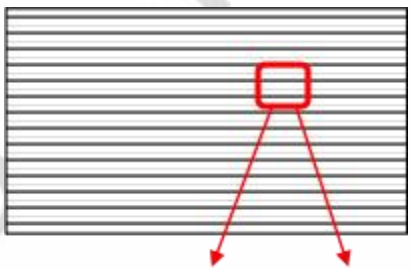


Fig. 3.1 VCC rising time condition

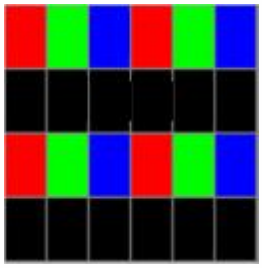
(3) Measurement condition: VCC = 12 V, Ta = 25 ± 2 ºC. The test patterns are shown as below.

A. White Pattern

B. Horizontal Stripe Pattern



C. Black Pattern



D.Mosaic Pattern

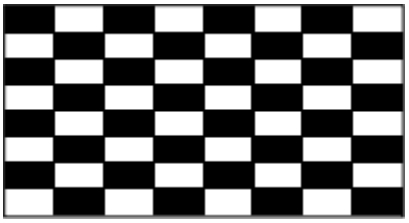


Fig. 3.2 Test patterns

3.2 LVDS Characteristics

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
LVDS Interface	Differential Input High Threshold Voltage	VTH	-	-	+100	mV	(1)
	Differential Input Low Threshold Voltage	VTL	-100	-	-	mV	
	Common Input Voltage	VCM	1.0	1.2	1.4	V	
	Differential Input Voltage	|VID|	100	-	600	mV	
	Terminating Resistor	RT	87.5	100	112.5	ohm	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.7	V	

Note:

(1) The product should be always operated within above ranges.

(2) The LVDS input signal has been defined as follows:

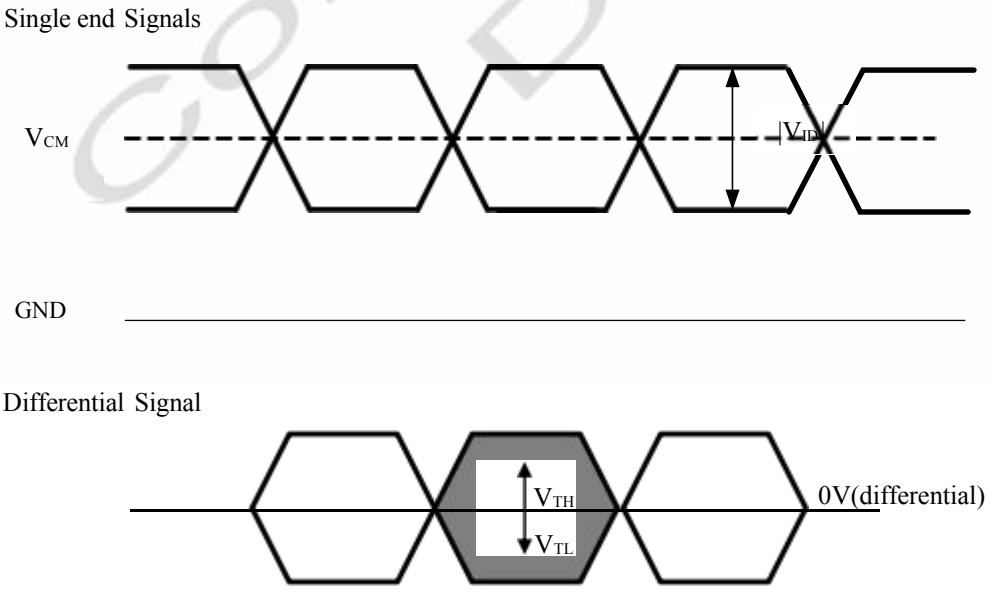


Fig. 3.3 LVDS input signal

3.3 Temperature Specifications

Parameter	Symbol	Spec			Unit	Note
		Min.	Typ.	Max.		
Source driver	T_{DRIVER}	-	-	115	℃	(1)
PMIC	T_{PMIC}	-	-	100	℃	(1)
TCON	T_{TCON}	-	-	105	℃	(1)

Note:

(1) Any point on the IC surface must be less than Max. specification under any condition ,If the surface temperature is out of the specification, thermal solutions should be applied to avoid to be damaged.

3.4 Driver IC ESD Specification

The Electro-Static Discharge tolerance of Source COF IC is ±2KV tested by ESD Gun. Especially if the LCD module is designed with the Plastic Bezel, we suggest ESD protection solutions should be applied to avoid be damaged, as shown in Fig.3.4.

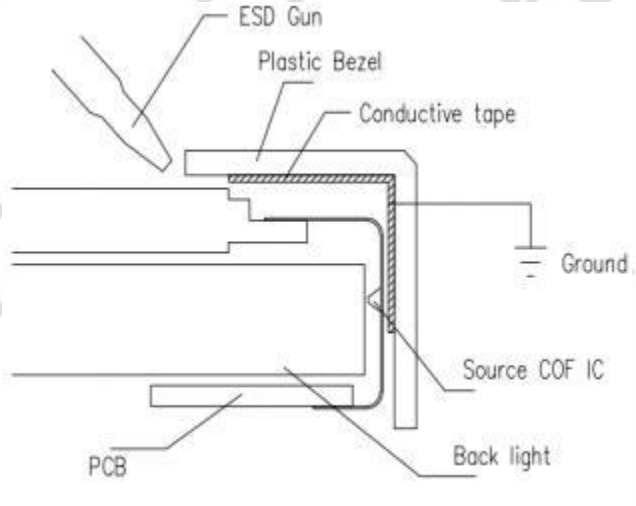


Fig. 3.4 Source COF IC ESD protection

4. Input Terminal Pin Assignment

4.1 Interface Pin Assignment

CN1: 300E40-0010RA-G3-D (CT) or equivalent (see Note (1))

Pin No.	Symbol	I/O	Description	Note
1	RxO0-	I	Negative LVDS differential data input (Odd data)	
2	RxO0+	I	Positive LVDS differential data input (Odd data)	
3	RxO1-	I	Negative LVDS differential data input (Odd data)	
4	RxO1+	I	Positive LVDS differential data input (Odd data)	
5	RxO2-	I	Negative LVDS differential data input (Odd data)	
6	RxO2+	I	Positive LVDS differential data input (Odd data)	
7	GND	P	Ground	
8	RxOCLK-	I	Negative LVDS differential clock input (Odd clock)	
9	RxOCLK+	I	Positive LVDS differential clock input (Odd clock)	
10	GND	P	Ground	
11	RxO3-	I	Negative LVDS differential data input (Odd data)	
12	RxO3+	I	Positive LVDS differential data input (Odd data)	
13	GND	P	Ground	
14	RxE0-	I	Negative LVDS differential data input (Even data)	
15	RxE0+	I	Positive LVDS differential data input (Even data)	
16	RxE1-	I	Negative LVDS differential data input (Even data)	
17	RxE1+	I	Positive LVDS differential data input (Even data)	
18	RxE2-	I	Negative LVDS differential data input (Even data)	
19	RxE2+	I	Positive LVDS differential data input (Even data)	
20	GND	P	Ground	
21	RxECLK-	I	Negative LVDS differential clock input (Even clock)	
22	RxECLK+	I	Positive LVDS differential clock input (Even clock)	
23	GND	P	Ground	
24	RxE3-	I	Negative LVDS differential data input (Even data)	
25	RxE3+	I	Positive LVDS differential data input (Even data)	
26	GND	P	Ground	
27	LCD_VCC	P	LCD VCC(12V)	
28	LCD_VCC	P	LCD VCC(12V)	
29	BIST	I	LCD self-test （Normal mode: NC or pull L； BIST mode: pull H）	
30	BL_ENABLE	I	Backlight on/off	(+3.3V Input)
31	BL_PWM_DIM	I	System PWM	
32	BL_POWER	P	LED Power Supply Input Voltage(12V)	

33	BL_POWER	P	LED Power Supply Input Voltage(12V)	
34	BL_POWER	P	LED Power Supply Input Voltage(12V)	
35	BL_POWER	P	LED Power Supply Input Voltage(12V)	
36	GND	P	Ground	
37	GND	P	Ground	
38	GND	P	Ground	
39	ID1	O	Reserved PIN, Default 'H' , Recommend NC	(2)
40	ID2	O	Reserved PIN, Default 'H' , Recommend NC	(2)

I:input signal. O:output signal. P:Power.

Note:

(1)The direction of pin assignment is shown as below:

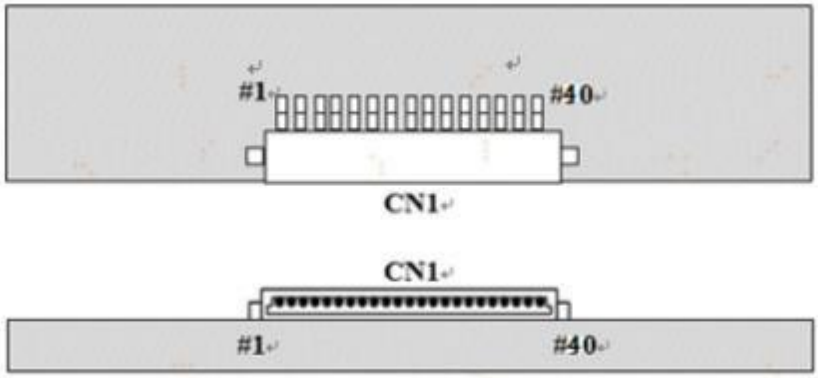


Fig. 4.1 LVDS connector direction sketch map

(2) Please let it open if it do not used.

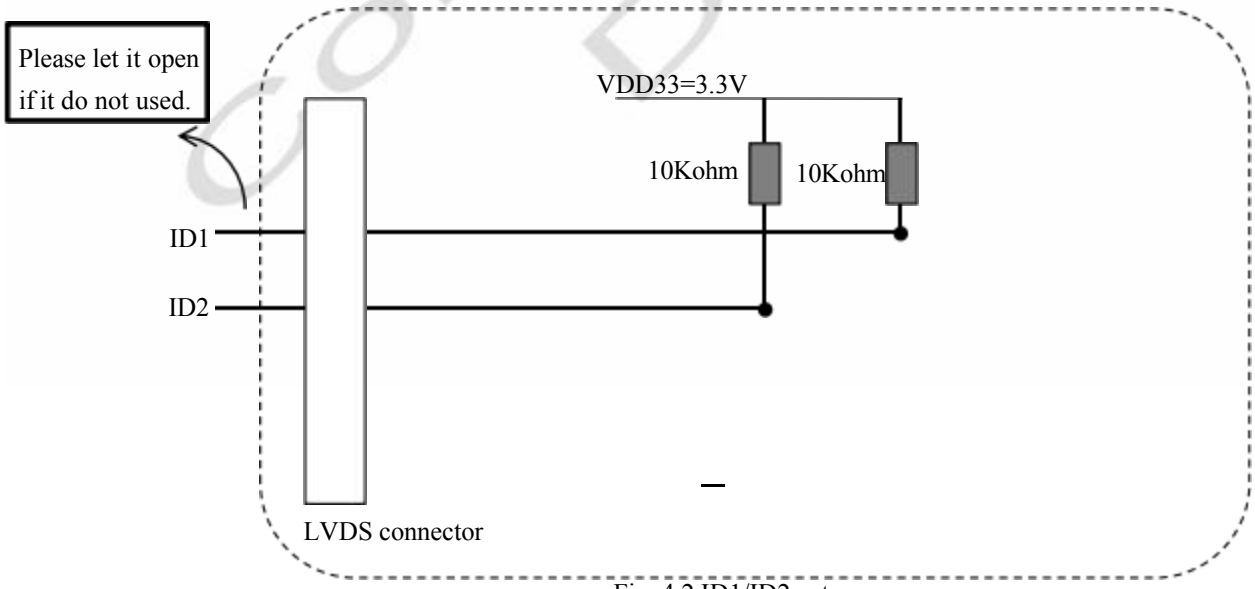


Fig. 4.2 ID1/ID2 set

4.2 Block Diagram of Interface

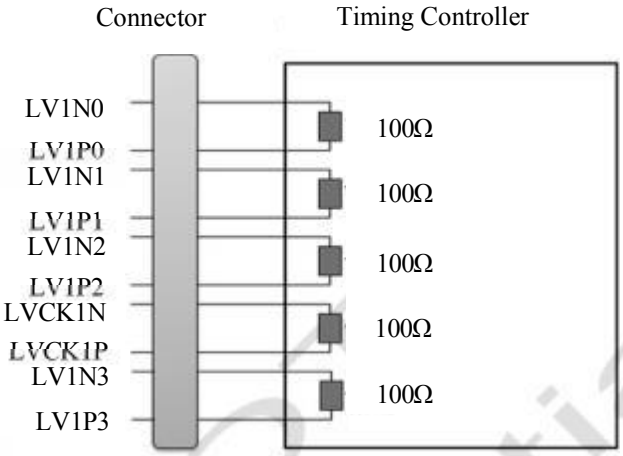


Fig. 4.4 Block diagram of interface

Attention:

(1) This open cell uses a 100 ohms (Ω) resistor between positive and negative lines of each receiver input.

(2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line respectivel

4.3 LVDS Interface

4.3.1 VESA Format

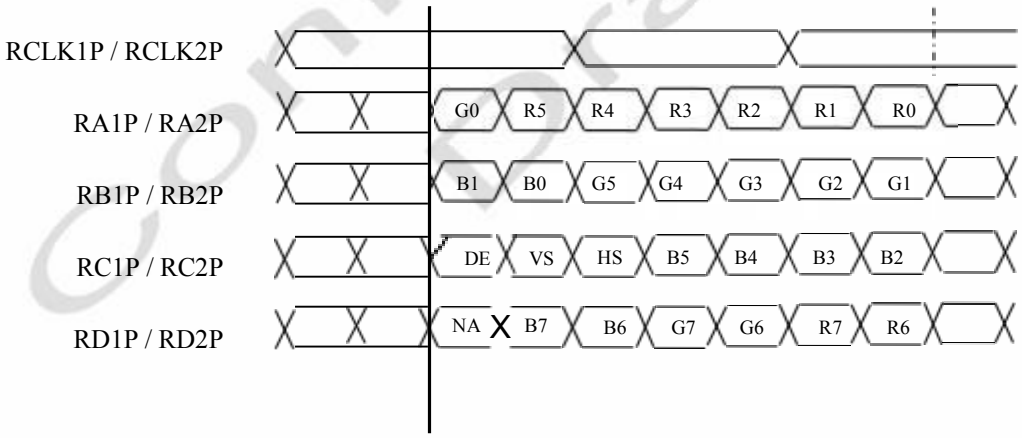
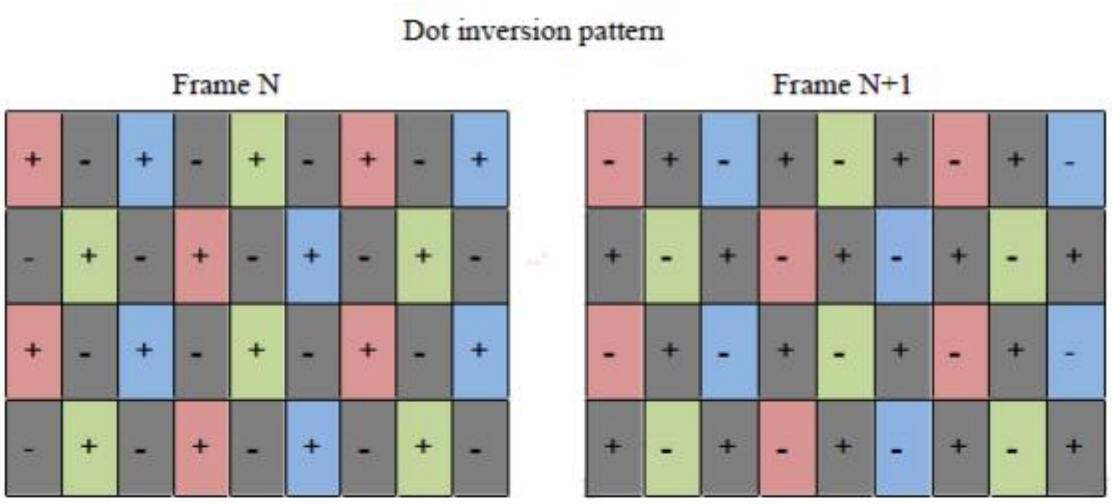


Fig. 4.5 VESA format

4.4 Flicker Pattern

Flicker should be adjusted by the Dot on/off pattern, where are displayed alternately at vertical line. (Dot inversion)



5. Interface Timing

5.1 Timing Table (DE Only Mode)

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	Fclkin (=1/TClk)	59.4	74.25	77.34	MHz	(1) (2)
	Input cycle to cycle jitter	Trcl	-	-	200	ps	(3)
	Spread spectrum modulation range	Fclkin_mod	Fclkin-2%	-	Fclkin+2%	MHz	(4)
	Spread spectrum modulation frequency	FSSM	60	-	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	TRSM	-400	-	400	ps	(5)
Vertical Active Display Term	Frame Rate	F	48	60	62.5	Hz	
	Total	TV	1092	1125	1380	TH	TV = TVD +TVB
	Display	TVD	1080				
	Blank	TVB	12	45	300	TH	
Horizontal Active Display Term	Total	TH	1046	1100	1174	TCLK	TH = THD + THB
	Display	THD	960				960=1920/2port
	Blank	THB	86	140	214	TCLK	

Note:

(1) The TFT LCD open cell is operated in DE only mode, H sync and V sync input signal have no effect on normal operation.

(2) Please make sure the range of pixel clock follows the following equations:

Fclkin(max) ≥ Fmax × Tv × Th Fmin × Tv × Th ≥ Fclkin(min) 74.25MHZ=148.5/2port LVDS

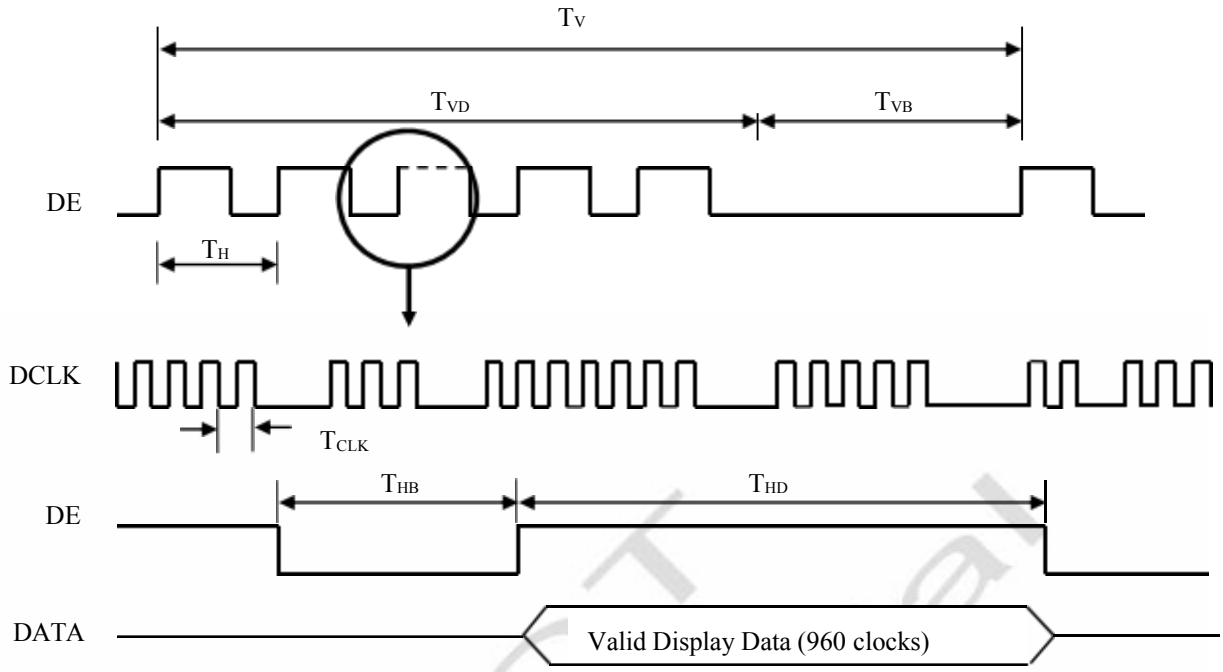


Fig. 5.1 Interface signal timing diagram

(3)The input clock cycle-to-cycle is defined as below figures.

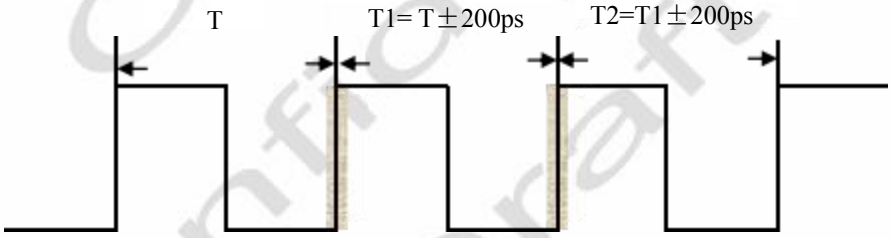


Fig. 5.2 Jitter

(4) The SSM (Spread Spectrum Modulation) is defined as the following figure.

The LVDS SSM 's suggestion is off by default, SOC board must test all validation if SOC board open the LVDS SSM.

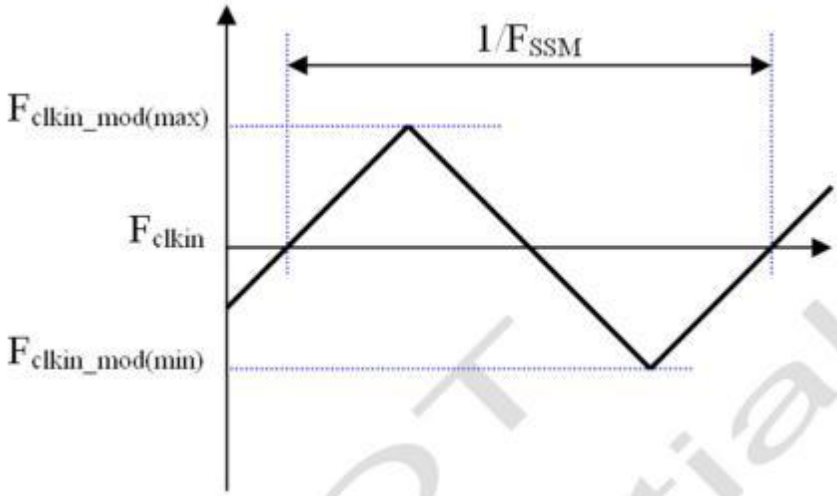


Fig. 5.3 SSM

(5) The LVDS timing diagram and setup/hold time is defined and showed as the following figure.

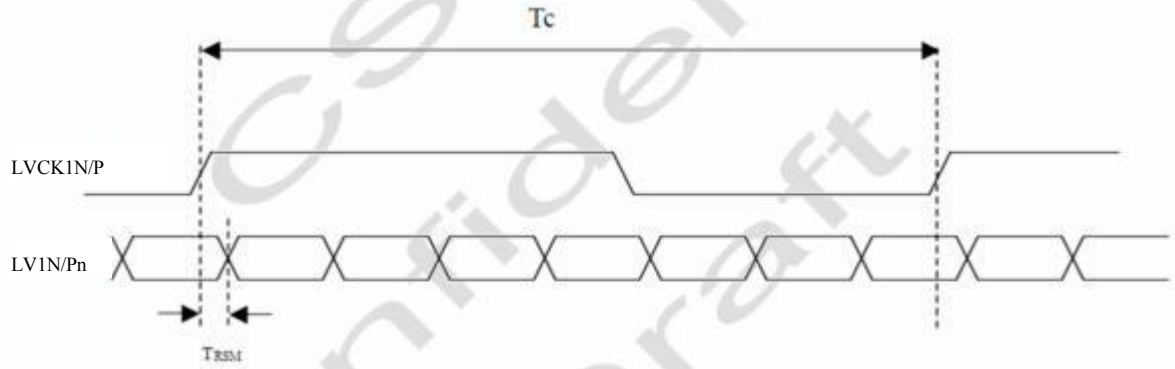


Fig.5.4 LVDS receive interface timing diagram

5.2 Power On/Off Sequence

To prevent a latch-up or DC operation of the Open cell, the power on/off sequence should be as the diagram below.

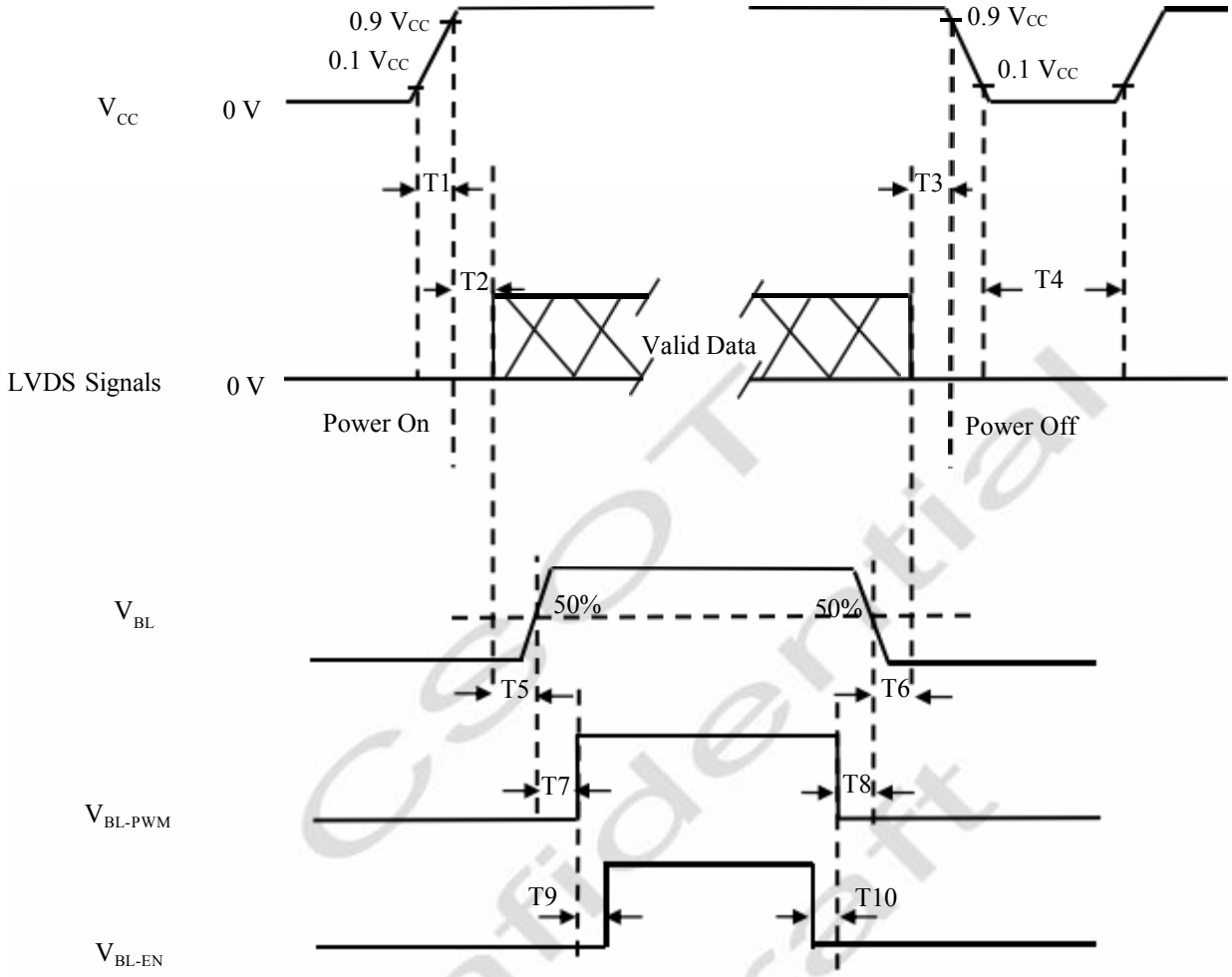


Fig.5.5 Power on/off sequence

Parameter	Values			Unit	Note
	Min.	Typ.	Max.		
T1	0.5	-	10.0	ms	
T2	0.0	50	200	ms	
T3	0.0	50	200	ms	
T4	1000.0	-	-	ms	
T5	500.0	-	-	ms	
T6	100.0	-	-	ms	
T7	0	-	-	ms	
T8	0	-	-	ms	
T9	0	-	-	ms	
T10	0	-	-	ms	

Attention:

(1) The supply voltage of the external system for the open cell input should follow the definition of VCC.

(2) When the customer's backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

(3) In case that VCC is in off level, please keep the level of input signals on the low or high impedance. If T2 < 0, that may cause electrical overstress.

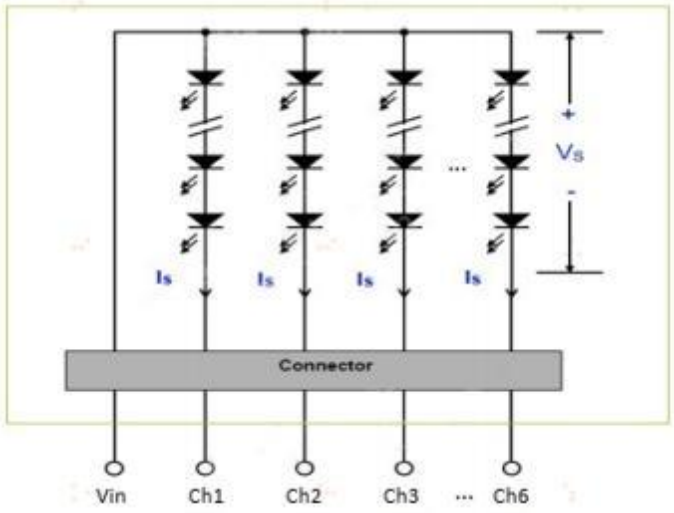
(4) T4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

6 Backlight Unit

6.1 Connector Pin Assignment

The following shows the block diagram of the 15.6 inch Backlight Unit. It includes 54 pcs LED in the LED lightbar.(6 strings and 9 pcs LED in one string).



Pin#	Symbol	Description	Remark
1	Vout	LED anode connection	
2	Vout	LED anode connection	
3	Vout	LED anode connection	
4	NC	NC	
5	LED	LED Cathode connection	
6	LED	LED Cathode connection	
7	LED	LED Cathode connection	
8	LED	LED Cathode connection	
9	LED	LED Cathode connection	
10	LED	LED Cathode connection	

6.2 Recommended Operating Condition

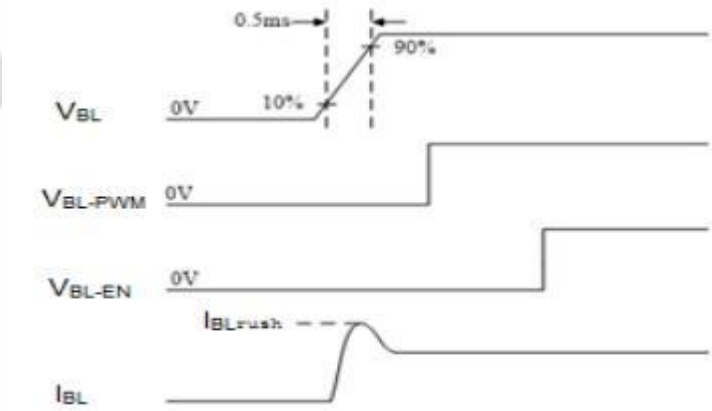
Symbol	Description	Min.	Typ.	Max.	Unit	Remark
V_{BL}	Power Supply Voltage for LED Driver	5	12	21	V	
I_{BL}	Input Current	-	0.37	0.40	A	V_{BL}=12V Duty=100%
P_{BL}	Power Consumption	–	4.44	4.819	W	
I_{BLrush}	Inrush Current	–	–	3	A	(1)
V_{BL-EN}	Backlight On	1.6	3.3	5	V	

	Backlight Off	0	0	0.6	V	
V_{BL-PWM}	High level	1.6	3.3	5	V	
	Low level	0	0	0.6	V	
F_{PWM}	PWM Control Frequency	0.1	1	20	KHz	
D_{PWM}	Duty Ratio	1	–	100	%	（2）
Is	LED String Current	-	25	-	[mA]	100% duty ratio of LED chip
Vs	LED String Voltage	-	26.6	27.5	[Volt]	(3)
P_{BLU}	LED Light Bar Power Consumption	-	3.99	4.13	[Watt]	(4)
LT_{LED}	LED Life Time	15,000	-	-	[Hour]	If= 25mA (5)

Note:

(1): IBLrush: the maximum current when V_{BL} is rising

Measurement Conditions: Shown as the following figure. VBL = Typ, Ta = 25 ± 2 ℃, fPWM = 1KHz, Duty=100%.



(2): DPWM Input:100%=Max luminance ；1%=Min luminance

(3):Vs(Typ.)=Vf(Typ.) ×LED No.(one string has 9 LEDs)，

The same equation to calculate Vs(Min.) & Vs(Max.) for respective Vf(Min.) & Vf(Max.)

Vf（ typ ）=2.95V ，Vf（ Max ）=3.05V ；

(4):PBLU(Typ.)=Vs(Typ.) ×Is(Typ.) ×6; (6 is total String No. of LED Light bar)

PBLU(Max.)= Vs(Max.) ×Is(Typ.) ×6;

(5):Definition of life time:

a. Brightness of LED becomes to 50% of its original value

b. Test condition：Is=25mA and 25℃(Room Temperature)

7. Optical Characteristics

7.1 Measurement Conditions

The table below is the test condition of optical measurement.

Item	Symbol	Value	Unit
Ambient Temperature	T_A	25 ± 2	ºC
Ambient Humidity	H_A	50 ± 10	%RH
VCC	VCC	12±1.2	V
Driving Signal	Refer to the typical value in Chapter 3: Electrical Specification		
Vertical Refresh Rate	F_R	60	Hz

To avoid abrupt temperature change during optical measurement, it's suggested to warm up the LCD module more than 20 minutes after lighting the backlight and in the windless environment.

To measure the LCD Module, it is suggested to set up the standard measurement system as Fig. 7.1. The measuring area S should contain at least 500 pixels of the LCD cell as illustrated in Fig.7.2 (A means the area allocated to one pixel). In this model, for example, the minimum measuring distance Z is 370mm when θ is 2 degree. Hence, 500mm is the typical measuring distance. This measuring condition is referred to 301-2H of VESAFPDM 2.0 about viewing distance, angle, and angular field of view definition.

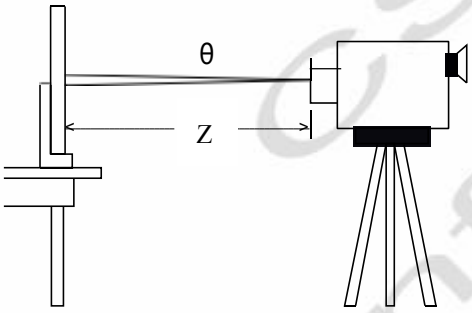


Fig. 7.1 The standard set-up system of measurement

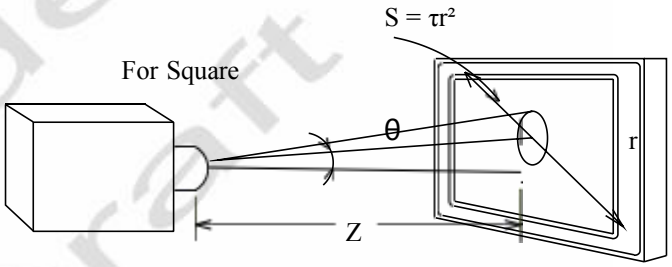


Fig. 7.2 The area S contains at least 500 pixels to be measured

$$N = \frac{S}{A} \geqslant 500 \text{ pixels}$$

N means the actual number of the pixels in the area S.

7.2 Optical Specifications

The table below of optical characteristics is measured by MINOLTA CS2000, ELDIM OPTI Scope-SA and ELDIM EZ contrast in dark room.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Static Contrast Ratio		CR	θH = 0。, θV = 0。 Normal direction at center point with CSOT's BLU ILED = 25mA	2000	3000	-	-	(1) (2)
Response Time		Ton+Toff			30	35	ms	(3)
Crosstalk		CT-127		-	-	1.2	-	(2) (5)
Luminance of White (5points)		L		212	250	-	cd/㎡	(4)
Luminous Uniformity	5points	ΔL5		80	85	-	%	(4)
	13points	ΔL13		62.5	70	-	%	(4)
Color Chromaticity (CIE1931)	White	WX		Typ. - 0.03	0.313	Typ. + 0.03	-	(2) (6)
		WY			0.329		-	
	Red	RX			0.650		-	
		RY			0.338		-	
	Green	GX			0.312		-	
		GY			0.615		-	
	Blue	BX			0.150		-	
		BY			0.071		-	
	Color Gamut	CG		68	72	-	% NTSC	
Viewing Angle	Horizontal	θH+	CR≥10	80	89	-	Deg.	(7)
		θH-		80	89	-		
	Vertical	θV+		80	89	-		
		θV-		80	89	-		

Note:

(1) Definition of static contrast ratio (CR):

It's necessary to switch offall the dynamic and dimming function when measuring the static contrast ratio.

$$\text{Static Contrast Ratio (CR)} = \frac{\text{CR - W}}{\text{CR - D}}$$

CR-W is the luminance measured by LMD (light-measuring device) at the center point ofthe LCD module with full-screen displaying white. The standard setup of measurement is illustrated in Fig. 7.3; CR-D is the luminance measured by LMD at the center point of the LCD module with full-screen displaying black. The LMD in this item is CS2000.

(2) The LMD in the item could be a spectrometer such as (KONICA MINOLTA) CS2000, CS1000 (TOPCON), SR-UL2 or the same level spectrometer. Other display color analyzer (KONICA MINOLTA) CA210, CA310 or (TOPCON) BM-7 could be involved after being calibrated with a spectrometer on each stage of a product.

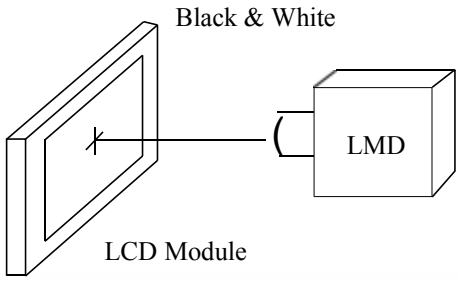


Fig. 7.3 The standard setup of CR measurement

(3) The electro-optical response time measurements shall be made as Figure 7.4 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_{on}, and 90% to 10% is Toff.

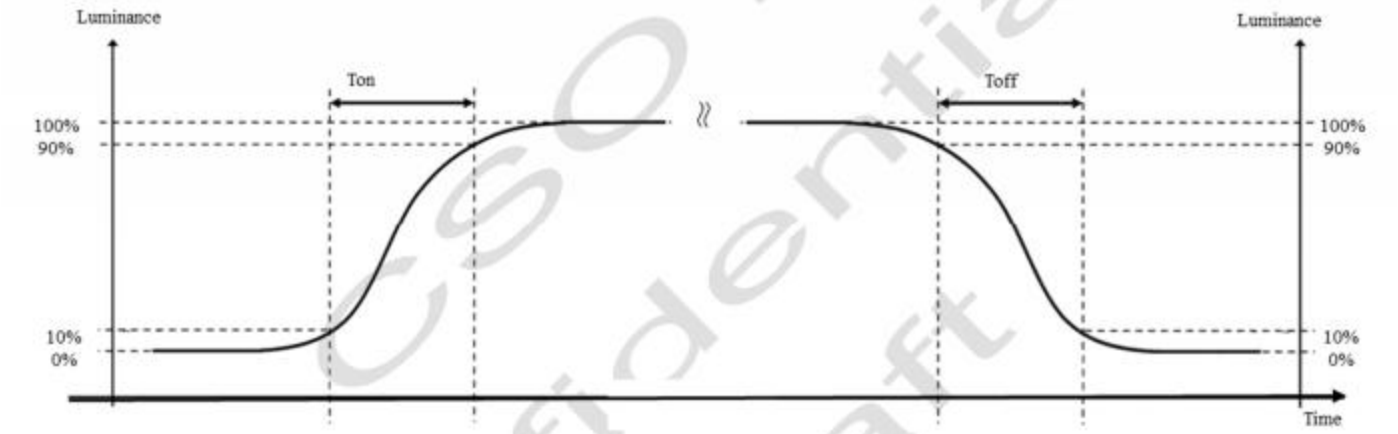


Fig. 7.4 The definition of Ton,Toff

All the transition time is measured at the center point of the LCD module by ELDIM OPTI Scope-SA.

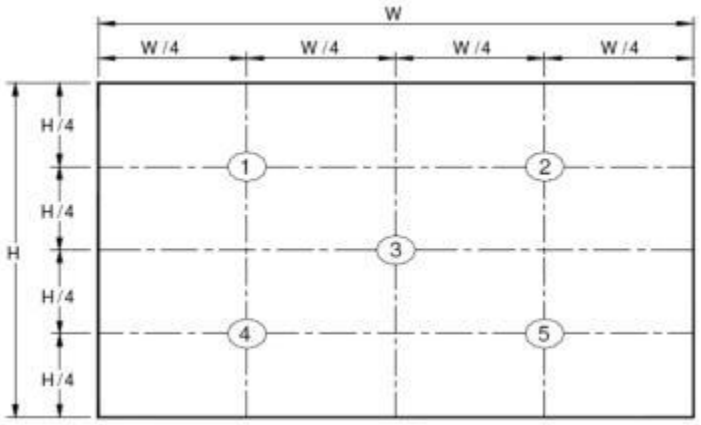
(4) Definition of Uniformity:

Definition of Luminance and Luminance uniformity：

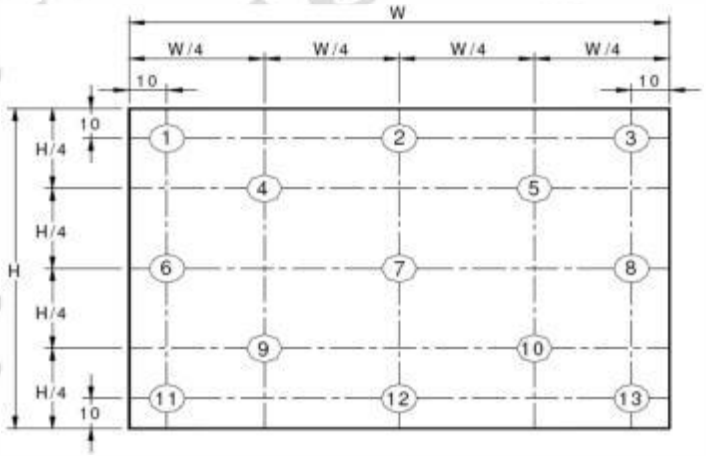
Luminance： To measure at the center position "5" on the screen (NO.5).

Luminance uniformity：Lw (MAX) and Lw(MIN) are the maximum and minimum luminance value measure at the position "1~9" on the screen (NO.1~9) and the equation：

$\Delta Lw = Lw(MIN) / Lw(MAX) \times 100\%$



White Luminance and Uniformity Measurement Locations (5 points)



Uniformity Measurement Locations (13 points)

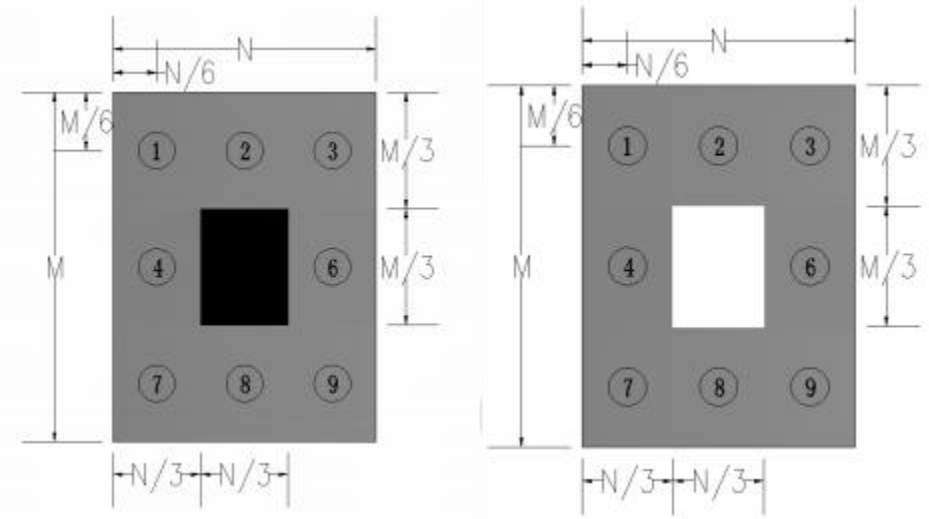
(5) Definition of the crosstalk:

- The point should be marked is, the background of Cross-talk Test Pattern-"gray " are defined as 50% gray scale .
- △Bpn = Bpn (gray) / Bpn (white)
- Which n means the dot No. In the Cross-talk Test Pattern ;

  Bpn (gray) means the brightness of the No.n spots in Cross-talk Test Pattern;

  Bpn (white) means the brightness of the No.n spots in Full white Test Pattern;
- △Bp (Max.) = Maximum value in △Bp1~△Bp9, except the No. 5 spot.

- △Bp (Min.) = Minimum value in △Bp1~△Bp9, except the No.5 spot.
- △CT=△Bp (Max.)/△Bp(Min.).



Cross-talk Test Pattern

(6) Definition of color chromaticity:

Each chromaticity coordinates (x, y) are measured in CIE1931 color space when full-screen displaying primary color R, G, B and white. The color gamut is defined as the fraction in percent of the area of the triangle bounded by R, G, B coordinates and the area is defined by NTSC 1953 color standard in the CIE color space. Chromaticity coordinates are measured by CS2000 and the standard setup of measurement is shown in Fig. 7.6.

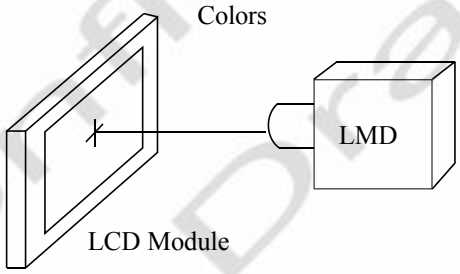


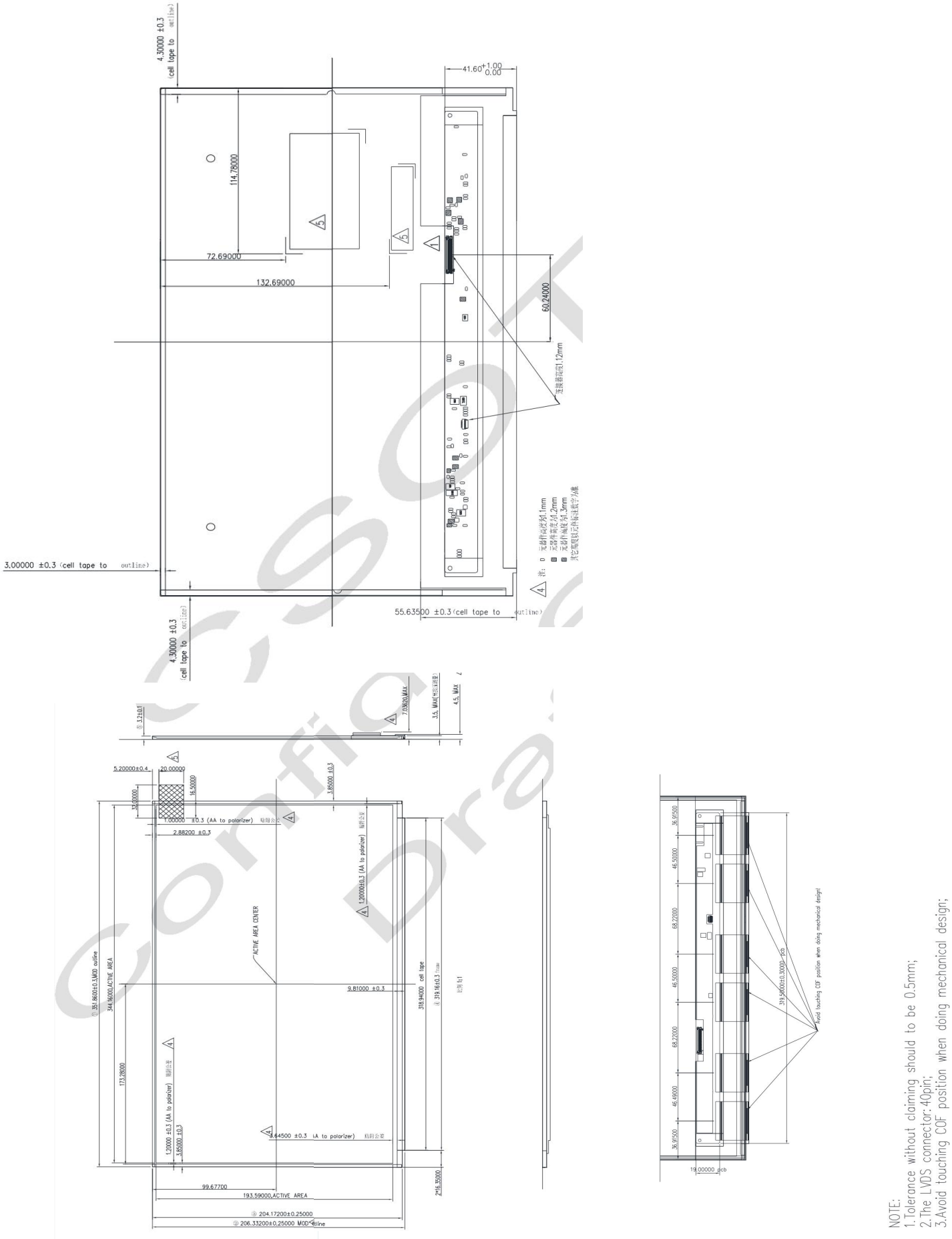
Fig. 7.6 The standard setup of color chromaticity measurement

(7) Definition of viewing angle coordinate system (θ_H, θ_V):

The contrast ratio is measured at the center point of the LCD module. The viewing angles are defined at the angle that the contrast ratio is larger than 10 at four directions relative to the perpendicular direction of the LCD module (two vertical angles: up θ_{V+} and down θ_{V-}; and two horizontal angles: right θ_{H+} and left θ_{H-}) as illustrated in Fig. 7.7. The contrast ratio is measured by ELDIM EZ Contrast.

8. Mechanical Characteristics

8.1 Mechanical Specification



NOTE:
1.Tolerance without claiming should to be 0.5mm;
2.The LVDS connector:40pin;
3.Avoid touching COF position when doing mechanical design;

8.2 Packing Specifications and Methods

The Packing Specifications and Method

Item	Specification		
	Quantity	Dimension (mm)	Weight (kg)
Packing Box	15PCS/BOX	470(L) x 320 (W) x 250 (H)	Net Weight: 7.95kg (±2%) Gross Weight: 10.53kg (±2%)
Pallet	1	1000 (L) x 970 (W) x 135 (H)	Net Weight: 15.0kg (±5%)
Stack Layer	1		
Boxes per Pallet	30box / pallet		
Pallet after Packing	450pcs / pallet	1000(L) x 970 (W) x 1395 (H)	Gross Weight:330.9kg (±5%)
Pallet Stack Layer	1		

9. Precautions

9.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

9.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. We do not warrant the module, if customers disassemble or modify the module.

9.3 Breakage of LCD Panel

9.3.1. If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

9.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

9.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

9.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

9.4 Electric Shock

9.4.1. Disconnect power supply before handling LCD module.

9.4.2. Do not pull or fold the CCFL cable.

9.4.3. Do not touch the parts inside LCD modules and the fluorescent lamp's connector or cables in order to prevent electric shock.

9.5 Absolute Maximum Ratings and Power Protection Circuit

9.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

9.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

9.5.3. It's recommended to employ protection circuit for power supply.

10.6 Operation

9.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

9.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

9.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

9.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may cause deformation or color fading.

9.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

9.7 Static Electricity

9.7.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

9.7.2 Because LCD module uses CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

9.8 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.