深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAY TECH. CO, LTD.

TFT-LCD Module Specification

Module NO.：TST070WSBH-21

Version：V1.0

☐ APPROVAL FOR SPECIFICATION ☐ APPROVAL FOR SAMPLE

For Customer's Acceptance：

Approved by	Comment

Team Source Display：

Presented by	Reviewed by	Organized by

Version No.	Date	Content	Remark
V1.0	2018-4-27	Initial Release	

Document Revision History

Revision	Data	Page	Description	Changed BY
A01	2018/4/27	--	First issue	Aron

Contents

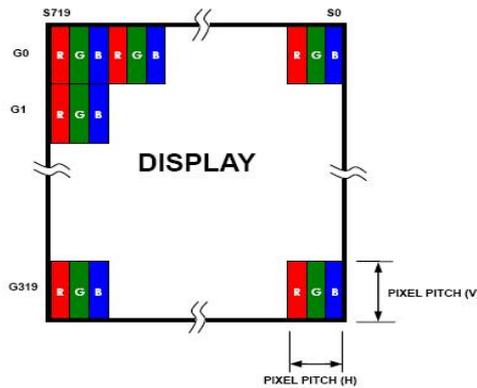# 1. LCM Specification

1.1 Description

TST070WSBH-21 is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, a drive IC, a FPC, and a WLED-backlight unit.The active display area is 7.0 inches diagonally measured and the native resolution is 1024*RGB*600. Features of this product are listed in the following table.
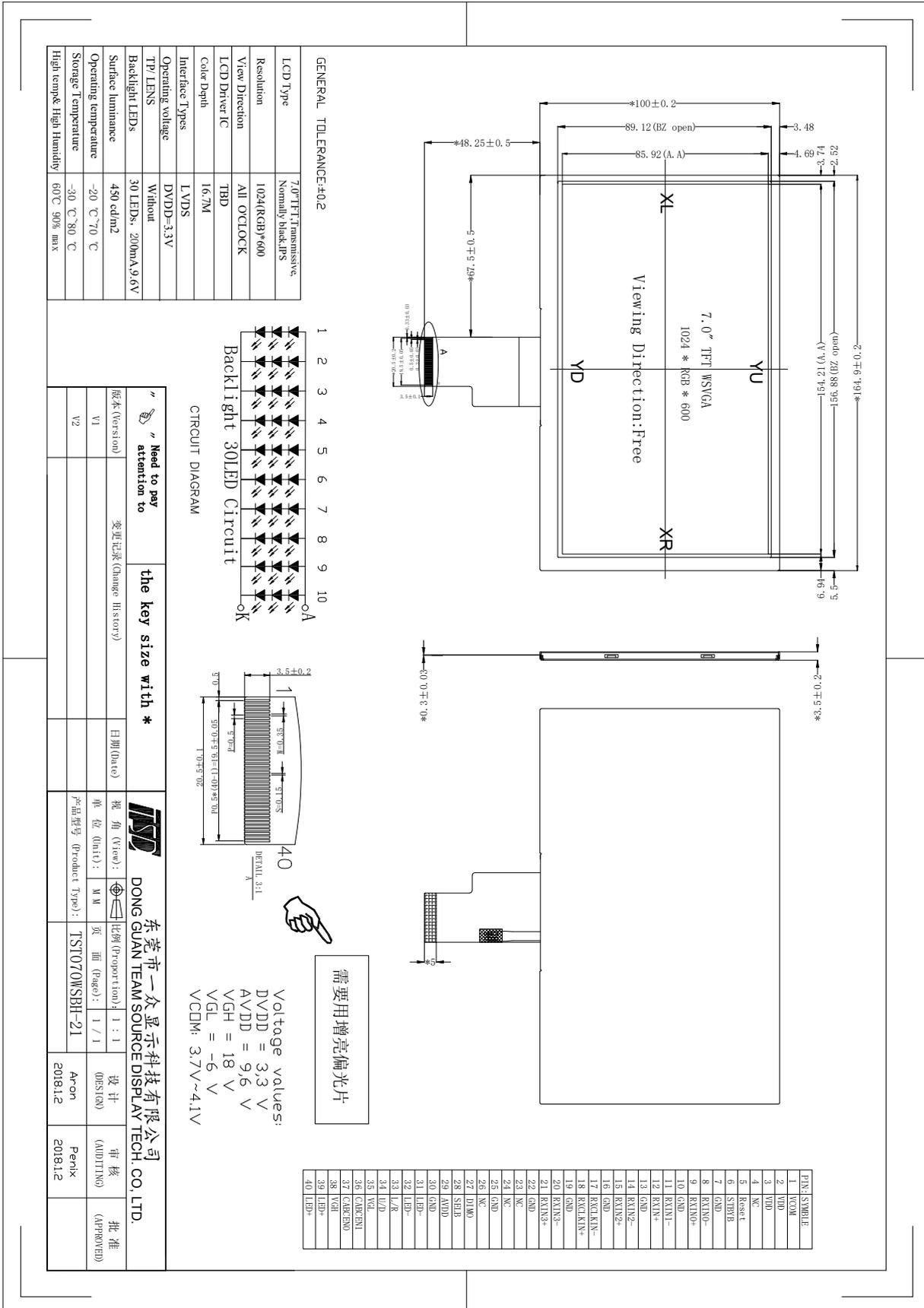
1.2 Functions & Features

Table1.1 Module Functions & Features

Parameter	Value	Unit
LCD Mode	a-Si TFT/transmissive	-
Number of Color	16.7M	-
Display Resolution	1024*3(RGB)*600	pixels
Outline Dimension	164.9(W) *100(H) *3.5(T)	mm
Active Area(A.A)	85.92*(H) *154.2144(W)	mm
Pixel pitch	0.1506(H) x 0.1432(V)	mm
Pixel Arrangement	RGB-Vertical stripe	-
Viewing Direction	Free	
Display Mode	Normally Black	
Back-light	White LED-30	PCS

Pixel Arrangement

2. Mechanical Specification

GENERAL TOLERANCE±0.2

LCD Type	7.0'TFT,Transmissive, Normally black,IPS
Resolution	1024(RGB)*600
View Direction	All O'CLOCK
LCD Driver IC	TBD
Color Depth	16.7M
Interface Types	LVDS
Operating voltage	DVDD=3.3V
TP/ LENS	Without
Backlight LEDs	30 LEDs, 200mA,9.6V
Surface luminance	450 cd/m2
Operating temperature	-20 ℃~70 ℃
Storage Temperature	-30 ℃~80 ℃
High temp& High Humidity	60℃ 90% max

Backlight 30LED Circuit

CIRCUIT DIAGRAM

" ✍ " Need to pay attention to

the key size with *

Voltage values:
DVDD = 3.3 V
AVDD = 9.6 V
VGH = 18 V
VGL = -6 V
VCOM: 3.7V~4.1V

需要用增亮偏光片

PIN	SYMBLE
1	VCOM
2	VDD
3	VDD
4	NC
5	Reset
6	STBYB
7	GND
8	RXIN0-
9	RXIN0+
10	GND
11	RXIN1-
12	RXIN1+
13	GND
14	RXIN2-
15	RXIN2+
16	GND
17	RXCLKIN-
18	RXCLKIN+
19	GND
20	RXIN3-
21	RXIN3+
22	GND
23	NC
24	NC
25	GND
26	NC
27	D1MO
28	SELB
29	AVDD
30	GND
31	LED-
32	LED-
33	L/R
34	U/D
35	VGL
36	CABCEN1
37	CABCEN0
38	VGH
39	LED+
40	LED+

版本 (Version)		变更记录 (Change History)		日期(Date)
V1				
V2				

视 角 (View):		产品型号 (Product Type):	TST070WSBH-21	
单 位 (Unit):	M M			
比例 (Proportion):	1 / 1	设 计 (DESIGN)	Aron	2018.1.2
页 面 (Page):	1 / 1	审 核 (AUDITING)	Penix	2018.1.2
		批 准 (APPROVED)		

3.　Electrical Units

3.1 ABSOLUTE MAXIMUM RATINGS

　　<Table3. Electrical specifications>

Item	Symbol	Conditions	Unit	Min	Max	Note
Power Supply Voltage for LCD	VCC	GND=0	V	-0.3	3.96	
	AVDD	AVSS=0	V	-0.5	14.85	
	VGH	GND=0	V	-0.3	40	-
	VGL		V	-20	0.3	
	VGH-VGL	GND=0	V	12	40	
Signal input voltage	Vi		V	-0.2	AVDD+0.2	Note1
	VI	S	V	-0.3	VCC+0.3	Note2
Operating temperature	Topa		℃	-20	70	
Storage temperature	Tstg		℃	-30	80	

Note1: If users use the product out off the environmemt al　operation range　（temperature and humidity）,
it will　have visual quality　concerns.

3.2 Pin Descriptions

3.2.1 TFT LCD Panel interface FPC Pin Descriptio

Pin NO.	Function Descriptions	Symbol
1	Common Voltage	VCOM
2	Digital Power	VDD
3	Digital Power	VDD
4	Not connect	NC
5	Global rest pin	RESET
6	Standby mode, Normally pulled high STBYB =　"1"，normal operation STBYB =　"0"，timing controller, source driver will turn off, all output are High-Z	STBYB
7	Power ground	GND
8	- LVDS differential data input	RXIN0-
9	LVDS differential data input	RXIN0+
10	Power ground	GND
11	- LVDS differential data input	RXIN1-
12	LVDS differential data input	RXIN1+
13	Power ground	GND
14	- LVDS differential data input	RXIN2-

15	LVDS differential data input	RXIN2+
16	Power ground	GND
17	- LVDS differential clock input	RXCLKIN-
18	+LVDS differential clock input	RXCLKIN+
19	Power ground	GND
20	- LVDS differential data input	RXIN3-
21	LVDS differential data input	RXIN3+
22	Power ground	GND
23	Not connect	NC
24	Not connect	NC
25	Power ground	GND
26	Not connect	NC
27	Backlight CABC controller signal output	DIMO
28	6bit/8bit mode select	SELB
29	Power for Analog Circuit	AVDD
30	Power ground	GND
31	LED Cathode	LED-
32	LED Cathode	LED-
33	Horizontal inversion	L/R
34	Vertical inversion	U/D
35	Gate OFF Voltage	VGL
36	CABC H/W enable	CABCEN1
37	CABC H/W enable	CABCEN0
38	Gate ON Voltage	VGH
39	LED Anode	LED+
40	LED Anode	LED+

Note1: If LVDS input data is 6 bits ,SELB must be set to High;
       If LVDS input data is 8 bits ,SELB must be set to Low.
Note2: When CABC_EN="00", CABC OFF.
       When CABC_EN="01", user interface image.
When CABC_EN="10", still picture.
When CABC_EN="11", moving image.
When CABC off, don't connect DIMO, else connect it to backlight.
Note3: When L/R="0", set right to left scan direction.
       When L/R="1", set left to right scan direction.

When U/D=" 0 " , set top to bottom scan direction.

When U/D=" 1 " , set bottom to top scan direction.

3.3.1 Electrical characteristics

3.3.2 (Ta=25℃) Typical conditions

Item	Symbol	Unit	Min	Value	Max	Note
Common Voltage	VCOM	V	3.7	3.9	4.1	Note1
Power Supply Voltage	VGH	V	17	18	19	
	VGL	V	-6.6	-6	-5.4	
	AVDD	V	9.4	9.6	9.8	
	VCC	V	3	3.3	4.1	
Input Signal Voltage	V_{IH}	V	0.7VCC	-	VCC	
	V_{IL}	V	GND	-	0.3VCC	

Note1: Please adjust VCOM to make the flicker level be minimum.

3.3.2 DC characteristics

Table 3.2: DC Characteristic (VCC=2.4~3.3V, Ta=0~60°C)

Item	Symbol	Unit	Test Condition	Min	Typ.	Max	Note
Drive Current	I_{GH}	mA	VGH=18V	-	0.5	1	Note1
	I_{GL}	mA	VGL=-6V	-	0.5	1	Note1
	I_{CC}	mA	VCC=3.3V	-	30	45	Note1
	I_{DD}	mA	AVDD=9.6V	-	35	45	Note1

Note1: Typ.specification:Gray-level test Pattern

       Max.specification:Black test Pattern

(a)Gray-level Pattern   (b)Black Pattern

3.3.3 Power、Signal sequence

Power On：DVDD →AVDD/V EEG→VDDG →Video &Logic Signal

Power Off：Video &Logic Signal →VDDG →AVDD/VEEG →DVDD

0＜T1≦10ms	T5＞0ms
T2＞20ms	T6＞0ms
T3＞10ms	0＜T7≦10ms
T4＞0ms	0＜T8≦10ms
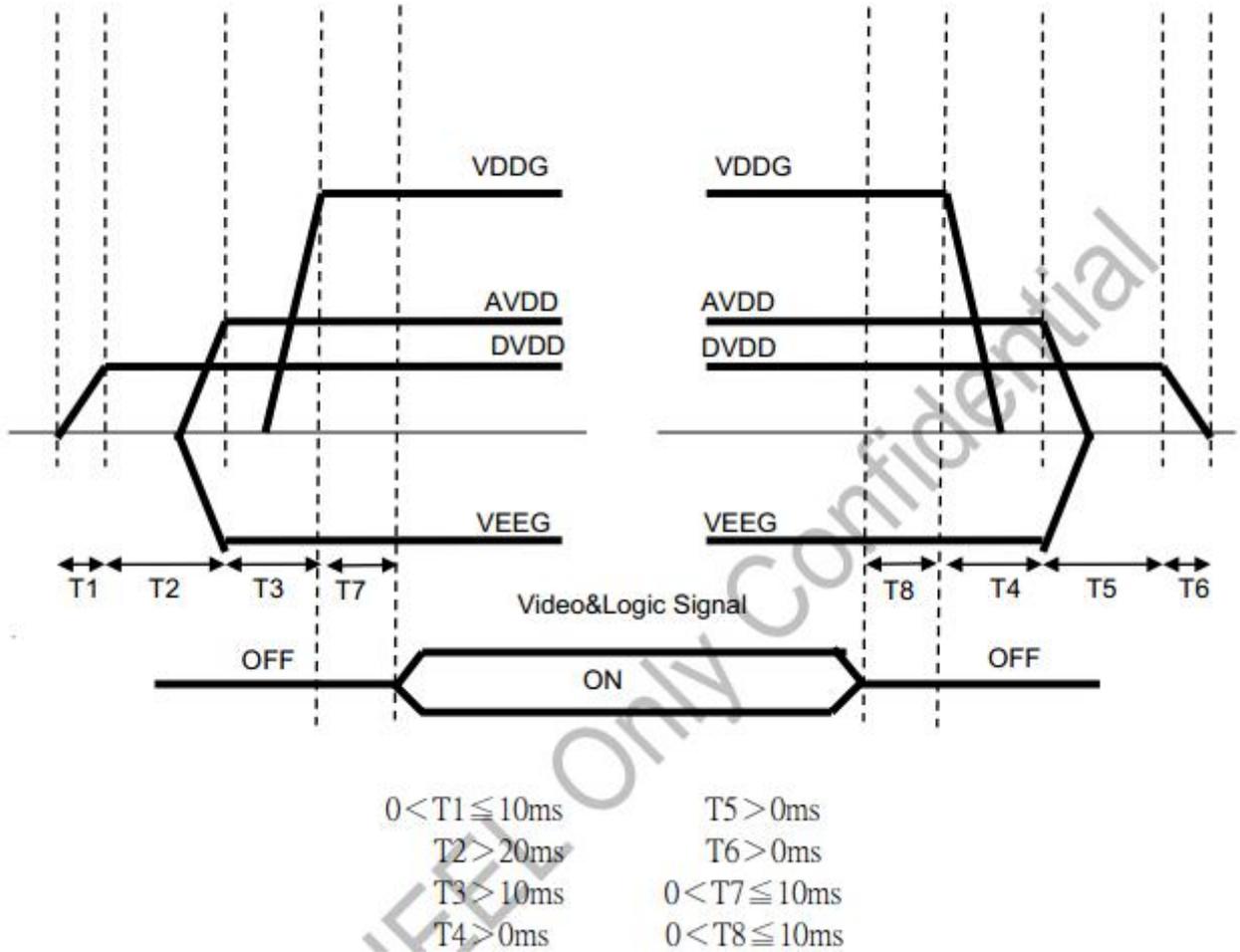
3.3 Back-light Specification

Table 3.3 Back-light Specification

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VF	Only	8.4	9.6	10.2	V
Supply Current	IF	Backlight	20*10=200			mA
Average Brightness	IV	Backlight Current IF=200mA	-		-	Cd/m2
CIE Color Coordinate	X	Backlight Current IF=200mA				-
	Y					
Uniformity	B	Backlight Current IF=200mA	70	-	-S	(%)
Color	White					

4 Timing characteristics of input signals

4.1. Timing characteristics of input signals

ITEM			SYMBOL	MIN	TYP	MAX	UNIT
LVDS input signal sequence	CLK Frequency		tclk	45	51.2	57	MHz
LCD input signal sequence (Input LVDS Transmitter)	DENA	Horizontal	Horizontal total Time	t_H	1324	1344	1364	tCLK
			Horizontal effective Time	t_{HA}		1024		tCLK
			Horizontal Blank Time	t_{HB}	300	320	340	tCLK
		Vertical	Vertical total Time	t_V	625	635	645	t_H
			Vertical effective Time	t_{VA}		600		t_H
			Vertical Blank Time	t_{VB}	25	35	45	t_H

4.2.Timing sequence(Timing chart)

4.2.1Horizontal Timing Sequence
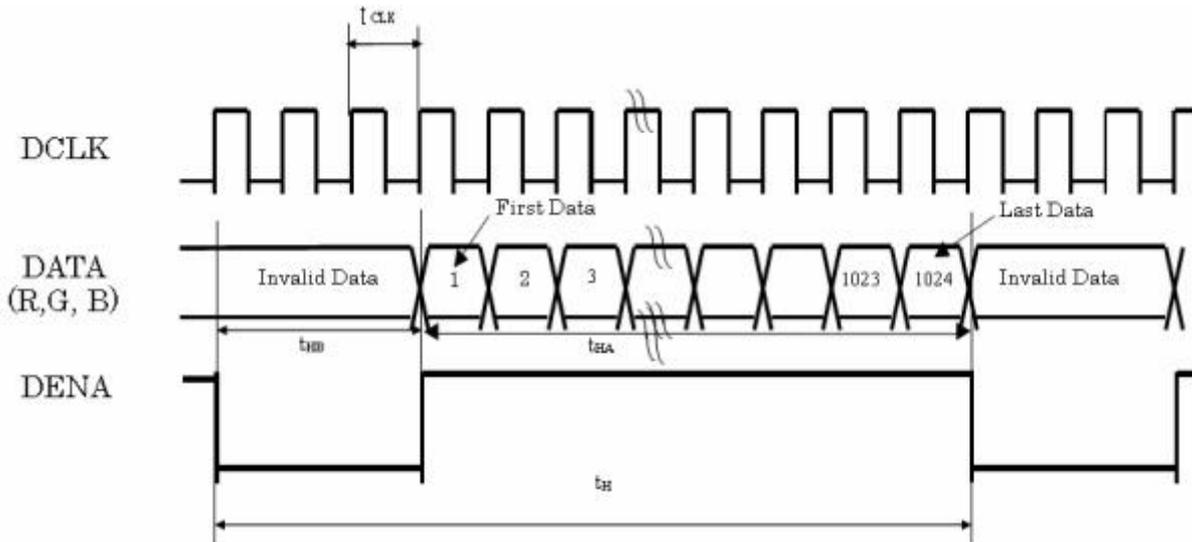
4.2.2 Vertical Timing Sequence
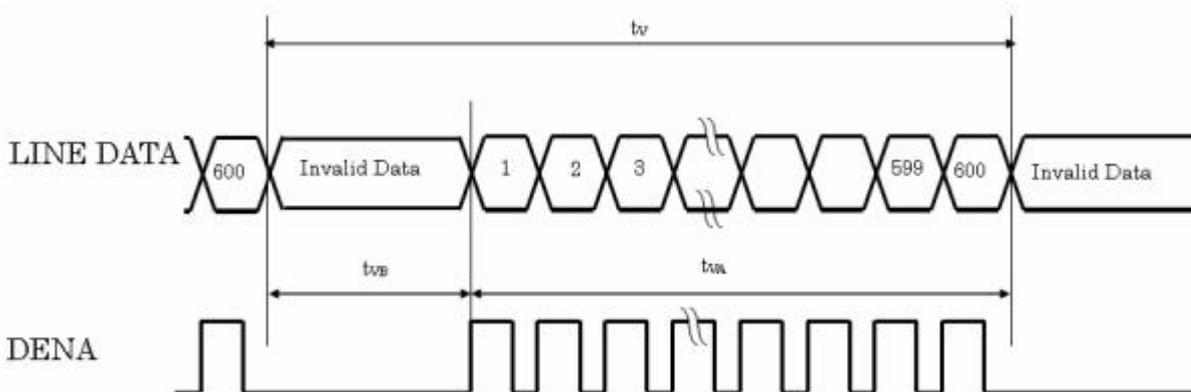
4.2.3 LVDS Input Data mapping

6Bit LVDS input
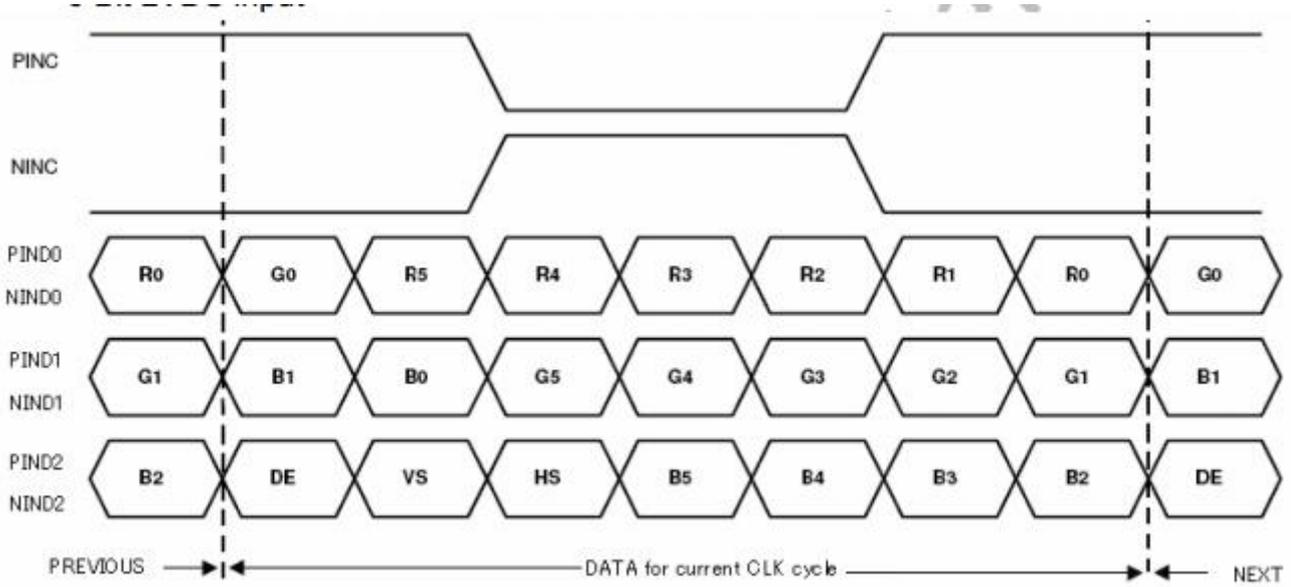
8Bit LVDS input
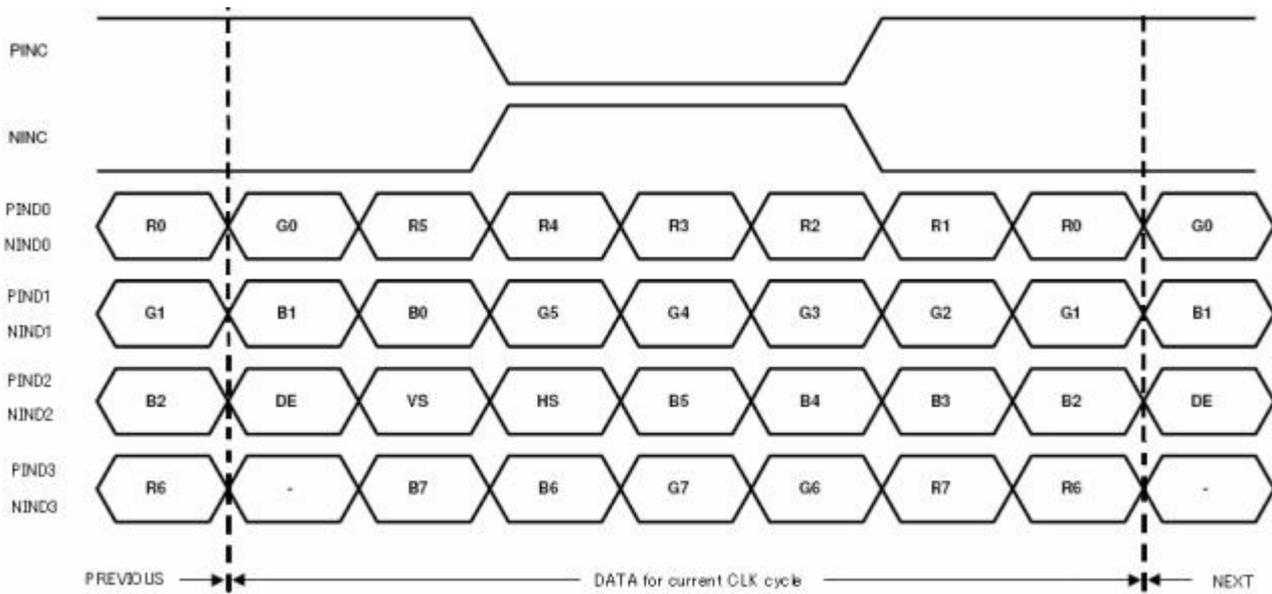
5.Optical Specifications

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Threshold voltage		Vsat		—		—		(6)
		Vth		—		—		(6)
Transmittance (With PZ)		T		3.8	4.1	—	%	
Contrast		CR		600	800	—		(1)(2)
Response time	Rising	TR		—	10	20	msec	(1)(3)
	Falling	TF		—	15	30		
White luminance(center)		YL	Θ=0 Normal viewing angle	400	450	-	Cd/m²	I=200mA
Color gamut		S		—	-	—	%	C light
Color chromaticity (CIE1931)	White	Wx						(1)(4) CF Glass C light
		Wy						
	Red	Rx						
		Ry						
	Green	Gx						
		Gy						
	Blue	Bx						
		By						
Viewing angle	Hor.	ΘL	CR>10	80	85	—		
		ΘR		80	85	—		
	Ver.	ΘU		80	85			
		ΘD		80	85			
Optima View Direction		Free						(5)

3.2 Measuring Condition

- Measuring surrounding: dark room
- LED current I_L: 200mA
- Ambient temperature: 25±2°C
- 15min. warm-up time.

3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
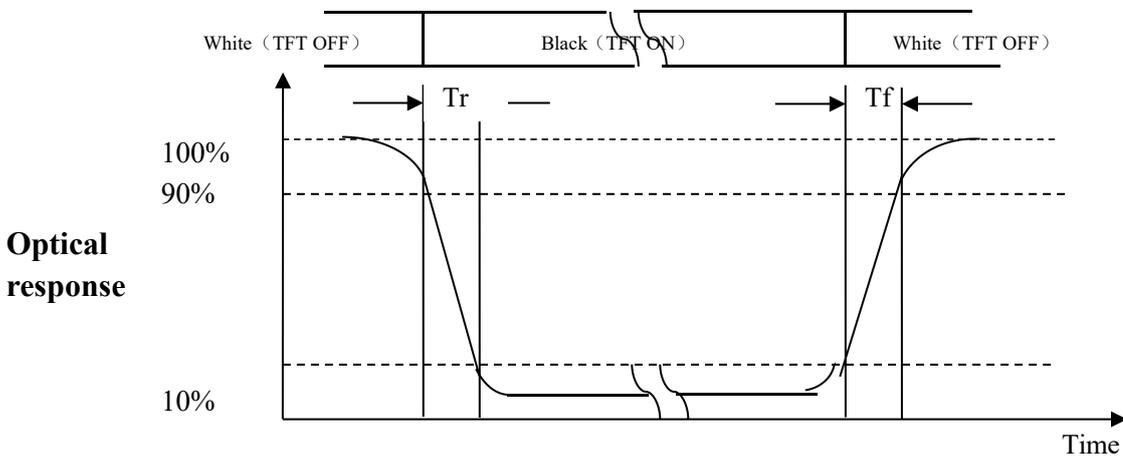- Measuring spot size: 20 ~ 21m

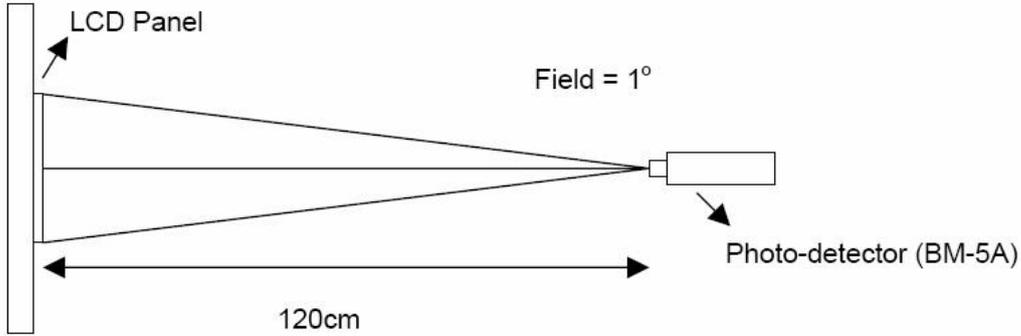Note (1) Definition of Viewing Angle:
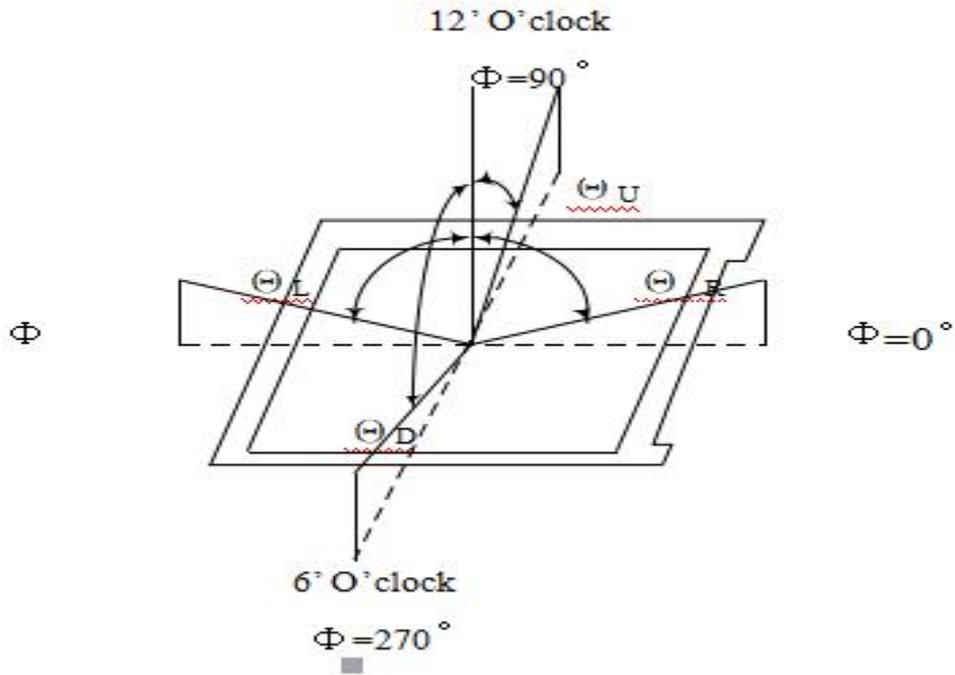
Note (2) Definition of Contrast Ratio (CR):

       measured at the center point of pane

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time: Sum of T_R and T_F
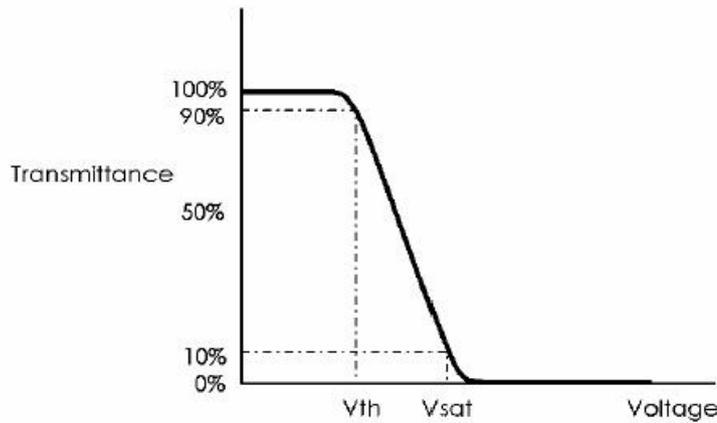
Note (4) Definition of optical measurement setup

Note (5) Rubbing Direction (The different Rubbing Direction will cause the different
                                optimal view direction.

Note (6)   Definition of Vsat and Vth (at 20^0C

6 Reliability Test Items

NO.	Test Item	Test Condition	Check Time
1	High temp storage	T=70	240hrs
2	Low temp storage	T=−30	240hrs
3	High temp operation	T=60	240hrs
4	Low temp operation	T= −20	240hrs
5	High temp&high humidity	T=50 H=90%	240hrs

Reliability Test Criteria:
Display function should be no change under normal operating condition.

7. Handling Precautions

7.1 Safety

The liquid crystal in the LCD is poisonous. Keep away from your mouth and eyes. If the liquid crystal contacts with your skin, mouse or clothes, use soap to wash it off immediately.

7.2 Handling

i. The LCD panel is made by thin glass. Prevent the panel from mechanical shock or putting excessive force on its surface.
ii. The polarizer attached on the display is very easy to be damaged, handle it with special attention.
iii. To avoid contamination on the display surface, do not touch the display surface with bare hands.
iv. The transparent electrodes may be disconnected if you use the LCD panel under dew-condensing environment.
v. The characteristics of the semiconductor devices may be affected when they are exposed to light, possibly resulting in malfunctioning of the ICs. To prevent such malfunctioning of the ICs, make sure the application and the mounting of the panel are designed so that the IC is not exposed to light.

7.3 Static Electricity

Ground soldering iron tips, tools and testers when you operate. Also ground your body when handling the products and store the products in an anti-electrostatic container.

7.4 Storage

Store the products in a dark place where the temperature is within the range of 25±10 and with low humidity (65%RH or less). Do not store the LCD product in an atmosphere containing organic solvents or corrosive gases.

7.5 Cleaning

Do not wipe the polarizer with dry cloth, as it might cause scratching. Wipe the polarizer with a soft cloth soaked with petroleum IPA. Other chemical might damage the panel.