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.: TST070WSBE-12

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	2018-7-21	Initial Release	

Document Revision History

Revision	Data	Page	Description	Changed BY
V1.0	2018/07/21	--	First issue	

Contents

1. LCM Specification

1.1 Description

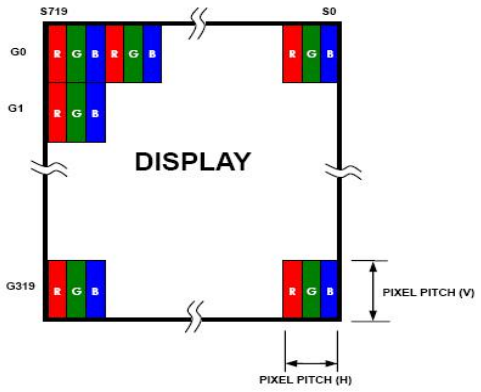
TST070WSBE-12 is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, a drive IC, a FPC, ,a WLED-backlight unit.The active display area is 7.0 inches diagonally measured and the native resolution is 1024*RGB*600. Features of this product are listed in the following table.

1.2 Functions & Features

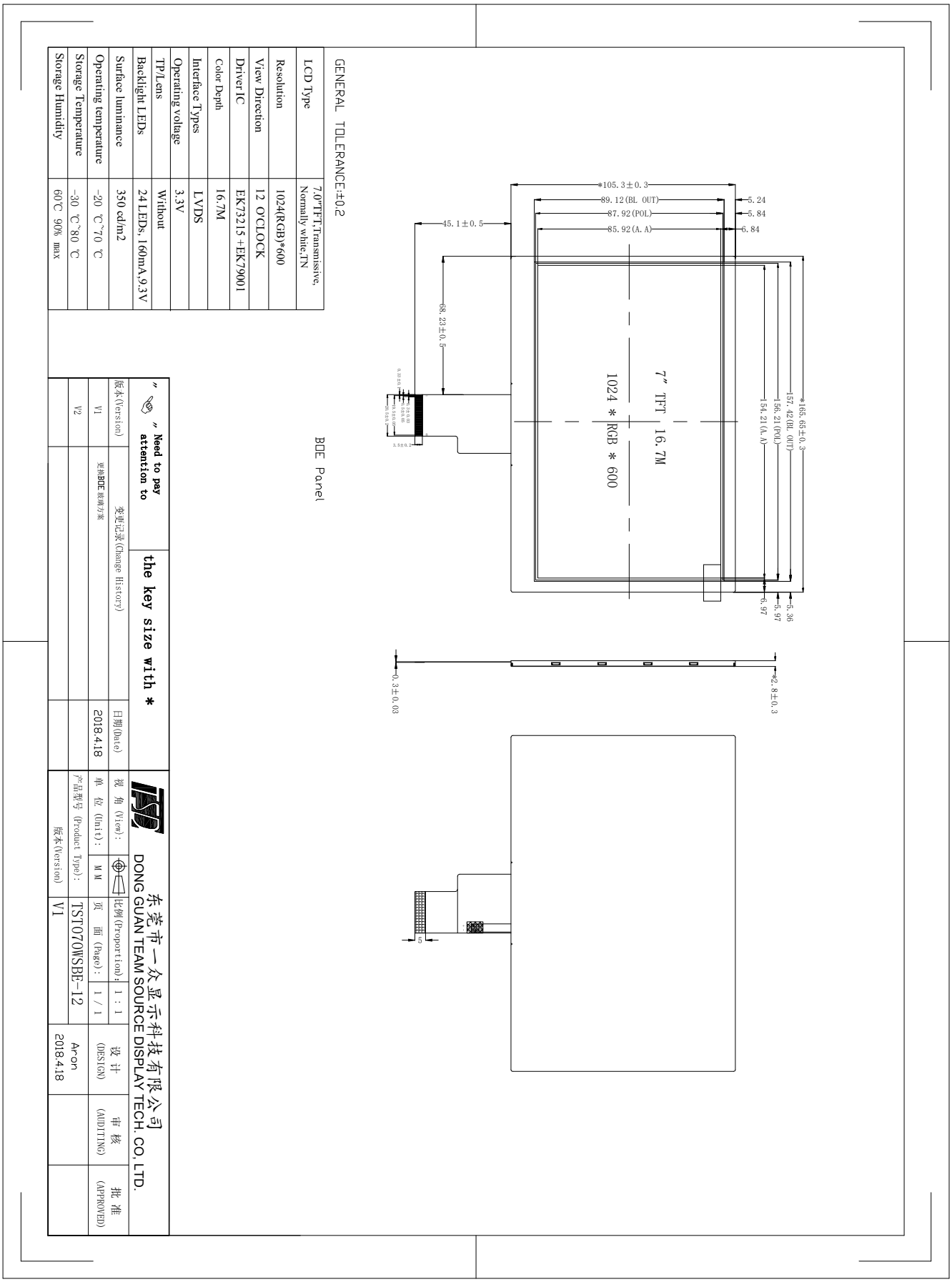
Table1.1 Module Functions & Features

Parameter	Value	Unit
LCD Mode	a-Si TFT/transmissive, TN	-
Number of Color	16.7M	-
Display Resolution	1024*3(RGB)*600	pixels
LCM Outline Dimension	165.65(W) *105.3(H) *2.8(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	12 O'clock	-
Display Mode	Normally WHITE	-
Back-light	White LED-24	PCS
TP/Lens	Without	-

Pixel Arrangement



2. Mechanical Specification



LCD Type	7.0"TFT,Transmissive, Normally white,TN
Resolution	1024(RGB)*600
View Direction	12 O'CLOCK
Driver IC	EK73215+EK79001
Color Depth	16.7M
Interface Types	LVDS
Operating voltage	3.3V
TP/Lens	Without
Backlight LEDs	24 LEDs, 160mA, 9.3V
Surface luminance	350 cd/m2
Operating temperature	-20 ℃~70 ℃
Storage Temperature	-30 ℃~80 ℃
Storage Humidity	60℃ 90% max

" Need to pay attention to the key size with *

版本(Version)	变更记录(Change History)	日期(Date)
V1	更新BOE 驱调方案	2018.4.18
V2		

东莞市一众显示科技有限公司
DONG GUAN TEAM SOURCE DISPLAY TECH. CO, LTD.

单 位 (Unit):	视 角 (View):	比例(Proportion):	页 面 (Page):	产品型号 (Product Type):	版本(Version)
M M		1 : 1	1 / 1	TST070WSBE-12	V1

设 计 (DESIGN)	审 核 (AUDITING)	批 准 (APPROVED)
Aron		
2018.4.18		

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	5.0	
	AVDD	AVSS=0	V	-0.5	15	
	VGH	GND=0	V	-0.3	20	-
	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.

3.2.2 CTP interface FPC Pin Descriptio

Pin NO.	Function Descriptions	Symbol
1	Global rest pin	RST
2	Digital Power supply Voltage	VDD
3	Power ground	GND
4	Interrupt signal Output	INT
5	I2C data signal input/output	SDA
6	I2C clock signal input	SCL

3.3.1 Electrical characteristics

3.3.2 (Ta=25℃) Typical conditions

Item	Symbol	Unit	Min	Value	Max	Note
Common Voltage	VCOM	V	3.0	-	4.5	Note1
Power Supply Voltage	VGH	V	16	18	20	
	VGL	V	-7	-6	-5	
	AVDD	V	8.0	10.5	13.5	
	VDD	V	3.0	3.3	3.6	
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.

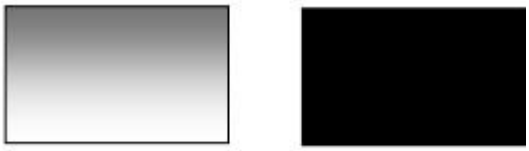
3.3.2 DC characteristics

Table 3.2: DC Characteristic (VDD=3.0~3.3V, 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	VDD=3.3V	-	30	45	Note1
	I_{DD}	mA	AVDD=10.5V	-	35	45	Note1

Note1: Typ.specification:Gray-level test Pattern

Max.specification:Black test Pattern

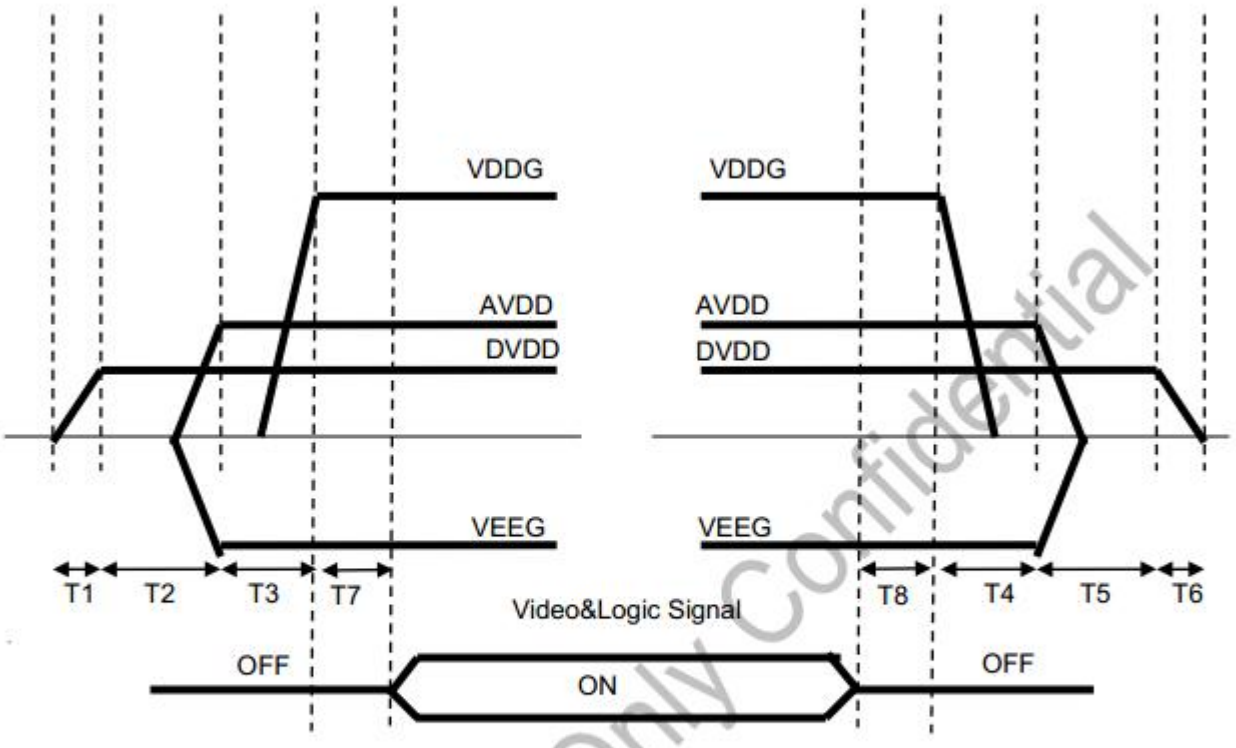


(a)Gray-level Pattern (b)Black Pattern

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

3.4 Back-light Specification

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VF	Only Backlight	8.6	9.3	9.6	V
Supply Current	IF		120	160	180	mA
Average Brightness	IV	Backlight Current IF=160mA	250	280	-	Cd/m2
CIE Color Coordinate	X	Backlight Current IF=160mA	0.26	-	0.31	-
	Y		0.26	-	0.31	
Uniformity	B	Backlight Current IF=160mA	70	-	-S	(%)
Color	White					

4 Timing characteristics of input signals

4.1. Timing characteristics of input signals

DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode
Horizontal input timing

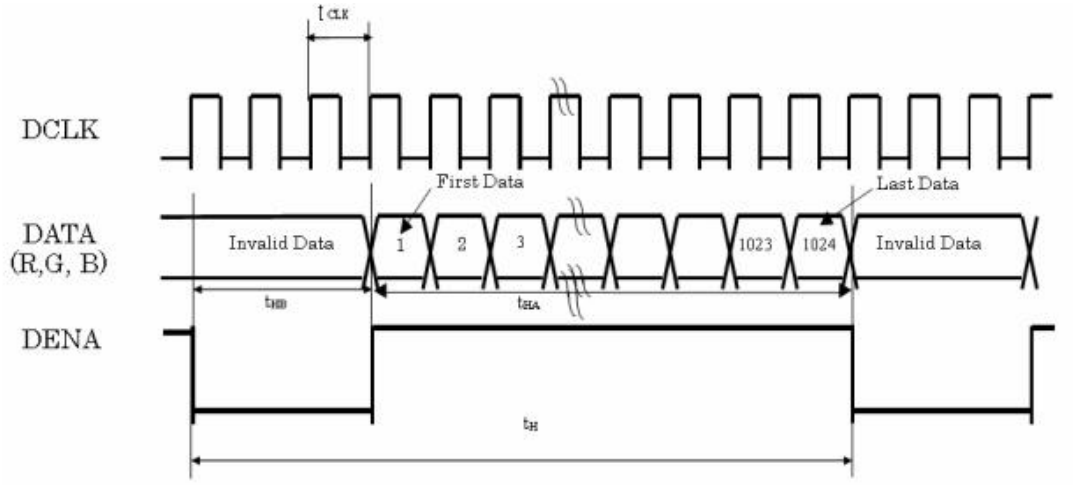
Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

LVDS mode

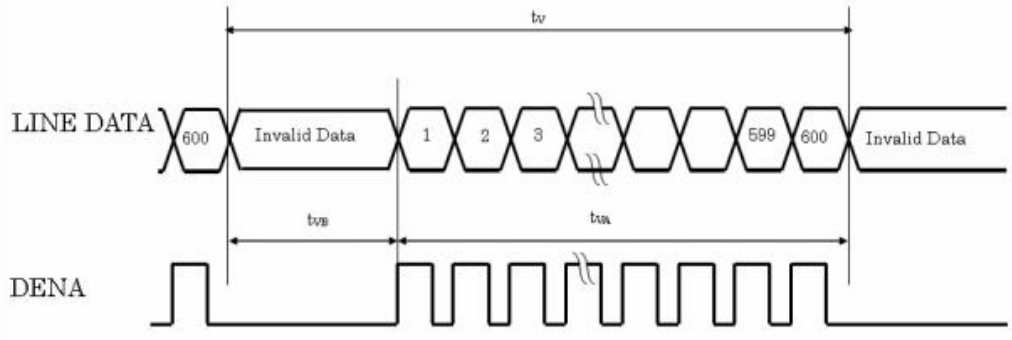
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK		20	-	71	MHz
Input data skew margin	TRSKM	|VID|=400mV RxVCM=1.2V RxFCLK=71MHz	500			ps
Clock High Time	TLVCH			4/(7* RxFCLK)		ns
						ns
Clock Low Time	TLVCL			3/(7* RxFCLK)		ns
PLL wake-up-time	TenPLL				150	us

4.2.Timing sequence(Timing chart)

4.2.1Horizontal Timing Sequence

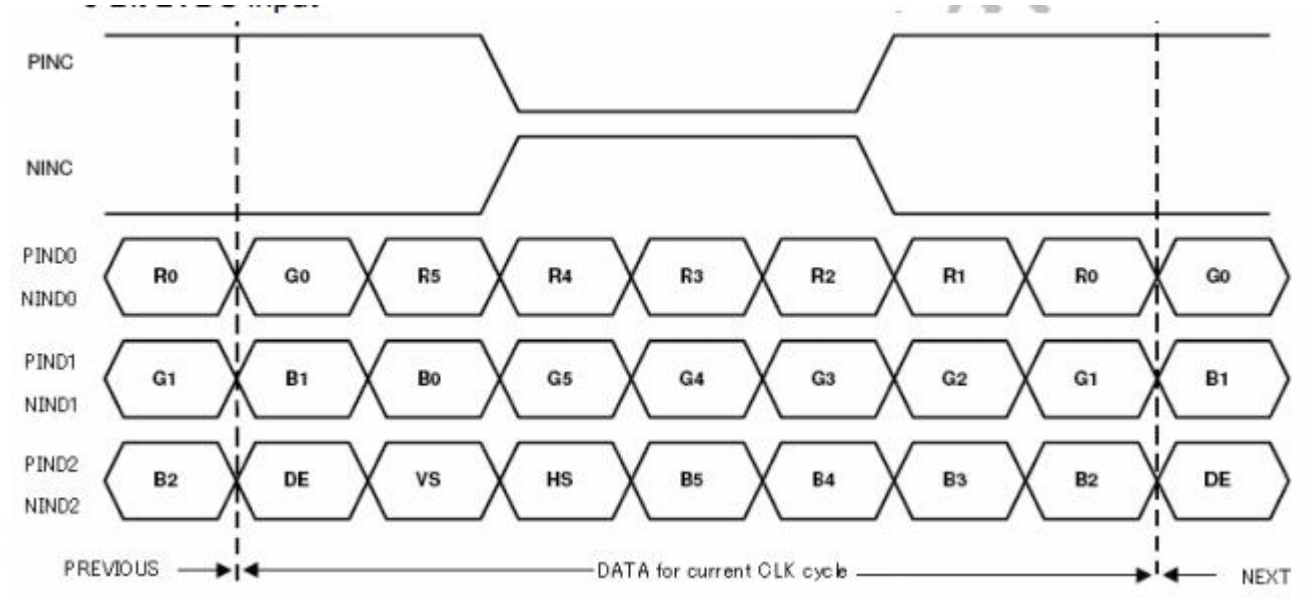


4.2.2 Vertical Timing Sequence

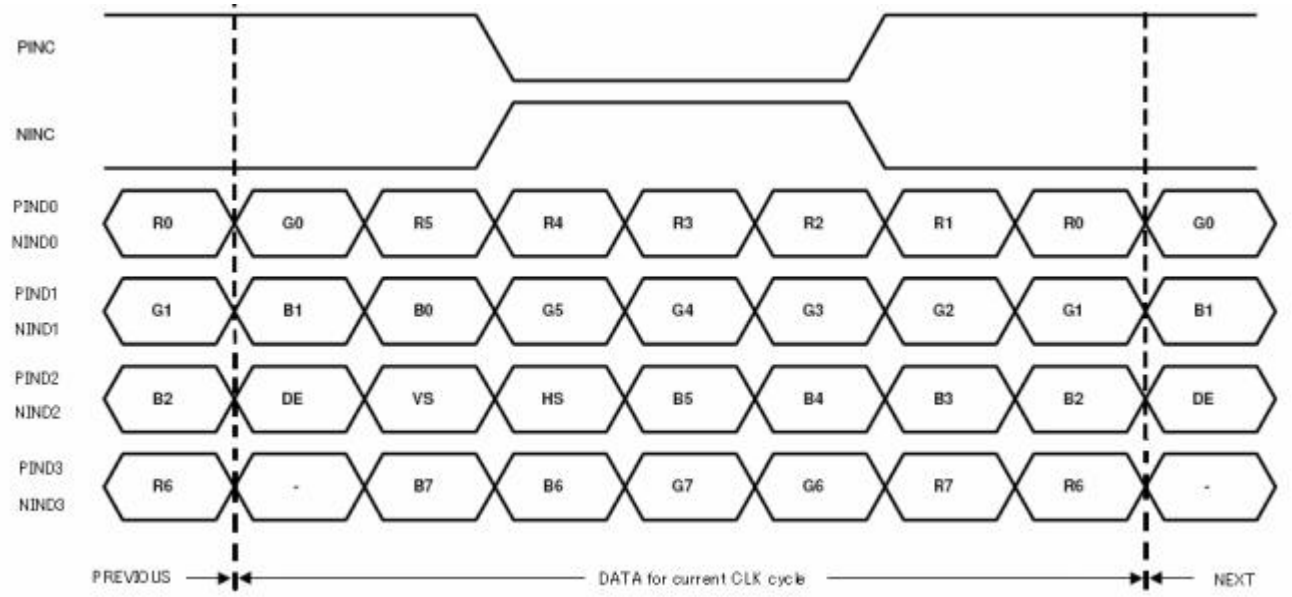


4.2.3 LVDS Input Data mapping

6Bit LVDS input



8Bit LVDS input



5.Optical Specifications

5.1 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	Θ=0 Normal viewing angle	600	800	—		(1)(2)
Response time	Rising	TR		—	10	20	msec	(1)(3)
	Falling	TF		—	15	30		
White luminance(center)		YL		250	280	-	Cd/m²	I=160mA
Color gamut		S		—	-	—	%	C light
Color chromaticity (CIE1931)	White	Wx		0.271	0.291	0.311		(1)(4) CF Glass C light
		Wy		0.285	0.305	0.325		
	Red	Rx		0.562	0.582	0.602		
		Ry		0.305	0.325	0.345		
	Green	Gx		0.323	0.343	0.363		
		Gy		0.587	0.607	0.627		
	Blue	Bx		0.147	0.167	0.187		
		By		0.081	0.101	0.121		
Viewing angle	Hor.	Θ L	CR>10	65	75	—		
		Θ R		65	75	—		
	Ver.	Θ U		60	70			
		Θ D		65	75			
Optima View Direction		12 O'clock						(5)

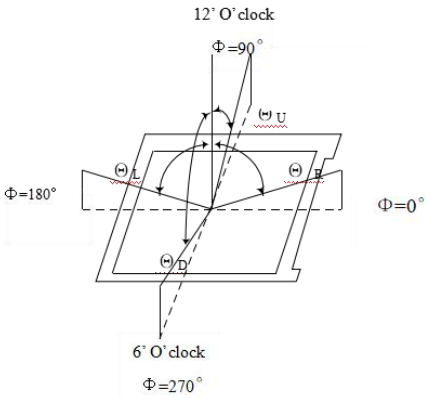
5.2 Measuring Condition

- Measuring surrounding: dark room
- LED current I_L: 160mA
- Ambient temperature: 25±2°C
- 15min. warm-up time.

5.3 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

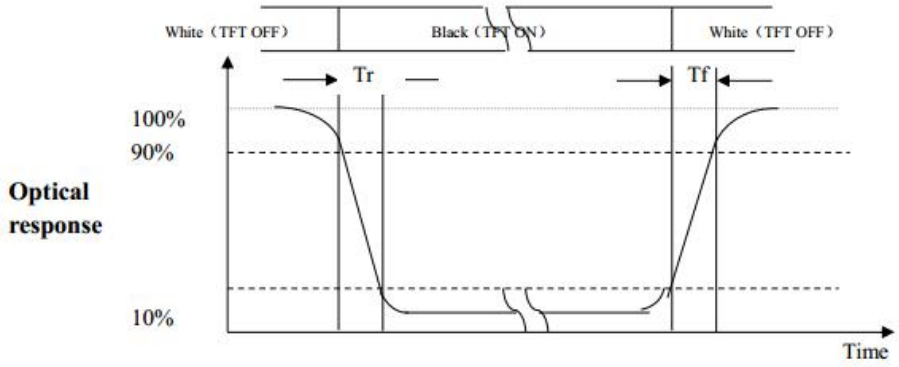
Note (1) Definition of Viewing Angle:



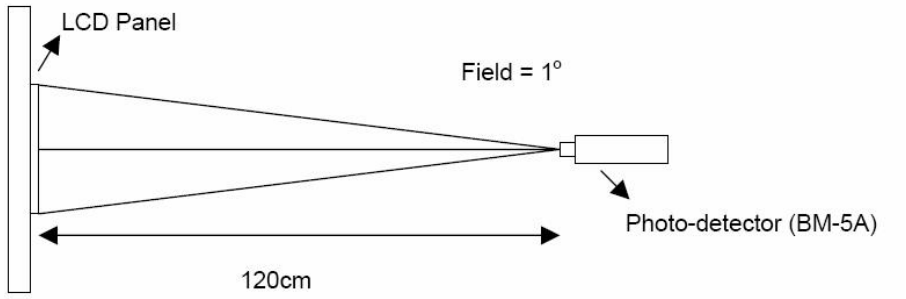
Note (2) Definition of Contrast Ratio (CR):
measured at the center point of pane

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

Note (3) Definition of Response Time: Sum of T_R and T_F

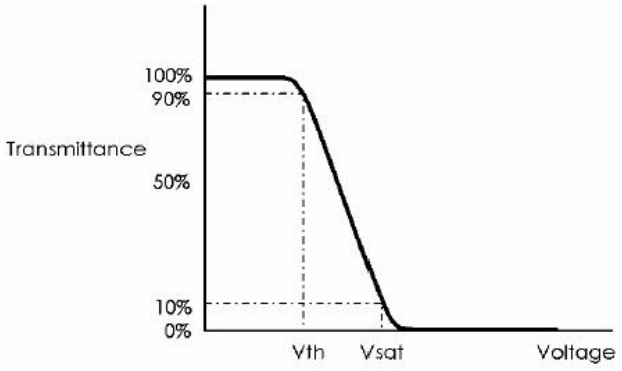


Note (4) Definition of optical measurement setup



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.