Product Specification

Part Name: 10.10 inch TFT Display Module
Customer Part ID:
Topovision Part ID: TVT1010D9E
Ver: A

Customer:
Approved by

From: Topovision Technology Co.,Ltd.
Approved by

Notes:

1. Please contact Topovision Technology Co., Ltd. before assigning your product based on this module specification
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Topovision Technology Co., Ltd. for any intellectual property claims or other problems that may result from application based on the module described herein.

1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by Topovision Technology CO., LTD.
LCD specification: Dots 1024xRGBx600.
As to basic specification of the driver IC, refer to the IC (Sitronix: ILI6150H2+ILI6120) specification and data book.
All material & processing of the LCD module should be Lead Free.

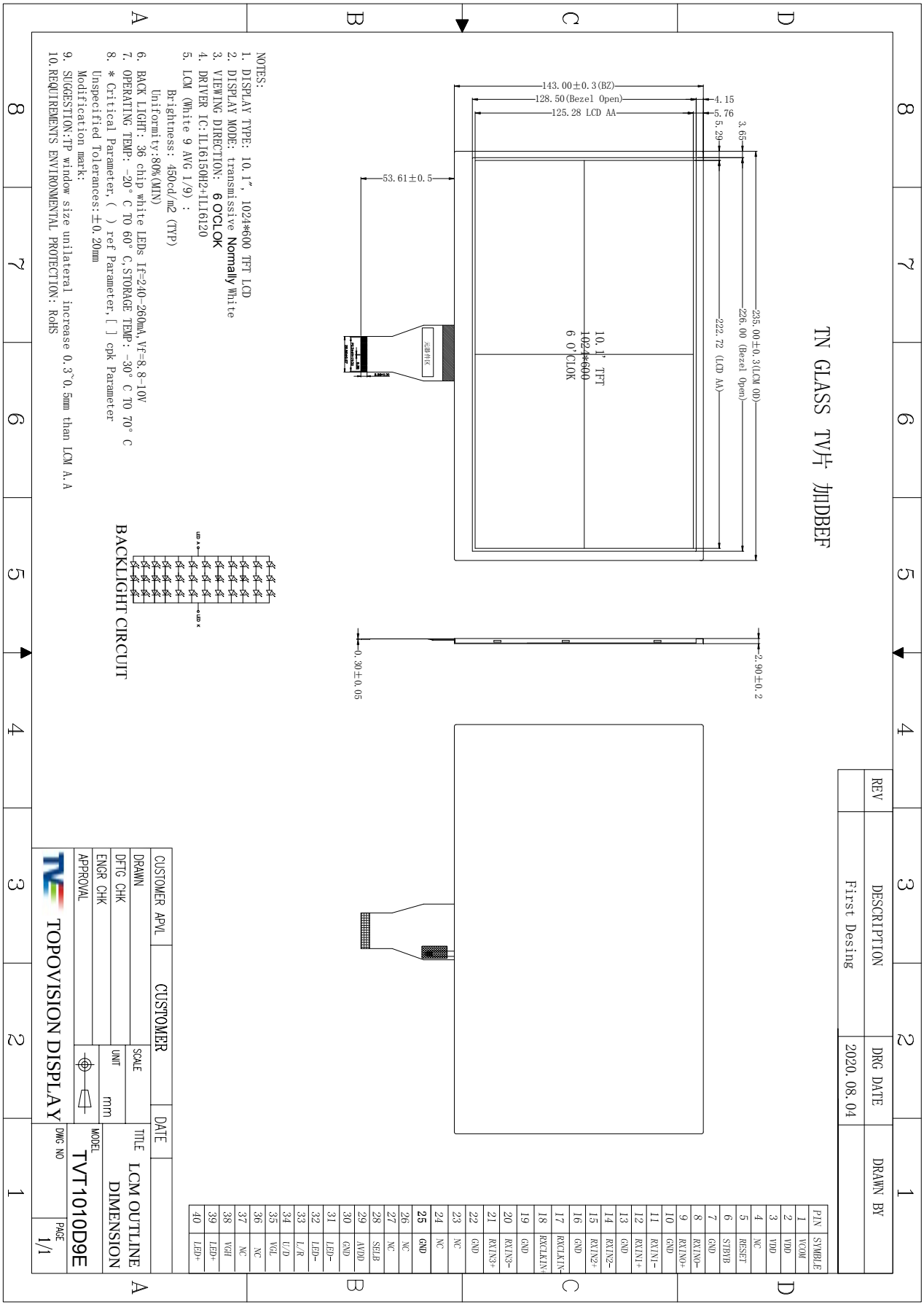
1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL+CTP;
6 O'CLOCK Type LCD
1024dot-segment and600 dot-common outputs;
16.7M Color can be selected by software;
White LED back light;
4Lane LVDS interface

1.3 Applications:

2. LCM General specification

ITEM	Sandard value	Unit
LCD Type	Normally White	--
Drive element	TFT active matrix	--
Number of pixels	1024*3RGB(H)X600(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (H*V)	0.2175 (H)×0.2088(V)	mm
Active area	222.72(H) x 125.28(V)	mm
Viewing direction	6 O'CLOCK	-
TFT Driver IC	ILI6150H2+ILI6120	
TFT interface	LVDS interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	235.00(W)x143.00(H) x 2.90(T)	mm
Touch structure		
Touch Driver IC		-
Touch Interface		


TN GLASS TV片 加DBEF
143.00±0.3(BZ)
128.50(Bezel Open)
125.28 LCD AA
4.15
5.76
5.29
3.65
235.00±0.3(LCM OD)
226.00 (Bezel Open)
222.72 (LCD AA)
53.61±0.5
10.1" TFT
1024*600
6 O'CLOK
0.30±0.05
2.90±0.2
BACKLIGHT CIRCUIT
NOTES:
1. DISPLAY TYPE: 10.1", 1024*600 TFT LCD
2. DISPLAY MODE: transmissive Normally White
3. VIEWING DIRECTION: 6 O'CLOK
4. DRIVER IC:ILI6150H2+ILI6120
5. LCM (White 9 AVG 1/9) :
Brightness: 450cd/m2 (TYP)
Uniformity:80%(MIN)
6. BACK LIGHT: 36 chip white LEDs If=240~260mA, Vf=8.8~10V
7. OPERATING TEMP: -20° C TO 60° C,STORAGE TEMP: -30° C TO 70° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
Unspecified Tolerances:±0.20mm
Modification mark:
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS
REV
DESCRIPTION
DRG DATE
DRAWN BY
First Desing
2020.08.04
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 NC
28 SELB
29 AVDD
30 GND
31 LED-
32 LED-
33 L/R
34 U/D
35 VGL
36 NC
37 NC
38 VGH
39 LED+
40 LED+
CUSTOMER APVL
CUSTOMER
DATE
DRAWN
DFTG CHK
ENGR CHK
APPROVAL
SCALE
UNIT
mm
TITLE
LCM OUTLINE DIMENSION
MODEL
TVT1010D9E
DWG NO
PAGE
1/1
TOPOVISION DISPLAY

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T_{OPR}	-20	+60	°C
LCM Storage Temperature	T_{STG}	-30	+70	°C
Humidity	RH	-	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO	-	-	-	V
Supply Voltage VDD	VDD	3.0	3. 3	3.6	V
Supply Voltage VGH	VGH	14.55	15	15.45	V
Supply Voltage VGL	VGL	-7.35	-7	-6.65	V
Supply Voltage AVDD	AVDD	8.0	9.0	10	V
Supply Voltage VCOM	VCOM	3.7	4	4.3	V

Note :

*1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

The storage structure of this model is CST(Storage on Common)

*3. Vcom must be adjusted to optimize display quality _Cross talk, Contrast Ratio and etc.

4.2 Back-Light Unit Characeristics

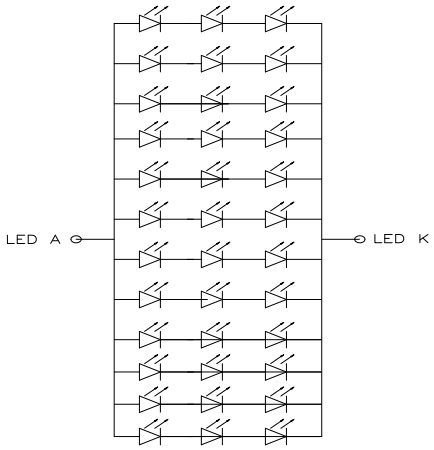
The back-light system is an edge-lighting type with white 36 LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	8.8	--	10	V	-
Forward current	I_F	--	240	-	mA	-
Luminance(With LCD)	Lv		450	--	cd/m^2	-
LED life time	N/A	--	30000	--	Hr	Note 1

Note:

(1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

LCM PIN Description:

Pin No.	Symbol	I/O	Function	Note
1	Vcom	-	Common voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	-	No connection	
5	Reset	I	Blobal reset pin	
6	STBYB	I	Standby mode. Normally pulled high STBYB="1", normal operation STBYB="0" timing controller, source driver will turn off ,all output are High-Z	
7	GND	P	Digital ground	
8	RXIN0-	I	-LVDS differential data input	
9	RXIN0+	I	+LVDS differential data input	
10	GND	P	Digital ground	
11	RXIN1-	I	-LVDS differential data input	
12	RXIN1+	I	+LVDS differential data input	
13	GND	P	Digital ground	
14	RXIN2-	I	-LVDS differential data input	
15	RXIN2+	I	+LVDS differential data input	
16	GND	P	Digital ground	
17	RXCLKIN-	I	-LVDS differential data input	
18	RXCLKIN+	I	+LVDS differential data input	
19	GND	P	Digital ground	
20	RXIN3-	I	-LVDS differential data input	
21	RXIN3+	I	+LVDS differential data input	
22	GND	P	Digital ground	
23	NC	-	No connection	
24	NC	-	No connection	
25	GND	P	Digital ground	
26	NC	-	No connection	
27	NC	-	No connection	
28	SELB	I	6 bit/8 bit mode select	
29	AVDD	I	Power for Analog Circuit	
30	GND	P	Digital ground	
31	LED-	I	LED Cathode	
32	LED-	I	LED Cathode	
33	L/R	P	Horixontal inversion	
34	U/D	P	Vertical inversion	
35	VGL	I	Gate OFF Voltage	
36	NC	-	No connection	
37	NC	-	No connection	
38	VGH	I	Gate ON Voltage	
49	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Note 1: 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;

Note 2: 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.

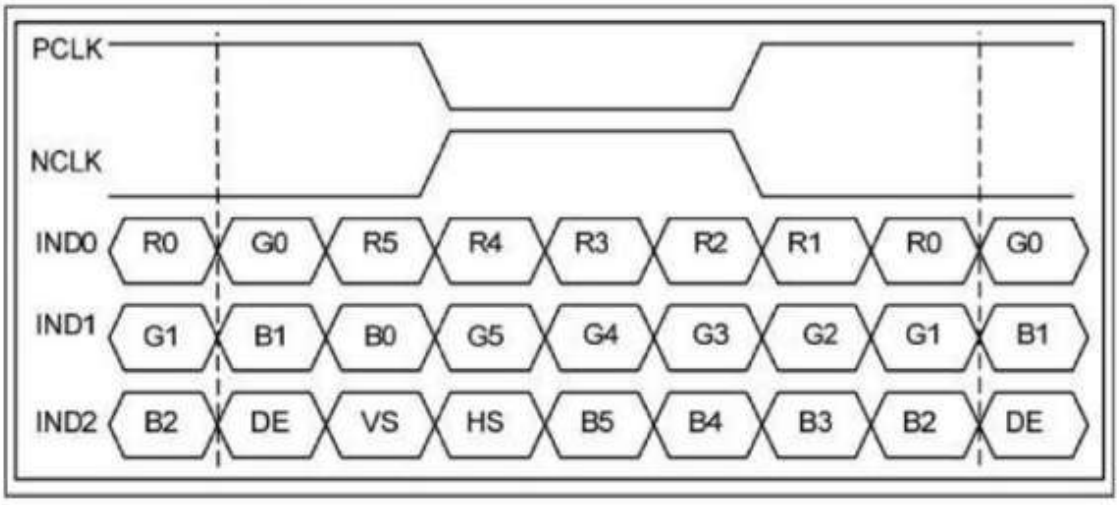
6. Timing Characteristics

6.1 Switching Characteristics for LVDS Receiver

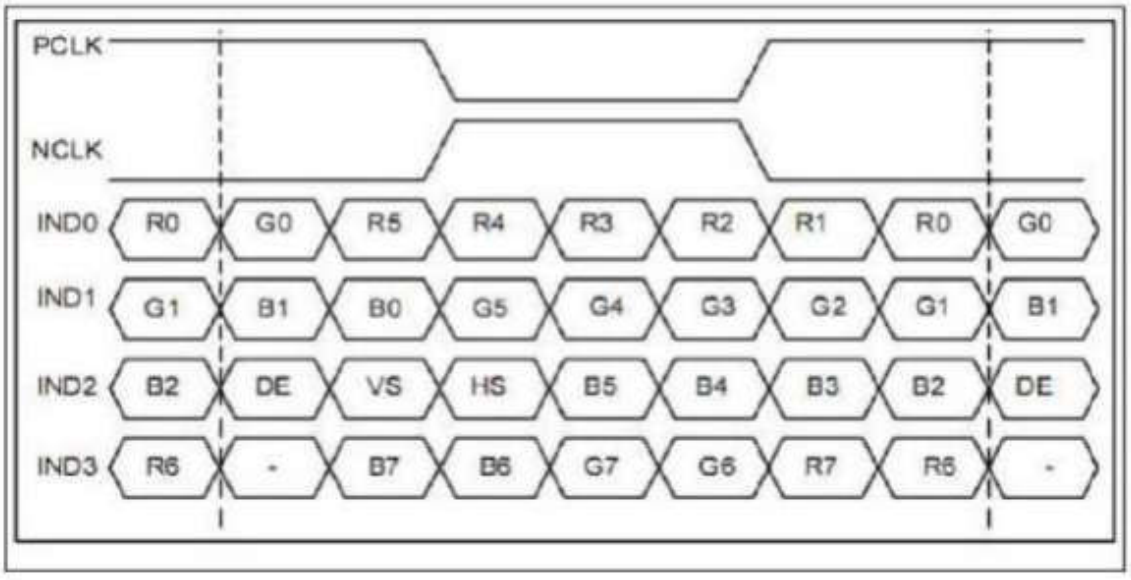
Item	Symbol	Min	Typ	Max	Unit	Confitions
Differential Input High Threshold	Vth	-	-	100	mV	VCM=1.2V
Differential Input Low Threshold	Vtl	-100	-	-	mV	
Input Current Different input Voltage	IIN |Vid|	-10	-	+10	uA	
		0.1	-	0.6	V	
Common Mode Voltage Offset	VCM	0.7	1.2	1.6-	V	

6.2 Bit LVDS input

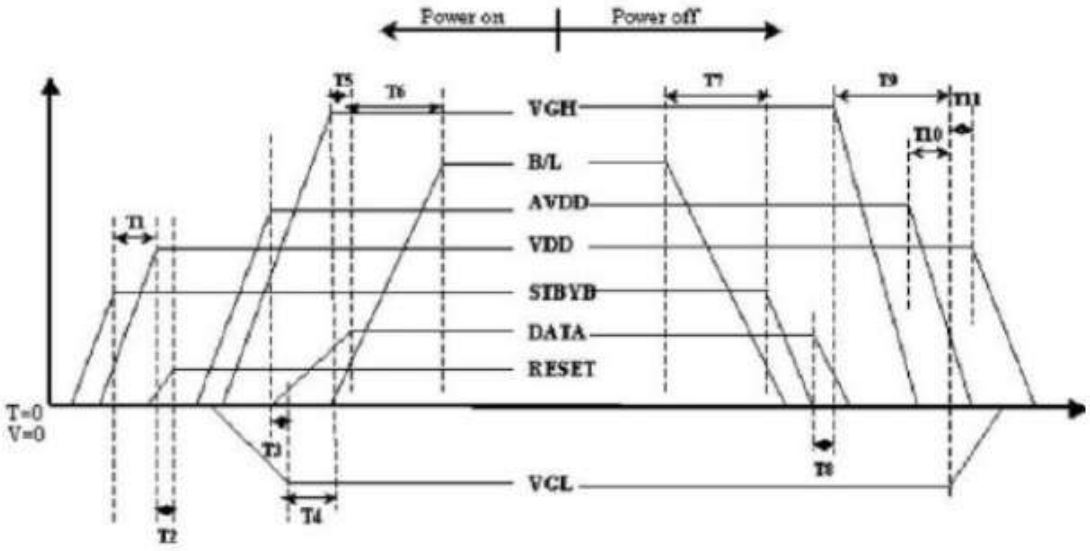
6.2.1 6bit LVDS input:



6.2.2 8bit LVDS input:



6.3 Power Signal sequence



Item	Min.	Typ.	Max.	Unit
T1	0	--	--	ms
T2	50	--	--	ms
T3	5	--	--	ms
T4	10	--	--	ms
T5	20	--	--	ms
T6	50	--	--	ms
T7	20	--	--	ms
T8	10	--	--	ms
T9	20	--	--	ms
T10	10	--	--	ms
T11	20	--	--	ms

Note(1) : LED life time (Hr) can be defined as the time in which it continues to operate under the contition: Ta=25±3℃, typical IL value indicated in the above table until the brigntness becomes less than 50%.

6.4 Interface Timing(DE mode)

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	55	60	65	Hz
Frame Period	t1	612	635	680	line
Vertical Display Time	t2	600	600	600	line
Vertical Blanking Time	t3	12	35	80	line
1 Line Scanning Time	t4	1114	1344	1400	clock
Horizontal Display Time	t5	1024	1024	1024	clock
Horizontal Blanking Time	t6	90	320	376	clock
Clock Rate	t7	40.8	51.2	61.6	MHz

6.5 AC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	25			ns	
DCLK frequency	fclk	44.9	51.2	63	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		1024		Tcph	
HSD period time	th	1200	1344	1400	Tcph	
HSD pulse width	thpw	1	-	140	Tcph	
HSD back porch	thb		160		Tcph	
HSD front porch	thfp	16	160	216	Tcph	
Vertical display area	tvd		600		th	
VSD period time	tv	624	635	750	th	
VSD pulse width	tvpw	1	-	20	th	
VSD back porch	tvb		23		th	
VSD front porch	tvfp	1	12	127	th	

7.Optical Characteristics

7.1 Optical specification

Item		Symbol	Condition	Min	Type	Max	Unit	Note
White luminance (Center)		YL	Θ=0 Normal Viewing Angle	400	450		cd/m2	(1)(4)(6)
Response time		Tr+Tf		--	16	25	msec	(1)(3)
Contrast ratio		CR		400	500	--	--	(1)(2)
Color Chromaticity (CIE 1931)	white	Wx		0.260	0.310	0.360		(1)(4)
		Wy		0.280	0.330	0.380		
Viewing Angle	Hor.	ΘL	CR≥10	40	45	--		(1)(4)
		ΘR		40	45	--		
	Ver.	ΘU		10	15	--		
		ΘD		30	35	--		
Brightness uniformity		BUNI	Θ=0	70	--	--	%	(5)
Optima View Direction		6 o'clock						

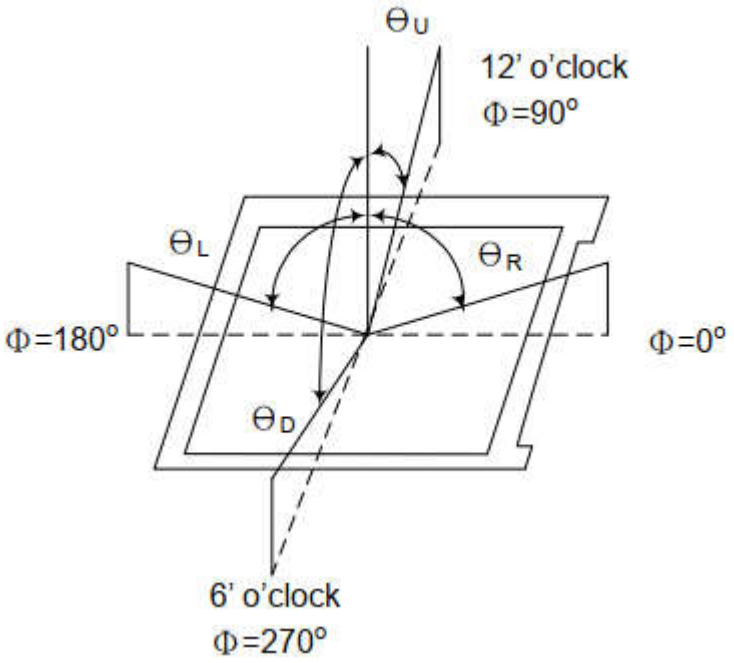
7.2 Measuring Condition

- Measuring surrounding： dark room
- Ambient temperature： 25±2°C
- 15min. warm-up time.

7.3 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 ~ 21 mm

Note (1) Definition of Viewing Angle:

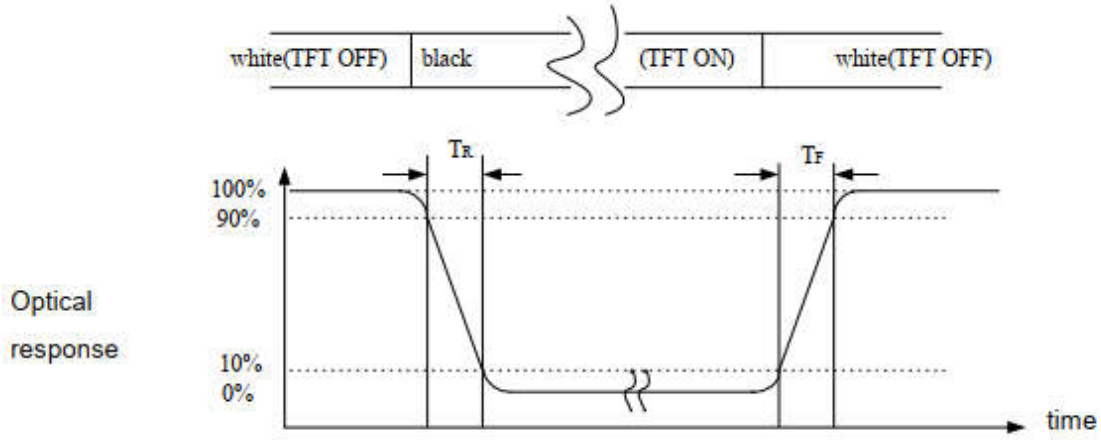


Note (2) Definition of Contrast Ratio (CR) :

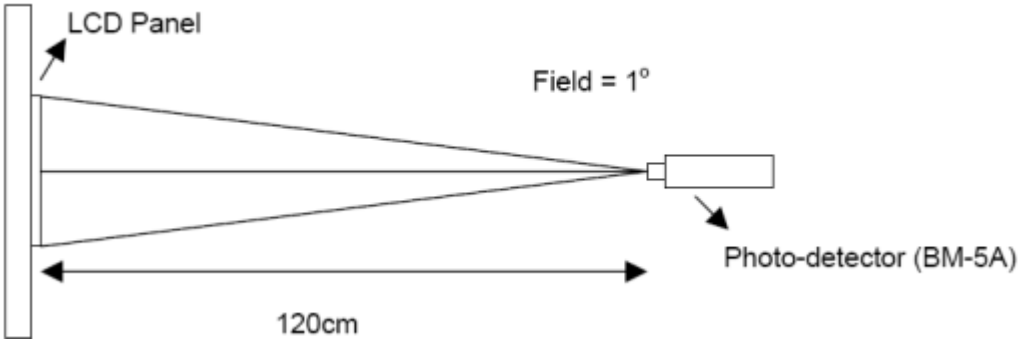
measured at the center point of panel

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

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 optima view direction.

8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+70°C / 96H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Tempe. Operating	+60°C / 96H	
4	Low Tempe. Operating	-20°C / 96H	
5	High Temperature /Humidity storage	50°C x 90%RH /96H	
6	Thermal and cold shock	Static state， -20℃（30min） ~60℃（30min），50 cycles	

9. Packing Method----TBD

- END -