Product Specification

Part Name:　　5.00　inch　TFT　Display　Module
Customer Part ID: TLET0500B9-I　(IPS　)

1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by Element Touch.
LCD specification: Dots 800xRGBx480.
As to basic specification of the driver IC, refer to the IC (ST7262H) 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;
ALL O'CLOCK Type LCD
800dot-segment and 480 dot-common outputs;
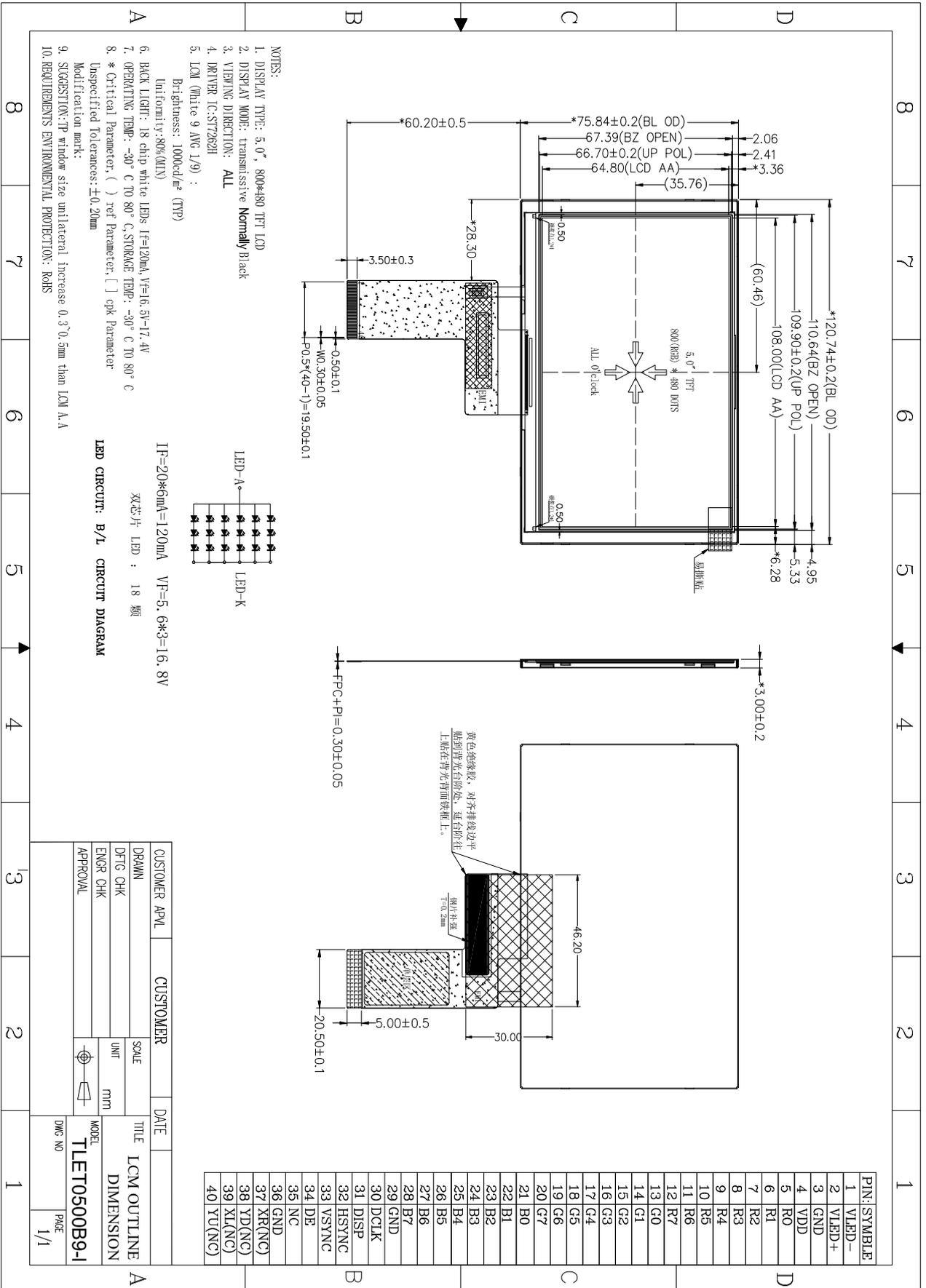16.7M Color can be selected by software;
White LED back light;
24 bit RGB interface

1.3 Applications:

2. LCM General specification

ITEM	Sandard value	Unit
LCD Type	Normally black	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.135 (H) x 0.135 (V)	mm
Active area	108 (H) x 64.8 (V)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	ST7262H	
TFT interface	24 bit RGB Interface	-
Module Size(W*H*T)	120.74(W) ×75.84(H) ×3.00(T)	mm
Approx. Weight	TBD	g
Touch structure		
Touch Driver IC		-
Touch Interface		

NOTES:
1. DISPLAY TYPE: 5.0″, 800*480 TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL
4. DRIVER IC:ST7262H
5. LCM (White 9 AVG 1/9) :
   Brightness: 1000cd/m² (TYP)
   Uniformity:80%(MIN)
6. BACK LIGHT: 18 chip white LEDs IF=120mA,VF=16.5V~17.4V
7. OPERATING TEMP: -30°C TO 80°C,STORAGE TEMP: -30°C TO 80°C
8. * Critical Parameter, ( ) ref Parameter,[ ] cpk Parameter
   Unspecified Tolerances:±0.20mm
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10.REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS

LED-A

LED-K

IF=20*6mA=120mA   VF=5.6*3=16.8V
双芯片 LED : 18 颗

LED CIRCUIT: B/L CIRCUIT DIAGRAM

*60.20±0.5
-3.50±0.3
*28.30
0.50±0.1
W0.30±0.05
P0.5*(40-1)=19.50±0.1

*75.84±0.2(BL OD)
67.39(BZ OPEN)
66.70±0.2(UP POL)
64.80(LCD AA)
(35.76)
2.06
2.41
*3.36

*120.74±0.2(BL OD)
110.64(BZ OPEN)
109.90±0.2(UP POL)
108.00(LCD AA)
(60.46)
4.95
5.33
*6.28

5.0″ TFT
800(RGB)* 480 DOTS
ALL 0'clock

0.50
0.50

*3.00±0.2
FPC+PI=0.30±0.05

46.20
30.00
20.50±0.1
5.00±0.5

PIN	SYMBLE
1	VLED-
2	VLED+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	XR(NC)
38	YD(NC)
39	XL(NC)
40	YU(NC)

CUSTOMER APVL		CUSTOMER		
DRAWN				
DFTG CHK		SCALE	DATE	
ENGR CHK		UNIT		
APPROVAL		mm		

TITLE: LCM OUTLINE DIMENSION
MODEL: TLET0500B9-I
DWG NO
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3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T_{OPR}	-30	+80	°C
LCM Storage Temperature	T_{STG}	-30	+80	°C
Humidity	RH	-	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage for(DC/DC)	VDD	3.1	3.3	3.6	V	
TFT Gate ON Voltage	VGH	--	(15)	--	V	*1,*2
TFT Gate OFF Voltage	VGL	--	(-10)	--	V	
TFT Common Voltage	Vcom	--	(0)	--	V	
Data (RGB signal) Voltage	Vsig	(-5.5)	--	(5.5)	V	

Note:

*1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

The storage structure of this model is C_{ST}(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 18 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	16.5	--	17.4	V	-
Forward current	I_F	--	120	-	mA	-
Luminance(With LCD)	Lv		1000	--	cd/m^2	-
LED life time	N/A	----	20,000	--	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:

LED-A   LED-K
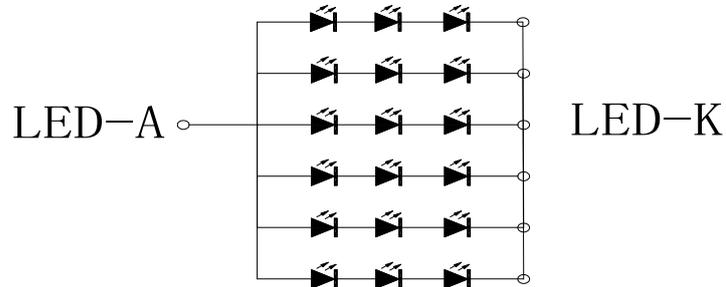
5. Module Function Description

Pin No.	Symbol	Description
1	LEDK	POWER SUPPLY- FOR BACKLIGHT cathode
2	LEDA	POWER SUPPLY+ FOR BACKLIGHT ANODE
3	GND	GND
4	VDD	POWER SUPPLY
5~12	R0~R7	8 bit data bus display red data.
13~20	G0~G7	8 bit data bus display green data
21~28	B0~B7	8 bit data bus display blue data
29	GND	GND
30	DCLK	Pixel clock signal in RGB I/F
31	DISP	DISP=0：Standby mode (Default)、DISP=1：Normal display mode
32	HSYNC	Horizontal sync. Signal in RGB I/F
33	VSYNC	Vertical sync. Signal in RGB I/F
34	DE	Data enable signal in RGB I/F mode 1
35	NC	NC
36	GND	GND
37	XR(NC)	NC
38	YD(NC)	NC
39	XL(NC)	NC
40	YU(NC)	NC

6. Timing Characteristics

RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side

DE Mode：
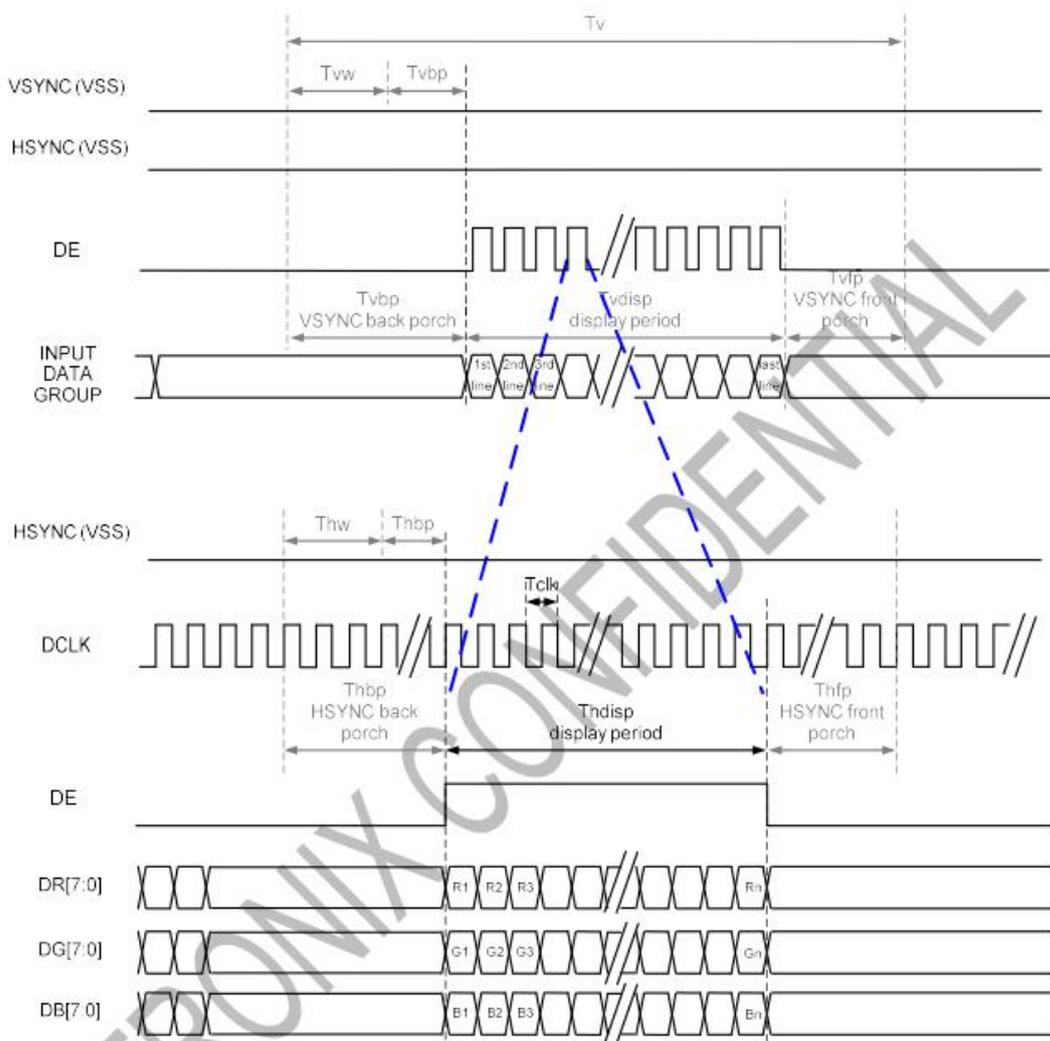
SYNC Mode：
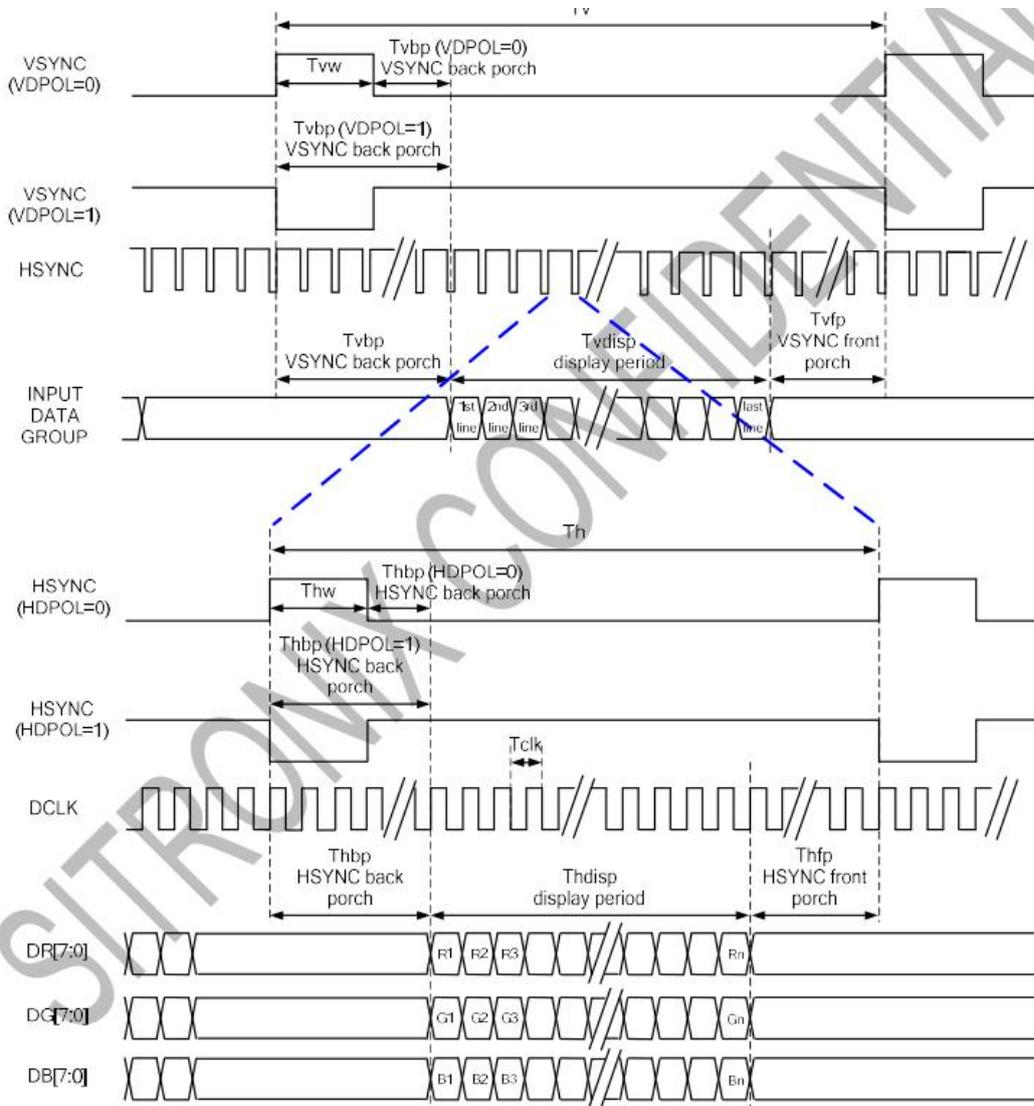
Parallel 24-bit RGB Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	-	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	-	8	48	DCLK	
	Front Porch	Thfp	-	8	48	DCLK	
	Pulse Width	Thw	-	4	8	DCLK	
VSYNC	Period Time	Tv	-	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	-	8	12	HSYNC	
	Front Porch	Tvfp	-	8	12	HSYNC	
	Pulse Width	Tvw	-	4	8	HSYNC	

Note: The minimum blanking time depends on the GIP timing of the panel specification.

7.Optical Characteristics

7.1 Optical Specification

| Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (with Polarizer)		T (%)	Θ=0 Normal viewing angle	—	(4.8)	—	%	Measuring with normal polarizer, Reference Only Base on Vop=5.1V
Transmittance (without Polarizer)		T (%)		—	(16.2)	—	%	
Contrast Ratio		CR		(800)	(1000)	—	—	(1)(2)
Response Time		T_R+T_F		—	30	40	msec	(1)(3)
Color Gamut	(%)			45	50	—	%	C-light
Color Chromaticity (CIE1931)	White	W_x		—	(0.320)	—	—	(1)(4) CF glass C-light
		W_y		—	(0.345)	—		
	Red	R_x		—	(0.629)	—	—	
		R_Y		—	(0.326)	—		
	Green	G_x		—	(0.337)	—	—	
		G_Y		—	(0.546)	—		
	Blue	B_x		—	(0.136)	—	—	
		B_Y		—	(0.143)	—		
Viewing Angle	Hor.	$Θ_L$	CR>10	70	80	—	—	(1)(4) Measuring with normal polarizer, Reference Only
		$Θ_R$		70	80	—		
	Ver.	$Θ_U$		70	80	—		
		$Θ_D$		70	80	—		
Optima View Direction			Free					(5)

7.2 Measuring Condition

■ Measuring surrounding: dark room

■ Ambient temperature: 25±2oC

■ 15min. warm-up time.

7.3 Measuring Equipment

■ FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity
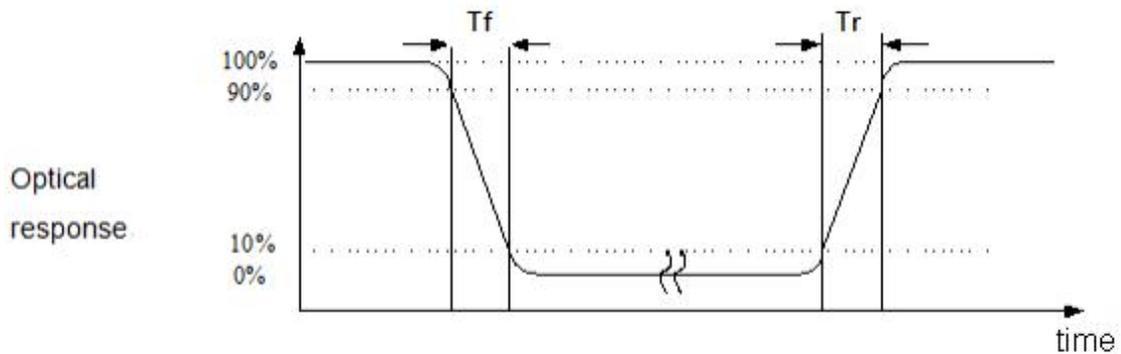and BM-5A for other optical characteristics.

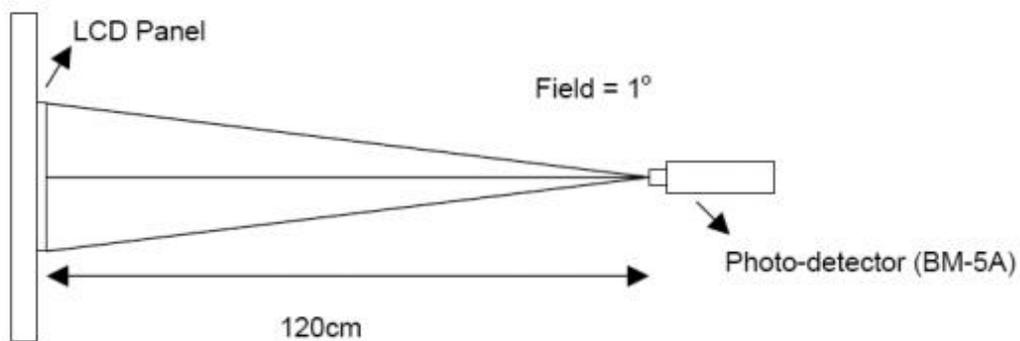Note (1) Definition of Viewing Angle:
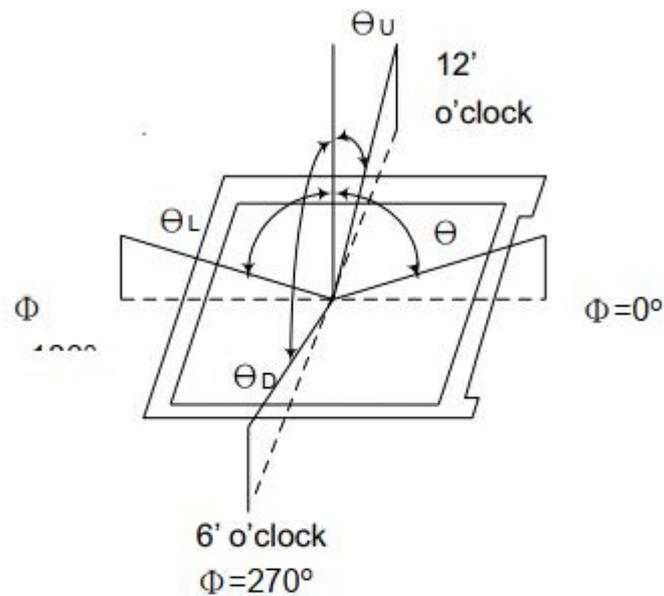
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

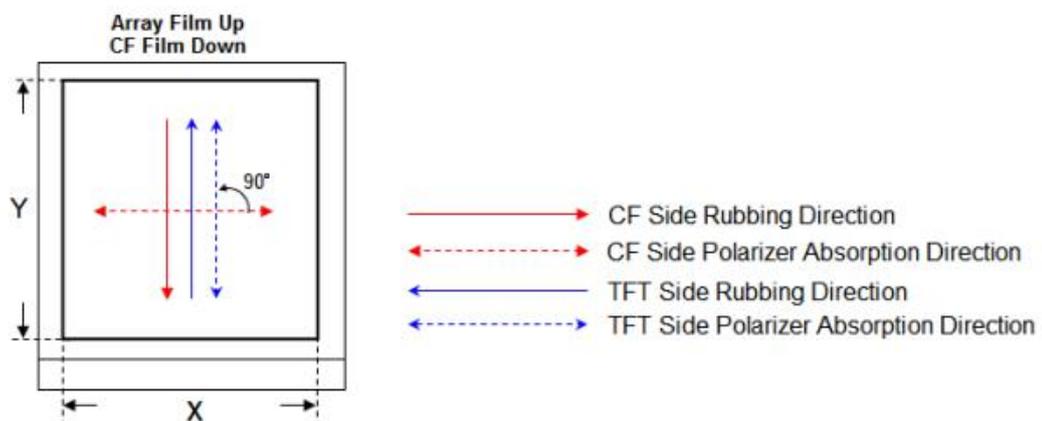$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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

Note (4) Definition of optical measurement setup

Note (5) Rubbing Direction & Polarizer Absorption Direction

Item	Specifications	Unit	Note
Rubbing Direction	90° (TFT) / -90° (CF)	degree	2-domain IPS-pro
Absorption axis of Polarizer	90° (TFT) / 0° (CF)	degree	Array Film Up CF Film Down

8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°C / 240H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed.
2	Low Temp. Storage	-30°C / 240H	
3	High Tempe. Operating	+80°C / 240H	
4	Low Tempe. Operating	-30°C / 240H	
5	High Temperature /Humidity storage	60+5°C x 90%RH / 240 H	2. No low temperature bubbles,end seal loose andfall, frame rainbow.
6	Thermal and cold shock	Static state，-30℃ 30min）~80℃ （30min）， 50 cycles	

9. Packing Method----TBD

- END -