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Shenzhen Youritech Technology Co.,Ltd

Project No. 项目编号	ET070WX01-TT		
Customer 客户名称			
Module No. 客户型号			
Product type 产品内容	Standard LCD Module TFT: 800*RGBx1280Dots 7.0”TFT LCD + CTP		
客户确认Customer Approval			
项目负责人Project Manager			
品质主管Director of Quality			
采购工程师Purchasing Engineer			

1. Introduction

1.1 Scope of application

LCD specification: Dots 800xRGBx1280

As to basic specification of the driver IC, refer to the IC (GH8555BL) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC1+BL+CTP;

ALL Viewing Type LCD

800 dot-segment and 1280 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

4lane MIPI interface

Touch I2C interface

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X1280(V)	Dots
Pixel arrangement	RGB Vertical Stripe	--
Pixel Pitch (W*H)	0.11775(H) X 0.11775(V)	mm
Active area	94.20(H) x 150.72(V)	mm
Viewing direction	ALL O'CLOCK	-
TFT Driver IC	GH8555BL	
TFT interface	4lane MIPI interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	99.65(W) ×160.85(H) ×2.40(T)	mm
LCM+CTP Size(W*H*T)	111.22(W) ×174.44(H) ×4.45(T)	mm
Touch structure	G+G	
Touch Driver IC	FT5446	-
Touch Interface	I2C	

Technical Drawing Details:

- Front View Dimensions:**
 - Top: 111.22±0.1 (LENS OD), 94.20 (LENS VA), 94.20 (LCD AA), 8.01, 5.51
 - Left: 174.44±0.1 (LENS OD), 151.72 (LENS VA), 150.72 (LCD AA), 11.36, 11.56
 - Bottom: 60.00±0.5, 46.46±0.5, 10, 0.50, 5.50
 - Internal: 7.0" TFT, 800 RGB (H) x 1280 (V), ALL 0° CLOCK
 - Other: 0.95, 0.95±0.05, 0.95, 0.95±0.05, 0.95±0.05, 0.95±0.05
- Side View Dimensions:**
 - Top: 4.45±0.3 (总成), 1.85±0.1 (TP), 0.20 (OCA), 2.40±0.1 (LCM)
 - Bottom: max 1.20, -0.30±0.03
- Detail View Dimensions:**
 - Top: 5.17, 0.62, 100.89±0.1 (SENSOR), 99.65±0.2 (BL), 5.17, 5.79, 0.5
 - Right: 161.70±0.1 (SENSOR), 160.85±0.2 (BL), 161.70±0.1 (SENSOR), 160.85±0.2 (BL)
 - Other: 5.17, 0.62, 100.89±0.1 (SENSOR), 99.65±0.2 (BL), 5.17, 5.79, 0.5
- Pin Definitions:**

PIN NO	DEFINITION
1	NC
2	NC
3	RST
4	GND
5	INT
6	SDA
7	SCL
8	GND
9	GND
10	VDD
- Technical Parameters:**
 - 1. 结构: G+G
 - 2. IC型号: FT5446
 - 3. 工作电压: 2.8V~3.3V
 - 4. 透光率: ≥85%
 - 5. 表面硬度: ≥6H
 - 6. 工作环境: -20°C~+70°C, 湿度20%~90%
 - 7. 储存环境: -30°C~+80°C, 湿度20%~90%
 - 8. 未注尺寸公差按±0.2mm
- Notes:**
 - 1. DISPLAY TYPE: 7.0", 800*1280 TFT LCD
 - 2. DISPLAY MODE: transmissive Normally Black
 - 3. VIEWING DIRECTION: ALL 0° CLOCK
 - 4. DRIVER IC: GH855BL
 - 5. LCM (White 9 AVG 1/6) : Brightness: cd/m2 (TBD) Uniformity: 80% (MIN) BACK LIGHT: 20 chip white LEDs If=80mA, Vf=14V~16V
 - 6. OPERATING TEMP: -20° C TO 60° C, STORAGE TEMP: -30° C TO 70° C
 - 7. * Critical Parameter, () ref Parameter, [] epk Parameter
 - 8. Unspecified Tolerances: ±0.20mm
 - 9. Modification mark:
 - 10. SUGGESTION: TP window size unilateral increase 0.3*0.5mm than LCM A.A
 - 10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS

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
TP Operating Temperature & Humidity(20% ~ 90%RH)	T _{OPR}	-20	+60	°C
TP SStorage Temperature & Humidity(20% ~ 90%RH)	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	1.65	1.8	3.6	V
Supply Voltage for(DC/DC)	VDD	2.7	2.8	3.6	V
Current Consumption	I _{DD}	--	--	50	mA
	I _{DD-SLEEP}	--	80	160	uA

4.2 Back-Light Unit Characeristics

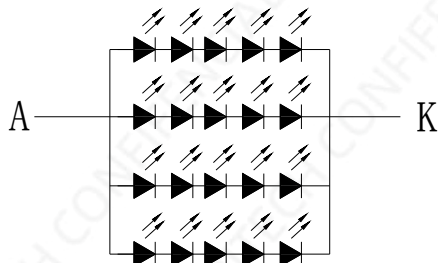
The back-light system is an edge-lighting type with 20 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	14		16	V	-
Forward current	I _F	--	80	-	mA	-
Luminance(With LCD)	L _V		TBD	--	cd/m ²	-
LED life time	N/A	----	30,000	--	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:



5. Module Function Description

Pin No.	Symbol	LCM Functional	Notes
1	LEDA	Power supply for backlight anode input terminal.	
2	LEDA	Power supply for backlight anode input terminal.	
3	LEDA	Power supply for backlight anode input terminal.	
4	NC	NC	
5	LEDK	Power supply for backlight cathode input terminal.	
6	LEDK	Power supply for backlight cathode input terminal.	
7	LEDK	Power supply for backlight cathode input terminal.	
8	LEDK	Power supply for backlight cathode input terminal.	
9	GND	Power Ground	
10	GND	Power Ground	
11	MIPI_D2+	MIPI-DSI Data differential signal input pins	
12	MIPI_D2-	MIPI-DSI Data differential signal input pins	
13	GND	Power Ground	
14	MIPI_D1+	MIPI-DSI Data differential signal input pins	
15	MIPI_D1-	MIPI-DSI Data differential signal input pins	
16	GND	Power Ground	
17	MIPI_CLK+	MIPI-DSI CLOCK differential signal input pins	
18	MIPI_CLK-	MIPI-DSI CLOCK differential signal input pins	
19	GND	Power Ground	
20	MIPI_D0+	MIPI-DSI Data differential signal input pins	
21	MIPI_D0-	MIPI-DSI Data differential signal input pins	
22	GND	Power Ground	
23	MIPI_D3+	MIPI-DSI Data differential signal input pins	
24	MIPI_D3-	MIPI-DSI Data differential signal input pins	
25	GND	Power Ground	
26	TE	Serves TE (Tearing Effect) pin on MPU interface	
27	RESET	Reset pin. Setting either pin low initializes the LSI	
28	ID	NC	
29	VDDIO/1.8V	power supply for the I/O circuit	
30	VDD/3.3V	power supply for DC/DC circuit	
31	VDD/3.3V	power supply for DC/DC circuit	

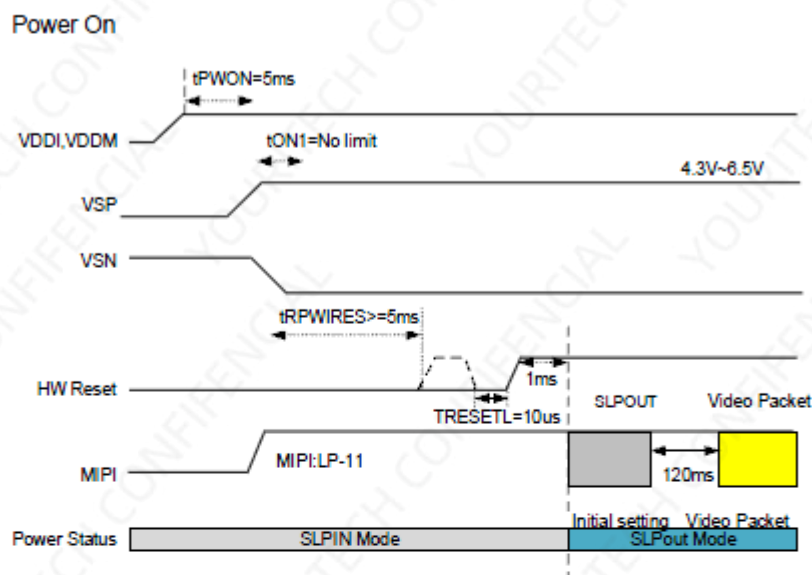
Pin No.	Symbol	TP Functional	Notes
1	NC	NC	
2	NC	NC	
3	TP_RST	Touch panel reset	I/O
4	GND	Power Ground	
5	TP_INT	Touch panel interrupt output	I/O
6	TP_SDA	Touch panel I2C data	I/O
7	TP_SCL	Touch panel I2C clock	I/O
8	GND	Power Ground	
9	GND	Power Ground	
10	TP_VDD	Touch panel I/O PWR supply	

6. Timing Characteristics

6.1 Power on sequence for differential power mode

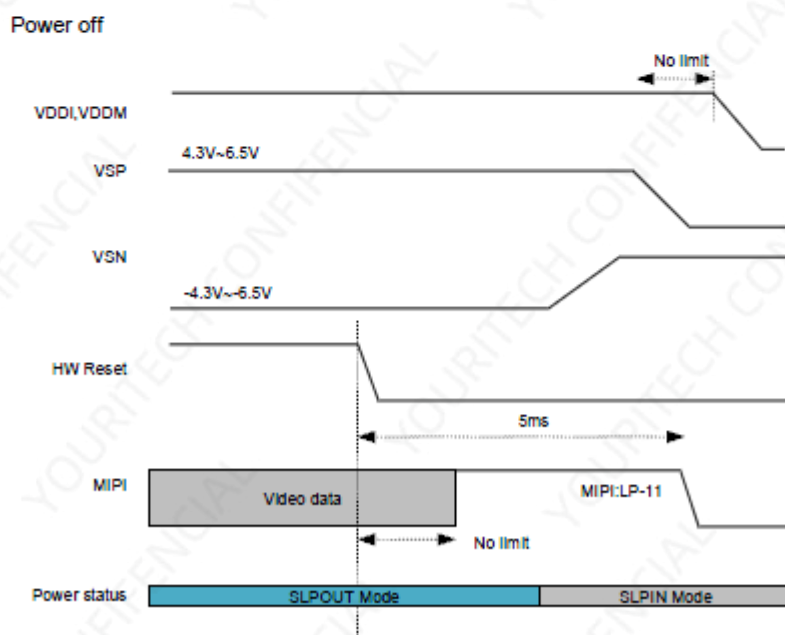
PM<1:0>=11 (External VSP/VSN Power)

VDDI=1.65V ~ 3.6V, VDDM=1.65V ~ 3.6V, VSP= 2.5V ~ 6.5V, VSN=-4.3V ~-6.5V



Note: t_{ON1} : The space time between VSP/VSP Power On and VSN Power On.

Figure 4.2: Power On sequence



Note: t_{ON1} : The space time between VSP Power On and VSN Power On.

Figure 4.3: Power-Off sequence

The diagram shows the timing of DSI Video Packets. The signals are:

- VS**: Vertical Synchronization signal, high during the display period and low during the blanking period.
- HS**: Horizontal Synchronization signal, a series of pulses during the blanking period.
- DE**: Data Enable signal, high during the display period and low during the blanking period.
- DB [23:0]**: Data Bus, carrying the video data.

The video packets are:

- VFP**: Vertical Front Porch packet.
- VS**: Vertical Sync packet.
- VBP**: Vertical Back Porch packet.
- VDISP**: Video Display period.

The diagram shows the sequence of video packets (VFP, VS, VBP) and the display period (VDISP). The data bus (DB [23:0]) is active during the display period and the blanking period.

Resolution=720x1280 ($T_A=25^{\circ}\text{C}$, $V_{DDI}=1.8\text{V}$, $V_{SP}=2.8\text{V}$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	-	Note(1)	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note(1)	Line
Vertical blanking period	VBK	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Resolution=640x1280 ($T_A=25^{\circ}\text{C}$, $V_{DDI}=1.8\text{V}$, $V_{SP}=2.8\text{V}$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	-	Note(1)	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note(1)	Line
Vertical blanking period	VBL	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Table 10.13: Vertical Timings for RGB I/F

6.3 Horizontal Timings

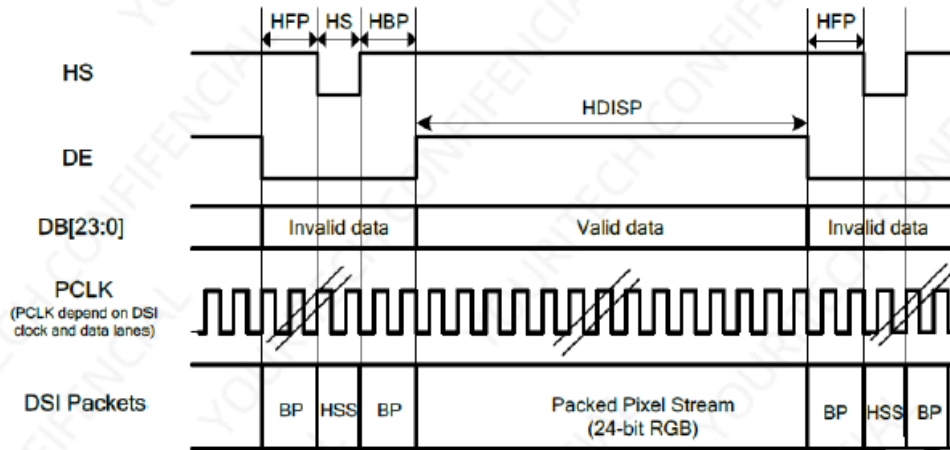


Figure 10.10: Horizontal Timing for DSI Video mode I/F

Resolution=720x1280 ($T_A=25^{\circ}\text{C}$, $V_{DDI}=1.8\text{V}$, $V_{SP}=2.8\text{V}$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
HS low pulse width	HS	-	6	-	78	DCK
Horizontal back porch	HBP	-	5	-	78	DCK
Horizontal front porch	HFP	-	5	-	78	DCK
Horizontal blanking period	HBLK	$HS+HBP+HFP$	16	-	88	DCK
Horizontal active area	HDISP	-	-	720	-	DCK

Resolution=640x1280 ($T_A=25^{\circ}\text{C}$, $V_{DDI}=1.8\text{V}$, $V_{SP}=2.8\text{V}$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
HS low pulse width	HS	-	6	-	78	DCK
Horizontal back porch	HBP	-	5	-	78	DCK
Horizontal front porch	HFP	-	5	-	78	DCK
Horizontal blanking period	HBLK	$HS+HBP+HFP$	16	-	88	DCK
Horizontal active area	HDISP	-	-	640	-	DCK

Table 10.14: Horizontal Timings for DSI Video mode I/F

Reset input timings

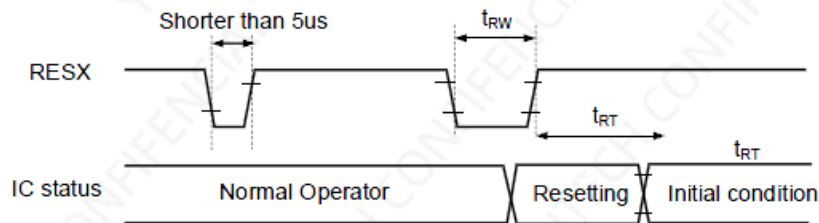


Figure 10.1: Reset input timings

Symbol	Parameter	Related pins	Min.	Max.	Unit
t_{RW}	Reset pulse width ⁽²⁾	RESX	10	-	μs
t_{RT}	Reset complete time ⁽³⁾	-	-	5 (Note 5)	ms
		-	-	120 (Note 6, 7)	ms

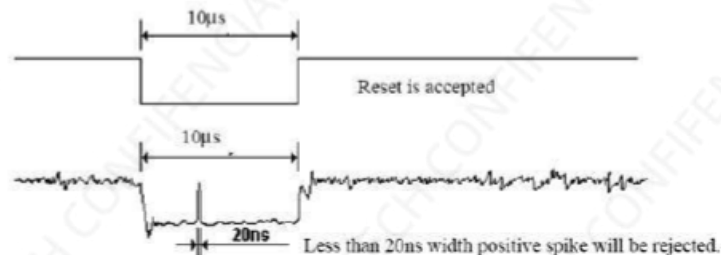
Note: (1) The reset complete time also required time for loading ID bytes from OTP to registers. This loading is done every time when there is HW reset cancel time (t_{RT}) within 5 ms after a rising edge of RESX.

(2) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 5 μs	Reset Rejected
Longer than 10 μs	Reset
Between 5 μs and 10 μs	Reset Start

(3) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then returns to Default condition for H/W reset.

(4) Spike Rejection also applies during a valid reset pulse as shown below:



(5) When Reset is applied during Sleep In Mode.

(6) When Reset is applied during Sleep Out Mode.

(7) It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

Table 10.3: Reset timings

7. Optical Characteristics

7.1 Optical Specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note			
Transmittance (with Polarizer)		T (%)	$\Theta=0$ Normal viewing angle	4.62	5.14	—	%	Measuring with Polarizer , Vop=5.1V Reference Only			
Transmittance (without Polarizer)		T (%)		15.74	17.49	—	%				
Contrast		CR		600	800	—	—	(1)(2)			
Response time		T _R		—	10	15	msec	(1)(3)			
		T _F		—	20	25					
Color gamut	(%)			55	60	—	%	C-light			
Color chromaticity (CIE1931)	White	W _x		-0.02	0.321	+0.02	—	(1)(4) CF glass			
		W _y			0.346		—				
	Red	R _x			0.645		—				
		R _y			0.333		—				
	Green	G _x	0.324		—						
		G _y	0.570		—						
		Blue	B _x				0.134			—	
			B _y				0.124				
Viewing angle	Hor.	Θ_L	CR>10	80	85	—	—	(1)(4) Measuring with Polarizer , Reference Only			
		Θ_R		80	85	—					
	Ver.	Θ_U		80	85	—					
		Θ_D		80	85	—					
		Optima View Direction		Free						(5)	

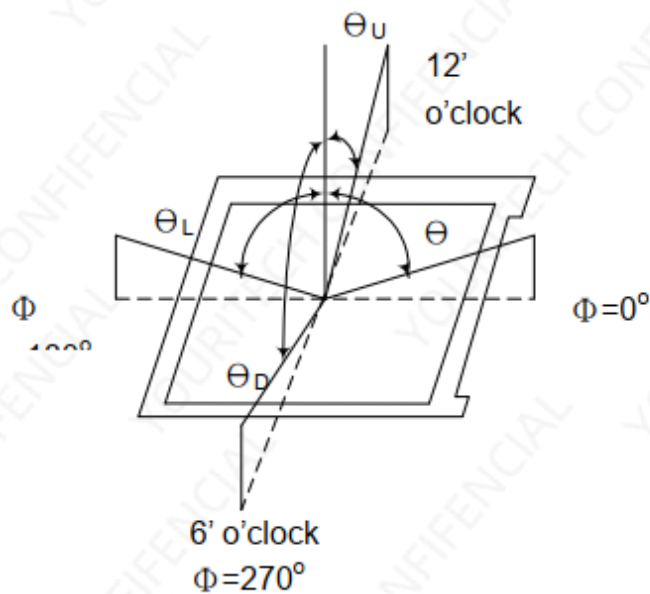
7.2 Measuring Condition

- Measuring surrounding: dark room
- Ambient temperature: 25±2℃
- 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.

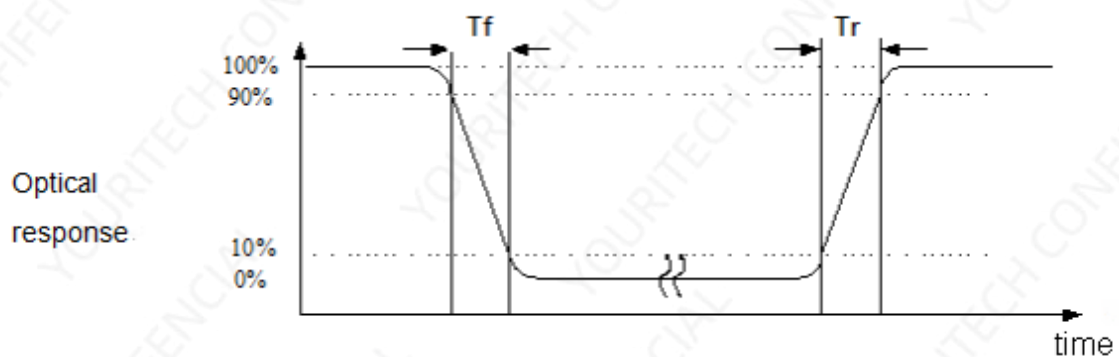
Note (1) Definition of Viewing Angle:



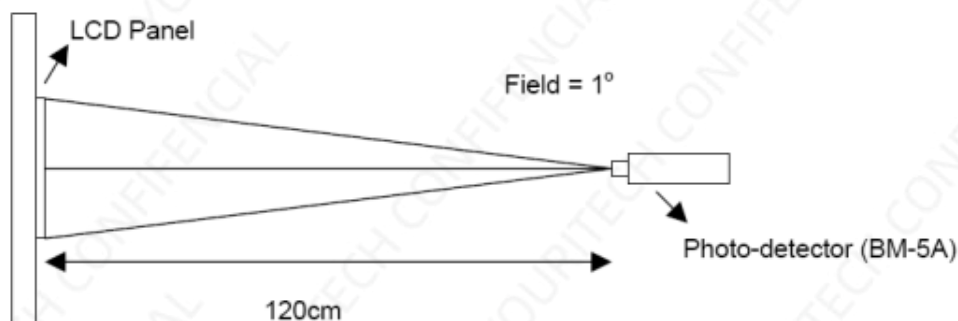
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

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

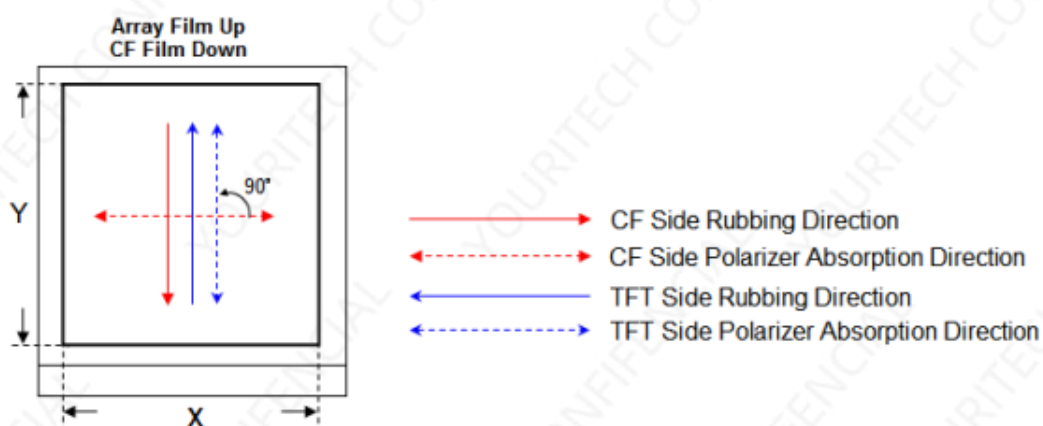
Note (3) Definition of Response Time : Sum of T_R and T_F



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

9. Packing Method----TBD

- END -