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Custom Display

PCAP

Mechanical design

Production Custom designs Installation



MODEL NO : ET050WV02-O

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2023-04-27

☒ **Preliminary Specification**

☐ **Final Product Specification**

Customer : _____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

LCD specification: Dots 800xRGBx480

As to basic specification of the driver IC, refer to the IC (ILI6123H-9G+ILI5960) specification and data book. It is a transfective type display.

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

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;

800 dot-segment and 480 dot-common outputs;

16.7M Color can be selected by software;

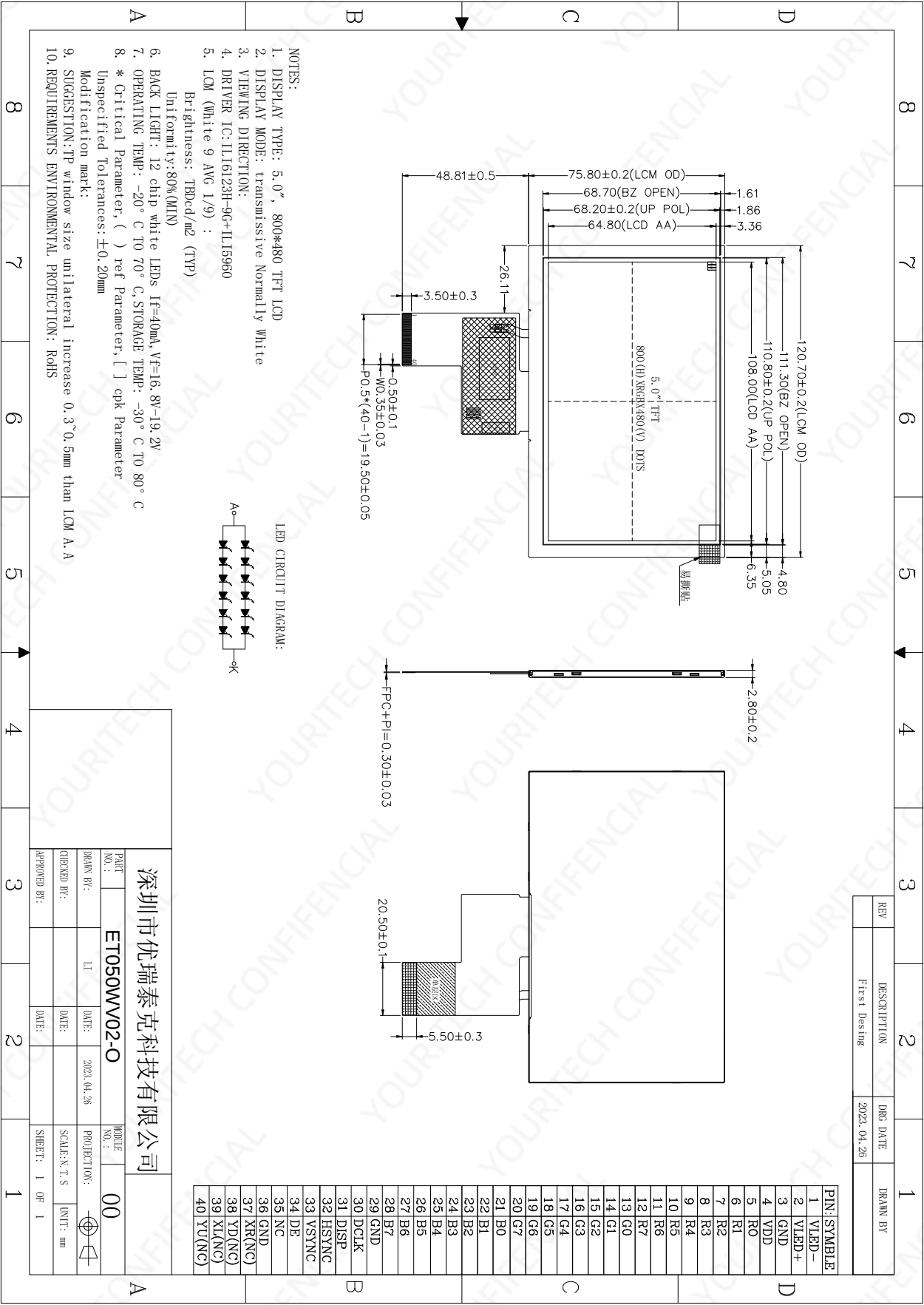
White LED back light;

24bit RGB interface

1.3 Applications:

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally White	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB Vertical Stripe	--
Pixel Pitch (W*H)	0.135(H) × 0.135(V)	mm
Active area	108.00(H) x 64.80(V)	mm
TFT Driver IC	ILI6123H-9G+ILI5960	--
TFT interface	24bit RGB Interface	--
Approx. Weight	TBD	g
LCM Size(W*H*T)	120.70(W) ×75.80(H) ×2.80(T)	mm
Touch structure	--	--
Touch Driver IC	--	--
Touch Interface	--	--



3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-20	+70	°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
Supply Voltage for I/O	IOVCC	--	--	--	V
Supply Voltage for(DC/DC)	VCC	3.0	3.3	3.6	V
Supply Voltage for(DC/DC)	AVDD	--	--	--	V
Supply Voltage for(DC/DC)	AVEE	--	--	--	V

4.2 Back-Light Unit Characteristics

The back-light system is an edge-lighting type with 12 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	16.8	--	19.2	V	--
Forward current	I _F	--	40	--	mA	--
Luminance(With LCD)	L _v	--	170	--	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	Note
1	LEDK	Power supply for backlight cathode input terminal.	
2	LEDA	Power supply for backlight anode input terminal.	
3	GND	Power Ground	
4	VDD	Power supply : 3.0V ~ 3.6V	
5	R0	Red data	
6	R1	Red data	
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data	
13	G0	Green data	
14	G1	Green data	
15	G2	Green data	
16	G3	Green data	
17	G4	Green data	
18	G5	Green data	
19	G6	Green data	
20	G7	Green data	
21	B0	Blue data	
22	B1	Blue data	
23	B2	Blue data	
24	B2	Blue data	
25	B4	Blue data	
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data	
29	GND	Power Ground	

30	DCLK	Dot clock signal for RGB interface operation.	
31	DISP	Standby mode, Normally pulled high. STBYB = “1” ,normal operation STBYB = “0” , timing controller, source driver will turn off.	
32	HSYNC	Horizontal (Line) synchronizing input signal for RGB interface operation.	
33	VSYNC	Vertical (Frame) synchronizing input signal for RGB interface operation.	
34	DE	Data enable signal for RGB interface operation.	
35	NC	No Connection.	
36	GND	Power Ground	
37	XR	No Connection.	
38	YD	No Connection.	
39	XL	No Connection.	
40	YU	No Connection.	

6. Timing Characteristics

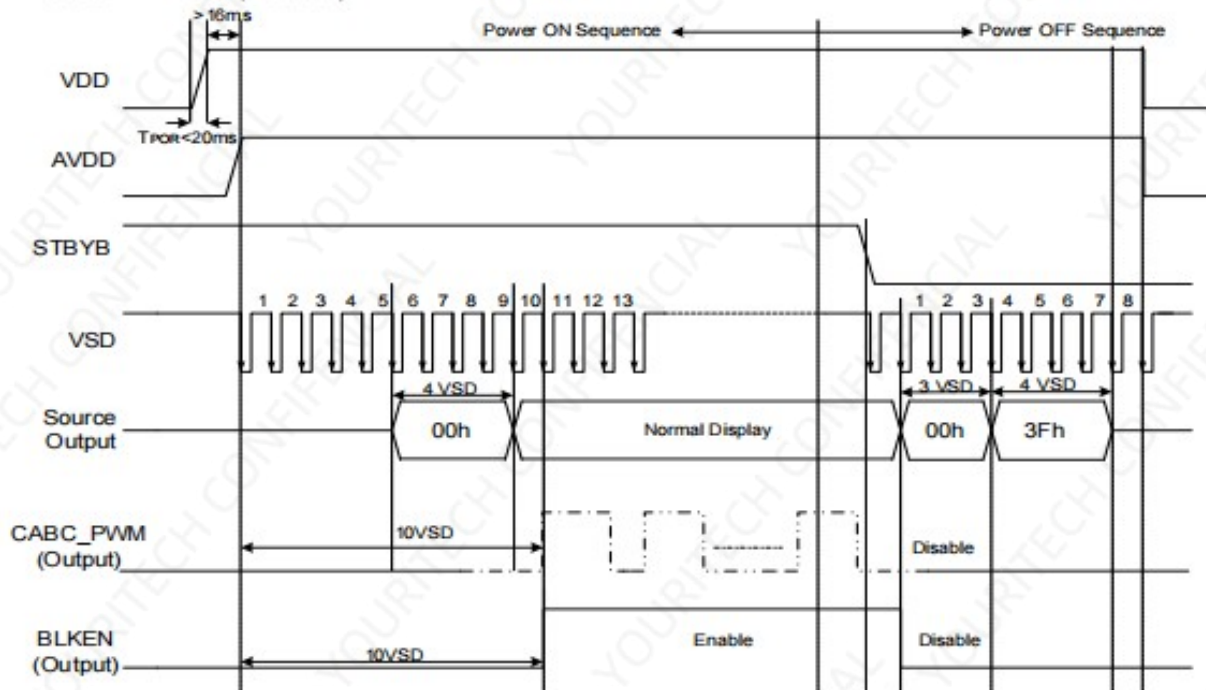
To prevent the device damage from latch up, the power ON/OFF sequence shown below must be followed.

Power ON: VDD, DGND → AVDD, AGND → V1 to V14

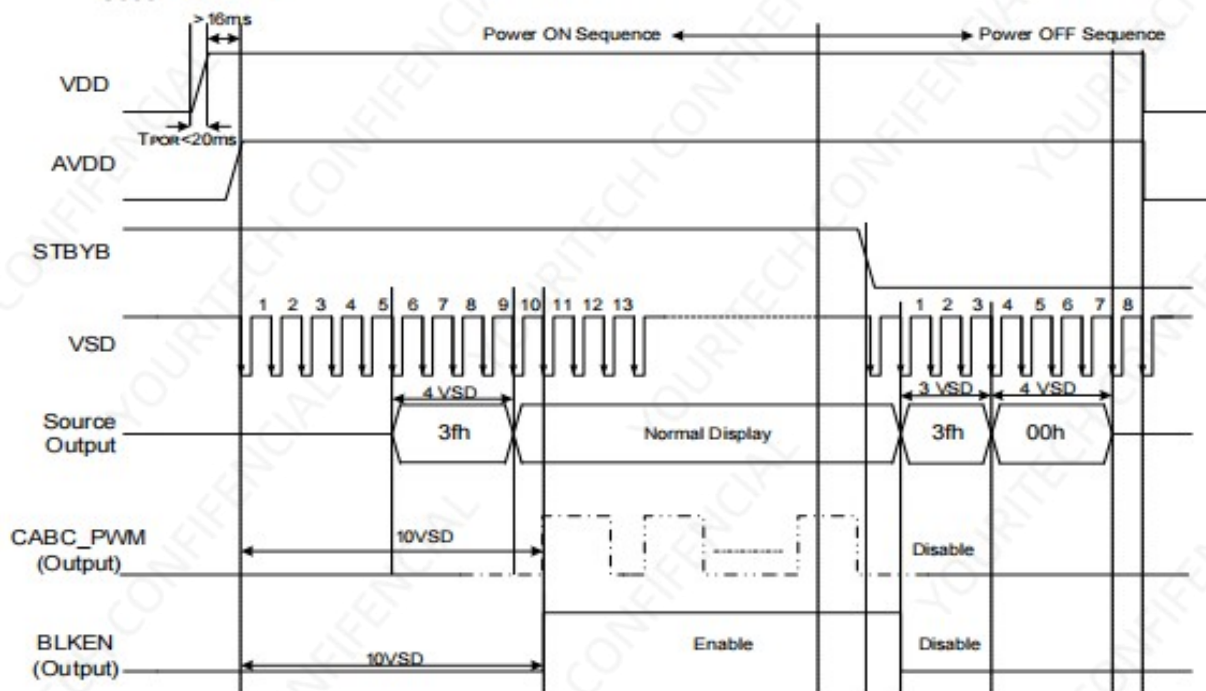
Power OFF: V1 to V14 → AVDD, AGND → VDD, DGND

In order to prevent ILI6123 from power ON reset fail, the rising time (t_{POR}) of the digital power supply VDD should be maintained within given specifications. The power ON/OFF timing sequence is illustrated as below:

Case1: REV = L (Default)



Case2: REV = H



Parallel 24-bit RGB Mode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD = 3.0V ~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	64	-	CLKIN	
Time from HSD to LD	Thld	-	64	-	CLKIN	
Time from HSD to STV	Thstv	-	2	-	CLKIN	
Time from HSD to CKV	Thckv	-	20	-	CLKIN	
Time from HSD to OEV	Thoev	-	4	-	CLKIN	
LD Pulse Width	Twld	-	10	-	CLKIN	
CKV Pulse Width	Twckv	-	66	-	CLKIN	
OEV Pulse Width	Twoev	-	74	-	CLKIN	

7.Optical Characteristics

Optical Specification

4.1 Optical Specification (Reflective, w/ HSD FOG+D65 light)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
White Reflectance (with Polarizer)	Rw (%)	$\Theta=0$ Normal viewing angle —	—	4.97	—	%	(4) Measuring with HSD polarizer , Reference Only Base on Vop=4.5V
Contrast Ratio	CR		—	8	—	—	(1)(2) Base on Vop=4.5V
NCS	S(%)		—	125	—	%	
White chromaticity (CIE1931)	Wx			0.344			
	Wy			0.382			
Response Time	ms			5	7		
Viewing Angle	Hor.	Θ_L	—	55	—	—	(1)(4) Measuring with HSD polarizer , Reference Only
		Θ_R	—	55	—		
	Ver.	Θ_U	—	60	—		
		Θ_D	—	60	—		

4.2 Optical Specification (Transmittance, w/HSD FOG+D65 light)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
White Transmittance (with Polarizer)	Tr(%)	$\Theta=0$ Normal viewing angle —	—	2.0	—	%	(4) Measuring with HSD polarizer , Reference Only Base on Vop=4.5V
Color Gamut	S(%)		—	30	—	%	
White chromaticity (CIE1931)	Wx			0.341			
	Wy			0.387			
Response Time	ms			6	8		
Viewing Angle	Hor.	Θ_L	—	60	—	—	(1)(4) Measuring with HSD polarizer , Reference Only
		Θ_R	—	60	—		
	Ver.	Θ_U	—	60	—		
		Θ_D	—	60	—		

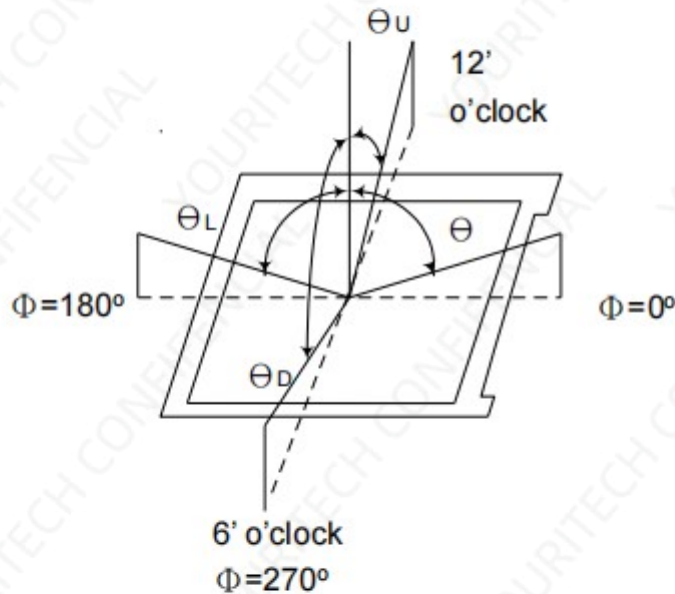
Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : $25 \pm 2^\circ\text{C}$
- 15min. warm-up time.

Measuring Equipment

- DMS (DMS = Display Measurement System) of AUTRONIC-MELCHERS GmbH, motorized goniometer system for comprehensive display characterization

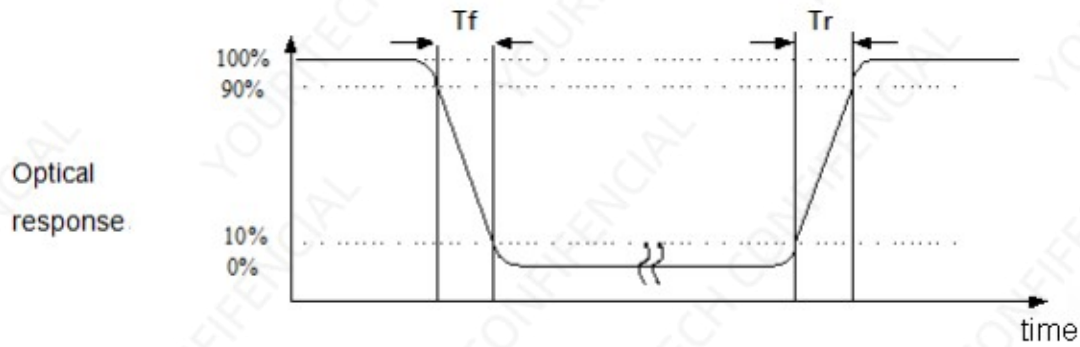
Note (1) Definition of Viewing Angle:



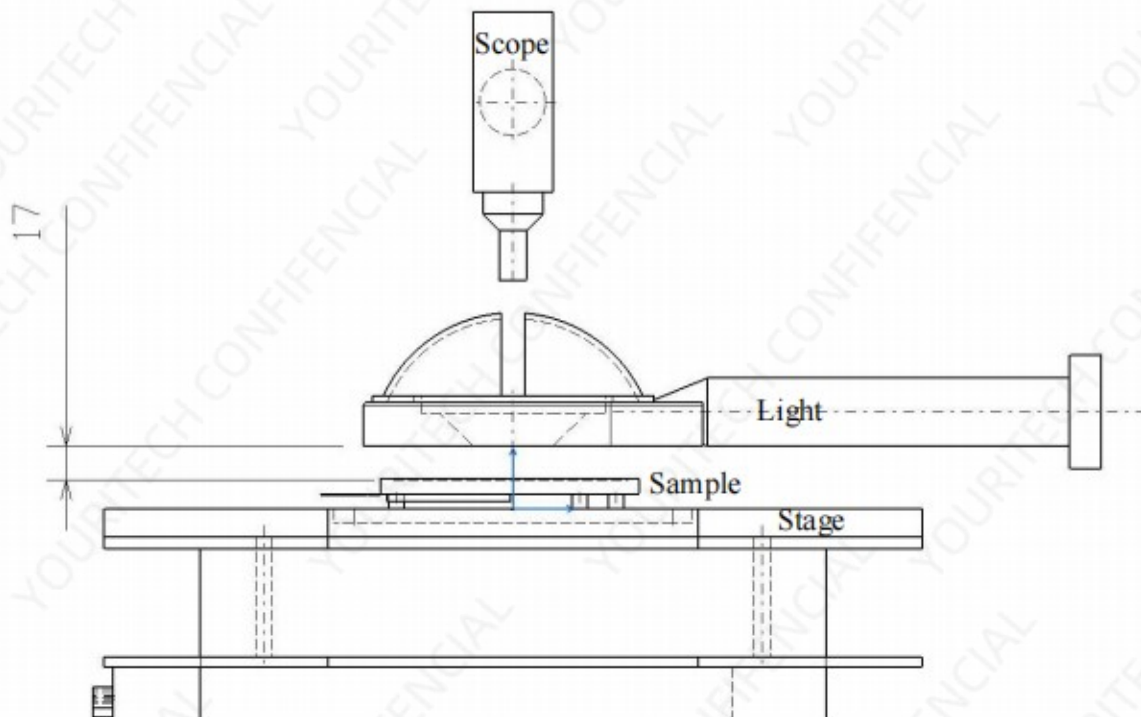
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

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

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.)



CF film down
 Array film up

8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°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	+70°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), 10 cycles	

9. Packing Method----TBD

- END -