Product Specification

Model Name	KD070BWU01HN
Description	1080(RGB)x1920 Dots 7" ON CELL AOLED MOUDLE
Date	2024/07/23
Revision	1.0

Approved by/Date	**Check by/Date**	**Prepared by/Date**
LXM 2024/7/23	HL 2024/7/23	ZWF 2024/7/23

Customer Approval	
Date	

Table of Contents

1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2024/7/23	First Release.	LXM

2 General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	7	inch
Display type	Rigid AMOLED	
Active Area	86.94 x 154.56	mm
Panel Size	86.94 x 154.56	mm
Pixel Size	80.5 x 80.5	mm
Pixel Pitch	80.5	mm
Pixel Per inch	316	PPI
Resolution	1080*1920	
Color Depth	1073.7M	
Viewing Direction	All	
Pixel Aspect Ratio	9：16	
Frame rate	60Hz/120HZ/144Hz	
Panel bonding type	COG	
Interface	MIPI	
TFT Technology Type	LTPS	
Encap glass height	0.3	mm
TFT glass height	0.3	mm
AOD frequency	60	Hz
Operation Temperature	-30~+85	deg
Storage Temperature	-40~+85	deg

1.2 Touch Panel Information

Item	Specification
TP type	On cell
Driver IC	FT3519
Interface	I²C
Touch Count Max	5 Points
TP doze mode function	Support
Pitch	4.355*4.298mm
Respond Time(80HZ)	25ms(Max)

3 Input/Output Terminals

No.	Symbol	Description
1	MTP_POWER	MTP programming power supply pin
2	VCI	Driver IC input voltage(3V)
3	AVDD_EN	AVDD enable
4	SWIRE	Swire protocol setting pin of power IC
5	TE	Tearing effect output pin to synchronize MCU to frame writing.
6	RESX	Global reset pin
7	GND	Ground
8	MIPI_D2N	MIPI Negative data signal(-)
9	MIPI_D2P	MIPI Positive data signal(+)
10	GND	Ground
11	GND	Ground
12	MIPI_D1N	MIPI Negative data signal(-)
13	MIPI_D1P	MIPI Positive data signal(+)
14	GND	Ground
15	GND	Ground
16	MIPI_CLKN	MIPI Negative clock signal(-)
17	MIPI_CLKP	MIPI Negative clock signal(+)
18	GND	Ground
19	GND	Ground

20	MIPI_D0N	MIPI Negative data signal(-)
21	MIPI_D0P	MIPI Positive data signal(+)
22	GND	Ground
23	GND	Ground
24	MIPI_D3N	MIPI Negative data signal(-)
25	MIPI_D3P	MIPI Positive data signal(+)
26	GND	Ground
27	GND	Ground
28	VDDI	VDDI for DDIC
29	VDDI	VDDI for DDIC
30	GND	Ground
31	GND	Ground
32	ELVSS	ELVSS for OLED
33	ELVSS	ELVSS for OLED
34	ELVSS	ELVSS for OLED
35	ELVSS	ELVSS for OLED
36	GND	Ground
37	GND	Ground
38	ELVDD	ELVDD for OLED
39	ELVDD	ELVDD for OLED
40	ELVDD	ELVDD for OLED
41	ELVDD	ELVDD for OLED
42	AVDD	Power supply for DDIC Analog system
43	AVDD	Power supply for DDIC Analog system
44	GND	Ground
45	GND	Ground
46	TP_AVDD	TP AVDD power
47	TP_SCL	I2C clock input for CTP
48	TP_INT	Interrupt Pin for CTP
49	TP_SDA	I2C data input and output for CTP
50	TP_VDDIO(1.8V)	Power supply 1.8V for CTP
51	TP_RST	I2C data input and output for CTP

4 Operation Specifications

4.1 Absolute Maximum Rating

Item	Symbol	MIN	MAX	Unit
Touch power supply voltage	VDD3-VSS	-0.3	3.6	V
Touch Input voltage for I/O bus	IOVCC	-0.3	3.6	V
Driver IC Operating temperature	Topr	-40	+85	℃
Driver IC Storage temperature	Tstg	-40	+125	℃
Touch IC Operating temperature	Topr	-55	+85	℃
Touch IC Storage temperature	Tstg	-30	+85	℃

NOTE:
1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

5 Electrical Characteristics

5.1 Power Consumption of Display Panel

Item		Symbol		Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
VCI		VCI		-	VCI	2.65	3	4.8	V	
VDDIO		VDDIO		-	VDDIO	1.65	1.8	1.95	V	
AVDD		AVDD		-	AVDD	6	7.6	8	V	
Power Consumption	Normal	Driver IC	VCI	100% Pixel On, 600nits, 120Hz	Ivci	-	0.35	0.42	mA	.
					Pvci	-	1.09	1.30	mW	
			VDDIO		Ivddio	-	86.24	90.55	mA	
					Pvddio	-	159.54	167.52	mW	
			AVDD		Iavdd	-	41.94	44.04	mA	
					Pavdd	-	318.74	334.68	mW	
		Panel	ELVDD		Ielvdd	-	412.25	432.86	mA	
					Pelvdd	-	1896.35	1991.17	mW	
			ELVSS		Ielvss	-	411.28	431.84	mA	
					Pelvss	-	1398.35	1468.27	mW	
	HBM	Driver IC	VCI	100% Pixel On, 1000nits, 120Hz	Ivci	-	0.35	0.41	mA	
					Pvci	-	1.07	1.28	mW	
			VDDIO		Ivddio	-	90.00	94.50	mA	
					Pvddio	-	166.50	174.83	mW	
			AVDD		Iavdd	-	44.74	46.98	mA	
					Pavdd	-	340.02	357.03	mW	
		Panel	ELVDD		Ielvdd	-	634.43	666.15	mA	
					Pelvdd	-	2918.38	3064.30	mW	
			ELVSS		Ielvss	-	676.00	709.80	mA	
					Pelvss	-	3380.00	3549.00	mW	
	AOD	Driver IC	VCI	100% Pixel On, 50nits, 30Hz	Ivci	-	0.28	0.33	mA	
					Pvci	-	0.86	1.03	mW	
			VDDIO		Ivddio	-	46.75	49.08	mA	
					Pvddio	-	86.48	90.81	mW	
			AVDD		Iavdd	-	9.17	9.63	mA	
					Pavdd	-	69.69	73.18	mW	

		Panel	ELVDD		Ielvdd	-	33.95	35.64	mA	
					Pelvdd	-	156.16	163.97	mW	
			ELVSS		Ielvss	-	33.4	35.07	mA	
					Pelvss	-	73.47	77.15	mW	
Frame Rate		F_{frm}		HBM&NOR	F_{frm}	-	120	-	Hz	
				AOD		-	30	-	Hz	

5.2 DPHY LP/HS Characteristics

Signal	Symbol	Parameter	Min.	Typ.	Max.	Unit
HS_RX	V_{IDTH}	Differential input high threshold	-	-	70	mV
	V_{IDTL}	Differential input low threshold	-70			
	V_{IHHS}	Single-ended input high voltage			460	
	V_{ILHS}	Single-ended input low voltage	-40			
	$V_{CMRX(DC)}$	Common-mode voltage HS receive mode	70		330	
	Z_{ID}	Differential input impedance	-	85	-	Ω
LP_RX	V_{IL}	Logic0 voltage not in ULP State	-	-	550	mV
	V_{IH}	Logic1 input voltage	740	-	-	mV
	V_{LEAK}	I/O leakage current	-10	-	10	uA
LP_TX	V_{OL}	The venin output low level	-50		50	mV
	V_{OH}	The venin output high level	1.1	1.15	1.3	V
	Z_{OLP}	Output impedance of LP transmitter	110	-	-	Ω

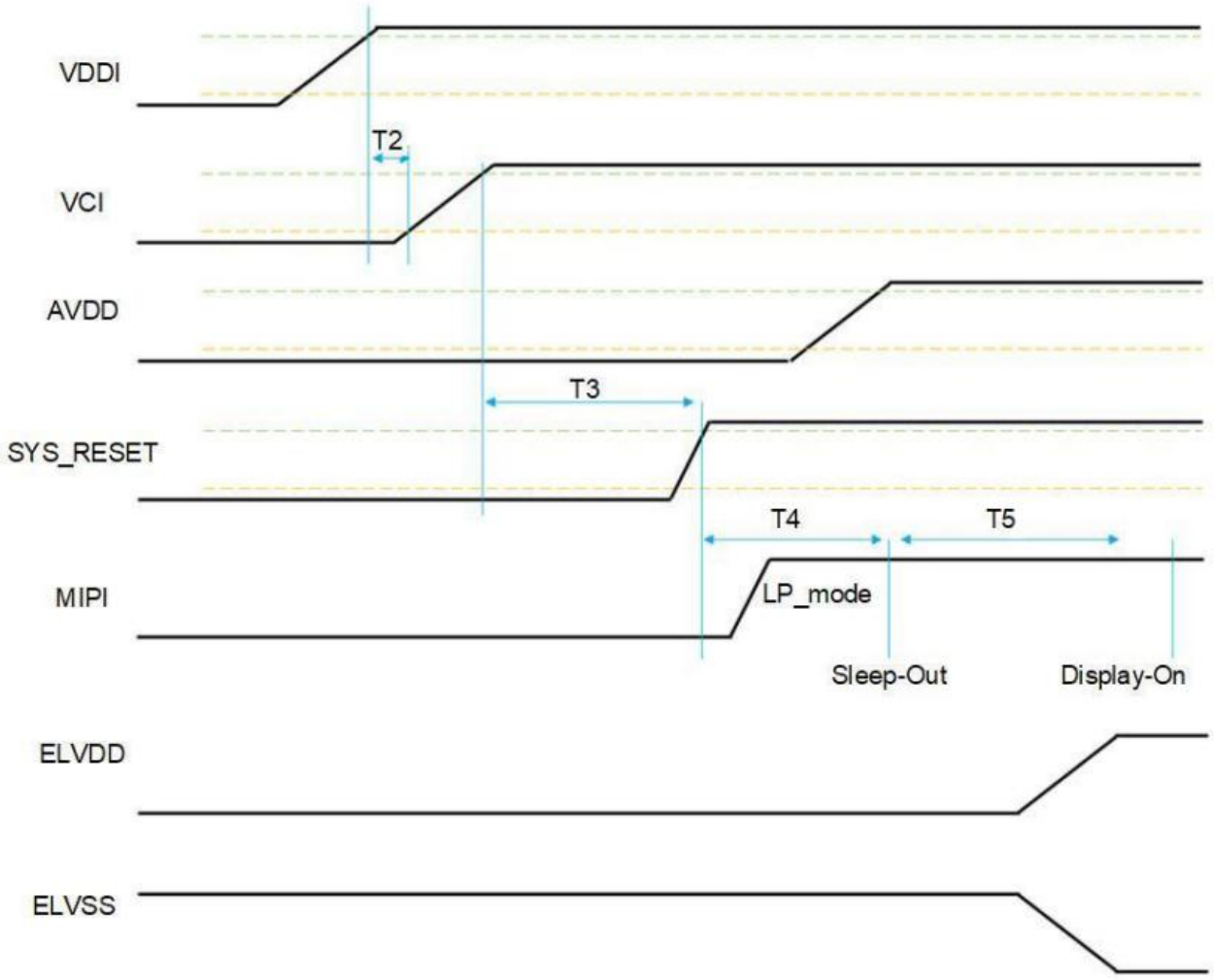
5.3 MIPI DSI High-Speed RX Clock and Data-Clock Timing

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
F_{DSICLK}	DISCLK Frequency	VDDI=1.62~1.98V	40	-	650	MHz
T_{CLKP}	DSICLK Cycle time		1.53	-	25	ns
T_{DSIR}	DSI Data Transfer Rate		80	-	1300	Mbps
T_{SETUP}	Data to Clock Setup time	⩽ 1000Mbps	0.15	-	-	UI
			0.15	-	-	ns
		⩾ 1000Mbps	0.2	-	-	UI
			0.15	-	-	ns
T_{HOLD}	Data to Clock Hold time	⩽ 1000Mbps	0.15	-	-	UI
			0.15	-	-	ns
		⩾ 1000Mbps	0.2	-	-	UI
			0.15	-	-	ns

5.4 Global Operation Timings

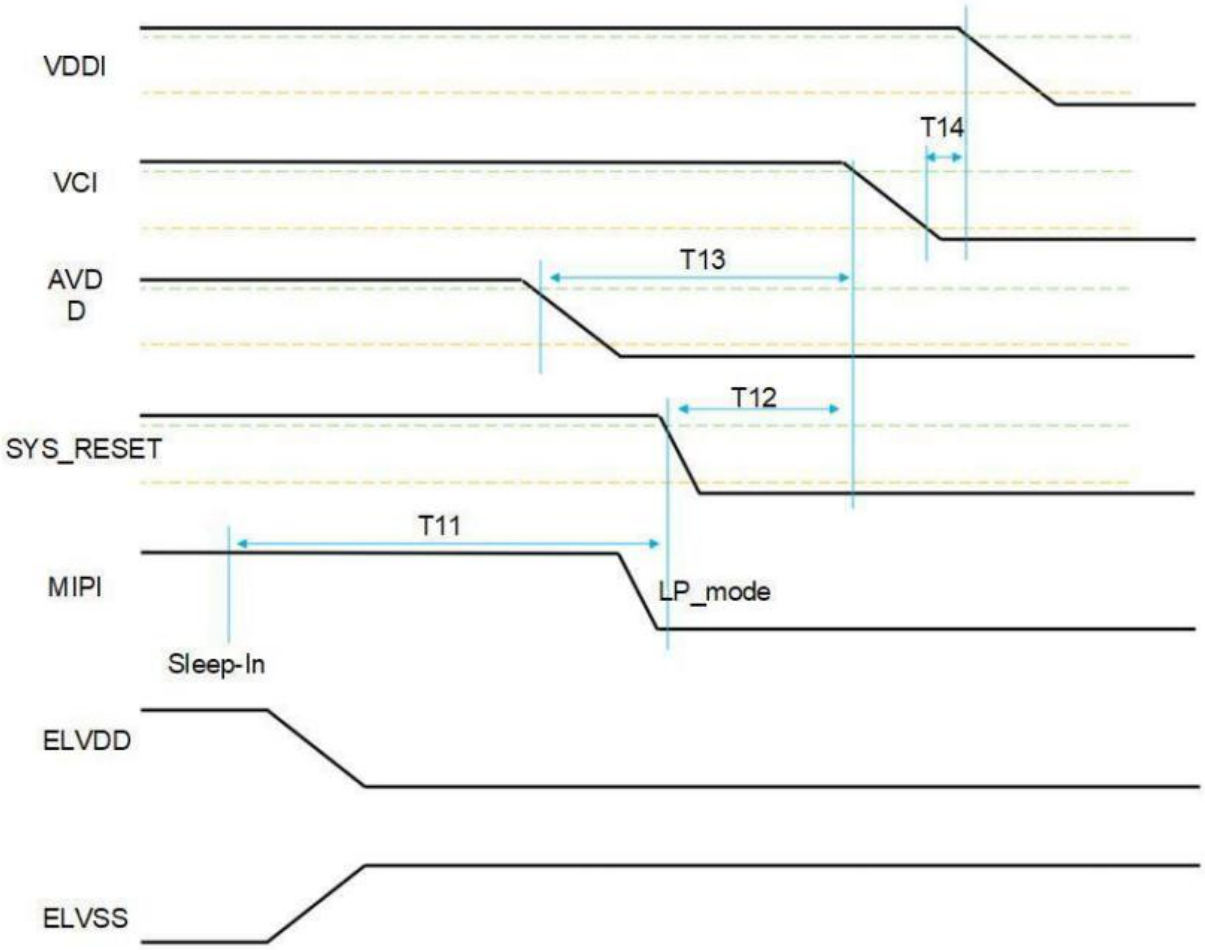
Parameter	Description	Spec.			Unit
		Min.	Typ.	Max.	
$T_{CLK-POST}$	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of $T_{HS-TRAIL}$ to beginning of $T_{CLK-TRAIL}$	60ns+52*UI	-	-	-
$T_{CLK-PRE}$	Time that the HS clock shall be driver by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8	-	-	UI
$T_{CLK-PREPARE}$	Time that the transmitter drives the Clock Lane LP-00 Line state immediately before the HS-00 Line state starting the HS transmission.	38	-	95	ns
$T_{CLK-TRAL}$	Time that the transmitter drives the HS-00 state after the last payload clock bit of a HS HS transmission burst.	60	-	-	ns
$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	$T_{CLK-PREPARE}$ + Time to that the transmitter drives the HS-00 state prior to starting the clock.	300	-	-	ns
T_{EOT}	Transmitted time interval from the start of $T_{HS-TRAIL}$ or $T_{CLK-TRAL}$, to the start of the LP-11 state following a HS burst.	-	-	105ns + n*12*UI	-
$T_{HS-EXIT}$	Time that the transmitter drives LP-11 following HS burst.	100	-	-	ns
$T_{HS-PREPARE}$	Time that the transmitter drives the Data Lane LP-00 Line state immediately before the HS-00 Line state starting the HS transmission.	40ns + 4*UI	-	85ns + 6*UI	-
$T_{HS-PREPARE}$ + $T_{HS-ZERO}$	$T_{HS-PREPARE}$ + Time that the transmitter drives the HS-0 state prior to transmitting the Sync sequence.	145ns + 10*UI	-	-	-
$T_{HS-TRAIL}$	Time that the transmitter drives the flipped differential state after last payload data bit of a HS transmission burst	(n*8*UI,60 ns+n*4*UI) 中的最大值	-	-	-
T_{LPX}	Transmitted length of any Low-Power state period	50	-	-	ns
Ratio T_{LPX}	Ratio of $T_{LPX(MARSTER)}$/$T_{LPS(SLAVE)}$ between Master and Slave side	2/3	-	3/2	-
T_{TA-GET}	Time that the new transmitter drives the bridge state (LP-00) after accepting control during a Link Turnaround.	5*T_{LPX}			-
T_{TA-GO}	Time that the new transmitter drives the bridge state (LP-00) before releasing control during a Link Turnaround.	4*T_{LPX}			-
$T_{TA-SURE}$	Time that the new transmitter waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link turnaround.	T_{LPX}	-	2*T_{LPX}	-

5.5 Display Power on Sequence



上电时序参数		Min	Typ	Max	Unit
T2	VDDI 上电时间到 Reset 开始时间	50	-	-	us
T3	VCI 上电时间到 Reset 开始时间	6	-	-	ms
T4	复位完成到能响应 sleep-out 时间	36	-	-	ms
T5	从 sleep-out 到 display-on 时间	40	-	-	ms

5.5 Display Power off Sequence



下电时序参数		Min	Typ	Max	Unit
T11	Sleep-In 到 AP 开始 Reset 的时间	45	-	-	ms
T12	Reset 到开始关掉 VCI 的时间	50	-	-	ms
T13	AVDD 下电完成到 VCI 开始下电的时间	50	-	-	ms
T14	VCI 下电完成到 VDDIO 开始下电的时间	50	-	-	ms

6 Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Uni	Note
Luminance(with pol)		Normal mode Bp	θ=0° ϕ=0°	540	600	-	cd/m2	CPK>1.33
		HBM mode Bp	θ=0° ϕ=0°	900	1000	-	cd/m2	
		Idle mode Bp			50		cd/m2	
Uniformity		△Bp		80	-	-	%	6.2
Viewing Angle	Left	θL		85	-	-	deg	6.3
	Right	θR		85	-	-		
	Top	ψT		85	-	-		
	Bottom	ψB		85	-	-		
Contrast Ratio		Cr	θ=0° ϕ=0°	100000		-	-	6.4
Response Time		Tr		-	-	3	ms	6.5
		Tf		-	-	3	ms	
		Tgray		-	-	3	ms	
Color Coordinate of CIE1931	Red	x	θ=0° ϕ=0°	0.65	0.68	0.71	-	CIE 1931
		y		0.29	0.32	0.35		
	Green	x		0.205	0.245	0.285		
		y		0.675	0.715	0.755		
	Blue	x		0.121	0.141	0.161		
		y		0.025	0.045	0.065		
	White	x		0.28	0.3	0.32		
		y		0.29	0.31	0.33		
Color temperature		CT		7000	7500	8000	K	
Color gamut		NTSC	Ratio	95	100		%	6.6
Flicker		amount	Interval screen	-	-	-30	dB	
Gamma		Idle mode		2	2.2	2.4		6.7（G16~G238）
		Normal mode		2	2.2	2.4		
		HBM mode		2	2.2	2.4		
Crosstalk		OLED △CT	-	-	-	2%		6.8

Transmittance (Without lens)	Tr	550nm	2%			%	6.8
Color shift		θL=30°	-	-	4	JNCD	6.9
		θR=30°	-	-	4	JNCD	
		ψT=30°	-	-	4	JNCD	
		ψB=30°	-	-	4	JNCD	
OLED lifetime	LT95*(Without lens 600 nit)	At 25℃,with white color pattern	-	400	4	hrs.	6.10

6.1 Luminance measurement

The test condition is at 25℃ and measured on the surface of OLED module.

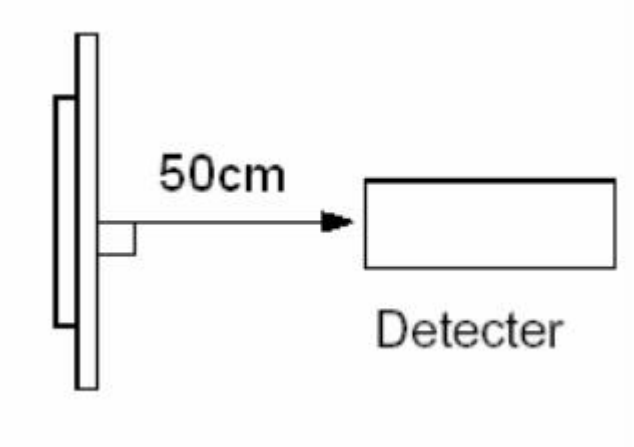
1.The data are measured after OLEDs are lighted on for more than 5 minutes and Displays.

2. equipment CS2000/CS2000A or similar equipments (Field of view:1deg,Distance:50cm)

3.Measuring surroundings: Dark room.

4. Adjust operating voltage to get optimum contrast at the center of the display.

5.Measured value at the center point of panel must be after more than 5 minutes while light up.



6.2 Uniformity

1.The test condition is at 25℃ and measured on the surface of display module

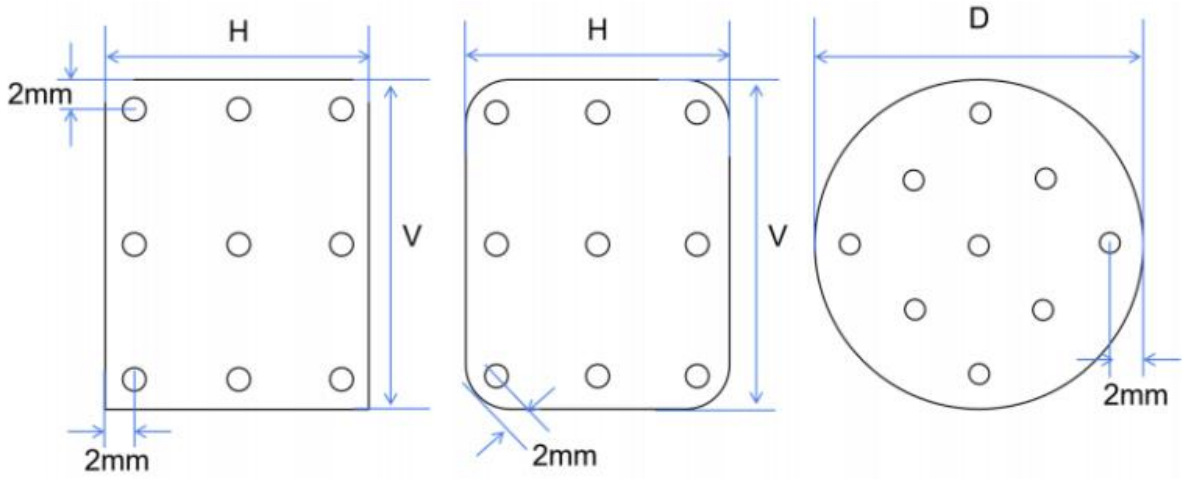
2.Measurement equipment: CS2000/CS2000A or similar equipment.

3. The luminance uniformity is calculated by using following formula.

△Bp = Bp (Min.) / Bp (Max.)×100 (%)

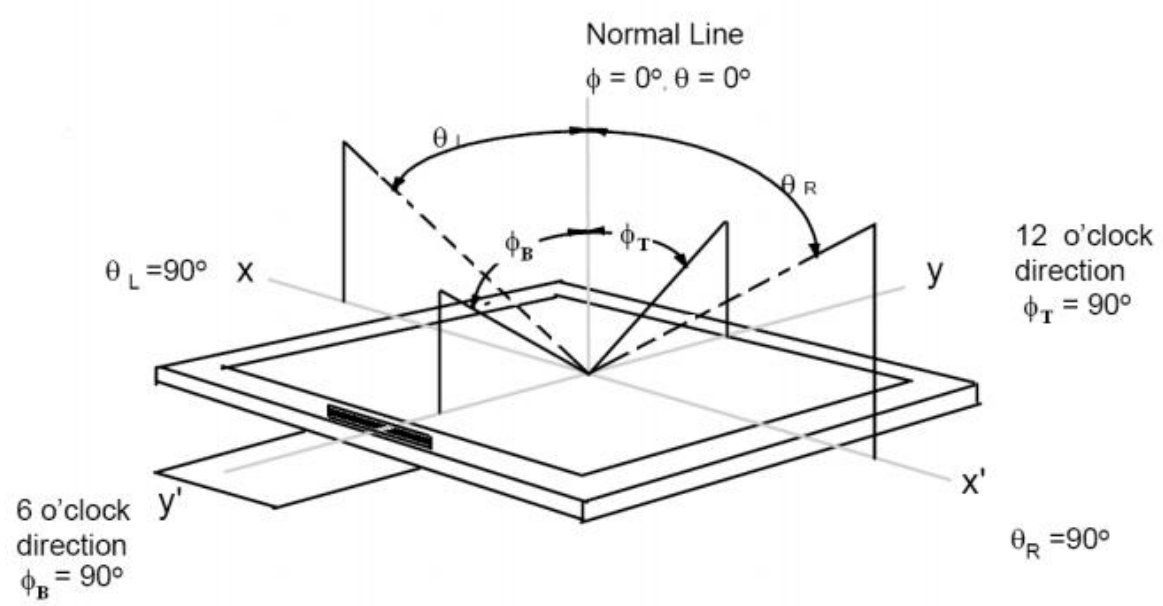
4. Bp (Max.) = Maximum brightness in 9 measured spots

5. Bp (Min.) = Minimum brightness in 9 measured spots.



6.3 The definition of Viewing Angle

Refer to the graph below marked by θ and Φ



6.4 The definition of Contrast Ratio (Test OLED using CS2000/CS2000A or similar equipments:

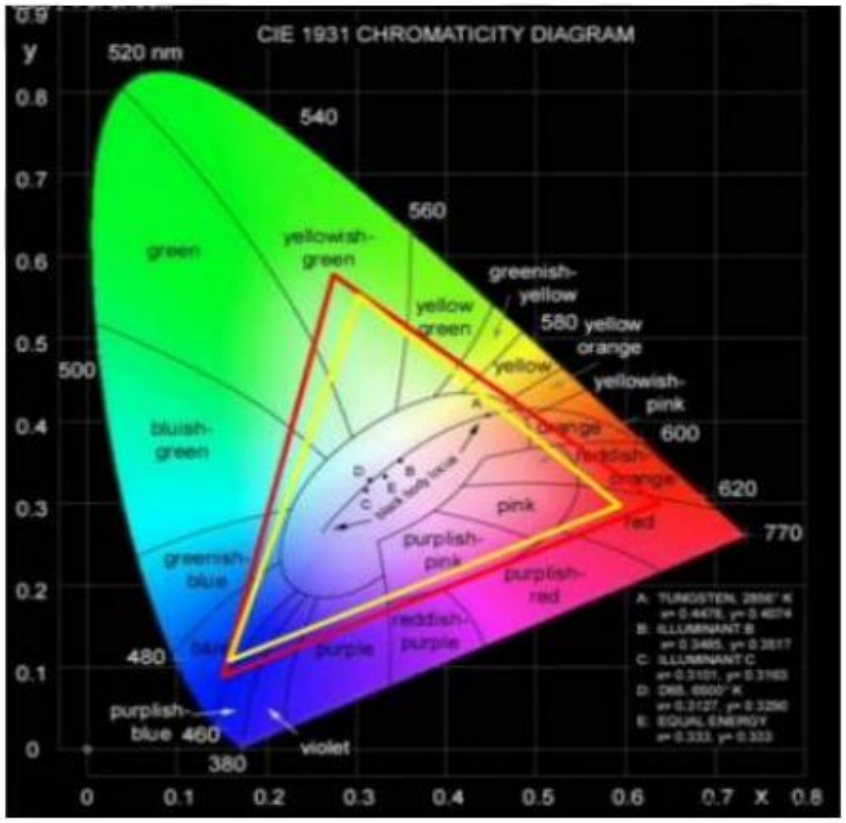
$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance is at “White” state}}{\text{Luminance is at “Black” state}}$$

6.5 Definition of Response time.

TBD

6.6 Definition of Color of CIE Coordinate and NTSC Ratio

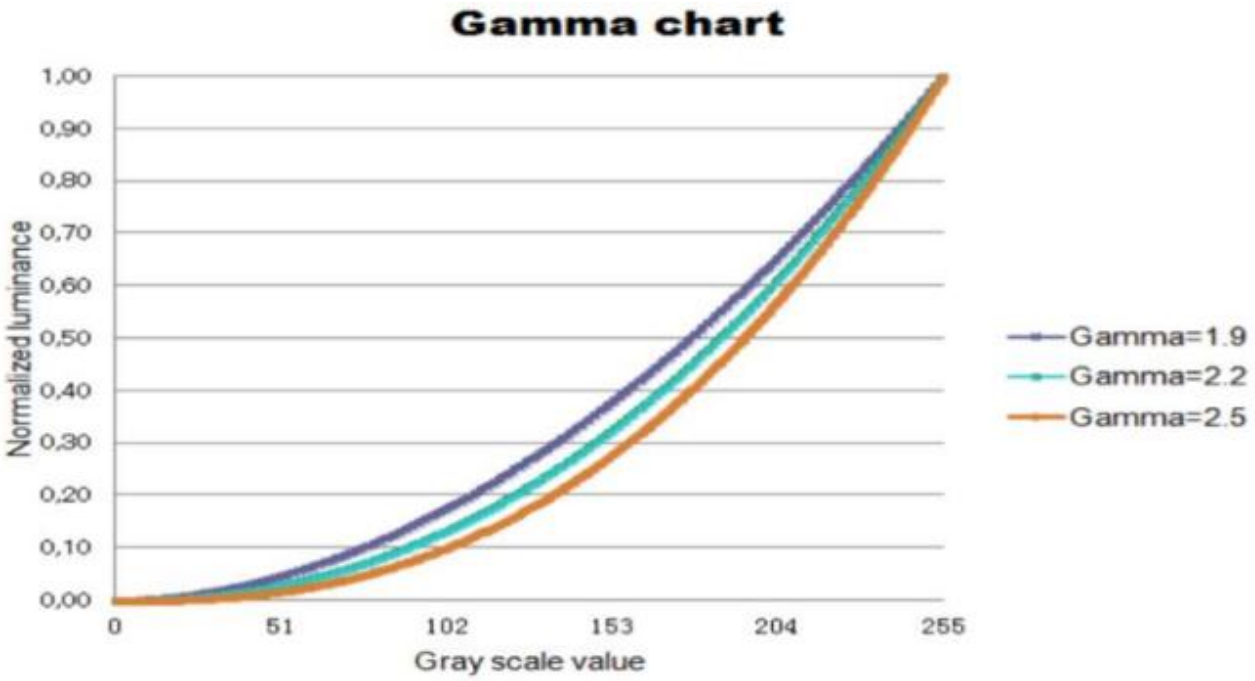
$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



6.7 Gamma curve control

1. For gamma curve control, request as below:
   the whole curve's tolerance must control within +/-0.2, will test the gray scale below: 0~255gray, interval 8 gray (0,4,8,16……255)
2. According to below formula chart the curves.

$$TR\%x = \sqrt{\frac{Gx - G0}{G255 - G0}}$$



6.8 Crosstalk

TBD

6.9 Color Shift JNCD

1.For JNCD measure:

- Fix on one pattern like white pattern,
- On the condition θ=0 F=0° , we can get the color coordinate (u1', v1') and on θ L=30° we can get another color coordinate (u2', v2')
- Delta = Square Root((u2' - u1')^2 + (v2' - v1')^2)
- JNCD stands for "Just Noticeable Color Difference"
- For the (u', v') color space JNCD=0.0040.

6.10 OLED lifetime

1.Measurement equipment: CS2000/CS2000A or similar equipment.

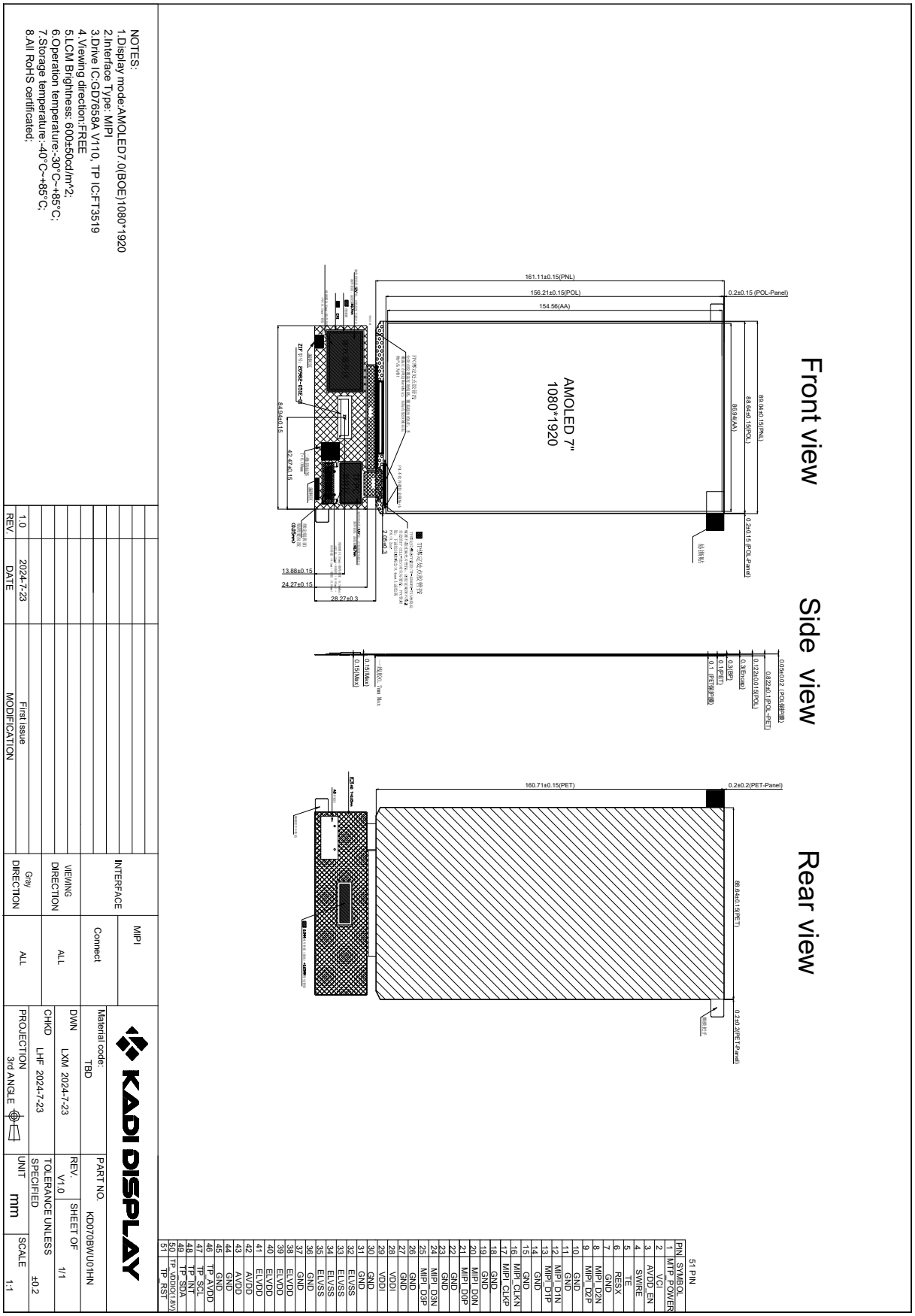
2.At room temperature(25℃), light the module with typical value brightness, display a white pattern.

7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +85℃, 240hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -40℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +85℃,240hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 240hours	IIEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-40℃ ~ +80℃ (30min) 100 cycles,(No Operation)	Start with cold temperature, end with high temperature IEC60068-2-14:1984, GB2423.22-2002
7	ESD	Air:±10KV Contact: ±8KV	IEC61000-4-2:2001 GB/T17626.2-2006

Note1: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

8 Mechanical Drawing



PIN	SYMBOL
1	MTP_POWER
2	VCI
3	AVDD_EN
4	SWIRE
5	TE
6	RESX
7	GND
8	MIPI_D2N
9	MIPI_D2P
10	GND
11	GND
12	MIPI_D1N
13	MIPI_D1P
14	GND
15	GND
16	MIPI_CLKN
17	MIPI_CLKP
18	GND
19	GND
20	MIPI_D0N
21	MIPI_D0P
22	GND
23	GND
24	MIPI_D3N
25	MIPI_D3P
26	GND
27	GND
28	VDDI
29	VDDI
30	GND
31	GND
32	ELVSS
33	ELVSS
34	ELVSS
35	ELVSS
36	GND
37	GND
38	ELVDD
39	ELVDD
40	ELVDD
41	ELVDD
42	AVDD
43	AVDD
44	GND
45	GND
46	TP_AVDD
47	TP_SCL
48	TP_SDA
49	TP_VDD(1.8V)
50	TP_INT
51	TP_RST

51 PIN

NOTES:
1.Display mode:AMOLED7.0(BOE)1080*1920
2.Interface Type: MIPI
3.Drive IC:GD7658A V110, TP IC:FT3519
4.Viewing direction:FREE
5.LCM Brightness: 600±50cd/m^2;
6.Operation temperature:-30°C~+85°C;
7.Storage temperature:-40°C~+85°C;
8.All RoHS certificated;

REV.	DATE	MODIFICATION
1.0	2024-7-23	First issue

INTERFACE	MIPI		
Gray DIRECTION	ALL	Connect	
VIEWING DIRECTION	ALL	Connect	

KADI DISPLAY

Material code: TBD		PART NO.	KD070BWU01HN
DWN	LXM 2024-7-23	REV.	V1.0
CHKD	LHF 2024-7-23	SHEET OF	1/1
PROJECTION 3rd ANGLE		TOLERANCE UNLESS SPECIFIED	±0.2
		UNIT	mm
		SCALE	1:1

9 Packing

TBD

10. Precautions for Use of modules

10.1 Handling Precautions

10.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4. The polarizer covering the display surface of the module is soft and easily scratched. Handle this polarizer carefully.

10.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketene

10.1.6. Do not attempt to disassemble the Module.

10.1.7. If the logic circuit power is off, do not apply the input signals.

10.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1. Be sure to ground the body when handling the Modules.

10.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4. The Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

10.2 Storage Precautions

10.2.1. When storing the modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2. The modules should be stored under the storage temperature range If the modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

10.2.3. The modules should be stored in the room without acid, alkali and harmful gas.

10.3 Transportation Precautions

The modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.