上海冠显光电科技有限公司
Shanghai Top Display Optoelectronics Co., LTD

LCD MODULE SPECIFICATION

Customer: _____

Module No.: TL088PWV01CT-H1608B

Date: 2025-12-04

Version: 1.0

For Customer's Acceptance:

Approved by	Comment

Approved by	Checked by	Prepared by
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Record of Revision

Rev.	Date	Description	Editor
1.0	2025-12-04	First release	Jian.Chen

1 General Specifications

No.	Item	Specification	Remark
1	LCD Size	8.88 inch (Diagonal)	
2	Driver Element	a-Si TFT active matrix	
3	Resolution	480 (RGB) ×1920	
4	Display Mode	Normally Black, Transmissive	
5	Pixel Pitch(mm)	0.038 (H) × 0.114 (V)	
6	Display Colors	16.7M	
7	Surface Treatment	--	
8	Color Arrangement	RGB-Stripe	
9	Interface	MIPI	
10	Viewing Direction	All	
11	Gray Scale Inversion Direction	/	Note 1
12	Outline Dimension (mm)	65.5 (W) × 232.5 (H) × 6.88 (T)	
13	Active Area (mm)	54.72(W) × 218.88 (H)	
14	Touch Screen	With CTP	
15	Display Driver IC	OTA7290N	
16	Touch Driver IC	GT911	

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180°shift.

Note 2: RoHS compliant.

2 Pin Assignment

2.1 LCD Pin assignment

Match connector : 0.5mm pitch FPC/FFC,T=0.3mm.

Type of connector on FPC: XF2M-4015-1A（OMRON）or equivalent.

N	Symbol	I/O	Description	Remark
1	GND	P	Ground	
2	D0P	I/O	MIPI DSI differential data pair (Data lane 0)	
3	D0N	I/O	MIPI DSI differential data pair (Data lane 0)	
4	GND	P	Ground	
5	D1P	I	MIPI DSI differential data pair (Data lane 1)	
6	D1N	I	MIPI DSI differential data pair (Data lane 1)	
7	GND	P	Ground	
8	DCKP	I	MIPI DSI differential clock pair	
9	DCKN	I	MIPI DSI differential clock pair	
10	GND	P	Ground	
11	D2P	I	MIPI DSI differential data pair (Data lane 2)	
12	D2N	I	MIPI DSI differential data pair (Data lane 2)	
13	GND	P	Ground	
14	D3P	I	MIPI DSI differential data pair (Data lane 3)	
15	D3N	I	MIPI DSI differential data pair (Data lane 3)	
16	GND	P	Ground	
17	GND	P	Ground	
18	VCC_1V8	--	Not connect	
19	VCC_1V8	--	Not connect	
20	REFCLK/NC	--	Not connect	
21	SDA	--	Not connect	
22	SCL	--	Not connect	
23	BIST	--	Not connect	
24	RSTB	I	Reset Signal ,Active Low(1.8V)	
25	STBYB	--	Not connect	
26	AVDD/NC	--	Not connect	
27	GND	P	Ground	
28	K	P	LED CATHODE	
29	K	P	LED CATHODE	
30	GND	P	Ground	
31	VGL/NC	--	Not connect	
32	GND	P	Ground	

33	GND	P	Ground	
34	VGH/NC	--	Not connect	
35	A	P	LED ANODE	
36	A	P	LED ANODE	
37	GND	P	Ground	
38	VDD-3V3	P	LCD analog power supply (3.3V)	
39	VDD-3V3	P	LCD analog power supply (3.3V)	
40	VCOM/NC	--	Not connect	

I---Input, O---Output, P--- Power/Ground

2.2 Touch panel pin assignment

Match connector: XF2M-0615-1A by OMRON or equivalent

No.	Symbol	Description
1	INT	External interrupt (2.8~3.3V)
2	TP_VDD	3.3V Power
3	GND	Ground
4	RESET	External reset(2.8~3.3V)
5	SCL 3.3V	I2C _SCL(2.8~3.3V), 4.7K~10K pull up resistor needed
6	SDA 3.3V	I2C_SDA (2.8~3.3V),4.7K~10K pull up resistor needed

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
Power Voltage	VDD-3V3	-0.30	+4.5	V	
	VCC_1V8	-	-	V	
Operating Temperature	Top	-20.0	70.0	℃	
Storage Temperature	T_{st}	-30.0	80.0	℃	
Operating and Storage Humidity	H_{stg}	10%	90%	%(RH)	

4. Electrical Characteristics

4.1 Recommended Operating Condition

VDD-3V3， GND=0V， Ta = 25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Digital supply Voltage	VCC_1V8	--	--	--	V	
Analog supply Voltage	VDD-3V3	2.8	3.0	3.3	V	
TP Power	TP_VDD	2.8	3.0	3.3	V	

Input Signal Voltage	Low Level	V_{IL}	0	-	0.3 x VDD_3V3	V	
	High Level	V_{IH}	0.7 x VDD_3V3	-	VDD_3V3	V	
Current of digital supply voltage		I_{VCC_1V8}	-	-	-	mA	
Current of analog supply voltage		$I_{VDD-3V3}$	-	150	180	mA	VDD-3V3=3.3V, color bar pattern

4.2 Backlight Unit Driving Condition

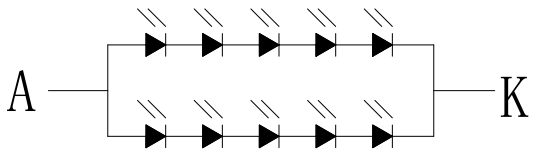
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I_F	-	180	200	mA	10 LEDs (5 LED Serial, 2 LED Parallel)
Forward Current Voltage	V_F	-	15	17.5	V	
Backlight Power Consumption	W_{BL}	-	2700	3500	mW	
Operating Life Time	--	20000	--	--	hrs	Note 2, Note 3

Note1: The LED driving condition is defined for each module (5 LED Serial, 2 LED Parallel).

Note2: When LCM is operated, the stable forward current should be inputted. And forward voltage is for reference only.

Note3: Optical performance should be evaluated at Ta=25℃ When LED is driven at high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

Note4: The LED driving condition is defined for each LED module.



5 Timing Chart

5.1 DSI Interface Timing Characteristics

HS Receiver AC Timing Characteristics

Parameter	Symbol	Rating			Unit	Note
		Min	Typ	Max		
Bandwidth per lane	-	-	-	1000	Mbps	Bandwidth selected by register 'speedup' Speedup=0 → Max=550Mbps Speedup=1→ Max=1000Mbps
Operation frequency	-	-	-	500	MHz	
UI instantaneous	UI_{INST}	1	-	12.5	ns	1
Data to Clock Skew	Tskew	-0.15	-	0.15	UI_{INST}	
Inter-lane static skew	Tskew-lane	-	-	$UI_{INST}/50$	UI_{INST}	
Data to Clock Setup Time	T_{SETUP}	0.25	-	-	UI_{INST}	2
Data to Clock Hold Time	T_{HOLD}	0.25	-	-	UI_{INST}	
Common-mode interference beyond 450MHz	$\Delta V_{CMRX(HF)}$	-	-	100	mV	4
Common-mode interference 50MHz- 450MHz	$\Delta V_{CMRX(LF)}$	-50	-	50	mV	3,6
Common-mode termination	C_{CM}	-	-	60	pF	5

Note:

(1) Total silicon and package delay budget of 0.3*UINST

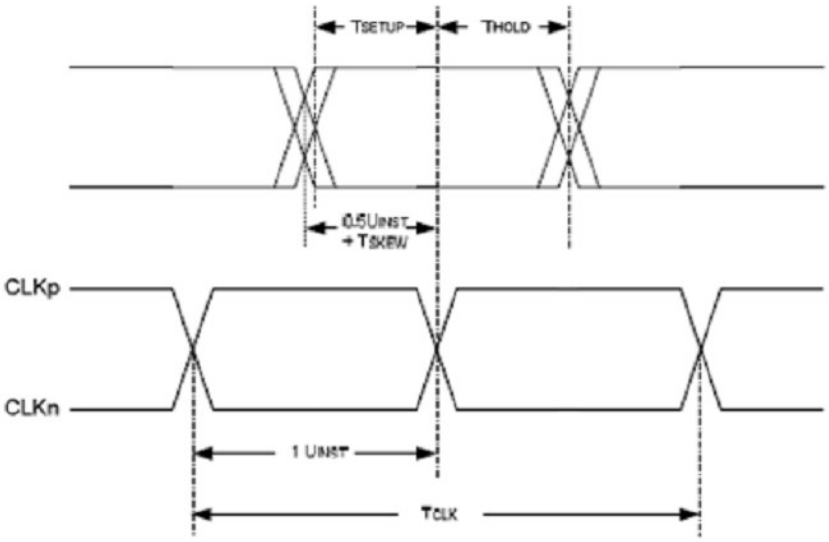
(2) Total setup and hold window for receiver of 0.3*UINST

(3) Excluding 'static' ground shift of 50mV

(4) =VCMRX (HF) is the peak amplitude of a sine wave superimposed on the receiver input

(5) For higher bit rates a 14pF capacitor will be needed to meet the common-mode return loss specification.

(6) Voltage difference compared to the DC average common-mode potential.



5.2 Recommended Timing Setting of TCON

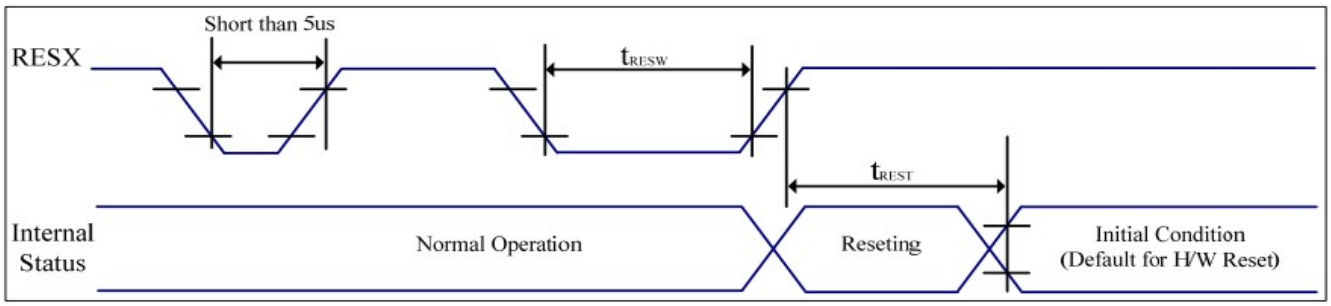
TCON (Embedded in Source IC) Input Timing (DCLK, HS, VS, DE)

VDD-3V3=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK	Fclk	-	62	-	MHz	
	tclk	-	16.1	-	ns	
HSD	thd	-	480	-	tclk	
	thpw	-	6	-	tclk	
	thb	-	20	-	tclk	
	thfp	-	30	-	tclk	
VSD	tvd	-	1920	-	th	
	tvpw	-	6	-	th	
	tvb	-	10	-	th	
	tvfp	-	20	-	th	

Note: For reference only, it needs to be adjusted according to the actual display effect.

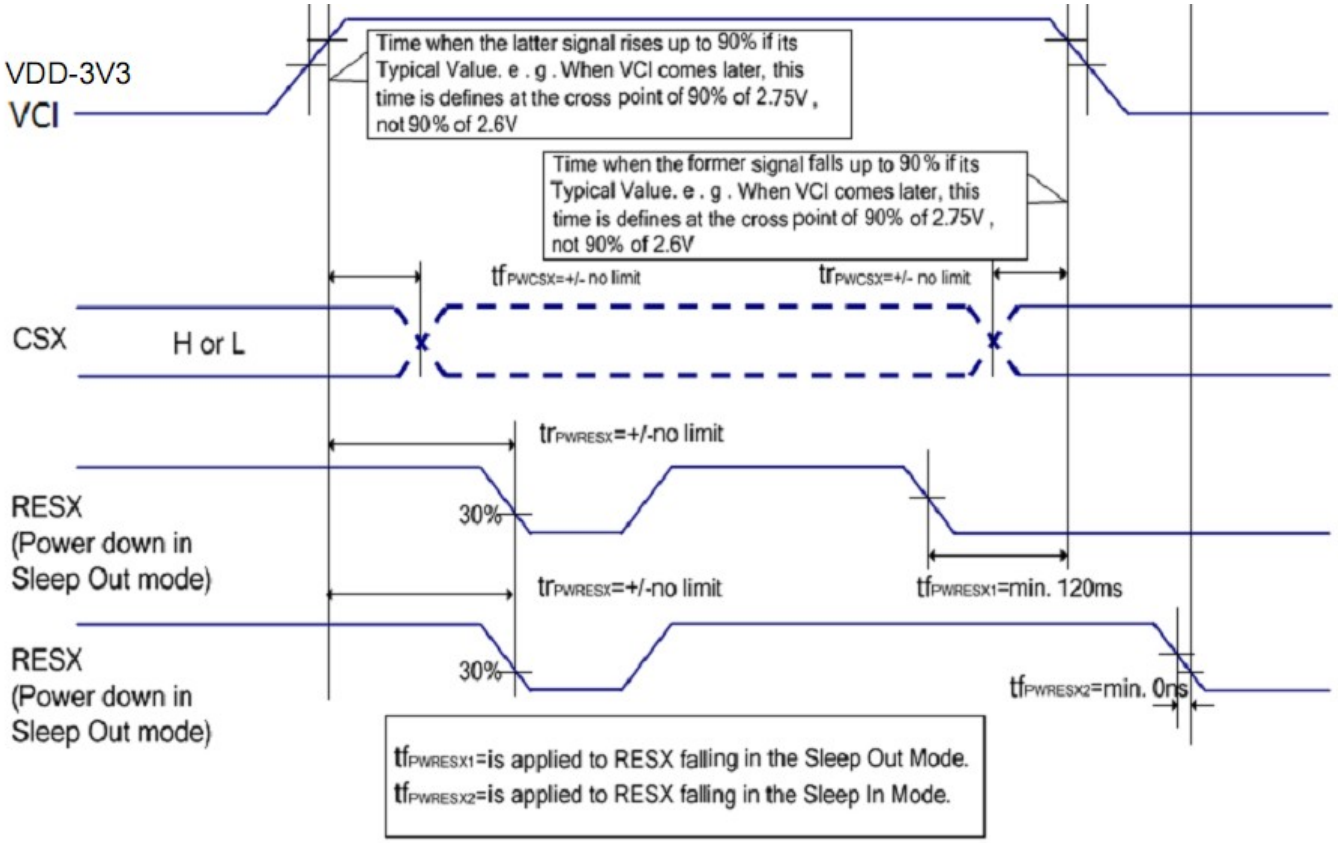
5.3 Reset input timing

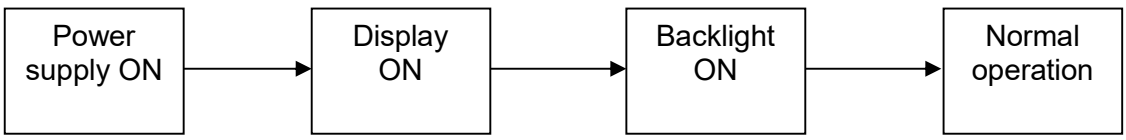


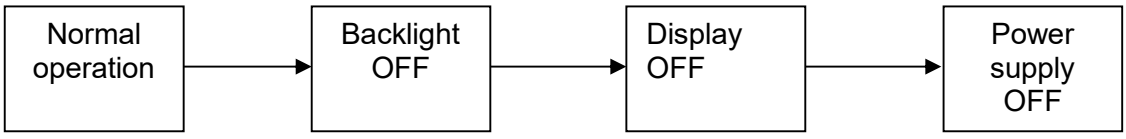
Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	10	-	-	-	us
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-	-	-	120	When reset applied during Sleep out mode	ms

Table: Reset input timing

5.4 Power On/Off Timing







6 Optical Characteristics

Ta=25℃

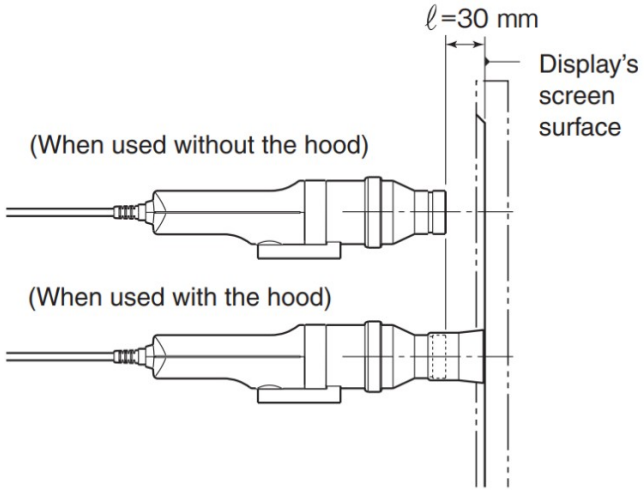
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θT	CR≧10	70	80	-	Degree	Note 2
		θB		70	80	-		
		θL		70	80	-		
		θR		70	80	-		
Contrast Ratio		CR	θ=0°	640	800	-		Note1 Note3
Response Time		T_{ON}	25℃	--	40	-	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.246	0.296	0.346		Note1 Note5
		y		0.274	0.324	0.374		
	Red	x		0.574	0.624	0.674		
		y		0.279	0.329	0.379		
	Green	x		0.238	0.288	0.338		
		y		0.472	0.522	0.572		
	Blue	x		0.086	0.136	0.186		
		y		0.087	0.137	0.187		
Uniformity		U		75	80	-	%	Note1 Note6
NTSC				-	50	-	%	Note 5
Luminance		L		470	520	-	cd/m^2	Note1 Note7

Test Conditions:

1. I_F= 180 mA, V_F=15 V and the ambient temperature is 25±2℃.humidity is 65±7%
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

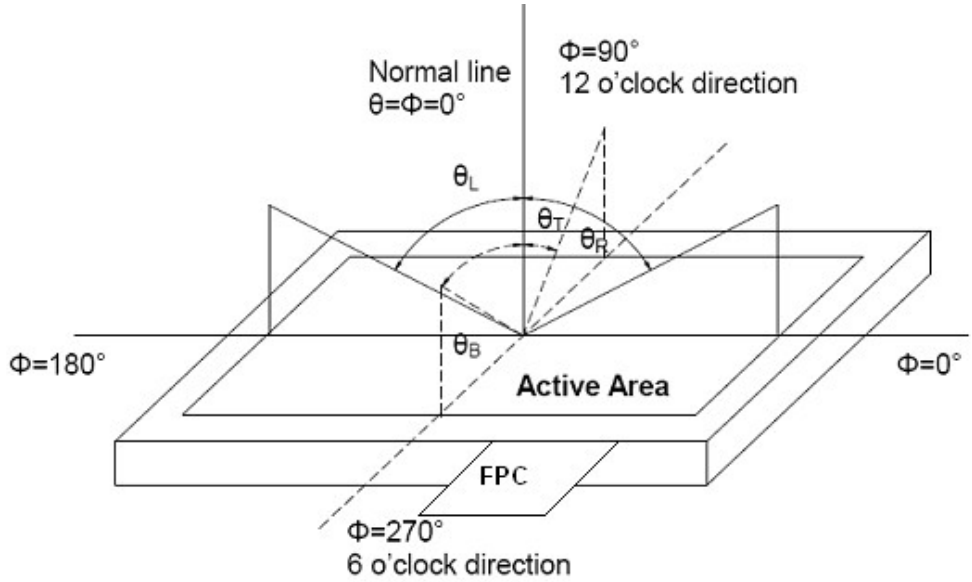
Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	CA210 or similar equipment	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80)。



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

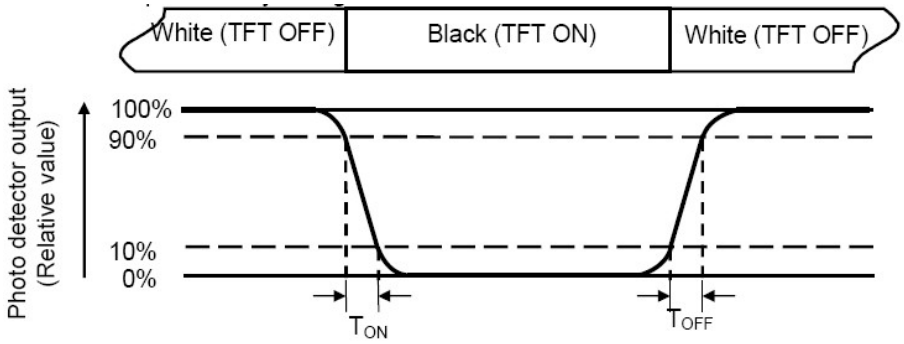
“White state “: The state is that the LCD should drive by Vwhite.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

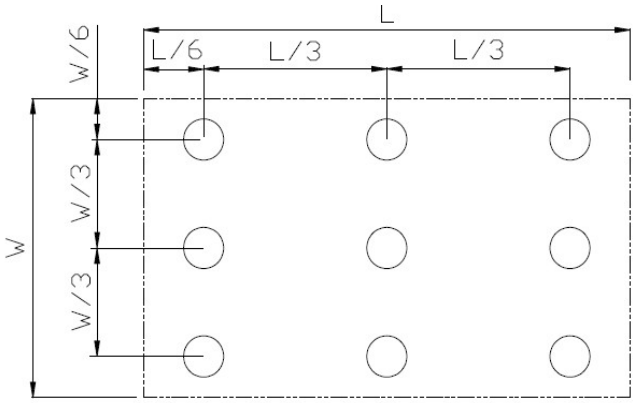
Color coordinates measured at center point of LCD.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-------Active area length W----- Active area width



Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of luminance:

Measure the luminance of white state at center point.

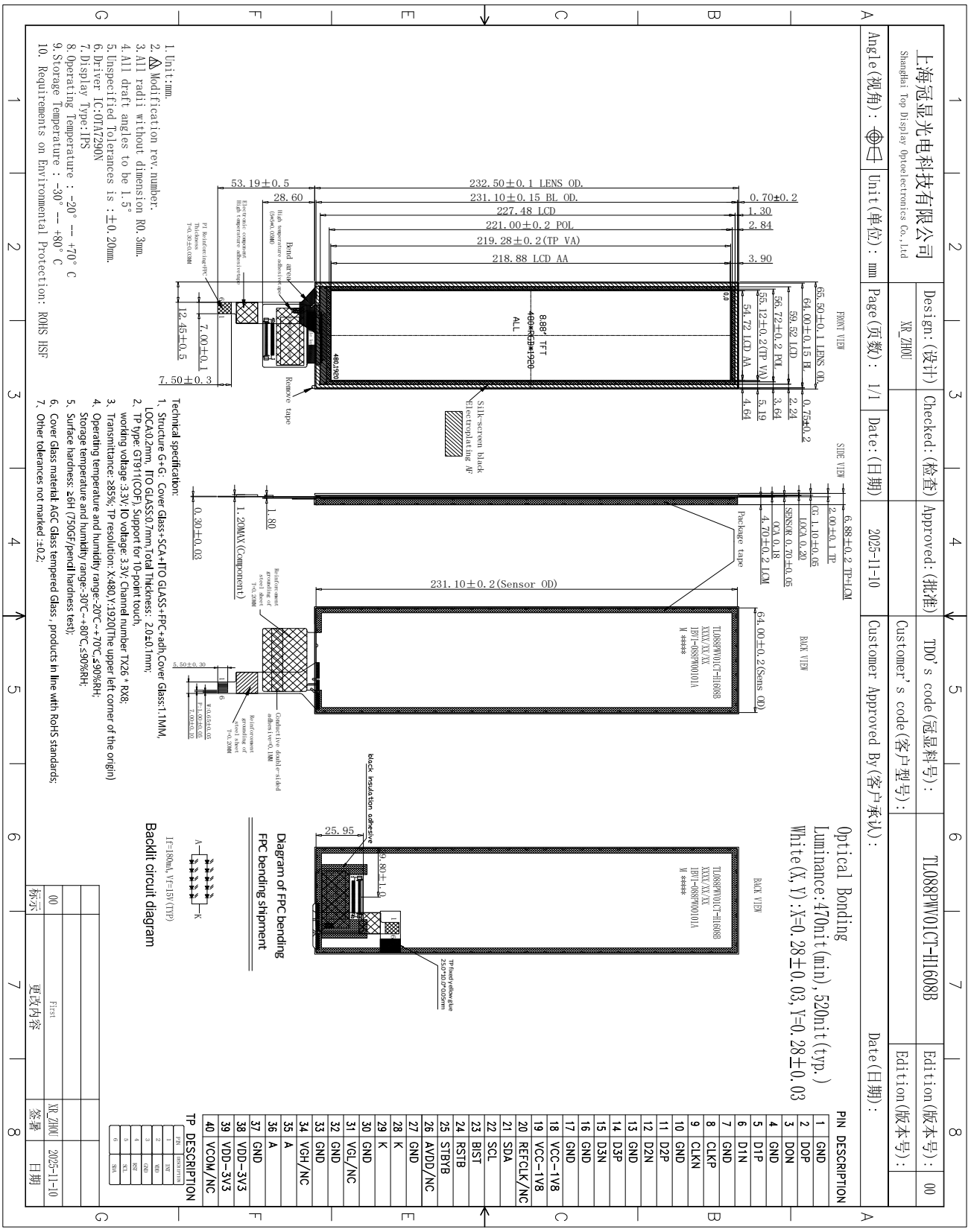
7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	No abnormalities in functions
2	Low Temperature Operation	Ta = -20℃, 240 hours	No abnormalities in functions
3	High Temperature Storage	Ta = +80℃, 240 hours	No abnormalities in functions
4	Low Temperature Storage	Ta = -30℃, 240 hours	No abnormalities in functions
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	No abnormalities in functions
6	Thermal Shock (non-operating)	-30℃ 30 min~ +70℃ 30 min, Change time: 0.5 hour ← 5 min → 0.5 hour.10 Cycle	Start with cold temperature, End with high temperature,
7	ESD	C=150pF, R=330Ω,5point/panel Air: ±8Kv, 5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	No abnormalities in functions

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of samples.

8 Mechanical Drawing



9 Precautions for Use of LCD Modules

Handling Precautions

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

9.1.2 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.

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

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

9.1.5 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
- Ketone
- Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

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

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

9.1.8.1 Be sure to ground the body when handling the LCD Modules.

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

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

9.1.8.4 The LCD 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.

Storage Precautions

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

9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is: Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

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

Transportation Precautions

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