



深圳显昶光电科技有限公司

Shenzhen Xianyang Optoelectronic Technology Co., Ltd

LCD MODULE SPECIFICATION

Customer: _____

Module No.: XY121WXH01-B1725A

Date: 2023-03-09

Version: 1.0

☒ Pre-Specification for parameter checking

☐ Final-Specification for sample approval

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	2023-03-09	First release	ping.Yang

1 General Specifications

No.	Item	Specification	Remark
1	LCD Size	12.1inch (Diagonal)	
2	Driver Element	a-Si TFT active matrix	
3	Resolution	1280 (RGB) ×800	
4	Display Mode	Normally Black, Transmissive	
5	Pixel Pitch(mm)	0.068 (H) × 0.204 (V)	
6	Display Colors	16.7M	
7	Surface Treatment	AG25	
8	Color Arrangement	RGB-Stripe	
9	Interface	LVDS (VESA 8bit)	
10	Viewing Direction	All	
11	Gray Scale Inversion Direction	/	Note 1
12	Outline Dimension (mm)	277.7(W) ×180.6 (H) × 7.50(T)	
13	Active Area (mm)	261.12(W) × 163.2 (H)	
14	Touch Screen	Without CTP	
15	Display Driver IC		
16	Touch Driver IC	/	

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

Connector on FPC: BAIKED FPC40PIN or equivalent.

PIN	Symbol	I/O	Description	Remark
1	NC	--	No Connection	
2	VDDIN	P	Power Supply,3.3V(typ.)	
3	VDDIN	P	Power Supply,3.3V(typ.)	
4	VDDIN	P	Power Supply,3.3V(typ.)	
5	NC	--	No Connection	
6	GND	P	Ground	
7	GND	P	Ground	
8	RIN0-	I	Negative LVDS differential data0 input	
9	RIN0+	I	Positive LVDS differential data0 input	
10	GND	P	Ground	
11	RIN1-	I	Negative LVDS differential data1 input	
12	RIN1+	I	Positive LVDS differential data1 input	
13	GND	P	Ground	
14	RIN2-	I	Negative LVDS differential data2 input	
15	RIN2+	I	Positive LVDS differential data2 input	
16	GND	P	Ground	
17	LVDS_CLK-	I	Negative LVDS differential Clock input	
18	LVDS_CLK+	I	Positive LVDS differential Clock input	
19	GND	P	Ground	
20	RIN3-	I	Negative LVDS differential data3 input	
21	RIN3+	I	Positive LVDS differential data3 input	
22	GND	P	Ground	
23	NC	--	No Connection	
24	NC	--	No Connection	
25	GND	P	Ground	
26	NC	--	No Connection	
27	NC	--	No Connection	
28	GND	P	Ground	
29	NC	--	No Connection	
30	NC	--	No Connection	
31	GND	P	Ground	
32	GND	P	Ground	

33	GND	P	Ground	
34	NC	--	No Connection	
35	PWM/NC	--	PWM dimming control input pin, No Connection	
36	LED_EN/NC	--	The enable pin to LED Driver, No Connection	
37	NC	--	No Connection	
38	VLED/NC	--	Power voltage for LED backlight Anode, No Connection	
39	VLED/NC	--	Power voltage for LED backlight Anode, No Connection	
40	VLED/NC	--	Power voltage for LED backlight Anode, No Connection	

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

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
Power Voltage	VDDIN	0	3.6	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

VDDIN=3.3V, GND=0V, Ta = 25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power supply Voltage	VDDIN	3.00	3.30	3.60	V	
Differential input high threshold	V _{TH}	-	-	+100	mV	
Differential input low threshold	V _{TL}	-100	-	-	mV	
LVDS common mode voltage	V _{IC}	0.7	-	1.6	V	
LVDS swing voltage	V _{ID}	±100	-	±600	mV	
Power supply Current	I _{VDDIN}	120	180	280	mA	VDDIN=3.3V

4.2 Backlight Unit Driving Condition

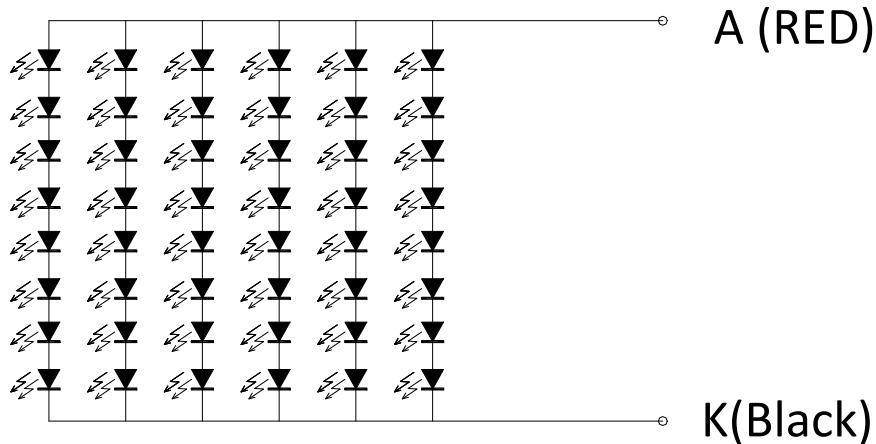
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I _F	-	240	270	mA	48 LEDs (8 LED Serial, 6LED Parallel)
Forward Current Voltage	V _F	-	24	27.2	V	
Backlight Power Consumption	W _{BL}	-	5760	7344	mW	
Operating Life Time	--	50000	--	--	hrs	Note 2, Note 3

Note1: The LED driving condition is defined for each module (8 LED Serial, 6 LED Parallel).

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

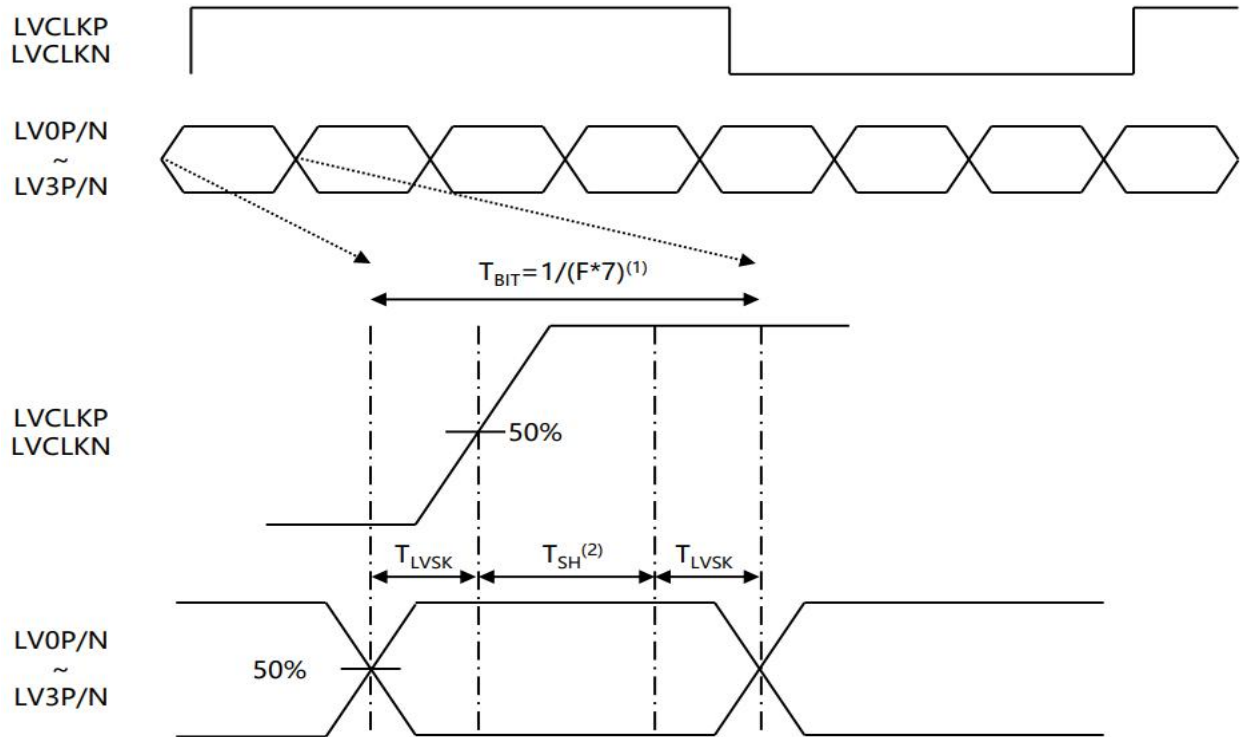
Note3: Optical performance should be evaluated at Ta=25℃ When LED is driven at high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

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



5 Timing Chart

5.1 LVDS Signal Timing Waveform .



Note:

(1) T_{BIT} : Data period

(2) Internal CLK sampling data window

Description	Symbol	Condition	Min	Typ	Max	Unit
LVDS Input frequency	F	-	20	-	85	MHz
LVDS channel to channel skew	T_{LVSK}	F=65MHz $V_{IC}=1.2V$ $V_{ID}=\pm 200mV$	-600	-	+600	ps

5.2 Recommended Timing Setting of TCON

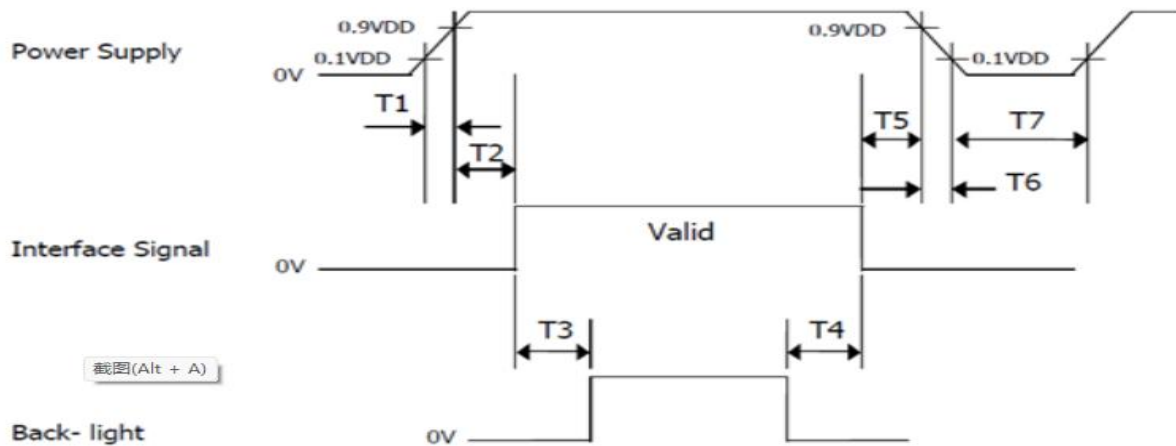
TCON (Embedded in Source IC) Input Timing (DCLK, HS, VS, DE)

VDDIN=3.3V, GND=0V, Ta=25℃

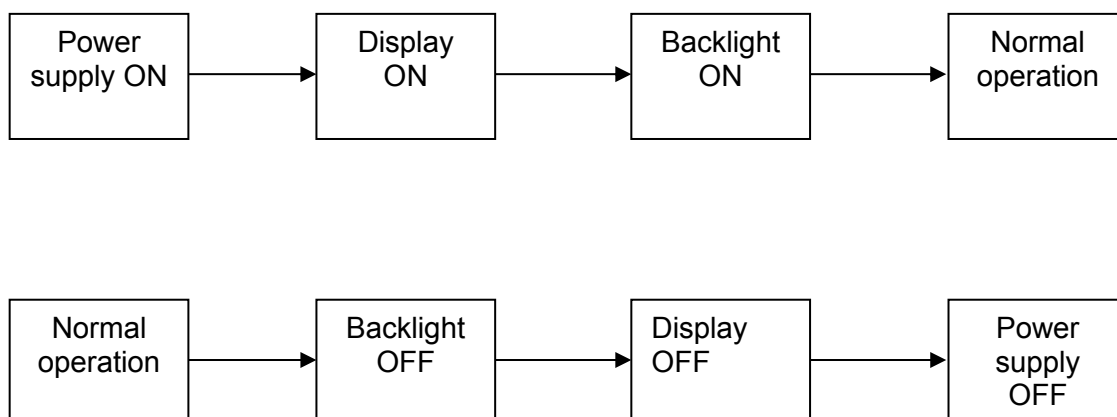
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK	Fclk		72.4		MHz	Frame Rate:60 Hz
	tclk		13.81		ns	
HSD	thd	-	1280	-	tclk	
	thpw	-	10	-	tclk	
	thb	-	78	-	tclk	
	thfp	-	72	-	tclk	
VSD	tvd	-	800		th	
	tvpw	-	5	-	th	
	tvb	-	18	-	th	
	tvfp	-	15	-	th	

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

5.3 Power On / Power Off Timing



Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0	-	10	(ms)
T2	0	-	50	(ms)
T3	200	-	-	(ms)
T4	200	-	-	(ms)
T5	0	-	50	(ms)
T6	0	-	10	(ms)
T7	500	-	-	(ms)



6 Optical Characteristics

Ta=25℃

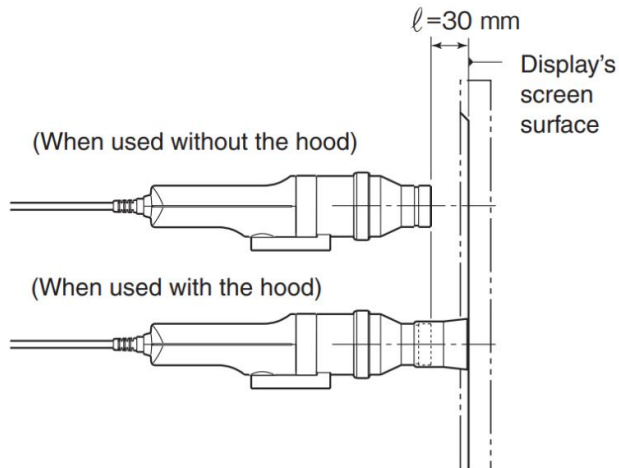
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θT	CR ≧ 10	80	85	-	Degree	Note 2
		θB		80	85	-		
		θL		80	85	-		
		θR		80	85	-		
Contrast Ratio		CR	θ=0°	1000	1200	-		Note1 Note3
Response Time		T _{ON}	25℃	--	30	35	ms	Note1
		T _{OFF}						Note4
Chromaticity	White	x	Backlight is on	0.292	0.322	0.352		Note1 Note5
		y		0.314	0.344	0.374		
	Red	x		0.629	0.659	0.689		
		y		0.289	0.319	0.349		
	Green	x		0.224	0.254	0.284		
		y		0.535	0.565	0.595		
	Blue	x		0.107	0.137	0.167		
		y		0.058	0.088	0.118		
Uniformity		U		70	80	-	%	Note1 Note6
NTSC				68	72	-	%	Note 5
Luminance		L		-	500	-	cd/m ²	Note1 Note7

Test Conditions:

1. $I_F=240\text{ mA}$, $V_F=24\text{V}$ and the ambient temperature is $25\pm 2^\circ\text{C}$. humidity is $65\pm 7\%$
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

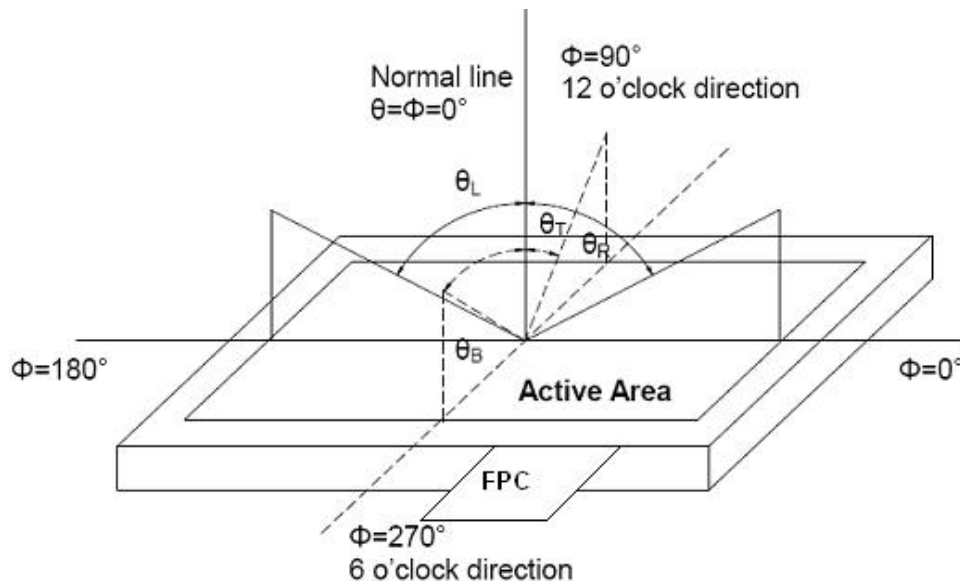
Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



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

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

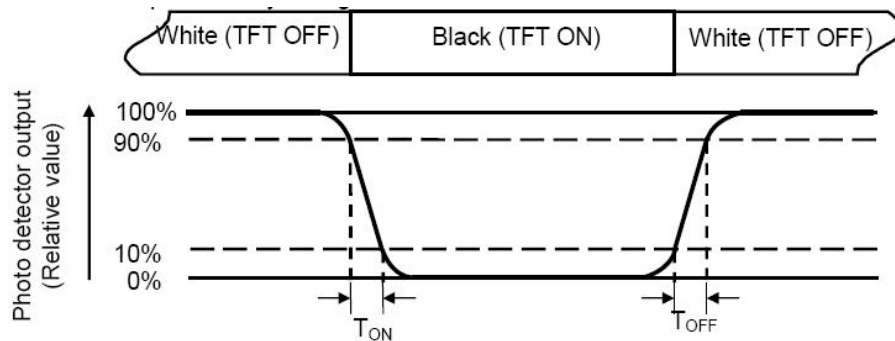
“White state “: The state is that the LCD should drive by V_{white}.

“Black state”: The state is that the LCD should drive by V_{black}.

V_{white}: To be determined V_{black}: 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)

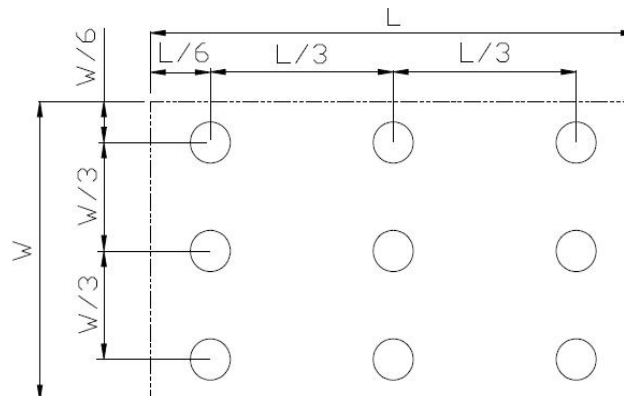
Color coordinates measured at center point of LCD.

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.

$$\text{Luminance Uniformity (U)} = L_{\min} / L_{\max}$$

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



$L_{\max}$: The measured Maximum luminance of all measurement position.

$L_{\min}$: The measured Minimum luminance of all measurement position.

Note 7: Definition of luminance:

Measure the luminance of white state at center point.

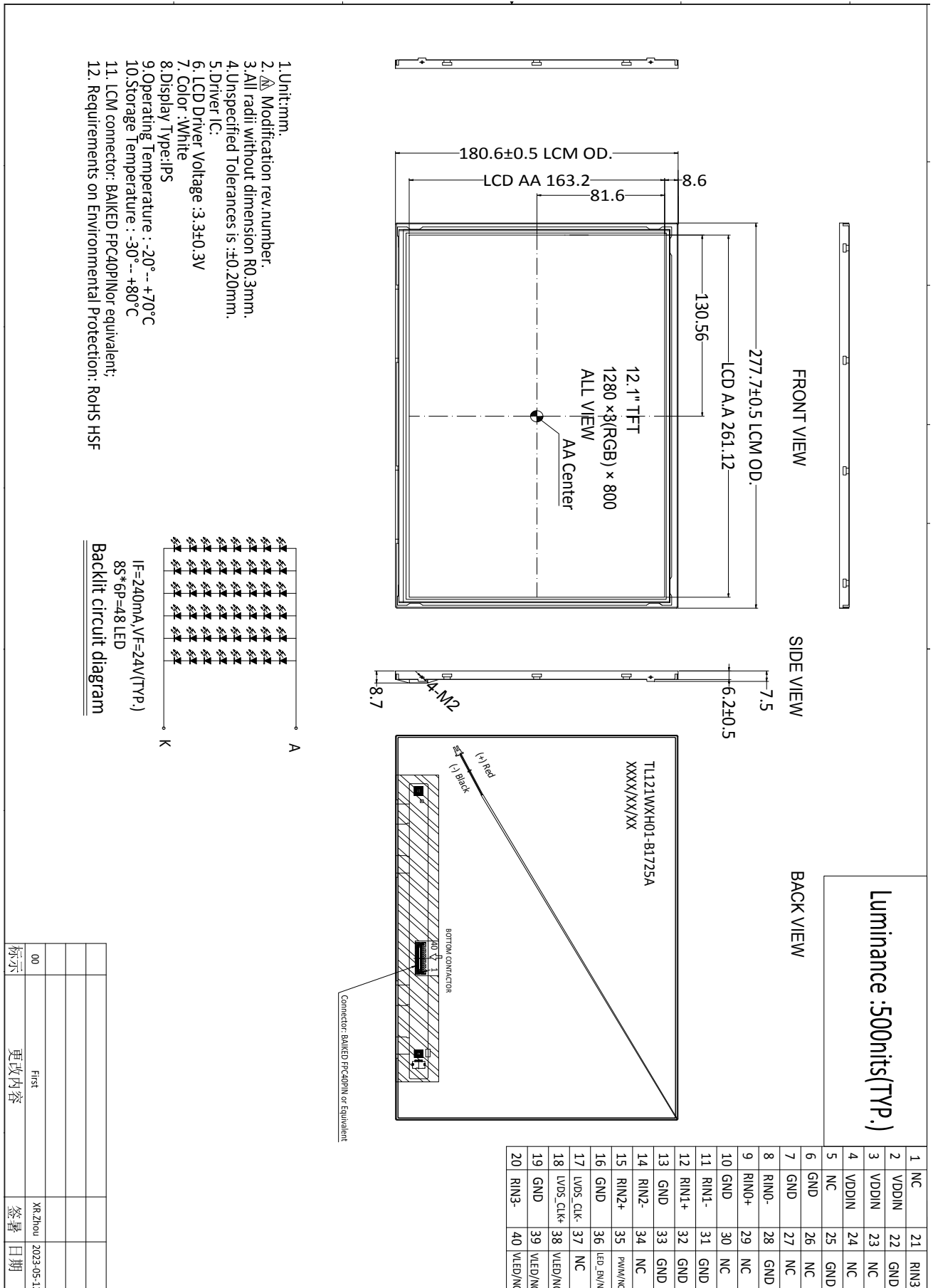
7 Environmental / Reliability Test

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, 240 hours	No abnormalities in functions
6	Thermal Shock (non-operating)	-40℃ 60 min ~ +85℃ 60 min, Change time: 0.5 hour ← 5 min → 0.5 hour. 100 Cycle	Start with cold temperature, End with high temperature,
7	ESD	C=150pF, R=330Ω, 5 point/panel Air: ±15Kv, 5 times; Contact: ±8Kv, 5 times (Environment: 15℃~35℃, 30%~60% RH, 86Kpa~106Kpa)	No abnormalities in functions Class B : Allow for occasional screen breaks or functional abnormalities that can be restored automatically

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°C ~ 40°C 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.