深圳显旸光电科技有限公司
Shenzhen Xianyang Optoelectronic Technology Co., Ltd

LCD MODULE SPECIFICATION

Customer: _____

Module No.: XY070HDV03-H1018C

Date: 2022-08-12

Version: 1.0

For Customer's Acceptance:

Approved by	Comment

Approved by	Checked by	Prepared by

Table of Contents

Record of Revision

Rev.	Date	Description	Editor
1.0	2022-08-12	First release	Zaiping.Yang

1 General Specifications

No.	Item	Specification	Remark
1	LCD Size	6.98 inch (Diagonal)	
2	Driver Element	a-Si TFT active matrix	
3	Resolution	720 (RGB) ×1280	
4	Display Mode	Normally Black, Transmissive	
5	Pixel Pitch(mm)	0.04025 (H) × 0.12075 (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	/	Note 1
12	OuXYine Dimension (mm)	90.34 (W) ×162.95 (H) × 2.15 (T)	
13	Active Area (mm)	86.94(W) × 154.56 (H)	
14	Touch Screen	Without CTP	
15	Display Driver IC	ILI9881C	
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

2.1LCD Pin assignment

Match connector :24-5804-024-500-829+ (KYOCERA) or equivalent

N	Symbol	I/O	Description	Remark
1	GND	P	Ground	
2	MIPI_CLKP	I	DSI-CLK+ clock signals	
3	MIPI_CLKN	I	DSI-CLK- clock signals	
4	GND	P	Ground	
5	MIPI_D0P	I/O	DSI-D0+ clock signals	
6	MIPI_D0N	I/O	DSI-D0- clock signals	
7	GND	P	Ground	
8	MIPI_D1P	I	DSI-D1+ clock signals	
9	MIPI_D1N	I	DSI-D1- clock signals	
10	GND	P	Ground	
11	LEDA	P	Power voltage for LED backlight Anode	
12	LEDK	P	Power voltage for LED backlight Cathode	
13	VIO18	P	Power Supply 1.8V-2.8V	
14	VDD28	P	Power Supply 2.8V	
15	GND	P	Ground	
16	TE	O	Tearing effect output	
17	RESET	I	LCM Reset input signal	
18	GND	P	Ground	
19	MIPI_D2P	I	DSI-D2+clock signals	
20	MIPI_D2N	I	DSI-D2-clock signals	
21	GND	P	Ground	
22	MIPI_D3P	I	DSI-D3+ clock signals	
23	MIPI_D3N	I	DSI-D3- clock signals	
24	GND	P	Ground	

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

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
Power Voltage	VDD28	-0.30	+6.6	V	
	VIO18	-0.30	+5.5	V	
	TP_VCI	-0.30	+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

VDD28，GND=0V，Ta = 25℃

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Digital supply Voltage		VIO18	1.65	1.8	3.3	V	
Analog supply Voltage		VDD28	2.8	3.0	3.3	V	
TP Power		TP_VCI	2.8	-	3.3	V	
Input Signal Voltage	Low Level	V_{IL}	0	-	0.3 x V_{IO18}	V	
	High Level	V_{IH}	0.7 x V_{IO18}	-	V_{IO18}	V	
Current of digital supply voltage		I_{VIO18}	-	20	40	mA	
Current of analog supply voltage		I_{VDD28}	-	35	60	mA	VDD28=3.3V, color bar pattern

4.2 Backlight Unit Driving Condition

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I_F	-	40	50	mA	16 LEDs (8 LED Serial, 2 LED Parallel)
Forward Current Voltage	V_F	-	25.6	28	V	
Backlight Power Consumption	W_{BL}	-	1024	1400	mW	

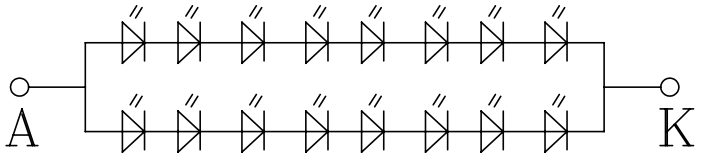
Operating Life Time	--	30000	--	--	hrs	Note 2, Note 3

Note1: The LED driving condition is defined for each module (8 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

High Speed Mode – Clock Channel Timing

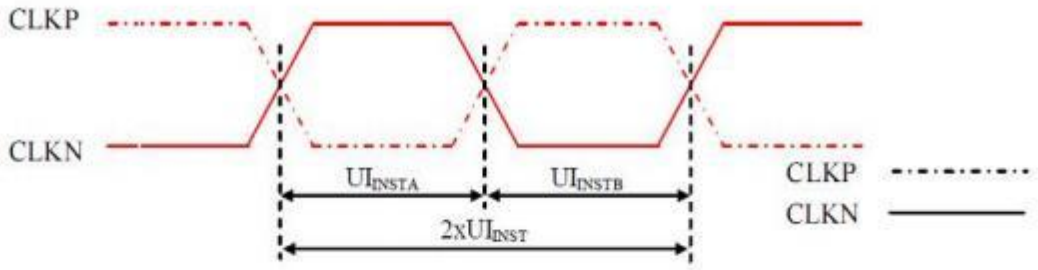


Figure : DSI Clock Channel Timing

Table : DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
CLKP/N	$2xUI_{INST}$	Double UI instantaneous	*Note 2*	25	ns
CLKP/N	UI_{INSTA}, UI_{INSTB} (Note 1)	UI instantaneous Half	*Note 2*	12.5	ns

Notes:

1. UI = UIINSTA = UIINSTB

2. Define the minimum value, see Table .

Table : Limited Clock Channel Speed

Data type	Two Lanes speed	Three Lanes speed	Four Lanes speed
Data Type = 00 1110 (0Eh), RGB 565, 16 UI per Pixel	566 Mbps	466 Mbps	366 Mbps
Data Type = 01 1110 (1Eh), RGB 666, 18 UI per Pixel	637 Mbps	525 Mbps	412 Mbps
Data Type = 10 1110 (2Eh), RGB 666 Loosely, 24 UI per Pixel	850 Mbps	750 Mbps	650 Mbps
Data Type = 11 1110 (3Eh), RGB 888, 24 UI per Pixel	850 Mbps	750 Mbps	650 Mbps

High Speed Mode – Data Clock Channel Timing

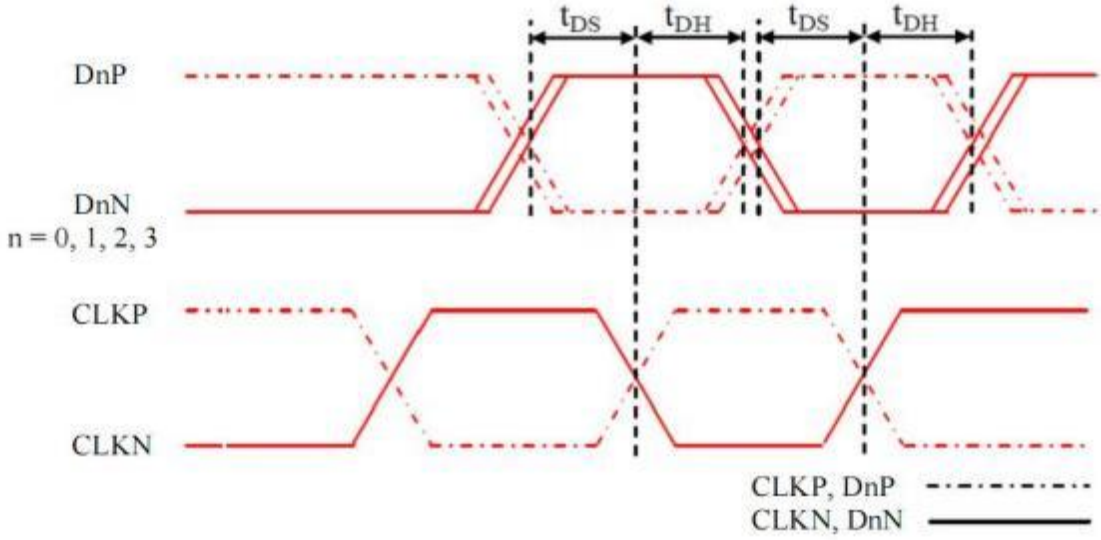


Figure : DSI Data to Clock Channel Timings

Table : DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DnP/N , n=0 and 1	t_{DS}	Data to Clock Setup time	0.15xUI	-
	t_{DH}	Clock to Data Hold Time	0.15xUI	-

5.2 Recommended Timing Setting of TCON

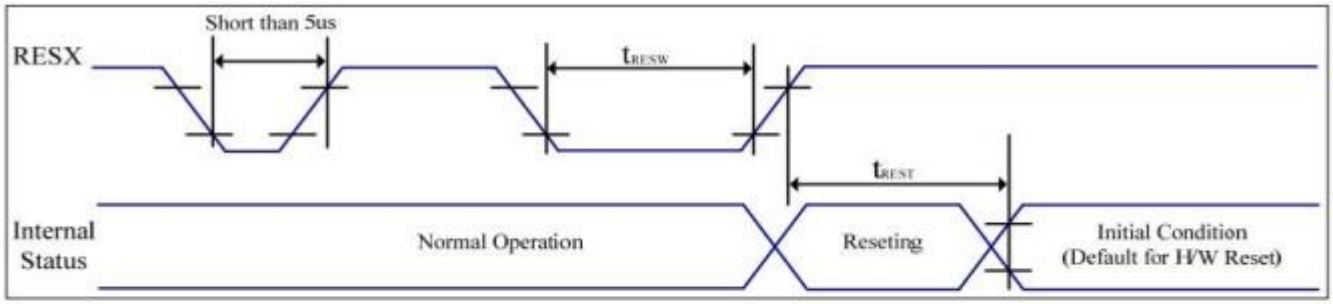
TCON (Embedded in Source IC) Input Timing (DCLK, HS, VS, DE)

VDD28=2.8V, GND=0V, Ta=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK	Fclk	-	72	-	MHz	
	tclk	-	13.9	-	ns	
HSD	thd	-	720	-	tclk	
	thpw	-	20	-	tclk	
	thb	-	80	-	tclk	
	thfp	-	80	-	tclk	
VSD	tvd	-	1280	-	th	
	tvpw	-	8	-	th	
	tvb	-	24	-	th	
	tvfp	-	16	-	th	

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

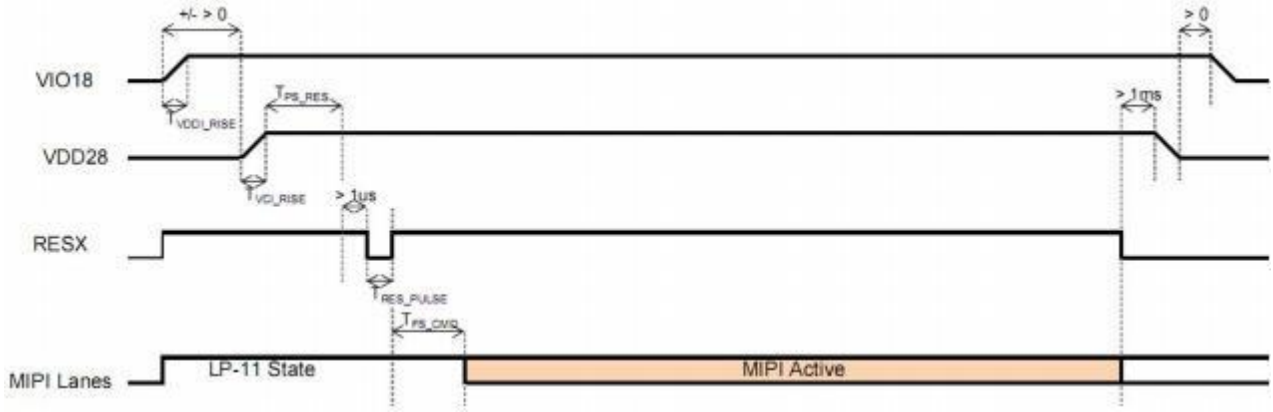
5.3 Reset input timing

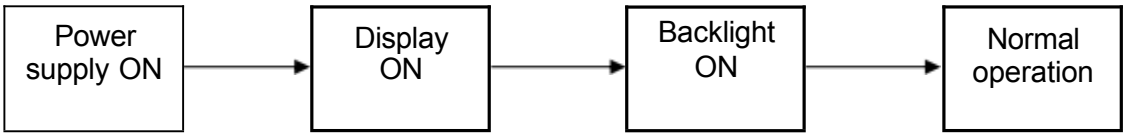


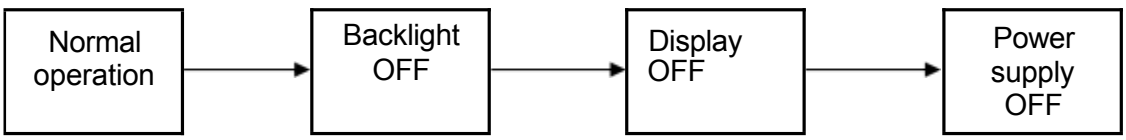
Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	10	-	-	-	us
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-	-	-	120	When reset applied during Sleep out mode	ms

Table: Reset input timing

5.4 Power On/Off Timing







6 Optical Characteristics

Ta=25℃

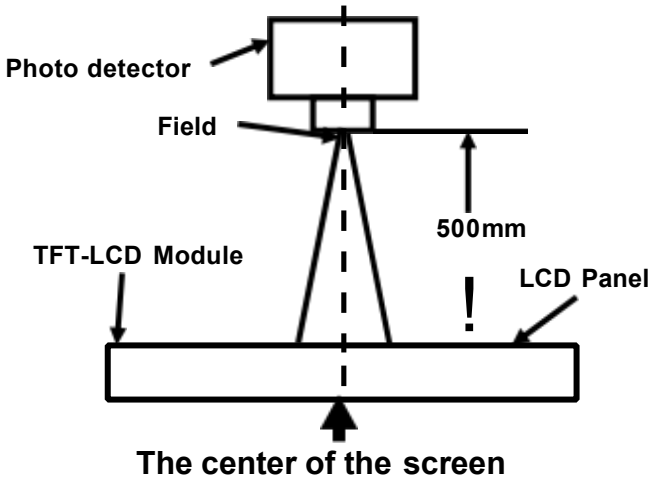
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θT	CR≥10	-	80	-	Degree	Note 2
		θB		-	80	-		
		θL		-	80	-		
		θR		-	80	-		
Contrast Ratio		CR	θ=0°	640	800	-		Note1 Note3
Response Time		T_{ON}	25℃	--	30	-	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.284	0.304	0.324		Note1 Note5
		y		0.304	0.324	0.344		
	Red	x		0.627	0.647	0.667		
		y		0.297	0.317	0.337		
	Green	x		0.238	0.258	0.260		
		y		0.546	0.566	0.586		
	Blue	x		0.120	0.140	0.160		
		y		0.068	0.088	0.108		
Uniformity		U		75	80	-	%	Note1 Note6
NTSC				-	70	-	%	Note 5
Luminance		L		270	300	-	cd/m^2	Note1 Note7

Test Conditions:

1. I_F = 40 mA, V_F =25.6 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.

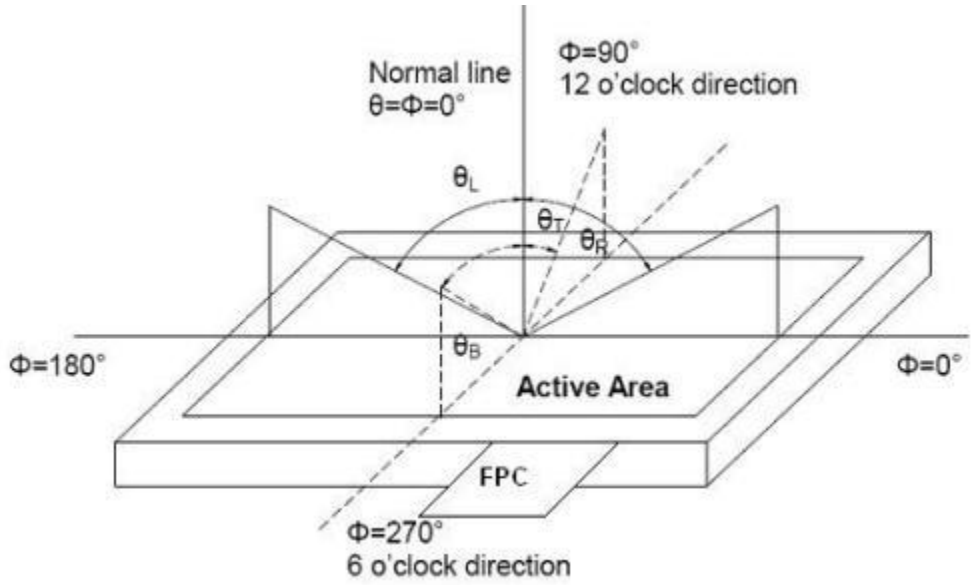
Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	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

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

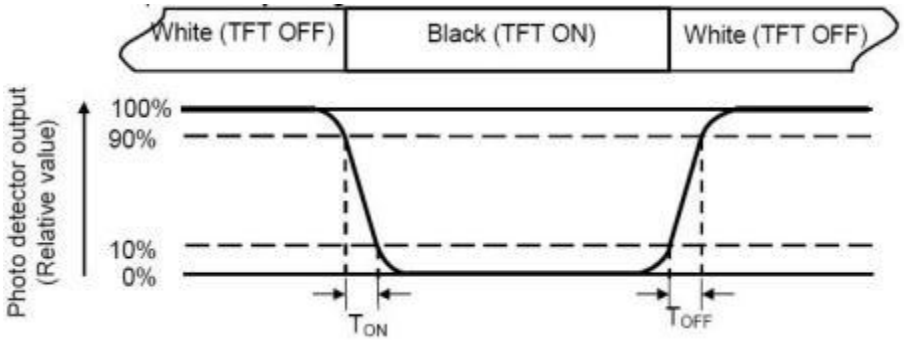
"White state ": The state is that the LCD should drive by Vwhite.

" 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)

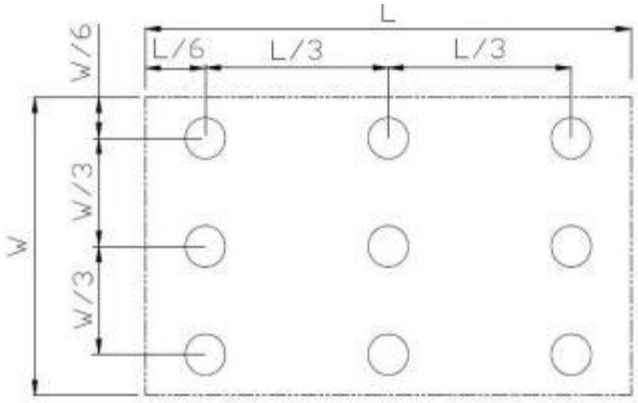
Color coordinates measured at center point of LCD.

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.

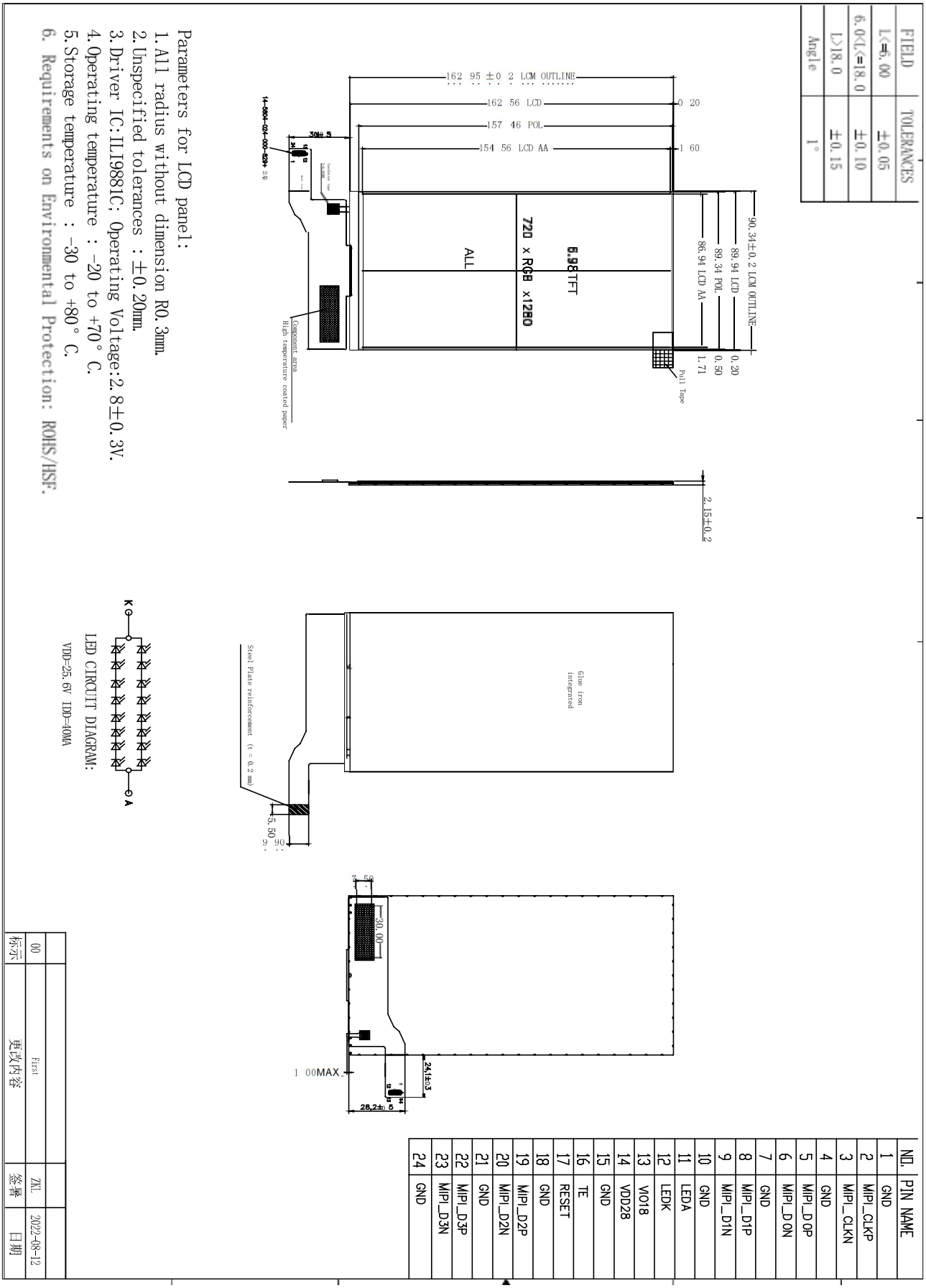
7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 120 hours	No abnormalities in functions
2	Low Temperature Operation	Ta = -20℃, 120 hours	No abnormalities in functions
3	High Temperature Storage	Ta = +80℃, 120 hours	No abnormalities in functions
4	Low Temperature Storage	Ta = -30℃, 120 hours	No abnormalities in functions
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,120hours	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, prompXYy washit 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 genXYy 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.