



深圳显昶光电科技有限公司

Shenzhen Xianyang Optoelectronic Technology Co., Ltd

PRODUCTION SPECIFICATION OF LCD MODULE

MODULE NO.: XY101WSH22

Customer Name:			
Customer Part Number:			
Approved By:		Date:	

Prepared By	Checked By	Approved By

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Revision History

Rev	Issued Date	Description	Page	Editor
1.0	Dec.7,2019	First release	All	

1 General Specifications

Feature		Specifications
Display Spec.	Display Size(Diagonal)	10.1 inch
	Resolution (H*V)	1024(RGB)×600
	LCD type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Viewing Direction	ALL
	Gray Scale Inversion Direction	-
Mechanical Characteristics	OutlineDimensions (H xV x T) (mm)	235 (H) x 143 (V) x4.8 (D)
	Active Area(mm)	222.72 (H) x 125.28 (V)
	With /Without Touch screen	With CTP
	Match Connector Type	0.5 Pitch 50 Pin
	Backlight Type	White LED
	Weight (g)	TBD
Electrical Characteristics	Interface	24RGB
	Number of color	16.7M
	Driver IC	

2 Pin Assignment

Terminal No.	Symbol	IO	Functions
1--2	LED+	P	Power for LED backlight (Anode)
3--4	LED-	P	Power for LED backlight (Cathode)
5	GND	P	Analog Ground
6	VCOM	I	Common voltage
7	DVDD	P	Power for Digital Circuit
8	MODE	I	DE/SYNC mode select
9	DEN	I	Data Input Enable
10	VSD	I	Vertical Sync Input
11	HSD	I	Horizontal Sync Input
12	B7	I	Blue data(MSB)
13	B6	I	Blue data
14	B5	I	Blue data
15	B4	I	Blue data
16	B3	I	Blue data
17	B2	I	Blue data
18	B1	I	Blue data
19	B0	I	Blue data
20	G7	I	Green data(MSB)
21	G6	I	Green data
22	G5	I	Green data
23	G4	I	Green data
24	G3	I	Green data
25	G2	I	Green data
26	G1	I	Green data
27	G0	I	Green data (LSB)
28	R7	I	Red data(MSB)
29	R6	I	Red data
30	R5	I	Red data
31	R4	I	Red data
32	R3	I	Red data
33	R2	I	Red data
34	R1	I	Red data
35	R0	I	Red data
36	GND	P	Power Ground
37	DCK	I	Sample clock
38	GND	P	Power Ground
39	SHLR	I	Left / right selection
40	UPDN	I	Up/down selection
42	VGL	P	Gate OFF Voltage
43	AVDD	P	Power for Analog Circuit
44	RESET	I	Global reset pin.
45	NC	-	No connection
46	VCOM	I	Common Voltage
47	DITH	I	Dithering function

48	GND	P	Power Ground
49	NC	-	No connection
50	NC	-	No connection

CTP Pin Assignment

TP NO.	TP PIN NAME	Description
1	SDA	I2C Serial Data
2	SCL	I2C Serial Clock
3	RST	External reset
4	INT	External interrupt INT to the host, It is active low when finger touching on the screen.
5	VDD	Supply voltage 3.3V
6	GND	Ground

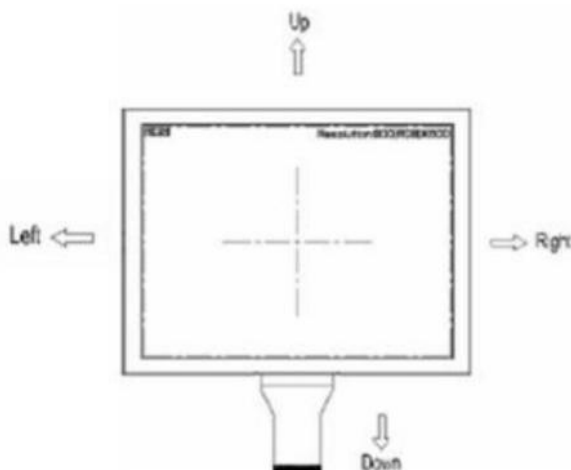
Note() Selection of scanning mode (please refer to the following table)

Setting of scan control input		IN/OUT state for start pulse				Scanning direction
U/D	L/R	STVD	STVU	STHR	STHL	
GND	DVDD	Output	input	output	input	up to down, and from left to right
DVDD	GND	input	output	input	output	down to up, and from right to left
GND	GND	output	input	input	output	up to down, and from right to left
DVDD	DVDD	input	output	output	input	down to up, and from left to right

Note() MOD=H: Simultaneous sampling.(Please check CPH2 and CPH3 to GND when MOD=H)

MOD=L: Sequential sampling.

Note Definition of scanning direction.
Refer to the figure as below:



Note Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note Dithering function enable control, normally pull high.
When DITHB="1", Disable internal dithering function,
When DITHB="0", Enable internal dithering function,

3 Absolute Maximum Ratings

GND=0V, Ta= 25℃

Item	Symbol	Value	Unit
Power supply voltage for logic	V _{DD}	0.3 to 5.0	V
Input voltage	V _{in}	V _{DD} +0.3	V
Operating temperature	T _{opr}	-20 to 70	℃
Storage temperature	T _{stg}	-30 to 80	℃

4 Electrical Characteristics

4.1 DC Characteristics

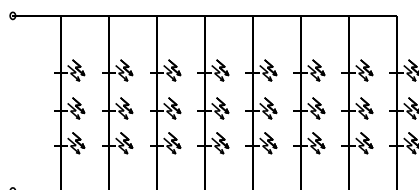
Item	Symbol	Min	Type	Max	Unit	Test condition
Power voltage	DVDD	3.0	3.3	3.6	V	-
	AVDD	9.4	9.6	9.8	V	
	VGH	17	18	19	V	
	VGL	-6.5	-6	-5.5	V	
Input signal voltage	VCOM	3.6	3.8	4.0	V	
Input logic high voltage	V _{IH}	0.7DVDD	-	DVDD	V	
Input logic low voltage	V _{IL}	0		0.3DVDD	V	
Current for Driver	IGH	-	0.2	1	mA	VGH=15.0V
	IGL	-	0.2	1	mA	VGL=-10.0V
	IDVDD	-	4.0	1	mA	DVDD=3.3V
	IAVDD	-	20	50	mA	AVDD=11.3V

4.2 Driving Backlight

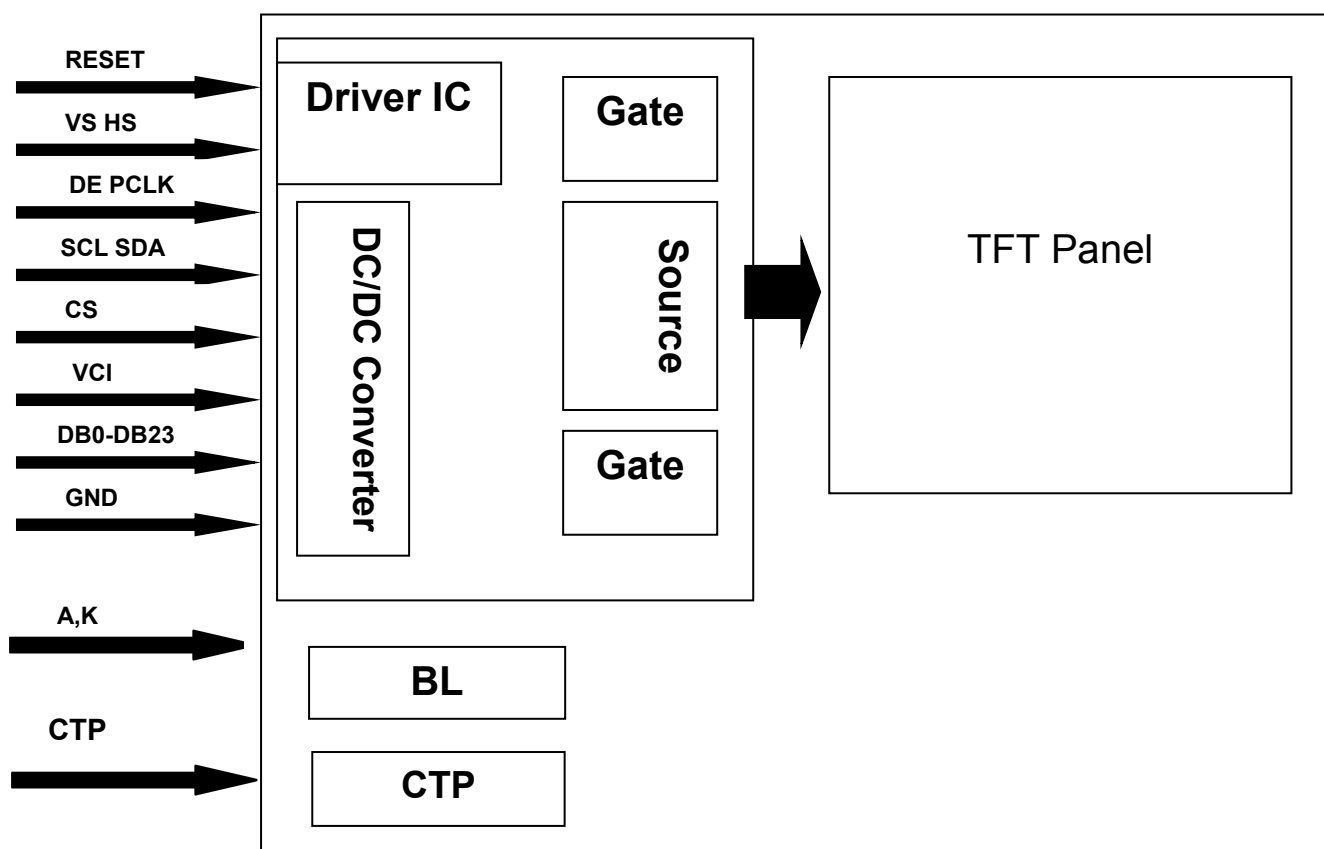
Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I _F	--	160		mA	
Forward Voltage	V _F	-	9.6	-	V	
Connection mode	P	--	3S8P	--		
LED number	/		24		pcs	
LED life time		20000			hours	

Note1: Optical performance should be evaluated at Ta=25℃ only .If LED is driven by 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.



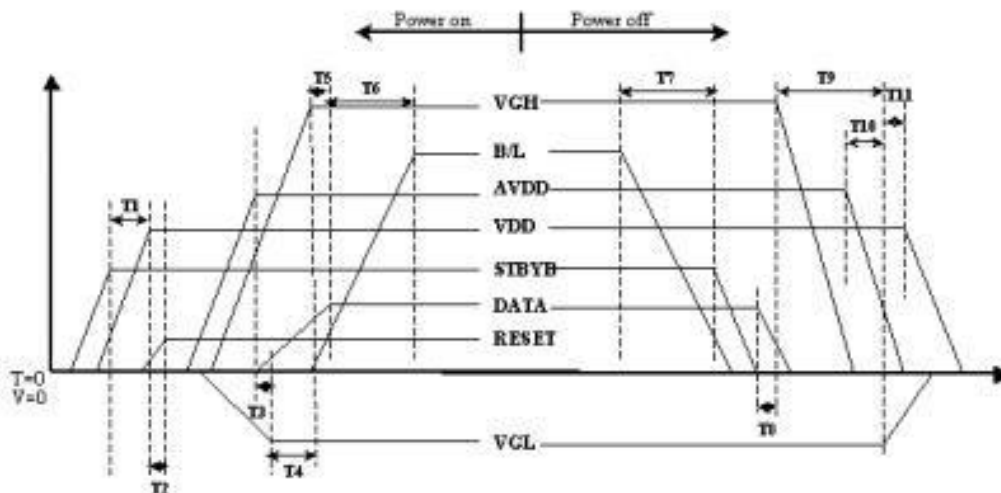
4.3 Block Diagram



5 INTERFACE TIMING

5.1 RGB interface

6.4 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit
T1	0	--	--	ms
T2	50	--	--	ms
T3	5	--	--	ms
T4	10	--	--	ms
T5	20	--	--	ms
T6	50	--	--	ms
T7	20	--	--	ms
T8	10	--	--	ms
T9	20	--	--	ms
T10	10	--	--	ms
T11	20	--	--	ms

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3\text{ }^{\circ}\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

- DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		T _H
VSD Period	tv	610	635	800	T _H
VSD Blanking	tvbp+ tvfp	10	35	200	T _H

- HV mode

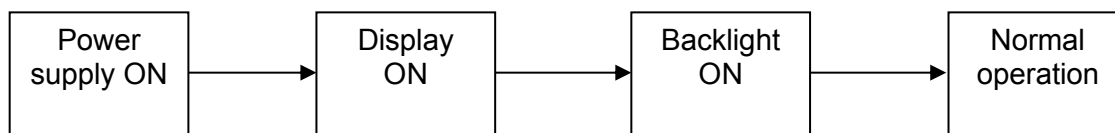
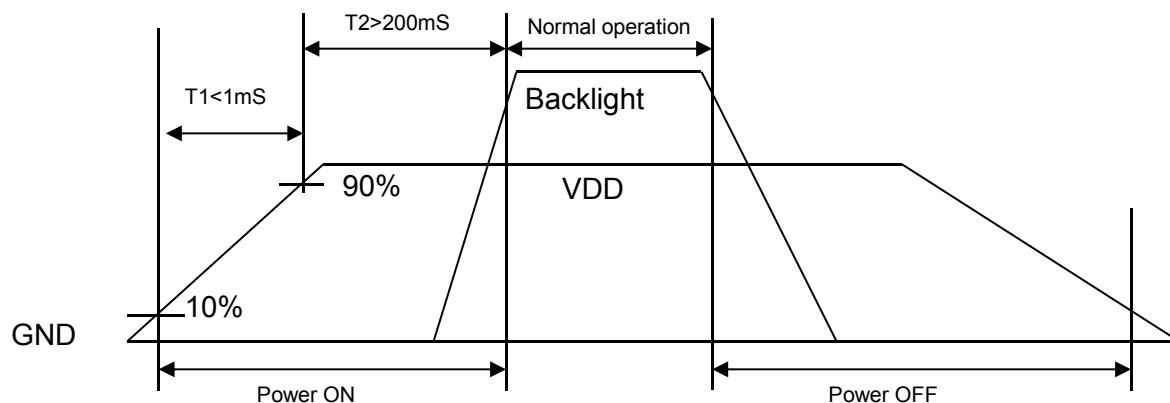
Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp		160		DCLK
HSD Front Porch	thfp	16	160	216	DCLK

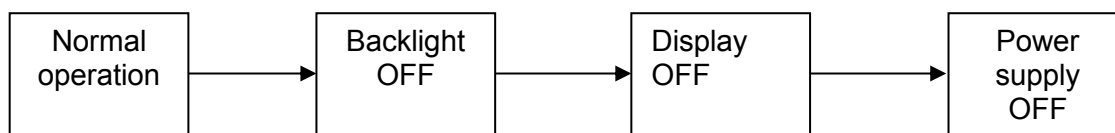
Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T _H
VSD Period	tv	624	635	750	T _H
VSD Pulse Width	tvpw	1	-	20	T _H
VSD Back Porch	tvbp		23		T _H
VSD Front Porch	tvfp	1	12	127	T _H

5.2 Power ON/OFF Timing



Power ON sequence



Power OFF sequence

6 Optical Characteristics

Ta=25℃

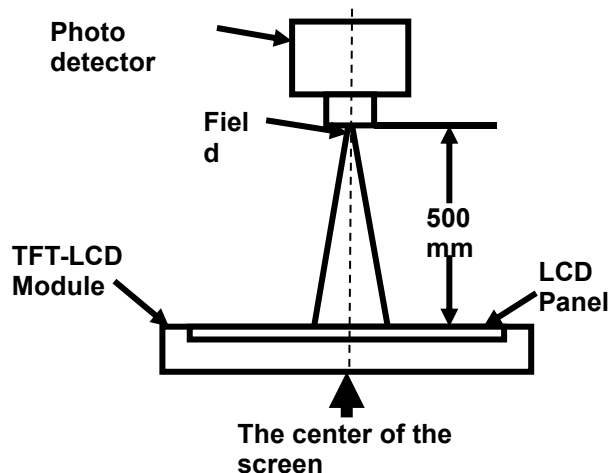
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	$CR \geq 10$		85	-	Degree	Note 2
	θB			85	-		
	θL			85	-		
	θR			85	-		
Contrast Ratio	CR	$\theta=0^\circ$	400	500	-	-	Note1 Note3
Response Time	T_{ON}	25℃	-	10	20	ms	Note1 Note4
	T_{OFF}				30		
Uniformity	U	-	80	85	-	%	Note1 Note6
NTSC	-	-	-	60	-	%	Note 5
Luminance	L		200	250	-	cd/m ²	Note1 Note7

Test Conditions:

1. $V_F=9.6V$, $I_F=160mA$, the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical 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).

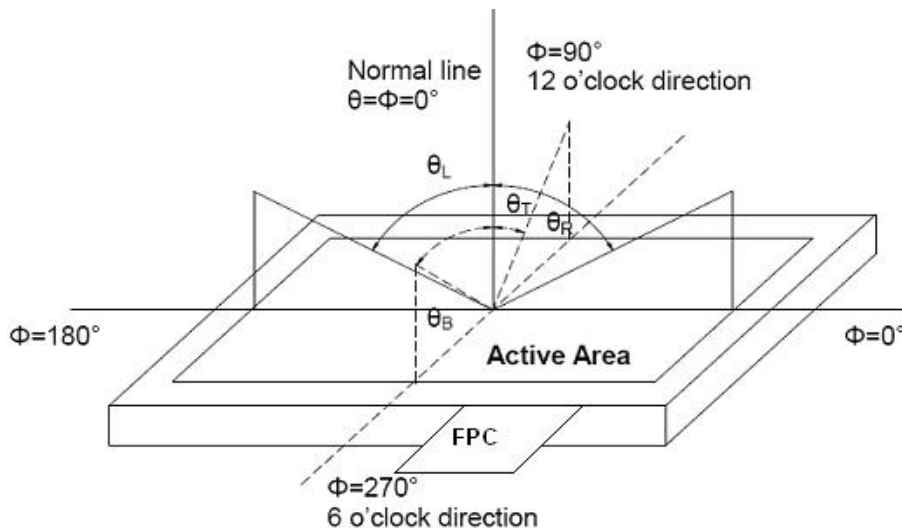


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

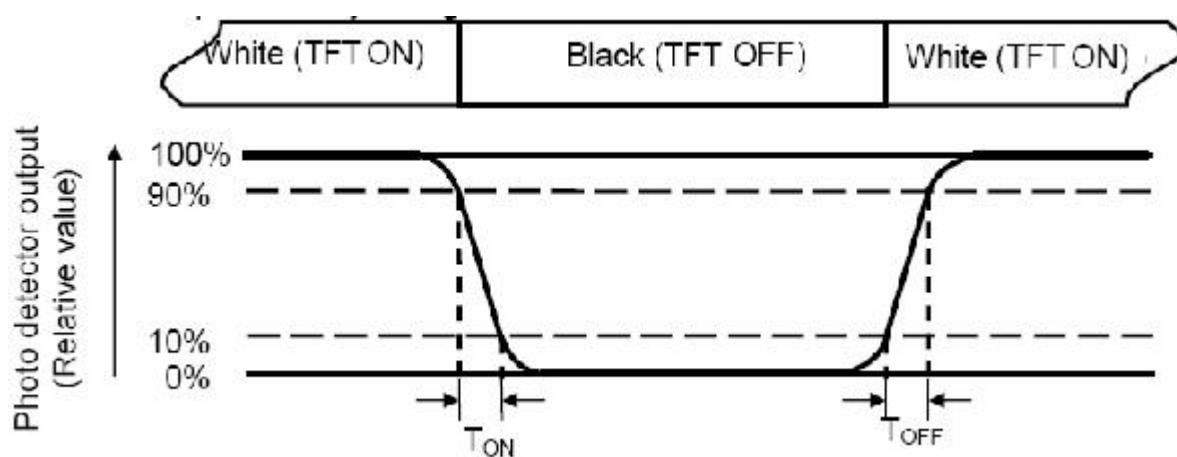
"White state ":The state is that the LCD should be driven by V_{white}.

"Black state": The state is that the LCD should be driven 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.

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

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

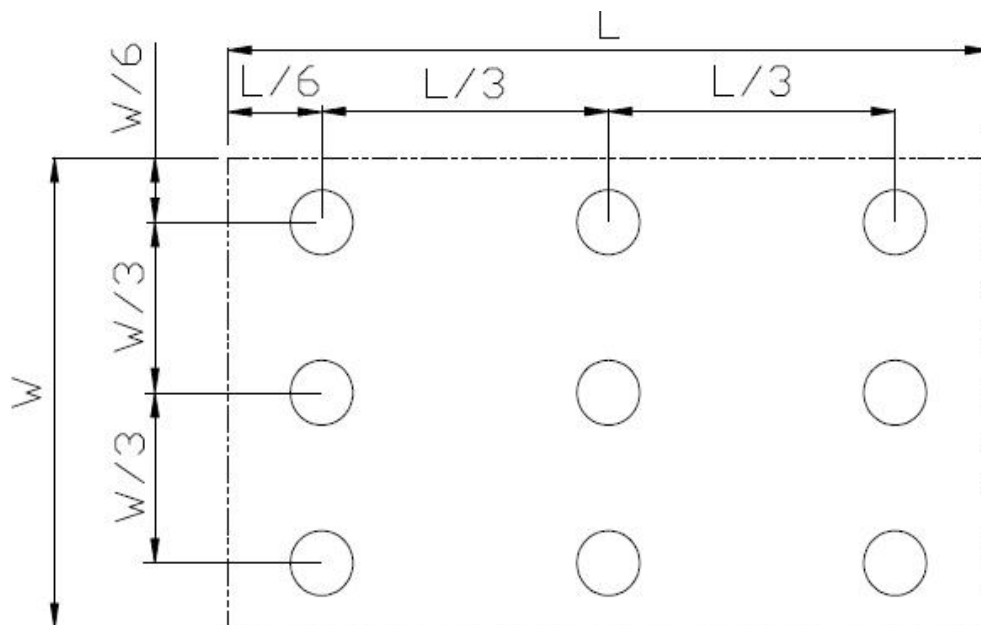


Fig. 2 Definition of uniformity

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

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80°C	120	No abnormalities in functions and appearance
High temp. Operating	70°C	120	
Low temp. Storage	-30°C	120	
Low temp. Operating	-20°C	120	
Humidity	40°C/ 90%RH	120	
Thermal Shock(Non-operation)	-20°C ← 25°C → 70°C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

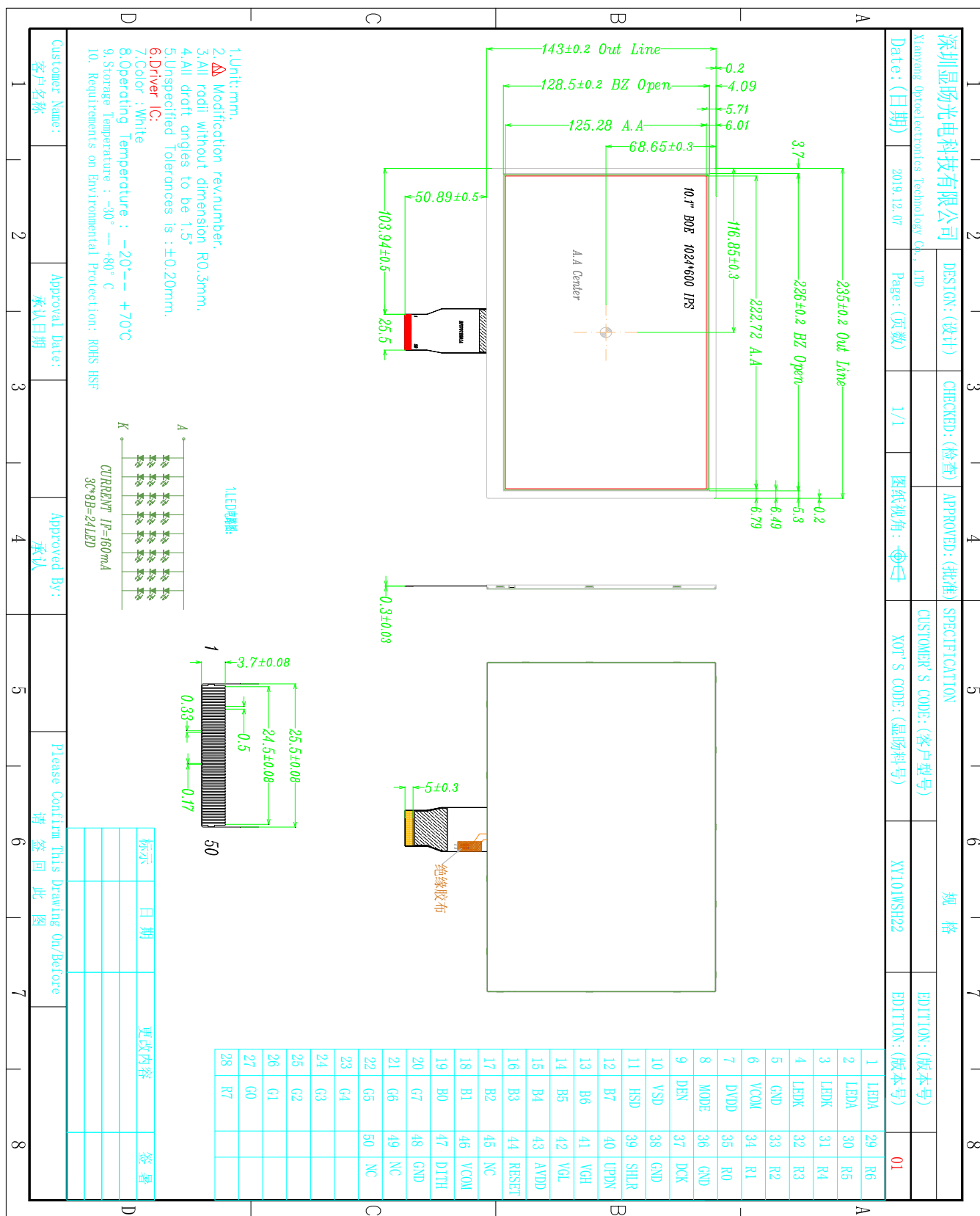
Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 1~10pcs.

3.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

8 Mechanical Drawing



9 Precautions For Use of LCD Modules

9.1 Handling Precautions

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

9.1.1.2 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.

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

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

9.1.1.5 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

9.1.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

9.1.1.12 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.

9.1.1.13 Storage precautions

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

9.1.1.15 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:

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

9.2 Transportation Precautions

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