LCD MODULE SPECIFICATION

MODEL NO. : IE-A-1110CH06R24-R0-1

CUSTOMER P/N:

ISSUED DATE : 2024.1.2

VERSION : 1.0

ATOPS:

Prepare by	Check by	Approve by
2024-1-2		

Customer :

Approve by	Notes

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Record of Version

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1.0	2024-1-2	First Issue	Bruce

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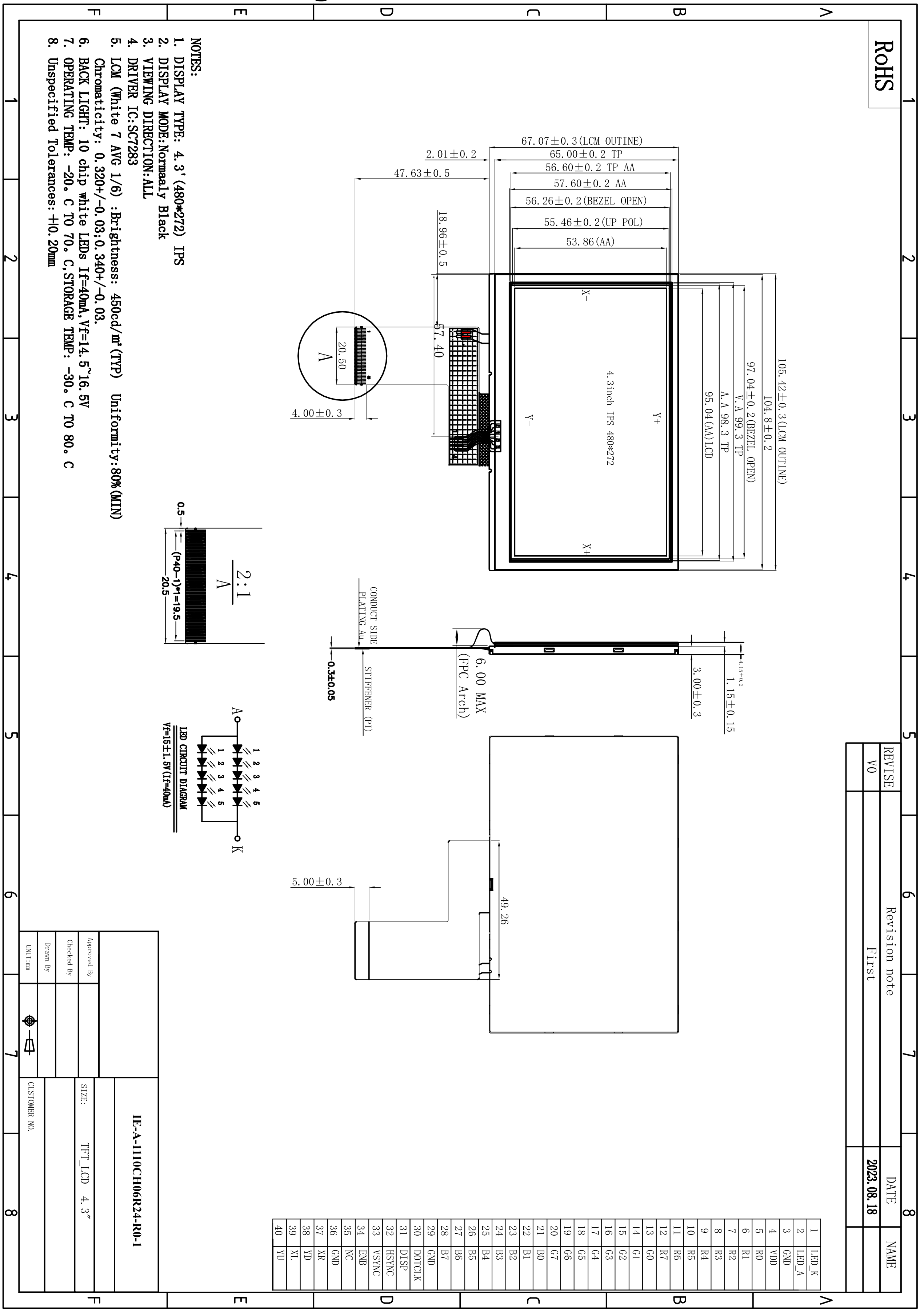
1. General Specification

1.1. General Specification for LCM

Feature		Spec
Characteristics	Size	4.3 inch
	Resolution	480(RGB) x 272
	Interface	RGB-24bit
	Color Depth	16.7M
	Technology Type	a-Si
	Pixel Pitch (mm)	0.1506(W) X 0.1432(H)
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Surface Treatment(Polarizer)	Glare
	Viewing Direction	ALL
Mechanical Characteristics	Overall dimensions (W x H x D) (mm)	105.42x67.07x4.15
	Active Area(mm)	95.04(W)X53.86(H)
	With /Without TP	With RTP
	Weight (g)	TBD
	LED Numbers	10 LEDs
Electronic	LCD Driver IC	SC7283

2.Mechanical Drawing



3. PIN Description

Pin No.	Symbol	I/O	**Function**
1	LEDK	P	LED back light(Cathode)
2	LEDA	P	LED back light(Anode)
3	GND	-	Ground.
4	VDD	P	Power supply
5-12	R0~R7	I	Red data bus
13-20	G0~G7	I	Green data bus
21-28	B0~B7	I	Blue data bus
29	GND	P	Ground.
30	CLK	I	Data clock
31	DISP	I	L:Standby mode ;H:Normal display mode
32	HSYNC	I	Horizontal sync. Signal in RGB I/F.
33	VSYNC	I	Vertical sync. Signal in RGB I/F.
34	DE	I	Data enable pin
35	NC	-	No connection.
36	GND	P	Ground.
37	XR	I	TP connection.(No connection)
38	YD	I	
39	XL	I	
40	YU	I	

4. Absolute Maximum Rating

Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Power Voltage for LCM	VDD	-0.3	4.0	V	-
Backlight Forward Current	IF	-	20.0	mA	For each serial LED
Operating Temperature	Top	-20	70	℃	-
Storage Temperature	Tst	-30	80	℃	-

5. Electrical Characteristics

5.1. Operating Condition for LCD

Ta = 25℃

Parameter		Symbol	MIN	TYP	MAX	Unit	Remark
Digital supply Voltage		VDD	3.00	3.30	3.60	V	-
Input Signal Voltage	Low Level	VIL	0	-	0.3*VDD	V	
	High Level	VIH	0.7*VDD	-	VDD	V	
Current of digital supply voltage		$I_{VDD-LCM}$	-	-	-	mA	VDD-LCM=3.3V color bar pattern

5.2. Driving Condition for Backlight

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	IF	-	40	-	mA	Constant current driving
Forward Voltage	VF	14.5	15	16.5	V	
Backlight Power Consumption	WBBLB	-	0.6	-	W	
Operating Life Time	-	-	30000	-	hrs	Note 3

Note 1: The LED driving condition is defined for total backlight consumption, and which depend on Forward Current setting.

Note 2: Forward Voltage is just for reference for one serial.

Note 3: The “Operating life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IF =40mA. The LED lifetime could be decreased if operating IF is lager than 40mA.

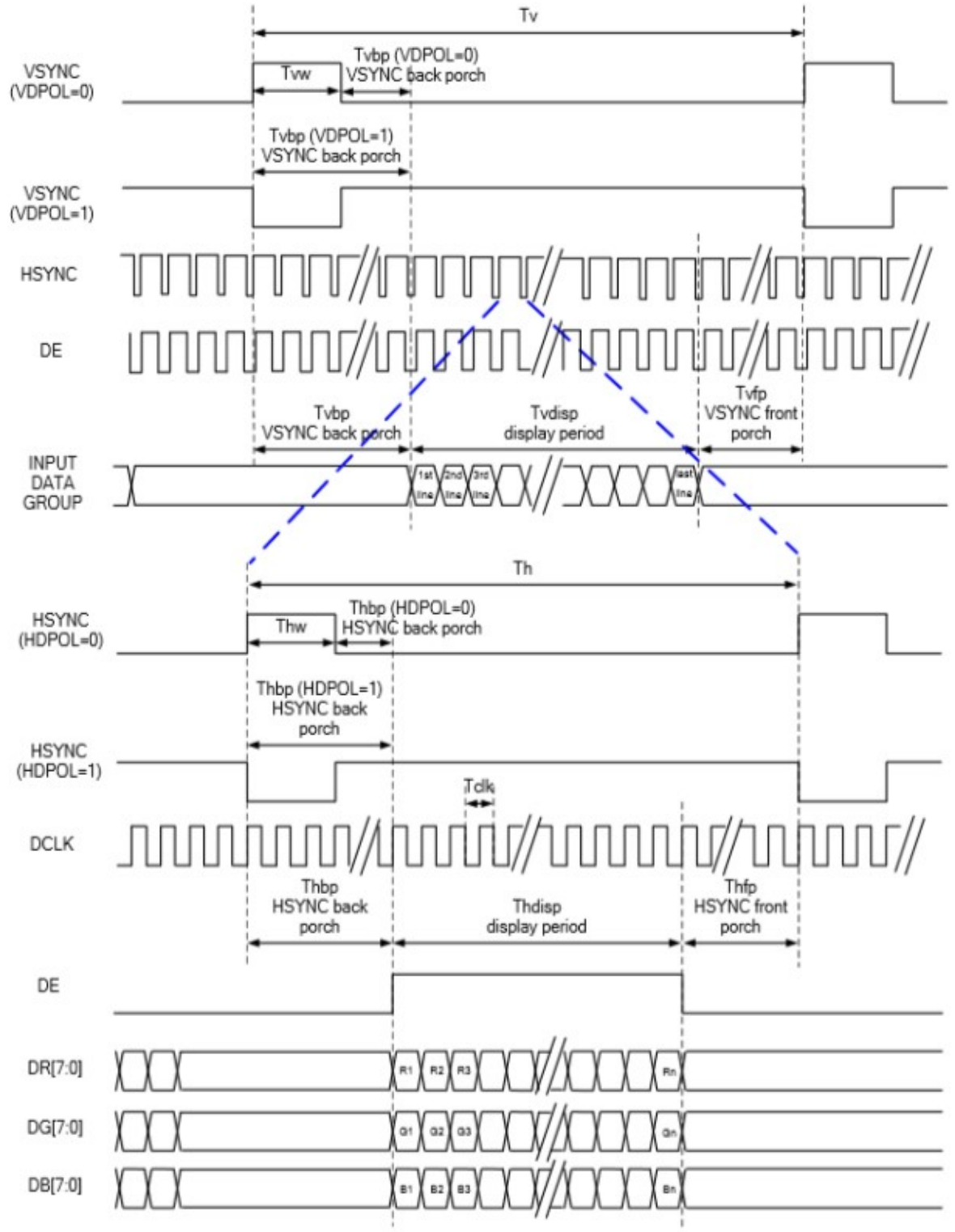
6.Timing Chart for LCM

6.1. Parallel 24-bit RGB Timing Tabel

480RGB X 272 Resolution Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	HSYNC	
	Display Period	Tvdisp		272		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	By V_BLANKING setting
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

6.2. SYNC-DE Mode Timing Diagram



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7. Optical Characteristics

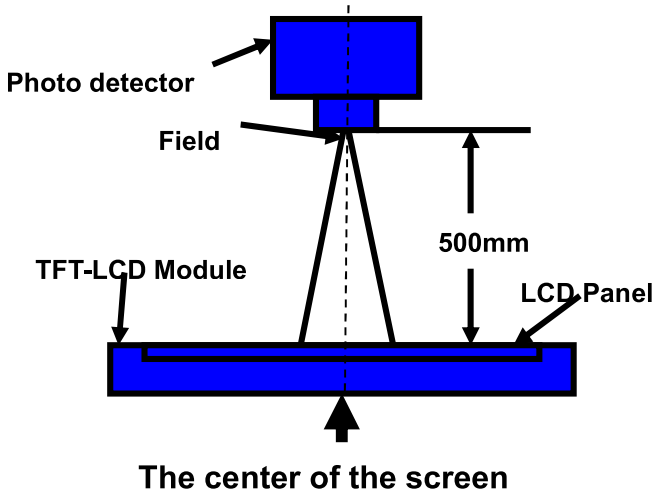
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angle		θ_T	CR≧10	70	80	--	Degree	Note 2
		θ_B		70	80	--		
		θ_L		70	80	--		
		θ_R		70	80	--		
Contrast Ratio		CR	θ=0°	640	800	--		Note1 Note3
Response Time		Tr	25℃	--	30	40	ms	Note1 Note4
		Tf						
Chromaticity (CIE1931)	White	x		0.274	0.324	0.374	-	Note1 Note5
		y		0.325	0.375	0.425		
	Red	x		0.561	0.611	0.661		
		y		0.285	0.335	0.385		
	Green	x		0.308	0.358	0.408		
		y		0.509	0.559	0.609		
	Blue	x		0.097	0.147	0.197		
		y		0.065	0.115	0.165		
Uniformity		U	-	75	80	--	%	Note1 Note6
NTSC ratio		-	-	50	60	--	%	Note 5
Luminance		L	-	--	450	--	cd/m2	Note1 Note7

Test Conditions:

1. IF= 40 mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

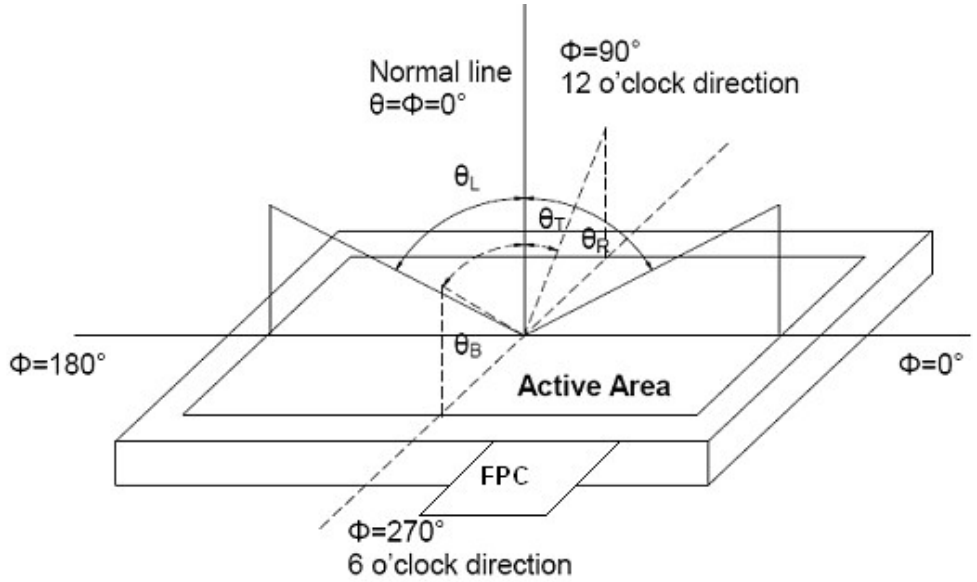
The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen.



Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		

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

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

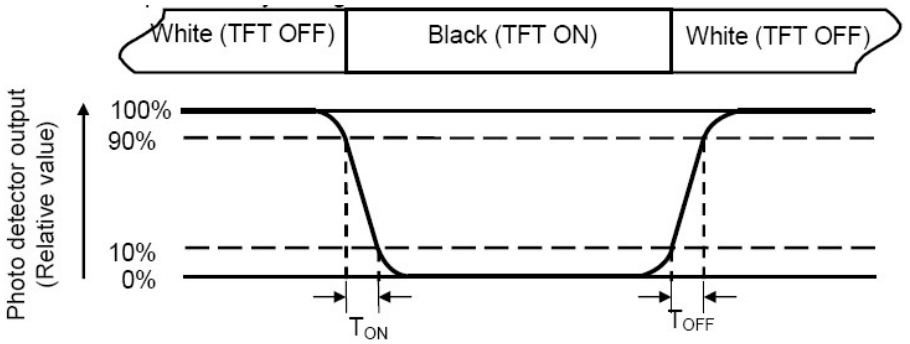
"White" state: The state is that the LCD should drive by Vwhite.

"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 (Tr) is the time between photo detector output intensity changed from 90% to 10%. And fall time (Tf) 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 x100%

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

Note 7: Definition of Luminance:

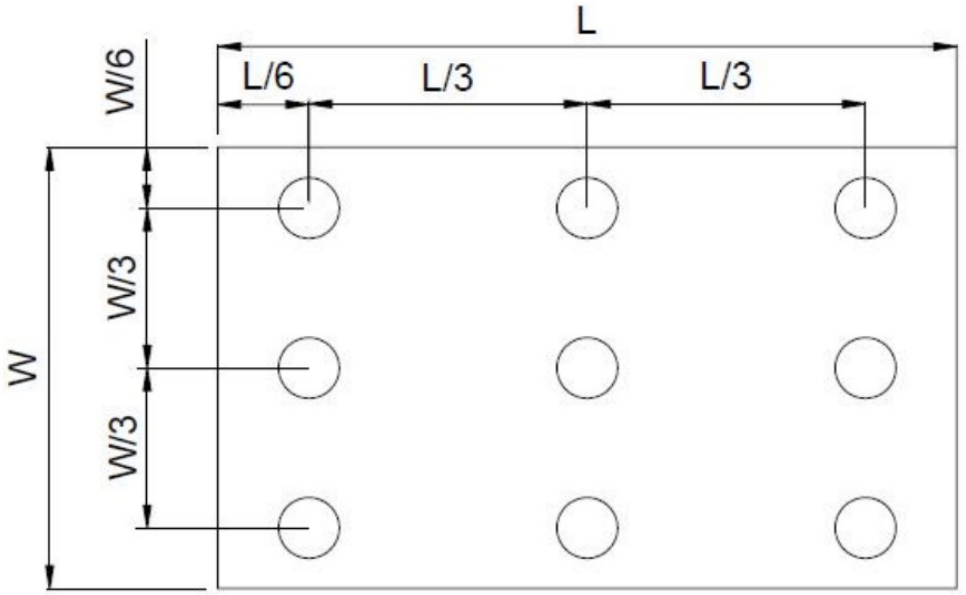
Measure the luminance of white state at center point.

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

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



8. Reliability Test

Item	Test Conditions	Criterion
High Temperature Storage	Ta = 80℃ 96hrs	A,B,C,D,E
Low Temperature Storage	Ta = -30℃ 96hrs	A,B,C,D,E
High Temperature Operation	Ts = 70℃ 96hrs	A,B,C,D,E
Low Temperature Operation	Ta =-20℃ 96hrs	A,B,C,D,E
Operate at High Temperature and Humidity	+60℃, 90%RH 96hrs	A,B,C,D,E
Thermal Shock(non operation)	-20℃/30 min ~ +70℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	A,B,C,D,E
Vibration Test	Sweep:10Hz~55Hz~10Hz 2G 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	A,B,C,D,E
Electro Static Discharge	Contact=+/-4KV, Air=+/-8KV,(R=330R,C=150pF), 1 sec,9point,10times/point;	A,B,C,D,E

※Criterion:

A.LCM each function is OK.

B.LCM appearance inspection without abnormalities (Including scratch, damage, corrosion and serious deformation)

C.LCM brightness above the Min. value of Spec.

D. Luminance uniformity above the Min. value of Spec.

E. Color chromaticity within tolerance range

9. Packing Specification

TBD

10. Precautions

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.

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.

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

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

10.1.4. 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

10.1.5. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.11. 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.

10.2. Storage Precautions

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

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%

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

10.3. Transportation Precautions

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