AGTechnologies
LCD Displays

SPECIFICATION

AGO 043J1-NN-N

Product Specification

4.3″ TFT LCD Module

Model No ：	AGO 043J1-NN-N
Resolution:	480*272
Interface:	RGB 40PIN
Luminance:	450cd/m²

< ◇> Preliminary Specification

< ◆> Finally Specification

CUSTOMER’ S APPROVAL	
CUSTOMER ：	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWED	PD REVIEWED	PREPARED BY

Record of Revision

Version	Revise Date	Page	Content
Pre-spec .01	2017/06/08		Initial Release.
Pre-spec .02	2019/06/05		Model updating

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	4.3 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	480 × 3 (RGB) × 272	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.066(W) × 0.198(H) mm	
6	Active area	95.04(W) × 53.856(H) mm	
7	Module size	105.4(W) × 67.07(H) ×3.0(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	Digital	
11	Backlight Power consumption	TBD W(Typ.)	
12	Panel Power consumption	TBD W (Typ.)	
13	Weight	TBD (Typ.)	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

2.1. TFT LCD Panel Driving Section

FPC Connector is used for the module electronics interface. The recommended model is "AGO 043J1-NN-N manufactured by AGT.

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED-}	P	Power for LED backlight cathode	
2	V_{LED+}	P	Power for LED backlight anode	
3	GND	P	Power ground	
4	V_{DD}	P	Power voltage	
5	R0	I	Red data (LSB)	
6	R1	I	Red data	
7	R2	I	Red data	
8	R3	I	Red data	
9	R4	I	Red data	
10	R5	I	Red data	
11	R6	I	Red data	
12	R7	I	Red data (MSB)	
13	G0	I	Green data (LSB)	
14	G1	I	Green data	
15	G2	I	Green data	
16	G3	I	Green data	
17	G4	I	Green data	
18	G5	I	Green data	
19	G6	I	Green data	
20	G7	I	Green data (MSB)	

21	B0	I	Blue data (LSB)	
22	B1	I	Blue data	
23	B2	I	Blue data	
24	B3	I	Blue data	
25	B4	I	Blue data	
26	B5	I	Blue data	
27	B6	I	Blue data	
28	B7	I	Blue data (MSB)	
29	GND	P	Power ground	
30	CLK	I	Pixel clock	
31	DISP	I	Display on/off	
32	HSYNC	.	HORIZONTAL SYNC INPUT IN RGB MODE	
33	VSYNC	.	VERTICAL SYNC INPUT IN RGB MODE	
34	DEN	I	DATA ENABLE	
35	NC	.	NC	
36	GND	P	GROUND	
37	XR(NC)	.	TOUCH PLANE PIN/NC	
38	YD(NC)	.	TOUCH PLANE PIN/NC	
39	XL(NC)	.	TOUCH PLANE PIN/NC	
40	YU(NC)	.	TOUCH PLANE PIN/NC	

I:input,O:output,P:

3. Operation Specifications

3.1Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{DD}	−0.5	5.0	V	
Input signal voltage	Logic input	−0.5	5.0	V	
Operation temperature	T_{OP}	−20	70	℃	
Storage temperature	T_{ST}	−30	80	℃	
LED Reverse Voltage	V_R	-	3.2	V	Each LED Note 2
LED Forward Current	I_F	-	25	mA	Each LED

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. A module should be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme condition, the module may be permanently destroyed.

Note 2: V_R Conditions: Zener Diode 20m

3.2. Typical operation conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V_{DD}	3.1	3.3	3.5	V	
Current for Driver	IV_{DD}	-	TBD	25	mA	V_{DD} = 3.3V
Inputlogic highvoltage	V_{IH}	$0.8V_{DD}$	-	V_{DD}	V	Note 1
Input logic low voltage	V_{IL}	GND	-	$0.2V_{DD}$	V	

Note1: CLK, DE, R0~ R7, G0~ G7, B0~ B7.

3.3 Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_L		15	16	V	Note 2
Current for LED Backlight	I_L	–	40	–	mA	
LED life time	-	30,000	-	-	Hr	Note 1

Note 1: The " LED life time" is defined as the module brightness decrease to 50% originalbrightness that the ambient temperature is 25℃ and I_L=40mA. The LED lifetime could be decreased if operating I_L is lager than 40mA.

Note 2: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L=40mA.

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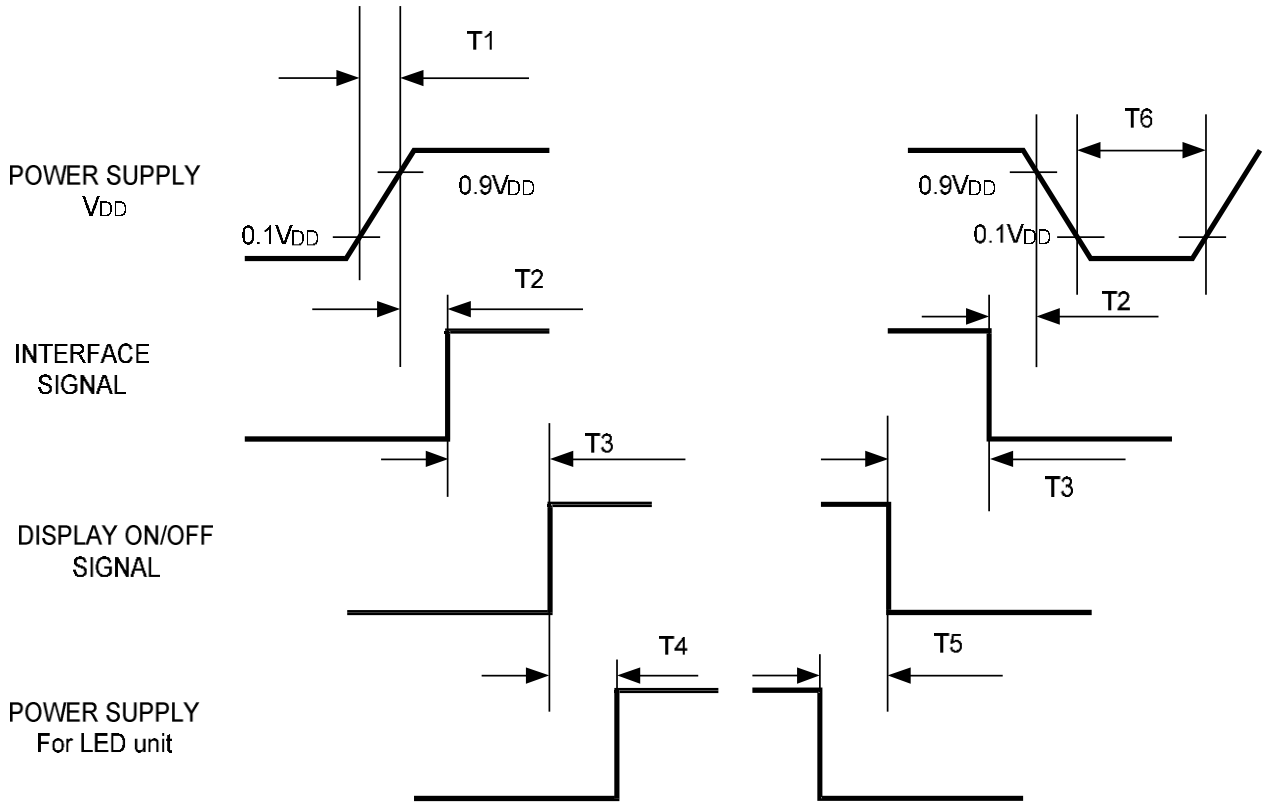
3.4. Power Sequence

To preventalatch-upor DCoperationofthe LCDmodule, thepoweron/offsequence should be as the diagram below.



Symbol	Specification	Symbol	Specification
T1	0≦ T1≦ 10msec	T4	160 msec ≦ T4
T2	0≦ T2≦ 100 msec	T5	160 msec ≦ T5
T3	0≦ T3≦ 200 msec	T6	1 msec ≦T6

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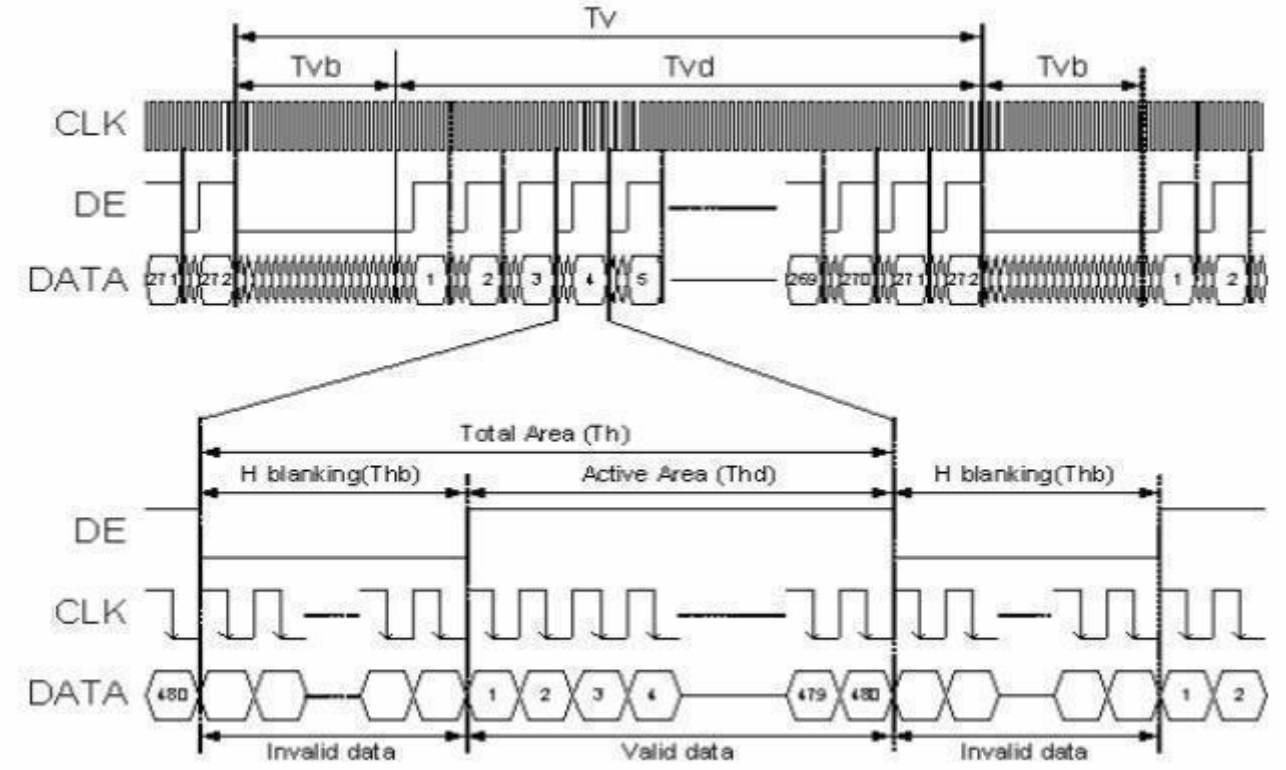
3.5. Timing Characteristics

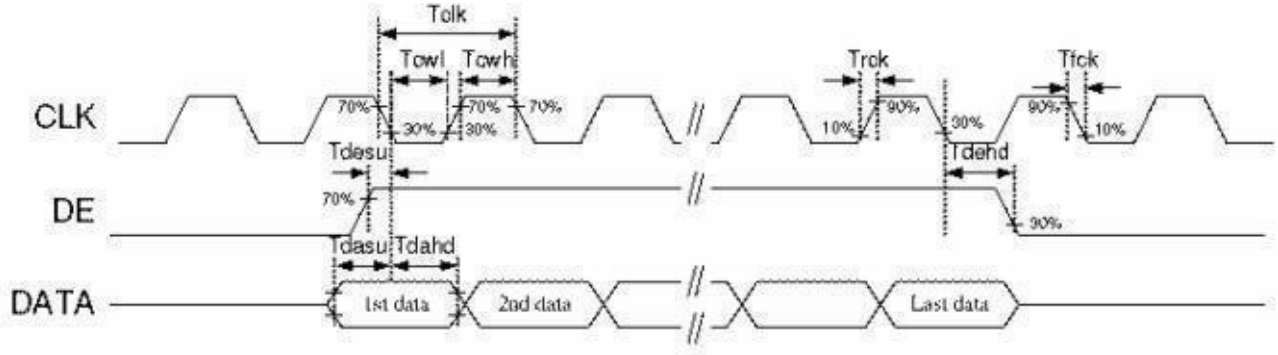
3.5.1. Timing Conditions

Parallel DE mode RGB input timing table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
CLK frequency	fclk	7	9	12	MHz
DEV period time	Tv	277	288	400	H
DEV display area	Tvd		272		H
DEV blanking	Tvb	5	16	128	H
DEH period time	Th	520	525	800	CLK
DEH display area	Thd		480		CLK
DEHblanking	Thb	40	45	320	CLK
CLK cycle time	Tclk	83	110	143	ns
Clock width of high level	Tcwh	40	50	60	%
Clock width of low level	Tcwl	40	50	60	%
Clock risingtime	t_{rck}		-	9	ns
Clock fallingtime	t_{fck}		-	9	ns
Data Setup Time	t_{desu}	10	-	-	ns
Data Hold Time	t_{dahd}	10	-	-	ns
DE Setup Time	t_{desu}	10	-	-	ns
DE HoldTime	t_{dehd}	10	-	-	ns

3.5.2. Timing Diagram





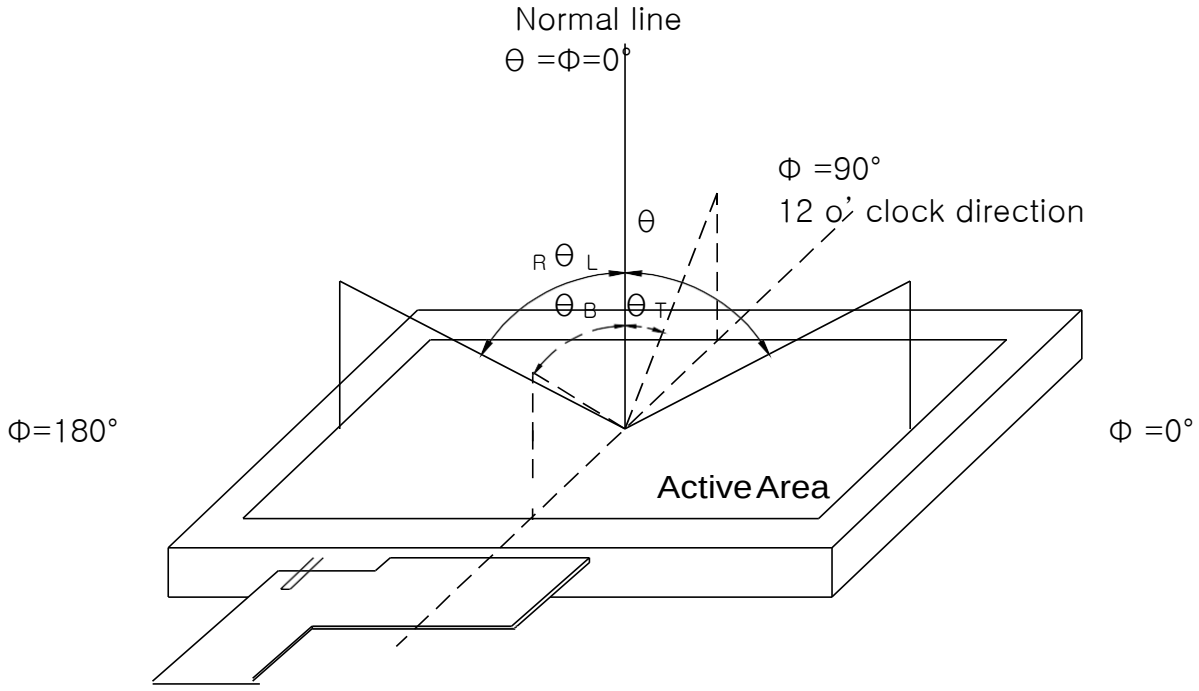
4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ =180°(9o' clock)	60	70	-	degree	Note 1
	θ_R	Φ =0°(3o' clock)	60	70	-		
	θ_T	Φ =90°(12o' clock)	40	50	-		
	θ_B	Φ =270°(6o' clock)	60	70	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR			500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5 Note 6
	W_Y		0.28	0.33	0.38	-	
Luminance	L		400	450	-	cd/m2	Note 6
Luminanceuniformity	Y_U		70	75	-	%	Note 7

Test Conditions:

1. V_{DD}=3.3V, I_L=40mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range



Φ =270°
6 o’ clock direction

Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

Theopticalcharacteristicsshouldbemeasuredindarkroom. After 30 minutes operation, the optical properties are measured at the center pointofthe LCD screen.(Responsetimeismeasuredby Photodetector TOPCONBM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

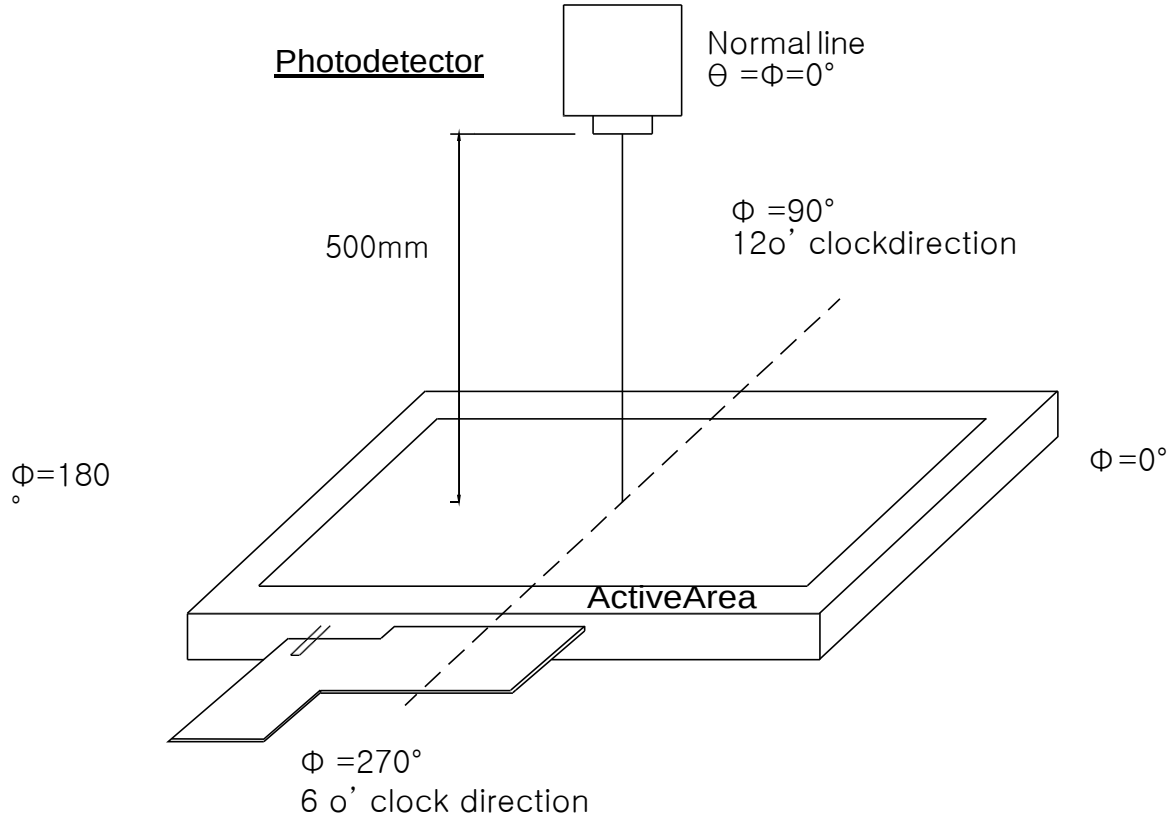


Fig. 4-2 Optical measurement system setup

Note 3: 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 photodetector 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%.

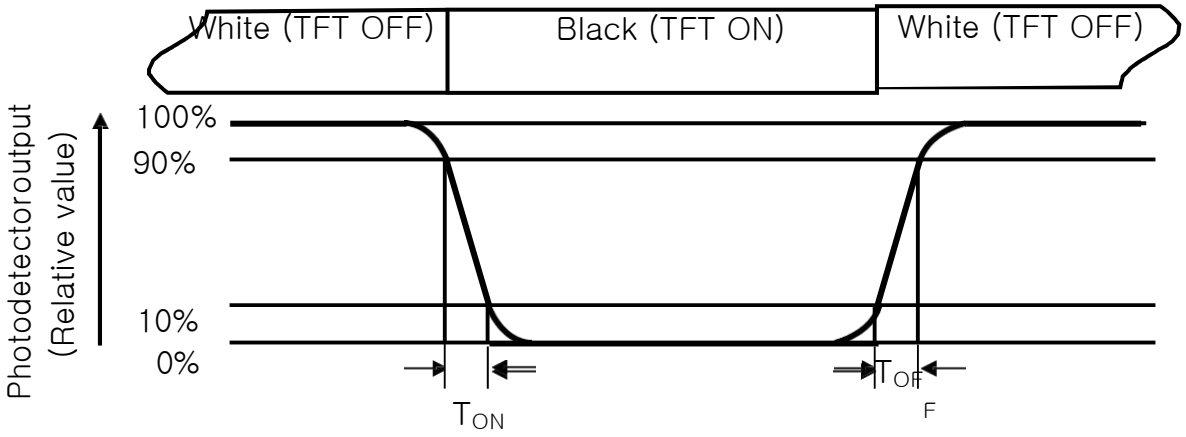


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=40mA.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig.4-4). Every measuring point is placed at the center of each measuring area.

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

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

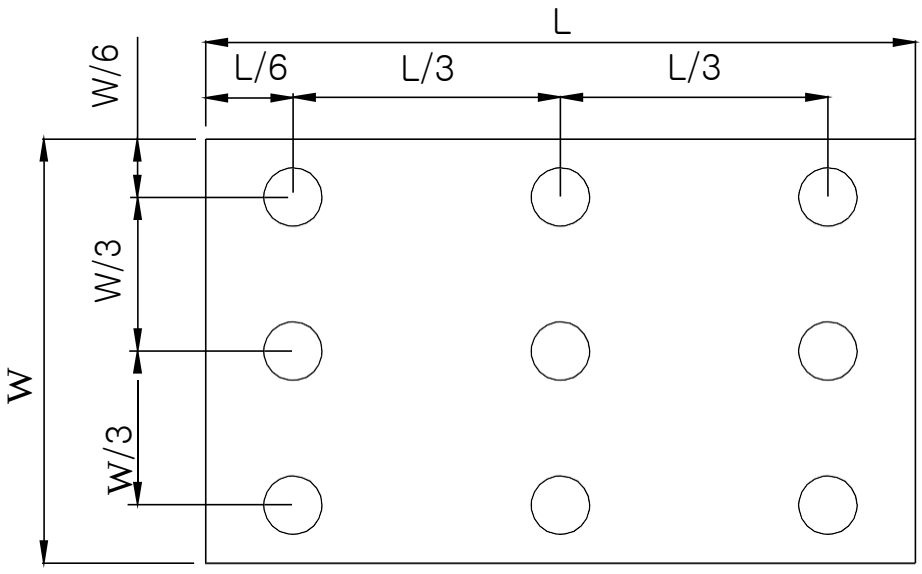


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.

B_{min}: The measured minimum luminance of all measurement position.

5. Reliability TestItems

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 240 hrs	Note 1,Note 4
Low Temperature Storage	Ta = -30℃ 240hrs	Note 1,Note 4
High Temperature Operation	Ts = 70℃ 240hrs	Note 2,Note 4
Low TemperatureOperation	Ta = -20℃ 240hrs	Note 1,Note 4
Operate at High Temperature and Humidity	+60℃, 90%RH 240 hrs	Note 5
Thermal Shock	-20℃/30 min~+70℃/30 minforatotal 100 cycles, Start with cold temperature and end with high temperature	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction ofX. Y.Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X,±Y,±Z 3times foreach direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2hours foreach direction of X.Y.Z. (6 hours for total)	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Tais the ambienttemperature of samples.

Note 2: Tsis the temperature ofpanel's surface.

Note 3: Inthestandardcondition, thereshallbenopracticalproblemthatmayaffectthe display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note 4: Before cosmetic and function tests, the product must have enough recovery time, at least 2 hours at room temperature.

6. General Precautions

7.1. Safety

Liquidcrystalispoisonous. Donotputitin yourmouth. If liquidcrystaltouches your skin or clothes, wash it off immediately by using soap and water.

7.2. Handling

1. TheLCDpanelis plateglass. Do notsubject thepanelto mechanical shockorto excessive force on its surface.
2. Thepolarizer attached to the display is easilydamaged. Pleasehandleit carefully to avoid scratch or other damages.
3. Toavoidcontaminationonthedisplaysurface, donottouchthemodulesurface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Putcover board such asacrylic board on the surface of LCDpanel to protect panel fromdamages.
6. Transparentelectrodesmaybedisconnectedifyouusethe LCDpanelunder environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

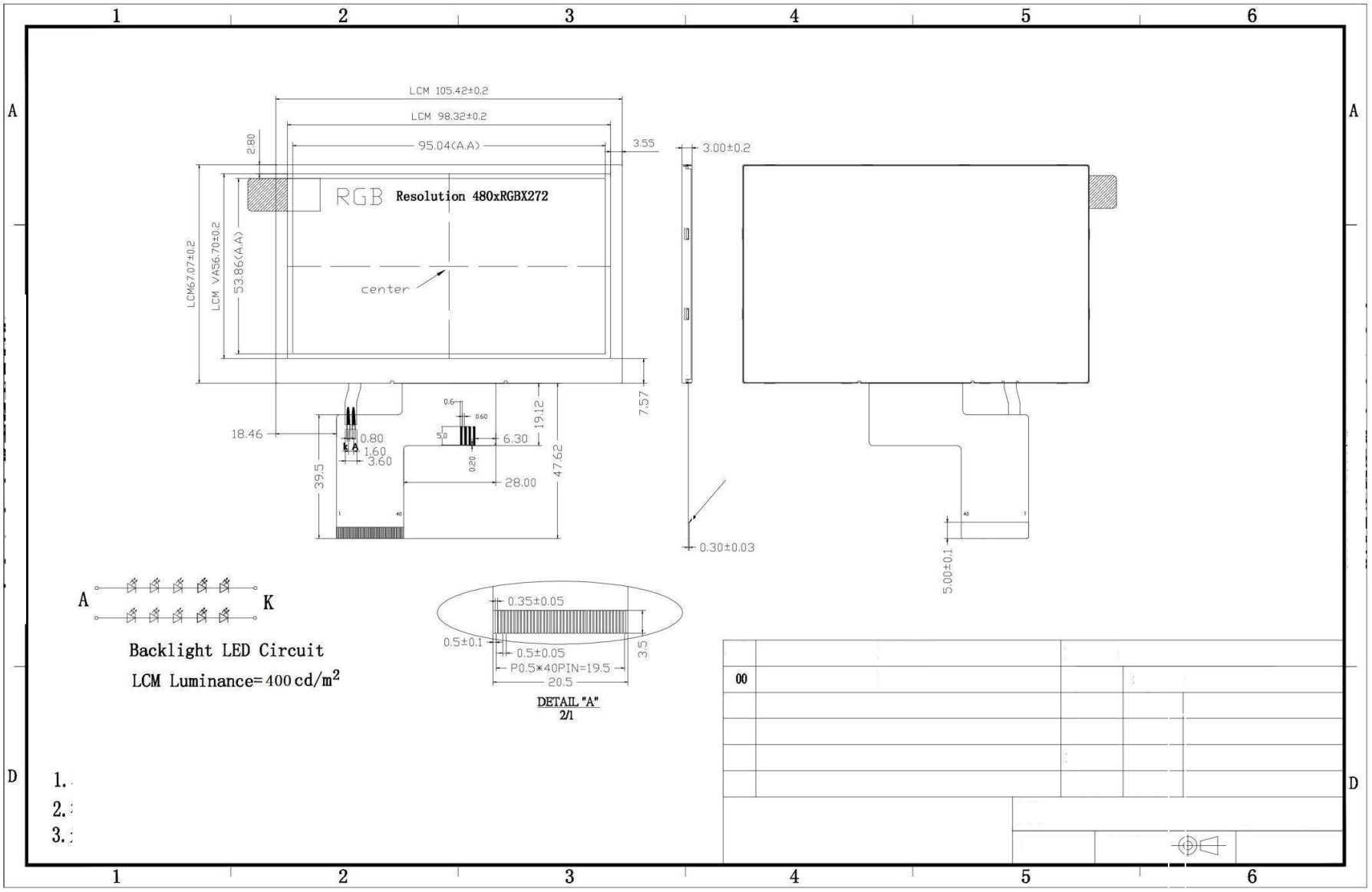
7.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

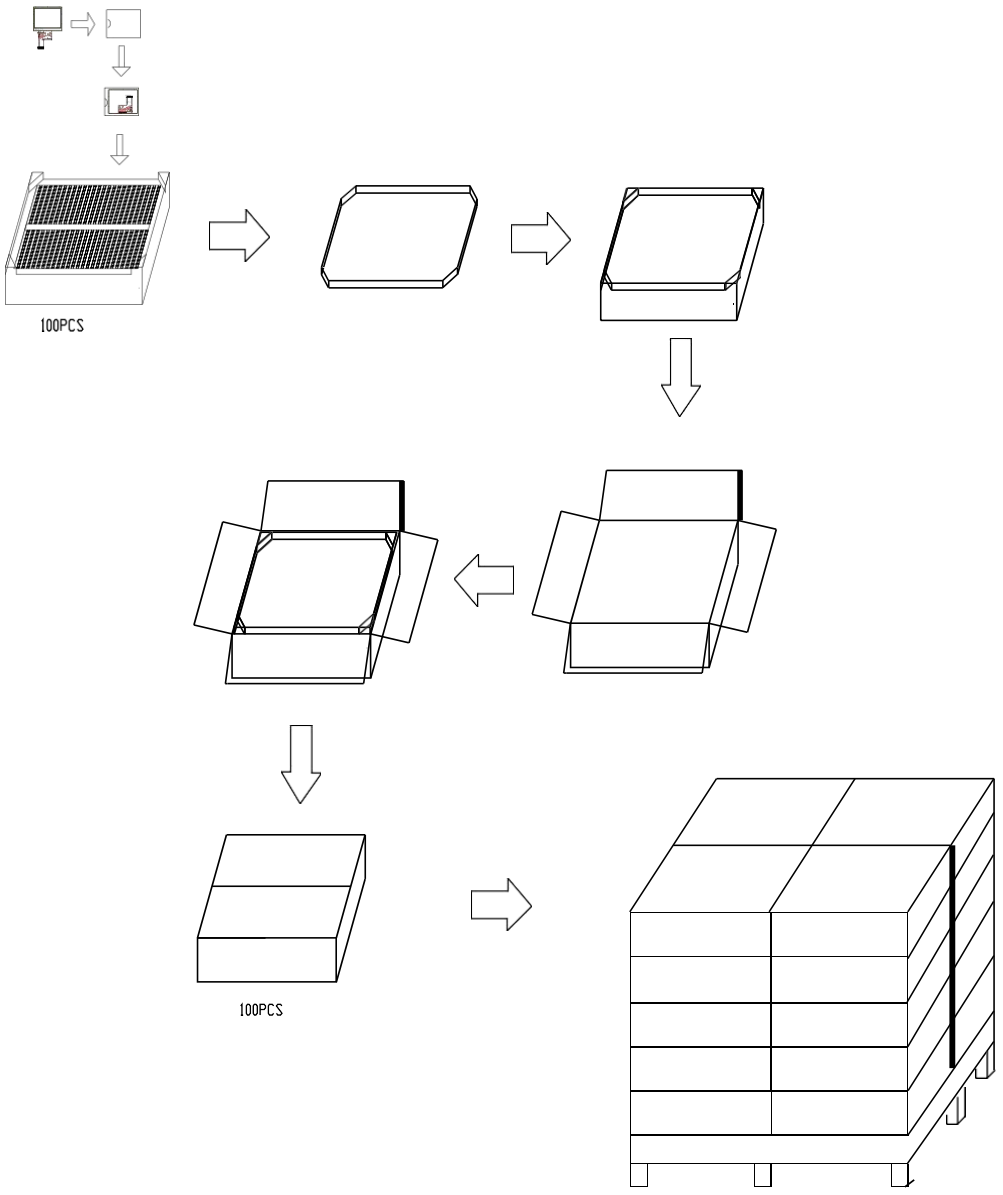
7.4. Storage

1. Storethe module in a dark room where must keep at 25±10℃ and 65%RHor less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Storethe module in an anti-electrostatic container or bag.

7.5. Cleaning


LCM 105.42±0.2
LCM 98.32±0.2
95.04(A.A)
2.80
3.55
RGB Resolution 480xRGBX272
LCM67.07±0.2
LCM VA56.70±0.2
53.86(A.A)
center
3.00±0.2
18.46
0.80
1.60
3.60
39.5
6.30
19.12
47.62
28.00
7.57
0.30±0.03
5.00±0.1
A
K
Backlight LED Circuit
LCM Luminance=400 cd/m²
0.35±0.05
0.5±0.1
0.5±0.05
P0.5*40PIN=19.5
20.5
3.5
DETAIL "A"
2/1
00
1.
2.
3.

9.Packaging Drawing



9. Package Drawing

9.1 Package Material Table

No	Item	Model (Material)	Dimensins (mm)	Quantity (pcs)	Remark
1	LCM Module	AGO 043J1-NN-N	105.4×67.07×3	120	
2	Dust-Proof Bag	PE	148×95×0.5	120	
3	Bubble Chamber	Red PUF	500×290×110	1	
4	Bubble Chamber Lid	Red PUF	500×290×20	1	
5	Carton	Cor Rugated Paper	510×310×125	1	

9.2. Packaging Quantity

(1) LCM quantity per Partition: 2Rows x 60quantity per Row = 120pcs
(2) Total LCM quantity in Carton: 1 layer x 120 pcs per Partition = 120pcs