Product Specification

Part Name: BI104X1-A2

Revision History

Special Notes

Note1.	

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.4 inch	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1024(W) RGB x 768(H)	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.20625(W) x 0.20625(H)	
6	Active area	211.2(W) x158.4(H) mm	
7	Module size	236(W) ×174.3(H) ×6.7(D) mm	Note 1
8	View direction	All	O clock
9	Surface treatment	Anti-Glare	
10	Color arrangement	RGB-stripe	
11	Interface	LVDS	
12	Lcm power consumption	（8.144W）TYP.	
13	Weight	(314g) TYP.	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

CN1 (Input Signal):MSBK2407P30D (STARCONN) or other of the same class.

Pin No.	Symbol	I/O	Function	Remark
1	GND	P	Ground	
2	VCC	P	+3.3V PowerPower Supply	
3	VCC	P	+3.3V PowerPower Supply	
4	NC	---	No connect	
5	NC	---	No connect	
6	NC	---	No connect	
7	GND	P	Ground	
8	RXIN0-	I	LVDS Signal(-)—channel 0	
9	RXIN0+	I	LVDS Signal(+)—channel 0	
10	GND	P	Ground	
11	RXIN1-	I	LVDS Signal(-)—channel 1	
12	RXIN1+	I	LVDS Signal(+)—channel 1	
13	GND	P	Ground	
14	RXIN2-	I	LVDS Signal(-)—channel 2	
15	RXIN2+	I	LVDS Signal(+)—channel 2	
16	GND	P	Ground	
17	RXCLKIN-	I	LVDS Clock Signal(-)	
18	RXCLKIN+	I	LVDS Clock Signal(+)	
19	GND	P	Ground	
20	NC	---	No connect	
21	NC	---	No connect	
22	GND	P	Ground	
23	GND	P	Ground	
24	NC	---	No connect	
25	NC	---	No connect	
26	NC	---	No connect	
27	NC	---	No connect	
28	NC	---	No connect	
29	NC	---	No connect	
30	NC	---	No connect	

I: input; O: output; P: Power or Ground(0V).

【Note】

1) GND Pin must be connected to ground. Don’t be floating.

2) NC Pin must be floating.

CN2 (LED backlight)

PIN NO	SYMBLE	FUNCTION
1	A	Anode
2	K	Cathode

Note：
Maker:JST
Input connector : SHR-02V-S AWG#28 1.0A
Outlet connector: SSH-003T-P0.2-H

3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	VCC	-0.3	5.0	V	TA=25℃
Operation Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	

Note1 : The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.2. Typical Operation Conditions

Test condition: GND=0V, T_A=25 °C

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VCC	3.0	3.3	3.6	V	
Input logic high voltage	V_{IH}	0.7 VCC	-	VCC	V	
Input logic low voltage	V_{IL}	0		0.3 VCC	V	

3.3. Current Consumption

3.3.1. Current for LCD Driver

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{VCC}	-	120	200	mA	VCC=3.3V

3.3.2.Current for LED Driver

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_L	11	12	13.2	V	Note 1
Crrent for LED Backlight	I_L	-	480	-	mA	
LED life time	-	30,000	-	-	Hrs	Note 2

Note1: V_L=12V, I_L=480mA (Backlight circuit:4series connection, 8 parallel connection), the ambient temperature is 25℃.

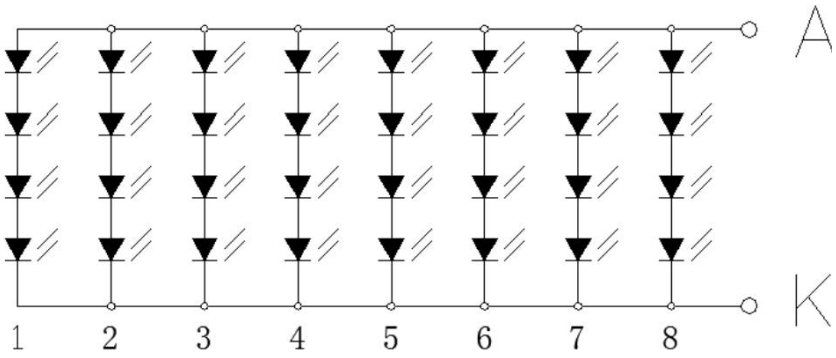
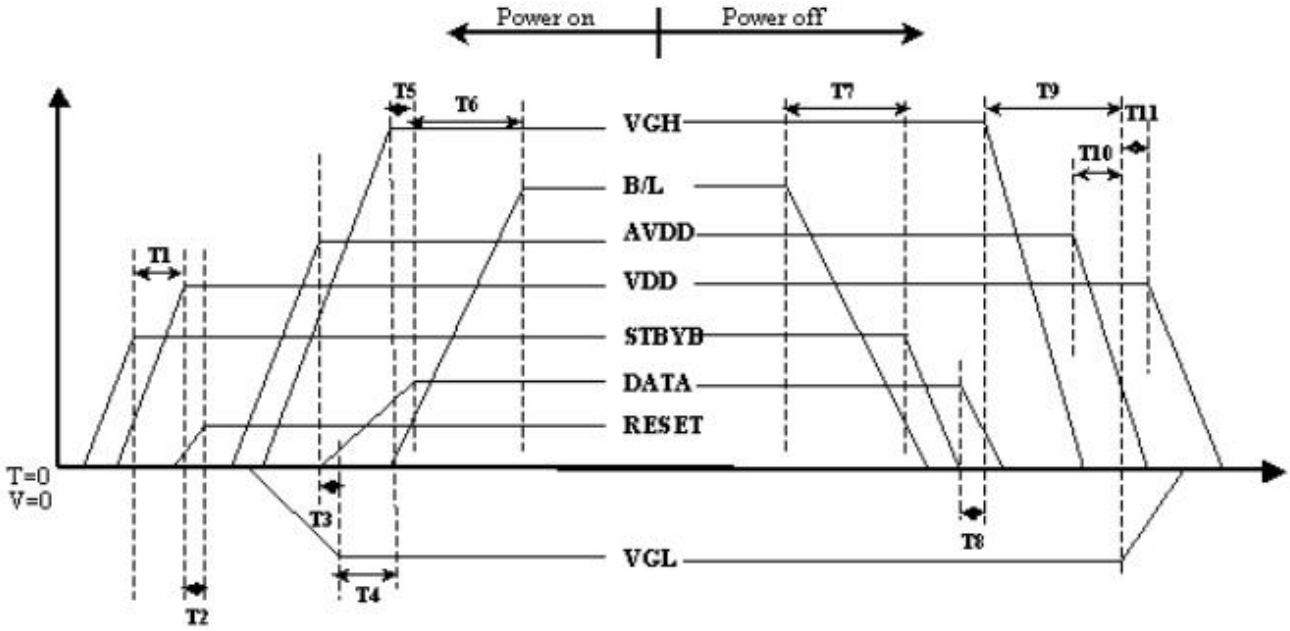


Fig. 3-1 LED test circuit diagram

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =60mA (each LED). The LED lifetime could be decreased if operating I_L is larger than 60 mA.

3.4. Power 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

3.5. LVDS Signal Timing Characteristics

3.5.1. Switching Characteristics for LVDS Receiver

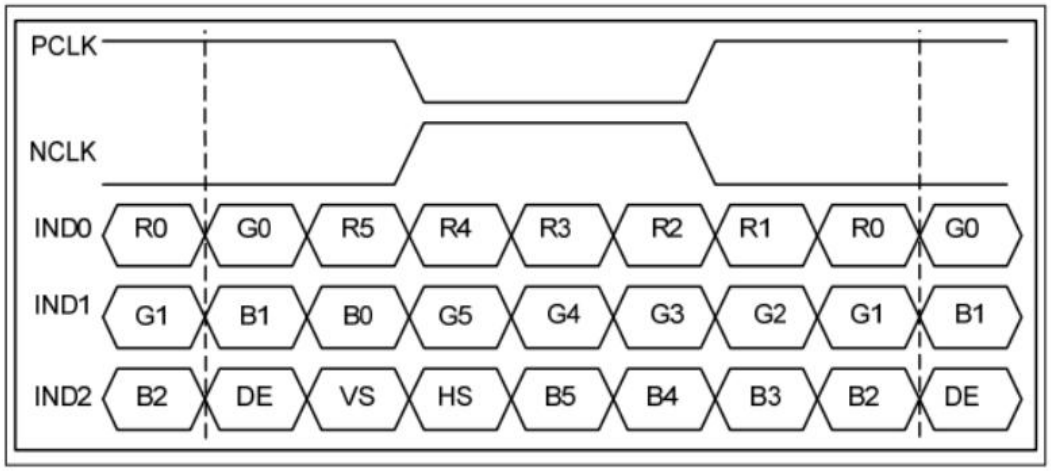
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	-	-	100	mV	V_{CM}=1.2V
Differential Input Low Threshold	Vtl	-100	-	-	mV	
Input Current	I_{IN}	-10	-	10	uA	
Differential input Voltage	$\|V_{ID}\|$	0.1	-	0.6	V	
Common Mode Voltage Offset	V_{CM}	0.7	1.2	1.6	V	

3.5.2. Timing Controller

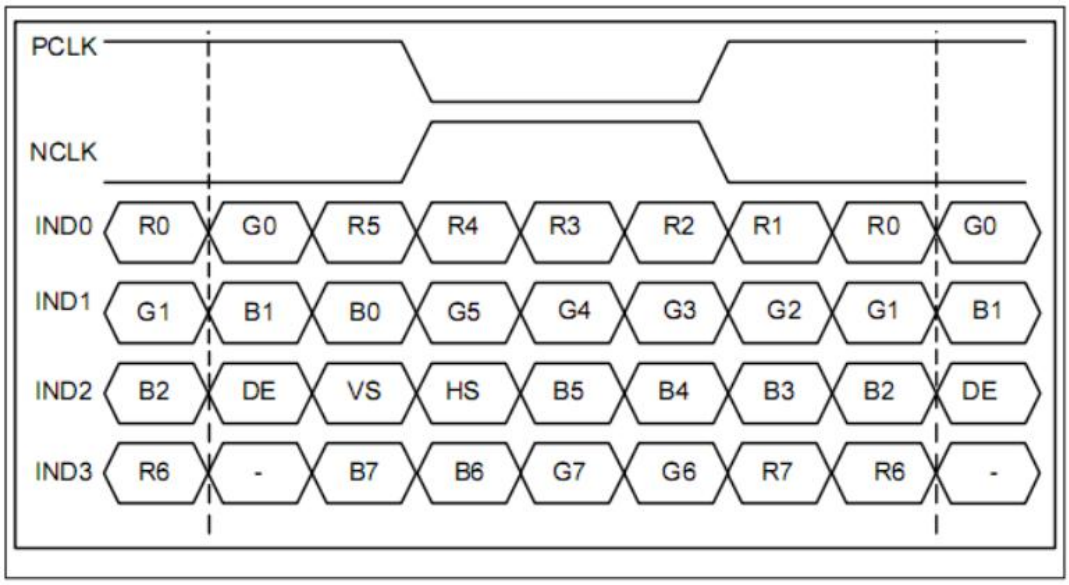
DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	52	65	71	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		768		H
VSYNC period time	tv	778	806	845	H
VSYNC blanking	tvb+tvfp	10	38	77	H

3.5.3. LVDS Data Input Format

6-bit LVDS input(HSD=” H”)



8-bit LVDS input(HSD=” L”)



4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180° (9 o'clock)	80	85	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	80	85	-		
	θ_T	Φ=90° (12 o'clock)	80	85	-		
	θ_B	Φ=270° (6 o'clock)	80	85	-		
Response time	T_{ON+} T_{OFF}	Normal θ=Φ=0°	-	30	40	msec	Note 3
Contrast ratio	CR		600	900	-	-	Note 4
Color chromaticity	W_X		0.27	0.31	0.35	-	Note 2 Note 5 Note 6
	W_Y		0.29	0.33	0.37	-	
Luminance	L		500	600	-	cd/m²	Note 6
Luminance uniformity	Y_U		70	80	-	%	Note 7

The test systems refer to Note 2.

Note 1: Definition of viewing angle range

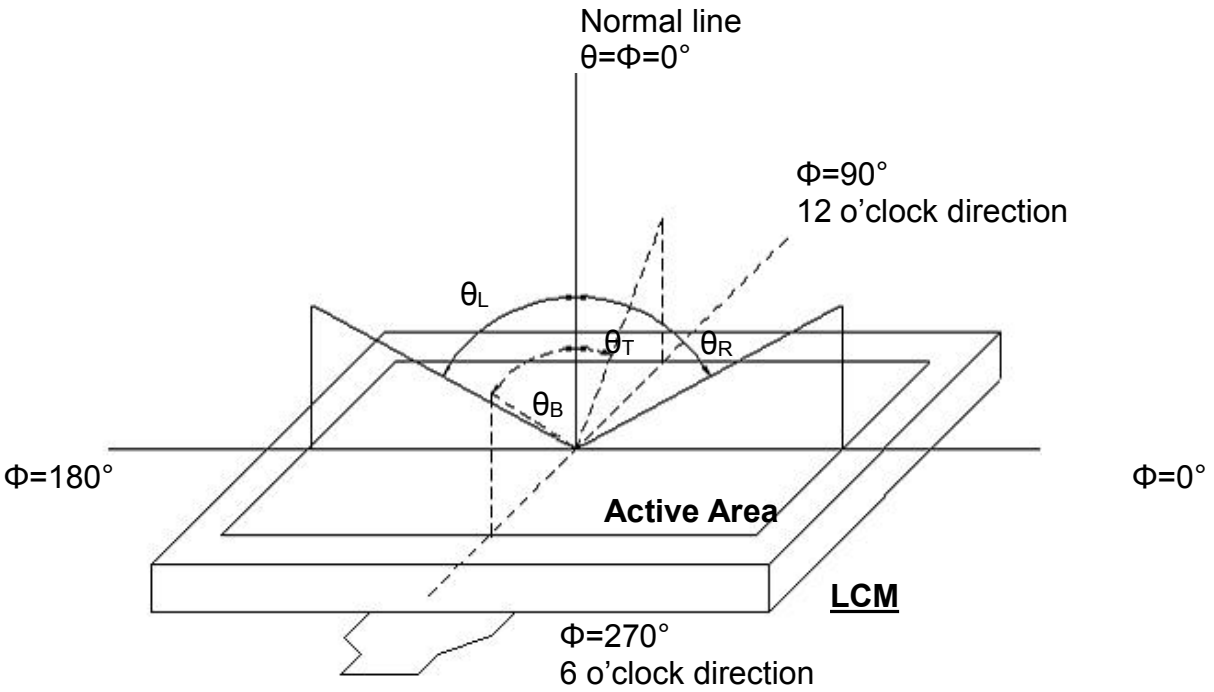


Fig. 4-2 Definition of viewing angle

Note 2: 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%.

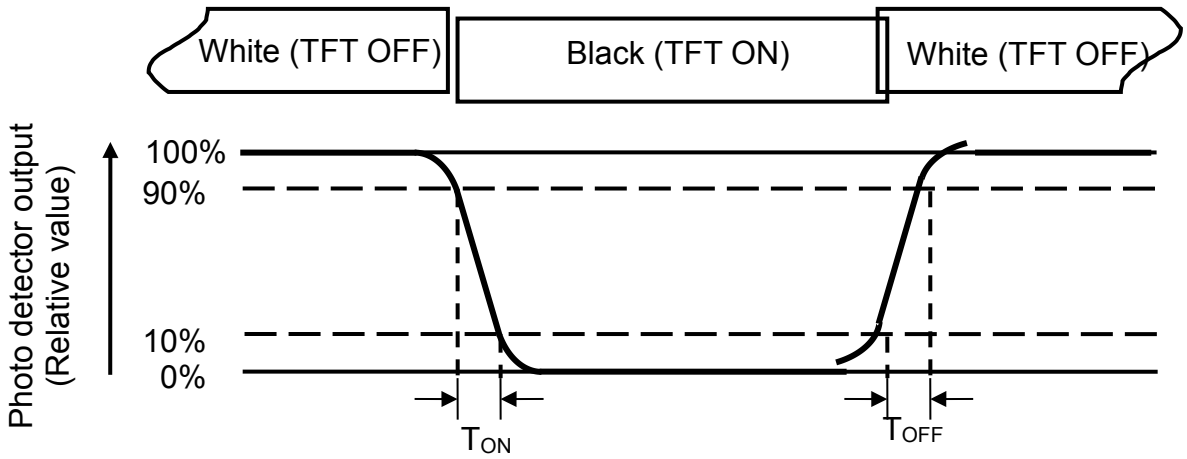


Fig. 4- 3 Definition of response time

Note 3: 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 4: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.) or CA-210.

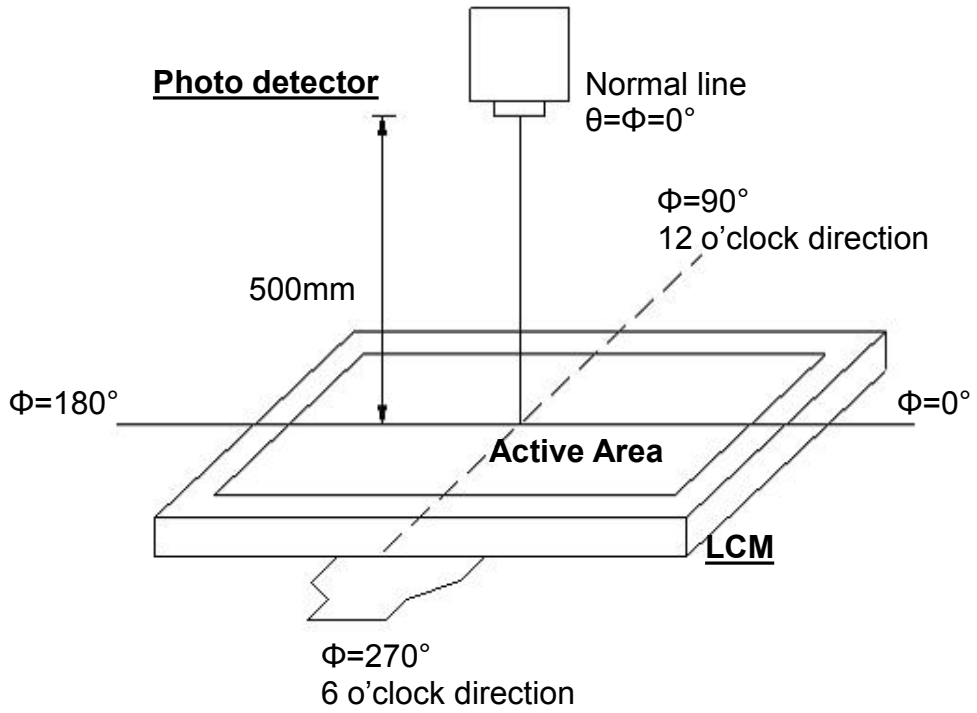


Fig. 4-4 Optical measurement system setup

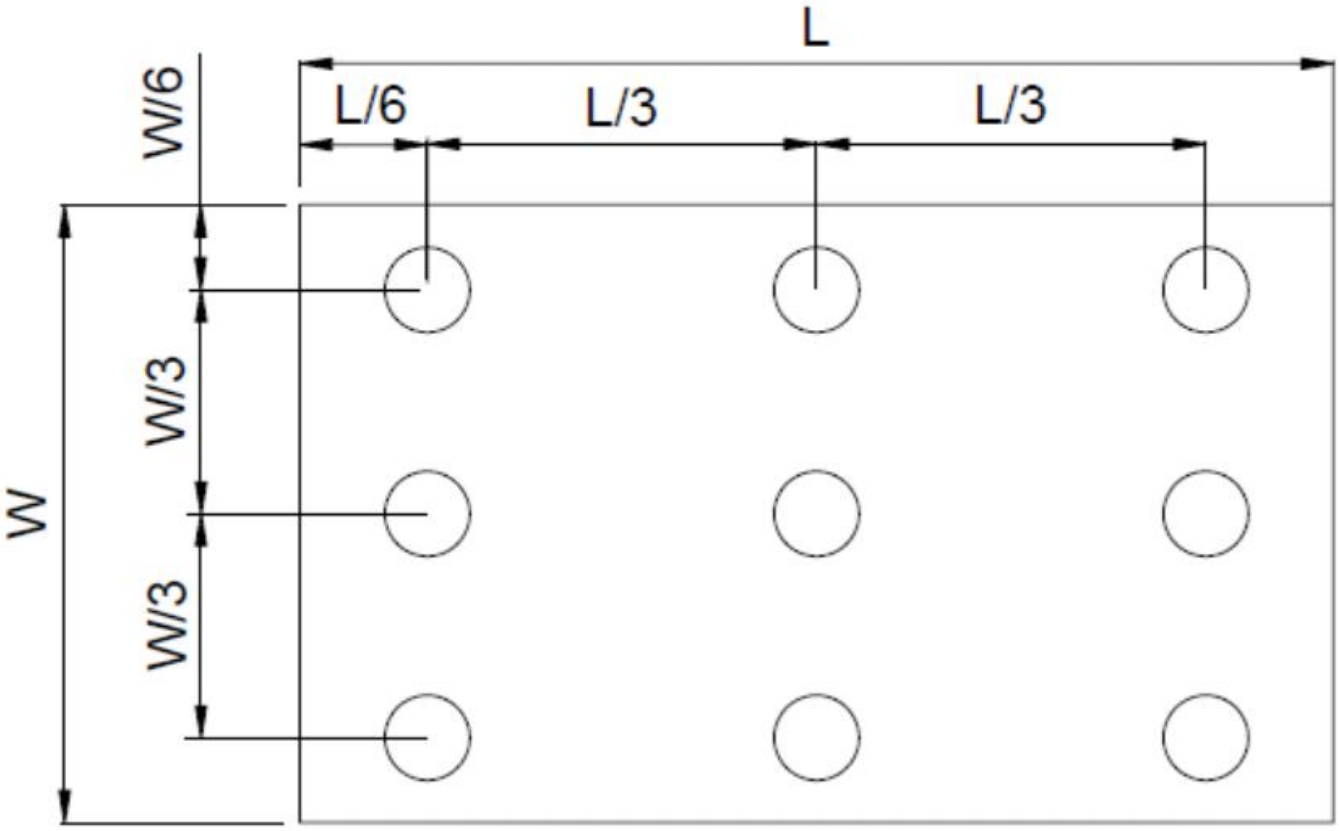
Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=480mA .

Note 7: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas(Refer to Fig. 4-5).
Every measuring point is placed at the center of each measuring area.

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

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



B_{MAX}: The measured maximum luminance of all measurement position.
B_{MIN}: The measured minimum luminance of all measurement position.

5. Reliability Test Items

Item	Test Conditions	Criterion
High Temperature Storage	Ta = 80℃ 240hrs	A,B,C,D,E
Low Temperature Storage	Ta = -30℃ 240hrs	A,B,C,D,E
High Temperature Operation	Ts = 70℃ 240hrs	A,B,C,D,E
Low Temperature Operation	Ta =-20℃ 240hrs	A,B,C,D,E
Operate at High Temperature and Humidity	+60℃, 90%RH 240hrs	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,.

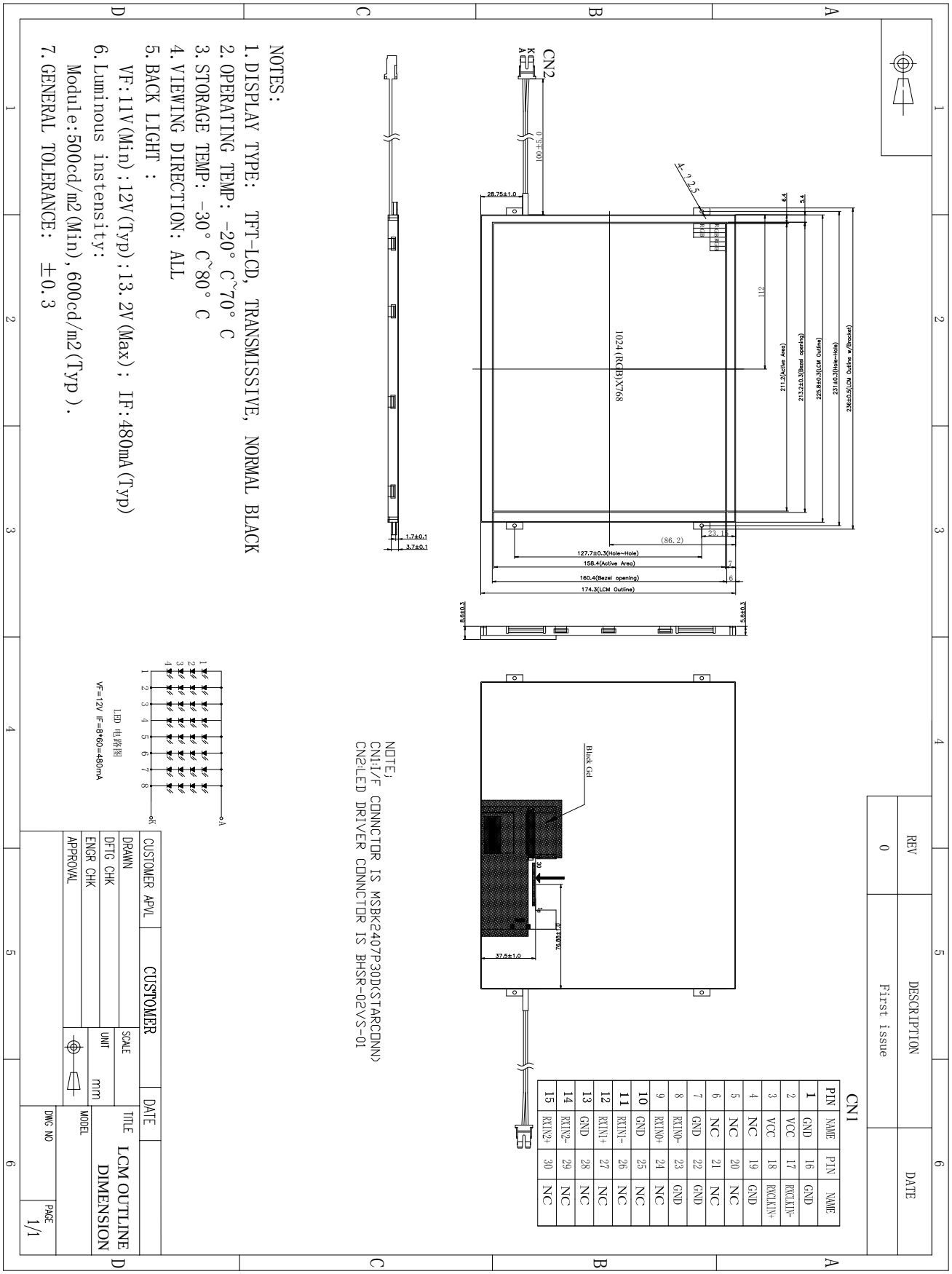
B.LCM appearance inspection without abnormalities (Including scratch, damage, corrosion and serious deformation)

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

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

E. Color chromaticity within tolerance range

6. Mechanical Drawing



7. Package Drawing

7.1. Packaging Material Table

TBD

7.2.Packaging Quantity

Total LCM quantity in Carton: No. of Partition TBD

7.3.Packaging Drawing

TBD

8. General Precautions

8.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

8.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

8.3. 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.

8.4. Storage

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

8.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.