

DOCUMENT NUMBER AND REVISION  
**VL-FS-COG-VLBOT009-01 REV. A**  
**(COG-VLBOT009-01)**

DOCUMENT TITLE:  
**SPECIFICATION**  
**OF**  
**LCD MODULE TYPE**

CUSTOMER	智诚光电
CUSTOMER REFERENCE NO	
MODEL NUMBER	<b>COG-VLBOT009-01</b> <b>(AV121XOM-N10-28P0)</b>
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
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## DOCUMENT REVISION HISTORY

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**Specification  
of  
TFT Module Type  
Model No.: COG-VLBOT009-01**

**1. General Description**

- 12.1"(1024 x RGB x 768) Color TFT, ADS Normally Black, Transmissive mode.
- Viewing Direction: All viewing angle.
- Viewing angle (U/D/L/R): Free viewing direction.
- Driving IC: HX8695-E01 \* 2pcs (Gate) & HX8282-A01 \* 2pcs (Source)
- Logic voltage: 3.3V.
- White LED Backlight
- "RoHS" Compliance.

**2. Mechanical Specifications**

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	265.5(H) x 206.3(V) x 13.5(D)	mm
Active area	245.76(H) x 184.32(V)	mm
Display format	1024 x RGB x 768	-
Pixel Pitch	0.22125(H) x 0.22125(V)	mm
Pixel Arrangement	RGB 2domain stripe	-
Display colors	16.2M	colors
Color Gamut	70% (typ.)	-
Weight	Approx.: 612	grams

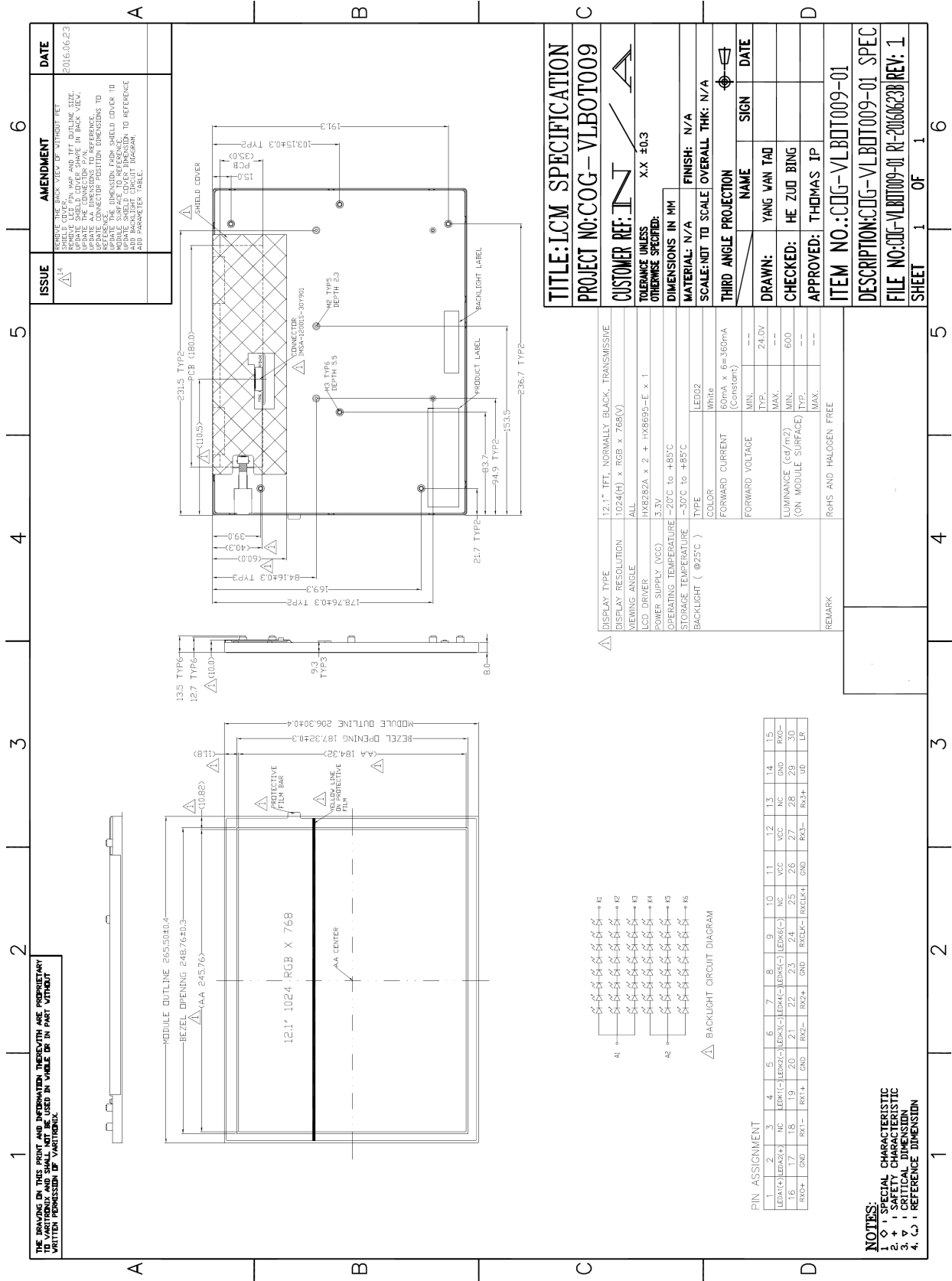


Figure 1: Module Specification

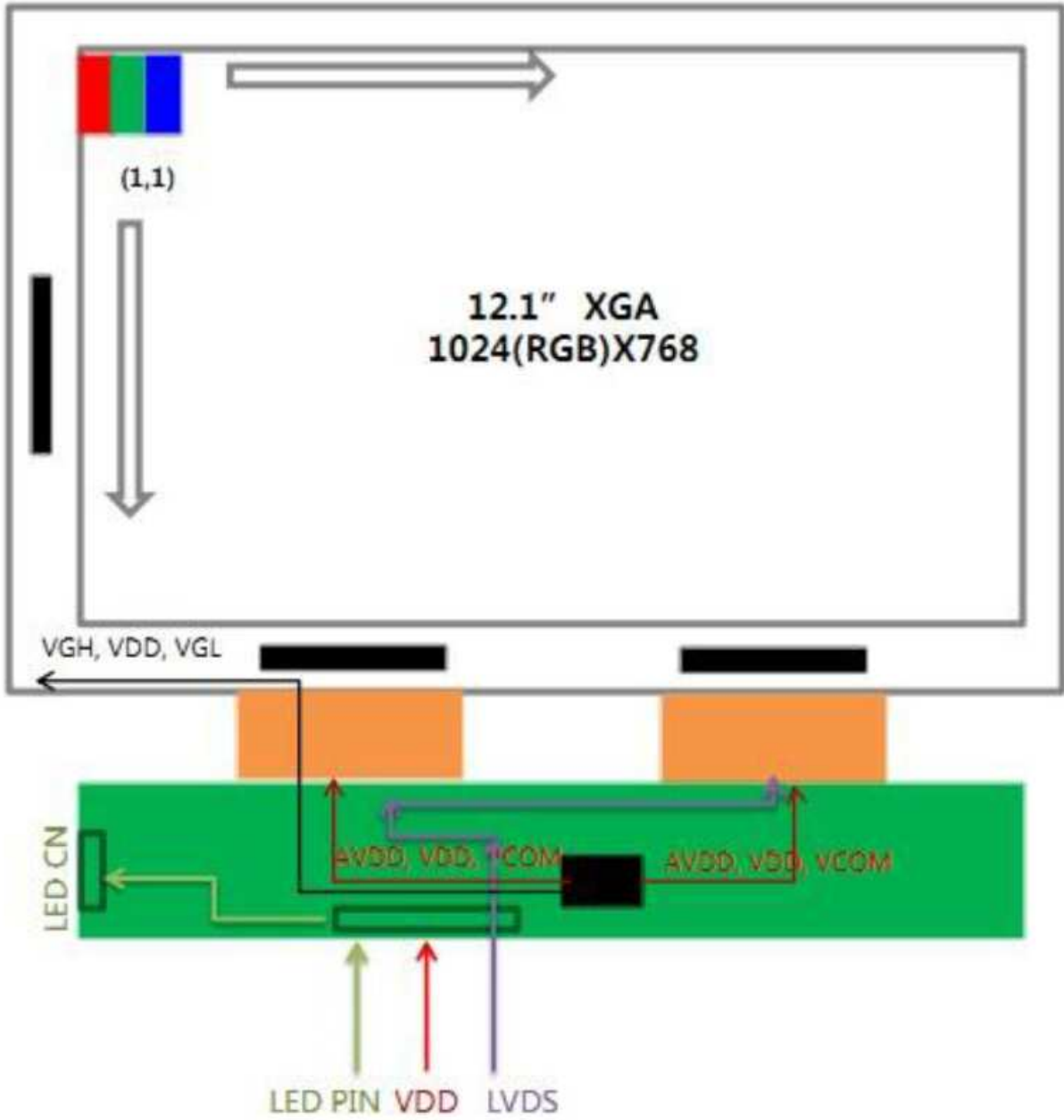


Figure 2: Block Diagram

### 3. Interface Connection

#### 3.1 The LCD Module Electrical Interface Connection

Table 2: Pin Assignment for the LCD Connector

PIN	SYMBOL	FUNCTION	PIN	SYMBOL	FUNCTION
1	LEDA1	BL voltage supply	16	RX0+	Positive transmission data of pixel 0
2	LEDA2	BL voltage supply	17	GND	Ground
3	NC	Not Connector	18	RX1-	Negative transmission data of pixel 1
4	LEDK1	BL negative pole	19	RX1+	Positive transmission data of pixel 1
5	LEDK2	BL negative pole	20	GND	Ground
6	LEDK3	BL negative pole	21	RX2-	Negative transmission data of pixel 2
7	LEDK4	BL negative pole	22	RX2+	Positive transmission data of pixel 2
8	LEDK5	BL negative pole	23	GND	Ground
9	LEDK6	BL negative pole	24	RXCLK-	Negative of clock
10	NC	Not Connector	25	RXCLK+	Positive of clock
11	VCC	Power supply:+3.3V	26	GND	Ground
12	VCC	Power supply:+3.3V	27	RX3-	Negative transmission data of pixel 3
13	NC	Not Connector	28	RX3+	Positive transmission data of pixel 3
14	GND	Ground	29	UD	Vertical Scan Direction Setting
15	RX0-	Negative transmission data of pixel 0	30	LR	Horizontal Scan Direction Setting

#### 3.2 The LED Electrical Interface Connection

The recommended connector is IMSA-9686S-10B-GFN4 (IRISO)

The connector interface pin assignments are listed in Table 3.

Table 3: Pin assignments for the LED connector

PIN	SYMBOL	FUNCTION
1	LEDA1	BL voltage supply
2	LEDA2	BL voltage supply
3	NC	Not Connector
4	LEDK1	BL negative pole
5	LEDK2	BL negative pole
6	LEDK3	BL negative pole
7	LEDK4	BL negative pole
8	LEDK5	BL negative pole
9	LEDK6	BL negative pole
10	NC	Not Connector

#### 4. Absolute Maximum Ratings

The absolute maximum ratings are list on table as follows. When used out of the absolute maximum ratings, the LSI may be permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the LSI will malfunction and cause poor reliability.

Table 4

Parameter	Symbol	Value	Unit
Power supply voltage	VCC	3.3	V
Driver supply voltage	VDD	3.3	V
Back-light power supply voltage	V <sub>LED</sub>	24	mA
Back-light LED current	I <sub>LED</sub>	360	mA

Note:

If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.



## 5. Electrical Specifications

### 5.1 Typical Electrical Characteristics

At Ta = +25 °C, VDD = 3.3V±0.3V, VSS=0V

Table 5

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply voltage	VCC	3	3.3	3.6	V	Note 1
Power Supply Current	IVCC	-	350	600	mA	
Analog voltage	AVDD	-	11.5	-	V	
LOW level input voltage	VGL	-	-9	-	V	
HIGH level input voltage	VGH	-	17	-	V	
Common electrode voltage	VCOM	5.1	5.3	5.5	V	Note 2
Back-light power supply voltage	VLED	21.6	24	26.4	V	
Back-light power supply current	ILED	-	360	-	mA	
Power consumption	PD	-	1.2	2.0	W	Note 3
	PBL	7.776	8.64	9.504	W	
	Ptotal	-	10.1	11.8	W	

Note 1: The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for 3.3V 60Hz at 25°C.

a.) Typ: Window XP pattern

b.) Max: Skip 2 dot 255 pattern

Note 2: VCOM should be adjusted to make the flicker level be minimum.

Note 3: Frame rate=60HZ, Typ. Pattern: White pattern 25°C.

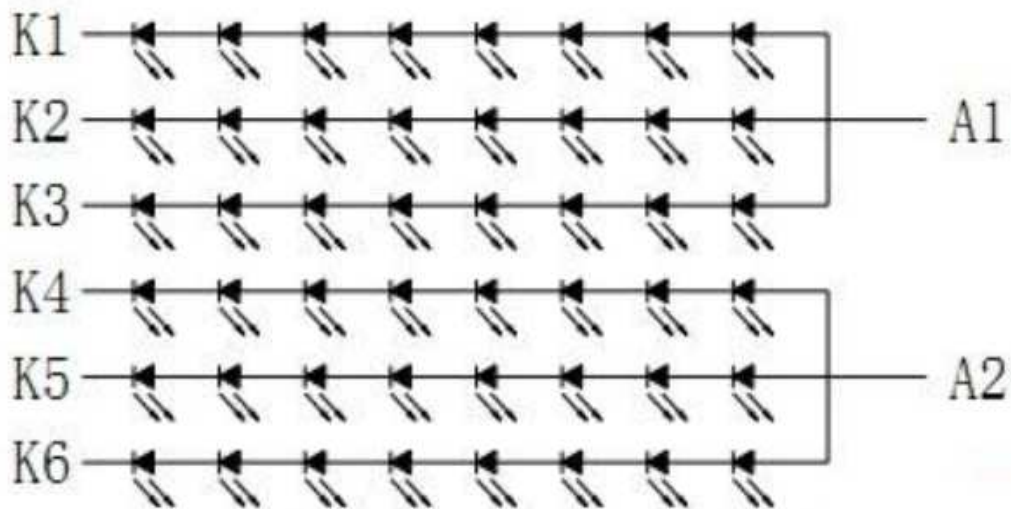
## 5.2 Backlight Driving Conditions

Table 6

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED forward voltage	$V_{F_{LED}}$	2.7	3	3.3	V	-
LED forward current	$I_{F_{LED}}$	-	60	-	mA	-
LED power consumption	$P_{LED}$	7.776	8.64	9.504	W	Note 1
LED life time	Hrs	30000	-	-	-	Note 2

Note 1: Calculator Value for reference  $I_{LED} \times V_{LED} \times LED \text{ Quantity} = P_{LED}$

Note 2: The LED Life-time define as the estimated time to 50% degradation of initial luminous.



## 5.3 Signal Specification

### 5.3.1 LVDS Signal Timing

Table 7

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RxFCLK	52	65	71	MHz	
Horizontal Display Area	thd	1024				
HS Period	th	1114	1344	1400	DCLK	
HS Blanking	Thb+thfp	90	320	376	DCLK	
Vertical Display Area	tvd	768				
VS Period	tv	778	806	845	TH	
VS Blanking	Tvbp+tvfp	10	38	77	TH	
Input data skew margin	TRSKM	500			ps	
Clock high time	TLVCH	10.99	8.79	8.05	ns	
Clock low time	TLVCL	8.24	6.59	6.04	ns	
PLL wake-up time	TenPLL			150	us	

### 5.3.2 Signal Format

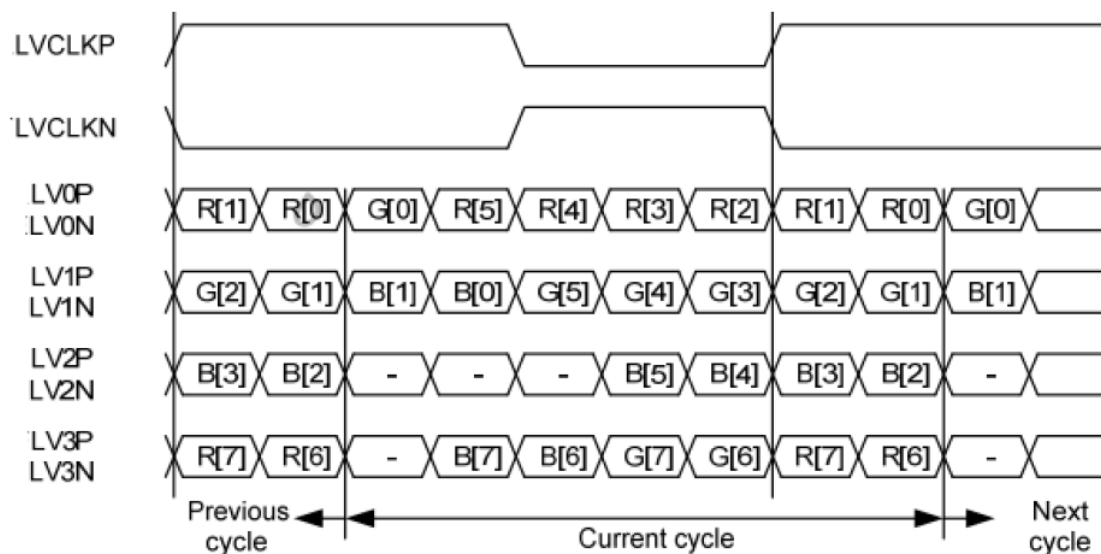
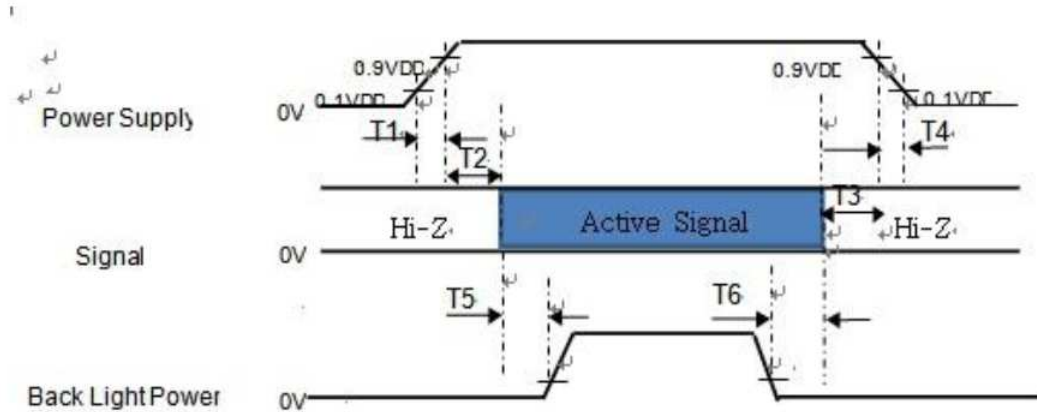


Figure 3: 8 Bit Signal Format

## 5.4 Power On/Off Sequence



- $0.5\text{ms} \leq T1 \leq 10\text{ms}$
- $2\text{ms} \leq T2$
- $16.6\text{ms} \leq T3$
- $0\text{ms} \leq T4 \leq 10\text{ms}$
- $200\text{ms} \leq T5$
- $500\text{ms} \leq T6$

### Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

## 6. Optical Characteristics

Table 8

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle	Horizontal	$\theta_3$	CR>10	-	85	-	°	
		$\theta_9$		-	85	-	°	
	Vertical	$\theta_{12}$		-	85	-	°	
		$\theta_6$		-	85	-	°	
Contrast ratio		CR	$\theta=0^\circ$	800	1000	-	-	Note 1
Luminance		cd/m <sup>2</sup>	$\theta=0^\circ$	600	-	-	-	Note 2
Uniformity		%	$\theta=0^\circ$	75	80	-	-	Note 3
NTSC		%	$\theta=0^\circ$	60	70	-	-	
Reproduction of color	Red	Rx	$\theta=0^\circ$	0.608	0.648	0.688	-	Note 4 * Module
		Ry		0.298	0.338	0.378	-	
	Green	Gx		0.270	0.310	0.350	-	
		Gy		0.557	0.597	0.637	-	
	Blue	Bx		0.100	0.140	0.180	-	
		By		0.045	0.085	0.125	-	
White		TC	$\theta=0^\circ$	5200	-	8500	-	
Response time		Tr+Tf	$\theta=0^\circ$	-	30	40	ms	Note 5

Note1: Contrast measurements shall be made at viewing angle of  $\Theta = 0^\circ$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIG. 4) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note2: Surface luminance is the center point across the LCD surface 50cm from the surface with all pixels displaying white. This measurement shall be taken at the locations shown in FIG. 5.

Note3: Uniformity measurement shall be taken at the locations shown in FIG. 5, for a total of the measurements per display, measure surface luminance of these nine points across the LCD surface 50cm from the surface with all pixels displaying white.

$$\text{Uniformity} = \frac{\text{Min Luminance of 9 points}}{\text{Max Luminance of 9 points}} \times 100\%$$

Note4: The color chromaticity coordinates specified in Table1 shall be calculated from The spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the Module.

Note5: The electro-optical response time measurements shall be made as FIG.6 by switching the “data” input signal ON and OFF.

The times needed for the luminance to change from 10% to 90% is Tr and 90% to 10% is Tf.

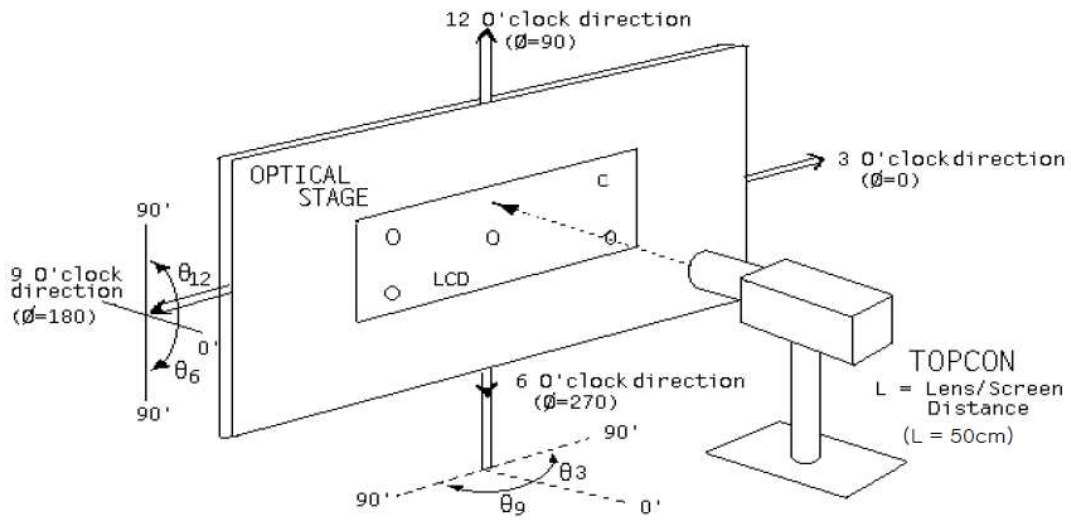


Figure 4: Measurement set up

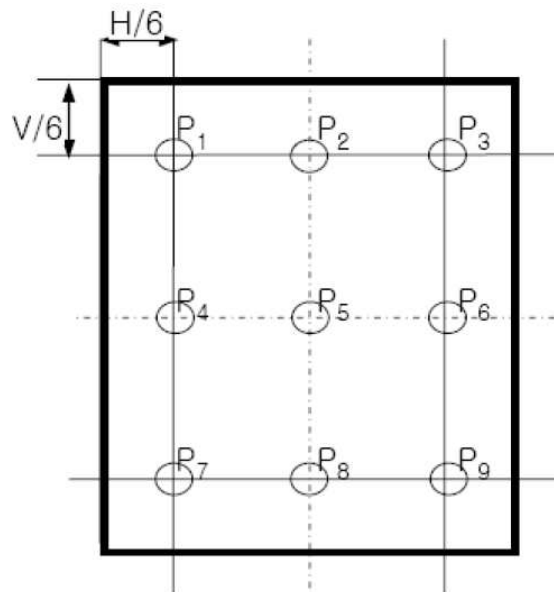


Figure 5: Uniformity Measurement Locations

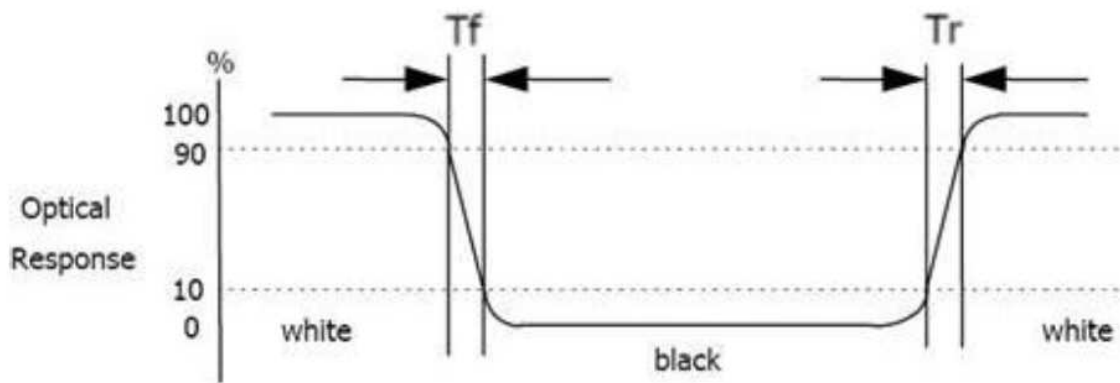


Figure 6: Response Time Testing

## 7. Reliability Conditions

Table 9

Test Item	Test Condition	Duration	Sample No.
Low temperature operation	-20°C±2°C	240H	#1~#3
High temperature operation	85°C±2°C	240H	#4~#6
High temperature storage	85°C±2°C	240H	#7~#11
Low temperature storage	-30°C±2°C	240H	#12~#16
High humidity & temperature operation	60°C±2°C, 90%±2%RH	240H	#17~#21
Thermal shock non-operation	-30°C(1H)→85°C(1H)	100cycle	#22~#26
Vibration test	Random: 5~200HZ, 0.015 psd, 200~500, -6db/octave	2hours each for XYZ directions (total 6hours)	#27~#29
Shock test	100g, 6ms	±XYZ 3times	#30~#32
ESD	Air discharge: Air:±/4,8,15KV	5point/panel 10 times	#33~#35
	Contact discharge: Contract:±/4,8KV,10times		
Image sticking	Operation with test pattern sustained for 1 hrs, then change to 50% gray pattern immediately. After 5 mins, the mura must be disappeared completely	Condition of Image Sticking test: 25°C± 2°C	#36~#38

Note 1: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

- 1.) Air bubble in the LCD
- 2.) Seal leak
- 3.) Non-display
- 4.) Missing segments
- 5.) Glass crack

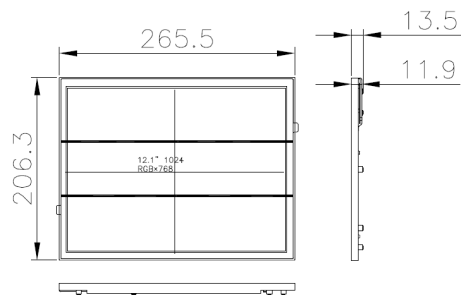
Note 2: Each test item applies for a test sample only once, the test sample can not be used again in any other test item.

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

Note 4: In the test of high temperature operation and high temperature & humidity operation. The operation temperature is the surface temperature of module.

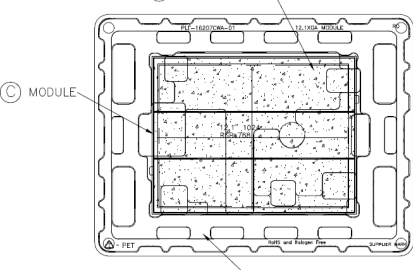
Note 5: LED forward current should follow the De-rating curve.

## 8. Package Method

CONFIGURATION :	REV	AMENDMENT	DATE			
	△ <sup>2</sup>	UPDATE THE TRAY ITEM DEL THE MATERIAL FROM	2016.7.5			
	G	SPE-VLBO009-01	PE FOAM SHEET	11	PCS	260X201X2
	F	LBE-102054-01	OUTER BOX LABEL	1	PCS	102X54
	E	SPE-VLBO008-01	EPE BOARD	2	PCS	480X384X140
	D	CTN-197158118K-0	OUTER BOX	1	PCS	500X400X300
	C	COG-VLBO009-01	MODULE	11	PCS	265.5X206.3X11.9
	B	PLT-16207CWA-01	PLASTIC TRAY	12	PCS	415X315X23
	A	ESD-700615-02	VACUUM BAG	1	PCS	700X615
NO.	ITEM NO.	DESCRIPTION	QTY	BAHN UNIT	SIZE	

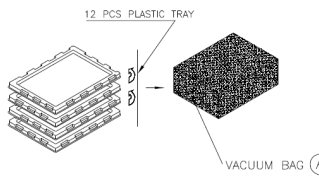
  

PLASTIC TRAY  
ONE TRAY FOR 1 PCS MODULE  
ITEM NO.: PLT-16207CWA-01  
MATERIAL: TRANSPARENT ANTI-STATIC PET T=1.2mm  
PLASTIC TRAY SIZE: 415(L) X 315(W) X 23(H)mm  
③ PE FOAM SHEET



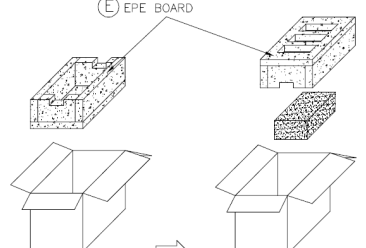
(DISPLAY SURFACE UPSTIDE)  
(显示屏朝上)

1. 1 PCS/TRAY X 11 TRAYS/OUTER BOX = 11 PCS/OUTER BOX.
2. EMPTY TRAY ADD ON TOP FOR ANTI-STATIC PURPOSE.  
(最上层吸塑盘为空盘)
3. EACH TRAY NEEDN'T TO BE ROTATED 180°.  
(每层吸塑盘不需旋转180度摆放)
4. AFTER PUT THE TRAY INTO VACUUM BAG, SEAL THE OPENING BY TRANSPARENT TAPE  
(把吸塑盘装入真空袋后再用透明胶纸封住)

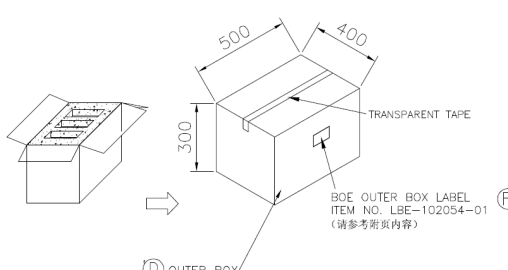


⑤ EPE BOARD



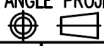
OUTER BOX ITEM: CTN-197158118K-0



OUTER BOX

1. 1 PCS/TRAY X 11 TRAYS/OUTER BOX = 11 PCS/OUTER BOX.
2. PUT THE TRAYS WITH VACUUM BAGS INTO THE OUTER BOX  
(把吸塑盘装入纸箱)
3. EACH BOX SHOULD BE PLACED AN EPE BOARD ON THE TOP & BOTTOM.  
(每个纸箱的最上面&最下面须各放1块珍珠棉)

④ OUTER BOX

<b>TITLE: PACKING DRAWING</b>					
3rd ANGLE PROJECTION	UNIT	SCALE			
	mm	NOT TO SCALE			
NAME	SIGN	DATE	MODEL:	REV	DATE
DRAWN	XU YANWEN		COG-VLBO009-01	0	2016.5.16
CHECKED	LIU NANCY		DRAWING NO.: PD-COG-VLBO009-01	1	2016.7.5
CHECKED	HUANG ZHIQIANG			SHEET 1 OF 2	
APPROVED	TONY CAO				



## BOE OUTER BOX LABEL

### 1、LABEL的格式:

**BOE** CHENGDU BOE OPTOELECTRONICS Technology Co., LTD


Model: AV121XOM-N10      Date: 2016.05.05  
 QTY: 11PCS  
 PLT ID: PMXXXXXX6500001A      Grade: A



### 2、LABEL的描述:

- 2.1: Model:BOE P/N, 需去掉P/N最后四位, 如BOE P/N是 AV121XOM-N10-28P0, 实际填写是AV121XOM-N10;
- 2.2: Date: 为包装日期;
- 2.3: QTY:为包装数量;
- 2.4: Grade:固定为A;
- 2.5: 28P0是BOE P/N的最后四位, 如BOE P/N是 AV121XOM-N10-28P0, 实际填写是28P0;
- 2.6: PLT ID:PM+LOT+YM+00001+A, 其中PM为固定, XXXXXX是 LOT ID, LOT ID填写工单号, YM是年月, Y是年的最后一位, 如2016年Y填写6, M为月份, 1-9月填写1-9, 10月是X, 11月是Y, 12月是Z, 00001为外箱的系列号(每个月的第一箱从00001开始), A为固定。

### 3、条码的内容: 内容参考PLT ID, BARCODE TYPE:128。

TITLE: PACKING DRAWING	 VARITRONIX LIMITED	
MODEL: COG-VLBOT009-01	REV 0	DATE 2016.5.16
DRAWING NO.: PD-COG-VLBOT009-01	1	2016.7.5
SHEET 2 OF 2		

## 9. Inspection Criteria

### A: Incoming Inspection Specification

#### 1.0 Introduction

##### 1.1. Scope

This incoming Inspection Standard shall be applied to TFT-LCD LCD that supplied by BOECD Optronics Corporation (hereinafter called the "Supplier") to its Customer.

##### 1.2. Incoming inspection Right

The buyer (customer) shall inspect the Cell within twenty days of the delivery date (inspection period) at its own cost. The results of the inspection (acceptance or rejection) shall be notified to Supplier .

The buyer may, under commercially reasonable reject procedures, reject an entire lot within the inspection period , such unacceptable Cell number in accordance with incoming inspection standard. Should the buyer fail to notify the result of the inspection to supplier within the inspection period, the buyer's right to reject the Cell shall lapse and shall be deemed to have been accepted by the buyer.

##### 1.3. Operation Instruction

###### 1.3.1 Mounting Method

- The panel of the LCD consists of two thin glasses with polarizers which easily get damaged. So extreme care should be taken when handling the LCD.
- Excessive stress or pressure on the glass of the LCD should be avoided. Care must be taken to insure that no torsional or compressive forces are applied to the LCD unit when it is mounted.
- If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
- To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- Mount a LCD module with the specified mounting parts.

###### 1.3.2 Caution of LCD Handling and Cleaning

- Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.
- The polarizers on the surface of panel are made from organic substances. Be very careful for chemicals not to touch the polarizers or it leads the polarizers to be deteriorated.
- If the use of a chemical is unavoidable, use soft cloth with solvent (recommended below) to clean the LCD's surface with wipe lightly.

- IPA(Isopropyl Alcohol), Ethyl Alcohol, Trichlorotrifluoroethane
- Do not wipe the LCD's surface with dry or hard materials that will damage the polarizers and others. Do not use the following solvent.
  - Water, Ketone, Aromatics
- It is recommended that the LCD be handled with soft gloves during assembly, etc. The polarizers on the LCD's surface are vulnerable to scratch and thus to be damaged by sharp particles.
- Do not drop water or any chemicals onto the LCD's surface.
- A protective film is supplied on the LCD and should be left in place until the LCD is required for operation.
- The ITO pad area needs special careful caution because it could be easily corroded. Do not contact the ITO pad area with HCFC, Soldering flux, Chlorine, Sulfur, saliva or fingerprint. To prevent the ITO corrosion, customers are recommended that the ITO area would be covered by UV or silicon.  
LCD should be stored in static-protective & vacuum polythene bag, please assemble it  
When it expose to the air within 3 days to avoid ITO corrosion
- Please clean the LCD without ultrasonic to avoid line open.
- Temperature of clean and bake should be less than 80°C.

### 1.3.3 Caution Against Static Charge

- The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.
- Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, if possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
- Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
- In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

### 1.3.4 Caution For operation

- It is indispensable to drive the LCD within the specified voltage limit since the higher Voltage than the limit causes the shorter LCD's life. An electro-chemical reaction due to DC causes undesirable deterioration of the LCD so that the use of DC drive should avoid.
- Do not connect or disconnect the LCD to or from the system when power is on.
- Never use the LCD under abnormal conditions of high temperature and high humidity.
- When expose to drastic fluctuation of temperature(hot to cold or cold to hot) ,the LCD may be affected; specifically, drastic temperature fluctuation from cold to hot ,produces

- dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation.
  - Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.
  - Static electricity (ESD) will damage the panel,. Please make sure that operators wear static-protective glove effectively and working tables & device are effectively grounded during operation and other ESD protective method
  - Please place LCD on the tray provided by BOECD while moving it, in order to avoid mechanical damage.
  - LCD should be stored in required humidity. Low humidity may add static, while high humidity may corrode the ITO circuit of LCD product.

## 2.0 Generals

### 2.1. Inspection Environment

#### 2.1.1. Inspection environment conditions:

- a. Room temperature:  $22 \pm 3$  °C
- b. Humidity:  $55 \pm 10\%$  RH
- c. Inspection Ambient Illumination : White fluorescent lamp light brightness -- 500~1000 Lux (150~250 Lux for function test)

#### 2.1.2. Viewing Distance

The distance between the panel and the inspector's eyes shall be at  $45 \pm 5$ cm

#### 2.1.3. Viewing Angle

performing in front of the panel , All directions for inspecting the sample should be within  $45^\circ$  to perpendicular line.

#### 2.1.4. Inspection Area :

Display Area (Active Area)

### 2.2. Main Defect Definitions

#### 2.2.1 Black / White Spots

Points on display which appear Black/ white

These defects do not vary in size or intensity (contrast) when contrast is varied.

#### 2.2.2. Dark / Bright Lines

Lines on display which appear dark/bright. Such as vertical, horizontal, or cross lines.

#### 2.2.3. Bright Dot Defects

Dots(sub-pixels) on display which appear bright in the display area and visible through the 5%ND filter at Black Pattern.

#### 2.2.4. Dark Dot Defects

Dots(sub-pixels) on display which appear dark in the display area at R,G,B Color Pattern.

#### 2.2.5. Mura

Mura on display which appears darker / brighter against background brightness on parts of display area

**2.2.6. Visual Inspection**

Inspection for Panel when the unit turns on.

**2.2.7. Appearance Inspection**

External inspection for Panel when the unit turns off.

## 3.0 Inspection Criteria

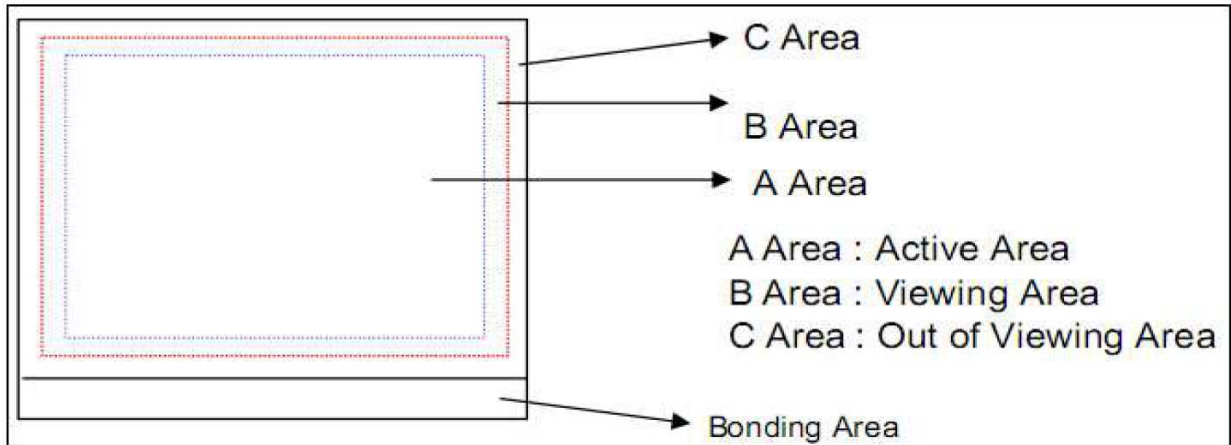
### 3.1. Visual Inspection Criteria

Dimensional unit: mm

Items		Details	Inspection Criteria		Type
			A Area& B Area	C Area	
Appearance Inspection	Spot/Foreign Material	Circular Type	D≤0.15, Ignore 0.15<D≤0.3,N ≤6 D>0.3,N =0	Ignore	Minor
	/Glass Dent/ Scratch /Bubble	Linear Type	W≤0.05, Ignore 0.05<W≤0.08, L≤2.0,N ≤2	Ignore	
	Others		Limit sample	Ignore	
Visual ( Function )Inspection	Mura Crosstalk;		Limit sample		Major
	Pixel Defects	Bright Dot Defect	N = 0		
		Dark Dot Defect	N ≤ 3		
		Bright + Dark Dot Defect	N ≤ 3		
	Line Defects	Bright Line, Dark Line	Not allowed		
Abnormal display	All white, All black, Gray scale, Abnormal display,	Not allowed			

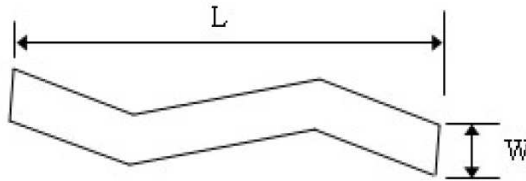
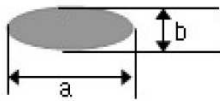
**Remark:** The determination of all defects is based on the panel with Polarizer.

※ Note 1) Definition of the Area


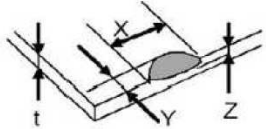
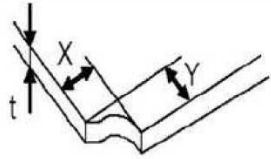
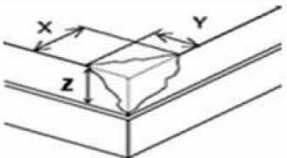
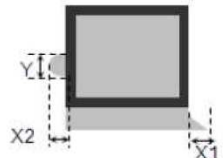


※ Note 2) D = Diameter, L = Length, W = Width, N = Number

$$D = (a + b) / 2$$

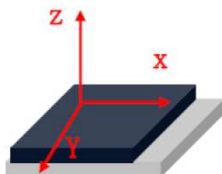


### 3.2. Appearance Inspection Criteria

项目	不良明细	判定基准	Type
Crack		$N \leq 0$	Major
Side Chipping		$y \leq 0.7, x \text{ ignore}$	Minor
Pad Area Chipping		$x+y \leq 4$	Minor
Corner Chipping		$x+y \leq 4$	Minor
Burr		$x1+x2 \leq 0.3$ 且不影响正常组装	Minor

注：“X”表示Chipping的长度 “Y”表示Chipping向内的深度 “Z”表示Chipping向下的深度

1. 以上均注意不影响线路功能及组装。
2. 表面脏污以可擦拭为 OK。



**B : BOECD Customer Quality Service Process**

In order to provide better service to Customer, BOECD shall apply the after-sales product quality service process as below:

- 1.0. According to the P/O from Customer, BOECD should deliver required product to the place appointed by Customer.
- 2.0. Customer will do IQC for the incoming product.
- 3.0. Inspection standard should be provided by BOECD, and it will be valid after confirmed by Customer. Inspection and Defects determination should be carried out according to the standard agreed by both Parties.
- 4.0. In order to guarantee in-time communication of product quality information and effective service, QA staff on Customer side should send Weekly Quality Report to the appointed CS staff in BOECD.
- 5.0.. BOECD should cooperate with Customer for special quality requirement.
- 6.0. After confirmed by both side, BOECD should be responsible for the defect products which caused by its quality problem.
- 7.0.. Customer should use the LCD product according to the instruction. BOECD will not be responsible for the defect product caused by violation of Users' Instruction.
- 8.0. Both parties should deal with the quality problem with friendly cooperative policy.  
And both parties should negotiate to deal with the defect products of which the responsibility is not very clear.
- 9.0. The Shelf life of the product is 12 months after the delivery date.



## 10. Quality Requirements

The defect categories covered in this specification include defects in the active area such as dot defects, blemishes and partly / completely malfunctioning displays as well as visual appearance of the complete product and packaging of the product.

## 11. Handling & Cautions

### 11.1 Mounting Method

- The panel of the LCM consists of two thin glasses with polarizer which easily get damaged. So extreme care should be taken when handling the LCM.
- Excessive stress or pressure on the glass of the LCM should be avoided. Care must be taken to insure that no torsional or compressive forces are applied to the LCM unit when it is mounted.
- If the customer's set presses the main parts of the LCM, the LCM may show the abnormal display. But this phenomenon does not mean the malfunction of the LCM and should be pressed by the way of mutual agreement.
- To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- Mount a LCM with the specified mounting parts.