Specification for Mono LCD Display module

320 x 240 Monochrome LCD Display module

Manufacturer	Yes Optoelectronics Co., Ltd
Part n°	YMS320240-02BBIFDSL
Ordering n°	YMS320240-02BBIFDSL
Customer Part n°	n/a
Revision n°	1.0
Issue Date	2012/07/18

Customer's Approval

Company name	
Printed name	
Job title	
Signature	
Approval Stage:	This product is approved for the following production stage: - ☐ Sample / Prototype ☐ Pre-Production ☐ Mass Production
Approval Date	

Supplied by Anders Electronics plc
Manufactured by Yes Optoelectronics Co., Ltd

anders electronics plc | Kings Studios, 43-45 Kings Terrace, London, NW1 0JR | Tel: +44(0)20 7388 7171| Fax: +44(0)20 7383 2423 | www.andersDX.com | info@andersDX.com

ANSHAN YES OPTOELECTRONICS DISPLAY CO.,LTD

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY MODULE

MODEL NO.: YMS320240-02BBIFDSL DATE:JUL.18.2012

Approved	Checked	Department

CUSTOMER:

MODEL NO.: DATE:

Approved	Checked	Department

ADD: 215# QIANSHAN ROAD,ANSHAN LIAONING P.R.CHINA
TEL: 86-412-5211859 FAX: 86-412-5211729 P.C.:114044
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http://www.asiansources.com/sante.com

LIST

Ⅰ.General Specifications

1.The Features :

Item	Contents	Unit
Drive Method	1/240 duty,1/13 bias	/
Operating voltage	5.0	V
Viewing direction	6:00	O' Clock
Operating Temperature	0-50	℃
Storage Temperature	-20-70	℃
Display type	FSTN mode, Transflective, Positive type display	/
Module Size	134.50*117.00	mm
View Area	103.00*79.00	mm
Dot Size	0.27*0.27	mm
Dot pitch	0.3*0.3	mm
Number of Dots	320*240	DOTS

2. Absolute Maximum Ratings

Characteristic	Symbol	Value	Unit
Power supply voltage	V_{DD}	-0.3~+7.0	V
Driver supply voltage	V_{LCD}	0~+30	
Input voltage	V_{IN}	-0.3~V_{DD}+0.3	

NOTE: Voltage greater than above may do damage to the circuit.

3.Pin Connections:

Pin No.	Symbol	Function
1	VL	Operating voltage for LCD
2	VEE	Supply voltage for LCD
3-6	DB3-DB0	Data bus
7	VSS	Ground
8	VDD	Power supply
9	CL2	Data shift clock
10	CL1	Data latch clock
11	FLM	First line marker
12	K	LED backlight
13	A	LED backlight
14	NC	No connection

5. AC CHARACTERISTICS

(1) Segment Driver Application

(V_{SS} = 0V, Ta = - 30 ~ +85°C)

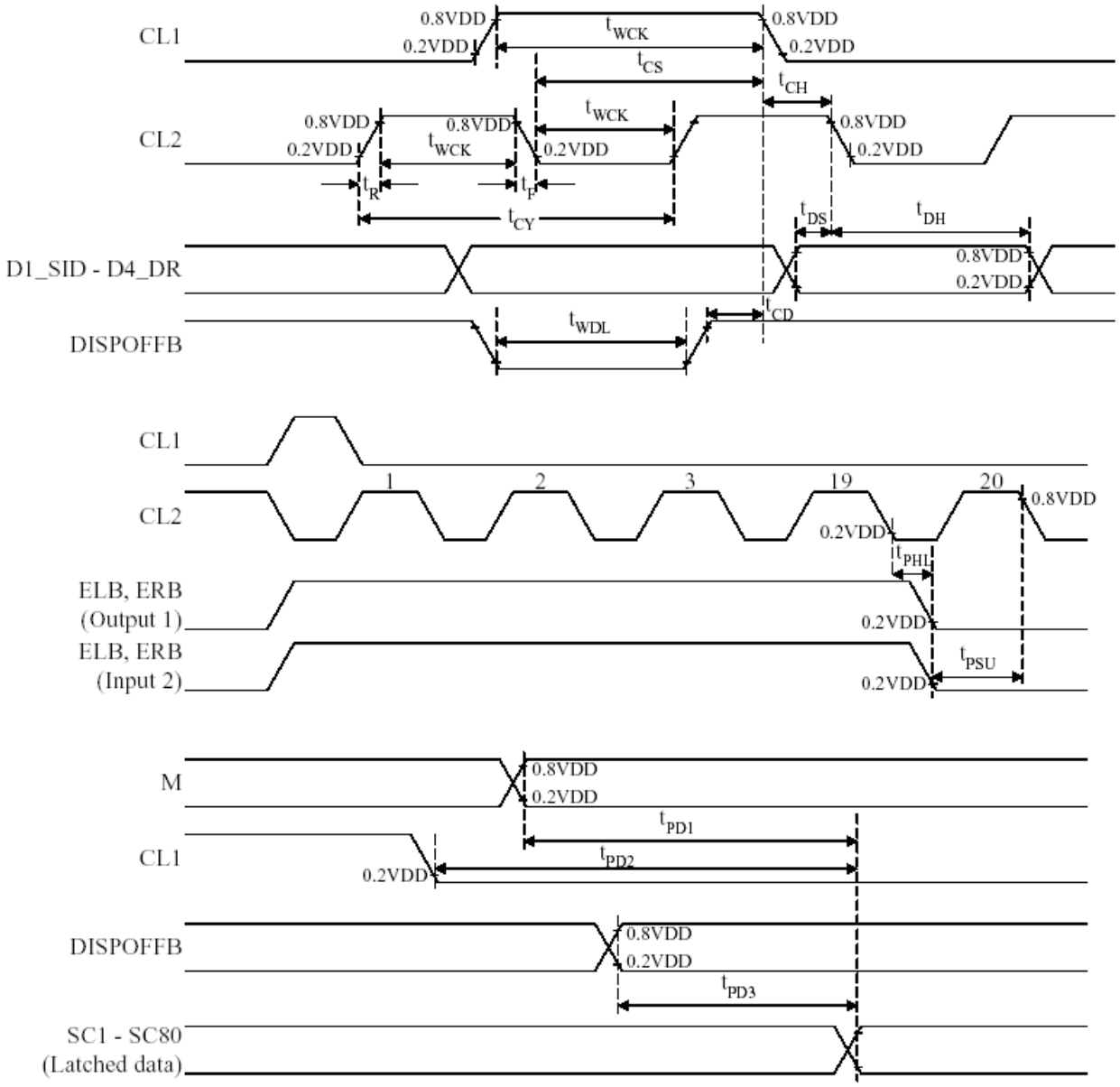
Characteristic	Symbol	Test condition	(1) VDD=5V±10%			(2) VDD=3V±10%			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Clock cycle time	t_{CY}	Duty=50%	125	-	-	250	-	-	ns
Clock pulse width	t_{WCK}	-	45	-	-	95	-	-	
Clock rise/ fall time	t_R / t_F	-	-	-	-	-	-	30	
Data set-up time	t_{DS}	-	30	-		65	-	-	
Data hold time	t_{DH}	-	30	-		65	-	-	
Clock set-up time	t_{CS}	-	80	-		120	-	-	
Clock hold time	t_{CH}	-	80	-		120	-	-	
Propagation delay time	t_{PHL}	ELB output	-	-	60	-	-	125	
		ERB output			60			125	
ELB,ERB set-up time	t_{PSU}	ELB input	30	-	-	65	-	-	
		ERB input	30			65			
DISPOFFB low pulse width	t_{WDL}	-	1.2	-	-	1.2	-	-	μs
DISPOFFB clear time	t_{CD}	-	100	-	-	100	-	-	ns
M – OUT propagation delay time	t_{PD1}	C_L=15pF	-	-	1.0	-	-	1.2	μs
CL1 – OUT propagation delay time	t_{PD2}		-	-	1.0	-	-	1.2	
DISPOFFB – OUT propagation delay time	t_{PD3}		-	-	1.0	-	-	-	

(2). Common Driver Application

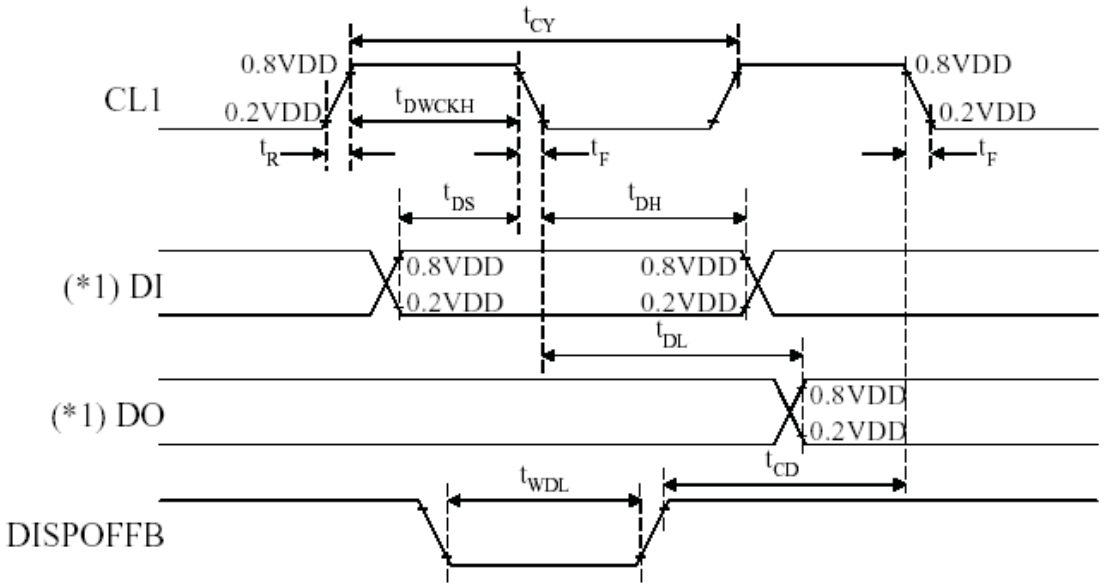
(V_{SS} = 0V, Ta = - 30 ~ +85°C)

Characteristic	Symbol	Test condition	(1) VDD=5V±10%			(2) VDD=3V±10%			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Clock cycle time	t_{CY}	Duty=50%	250	-	-	500	-	-	ns
Clock pulse width	t_{WCK}	-	45	-	-	95	-	-	
Clock rise/ fall time	t_R / t_F	-	-	-	50	-	-	50	
Data set-up time	t_{DS}	-	30	-		65	-	-	
Data hold time	T_{DH}	-	30	-		65	-	-	
DISPOFFB low pulse width	t_{WDL}	-	1.2	-	-	1.2	-	-	μs
DISPOFFB clear time	t_{CD}	-	100	-	-	100	-	-	ns
Output delay time	t_{DL}	C_L=15pF	-	-	200	-	-	250	
M – OUT propagation delay time	t_{PD1}		-	-	1.0	-	-	1.2	μs
CL1 – OUT propagation delay time	t_{PD2}		-	-	1.0	-	-	1.2	
DISPOFFB – OUT propagation delay time	t_{PD3}		-	-	1.0	-	-	1.2	

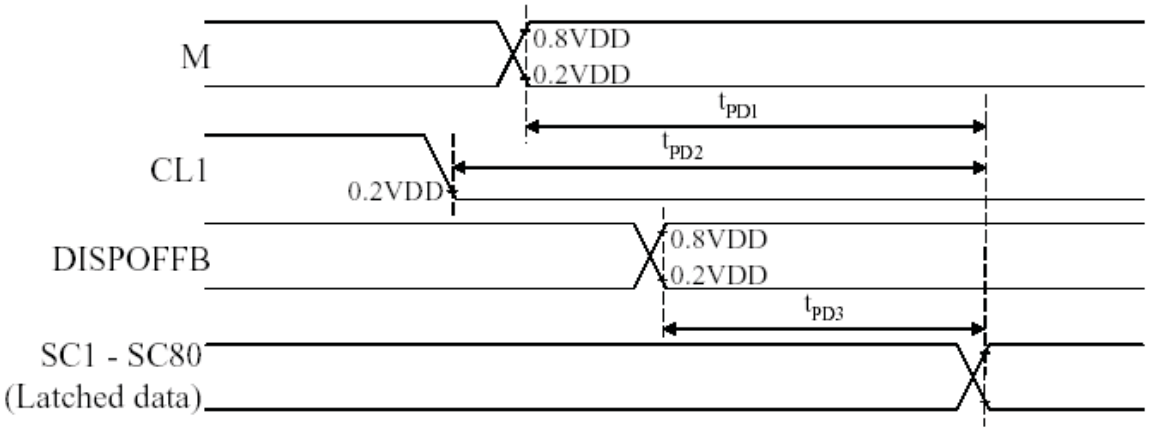
(3) Segment Driver Application Timing



(4). Common Driver Application Timing



(*1) When in single-type interface mode
DI=>DDL(SHL=L), D4_DR(SHL=H)
DO=>D4_DR(SHL=L), D2_DL(SHL=H)
When in dual-type interface mode
DI=>D2_DL and D3_DM(SHL=L),D4_DR and D3_DM(SHL=H)
DO=>D4_DR(SHL=L), D2_DL(SHL=H)



Ⅱ.The Characteristics and Reliability Test

1.Electro-Optic Characteristics

Condition:TEMP=(23±3)℃

NO	Item		Symbol	Min.	Typ.	Max.	Unit	Condition
1	Supply Voltage(Logic)		Vdd-Vss		5.0		V	
2	LCD Operating Voltage		Vdd-V_0		23.1		V	0℃
				22.7	22.9	23.1	V	25℃
					22.7		V	50℃
3	Response Time		Ton		188		ms	
			Toff		256		ms	
4	Contrast Ratio		CR	2				
5	Viewing Angle	12H	θ 1		44		Deg.	(CR≥2.0)
		6H	θ 2		52			
		3H	θ 3		50			
		9H	θ 4		50			

2. Characteristics of backlight

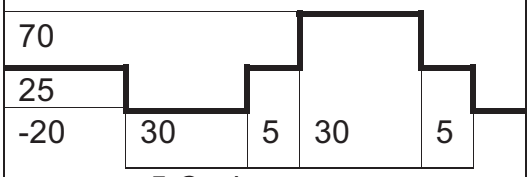
Color:White

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	VF	3.3	3.5	3.7	V	IF=120mA
Luminance	LV	225	300		cd/m^2	IF=120mA
Reverse current	IR		30		mA	VR=0.8V

WARNING:

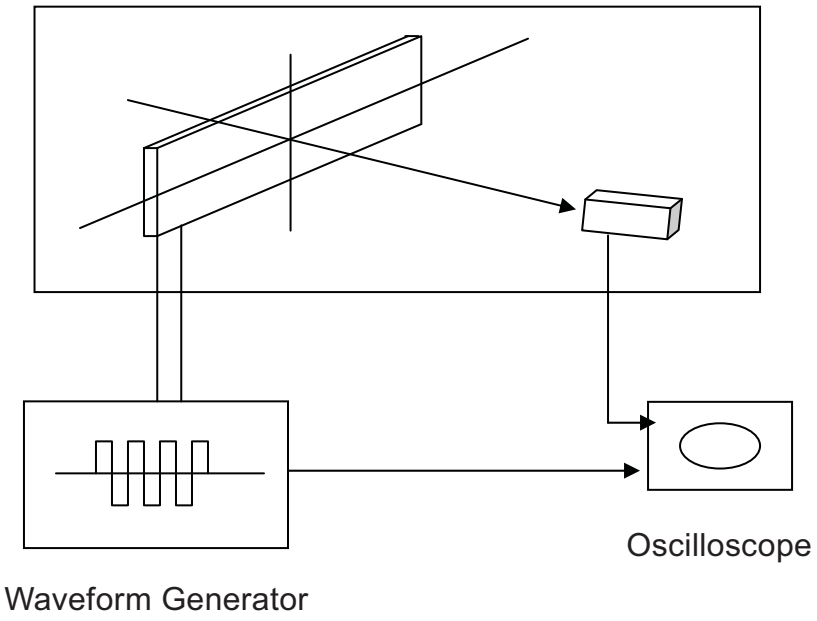
A BACKLIGHT IS A KIND OF CURRENT DEVICE,IT MUST CONNECT WITH A RESISTOR FOR LIMITING CURRENT ,OR IT WILL BE DAMAGED.

3.Reliability Test

No	Items	Test Condition	Test Result
1	High Temp Storage	Temp:70±2℃ Time:96h Restore:24h	Passed
2	Low Temp Storage	Temp:-20±3℃ Time:96h Restore:24h	Passed
3	High Temp Operating	Temp:50±2℃ Vop:5V Time:24h Restore:24h	Passed
4	Low Temp Operating	Temp:0±3℃ Vop:5V Time:24h Restore:24h	Passed
5	High Temp High Hum Storage	Temp:40±2℃ Hum:95%Rh Time:96h Restore:24h	Passed
6	Thermal Shock	Temp:(℃)  5 Cycles Restore:24h	Passed

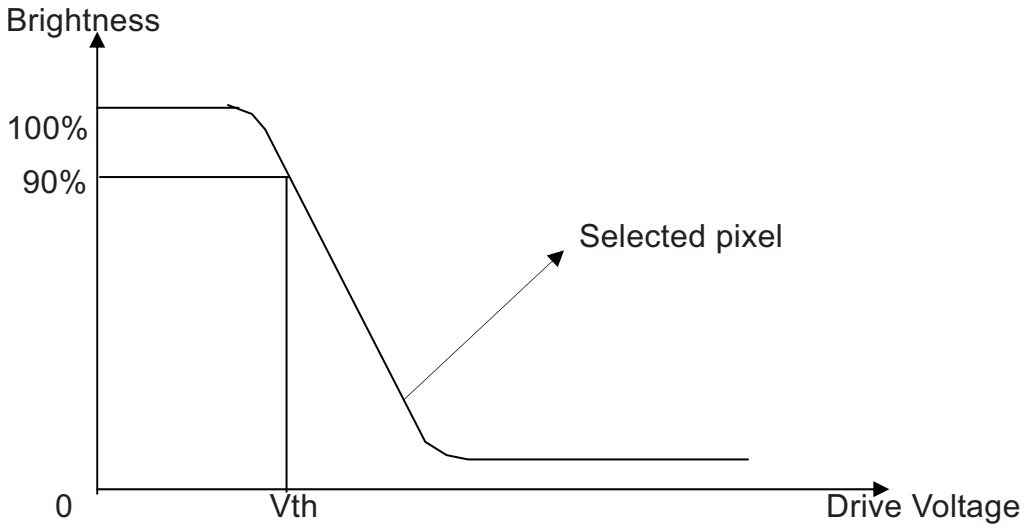
Ⅲ.The Equipment and LCD Measuring Method

1. Equipment

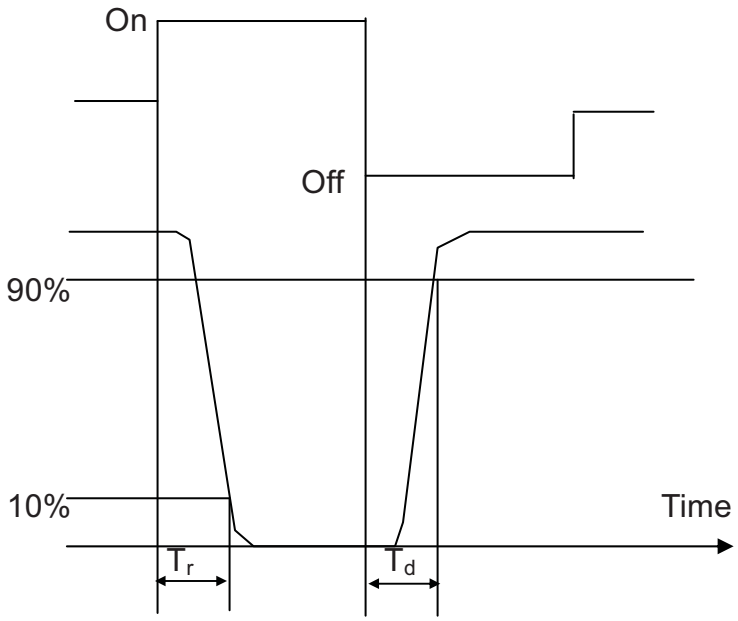


2. Definition

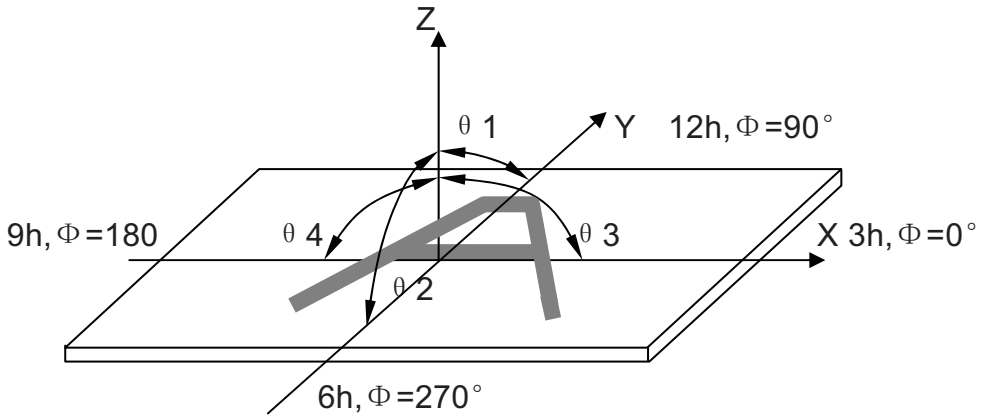
(1). Threshold Voltage (Vth)



(2). Response Time



(3).Viewing Angle:



(4).Contrast Ratio (Positive)

$$CR = \frac{\text{Brightness of non-selected pixel}}{\text{Brightness of selected pixel}}$$

3. Reliability Test:

Equipment : TENNY

Ⅳ.Standard Specifications for Product Quality

1.MTBF

More than 50,000 hours.

2. Method of Test:：

(1)The Test Must Be Under 40W Fluorescent Lamp, And The Distance Of View Must Be At 30cm.

(2)The eye's Test Direction Is Based On the vertical direction 15° - 45° .

3. Definition Of Defects

(1) Major Defects

A:Non-Display

B:Segment Missing

C:Over Current

D:Segment Short

E: Wrong Polarizer Direction

(2)Minor Defects: The Others.

4. Quality specification

Major Defects Should Be In AQL 0.25,and The Minor In AQL 1.00

The sampling inspection plan is in accordance with the Level Ⅱ and normal inspection.

Definition of area:

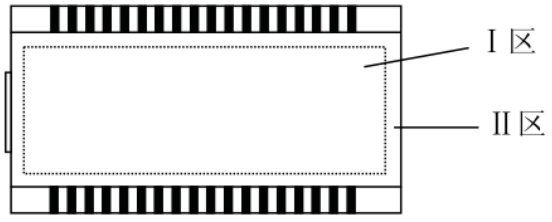
I area: viewing area

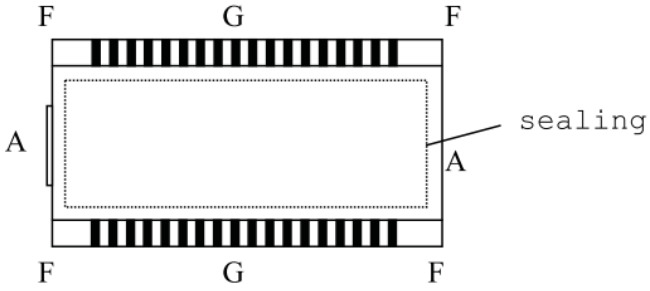
II area: Outside of viewing area

A area: The area outside sealing

G area : Electrode pad area

F area : Without electrode pad area



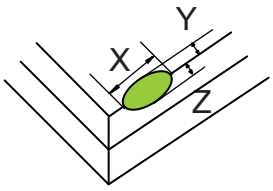
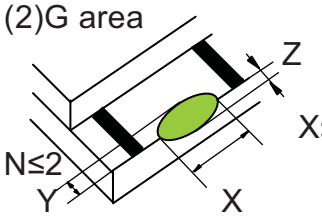
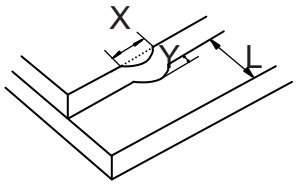
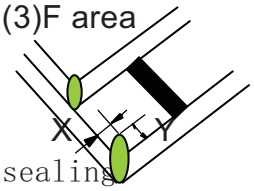
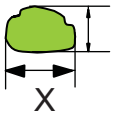
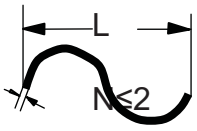


5.Inspection Item and Standards

Item	The Standard Of Quality Inspection	Checking Method	Quantity Ratio
Frame	Smooth and even surface,no crack,no scratch,no rusty,and not be wrenched out of shape.the range between convex and concave is:d≤0.35mm,and the frame must be connected with the ground pad.	Checking With Eyes And Using Vernier Caliper, Multimeter	100%
The Relative Position of LCD and Frame	The end seal of the LCD must be at the same side with the frame's opening.	Checking With Eyes	100%
The Relative Position of PCB/Panel /Frame	The frame installing direction must be correct.the twisted angle of the leg is from 45° to 60° ,the leg is vertical to PCB panel and it must be in the middle position of the installing holes.	Checking With Eyes	100%
LED	1.The LED must be White 2.The LED must be uniform.	Checking With Eyes	100%
Function Test	1. The major defects must be reject. 2. Background changes evenly and no disorderly displaying phenomenon. 3. Display no shortage.	Check It When Displaying	100%

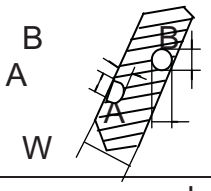
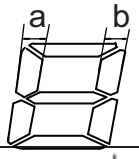
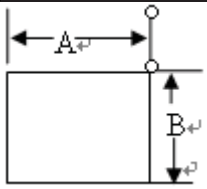
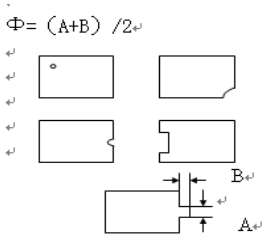
LCD:

Standard of appearance test: (unit: mm)

№	Items	Criterion	Checking manner
1	Substrate crack X: defect Length Y: defect Width Z: defect Depth T: glass Thickness N: defect QTY L:Connector Width	(1) A area  X≤3.0 Y：Don’t allowed hurt sealing Z≥T/2 N≤3 X≤5.0 Y：Don’t allowed hurt sealing Z≤T/2 N≤3 X≤1.0 Y≤0.5 Z≤T/3 No check (2)G area  X≤3.0 Y≤0.5 Z≤T/2  X≤1/2 total length Y≤1/4L N≤1 Over the drawing tolerance is not allowed (3)F area  X≤2.0 Y≤3 Z≤T N≤3 Don’t allowed hurt	checking with eyes
2	Black spot white spot D=(X+Y)/2 Line	(1)  0.2<D≤0.25 N≤1 0.1<D≤0.2 N≤3 D≤0.1 No check (2)  L≤2.0 W≤0.03 L≤1.0 W≤0.05 N≤1 W	Checking on the table with light and polarizer and checking with eyes directly.

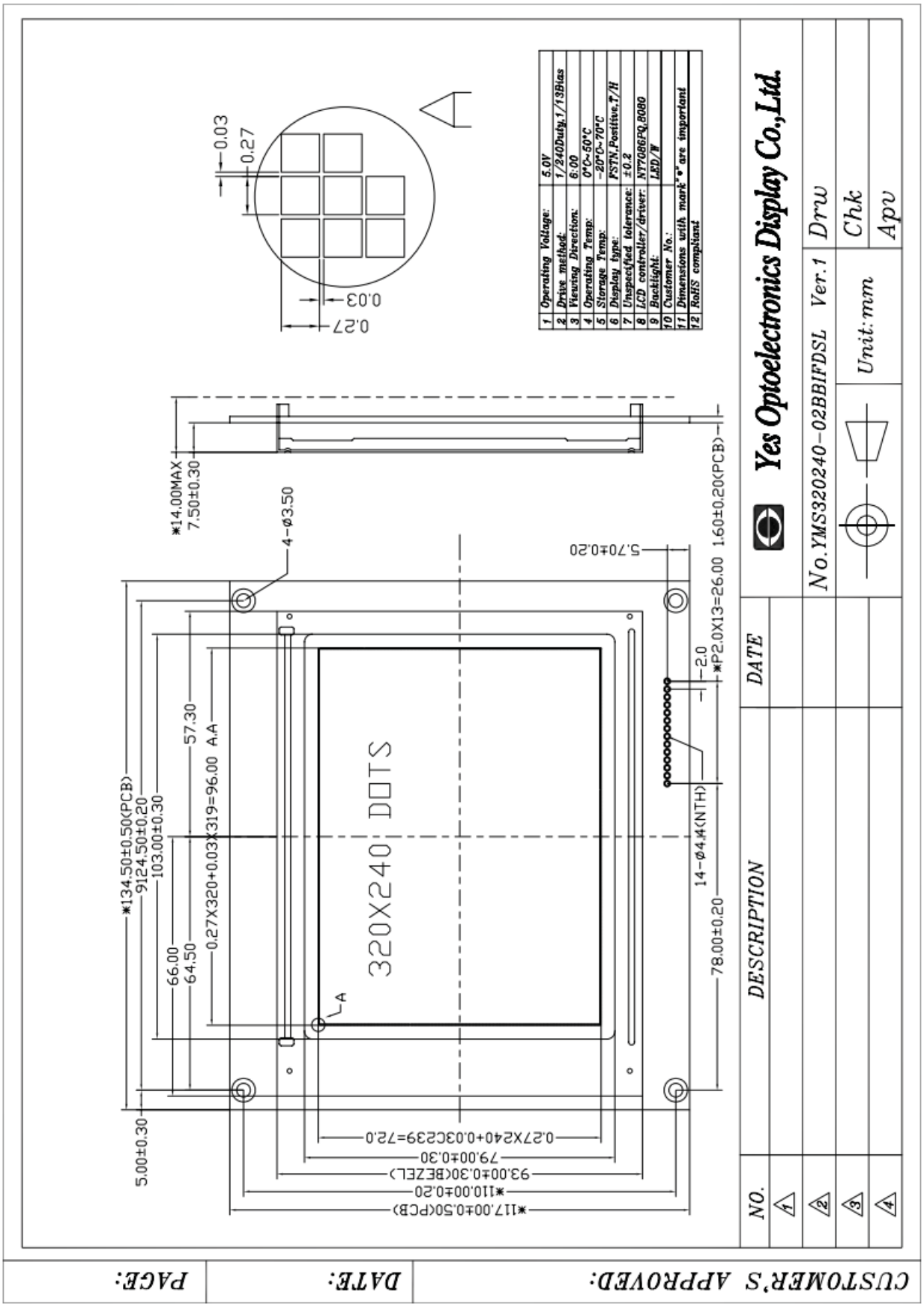
№	Items	Criterion	Checking manner
3	Polarizer Bubble	D≤0.15 No check 0.15<D≤0.4 N≤2	Checking on the table with light and polarizer, and checking with eyes directly
4	Rainbow Color	Allow tiny rainbow Allow 5% color contrast or accord limitative sample	Checking on the table with light and polarizer, And checking with eyes directly
5	END Seal	1. Dimension accord design require 2. Inject depth（d）：1/5D≤d≤D （D：seal design depth）	Checking with eyes
6	Polarizer or pad appearance	No dirty	Checking with eyes

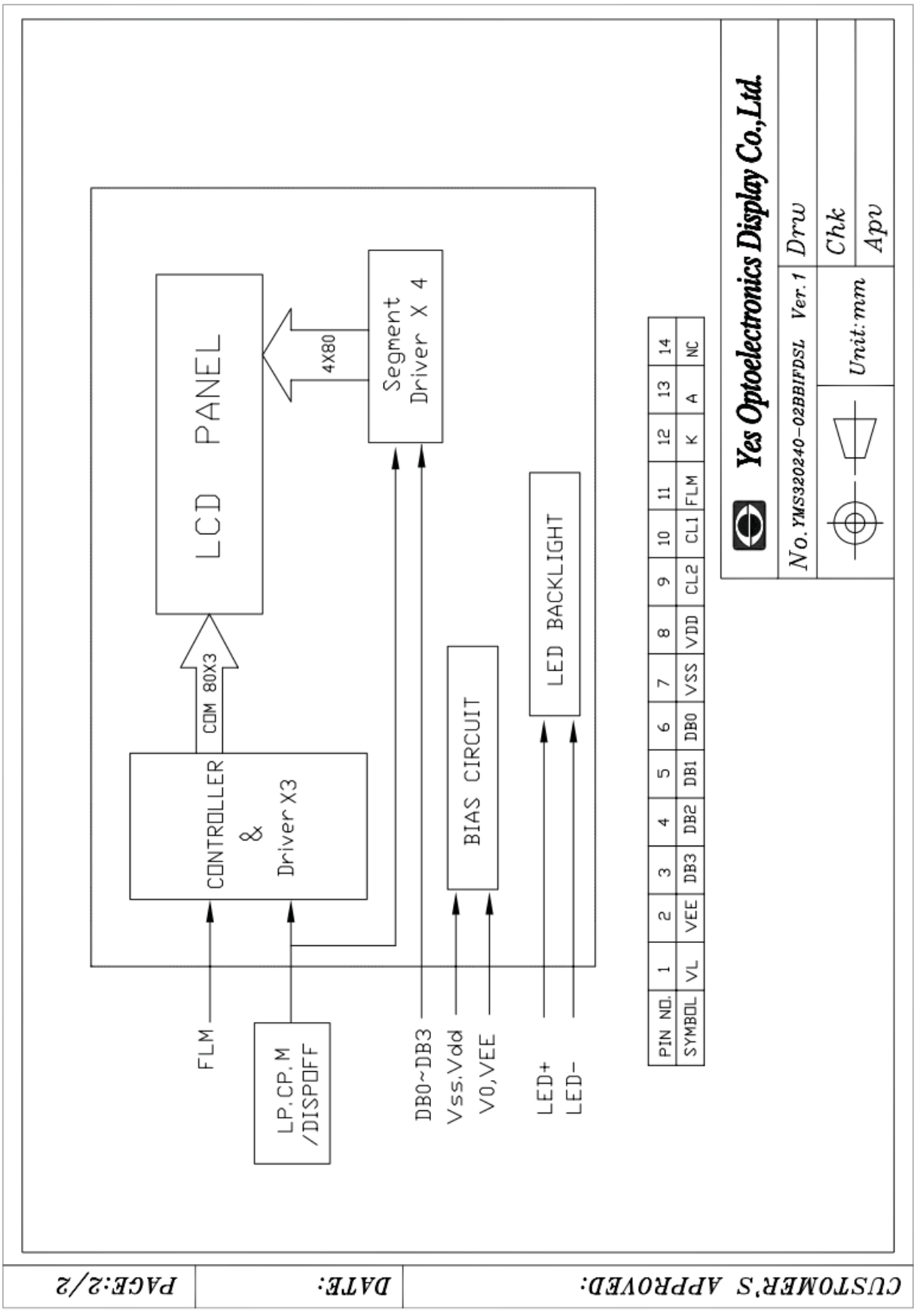
Standard of display test

№	Items	Criterion	Checking manner
1	Pin hole D=(A+B)/2 W: segment width	 W≤0.4 D≤0.20 And D≤1/2W N≤1 W>0.4 D≤0.25 And D≤1/3W N≤2 D≤0.05 No check	Checking at the display state
2	Different width of segment	 |a-b|<0.25 or |a-b|≤1/4W No check	Checking at the display state
3	Different width		A：distortion≤10% B：distortion≤10% Superfluous Electrode lines display is not allowed
4	Pinhole		0.15＜Φ≤0.2 N≤1 0.05＜Φ≤0.15 N≤3 Φ≤0.05 Any number Note: Distance between two spots ≥ 10mm ，Φ〈1/3 pixels

Note: d～Diameter n～Quantity Unit: mm

V .Attached Drawing




CUSTOMER'S APPROVED:
DATE:
PAGE:2/2
Yes Optoelectronics Display Co.,Ltd.
No. YMS320240-02BBIFDSL Ver.1
Drw
Chk
Apv
Unit:mm
LCD PANEL
CONTROLLER & Driver X3
COM 80X3
4X80
Segment Driver X 4
BIAS CIRCUIT
LED BACKLIGHT
FLM
LP.CP.M /DISPOFF
DB0~DB3
Vss.Vdd
V0,VEE
LED+
LED-
PIN NO. 1 2 3 4 5 6 7 8 9 10 11 12 13 14
SYMBOL VL VEE DB3 DB2 DB1 DB0 VSS VDD CL2 CL1 FLM K A NC

VI. Packing

CUSTOMER'S APPROVED:	DATE: 2012.07.18	PAGE: 1/1

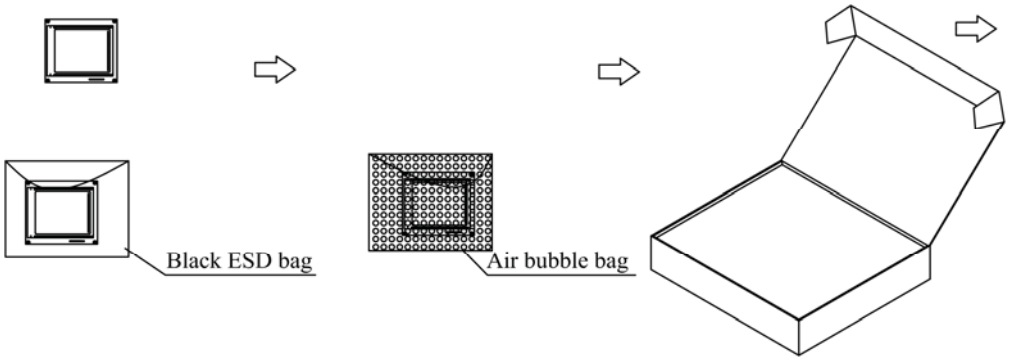
PRODUCT PART NO.:YMS320240-02BBIFDSL

Packing Process:

1) Putting Modules into each black ESD bag

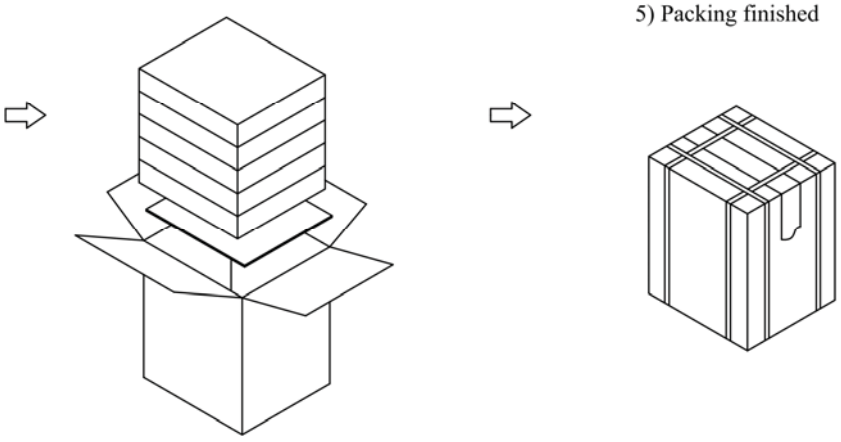
2) Putting Modules with black ESD bag into the air bubble bag

3) Putting 16pcs Modules into the inner box (TYPE:H82) and space filled filling piece



4) Putting 5 small inner boxes into one out carton

5) Packing finished



Note: 16x5=80pcs/Outcarton

Dimension (Small carton): 385*325*87mm

Dimension (Out carton): 394*344*470mm

NO. YMS320240-02BBIFDSL Ver.1	Drw:		Chk:		Apv:	

ANSHAN YES OPTOELECTRONICES DISPLAY CO., LTD

Ⅶ.Precautions For Use

1. Safety

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.

(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.

(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

2.Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 25±10°C and the humidity is 50±20%RH.

(2) Store in anti-static electricity container.

(3) Store in clean environment, free from dust, active gas, and solvent.

(4) Do not place the module near organics solvents or corrosive gases.

(5) Do not crush, shake, or jolt the module.

(6) Do not exposed to direct sun light of fluorescent lamps.

3.Installing LCD Module

Attend to the following items when installing the LCM.

(1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.

(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements.

4.Precautions For Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.

(2) Driving the LCD in the voltage above the limit will shorten its lifetime.

(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.

(4) When turning the power on, input each signal after the positive/negative voltage becomes stable.

(5) Do not apply water or any liquid on product which composed of T/P.

5.Handling Precautions

(1) Avoid static electricity which can damage the CMOS LSI; please wear the wrist strap when handling.

(2) The polarizing plate of the display is very fragile. so, please handle it very carefully.

(3) Do not give external shock.

(4) Do not apply excessive force on the surface; it may cause display abnormal .

(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.

(7) Do not operate it above the absolute maximum rating.

(8) Do not remove the panel or frame from the module.

(9) Do not apply water or any liquid on product which composed of T/P.