Mono FSTN Display Module

Product Specification
Part No. YMS-320240-16AABFUGL
320 x 240 FSTN Display

For more information, please visit www.andersdx.com
or email info@andersdx.com

Version 1.0

Interfaces to Inspire

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY MODULE

MODEL NO.: YMS320240-16AABFUGL DATE:JUN.05.2012

Approved	Checked	Department

CUSTOMER:

MODEL NO.: DATE:

Approved	Checked	Department

LIST

Ⅰ.General Specifications

1.The Features :

(1). The module operating voltage: 3.3V

(2).Drive method: 1/240 duty,1/12 bias

(3). Viewing direction: 12:00

(4). Operating temperature: 0~50℃

(5). Storage temperature: -20~70℃

(6). Display type: FSTN type, Transflective, Positive mode display

2.Mechanical Data and Conditions:

(1) Number of DOTS---------- 320 Dots * 240 Dots

(2) Module Size----------94.00 (w) * 80.40 (h) mm

(3) Viewing Area ---------- 80.2(w) * 61.0 (h) mm

(4) Dot Size ----------0.23 (w) * 0.23(h) mm

(5) Outline Dimensions----------See Attached Drawing

3. Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage range	VCC	-0.3 to +8.0	V
	V0/VOUT	-0.3 to +40	V
	V1/V2/V3/V4	-0.3 to V0	V

NOTES

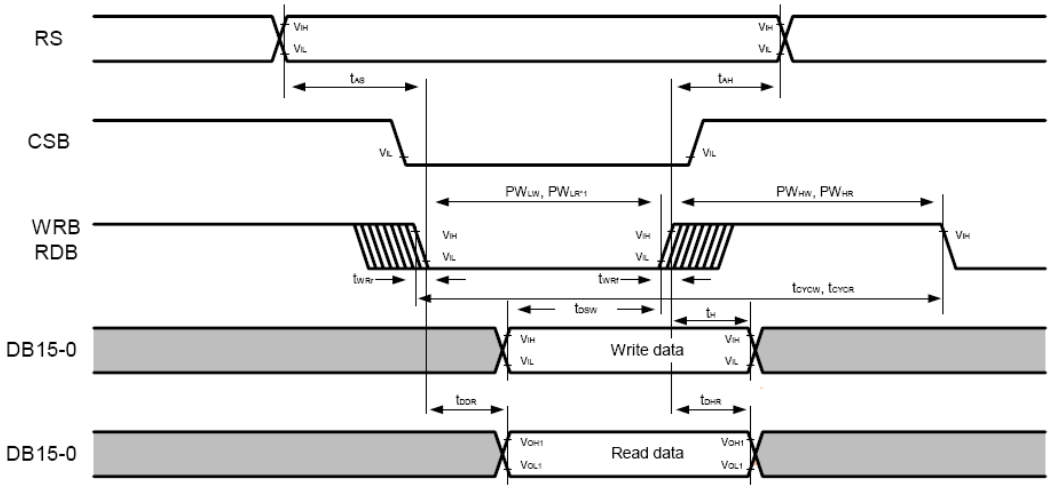
1. VCC and VOUT are measured based on GND = 0V
2. Voltages V0 ≧ V1 ≧ V2 ≧ V3 ≧ V4 ≧ GND must always be satisfied.
3. If supply voltage exceeds its absolute maximum range, this LSI may be damaged permanently.
4. It is desirable to use this LSI under electrical characteristic conditions during general operation, otherwise, this LSI may malfunction or reduced LSI reliability may result.

4.Pin Connections:

Pin No.	Symbol	Function
1	ESD	Electro-Static discharge
2-6	V4-V0	Built-in driver voltage sources output.
7	VOUT2	VOUT2 is the internal booster output,step-up voltage based on the difference voltage of VCI&GND.
8	VCI	VCI is the reference voltage source of internal booster circuit.
9	RWRDB	For a 68-system bus interface, serves as a signal to select data read/write operation. Low: Write High: Read For an 80-system bus interface, serves as a read strobe signal and reads data at the low level For 4-line serial interface, serves as the serial data pin for data transformation.
10	RS	Register select
11	RESETB	Reset pin,Low active
12	EWRB	For 68-system bus interface, serves as an enable signal to activate data read/write operation. For 80-system bus interface, serves as a write strobe signal and writes data at the low level. For 4-line serial interface, serves as a synchronized clock signal
13-15	IM0-IM2	Selects the MPU interface mode IM2 IM1 IM0 MPU interface mode GND GND GND 68-system 16-bit bus interface GND GND VCC 68-system 8-bit bus interface GND VCC GND 80-system 16-bit bus interface GND VCC VCC 80-system 8-bit bus interface VCC GND GND 4-line serial interface
16	CSB	Chip select
17	VDD	Digital core power pad
18	VCC	Power supply
19	VPP	VPP is the power pin of embedded OTP(One-Time-Programming)non-volatile memory circuit.
20	GND	Ground
21-28	DB8-DB15	Data bus
29	ESD	Electro-Static discharge
30	NC	No connection

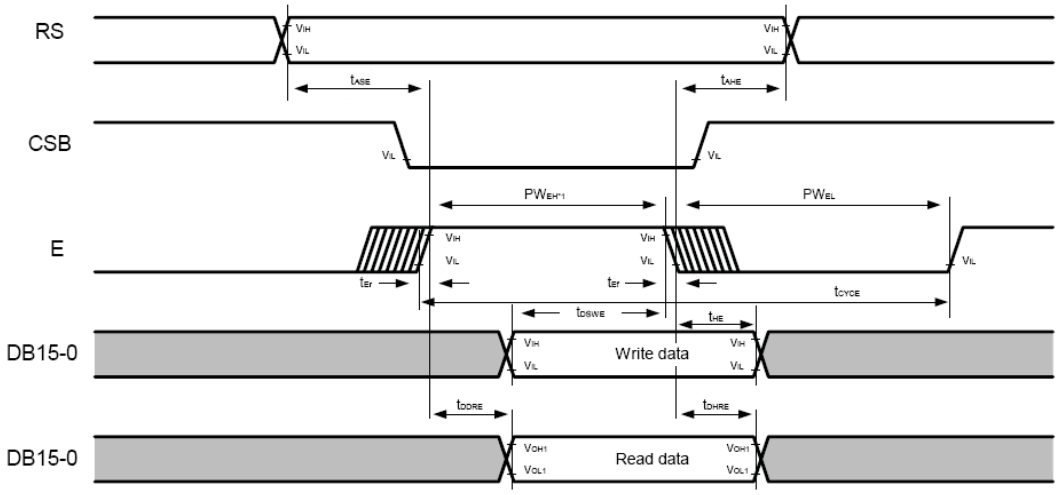
5. AC CHARACTERISTICS

80-System Bus Operation



Note : PW_{LW} and PW_{HR} are specified in the overlapped period when CSB is low and WRB or RDB is low.

68-System Bus Operation



Note : PW_{EH} is specified in the overlapped period when CSB is low and E is high.

80-System Bus Interface Timing Characteristics

Vcc = 2.4 to 3.3 V **Temp = -30 to +80℃**

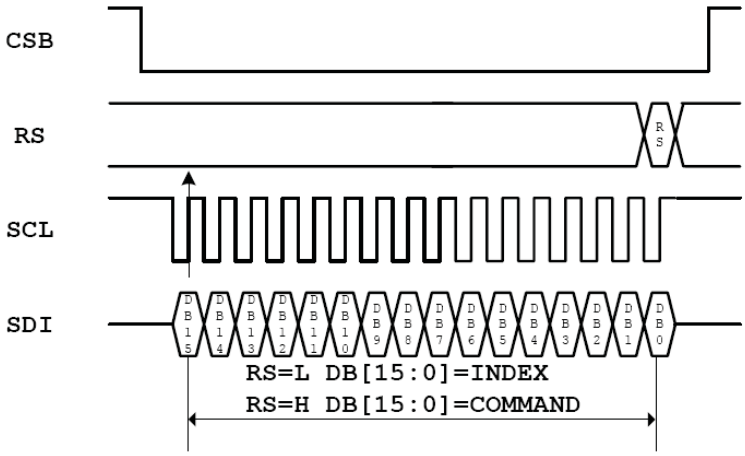
Item		Symbol	Min	Typ	Max	Unit
Bus cycle time	Write	t_{CYCW}	350			ns
	Read	t_{CYCR}	500			ns
Write low-level pulse width		PW_{LW}	170			ns
Read low-level pulse width		PW_{LR}	250			ns
Write high-level pulse width		PW_{HW}	180			ns
Read high-level pulse width		PW_{HR}	250			ns
Write/Read rise/fall time		t_{WRr} , $_{WRf}$			15	ns
Setup time (RS to CS*, WR*, RD*)		t_{AS}	50			ns
Address hold time		t_{AH}	20			ns
Write data setup time		t_{DSW}	70			ns
Write data hold time		t_{H}	60			ns
Read data delay time		t_{DDR}			200	ns
Read data hold time		t_{DHR}	5			ns

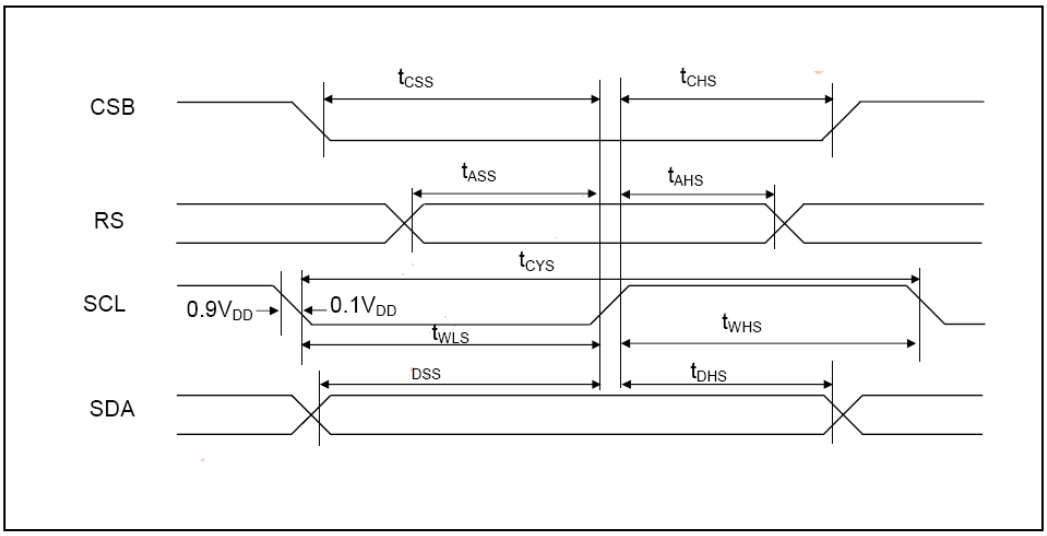
68-System Bus Interface Timing Characteristics

Vcc = 2.4 to 3.3 V **Temp = -30 to +80**

Item		Symbol	Min	Typ	Max	Unit
Enable cycle time	Write	t	350			ns
	Read	t	500			ns
Enable high-level pulse width	Write	PW	170			ns
	Read	PW	250			ns
Enable low-level pulse width	Write	PW	180			ns
	Read	PW	250			ns
Enable rise/fall tiem		t			15	ns
Setup time (RS to CS*, WR*, RD*)		t_{ASE}	50			ns
Address hold time		t_{AHE}	20			ns
Write data setup time		t_{DSWE}	70			ns
Write data hold time		t_{HE}	60			ns
Read data delay time		t_{DDRE}			200	ns
Read data hold time		t_{DHRE}	5			ns

4 Line Serial Interface Timing Characteristics





VCC = 2.4 to 3.3V **Temp = -30 to +80°C**

Item	Signal	Symbol	Min.	Typ.	Max.	Unit	Remark
Serial clock cycle	SCL	tCYS	250	-	-	ns	
SCLK high pulse width	SCL	tWHS	125	-	-		
SCLK low pulse width	SCL	tWLS	125	-	-		
RS setup time	RS	tASS	110	-	-	ns	
RS hold time	RS	tAHS	110	-	-		
Data setup time	SDA	tDSS	110	-	-	ns	
Data hold time	SDA	tDHS	110	-	-		
CSB setup time	CSB	tCSS	110	-	-	ns	
CSB hold time	CSB	tCHS	110	-	-		

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		3.3		V	
2	LCD Operating Voltage		Vdd-V_0		22.2		V	0℃
				21.8	22.0	22.2	V	25℃
					21.8		V	50℃
3	Response Time		Ton		130		ms	
			Toff		265		ms	
4	Contrast Ratio		CR	2				
5	Viewing Angle	12H	θ 1		60		Deg.	(CR≥2.0)
		6H	θ 2		46			
		3H	θ 3		55			
		9H	θ 4		55			

2. Characteristics of backlight (LED unit)

Color: White

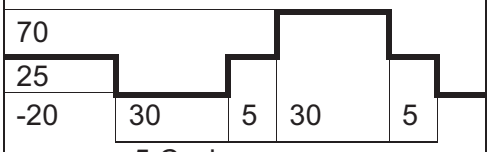
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Forward Current	Vf	3.2	3.5	3.8	mA	If=75mA
Power Dissipation	Pd	—	0.262	0.285	W	If=75mA
Reverse Voltage	Vr	—	--	5.0	V	—
Reverse Current	Ir	—	--	50	uA	Vr=5.0V Each chip
Luminous Intensity	Lv	TBD	--	--	cd/m²	If=75mA
Luminous Uniformity	ΔLv	70	--	--	%	
Chromaticity coordinate	X	X=0.260	--	X=0.320		Each chip If=20mA Ta=25° C
	Y	Y=0.260	--	Y=0.320		

ITEM	SYMBOL	RATINGS
Operating Temperature Range	Topr	-20° C to +70° C
Storage Temperature Range	Tstg	-30° C to +80° C

WARNING:

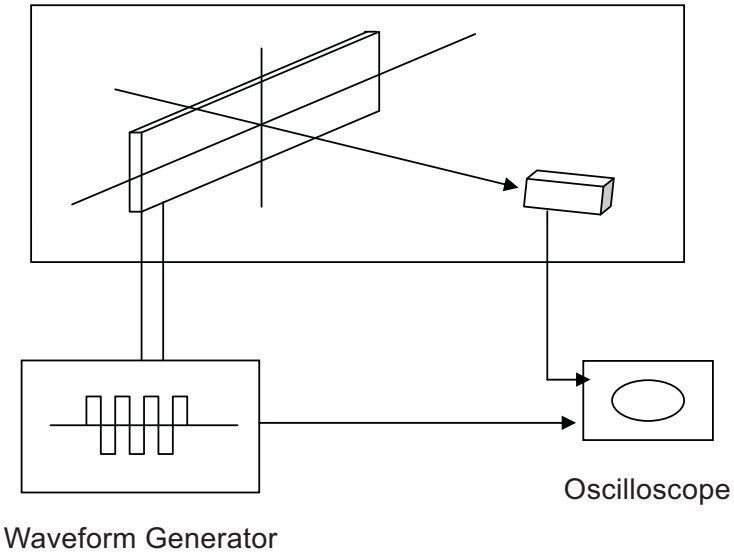
A BACKLIGHT IS A KIND OF CURRENT DEVICE,IT MUST CONNECT WITH A RESISTOR FOR LIMITING CURRENT ,OR IT WILL BE DAMAGED.

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:3.3V Time:24h Restore:24h	Passed
4	Low Temp operating	Temp: 0±3℃ Vop:3.3V 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:(℃) Time: (min)  5 Cycles Restore:24h	Passed

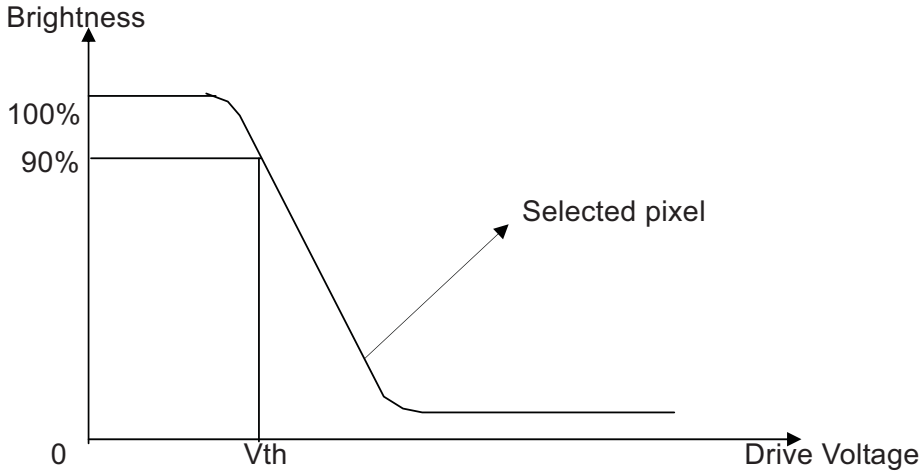
Ⅲ.The Equipment and LCD Measuring Method

1. Equipment

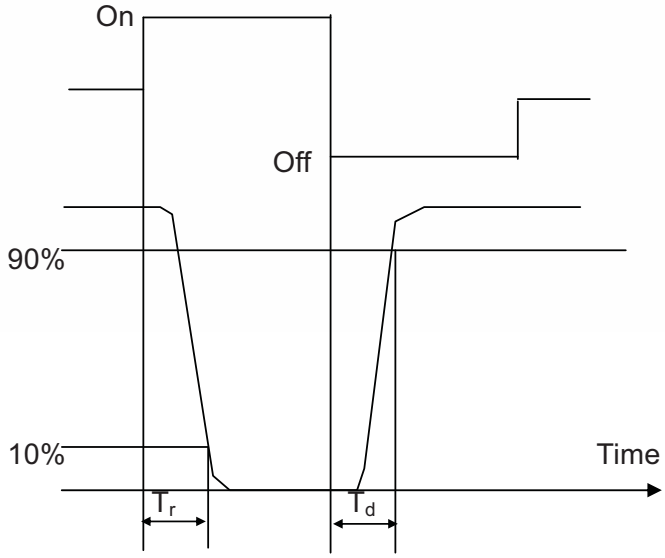


2. Definition

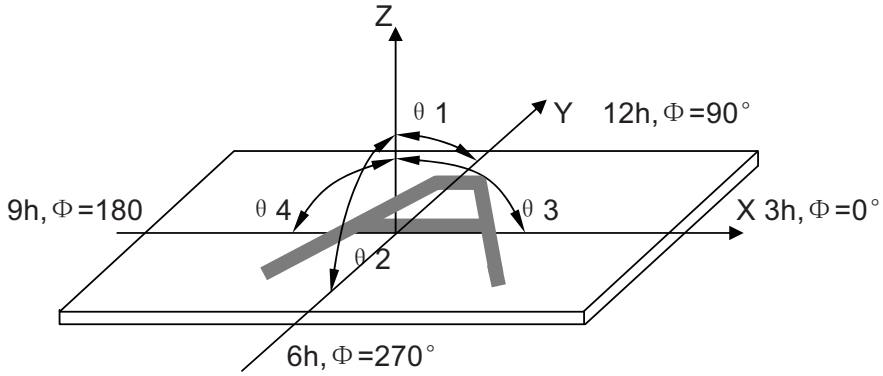
(1). Threshold Voltage (Vth)



(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:

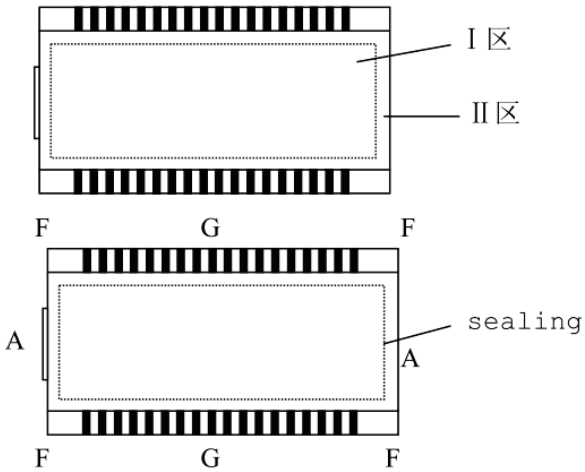
I area: viewing area

II area: Outside of viewing area

A area: The area outside sealing

G area : Electrode pad area

F area : Without electrode pad area

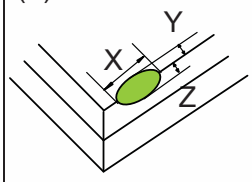
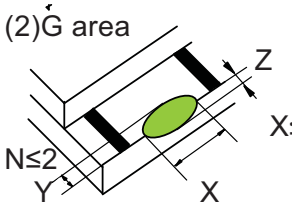
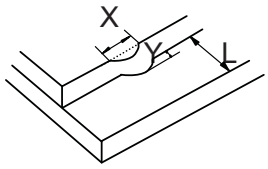
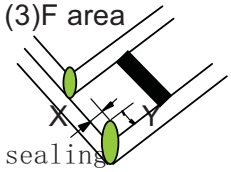
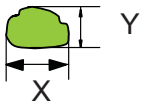
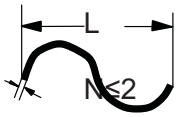


5.Inspection Item and Standards

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%

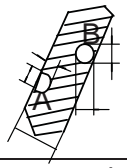
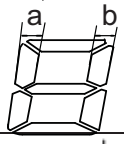
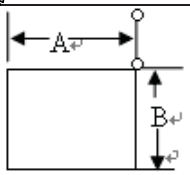
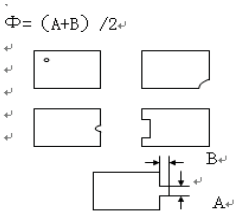
LCD:

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 sealing	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	Checking on the table with light and polarizer and checking with eyes directly.

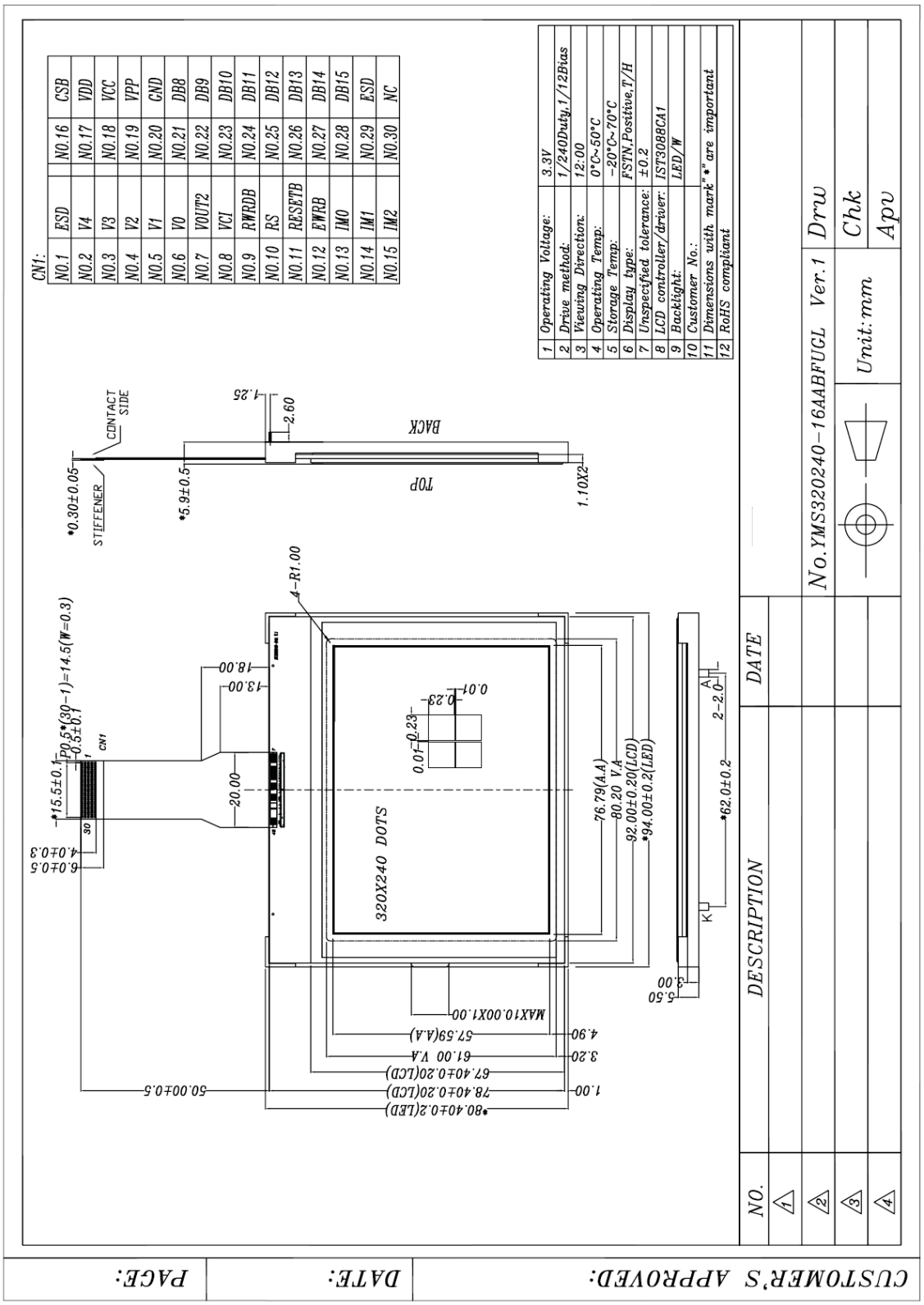
№	Items	Criterion	Checking manner
3	Polarizer Bubble	D≤0.15 No check 0.15<D≤0.4 N≤2	Checking on the table with light and polarizer, and checking with eyes directly
4	Rainbow Color	Allow tiny rainbow Allow 5% color contrast or accord limitative sample	Checking on the table with light and polarizer, And 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	B A W  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



VI. Packing

CUSTOMER'S APPROVED:	DATE: 2011.03.25	PAGE: 1/1

PRODUCT PART NO.:YMS320240-16AABFUGL

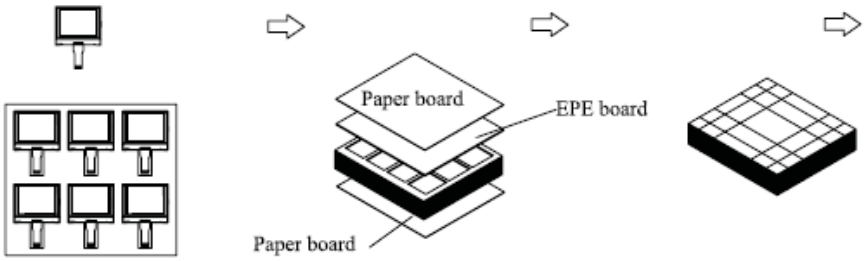
PACKING TYPE: BY EPE TRAY(T320240-16A)

PACKLING ORDER:

1) Putting 6pcs Modules on each EPE tray.

2) Putting 6pcs EPE trays together with EPE paper on the top of EPE tray.

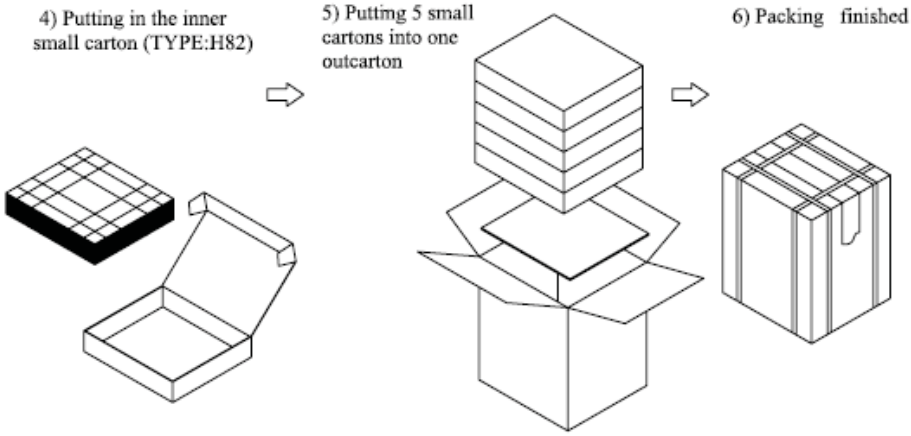
3) Assembling the boards and the tray together with adhesive tape



4) Putting in the inner small carton (TYPE:H82)

5) Putting 5 small cartons into one outcarton

6) Packing finished



Note: 6pcs in a tray,6trays in a inner carton,5 inner cartons in a out carton, so 6x6x5=180pcs/Outcarton

Dimension (Small carton): 385*325*87mm Dimension (Out carton): 394*344*470mm

NO.	YMS320240-16AABFUGL	Ver. 1	Drw:		Chk:		Apv:	

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 23±5°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 hanc it very carefully.

(3) Do not give external shock.

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

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

(6) Do not use ketonics solvent & Aromatic solvent, use with a soft ɔth 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.