Specification for Mono LCD Display module

240 x 128 Monochrome LCD Display module

Manufacturer	Yes Optoelectronics Co., Ltd
Part n°	YMS240128-01AEPFDSL
Ordering n°	YMS240128-01AEPFDSL
Customer Part n°	n/a
Revision n°	1.0
Issue Date	2015/10/09

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

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YES OPTOELECTRONICS CO.,LTD

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY MODULE

MODEL NO.: YMS240128-01AEPFDSL DATE:OCT.09.2015

Approved	Checked	Department

CUSTOMER:

MODEL NO.: DATE:

Approved	Checked	Department

ADD: No.288Yueling Road Anshan,Liaoning,CHINA

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REVISION HISTORY

Rev	Date	Item	Page	Remark
1.0	SEP.06.2011	New Creation	ALL	
1.1	OCT.09.2015	Update Electro-Optic Characteristics	P10	

LIST

Ⅰ. General Specifications

1.Features

A. Drive Method: 1/128 Duty, 1/12 Bias

B. The Module Operating Voltage: 5.0V;

C. The LCD Operating Voltage : 16.6V;

D. Viewing Direction: 6:00

E. Operating Temperature: -20℃~70℃

F. Storage Temperature: -30℃~80℃

G. Display type: FSTN mode, Transflective, Positive type display

2.Mechanical Data and Conditions:

(1) Module Size----------144.0 w *104.0h mm

(2) Viewing Area ---------- 114.0w * 64.0h mm

(3) Dot Size ----------0.4 w *0.4h mm

(4) Number of Dots ---------- 240* 128 Dots

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

3. Absolute Maximum Ratings

（Ta=25℃）

ITEM	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD} (Note)	−0.3 to 7.0	V
Input Voltage	V_{IN} (Note)	−0.3 to V_{DD} + 0.3	V

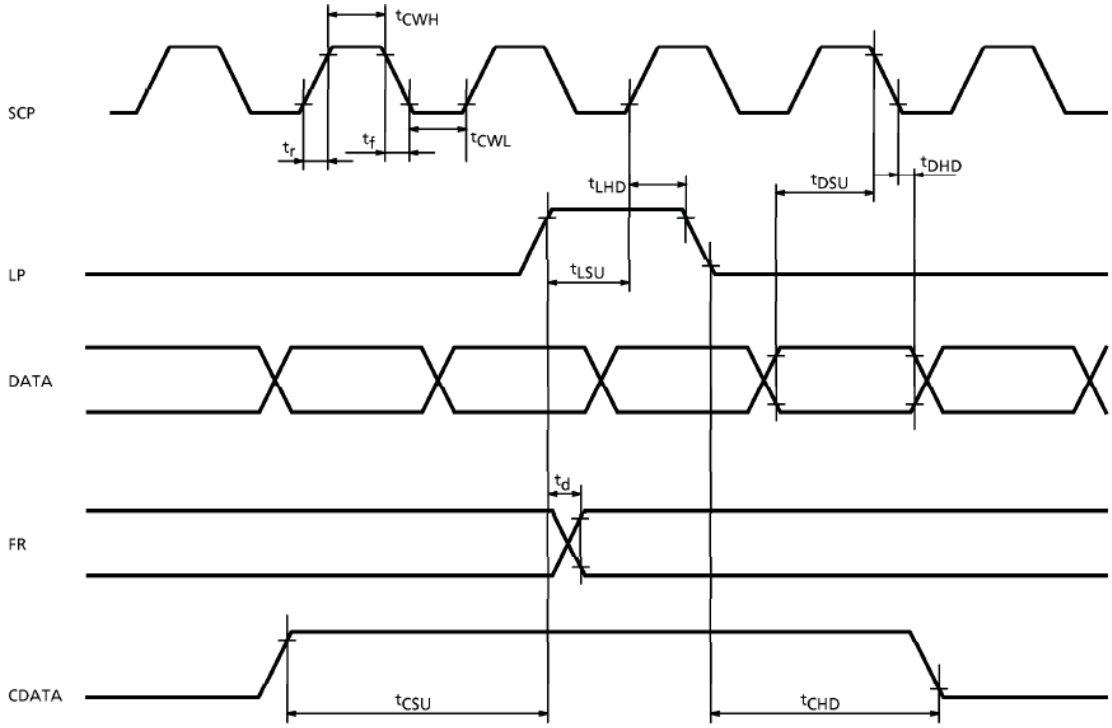
(Note) Referenced to V_{SS} = 0V.

4.Pin Connections:

Pin No.	Symbol	Function
1	VSS	Ground
2	VDD	Power supply
3	V0	Contrast adjust for LCD driving
4	C/D	Selection of Command/Status or Data for data transfer
5	RD	Read Signal
6	WR	Write Signal
7-14	DB0-DB7	Data Bus
15	CE	Chip Enable Signal
16	RESET	Reset signal
17	VEE	Power supply for LCD driving
18	MD2	Pins for selection of number of columns
19	FS1	Pins for selection of font
20	N/C	No connection

5.Timing Characteristics:

- Switching Characteristics (1)

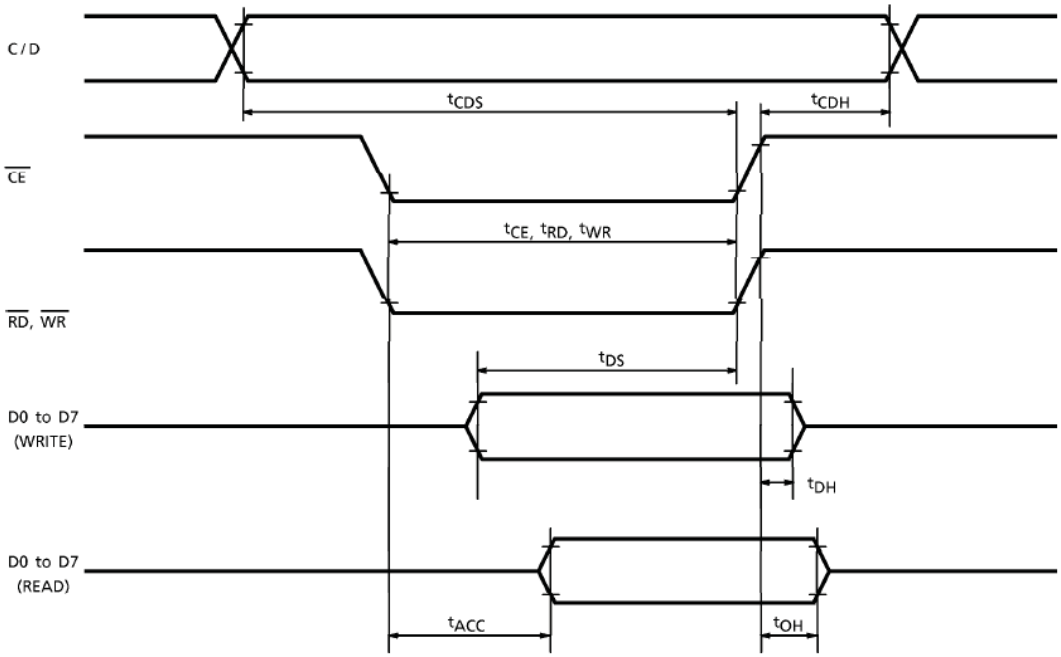


TEST CONDITIONS (Unless otherwise noted, V_{DD} = 5.0V ± 10%, V_{SS} = 0V, Ta = −20 to 70°C)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Operating Frequency	f_{scp}	Ta = −10~70°C	—	2.75	MHz
SCP Pulse Width	t_{CWH}, t_{CWL}	—	150	—	ns
SCP Rise / Fall Time	t_r, t_f	—	—	30	ns
LP Set-up Time	t_{LSU}	—	150	290	ns
LP Hold Time	t_{LHD}	—	5	40	ns
Data Set-up Time	t_{DSU}	—	170	—	ns
Data Hold Time	t_{DHD}	—	80	—	ns
FR Delay Time	t_d	—	0	90	ns
CDATA Set-up Time	t_{CSU}	—	450	850	ns
CDATA Hold Time	t_{CHD}	—	450	950	ns

- Switching Characteristics (2)

Bus Timing

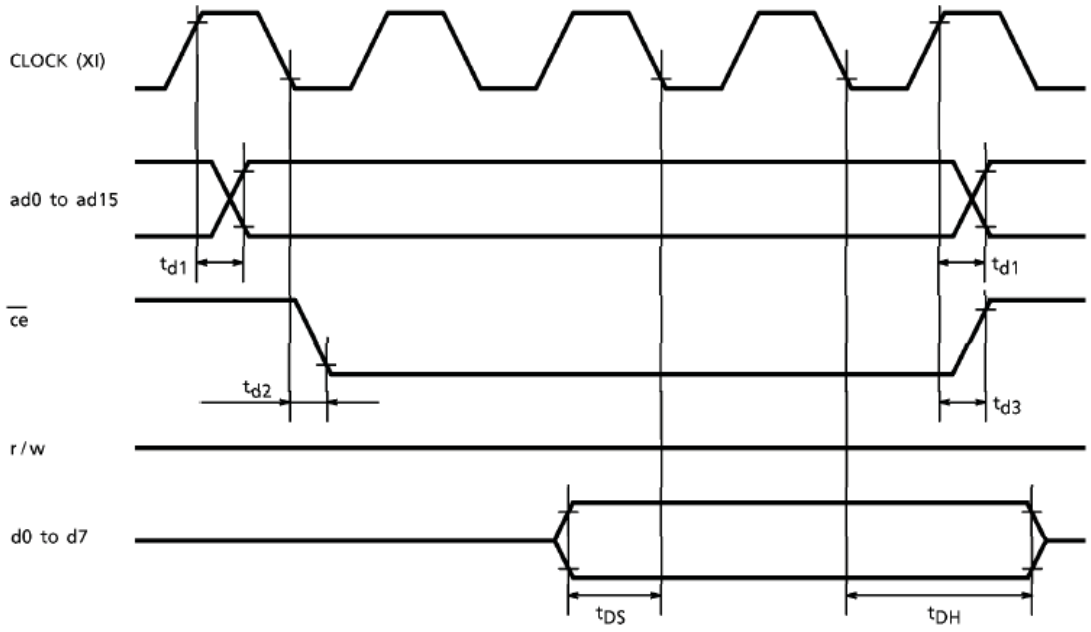


TEST CONDITIONS (Unless otherwise noted, V_{DD} = 5.0V ± 10%, V_{SS} = 0V, Ta = −20 to 75°C)

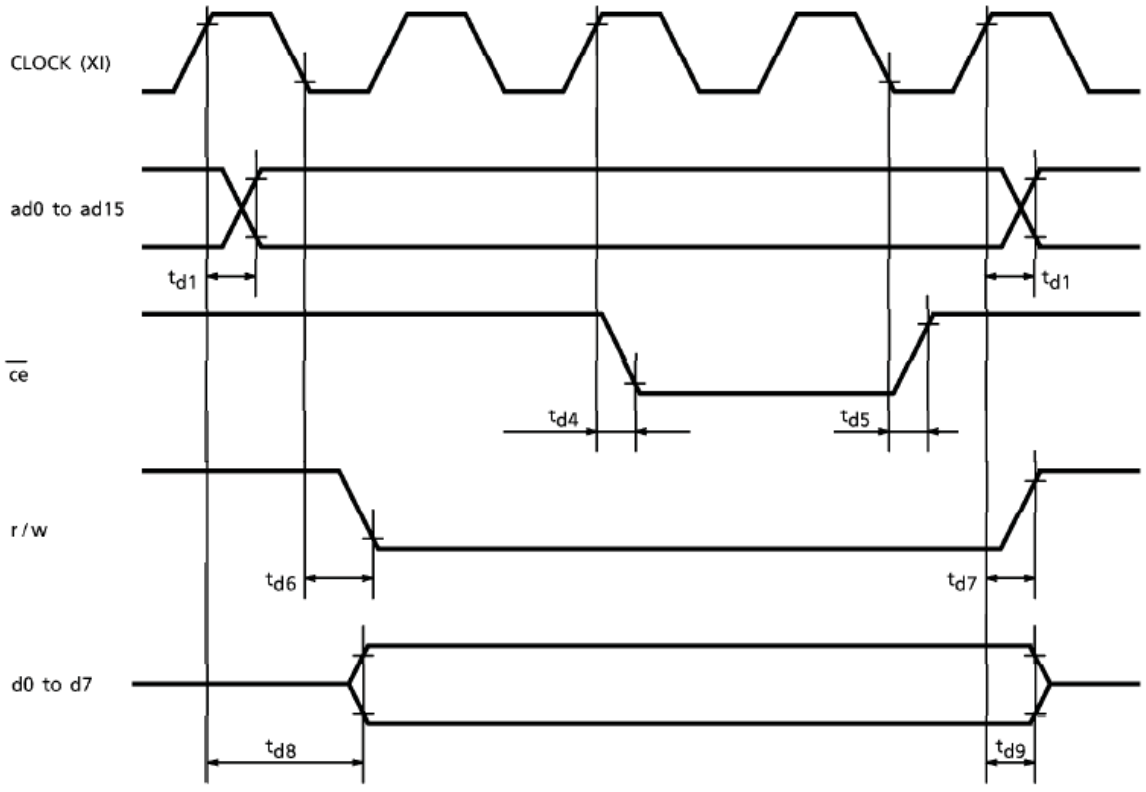
ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
C/D Set-up Time	t_{CDS}	—	100	—	ns
C/D Hold Time	t_{CDH}	—	10	—	ns
$\overline{CE}$, $\overline{RD}$, $\overline{WR}$ Pulse Width	t_{CE}, t_{RD}, t_{WR}	—	80	—	ns
Data Set-up Time	t_{DS}	—	80	—	ns
Data Hold Time	t_{DH}	—	40	—	ns
Access Time	t_{ACC}	—	—	150	ns
Output Hold Time	t_{OH}	—	10	50	ns

- Switching Characteristics (3)

(1) External RAM Read mode



(2) External RAM Write mode



TEST CONDITIONS (Unless otherwise noted, $V_{DD} = 5.0V \pm 10\%$, $V_{SS} = 0V$, Ta = −20 to 70°C)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Address Delay Time	t_{d1}	—	—	250	ns
$\overline{ce}$ Fall Delay Time (Read)	t_{d2}	—	—	180	ns
$\overline{ce}$ Rise Delay Time (Read)	t_{d3}	—	—	180	ns
Data Set-up Time	t_{DS}	—	0	—	ns
Data Hold Time	t_{DH}	—	30	—	ns
$\overline{ce}$ Fall Delay Time (Write)	t_{d4}	—	—	200	ns
$\overline{ce}$ Rise Delay Time (Write)	t_{d5}	—	—	200	ns
r/w Fall Delay Time	t_{d6}	—	—	180	ns
r/w Rise Delay Time	t_{d7}	—	—	180	ns
Data Stable Time	t_{d8}	—	—	450	ns
Data Hold Time	t_{d9}	—	—	200	ns

Ⅱ.The Characteristics and The 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	
3	LCD Operating Voltage		Vdd-V_0		18.4		V	-20℃
				16.4	16.6	16.8	V	25℃
					15.0		V	70℃
4	Response Time		Ton		36		ms	
			Toff		44		ms	
5	Contrast Ratio		CR	2				
6	Viewing Angle	12H	θ 1		35		Deg.	(CR≥2.0)
		6H	θ 2		58			
		3H	θ 3		50			
		9H	θ 4		50			

2. Characteristics of backlight (LED unit)

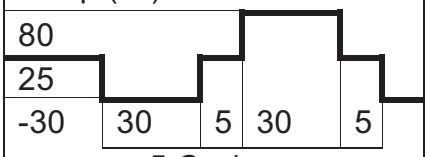
Color:White

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	Vf	3.0	3.2	3.5	V	If=165mA
Reverse current	Ir			110	μA	Vr=5.0V
Chromaticity coordinates	X	0.27		0.31		If=165mA
	Y	0.28		0.33		If=165mA
Luminance	Lv		780		cd/m^2	If=165mA
Uniformity	Avg	70			%	If=165mA

WARNING:

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

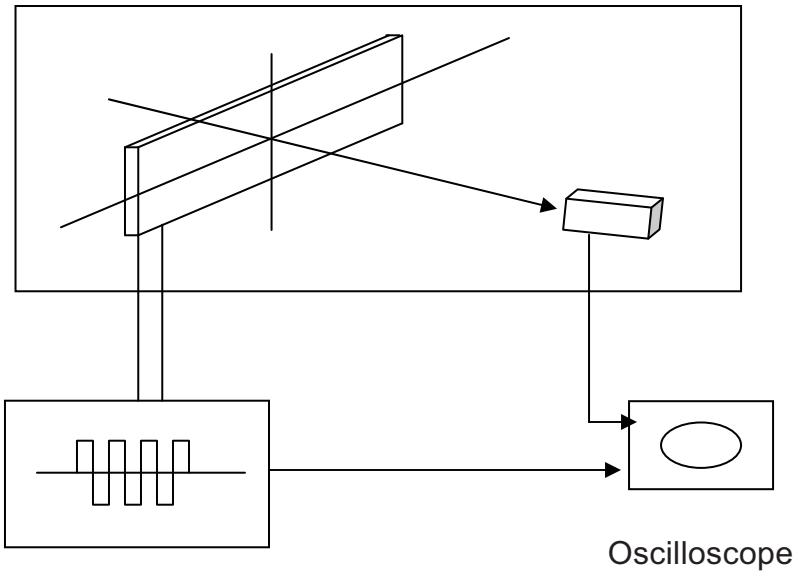
3.Reliability Test

No	Items	Test Condition	Equipment	Test Result
1	High Temp Storage	Temp:80±2℃ Time:96h Restore:24h	Tenny	Passed
2	Low Temp Storage	Temp:-30±3℃ Time:96h Restore:24h	Tenny	Passed
3	High Temp Operating	Temp:70±2℃ Vop:5.0V Time:24h Restore:24h	Tenny	Passed
4	Low Temp Operating	Temp: -20±3℃ Vop:5.0V Time:24h Restore:24h	Tenny	Passed
5	High Temp High Hum Storage	Temp:40±2℃ Hum:95%Rh Time:96h Restore:24h	Tenny	Passed
6	Thermal Shock	Temp:(℃)  5 Cycles Restore:24h	Tenny	Passed

Ⅲ.The LCD Measuring Method and Equipment

1. Threshold Voltage and Response Time Measuring

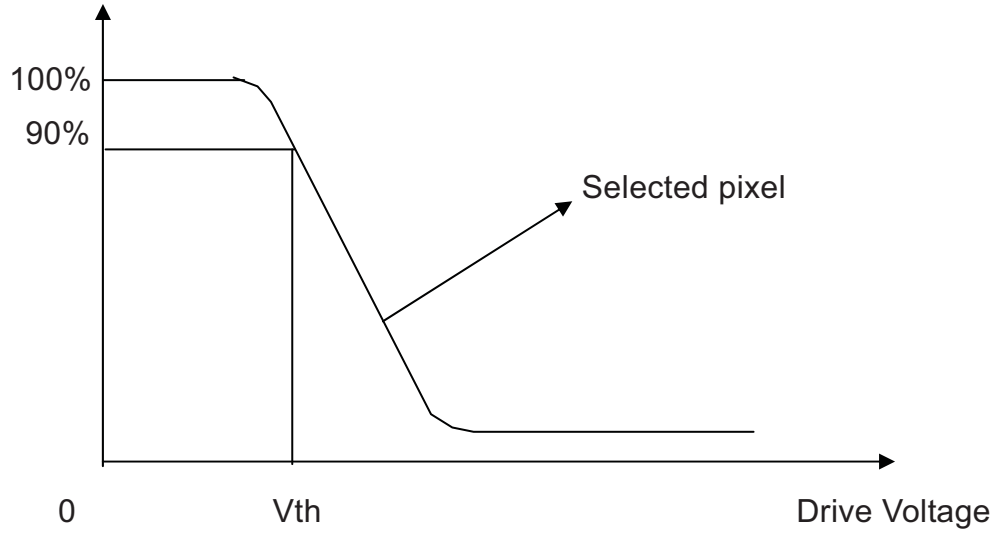
(1) Equipment



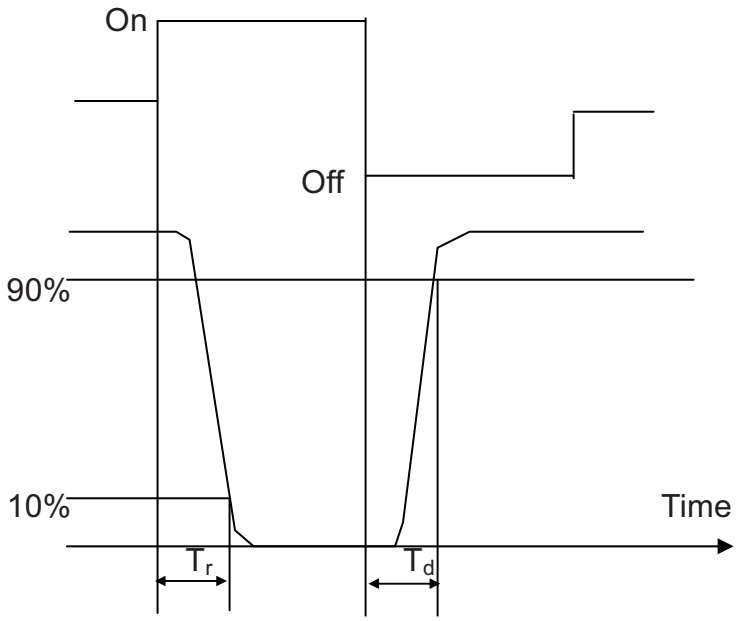
(2) Definition

A. Threshold Voltage (Vth)

Brightness

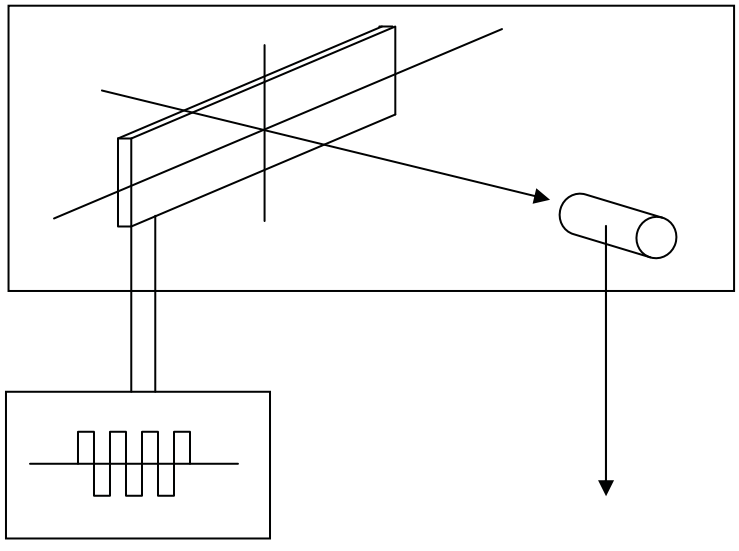


B. Response Time



2. Contrast Measuring

(1) Equipment

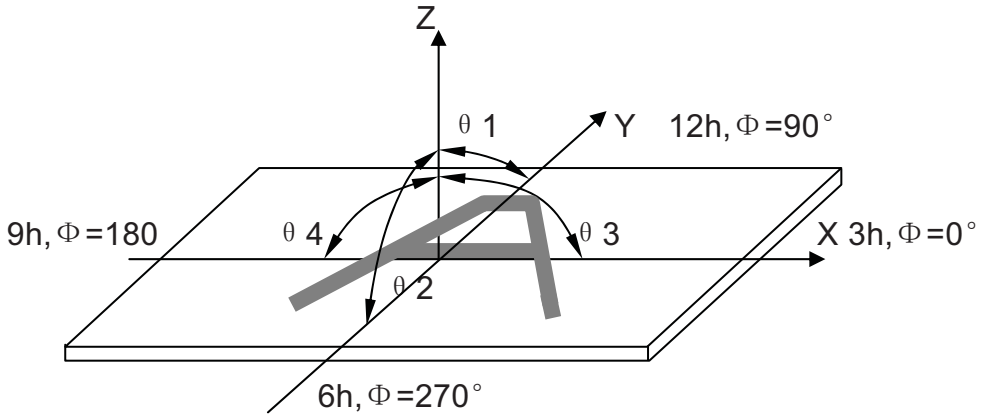


Spectrophotometer

Waveform Generator

(2)Definition:

A.Viewing Angle:



B. 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 of 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.

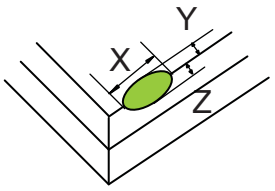
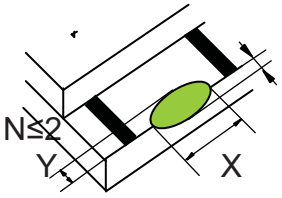
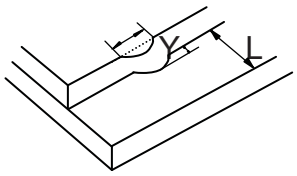
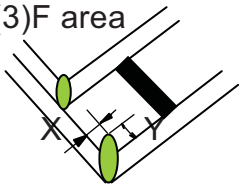
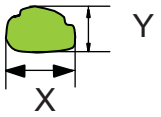
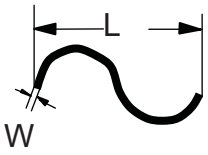
4.Major Defects Should Be In AQL 0.25,and The Minor In AQL 1.00

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%

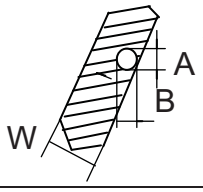
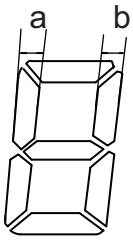
LCD:

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  Z 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 N≤2 L≤1.0 W≤0.05 N≤1	Checking on the table with light and polarizer and checking with eyes directly.

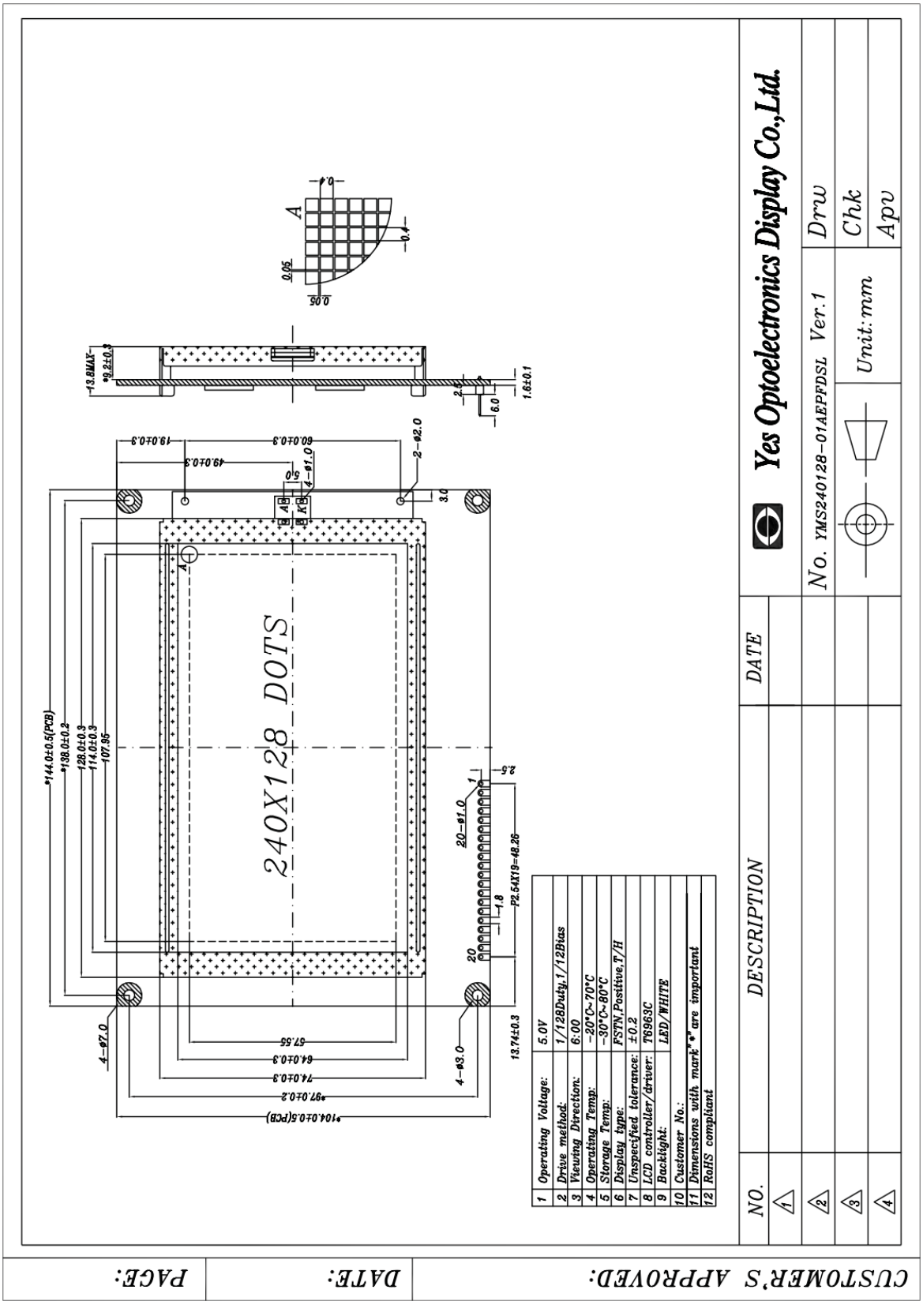
№	Items	Criterion	Checking manner
3	Polarizer Bubble	D≤0.15 No check 0.15<D≤0.4 N≤2	Checking on the table with light and polarizer, and checking with eyes directly
4	Rainbow Color	Allow tiny rainbow Allow 5% color contrast or accord limitative sample	Checking on the table with light and polarizer, And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

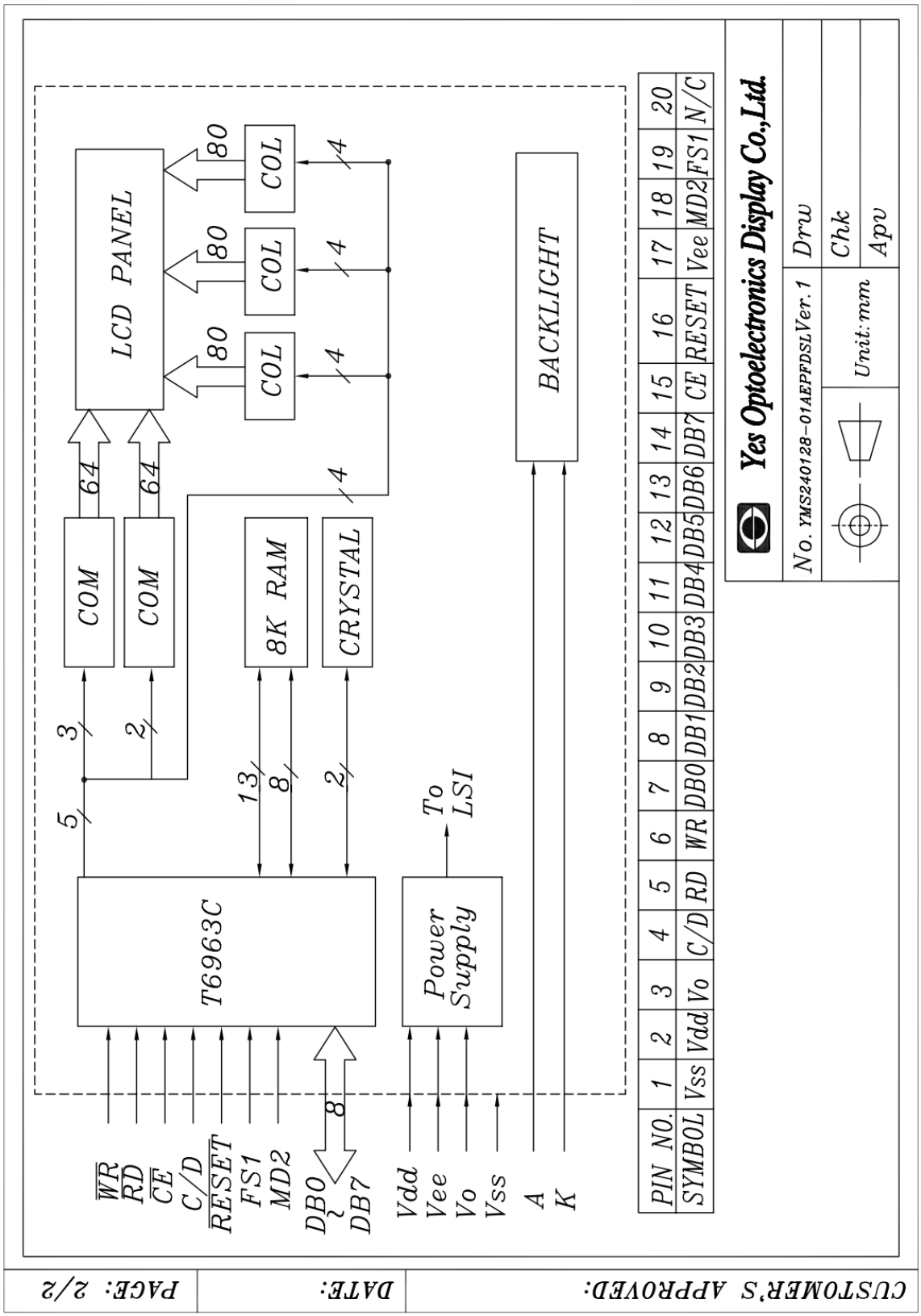
Standard of display test

№	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

Note:d～Diameter n～Quantity Unit:mm

Ⅴ. Attached Drawing




LCD PANEL
COM
COM
8K RAM
CRYSTAL
T6963C
Power Supply
BACKLIGHT
To LSI
WR
RD
CE
C/D
RESET
FS1
MD2
DB0 ~ DB7
Vdd
Vee
Vo
Vss
A
K
PIN NO. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
SYMBOL Vss Vdd Vo C/D RD WR DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7 CE RESET Vee MD2 FS1 N/C
Yes Optoelectronics Display Co.,Ltd.
No. YMS240128-01AEPFDSLVer.1
Drw
Chk
Apv
Unit: mm
CUSTOMER'S APPROVED:
DATE:
PAGE: 2/2

VI.Packing

CUSTOMER'S APPROVED:	DATE: 2011.09.06	PAGE: 1/1

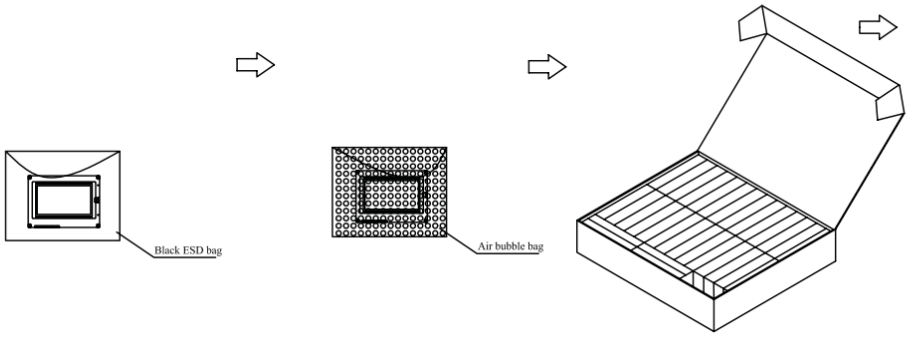
PRODUCT PART NO.:YMS240128-01AEPFDSL

Packing Process:

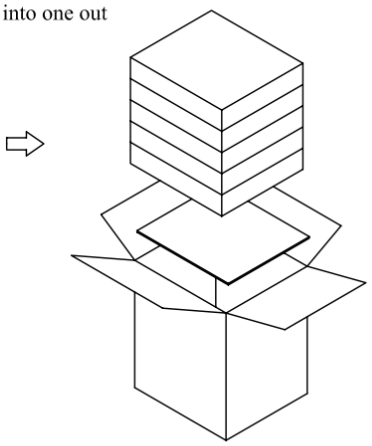
1) Putting Modules into each black ESD bag

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

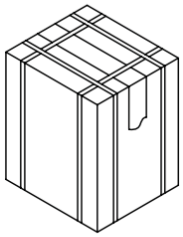
3) Putting 18 pcs Modules into the inner box (TYPE:H82) and space filled filling piece



4) Putting 5 small inner boxes into one out carton



5) Packing finished



Note: 18x5=90pcs/Outcarton

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

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

NO. YMS240128-01AEPFDSL 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 23±5°C and the humidity is below 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.