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SPECIFICATION FOR LCM Module

MODULE No:	ET080WU20-K
CUSTOMER:	

YOURITECH	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

Date	Rev. No.	Page	Summary
2023.10.09	V1.0	ALL	FIRST ISSUE

Contents

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorpho us silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit,back-light unit. The resolution of a 8.0'TFT-LCD contains 1920X1200 pixels, and can displayup to 16.7M colors.

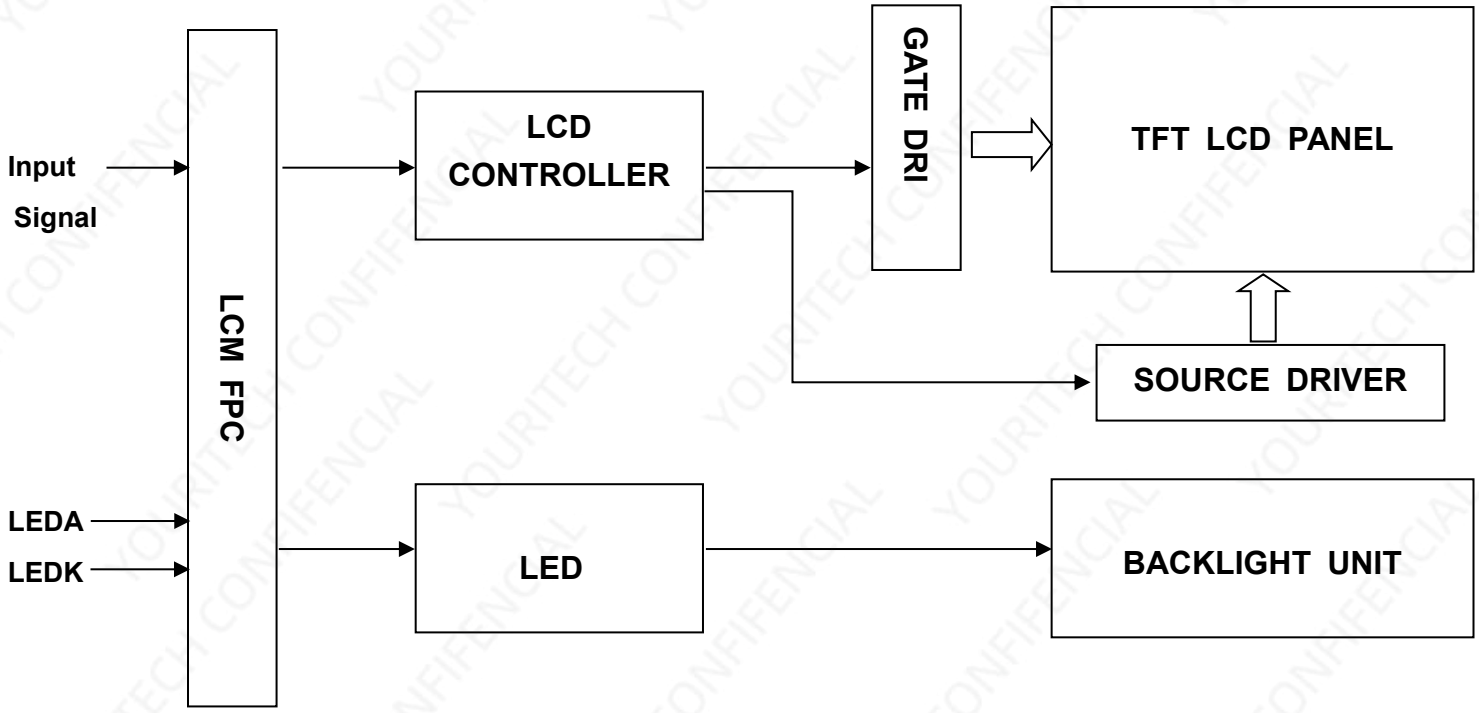
* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	172.22(H)*107.64(V) (8.0 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1920(RGB)*1200	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.0299(H)*3*0.0897(V)	mm	
Viewing angle	ALL	o'clock	
LCM Interface	2-Port LVDS(8bit)	-	
Display mode	Normally Black	-	
Operating temperature	-30～+85	℃	
Storage temperature	-30～+85	℃	

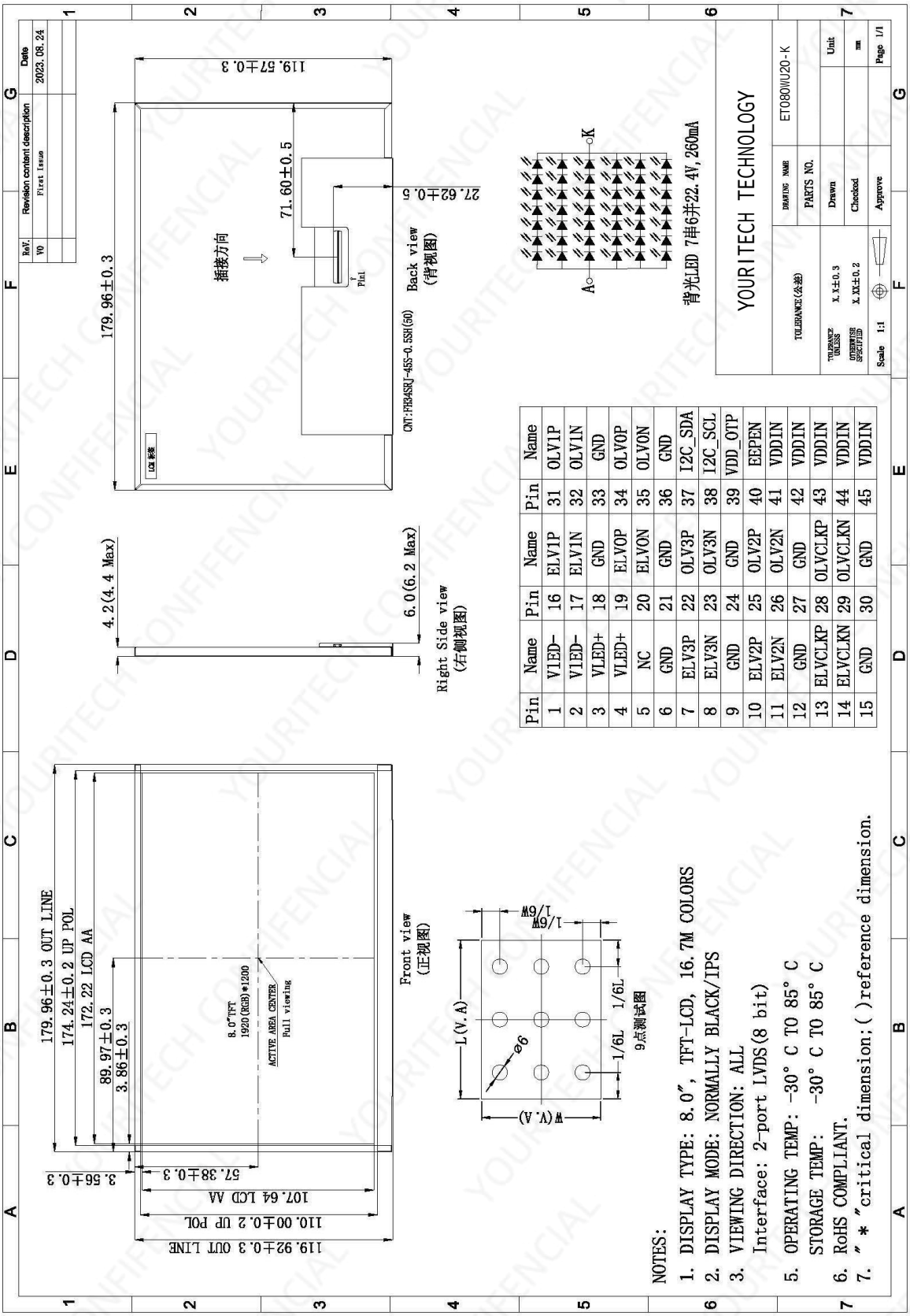
* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	179.96	-	mm	
	Vertical(V)	-	119.92	-	mm	
	Depth(D)	-	4.2	-	mm	
Weight		-	147	-	g	

1. Block Diagram



2. Outline dimension



Pin	Name	Pin	Name	Pin	Name
1	V1ED-	16	ELV1P	31	OLV1P
2	V1ED-	17	ELV1N	32	OLV1N
3	VLED+	18	GND	33	GND
4	VLED+	19	ELVOP	34	OLVOP
5	NC	20	ELVON	35	OLVON
6	GND	21	GND	36	GND
7	ELV3P	22	OLV3P	37	I2C_SDA
8	ELV3N	23	OLV3N	38	I2C_SCL
9	GND	24	GND	39	VDD_OTP
10	ELV2P	25	OLV2P	40	EEPEN
11	ELV2N	26	OLV2N	41	VDDIN
12	GND	27	GND	42	VDDIN
13	ELVCLKP	28	OLVCLKP	43	VDDIN
14	ELVCLKN	29	OLVCLKN	44	VDDIN
15	GND	30	GND	45	VDDIN

3. Input terminal Pin Assignment

3.1 TFT PIN

Connector(CN1):FH34SRJ-45S-0.5SH(50) or compatible

NO.	SYMBOL	DISCRIPTION	I/O
1	VLED-	Power for LED backlight(Cathode)	P
2	VLED-	Power for LED backlight(Cathode)	P
3	VLED+	Power for LED backlight(Anode)	P
4	VLED+	Power for LED backlight(Anode)	P
5	NC	Odd LVDS Negative data signal (-)	--
6	GND	Ground	P
7	ELV3P	LVDS differential data input Positive(EVEN)	I
8	ELV3N	LVDS differential data input Negative(EVEN)	I
9	GND	Ground	P
10	ELV2P	LVDS differential data input Positive(EVEN)	I
11	ELV2N	LVDS differential data input Negative(EVEN)	I
12	GND	Ground	P
13	ELVCLKP	LVDS differential clock input Positive(EVEN)	I
14	ELVCLKN	LVDS differential clock input Negative(EVEN)	P
15	GND	Ground	P
16	ELV1P	LVDS differential data input Positive(EVEN)	I
17	ELV1N	LVDS differential data input Negative(EVEN)	P
18	GND	Ground	P
19	ELV0P	LVDS differential data input Positive(EVEN)	I
20	ELV0N	LVDS differential data input Negative(EVEN)	I
21	GND	Ground	P
22	OLV3P	LVDS differential data input Positive(ODD)	I

23	OLV3N	LVDS differential data input Negative(ODD)	I
24	GND	Ground	P
25	OLV2P	LVDS differential data input Positive(ODD)	I
26	OLV2N	LVDS differential data input Negative(ODD)	I
27	GND	Ground	P
28	OLVCLKP	LVDS differential clock input Positive(ODD)	I
29	OLVCLKN	LVDS differential clock input Negative(ODD)	I
30	GND	Ground	P
31	OLV1P	LVDS differential data input Positive(ODD)	I
32	OLV1N	LVDS differential data input Negative(ODD)	I
33	GND	Ground	P
34	OLV0P	LVDS differential data input Positive(ODD)	I
35	OLV0N	LVDS differential data input Negative(ODD)	I
36	GND	Ground	P
37	I2C_SDA	Data input/output for I2C(Please let these pins o pen.)	I
38	I2C_SCL	Clock signal for I2C(Please let these pins open.)	I
39	VDD_OTP	Power supply for OTP Circuit(Please let these pins open.)	I
40	EEPEN	Only test Pin(Please let these pins open.)	I
41	VDDIN	Power supply:+3.3V	P
42	VDDIN	Power supply:+3.3V	P
43	VDDIN	Power supply:+3.3V	P
44	VDDIN	Power supply:+3.3V	P
45	VDDIN	Power supply:+3.3V	P

4. LCD Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal viewing angle	800	1000	--		(1)(2)
Response time	Rising	T_R+T_F		--	30	35	msec	
	Falling			--				(1)(3)
Color Gamut		S(%)		--	69.48	--	%	
Color Filter Chromacicity	White	W_X		-0.04	0.3050	+0.04		(1)(4) CA310
		W_Y			0.3683			
	Red	R_X			0.6516			
		R_Y			0.3465			
	Green	G_X			0.2970			
		G_Y			0.6083			
	Blue	B_X			0.1429			
		B_Y			0.1021			
Viewing angle	Hor.	ΘL	CR>10	80	85	--		
		ΘR		80	85	--		
	Ver.	ΘU		80	85	--		
		ΘD		80	85	--		
Option View Direction		ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

Ambient temperature : 25±2oC

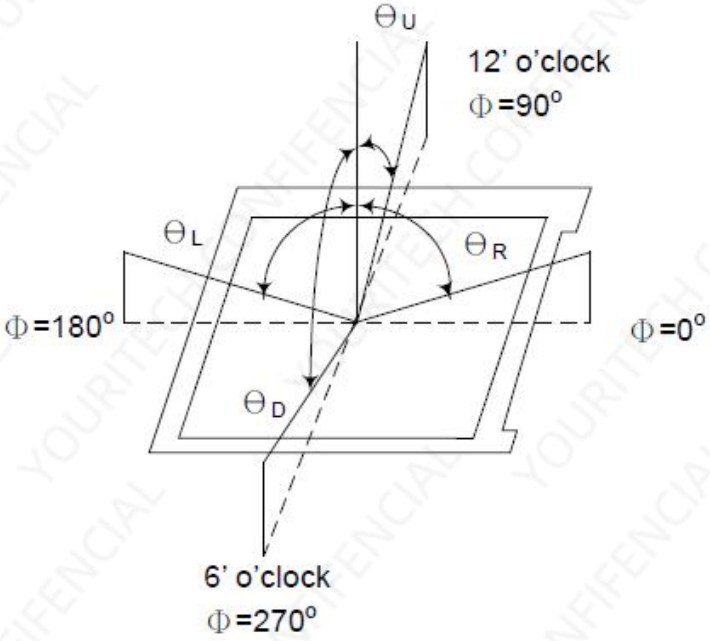
15min. warm-up time.

Measuring Equipment

FPM520 , which utilized SR-3 for Chromaticity and BM-5A for other optical

characteristics.

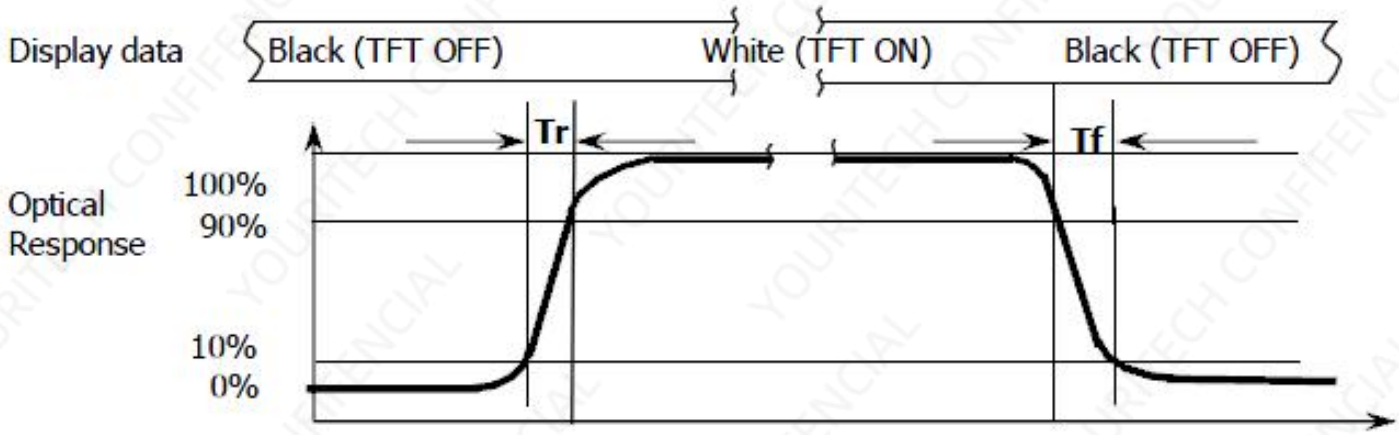
Note (1): Definition of Viewing Angle :



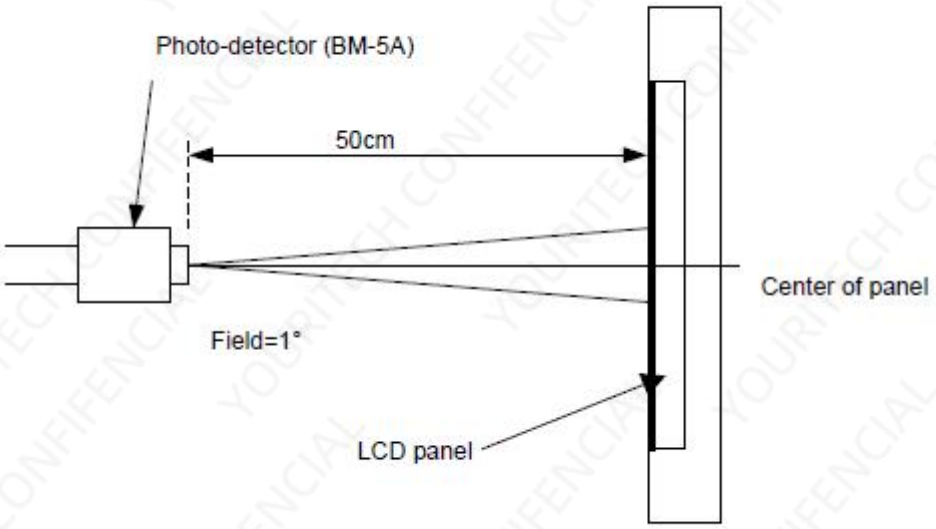
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time



Note (4): Definition of optical measurement setup



5. Electrical Characteristics

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDDIN	-0.3	3.6	V	
Operating temperature	T_{OP}	-30	+85	℃	
Storage temperature	T_{ST}	-30	+85	℃	

NOTE:

1.All of the voltages listed above are with respective to GND=0V

2.Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VDDIN	3.0	3.3	3.6	V	
Power Supply Current	IDD	--	310	620	mA	
Rush Current	IRUSH	--	--	2.5	A	
VDD Power	PDD	--	1.22	1.32	W	
Allowable Logic/LCD Drive Ripple Voltage	VDDrp	--	--	200	mV	

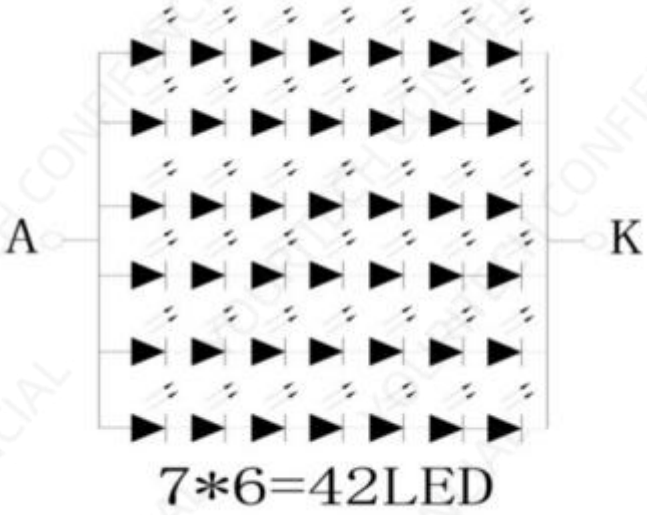
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 42 chips LED

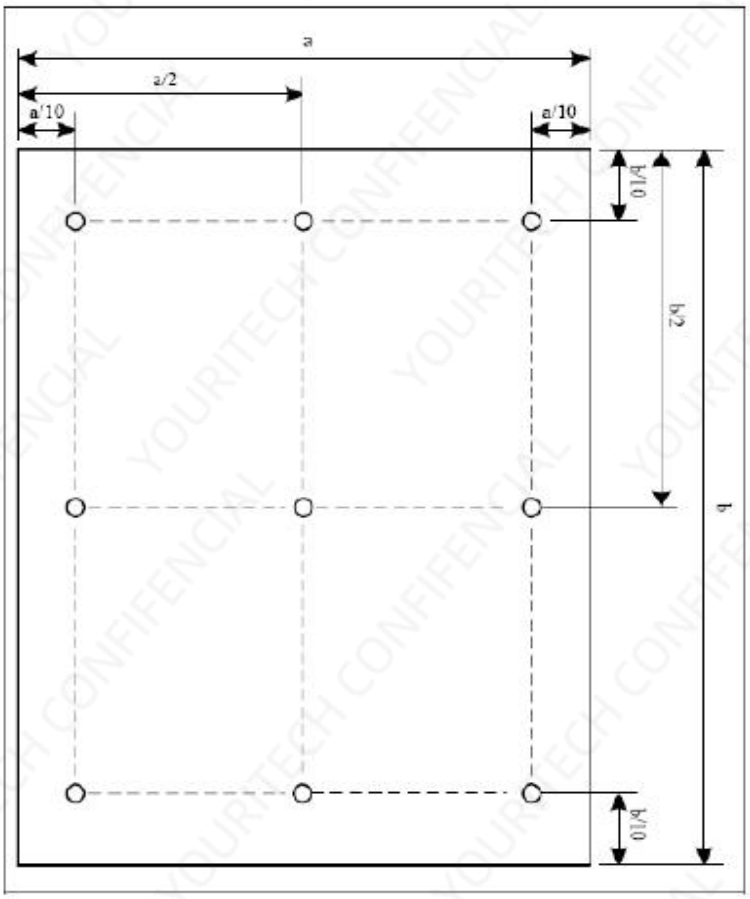
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	--	260	--	mA	
Forward Voltage	V_F	20.06	22.4	--	V	
LCM Luminance	LV	1350	1500	--	cd/m2	IF=260mA
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	80	--	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=260mA. The LED lifetime could be decreased if operating IL is larger than 260mA. The constant current driving method is suggested.



Note (5) Luminance Uniformity of these 9 points is defined as below:



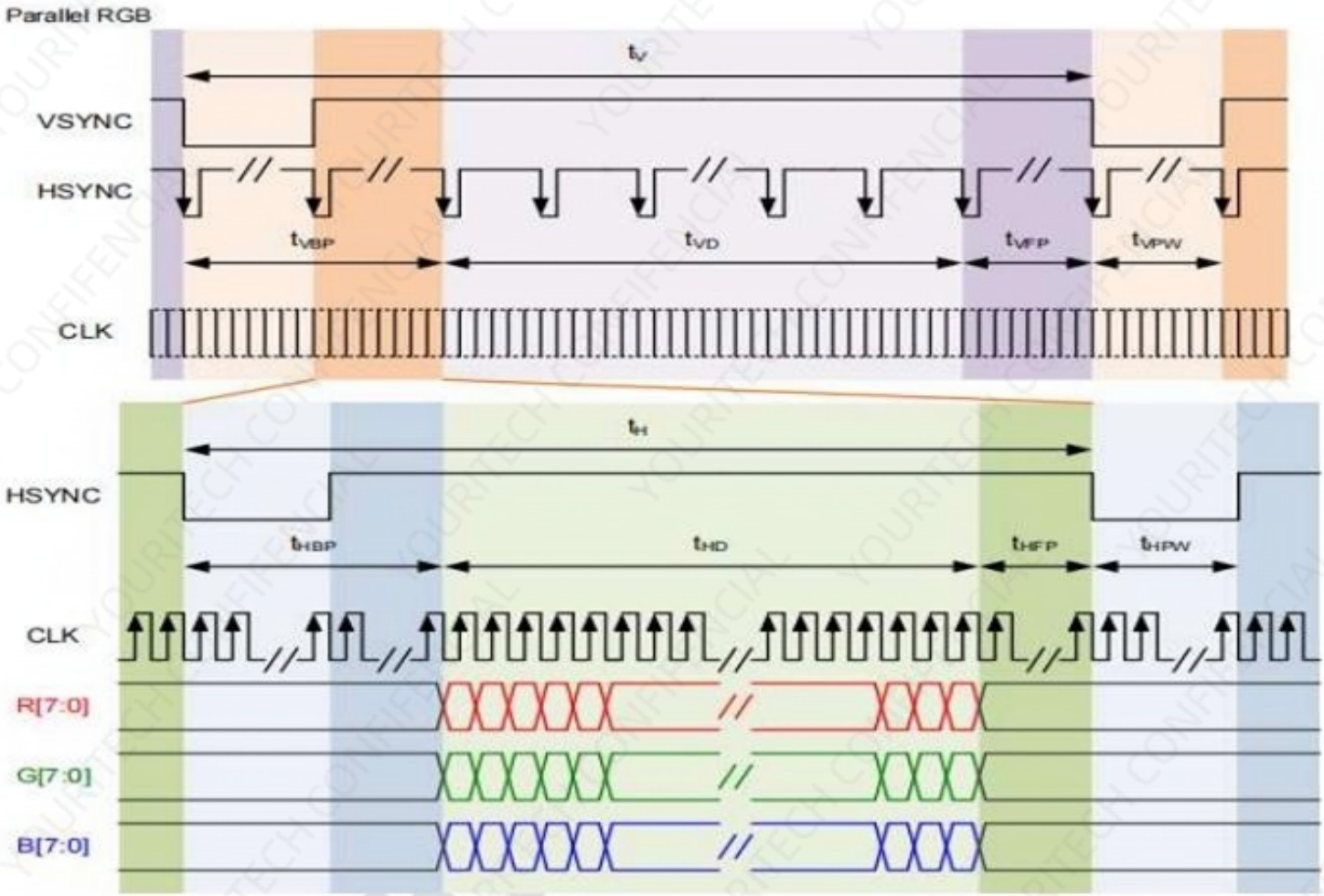
$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

6. LVDS Signal Timing Characteristics

6.1 LVDS Interface Timing Parameter

Timing Chart of Signals in LVDS Interface SYNC Mode

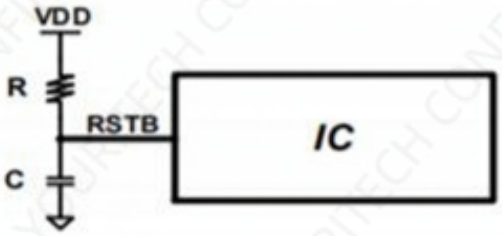


1920 x 1200(Only 2-Port)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	t_{CLK}	144.8	146.56	149.8	MHz	
Horizontal blanking time	t_{HBT}	48	50	96	t_{CLK}	t_{HBP} + t_{HFP}
Horizontal back porch	t_{HBP}	24	26	253	t_{CLK}	Include t_{HPW}
Horizontal display area	t_{HD}		1920		tCLK	
Horizontal front porch	t_{HFP}	24	24	255	t_{CLK}	
Horizontal period	t_H	1968	1970	2019	t_{CLK}	
Horizontal pulse width	t_{HPW}	2	2	2	t_{CLK}	
Vertical blanking time	t_{VBT}	20	40	66	t_H	t_{VBP} + t_{VFP}
Vertical back porch	t_{VBP}	10	20	253	t_H	Include t_{VPW}
Vertical display area	t_{VD}		1200		tH	
Vertical front porch	t_{VFP}	10	20	255	t_H	
Vertical period	t_V	1220	1240	1266	t_H	
Vertical pulse width	t_{VPW}	2	2	2	t_H	
Frame rate	FR	60	60	60	Hz	

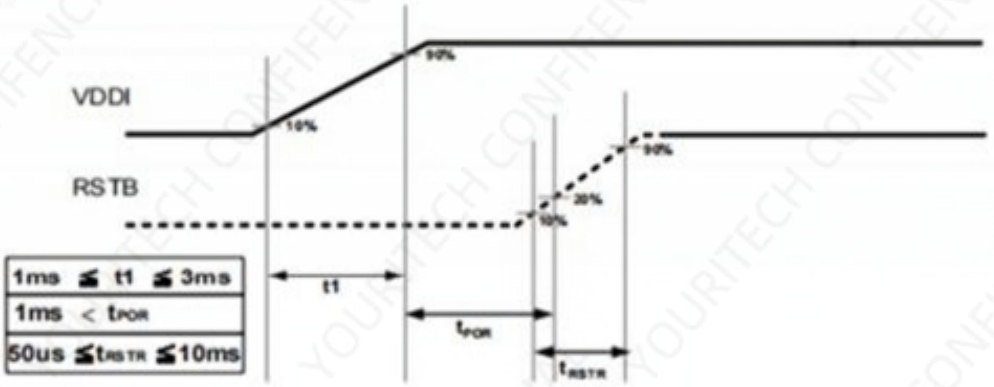
6.2 Reset Timing

Setting RSTB pin to "L" (hardware reset) can initialize internal function. Generally, VDDI is not stable at the time that the system power is just turned ON. The hardware reset is required to initialize internal registers after VDDI is stable. Initialized by RSTB pin is essential before operating. There are two suggestions for the hardware reset connection. One is RSTB controlled by MCU. The other is connecting an external RC circuit with RSTB pin, and the recommended RC circuit is 47 KΩ ~ 200KΩ + 0.47uF. (For 1ms ≤ t1 ≤3ms)

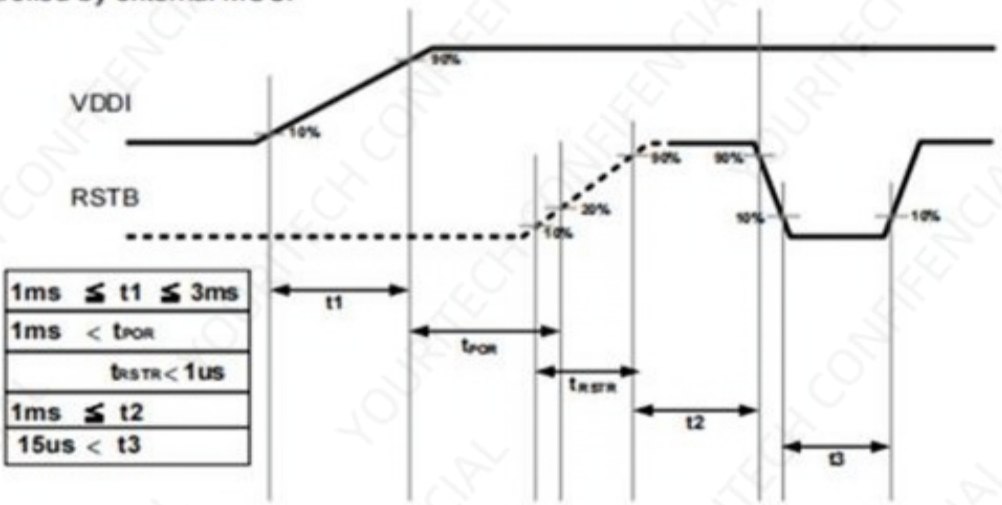


Recommend power on reset timing is shown as below.

* For RSTB pin +RC:



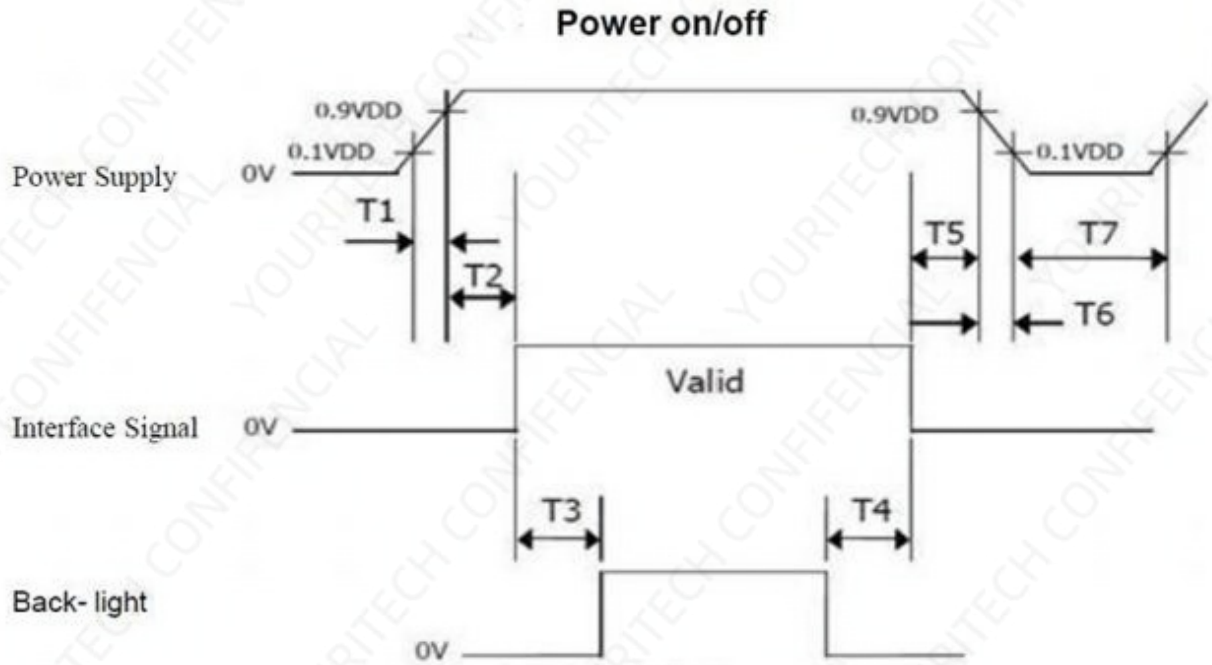
* For RSTB pin controlled by external MCU:



6.3 Power Sequence

Power ON/OFF Sequence

To prevent a latch-up or DC operation of the LCD, the power on/off sequence shall be as shown in below.



Parameter	Value			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms

7. LCD Module Out-Going Quality Level

7.1 VISUAL & FUNCTION INSPECTION STANDARD

7.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

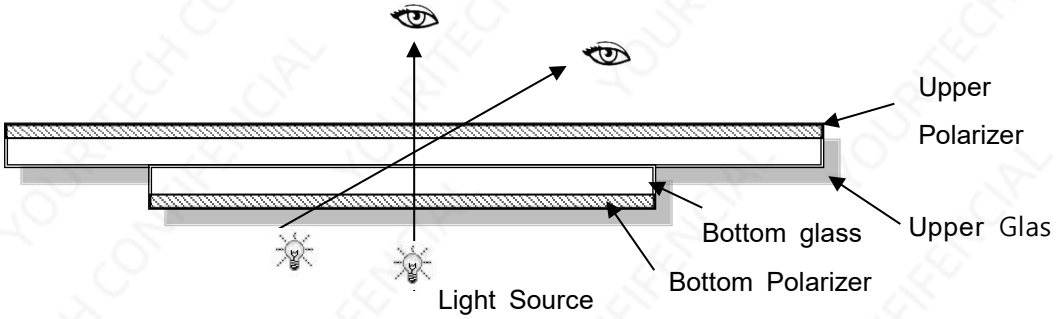
Temperature : 25±5℃

Humidity : 65%±10%RH

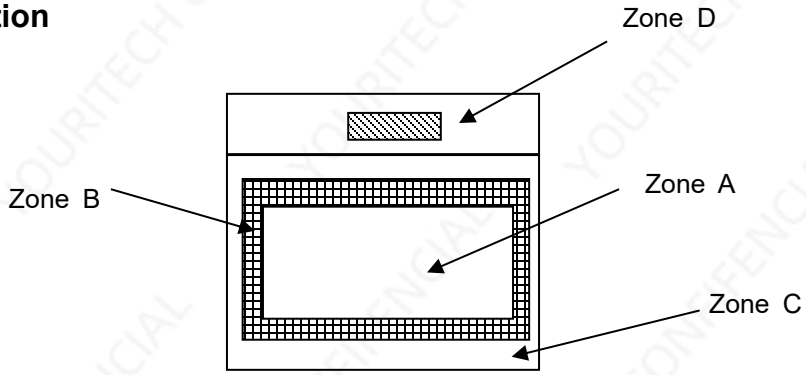
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



7.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note:As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

7.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ

AQL:

Major defect	Minor defect
0.65	1.5

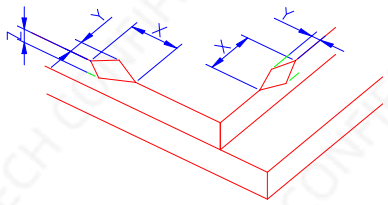
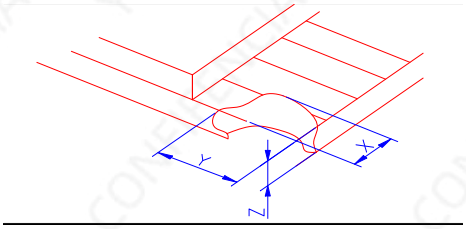
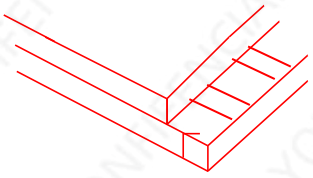
LCD: Liquid Crystal Display , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. etc…	Major
2	Missing	Missing components and etc…	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed,deformation and etc…	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot/Line defect	Light dot,Dim spot,(Note1) Polarizer Air Bubble, Polarizer accidented spot and etc…	
6	Soldering appearance	Good soldering , Peeling off is not allowed and etc…	
7	LCD/Polarizer	Black/White spot/line, scratch, crack, etc.	

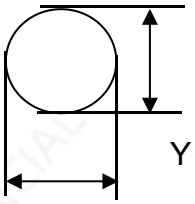
Note1: a) Light dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

7.1.4 Criteria (Visual)

<table>
<tr><th>Number</th><th>Items</th><th>Criteria(mm)</th></tr>
<tr><td rowspan="3">1.0 LCD Crack/Broken
NOTE:
X: Length
Y: Width
Z: Height
L: Length of ITO,
T: Height of LCD</td><td>(1) The edge of LCD broken</td><td> 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table></td></tr>
<tr><td>(2)LCD corner broken</td><td> 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table></td></tr>
<tr><td>(3) LCD crack</td><td> 
Crack
Not allowed</td></tr>
</table>

2.0 Spot defect



Φ=(X+Y)/2

① light dot (black/white spot , pinhole, stain，etc.)

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧10mm)		
0.25<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

② Dim spot (light leakage、dent、dark spot，etc)

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧10mm)		
0.25<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.5	2(distance≧10mm)		
Φ>0.5	0		

④Polarizer Bubble

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

3.0	LCD Pixel defect	Pixel bad points

Item	Zone A	Acceptable Qt
Bright dot	Random	N≤2
	2 dots adjacent	N≤0
	3 dots adjacent	N≤0
Dark dot	Random	N≤3
	2 dots adjacent	N≤0
	3 dots adjacent	N≤0
Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm
Total bright and dark dot		N≤4

Note:

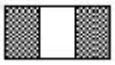
A) Bright dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

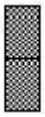
C) 2 dot adjacent = 1 pair = 2 dots

Picture:

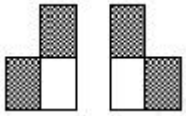
2 dot adjacent



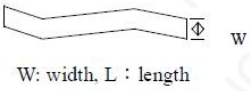
2 dot adjacent



2 dot adjacent (vertical)



2 dot adjacent (slant)

<table>
<tr>
<td>4.0</td>
<td>Line defect (LCD /Polarizer backlight black/white line, scratch, stain)
 

W: width, L：length
N：Count</td>
<td>
<table>
<tr><td rowspan="2">Width(mm)</td><td rowspan="2">Length(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.05</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.05<W≤0.06</td><td>L≤5.0</td><td colspan="2">N≤3</td></tr>
<tr><td>0.06<W≤0.08</td><td>L≤4.0</td><td colspan="2">N≤2</td></tr>
<tr><td>W>0.08</td><td colspan="4">Define as spot defect</td></tr>
</table>
</td>
</tr>
<tr><td>5.0</td><td>Electronic Components SMT.</td><td>Not allow missing parts，solderless connection，cold solder joint，mismatch，The positive and negative polarity opposite</td></tr>
<tr><td>6.0</td><td>Display color& Brightness.</td><td>1. Color：Measuring the color coordinates, The measurement standard according to the datasheet or samples.
2. Brightness：Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.</td></tr>
<tr><td>7.0</td><td>LCD Mura/Waving/ Hot spot</td><td>Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.</td></tr>
</table>

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	CTP no function	Not allowed

8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	85℃,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-30℃, 96HR	
High Temperature Storage	85℃, 96HR	
Low Temperature Storage	-30℃, 96HR	
High Temperature & High Humidity Operating	60℃, 80% RH ,96hours.	
Thermal Shock (Non-operation)	-20℃,30 min ↔ +60℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±15KV, 5times; Contact:±8KV, 5 times; (Environment: 15℃~35℃, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~500Hz, Stroke:1.5mm Sweep:10Hz~500Hz~10Hz 1 hours for each direction of X.Y.Z. (1 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80㎝(MEDIUM BOX)	

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 5~10pcs.

3.For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.

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

5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

9. Cautions and Handling Precautions

9.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
(4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
(8) Protect the module from static; it may cause damage to the CMOS ICs.
(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
(10) Do not disassemble the module.
(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
(12) Pins of I/F connector shall not be touched directly with bare hands.
(13) Do not connect, disconnect the module in the “Power ON” condition.

9.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
(2) Do not store the TFT-LCD module in direct sunlight.
(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.
In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.