
Display Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 1920720E VMX-PW-N

10,3" TFT

Product Specification

Version: 0

27.12.2024

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*** Description**

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 10.25 " TFT-LCD contains 1920x720 pixels, and can display up to 16.7M colors.

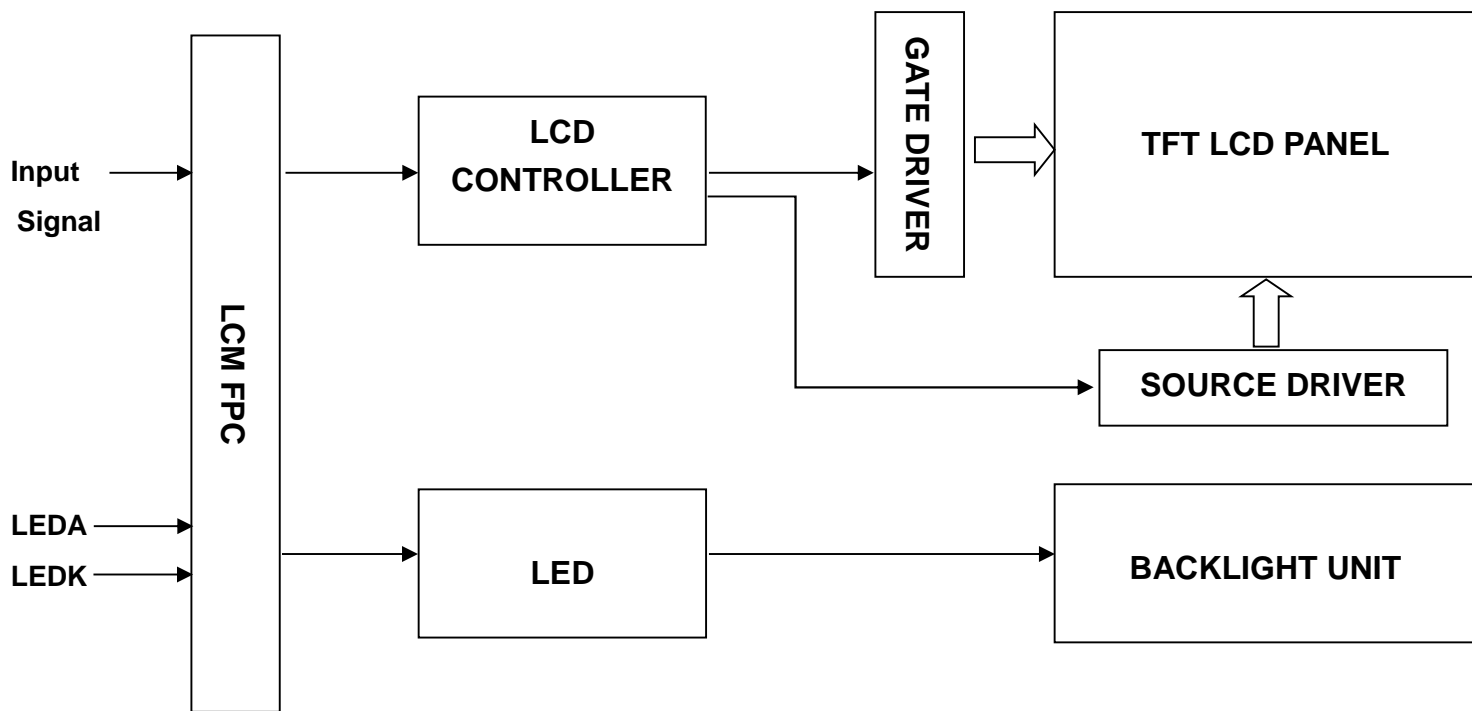
*** Features**

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	243.65(H)*91.37(V) (10.25inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1920(RGB)*720	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1269(H)*0.1269(V)	mm	-
Viewing angle	ALL	o'clock	-
LCM Interface	2-Port LVDS	-	-
Display mode	Transmissive/ Normally Black	-	-
Operating temperature	-30~+85	°C	-
Storage temperature	-40~+90	°C	-

*** Mechanical Information**

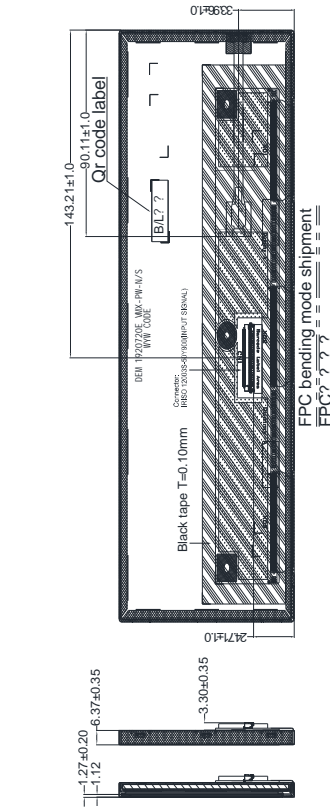
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		258.60		mm	-
	Vertical(V)		107.00		mm	-
	Depth(D)		6.37		mm	-
Weight			232		g	-

1. Block Diagram

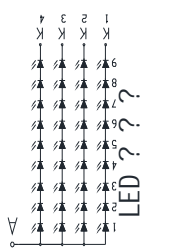
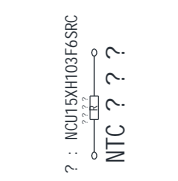


2. Outline dimension

1	ANV
2	ANP
3	ANP
4	ANP
5	ANP
6	ANP
7	ANP
8	ANP
9	ANP
10	ANP
11	ANP
12	ANP
13	ANP
14	ANP
15	ANP
16	ANP
17	ANP
18	ANP
19	ANP
20	ANP
21	ANP
22	ANP
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24	ANP
25	ANP
26	ANP
27	ANP
28	ANP
29	ANP
30	ANP
31	ANP
32	ANP
33	ANP
34	ANP
35	ANP
36	ANP
37	ANP
38	ANP
39	ANP
40	ANP
41	ANP
42	ANP
43	ANP
44	ANP
45	ANP
46	ANP
47	ANP
48	ANP
49	ANP
50	ANP



PIN	Symbol	Description
1	A1	Anode(+)
2	A2	Anode(+)
3	A3	Anode(+)
4		NC connection
5	NTC1	Thermistor
6	NTC2	Thermistor
7	K1	Cathode(-)
8	K2	Cathode(-)
9	K3	Cathode(-)
10	K4	Cathode(-)



- NOTES:
1. DISPLAY TYPE: 10.25", TFT LCD, 16.7M COLORS
 2. DISPLAY MODE: NORMALLY BLACK, IPS
 3. VIEWING DIRECTION: FREE
 4. LCM DRIVER IC: *****
 5. TFT INTERFACE: 2 Ports LVDS
 6. VDD: 3.3V
 7. OPERATING TEMP: -30°C TO 85°C
 8. STORAGE TEMP: -40°C TO 90°C
 9. BACK LIGHT: LED WHITE, 36 LED, 300mA, 25.2~29.7V
 9. RoHS AND REACH COMPLIANT.

3. Input terminal Pin Assignment

3.1 TFT PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	VDD	Power supply for LVDS circuit	P
3	VDD	Power supply for LVDS circuit	P
4	NC	--	--
5	RESET	Reset Pin. Low active.	I
6	STBYB	Standby mode: 'H': Power on (Default) . 'L': Power off.	I
7	GND	Ground.	P
8	OLV0N	Odd LVDS Negative data signal (-)	I
9	OLV0P	Odd LVDS Positive data signal (+)	I
10	GND	Ground.	P
11	OLV1N	Odd LVDS Negative data signal (-)	I
12	OLV1P	Odd LVDS Positive data signal (+)	I
13	GND	Ground.	P
14	OLV2N	Odd LVDS Negative data signal (-)	I
15	OLV2P	Odd LVDS Positive data signal (+)	I
16	GND	Ground.	P
17	OLVCLKN	Odd LVDS Negative CLK signal (-)	I
18	OLVCLKP	Odd LVDS Positive CLK signal (+)	I
19	GND	Ground.	P
20	OD3-	Odd LVDS Negative data signal (-)	I
21	OD3+	Odd LVDS Positive data signal (+)	I
22	GND	Ground.	P
23	ELV0N	EVEN LVDS Negative data signal (-)	I
24	ELV0P	EVEN LVDS Positive data signal (+)	I
25	GND	Ground.	P

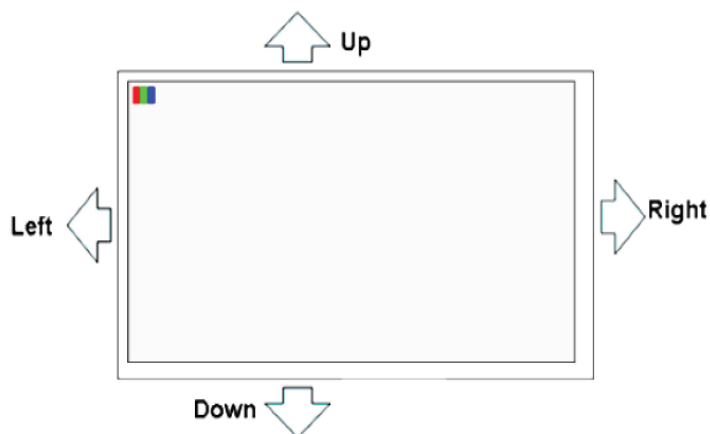
26	ELV1N	EVEN LVDS Negative data signal (-)	I
27	ELV1P	EVEN LVDS Positive data signal (+)	I
28	GND	Ground.	P
29	ELV2N	EVEN LVDS Negative data signal (-)	I
30	ELV2P	EVEN LVDS Positive data signal (+)	I
31	GND	Ground.	P
32	ELVCLKN	EVEN LVDS Negative CLK signal (-)	I
33	ELVCLKP	EVEN LVDS Positive CLK signal (+)	I
34	GND	Ground.	P
35	ELV3N	EVEN LVDS Negative data signal (-)	I
36	ELV3P	EVEN LVDS Positive data signal (+)	I
37	GND	Ground.	P
38	GND	Ground.	P
39	RL	Horizontal shift direction (source output) selection(NOTE1)	I
40	TB	Vertical shift direction (gate output) selection(NOTE1)	I
41	NC	--	--
42	NC	--	--
43	NC	--	--
44	VDD	Power supply for LVDS circuit	P
45	NC	--	--
46	NC	--	--
47	NC	--	--
48	NC	--	--
49	NC	--	--
50	NC	--	--

Note1: When RL="1", set left to right scan direction.

When RL="0", set right to left scan direction.

When TB="1", set up to down scan direction.

When TB="0", set down to up scan direction.



3.2 BL PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	A1	Power LED anode power supply	P
2	A2	Power LED anode power supply	P
3	A3	Power LED anode power supply	P
4	NC	--	--
5	NTC1	Hear sensor	I
6	NTC2	Hear sensor	I
7	K1	Power LED Cathode power supply	P
8	K2	Power LED Cathode power supply	P
9	K3	Power LED Cathode power supply	P
10	K4	Power LED Cathode power supply	P

4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio	CR	$\Theta=0$	1000	1100	--		(1)(2)
Response time	Rising	T_{R+T_F}	--	25	30	msec	(1)(3)
	Falling						
Color gamut	S(%)		--	65	--	%	
Color Filter Chromaticity	White	W_X	-0.04	0.3126	+0.04		(1)(4) CA-310
		W_Y		0.3401			
	Red	R_X		0.6332			
		R_Y		0.3445			
	Green	G_X		0.2994			
		G_Y		0.5836			
	Blue	B_X		0.1482			
		B_Y		0.0675			
Viewing angle	Hor.	Θ_L	CR>10	80	85	--	(1)(4)
		Θ_R		80	85	--	
	Ver.	Θ_U		80	85	--	
		Θ_D		80	85	--	
Option View Direction	ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

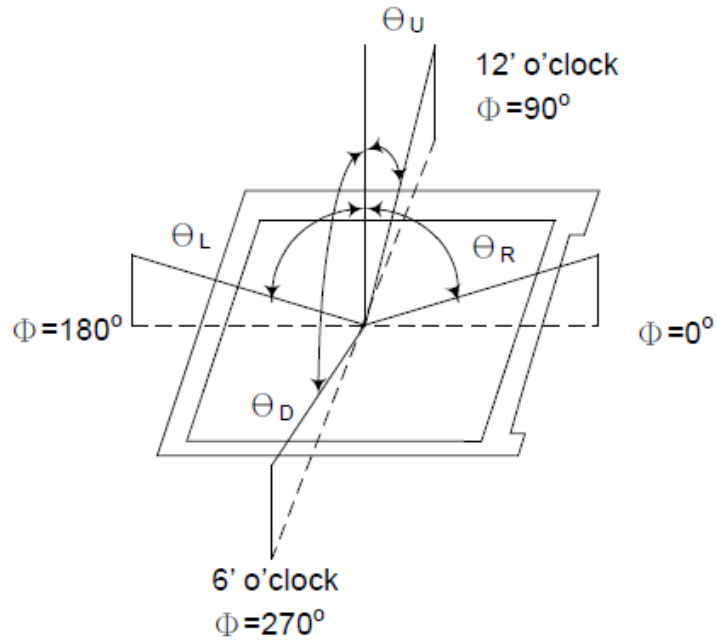
Ambient temperature : 25±2°C

15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

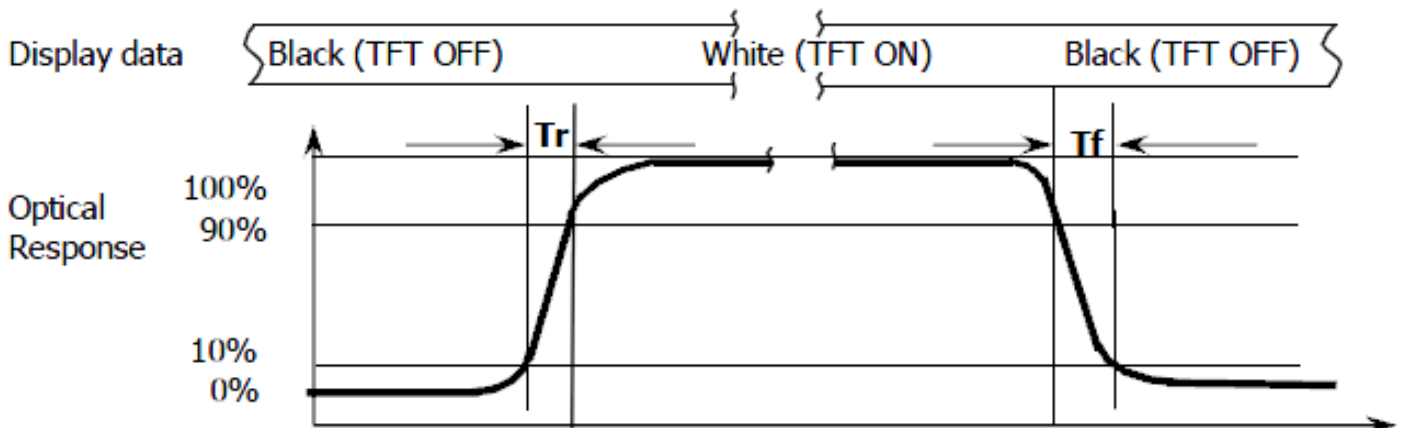
Note (1): Definition of Viewing Angle :



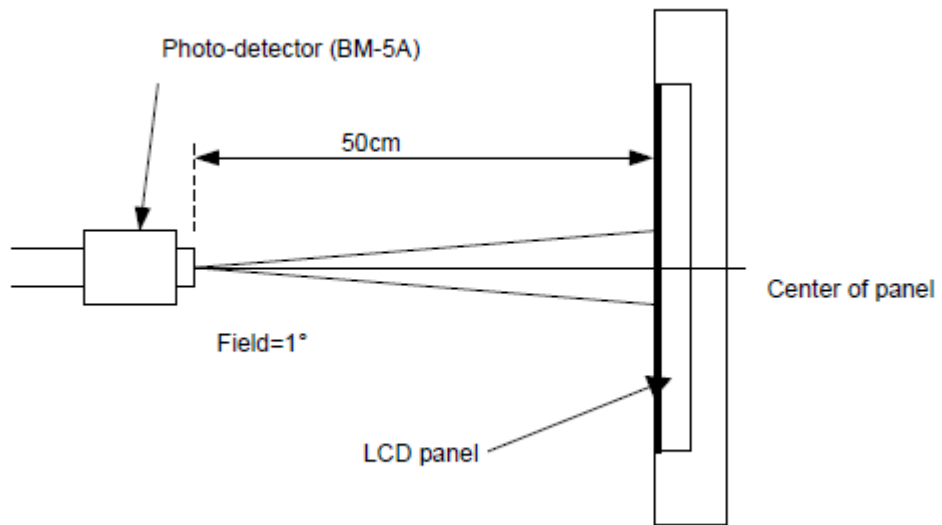
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

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
Digital Supply Voltage	VDD	-0.3	5.0	V	Note1
Operating temperature	T _{OP}	-30	+85	°C	
Storage temperature	T _{ST}	-40	+90	°C	

NOTE1: 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.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Normal mode Current	IDD	--	385	600	mA	
Level input voltage	V _{IH}	0.8VDD	--	VDD	V	
	V _{IL}	GND	--	0.2VDD	V	
Level output voltage	V _{OH}	0.8VDD	--	VDD	V	
	V _{OL}	GND	--	0.2VDD	V	

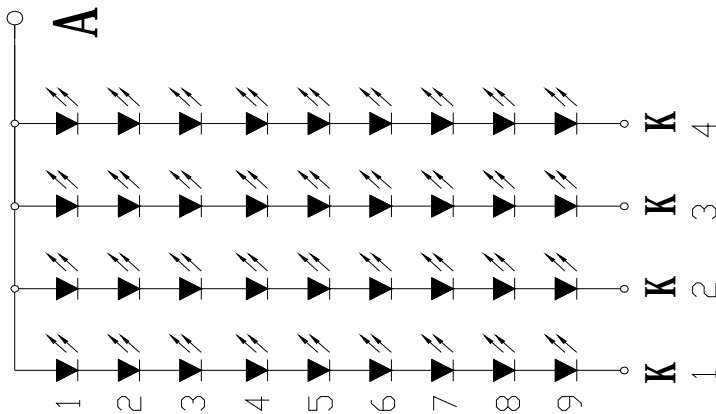
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 36 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I _F	30	300	--	mA	
Forward Voltage	V _F	25.2	26.78	29.7	V	
LCM Luminance	LV	1000	1100	--	cd/m ²	I _F =300mA
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:
 T_a=25±3 °C, 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 T_a=25°C and I_L=300mA. The LED lifetime could be decreased if operating I_L is larger than 300mA. The constant current driving method is suggested.



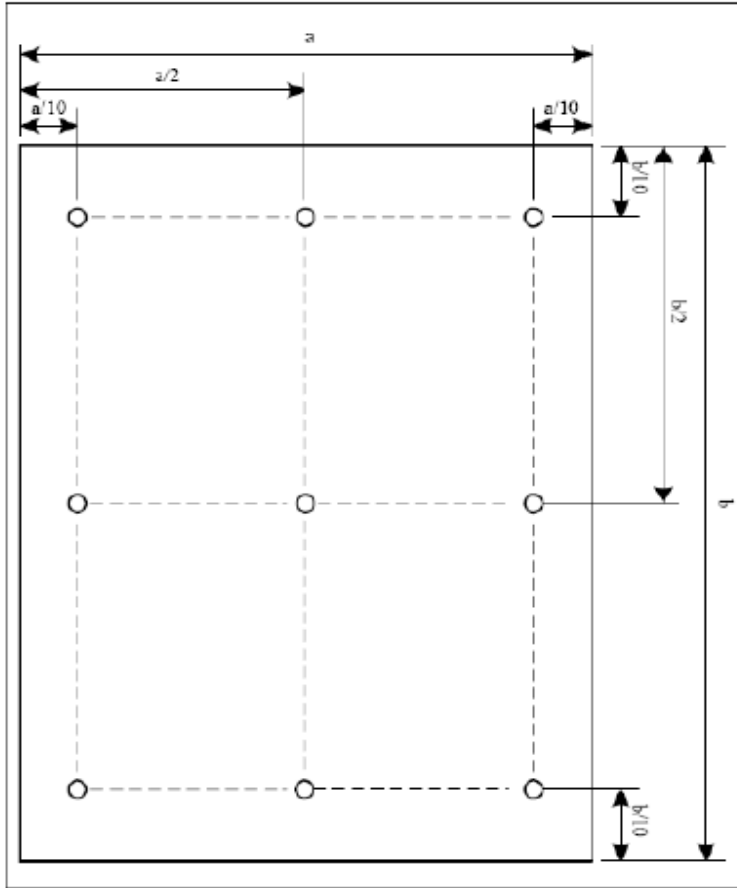
LED 电路图

村田: NCU15XH103F6SRC



NTC 电路图

Note (3) Luminance Uniformity of these 9 points is defined as below:

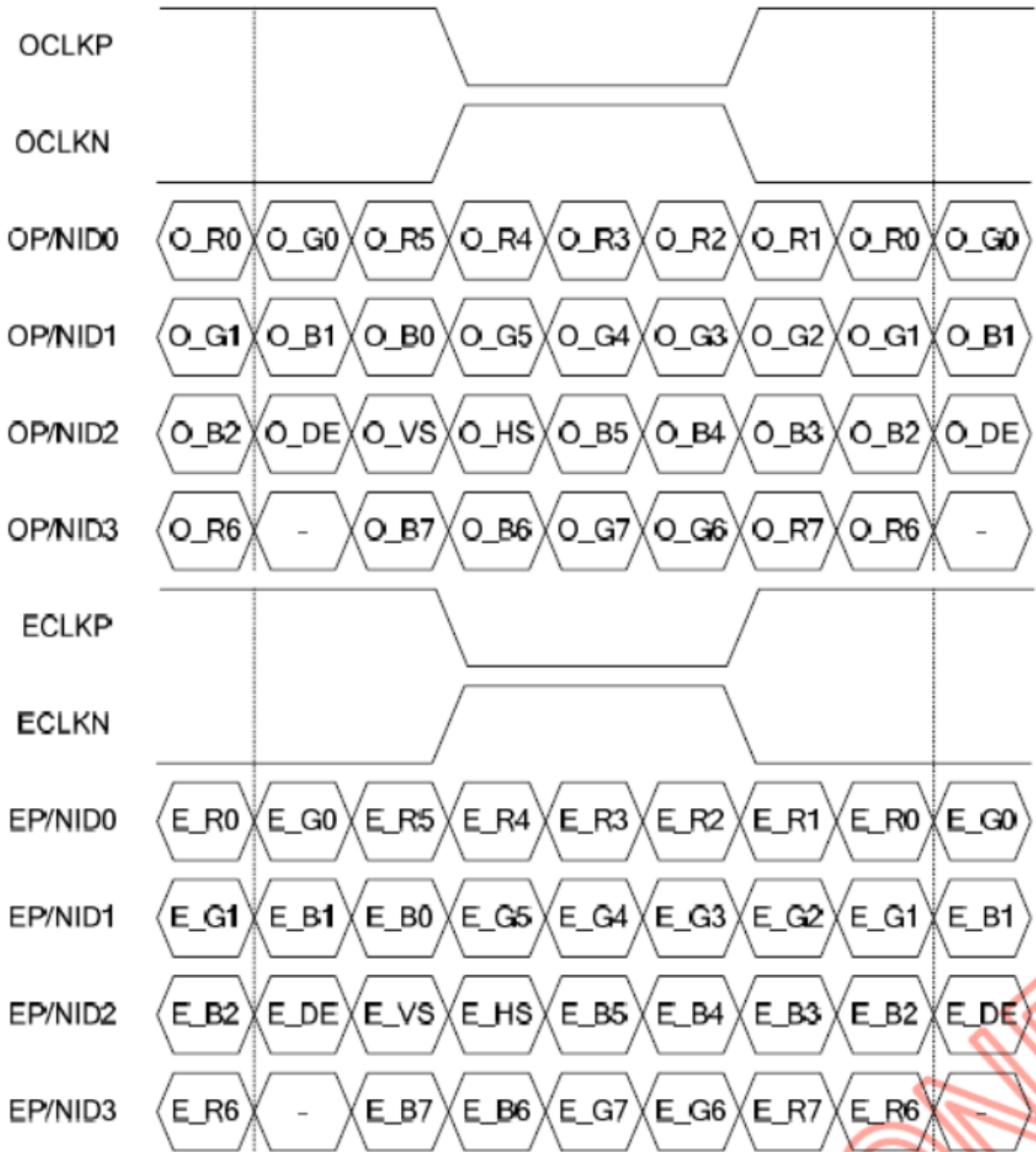


$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

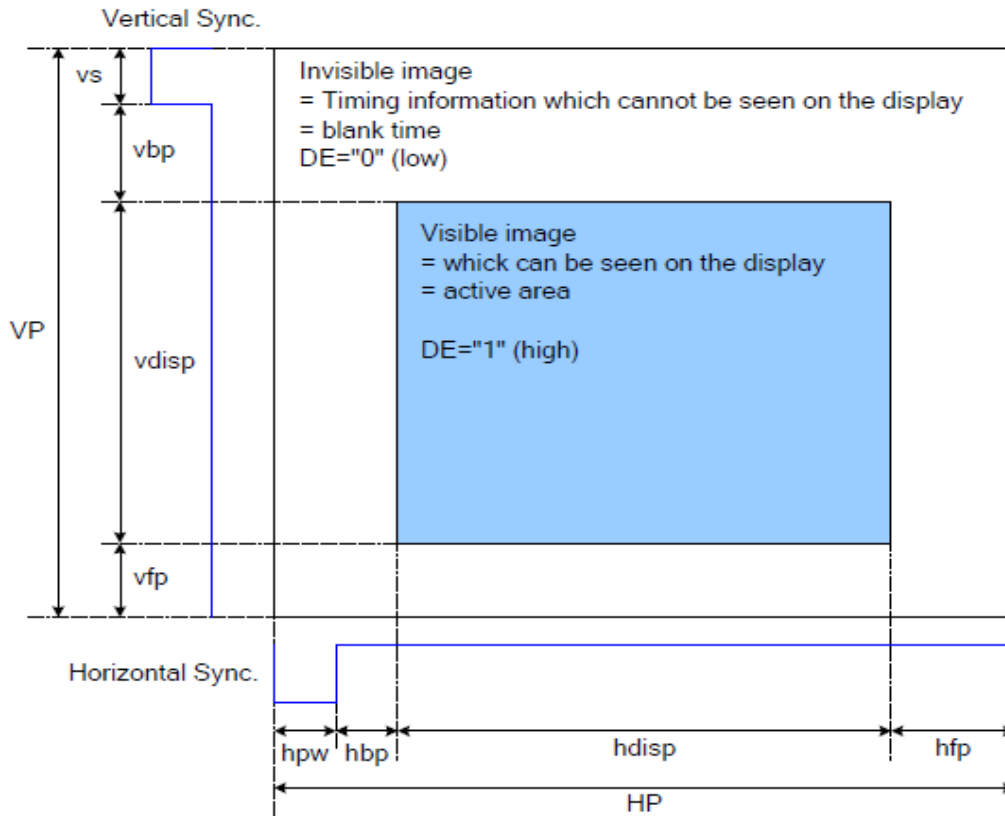
$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

6. AC Characteristic

6.1 8BIT LVDS Interface



6.2 Timing for LVDS mode



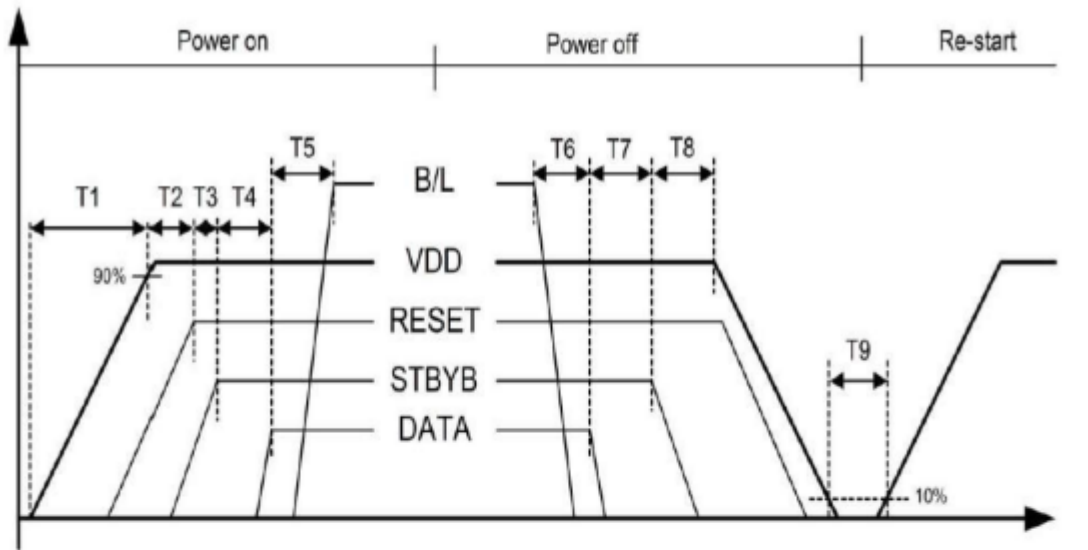
DRAM Access Area by RGB Interface

Please refer to the following table for the setting limitation of LVDS interface signals.(Only 2-Port LVDS)

Parameter	Symbol	Min.	Typ.	Max.		Unit
DCLK frequency	FCLK	--	(132)	--		MHz
Horizontal display area	HDISP	--	960	--		Clock
Horizontal Sync. Width	hpw	1	4	--		Clock
Horizontal Sync. Back Porch	hbp	1	10	-		Clock
Horizontal Sync. Front Porch	hfp	1	40	--		Clock
Vertical display area	VDISP	--	720	--		Line
Vertical Sync. Width	vs	2	4	--		Line
Vertical Sync. Back Porch	vbp	2	10	--		Line
Vertical Sync. Front Porch	vfp	2	20	--		Line
Frame-Rate		--	60	--		Hz

Note: Typical value are related to the setting frame rate is 60Hz.

6.3 Power On/Off Sequence



Item	Min.	Typ.	Max.	Unit
T1	0.5	--	20	ms
T2	1	--	--	ms
T3	1	--	--	ms
T4	200	--	--	ms
T5	50	--	--	ms
T6	50	--	--	ms
T7	16	--	--	ms
T8	16	--	--	ms
T9	1000	--	--	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.

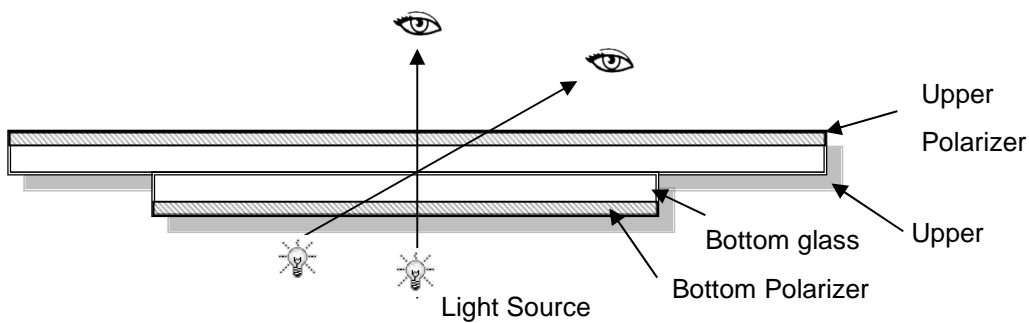
Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65\% \pm 10\% \text{RH}$

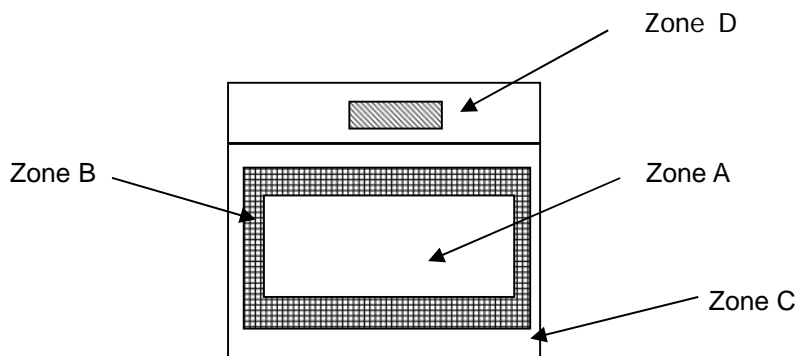
Viewing Angle : Normal viewing Angle.

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

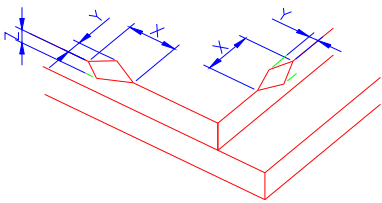
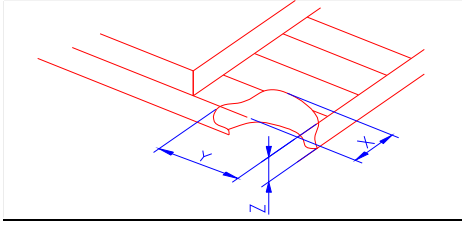
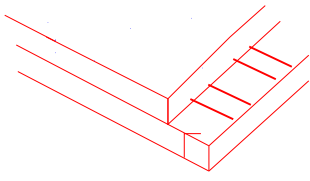
LCD: Liquid Crystal Display , LCM: Liquid Crystal Module,

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.

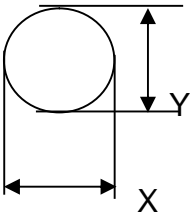
b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

7.1.4 Criteria (Visual)

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

2.0

Spot defect



$$\Phi = (X + Y) / 2$$

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

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore		
$0.15 < \Phi \leq 0.25$	3(distance ≥ 10 mm)		
$0.25 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
$\Phi > 0.4$	0		

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


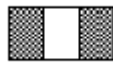

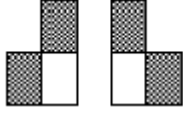
Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore		
$0.15 < \Phi \leq 0.25$	3(distance ≥ 10 mm)		
$0.25 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
$\Phi > 0.4$	0		


③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.2 < \Phi \leq 0.5$	2(distance ≥ 10 mm)		
$\Phi > 0.5$	0		

④ Polarizer Bubble

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.2 < \Phi \leq 0.4$	3(distance ≥ 10 mm)		
$\Phi > 0.4$	0		

3.0	LCD Pixel defect	<p>Pixel bad points</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Zone A</th> <th>Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Bright dot</td> <td>Random</td> <td>N≤2</td> </tr> <tr> <td>2 dots adjacent</td> <td>N≤0</td> </tr> <tr> <td>3 dots adjacent</td> <td>N≤0</td> </tr> <tr> <td rowspan="3">Dark dot</td> <td>Random</td> <td>N≤2</td> </tr> <tr> <td>2 dots adjacent</td> <td>N≤0</td> </tr> <tr> <td>3 dots adjacent</td> <td>N≤0</td> </tr> <tr> <td>Distance</td> <td> 1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot. </td> <td>5mm</td> </tr> <tr> <td colspan="2">Total bright and dark dot</td> <td>N≤4</td> </tr> </tbody> </table> <p>Note:</p> <p>A) Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.</p> <p>B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.</p> <p>C) 2 dot adjacent = 1 pair = 2 dots</p> <p>Picture:</p> <div style="display: inline-block; text-align: center;">  </div> <div style="display: inline-block; text-align: center;">2 dot adjacent</div> <div style="display: inline-block; text-align: center;">  </div> <div style="display: inline-block; text-align: center;">2 dot adjacent</div> <div style="display: inline-block; text-align: center;">  </div> <div style="display: inline-block; text-align: center;">2 dot adjacent (vertical)</div> <div style="display: inline-block; text-align: center;">  </div> <div style="display: inline-block; text-align: center;">2 dot adjacent (slant)</div>	Item	Zone A	Acceptable Qty	Bright dot	Random	N≤2	2 dots adjacent	N≤0	3 dots adjacent	N≤0	Dark dot	Random	N≤2	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
Item	Zone A	Acceptable Qty																							
Bright dot	Random	N≤2																							
	2 dots adjacent	N≤0																							
	3 dots adjacent	N≤0																							
Dark dot	Random	N≤2																							
	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																							

4.0	Line defect (LCD /Polarizer backlight black/white line, scratch, stain)  W: width, L : length N : Count	<table border="1"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(m m)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.05$</td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.05 < W \leq 0.06$</td> <td>$L \leq 4.0$</td> <td colspan="3">N\leq3</td> </tr> <tr> <td>$0.06 < W \leq 0.08$</td> <td>$L \leq 3.0$</td> <td colspan="3">N\leq2</td> </tr> <tr> <td>$W > 0.08$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(m m)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 4.0$	N \leq 3			$0.06 < W \leq 0.08$	$L \leq 3.0$	N \leq 2			$W > 0.08$	Define as spot defect			
		Width(mm)			Length(m m)	Acceptable Qty																								
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$W > 0.08$	Define as spot defect																													
5.0	Electronic Components SMT.	Not allow missing parts, solderless connection, cold solder joint, mismatch, The positive and negative polarity opposite																												
6.0	Display color& Brightness.	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.																												
7.0	LCD Mura/Waving/ Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.																												

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

8. Reliability Test Result

Remark:

Item	Condition	Inspection after test
High Temperature Operating	85°C,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°C, 96HR	
High Temperature Storage	90°C, 96HR	
Low Temperature Storage	-40°C, 96HR	
High Temperature & High Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-10°C,30 min ↔60°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

- 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.
6. The color fading mura of polarizing filter should not care.

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.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

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 °C 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.