

Display Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 19201080G VMH-PW-N

15,6“ TFT

Product Specification

Version: 0

14.12.2024

Revision History

Date	Rev. No.	Page	Summary
14.12.2024	0	ALL	FIRST ISSUE

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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 model is composed of a Transmissive type TFT-LCD Panel, driver circuit, cover lens, back-light unit. The resolution of a 15.6" TFT-LCD contains 1920X1080 pixels, and can display up to 16.7M colors.

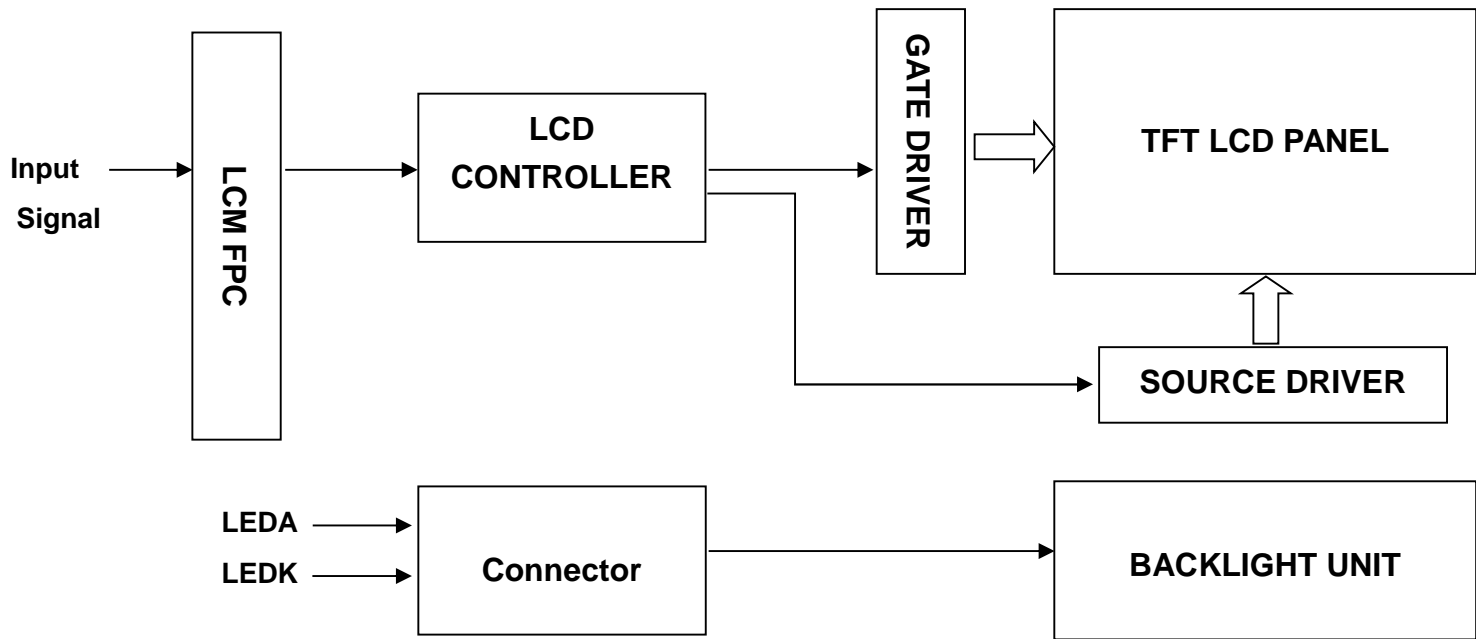
*** Features**

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	344.16(H)*193.59(V) (15.6inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1920(RGB)*1080	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.17925(H)*0.17925(V)	mm	
Viewing angle	Supper wide angle	o'clock	
LCM Interface	2-Port LVDS	-	
Display mode	Normally Black	-	
Operating temperature	-20~+80	°C	
Storage temperature	-30~+85	°C	

*** Mechanical Information**

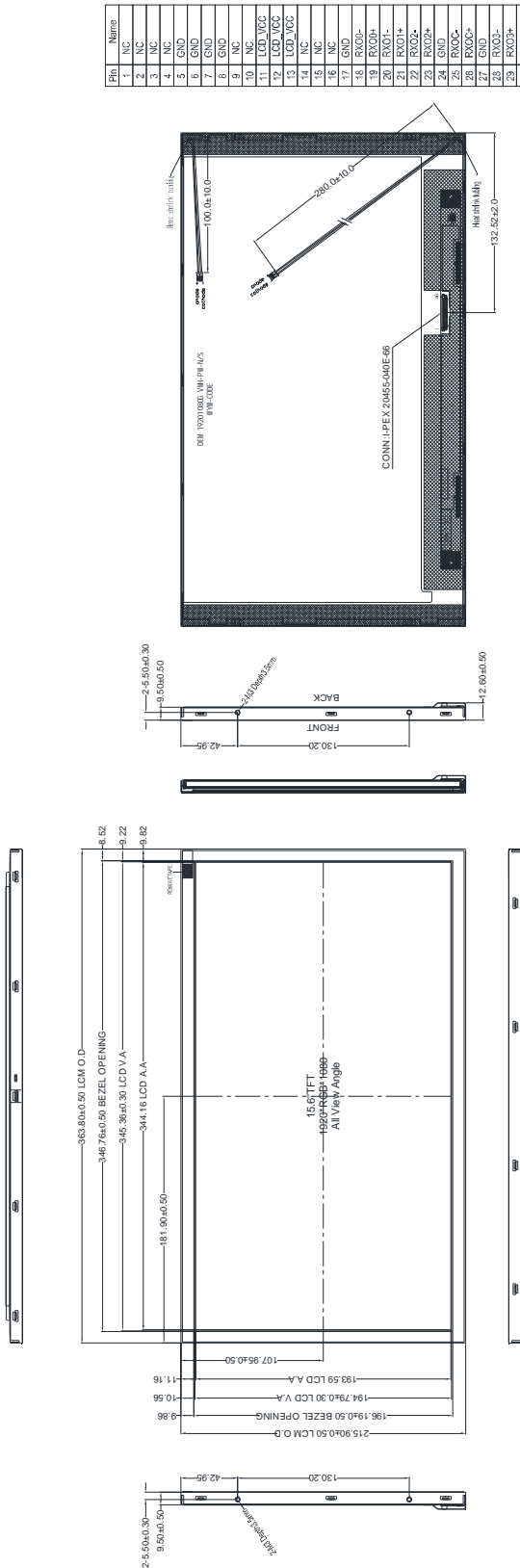
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		363.80		mm	-
	Vertical(V)		215.90		mm	-
	Depth(D)		9.50	12.60	mm	-
Weight			880		g	-

1. Block Diagram

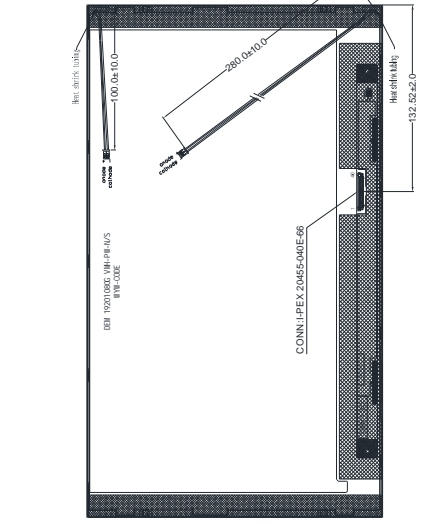


2. Outline dimension

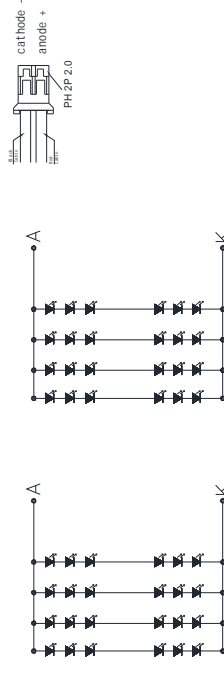
TFT



Pin	Name
1	NC
2	NC
3	NC
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	NC
11	LCD_VCC
12	LCD_VCC
13	LCD_VCC
14	NC
15	NC
16	NC
17	GND
18	FX0D+
19	FX0D+
20	FX0D+
21	FX0D+
22	FX0D+
23	FX0D+
24	GND
25	FX0C+
26	FX0C+
27	GND
28	FX0C+
29	FX0C+
30	FX0C+
31	FX0C+
32	FX0E+
33	FX0E+
34	GND
35	FX0E+
36	FX0E+
37	FX0E+
38	FX0E+
39	FX0E+
40	FX0E+



CN3: PH2.0-2PIN	
NO.	Definition
1	LED A+
2	LED K-



LED Numbers: 16X4=64 LED Numbers: 16X4=64EA
 4014LED (90mA/LED) 4014LED (90mA/LED)
 LED(B/L) CIRCUIT LED(B/L) CIRCUIT

- NOTES:
1. DISPLAY TYPE: 15.6", TFT LCD, 16.7M COLORS
 2. DISPLAY MODE: NORMALLY BLACK, IPS
 3. VIEWING DIRECTION: FREE
 4. LCM DRIVER IC: *****(COG)
 5. TFT INTERFACE: 2 Port LVDS
 6. TOUCH MODE: NA
 7. TOUCH DRIVER: NA
 8. CTP INTERFACE: NA
 9. TOUCH AND LCM BONDING TECHNOLOGY: NA
 10. LCD_VCC: 3.3V
 11. OPERATING TEMP: -20°C TO 80°C
 12. STORAGE TEMP: -30°C TO 85°C
 13. BACK LIGHT: LED WHITE, 64 LED*2Group, 120mA*2, 40.0~52.8V
 14. RoHS AND REACH COMPLIANT.

3. Input terminal Pin Assignment**3.1 TFT PIN Defin****Connector:I-PEX 20455-040E-66**

NO.	SYMBOL	DISCRIPTION	I/O
1	NC	No Connection	--
2	NC	No Connection	--
3	NC	No Connection	--
4	MC	No Connection	--
5	GND	Ground	P
6	GND	Ground	P
7	GND	Ground	P
8	GND	Ground	P
9	NC	No Connection	--
10	NC	No Connection	--
11	LCD_VCC	LCD VCC(3.3V)	P
12	LCD_VCC	LCD VCC(3.3V)	P
13	LCD_VCC	LCD VCC(3.3V)	P
14	NC	No Connection	--
15	NC	No Connection	--
16	NC	No Connection	--
17	GND	Ground	P
18	RX00-	Negatige LVDS differential data input(Odd data)	I
19	RX00+	Positive LVDS differential data input(Odd data)	I
20	RX01-	Negatige LVDS differential data input(Odd data)	I
21	RX01+	Positive LVDS differential data input(Odd data)	I
22	RX02-	Negatige LVDS differential data input(Odd data)	I
23	RX02+	Positive LVDS differential data input(Odd data)	I
24	GND	Ground	P
25	RXOCLK-	Negatige LVDS differential clock input(Odd data)	I
26	RXOCLK+	Positive LVDS differential clock input(Odd data)	I

27	GND	Ground	P
28	RXO3-	Negative LVDS differential data input(Odd data)	I
29	RXO3+	Positive LVDS differential data input(Odd data)	I
30	RXE0-	Negative LVDS differential data input(Even data)	I
31	RXE0+	Positive LVDS differential data input(Even data)	I
32	RXE1-	Negative LVDS differential data input(Even data)	I
33	RXE1+	Positive LVDS differential data input(Even data)	I
34	GND	Ground	P
35	RXE2-	Negative LVDS differential data input(Even data)	I
36	RXE2+	Positive LVDS differential data input(Even data)	I
37	RXECLK-	Negative LVDS differential clock input(Even data)	I
38	RXECLK+	Positive LVDS differential clock input(Even data)	I
39	RXE3-	Negative LVDS differential data input(Even data)	I
40	RXE3+	Positive LVDS differential data input(Even data)	I

3.2 BL PIN Defin

Connector(CON2/CON3):PH2.0-2PIN

NO.	SYMBOL	DISCRIPTION	I/O
1	LEDA+	Anode pin of backlight	P
2	LEDK-	Cathode pin of backlight	P

4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio	CR	$\Theta=0$	1300	1500	--		(1)(2)
Response time	Rising	T_R	--	30	35	msec	(1)(3)
	Falling	T_F	--	30	35		
Color Gamut	S(%)		--	55.32	--	%	
Color Filter Chromaticity	White	W_X	-0.04	0.3423	+0.04		(1)(4) CA31 0
		W_Y		0.3487			
	Red	R_X		0.6086			
		R_Y		0.3665			
	Green	G_X		0.3424			
		G_Y		0.5673			
	Blue	B_X		0.1466			
		B_Y		0.0575			
Viewing angle	Hor.	Θ_L	80	89	--		
		Θ_R	80	89	--		
	Ver.	Θ_U	80	89	--		
		Θ_D	80	89	--		
Option View Direction	ALL						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

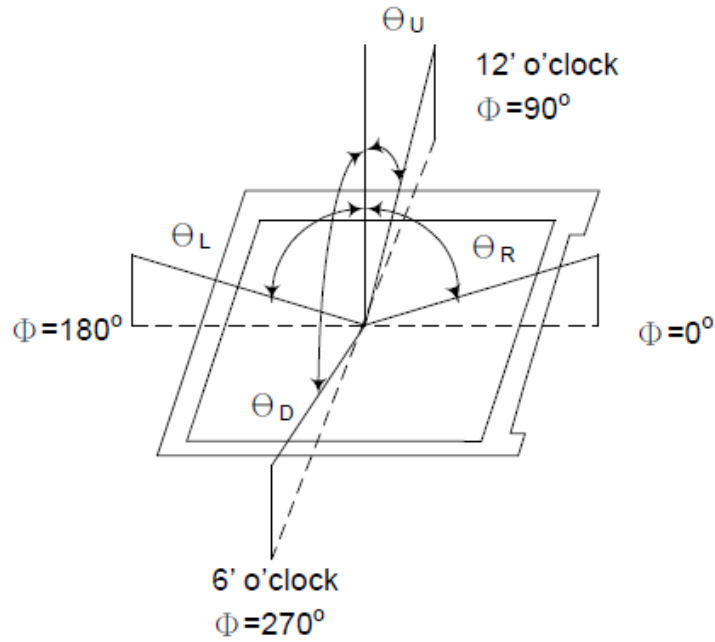
Ambient temperature : 25 ± 2 °C

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.

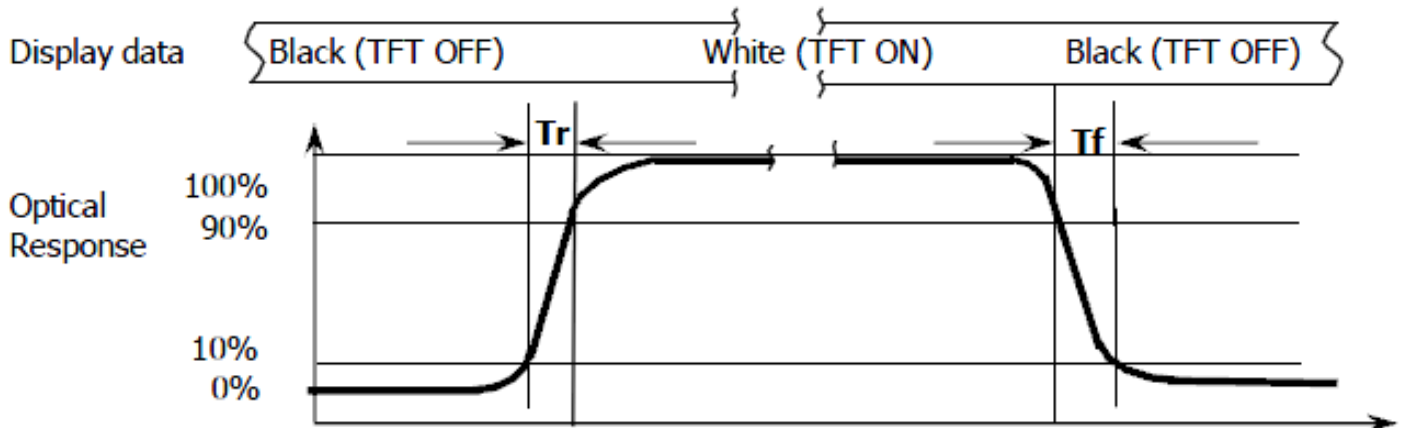
Note (1): Definition of Viewing Angle :



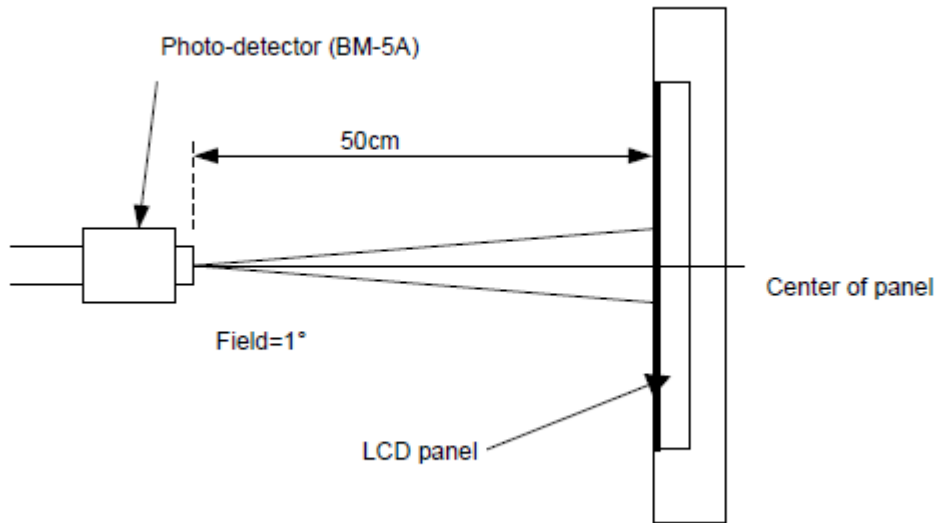
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

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
Power Supply Voltage	LCD_VCC	-0.3	3.6	V	Note1
Operating temperature	T _{OP}	-20	+80	°C	
Storage temperature	T _{ST}	-30	+85	°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	LCD_VCC	3.0	3.3	3.4	V	
Normal mode Current	I _{DD}	--	377	700	mA	
Level input voltage	V _{IH}	0.7LCD_VCC		LCD_VCC	V	
	V _{IL}	GND		0.3 LCD_VCC	V	
Level output voltage	V _{OH}	LCD_VCC-		--	V	
	V _{OL}	GND		GND+0.4	V	

5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 64 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I _F	--	120	240	mA	EACH GROUP
Forward Voltage	V _F	43.2	51.2	52.8	V	
LCM Luminance	LV	--	1200	--	cd/m ²	I _F =120*2mA
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	75	80	--	%	Note3

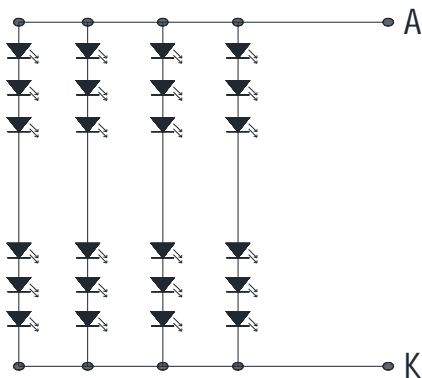
Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

T_a=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

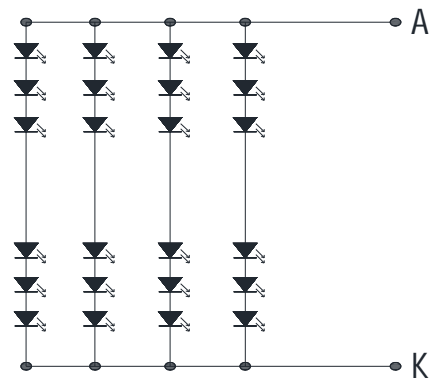
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at

T_a=25°C and I_L=240mA. The LED lifetime could be decreased if operating I_L is larger than 240mA.

The constant current driving method is suggested.

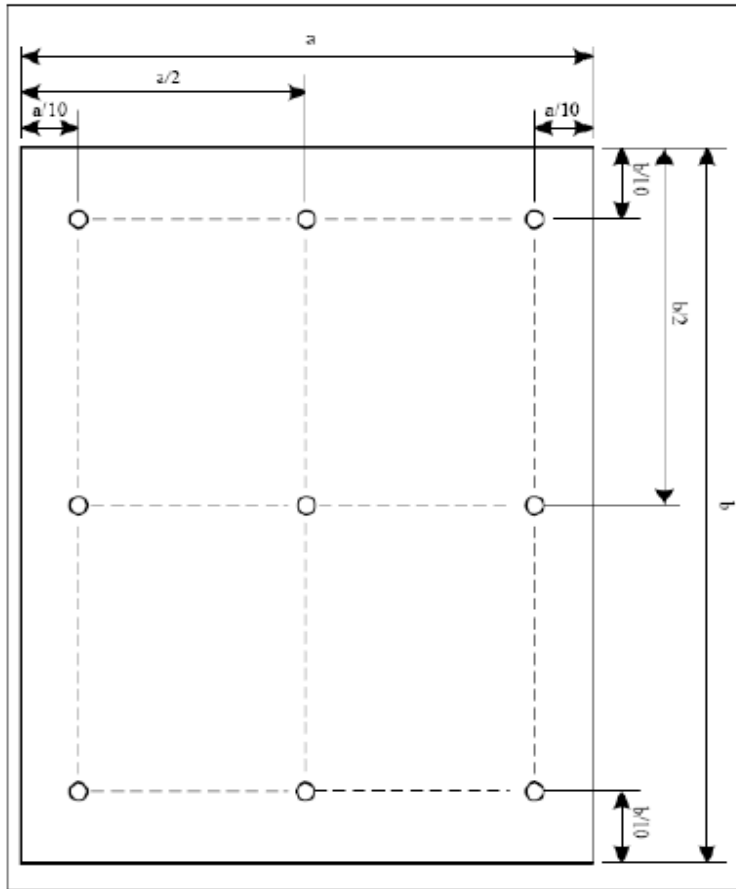


LED Numbers: 16X4=64EA
 4014LED (90mA/LED)
 LED(B/L) CIRCUIT



LED Numbers: 16X4=64EA
 4014LED (90mA/LED)
 LED(B/L) CIRCUIT

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. Signal Timing Specification

6.1 Operated by the DE only

Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	70.9	71.9	72.8	MHz
Frame Period		Tv	1118	1128	1138	lines
			-	60	-	Hz
			-	16.67	-	ms
Vertical Display Period		Tvd	-	1080	-	lines
One line Scanning Period		Th	1057	1062	1067	clocks
Horizontal Display Period		Thd	-	960	-	clocks

6.2 LVDS Electrical Specification

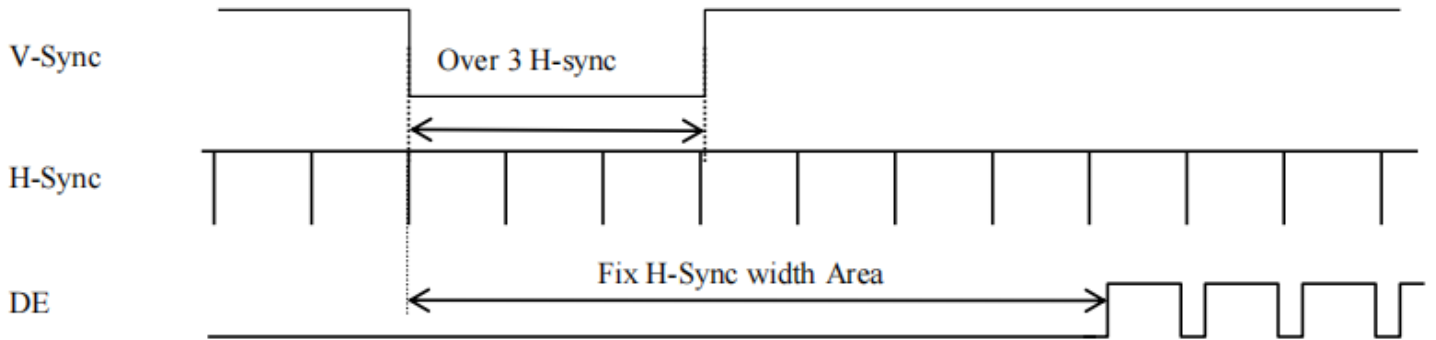
The specification of the LVDS Rx interface timing parameter is shown in Table 4.

<Table 4. LVDS Rx Interface Timing Specification>

Symbol	Symbol	Min	Typ	Max	Unit
Vth	Differential input high threshold	-	-	0.1	V
Vtl	Differential input low threshold	-0.1	-	-	V
Vcm	LVDS common mode voltage	0.9	-	1.4	V

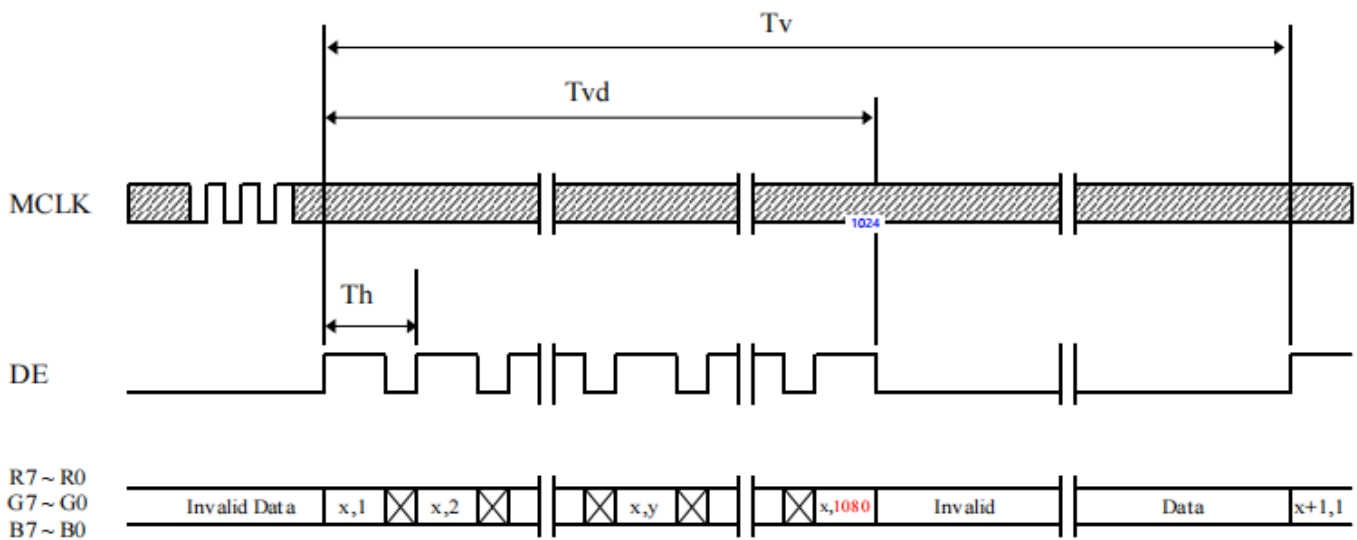
6.3 Signal Timing Waveforms of Interface Signal

6.3.1 Sync Timing Waveforms

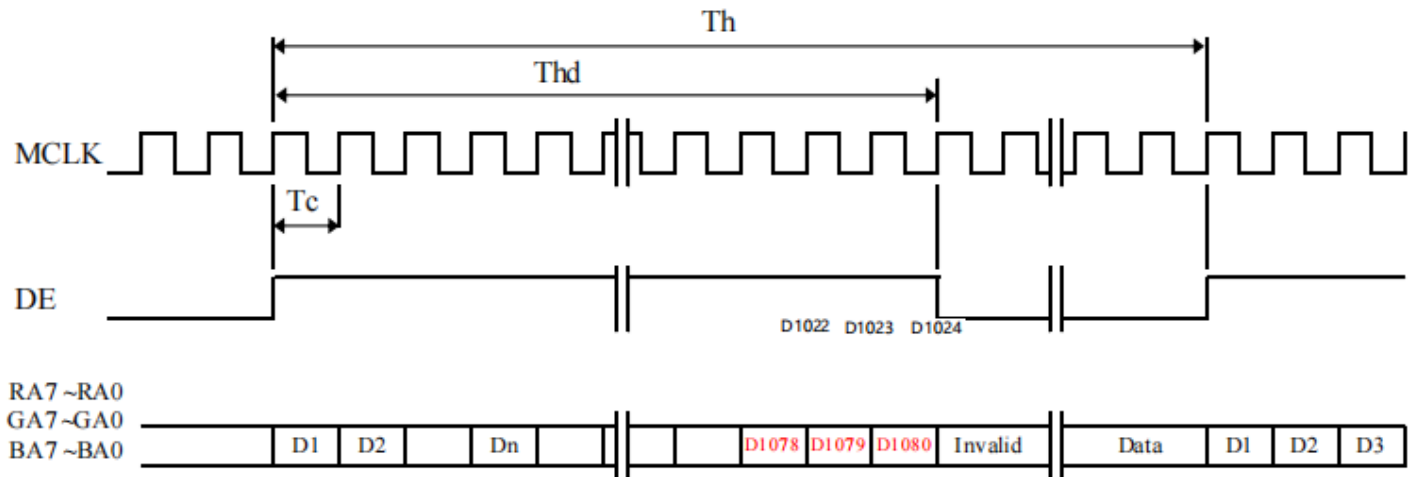


- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

6.3.2 Vertical Timing Waveforms

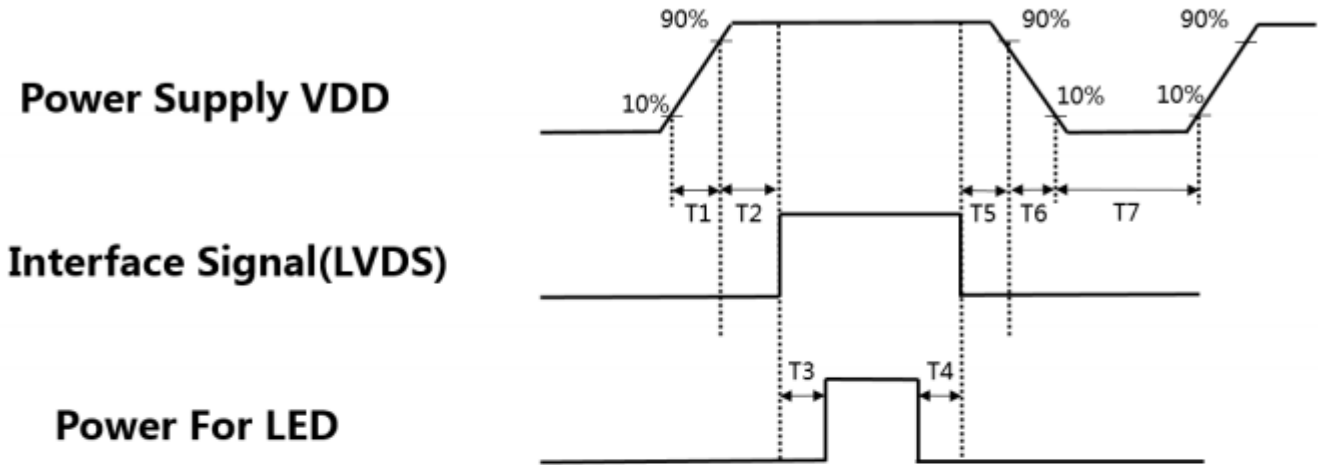


6.3.3 Horizontal Timing Waveforms



6.4 Power Sequence

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



Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.1	-	8	(ms)
T2	120	-	-	(ms)
T3	300	-	-	(ms)
T4	300	-	-	(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.

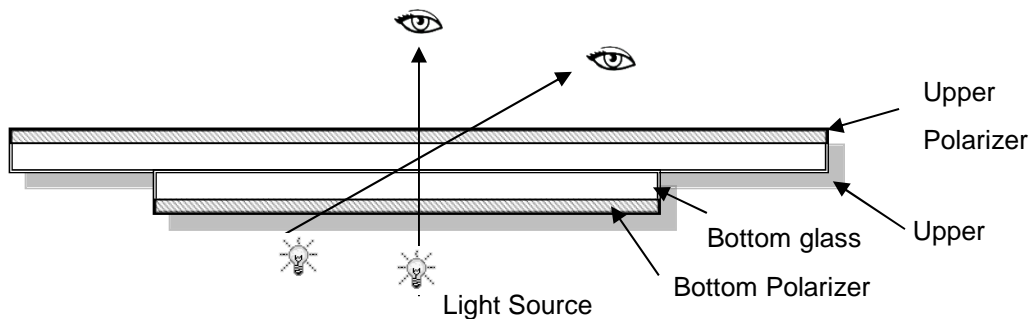
Temperature : $25\pm 5^{\circ}\text{C}$

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

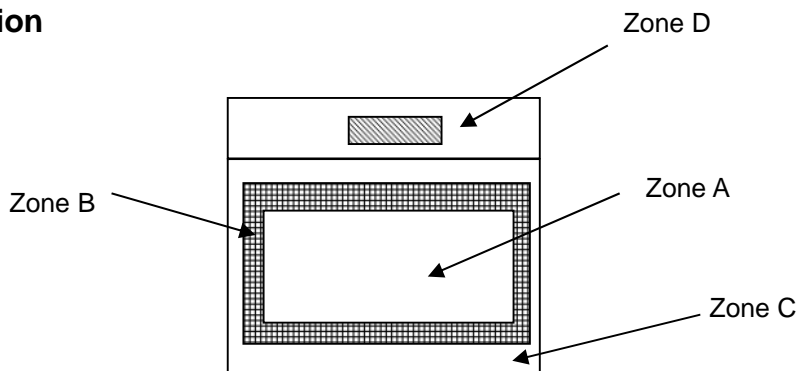
Viewing Angle : Normal viewing Angle.

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 2828-2012 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

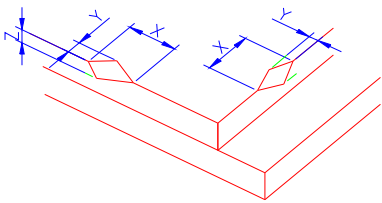
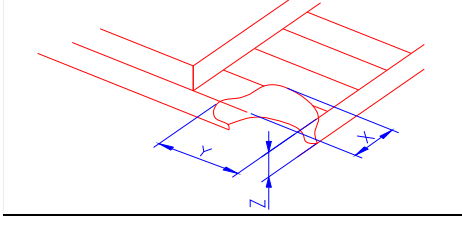
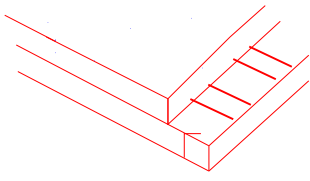
LCD: Liquid Crystal Display , LCM: Liquid Crystal Module

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.

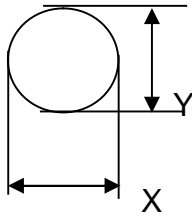
b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

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" data-bbox="753 613 1453 759"> <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" data-bbox="831 1068 1372 1167"> <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)


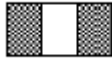
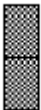
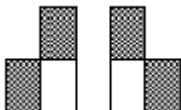
Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore		
$0.15 < \Phi \leq 0.25$	3(distance ≥ 10 mm)		
$0.25 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
$\Phi > 0.4$	0		


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		
$0.2 < \Phi \leq 0.4$	2(distance ≥ 10 mm)		
$\Phi > 0.4$	0		

3.0	LCD Pixel defect	<p>Pixel bad points</p> <table border="1"> <thead> <tr> <th data-bbox="534 250 726 302">Item</th> <th data-bbox="726 250 1241 302">Zone A</th> <th data-bbox="1241 250 1492 302">Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td data-bbox="534 302 726 465" rowspan="3">Bright dot</td> <td data-bbox="726 302 1241 362">Random</td> <td data-bbox="1241 302 1492 362">N≤2</td> </tr> <tr> <td data-bbox="726 362 1241 414">2 dots adjacent</td> <td data-bbox="1241 362 1492 414">N≤0</td> </tr> <tr> <td data-bbox="726 414 1241 465">3 dots adjacent</td> <td data-bbox="1241 414 1492 465">N≤0</td> </tr> <tr> <td data-bbox="534 465 726 629" rowspan="3">Dark dot</td> <td data-bbox="726 465 1241 517">Random</td> <td data-bbox="1241 465 1492 517">N≤3</td> </tr> <tr> <td data-bbox="726 517 1241 568">2 dots adjacent</td> <td data-bbox="1241 517 1492 568">N≤0</td> </tr> <tr> <td data-bbox="726 568 1241 629">3 dots adjacent</td> <td data-bbox="1241 568 1492 629">N≤0</td> </tr> <tr> <td data-bbox="534 629 726 943">Distance</td> <td data-bbox="726 629 1241 943"> 1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot. </td> <td data-bbox="1241 629 1492 943">5mm</td> </tr> <tr> <td colspan="2" data-bbox="534 943 1241 994">Total bright and dark dot</td> <td data-bbox="1241 943 1492 994">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: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>2 dot adjacent</p> </div> <div style="text-align: center;">  <p>2 dot adjacent</p> </div> <div style="text-align: center;">  <p>2 dot adjacent (vertical)</p> </div> <div style="text-align: center;">  <p>2 dot adjacent (slant)</p> </div> </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≤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
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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>$L \leq 5.0$</td> <td colspan="3">$N \leq 3$</td> </tr> <tr> <td>$0.06 < W \leq 0.08$</td> <td>$L \leq 4.0$</td> <td colspan="3">$N \leq 2$</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			$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$			$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$			$W > 0.08$	Define as spot defect			
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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
5	CTP no function	Not allowed

8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	80°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	-20°C, 96HR	
High Temperature Storage	85°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Operating	50°C, 80% RH ,96hours.	
Thermal Shock (Non-operation)	-20°C,30 min ↔ +60°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±15KV, 5times; Contact:±8KV, 5 times; (Environment: 15°C~35°C, 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,80cm(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 °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.