Display Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 1920360A VM-PW-N

28,0“ Wide-Screen TFT

Product Specification **Ver.: 0**

21.12.2018

Revision History

Revision	Date	Originator	Detail	Remarks
0	21.12.2018	ZDT	Initial Release	

Table of Contents

1. General Description

The specification is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT-LCD panel, driver ICs, and a backlight unit.

2. Module Parameter

Features	Details	Unit
Display Size (Diagonal)	28.0''	-
LCD type	IPS TFT	-
Display Mode	Transmissive / Normally Black	-
Resolution	1920 x RGB x 360	Pixels
View Direction	FULL VIEW	Best Image
Module Outline	732.00 x 165.00 x 16.80 (Note1)	mm
Active Area	699.84 x 131.22	mm
Pixel Pitch	0.3645 x 0.3645	mm
Pixel Arrangement	RGB Stripe	-
Display Colors	16.7 Million	-
Interface	LVDS Interface	-
With or Without Touch Panel	without	-
Operating Temperature	0°C to +50°C	ºC
Storage Temperature	-20°C to +60°C	ºC
Weight	~ 2393	g

Note 1: Exclusive hooks, posts, FFC/FPC tail etc.

3. Absolute Maximum Ratings

GND=0V, Ta=25ºC

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.3	13.2	V
Storage Temperature	T_{STG}	-20	+60	ºC
Operating Temperature	T_{OP}	0	+50	ºC

Note 1: If Ta below 50ºC, the maximal humidity is 90%RH, if Ta over 50ºC, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

4. DC Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Supply Voltage		VDD	10.8	12	13.2	V
LVDS Interface	Differential Input High Threshold Voltage	VRTH	100	-	360	mV
	Differential Input Low Threshold Voltage	VRTL	-360	-	-100	mV
	Common Input Voltage	VLVC	1.0	1.2	1.4	V
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V
	Input Low Threshold Voltage	VIL	0	-	0.6	V

5. Backlight Characteristic

5.1. Backlight Characteristic

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Backlight Voltage	V_{LED}	Ta=25 ºC	40.6	43.4	44.8	V
Backlight Current	I_{LED}	Ta=25 ºC	-	208	-	mA
Power Dissipation	P_D	-	-	9027.2	-	mW
Uniformity	Avg	-	75	80	-	%
LED lifetime (+25°C)	-		20000	30000	-	Hrs
Drive Method	Constant Current					
LED Configuration	t.b.d.					

Note1：LED life time defined as follows: The final brightness is at 50% of original brightness.
The environmental conducted under ambient air flow, at Ta=25°C ± 2°C, 60%RH±5%,
IF=20mA/LED.

5.2. Backlight Characteristic

TBD

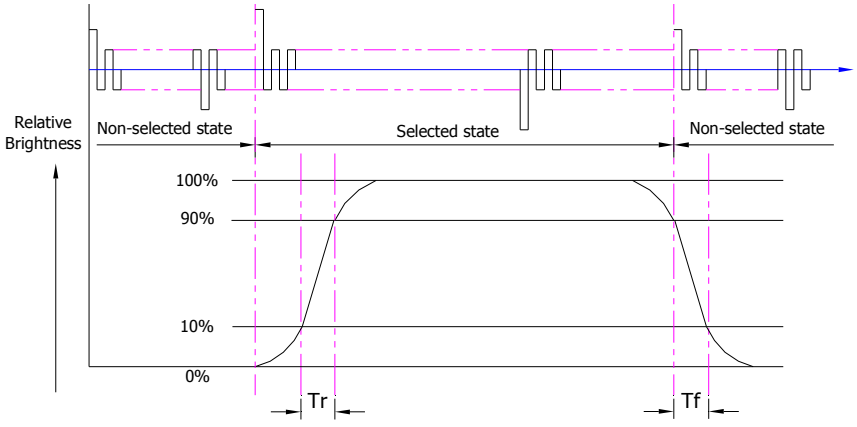
6. Optical Characteristics

Ta=25ºC, VDD=12V

	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Luminance on TFT(I_f =500mA)		Lv		560	700	-	cd/m²
	Contrast ratio(See 6.3)		CR		-	1200	-	
	Response time (See 6.2)		TR+TF		-	8	-	ms
	Chromaticity Transmissive (See 6.5)	Red	XR		-	(0.652)	-	
			YR		-	(0.331)	-	
		Green	XG		-	(0.287)	-	
			YG		-	(0.617)	-	
		Blue	XB		-	(0.147)	-	
			YB		-	(0.084)	-	
		White	XW		-	(0.275)	-	
			YW		-	(0.300)	-	
	Viewing Angle (See 6.4)	Horizontal	θX+	Center CR≥10	-	89	-	Deg.
			θX-		-	89	-	
		Vertical	φY+		-	89	-	
			φY-		-	89	-	
	NTSC ratio（Color gamut）				-	72	-	%

6.1. Definition of Response Time

6.1.1. Normally Black Type (Negative)

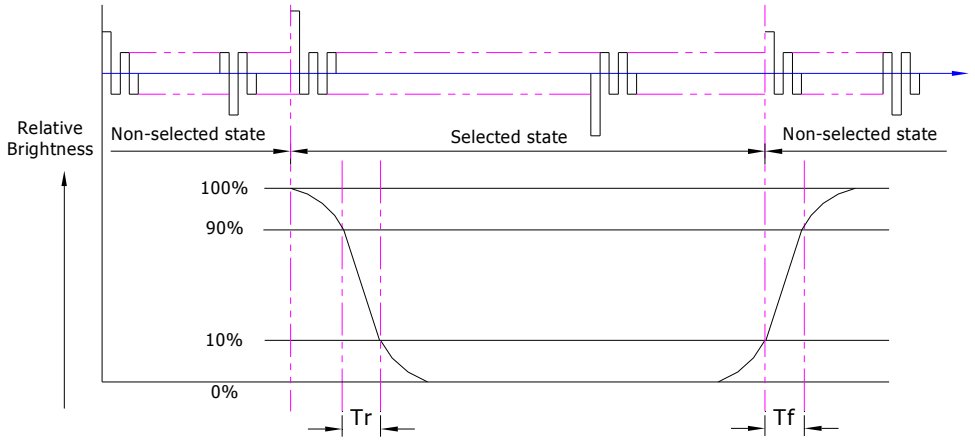


Tr is the time it takes to change form non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

Tf is the time it takes to change from selected state with relative luminance 90% to non-selected state with relative luminance 10%.

Note: Measuring machine: LCD-5100

6.1.2. Normally White Type (Positive)



Tr is the time it takes to change form non-selected stage with relative luminance 90% to selected state with relative luminance 10%;
Tf is the time it takes to change from selected state with relative luminance 10% to non-selected state with relative luminance 90%;
Note: Measuring machine: LCD-5100 or EQUI

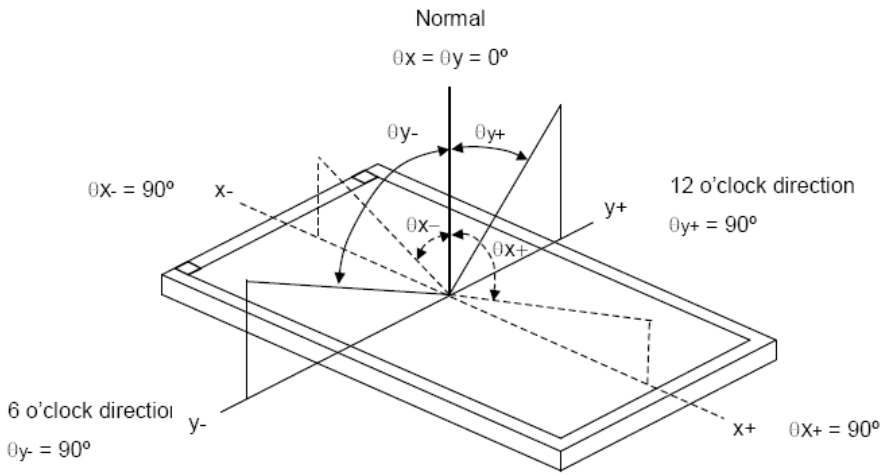
6.2. Definition of Contrast Ratio

Contrast is measured perpendicular to display surface in reflective and transmissive mode.
The measurement condition is:

Measuring Equipment	Eldim or Equivalent
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area centre point
Test pattern	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

6.3. Definition of Viewing Angles



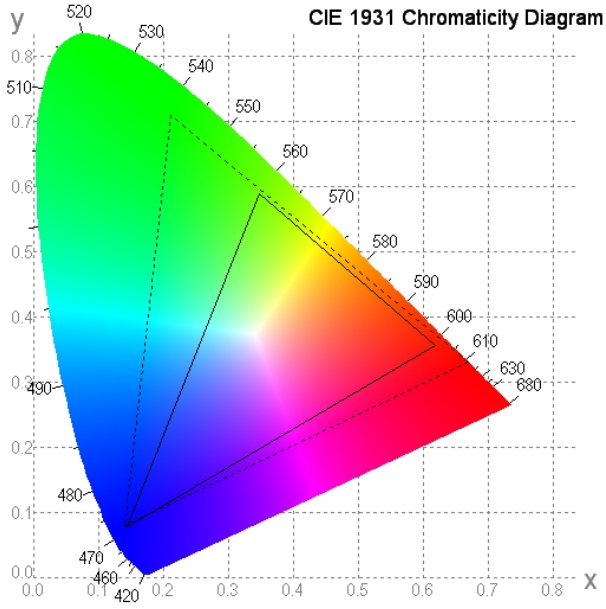
Measuring machine: LCD-5100 or EQUI

6.4. Definition of Color Appearance

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7)



6.5. Definition of Surface Luminance, Uniformity and Transmittance

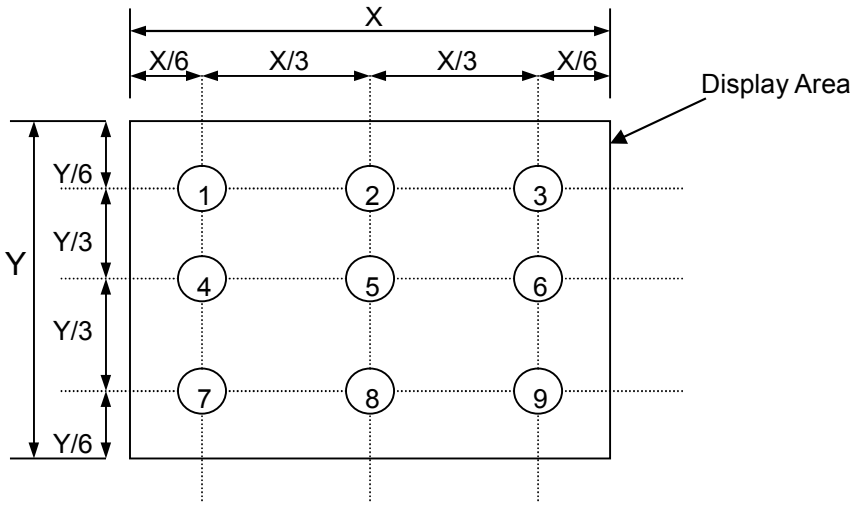
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

6.5.1. Surface Luminance: L_V = average (L_{P1}:L_{P9})

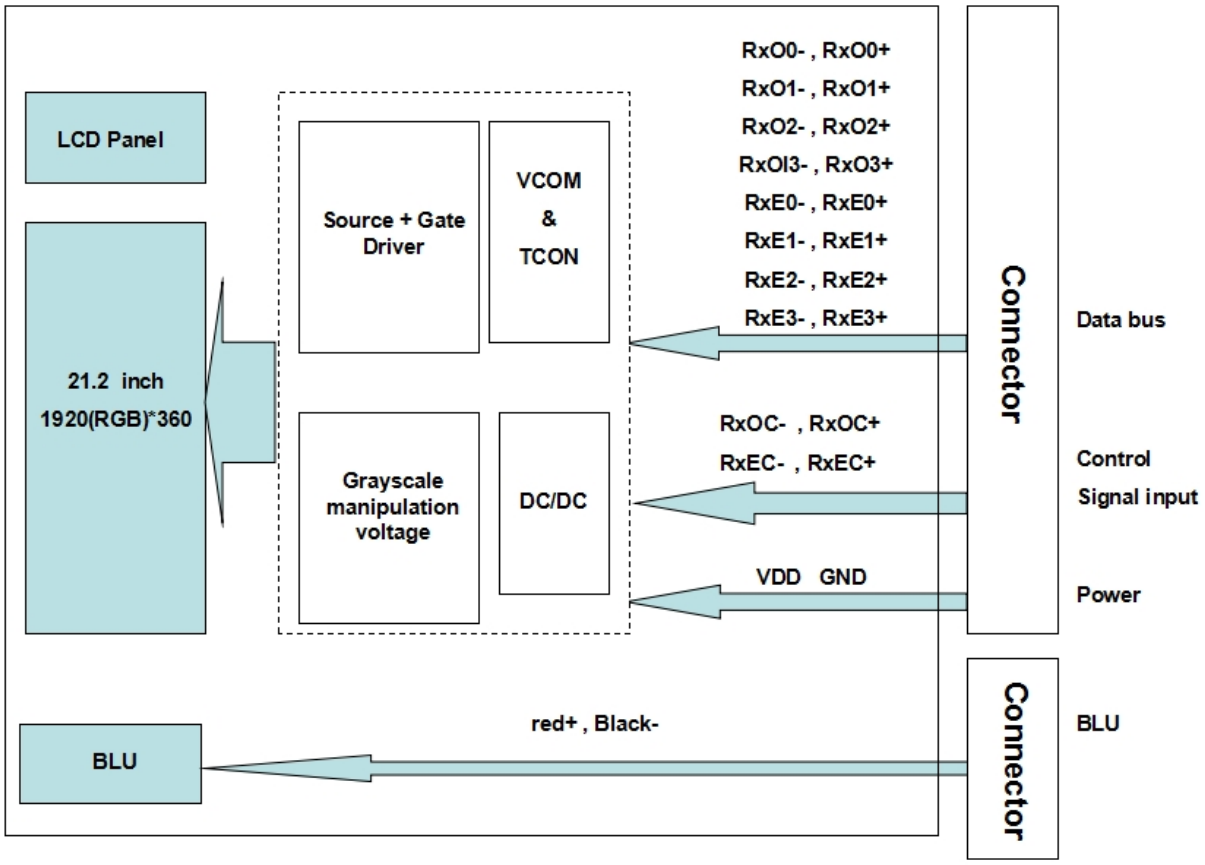
6.5.2. Uniformity = Minimal (L_{P1}:L_{P9}) / Maximal (L_{P1}:L_{P9}) * 100%

6.5.3. Transmittance = L_V on LCD / L_V on Backlight * 100%

Note: Measuring machine: BM-7



7. Block Diagram and Power Supply



8. Interface Pins Definition

Connector : IS050-C51B-C39-S (UJU)/ PM.LVS.S040505101 (UJC)

No.	Symbol	Function	Remark
1	NC	No connection	
2	SDA	Serial communication data input	
3	SCL	Serial communication clock input	
4	WP	Write Production	
5	N**C**	No connection	
6	NC	No connection	
7	LVDS_SEL	'H'=JEIDA , 'L'or NC= VESA	
8	NC	No connection	
9	NC	No connection	
10	GND	Ground	
11	GND	Ground	
12	CH1_0-	LVDS Channel 1,Signal0-	
13	CH1_0+	LVDS Channel 1,Signal0+	
14	CH1_1-	LVDS Channel 1,Signal1-	
15	CH1_1+	LVDS Channel 1,Signal1+	
16	CH1_2-	LVDS Channel 1,Signal2-	
17	CH1_2+	LVDS Channel 1,Signal2+	
18	GND	Ground	
19	CH1_CLK-	LVDS Channel 1,Clock-	
20	CH1_CLK+	LVDS Channel 1,Clock+	
21	GND	Ground	
22	CH1_3-	LVDS Channel 1,Signal3-	
23	CH1_3+	LVDS Channel 1,Signal3+	
24	NC	No connection	
25	NC	No connection	
26	GND	Ground	
27	GND	Ground	
28	CH2_0-	LVDS Channel 2,Signal0-	
29	CH2_0+	LVDS Channel 2,Signal0+	
30	CH2_1-	LVDS Channel 2,Signal1-	
31	CH2_1+	LVDS Channel 2,Signal1+	
32	CH2_2-	LVDS Channel 2,Signal2-	
33	CH2_2+	LVDS Channel 2,Signal2+	
34	GND	Ground	
35	CH2_CLK-	LVDS Channel 2,Clock-	
36	CH2_CLK+	LVDS Channel 2,Clock+	
37	GND	Ground	
38	CH2_3-	LVDS Channel 2,Signal3-	
39	CH2_3+	LVDS Channel 2,Signal3+	
40	NC	No connection	
41	NC	No connection	

42	GND	Ground	
43	GND	Ground	
44	GND	Ground	
45	GND	Ground	
46	GND	Ground	
47	NC	No connection	
48	VDD(12V)	Power Supply：+12V	
49	VDD(12V)	Power Supply：+12V	
50	VDD(12V)	Power Supply：+12V	
51	VDD(12V)	Power Supply：+12V	

Backlight Unit Pins:

No.	Color	Function
1	CH1+	VLED OUT CH1
2	CH1-	I Return CH1
3	NC	No connection
4	NC	No connection
5	CH2+	VLED OUT CH2
6	CH2-	I Return CH2

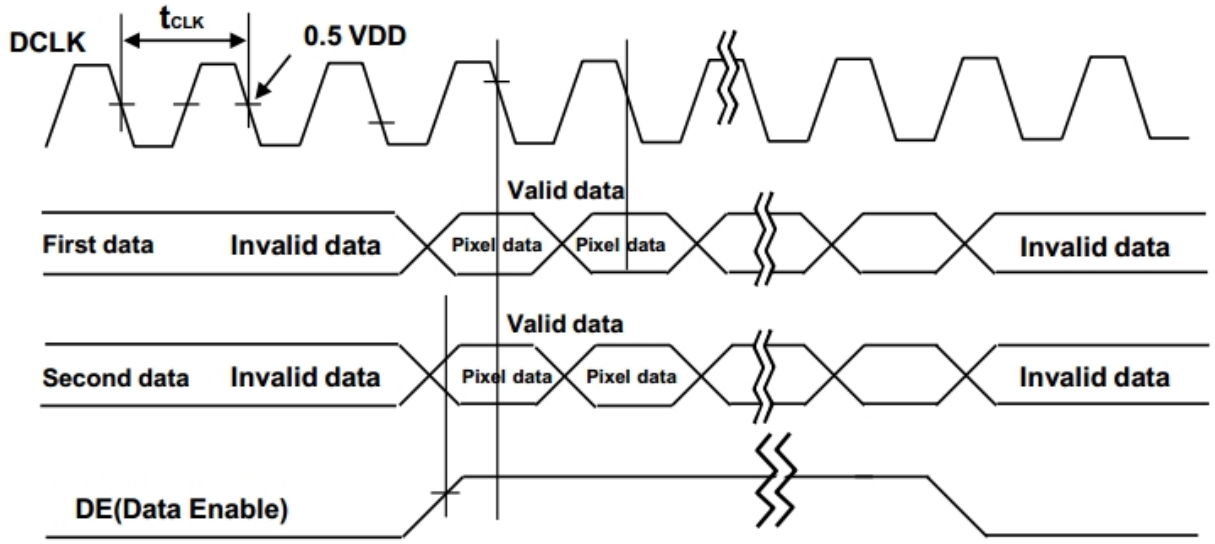
9. Signal Timing Specification

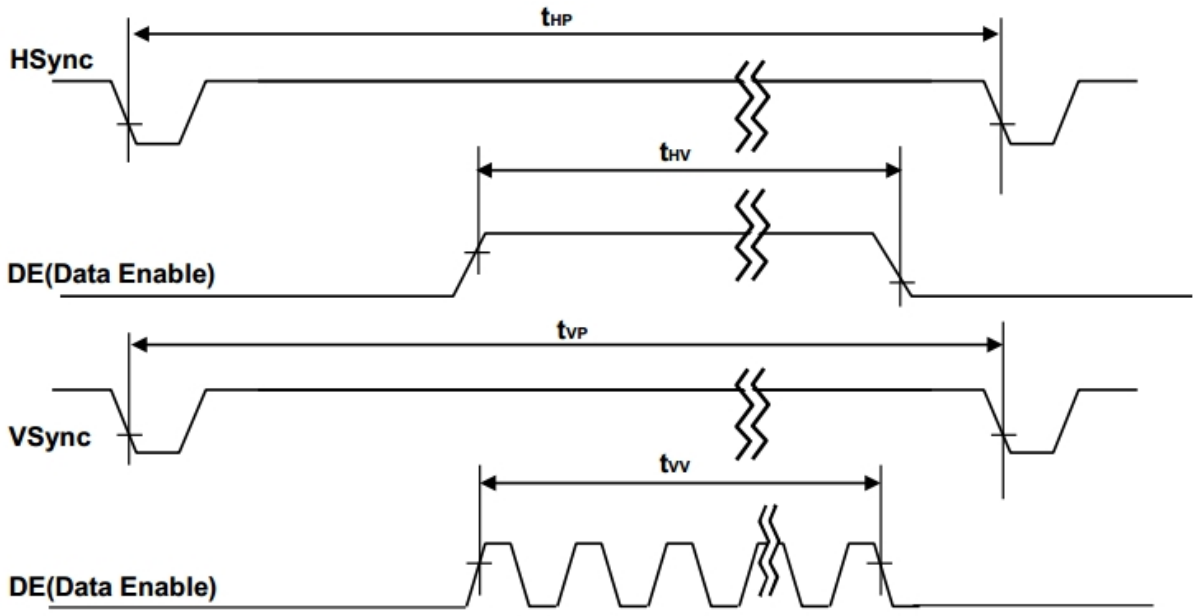
9.1. Timing Parameters (DE only mode)

Item		Symbols		Min	Typ	Max	Unit
Clock	Frequency	1/Tc		58	74.25	97	MHz
	High Time	Tch		-	4/7Tc	-	
	Low Time	Tcl		-	4/7Tc	-	
Frame Period		Tv		1100	1125	1149	lines
				47	60	78	Hz
Horizontal Active Display Term		Valid	t_{HV}	-	960	-	t_{CLK}
		Total	t_{HP}	1060	1100	1200	t_{CLK}
Vertical Active Display Term		Valid	t_{VV}	-	1080	-	t_{HP}
		Total	t_{VP}	1100	1125	1149	t_{HP}

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

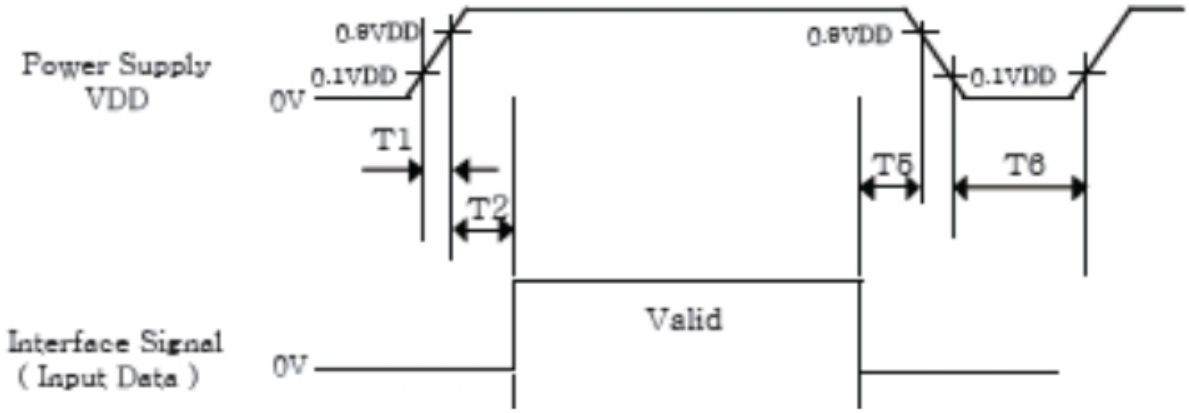
9.2. Signal Timing Waveform





10. Power Sequence

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



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	20	ms
T2	0	-	50	ms
T5	0	-	50	ms
T6	1	-	-	s

Notes: 1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.
2. Back Light must be turn on after power for logic and interface signal are valid.

11. Quality Assurance

11.1. Purpose

This standard for Quality Assurance assures the quality of LCD module products supplied to customer.

11.2. Standard for Quality Test

11.2.1. Sampling Plan:

GB2828.1-2012

Single sampling, general inspection level II

11.2.2. Sampling Criteria:

Visual inspection: AQL 1.5%

Electrical functional: AQL 0.65%.

11.2.3. Reliability Test:

Detailed requirement refer to Reliability Test Specification.

11.3. Nonconforming Analysis & Disposition

11.3.1. Nonconforming analysis:

11.3.1.1. Customer should provide overall information of non-conforming sample for their complaints.

11.3.1.2. After receipt of detailed information from customer, the analysis of nonconforming parts usually should be finished in one week.

11.3.1.3. If cannot finish the analysis on time, customer will be notified with the progress status.

11.3.2. Disposition of nonconforming:

11.3.2.1. Non-conforming product over PPM level will be replaced.

11.3.2.2. The cause of non-conformance will be analyzed. Corrective action will be discussed and implemented.

11.4. Agreement Items

Shall negotiate with customer if the following situation occurs:

11.4.1. There is any discrepancy in standard of quality assurance.

11.4.2. Additional requirement to be added in product specification.

11.4.3. Any other special problem.

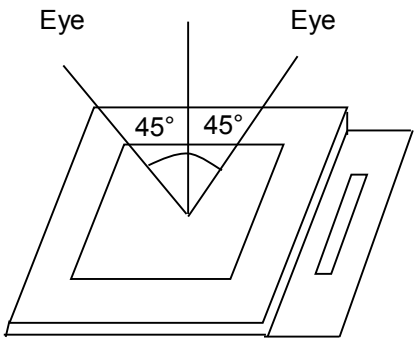
11.5. Standard of the Product Visual Inspection

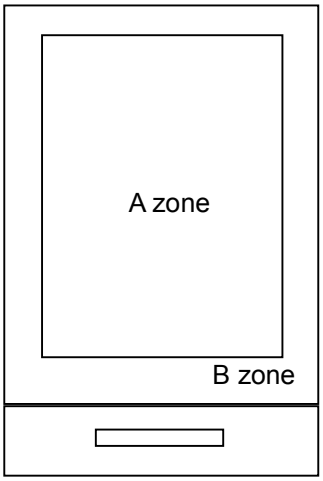
11.5.1. Appearance inspection:

11.5.1.1. The inspection must be under illumination about 1000 – 1500 lx, and the distance of view must be at 30cm ± 2cm.

11.5.1.2. The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

11.5.1.3. Definition of area: A Zone: Active Area, B Zone: Viewing Area,



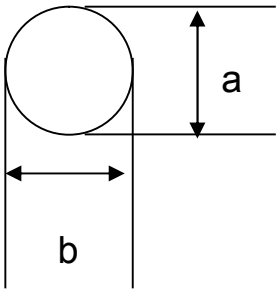


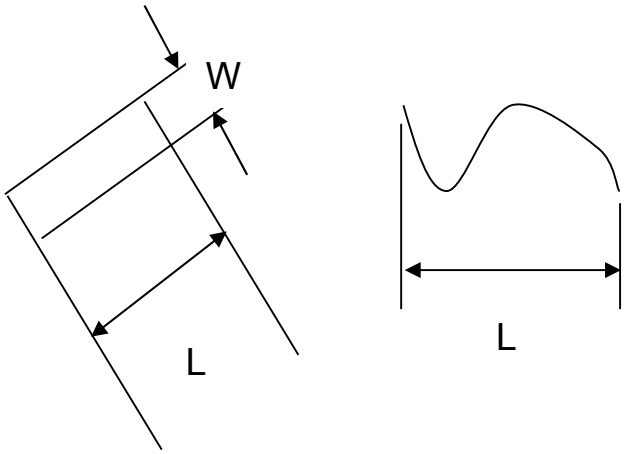
11.5.2. Basic principle:

11.5.2.1. A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.

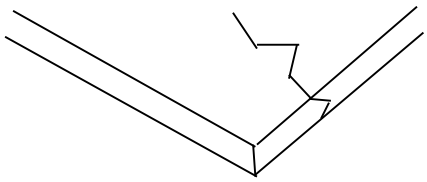
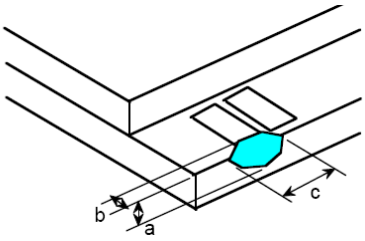
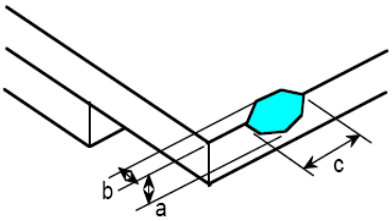
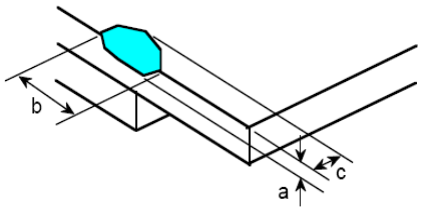
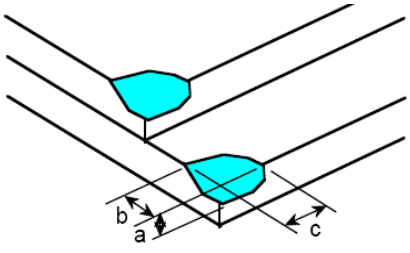
11.5.2.2. New item must be added on time when it is necessary.

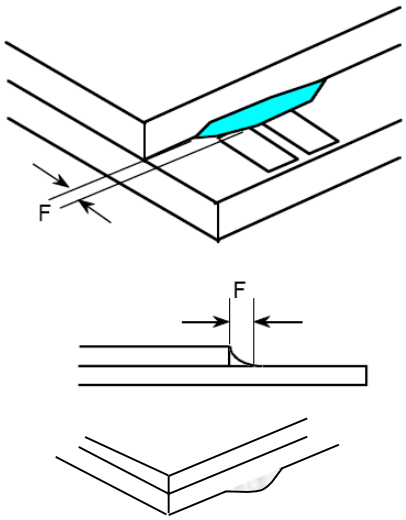
11.6.Inspection Specification for the TFT module

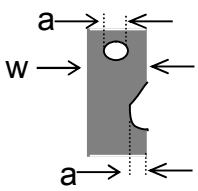
<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>01</td><td>Black / White spot
Foreign material
(Round type)
Pinholes
Stain
Particles inside cell.
(Minor defect)</td><td>


<table>
<tr><th>Area / Size</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.20</td><td>Ignore</td></tr>
<tr><td>0.20<φ≤0.50</td><td>N≤3</td></tr>
<tr><td>0.50<φ</td><td>0</td></tr>
</table>
φ= (a + b) /2
Distance between 2 defects should more than 5mm apart.
</td></tr>
<tr><td>02</td><td>Electrical Defect
(Minor defect)</td><td>
<table>
<tr><td rowspan="2">Bright dot</td><td>Display Area</td><td>Total</td><td rowspan="3">Note1</td></tr>
<tr><td>N≤2</td><td>N≤2</td></tr>
<tr><td>Dark dot</td><td>N≤4</td><td>N≤4</td></tr>
<tr><td>Total dot</td><td>N≤4</td><td>N≤4</td></tr>
<tr><td>Mura</td><td colspan="2">Not visible through 5% ND filters.</td><td>Note 2</td></tr>
</table>
Remark:
1. Bright dot caused by scratch and foreign object accords to item 1.
</td></tr>
<tr><td>03</td><td>Black and White line
Scratch
Foreign material
(Line type)
(Minor defect)</td><td>


<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.1</td><td>Ignore</td></tr>
<tr><td>L ≦ 2.5</td><td>0.1 < W ≦ 0.2</td><td>3</td></tr>
<tr><td>L>2.5</td><td>0.2 < W</td><td>0</td></tr>
<tr><td colspan="2">Total</td><td>3</td></tr>
</table>
Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.
</td></tr>
</table>

<table>
<tr><td>04</td><td>Glass Crack
(Minor defect)</td><td colspan="2"> 
Crack is potential to enlarge, any type is not allowed.</td></tr>
<tr><td>05</td><td>Glass Chipping Pad Area:
(Minor defect)
  </td><td colspan="2"><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c > 3.0, b< 1.0</td><td>1</td></tr><tr><td>c< 3.0, b< 1.0</td><td>3</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
<tr><td>06</td><td>Glass Chipping Rear of Pad Area:
(Minor defect)
  </td><td colspan="2"><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c > 3.0, b< 1.0</td><td>1</td></tr><tr><td>c< 3.0, b< 1.0</td><td>2</td></tr><tr><td>c< 3.0, b< 0.5</td><td>4</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
<tr><td>07</td><td>Glass Chipping Except Pad Area:
(Minor defect)
  </td><td colspan="2"><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c > 3.0, b< 1.0</td><td>1</td></tr><tr><td>c< 3.0, b< 1.0</td><td>2</td></tr><tr><td>c< 3.0, b< 0.5</td><td>4</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
<tr><td>08</td><td>Glass Corner Chipping:
(Minor defect)
  </td><td colspan="2"><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c < 3.0, b< 3.0</td><td>Ignore</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
</table>

<table>
<tr>
<td>09</td>
<td>Glass Burr:
(Minor defect)
 

</td>
<td><table><tr><th>Length</th><th>Acc. Qty</th></tr><tr><td>F < 1.0</td><td>Ignore</td></tr></table>
Glass burr don’t affect
assemble and module dimension.</td>
</tr>
<tr>
<td>10</td>
<td>FPC Defect:
(Minor defect)
 
</td>
<td>10.1 Dent, pinhole width a<w/3.
(w: circuitry width.)
10.2 Open circuit is unacceptable.
10.3 No oxidation, contamination and distortion.</td>
</tr>
<tr>
<td>11</td>
<td>Bubble on Polarizer
(Minor defect)</td>
<td><table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>φ≤0.30</td><td>Ignore</td></tr><tr><td>0.30 <φ≤0.50</td><td>N≤2</td></tr><tr><td>0.50 < φ</td><td>N=0</td></tr></table></td>
</tr>
<tr>
<td>12</td>
<td>Dent on Polarizer
(Minor defect)</td>
<td><table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>φ≤0.25</td><td>Ignore</td></tr><tr><td>0.25 <φ≤0.50</td><td>N≤4</td></tr><tr><td>0.50 < φ</td><td>None</td></tr></table></td>
</tr>
<tr>
<td>13</td>
<td>Bezel</td>
<td>13.1 No rust, distortion on the Bezel.
13.2 No visible fingerprints, stains or other contamination.</td>
</tr>
</table>

14	Touch Panel	D: Diameter W: width L: length 14.1 Spot: D<0.25 is acceptable 0.25≤D≤0.4 2dots are acceptable and the distance between defects should more than 10 mm. D>0.4 is unacceptable 14.2 Dent: D>0.40 is unacceptable 14.3 Scratch: W≤0.03, L≤10 is acceptable, 0.03<W≤0.10, L≤10 is acceptable Distance between 2 defects should more than 10 mm. W>0.10 is unacceptable.
15	PCB	15.1 No distortion or contamination on PCB terminals. 15.2 All components on PCB must same as documented on the BOM/component layout. 15.3 Follow IPC-A-600F.
16	Soldering	Follow IPC-A-610C standard
17	Electrical Defect (Major defect)	The below defects must be rejected. 17.1 Missing vertical / horizontal segment, 17.2 Abnormal Display. 17.3 No function or no display. 17.4 Current exceeds product specifications. 17.5 LCD viewing angle defect. 17.6 No Backlight. 17.7 Dark Backlight. 17.8 Touch Panel no function.

Remark: LCD Panel Broken shall be rejected. Defect out of LCD viewing area is acceptable.

11.7. Classification of Defects

11.7.1. Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

11.7.2. Two minor defects are equal to one major in lot sampling inspection.

11.8. Identification/marking criteria

Any unit with illegible / wrong /double or no marking/ label shall be rejected.

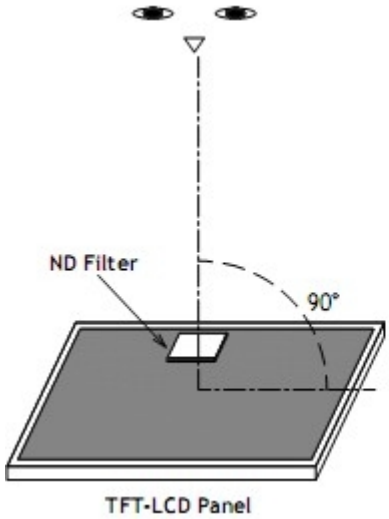
11.9. Packing

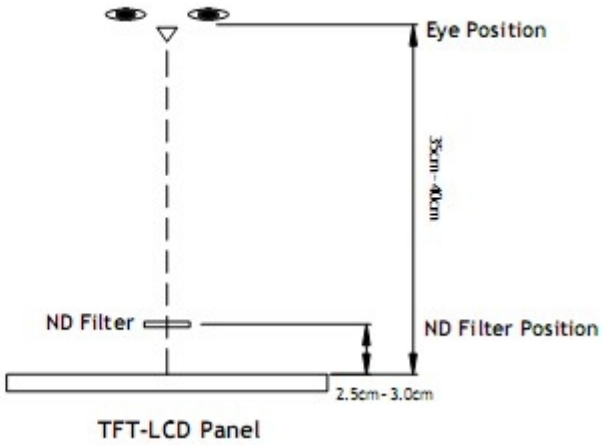
11.9.1. There should be no damage of the outside carton box, each packaging box should have one identical label.

11.9.2. Modules inside package box should have compliant mark.

11.9.3. All direct package materials shall offer ESD protection.

Note1: Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixel area.





Bright dot: The bright dot size defect at black display pattern. It can be recognized by 2% transparency of filter when the distance between eyes and panel is 350mm±50mm.

Dark dot: Cyan, Magenta or Yellow dot size defect at white display pattern. It can be recognized by 5% transparency of filter when the distance between eyes and panel is 350mm±50mm.

Note2: Mura on display which appears darker / brighter against background brightness on parts of display area.

12. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	+50°C, 96Hrs	2	GB/T2423.2 -2008
2	Low Temperature Operating	0°C, 96Hrs	2	GB/T2423.1 -2008
3	High Humidity	+50°C, 80%RH, 96Hrs	2	GB/T2423.3 -2006
4	High Temperature Storage	+60°C, 96Hrs	2	GB/T2423.2 -2008
5	Low Temperature Storage	-20°C, 96Hrs	2	GB/T2423.1 -2008
6	Thermal Cycling Test	-20°C, 60min~+60°C, 60min, 20 cycles.	2	GB/T2423.22 -2012
7	Packing vibration	Frequency range:10Hz~50Hz Acceleration of gravity:1.5G X, Y, Z 30 min for each direction.	2	GB/T5170.14 -2009
8	Electrical Static Discharge	Air:±4kV 150pF/330Ω 5 times	2	GB/T17626.2 -2006
		Contact:±2kV 150pF/330Ω 5 times		
9	Drop Test (Packaged)	Height:80 cm,1 corner, 3 edges, 6 surfaces.	2	GB/T2423.8 -1995

Note1. No defection cosmetic and operational function allowable.

Note2. Total current Consumption should be below double of initial value

13. Precautions and Warranty

13.1. Safety

13.1.1. The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

13.1.2. Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

13.2. Handling

13.2.1. Reverse and use within ratings in order to keep performance and prevent damage.

13.2.2. Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

13.3. Storage

13.3.1. Do not store the LCD module beyond the specified temperature ranges.

13.3.2. Strong light exposure causes degradation of polarizer and color filter.

13.4. Metal Pin (Apply to Products with Metal Pins)

13.4.1. Pins of LCD and Backlight

13.4.1.1. Solder tip can touch and press on the tip of Pin LEAD during the soldering

13.4.1.2. Recommended Soldering Conditions

Solder Type: Sn96.3~94-Ag3.3~4.3-Cu0.4~1.1

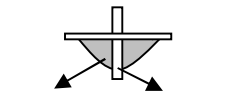
Maximum Solder Temperature: 370℃

Maximum Solder Time: 3s at the maximum temperature

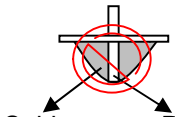
Recommended Soldering Temp: 350±20℃

Typical Soldering Time: ≤3s

13.4.1.3. Solder Wetting



Recommended



Not Recommended

13.4.2. Pins of EL

13.4.2.1. Solder tip can touch and press on the tip of EL leads during soldering.

13.4.2.2. No Solder Paste on the soldering pad on the motherboard is recommended.

13.4.2.3. Recommended Soldering Conditions

Solder type: Nippon Alimit Leadfree SR-34, size 0.5mm

Recommended Solder Temperature: 270～290℃

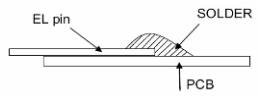
Typical Soldering Time: ≤2s

Minimum solder distance from EL lamp (body):2.0mm

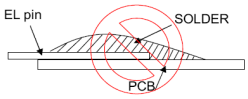
13.4.2.4. No horizontal press on the EL leads during soldering.

13.4.2.5. 180° bend EL leads three times is not allowed.

13.4.2.6. Solder Wetting

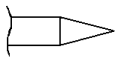


Recommended

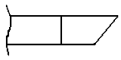


Not Recommended

13.4.2.7. The type of the solder iron:

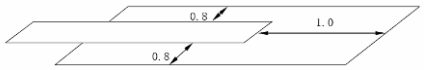


Recommended



Not Recommended

13.4.2.8. Solder Pad



13.5. Operation

13.5.1. Do not drive LCD with DC voltage

13.5.2. Response time will increase below lower temperature

13.5.3. Display may change color with different temperature

13.5.4. Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

13.5.5. Do not connect or disconnect the LCM to or from the system when power is on.

13.5.6. Never use the LCM under abnormal condition of high temperature and high humidity.

13.5.7. Module has high frequency circuits. Sufficient suppression to the electromagnetic interface shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

13.5.8. Do not display the fixed pattern for long time（we suggest the time not longer than one hour）because it may develop image sticking due to the TFT structure.

13.6. Static Electricity

13.6.1. CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.

13.6.2. The normal static prevention measures should be observed for work clothes and benches.

13.6.3. The module should be kept into anti-static bags or other containers resistant to static for storage.

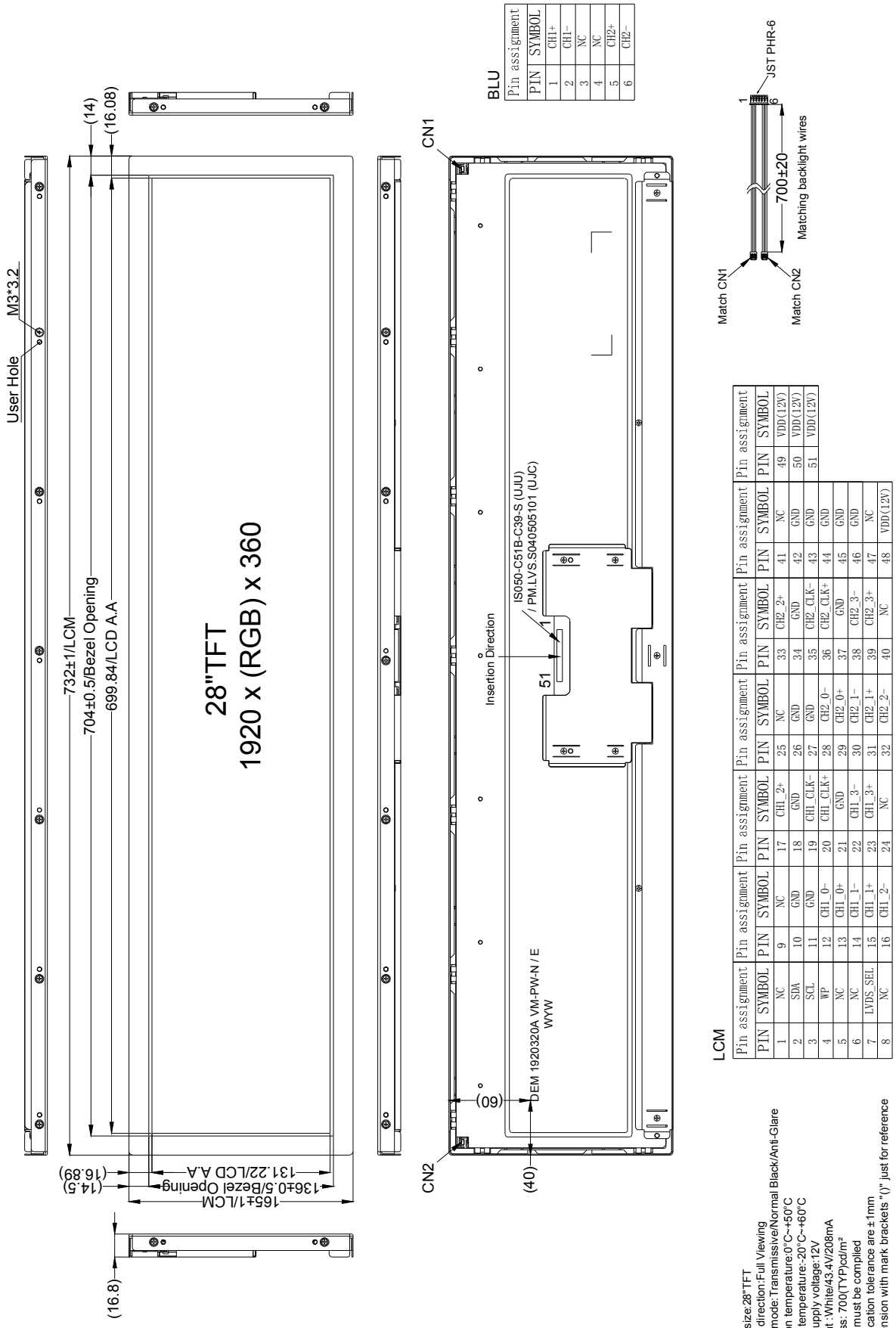
13.7. Limited Warranty

13.7.1. Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.

13.7.2. If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

13.7.3. After the product shipped, any product quality issues must be feedback within three months, otherwise, we will not be responsible for the subsequent or consequential events.

14. Outline Drawing



LCM

Pin assignment			Pin assignment			Pin assignment			Pin assignment			Pin assignment		
PIN	SYMBOL		PIN	SYMBOL		PIN	SYMBOL		PIN	SYMBOL		PIN	SYMBOL	
1	NC	9	NC	17	CH1_2+	25	NC	33	CH2_2+	41	NC	49	VDD(12V)	
2	SDA	10	GND	18	GND	26	GND	34	GND	42	GND	50	VDD(12V)	
3	SCL	11	GND	19	CH1_CLK-	27	GND	35	CH2_CLK-	43	GND	51	VDD(12V)	
4	WP	12	CH1_0-	20	CH1_CLK+	28	CH2_0-	36	CH2_CLK+	44	GND			
5	NC	13	CH1_0+	21	GND	29	CH2_0+	37	GND	45	GND			
6	NC	14	CH1_1-	22	CH1_3-	30	CH2_1-	38	CH2_3-	46	GND			
7	LVDS_SEL	15	CH1_1+	23	CH1_3+	31	CH2_1+	39	CH2_3+	47	NC			
8	NC	16	CH1_2-	24	NC	32	CH2_2-	40	NC	48	VDD(12V)			

NOTES:
1.Display size:28"TFT
2.Viewing direction:Full Viewing
4.Display mode:Transmissive/Normal Black/Anti-Glare
5.Operation temperature:0°C~+50°C
6.Storage temperature:-20°C~+60°C
7.Power supply voltage:12V
8.Backlight :White/43.4V/208mA
9.Brighness: 700(TYP)cd/m²
10.ROHS must be complied
*Unspecification tolerance are ±1mm
*"The dimension with mark brackets "()" just for reference