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VXT084XJWA-01

☐ Preliminary Specification

☐ Final Specification

Approved By:
Date:

RECORD OF REVISION

Rev No.	Rev Date	Page	Contents	Editor
V00	2025/4.31		New issue.	Bob
V01	2025-06-11		Revised the drawing in Item#3	Solon

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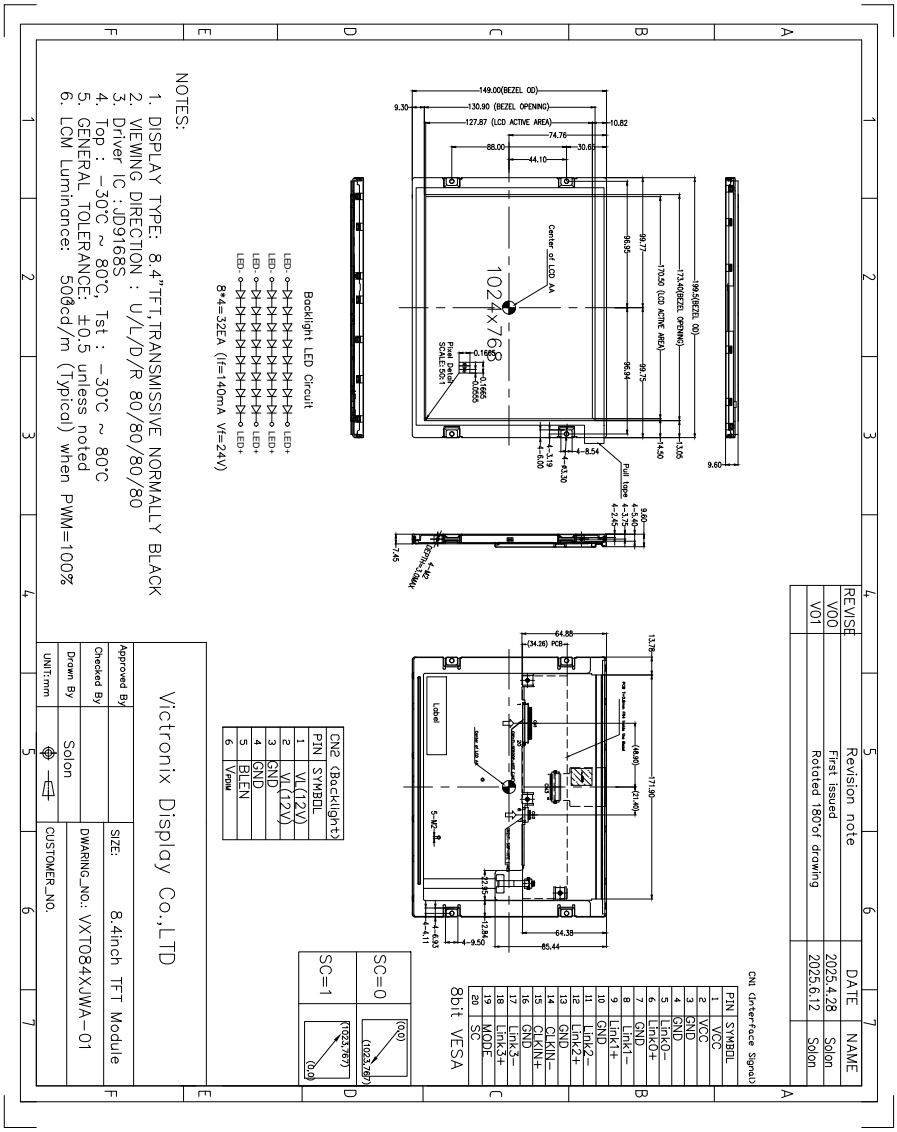
This specification defines general provisions as well as inspection standards for TFT module supplied by Victronix.
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution

2. General Specifications

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	All	O'Clock	
Operating temperature	-30~+80	℃	
Storage temperature	-30~+80	℃	
Module size	8.4	inch	
Active Area(W×H)	170.496X127.872	mm	
Number of Dots	1024（RGB）*768	dots	
Controller	JD9168S	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	199.5x149.0x9.60	mm	
Backlight	8x4-LEDs (white)	pcs	
Weight	---	g	
Interface	LVDS	-	

3.Outline Drawing



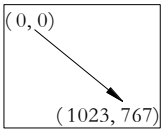
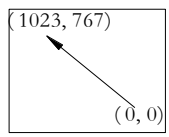
4. Interface Description

4..1 CN 1(Interface Signal)

Used connector: 20186-020E-11F (I-PEX) or FI-SEB20P-HFE (JAE)

Corresponding connector: 20197-□20U-F (I-PEX) or FI-S20S[for discrete Wire],

FI-SE20ME[for FPC] (JAE)

Pin No.	Symbol	I/O	Function
1-2	VCC	P	Power supply
3-4	GND	P	Ground.
5	LINK0-	I	LVDS lane0 input
6	LINK0+	I	
7	GND	P	Ground.
8	LINK1-	I	LVDS lane1 input
9	LINK1+	I	
10	GND	P	Ground.
11	LINK2-	I	LVDS lane2 input
12	LINK2+	I	
13	GND	P	Ground.
14	CLKIN-	I	LVDS CLK input
15	CLKIN+	I	
16	GND	P	Ground.
17	LINK3-	I	LVDS lane3 input
18	LINK3+	I	
19	MODE	-	Not connection
20	SC	I	Scan direction control (Low=Normal, High=Reverse) SC=0  SC=1 

4.2 CN 2(Backlight)

Backlight-side connector: FI-S6P-HFE (JAE)

Corresponding connector: FI-S6S (JAE)

Pin No.	Symbol	I/O	Function
1-2	VL	P	Power supply For BL.
3-4	GND	P	Ground.
5	BLEN	I	LED driver enable input
6	VPDIM	I	PWM dimming control input.

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5. Absolute Maximum Ratings(Ta=25℃)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VCC	-0.3	4.0	V	1，2
	VL	-0.3	14.0	V	1，2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V_{DD} >V_{SS} must be maintained.

5.2Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-30℃	80℃	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.
   The phenomenon is reversible.
3. Ta<=40℃:85%RH MAX.
   Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

6. Electrical Specifications and Instruction Code

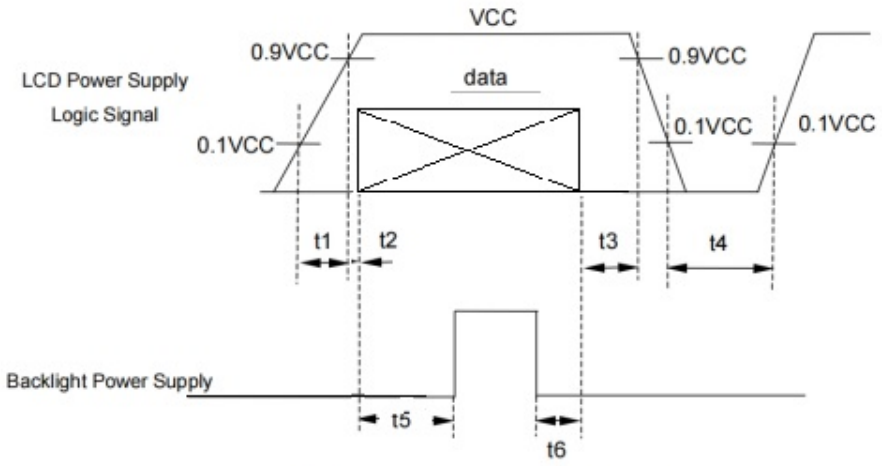
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VCC	Ta=25℃	3.0	3.3	3.6	V	1
Backlight Power supply		VL	Ta=25℃	9	12.0	13.2	V	1
Input voltage	'H'	VIH	Ta=25℃	0.7VCC	-	VCC	V	
	'L'	VIL	Ta=25℃	-0.3	-	0.3VCC	V	
Current of power supply		ICC	Ta=25℃	-	180	-	mA	1

Note: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded. Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

7. Timing Characteristics

7.1 Power Sequence

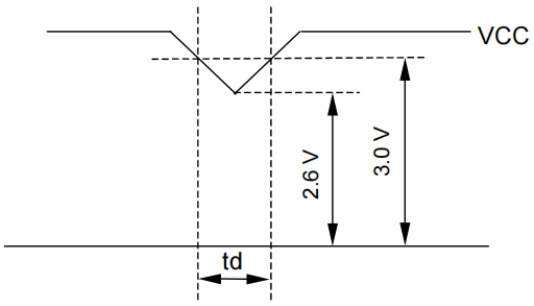
0.1 ms ≤ t1 ≤ 10 ms	200 ms ≤ t4
0 ≤ t2 ≤ 50 ms	200 ms ≤ t5
0 < t3 ≤ 50 ms	0 ≤ t6



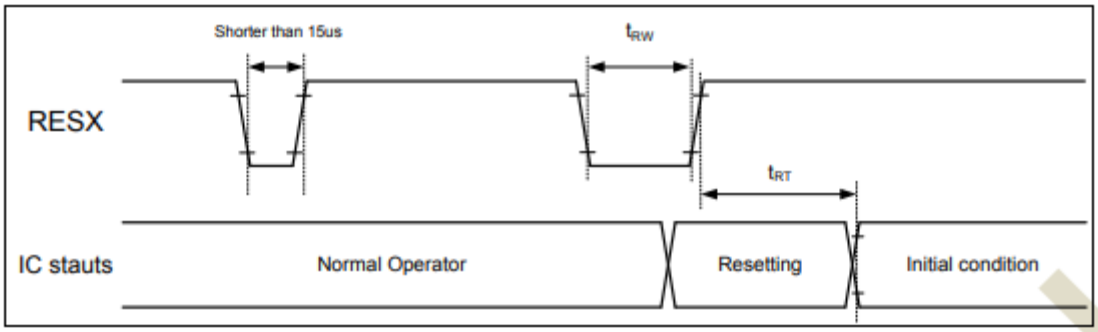
data: RGB DATA, DCLK, DENA, MODE, SC

VCC-dip conditions:

1) When 2.6 V ≤ VCC < 3.0 V, td ≤ 10 ms
2) When VCC < 2.6 V
   VCC-dip conditions should also follow the power and signals sequence.



7.2 Reset input timings



Reset input timings

Symbol	Parameter	Related pins	Min.	Max.	Unit
t_{RW}	Reset "L" pulse width(2)	RESX	20	-	µs
t_{RT}	Reset complete time(3)	-	-	5(5)	ms
		-	-	120(6) (7) (8)	ms

Note:

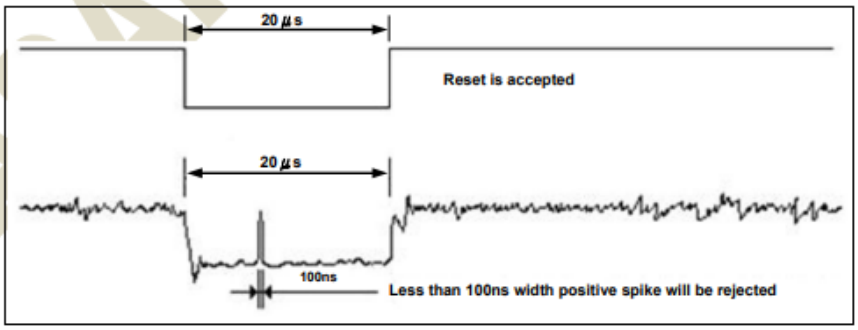
(1) The reset complete time also required time for loading ID bytes from OTP to registers. This loading is done every time when there is HW reset complete time (t_{RT}) within 5 ms after a rising edge of RESX.

(2) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 15 µs	Reset Rejected
Longer than 20 µs	Reset
Between 15 µs and 20 µs	Reset Start

(3) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then returns to Default condition for H/W reset.

(4) Spike Rejection also applies during a valid reset pulse as shown below:



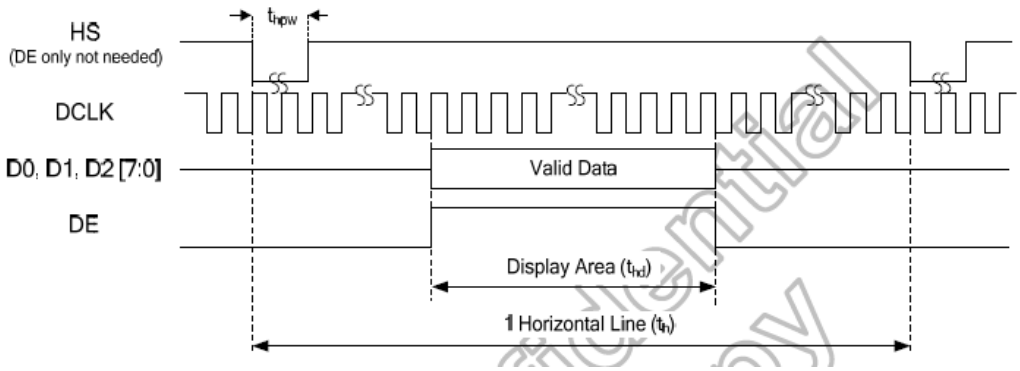
Reset timings

(5) When Reset is applied during Sleep In Mode.
(6) When Reset is applied during Sleep Out Mode.
(7) It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

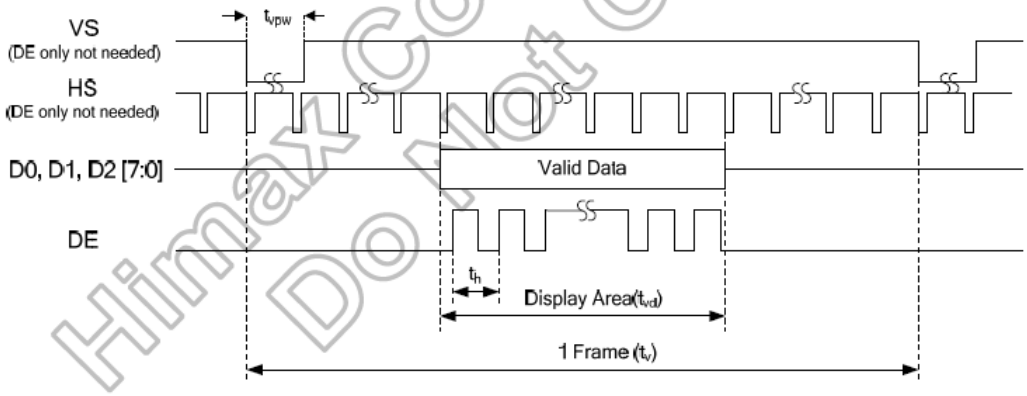
(8) After Sleep Out command, it is necessary to wait 120msec then send RESX.

7.3 Timings mode

- **Horizontal**

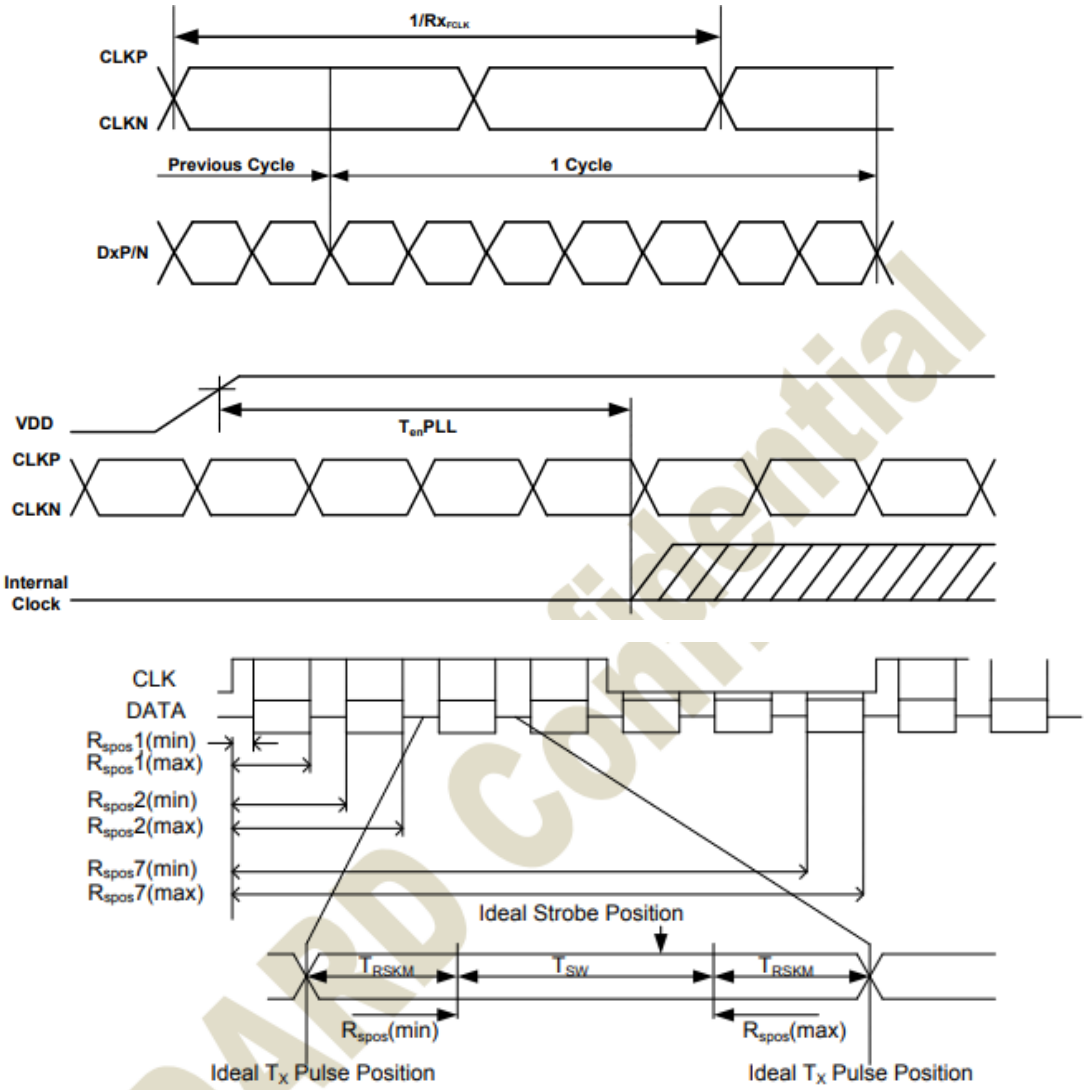


- **Vertical**



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK frequency	FDCLK	49	50	73.6	MHz
Horizontal valid data	thd		1024		DCLK
Hsync pulse width	thpw	10	12	255	DCLK
Hsync back porch	thbp	5	16	255	DCLK
Hsync front porch	thfp	24	26	260	DCLK
1 Horizontal line	th	1053	1066	1331	DCLK
Vertical valid data	tvd		768		H
Vsync pulse width	tvpw	1	3	20	H
Vsync back porch	tvbp	2	5	255	H
Vsync front porch	tvfp	5	8	260	H
1 Vertical field	tv	775	781	921	H
Frame rate	FR		60		Hz

7.4 LVDS electronic characteristics



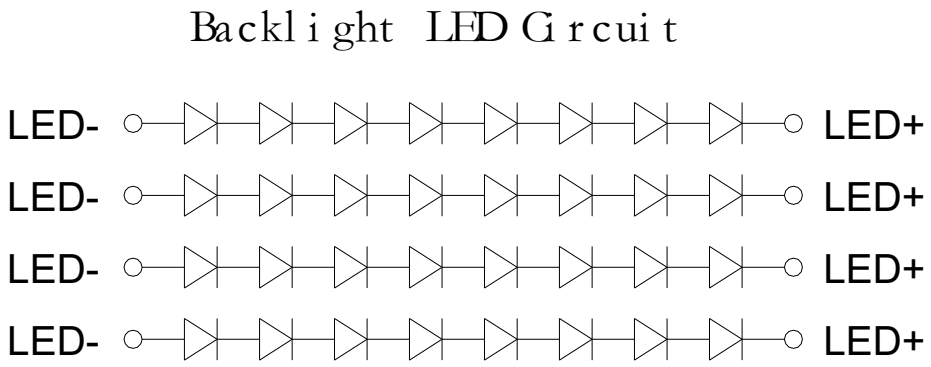
T_{SW}: Strobe width (Internal data sampling window)
R_{spos} : Receiver strobe position
T_{RSKM} : Receiver strobe margin

LVDS AC characteristics

Signal	Symbol	Min.	Typ	Max.	Unit	Description
Clock frequency	Rx_{FCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	$4/(7 \times Rx_{FCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7 \times Rx_{FCLK})$	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

LVDS AC characteristics

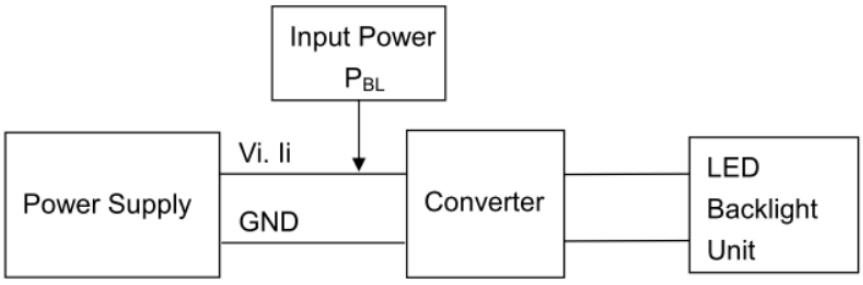
8.Backlight Characteristic



Item		Symbol	Min	Typ	Max	Unit	Note
Supply voltage		VL	9	12.0	13.2	V	1
Supply Current		IL	-	350	-	mA	(VL=12V) PWM=100%
Power Consumption		PL	-	4.2	-	W	(VL=12V) PWM=100%
PWM Control Frequency		FPDIM	100	-	30K	Hz	
Backlight ON-OFF	High	BLEN	1.6	-	VL	V	
	Low		0	-	0.8	V	
PWM Control Level	High	VPDIM	1.6	-	VL	V	
	Low		0	-	0.8	V	
Uniformity		∆ Bp	75	80	-	%	
Life Time		time	-	50K	-	hours	3

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃.

Note 2: LED current is measured by utilizing a high frequency current meter as shown below:



Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and PWM=100%.

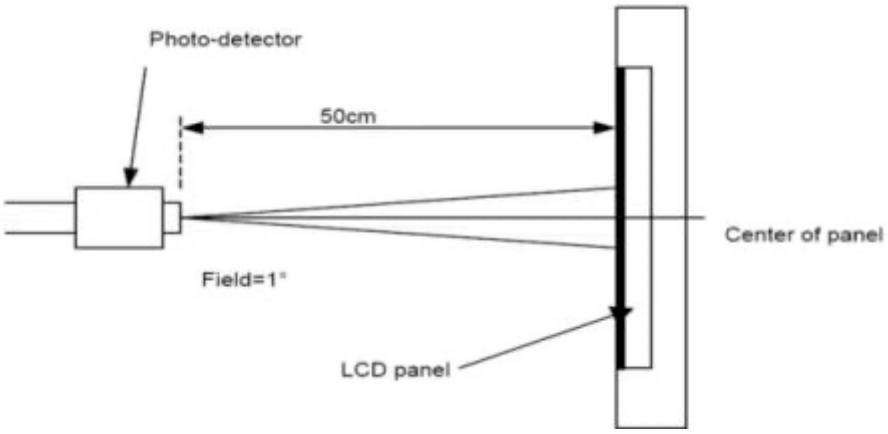
9. Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		PWM=100%	400	500	-	Cd/m^2	1
Uniformity	⊿Bp			75	80	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	85	-	Deg	1,2
	6:00			-	85	-		
	9:00			-	85	-		
	12:00			-	85	-		
Contrast Ratio	Cr		θ=0° Φ=0°	1000	1500	-	-	3,4
Response Time	$T_{r+}T_f$			-	25	30	ms	4,5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ-0.05	0.300	Typ+0.05	-	1,6
		y			0.330		-	
	R	x			0.646		-	
		y			0.317		-	
	G	x			0.290		-	
		y			0.587		-	
	B	x			0.141		-	
		y			0.120		-	
NTSC Ratio	S			60	65	-	%	

*The parameter is slightly changed by temperature, driving voltage and materiel

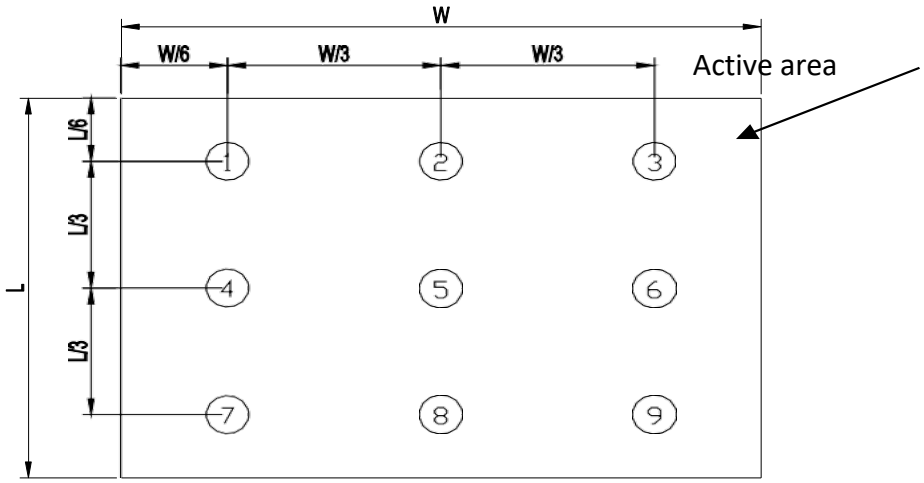
Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7A (Φ8mm)Measuring condition:-Measuring surroundings: Dark room.-Measuring temperature: Ta=25℃.-Adjust operating voltage to get optimum contrast at the center of the display.

The measured value is more than 5 minutes at the center point of the LCD panel, and the backlight is turned on at the same time.

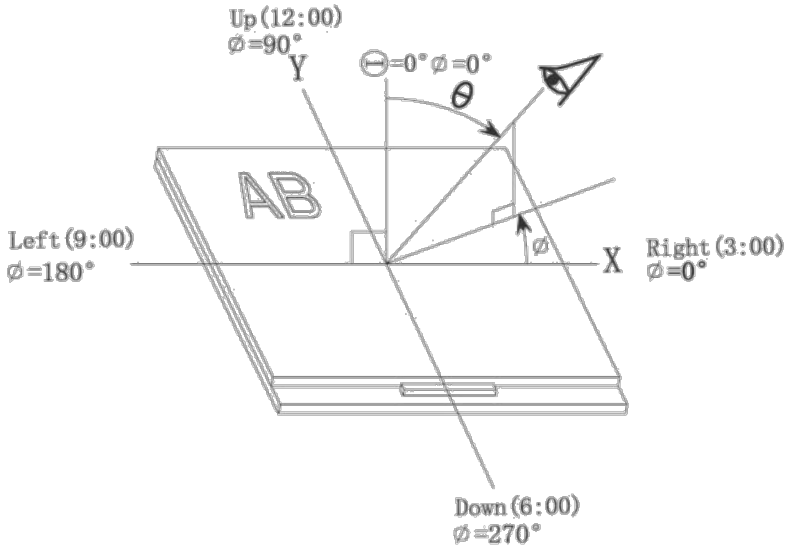


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%);Bp (Max.) = Maximum brightness in 9 measured spots Bp (Min.) = Minimum brightness in 9 measured spots.



Note 3: The definition of viewing angle:Refer to the graph below marked by θ and Φ

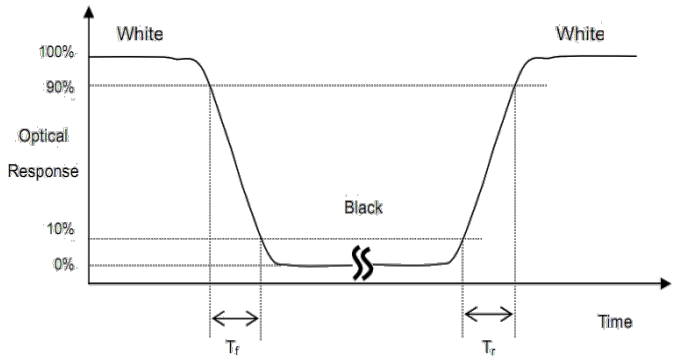


Note 4: Definition of contrast ratio Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface.Luminance shall be measured with all pixels in the

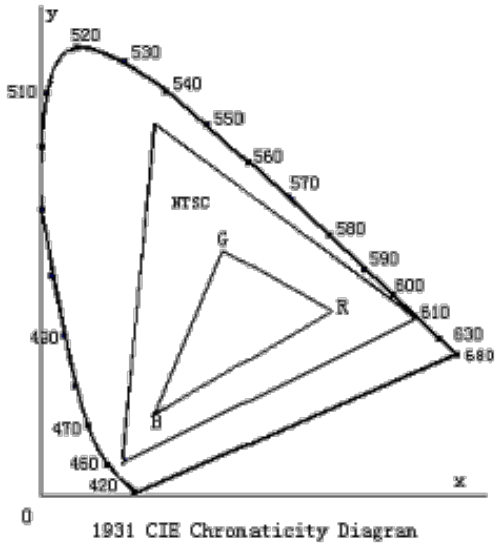
view field set first to white, then to the dark (black) state.

$$\mathbf{CR} = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 5: Definition of Response time The output signals of photo detector are measured when the input signals are changed from “white” to “black”(Tf) and from “black” to “white”(Tr), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.



1931 CIE Chromaticity Diagram

Color gamut:

$$\mathbf{S} = \frac{\textbf{area of RGB triangle}}{\textbf{area of NTSC triangle}} \times 100\%$$

10. Reliability Test Conditions and Methods

No.	Test Items	Test Condition	Inspection After Test
1	High Temperature Storage	80°C±2°C×240Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied. 9.Brightness reduction more than 50%.
2	Low Temperature Storage	-30°C±2°C×240Hours	
3	High Temperature Operating	80°C±2°C×240Hours	
4	Low Temperature Operating	-30°C±2°C×240Hours	
5	Temperature Cycle(Storage)	-30°C ⇐⇒ 80°C (30min) (5min) (30min) 1cycle Total 50cycle.	
6	Operation at High Temperature/Humidity	60°C±5°C×90%RH×240Hours	
7	Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
8	Mechanical Shock (NON-OPERATION)	Shock level: 1470 m/s 2 (150G) Waveform: half sinusoidal wave, 2 ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs	
9	Vibration Test (NON-OPERATION)	Vibration level: 9.8 m/s 2 (1.0G) Waveform: sinusoidal Frequency range: 5 to 500 Hz Frequency sweep rate: 0.5 octave /min Duration: one sweep from 5 to 500 Hz in each of three mutually perpendicular axis(each x,y,z axis: 1 hour, total 3 hours)	
10	Package Drop Test	Height:60cm 1 corner, 3 edges, 6 surfaces	
11	CONTACT DISCHARGE (OPERATION)	150pF, 330Ω, 8kV, 10 times at 1 sec interval	

REMARK:

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

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

3,For ⑥ 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 judge as a good part.

5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

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

11. Inspection Standard

11.1 Scope

Specifications contain
11.1.1 Display Quality Evaluation
11.1.2 Mechanics Specification

11.2 Sampling Plan

Unless there is other agreement, the sampling plan for incoming inspection shall follow MIL-STD-105E.
11.2.1 Lot size: Quantity per shipment as one lot (different model as different lot).
11.2.2 Sampling type: Normal inspection, single sampling.
11.2.3 Sampling level: Level II.
11.2.4 AQL: Acceptable Quality Level
Major defect: AQL=0.65
Minor defect: AQL=1.5

11.3 Panel Inspection Condition

11.3.1 Environment:
Room Temperature: 25±5°C.
Humidity: 65±5% RH.
Illumination: 300 ~ 700 Lux.

11.3.2 Inspection Distance:
35±5 cm

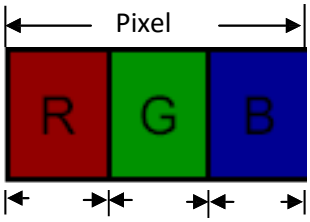
11.3.3 Inspection Angle:
The vision of inspector should be perpendicular to the surface of the Module.
11.3.4 Inspection time：
Perceptibility Test Time: 20 seconds max.

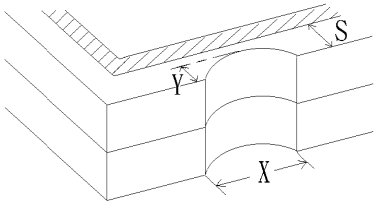
11.4 Inspection Plan

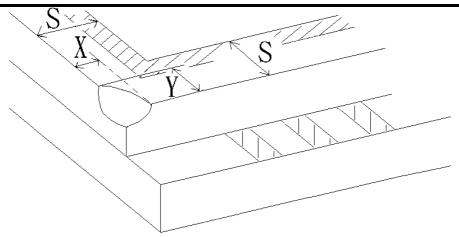
Class	Item	Judgment	Class
Packing & Indicate	1. Outside and inside package.	"MODEL NO.", "LOT NO." and "QUANTITY" should indicate on the package.	Minor
	2. Model mixed and quantity.	Other model mixed Quantity short or over	Major
	3. Product indication.	"MODEL NO." should indicate on the product.	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area.	Polarizer edge or LCD's sealing line is visible in the viewing area…….Rejected.	Minor
	6. Blemish, black spot, white spot in the LCD and LCD glass cracks.	According to standard of visual inspection.(inside viewing area)	Minor
	7. Blemish, black spot, white spot and scratch on the polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	8. Bubble in polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	9. LCD's rainbow color.	Strong deviation color (or newton ring) of LCD……..Rejected. Or according to limited sample.(if needed, and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics.(contrast Vop chromaticity….etc)	According to specification or drawing.(inside viewing area)	Major
	11. Missing line.	Missing dot line character	Major
	12.Short circuit. Wrong pattern display.	No display, wrong pattern display, current consumption. Out of specification	Major
	13. Dot defect.(for color and TFT)	According to standard of visual Inspection.	Minor

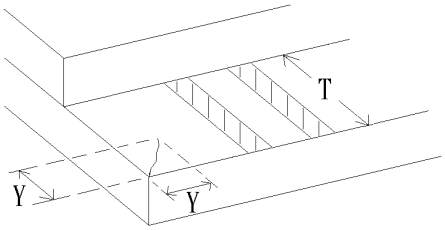
11.5 Standard Of Visual Inspection

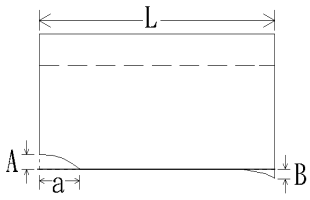
<table>
<tr><th>NO.</th><th>CLASS</th><th>ITEM</th><th>JUDGMENT</th></tr>
<tr><td>11.5.1</td><td>Minor</td><td>Black and white spot.
Foreign materiel.
Dust.
Blemish.
Scratch.</td><td>(A) Round type: Unit: mm
<table>
<tr><th>Diameter (mm.)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.2</td><td>Disregard</td></tr>
<tr><td>0.2 < Φ≦0.5</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.50 < Φ</td><td>0</td></tr>
</table>
Note: Φ = (length+width)/2
(B) Linear type: Unit: mm
<table>
<tr><th>Length</th><th>Width (mm.)</th><th>Acceptable Q'ty</th></tr>
<tr><td>--</td><td>W≦0.05</td><td>Disregard</td></tr>
<tr><td>L≦3.0</td><td>0.05< W≦0.1</td><td>2(Distance>10mm)</td></tr>
<tr><td>--</td><td>0.1 < W</td><td>Not allow</td></tr>
</table></td></tr>
<tr><td>11.5.2</td><td>Minor</td><td>Dent on polarizer.</td><td>Unit: mm.
<table>
<tr><th>Diameter</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.2</td><td>Disregard</td></tr>
<tr><td>0.2 < Φ≦0.5</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.50 < Φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>11.5.3</td><td>Minor</td><td>Bubble in polarizer.</td><td>Unit: mm.
<table>
<tr><th>Diameter</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.2</td><td>Disregard</td></tr>
<tr><td>0.2 < Φ≦0.5</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.50 < Φ</td><td>0</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>11.5.4</td><td>Minor</td><td>Dot defect</td><td>
<table>
<tr><th>Items</th><th>Acceptable Q'ty</th></tr>
<tr><td>Bright dot</td><td>N ≦3</td></tr>
<tr><td>Dark dot</td><td>N ≦3</td></tr>
<tr><td>Total dot</td><td>N ≦6</td></tr>
</table>
Pixel define :
 

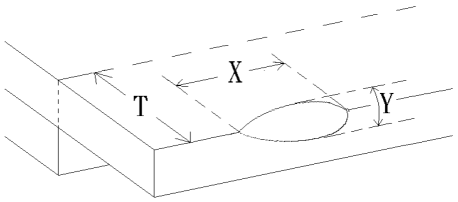
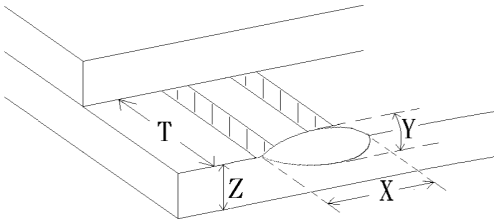
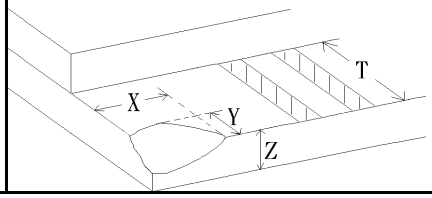
Dot Dot Dot
Note1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.
Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.
Note 3: The bright dot defect must be visible through 2% ND filter
Note 4: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue
</td></tr>
<tr><td>11.5.5</td><td>Minor</td><td>LCD glass chipping.</td><td> 

Y>S
Reject</td></tr>
<tr><td>11.5.6</td><td>Minor</td><td>LCD glass chipping.</td><td> 

X or Y>S
Reject</td></tr>
<tr><td>11.5.7</td><td>Major</td><td>LCD glass crack.</td><td> 

Y>(1/2) T
Reject</td></tr>
<tr><td>11.5.8</td><td>Major</td><td>LCD glass scribe defect.</td><td> 

1. a>L/3, A>1.5mm Reject
2. B : According to dimension</td></tr>
</table>

11.5.9	Minor	LCD glass chipping. (on the terminal area)		Φ = (x+y)/2>2.5mm Reject
11.5.10	Minor	LCD glass chipping. (on the terminal surface)		Y>(1/3)T Reject
11.5.11	Minor	LCD glass chipping.		Y>T Reject

12. Handling Precautions

12.1 Mounting method

The TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly.

- Isopropyl alcohol.
- Ethyl alcohol.

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.
Do not use the following solvent:

- Water.
- Aromatics.

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux.
- Chlorine (Cl) , Sulfur (S).

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to POWER or GROUND, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity.

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electro chemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us.

12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to TFT , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

- END