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# SPECIFICATION

## VXT121QIHA-01

☐ Preliminary Specification

☐ Final Specification

| |
|---|
| **Approved By:** |
| **Date:** |

# RECORD OF REVISION

| Rev No. | Rev Date | Page | Contents | Editor |
|---|---|---|---|---|
| V00 | 2025.1.10 | | New issue. | Solon |
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# 1. Scope

VXT21QIHA-01 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC,a back light unit and PCBA. The 12.1″ display area contains 1280X(RGB)X800 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

# 2. General Specifications

### 2.1 LCD Parameter

| Item | Contents | Unit | Note |
|---|---|---|---|
| LCD Type | TFT | - | |
| Display color | 16.7M | | |
| Viewing Direction | ALL | O'Clock | |
| Grayscale inversion direction | - | O'Clock | |
| Operating temperature | -20~+70 | ℃ | |
| Storage temperature | -20~+70 | ℃ | |
| Module size | 12.1 | inch | |
| Active Area(W×H) | 261.12(H)x163.20(V) | mm | |
| Number of Dots | 1280x 800 | dots | |
| Power Supply Voltage | 3.3 | V | |
| Outline Dimensions | 278.00x184.00x7.10 (10.00Max) | mm | |
| Backlight | 11x4-LEDs (white) | pcs | |
| Weight | - | g | |
| Interface | 6/8 BIT LVDS | - | |



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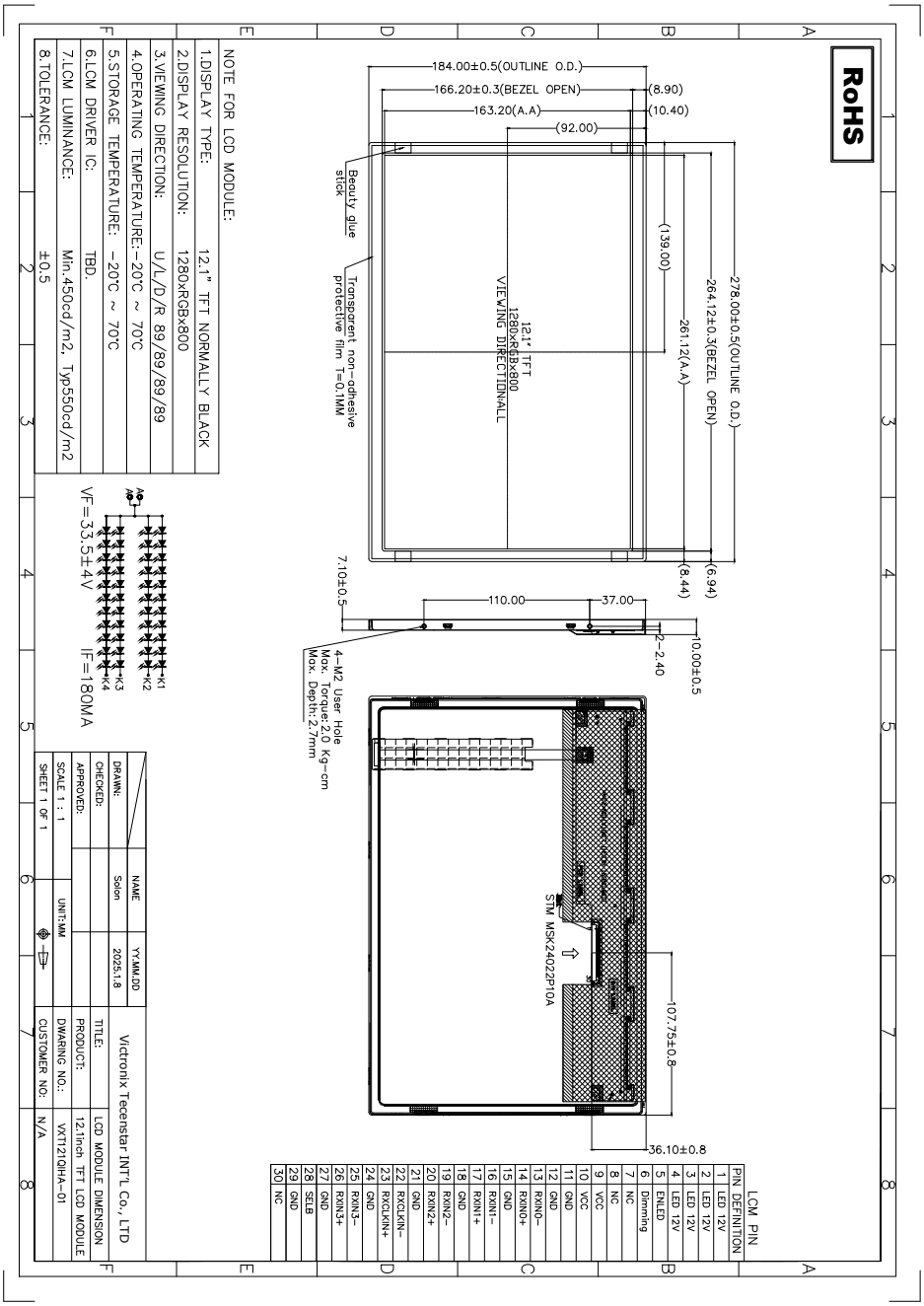
## 3.Outline Drawing



## 4.Interface Description

### 4.1 LCD interface: Connector Part No. STM MSK24022P10A

| Pin No. | Symbol | I/O | Function |
|---|---|---|---|
| 1-4 | LED12V | P | LED power |
| 5 | ENLED | P | Enable pin |
| 6 | Dimming | P | Backlight Adjust |
| 7-8 | NC | - | No connect |
| 9-10 | VCC | P | Power supply: +3.3V |
| 11-12 | GND | P | Ground |
| 13 | RXIN0- | I | Negative transmission data of pixel 0 |
| 14 | RXIN0+ | I | Positive transmission data of pixel 0 |
| 15 | GND | P | Ground |
| 16 | RXIN1- | I | Negative transmission data of pixel 1 |
| 17 | RXIN1+ | I | Positive transmission data of pixel 1 |
| 18 | GND | P | Ground |
| 19 | RXIN2- | I | Negative transmission data of pixel 2 |
| 20 | RXIN2+ | I | Positive transmission data of pixel 2 |
| 21 | GND | P | Ground |
| 22 | RXCLKIN- | I | Negative of clock |
| 23 | RXCLKIN+ | I | Positive of clock |
| 24 | GND | P | Ground |
| 25 | RXIN3- | I | Negative transmission data of pixel 3 |
| 26 | RXIN3+ | I | Positive transmission data of pixel 3 |
| 27 | GND | P | Ground |
| 28 | SELB | P | LVDS 6/8 bit select function control<br>Low: 6 bit Input Mode<br>High: 8 bit Input Mode |
| 29 | GND | P | Ground |
| 30 | NC | - | No connect |



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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 | VDD | -0.3 | 3.6 | 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.

### 5.2 Environmental Absolute Maximum Ratings.

| Item | Storage | | Operating | | Note |
|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | |
| Ambient Temperature | -20℃ | 70℃ | -20℃ | 70℃ | 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℃.



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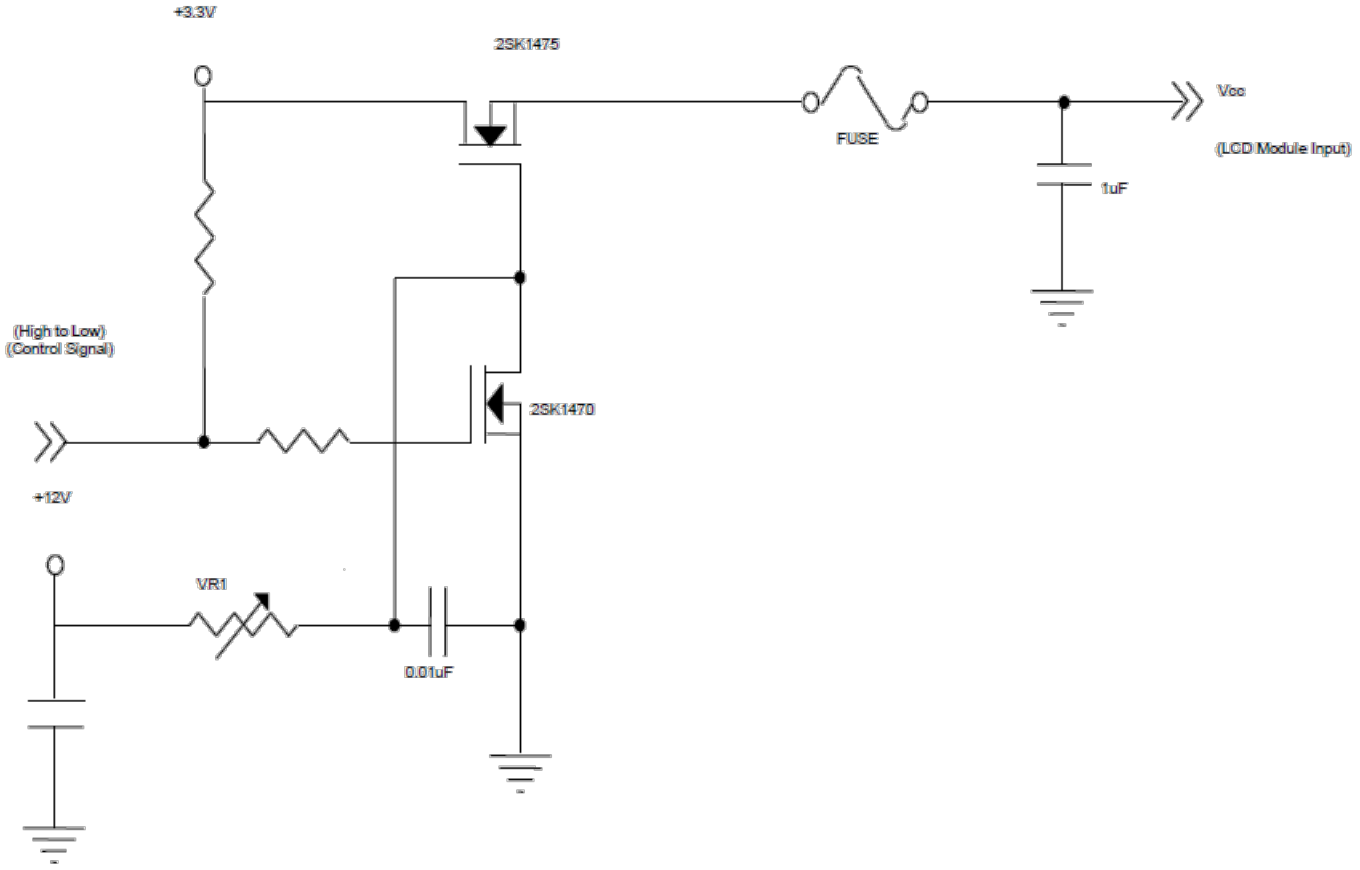
## 6. Electrical Specifications and Instruction Code

### 6.1 Electrical characteristics(Vss=0V ,Ta=25°C)

| Parameter | | Symbol | Value | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Power Supply Voltage | | $V_{CC}$ | 3.0 | 3.3 | 3.6 | V | - |
| Ripple Voltage | | $V_{RP}$ | - | 50 | - | mVp-p | |
| Inrush Current | | $I_{INRUSH}$ | | 1.5 | | A | (2) |
| Power Supply Current | White | Icc | - | 560 | 675 | mA | (3)a |
| | Black | | - | 360 | 430 | mA | (3)b |
| LVDS differential input voltage | | $V_{id}$ | 100 | - | 600 | mV | |
| LVDS common input voltage | | $V_{ic}$ | 1.125 | 1.2 | 1.375 | V | |
| Differential Input Voltage for LVDS Receiver Threshold | "H" Level | $V_{IH}$ | 100 | - | - | mV | - |
| | "L" Level | $V_{IL}$ | - | - | -100 | mV | - |
| Terminating Resistor | | $R_T$ | - | 100 | - | Ohm | - |

Note (1)The module should be always operated within above ranges.

Note (2)Measurement Conditions:



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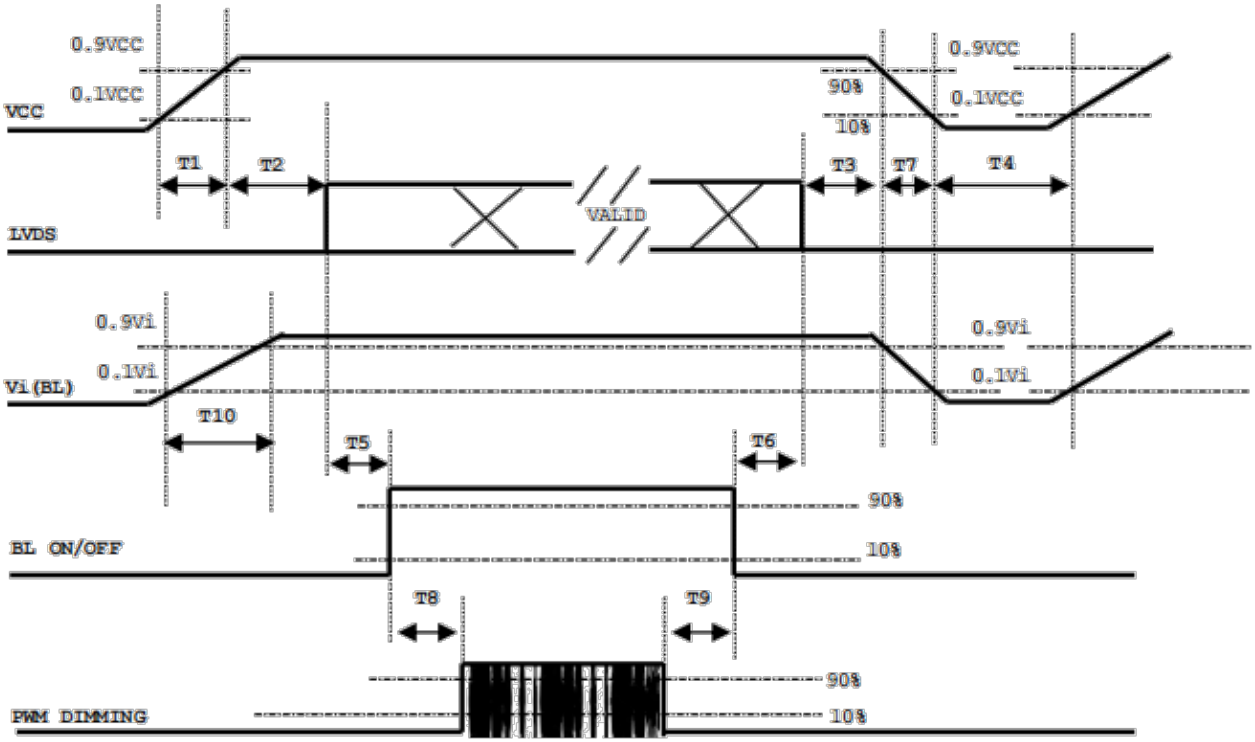
## 7. Timing Characteristics

### 7.1 power on/off sequence




| Parameter | Value | | | Units |
|---|---|---|---|---|
| | Min | Typ | Max | |
| T1 | 0.5 | - | 10 | ms |
| T2 | 0 | - | 50 | ms |
| T3 | 0 | - | 50 | ms |
| T4 | 500 | - | - | ms |
| T5 | 450 | - | - | ms |
| T6 | 200 | - | - | ms |
| T7 | 10 | - | 100 | ms |
| T8 | 10 | - | - | ms |
| T9 | 10 | - | - | ms |
| T10 | 20 | - | 50 | ms |



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## 7.2 Input Signal Timing Specifications

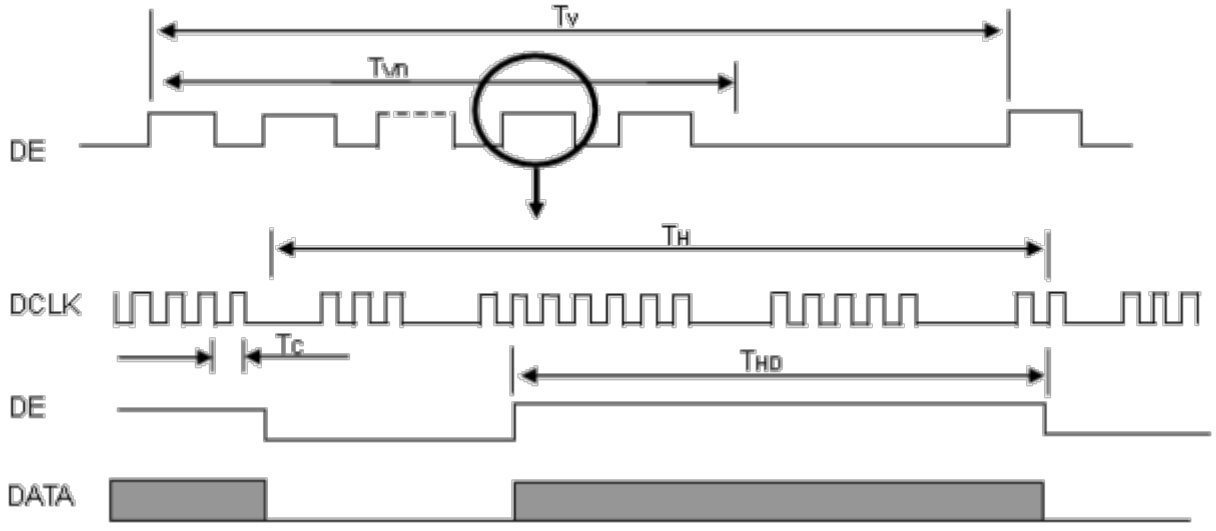
The input signal timing specifications are shown as the following table and timing diagram.

| Signal | Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| LVDS Clock | Frequency | $F_r$ | 65.9 | 71 | 85 | MHz | - |
| | Period | $T_c$ | 13.4 | 14.1 | 15.2 | ns | |
| | Input cycle to cycle jitter | $T_{rd}$ | --- | --- | 200 | ns | (a) |
| | Input Clock to data skew | TLVCCS | -0.02*Tc | --- | 0.02*Tc | ps | (b) |
| | Spread spectrum modulation range | $F_{clkin\_mod}$ | 0.987*Fc | --- | 1.013*Fc | MHz | (c) |
| | Spread spectrum modulation frequency | $F_{SSM}$ | --- | --- | 200 | KHz | |
| Vertical Display Term | Frame Rate | $F_r$ | --- | 60 | --- | Hz | $T_v=T_{vd}+T_{vb}$ |
| | Total | $T_v$ | 808 | 823 | 885 | $T_h$ | - |
| | Active Display | $T_{vd}$ | 800 | 800 | 800 | $T_h$ | - |
| | Blank | $T_{vb}$ | 8 | 23 | 85 | $T_h$ | - |
| Horizontal Display Term | Total | $T_h$ | 1360 | 1440 | 1600 | $T_c$ | $T_h=T_{hd}+T_{hb}$ |
| | Active Display | $T_{hd}$ | 1280 | 1280 | 1280 | $T_c$ | - |
| | Blank | $T_{hb}$ | 80 | 160 | 320 | $T_c$ | - |

Note (1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

Note (2) The Tv(Tvd+Tvb) must be integer, otherwise, the module would operate abnormally.

**INPUT SIGNAL TIMING DIAGRAM**



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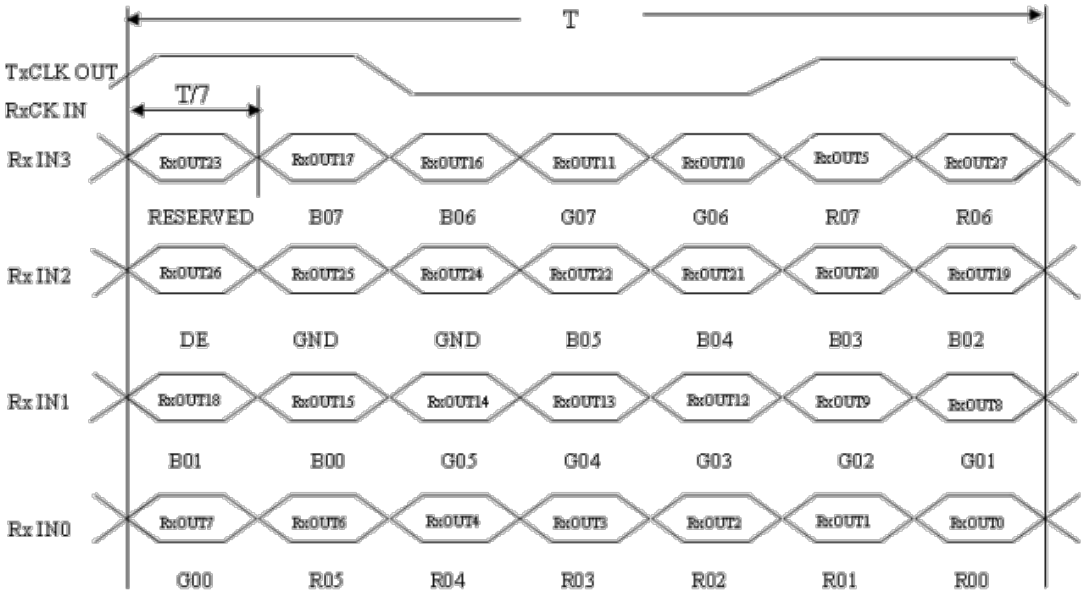
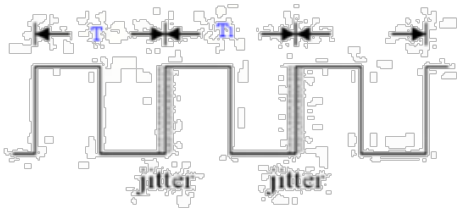
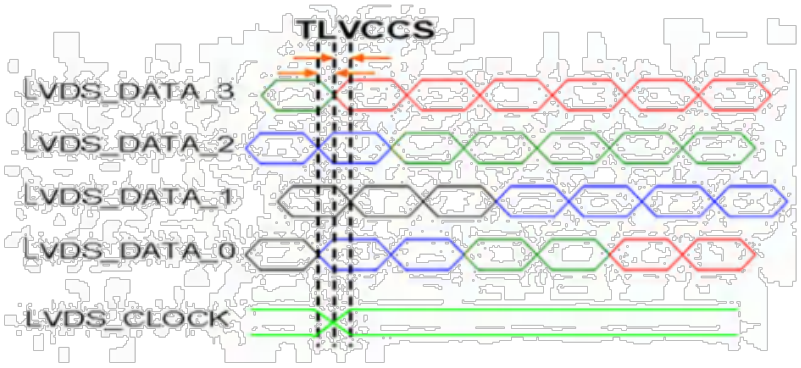
## TIMING DIAGRAM of LVDS



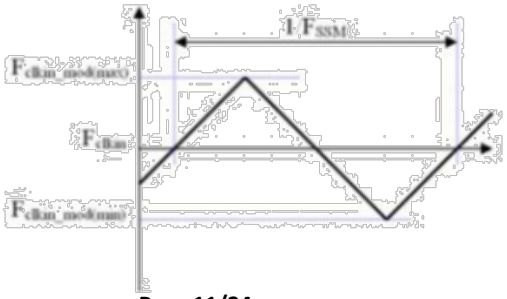

Note (a) The input clock cycle-to-cycle jitter is defined as below figures. $T_{rcd}$ = I T1 – TI




Note (b) Input Clock to data skew is defined as below figures.




Note (c) The SSCG (Spread spectrum clock generator) is defined as below figures.



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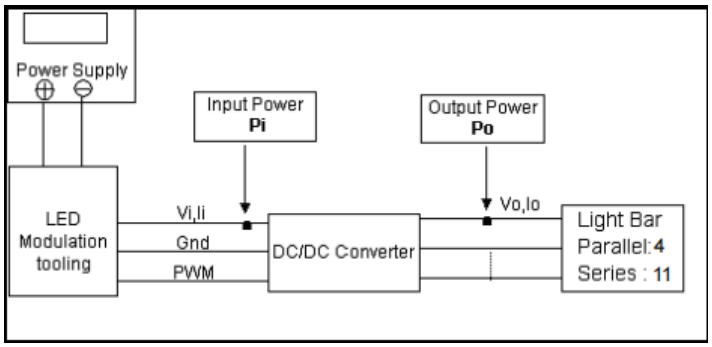
## 8.0 Backlight Characteristic

| Item | Symbol | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|---|
| Power For LED backlight | Vi | 10.8 | 12.0 | 13.2 | V | Duty Ratio=100% |
| Input Current | Ii | - | 0.55 | 0.7 | A | |
| Backlight Power Consumption | PBL | - | 6.6 | - | W | |
| Logic Low Level (EN, PWM) | $V_{IL}$ | - | - | 0.15 | V | |
| Logic High Level (EN, PWM) | $V_{IH}$ | 2.5 | - | 5.0 | | |
| PWM Dimming Frequency | $F_{DIM}$ | 190 | 200 | 20K | Hz | 2 |
| Life Time | time | 30K | - | - | hours | 3,4 |

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:




At 190 ~1kHz PWM control frequency, duty ratio range is restricted from 5% to 100%.

1K ~20kHz PWM control frequency, duty ratio range is restricted from 20% to 100%.

If PWM control frequency is applied in the range from 1KHz to 20KHZ, The“non-linear”phenomenon on the Backlight Unit may be found. So It’s a suggestion that PWM control frequency should be less than 1KHz.

Note 3: The lifetime of LED is estimated data and defined as the time when it continues to operate under the conditions at Ta = 25 ±2 ºC and Duty 100% until the brightness becomes ≦ 50% of its original value. Operating LED at high temperature condition will reduce life time and lead to color shift.



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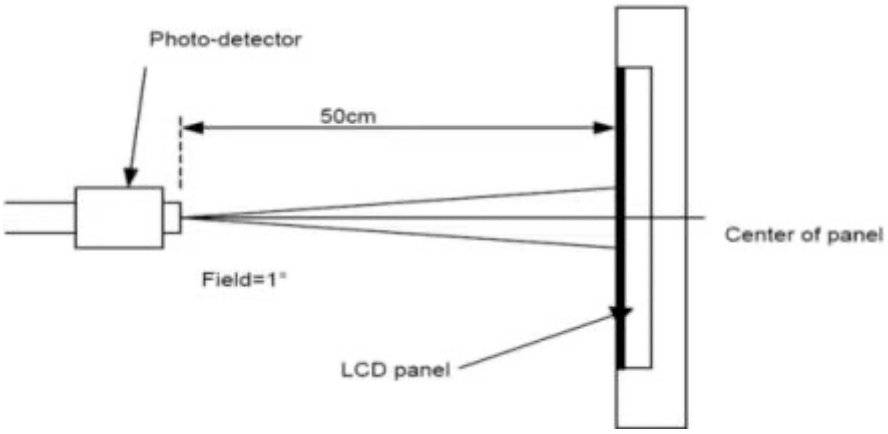
## 9. Optical Characteristics

| Item | Symbol | | Condition | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|---|
| Brightness | Bp | | Vi=12V Ii=550mA | - | 550 | - | $Cd/m^2$ | 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° | 800 | 1000 | - | - | 3,4 |
| Response Time | $T_r+T_f$ | | | - | 20 | 30 | ms | 4,5 |
| Color of CIE Coordinate | W | x | θ=0° Φ=0° | Typ-0.05 | 0.295 | Typ+0.05 | - | 1,6 |
| | | y | | | 0.325 | | - | |
| | R | x | | | 0.647 | | - | |
| | | y | | | 0.340 | | - | |
| | G | x | | | 0.315 | | - | |
| | | y | | | 0.612 | | - | |
| | B | x | | | 0.147 | | - | |
| | | y | | | 0.056 | | - | |
| NTSC Ratio | S | | | - | TBD | - | % | |

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

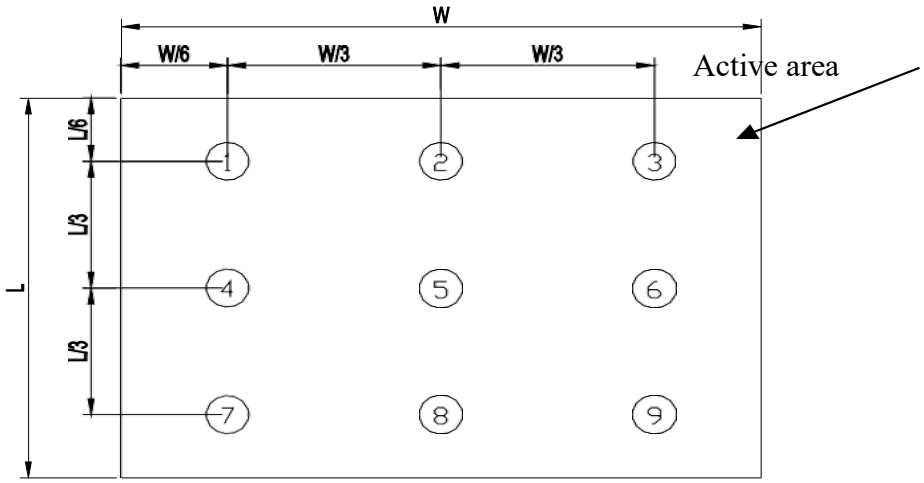
**Note 1:** The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment CA310 Measuring condition:-Measuring surroundings: Dark room.-Measuring temperature: Ta=25℃.-Adjust operating voltage to get 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.

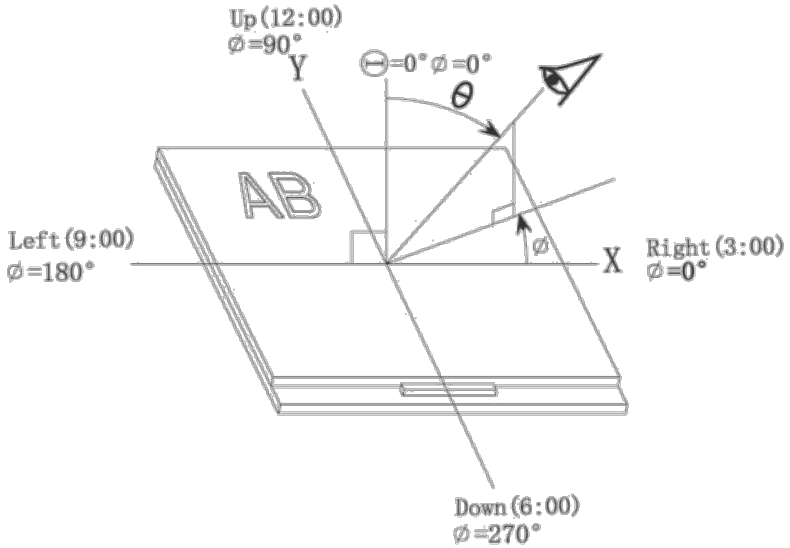



**Note 2:** The luminance uniformity is calculated by using following formula.

⊿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

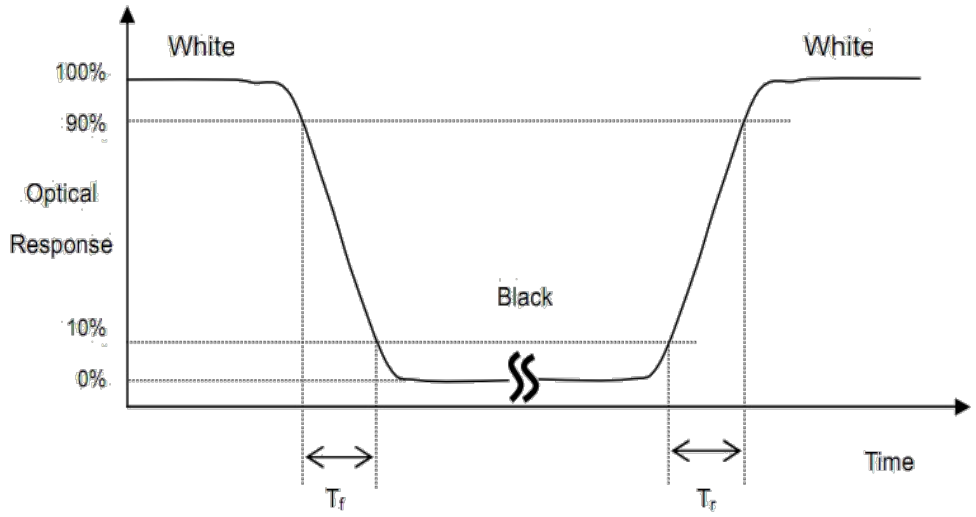



**Note 4:** Definition of contrast ratio Contrast measurements shall be made at viewing angle of Θ= 0 and at

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.



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## 10. Reliability Test Conditions and Methods

| No. | Test Items | Test Condition | Inspection After Test |
|---|---|---|---|
| ① | High Temperature Storage | 70°C±2°C×240Hours | Inspection after 2~4hours storage at room temperature, the samples should be free from defects:<br>1, Air bubble in the LCD.<br>2, Seal leak.<br>3, Non-display.<br>4, Missing segments.<br>5, Glass crack.<br>6, Current IDD is twice higher than initial value.<br>7, The surface shall be free from damage.<br>8, The electric characteristic requirements shall be satisfied.<br>9.Brightness reduction more than 50%. |
| ② | Low Temperature Storage | -20°C±2°C×240Hours | |
| ③ | High Temperature Operating | 70°C±2°C×240Hours | |
| ④ | Low Temperature Operating | -20°C±2°C×240Hours | |
| ⑤ | Temperature Cycle(Storage) | -20°C ⇔ 60°C<br>(30min) (5min) (30min)<br>1cycle<br>Total 10cycle. | |
| ⑥ | Damp Proof Test (Storage) | 60°C±5°C×90%RH×240Hours | |

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 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 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.



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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.



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## 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<br>Quantity short or over | Major |
| | 3. Product indication. | "MODEL NO." should indicate on the product. | Major |
| Assembly | 4. Dimension,<br>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.<br>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.<br>Wrong pattern display. | No display, wrong pattern display, current consumption.<br>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.<br>Foreign materiel.<br>Dust.<br>Blemish.<br>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>4(Distance>10mm)</td></tr>
<tr><td>0.50 < Φ</td><td>0</td></tr>
</table>
Note: Φ = (length+width)/2<br>(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≦10</td><td>0.05< W≦0.1</td><td>4(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>4(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>4(Distance>10mm)</td></tr>
<tr><td>0.50 < Φ</td><td>0</td></tr>
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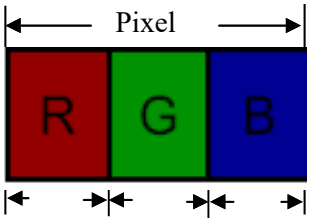
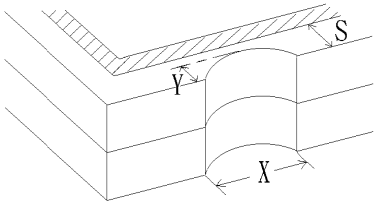
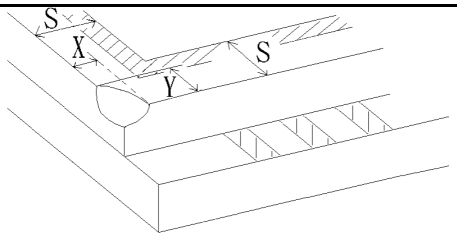
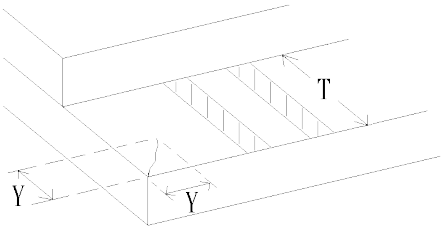
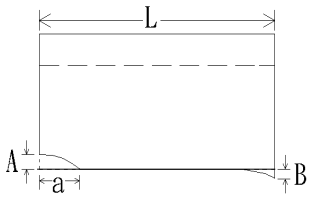
<table>
<tr><td>11.5.4</td><td>Minor</td><td>Dot defect</td><td>
<table>
<tr><th>Items</th><th>Acceptable Q'ty</th></tr>
<tr><td>Bright dot</td><td>N ≦3</td></tr>
<tr><td>Dark dot</td><td>N ≦3</td></tr>
<tr><td>Total dot</td><td>N ≦6</td></tr>
</table>
Pixel define :<br> 

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

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

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

Y>(1/2) T<br>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<br>2. B : According to dimension</td></tr>
</table>



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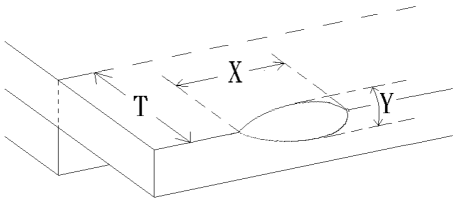
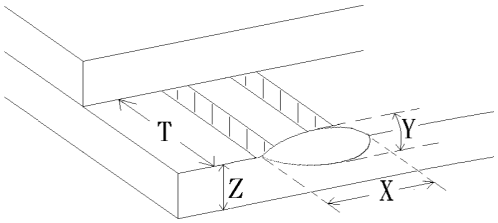
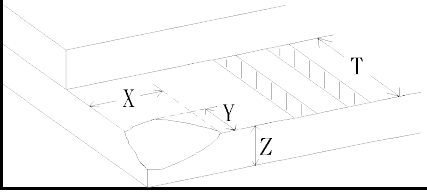
| | | | |
|---|---|---|---|
| 11.5.9 | Minor | LCD glass chipping.<br>(on the terminal area) |  Φ = (x+y)/2>2.5mm<br>Reject |
| 11.5.10 | Minor | LCD glass chipping.<br>(on the terminal surface) |  Y>(1/3)T<br>Reject |
| 11.5.11 | Minor | LCD glass chipping. |  Y>T Reject |



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## 12. Handling Precautions

### 12.1 Mounting method

This 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 sRXOent

[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 sRXOent:

- 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 sRXOent 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 sRXOents 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**



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