**MODEL NO : P1210XGF1MA00**

**SPEC VERSION : V1.4**

**ISSUED DATE: 2021-10-28**

■ Preliminary Specification
□ Final Product Specification

Customer :

| Approved by | Notes |
|---|---|
| | |

TIANMA Confirmed :

| Prepared by | Checked by | Approved by |
|---|---|---|
| Chunhui.Yang | Longping.Deng | |

This technical specification is subjected to change without notice

# Table of Contents

# Record of Revision

| Rev | Issued Date | Description | Editor |
|---|---|---|---|
| 1.0 | 2020-09-29 | Preliminary Specification Released. | Chunhui.Yang |
| 1.1 | 2021-1-26 | Add LVDS data parameters in Page 11. | Chunhui.Yang |
| 1.2 | 2021-4-14 | Change LED Forward Item in Page 8. | Chunhui.Yang |
| 1.3 | 2021-10-20 | Change LVDS data parameters. | Chunhui.Yang |
| 1.4 | 2021-10-28 | Update LVDS data parameters. | Chunhui.Yang |
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# 1 General Specifications

| Feature | | Spec |
|---|---|---|
| **Display Spec.** | Size | 12.1 inch |
| | Resolution | 1024(RGB) x 768 |
| | Technology Type | SFT |
| | Pixel Configuration | R.G.B. Vertical Stripe |
| | Pixel Pitch (mm) | 0.240 (H) × 0.240 (V) |
| | Display Mode | Transmissive, Normally Black |
| | Surface Treatment(Up Polarizer) | AG |
| | Viewing Direction | All direction |
| **Mechanical Characteristics** | LCM (W x H x D) (mm) | 260.5x203x9.5 |
| | Active Area(mm) | 245.76*184.32 |
| | With /Without TSP | Without Touch Screen |
| | Matching Connection Type | CN1: FI-S20S<br>CN2: SHLP-10V-S-B |
| | Weight (g) | (550g) |
| **Electrical Characteristics** | Interface | 1port LVDS 8bit |
| | Color Depth | 16.7M&262K |

Note 1: Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

Note 2 : Requirements on Environmental Protection: Q/S0002

Note 3 : LCM weight tolerance : +/- 5%

# 2 Input/Output Terminals

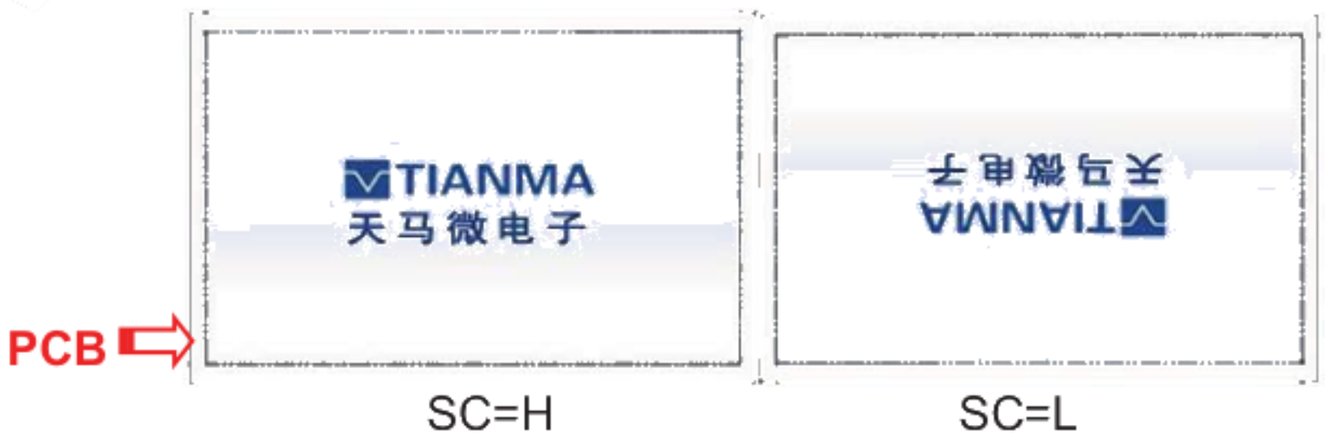
## 2.1 TFT LCD Panel (CN1)

**Connector type:** FI-SEB20P-HFE(JAE)

**Matching connector:** FI-S20S, FI-SE20-ME(JAE)

| Pin No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | Vcc | P | +3.3V Power supply | |
| 2 | Vcc | P | +3.3V Power supply | |
| 3 | GND | P | Ground | |
| 4 | GND | P | Ground | |
| 5 | D0- | I | LVDS Channel 0- | |
| 6 | D0+ | I | LVDS Channel 0+ | |
| 7 | GND | P | Ground | |
| 8 | D1- | I | LVDS Channel 1- | |
| 9 | D1+ | I | LVDS Channel 1+ | |
| 10 | GND | P | Ground | |
| 11 | D2- | I | LVDS Channel 2- | |
| 12 | D2+ | I | LVDS Channel 2+ | |
| 13 | GND | P | Ground | |
| 14 | CLK- | I | LVDS Clock- | |
| 15 | CLK+ | I | LVDS Clock+ | |
| 16 | GND | P | Ground | |
| 17 | D3- | I | LVDS Channel3- | |
| 18 | D3+ | I | LVDS Channel3+ | |
| 19 | MODE | I | Low=ISP 6bit compatibility mode<br>High=ISP 8bit compatibility mode | Defalut H |
| 20 | SC | I | Scan direction control<br>(High: Normal Low: Reverse ) | Defalut H |

Note1: I/O definition. I---Input pin, O---Output pin, P--- Power/Ground, N--- No Connection



## 2.1 Backlight (CN2)

**Connector type:** SM10B-SHLS-TF(LF)(SN)(JST)

**Matching connector**:SHLP-10V-S-B(JST)

| No | Symbol | I/O | Description | Remarks |
|---|---|---|---|---|
| 1 | NC | N | This pin should be open | |
| 2 | NC | N | This pin should be open | |
| 3 | LEDC1 | P | Cathode 1 | |
| 4 | LEDA1 | P | Anode 1 | |
| 5 | LEDA2 | P | Anode 2 | |
| 6 | LEDC2 | P | Cathode 2 | |
| 7 | LEDC3 | P | Cathode 3 | |
| 8 | LEDA3 | P | Anode 3 | |
| 9 | LEDA4 | P | Anode 4 | |
| 10 | LEDC4 | P | Cathode 4 | |

I/O definition:

I----Input O----Output P----Power/Ground N—No Connect

# 3 Absolute Maximum Ratings

## 3.1 Driving TFT LCD Panel

GND=0V

| Item | Symbol | MIN | MAX | Unit | Remark |
|---|---|---|---|---|---|
| Voltage Input | Vin | -0.50 | 5.00 | V | Note1 |
| Operating Temperature | $T_{op}$ | -30.0 | 80.0 | ℃ | |
| Storage Temperature | $T_{st}$ | -40.0 | 90.0 | ℃ | |
| Relative Humidity (Note2) | RH | -- | ≤95 | % | Ta≤40℃ |
| | | -- | ≤85 | % | 40℃<Ta≤50℃ |
| | | -- | ≤55 | % | 50℃<Ta≤60℃ |
| | | -- | ≤36 | % | 60℃<Ta≤70℃ |
| | | -- | ≤24 | % | 70℃<Ta≤80℃ |
| Absolute Humidity | AH | -- | ≤70 | $g/m^3$ | Ta>70℃ |

**Table 3.1 absolute maximum rating**

Note1: The parameter is for driver IC (gate driver, source driver) only.

Note2: Ta means the ambient temperature.
It is necessary to limit the relative humidity to the specified temperature range.
Condensation on the module is not allowed.

# 4 Electrical Characteristics

## 4.1 Driving TFT LCD Panel

VCC=3.3V,GND=0V, Ta=25℃

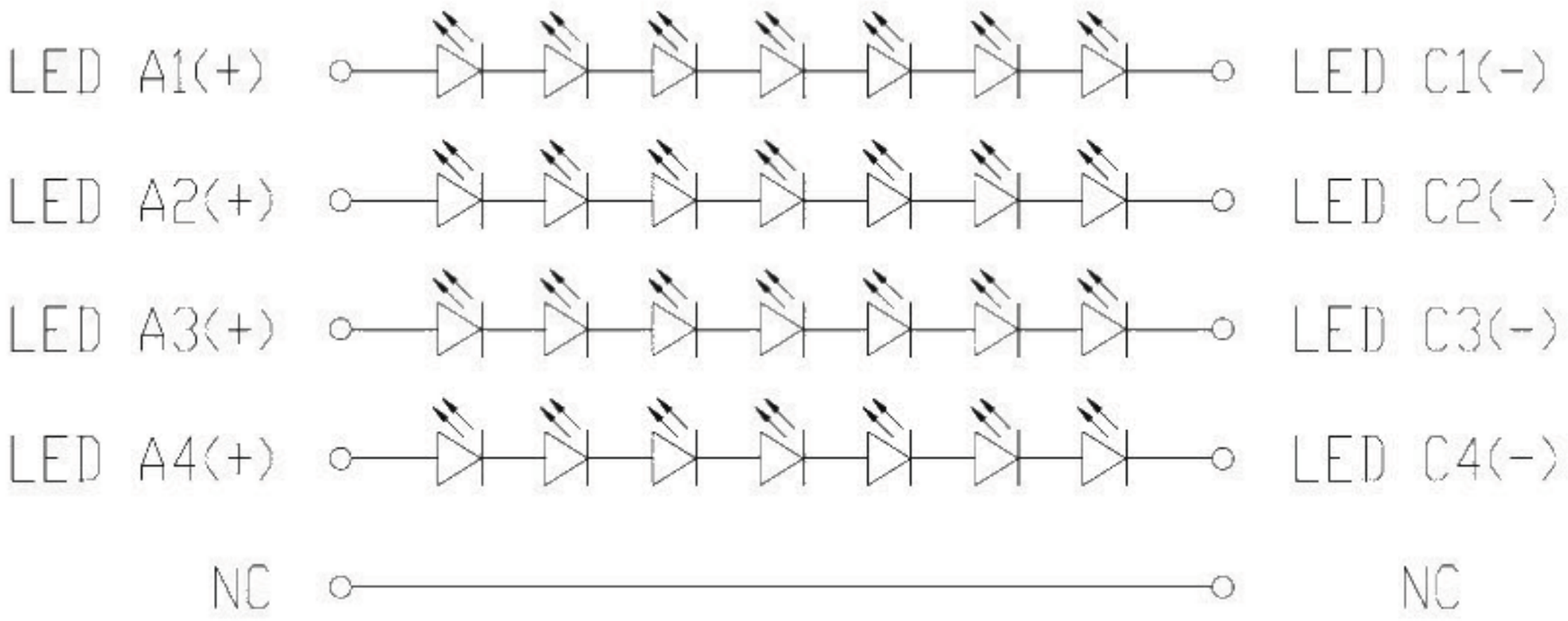
| Item | | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Power supply Voltage | | VDD | - | 3.3 | - | V | |
| Power supply ripple | | Vp-p | - | - | - | mV | |
| Power supply current | | IDD | - | - | - | mA | |
| LCD power consumption | | P | - | (1200) | - | mW | |
| Gate On Voltage | | VGH | - | 23 | - | V | |
| Gate On Voltage | | VGL | - | -7 | - | V | |
| Differential input voltage | | \|Vid\| | - | - | - | mV | |
| Power For Analog Circuit | | AVDD | - | (12.5) | - | V | |
| Logic Input Voltage | Low level | VIL | 0 | - | 0.3VDD | mV | |
| | High level | ViH | 0.7VDD | - | VDD | mV | |
| Inrush current | | Irush | - | - | | A | |

## 4.2 Driving Backlight

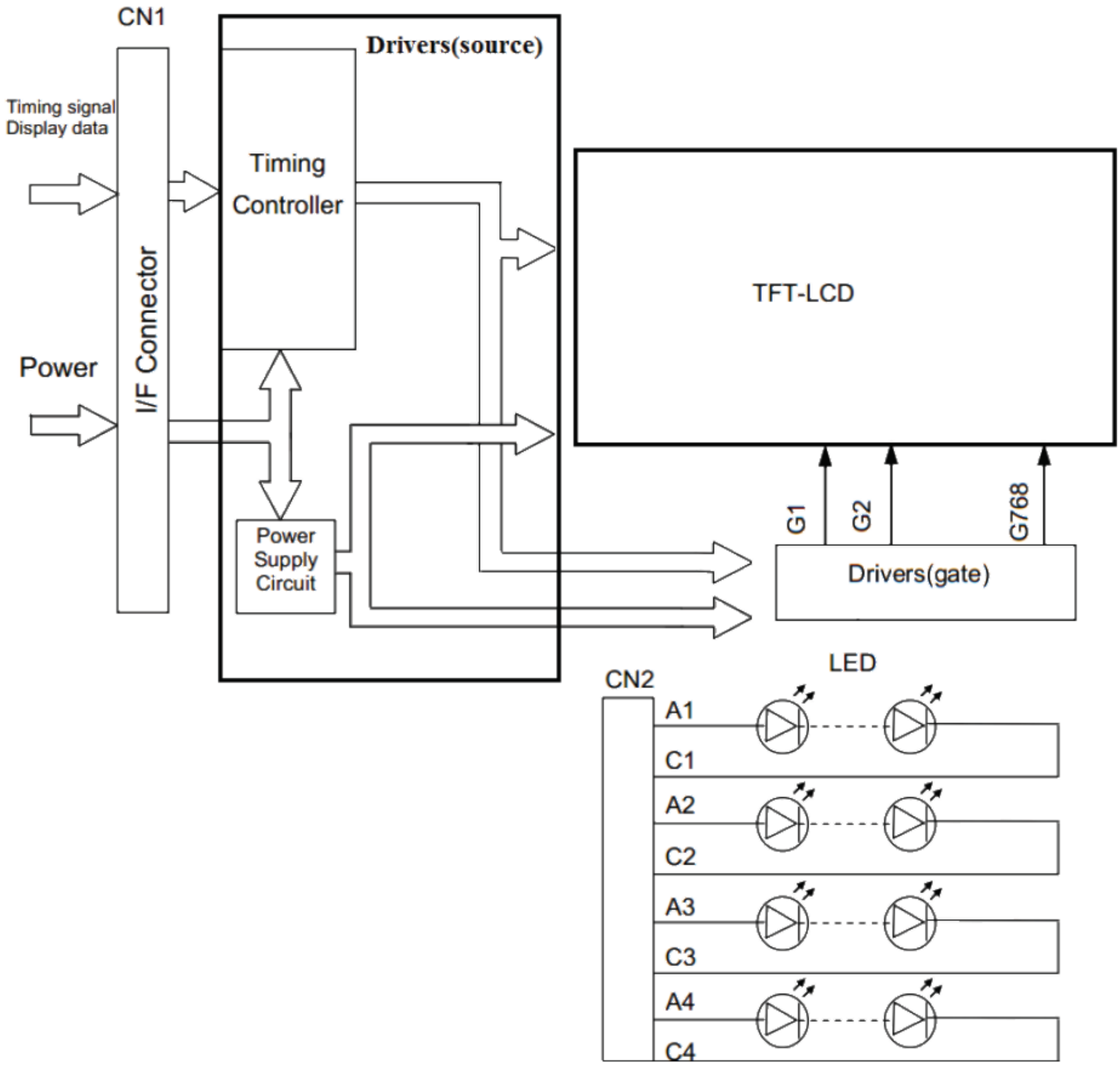
Ta=25℃

| Item | Symbol | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|
| Forward Current Voltage (per string) | $V_F$ | -- | 21 | -- | V | |
| Forward Current(per string) | $I_F$ | -- | 115 | -- | mA | |
| Backlight Power Consumption | $W_{BL}$ | -- | 9660 | -- | mW | |
| LED life time | -- | 80000 | 100000 | -- | Hrs | |

Note 1: The figure below shows the connection of backlight LED.



## 4.3 Block Diagram



# 5 Timing Chart

## 5.1 LVDS data input format

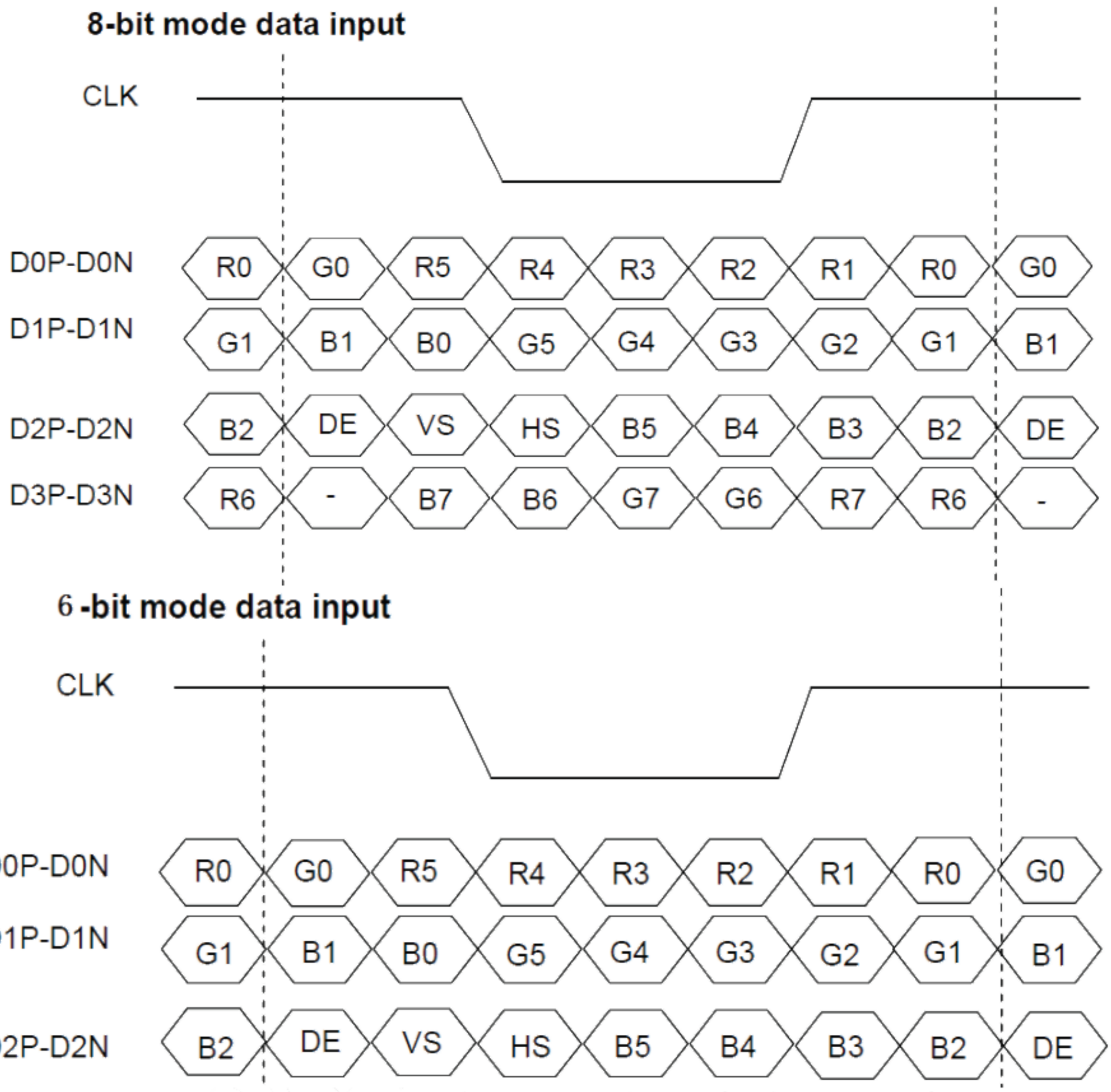



**Figure 5.1.1 LVDS data input format (VESA standard)**

DE mode for 1024RGB*768

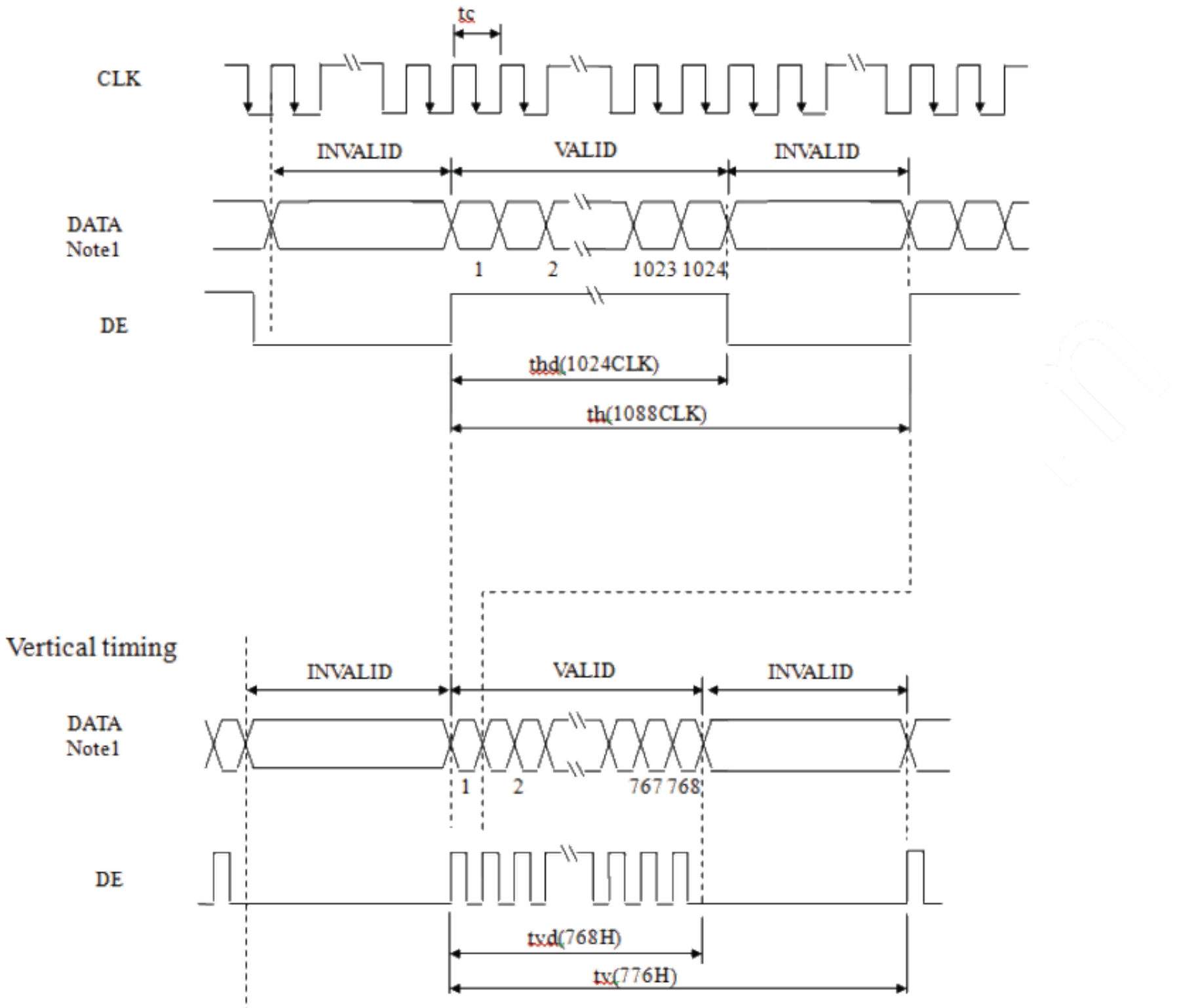



**Figure5.1.2 Recommended input timing of LVDS transmitter**

Note1:DATA = R0-R7, G0-G7, B0-B7

| Parameter | | | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| CLK | Frequency | | 1/tc | 50.34 | 50.66 | 80 | MHz | 19.74ns(typ.) |
| DE | Horizontal | Display area | thd | | 1024 | | CLK | |
| | | Period time | th | - | 21.477 | - | μs | 46.561 kHz (typ.) |
| | | | | 1084 | 1088 | 1332 | CLK | |
| | Vertical (One frame) | Display area | tvd | | 768 | | H | |
| | | Period time | tv | - | 16.666 | - | ms | 60.0Hz (typ.) |
| | | | | 774 | 776 | 1001 | H | |

**Figure5.1.3 LVDS data parameters**

# 6 Optical Characteristics

## 6.1 Optical Specification

Ta=25℃

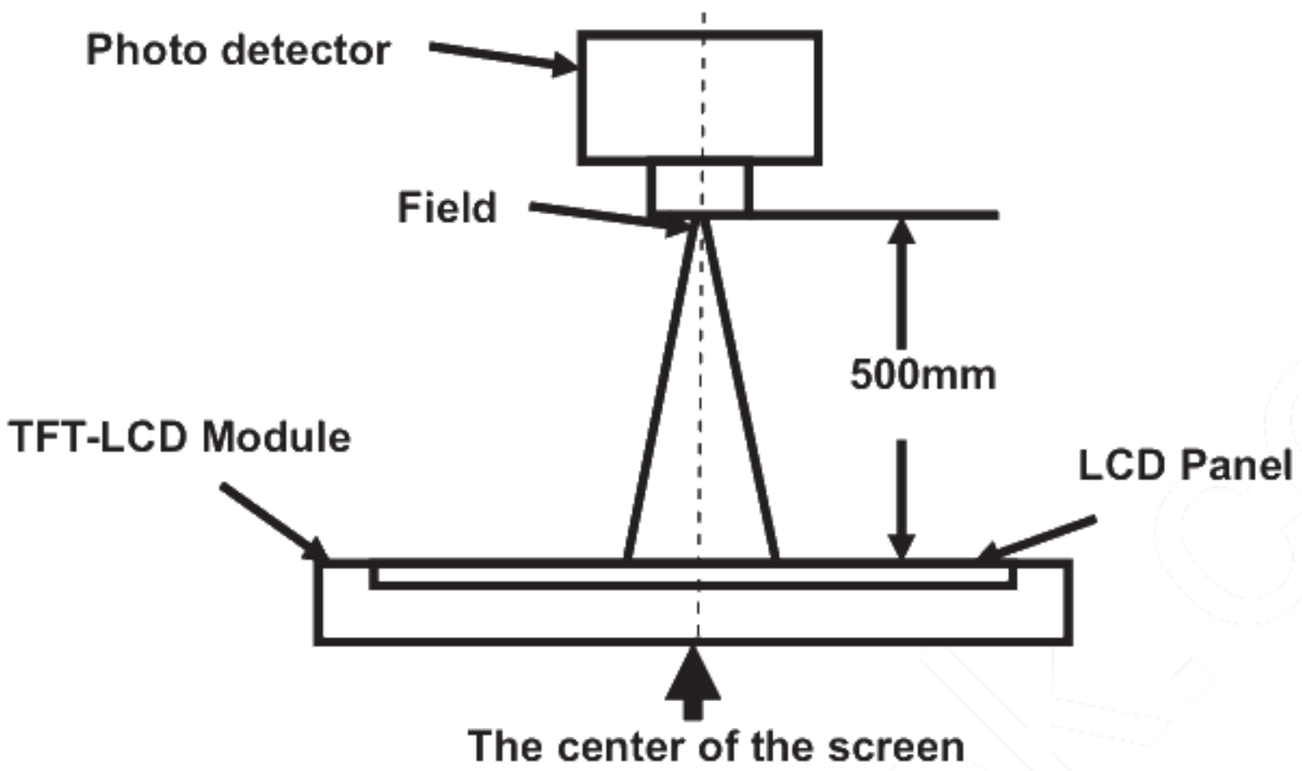
| Item | | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| View Angles | | θT | CR≧10 | 80 | 88 | - | Degree | Note 2 |
| | | θB | | 80 | 88 | - | | |
| | | θL | | 80 | 88 | - | | |
| | | θR | | 80 | 88 | - | | |
| Contrast Ratio | | CR | θ=0° | 800 | 1000 | - | - | Note1<br>Note3 |
| Response Time | | $T_{ON}+T_{OFF}$ | 25℃ | - | 25 | 35 | ms | Note1<br>Note4 |
| Chromaticity | White | x | Backlight is on | | TBD | | - | Note5<br>Note1 |
| | | y | | | TBD | | | |
| | Red | x | | | TBD | | | |
| | | y | | | TBD | | | |
| | Green | x | | | TBD | | | |
| | | y | | | TBD | | | |
| | Blue | x | | | TBD | | | |
| | | y | | | TBD | | | |
| Uniformity | | U | - | 75 | 80 | - | % | Note1<br>Note6 |
| NTSC | | - | - | 65 | 72 | - | % | Note 5 |
| Luminance | | L | - | 1000 | 1300 | - | $cd/m^2$ | Note1 |

Test Conditions:

1. The ambient temperature is 25±2℃.humidity is 65±7%
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.




Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80)。

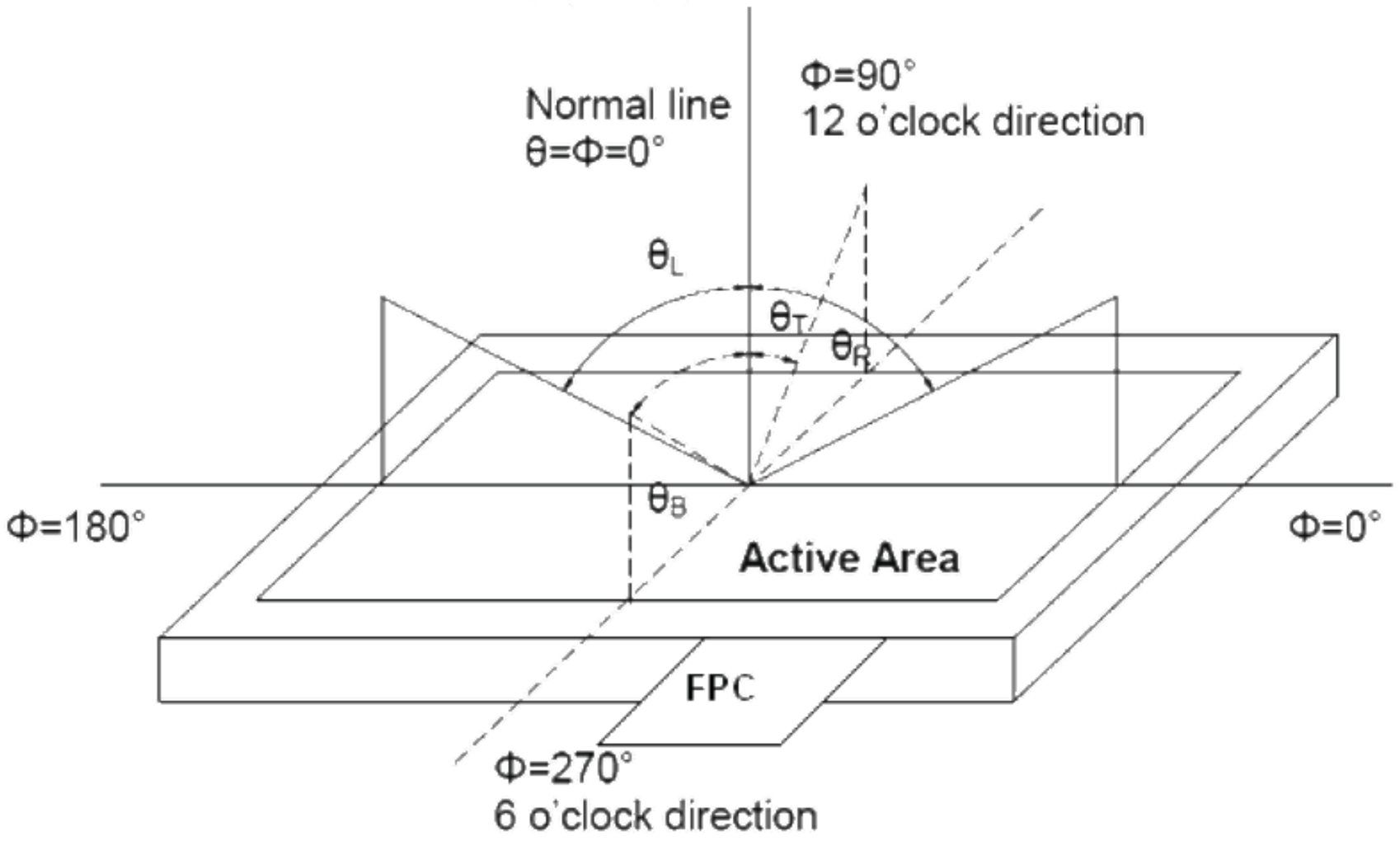



Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

“White state “:The state is that the LCD should driven by Vwhite.

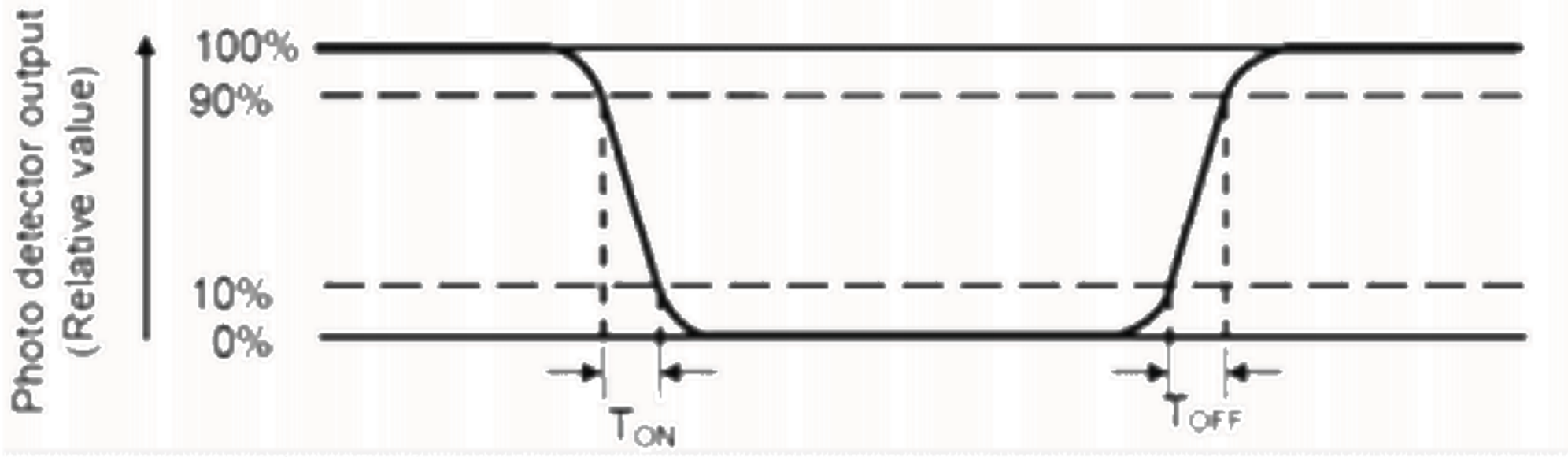
“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

| White (TFT on) | Black (TFT off) | White (TFT on) |
|---|---|---|




Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

## Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = Lmin/ Lmax

L-------Active area length W----- Active area width

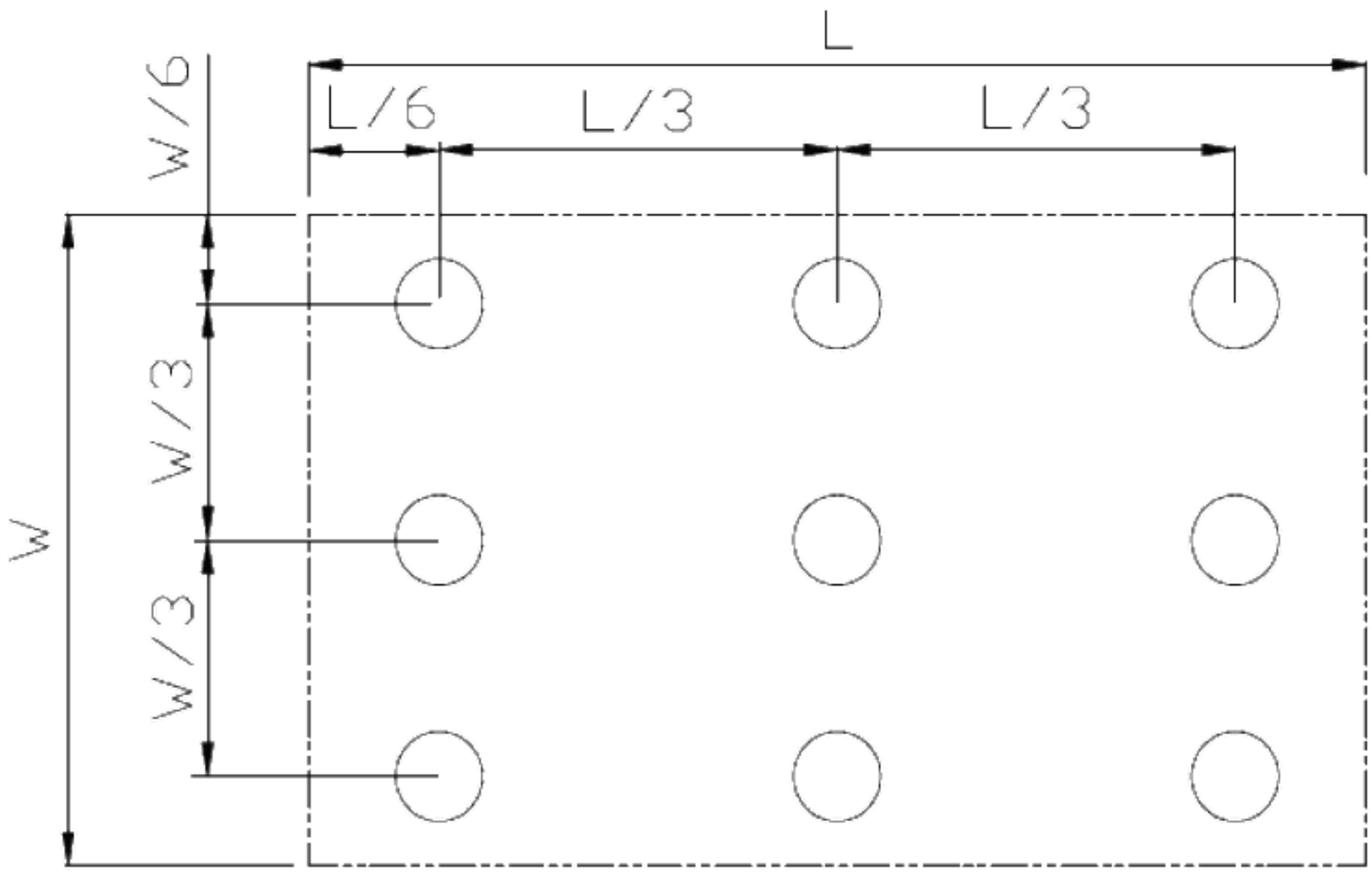



Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

## Note 7: Definition of Luminance :

Measure the luminance of white state at center point.

# 7 Environmental / Reliability Test

| No | Test Item | Condition | Remark |
|---|---|---|---|
| 1 | High Temperature Operation | Ta = +80℃,240 hours | IEC60068-2-1<br>GB2423.2 |
| 2 | Low Temperature Operation | Ta = -30℃, 240 hours | IEC60068-2-1<br>GB2423.1 |
| 3 | High Temperature Storage | Ta = +90℃, 240 hours | IEC60068-2-1<br>GB2423.2 |
| 4 | Low Temperature Storage | Ta = -40℃, 240 hours | IEC60068-2-1<br>GB2423.1 |
| 5 | High Temperature & High Humidity Operation | Ta = +60℃, 90% RH max,240 hours | IEC60068-2-78<br>GB/T2423.3 |
| 6 | Thermal Shock (non-operation) | -30℃ 30 min~+80℃ 30 min,<br>Change time:5min, 100 Cycle | Start with cold temperature,<br>End with high temperature,<br>IEC60068-2-14,GB2423.22 |
| 7 | ESD | C=150pF,R=330Ω,9point/panel<br>Air:±15Kv,5times;<br>Contact:±8Kv,5times<br>(Environment:15℃~35℃,<br>30%~60%.86Kpa~106Kpa) | IEC61000-4-2<br>GB/T17626.2 |
| 8 | Vibration Test (Non Op) | 5~100HZ，19.60m/s2<br>1min/cycle 120times Per<br>X\Y\Z | IEC60068-2-6<br>GB/T17626.6 |
| 9 | Mechanical Shock (Non Op) | 539m/s2, 11ms<br>5times ±X、±Y、±Z | IEC60068-2-27<br>GB/T2423.5 |

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

# 8 Mechanical Drawing

# 9 Packing Drawing

# 10 Precautions For Use of LCD Modules

## 10.1 Handling Precautions

10.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

10.1.7 If the logic circuit power is off, do not apply the input signals.

10.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

## 10.2 Storage Precautions

10.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

10.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

## 10.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.