| Prepared by: Date Nov.11, '04 | Quanta Display Inc. SPECIFICATION | Doc. No. QD26WL01-01<br>Doc. Rev. : 08<br>Issue Date : Feb.15,'05<br>Page: 22 pages ( Include cover page, drawing) |
|---|---|---|

# Specification for TFT LCD Module

## Model No. QD26WL01 REV:01



☐ **Customer's Approval**

**Date** _____

**by** _____

**Approved By** _____

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| Revision History | | | |
|---|---|---|---|
| REV. | Date | ECN NO. | Change Content |
| 1 | Nov.11,'04 | N/A | Preliminary specification Initiate |
| 2. | Nov. 22,'04 | N/A | Page 8, update connector type, page 15, add gray to gray reponse time 12ms. |
| 3 | Dec. 2,'04 | N/A | Page 11, update lamp spec., page 12, update inverter spec. |
| 4 | Dec. 6,'04 | N/A | Page 5, update weight 3600g, page 10, input Icc 380 mA. |
| 5 | Dec. 31,'04 | N/A | Page 12, define DCLK min. 50MHz, max. 20ns, update Hsync min. 37 kHz. |
| 6 | Jan.11,'05 | N/A | Page 11, update lamp current 4.3mA, lamp voltage 950V, frequency 51k, page 12, update inverter input current 3.0A |
| 7 | Feb.1,'05 | N/A | Page 5, update thickness max. from 39 to 38mm, page 19, update thickness dimension from 36.8 to 37+/-1mm. |
| 8 | Feb.15,'05 | N/A | Page 15, 17, update bright and dark luminance uniformity spec. |
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## Content List

## 1. Application

This specification applies to a color TFT-LCD module, QD26WL01

## 2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel; driver ICs, control circuit and power supply circuit and a backlight unit. Graphics and texts can be displayed on a 1280×3×768 dots panel with 16.7 million colors by using the LVDS (Low Voltage Differential Signaling) interface, 8-bit driving method and supplying +12V DC supply voltage for TFT-LCD panel driving.

The TFT-LCD panel used for this module has fast response time. A low-reflection and higher-color-saturation type color filter is also used for this panel. Therefore, high-brightness and high-contrast image, which is suitable for multimedia use, can be obtained by using this module.

[Features]

1) Brilliant and high contrast image.
2) Wide viewing angle.
3) Fast response time
4) WXGA resolution.
5) LVDS interface.
6) High color saturation

## 3. General Specifications

| Parameter | Specifications | Unit |
|---|---|---|
| Display size | 66.05 (26") Diagonal | cm |
| Active area | 566.40 (H)×339.84 (V) | mm |
| Pixel format | 1280 (H)×768 (V) | Pixel |
| | (1 pixel = R+G+B dots) | |
| Pixel pitch | 0.4425 (H) × 0.4425 (V) | mm |
| Pixel configuration | R,G,B vertical stripe | |
| Display mode | Normally Black | |
| Unit outline dimensions | 595.4 x 366.4 x 38max | mm |
| Weight | 3600 max. | g |
| Surface treatment | Anti-glare and hard-coating 3H | |
| Lamp Quantity | 14 | pcs |

## 4. Input Terminals

### 4-1. TFT-LCD panel driving

CN1 (LVDS signals and +12V DC power supply)

Using connector: (DF14H-20P-1.25H (Hirose) or Equivalent)

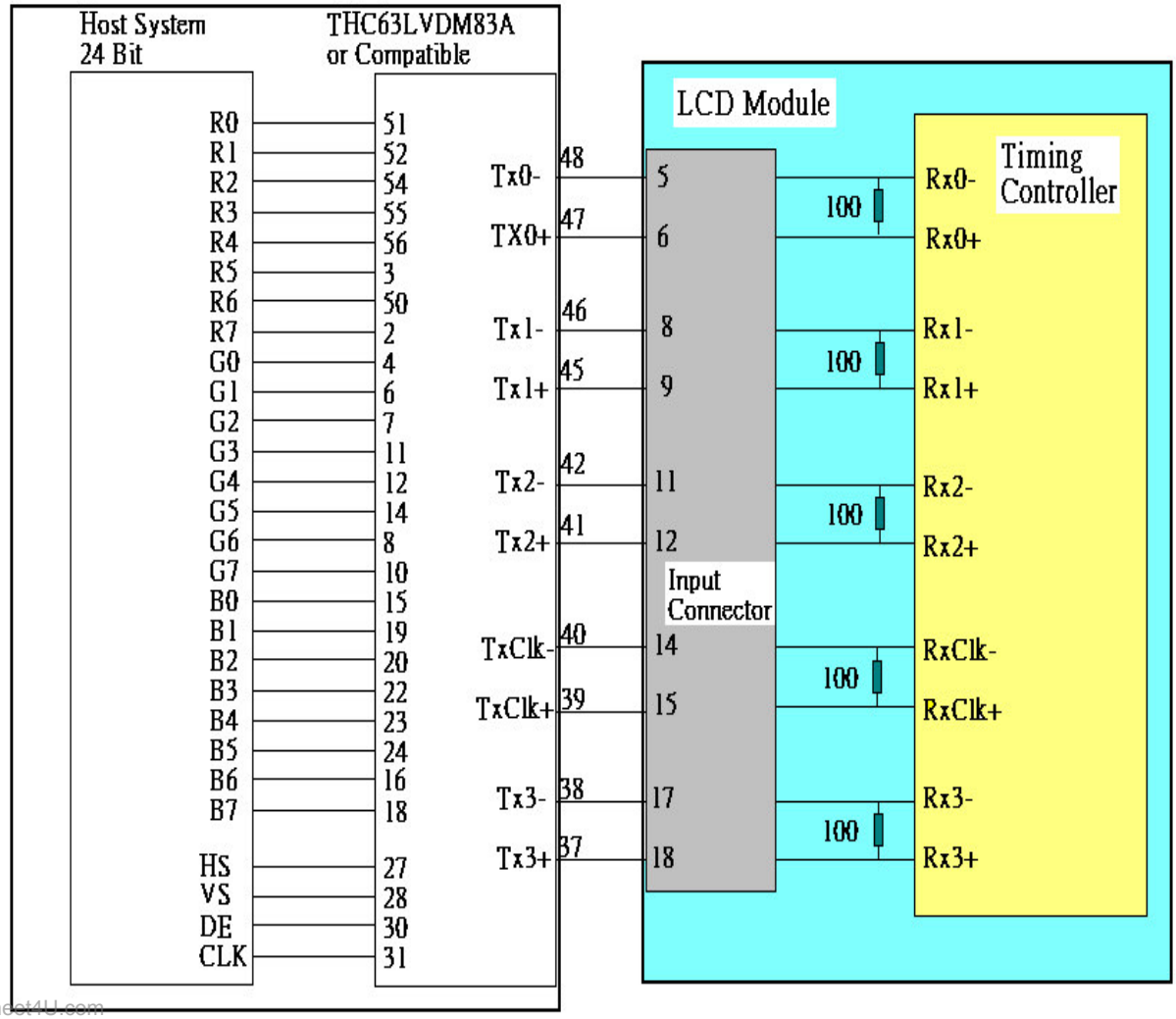
| Pin No. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | VCC | +12V Input | |
| 2 | VCC | +12V Input | |
| 3 | GND | Ground | |
| 4 | GND | Ground | |
| 5 | Rx0- | Low Voltage Differential signal Input Data (-) | LVDS |
| 6 | Rx0+ | Low Voltage Differential signal Input Data (+) | LVDS |
| 7 | GND | Ground | |
| 8 | Rx1- | Low Voltage Differential signal Input Data (-) | LVDS |
| 9 | Rx1+ | Low Voltage Differential signal Input Data (+) | LVDS |
| 10 | GND | Ground | |
| 11 | Rx2- | Low Voltage Differential signal Input Data (-) | LVDS |
| 12 | Rx2+ | Low Voltage Differential signal Input Data (+) | LVDS |
| 13 | GND | Ground | |
| 14 | RxCLK- | Low Voltage Differential signal Input Clock (-) | LVDS |
| 15 | RxCLK+ | Low Voltage Differential signal Input Clock (+) | LVDS |
| 16 | GND | Ground | |
| 17 | Rx3- | Low Voltage Differential signal Input Data (-) | LVDS |
| 18 | Rx3+ | Low Voltage Differential signal Input Data (+) | LVDS |
| 19 | GND | Ground | |
| 20 | GND | Ground | |



【Note 1】 All GND(ground) pins should be connected together (and to Vss which should also be connected to the LCDs metal frame).

【Note 2】 All $V_{CC}$ (power supply) pins should be connected together.

**4-2 Interface block diagram**



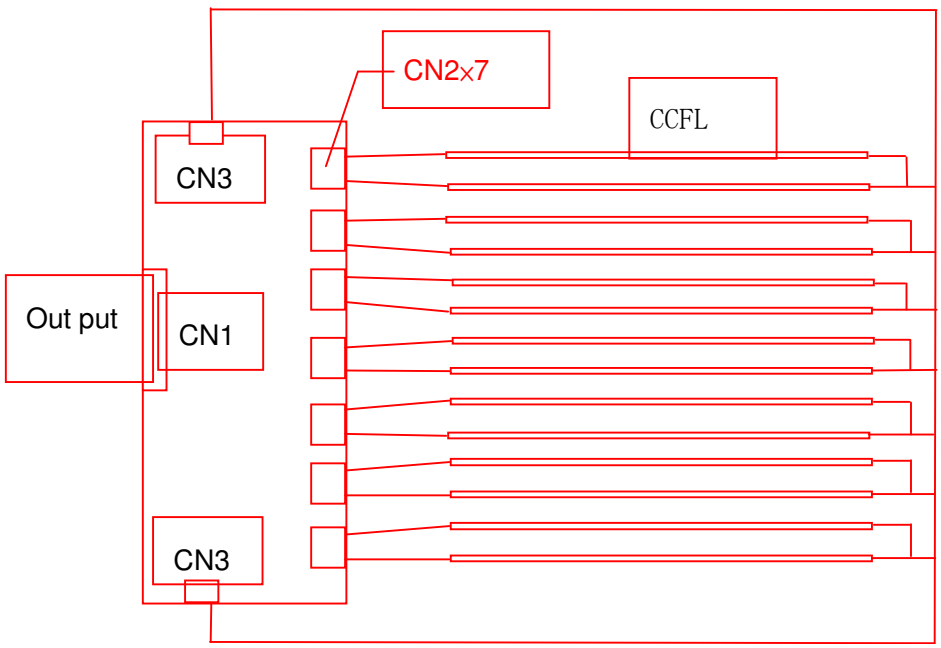
### 4-3. Backlight driving

| Connector | Type | Manufactured |
|---|---|---|
| CN1 | S14B-PH-SM3-TB(LF)<br>2003P14S0T | JST<br>LANDWIN |
| CN2 | SM02(12)B-BHS-1-TB(LF) | JST |
| CN3 | S2B-ZR-SM3A-TF(LF) | JST |

**Mating connector of CN1 : BHR-14(JST) or Equivalent**

| Pin No. | Symbol | Description | Remark |
|---|---|---|---|
| 1 | VDDB | Power Input +24V | |
| 2 | VDDB | Power Input +24V | |
| 3 | VDDB | Power Input +24V | |
| 4 | VDDB | Power Input +24V | |
| 5 | VDDB | Power Input +24V | |
| 6 | GND | BACKLIGHT GND | |
| 7 | GND | BACKLIGHT GND | |
| 8 | GND | BACKLIGHT GND | |
| 9 | GND | BACKLIGHT GND | |
| 10 | GND | BACKLIGHT GND | |
| 11 | NC | NOT CONNECTION | |
| 12 | Von/off | ON/OFF | ON:2~5V ,OFF:0~0.8V |
| 13 | VBR | LUMINANCE BY VOLTAGE CONTROL | 0~3.3V |
| 14 | GND | SIGNAL GND | |





## 5.Absolute Maximum Ratings

### LCD module

| Parameter | Symbol | Condition | Ratings | Unit | Remark |
|---|---|---|---|---|---|
| +12V supply voltage | $V_{CC}$ | Ta=25℃ | -0.3 ～ ＋14.0 | $V_{DC}$ | |
| Storage temperature | Tstg | － | －20 ～ ＋60 | ℃ | 【Note1】 |
| Operating temperature (Ambient) | Topa | － | 0 ～ ＋50 | ℃ | |

【Note1】Humidity：90％RH Max. at Ta≦40℃.

Maximum wet-bulb temperature at 39℃ or less at Ta>40℃.

No condensation.

## 6. Electrical Characteristics

### 6-1.TFT-LCD panel driving

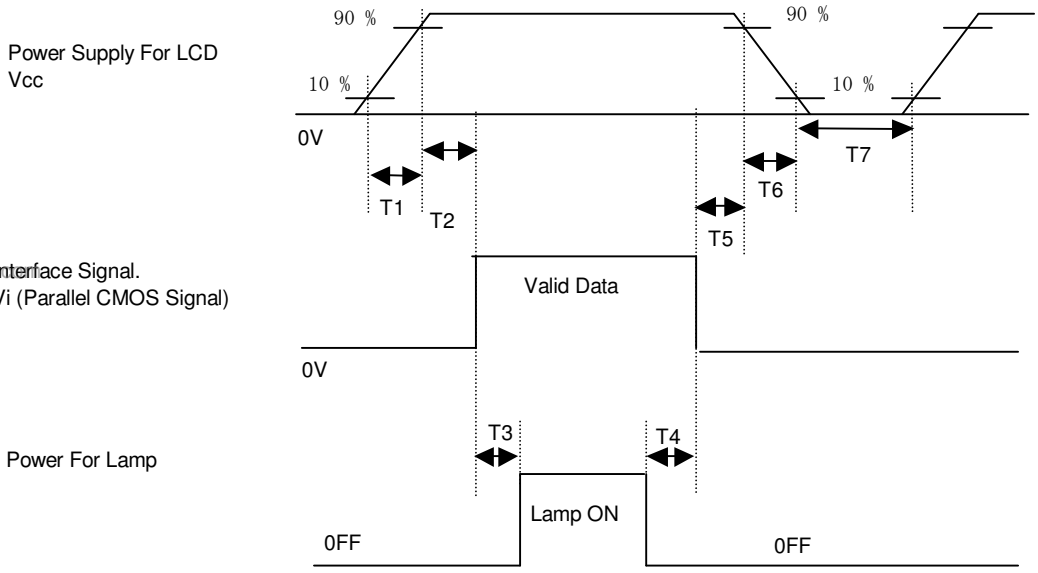
Ta＝25℃

| Parameter | | | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Vcc | Supply voltage | | Vcc | +11.4 | +12 | +12.6 | V | 【Note2】 |
| | Current dissipation | | Icc | — | 380 | 500 | mA | 【Note3】 |
| | Rush current | | Iccs | | | 3.0 | A | |
| | Permissive input ripple voltage | | Vrp | | | 120 | mV | |
| Differential input threshold voltage | | High | $V_{TH}$ | — | — | +100 | mV | $V_{CM}$=+1.2V 【Note1】 |
| | | Low | $V_{TL}$ | –100 | — | — | mV | |
| Input current (High) | | | $I_{OH}$ | — | — | +/-10 | μA | $V_I$=2.4V Vcc=3.6V |
| Input current (Low) | | | $I_{OL}$ | — | — | +/-10 | μA | $V_I$=0V Vcc=3.6V |
| Terminal resistor | | | $R_T$ | — | 100 | — | Ω | Differential input |

【Note1】 $V_{CM}$ : Common mode voltage of LVDS driver.

【Note2】

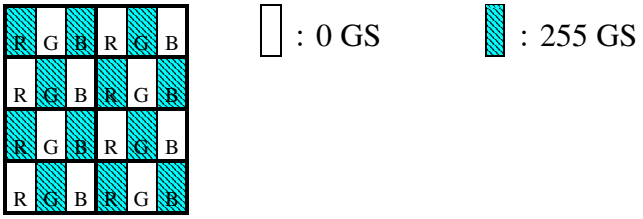
Power On-off sequence






1ms＜T1,T6≦10 ms　　0 ms＜T2,T5≦50 ms　　200ms＜T3,T4　　T7＞400ms

【Note3】Maximum current condition; Change to 1x1 dot checker board pattern. $V_{DD}$=+12V



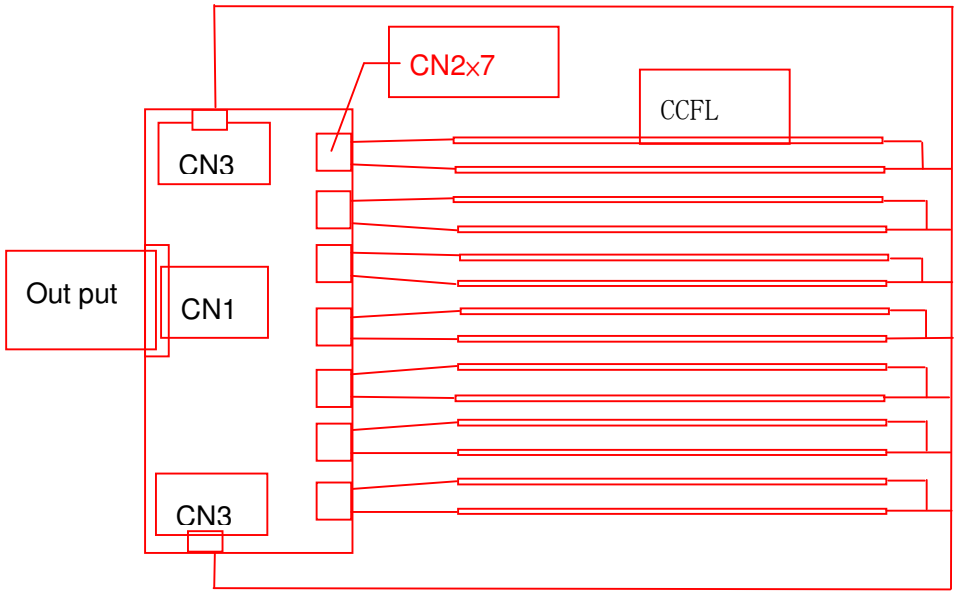
## 6-2. Backlight driving

**The backlight system is a direct-lighting type with 14 CCFT (Cold Cathode Fluorescent Tube).**

**The characteristics of the lamp are shown in the following table.**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| **Inverter** | | | | | | |
| **Lamp current** | $I_L$ | **3.8** | **4.3** | **4.8** | **mArms** | **Not include current loss** |
| **Lamp voltage** | $V_L$ | *850* | **950** | *1050* | **Vrms** | |
| **Lamp power consumption** | $P_L$ | | **4.09** | | **W** | **【Note2】IL=4.3mA** |
| **Lamp frequency** | $F_L$ | *46* | **51** | *56* | **kHz** | **【Note3】** |
| **Established starting voltage** | **Vs** | | | **1400** | **Vrms** | **Ta=25℃** |
| | | | | **1820** | **Vrms** | **Ta=0℃ 【Note4】** |
| **Lamp life time** | $L_L$ | **50000** | | | **hour** | **【Note5】** |
| | | | | | | |

**【Note1】 Lamp current is measured with current meter for high frequency as shown below.**






**【Note2】 Calculated Value for reference ( $I_L$ × $V_L$)**

**【Note3】 Lamp frequency may produce interference with horizontal synchronous frequency, and this may cause beat on the display. Therefore lamp frequency shall be detached as much as possible from the horizontal synchronous frequency and from the harmonics of horizontal synchronous to avoid interference.**

**【Note4】 The voltage above this value should be applied to the lamp for more than 1 second to start-up. Otherwise the lamp may not be turned on.**

**【Note5】 The life is determined as the time at which luminance of the lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at 25 ± 2°C.**

### 6-3. Inverter Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| Power Supply Input Voltage | $V_{DDB}$ | 22.8 | 24 | 25.2 | Vdc | |
| Power Supply Input Current | $I_{DDB}$ | 2700 | 3000 | 3300 | mA | TBD |
| Power Consumption | $P_B$ | 61.6 | 72 | 83.2 | W | TBD |

Note) 1. The performance of the backlight, for example life time or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the backlight and the inverter (miss-lighting, flicker, etc.) never occur. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

2. Protection function : if one lamp cannot light on well, the inverter will shut down all lamps.

## 7. Timing characteristics of LCD module input signals

### 7-1. Timing characteristics

(This is specified at digital outputs of LVDS driver.)

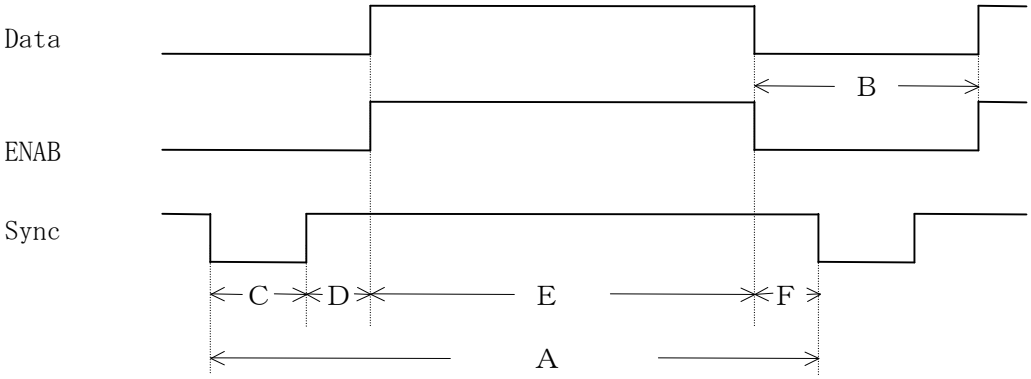
| ITEM | Symbol | | Min | Typ | Max | Unit | Notes |
|---|---|---|---|---|---|---|---|
| DCLK | Frequency | $F_{CLK}$ | 50 | 80 | 82 | MHz | |
| | Period | $t_{CLK}$ | 12.2 | 12.5 | 20 | ns | |
| Hsync | Period | $t_{HA}$ | 1337 | 1648 | 1780 | $t_{CLK}$ | |
| | Width-Active | $t_{HC}$ | 8 | 16 | - | | |
| | Frequency | fH | 37 | 48.54 | 52 | kHz | |
| Vsync | Frequency | fv | 47 | 60 | 63 | Hz | |
| | Period | $t_{VA}$ | 774 | 810 | - | $t_{HA}$ | |
| | Width-Active | $t_{VC}$ | 2 | 6 | - | | |
| Data Enable | Horizontal back porch | $t_{HD}$ | 8 | 80 | - | $t_{CLK}$ | |
| | Horizontal front porch | $t_{HF}$ | 16 | 272 | - | $t_{CLK}$ | |
| | Horizontal active | $t_{HE}$ | 1280 | 1280 | 1280 | $t_{CLK}$ | |
| | Horizontal blanking | $t_{HB}$ | 57 | 368 | | $t_{CLK}$ | |
| | Vertical back porch | $t_{VD}$ | 2 | 20 | - | $t_{HA}$ | |
| | Vertical front porch | $t_{VF}$ | 2 | 16 | - | $t_{HA}$ | |
| | Vertical active | $t_{VE}$ | 768 | 768 | 768 | $t_{HA}$ | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Vertical blanking** | **$t_{VB}$** | **6** | **42** | | **$t_{HA}$** | |

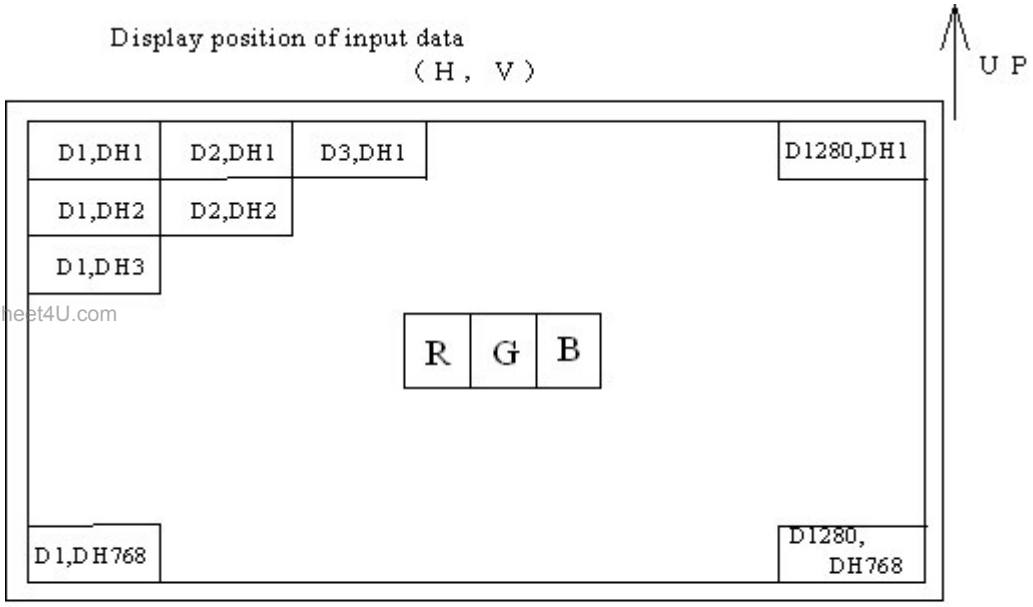
**Notes: 1. The performance of electro-optical characteristics may be influenced by variance of the vertical refresh rates.**

**2.Hsync period shall be a double number of chraracter (8).**

**7-2 Signal Timing Waveform**




7-3. Input Data Signals and Display Position on the screen



**8. Input Signals, Basic Display Colors and Gray Scale of Each Color**

| | Colors & Gray scale | Data Signal | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R0 | R1 | R2 | R3 | R4 | R5 | R6 | R7 | G0 | G1 | G2 | G3 | G4 | G5 | G6 | G7 | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
| Basic Color | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gray Scale of Red | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | | | | ↑ | | | | | | | | ↑ | | | | | | | | ↑ | | | | |
| | ⇩ | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | | |
| | Bright | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇩ | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Green | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | | | | ↑ | | | | | | | | ↑ | | | | | | | | ↑ | | | | |
| | ⇩ | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | | |
| | Bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇩ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Blue | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Darker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ⇧ | | | | ↑ | | | | | | | | ↑ | | | | | | | | ↑ | | | | |
| | ⇩ | | | | ↓ | | | | | | | | ↓ | | | | | | | | ↓ | | | | |
| | Bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | ⇩ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**0 : Low level voltage, 1 : High level voltage**

**9. Optical Characteristics** **Ta=25℃, $V_{CC}$=+12V**

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Viewing | L/R | θ 21, θ 22 | CR>10 | 85 | 88 | | Deg. | 【Note1,4】 |
| angle | U | θ 11 | | 85 | 88 | | Deg. | |
| range | D | θ 12 | | 85 | 88 | | Deg. | |
| Contrast ratio | | C R n | θ =0° | 500 | 600 | — | | 【Note2,4】 |
| Response time | | τ | | — | 25 | | ms | 【Note3,4】 |
| Rise time | τ r | | | | 20 | | ms | |
| Fall time | τ d | | | | 5 | | ms | |
| Gray to gray | | | | | 12 | | ms | |
| Chromaticity of | | Wx | | 0.256 | 0.286 | 0.316 | | 【Note4】 |
| White (CIE 1931) | | Wy | | 0.277 | 0.307 | 0.337 | | |
| Chromaticity of | | Rx | | 0.615 | 0.645 | 0.675 | | |
| Red (CIE 1931) | | Ry | | 0.308 | 0.338 | 0.368 | | |
| Chromaticity of | | Gx | | 0.252 | 0.282 | 0.312 | | |
| Green (CIE 1931) | | Gy | | 0.586 | 0.616 | 0.646 | | |
| Chromaticity of | | Bx | | 0.113 | 0.143 | 0.173 | | |
| Blue (CIE 1931) | | By | | 0.049 | 0.079 | 0.109 | | |
| Luminance of white 【Note4】 | | $Y_L$ | | 350 | 450 | | $Cd/m^2$ | |
| White Uniformity | | $\delta_{W(5P)}$ | | — | - | 1.3 | | 【Note5】 |
| Black Uniformity | | $\delta_{B(5P)}$ | | | | 1.3 | | 【Note5】 |



※ The measurement shall be executed 30 minutes after lighting at rating. (typical condition : $I_L$ = 4.3 mArms)

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.3 below.

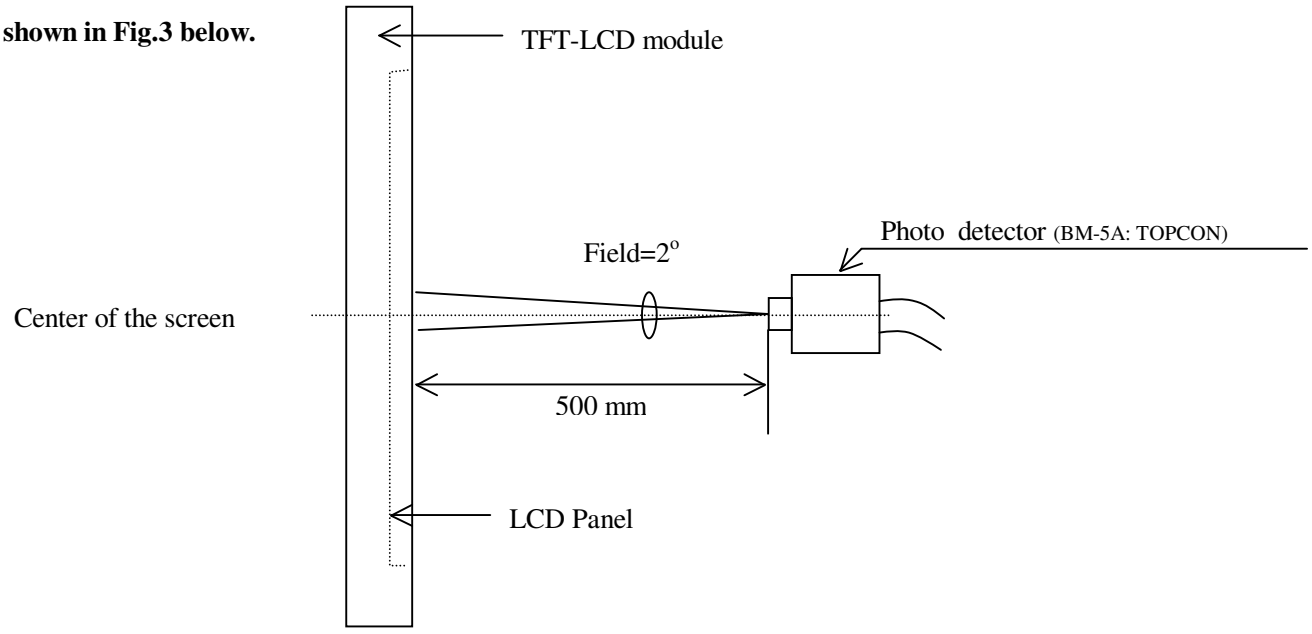
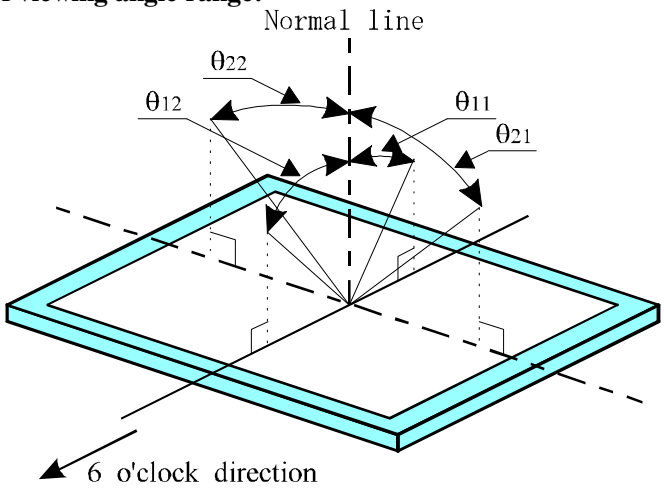



Fig 1. Optical characteristics measurement method

【Note1】 **Definitions of viewing angle range:**




【Note2】 **Definition of contrast ratio:**

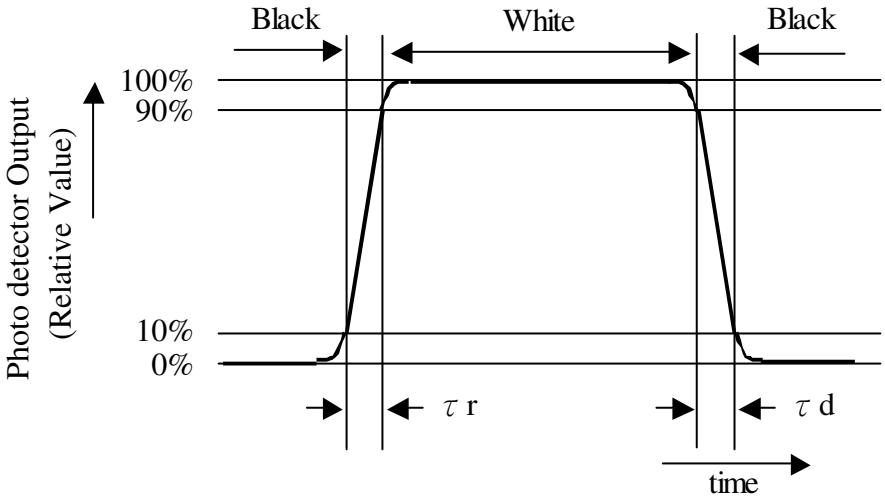
**The contrast ratio is defined as the following.**

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

【Note3】 **Definition of response time:**

**The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white" .**

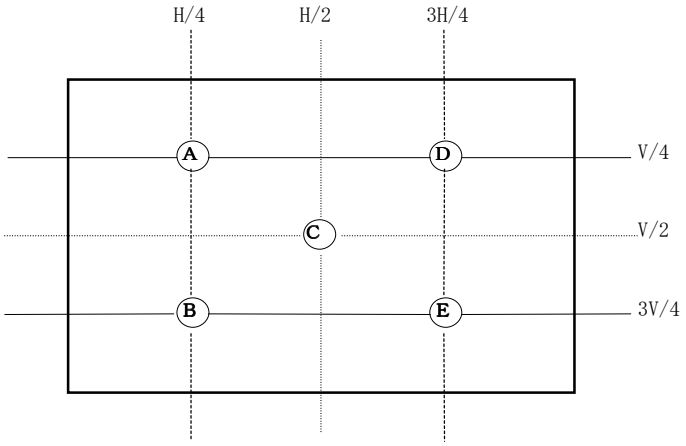





【Note4】 **This shall be measured at center of the screen.**

【Note5】Definition of white and black uniformity:

White and balck uniformity is defined as the following the number of measurement points within active area, formula are δw(5)(A～E). HxV : active area




$$\delta_W = \frac{\text{Maximum or minumum Luminance (A,B,D,E points)}}{\text{Luminance (C point measurement)}}$$

## 10. Display Quality

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standard.

## 11. Handling Precautions

a) Be sure to turn off the power supply when inserting or disconnecting the cable.



b) Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.

c) Since the front polarizer is easily damaged, pay attention not to scratch it.

d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.

g) Since CMOS LSI is used in this module, take care of static electricity and injure the human earth when handling.

h) Observe all other precautionary requirements in handling components.

i) This module has its circuitry PCBs on the rear side and should be handled carefully in order not to be stressed.

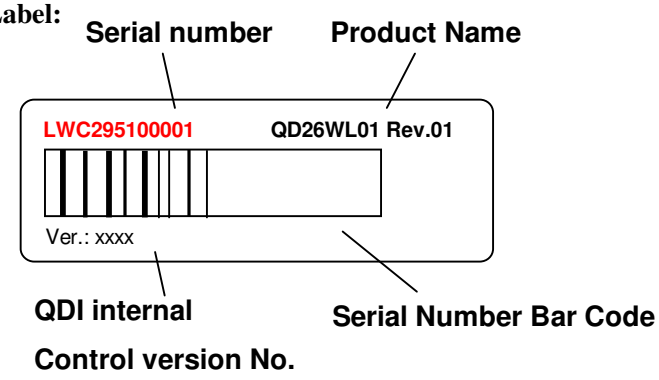
j) Laminated film is attached to the module surface to prevent it from being scratched . Peel the film off slowly just before the use with strict attention to electrostatic charges. Ionized air shall be blown over during the action. Blow off the 'dust' on the polarizer by using an ionized nitrogen gun, etc..

## 12.Reliability test items

| No. | Test item | Conditions |
|---|---|---|
| 1 | High temperature storage test | Ta = 70℃ 240h |
| 2 | Low temperature storage test | Ta = -30℃ 240h |
| 3 | High temperature<br>& high humidity operation test | Ta = 50℃ ; 95%RH 240h<br>(No condensation) |
| 4 | High temperature operation test | Ta = 60℃ 240h |
| 5 | Low temperature operation test | Ta = 0℃ 240h |
| 6 | Vibration test (non- operating) | Frequency: 10～500Hz, 1.0G , 1Hr/each axis |
| 7 | Shock test<br>(non- operating) | Gravity : 100G<br>Pulse width : 2 ms, half sine wave<br>Direction : ±X,±Y,±Z<br>Once for each direction. |
| 8 | ESD | Contact-op:+-8kv, Contact-nop: +-10kv,<br>Air-op:+-15kv, Air-nop: +-20kv,<br>(contact area is limited on metal bezel) |

## 13. Others

1) Lot No. Label:






LWC295100001 **Digital code 4, 5 is Date code.**

**Digital 4 (Year) 1: 2001, 2: 2002, 3:2003,….**

**Digital 5 (Month) 1: Jan, 2: Feb,… , A:Oct, B:Nov., C: Dec.**

**2) Adjusting volume has been set optimally before shipment, so do not change any adjusted value. If adjusted value is changed, the specification may not be satisfied.**

**3) Disassembling the module can cause permanent damage and should be strictly avoided.**

**4) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.**

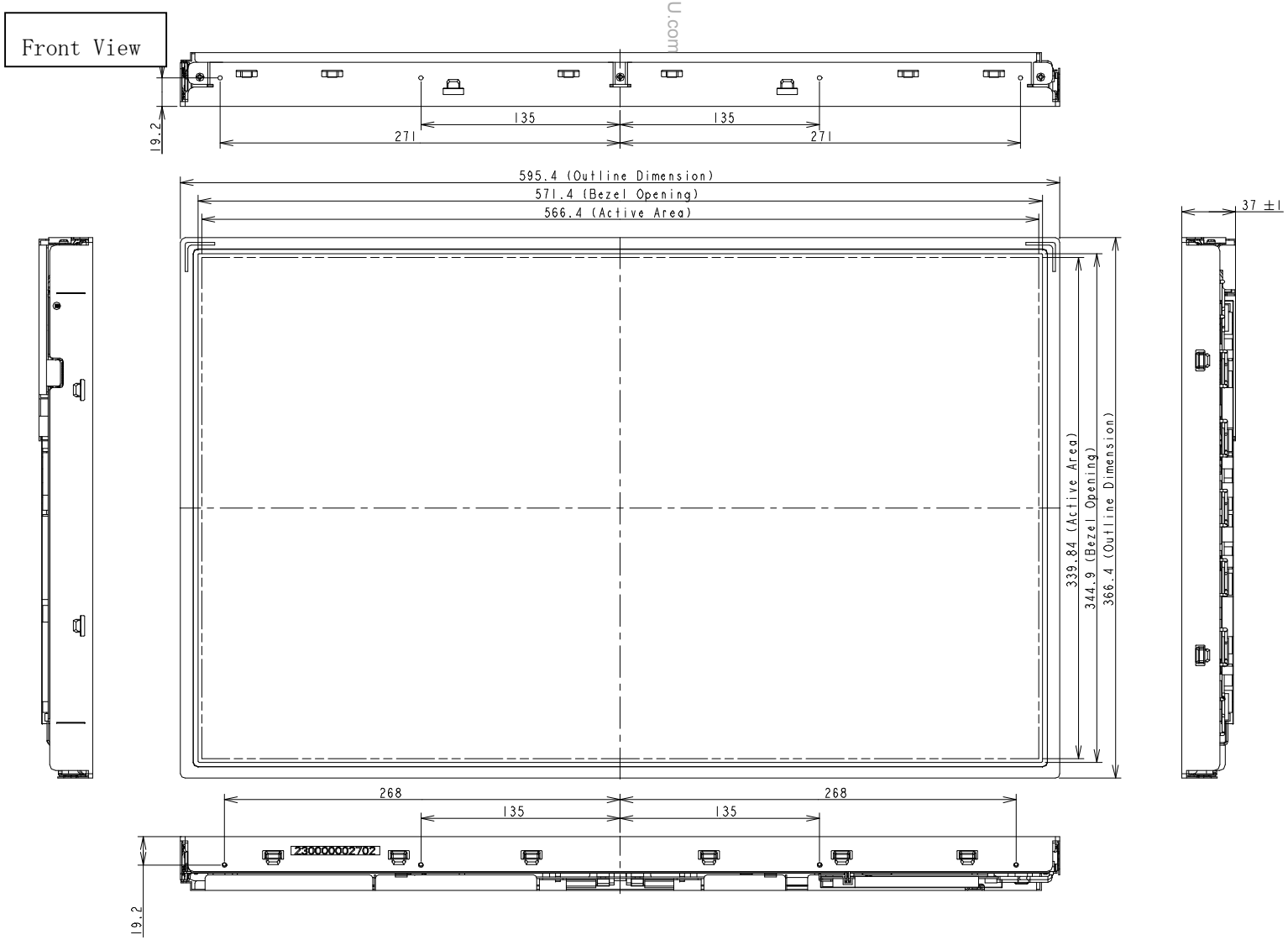
**5) If any problem occurs in relation to the description of this specification, it shall be resolved through discussion with spirit of cooperation.**

**6) UL certification number : E216479-A3-UL-1**

**TUV certification number : R50031484.**

## 14. Drawing

Front View



Back View