# Model Name: T315XW04 V5L1

## Issue Date : 2010/12/25

## ( ) Preliminary Specifications
## (＊)Final Specifications

| Customer Signature | Date | AUO | Date |
|---|---|---|---|
| Approved By | | Approval By PM Director | |
| Note | | Reviewed By RD Director | |
| | | Reviewed By Project Leader | |
| | | Prepared By PM | |

# Contents

# Record of Revision

| Version | Date | Page | Description |
|---|---|---|---|
| 0.1 | 2010/12/25 | | First release |
| 1.0 | 2011/02/22 | P6 | Backlight Power Consumption : 78W |
| | | P15 | Power Sequence for LCD |
| | | P25 | Vibration and drop test |
| | | P28 | Packing Method |
| | | P29 | Pallet and Shipment Information |
| | | | |
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# 1. General Description

This specification applies to the 31.5 inch Color TFT-LCD SKD model T315XW04 V5. This LCD Open Cell Unit has a TFT active matrix type liquid crystal panel 1366 x 768 pixels, and diagonal size of 31.5 inch. This Open Cell Unit supports 1366 x 768 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot.

*** General Information**

| Items | Specification | Unit | Note |
|---|---|---|---|
| Active Screen Size | 31.5 | inch | |
| Display Area | 697.6(H)*392.2(V) | mm | |
| Outline Dimension | 760.0(H)*450.0(V)*46.5(D) | mm | |
| Driver Element | a-Si TFT active matrix | | |
| Display Colors | 8 bit, 16.7M | Colors | |
| Number of Pixels | 1366 x 768 | Pixel | |
| Pixel Pitch | 0.51075 | mm | |
| Pixel Arrangement | RGB vertical stripe | | |
| Display Operation Mode | Normally Black | | |
| Surface Treatment | Anti-Glare, 3H | | Haze=2% |



# 2. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit

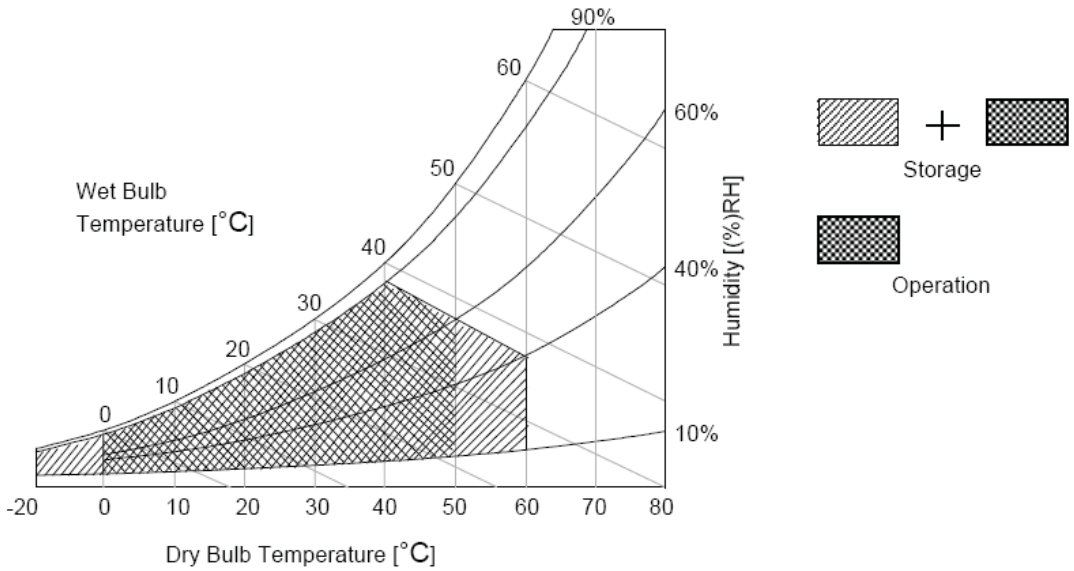
| Item | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Logic/LCD Drive Voltage (for 12V input) | Vcc | -0.3 | 14 | [Volt] | Note 1 |
| Input Voltage of Signal (for 5V input) | Vin | -0.3 | 3.6 | [Volt] | Note 1 |
| Operating Temperature | TOP | 0 | +50 | [°C] | Note 2 |
| Operating Humidity | HOP | 10 | 90 | [%RH] | Note 2 |
| Storage Temperature | TST | -20 | +60 | [°C] | Note 2 |
| Storage Humidity | HST | 10 | 90 | [%RH] | Note 2 |
| Panel Surface Temperature | PST | | 65 | [°C] | Note 3 |

Note 1: Duration:50 msec.

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3: Surface temperature is measured at 50℃ Dry condition



# 3. Electrical Specification

The T315XW04 V5 Cell Unit requires power input which is employed to power the LCD electronics and to drive the TFT array and liquid crystal.

## 3.1 Electrical Characteristics

### 3.1.1: DC Characteristics

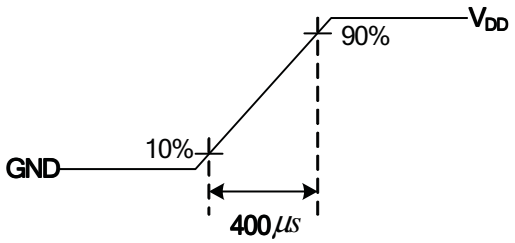
| Parameter | | Symbol | Value | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max | | |
| LCD | | | | | | | |
| Power Supply Input Voltage | | $V_{DD}$ | 10.8 | 12 | 13.2 | $V_{DC}$ | |
| Power Supply Input Current | | $I_{DD}$ | -- | 0.3 | 0.36 | A | 1 |
| Inrush Current | | $I_{RUSH}$ | -- | 2 | 3 | A | 2 |
| Permissible Ripple of Power Supply Input Voltage | | $V_{RP}$ | -- | -- | $V_{DD}$ * 5% | $mV_{pk-pk}$ | 3 |
| LVDS Interface | Input Differential Voltage | $\lvert V_{ID} \rvert$ | 200 | 400 | 600 | $mV_{DC}$ | 4 |
| | Differential Input High Threshold Voltage | $V_{TH}$ | +100 | -- | +300 | $mV_{DC}$ | 4 |
| | Differential Input Low Threshold Voltage | $V_{TL}$ | -300 | -- | -100 | $mV_{DC}$ | 4 |
| | Input Common Mode Voltage | $V_{ICM}$ | 1.1 | 1.25 | 1.4 | $V_{DC}$ | 4 |
| CMOS Interface | Input High Threshold Voltage | $V_{IH}$ (High) | 2.7 | -- | 3.3 | $V_{DC}$ | 5 |
| | Input Low Threshold Voltage | $V_{IL}$ (Low) | 0 | -- | 0.6 | $V_{DC}$ | 5 |
| Backlight Power Consumption | | $P_{BL}$ | | 78 | | Watt | |

### 3.1.2: AC Characteristics

| Parameter | | Symbol | Value | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max | | |
| LVDS Interface | Receiver Clock : Spread Spectrum Modulation range | Fclk_ss | Fclk -3% | -- | Fclk +3% | MHz | 6 |
| | Receiver Clock : Spread Spectrum Modulation frequency | Fss | 30 | -- | 200 | KHz | 6 |
| | Receiver Data Input Margin<br>Fclk = 85 MHz<br>Fclk = 65 MHz | tRMG | <br>-0.4<br>-0.5 | <br>--<br>-- | <br>0.4<br>0.5 | ns | 7 |

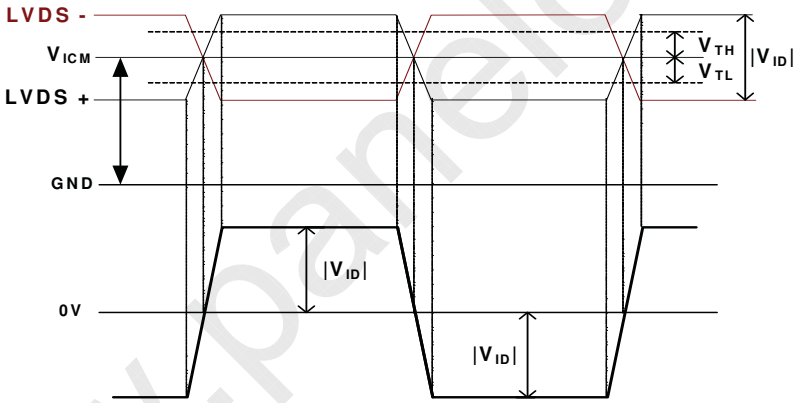
**Note :**

1. Test Condition:
   (1) $V_{DD}$ = 12.0V
   (2) Fv = 60 Hz
   (3) Fclk= 82 Mhz(typ)
   (4) Temperature = 25 ℃
   (5) Typ. Input current : White Pattern
2. Measurement condition : Rising time = 400us

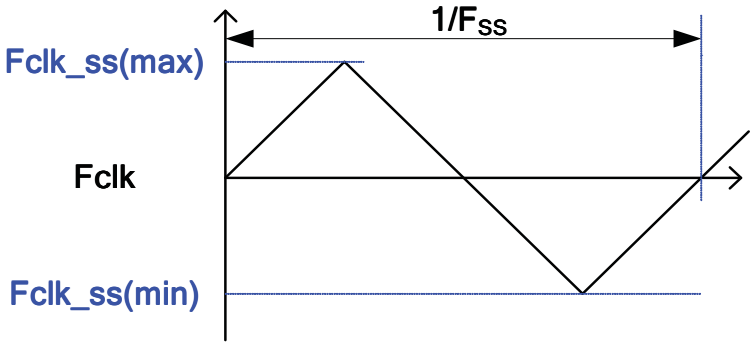



3. Test Condition:
   (1) The measure point of $V_{RP}$ is in LCM side after connecting the System Board and LCM.
   (2) Under Max. Input current spec. condition.

4. $V_{ICM}$ = 1.25V

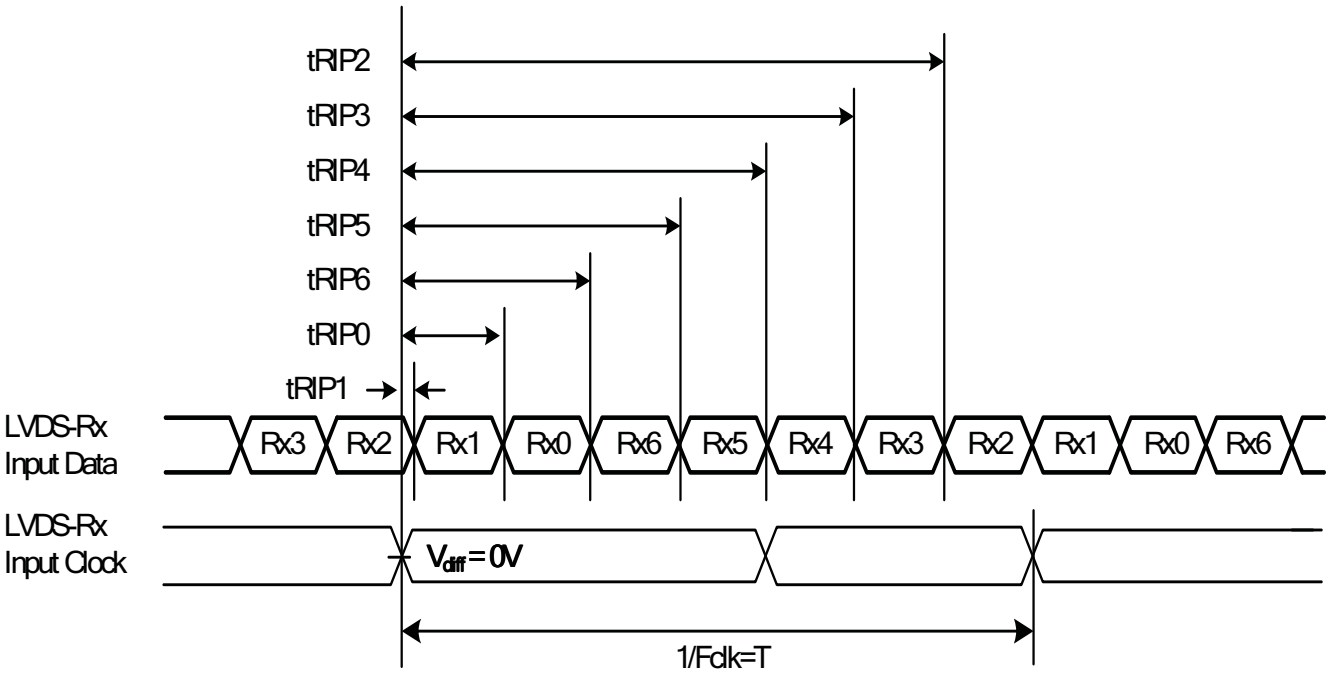



5. The measure points of $V_{IH}$ and $V_{IL}$ are in LCM side after connecting the System Board and LCM.
6. LVDS Receiver Clock SSCG (Spread spectrum clock generator) is defined as below figures



**7.** Receiver Data Input Margin

| Parameter | Symbol | Rating | | | Unit | Note |
|---|---|---|---|---|---|---|
| | | Min | Type | Max | | |
| Input Clock Frequency | Fclk | Fclk (min) | -- | Fclk (max) | MHz | **T=1/Fclk** |
| Input Data Position0 | tRIP1 | -\|tRMG\| | 0 | \|tRMG\| | ns | |
| Input Data Position1 | tRIP0 | T/7-\|tRMG\| | T/7 | T/7+\|tRMG\| | ns | |
| Input Data Position2 | tRIP6 | 2T/7-\|tRMG\| | 2T/7 | 2T/7+\|tRMG\| | ns | |
| Input Data Position3 | tRIP5 | 3T/7-\|tRMG\| | 3T/7 | 3T/7+\|tRMG\| | ns | |
| Input Data Position4 | tRIP4 | 4T/7-\|tRMG\| | 4T/7 | 4T/7+\|tRMG\| | ns | |
| Input Data Position5 | tRIP3 | 5T/7-\|tRMG\| | 5T/7 | 5T/7+\|tRMG\| | ns | |
| Input Data Position6 | tRIP2 | 6T/7-\|tRMG\| | 6T/7 | 6T/7+\|tRMG\| | ns | |



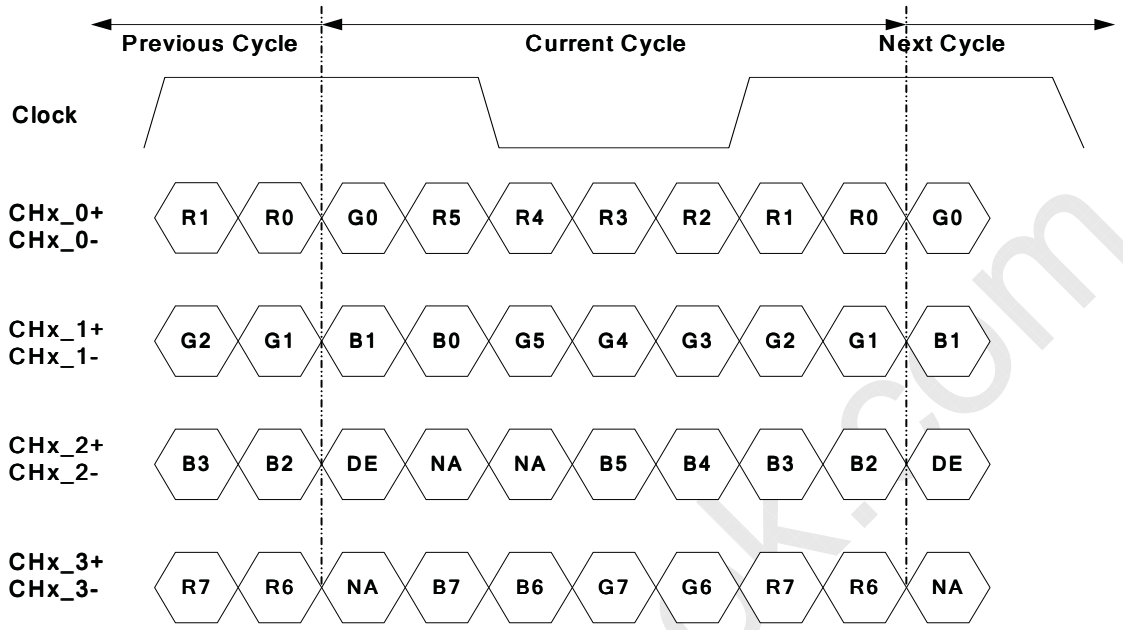
## 3-2 Interface Connections

- LCD connector: 196337-30041-3 (P-TWO, FFC connector)

| PIN | Symbol | Description |
|---|---|---|
| 1 | $V_{DD}$ | Power Supply, +12V DC Regulated |
| 2 | $V_{DD}$ | Power Supply, +12V DC Regulated |
| 3 | $V_{DD}$ | Power Supply, +12V DC Regulated |
| 4 | $V_{DD}$ | Power Supply, +12V DC Regulated |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | LVDS_SEL | Open/High(3.3V) for NS, Low(GND) for JEIDA |
| 10 | N.C. | AUO Internal Use Only |
| 11 | GND | Ground |
| 12 | CH1_0- | LVDS Channel 1, Signal 0- |
| 13 | CH1_0+ | LVDS Channel 1, Signal 0+ |
| 14 | GND | Ground |
| 15 | CH1_1- | LVDS Channel 1, Signal 1- |
| 16 | CH1_1+ | LVDS Channel 1, Signal 1+ |
| 17 | GND | Ground |
| 18 | CH1_2- | LVDS Channel 1, Signal 2- |
| 19 | CH1_2+ | LVDS Channel 1, Signal 2+ |
| 20 | GND | Ground |
| 21 | CH1_CLK- | LVDS Channel 1, Clock - |
| 22 | CH1_CLK+ | LVDS Channel 1, Clock + |
| 23 | GND | Ground |
| 24 | CH1_3- | LVDS Channel 1, Signal 3- |
| 25 | CH1_3+ | LVDS Channel 1, Signal 3+ |
| 26 | GND | Ground |
| 27 | N.C. | AUO Internal Use Only |
| 28 | N.C. | AUO Internal Use Only |
| 29 | N.C. | AUO Internal Use Only |
| 30 | GND | Ground |

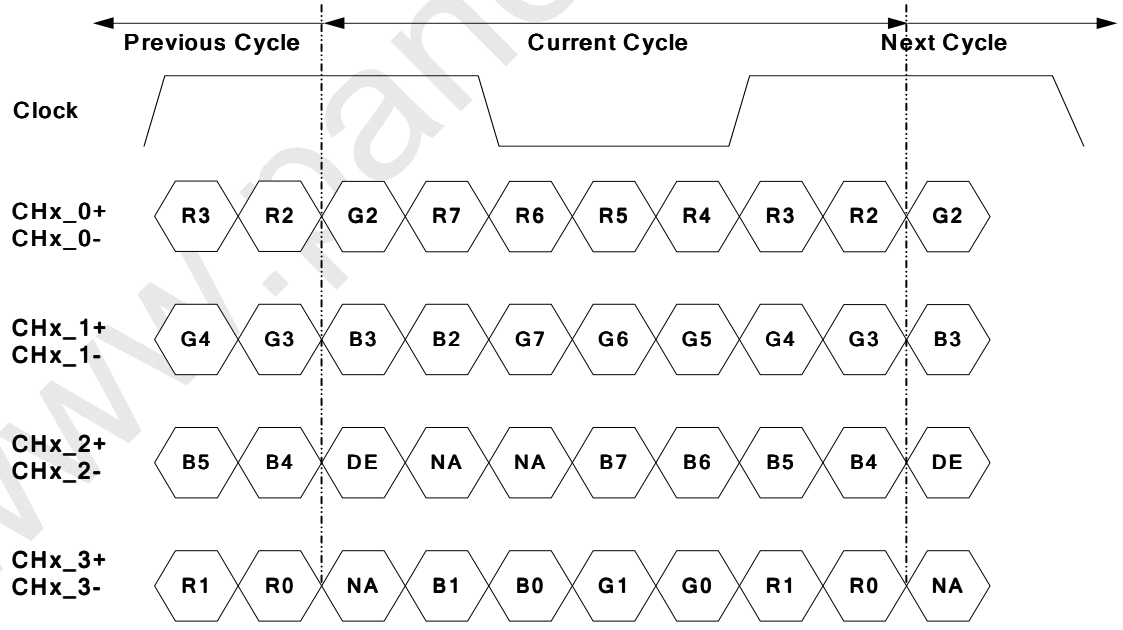
**Note: N.C. : please leave this pin unoccupied. It can not be connected by any signal (Low/GND/High).**

- **LVDS Option = High/Open → NS**




Note: x = 1, 2, 3, 4…

- **LVDS Option = Low → JEIDA**




Note: x = 1, 2, 3, 4…

## 3-3 Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

| Signal | Item | Symbol | Min. | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Vertical Section | Period | Tv | 784 | 810 | 1015 | Th |
| | Active | Tdisp (v) | | 768 | | Th |
| | Blanking | Tblk (v) | 16 | 42 | 247 | Th |
| Horizontal Section | Period | Th | 1460 | 1648 | 2000 | Tclk |
| | Active | Tdisp (h) | | 1366 | | Tclk |
| | Blanking | Tblk (h) | 94 | 282 | 634 | Tclk |
| Clock | Frequency | Fclk=1/Tclk | 50 | 80 | 86 | MHz |
| Vertical Frequency | Frequency | Fv | 47 | 60 | 63 | Hz |
| Horizontal Frequency | Frequency | Fh | 43 | 48 | 53 | KHz |

Notes:

(1) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.

(2) Vertical display position is specified by the rise of DE after a “Low” level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise of 1st DE is displayed at the top line of screen.

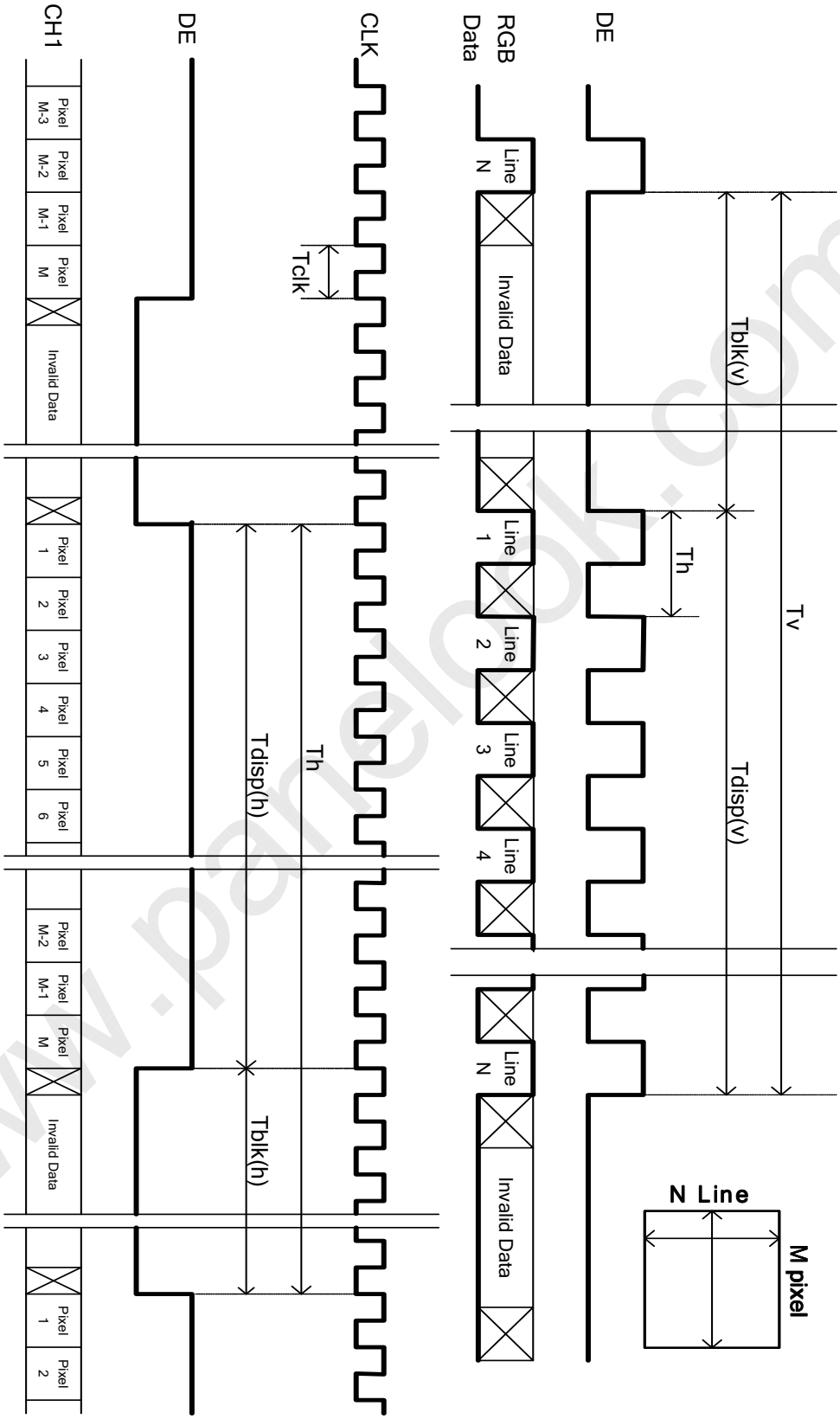
(3) If a period of DE “High” is less than 1,366 DCLK or less than 768 lines, the rest of the screen displays black.

(4) The display position does not fit to the screen if a period of DE “High” and the effective data period do not synchronize with each other.



## 3-4 Signal Timing Waveforms



## 3-5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

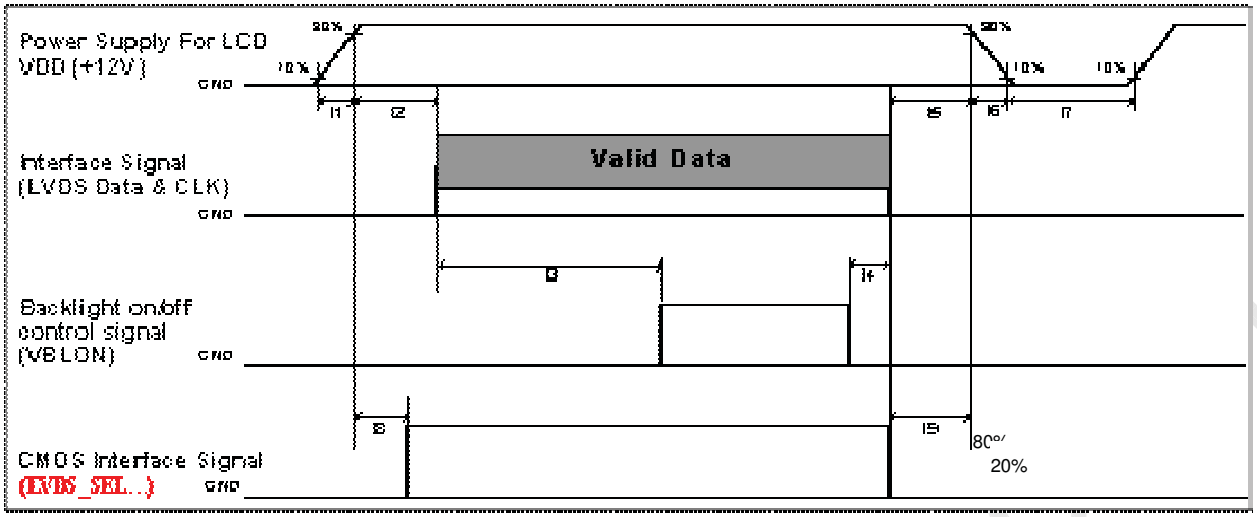
### COLOR DATA REFERENCE

| Color | | Input Color Data | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RED | | | | | | | | GREEN | | | | | | | | BLUE | | | | | | | |
| | | MSB | | | | | | | LSB | MSB | | | | | | | LSB | MSB | | | | | | | LSB |
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| 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 |
| | Red(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 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 |
| | 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 |
| R | RED(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | RED(254) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | RED(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| G | GREEN(000) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | GREEN(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | GREEN(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B | BLUE(000) | 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(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | ---- | | | | | | | | | | | | | | | | | | | | | | | | |
| | BLUE(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| | BLUE(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |



## 3.6 Power Sequence for LCD




| Parameter | Values | | | Unit |
|---|---|---|---|---|
| | Min. | Type. | Max. | |
| t1 | 0.4 | --- | 30 | ms |
| t2 | 0.1 | --- | **50** | ms |
| t3 | **450** | --- | --- | ms |
| t4 | 0 *1 | --- | --- | ms |
| t5 | 0 | --- | --- | ms |
| t6 | --- | --- | --- *2 | ms |
| t7 | 500 | --- | --- | ms |
| t8 | 10 *3 | --- | 50 | ms |
| t9 | 0 | --- | --- | ms |

Note:
(1) t4=0 : concern for residual pattern before BLU turn off.
(2) t6 : voltage of VDD must decay smoothly after power-off. (Customer system decide this value)
(3) When CMOS Interface signal is N.C. (no connection), opened in Transmitted end, t8 timing spec can be negligible.

# 3.7 Backlight Power Specification For LCD Modules

## 3.7.1: Electrical specification

| Item | Symbol | Condition | Spec | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| Operating Voltage | Vo | - | 1242 | 1380 | 1518 | Vrms | |
| Operating Current | Io | - | -- | 12.5 | -- | mArms | |
| BL Total Power Dissipation | PBL | - | -- | 80 | -- | Watt | |
| Striking Voltage | Vstk | At 0℃ | | 2750 | - | Vrms | |
| | | At 25℃ | | 2290 | - | | |
| Striking Time | Ts | - | 1,000 | -- | 1,500 | msec | |
| Operating Frequency | fo | - | -- | 55 | -- | kHz | |
| PWM Operating Frequency | F_PWM | - | 120 | 180 | 240 | Hz | |
| PWM Dimming Duty Ratio | D_PWM | - | 10 | -- | 100 | % | Note 1&2 |
| Lamp Type | | | U type | | | | |
| Number of Lamps | | | 4 | | | pcs | |

（Ta=25±5℃, Turn on for 45minutes）

**Note 1:** Dimming range


PWM Dimming : include Internal and External PWM Dimming

**Note 2:** Low dimming ratio operation

When PWM dimming duty ratio is operated lower than recommended value, feedback signal and all protection functions should be confirmed by LIPS design. Display performance should also be confirmed by customer's implement.

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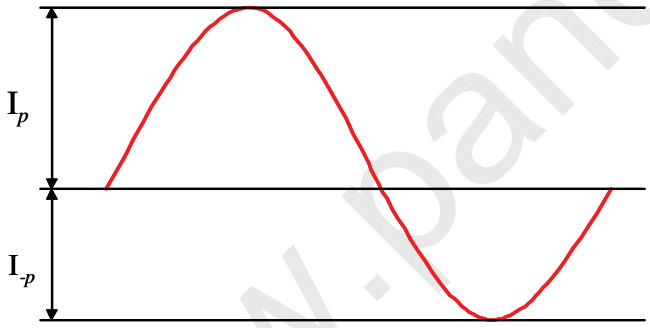
### 3.7.2: Lamp specification

| Item | Symbol | Condition | Spec | | | Unit | Note |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| Lamp voltage | VL | | 1242 | 1380 | 1518 | Vrms | |
| Lamp current | IL | | -- | 12.5 | -- | mArms | |
| Lamp frequency | fL | | -- | - | -- | kHz | |
| Starting voltage | Vs | At 0℃ | -- | 2750 | - | Vrms | |
| | | At 25℃ | -- | 2290 | - | Vrms | |
| Delayed discharge time | TD | | - | - | 1.0 | sec | |
| Life time | TL | | 50K | - | - | hr | |
| Unsymmetrical ratio | UR | | - | - | 10% | - | Note 1. |
| Crest factor | C.F. | | $\sqrt{2}-10\%$ | $\sqrt{2}$ | $\sqrt{2}+10\%$ | - | |

The above characteristics are measured under the conditions:
Ambient temperature: 25±2℃, Relative Humidity: 65±20%RH.

**Note 1:** Waveform definition

Please light on the lamp with symmetrical voltage and current waveform (unsymmetrical ratio is less than 10%, crest factor within $\sqrt{2}\pm10\%$ ).




Unsymmetrical Ratio = $|I_p-I_{-p}| / I_{rms}*100\%$

Crest Factor = $I_p$ (or $I_{-p}$) / $I_{rms}$

$I_p$ : High side peak value

$I_{-p}$ : Low side peak value

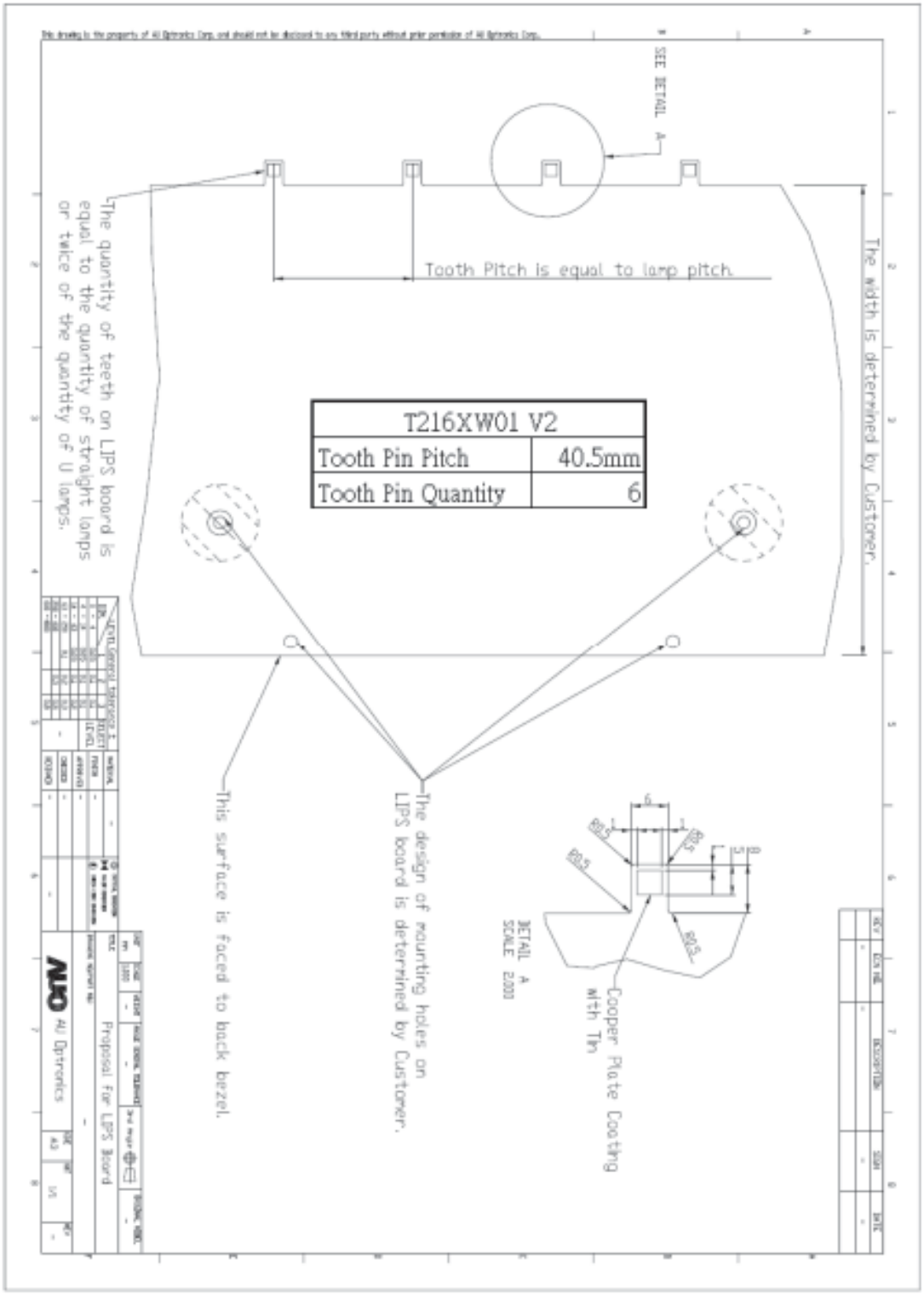
$I_{rms}$ : Root mean square value



### 3.7.3: Backlight Connector Pin Configuration

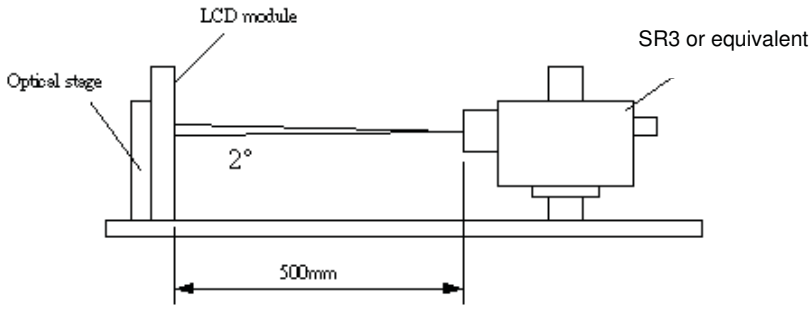
CN1: EL7H001ZZ2 (JAE)



# 4. Optical Specification

Optical characteristics are determined after the BLU unit has been 'ON' (note 1.) and stable for approximately 45 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of φ and θ equal to 0°.

**Fig.1 presents additional information concerning the measurement equipment and method.**




| Parameter | | Symbol | Values | | | Unit | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max | | |
| Contrast Ratio | | CR | 2,400 | 3,000 | -- | -- | 1 |
| Surface Luminance (White) | | $L_{WH}$ | 320 | 400 | -- | $cd/m^2$ | 2 |
| Luminance Variation | | $\delta_{WHITE(9P)}$ | -- | 1.25 | 1.33 | -- | 3 |
| Response Time (G to G) | | Tγ | -- | 8 | 12 | Ms | 4 |
| Color Gamut | | NTSC | -- | 72 | -- | % | -- |
| Color Coordinates | Red | $R_X$ | Typ.-0.03 | 0.64 | Typ.+0.03 | -- | -- |
| | | $R_Y$ | | 0.33 | | -- | -- |
| | Green | $G_X$ | | 0.29 | | -- | -- |
| | | $G_Y$ | | 0.60 | | -- | -- |
| | Blue | $B_X$ | | 0.15 | | -- | -- |
| | | $B_Y$ | | 0.06 | | -- | -- |
| | White | $W_X$ | | 0.280 | | -- | -- |
| | | $W_Y$ | | 0.290 | | -- | -- |
| Viewing Angle | x axis, right(φ=0°) | $\theta_r$ | -- | 88 | -- | degree | 5 |
| | x axis, left(φ=180°) | $\theta_l$ | -- | 88 | -- | degree | 5 |
| | y axis, up(φ=90°) | $\theta_u$ | -- | 88 | -- | degree | 5 |
| | y axis, down (φ=270°) | $\theta_d$ | -- | 88 | -- | degree | 5 |

Note:

1. All above optical specifications are defined by T315XW04 V5 module basis.
2. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance of } L_{on5}}{\text{Surface Luminance of } L_{off5}}$$

3. Surface luminance is luminance value at point 5 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see FIG 2., $L_{WH}$=Lon5 where Lon5 is the luminance with all pixels displaying white at center 5 location.
4. The variation in surface luminance, δWHITE is defined (center of Screen) as:

   $\delta_{WHITE(9P)}$= Maximum($L_{on1}$, $L_{on2}$,…,$L_{on9}$)/ Minimum($L_{on1}$, $L_{on2}$,…$L_{on9}$)
5. Response time $T_\gamma$ is the average time required for display transition by switching the input signal for five luminance ratio (0%,25%,50%,75%,100% brightness matrix) and is based on $F_V$=60Hz to optimize.

| Measured Response Time | | Target | | | | |
|---|---|---|---|---|---|---|
| | | 0% | 25% | 50% | 75% | 100% |
| Start | 0% | | 0% to 25% | 0% to 50% | 0% to 75% | 0% to 100% |
| | 25% | 25% to 0% | | 25% to 50% | 25% to 75% | 25% to 100% |
| | 50% | 50% to 0% | 50% to 25% | | 50% to 75% | 50% to 100% |
| | 75% | 75% to 0% | 75% to 25% | 75% to 50% | | 75% to 100% |
| | 100% | 100% to 0% | 100% to 25% | 100% to 50% | 100% to 75% | |

$T_\gamma$ is determined by 10% to 90% brightness difference of rising or falling period. (As illustrated)

The response time is defined as the following figure and shall be measured by switching the input signal for "any level of grey(bright) " and "any level of gray(dark)".

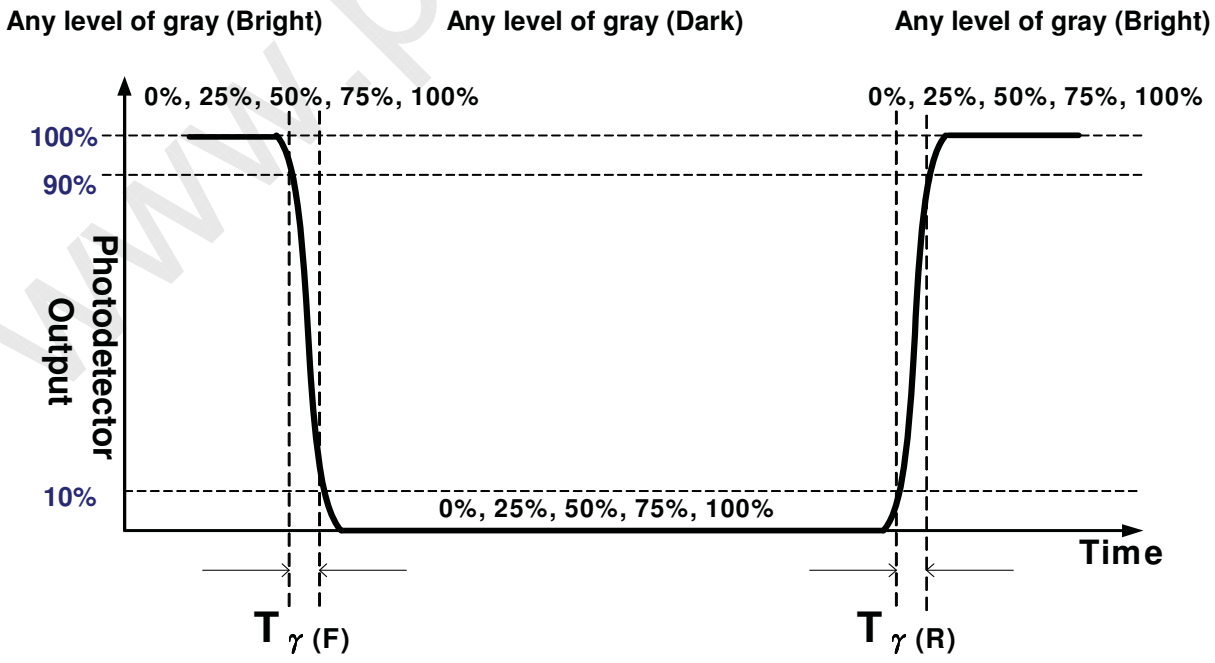
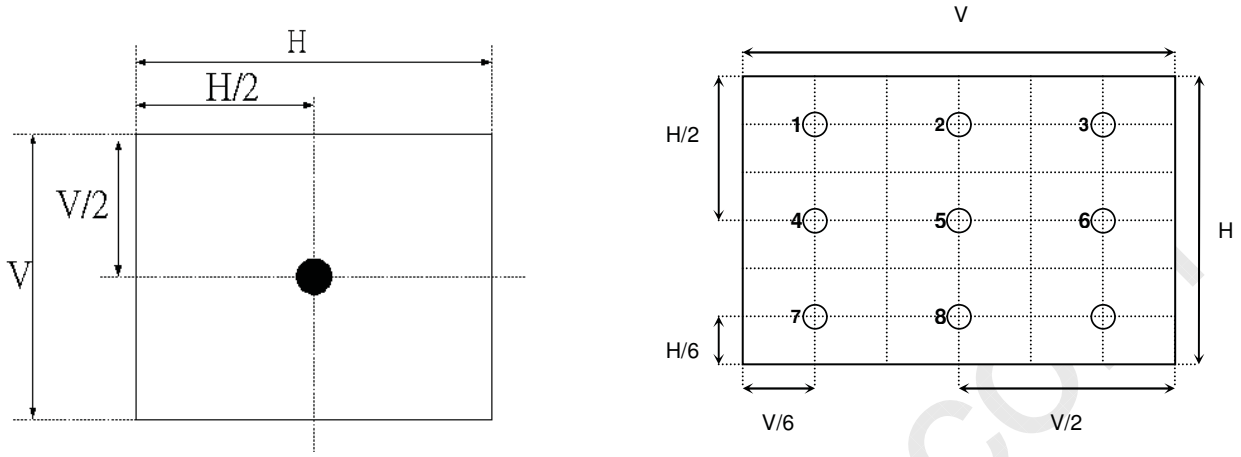


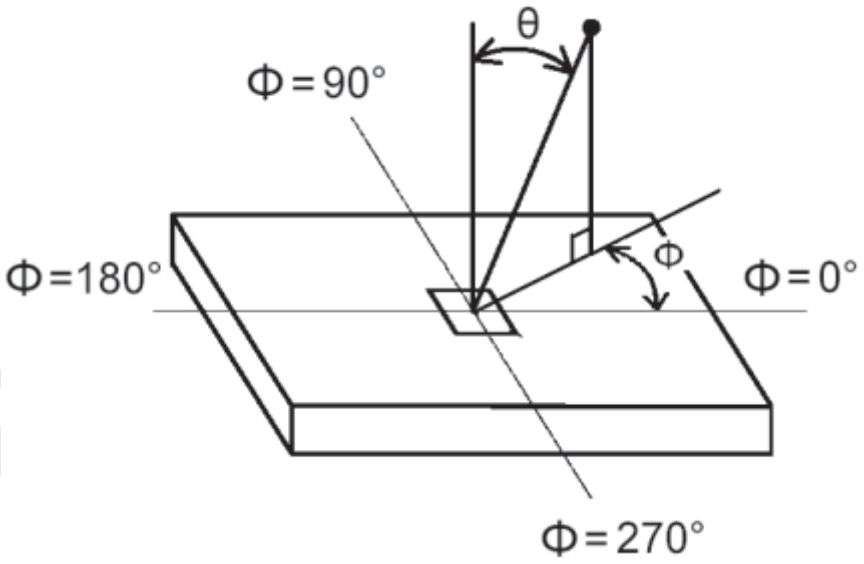

 

**FIG. 2 Luminance**




6. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG3.

**FIG.3 Viewing Angle**

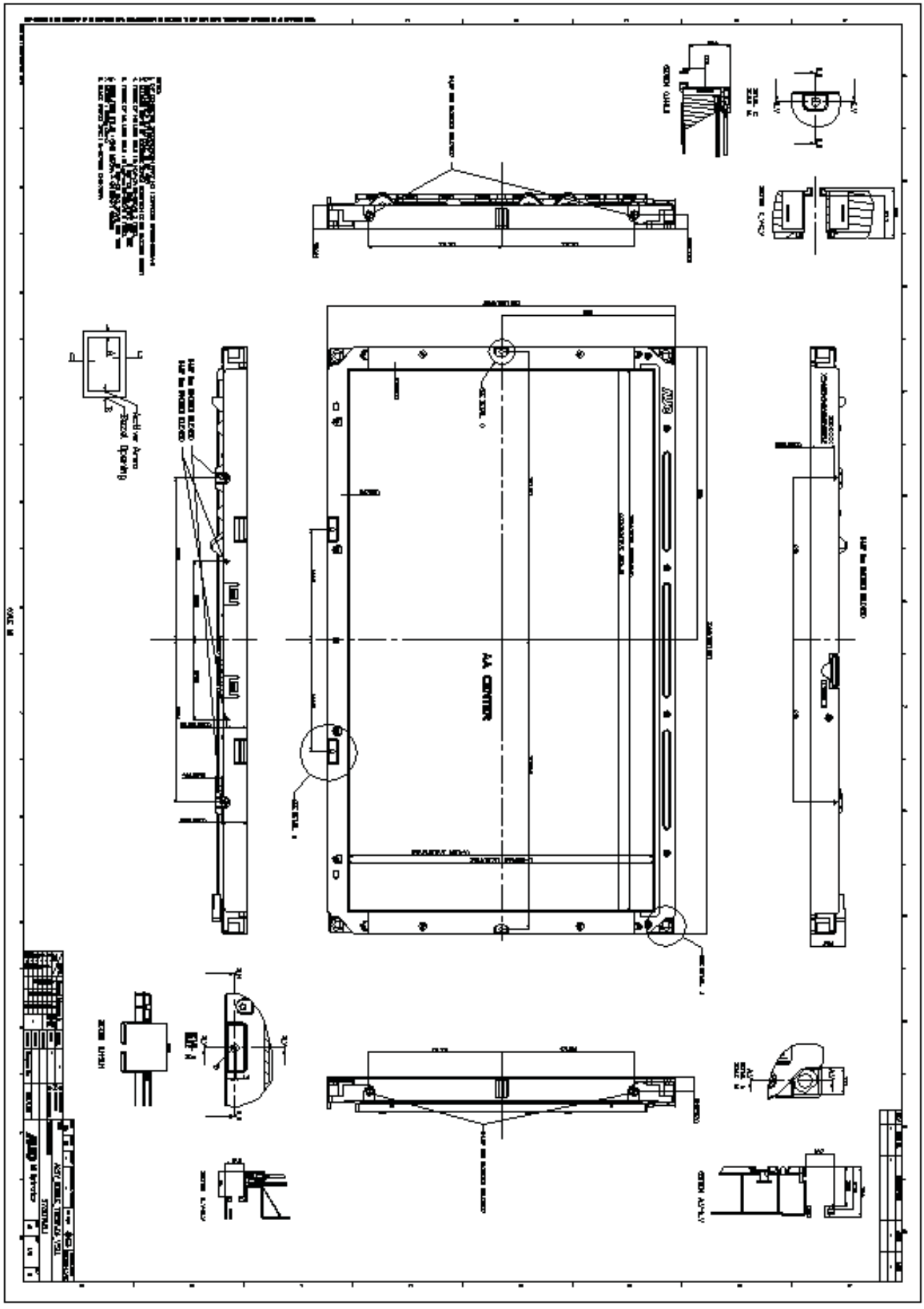


# 5. Mechanical Characteristics

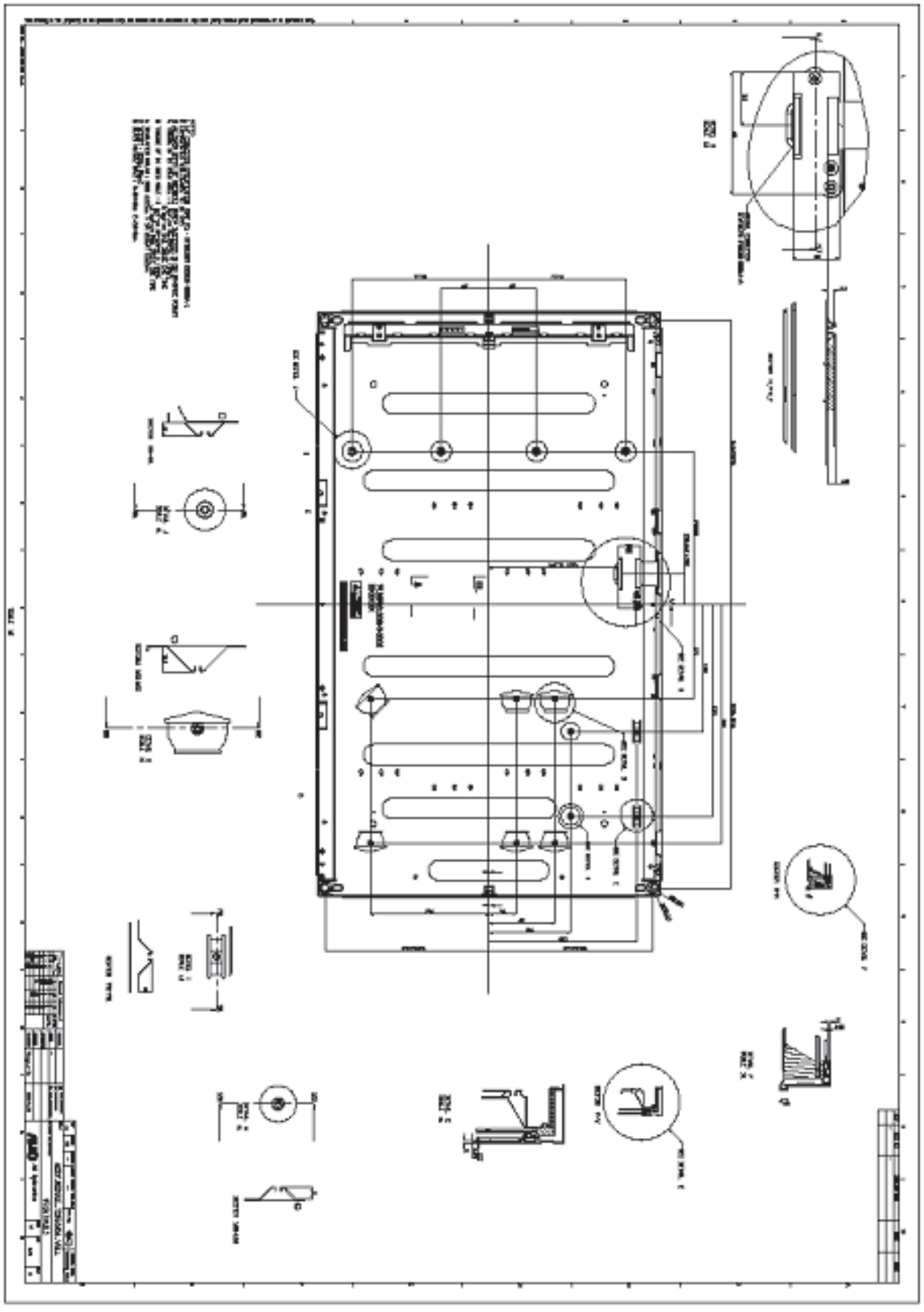
The contents provide general mechanical characteristics for the model T315XW04 V3. In addition the figures in the next page are detailed mechanical drawing of the LCD.

| | | |
|---|---|---|
| Outline Dimension | Horizontal | 760.0 |
| | Vertical | 450.0 |
| | Depth | 46.5 |
| Bezel Opening | Horizontal | 703.6 |
| | Vertical | 398.4 |
| Active Display Area | Horizontal | 697.6 |
| | Vertical | 392.2 |
| Weight | 4.8Kg-5.0Kg | |
| Surface Treatment | Anti-Glare , 3H, Haze 2% | |

- **Front View**



- **Back View**



# 6. Reliability Test Items

| | Test Item | Q'ty | Condition |
|---|---|---|---|
| 1 | High temperature storage test | 3 | 60℃, 300hrs |
| 2 | Low temperature storage test | 3 | -20℃, 300hrs |
| 3 | High temperature operation test | 3 | 50℃, 300hrs |
| 4 | Low temperature operation test | 3 | -5℃, 300hrs |
| 5 | Vibration test (non-operation) | 3 | Wave form : random<br>Vibration level : 1.75G RMS<br>Bandwidth: 10-300-500Hz<br>Duration: X, Y, Z 30min<br>One time for each direction face up |
| 6 | Shock test (non-operation) | 3 | Shock level: 50G<br>Waveform: half sine wave, 20ms<br>Direction: ±X, ±Y, ±Z, One time each direction |
| 7 | Vibration test (With carton) | 4 | Random wave (1.05 G RMS, 10-200Hz)<br>10mins/ each X,Y,Z axes |
| 8 | Drop test (With carton) | 4 | Height: 38.1cm<br>1 corner, 3 edges, 6 surfaces<br>(ASTM-D5276) |

Note: Test item 1~4 RA tests are done on AUO T315XW04 V5 panels.



# 7. International Standard

## 7-1 Safety

(1) UL 60950-1, UL 60065; Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) IEC 60950-1 : 2001, IEC 60065:2001 ; Standard for Safety of International Electrotechnical Commission

(3) EN 60950 : 2001+A11, EN 60065:2002+A1:2006; European Committee for Electrotechnical Standardization (CENELEC), EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

## 7-2 EMC

(4) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992

(5) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.

(6) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electrotechnical Standardization. (CENELEC), 1998

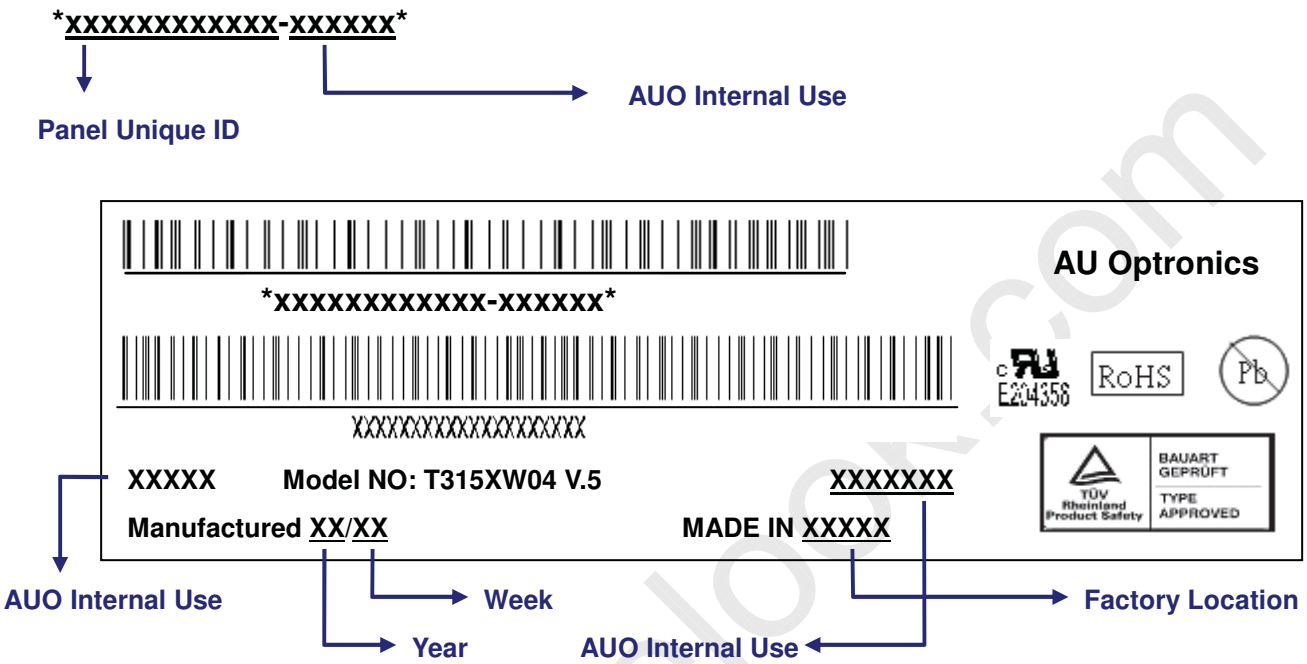


# 8. Packing

## 8-1 Definition of Label

- **Panel Label**



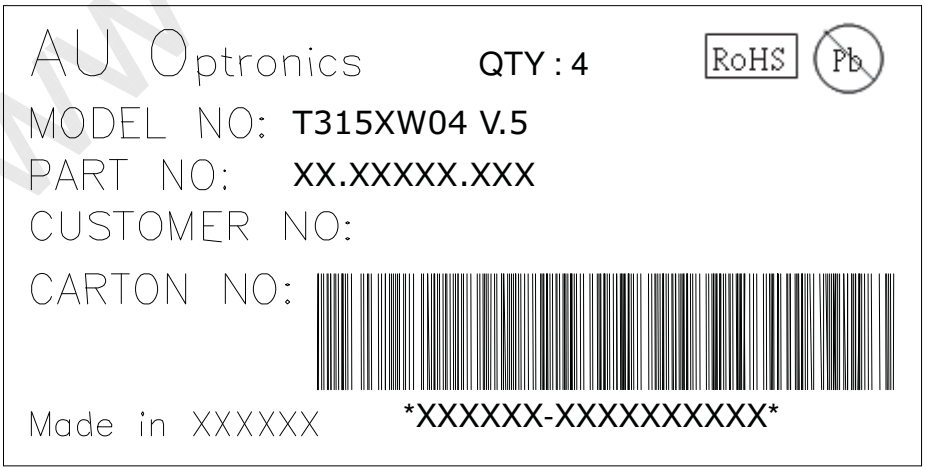

**Green mark description**

(1) For Pb Free Product, AUO will add Pb for identification.

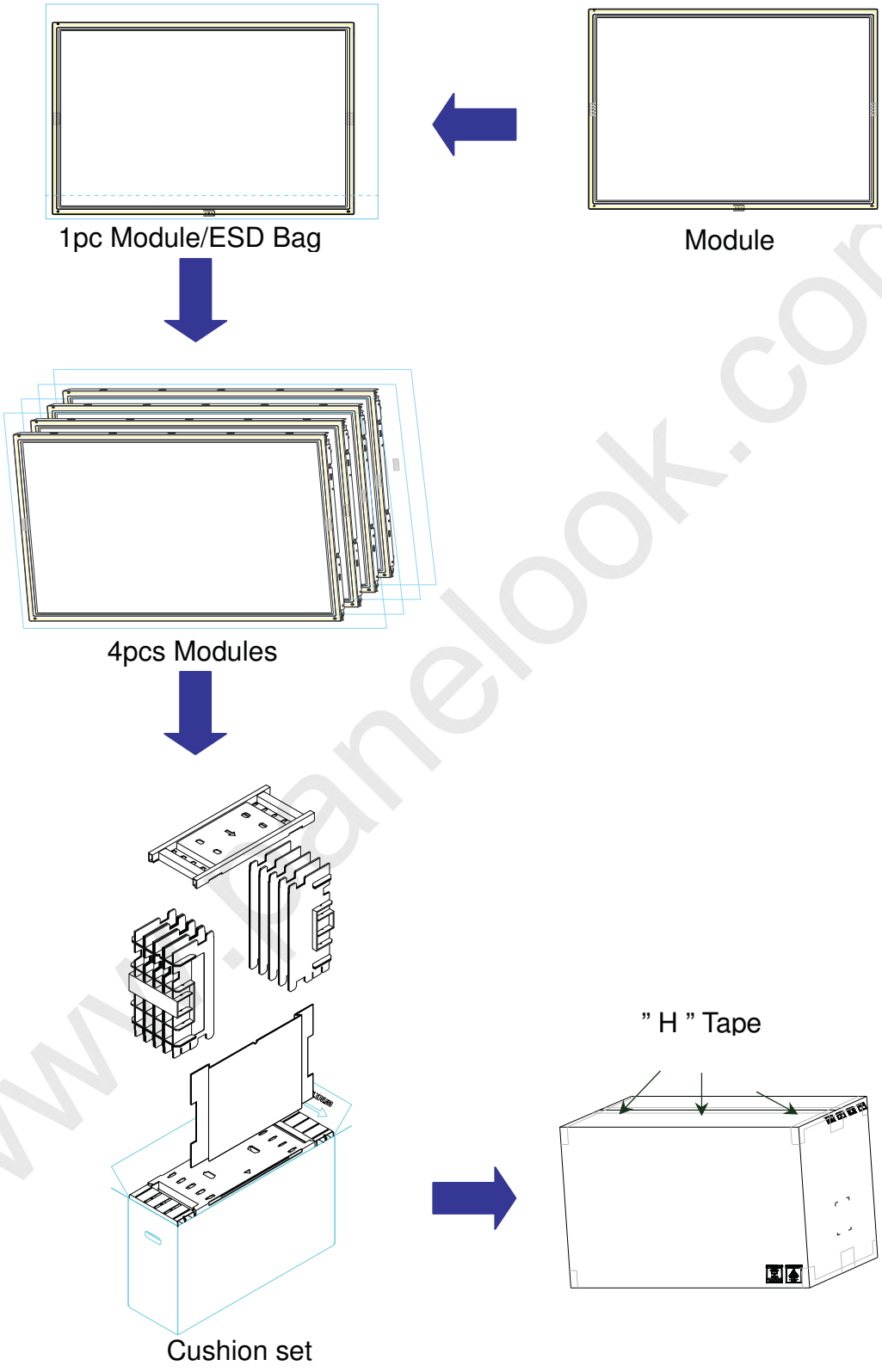
(2) For RoHs compatible products, AUO will add RoHS for identification.

Note: The green Mark will be present only when the green documents have been ready by AUO internal green team. (definition of green design follows the AUO green design checklist.)

- **Carton Label**

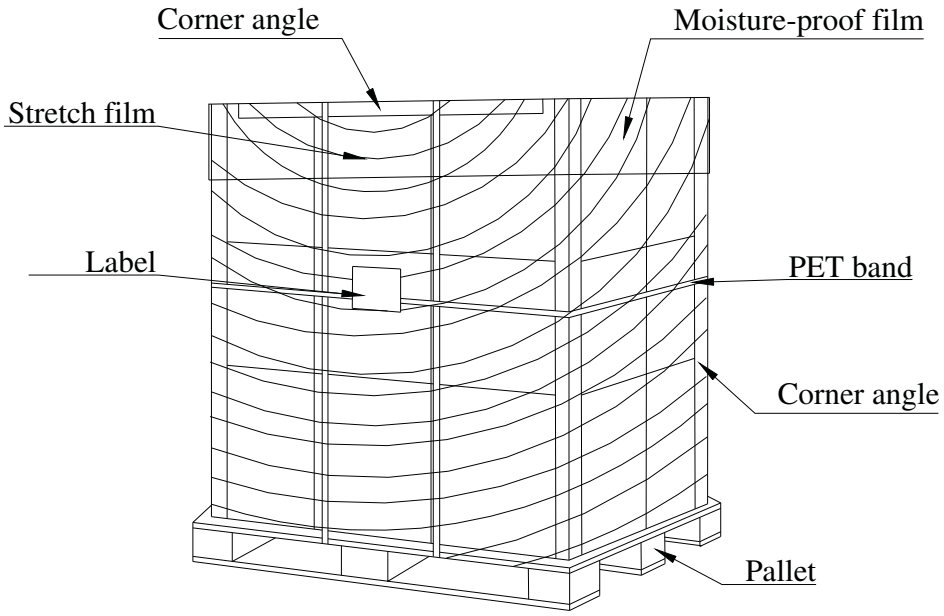


## 8-2 Packing Method



## 8-3 Pallet and Shipment Information

| | Item | Specification | | | Packing Remark |
|---|---|---|---|---|---|
| | | Quantity | Dimension | Weight (kg) | |
| 1 | Packing BOX | 4pcs/box | 832(L)mm*283W)mm*545(H)mm | 28 | |
| 2 | Pallet | 1 | 1150(L)mm*840(W)mm*132(H)mm | 13 | |
| 3 | Boxes per Pallet | 8 boxes/Pallet | | | |
| 4 | Panels per Pallet | 32 pcs/pallet | | | |
| 5 | Pallet after packing | N/A | 1150(L)mm*840(W)mm*1222(H)mm | 237 | |
| | | | 1150(L)mm*840(W)mm*2444(H)mm Double Pallet | 474 | |



# 9. Precautions

Please pay attention to the followings when you use this TFT LCD module.

## 9-1 Mounting Precautions

(1) You must mount a module using holes arranged in four corners or four sides.

(2) You should consider the mounting structure so that uneven force (ex. twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter cause circuit broken by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizer with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizer. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

## 9-2 Operation Precautions

(1) The device listed in the product specification sheets was designed and manufactured for TV application

(2) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)

(3) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(4) Brightness of module depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(6) When fixed patterns are displayed for a long time, remnant image is likely to occur.

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

## 9-3 Electrostatic Discharge Control

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

## 9-4 Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

## 9-5 Storage

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

## 9-6 Handling Precautions for Protection Film

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

