



## Specifications

Doc. No1.

|                 |                      |
|-----------------|----------------------|
| Customer        |                      |
| Customer Type   | TXW011 31.5" HD_60Hz |
| CLT Type        | TXW011 31.5" HD_60Hz |
| Date            | 2011-08-25           |
| Revision number | A                    |
| Code            | 10190170-A0          |
| Open Cell Type  | CMI V315B6-P01       |

|                   |
|-------------------|
| Customer Approved |
|                   |

| CHILIN TECHNOLOGY |             |          |         |        |
|-------------------|-------------|----------|---------|--------|
| QRA               | Manufacture | Approved | Checked | Design |
| 黃立元               | 林政銘         | 余鴻文      | 洪明鴻     | 吳淑如    |



## Specifications

Doc. No2.

Revision History

| Version | Date       | Page | Section | Description |
|---------|------------|------|---------|-------------|
| A       | 2011/08/25 | All  | All     |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |
|         |            |      |         |             |



# Specifications

Doc. No3.

## CONTENTS OF WHITE LED MODULE for 31.5" LCM

|                                                                       |       |         |
|-----------------------------------------------------------------------|-------|---------|
| 1.0 APPLIED TYPE                                                      | ..... | PAGE 4  |
| 1.1 GENERAL SPECIFICATIONS                                            |       |         |
| 1.2 MECHANICAL SPECIFICATIONS                                         |       |         |
| 1.3 ABSOLUTE MAXIMUM RATING                                           |       |         |
| 1.4 LCM MODULE INTERFACE DEFINITION                                   |       |         |
| 1.4.1 CELL MODULE INFORMATION                                         |       |         |
| 1.4.1.1 REFERENCE TO CMI V315B6-P01 SPECIFICATION                     |       |         |
| 1.4.1.2 LVDS INPUT CONNECTOR PIN ASSIGNMENT                           |       |         |
| 1.4.1.3 CONNECTOR EMECHANICAL SPECIFICATIONS                          |       |         |
| 1.4.1.4 LVDS INTERFACE                                                |       |         |
| 1.4.1.5 ELECTRICAL CHARACTERISTICS FOR LVDS RECEIVER                  |       |         |
| 1.4.1.6 COLOR DATA INPUT ASSIGNMENT                                   |       |         |
| 1.4.1.7 INPUT SIGNAL TIMING SPECIFICATIONS                            |       |         |
| 1.4.1.8 CELL ON/OFF SEQUENCE                                          |       |         |
| 1.4.1.9 BLOCK DIAGRAM INTERFACE                                       |       |         |
| 1.4.2 LED BACKLIGHT MODULE                                            |       |         |
| 1.4.2.1 LED BACKLIGHT LIGHT ON CONNECTOR PIN DEFINITION AND SCHEMATIC |       |         |
| 1.4.2.2 LED BACKLIGHT LED RATING SPECIFICATION                        |       |         |
| 1.4.3 STATIC ELECTRICITY PROTECTION REQUIREMENT FOR LED               |       |         |
| 2.0 OPTICAL SPECIFICATIONS                                            | ..... | PAGE 19 |
| 3.0 RELIABILITY TEST ITEM                                             | ..... | PAGE 23 |
| 4.0 PACKING                                                           | ..... | PAGE 24 |
| 4.1 PACKING SPECIFICATIONS                                            |       |         |
| 4.2 PACKING METHOD                                                    |       |         |
| 4.3 PACKAGING LABEL                                                   |       |         |
| 5.0 PRECAUTIONS                                                       | ..... | PAGE 26 |
| 5.1 MOUNTING PRECAUTIONS                                              |       |         |
| 5.2 OPERATING PRECAUTIONS                                             |       |         |
| 5.3 ELECTROSTATIC DISCHARGE CONTROL                                   |       |         |
| 5.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE                             |       |         |
| 5.5 STORAGE                                                           |       |         |
| 5.6 HANDLING PRECAUTIONS FOR PROTECTION FILM                          |       |         |
| 6.0 LOT NO. GENERATION                                                | ..... | PAGE 28 |
| 7.0 SALES REGION                                                      | ..... | PAGE 28 |
| 8.0 MECHANICAL CHARACTERISTICS                                        | ..... | PAGE 29 |



# Specifications

Doc. No4.

## 1.0 APPLIED TYPE

This model adopts : CMI V315B6-P01 (OPEN CELL) .

Therefore, please refer to specifications of 315"wide TFT-LCD module for a driving method and an electrical characteristic of cell.

## 1.1 GENERAL SPECIFICATIONS

| Item                   | Specification                             | Unit  | Note |
|------------------------|-------------------------------------------|-------|------|
| Active Area            | 697.6845(H) x 392.256 (V) (315" diagonal) | mm    |      |
| Bezel Opening Area     | 705.4 (L) x 399.8 (H)                     | mm    |      |
| Driver Element         | a-si TFT active matrix                    | -     |      |
| Pixel Number           | 1366 x R.G.B. x 768                       | pixel |      |
| Sub-Pixel Pitch        | 0.17025 (H) x 0.51075(V)                  | mm    |      |
| Pixel Arrangement      | RGB vertical stripe                       | -     |      |
| Display Operation Mode | Normally black                            | -     |      |
| Surface Treatment      | Anti Glare + 3H                           | -     |      |

## 1.2 MECHANICAL SPECIFICATIONS(機構)

| Item        |               | Typ.  | Unit | Note          |
|-------------|---------------|-------|------|---------------|
| Module Size | Horizontal(H) | 741.4 | mm   |               |
|             | Vertical(V)   | 435.8 | mm   |               |
|             | Depth(D)      | 16.8  | mm   | To Frame Rear |
| Weight      |               | 4.38  | Kg   |               |

## 1.3 ABSOLUTE MAXIMUM RATING

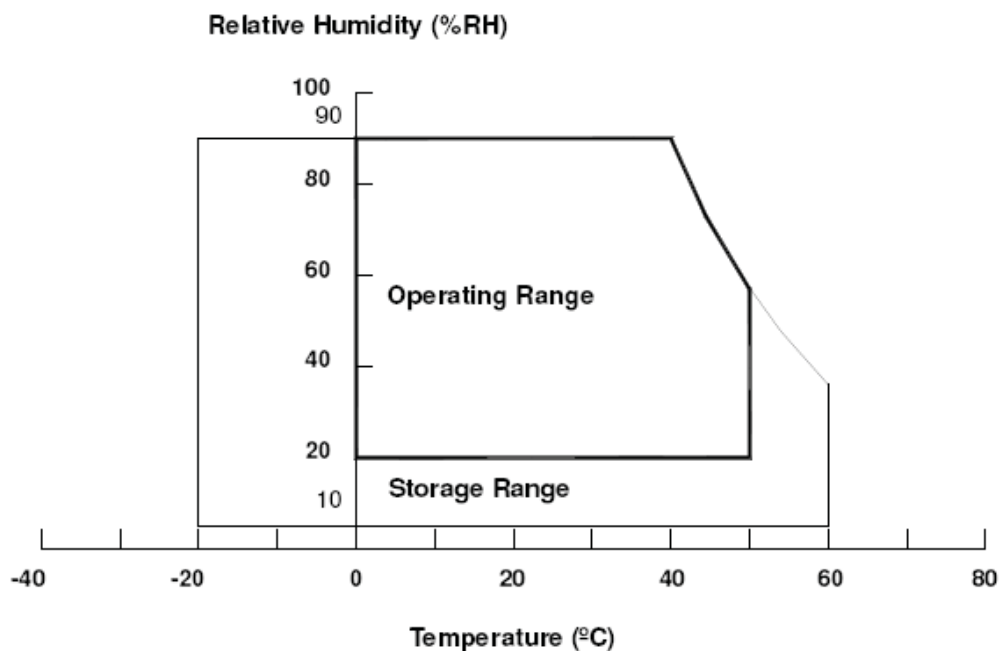
| Item                          | Symbol          | Value |       | Unit | Note          |
|-------------------------------|-----------------|-------|-------|------|---------------|
|                               |                 | Min.  | Max.  |      |               |
| Storage Temperature           | T <sub>ST</sub> | -20   | +60   | °C   | (1), (3)      |
| Operating Ambient Temperature | T <sub>OP</sub> | 0     | 50    | °C   | (1), (2), (3) |
| Altitude Operating            | A <sub>OP</sub> | 0     | 5000  | M    | (3)           |
| Altitude Storage              | A <sub>ST</sub> | 0     | 12000 | M    | (3)           |

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≤ 40 °C).

(b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).

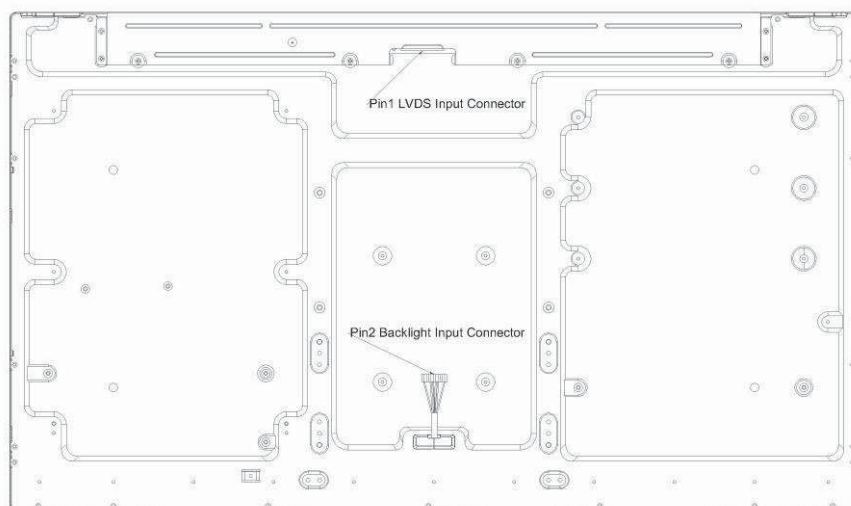
(c) No condensation.



Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65 °C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in your product design to prevent the surface temperature of display area from being over 65 °C. The range of operating temperature may degrade in case of improper thermal management in your product design.

Note (3) The rating of environment is base on LCD module. Leave LCD cell alone, this environment condition can't be guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.

#### 1.4 LCM MODULE INTERFACE DEFINITION





# Specifications

Doc. No6.

## 1.4.1 CELL INFORMATION

### 1.4.1.1 REFERENCE TO CMI V315B6-P01 SPECIFICATION

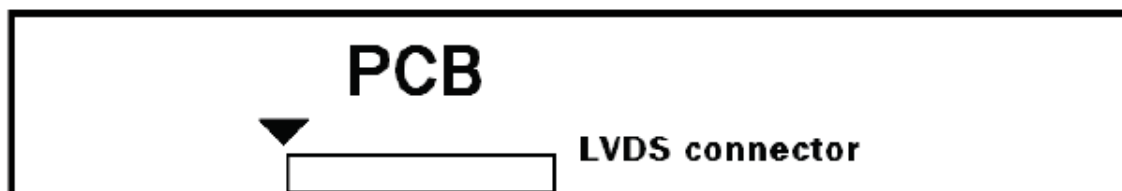
### 1.4.1.2 LVDS INTERFACE

#### CNF1 Connector Pin Assignment

| Pin No. | Symbol  | Description                           | Note   |
|---------|---------|---------------------------------------|--------|
| 1       | VCC     | Power supply: +12V                    |        |
| 2       | VCC     | Power supply: +12V                    |        |
| 3       | VCC     | Power supply: +12V                    |        |
| 4       | VCC     | Power supply: +12V                    |        |
| 5       | GND     | Ground                                |        |
| 6       | GND     | Ground                                |        |
| 7       | GND     | Ground                                |        |
| 8       | GND     | Ground                                |        |
| 9       | SELLVDS | Select LVDS data format               | (2)(6) |
| 10      | ODSEL   | Overdrive Lookup Table Selection      | (3)(6) |
| 11      | GND     | Ground                                |        |
| 12      | RX0-    | Negative transmission data of pixel 0 |        |
| 13      | RX0+    | Positive transmission data of pixel 0 |        |
| 14      | GND     | Ground                                |        |
| 15      | RX1-    | Negative transmission data of pixel 1 |        |
| 16      | RX1+    | Positive transmission data of pixel 1 |        |
| 17      | GND     | Ground                                |        |
| 18      | RX2-    | Negative transmission data of pixel 2 |        |
| 19      | RX2+    | Positive transmission data of pixel 2 |        |
| 20      | GND     | Ground                                |        |
| 21      | RXCLK-  | Negative of clock                     |        |
| 22      | RXCLK+  | Positive of clock                     |        |
| 23      | GND     | Ground                                |        |
| 24      | RX3-    | Negative transmission data of pixel 3 |        |
| 25      | RX3+    | Positive transmission data of pixel 3 |        |
| 26      | GND     | Ground                                |        |
| 27      | TST_AGE | Aging Mode                            | (4)    |
| 28      | NC      | No connection                         | (5)    |
| 29      | GND     | Ground                                |        |
| 30      | GND     | Ground                                |        |

Note (1) Connector type: STARCONN 093G30-B0001A or P-TWO 187053-30091 or compatible

LVDS connector pin order defined as follows



Pin1 Note (7) General LVDS INTERFCAE

Note (2) Low = Open or connect to GND: VESA Format, High = Connect to +3.3V: JEIDA Format.

Note (3) Overdrive lookup table selection. The Overdrive lookup table should be selected in accordance to the frame rate to optimize image quality.

Low = Open or connect to GND, High = Connect to +3.3V

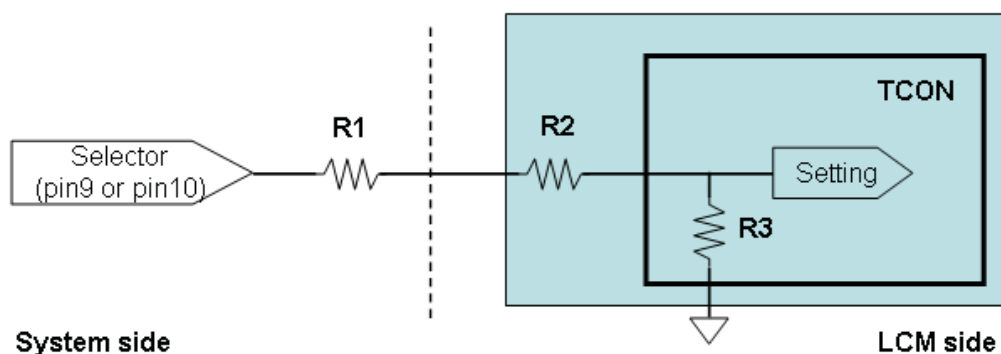
| ODSEL     | Note                                             |
|-----------|--------------------------------------------------|
| L or Open | Lookup table was optimized for 60 Hz frame rate. |
| H         | Lookup table was optimized for 50 Hz frame rate. |

Note (4) Ground or OPEN: Disable, High: Enable.

Note (5) Reserved for internal use. Left it open.

Note (6) LVDS signal pin connected to the LCM side has the following diagram.

R1 in the system side should be less than 1K Ohm. ( $R1 < 1K \text{ Ohm}$ )



#### 1.4.1.3 CONNECTOR EMECHANICAL SPECIFICATIONS

| Item                            | Min.                                                                                                           | Typ. | Max. | Unit | Note |
|---------------------------------|----------------------------------------------------------------------------------------------------------------|------|------|------|------|
| Weight                          |                                                                                                                | 1150 |      | g    | -    |
| I/F connector mounting position | The mounting inclination of the connector makes the screen center within $\pm 0.5\text{mm}$ as the horizontal. |      |      |      | (2)  |

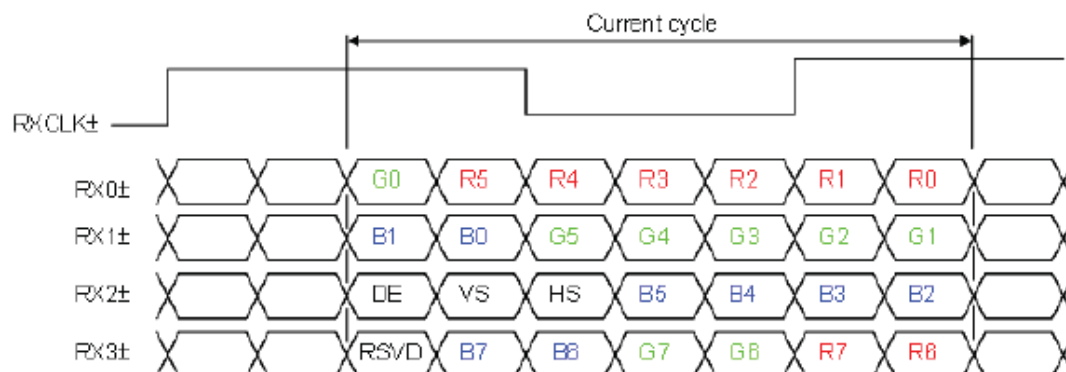
Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

(2) Connector mounting position

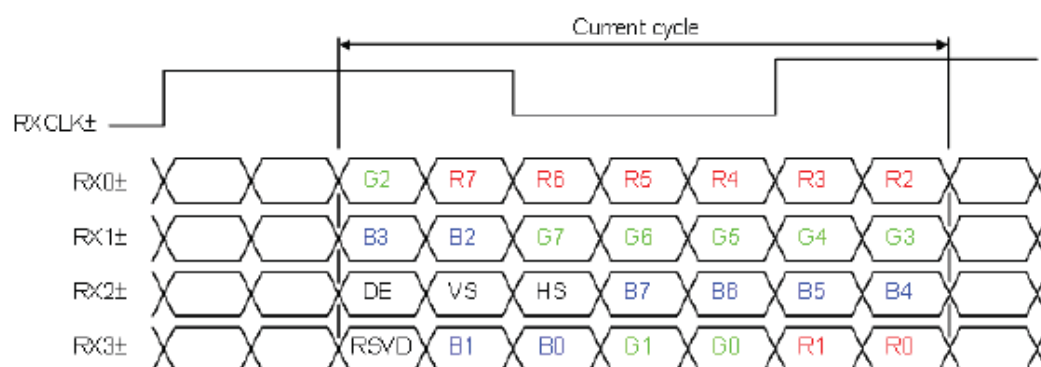


#### 1.4.1.4 LVDS INTERFACE

VESA LVDS format : (SELLVDS pin=L or open)



JEDIA LVDS format : (SELLVDS pin=H)



R0~R7: Pixel R Data (7; MSB, 0; LSB)

G0~G7: Pixel G Data (7; MSB, 0; LSB)

B0~B7: Pixel B Data (7; MSB, 0; LSB)

DE: Data enable signal

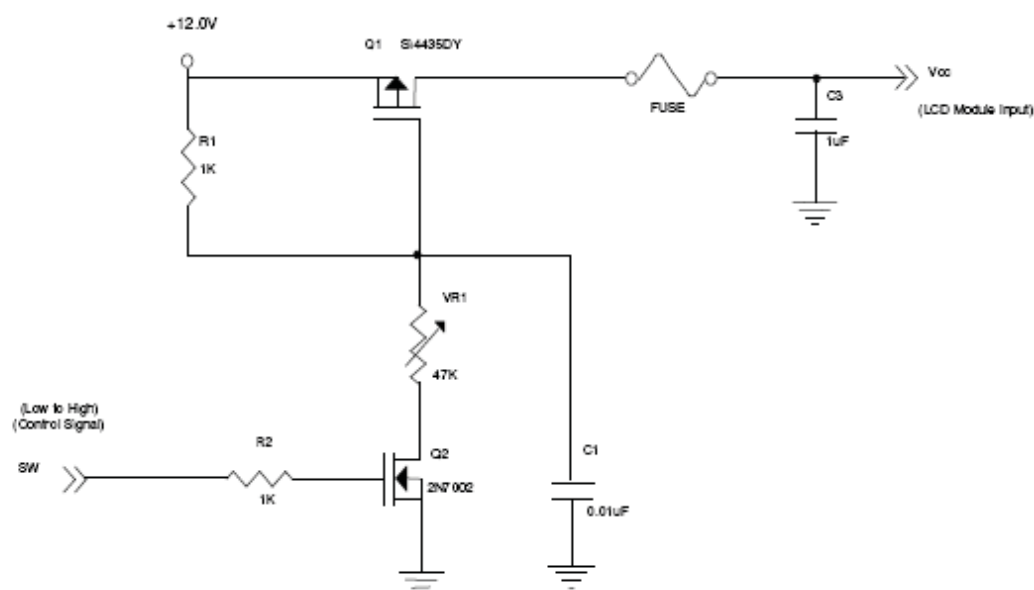
Note (1) RSVD(reserved)pins on the transmitter shall be "H" or( "L" or OPEN)

## 1.4.1.5 ELECTRICAL CHARACTERISTICS FOR LVDS RECEIVER

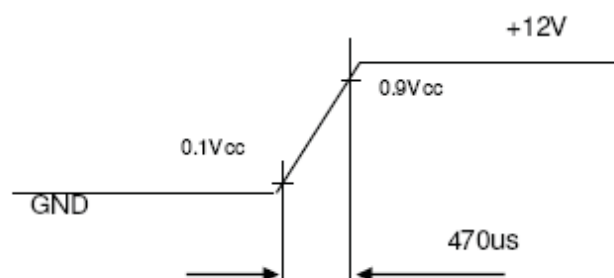
| Parameter            |                                           | Symbol     | Value |      |      | Unit | Note |
|----------------------|-------------------------------------------|------------|-------|------|------|------|------|
|                      |                                           |            | Min.  | Typ. | Max. |      |      |
| Power Supply Voltage |                                           | $V_{CC}$   | 10.8  | 12.0 | 13.2 | V    | (1)  |
| Rush Current         |                                           | $I_{RUSH}$ | -     | -    | 3.3  | A    | (2)  |
| Power Supply Current | White                                     | $I_{CC}$   | -     | 0.51 | -    | A    | (3)  |
|                      | Horizontal Stripe                         |            | -     | 0.6  | 0.72 | A    |      |
|                      | Black                                     |            | -     | 0.4  | -    | A    |      |
| LVDS Interface       | Differential Input High Threshold Voltage | $V_{LVTH}$ | +100  | -    | -    | mV   | (4)  |
|                      | Differential Input Low Threshold Voltage  | $V_{LVTL}$ | -     | -    | -100 | mV   |      |
|                      | Common Input Voltage                      | $V_{CM}$   | 1.0   | 1.2  | 1.4  | V    |      |
|                      | Differential input voltage                | $ V_{ID} $ | 200   | -    | 600  | mV   |      |
|                      | Terminating Resistor                      | $R_T$      | -     | 100  | -    | ohm  |      |
| CMOS interface       | Input High Threshold Voltage              | $V_{IH}$   | 2.7   | -    | 3.3  | V    |      |
|                      | Input Low Threshold Voltage               | $V_{IL}$   | 0     | -    | 0.7  | V    |      |

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

Note (2) Measurement Conditions:



**Vcc rising time is 470us**





## Specifications

Doc. No10.

Note (3) The specified power supply current is under the conditions at  $V_{CC} = 12V$ ,  $T_a = 25 \pm 2^\circ C$ ,  $f_v = 60$  Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



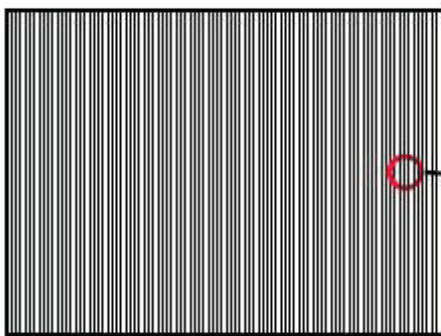
Active Area

b. Black Pattern



Active Area

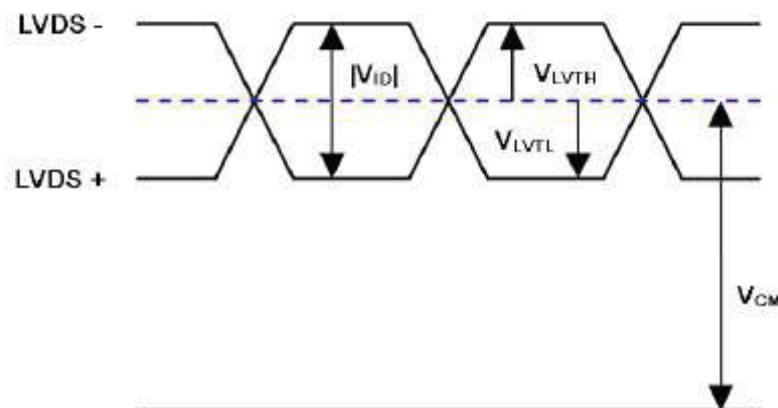
### c. Vertical Stripe Pattern



Active Area



Note (4) The LVDS input characteristics are as follows:





# Specifications

Doc. No11.

## 1.4.1.6 COLOR DATA INPUT ASSIGNMENT

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 the assignment of color versus data input.

| Color               |                 | Data Signal |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |
|---------------------|-----------------|-------------|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|------|----|----|----|----|----|----|----|
|                     |                 | Red         |    |    |    |    |    |    |    | Green |    |    |    |    |    |    |    | Blue |    |    |    |    |    |    |    |
|                     |                 | 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 Colors        | 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             | 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           | 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            | 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  |
|                     |                 |             |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |
| Gray Scale Of Red   | Red(0) / Dark   | 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(1)          | 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(2)          | 0           | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Red(253)        | 1           | 1  | 1  | 1  | 1  | 1  | 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  | 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  |
|                     |                 |             |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |
| Gray Scale Of Green | Green(0) / Dark | 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(1)        | 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(2)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Green(253)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 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  | 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  |
|                     |                 |             |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |
| Gray Scale Of Blue  | Blue(0) / Dark  | 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(1)         | 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(2)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 1  | 0  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | :               | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  |
|                     | Blue(253)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  | 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  |
|                     |                 |             |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |    |

Note (1) 0: Low Level Voltage, 1: High Level Voltage



## Specifications

Doc. No12.

## 1.4.1.7 INPUT SIGNAL TIMING SPECIFICATIONS

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

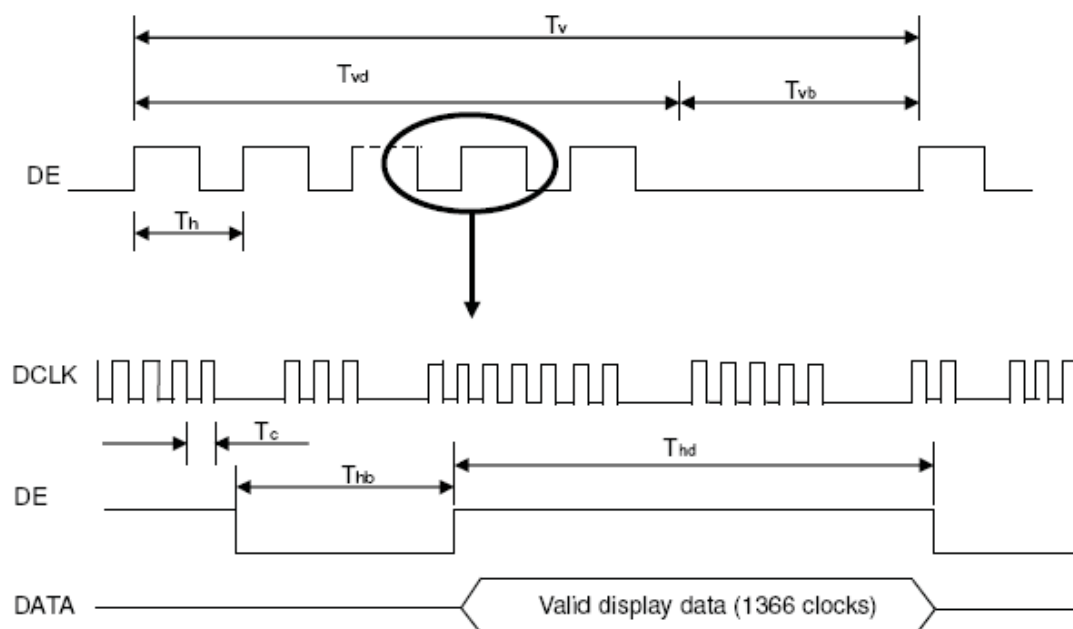
| Signal                         | Item                                 | Symbol            | Min.          | Typ. | Max.          | Unit | Note                |
|--------------------------------|--------------------------------------|-------------------|---------------|------|---------------|------|---------------------|
| LVDS Receiver Clock            | Frequency                            | $F_{clk} (=1/TC)$ | 60            | 76   | 82            | MHz  |                     |
|                                | Input cycle to cycle jitter          | $T_{rd}$          | —             | —    | 200           | ps   | (3)                 |
|                                | Spread spectrum modulation range     | $F_{clk\_mod}$    | $F_{clk}-2\%$ | —    | $F_{clk}+2\%$ | MHz  | (4)                 |
|                                | Spread spectrum modulation frequency | $F_{SSM}$         |               |      | 200           | KHz  |                     |
| LVDS Receiver Data             | Setup Time                           | $T_{lvsu}$        | 600           | —    | —             | ps   | (5)                 |
|                                | Hold Time                            | $T_{lvhd}$        | 600           | —    | —             | ps   |                     |
| Vertical Active Display Term   | Frame Rate                           | $F_{r5}$          | 47            | 50   | 53            | Hz   | (6)                 |
|                                |                                      | $F_{r6}$          | 57            | 60   | 63            | Hz   |                     |
|                                | Total                                | $T_v$             | 778           | 806  | 888           | Th   | $T_v=T_{vd}+T_{vb}$ |
|                                | Display                              | $T_{vd}$          | 768           | 768  | 768           | Th   | —                   |
|                                | Blank                                | $T_{vb}$          | 10            | 38   | 120           | Th   | —                   |
| Horizontal Active Display Term | Total                                | $T_h$             | 1442          | 1560 | 1936          | Tc   | $T_h=T_{hd}+T_{hb}$ |
|                                | Display                              | $T_{hd}$          | 1366          | 1366 | 1366          | Tc   | —                   |
|                                | Blank                                | $T_{hb}$          | 76            | 194  | 570           | Tc   | —                   |

Note (1) Please make sure the range of pixel clock has follow the below equation :

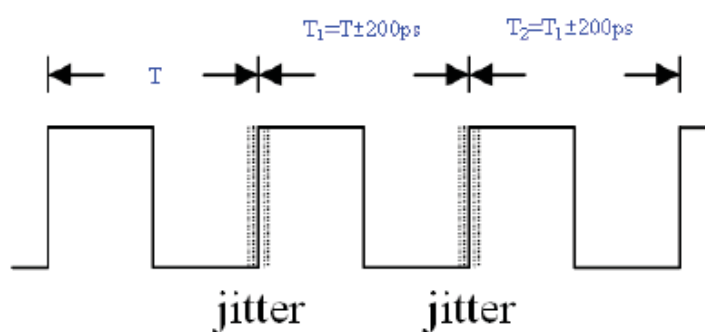
$$F_{clk(max)} \geq F_{r6} \times T_v \times T_h$$

$$F_{r5} \times T_v \times T_h \geq F_{clk(min)}$$

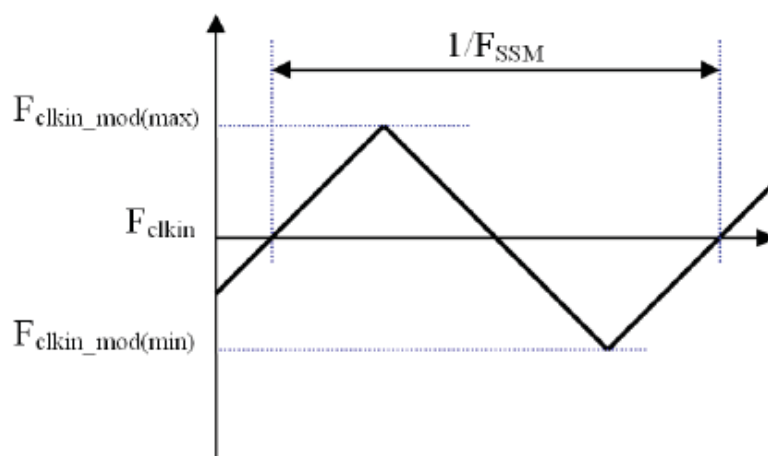
Note (2) This module is operated in DE only mode and please follow the input signal timing diagram below :

**INPUT SIGNAL TIMING DIAGRAM**

Note (3) The input clock cycle-to-cycle jitter is defined as below figures.  $Trcl = |T_1 - T_1|$

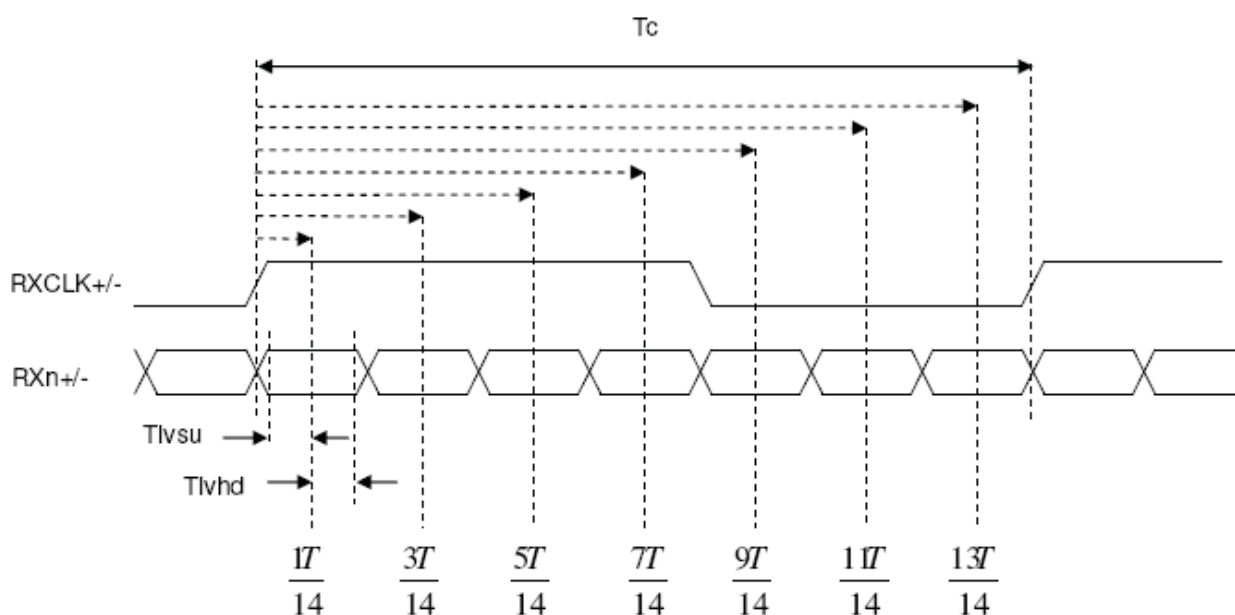


Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.



Note (5) The LVDS timing diagram and setup/hold time is defined and showing as the following figures.

#### LVDS RECEIVER INTERFACE TIMING DIAGRAM

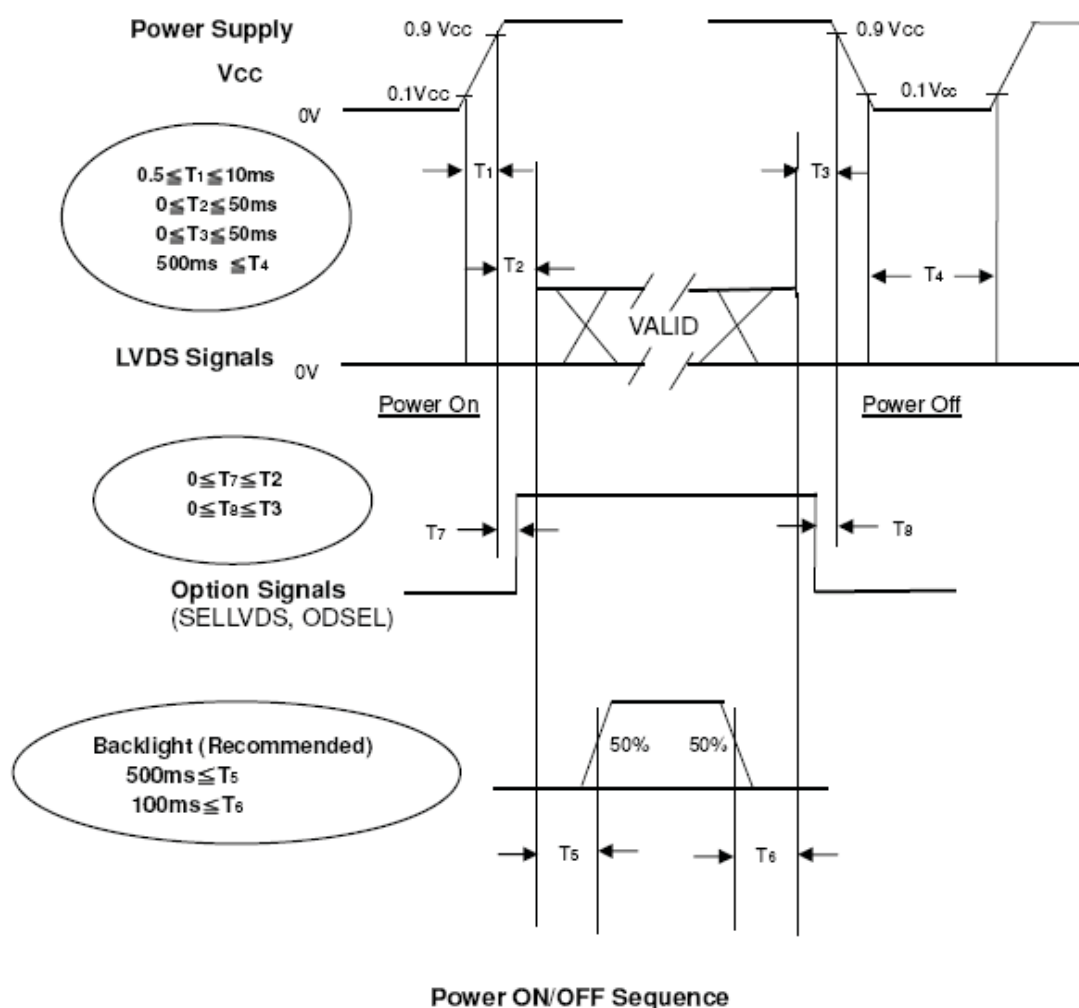


Note (6) : (ODSEL) = H/L or open for 50/60Hz frame rate. Please refer to 5.1 for detail information

### 1.4.1.8 CELL ON/OFF SEQUENCE

( $T_a = 25 \pm 2^\circ\text{C}$ )

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Note (1) The supply voltage of the external system for the module input should follow the definition of Vcc.

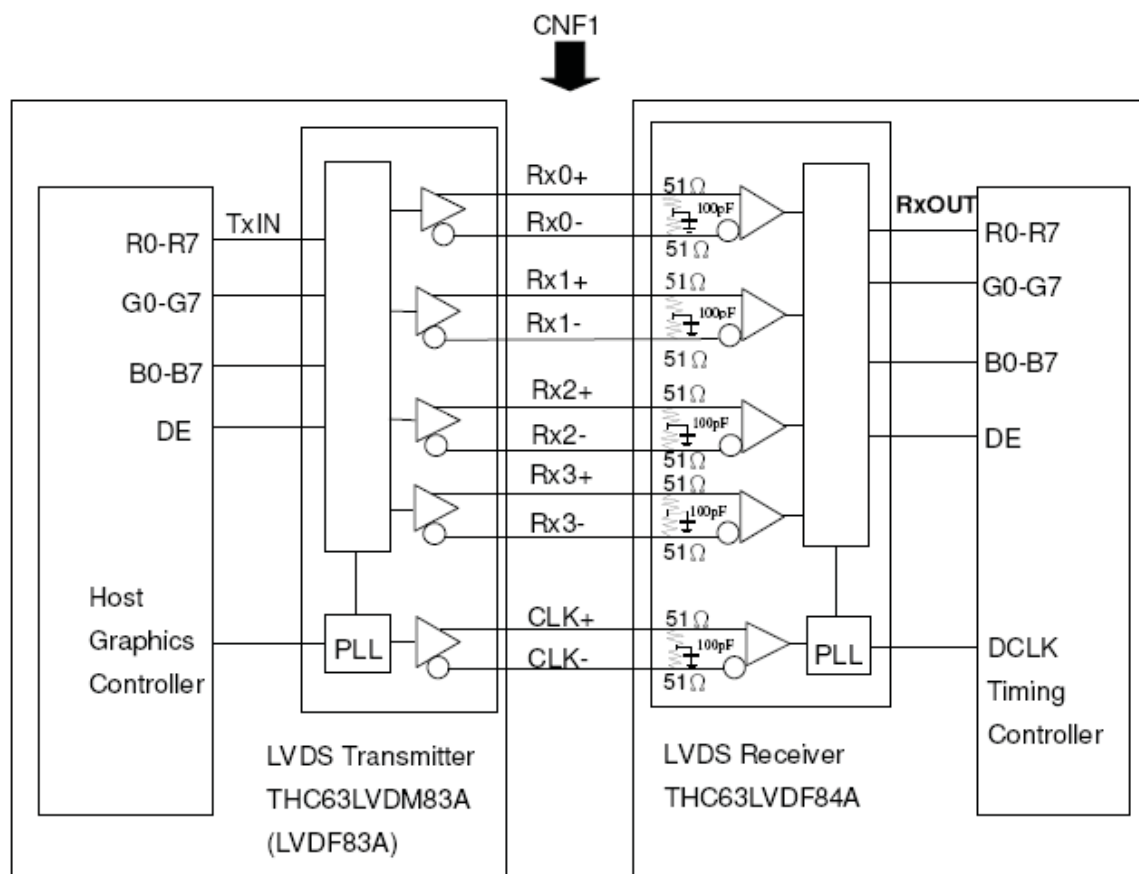
Note (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

Note (3) In case of Vcc is in off level, please keep the level of input signals on the low or high impedance. If  $T_2 < 0$ , that maybe cause electrical overstress failures.

Note (4) T4 should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

## 1.4.1.9 BLOCK DIAGRAM OF INTERFACE



R0~R7 : Pixel R Data  
 G0~G7 : Pixel G Data  
 B0~B7 : Pixel B Data  
 DE : Data enable signal  
 DCLK : Data clock signal

Note (1) The system must have the transmitter to drive the module.

Note (2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially.



# Specifications

Doc. No17.

## 1.4.2 LED BACKLIGHT MODULE

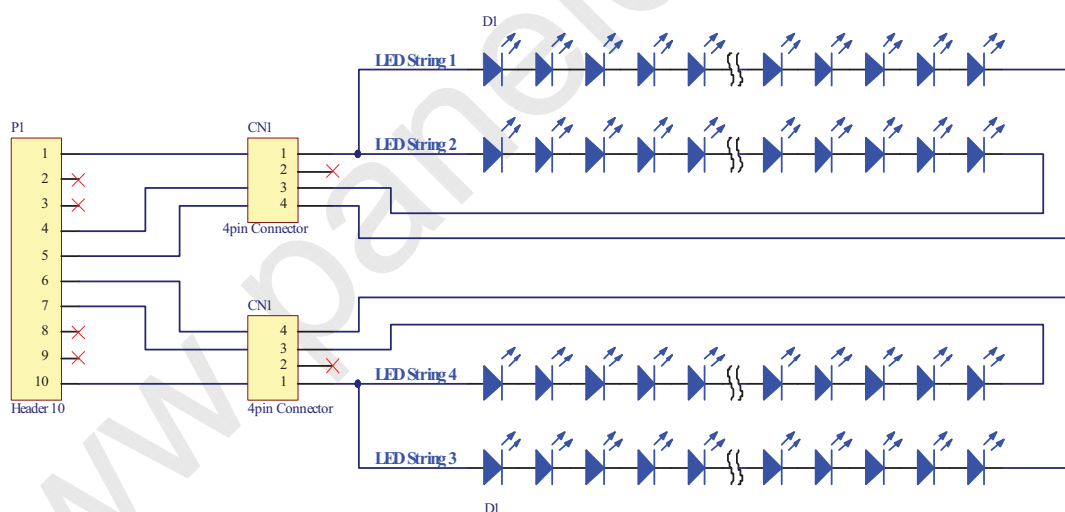
### 1.4.2.1 LED BACKLIGHT LIGHT ON CONNECTOR PIN DEFINITION AND SCHEMATIC

Connector Pin Definition:

Input Connector : JST PHR-10 or equivalent

| Pin No. | Symbol | Definition                    |
|---------|--------|-------------------------------|
| 1       | LED+   | Anode (+) of LED String1 & 2  |
| 2       | NC     | NC                            |
| 3       | NC     | NC                            |
| 4       | LED2-  | LED String2(-)                |
| 5       | LED1-  | LED String1(-)                |
| 6       | LED3-  | LED String3(-)                |
| 7       | LED4-  | LED String4(-)                |
| 8       | NC     | NC                            |
| 9       | NC     | NC                            |
| 10      | LED+   | Anode (+) of LED String 3 & 4 |

Schematic:



### 1.4.2.2 LED BACKLIGHT LED RATING SPECIFICATION

Ta=25°C

| Item                       | Min. | Typ. | Max. | Unit | Remark                 |
|----------------------------|------|------|------|------|------------------------|
| Input Voltage              | 63.0 | -    | 77.7 | V    | Constant Current=125mA |
| Input Current (per string) | 120  | 125  | 130  | mA   |                        |



## Specifications

Doc. No18.

### 1.4.3 LED ABSOLUTE MAXIMUM RATING (ELECTRICAL)

Ta=25°C

| Item                  | Symbol | Min.  | Typ. | Max. | Unit | Remark   |
|-----------------------|--------|-------|------|------|------|----------|
| LED Forward Voltage   | $V_F$  | 3.0   | -    | 3.6  | V    | IF=120mA |
| LED Forward Current   | $I_F$  | -     | 120  | 150  | mA   |          |
| LED Reverse Voltage   | $V_R$  | 5     |      |      | V    |          |
| LED Power Dissipation | $P_D$  | 600   |      |      | mW   |          |
| ESD (HBM)             | -      | >1500 |      |      | V    | Note(1)  |
| ESD (MM)              | -      | >150  |      |      | V    | Note(1)  |

**Note (1)** : Static electricity or surge voltage can damage the LEDs. All equipment, machinery and the treatment persons must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handling the LED.

And don't touch interface pin directly.



# Specifications

Doc. No19.

## 2.0 OPTICAL SPECIFICATIONS

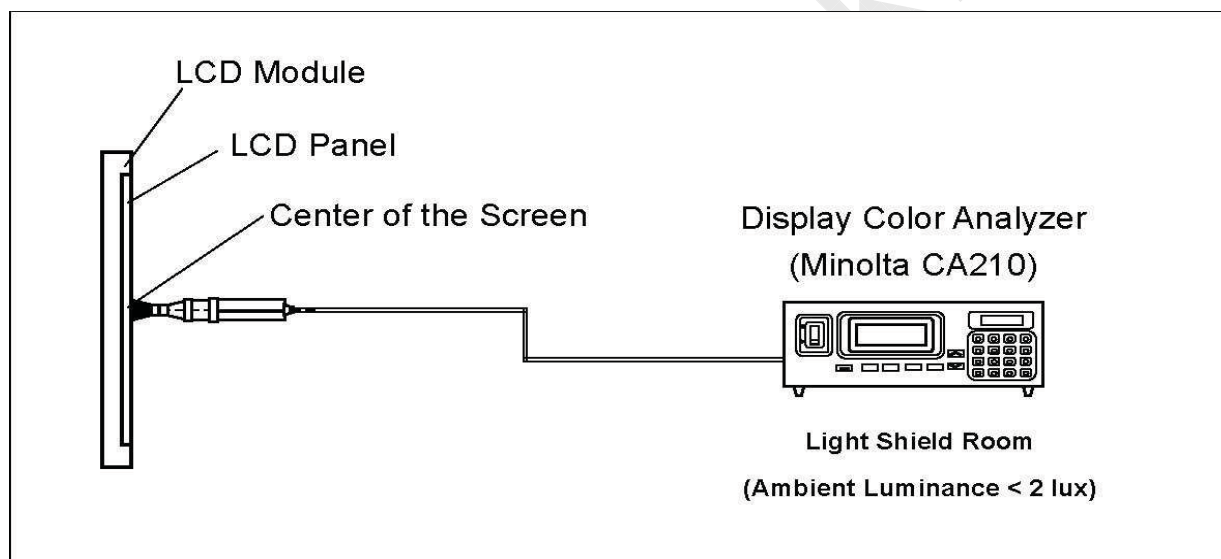
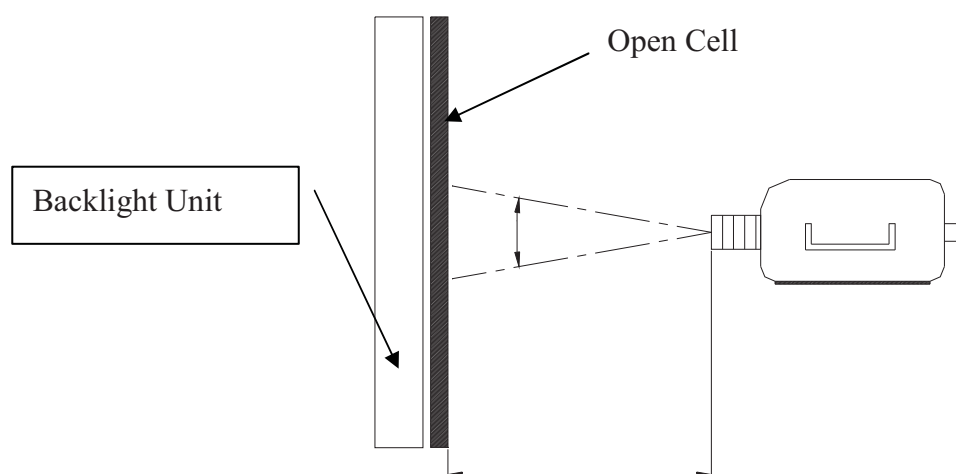
| Item               |            | Symbol       | Condition                                                           | Min.         | Typ.  | Max.         | Unit              | Note                    |
|--------------------|------------|--------------|---------------------------------------------------------------------|--------------|-------|--------------|-------------------|-------------------------|
| Contrast Ratio     |            | CR           | $\theta x=0^{\circ}, \theta y=0^{\circ}$<br>Viewing<br>Normal Angle | —            | 3000  | —            | —                 | (1), (2), (4), (6), (8) |
| Response Time      |            | Gray to Gray |                                                                     | —            | 6.5   | 12           | ms                | (1), (2), (5), (6), (8) |
| Brightness         |            | B1           |                                                                     | 350          | 380   | —            | cd/m <sup>2</sup> | (1), (2), (6)           |
| White Variation    |            | $\delta W$   |                                                                     | —            | —     | 1.5          | —                 | (1), (2), (7)           |
| Color Chromaticity | White      | Wx           |                                                                     | Typ<br>−0.03 | 0.279 | Typ<br>+0.03 | —                 | (1), (2), (6)           |
|                    |            | Wy           |                                                                     |              | 0.292 |              |                   |                         |
|                    | Red        | Rx           |                                                                     |              | 0.637 |              | —                 |                         |
|                    |            | Ry           |                                                                     |              | 0.335 |              |                   |                         |
|                    | Green      | Gx           |                                                                     |              | 0.310 |              | —                 |                         |
|                    |            | Gy           |                                                                     |              | 0.640 |              |                   |                         |
|                    | Blue       | Bx           | 0.145                                                               |              | —     |              |                   |                         |
|                    |            | By           | 0.062                                                               |              |       |              |                   |                         |
| Viewing Angle      | Horizontal | $\theta x+$  | $CR \geq 20$                                                        | —            | 88    | —            | Deg.              | (1), (3), (6), (8)      |
|                    |            | $\theta x-$  |                                                                     | —            | 88    | —            |                   |                         |
|                    | Vertical   | $\theta y+$  |                                                                     | —            | 88    | —            |                   |                         |
|                    |            | $\theta y-$  |                                                                     | —            | 88    | —            |                   |                         |

### Note (1) Measurement Setup

The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.

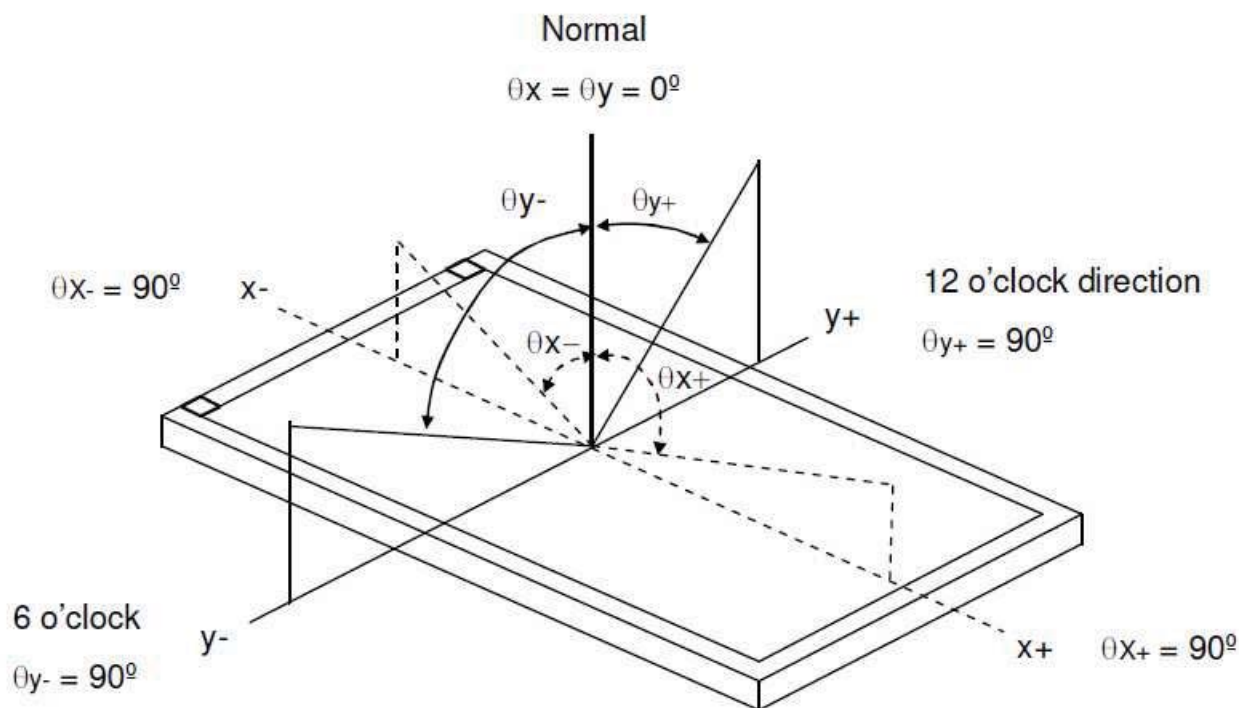
Any outstanding stain (or mura) and/or any outstanding difference of Chromaticity between any parts of the active area will cause Backlight Assembly and LCM to be rejected.

## Note (2) Measurement Method



| Item       | E              | CA210           |
|------------|----------------|-----------------|
|            | Angle $\theta$ | $\pm 2.5^\circ$ |
| Distance L |                | 3cm             |

Note (3) Definition of Viewing Angle( $\theta_x$ ,  $\theta_y$ ):



Note (4) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) =  $L_{255}/L_0$

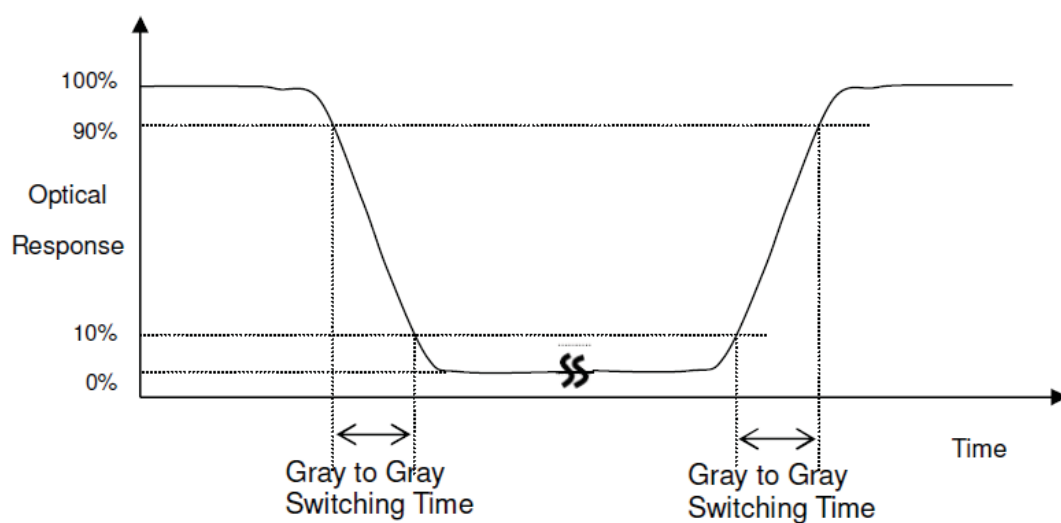
$L_{1023}$ : Luminance of gray level 255

$L_0$ : Luminance of gray level 0

$CR = CR(0)$ , where  $CR(X)$  is corresponding to the Contrast Ratio of the point X at Figure in Note(7)

Note (5) Definition of Gray to Gray Switching Time:

The driving signal means the signal of gray level 0, 123, 168, 202, 230, 255. Gray to gray average time means the average switching time of gray level 0, 123, 168, 202, 230, 255 to each other.



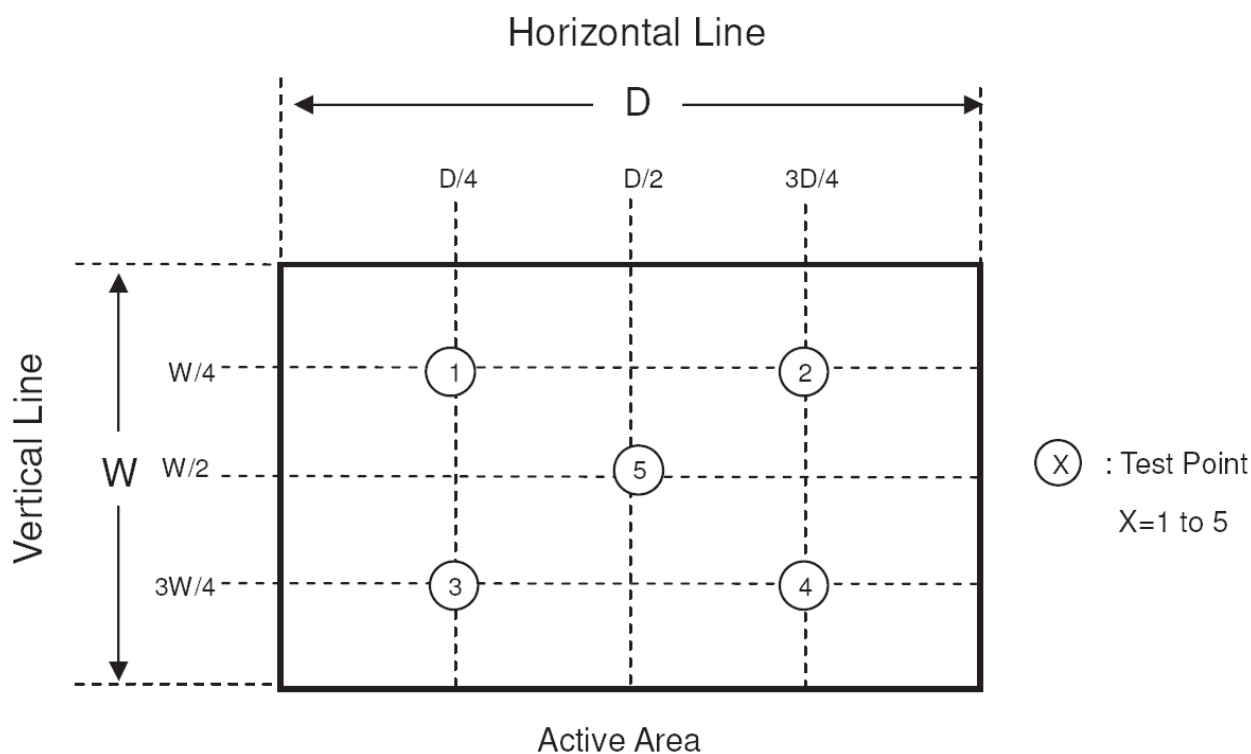
Note (6) This shall be measured at center of the screen.

Note (7) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \text{Maximum [L (1), L (2), L (3), L (4), L (5)]} / \text{Minimum [L (1), L (2), L (3), L (4), L (5)]}$$

where L (X) is corresponding to the luminance of the point X at the figure below.





## Specifications

Doc. No23.

### Note (8)

Contrast ratio and response time is corresponded to the original open-cell specification of V315B6-P01 defined by CHIMEI INNOLUX.

### 3.0 RELIABILITY TEST ITEM

|   | Test Items                                   | Q'ty | Condition                                                                                                                                  |
|---|----------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | High Temperature Operation                   | 3    | 50℃ , 300hrs                                                                                                                               |
| 2 | High Temperature And High Humidity Operation | 3    | 50℃/ 80%RH , 300hrs                                                                                                                        |
| 3 | ESD Contact Mode                             | 3    | '+/-8,10KV, 1sec/cycle, class C , 2hrs                                                                                                     |
| 4 | ESD Air Mode                                 | 3    | '+/-15KV, 1sec/cycle, class C , 2hrs                                                                                                       |
| 5 | Mechanical Shock (non-operation)             | 3    | 50G, 11ms, half sine wave, 1 times for each direction of $\pm X, \pm Y$ , 35G, 11ms, half sine wave, 1 times for each direction of $\pm Z$ |
| 6 | Panel Vibration                              | 3    | 10-200Hz, 1G, 30mm is Max., 30min/cycle, 1cycles for each X,Y,Z.                                                                           |

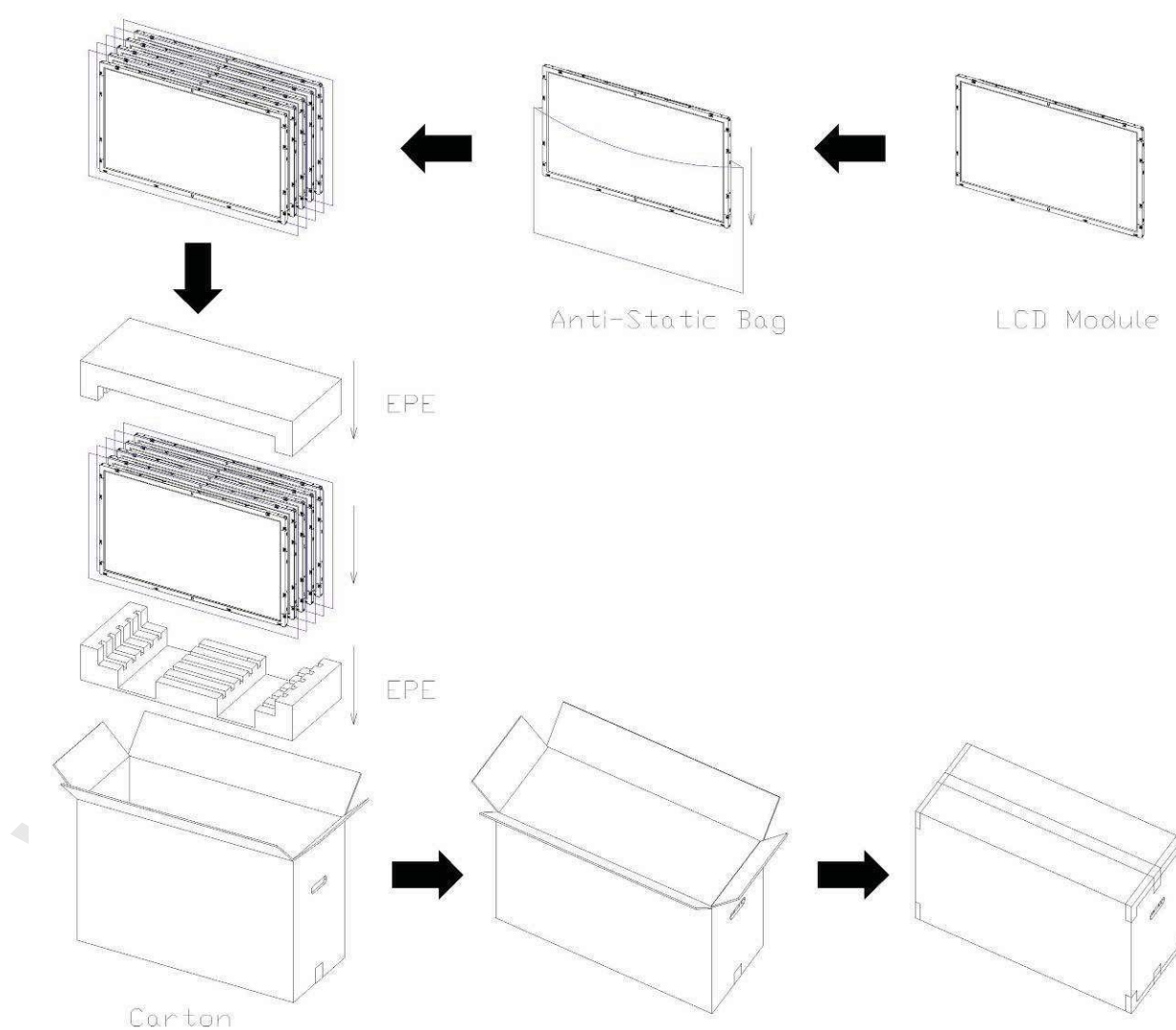
## 4.0 PACKING

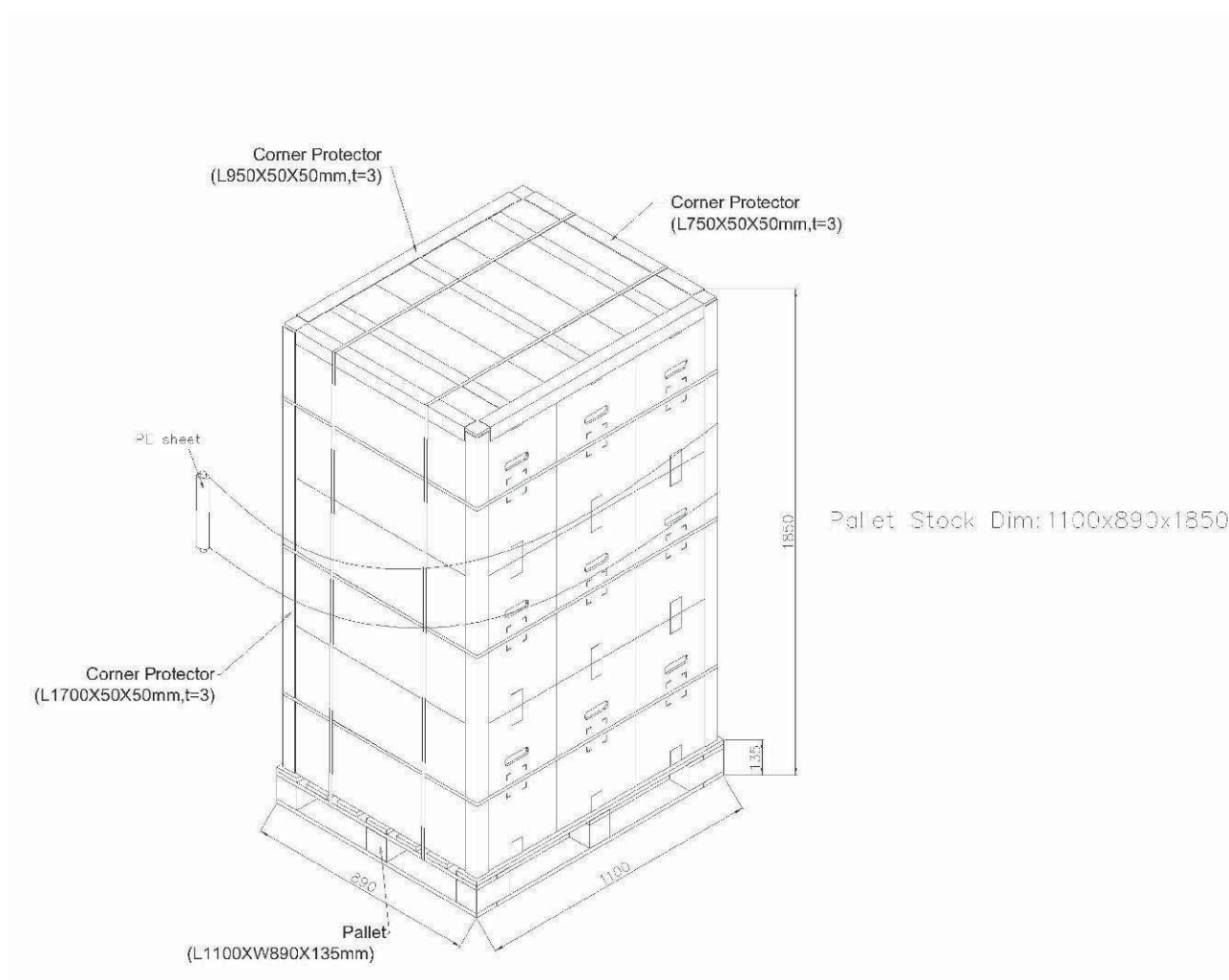
### 4.1 PACKING SPECIFICATIONS

#### Carton SPECIFICATIONS

- (1) 5 LCD modules / 1Box
- (2) Box dimensions : 860 (L) × 355 (W) × 570 (H) mm
- (3) Weight : approximately : 26.9 kg (5 modules per box , packaging materials including pallet)

### 4.2 PACKING METHOD

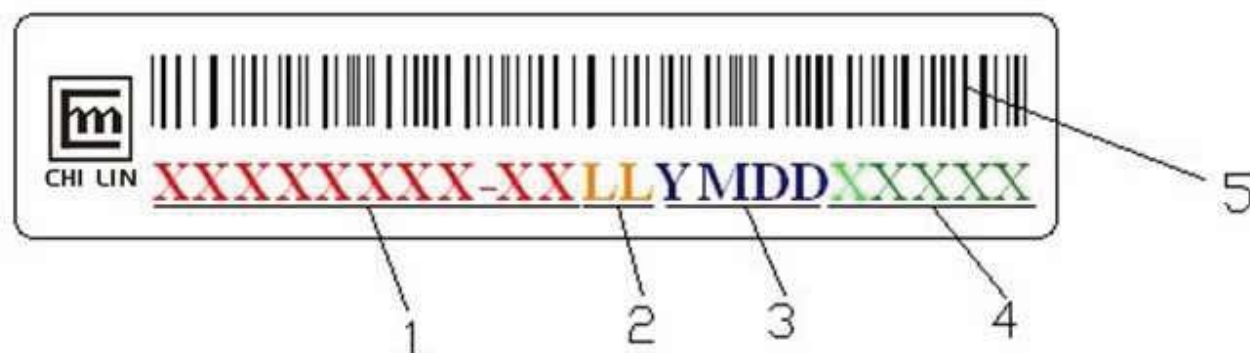




#### 4.3 PACKAGING LABEL

##### LCM Label

The barcode nameplate is pasted on each backlight as illustration, and its definitions are as following explanation.



- 1 : LCM Part No : 10190165-A0, 10190170-A0  
 2 : Manufacturing Site : C4  
 3 : Year 2010 : A, 2011 : B, 2012 : C,..... not include I,O,U,V  
     Month : 1 2 3 4 5 6 7 8 9 X Y Z  
     Date : 01,02,03,04 ~30,31  
 4 : Serial No 00001~99999 (Reset every day)  
 5 : Barcode Format (CODE 93)

## 5.0 PRECAUTIONS

### 5.1 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 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 may chemical damage to the polarizer.



# Specifications

Doc. No27.

- (8) Wipe off saliva or water drops as soon as possible. Their long time contacting with polarizer causes deformations and color fading.
- (9) Do not open the case because inside circuits do not have sufficient strength.

## 5.2 OPERATING 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:  
 $V = \pm 200\text{mV}$  (Over and under shoot voltage)
- (3) Response time depends on the temperature. (In lower temperature, it becomes longer..)
- (4) 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 be occurred.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) 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.

## 5.3 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.

## 5.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

## 5.5 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 20°C and 30°C at Humidity between 25% and 75%
- (2) The polarizer surface should not come in contacting with any other object. It is recommended that they could be in the container in which they were shipped.



## Specifications

Doc. No28.

### 5.6 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.

### 6.0 LOT NO. GENERATION

According to the customer supply specification

### 7.0 SALES REGION

TXW011 (10190170-A0) Sales region : Worldwide except Japan



## Specifications

Doc. No30.

