

# KOE

## JDI Group

TENTATIVE

Kaohsiung Opto-Electronics Inc.

FOR MESSRS : \_\_\_\_\_

DATE : Apr. 29<sup>th</sup>, 2021

### TECHNICAL DATA

## TX27D201VM0AAA

### Contents

| No. | ITEM                       | SHEET No.      | PAGE         |
|-----|----------------------------|----------------|--------------|
| 1   | COVER                      | 7B64LTD-2658-3 | 1-1/1        |
| 2   | RECORD OF REVISION         | 7B64LTD-2658-3 | 2-1/1        |
| 3   | GENERAL DATA               | 7B64LTD-2658-3 | 3-1/1        |
| 4   | ABSOLUTE MAXIMUM RATINGS   | 7B64LTD-2658-3 | 4-1/1        |
| 5   | ELECTRICAL CHARACTERISTICS | 7B64LTD-2658-3 | 5-1/2~2/2    |
| 6   | OPTICAL CHARACTERISTICS    | 7B64LTD-2658-3 | 6-1/2~2/2    |
| 7   | BLOCK DIAGRAM              | 7B64LTD-2658-3 | 7-1/1        |
| 8   | LCD INTERFACE              | 7B64LTD-2658-3 | 8-1/10~10/10 |
| 9   | OUTLINE DIMENSIONS         | 7B64LTD-2658-3 | 9-1/2~2/2    |
| 10  | DESIGNATION OF LOT MARK    | 7B64LTD-2658-3 | 10-1/1       |

ACCEPTED BY: \_\_\_\_\_

PROPOSED BY: Oblack Tsai

## 2. RECORD OF REVISION

| DATE                               | SHEET No.                          | SUMMARY   |
|------------------------------------|------------------------------------|---|
| Feb. 18 , '21                      | 7B64LTD-2658-2<br>Page 3-1/1       | 3.1 DISPLAY FEATURES<br>Removed 16.2M(6-bit RGB + FRC) in the column of Number of Colors                  |
|                                    | 7B64LTD-2658-2<br>Page 5-1/2       | 5.1 LCD CHARACTERISTICS<br>Added the column of Logic Input Voltage  |
|                                    | 7B64LTD-2658-2<br>Page 8-5/10      | 8.4 TIMING CHART<br>Revised the Fig. 8.1 Horizontal Timing and Fig. 8.2 Vertical Timing                   |
|                                    | 7B64LTD-2658-2<br>Page 8-6/10      | 8.5 TIMING TABLE<br>Revised the data of 8.5 TIMING TABLE  |
|                                    | 7B64LTD-2658-2<br>Page 8-7/10      | 8.7 LVDS RECEIVER TIMING<br>Revised the data of 8.7 LVDS RECEIVER TIMING                                  |
|                                    | 7B64LTD-2658-2<br>Page 9-1/2 ~ 2/2 | 9. OUTLINE DIMENSIONS<br>Revised the drawing of 9. OUTLINE DIMENSIONS                                     |
|                                    | Apr.29, '21                        | 7B64LTD-2658-3<br>Page 3-1/1  |
| 7B64LTD-2658-3<br>Page 5-1/2       |                                    | 5.1 LCD CHARACTERISTICS<br>Revised the data of Power Supply Current                                       |
| 7B64LTD-2658-3<br>Page 8-5/10      |                                    | 8.4 TIMING CHART<br>Revised the Fig. 8.1 Horizontal Timing and Fig. 8.2 Vertical Timing                   |
| 7B64LTD-2658-3<br>Page 8-6/10      |                                    | 8.5 TIMING TABLE<br>Revised the Min. data of Cycle Time   |
| 7B64LTD-2658-3<br>Page 9-1/2 ~ 2/2 |                                    | 9. OUTLINE DIMENSIONS<br>Revised the mechanical features of the outline.(No change to all the dimensions) |
|                                    |                                    |   |

### 3. GENERAL DATA

#### 3.1 DISPLAY FEATURES

This module is a 10.6" WXGA of 16:9 format amorphous silicon TFT. The pixel format is vertical stripe and sub pixels are arranged as R(red), G(green), B(blue) sequentially. This display is RoHS compliant, and COG (chip on glass) technology and LED backlight are applied on this display.

|                         |   |
|-------------------------|---|
| Part Name               | TX27D201VM0AAA                                  |
| Module Dimensions       | 250.0 (W) mm x 157.0 (H) mm x 8.9 (D) mm (Typ.) |
| LCD Active Area         | 231.36 (W)mm x 138.816(H)mm                     |
| Pixel Pitch             | 0.18075 (W) mm x 0.18075 (H) mm                 |
| Resolution              | 1280x 3 (RGB) (W) x 768 (H) dots                |
| Color Pixel Arrangement | RGB Vertical Stripe                             |
| LCD Type                | Transmissive Type, Normally Black               |
| Display Type            | Active Matrix                                   |
| Number of Colors        | 262K (6-bit RGB) / 16.7M (8-bit RGB) Colors     |
| Backlight               | Light Emitting Diode (LED)                      |
| Weight                  | (TBD)g (typ)                                    |
| Interface               | LVDS ; 20pins                                   |
| Power Supply Voltage    | 3.3V for LCD ; 21V for Backlight                |
| Viewing Direction       | Super Wide Version                              |
| Upper Polarizer         | Glare type and Circular polarized solution      |

## 4. ABSOLUTE MAXIMUM RATINGS

| Item                    | Symbol           | Min. | Max. | Unit | Remarks |
|-------------------------|------------------|------|------|------|---------|
| Supply Voltage          | V <sub>DD</sub>  | -0.3 | 4.0  | V    | -       |
| Input Voltage of Logic  | V <sub>I</sub>   | -0.3 | 4.0  | V    | Note 1  |
| Operating Temperature   | T <sub>op</sub>  | -40  | 85   | °C   | Note 2  |
| Storage Temperature     | T <sub>st</sub>  | -40  | 90   | °C   | Note 2  |
| Backlight Input Voltage | V <sub>LED</sub> | -    | 23.8 | V    | -       |

Note 1: The rating is defined for the signal voltage of the interface such as CLK and pixel data pairs.

Note 2: The maximum rating is defined as above based on the panel surface temperature, which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Background color, contrast and response time would be different in temperatures other than 25 °C.
- Operating under high temperature will shorten LED lifetime.

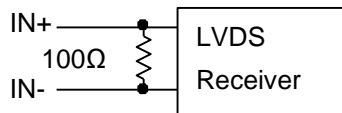
# 5. ELECTRICAL CHARACTERISTICS

## 5.1 LCD CHARACTERISTICS

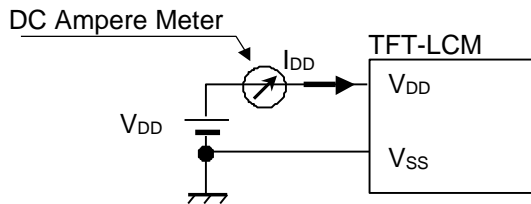
$T_a = 25\text{ }^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$

| Item   | Symbol      | Condition                   | Min.                | Typ. | Max.                | Unit | Remarks  |
|--|-------------|-----------------------------|---------------------|------|---------------------|------|----------|
| Power Supply Voltage                                   | $V_{DD}$    | -                           | 3.0                 | 3.3  | 3.6                 | V    | -        |
| Differential Input Voltage for LVDS Receiver Threshold | $V_I$       | $V_{IH}$                    | -                   | -    | +100                | mV   | Note 1   |
|  |             | $V_{IL}$                    | -100                | -    | -                   |      |          |
| Power Supply Current                                   | $I_{DD}$    | $V_{DD}-V_{SS}=3.3\text{V}$ | -                   | 460  | 550                 | mA   | Note 2,3 |
| Frame Frequency  | $f_{Frame}$ | -                           | -                   | 60   | -                   | Hz   | Note 4   |
| CLK Frequency  | $f_{CLK}$   | -                           | -                   | 68.3 | -                   | MHz  |          |
| Logic Input Voltage                                    | High        | $V_{IH}$                    | $0.8 \times V_{CC}$ | -    | $V_{CC}$            | V    | MODE,SC  |
|  | Low         | $V_{IL}$                    | 0                   | -    | $0.2 \times V_{CC}$ | V    | MODE,SC  |

Note 1: VCM 1.2V is common mode voltage of LVDS transmitter and receiver. The input terminal of LVDS transmitter is terminated with  $100\Omega$ .



Note 2: An all white check pattern is used when measuring  $I_{DD}$ .  $f_{Frame}$  is set to 60Hz.



Note 3: (TBD) fuse is applied in the module for  $I_{DD}$ . For display activation and protection purpose, power supply is recommended larger than (TBD) to start the display and break fuse once any short circuit occurred.

Note 4: For LVDS transmitter input.

## 5.2 BACKLIGHT CHARACTERISTICS

$T_a = 25^\circ C$

| Item                | Symbol | Condition      | Min. | Typ. | Max. | Unit | Remarks |
|---------------------|--------|----------------|------|------|------|------|---------|
| LED Input Voltage   | VLED   | Backlight Unit | -    | 21   | -    | V    | Note 1  |
| LED Forward Current | ILED   | Backlight Unit | -    | 87   | -    | mA   | -       |
| LED Lifetime        | -      | 87 mA          | -    | 100K | -    | hrs  | Note 2  |

Note 1: Fig. 5.1 shows the LED backlight circuit. The circuit has 28 LEDs in total.

Note 2: The estimated lifetime is specified as the time to reduce 50% brightness by applying 87 mA at  $25^\circ C$ .

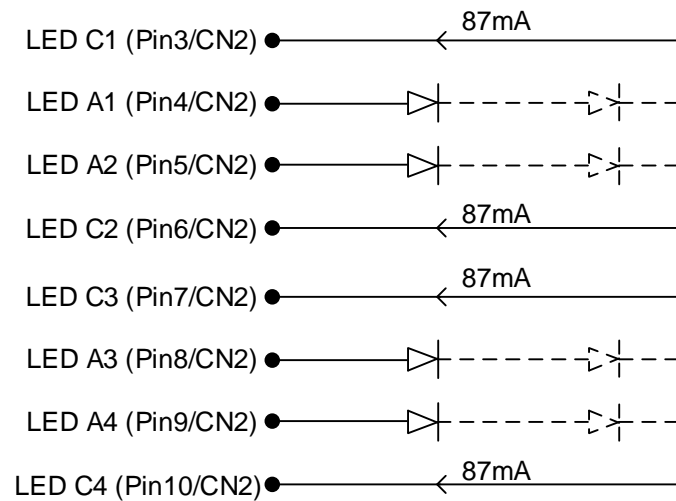


Fig 5.1

## 6. OPTICAL CHARACTERISTICS

The optical characteristics are measured based on the conditions as below:

- Supplying the signals and voltages defined in the section of electrical characteristics.
- The ambient temperature is 25 °C .
- In the dark room less than 100 lx, the equipment has been set for the measurements as shown in Fig 6.1.

$$T_a = 25 \text{ }^\circ\text{C}, f_{\text{Frame}} = 60 \text{ Hz}, V_{\text{DD}} = 3.3\text{V}$$

| Item                  | Symbol        | Condition   | Min. | Typ.  | Max. | Unit              | Remarks |
|-----------------------|---------------|---|------|-------|------|-------------------|---------|
| Brightness of White   | -             | $I_{\text{LED}} = 348\text{mA}$<br>$\phi = 0^\circ, \theta = 0^\circ$ | 800  | 1000  | -    | cd/m <sup>2</sup> | Note 1  |
| Brightness Uniformity | -             |   | 70   | -     | -    | %                 | Note 2  |
| Contrast Ratio        | CR            |   | 650  | 1000  | -    | -                 | Note 3  |
| Response Time         | Tr + Tf       | $\phi = 0^\circ, \theta = 0^\circ$                                    | -    | 24    | -    | ms                | Note 4  |
| NTSC Ratio            | -             | $\phi = 0^\circ, \theta = 0^\circ$                                    | -    | 50    | -    | %                 | -       |
| Viewing Angle         | $\theta_x$    | $\phi = 0^\circ, \text{CR} \geq 10$                                   | -    | 85    | -    | Degree            | Note 5  |
|                       | $\theta_{x'}$ | $\phi = 180^\circ, \text{CR} \geq 10$                                 | -    | 85    | -    |                   |         |
|                       | $\theta_y$    | $\phi = 90^\circ, \text{CR} \geq 10$                                  | -    | 85    | -    |                   |         |
|                       | $\theta_{y'}$ | $\phi = 270^\circ, \text{CR} \geq 10$                                 | -    | 85    | -    |                   |         |
| Color Chromaticity    | Red           | X   | -    | 0.581 | -    | -                 | Note 6  |
|                       |               | Y   | -    | 0.319 | -    |                   |         |
|                       | Green         | X   | -    | 0.334 | -    |                   |         |
|                       |               | Y   | -    | 0.582 | -    |                   |         |
|                       | Blue          | X   | -    | 0.150 | -    |                   |         |
|                       |               | Y   | -    | 0.131 | -    |                   |         |
|                       | White         | X   | -    | 0.313 | -    |                   |         |
|                       |               | Y   | -    | 0.329 | -    |                   |         |

Note 1: The brightness is measured from the center point of the panel, P5 in Fig. 6.2, for the typical value.

Note 2: The brightness uniformity is calculated by the equation as below:

$$\text{Brightness uniformity} = \frac{\text{Min. Brightness}}{\text{Max. Brightness}} \times 100\%$$

which is based on the brightness values of the 9 points measured by BM-5 as shown in Fig. 6.2.

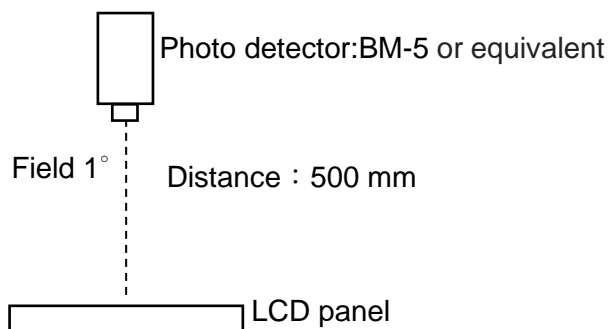


Fig. 6.1

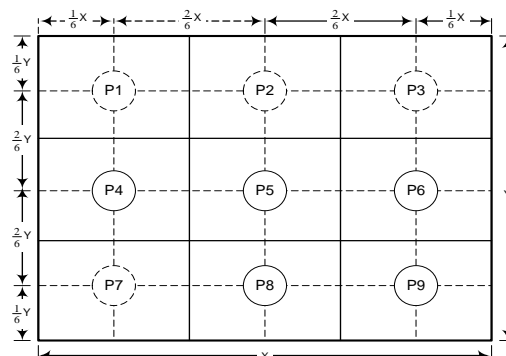


Fig. 6.2

Note 3: The Contrast ratio is measured from the center point of the panel, P5, and defined as the following equation:

$$CR = \frac{\text{Brightness of White}}{\text{Brightness of Black}}$$

Note 4: The definition of response time is shown in Fig. 6.3. The rising time is the period from 10% brightness to 90% brightness when the data is from black to white. Oppositely, Falling time is the period from 90% brightness falling to 10% brightness.

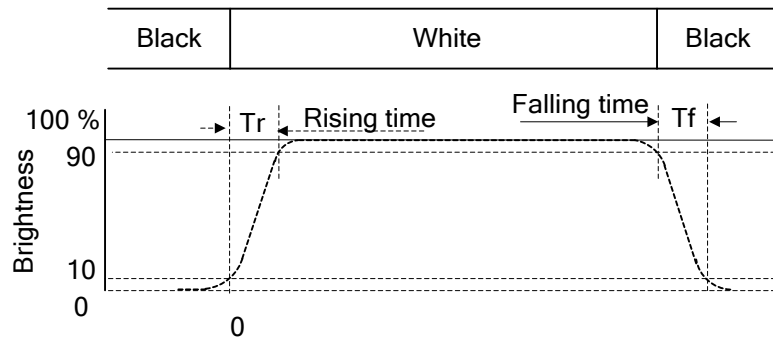


Fig. 6.3

Note 5: The definition of viewing angle is shown in Fig. 6.4. Angle  $\phi$  is used to represent viewing directions, for instance,  $\phi = 270^\circ$  means 6 o'clock, and  $\phi = 0^\circ$  means 3 o'clock. Moreover, angle  $\theta$  is used to represent viewing angles from axis Z toward plane XY.

The display is super wide viewing angle version, so that the best optical performance can be obtained from every viewing direction.

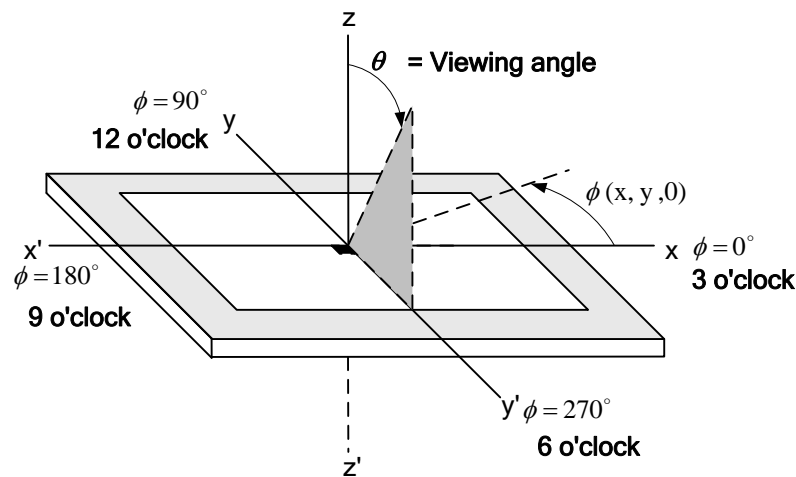
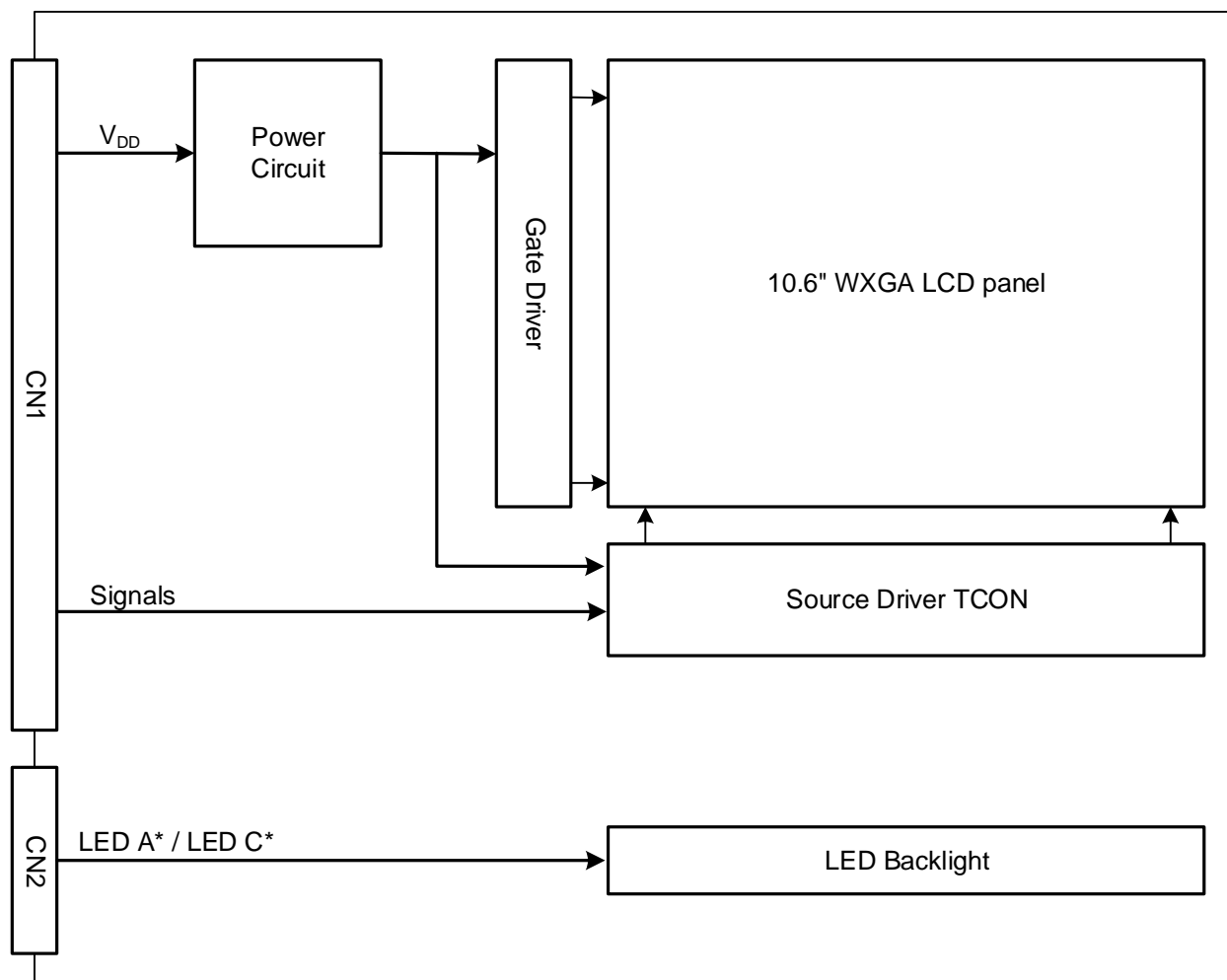


Fig. 6.4

Note 6: The color chromaticity is measured from the center point of the panel, P5, as shown in Fig. 6.2.



## 7. BLOCK DIAGRAM



Note :1 Signals are UD/LR, CLK and pixel data pairs.

# 8. LCD INTERFACE

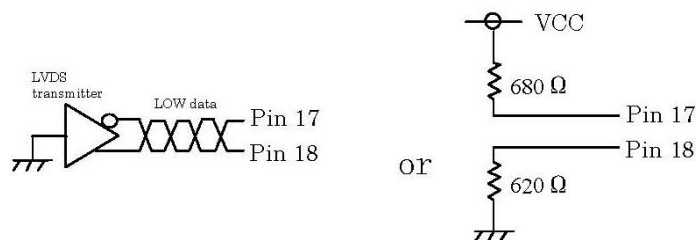
## 8.1 INTERFACE PIN CONNECTIONS

The display interface connector (CN1) is FI-SE20P-HFE made by JAE and pin assignment is as below:

| Pin No. | Signal          | Function (6 bit mode)                                 |                     | Function (8 bit mode)            |
|---------|-----------------|---|---------------------|----------------------------------|
|         |                 | 6 bit input   | 8 bit input         | 8 bit input                      |
| 1       | V <sub>DD</sub> | +3.3V Power Supply for Logic                          |                     | +3.3V Power Supply for Logic     |
| 2       | V <sub>DD</sub> | +3.3V Power Supply for Logic                          |                     | +3.3V Power Supply for Logic     |
| 3       | V <sub>SS</sub> | GND   |                     | GND                              |
| 4       | V <sub>SS</sub> | GND   |                     | GND                              |
| 5       | Link 0-         | R0~R5, G0   | R2~R7, G2           | R0~R5, G0                        |
| 6       | Link 0+         | R0~R5, G0   | R2~R7, G2           | R0~R5, G0                        |
| 7       | V <sub>SS</sub> | GND   |                     | GND                              |
| 8       | Link 1-         | G1~G5, B0~B1  | G3~G7, B2~B3        | G1~G5, B0~B1                     |
| 9       | Link 1+         | G1~G5, B0~B1  | G3~G7, B2~B3        | G1~G5, B0~B1                     |
| 10      | V <sub>SS</sub> | GND   |                     | GND                              |
| 11      | Link 2-         | B2~B5, DE   | B4~B7, DE           | B2~B5, DE                        |
| 12      | Link 2+         | B2~B5, DE   | B4~B7, DE           | B2~B5, DE                        |
| 13      | V <sub>SS</sub> | GND   |                     | GND                              |
| 14      | CLK IN-         | Pixel Clock -   |                     | Pixel Clock -                    |
| 15      | CLK IN+         | Pixel Clock +   |                     | Pixel Clock +                    |
| 16      | V <sub>SS</sub> | GND   |                     | GND                              |
| 17      | Link 3-         | See:*2)   | R0~R1, G0~G1, B0~B1 | R6~R7, G6~G7, B6~B7              |
| 18      | Link 3+         | See:*2)   | R0~R1, G0~G1, B0~B1 | R6~R7, G6~G7, B6~B7              |
| 19      | MODE            | Low=ISP 6bit compatibility mode                       |                     | High=ISP 8bit compatibility mode |
| 20      | UD/LR           | Scan direction control (Low = Normal, High = Reverse) |                     |                                  |

Note 1: Link n- and Link n+ (n=0, 1, 2, 3), CLK IN- and CLK IN+ should be wired by twist-pairs.

Note 2: Recommended wiring of Pin 17,18(6 bit input)

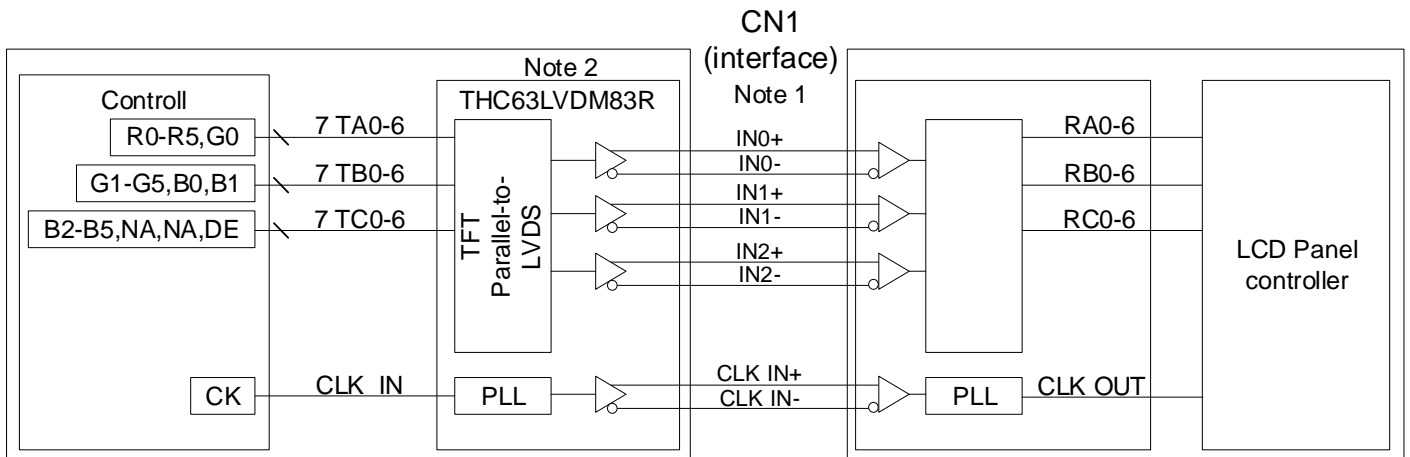


The display interface connector (CN2) is SM10B-SHLS-TF made by JST and pin assignment is as below:

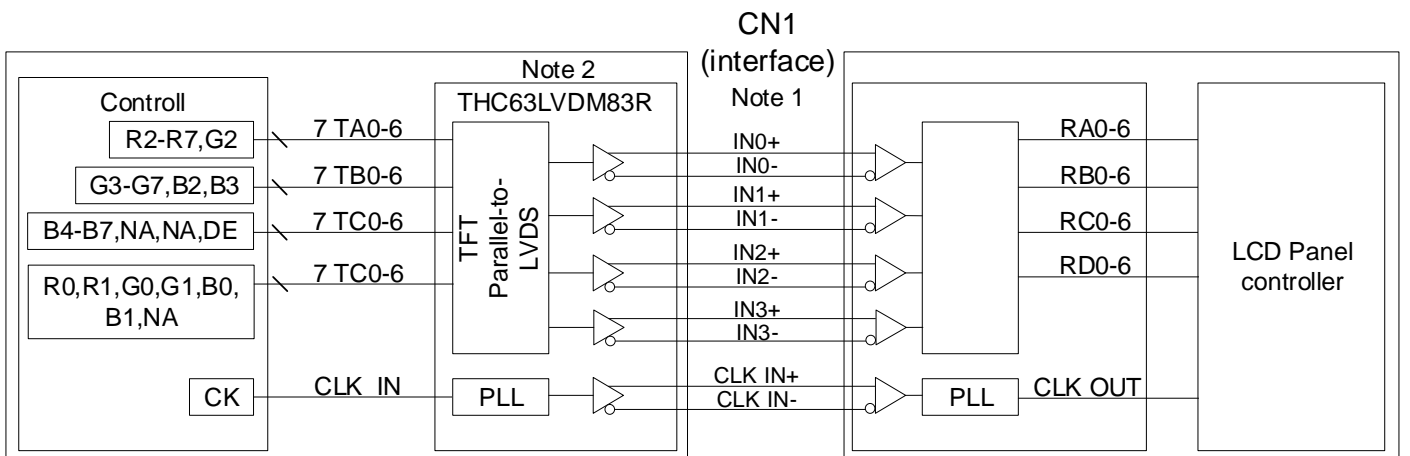
| Pin No. | Symbol | Function                 |
|---------|--------|--------------------------|
| 1       | NC     | This pin should be open. |
| 2       | NC     | This pin should be open. |
| 3       | LED C1 | LED catfode1             |
| 4       | LED A1 | LED anode1               |
| 5       | LED A2 | LED anode2               |
| 6       | LED C2 | LED catfode2             |
| 7       | LED C3 | LED catfode3             |
| 8       | LED A3 | LED anode3               |
| 9       | LED A4 | LED anode4               |
| 10      | LED C4 | LED catfode4             |

## 8.2 LVDS INTERFACE

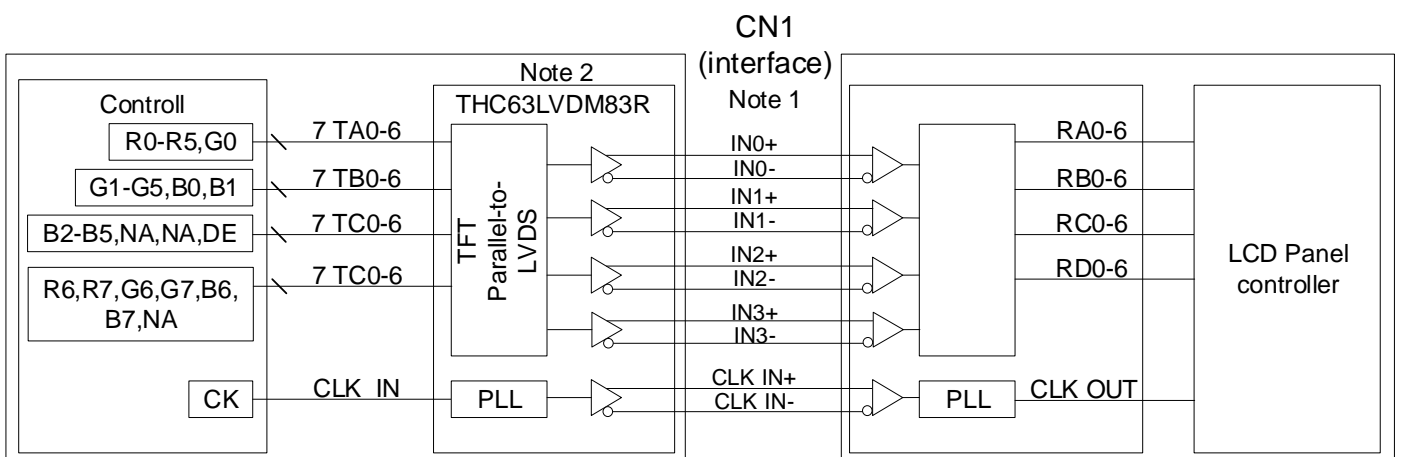
### 8.2.1 ISP 6 bit compatibility mode(6 bit input)



### 8.2.2 ISP 6 bit compatibility mode(8 bit input)



### 8.2.3 ISP 8 bit compatibility mode

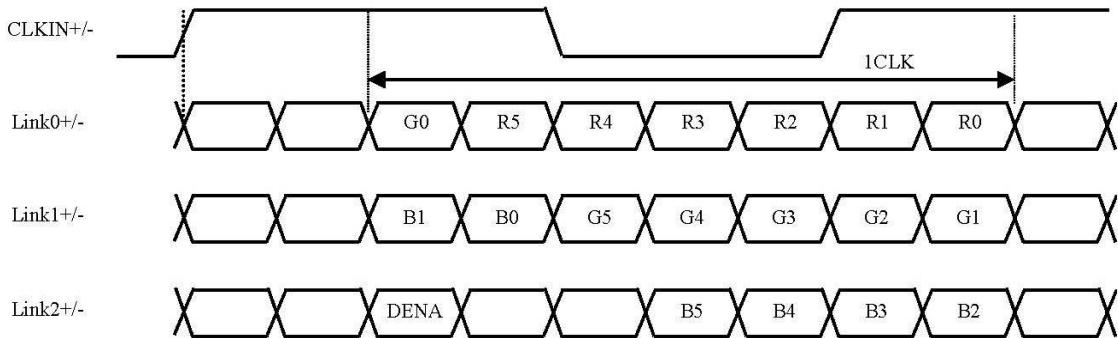


Note 1: LVDS cable impedance should be 100 ohms per signal line when each 2-lines (+, -) is used in differential mode.

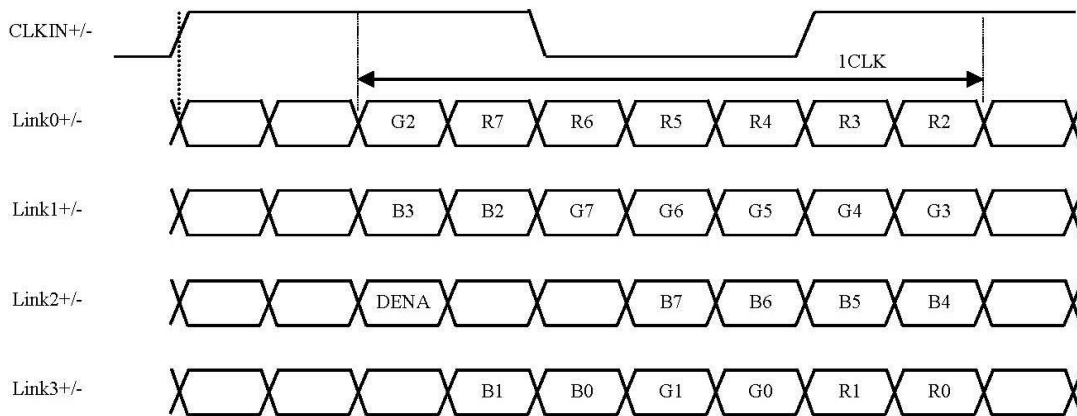
Note 2: The recommended transmitter, THC63LVDM83R, is made by Thine or equivalent, which is not contained in the module.

### 8.3 LVDS DATA FORMAT

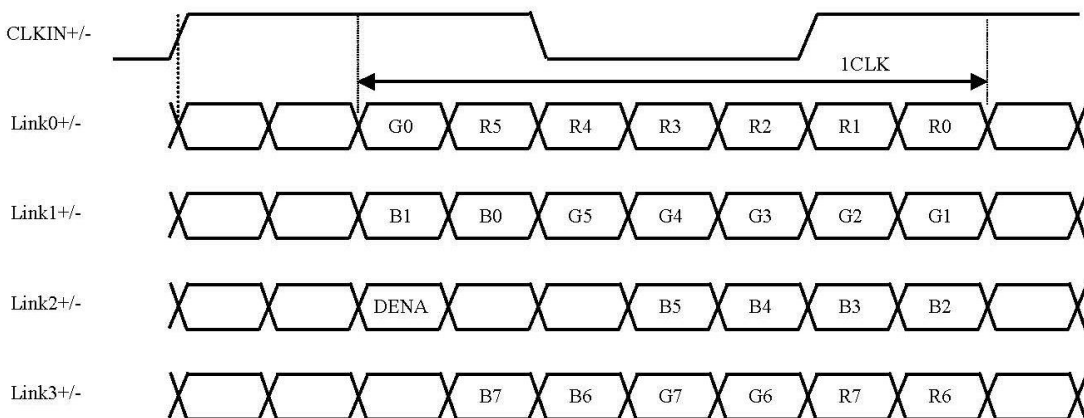
#### 8.3.1 ISP 6 bit compatibility mode(6 bit input)



#### 8.3.2 ISP 6 bit compatibility mode(8 bit input)



#### 8.3.3 ISP 8 bit compatibility mode



### 8.4 TIMING CHART

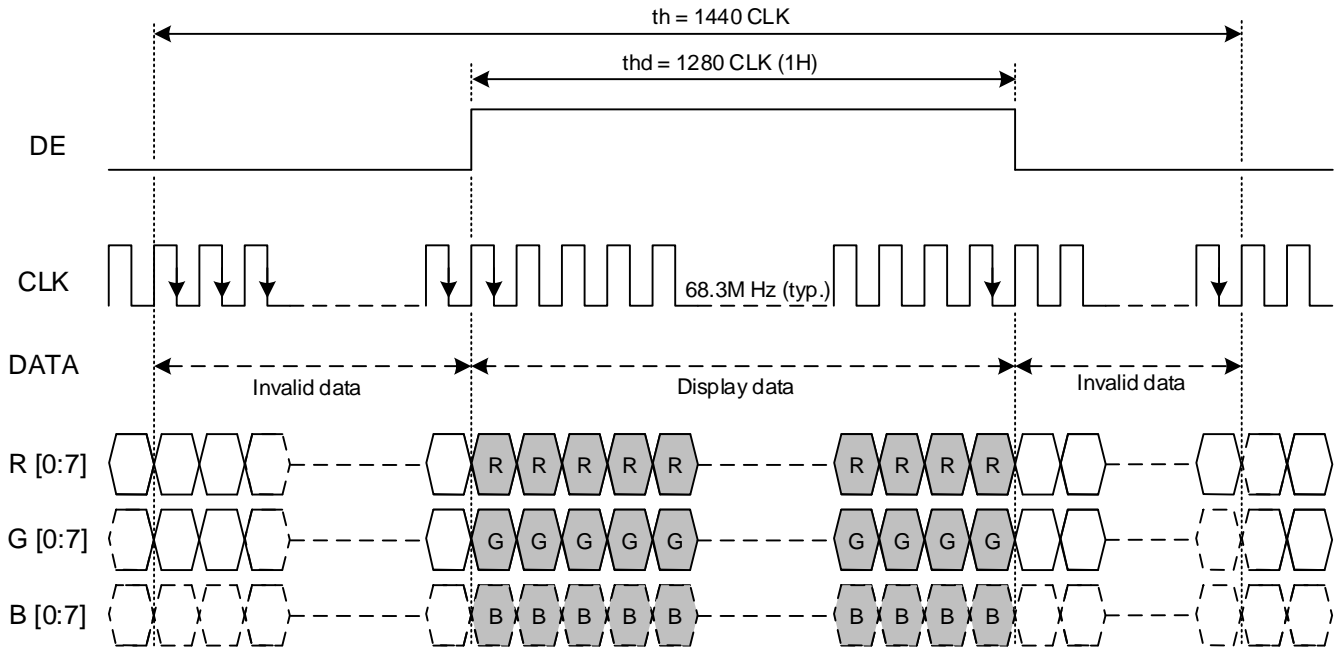


Fig. 8.1 Horizontal Timing

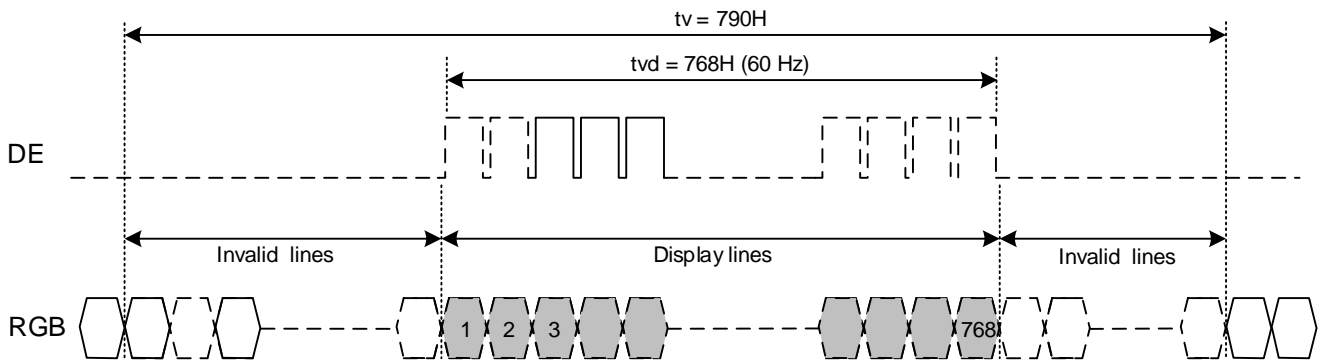


Fig. 8.2 Vertical Timing

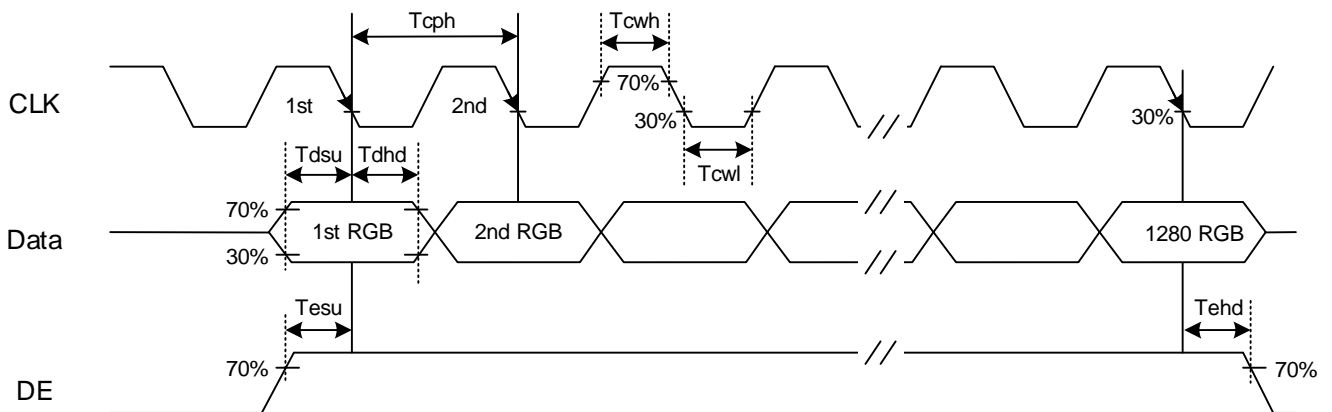


Fig. 8.3 Setup & Hold Time

## 8.5 TIME TABLE

|            | Item          | Symbol | Min. | Typ. | Max. | Unit |
|------------|---------------|--------|------|------|------|------|
| Horizontal | CLK Frequency | fclk   | 50   | 68.3 | 80   | M Hz |
|            | Display Data  | thd    | 1280 |      |      | CLK  |
|            | Cycle Time    | th     | 1316 | 1440 | -    |      |
| Vertical   | Display Data  | tvd    | 768  |      |      | H    |
|            | Cycle Time    | tv     | 771  | 790  | -    |      |
|            | Frequency     | fv     | 55   | 60   | 75   | Hz   |

## 8.6 DISPLAY MODE CONTROL

Scan direction is available to be switched as below by setting CN1's UD/ LR pin.

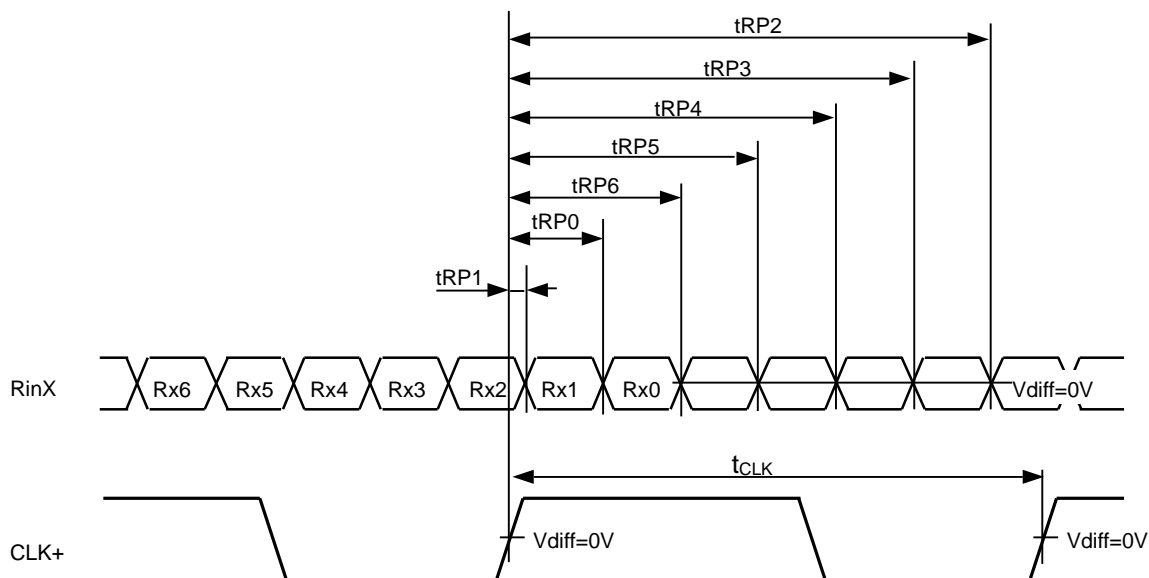


UD/LR : Low



UD/LR : High

## 8.7 LVDS RECEIVER TIMING

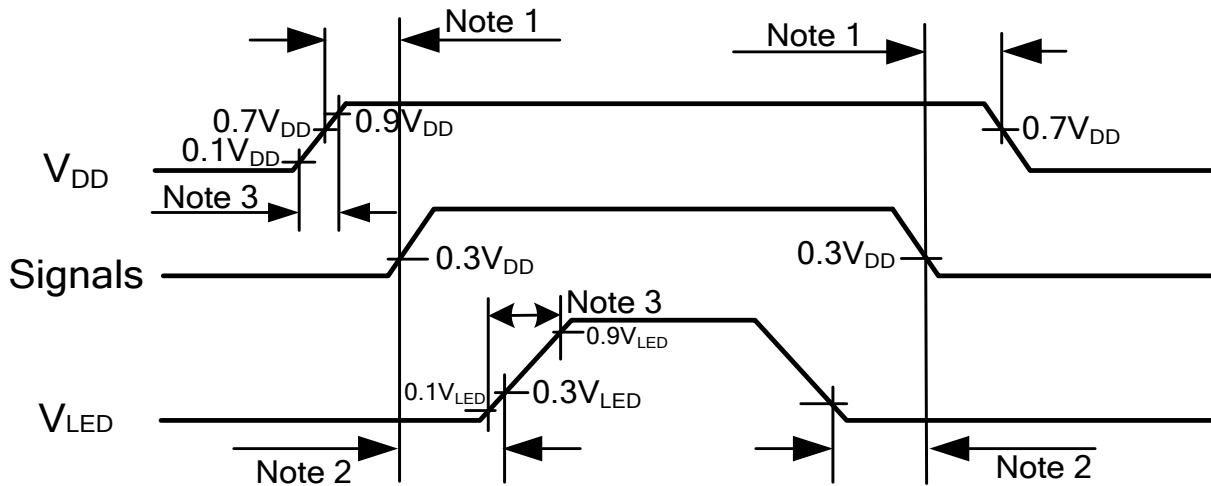


$$RinX = (RinX+) - (RinX-) \quad (X=0, 1, 2, 3)$$

|                     | Item              | Symbol      | Min.             | Typ.          | Max.             | Unit |
|---------------------|-------------------|-------------|------------------|---------------|------------------|------|
| CLK                 | Cycle frequency   | $1/t_{CLK}$ | 50               | 68.3          | 80               | MHz  |
| RinX<br>(X=0,1,2,3) | 0 data position   | $t_{RP0}$   | $1/7t_{CLK}-0.4$ | $1/7*t_{CLK}$ | $1/7t_{CLK}+0.4$ | ns   |
|                     | 1st data position | $t_{RP1}$   | -0.4             | 0             | -0.4             |      |
|                     | 2nd data position | $t_{RP2}$   | $6/7t_{CLK}-0.4$ | $6/7*t_{CLK}$ | $6/7t_{CLK}+0.4$ |      |
|                     | 3rd data position | $t_{RP3}$   | $5/7t_{CLK}-0.4$ | $5/7*t_{CLK}$ | $5/7t_{CLK}+0.4$ |      |
|                     | 4th data position | $t_{RP4}$   | $4/7t_{CLK}-0.4$ | $4/7*t_{CLK}$ | $4/7t_{CLK}+0.4$ |      |
|                     | 5th data position | $t_{RP5}$   | $3/7t_{CLK}-0.4$ | $3/7*t_{CLK}$ | $3/7t_{CLK}+0.4$ |      |
|                     | 6th data position | $t_{RP6}$   | $2/7t_{CLK}-0.4$ | $2/7*t_{CLK}$ | $2/7t_{CLK}+0.4$ |      |



## 8.8 POWER SEQUENCE



Note 1: In order to avoid any damages,  $V_{DD}$  has to be applied before all other signals. The opposite is true for power off where  $V_{DD}$  has to be remained on until all other signals have been switch off. The recommended time period is 1 second.

Note 2: In order to avoid showing uncompleted patterns in transient state. It is recommended that switching the backlight on is delayed for 1 second after the signals have been applied. The opposite is true for power off where the backlight has to be switched off 1 second before the signals are removed.

Note 3: In order to avoid high Inrush current,  $V_{DD}$  rising time need to set more than 0.5ms.

## 8.9 DATA INPUT for DISPLAY COLOR

### 8.9.1 ISP 6 bit compatibility mode

| Input color    |            | Red Data |    |    |     |    |    | Green Data |    |    |     |    |    | Blue Data |    |    |     |    |    |
|----------------|------------|----------|----|----|-----|----|----|------------|----|----|-----|----|----|-----------|----|----|-----|----|----|
|                |            | R5       | R4 | R3 | R2  | R1 | R0 | G5         | G4 | G3 | G2  | G1 | G0 | B5        | B4 | B3 | B2  | B1 | B0 |
|                |            | MSB      |    |    | LSB |    |    | MSB        |    |    | LSB |    |    | MSB       |    |    | LSB |    |    |
| Basic<br>Color | Black      | 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  | 0          | 0  | 0  | 0   | 0  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Green(255) | 0        | 0  | 0  | 0   | 0  | 0  | 1          | 1  | 1  | 1   | 1  | 1  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Blue(255)  | 0        | 0  | 0  | 0   | 0  | 0  | 0          | 0  | 0  | 0   | 0  | 0  | 1         | 1  | 1  | 1   | 1  | 1  |
|                | Cyan       | 0        | 0  | 0  | 0   | 0  | 0  | 1          | 1  | 1  | 1   | 1  | 1  | 1         | 1  | 1  | 1   | 1  | 1  |
|                | Magenta    | 1        | 1  | 1  | 1   | 1  | 1  | 0          | 0  | 0  | 0   | 0  | 0  | 1         | 1  | 1  | 1   | 1  | 1  |
|                | Yellow     | 1        | 1  | 1  | 1   | 1  | 1  | 1          | 1  | 1  | 1   | 1  | 1  | 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  |
| Red            | Red(1)     | 0        | 0  | 0  | 0   | 0  | 1  | 0          | 0  | 0  | 0   | 0  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Red(2)     | 0        | 0  | 0  | 0   | 1  | 0  | 0          | 0  | 0  | 0   | 0  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | Red(62)    | 1        | 1  | 1  | 1   | 1  | 0  | 0          | 0  | 0  | 0   | 0  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Red(63)    | 1        | 1  | 1  | 1   | 1  | 1  | 0          | 0  | 0  | 0   | 0  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
| Green          | Green(1)   | 0        | 0  | 0  | 0   | 0  | 0  | 0          | 0  | 0  | 0   | 0  | 1  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Green(2)   | 0        | 0  | 0  | 0   | 0  | 0  | 0          | 0  | 0  | 0   | 1  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | Green(62)  | 0        | 0  | 0  | 0   | 0  | 0  | 1          | 1  | 1  | 1   | 1  | 0  | 0         | 0  | 0  | 0   | 0  | 0  |
|                | Green(63)  | 0        | 0  | 0  | 0   | 0  | 0  | 1          | 1  | 1  | 1   | 1  | 1  | 0         | 0  | 0  | 0   | 0  | 0  |
| Blue           | Blue(1)    | 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   | 1  | 0  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | :          | :        | :  | :  | :   | :  | :  | :          | :  | :  | :   | :  | :  | :         | :  | :  | :   | :  | :  |
|                | Blue(62)   | 0        | 0  | 0  | 0   | 0  | 0  | 0          | 0  | 0  | 0   | 0  | 0  | 1         | 1  | 1  | 1   | 1  | 0  |
|                | Blue(63)   | 0        | 0  | 0  | 0   | 0  | 0  | 0          | 0  | 0  | 0   | 0  | 0  | 1         | 1  | 1  | 1   | 1  | 1  |

Note 1: Definition of gray scale : Color(n) Number in parenthesis indicates gray scale level. Larger number corresponds to brighter level.

Note 2: Data Signal : 1 : High, 0 : Low

### 8.9.2 ISP 8 bit compatibility mode

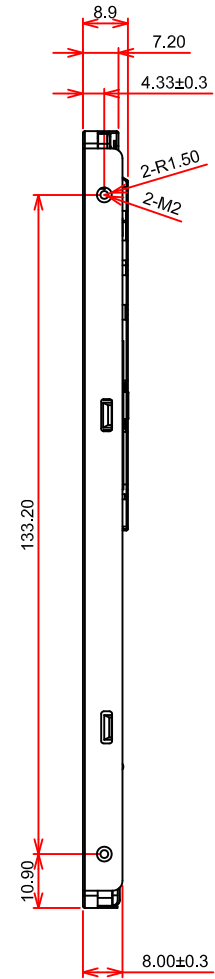
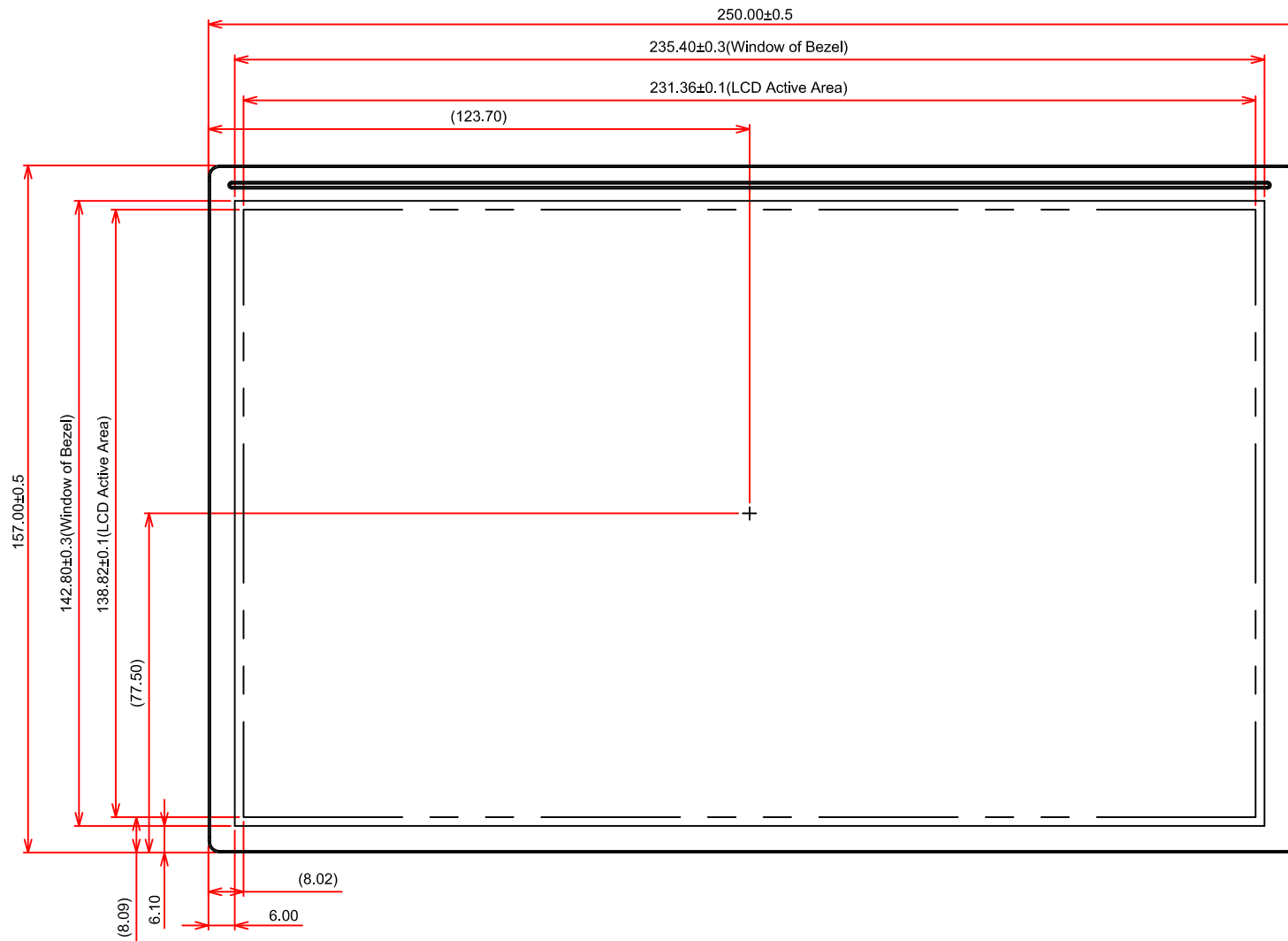
| Input color    |            | Red Data |    |    |    |    |    |    |    | Green Data |    |    |    |    |    |    |    | Blue Data |    |    |    |    |    |    |    |     |  |  |  |  |  |
|----------------|------------|----------|----|----|----|----|----|----|----|------------|----|----|----|----|----|----|----|-----------|----|----|----|----|----|----|----|-----|--|--|--|--|--|
|                |            | R7       | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7         | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7        | B6 | B5 | B4 | B3 | B2 | B1 | B0 |     |  |  |  |  |  |
|                |            | MSB      |    |    |    |    |    |    |    | LSB        |    |    |    |    |    |    |    | MSB       |    |    |    |    |    |    |    | LSB |  |  |  |  |  |
| Basic<br>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  |    |     |  |  |  |  |  |
|                | Green(255) | 0        | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 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  | 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  |    |     |  |  |  |  |  |
|                | Magenta    | 1        | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 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  | 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  |    |     |  |  |  |  |  |
| 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  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
|                | :          | :        | :  | :  | :  | :  | :  | :  | :  | :          | :  | :  | :  | :  | :  | :  | :  | :         | :  | :  | :  | :  | :  | :  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
| 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  |    |     |  |  |  |  |  |
|                | Green(1)   | 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  | 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  |    |     |  |  |  |  |  |
|                | 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  |    |     |  |  |  |  |  |
|                | Green(255) | 0        | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |    |     |  |  |  |  |  |
| 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  |    |     |  |  |  |  |  |
|                | Blue(1)    | 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  | 1  | 0  |    |     |  |  |  |  |  |
|                | :          | :        | :  | :  | :  | :  | :  | :  | :  | :          | :  | :  | :  | :  | :  | :  | :  | :         | :  | :  | :  | :  | :  | :  |    |     |  |  |  |  |  |
|                | Blue(253)  | 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  | 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  | 1  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |    |     |  |  |  |  |  |

Note 1: Definition of gray scale : Color(n) Number in parenthesis indicates gray scale level. Larger number corresponds to brighter level.

Note 2: Data Signal : 1 : High, 0 : Low

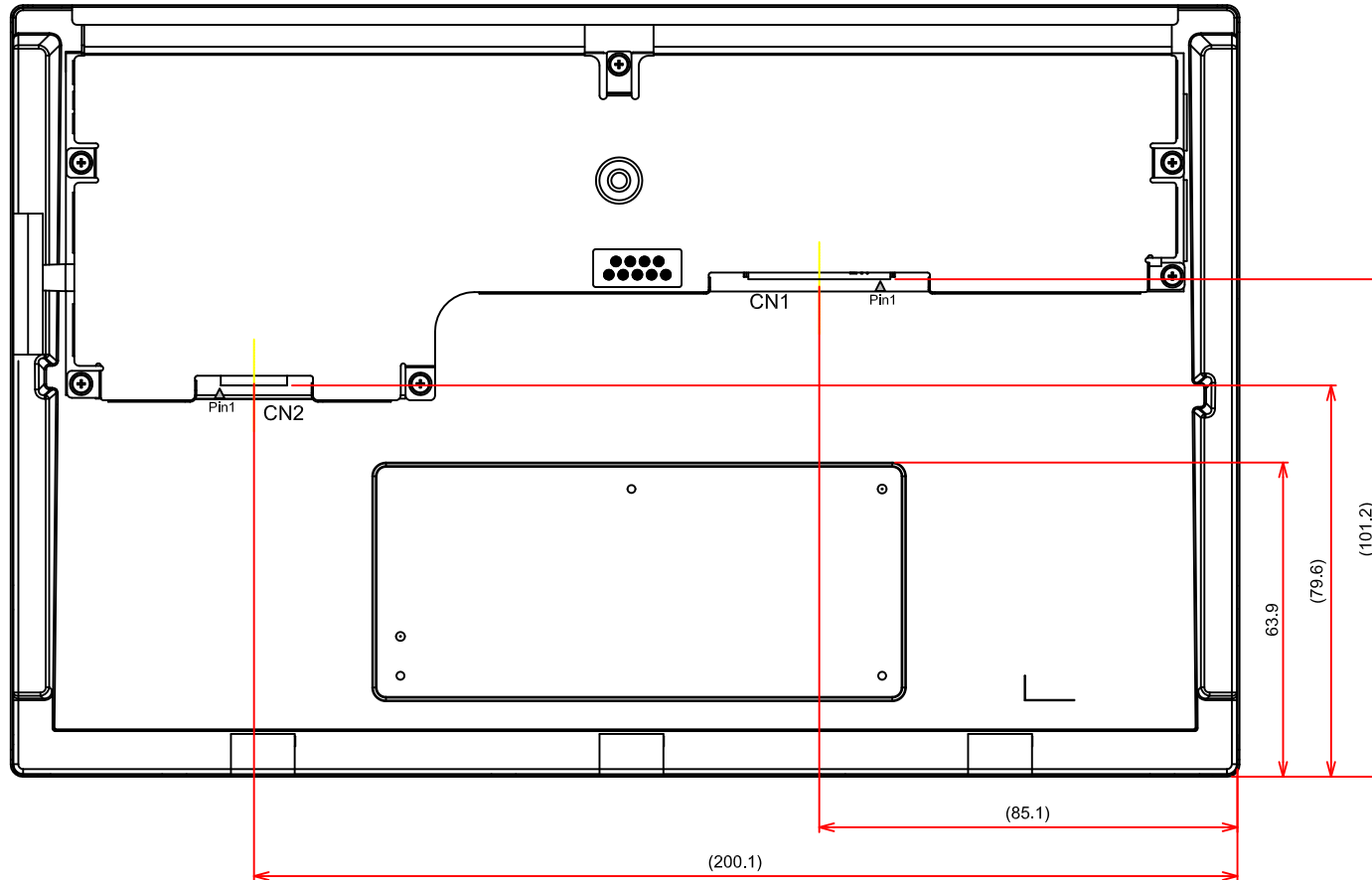
# 9. OUTLINE DIMENSIONS

## 9.1 FRONT VIEW



General Tolerance:±0.5mm  
Scale : NTS  
Unit : mm

## 9.2 REAR VIEW



General Tolerance:  $\pm 0.5$ mm  
Scale : NTS  
Unit : mm

# 10. DESIGNATION of LOT MARK

1) The lot mark is showing in Fig.10.1. First 4 digits are used to represent production lot, T represented made in Taiwan, and the last 6 digits are the serial number.

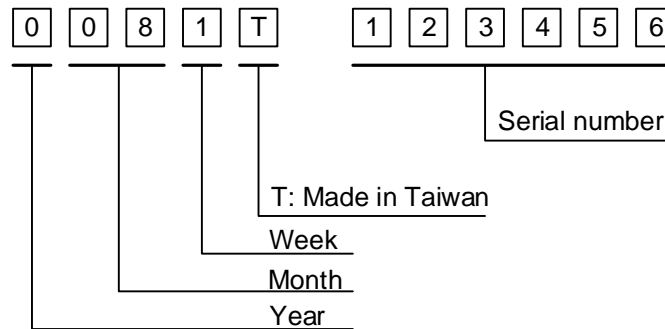


Fig. 10.1

2) The tables as below are showing what the first 4 digits of lot mark are shorted for.

| Year | Lot Mark |
|------|----------|
| 2020 | 0        |
| 2021 | 1        |
| 2022 | 2        |
| 2023 | 3        |
| 2024 | 4        |

| Month | Lot Mark | Month | Lot Mark |
|-------|----------|-------|----------|
| Jan.  | 01       | Jul.  | 07       |
| Feb.  | 02       | Aug.  | 08       |
| Mar.  | 03       | Sep.  | 09       |
| Apr.  | 04       | Oct.  | 10       |
| May   | 05       | Nov.  | 11       |
| Jun.  | 06       | Dec.  | 12       |

| Week       | Lot Mark |
|------------|----------|
| 1~7 days   | 1        |
| 8~14 days  | 2        |
| 15~21 days | 3        |
| 22~28 days | 4        |
| 29~31 days | 5        |

3) The location of the lot mark is on the back of the display shown in Fig. 10.2

Label example :

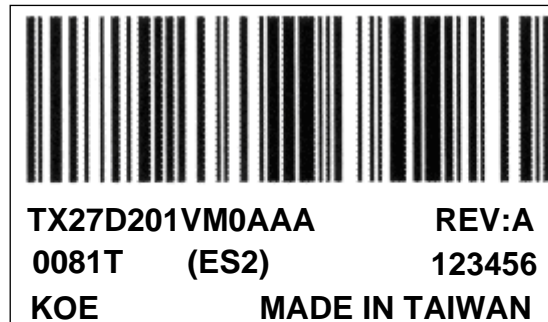


Fig. 10.2