



AUO Display+

## Product Specification

G240UAN01.0

☐ Preliminary Specification

☒ Final Specification

|            |                       |
|------------|-----------------------|
| Module     | 24 Inch Color TFT-LCD |
| Model Name | G240UAN01.0           |

|                                                                                                                                                                                          |                                                                 |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|-------|-------|-----------------------|------|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------------|---------------------|-------------|------|-----------------------|---------------------|
| <table><tr><td>Customer</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr><tr><td>Checked &amp; Approved by</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr></table> | Customer                                                        | Date | <hr/> | <hr/> | Checked & Approved by | Date | <hr/> | <hr/> | <table><tr><td>Approved by</td><td>Date</td></tr><tr><td><u>Buffy Chen</u></td><td><u>JAN 19, 2023</u></td></tr><tr><td>Prepared by</td><td>Date</td></tr><tr><td><u>Isaac TY Huang</u></td><td><u>JAN 19, 2023</u></td></tr></table> | Approved by | Date | <u>Buffy Chen</u> | <u>JAN 19, 2023</u> | Prepared by | Date | <u>Isaac TY Huang</u> | <u>JAN 19, 2023</u> |
| Customer                                                                                                                                                                                 | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| Checked & Approved by                                                                                                                                                                    | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| Approved by                                                                                                                                                                              | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| <u>Buffy Chen</u>                                                                                                                                                                        | <u>JAN 19, 2023</u>                                             |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| Prepared by                                                                                                                                                                              | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| <u>Isaac TY Huang</u>                                                                                                                                                                    | <u>JAN 19, 2023</u>                                             |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |
| Customer's sign back page                                                                                                                                                                | General Display Business Unit /<br>AUO Display Plus Corporation |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                       |             |      |                   |                     |             |      |                       |                     |

## Contents

|                                                                |           |
|----------------------------------------------------------------|-----------|
| <b>1. Operating Precautions .....</b>                          | <b>4</b>  |
| <b>2. General Description .....</b>                            | <b>5</b>  |
| 2.1 Display Characteristics.....                               | 5         |
| 2.2 Optical Characteristics .....                              | 6         |
| <b>3. Functional Block Diagram .....</b>                       | <b>9</b>  |
| <b>4. Absolute Maximum Ratings .....</b>                       | <b>10</b> |
| 4.1 Absolute Ratings of TFT LCD Module.....                    | 10        |
| 4.2 Absolute Ratings of Environment.....                       | 10        |
| <b>5. Electrical Characteristics .....</b>                     | <b>11</b> |
| 5.1 TFT LCD Module .....                                       | 11        |
| 5.2 Backlight Unit .....                                       | 13        |
| <b>6. Signal Characteristic .....</b>                          | <b>15</b> |
| 6.1 Pixel Format Image .....                                   | 15        |
| 6.2 Scanning Direction .....                                   | 15        |
| 6.3 Signal Description .....                                   | 16        |
| 6.4 The Input Data Format.....                                 | 18        |
| 6.5 Interface Timing .....                                     | 19        |
| 6.6 Power ON/OFF Sequence .....                                | 21        |
| <b>7. Reliability Test Criteria .....</b>                      | <b>22</b> |
| <b>8. Mechanical Characteristics.....</b>                      | <b>23</b> |
| 8.1 LCM Outline Dimension .....                                | 23        |
| <b>9. Label and Packaging .....</b>                            | <b>25</b> |
| 9.1 Shipping Label (on the rear side of TFT-LCD display) ..... | 25        |
| 9.2 Carton Package .....                                       | 25        |
| <b>10 Safety.....</b>                                          | <b>26</b> |
| 10.1 Sharp Edge Requirements.....                              | 26        |
| 10.2 Materials .....                                           | 26        |
| 10.3 Capacitors.....                                           | 26        |
| 10.4 National Test Lab Requirement.....                        | 26        |

## Record of Revision

| Version            | Date<br>(yyyy/m/d)    | Page            | Old description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | New Description                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|--------------------|-----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------|------------|------|------|------|-----------------|-----------------------|-------------------|-----|-----|-----|------------------|--------|----------------|------|------|------|----------------|-----------------|--------------------|------|------|----------|-----------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------|--------|----------------|------|------|--------|-------------------|-------------------|-----|-----|-----|----------|-----------------|---------------|----|-----|------------|----------------|----|--------------------|----|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------|------|------|------|------|-----------------|-----------------------|----|----|----|-----|------------------|--------|----------------|------|------|------|--------|-----------------|------|------|------|----------|-----------------|----|----|-----|--------------------|--------|----------------|------|------|------|--------|-----------------|-----|-----|-----|----------|-----------------|----|----|-----|------------|---|----|----|----|----|
| 1.0                | 2017/01/19            | All             | First edition specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 1.1                | 2017/04/05            | p.13<br>p.14    | backlight connector type<br>backlight input signal_VDD max. & min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 2.0                | 2018/07/30            | p.5,6           | NTSC typ.72%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NTSC typ. 78%                                                               |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 3.0                | 2019/03/14            | P.11            | Backlight input signal characteristics<br>table I <sub>VDD</sub> max 1.78<br>Power Consumption<br>P <sub>VDD</sub> : (Typ) 40.33(Max):41.16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | table I <sub>VDD</sub> max 1.82<br>P <sub>VDD</sub> : (Typ) 39.83(Max):43.7 |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 4.0                | 2019/06/04            | P16             | 6.3 Signal Description<br>Delete the description about the transmitter”<br>SN75LVDS83” Couldn’t use for our Panel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Delete suggested item, about the<br>description receiver.                   |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 5.0                | 2020/01/03            | P17             | 6.3.1 TFT LCD Module: LVDS<br>Connector<br>Delete the photo on Back Bezel whose<br>are LCD &LED connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Delete the photo on Back Bezel whose<br>are LCD &LED connector              |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 6.0                | 2022/11/18            | P5              | Support Color 1.07B colors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Support Color 16.7M colors, 8 bit+FRC                                       |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    |                       | P9              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    |                       | P18             | Data Mapping of JEIDA Format:<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    |                       | P14             | <table><thead><tr><th>Symbol</th><th>Parameter</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th><th>Remark</th></tr></thead><tbody><tr><td rowspan="3">F<sub>Free</sub></td><td>Dimming Frequency</td><td>0.1</td><td>0.2</td><td>20</td><td>[kHz]</td><td>°</td></tr><tr><td>Swing Voltage</td><td>3</td><td>3.3</td><td>5</td><td>V<sub>r</sub></td><td>°</td></tr><tr><td>Dimming Duty Cycle</td><td>10</td><td>-</td><td>100</td><td>%</td><td>°</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Symbol                                                                      | Parameter      | Min.       | Typ. | Max. | Unit | Remark          | F <sub>Free</sub>     | Dimming Frequency | 0.1 | 0.2 | 20  | [kHz]            | °      | Swing Voltage  | 3    | 3.3  | 5    | V <sub>r</sub> | °               | Dimming Duty Cycle | 10   | -    | 100      | %               | °  | <table><thead><tr><th>Symbol</th><th>Parameter</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th><th>Remark</th></tr></thead><tbody><tr><td rowspan="3">F<sub>Free</sub></td><td>Dimming Frequency</td><td>0.1</td><td>0.2</td><td>20</td><td>[kHz]</td><td>°</td></tr><tr><td>Swing Voltage</td><td>3</td><td>3.3</td><td>5</td><td>V<sub>r</sub></td><td>°</td></tr><tr><td>Dimming Duty Cycle</td><td>15</td><td>-</td><td>100</td><td>%</td><td>5KHz~20KHz</td></tr></tbody></table> | Symbol | Parameter          | Min.   | Typ.           | Max. | Unit | Remark | F <sub>Free</sub> | Dimming Frequency | 0.1 | 0.2 | 20  | [kHz]    | °               | Swing Voltage | 3  | 3.3 | 5          | V <sub>r</sub> | °  | Dimming Duty Cycle | 15 | -  | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | %      | 5KHz~20KHz |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Symbol             | Parameter             | Min.            | Typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max.                                                                        | Unit           | Remark     |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| F <sub>Free</sub>  | Dimming Frequency     | 0.1             | 0.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 20                                                                          | [kHz]          | °          |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Swing Voltage         | 3               | 3.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5                                                                           | V <sub>r</sub> | °          |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Dimming Duty Cycle    | 10              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100                                                                         | %              | °          |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Symbol             | Parameter             | Min.            | Typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max.                                                                        | Unit           | Remark     |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| F <sub>Free</sub>  | Dimming Frequency     | 0.1             | 0.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 20                                                                          | [kHz]          | °          |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Swing Voltage         | 3               | 3.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5                                                                           | V <sub>r</sub> | °          |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Dimming Duty Cycle    | 15              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100                                                                         | %              | 5KHz~20KHz |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    |                       | P25             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                             |                |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| 7.0                | 2023/01/19            | P19             | <table><thead><tr><th>Signal</th><th>Symbol</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th></tr></thead><tbody><tr><td>Clock Frequency</td><td>1/ T<sub>clock</sub></td><td>59.5</td><td>77</td><td>85</td><td>MHz</td></tr><tr><td rowspan="3">Vertical Section</td><td>Period</td><td>T<sub>V</sub></td><td>1214</td><td>1235</td><td>1734</td></tr><tr><td>Active</td><td>T<sub>VD</sub></td><td>1200</td><td>1200</td><td>1200</td></tr><tr><td>Blanking</td><td>T<sub>VB</sub></td><td>14</td><td>35</td><td>534</td></tr><tr><td rowspan="3">Horizontal Section</td><td>Period</td><td>T<sub>H</sub></td><td>1000</td><td>1040</td><td>1428</td></tr><tr><td>Active</td><td>T<sub>HD</sub></td><td>960</td><td>960</td><td>960</td></tr><tr><td>Blanking</td><td>T<sub>HB</sub></td><td>40</td><td>80</td><td>468</td></tr><tr><td>Frame Rate</td><td>F</td><td>49</td><td>60</td><td>66</td><td>Hz</td></tr></tbody></table> <p>Note : DE mode only</p> | Signal                                                                      | Symbol         | Min.       | Typ. | Max. | Unit | Clock Frequency | 1/ T <sub>clock</sub> | 59.5              | 77  | 85  | MHz | Vertical Section | Period | T <sub>V</sub> | 1214 | 1235 | 1734 | Active         | T <sub>VD</sub> | 1200               | 1200 | 1200 | Blanking | T <sub>VB</sub> | 14 | 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 534    | Horizontal Section | Period | T <sub>H</sub> | 1000 | 1040 | 1428   | Active            | T <sub>HD</sub>   | 960 | 960 | 960 | Blanking | T <sub>HB</sub> | 40            | 80 | 468 | Frame Rate | F              | 49 | 60                 | 66 | Hz | <table><thead><tr><th>Signal</th><th>Symbol</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th></tr></thead><tbody><tr><td>Clock Frequency</td><td>1/ T<sub>clock</sub></td><td>61</td><td>77</td><td>85</td><td>MHz</td></tr><tr><td rowspan="3">Vertical Section</td><td>Period</td><td>T<sub>V</sub></td><td>1214</td><td>1235</td><td>1734</td></tr><tr><td>Active</td><td>T<sub>VD</sub></td><td>1200</td><td>1200</td><td>1200</td></tr><tr><td>Blanking</td><td>T<sub>VB</sub></td><td>14</td><td>35</td><td>534</td></tr><tr><td rowspan="3">Horizontal Section</td><td>Period</td><td>T<sub>H</sub></td><td>1016</td><td>1040</td><td>1428</td></tr><tr><td>Active</td><td>T<sub>HD</sub></td><td>960</td><td>960</td><td>960</td></tr><tr><td>Blanking</td><td>T<sub>HB</sub></td><td>56</td><td>80</td><td>468</td></tr><tr><td>Frame Rate</td><td>F</td><td>49</td><td>60</td><td>66</td><td>Hz</td></tr></tbody></table> <p>Note : DE mode only</p> | Signal | Symbol     | Min. | Typ. | Max. | Unit | Clock Frequency | 1/ T <sub>clock</sub> | 61 | 77 | 85 | MHz | Vertical Section | Period | T <sub>V</sub> | 1214 | 1235 | 1734 | Active | T <sub>VD</sub> | 1200 | 1200 | 1200 | Blanking | T <sub>VB</sub> | 14 | 35 | 534 | Horizontal Section | Period | T <sub>H</sub> | 1016 | 1040 | 1428 | Active | T <sub>HD</sub> | 960 | 960 | 960 | Blanking | T <sub>HB</sub> | 56 | 80 | 468 | Frame Rate | F | 49 | 60 | 66 | Hz |
| Signal             | Symbol                | Min.            | Typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max.                                                                        | Unit           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Clock Frequency    | 1/ T <sub>clock</sub> | 59.5            | 77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 85                                                                          | MHz            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Vertical Section   | Period                | T <sub>V</sub>  | 1214                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1235                                                                        | 1734           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Active                | T <sub>VD</sub> | 1200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1200                                                                        | 1200           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Blanking              | T <sub>VB</sub> | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 35                                                                          | 534            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Horizontal Section | Period                | T <sub>H</sub>  | 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1040                                                                        | 1428           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Active                | T <sub>HD</sub> | 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 960                                                                         | 960            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Blanking              | T <sub>HB</sub> | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 80                                                                          | 468            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Frame Rate         | F                     | 49              | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66                                                                          | Hz             |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Signal             | Symbol                | Min.            | Typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max.                                                                        | Unit           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Clock Frequency    | 1/ T <sub>clock</sub> | 61              | 77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 85                                                                          | MHz            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Vertical Section   | Period                | T <sub>V</sub>  | 1214                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1235                                                                        | 1734           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Active                | T <sub>VD</sub> | 1200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1200                                                                        | 1200           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Blanking              | T <sub>VB</sub> | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 35                                                                          | 534            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Horizontal Section | Period                | T <sub>H</sub>  | 1016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1040                                                                        | 1428           |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Active                | T <sub>HD</sub> | 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 960                                                                         | 960            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
|                    | Blanking              | T <sub>HB</sub> | 56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 80                                                                          | 468            |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |
| Frame Rate         | F                     | 49              | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66                                                                          | Hz             |            |      |      |      |                 |                       |                   |     |     |     |                  |        |                |      |      |      |                |                 |                    |      |      |          |                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |        |                |      |      |        |                   |                   |     |     |     |          |                 |               |    |     |            |                |    |                    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |            |      |      |      |      |                 |                       |    |    |    |     |                  |        |                |      |      |      |        |                 |      |      |      |          |                 |    |    |     |                    |        |                |      |      |      |        |                 |     |     |     |          |                 |    |    |     |            |   |    |    |    |    |

## 1. Operating Precautions

- 1) Since front polarizer is easily damaged, please be cautious and not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.
- 5) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.
- 6) To avoid ESD (Electro Static Discharge) damage, be sure to ground yourself before handling TFT-LCD Module.
- 7) Do not open nor modify the module assembly.
- 8) Do not press the reflector sheet at the back of the module to any direction.
- 9) In case if a module has to be put back into the packing container slot after it was taken out from the container, do not press the center of the LED light bar edge. Instead, press at the far ends of the LED light bar edge softly. Otherwise the TFT Module may be damaged.
- 10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 11) TFT-LCD Module is not allowed to be twisted & bent even force is added on module in a very short time. Please design your display product well to avoid external force applying to module by end-user directly.
- 12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
- 13) Severe temperature condition may result in different luminance, response time and lamp ignition voltage.
- 14) Continuous operating TFT-LCD display under low temperature environment may accelerate lamp exhaustion and reduce luminance dramatically.
- 15) The data on this specification sheet is applicable when LCD module is placed in landscape position.
- 16) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.

## 2. General Description

G240UAN01.0 is a Color Active Matrix Liquid Crystal Display composed of a TFT-LCD panel, a driver circuit, and a backlight system. The screen format is intended to support the WUXGA (1920(H) x 1200(V)) screen and 16.7M colors. All input signals are 2-channel LVDS interface compatible.

### 2.1 Display Characteristics

The following items are characteristics summary on the table under 25 °C condition:

| Items                     | Unit    | Specifications                         |
|---------------------------|---------|----------------------------------------|
| Screen Diagonal           | [inch]  | 24.07 (611.32mm)                       |
| Active Area               | [mm]    | 518.4 (H) x 324.0 (V)                  |
| Resolution                |         | 1920(x3) x 1200                        |
| Pixel Pitch               | [mm]    | 0.270 (per one triad) x 0.270          |
| Pixel Arrangement         |         | R.G.B. Vertical Stripe                 |
| Display Mode              |         | AHVA mode, Normally Black              |
| Nominal Input Voltage VDD | [Volt]  | +12                                    |
| Power Consumption         | [Watt]  | 45.13 (typ)<br>(BLU 40.33W + LCD 4.8W) |
| Color gamut               |         | NTSC 78%                               |
| Weight                    | [Grams] | 2500 (Typ)                             |
| Physical Size             | [mm]    | 546.4 (H) x 352.0 (V) x 18.1 (D) (Typ) |
| Electrical Interface      |         | Dual channel LVDS                      |
| Surface Treatment         |         | Anti-Glare treatment                   |
| Support Color             |         | 1.07B colors(8bit+HiFRC)               |
| Temperature Range         |         |                                        |
| Operating                 | [°C]    | 0 to +50                               |
| Storage (Non-Operating)   | [°C]    | -20 to +60                             |
| RoHS Compliance           |         | RoHS Compliance                        |

## 2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25 °C (Room Temperature):

| Item                                              | Unit              | Conditions              |         | Min.  | Typ.  | Max.  | Note |
|---------------------------------------------------|-------------------|-------------------------|---------|-------|-------|-------|------|
| White Luminance                                   | cd/m <sup>2</sup> | ILED=65mA(center point) |         | 720   | 900   | -     | 1    |
| Uniformity                                        | %                 | 9 points                |         | 80    | 85    | -     | 2,3  |
| Contrast Ratio                                    | --                |                         |         | 700   | 1000  | -     | 4    |
| Response Time                                     | msec              | Rising                  |         | -     | -     | -     | 5    |
|                                                   |                   | Falling                 |         | -     | -     | -     |      |
|                                                   |                   | Rising + Falling        |         | -     | 14    | 25    |      |
| Viewing Angle                                     | degree            | Horizontal<br>CR >= 10  | (Right) | 75    | 89    | -     | 6    |
|                                                   |                   |                         | (Left)  | 75    | 89    | -     |      |
|                                                   |                   | Vertical<br>CR >= 10    | (Upper) | 70    | 89    | -     |      |
|                                                   |                   |                         | (Lower) | 70    | 89    | -     |      |
| Color / Chromaticity<br>Coordinates<br>(CIE 1931) | --                | Red x                   |         | 0.624 | 0.654 | 0.684 |      |
|                                                   |                   | Red y                   |         | 0.305 | 0.335 | 0.365 |      |
|                                                   |                   | Green x                 |         | 0.283 | 0.313 | 0.343 |      |
|                                                   |                   | Green y                 |         | 0.613 | 0.643 | 0.673 |      |
|                                                   |                   | Blue x                  |         | 0.126 | 0.156 | 0.186 |      |
|                                                   |                   | Blue y                  |         | 0.015 | 0.045 | 0.075 |      |
|                                                   |                   | White x                 |         | 0.283 | 0.313 | 0.343 |      |
|                                                   |                   | White y                 |         | 0.299 | 0.329 | 0.359 |      |

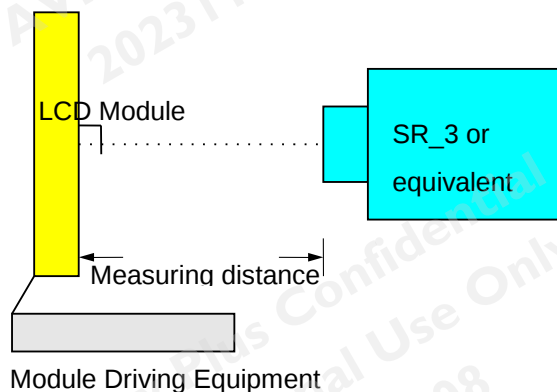
Note 1: Measurement method

Equipment Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR\_3 or equivalent)

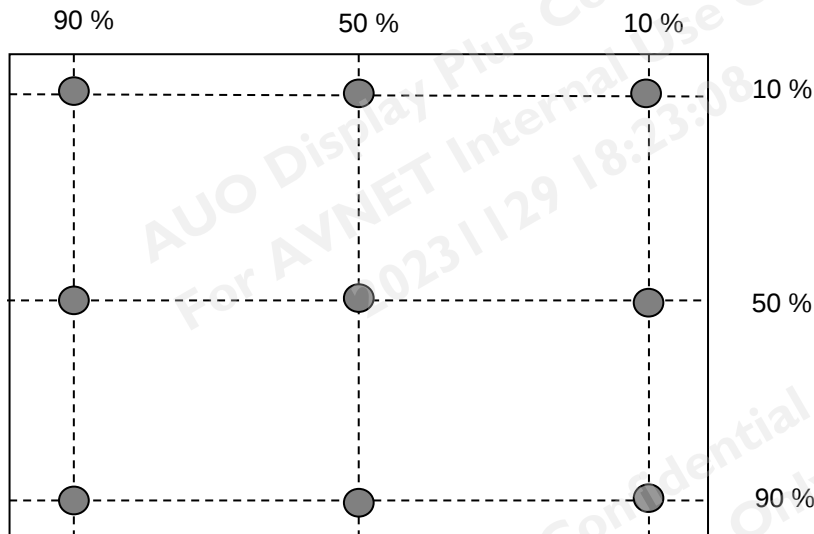
Aperture 1° with 50cm viewing distance

Test Point Center

Environment < 1 lux



Note 2: Definition of 9 points position



Note 3: The luminance uniformity of 9 points is defined by dividing the minimum luminance values by the maximum test point luminance

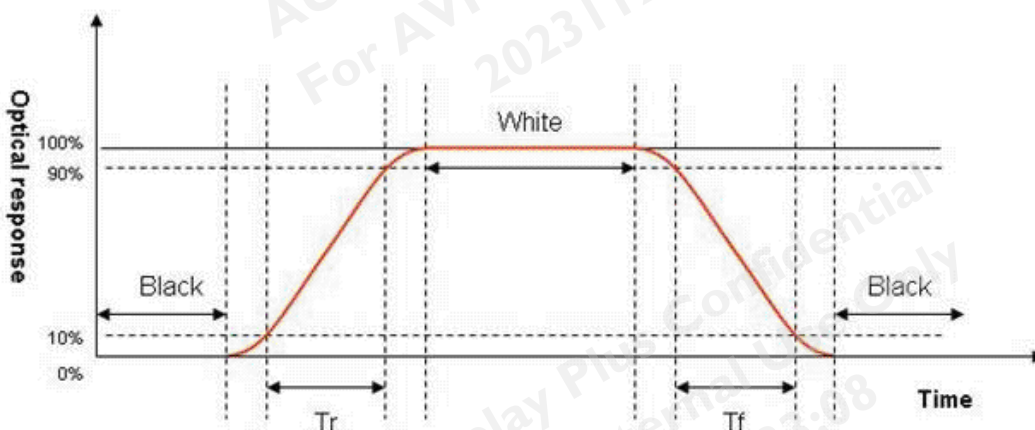
$$\delta_{w9} = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$

Note 4: Definition of contrast ratio (CR):

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

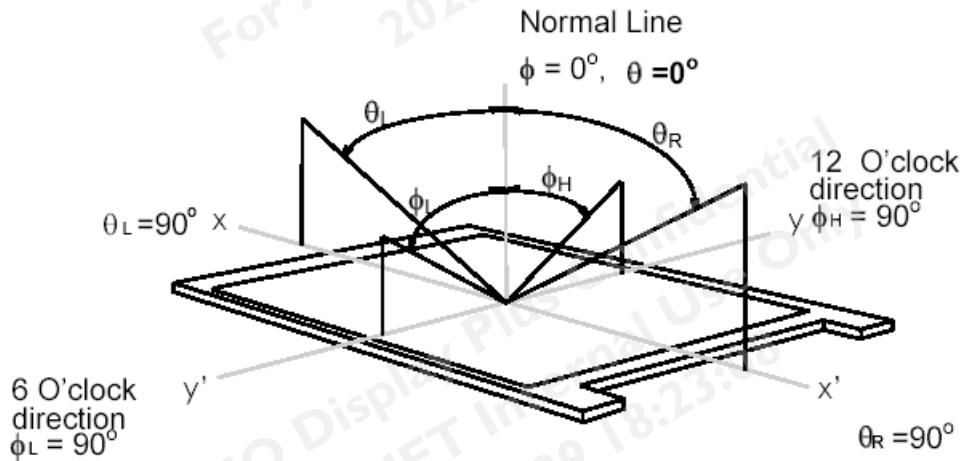
Note 5: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "White" to "Black" (falling time) and from "Black" to "White" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.



Note 6: Definition of viewing angle

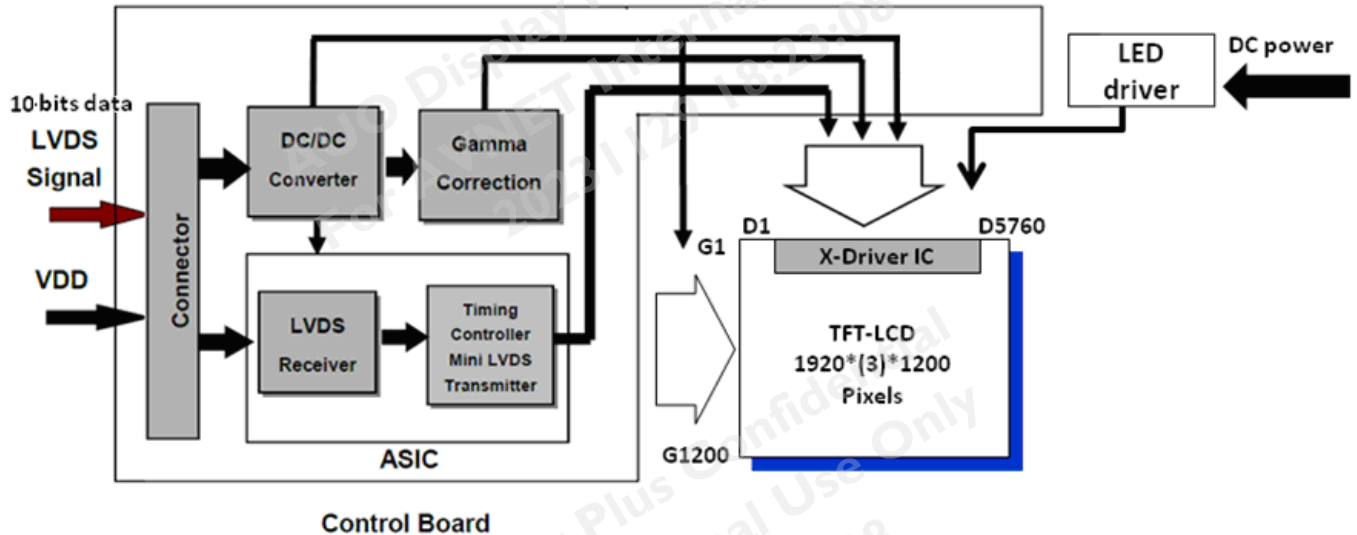
Viewing angle is the measurement of contrast ratio  $\geq 10$ , at the screen center, over a  $180^\circ$  horizontal and  $180^\circ$  vertical range (off-normal viewing angles). The  $180^\circ$  viewing angle range is broken down as below:  $90^\circ$  ( $\theta$ ) horizontal left and right, and  $90^\circ$  ( $\Phi$ ) vertical high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated to its center to develop the desired measurement viewing angle.



AUO Display+

## 3. Functional Block Diagram

The following diagram shows the functional block of the 24 inch color TFT/LCD module:



AUO Display+

## 4. Absolute Maximum Ratings

### 4.1 Absolute Ratings of TFT LCD Module

| Item                    | Symbol | Min. | Max.  | Unit   | Conditions |
|-------------------------|--------|------|-------|--------|------------|
| Logic/LCD Drive Voltage | VDD    | -0.3 | +16.5 | [Volt] | Note 1, 2  |

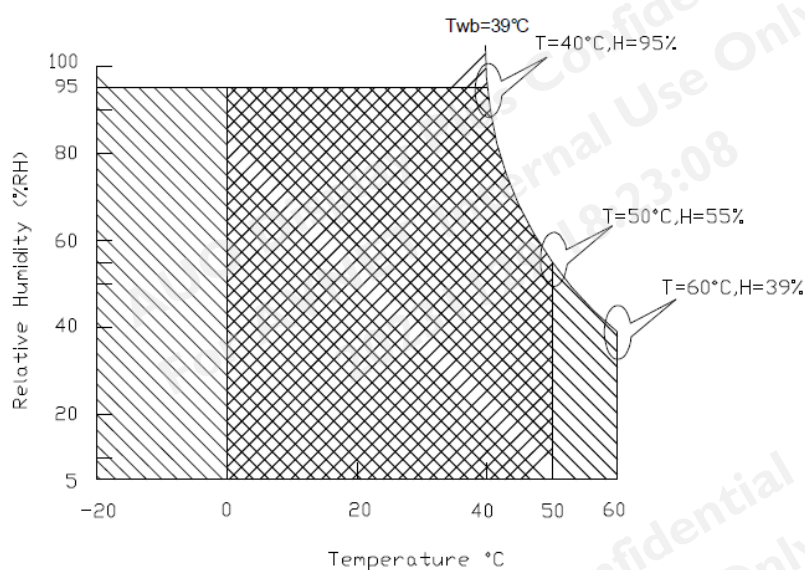
### 4.2 Absolute Ratings of Environment

| Item               | Symbol | Min. | Max. | Unit  | Conditions |
|--------------------|--------|------|------|-------|------------|
| Operating          | TOP    | 0    | +50  | [°C]  | Note       |
| Operation Humidity | HOP    | 5    | 90   | [%RH] |            |
| Storage            | TST    | -20  | +60  | [°C]  |            |
| Storage Humidity   | HST    | 5    | 90   | [%RH] |            |

Note 1: With in Ta= 25°C

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to AUO IIS (Incoming Inspection Standard).



Operating Range

Storage Range

AUO Display+

## 5. Electrical Characteristics

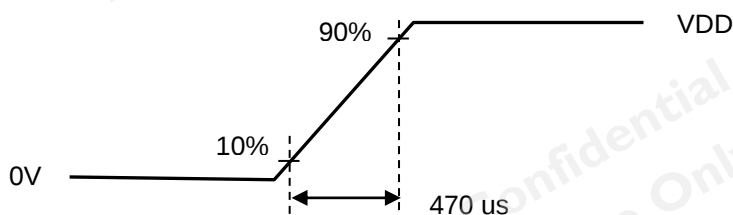
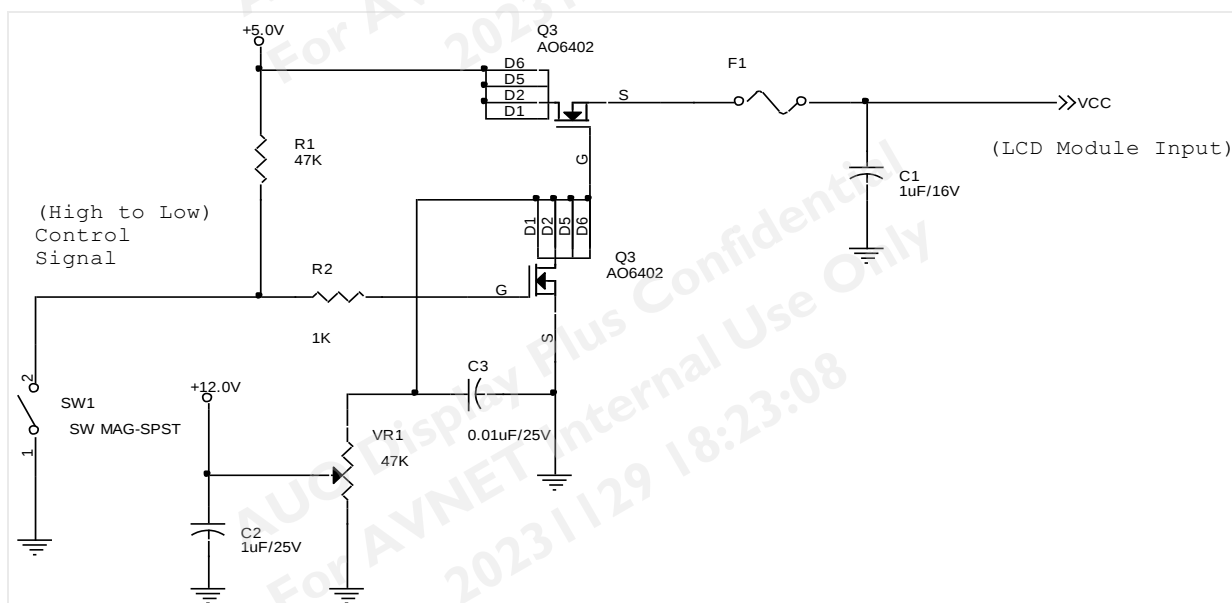
### 5.1 TFT LCD Module

#### 5.1.1 Power Specification

Input power specifications are shown as follows;

| Symbol | Parameter                                | Min  | Typ  | Max  | Units       | Remark                          |
|--------|------------------------------------------|------|------|------|-------------|---------------------------------|
| VDD    | Logic/LCD Drive Voltage                  | 10.8 | 12.0 | 13.2 | [Volt]      | ± 10%                           |
| IDD    | VDD Current                              | -    | 0.4  | 0.6  | [A]         | Vin=12V, White Pattern, at 60Hz |
| Irush  | LCD Inrush Current                       | -    | 2.7  | 3.4  | [A]         | Note 1                          |
| PDD    | VDD Power                                | -    | 4.8  | 7.2  | [Watt]      | Vin=12V, White Pattern, at 60Hz |
| VDDrp  | Allowable Logic/LCD Drive Ripple Voltage | -    | -    | 300  | [mV]<br>p-p | With panel loading              |

Note 1: Measurement condition:



VDD rising time

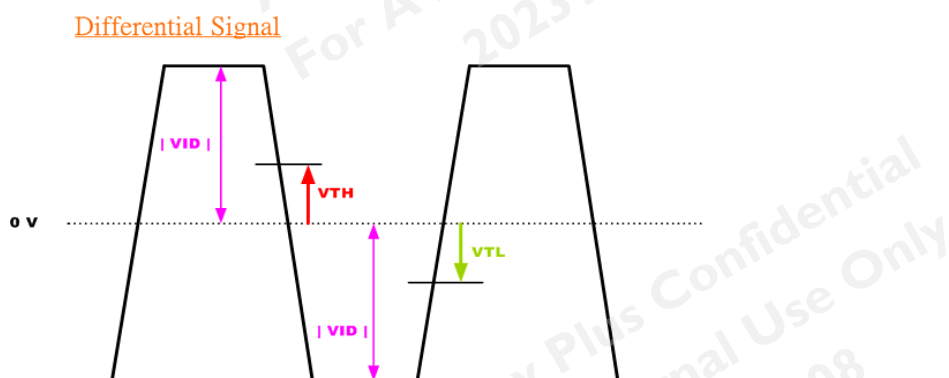
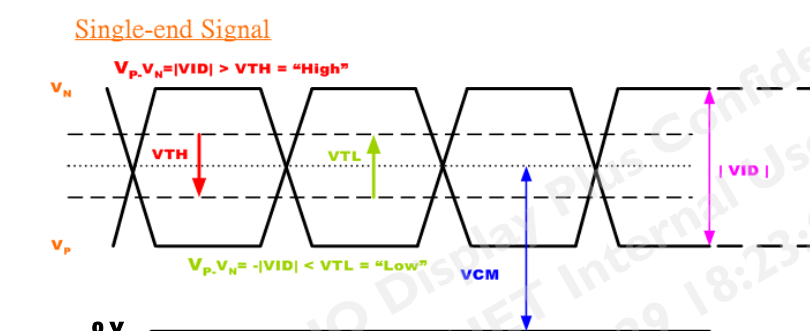
## AUO Display+

### 5.1.2 LVDS DC Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

| Symbol    | Item                                   | Min. | Typ. | Max. | Unit | Remark                  |
|-----------|----------------------------------------|------|------|------|------|-------------------------|
| $V_{TH}$  | Differential Input High Threshold      | -    | -    | +100 | [mV] | $V_{CM}=1.2V$           |
| $V_{TL}$  | Differential Input Low Threshold       | -100 | -    | -    | [mV] | $V_{CM}=1.2V$           |
| $ VID $   | Input Differential Voltage             | 100  | -    | 600  | [mV] |                         |
| $V_{ICM}$ | Differential Input Common Mode Voltage | +1.0 | +1.2 | +1.5 | [V]  | $V_{TH}/V_{TL}=+-200mV$ |

Note: LVDS Signal Waveform.



## 5.2 Backlight Unit

### 5.2.1 LED Backlight Unit : Driver Connector

|           |              |                      |
|-----------|--------------|----------------------|
| Backlight | manufacturer | JST                  |
|           | part number  | S14B-PH-SM6-K-TB(HF) |
| Mating    | manufacturer | JST                  |
|           | part number  | PHR-14               |

| Pin # | Symbol  | Pin Description                   |
|-------|---------|-----------------------------------|
| 1     | VDD     | Power +24V                        |
| 2     | VDD     | Power +24V                        |
| 3     | VDD     | Power +24V                        |
| 4     | VDD     | Power +24V                        |
| 5     | VDD     | Power +24V                        |
| 6     | GND     | GND                               |
| 7     | GND     | GND                               |
| 8     | GND     | GND                               |
| 9     | GND     | GND                               |
| 10    | GND     | GND                               |
| 11    | NC      | Do not connect                    |
| 12    | EN      | Enable(0V:disable, 2.5~5V:Enable) |
| 13    | Dimming | PWM; duty 10%~ 100%               |
| 14    | NC      | Do not connect                    |

## 5.2.2 Parameter guideline for LED

Following characteristics are measured under a stable condition using an inverter at 25°C (Room Temperature):

### LED characteristics

| Symbol | Parameter             | Min    | Typ   | Max   | Units | Condition                                         |
|--------|-----------------------|--------|-------|-------|-------|---------------------------------------------------|
| PLED   | LED Power Consumption | -      | 16.93 | 18.56 | Watt  | IF =65 mA, Ta = 25°C<br>LBx2 : 16.93x2=33.86(typ) |
| LTLED  | LED Lifetime          | 50,000 |       |       | Hrs   | IF=65 mA, Ta= 25°C                                |

Note 1: Calculator value for reference PLED = VF (Normal Distribution) \* IF (Normal Distribution) / Efficiency

Note 2: The LED life-time define as the estimated time to 50% degradation of initial luminous.

### Backlight input signal characteristics

| Symbol                | Parameter           | Min. | Typ.  | Max.  | Unit   | Remark                           |
|-----------------------|---------------------|------|-------|-------|--------|----------------------------------|
| VDD                   | Input Voltage       | 22.8 | 24.0  | 25.2  | [Volt] | ±5%                              |
| I <sub>VDD</sub>      | Input Current       |      | 1.66  | 1.82  | [A]    | 100% PWM Duty                    |
| P <sub>VDD</sub>      | Power Consumption   |      | 39.83 | 43.68 | [Watt] | 100% PWM Duty                    |
| I <sub>rush LED</sub> | Inrush Current      | -    | -     | 6     | [A]    | at rising time=470us             |
| F <sub>PWM</sub>      | Dimming Frequency   | 0.1  | 0.2   | 20    | [kHz]  |                                  |
|                       | Swing Voltage       | 3    | 3.3   | 5     | V      |                                  |
|                       | Dimming Duty        | 5    | -     | 100   | %      | 200Hz~5KHz                       |
|                       | Dimming Duty        | 15   | -     | 100   | %      | 5KHz~20KHz                       |
| I <sub>F</sub>        | LED Forward Current |      | 65    |       | mA     | Ta = 25°C                        |
| V <sub>IF</sub>       | LED Forward Voltage | -    | -     | -     | Volt   |                                  |
|                       |                     | -    | 37.2  | 40.8  | Volt   | I <sub>F</sub> =65 mA, Ta = 25°C |
|                       |                     | -    | -     | -     |        |                                  |

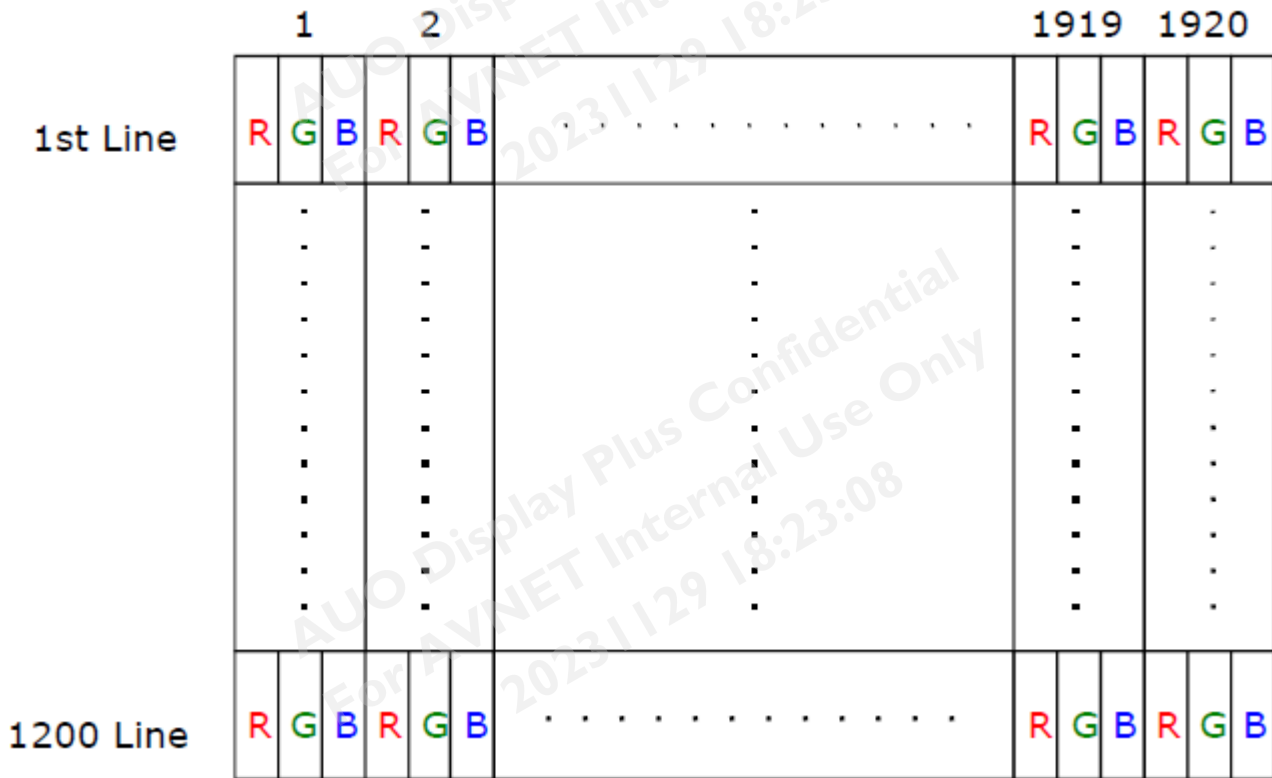
Note1: Measured on panel VLED

AUO Display+

## 6. Signal Characteristic

### 6.1 Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.



### 6.2 Scanning Direction

The following figures show the image seen from the front view. The arrow indicates the direction of scan.



## 6.3 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device. The first LVDS port(RxOxxx) transmits odd pixels while the second LVDS port(RxExxx) transmits even pixels.

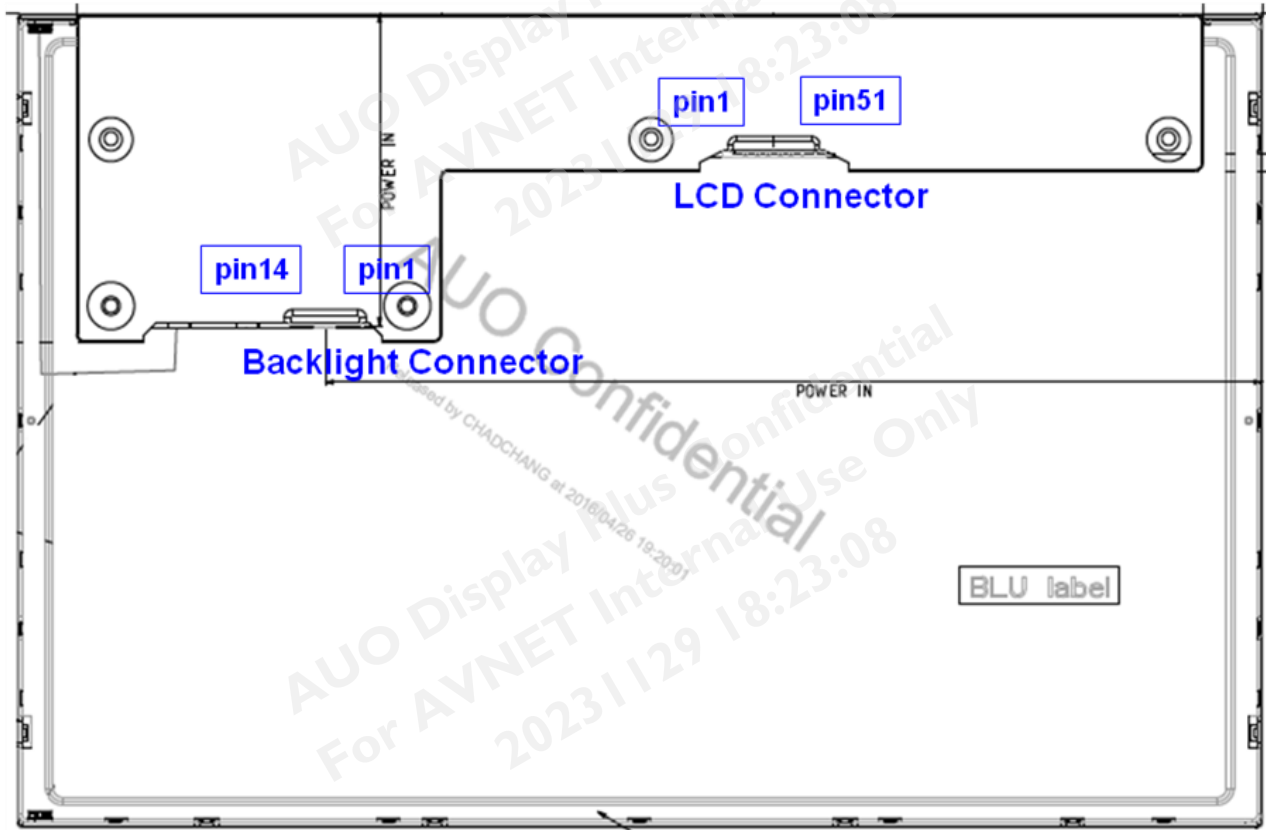
### 6.3.1 TFT LCD Module: LVDS Connector

|        |              |                   |
|--------|--------------|-------------------|
| LCD    | manufacturer | JAE               |
|        | part number  | FI-RE51S-HF-R1500 |
| Mating | manufacturer | JAE               |
|        | part number  | FI-RE51HL         |

| PIN # | Symbol | PIN # | Symbol |
|-------|--------|-------|--------|
| 1     | GND    | 27    | GND    |
| 2     | NC     | 28    | RE0N   |
| 3     | NC     | 29    | RE0P   |
| 4     | NC     | 30    | RE1N   |
| 5     | NC     | 31    | RE1P   |
| 6     | NC     | 32    | RE2N   |
| 7     | GND    | 33    | RE2P   |
| 8     | GND    | 34    | GND    |
| 9     | NC     | 35    | RECLKN |
| 10    | GND    | 36    | RECLKP |
| 11    | GND    | 37    | GND    |
| 12    | RO0N   | 38    | RE3N   |
| 13    | RO0P   | 39    | RE3P   |
| 14    | RO1N   | 40    | RE4N   |
| 15    | RO1P   | 41    | RE4P   |
| 16    | RO2N   | 42    | GND    |
| 17    | RO2P   | 43    | GND    |
| 18    | GND    | 44    | GND    |
| 19    | ROCLKN | 45    | GND    |
| 20    | ROCLKP | 46    | NC     |
| 21    | GND    | 47    | NC     |
| 22    | RO3N   | 48    | VDD    |
| 23    | RO3P   | 49    | VDD    |
| 24    | RO4N   | 50    | VDD    |

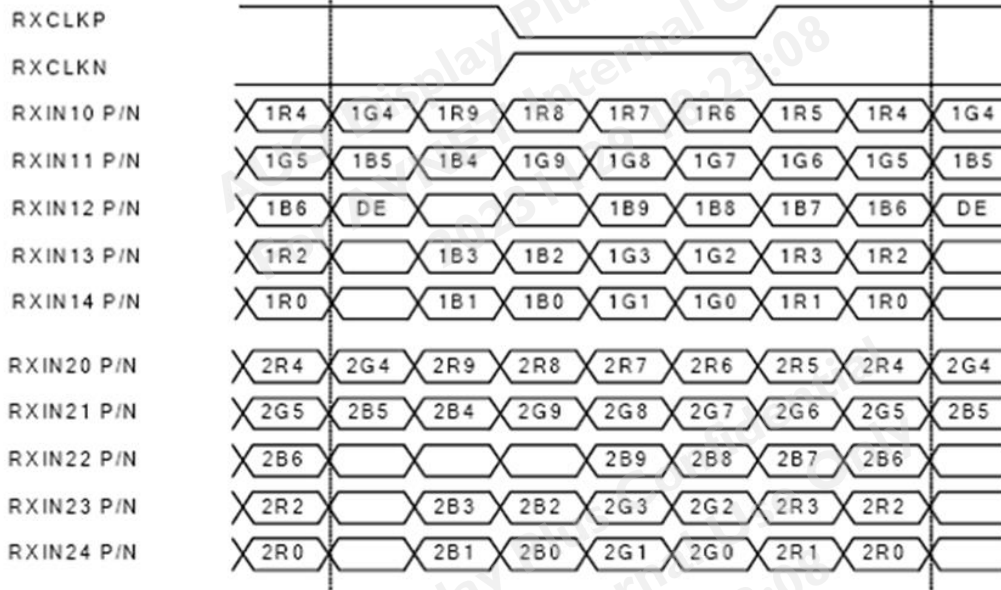
## AUO Display+

|    |      |    |     |
|----|------|----|-----|
| 25 | RO4P | 51 | VDD |
| 26 | GND  |    |     |



## 6.4 The Input Data Format

Data Mapping of JEIDA Format



| 10 BIT<br>COLOR<br>BIT ORDER |    |
|------------------------------|----|
| MSB                          | R9 |
|                              | R8 |
|                              | R7 |
|                              | R6 |
|                              | R5 |
|                              | R4 |
|                              | R3 |
|                              | R2 |
|                              | R1 |
| LSB                          | R0 |

## 6.5 Interface Timing

### 6.5.1 Timing Characteristics

| Signal             |          | Symbol                | Min. | Typ. | Max. | Unit               |
|--------------------|----------|-----------------------|------|------|------|--------------------|
| Clock Frequency    |          | 1/ T <sub>Clock</sub> | 61   | 77   | 85   | MHz                |
| Vertical Section   | Period   | T <sub>V</sub>        | 1214 | 1235 | 1734 | T <sub>Line</sub>  |
|                    | Active   | T <sub>VD</sub>       | 1200 | 1200 | 1200 |                    |
|                    | Blanking | T <sub>VB</sub>       | 14   | 35   | 534  |                    |
| Horizontal Section | Period   | T <sub>H</sub>        | 1016 | 1040 | 1428 | T <sub>Clock</sub> |
|                    | Active   | T <sub>HD</sub>       | 960  | 960  | 960  |                    |
|                    | Blanking | T <sub>HB</sub>       | 56   | 80   | 468  |                    |
| Frame Rate         |          | F                     | 49   | 60   | 66   | Hz                 |

Note : DE mode only

**Note 6-1:** The equation is listed as following. Please don't exceed the above recommended value.

$$F_h (\text{Min.}) = F_{clk} (\text{Min.}) / T_h (\text{Min.});$$

$$F_h (\text{Typ.}) = F_{clk} (\text{Typ.}) / T_h (\text{Typ.});$$

$$F_h (\text{Max.}) = F_{clk} (\text{Max.}) / T_h (\text{Min.});$$

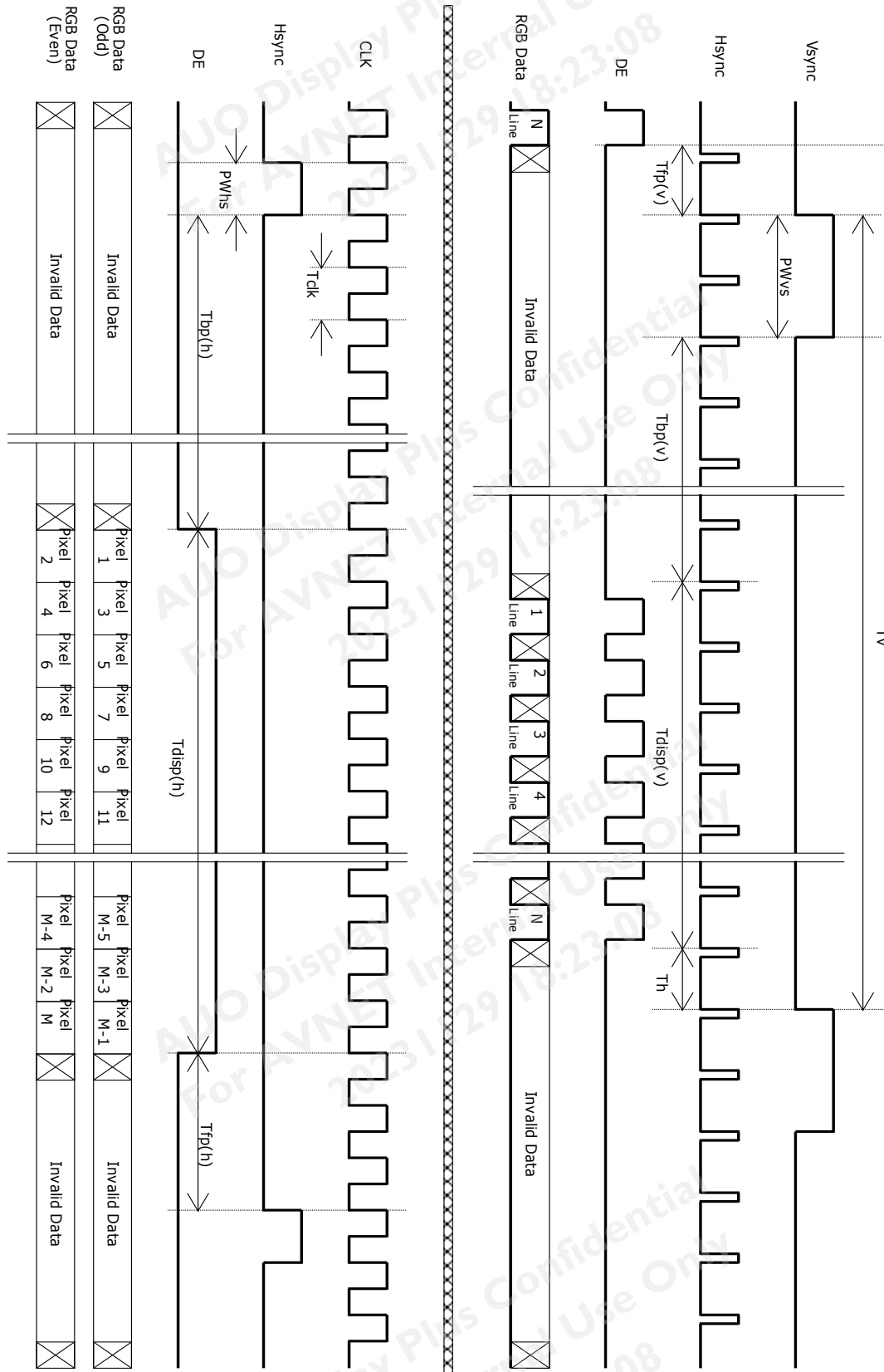
**Note 6-2:** The equation is listed as following. Please don't exceed the above recommended value.

$$F_{clk} (\text{Min.}) = F_v (\text{Min.}) \times T_h (\text{Min.}) \times T_v (\text{Min.});$$

$$F_{clk} (\text{Typ.}) = F_v (\text{Typ.}) \times T_h (\text{Typ.}) \times T_v (\text{Typ.});$$

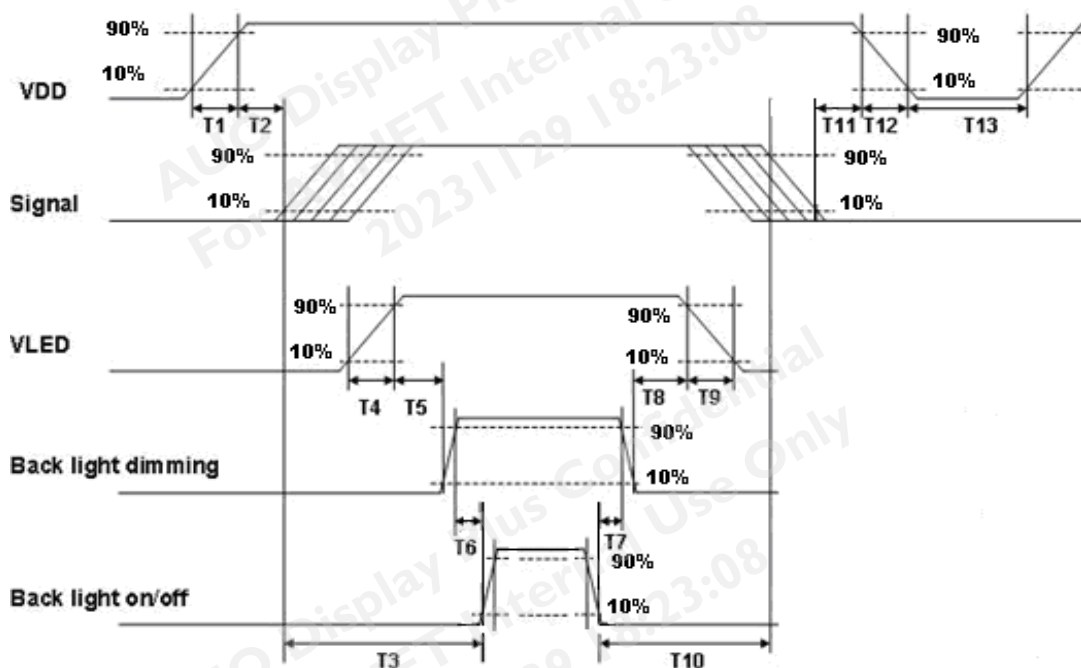
$$F_{clk} (\text{Max.}) = F_v (\text{Max.}) \times T_h (\text{Typ.}) \times T_v (\text{Typ.})$$

## 6.5.2 Input Timing Diagram



## 6.6 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

| Parameter | Value |      |      | Units |
|-----------|-------|------|------|-------|
|           | Min.  | Typ. | Max. |       |
| T1        | 0.5   | -    | 10   | [ms]  |
| T2        | 30    | 40   | 50   | [ms]  |
| T3        | 200   | -    | --   | [ms]  |
| T4        | 0.5   | -    | 10   | [ms]  |
| T5        | 10    | -    | -    | [ms]  |
| T6        | 10    | -    | -    | [ms]  |
| T7        | 0     | -    | -    | [ms]  |
| T8        | 10    | -    | -    | [ms]  |
| T9        | -     | -    | 10   | [ms]  |
| T10       | 110   | -    | -    | [ms]  |
| T11       | 0     | 16   | 50   | [ms]  |
| T12       | 0     |      | 10   | [ms]  |
| T13       | 1000  | -    | -    | [ms]  |

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

## 7. Reliability Test Criteria

| Items                             | Required Condition                                                                                            | Note |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------|------|
| Temperature Humidity Bias (THB)   | Ta= 50°C, 80%RH, 300hours                                                                                     |      |
| High Temperature Operation (HTO)  | Ta= 50°C, 300hours                                                                                            |      |
| Low Temperature Operation (LTO)   | Ta= 0°C, 300hours                                                                                             |      |
| High Temperature Storage (HTS)    | Ta= 60°C, 300hours                                                                                            |      |
| Low Temperature Storage (LTS)     | Ta= -20°C, 300hours                                                                                           |      |
| Vibration Test<br>(Non-operation) | Acceleration: 1.5 G<br>Wave: Random<br>Frequency: 10 - 200 Hz<br>Sweep: 30 Minutes each Axis (X, Y, Z)        |      |
| Shock Test<br>(Non-operation)     | Acceleration: 50 G<br>Wave: Half-sine<br>Active Time: 20 ms<br>Direction: ±X, ±Y, ±Z (one time for each Axis) |      |
| Drop Test                         | Height: 60 cm, package test                                                                                   |      |
| Thermal Shock Test (TST)          | -20 °C /30min, 60/ °C 30min, 100 cycles                                                                       | 1    |
| On/Off Test                       | On/10sec, Off/10sec, 30,000 cycles                                                                            |      |
| ESD (Electrostatic Discharge)     | Contact Discharge: ± 8KV, 150pF(330Ω ) 1sec,<br>9 points, 25 times/ point.                                    | 2    |
|                                   | Air Discharge: ± 15KV, 150pF(330Ω ) 1sec<br>9 points, 25 times/ point.                                        |      |
| Altitude Test                     | Operation:10,000 ft<br>Non-Operation:30,000 ft                                                                |      |

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20°C to 50°C, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

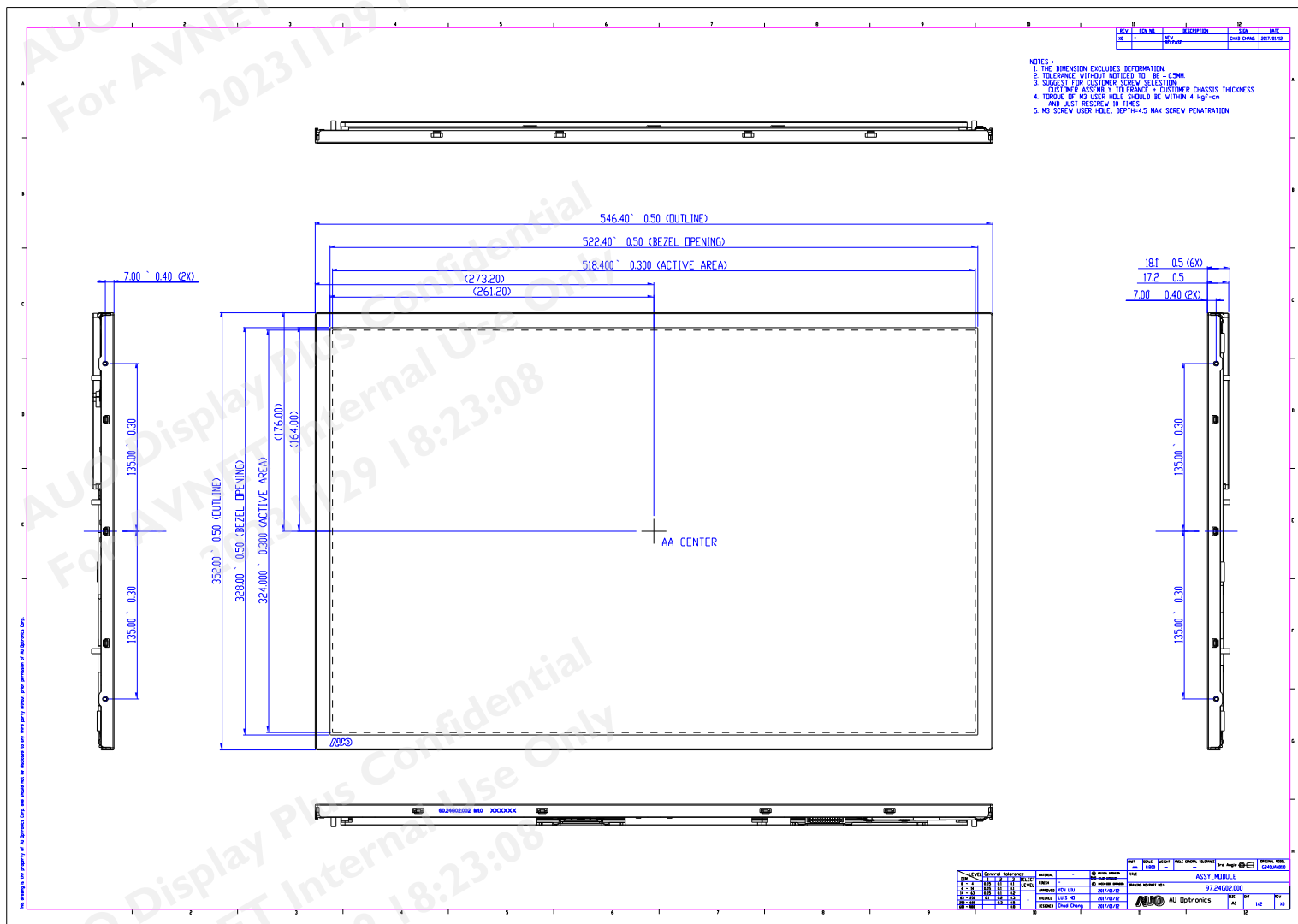
Note 3:

- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.
- No function failure occurs.



## G240UAN01.0

## 8.1 LCM Outline Dimension





AUO Display+

## 9. Label and Packaging

### 9.1 Shipping Label (on the rear side of TFT-LCD display)



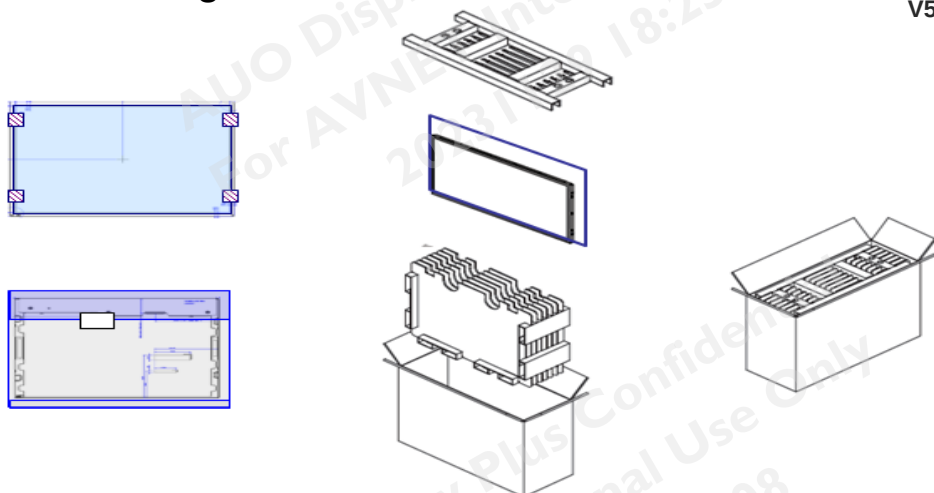
Note 1: For Pb Free products, AUO will add  for identification.

Note 2: For RoHS compatible products, AUO will add  for identification.

Note 3: For China RoHS compatible products, AUO will add  for identification.

Note 4: The Green Mark will be presented only when the green documents have been ready by AUO Internal Green Team.

### 9.2 Carton Package



Max capacity : 6 PCS TFT-LCD module per carton

Max weight: 17.3 kg per carton

Outside dimension of carton: 630mm(L)\* 245mm(W)\*450mm(H)

Pallet size : 1060 mm \* 760 mm \* 132mm

Box stacked

Module by air\_Max : (1 \*4) \*3 layers , one pallet put 12 boxes , total 72pcs module

Module by sea\_Max : (1\*4) \*3 layers + (1 \*4) \*1 layers , two pallet put 16 boxes , total 96pcs module

Module by sea\_HQ\_Max : (1\*4) \*3 layers+(1\*4) \*1 layers, two pallet put 16 boxes, total 96pcs module

## 10 Safety

### 10.1 Sharp Edge Requirements

There will be no sharp edges or corners on the display assembly that could cause injury.

### 10.2 Materials

#### 10.2.1 Toxicity

There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible AUO toxicologist.

#### 10.2.2 Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process.

The printed circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board.

### 10.3 Capacitors

If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

### 10.4 National Test Lab Requirement

The display module will satisfy all requirements for compliance to:

UL 60950-1 second edition

U.S.A. Information Technology Equipment