



(i) Preliminary Specifications

(v) Final Specifications

|            |                         |
|------------|-------------------------|
| Module     | 10.1 Inch Color TFT-LCD |
| Model Name | G101EAN02.5             |

|                                  |             |                                                            |                   |
|----------------------------------|-------------|------------------------------------------------------------|-------------------|
| <b>Customer</b>                  | <b>Date</b> | <b>Approved by</b>                                         | <b>Date</b>       |
|                                  |             | <u>Grace Hung</u>                                          | <u>2020/10/21</u> |
| <b>Checked &amp; Approved by</b> |             | <b>Prepared by</b>                                         |                   |
|                                  |             | <u>Jon Tseng</u>                                           | <u>2020/10/21</u> |
|                                  |             | General Display Business Unit/<br>AU Optronics corporation |                   |

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## Record of Revision

| Version and Date | Page                                                                                                              | Old description                                                                                                                                                                                                                                                                                                                             | New Description                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------|--------|--------|------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------|-------------------|-----|-----|-----|--------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|-----|-----|-----|------|------------------------------------------|------------------|-------------------|-----|-------|-------|--------|------------------------------------------|
| 0.0 2019/11/13   | All                                                                                                               | First draft specification                                                                                                                                                                                                                                                                                                                   | --                                                          |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| 1.0 2020/10/21   | 4                                                                                                                 | Remove item 17                                                                                                                                                                                                                                                                                                                              | --                                                          |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | 5                                                                                                                 | LED power max TBD W                                                                                                                                                                                                                                                                                                                         | LED power max 2.916 W                                       |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | 5                                                                                                                 | G101EAN02.1 is a Color Active Matrix Liquid Crystal Display                                                                                                                                                                                                                                                                                 | G101EAN02.5 is a Color Active Matrix Liquid Crystal Display |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | 6                                                                                                                 | NTSC 50%                                                                                                                                                                                                                                                                                                                                    | NTSC 45%                                                    |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | 14                                                                                                                | <table><tr><td>I<sub>LED</sub></td><td>Input Current</td><td>---</td><td>188.75</td><td>204.19</td><td>[mA]</td><td>100% Brightness (V<sub>LED</sub> = 12V)</td></tr><tr><td>P<sub>LED</sub></td><td>Power Consumption</td><td>---</td><td>TBD</td><td>TBD</td><td>[Watt]</td><td>100% Brightness (V<sub>LED</sub> = 12V)</td></tr></table> | I <sub>LED</sub>                                            | Input Current | ---    | 188.75 | 204.19                                   | [mA]                                                                                                           | 100% Brightness (V <sub>LED</sub> = 12V) | P <sub>LED</sub> | Power Consumption | --- | TBD | TBD | [Watt] | 100% Brightness (V <sub>LED</sub> = 12V) | <table><tr><td>I<sub>LED</sub></td><td>Input Current</td><td>---</td><td>218</td><td>243</td><td>[mA]</td><td>100% Brightness (V<sub>LED</sub> = 12V)</td></tr><tr><td>P<sub>LED</sub></td><td>Power Consumption</td><td>---</td><td>2.616</td><td>2.916</td><td>[Watt]</td><td>100% Brightness (V<sub>LED</sub> = 12V)</td></tr></table> | I <sub>LED</sub> | Input Current | --- | 218 | 243 | [mA] | 100% Brightness (V <sub>LED</sub> = 12V) | P <sub>LED</sub> | Power Consumption | --- | 2.616 | 2.916 | [Watt] | 100% Brightness (V <sub>LED</sub> = 12V) |
|                  | I <sub>LED</sub>                                                                                                  | Input Current                                                                                                                                                                                                                                                                                                                               | ---                                                         | 188.75        | 204.19 | [mA]   | 100% Brightness (V <sub>LED</sub> = 12V) |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | P <sub>LED</sub>                                                                                                  | Power Consumption                                                                                                                                                                                                                                                                                                                           | ---                                                         | TBD           | TBD    | [Watt] | 100% Brightness (V <sub>LED</sub> = 12V) |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | I <sub>LED</sub>                                                                                                  | Input Current                                                                                                                                                                                                                                                                                                                               | ---                                                         | 218           | 243    | [mA]   | 100% Brightness (V <sub>LED</sub> = 12V) |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  | P <sub>LED</sub>                                                                                                  | Power Consumption                                                                                                                                                                                                                                                                                                                           | ---                                                         | 2.616         | 2.916  | [Watt] | 100% Brightness (V <sub>LED</sub> = 12V) |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| 14               | <table><tr><td>Operation Life</td><td>---</td><td>20,000</td><td>30,000</td><td>---</td><td>Hrs</td></tr></table> | Operation Life                                                                                                                                                                                                                                                                                                                              | ---                                                         | 20,000        | 30,000 | ---    | Hrs                                      | <table><tr><td>Operation Life</td><td>---</td><td>20,000</td><td>---</td><td>---</td><td>Hrs</td></tr></table> | Operation Life                           | ---              | 20,000            | --- | --- | Hrs |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| Operation Life   | ---                                                                                                               | 20,000                                                                                                                                                                                                                                                                                                                                      | 30,000                                                      | ---           | Hrs    |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| Operation Life   | ---                                                                                                               | 20,000                                                                                                                                                                                                                                                                                                                                      | ---                                                         | ---           | Hrs    |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| 14               | Note 3: If G101EAN02.1 module                                                                                     | Note 3: If G101EAN02.5 module                                                                                                                                                                                                                                                                                                               |                                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| 23               | Shipping label G101EAN02.1                                                                                        | Shipping label G101EAN02.5                                                                                                                                                                                                                                                                                                                  |                                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
| 23               | 入库堆栈层数：5层                                                                                                         | Box stacked 5 layers                                                                                                                                                                                                                                                                                                                        |                                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  |                                                                                                                   |                                                                                                                                                                                                                                                                                                                                             |                                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |
|                  |                                                                                                                   |                                                                                                                                                                                                                                                                                                                                             |                                                             |               |        |        |                                          |                                                                                                                |                                          |                  |                   |     |     |     |        |                                          |                                                                                                                                                                                                                                                                                                                                           |                  |               |     |     |     |      |                                          |                  |                   |     |       |       |        |                                          |

## 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

G101EAN02.5 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel and LED backlight system. The screen format is intended to support the 16:10 WXGA, 1200(H) x 800(V) screen and 16.7M colors (RGB 6-bits + Hi-FRC) with LED backlight driving circuit. All input signals are LVDS interface compatible.

### 2.1 Display Characteristics

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

| Items                                                     | Unit         | Specifications                                                          |
|-----------------------------------------------------------|--------------|-------------------------------------------------------------------------|
| Screen Diagonal                                           | [inch]       | 10.1"                                                                   |
| Active Area                                               | [mm]         | 216.96(H) x 135.6(V)                                                    |
| Pixels H x V                                              |              | 1280 x 3(RGB) x 800                                                     |
| Pixel Pitch                                               | [mm]         | 0.1695X 0.1695                                                          |
| Pixel Arrangement                                         |              | R.G.B. Vertical Stripe                                                  |
| Display Mode                                              |              | AHVA, Normally Black                                                    |
| Nominal Input Voltage VDD                                 | [Volt]       | 3.3 (Typical)                                                           |
| Power Consumption                                         | [Watt]       | Logic Power : 1W(Max)@White pattern 3.3V input<br>LED power max 2.916 W |
| Weight (Max.)                                             | [Grams]      | 195                                                                     |
| Physical Size (Max.)                                      | [mm]         | 228.22 x 148.3x 4.8(max)                                                |
| Electrical Interface                                      |              | LVDS 1Port 8bit                                                         |
| Surface Treatment                                         |              | HC                                                                      |
| Support Color                                             |              | 16.7M colors (RGB 6-bit + Hi-FRC)                                       |
| Temperature Range<br>Operating<br>Storage (Non-Operating) | [°C]<br>[°C] | -20 to +60 (Front and rear surface)<br>-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> ] | I <sub>LED</sub> = 25mA<br>(center)  | 360      | 450      | ---        |      |
| Uniformity                                     | %                    | 5 points                             | 70%      |          | ---        |      |
| Contrast Ratio                                 |                      |                                      | 600      | 800      | ---        |      |
| Response Time                                  | [msec]               | Rising + Falling                     | ---      | 29       | 38         |      |
| Viewing Angle                                  | [degree]<br>[degree] | Horizontal (Right)<br>CR = 10 (Left) | 80<br>80 | 89<br>89 | ---<br>--- |      |
|                                                |                      | Vertical (Upper)<br>CR = 10 (Lower)  | 80<br>80 | 89<br>89 | ---<br>--- |      |
|                                                | [degree]<br>[degree] |                                      |          |          |            |      |
|                                                |                      |                                      |          |          |            |      |
| Color / Chromaticity Coordinates<br>(CIE 1931) |                      | Red x                                | 0.532    | 0.582    | 0.632      |      |
|                                                |                      | Red y                                | 0.295    | 0.345    | 0.395      |      |
|                                                |                      | Green x                              | 0.29     | 0.34     | 0.39       |      |
|                                                |                      | Green y                              | 0.522    | 0.572    | 0.622      |      |
|                                                |                      | Blue x                               | 0.112    | 0.162    | 0.212      |      |
|                                                |                      | Blue y                               | 0.077    | 0.127    | 0.177      |      |
|                                                |                      | White x                              | 0.263    | 0.313    | 0.363      |      |
|                                                |                      | White y                              | 0.279    | 0.329    | 0.379      |      |
| Color Gamut                                    | %                    |                                      | ---      | 45       | ---        |      |

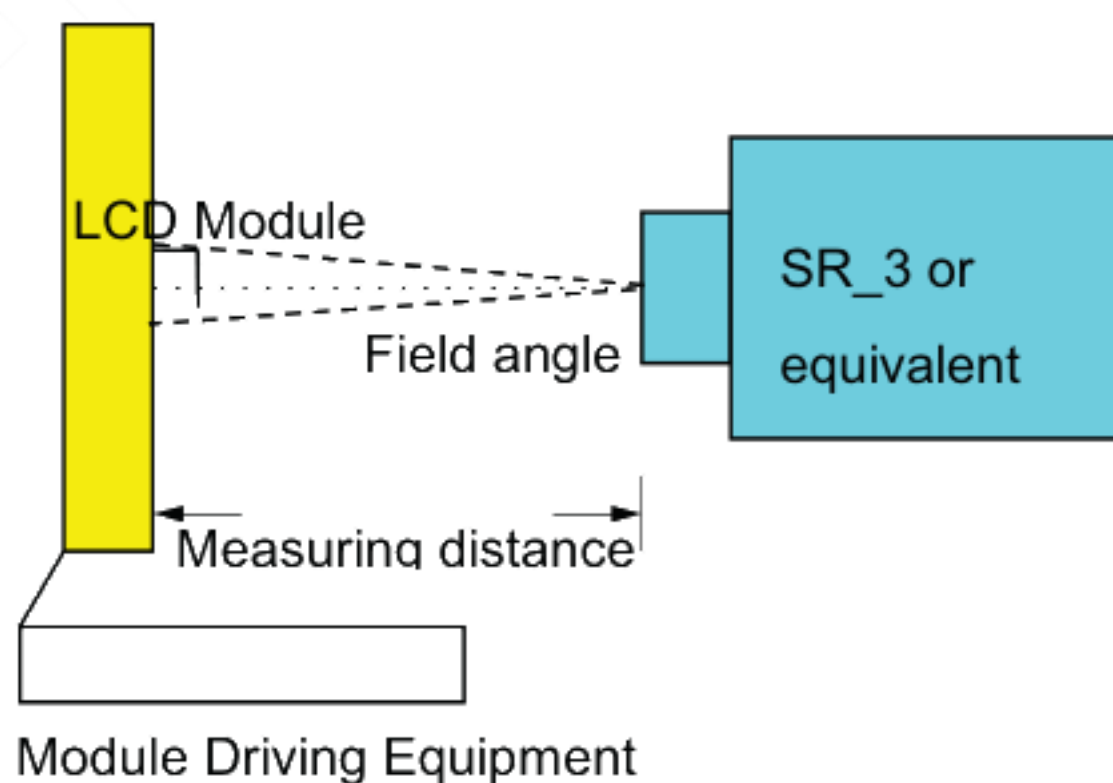
Note 1: Measurement method

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

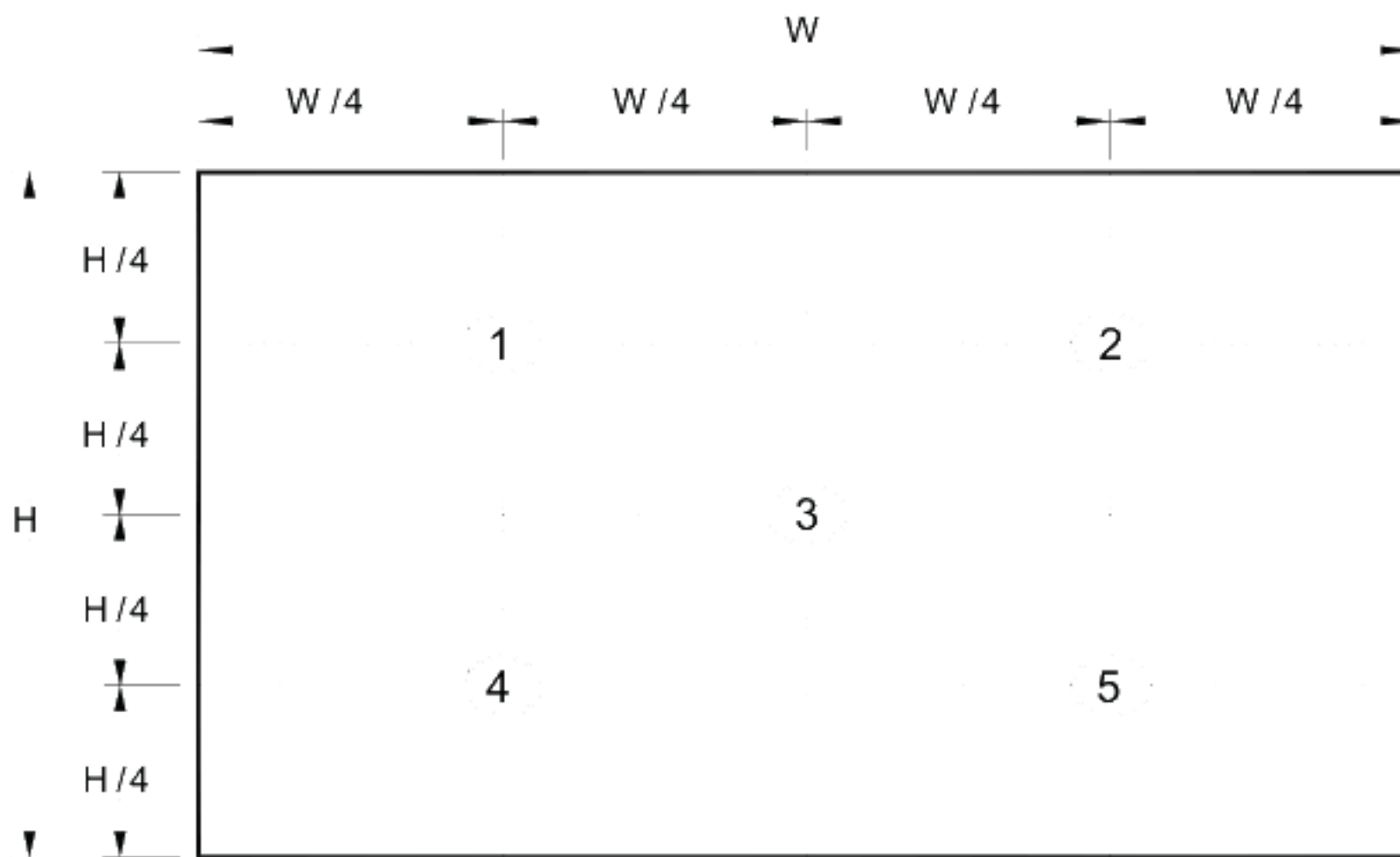
Aperture Field angle 2° with 50cm measuring distance

Test Point Follow Note 2 position

Environment < 1 lux



Note 2: Definition of 5 points position



Note 3: The luminance uniformity of 5 points is defined by dividing the minimum luminance values by the maximum test point luminance

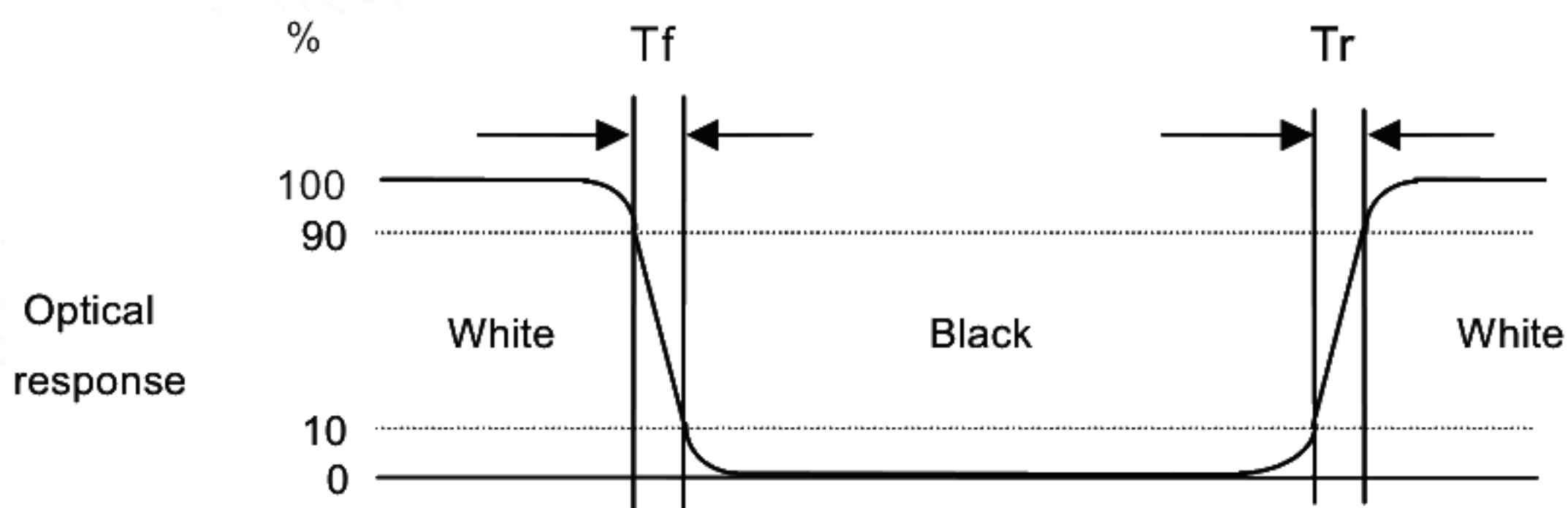
$$\delta_{W5} = \frac{\text{Minimum Brightness of five points}}{\text{Maximum Brightness of five points}}$$

Note 4: Definition of contrast ratio (CR):

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

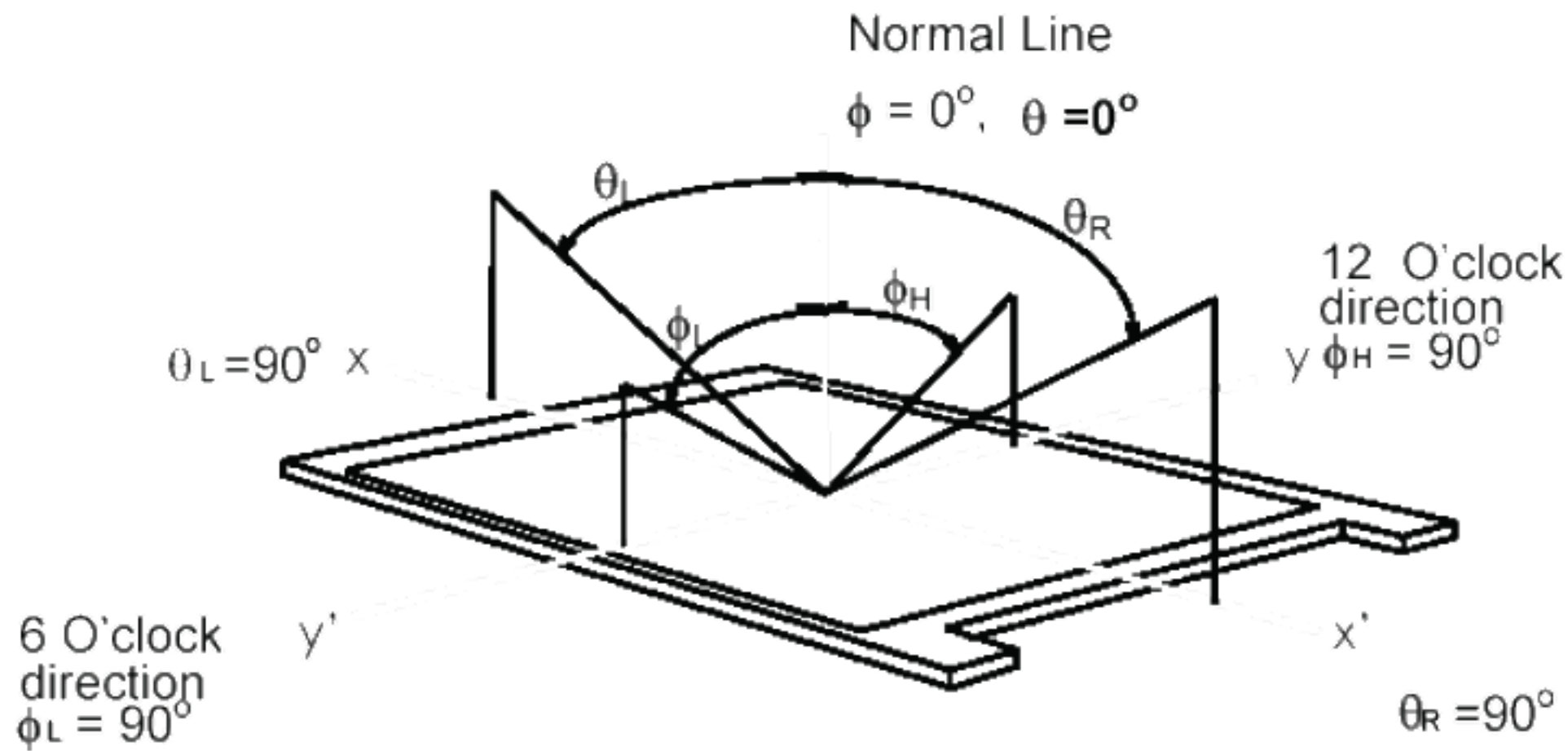
Note 5: Definition of response time:

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.



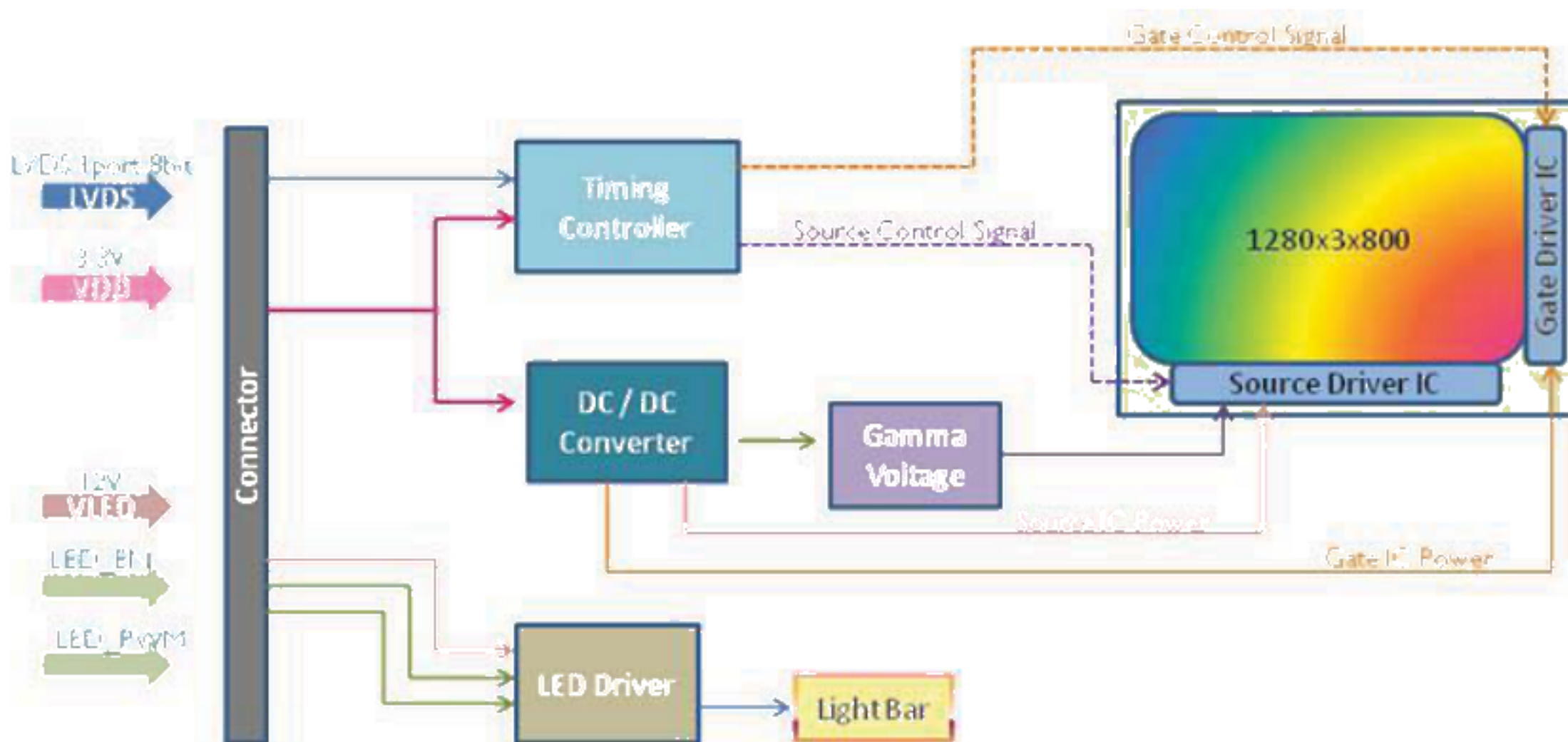
## Note 6: Definition of viewing angle

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.



## 3. Functional Block Diagram

The following diagram shows the functional block of the 10.1 inch color TFT/LCD module:



## 4. Absolute Maximum Ratings

### 4.1 Absolute Ratings of TFT LCD Module

| Item                     | Symbol              | Min  | Max | Unit   |
|--------------------------|---------------------|------|-----|--------|
| Logic/LCD drive Voltage  | VDD                 | -0.3 | 3.6 | [Volt] |
| LCD Input Signal Voltage | V <sub>SIGNAL</sub> | -0.3 | 3.6 | [Volt] |

### 4.2 Absolute Ratings of Environment

| Item                  | Symbol | Min | Max | Unit  |
|-----------------------|--------|-----|-----|-------|
| Operating Temperature | TOP    | -20 | +60 | [°C]  |
| Humidity              | HOP    | 5   | 90  | [%RH] |
| Storage Temperature   | TST    | -20 | +60 | [°C]  |
| Storage Humidity      | HST    | 5   | 90  | [%RH] |

Note 1: At Ta (25°C)

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

Note 3: Maximum wet-bulb temperature is less than 39 oC and no condensation

Note 4: Operating temperature means "Front and rear surface" of panel

## 5. Electrical Characteristics

### 5.1 TFT LCD Module

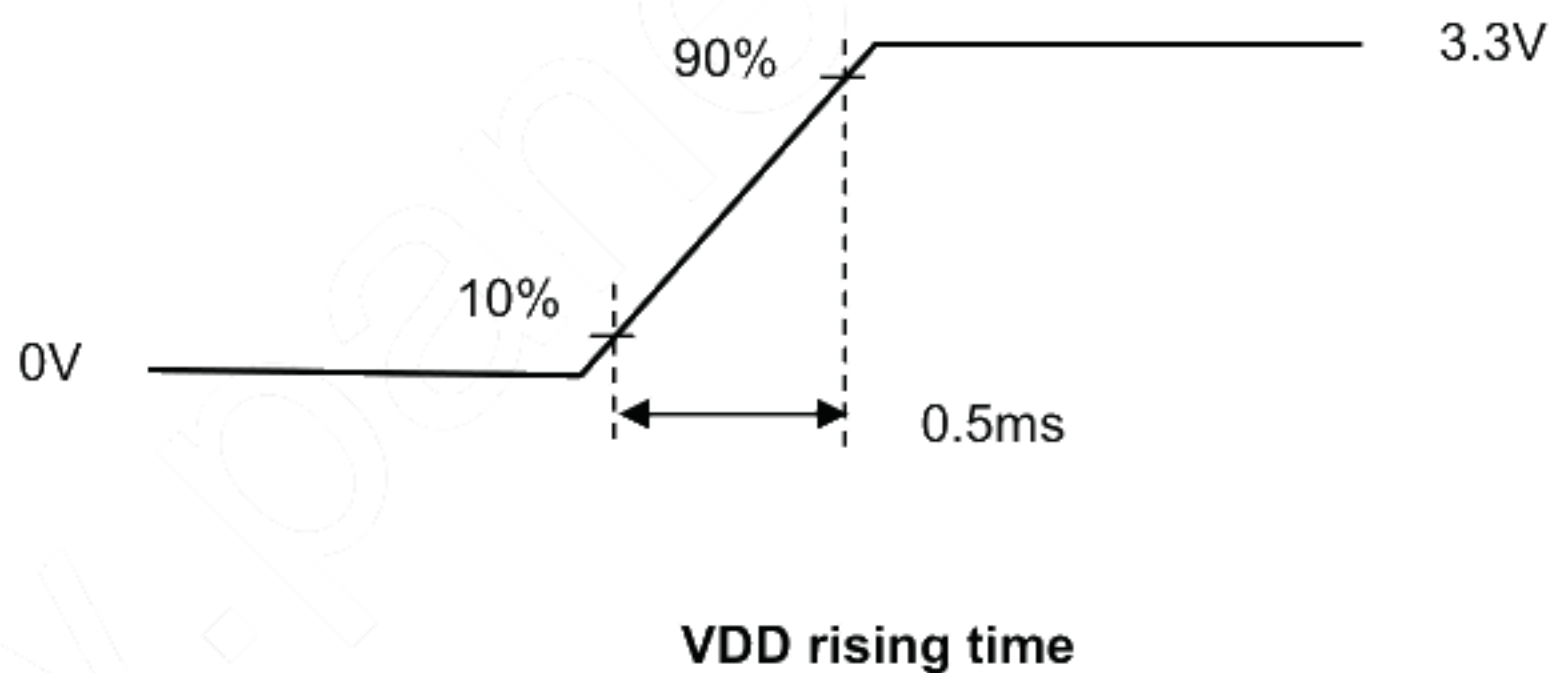
#### 5.1.1 Power Specification

The power specification are measured under 25°C and frame frequency under 60Hz

| Symbol | Parameter                                | Min | Typ   | Max  | Units       | Remark                                  |
|--------|------------------------------------------|-----|-------|------|-------------|-----------------------------------------|
| VDD    | Logic/LCD Drive Voltage                  | 3.0 | 3.3   | 3.6  | [Volt]      |                                         |
| IDD    | VDD Current                              | -   | 278.7 | 303  | [mA]        | All White Pattern (VDD=3.3V, at 59.9Hz) |
| Irush  | LCD Inrush Current                       | -   | -     | 1500 | [mA]        | Note 1                                  |
| PDD    | VDD Power                                | -   | 0.92  | 1    | [Watt]      | All White Pattern (VDD=3.3V, at 59.9Hz) |
| VDDrp  | Allowable Logic/LCD Drive Ripple Voltage | -   | -     | 100  | [mV]<br>p-p | All White Pattern (VDD=3.3V, at 59.9Hz) |

Note 1 : Maximum Measurement Condition : White Pattern at 3.3V driving voltage. ( $P_{max}=V_{3.3} \times I_{white}$ )

Note 2: Measure Condition



## 5.1.2 Signal Electrical Characteristics

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

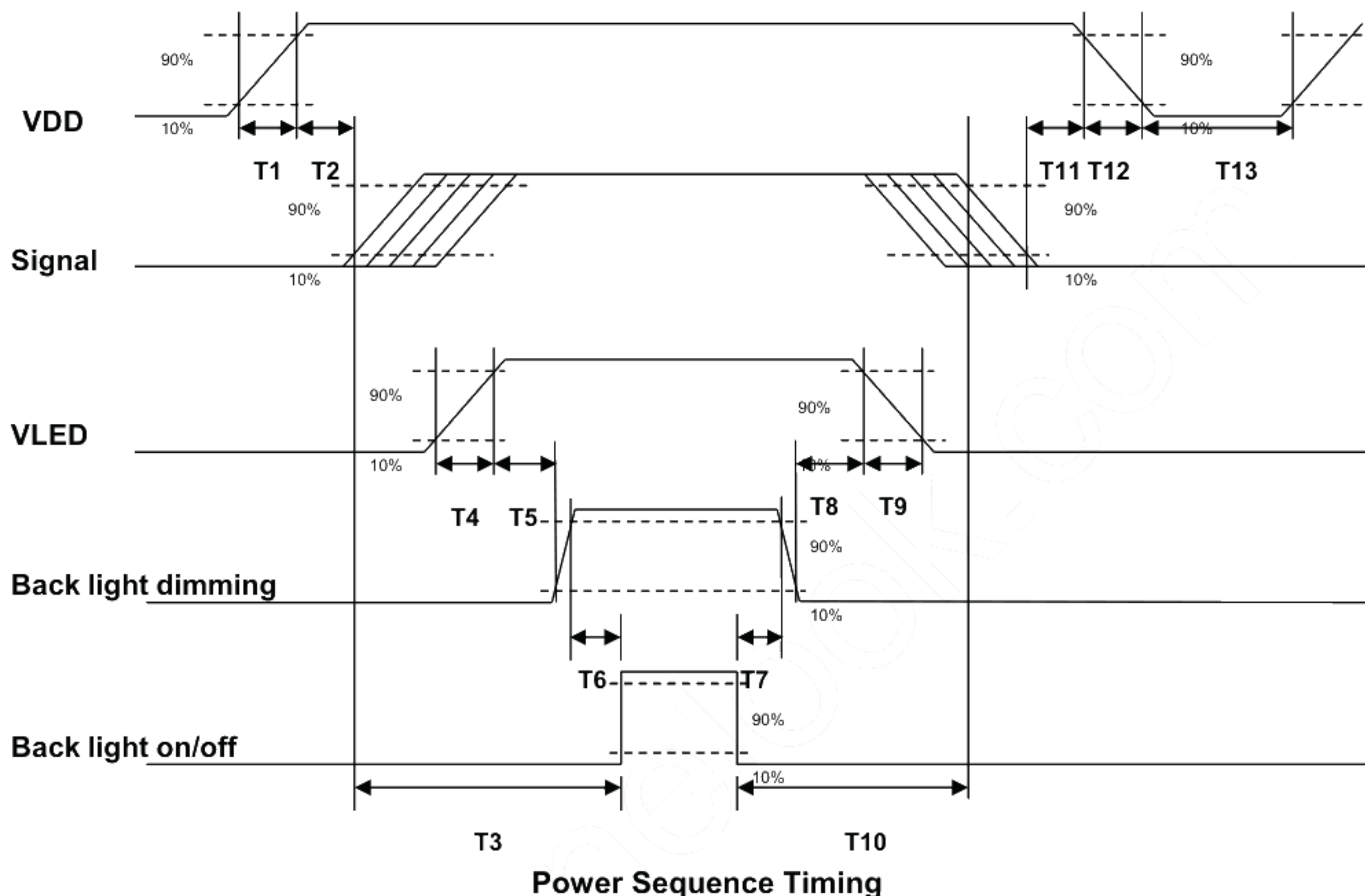
| Symbol | Item                                   | Min. | Typ. | Max. | Unit | Remark         |
|--------|----------------------------------------|------|------|------|------|----------------|
| VTH    | Differential Input High Threshold      | -    | -    | 100  | [mV] | VCM=1.2V       |
| VTL    | Differential Input Low Threshold       | -100 | -    | -    | [mV] | VCM=1.2V       |
| VID    | Input Differential Voltage             | 100  |      | 600  | [mV] |                |
| VICM   | Differential Input Common Mode Voltage | 1.0  | 1.2  | 1.5  | [V]  | VTH/VTl=±100mV |

Note: LVDS Signal Waveform.



## 5.1.3 Power ON/OFF Sequence

VDD power and backlight 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.



| Parameter | Value |      |      | Unit |
|-----------|-------|------|------|------|
|           | Min.  | Typ. | Max. |      |
| T1        | 0.5   | -    | 10   | [ms] |
| T2        | 50    | 60   | 70   | [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       | -     | -    | 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.

## 5.2 Backlight Unit

### 5.2.1 Parameter guideline for LED

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

| Symbol                 | Parameter                      | Min.   | Typ.  | Max.  | Unit   | Remark                          |
|------------------------|--------------------------------|--------|-------|-------|--------|---------------------------------|
| VLED                   | Input Voltage                  | 10.8   | 12    | 13.2  | [Volt] |                                 |
| I <sub>VLED</sub>      | Input Current                  | ---    | 218   | 243   | [mA]   | 100% Brightness<br>(VLED = 12V) |
| P <sub>VLED</sub>      | Power Consumption              | ---    | 2.616 | 2.916 | [Watt] | 100% Brightness<br>(VLED = 12V) |
| I <sub>F</sub>         | LED Forward Current            | ---    | 25    | ---   | [mA]   | Ta = 25°C                       |
| VEN                    | LED Enable Input<br>High Level | 2.3    | -     | 5.5   | [Volt] |                                 |
|                        | LED Enable Input<br>Low Level  | -      | -     | 0.3   | [Volt] |                                 |
| VPWM                   | PWM Logic Input<br>High Level  | 2.3    | -     | 5.5   | [Volt] |                                 |
|                        | PWM Logic Input<br>Low Level   | -      | -     | 0.3   | [Volt] |                                 |
| PWM Input<br>Frequency | FPWM                           | 200    | -     | 20K   | Hz     |                                 |
| PWM Duty<br>Ratio      | Duty                           | 10     |       | 100   | %      |                                 |
| Operation Life         | ---                            | 20,000 | ---   | ---   | Hrs    | (Ta=25°C), Note 2<br>IF=25mA    |

Note 1: Ta means ambient temperature of TFT-LCD module.

Note 2: V<sub>LED</sub>, I<sub>VLED</sub>, P<sub>VLED</sub> are defined for LED backlight.(100% duty of PWM dimming)

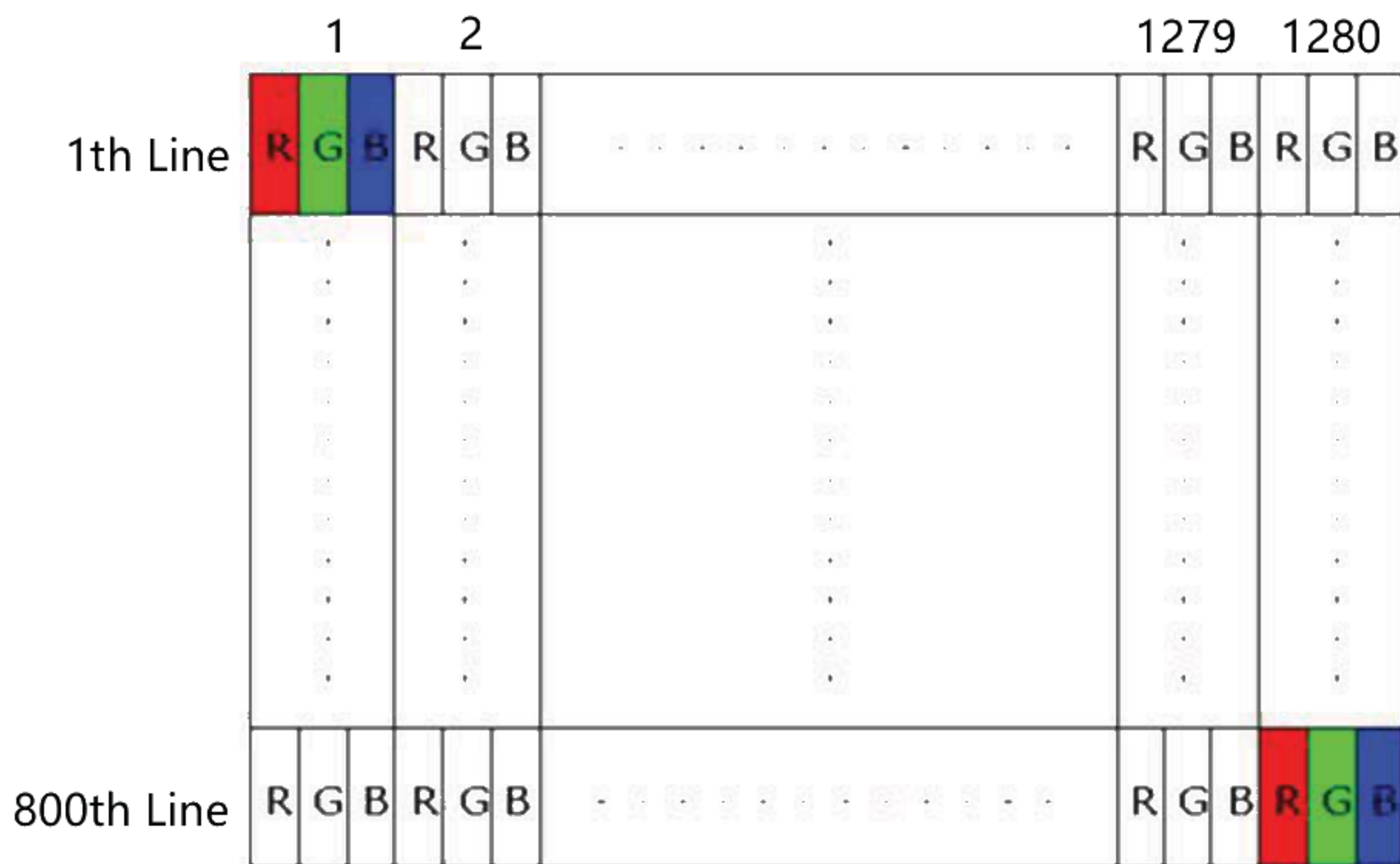
Note 3: If G101EAN02.5 module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

Note 4: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

## 6. Signal Characteristic

### 6.1 Pixel Format Image

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



## 6.2 Signal Description

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



AUO

### 6.2.1 Pin Assignment

LVDS is a differential signal technology for LCD interface and high speed data transfer device.

| PIN NO | Symbol | Function                       |
|--------|--------|--------------------------------|
| 1      | GND    | Ground                         |
| 2      | VDD    | LCD Power Supply +3.3V         |
| 3      | VDD    | LCD Power Supply +3.3V         |
| 4      | VDD    | LCD Power Supply +3.3V         |
| 5      | NC     | AUO Self Test Pin              |
| 6      | NC     | AUO Self Test Pin              |
| 7      | NC     | AUO Self Test Pin              |
| 8      | Rxin0- | -LVDS differential data input  |
| 9      | Rxin0+ | +LVDS differential data input  |
| 10     | GND    | Ground                         |
| 11     | Rxin1- | -LVDS differential data input  |
| 12     | Rxin1+ | +LVDS differential data input  |
| 13     | GND    | Ground                         |
| 14     | Rxin2- | -LVDS differential data input  |
| 15     | Rxin2+ | +LVDS differential data input  |
| 16     | GND    | Ground                         |
| 17     | ClkIN- | -LVDS differential clock input |
| 18     | ClkIN+ | +LVDS differential clock input |
| 19     | GND    | Ground                         |
| 20     | Rxin3- | -LVDS differential data input  |



|    |         |                               |
|----|---------|-------------------------------|
| 21 | Rxin3+  | +LVDS differential data input |
| 22 | GND     | Ground                        |
| 23 | NC      | No connect                    |
| 24 | NC      | No connect                    |
| 25 | GND     | Ground                        |
| 26 | NC      | No connect                    |
| 27 | NC      | No connect                    |
| 28 | GND     | Ground                        |
| 29 | NC      | No connect                    |
| 30 | NC      | No connect                    |
| 31 | BL_GND  | Ground for backlight          |
| 32 | BL_GND  | Ground for backlight          |
| 33 | BL_GND  | Ground for backlight          |
| 34 | NC      | No connect                    |
| 35 | LED_PWM | PWM Dimming                   |
| 36 | LED_EN  | LED ON/OFF                    |
| 37 | NC      | No connect                    |
| 38 | VLED    | LED Power Supply +12V         |
| 39 | VLED    | LED Power Supply +12V         |
| 40 | VLED    | LED Power Supply +12V         |

## 6.2.2 LVDS Connector

| Connector Name / Designation | Signal Connector                  |
|------------------------------|-----------------------------------|
| Manufacturer                 | IPEX or compatible                |
| Connector Model Number       | IPEX 20765-040E-11A or compatible |
| Adaptable Plug               | IPEX 20453-040T-01 or compatible  |

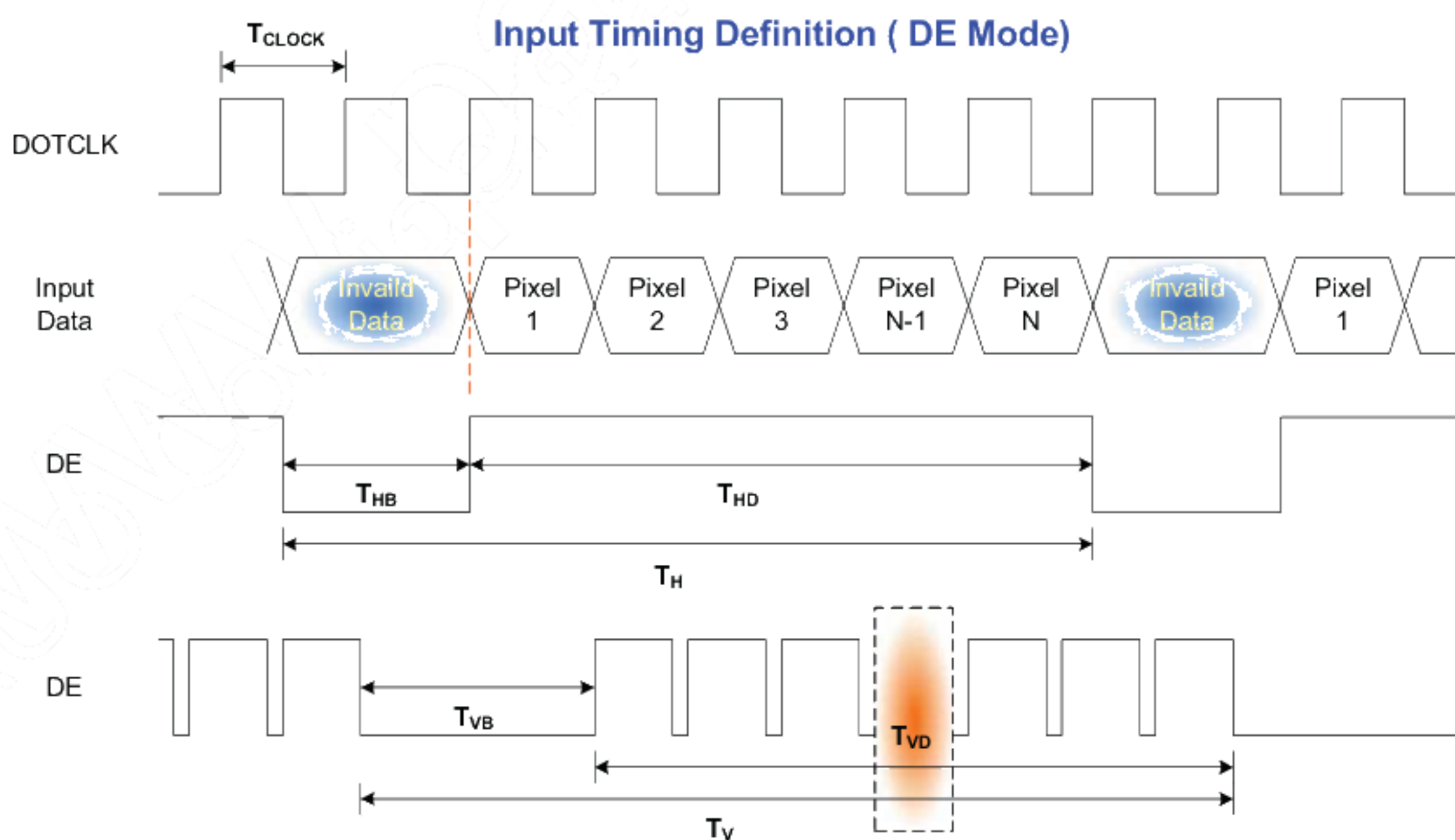
## 6.3 Interface Timing

### 6.3.1 Timing Characteristics

| Signal                |          | Symbol    | Min. | Typ.  | Max. | Unit   |
|-----------------------|----------|-----------|------|-------|------|--------|
| Clock Frequency       |          | 1/ TClock | 68.9 | 71.1  | 74.5 | MHz    |
| Vertical<br>Section   | Period   | TV        | 815  | 823   | 840  | TLine  |
|                       | Active   | TVD       | 800  |       |      |        |
|                       | Blanking | TVB       | 15   | 23    | 40   |        |
| Horizontal<br>Section | Period   | TH        | 1410 | 1440  | 1480 | TClock |
|                       | Active   | THD       | 1280 |       |      |        |
|                       | Blanking | THB       | 130  | 160   | 200  |        |
| Frame Rate            |          | F         | ---  | 59.99 | ---  | Hz     |

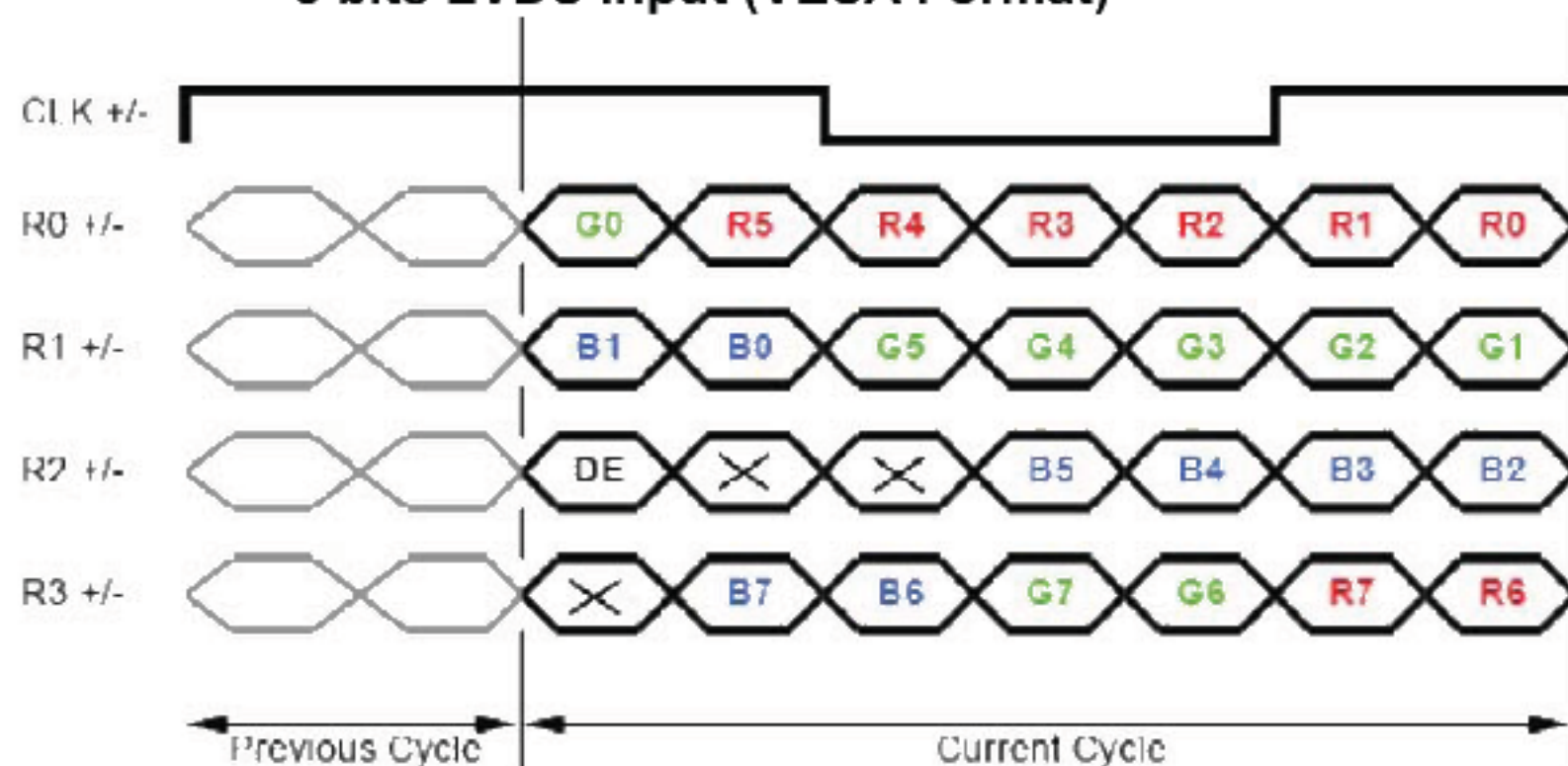
Note : DE mode.

### 6.3.2 Input Timing Diagram



## 6.3.3 The Input Data Format

8 bits LVDS Input (VESA Format)



| Signal Name                                  | Description                                                                                                                              |                                                                                                                                           |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| R7<br>R6<br>R5<br>R4<br>R3<br>R2<br>R1<br>R0 | Red Data 7 (MSB)<br>Red Data 6<br>Red Data 5<br>Red Data 4<br>Red Data 3<br>Red Data 2<br>Red Data 1<br>Red Data 0 (LSB)                 | Red-pixel Data<br><br>For 8Bits LVDS input<br>MSB: R7 ; LSB: R0                                                                           |
| G7<br>G6<br>G5<br>G4<br>G3<br>G2<br>G1<br>G0 | Green Data 7 (MSB)<br>Green Data 6<br>Green Data 5<br>Green Data 4<br>Green Data 3<br>Green Data 2<br>Green Data 1<br>Green Data 0 (LSB) | Green-pixel Data<br><br>For 8Bits LVDS input<br>MSB: R7 ; LSB: R0                                                                         |
| B7<br>B6<br>B5<br>B4<br>B3<br>B2<br>B1<br>B0 | Blue Data 7 (MSB)<br>Blue Data 6<br>Blue Data 5<br>Blue Data 4<br>Blue Data 3<br>Blue Data 2<br>Blue Data 1<br>Blue Data 0 (LSB)         | Blue-pixel Data<br><br>For 8Bits LVDS input<br>MSB: R7 ; LSB: R0                                                                          |
| RxCLKIN                                      | Data Clock                                                                                                                               | The signal is used to strobe the pixel data and DE signals. All pixel data shall be valid at the falling edge when the DE signal is high. |
| DE                                           | Display Timing                                                                                                                           | This signal is strobed at the falling edge of RxCLKIN. When the signal is high, the pixel data shall be valid to be displayed.            |

Note: Output signals from any system shall be low or High-impedance state when VDD is off.

## 7. Reliability Test Criteria

| Items                      | Required Condition                                                       | Note   |
|----------------------------|--------------------------------------------------------------------------|--------|
| Temperature Humidity Bias  | 40 °C /90%,300Hr                                                         |        |
| High Temperature Operation | 60 °C, 300Hr (center point of panel surface)                             |        |
| Low Temperature Operation  | -20 °C, 300Hr                                                            |        |
| Hot Storage                | 60 °C, 300Hr                                                             |        |
| Cold Storage               | -20 °C, 300Hr                                                            |        |
| Thermal Shock Test         | -20 °C /30 min , 60 °C /30 min , 100cycles                               |        |
| On/off test                | On/10 sec, Off/10 sec, 30,000 cycles                                     |        |
| ESD                        | Contact : ± 8KV/ operation, Class B<br>Air : ± 15KV / operation, Class B | Note 1 |
| Shock test                 | 50G,20ms,Half-sine wave,( ±X, ±Y, ±Z), non-operation                     |        |
| Vibration test             | 1.5G, (10~200Hz, random), 30 mins / axis (X, Y, Z),non-operation         |        |

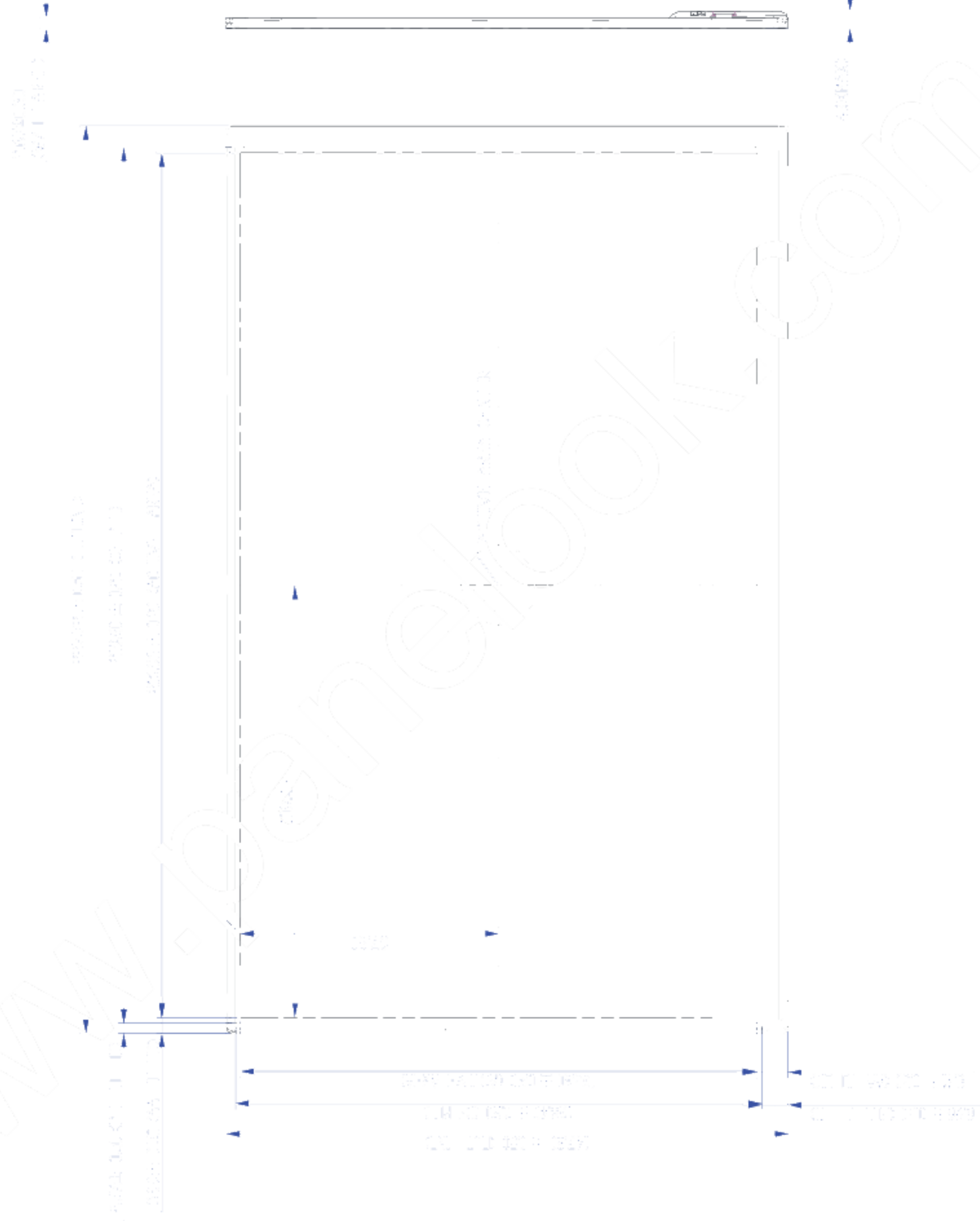
Note1: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost  
. Self-recoverable. No hardware failures.

Note2:

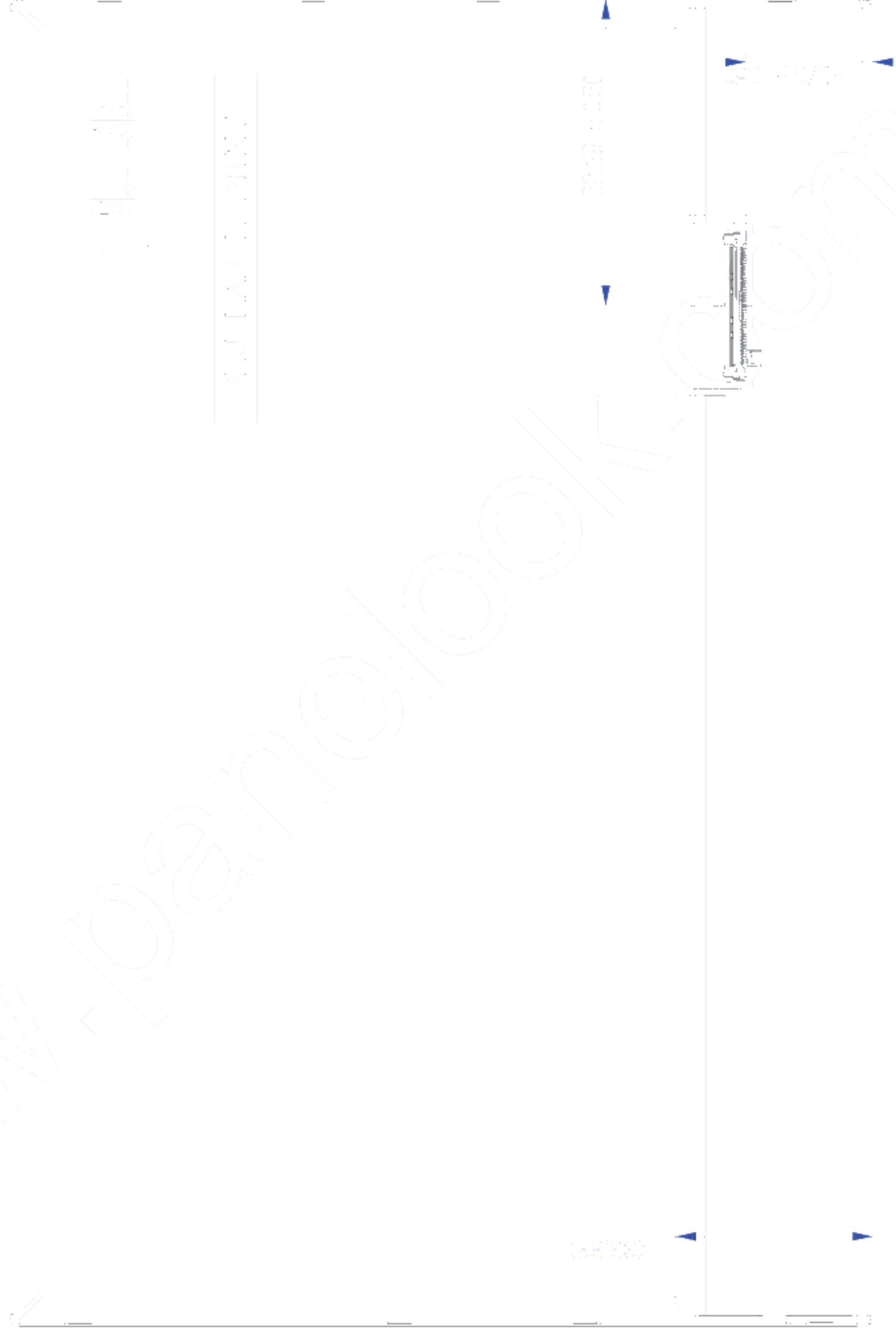
- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.

## 8. Mechanical Characteristics

### 8.1 Outline Dimension (Front View)



## 8.2 Outline Dimension (Rear View)

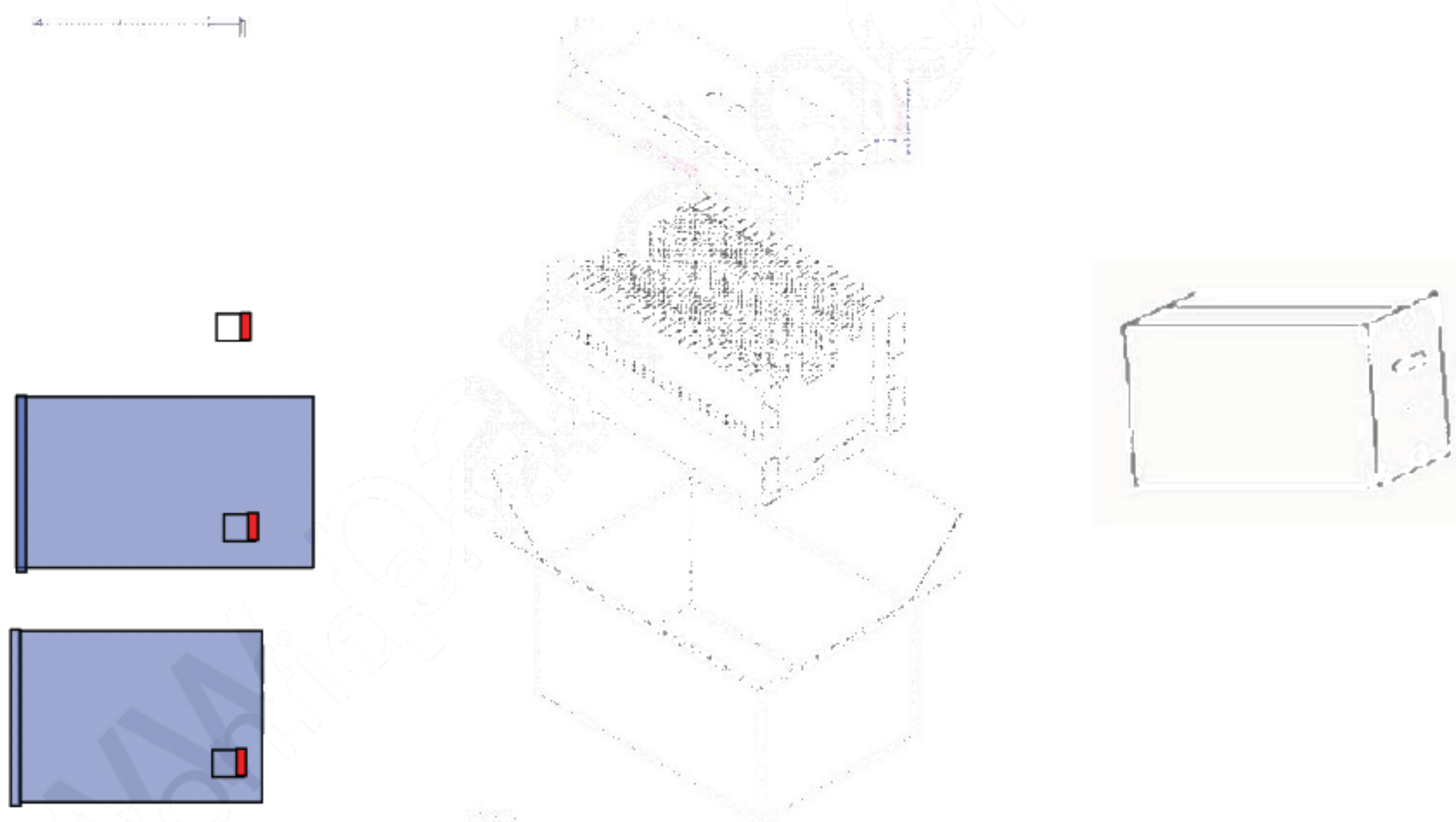


## 9. Label and Packaging

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



### 9.2 Carton/Pallet Package



Max capacity: 40 TFT-LCD module per carton

Outside dimension of carton: 484\*328\*257mm

Pallet size: 1150 mm \* 980 mm \* 132mm

Box stacked 5 layers

Box stacked

Module by air: (2 \*3) \*5 layers, one pallet put 30 boxes, total 1200pcs module

Module by sea: (2 \*3) \*5 layers + (2 \*3) \*2 layers, two pallet put 42 boxes, total 1680pcs module

Module by sea\_HQ: (2 \*3) \*5 layers+(2 \*3) \*3 layers, two pallet put 48 boxes, total 1920pcs module



## 10 Safety

### 10.1 Sharp Edge Requirements

There will be no sharp edges or comers 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