



# Product Specification

M185XTN01.2

AU OPTRONICS CORPORATION

( V ) Preliminary Specification

( ) Final Specification

|            |                     |
|------------|---------------------|
| Module     | 18.5" Color TFT-LCD |
| Model Name | M185XTN01.2         |

|                                                                                                                                                                        |                                                              |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------|-------|-------|-------------|--|-------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------------|-------|-------------|--|-------------------|-----------------|
| <table><tr><td>Customer</td><td>Date</td></tr><tr><td>_____</td><td>_____</td></tr><tr><td>Approved by</td><td></td></tr><tr><td>_____</td><td>_____</td></tr></table> | Customer                                                     | Date | _____ | _____ | Approved by |  | _____ | _____ | <table><tr><td>Approved by</td><td>Date</td></tr><tr><td><u>Howard Lee</u></td><td>_____</td></tr><tr><td>Prepared by</td><td></td></tr><tr><td><u>Glenn Chan</u></td><td><u>2012/5/9</u></td></tr></table> | Approved by | Date | <u>Howard Lee</u> | _____ | Prepared by |  | <u>Glenn Chan</u> | <u>2012/5/9</u> |
| Customer                                                                                                                                                               | Date                                                         |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| _____                                                                                                                                                                  | _____                                                        |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| Approved by                                                                                                                                                            |                                                              |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| _____                                                                                                                                                                  | _____                                                        |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| Approved by                                                                                                                                                            | Date                                                         |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| <u>Howard Lee</u>                                                                                                                                                      | _____                                                        |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| Prepared by                                                                                                                                                            |                                                              |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| <u>Glenn Chan</u>                                                                                                                                                      | <u>2012/5/9</u>                                              |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |
| Note: This Specification is subject to change without notice.                                                                                                          | Video Solutions Business Group /<br>AU Optronics corporation |      |       |       |             |  |       |       |                                                                                                                                                                                                             |             |      |                   |       |             |  |                   |                 |

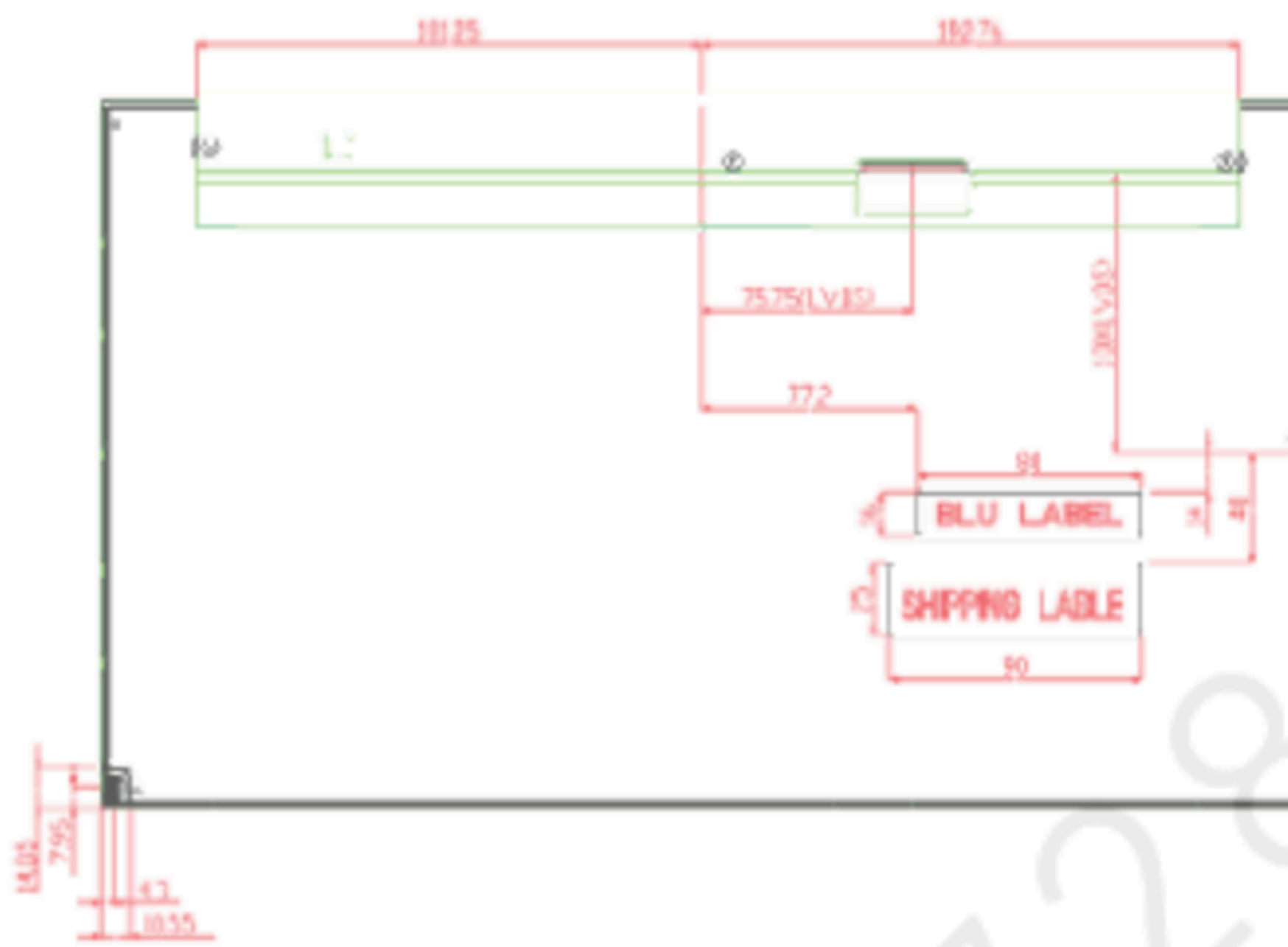
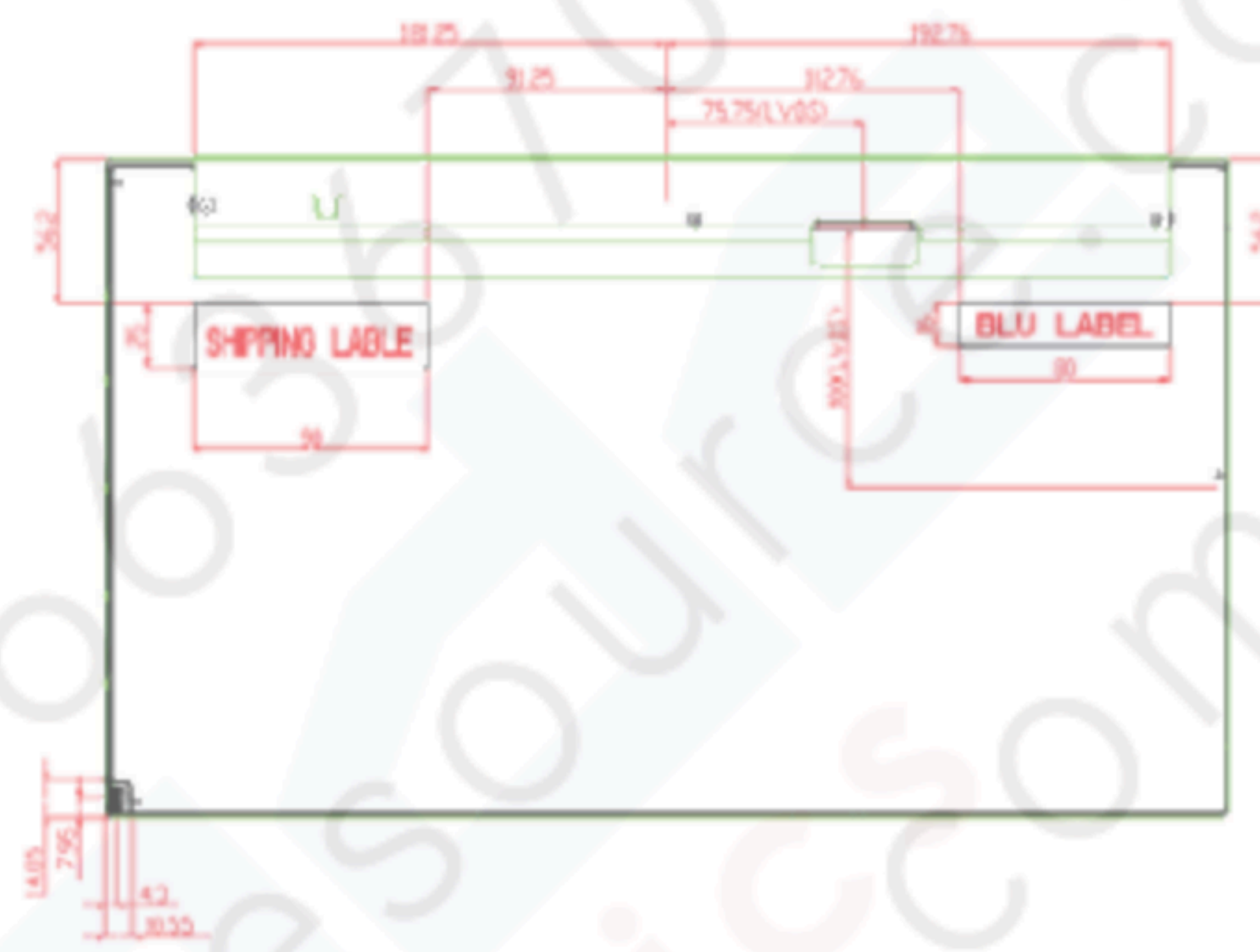
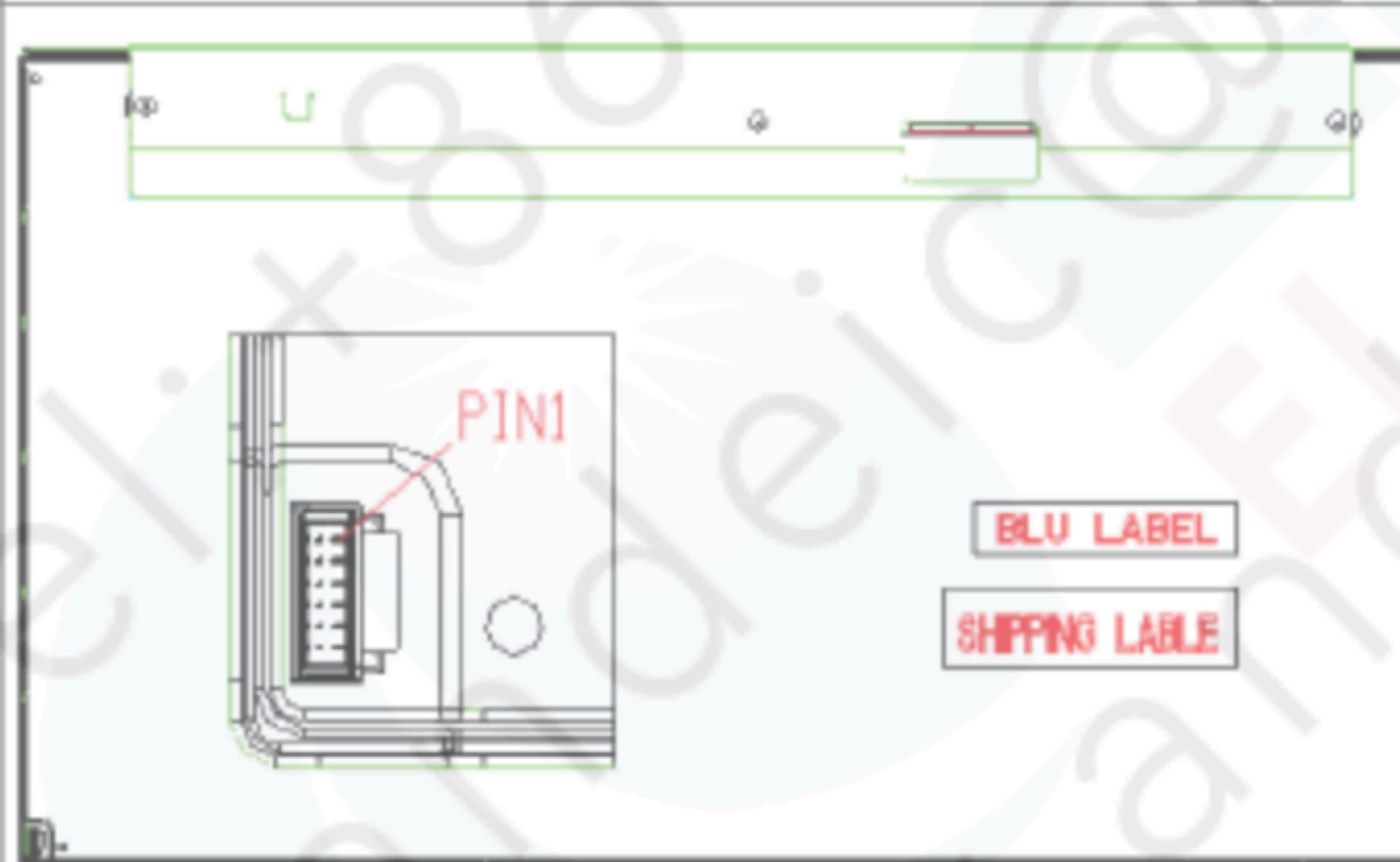


## Contents

|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>1.0 Handling Precautions .....</b>               | <b>5</b>  |
| <b>2.0 General Description.....</b>                 | <b>6</b>  |
| 2.1 Display Characteristics .....                   | 6         |
| 2.2 Optical Characteristics .....                   | 7         |
| <b>3.0 Functional Block Diagram.....</b>            | <b>11</b> |
| <b>4.0 Absolute Maximum Ratings .....</b>           | <b>12</b> |
| 4.1 TFT LCD Module .....                            | 12        |
| 4.2 Backlight Unit.....                             | 12        |
| 4.3 Absolute Ratings of Environment .....           | 12        |
| <b>5.0 Electrical characteristics .....</b>         | <b>14</b> |
| 5.1 TFT LCD Module.....                             | 14        |
| <b>5.1.1 Power Specification .....</b>              | <b>14</b> |
| <b>5.1.2 Signal Electrical Characteristics.....</b> | <b>15</b> |
| 5.2 Backlight Unit.....                             | 17        |
| <b>6.0 Signal Characteristic .....</b>              | <b>18</b> |
| 6.1 Pixel Format Image .....                        | 18        |
| 6.2 The input data format.....                      | 18        |
| 6.3 Signal Description.....                         | 19        |
| 6.4 Timing Characteristics.....                     | 21        |
| 6.5 Timing diagram.....                             | 22        |
| 6.6 Power ON/OFF Sequence .....                     | 23        |
| <b>7.0 Connector &amp; Pin Assignment .....</b>     | <b>24</b> |
| 7.1 TFT LCD Module.....                             | 24        |
| <b>7.1.1 Pin Assignment.....</b>                    | <b>24</b> |
| 7.2 LED Connector on Backlight Unit.....            | 25        |
| <b>7.2.1 LED Pin assignment .....</b>               | <b>25</b> |
| <b>7.2.2 LED Connector dimension .....</b>          | <b>26</b> |
| <b>7.2.3 LED Mating housing dimension .....</b>     | <b>26</b> |
| <b>8.0 Reliability Test .....</b>                   | <b>27</b> |
| <b>9.0 Shipping Label.....</b>                      | <b>28</b> |
| <b>10.0 Mechanical Characteristics .....</b>        | <b>29</b> |
| <b>11. Packing Specification .....</b>              | <b>32</b> |



## Record of Revision

| Version and Date  | Page | Old description                                                                                                                                                                          | New Description                                                                                                                                                      | Remark |
|-------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 0.1<br>2012/05/09 |      | Preliminary Version                                                                                                                                                                      |                                                                                                                                                                      |        |
| 0.2<br>2012/6/18  | 29   | Update label positions.<br>                                                                           |                                                                                  |        |
|                   | 11   | Logic/LCD Drive Voltage VDD: +5.5V                                                                                                                                                       | Logic/LCD Drive Voltage VDD: +6.0V                                                                                                                                   |        |
|                   | 13   | 5.1.1 Power specification Irush Max. :2A                                                                                                                                                 | 5.1.1 Power specification Irush Max. : TBD                                                                                                                           |        |
| 0.3<br>2012/7/4   | 24   |                                                                                                      |                                                                                 |        |
|                   | 6    | "Energy Star 6.0 Compliance" : Yes                                                                                                                                                       | Remove "Energy Star 6.0 Compliance" because it'll be tested not with panel only but completed set.                                                                   |        |
|                   | 26   | Altitude test: Operation 15,000ft                                                                                                                                                        | Altitude test: Operation 18,000ft                                                                                                                                    |        |
| 0.3<br>2012/7/9   | 6    | Color / Chromaticity Coordinates (CIE)<br>                                                           | Color / Chromaticity Coordinates (CIE)<br>                                      |        |
| 0.4<br>2012/8/6   | 12   | Revise "VDD min."<br>                                                                                |                                                                                 |        |
|                   | 14   | Revise "VDD max."<br>*5.1.1 Power Specification:<br>Input power specifications are as following:<br> | *5.1.1 Power Specification:<br>Input power specifications are as following:<br> |        |





# Product Specification

M185XTN01.2

AU OPTRONICS CORPORATION

|  |    |                         |  |  |
|--|----|-------------------------|--|--|
|  | 22 | Revise "Timing Diagram" |  |  |
|  |    |                         |  |  |
|  |    |                         |  |  |

Tel: +86 13728663670  
Email: andeic@andesource.com  
www.andesource.com



## 1.0 Handling Precautions

- 1) Since front polarizer is easily damaged, pay attention 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 other soft cloth.
- 5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
- 6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
- 7) Do not open or modify the Module Assembly.
- 8) Do not press the reflector sheet at the back of the module to any directions.
- 9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center of the LED lightbar 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) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
- 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) Please avoid touching COF contact while handling or fitting the TFT module into your system.
- 14) When storing modules as spares for a long time, the following precaution is necessary:  
Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.



## 2.0 General Description

This specification applies to the 18.5 inch-wide Color a-Si TFT-LCD Module M185XTN01. The display supports the WXGA - 1366(H) x 768(V) screen format and 16.7M colors (RGB 6-bits + Hi-FRC data). All input signals are 1-channel LVDS interface and this module doesn't contain an inverter board for backlight.

## 2.1 Display Characteristics

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

| ITEMS                                      | Unit                 | SPECIFICATIONS                                                                                         |
|--------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------|
| Screen Diagonal                            | [mm]                 | 470.1(18.51")                                                                                          |
| Active Area                                | [mm]                 | 409.8 (H) x 230.4 (V)                                                                                  |
| Pixels H x V                               |                      | 1366(x3) x 768                                                                                         |
| Pixel Pitch                                | [um]                 | 300 (per one triad) × 300                                                                              |
| Pixel Arrangement                          |                      | R.G.B. Vertical Stripe                                                                                 |
| Display Mode                               |                      | TN Mode, Normally White                                                                                |
| White Luminance ( Center )                 | [cd/m <sup>2</sup> ] | 250 cd/m <sup>2</sup> (Typ.)                                                                           |
| Contrast Ratio                             |                      | 1000 (Typ.)                                                                                            |
| Optical Response Time                      | [msec]               | 5ms (Typ., on/off)                                                                                     |
| Nominal Input Voltage VDD                  | [Volt]               | +5.0 V (Typ)                                                                                           |
| Power Consumption<br>(VDD line + LED line) | [Watt]               | VDD line: PDD (typ)= 1.75W, All black pattern at 60Hz<br>LED line : PBLU (typ) = 7.2W<br>Total : 8.95W |
| Weight                                     | [Grams]              | 1290 (Typ)                                                                                             |
| Physical Size                              | [mm]                 | 430.4 (W) x 254.6 (H) Typ. x 9.9 (D) Typ                                                               |
| Interface                                  |                      | One channel LVDS                                                                                       |
| Support Color                              |                      | 16.7M colors (RGB 6-bit + Hi_FRC )                                                                     |
| Surface Treatment                          |                      | Anti-Glare, 3H                                                                                         |
| Temperature Range                          |                      |                                                                                                        |
| Operating                                  | [°C]                 | 0 to +50                                                                                               |
| Storage (Shipping)                         | [°C]                 | -20 to +60                                                                                             |
| TCO6.0 Compliance                          |                      | Yes                                                                                                    |



## 2.2 Optical Characteristics

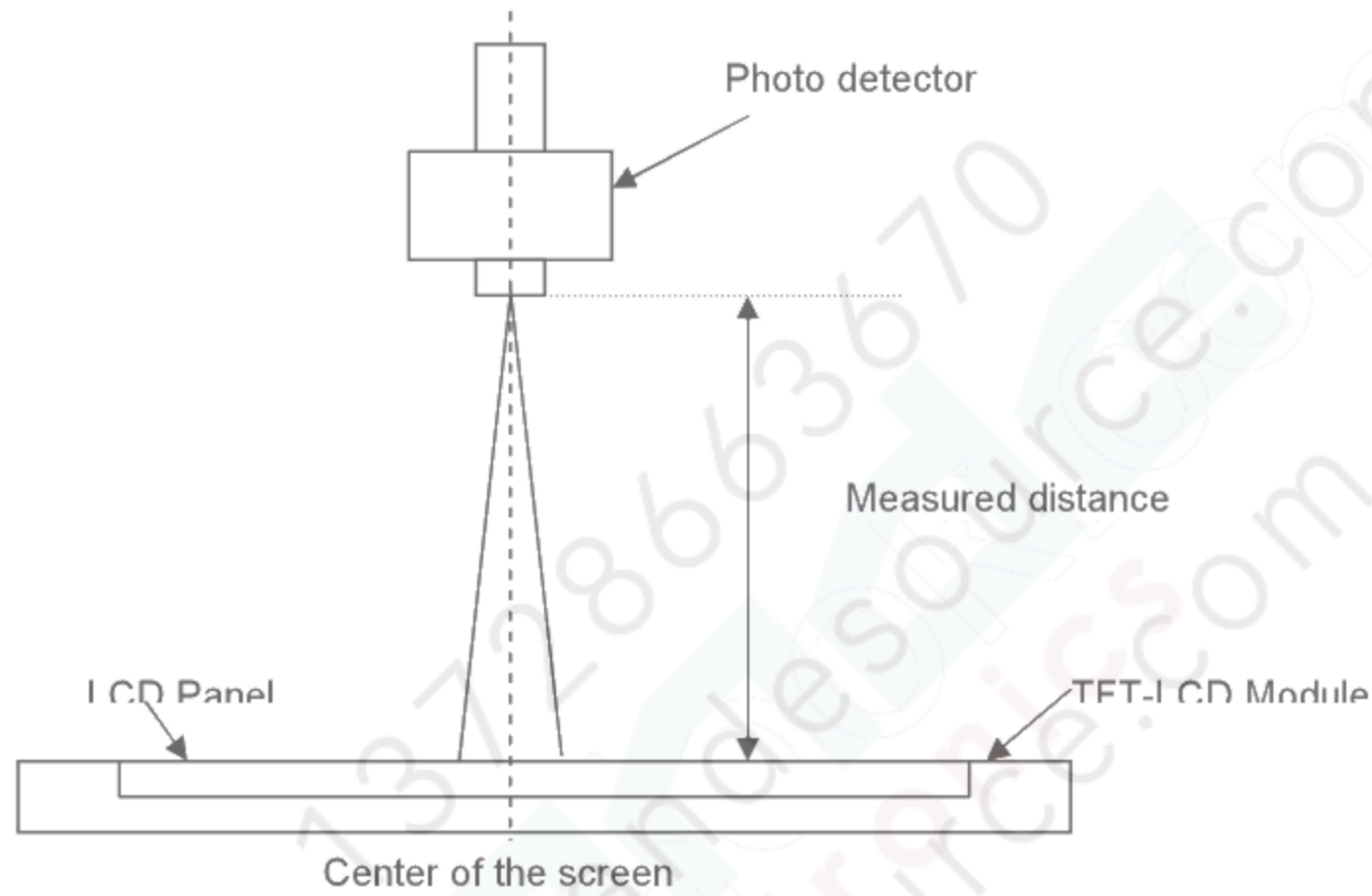
The optical characteristics are measured under stable conditions at 25°C:

| Item                                   | Unit                 | Conditions                           | Min.     | Typ.     | Max.   | Note |
|----------------------------------------|----------------------|--------------------------------------|----------|----------|--------|------|
| Viewing Angle                          | [degree]             | Horizontal (Right)<br>CR = 10 (Left) | 75<br>75 | 85<br>85 | -<br>- | 2    |
|                                        |                      | Vertical (Up)<br>CR = 10 (Down)      | 70<br>70 | 80<br>80 | -<br>- |      |
| Contrast ratio                         |                      | Normal Direction                     | 600      | 1000     | -      | 3    |
| Response Time                          | [msec]               | Raising Time ( $T_{rR}$ )            | -        | 3.6      | -      | 4    |
|                                        |                      | Falling Time ( $T_{rF}$ )            | -        | 1.4      | -      |      |
|                                        |                      | Raising + Falling                    | -        | 5        | -      |      |
| Color / Chromaticity Coordinates (CIE) |                      | Red x                                | 0.616    | 0.646    | 0.676  | 5    |
|                                        |                      | Red y                                | 0.303    | 0.333    | 0.363  |      |
|                                        |                      | Green x                              | 0.287    | 0.317    | 0.347  |      |
|                                        |                      | Green y                              | 0.595    | 0.625    | 0.655  |      |
|                                        |                      | Blue x                               | 0.124    | 0.154    | 0.184  |      |
|                                        |                      | Blue y                               | 0.031    | 0.061    | 0.091  |      |
| Color Coordinates (CIE) White          |                      | White x                              | 0.283    | 0.313    | 0.343  |      |
|                                        |                      | White y                              | 0.299    | 0.329    | 0.359  |      |
| Central Luminance                      | [cd/m <sup>2</sup> ] |                                      | 200      | 250      | -      | 6    |
| Luminance Uniformity                   | [%]                  |                                      | 75       | 80       | -      | 7    |
| Crosstalk (in 60Hz)                    | [%]                  |                                      |          |          | 1.5    | 8    |
| Flicker                                | dB                   |                                      |          |          | -20    | 9    |



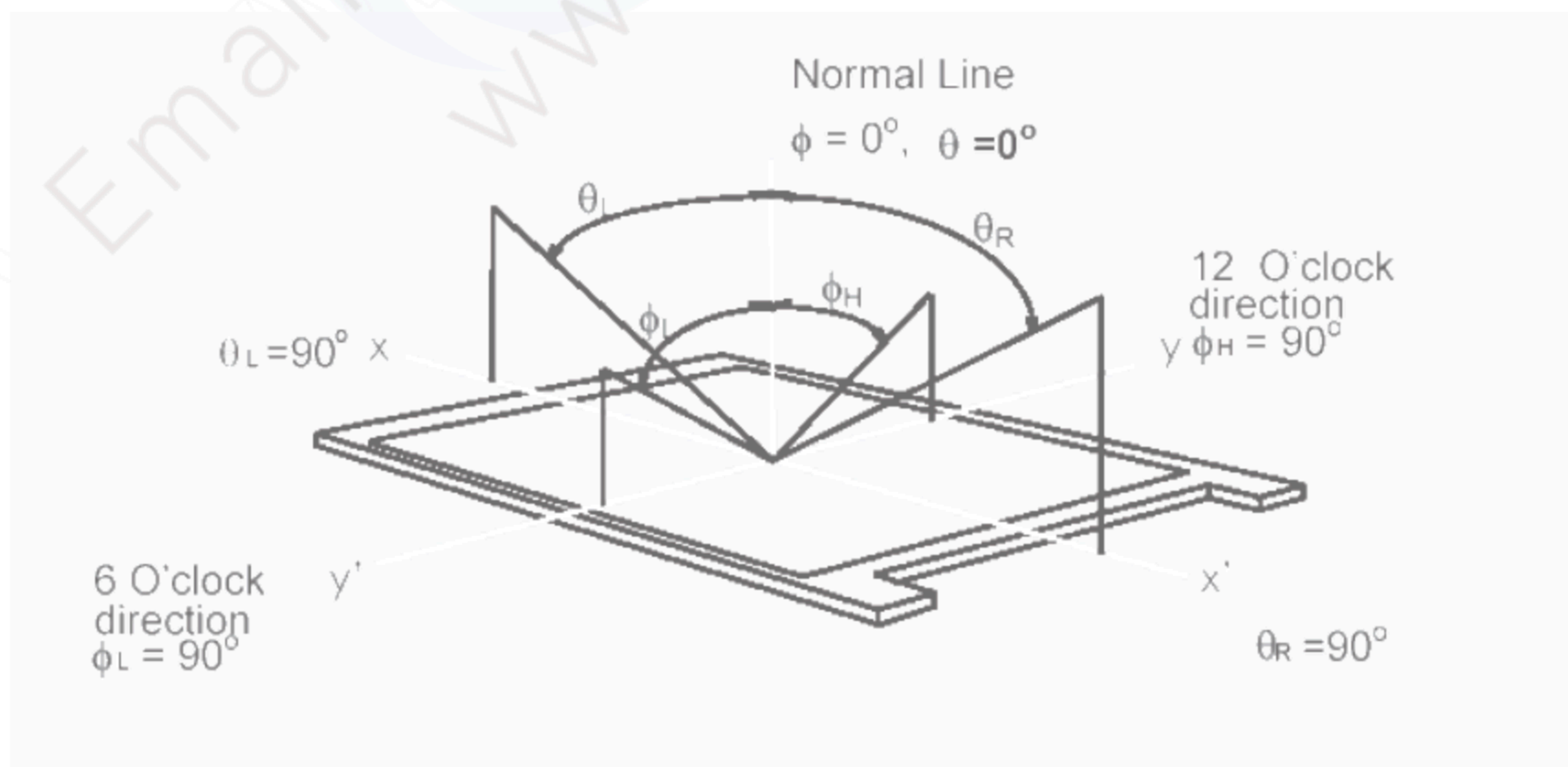
## Note 1: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring (at surface  $35^{\circ}\text{C}$ ). In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room.



## Note 2: Definition of viewing angle measured by ELDIM (EZContrast 88)

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 follows;  $90^{\circ}$  ( $\theta$ ) 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 about its center to develop the desired measurement viewing angle.

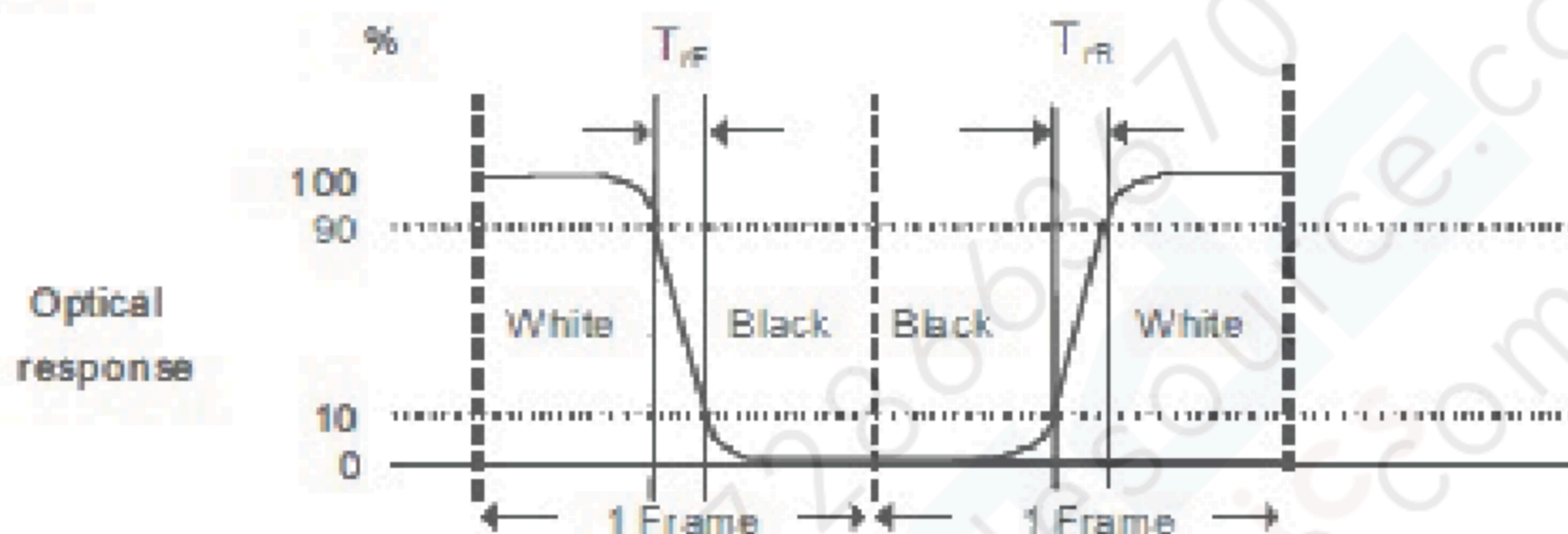




**Note 3:** Contrast ratio is measured by TOPCON SR-3

**Note 4:** Definition of Response time measured by Westar TRD-100A

The output signals of photo detector are measured when the input signals are changed from "Full Black" to "Full White" (rising time,  $T_{rR}$ ), and from "Full White" to "Full Black" (falling time,  $T_{rF}$ ), respectively. The response time is interval between the 10% and 90% (1 frame at 60 Hz) of amplitudes.

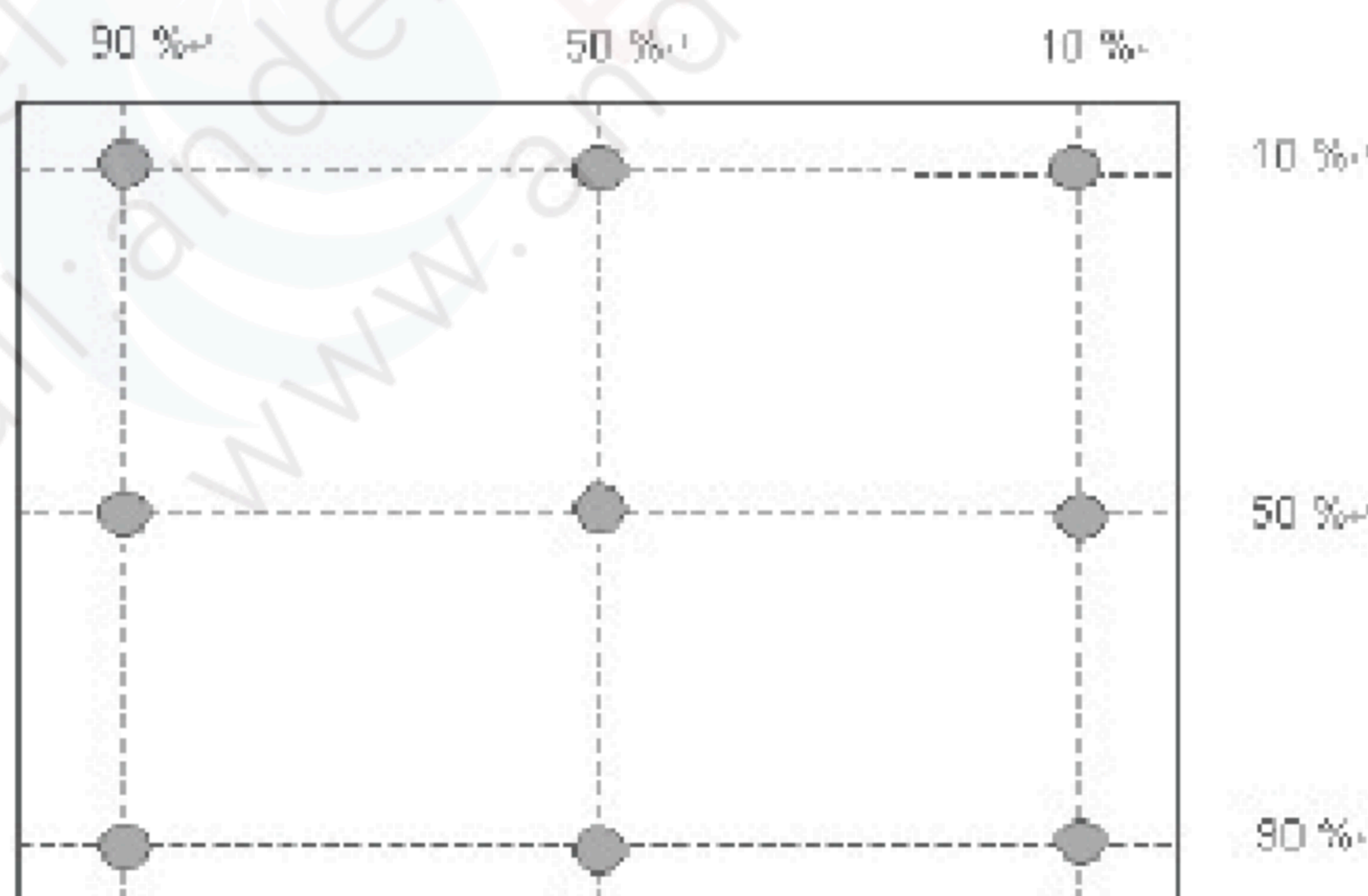


$$T_{rR} + T_{rF} = 5 \text{ msec (typ.)}$$

**Note 5:** Color chromaticity and coordinates (CIE) is measured by TOPCON SR-3

**Note 6:** Central luminance is measured by TOPCON SR-3

**Note 7:** Luminance uniformity of these 9 points is defined as below and measured by TOPCON SR-3



$$\text{Uniformity} = \frac{\text{Minimum Luminance in 9 points (1-9)}}{\text{Maximum Luminance in 9 Points (1-9)}}$$



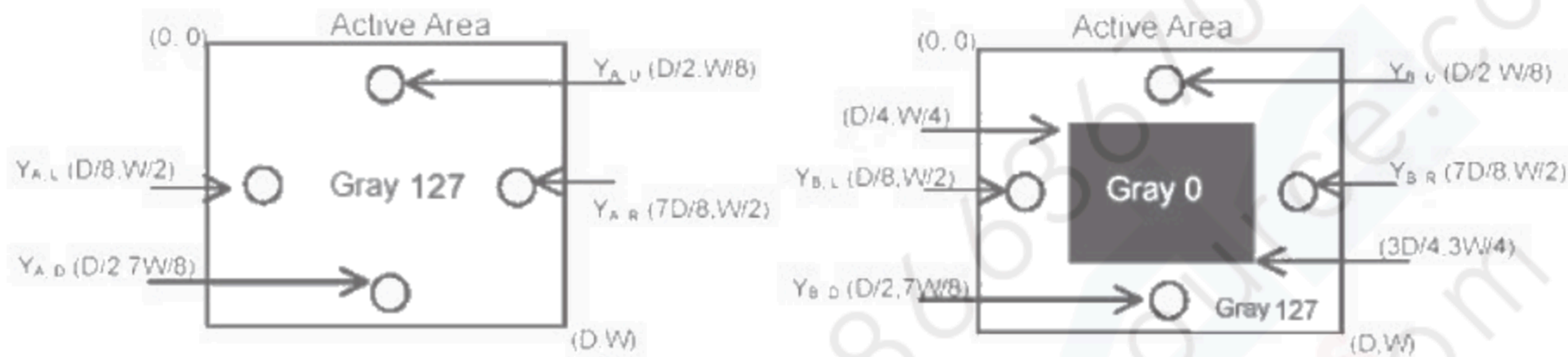
**Note 8: Crosstalk is defined as below and measured by TOPCON SR-3**

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

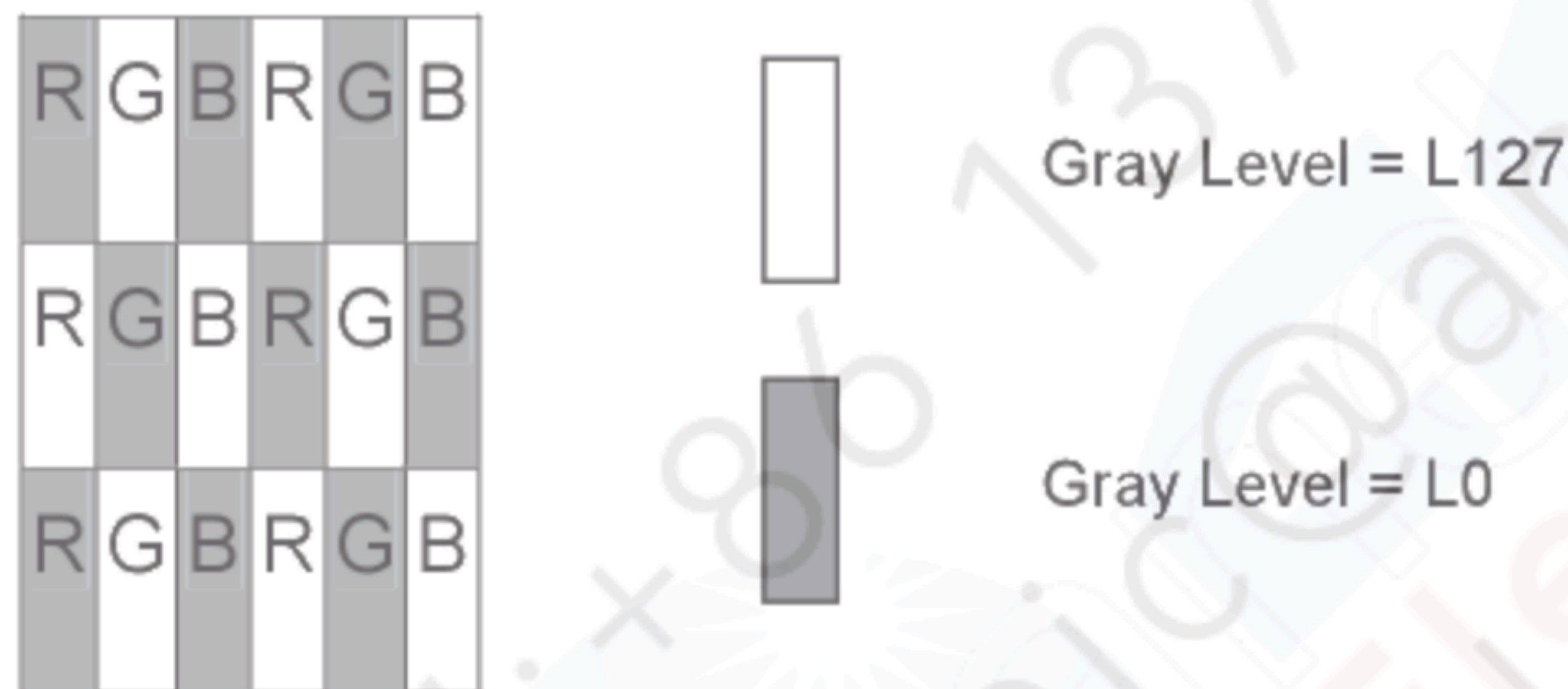
Where

YA = Luminance of measured location without gray level 0 pattern (cd/m2)

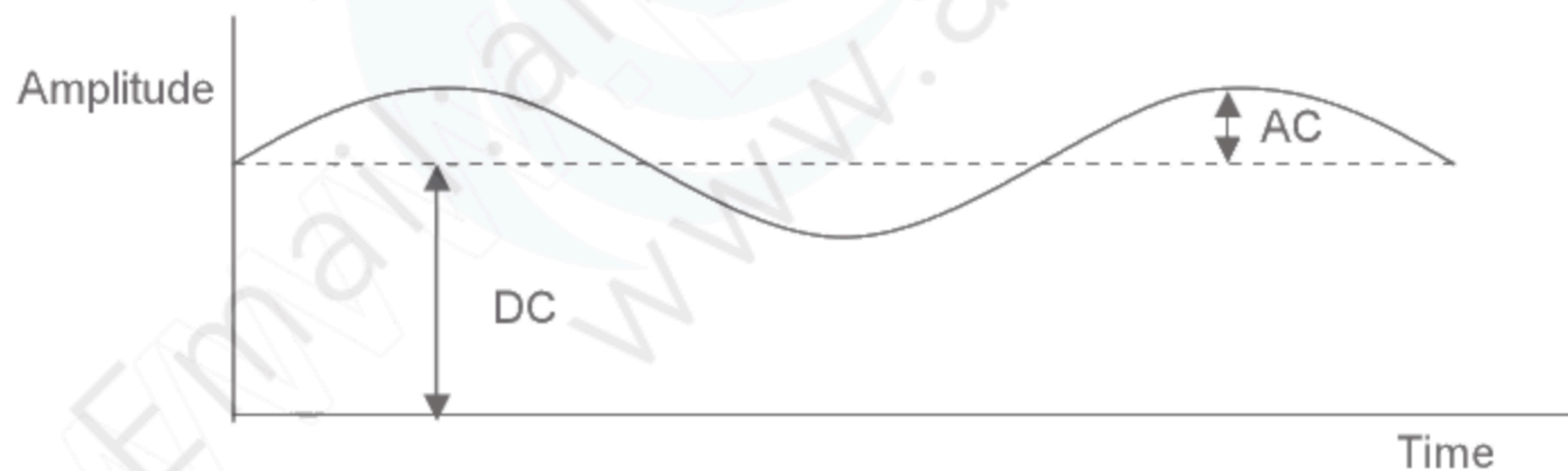
YB = Luminance of measured location with gray level 0 pattern (cd/m2)



**Note 9: Test Pattern: Subchecker Pattern** measured by TOPCON SR-3



Method: Record dBV & DC value with TRD-100

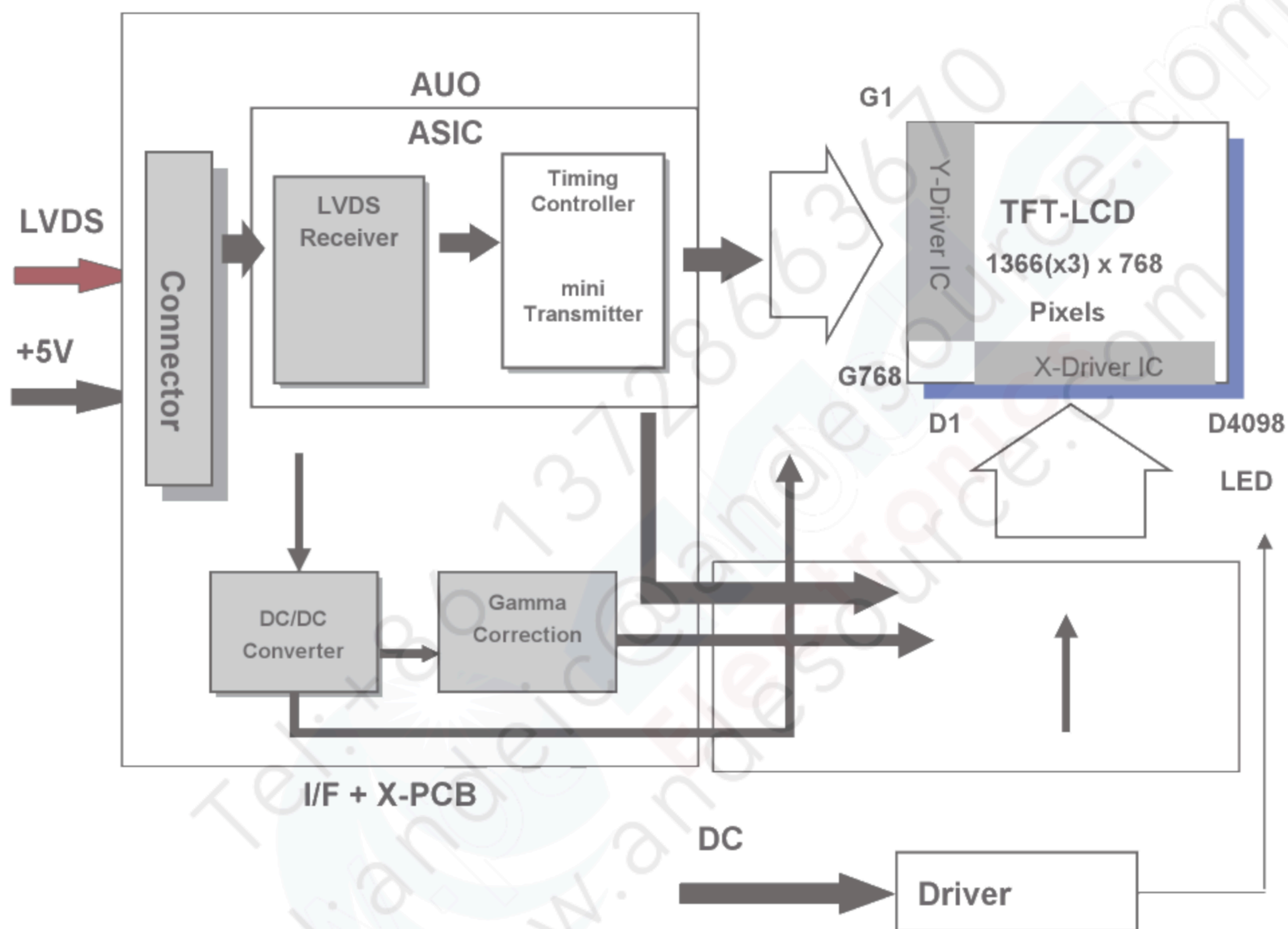


$$\text{Flicker (dB)} = 20 \log \frac{\text{AC Level(at 30 Hz)}}{\text{DC Level}}$$



## 3.0 Functional Block Diagram

The following diagram shows the functional block of the 18.5 inch Color TFT-LCD Module:



### I/F PCB Interface:

MSCKT2407P30HB (STM) / AL230F-A0G1D-P (P-TWO)

### Mating Type:

FI-X30HL(JAE) (Locked Type)

FI-X30H (JAE)(Unlocked Type)



## 4.0 Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

### 4.1 TFT LCD Module

| Item                    | Symbol | Min  | Max  | Unit   | Conditions      |
|-------------------------|--------|------|------|--------|-----------------|
| Logic/LCD Drive Voltage | VDD    | -0.3 | +6.0 | [Volt] | <b>Note 1,2</b> |

### 4.2 Backlight Unit

| Item                                                 | Symbol       | Min | Max | Unit   | Conditions                           |
|------------------------------------------------------|--------------|-----|-----|--------|--------------------------------------|
| LED Forward Current                                  | IRLED1       | 0   | 90  | [mA]   | <b>Note 1,2,5</b><br>100% duty       |
|                                                      | IRLED2       |     |     |        |                                      |
|                                                      | IRLED3       |     |     |        |                                      |
|                                                      | IRLED4       |     |     |        |                                      |
| LED Pulse Forward Current                            | IPLD1        | -   | 150 | [mA]   | <b>Note 1,2,5</b><br>10% duty @100Hz |
|                                                      | IPLD2        |     |     |        |                                      |
|                                                      | IPLD3        |     |     |        |                                      |
|                                                      | IPLD4        |     |     |        |                                      |
| LED forward Voltage variation (per string variation) | $\Delta V_f$ | -   | 3.4 | [Volt] | <b>Note 1,2</b>                      |

### 4.3 Absolute Ratings of Environment

| Item                                  | Symbol | Min. | Max. | Unit  | Conditions            |
|---------------------------------------|--------|------|------|-------|-----------------------|
| Operating Temperature                 | TOP    | 0    | +50  | [°C]  | <b>Note 3</b>         |
| Glass surface temperature (operation) | TGS    | 0    | +65  | [°C]  | <b>Note 3, Note 4</b> |
| Operation Humidity                    | HOP    | 5    | 90   | [%RH] | <b>Note 3</b>         |
| Storage Temperature                   | 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 exceeding maximum values

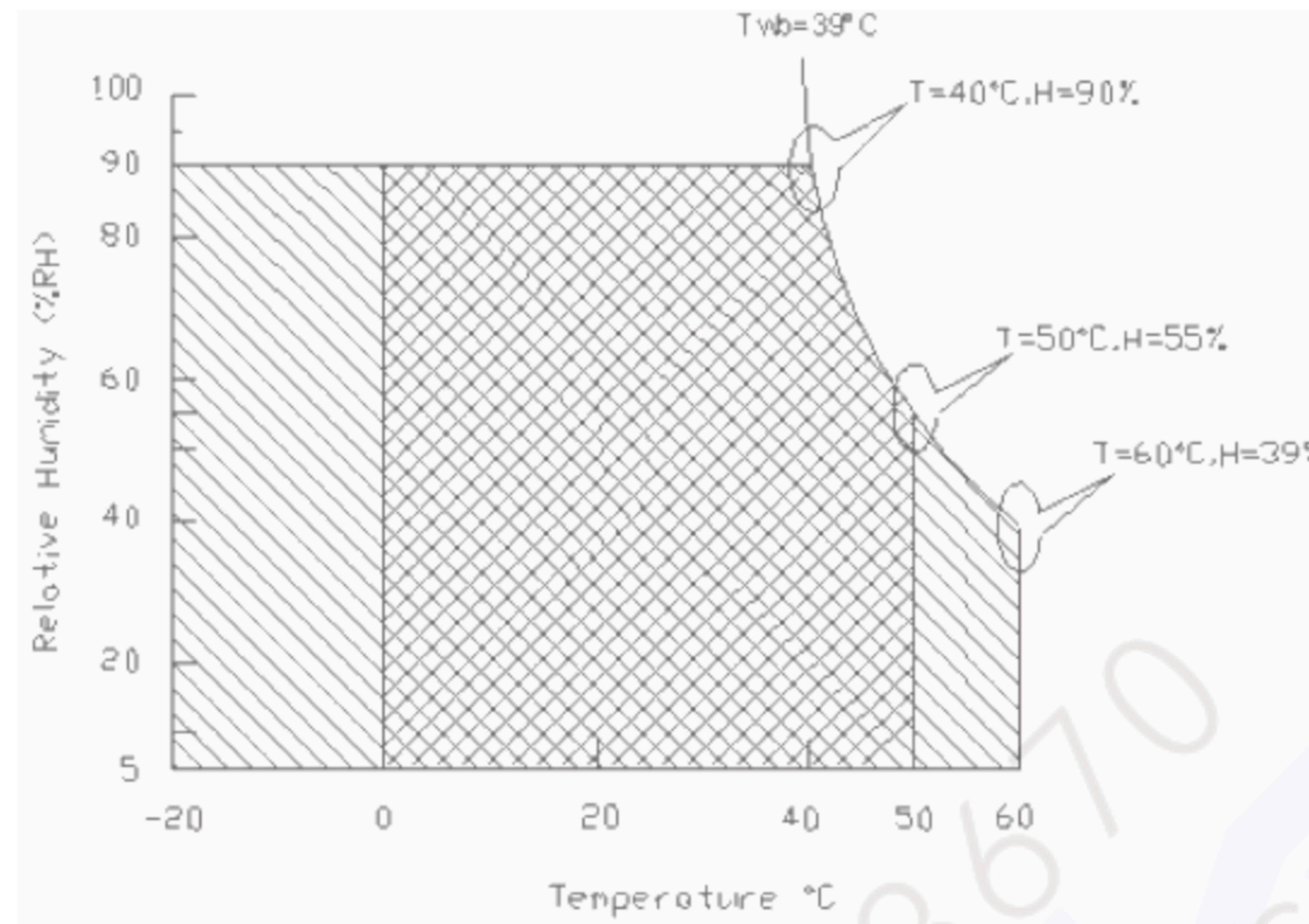
**Note 3:** Temperature and relative humidity range are shown as the below figure.

1. 90% RH Max ( Ta ≤39°C )
2. Max wet-bulb temperature at 39°C or less. ( Ta ≤39°C )
3. No condensation

**Note 4:** Function Judged only

**Note 5:** IRLED1,2,3,4 and IPLD1,2,3,4 define as per strings LED current.





Operating Range



Storage Range





## 5.0 Electrical characteristics

### 5.1 TFT LCD Module

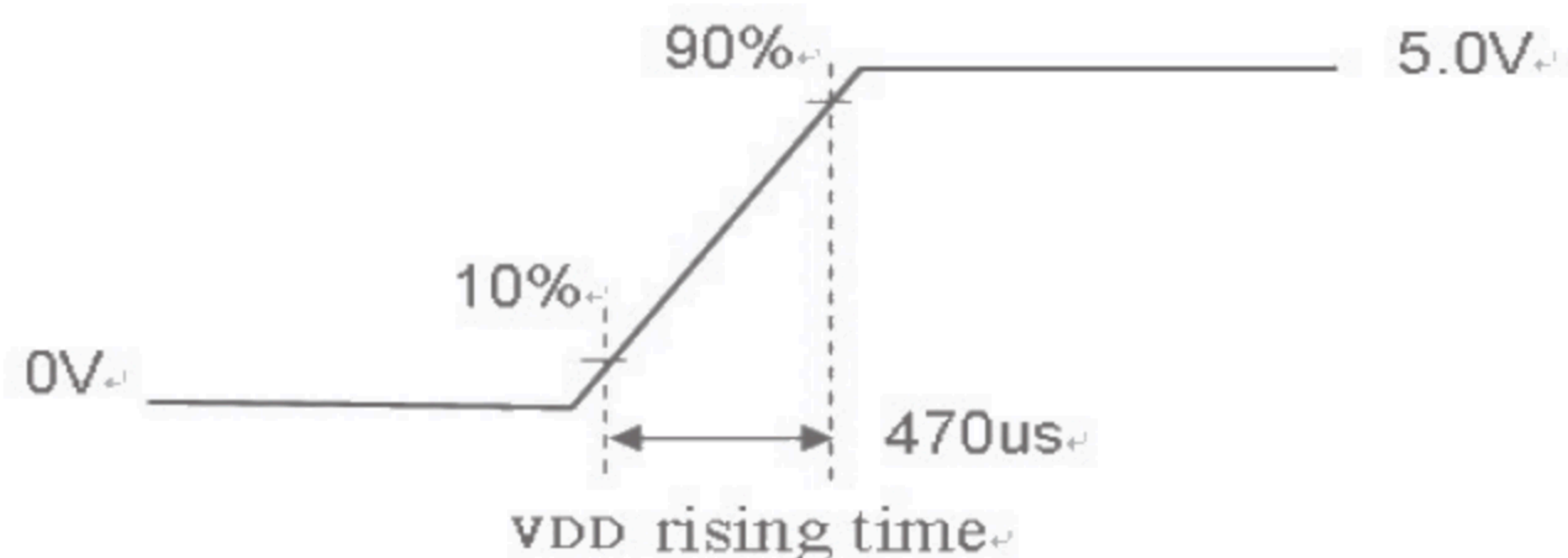
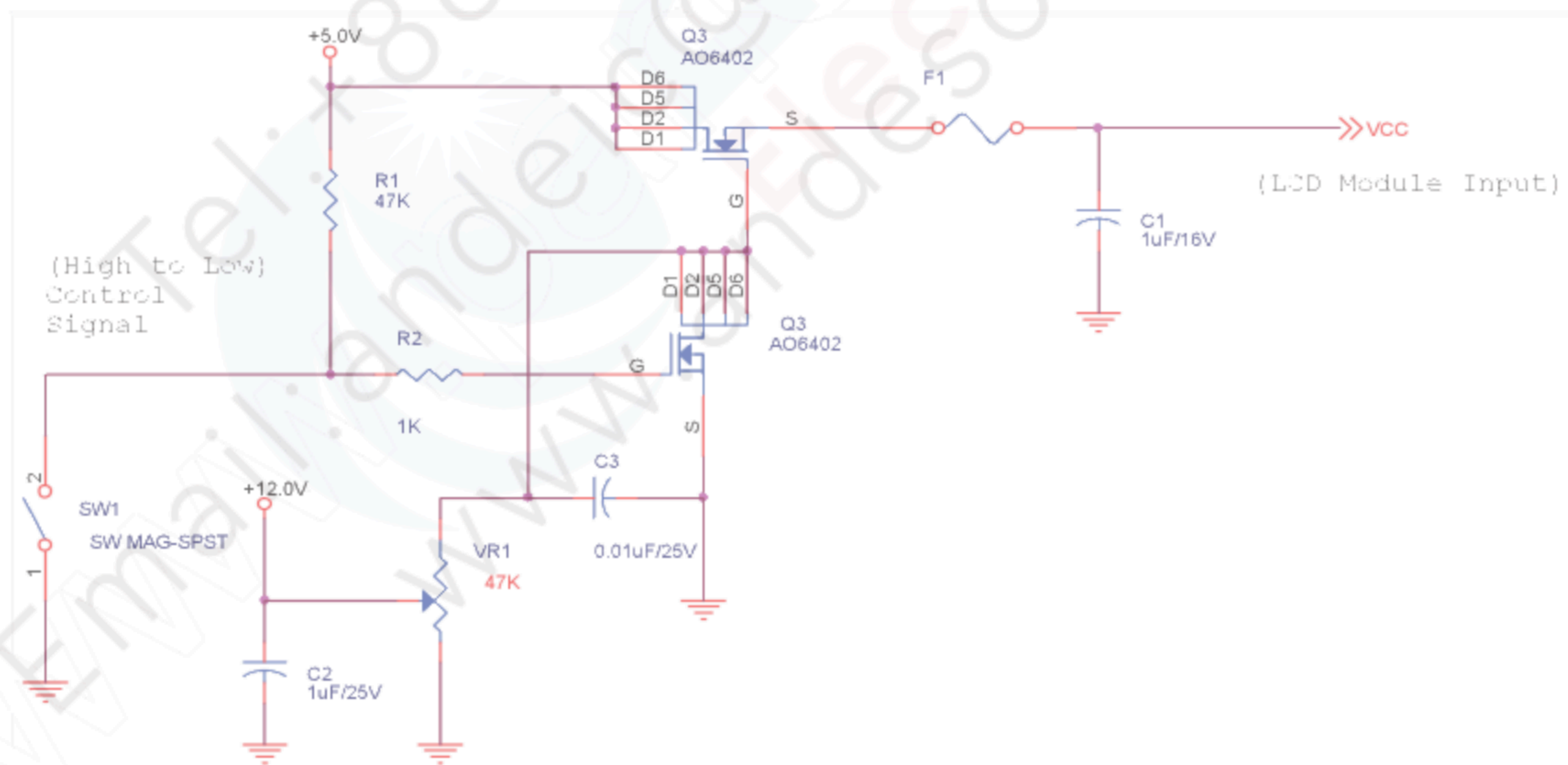
#### 5.1.1 Power Specification

Input power specifications are as following:

| Symbol | Parameter                                | Min | Typ  | Max  | Unit     | Conditions                            |
|--------|------------------------------------------|-----|------|------|----------|---------------------------------------|
| VDD    | Logic/LCD Drive Voltage                  | 4.5 | 5.0  | 5.5  | [Volt]   | +/-10%                                |
| IDD    | Input Current                            | -   | 0.35 | 0.42 | [A]      | VDD= 5.0V, All Black Pattern At 60Hz, |
|        |                                          | -   | 0.42 | 0.5  |          | VDD= 5.0V, All Black Pattern At 75Hz  |
| PDD    | VDD Power                                | -   | 1.75 | 2.1  | [Watt]   | VDD= 5.0V, All Black Pattern At 60Hz  |
|        |                                          | -   | 2.1  | 2.5  |          | VDD= 5.0V, All Black Pattern At 75Hz  |
| IRush  | Inrush Current                           | -   | -    | TBD  | [A]      | Note 1                                |
| VDDrp  | Allowable Logic/LCD Drive Ripple Voltage | -   | -    | 350  | [mV] p-p | VDD= 5.0V, All Black Pattern At 75Hz  |

**Note 1:** Measurement conditions:

The duration of rising time of power input is 470us.





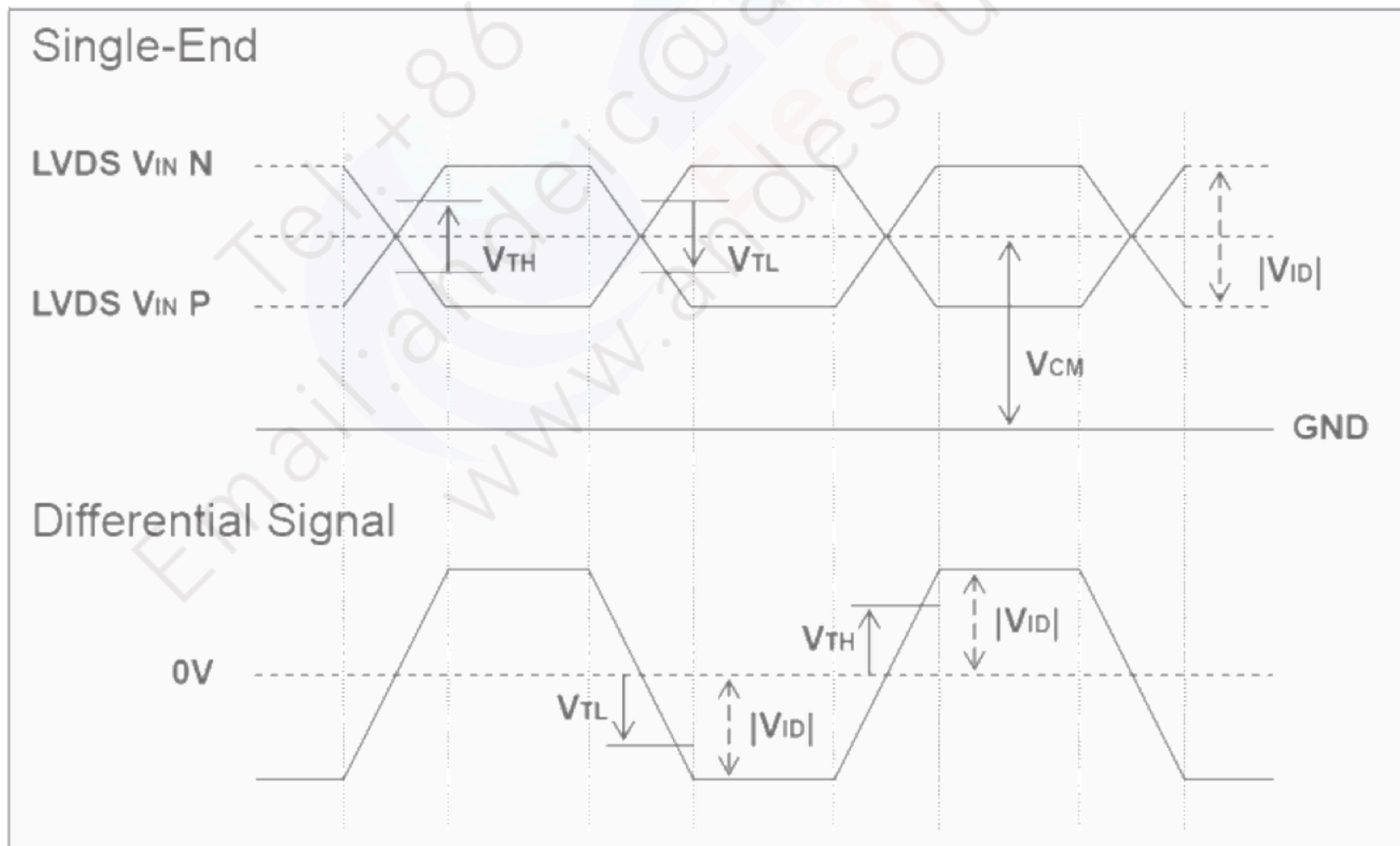
## 5.1.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off. Please refer to specifications of SN75LVDS82DGG (Texas Instruments) in detail.

### 1. DC Characteristics of each signal are as following:

| Symbol          | Parameter                              | Min  | Typ  | Max  | Units | Condition                                                       |
|-----------------|----------------------------------------|------|------|------|-------|-----------------------------------------------------------------|
| V <sub>TH</sub> | Differential Input High Threshold      | -    | -    | +100 | [mV]  | V <sub>CM</sub> = 1.2V<br><b>Note 1</b>                         |
| V <sub>TL</sub> | Differential Input Low Threshold       | -100 | -    | -    | [mV]  | V <sub>CM</sub> = 1.2V<br><b>Note 1</b>                         |
| V <sub>ID</sub> | Input Differential Voltage             | 100  | -    | 600  | [mV]  | <b>Note 1</b>                                                   |
| V <sub>CM</sub> | Differential Input Common Mode Voltage | +1.0 | +1.2 | +1.5 | [V]   | V <sub>TH</sub> -V <sub>TL</sub> = 200mV (max)<br><b>Note 1</b> |

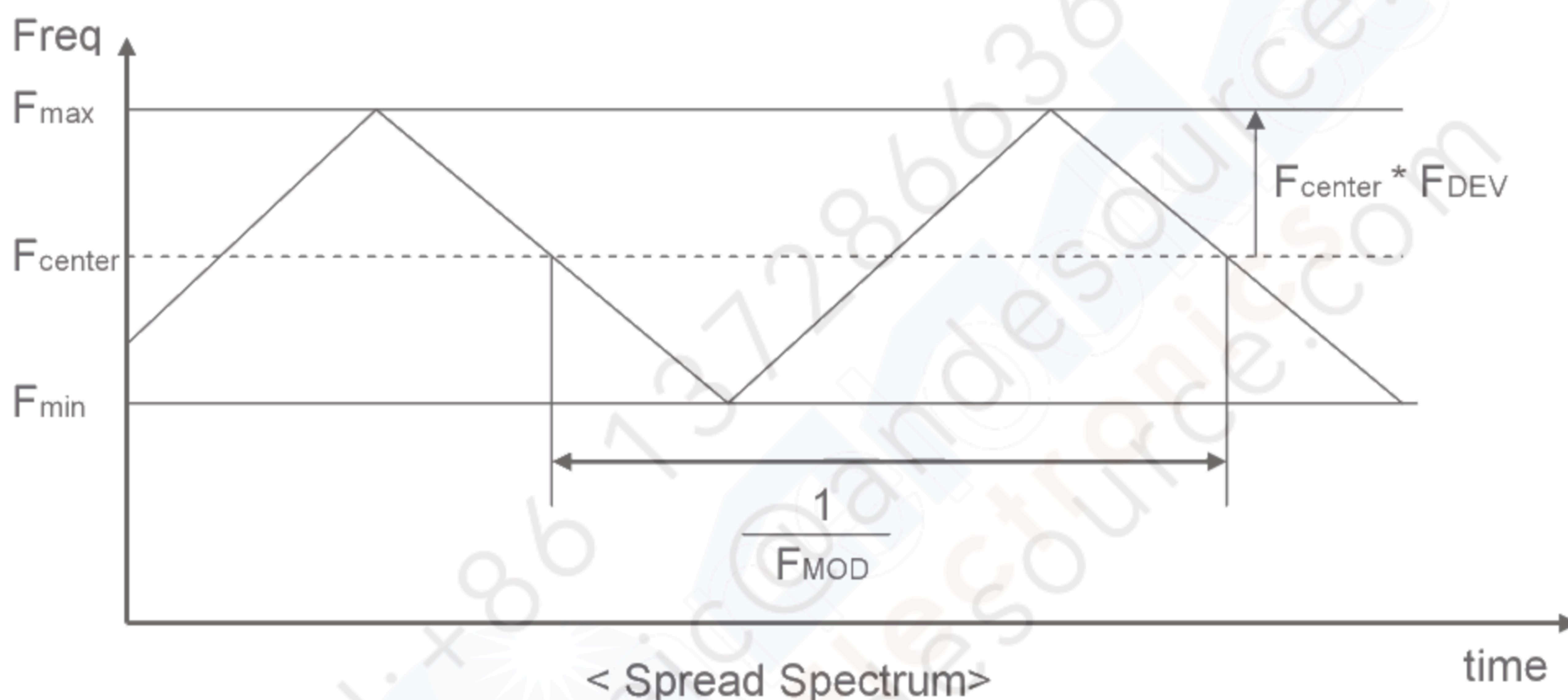
**Note 1:** LVDS Signal Waveform





## 2. AC Characteristics

| Description                                            | Symbol    | Min | Max     | Unit | Note |
|--------------------------------------------------------|-----------|-----|---------|------|------|
| Maximum deviation of input clock frequency during SSC  | $F_{DEV}$ | -   | $\pm 3$ | %    |      |
| Maximum modulation frequency of input clock during SSC | $F_{MOD}$ | -   | 200     | KHz  |      |





## 5.2 Backlight Unit

Parameter guideline for LED driving is under stable conditions at 25°C (Room Temperature):

| Symbol | Description                 | Min.□  | Typ. | Max. | Unit   | Note   |
|--------|-----------------------------|--------|------|------|--------|--------|
| IRLED1 | LED Operation Current       | 67     | 70   | 73   | [mA]   | Note 1 |
| IRLED2 |                             |        |      |      |        |        |
| IRLED3 |                             |        |      |      |        |        |
| IRLED4 |                             |        |      |      |        |        |
| VLED   | Light Bar Operation Voltage | 24     | 25.6 | 27.2 | [Volt] | Note 2 |
| PBLU   | BLU Power Consumption       | 6.4    | 7.2  | 7.9  | [Watt] | Note 3 |
| LTLED  | LED Life Time (Typical)     | 30,000 | -    | -    | [Hour] | Note 4 |

Each module consists of 32 pcs LED ( 4 strings x 8 pcs / string )

Note 1 : The specified current is 100% duty of LED chip input current, IRLED1,2,3,4 define as per strings LED current.

Note 2 : The value showed in the table is one light bar's operation voltage.

Note 3 :  $PBLU = VLED * (IRLED1 + IRLED2 + IRLED3 + IRLED4)$

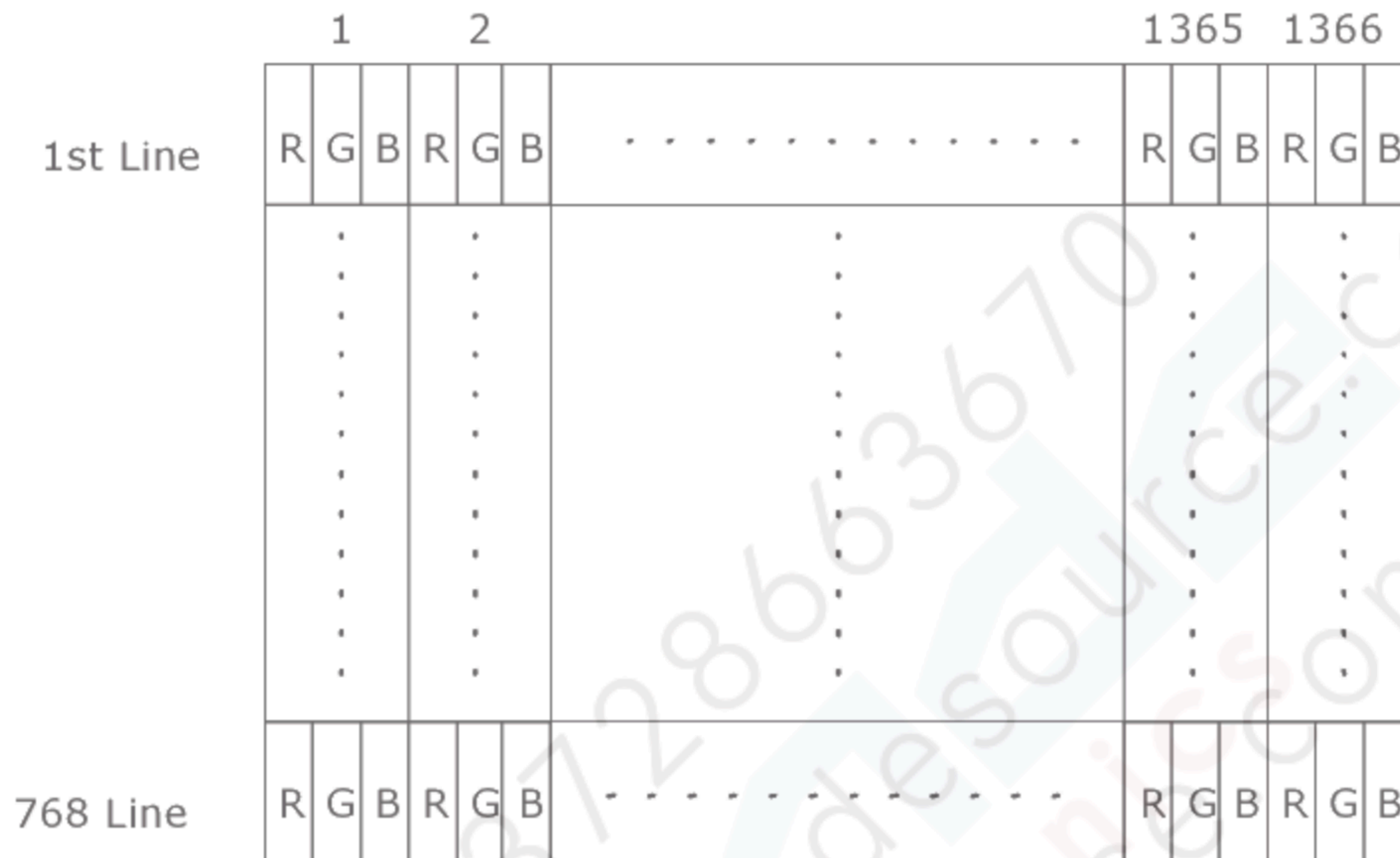
Note 4: Definition of life time: Brightness becomes to 50% of its original value. The minimum life time of LED unit is on the condition of IRLED = 70mA and 25±2°C (Room Temperature).



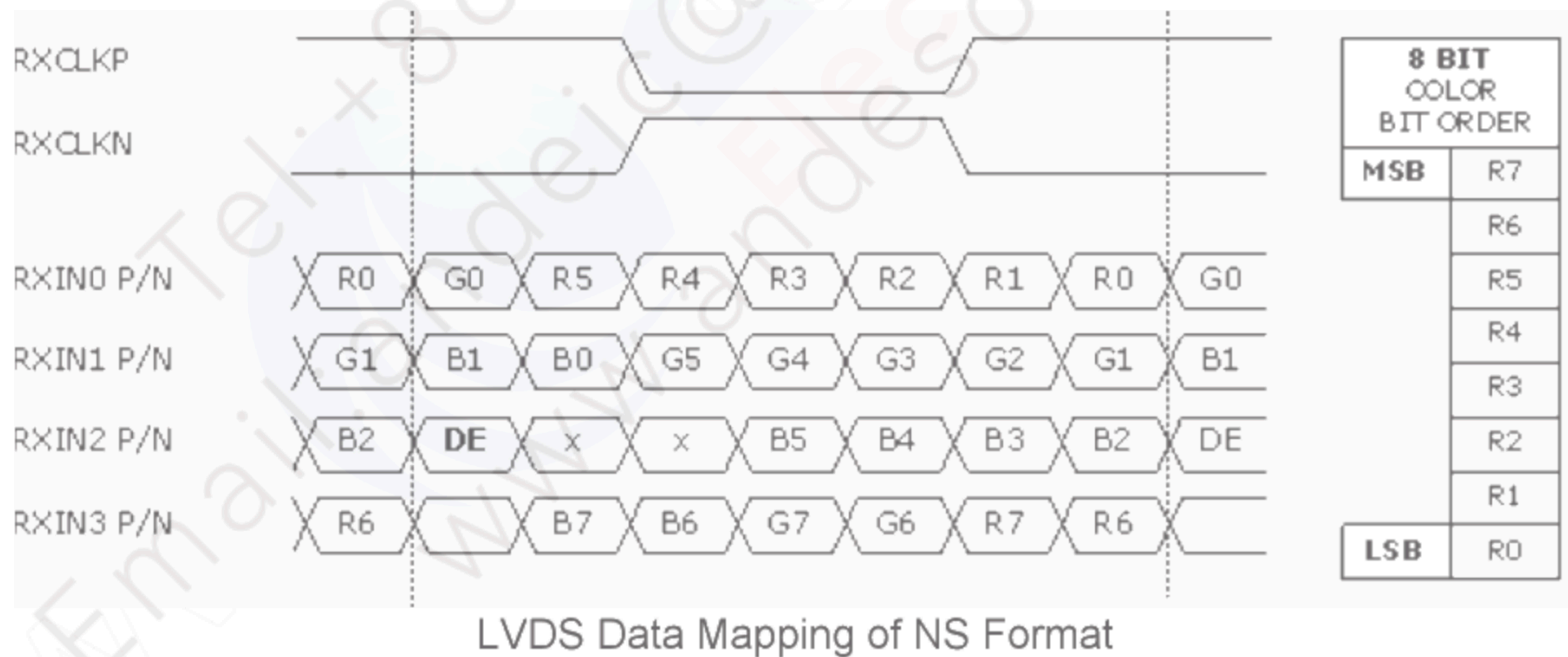
## 6.0 Signal Characteristic

### 6.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.



### 6.2 The input data format



Note1: Normally, DE, VS, HS on EVEN channel are not used.

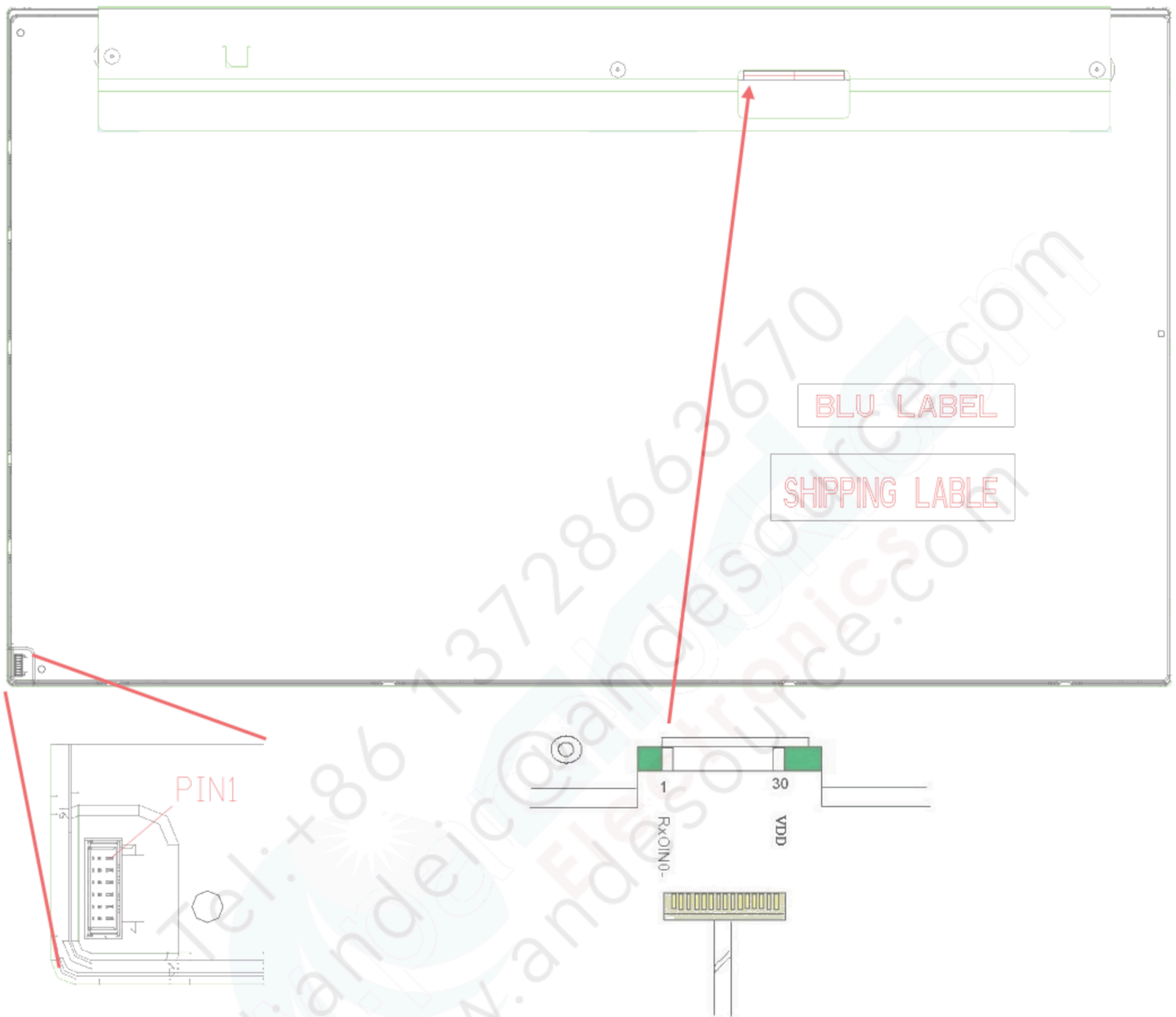
Note2: 8-bits signal input.



## 6.3 Signal Description

| PIN # | SIGNAL NAME | DESCRIPTION                                    |
|-------|-------------|------------------------------------------------|
| 1     | NC          | No contact (For AUO internal use)              |
| 2     | NC          | No contact (For AUO internal use)              |
| 3     | NC          | No contact (For AUO internal use)              |
| 4     | GND         | Power Ground                                   |
| 5     | RXIN0-      | Negative LVDS differential data input (0)      |
| 6     | RXIN0+      | Positive LVDS differential data input (0)      |
| 7     | GND         | Power Ground                                   |
| 8     | RXIN1-      | Negative LVDS differential data input (1)      |
| 9     | RXIN1+      | Positive LVDS differential data input (1)      |
| 10    | GND         | Power Ground                                   |
| 11    | RXIN2-      | Negative LVDS differential data input (2)      |
| 12    | RXIN2+      | Positive LVDS differential data input (2)      |
| 13    | GND         | Power Ground                                   |
| 14    | RXCLKIN-    | Negative LVDS differential clock input (clock) |
| 15    | RXCLKIN+    | Positive LVDS differential data input (clock)  |
| 16    | GND         | Power Ground                                   |
| 17    | RXIN3-      | Negative LVDS differential data input (3)      |
| 18    | RXIN3+      | Positive LVDS differential data input (3)      |
| 19    | GND         | Power Ground                                   |
| 20    | NC          | No contact (For AUO internal use)              |
| 21    | NC          | No contact (For AUO internal use)              |
| 22    | NC          | No contact (For AUO internal use)              |
| 23    | GND         | Power Ground                                   |
| 24    | GND         | Power Ground                                   |
| 25    | GND         | Power Ground                                   |
| 26    | VDD         | +5V power supply                               |
| 27    | VDD         | +5V power supply                               |
| 28    | VDD         | +5V power supply                               |
| 29    | VDD         | +5V power supply                               |
| 30    | VDD         | +5V power supply                               |







## 6.4 Timing Characteristics

Basically, interface timing described here is not actual input timing of LCD module but close to output timing of SN75LVDS82DGG (Texas Instruments) or equivalent.

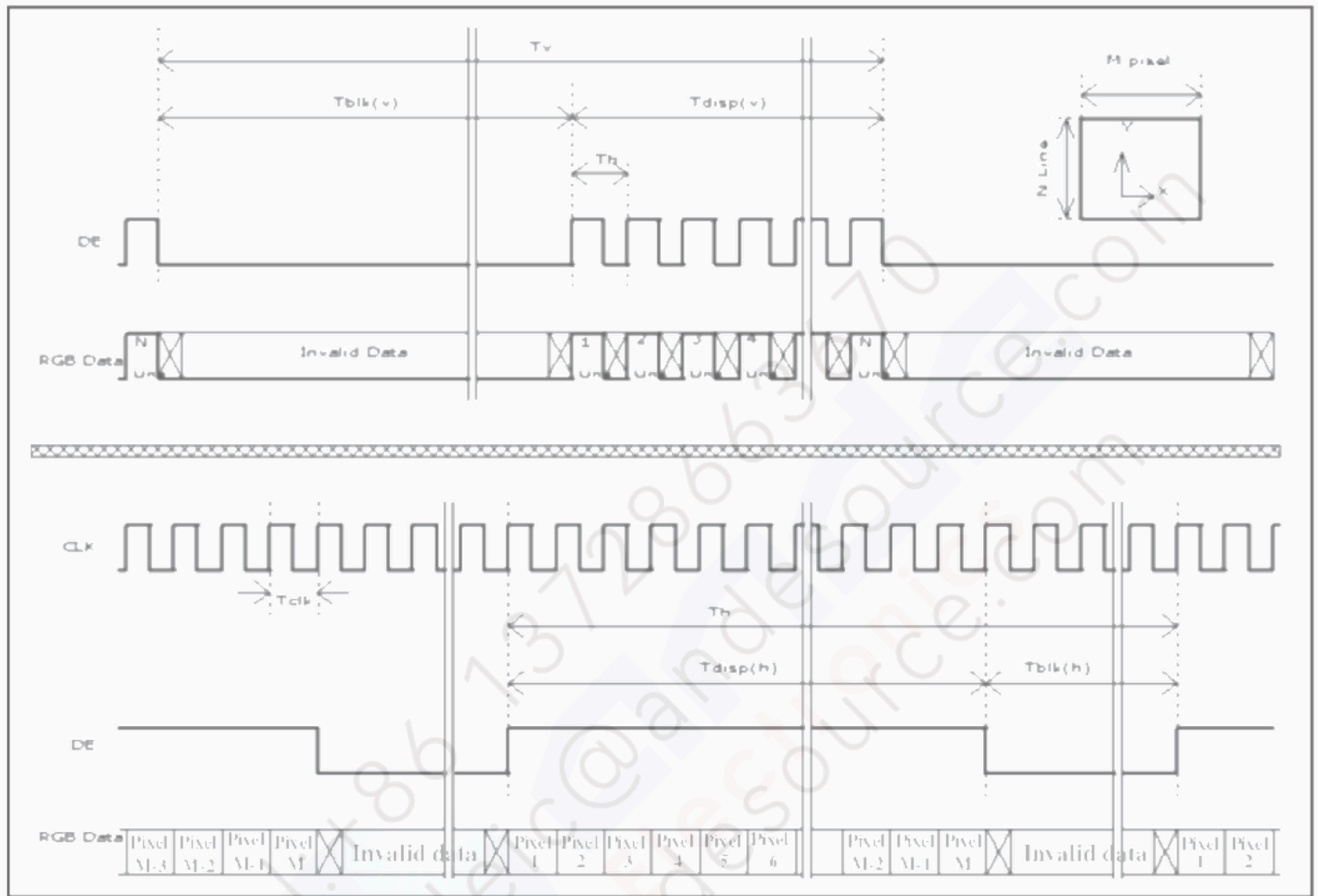
| Signal     | Item       | Symbol               | Min  | Typ  | Max  | Unit |
|------------|------------|----------------------|------|------|------|------|
| V-section  | Period     | T <sub>v</sub>       | 776  | 808  | 1023 | Th   |
|            | Active     | T <sub>disp(v)</sub> | 768  | 768  | 768  | Th   |
|            | Blanking   | T <sub>blk(v)</sub>  | 8    | 40   | 255  | Th   |
| H-section  | Period     | T <sub>h</sub>       | 1416 | 1606 | 2047 | Tclk |
|            | Active     | T <sub>disp(h)</sub> | 1366 | 1366 | 1366 | Tclk |
|            | Blanking   | T <sub>blk(h)</sub>  | 50   | 240  | 681  | Tclk |
| Clock      | Period     | Tclk                 | -    | 12.8 | -    | ns   |
|            | Frequency  | Freq                 | 55   | 78   | 90   | MHz  |
| Frame Rate | Frame Rate | F                    | 50   | 60   | 75   | Hz   |

**Note1** : DE mode only

**Note2** : Clock Frequency 90MHz(Max.)= 1416(H)\*847(V)\*75Hz



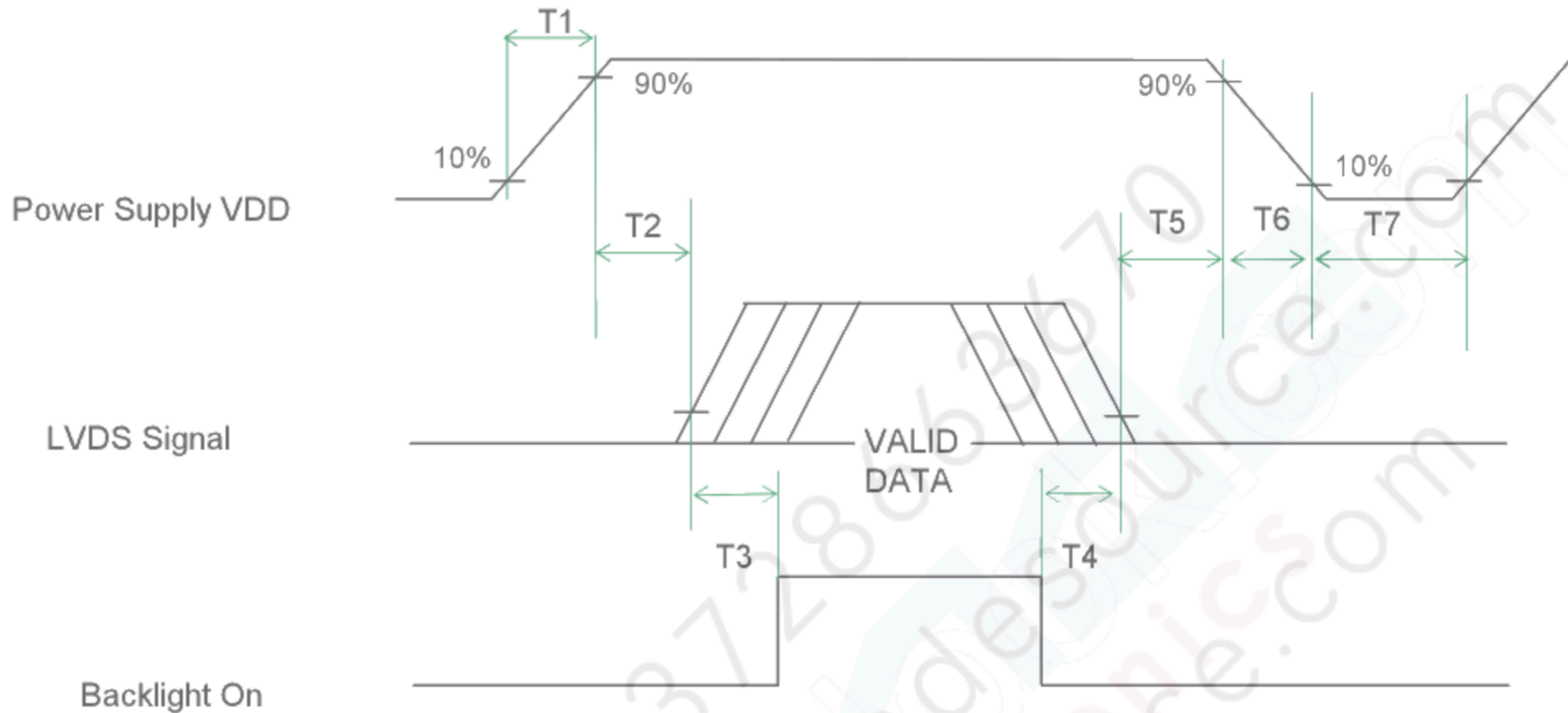
## 6.5 Timing diagram





## 6.6 Power ON/OFF Sequence

VDD power and lamp on/off sequence are as follows. 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 Sequence Timing

| Parameter | Value |      |      | Unit            |
|-----------|-------|------|------|-----------------|
|           | Min.  | Typ. | Max. |                 |
| T1        | 0.5   | -    | 10   | [ms]            |
| T2        | 0     | -    | 50   | [ms]            |
| T3        | 500   | -    | -    | [ms]            |
| T4        | 100   | -    | -    | [ms]            |
| T5        | 0     | -    | 50   | [ms]<br>Note1,2 |
| T6        | 5     | -    | 100  | [ms]<br>Note1,2 |
| T7        | 1000  | -    | -    | [ms]            |

**Note1** : Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.

**Note2** : During T5 and T6 period , please keep the level of input LVDS signals with Hi-Z state.



## 7.0 Connector & Pin Assignment

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

### 7.1 TFT LCD Module

| Connector Name / Designation | Interface Connector / Interface card                        |
|------------------------------|-------------------------------------------------------------|
| Manufacturer                 | STM or P-TWO                                                |
| Type Part Number             | MSCKT2407P30HB (STM) / AL230F-A0G1D-P (P-TWO)               |
| Mating Housing Part Number   | FI-X30HL(JAE) (Locked Type)<br>FI-X30H (JAE)(Unlocked Type) |

#### 7.1.1 Pin Assignment

| Pin# | Signal Name | Pin# | Signal Name |
|------|-------------|------|-------------|
| 1    | NC          | 2    | NC          |
| 3    | NC          | 4    | GND         |
| 5    | RXIN0-      | 6    | RXIN0+      |
| 7    | GND         | 8    | RXIN1-      |
| 9    | RXIN1+      | 10   | GND         |
| 11   | RXIN2-      | 12   | RXIN2+      |
| 13   | GND         | 14   | RXCLKIN-    |
| 15   | RXCLKIN+    | 16   | GND         |
| 17   | RXIN3-      | 18   | RXIN3+      |
| 19   | GND         | 20   | NC          |
| 21   | NC          | 22   | NC          |
| 23   | GND         | 24   | GND         |
| 25   | GND         | 26   | VDD         |
| 27   | VDD         | 28   | VDD         |
| 29   | VDD         | 30   | VDD         |



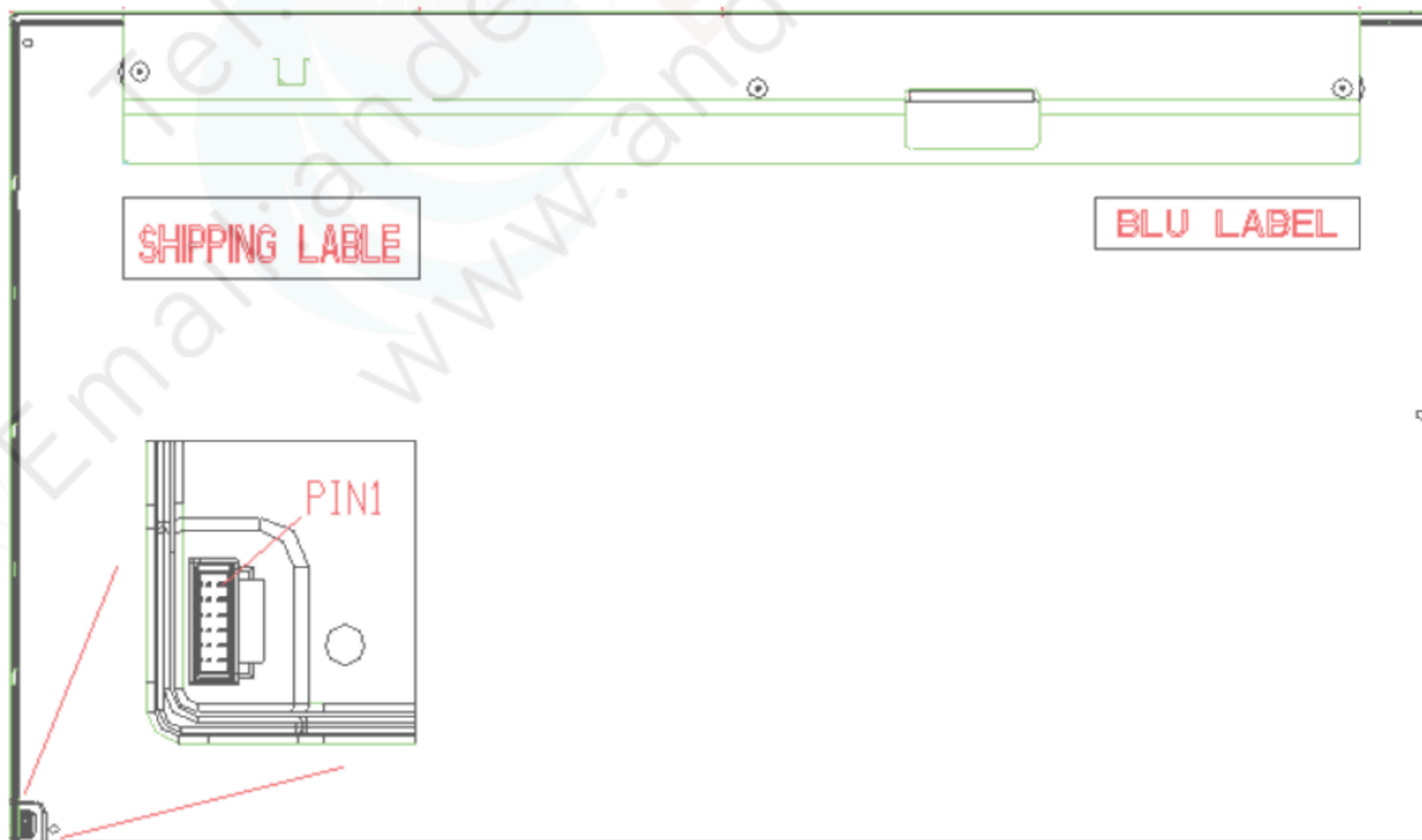
## 7.2 LED Connector on Backlight Unit.

This connector is mounted on LED light-bar.

|                              |                                      |
|------------------------------|--------------------------------------|
| Connector Name / Designation | Light Bar Connector                  |
| Manufacturer                 | ENTERY (E&T) Corporation             |
| Mating Type Part Number      | <b>3707K-Q06N-01R</b> (Wire harness) |

### 7.2.1 LED Pin assignment

| Pin# | Signal Name          |
|------|----------------------|
| 1    | IRLED1 (current out) |
| 2    | IRLED2 (current out) |
| 3    | VLED (voltage in)    |
| 4    | VLED (voltage in)    |
| 5    | IRLED3 (current out) |
| 6    | IRLED4 (current out) |

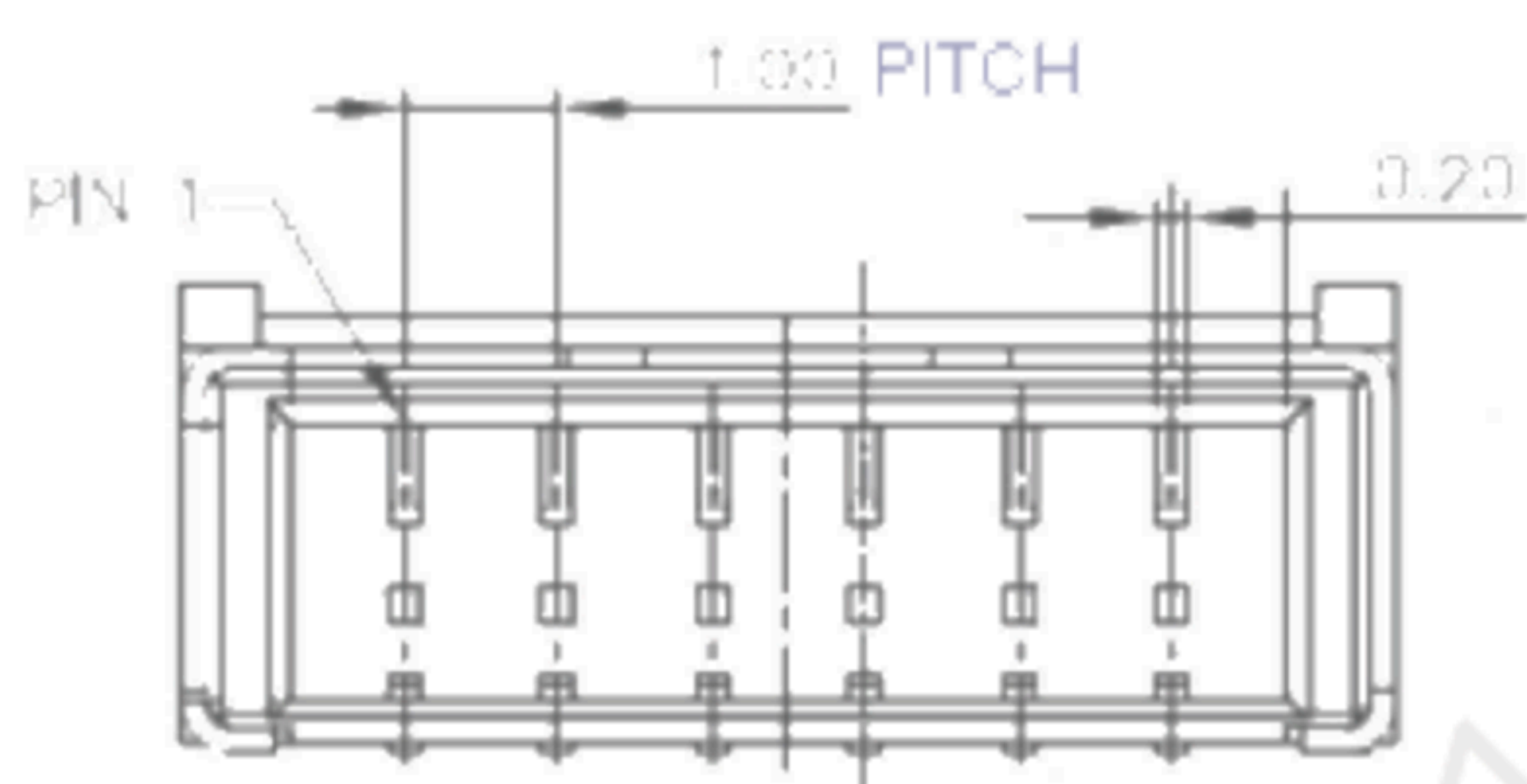
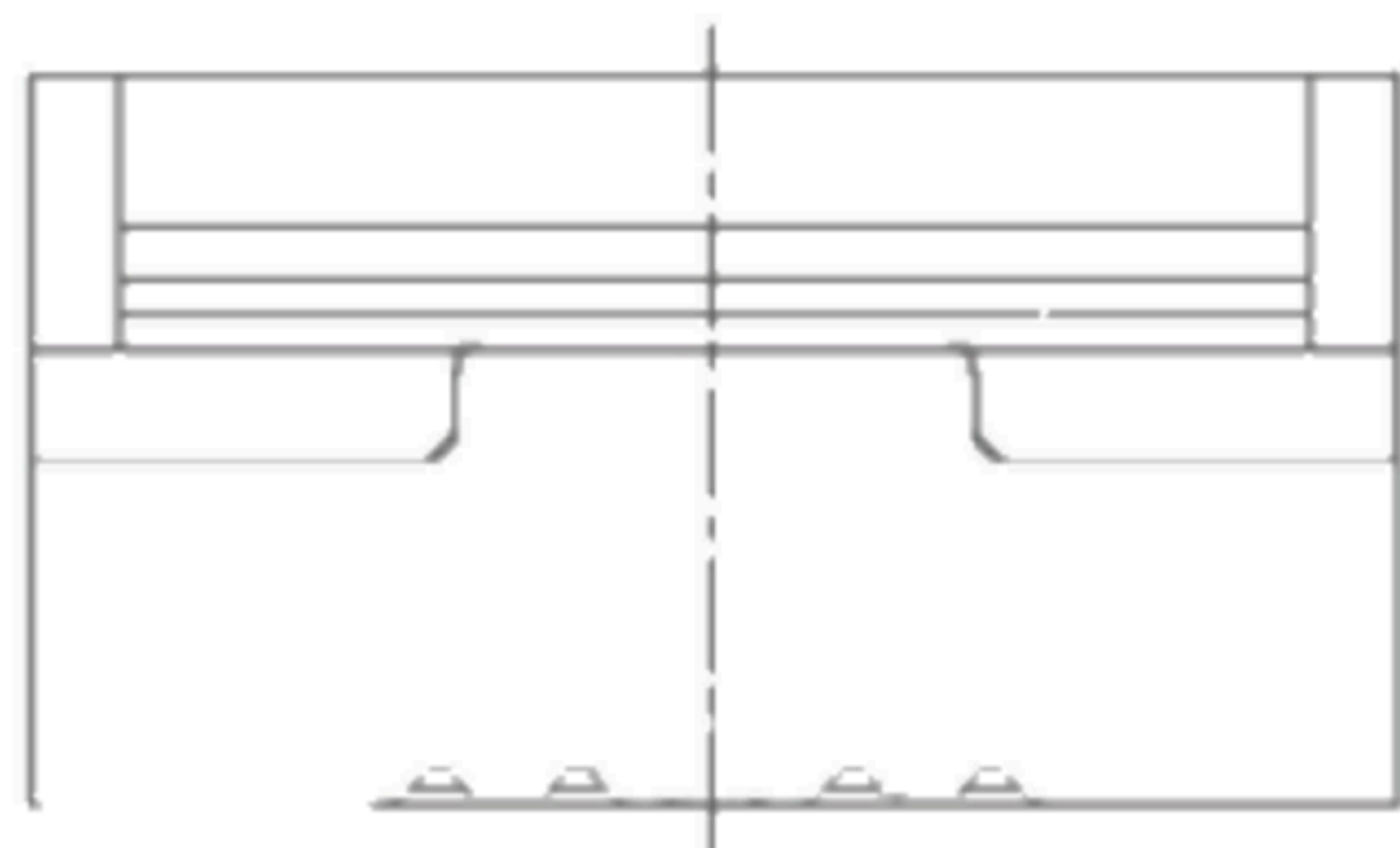




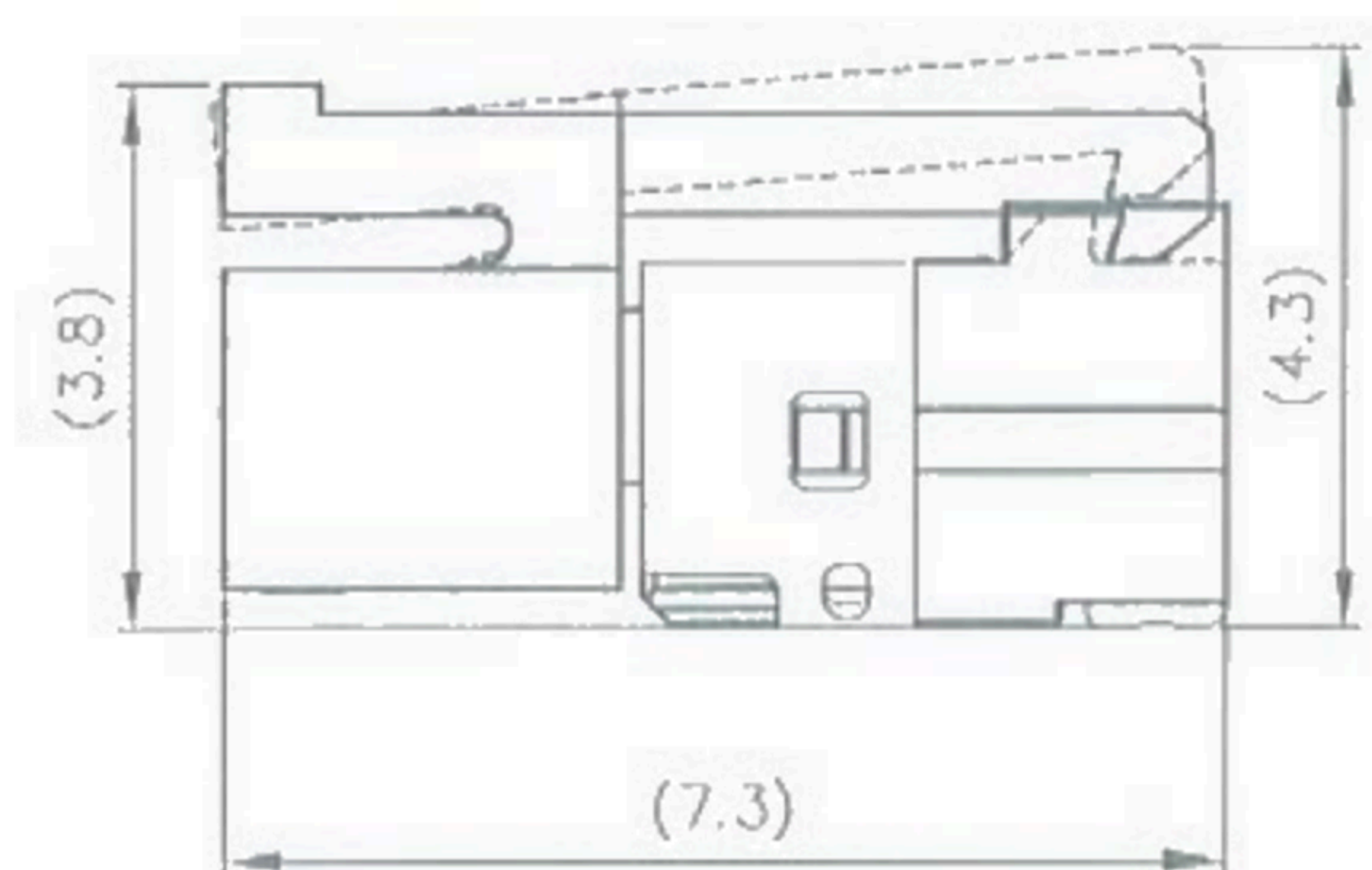
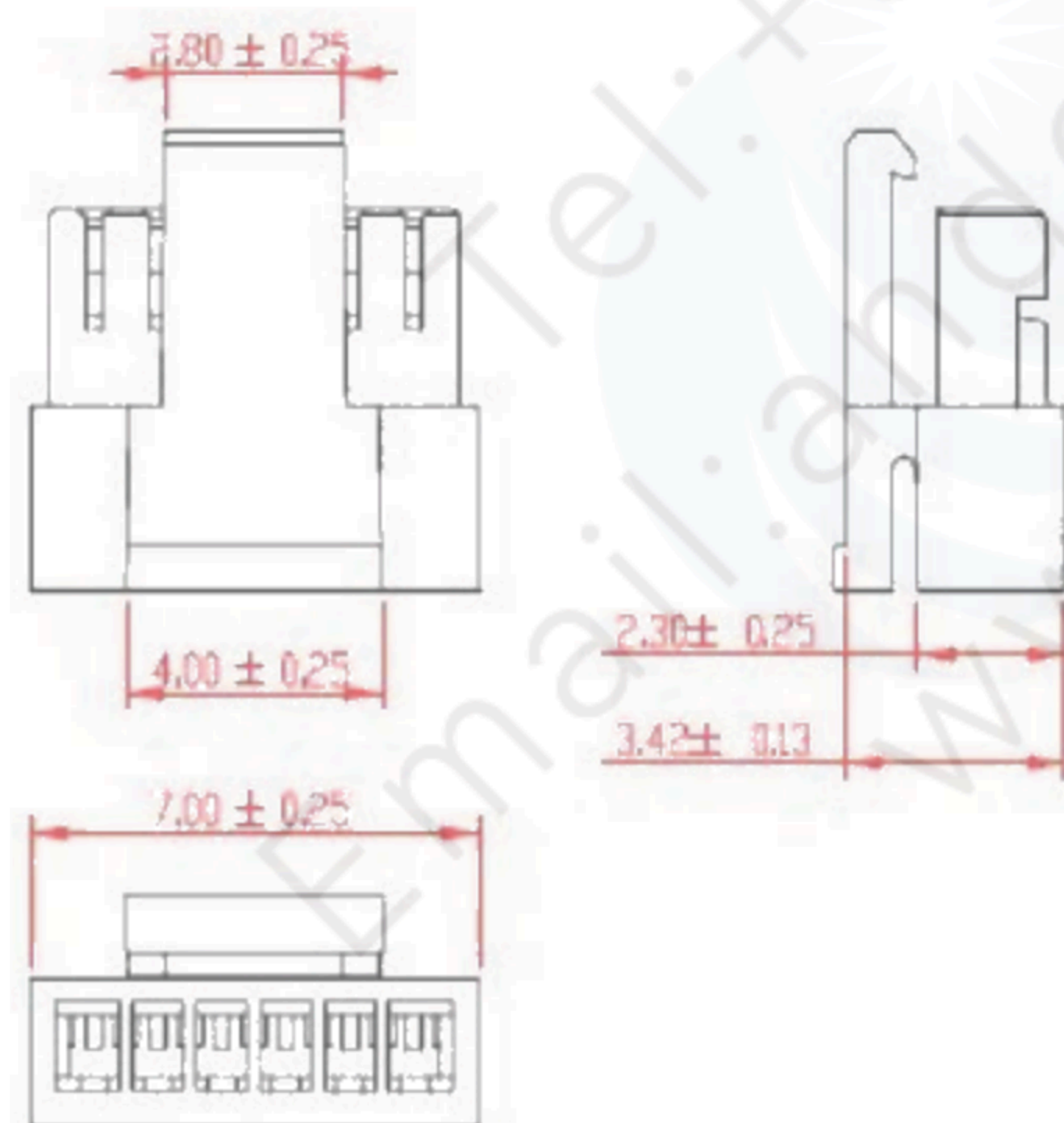
## 7.2.2 LED Connector dimension

$H \times V \times D = 13.9 \times 3.00 \times 4.25$ , Pitch = 1.0(unit = mm)

$H \times V \times D = 13.9 \times 3.00 \times 4.25$ , Pitch = 1.0(unit = mm)



## 7.2.3 LED Mating housing dimension





## 8.0 Reliability Test

Environment test conditions are listed as following table.

| Items                             | Required Condition                                                                                            | Note     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------|----------|
| Temperature Humidity Bias (THB)   | Ta= 50°C , 80%RH, 300hours                                                                                    |          |
| High Temperature Operation (HTO)  | Ta= 50°C , 50%RH, 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 Grms<br>Wave: Random<br>Frequency: 10 - 200 Hz<br>Duration: 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: 46 cm, package test                                                                                   |          |
| Thermal Shock Test (TST)          | -20°C/30min, 60°C/30min, 100 cycles                                                                           | <b>1</b> |
| On/Off Test                       | On/10sec, Off/10sec, 30,000 cycles                                                                            |          |
| ESD (Electro Static Discharge)    | Contact Discharge: ± 15KV, 150pF(330Ω ) 1sec,<br>15 points, 25 times/ point.                                  | <b>2</b> |
|                                   | Air Discharge: ± 15KV, 150pF(330Ω ) 1sec<br>15 points, 25 times/ point.                                       |          |
| Altitude Test                     | Operation:18,000 ft<br>Non-Operation:40,000 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 60°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:** EN61000-4-2, ESD class B:

Certain performance degradation allowed

No data lost

Self-recoverable

No hardware failures.

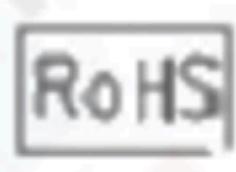


## 9.0 Shipping Label

The label is on the panel as shown below:



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

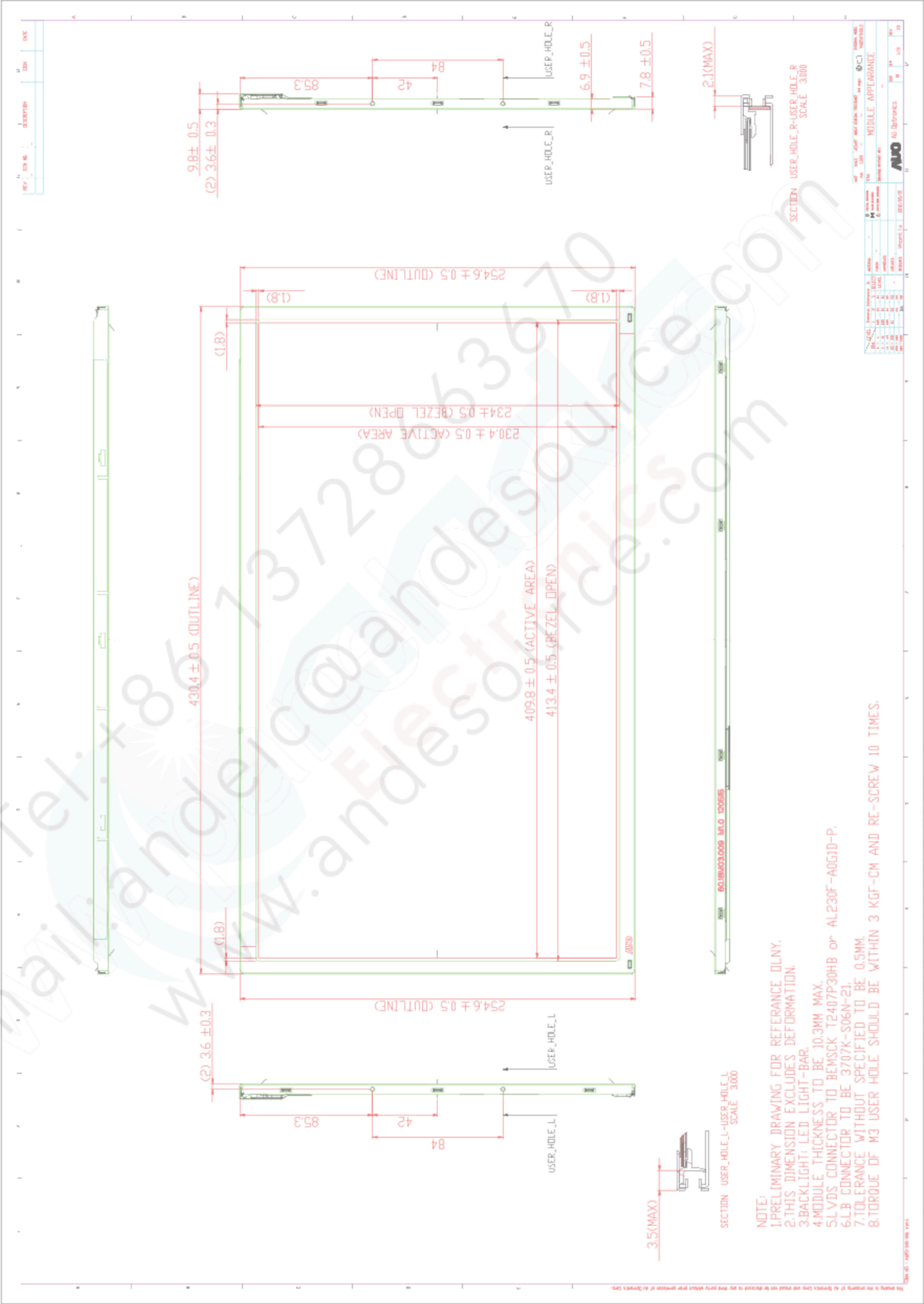
**Note 2:** For RoHS compatible products, AUO will add  for identification.

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

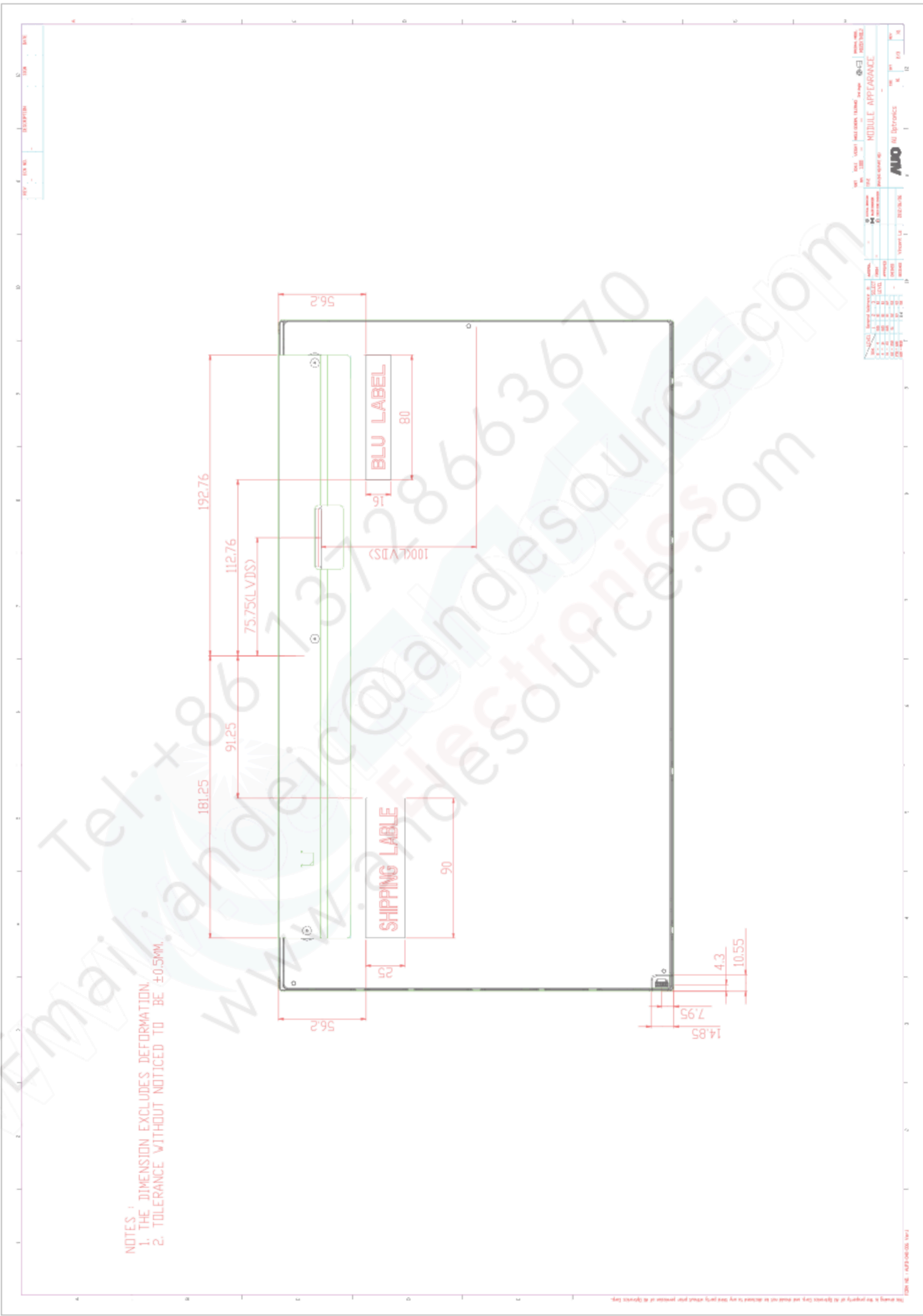
**Note 4:** The Green Mark will be presented only when the green documents have been ready by AUO Internal Green Team.



10.0 Mechanical Characteristics













## 11. Packing Specification

**M185 14片裝:48.5\*37.2\*34.8cm**

料號:

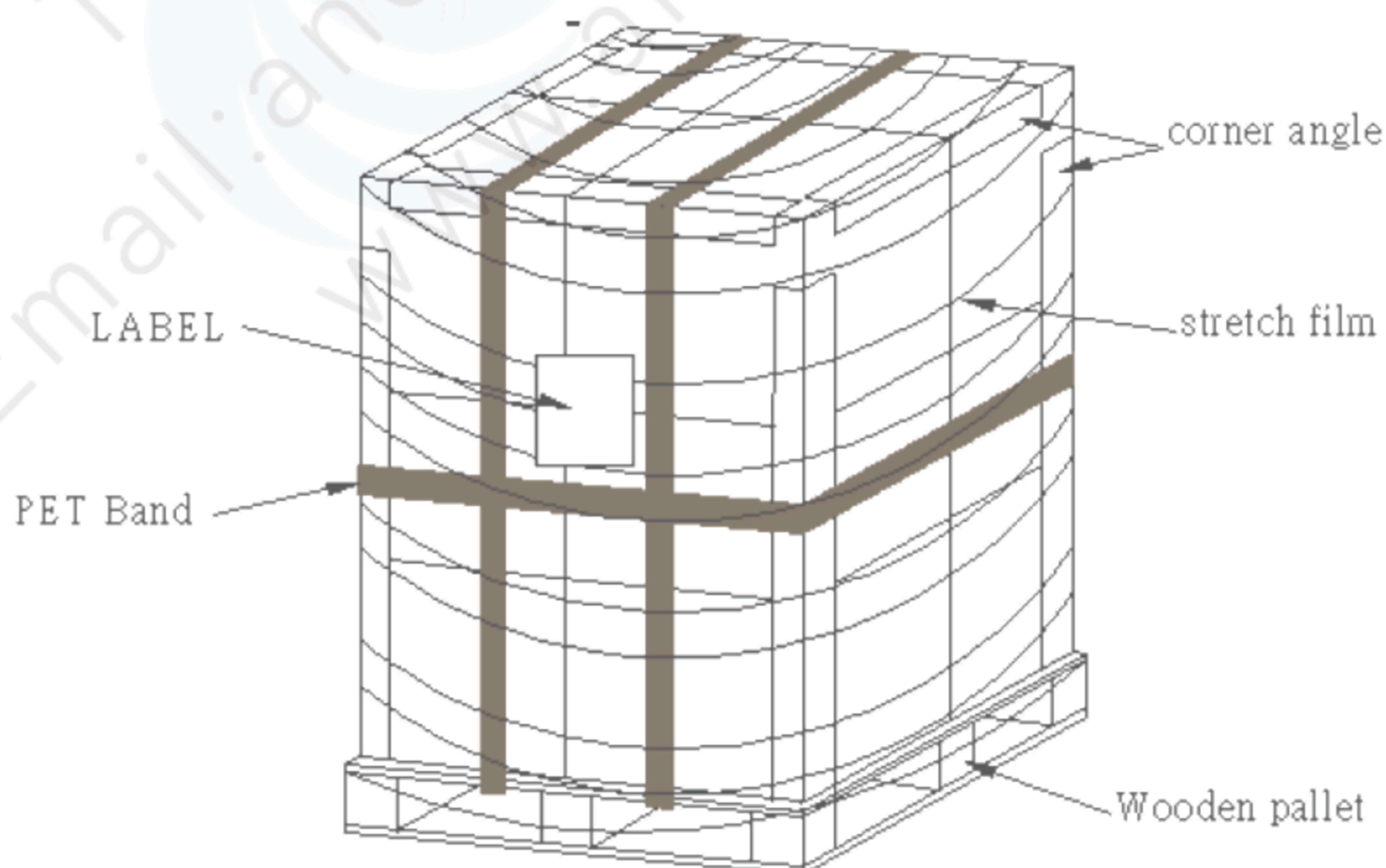
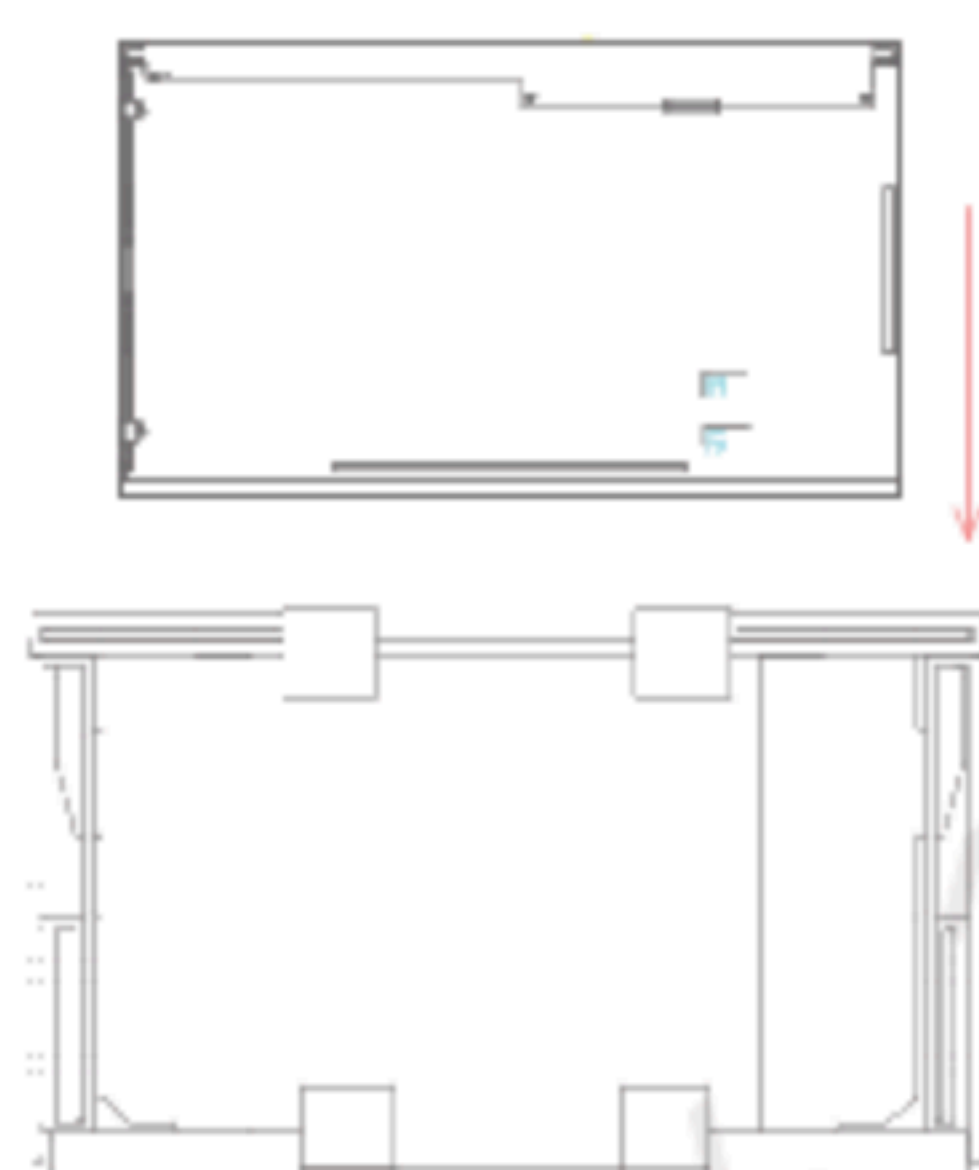
Carton:81.18M02.008 /Cushion:84.18M02.037



將M185模組置入靜電袋中並折疊後  
依序放入包裝隔板中



放置14片，放入上蓋緩衝，封箱完成



單層 pallet 打棧示意圖



## Pallet and shipment information

|   | Item                 | Specification   |                                     |            | Remark                  |
|---|----------------------|-----------------|-------------------------------------|------------|-------------------------|
|   |                      | Q'ty            | Dimension                           | Weight(kg) |                         |
| 1 | Panel                | 1               | 430.37(H)mm x 254.6(V)mm x 9.9(D)mm | 1.330      |                         |
| 2 | Cushion              | 1               | -                                   | 1.125      |                         |
| 3 | Box                  | 1               | 485(L)mm x 372(W)mm x 348(H)mm      | 1.00       | without Panel & cushion |
| 4 | Packing Box          | 14 pcs/Box      | 485(L)mm x 372(W)mm x 348(H)mm      | 20.745     | with panel & cushion    |
| 5 | Pallet               | 1               | 1150(L)mm x 980(W)mm x 138(H)mm     | 15         |                         |
| 6 | Pallet after Packing | 24 boxes/pallet | 1150(L)mm x 980(W)mm x 138(H)mm     | 509        |                         |