**(  ) Preliminary Specification**
**( ˘ ) Final Specification**

| Module | 32.0" Color TFT-LCD |
|---|---|
| Model Name | M320QAN01.0 |

| Customer | Date |
|---|---|

_____    _____

**Approved by**

_____    _____

Note: This Specification is subject to change without notice.

| Approved by | Date |
|---|---|

Howard Lee    June 25, 2014

**Prepared by**    **Date**

Shihhao Wang    June 25, 2014

AU Optronics corporation

# Contents

# Record of Revision

| Version | Date | Page | Old description | New Description | Remark |
|---|---|---|---|---|---|
| 0.1 | 2013/8/16 | All | First version release | - | |
| 0.2 | 2013/11/26 | P6 | TBD (Typ.)<br>LCD module: PDD (Typ.)=TBD @ white pattern, 60Hz, 12V<br>Backlight unit : PBLU (Typ.) =38.9 @Is=130mA | 52W (Typ.)<br>LCD module: PDD(Typ.)=10.8W @white pattern,60Hz, 12V<br>Backlight unit : PBLU (Typ.) =41.2 W@Is=120mA | |
| | | P6 | TBD | Update weight of panel | |
| | | P8 | Color Coordinates | Revise | |
| | | P14 | Connector Type | Revise | |
| | | P17 | 3.3.2 Recommended Operating Condition | Revise | |
| | | P22 | 3.4.5 Input Timing Specification | Revise | |
| | | P23 | 3.5 Power ON/OFF Sequence<br><br>Power Sequence Timing | Revise<br><br>Revise | |

P8 Old Color Coordinates (CIE 1931):

| Color Coordinates (CIE 1931) | | | |
|---|---|---|---|
| Red x | 0.624 | 0.654 | 0.684 |
| Red y | 0.303 | 0.333 | 0.363 |
| Green x | 0.275 | 0.305 | 0.335 |
| Green y | 0.596 | 0.626 | 0.656 |
| Blue x | 0.116 | 0.146 | 0.176 |
| Blue y | 0.017 | 0.047 | 0.077 |
| White x | 0.283 | 0.313 | 0.343 |
| White y | 0.299 | 0.329 | 0.359 |

P8 New Color Coordinates (CIE 1931):

| Color Coordinates (CIE 1931) | | | |
|---|---|---|---|
| Red x | 0.628 | 0.658 | 0.688 |
| Red y | 0.302 | 0.332 | 0.362 |
| Green x | 0.272 | 0.302 | 0.332 |
| Green y | 0.594 | 0.624 | 0.654 |
| Blue x | 0.117 | 0.147 | 0.177 |
| Blue y | 0.023 | 0.056 | 0.086 |
| White x | 0.283 | 0.313 | 0.343 |
| White y | 0.299 | 0.329 | 0.359 |

P14 Old Connector Type:

| TFT-LCD Connector | Manufacturer | P-TWO | JAE | CHIEF LAND |
|---|---|---|---|---|
| | Part Number | 187060-4122 | FI-RE41S-HF | 107C41-0000RA-G4 |
| Mating Connector | Manufacturer | JAE | | |
| | Part Number | FI-RE41-HL | | |

P14 New Connector Type:

| TFT-LCD Connector | Manufacturer | P-TWO | JAE |
|---|---|---|---|
| | Part Number | 187060-4122 | FI-RE41S-HF |
| Mating Connector | Manufacturer | JAE or compatible | |
| | Part Number | FI-RE41CL | |

P17 Old 3.3.2 Recommended Operating Condition:

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| VDD | Power supply Input voltage | 10.8 | 12.0 | 13.2 | [Volt] | |
| IDD | Power supply Input Current (RMS) | | TBD | TBD | [A] | VDD=12.0V, White pattern, Fv=60Hz |
| PDD | VDD Power Consumption | | TBD | TBD | [Watt] | VDD=12.0V, White pattern, Fv=60Hz |
| IRush | Inrush Current | | | TBD | [A] | Note 3-1 |
| VDDrp | Allowable VDD Ripple Voltage | | | VDD*5% | [mV] | VDD=12.0V, White pattern, Fv=73Hz |

P17 New 3.3.2 Recommended Operating Condition:

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| VDD | Power supply Input voltage | 10.8 | 12.0 | 13.2 | [Volt] | |
| IDD | Power supply Input Current (RMS) | | 0.9 | 1.1 | [A] | VDD=12.0V, White pattern, Fv=60Hz |
| PDD | VDD Power Consumption | | 10.8 | 13.3 | [Watt] | VDD=12.0V, White pattern, Fv=60Hz |
| IRush | Inrush Current | | | 3 | [A] | Note 3-2 |
| VDDrp | Allowable VDD Ripple Voltage | | | VDD*5% | [mV] | VDD=12.0V, White pattern, Fv=60Hz |

P22 Old 3.4.5 Input Timing Specification:

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | | 2250 | | Th | |
| Tdisp (v) | | Active | | 2160 | | Th | |
| Tblk (v) | | Blanking | | 90 | | Th | |
| Fv | | Frequency | | 60 | | Hz | |
| Th | Horizontal Section | Period | | 2080 | | Tclk | |
| Tdisp (h) | | Active | | 1920 | | Tclk | |
| Tblk (h) | | Blanking | | 160 | | Tclk | |
| Fh | | Frequency | | 135 | | KHz | |
| Fclk | Clock per lane | Frequency | | 2.7 | | GHz | |

P22 New 3.4.5 Input Timing Specification:

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | 2180 | 2200 | 2372 | Th | |
| Tdisp (v) | | Active | 2160 | 2160 | 2160 | Th | |
| Tblk (v) | | Blanking | 20 | 40 | 212 | Th | |
| Fv | | Frequency | 59 | 60 | 61 | Hz | |
| Th | Horizontal Section | Period | 2000 | 2100 | 2176 | Tclk | |
| Tdisp (h) | | Active | 1920 | 1920 | 1920 | Tclk | |
| Tblk (h) | | Blanking | 80 | 180 | 256 | Tclk | |
| Tclk | Pixel Clock | Period | 3.89 | 3.61 | 3.57 | ns | 1/Fclk |
| Fclk | | Frequency | 257.24 | 277.20 | 280.00 | MHz | Note 3-4 |
| | Link Rate per Lane | | | 2.7 | | Gbps | |

| Symbol | Value Min. | Value Typ. | Value Max. | Unit | Remark |
|---|---|---|---|---|---|
| T1 | 0.5 | | 10 | [ms] | |
| T2 | TBD | | TBD | [ms] | |
| T3 | TBD | | | [ms] | |
| T4 | 100 | | | [ms] | |
| T5 | 0 | | 50 | [ms] | Note 3-4, Note 3-5 |
| T6 | 0 | | 150 | [ms] | Note 3-5 |
| T7 | 1000 | | | [ms] | |

| Symbol | Value Min. | Value Typ. | Value Max. | Unit | Remark |
|---|---|---|---|---|---|
| T1 | 0.5 | | 10 | [ms] | |
| T2 | 100 | | | [ms] | |
| T3 | 0 | | | [ms] | Note 2-5 |
| T4 | 500 | | | [ms] | |
| T5 | 100 | | | [ms] | |
| T6 | 0 | | 50 | [ms] | Note 2-6, Note 2-7 |
| T7 | 0 | | 150 | [ms] | Note 2-7 |
| T8 | 1000 | | | [ms] | |

| | | Page | Before | After |
|---|---|---|---|---|
| | | P24 | Each LED light bar includes 44 pcs LED package. (4 strings and 11 pcs LED of one string). | Each LED light bar includes 52 pcs LED package. (4 strings and 13 pcs LED of one string). |
| | | P28 | **4.3.2 Recommended Operating condition** (table) | **Revise** (table) |
| | | P30 | **Vibration Test condition**<br>Acceleration : 1.75 Grms<br>Wave form : Random<br>Bandwidth & Level :<br>Frequency / PSD(g²/Hz)<br>10~300HZ / 0.0073<br>301~500Hz / 0.0045<br>Duration : 30 Minutes each Axis (X, Y, Z)<br>X : Horizontal, face up<br>Y : Horizontal, face up<br>Z : Horizontal, face up | **Revise**<br>Frequency:10~57Hz/Vibration width(one side):0.075mm<br>: 58~500Hz/Acceleration:9.8 m/s2<br>Sweep time: 11minutes<br>Test period: 3 hours(1h for each direction of X,Y,Z) |
| | | P30 | **Drop Test condition**<br>Drop Test / Height: 30.5 cm, package test | **Remove** |
| 0.3 | 2014/03/17 | P23 | **3.4.5 Input Timing Specification** (table) | **Revise** (table) |
| | | P33 | Connector position<br>X-dir: 28.9+a/-5mm<br>Y-dir: 85+/-5mm | Connector position shift to<br>X-dir: 17.2+/-5mm<br>Y-dir: 84.7+/-5mm |
| 1.0 | 2014/05/14 | P8 | - | Add sRGB coverage ratio |
| | | P24 | T2 Min. 100ms | T2 Min. 0ms, Max. 200ms |
| 1.1 | 2014/06/16 | P23 | - | 3.4.5 Input Timing Specification<br>Add Fh Description |
| | | P6 | Power Consumption<br>52W (Typ.)<br>Backlight unit : PBLU (Typ.)<br>=41.2W @Is=120mA | Power Consumption<br>45.6W (Typ.)<br>Backlight unit : PBLU (Typ.)<br>=34.8W @Is=120mA |

**4.3.2 Recommended Operating condition (Before)**

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Is | LED String Current | | 130 | 143 | [mA] | 100% duty ratio of LED chip. |
| Vs | LED String Voltage | 33 | 37.4 | 39.6 | [Volt] | Is=130mA @ 100% duty ratio, Note 4-1/Note 4-5 |
| ΔVs | Maximum Vs Voltage Deviation of light bar | | | 2.2 | [Volt] | Is=130mA @ 100% duty ratio, Note 4-2 |
| PLED | LED Light Bar Power Consumption | | 38.9 | 41.18 | [Watt] | Note 4-3 |
| LTLED | LED Life Time | 30,000 | | | [Hour] | Note 4-4 |

**4.3.2 Recommended Operating condition (Revise)**

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Is | LED String Current | | 120 | 132 | [mA] | 100% duty ratio of LED chip |
| Vs | LED String Voltage | 39 | 42.9 | 46.8 | [Volt] | Is=120mA @ 100% duty ratio, Note 4-1/Note 4-5 |
| ΔVs | Maximum Vs Voltage Deviation of light bar | | | 2.6 | [Volt] | Is=120mA @ 100% duty ratio, Note 4-2 |
| PLED | LED Light Bar Power Consumption | | 41.2 | 44.9 | [Watt] | Note 4-3 |
| LTLED | LED Life Time | 30,000 | | | [Hour] | Note 4-4 |
| OVP | Over Voltage Protection in system board | 110% VLED max | | | [Volt] | Note 4-5 |

**3.4.5 Input Timing Specification (Before)**

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | 2180 | 2200 | 2372 | Th | |
| Tdisp (v) | | Active | 2160 | 2160 | 2160 | Th | |
| Tblk (v) | | Blanking | 20 | 40 | 212 | Th | |
| Fv | | Frequency | 59 | 60 | 61 | Hz | |
| Th | Horizontal Section | Period | 2000 | 2100 | 2176 | Tclk | |
| Tdisp (h) | | Active | 1920 | 1920 | 1920 | Tclk | |
| Tblk (h) | | Blanking | 80 | 180 | 256 | Tclk | |
| Tclk | Pixel Clock | Period | 3.89 | 3.61 | 3.57 | ns | 1/Fclk |
| Fclk | | Frequency | 257.24 | 277.20 | 280.00 | MHz | Note 3-4 |
| | Link Rate per Lane | | | 2.7 | | Gbps | |

**3.4.5 Input Timing Specification (Revise)**

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | 2180 | 2200 | 2372 | Th | |
| Tdisp (v) | | Active | 2160 | 2160 | 2160 | Th | |
| Tblk (v) | | Blanking | 20 | 40 | 212 | Th | |
| Fv | | Frequency | 59 | 60 | 61 | Hz | |
| Th | Horizontal Section | Period | 2026 | 2100 | 2176 | Tclk | |
| Tdisp (h) | | Active | 1920 | 1920 | 1920 | Tclk | |
| Tblk (h) | | Blanking | 106 | 180 | 256 | Tclk | |
| Tclk | Pixel Clock | Period | 3.84 | 3.61 | 3.57 | ns | 1/Fclk |
| Fclk | | Frequency | 260.58 | 277.20 | 280.00 | MHz | Note 3-4 |
| | Link Rate per Lane | | | 2.7 | | Gbps | |

| | | P25 | Each LED light bar includes 52 pcs LED package. (4 strings and 13 pcs LED of one string). | Each LED light bar includes 44 pcs LED package. (4 strings and 11 pcs LED of one string). | 5 |
|---|---|---|---|---|---|
| | | P29 | **4.3.2 Recommended Operating Condition** | **4.3.2 Recommended Operating Condition** | |

**P29 (left table): 4.3.2 Recommended Operating Condition**

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| I$_S$ | LED String Current | -- | 120 | 132 | [mA] | 100% duty ratio of LED chip |
| V$_S$ | LED String Voltage | 39 | 42.9 | 46.8 | [Volt] | I$_S$=120mA @ 100% duty ratio, Note 4-1& Note 4-5 |
| ΔV$_S$ | Maximum Vs Voltage Deviation of light bar | -- | -- | 2.6 | [Volt] | I$_S$=120mA @ 100% duty ratio, Note 4-2 |
| P$_{LED}$ | LED Light Bar Power Consumption | -- | 42 | 44.9 | [Watt] | Note 4-3 |
| LT$_{time}$ | LED Life Time | 30,000 | -- | -- | [Hour] | Note 4-4 |
| OVP | Over Voltage Protection in system board | 105% Vs (max) | -- | -- | [Volt] | Note 4-5 |

**P29 (right table): 4.3.2 Recommended Operating Condition**

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| I$_S$ | LED String Current | -- | 120 | 132 | [mA] | 100% duty ratio of LED chip |
| V$_S$ | LED String Voltage | 33 | 36.3 | 39.6 | [Volt] | I$_S$= 120mA @ 100% duty ratio, Note 4-1& Note 4-5 |
| ΔV$_S$ | Maximum Vs Voltage Deviation of light bar | -- | -- | 2.2 | [Volt] | I$_S$= 120mA @ 100% duty ratio, Note 4-2 |
| P$_{LED}$ | LED Light Bar Power Consumption | -- | 34.8 | 38 | [Watt] | Note 4-3 |
| LT$_{time}$ | LED Life Time | 30,000 | -- | -- | [Hour] | Note 4-4 |
| OVP | Over Voltage Protection in system board | 110% Vs (max) | -- | -- | [Volt] | Note 4-5 |

## 1 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 a TFT-LCD 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. Otherwise the TFT-LCD Module may be damaged.
10) Insert or pull out the interface connector, be sure not to rotate nor tilt it of the TFT-LCD Module.
11) Do not twist nor bend the TFT -LCD Module even momentary. It should be taken into consideration that no bending/twisting forces are applied to the TFT-LCD Module from outside. Otherwise the TFT-LCD Module may be damaged.
12) Please avoid touching COF position while you are doing mechanical design.
13) 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　and 35　at normal humidity.

## 2 General Description

This specification applies to the 32.0 inch wide Color a-Si TFT-LCD Module M320QAN01.0. The display supports the UHD - 3840(H) x 2160(V) screen format and 1.07B colors (10bits data input). The input interface is 8-lanes eDP and this module doesn't contain an driver board for backlight.

### 2.1 Display Characteristics

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

| ITEMS | Unit | SPECIFICATIONS |
|---|---|---|
| Screen Diagonal | [mm] | 812.8 (32.0″) |
| Active Area | [mm] | 708.48 (H) x 398.52 (V) |
| Pixels H x V | - | 3840(x3) x 2160 |
| Pixel Pitch | [um] | 184.5 (per one triad) × 184.5 |
| Pixel Arrangement | - | R.G.B. Vertical Stripe |
| Display Mode | - | Normally Black |
| White Luminance ( Center ) | [cd/m²] | 350 (Typ.) |
| Contrast Ratio | - | 1000 (Typ.) |
| Response Time | [msec] | 12 (Typ., Gray to Gray) |
| Power Consumption (LCD Module + Backligh unit) | [Watt] | 45.6W (Typ.)<br>LCD module : PDD(Typ.)=10.8W @white pattern, 60Hz, 12V<br>Backlight unit : PBLU (Typ.) =34.8W @Is=120mA |
| Weight | [Grams] | 5,160 |
| Outline Dimension | [mm] | 727.88 (H) x 422.07 (V) × 15.1 (D) Typ. |
| Electrical Interface | - | 8-lanes eDP , 10bits RGB data input |
| Support Color | - | 1.07B colors |
| Surface Treatment | - | Anti-Glare, 3H |
| Temperature Range<br>    Operating<br>    Storage (Shipping) | [ºC]<br>[ºC] | 0 to +50<br>-20 to +60 |
| RoHS Compliance | - | RoHS Compliance |
| TCO Compliance | - | TCO 6.0 Compliance |

## 2.2 Absolute Maximum Rating of Environment

Permanent damage may occur if exceeding the following maximum rating.

| Symbol | Description | Min. | Max. | Unit | Remark |
|--------|-------------|------|------|------|--------|
| TOP | Operating Temperature | 0 | +50 | [°C] | Note 2-1 |
| TGS | Glass surface temperature (operation) | 0 | +65 | [°C] | Note 2-1 Function judged only |
| HOP | Operation Humidity | 5 | 90 | [%RH] | Note 2-1 |
| TST | Storage Temperature | -20 | +60 | [°C] | |
| HST | Storage Humidity | 5 | 90 | [%RH] | |

Note 2-1: Temperature and relative humidity range are shown as the below figure.

       1. 90% RH Max ( Ta 39 )

       2. Max wet-bulb temperature at 39 or less. ( Ta 39 )

       3. No condensation
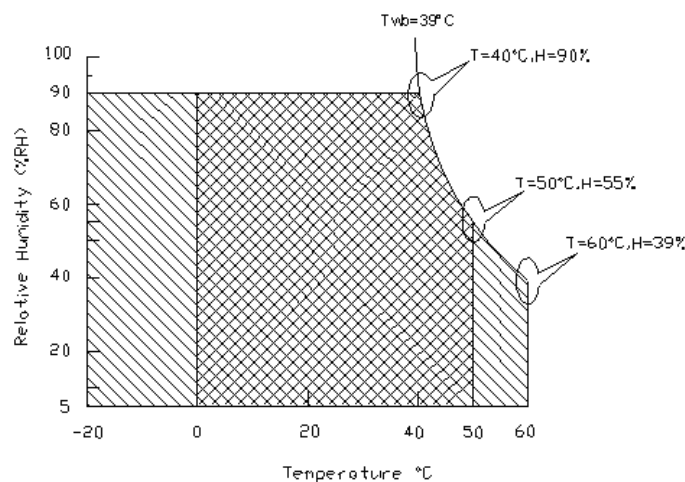


Operating Range     ⬚       Storage Range    ⬚ + ⬚
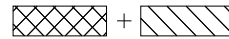
## 2.3 Optical Characteristics

The optical characteristics are measured on the following test condition.

**Test Condition:**

1. Equipment setup: Please refer to Note 2-2.

2. Panel Lighting time: 30 minutes

3. VDD=12.0V, Fv=60Hz, Is=120mA, Ta=25

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| $L_W$ | White Luminance (Center of screen) | | 280 | 350 | - | [cd/m2] | Note 2-2 By SR-3 |
| $L_{uni}$ | Luminance Uniformity (9 points) | | 75 | 80 | - | [%] | Note 2-3 By SR-3 |
| CR | Contrast Ratio (Center of screen) | | 600 | 1000 | - | - | Note 2-4 By SR-3 |
| $\theta_R$ | Horizontal Viewing Angle (CR=10) | Right | 75 | 89 | - | [degree] | Note 2-5 By SR-3 |
| $\theta_L$ | | Left | 75 | 89 | - | | |
| $\Phi_H$ | Vertical Viewing Angle (CR=10) | Up | 75 | 89 | - | | |
| $\Phi_L$ | | Down | 75 | 89 | - | | |
| $T_{GTG}$ | Response Time | Gray to Gray | - | 12 | - | [msec] | Note 2-6 By TRD-100 |
| $R_x$ | Color Coordinates (CIE 1931) | Red x | 0.628 | 0.658 | 0.688 | - | By SR-3 |
| $R_y$ | | Red y | 0.302 | 0.332 | 0.362 | | |
| $G_x$ | | Green x | 0.272 | 0.302 | 0.332 | | |
| $G_y$ | | Green y | 0.594 | 0.624 | 0.654 | | |
| $B_x$ | | Blue x | 0.117 | 0.147 | 0.177 | | |
| $B_y$ | | Blue y | 0.023 | 0.056 | 0.086 | | |
| $W_x$ | | White x | 0.283 | 0.313 | 0.343 | | |
| $W_y$ | | White y | 0.299 | 0.329 | 0.359 | | |
| | sRGB coverage ratio | | | 100 | | [%] | By SR-3 |
| CT | Crosstalk | | - | - | 1.5 | [%] | Note 2-7 By SR-3 |
| $F_{dB}$ | Flicker (Center of screen) | | - | - | -20 | [dB] | Note 2-8 By SR-3 |

Note 2-2: Equipment setup:

Photo detector (SR-3, TRD-100)

Measured distance (50cm)

LCD

TFT-LCD

Center of the screen
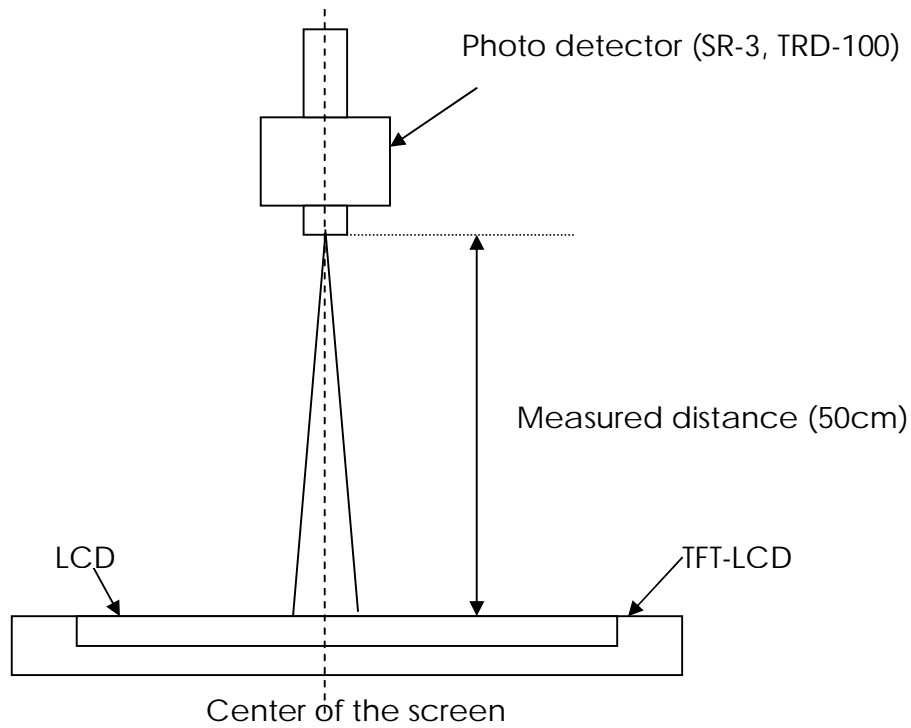
Note 2-3: Luminance Uniformity Measurement

**Definition:**

$$\text{Luminance Uniformity} = \frac{\text{Minimum Luminance of 9 Points (P1} \sim \text{P9)}}{\text{Maximum Luminance of 9 Points (P1} \sim \text{P9)}}$$

a. Test pattern: White Pattern
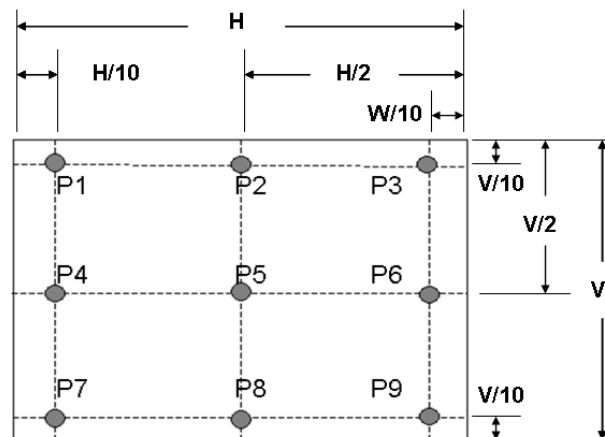
Note 2-4: Contrast Ratio Measurement

**Definition:**

$$\text{Contrast Ratio} = \frac{\text{Luminance of White pattern}}{\text{Luminance of Black pattern}}$$

a. Measured position: Center of screen (P5) & perpendicular to the screen ($\theta=\Phi=0°$)

Note 2-5: Viewing angle measurement

**Definition:** The angle at which the contrast ratio is greater than 10 & 5 .

a. Horizontal view angle: Divide to left & right ($\theta_L$ & $\theta_R$)
   Vertical view angle: Divide to up & down ($\Phi_H$ & $\Phi_L$)

Normal Line
$\phi = 0°$, $\theta = 0°$

$\theta_L$    $\theta_R$

$\phi_H$

12 O'clock direction
y $\phi_H = 90°$

$\theta_L = 90°$ x

$\phi_L$

6 O'clock direction
$\phi_L = 90°$    y'

x'

$\theta_R = 90°$
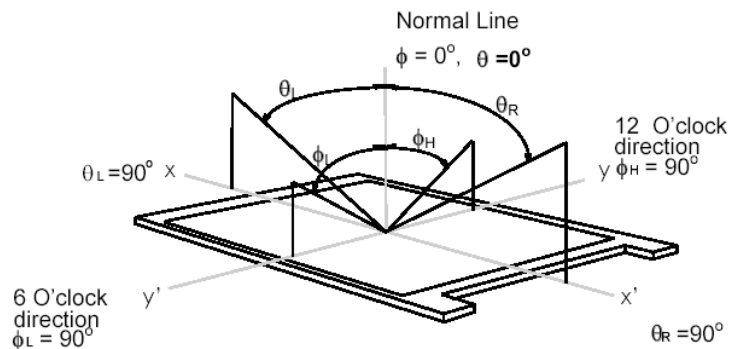
Note 2-6: Response time measurement

The output signals of photo detector are measured when the input signals are changed from "Gray level A" to "Gray level B" (falling time, $T_f$), and from "Gray level B" to "Gray level A" (rising time, $T_r$), respectively. The response time is interval between the 10% and 90% of optical response.

%

$T_f$      $T_r$

Optical
Response

100
90

Gray level A   Gray level B   Gray level B   Gray level A

10
0

1 Frame    1 Frame
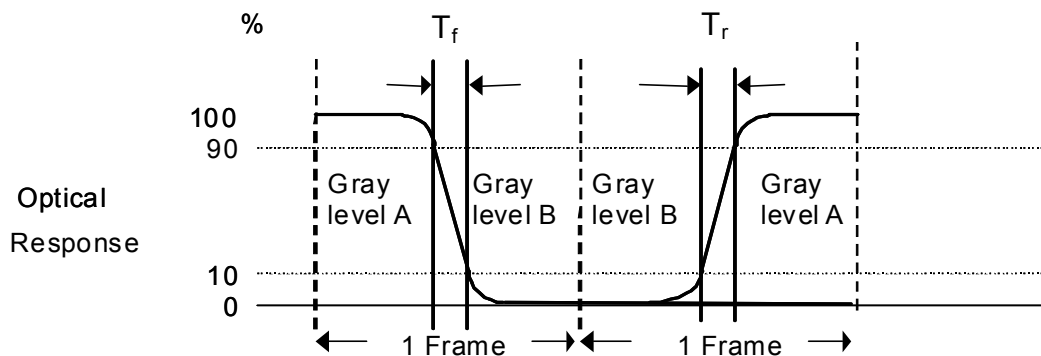
The gray to gray response time is defined as the following table.

| Gray Level to Gray Level | | Target gray level | | | | |
|---|---|---|---|---|---|---|
| | | L0 | L255 | L511 | L767 | L1023 |
| Start gray level | L0 | | | | | |
| | L255 | | | | | |
| | L511 | | | | | |
| | L767 | | | | | |
| | L1023 | | | | | |

■ $T_{GTG\_typ}$ is the total average time at rising time and falling time of gray to gray.

Note 2-7: Crosstalk measurement

**Definition:**

CT = Max. ($CT_H$, $CT_V$);

Where

a. Maximum Horizontal Crosstalk:

$CT_H$ = Max. (| $Y_{BL}$ – $Y_{AL}$ | / $Y_{AL}$ × 100 %, | $Y_{BR}$ – $Y_{AR}$ | / $Y_{AR}$ × 100 %);

Maximum Vertical Crosstalk:

$CT_V$ = Max. (| $Y_{BU}$ – $Y_{AU}$ | / $Y_{AU}$ × 100 %, | $Y_{BD}$ – $Y_{AD}$ | / $Y_{AD}$ × 100 %);

b. $Y_{AU}$, $Y_{AD}$, $Y_{AL}$, $Y_{AR}$ = Luminance of measured location without Black pattern

   $Y_{BU}$, $Y_{BD}$, $Y_{BL}$, $Y_{BR}$ = Luminance of measured location with Black pattern
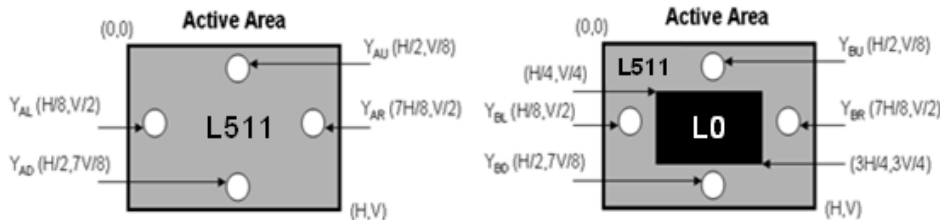


Note 2-8: Flicker measurement

a. Test pattern: It is listed as following.

| | | | | | | | |
|R|G|B|R|G|B|R|G|B|
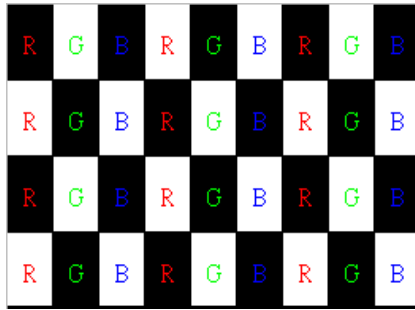
Gray level = L0

Gray level = L511

R: Red, G: Green, B:Blue

b. Measured position: Center of screen (P5) & perpendicular to the screen ($\theta=\Phi=0°$)

## 3 TFT-LCD Module

## 3.1 Block Diagram

The following shows the block diagram of the 32.0 inch Color TFT-LCD Module.
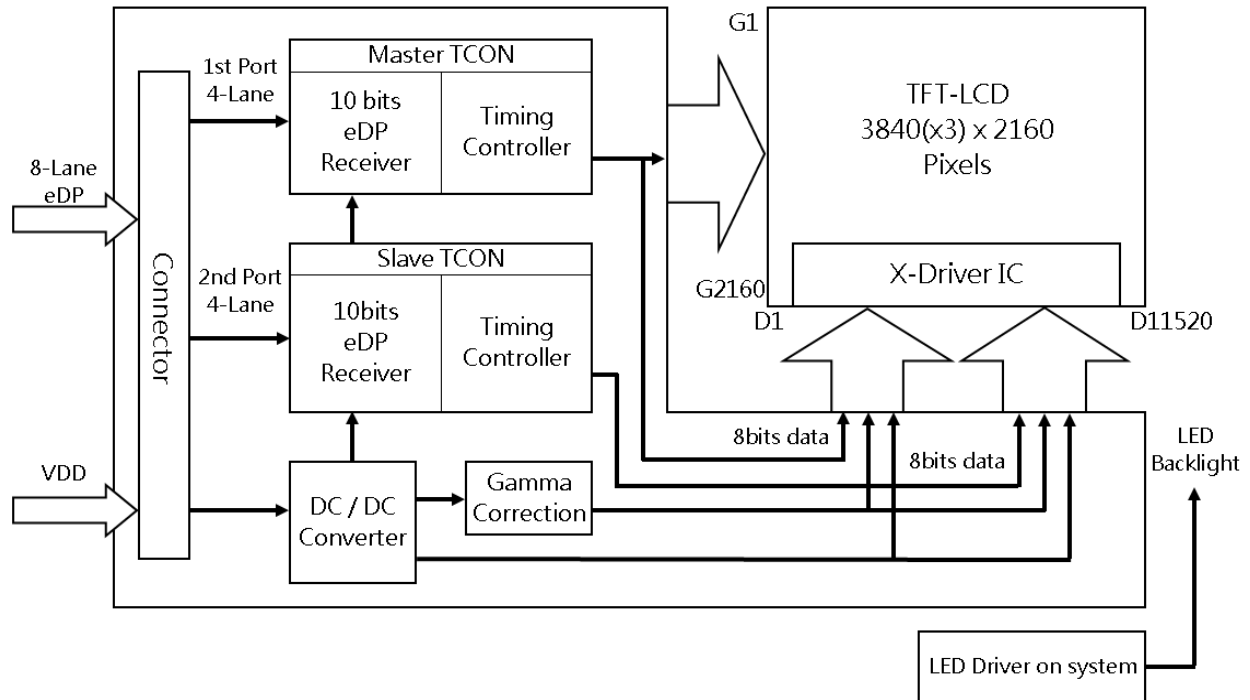
## 3.2 Interface Connection

### 3.2.1 Connector Type

| TFT-LCD Connector | Manufacturer | P-TWO | JAE |
|---|---|---|---|
| | Part Number | 187060-4122 | FI-RE41S-HF |
| Mating Connector | Manufacturer | JAE or compatible | |
| | Part Number | FI-RE41CL | |

### 3.2.2 Connector Pin Assignment

| PIN # | Symbol | Description | Remark |
|---|---|---|---|
| 1 | 1st Lane3_N | Negative eDP differential data input | |
| 2 | 1st Lane3_P | Positive eDP differential data input | |
| 3 | GND | Ground | |
| 4 | 1st Lane2_N | Negative eDP differential data input | |
| 5 | 1st Lane2_P | Positive eDP differential data input | |
| 6 | GND | Ground | |
| 7 | 1st Lane1_N | Negative eDP differential data input | |
| 8 | 1st Lane1_P | Positive eDP differential data input | |
| 9 | GND | Ground | |
| 10 | 1st Lane0_N | Negative eDP differential data input | |
| 11 | 1st Lane0_P | Positive eDP differential data input | |
| 12 | GND | Ground | |
| 13 | 1st AUX_CH_P | Positive AUX Channel differential data input | |
| 14 | 1st AUX_CH_N | Negative AUX Channel differential data input | |
| 15 | 1st HPD | Hot plug detection | |
| 16 | 2nd Lane3_N | Negative eDP differential data input | |
| 17 | 2nd Lane3_P | Positive eDP differential data input | |
| 18 | GND | Ground | |
| 19 | 2nd Lane2_N | Negative eDP differential data input | |
| 20 | 2nd Lane2_P | Positive eDP differential data input | |

| 21 | GND | Ground | |
|----|-----|--------|---|
| 22 | 2nd Lane1_N | Negative eDP differential data input | |
| 23 | 2nd Lane1_P | Positive eDP differential data input | |
| 24 | GND | Ground | |
| 25 | 2nd Lane0_N | Negative eDP differential data input | |
| 26 | 2nd Lane0_P | Positive eDP differential data input | |
| 27 | GND | Ground | |
| 28 | 2nd AUX_CH_P | Positive AUX Channel differential data input | |
| 29 | 2nd AUX_CH_N | Negative AUX Channel differential data input | |
| 30 | 2nd HPD | Hot plug detection | |
| 31 | NC | No connection (for AUO test only. Do not connect) | |
| 32 | NC | No connection (for AUO test only. Do not connect) | |
| 33 | NC | No connection (for AUO test only. Do not connect) | |
| 34 | NC | No connection (for AUO test only. Do not connect) | |
| 35 | GND | Ground | |
| 36 | GND | Ground | |
| 37 | GND | Ground | |
| 38 | NC | No connection | |
| 39 | VDD | Power +12V | |
| 40 | VDD | Power +12V | |
| 41 | VDD | Power +12V | |

L/B CONNECTOR                                    L/B CONNECTOR
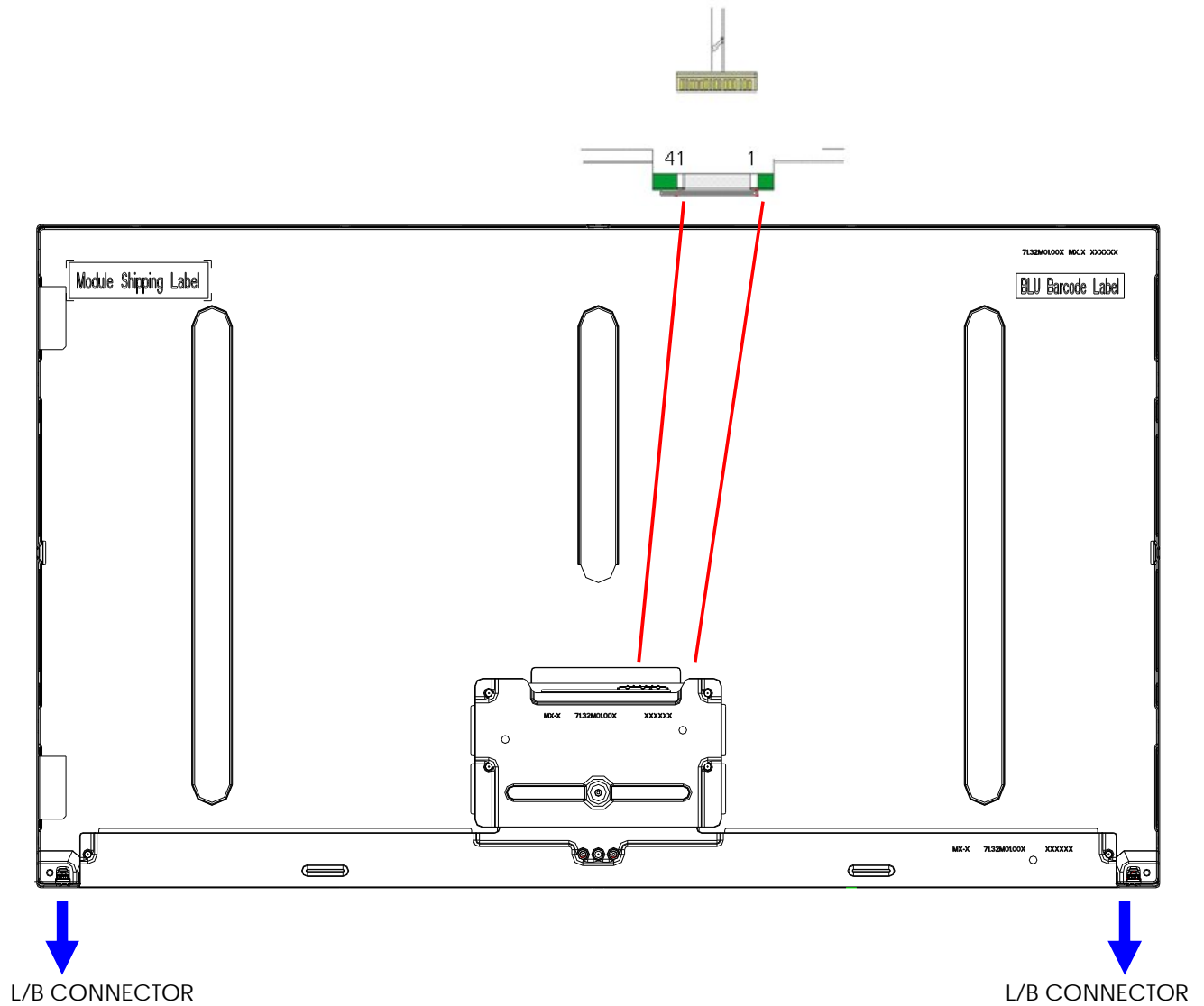
Note 3-1: Input signals of port 1 to port 4 clocks shall be the same timing.

## 3.3 Electrical Characteristics

### 3.3.1 Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

| Symbol | Description | Min | Max | Unit | Remark |
|---|---|---|---|---|---|
| VDD | Power Supply Input Voltage | GND-0.3 | 14 | [Volt] | Ta=25 |

### 3.3.2 Recommended Operating Condition

| Symbol | Description | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|
| VDD | Power supply Input voltage | 10.8 | 12.0 | 13.2 | [Volt] | |
| IDD | Power supply Input Current (RMS) | - | 0.9 | 1.1 | [A] | VDD= 12.0V, White pattern, Fv=60Hz |
| PDD | VDD Power Consumption | - | 10.8 | 13.2 | [Watt] | VDD= 12.0V , White pattern, Fv=60Hz |
| IRush | Inrush Current | - | - | 3 | [A] | Note 3-2 |
| VDDrp | Allowable VDD Ripple Voltage | - | - | VDD*5% | [mV] | VDD= 12.0V, White pattern, Fv=60Hz |

Note 3-2:   Inrush Current measurement:

Test circuit:
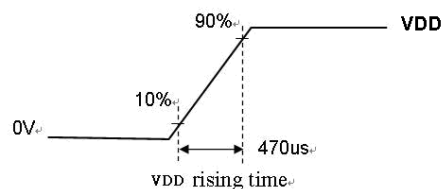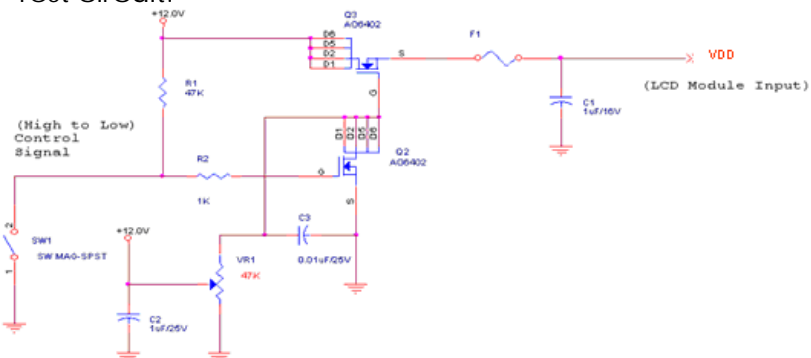


The duration of VDD rising time: 470us.

## 3.4 Signal Characteristics

## 3.4.1 LCD Pixel Format

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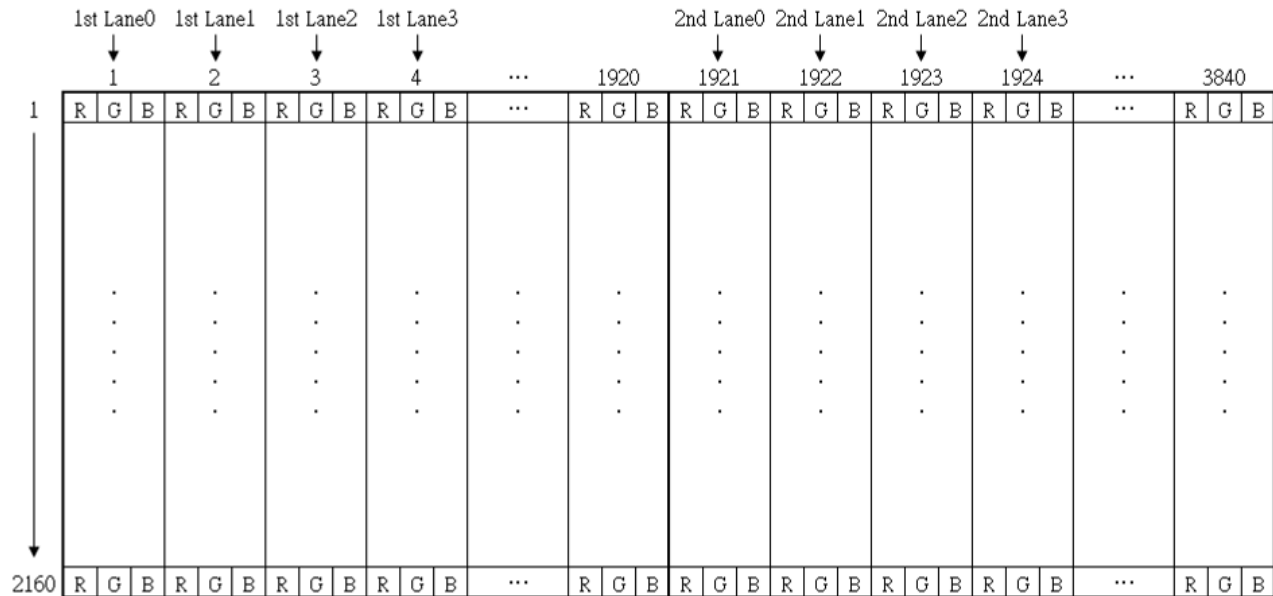


Note 3-3: The module use 8-Lanes eDP interface.

1st port:
  1st Lane0    1+4n pixel
  1st Lane1    2+4n pixel
  1st Lane2    3+4n pixel
  1st Lane3    4+4n pixel

2nd port:
  2nd Lane0    1921+4n pixel
  2nd Lane1    1922+4n pixel
  2nd Lane2    1923+4n pixel
  2nd Lane3    1924+4n pixel
  n=0~479

### 3.4.2 eDP Data Format

| 1st Lane0 | 1st Lane1 | 1st Lane2 | 1st Lane3 | 2nd Lane0 | 2nd Lane1 | 2nd Lane2 | 2nd Lane3 |
|---|---|---|---|---|---|---|---|
| R1-9:2 | R2-9:2 | R3-9:2 | R4-9:2 | R1921-9:2 | R1922-9:2 | R1923-9:2 | R1924-9:2 |
| R1-1:0IG1-9:4 | R2-1:0IG2-9:4 | R3-1:0IG3-9:4 | R4-1:0IG4-9:4 | R1921-1:0IG1921-9:4 | R1922-1:0IG1922-9:4 | R1923-1:0IG1923-9:4 | R1924-1:0IG1924-9:4 |
| G1-3:0IB1-9:6 | G2-3:0IB2-9:6 | G3-3:0IB3-9:6 | G4-3:0IB4-9:6 | G1921-3:0IB1921-9:6 | G1922-3:0IB1922-9:6 | G1923-3:0IB1923-9:6 | G1924-3:0IB1924-9:6 |
| B1-5:0IR5-9:8 | B2-5:0IR6-9:8 | B3-5:0IR7-9:8 | B4-5:0IR8-9:8 | B1921-5:0IR1925-9:8 | B1922-5:0IR1926-9:8 | B1923-5:0IR1927-9:8 | B1924-5:0IR1928-9:8 |
| R5-7:0 | R6-7:0 | R7-7:0 | R8-7:0 | R1925-7:0 | R1926-7:0 | R1927-7:0 | R1928-7:0 |
| G5-9:2 | G6-9:2 | G7-9:2 | G8-9:2 | G1925-9:2 | G1926-9:2 | G1927-9:2 | G1928-9:2 |
| G5-1:0IB5-9:4 | G6-1:0IB6-9:4 | G7-1:0IB7-9:4 | G8-1:0IB8-9:4 | G1925-1:0IB1925-9:4 | G1926-1:0IB1926-9:4 | G1927-1:0IB1927-9:4 | G1928-1:0IB1928-9:4 |
| B5-3:0IR9-9:6 | B6-3:0IR10-9:6 | B7-3:0IR11-9:6 | B8-3:0IR12-9:6 | B1925-3:0IR1929-9:6 | B1926-3:0IR1930-9:6 | B1927-3:0IR1931-9:6 | B1928-3:0IR1932-9:6 |
| R9-5:0IG9-9:8 | R10-5:0IG10-9:8 | R11-5:0IG11-9:8 | R12-5:0IG12-9:8 | R1929-5:0IG1929-9:8 | R1930-5:0IG1930-9:8 | R1931-5:0IG1931-9:8 | R1932-5:0IG1932-9:8 |
| G9-7:0 | G10-7:0 | G11-7:0 | G12-7:0 | G1929-7:0 | G1930-7:0 | G1931-7:0 | G1932-7:0 |
| B9-9:2 | B10-9:2 | B11-9:2 | B12-9:2 | B1929-9:2 | B1930-9:2 | B1931-9:2 | B1932-9:2 |
| B9-1:0IR13-9:4 | B10-1:0IR14-9:4 | B11-1:0IR15-9:4 | B12-1:0IR16-9:4 | B1929-1:0IR1933-9:4 | B1930-1:0IR1934-9:4 | B1931-1:0IR1935-9:4 | B1932-1:0IR1936-9:4 |
| R13-3:0IG13-9:6 | R14-3:0IG14-9:6 | R15-3:0IG15-9:6 | R16-3:0IG16-9:6 | R1933-3:0IG1933-9:6 | R1934-3:0IG1934-9:6 | R1935-3:0IG1935-9:6 | R1936-3:0IG1936-9:6 |
| G13-5:0IB13-9:8 | G14-5:0IB14-9:8 | G15-5:0IB15-9:8 | G16-5:0IB16-9:8 | G1933-5:0IB1933-9:8 | G1934-5:0IB1934-9:8 | G1935-5:0IB1935-9:8 | G1936-5:0IB1936-9:8 |
| B13-7:0 | B14-7:0 | B15-7:0 | B16-7:0 | B1933-7:0 | B1934-7:0 | B1935-7:0 | B1936-7:0 |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |

### 3.4.3 Color versus Input Data

The following table is for color versus input data (10bit). The higher the gray level, the brighter the color.

.

| Color | Gary Level | Color Input Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Remark |
|-------|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|
| | | RED data (**MSB**:R9,**LSB**:R0) | | | | | | | | | | GREEN data (**MSB**:G9,**LSB**:G0) | | | | | | | | | | BLUE data (**MSB**:B9,**LSB**:B0) | | | | | | | | | | | |
| | | R9 | R8 | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G9 | G8 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B9 | B8 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | |
| Black | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| White | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| L511 | - | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Red | L0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L1023 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Green | L0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L1023 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Blue | L0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L1023 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |

### 3.4.4 eDP Specification (Follow as VESA DisplayPort Standard Version 1.2)

### a. DisplayPort main link signal:

| DisplayPort main link | | | | | |
|---|---|---|---|---|---|
| | | Min | Typ | Max | unit |
| VCM | RX input DC Common Mode Voltage | - | 0 | - | V |
| VDiff$_{P-P}$ | Peak-to-peak Voltage at a receiving Device | 120 | - | - | mV |
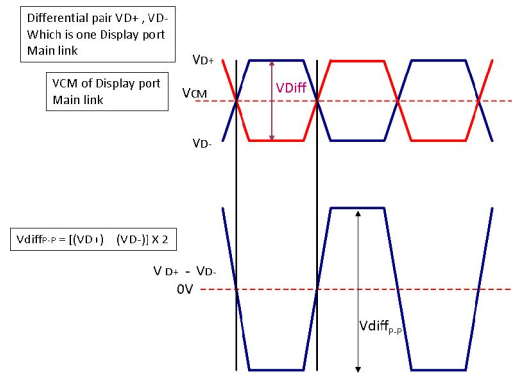


### b. DisplayPort AUX_CH signal:

| DisplayPort AUX_CH | | | | | |
|---|---|---|---|---|---|
| | | Min | Typ | Max | unit |
| VCM | AUX DC Common Mode Voltage | | 0.5 | | V |
| VDiff$_{P-P}$ | AUX Peak-to-peak voltage at a receiving device | 0.32 | 0.6 | 1.32 | V |
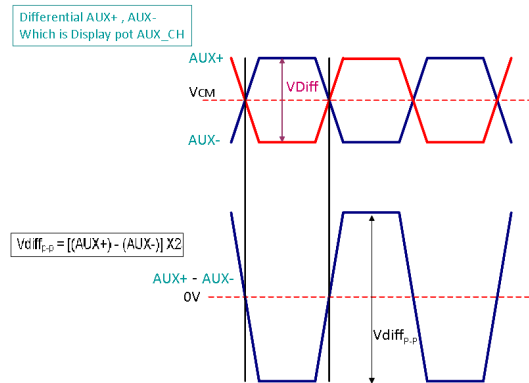


### c. DisplayPort VHPD signal:

| DisplayPort VHPD | | | | | |
|---|---|---|---|---|---|
| | | Min | Typ | Max | unit |
| VHPD | HPD Voltage | 2.25 | - | 3.6 | V |

### 3.4.5 Input Timing Specification

The input timing is shown as the following table.

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | 2180 | 2200 | 2372 | Th | |
| Tdisp (v) | | Active | 2160 | 2160 | 2160 | Th | |
| Tblk (v) | | Blanking | 20 | 40 | 212 | Th | |
| Fv | | Frequency | 59 | 60 | 61 | Hz | |
| Th | Horizontal Section | Period | 2026 | 2100 | 2176 | Tclk | |
| Tdisp (h) | | Active | 1920 | 1920 | 1920 | Tclk | |
| Tblk (h) | | Blanking | 106 | 180 | 256 | Tclk | |
| Fh | | Frequency | 128.62 | 132.00 | 138.20 | kHz | Note 3-4 |
| Tclk | Pixel Clock | Period | 3.84 | 3.61 | 3.57 | ns | 1/Fclk |
| Fclk | | Frequency | 260.58 | 277.20 | 280.00 | MHz | Note 3-5 |
| Link Rate per Lane | | | 2.7 | | | Gbps | |

Note 3-4: The equation is listed as following. Please don't exceed the above recommended value.

   Fh (Min.) = Fclk (Min.) / Th (Min.)

   Fh (Typ.) = Fclk (Typ.) / Th (Typ.)

   Fh (Max.)= Fclk (Max.) / Th (Min.)

Note 3-5: The equation is listed as following. Please don't exceed the above recommended value.

   1st Lane N & 2nd Lane N skew < 200ns

   Fclk (Min.) = Fv (Min.) x Th (Min.) x Tv (Min.)

   Fclk (Typ.) = Fv (Typ.) x Th (Typ.) x Tv (Typ.)

   Fv x Th x Tv     Fclk (Max.)

### 3.5 Power ON/OFF Sequence

VDD power,eDP signal and backlight on/off sequence are as following. eDP signals from any system shall be Hi-Z state when VDD is off.
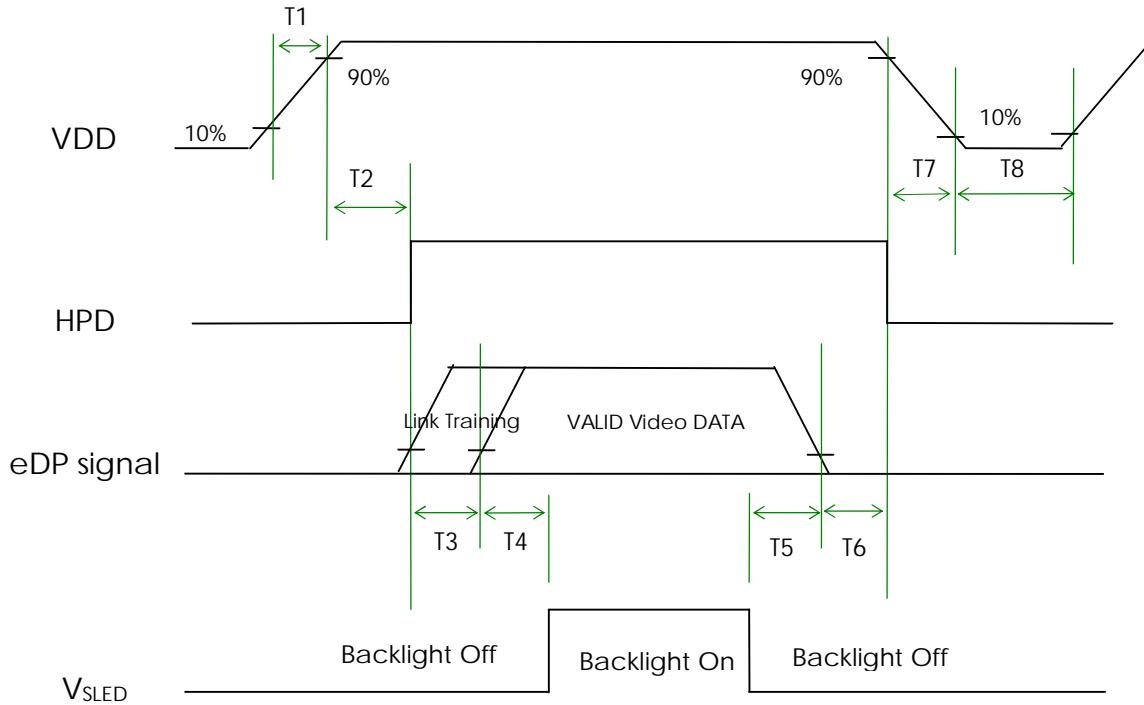


**Power Sequence Timing**

| Symbol | Value | | | Unit | Remark |
|---|---|---|---|---|---|
| | **Min.** | **Typ.** | **Max.** | | |
| T1 | 0.5 | - | 10 | [ms] | |
| T2 | 0 | - | 200 | [ms] | |
| T3 | 0 | - | - | [ms] | Note 3-6 |
| T4 | 500 | - | - | [ms] | |
| T5 | 100 | | - | [ms] | |
| T6 | 0 | - | 50 | [ms] | Note 3-7 Note 3-8 |
| T7 | 0 | - | 150 | [ms] | Note 3-8 |
| T8 | 1000 | - | - | [ms] | |

Note 3-6: During T3 period , eDP link training time by customer's system.
Note 3-7: Recommend setting T6 = 0ms to avoid electronic noise when VDD is off.
Note 3-8: During T6 and T7 period , please keep the level of input eDP signals with Hi-Z state.

## 4 Backlight Unit

### 4.1 Block Diagram

The following shows the block diagram of the 32.0 inch Backlight Unit. And it includes 2 pcs LED light bar in Backlight Unit. Each LED light bar includes 44 pcs LED package. (4 strings and 11 pcs LED of one string).
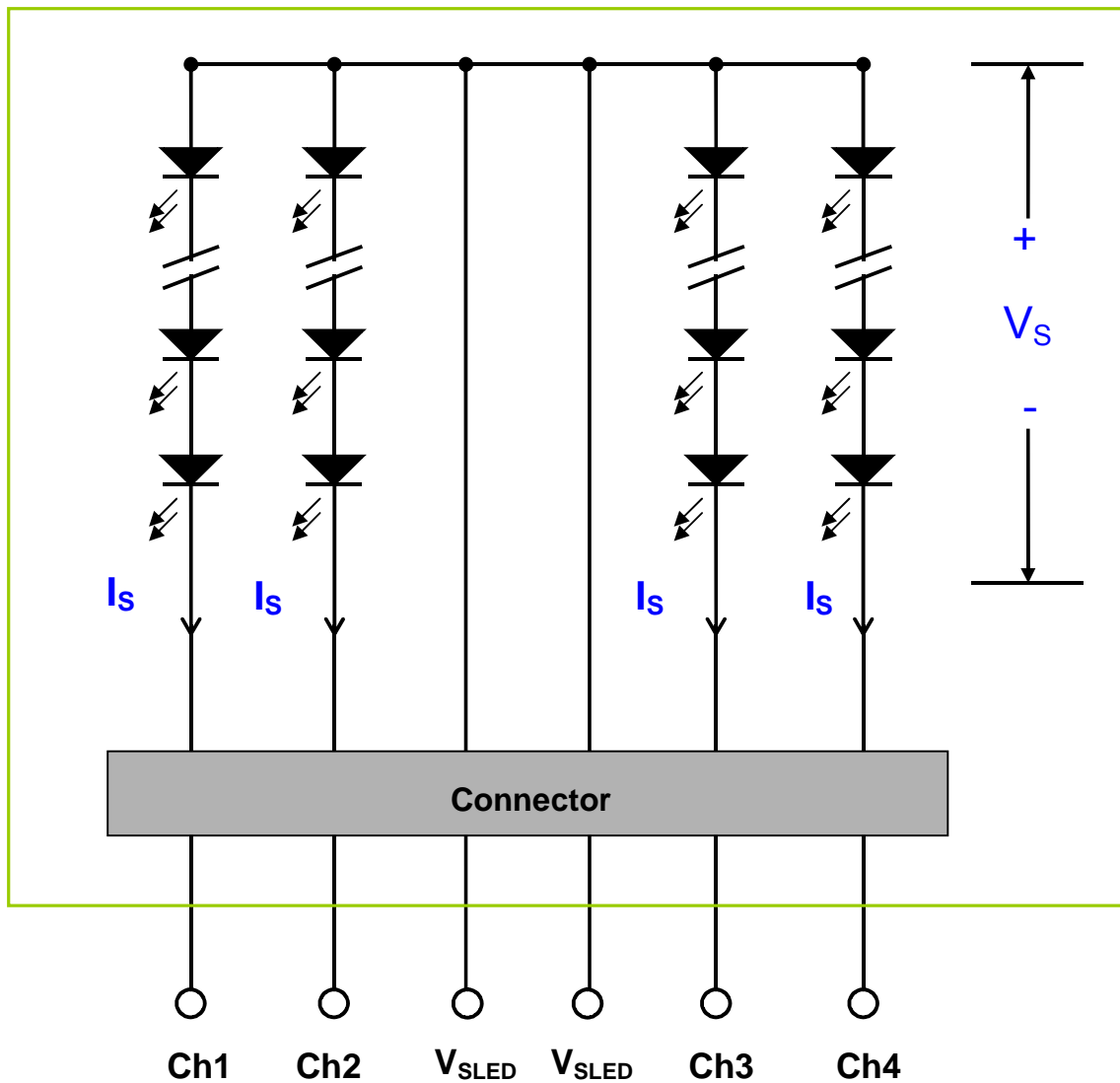
## 4.2 Interface Connection

### 4.2.1 Connector Type

| Backlight Connector | Manufacturer | ENTERY |
|---|---|---|
| | Part Number | 3707K-S06N-07L |
| Mating Connector | Manufacturer | ENTERY |
| | Part Number | H112K-P06N-00B (Non-Locking type)<br>H112K-P06N-11B(White) (Locking type)<br>H112K-P06N-13B(Black) (Locking type) |

**Backlight Connector dimension:**

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

PIN 1     1.00          0.20
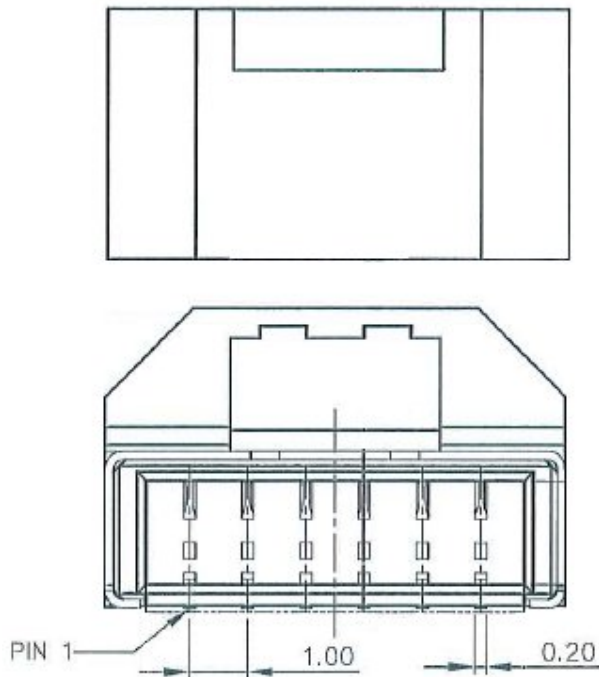
**Mating Connector dimension:**
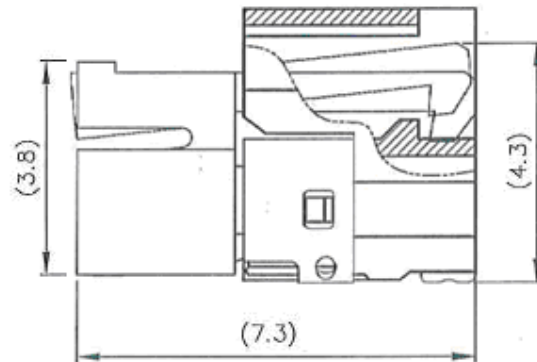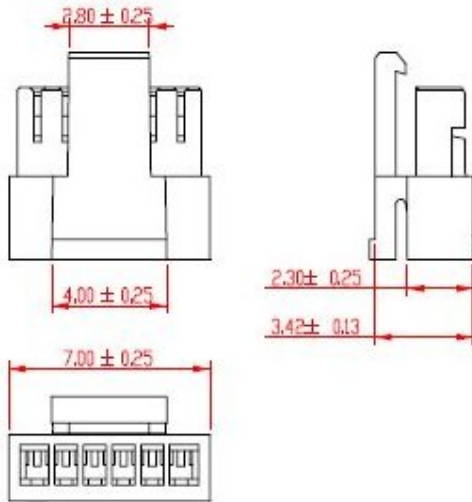
## 4.2.2 Connector Pin Assignment

| Pin# | Symbol | Description | Remark |
|------|--------|-------------|--------|
| 1 | Ch1 | LED Current Feedback Terminal (Channel 1) | |
| 2 | Ch2 | LED Current Feedback Terminal (Channel 2) | |
| 3 | $V_{SLED}$ | LED Power Supply Voltage Input Terminal | |
| 4 | $V_{SLED}$ | LED Power Supply Voltage Input Terminal | |
| 5 | Ch3 | LED Current Feedback Terminal (Channel 3) | |
| 6 | Ch4 | LED Current Feedback Terminal (Channel 4) | |
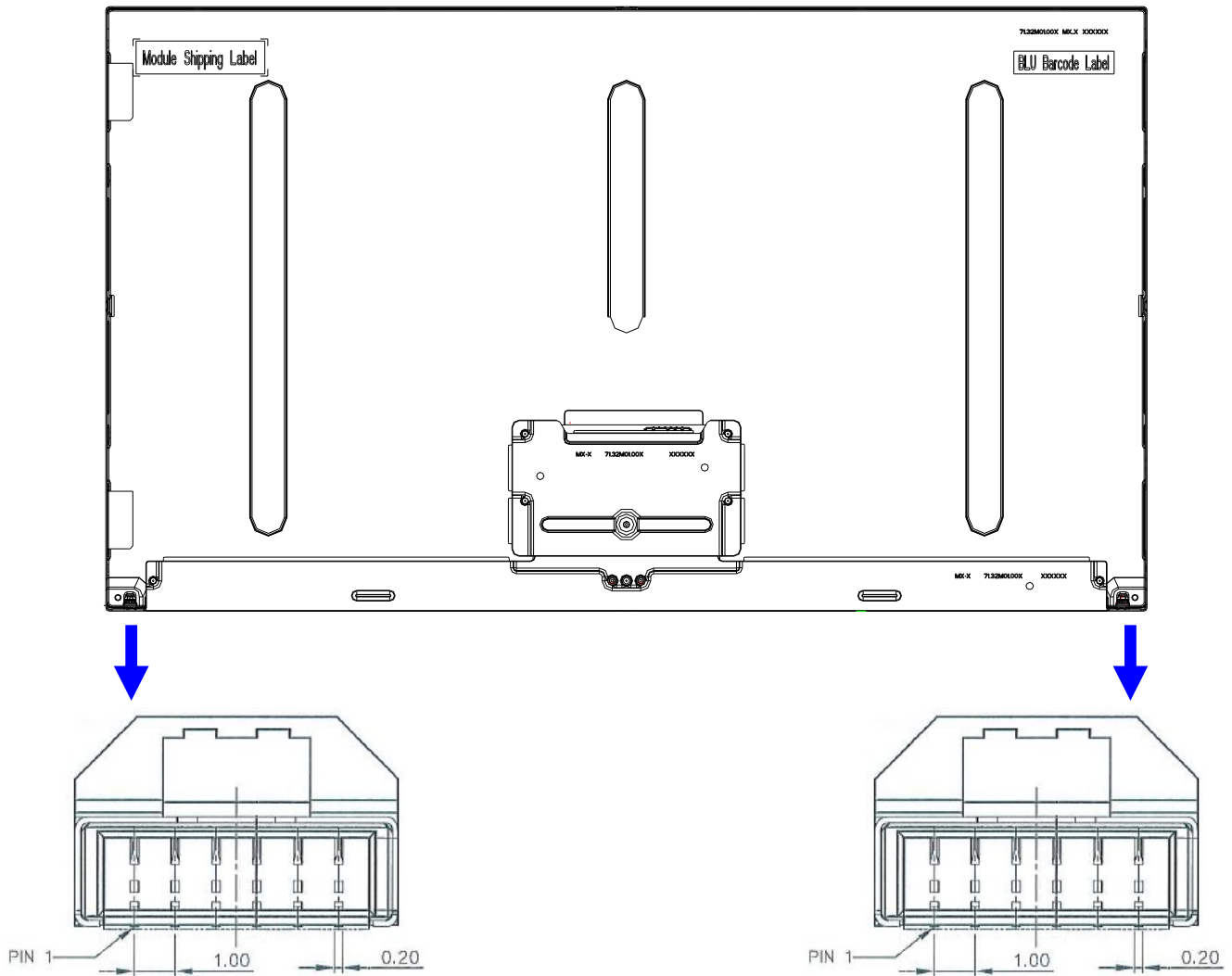
## 4.3 Electrical Characteristics

### 4.3.1 Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

(Ta=25　)

| Symbol | Description | Min | Max | Unit | Remark |
|--------|-------------|-----|-----|------|--------|
| Is | LED String Current | 0 | 150 | [mA] | 100% duty ratio |
|    |                    |   | 300 | [mA] | Duty ratio　10%<br>Pulse time=10 ms |
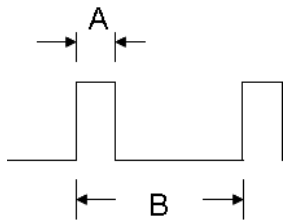


Duty ratio= (A / B) X 100% ;　(A: Pulse time, B: Period)

### 4.3.2 Recommended Operating Condition

(Ta=25　)

| Symbol | Description | Min. | Typ. | Max. | Unit | Remark |
|--------|-------------|------|------|------|------|--------|
| Is | LED String Current | - | 120 | 132 | [mA] | 100% duty ratio of LED chip |
| Vs | LED String Voltage | 33 | 36.3 | 39.6 | [Volt] | Is=120mA @ 100% duty ratio; Note 4-1& Note 4-5 |
| ΔVs | Maximum Vs Voltage Deviation of light bar | - | - | 2.2 | [Volt] | Is=120mA @ 100% duty ratio; Note 4-2 |
| P$_{BLU}$ | LED Light Bar Power Consumption | - | 34.8 | 38 | [Watt] | Note 4-3 |
| LT$_{LED}$ | LED Life Time | 30,000 | - | - | [Hour] | Note 4-4 |
| OVP | Over Voltage Protection in system board | 110% Vs (max) | - | - | [Volt] | Note 4-5 |

Note 4-1:   Vs (Typ.) = $V_F$ (Typ.) X LED No. (one string);

a. $V_F$: LED chip forward voltage, $V_F$ (Min.)=3.0V, $V_F$(Typ.)=3.3V, $V_F$(Max.)=3.6V

b. The same euqation to calculate Vs(Min.) & Vs (Max.) for respective $V_F$ (Min.) & $V_F$(Max.);
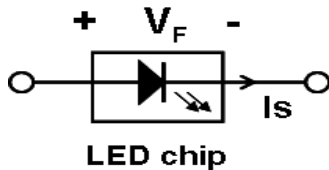


Note 4-2:   $\Delta Vs$ (Max.) = $\Delta V_F$ X LED No. (one string);

a. $\Delta V_F$: LED chip forward voltage deviation (0.2V , each Bin of LED $V_F$)

Note 4-3:   $P_{BLU}$ (Typ.) = Vs (Typ.) X Is (Typ.) X 8 ( 8 is total String No. of BLU )

$P_{BLU}$ (Max.) = Vs (Max.) X Is (Typ.) X 8

Note 4-4:   Definition of life time:

a. Brightness of LED becomes to 50% of its original value

b. Test condition: Is = 120mA and 25    (Room Temperature)

Note 4-5:   Recommendation for LED driver power design:

Due to there are electrical property deviation in LED & monitor set system component after long time operation. AUO strongly recommend the design value of LED driver board OVP (over voltage protection) should be 10% higher than max. value of LED string voltage (Vs) at least.

Note 4-6:   AUO strongly recommend "Analog Dimming" method for backlight brightness control for Wavy Noise Free. Otherwise, recommend that Dimming Control Signal (PWM Signal) should be synchronized with Frame Frequency

## 5 Reliability Test

AUO reliability test items are listed as following table. (Bare Panel only)

| Items | Condition | Remark |
|---|---|---|
| Temperature Humidity Bias (THB) | Ta= 50 , 80%RH, 300hours | |
| High Temperature Operation (HTO) | Ta= 50 , 50%RH, 300hours | |
| Low Temperature Operation (LTO) | Ta= 0 , 300hours | |
| High Temperature Storage (HTS) | Ta= 60 , 300hours | |
| Low Temperature Storage (LTS) | Ta= -20 , 300hours | |
| Vibration Test (Non-operation) | Frequency:10~57Hz/Vibration width(one side):0.075mm<br>　　　　: 58~500Hz/Acceleration:9.8 m/s2<br>Sweep time: 11minutes<br>Test period: 3 hours(1h for each direction of X,Y,Z) | |
| Shock Test (Non-operation) | Acceleration: 50 G<br>Wave: Half-sine<br>Active Time: 20 ms<br>Direction: ±X, ±Y, ±Z (one time for each Axis) | |
| Thermal Shock Test (TST) | -20 /30min, 60 /30min, 100 cycles | Note 5-1 |
| On/Off Test | On/10sec, Off/10sec, 30,000 cycles | |
| ESD (Electro Static Discharge) | Contact Discharge: ± 15KV, 150pF(330Ω ) 1sec, 8 points, 25 times/ point. | Note 5-2 |
| | Air Discharge: ± 15KV, 150pF(330Ω ) 1sec 8 points, 25 times/ point. | |
| Altitude Test | Operation:18,000 ft<br>Non-Operation:40,000 ft | |

Note 5-1: a. A cycle of rapid temperature change consists of varying the temperature from -20 to 60 , and back again. Power is not applied during the test.

b. After finish temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 5-2: EN61000-4-2, ESD class B: Certain performance degradation allowed

No data lost

Self-recoverable

No hardware failures.

## 6 Shipping Label

The label is on the panel as shown below:

```
Manufactured XX/XX
Model No: M320QAN01.0
AU Optronics          XXXXX
MADE IN XXXXXX (XX)
```

*xxxxxxxxxxxxx－xxxxx*

xxxxxxxxxxxxxxxxxxx

cᴙus
E204356

(Pb)

RoHS

(15)

Note 6-1: For Pb Free products, AUO will add (Pb) for identification.

Note 6-2: For RoHS compatible products, AUO will add [RoHS] for identification.

Note 6-3: For China RoHS compatible products, AUO will add (15) for identification.

Note 6-4: The Green Mark will be presented only when the green documents have been ready by AUO Internal Green Team.

# 7 Mechanical Characteristics



NOTES :
1. THE DIMENSION EXCLUDES DEFORMATION.
2. TOLERANCE WITHOUT NOTICED TO BE ±0.8mm.
3. 41PIN LVDS CONNECTOR TO BE FI-RE41S-HF OR 187060-4122 OR 107C41-0000RA-G4 OR AUO APPROVED.
4. LIGHTBAR CONNECTOR TO BE 3707K-S06N-07L OR AUO APPROVED.
5. TORQUE OF M3 USER HOLE SHOULD BE WITHIN 6 kgf-cm MAX..
6. USER HOLE SCREW PENETRATION 3.0mm MAX..
7. MODULE THICKNESS TO BE 15.1±0.5mm.
8. AVOID TOUCHING COF IC POSITIONS WHEN DOING MECHANICAL DESIGN.

Ver 1.1

# 8 Packing Specification

## 8.1 Packing Flow



Protect Film → Creped Paper Tape → Anti-Static Bag (Blue)

Cushion Set ← (7) Pcs Modules

(7) Pcs / 1 Carton → "H" Tape

Corner angle Moisture-proof film
Stretch film
Label PET band
Corner angle
Pallet
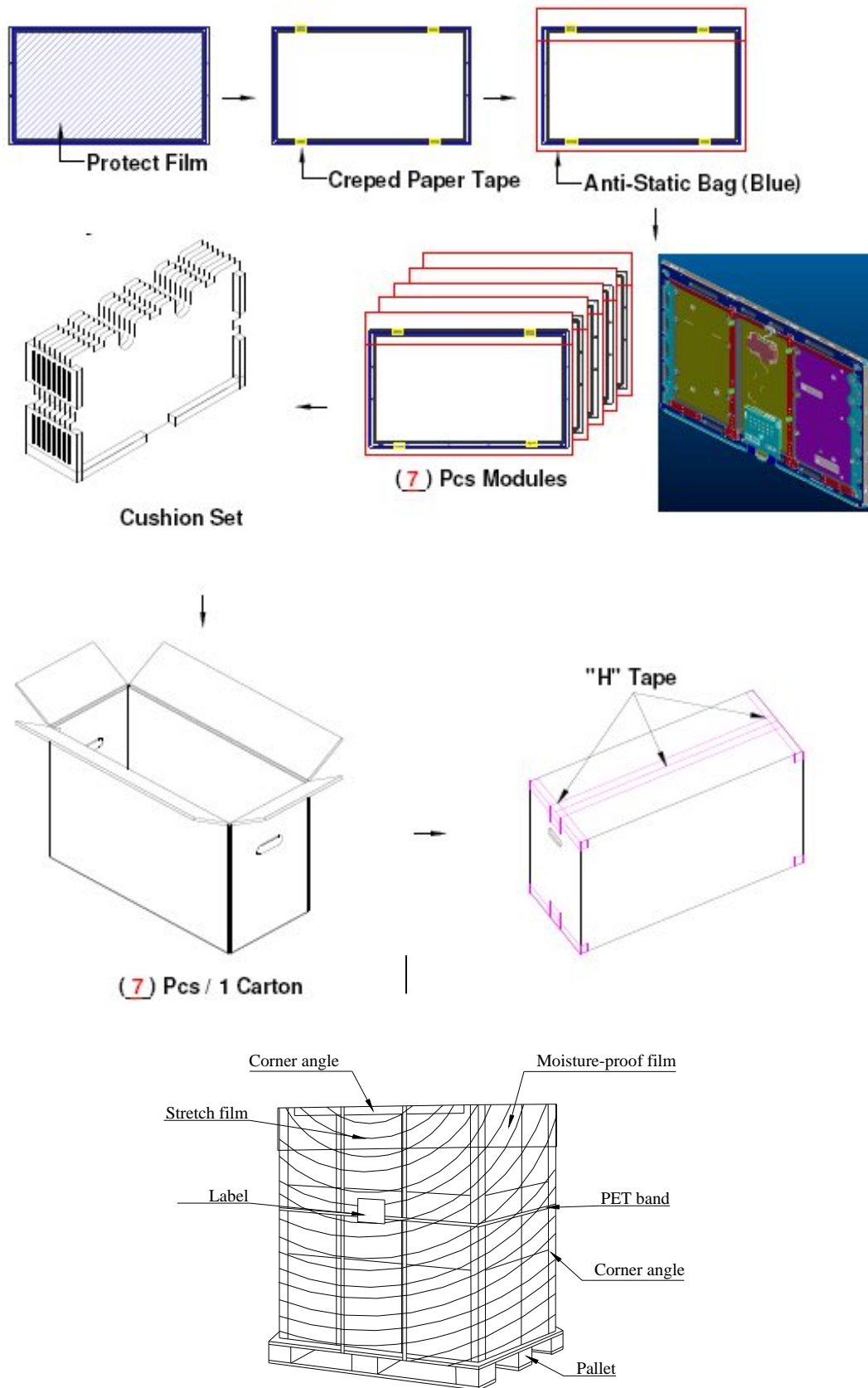
## 8.2 Pallet and shipment information

| Item | Specification | | | Remark |
|---|---|---|---|---|
| | Q'ty | Dimension | Weight(kg) | |
| Panel | 1 | 727.88(H)mm x 422.07(V)mm x 15.1(D)mm | 5.16 | |
| Cushion | 1 | - | 6.876 | |
| Box | 1 | 805(L)mm x 280(W)mm x 512(H)mm | | without Panel & cushion |
| Packing Box | 7 pcs/Box | 805(L)mm x 280(W)mm x 512(H)mm | 42.436 | with panel & cushion |
| Pallet | 1 | 1150(L)mm x 840(W)mm x 132(H)mm | 13.8 | |
| Pallet after Packing | 8 boxes/pallet | 1150(L)mm x 840(W)mm x 1156(H)mm | 353.3 | |