# 27" Full HD

# High brightness color TFT-LCD module

**Customer:**

**Customer Model name:**

**Model: VM27**

**Model control code：VM27B3 V1**

**Date: Oct 12th, 2018**

**Version: 01**

**Note: This specification is subject to change without notice**

| |
|---|
| **Customer：** <br><br> **Approved by ：** <br><br><br> **Date：** |

| **Approved** | **Prepared** |
|---|---|
| <br><br><br><br><br> **Date:** | <br><br><br><br><br> **Date:** |

# Contents

# AGL  Product Specification  Applied Green Light, Inc.

## RECORD OF REVISION

| Version and Date | Page | Old description | New description | Remark |
|---|---|---|---|---|
| 0.1  2016/10/30 | All | First Edition for customer | | |
| 0.2  2017/09/13 | 6 | Power consumption： 58.22W  LED line：53.57W | Power consumption： 52.09W  LED line：47.44W | |
| | 15 |  |  | |
| | 24 |  |  | |
| 0.3  2018/09/21 | 24 |  |  | |
| | 27、28 |  |  | |

| 0.3 | 2018/10/12 | 7 | | | |

**Left column:**

| Power Consumption | Watt | 52.09W (60 Hz) (VDD: 4.65 W, LED lines: 47.44 W) |
| --- | --- | --- |

| Items | Symbol | Min | Max | Unit | Conditions |
| --- | --- | --- | --- | --- | --- |
| LED Forward Current | | 0 | 120 | mA | T=25 °C |
| LED Pulse Forward Current | | 0 | TBD | mA | |
| LED forward Voltage variation | | | 3 | V | Note 1, 2 |

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks (Test condition) |
| --- | --- | --- | --- | --- | --- | --- |
| Input Voltage | Vin | | 24.0 | 26.4 | VDC | |
| Input current | Iin | | 2.0 | 3.0 | A | Vin=24V, Dim=max |
| Input power | Pin | | 48 | | W | |
| On/Off control | ON/OFF | | 3 | 5 | VDC | ON state |
| | | -0.3 | | 0.7 | | OFF state |
| Dimming control | DIMM | 180 | 200 | 220 | Hz | PWM |

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

| Symbol | Description | Min | Typ | Max | Unit | Note |
| --- | --- | --- | --- | --- | --- | --- |
| ILED | LED Forward Current | | 240 | | mA | Note 1 |
| VLB | Light Bar Operation Voltage | | 42 | | V | Note 2 |
| PBLU | BLU Power Consumption | | 40.32 | | W | Note 3 |
| LTLED | LED Life Time (Typical) | | 50,000 | | | Note 4 |

Note 1: The specified current is 100% duty of LED chip input current.
Note 2: The value showed is one string operation voltage.
Note 3: PBLU = VLED * ILED * 4 (Total)
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 = 240 mA and 25±2°C (Room Temperature).

**Right column:**

| Power Consumption | Watt | 63.95W (60 Hz) (VDD: 4.65 W, LED lines: 59.3 W) |
| --- | --- | --- |

| Items | Symbol | Min | Max | Unit | Conditions |
| --- | --- | --- | --- | --- | --- |
| LED Forward Current | | 0 | 480 | mA | T=25 °C |
| LED forward Voltage variation | | | 45 | V | Note 1, 2 |

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks (Test condition) |
| --- | --- | --- | --- | --- | --- | --- |
| Input Voltage | Vin | | 24.0 | 26.4 | VDC | |
| Input current | Iin | | 2.5 | 3.5 | A | Vin=24V, Dim=max |
| Input power | Pin | | 59.3 | | W | |
| On/Off control | ON/OFF | | 3 | 5 | VDC | ON state |
| | | -0.3 | | 0.7 | | OFF state |
| Dimming control | DIMM | 180 | 200 | 220 | Hz | PWM |

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

| Symbol | Description | Min | Typ | Max | Unit | Note |
| --- | --- | --- | --- | --- | --- | --- |
| ILED | LED Forward Current | | 300 | | mA | Note 1 |
| VLB | Light Bar Operation Voltage | | 42 | | V | Note 2 |
| PBLU | BLU Power Consumption | | 50.4 | | W | Note 3 |
| LTLED | LED Life Time (Typical) | | 50,000 | | | Note 4 |

Note 1: The specified current is 100% duty of LED chip input current.
Note 2: The value showed is one string operation voltage.
Note 3: PBLU = VLED * ILED * 4 (Total)
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 = 300 mA and 25±2°C (Room Temperature).

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## 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 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.

10) 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.

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## 2. General Description

### 2.1, Overview

VM27B3 V1 is a Color Active Matrix Liquid Crystal Display composed of a TFT-LCD panel, a driver circuit, and a backlight system. The screen format is intended to support the Full HD (1920(H) x 1080(V)) screen and 16.7M colors (8-bits/Color). All input signals are 2-channel LVDS interface compatible.

### 2.2 Features

- High brightness display, 1000nits.
- LED backlight
- Wide operation temperature
- RoHS Compliance

### 2.3 Application

Industrial Application.

2.4 Display Specifications

| Items | Unit | Specification |
|---|---|---|
| Screen Diagonal | inch | 27 (685.65 mm) |
| Active Area | mm | 597.6(H) x 336.15(V) |
| Pixels H x V | pixels | 1920x3(RGB) x 1080 |
| Pixels Pitch | mm | 0.31125(H) x 0.31125 (V) |
| Pixel Arrangement | | RGB Vertical stripe |
| Display mode | | Transmssive mode, normally black |
| White luminance (center) | Cd/m$^2$ | 1000 (Typ.) |
| Contrast ratio | | 3000 :1(Typ.) |
| Optical Response Time | msec | 12 ms (Typ. on/off) |
| Normal Input Voltage VDD | Volt | 5 |
| Power Consumption | Watt | 55.05W (60 Hz)<br>(VDD: 4.65 W; LED lines: 50.4 W) |
| Weight | Grams | TBD (Typ) |
| Physical size | mm | 613.6(H)x356.85(V)x10.0(D) Typ.<br><br>(D: without led driver) |
| Electrical Interface | | 2 Channel LVDS |
| Support Colors | | 16.7 M colors (RGB 8-bits) |
| Surface Treatment | | Anti-Glare, 3H |
| Temperature range | | |
| Operating | $^0$C | -10 ~ 50 |
| Storage (Shipping) | $^0$C | -20 ~ 60 |
| RoHS Compliance | | RoHS Compliance |

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## 2.5 Optical Characteristics

The following optical characteristics are measured under stable condition at 25 $^0$C

| Items | Unit | Conditions | | Min. | Typ. | Max. | Note |
|---|---|---|---|---|---|---|---|
| Viewing angle | Deg. | Horizontal (Right) CR$\geq$20　　(Left) | | 160 | 178 | | 2 |
| | | Vertical 　(Up) CR$\geq$20　(Down) | | 160 | 178 | | |
| Contrast Ratio | | Normal Direction | | | 3000 | | 3 |
| Response Time | msec | Raising + Falling | | | 12 | | 4 |
| Color / Chromaticity Coordinates (CIE) | | Red x | | -0.05 | 0.64 | +0.05 | 5 |
| | | Red y | | | 0.33 | | |
| | | Green x | | | 0.32 | | |
| | | Green y | | | 0.620 | | |
| | | Blue x | | | 0.15 | | |
| | | Blue y | | | 0.06 | | |
| Color coordinates (CIE) White | | White x | | | 0.31 | | |
| | | White y | | | 0.33 | | |
| Center Luminance | Cd/m$^2$ | | | 800 | 1000 | | 6 |
| Luminance Uniformity | % | | | | 70 | | 7 |
| Crosstalk (in 60 Hz) | % | | | | | 4.0 | |

Note 1: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.
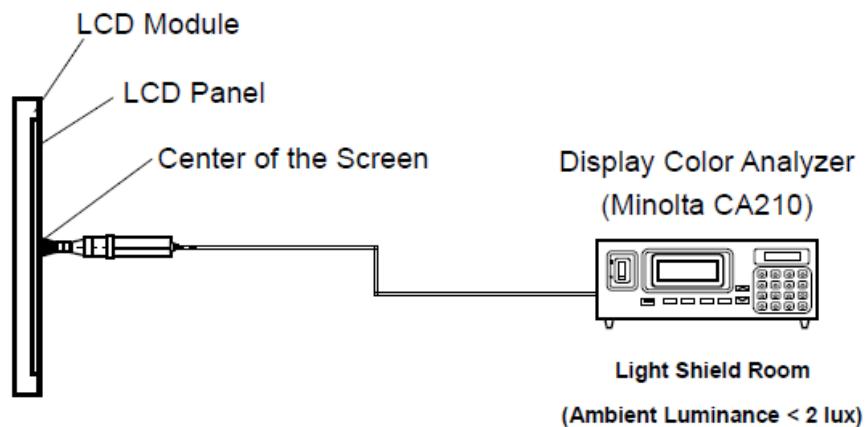


Note 2: Definition of viewing angle
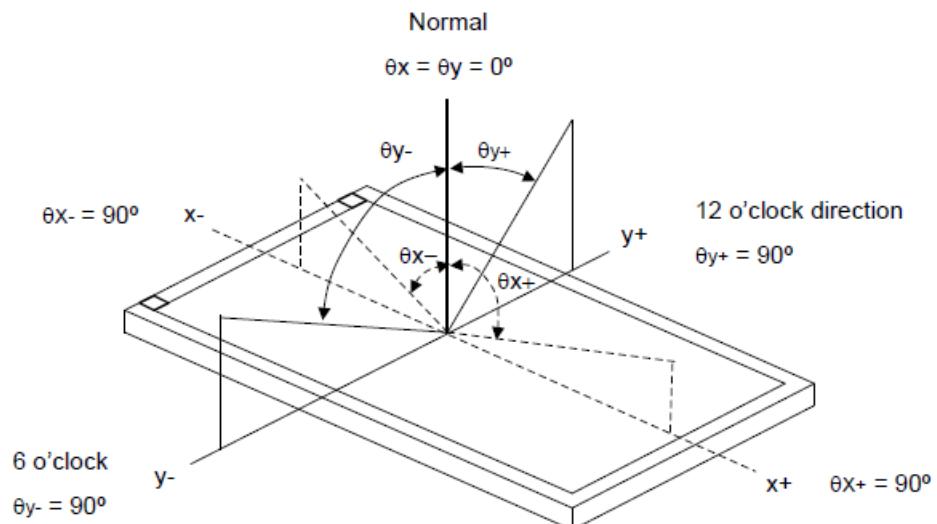


Note 3: Contrast ratio is measured by Minolta CA210
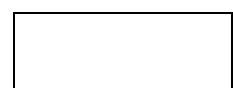
Note 4: Definition of Response time

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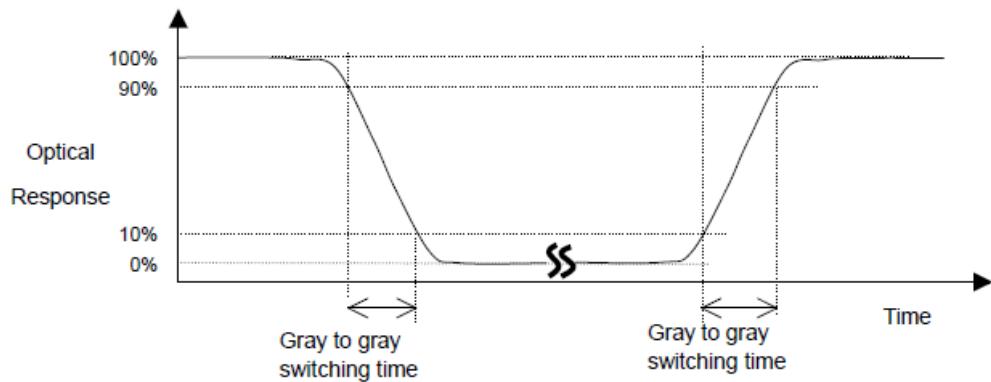


Note 5: Color chromaticity and coordinates (CIE) is measured by Minolta CA210

Note 6: Center luminance is measured by Minolta CA210

Note 7: Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210
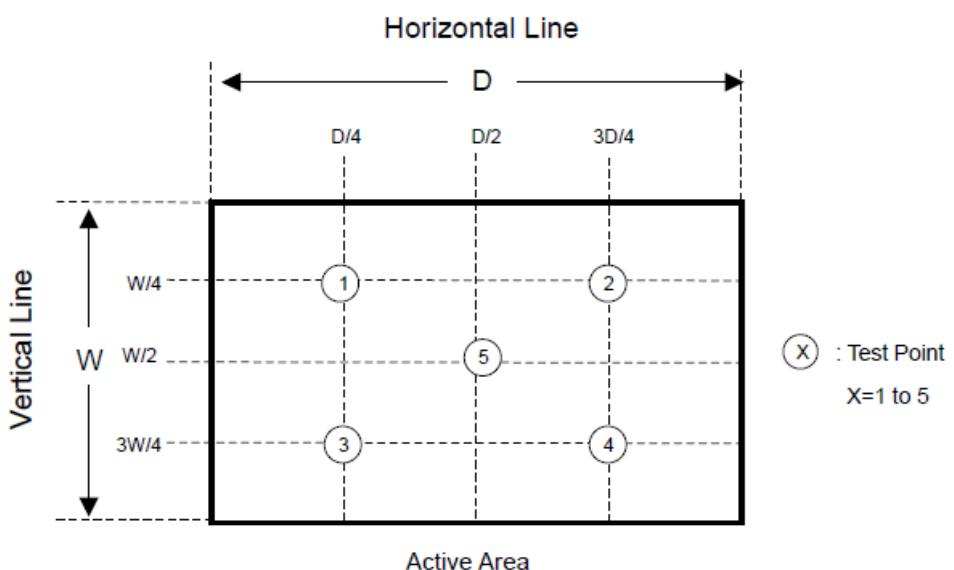


Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

## 3. **Functional Block Diagram**
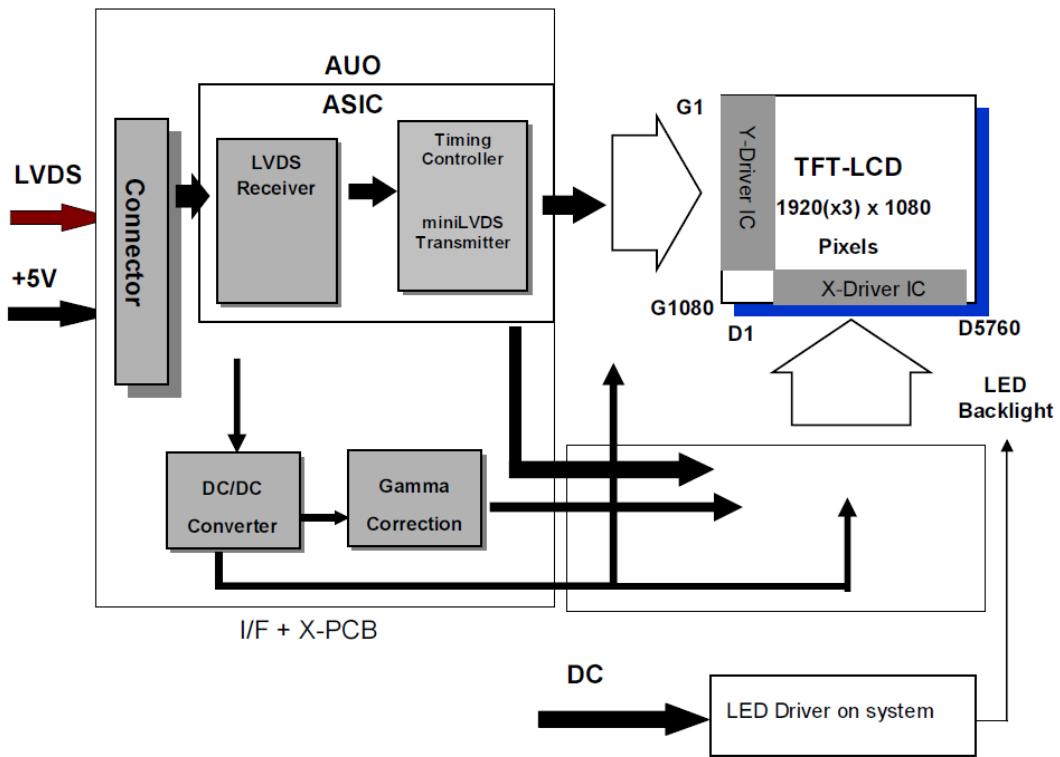


I/F PCB Interface:

MSCKT2407P30HB

AL230F-A0G1D-P

Mating Type:

FI-X30HL(Locked Type)

## 4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD Module

| Items | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Power supply voltage | Vcc | -0.3 | 6.0 | | Note 1 |
| Logic/ LCD drive voltage | Vin | -0.3 | 6.0 | Volt | Note 1 |

4.2 Backlight converter unit

| Items | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| LED Forward Current | | 0 | 480 | mA | T=25 $^0$C |
| LED forward Voltage variation | | | 45 | V | Note 1, 2 |

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

4.3 Absolute Ratings of Environment

| Items | Symbol | Values | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Operation temperature | $T_{OP}$ | -10 | - | 50 | $^0$C | Note 3 |
| Operation Humidity | $H_{OP}$ | 5 | | 90 | % | |
| Storage temperature | $T_{ST}$ | -20 | | 60 | $^0$C | |
| Storage Humidity | $H_{ST}$ | 5 | | 90 | % | |

Note 1: With in Ta= 25℃

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

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

## 5. Electrical characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Input power specifications are as follows

| Symbol | Description | Min | Typ | Max | Unit | Remark |
|--------|-------------|-----|-----|-----|------|--------|
| VDD | Power supply Input voltage | 4.5 | 5.0 | 5.5 | [Volt] | |
| IDD | Power supply Input Current (RMS) | - | 0.93 | 1.22 | [A] | VDD= 5.0V, All white Pattern at 60 Hz |
| | | | 1.22 | 1.46 | [A] | VDD= 5.0V, All white Pattern at 75 Hz |
| PDD | VDD Power Consumption | - | 4.65 | 5.58 | [Watt] | VDD= 5.0V, All white Pattern at 60 Hz |
| | | | 6.10 | 7.30 | [Watt] | VDD= 5.0V, All white Pattern at 75 Hz |
| IRush | Inrush Current | - | - | 3.0 | [A] | *Note 3-1* |
| VDDrp | Allowable VDD Ripple Voltage | - | - | 500 | [mV] | VDD= 5.0V, All white Pattern at 75 Hz |
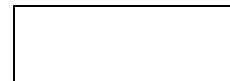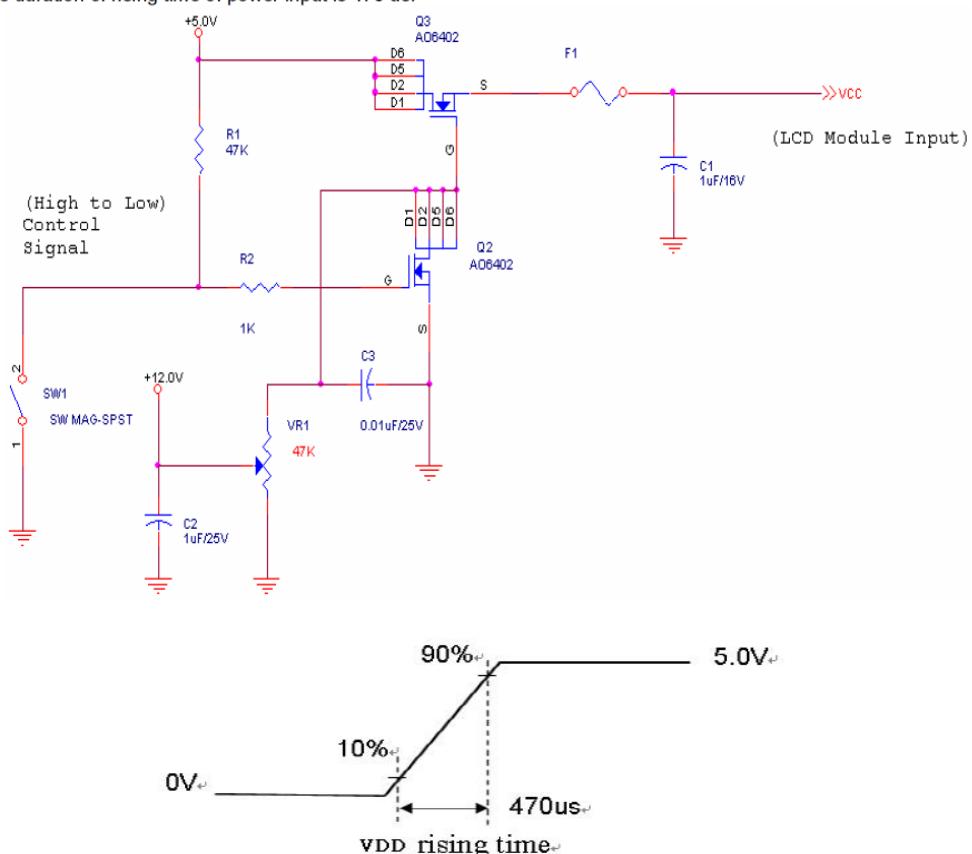
### 5.1.2 Signal Electrical Characteristics

(1) DC Characteristics of each signal are as following:

| Symbol | Description | Min | Typ | Max | Units | Conditions |
|--------|-------------|-----|-----|-----|-------|------------|
| $V_{TH}$ | Differential Input High Threshold | - | - | +100 | [mV] | $V_{CM}$ = 1.2V<br>*Note 1* |
| $V_{TL}$ | Differential Input Low Threshold | -100 | - | - | [mV] | $V_{CM}$ = 1.2V<br>*Note 1* |
| $\lvert V_{ID} \rvert$ | Input Differential Voltage | 100 | - | 600 | [mV] | *Note 1* |
| $V_{CM}$ | Differential Input Common Mode Voltage | +1.0 | +1.2 | +1.5 | [V] | $V_{TH}$-$V_{TL}$ = 200MV (max)<br>*Note 1* |

The LVDS input characteristics are as follows:
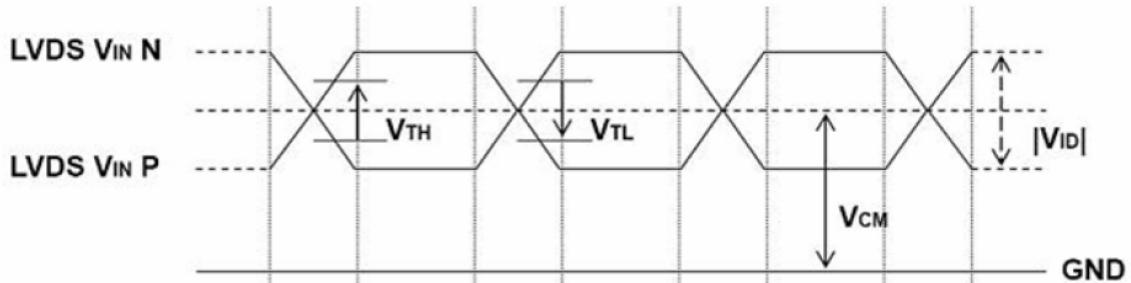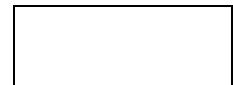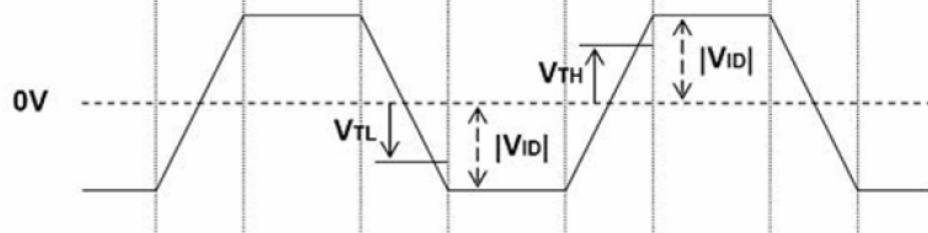
## (2) AC Characteristics

| Symbol | Description | Min | Max | Units | Conditions |
|--------|-------------|-----|-----|-------|------------|
| $F_{DEV}$ | Maximum deviation of input clock frequency during SSC | - | ± 3 | % | |
| $F_{MOD}$ | Maximum modulation frequency of input clock during SSC | - | 200 | KHz | |
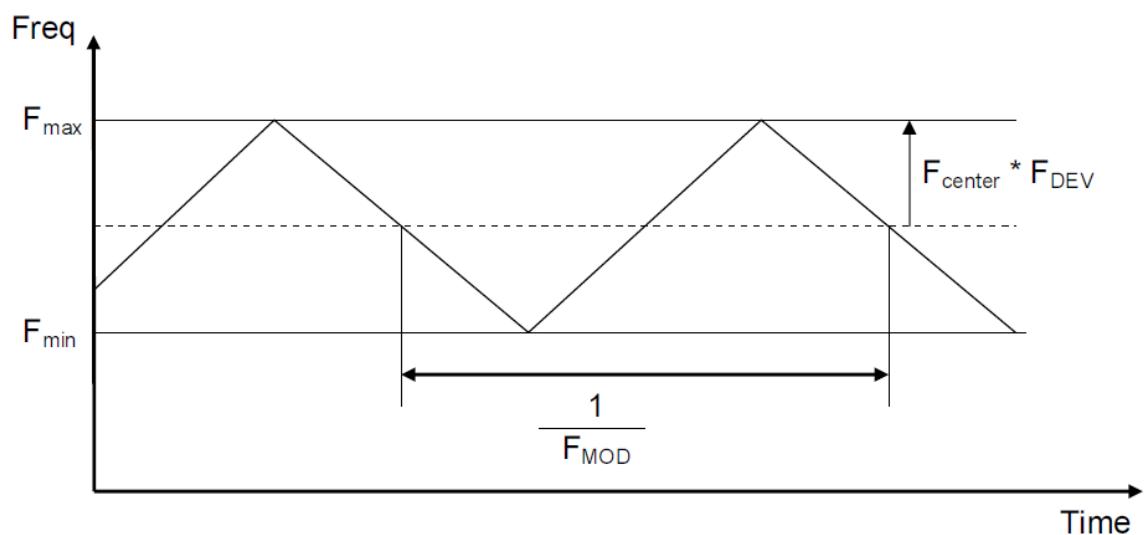
< Spread Spectrum>
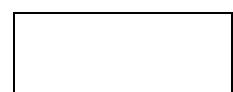
### 5.2 Backlight Unit

**5.2.1 BLU driving condition**

| Parameter | Symbol | Min | Typ. | Max | Unit | Remarks (Test condition) |
|---|---|---|---|---|---|---|
| Input Voltage | Vin | | 24.0 | 26.4 | VDC | |
| Input current | Iin | | 2.1 | 3.5 | A | Vin=24V, Dim=max |
| Input power | Pin | | 50.4 | | W | |
| On/Off control | ON/OFF | | 3 | 5 | VDC | ON state |
| | | -0.3 | | 0.7 | | OFF state |
| Dimming control | DIMM | 180 | 200 | 220 | Hz | PWM |

**5.2.2 LED driving condition**

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

| Symbol | Description | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|---|
| ILED | LED Forward Current | | 300 | | mA | Note 1 |
| VLB | Light Bar Operation Voltage | | 42 | | V | Note 2 |
| PBLU | BLU Power Consumption | | 50.4 | | W | Note 3 |
| LTLED | LED Life Time (Typical) | | 50,000 | | | Note 4 |

Note 1: The specified current is 100% duty of LED chip input current

Note 2: The value showed is one string operation voltage.

Note 3: PBLU = VLED * ILED * 4 (Total)

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 = 300 mA and 25±2°C (Room Temperature).

## 6. Signal Characteristics

### 6.1 Pixel Format Definition

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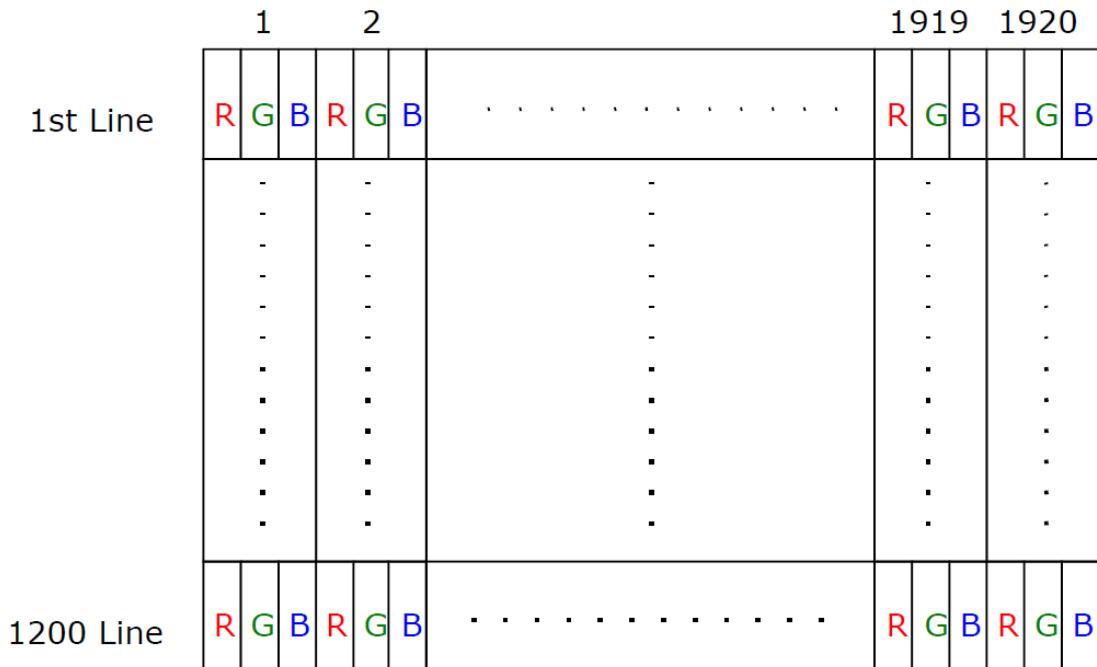


### 6.2 Input Data Format Definition



| 8 Bit Color Bit Order | | | |
|---|---|---|---|
| MSB | R7 | G7 | B7 |
| | R6 | G6 | B6 |
| | R5 | G5 | B5 |
| | R4 | G4 | B4 |
| | R3 | G3 | B3 |
| | R2 | G2 | B2 |
| | R1 | G1 | B1 |
| LSB | R0 | G0 | B0 |
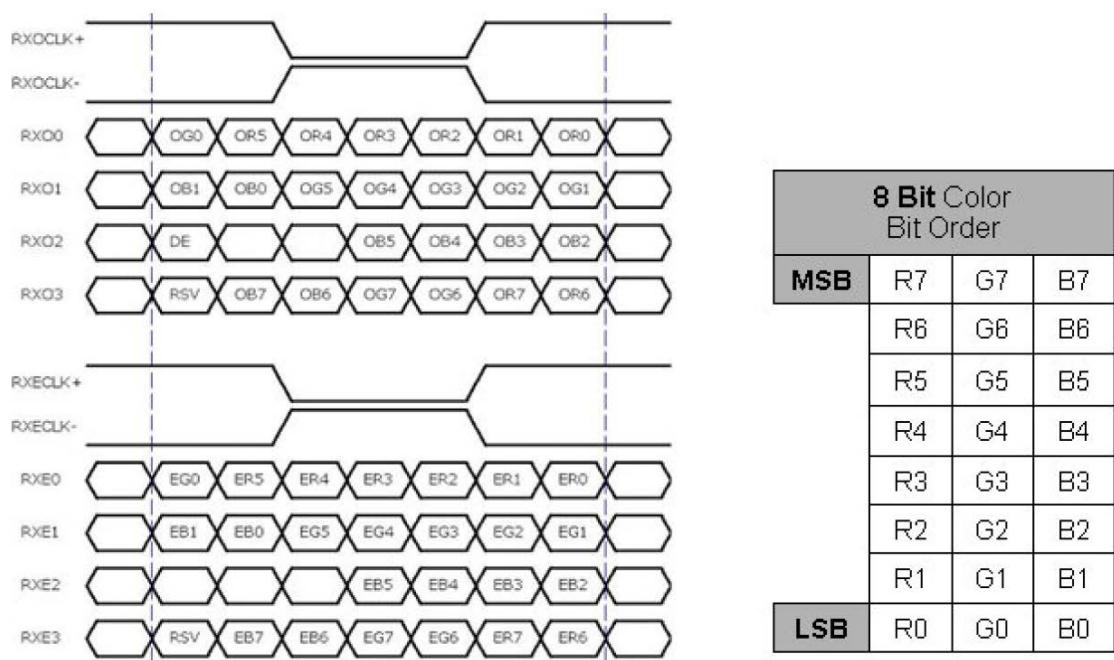
Note 1: R/G/B data 7:MSB, R/G/B data 0:LSB O = "Odd Pixel Data" E = "Even Pixel Data"

# AGL Product Specification   Applied Green Light, Inc.
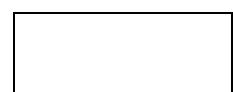
**Color versus Input Data**

The following table is for color versus input data (8bit). The higher the gray level, the brighter the color.

| Color | Gray Level | Color Input Data | | | | | | | | | | | | | | | | | | | | | | | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RED data (MSB:R7, LSB:R0) | | | | | | | | GREEN data (MSB:G7, LSB:G0) | | | | | | | | BLUE data (MSB:B7, LSB:B0) | | | | | | | | |
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | 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 | |
| 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 | |
| Gray 127 | - | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 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 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L255 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 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 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 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 | Black |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | L255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |

6.3 Signal Description

| PIN# | SIGNAL NAME | DESCRIPTION |
|---|---|---|
| 1 | RxOIN0- | Negative LVDS differential data input (Odd data) |
| 2 | RxOIN0+ | Positive LVDS differential data input (Odd data) |
| 3 | RxOIN1- | Negative LVDS differential data input (Odd data) |
| 4 | RxOIN1+ | Positive LVDS differential data input (Odd data) |
| 5 | RxOIN2- | Negative LVDS differential data input (Odd data, DSPTMG) |
| 6 | RxOIN2+ | Positive LVDS differential data input (Odd data, DSPTMG) |
| 7 | GND | Power Ground |
| 8 | RxOCLK- | Negative LVDS differential clock input (Odd clock) |
| 9 | RxOCLK+ | Positive LVDS differential clock input (Odd clock) |
| 10 | RxOIN3- | Negative LVDS differential clock input (Odd clock) |
| 11 | RxOIN3+ | Positive LVDS differential data input (Odd data) |
| 12 | RxEIN0- | Negative LVDS differential data input (Even data) |
| 13 | RxEIN0+ | LVDS differential data input (Even data) |
| 14 | GND | Power Ground |
| 15 | RxEIN1- | Negative LVDS differential data input (Even data) |
| 16 | RxEIN1+ | Positive LVDS differential data input (Even data) |
| 17 | GND | Power Ground |
| 18 | RxEIN2- | Negative LVDS differential data input (Even data) |
| 19 | RxEIN2+ | Positive LVDS differential data input (Even data) |
| 20 | RxECLK- | Negative LVDS differential clock input (Even clock) |
| 21 | RxECLK+ | Positive LVDS differential clock input (Even clock) |
| 22 | RxEIN3- | Negative LVDS differential data input (Even data) |
| 23 | RxEIN3+ | Positive LVDS differential data input (Even data) |
| 24 | GND | Power Ground |
| 25 | NC | No connection (for test only. Do not connect) |
| 26 | NC | No connection (for test only. Do not connect) |
| 27 | NC | No connection (for test only. Do not connect) |
| 28 | VDD | Power +5V |
| 29 | VDD | Power +5V |
| 30 | VDD | Power +5V |

Note 1: Input signals of odd and even clock shall be the same timing.

VDD

RxCIN0-

30

1

7

S

BLU LABEL

LVDS C/N PIN 1

L/B C/N PIN 1
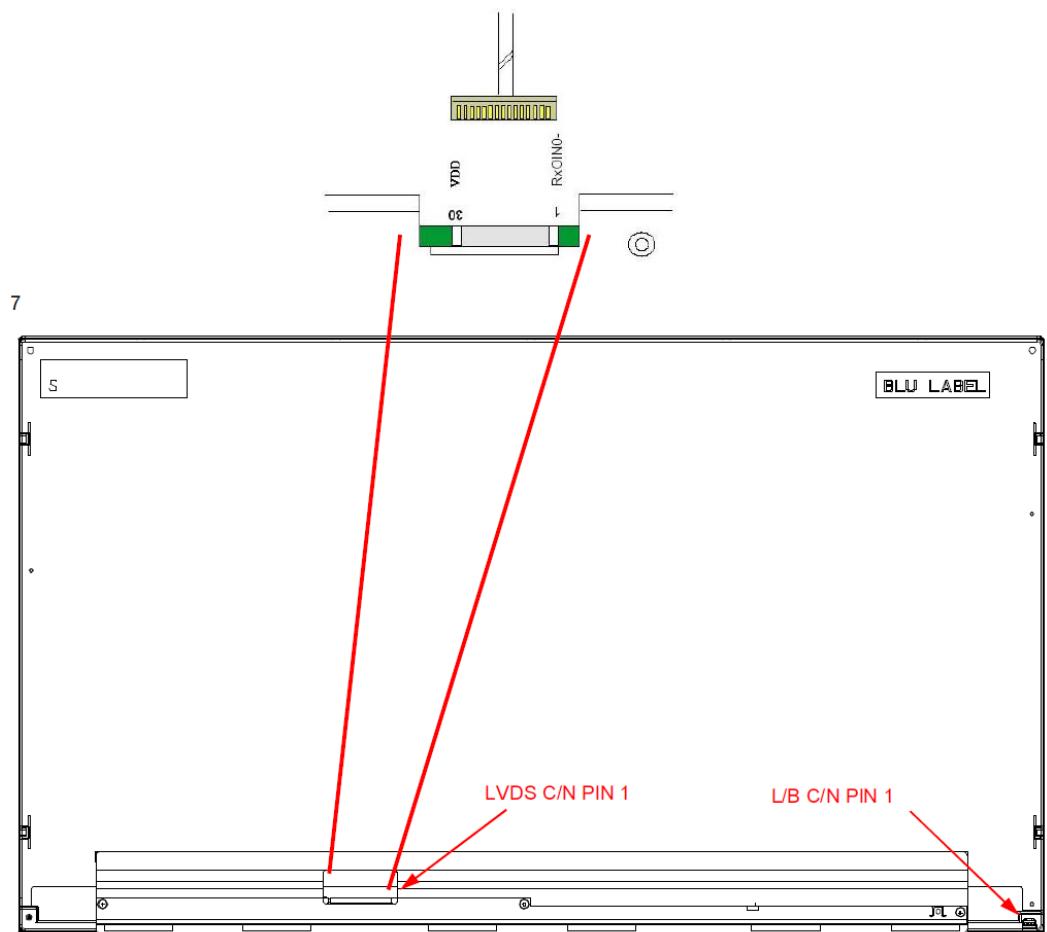
### 6.4 Timing Characteristics

The input signal timing specifications are shown as the following table

| Symbol | Description | | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Tv | Vertical Section | Period | 1092 | 1130 | 1793 | Th | |
| Tdisp (v) | | Active | 1080 | 1080 | 1080 | Th | |
| Tblk (v) | | Blanking | 12 | 50 | 713 | Th | |
| Fv | | Frequency | 50 | 60 | 76 | Hz | |
| Th | Horizontal Section | Period | 1004 | 1050 | 1100 | Tclk | |
| Tdisp (h) | | Active | 960 | 960 | 960 | Tclk | |
| Tblk (h) | | Blanking | 44 | 90 | 140 | Tclk | |
| Fh | | Frequency | 55 | 68 | 90 | KHz | **Note 3-3** |
| Tclk | LVDS Clock | Period | 11.1 | 14.0 | 18.2 | ns | 1/Fclk |
| Fclk | | Frequency | 54.8 | 71.2 | 90.0 | MHz | **Note 3-4** |

Note 1: DE mode only\

## 6.5 Timing Diagram
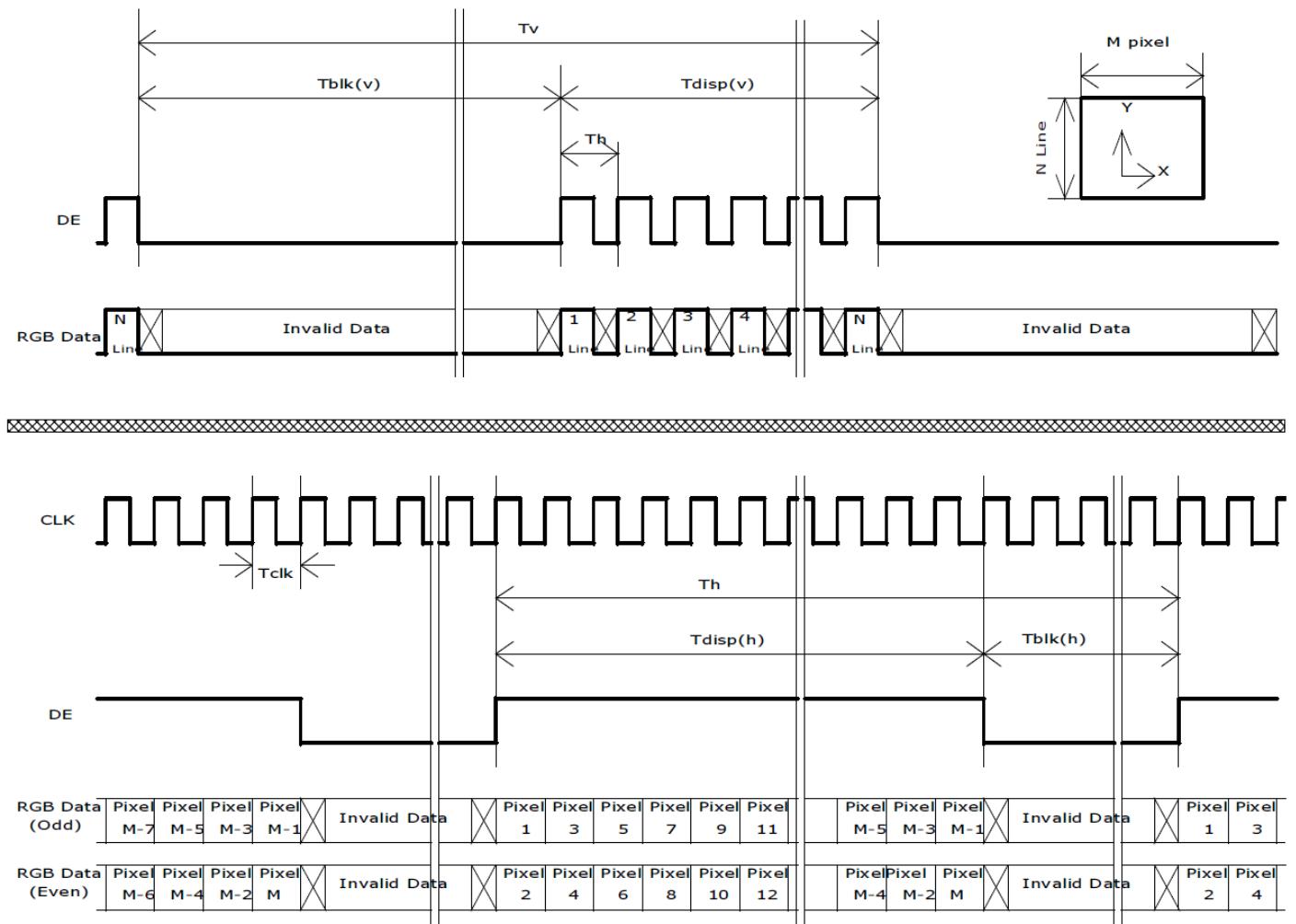
### 6.6 Power ON/OFF Sequence

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 when VDD is off.
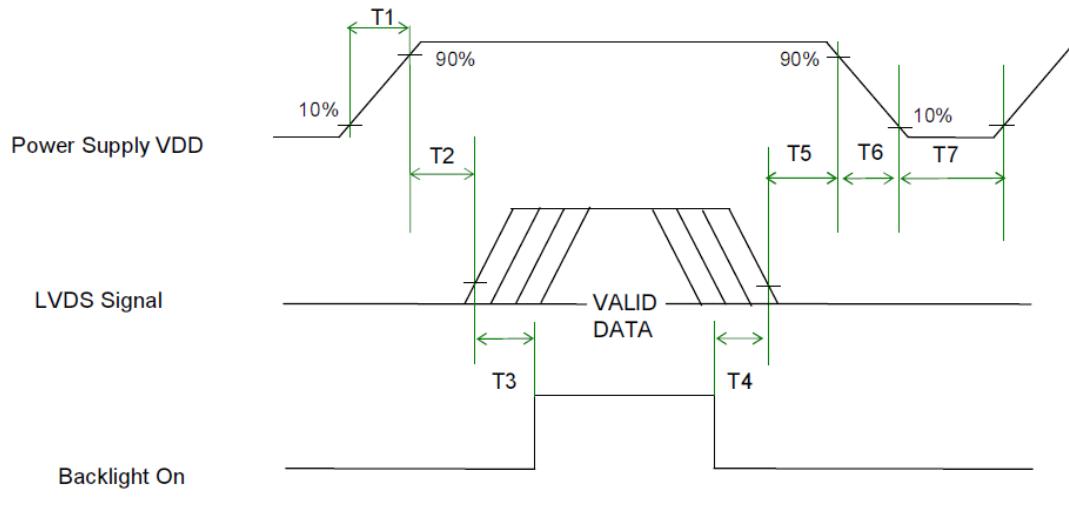


Power Sequence Timing

| 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] Note1,2 |
| T6 | 5 | - | 100 | [ms] 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.

# AGL    Product Specification    Applied Green Light, Inc.

## 7. Connector and 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 (CN1)

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

### 7.1.1 Pin Assignment

| Pin# | Signal Name | Pin# | Signal Name |
|---|---|---|---|
| 1 | RxOIN0- | 2 | RxOIN0+ |
| 3 | RxOIN1- | 4 | RxOIN1+ |
| 5 | RxOIN2- | 6 | RxOIN2+ |
| 7 | GND | 8 | RxOCLKIN- |
| 9 | RxOCLKIN+ | 10 | RxOIN3- |
| 11 | RxOIN3+ | 12 | RxEIN0- |
| 13 | RxEIN0+ | 14 | GND |
| 15 | RxEIN1- | 16 | RxEIN1+ |
| 17 | GND | 18 | RxEIN2- |
| 19 | RxEIN2+ | 20 | RxECLKIN- |
| 21 | RxECLKIN+ | 22 | RxEIN3- |
| 23 | RxEIN3+ | 24 | GND |
| 25 | NC (for AUO test only. Do not connect) | 26 | NC (for AUO test only. Do not connect) |
| 27 | NC (for AUO test only. Do not connect) | 28 | VDD |
| 29 | VDD | 30 | VDD |

7.2 LED Driver Connector on Backlight Unit

Pin & Connector Assignment: (CN2)

Connector: CviLux CI0114M1HR0 or equivalent

| Pin NO | Symbol | Description |
|--------|--------|-------------|
| 1 | VIN | DC +24V |
| 2 | VIN | DC +24V |
| 3 | VIN | DC +24V |
| 4 | VIN | DC +24V |
| 5 | VIN | DC +24V |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | GND | Ground |
| 10 | GND | Ground |
| 11 | NC | No connected |
| 12 | ON / OFF | OFF=0V; ON=+3V |
| 13 | DIMM | 20~100% |
| 14 | NC | No connected |

### 8.0 Reliability Test

Environment test conditions are listed as following table.

| Items | Required Condition | Note |
|---|---|---|
| Temperature Humidity Bias (THB) | Ta= 40℃, 80%RH, 300hours | |
| High Temperature Operation (HTO) | Ta= 50℃, 50%RH, 300hours | 3 |
| Low Temperature Operation (LTO) | Ta= -10℃, 300hours | |
| High Temperature Storage (HTS) | Ta= 60℃, 300hours | |
| Low Temperature Storage (LTS) | Ta= -20℃, 300hours | |
| Drop Test | Height: 60 cm, package test | |
| Thermal Shock Test (TST) | -20℃/30min, 60℃/30min, 100 cycles | 1 |
| On/Off Test | On/10sec, Off/10sec, 30,000 cycles | |
| ESD (Electrostatic Discharge) | Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 9 points, 25 times/ point. | 2 |
| | Air Discharge: ± 15KV, 150pF(330Ω) 1sec 9 points, 25 times/ point. | 2 |

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℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

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

Note 3: The test items are tested by open frame type chassis.

## 9. Shipping Label & Package
(TBD)
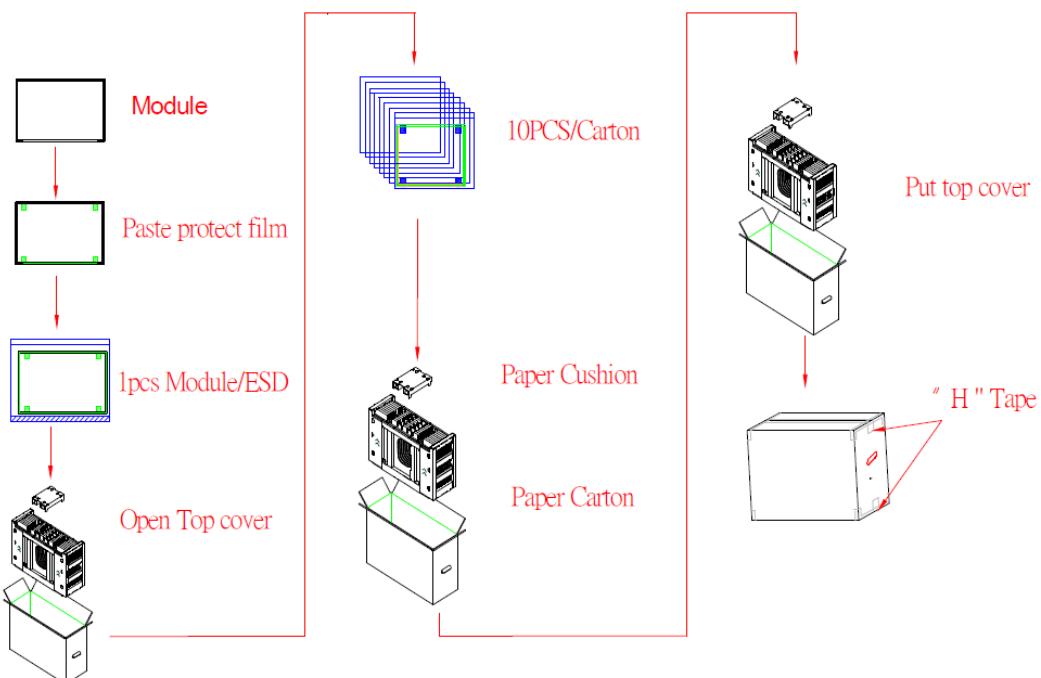


| | Item | Specification | | | Remark |
|---|---|---|---|---|---|
| | | Q'ty | Dimension | Weight(kg) | |
| 1 | Panel | 1 | 613.6(H)mm x 356.85(V)mm x 10(D)mm | 2.180 | |
| 2 | Cushion | 1 | - | 4.41 | |
| 3 | Box | 1 | 708(L)mm x 261(W)mm x 473(H)mm | 1.38 | without Panel & cushion |
| 4 | Packing Box | 10 pcs/Box | 708(L)mm x 261(W)mm x 473(H)mm | 27.13 | with panel & cushion |
| 5 | Pallet | 1 | 1070(L)mm x 740(W)mm x 138(H)mm | 12.9 | |
| 6 | Pallet after Packing | 8 boxes/pallet | 1070(L)mm x 740(W)mm x 138(H)mm | 229.94 | |

## 9. Mechanical Characteristics