(   ) Preliminary Specification
(V) Final Specification

Module	27.0" Color TFT-LCD
Model Name	M270QAN01.0

Customer	Date

Approved by

Approved by	Date

__Howard Lee__   Nov 20, 2014

Prepared by	Date

__JiaHau Jean__   Nov 20, 2014

Note: This Specification is subject to
change without notice.

AU Optronics corporation

Contents

Record of Revision

Version	Date	Page	Old description	New Description	Remark
0.1	2014/1/20	All	First version release		
0.2	2014/2/10	15,26,32		Modify shielding cover drawing	
0.3	2014/5/13	21			Modify Timing
0.4	2014/7/1	21	NA	3.4.5 Input Timing Specification increase Fh information	
0.5	2014/10/3	27	Vs Min. is NA	Vs Min. is 61.6V	
1.0	2014/11/20	20			

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 27.0 inch wide Color a-Si TFT-LCD Module M270QAN01.0. The display supports the UHD - 3840(H) x 2160(V) screen format and 1.07B colors (10bits RGB 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]	684 (26.93")
Active Area	[mm]	596.16 (H) x 335.34 (V)
Pixels H x V	-	3840x3(RGB) x 2160
Pixel Pitch	[um]	155.25 (per one triad) × 155.25
Pixel Arrangement	-	R.G.B. Vertical Stripe
Display Mode	-	Normally Black
White Luminance (Center)	[cd/m^2]	300 (Typ.)
Contrast Ratio	-	1000 (Typ.)
Response Time	[msec]	12 (Typ., Gray to Gray)
Power Consumption (LCD Module + Backligh unit)	[Watt]	Total = 44.6 (Typ.) LCD module : PDD (Typ.)=10.8 @ white pattern, 60Hz, 12 V Backlight unit : PBLU (Typ.) =33.8 @ Is=120mA
Weight	[Grams]	2820 (Typ.)
Outline Dimension	[mm]	613.6 (H) x 356.85 (V) × 14.5 (D) (Typ.)
Electrical Interface	-	8-lanes eDP , 10bits RGB data input
Support Color	-	1.07B colors
Surface Treatment	-	Anti-Glare, 3H
Temperature Range Operating Storage (Shipping)	[^{o}C] [^{o}C]	0 to +50 -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	[^{o}C]	**Note 2-1**
TGS	Glass surface temperature (operation)	0	+65	[^{o}C]	**Note 2-1** *Function judged only*
HOP	Operation Humidity	5	90	[%RH]	**Note 2-1**
TST	Storage Temperature	-20	+60	[^{o}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
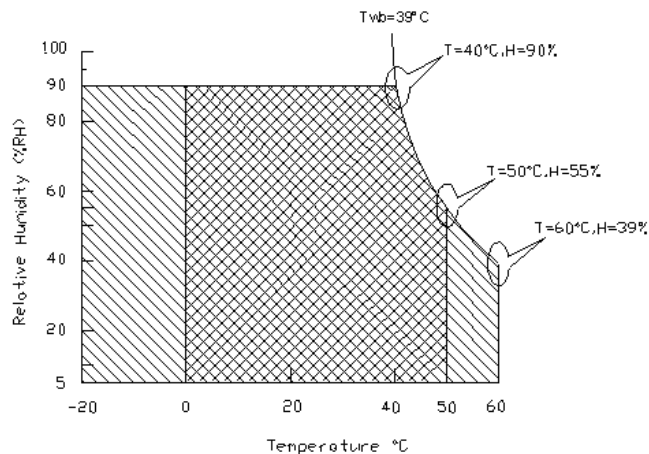
Operating Range   ▨   Storage Range   ▨ + ▧

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)		240	300	-	[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*
θ_R	Horizontal Viewing Angle (CR=10)	Right	75	89	-	[degree]	**Note 2-5** *By SR-3*
θ_L		Left	75	89	-		
Φ_H	Vertical Viewing Angle (CR=10)	Up	75	89	-		
Φ_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) (TBD)	Red x	0.623	0.653	0.683	-	*By SR-3*
R_y		Red y	0.302	0.332	0.362		
G_x		Green x	0.262	0.292	0.322		
G_y		Green y	0.584	0.614	0.644		
B_x		Blue x	0.114	0.144	0.174		
B_y		Blue y	0.026	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		99	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
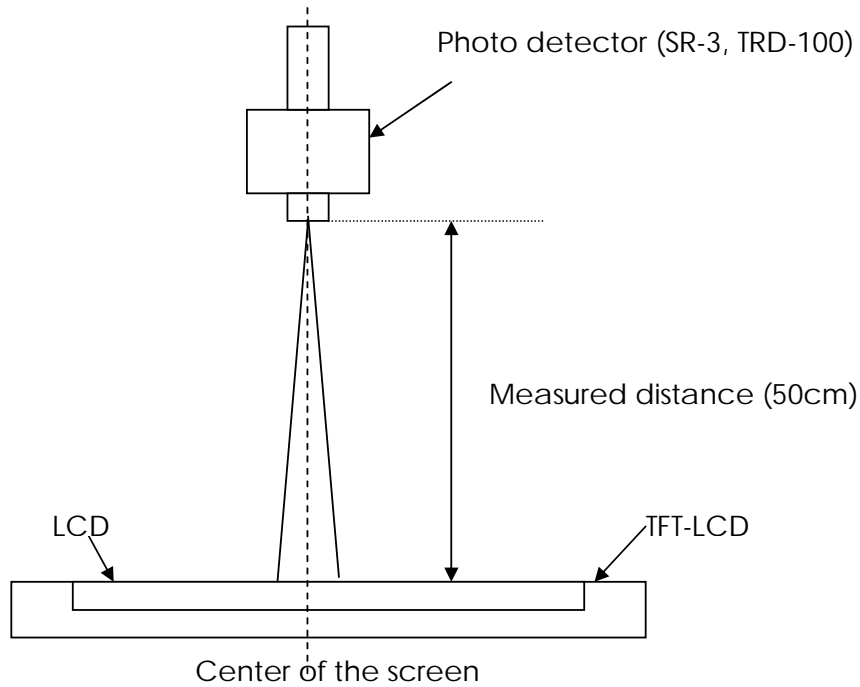
Note 2-3: Luminance Uniformity Measurement

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
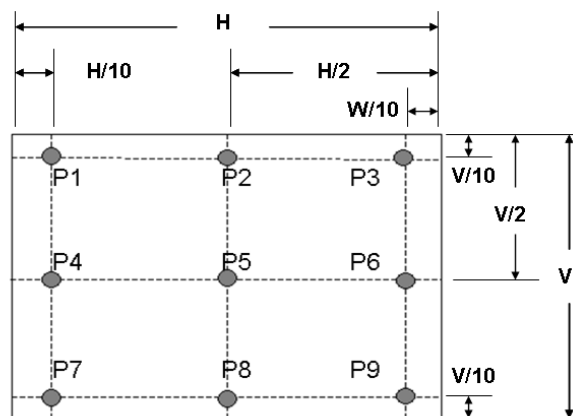
***Note 2-4:*** Contrast Ratio Measurement

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 (θ_L & θ_R)

Vertical view angle: Divide to up & down (Φ_H &Φ_L)
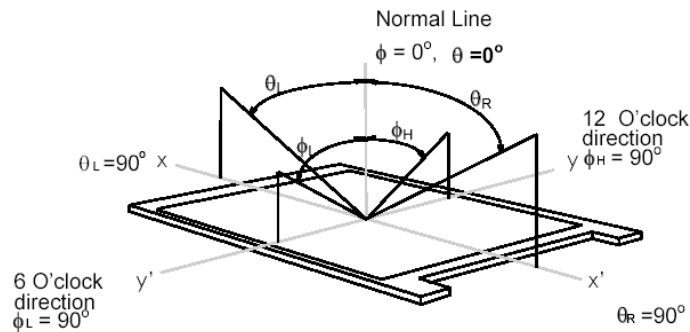
Note 2-6: Response   time
measurement
The output signals of photo detector are measured when the input signals are changed from "Gray level A" to "Gray level B" (falling time, T_f), and from "Gray level B" to "Gray level A" (rising time, T_r), respectively. The response time is interval between the 10% and 90% of optical response.
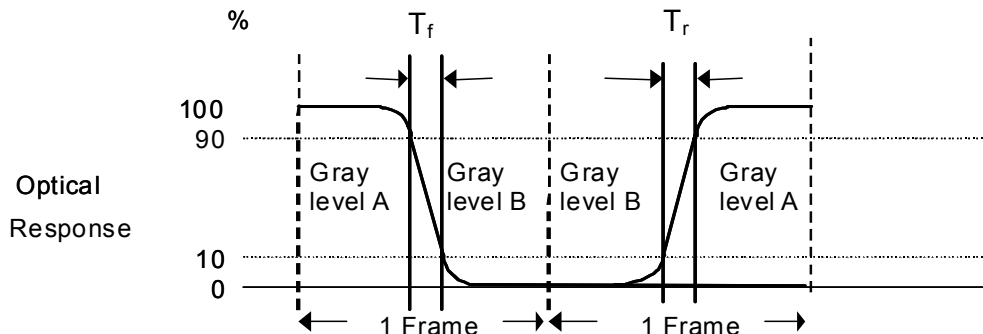
The gray to gray response time is defined as the following table.

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
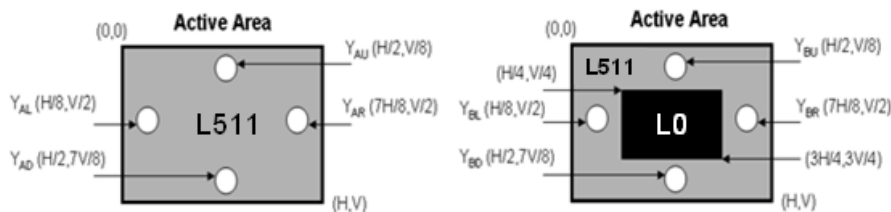
Note 2-8: Flicker measurement

    a. Test pattern: It is listed as following.

Gray level = L0

Gray level = L511

R: Red, G: Green, B:Blue
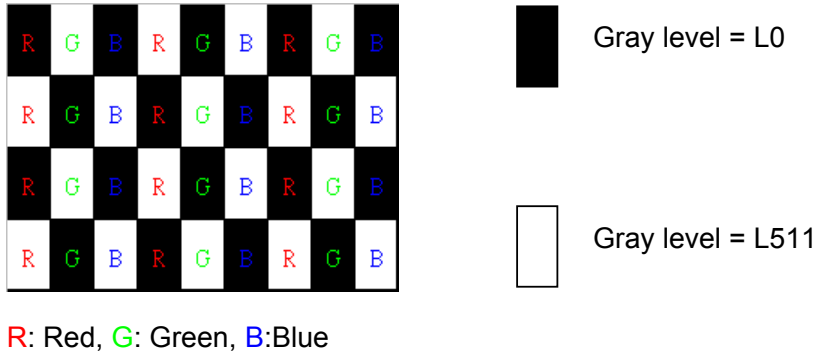
  b. Measured position: Center of screen (P5) & perpendicular to the screen (θ=Φ=0°)

3 TFT-LCD Module

3.1 Block Diagram

The following shows the block diagram of the 27.0 inch Color TFT-LCD Module.
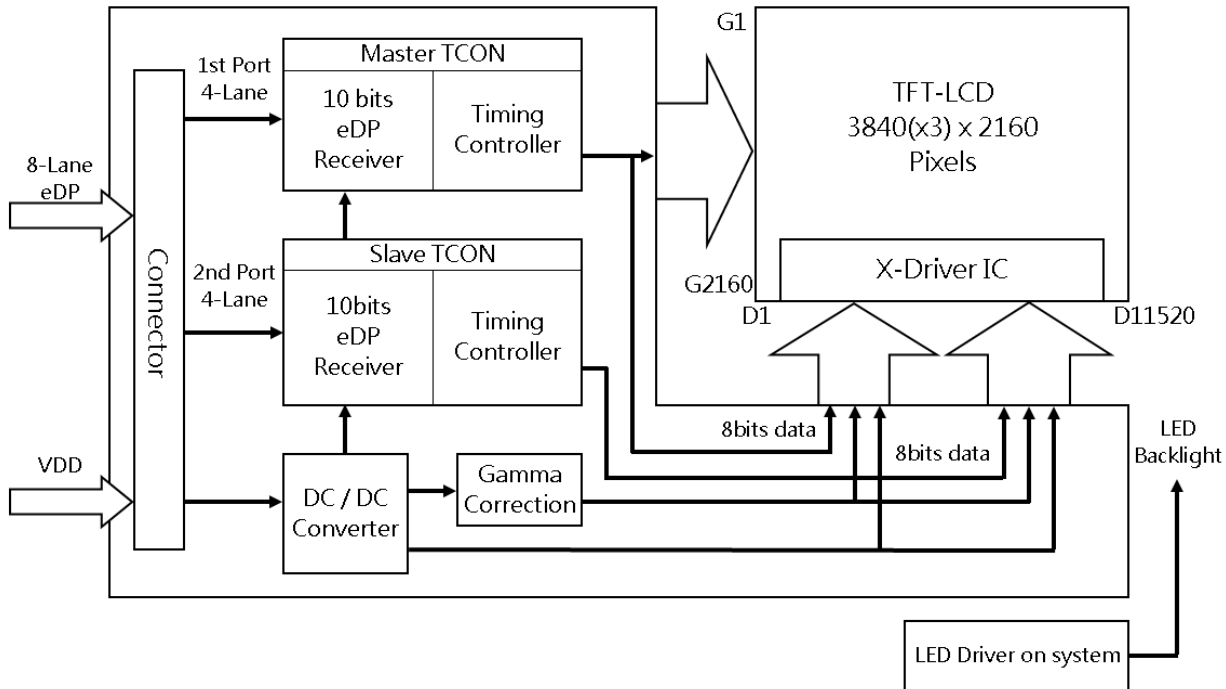
3.2 Interface Connection

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 or Compatible	

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	

41   1

SHIPPING LABEL

BLU LABEL

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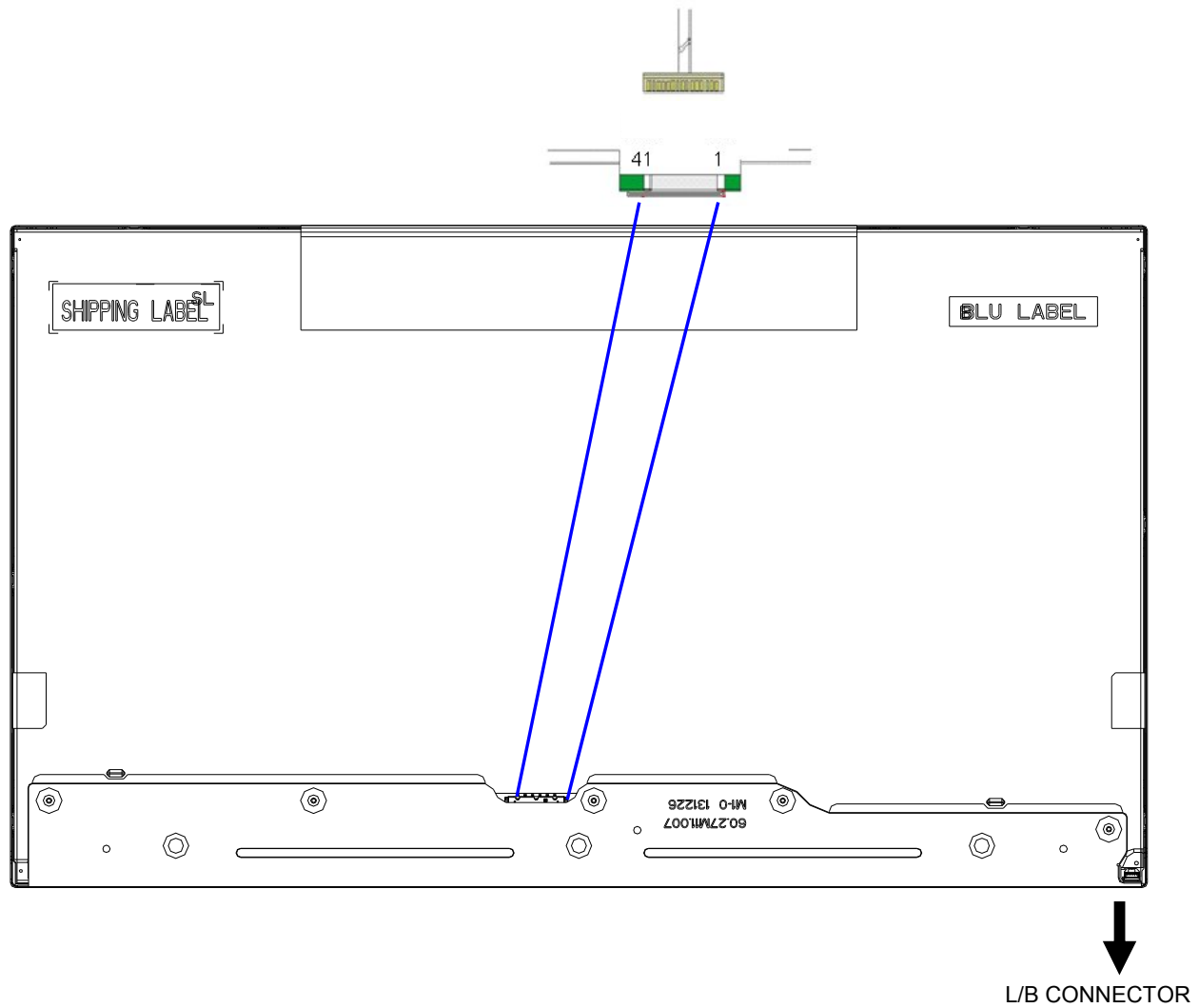
Note 3-1: Input signals of port 1 to port 4 clocks shall be the same timing.

## 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:
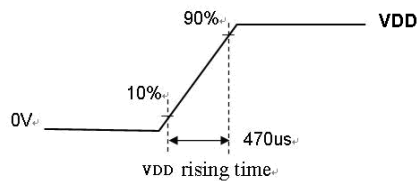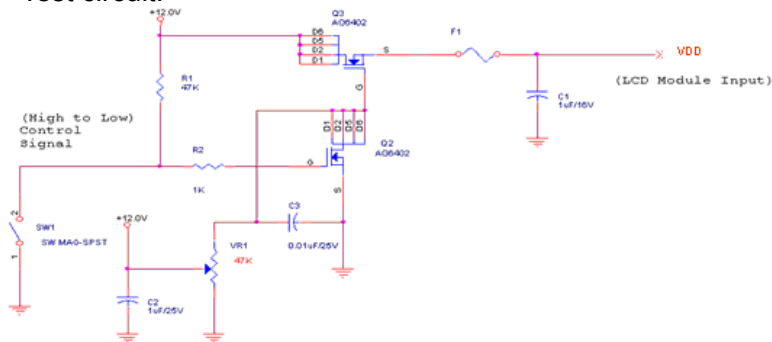
The duration of VDD rising time: 470us.

3.4 Signal Characteristics

3.4.1 LCD Pixel Format

Following figure shows the relationship between the input signals and LCD pixel format.
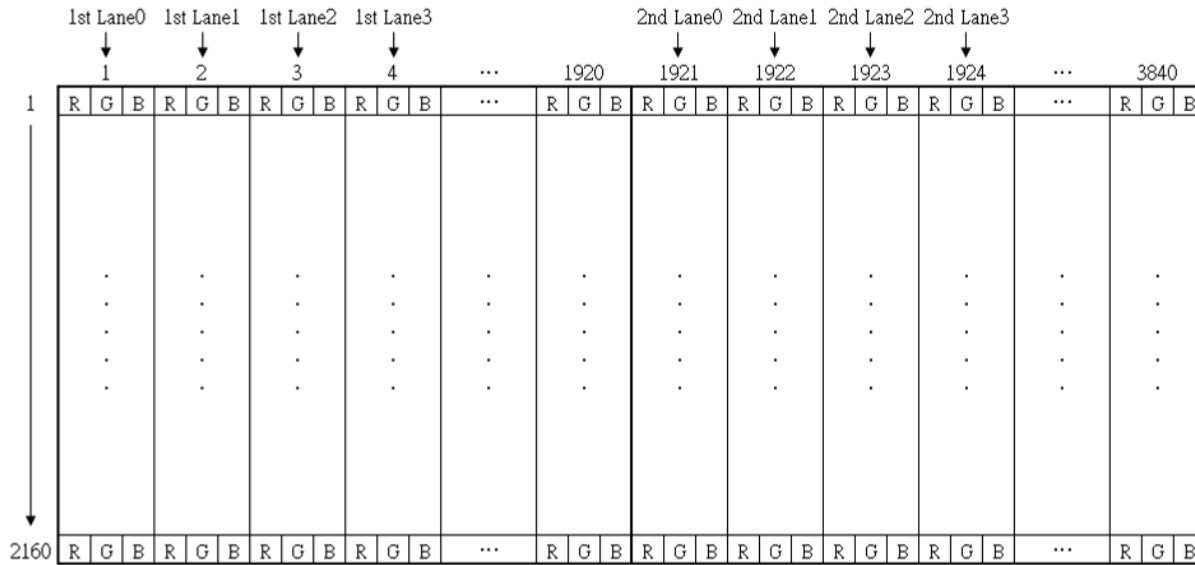
Note 3-3: The module use 8-Lanes eDP interface.

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
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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	RED data (MSB:R9,LSB:R0)										GREEN data (MSB:G9,LSB:G0)										BLUE data (MSB:B9,LSB:B0)										Remark
		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	-	2.0	V
VDiff$_{P-P}$	Peak-to-peak Voltage at a receiving Device	120	-	-	mV
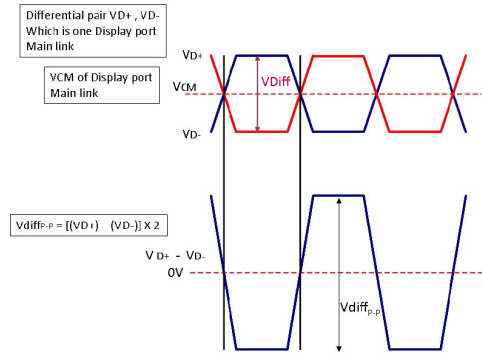
b. DisplayPort AUX_CH signal:

DisplayPort AUX_CH		Min	Typ	Max	unit
VCM	AUX DC Common Mode Voltage	0	0.5	2.0	V
VDiff$_{P-P}$	AUX Peak-to-peak voltage at a receiving device	0.32	0.6	1.32	V
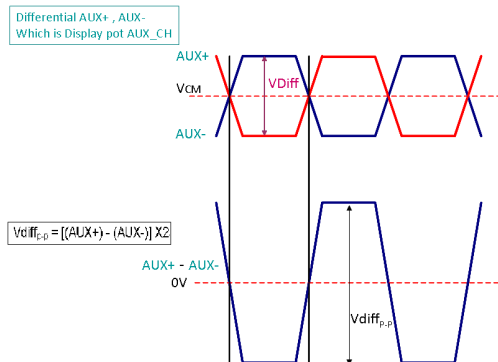
c. DisplayPort VHPD signal:

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

$$Fclk\ (Min.) = Fv\ (Min.) \times Th\ (Min.) \times Tv\ (Min.)$$

$$Fclk\ (Typ.) = Fv\ (Typ.) \times Th\ (Typ.) \times Tv\ (Typ.)$$

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.
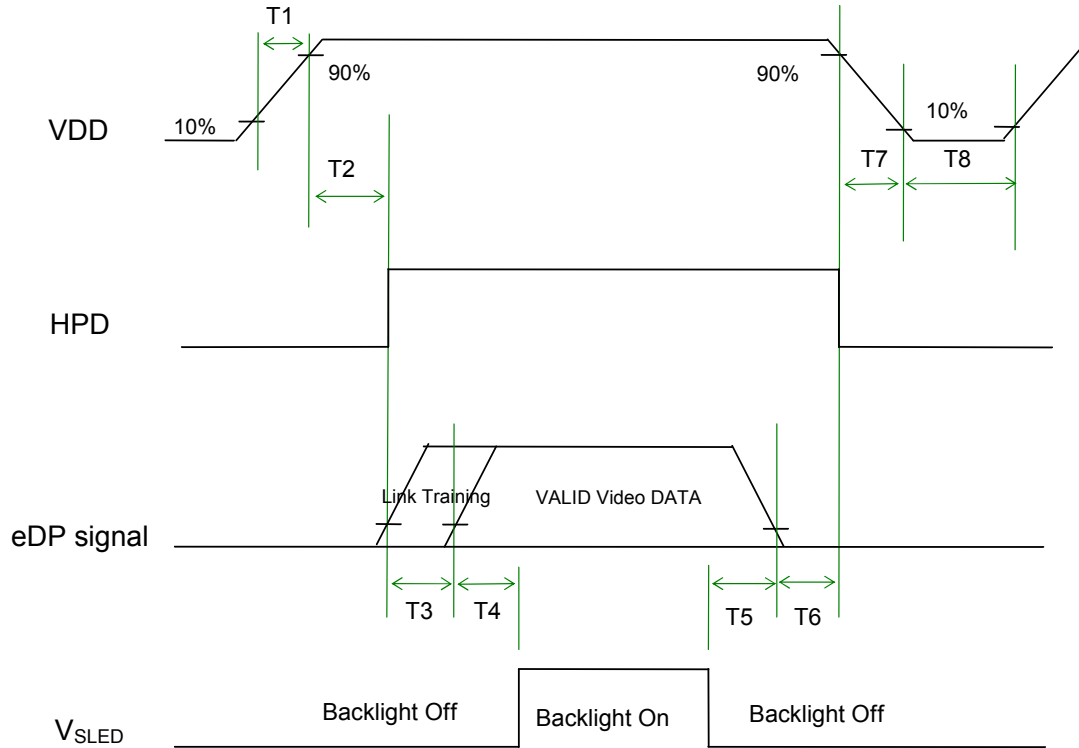
Power Sequence Timing

Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T1	0.5	-	10	[ms]	
T2	0	-	200	[ms]	
T3	0	-	-	[ms]	*Note 3-4*
T4	500	-	-	[ms]	
T5	100	-	-	[ms]	
T6	0		50	[ms]	*Note 3-5* *Note 3-6*
T7	0	-	150	[ms]	*Note 3-6*
T8	1000	-	-	[ms]	

Note 3-4: During T3 period , eDP link training time by customer's system.
*Note 3-5:* Recommend setting T6 = 0ms to avoid electronic noise when VDD is off.
Note 3-6: 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 27.0 inch Backlight Unit. Each LED light bar includes 88 pcs LED package. (4 strings and 22 pcs LED of one string).
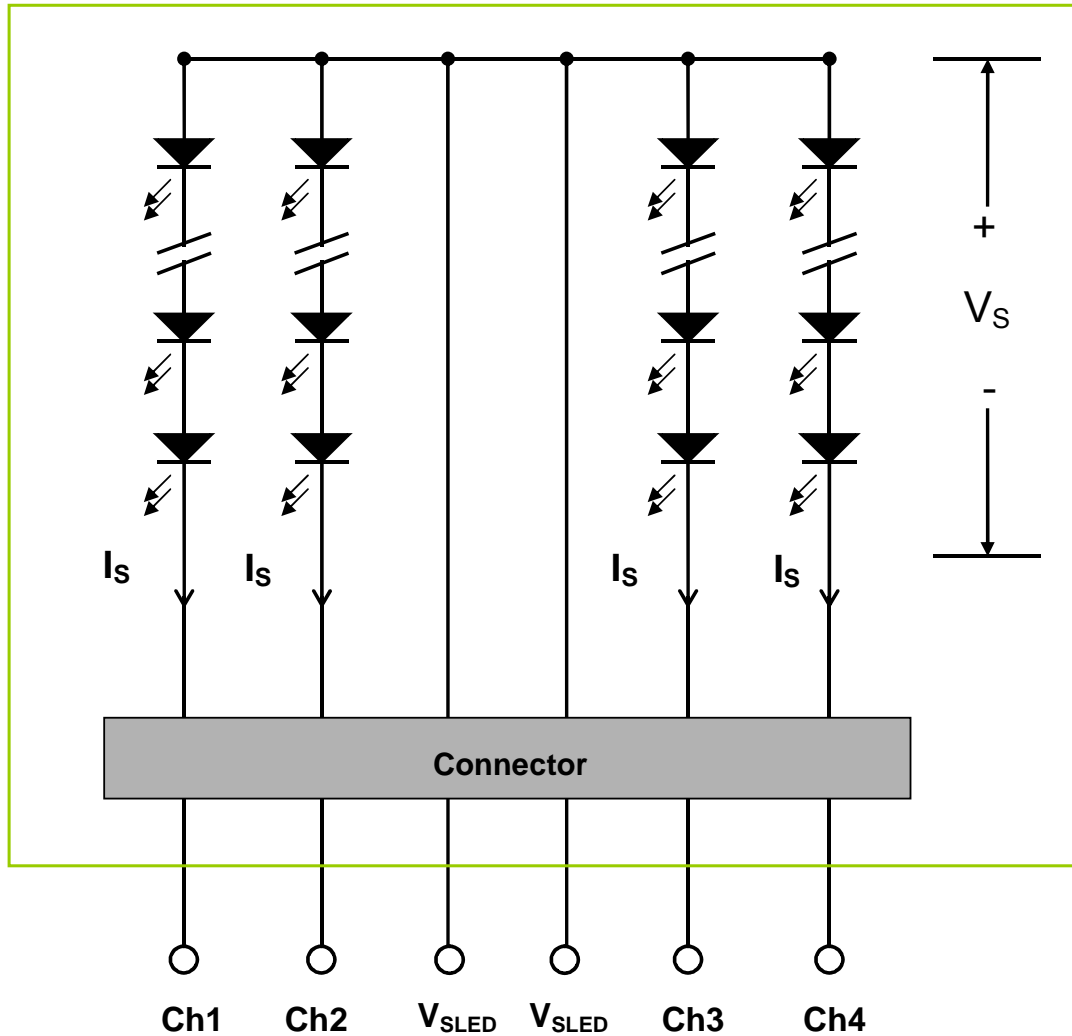
4.2 Interface Connection

4.2.1 Connector Type

|		
Backlight Connector	Manufacturer	ENTERY
	Part Number	3707K-S06N-07R
Mating Connector	Manufacturer	ENTERY
	Part Number	H112K-P06N-13B (Locked type)

Backlight Connector dimension:

$H \times V \times D = 7.9 \times 5.05 \times 4.25, Pitch = 1.0 (unit = mm)$
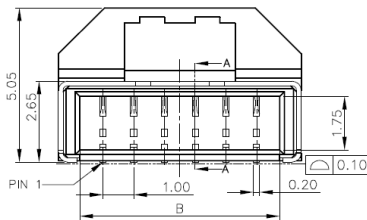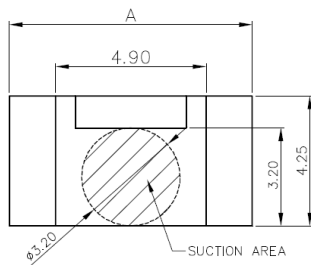
Mating Connector dimension:
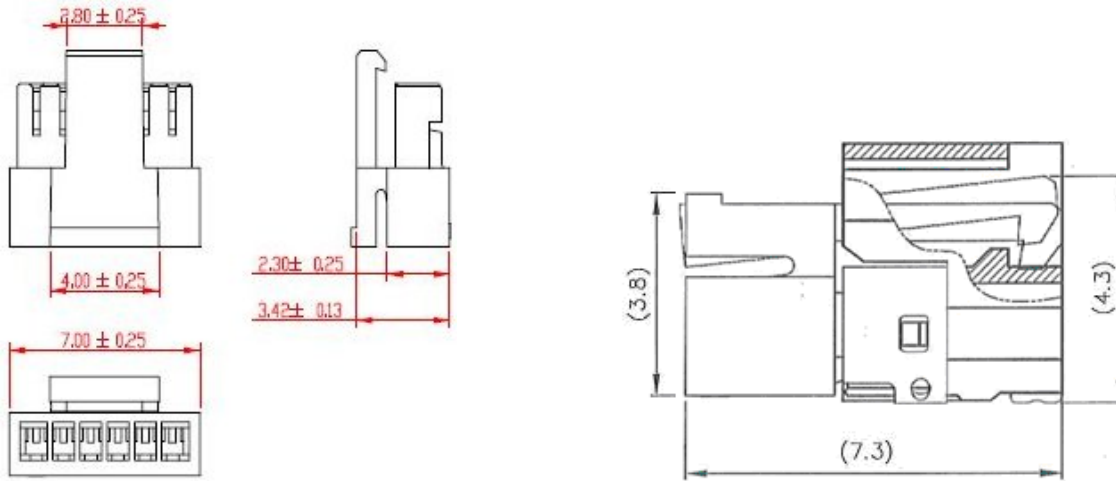
4.2.2 Connector Pin Assignment

| 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)	

PIN 1
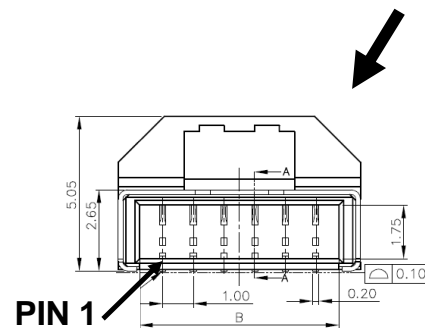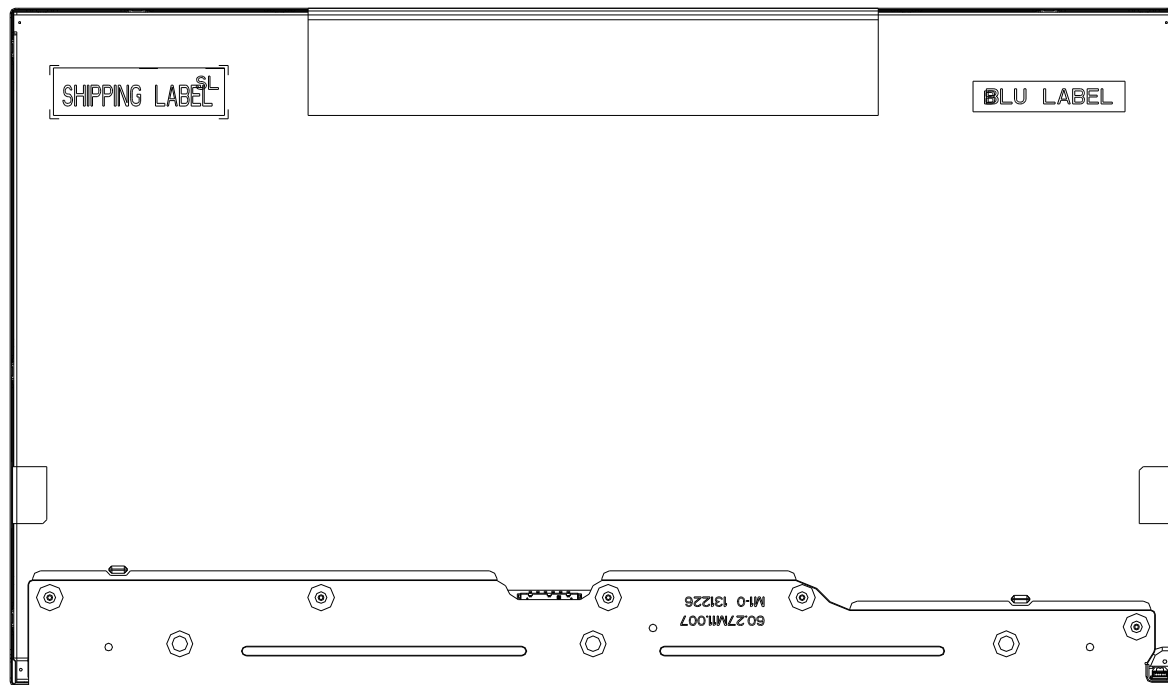
4.3 Electrical Characteristics

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% Pulse time=10 ms
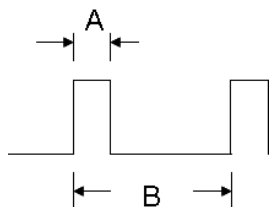
Duty ratio= (A / B) X 100% ;   (A: Pulse time, B: Period)

4.3.2 Recommended Operating Condition

(Ta=25)

Symbol	Description	Min.	Typ.	Max.	Unit	Remark
Is	LED String Current		120	130	[mA]	100% duty ratio of LED chip
Vs	LED String Voltage	61.6	70.4	79.2	[Volt]	Is=120mA @ 100% duty ratio; *Note 4-1&Note 4-5*
ΔVs	Maximum Vs Voltage Deviation of light bar			4.4	[Volt]	Is=120mA @ 100% duty ratio; *Note 4-2*
P$_{BLU}$	LED Light Bar Power Consumption		33.8	38	[Watt]	*Note 4-3*
LT$_{LED}$	LED Life Time	30000			[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.)=2.8V, V_F(Typ.)=3.2V, 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: ΔVs (Max.) = $ΔV_F$ X LED No. (one string);
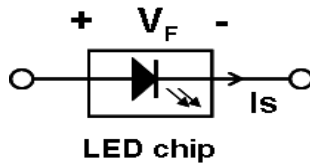
a. $ΔV_F$: LED chip forward voltage deviation (0.2V , each Bin of LED V_F)

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

P_{BLU} (Max.) = Vs (Max.) X Is (Typ.) X 4

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)	Acceleration: 1.5 Grms Wave: Random Frequency: 10 - 200 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 20 ms 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 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:

```
*xxxxxxxxxxxx—xxxxx*          Manufactured XX/XX
                              Model No: M270QAN01.0
                              AU Optronics        XXXXX
                              MADE IN XXXXXX (XX)

xxxxxxxxxxxxxxxxxxxx
```
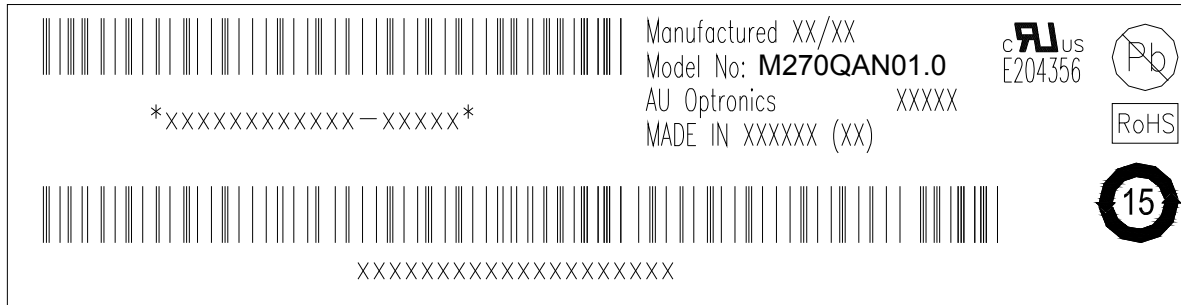
Note 6-1: For Pb Free products, AUO will add ⊘Pb for identification.

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

613.6 ± 0.5 (OUTLINE)

306.8

300.8

9.15 ± 0.5

(2.41)

(2.72)

335.34 ± 0.3 (ACTIVE AREA)

340.16 ± 0.5 (BEZEL OPEN)

356.85 ± 0.5 (OUTLINE)

(BEZEL OPEN)

(ACTIVE AREA)

170.08

180.78

596.16 ± 0.3 (ACTIVE AREA)

601.6 ± 0.5 (BEZEL OPEN)

(2.72)

9.15 ± 0.5

(8X) 4.55

14.5 ± 0.5

21.62

(8X) 58.4

86.29

170.66

235.33

319.7

384.37

468.74

533.41

(2.41)

(8X) Avoid Touching COF Position
When Doing Mechanical Design

14.5 ± 0.5

NOTE:
1.PRELIMINARY DRAWING FOR REFERANCE OLNY.
2.THIS DIMENSION EXCLUDES DEFORMATION.
3.BACKLIGHT: LED LIGHT-BAR.
4.LB CONNECTOR TO BE 3707K-S06N-07R.
5.EDP CONNECTOR TO BE CONNECTOR:J101:187060-41221
6.TOLERANCE WITHOUT SPECIFIED TO BE 0.5MM.

Ver 1.0

194   200

90   80

25   SHIPPING LABEL   BLU LABEL   16

144.68   137.68

133.19   298.45

23.03   174.21

60.85   6027WM007
MH0 E3122B   45

(8X) 13.83   (8X) 58.4   3.26
86.29   21.62

170.66

235.33

(8X) Avoid Touching COF Position   319.7
When Doing Mechanical Design   384.37

468.74

533.41

603.76

Ver 1.0

8 Packing Specification

8.1 Packing Flow

M270QAN01.0 PCBA
Board

Aint Bag

靜電袋Aint Bag 多餘的部分往面板背後折疊

需敏膠帶
SD.19M02.009

77.27M06.003 保護膜

M270QAN01.0 PCBA
Board

M270QAN01.0 PCBA
Board   8PCS

corner angle

stretch film

LABEL

PET Band

Wooden pallet

Ver 1.0
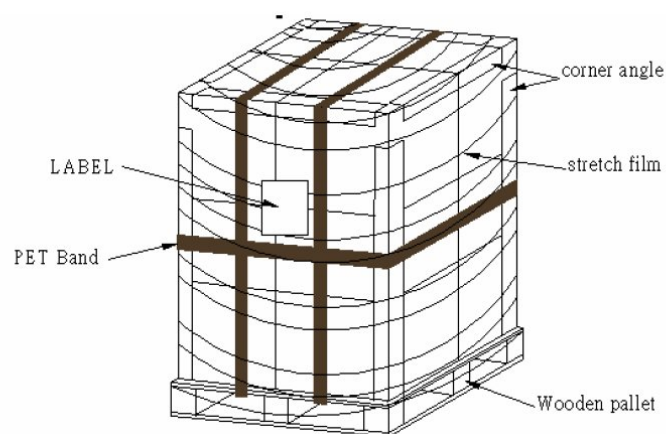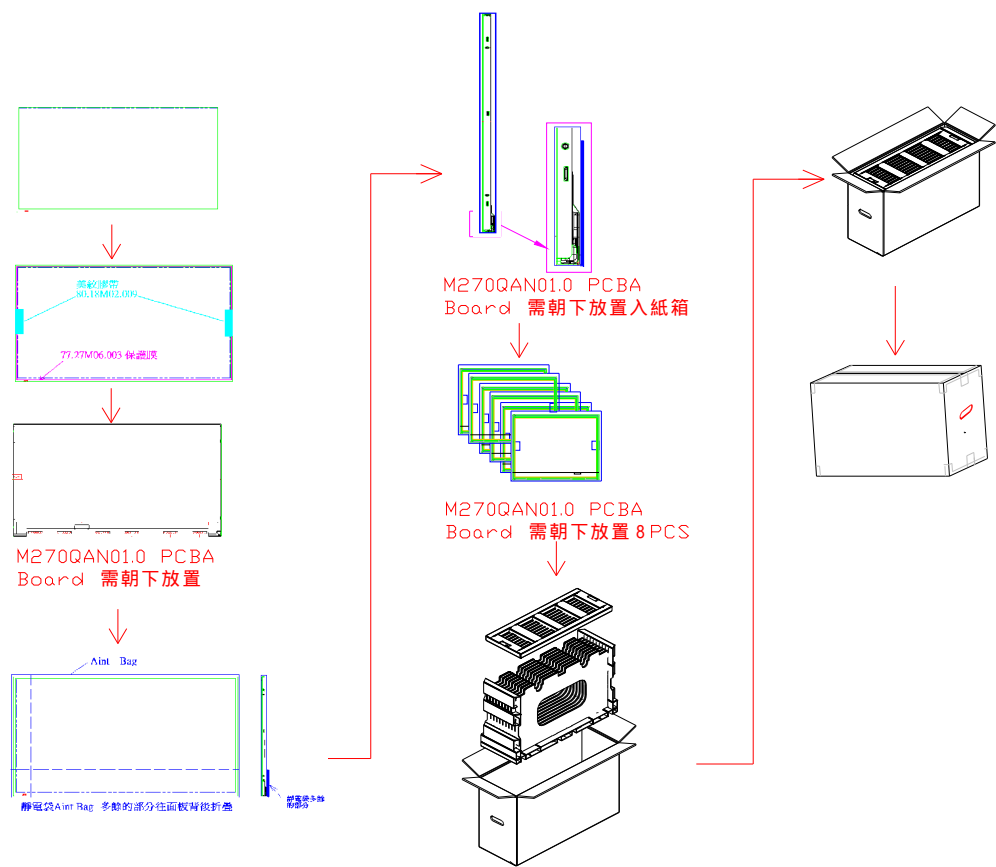
8.2 Pallet and shipment information

Item	Specification			Remark
	Q'ty	Dimension	Weight (kg)	
Panel	1	613.6(H)mm × 356.85(V)mm × 14.5(D)mm	2.82	
Cushion	1	-	3.408	
Box	1	720(L)mm x 264(W)mm x 460(H)mm	1.423	without Panel & cushion
Packing Box	8 pcs/Box	720(L)mm x 264(W)mm x 460(H)mm	27.4	with panel & cushion
Pallet	1	1070(L)mm x 740(W)mm x 132(H)mm	14.80	
Pallet after Packing	8 boxes/pallet	1070(L)mm x 740(W)mm x 1086(H)mm	234	