



# Product Specification

M240UAN01.0

AU OPTRONICS CORPORATION

( ) Preliminary Specifications

( v ) Final Specifications

Module	24 Inch Color TFT-LCD
Model Name	M240UAN01.0 (G0)

<table><tr><td>Customer</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr><tr><td>Checked &amp; Approved by</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr></table>	Customer	Date	<hr/>	<hr/>	Checked & Approved by	Date	<hr/>	<hr/>	<table><tr><td>Approved by</td><td>Date</td></tr><tr><td><u>Jason Pan</u></td><td><u>Aug 20, 2018</u></td></tr><tr><td>Prepared by</td><td>Date</td></tr><tr><td><u>HsinYin Lee</u></td><td><u>Aug 20, 2018</u></td></tr></table>	Approved by	Date	<u>Jason Pan</u>	<u>Aug 20, 2018</u>	Prepared by	Date	<u>HsinYin Lee</u>	<u>Aug 20, 2018</u>
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AU OPTRONICS CORPORATION

M240UAN01.0

## Record of Revision

[illegible]

## 1. Operating Precautions

- 1) Since front polarizer is easily damaged, please be cautious and not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.
- 5) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.
- 6) To avoid ESD (Electro Static Discharge) damage, be sure to ground yourself before handling TFT-LCD Module.
- 7) Do not open nor modify the module assembly.
- 8) Do not press the reflector sheet at the back of the module to any direction.
- 9) In case if a module has to be put back into the packing container slot after it was taken out from the container, do not press the center of the LED light bar edge. Instead, press at the far ends of the LED light bar edge softly. Otherwise the TFT Module may be damaged.
- 10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 11) TFT-LCD Module is not allowed to be twisted & bent even force is added on module in a very short time. Please design your display product well to avoid external force applying to module by end-user directly.
- 12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
- 13) Severe temperature condition may result in different luminance, response time and lamp ignition voltage.
- 14) Continuous operating TFT-LCD display under low temperature environment may accelerate lamp exhaustion and reduce luminance dramatically.
- 15) The data on this specification sheet is applicable when LCD module is placed in landscape position.
- 16) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.

## 2. General Description

This specification applies to the 24 inch wide color a-Si TFT-LCD module M240UAN01.0.

The display supports the WUXGA 1920(H) x 1200(V) screen format and 16.7M colors (8-bits RGB data input).

The input interface is dual channel LVDS and this module doesn't contain driver board for backlight.

## 2.1 Display Characteristics

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

Items	Unit	Specifications
Screen Diagonal	[inch]	24.07 (611.32mm)
Active Area	[mm]	518.4(H) x 324.0(V)
Resolution		1920*RGB(H) x 1200(V)
Pixel Pitch	[mm]	270(per one triad) x 270
Pixel Arrangement		RGB Strip
Display Mode		AHVA mode, Normally Black
Nominal Input Voltage VDD	[Volt]	+12
Power Consumption	[Watt]	15.6 (Typ) LCD: 4.8W @ white pattern, Fv=60Hz Backlight: 10.8W @ Is=90mA
Weight	[Grams]	2530(Typ.)
Physical Size	[mm]	546.4(H) x 352.0(V) x 11.7(D) Typ.
Electrical Interface		Dual Channel LVDS
Surface Treatment		Anti-Glare treatment
Support Color		16.7M colors (6bit+Hi-FRC)
Temperature Range		
Operating	[°C]	0 to +50
Storage (Non-Operating)	[°C]	-20 to +60
RoHS Compliance		Yes
TCO Compliance		Yes

## 2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25°C (Room Temperature).

Test Condition:

Panel lighting time: 30minutes

VDD=12V, Fv=60Hz, Is=90mA, Ta=25°C

Item	Unit	Conditions		Min.	Typ.	Max.	Note
White Luminance	cd/m <sup>2</sup>	I <sub>LED</sub> =90mA(center point)		240	300	-	<b>1</b>
Uniformity	%	9 points		75	80	-	<b>2,3</b>
Contrast Ratio	-			600	1000	-	<b>4</b>
Response Time	msec	Gray to Gray		-	14	-	<b>5</b>
Viewing Angle	degree	Horizontal	(Right)	75	89	-	<b>6</b>
		CR >= 10	(Left)	75	89	-	
		Vertical	(Upper)	70	89	-	
		CR >= 10	(Lower)	70	89	-	
Color / Chromaticity Coordinates (CIE 1931)	-	Red x		0.629	0.659	0.689	
		Red y		0.302	0.332	0.362	
		Green x		0.275	0.305	0.335	
		Green y		0.596	0.626	0.656	
		Blue x		0.118	0.148	0.178	
		Blue y		0.023	0.053	0.083	
		White x		0.283	0.313	0.343	
		White y		0.299	0.329	0.359	
sRGB coverage ratio	%			-	100	-	
Crosstalk	%			-	-	1.5	<b>7</b>
Flicker (center of screen)	dB			-	-	-20	<b>8</b>

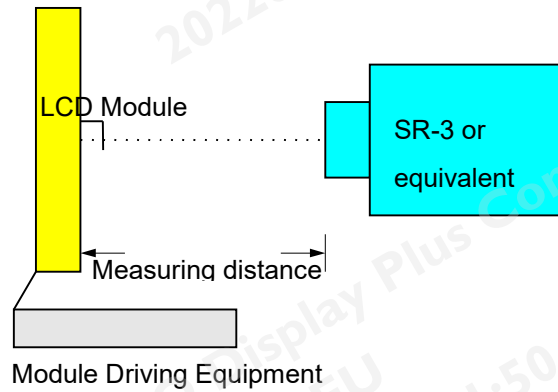
## Note 1: Measurement method

Equipment Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR-3 or equivalent)

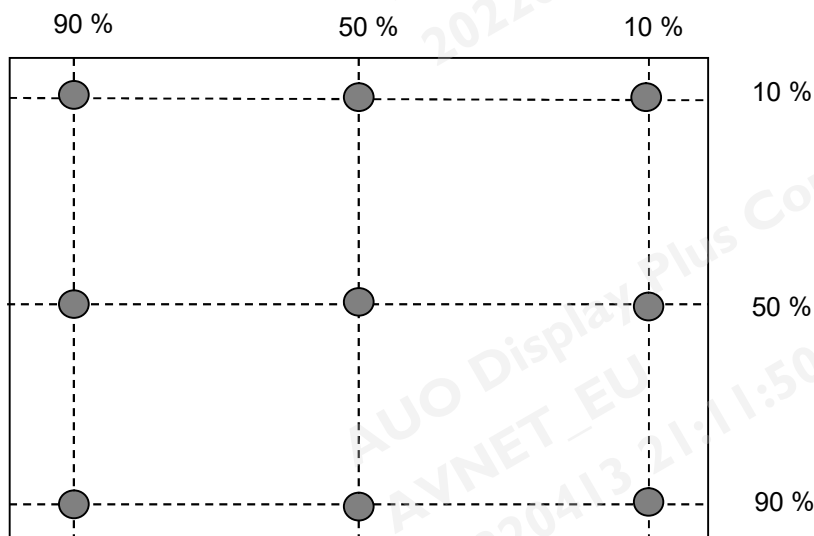
Aperture 1° with 50cm viewing distance

Test Point Center

Environment < 1 lux



## Note 2: Definition of 9 points position



**Note 3:** The luminance uniformity of 9 points is defined by dividing the minimum luminance values by the maximum test point luminance

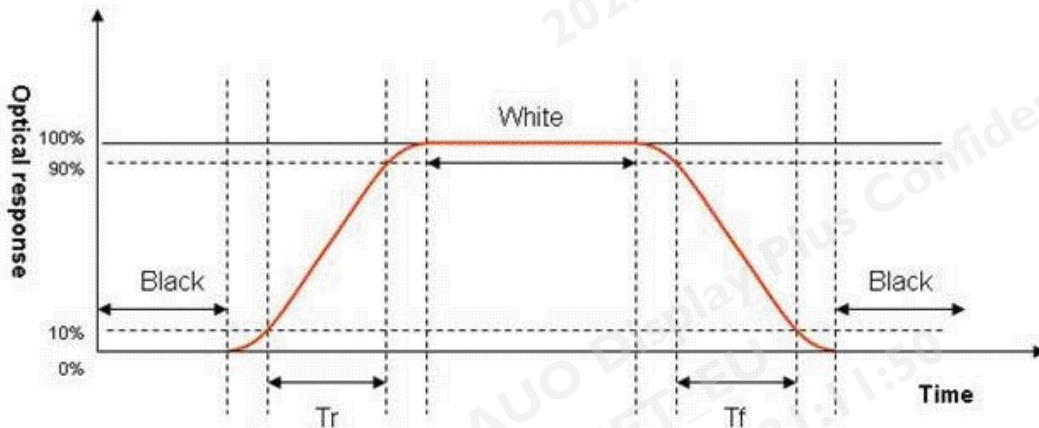
$$\delta_{w9} = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$

## Note 4: Definition of contrast ratio (CR):

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

## Note 5: Definition of response time:

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



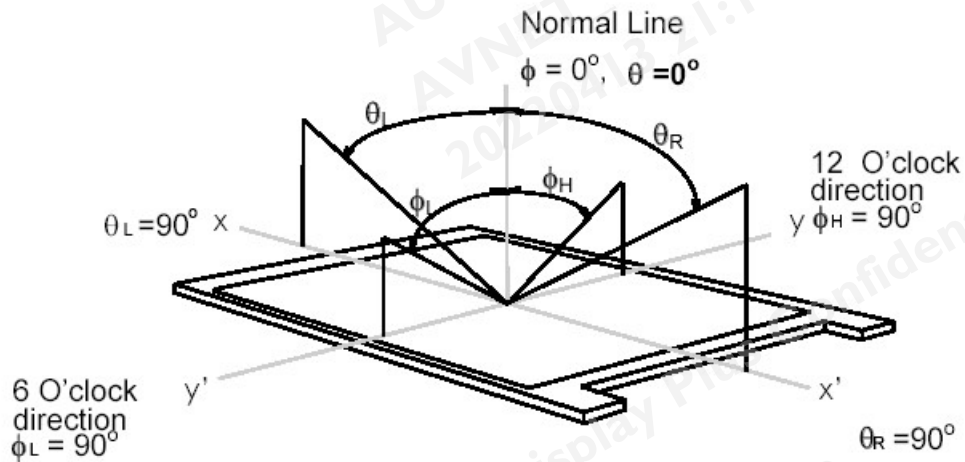
The gray to gray response time is defined as the following table.

Gray Level to Gray Level		Target gray level				
		L0	L63	L127	L191	L255
Start gray level	L0					
	L63					
	L127					
	L191					
	L255					

T<sub>GTG\_typ</sub> is the total average time at rising time and falling time of gray to gray.

## Note 6: Definition of viewing angle

Viewing angle is the measurement of contrast ratio  $\geq 10$ , at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as below: 90° ( $\theta$ ) horizontal left and right, and 90° ( $\Phi$ ) vertical high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated to its center to develop the desired measurement viewing angle.



## Note 7: Crosstalk measurement

### Definition:

$$CT = \text{Max.} (CT_H, CT_V);$$

Where

a. Maximum Horizontal Crosstalk :

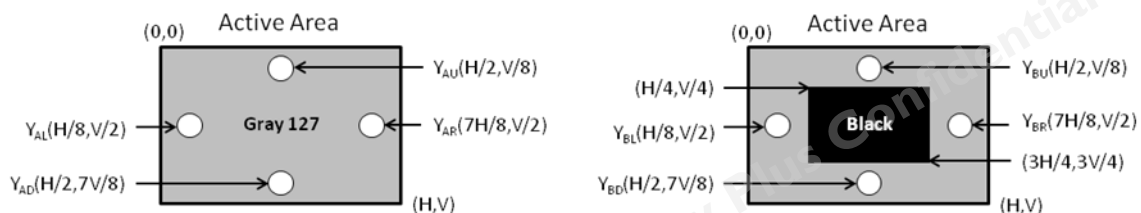
$$CT_H = \text{Max.} ( | Y_{BL} - Y_{AL} | / Y_{AL} \times 100\%, | Y_{BR} - Y_{AR} | / Y_{AR} \times 100\% );$$

Maximum Vertical Crosstalk :

$$CT_V = \text{Max.} ( | Y_{BU} - Y_{AU} | / Y_{AU} \times 100\%, | Y_{BD} - Y_{AD} | / Y_{AD} \times 100\% );$$

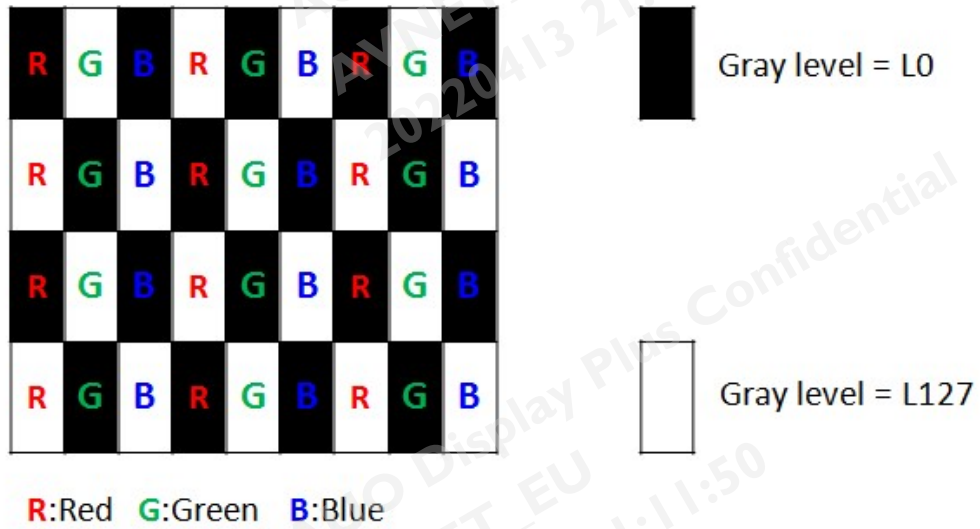
b.  $Y_{AU}$ ,  $Y_{AD}$ ,  $Y_{AL}$ ,  $Y_{AR}$  = Luminance of measured location without Black pattern

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



## Note 8: Flicker measurement

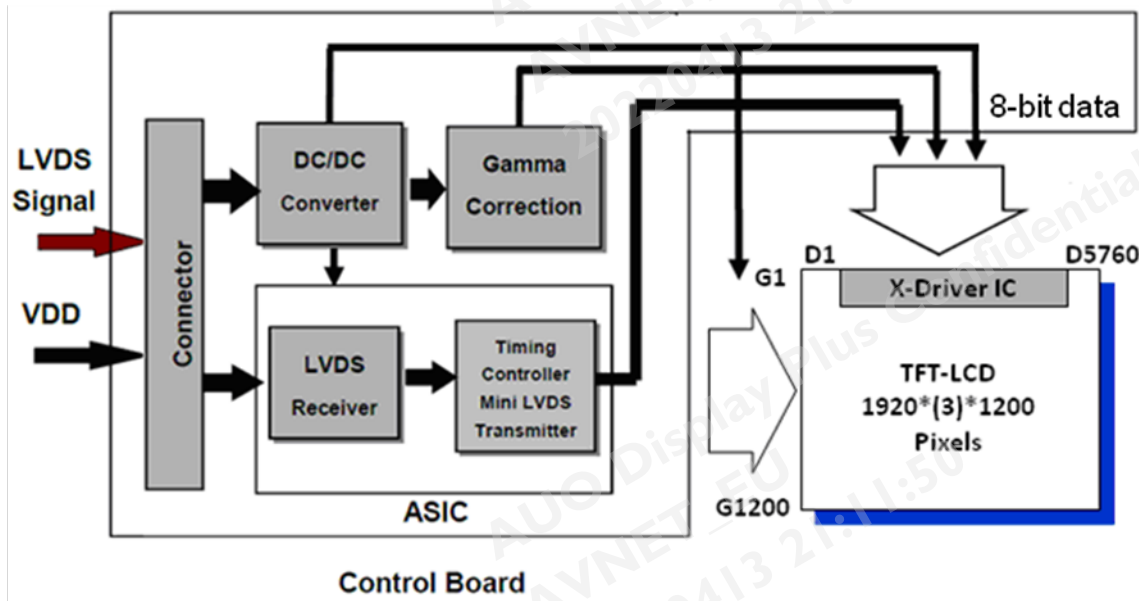
- a. Test pattern: It is listed as following



- b. Measured position: Center of screen (P5) & perpendicular to the screen.  
( $\Theta = \Phi = 0^\circ$ )

## 3. Functional Block Diagram

The following diagram shows the functional block of the 24 inch color TFT/LCD module:



## 4. Absolute Maximum Ratings

### 4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Conditions
Power Supply Input Voltage	VDD	GND-0.3	+14	[Volt]	<b>Note 1, 2</b>

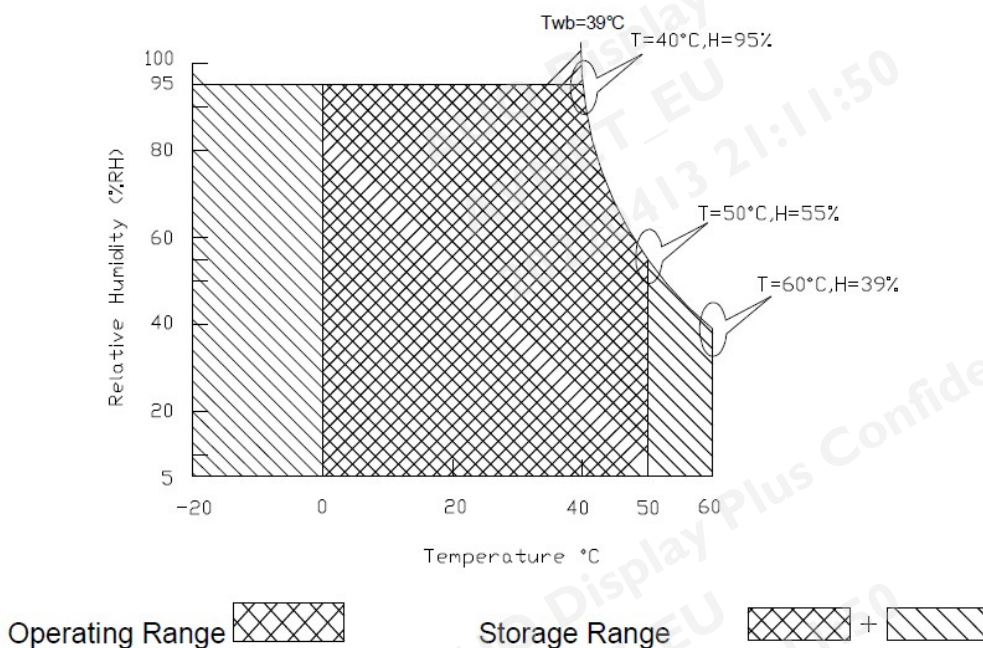
### 4.2 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	<b>Note 1</b>
Glass surface temperature (operating)	TGS	0	+65	[°C]	<b>Note 1,2</b>
Operation Humidity	HOP	5	90	[%RH]	<b>Note 1</b>
Storage Temperature	TST	-20	+60	[°C]	<b>Note 1</b>
Storage Humidity	HST	5	90	[%RH]	<b>Note 1</b>

**Note 1:**

- With in  $T_a = 25^{\circ}\text{C}$
- Permanent damage to the device may occur if exceed maximum values
- For quality performance, please refer to AUO IIS (Incoming Inspection Standard).

**Note 2:** function judged only



## 5. Electrical Characteristics

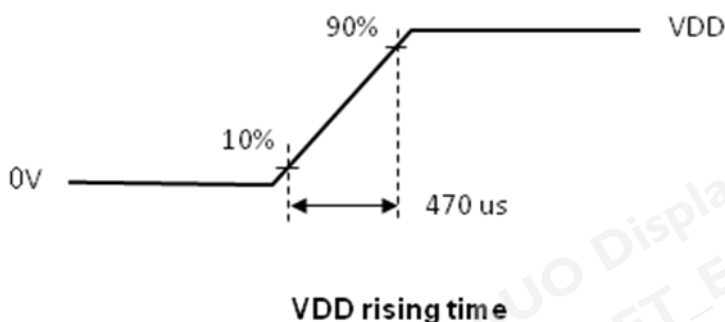
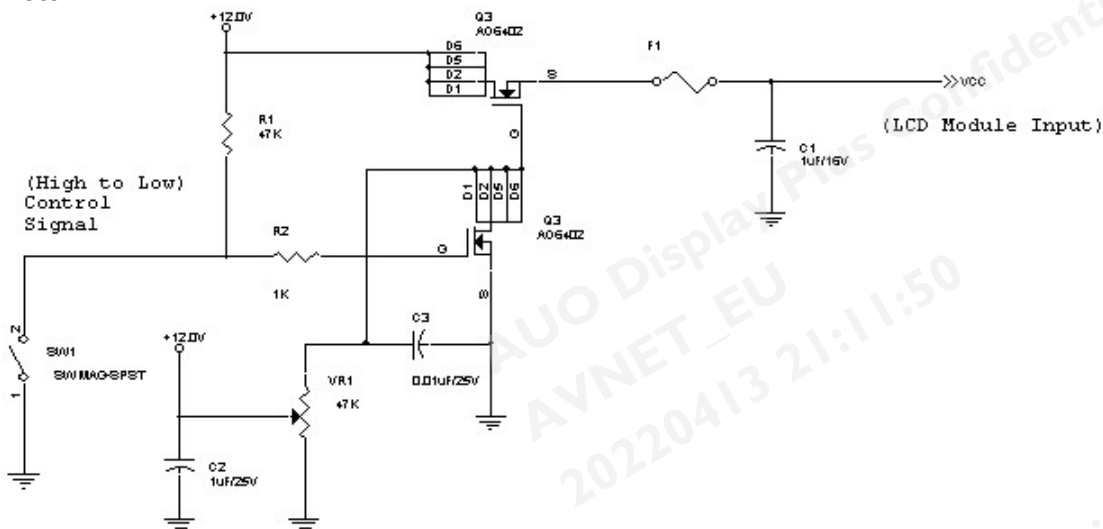
### 5.1 TFT LCD Module

#### 5.1.1 Power Specification

Input power specifications are shown as follows;

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Drive Voltage	10.8	12.0	13.2	[Volt]	
IDD	VDD Current(RMS)	-	0.4	0.48	[A]	VDD=12V, White Pattern, at 60Hz
		-	0.44	0.53	[A]	VDD=12V, White Pattern, at 66Hz
PDD	VDD Power	-	4.8	5.76	[Watt]	VDD=12V, White Pattern, at 60Hz
		-	5.28	6.36	[Watt]	VDD=12V, White Pattern, at 66Hz
Irush	LCD Inrush Current	-	-	3.0	[A]	Note 1
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	500	[mV] p-p	With panel loading

**Note 1:** Measurement condition:

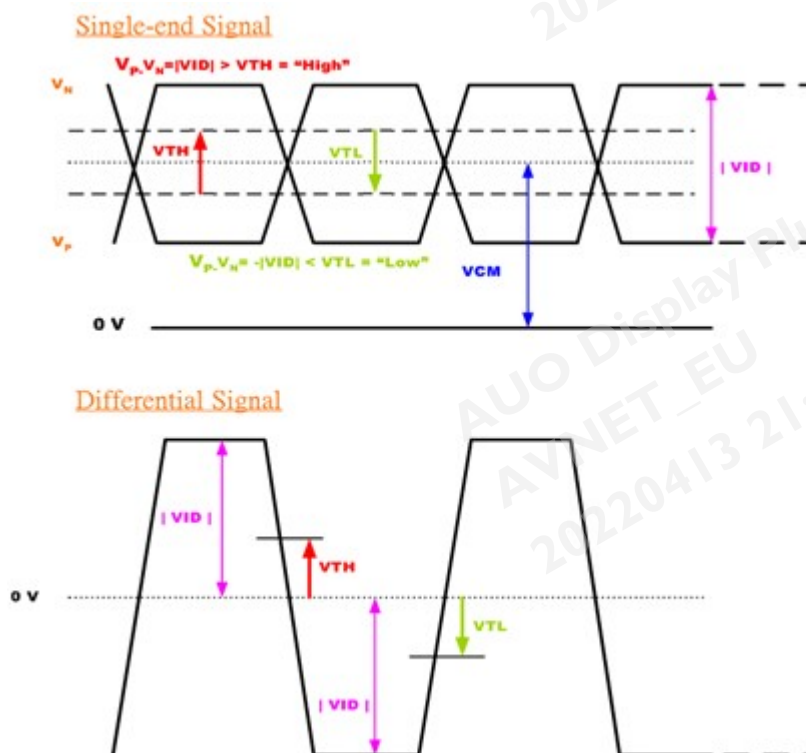


Symbol	Item	Min.	Typ.	Max.	Unit	Remark
$V_{TH}$	LVDS Differential Input High Threshold	-	-	+100	[mV]	$V_{CM}=1.2V$
$V_{TL}$	LVDS Differential Input Low Threshold	-100	-	-	[mV]	$V_{CM}=1.2V$
$ V_{ID} $	LVDS Input Differential Voltage	100	-	600	[mV]	
$V_{CM}$	LVDS Common Mode Voltage	+1.0	+1.2	+1.5	[V]	$V_{TH}-V_{TL}=200mV$

## 5.1.2 LVDS DC Signal Electrical Characteristics

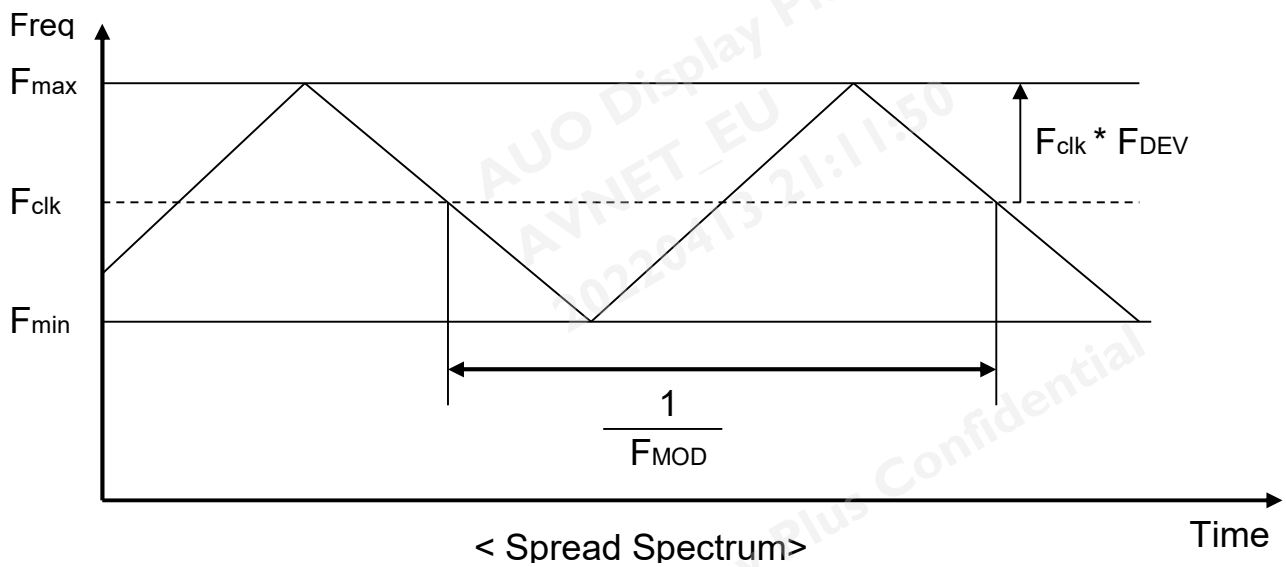
Input signals shall be low or Hi-Z state when VDD is off.

Note: LVDS Signal Waveform.



## 5.1.3 AC Characteristics:

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



Fclk: LVDS Clock Frequency

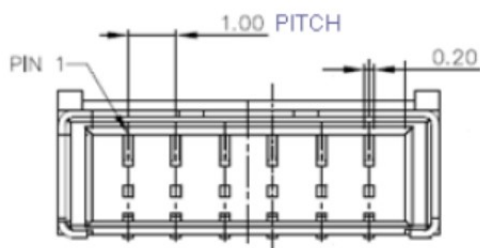
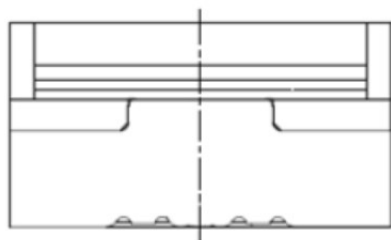
## 5.2 Backlight Unit

### 5.2.1 LED Backlight Unit: Light bar Connector

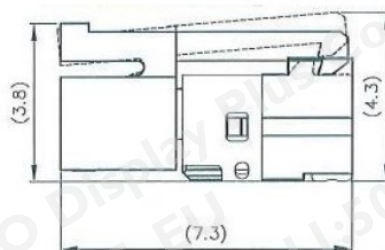
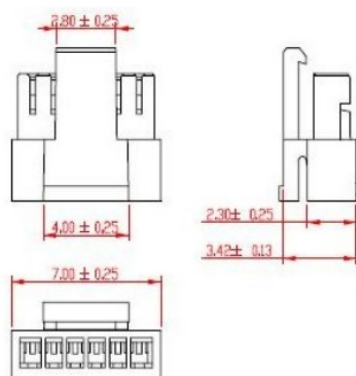
Connector Name / Designation	Lamp Connector
Manufacturer	ENTERY
Backlight connector	3707K-S06N-21R
Mating connector	H112K-P06N-00B (non-locking type) H112K-P06N-03B (locking type)

#### Backlight Connector dimension:

H x V x D = 13.9 x 3.00 x 4.25, Pitch = 1.0 (unit:mm)



#### Mating Connector dimension:



## 5.2.2 Connector Pin Assignment

Pin #	Symbol	Description
1	Ch1	IRLED (current out)
2	Ch2	IRLED (current out)
3	V <sub>SLED</sub>	VLED (voltage in))
4	V <sub>SLED</sub>	VLED (voltage in)
5	Ch3	IRLED (current out)
6	Ch4	IRLED (current out)



## 5.2.3 Parameter guideline for LED

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Remark
$I_s$	LED String Current	-	90	99	[mA]	$T_a = 25^\circ\text{C}$ , Note 2
$V_s$	LED String Voltage	27	30	33	[Volt]	$I_F = 90\text{mA}$ , $T_a = 25^\circ\text{C}$ Note 2,3
$P_{BLU}$	LED Light Bar Power Consumption	-	10.8	11.9	[Watt]	$I_F = 90\text{mA}$ , $T_a = 25^\circ\text{C}$ Note 3,4,5
$LT_{LED}$	LED Life Time	30,000	-	-	Hrs	$I_F = 90\text{mA}$ , $T_a = 25^\circ\text{C}$ , Note 6,7
OVP	Over Voltage Protection in system board	110% $V_{smax}$	-	-	[Volt]	Note 8

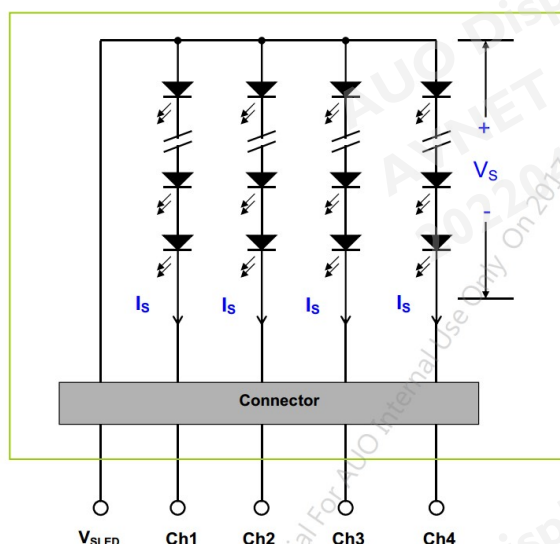
**Note 1:**  $T_a$  means ambient temperature of TFT-LCD module.

**Note 2:**  $I_s$ ,  $V_s$  are defined for one channel LED. There are four LED channel in back light unit.

**Note 3:** LED backlight is 40 LEDs (4 strings, 10pcs for each string)

**Note 4:** The LED supply power is for 4 string of LED

**Note 5:** The voltage capacity of LED driver IC must be over max. of LED Voltage.



**Note 6:** Definition of life time: Brightness becomes to 50% of its original value.

The minimum life time of LED unit is on the condition of  $I_s = 90\text{ mA}$  and  $25 \pm 2^\circ\text{C}$  (Room Temperature).

**Note 7:** If M240UAN01.0 module is driven by high current or at high ambient temperature



& humidity condition. The operating life will be reduced.

**Note 8:** Recommendation for LED driver power design:

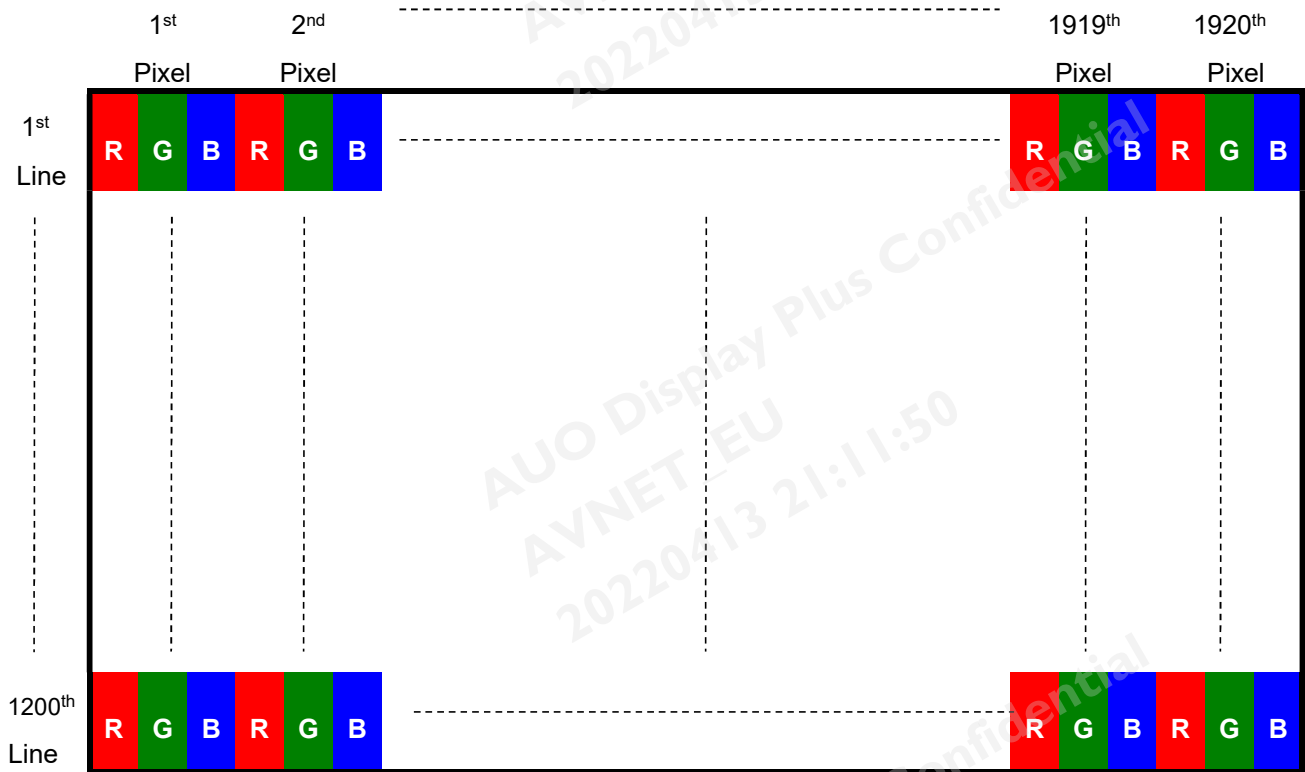
Due to there are electrical property deviation in LED & monitor set system component after long time operation. AUO strongly recommend the design value of LED driver board OVP (over voltage protection) should be 10% higher than max. value of LED string voltage (Vs) at least.

**Note 9:** 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.

## 6. Signal Characteristic

### 6.1 Pixel Format Image

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



### 6.2 Scanning Direction

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

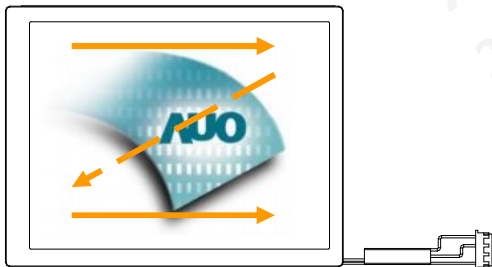


Fig. 1 Normal scan (Pin4, DPS = Low or NC)

## 6.3 Signal Description

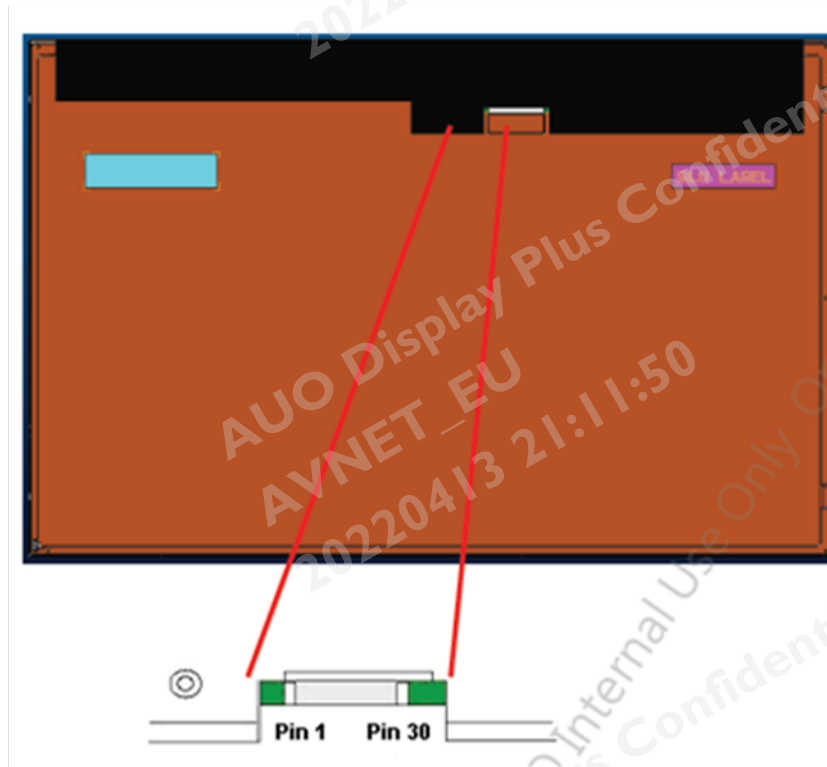
The module uses a LVDS receiver embedded in AUO's ASIC. LVDS is a differential signal technology for LCD interface and a high-speed data transfer device.

### 6.3.1 TFT LCD Module: LVDS Connector

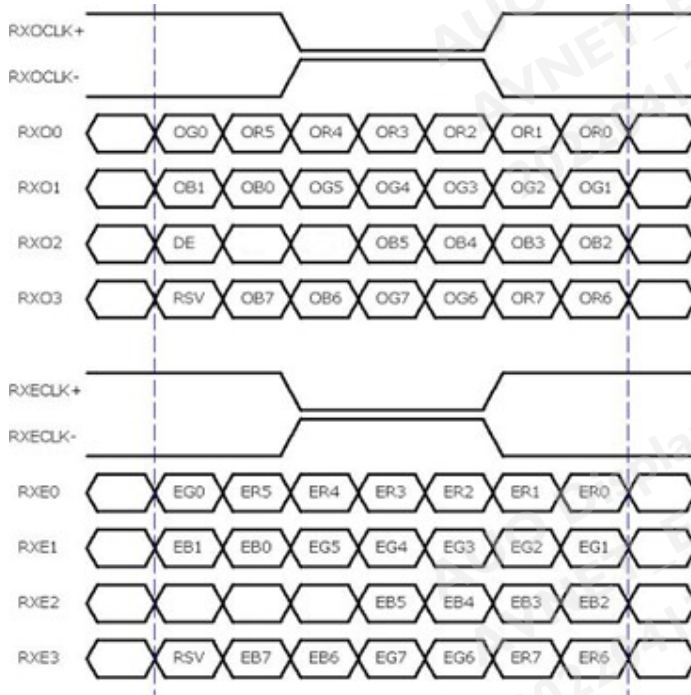
TFT-LCD Connector	Manufacturer	P-TWO	STM
	Part Number	187034-3009	MSBKT2407P30HB
Mating Connector	Manufacturer	JAE or Compatible	
	Part Number	FI-X30HL (Locked Type)	

PIN #	Symbol	Description	Remark
1	RxO0-	Negative LVDS differential data input (Odd data)	
2	RxO0+	Positive LVDS differential data input (Odd data)	
3	RxO1-	Negative LVDS differential data input (Odd data)	
4	RxO1+	Positive LVDS differential data input (Odd data)	
5	RxO2-	Negative LVDS differential data input (Odd data)	
6	RxO2+	Positive LVDS differential data input (Odd data)	
7	GND	Ground	
8	RxOCLK-	Negative LVDS differential clock input (Odd clock)	
9	RxOCLK+	Positive LVDS differential clock input (Odd clock)	
10	RxO3-	Negative LVDS differential data input (Odd data)	
11	RxO3+	Positive LVDS differential data input (Odd data)	
12	RxE0-	Negative LVDS differential data input (Even data)	
13	RxE0+	Positive LVDS differential data input (Even data)	
14	GND	Ground	
15	RxE1-	Negative LVDS differential data input (Even data)	
16	RxE1+	Positive LVDS differential data input (Even data)	
17	GND	Ground	
18	RxE2-	Negative LVDS differential data input (Even data)	
19	RxE2+	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	RxE3-	Negative LVDS differential data input (Even data)	
23	RxE3+	Positive LVDS differential data input (Even data)	
24	GND	Ground	
25	NC	No connection (for AUO test only. Do not connect)	
26	NC	No connection (for AUO test only. Do not connect)	

27	NC	No connection (for AUO test only. Do not connect)	
28	VDD	Power Supply Input Voltage	
29	VDD	Power Supply Input Voltage	
30	VDD	Power Supply Input Voltage	



## 6.4 The Input Data Format



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:** Please follow PSWG.

**Note 2:** R/G/B data 7:MSB, R/G/B data 0:LSB

- O = "Odd Pixel Data" E = "Even Pixel Data"
- Refer to 6.4. LCD pixel format, the 1st data is 1 (Odd Pixel Data), the 2nd data is 2 (Even Pixel Data) and the last data is 1920 (Even Pixel Data).

## 6.4.1 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 ( <b>MSB</b> :R7, <b>LSB</b> :R0)								GREEN data ( <b>MSB</b> :G7, <b>LSB</b> :G0)								BLUE data ( <b>MSB</b> :B7, <b>LSB</b> :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	

**Note:** Output signals from any system shall be low or Hi-Z state when VDD is off.

## 6.5 Interface Timing

### 6.5.1 Timing Characteristics

It only support DE mode, and the input timing are shown as the following table.

Symbol	Description		Min.	Typ.	Max.	Unit	Remark
Tv	Vertical Section	Period	1214	1235	1734	Th	
Tdisp (v)		Active	1200	1200	1200	Th	
Tblk (v)		Blanking	14	35	534	Th	
Fv		Frequency	49	60	66	Hz	<b>Note 1</b>
Th	Horizontal Section	Period	1000	1040	1428	Tclk	
Tdisp (h)		Active	960	960	960	Tclk	
Tblk (h)		Blanking	40	80	468	Tclk	
Fh		Frequency	59.5	74.0	85.0	KHz	<b>Note 2</b>
Tclk	LVDS Clock	Period	11.8	13.0	16.8	ns	1/Fclk
Fclk		Frequency	59.5	77.0	85	MHz	<b>Note 3</b>

**Note 1:** The optimal vertical Frequency is 49 ~66 Hz for Best picture quality.

**Note 2:** The equation is listed as following. Please don't exceed the above recommended value.

$$Fh (\text{Min.}) = Fclk (\text{Min.}) / Th (\text{Min.});$$

$$Fh (\text{Typ.}) = Fclk (\text{Typ.}) / Th (\text{Typ.});$$

$$Fh (\text{Max.}) = Fclk (\text{Max.}) / Th (\text{Min.});$$

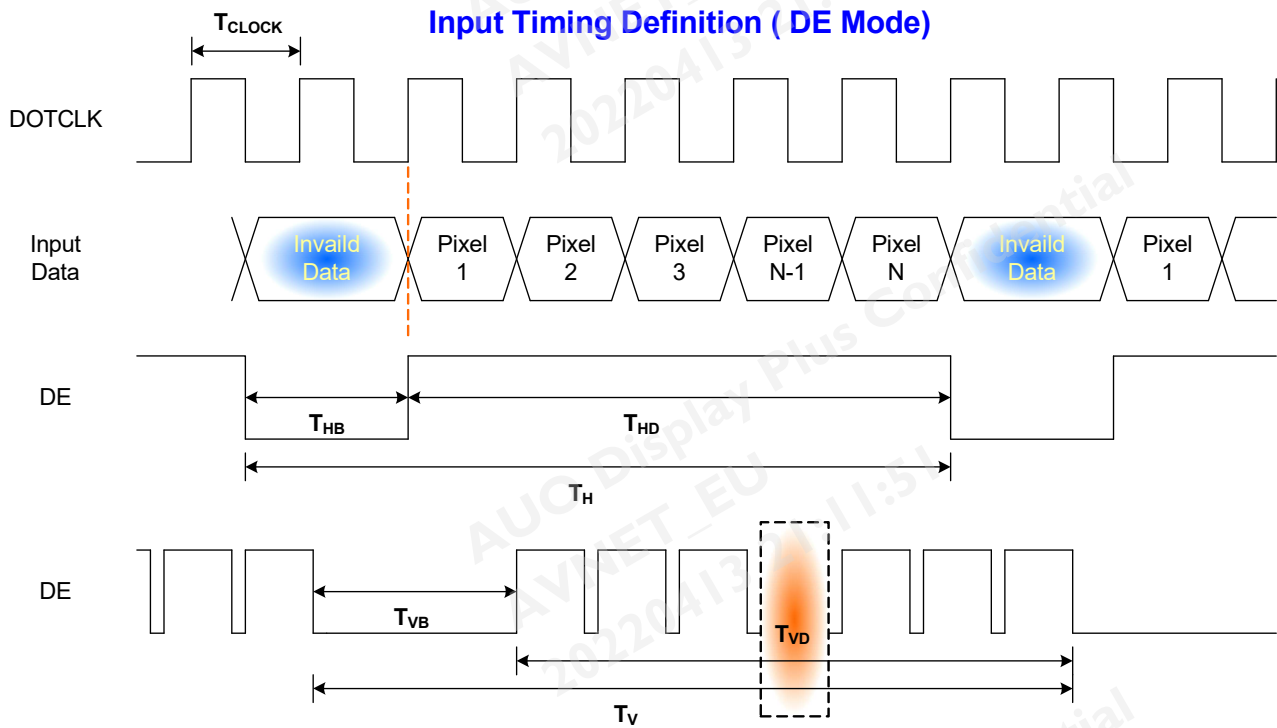
**Note 3:** The equation is listed as following. Please don't exceed the above recommended value.

$$Fclk (\text{Min.}) = Fv (\text{Min.}) \times Th (\text{Min.}) \times Tv (\text{Min.});$$

$$Fclk (\text{Typ.}) = Fv (\text{Typ.}) \times Th (\text{Typ.}) \times Tv (\text{Typ.});$$

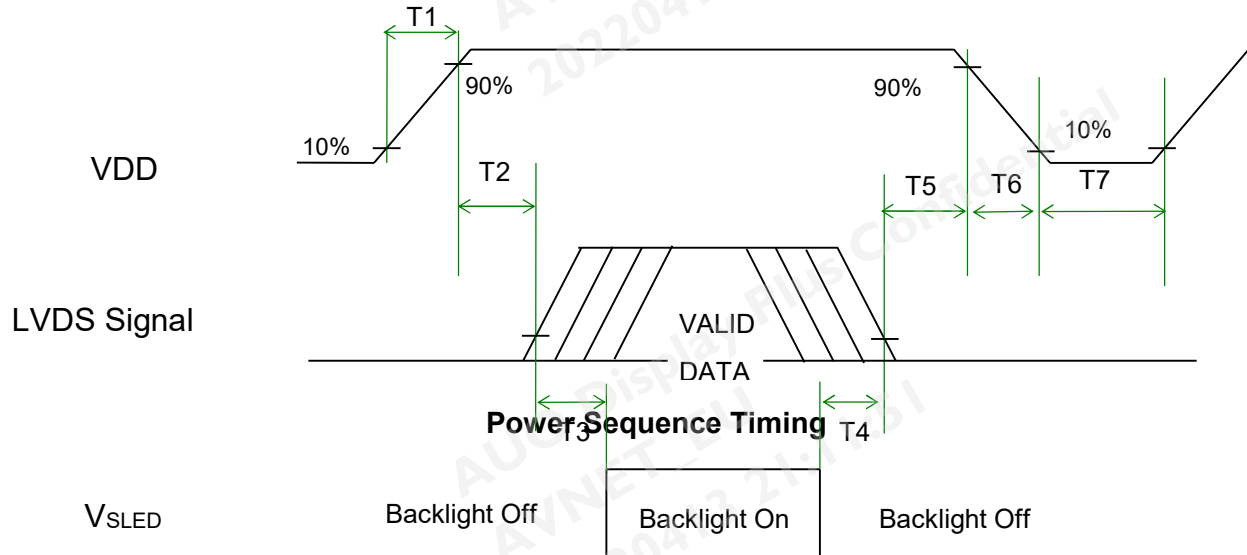
$$Fclk (\text{max.}) = Fv (\text{max.}) \times Th (\text{Typ.}) \times Tv (\text{Typ.});$$

## 6.5.2 Input Timing Diagram



## 6.6 Power ON/OFF Sequence

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



Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T1	0.5	-	10	[ms]	
T2	0	-	50	[ms]	
T3	500	-	-	[ms]	
T4	100	-	-	[ms]	
T5	0	-	200	[ms]	<b>Note 1,2</b>
T6	0	-	-	[ms]	<b>Note 2,3</b>
T7	1000	-	-	[ms]	

**Note 1** : Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.

**Note 2** : During T5 and T6 period , please keep the level of input LVDS signals with Hi-Z state.

**Note 3** : Voltage of VDD must decay smoothly after power-off.(customer system decide this value)

## 7. Reliability Test Criteria

Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50°C, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 50°C, 300hours	
Low Temperature Operation (LTO)	Ta= 0°C, 300hours	
High Temperature Storage (HTS)	Ta= 60°C, 300hours	
Low Temperature Storage (LTS)	Ta= -20°C, 300hours	
Vibration Test (Non-operation)	Acceleration: 1.5 G 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 °C /30min, 60/ °C 30min, 100 cycles	<b>1</b>
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (Electrostatic Discharge)	Contact Discharge: ± 15KV, 150pF(330Ω ) 1sec, 8 points, 25 times/ point.	<b>2</b>
	Air Discharge: ± 15KV, 150pF(330Ω ) 1sec 8 points, 25 times/ point.	
Altitude Test	Operation:18,000 ft Non-Operation:40,000 ft	

**Note 1:** The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20oC to 60oC, 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.

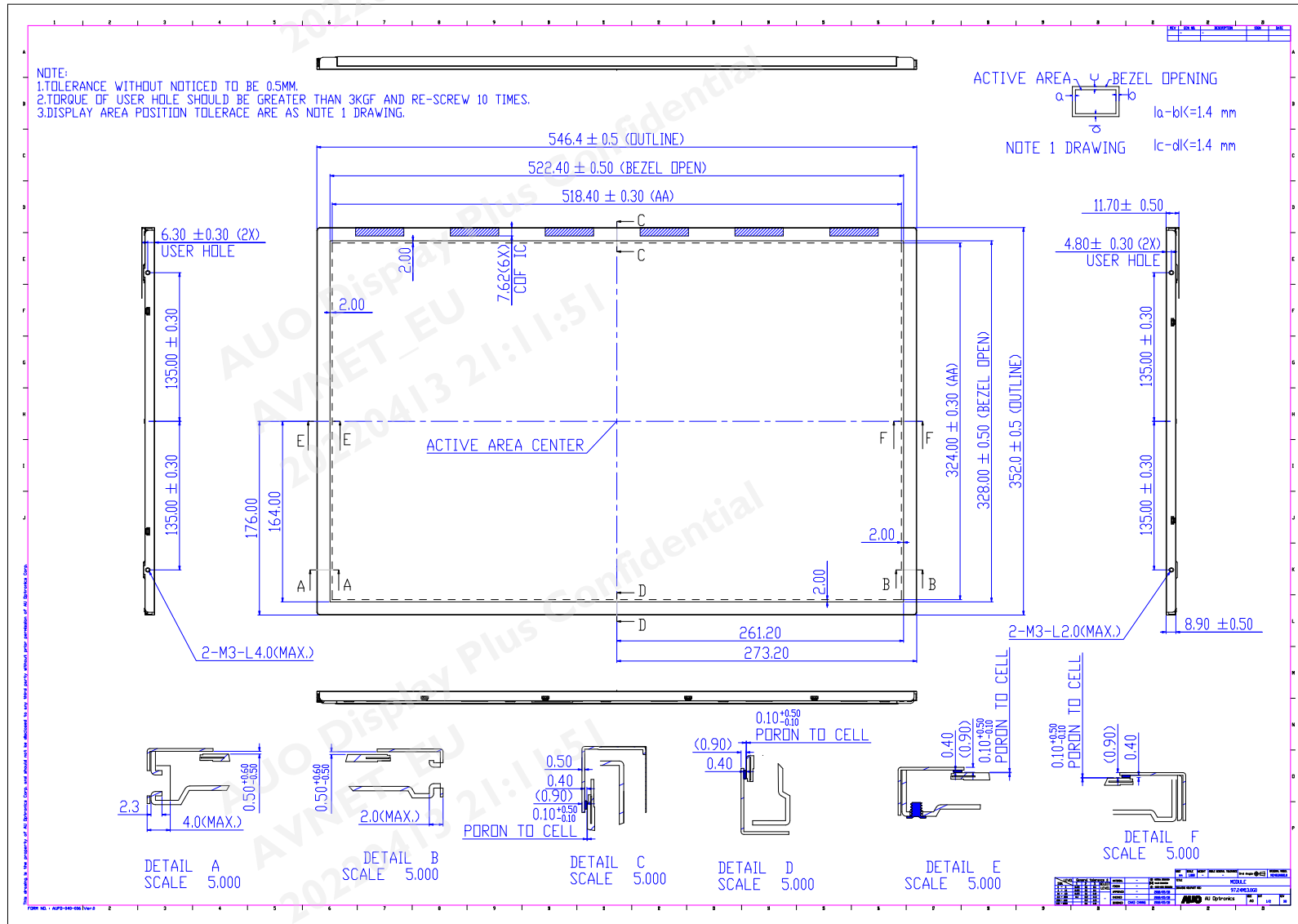
No data lost. Self-recoverable. No hardware failures.

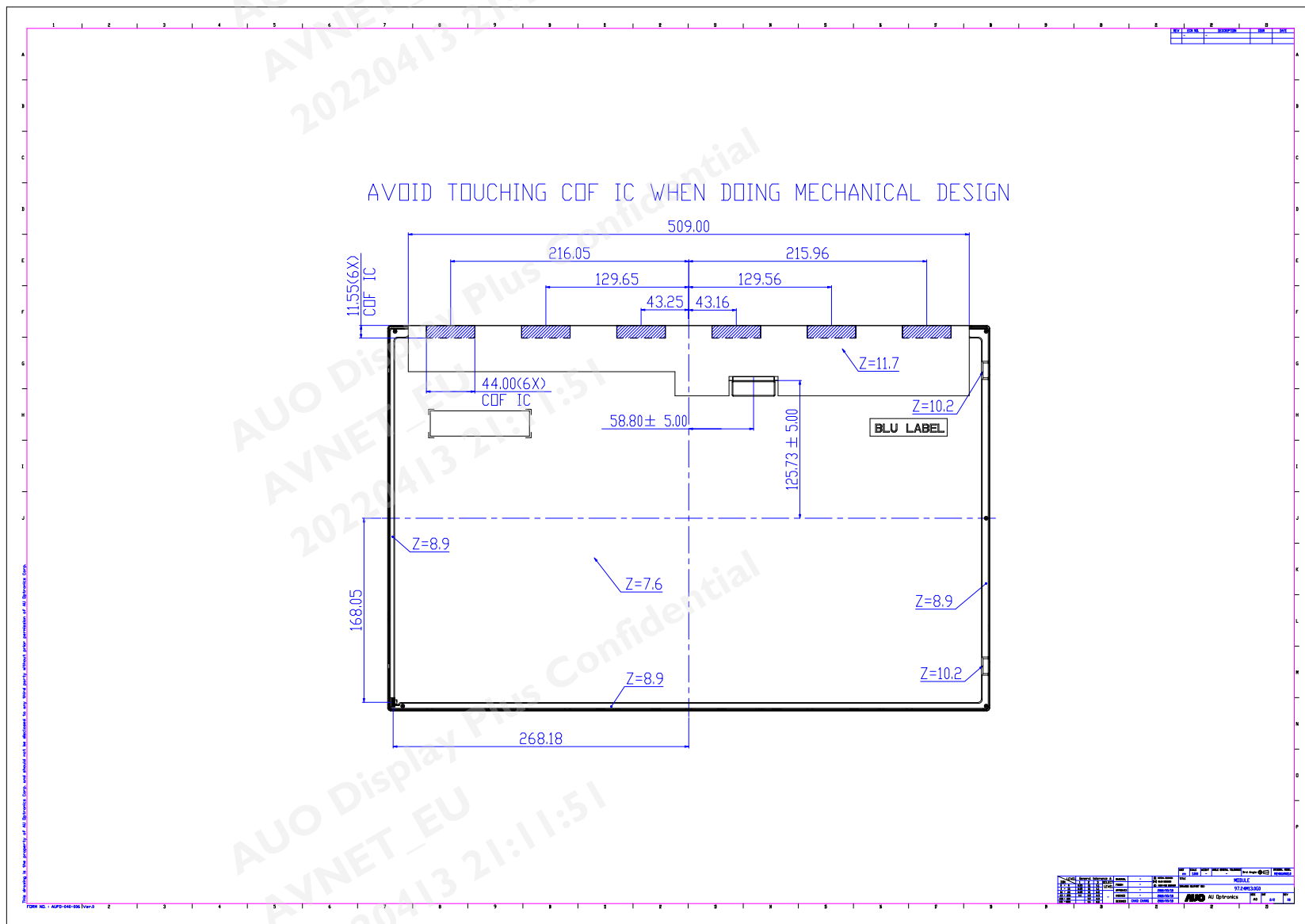
**Note 3:**

- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.
- No function failure occurs.

## 8. Mechanical Characteristics

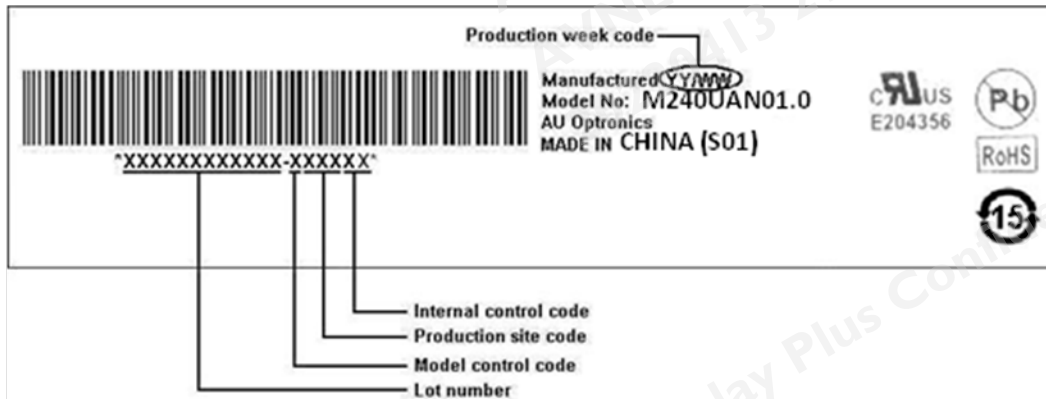
### 8.1 LCM Outline Dimension






## 9. Label and Packaging

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



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

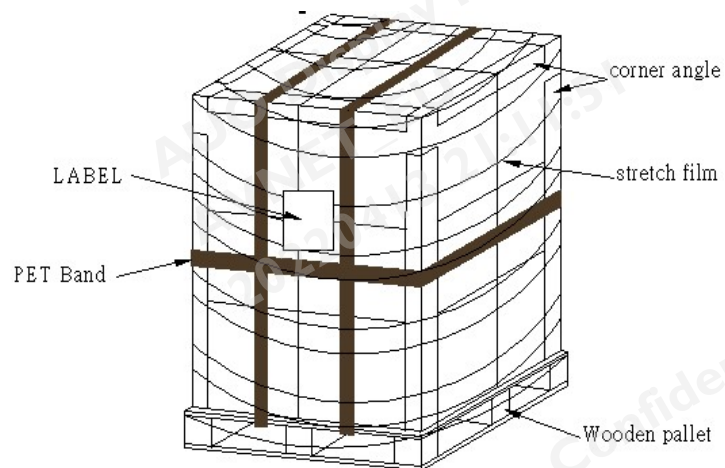
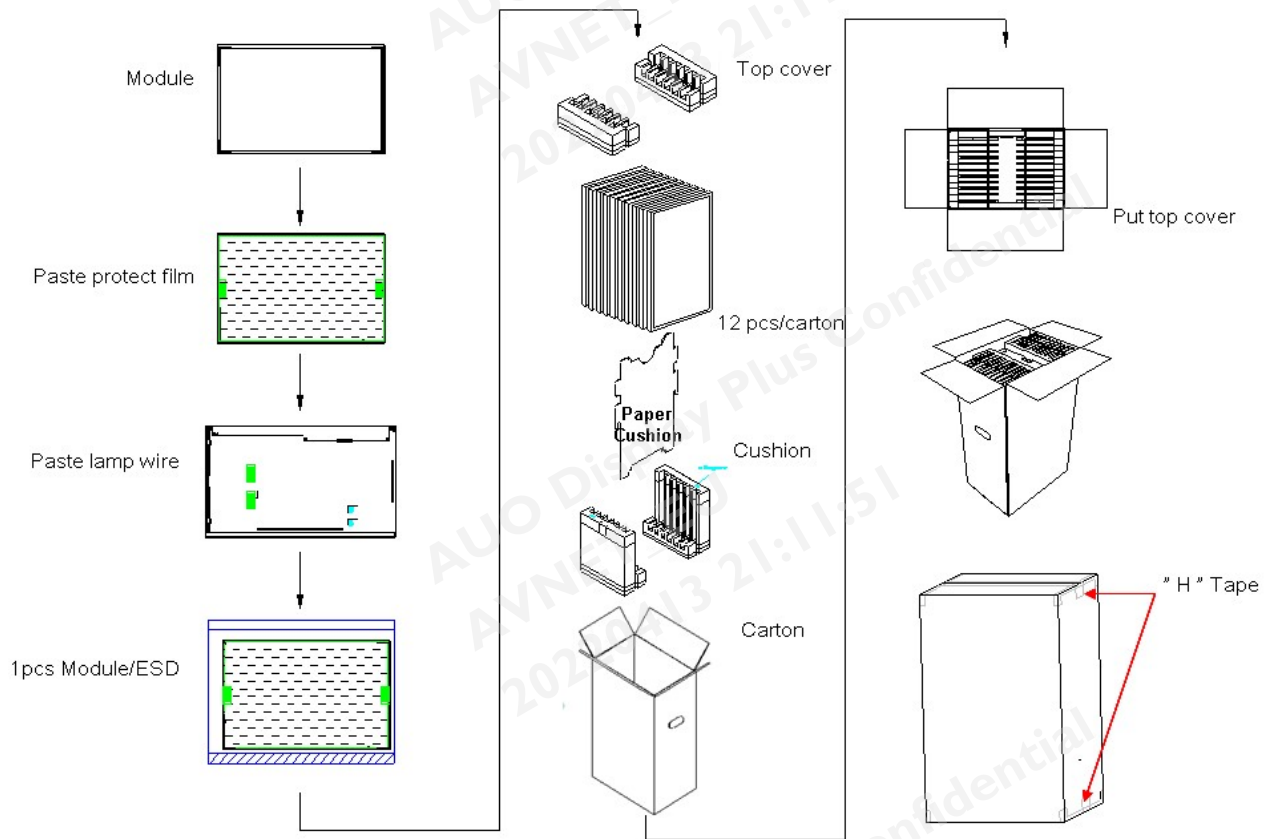
**Note 2:** For RoHS compatible products, AUO will add  for identification.

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

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

## 9.2 Carton Package

### 9.2.1 Package Flow





## 9.2.2 Pallet and shipment information

Item	Specification			Remark
	Q'ty	Dimension	Weight(kg)	
Panel	1	546.4(H) x 352.0(V) x 11.7(D) Typ.	2.53	
Cushion	1	-	0.435	without panel & cushion
Box	1	419(L)mm x 280(W)mm x 641(H)mm	1.56	with panel & cushion
Packing Box	12pcs/Box	419(L)mm x 280(W)mm x 641(H)mm	33	
Pallet	1	1150(L)mm x 840(W)mm x 140(H)mm	13	
Pallet after Packing	8boxes/pallet	1150(L)mm x 840(W)mm x 781(H)mm	277	



## 10 Safety

### 10.1 Sharp Edge Requirements

There will be no sharp edges or corners on the display assembly that could cause injury.

### 10.2 Materials

#### 10.2.1 Toxicity

There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible AUO toxicologist.

#### 10.2.2 Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process.

The printed circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board.

### 10.3 Capacitors

If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

### 10.4 National Test Lab Requirement

The display module will satisfy all requirements for compliance to:

UL 60950-1 second edition

U.S.A. Information Technology Equipment