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# Product Specification

AU OPTRONICS CORPORATION

( ) Preliminary Specifications

(V) Final Specifications

Module	WXGA Color TFT-LCD with LED Backlight design
Model Name	B121EW09 V3 (H/W:1A)
Note (  )	<i>LED Backlight with driving circuit design</i>

<b>Customer</b>	<b>Date</b>
<b>Checked &amp; Approved by</b>	<b>Date</b>
_____	_____
<p>Note: This Specification is subject to change without notice.</p>	

<b>Approved by</b>	<b>Date</b>
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## Contents

<b>1. Handling Precautions</b>	<b>5</b>
<b>2. General Description</b>	<b>6</b>
2.1 General Specification	6
2.2 Optical Characteristics	7
<b>3. Functional Block Diagram</b>	<b>12</b>
<b>4. Absolute Maximum Ratings</b>	<b>13</b>
4.1 Absolute Ratings of TFT LCD Module	13
4.2 Absolute Ratings of Backlight Unit	13
4.3 Absolute Ratings of Environment	13
<b>5. Electrical characteristics</b>	<b>14</b>
5.1 TFT LCD Module	14
5.2 Backlight Unit	15
<b>6. Signal Characteristic</b>	<b>16</b>
6.1 Pixel Format Image	16
6.2 The input data format	17
6.3 Signal Description/Pin Assignment	18
6.4 Interface Timing	20
6.5 Power ON /OFF Sequence	22
<b>7. Connector Description</b>	<b>23</b>
7.1 TFT LCD Module	23
<b>8. LED Driving Specification</b>	<b>24</b>
8.1 Connector Description	24
8.2 Pin Assignment	24
<b>9. Vibration and Shock Test</b>	<b>25</b>
9.1 Vibration Test	25
9.2 Shock Test Spec	25
<b>10. Reliability</b>	<b>26</b>
<b>11. Mechanical Characteristics</b>	<b>27</b>
11.1 LCM Outline Dimension	27
11.2 Screw Hole Depth and Center Position	29
<b>12. Shipping and Package</b>	<b>30</b>
12.1 Shipping Label Format	30
12.2 Carton package	31
12.3 Shipping package of palletizing sequence	31



# Product Specification

AU OPTRONICS CORPORATION

**13. Appendix: EDID description ..... 32**



# Product Specification

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## Record of Revision

Version and Date	Page	Old description	New Description	Remark
0.1 2009/1/21				
0.2 2009/5/12	32		Update shipping label	
0.3 2009/6/09	6		Update min. brightness	
0.3 2009/6/09	7		Update Color Chromaticity	
0.4 2009/9/29	37		Delete IIS data	
1.0 2009/11/01	29		Update 2D graph	
1.0 2009/11/01	31		Update shipping label (add H/W & F/W)	



## 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 nor modify the Module Assembly.
- 8) Do not press the reflector sheet at the back of the module to any directions.
- 9) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 11) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
- 12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
- 13) Disconnecting power supply before handling LCD modules, it can prevent electric shock, DO NOT TOUCH the electrode parts, cables, connectors and LED circuit part of TFT module that a LED light bar build in as a light source of back light unit. It can prevent electrostatic breakdown.



# Product Specification

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## 2. General Description

B121EW09 V3 is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit, and LED backlight system. The screen format is intended to support the WXGA (1280(H) x 800(V)) screen and 262k colors (RGB 6-bits data driver) with LED backlight driving circuit. All input signals are LVDS interface compatible.

B121EW09 V3 is designed for a display unit of notebook style personal computer and industrial machine.

## 2.1 General Specification

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

Items	Unit	Specifications			
Screen Diagonal	[mm]	307.9 (12.1W")			
Active Area	[mm]	261.12(H) X 163.20(V)			
Pixels H x V		1280x3(RGB) x 800			
Pixel Pitch	[mm]	0.204X0.204			
Pixel Arrangement		R.G.B. Vertical Stripe			
Display Mode		Normally White			
White Luminance (I <sub>LED</sub> =20mA)	[cd/m <sup>2</sup> ]	220 typ. (5 points average) 187 min. (5 points average)			
Luminance Uniformity		1.25 max. (5 points)			
Contrast Ratio		300 typ			
Response Time	[ms]	16 typ / 25 Max			
Nominal Input Voltage VDD	[Volt]	+3.3 typ.			
Power Consumption	[Watt]	3.87 max.(Include Logic and BLU power)			
Weight	[Grams]	295 max.			
Physical Size	[mm]		L	W	T
		Max	276.3	178.6	5.3
		Typical	275.8	178.1	-
		Min	275.3	-	-
Electrical Interface		1 channel LVDS			



# Product Specification

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Surface Treatment		Anti-glare (Haze=42%(typ.)) -Anti-reflection -Anti-electrostatic -Hardness (2H )
Support Color		262K colors ( RGB 6-bit )
Temperature Range Operating	[°C]	0 to +50
Storage (Non-Operating)	[°C]	-20 to +60
RoHS Compliance		RoHS Compliance

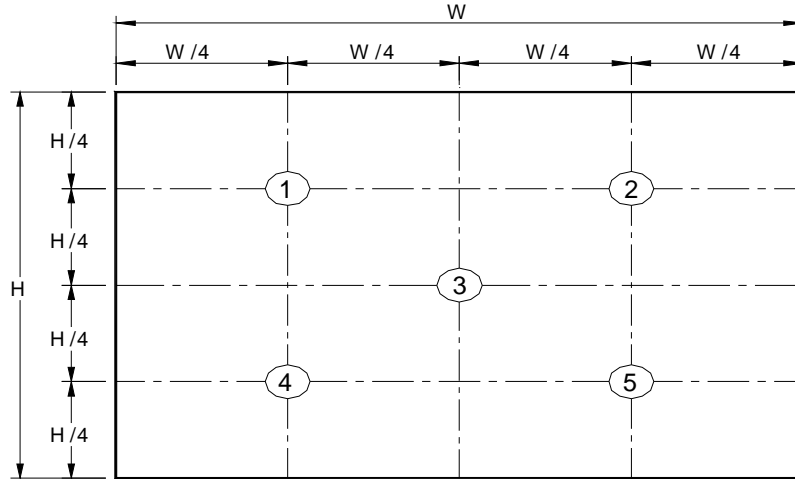
## 2.2 Optical Characteristics

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

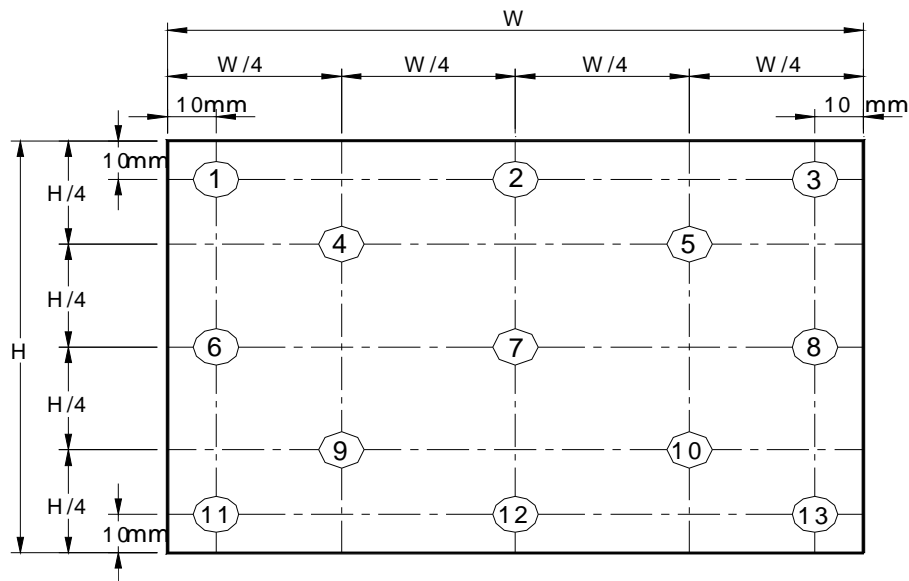
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
<b>White Luminance</b> I <sub>LED</sub> =20mA		<b>5 points average</b>	<b>187</b>	<b>220</b>	-	cd/m <sup>2</sup>	1, 4, 5.
<b>Viewing Angle</b>	$\theta_R$	<b>Horizontal (Right)</b> <b>CR = 10 (Left)</b>	<b>40</b>	<b>45</b>	-	degree	4, 9
	$\theta_L$		<b>40</b>	<b>45</b>	-		
	$\phi_H$	<b>Vertical (Upper)</b> <b>CR = 10 (Lower)</b>	<b>10</b>	<b>20</b>	-		
	$\phi_L$		<b>30</b>	<b>40</b>	-		
<b>Luminance Uniformity</b>	$\delta_{5P}$	<b>5 Points</b>	-	-	<b>1.25</b>		1, 3, 4
<b>Luminance Uniformity</b>	$\delta_{13P}$	<b>13 Points</b>	-	-	<b>1.54</b>		2, 3, 4
<b>Contrast Ratio</b>	<b>CR</b>			<b>300</b>	-		4, 6
<b>Cross talk</b>	%				<b>4</b>		4, 7
<b>Response Time</b>	<b>T<sub>r</sub></b>	<b>Rising</b>	-	-	-	msec	4, 8
	<b>T<sub>f</sub></b>	<b>Falling</b>	-	-	-		
	<b>T<sub>RT</sub></b>	<b>Rising + Falling</b>	-	<b>16</b>	<b>25</b>		
<b>Color / Chromaticity Coordinates</b>	<b>Red</b>	<b>Rx</b>	<b>CIE 1931</b>	<b>0.530</b>	<b>0.560</b>	<b>0.590</b>	4
		<b>Ry</b>		<b>0.320</b>	<b>0.350</b>	<b>0.380</b>	
		<b>Green</b>		<b>Gx</b>	<b>0.315</b>	<b>0.345</b>	
	<b>Gy</b>			<b>0.530</b>	<b>0.560</b>	<b>0.590</b>	
	<b>Blue</b>	<b>Bx</b>		<b>0.120</b>	<b>0.150</b>	<b>0.180</b>	
		<b>By</b>		<b>0.075</b>	<b>0.105</b>	<b>0.135</b>	
	<b>White</b>	<b>Wx</b>		<b>0.283</b>	<b>0.313</b>	<b>0.343</b>	
		<b>Wy</b>		<b>0.299</b>	<b>0.329</b>	<b>0.359</b>	
	<b>NTSC</b>	%			-	<b>45</b>	



Note 1: 5 points position (Ref: Active area)



Note 2: 13 points position (Ref: Active area)



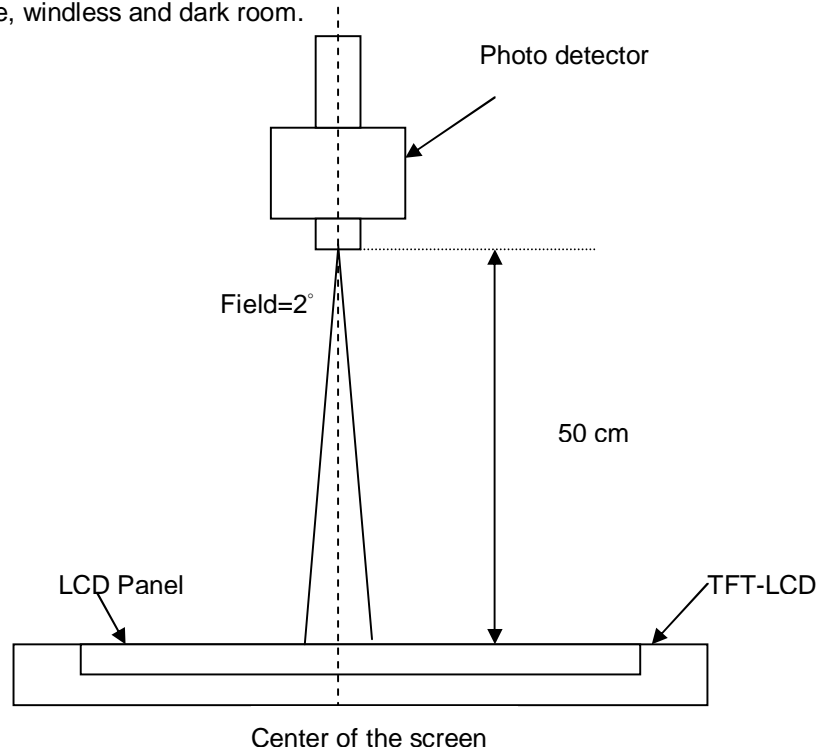
Note 3: The luminance uniformity of 5 or 13 points is defined by dividing the maximum luminance values by the minimum test point luminance. Length unit

$$\delta_{w5} = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

$$\delta_{w13} = \frac{\text{Maximum Brightness of thirteen points}}{\text{Minimum Brightness of thirteen points}}$$

Note 4: Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room.



Note 5 : Definition of Average Luminance of White ( $Y_L$ ):

Measure the luminance of gray level 63 at 5 points ,  $Y_L = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$

$L(x)$  is corresponding to the luminance of the point X at Figure in Note (1).

Note 6 : Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

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

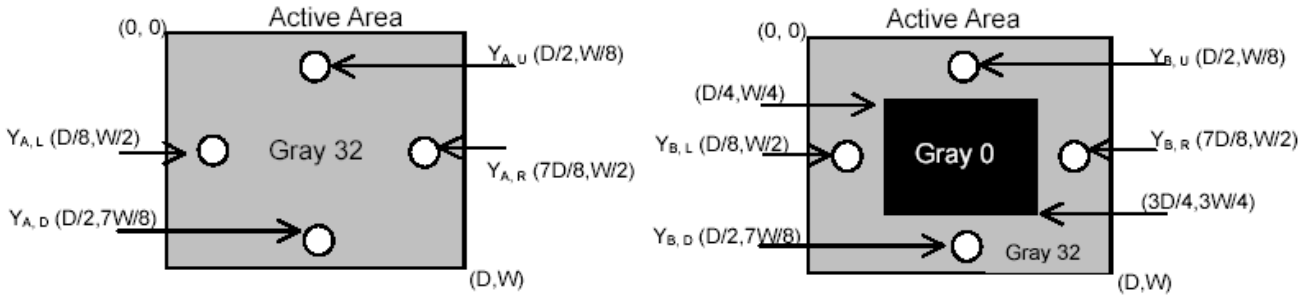
Note 7 : Definition of Cross Talk (CT)

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

Where

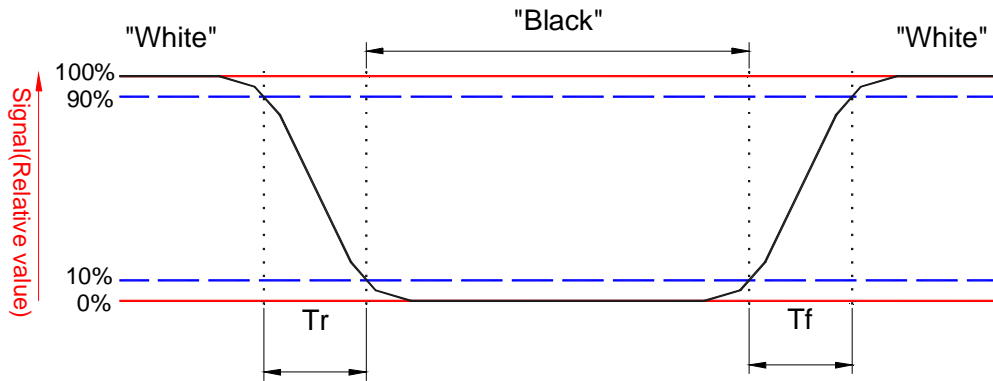
$Y_A$  = Luminance of measured location without gray level 0 pattern (cd/m<sup>2</sup>)

$Y_B$  = Luminance of measured location with gray level 0 pattern (cd/m<sup>2</sup>)



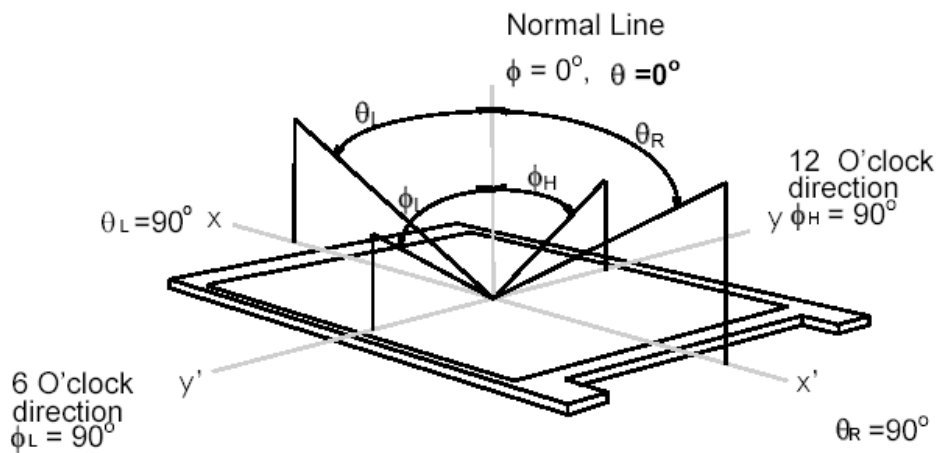
Note 8: Definition of response time:

The output signals of BM-7 or equivalent are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.



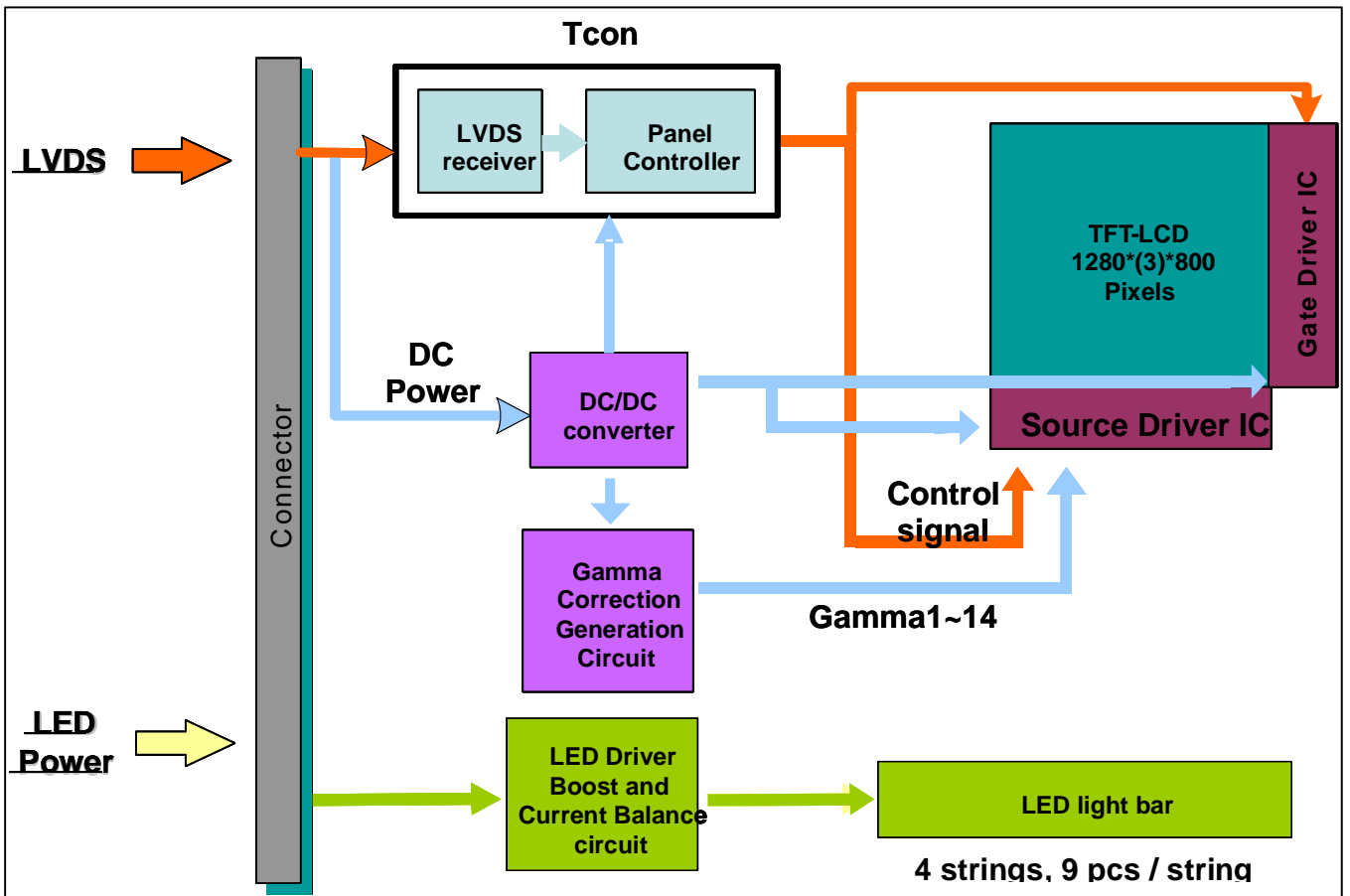
Note 8. Definition of viewing angle

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 follows; 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 about its center to develop the desired measurement viewing angle.



### 3. Functional Block Diagram

The following diagram shows the functional block of the 12.1 inches wide Color TFT/LCD 30 Pin (One ch/connector Module)



## 4. Absolute Maximum Ratings

An absolute maximum rating of the module is as following:

### 4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive	V <sub>in</sub>	-0.3	+4.0	[Volt]	Note 1,2

### 4.2 Absolute Ratings of Backlight Unit

Item	Symbol	Min	Max	Unit	Conditions
LED Driving Voltage	V <sub>LED</sub>	-	36	[Volt]	Note 1,2,3
LED Driving Current	I <sub>LED</sub>	-	30	[mA] rms	Note 1,2,3

### 4.3 Absolute Ratings of Environment

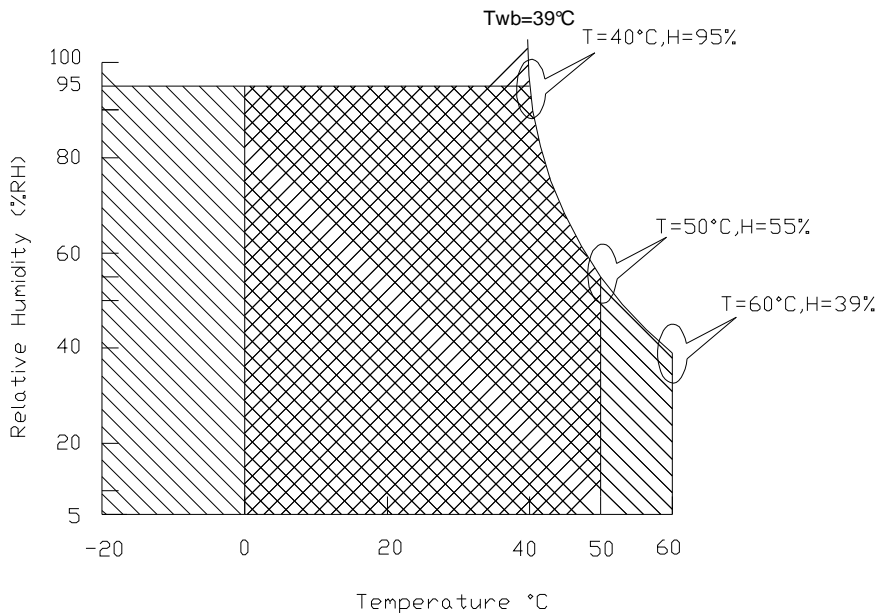
Item	Symbol	Min	Max	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	Note 4
Operation Humidity	HOP	5	90	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[°C]	Note 4
Storage Humidity	HST	5	90	[%RH]	Note 4

Note 1: At Ta (25°C )

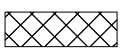
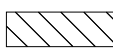
Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: LED specification refer to section 5.2

**Note 4: For quality performance, please refer to AUO IIS (Incoming Inspection Standard).**



Operating Range 

Storage Range  + 

## 5. Electrical characteristics

### 5.1 TFT LCD Module

#### 5.1.1 Power Specification

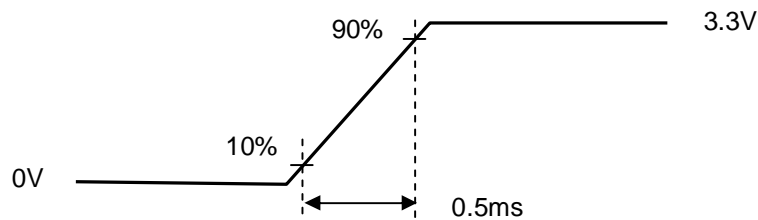
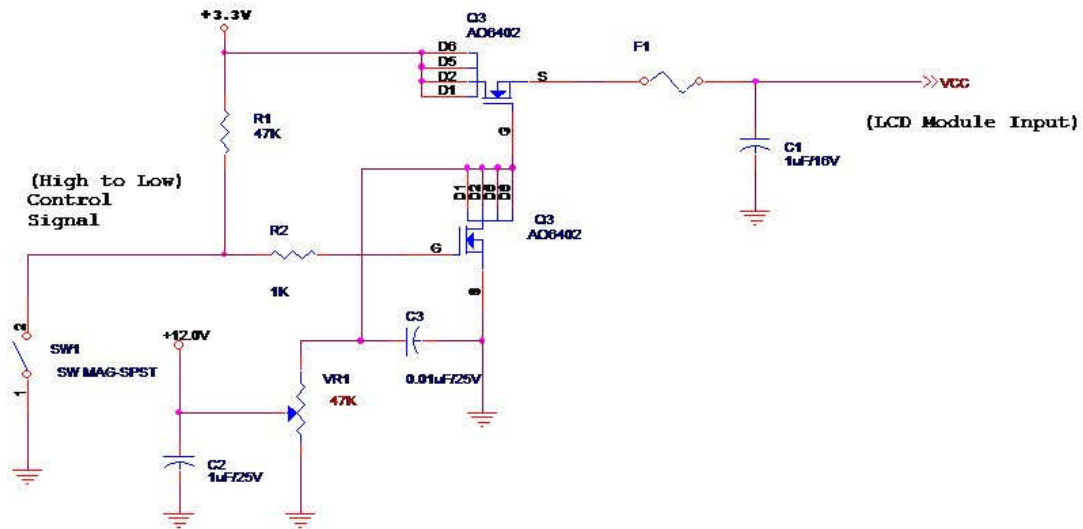
Input power specifications are as follows;

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	0.78	0.9	[Watt]	Note 1/2
IDD	IDD Current	-	235	-	[mA]	Note 1/2
IRush	Inrush Current	-	-	2000	[mA]	Note 3
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	

Note 1 : Maximum Measurement Condition : Black Pattern

Note 2 : Typical Measurement Condition: Mosaic Pattern

Note 3 : Measure Condition



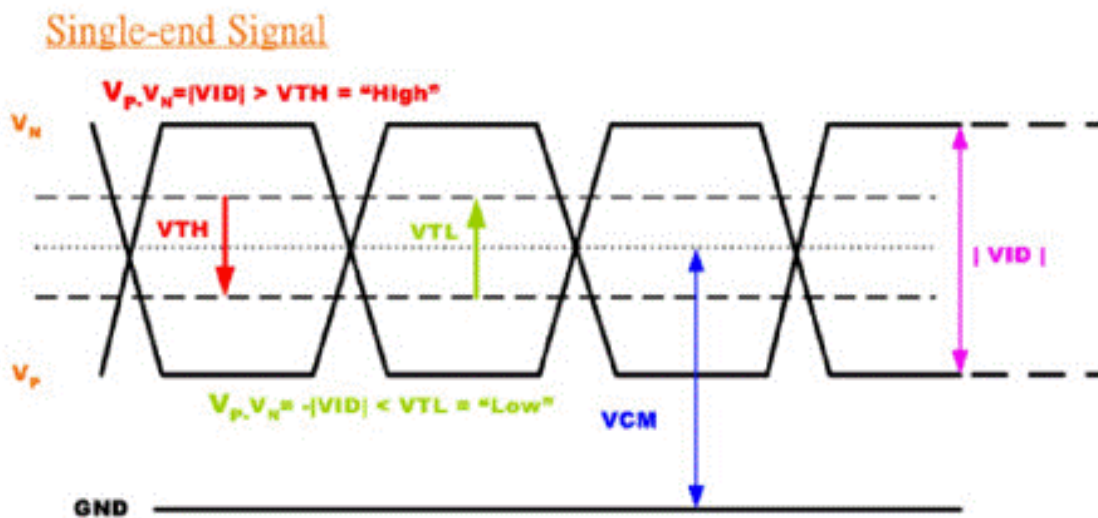
## 5.1.2 Signal Electrical Characteristics

Input signals shall be low or High-impedance state when VDD is off.

Signal electrical characteristics are as follows;

Parameter	Condition	Min	Max	Unit
$V_{TH}$	Differential Input High Threshold ( $V_{cm}=+1.2V$ )		100	[mV]
$V_{TL}$	Differential Input Low Threshold ( $V_{cm}=+1.2V$ )	-100	-	[mV]
$ V_{ID} $	Differential Input Voltage	100	600	[mV]
$V_{CM}$	Differential Input Common Mode Voltage	1.125	1.375	[V]

Note: LVDS Signal Waveform



## 5.2 Backlight Unit

LED Parameter guideline for LED driving selection (Ref. Remark 1)

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Forward Voltage	$V_F$	3.0	3.2	3.4	[Volt]	( $T_a=25^\circ C$ )



LED Forward Current	$I_F$		20		[mA]	( $T_a=25^\circ\text{C}$ )
LED Power consumption	$P_{LED}$		2.71	2.97	[Watt]	( $T_a=25^\circ\text{C}$ ) Note 1
LED Life-Time	N/A	12,000	-	-	Hour	( $T_a=25^\circ\text{C}$ ) $I_F=20\text{ mA}$ Note 2
Output PWM frequency	FPWM	100	200	20K	Hz	
Duty ratio	--	5	--	100	%	Note 3

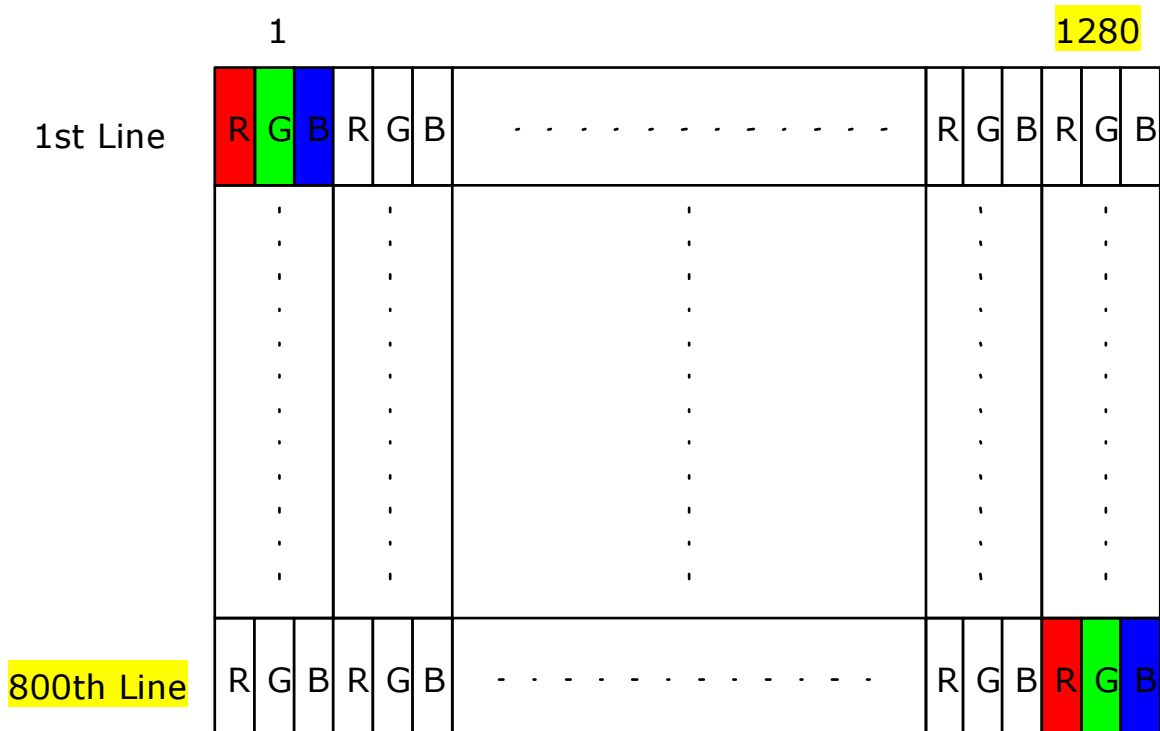
**Note 1:** Calculator value for reference  $I_F \times V_F \times 36 / \text{efficiency (85\%)} = P$  (typ.);  $P$  (max) estimated with  $I_F$  and  $V_F$  tolerance.

**Note 2:** The LED life-time define as the estimated time to 50% degradation of initial luminous.

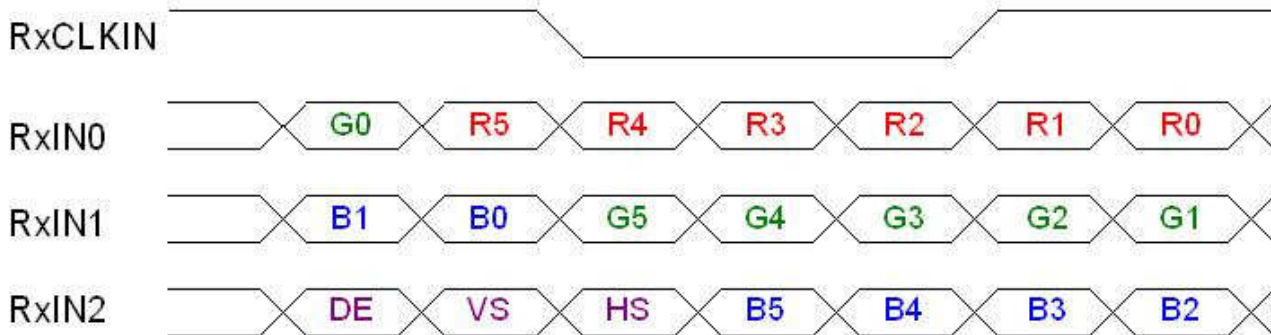
## 6. Signal Characteristic

### 6.1 Pixel Format Image

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



## 6.2 The input data format



Signal Name	Description	
R5 R4 R3 R2 R1 R0	Red Data 5 (MSB) Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB)	Red-pixel Data Each red pixel's brightness data consists of these 6 bits pixel data.
G5 G4 G3 G2 G1 G0	Green Data 5 (MSB) Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0 (LSB)	Green-pixel Data Each green pixel's brightness data consists of these 6 bits pixel data.
B5 B4 B3 B2 B1 B0	Blue Data 5 (MSB) Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 6 bits pixel data.
RxCLKIN	Data Clock	The typical frequency is 69.3 MHz. The signal is used to strobe the pixel data and DE signals. All pixel data shall be valid at the falling edge when the DE signal is high.
DE	Display Timing	This signal is strobed at the falling edge of RxCLKIN. When the signal is high, the pixel data shall be valid to be displayed.
VS	Vertical Sync	The signal is synchronized to RxCLKIN .
HS	Horizontal Sync	The signal is synchronized to RxCLKIN .

Note: Output signals from any system shall be low or High-impedance state when VDD is off.

## 6.3 Signal Description/Pin Assignment

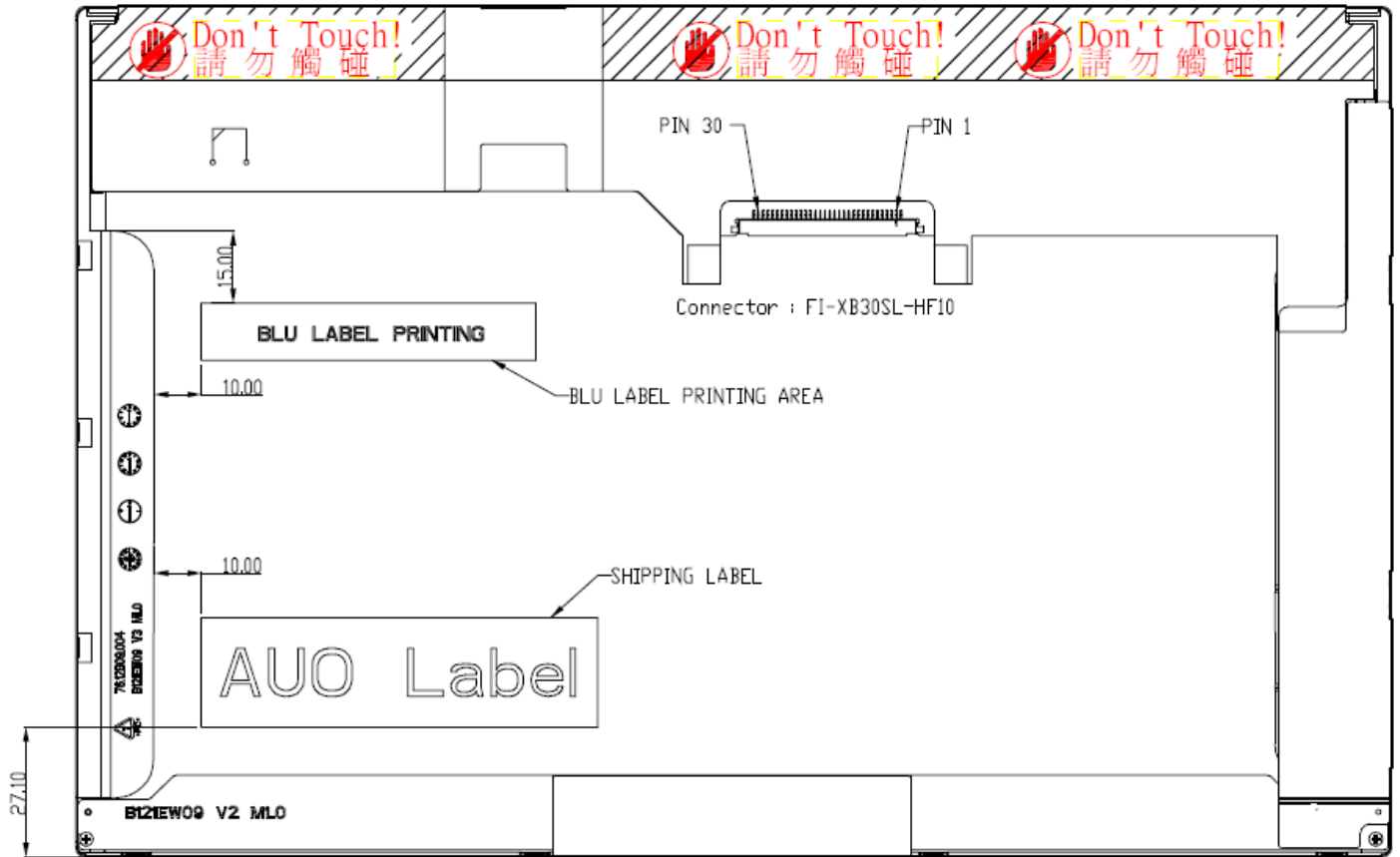
LVDS is a differential signal technology for LCD interface and high speed data transfer device.

Connector PN: FI-XB30SL-HF10

Pin#	Signal Name	Pin#	Signal Name
1	NC	16	GND
2	VDD	17	Odd RxCLKIN- (Clock Input)
3	VDD	18	Odd RxCLKIN+ (Clock Input)
4	V <sub>EDID</sub>	19	GND
5	Reserved (for supplier test point)	20	GND
6	Ck <sub>EDID</sub>	21	VBL- (GND)
7	Data <sub>EDID</sub>	22	VBL- (GND)
8	Odd RxIN0- (R0-R5,G0)	23	VBL- (GND)
9	Odd RxIN0+ (R0-R5,G0)	24	NC
10	GND	25	VBL+ (7~21V)
11	Odd RxIN1- (G1-G5, B0-B1)	26	VBL+ (7~21V)
12	Odd RxIN1+ (G1-G5, B0-B1)	27	VBL+ (7~21V)
13	GND	28	PWM
14	Odd RxIN2- (B2-B5,HS,VS,DE)	29	BL_ON
15	Odd RxIN2+ (B2-B5,HS,VS,DE)	30	NC

NC: Not connected

Note1: Signal Start from right side



## 6.4 Interface Timing

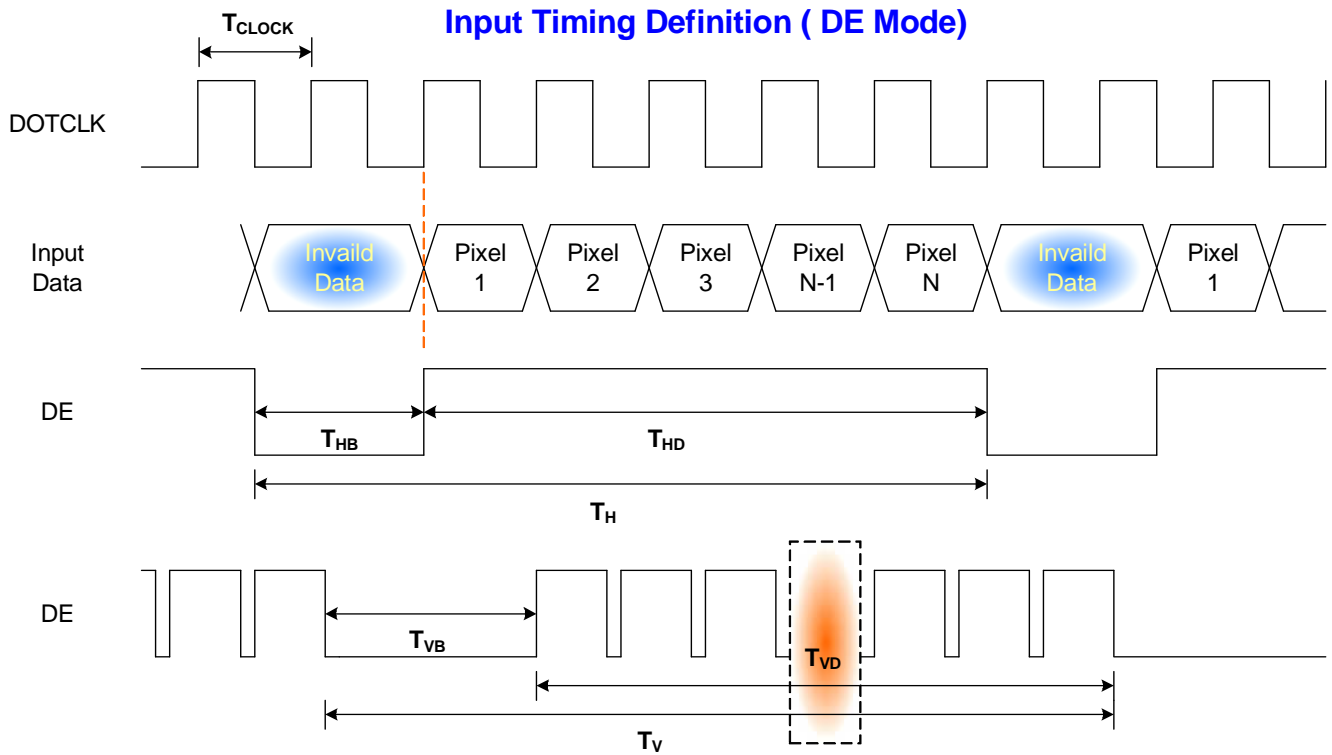
### 6.4.1 Timing Characteristics

Basically, interface timings should match the 1280x800 /60Hz manufacturing guide line timing.

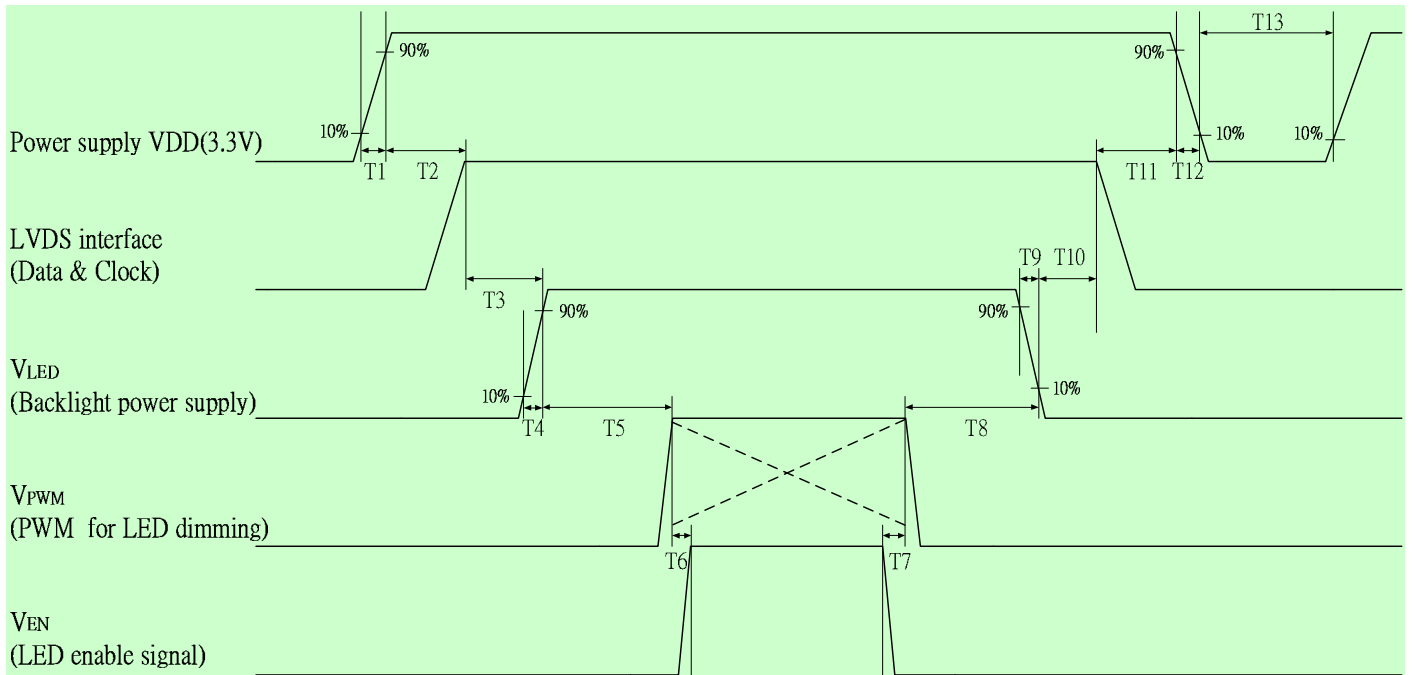
Parameter	Symbol	Min.	Typ.	Max.	Unit	
Frame Rate	-	-	60	-	Hz	
Clock frequency	$1/T_{\text{Clock}}$	50-	69.3	80-	MHz	
Vertical Section	Period	$T_V$	808	816	1023	$T_{\text{Line}}$
	Active	$T_{VD}$	800	800	800	
	Blanking	$T_{VB}$	8	16	223	
Horizontal Section	Period	$T_H$	1310	1408	2047	$T_{\text{Clock}}$
	Active	$T_{HD}$	1280	1280	1280	
	Blanking	$T_{HB}$	30	128	767	

Note : DE mode only

## 6.4.2 Timing diagram



## 6.5 Power ON /OFF Sequence



Power Sequence Timing				
Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	ms
T2	0	-	50	
T3	200	-	-	
T4	0.5	-	10	
T5	10	-	-	
T6	10	-	-	
T7	0	-	-	
T8	10	-	-	
T9	0	-	10	
T10	200	-	-	
T11	0.5	-	50	
T12	0	-	10	
T13	400	-	-	

Note: If T3, T5, T6 couldn't match above specifications, must request  $T3+T5+T6 > 200\text{ms}$  at least

## 7. Connector Description

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

<b>Connector Name / Designation</b>	<b>For Signal Connector</b>
Manufacturer	Japan Aviation Electronics Industry, LTD
Type / Part Number	FI-XB30SL-HF10
Mating Housing/Part Number	FI-XB30SRL-HF11





## 8. 8. LED Driving Specification

### 8.1 Connector Description

It is a integrative interface and comibe into LVDS connector. The type and mating refer to section 7.

### 8.2 Pin Assignment

Ref. to 6.3



## 9. Vibration and Shock Test

### 9.1 Vibration Test

**Test Spec:**

- Test method: Non-Operation
- Acceleration: 1.5 G
- Frequency: 10 - 500Hz Random
- Sweep: 30 Minutes each Axis (X, Y, Z)

### 9.2 Shock Test Spec:

**Test Spec:**

- Test method: Non-Operation
- Acceleration: 220 G , Half sine wave
- Active time: 2 ms
- Pulse: X,Y,Z .one time for each side

## 10. Reliability

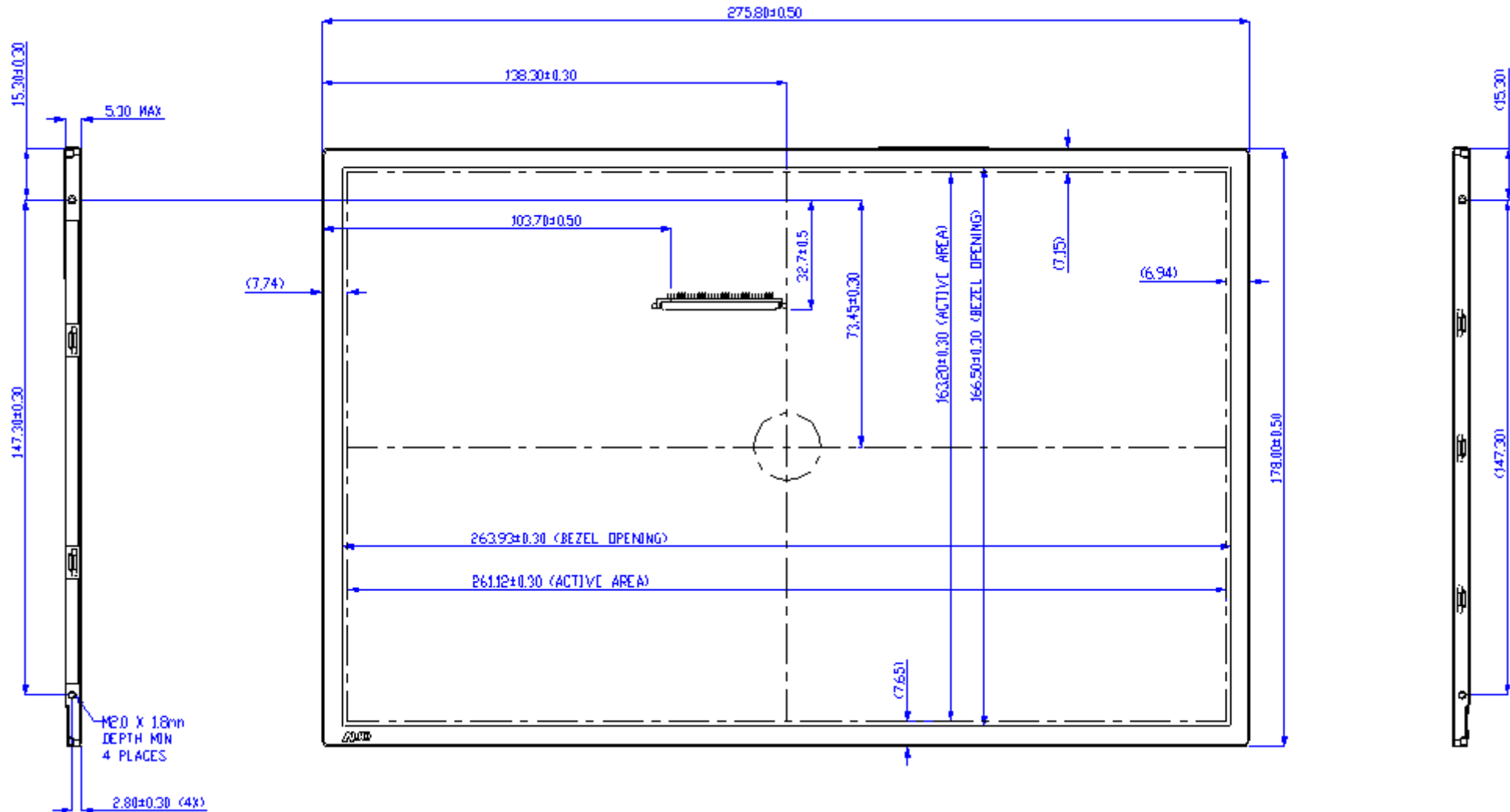
Items	Required Condition	Note
Temperature Humidity Bias	Ta= 40°C , 90%RH, 300h	
High Temperature Operation	Ta= 50°C , Dry, 300h	
Low Temperature Operation	Ta= 0°C , 300h	
High Temperature Storage	Ta= 60°C , 300h	
Low Temperature Storage	Ta= -20°C , 300h	
Thermal Shock Test	Ta=-20°C to 60°C , Duration at 30 min, 100 cycles	
ESD	Contact : ±8 KV Air : ±15 KV	Note 1

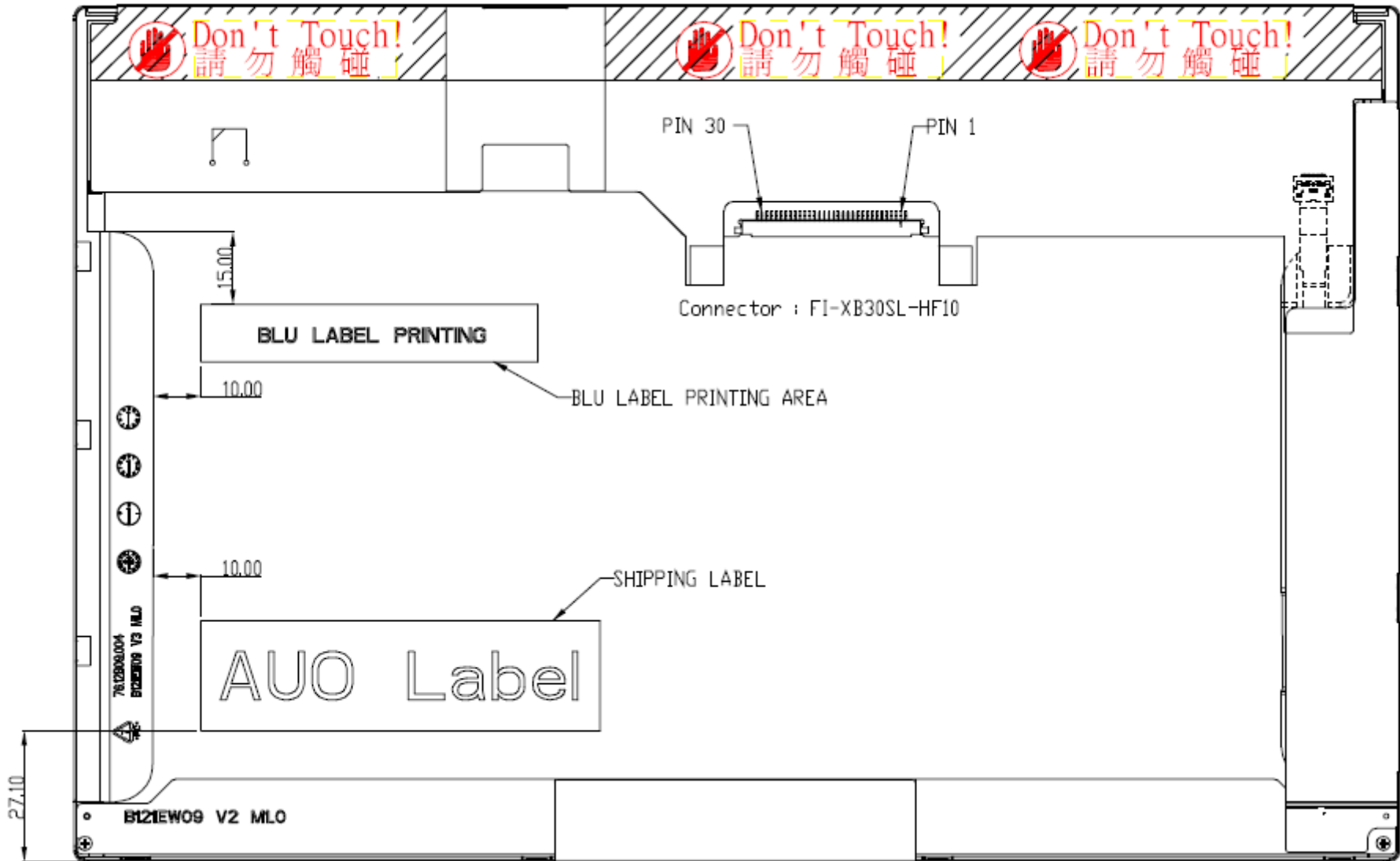
**Note1:** According to EN 61000-4-2 , ESD class B: Some performance degradation allowed. No data lost  
 . Self-recoverable. No hardware failures.

**Remark:** MTBF (Excluding the LED): 30,000 hours with a confidence level 90%

## 11. Mechanical Characteristics

### 11.1 LCM Outline Dimension





## 11.2 Screw Hole Depth and Center Position

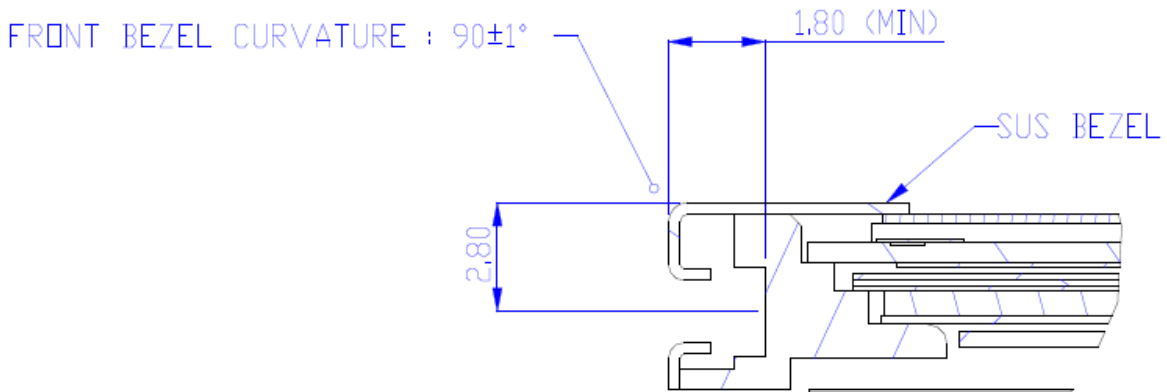
Screw hole minimum depth, from side surface = 1.8 mm (See drawing)

Screw hole center location, from front surface = 2.8mm (See drawing)

Screw Torque:


2.3 ~ 2.5 kgf-cm Max (Rework 6 times)

3.0 kgf-cm max Max (Rework 3 times)

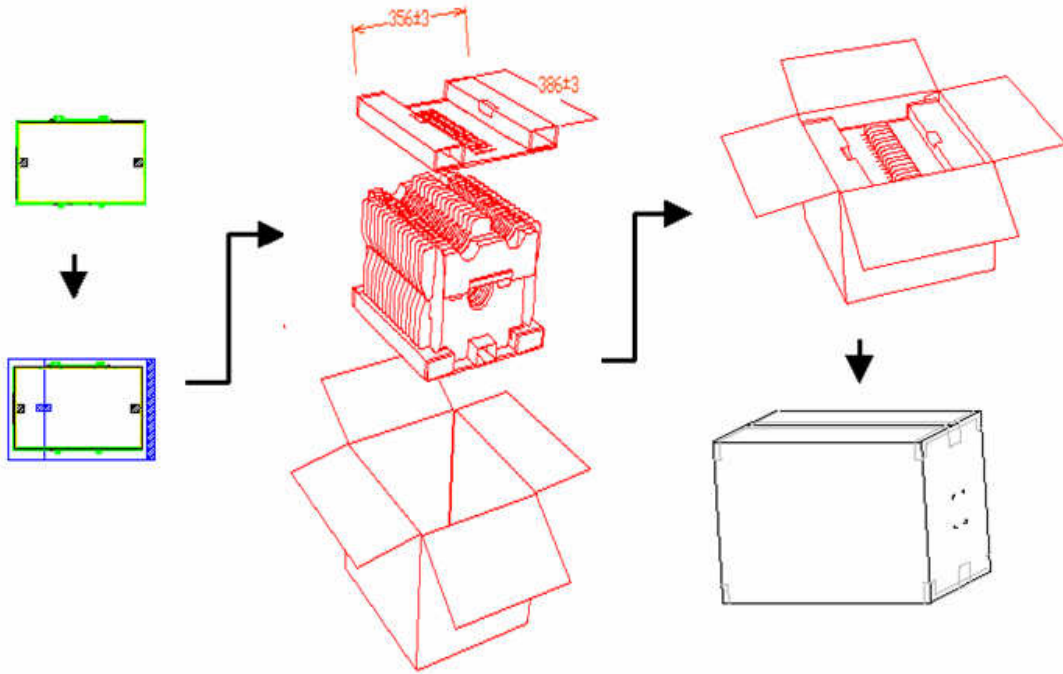


## 12. Shipping and Package

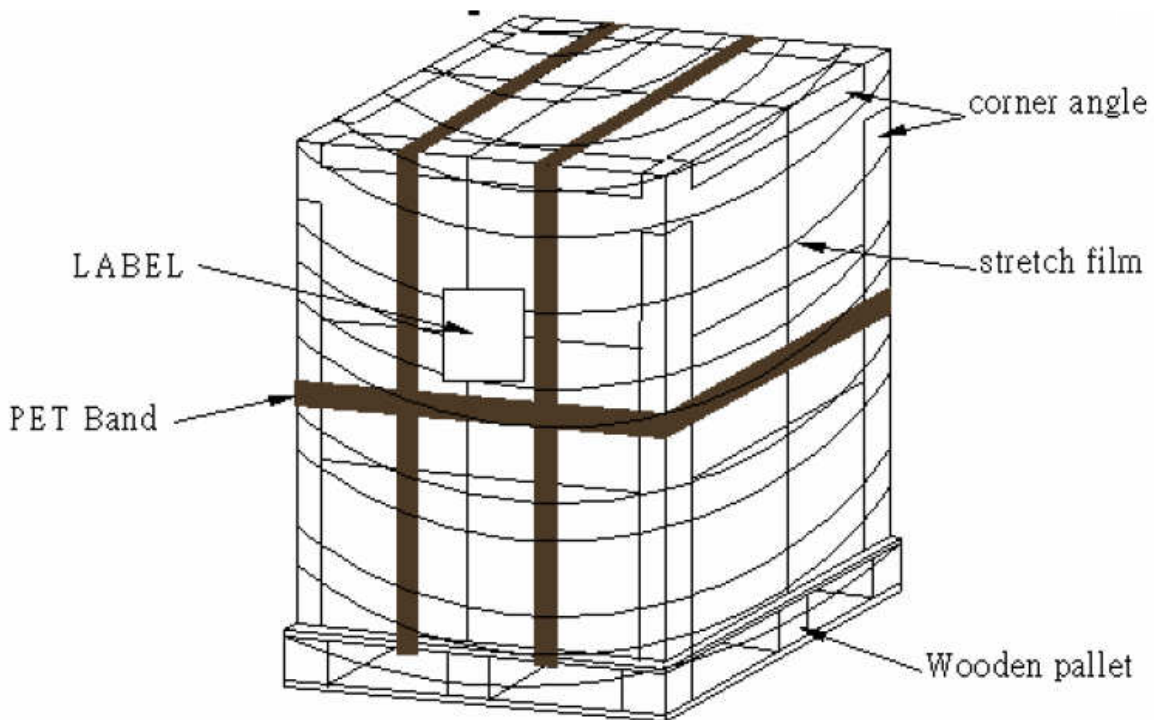
### 12.1 Shipping Label Format

 *XXXXXXXXXXXX-XXXX*	<b>Manufactured 06/35</b> <b>Model No: B121EW09 V3</b> <b>AU Optronics</b> <b>MADE IN CHINA (S03)</b>  <b>HW: 1A FW:1</b>	 
 <b>11S42T0708Z1ZH8TXXXXXX YMM P/N 42T0708 FRU 42T0709</b>		

## 12.2 Carton package



## 12.3 Shipping package of palletizing sequence







# Product Specification

AU OPTRONICS CORPORATION

## 13. Appendix: EDID description

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)	Remarks	Value (Hex)	Value (Decimal)	Value (Binary)
0	00	Header	00	EDID VESA Spec Fixed	00	0	00000000
1	01	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
2	02	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
3	03	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
4	04	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
5	05	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
6	06	Header	FF	EDID VESA Spec Fixed	FF	255	11111111
7	07	Header	00	EDID VESA Spec Fixed	00	0	00000000
8	08	ID Manufacturer Name	30	LEN	30	48	00110000
9	09		AE		AE	174	10101110
10	0A	ID Product Code	11	12" 16:10 WXGA 1280x800 LED B/L	11	17	00010001
11	0B		40		40	64	01000000
12	0C	ID Serial Number (32-bit serial number)	00	not used	00	0	00000000
13	0D		00	not used	00	0	00000000
14	0E		00	not used	00	0	00000000
15	0F		00	not used	00	0	00000000
16	10	Week of Manufacture			01	1	00000001
17	11	Year of Manufacture			13	19	00010011
18	12	EDID Structure version	01	Ver. 1.3	01	1	00000001
19	13	EDID Revision	03		03	3	00000011
20	14	Video Input Definition	80	Digital	80	128	10000000
21	15	Max H Image Size(cm)			1A	26	00011010
22	16	Max V Image Size(cm)			10	16	00010000
23	17	Display gamma (gamma x 100)-100	78	2.2	78	120	01111000
24	18	Feature support(DPMS)	EA	Lenovo Spec fixed	EA	234	11101010
25	19	Red/Green Low Bits			65	101	01100101
26	1A	Blue/White Low Bits			85	133	10000101
27	1B	Red x			8F	143	10001111
28	1C	Red y			59	89	01011001
29	1D	Green x			58	88	01011000
30	1E	Green y			8F	143	10001111
31	1F	Blue x			26	38	00100110
32	20	Blue y			1B	27	00011011
33	21	White x			50	80	01010000
34	22	White y			54	84	01010100
35	23	Established Timing 1	00	Lenovo Spec fixed	00	0	00000000
36	24	Established Timing 2	00	Lenovo Spec fixed	00	0	00000000



# Product Specification

AU OPTRONICS CORPORATION

37	25	Manufacturer's Timings	00		00	0	00000000
38	26	Standard Timing Identification #1	01	Lenovo Spec fixed	01	1	00000001
39	27		01	Lenovo Spec fixed	01	1	00000001
40	28	Standard Timing Identification #2	01	Lenovo Spec fixed	01	1	00000001
41	29		01	Lenovo Spec fixed	01	1	00000001
42	2A	Standard Timing Identification #3			01	1	00000001
43	2B				01	1	00000001
44	2C	Standard Timing Identification #4			01	1	00000001
45	2D				01	1	00000001
46	2E	Standard Timing Identification #5			01	1	00000001
47	2F				01	1	00000001
48	30	Standard Timing Identification #6			01	1	00000001
49	31				01	1	00000001
50	32	Standard Timing Identification #7			01	1	00000001
51	33				01	1	00000001
52	34	Standard Timing Identification #8			01	1	00000001
53	35				01	1	00000001
54	36	Pixel Clock/10,000 (LSB)		Refresh rate 60Hz	12	18	00010010
55	37	Pixel Clock/10,000 (MSB) /			1B	27	00011011
56	38	Horizontal Active			00	0	00000000
57	39	Horizontal Blanking			7B	123	01111011
58	3A	Horizontal Active : Horizontal Blanking			50	80	01010000
59	3B	Vertical Active			20	32	00100000
60	3C	Vertical Blanking			15	21	00010101
61	3D	Vertical Active : Vertical Blanking			30	48	00110000
62	3E	Horizontal Sync. Offset			30	48	00110000
63	3F	Horizontal Sync Pulse Width			20	32	00100000
64	40	Vertical Sync Offset : Sync Width			36	54	00110110
65	41	Horizontal Vertical Sync Offset/Width upper 2bits			00	0	00000000
66	42	Horizontal Image Size			05	5	00000101
67	43	Vertical Image Size			A3	163	10100011
68	44	Horizontal & Vertical Image Size			10	16	00010000
69	45	Horizontal Border			00	0	00000000
70	46	Vertical Border			00	0	00000000
71	47	Flags			18	24	00011000
72	48	Pixel Clock/10,000 (LSB) (Slow Refresh rate)		Refresh rate 50Hz	7F	127	01111111
73	49	Pixel Clock/10,000 (MSB) / (Slow Refresh rate)			16	22	00010110



# Product Specification

AU OPTRONICS CORPORATION

74	4A	Horizontal Active			00	0	00000000
75	4B	Horizontal Blanking			7B	123	01111011
76	4C	Horizontal Active : Horizontal Blanking			50	80	01010000
77	4D	Vertical Active			20	32	00100000
78	4E	Vertical Blanking			15	21	00010101
79	4F	Vertical Active : Vertical Blanking			30	48	00110000
80	50	Horizontal Sync. Offset			30	48	00110000
81	51	Horizontal Sync Pulse Width			20	32	00100000
82	52	Vertical Sync Offset : Sync Width			36	54	00110110
83	53	Horizontal Vertical Sync Offset/Width upper 2bits = 0			00	0	00000000
84	54	Horizontal Image Size			05	5	00000101
85	55	Vertical Image Size			A3	163	10100011
86	56	Horizontal & Vertical Image Size			10	16	00010000
87	57	Horizontal Border			00	0	00000000
88	58	Vertical Border			00	0	00000000
89	59	Flags			18	24	00011000
90	5A	Flag	00	VESA Spec Fixed	00	0	00000000
91	5B	Flag	00	VESA Spec Fixed	00	0	00000000
92	5C	Flag	00	VESA Spec Fixed	00	0	00000000
93	5D	Data Type Tag	0F	Lenovo Spec fixed	0F	15	00001111
94	5E	Flag	00	VESA Spec Fixed	00	0	00000000
95	5F	(Horizontal active pixel /8)-31	81	129	81	129	10000001
96	60	Image Aspect Ratio	0A	16 : 10	0A	10	00001010
97	61	Middle Refresh Rate	3C	60	3C	60	00111100
98	62	(Horizontal active pixel /8)-31	81	129	81	129	10000001
99	63	Image Aspect Ratio	0A	16 : 10	0A	10	00001010
100	64	Low Refresh Rate	32	50	32	50	00110010
101	65	Brightness(1/10nit)			16	22	00010110
102	66	Feature flag	09	TN LED B/L	09	9	00001001
103	67	Reserved	00	Lenovo Spec fixed	00	0	00000000
104	68	LCD Supplier manufacture Code (3 character ID)			06	6	00000110
105	69	LCD Supplier manufacture Code (3 character ID)			AF	175	10101111
106	6A	LCD Supplier Product code			56	86	01010110
107	6B	LCD Supplier Product code			33	51	00110011
108	6C	Flag	00	VESA Spec Fixed	00	0	00000000
109	6D	Flag	00	VESA Spec Fixed	00	0	00000000
110	6E	Flag	00	VESA Spec Fixed	00	0	00000000
111	6F	Data Type Tag	FE	Lenovo Spec fixed	FE	254	11111110
112	70	Flag	00	VESA Spec Fixed	00	0	00000000
113	71	Model Name			42	66	01000010



# Product Specification

AU OPTRONICS CORPORATION

114	72	Model Name			31	49	00110001
115	73	Model Name			32	50	00110010
116	74	Model Name			31	49	00110001
117	75	Model Name			45	69	01000101
118	76	Model Name			57	87	01010111
119	77	Model Name			30	48	00110000
120	78	Model Name			39	57	00111001
121	79	Model Name			20	32	00100000
122	7A	Model Name			56	86	01010110
123	7B	Model Name			33	51	00110011
124	7C	Model Name			20	32	00100000
125	7D	Model Name			0A	10	00001010
126	7E	Extension flag	00	VESA Spec Fixed	00	0	00000000
127	7F	Checksum			9B	155	10011011