Model Name: T315XW03 VD

Issue Date : 2010/10/14

( ) Preliminary Specifications
(*) Final Specifications

Customer Signature	Date	AUO	Date
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Record of Revision

Version	Date	Page	Description
0.1	2010/10/1		First release
1.0	2010/11/15	5	Update T-B/B Input Voltage
		5	Update Supply control Voltage
		6	Update Power Supply Input Current
		6	Update Power Consumption
		6	Update Inrush Current
		6	Update Backlight Power Consumption
		6	Add AC Characteristics
		7	Update note 1, (5) Typ. Input current : White Pattern Max. Input current: Heavy loading pattern defined by AUO
		9	Update LCD connector: 196337-30041-3 (P-TWO, FFC connector)
		9	Update Pin 1
		9	Update Pin 20
		10	Update LVDS option
		15	Update Electrical specification
		16	Add Input Pin Assignment
		16	Update Protection circuit specification
		17	Update lamp current Typ.
		18	Update Color Coordinates : Wx=0.281, Wy=0.288
		21	Update Outline Dimension Depth=57mm
		22	Update front view
		23	Update back view
		28	Update Pallet and Shipment Information

1. General Description

This specification applies to the 31.5 inch Color TFT-LCD Module T315XW03 VD. This LCD module has a TFT active matrix type liquid crystal panel 1,366 x 768 pixels, and diagonal size of 31.5 inch. This module supports 1,366 x 768 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot.

The T315XW03 VD has been designed to apply the 8-bit 1 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

General Information

Items	Specification	Unit	Note
Active Screen Size	31.5	inch	
Display Area	697.685 (H) x 392.256(V)	mm	
Outline Dimension	760.0 (H) x 450.0 (V) x 57.0(D)	mm	With T-balance board
Driver Element	a-Si TFT active matrix		
Display Colors	8 bit, 16.7M	Colors	
Number of Pixels	1,366 x 768	Pixel	
Pixel Pitch	0.51075	mm	
Pixel Arrangement	RGB horizontal stripe		
Display Operation Mode	Normally Black		
Surface Treatment	Anti-Glare, 3H		Haze=2%

2. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	V_{DD}	-0.3	14	V_{DC}	Note 1
Input Voltage of Signal	Vin	-0.3	4	V_{DC}	Note 1
T-B/B Input Voltage	V_{BB}	-	500	V_{p-p}	Note 2
Supply control Voltage	Vcc	-0.3	15	V_{DC}	Note 2
Operating Temperature	TOP	0	+50	[°C]	Note 3
Operating Humidity	HOP	10	90	[%RH]	Note 3
Storage Temperature	TST	-20	+60	[°C]	Note 3
Storage Humidity	HST	10	90	[%RH]	Note 3
Panel Surface Temperature	PST	-	65	[°C]	Note 3

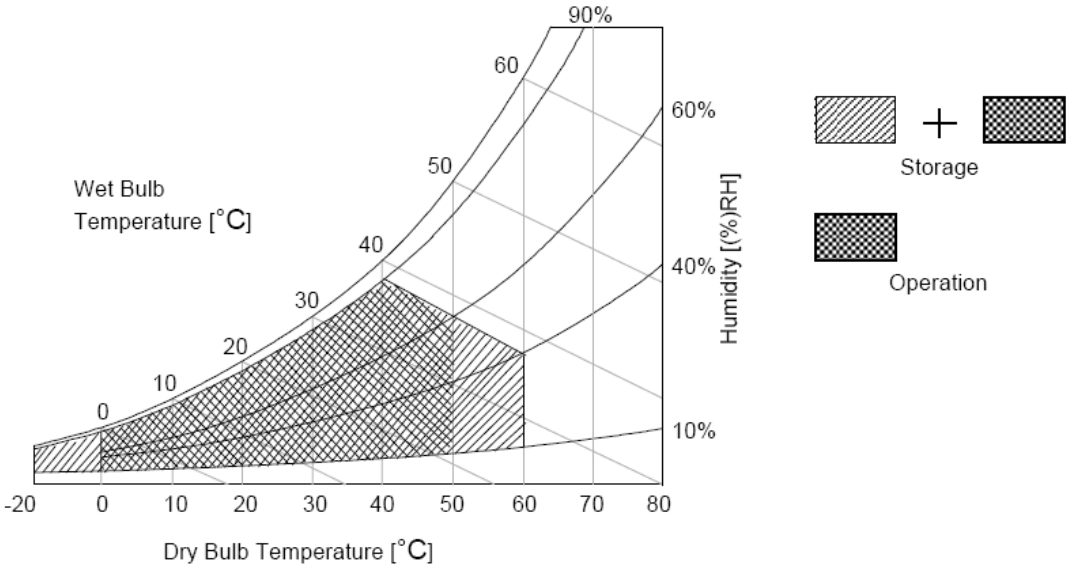
Note 1: Duration:50 msec.

Note 2: Duration: 2 sec.

Note 3: Maximum Wet-Bulb should be 39℃ and No condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3: Surface temperature is measured at 50℃ Dry condition



3. Electrical Specification

The T315XW03 VD requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input for BLU is to power inverter.

3-1 Electrical Characteristics

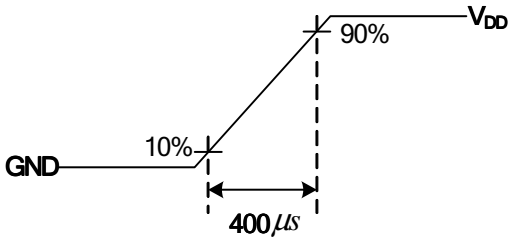
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
LCD							
Power Supply Input Voltage		V_{DD}	10.8	12	13.2	V_{DC}	
Power Supply Input Current		I_{DD}	--	0.15	0.3	A	1
Power Consumption		P_C	--	1.8	4	Watt	1
Inrush Current		I_{RUSH}	--	--	4	A	2
LVDS Interface	Input Differential Voltage	$\|V_{ID}\|$	200	400	600	mV_{DC}	3
	Differential Input High Threshold Voltage	V_{TH}	+100	--	+300	mV_{DC}	3
	Differential Input Low Threshold Voltage	V_{TL}	-300	--	-100	mV_{DC}	3
	Input Common Mode Voltage	V_{ICM}	1.1	1.25	1.4	V_{DC}	3
CMOS Interface	Input High Threshold Voltage	V_{IH} (High)	2.7	--	3.3	V_{DC}	4
	Input Low Threshold Voltage	V_{IL} (Low)	0	--	0.6	V_{DC}	4
Backlight Power Consumption		P_{BL}	77	86	95	Watt	--
Life Time			50,000	--	--	Hours	--

3.1.2: AC Characteristics

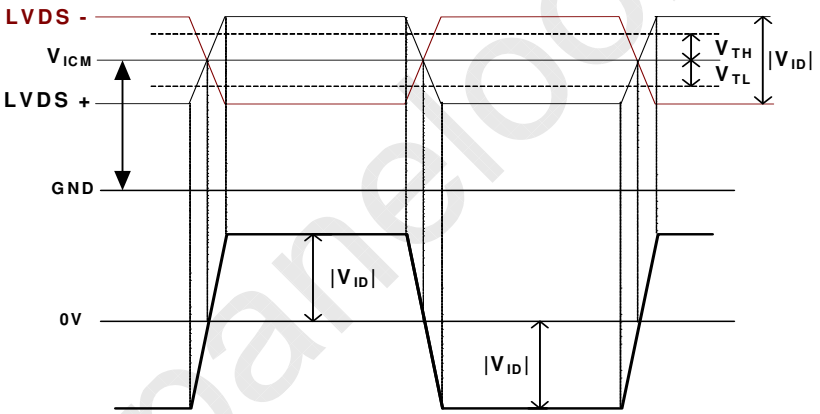
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
LVDS Interface	Receiver Clock : Spread Spectrum Modulation range	Fclk_ss	Fclk -3%	--	Fclk +3%	MHz	5
	Receiver Clock : Spread Spectrum Modulation frequency	Fss	30	--	200	KHz	5
	Receiver Data Input Margin Fclk = 85 MHz Fclk = 65 MHz	tRMG	 -0.4 -0.5	 -- --	 0.4 0.5	ns	6

Note :

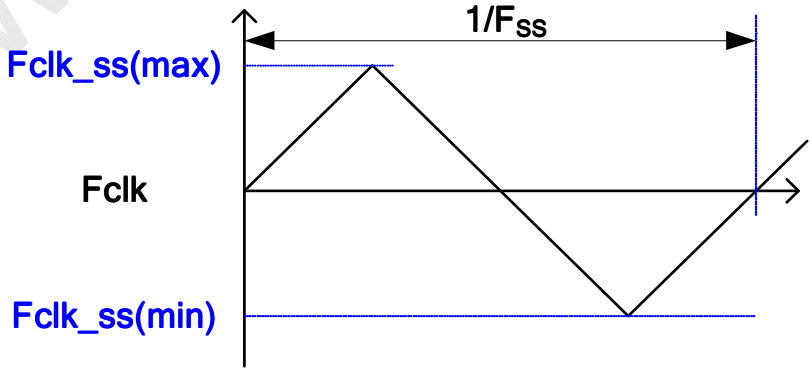
1. Test Condition:
   (1) V_{DD} = 12.0V
   (2) Fv = 60Hz
   (3) F_{CIK} = Max freq
   (4) Temperature = 25 ℃
   (5) Typ. Input current : White Pattern
   Max. Input current: Heavy loading pattern defined by AUO
2. Measurement condition : Rising time = 400us



3. V_{ICM} = 1.25V

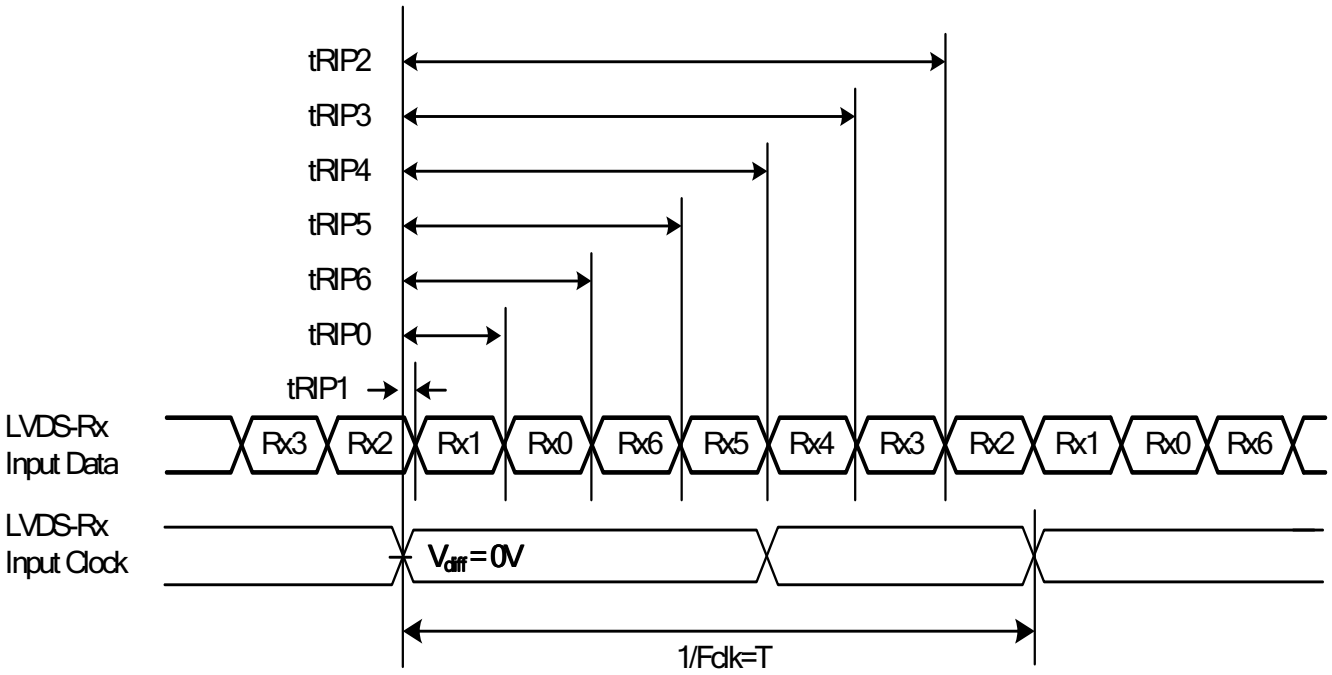


4. The measure points of V_{IH} and V_{IL} are in LCM side after connecting the System Board and LCM.
5. LVDS Receiver Clock SSCG (Spread spectrum clock generator) is defined as below figures



6. Receive Data Input Margin

Parameter	Symbol	Rating			Unit	Note
		Min	Type	Max		
Input Clock Frequency	Fclk	Fclk (min)	--	Fclk (max)	MHz	**T=1/Fclk**
Input Data Position0	tRIP1	-|tRMG|	0	|tRMG|	ns	
Input Data Position1	tRIP0	T/7-|tRMG|	T/7	T/7+|tRMG|	ns	
Input Data Position2	tRIP6	2T/7-|tRMG|	2T/7	2T/7+|tRMG|	ns	
Input Data Position3	tRIP5	3T/7-|tRMG|	3T/7	3T/7+|tRMG|	ns	
Input Data Position4	tRIP4	4T/7-|tRMG|	4T/7	4T/7+|tRMG|	ns	
Input Data Position5	tRIP3	5T/7-|tRMG|	5T/7	5T/7+|tRMG|	ns	
Input Data Position6	tRIP2	6T/7-|tRMG|	6T/7	6T/7+|tRMG|	ns	



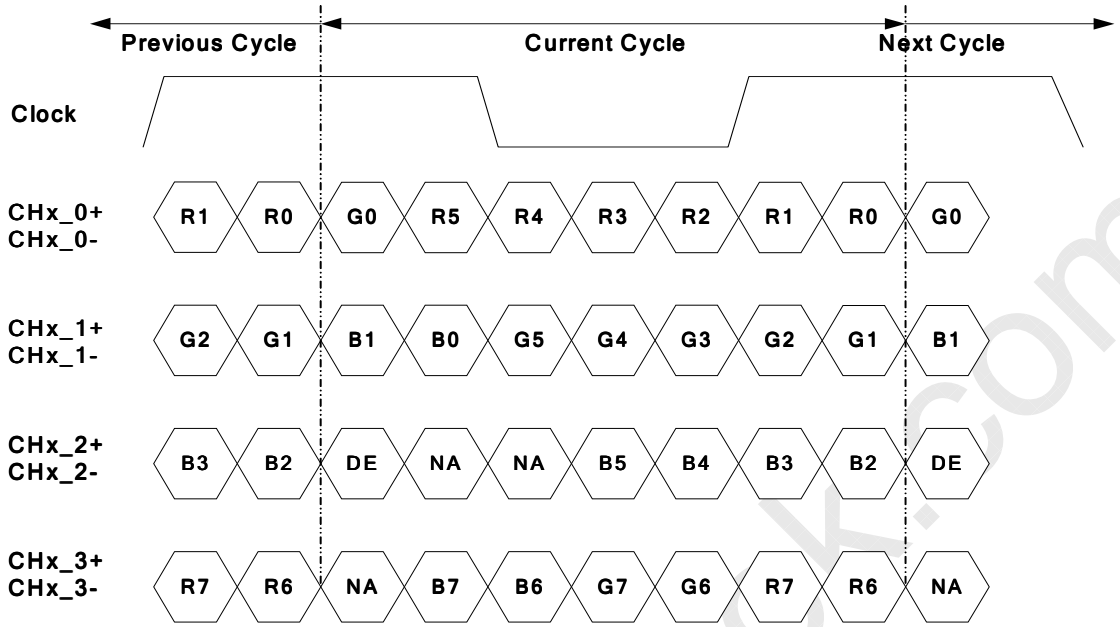
3-2 Interface Connections

- **LCD connector: 196337-30041-3 (P-TWO, FFC connector)**

PIN	Symbol	Description
1	Aging	Aging pattern control High(3.3V) : Aging Enable Open/Low(GND) : Aging Disable
2	SCL	EEPROM Serial Clock
3	SDA	EEPROM Serial Data
4	GND	Ground
5	CH1_0-	LVDS Channel 1, Signal 0-
6	CH1_0+	LVDS Channel 1, Signal 0+
7	GND	Ground
8	CH1_1-	LVDS Channel 1, Signal 1-
9	CH1_1+	LVDS Channel 1, Signal 1+
10	GND	Ground
11	CH1_2-	LVDS Channel 1, Signal 2-
12	CH1_2+	LVDS Channel 1, Signal 2+
13	GND	Ground
14	CH1_CLK-	LVDS Channel 1, Clock -
15	CH1_CLK+	LVDS Channel 1, Clock +
16	GND	Ground
17	CH1_3-	LVDS Channel 1, Signal 3-
18	CH1_3+	LVDS Channel 1, Signal 3+
19	GND	Ground
20	N.C.	No connection
21	LVDS_SEL	High(3.3V) for NS, Open/Low(GND) for JEIDA
22	WP	EEPROM Write Protection High(3.3V) for Writable, Low(GND) for Protection
23	GND	Ground
24	GND	Ground
25	GND	Ground
26	V_{DD}	Power Supply, +12V DC Regulated
27	V_{DD}	Power Supply, +12V DC Regulated
28	V_{DD}	Power Supply, +12V DC Regulated
29	V_{DD}	Power Supply, +12V DC Regulated
30	V_{DD}	Power Supply, +12V DC Regulated

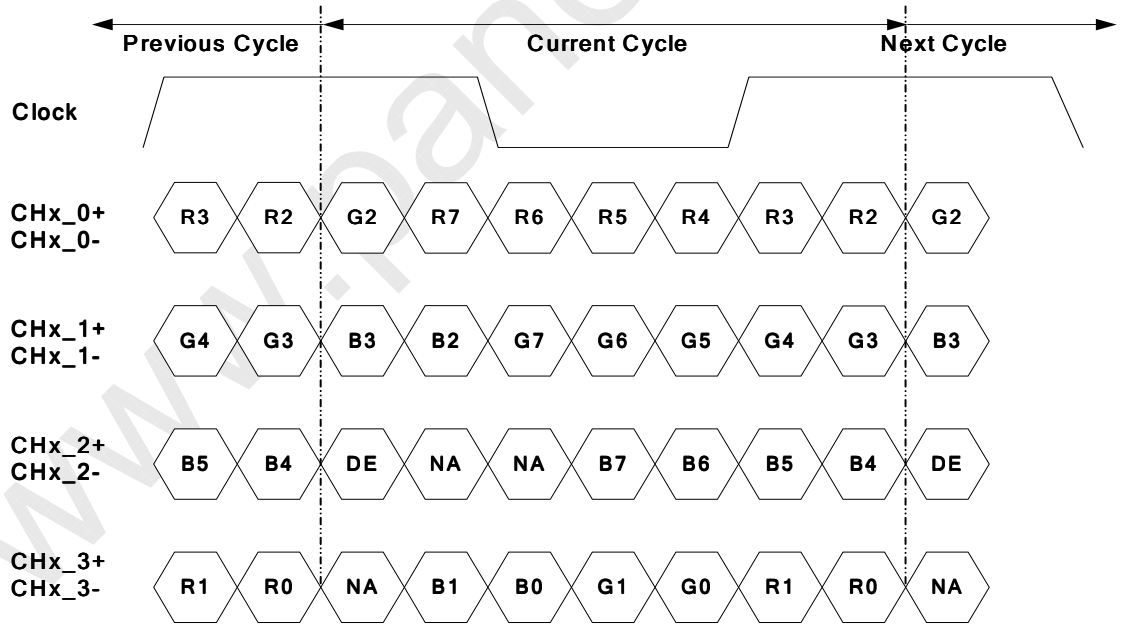
Note: N.C. : please leave this pin unoccupied. It can not be connected by any signal (Low/GND/High).

- **LVDS Option = High → NS**



Note: x = 1, 2, 3, 4…

- **LVDS Option = Low/Open→ JEIDA**



Note: x = 1, 2, 3, 4…

3-3 Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

Signal	Item	Symbol	Min.	Typ.	Max	Unit
Vertical Section	Period	Tv	784	810	1015	Th
	Active	Tdisp (v)		768		Th
	Blanking	Tblk (v)	16	42	247	Th
Horizontal Section	Period	Th	1460	1648	2000	Tclk
	Active	Tdisp (h)		1366		Tclk
	Blanking	Tblk (h)	94	282	634	Tclk
Clock	Frequency	Fclk=1/Tclk	50	80	86	MHz
Vertical Frequency	Frequency	Fv	47	60	63	Hz
Horizontal Frequency	Frequency	Fh	43	48	53	KHz

Notes:

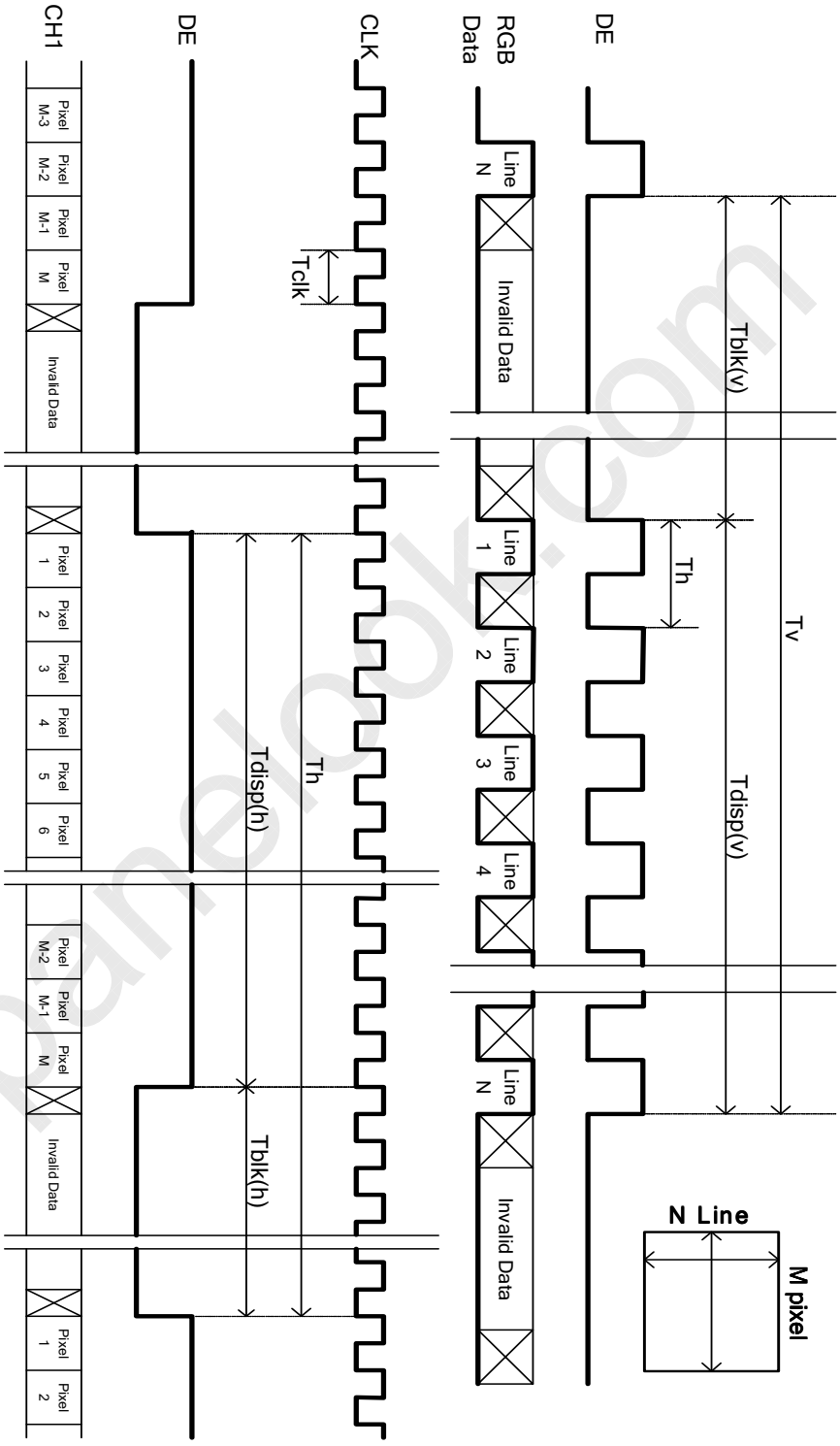
(1) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.

(2)Vertical display position is specified by the rise of DE after a “Low” level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise of 1st DE is displayed at the top line of screen.

(3)If a period of DE “High” is less than 1366 DCLK or less than 768 lines, the rest of the screen displays black.

(4)The display position does not fit to the screen if a period of DE “High” and the effective data period do not synchronize with each other.

3-4 Signal Timing Waveforms



3-5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

- **Color Data Reference**

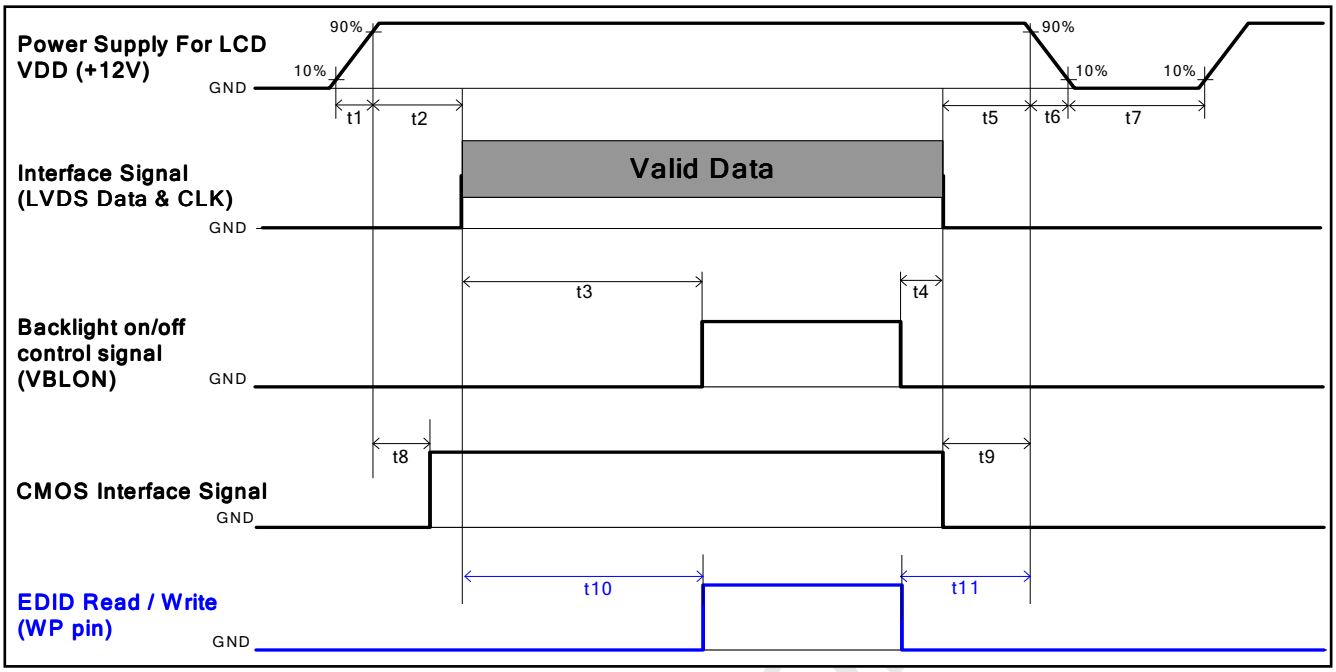
Color		Input Color Data																									
		RED								GREEN								BLUE									
		MSB							LSB	MSB							LSB	MSB							LSB		
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0		
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Green(255)	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(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	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		
R	RED(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
G	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		

	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0		
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
B	BLUE(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	BLUE(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		

	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0		
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		

3-6 Power Sequence for LCD



Parameter	Values			Unit
	Min.	Type.	Max.	
t1	0.4	---	30	ms
t2	0.1	---	**50**	ms
t3	**450**	---	---	ms
t4	0 *1	---	---	ms
t5	0	---	---	ms
t6	---	---	--- *2	ms
t7	500	---	---	ms
t8	10	---	50	ms
t9	0	---	---	ms
t10	**450**	---	---	ms
t11	**150** *3	---	---	ms

Note:
(1) t4=0 : concern for residual pattern before BLU turn off.
(2) t6 : voltage of VDD must decay smoothly after power-off. (customer system decide this value)
(3) t11: the min value is decided by the download finish time of EDID 2Kbits.(when SCL over 30KHz)

3-7 Backlight Specification (T-BB Product Type)

3-7-1 Electrical specification

Item	Symbol	Condition	Spec			Unit	Note
			Min	Typ	Max		
Operating Voltage	HIGH (FET)	-	380	390	400	Vp-p	
	Low (FET)	-	190	195	200	Vp-p	
Operating Current	Io	-	11.625	12.5	13.375	mArms	
BL Total Power Dissipation	PBL	-	-	86	-	Watt	
Striking Voltage	Vstk	At 0℃	1500	-	-	Vrms	
		At 25℃	1250	-	-		
Striking Time	Ts	-	1000	1500	2000	msec	
Operating Frequency	fo	-	62.0	63.0	64.0	kHz	
PWM Operating Frequency	F_PWM	-	140	150	160	Hz	
PWM Dimming Duty Ratio	D_PWM	-	10	-	100	%	Note 1&2
Lamp Type			U-type				
Number of Lamps			4			pcs	
Type of current balance			T-balance				

（Ta=25±5℃, Turn on for 45minutes）

Note 1: Dimming range

PWM Dimming : include Internal and External PWM Dimming

Note 2: Low dimming ratio operation

When PWM dimming duty ratio is operated lower than recommended value, feedback signal and all protection functions should be confirmed by LIPS design. Display performance should also be confirmed by customer's implement.

3-7-2：Input Pin Assignment

CN101 : 20037WR-H12 (YEONHO)

Pin	Symbol	Description
1	HIGH(FET)	High Voltage Input
2	NC	NC
3	LOW(FET)	Low Voltage Input
4	NC	NC
5	NC	NC
6	NC	NC
7	NC	NC
8	GND	GND
9	OVP	Over Voltage Protection
10	CNT_PRT	Open Connector Protection
11	VCC	Power Supply For Protection Voltage
12	LD	Lamp Open & Non Lighten Signal

3-7-3：Protection circuit specification

Item	Symbol	Spec			Unit	Note
		Min	Typ	Max		
Supply control voltage	Vcc	11	13	15	VDC	
Input Current of VCC	Icc	20	-	100	mADC	
Current feedback signal	IFB	2.05	2.20	2.35	Vrms	
Open Connector Detection	CNT_PRT(H)	13V-0.5	-	13	VDC	Lamp normal status
	CNT_PRT(L)	-	-	1	VDC	Lamp abnormal status
Lamp Detection	LD(H)	13V-0.5	-	13	VDC	Lamp normal status
	LD(L)	-	-	1	VDC	Lamp abnormal status

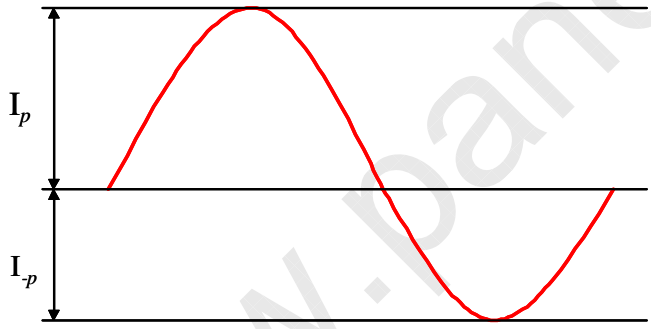
3-7-4: Lamp specification

Item	Symbol	Condition	Spec			Unit	Note
			Min	Typ	Max		
Lamp voltage	VL		766	851	936	Vrms	
Lamp current	IL		-	12.5	-	mArms	
Lamp frequency	fL		35	-	80	kHz	
Starting voltage	Vs	At 0℃	-	-	1480	Vrms	
		At 25℃	-	-	1230	Vrms	
Delayed discharge time	TD		-	-	0.5	sec	
Life time	TL		50K	-	-	hr	
Unsymmetrical ratio	UR		-	-	10%	-	Note 1.
Crest factor	C.F.		$\sqrt{2}-10\%$	$\sqrt{2}$	$\sqrt{2}+10\%$	-	

The above characteristics are measured under the conditions:
Ambient temperature: 25±2℃, Relative Humidity: 65±20%RH.

Note 1: Waveform definition

Please light on the lamp with symmetrical voltage and current waveform (unsymmetrical ratio is less than 10%, crest factor within $\sqrt{2}\pm10\%$).



Unsymmetrical Ratio = $|I_p - I_{-p}| / I_{rms} * 100\%$

Crest Factor = I_p (or I_{-p}) / I_{rms}

I_p : High side peak value

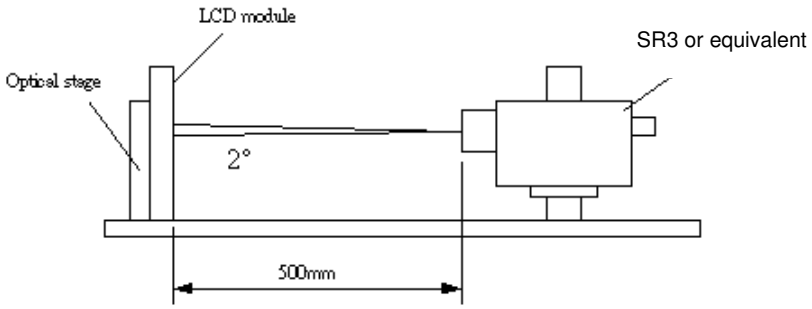
I_{-p} : Low side peak value

I_{rms} : Root mean square value

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 45 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of φ and θ equal to 0°.

Fig.1 presents additional information concerning the measurement equipment and method.



Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max		
Contrast Ratio		CR	2,800	3,500	--	--	1
Surface Luminance (White)		L_{WH}	350	450	--	cd/m^2	2
Luminance Variation		$\delta_{WHITE(9P)}$	--	--	1.3	--	3
Response Time (G to G)		Tγ	--	6.5	--	Ms	4
Color Gamut		NTSC	--	72	--	%	--
Color Coordinates	Red	R_X	Typ.-0.03	0.64	Typ.+0.03	--	--
		R_Y		0.33		--	--
	Green	G_X		0.29		--	--
		G_Y		0.60		--	--
	Blue	B_X		0.15		--	--
		B_Y		0.06		--	--
	White	W_X		0.281		--	--
		W_Y		0.288		--	--
Viewing Angle	x axis, right(φ=0°)	θ_r	--	89	--	degree	5
	x axis, left(φ=180°)	θ_l	--	89	--	degree	5
	y axis, up(φ=90°)	θ_u	--	89	--	degree	5
	y axis, down (φ=270°)	θ_d	--	89	--	degree	5

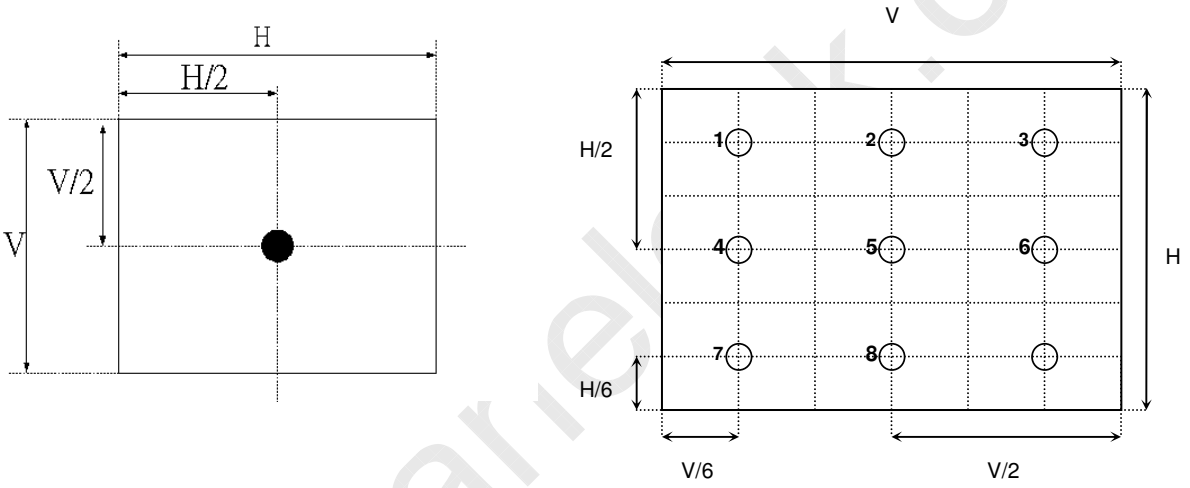
Note:

1. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance of } L_{on5}}{\text{Surface Luminance of } L_{off5}}$$

2. Surface luminance is luminance value at point 5 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see Fig 2.L_{WH}=Lon5 where Lon5 is the luminance with all pixels displaying white at center 5 location.

Fig 2 Luminance



3. The variation in surface luminance, δWHITE is defined (center of screen) as:

$\delta_{WHITE(9P)}$= Maximum(L_{on1}, L_{on2},…,L_{on9})/ Minimum(L_{on1}, L_{on2},…L_{on9})

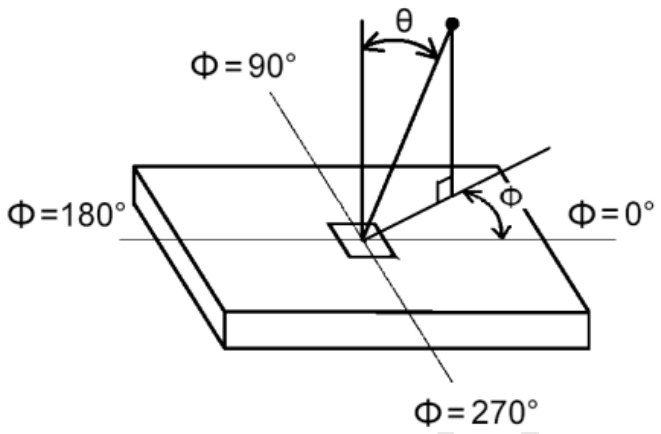
4. Response time T_{γ} is the average time required for display transition by switching the input signal for five luminance ratio (0%,25%,50%,75%,100% brightness matrix) and is based on F_v=60Hz to optimize.

Measured Response Time		Target				
		0%	25%	50%	75%	100%
Start	0%		0% to 25%	0% to 50%	0% to 75%	0% to 100%
	25%	25% to 0%		25% to 50%	25% to 75%	25% to 100%
	50%	50% to 0%	50% to 25%		50% to 75%	50% to 100%
	75%	75% to 0%	75% to 25%	75% to 50%		75% to 100%
	100%	100% to 0%	100% to 25%	100% to 50%	100% to 75%	

FIG.3 Response Time

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see Fig 3.

Fig 3 Viewing Angle

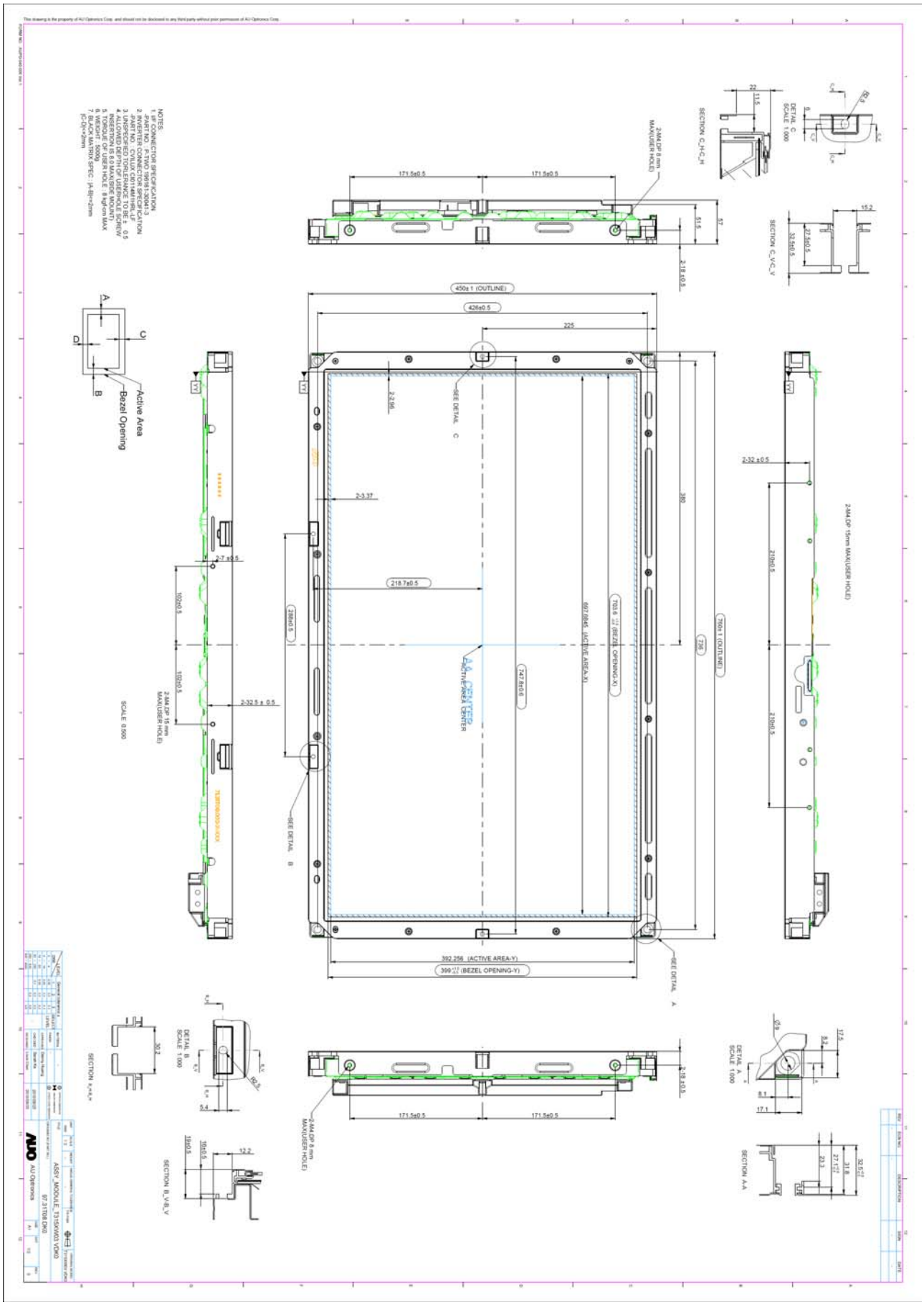


5. Mechanical Characteristics

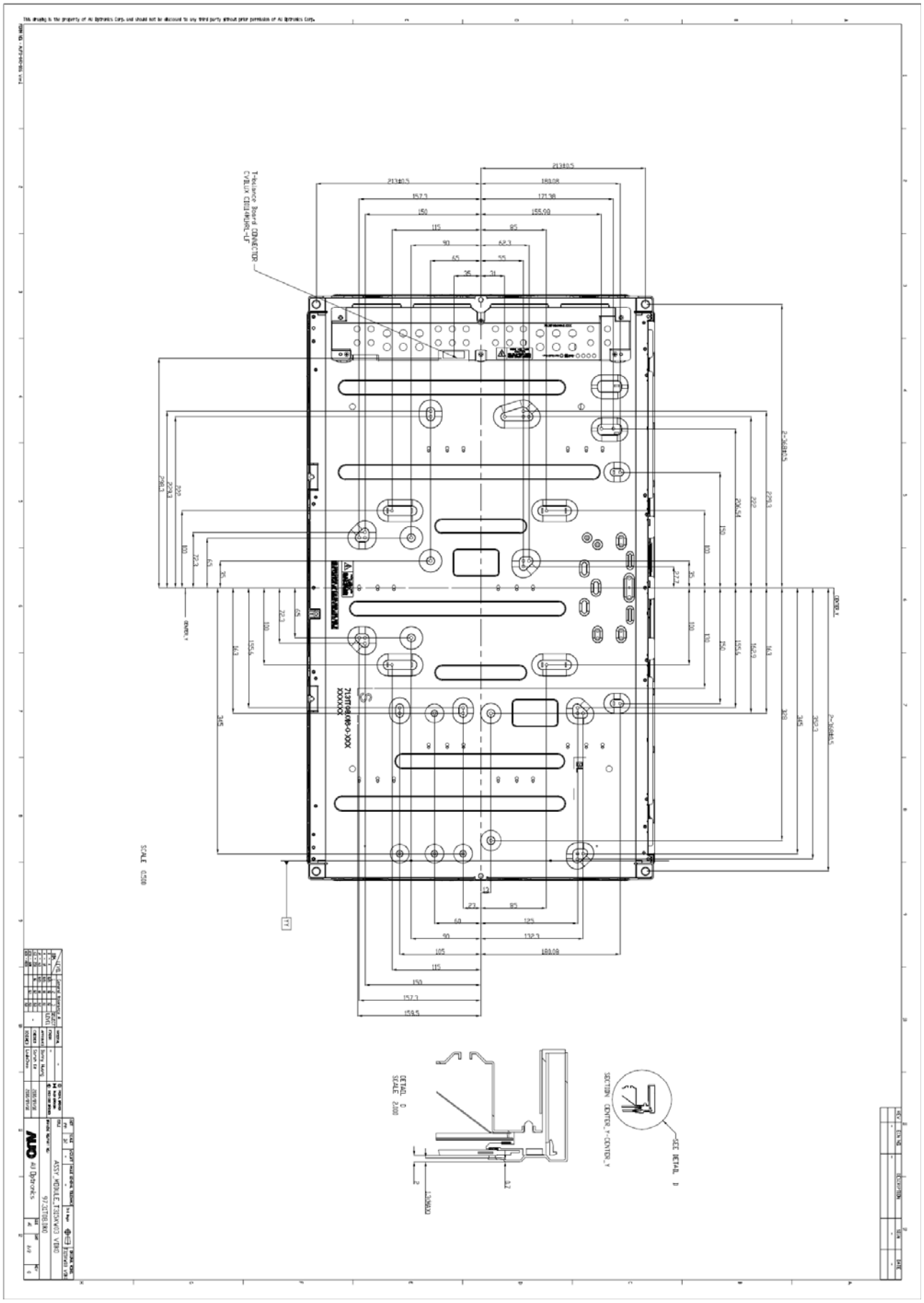
The contents provide general mechanical characteristics for the model T315XW03 VD. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal	760.0mm
	Vertical	450.0mm
	Depth	57mm (w/ T-Balance Board & shielding)
Bezel Opening	Horizontal	703.6mm
	Vertical	398.3mm
Active Display Area	Horizontal	697.685mm
	Vertical	392.256mm
Weight	5,000 g (Typ.)	
Surface Treatment	AG, Haze=2%, 3H	

- **Front View**



- **Back View**



6. Reliability Test Items

No.	Test Item	Q'ty	Condition
1	High temperature storage test	3	60℃, 300hrs
2	Low temperature storage test	3	-20℃, 300hrs
3	High temperature operation test	3	50℃, 300hrs
4	Low temperature operation test	3	-5℃, 300hrs
5	Vibration test (non-operation)	3	Fixed place：FMB (Only at 4-corner) Wave form：random 8~200Hz Overall average energy level：0.85018 Grms Bandwidth & Level： Frequency PSD (g2/Hz) 8Hz 0.0265 (PSD) 13Hz 0.00290 (PSD) 30Hz 0.02641 (PSD) 40Hz 0.006798 (PSD) 130Hz 0.0015725 (PSD) 200Hz 0.0002995 (PSD) Duration：Y,X,Z 30min, one time ech direction
6	Shock test (non-operation)	3	Shock level: 50G Waveform: half since wave, 11ms Direction: ±X, ±Y, ±Z, One time each direction
7	Vibration test (With carton)	4	Random wave (1.5G RMS, 10-200Hz) 30mins/ Per each X,Y,Z axes
8	Drop test (With carton)	4	Height: 45.7 cm 1 corner, 3 edges, 6 surfaces (ASTMD4169-I)

7. International Standard

7-1 Safety

(1) UL 60950-1, UL 60065; Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) IEC 60950-1 : 2001, IEC 60065:2001 ; Standard for Safety of International Electrotechnical Commission

(3) EN 60950 : 2001+A11, EN 60065:2002+A1:2006; European Committee for Electrotechnical Standardization (CENELEC), EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7.2 EMC

(1) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992

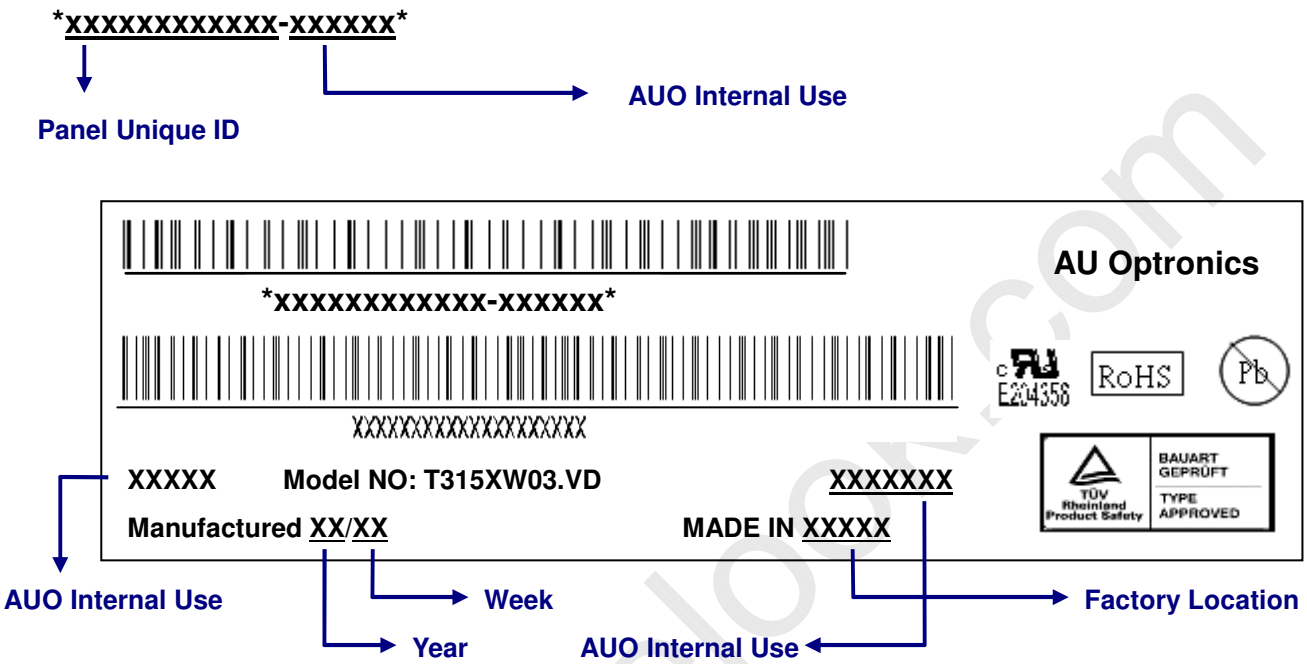
(2) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.

(3) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electrotechnical Standardization. (CENELEC), 1998

8. Packing

8-1 Definition of Label

- **Panel Label**



Green mark description

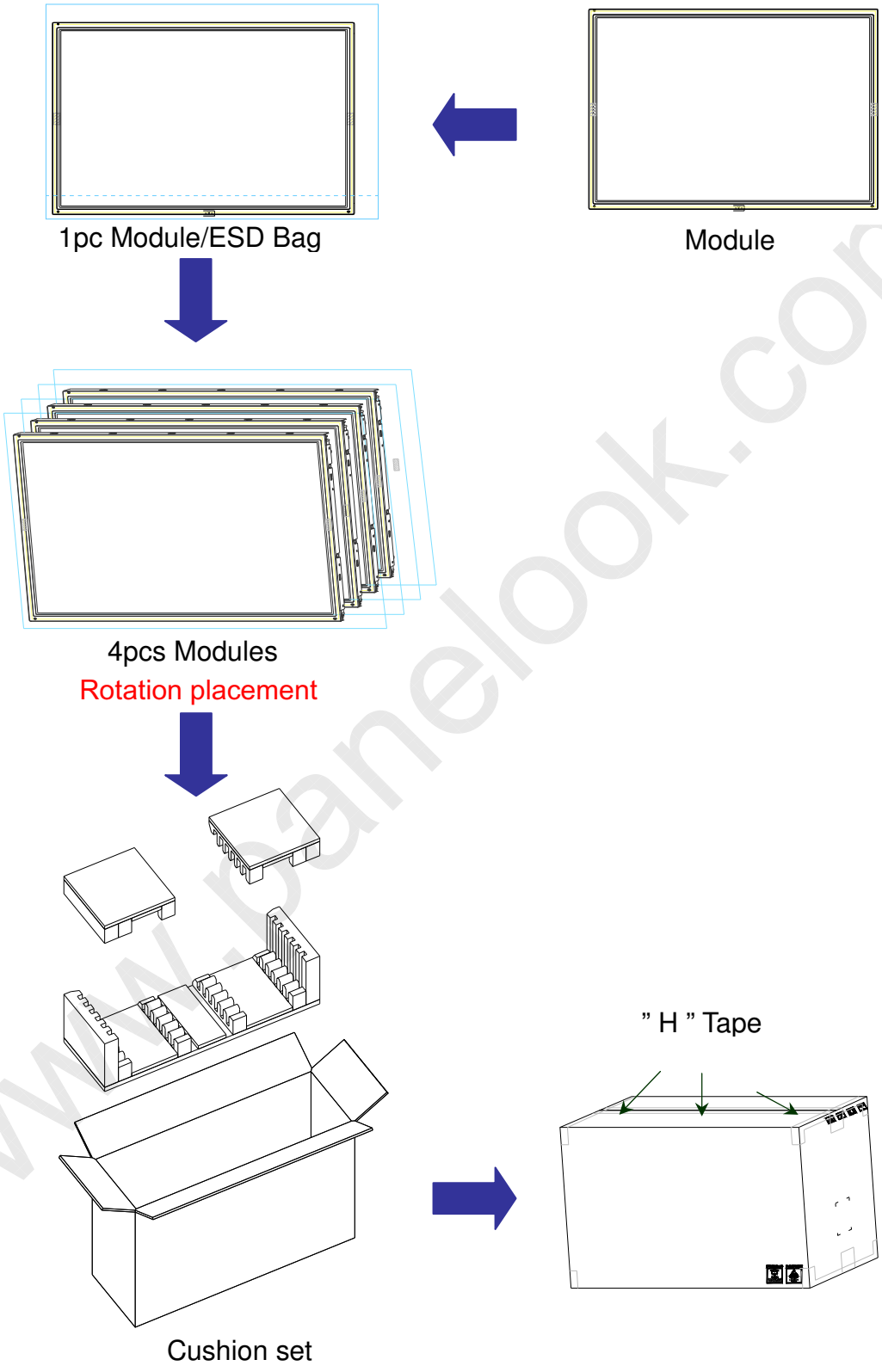
(1) For Pb Free Product, AUO will add Pb for identification.

(2) For RoHs compatible products, AUO will add RoHS for identification.

Note: The green Mark will be present only when the green documents have been ready by AUO internal green team. (definition of green design follows the AUO green design checklist.)

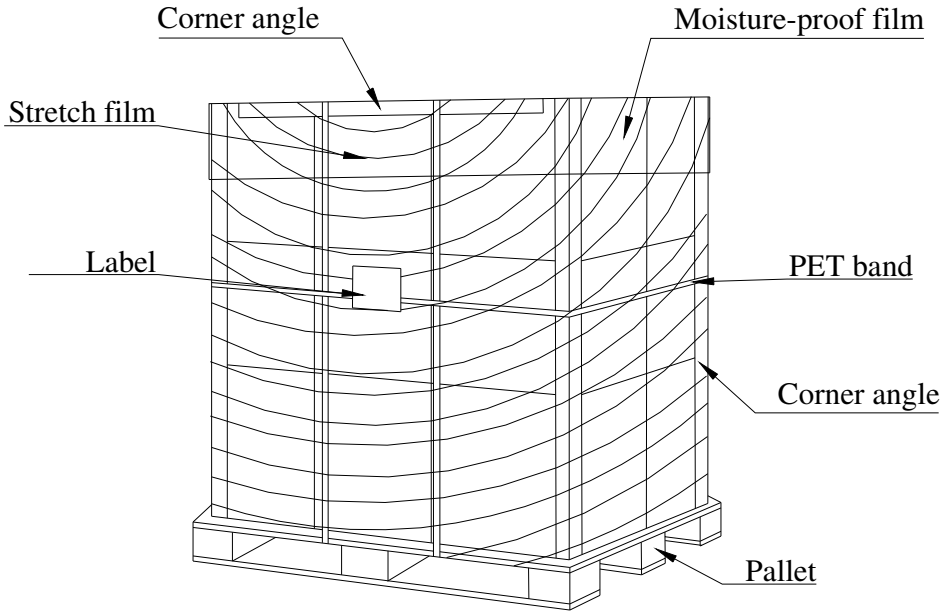
- **Carton Label**

8-2 Packing Methods:



8-3 Pallet and Shipment Information

	Item	Specification			Packing Remark
		Quantity	Dimension	Weight (kg)	
1	Packing BOX	4pcs/box	832(L)mm*283(W)mm*545(H)mm	24.1	
2	Pallet	1	1150(L)mm*840(W)mm*132(H)mm	13	
3	Boxes per Pallet	8 boxes/Pallet			
4	Panels per Pallet	32pcs/pallet			
5	Pallet after packing	N/A	1150(L)mm*840(W)mm*1222(H)mm	205.8	



7. Precautions

Please pay attention to the followings when you use this TFT LCD module.

9-1 Mounting Precautions

(1) You must mount a module using holes arranged in four corners or four sides.

(2) You should consider the mounting structure so that uneven force (ex. twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter cause circuit broken by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizer with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizer. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

9-2 Operation Precautions

(1) The device listed in the product specification sheets was designed and manufactured for TV application

(2) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)

(3) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(4) Brightness of CCFL depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(6) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(7) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

9-3 Electrostatic Discharge Control

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

9-4 Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

9-5 Storage

When storing modules as spares for a long time, the following precautions are necessary.

(1) 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) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

9-6 Handling Precautions for Protection Film

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

