( ) Preliminary Specification
(V) Final Specification

Module	**27” Color TFT-LCD**
Model Name	**M270HTN01.0**

Customer	**Date**	**Approved by**	**Date**
		Howard Lee	Oct. 18, 2013
Approved by		**Prepared by**	**Date**
		Evelyn Sung	Oct. 18, 2013
Note: This Specification is subject to change without notice.		AU Optronics corporation	

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Record of Revision

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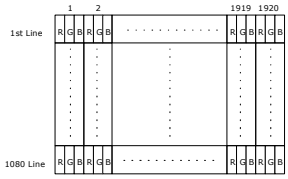
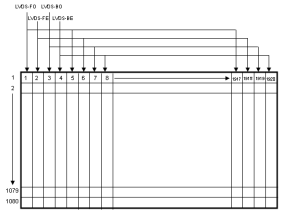
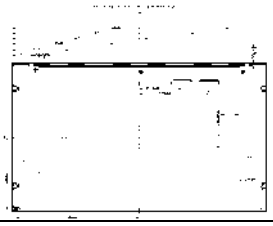
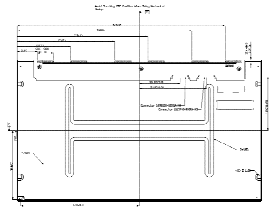
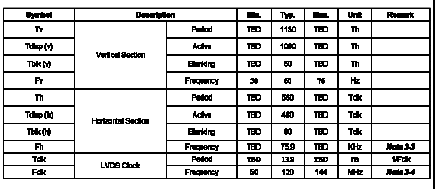
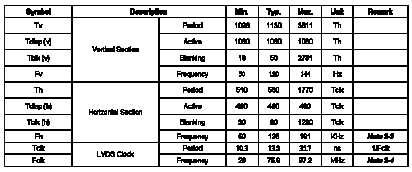
	2013/5/2	17	3.4.1 LCD Pixel Format 	3.4.1 LCD Pixel Format 	
	2013/5/2	32	7 Mechanical Characteristics 	7 Mechanical Characteristics 	
2.1	2013/5/24	21	3.4.5 Input Timing Specification 	3.4.5 Input Timing Specification 	
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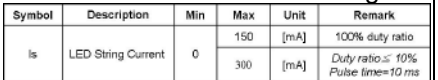
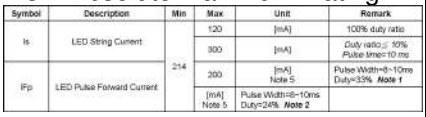
2.3	2013/6/27	28	4.3.1 Absolute Maximum Rating 	4.3.1 Absolute Maximum Rating 	
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<tr><td>Tdisp (v)</td><td>Active</td><td>1080</td><td>1080</td><td>1080</td><td>Th</td><td></td></tr>
<tr><td>Tblk (v)</td><td>Blanking</td><td>18</td><td>50</td><td>2731</td><td>Th</td><td></td></tr>
<tr><td>Fv</td><td>Frequency</td><td>50</td><td>120</td><td>144</td><td>Hz</td><td></td></tr>
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<tr><td>Tdisp (v)</td><td>Active</td><td>1080</td><td>1080</td><td>1080</td><td>Th</td><td></td></tr>
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<tr><td>T2</td><td>0</td><td>-</td><td>50</td><td>[ms]</td><td></td></tr>
<tr><td>T3</td><td>500</td><td>-</td><td>-</td><td>[ms]</td><td></td></tr>
<tr><td>T4</td><td>100</td><td>-</td><td>-</td><td>[ms]</td><td></td></tr>
<tr><td>T5</td><td>0</td><td></td><td>50</td><td>[ms]</td><td>Note 3-5
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<tr><td>T2</td><td>250</td><td>-</td><td>300</td><td>[ms]</td><td></td></tr>
<tr><td>T3</td><td>500</td><td>-</td><td>-</td><td>[ms]</td><td></td></tr>
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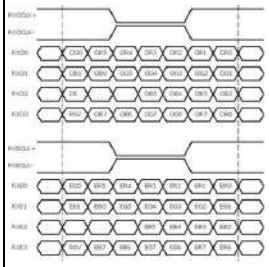
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T2 Min 250 / Max 300 ms</td><td>Power Sequence Timing
T2 Min 0 / Max 50 ms</td><td></td></tr>
</table>

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 inch wide Color a-Si TFT-LCD Module M270HTN01.0. The display supports the Full HD - 1920(H) x 1080(V) screen format and 16.7M colors (RGB 6-bits + Hi-FRC data). The input interface is Four channel LVDS 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]	685.65(27")
Active Area	[mm]	597.6 (H) x 336.15 (V)
Pixels H x V	-	1920(x3) x 1080
Pixel Pitch	[um]	311.25 (per one triad) ×311.25
Pixel Arrangement	-	R.G.B. Vertical Stripe
Display Mode	-	TN Mode, Normally White
White Luminance (Center)	[cd/m^2]	300 (Typ.)
Contrast Ratio	-	1000:1 (Typ.)
Response Time	[msec]	5ms (Typ., on/off)
Power Consumption (LCD Module + Backligh unit)	[Watt]	27.85 (Typ.) LCD module : PDD (Typ.) =7.25 @ Black pattern,Fv=144Hz Backlight unit : P_{BLU} (Typ.) =20.6 @Is=120mA
Weight	[Grams]	2860
Outline Dimension	[mm]	630 (W) × 368.2 (H) × 14.1(D)
Electrical Interface	-	Four channel LVDS
Support Color	-	16.7M colors (RGB 6-bit + Hi_FRC)
Surface Treatment	-	Anti-Glare, 3H
Temperature Range Operating Storage (Shipping)	 [℃] [℃]	 0 to +50 -20 to +60
RoHS Compliance	-	RoHS Compliance
TCO Compliance	-	TCO 6.0 Compliance

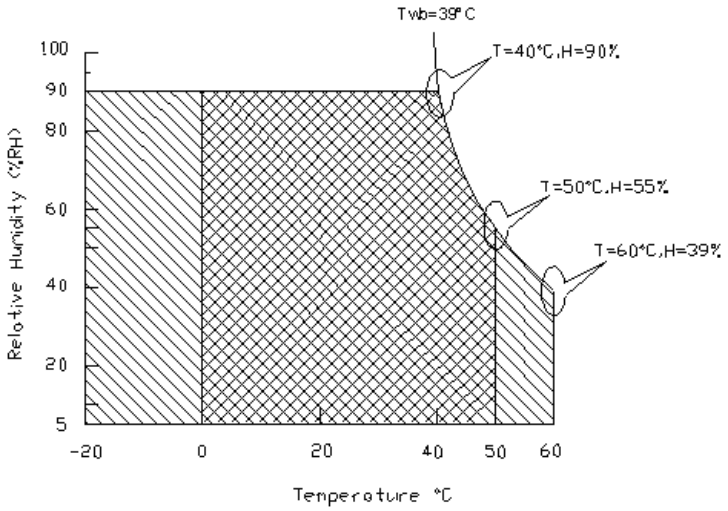
2.2 Absolute Maximum Rating of Environment

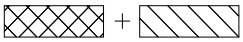
Permanent damage may occur if exceeding the following maximum rating.

Symbol	Description	Min.	Max.	Unit	Remark
TOP	Operating Temperature	0	+50	[℃]	***Note 2-1***
TGS	Glass surface temperature (operation)	0	+65	[℃]	***Note 2-1*** *Function judged only*
HOP	Operation Humidity	5	90	[%RH]	***Note 2-1***
TST	Storage Temperature	-20	+60	[℃]	
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

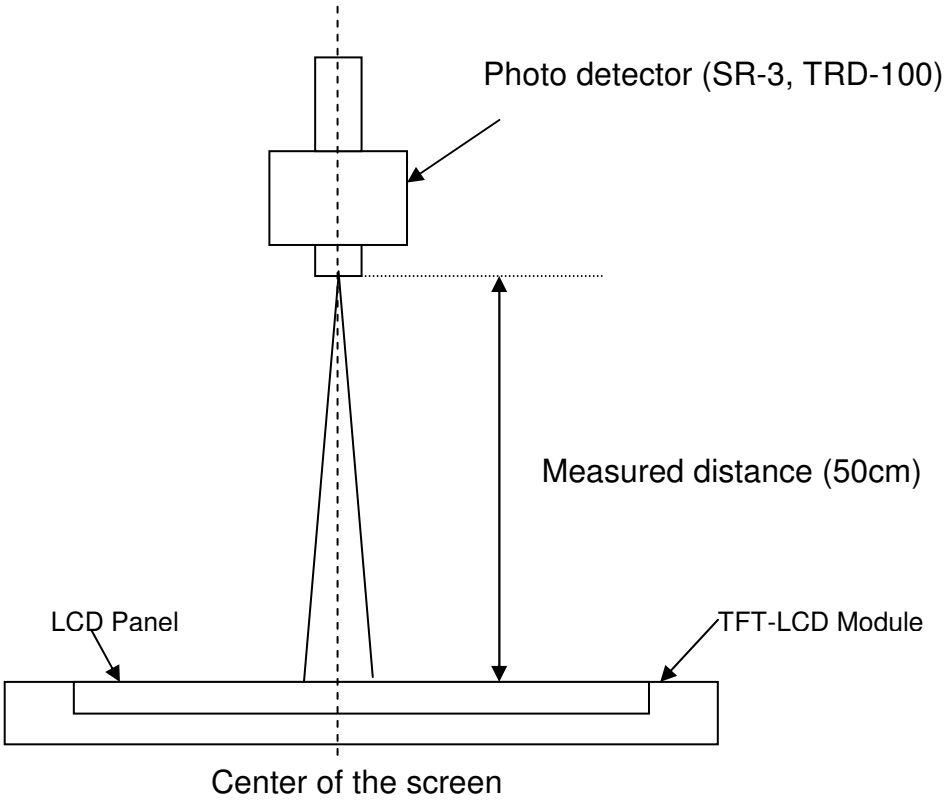
The optical characteristics are measured on the following test condition.

Test Condition:

1. Equipment setup: Please refer to ***Note 2-2***.
2. Panel Lighting time: 30 minutes
3. VDD=5.0V, Fv=144Hz,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	85	-	[degree]	***Note 2-5*** *By SR-3*
θ_L		Left	75	85	-		
Φ_H	Vertical Viewing Angle (CR=10)	Up	70	80	-		
Φ_L		Down	70	80	-		
θ_R	Horizontal Viewing Angle (CR=5)	Right	75	88	-		
θ_L		Left	75	88	-		
Φ_H	Vertical Viewing Angle (CR=5)	Up	70	85	-		
Φ_L		Down	70	85	-		
T_R	Response Time	Rising Time	-	3.8	5.5	[msec]	***Note 2-6*** *By TRD-100*
T_F		Falling Time	-	1.2	2.5		
-		Rising + Falling	-	5	8		
R_x	Color Coordinates (CIE 1931)	Red x	0.615	0.645	0.675	-	*By SR-3*
R_y		Red y	0.315	0.345	0.375		
G_x		Green x	0.291	0.321	0.351		
G_y		Green y	0.603	0.633	0.663		
B_x		Blue x	0.121	0.151	0.181		
B_y		Blue y	0.018	0.048	0.078		
W_x		White x	0.283	0.313	0.343		
W_y		White y	0.299	0.329	0.359		
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 :

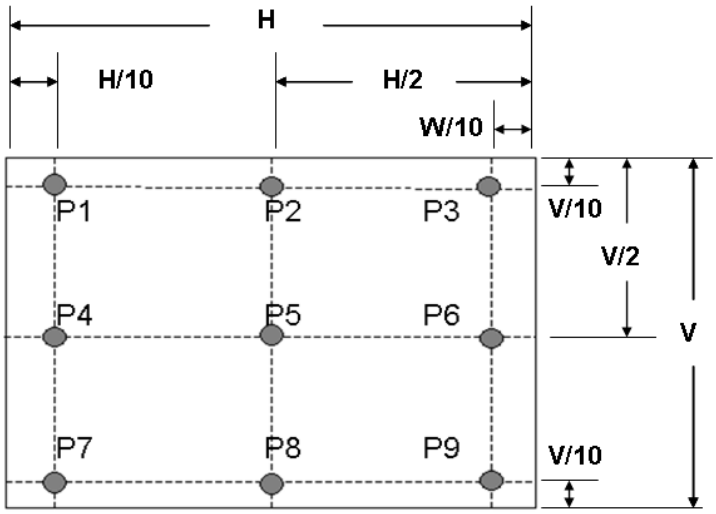


Note 2-3: Luminance Uniformity Measurement

Definition:

$$\text{Luminance Uniformity} = \frac{\text{Minimum Luminance of 9 Points (P1 ~ P9)}}{\text{Maximum Luminance of 9 Points (P1 ~ P9)}}$$

a.Test pattern: White Pattern



Note 2-4: Contrast Ratio Measurement

Definition:

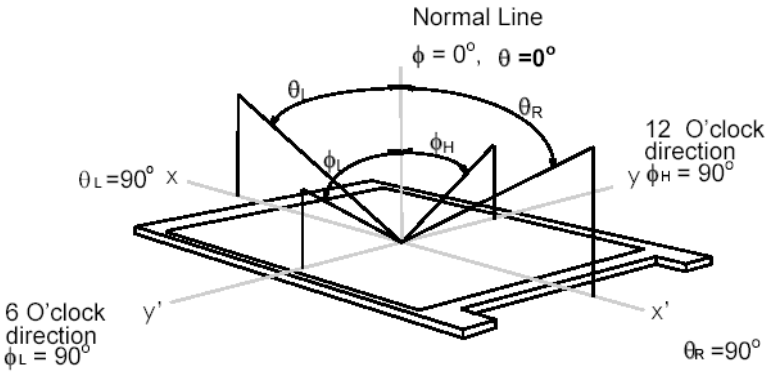
$$\text{Contrast Ratio} = \frac{\text{Luminance of White pattern}}{\text{Luminance of Black pattern}}$$

a. Measured position: Center of screen (P5) & perpendicular to the screen (θ=Φ=0°)

Note 2-5: Viewing angle measurement

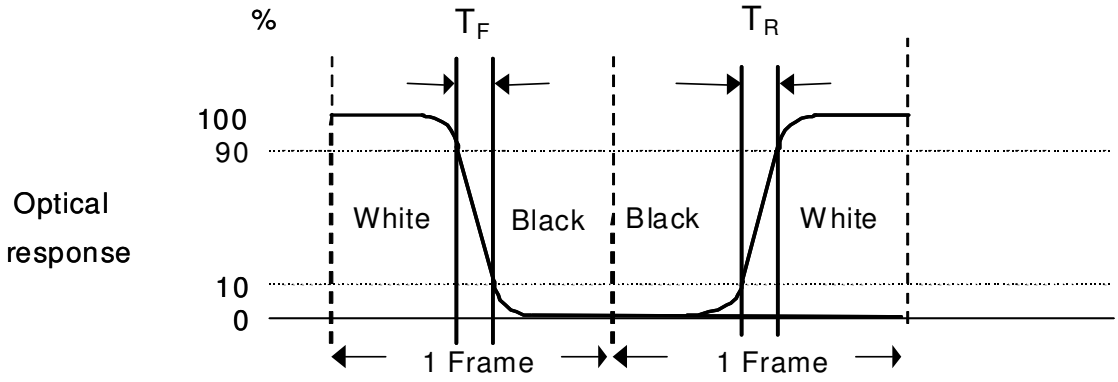
Definition: The angle at which the contrast ratio is greater than 10 & 5 .

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 "Black" to "White" (rising time, T_R), and from "White" to "Black" (falling time, T_F), respectively. The response time is interval between the 10% and 90% of optical response. (*Black & White color definition: Please refer section 3.4.3)*



Note 2-7: Crosstalk measurement

Definition:

$CT = Max. (CT_H, CT_V)$;

Where

a.Maximum Horizontal Crosstalk :

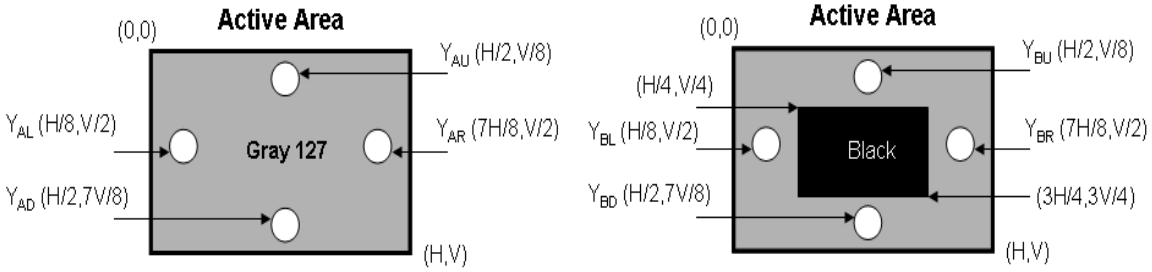
$CT_H = Max. (| Y_{BL} – Y_{AL} | / Y_{AL} \times 100\ \%, | Y_{BR} – Y_{AR} | / Y_{AR} \times 100\ \%)$;

Maximum Vertical Crosstalk:

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

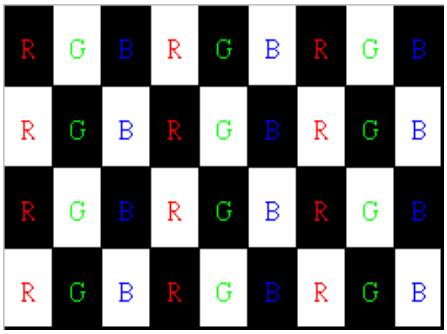
b. Y_{AU}, Y_{AD}, Y_{AL}, Y_{AR} = Luminance of measured location without Black pattern

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

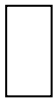


Note 2-8: Flicker measurement

a. Test pattern: It is listed as following.



Gray level = L0



Gray level = L127

R: Red, G: Green, B:Blue

b. Measured position: Center of screen (P5) & perpendicular to the screen (θ=Φ=0°)

2.4 Mechanical Characteristics

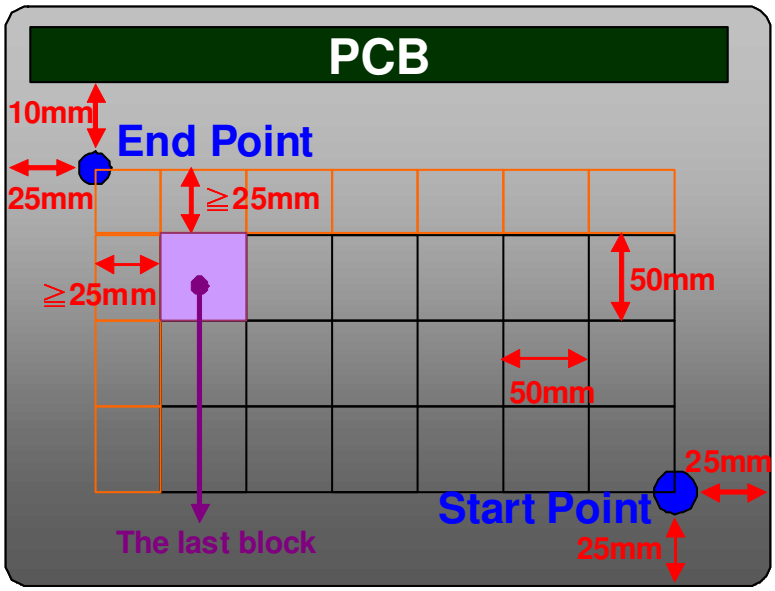
Symbol	Description	Min.	Max.	Unit	Remark
P_{bc}	Backside Compression	2.5	-	[Kgf]	***Note 2-9***

Note 2-9: Test Method:

The point is at a distance from right-downside 25mm x 25mm defined as the Start Point of Measure Points, and the point is at a distance 25mm from left-side & around 10mm from PCB defined as the End Point.

Align 50mm x 50mm block from Start Point on the Bezel Back, and the corners of each block are Measure Points.

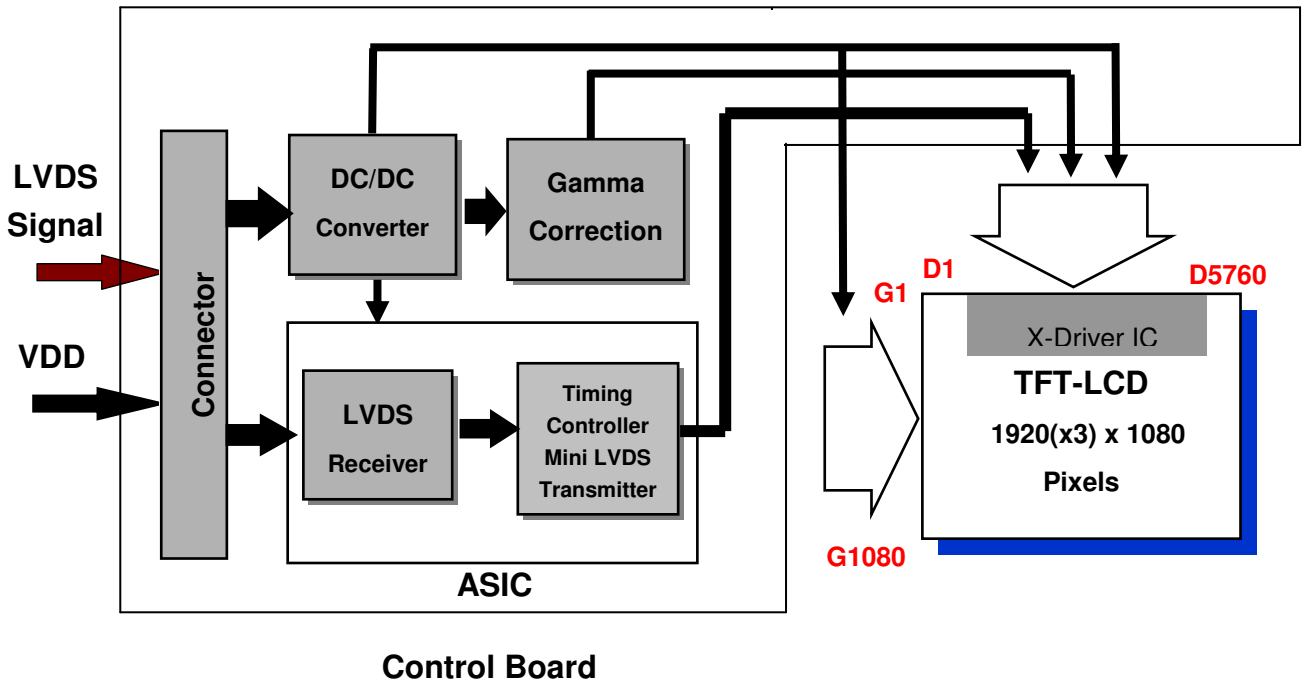
If the distance from the last block to each side of the End Point ≧ 25mm, add other blocks to make sure that most area of Bezel Back can be measured.



3 TFT-LCD Module

3.1 Block Diagram

The following shows the block diagram of the 27 inch Color TFT-LCD Module.



3.2 Interface Connection

3.2.1 Connector Type

30 Pin

TFT-LCD Connector	Manufacturer	STARCONN	STM
	Part Number	093G30-02001AM4	MSCKT2407P30HB
Mating Connector	Manufacturer	JAE	
	Part Number	FI-X30HL (Locked Type)	

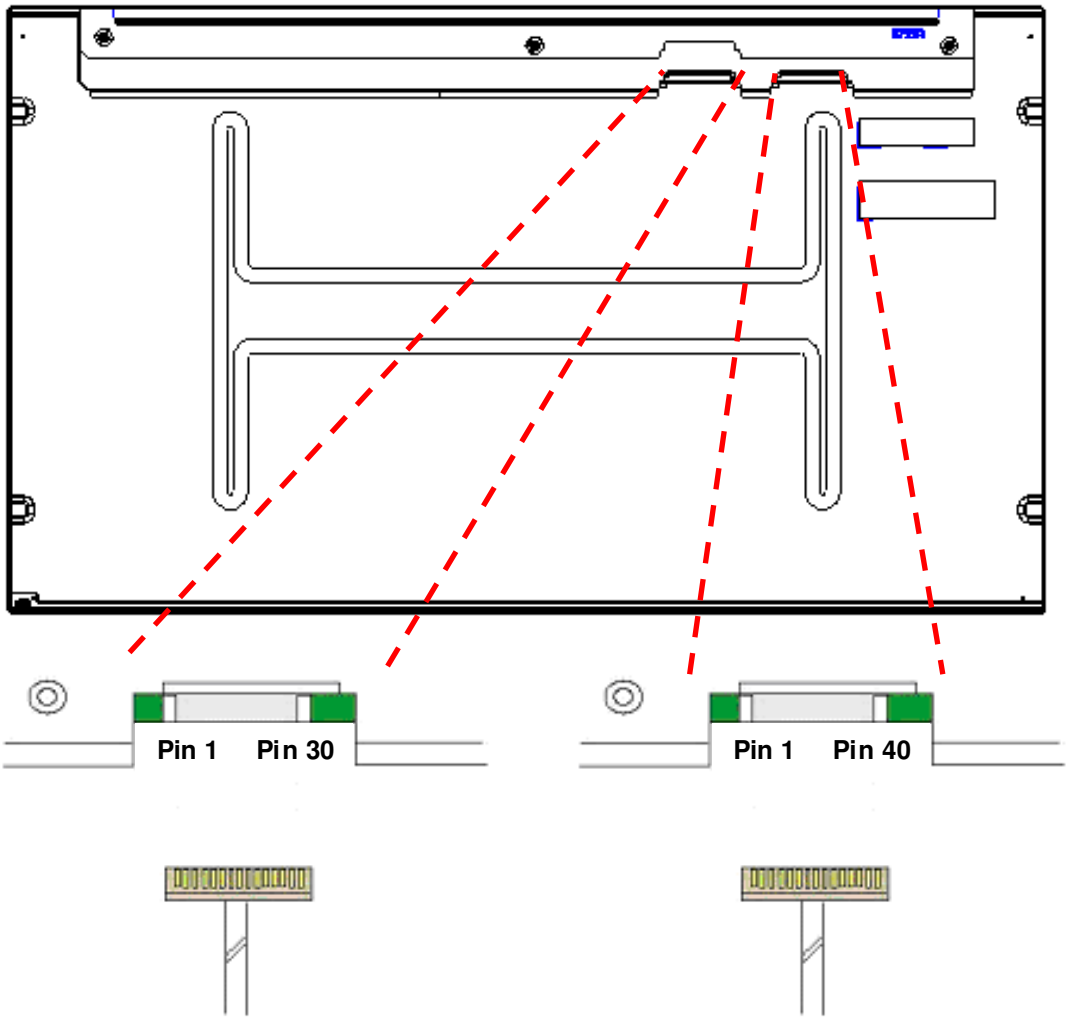
40 Pin

TFT-LCD Connector	Manufacturer	STARCONN
	Part Number	115F40-R000RA-M3
Mating Connector	Manufacturer	JAE
	Part Number	FI-NX40HL (Locked Type)

3.2.2 Connector Pin Assignment

Pin number	Signal name	Description
1	RxO1CN0	F path_ Negative LVDS differential data input (Odd data)
2	RxO1CP0	F path_ Positive LVDS differential data input (Odd data)
3	RxO1CN1	F path_ Negative LVDS differential data input (Odd data)
4	RxO1CP1	F path_ Positive LVDS differential data input (Odd data)
5	RxO1CN2	F path_ Negative LVDS differential data input (Odd data)
6	RxO1CP2	F path_ Positive LVDS differential data input (Odd data)
7	GND	Power Ground
8	RxO1CCLKN	F path_ Negative LVDS differential clock input (Odd clock)
9	RxO1CCLKP	F path_ Positive LVDS differential clock input (Odd clock)
10	GND	Power Ground
11	RxO1CN3	F path_ Negative LVDS differential data input (Odd data)
12	RxO1CP3	F path_ Positive LVDS differential data input (Odd data)
13	NC	Do not connect (for AUO test only.)
14	NC	Do not connect (for AUO test only.)
15	GND	Power Ground
16	RxE2CN0	F path_ Negative LVDS differential data input (Even data)
17	RxE2CP0	F path_ Positive LVDS differential data input (Even data)
18	RxE2CN1	F path_ Negative LVDS differential data input (Even data)
19	RxE2CP1	F path_ Positive LVDS differential data input (Even data)
20	RxE2CN2	F path_ Negative LVDS differential data input (Even data)
21	RxE2CP2	F path_ Positive LVDS differential data input (Even data)
22	GND	Power Ground
23	RxE2CCLKN	F path_ Negative LVDS differential clock input (Even clock)
24	RxE2CCLKP	F path_ Positive LVDS differential clock input (Even clock)

25	GND	Power Ground
26	RxE2CN3	F path_ Negative LVDS differential data input (Even data)
27	RxE2CP3	F path_ Positive LVDS differential data input (Even data)
28	NC	Do not connect (for AUO test only.)
29	NC	Do not connect (for AUO test only.)
30	GND	Power Ground



Pin number	Signal name	Description
1	RxO3CN0	B path_ Negative LVDS differential data input (Odd data)
2	RxO3CP0	B path_ Positive LVDS differential data input (Odd data)
3	RxO3CN1	B path_ Negative LVDS differential data input (Odd data)
4	RxO3CP1	B path_ Positive LVDS differential data input (Odd data)
5	RxO3CN2	B path_ Negative LVDS differential data input (Odd data)
6	RxO3CP2	B path_ Positive LVDS differential data input (Odd data)
7	GND	Power Ground
8	RxO3CCLKN	B path_ Negative LVDS differential clock input (Odd clock)
9	RxO3CCLKP	B path_ Positive LVDS differential clock input (Odd clock)
10	GND	Power Ground
11	RxO3CN3	B path_ Negative LVDS differential data input (Odd data)
12	RxO3CP3	B path_ Positive LVDS differential data input (Odd data)
13	NC	Do not connect (for AUO test only.)
14	NC	Do not connect (for AUO test only.)
15	GND	Power Ground
16	RxE4CN0	B path_ Negative LVDS differential data input (Even data)
17	RxE4CP0	B path_ Positive LVDS differential data input (Even data)
18	RxE4CN1	B path_ Negative LVDS differential data input (Even data)
19	RxE4CP1	B path_ Positive LVDS differential data input (Even data)
20	RxE4CN2	B path_ Negative LVDS differential data input (Even data)
21	RxE4CP2	B path_ Positive LVDS differential data input (Even data)
22	GND	Power Ground
23	RxE4CCLKN	B path_ Negative LVDS differential clock input (Even clock)
24	RxE4CCLKP	B path_ Positive LVDS differential clock input (Even clock)
25	GND	Power Ground
26	RxE4CN3	B path_ Negative LVDS differential data input (Even data)
27	RxE4CP3	B path_ Positive LVDS differential data input (Even data)
28	NC	Do not connect (for AUO test only.)
29	NC	Do not connect (for AUO test only.)
30	GND	Power Ground
31	NC	Do not connect (for AUO test only.)
32	NC	Do not connect (for AUO test only.)
33	GND	Power Ground
34	GND	Power Ground
35	GND	Power Ground
36	VDD	Power +5V
37	VDD	Power +5V
38	VDD	Power +5V
39	VDD	Power +5V
40	VDD	Power +5V

3.3 Electrical Characteristics

3.3.1 Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

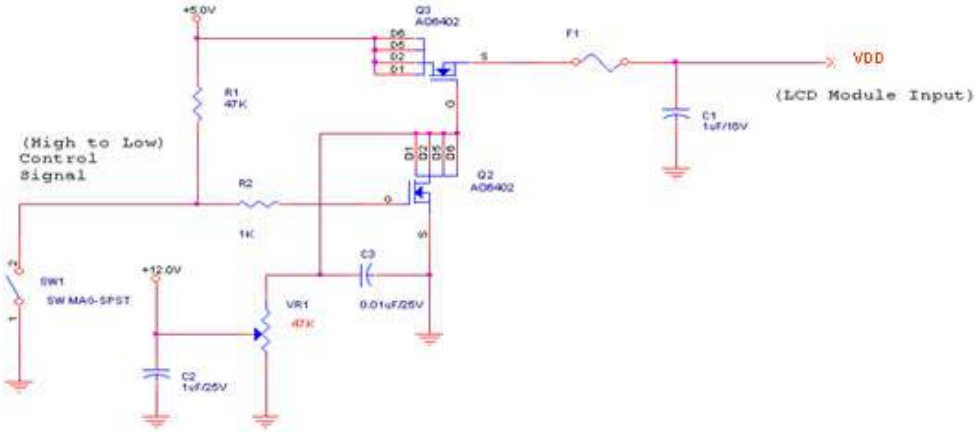
Symbol	Description	Min	Max	Unit	Remark
VDD	Power Supply Input Voltage	GND-0.3	6.0	[Volt]	Ta=25℃

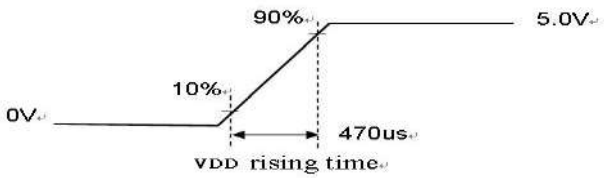
3.3.2 Recommended Operating Condition

Symbol	Description	Min	Typ	Max	Unit	Remark
VDD	Power supply Input voltage	4.5	5.0	5.5	[Volt]	
IDD	Power supply Input Current (RMS)	-	0.8	0.96	[A]	VDD= 5.0V, Black Pattern, Fv=60Hz
			1.45	1.74	[A]	VDD= 5.0V, Black Pattern, Fv=144Hz
PDD	VDD Power Consumption	-	4	4.8	[Watt]	VDD= 5.0V, Black Pattern, Fv=60Hz
			7.25	8.7	[Watt]	VDD= 5.0V, Black Pattern, Fv=144Hz
IRush	Inrush Current	-	-	3.0	[A]	***Note 3-1***
VDDrp	Allowable VDD Ripple Voltage	-	-	500	[mV]	VDD= 5.0V, Black Pattern, Fv=75Hz

Note 3-1: Inrush Current measurement:

Test circuit:

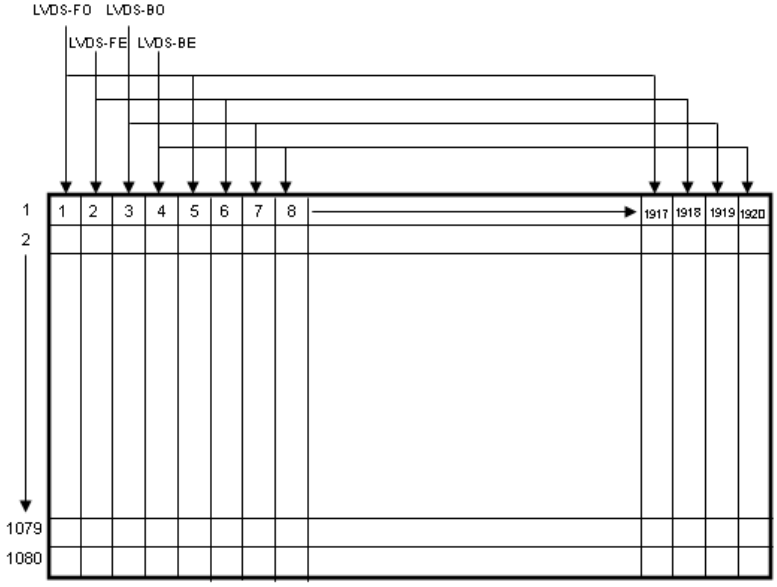




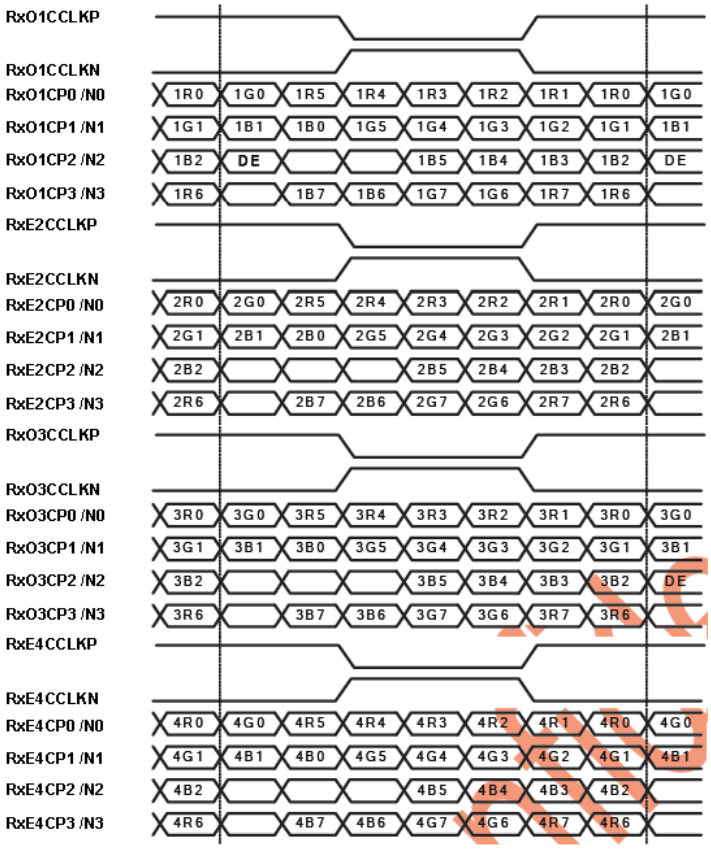
The duration of VDD rising time: 470us.

3.4 Signal Characteristics

3.4.1 LCD Pixel Format



3.4.2 LVDS Data Format



Note 3-2:

a. O1 and O3 = “Odd Pixel Data” E2 and E4 = “Even Pixel Data”

b. Refer to 3.4.1 LCD pixel format, the 1st data is O1 (Odd Pixel Data), the 2nd data is E2 (Even Pixel Data), the 3rd data is O3 (Even Pixel Data), the 4th data is E4 (Even Pixel Data), and the last data is 1920 (Even Pixel Data).

3.4.3 Color versus Input Data

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

Color	Gray Level	Color Input Data																								Remark
		RED data (MSB:R7, LSB:R0)								GREEN data (MSB:G7, LSB:G0)								BLUE data (MSB:B7, LSB:B0)								
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0	
Black	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
White	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gray 127	-	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	
Red	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Green	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Blue	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	

3.4.4 LVDS Specification

a. DC Characteristics:

LVDS Receiver Differential Input					
Symbol	Parameter	Min.	Max.	Unit	Condition
R_{xVTH}	Differential input high threshold voltage		+0.1	V	R_{xVCM} =1.2V
R_{xVTL}	Differential input low threshold voltage	-0.1		V	
R_{XVIN}	Input voltage range (singled-end)	0	2.4	V	
R_{xVCM}	Differential input common mode voltage	$\|V_{ID}\|/2$	2.4 - $\|V_{ID}\|/2$	V	
$\|V_{ID}\|$	Differential input voltage	0.1	0.6	V	
RV_{xliz}	Differential input leakage current	-10	+10	uA	

LVDS Signal Waveform:

Use RxOCLK- & RxOCLK+ as example.

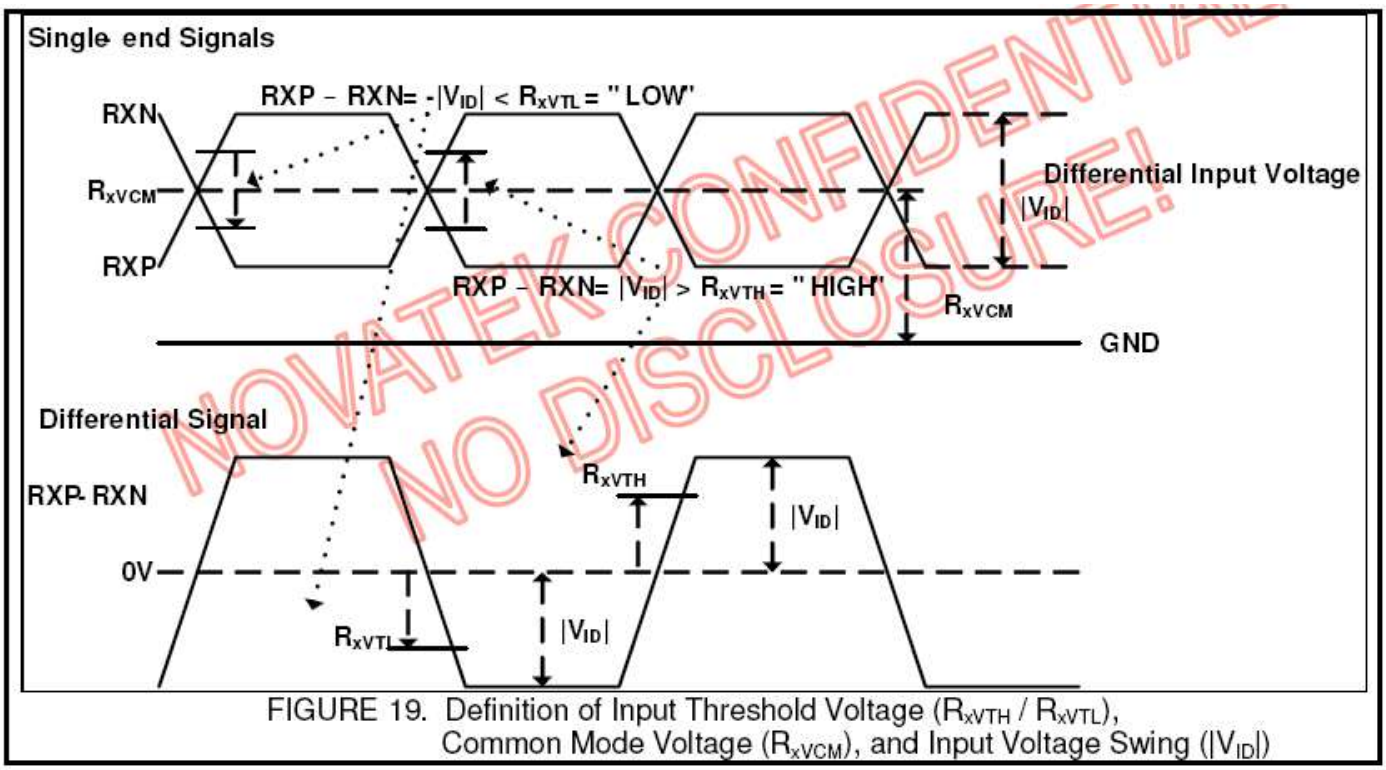
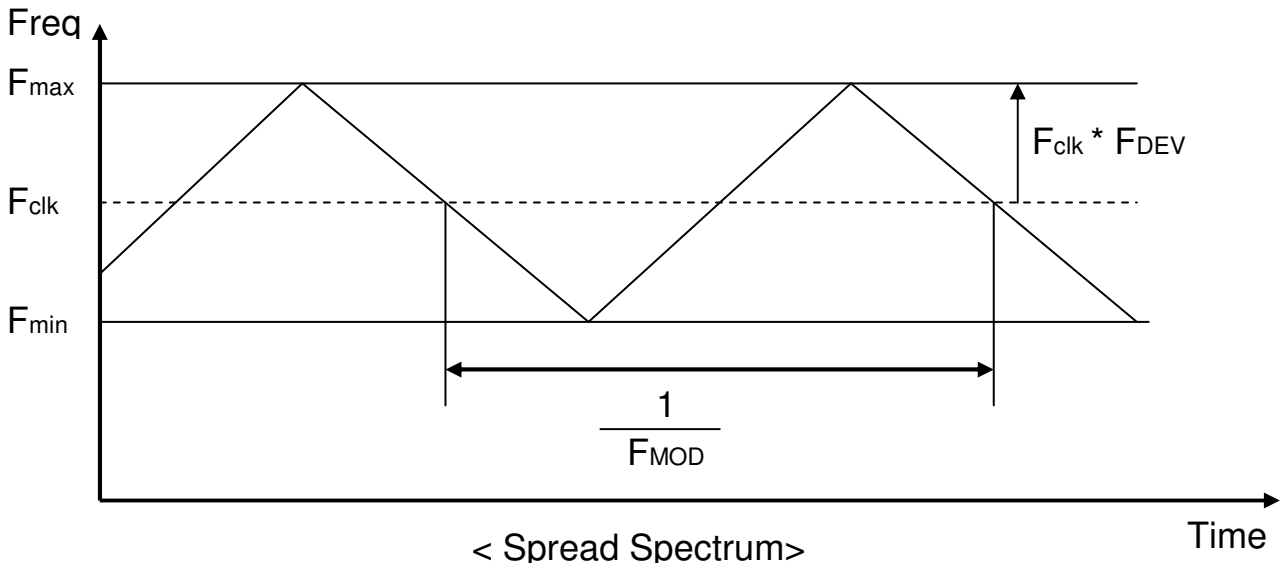


FIGURE 19. Definition of Input Threshold Voltage (R_{xVTH} / R_{xVTL}), Common Mode Voltage (R_{xVCM}), and Input Voltage Swing ($|V_{ID}|$)

b. AC Characteristics:

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



< Spread Spectrum>

Fclk: LVDS Clock Frequency

3.4.5 Input Timing Specification

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	1098	1130	3000	Th	
Tdisp (v)		Active	1080	1080	1080	Th	
Tblk (v)		Blanking	18	50	1920	Th	
Fv		Frequency	50	120	144	Hz	
Th	Horizontal Section	Period	510	560	715	Tclk	
Tdisp (h)		Active	480	480	480	Tclk	
Tblk (h)		Blanking	30	80	235	Tclk	
Fh		Frequency	50	136	191	KHz	***Note 3-3***
Tclk	LVDS Clock	Period	10.3	13.2	35.7	ns	1/Fclk
Fclk		Frequency	28	75.9	97.2	MHz	***Note 3-4***

※ ***For 2D mode(FHD), the suggestion in 144Hz frame rate: Tv=1098 Th , and Th=520 Tclk***
※ ***For 3D mode(FHD), the suggestion in 120Hz frame rate: Tv=1588 Th , and Th=510 Tclk***

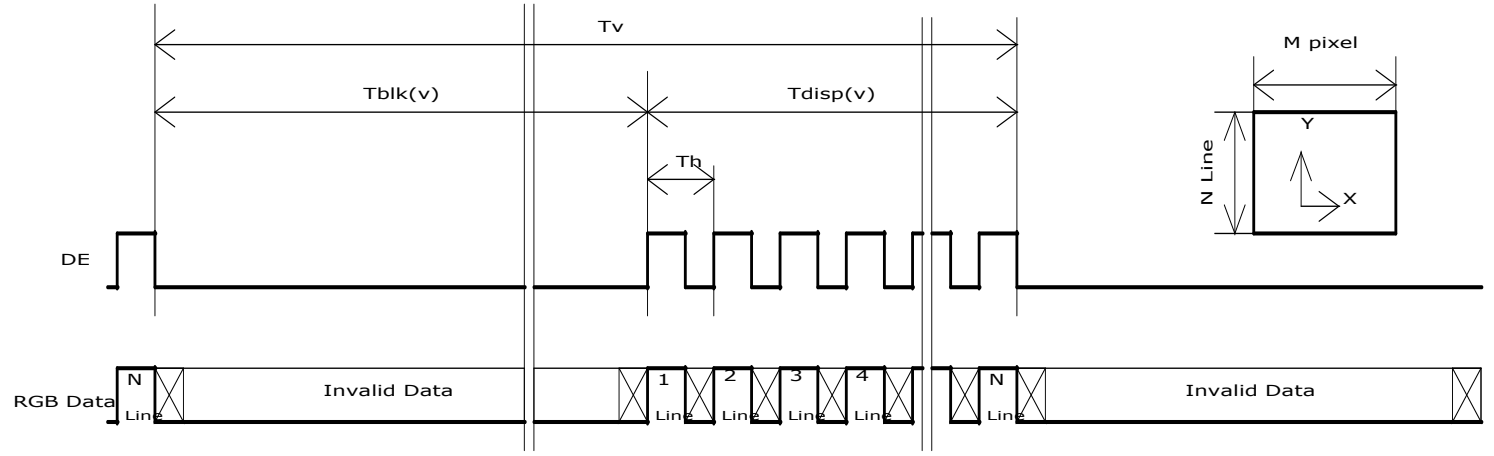
Note 3-3: The equation is listed as following. Please don't exceed the above recommended value.

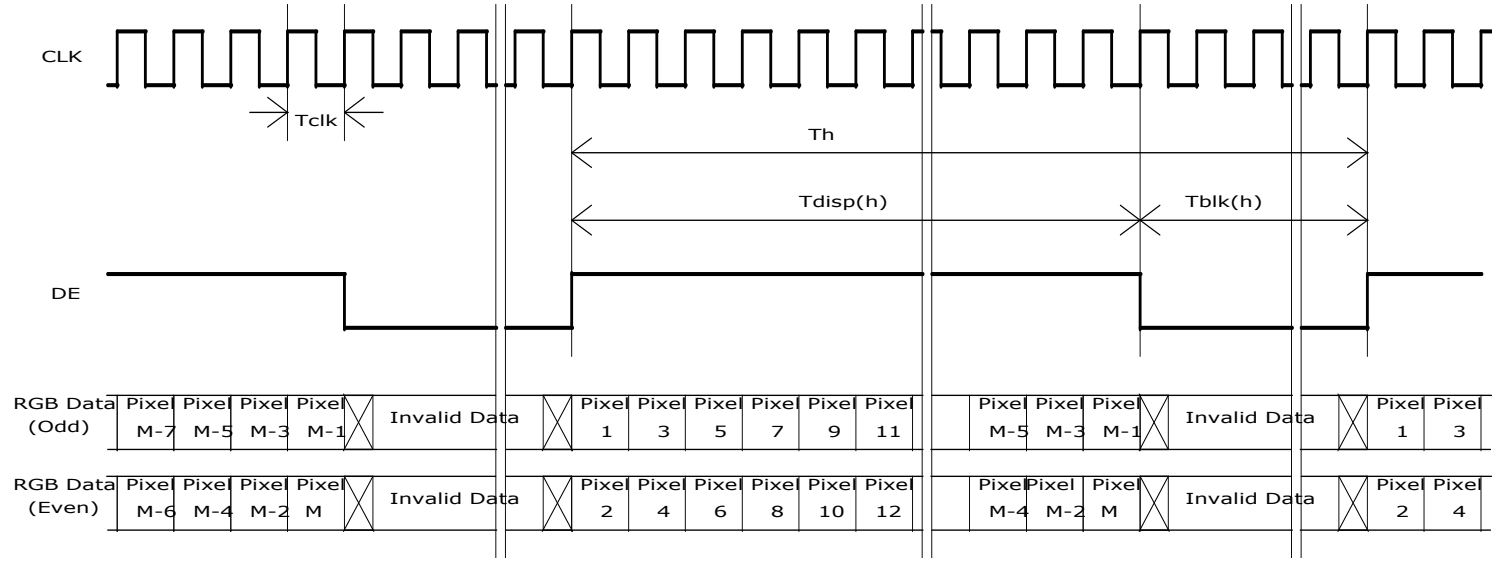
Fh (Min.) = Fclk (Min.) / Th (Min.);
Fh (Typ.) = Fclk (Typ.) / Th (Typ.);
Fh (Max.)= Fclk (Max.) / Th (Min.);

Note 3-4: The equation is listed as following. Please don't exceed the above recommended value.

Fclk (Min.) = Fv (Min.) x Th (Min.) x Tv (Min.);
Fclk (Typ.) = Fv (Typ.) x Th (Typ.) x Tv (Typ.);
Fclk (Max.) = Fv (Max.) x Th (Typ.) x Tv (Typ.);

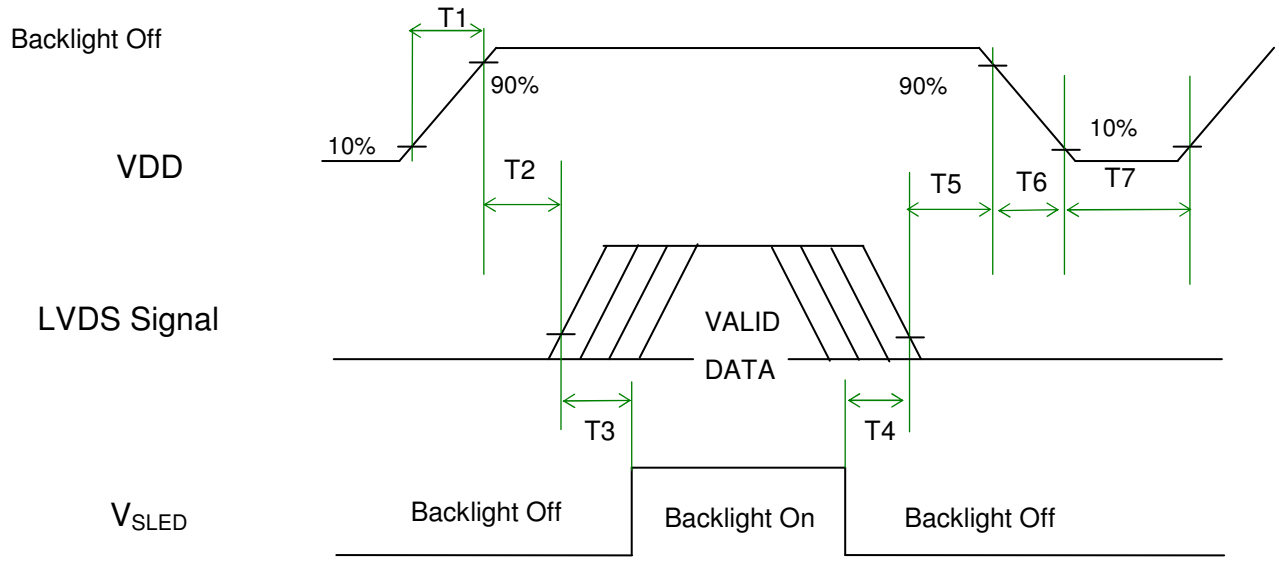
3.4.6 Input Timing Diagram





3.5 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.



Power Sequence Timing

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

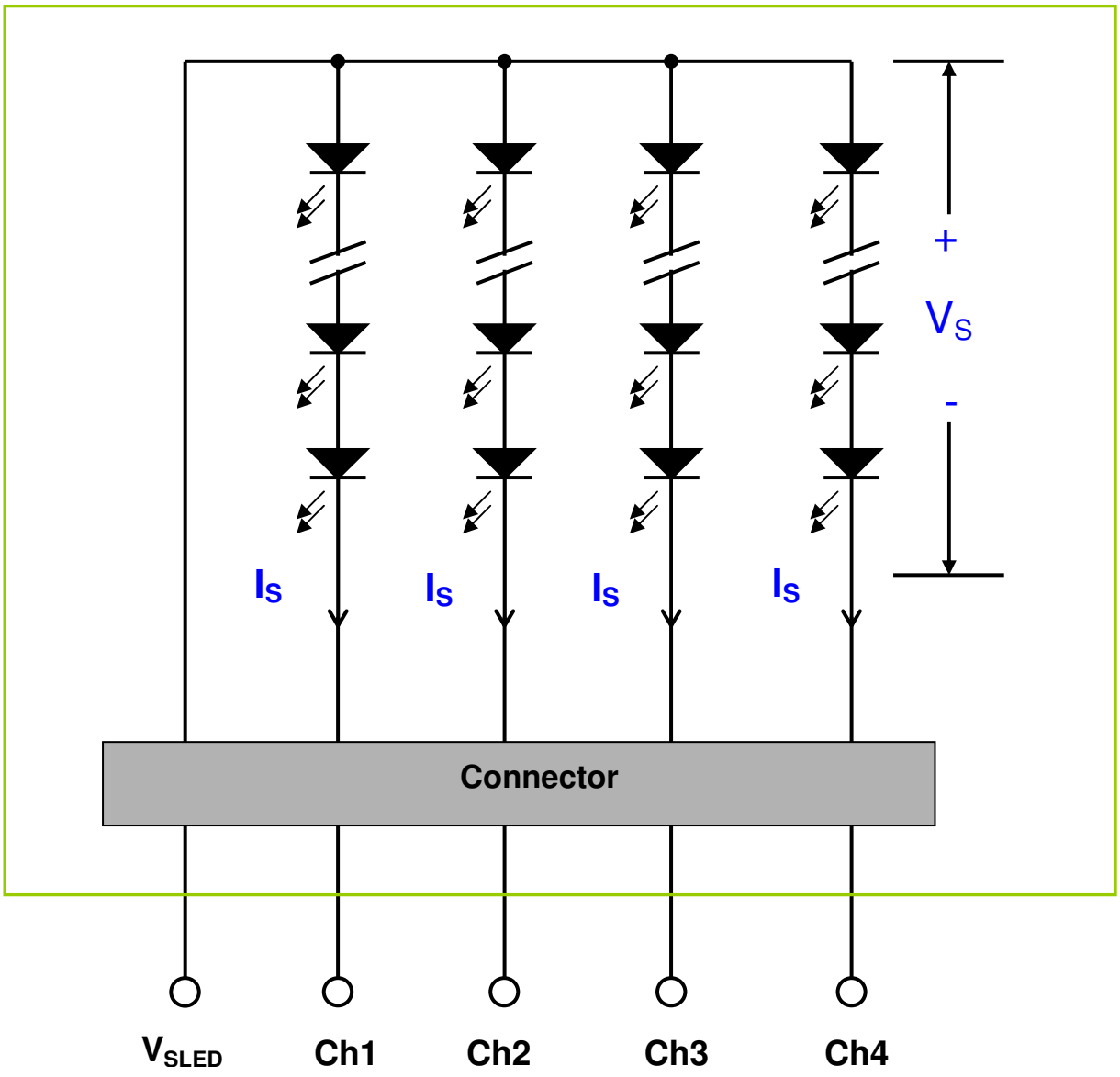
Note 3-5 : Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.

Note 3-6 : During T5 and T6 period , please keep the level of input LVDS signals with Hi-Z state.

4 Backlight Unit

4.1 Block Diagram

The following shows the block diagram of the 27 inch Backlight Unit. And it includes 52 pcs LED in the LED light bar. (4 strings and 13 pcs LED of one string).



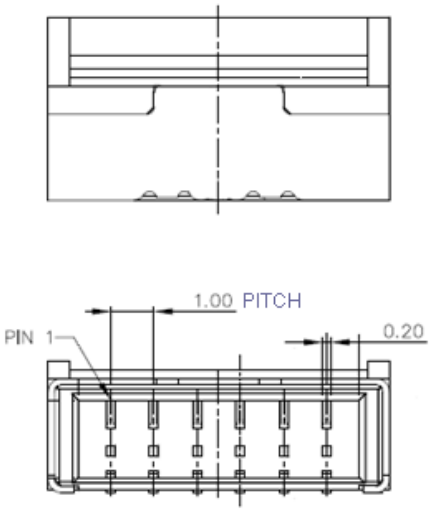
4.2 Interface Connection

4.2.1 Connector Type

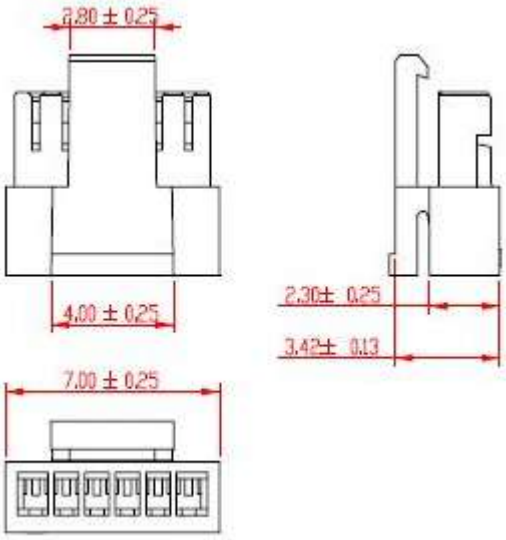
Backlight Connector	Manufacturer	ENTERY
	Part Number	3707K-S06N-21R
Mating Connector	Manufacturer	ENTERY
	Part Number	H112K-P06N-00B (Non-Locking type) H112K-P06N-03B (Locking type)

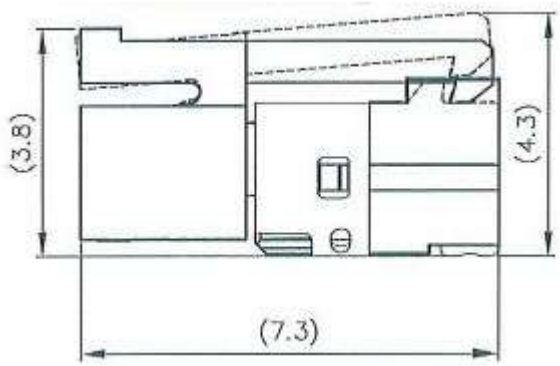
Backlight Connector dimension:

$H \times V \times D = 13.9 \times 3.00 \times 4.25, Pitch = 1.0(unit = mm)$



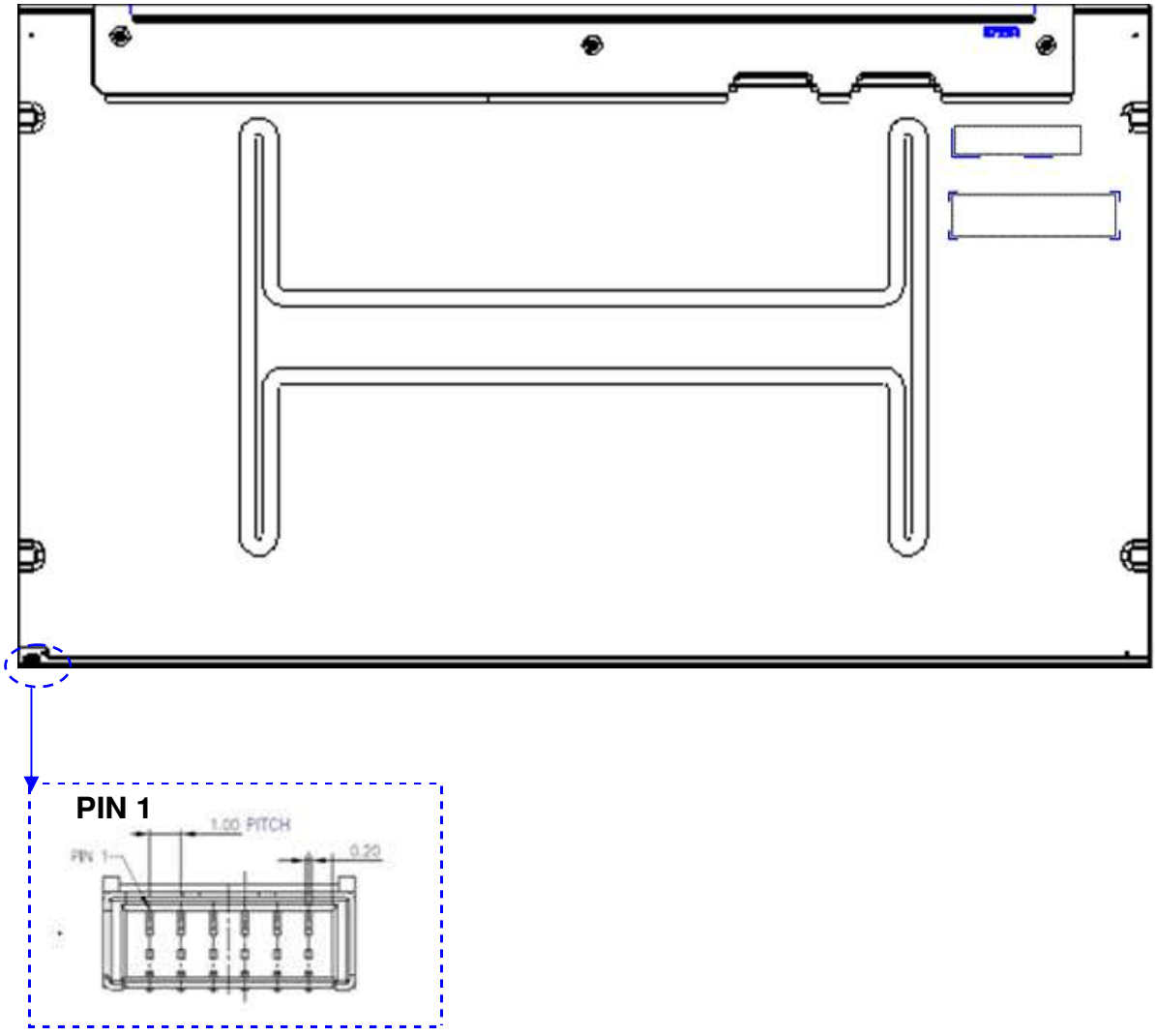
Mating Connector dimension:





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)	



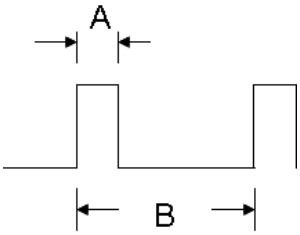
4.3 Electrical Characteristics

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*
IFp	LED Pulse Forward Current		200	[mA] **Note 5**	Pulse Width=8~10ms Duty=33% ***Note 1***
			214	[mA] Note 5	Pulse Width=8~10ms Duty=24% ***Note 2***



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

Note 1: Current @33% duty~I=200mA lifetime=30khrs (base on Lextar's measurement,it's vender's limit)

Note 2: Current @24% duty~I=214mA lifetime=30khrs (base on Lextar 's measurement,it's vender's limit)

4.3.2 Recommended Operating Condition

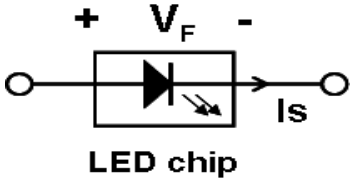
(Ta=25℃)

Symbol	Description	Min.	Typ.	Max.	Unit	Remark
Is	LED String Current	-	**120**	**132**	[mA]	100% duty ratio of LED chip
Vs	LED String Voltage	**39**	**42.9**	**46.8**	[Volt]	Is=**120mA** @ 100% duty ratio; ***Note 4-1, Note 4-5***
ΔVs	Maximum Vs Voltage Deviation of light bar	-	-	**2.6**	[Volt]	Is=**120mA** @ 100% duty ratio; ***Note 4-2***
P_{BLU}	LED Light Bar Power Consumption	-	**20.6**	**22.5**	[Watt]	***Note 4-3***
LT_{LED}	LED Life Time	**30,000**	-	-	[Hour]	***Note 4-4***

Note 4-1: Vs (Typ.) = V_F (Typ.) X LED No. (one string);

a. V_F: LED chip forward voltage, V_F (Min.)=**3.0V**, V_F(Typ.)=**3.3V**, 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; (0.2 V , 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 LED Light bar)

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 = **120**mA and 25±2°C (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 voltageprotection) 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*)

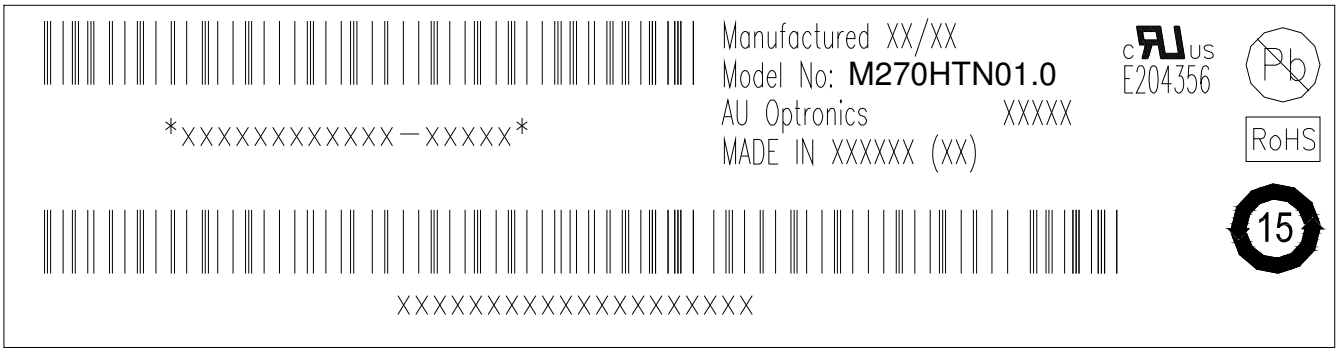
Items	Condition	Remark
Temperature Humidity Bias (THB)	Ta= 50℃, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 60℃, 300hours	
Low Temperature Operation (LTO)	Ta= 0℃, 300hours	
High Temperature Storage (HTS)	Ta= 60℃, 300hours	
Low Temperature Storage (LTS)	Ta= -20℃, 300hours	
Vibration Test (Non-operation)	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)	
Drop Test	Height: 60 cm, package test	
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:



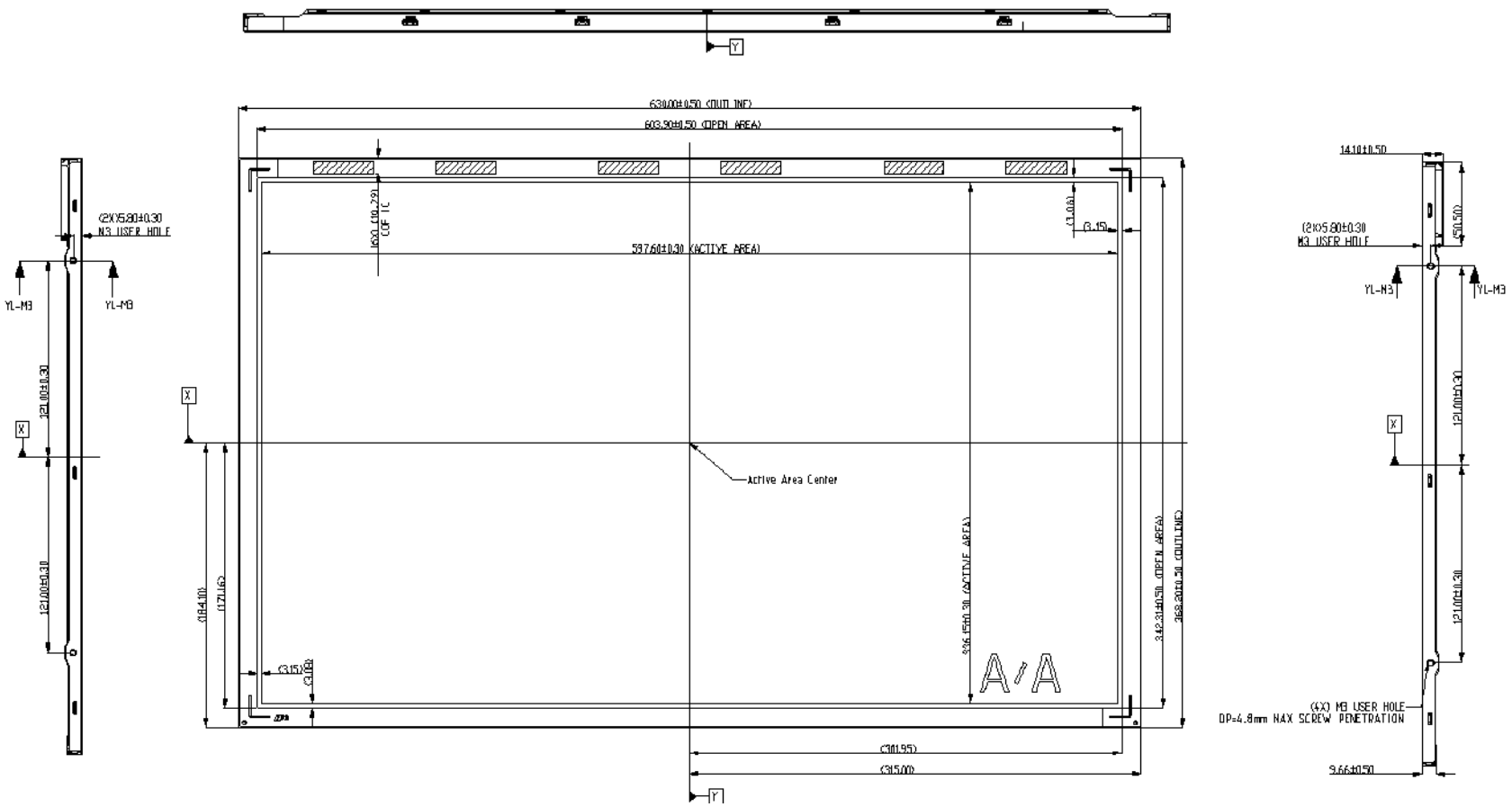
Note 6-1: For Pb Free products, AUO will add for identification.

Note 6-2: For RoHS compatible products, AUO will add for identification.

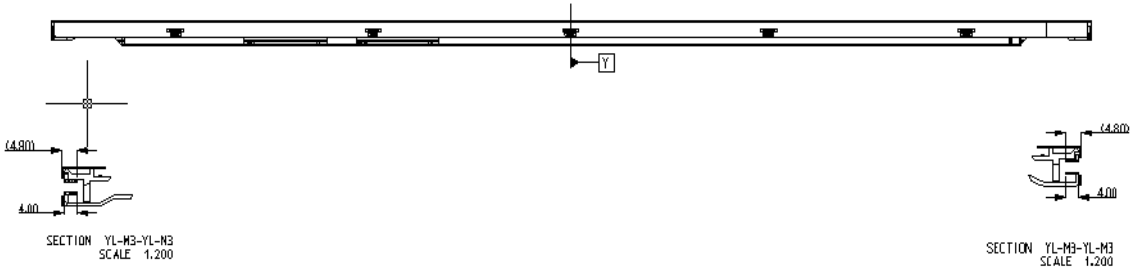
Note 6-3: For China RoHS compatible products, AUO will add for identification.

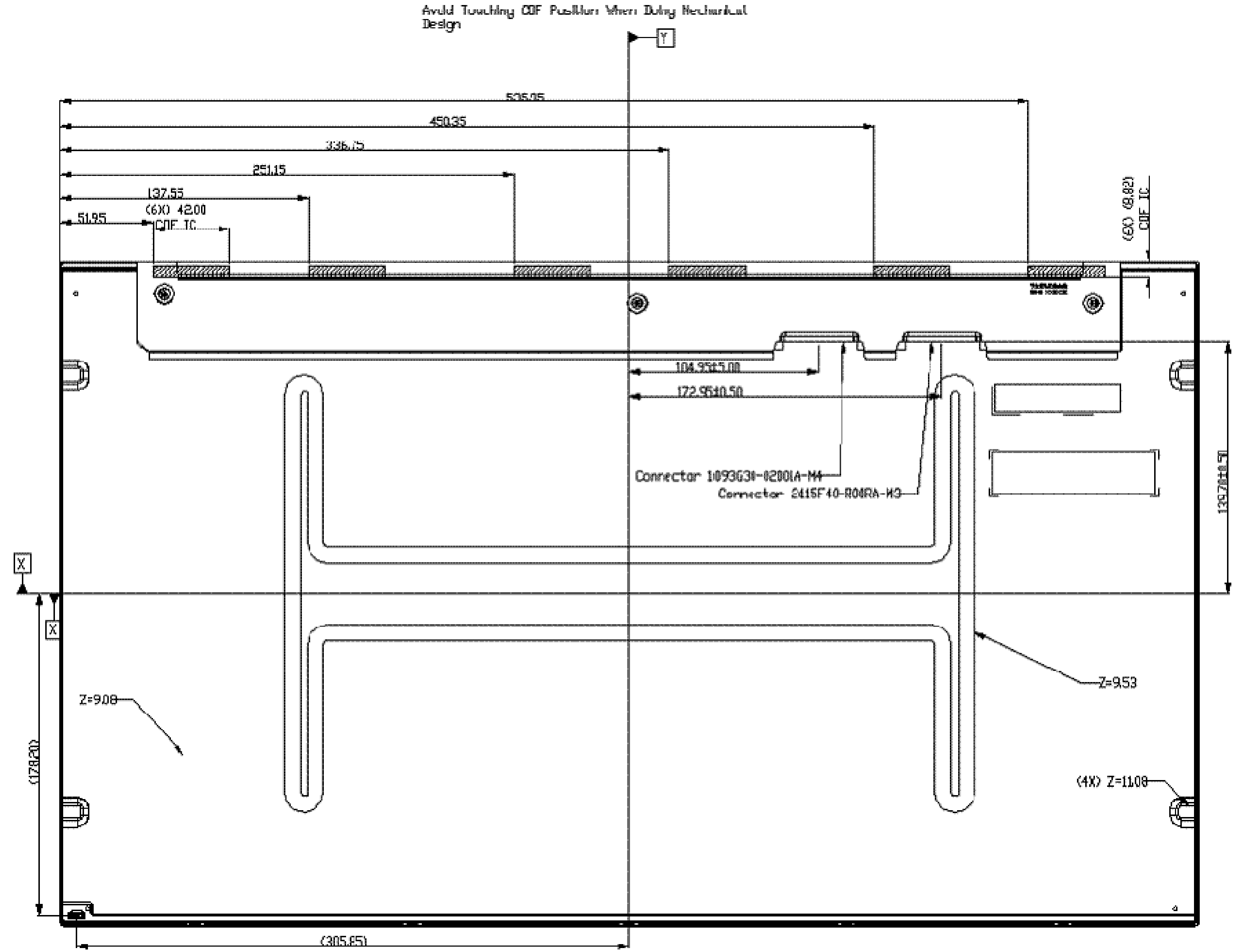
Note 6-4: The Green Mark will be presented only when the green documents have been ready by AUO Internal Green Team.

7 Mechanical Characteristics



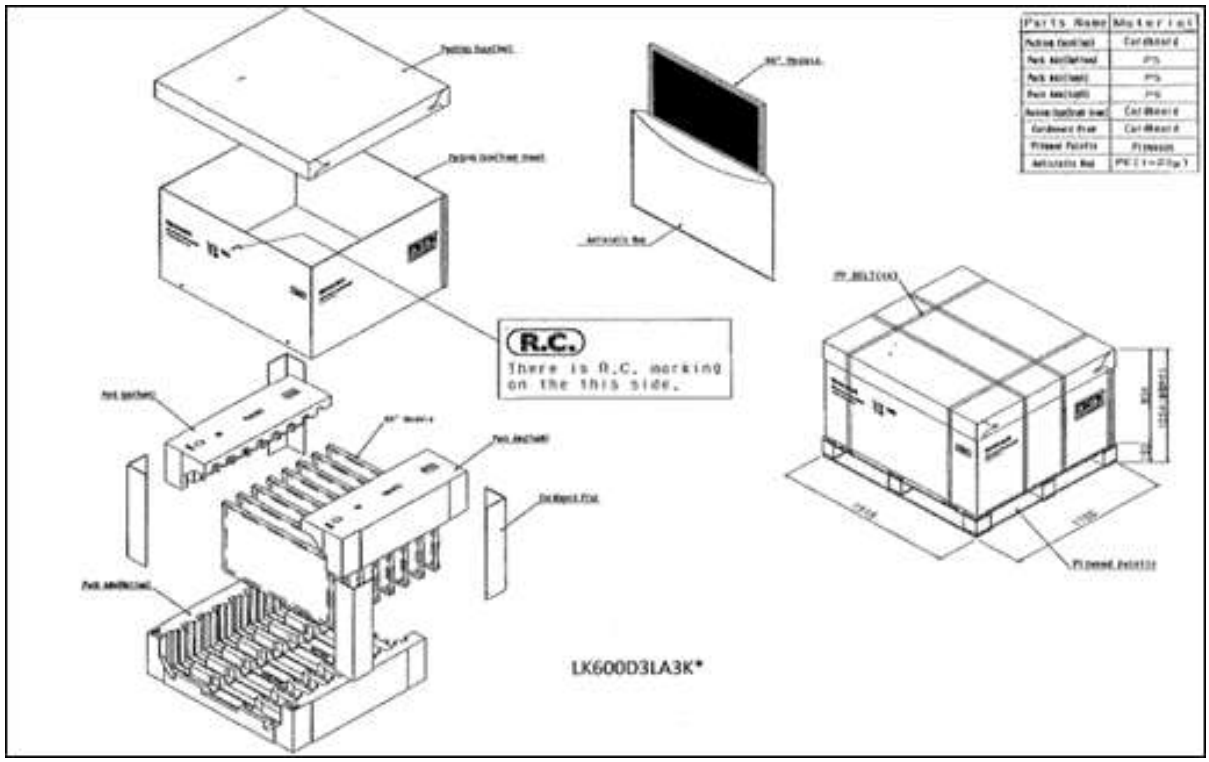
Avoid touching COF position when doing mechanical design





Avoid Touching COF Position When Doing Mechanical Design
Y
535.95
450.35
336.75
251.15
137.55
(6X) 42.00
COF IC
51.95
(6X) (8.82)
COF IC
104.95±5.00
172.95±0.50
Connector 1093G30-0200IA-M4
Connector 2415F40-R00RA-M3
139.70±0.50
X
X
(178.20)
Z=9.08
Z=9.53
(4X) Z=11.08
(305.65)

8 Packing Specification



Pallet and shipment information

	Item	Specification			Remark
		Q'ty	Dimension	Weight(kg)	
1	Panel	1	630(H)mm x 368.2(V)mm x 14.1(D)mm	2.86	
2	Cushion	1	-	2.97	
3	Box	1	715(L)mm x 261(W)mm x 455(H)mm	1.43	without Panel & cushion
4	Packing Box	7 pcs/Box	715(L)mm x 261(W)mm x 455(H)mm	24.42	with panel & cushion
5	Pallet	1	1070(L)mm x 740(W)mm x 138(H)mm	12	
6	Pallet after Packing	8 boxes/pallet	1070(L)mm x 740(W)mm x 138(H)mm	262.48	