

Product Specification

EB270-23-5933-1000

Preliminary Specification

Final Specification

Module	27.0" Color TFT-LCD
Model Name	EB270-23-5933-1000

Customer	Date
_____	_____
Approved by	
_____	_____

Approved by	Date
<u>ALLEN</u>	MAR 20 ,2022
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I Handling Precautions

- 1) Since polarizer is easily damaged, do not touch or press the surface of polarizer with hand.
- 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°C and 35°C at normal humidity.
- 14) Do not apply the same pattern for a long time, it will enhance relevant defect.
- 15) When this reverse-type model (PCBA on bottom side) is used as forward-type model (PCBA on top side) , EB-LCM can not guarantee any defects of LCM .

2 General Description

This specification applies to the 27 inch-FHD color a-Si TFT-LCD Module EB270-23-5933-1000. The display supports the FHD - 1920(H) x 1080(V) screen format and 16.7M colors (RGB 8-bits data input). The input interface is Dual 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°C condition:

Items	Unit	Specification
Screen Diagonal	[mm]	685.65(27.0")
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) x311.25
Pixel Arrangement	-	R.G.B. Vertical island
Display Mode	-	VA Mode, Normally Black
White Luminance (Center)	[cd/m ²]	1000cd/m ² (Typ.)
Contrast Ratio	-	3000 (Typ.)
Optical Response Time	[msec]	20 (Typ., Gray to Gray)
Nominal Input Voltage VDD	[Volt]	5 V (Typ)
Power Consumption (VDD line + LED line)	[Watt]	VDD line : PDD (typ), All white pattern at 60Hz = 4.65W LED line : PBLU (typ) = 40W(@100mA)
Weight	[Grams]	2180
Physical Size	[mm]	613.6(H)x356.85(V)x10.0(D) Typ.
Electrical Interface	-	Dual channel LVDS
Support Color	-	16.7M colors (RGB 8-bits data input)
Surface Treatment	-	Anti-Glare 3H
Temperature Range		
Operating	[°C]	0 to +50
Storage (Shipping)	[°C]	-20 to +60
RoHS Compliance		RoHS Compliance
TCO Compliance		TBD

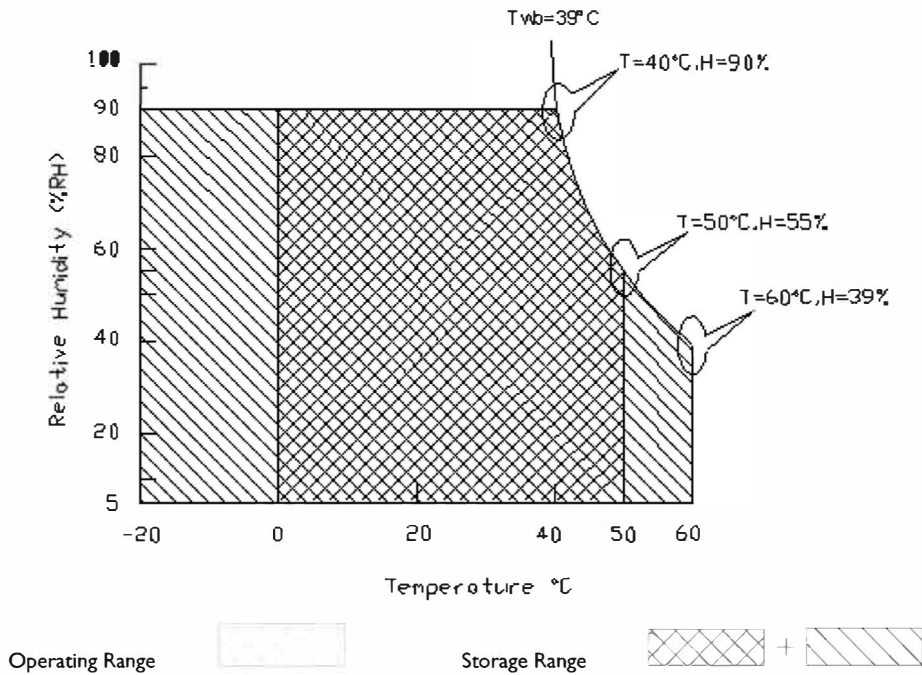
2.2 Absolute Ratings of Environment

Permanent damage may occur if exceeding the following maximum rating.

Symbol	Description	Min.	Max.	Unit	Remark
TOP	Operating Temperature	0	+50	[°C]	Note 2-1
TGS	Glass surface temperature (operation)	0	+65	[°C]	Note 2-1 Function judged only
H _{OP}	Operation Humidity	5	90	[%RH]	Note 2-1
T _{ST}	Storage Temperature	-20	+60	[°C]	
H _{ST}	Storage Humidity	5	90	[%RH]	

Note 2-1: Temperature and relative humidity range are shown as the below figure.

1. 90% RH Max ($T_a \leq 39^\circ\text{C}$)
2. Max wet-bulb temperature at 39°C or less. ($T_a \leq 39^\circ\text{C}$)
3. No condensation



2.3 Optical Characteristics

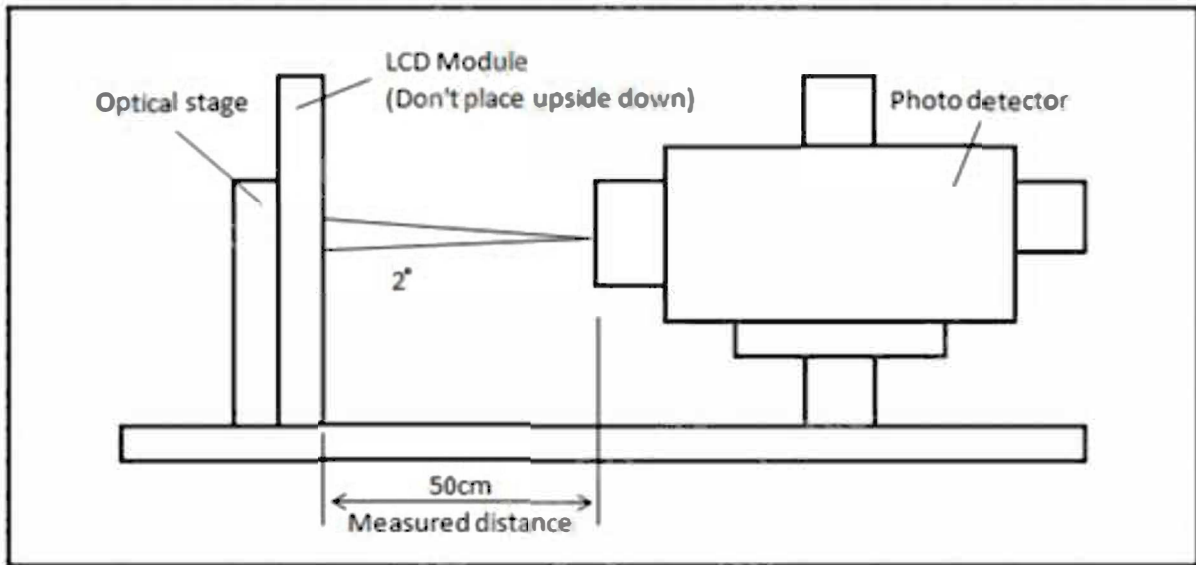
The optical characteristics are measured on the following test condition.

Test Condition:

1. Equipment setup: Please refer to **Note 2-2**.
2. Panel Lighting time: 30 minutes
3. VDD=5V, Fv=60Hz, Is=70mA, Ta=25°C

Symbol	Description		Min.	Typ.	Max.	Unit	Remark
L _w	White Luminance (Center of screen)		900	1000	-	[cd/m ²]	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)		1800	3000	-	-	Note 2-4 By SR-3
θ _R	Horizontal Viewing Angle (CR=10)	Right	75	89	-	[degree]	Note 2-5 By SR-3
θ _L		Left	75	89	-		
Φ _H	Vertical Viewing Angle (CR=10)	Up	75	89	-		
Φ _L		Down	75	89	-		
T _{GTG}	Response Time	Gray To Gray	-	20	-	[msec]	Note 2-6 By TRD-100
R _x	Color Coordinates (CIE 1931)	Red x	0.625	0.655	0.685	-	By SR-3
R _y		Red y	0.304	0.334	0.364		
G _x		Green x	0.288	0.318	0.348		
G _y		Green y	0.585	0.615	0.645		
B _x		Blue x	0.121	0.151	0.181		
B _y		Blue y	0.047	0.077	0.107		
W _x		White x	0.283	0.313	0.343		
W _y		White y	0.299	0.329	0.359		
NTSC				72		[%]	By SR-3

Note 2-2: Equipment setup :

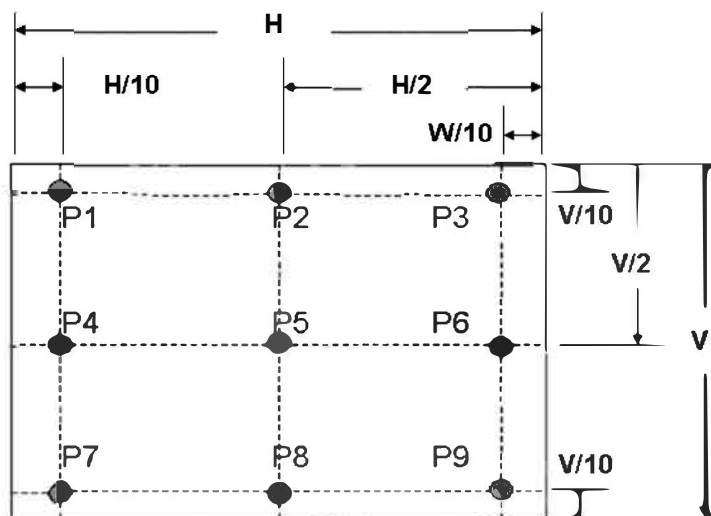


Note 2-3: Luminance Uniformity Measurement

Definition:

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

a. Test pattern: White Pattern



Note 2-4: Contrast Ratio Measurement

Definition:

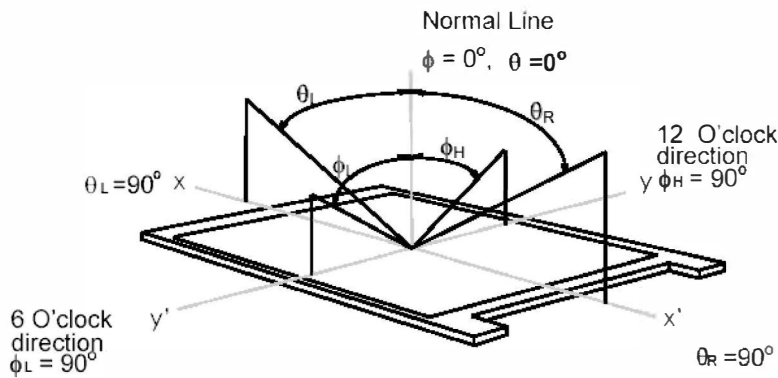
$$\text{Contrast Ratio} = \frac{\text{Luminance of White pattern}}{\text{Luminance of Black pattern}}$$

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

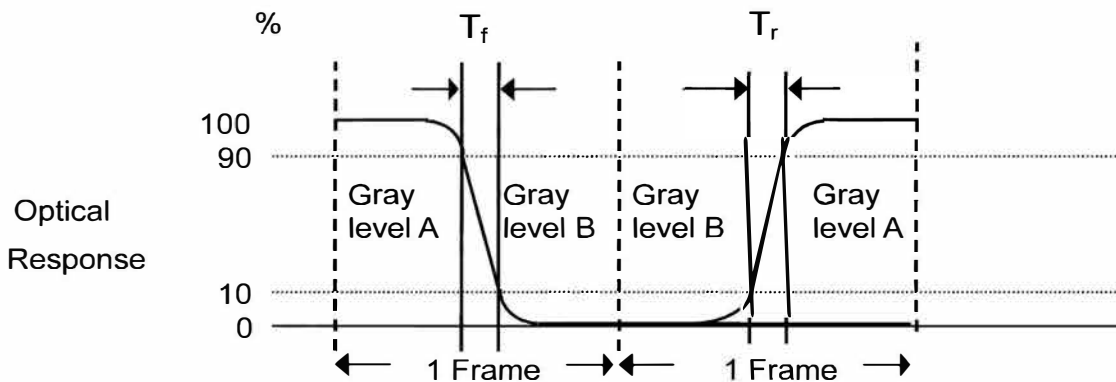
Note 2-5: Viewing angle measurement

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

- a. Horizontal view angle: Divide to left & right (θ_L & θ_R)
 Vertical view angle: Divide to up & down (Φ_H & Φ_L)



Note 2-6: Response time measurement



The output signals of photo detector are measured when the input signals are changed from “Gray level A” to “Gray level B” (falling time, TF), and from “Gray level B” to “Gray level A” (rising time, TR), respectively. The response time is interval between the 10% and 90% of optical response. The gray to gray response time is defined as the following table.

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

■ T_{GTG_typ} is the total average time at rising time and falling time of gray to gray.

2.4 Mechanical Characteristics

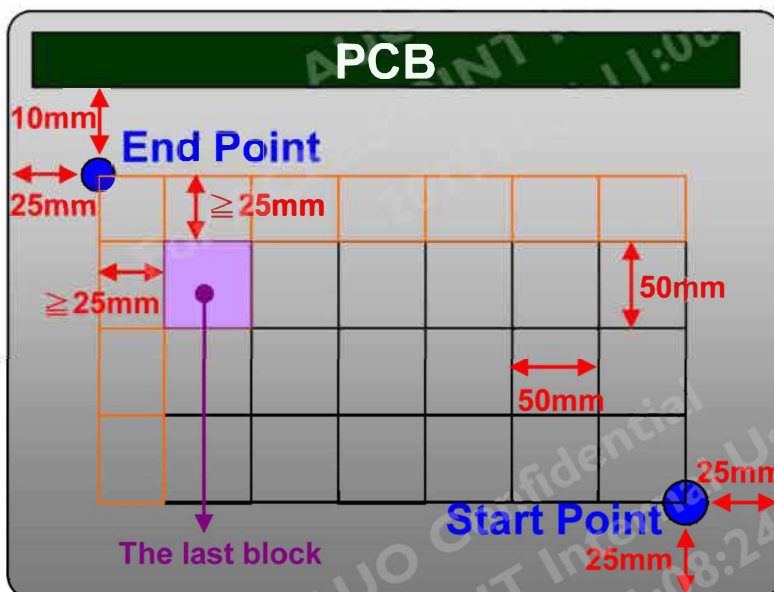
Symbol	Description	Min.	Max.	Unit	Remark
P_{bc}	Backside Compression	2.5	-	[Kgf]	Note 2-7

Note 2-7: 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.

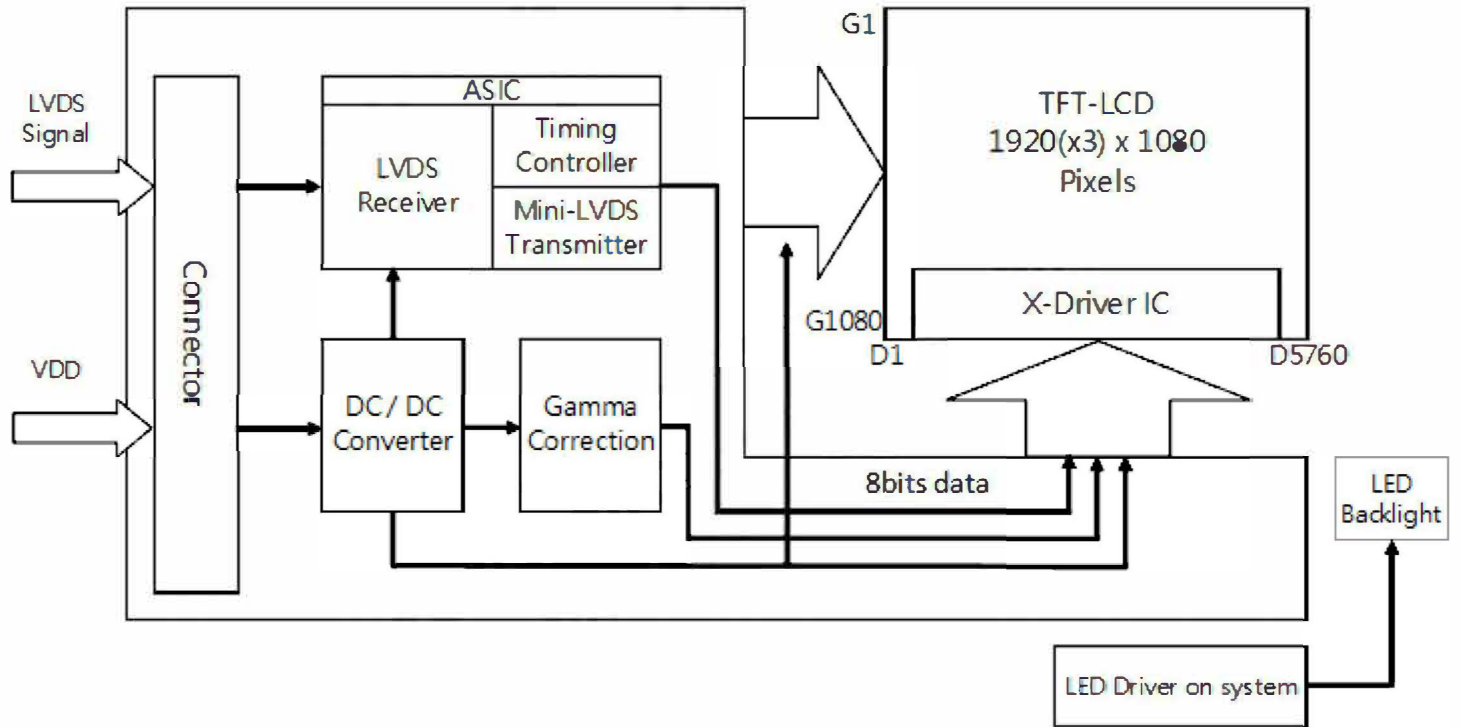
If the distance from the last block to each side of the End Point $\geq 25mm$, add other blocks to make sure that most area of Bezel Back can be measured.



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

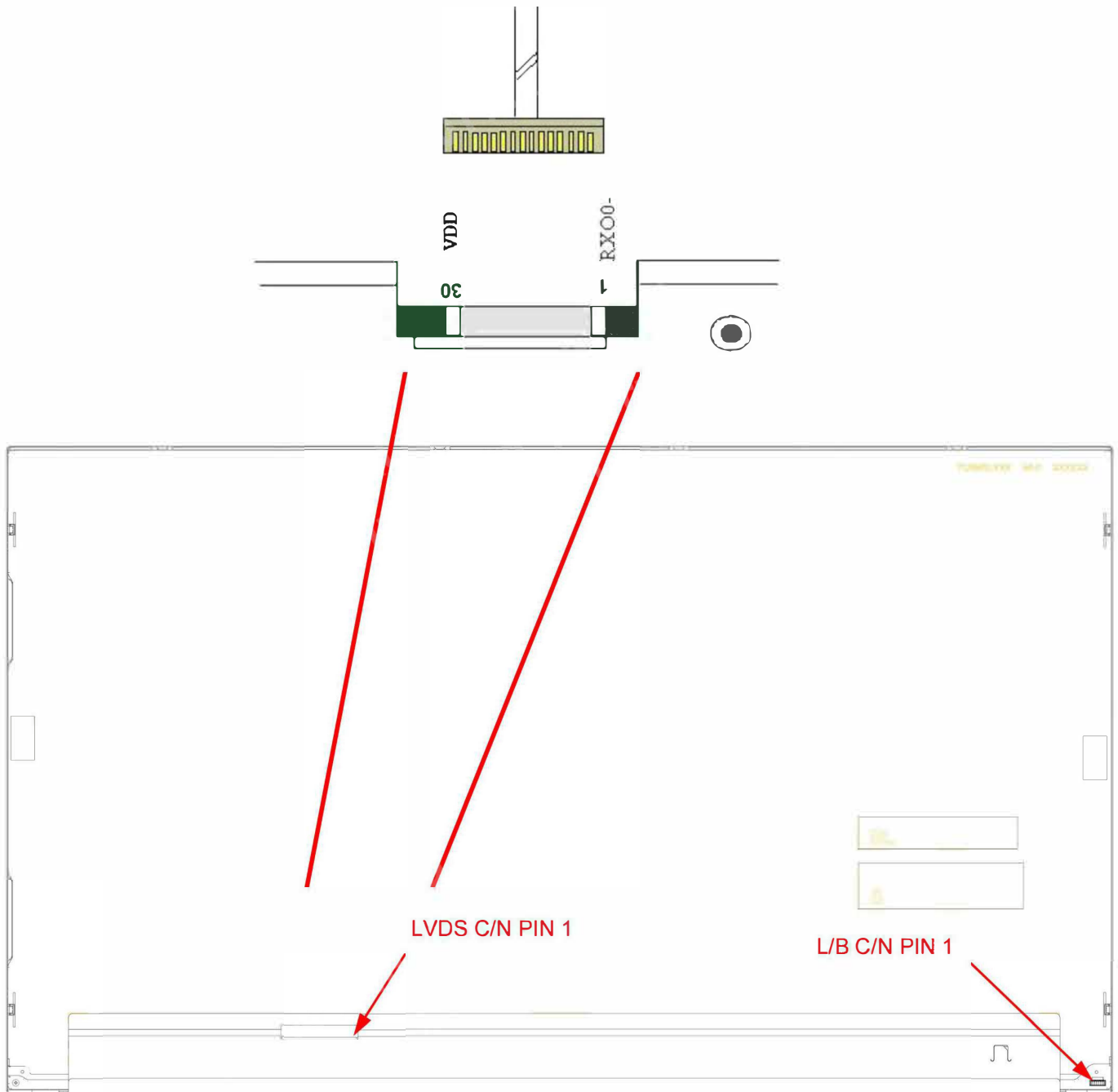
3.2.1 Connector Type

TFT-LCD Connector	Manufacturer	P-TWO	STM	STARCONN
	Part Number	AL230F-A0GID-P	MSCKT2407P30HB	093G30-02001A-M4
Mating Connector	Manufacturer	JAE or Compatible		
	Part Number	FI-X30HL (Locked Type)		

3.2.2 Connector Pin Assignment

PIN #	SIGNAL NAME	DESCRIPTION
1	RXO0-	Negative LVDS differential data input (Odd data)
2	RXO0+	Positive LVDS differential data input (Odd data)
3	RXO1-	Negative LVDS differential data input (Odd data)
4	RXO1+	Positive LVDS differential data input (Odd data)
5	RXO2-	Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
6	RXO2+	Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG)
7	GND	Power Ground
8	RXOCLK-	Negative LVDS differential clock input (Odd clock)
9	RXOCLK+	Positive LVDS differential clock input (Odd clock)
10	RXO3-	Negative LVDS differential data input (Odd data)
11	RXO3+	Positive LVDS differential data input (Odd data)
12	RXE0-	Negative LVDS differential data input (Even data)
13	RXE0+	Positive LVDS differential data input (Even data)
14	GND	Power Ground
15	RXE1-	Negative LVDS differential data input (Even data)
16	RXE1+	Positive LVDS differential data input (Even data)
17	GND	Power Ground
18	RXE2-	Negative LVDS differential data input (Even data)
19	RXE2+	Positive LVDS differential data input (Even data)
20	RXECLK-	Negative LVDS differential clock input (Even clock)
21	RXECLK+	Positive LVDS differential clock input (Even clock)
22	RXE3-	Negative LVDS differential data input (Even data)
23	RXE3+	Positive LVDS differential data input (Even data)
24	GND	Power Ground
25	NC	No contact
26	SCL	I2C-compatible Serial-Clock input for Vcom adjust
27	SDA	I2C-compatible Serial-Clock input/Output for Vcom adjust
28	VDD	+5.0V Power Supply

29	VDD	+5.0V Power Supply
30	VDD	+5.0V Power Supply



3.3 Electrical Characteristics

3.3.1 Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

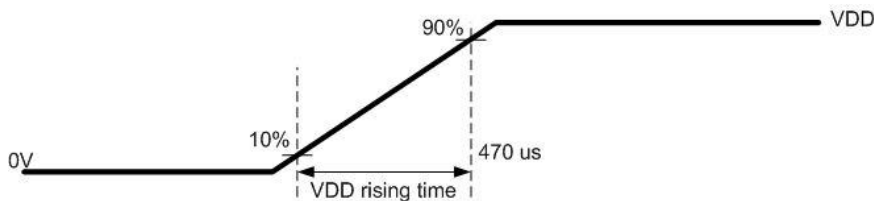
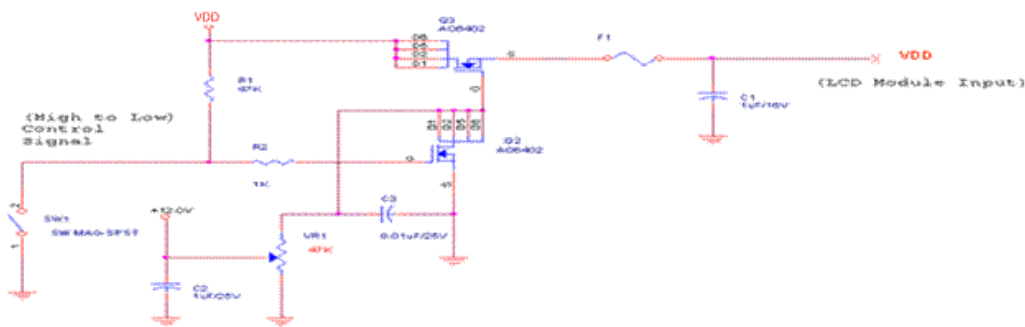
Symbol	Description	Min	Max	Unit	Remark
VDD	Power Supply Input Voltage	GND-0.3	6.0	[Volt]	Ta=25°C
SCL, SDA	I2C input Voltage	GND-0.3	4.0	[Volt]	Ta=25°C

3.3.2 Recommended Operating Condition

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)	-	0.93	1.22	[A]	VDD= 5.0V, White Pattern, Fv=60Hz
			1.22	1.46	[A]	VDD= 5.0V, White Pattern, Fv=75Hz
PDD	VDD Power Consumption	-	4.65	6.10	[Watt]	VDD= 5.0V, White Pattern, Fv=60Hz
			6.10	7.30	[Watt]	VDD= 5.0V, White Pattern, Fv=75Hz
IRush	Inrush Current	-	-	3	[A]	Note 3-1
VDDrp	Allowable VDD Ripple Voltage	-	-	500	[mV]	VDD= 5.0V, Black Pattern, Fv=75Hz

Note 3-1: Inrush Current measurement:



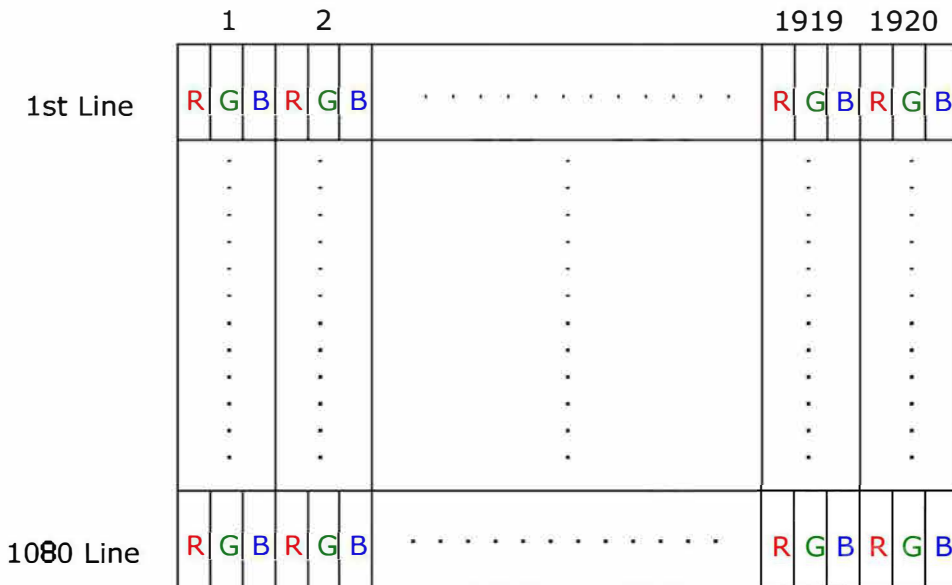
The duration of VDD rising time: 470us.

3.3.3 Input control signal threshold voltage definition

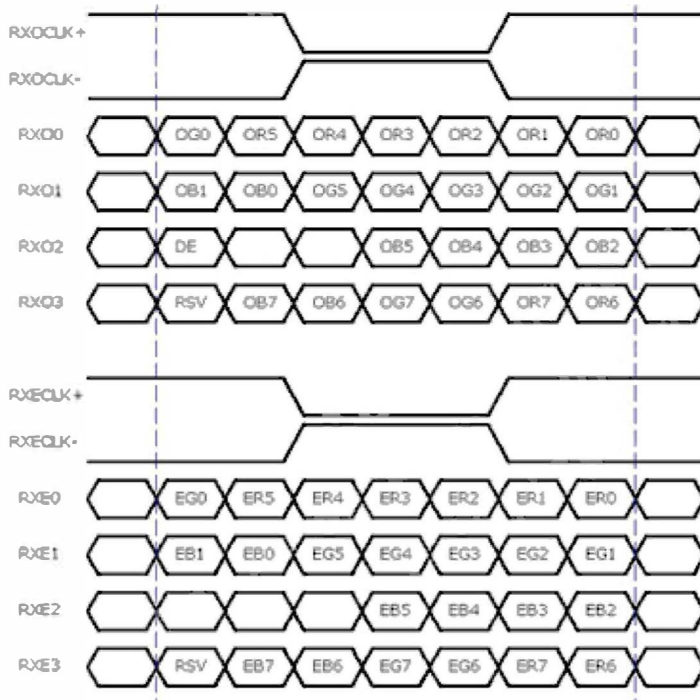
Item	Symbol	Min.	Typ.	Max.	Unit
Input High Threshold Voltage	VIH	2.7	-	3.6	V
Input Low Threshold Voltage	VIL	0	-	0.6	V

3.4 Signal Characteristics

3.4.1 LCD Pixel Format



3.4.2 LVDS Data Format



8 Bit Color Bit Order			
MSB	R7	G7	B7
	R6	G6	B6
	R5	G5	B5
	R4	G4	B4
	R3	G3	B3
	R2	G2	B2
	R1	G1	B1
LSB	R0	G0	B0

Note 3-2:

- a. O = "Odd Pixel Data" E = "Even Pixel Data"
- b. Refer to 3.4.1 LCD pixel format, the 1st data is 1 (Odd Pixel Data), the 2nd data is 2 (Even Pixel Data) and the last data is 1920 (Even Pixel Data).

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	1	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	

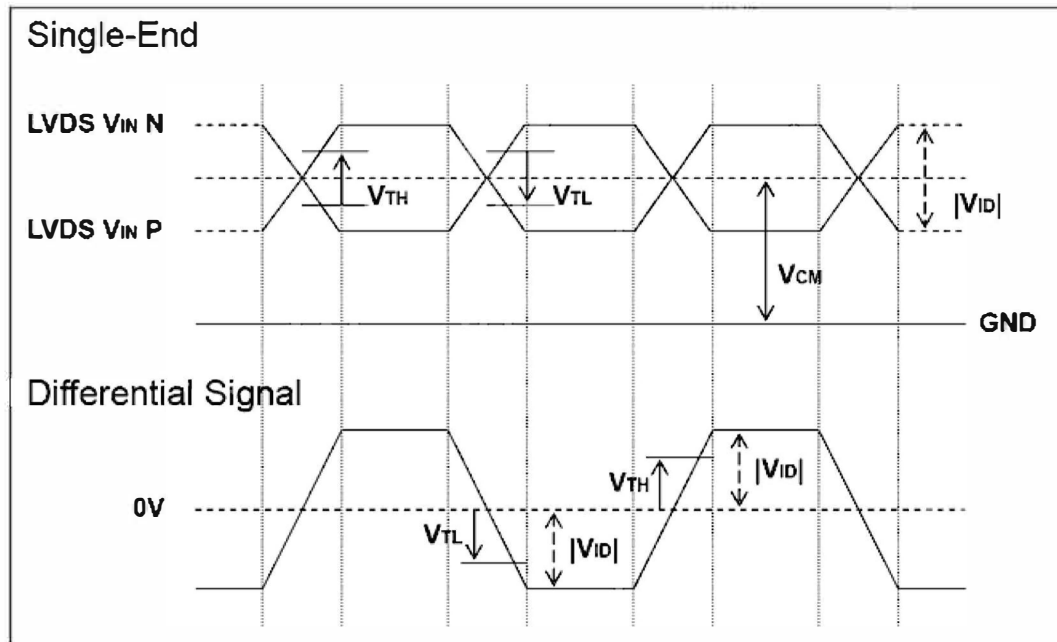
3.4.4 LVDS Specification

a. DC Characteristics:

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

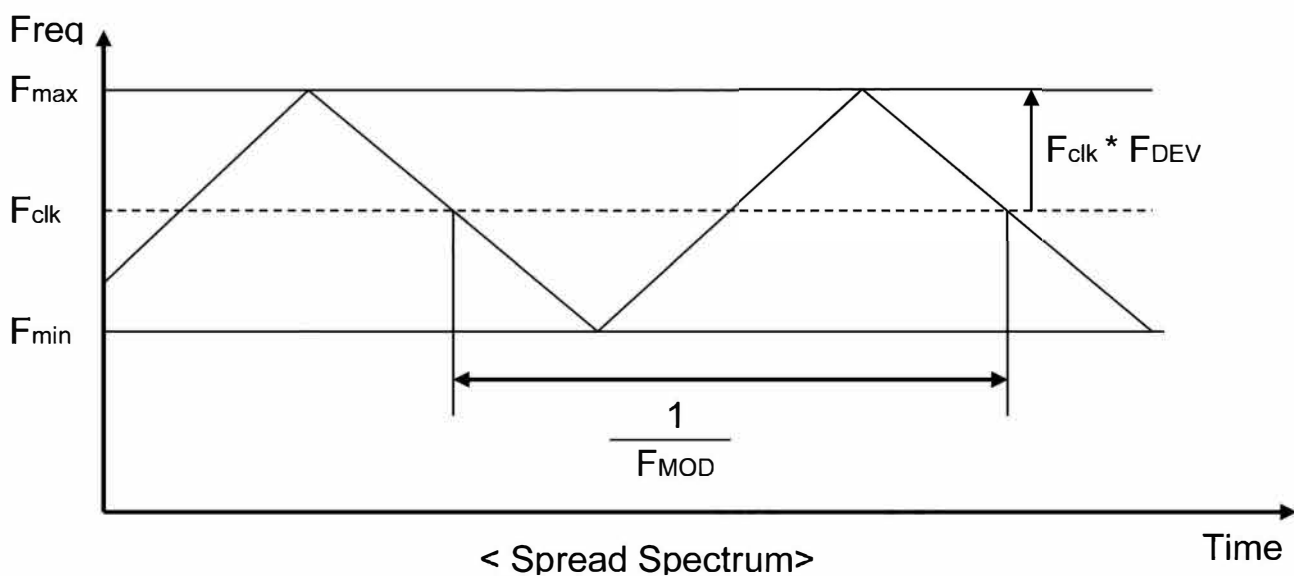
LVDS Signal Waveform:

Use RxOCLK- & RxOCLK+ as example.



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	



F_{clk} : 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	1092	1130	1793	Th	
Tdisp (v)		Active	1080	1080	1080	Th	
Tblk (v)		Blanking	12	50	713	Th	
Fv		Frequency	50	60	76	Hz	
Th	Horizontal Section	Period	1004	1050	1100	Tclk	
Tdisp (h)		Active	960	960	960	Tclk	
Tblk (h)		Blanking	44	90	140	Tclk	
Fh		Frequency	55	68	90	KHz	Note 3-3
Tclk	LVDS Clock	Period	11.1	14.0	18.2	ns	1/Fclk
Fclk		Frequency	54.8	71.2	90.0	MHz	Note 3-4

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

$$Fh (Min.) = Fclk (Min.) / Th (Min.);$$

$$Fh (Typ.) = Fclk (Typ.) / Th (Typ.);$$

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

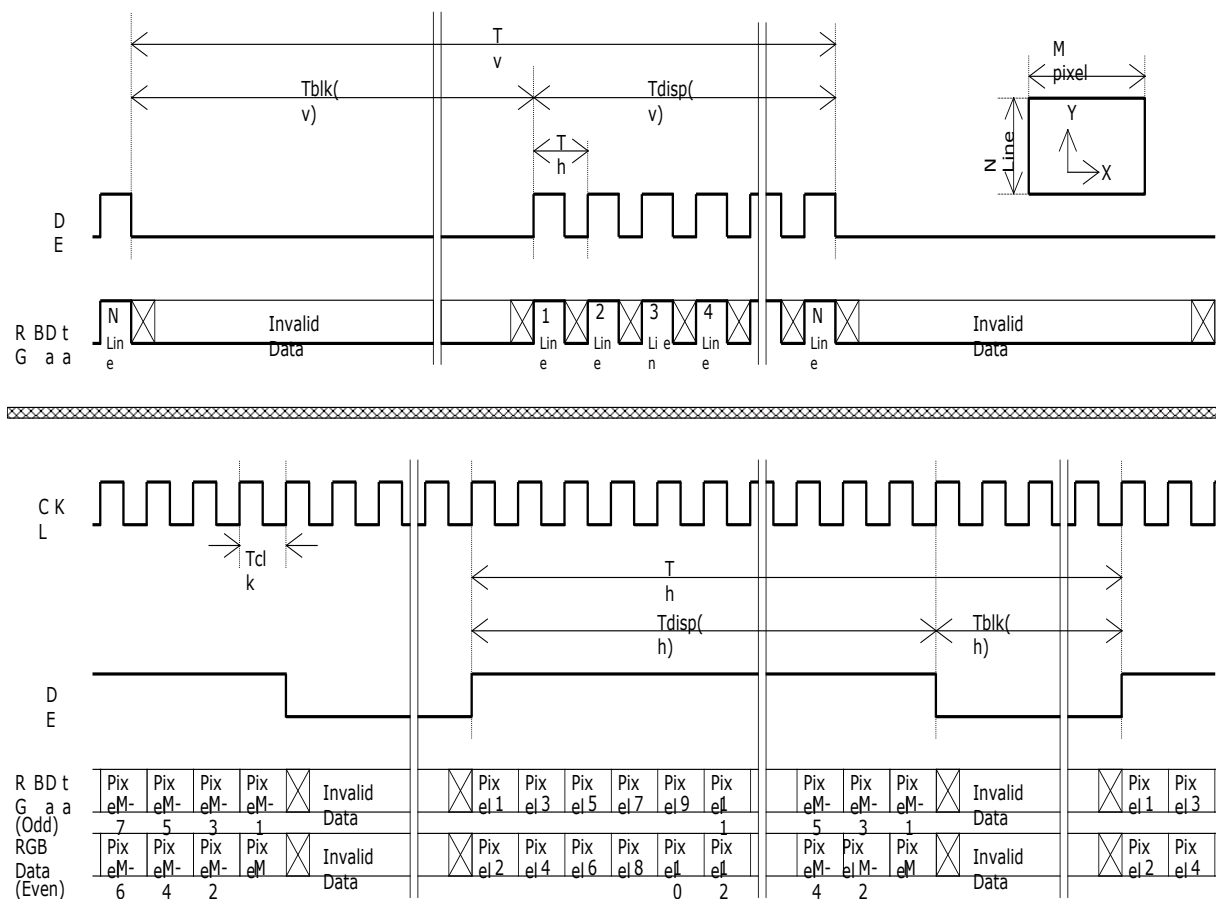
Note 3-4: The equation is listed as following. Please don't exceed the above recommended value.

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

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

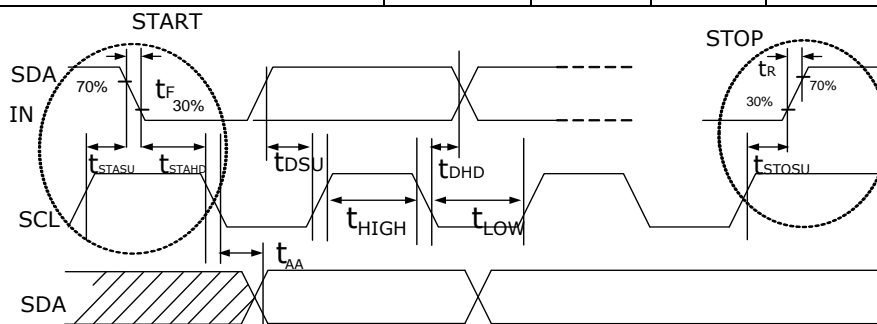
$$Fclk (Max.) = Fv (Max.) \times Th (Typ.) \times Tv (Typ.);$$

3.4.6 Input Timing Diagram



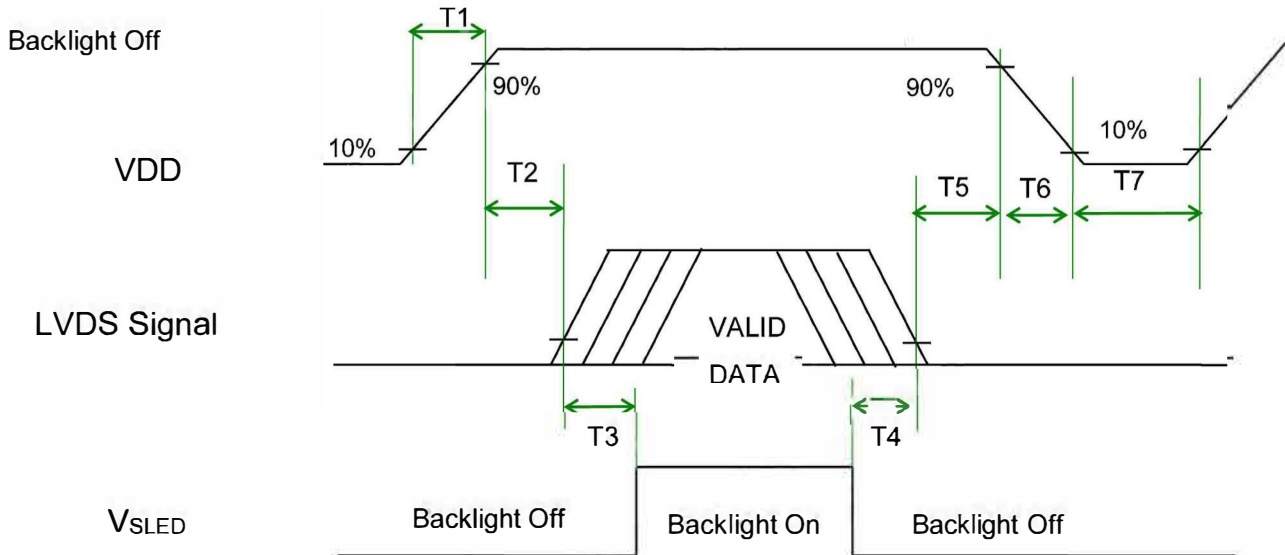
3.4.7 I2C Electrical Characteristics (VDD=5V, VSDA/VSCL=3.3V, TA=25°C)

Parameter	Symbol	Min.	Typ.	Max	Unit	
I2C	SCL clock frequency	fSCL	-	350	kHz	
	Clock Pulse Width Low	tLOW	1.85	-	us	
	Clock Pulse Width High	tHIGH	0.4	-	us	
	Clock Low to Data Output Valid	tAA	1.76	-	us	
	Start Setup Time	tSTASU	0.6	-	us	
	Start Hold Time	tSTAHD	0.6	-	us	
	Stop Setup Time	tSTOSU	0.6	-	us	
	Data In Setup Time	tDSU	0.1	-	us	
	Data In Hold Time	tDHD	0	-	us	
	SCL/SDA Rise Time	tR	-	-	0.3	us
	SCL/SDA Fall Time	tF	-	-	0.3	us



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	-	200	[ms]	Note 3-7
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.

Note 3-7 : Voltage of VDD must decay smoothly after power-off. (customer system decide this value)

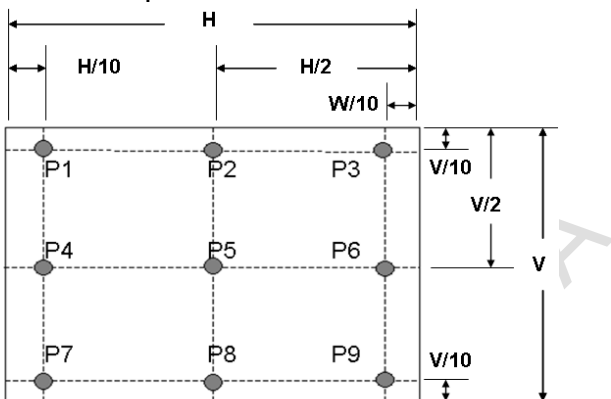
3.6 Vcom adjustment flow

A. Flicker Pattern

2L+1 (1V) L127

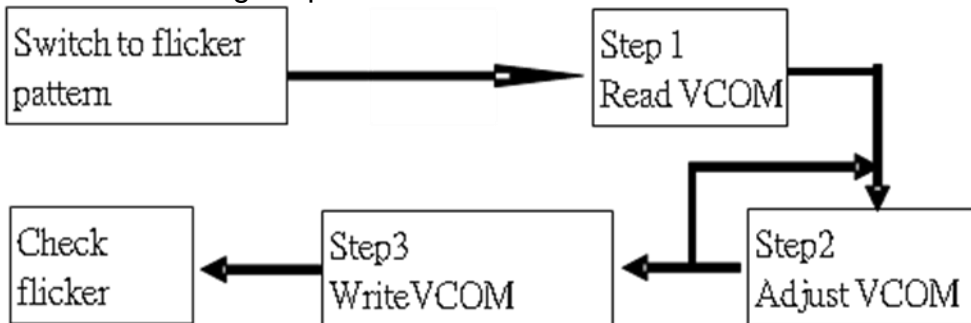


B. Vcom is optimization when minimized flicker phenomenon of location P5 (as below figure)



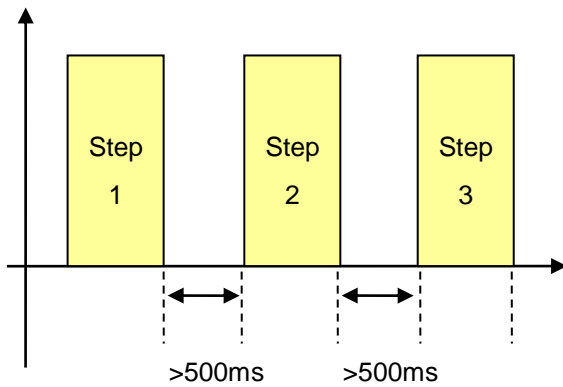
C. Tuning Step

VCOM I2C Tuning Step



D. Interval of Step to Step

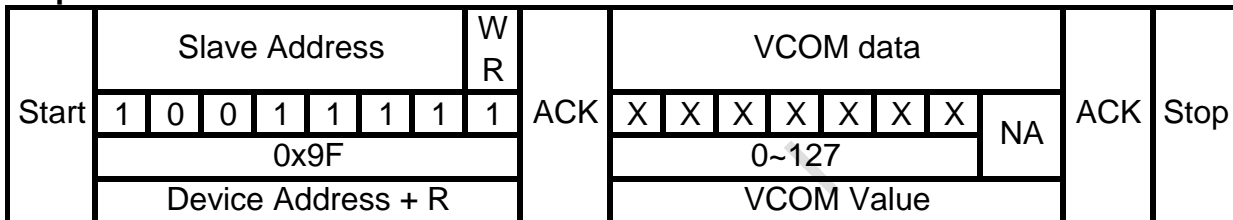
VCOM I2C Tuning Step



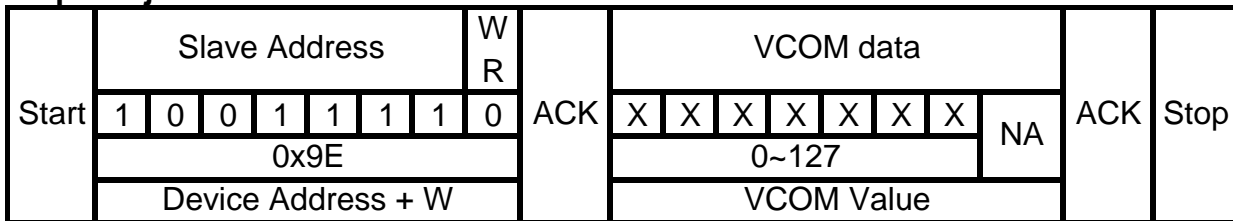
E. I2C Protocol Define

DVCOM IC address (slave) : 1001111 (0x4F)

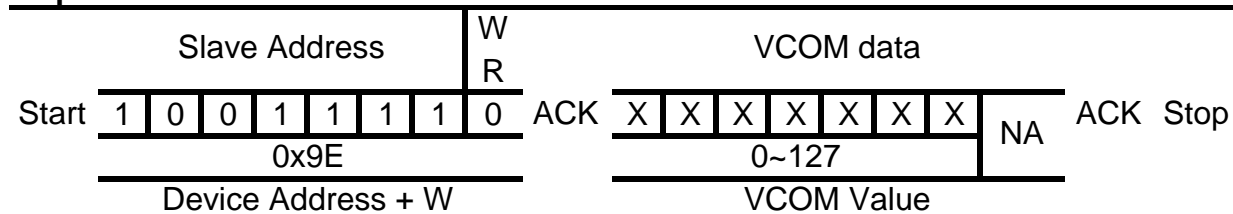
Step1 Read Vcom Command



Step2 Adjust Vcom Command



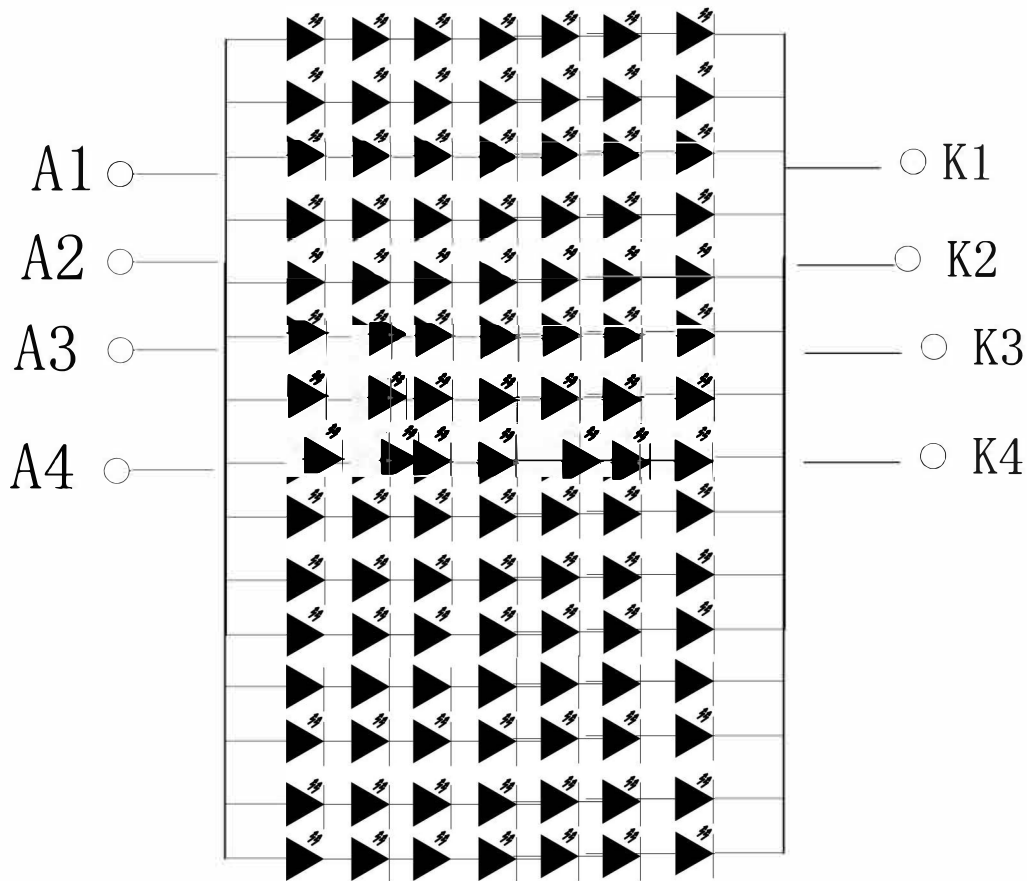
Step3 Write Vcom Command



4 Backlight Unit

4.1 Block Diagram

The following shows the block diagram of the 27 inch Backlight Unit. And it includes 105 pcs LED in the LED light bar. (7 strings and 16 pcs LED of one string).



7 series 16 Parallel

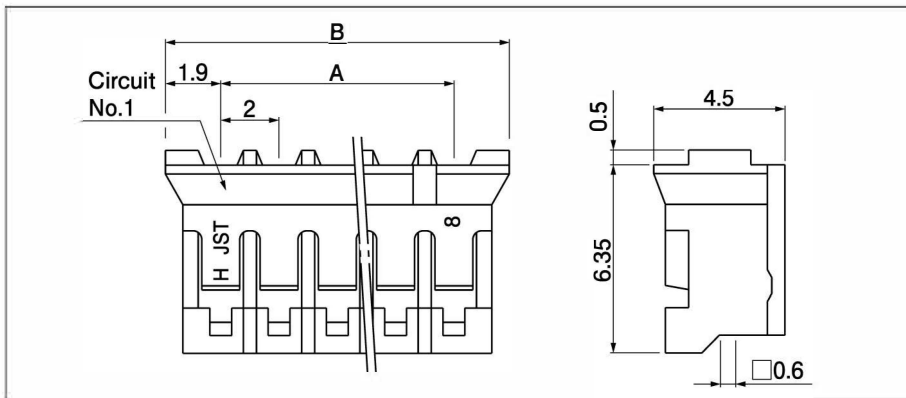
Volt. 38-42V

Current 1000mA

4.2 Interface Connection

4.2.1 Connector Type

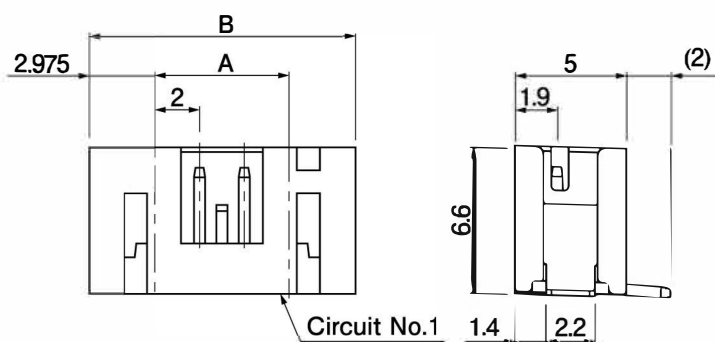
Backlight Connector	Manufacturer	ENTERY
	Part Number	PHR-2
Mating Connector	Manufacturer	ENTERY
	Part Number	B2B-PH-SM4-TB



No. of circuits	Model No.	Dimensions (mm)	
		A	B
2	PHR-2	2.0	5.8

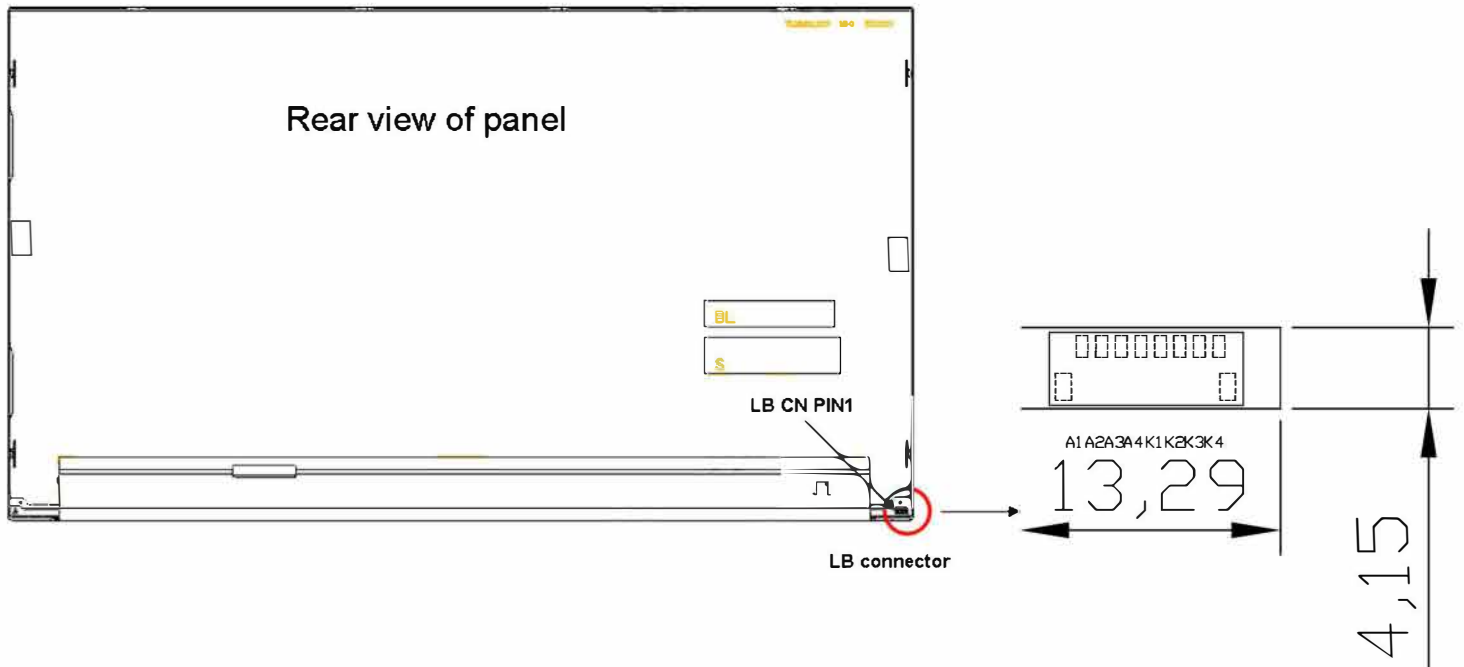
Mating Connector dimension:

No. of circuits	Model No.		Dimensions (mm)		
	Top entry type	Side entry type	A	B	
				Top entry type	Side entry type
2	B2B-PH-SM4-TB	S2B-PH-SM4-TB	2.0	7.95	7.9



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°C)

Symbol	Description	Min	Max	Unit	Remark
Is	LED String Current	0	1000	[mA]	100% duty ratio

4.3.2 Recommended Operating Condition

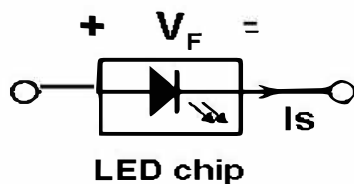
(Ta=25°C)

Symbol	Description	Min.	Typ.	Max.	Unit	Remark
Is	LED String Current	-	68	75	[mA]	100% duty ratio of LED chip Note 4-7
Vs	LED String Voltage	40	42.87	48.59	[Volt]	Is=70mA @ 100% duty ratio; Note 4-1, Note 4-5
ΔVs	Maximum Vs Voltage Deviation of light bar	-	-	3	[Volt]	Is=70mA @ 100% duty ratio; Note 4-2
P _{BLU}	LED Light Bar Power Consumption	-	38	40	[Watt]	Note 4-3
LT _{LED}	LED Life Time	30,000	-	-	[Hour]	Note 4-4
OVP	Over Voltage Protection in system board	110% Vsmax	-	-	[Volt]	Note 4-5

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

a. V_F: LED chip forward voltage, V_F (Min.)=2.67V, V_F(Typ.)=2.86V, V_F(Max.)=3.24V

b. The same equation 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: $P_{BLU} (Typ.) = V_s (Typ.) \times I_s (Typ.) \times 4$; (4 is total String No. of LED Light bar)

$P_{BLU} (Max.) = V_s (Max.) \times I_s (Typ.) \times 4$;

Note 4-4: Definition of life time:

- a. Brightness of LED becomes to 50% of its original value
- b. Test condition: $I_s = 70\text{mA}$ and 25°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 voltage protection) should be 10% higher than max. value of LED string voltage (V_s) 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.

Note 4-7 Ensure that the LED light bar is not subjected either forward or reverse voltage while monitor set is on standby mode or not in use.

5 Reliability Test

AUO reliability test items are listed as following table. (Bare Panel only)

Items	Condition	Remark
Temperature Humidity Bias (THB)	Ta= 50°C, 80%RH, 300hours	
High Temperature Operation (HTO)	Ta= 50°C, 50%RH, 300hours	
Low Temperature Operation (LTO)	Ta= 0°C, 300hours	
High Temperature Storage (HTS)	Ta= 60°C, 300hours	
Low Temperature Storage (LTS)	Ta= -20°C, 300hours	
Vibration Test (Non-operation)	Acceleration: 1.5 Grms Wave: Random Frequency: 10 - 200 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 20 ms Direction: ±X, ±Y, ±Z (one time for each Axis)	
Thermal Shock Test (TST)	-20°C/30min, 60°C/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°C to 60°C, 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.

ESD discharged points should avoid display area and periphery front bezel of display area. Suggest points were 4 side parallel edge of display area surface.

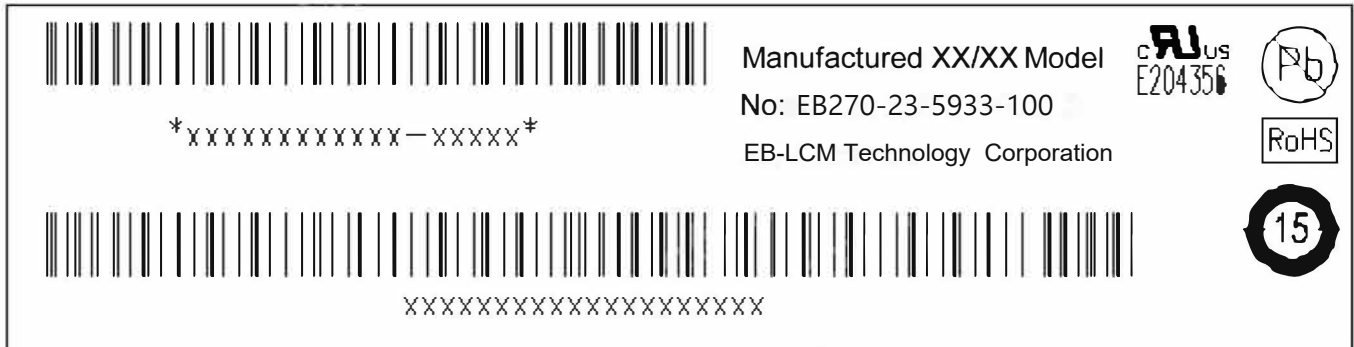
Metal front bezel must cover half area of BM (black matrix), and metal front bezel must connect with metal back bezel to protect source IC of panel by ESD damaged.


Note 5-3 : Result Evaluation Criteria:

TFT-LCD panels test should take place after gradually cooling enough at room temperature
 In the normal application, there should be no particular problems that may affect the display function.

6 Shipping Label

The label on the panel is shown as below:



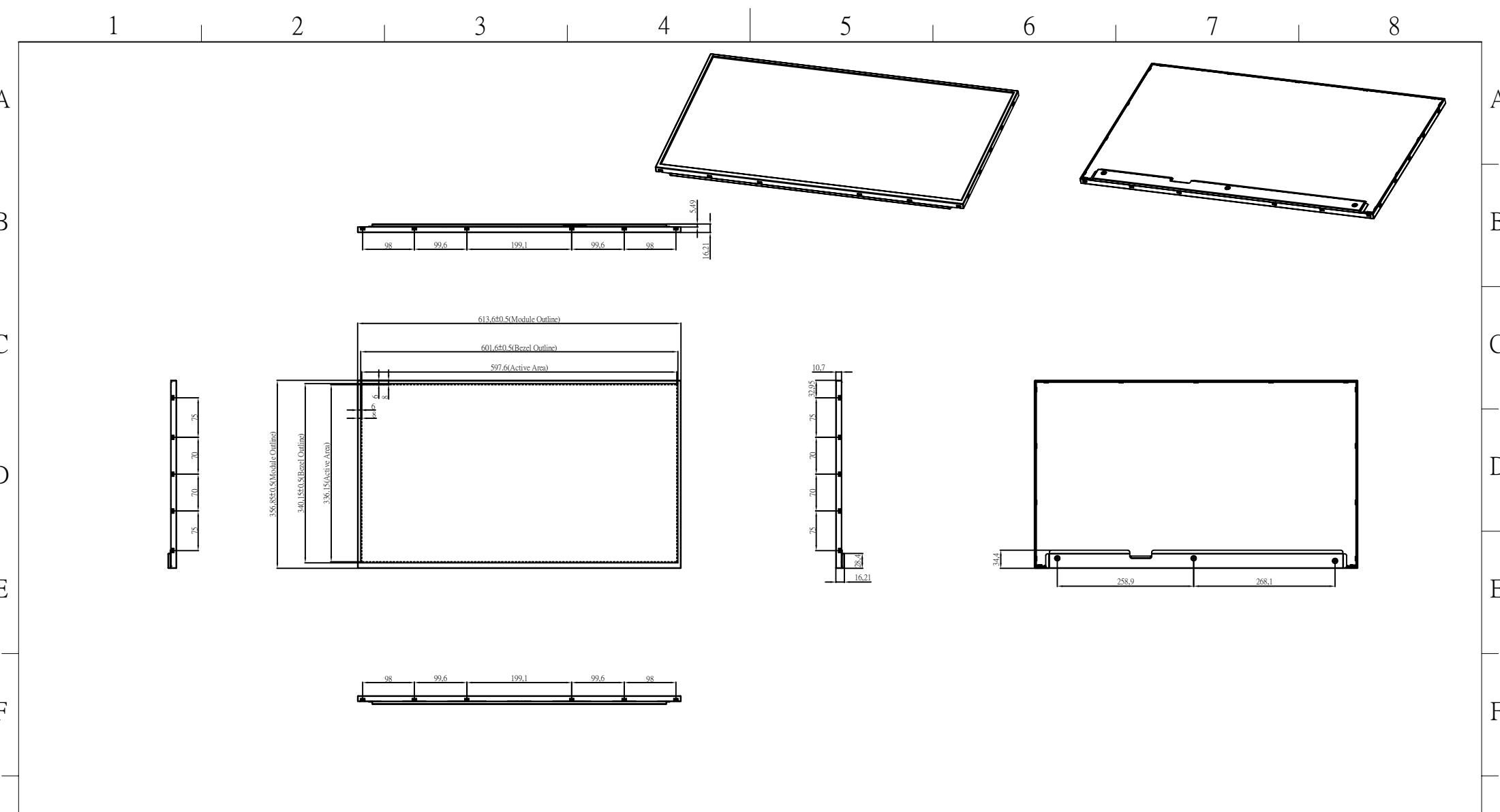
Note 6-1: For Pb Free products, It will add  for identification.

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

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

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

7 Mechanical Characteristics



REVISION RECORD

ITEM	AREA	CONTENT	DATE	REV	ISSUE
△		NEW DRAWING	04/07-22	1	TACO

TOLERANCE:
No marked is 0.35

SCALE 1:1
UNITS mm

Part No.,	
Model	27" LCM
Spec.	SMD 110 530.2*299.6 mm(V/A) W
C/P-N	

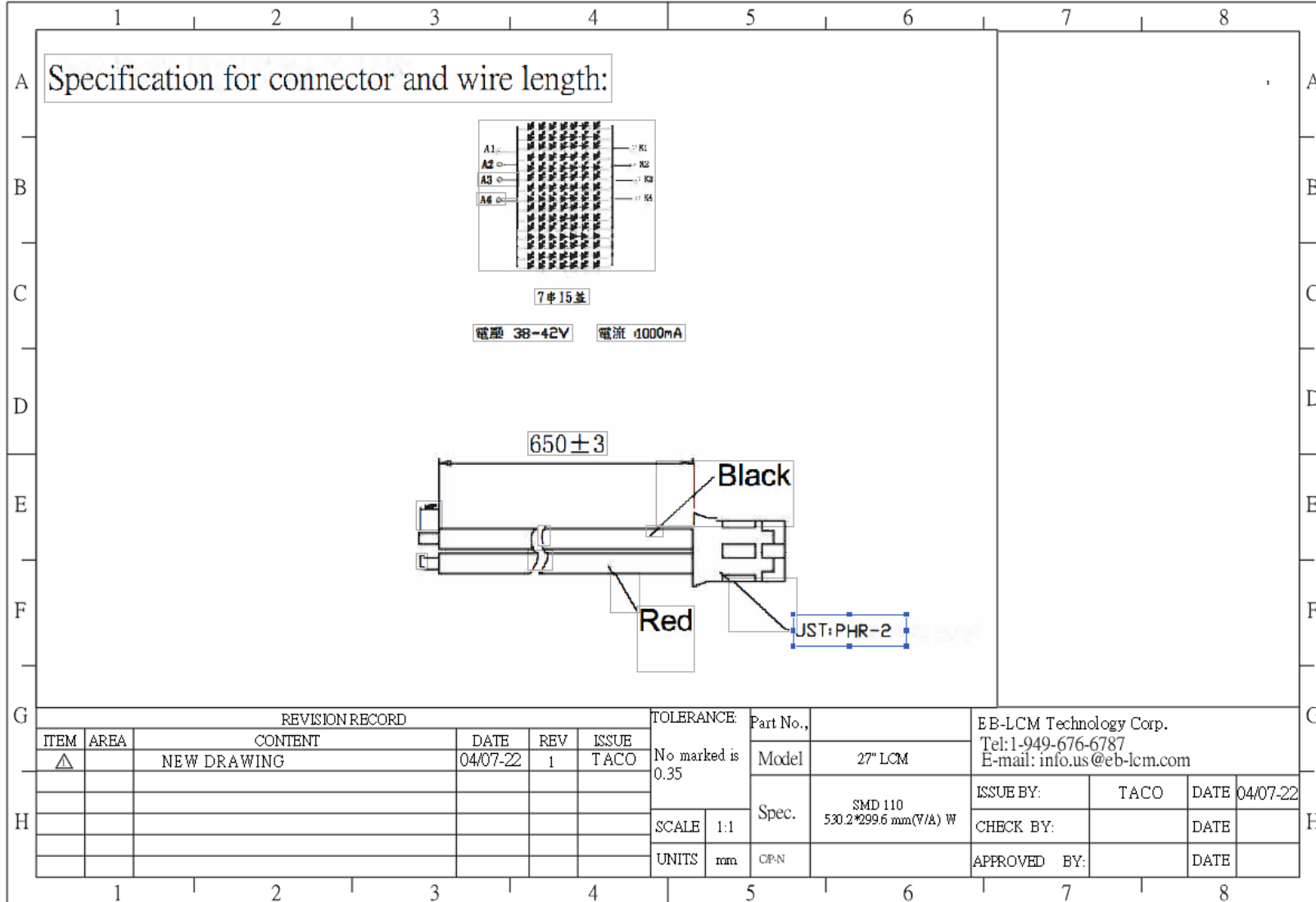
EB-LCM Technology Corp. Tel:1-949-676-6787 E-mail: info.us@eb-lcm.com			
ISSUE BY:	TACO	DATE	04/07-22
CHECK BY:		DATE	
APPROVED BY:		DATE	

Product Specification

EB270-23-5933-1000

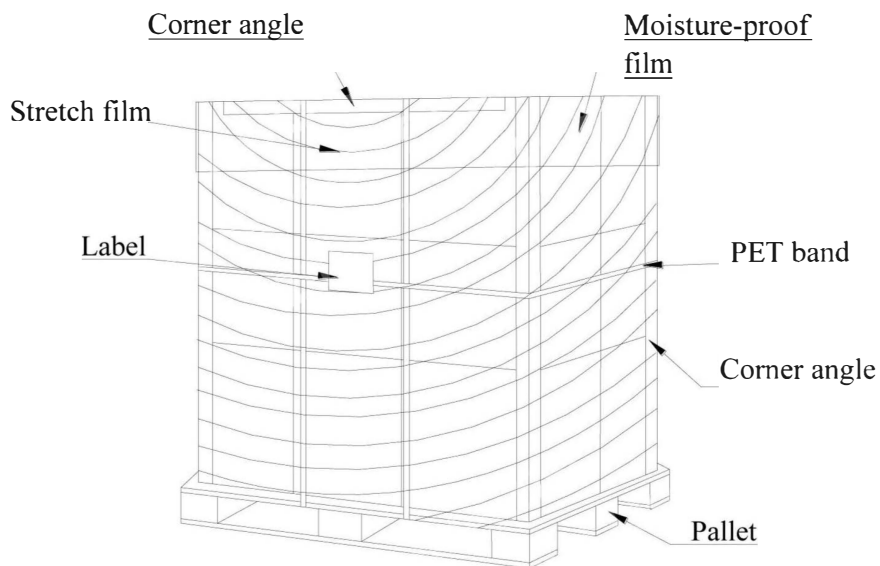
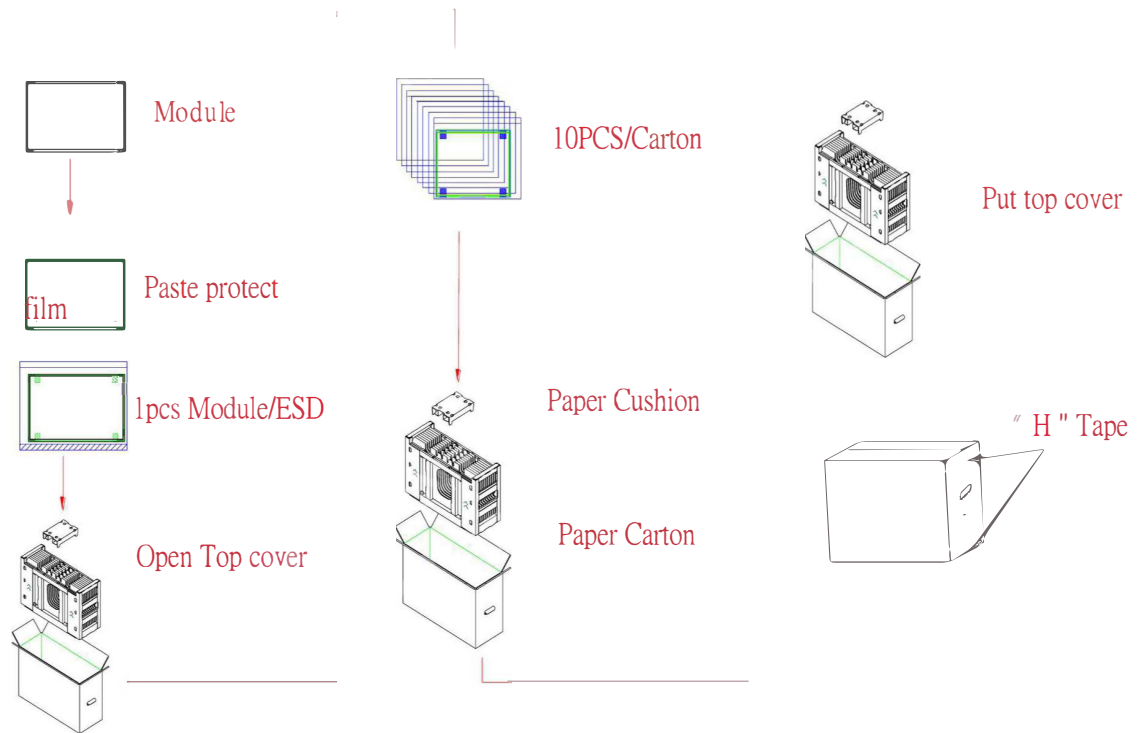
M27 19201080 W-L1000

Product Specification



8 Packing Specification

8.1 Packing Flow



8.2 Pallet and shipment information

Item	Specification			Remark
	Q'ty	Dimension	Weight(kg)	
EPO BOX	1	780(L)mm*545(W)mm*161(H)mm	1.645	without cell & spacer
Packing Box	20 pcs/Box	780(L)mm*545(W)mm*161(H)mm	14.5	with cell & cushion & spacer
Pallet	1	1150(L)mm x 840(W)mm x 132(H)mm	15.9	
Pallet after Packing	20 boxes/pallet	1150(L)mm x 840(W)mm x 1472(H)mm	305.9	