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Product Specification

AU OPTRONICS CORPORATION

(V) Preliminary Specifications

() Final Specifications

Module	13.3''(13.26'') UHD 16:9 Color TFT-LCD with LED Backlight design
Model Name	G133ZAN01.1
Note ()	<i>LED Backlight with driving circuit design</i>

Customer

Date

Checked &
Approved by

Date

Note: This Specification is subject to change
without notice.

Approved by

Date

Prepared by

Date

NBBU Marketing Division
AU Optronics corporation



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Record of Revision

[illegible]



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.
- 10) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bend the TFT Module even momentarily. 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.
- 11) 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.
- 12) 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.



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2. General Description

G133ZAN01.1 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 16:9 UHD, 3840(H) x2160(V) screen and 1064M colors (RGB 8-bits+2FRC data driver) with LED backlight driving circuit. All input signals are eDP(Embedded DisplayPort) interface compatible.

G133ZAN01.1 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]	336.804			
Active Area	[mm]	293.76 (H) x			
Pixels H x V		3840 x 3 (RGB) x 2160			
Pixel Pitch	[mm]	0.0765 x 0.0765			
Pixel Format		R.G.B. Vertical Stripe			
Display Mode		Normally Black			
White Luminance (ILED=24mA) (Note: ILED is LED current)	[cd/m ²]	450 typ. (5 points average)			
Luminance Uniformity		1.25 max. (5 points)			
Contrast Ratio		1200 typ			
Response Time	[ms]	30 typ / 35max			
Nominal Input Voltage VDD	[Volt]	+3.3 typ			
Power Consumption	[Watt]	TBD (Include Logic and BLU)			
Weight	[Grams]	190 max			
Physical Siz	[mm]		Min.	Typ.	Max.
		Length	298.66	298.96	299.26
		Width	185.92	186.42	186.92
		Thickness	--	--	2.2
Electrical Interface		4Lane eDP 1.4a			
Glass Thickness	[mm]	0.2			
Surface Treatment		Glare, Hardness 1H, Reflection 5%			



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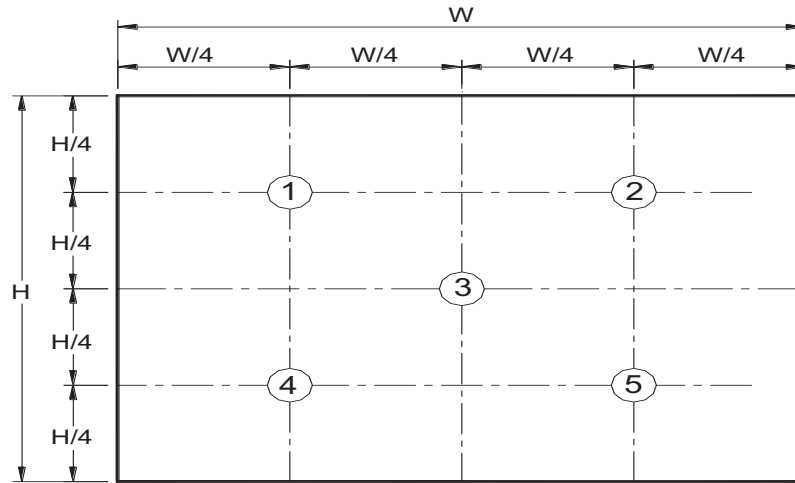
Support Color		1064M colors (RGB 8-bit +2 FRC)
Temperature Range Operating Storage (Non-Operating)	[°C] [°C]	0 to +50 -20 to +60
RoHS Compliance		RoHS Compliance

2.2 Optical Characteristics

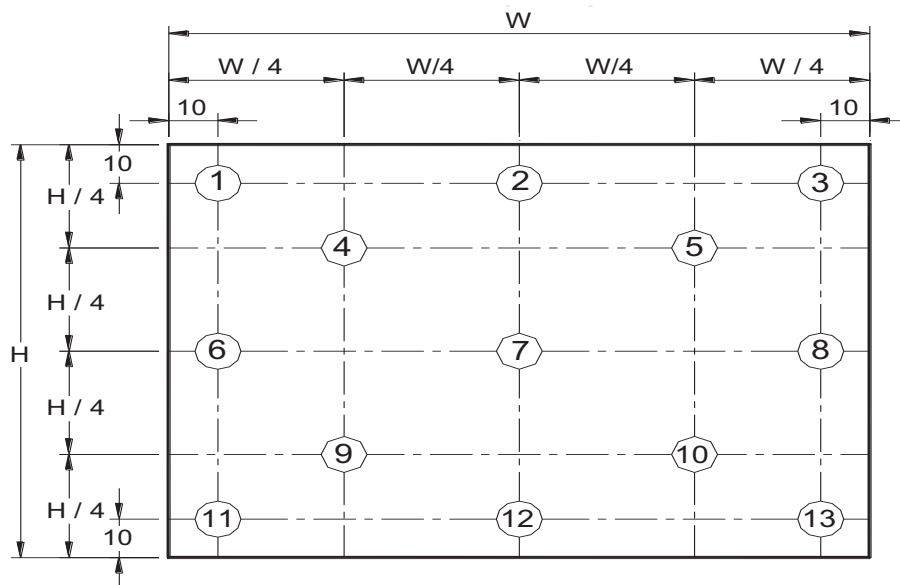
The optical characteristics are measured under stable conditions at 25°C (Room Temperature) :

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
White Luminance I _{LED} =19.6mA		5 points average	-	450	-	cd/m ²	1, 4, 5.
Viewing Angle	θ_R	Horizontal (Right) CR = 10 (Left)	80	85	-	degree	4, 9
	θ_L		80	85	-		
	ϕ_H	Vertical (Upper) CR = 10 (Lower)	80	85	-		
	ϕ_L		80	85	-		
Luminance Uniformity	δ_{5P}	5 Points	-	-	1.25		1, 3, 4
Luminance Uniformity	δ_{13P}	13 Points	-	-	1.60		2, 3, 4
Contrast Ratio	CR			1200	-		4, 6
Cross talk	%				4		4, 7
Response Time	T_{RT}	Rising + Falling	-	30	35	msec	4, 8
Color / Chromaticity Coordinates	Red	R_x	CIE 1931	0.61	0.64	0.67	4
		R_y		0.3	0.33	0.36	
	Green	G_x		0.27	0.3	0.33	
		G_y		0.57	0.6	0.63	
	Blue	B_x		0.12	0.15	0.18	
		B_y		0.03	0.06	0.09	
	White	W_x		0.283	0.313	0.343	
		W_y		0.299	0.329	0.359	
NTSC	%		-	72	-		

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



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



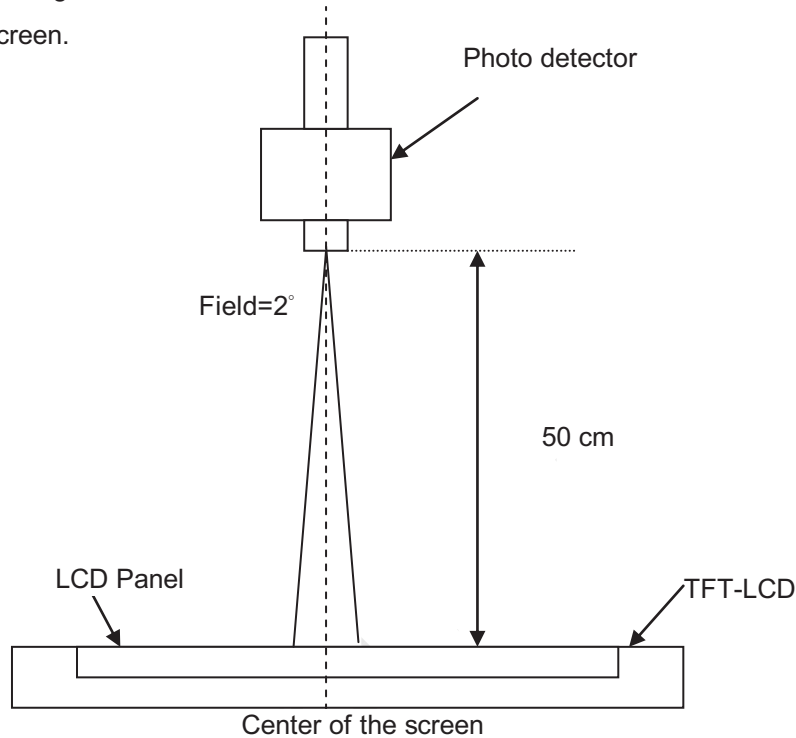
Note 3: The luminance uniformity of 5 or 13 points is defined by dividing the maximum luminance values by the minimum test point luminance

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

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

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, and it should be measured in the center of screen.



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.

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

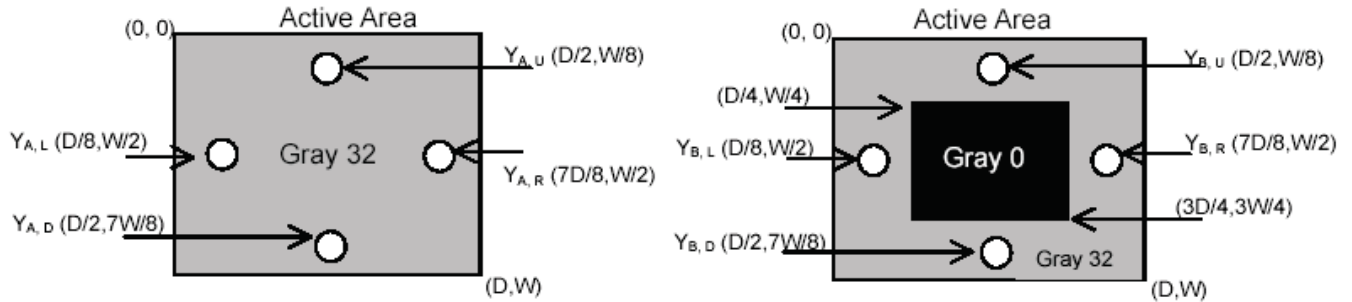
Note 7 : Definition of Cross Talk (CT)

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

Where

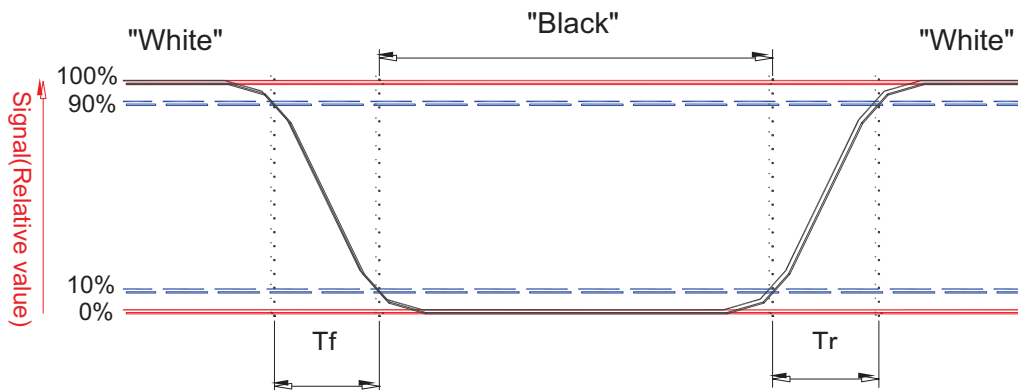
Y_A = Luminance of measured location without gray level 0 pattern (cd/m²)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m²)



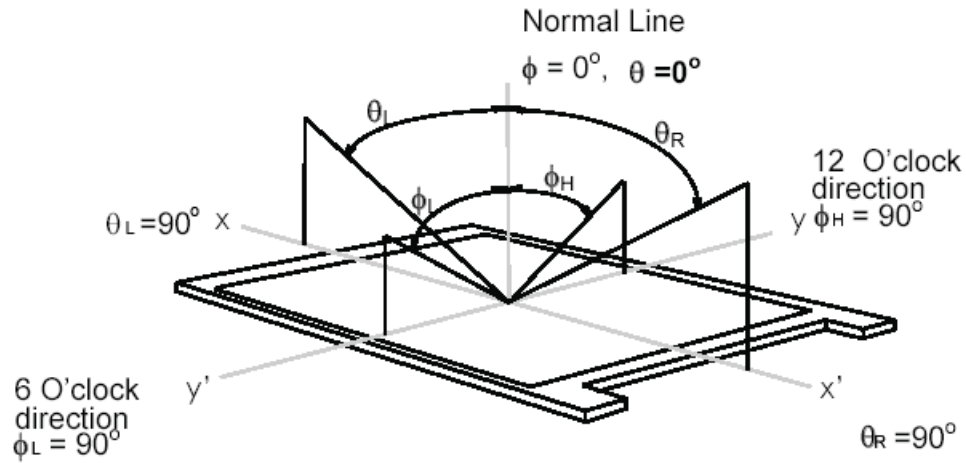
Note 8: Definition of response time:

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.



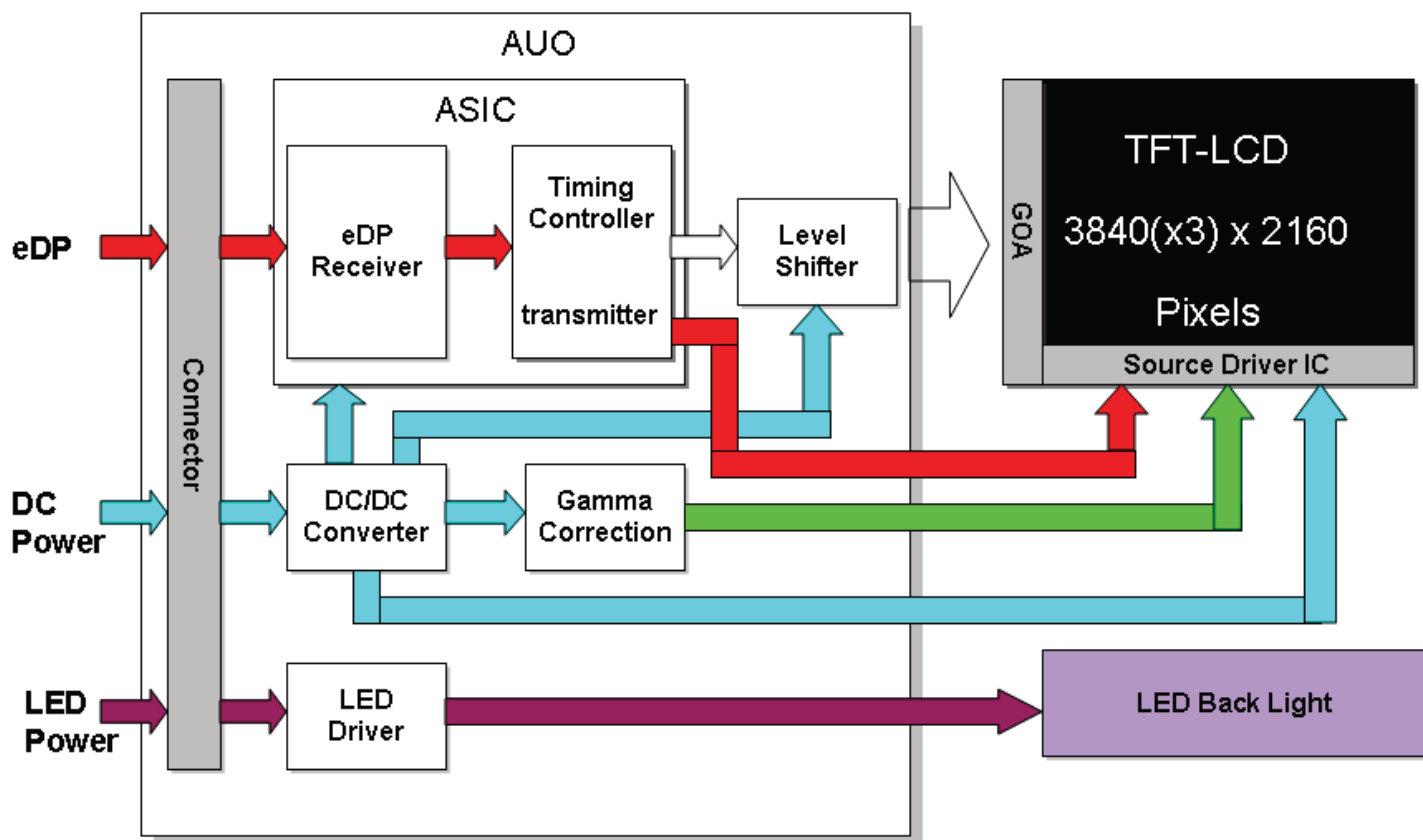
Note 9. Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≥ 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° (θ) horizontal left and right and 90° (Φ) 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 13.3 inches wide Color TFT/LCD 40 Pin



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	Vin	-0.3	+4.0	[Volt]	Note 1,2

4.2 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	Note 4
Operation Humidity	HOP	5	95	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[°C]	Note 4
Storage Humidity	HST	5	95	[%RH]	Note 4

Note 1: At Ta (25°C)

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

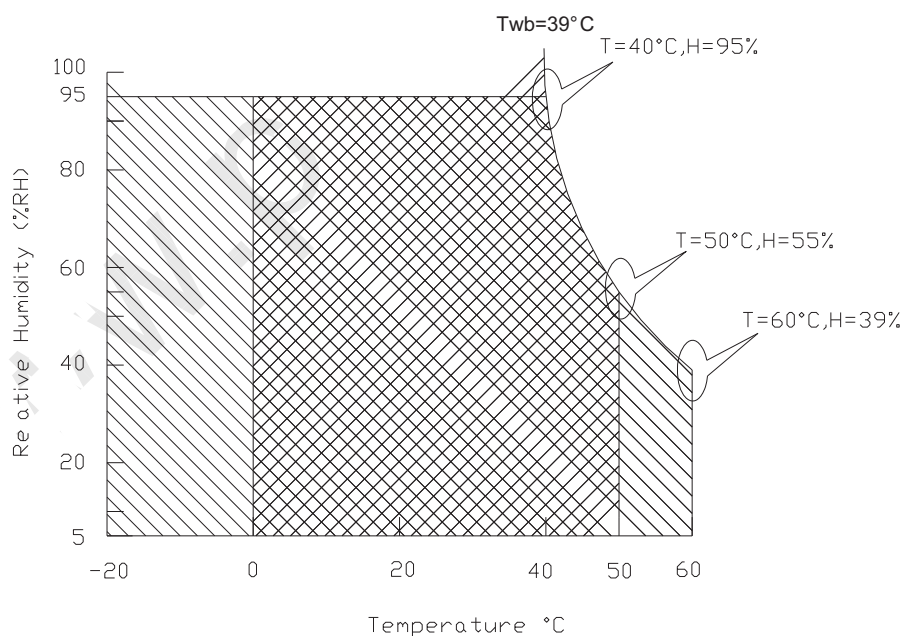
Note 3: LED specification refer to section 5.2

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

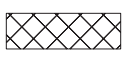
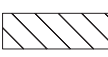
Note 5: The packing material of system forbid to involve ammonium component

Note 6: The reliability test conditions of system do not exceed the verified conditions of TFT module

Note 7: Be sure the panel test condition do not exceed the component limitation of TFT module(TN Liquid crystal , for example)



Operating Range 

Storage Range  + 

5. Electrical Characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Input power specifications are as follows;

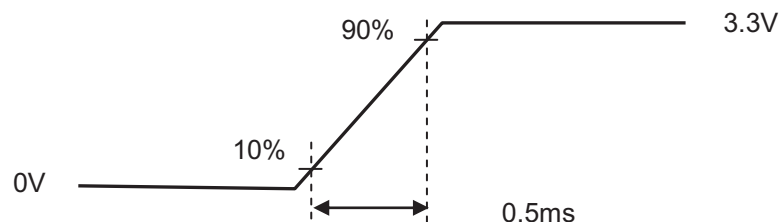
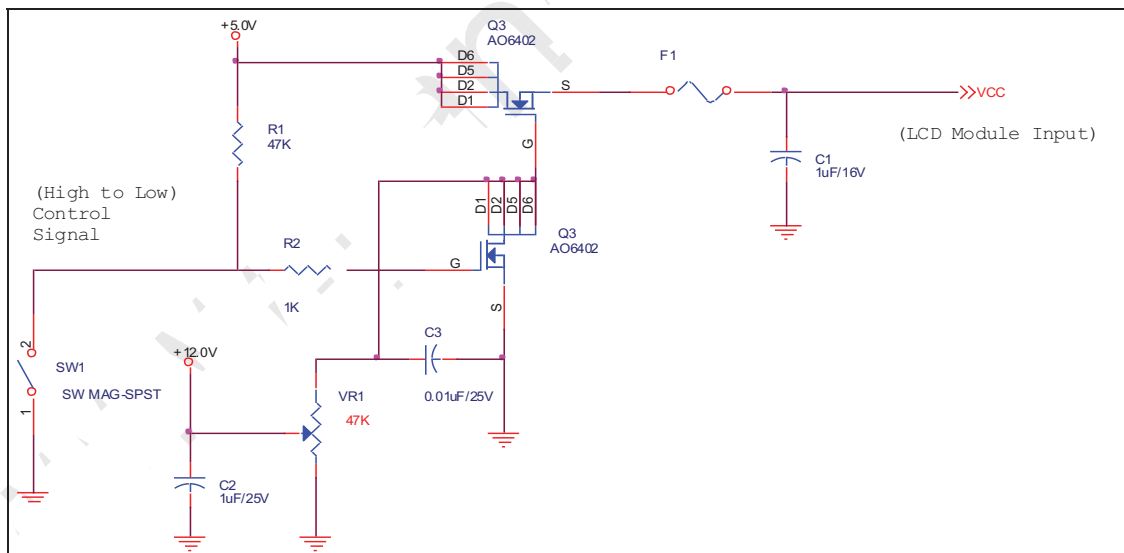
The power specification are measured under 25°C and frame frequency under 60Hz

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	1.8	3.0	[Watt]	Note 1
IDD	IDD Current	-		1000	[mA]	Note 1
IRush	Inrush Current	-	-	2000	[mA]	Note 2
VDDrp	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mV] p-p	

Note 1 : PDD(typ)@ mosaic pattern Maximum Power; PDD(Max)@ R/G/B pattern Maximum Power

$$IDD(Max)=PDD(Max) / VDD(Min)$$

Note 2 : Measure Condition



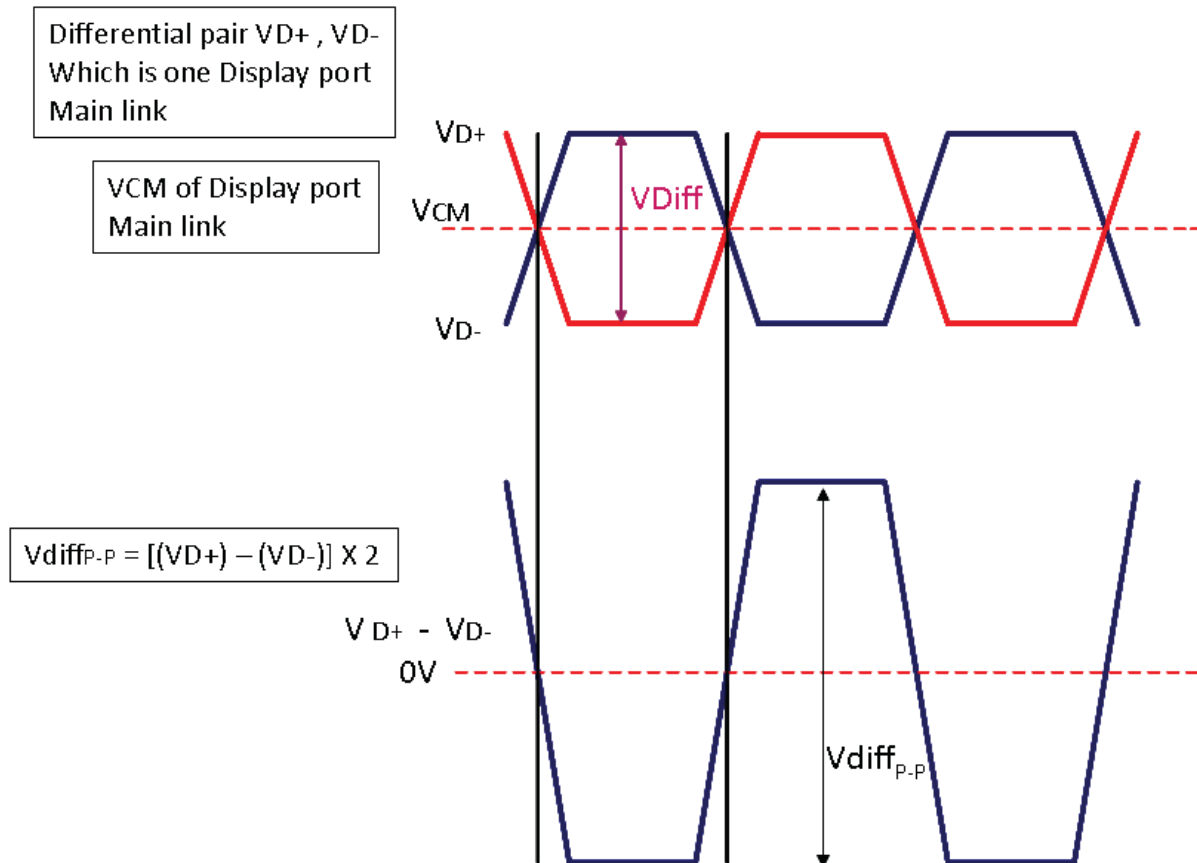
Vin rising time

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;

Display Port main link signal:

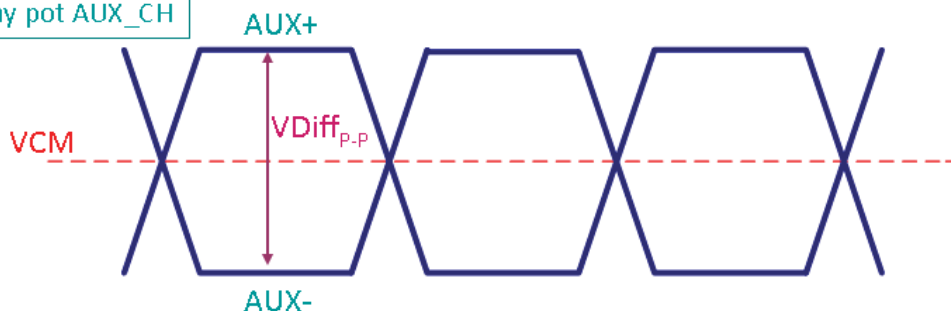


Display port main link					
		Min	Typ	Max	unit
VCM	RX input DC Common Mode Voltage	--	0	--	V
VDiff _{P-P}	Peak-to-peak Voltage at a receiving Device	150	--	1320	mV

Follow as VESA display port standard V1.4a

Display Port AUX_CH signal:

Differential AUX+ , AUX-
Which is Display port AUX_CH



Display port AUX_CH					
		Min	Typ	Max	unit
VCM	AUX DC Common Mode Voltage	--	0	--	V
VDiff _{p-p}	AUX Peak-to-peak Voltage at a receiving Device	270		800	mV

Follow as VESA display port standard V1.4a

Display Port VHPD signal:

Display port VHPD					
		Min	Typ	Max	unit
VHPD	HPD Voltage	2.25	--	3.6	V

Follow as VESA display port standard V1.4a



5.2 Backlight Unit

5.2.1 LED characteristics

Parameter	Symbol	Min	Typ	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	5.3	[Watt]	(Ta=25°C), Note 1 Vin =12V
LED Life-Time	N/A	30,000	-	-	Hour	(Ta=25°C), Note 2 IF=19.6mA

Note 1: Calculator value for reference $P_{LED} = V_F$ (Normal Distribution) * I_F (Normal Distribution) / Efficiency

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

5.2.2 Backlight input signal characteristics

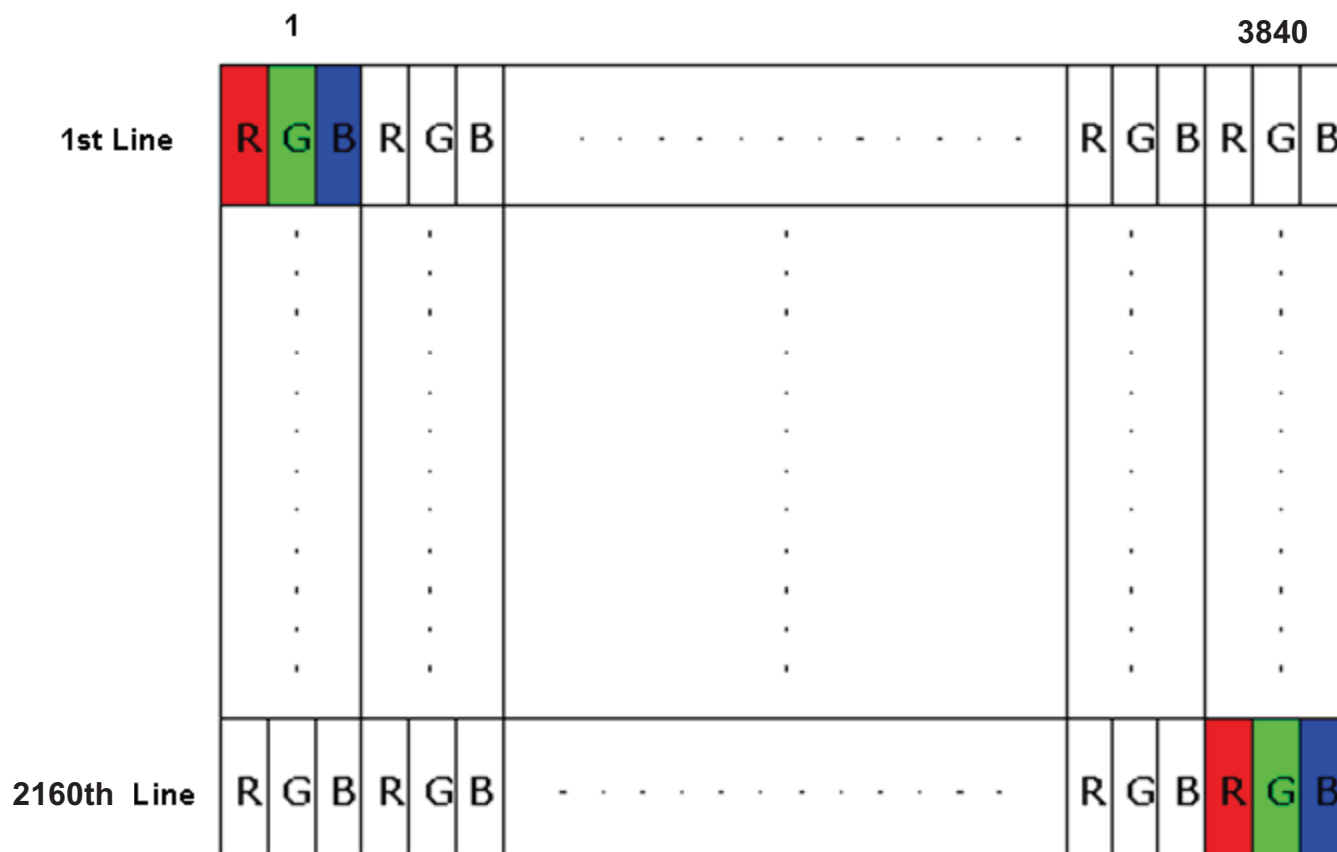
Parameter	Symbol	Min	Typ	Max	Units	Remark
LED Power Supply	VLED	5	12	21	[Volt]	Define as Connector Interface (Ta=25°C)
LED Enable Input High Level	VLED_EN	3.0	3.3	3.6	[Volt]	
LED Enable Input Low Level		0	0	0.5	[Volt]	
PWM Logic Input High Level	VPWM_EN	3.0	3.3	3.6	[Volt]	
PWM Logic Input Low Level		0	0	0.5	[Volt]	
PWM Input Frequency	FPWM	200	1K	10K	Hz	
PWM Duty Ratio	Duty	5	--	100	%	

Note 1 : Recommend system pull up/down resistor no bigger than 10KOhm

6. Signal Interface Characteristic

6.1 Pixel Format Image

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





6.2 Integration Interface Requirement

6.2.1 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.

Connector Name / Designation	For Signal Connector
Manufacturer	I-PEX
Type / Part Number	IPEX - 20765-040E-11A or compatible
Mating Housing/Part Number	I-PEX 20704-040T-13 or compatible



6.2.2 Pin Assignment (2 Lane)

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

Pin No.	Symbol	Function
1	NC (DCR)	No Connect (Reserve for DCR) CABC
2	H_GND	High Speed Ground
3	Lane3_N	Comp Signal Link Lane3
4	Lane3_P	True Signal Link Lane3
5	H_GND	High Speed Ground
6	Lane2_N	Comp Signal Link Lane2
7	Lane2_P	True Signal Link Lane2
8	H_GND	High Speed Ground
9	Lane1_N	Comp Signal Link Lane1
10	Lane1_P	True Signal Link Lane1
11	H_GND	High Speed Ground
12	Lane0_N	Comp Signal Link Lane0
13	Lane0_P	True Signal Link Lane0
14	H_GND	High Speed Ground
15	AUX_CH_P	True Signal Auxiliary Ch
16	AUX_CH_N	Comp Signal Auxiliary
17	H_GND	High Speed Ground
18	LCD_VCC	LCD logic and driver power
19	LCD_VCC	LCD logic and driver power
20	LCD_VCC	LCD logic and driver power
21	LCD_VCC	LCD logic and driver power
22	LCD_Self_Test or NC	LCD Panel Self Test Enable (Optional) BIST
23	LCD GND	LCD logic and driver ground
24	LCD GND	LCD logic and driver ground
25	LCD GND	LCD logic and driver ground
26	LCD GND	LCD logic and driver ground
27	HPD	HPD signal pin
28	BL_GND	Backlight_ground
29	BL_GND	Backlight_ground
30	BL_GND	Backlight_ground
31	BL_GND	Backlight_ground
32	BL_Enable	Backlight On/Off enable
33	BL_PWM_DIM	Backlight PWM Signal Input
34	NC (SCL)	NC or SCL for I2C
35	NC (SDA)	NC or SDA for I2C
36	BL_PWR	Backlight Power
37	BL_PWR	Backlight Power



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38	BL_PWR	Backlight Power
39	BL_PWR	Backlight Power
40	NC	No connect (Reserve for CM)

Note1: Start from right side

Note2: Input signals shall be low or High-impedance state when VDD is off. Internal circuit of **eDP inputs** are as following.

6.3 Interface Timing

6.3.1 Timing Characteristics

Basically, interface timings should match the 3840x2160 /60Hz manufacturing guide line timing.

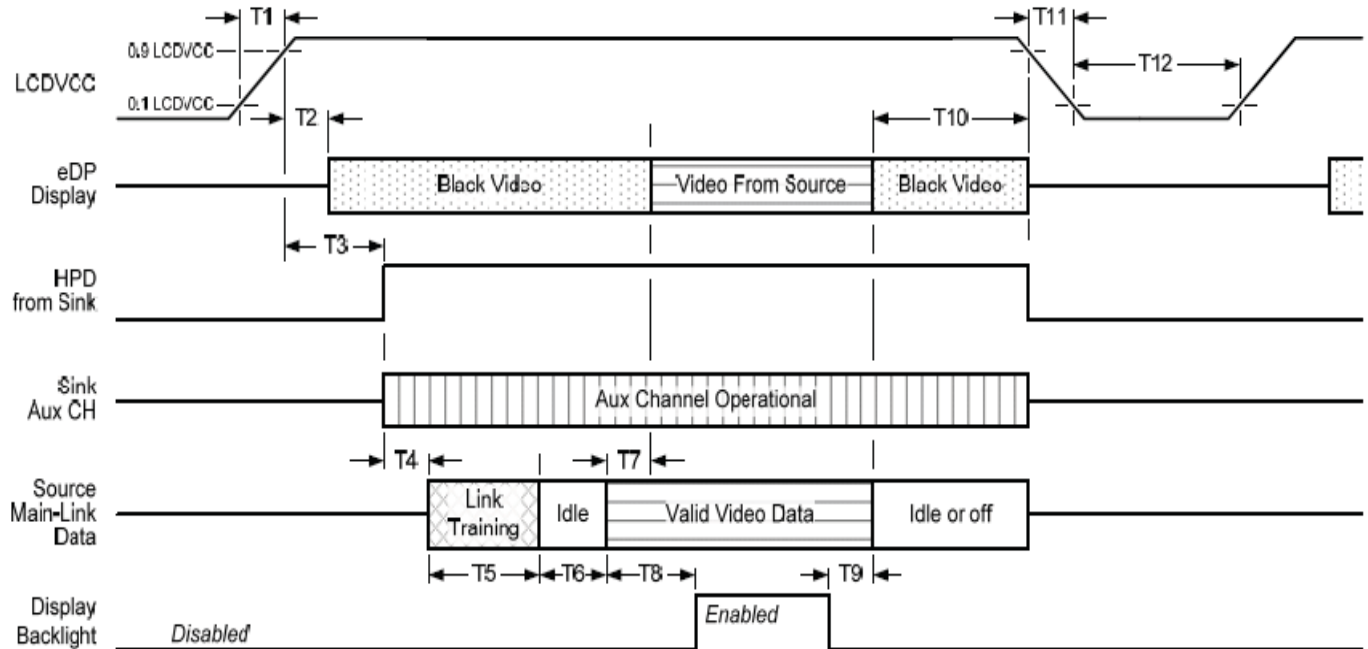
Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		-	59.94	59.97	60	Hz
Clock frequency		1/ T _{Clock}	--	533.01	--	MHz
Vertical Section	Period	T _V	--	2222	--	T _{Line}
	Active	T _{VD}	2160			
	Blanking	T _{VB}	--	62	--	
Horizontal Section	Period	T _H	--	4000	--	T _{Clock}
	Active	T _{HD}	3840			
	Blanking	T _{HB}	--	160	--	

Note 1 : The above is as optimized setting

Note 2 : The maximum clock frequency

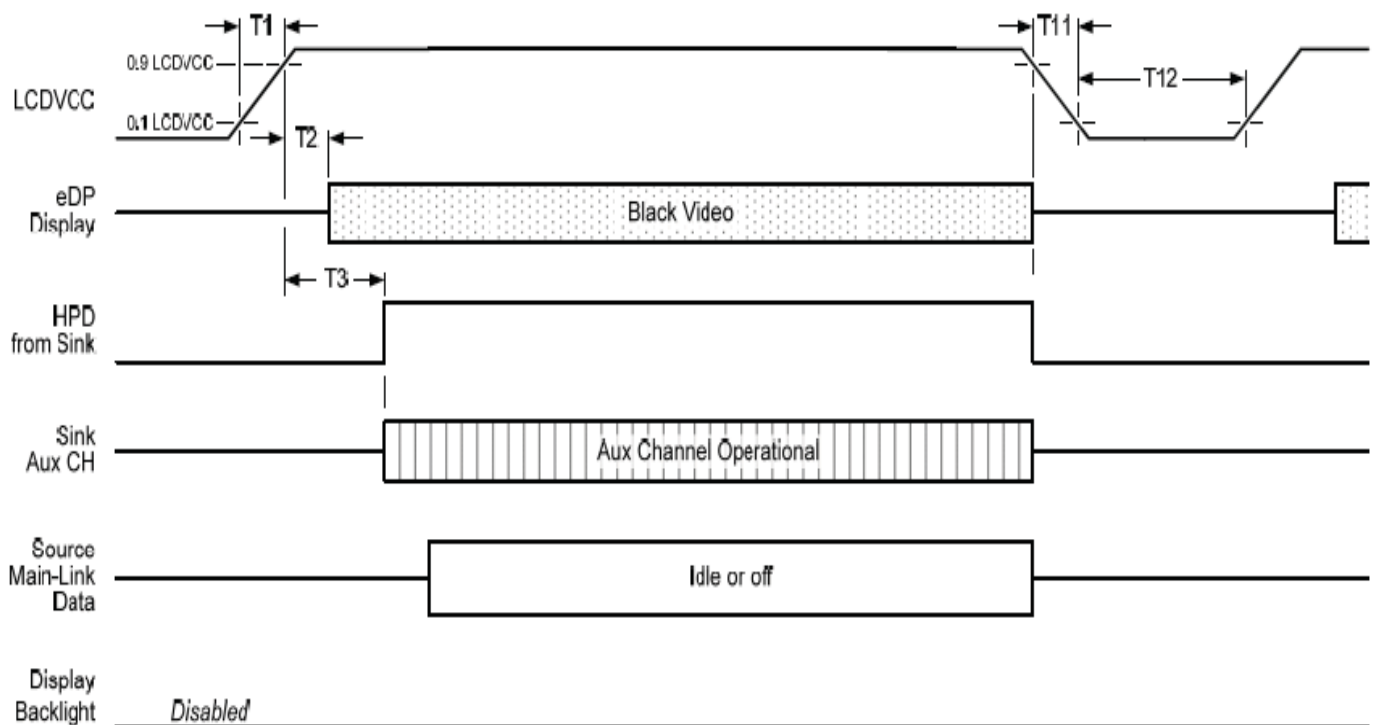
6.4 Power ON/OFF Sequence

Display Port panel power sequence:



Display port interface power up/down sequence, normal system operation

Display Port AUX_CH transaction only:



Display port interface power up/down sequence, AUX_CH transaction only



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Display Port panel power sequence timing parameter:

Timing parameter	Description	Reqd. by	Limits			Notes
			Min.	Typ.	Max.	
T1	power rail rise time, 10% to 90%	source	0.5ms		10ms	
T2	delay from LCDVDD to black video generation	sink	0ms		200ms	prevents display noise until valid video data is received from the source
T3	delay from LCDVDD to HPD high	sink	0ms		200ms	sink AUX_CH must be operational upon HPD high.
T4	delay from HPD high to link training initialization	source				allows for source to read link capability and initialize.
T5	link training duration	source				dependant on source link to read training protocol.
T6	link idle	source				Min accounts for required BS-Idle pattern. Max allows for source frame synchronization.
T7	delay from valid video data from source to video on display	sink	0ms		50ms	max allows sink validate video data and timing.
T8	delay from valid video data from source to backlight enable	source				source must assure display video is stable.
T9	delay from backlight disable to end of valid video data	source				source must assure backlight is no longer illuminated.
T10	delay from end of valid video data from source to power off	source	50ms		500ms	
T11	power rail fall time, 90% to 10%	source			10ms	
T12	power off time	source	500ms			

Note1: The sink must include the ability to generate black video autonomously. The sink must automatically enable black video under the following conditions:

- upon LCDVDD power on (within T2 max)-when the "Novideostream_Flag" (VB-ID Bit 3) is received from the source (at the end of T9).
- when no main link data, or invalid video data, is received from the source. Black video must be displayed within 64ms (typ) from the start of either condition. Video data can be deemed invalid based on MSA and timing information, for example.

Note 2: The sink may implement the ability to disable the black video function, as described in Note 1, above, for system development and debugging purpose.

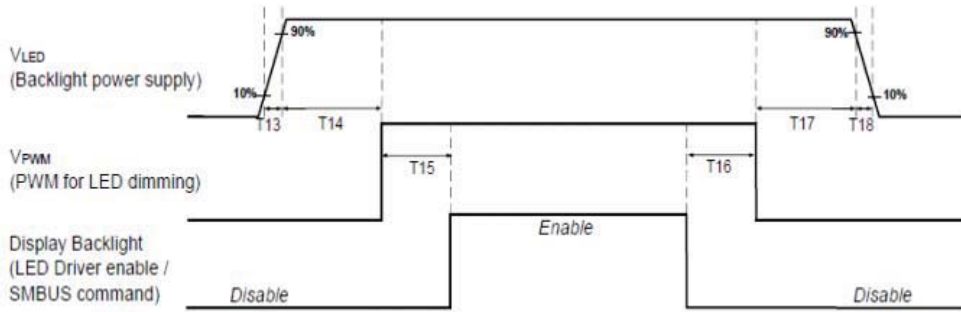
Note 3: The sink must support AUX_CH polling by the source immediately following LCDVDD power on without causing damage to the sink device (the source can re-try if the sink is not ready). The sink must be able to respond to an AUX_CH transaction with the time specified within T3 max.



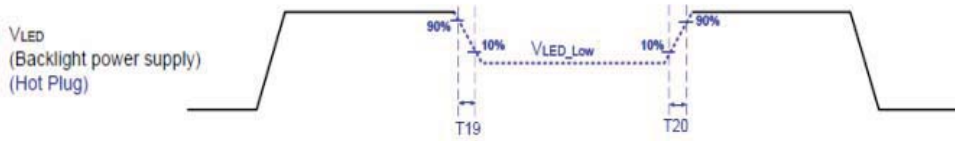
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Display Port panel B/L power sequence timing parameter:



Note : When the adapter is hot plugged, the backlight power supply sequence is shown as below.



	Min (ms)	Max (ms)
T13	0.5	10
T14	10	-
T15	0	-
T16	0	-
T17	10	-
T18	0.5	10
T19	1*	-
T20	1*	-

Seamless change: $T19/T20 = 5 \times T_{PWM}^*$

* $T_{PWM} = 1/\text{PWM Frequency}$



7. Panel Reliability Test

7.1 Vibration Test

Test Spec:

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

7.2 Shock Test

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

7.3 Reliability Test

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 , 35%RH, 300h	
Low Temperature Storage	Ta= -20°C , 50%RH, 250h	
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.

Self-recoverable.

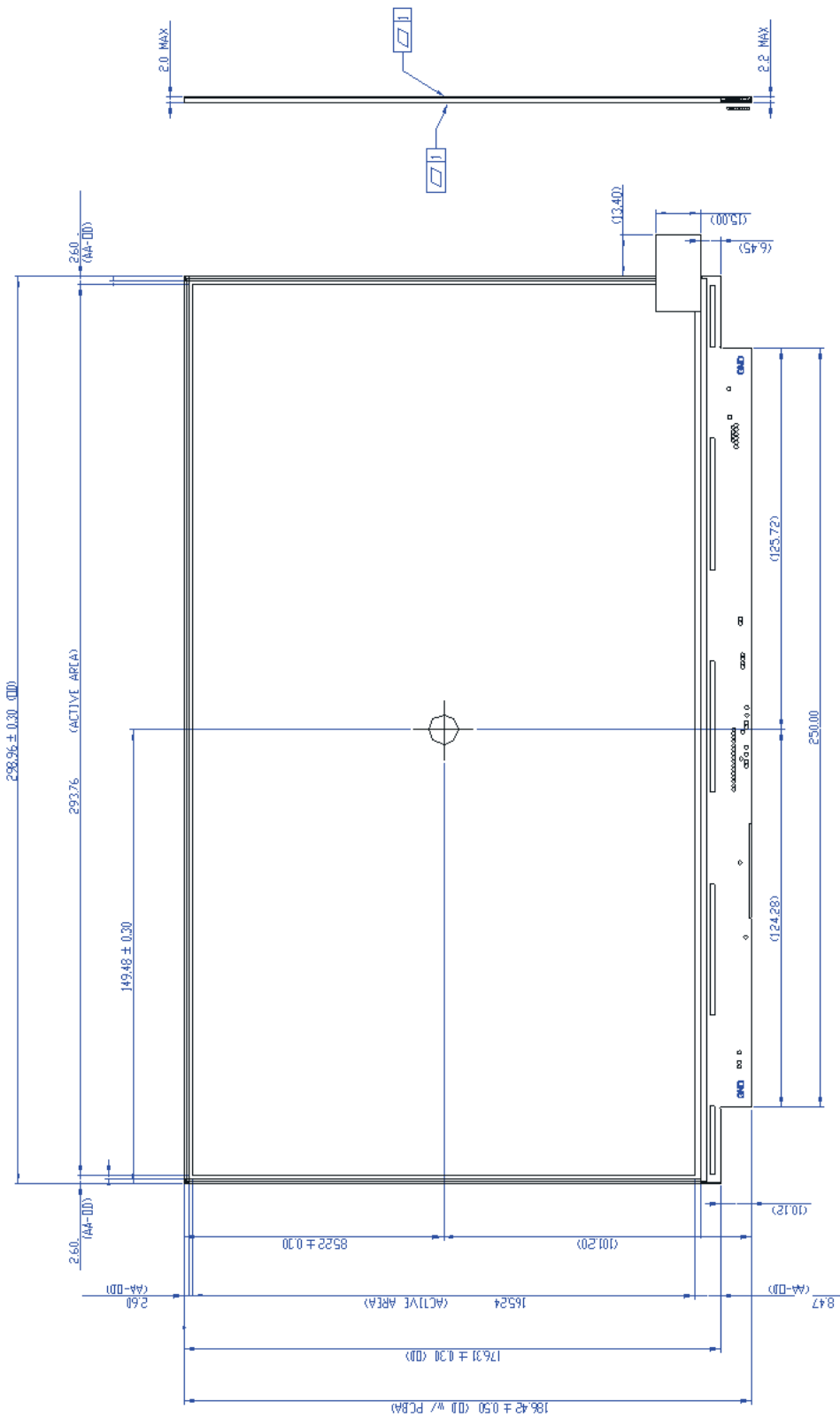
No data lost, No hardware failures.

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

8. Mechanical Characteristics

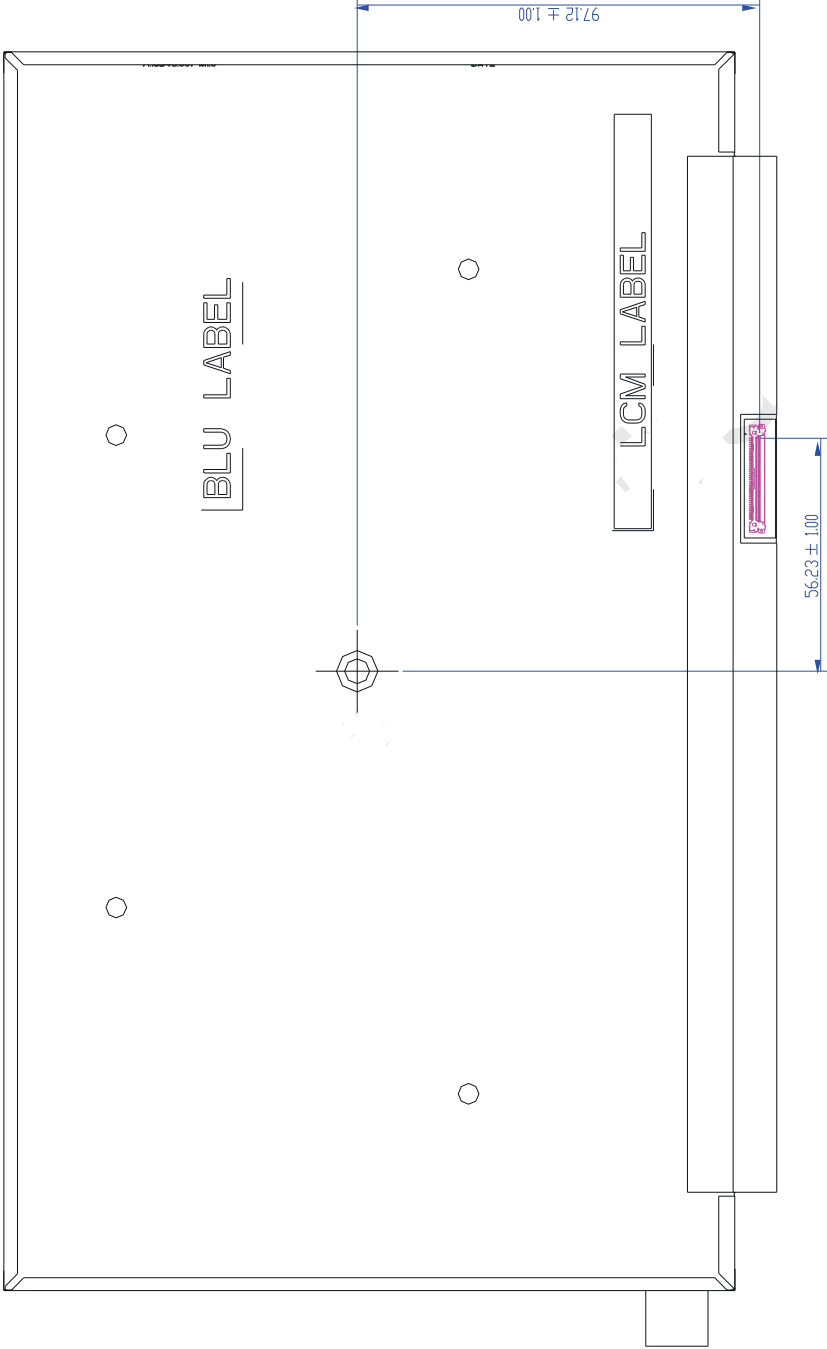
8.1 LCM Outline Dimension

8.1.1 Standard Front View



8.1.2 Standard Rear View & Key components remark and remind

Prevention damage the IC, connector, Capacitor...., we recommend your design (Ex: cable, rib, hardness parts) far away those section those have remarked at this drawing.

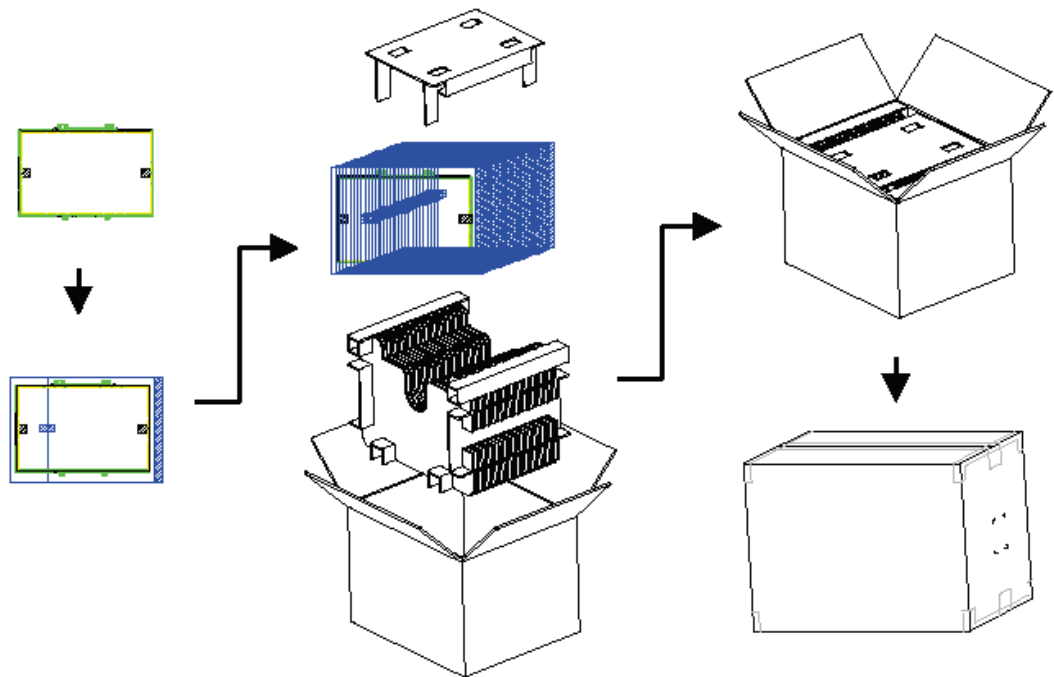


9. Shipping and Package

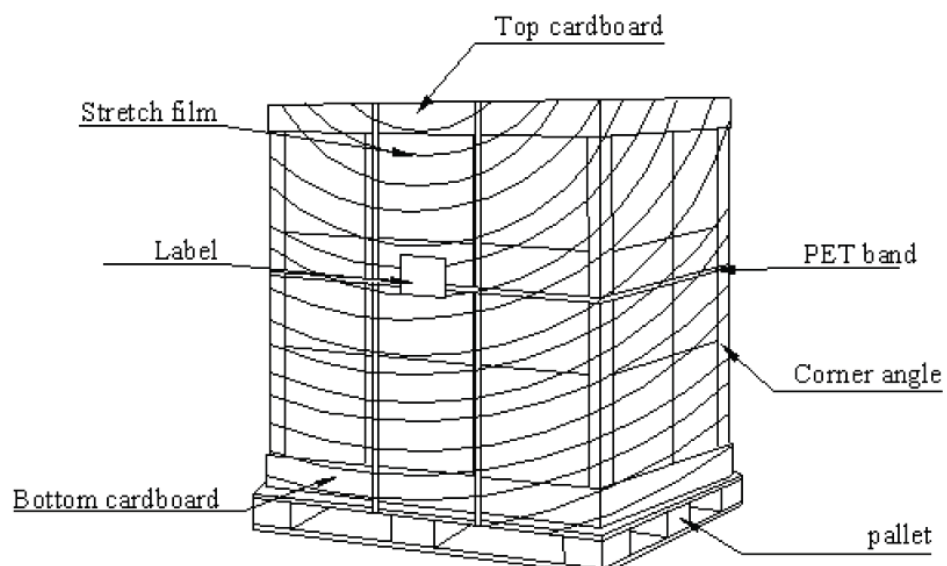
9.1 Shipping Label Format



9.2 Carton Package



9.3 Shipping Package of Palletizing Sequence



10. Appendix: EDID Description

Address	FUNCTION	Value	Value	Value
HEX		HEX	BIN	DEC
00	Header	00	00000000	0
01		FF	11111111	255
02		FF	11111111	255
03		FF	11111111	255
04		FF	11111111	255
05		FF	11111111	255
06		FF	11111111	255
07		00	00000000	0
08	EISA Manuf. Code LSB	06	00000110	6
09	Compressed ASCII	AF	10101111	175
0A	Product Code	2B	00101011	43
0B	hex, LSB first	29	00101001	41
0C	32-bit ser #	00	00000000	0
0D		00	00000000	0
0E		00	00000000	0
0F		00	00000000	0
10	Week of manufacture	00	00000000	0
11	Year of manufacture	1C	00011100	28
12	EDID Structure Ver.	01	00000001	1
13	EDID revision #	04	00000100	4
14	Video input def. <i>(digital I/P, non-TMDS, CRGB)</i>	B5	10110101	181
15	Max H image size <i>(rounded to cm)</i>	1D	00011101	29
16	Max V image size <i>(rounded to cm)</i>	11	00010001	17
17	Display Gamma <i>(=(gamma*100)-100)</i>	78	01111000	120
18	Feature support <i>(no DPMS, Active OFF, RGB, tmg Blk#1)</i>	03	00000011	3
19	Red/green low bits (Lower 2:2:2:2 bits)	EE	11101110	238
1A	Blue/white low bits (Lower 2:2:2:2 bits)	95	10010101	149
1B	Red x (Upper 8 bits)	A3	10100011	163
1C	Red y/ highER 8 bits	54	01010100	84
1D	Green x	4C	01001100	76
1E	Green y	99	10011001	153
1F	Blue x	26	00100110	38
20	Blue y	0F	00001111	15
21	White x	50	01010000	80
22	White y	54	01010100	84
23	Established timing 1	00	00000000	0
24	Established timing 2	00	00000000	0
25	Established timing 3	00	00000000	0
26	Standard timing #1	01	00000001	1
27		01	00000001	1
28	Standard timing #2	01	00000001	1
29		01	00000001	1

2A	Standard timing #3	01	00000001	1
2B		01	00000001	1
2C	Standard timing #4	01	00000001	1
2D		01	00000001	1
2E	Standard timing #5	01	00000001	1
2F		01	00000001	1
30	Standard timing #6	01	00000001	1
31		01	00000001	1
32	Standard timing #7	01	00000001	1
33		01	00000001	1
34	Standard timing #8	01	00000001	1
35		01	00000001	1
36	Pixel Clock/10000 LSB	64	01100100	100
37	Pixel Clock/10000 USB	D2	11010010	210
38	Horz active Lower 8bits	00	00000000	0
39	Horz blanking Lower 8bits	A0	10100000	160
3A	HorzAct:HorzBlnk Upper 4:4 bits	F0	11110000	240
3B	Vertical Active Lower 8bits	70	01110000	112
3C	Vertical Blanking Lower 8bits	54	01010100	84
3D	Vert Act : Vertical Blanking (upper 4:4 bit)	80	10000000	128
3E	HorzSync. Offset	30	00110000	48
3F	HorzSync.Width	20	00100000	32
40	VertSync.Offset : VertSync.Width	35	00110101	53
41	Horz&Vert Sync Offset/Width Upper 2bits	00	00000000	0
42	Horizontal Image Size Lower 8bits	25	00100101	37
43	Vertical Image Size Lower 8bits	A5	10100101	165
44	Horizontal & Vertical Image Size (upper 4:4 bits)	10	00010000	16
45	Horizontal Border <i>(zero for internal LCD)</i>	00	00000000	0
46	Vertical Border <i>(zero for internal LCD)</i>	00	00000000	0
47	Signal <i>(non-intr, norm, no stero, sep sync, neg pol)</i>	18	00011000	24
48	Pixel Clock/10,000 (LSB)	43	01000011	67
49	Pixel Clock/10,000 (MSB)	8C	10001100	140
4A	Horizontal Addressable Pixels, lower 8 bits	00	00000000	0
4B	Horizontal Blanking Pixels, lower 8 bits	A0	10100000	160
4C	H Pixels, upper nibble : H Blanking, upper nibble	F0	11110000	240
4D	Vertical Addressable Lines, lower 8 bits	70	01110000	112
4E	Vertical Blanking Lines, lower 8 bits	54	01010100	84
4F	V lines, upper nibble : V blanking, upper nibble	80	10000000	128
50	Horizontal Front Porch, lower 8 bits	30	00110000	48
51	Horizontal Sync Pulse, lower 8 bits	20	00100000	32
52	V Front Porch, lower nibble : V Sync Pulse, lower nibble	35	00110101	53
53	VFP, 2 bits: VSP 2 bits: HFP 2 bits: HFP 2 bits	00	00000000	0
54	Horizontal Image Size in mm, lower 8 bits	25	00100101	37
55	Vertical Image Size in mm, lower 8 bits	A5	10100101	165
56	H Image Size, upper nibble : V Image Size, upper nibble	10	00010000	16
57	Horizontal Border	00	00000000	0
58	Vertical Border	00	00000000	0

59	Bit Encode Sync Information	18	00011000	24
5A	DC	00	00000000	0
5B	HTOTAL	00	00000000	0
5C	HA	00	00000000	0
5D	HBL	00	00000000	0
5E	HFP	00	00000000	0
5F	HFPe	00	00000000	0
60	HBP	00	00000000	0
61	HB	00	00000000	0
62	HSO	00	00000000	0
63	HS	00	00000000	0
64	VTOTAL	00	00000000	0
65	VA	00	00000000	0
66	VBL	00	00000000	0
67	VFP	00	00000000	0
68	VBP	00	00000000	0
69	VB	00	00000000	0
6A	VSO	00	00000000	0
6B	VS	00	00000000	0
6C	Detail Timing Description #4	00	00000000	0
6D	Flag	00	00000000	0
6E	Reserved	00	00000000	0
6F	For Brightness Table and Power Consumption	03	00000011	3
70	Flag	00	00000000	0
71	PWM % [7:0] @ Step 0	0C	00001100	12
72	PWM % [7:0] @ Step 5	22	00100010	34
73	PWM % [7:0] @ Step 10	FF	11111111	255
74	Nits [7:0] @ Step 0	16	00010110	22
75	Nits [7:0] @ Step 5	3C	00111100	60
76	Nits [7:0] @ Step 10	13	00010011	19
77	Panel Electronics Power @ 32x32 Chess Pattern =	2B	00101011	43
78	Backlight Power @ 60 nits =	37	00110111	55
79	Backlight Power @ Step 10 =	39	00111001	57
7A	Nits [7:0] @ 100% PWM Duty =	13	00010011	19
7B	Flag	01	00000001	1
7C	Flag	01	00000001	1
7D	Flag	20	00100000	32
7E	Extension Flag	01	00000001	1
7F	Checksum	35	00110101	53
			SUM	6656

Extend EDID for HDR

Address	FUNCTION	Value	Value	Value	Note
HEX		HEX	BIN	DEC	
80	Tag (0x02)	2	10	2	

81	Revision Number	3	11	3	
82	Byte Offset of DT Blocks	0F	1111	15	
83		0	0	0	
84	Tag Code	E3	11100011	227	
85	Extended Tag Code	5	101	5	
86	BT2020 RGB	80	10000000	128	
87		0	0	0	
88	Tag Code	E6	11100110	230	
89	Extended Tag Code	6	110	6	
8A	Support Tranditional Gamma SDR, SMPTE ST2084	5	101	5	
8B	Static Metadata Type 1	1	1	1	
8C	MAX Luminance Data (550nits)	6F	1101111	111	
8D	MAX Frame-average Luminance Data (550nits)	6F	1101111	111	
8E	MIN Luminance Data (0.098nits)	22	100010	34	