



Product Specification

AU OPTRONICS CORPORATION

(✓) Preliminary Specifications

() Final Specifications

Module	14.0"(13.97") FHD 16:9 Color TFT-LCD with LED Backlight design
Model Name	BI40HAK02.4 Dell P/N: 0RWGX1
H/W	2A
Note ()	oTP Display

Customer	Date
Checked & Approved by	Date
Note: This Specification is subject to change without notice.	

Approved by	Date
<u>Grace Hung</u>	<u>08/10/2021</u>
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AU Optronics corporation	



Product Specification

AU OPTRONICS CORPORATION

Contents

1. Handling Precautions	4
2. General Description	5
2.1 General Specification	5
2.2 General Touch Specification	6
2.3 Optical Characteristics	7
3. Functional Block Diagram	12
4. Absolute Maximum Ratings	13
4.1 Absolute Ratings of TFT LCD Module	13
4.2 Absolute Ratings of Touch Sensor Module.....	13
4.3 Absolute Ratings of Environment	13
5. Electrical Characteristics	14
5.1 TFT LCD Module	14
5.2 Backlight Unit	17
5.3 Touch Sensor Module	18
6. Signal Interface Characteristic	19
6.1 Pixel Format Image.....	19
6.2 Integration Interface Requirement	20
6.3 Interface Timing	23
6.4 Power ON/OFF Sequence	24
7. Panel Reliability Test	27
7.1 Vibration Test	27
7.2 Shock Test	27
7.3 Reliability Test	27
8. Mechanical Characteristics	28
8.1 Total Solution Outline Dimension	28
9. Shipping and Package	30
9.1 Shipping Label Format	30
9.2 Shipping Package of Palletizing Sequence	30
10. Appendix:	31
10.1 EDID Description	31
10.2 Notes.....	33



Product Specification

AU OPTRONICS CORPORATION

Record of Revision

Version and Date	Page	Old description	New Description	Remark
0.1 2021/08/10	All	First Edition for Customer		X10



Product Specification

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I. 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.



Product Specification

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2. General Description

BI40HAK02.4 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 FHD, 1920(H) x 1080(V) screen and 16.2M colors (RGB -6bits with FRC) with LED backlight driving circuit. All input signals are eDP (Embedded DisplayPort) interface compatible.

BI40HAK02.4 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]	354.95			
Active Area	[mm]	309.37 X 174.02			
Pixels H x V		1920x3(RGB) x 1080			
Pixel Pitch	[mm]	0.161 x 0.161			
Pixel Format		R.G.B. Vertical Stripe			
Display Mode		Normal, Black (AHVA)			
White Luminance (ILED=22.5mA) (Note: ILED is LED current)	[cd/m²]	300 typ. (5 points average) 255 min. (5 points average)			
Luminance Uniformity		1.25 max. (5 points)			
Contrast Ratio		700 typ			
Response Time	[ms]	25			
Nominal Input Voltage VDD	[Volt]	+3.3 typ			
Power Consumption	[Watt]	4.3 (include Logic and Blu power)			
Weight	[Grams]	320 g max (Total Solution) ¹			
Physical Size	[mm]		Min.	Typ.	Max.
		Length	315.57	315.87	316.17
		Width	185.78	186.08	186.38 187.68 (with FPC Bending area)
		Thickness	-	-	3.0 (W/O PCBa) 5.25 (W/ PCBa)
Electrical Interface		eDPI.3			
Glass Thickness	[mm]	0.4			
Surface Treatment		Anti-Glare, Hardness 3H			
Support Color		16.2M colors (RGB-6 bits with FRC)			
Temperature Range					
Operating	[°C]	0 to 50			
Storage (Non-Operating)	[°C]	-20 to +60			
RoHS Compliance		RoHS Compliance			

¹ Total solution max weight includes touch sensor and FPCA.



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2.2 General Touch Specification

Item	Spec	Unit
Type of Touch Sensor	Projective Capacitive	
Panel Size	14.0"	
Outline Dimension	NA(Cover lens free)	mm
Total Thickness	NA(Cover lens free)	mm
Total Weight	NA(Cover lens free)	g
TP View Area	NA(Cover lens free)	mm
TP Active Area	NA(Cover lens free)	mm
Interface	HID-I2C	
Report Rate	Follow win10	Hz
Multi-Touch Point	10 points	
Input method	Finger	
Touch panel sensor IC	ELAN eKTI5015M	
Channel	Rx74, Tx42	
Distance between 2 point	Follow win10	mm
Surface hardness	3 (Note 1)	H
Surface treatment	NA	
TP F/W version	TBD	
Support OS	Window 10	

Note1: Polarizer Test condition. Working speed: 50cycle/min 、 Moves distance: 100mm/sec (Exceptions to the rubber tip of the diameter is 6mm) 。 Measuring Process: The Load force and the friction material are fixed on 25mm diameter cylinder tooling. Polarizer pasted on bare glass and the start to test. 、 Inspect on the 500/1000/1500/2000 cycles.



Product Specification

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2.3 Optical Characteristics

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

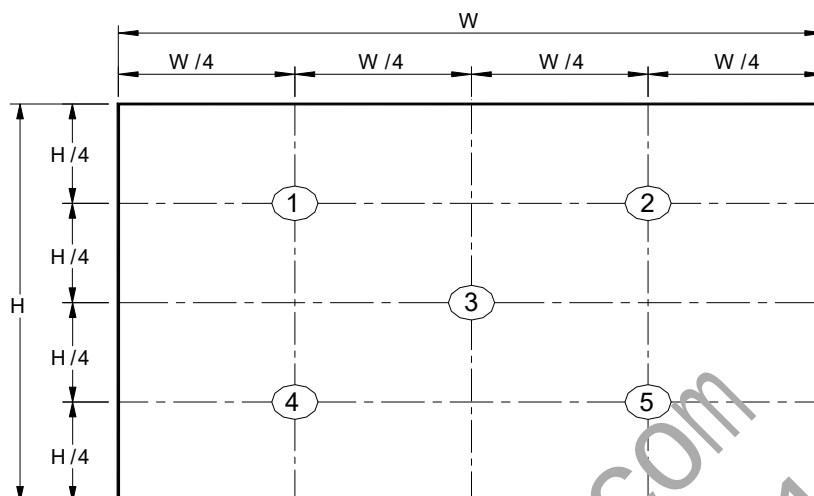
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note	
White Luminance ILED=10mA (Base Panel Only)		5 points average	255	300	-	cd/m2	1, 4, 5.	
Viewing Angle	θR	Horizontal (Right) CR = 10 (Left)	-	85	-	degree	4, 9	
	θL		-	85	-			
	ψH	Vertical (Upper) CR = 10 (Lower)	-	85	-			
	ψL		-	85	-			
Luminance Uniformity	δ5P	5 Points	-	-	1.25		1, 3, 4	
Luminance Uniformity	δ13P	13 Points	-	-	1.6		2, 3, 4	
Contrast Ratio	CR		500	700	-		4, 6	
Cross talk	%				4		4, 7	
Response Time	TRT	Rising + Falling	-	25	35			
Color / Chromaticity Coodinates	Red	Rx	CIE 1931	0.601	0.631	0.661	-	4
		Ry		0.306	0.336	0.366		
	Green	Gx		0.293	0.323	0.353		
		Gy		0.584	0.614	0.644		
	Blue	Bx		0.126	0.156	0.186		
		By		0.010	0.040	0.070		
	White	Wx		0.283	0.313	0.343		
		Wy		0.299	0.329	0.359		
	NTSC			%	-	72		



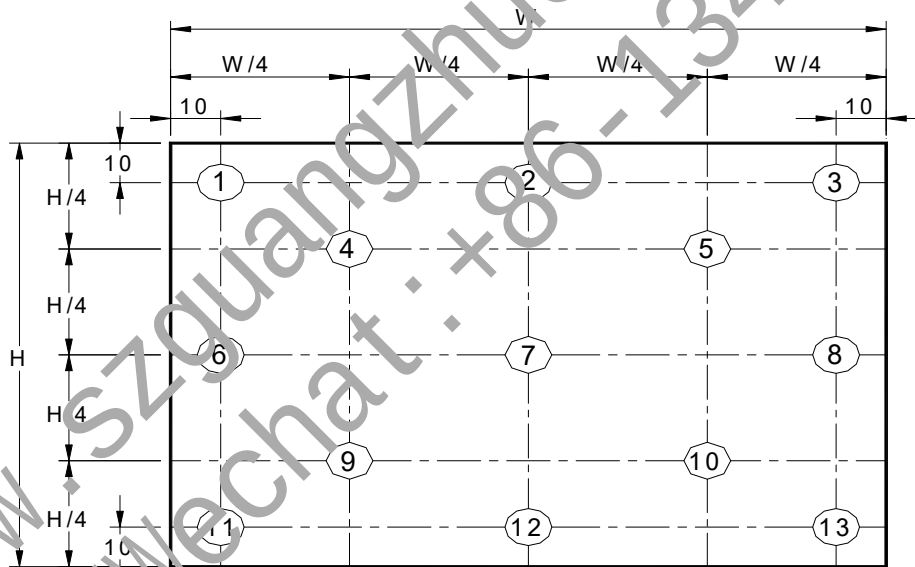
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Note 1: 5 points position (Ref: Active area)



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

$$\delta W_5 = \frac{\text{Maximum Brightness of five points}}{\text{Minimum Brightness of five points}}$$

$$\delta W_{13} = \frac{\text{Maximum Brightness of thirteen points}}{\text{Minimum Brightness of thirteen points}}$$

Note 4: Measurement method

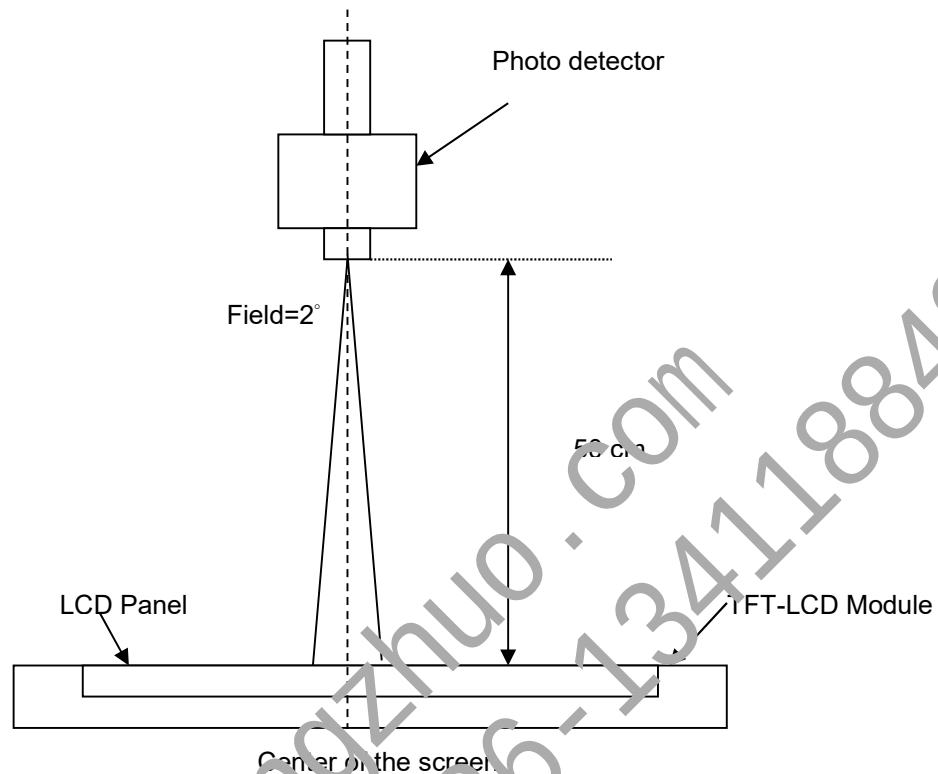
The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during



Product Specification

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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

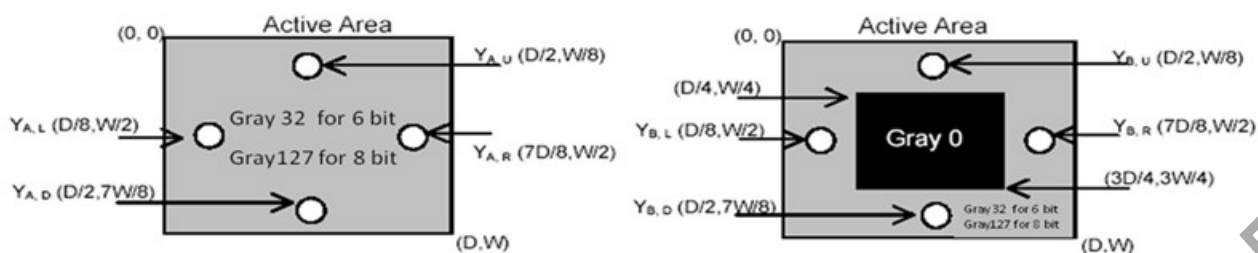
Y_A = Luminance of measured location without gray level 0 pattern (cd/m²)

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



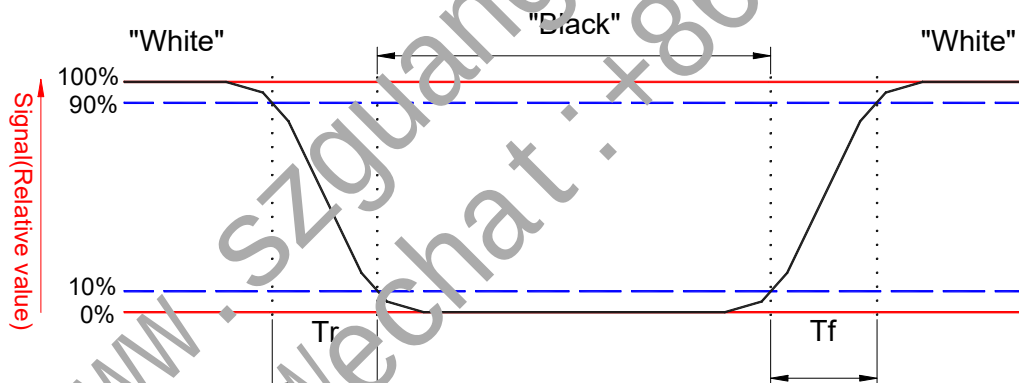
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Note 8: Definition of response time:

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.



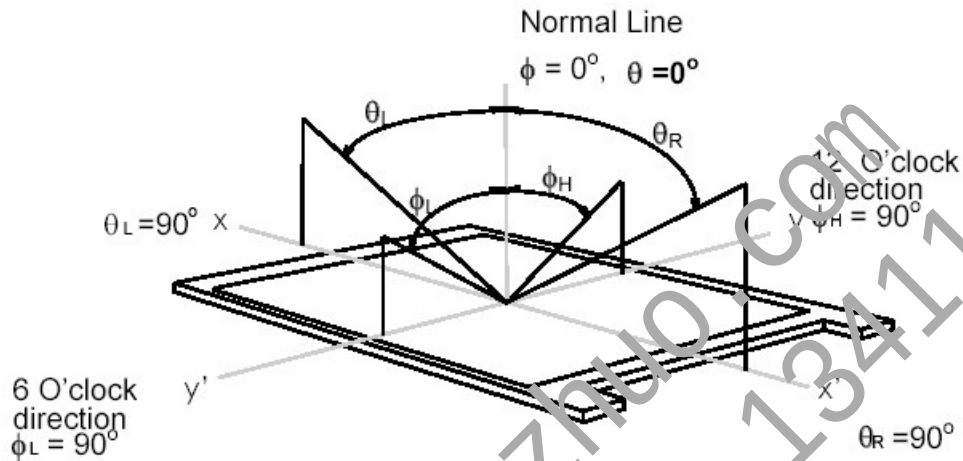


Product Specification

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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.



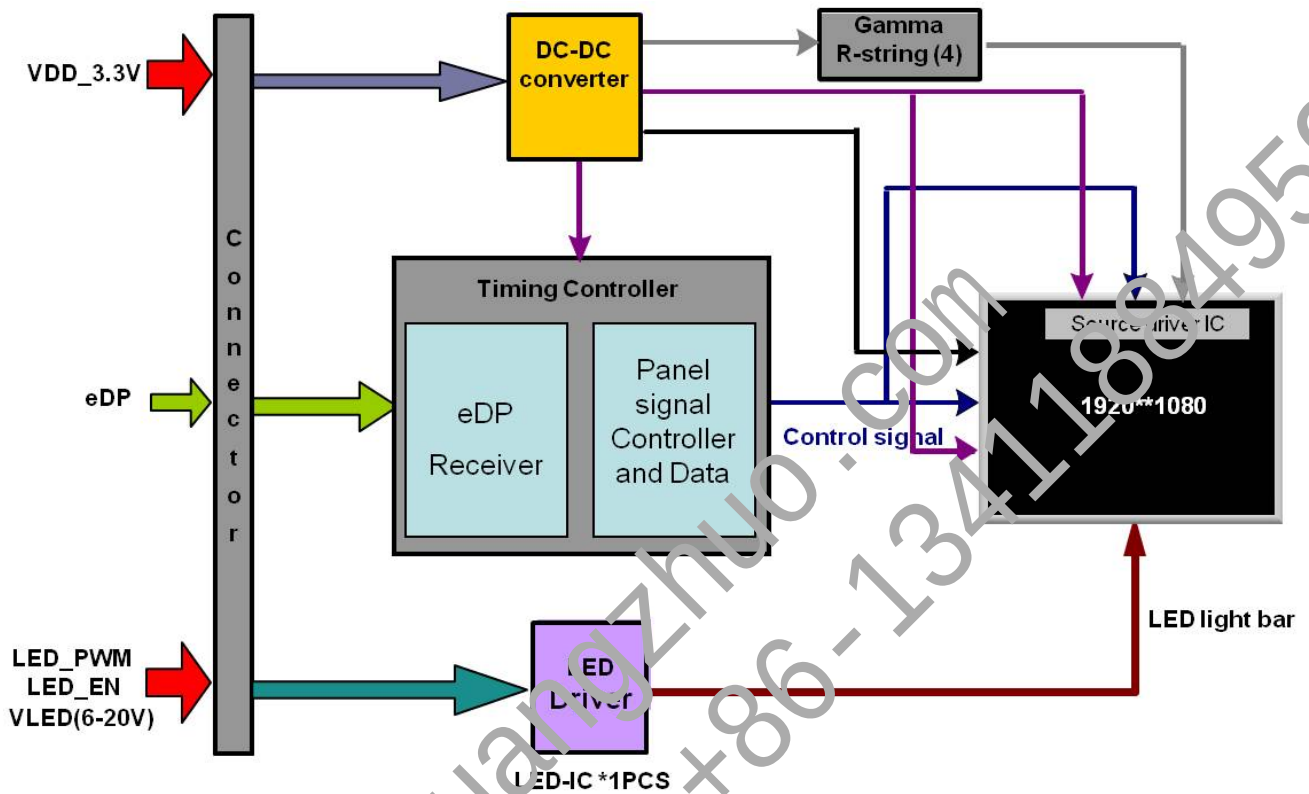


Product Specification

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3. Functional Block Diagram

The following diagram shows the functional block of the 14.0 inches wide Color TFT/LCD 40 Pin





Product Specification

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

4.2 Absolute Ratings of Touch Sensor Module

Item	Symbol	Min	Max	Unit	Conditions
Touch Sensor Module	VTSP	-0.3	+7	[Volt]	
Touch Sensor Module Reset Signal	RST	-0.3	+3.6	[Volt]	
Touch Sensor Module enable Signal	TP_EN	-0.3	+3.6	[Volt]	

4.3 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit	Conditions
Operating Temperature	TOP	0	+50	[°C]	Note 4
Operation Humidity	HOP	5	90	[%RH]	Note 4
Storage Temperature	TST	-20	+60	[°C]	Note 4
Storage Humidity	HST	5	95	[%RH]	Note 4

Note 1: At Ta (25°C)

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

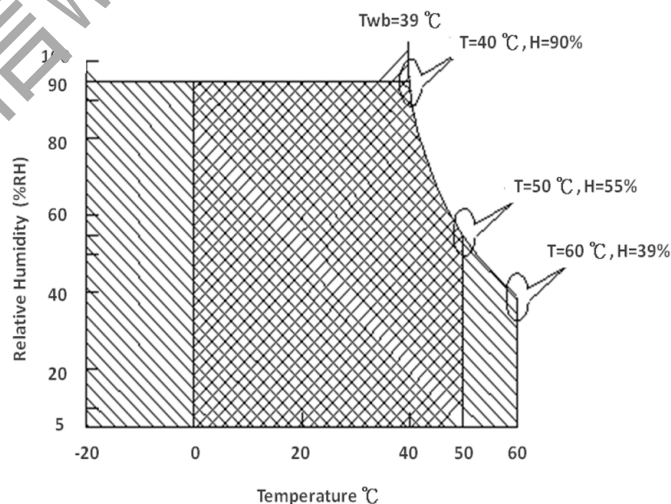
Note 3: LED specification refer to section 5.2

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

Note 5: The packing material or 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)





Product Specification

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5. Electrical Characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Input power specifications are as follows;

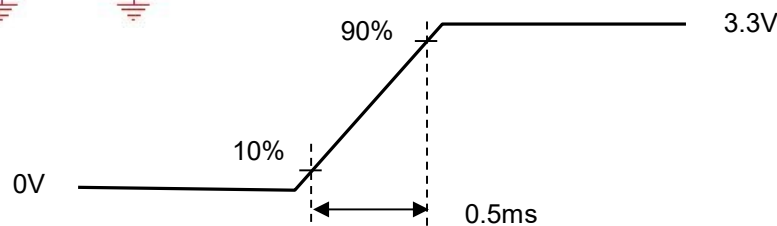
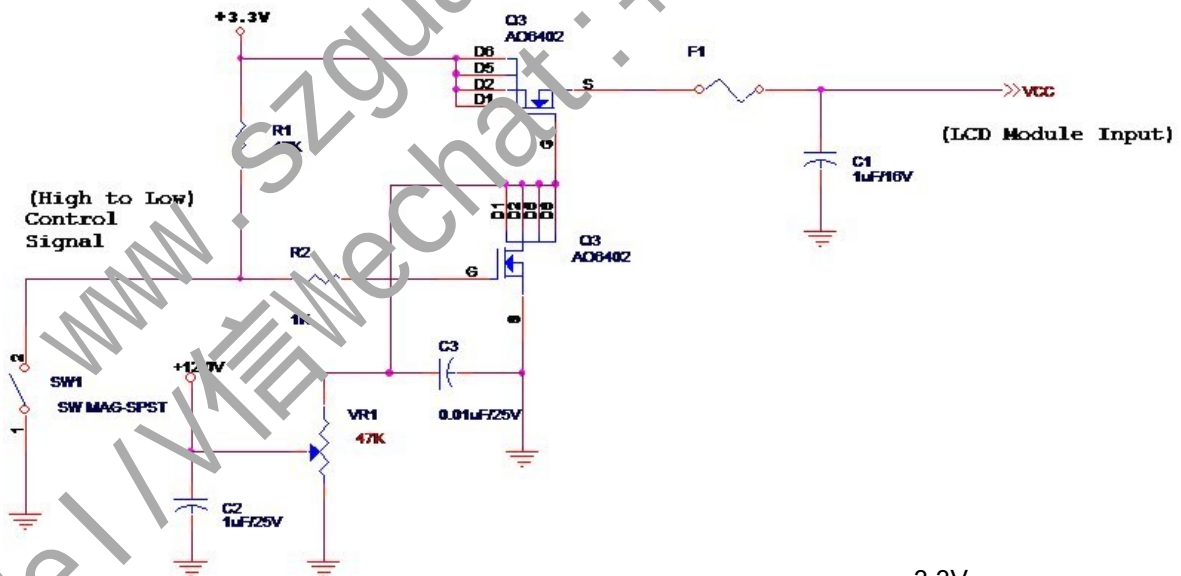
The power specification are measured under 25°C and frame frequency under 60Hz

Symble	Parameter	Min	Typ	Max	Units	Note
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	
PDD	VDD Power	-	0.9	1.8	[Watt]	Note 1
IDD	IDD Current(RMS)	-	-	234	[mA]	Note 1
IRush	Inrush Current	-	-	1500	[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



Product Specification

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5.1.2 Signal Electrical Characteristics

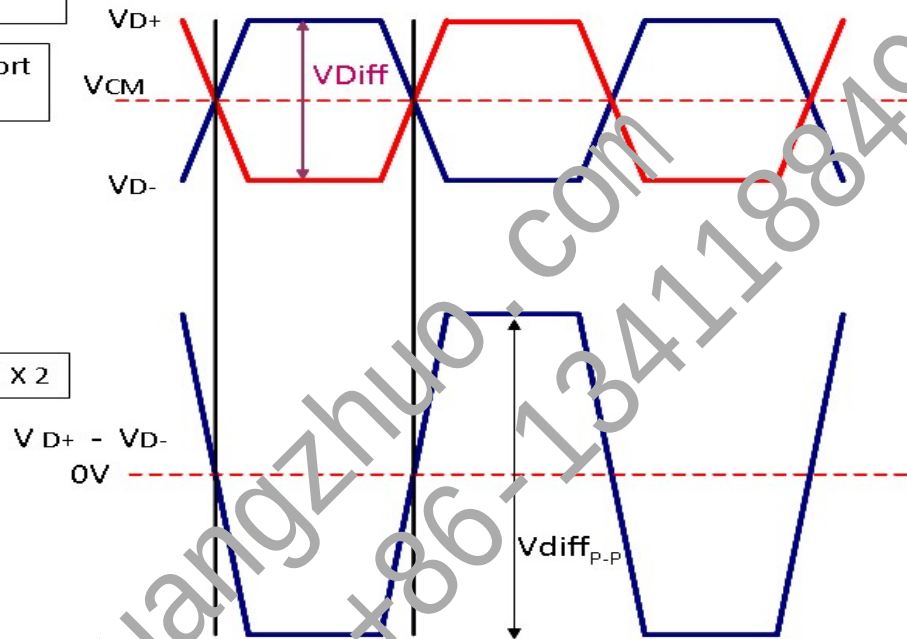
Signal electrical characteristics are as follows;

Display Port main link signal:

Differential pair VD+, VD-
Which is one Display port
Main link

VCM of Display port
Main link

$$V_{diff_{P-P}} = [(V_{D+}) - (V_{D-})] \times 2$$



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	HBR:150		1320	mV

Follow as VESA display port standard V1.4

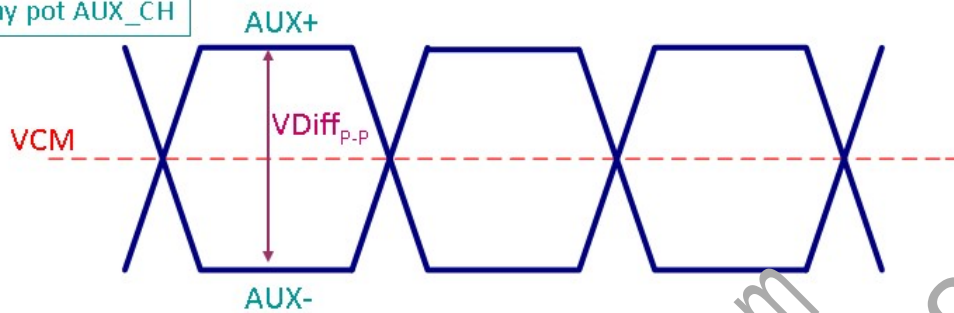


Product Specification

AU OPTRONICS CORPORATION

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 VI.4

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 VI.4



Product Specification

AU OPTRONICS CORPORATION

5.2 Backlight Unit

5.2.1 LED characteristics

Parameter	Symbol	Min	Typ	Max	Units	Condition
Backlight Power Consumption	PLED	-	-	2.775	[Watt]	(Ta=25°C, Note 1)
LED Life-Time	N/A	15,000	-	-	Hour	(Ta=25°C), Note 2 If=22.5 mA

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 (Note 1)	5.0	12.0	21.0	[Volt]	Define as Connector Interface (Ta=25°C)
LED Enable Input High Level	VLED_EN	2.5	-	5.5	[Volt]	
LED Enable Input Low Level		-	-	0.5	[Volt]	
PWM Logic Input High Level	VPWM_EN	2.5	-	5.5	[Volt]	
PWM Logic Input Low Level		-	-	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



Product Specification

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5.3 Touch Sensor Module

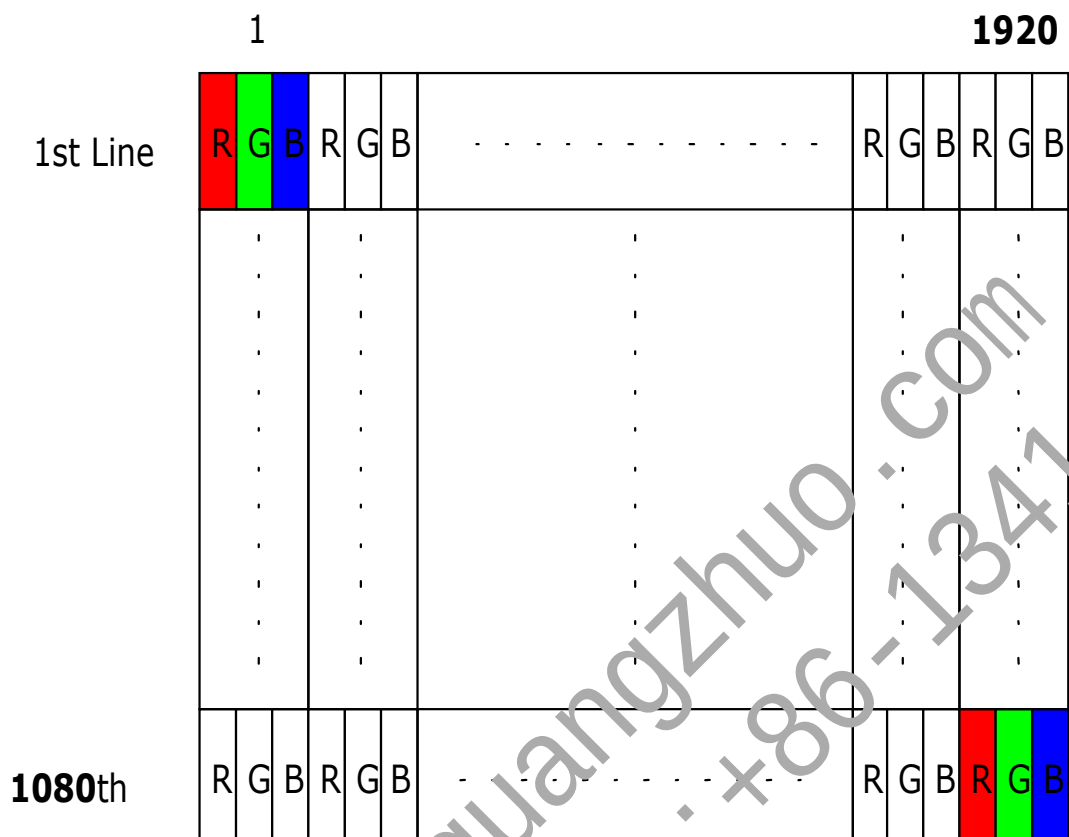
5.3.1 Power Specification

Items	Symbol		Specifications			Unit	Notes
			Min.	Typ.	Max.		
Touch sensor module Power Supply	VTSP		4.5	5	5.5	V	
Touch sensor module Power Consumption	PTP	Active	-	-	625	mW	
		Idle	-	-	125	mW	
		Sleep	-	-	10	mW	
Touch Sensor Module Power ripple	VTSPrp		-	-	-	100	mV
Input Voltage	RST, TP_EN	V _{IH}	2.31		3.3	V	
		V _{IL}	0		0.99	V	

6. Signal Interface Characteristic

6.1 Pixel Format Image

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





Product Specification

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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	IPEX or Compatible
Type / Part Number	20765-040E-11A or Compatible
Mating Housing/Part Number	20704-040T-13(with Lock) or Compatible

Product Specification

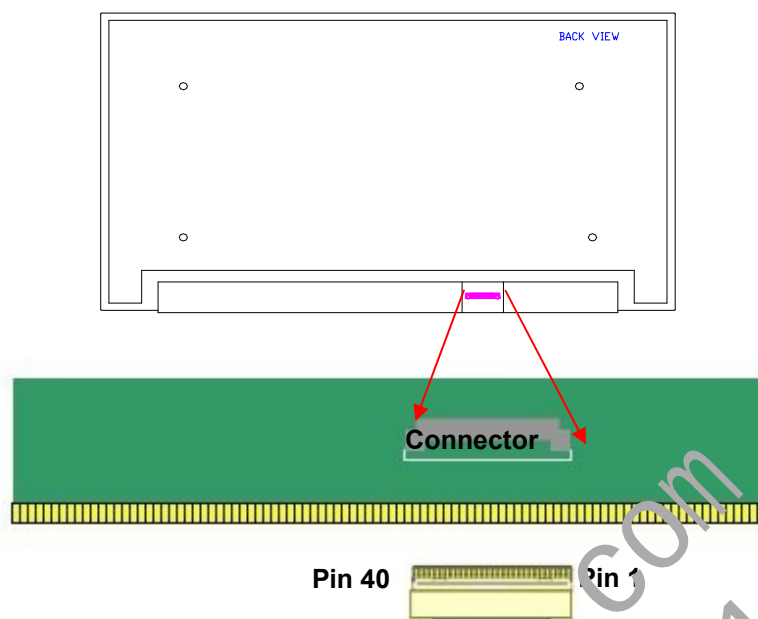
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6.2.2 Pin Assignment (with Touch Sensor Pin Assignment)

Pin	Signal	Description
1	DCR_EN	DCR on/off
2	H_GND	High Speed Ground
3	LaneI_N	Comp Signal Link Lane I
4	LaneI_P	True Signal Link Lane I
5	H_GND	High Speed Ground
6	Lane0_N	Comp Signal Link Lane 0
7	Lane0_P	True Signal Link Lane 0
8	H_GND	High Speed Ground
9	AUX_P	True Signal Auxiliary Ch.
10	AUX_N	Comp Signal Auxiliary Ch.
11	H_GND	High Speed Ground
12	VCC	LCD logic and driver power
13	VCC	LCD logic and driver power
14	Aging	LCD Panel Self Test Enable
15	GND	LCD logic and driver ground
16	GND	LCD logic and driver ground
17	HPD	HPD signal pin
18	BL_GND	Back light ground
19	BL_GND	Back light ground
20	BL_GND	Back light ground
21	BL_GND	Back light ground
22	BL_EN	Back light On/Off
23	BL_PWM	System PWM signal Input
24	NC	No connect
25	NC	No connect
26	BL_PWM	Back light power
27	BL_PWR	Back light power
28	BL_PWR	Back light power
29	BL_PWR	Back light power
30	NC	No connect
31	TP_DN	USB Data- for Touch
32	TP_DP	USB Data+ for Touch
33	GND	Ground
34	VTSP	Touch panel power supply
35	VTSP	Touch panel power supply
36	TP_EN	Touch function enable (active High)
37	TP_CLK	I2C Clock for Touch
38	TP_SDA	I2C Data for Touch
39	TP_INT	Interrupt for Touch
40	TP_RST	Reset for Touch

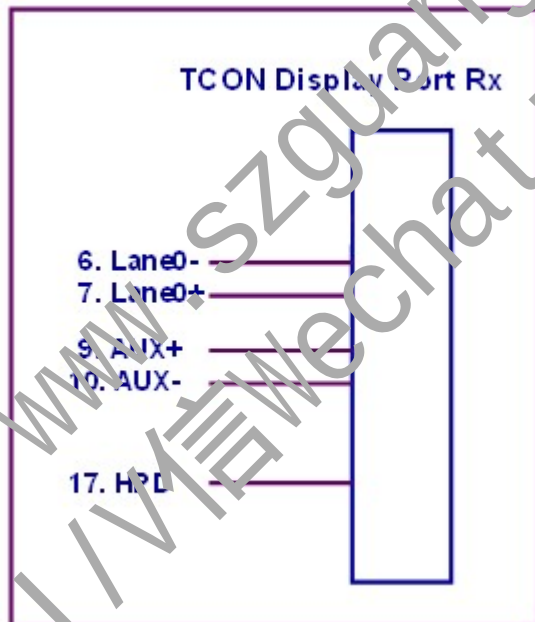
Product Specification

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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

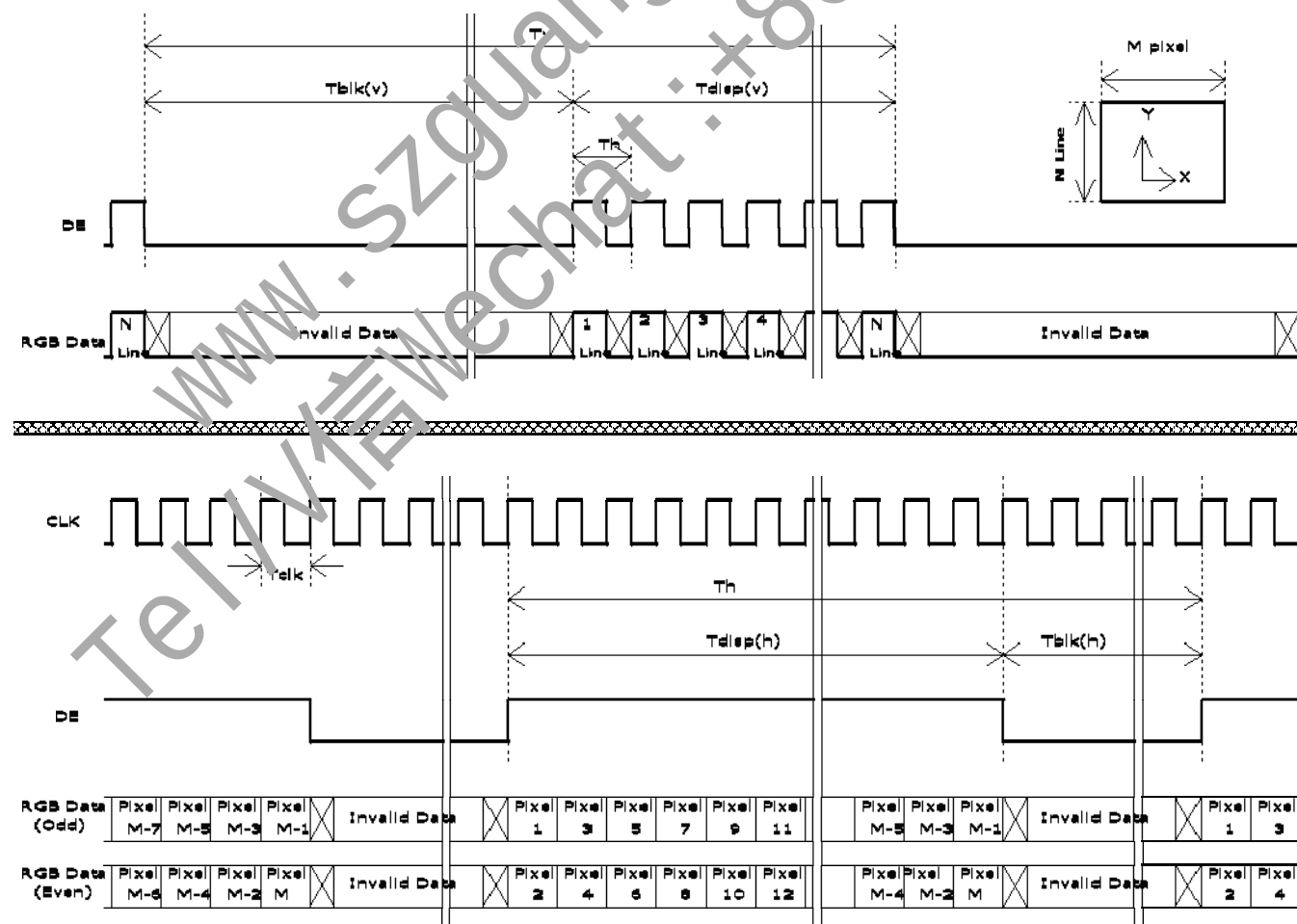
For normal display, interface timings should match the 1920x1080 /60Hz manufacturing guide line timing.

Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		-	-	60	-	Hz
Clock frequency		I/ T _{Clock}	138.8	141	180	MHz
Vertical Section	Period	T _V	1090	1116	1080+A	Vertical Section
	Active	T _{VD}	1080			
	Blanking	T _{VB}	10	36	A	
Horizontal Section	Period	T _H	2000	2104	1920+B	Horizontal Section
	Active	T _{HD}	1920			
	Blanking	T _{HB}	80	184	400	

Note 1 : The above is as optimized setting

Note 2 : The maximum clock frequency = $(1920+B) \times (1080+A) \times 60 < 60\text{MHz}$

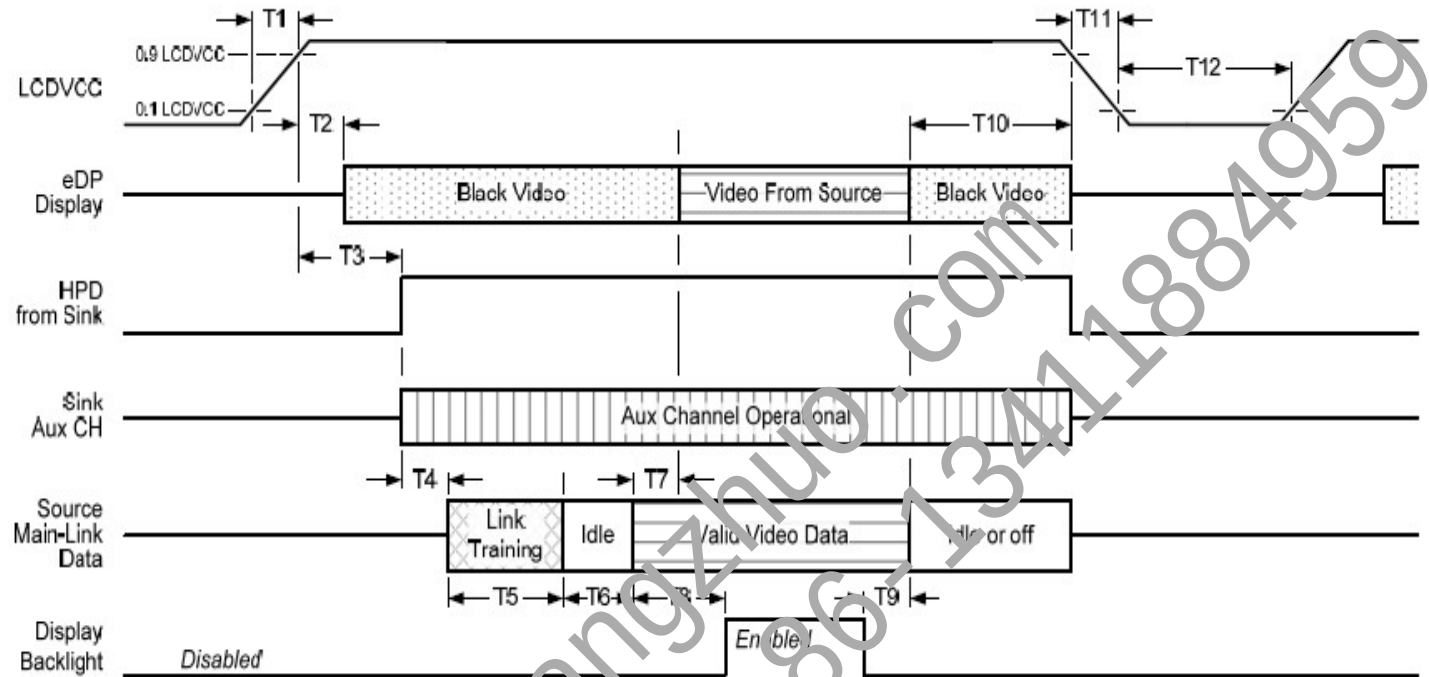
6.3.2 Timing diagram



6.4 Power ON/OFF Sequence

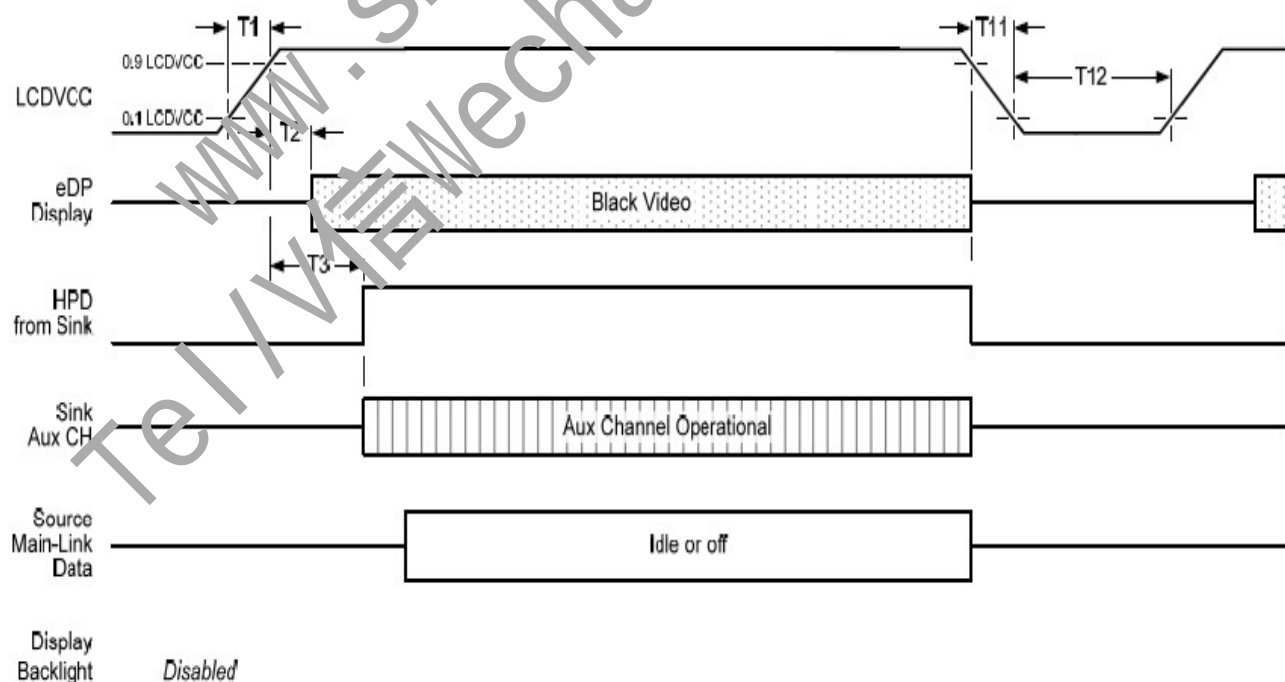
Power on/off sequence is as follows. Interface signals and LED on/off sequence are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off

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

Product Specification

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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 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	0ms		100ms	
T11	power rail fall time, 90% to 10%	source			10ms	
T12	power off time	source	500ms			

Note 1: The sink must include the ability to generate black video autonomously. The sink must automatically enable black video under the following conditions:

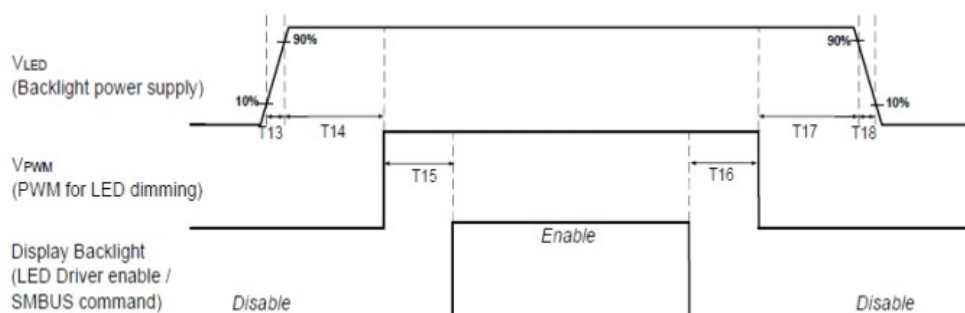
- upon LCDVDD power on (within T2 max)-when the "videostream_Flag" (VB-ID Bit 3) is received from the source (at the end of T9).
- when no main link data, or invalid video data is received from the source. Black video must be displayed within 64ms (typ) from the start of either condition. Video data 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 purposes.

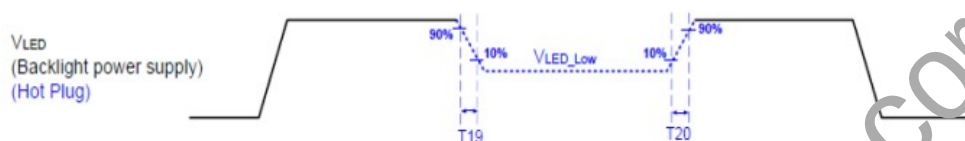
Note 3: The sink must support AUX_CH polling by the source immediately following LCDVDD power on without causing damage to the sink device (the source can re-try if the sink is not ready). The sink must be able to respond to an AUX_CH transaction with the time specified within T3 max.

Note 4: T8>T7

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.

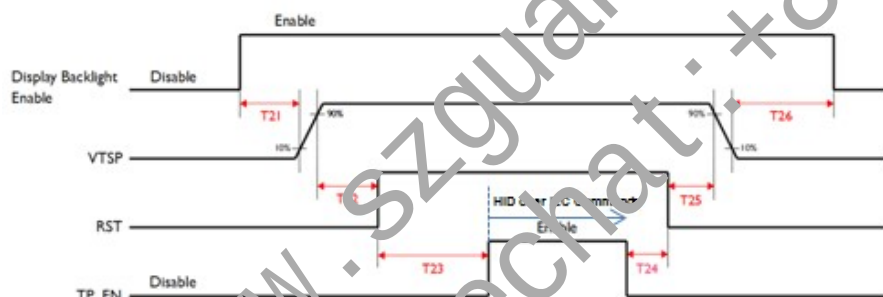


	Min (ms)	Max (ms)
T13	0.5	10
T14	10	-
T15	0	-
T16	0	-
T17	10	-
T18	0.5	10
T19	1*	-
T20	1*	-

Seamless charge: $T20 = 5 \times T_{PWM}^*$
 $*T_{PWM} = 1/PWM \text{ Frequency}$

Touch Panel Power on Sequence

HID-I2C



	Min	Max
T21	-	-
T22	1 ms	-
T23	300ms *(1)	-
T24	2ms *(2)	-
T25	2ms *(2)	-
T26	-	-

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

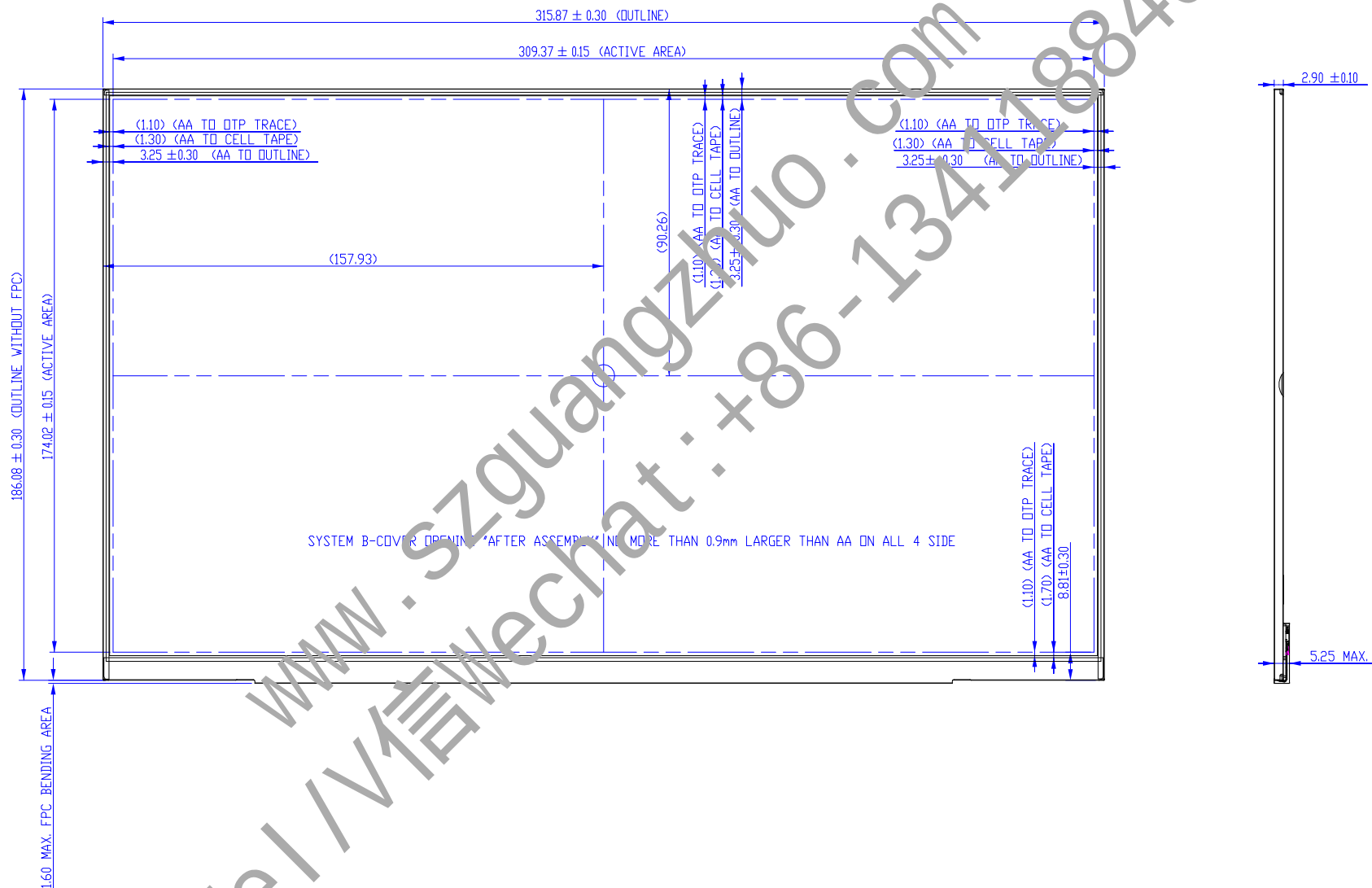
Items	Required Condition	Note
Temperature Humidity Bias	Ta= 40°C, 90%RH, 240h	
High Temperature Operation	Ta= 60°C, Dry, 240h	
Low Temperature Operation	Ta=0°C, 240h	
High Temperature Storage	Ta= 60°C, 240h	
Low Temperature Storage	Ta= -20°C, 240h	
Thermal Shock Test	Ta=-20°C(30min) ~60°C(30min), 20cycles condition.	
ESD	Contact : ±8 KV Air : ±15 KV	Note I

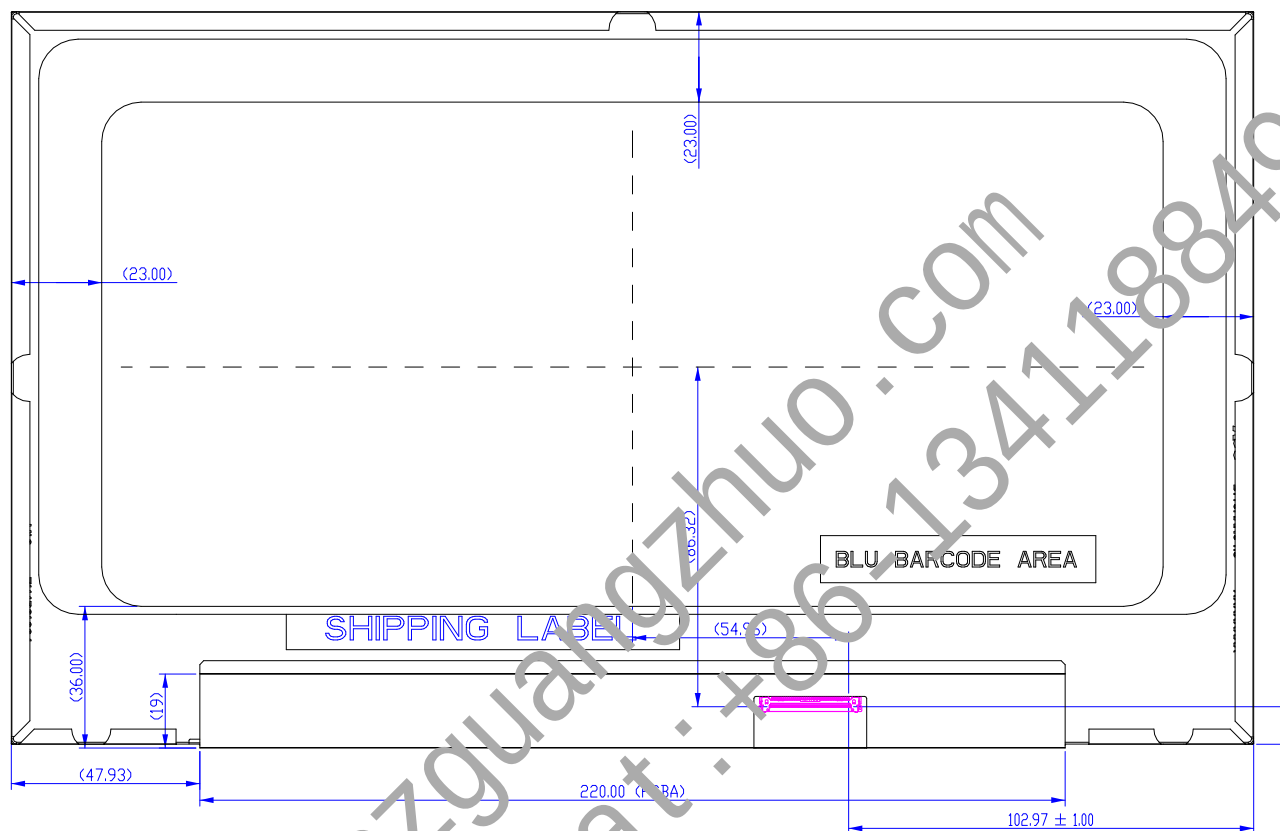
Note I: According to EN 61000-4-2 , ESD class B: Some performance degradation allowed. No data lost
. Self-recoverable. No hardware failures.

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

8. Mechanical Characteristics

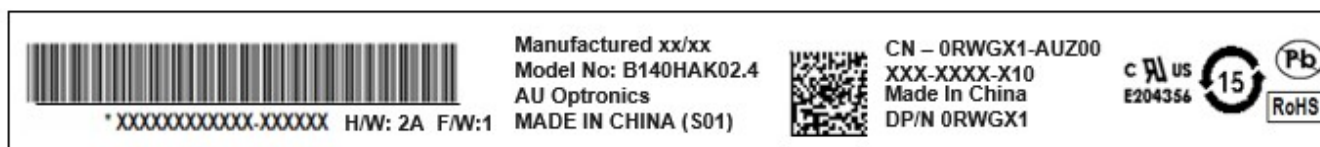
8.1 Total Solution Outline Dimension



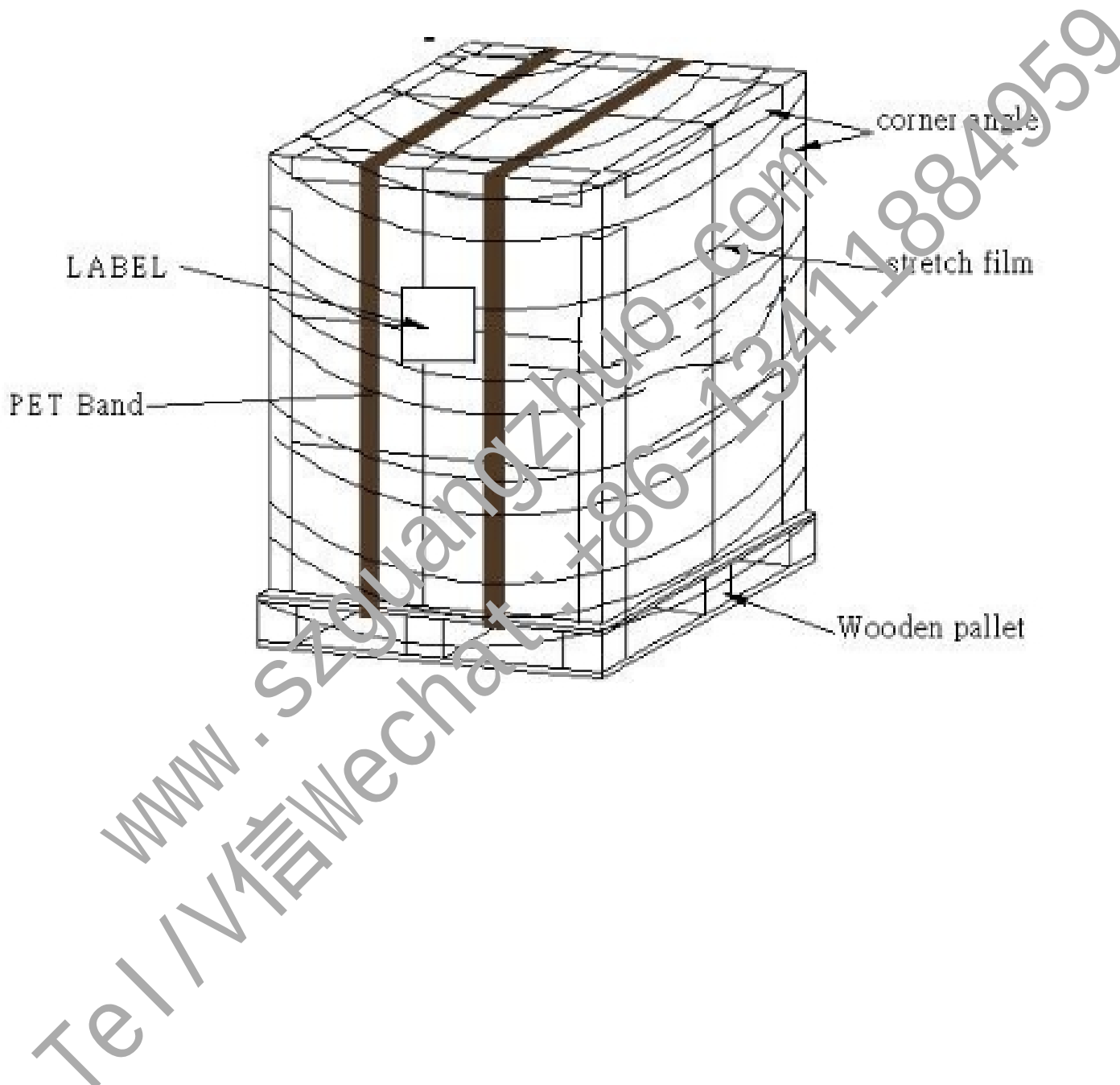


9. Shipping and Package

9.1 Shipping Label Format



9.2 Shipping Package of Palletizing Sequence



10. Appendix:

10.1 EDID Description

Byte (hex)	Field Name and Comments	Value (hex)	Value (binary)	Value (DEC)
0	Header	00	00000000	0
1	Header	FF	11111111	255
2	Header	FF	11111111	255
3	Header	FF	11111111	255
4	Header	FF	11111111	255
5	Header	FF	11111111	255
6	Header	FF	11111111	255
7	Header	00	00000000	0
8	EISA manufacture code = 3 Character ID	06	00000110	6
9	EISA manufacture code (Compressed ASCII)	AF	10101111	175
0A	Panel Supplier Reserved – Product Code	9F	10011111	159
0B	Panel Supplier Reserved – Product Code	D9	11011001	217
0C	LCD module Serial No - Preferred but Optional (“0” if not used)	00	00000000	0
0D	LCD module Serial No - Preferred but Optional (“0” if not used)	00	00000000	0
0E	LCD module Serial No - Preferred but Optional (“0” if not used)	00	00000000	0
0F	LCD module Serial No - Preferred but Optional (“0” if not used)	00	00000000	0
10	Week of manufacture	00	00000000	0
11	Year of manufacture	1F	00011111	31
12	EDID structure version # = 1	01	00000001	1
13	EDID revision # = 4	04	00000100	4
14	Video I/P definition	A5	10100101	165
15	Max H image size = ?? cm(Rounded to cm)	1F	00011111	31
16	Max V image size = ?? cm(Rounded to cm)	11	00010001	17
17	Display gamma = (gamma × 100) - 100 = Example: (2.2 × 100) – 100 = 120	78	01111000	120
18	Feature support	02	00000010	2
19	Red/Green Low bit (RxRy/G/Gy)	8D	10001101	141
1A	Blue/White Low bit (BxBy/Wx/Wy)	15	00010101	21
1B	Red X Rx = 0.???	A1	10100001	161
1C	Red Y Ry = 0.???	56	01010110	86
1D	Green X Rx = 0.???	52	01010010	82
1E	Green Y Ry = 0.???	9D	10011101	157
1F	Blue X Rx = 0.???	28	00101000	40
20	Blue Y Ry = 0.???	0A	00001010	10
21	White X Rx = 0.???	50	01010000	80
22	White Y Ry = 0.???	54	01010100	84
23	Established timings 1 (00h if not used)	00	00000000	0
24	Established timings 2 (00h if not used)	00	00000000	0
25	Manufacturer's timings (00h if not used)	00	00000000	0
26	Standard timing ID1 (01h if not used)	01	00000001	1
27	Standard timing ID1 (01h if not used)	01	00000001	1
28	Standard timing ID2 (01h if not used)	01	00000001	1
29	Standard timing ID2 (01h if not used)	01	00000001	1
2A	Standard timing ID3 (01h if not used)	01	00000001	1
2B	Standard timing ID3 (01h if not used)	01	00000001	1
2C	Standard timing ID4 (01h if not used)	01	00000001	1
2D	Standard timing ID4 (01h if not used)	01	00000001	1
2E	Standard timing ID5 (01h if not used)	01	00000001	1
2F	Standard timing ID5 (01h if not used)	01	00000001	1

30	Standard timing ID6 (01h if not used)	01	00000001	1
31	Standard timing ID6 (01h if not used)	01	00000001	1
32	Standard timing ID7 (01h if not used)	01	00000001	1
33	Standard timing ID7 (01h if not used)	01	00000001	1
34	Standard timing ID8 (01h if not used)	01	00000001	1
35	Standard timing ID8 (01h if not used)	01	00000001	1
36	Pixel Clock/10,000 (LSB)	14	00010100	20
37	Pixel Clock/10,000 (MSB)	37	00110111	55
38	Horizontal Active = ??? pixels (lower 8 bits)	80	10000000	128
39	Horizontal Blanking (Thbp) = 320 pixels (lower 8 bits)	B8	10111000	184
3A	Horizontal Active/Horizontal blanking (Thbp) (upper4:4 bits)	70	01110000	112
3B	Vertical Active = ??? lines	38	00111000	56
3C	Vertical Blanking (Tvbp) = ?? lines (DE Blanking typ. for DE only panels)	24	00100100	36
3D	Vertical Active : Vertical Blanking (Tvbp) (upper4:4 bits)	40	01000000	64
3E	Horizontal Sync, Offset (Thfp) = ?? pixels	10	00010000	16
3F	Horizontal Sync, Pulse Width = ??? pixels	10	00010000	16
40	Vertical Sync, Offset (Tvfp) = ? lines Sync Width = ? lines	3E	00111110	62
41	Horizontal Vertical Sync Offset/Width upper 2 bits	00	00000000	0
42	Horizontal Image Size =??? mm	35	00110101	53
43	Vertical image Size = ??? mm	AE	10101110	174
44	Horizontal Image Size / Vertical image size	10	00010000	16
45	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000	0
46	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000	0
47	Bit[7] 0: Non-interlace, 1: Interlace Bit[6:5] 00: Normal display, no strero, see VESA EDID Spec 1.3 Bit[4:3] 00: Analog composite, 01: Bipolar analog composite, 10: Digital composite, 11: Digital separate Bit[2:1] : The interpretation of bits 2 and 1 is dependent on the decode of bits 4 and 3 - see VESA EDID Spec 1.3 Bit[0] : See VESA EDID Spec 1.3 ==> fix=1A	1A	00011010	26
48	Pixel Clock/10,000 (LSB)	10	00010000	16
49	Pixel Clock/10,000 (MSB)	2C	00101100	44
4A	Horizontal Active = xxxx pixels (lower 8 bits)	80	10000000	128
4B	Horizontal Blanking (Thbp) = xxxx pixels (lower 8 bits)	B8	10111000	184
4C	Horizontal Active/Horizontal blanking (Thbp) (upper4:4 bits)	70	01110000	112
4D	Vertical Active = xxxx lines	38	00111000	56
4E	Vertical Blanking (Tvbp) = xxxx lines (DE Blanking typ. for DE only panels)	24	00100100	36
4F	Vertical Active : Vertical Blanking (Tvbp) (upper4:4 bits)	40	01000000	64
50	Horizontal Sync, Offset (Thfp) = xxxx pixels	10	00010000	16
51	Horizontal Sync, Pulse Width = xxxx pixels	10	00010000	16
52	Vertical Sync, Offset (Tvfp) = xx lines Sync Width = xx lines	3E	00111110	62
53	Horizontal Vertical Sync Offset/Width upper 2 bits	00	00000000	0
54	Horizontal Image Size =xxx mm	35	00110101	53
55	Vertical image Size = xxx mm	AE	10101110	174
56	Horizontal Image Size / Vertical image size	10	00010000	16
57	Horizontal Border = 0 (Zero for Notebook LCD)	00	00000000	0
58	Vertical Border = 0 (Zero for Notebook LCD)	00	00000000	0
59	Bit[7] 0: Non-interlace, 1: Interlace Bit[6:5] 00: Normal display, no strero, see VESA EDID Spec 1.3 Bit[4:3] 00: Analog composite, 01: Bipolar analog composite, 10: Digital composite, 11: Digital separate Bit[2:1] : The interpretation of bits 2 and 1 is dependent on the decode of	1A	00011010	26

	bits 4 and 3 - see VESA EDID Spec 1.3			
	Bit[0] : See VESA EDID Spec 1.3 ==> fix=1A			
5A	Flag	00	00000000	0
5B	Flag	00	00000000	0
5C	Flag	00	00000000	0
5D	Data Type Tag: Alphanumeric Data String (ASCII) ==> fix=FE	FE	11111110	254
5E	Flag	00	00000000	0
5F	Dell P/N 1 st Character	52	01010010	82
60	Dell P/N 2 nd Character	57	01010111	87
61	Dell P/N 3 rd Character	47	01000111	71
62	Dell P/N 4 th Character	58	01011000	88
63	Dell P/N 5 th Character	31	00110001	19
	EDID Revision Bit[6:0] See charts below			
64	Bit[7] 0: X-rev, 1: A-rev	0A	00010110	10
65	Manufacturer P/N	42	01000110	66
66	Manufacturer P/N	31	00100011	49
67	Manufacturer P/N	34	00110100	52
68	Manufacturer P/N	30	00110000	48
69	Manufacturer P/N	40	01001000	72
6A	Manufacturer P/N	41	01000001	65
6B	Manufacturer P/N (If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	4B	01001011	75
6C	Flag	00	00000000	0
6D	Flag	00	00000000	0
6E	Flag	00	00000000	0
6F	Data Type Tag: Manufacturer Specified Data 00 ==>fix=00	00	00000000	0
70	Flag	00	00000000	0
71	Color Management	01	00000001	1
72	Panel Structure	41	01000001	65
73	Frame Rate	02	00000010	2
74	Light Controller Interface and Luminance	9E	10011110	158
75	Outdoor Features	00	00000000	0
76	Multi-Media Features	11	00010001	17
77	Multi-Media Features	00	00000000	0
78	Special Features #1	00	00000000	0
79	Special Features #2	0A	00001010	10
7A	Special Features #3	01	00000001	1
7B	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	0A	00001010	10
7C	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	20	00100000	32
7D	(If <13 char, then terminate with ASCII code 0Ah, set remaining char = 20h)	20	00100000	32
7E	Extension Tag (# of optional 128 EDID extension blocks to follow, Typ = 0)	00	00000000	0
7F	Checksum (The 1-byte sum of all 128 bytes in this EDID block shall = 0)	9F	10011111	159

10.2 Notes

DPCD Ver.	sDRRS	DCR	DMRRS	PSR	MBO	VESA DSC	MSO	Free-Sync	HDR	Dimming
1.3	On	On	Off	PSR1 on	Off	NA	NA	Off	NA	NA

- 1) The vernier caliper is used to measure the X,Y,Z outline dimension and other dimensions are measured by 3D measuring instrument. For the flatness is measured by the thick gauge..
- 2) Attached cell tape is naturally floating, and need to be compressed while measuring.

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