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MODEL NO : ET101WU01-J**MODEL VERSION:** 01**SPEC VERSION :** 1.0**ISSUED DATE:** 2018-06-11

- ☒ Preliminary Specification
☐ Final Product Specification

Customer : _____

Approved by	Notes

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Record of Revision

[illegible]

1 General Specifications

Feature		Spec
Display Spec.	Size	10.1 inch
	Resolution	1920×RGB (3) ×1200
	Technology Type	a-Si
	Pixel Configuration	RGB Vertical Stripe
	Pixel pitch(mm)	0.1128 (H) × 0.1128 (V)
	Display Mode	Transmissive/Normally Black
	Viewing Direction	Free angle
Mechanical Characteristics	LCM (W x H x D) (mm)	232.75(H) x 155.3(V) x 6.77(D)
	Active Area(mm)	216.576(H) x 135.36(V)
	With /Without TSP	Without TSP
	Weight (g)	TBD
Electrical Characteristics	Interface	LVDS (2ch) Interface
	Color Depth	16.7M

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3: LCM weight tolerance: ± 5%

2 Input/Output Terminals

Outlet connector: AYF334535 (PANASONIC)

Pin No. is 45 pin define of Plug connector

Pin #	Signal Name	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	VDD	Power Supply, 3.3V (typical)
4	VDD	Power Supply, 3.3V (typical)
5	NC	Not Connect
6	2-L3P	LVDS 2 data 3 (positive)
7	GND	Ground
8	2-L3N	LVDS 2 data 3 (negative)
9	GND	Ground
10	GND	Ground
11	1-L3P	LVDS 1 data 3 (positive)
12	2-LCNKP	LVDS 2 Clock (positive)
13	1-L3N	LVDS 1 data 3 (negative)
14	2-LCNKN	LVDS 2 Clock (negative)
15	GND	Ground
16	GND	Ground
17	1-LCNKP	LVDS 1 Clock (positive)
18	2-L2P	LVDS 2 data 2 (positive)
19	1-LCNKN	LVDS 1 Clock (negative)
20	2-L2N	LVDS 2 data 2 (negative)
21	GND	Ground
22	GND	Ground
23	1-L2P	LVDS 1 data 2 (positive)
24	2-L1P	LVDS 2 data 1 (positive)
25	1-L2N	LVDS 1 data 2 (negative)
26	2-L1N	LVDS 2 data 1 (negative)
27	GND	Ground

28	GND	Ground
29	1-L1P	LVDS 1 data 1 (positive)
30	2-L0P	LVDS 2 data 0 (positive)
31	1-L1N	LVDS 1 data 2 (negative)
32	2-L0N	LVDS 2 data 0 (negative)
33	GND	Ground
34	GND	Ground
35	1-L0P	LVDS 1 data 0 (positive)
36	NC	Not Connect
37	1-L0N	LVDS 1 data 0 (negative)
38	NC	Not Connect
39	NC	Not Connect
40	CABC_EN	CABC Function Enable Pin
41	NC	Not Connect
42	NC	Not Connect
43	NC	Not Connect
44	NC	Not Connect
45	NC	Not Connect

CN2: Connector 87213-1010

Pin No.	Symbol	I/O	Description	Note
1	LED_EN	P	LED BLU ON/OFF. High level: ON; Low level: OFF.	
2	ADJ	P	Adjust the LED brightness by PWM	
3	GND	I	Power ground	
4	GND	I	Power ground	
4	GND	I	Power ground	
6	GND	I	Power ground	
7	GND	I	Power ground	
8	VLED	P	Voltage for LED circuit (12V)	
9	VLED	P	Voltage for LED circuit (12V)	
10	VLED	P	Voltage for LED circuit (12V)	

3 Absolute Maximum Ratings

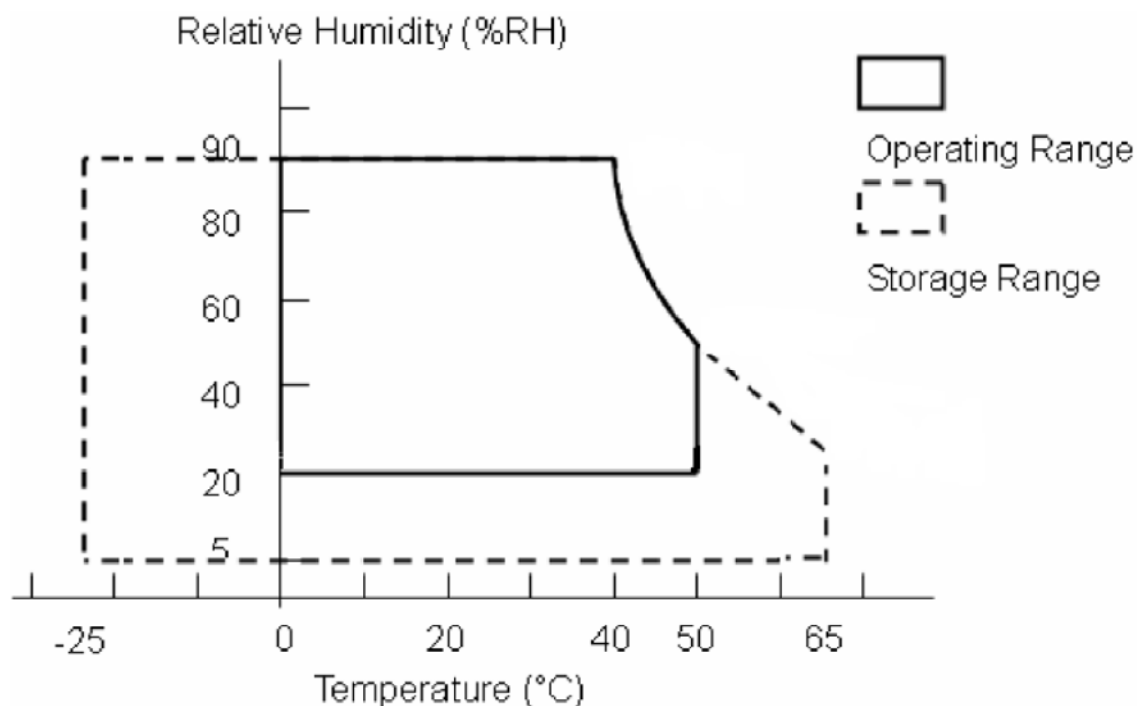
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Logic Signal Input Level	V_{in}	-0.3	--	+4.5	V	Ta=25℃
Operating Temperature	Tops	-20	--	65	℃	
Storage Temperature	Tstg	-20	--	65	℃	

*1) The relative temperature and humidity range are as below sketch, 90%RH Max. (Ta ≤ 40℃)

*2) The maximum wet bulb temperature ≤ 39℃ (Ta > 40℃) and without dewing.

*3) If product in environment which over the definition of the relative temperature and humidity out of range too long, it will affect visual of LCD.

*4) If you operate LCD in normal temperature range, the center surface of panel should be under 50℃.



4 Electrical Characteristics

4.1 Driving TFT LCD Panel

ITEM		SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LCD Power Voltage		VCC	3.0	3.3	3.6	V	*1)
LCD Power Current		ICC	-	290	303	mA	*2)
LCD Rush Current		VCC_Irus			3	A	*3)
Logic Input Voltage (LVDS: IN+,IN-)	Common Voltage	VCM	$\frac{ VID }{2}$	-	$2.4 - \frac{ VID }{2}$	V	*4)
	Differential Input Voltage	VID	200	-	600	mV	*4)
	Threshold Voltage (HIGH)	VTH	-	-	100	mV	*1) When VCM = +1.2V
	Threshold Voltage (LOW)	VTL	-100	-	-	mV	

4.2 Backlight Unit

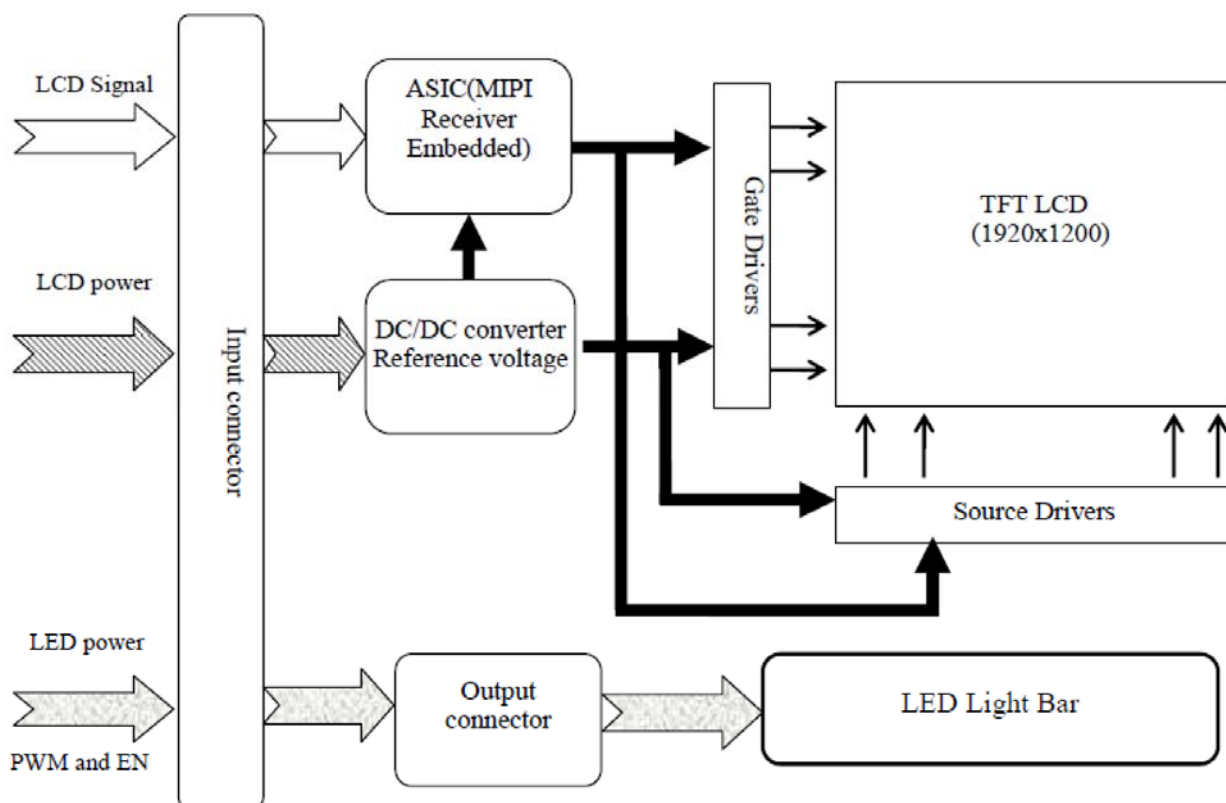
Backlight input signal characteristics

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LED Driver Power Voltage	V _{LED}	11.5	12	12.5	V	
LED Current	I _{LED}	--	360	--	mA	LED_EN=ADJ=High
LED Driver Power Current	I _{LED} (V _{LED} =12V)	-	1400	--	mA	Ta=25°C
ADJ frequency	f _{PWM}	100	--	20k	Hz	
ADJ logic level High	V _{IH}	2.4	--	--	V	
ADJ logic level High	V _{IL}	--	--	0.7	V	
LED Life Time		--	50K	-	KHr	Note*

Note* : Brightness to be decreased to 50% of the initial value.

Ta=25°C

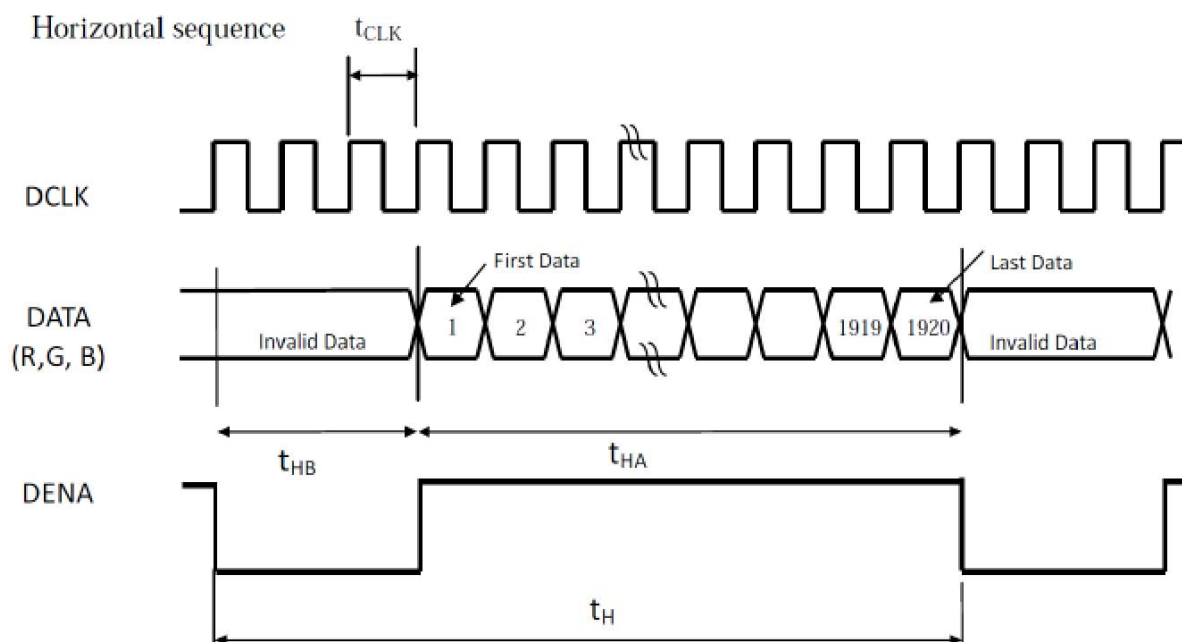
4.3 BLOCK DIAGRAM



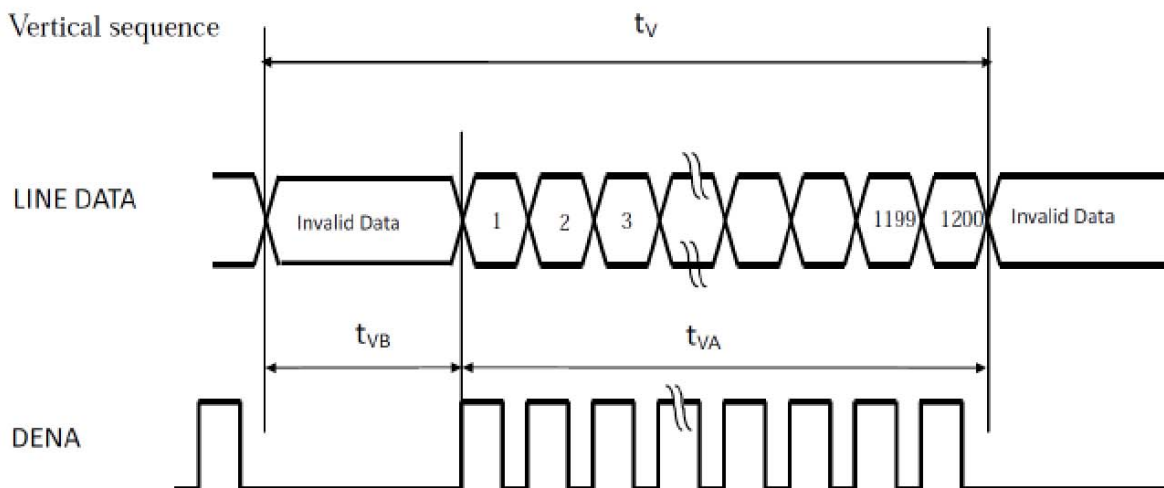
5 Timing Chart

5.1 Timing Characteristics

(a). LVDS input time sequence



(b) LCD input time sequence



(c) Data mapping

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

(2) Timing Chart

ITEM			SYMBOL	MIN	TYP	MAX	UNIT	
LCD Timing	Frame Rate		-	60			Hz	
	DCLK		Frequency	f _{CLK}	147.38	150.67	154	MHz
	DENA	Horizontal	Horizontal total time	t _H	2020	2050	2080	t _{CLK}
			Horizontal Active time	t _{HA}	1920			t _{CLK}
			Horizontal Blank time	t _{HB}	100	130	160	t _{CLK}
		Vertical	Vertical total time	t _V	1216	1225	1235	t _H
			Vertical Active time	t _{VA}	1200			t _H
			Vertical Blank time	t _{VB}	16	25	35	t _H

【Note】

- *1) DENA (DATA ENABLE) usually is positive.
- *2) During the whole blank period, DCLK should keep input.

6 Optical Characteristics

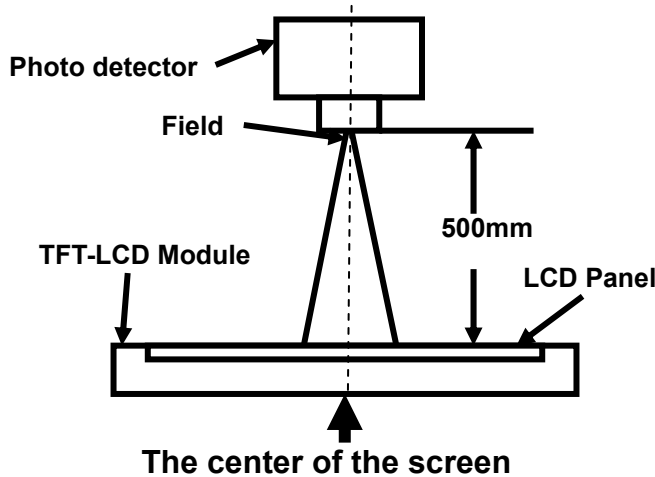
Item		Symbol	Condition	Mi	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	-	85	-	Degree	Note2,3
		θB		-	85	-		
		θL		-	85	-		
		θR		-	85	-		
Contrast Ratio		CR	θ=0°	-	800	-		Note 3
Response Time		T _{ON}	25℃	-	25	30	ms	Note 4
		T _{OFF}						
Chromaticity	White	x	Backlight is on	0.26	0.29	0.32		Note 1,5
		y		0.31	0.34	0.37		
	Red	x						Note 1,5
		y						
	Green	x						Note 1,5
		y						
	Blue	x						Note 1,5
		y						
Uniformity		U		75	80	--	%	Note 6
Luminance		L		-	1000		cd/m ²	Note 7

Test Conditions:

1. $I_F = 1400$ mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

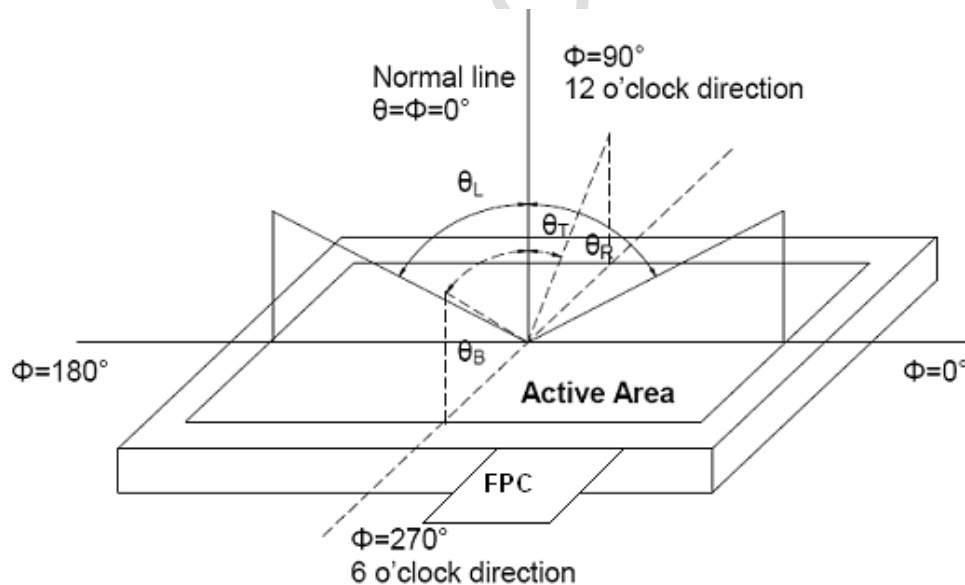
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD.



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

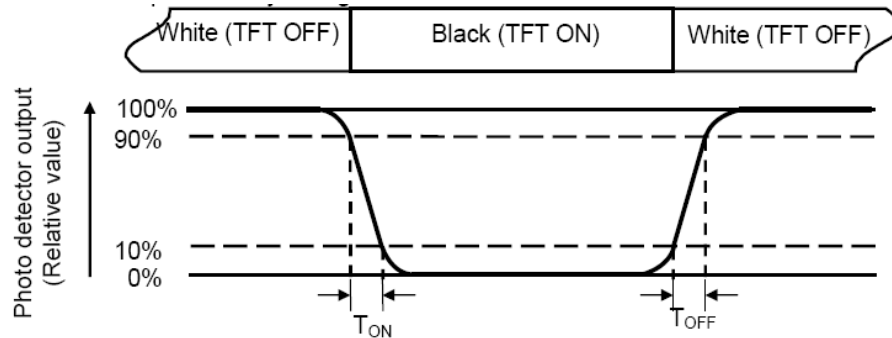
"White state ": The state is that the LCD should drive by V_{white} .

"Black state": The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

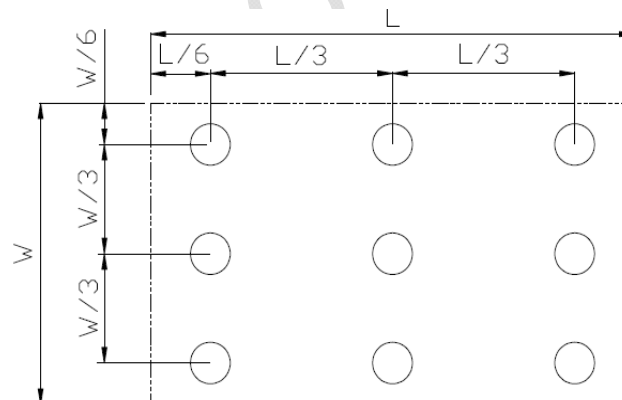
Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\min} / L_{\max}$$

L-----Active area length W----- Active area width



$L_{\max}$: The measured Maximum luminance of all measurement position.

$L_{\min}$: The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	65°C / 24Hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-20°C / 24Hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	65°C / 24Hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-20°C / 24Hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	40°C x 90%RH / 24H	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	0°C $\leftrightarrow$ 50°C x 10cycles (30min) (5min) (30min)	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,G B2423.22-2002
7	ESD	Contact: $\pm$ 4KV Air: $\pm$ 8KV 150PF/330 Ω ,5Points/panel,5times	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude:1.5mm, 2 hours for each direction of X, Y, Z	IEC60068-2-6:1982 GB/T2423.10—1995
10	Package Drop Test	Drop to the ground from 1m height, 1 corner, 3 edges, 6 surfaces.	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

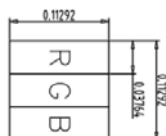
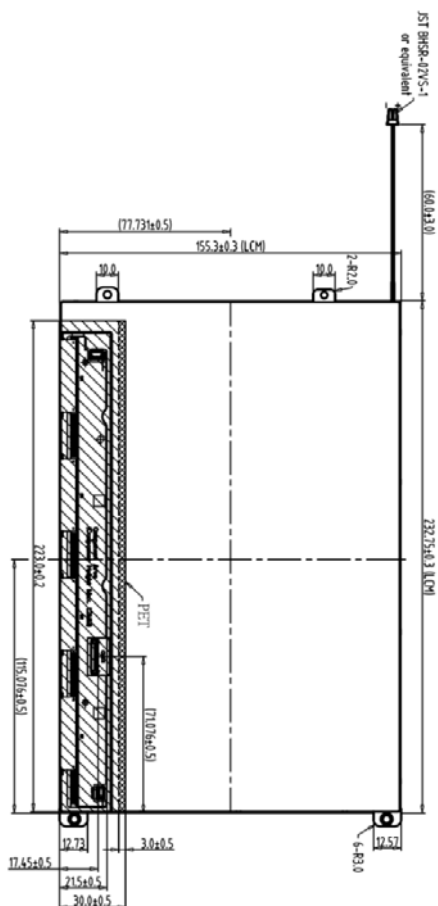
Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

8. Outline Dimension



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A Block

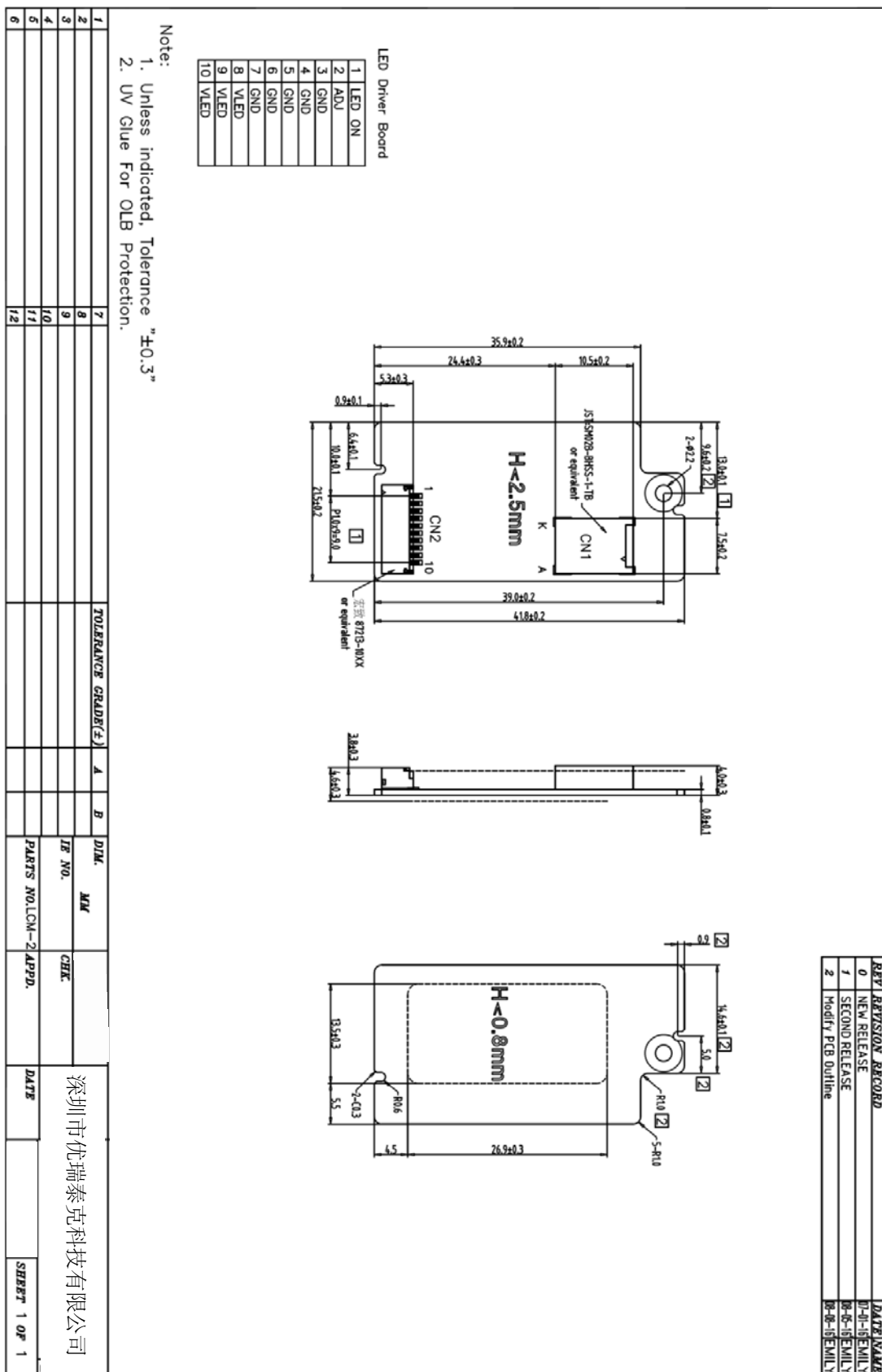
Back View

Notes:

1. Unless indicated, Tolerance "±0.5"
2. UV Glue For OLB Protection.
3. Connector:AYF334535 (PANASONIC) or Equivalent

1	VDD	24.2-1P
2	VDD	25.1-1.2N
3	VDD	26.2-1.1N
4	VDD	27.2 GND
5	NC(BIST)	28 GND
6	2-1.3P	29.1-1.1P
7	GND	30.2-1.0P
8	2-3.5N	31.1-1.1N
9	GND	32.2-1.0N
10	GND	33 GND
11	1-1-3P	34 GND
12	3-1-3.5N	35.1-1.0P
13	2-1-3.5N	36 NC
14	2-1-3.5N	37.1-1.0N
15	GND	38 NC
16	GND	39 NC
17	1-1-CHKP	40 CAOC_EN
18	2-1-2.2P	41 NC
19	1-1-CHKN	42 NC
20	2-1-2.2N	43 NC
21	GND	44 NC
22	GND	45 NC
23	1-1-2P	

1	19201200C	7		TOLERANCE GRADE(+)	A	B	DIM.	MM		深圳市优瑞泰克科技有限公司
2		8								
3		9					IE NO.		CHEK.	
4		10								
5		11							APPD.	
6		12							DATE	
										SHEET 1 OF 1



9 Packing Drawing

TBD

10 Precautions for Use of LCD Modules

a) Handling Precautions

- i. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- ii. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
- iii. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- iv. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- v. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
 - Ketone
 - Aromatic solvents
- vi. Do not attempt to disassemble the LCD Module.
 - vii. If the logic circuit power is off, do not apply the input signals.
 - viii. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

b) Storage precautions

- i. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

- ii. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

- iii. The LCD modules should be stored in the room without acid, alkali and harmful gas.

c) Transportation Precautions

- i. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.