



**WINSTAR Display Co.,Ltd.**  
**華凌光電股份有限公司**



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## SPECIFICATION

**CUSTOMER :** \_\_\_\_\_

**MODULE NO.:**           **WJ88ATYJ8LNNO#**          

<p style="text-align: center;"><b>APPROVED BY:</b></p> <p style="text-align: center;">( FOR CUSTOMER USE ONLY )</p>	<p><b>PCB VERSION:</b> _____</p> <p><b>DATA:</b> _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
<b>ISSUED DATE: 2019/12/31</b>			

TFT Display Inspection Specification: <https://www.winstar.com.tw/technology/download.html>

Precaution in use of TFT module: <https://www.winstar.com.tw/technology/download/declaration.html>



**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2019/11/07		First issue
A	2019/12/31		Modify interface (2 channel LVDS)

# Contents

- 1.Module Classification Information
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- 3.General Specification
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# 1. Module Classification Information

W J 88 A T Y J 8 L N N 0 #  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

①	Brand : WINSTAR DISPLAY CORPORATION																	
②	Display Type : F→TFT Type, J→Custom TFT																	
③	Display Size : 8.8" TFT																	
④	Model serials no.																	
⑤	Backlight Type :						F→CCFL, White S→LED, High Light White						T→LED, White Z→Nichia LED, White					
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction						A→Transmissive, N.T, IPS TFT C→Transmissive, N. T, 6:00 ; F→Transmissive, N.T,12:00 ; I→Transmissive, W. T, 6:00 K→Transflective, W.T,12:00 L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00						Q→Transmissive, Super W.T, 12:00 R→Transmissive, Super W.T, O-TFT V→Transmissive, Super W.T, VA TFT W→Transmissive, Super W.T, IPS TFT X→Transmissive, W.T, VA TFT Y→Transmissive, W.T, IPS TFT Z→Transmissive, W.T, O-TFT					
⑦	A : TFT LCD B : TFT+SCREW HOLES+CONTROL BOARD C : TFT+ SCREW HOLES +A/D BOARD D : TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD E : TFT+ SCREW HOLES +POWER BOARD						F : TFT+CONTROL BOARD G : TFT+ SCREW HOLES H : TFT+D/V BOARD I : TFT+ SCREW HOLES +D/V BOARD J : TFT+POWER BD											
⑧	Resolution:																	
	A	128160	B	320234	C	320240	D	480234	E	480272	F	640480	G	800480				
	H	1024600	I	320480	J	240320	K	800600	L	240400	M	1024768	N	128128				
	P	1280800	Q	480800	R	640320	S	480128	T	800320	U	8001280	V	176220				
	W	1280398	X	1024250	Y	1920720	Z	800200	2	1024324	3	7201280	4	19201200				
	5	1366768	6	1280320	7	1280480	8	4801920										
⑨	D: Digital L : LVDS M:MIPI																	
⑩	Interface:																	
	N	Without control board			A	8Bit		B	16Bit			H	HDMI					
	I	I2C Interface			R	RS232		S	SPI Interface			U	USB					
⑪	TS:																	
	N	Without TS				T	Resistive touch panel				C	Capacitive touch panel (G-F-F)						
	G	Capacitive touch panel (G-G)						C1	Capacitive touch panel (G-F-F)+OCA									
	C2	Capacitive touch panel (G-F-F)+OCR						G1	Capacitive touch panel (G-G)+OCA									
	G2	Capacitive touch panel (G-G)+OCR						B	CTP+GG+USB									
⑫	Version: X:Raspberry pi																	
⑬	Special Code			#:Fit in with ROHS directive regulations														

## **2.Summary**

WF88 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 8.8 (1:4) inch diagonally measured active display area with (480 horizontal by 1920 vertical pixel) resolution.

### **3. General Specifications**

<b>Item</b>	<b>Dimension</b>	<b>Unit</b>
Size	8.8	inch
Dot Matrix	480 x R.G.B. x 1920	dots
Module dimension	231.3*64.3*14.6	mm
Active area	218.88 *54.72	mm
Dot pitch	0.114 x 0.114	mm
LCD type	TFT, Normally black, Transmissive	
Viewing angle	85/85/85/85	
Backlight Type	LED ,Normally White	
Interface	2 channel LVDS	
With /Without TP	Without TP	
Surface	Glare	

\*Color tone slight changed by temperature and driving voltage.

## **4. Absolute Maximum Ratings**

<b>Item</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp.  $\leq 60^{\circ}\text{C}$ , 90% RH MAX. Temp.  $> 60^{\circ}\text{C}$ , Absolute humidity shall be less than 90% RH at  $60^{\circ}\text{C}$



# 5. Electrical Characteristics

## 5.1. TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	VDD	-	5.0	-	V	
Current of power supply	IDD	-	585	880	mA	VDD =5.0V

## 5.2. Backlight Unit

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
LED Current	IF	-	160	-	mA	Ta=25°C
LED Voltage	VF	-	16.0	17.5	Volt	Ta=25°C
LED Life-Time	N/A		30,000	-	Hour	Ta=25°C IF=160 mA Note (2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 oC, typical IL value indicated in the above table until the brightness becomes less than 50%

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C , and IL=160mA. The LED lifetime could be decreased if operating IL is larger than 160mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit

# 6. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr+ Tf	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	30	40	.ms	Note 3	
Contrast ratio	CR	At optimized viewing angle	600	800	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ$ 、 $\phi=0$	0.250	0.300	0.350		Note 2,6,7
		Wy		0.272	0.322	0.372		
Viewing angle	Hor.	$\Theta_R$	$CR \geq 10$	75	85	-	Deg.	Note 1
		$\Theta_L$		75	85	-		
	Ver.	$\Phi_T$		75	85	-		
		$\Phi_B$		75	85	-		
Brightness	-	-	480	600	-	cd/m <sup>2</sup>	Center of display	
Uniformity	(U)	-	75	-	-	%	Note 5	

Ta=25±2°C,

Note 1: Definition of viewing angle range

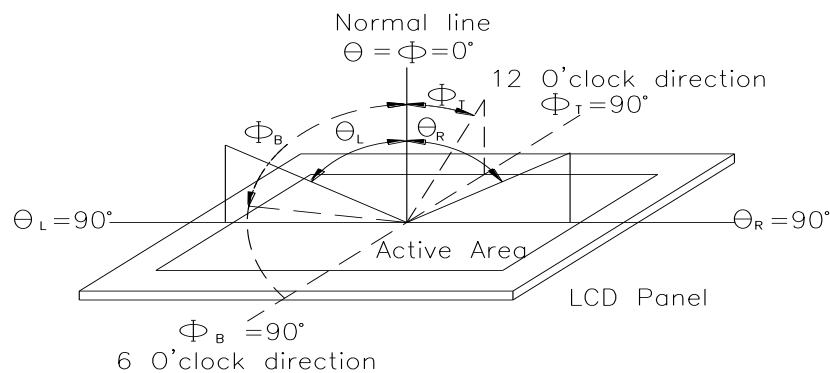


Fig.6.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

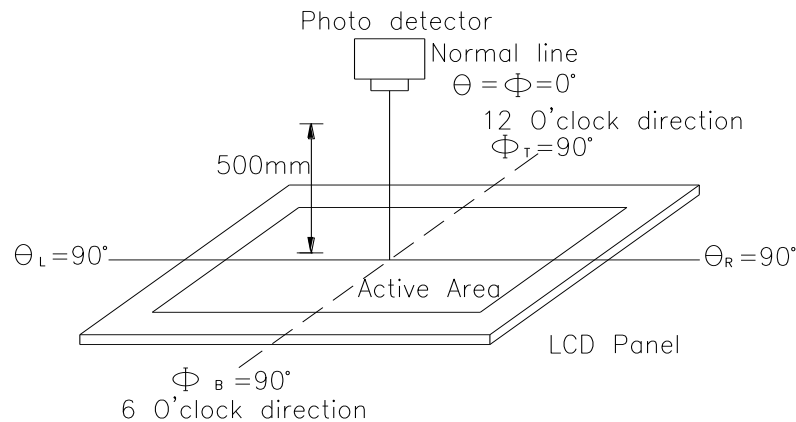
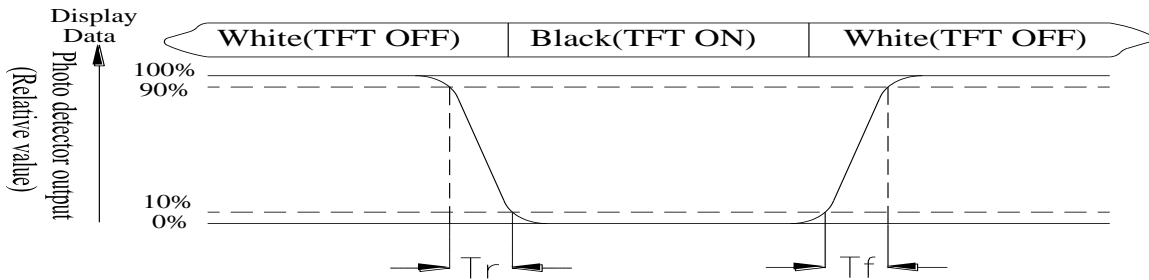


Fig. 6.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = \text{Lmin/Lmax} \times 100\%$$

L = Active area length

W = Active area width

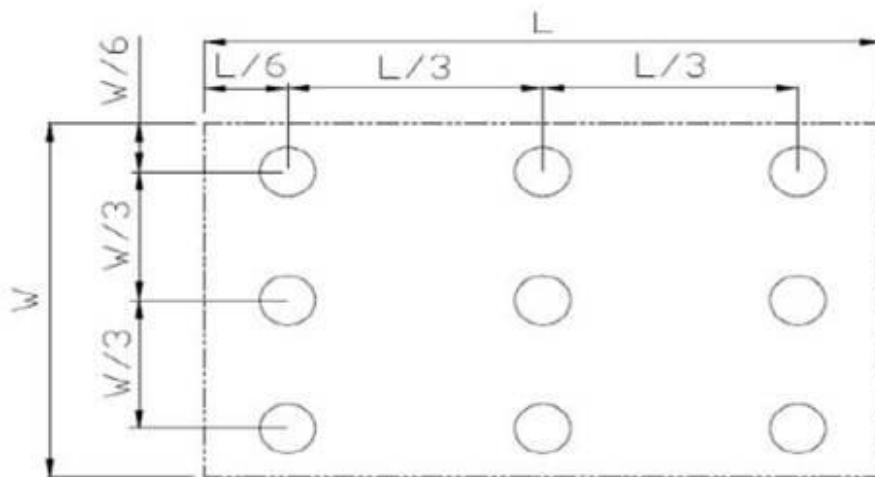


Fig 6.3. Definition of uniformity

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD


Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

# 7.Interface

Pin No.	Symbol	Function
1-3	VDD	Power Supply
4-6	GND	Ground
7	RXNA1	LVDS ODD 0- Signal
8	RXPA1	LVDS ODD 0+ Signal
9	RXNB1	LVDS ODD 1- Signal
10	RXPB1	LVDS ODD 1+ Signal
11	RXNC1	LVDS ODD 2- Signal
12	RXPC1	LVDS ODD 2+ Signal
13-14	GND	Ground
15	RXNCLK1	LVDS ODD Clock- Signal
16	RXPCLK1	LVDS ODD Clock+ Signal
17	RXND1	LVDS ODD 3- Signal
18	RXPD1	LVDS ODD 3+ Signal
19	RXNA2	LVDS EVEN 0- Signal
20	RXPA2	LVDS EVEN 0+ Signal
21	RXNB2	LVDS EVEN 1- Signal
22	RXPB2	LVDS EVEN 1+ Signal
23	RXNC2	LVDS EVEN 2- Signal
24	RXPC2	LVDS EVEN 2+ Signal
25-26	GND	Ground
27	RXNCLK2	LVDS EVEN Clock- Signal
28	RXPCLK2	LVDS EVEN Clock+ Signal
29	RXND2	LVDS EVEN 3- Signal
30	RXPD2	LVDS EVEN 3+ Signal

# 8. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

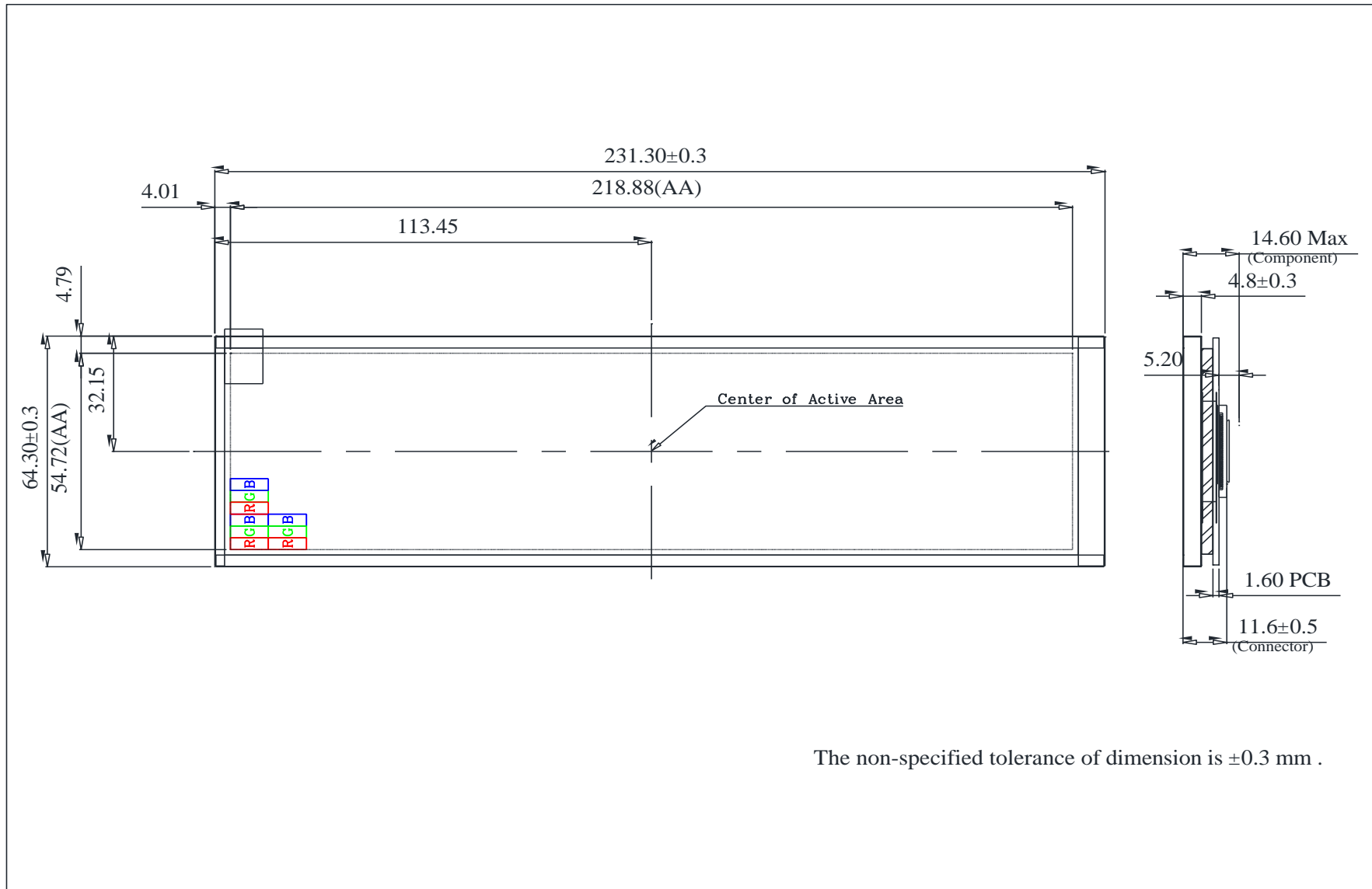
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	<p>The sample should be allowed stand the following 10 cycles of operation</p> <p style="text-align: center;">           -20°C    25°C    70°C              30min    5min    30min            1 cycle         </p>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

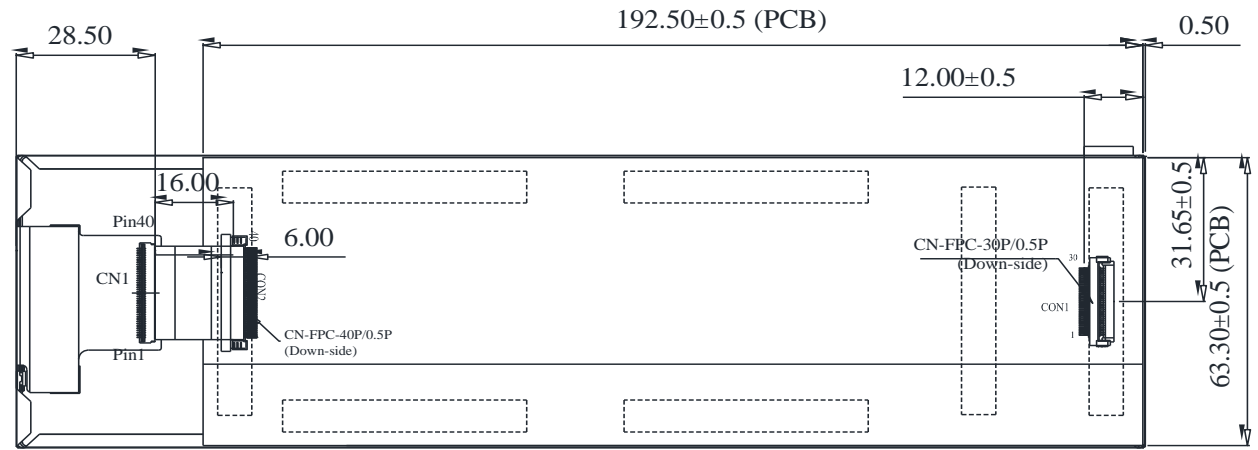
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

# 9. Contour Drawing



PIN NO	SYMBOL	PIN NO	SYMBOL
1	VDD	16	RXPCLK1
2	VDD	17	RXND1
3	VDD	18	RXPD1
4	GND	19	RXNA2
5	GND	20	RXPA2
6	GND	21	RXNB2
7	RXNA1	22	RXPB2
8	RXPA1	23	RXNC2
9	RXNB1	24	RXPC2
10	RXPB1	25	GND
11	RXNC1	26	GND
12	RXPC1	27	RXNCLK2
13	GND	28	RXPCLK2
14	GND	29	RXND2
15	RXNCLK1	30	RXPD2



The non-specified tolerance of dimension is  $\pm 0.3$  mm .







**1、Panel Specification :**

- 1. Panel Type :  Pass  NG , \_\_\_\_\_
- 2. View Direction :  Pass  NG , \_\_\_\_\_
- 3. Numbers of Dots :  Pass  NG , \_\_\_\_\_
- 4. View Area :  Pass  NG , \_\_\_\_\_
- 5. Active Area :  Pass  NG , \_\_\_\_\_
- 6. Operating Temperature :  Pass  NG , \_\_\_\_\_
- 7. Storage Temperature :  Pass  NG , \_\_\_\_\_
- 8. Others : \_\_\_\_\_

**2、Mechanical Specification :**

- 1. PCB Size :  Pass  NG , \_\_\_\_\_
- 2. Frame Size :  Pass  NG , \_\_\_\_\_
- 3. Material of Frame :  Pass  NG , \_\_\_\_\_
- 4. Connector Position :  Pass  NG , \_\_\_\_\_
- 5. Fix Hole Position :  Pass  NG , \_\_\_\_\_
- 6. Backlight Position :  Pass  NG , \_\_\_\_\_
- 7. Thickness of PCB :  Pass  NG , \_\_\_\_\_
- 8. Height of Frame to PCB :  Pass  NG , \_\_\_\_\_
- 9. Height of Module :  Pass  NG , \_\_\_\_\_
- 10. Others :  Pass  NG , \_\_\_\_\_

**3、Relative Hole Size :**

- 1. Pitch of Connector :  Pass  NG , \_\_\_\_\_
- 2. Hole size of Connector :  Pass  NG , \_\_\_\_\_
- 3. Mounting Hole size :  Pass  NG , \_\_\_\_\_
- 4. Mounting Hole Type :  Pass  NG , \_\_\_\_\_
- 5. Others :  Pass  NG , \_\_\_\_\_

**4、Backlight Specification :**

- 1. B/L Type :  Pass  NG , \_\_\_\_\_
- 2. B/L Color :  Pass  NG , \_\_\_\_\_
- 3. B/L Driving Voltage (Reference for LED Type) :  Pass  NG , \_\_\_\_\_
- 4. B/L Driving Current :  Pass  NG , \_\_\_\_\_
- 5. Brightness of B/L :  Pass  NG , \_\_\_\_\_
- 6. B/L Solder Method :  Pass  NG , \_\_\_\_\_
- 7. Others :  Pass  NG , \_\_\_\_\_

>> **Go to page 2** <<



Winstar      Module Number : \_\_\_\_\_

Page: 2

**5、Electronic Characteristics of Module :**

- 1. Input Voltage :                       Pass                       NG , \_\_\_\_\_
- 2. Supply Current :                       Pass                       NG , \_\_\_\_\_
- 3. Driving Voltage for LCD :            Pass                       NG , \_\_\_\_\_
- 4. Contrast for LCD :                    Pass                       NG , \_\_\_\_\_
- 5. B/L Driving Method :                 Pass                       NG , \_\_\_\_\_
- 6. Negative Voltage Output :            Pass                       NG , \_\_\_\_\_
- 7. Interface Function :                  Pass                       NG , \_\_\_\_\_
- 8. LCD Uniformity :                     Pass                       NG , \_\_\_\_\_
- 9. ESD test :                               Pass                       NG , \_\_\_\_\_
- 10. Others :                                 Pass                       NG , \_\_\_\_\_

**6、Summary :**

Sales signature : \_\_\_\_\_

Customer Signature : \_\_\_\_\_

Date :        /        /        \_\_\_\_\_