



**Winstar Display Co., LTD**

**華凌光電股份有限公司**



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## SPECIFICATION

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

**MODULE NO.:** WF57ETIECDNNO#

<p><b>APPROVED BY:</b> ( FOR CUSTOMER USE ONLY )</p>	<p><b>PCB VERSION:</b> _____ <b>DATA:</b> _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
<b>ISSUED DATE: 2017/01/05</b>			



**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	<b>SUMMARY</b>
0	2017/01/05		First issue

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# 1.Module Classification Information

W F 57 E T I E C D 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 : 5.7" TFT						
④	Model serials no.						
⑤	Backlight Type :	F→CCFL, White S→LED, High Light White			T→LED, White		
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	C→Transmissive, N. T, 6:00 ; I→Transmissive, W. T, 6:00 F→Transmissive, N.T,12:00 ; L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00 Q→Transmissive, Super W.T, 12:00 X→Transmissive, W.T, VA TFT V→Transmissive, Super W.T, VA TFT R→Transmissive, Super W.T, O-TFT Z→Transmissive, W.T, O-TFT A→Transmissive, N.T, IPS TFT Y→Transmissive, W.T, IPS TFT					
⑦	A : TFT LCD B : TFT+FR+CONTROL BOARD C : TFT+FR+A/D BOARD D : TFT+FR+A/D BOARD+CONTROL BOARD E : TFT+FR+POWER BOARD F : TFT+CONTROL BOARD			G : TFT+FR H : TFT+D/V BOARD I : TFT+FR+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	P :1280800
	S:480128	T:800320					
⑨	D: Digital L : LVDS						
⑩	Interface : N : without control board A : 8Bit B : 16Bit						
⑪	TS : N : Without TS T : resistive touch panel C : capacitive touch panel (G-F-F) G : capacitive touch panel(G-G)						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

## **2.Summary**

TFT 5.7” is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT\_LCD module, It is usually designed for industrial application and this module follows RoHs.

### **3. General Specifications**

<b>Item</b>	<b>Dimension</b>	<b>Unit</b>
Size	5.7	inch
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	141.12 x 101.55 x 9.4	mm
Active area	115.2 x 86.40	mm
Dot pitch	0.12 x 0.36	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Aspect Ratio	4:3	
Backlight Type	LED, Normally White	
With /Without TP	Without TP	
Surface	Glare	

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

## 4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
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. Operating conditions:

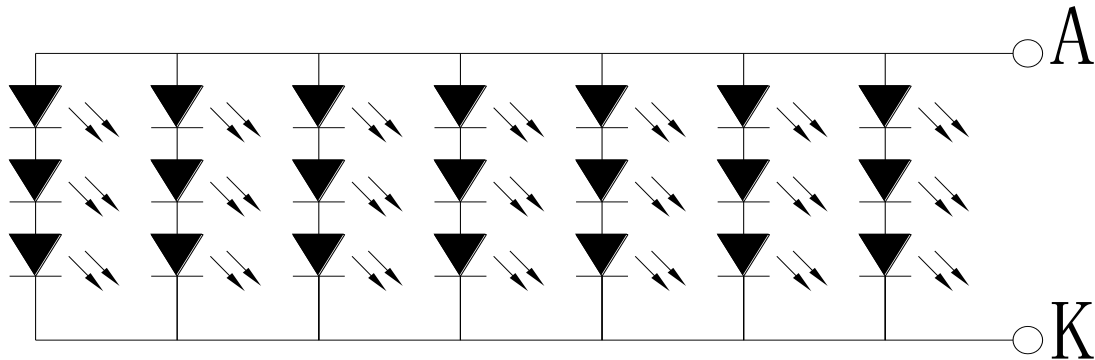
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VCC	—	3.0	3.3	3.6	V	
Supply Current For LCM	ICC	—	—	110	170	mA	Note1
Power Consumption	—	—	—	363	612	mW	VCC=3.3V

Note 1 : This value is test for VCC=3.3V , Ta=25 °C only

## 5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	140	-	mA	
Power Consumption		1260		1470	mW	
LED voltage	VBL+	9.0		10.5	V	Note 1
LED Life Time			50,000		Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case.



## 6.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	$V_{IL}$	0	-	0.3VCC	V	
High level input voltage	$V_{IH}$	0.7VCC	-	VCC	V	

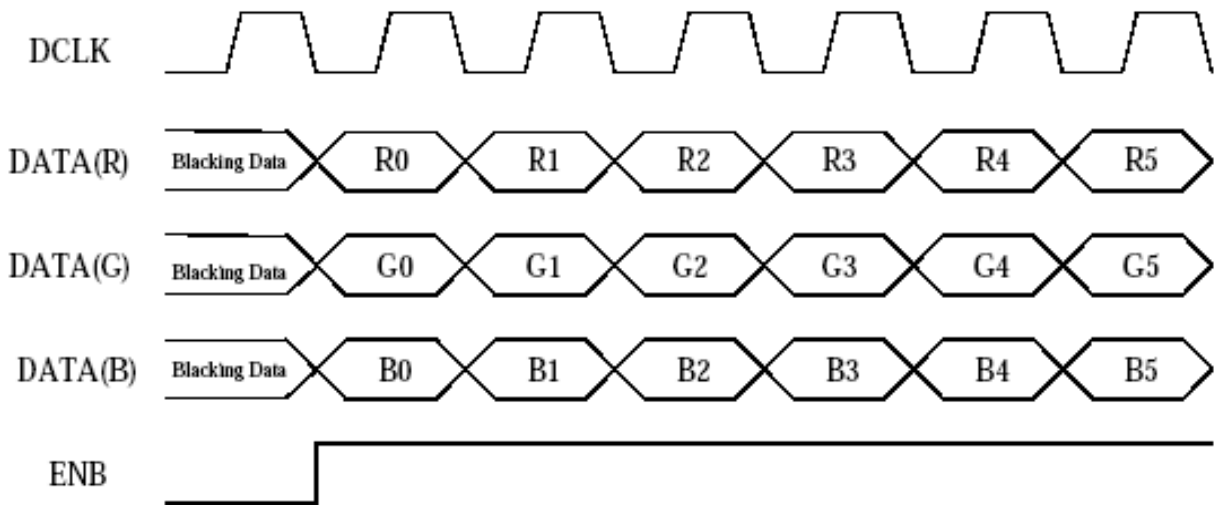
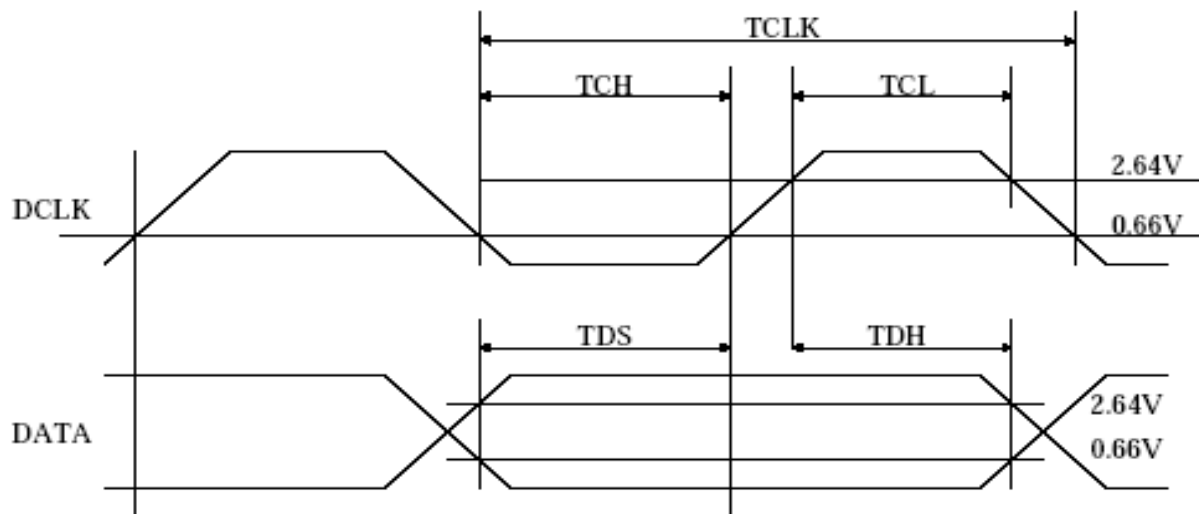
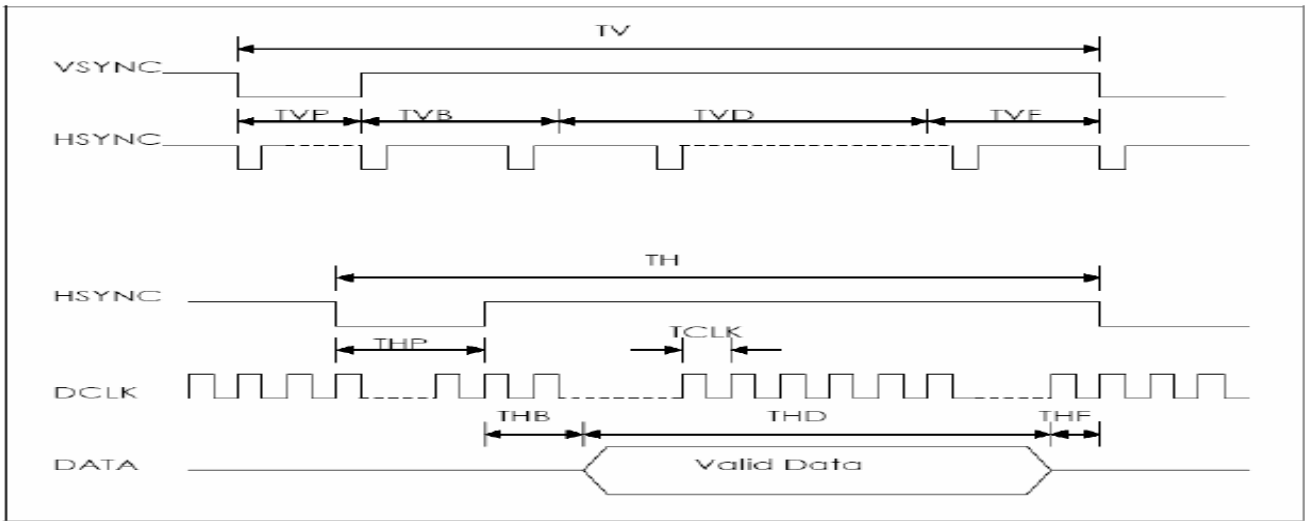
# 7.AC CHARACTERISTICS

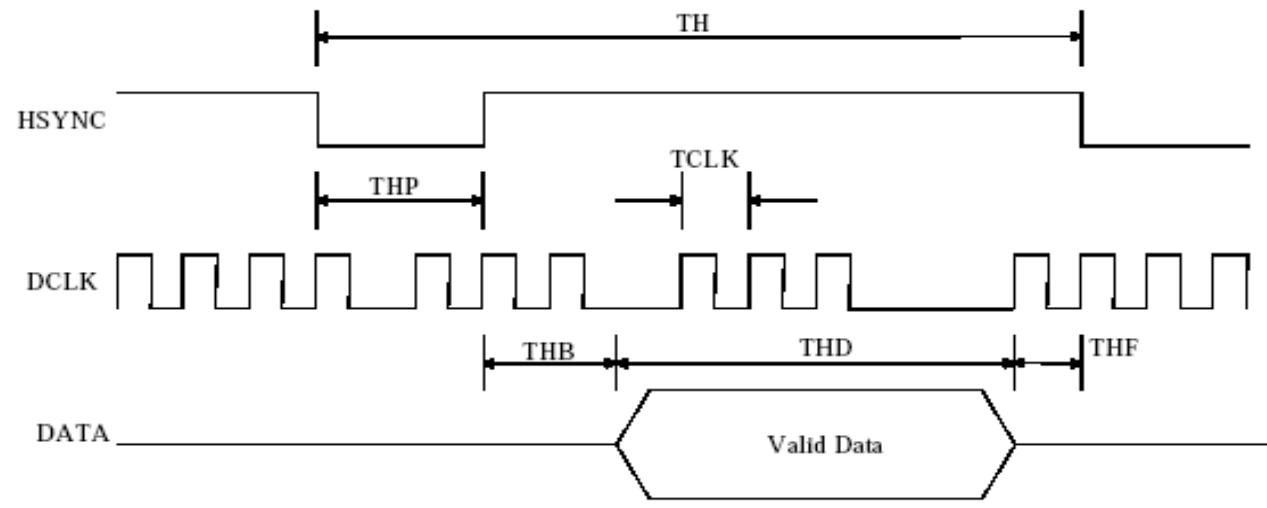
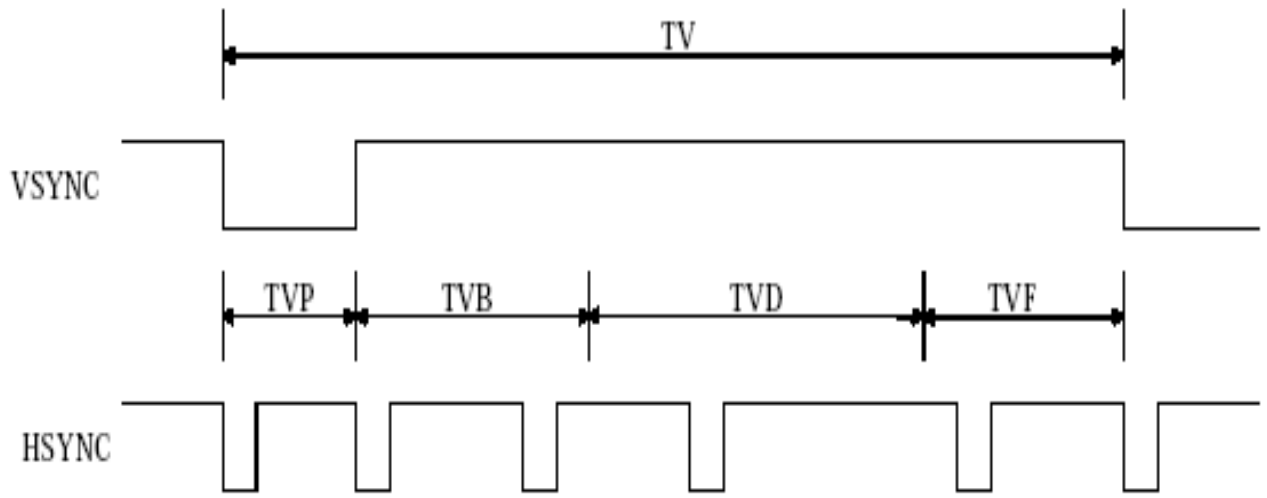
## 7.1. 24-bits parallel RGB Interface

### AC Timing Characteristics

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	
Dclk	Frequency	Dclk	-	6.4	-	MHZ	
	High time	Tch	-	78	-	ns	
	Low time	Tcl	-	78	-	ns	
Data	Setup time	Tds	12	-	-	ns	
	Hold time	Tdh	12	-	-	ns	
Hsync	Period	TH	-	408	-	DCLK	
	Pulse Width	Thp	-	30	-	DCLK	
	Back-Porch	Thb	-	38	-	DCLK	
	Display Period	Thd	-	320	-	DCLK	
	Front-Porch	Thf	-	20	-	DCLK	
Vsync	Period	NTSC	TV	-	262.5	-	DCLK
		PAL		312.5			
	Pulse Width		Tvp	1	3	5	TH
	Back-Porch	NTSC	Tvb	-	15	-	TH
		PAL		23			
	Display Period		Tvd	-	240	-	TH
	Front-Porch	NTSC	Tvf	-	4.5	-	TH
		PAL		46.5			

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	
Dclk	Frequency	Dclk	-	6.4	-	MHZ	
	High time	Tch	-	78	-	ns	
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	Pulse Width	Thp	-	30	-	DCLK	
	Back-Porch	Thb	-	38	-	DCLK	
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		PAL		312.5			
	Pulse Width		Tvp	1	3	5	TH
	Back-Porch	NTSC	Tvb	-	15	-	TH
		PAL		23			
	Display Period		Tvd	-	240	-	TH
	Front-Porch	NTSC	Tvf	-	4.5	-	TH
		PAL		46.5			





## 7.2. Basic Display Color and Gray Scale

	Color & Gray scale	Data signal																		
		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic color	Black	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	-	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	-	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	-	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	-	1	1	1	1	1	1	1	1	1	1	1	1	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
Gray Scale of red	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		▽			▽					▽					▽					
		▽			▽					▽					▽					
	Brighter	CS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		CS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	CS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of green	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		CS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		▽			▽					▽					▽					
		▽			▽					▽					▽					
	Brighter	CS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
		CS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	CS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of blue	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		CS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		▽			▽					▽					▽					
		▽			▽					▽					▽					
	Brighter	CS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
		CS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	CS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

# 8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time	Tr	$\theta = 0^\circ \cdot \Phi = 0^\circ$	-	15	30	.ms	Note 3,5
	Tf		-	35	50	.ms	
Contrast ratio	CR	At optimized viewing angle	150	250	-	-	Note 4,5
Color Chromaticity	White	Wx	$\theta = 0^\circ \cdot \Phi = 0^\circ$	0.282	0.312	0.342	Note 2,6,7
		Wy		0.319	0.349	0.379	
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\Theta R$	$CR \geq 10$	60	70	Deg.	Note 1
		$\Theta L$		60	70		
	Ver.	$\Phi T$		40	50		
		$\Phi B$		60	70		
Brightness	-	-	800	900		cd/m <sup>2</sup>	Center of display

Ta=25±2°C, IL=140mA

Note 1: Definition of viewing angle range

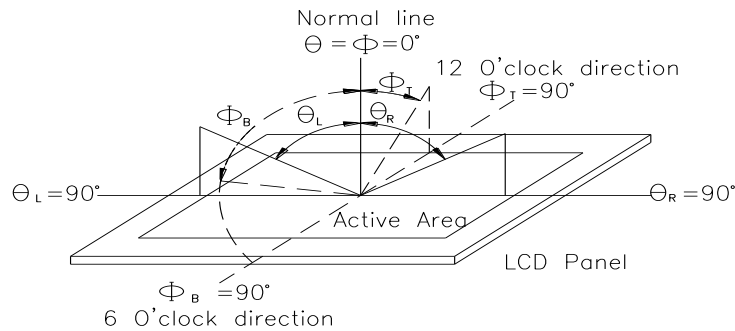


Fig.8.1. Definition of viewing angle

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-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

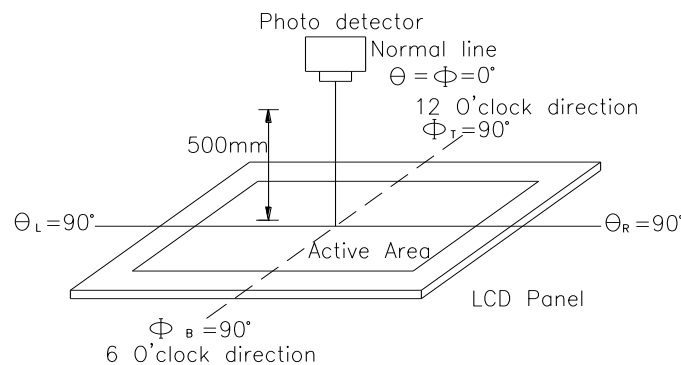
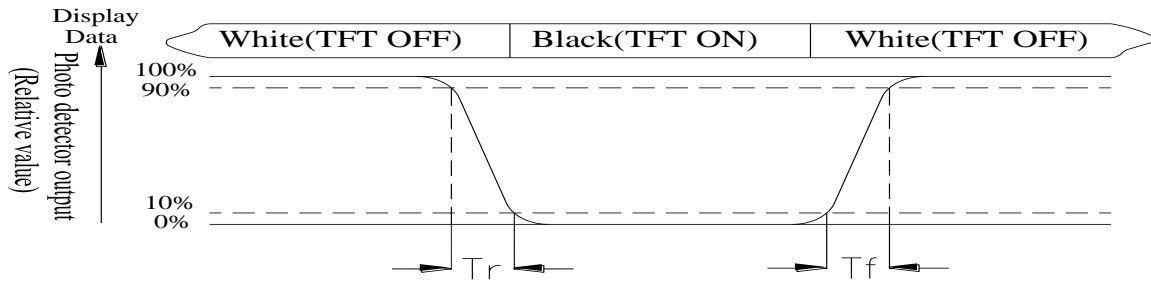


Fig. 8.2. Optical measurement system setup

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, Tr, 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: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

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.

# 9. Interface

## 9.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	Vcc	Power Supply : +3.3V	
2	Vcc	Power Supply : +3.3V	
3	HSYNC	Horizontal synchronous signal	
4	VSYNC	Vertical synchus signalrono	
5	DCLK	Clock signal for sampling each data signal	
6	ENB	Signal to settle the horizontal display position	
7	B0	Blue Data bit	
8	B1		
9	B2		
10	B3		
11	B4		
12	B5		
13	B6		
14	B7		
15	G0	Green Data bit	
16	G1		
17	G2		
18	G3		
19	G4		
20	G5		
21	G6		
22	G7		
23	R0	Red Data bit	
24	R1		
25	R2		
26	R3		
27	R4		
28	R5		
29	R6		
30	R7		
31	GND	ground	
32	GND	ground	

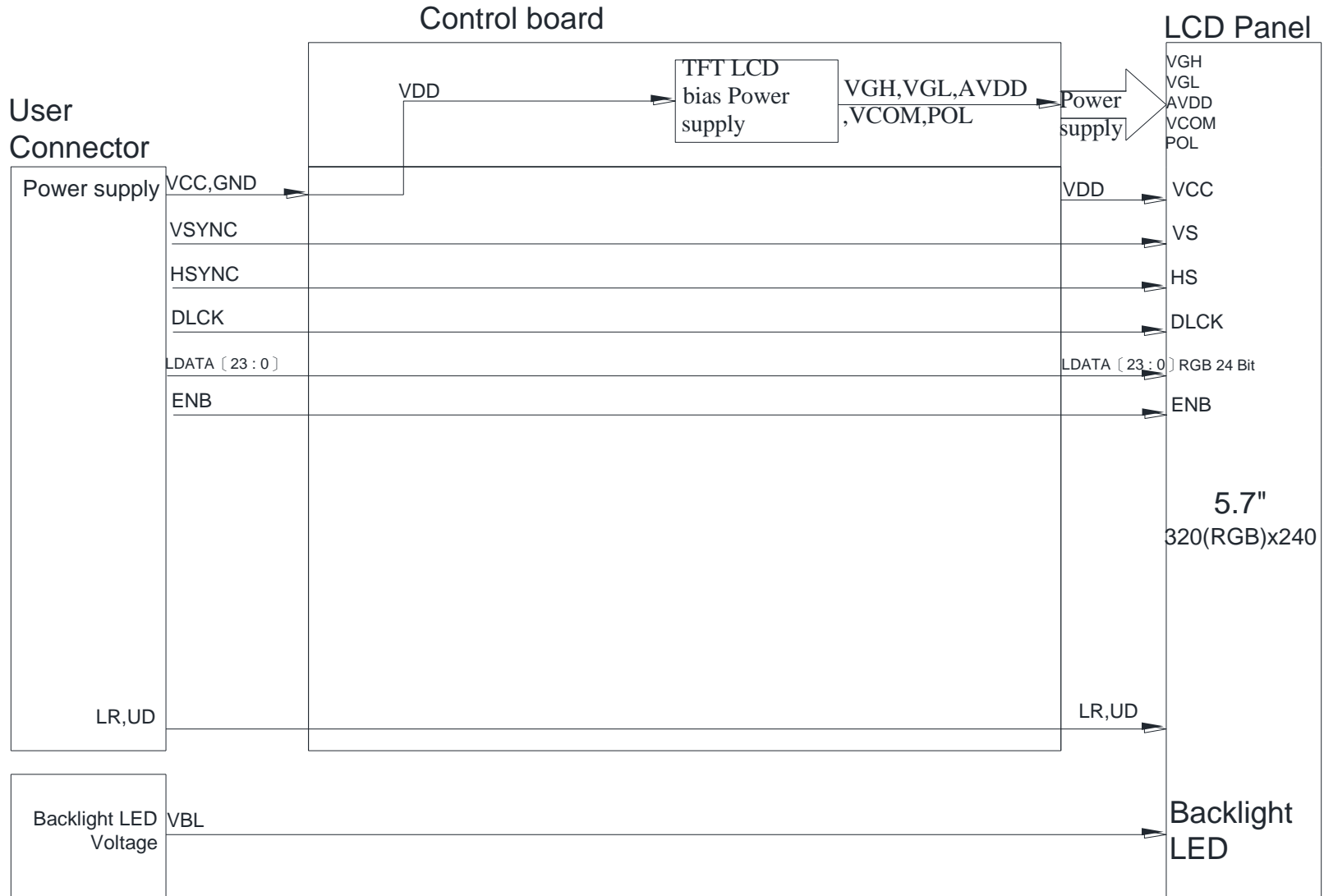
## 9.2. Backlight PIN Definition

Pin No.	Symbol	I/O	Description
1	VLED+	I	Red, LED_ Anode
2	VLED-	I	White, LED_ Cathode

Note: The backlight interface connector is a model **PHR-2** manufactured by JST or equivalent.  
The matching connector part number is **S 2B-PH-K-S** manufactured by JST or equivalent.



# 10. Block Diagram



# 11. Reliability

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

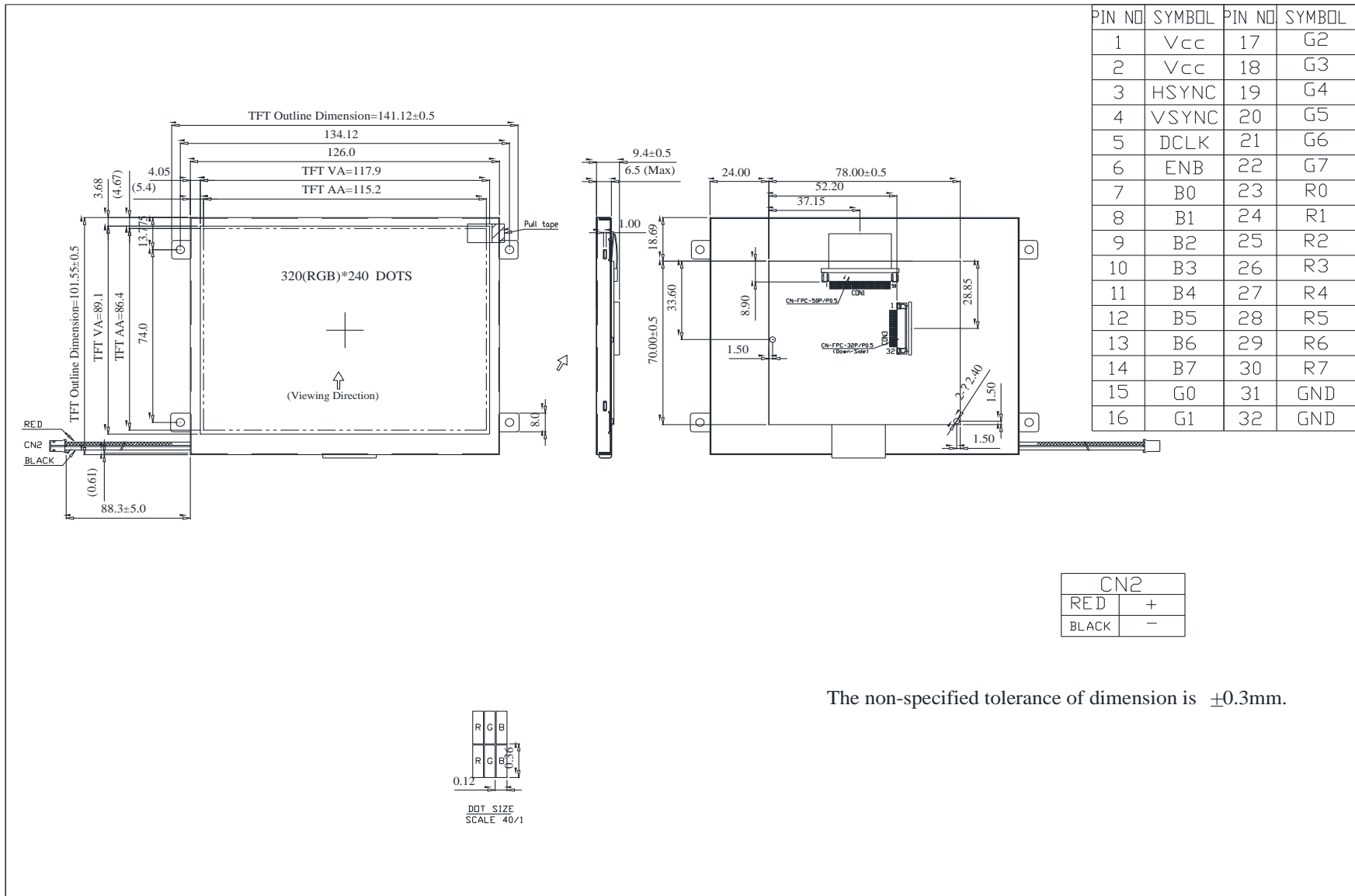
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="text-align: center;">-20°C    25°C    70°C</p> <p style="text-align: center;">30min    5min    30min</p> <p style="text-align: center;">1 cycle</p> </div>	-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.

# 12. Contour Drawing





**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 :        /        /        \_\_\_\_\_