



# Winstar Display Co., LTD

## 華凌光電股份有限公司



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### SPECIFICATION

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

**MODULE NO.:** WF70HTIFGDBNO#

<p style="text-align: center;"><b>APPROVED BY:</b></p> <p>( 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
			万健
<b>ISSUED DATE:</b>	<b>2013-7-19</b>		



**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2013.7.19		First issue

# Contents

1. Module Classification Information
2. Summry
3. General Specification
4. Absolute Maximum Ratings
5. Electrical Characteristics
6. DC Characteristics
7. Interface Timing
8. Optical Characteristics
9. Interface
10. Block Diagram
11. Reliability
12. Contour Drawing
13. Package specification
14. Initial Code For Reference

# 1. Module Classification Information

W   F   70   H   T   I   F   G   D   B   N   0   #  
 ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⑩   ⑪   ⑫   ⑬

①	Brand : WINSTAR DISPLAY CORPORATION						
②	Display Type : H→Character Type, G→Graphic Type F→TFT Type						
③	Display Size : 7.0" TFT						
④	Model serials no.						
⑤	Backlight Type :	F→CCFL, White			T→LED, White		
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	I→Transmissive, W. T, 6:00 L→Transmissive, W.T,12:00					
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	Solution:						
	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	
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						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

## **2.SUMMARY**

This technical specification applies to 7.0' color TFT-LCD panel. The 7.0' color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

## **3.General Specification**

Item	Dimension	Unit
Dot Matrix	800 x RGB x 480(TFT)	dots
Module dimension	165.0(W) x 104.8(H) x 9.0(D)	mm
Active area	152.4 x 91.44	mm
Dot pitch	0.0635x0.1905	mm
LCD type	TFT, Negative, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED, Normally White	

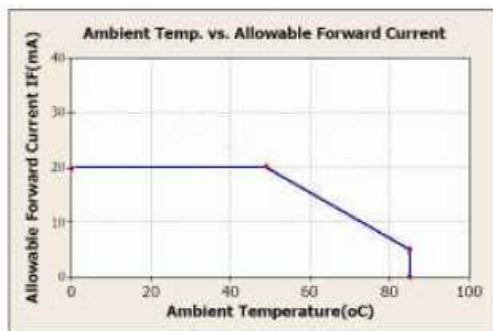
\*Color tone slight changed by temperature and driving voltage.

## **4.Absolute Maximum Ratings**

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T <sub>OP</sub>	-20	—	+70	°C
Storage Temperature	T <sub>ST</sub>	-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

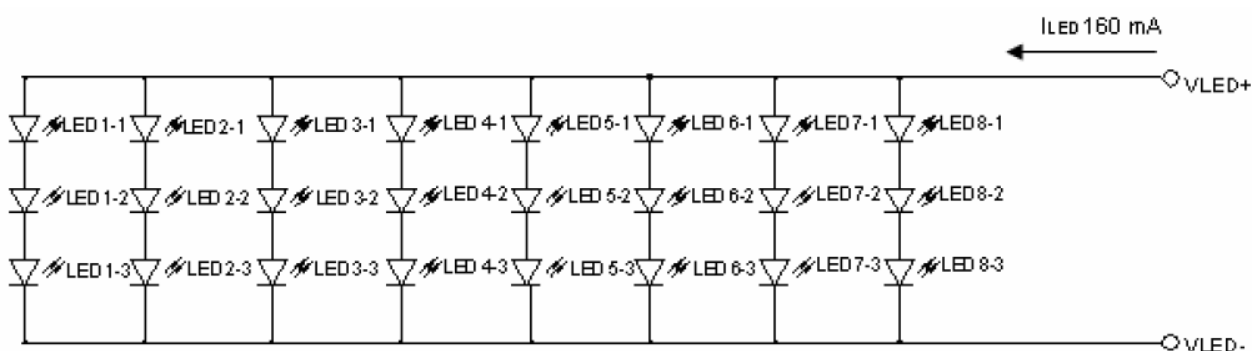
### 5.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	VDD	-	3.0	3.3	3.6	V

### 5.2 LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	-	-	160	-	mA	
Power Consumption	-	-	1552	1760	mW	
LED voltage	VBL+	8.4	-	11	V	Note 1
LED Life Time	-	-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 :  $T_a = 25\text{ }^\circ\text{C}$

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

Note 4 : The single LED lamp case

## 6. DC Characteristics

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

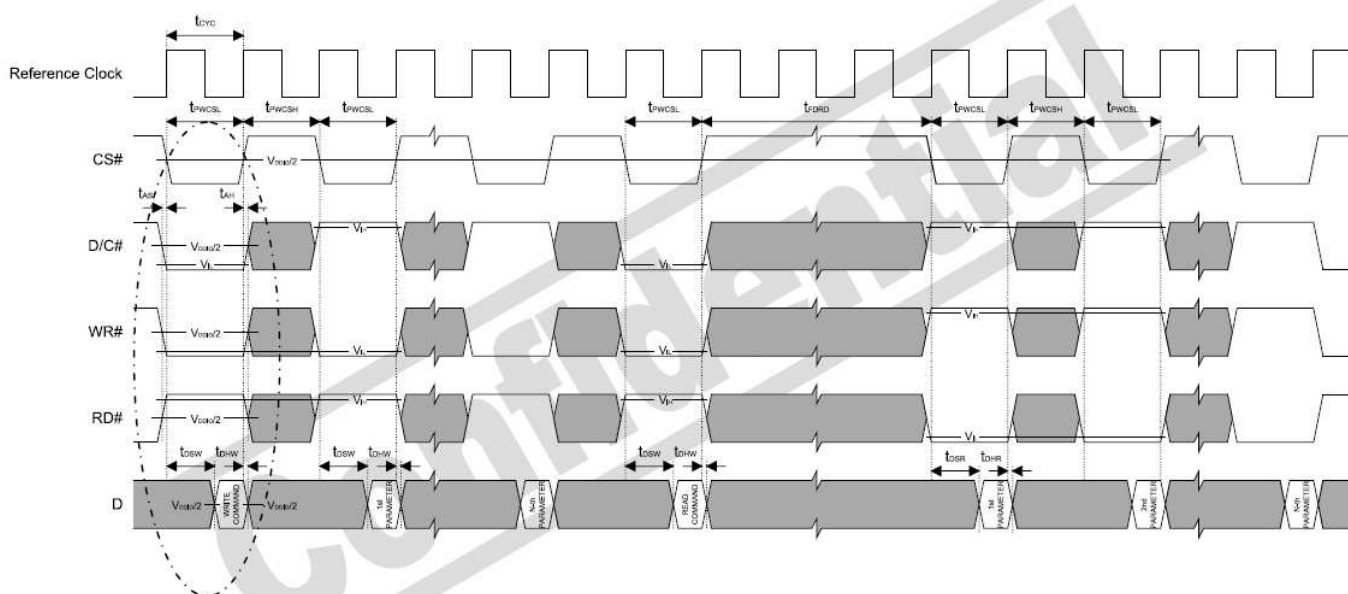
# 7. Interface Timing

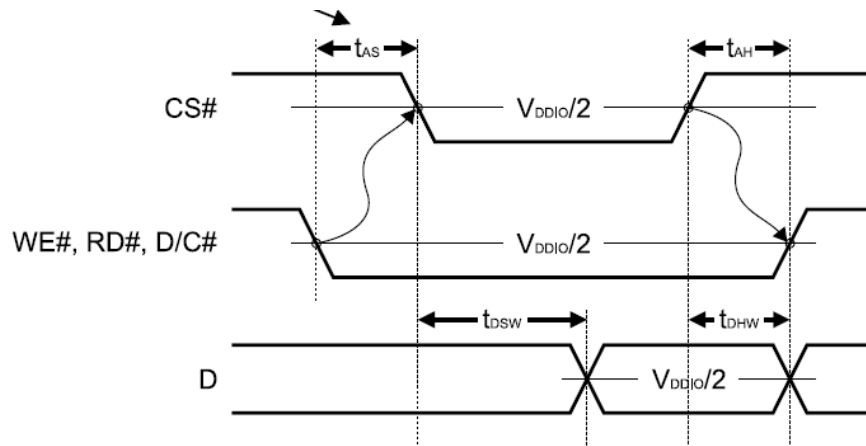
## 7.1.1 8080 Mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, D[23:0] and TE signals (Please refer to Table 6-1 for pin multiplexed with 6800 mode). This interface use WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

## 7.1.2 8080 Mode Write Cycle

Symbol	Parameter	Min	Typ	Max	Unit
$t_{cyc}$	Reference Clock Cycle Time	9	-	-	ns
$t_{PWCSL}$	Pulse width CS# low	1	-	-	$t_{cyc}$
$t_{PWCSH}$	Pulse width CS# high	1	-	-	$t_{cyc}$
$t_{FDRD}$	First Read Data Delay	5	-	-	$t_{cyc}$
$t_{AS}$	Address Setup Time	1	-	-	ns
$t_{AH}$	Address Hold Time	1	-	-	ns
$t_{DSW}$	Data Setup Time	4	-	-	ns
$t_{DHW}$	Data Hold Time	1	-	-	ns
$t_{DSR}$	Data Access Time	-	-	5	ns
$t_{DHR}$	Output Hold time	1	-	-	ns





### 7.1.3 Pixel Data Format

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
24 bits	1 <sup>st</sup>	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
18 bits	1 <sup>st</sup>							R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
16 bits (565 format)	1 <sup>st</sup>									R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 <sup>st</sup>									R5	R4	R3	R2	R1	R0	X	X	G5	G4	G3	G2	G1	G0	X	X
	2 <sup>nd</sup>									B5	B4	B3	B2	B1	B0	X	X	R5	R4	R3	R2	R1	R0	X	X
	3 <sup>rd</sup>									G5	G4	G3	G2	G1	G0	X	X	B5	B4	B3	B2	B1	B0	X	X
9 bits	1 <sup>st</sup>																R5	R4	R3	R2	R1	R0	G5	G4	G3
	2 <sup>nd</sup>																G2	G1	G0	B5	B4	B3	B2	B1	B0
8 bits	1 <sup>st</sup>																	R5	R4	R3	R2	R1	R0	X	X
	2 <sup>nd</sup>																	G5	G4	G3	G2	G1	G0	X	X
	3 <sup>rd</sup>																	B5	B4	B3	B2	B1	B0	X	X

X: Don't Care



## 8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta = 0^\circ$ 、 $\Phi = 0^\circ$	-	5	10	.ms	Note 3	
	Tf		-	11	16	.ms		
Contrast ratio	CR	At optimized viewing angle	250	400	-	-	Note 4	
Color Chromaticity	White	$\theta = 0^\circ$ 、 $\Phi = 0$	Wx	0.26	0.31	0.36	-	Note 2,5,6
			Wy	0.28	0.33	0.38	-	
Viewing angle	Hor.	CR $\geq 10$	$\Theta R$	65	70	-	Deg.	Note 1
			$\Theta L$	65	70	-		
	Ver.		$\Phi T$	55	60	-		
			$\Phi B$	55	60	-		
Brightness	-	-	350	460	-	cd/m <sup>2</sup>	Center of display	

Ta=25±2°C, IL=20mA

Note 1: Definition of viewing angle range

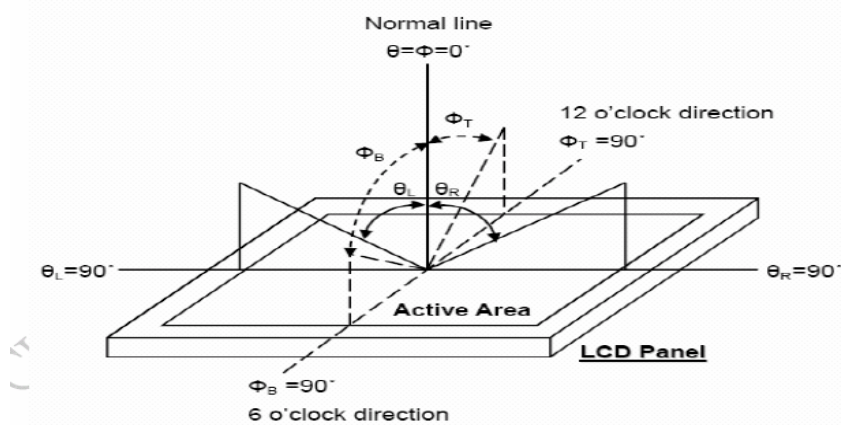


Fig. 8-1 Definition of viewing angle

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 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

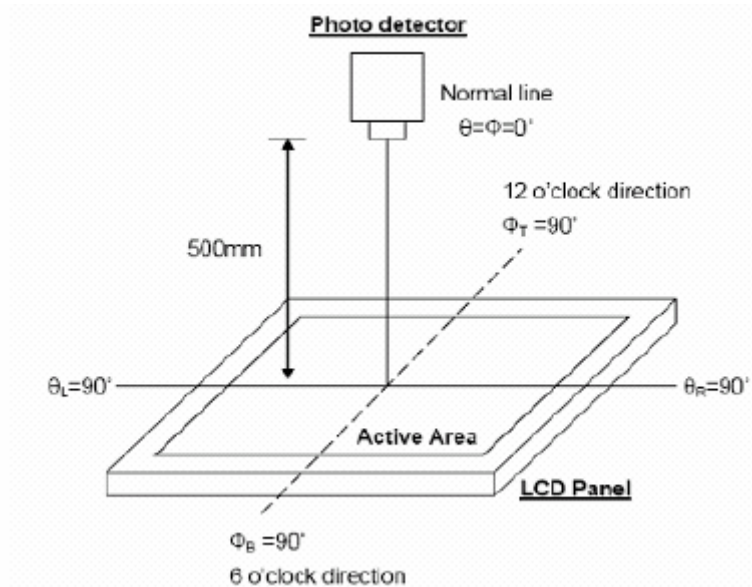
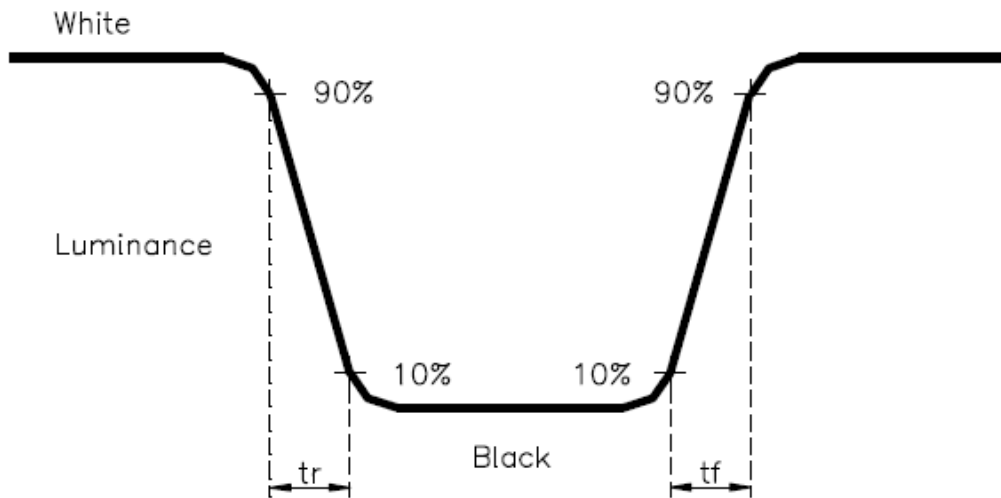


Fig. 8-2 Optical measurement system setup

Note 3: Definition of Response time:

Definition of response time : The response time is defined as the time interval between the 10% and 90% amplitudes.



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 color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

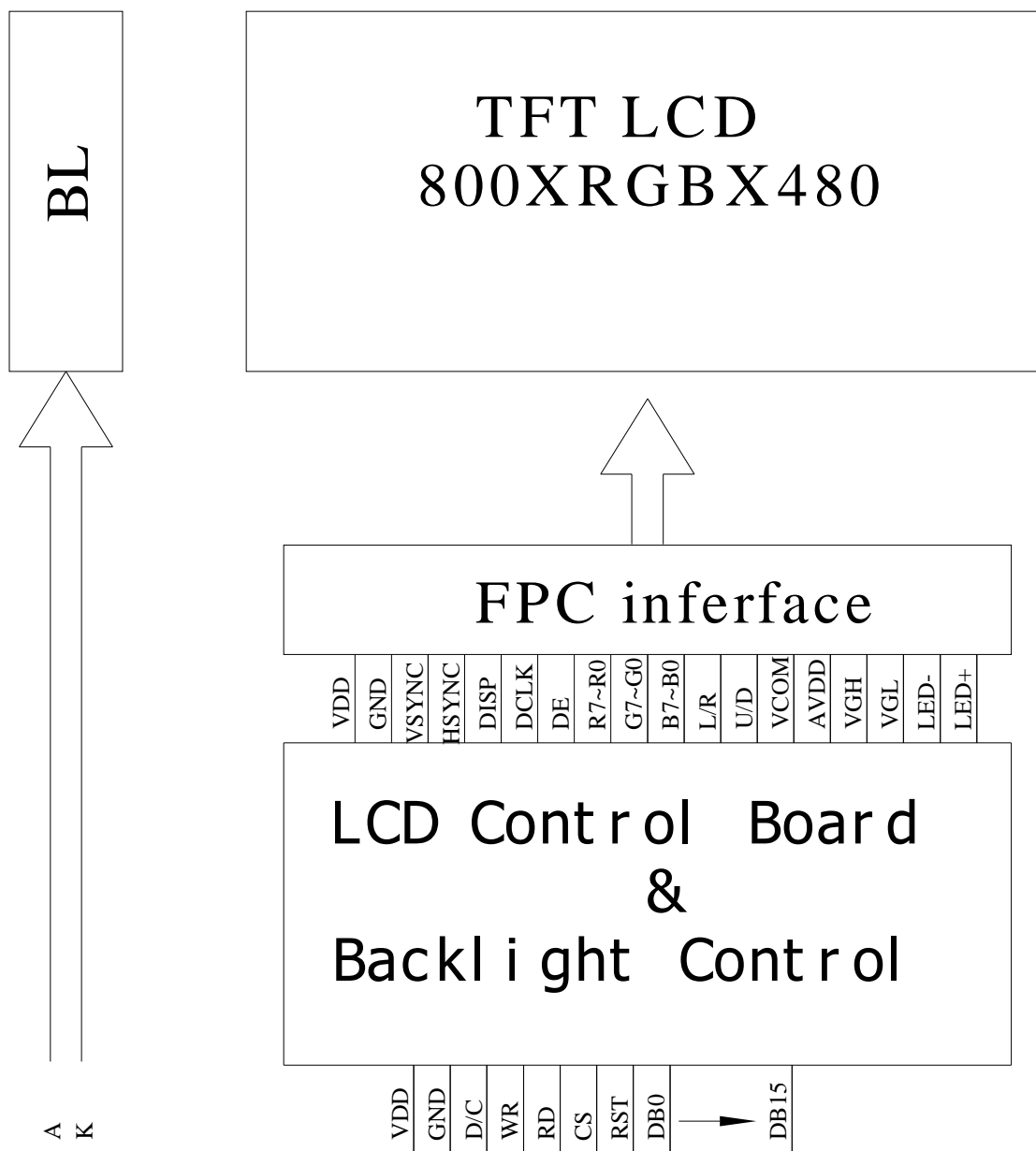
Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.

## 9. Interface

### 9.1. LCM PIN Definition

Pin	Symbol	I/O	Function	Remark
1	VDD		Power Supply : +3.3V	
2	VDD		Power Supply : +3.3V	
3	DB0		Data bus	
4	DB1		Data bus	
5	DB2		Data bus	
6	DB3		Data bus	
7	DB4		Data bus	
8	DB5		Data bus	
9	DB6		Data bus	
10	DB7		Data bus	
11	DB8		Data bus	
12	DB9		Data bus	
13	DB10		Data bus	
14	DB11		Data bus	
15	DB12		Data bus	
16	DB13		Data bus	
17	DB14		Data bus	
18	DB15		Data bus	
19	CS		Chip select	
20	D/C		Display data/Command data	
21	RD		Read strobe signal	
22	WR		Write strobe signal	
23	NC		No connect	
24	RST		Hardware reset	
25	NC		No connect	
26	NC		No connect	
27	NC		No connect	
28	NC		No connect	
29	NC		No connect	
30	NC		No connect	
31	GND		Power Ground	
32	GND		Power Ground	

# 10. BLOCK DIAGRAM



# 11. Reliability

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

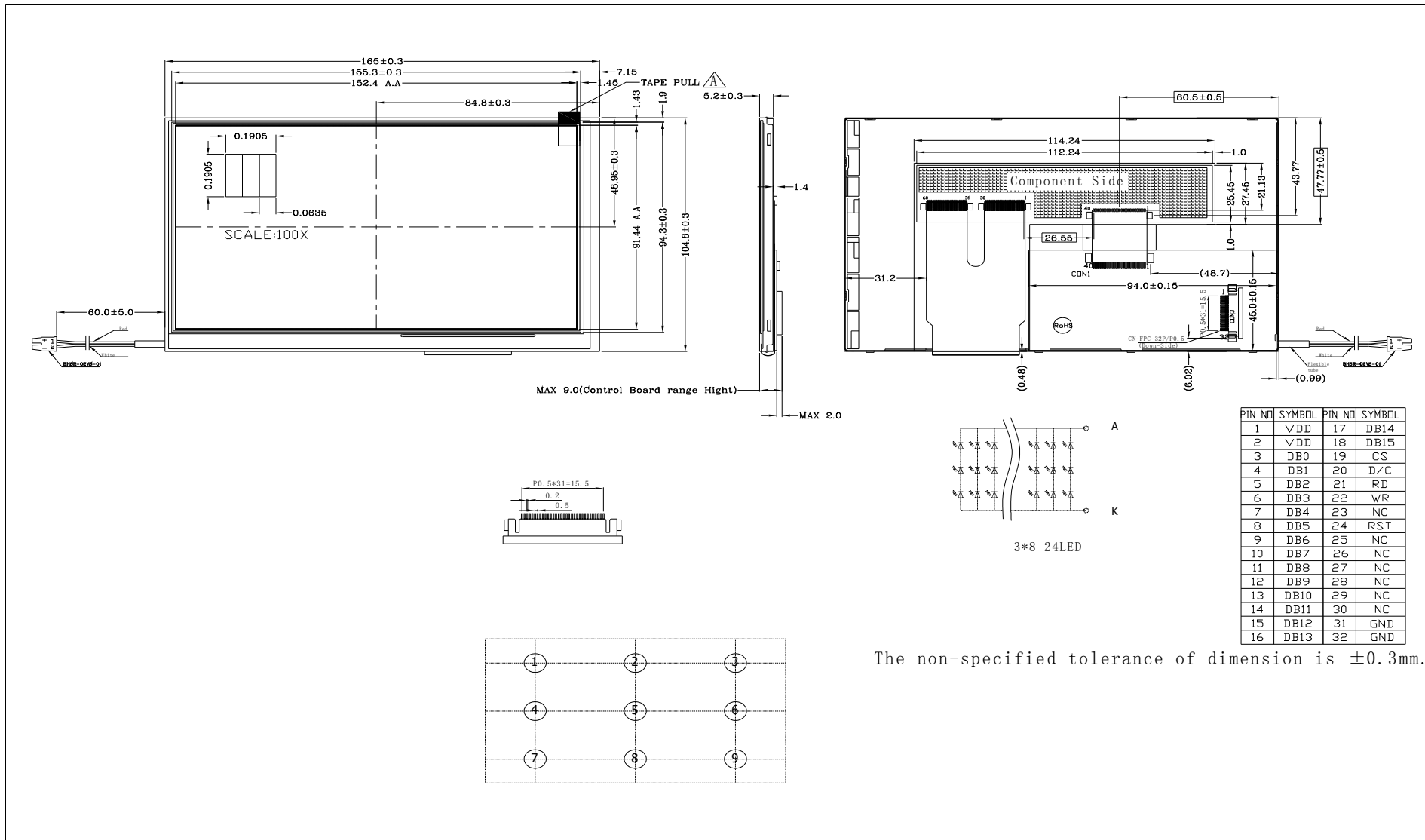
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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 For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	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="margin: 0;">-20°C    25°C    70°C</p> <p style="margin: 0;">30min    5min    30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 3 15mm 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=800V,RS=1.5kΩ CS=100pF 1 time	—

**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: Vibration test will be conducted to the product itself without putting it in a container.**

# 12. Contour Drawing



# 13. Package specification

<b>LCM Model</b>	WF70HTIFGDBN0#	<b>LCM 包裝規格書</b> <b>LCM Packaging Specifications</b>	<b>Approve</b>	<b>Check</b>	<b>Contact</b>
<b>Drawing NO.</b>			<b>DATE</b>	初版	版次 Ver
			13'7/19	13'7/19	0

**1. 包裝材料規格表 (Packaging Material) :(per carton)**

NO.	Item	Model	Dimensions	Quantity
1	成品 (LCM)	WF70HTIFGDBN0#	165.0 x 104.8 x 9.0	60
2	TRAY 盤 (2)	PKCA1XXXXXXXXXXXX0294	315 x 265	30
3	BP01 內盒(3)Product Box	PK3R1XXXXXXXXXXXX0001	332 x 280 x 100	6
4	泡棉(4)Foam	-----	283 x 230 x 8	6
5	外紙箱(5)Carton	PK4Q1XXXXXXXXXXXX0000	565 x 340 x 320	1
6				
7				
8				
9				

**2. 單箱數量規格表(Packaging Specifications and Quantity) :**

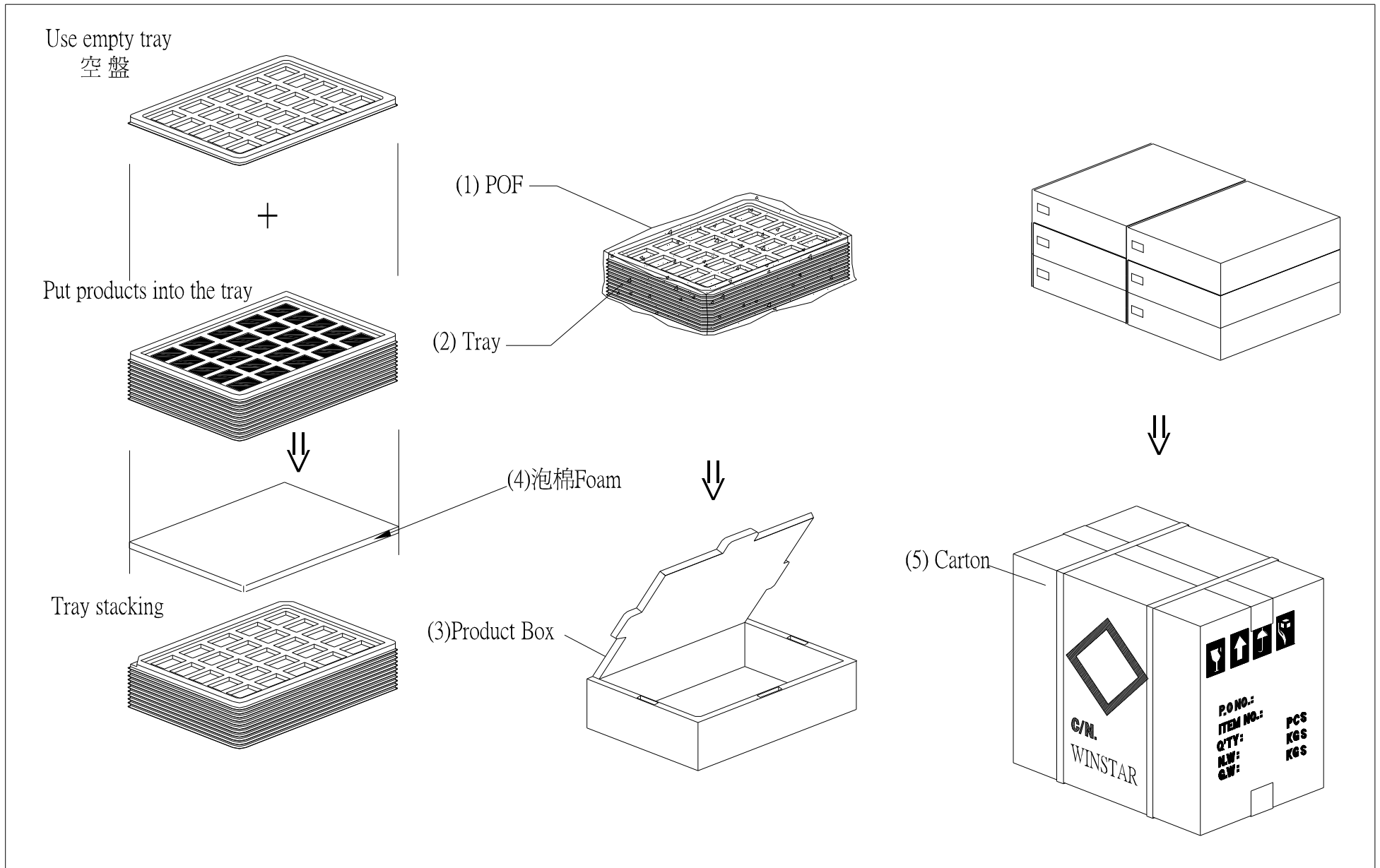
(1) LCM quantity per box : no per tray                      2    x no of tray        5    =    10

(2) Total LCM quantity in carton : quantity per box    10    x no of boxes      6    =    60

**特 記 事 項 (REMARK)**

<b>1. Label Specifications :</b> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> MOOEL:  LOT NO :  QUANTITY:  CHECK: </div>	
--	--





## **14. Initial Code For Reference**

```
void Initial_code()
{
    Write_Command(0x01);
    Delay_ms(10);
    Write_Command(0xe0);
    Write_Parameter(0x01);
    Delay_ms(5);
    Write_Command(0xe0);
    Write_Parameter(0x03);
    Delay_ms(5);

    Write_Command(0xb0);
    Write_Parameter(0x08);
    Write_Parameter(0x80);
    Write_Parameter(0x03);
    Write_Parameter(0x1f);
    Write_Parameter(0x01);
    Write_Parameter(0xdf);
    Write_Parameter(0x00);

    Write_Command(0xf0);
    Write_Parameter(0x03);
    Write_Command(0x3a);
    Write_Parameter(0x50);

    Write_Command(0xe2);
    Write_Parameter(0x1d);
    Write_Parameter(0x02);
    Write_Parameter(0x54);

    Write_Command(0xe6);
    Write_Parameter(0x04);
    Write_Parameter(0x6f);
    Write_Parameter(0x47);

    Write_Command(0xb4);
    Write_Parameter(0x04);
    Write_Parameter(0x20);
    Write_Parameter(0x01);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);
    Write_Parameter(0x00);

    Write_Command(0xb6);
    Write_Parameter(0x02);
    Write_Parameter(0x0d);
    Write_Parameter(0x00);
    Write_Parameter(0x2d);
    Write_Parameter(0x00);
}
```

```
Write_Parameter(0x00);  
Write_Parameter(0x00);
```

```
Write_Command(0x2a);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x03);  
Write_Parameter(0x1f);
```

```
Write_Command(0x2b);  
Write_Parameter(0x00);  
Write_Parameter(0x00);  
Write_Parameter(0x01);  
Write_Parameter(0xdf);
```

```
Write_Command(0x29);  
Write_Command(0x2c);
```

```
}
```



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

Page: 1

**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** <<



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