



Winstar Display Co., LTD

華凌光電股份有限公司

WEB: <http://www.winstar.com.tw>

E-mail: winstar@winstar.com.tw



Distributed by:

SPECIFICATION



CUSTOMER : _____

MODULE NO.: WF35QSIBCDBNO#

<p>APPROVED BY: (FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: _____ DATA: _____</p>
--	---

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2015/04/27			

TFT Display Inspection Specification: <http://www.winstar.com.tw/service.php>



RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2014/12/24		First issue
A	2015/04/27		Modify Reliability.

Texim Europe

Contents

- 1.Module Classification Information
- 2.Summary
- 3.General Specification
- 4.Absolute Maximum Ratings
- 5.Electrical Characteristics
- 6.DC Characteristics
- 7.Interface Timing Characteristics
- 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 35 Q S I B C 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 : F→TFT Type, J→Custom TFT						
③	Display Size : 3.5" 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	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	P :1280800
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

This technical specification applies to 3.45' color TFT-LCD panel. The 3.45' 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.

Texim Europe

3. General Specifications

Item	Dimension	Unit
Size	3.5	inch
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	93.5 x 66.44 x 7.3	mm
Active area	70.08 x 52.56	mm
Dot pitch	0.073 x 0.219	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED, Normally White	
Controller IC	SSD1963	
Interface	Digital 8080 family MPU 8bit/16bit	
With /Without TP	Without TP	
Surface	Anti-Glare	

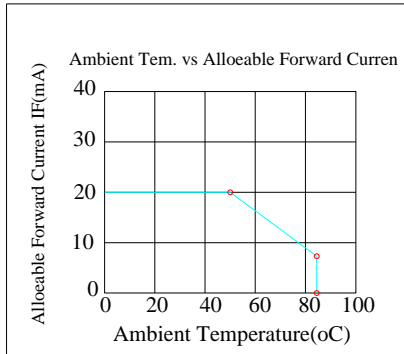
*Color tone slight changed by temperature and driving voltage.

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°C



Texim Europe

5. Electrical Characteristics

5.1. Operating conditions: (CON2.Pin1=GND, Pin2=VDD)

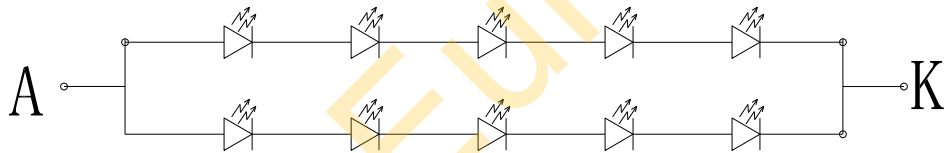
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	3.0	3.1	3.3	V	-
Supply Current For LCM	IDD	—	—	200	300	mA	Note1

Note 1 : This value is test for VCC=3.1V , Ta=25°C only

5.2. Backlight driving conditions (CON2.Pin33,34=VLED-, Pin35,36=VLED+)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	-	-	38	40	mA	Note 5
Power Consumption	-	550	-	700	mW	-
LED voltage	VBL+	14.5	-	17.5	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

Note 5 : Make sure LED current less than Max. value

6.DC CHARACTERISTICS

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

Texim Europe

7. Interface timing

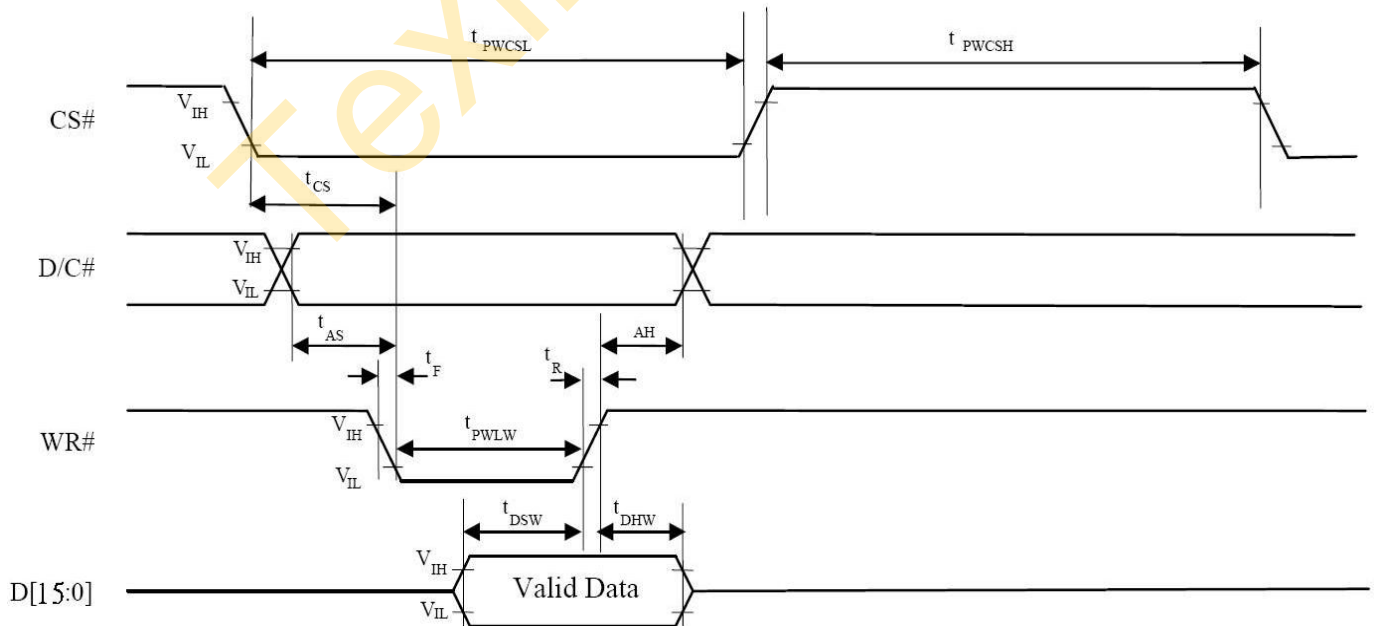
7.1. 8080 Mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, Data bus. 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#.

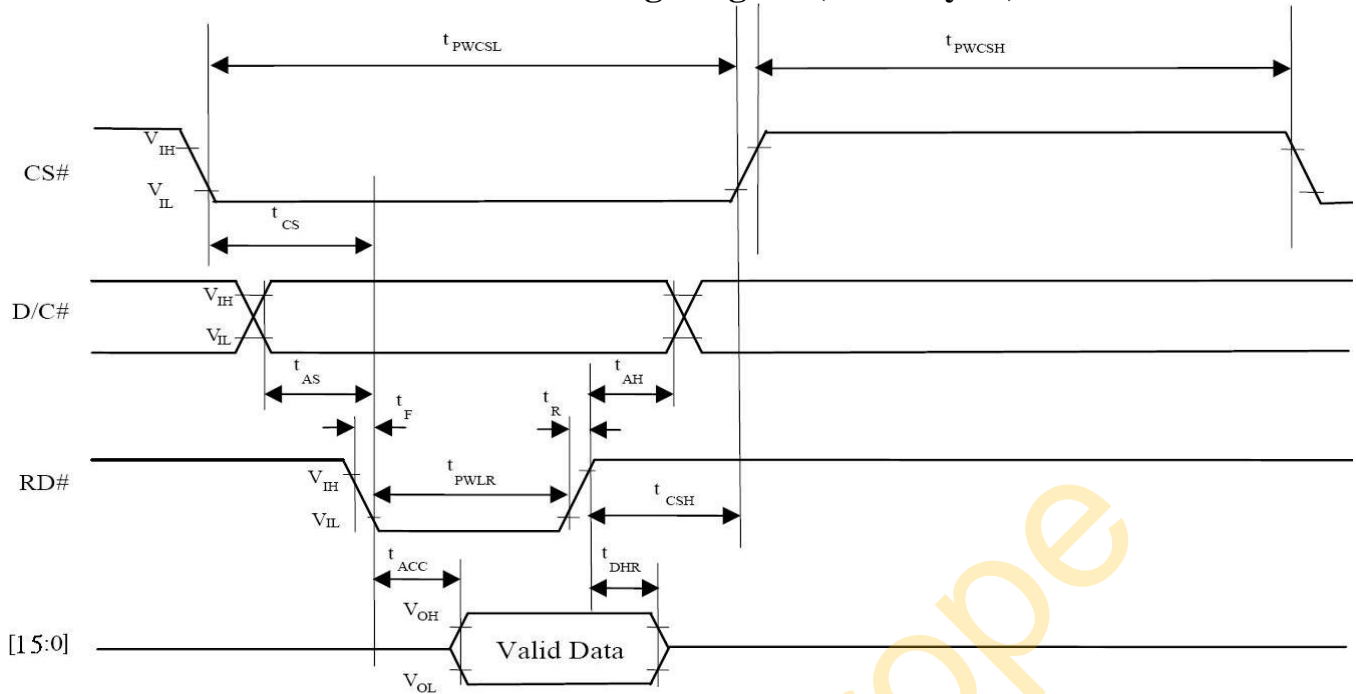
7.2. 8080 Mode Write Cycle

Symbol	Parameter	Min	Typ	Max	Unit																																																						
fMCLK	System Clock Frequency	1	-	110	MHz																																																						
tMCLK	System Clock Period	1/ fMCLK	-	-	ns																																																						
tPWCSH	Control Pulse High Width	13	1.5* tMCLK	-	ns																																																						
	Write	30	3.5* tMCLK	-	ns																																																						
tPWCSL	Control Pulse Low Width	13	1.5* tMCLK	-	ns																																																						
	Write (next write cycle)	80	9* tMCLK	-	ns																																																						
	Write (next read cycle)	80	9* tMCLK	-	ns																																																						
tAS	Address Setup Time	1	-	-	ns																																																						
tAH	Address Hold Time	2	-	-	ns																																																						
tDSW	Write Data Setup Time	4	-	-	ns </tr <tr> <td>tDHW</td> <td>Write Data Hold Time</td> <td>1</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tPWLW</td> <td>Write Low Time</td> <td>12</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tDHR</td> <td>Read Data Hold Time</td> <td>1</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tACC</td> <td>Access Time</td> <td>32</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tPWLW</td> <td>Read Low Time</td> <td>36</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tR</td> <td>Rise Time</td> <td>-</td> <td>-</td> <td>0.5</td> <td>ns</td> </tr> <tr> <td>tF</td> <td>Fall Time</td> <td>-</td> <td>-</td> <td>0.5</td> <td>ns</td> </tr> <tr> <td>tCS</td> <td>Chip select setup time</td> <td>2</td> <td>-</td> <td>-</td> <td>ns</td> </tr> <tr> <td>tCSH</td> <td>Chip select hold time to read signal</td> <td>3</td> <td>-</td> <td>-</td> <td>ns</td> </tr>	tDHW	Write Data Hold Time	1	-	-	ns	tPWLW	Write Low Time	12	-	-	ns	tDHR	Read Data Hold Time	1	-	-	ns	tACC	Access Time	32	-	-	ns	tPWLW	Read Low Time	36	-	-	ns	tR	Rise Time	-	-	0.5	ns	tF	Fall Time	-	-	0.5	ns	tCS	Chip select setup time	2	-	-	ns	tCSH	Chip select hold time to read signal	3	-	-	ns
tDHW	Write Data Hold Time	1	-	-	ns																																																						
tPWLW	Write Low Time	12	-	-	ns																																																						
tDHR	Read Data Hold Time	1	-	-	ns																																																						
tACC	Access Time	32	-	-	ns																																																						
tPWLW	Read Low Time	36	-	-	ns																																																						
tR	Rise Time	-	-	0.5	ns																																																						
tF	Fall Time	-	-	0.5	ns																																																						
tCS	Chip select setup time	2	-	-	ns																																																						
tCSH	Chip select hold time to read signal	3	-	-	ns																																																						

7.3. Parallel 8080-series Interface Timing Diagram(Write Cycle)



7.4. Parallel 8080-series Interface Timing Diagram(Read Cycle)



7.5. Pixel Data Format

Interface	Cycle	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]
16 bits (565 format)	1 st	R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 st	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0
	2 nd	B7	B6	B5	B4	B3	B2	B1	B0	R7	R6	R5	R4	R3	R2	R1	R0
	3 rd	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
8 bits	1 st									R7	R6	R5	R4	R3	R2	R1	R0
	2 nd									G7	G6	G5	G4	G3	G2	G1	G0
	3 rd									B7	B6	B5	B4	B3	B2	B1	B0

8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	10		ms	Note 3,5	
	Tf		-	15		ms		
Contrast ratio	CR	At optimized viewing angle	300	350	-	-	Note 4,5	
Color Chromaticity	White	$\theta=0^\circ$ 、 $\phi=0^\circ$	Wx	0.26	0.31	0.36	-	Note 2,6,7
	Wy		0.28	0.33	0.38	-		
Viewing angle (Gray Scale Inversion Direction)	Hor.	θ_R	-	55	-	Deg.	Note 1	
		θ_L	-	55	-			
	Ver.	ϕ_T	-	45	-			
		ϕ_B	-	50	-			
Brightness	-	-	1000	1100	-	cd/m ²	Center of display	

Ta=25±2°C

Note 1: Definition of viewing angle range

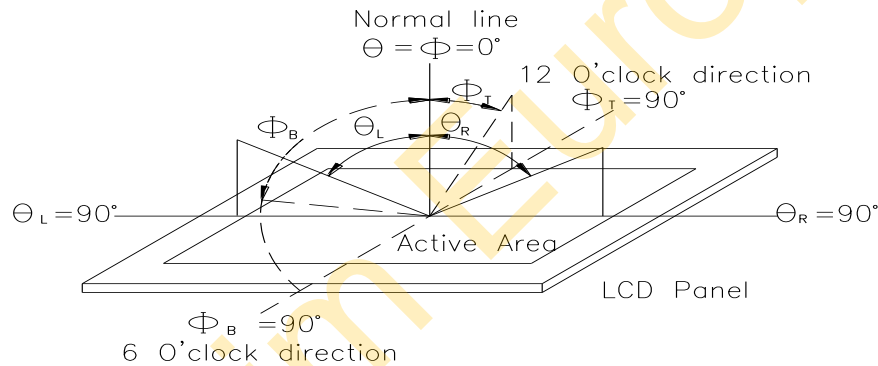


Fig. 8.1. Definition of viewing angle

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.

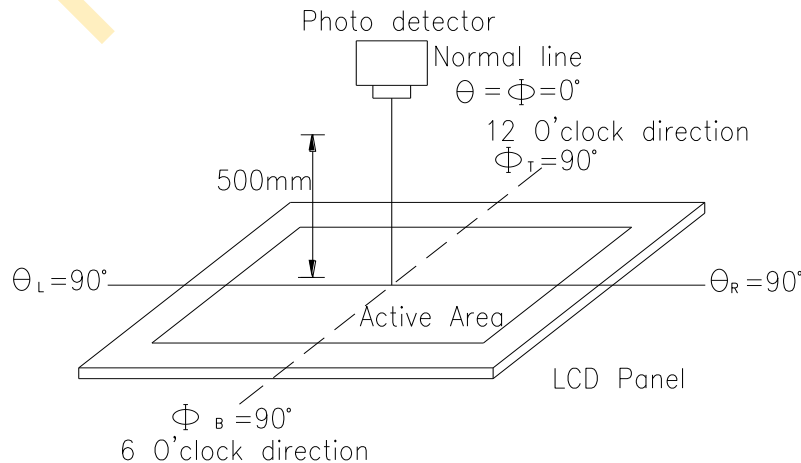
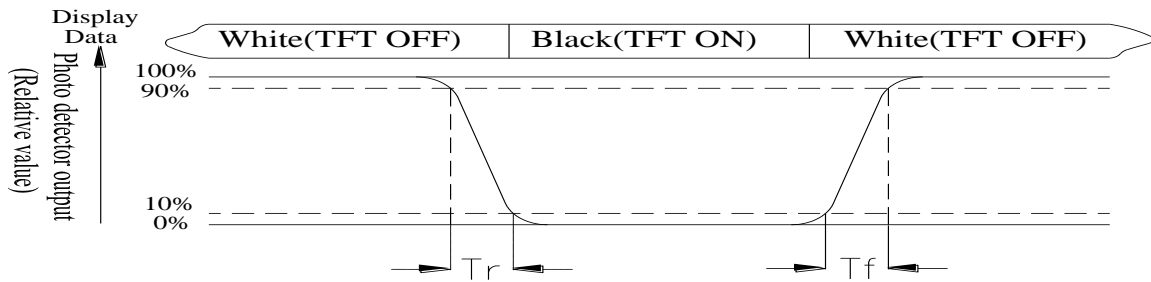


Fig. 8.2. Optical measurement system setup

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, 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: 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.

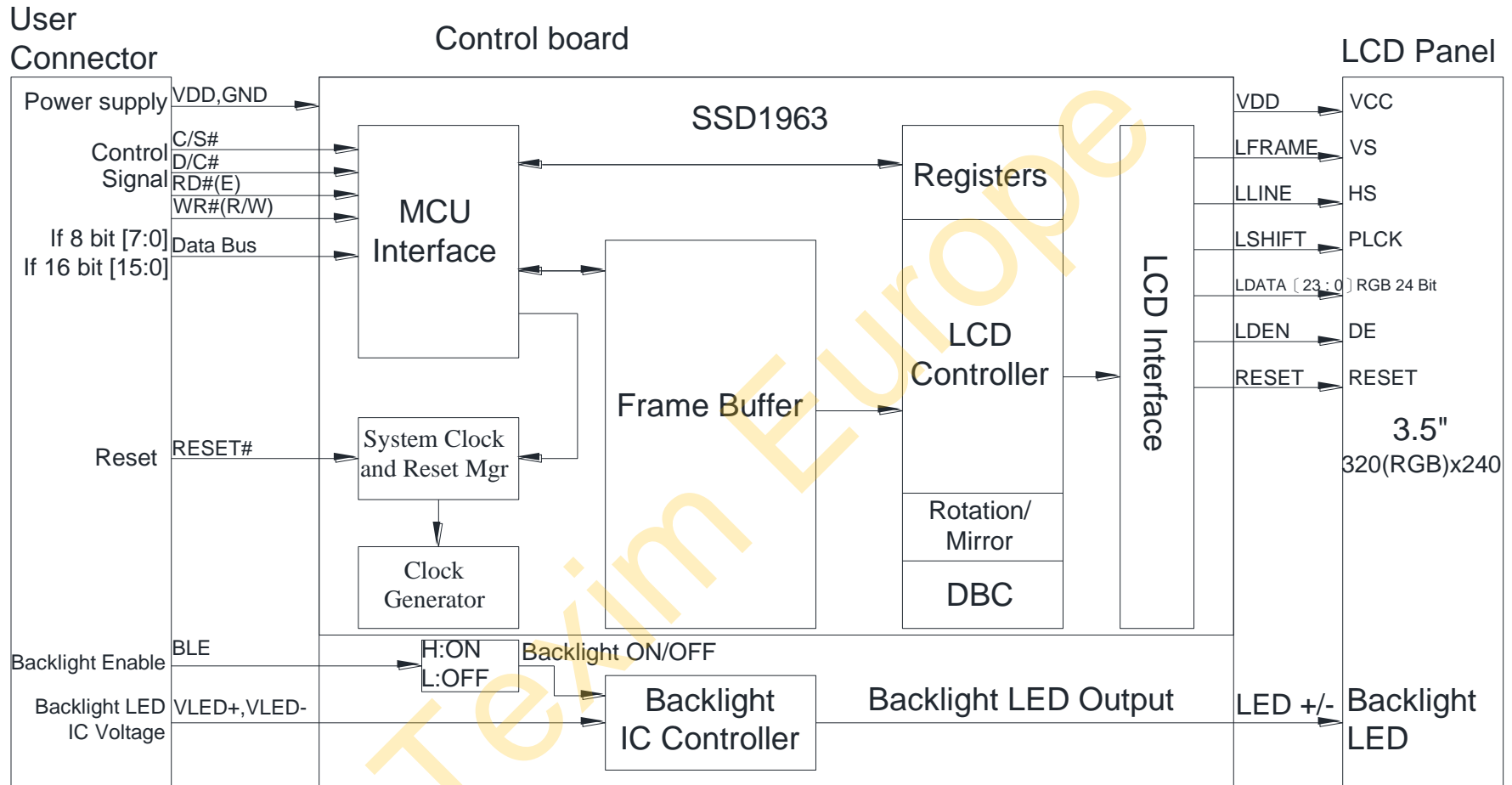
9.Interface

9.1. LCM PIN Definition (CON2)

Pin	Symbol	Function	Remark
1	GND	System ground pin of the IC. Connect to system ground.	
2	VDD	Power Supply : +3.3V	
3	BL_E	Backlight control signal , H: On \ L: Off	
4	D/C	Data/Command select	
5	WR	Write strobe signal	
6	RD	Read strobe signal	
7	DB0	Data bus	
8	DB1	Data bus	
9	DB2	Data bus	
10	DB3	Data bus	
11	DB4	Data bus	
12	DB5	Data bus	
13	DB6	Data bus	
14	DB7	Data bus	
15	DB8	Data bus (When select 8bits Mode, this pin is NC)	Note1
16	DB9	Data bus (When select 8bits Mode, this pin is NC)	Note1
17	DB10	Data bus (When select 8bits Mode, this pin is NC)	Note1
18	DB11	Data bus (When select 8bits Mode, this pin is NC)	Note1
19	DB12	Data bus (When select 8bits Mode, this pin is NC)	Note1
20	DB13	Data bus (When select 8bits Mode, this pin is NC)	Note1
21	DB14	Data bus (When select 8bits Mode, this pin is NC)	Note1
22	DB15	Data bus (When select 8bits Mode, this pin is NC)	Note1
23	NC	No connect	
24	NC	No connect	
25	CS	Chip select	
26	RESET	Hardware reset	
27	NC	No connect	
28	NC	No connect	
29	NC	No connect	
30	NC	No connect	
31	NC	No connect	
32	NC	No connect	
33	VLED-	VLED- for B/L LED inverter (GND)	
34	VLED-	VLED- for B/L LED inverter (GND)	
35	VLED+	VLED+ for B/L LED inverter (+3.3V)	
36	VLED+	VLED+ for B/L LED inverter (+3.3V)	

Note1: When select 8bit mode, DB0~DB7 be used, DB8~DB15 no connect
When select 16bit mode, DB0~DB15 be used

10. Block Diagram



11. Reliability

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

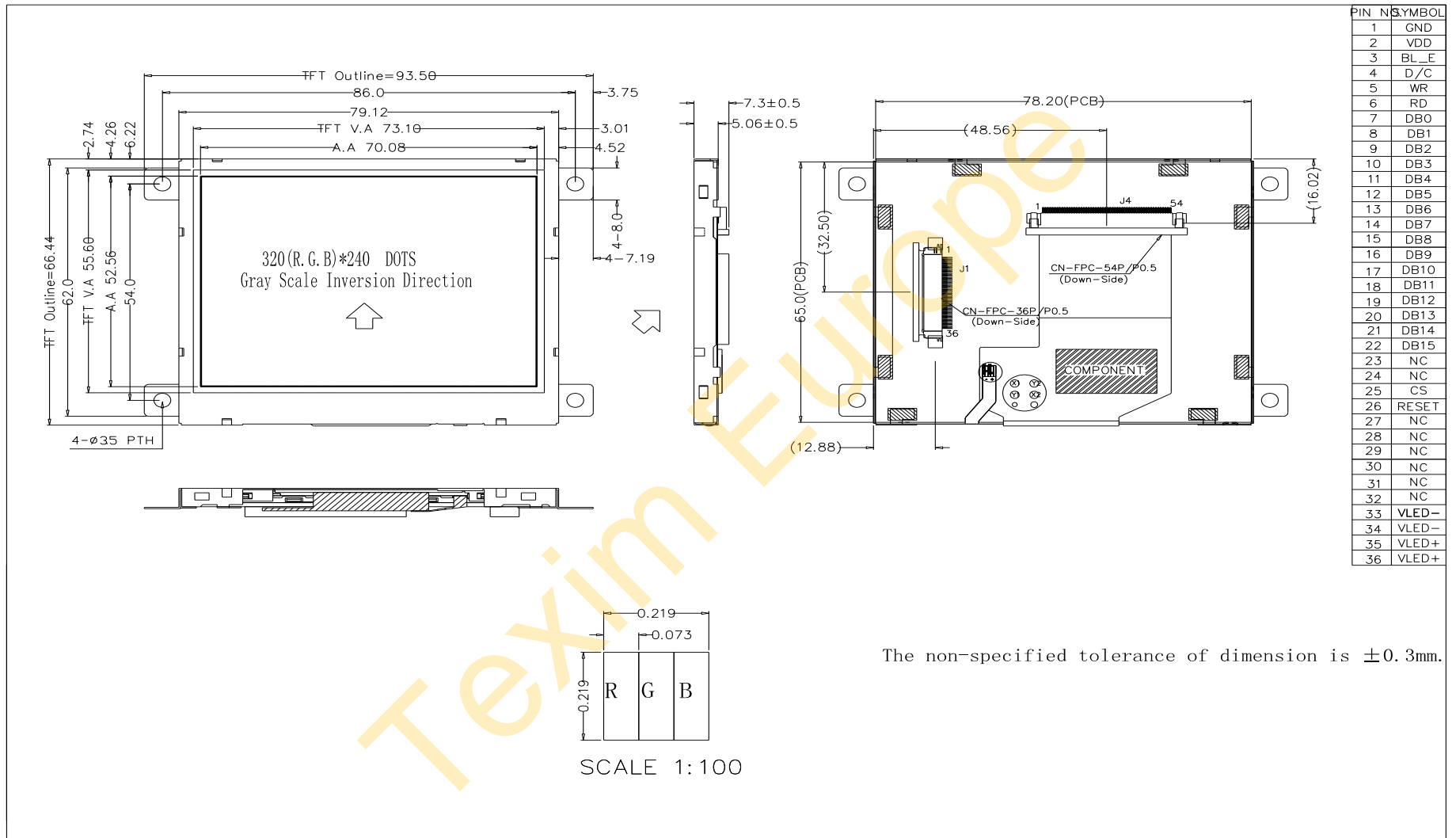
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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="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 : 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	—

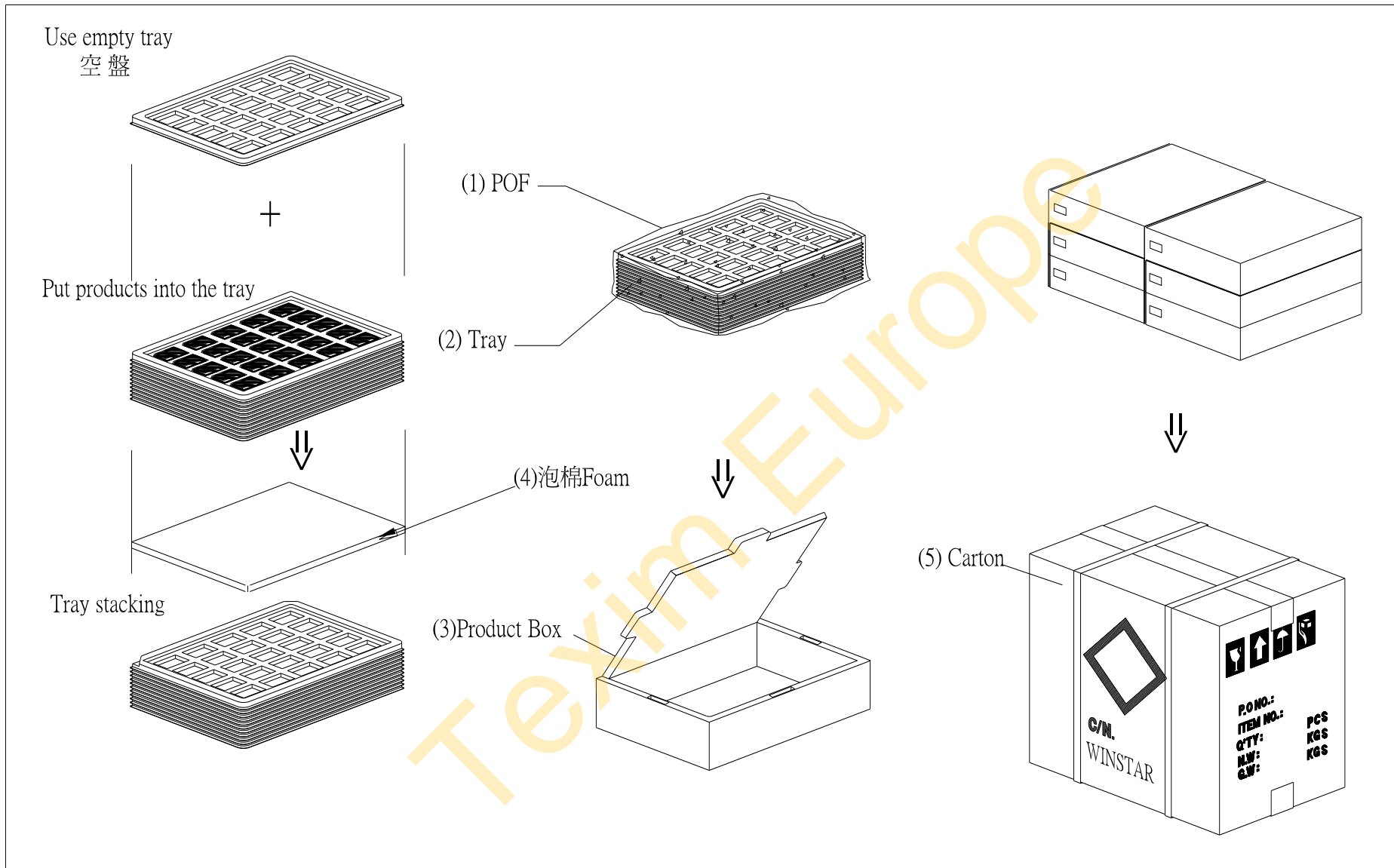
Note1: No dew condensation to be observed.

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

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

12. Contour Drawing





14.Initial Code For Reference

```
void Initial_code()
{
    Unsigned int SOURCE,GATE;
    SOURCE=320;
    GATE=240;

    Reset = 1;
    Delay_ms(10);
    Reset = 0;
    Delay_ms(50);
    Reset = 1;
    Delay_ms(100);

    Write_Command(0x01);
    Delay_ms(10);
    Write_Command(0xe0); //START PLL
    Write_Parameter(0x01);
    Delay_ms(50);
    Write_Command(0xe0); //LOCK PLL
    Write_Parameter(0x03);
    Delay_ms(5);
    Write_Command(0xb0);
    Write_Parameter(0x2C);
    Write_Parameter(0x80);
    Write_Parameter((SOURCE-1)>>8);
    Write_Parameter(SOURCE-1);
    Write_Parameter((GATE-1)>>8);
    Write_Parameter(GATE-1);
    Write_Parameter(0x00);
    Write_Command(0xf0);
    Write_Parameter(0x03); //0x03 is 16bit(565 format);0x00 is for 8-bit,pixel data format
    //Set the MN of PLL
    Write_Command(0xe2);
    Write_Parameter(0x1d);
    Write_Parameter(0x02);
    Write_Parameter(0x54);
    Write_Command(0xe6);
    Write_Parameter(0x01);
    Write_Parameter(0xdd);
    Write_Parameter(0xde);
    //Set front porch and back porch
    Write_Command(0xb4);
    Write_Parameter(0x01);
    Write_Parameter(0x98);
    Write_Parameter(0x00);
    Write_Parameter(0x44);
    Write_Parameter(0x14);
    Write_Parameter(0x00);
```

```
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Command(0xb6);
Write_Parameter(0x01);
Write_Parameter(0x06);
Write_Parameter(0x00);
Write_Parameter(0x12);
Write_Parameter(0x04);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Command(0x2a);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Parameter((SOURCE-1)>>8); /
Write_Parameter(SOURCE-1);
Write_Command(0x2b);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Parameter((GATE-1)>>8);
Write_Parameter(GATE-1);
Write_Command(0x29);
Write_Command(0x2c);
```

```
}
```

Texim Europe



winstar LCM Sample Estimate Feedback Sheet

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** <<



Winstar

Module Number : _____

Page: 2

5、Electronic Characteristics of Module :

- | | | |
|------------------------------|-------------------------------|-------------------------------------|
| 1. Input Voltage : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. Supply Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Driving Voltage for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. Contrast for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. B/L Driving Method : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. Negative Voltage Output : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Interface Function : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8. LCD Uniformity : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 9. ESD test : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 10. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

6、Summary :

Sales signature : _____

Customer Signature : _____

Date : / /

Texim Europe