



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司



Winstar Display Co., LTD

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WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF0283ATDAJDNNO#

<p>APPROVED BY:</p> <p>(FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: _____</p> <p>DATA: _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2018/10/30			

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	2018/09/06		First issue
A	2018/10/30		Correct LCD type

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2.General Specification

3.Absolute Maximum Ratings

4.Electrical Characteristics

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6.Interface

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1.Module Classification Information

W F 0283 A T D A J 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 : 2.83" 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 ; D→Transflective, W.T, 9:00 ; 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
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									

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2. General Specifications

Item	Dimension	Unit
Size	2.83	inch
Dot Matrix	240 x RGB x 320(TFT)	dots
Module dimension	53.1(W) x 71.1(H) x 5.35 (D)	mm
Active area	43.2 x 57.6	mm
Dot pitch	0.18 x 0.18	mm
LCD type	TFT, Normally White, Transflective	
TFT Driver IC	HX8367-A or equivalent	
TFT Interface	MCU/SPI/RGB	
View Direction	3 o'clock	
Gray Scale Inversion Direction	9 o'clock	
Aspect Ratio	3:4	
Backlight Type	LED, Normally White	
With /Without TP	Without TP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

3. 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

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4. Electrical Characteristics

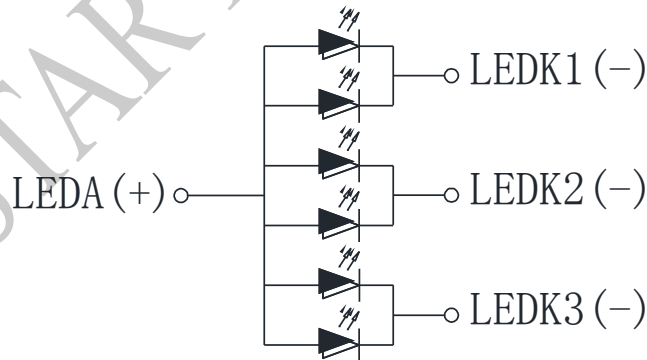
4.1. Operating conditions:

Item	Symbol	Min	Typ	Max	Unit
Supply voltage for logic	VCI	2.5	2.8	3.3	V
I/O power supply	IOVCC	1.65	1.8	3.3	V
Input current	I _{dd}	—	6.7	10.1	mA
Input voltage 'H' level	V _{IH}	0.7IOVCC	—	IOVCC	V
Input voltage 'L' level	V _{IL}	GND	—	0.3IOVCC	V
Output voltage 'H' level	V _{OH}	0.8IOVCC	—	IOVCC	V
Output voltage 'L' level	V _{OL}	GND	—	0.2IOVCC	V

4.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	480	-	mA	
LED voltage	V _{BL+}	2.7	3.0	3.4	V	Note 1
LED Life Time		50,000	-	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



CIRCUIT DIAGRAM

Note 2 : T_a = 25 °C

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

Note 4 : The single LED lamp case

5. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr+ Tf	$\theta=0^\circ$ 、 $\Phi=0^\circ$	-	35	55	ms	Note 3	
Contrast ratio	CR	At optimized viewing angle	36	72	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ$ 、 $\Phi=0$	0.26	0.31	0.36	Note 2,6,7	
		Wy		0.28	0.33	0.38		
Viewing angle	Hor.	Θ_R	$CR \geq 10$	30	45	-	Deg.	Note 1
		Θ_L		20	30	-		
	Ver.	Φ_T		20	35	-		
		Φ_B		10	20	-		
Brightness	-	-	450	500	-	cd/m ²	Center of display	
Uniformity	(U)	-	75	-	-	%	Note 5	

Ta=25±2°C

Note 1: Definition of viewing angle range

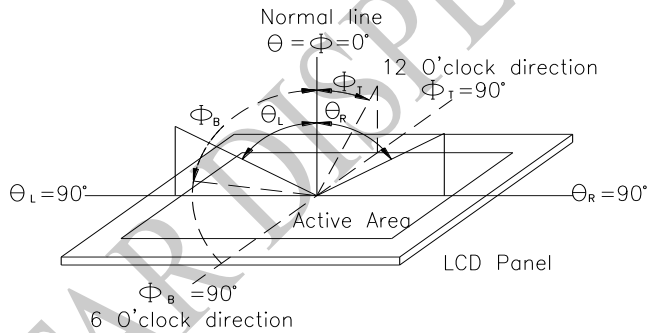


Fig. 5.1. Definition of viewing angle

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.

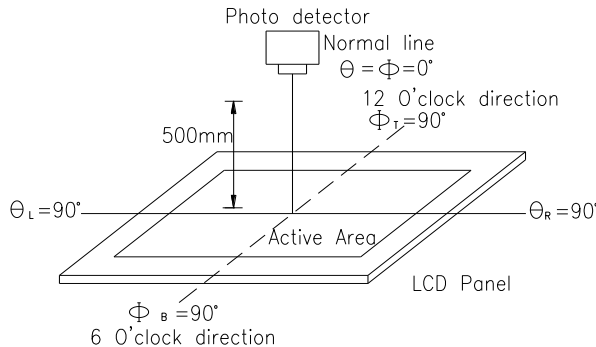
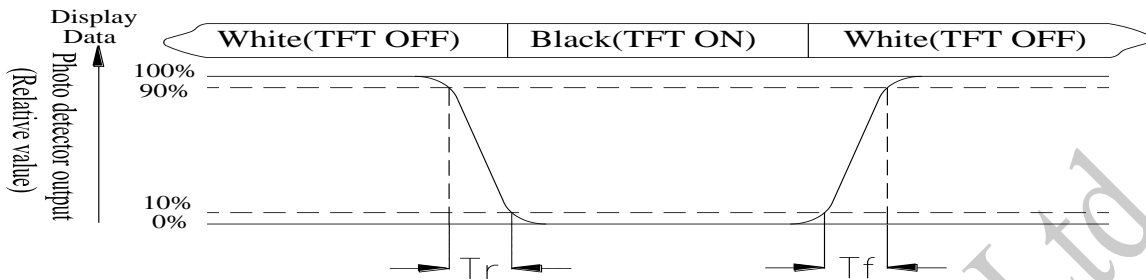


Fig. 5.2. Optical measurement system setup

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.

$$\text{Luminance Uniformity (U)} = L_{\min}/L_{\max} \times 100\%$$

L = Active area length

W = Active area width

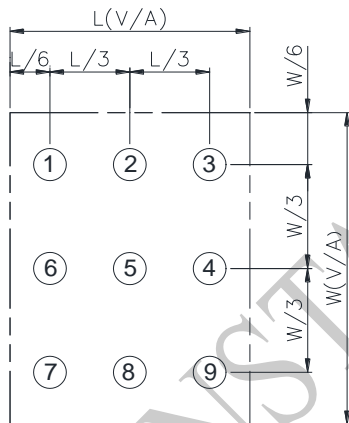


Fig5.3. Definition of uniformity

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.

6.Interface

6.1. LCM PIN Definition

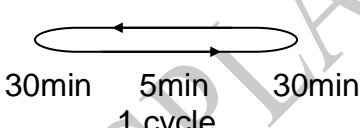
NO	Symbol	Function	I/O																																																							
1	IM0	System interface select. <table border="1"> <thead> <tr> <th>IM3</th> <th>IM2</th> <th>IM1</th> <th>IM0</th> <th>Interface</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>8080 MCU 16-bits Parallel type I</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>8080 MCU 8-bits Parallel type I</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>8080 MCU 16-bits Parallel type II</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>8080 MCU 8-bits Parallel type II</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>ID</td> <td>3-wire Serial interface</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>-</td> <td>4-wire Serial interface</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>8080 MCU 18-bits Parallel type I</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>8080 MCU 9-bits Parallel type I</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>8080 MCU 18-bits Parallel type II</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>8080 MCU 9-bits Parallel type II</td> </tr> </tbody> </table>	IM3	IM2	IM1	IM0	Interface	0	0	0	0	8080 MCU 16-bits Parallel type I	0	0	0	1	8080 MCU 8-bits Parallel type I	0	0	1	0	8080 MCU 16-bits Parallel type II	0	0	1	1	8080 MCU 8-bits Parallel type II	0	1	0	ID	3-wire Serial interface	0	1	1	-	4-wire Serial interface	1	0	0	0	8080 MCU 18-bits Parallel type I	1	0	0	1	8080 MCU 9-bits Parallel type I	1	0	1	0	8080 MCU 18-bits Parallel type II	1	0	1	1	8080 MCU 9-bits Parallel type II	I
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2	IM1																																																									
3	IM2																																																									
4	IM3																																																									
5	RESET	Reset pin. Setting either pin low initializes the LSI. Must be reset after power is supplied.	I																																																							
6	VSYNC	Vertical synchronizing signal in RGB interface.	I																																																							
7	HSYNC	Horizontal synchronizing signal in RGB interface	I																																																							
8	DOTCLK	Data enable signal in RGB interface	I																																																							
9	ENABLE	A data ENABLE signal in RGB I/F mode	I																																																							
10-27	DB17-DB0	18-bit bi-directional data bus.	I/O																																																							
28	SDO	Serial data output pin in serial bus system interface	O																																																							
29	SDI	Serial data input pin in serial bus system interface. The data is inputted on the rising edge of the SCL signal.	I																																																							
30	RD	Read enable pin I80 parallel bus system interface.	I																																																							
31	WR/SCL	(WR)Write enable pin I80 parallel bus system interface.(SCL)server as serial data clock in serial bus system interface.	I																																																							
32	RS	Command / parameter or display data selection pin.	I																																																							
33	CS	Chip select signal.Low: chip can be accessed;High: chip cannot be accessed	I																																																							
34	FMARK	Tearing effect output.	O																																																							
35	IOVCC	Digital IO Pad power supply.	P																																																							
36	VCC	Analog power supply	P																																																							
37	VCI	Analog power supply.	P																																																							

38	GND	Power ground.	P
39	NC	No connection	-
40	NC	No connection	-
41	NC	No connection	-
42	NC	No connection	-
43	LEDA	LED light, anode.	
44	LEDK1	LED light, cathode	
45	LEDK2	LED light, cathode	
46	LEDK3	LED light, cathode	
47	NC	No connection	

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7. Reliability

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

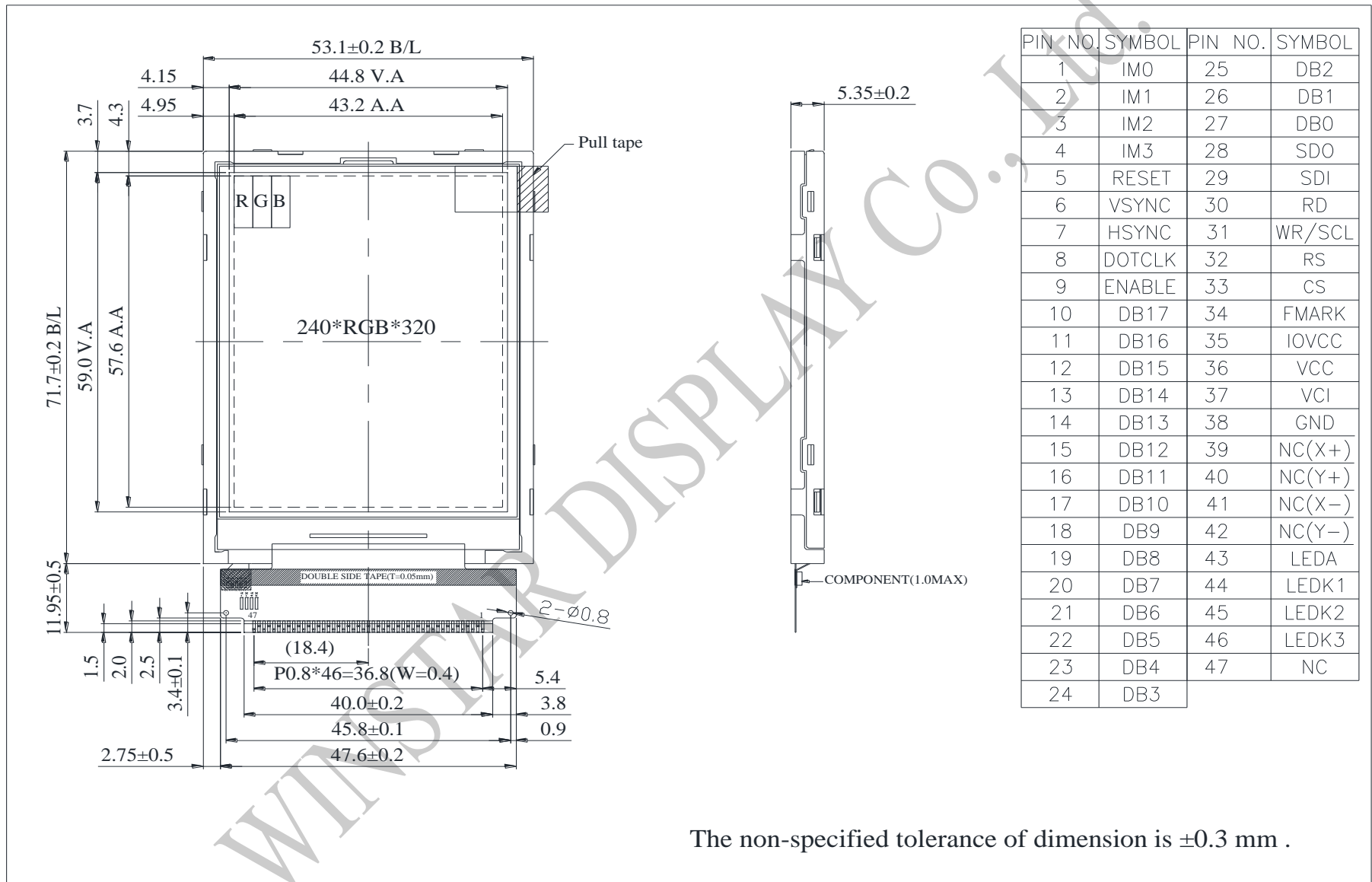
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature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

8. 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 : Pass NG , _____
- 7. Storage Temperature : Pass NG , _____
- 8. Others : _____

2、Mechanical

- 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) : 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 , _____



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 : / / _____

