



Winstar Display Co., LTD

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SPECIFICATION

CUSTOMER : _____

MODULE NO.: WO14464A2-TFH#

<p>APPROVED BY: (FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: DATA:</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2009/9/3		First issue



RECORDS OF REVISION

DOC. FIRST ISSUE

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0	2009/9/3		First issue

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1.Module Classification Information

W O 14464 A2— T F H #
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Brand : WINSTAR DISPLAY CORPORATION
- ② Display Type : H→Character Type, G→Graphic Type O→COG Type
- ③ Display Font : 144 x 64 dots
- ④ Model serials no.
- ⑤ Backlight Type : N→Without backlight T→LED, White
 B→EL, Blue green A→LED, Amber
 D→EL, Green R→LED, Red
 W→EL, White O→LED, Orange
 F→CCFL, White G→LED, Green
 Y→LED, Yellow Green P→LED, Blue
- ⑥ LCD Mode : B→TN Positive, Gray T→FSTN Negative
 N→TN Negative,
 G→STN Positive, Gray
 Y→STN Positive, Yellow Green
 M→STN Negative, Blue
 F→FSTN Positive
- ⑦ LCD Polarize A→Reflective, N.T, 6:00 H→Transflective, W.T,6:00
 Type/ Temperature D→Reflective, N.T, 12:00 K→Transflective, W.T,12:00
 range/ View G→Reflective, W. T, 6:00 C→Transmissive, N.T,6:00
 direction J→Reflective, W. T, 12:00 F→Transmissive, N.T,12:00
 B→Transflective, N.T,6:00 I→Transmissive, W. T, 6:00
 E→Transflective, N.T.12:00 L→Transmissive, W.T,12:00
- ⑧ Special Code #:Fit in with the ROHS Directions and regulations

2. Precautions in use of LCD Modules

- (1) Avoid applying excessive shocks to the module or making any alterations or modifications to it.
- (2) Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
- (3) Don't disassemble the LCM.
- (4) Don't operate it above the absolute maximum rating.
- (5) Don't drop, bend or twist LCM.
- (6) Soldering: only to the I/O terminals.
- (7) Storage: please storage in anti-static electricity container and clean environment.
- (8). Winstar have the right to change the passive components
- (9). Winstar have the right to change the PCB Rev.

3. General Specification

Item	Dimension	Unit
Number of Characters	144 x 64 dots	—
Module dimension	80.0x 54.0 x 10.0(MAX)	mm
View area	70.7 x 38.8	mm
Active area	64.78 x 33.26	mm
Dot size	0.43 x 0.50	mm
Dot pitch	0.45x 0.52	mm
LCD type	FSTN Positive Transflective, (In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.)	
Duty	1/64 , 1/9 Bias	
View direction	6 o'clock	
Backlight Type	LED White	

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	°C
Storage Temperature	T_{ST}	-30	—	+80	°C
Input Voltage	V_I	-0.3	—	$V_{DD}+0.3$	V
Power Supply Voltage	V_{DD}	-0.3		6.5	V

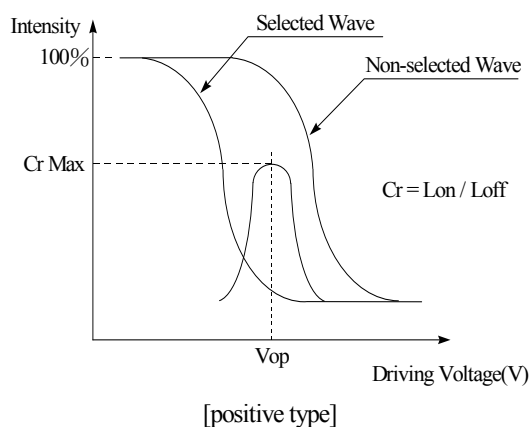
5. Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	—	3.0	3.3	3.6	V
Supply Voltage For LCM	$V_{DD}-V_0$	$T_a=-20^{\circ}C$	—	—	—	V
		$T_a=25^{\circ}C$	—	10.0	—	V
		$T_a=70^{\circ}C$	—	—	—	V
Input High Volt.	V_{IH}	—	$0.8 V_{DD}$	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	V_{SS}	—	$0.2 V_{DD}$	V
Output High Volt.	V_{OH}	—	$0.8 V_{DD}$	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	V_{SS}	—	$0.2V_{DD}$	V
Supply Current(No include LED Backlight)	I_{DD}	$V_{DD}=3.3V$	—	0.1	—	mA

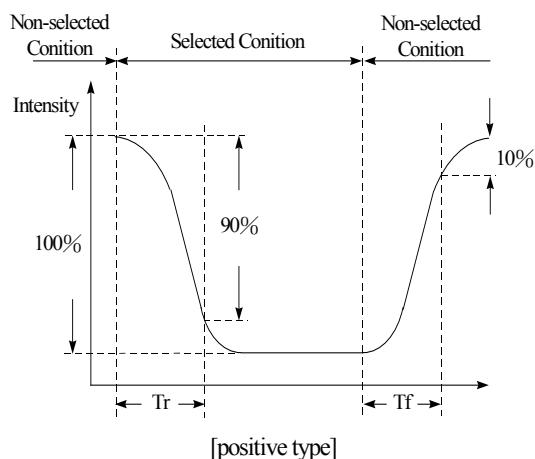
6. Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V) θ	$CR \geq 2$	30	—	60	deg
	(H) φ	$CR \geq 2$	-45	—	45	deg
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	250	350	ms

Definition of Operation Voltage (Vop)



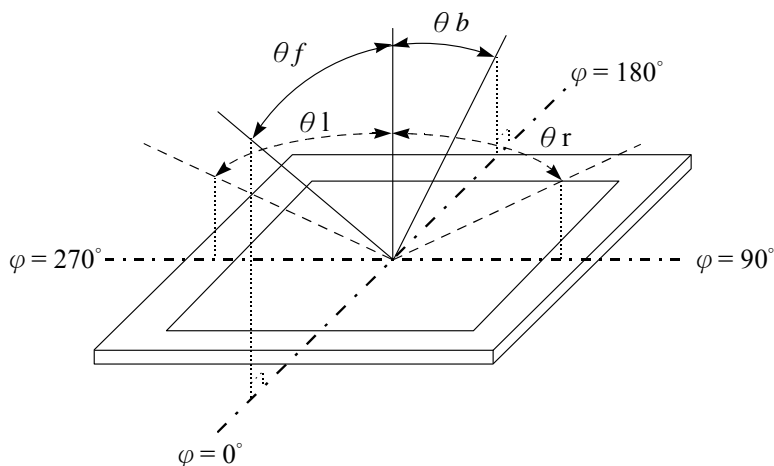
Definition of Response Time (Tr, Tf)



Conditions :

Operating Voltage : Vop Viewing Angle(θ , φ) : 0° , 0°
 Frame Frequency : 64 HZ Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle($CR \geq 2$)

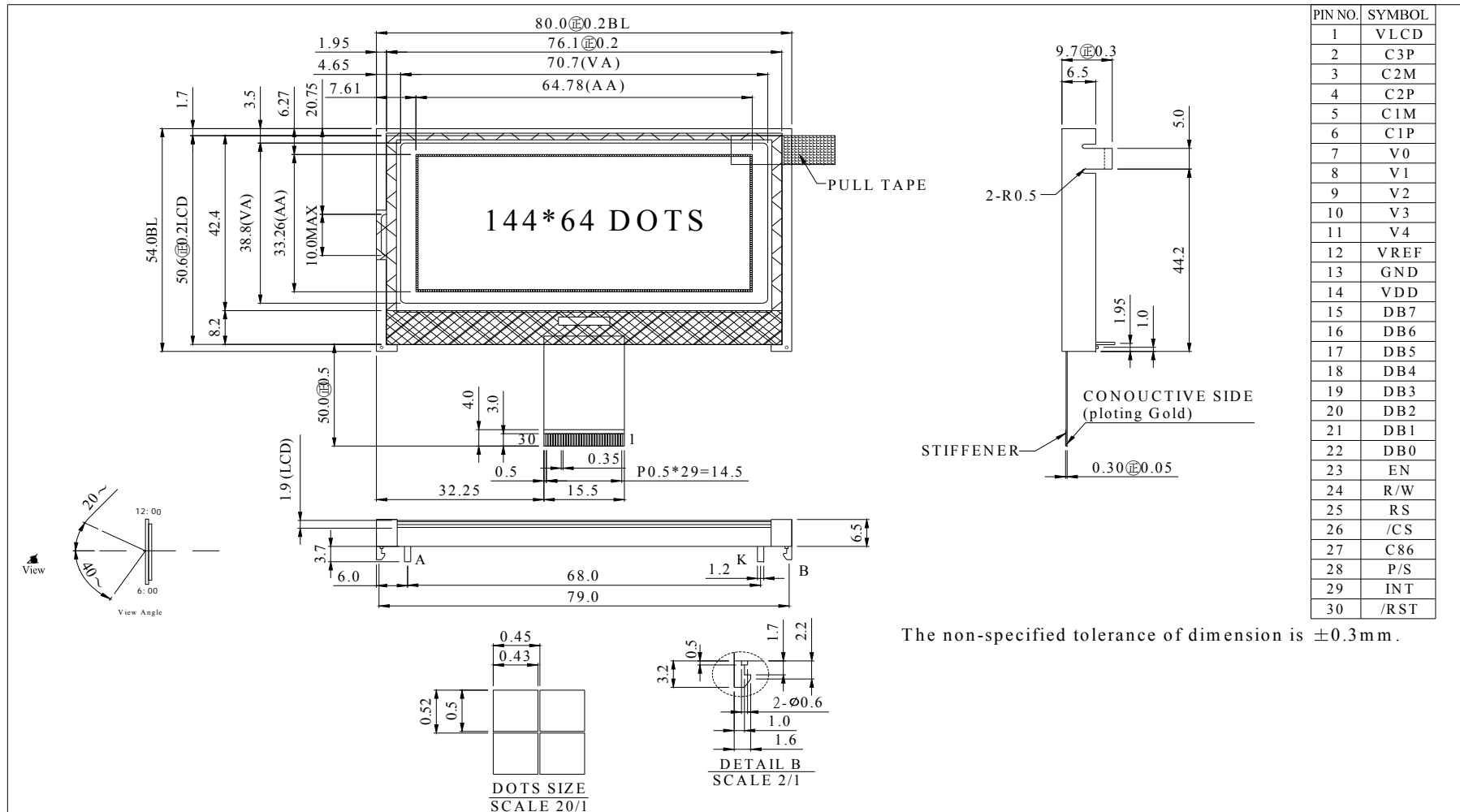


7. Interface Pin Function

Pin No.	Symbol	Level	Description
1	VLCD	O	Booster Output
2	C3P	I	External capacitors for internal booster.
3	C2M	I	External capacitors for internal booster.
4	C2P	I	External capacitors for internal booster.
5	C1M	I	External capacitors for internal booster.
6	C1P	I	External capacitors for internal booster.
7	V0	O	Voltage Source of LCD Driver The relationship of the power is: $VLCD > V0 \geq V1 \geq V2 \geq V3 \geq V4 \geq VSS$.
8	V1		
9	V2		
10	V3		
11	V4		
12	VREF	I	Reference Voltage Input This is the reference voltage input when use an external regulator.
13	GND		Power ground.
14	VDD		Power supply for the LCM.
15~22	DB7~DB0	I/O	Data bus line
23	EN	I	Read Control or Enable When use 8080 series interface, RD is the read signal and active low. When use 6800 series interface, EN is the Enable signal and active high. In the IIC mode, RD is used as IIC device address IICA[4]. This pin must keep NC for 3 or 4-wires serial mode.
24	R/W	I	Write Control or Read-Write Control When use 8080 series interface, WR is the write signal and active low When use 6800 series interface, this pin is R/W, active high for read cycle and active low for write cycle. In the IIC mode, WR is used as IIC device address IICA[5]. This pin must keep NC for 3 or 4-wires serial mode.
25	RS	I	Data/Command Select or Register Select When RS = 0, means Register Cycle (or Command Cycle). When RS = 1, means Data Access Cycle(Data Cycle).
26	/CS	I	Chip Select This is a chip enable for LCM. This pin must keep NC for serial mode.

27	C86	I	MPU Select C86 = 0 The MPU interface is 8080 series. C86 = 1 The MPU interface is 6800 series(Default). This pin must keep NC for serial mode.
28	P/S	I	Parallel/Serial Select P/S = 0 The MPU interface is serial mode(Default). See the setting of DB[7..6]. P/S = 1 The MPU interface is parallel mode.
29	INT	O	Interrupt Signal This is an interrupt output for MPU. Active low
30	/RST	I	When RST=0 , all control registers are re-initialized by their default states.

8. Contour Drawing & Block Diagram



PIN NO.	SYMBOL
1	V LCD
2	C3P
3	C2M
4	C2P
5	C1M
6	C1P
7	V0
8	V1
9	V2
10	V3
11	V4
12	VREF
13	GND
14	VDD
15	DB7
16	DB6
17	DB5
18	DB4
19	DB3
20	DB2
21	DB1
22	DB0
23	EN
24	R/W
25	RS
26	/CS
27	C86
28	P/S
29	INT
30	/RST

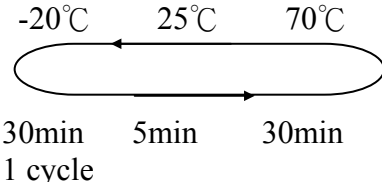
The non-specified tolerance of dimension is ±0.3mm.

9. Timing Characteristics

Reference to IC RA8816.pdf

10. 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  30min 5min 30min 1 cycle	-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=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.

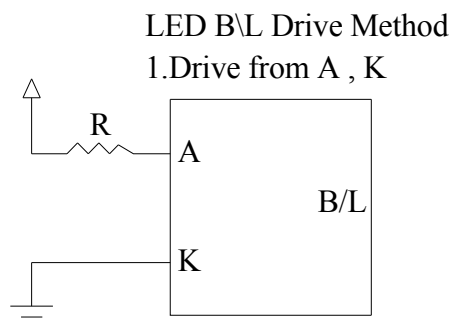
11. Backlight Information

Specification

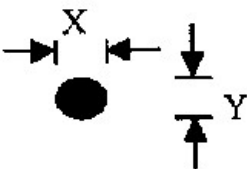
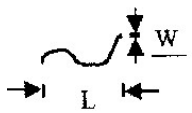
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	I _{LED}	86.4	96	144	mA	V= 3.5 V
Supply Voltage	V	3.4	3.5	3.6	V	—
Reverse Voltage	V _R	—	—	5	V	—
Luminous Intensity (Without LCD)	I _V	672.8	755	—	CD/M ²	I _{LED} = 96 mA
LED Life Time (For Reference only)	—	—	50K	—	Hr.	I _{LED} ≤ 96 mA 25°C, 50-60%RH, (Note 1)
Color	White					

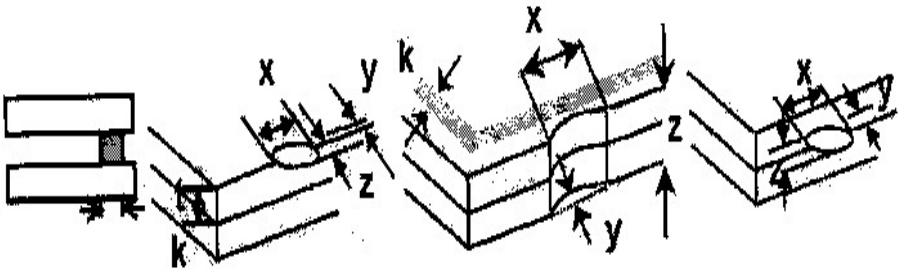
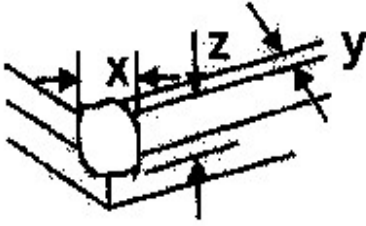
Note: The LED of B/L is drive by current only ; driving voltage is only for reference
To make driving current in safety area (waste current between minimum and maximum).

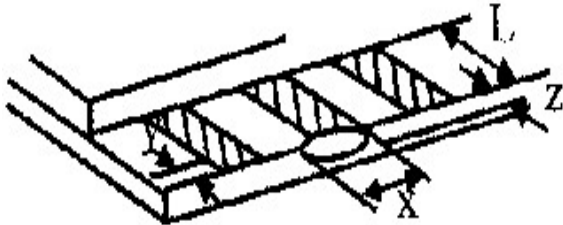
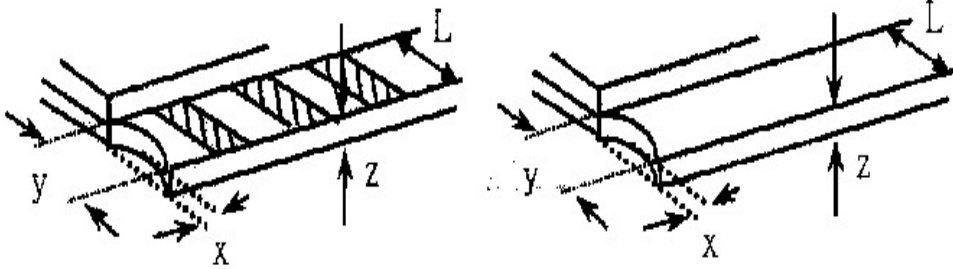
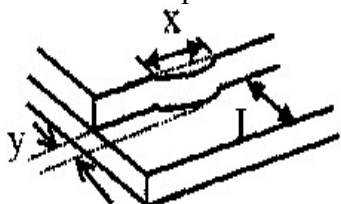
Note1 :50K hours is only an estimate for reference.

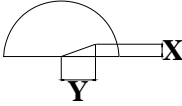


12. Inspection specification

NO	Item	Criterion	AQL													
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character , dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Contrast defect.	0.65													
02	Black or white spots on LCD (display only)	2.1 White and black spots on display $\leq 0.25\text{mm}$, no more than three white or black spots present. 2.2 Densely spaced: No more than two spots or lines within 3mm	2.5													
03	LCD black spots, white spots, contamination (non-display)	3.1 Round type : As following drawing $\Phi = (x + y) / 2$  <table border="1" data-bbox="874 1025 1353 1305"> <thead> <tr> <th>SIZE</th> <th>Acceptable Q TY</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.25$</td> <td>1</td> </tr> <tr> <td>$0.25 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	SIZE	Acceptable Q TY	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	1	$0.25 < \Phi$	0	2.5			
		SIZE	Acceptable Q TY													
$\Phi \leq 0.10$	Accept no dense															
$0.10 < \Phi \leq 0.20$	2															
$0.20 < \Phi \leq 0.25$	1															
$0.25 < \Phi$	0															
3.2 Line type : (As following drawing)  <table border="1" data-bbox="710 1400 1353 1641"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable Q TY</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.02$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.02 < W \leq 0.03$</td> <td rowspan="2">2</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.03 < W \leq 0.05$</td> </tr> <tr> <td>---</td> <td>$0.05 < W$</td> <td>As round type</td> </tr> </tbody> </table>	Length	Width	Acceptable Q TY	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.03$	2	$L \leq 2.5$	$0.03 < W \leq 0.05$	---	$0.05 < W$	As round type	2.5	
Length	Width	Acceptable Q TY														
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$L \leq 3.0$	$0.02 < W \leq 0.03$	2														
$L \leq 2.5$	$0.03 < W \leq 0.05$															
---	$0.05 < W$	As round type														
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.	<table border="1" data-bbox="842 1697 1353 1995"> <thead> <tr> <th>Size Φ</th> <th>Acceptable Q TY</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.50$</td> <td>3</td> </tr> <tr> <td>$0.50 < \Phi \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$1.00 < \Phi$</td> <td>0</td> </tr> <tr> <td>Total Q TY</td> <td>3</td> </tr> </tbody> </table>	Size Φ	Acceptable Q TY	$\Phi \leq 0.20$	Accept no dense	$0.20 < \Phi \leq 0.50$	3	$0.50 < \Phi \leq 1.00$	2	$1.00 < \Phi$	0	Total Q TY	3	2.5
Size Φ	Acceptable Q TY															
$\Phi \leq 0.20$	Accept no dense															
$0.20 < \Phi \leq 0.50$	3															
$0.50 < \Phi \leq 1.00$	2															
$1.00 < \Phi$	0															
Total Q TY	3															

NO	Item	Criterion	AQL																		
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination																			
06	Chipped glass	<p>Symbols Define: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length:</p> <p>6.1 General glass chip : 6.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="416 967 1311 1151"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</td> </tr> </tbody> </table> <p>⊙ If there are 2 or more chips, x is total length of each chip.</p> <p>6.1.2 Corner crack:</p>  <table border="1" data-bbox="416 1525 1311 1709"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td>$Z \leq 1/2t$</td> <td>Not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> <tr> <td>$1/2t < z \leq 2t$</td> <td>Not exceed 1/3k</td> <td>$x \leq 1/8a$</td> </tr> </tbody> </table> <p>⊙ If there are 2 or more chips, x is the total length of each chip.</p>	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length																			
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$																			
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NO	Item	Criterion	AQL																
06	Glass crack	<p>Symbols :</p> <p>x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length</p> <p>6.2 Protrusion over terminal :</p> <p>6.2.1 Chip on electrode pad :</p>  <table border="1" data-bbox="352 701 1265 786"> <thead> <tr> <th>y: Chip width</th> <th>x: Chip length</th> <th>z: Chip thickness</th> </tr> </thead> <tbody> <tr> <td>$y \leq 0.5\text{mm}$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </tbody> </table> <p>6.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="424 1113 1265 1198"> <thead> <tr> <th>y: Chip width</th> <th>x: Chip length</th> <th>z: Chip thickness</th> </tr> </thead> <tbody> <tr> <td>$y \leq L$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark not be damaged. <p>6.2.3 Substrate protuberance and internal crack.</p>  <table border="1" data-bbox="762 1429 1270 1514"> <thead> <tr> <th>y: width</th> <th>x: length</th> </tr> </thead> <tbody> <tr> <td>$y \leq 1/3L$</td> <td>$x \leq a$</td> </tr> </tbody> </table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$x \leq a$	2.5
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$																	
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$x \leq a$																		

NO	Item	Criterion	AQL
07	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
08	Backlight elements	8.1 Illumination source flickers when lit. 8.2 Spots or scratched that appear when lit must be judged. Using LCD spot, lines and contamination standards. 8.3 Backlight doesn't light or color wrong.	0.65 2.5 0.65
09	Bezel	9.1 Bezel may not have rust, be deformed or have fingerprints, stains or other contamination. 9.2 Bezel must comply with job specifications.	2.5 0.65
10	PCB、COB	10.1 COB seal may not have pinholes larger than 0.2mm or contamination. 10.2 COB seal surface may not have pinholes through to the IC. 10.3 The height of the COB should not exceed the height indicated in the assembly diagram. 10.4 There may not be more than 2mm of sealant outside the seal area on the PCB. And there should be no more than three places. 10.5 No oxidation or contamination PCB terminals. 10.6 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 10.7 The jumper on the PCB should conform to the product characteristic chart. 10.8 If solder gets on bezel tab pads, LED pad, zebra pad or screw hold pad, make sure it is smoothed down. 10.9 The Scraping testing standard for Copper Coating of PCB  $X * Y \leq 2\text{mm}^2$	2.5 2.5 0.65 2.5 2.5 0.65 0.65 2.5 2.5
11	Soldering	11.1 No un-melted solder paste may be present on the PCB. 11.2 No cold solder joints, missing solder connections, oxidation or icicle. 11.3 No residue or solder balls on PCB. 11.4 No short circuits in components on PCB.	2.5 2.5 2.5 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP.	2.5
		12.2 No cracks on interface pin (OLB) of TCP.	0.65
		12.3 No contamination, solder residue or solder balls on product.	2.5
		12.4 The IC on the TCP may not be damaged, circuits.	2.5
		12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it cause the interface pin to sever.	2.5
		12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color.	2.5
		12.7 Sealant on top of the ITO circuit has not hardened.	0.65
		12.8 Pin type must match type in specification sheet.	0.65
		12.9 LCD pin loose or missing pins.	0.65
		12.10 Product packaging must the same as specified on packaging specification sheet.	0.65
		12.11 Product dimension and structure must conform to product specification sheet.	

13. Material List of Components for RoHs

1. WINSTAR Display Co., Ltd hereby declares that all of or part of products (with the mark “#”in code), including, but not limited to, the LCM, accessories or packages, manufactured and/or delivered to your company (including your subsidiaries and affiliated company) directly or indirectly by our company (including our subsidiaries or affiliated companies) do not intentionally contain any of the substances listed in all applicable EU directives and regulations, including the following substances.

Exhibit A : The Harmful Material List

Material	(Cd)	(Pb)	(Hg)	(Cr6+)	PBBs	PBDEs
Limited Value	100 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm
Above limited value is set up according to RoHS.						

2.Process for RoHS requirement :

(1) Use the Sn/Ag/Cu soldering surface ; the surface of Pb-free solder is rougher than we used before.

(2) Heat-resistance temp. :

Reflow : 250°C,30 seconds Max. ;

Connector soldering wave or hand soldering : 320°C, 10 seconds max.

(3) Temp. curve of reflow, max. Temp. : 235±5°C ;

Recommended customer’s soldering temp. of connector : 280°C, 3 seconds.



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 : A 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 , _____

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Module Number : _____

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 : / /