


MC122032C6W-SPR	122 x 32	LCD Module
<b>Specification</b>		
Version: 1	Date: 14/09/2016	
<b>Revision</b>		
1	14/09/2016	First Issue

Display Features		
Resolution	122 x 32	
Appearance	Black on Yellow/Green	
Logic Voltage	5V	
Interface	Parallel	
Font Set	N/A	
Display Mode	Reflective	
LC Type	STN	
Module Size	59.00 x 29.30 x 5.50mm	
Operating Temperature	-20°C ~ +70°C	
Construction	COB	Box Quantity
LED Backlight	---	Weight / Display
		---

\* - For full design functionality, please use this specification in conjunction with the SBN1661G specification.(Provided Separately)

Display Accessories	
Part Number	Description
VBWFD1	USB PIC18F2550 microcontroller board to 20-way Single in-line COB Graphic LCD.

Optional Variants	
Appearances	Voltage
Black on White White on Blue	



## General Specification

The Features is described as follow:

- Module dimension: 59.0 x 29.3 x 5.5 (max.) mm
- View area: 52.0 x 15.0 mm
- Active area: 45.72 x 11.97 mm
- Number of dots: 122 x 32
- Dot size: 0.345 x 0.345 mm
- Dot pitch: 0.375 x 0.375 mm
- LCD type: STN Positive, Yellow Green Reflective
- Duty: 1/32
- View direction: 6 o'clock
- Backlight Type: Without backlight
- IC: SBN1661G

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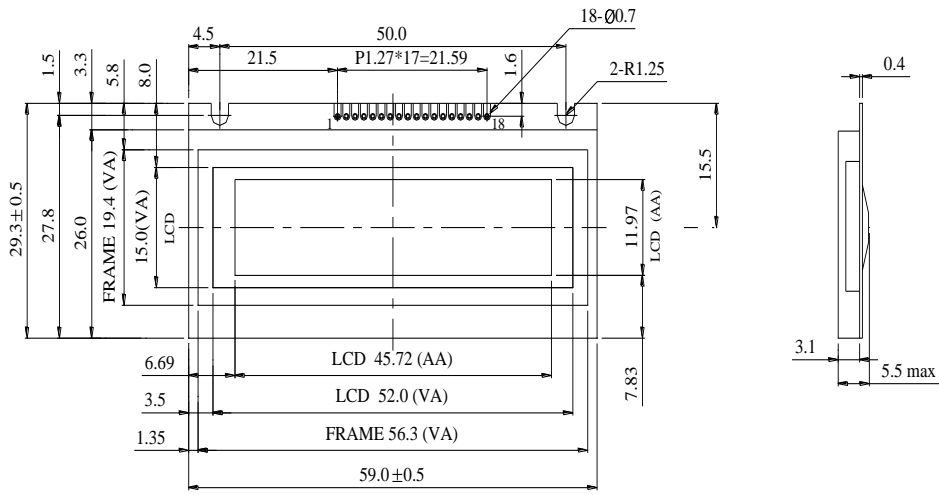


## Interface Pin Function

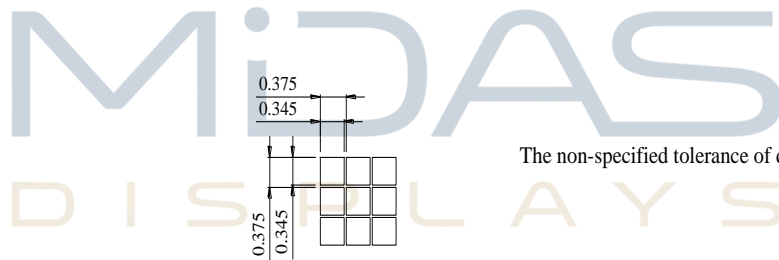
Pin No.	Symbol	Level	Description
1	NC	—	No connection
2	VSS	0V	Ground
3	VDD	5.0V	Power supply for logic
4	Vo	(Variable)	Contrast Adjustment
5	A0	H/L	H : Data L : Instruction
6	E1	H/L	Chip select signal for IC1 ( left 61*32 dots ) active "H"
7	E2	H/L	Chip select signal for IC2 ( right 61*32 dots ) active "H"
8	DB0	H/L	Data bus line
9	DB1	H/L	Data bus line
10	DB2	H/L	Data bus line
11	DB3	H/L	Data bus line
12	DB4	H/L	Data bus line
13	DB5	H/L	Data bus line
14	DB6	H/L	Data bus line
15	DB7	H/L	Data bus line
16	R/W	H/L	H : Read ; L : Write
17	Vee	—	Negative voltage output
18	NC	—	No connection



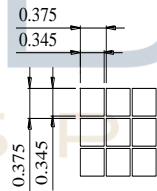
# Contour Drawing & Block Diagram



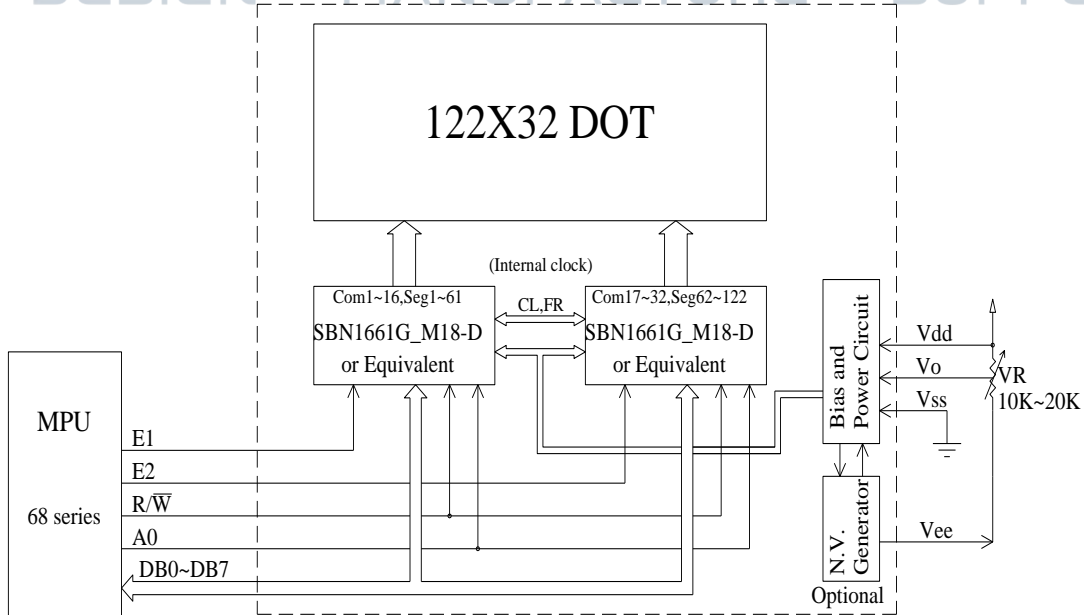
PIN NO.	SYMBOL
1	NC
2	VSS
3	VDD
4	VO
5	AO
6	E1
7	E2
8	DB0
9	DB1
10	DB2
11	DB3
12	DB4
13	DB5
14	DB6
15	DB7
16	R/W
17	Vee
18	NC



The non-specified tolerance of dimension is  $\pm 0.3$  mm.



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External contrast adjustment.

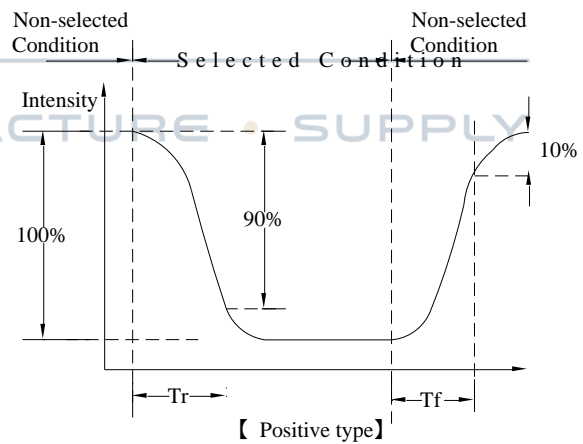
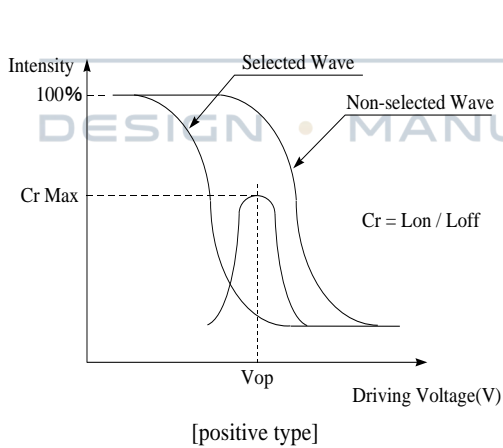


# Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	$\theta$	$CR \geq 2$	0	-	20	$\psi = 180^\circ$
	$\theta$	$CR \geq 2$	0	-	40	$\psi = 0^\circ$
	$\theta$	$CR \geq 2$	0	-	30	$\psi = 90^\circ$
	$\theta$	$CR \geq 2$	0	-	30	$\psi = 270^\circ$
Contrast Ratio	CR	-	-	3	-	-
Response Time	T rise	-	-	150	200	ms
	T fall	-	-	150	200	ms

**Definition of Operation Voltage (Vop)**

**Definition of Response Time (Tr, Tf)**



**Conditions :**

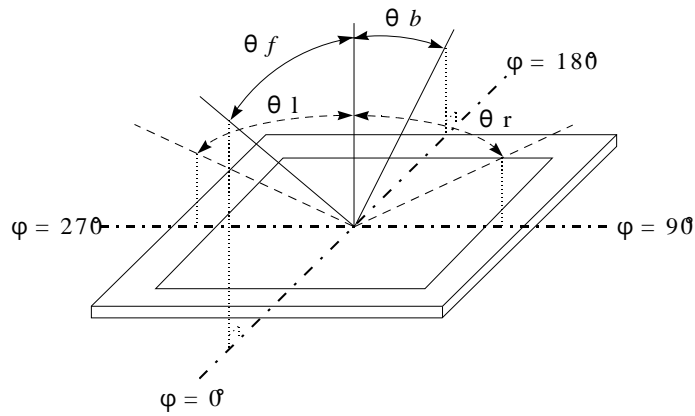
Operating Voltage : Vop

Viewing Angle( $\theta$  ,  $\varphi$ ) :  $0^\circ$  ,  $0^\circ$

Frame Frequency : 64 HZ Driving Waveform : 1/N duty , 1/a bias

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





## 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
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-0.3	-	+7.0	V
LCD bias voltage	$V_{LCD}$	0	-	13	V

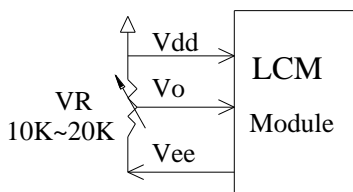


# Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-	4.5	5.0	5.5	V
Supply Voltage For LCD * Note	$V_{DD}-V_0$	Ta=-20°C	-	-	5.8	V
		Ta=25°C	4.2	4.35	4.5	V
		Ta=+70°C	3.9	-	-	V
Input High Volt.	$V_{IH}$	-	2.0	-	$V_{DD}$	V
Input Low Volt.	$V_{IL}$	-	0	-	1.2	V
Output High Volt.	$V_{OH}$	-	$V_{DD}-0.3$	-	$V_{DD}$	V
Output Low Volt.	$V_{OL}$	-	0	-	0.3	V
Supply Current	$I_{DD}$	$V_{DD}=5.0V$	-	0.5	1.5	mA


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\* Note: Please design the VOP adjustment circuit on customer's main board



# 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 storage	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 -20°C    25°C    70°C  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=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	—

**Note1: No dew condensation to be observed.**

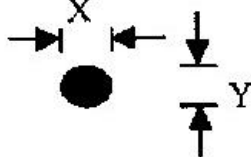
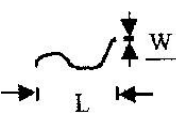
**Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.**

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





# 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"> <thead> <tr> <th>SIZE</th> <th>Acceptable Q TY</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.20</math></td> <td>2</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.25</math></td> <td>1</td> </tr> <tr> <td><math>0.25 &lt; \Phi</math></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"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable Q TY</th> </tr> </thead> <tbody> <tr> <td>---</td> <td><math>W \leq 0.02</math></td> <td>Accept no dense</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.02 &lt; W \leq 0.03</math></td> <td rowspan="2">2</td> </tr> <tr> <td><math>L \leq 2.5</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> </tr> <tr> <td>---</td> <td><math>0.05 &lt; W</math></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													
---	$W \leq 0.02$	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													



04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.	Size $\Phi$	Acceptable Q TY	2.5
			$\Phi \leq 0.20$	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	

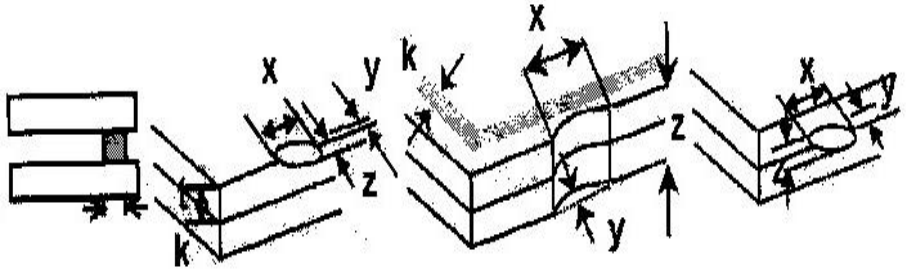
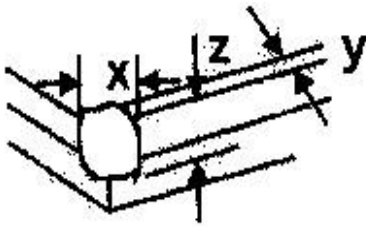
# MIDAS

## DISPLAYS

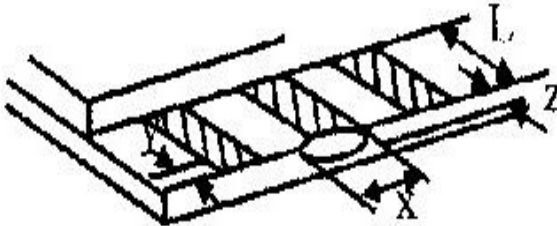
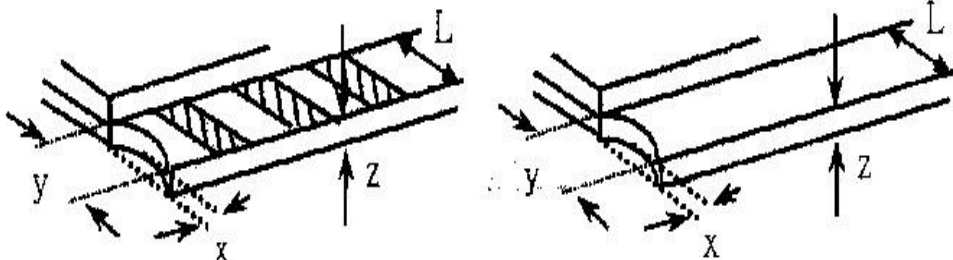
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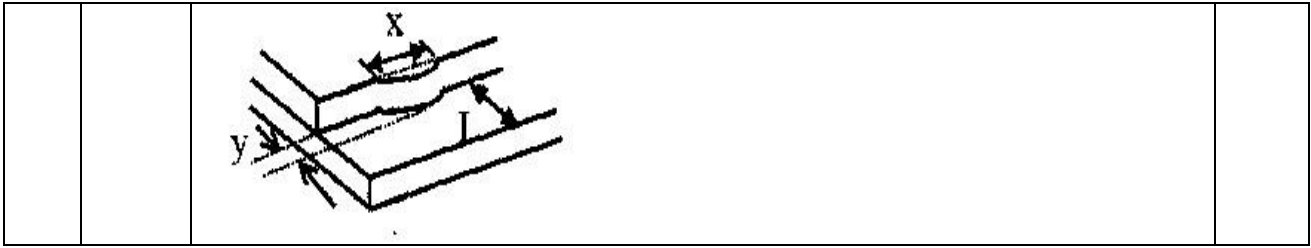


NO	Item	Criterion	AQL																		
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination																			
06	Chipped glass	<p>Symbols Define:  x: Chip length      y: Chip width      z: Chip thickness  k: Seal width      t: Glass thickness      a: LCD side length  L: Electrode pad 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="443 992 1353 1238"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td><math>z \leq 1/2t</math></td> <td>Not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> <tr> <td><math>1/2t &lt; z \leq t</math></td> <td>Not exceed 1/3k</td> <td><math>x \leq 1/8a</math></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="443 1720 1353 1966"> <thead> <tr> <th>z: Chip thickness</th> <th>y: Chip width</th> <th>x: Chip length</th> </tr> </thead> <tbody> <tr> <td><math>z \leq 1/2t</math></td> <td>Not over viewing area</td> <td><math>x \leq 1/8a</math></td> </tr> <tr> <td><math>1/2t &lt; z \leq t</math></td> <td>Not exceed 1/3k</td> <td><math>x \leq 1/8a</math></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	$x \leq 1/8a$	$1/2t < z \leq t$	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	$x \leq 1/8a$	$1/2t < z \leq t$	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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z: Chip thickness	y: Chip width	x: Chip length																			
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$1/2t < z \leq t$	Not exceed 1/3k	$x \leq 1/8a$																			



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="363 869 1286 1016"> <thead> <tr> <th>y: Chip width</th> <th>x: Chip length</th> <th>z: Chip thickness</th> </tr> </thead> <tbody> <tr> <td><math>y \leq 0.5\text{mm}</math></td> <td><math>x \leq 1/8a</math></td> <td><math>0 &lt; z \leq t</math></td> </tr> </tbody> </table> <p>6.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="434 1400 1260 1556"> <thead> <tr> <th>y: Chip width</th> <th>x: Chip length</th> <th>z: Chip thickness</th> </tr> </thead> <tbody> <tr> <td><math>y \leq L</math></td> <td><math>x \leq 1/8a</math></td> <td><math>0 &lt; z \leq t</math></td> </tr> </tbody> </table> <p>⊙If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> <p>⊙If the product will be heat sealed by the customer, the alignment mark not be damaged.</p> <p>6.2.3 Substrate protuberance and internal crack.</p> <table border="1" data-bbox="772 1953 1334 2098"> <thead> <tr> <th>y: width</th> <th>x: length</th> </tr> </thead> <tbody> <tr> <td><math>y \leq 1/3L</math></td> <td><math>x \leq a</math></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																	
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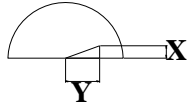
# MiDAS

DISPLAYS

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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 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.	0.65
		12.12 Visual defect outside of VA is not considered to be rejection.	

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## 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) Midas have the right to change the passive components, including R3,R6 & backlight adjust resistors. (Resistors, capacitors and other passive components will have different appearance and color caused by the different supplier.)
- (9) Midas have the right to change the PCB Rev. (In order to satisfy the supplying stability, management optimization and the best product performance...etc, under the premise of not affecting the electrical characteristics and external dimensions, Midas have the right to modify the version.)
- (10) To ensure the stability of the display screen, please apply screen saver after showing 30 mins of fixed display content.

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# Material List of Components for RoHs

1. Midas 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 : (only for RoHS inspection)

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

(2) Heat-resistance temp. : **DESIGN • MANUFACTURE • SUPPLY**

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.

## Recommendable Storage

1. Place the panel or module in the temperature 25°C±5°C and the humidity below 65% RH
2. Do not place the module near organics solvents or corrosive gases.
3. Do not crush, shake, or jolt the module.

