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MCCOG128064N6W-BNMLW	128 x 64	N/A	LCD Module

Specification

Version: 3	Date: 11/10/2012

Revision

1	10/2011	Initial Issued	All	All
2	12/2011	Modify LCM drawing	8	8/18
3	10/2012	Modify note 3	13	13/18

Display Features		
Resolution	128 x 64	
Appearance	White on Blue	
Logic Voltage	3.3V	
Interface	Parallel	
Font Set	N/A	
Display Mode	Transmissive	
LC Type	FSTN	
Module Size	80.00 x 54.00 x 9.50mm	
Operating Temperature	-20°C ~ +70°C	
Construction	COG	Box Quantity	Weight / Display
LED Backlight	White	—	---

* - For full design functionality, please use this specification in conjunction with the ST7565P specification. (Provided Separately)

Display Accessories	
Part Number	Description

Optional Variants	
Appearances	Voltage

General Specification

The Features of the Module is description as follow:

- Module dimension: 80.0x 54.0 x9.5 (max.) mm^3

- View area: 70.7 x 38.8 mm^2

- Active area: 66.52 x 33.24 mm^2

- Number of Dots: 128 x 64

- Dot size: 0.48 x0.48 mm^2

- Dot pitch: 0.52 x 0.52 mm^2

- LCD type: STN Negative, Blue   Transmissive,

- Duty: 1/64

- View direction: 6 o'clock

- Backlight Type: LED White

Interface Pin Function

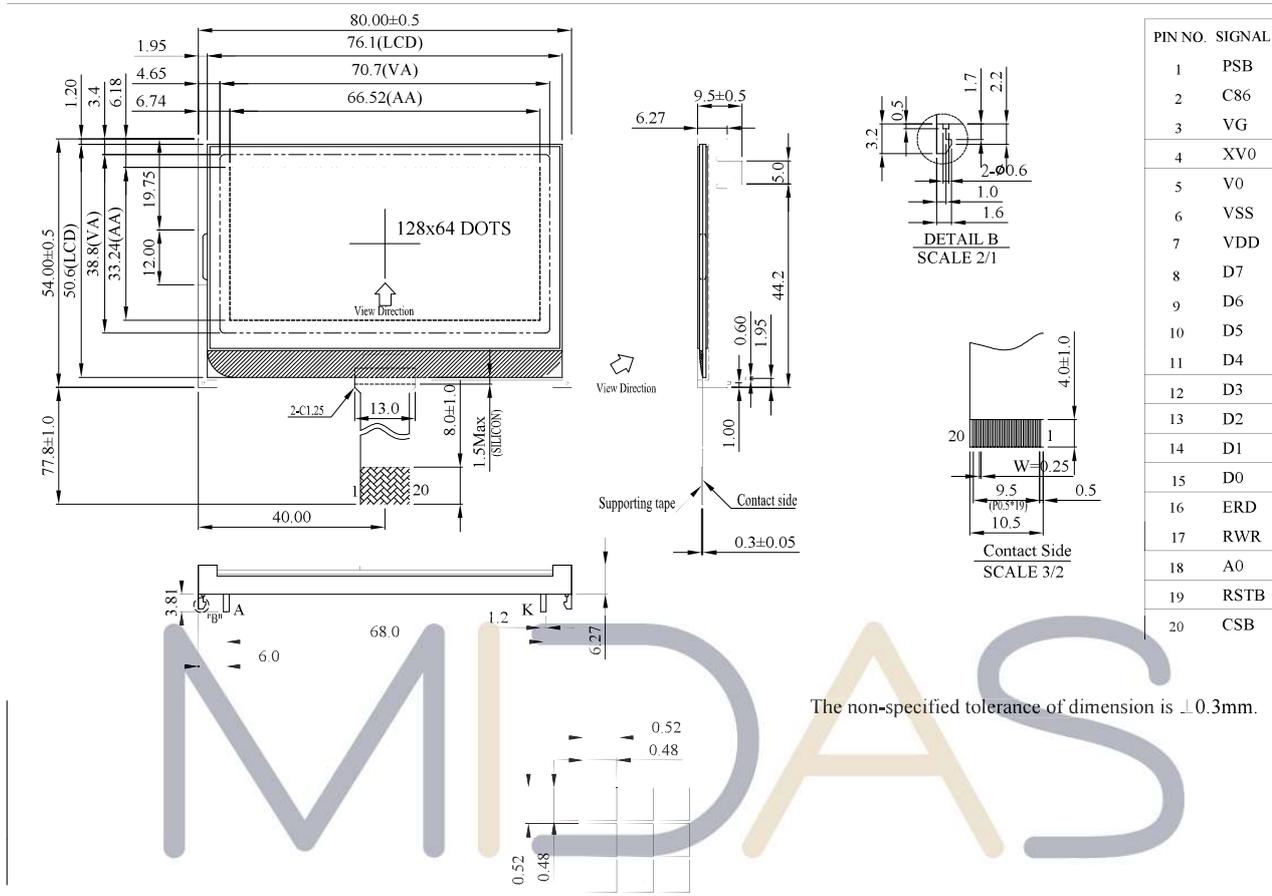| Pin No.	Symbol	Level	Description
1	PSB	I	PSB selects the interface type: Serial or Parallel.
2	C86	I	C86 selects the microprocessor type in parallel interface mode. <table><tr><th>PSB</th><th>C86</th><th>Selected Interface</th></tr><tr><td>"H"</td><td>"H"</td><td>Parallel 6800 Series MPU Interface</td></tr><tr><td>"H"</td><td>"L"</td><td>Parallel 8080 Series MPU Interface</td></tr><tr><td>"L"</td><td>"X"</td><td>Serial 4-Line SPI Interface</td></tr></table>Please refer to "APPLICATION NOTES" and "Microprocessor Interface" (Section 6) for detailed connection of the selected interface.
3	VG	Power	VG is the LCD driving voltage for segment circuits.
4	XV0	Power	XV0 is the LCD driving voltage for common circuits at positive frame.
5	V0	Power	V0 is the LCD driving voltage for common circuits at negative frame.
6	VSS		This is a 0V terminal connected to the system GND.
7	VDD		Shared with the MPU power supply terminal VDD. (3.3 V)
8	D7		**When using 8-bit parallel interface: (6800 or 8080 mode)** 8-bit bi-directional data bus. Connect to the data bus of 8-bit microprocessor. When CSB is non-active (CSB="H"), D[7:0] pins are high impedance. **When using serial interface: 4-LINE** D7=SDA : Serial data input. D6=SCL : Serial clock input. D[5:0] are not used and should connect to "H" by VDD1 or VDDH. When CSB is non-active (CSB="H"), D[7:0] pins are high impedance.
9	D6		
10	D5		
11	D4		
12	D3		
13	D2		
14	D1		
15	D0		
16	ERD	I	Read/Write execution control pin. When PSB is "H", <table><tr><th>C86</th><th>MPU Type</th><th>ERD</th><th>Description</th></tr><tr><td>H</td><td>6800 series</td><td>E</td><td>Read/Write control input pin. R/W="H": When E is "H", D[7:0] are in output mode. R/W="L": Signals on D[7:0] are latched at the falling edge of E signal.</td></tr><tr><td>L</td><td>8080 series</td><td>/RD</td><td>Read enable input pin. When /RD is "L", D[7:0] are in output mode.</td></tr></table>ERD is not used in serial interface and should fix to "H" by VDD1 or VDDH.

17	RWR	I	Read/Write execution control pin. When PSB is "H",

C86	MPU Type	RWR	Description
H	6800 series	R/W	Read/Write control input pin. R/W="H": read. R/W="L": write.
L	8080 series	/WR	Write enable input pin. Signals on D[7:0] will be latched at the rising edge of /WR signal.

RWR is not used in serial interface and should fix to "H" by VDD1 or VDDH.

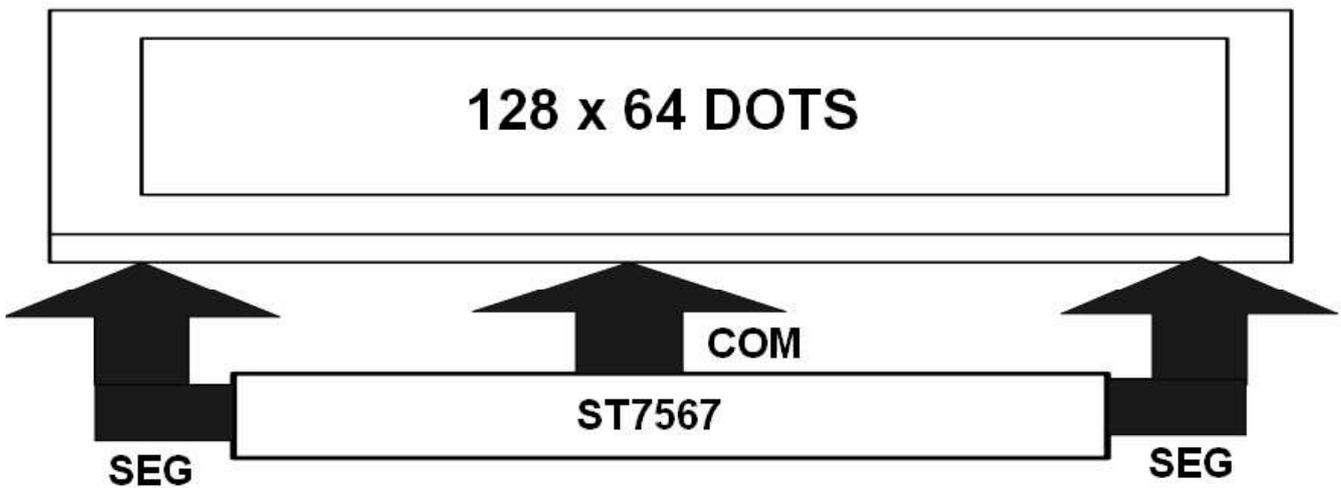| 18	A0	I	It determines whether the access is related to data or command. A0="H" : Indicates that signals on D[7:0] are display data. A0="L" : Indicates that signals on D[7:0] are command.
19	RSTB	I	Hardware reset input pin. When RSTB is "L", internal initialization is executed and the internal registers will be initialized.
20	CSB	I	Chip select input pin. Interface access is enabled when CSB is "L".When CSB is non-active (CSB="H"), D[7:0] pins are high impedance.

C1=C2=1UF/0805

PIN NO.	SIGNAL	
1	PSB	P3.6
2	C86	P3.6
3	VG	
4	XV0	
5	V0	
6	VSS	VSS
7	VDD	VDD
8	D7	P1.7
9	D6	P1.6
10	D5	P1.5
11	D4	P1.4
12	D3	P1.3
13	D2	P1.2
14	D1	P1.1
15	D0	P1.0
16	ERD	P3.4
17	RWR	P3.7
18	A0	P3.0
19	RSTB	P3.2
20	CSB	P3.3

Outline Dimension & Block Diagram

PIN NO.	SIGNAL
1	PSB
2	C86
3	VG
4	XV0
5	V0
6	VSS
7	VDD
8	D7
9	D6
10	D5
11	D4
12	D3
13	D2
14	D1
15	D0
16	ERD
17	RWR
18	A0
19	RSTB
20	CSB

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

Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V)θ	CR≧2	20	—	40	deg
	(H)φ	CR≧2	-30	—	30	deg
Contrast Ratio	CR	—	—	3	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	250	350	ms

Definition of Operation Voltage, Vop.　　　**Definition of Response Time, Tr and Tf.**
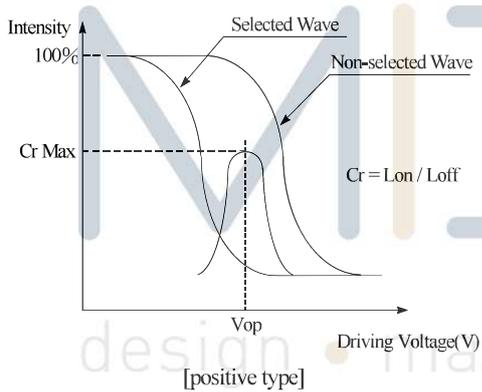
$Cr = Lon / Loff$

[positive type]
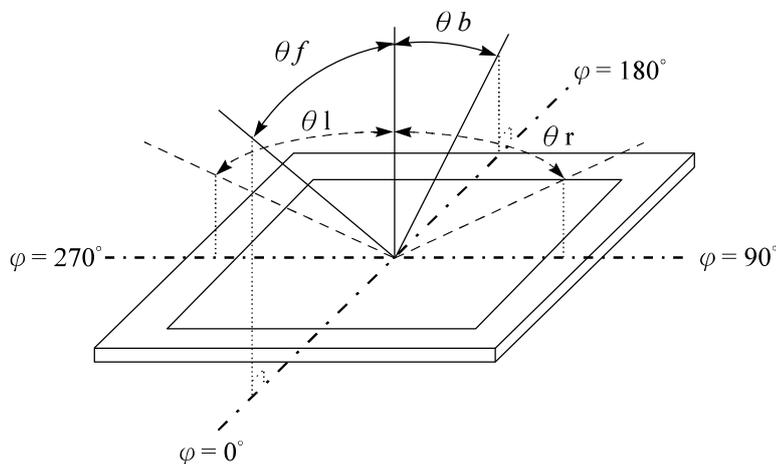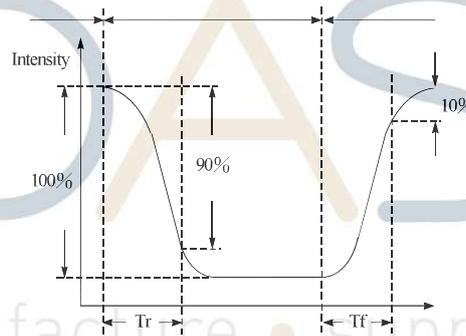
Absolute Maximum Ratings

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

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_{OP}	Ta=-20℃	—	—	—	V
		Ta=25℃	9.8	10.0	10.2	V
		Ta=70℃	—	—	—	V
Input High Volt.	V_{IH}	—	0.7 V_{DD}	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	Vss	—	0.3 V_{DD}	V
Output High Volt.	V_{OH}	—	0.8 V_{DD}	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	Vss	—	0.2V_{DD}	V
Supply Current(No include LED Backlight)	I_{DD}	V_{DD}=3.3V	—	2.0	—	mA

Backlight Information

Specification

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	ILED	86.4	96	144	mA	V=3.5V
Supply Voltage	V	3.4	3.5	3.6	V	
Reverse Voltage	VR	—	—	5	V	—
Luminous Intensity (Without LCD)	IV	672.8	755	—	CD/M^2	ILED=96mA
LED Life Time (For Reference only)	—	—	50K	—	Hr.	ILED$\leqq$96mA 25℃,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).

Note 1:50K hours is only an estimate for reference

LED B\L Drive Method
1.Drive from A , K
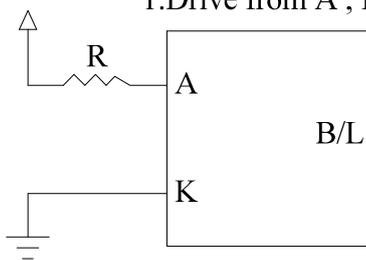
Reliability

Content of Reliability Test (wide temperature, -20℃~70℃)

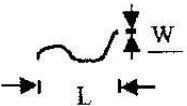| Environmental Test				
Test Item	**Content of Test**	**Condition**	**Note**	
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2	
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 200hrs	1,2	
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	-	
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	1	
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2	
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃　　25℃　　70℃ 30min　5min　30min 1 cycle	-20℃/70℃ 10 cycles	-	
Vibration test	Endurance test applying the vibration during transportation and using.	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	___	
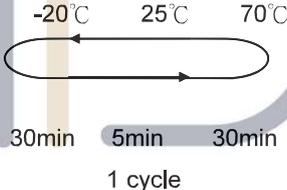
Note1: No dew condensation to be observed.

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

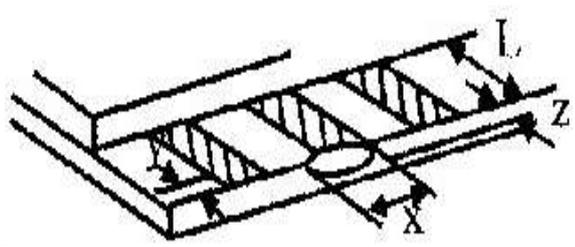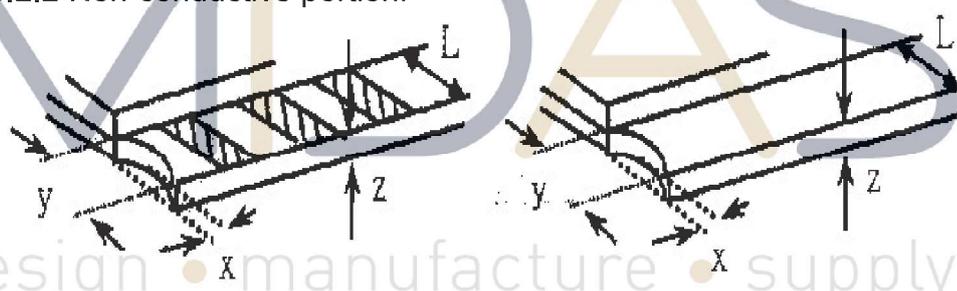**Note3: The packing have to including into the vibration testing.**

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 $\leqq$ 0.25mm, 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 $\Phi = (x + y) / 2$	2.5

3.2 Line type : (As following drawing)

Length	Width	Acceptable QTY
---	W$\leqq$0.02	Accept no dense
L$\leqq$3.0	0.02$<$W$\leqq$0.03	2
L$\leqq$2.5	0.03$<$W$\leqq$0.05	
---	0.05$<$W	As round type

(AQL: 2.5)

| 04 | Polarizer bubbles | If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction. | 2.5 |

Size Φ	Acceptable QTY
$\Phi \leqq$ 0.20	Accept no dense
0.20$<\Phi\leqq$0.50	3
0.50$<\Phi\leqq$1.00	2
1.00$<\Phi$	0
Total QTY	3

NO	Item	Criterion	AQL
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination	

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:

6.1 General glass chip :
6.1.1 Chip on panel surface and crack between panels:
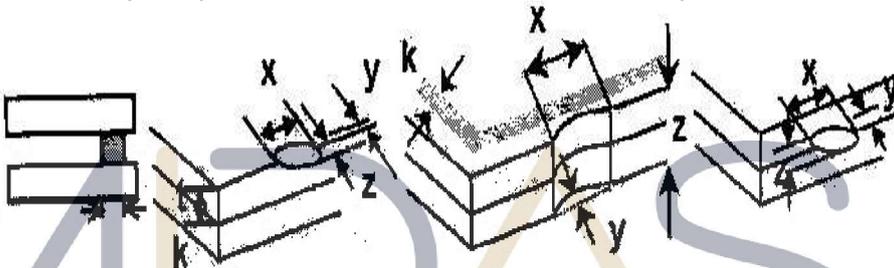
z: Chip thickness	y: Chip width	x: Chip length
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙If there are 2 or more chips, x is total length of each chip.

6.1.2 Corner crack:
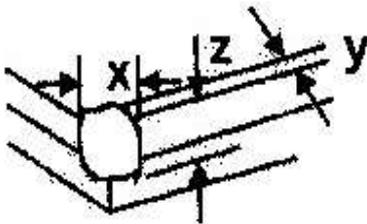
z: Chip thickness	y: Chip width	x: Chip length
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙If there are 2 or more chips, x is the total length of each chip.

Row 06 — Item: Chipped glass — AQL: 2.5

NO	Item	Criterion	AQL
06	Glass crack	Symbols : x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.2 Protrusion over terminal : 6.2.1 Chip on electrode pad : (table) 6.2.2 Non-conductive portion: (table) ⊙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. 6.2.3 Substrate protuberance and internal crack. (table)	2.5

6.2.1 Chip on electrode pad :
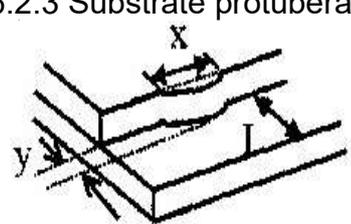
y: Chip width	x: Chip length	z: Chip thickness
y ≤ 0.5mm	x ≤ 1/8a	$0 < z \leq t$

6.2.2 Non-conductive portion:

y: Chip width	x: Chip length	z: Chip thickness
y ≤ L	x ≤ 1/8a	$0 < z \leq t$

6.2.3 Substrate protuberance and internal crack.

y: width	x: length
y ≤ 1/3L	x ≤ 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<=2mm^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
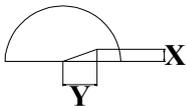
NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP. 12.2 No cracks on interface pin (OLB) of TCP. 12.3 No contamination, solder residue or solder balls on product. 12.4 The IC on the TCP may not be damaged, circuits. 12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it causes the interface pin to sever. 12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color. 12.7 Sealant on top of the ITO circuit has not hardened. 12.8 Pin type must match type in specification sheet. 12.9 LCD pin loose or missing pins. 12.10 Product packaging must the same as specified on packaging specification sheet. 12.11 Product dimension and structure must conform to product specification sheet.	2.5 0.65 2.5 2.5 2.5 2.5 2.5 0.65 0.65 0.65 0.65

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
   (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.

Material List of Components for RoHs

1. Midas hereby declares that all of or part of products, 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℃, 30 seconds Max.；
       Connector soldering wave or hand soldering：320℃, 10 seconds max.
   (3) Temp. curve of reflow, max. Temp.：235±5℃；
       Recommended customer's soldering temp. of connector：280℃, 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