

**PRODUCT** : LCD MODULE**MODEL NO.** : CMF-GG1P0104DTSW-W-E**SUPPLIER** : TRULY SEMICONDUCTORS LTD.**DATE** : December 13, 2006CERT. No. 946535  
(ISO9001)CERT. No. H002005  
(ISO14001)

# SPECIFICATION

Revision: 1.4

**CMF-GG1P0104DTSW-W-E**

If there is no special request from customer, TRULY SEMICONDUCTORS Co., Ltd will not reserve the tooling of the product under the following conditions:

1. There is no response from customer in two years after TRULY SEMICONDUCTORS Co., Ltd submit the samples;

2. There is no order in two years after the latest mass production.

And correlated data (include quality record) will be reserved one year more after tooling was discarded.

**TRULY SEMICONDUCTORS LTD:****CUSTOMER:**

Quality Assurance Department: \_\_\_\_\_

Approved by: \_\_\_\_\_

Technical Department: \_\_\_\_\_

Approved by: \_\_\_\_\_



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WRITTEN BY	CHECKED BY	APPROVED BY
ZHOU ZHAO YU	LIU JIA	LIN MING CHUAN



Customer No.:

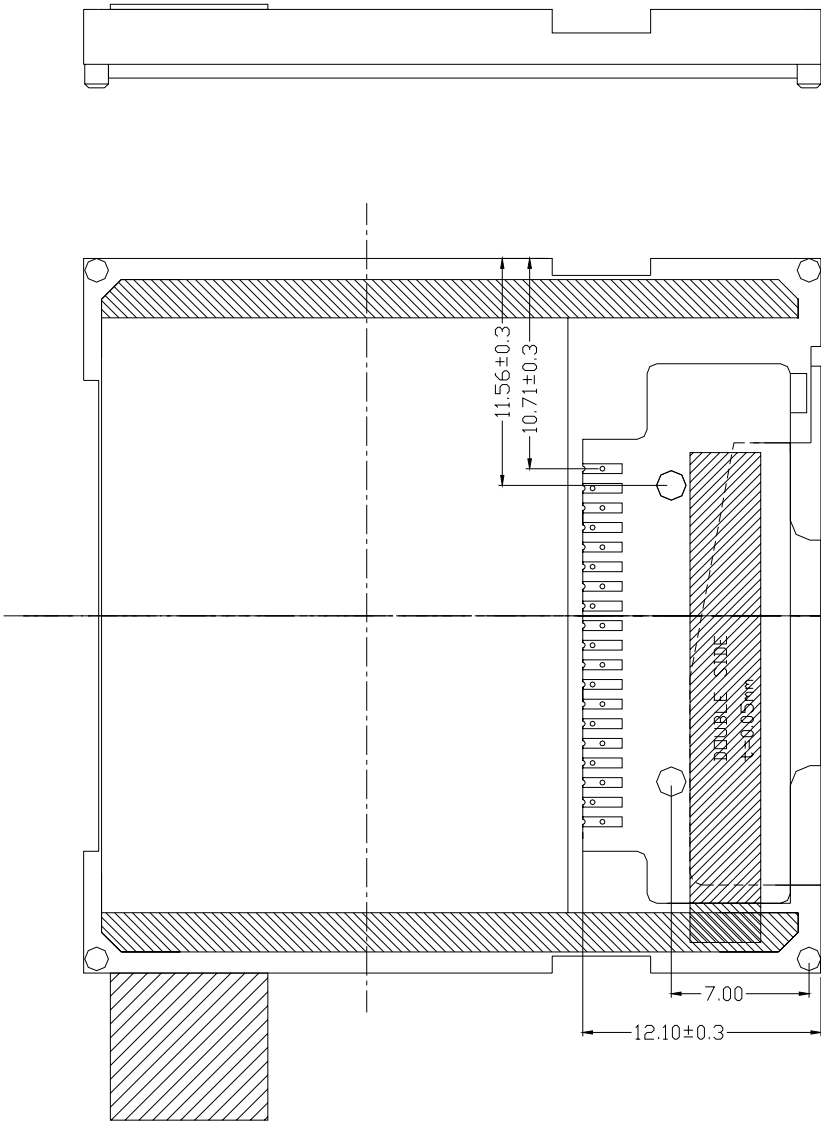
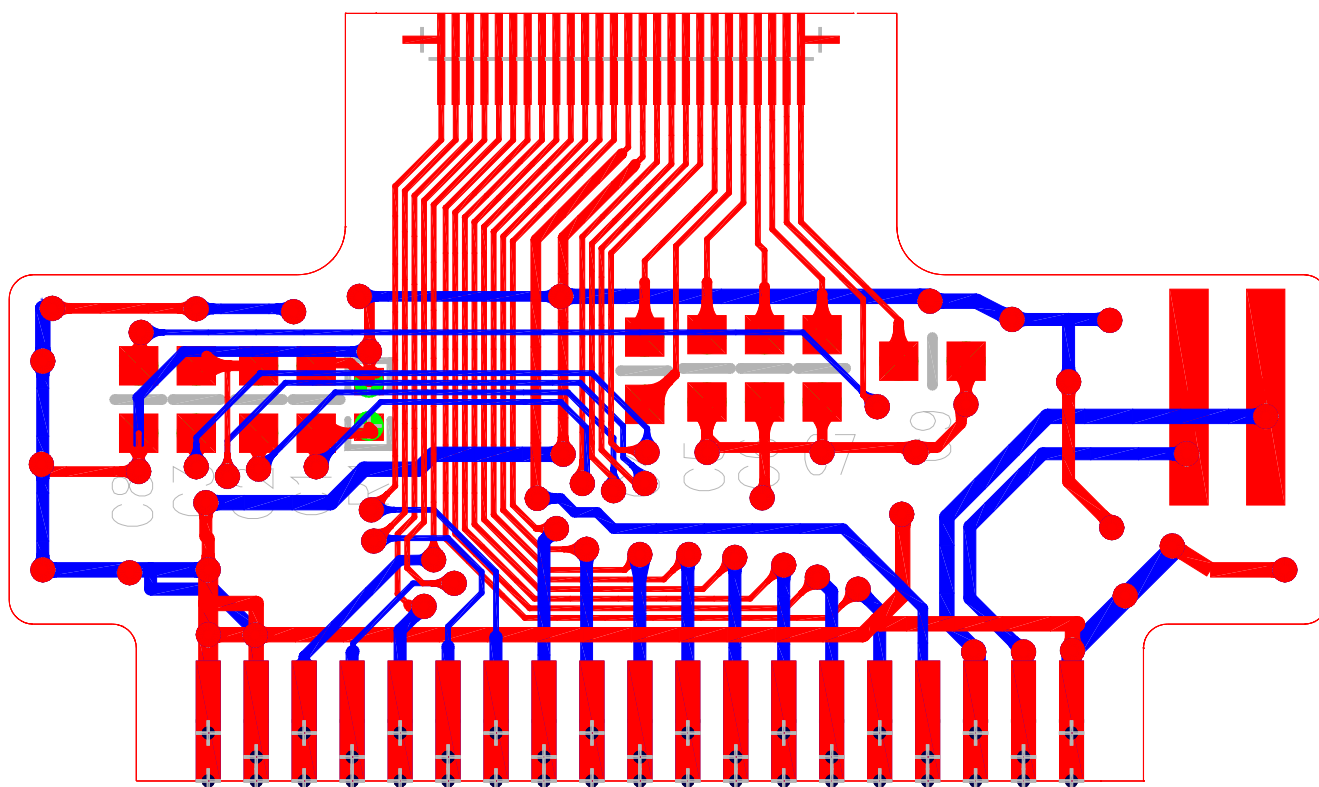


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TRULY SEMICONDUCTORS LTD.			
PRODUCT NO.	DRAW NO.	REV	
GG1P0104		A	
DWN 李偉 20051217	DSN 李偉 20051217	APPD 呂泰添 20051217	
CHKD 呂泰添 20051217	NOT IN SCALE	UNIT mm	SHEET: 5 / 5

## FPC LAYOUT



## ■ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply voltage for logic	$V_{DD}$	0.3	5.0	V
Input voltage	$V_{IN}$	-0.3	$V_{DD} + 0.3$	V
Operating temperature	$T_{OP}$	-20	70	°C
Storage temperature	$T_{ST}$	-30	80	°C

## ■ELECTRICAL CHARACTERISTICS

### DC CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage for logic	$V_{DD}-V_{SS}$	2.7	2.8	2.9	V
Input Current	$I_{dd}$	-	0.27	0.39	mA
Operating voltage for LCD	$V_{OP}$	9.8	10.0	10.2	V
Input voltage 'H' level	$V_{IH}$	$0.8V_{DD}$	$V_{DD}$	$V_{DD}$	V
Input voltage 'L' level	$V_{IL}$	0	0	$0.2V_{DD}$	V
Output voltage 'H' level	$V_{OH}$	$0.8V_{DD}$	$V_{DD}$	$V_{DD}$	V
Output voltage 'L' level	$V_{OL}$	0	0	$0.2V_{DD}$	V

## ■ TIMING OF POWER SUPPLY

PLEASE REFER TO THE DRIVER IC SPECIFICATION.



WAIACHI ELECTRONICS LTD.

DESIGN(设计):

CHECKED(检查):

COUNTERSIGN(会签):

APPROVED(批准):

SPECIFICATION FOR BACKLIGHT

Drawing No(图号):

WU2072.2.01

EDITION(版本号):

A2

Date(日期):

Page(页数):

图框规格:

Unit(单位):

CUSTOMERS CODE(客户型号):

D.C. MODEL NO.(供应商型号):

WU2072A-01

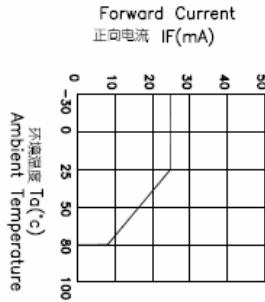
极限参数 ABSOLUTE MAXIMUM RATINGS  
(除非特别说明,环境温度 Ta=25°C. Unless specified, The Ambient temperature Ta=25°C)

项目	Item	符号	Symbol	条件	Conditions	值	Rating	单位	Unit
极限正向电流	Absolute maximum forward current	Ifm				25		mA	
脉冲驱动时极限正向电流	Peak forward current	Ifp		1 msec 脉冲, 1/10 占空比	1 msec Pulse, 1/10 Duty Cycle	60		mA	
反向电压	Reverse Voltage	Vr				1.0		V	
极限功耗	Power dissipation	Pd				75		mW	
工作温度	Operating Temperature Range	Topr				-30~+70		°C	
贮存温度	Storage Temperature Range	Tstg				-40~+80		°C	

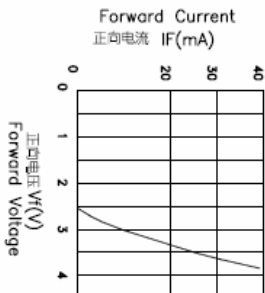
项目	Item	符号	Symbol	最小值	Typ.	典型值	最大值	单位	测试条件
亮度	Luminance	Lv		125	170	215		cd/m²	
均匀性	Uniformity	Avg		70	---	---		%	
色度坐标	Colour Coordinate	X		0.283		0.330			Vf= 3.8 V
		Y		0.276		0.339			
正向电流	Forward Current	If				11		mA	
反向电流	Reverse Current	Ir				15		mA	Vr= 0.8 V

• 当工作温度高于 25°C 时, Ifm, Ifp 和 Pd 必须降低, 电流降低率是 -0.36 mA/°C (直流驱动), 或 -0.86 mA/°C (脉冲驱动), 功耗降低率是 -0.75 mW/°C. 产品的工作电流不能大于对应工作温度条件下 Ifm 或 Ifp 的 60 %.  
For operation above 25°C, The Ifm, Ifp & Pd must be derated, the Current derating is -0.36 mA/°C for DC drive and -0.86 mA/°C for Pulse drive, the Power dissipation is -0.75 mW/°C. The product working current must not more than the 60 % of the Ifm or Ifp according to the working temperature.

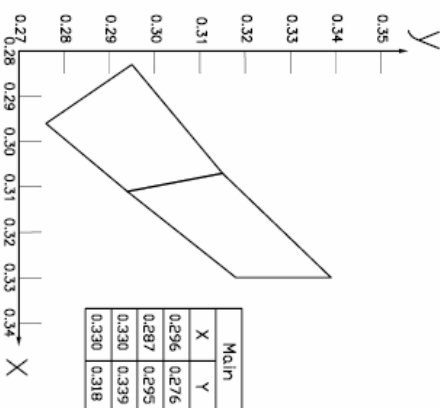
正向电流 环境温度  
Forward Current VS. Ambient Temperature



正向电流 正向电压特性  
Forward Current VS. Forward Voltage



Chromaticity Diagram:



A

B

C

D

A

B

C

D



## ■ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time	Tr	$\theta=0^\circ$	---	120	---	ms	FIG.3	2
	Tf	$\varnothing=0^\circ$	---	155	---	ms	FIG.3	2
Surface Luminance	Lv	Ta=25℃	---	---	---	cd/m <sup>2</sup>	FIG 4.	1
Viewing angle range	$\theta$	$\varnothing = 90^\circ$	30	40	---	deg	FIG 5	3
		$\varnothing = 270^\circ$	40	50	---	deg		
		$\varnothing = 0^\circ$	30	40	---	deg		
		$\varnothing = 180^\circ$	30	40	---	deg		

Note 1. Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 4.

**Lv = Average** Surface Luminance with all white pixels (**P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>,P<sub>4</sub>, P<sub>5</sub>**)

Note 2. Response time is the time required for the display to transition from White to black(Rise Time, Tr) and from black to white(Decay Time, Tf). For additional information see FIG 3.

Note 3. Viewing angle is the angle at which the contrast ratio is greater than 2. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 5.

FIG. 1 Optical Characteristic Measurement Equipment and Method

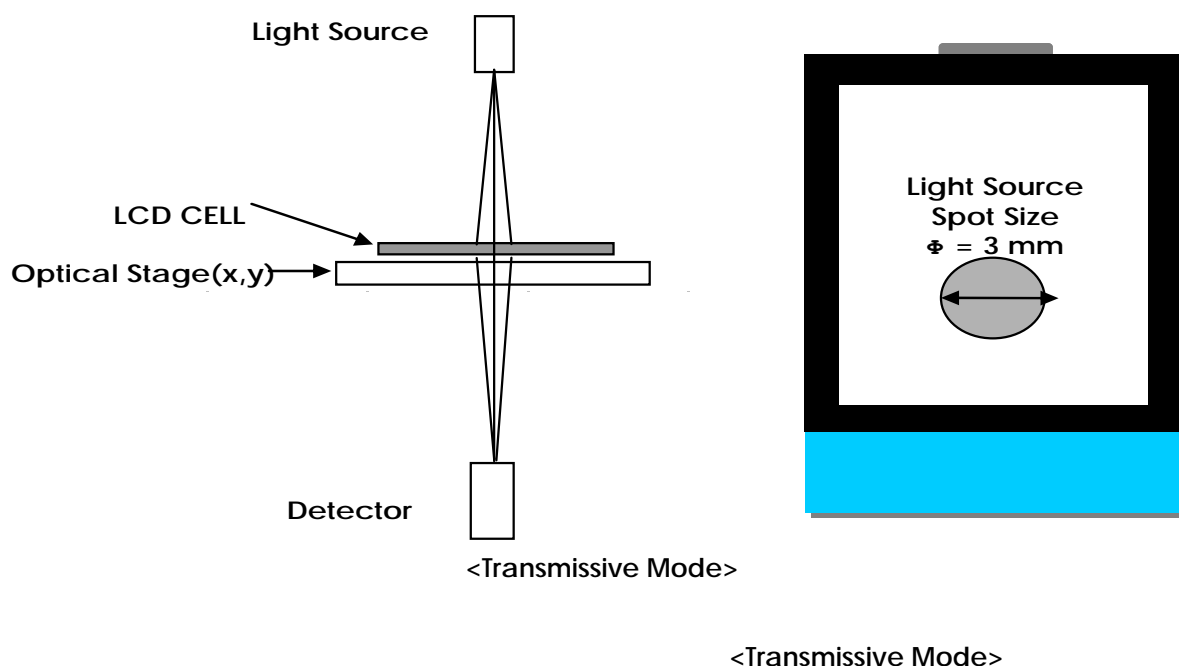


FIG. 2 Measuring method for optical characteristics in Reflective mode

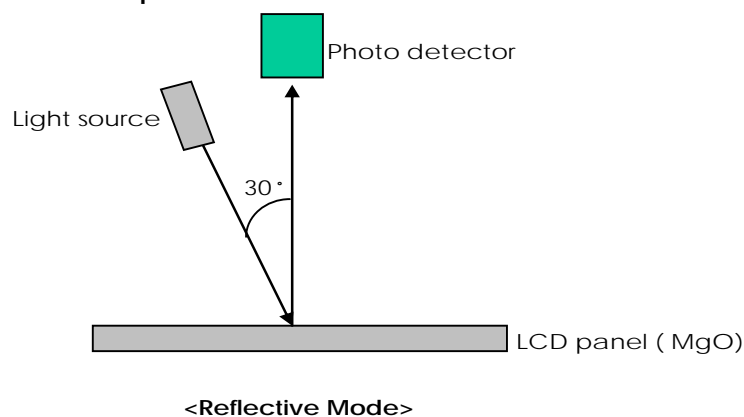
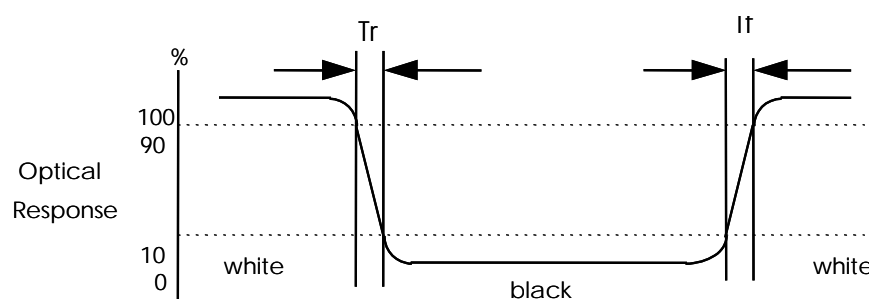


FIG. 3 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

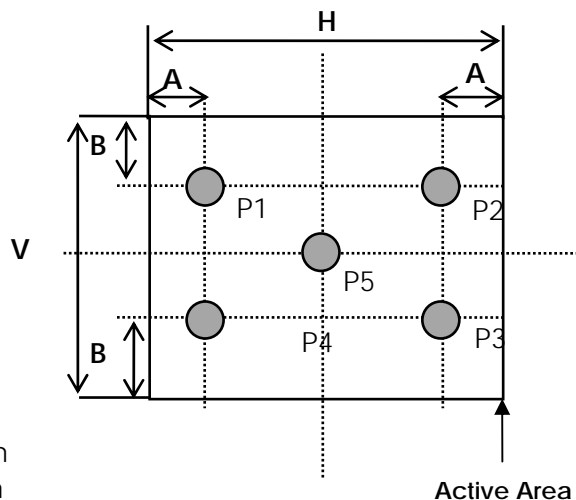


The values specified are at an approximate distance 500 mm from the LCD surface at a viewing angle of  $\Phi$  and  $\theta$  equal to  $0^\circ$ . Measurement condition : Refer to next pages ( B - light source , Halogen Lamp, with polarizer )

**FIG. 4 Measuring method for Contrast ratio, surface luminance, Luminance uniformity , CIE (x, y) chromaticity**

<measuring point for luminance variation>

<measuring point for surface luminance>



$A : 5 \text{ mm}$

$B : 5 \text{ mm}$

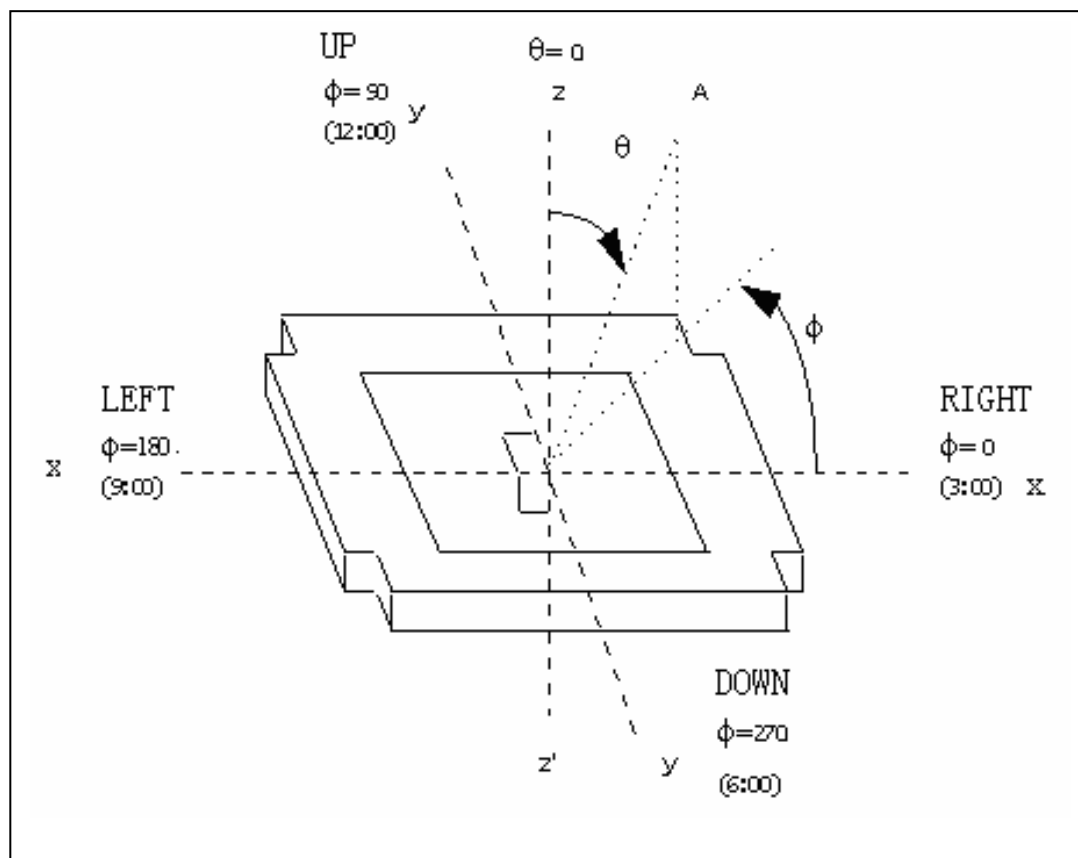
Light source spot size  $\varnothing=2\text{mm}$

$H, V$  : Active Area

measurement device is TOPCON luminance meter BM-7

**FIG. 5 The definition of viewing angle**

<dimension of viewing angle range>



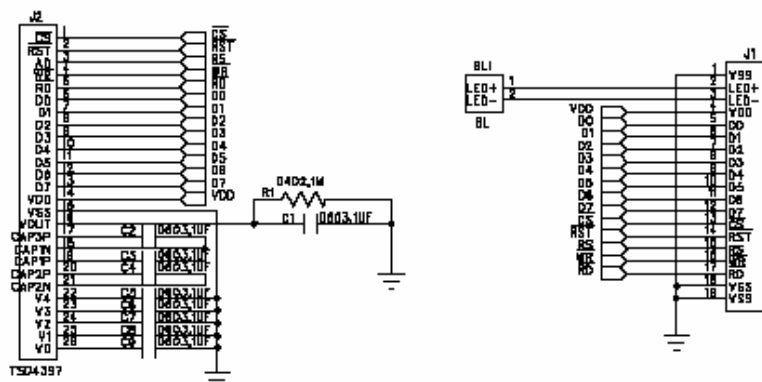
## ■ INTERFACE DESCRIPTION

Pin No.	Symbol	Level	Description
1	VSS	VSS	Ground.
2	LED+	-	LED, anode.
3	LED-	-	LED, cathode.
4	VDD	2.8V	Power supply.
5~12	D0~D7	H/L	Data bus.
13	/CS	H/L	Chip select.
14	/RESET	H/L	System reset pin.
15	RS	H/L	Command/data select input pin.
16	/WR	H/L	Write execute control pin.
17	/RD	H/L	Read execute control pin.
18	VSS	VSS	Ground.
19	VSS	VSS	Ground.

## ■ APPLICATION CIRCUIT

DRIVER IC:ST7565P-G

REVISION RECORD			
Version	Contents	APPROVED:	DATE:
A	First Release	NAME	Jan3,2006



SEMICONDUCTORS LIMITED R&D Center DISPLAY MODULE R&D DEPARTMENT			
PRODUCT No. TSE8G0005FPC-A			
DRAWN:LWC	DATED:2006-03-17	DRAWING NO:	REV: A
CHECKED:QBM	DATED:2006-03-17	SHEET: 1 OF 1	
APPROVED:	DATED:	FILE No.DOC-03B0009-01B	

## ■ INITIAL CODE

Please consult our technical department for detail information.


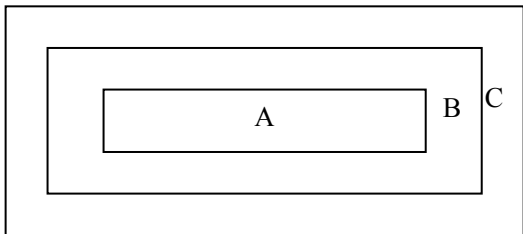
## ■ RELIABILITY TEST

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	$80 \pm 2^{\circ}\text{C}/200$ hours	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Sealleak; 3.Non-display; 4.missing segments; 5.Glass crack; 6.Current Idd is twice higher than initial value.
2	Low Temperature Storage	$-30 \pm 2^{\circ}\text{C}/200$ hours	
3	High Temperature Operating	$70 \pm 2^{\circ}\text{C}/120$ hours	
4	Low Temperature Operating	$-20 \pm 2^{\circ}\text{C}/120$ hours	
5	Temperature Cycle	$-20 \pm 2^{\circ}\text{C} \sim 25 \sim 70 \pm 2^{\circ}\text{C} \times 10$ cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test	$50^{\circ}\text{C} \pm 5^{\circ}\text{C} \times 90\%\text{RH}/120$ hours	
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude: 1.5mm, X, Y, Z direction for total 3hours (Packing condition)	
8	Drooping test	Drop to the ground from 1m height, one time, every side of carton. (Packing condition)	
9	ESD test	Voltage: $\pm 8\text{KV}$ R: $330 \Omega$ C: 150pF Air discharge, 10time	

**Remark:**

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.
- 3.For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
- 5.EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
- 6.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
- 7.Please use automatic switch menu(or roll menu) testing mode when test operating mode.

## ■ INSPECTION CRITERION

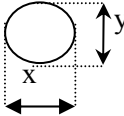
 OUTGOING QUALITY STANDARD	PAGE 1 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	MDS Product
<p>This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM.</p> <p>1 Sample plan</p> <p>Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:</p> <p>Major defect: AQL 0.65</p> <p>Minor defect: AQL 1.5</p> <p>2. Inspection condition</p> <p>Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45° against perpendicular line.</p> <p>3. Definition of inspection zone in LCD.</p> <div data-bbox="489 1151 1015 1384" data-label="Diagram">  </div> <p>Zone A: character/Digit area</p> <p>Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)</p> <p>Zone C: Outside viewing area (invisible area after assembly in customer's product)</p> <p>Fig.1 Inspection zones in an LCD.</p> <p>Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.</p>	

#### 4. Inspection standards

##### 4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	

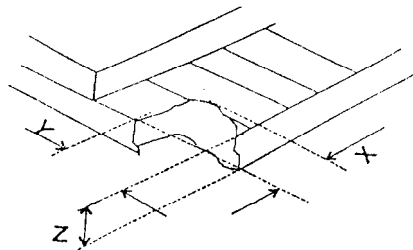
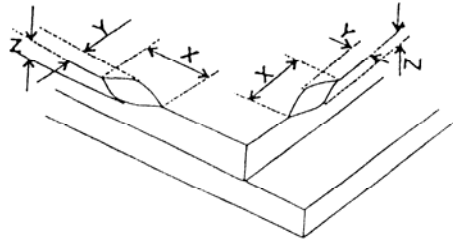
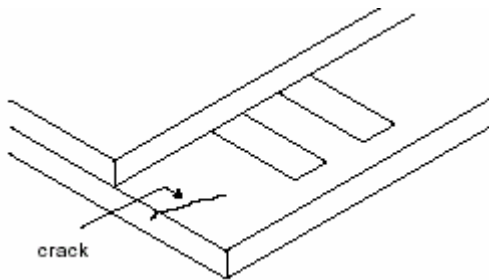
##### 4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects																				
4.2.1	Clear Spots	For dark/white spot, size $\Phi$ is defined as $\Phi = \frac{(x+y)}{2}$ <div></div>	Minor																				
	Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	1. <table><tr><th rowspan="2">Size(mm) \ Zone</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td><math>\Phi \leq 0.1</math></td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td><math>0.10 &lt; \Phi \leq 0.15</math></td><td colspan="2">2</td></tr><tr><td><math>0.15 &lt; \Phi \leq 0.20</math></td><td colspan="2">1</td></tr><tr><td><math>\Phi &gt; 0.20</math></td><td colspan="2">0</td></tr></table>		Size(mm) \ Zone	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore		Ignore	$0.10 < \Phi \leq 0.15$	2		$0.15 < \Phi \leq 0.20$	1		$\Phi > 0.20$	0	
Size(mm) \ Zone	Acceptable Qty																						
	A	B	C																				
$\Phi \leq 0.1$	Ignore		Ignore																				
$0.10 < \Phi \leq 0.15$	2																						
$0.15 < \Phi \leq 0.20$	1																						
$\Phi > 0.20$	0																						
	Dim Spots	2. <table><tr><th rowspan="2">2. Zone \ Size(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td><math>\Phi \leq 0.2</math></td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td><math>0.20 &lt; \Phi \leq 0.40</math></td><td colspan="2">2</td></tr><tr><td><math>0.40 &lt; \Phi \leq 0.60</math></td><td colspan="2">1</td></tr><tr><td><math>0.60 &lt; \Phi</math></td><td colspan="2">0</td></tr></table>	2. Zone \ Size(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.20 < \Phi \leq 0.40$	2		$0.40 < \Phi \leq 0.60$	1		$0.60 < \Phi$	0		Minor
2. Zone \ Size(mm)	Acceptable Qty																						
	A	B	C																				
$\Phi \leq 0.2$	Ignore		Ignore																				
$0.20 < \Phi \leq 0.40$	2																						
$0.40 < \Phi \leq 0.60$	1																						
$0.60 < \Phi$	0																						

TRULY® OUTGOING QUALITY STANDARD				PAGE 3 OF 4				
TITLE: FUNCTIONAL TEST & INSPECTION CRITERIA				MDS Product				
4.2. Cosmetic Defect								
Item No	Items to be inspected	Inspection Standard					Classification of defects	
4.2.2	Line defect Black line, White line, Foreign material under polarizer,	Size(mm)			Acceptable Qty			Minor
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	W≤0.02	Ignore		Ignore		
		L≤3.0	0.02<W≤0.03	2				
		L≤2.0	0.03<W≤0.05	1				
			0.05<W	Define as spot defect				
		4.2.3	Polarizer scratch	If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2. If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.				
Size(mm)				Acceptable Qty				
L(Length)	W(Width)			Zone				
				A	B	C		
Ignore	W≤0.03			Ignore		Ignore		
5.0<L≤10.0	0.03<W≤0.05			2				
L≤5.0	0.05<W≤0.08			1				
	0.08<W			0				
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer					Minor	
		2. Zone Size(mm)		Acceptable Qty				
				A	B	C		
		Φ≤0.2		Ignore		Ignore		
		0.20<Φ≤0.30		2				
		0.30<Φ≤0.50		1				
		0.50<Φ		0				



## 4.3. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects						
4.3.5	Glass defect	<p>(i) Chips on corner</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤2.0</td><td>≤S</td><td>Disregard</td></tr></table> <p>Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.</p>	X	Y	Z	≤2.0	≤S	Disregard	Minor
		X	Y	Z					
		≤2.0	≤S	Disregard					
<p>(ii) Usual surface cracks</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0</td><td>&lt;Inner border line of the seal</td><td>Disregard</td></tr></table>	X	Y	Z	≤3.0	<Inner border line of the seal	Disregard	Minor		
X	Y	Z							
≤3.0	<Inner border line of the seal	Disregard							
<p>(iii) Crack</p> <p>Cracks tend to break are not allowed.</p> 	Major								
4.3.6	Parts alignment	<p>1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern.</p> <p>2) Not allow chip or solder component is off center more than 50% of the pad outline.</p>	Minor						
4.3.7	SMT	According to the <Acceptability of electronic assemblies> IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.							

## ■ PRECAUTIONS FOR USING LCD MODULES

### Handling Precautions

(1) The display panel is made of glass and polarizer. As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents

- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Electro-Static Discharge Control, Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Before remove LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential .Be sure to ground the body when handling the LCD modules.

- Tools required for assembling, such as soldering irons, must be properly grounded. make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended .As far as possible make the electric potential of your work clothes and that of the work bench the ground potential

- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated

(13) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

### **Storage Precautions**

When storing the LCD modules, the following precaution is necessary.

- (1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
- (2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

### **Others**

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

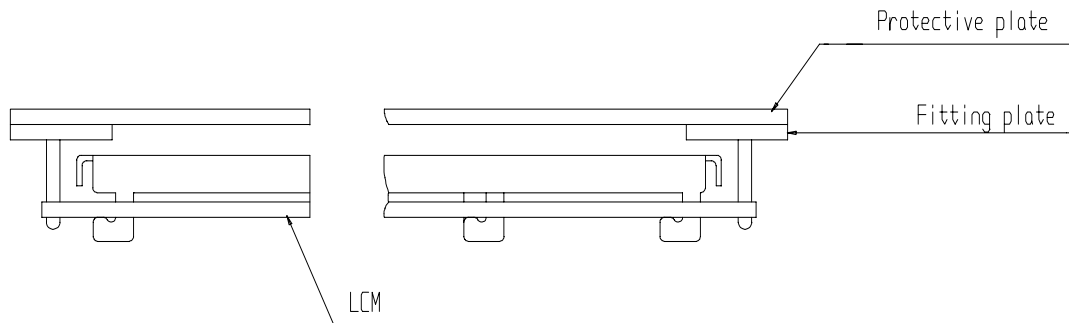
- Exposed area of the printed circuit board.
- Terminal electrode sections.

## USING LCD MODULES

### Installing LCD Modules

The hole in the printed circuit board is used to fix LCM as shown in the picture below. Attend to the following items when installing the LCM.

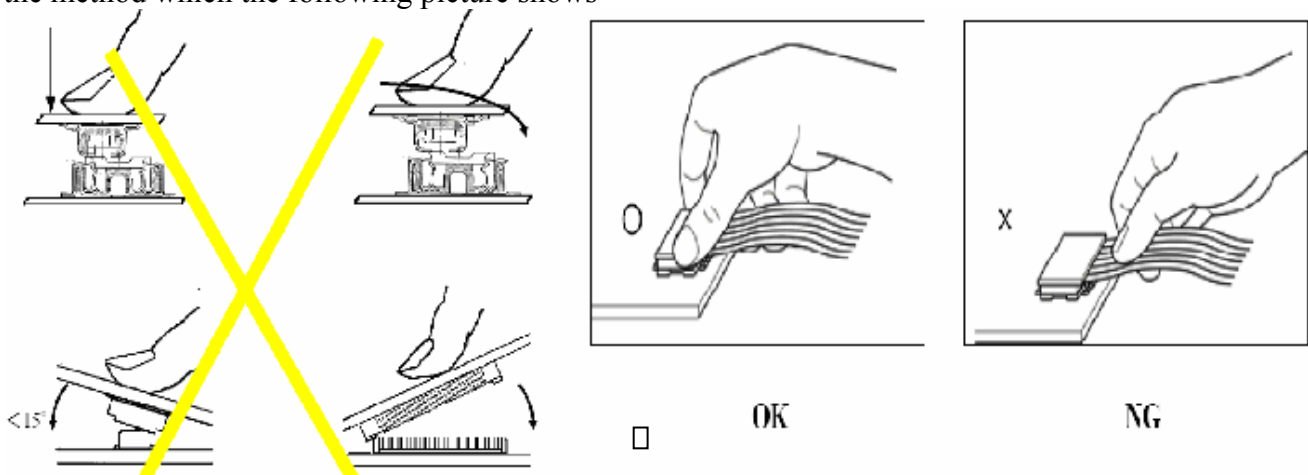
- (1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



- (2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be  $\pm 0.1\text{mm}$ .

### Precaution for assemble the module with BTB connector:

Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows



### Precaution for soldering to the LCM

	Hand soldering	Machine drag soldering	Machine press soldering
No ROHS product	290°C ~350°C. Time : 3-5S.	330°C ~350°C. Speed : 4-8 mm/s.	300°C ~330°C. Time : 3-6S. Press: 0.8~1.2Mpa
ROHS product	340°C ~370°C. Time : 3-5S.	350°C ~370°C. Time : 4-8 mm/s.	330°C ~360°C. Time : 3-6S. Press: 0.8~1.2Mpa

- (1) If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

- (2) When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

- (3) When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

## Precautions for Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (VLCD). Adjust VLCD to show the best contrast.

(2) It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage than the limit causes the shorter LCD life. An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.

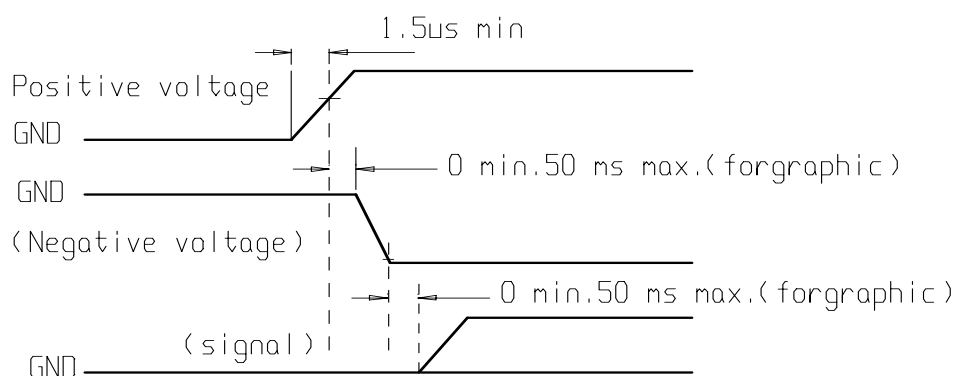
(3) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, Which will come back in the specified operating temperature.

(4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(5) A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature, 50%RH or less is required.

(6) Input each signal after the positive/negative voltage becomes stable.

(7) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.



## Safety

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

## Limited Warranty

Unless agreed between TRULY and customer, TRULY will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with TRULY LCD acceptance standards (copies available upon request) for a period of one year from date of shipments. Cosmetic/visual defects must be returned to TRULY within 90 days of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of TRULY limited to repair and/or replacement on the terms set forth above. TRULY will not be responsible for any subsequent or consequential events.

## Return LCM under warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

- Broken LCD glass.
- PCB eyelet is damaged or modified.
- PCB conductors damaged.
- Circuit modified in any way, including addition of components.
- PCB tampered with by grinding, engraving or painting varnish.
- Soldering to or modifying the bezel in any manner.

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

**■ PACKING SPECIFICATION**

TBD

**■ PRIOR CONSULT MATTER**

- 1.①For Truly standard products, we keep the right to change material, process ... for improving the product property without notice on our customer.
- ②For OEM products, if any change needed which may affect the product property, we will consult with our customer in advance.
2. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

**■ FACTORY****FACTORY NAME:** TRULY SEMICONDUCTORS LTD.**FACTORY ADDRESS:** Truly Industrial Area, ShanWei City,GuangDong,China**FACTORY PHONE:** 86-0660-3380061    **FAX:** 86-0660-3371772