



**MULTI-INNO TECHNOLOGY CO., LTD.**

[www.multi-inno.com](http://www.multi-inno.com)

## LCD MODULE SPECIFICATION

**Model : MI0840KT**

This module uses ROHS material

### For Customer's Acceptance:

Customer	
Approved	
Comment	

This specification may change without prior notice in order to improve performance or quality. Please contact Multi-Inno for updated specification and product status before design for this product or release of this order.

Revision	1.0
Engineering	
Date	2013-05-16
Our Reference	



**REVISION RECORD**

<b>REV NO.</b>	<b>REV DATE</b>	<b>CONTENTS</b>	<b>REMARKS</b>
1.0	2013-05-16	First Release	

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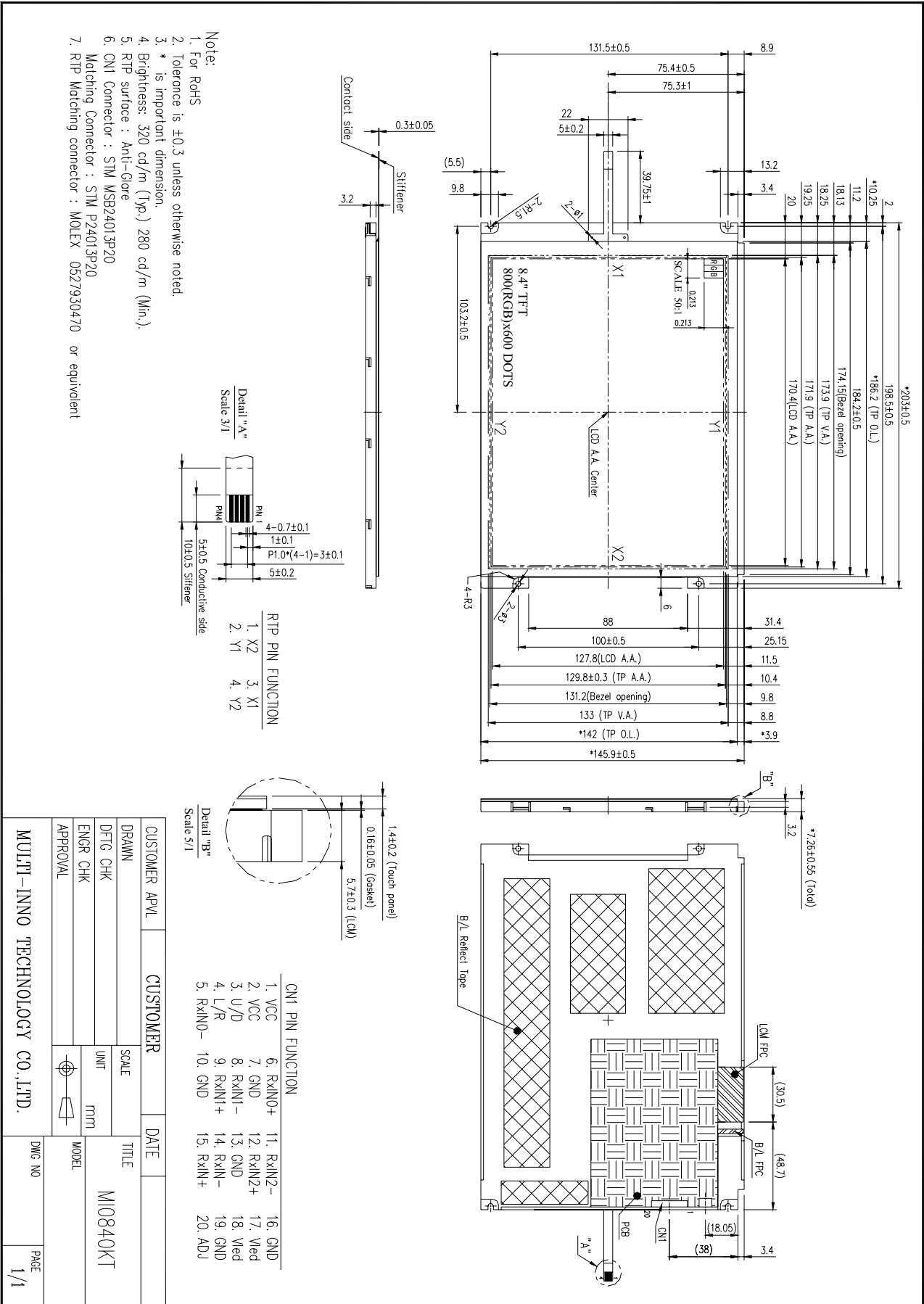
**■ GENERAL INFORMATION**

Item	Contents	Unit
LCD type	TFT/Normally white	/
Size	8.4	Inch
Viewing direction	6:00(without image inversion and least brightness change)	O' Clock
Gray scale inversion direction	12:00(contrast peak located at)	O' Clock
LCM (W × H × D )	203.0×145.9×7.26	mm <sup>3</sup>
Active area (W×H)	170.4×127.8	mm <sup>2</sup>
Pixel pitch (W×H)	0.213×0.213	mm <sup>2</sup>
Number of dots	800 (RGB) × 600	/
Backlight type	42 LEDs	/
Interface type	LVDS	/
Color depth	262K	/
Pixel configuration	R.G.B-stripe	/
Input voltage	3.3	V
With/Without TSP	With TSP	/
Weight	315	g

Note 1: RoHS compliant;

Note 2: LCM weight tolerance: ± 5% .

**EXTERNAL DIMENSIONS**



## ■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Power supply voltage	V <sub>CC</sub>	-0.3	5.0	V
LED driving voltage	V <sub>LED</sub>	-0.3	17	V
Logic input voltage	V <sub>IN</sub>	-0.3	V <sub>CC</sub> +0.3	V
Operating temperature	T <sub>OP</sub>	-5	60	°C
Storage temperature	T <sub>ST</sub>	-20	70	°C
Operation humidity	-	20	90	%RH
Storage humidity	-	-10	90	%RH

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation T<sub>a</sub>=60°C & -5°C ≤ 240Hrs.

Note 4 : Operation T<sub>a</sub>=40°C & H=90% ≤ 240Hrs.

## ■ ELECTRICAL CHARACTERISTICS

### DC CHARACTERISTICS

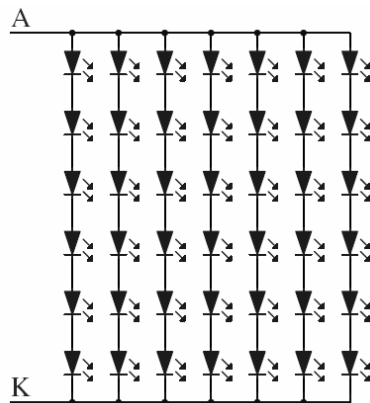
Parameter	Symbol	Min	Typ	Max	Unit
Power voltage for LCD	V <sub>CC</sub>	3.0	3.3	3.6	V
Power voltage for LCD	I <sub>CC</sub>	-	210	-	mA
Input voltage ' H ' level	V <sub>IH</sub>	0.7V <sub>CC</sub>	-	V <sub>CC</sub>	V
Input voltage ' L ' level	V <sub>IL</sub>	0	-	0.3V <sub>CC</sub>	V

Note1:Test Pattern: all black.

Note2: HSYNC, VSYNC, DE, Digital data.

## ■ BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
LED driving voltage	V <sub>LED</sub>	4.5	5.0	15	V	
	I <sub>LED</sub>	-	690	-	mA	
ADJ input analog dimming	-	0.7	-	1.4	V <sub>DC</sub>	
ADJ input PWM dimming	-	1.4	-	5.0	V <sub>P-P</sub>	
ADJ frequency	-	100	-	1000	Hz	



**■ELECTRO-OPTICAL CHARACTERISTICS**

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time	Tr+Tf	$\theta=0^\circ$ $\varnothing=0^\circ$ $T_a=25^\circ\text{C}$	-	8	16	ms	FIG 1.	4
Contrast ratio	Cr		450	600	-	---	FIG 2.	1
Luminance uniformity	$\delta$ WHITE		70	-	-	%	FIG 2.	3
Surface Luminance	Lv		280	320	-	cd/m <sup>2</sup>	FIG 2.	2
Viewing angle range	$\theta$	$\varnothing = 90^\circ$	60	70	-	deg	FIG 3.	6
		$\varnothing = 270^\circ$	50	60	-	deg	FIG 3.	
		$\varnothing = 0^\circ$	65	75	-	deg	FIG 3.	
		$\varnothing = 180^\circ$	65	75	-	deg	FIG 3.	
CIE (x, y) chromaticity	Red	x	-	-	-	FIG 2.	5	
		y	-	-	-			
	Green	x	-	-	-			
		y	-	-	-			
	Blue	x	-	-	-			
		y	-	-	-			
	White	x	0.25	0.30	0.35			
		y	0.27	0.32	0.37			

Note 1. Contrast Ratio(CR) is defined mathematically as For more information see FIG 2.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

$$L_v = \text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}$$

Note 3. The uniformity in surface luminance ,  $\delta$  WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see FIG 2.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

Note 4. 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 1. The test equipment is Autronic-Melchers's ConoScope. Series.

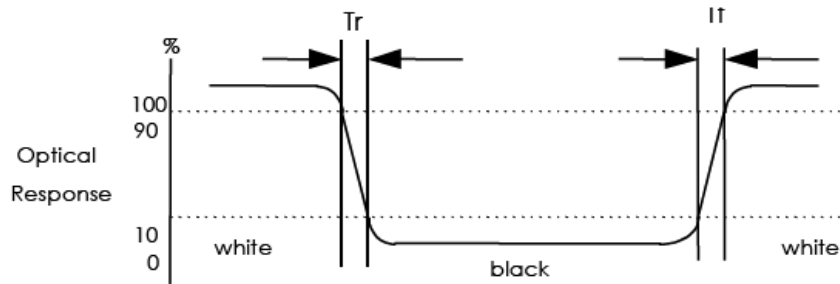
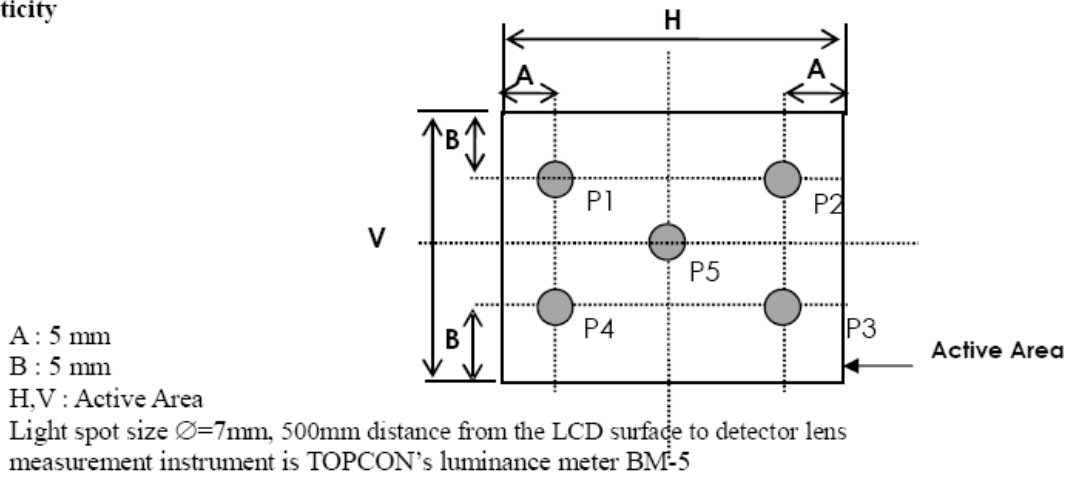
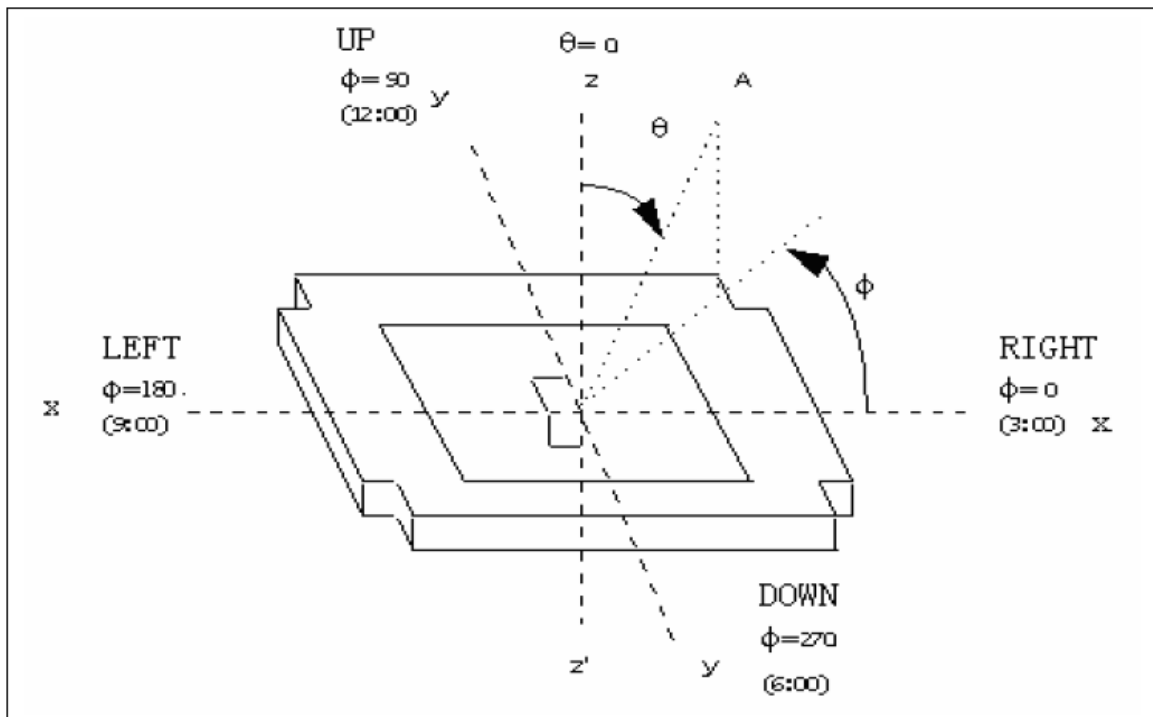
Note 5. CIE (x, y) chromaticity, The x, y value is determined by measuring luminance at each test position 1 through 5, and then make average value.

Note 6. Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 10. 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 3.

Note 7. For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope. Series Instruments For contrast ratio, Surface Luminance, Luminance uniformity, CIE The test data is base on TOPCON's BM-5 photo detector.

**FIG. 1 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".


**FIG. 2 Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity**

**FIG. 3 The definition of viewing angle**




## ■ INTERFACE DESCRIPTION

### 1 TFT LCD Panel Driving Section

PIN No.	SIGNAL	FUNCTION	Remark
1	VCC	Power Supply For Digital Circuit	
2	VCC	Power Supply For Digital Circuit	
3	U/D	Vertical Display Mode Select Signal Up / Down Scan Control Input.	Note1
4	L/R	Horizontal Display Mode Select Signal Left / Right Scan Control Input.	Note1
5	RxIN0-	Differential Clock Input,CH0(Negative)	
6	RxIN0+	Differential Clock Input,CH0(Positive)	
7	GND	Ground	
8	RxIN1-	Differential Clock Input,CH1(Negative)	
9	RxIN+	Differential Clock Input,CH1(Positive)	
10	GND	Ground	
11	RxIN2-	Differential Clock Input,CH2(Negative)	
12	RxIN2+	Differential Clock Input,CH2(Positive)	
13	GND	Ground	
14	RxIN-	Differential Clock Input(Negative)	
15	RxIN+	Differential Clock Input(Positive)	
16	GND	Ground	
17	Vled	Power Supply for LED Driver Circuit(5V)	
18	Vled	Power Supply for LED Driver Circuit(5V)	
19	GND	Ground	
20	ADJ	Adjust The Back Light Brightness	Note2,3

Note1:

L/R=L U/D=H



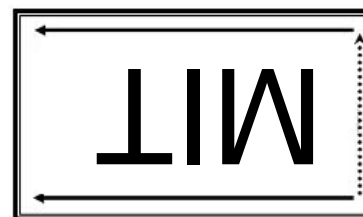
L/R=H U/D=H



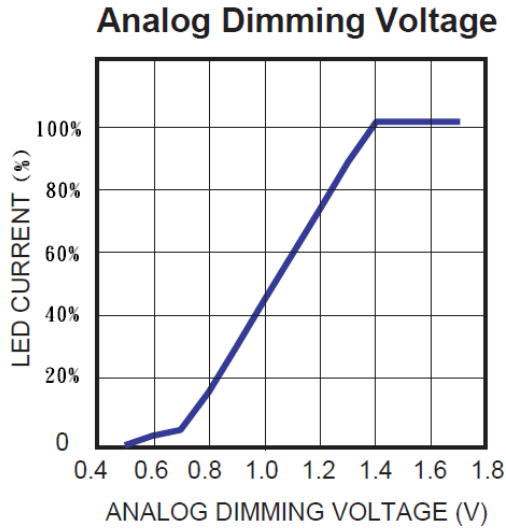
L/R=L U/D=L



L/R=H U/D=L



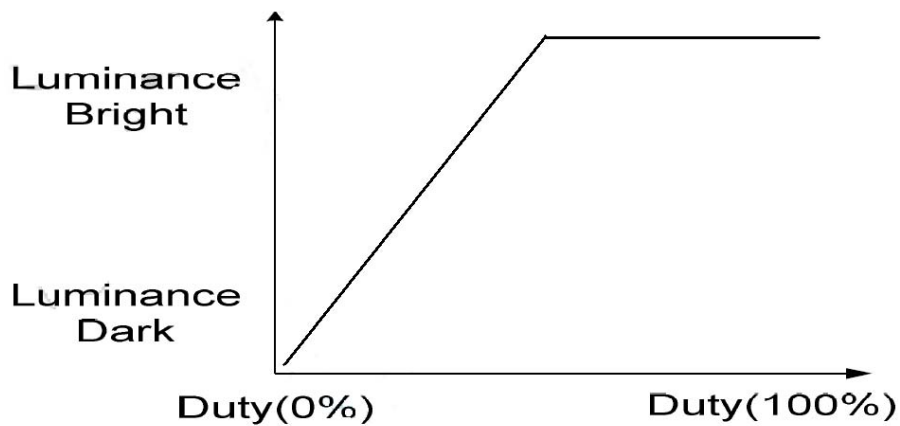
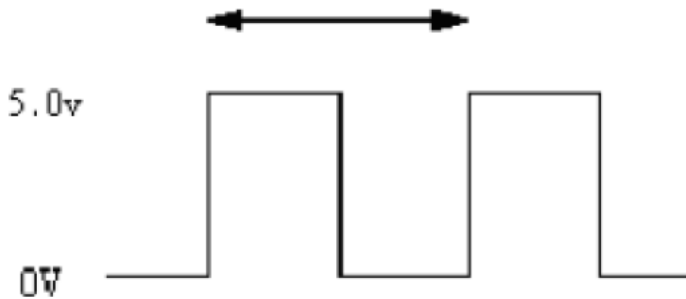
Note2: When the ADJ pin voltage rises from 0.7VDC to 1.4VDC, the LED current will change from 0% to 100% of the maximum LED current.



Note3: ADJ signal Vp-p = 1.4~5.0V ,operation frequency: 100Hz ~ 1kHz

### PWM Dimming Duty

F=1KHZ, T=1mS



## 2 Power Signal Sequence

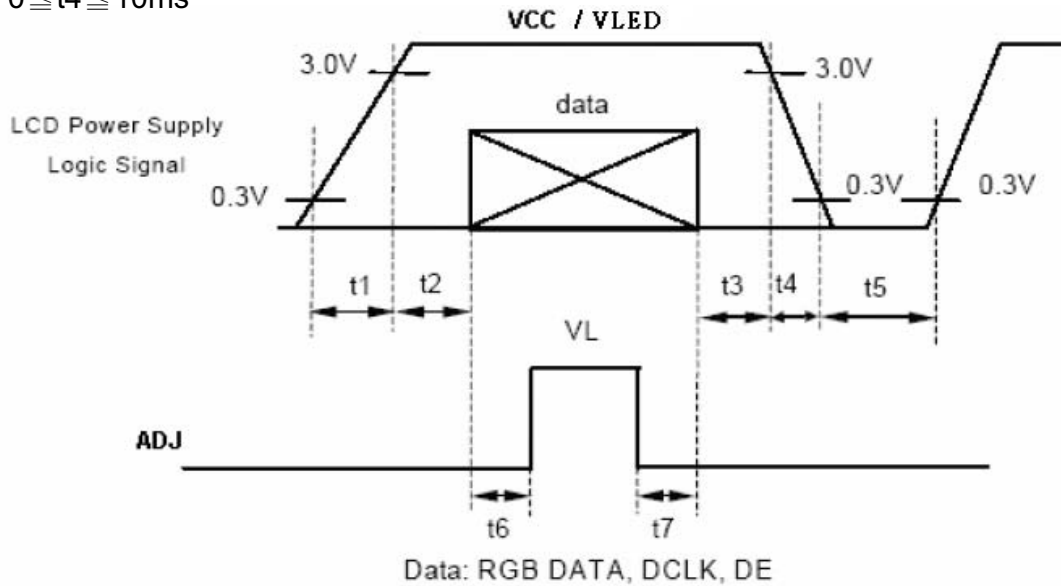
Power Signal Sequence:

$t1 \leq 10\text{ms}$  ;  $1\text{sec} \leq t5$

$200\text{ms} \leq t2$  ;  $200\text{ms} \leq t6$

$0 \leq t3 \leq 50\text{ms}$  ;  $200\text{ms} \leq t7$

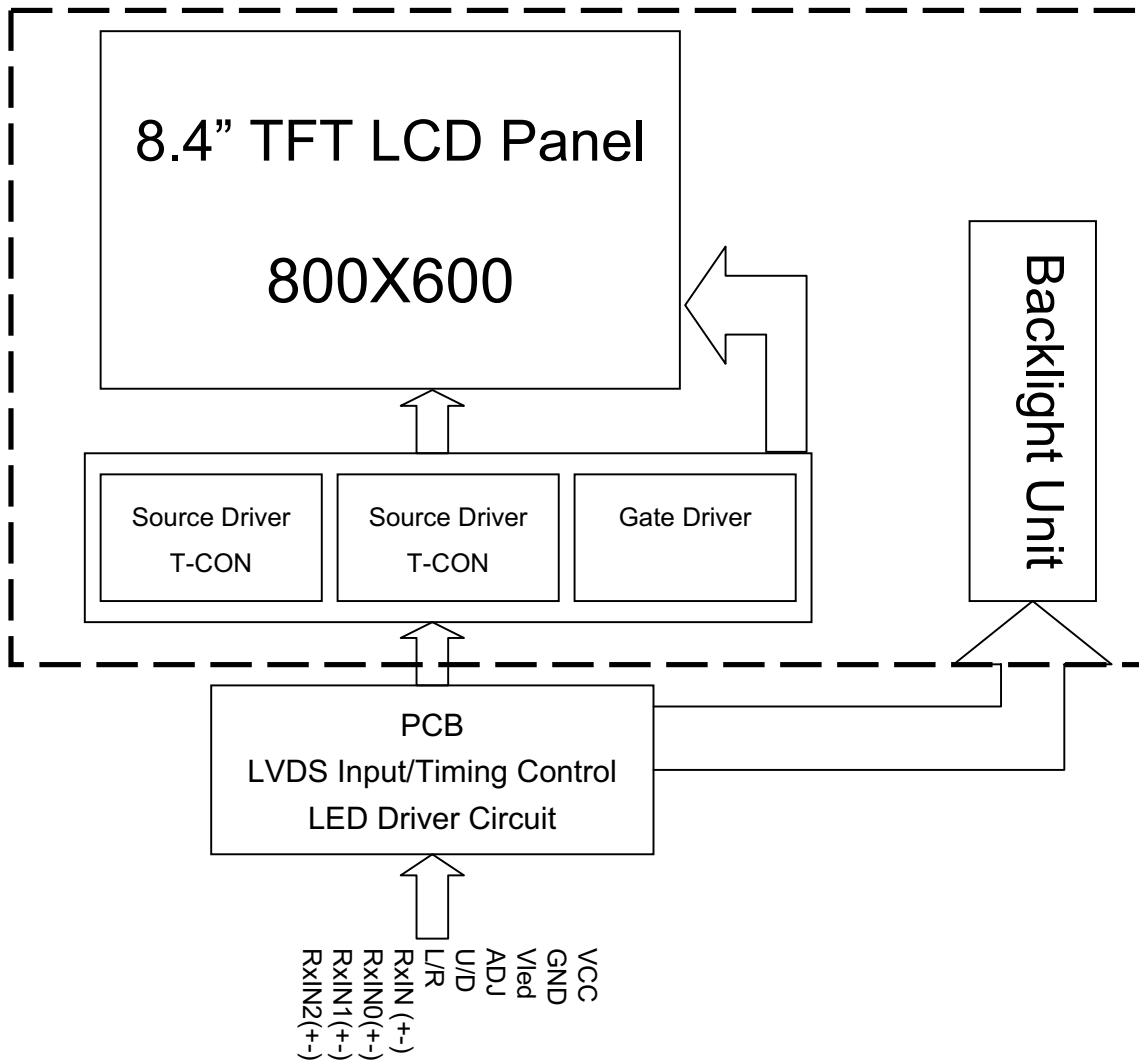
$0 \leq t4 \leq 10\text{ms}$



## 3 Touch Panel Pin Assignment

PIN No.	SIGNAL	FUNCTION	Remark
1	X2	Right	
2	Y1	Top	
3	X1	Left	
4	Y2	Bottom	

■ BLOCK DIAGRAM

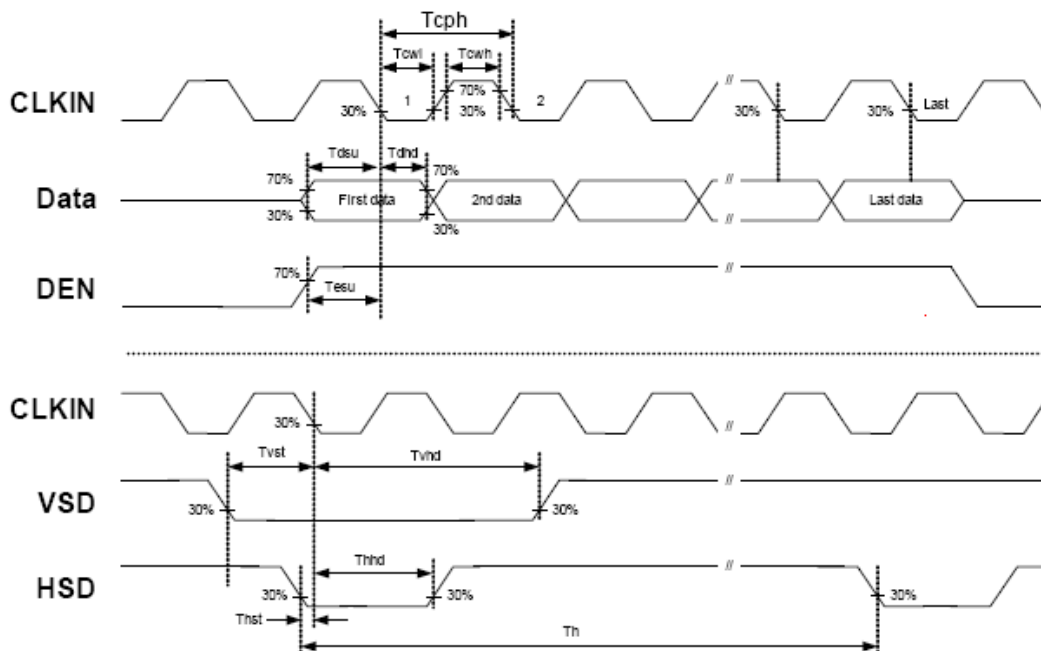


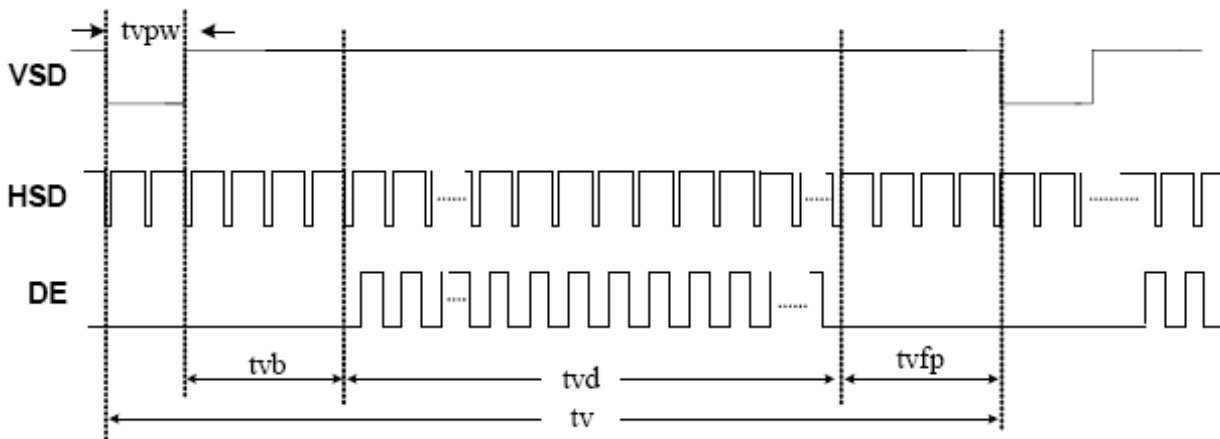
## ■ APPLICATION NOTES

### 1. INTERFACE SPECIFICATIONS

#### 1.1 Input signal characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
DCLK cycle time	Tcph	20			ns
DCLK frequency	Fclk		40	50	MHz
DCLK pulse duty	Tcwh	40	50	60	%
VSD setup time	Tvst	8			ns
VSD hold time	Tvhd	8			ns
HSD setup time	Thst	8			ns
HSD hold time	Thhd	8			ns
Data setup time	Tdsu	8			ns
Data hold time	Tdhd	8			ns
DE setup time	Tesu	8			ns
DE hold time	Tehd	8			Ns
Horizontal display area	Thd		800		Tcph
HSD period time	Th		1000		Tcph
HSD pulse width	Thpw	1	48		Tcph
HSD back porch	Thb		40		Tcph
HSD front porch	Thfp		112		Tcph
Vertical display area	Tvd		600		th
VSD period time	Tv		660		th
VSD pulse width	Tvpw		3		th
VSD back porch	Tvb		36		th
VSD front porch	tvfp		21		th





## ■ TOUCH PANEL CHARACTERISTICS

### 1. Input Method and Activation Force

Input Method	Activation Force
0.8mm dia. Delrin Polyacetal stylus	5~50gf Max.
8.0mm dia. Silicon "finger"	80gf Max.

### 2. Typical Optical Characteristics

ITEM	Parameter
Visible Light Transmission	82%typ.
Haze	5%typ.

### 3. Electrical Specification

ITEM	Parameter
Operating Voltage	DC 7V Max
Circuit close resistance	X 300~1000Ω Y 100~600Ω
Circuit open resistance	20MΩ min at 25V DC
Linear Test	≤1.5%

### 4. Linearity

ITEM	Parameter
Linear Test Specification Direction	X ≤1.5% Y ≤1.5%

### 5. Specification

ITEM	Parameter
Operating Temperature	-5°C~+60°C
Storage Temperature	-20°C~+70°C

**6. Durability test:**

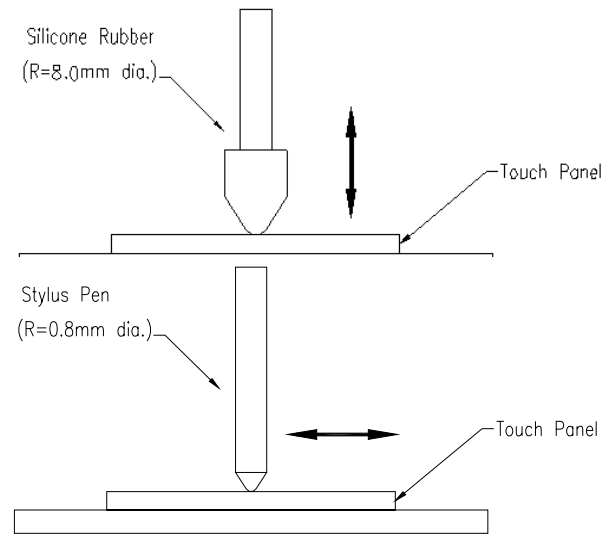
6.1 Touch panel is hit 1 millions times with a silicone rubber of R8 finger, hitting rate is by 200g at 2 times per second. The measurement must satisfy the following:

- Circuit close resistance: x300~1000Ω ; y 100~600Ω
- Circuit open resistance: 20MΩ min at 25V DC
- Linearity test: ≤3%

6.2 Stylus writing

Touch panel is drawn by R0.8 Darling stylus pen, at 250g forces, repeat one inch by 100k times. The measurement must satisfy the following:


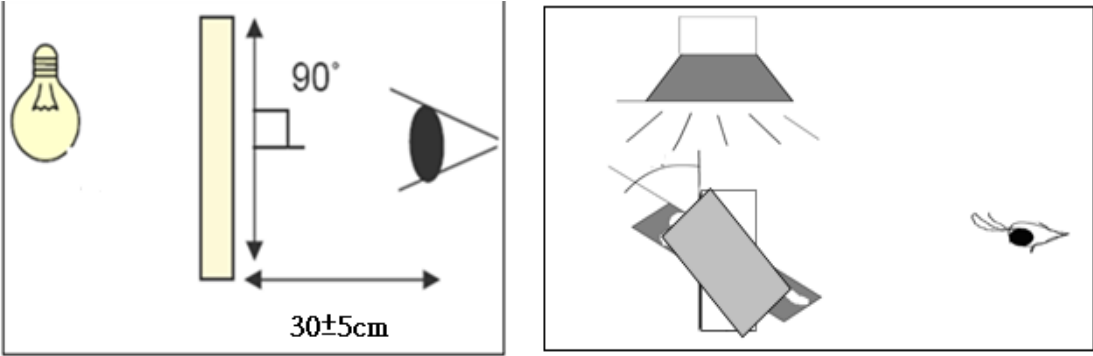
- Circuit close resistance: x 390~1350Ω ; y 100~800Ω
- Circuit open resistance: 20MΩ min at 25V DC
- Linearity test: ≤3%



**■ RELIABILITY TEST**


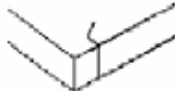
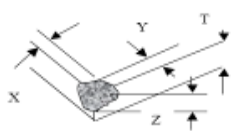
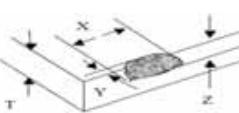
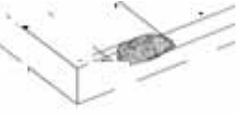
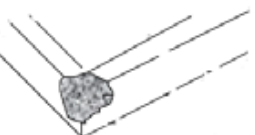

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	70 ± 2 °C / 240 hours	IEC68-2-2
2	Low Temperature Storage	-20 ± 2 °C / 240 hours	IEC68-2-1
3	High Temperature Operating	60 ± 2 °C / 240 hours	IEC68-2-2
4	Low Temperature Operating	-5 ± 2 °C / 240 hours	IEC68-2-1
5	Temperature Cycle	-20 ± 2 °C ~ 25 ~ 70 ± 2 °C × 100cycles (30min.) (5min.) (30min.)	IEC68-2-14
6	Damp Proof Test	40 °C ± 5 °C × 90%RH / 240 hours	IEC68-2-3

## ■ INSPECTION CRITERION

	OUTGOING QUALITY STANDARD	PAGE 1 OF 3						
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA								
This specification is made to be used as the standard acceptance/rejection criteria for Wider Screen TFT-LCD module product.								
<b>1. Sample plan</b>								
Sampling plan according to GB/T2828.1-2003/ISO 2859-1 : 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:								
Major defect: AQL 0.65								
Minor defect: AQL 1.5								
<b>2. Inspection condition</b>								
1.1 Inspection conditions								
1.1.1 Inspection Distance : $35 \pm 5\text{cm}$								
1.1.2 View Angle :								
(1) Inspection that light pervious to the product: $90 \pm 15^\circ$								
(2) Inspection that light reflects on the product: $90 \pm 15^\circ$								
								
1.1.3 Environment conditions :								
<table border="1"> <tr> <td data-bbox="320 1514 767 1547">Ambient Temperature :</td> <td data-bbox="767 1514 979 1547">25±5℃</td> </tr> <tr> <td data-bbox="320 1559 767 1592">Ambient Humidity :</td> <td data-bbox="767 1559 979 1592">30~75%RH</td> </tr> <tr> <td data-bbox="320 1603 767 1637">Ambient Illumination</td> <td data-bbox="767 1603 979 1637">600~800 lux</td> </tr> </table>			Ambient Temperature :	25±5℃	Ambient Humidity :	30~75%RH	Ambient Illumination	600~800 lux
Ambient Temperature :	25±5℃							
Ambient Humidity :	30~75%RH							
Ambient Illumination	600~800 lux							



		<p>OUTGOING QUALITY STANDARD</p>	<p>PAGE 2 OF 3</p>
<p>TITLE:FUNCTIONAL TEST &amp; INSPECTION CRITERIA</p>			
<p><b>3. Inspection parameters</b>          Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness)</p>			
Inspection item	Inspection standard		Description
Foreign material in dot shape	SPEC (unit: mm)	Acceptable	<p>D = (L + W) / 2</p>
	$D \leq 0.5$	Ignored	
	$0.5 < D \leq 0.8$ , distance >5	$n \leq 3$	
	$D > 0.8$	0	
Foreign material in line shape	SPEC	Acceptable	<p>L : Long W : Width</p>
	$W \leq 0.05$ and $L \leq 7$	Ignored	
	$0.05 < W \leq 0.08$ , $L \leq 7$ , distance >5	$n \leq 3$	
	$W > 0.08$ or $L > 7$	0	
Contamination	It is acceptable if the dirt can be wiped.		
Scratch	SPEC	Acceptable	
	$W \leq 0.05$ and $L \leq 7$	Ignored	
	$0.05 < W \leq 0.08$ , $L \leq 7$ , distance >5	$n \leq 3$	
	$0.08 < W \leq 0.1$ , $L \leq 7$ , distance >5	$n \leq 2$	
	$W > 0.1$ or $L > 7$	0	
Inspection item	SPEC		Description
Bubble	SPEC (unit: mm)	Acceptable	<p>D = (L + W) / 2</p>
	$D \leq 0.2$	Ignored	
	Non visible area	Ignored	
	$0.2 < D \leq 0.3$ , distance >5	$n \leq 3$	
	$D > 0.3$	0	

 OUTGOING QUALITY STANDARD		PAGE 3 OF 3		
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA				
Cover & Sensor Crack	Prohibited			
Cover angle missing	SPEC (unit: mm)	Acceptable		
	Side/Bottom	Ignored		
	It is prohibited if the defect appears on the front.			0
Inspection item	SPEC		Description	
Cover edge break	SPEC (unit: mm)	Acceptable		
	$X \leq 2.0, Y \leq 2.0, Z \leq T$	Ignored		
	$X > 2.0, Y > 2.0, Z > T$	0		
Sensor angle missing/edge break	SPEC (unit: mm)	Acceptable	 	
	Damage circuit or function.			0
	It can be seen from the front of cover visible area.			0
Sensor flange	SPEC (unit: mm)	Acceptable		
	Do not affect assembly.			Ignored
Ink	SPEC (unit: mm)	Acceptable		
	word unclear, inverted, mistake, break line			0
Bubble under protection film	SPEC (unit: mm)	Acceptable		
	NA			
Function	Prohibited			

## ■ PRECAUTIONS FOR USING LCD MODULES

### Handing 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.

**Handling precaution for LCM**

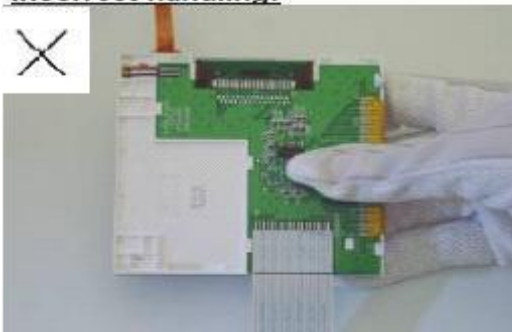
LCM is easy to be damaged.  
Please note below and be careful for handling!

**Correct handling:**



As above picture, please handle with anti-static gloves around LCM edges.

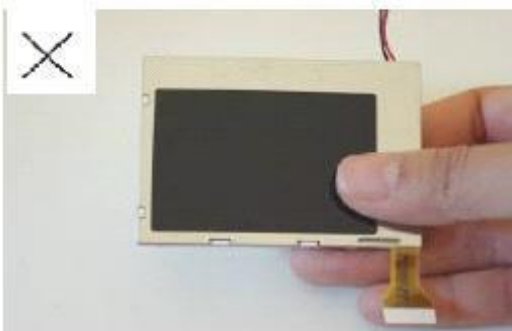
**Incorrect handling:**



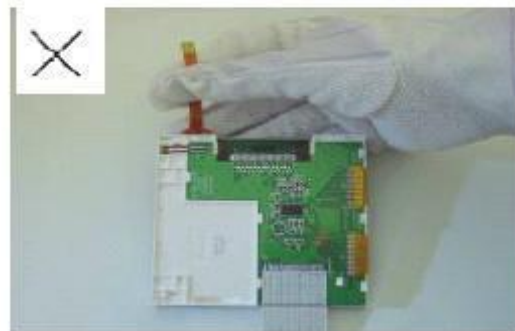
Please don't touch IC directly.



Please don't stack LCM.



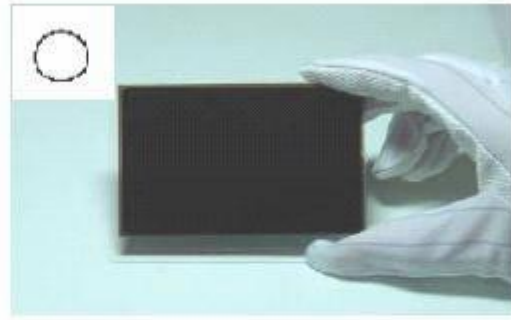
Please don't hold the surface of panel.



Please don't stretch interface of output, such as FPC cable.

**Handling precaution for LCD**

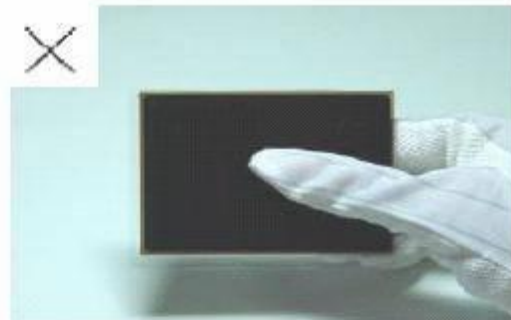
LCD is easy to be damaged.  
Please note below and be careful for handling!

**Correct handling:**

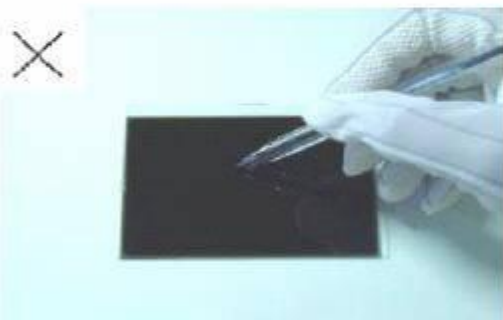
As above photo, please handle with anti-static gloves around LCD edges.

**Incorrect handling:**

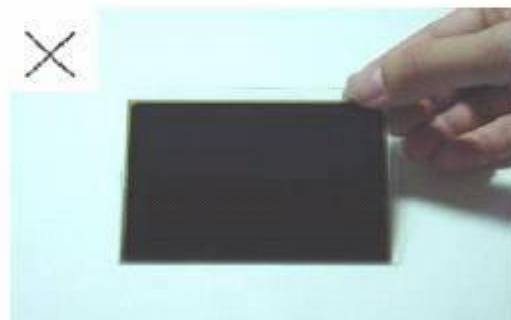
Please don't stack the LCDS.



Please don't hold the surface of LCD.



Please don't operate with sharp stick such as pens.



Please don't touch ITO glass without anti-static gloves.

### 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, and keep the relative humidity between 40%RH and 60%RH.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the anti-static electricity 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.

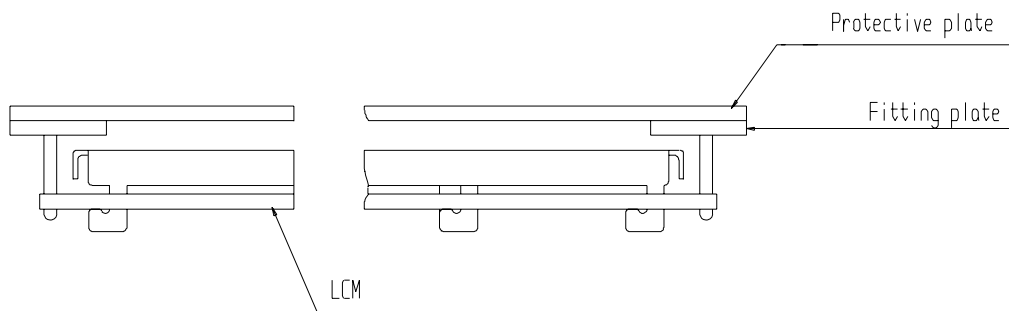
- Exposed area of the printed circuit board.
- Terminal electrode sections.

### 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.

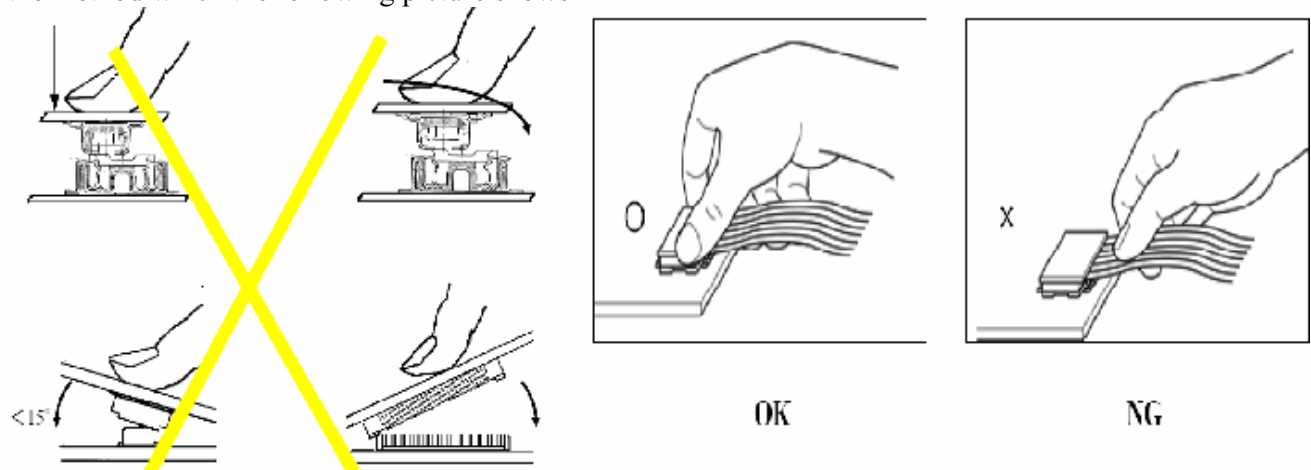
- (1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



- (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  $\pm 0.1$ 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 then the limit cause 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.

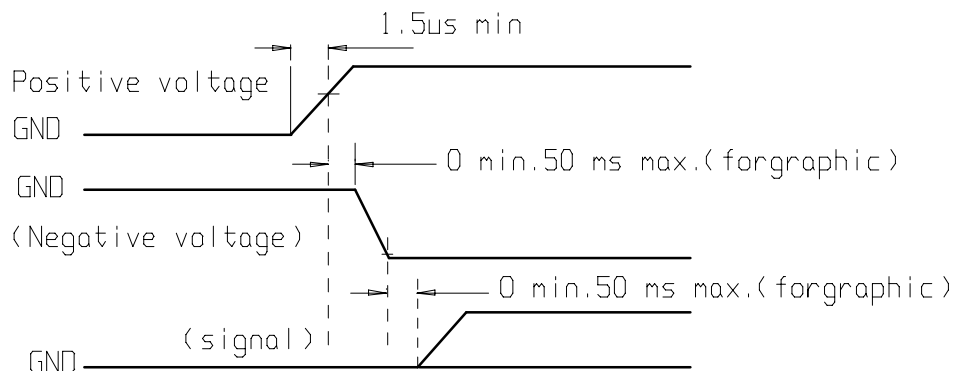
(3) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, Which will come back in the specified operating 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 Multi-Inno and customer, Multi-Inno will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with Multi-Inno LCD acceptance standards (copies available upon request) for a period of one year from date of production. Cosmetic/visual defects must be returned to Multi-Inno within 90 days of shipment. Confirmation of such date shall be based on data code on product. The warranty liability of Multi-Inno limited to repair and/or replacement on the terms set forth above. Multi-Inno 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.

**■ PRIOR CONSULT MATTER**

1. ① For Multi-Inno standard products, we keep the right to change material, process ... for improving the product property without notice on our customer.  
② For 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.