

NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LKBA7T461M4_

SPEC. NO.: LM461-4-~~2~~

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
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EDITED ON : MAY.31, 2005

Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER
			J.P Weng

[illegible]

Diagram illustrating the naming convention for the LKBA7T461M4:

The model number is broken down into its components:

- LKBA**: Back Light
- 7**: B : CCFL Back Light
- T**: Reflective/Transmissive
- 4**: T : Transmission
- 61**: Mode/View Angle
- M**: M : For 6 O'clock Color STN Module
- 4**: Option
- 4**: 4 : Version
- 4**: T : Sample

2.ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

GND=0V

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	7.0	V	
Power Supply for LC Drive	VEE-VSS	-0.3	36.0	V	
Input Voltage	VI	-0.3	VDD+0.3	V	
Static Electricity	-	-	-	-	Note 1

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	-20	70
Humidity (Without Condensation)	Note 2,4		Note 3,4	

Note 2 Ta ≤ 50°C : 80%RH max

Note 3 Ta at -20°C will be < 120hrs, at 70°C will be < 120hrs

Note 4 Background color will change slightly depending on ambient temperature.
That phenomenon is reversible.

3-1. ELECTRICAL CHARACTERISTICS

LCD

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply		VDD-VSS	Ta= 25°C		3.0	3.3	3.6	V
Input Voltage		VIH	H level		0.8VDD	—	VDD	V
		VIL	L level		0	—	0.2VDD	
Recommended LCD Driving Voltage		VEE-VSS (Vop)	Duty=1/320 (Bias=1/17)	0°C	30.2	30.6	31.0	V
				25°C	29.9	30.3	30.7	
				50°C	29.6	30.0	30.4	
Power Supply Current		IDD	VDD-VSS = 3.3V VEE-VSS = 30.3V Ta= 25°C		—	0.56	1.0	mA
		IEE	PATTERN: □ ■ □ ■ □ ■ □ ■ ■ □ ■ □ ■ □ ■ □		—	4.5	6.8	
LCM	Surface Luminance	L	$I_L=3mA_{rms}$	PATTERN: (Dots All On of White Color)	60	165	—	cd/m ²
				PATTERN: (Dots All Off)	—	10	15	

3-2.ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used CCFL Rating

Temp.=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Lamp voltage	V _L	—	236	—	Vrms	—
Lamp current	I _L	2.5	3.0	6	mA _{rms}	—
Lamp power consumption	P _L	—	708	—	mW	(*1)
Starting voltage	V _S	—	—	640	Vrms	At 25°C
	V _S	—	—	680	Vrms	At 0°C
Lamp frequency	F _L	40	55	80	KHz	—
Lamp life time	L _L	40000	—	—	hrs	I _L = 3 mA _{rms} (*2)
CCFL Luminance	L	1200	—	—	cd/m ²	I _L = 3 mA _{rms}

(*1) Power consumption excluded inverter loss .

(*2) Lamp life time is defined as follows : The final brightness is at 50% of original brightness .

3-3.CHARACTERISTICS OF TOUCH SCREEN

Used Touch screen Rating

Temp.=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Applied Rating Voltage	V_R	—	—	—	7.0	V
Operating Temperature	T_{OPR}	20%~85% R.H. Max. Avoid Dew Condensation at Any Time	0	—	50	°C
Storage Temperature	T_{STO}		-20	—	70	
Resistance of Terminal Electrodes	R_{ETD}	X Electrode	200	—	800	Ω
		Y Electrode	200	—	800	
Linearity	L	—	—	—	1.5	%
Insulation Resistance	R_{OFF}	$V_{DC} = 25V$	20	—	—	M Ω
Transparency	T	According to JIS-K7015	82	85	—	%
Surface Hardness	S_H	According to JIS-K5400	3	—	—	H

Test condition : Touch screen is placed horizontally in a vessel and no power is supplied to T/P.
Normal state is temperature : $25 \pm 10^\circ\text{C}$, relative humidity : $60 \pm 25^\circ\text{C}$

3-4.RECOMMENDED INVERTER : Cotek INV-191 (Brightness Adjustable)

3-4-1 GENERAL SPECIFICATIONS

3.4.1 OPERATION TEMPERATURE : -10°C~50°C

3.4.2 STORAGE TEMPERATURE : -20°C~85°C

3.4.3 DIMENSION : 95.0(L)mm x 20.0(W)mm x MAX 9.4(H)mm

3.4.4 PIN ASSIGNMENTS

INPUT (CN1) CONNECTOR :
JST : S4B-ZR-SM3A-TF

OUTPUT (CN2) CONNECTOR :
JST : SM02B-BHSS-1-TB

NO.	SIGNAL
1	Vin
2	Gnd
3	Vrmt
4	Vctrl

NO.	SIGNAL
1	HVOUT1
2	RTN

3-4-2 INPUT CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
Input Voltage	Vin	10.8	12	13.2	V	
Input Current	Iin	-	200	240	mA	RL = 100KΩ, Vin = 12V
Input Power	Pin	-	2.5	3.0	W	RL = 100KΩ, Vin = 12V
Standby Standby Input Current	Iin Standby	-	0.1	1.0	μA	OFF state
Control Terminal Input Voltage	Vrmt	2 -0.5	2.7 0	12 0.4	V V	ON state OFF state
Control Terminal Input Current	Irmt	- -	0.5 -	1.0 -0.3	mA μA	Vrmt = 5V Vrmt = 0V

3-4-3 RELATIONSHIP BETWEEN VDIM & TUBE CURRENT

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
Vctrl Input Voltage	Vctrl	3.0	1.8	0	V	
Tube Current	IL	0.6	3.0	6.0	mA	

Note : Inverter must be used in the range of Vctrl Input Voltage.
If it doesn't used in this range, the electrical characteristics
of backlight would not be to guarantee.

4.OPTICAL CHARACTERISTICS

4-1 Optical Characteristics of LCD

AT Vop

ITEM MODE		Cr(Contrast Ratio)						θ (Viewing Angle)		ϕ (Viewing Angle)	
		0°C		25°C		50°C		25°C		25°C	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
T	M	10.5	13.5	16	20	7	10	—	83	—	±35
note		NOTE 6						NOTE 5			

NOTE :

T: TRANSMISSION

M: FOR 6 O'CLOCK COLOR STN MODULE

AT $\phi=0^\circ$ $\theta=0^\circ$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0°C	800	1000	1200	ms	NOTE 2
		25°C	340	420	500		
		50°C	270	340	410		
Response Time (fall)	Tf	0°C	360	450	540	ms	NOTE 2
		25°C	130	160	190		
		50°C	70	90	110		

$$T_a = 25^{\circ}\text{C}$$

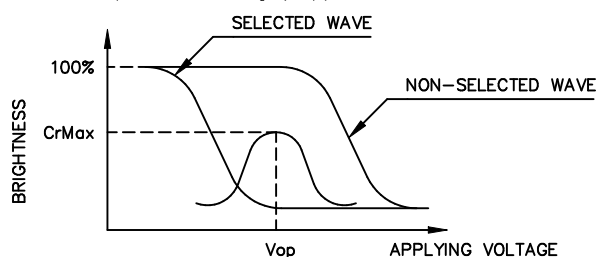
ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	$\phi=0^\circ$, $\theta=0^\circ$	0.474	Note※
		y		0.311	
	Green	X		0.281	
		y		0.499	
	Blue	X		0.164	
		y		0.151	
	White	X		0.302	
		y		0.336	

Tolerance : ± 0.05

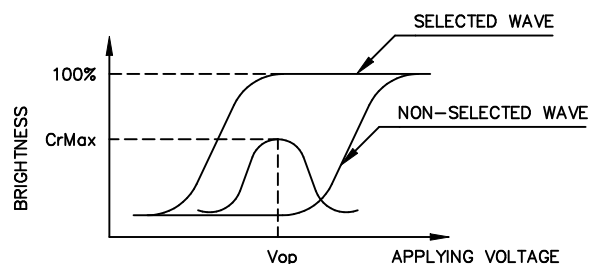
A coordinate plane with x and y axes ranging from 0 to 0.9. The grid lines are spaced at intervals of 0.1. A triangle BGR is plotted with vertices B at (0.15, 0.15), G at (0.28, 0.5), and R at (0.48, 0.32). A point W is located at (0.3, 0.34).

(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



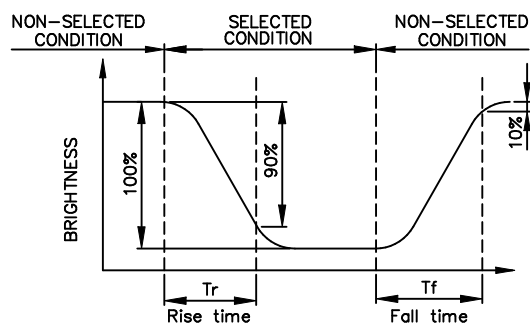
(negative type)

*Conditions

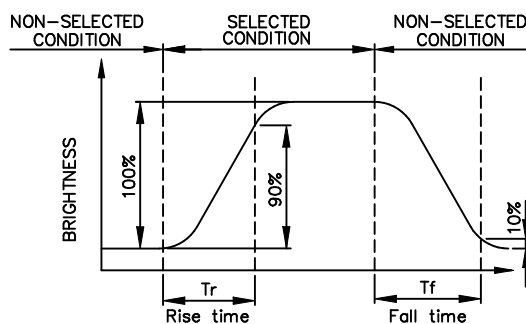
Viewing Angle : 0
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



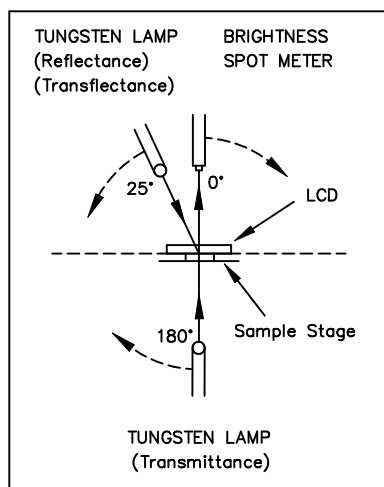
(negative type)

*Conditions

Operating Voltage : Vop
Viewing Angle (θ, θ) : (0,0)
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

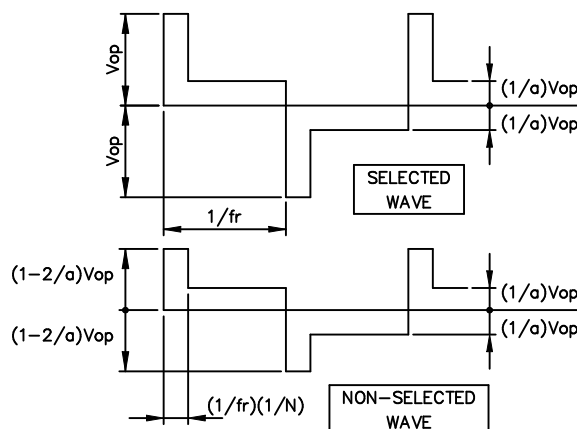
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



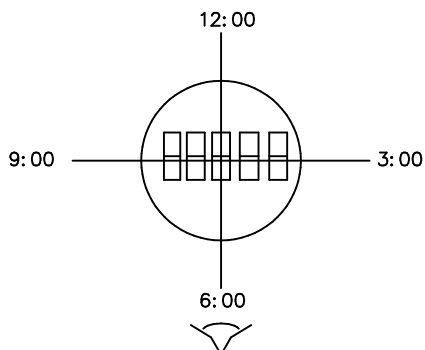
CONST.
TEMP.
CHAMBER

Multiplex Driving (1/N duty 1/a bias)



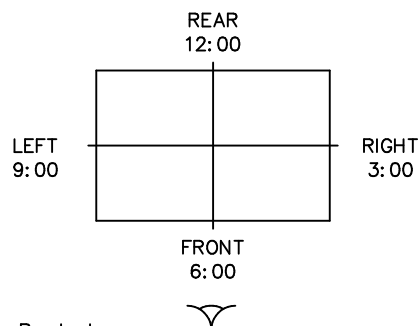
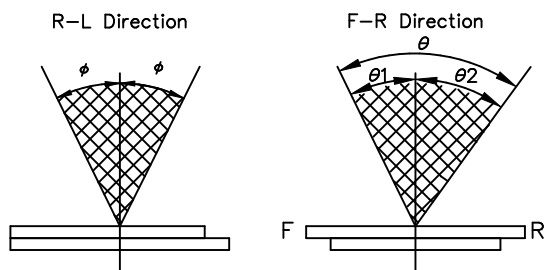
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



*For This Product
The Viewing Direction Is 6 O'clock
So $\theta_1 > \theta_2$

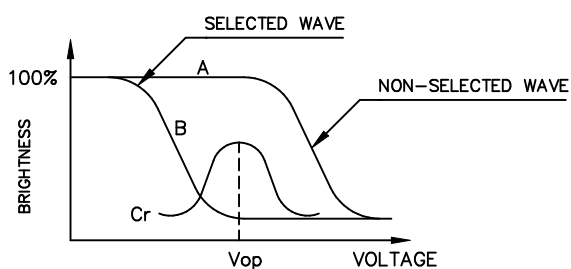
$$\theta = \theta_1 + \theta_2$$

*Conditions

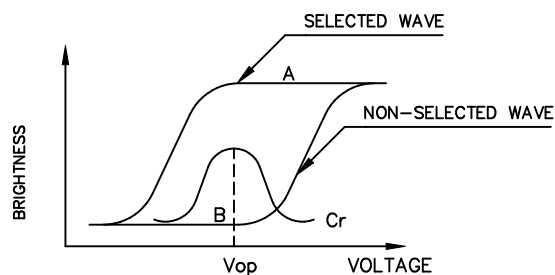
Operating Voltage : V_{op}
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



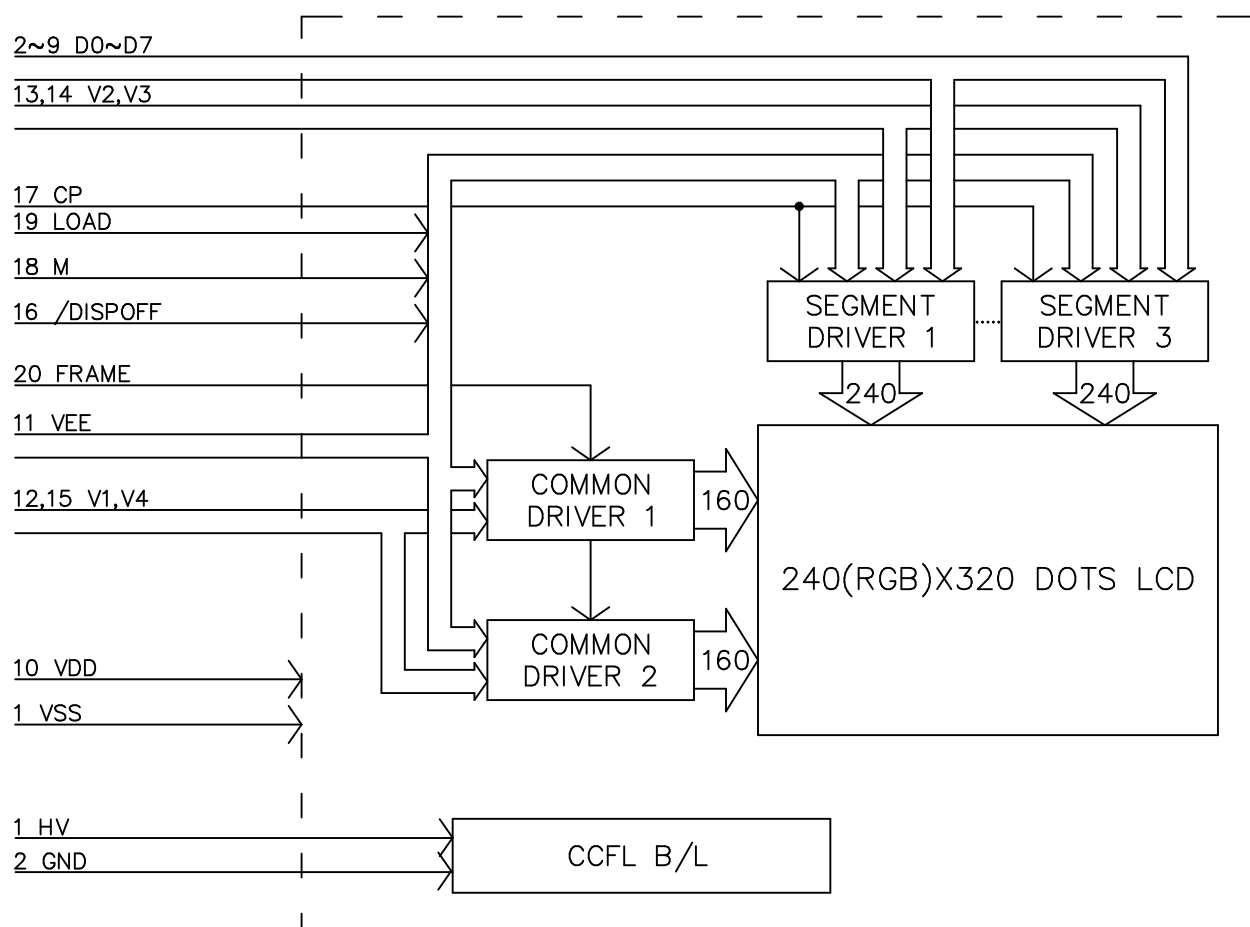
(negative type)

$$\text{Contrast Ratio : } Cr = A/B$$

*Conditions

Viewing Angle : 0
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

5. BLOCK DIAGRAM



Note :

- 1) Controller and bias voltage supply circuit are not included.
- 2) VEE, V1, V2, V3, V4 and VSS are power supply voltage for LCD.
(VEE > V1 > V2 > V3 > V4 > VSS)

6.INTERNAL PIN CONNECTION

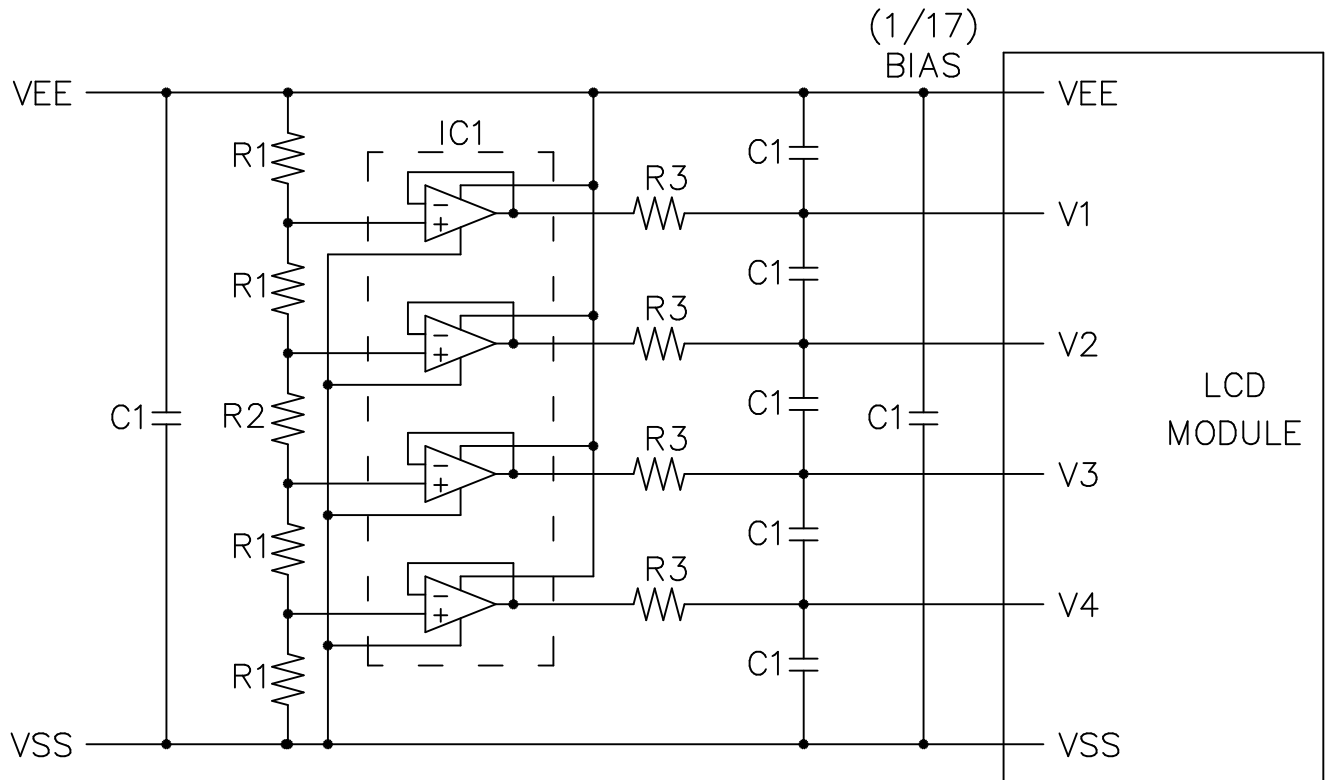
CN1 : (FPC) PITCH 0.5mm WIDTH 10.5mm

PIN NO.	SYMBOL	FUNCTION
1	VSS	Power Supply for Logic (GND) Power Supply for LCD (COM/SEG Selected Level)
2	D0	DISPLAY DATA
3	D1	DISPLAY DATA
4	D2	DISPLAY DATA
5	D3	DISPLAY DATA
6	D4	DISPLAY DATA
7	D5	DISPLAY DATA
8	D6	DISPLAY DATA
9	D7	DISPLAY DATA
10	VDD	Power Supply for Logic
11	VEE	Power Supply for LCD (COM/SEG Selected Level)
12	V1	Power Supply for LCD (COM Non-Selected Level)
13	V2	Power Supply for LCD (SEG Non-Selected Level)
14	V3	Power Supply for LCD (SEG Non-Selected Level)
15	V4	Power Supply for LCD (COM Non-Selected Level)
16	$\overline{\text{DISPOFF}}$	Display Control L:off H:on
17	CP	Display Data Shift Clock
18	M	AC Signal for LC
19	LOAD	Display Data Latch Clock
20	FRAME	FRAME CLOCK

CN2 : BHSR-02VS-1(JST) (PIN1-HOT;PIN2-GND)

1	H.V.	Power Supply Voltage for CCFL
2	GND	CCFL GND

7. POWER SUPPLY



IC1 : LP324M(NATIONAL SEMICONDUCTOR)
R1 : 2.2(KOHM) $\pm$ 1%, R2 : 28.2(KOHM) $\pm$ 1%,
R3 : 0~4.7(OHM) $\pm$ 1%
C1 : 2.2-4.7(uF)

Note : These are general values.

In case to decrease LCD driving voltage with minimizing bias value, set these values with check display to avoid display's deterioration (response etc).

8. TIMING CHARACTERISTICS

8-1. INTERFACE TIMING

@ VDD=3.0V±10%, Ta=-20~70 °C

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
CP Cycle Time	tC	Fig.a	82	—	—	ns
CP Pulse Width	tSWH,tSWL	Fig.a	28	—	—	ns
CP Rise/Fall Time	tCR,tCF	Fig.a	—	—	50	ns
Data Set Up Time	tDSU	Fig.a , Fig.b	100	—	—	ns
Data Hold Time	tDHD	Fig.a , Fig.b	30	—	—	ns
LOAD Cycle Time	tL	Fig.b	250	—	—	ns
LOAD "H" Pulse Width	tLWH	Fig.a , Fig.b	100	—	—	ns
LOAD Rise/Fall Time	tLR,tLF	Fig.b	—	—	30	ns
CP To LOAD Delay Time	tCL	Fig.a	30	—	—	ns
LOAD To CP Delay Time	tLC	Fig.a	—	—	200	ns
FRAME TO LOAD SETUP TIME	tFLS	Fig.b	30	—	—	ns
FRAME TO LOAD HOLD TIME	tFLH	Fig.b	50	—	—	ns

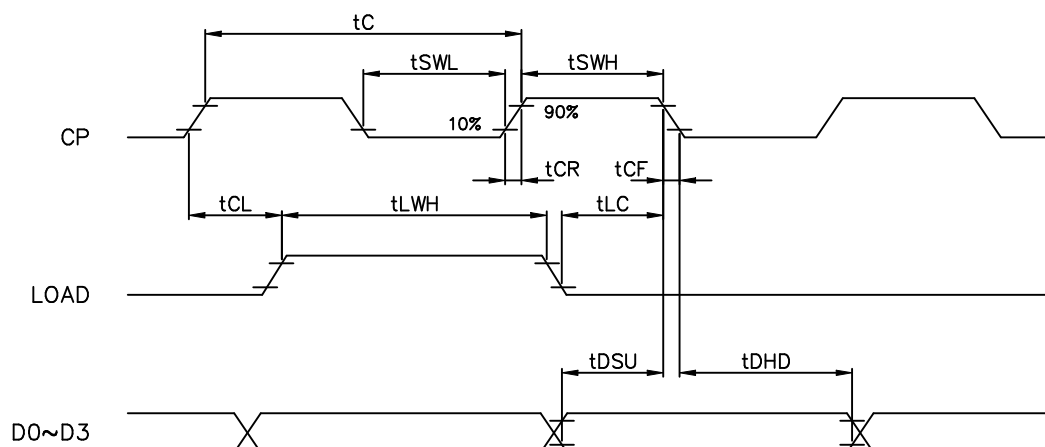


Fig . a Interface timing (SEGMENT)

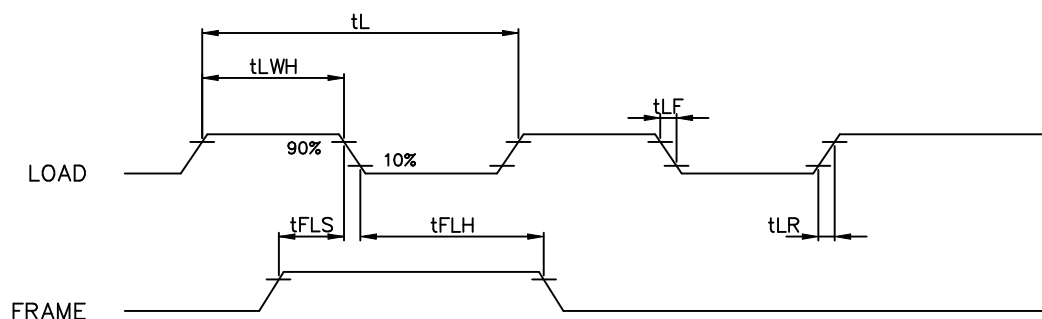
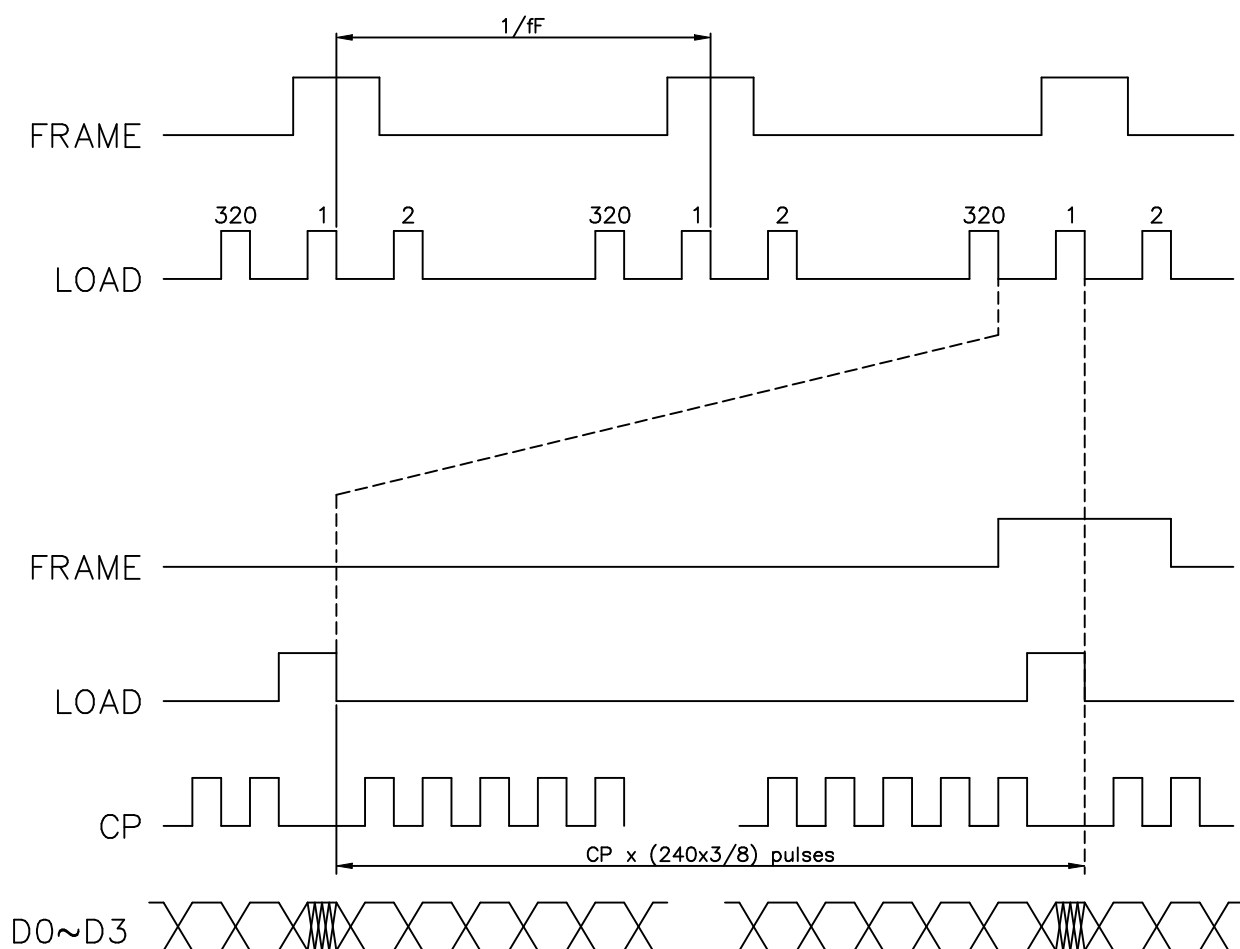
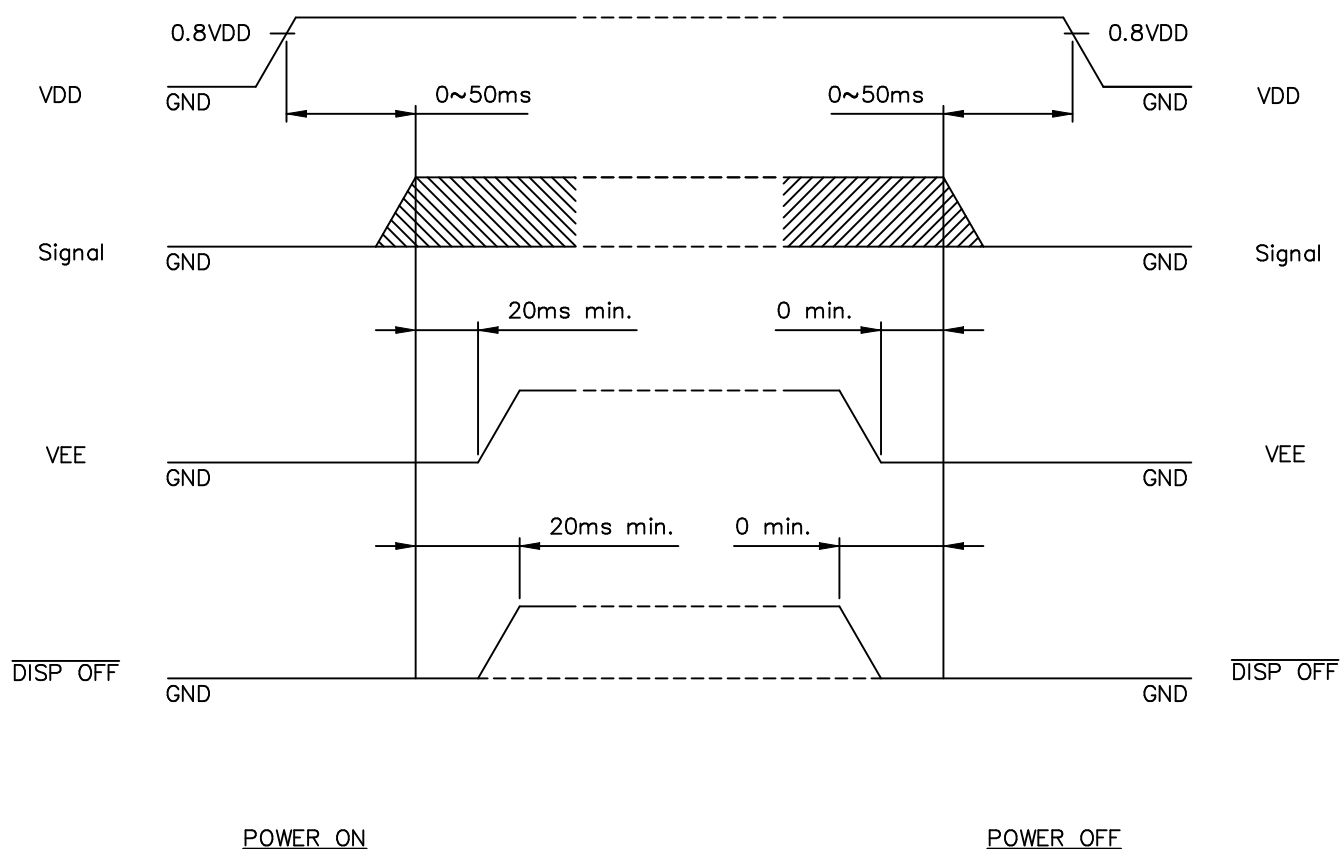


Fig . b Interface timing (COMMON)

8-2. TIMING CHART OF INPUT SIGNAL

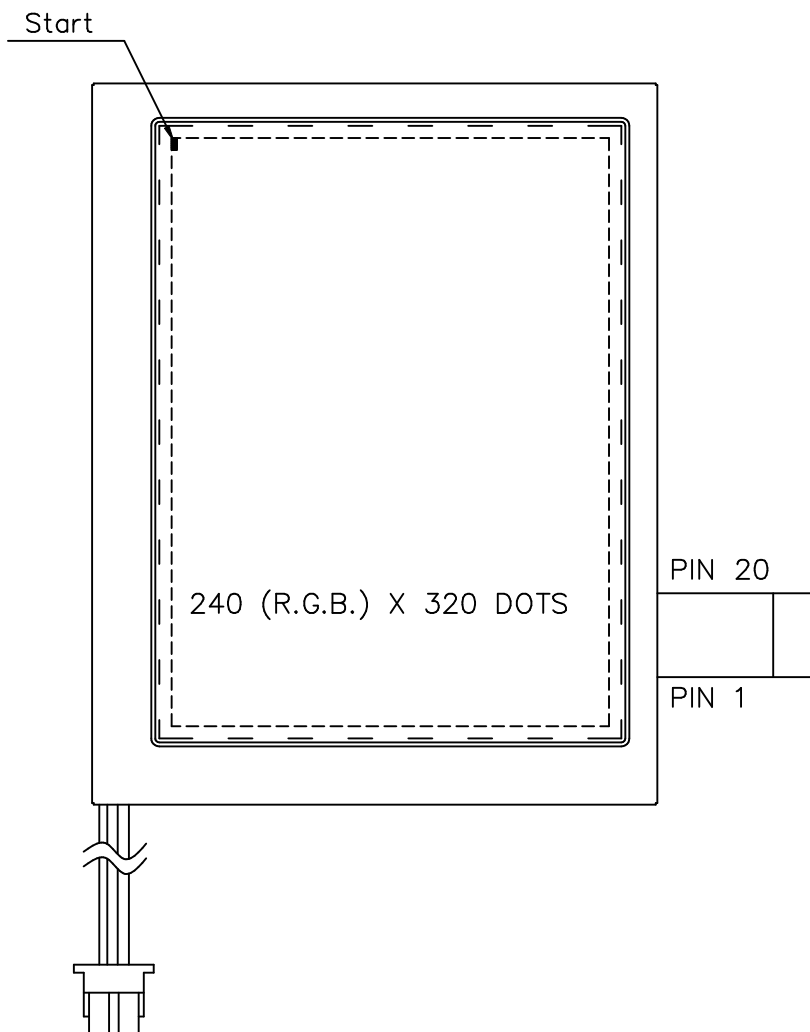
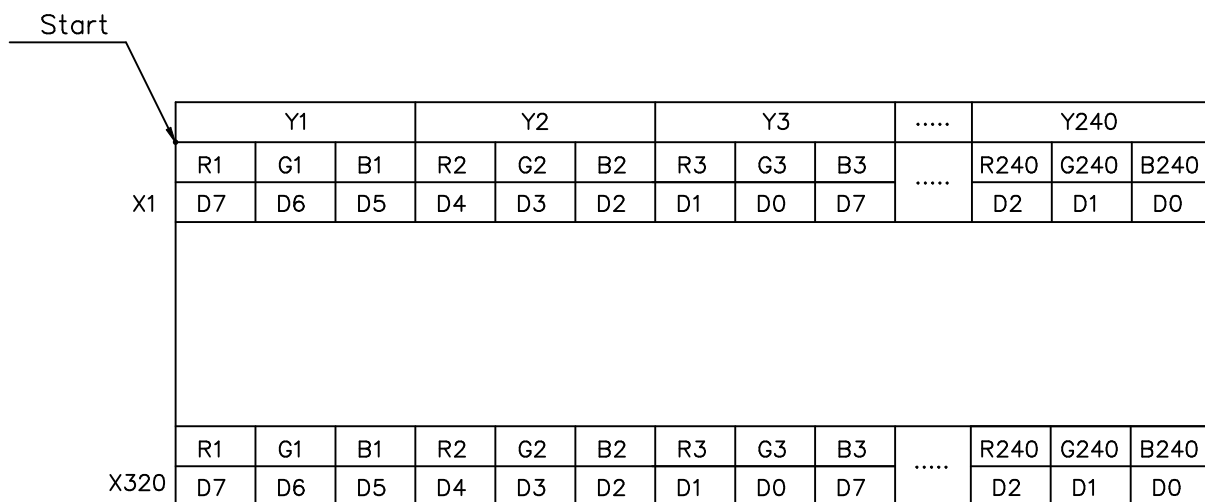


8-3.POWER ON/OFF TIMING



The missing pixels may occur when the LCM is driven beyond above power ON/OFF timing sequence.

8-4.DISPLAY PATTERN



9.RELIABILITY TEST

NORMAL TEMPERATURE RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	70°C	120Hrs		Appearance without defect	
2	Low Temp. Storage	-20°C	120Hrs		Appearance without defect	
3	High Temp. & High Humi. Storage	50°C 90%RH	120Hrs		Appearance without defect	
4	High Temp. Operating Display	50°C	120Hrs		Appearance without defect	
5	Low Temp. Operating Display	0°C	120Hrs		Appearance without defect	
6	Thermal Shock	-20°C,30min → 70°C,30min ↑ (1cycle)			Appearance without defect	10 cycles
7	Vibration test (with package)	5G ,sine , (10~250~10) Hz ,3 dir , 20 mins/dir(60 mins total) at 25°C				A,B
8	Drop test (with package)	Free Falling Hight : 70 cm x,y,z Direction				A,B

A. There shall be no deformation which can affect performance

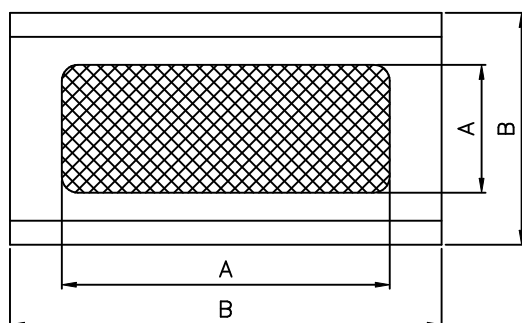
B. The specification shall be met.

	Dimensions	External from Dimensions	0.4	
Minor Defect	Inside the glass	Black spots	0.65	faults which appear to pose almost no obstacle to the practicality, effective use, and operation.
	Polarizing plate	Scratches, foreign Matter, air bubbles, and peeling		
	Dots	Pinhole, deformation		
	Color tone	Color unevenness		
	Solder appearance	Cold solder Solder projections		

4-3 Inspection Provisions

*Viewing Area Definition

Fig. 1



A : Zone Viewing Area
B : Zone Glass Plate Out Line

*Inspection place to be 500 to 1000 lux illuminance uniformly without glaring.

The distance between luminous source(daylight fluorescent lamp and cool white fluorescent lamp) and a sample to be 30cm to 50cm.

SPECIFICATION

*Test and measurement are performed under the following conditions, unless otherwise specified.

Temperature 20± 15°C
Humidity 65± 20%R.H..
Pressure 860~1060hPa(mmbar)

In case of doubtful judgment, it is performed under the following conditions.

Temperature 20± 2°C
Humidity 65± 5%R.H..
Pressure 860~1060hPa(mmbar)

5.Specification for quality check 5-1 Electrical characteristics

NO.	Item	Criterion
1.	Non operational	Fail
2.	Miss operating	Fail
3.	Missing dot	Fail
4.	Contrast irregular	Fail
5.	Response time	Within Specified value
6.	Tablet contact resistance	Within Specified value
7.	Tablet input load	Within Specified value
8.	Tablet lineality	Within Specified value
9.	CCFL backligh turn on/off	Within Specified value

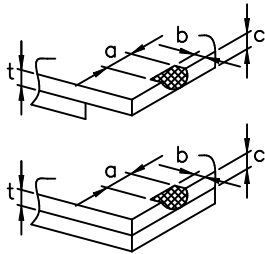
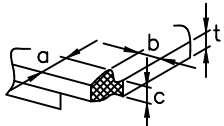
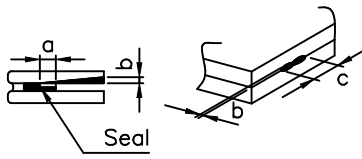
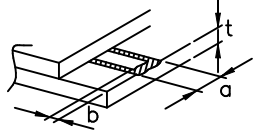
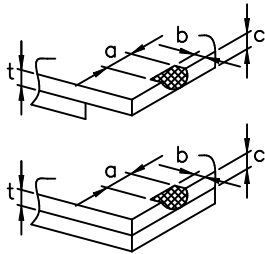
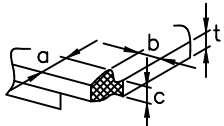
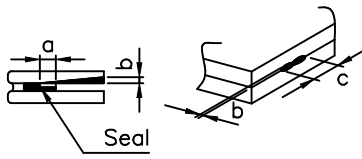
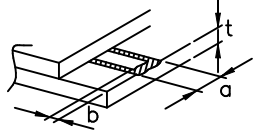
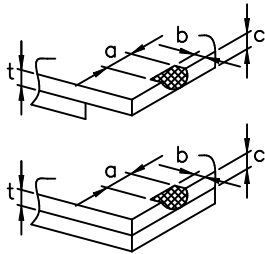
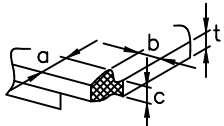
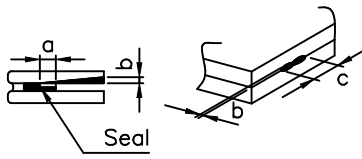
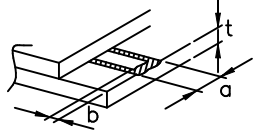
5-2 External Appearance Defect

NO.	Item	Criterion																		
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	(1)–1–Spots <table><tr><th>Average Diameter(mm):D</th><th>Number of pieces permitted</th></tr><tr><td>$D\leq0.1$</td><td>Ignore</td></tr><tr><td>$0.1<D\leq0.2$</td><td>5</td></tr><tr><td>$0.2<D\leq0.3$</td><td>2</td></tr><tr><td>$0.3<D$</td><td>0</td></tr></table> Number of total pieces is set to within 5 pieces. Note that when there are 2 pieces or more, they are not to be concentrated. Set as: Average diameter = (Long diameter + Short diameter)/2 (1)–2–Blurred Spots(At lighting condition) <table><tr><th>Average Diameter(mm):D</th><th>Number of pieces permitted</th></tr><tr><td>$D\leq0.3$</td><td>Ignore</td></tr><tr><td>$0.3<D\leq0.75$</td><td>5</td></tr><tr><td>$0.75<D$</td><td>0</td></tr></table> Number of total pieces is set to within 5 pieces. Note that when there are 2 pieces or more, they are not to be concentrated. Set as: Average diameter = (Long diameter + Short diameter)/2	Average Diameter(mm):D	Number of pieces permitted	$D\leq0.1$	Ignore	$0.1<D\leq0.2$	5	$0.2<D\leq0.3$	2	$0.3<D$	0	Average Diameter(mm):D	Number of pieces permitted	$D\leq0.3$	Ignore	$0.3<D\leq0.75$	5	$0.75<D$	0
Average Diameter(mm):D	Number of pieces permitted																			
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SPECIFICATION

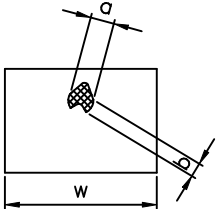
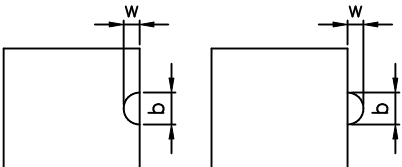
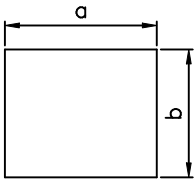
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	(1)-1-Spots <table border="1" data-bbox="730 427 1474 712"> <thead> <tr> <th>Width(mm): W</th><th>Length(mm):L</th><th>Number of pieces permitted</th></tr> </thead> <tbody> <tr> <td>$W \leq 0.03$</td><td>Ignore</td><td>Ignore</td></tr> <tr> <td>$0.03 < W \leq 0.08$</td><td>$L \leq 4$</td><td>2</td></tr> <tr> <td>$0.08 < W \leq 0.1$</td><td>$L \leq 1$</td><td>1</td></tr> </tbody> </table> Object exceeding 0.1mm follow the standards of the spots form. Note that when there are 2 pieces or more, they are not to be concentrated. (1)-2-Blurred Spots(At lighting condition) <table border="1" data-bbox="730 1019 1474 1303"> <thead> <tr> <th>Width(mm): W</th><th>Length(mm):L</th><th>Number of pieces permitted</th></tr> </thead> <tbody> <tr> <td>$W \leq 0.03$</td><td>Ignore</td><td>Ignore</td></tr> <tr> <td>$0.03 < W \leq 0.08$</td><td>$L \leq 3$</td><td>6</td></tr> <tr> <td>$0.08 < W$</td><td>$3 < L$</td><td>None</td></tr> </tbody> </table> Object exceeding 0.1mm follow the standards of the spots form. Note that when there are 2 pieces or more, they are not to be concentrated.	Width(mm): W	Length(mm):L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 4$	2	$0.08 < W \leq 0.1$	$L \leq 1$	1	Width(mm): W	Length(mm):L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 3$	6	$0.08 < W$	$3 < L$	None
Width(mm): W	Length(mm):L	Number of pieces permitted																								
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$0.08 < W$	$3 < L$	None																								
2.	Scratches(Glass, reflection plates, and polarizing plates)	In accordance with black spots. (At non lighting condition)																								
3.	Color irregular	Not remarkable color irregular.																								

SPECIFICATION

4.	Air bubbles polarizing plates, and reflection plates	<table><tr><td>Average Diameter (mm): D</td><td>Number of pieces permitted</td><td rowspan="2">Average diameter = (Long diameter + Short diameter)/2</td></tr><tr><td>$D \leq 0.3$ $0.3 < D$</td><td>Ignore 0</td></tr></table> Note that when there are 4 pieces or more, they are not to be concentrated.	Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2	$D \leq 0.3$ $0.3 < D$	Ignore 0										
Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2															
$D \leq 0.3$ $0.3 < D$	Ignore 0																
5.	Cracks	<table><tr><td>(1)General crack</td><td></td><td>$a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces.</td></tr><tr><td>(2)Corner crack</td><td></td><td>$a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$</td></tr><tr><td>(3)Seal portion crack</td><td></td><td>$a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$ The numbers of pieces are set at up to 5 pieces.</td></tr><tr><td>(4)ITO Pin crack</td><td></td><td>$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$</td></tr><tr><td>(5)Progressive cracks</td><td colspan="2">All taken to be unacceptable.</td></tr></table>	(1)General crack		$a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces.	(2)Corner crack		$a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$	(3)Seal portion crack		$a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$ The numbers of pieces are set at up to 5 pieces.	(4)ITO Pin crack		$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$	(5)Progressive cracks	All taken to be unacceptable.	
(1)General crack		$a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces.															
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(5)Progressive cracks	All taken to be unacceptable.																

6.	Outer dimensions	Should be with in the tolerance.
7.	Newton ring	Orbicular of interference fringes. To be non.
8.	Soldering	Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mouting position, etc.

5-3 Dot Appearance Defect

NO.	Item	Criteria
1.	Pinhole	 Dot display a and b are each $\leq 0.2\text{mm}$ The overall total is taken be with in 10 units. Note that they are not to be concentrated.
2.	Missing	 Dot display a and b are each $\leq 0.2\text{mm}$ The overall total is taken to be with in 10 units.
3.	Thick and thin display	 Taken to be within $\pm 1.5\%$ of display character width(a) and height(b).

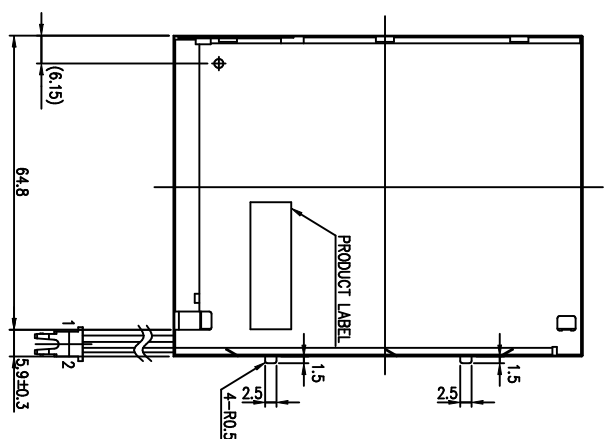
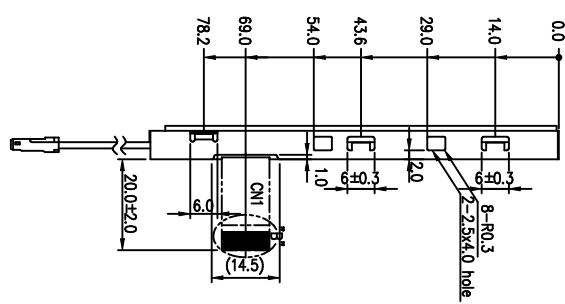
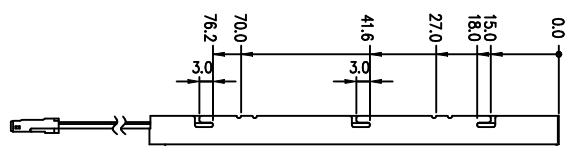
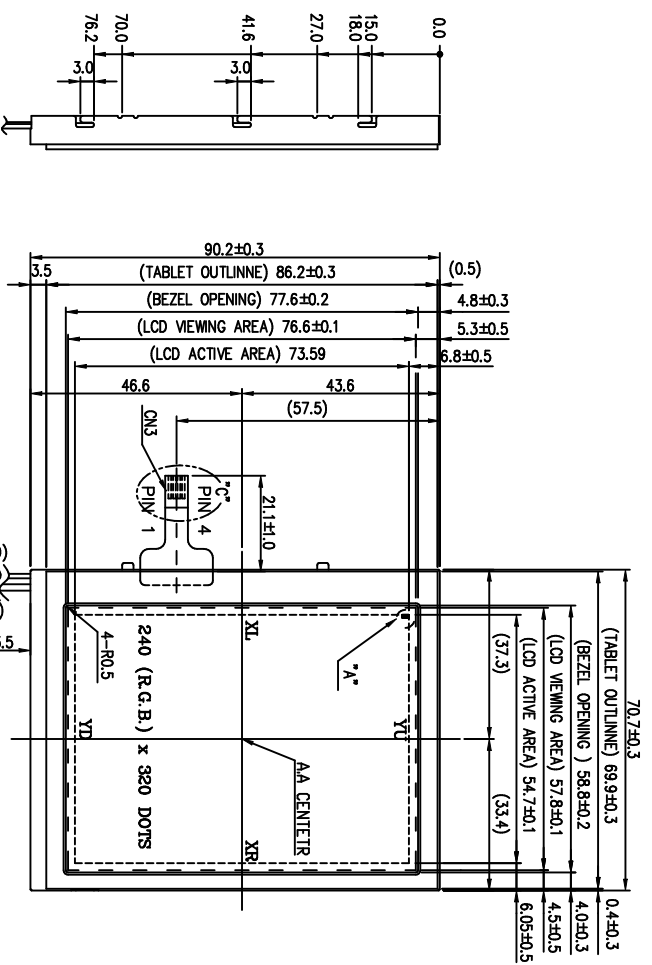
- SAFETY

- HANDLING

- STORAGE

- TERMS OF WARRANT

1. Acceptance inspection period
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
2. Applicable warrant period
The period is within twelve months since the date of shipping out under normal using and storage conditions.

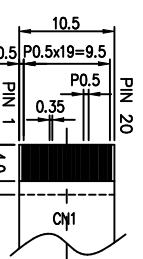
[illegible]

DISPLAY PATTERN

Diagram illustrating the layout of a 3x3 grid of cells. The top row is labeled 'R', the middle row 'G', and the bottom row 'B'. The columns are labeled '0.015' and '0.215' above the first two columns. The third column is unlabeled.

DETAIL "A"

(SCALE 40:1)



DETAIL "B"

(SCALE 2:1)

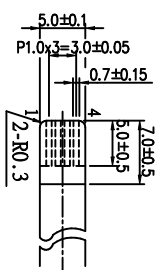
CN3 FOR TOUCH PANEL

Pin No.	Pin Name
1	XR
2	YD
3	XL
4	YU

NOTE:

1. RESOLUTION: 240 (R.G.B.) x320 DOTS
2. BACKLIGHT: CCFL
3. FRAME MATERIAL: SUS304 (0.2mmt)

DIMENSION	TOLERANCE
1.00	0.05



DETAIL "C"

(SCALE 2:1)

$L \equiv b$	± 0.25 (mm)
$6 < L \leq 18$	± 0.3 (mm)
$18 < L \leq 50$	± 0.4 (mm)
$50 < L \leq 125$	± 0.5 (mm)
$125 < L$	± 0.6 (mm)
ANGLE	$\pm 1^\circ$ (DEG)



南亞塑膠工業股份有限公司
NANYA PLASTICS CORPORATION

製品圖

LBBA7T46IM4

NAME	DATE	THIRD ANGLE P.

PIN NO	SYMBOL	FUNCTION	PIN NO	SYMBOL	FUNCTION
1	V _{SS}	POWER SUPPLY FOR LOGIC (GND)	12	V _I	POWER SUPPLY FOR I/O (COM NON-SELECTED LEVEL)
2	D0	POWER SUPPLY FOR I/O (COM/SEG SELECTED LEVEL)	13	V ₂	POWER SUPPLY FOR I/O (SEG NON-SELECTED LEVEL)
3	D1	DISPLAY DATA	14	V ₃	POWER SUPPLY FOR I/O (SEG NON-SELECTED LEVEL)
4	D2	DISPLAY DATA	15	V ₄	POWER SUPPLY FOR I/O (COM NON-SELECTED LEVEL)
5	D3	DISPLAY DATA	16	DISOFF	DISPLAY CONTROL L: OFF H: ON
6	D4	DISPLAY DATA	17	CP	DISPLAY DATA SHIFT CLOCK
7	D5	DISPLAY DATA	18	M	AC SIGNAL FOR LC
8	D6	DISPLAY DATA	19	LOAD	DISPLAY DATA LATCH CLOCK
9	D7	DISPLAY DATA	20	FRAME	FRAME CLOCK
10	V _{DD}	POWER SUPPLY FOR LOGIC	CN2 : BHSR—02VS—(JST) (PIN1—HOT; PIN2—GND)		
11	V _{EE}	POWER SUPPLY FOR I/O (COM/SEG SELECTED LEVEL)	1	H/V	POWER SUPPLY VOLTAGE FOR CCFL
			2	GND	CCFL GND

REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE	
△5						APPROVE
△4						CHECK
△3						DESIGN
△2						DRAWN
△1						

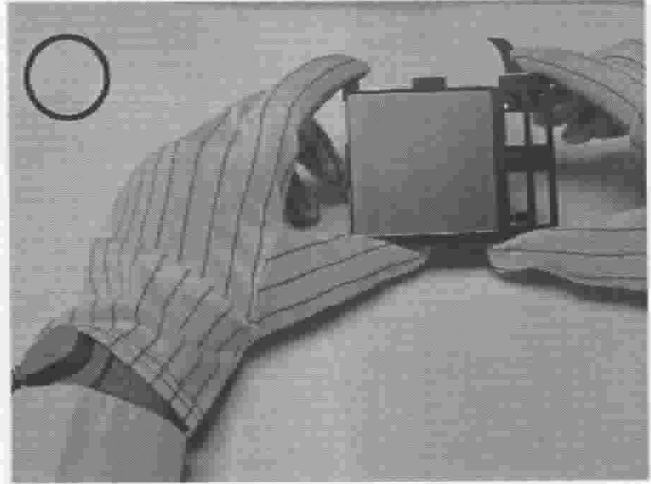
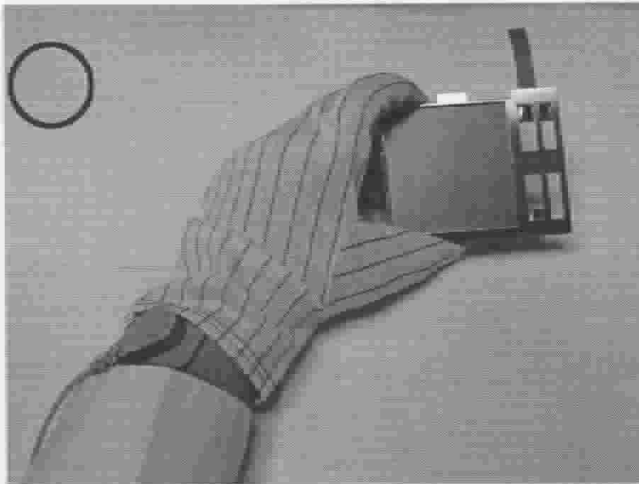
DWG NO.	M461-D4A		
		SCALE	UNIT
		1/1	mm

THE NOTES OF LCM USING

LCM is easy to damage.

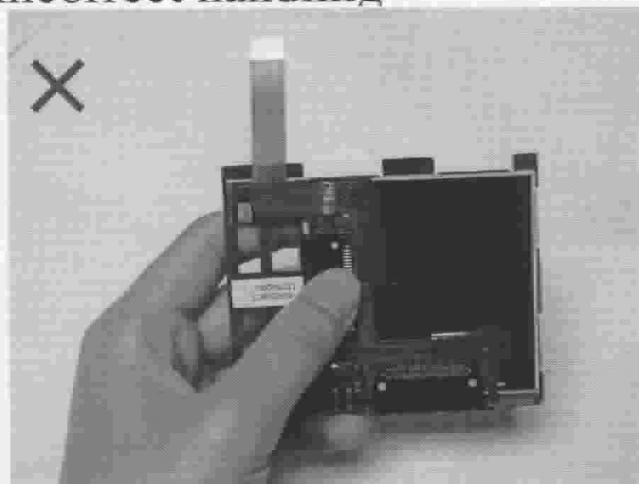
Please follow the notes as bellows, and be careful of handling!

Correct handling

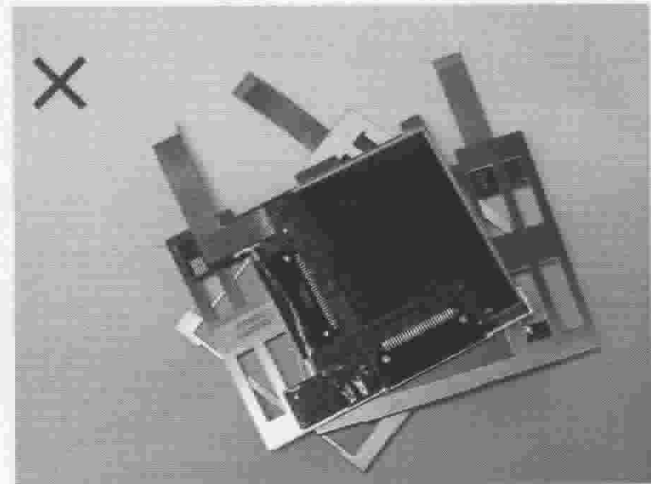


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

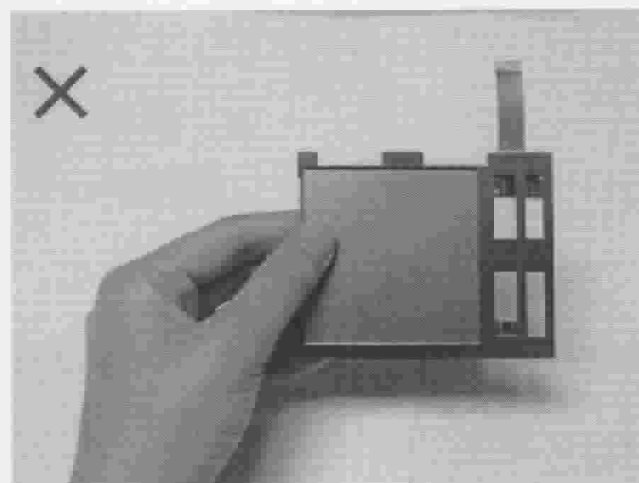
Incorrect handling



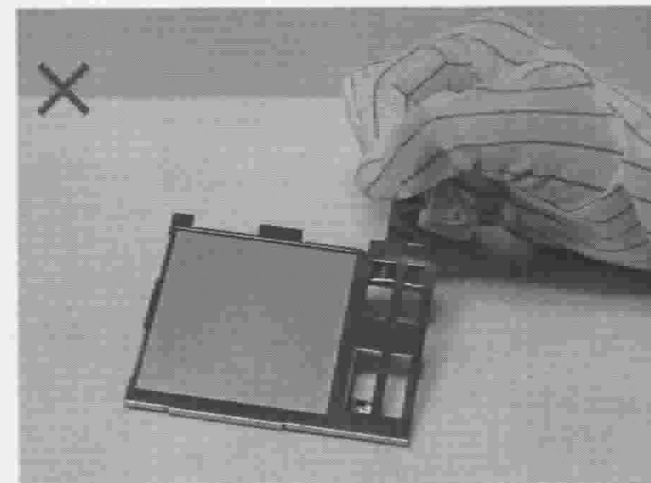
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.



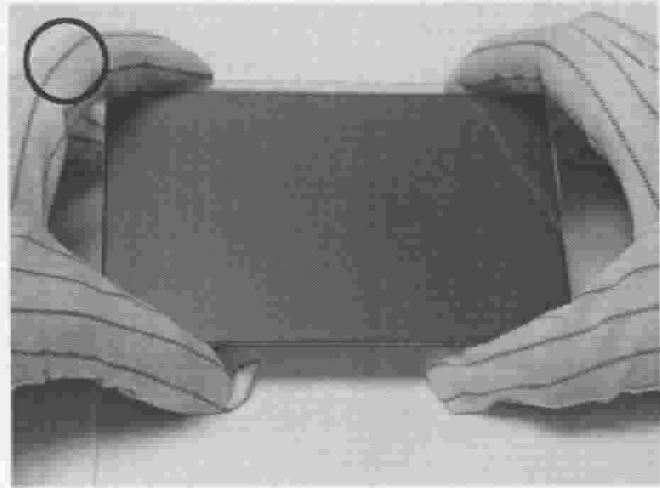
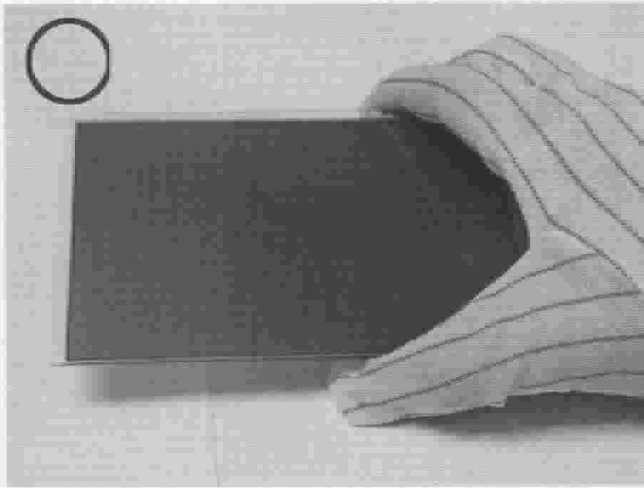
Please don't stretch interface of output.

THE NOTES OF LCD USING

LCD is easy damage.

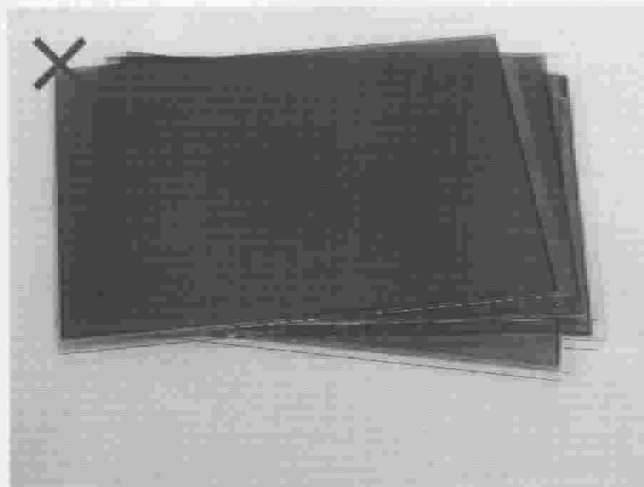
Please follow notes as bellows, and be careful of handling!

Correct handling

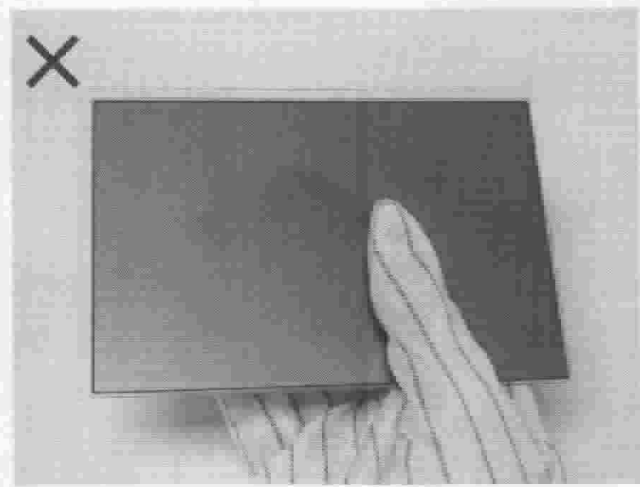


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

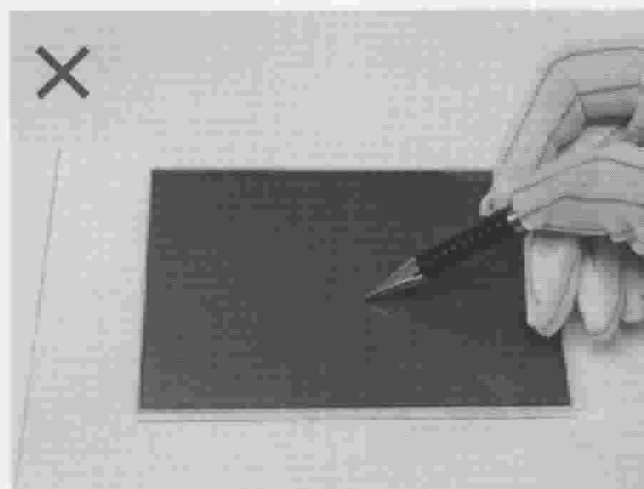
Incorrect handling



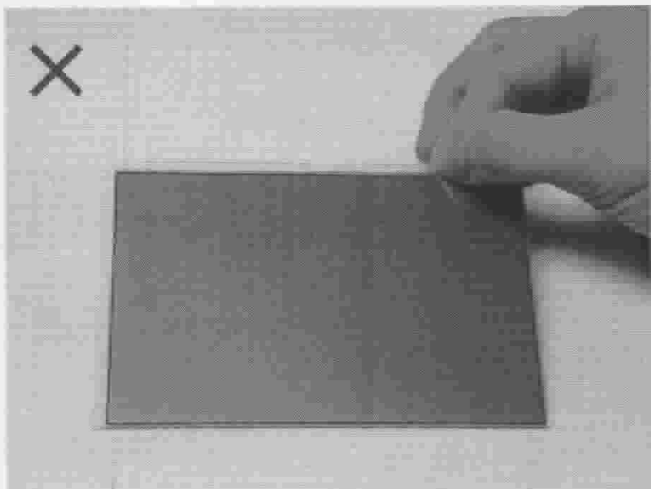
Please don't put one on another LCD.



Please don't hold the surface of LCD.



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



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

