

NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LCCA7T211M13S

SPEC. NO.: LM211-13D- \triangle 2

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
ELECTRONIC MATERIALS DIVISION
NAN YA PLASTICS CORPORATION
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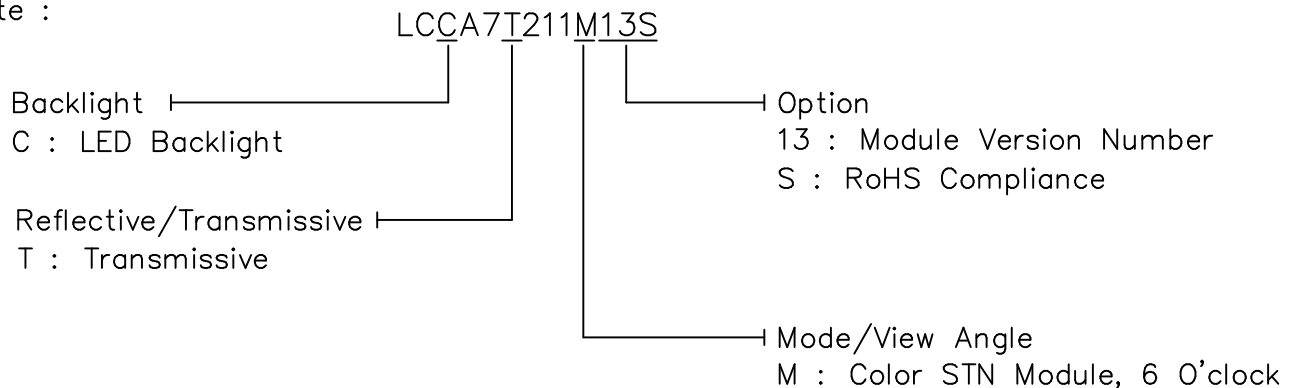
EDITED ON : Mar. 21. 2008

Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER
			W. R. HSU

1. MECHANICAL DATA

NO	ITEM	CONTENTS	UNIT
1	Product No.	LCCA7T211M13S	-
2	Module Size	76.8 (W) x 103.7 (H) x 6.9 (D)	mm
3	Dot Size	0.234 (W) x 0.068 (H)	mm
4	Dot Pitch	0.249 (W) x 0.083 (H)	mm
5	Number of Dots	240 (W) x 320 x RGB (H)	Dot
6	Duty	1/240	-
7	LCD Display Mode	FSTN, Color STN Module	-
8	Rear Polarizer	Color Transmissive Type	-
9	Viewing Direction	6	O'clock
10	Backlight	LED	-
11	Controller	Excluded	-
12	DC/DC Converter	Excluded	-
13	Touch Panel	Included	-
14	Weight	80 (Approx.)	g

Note :



RoHS Compliance.

Nan Ya guarantees that this project doesn't include any materials (6 materials) or includes less than specified quantities which are regulated by RoHS Compliance.

REV/DATE	R0/ 04.12.06'					BY W.R.HSU
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2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

VSS=0V

	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	5.5	V	
Input Voltage	VI	-0.3	VDD	V	
Static Electricity	-	-	-	-	Note 1

Note 1 LCM should be grounded during handling LCM.

(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 $T_a \leq 50^{\circ}\text{C}$: 80%RH max

Note 3 Please refer to item of reliability test

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

3. ELECTRICAL CHARACTERISTICS

3-1. ELECTRICAL CHARACTERISTICS OF LCM

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply	VDD-VSS	Ta= 25°C		3.0	3.3	3.6	V
				4.5	5.0	5.5	
Input Voltage	VIH	H level		0.8VDD	-	VDD	V
	VIL	L level		0	-	0.2VDD	V
Recommended LCD Driving Voltage	VEE-VSS (Vop)	Duty=1/240	0°C	24.6	24.9	25.2	V
			25°C	23.2	23.5	23.8	
			50°C	22.3	22.6	22.9	
Power Supply Current	IDD	VDD-VSS = 3.3V VEE-VSS = 23.5V Ta= 25°C		-	1.0	2.0	mA
	IEE	PATTERN: □ ■ □ ■ □ ■ □ ■ ■ □ ■ □ ■ □ ■ □		-	3.0	5.0	mA
	IDD	VDD-VSS = 5.0V VEE-VSS = 23.5V Ta= 25°C		-	1.0	2.0	mA
	IEE	PATTERN: □ ■ □ ■ □ ■ □ ■ ■ □ ■ □ ■ □ ■ □		-	3.0	5.0	mA
Surface Luminance of LCM	L	VAK=7.5V Pattern: Dots All ON(White)		55	70	-	cd/m ²
		VAK=7.5V Pattern: Dots All OFF(Black)		-	3	6	cd/m ²

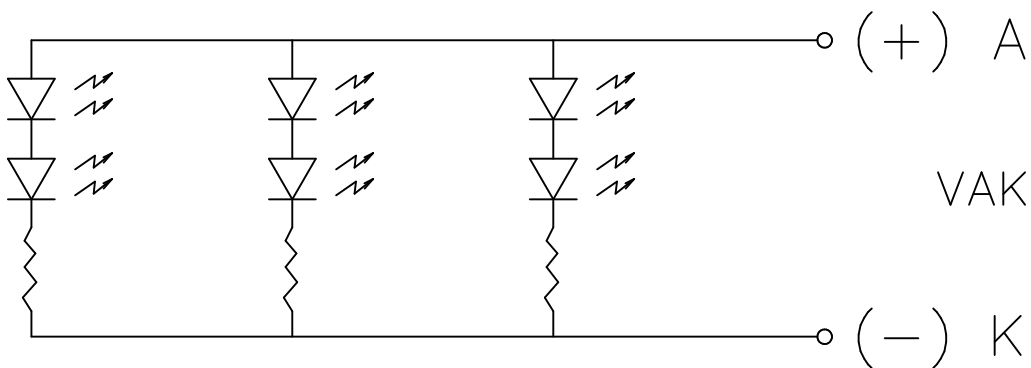
3-2.ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used LED Rating (Constant Voltage Driving)

Temp.=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Peak forward current	I_P	-	-	120	mA	-
Maximum reverse voltage	V_R	-	-	5	V	-
Applied forward voltage	V_{AK}	-	7.5	-	V	-
Applied forward current	I_{AK}	-	-	60	mA	-
LED power consumption	P_F	-	-	0.45	W	-
LED life time	L_L	10000	-	-	hrs	at $V_{AK} = 7.5$ V (*1)

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



3-3.CHARACTERISTICS OF TOUCH PANEL

Used Touch Panel 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	180	330	700	Ω
		Y Electrode	300	550	1000	
Linearity	L	—	—	—	1.5	%
Insulation Resistance	R_{OFF}	$V_{DC}=25V$	20	—	—	MΩ
Transparency	T	According to JIS-K7105	—	80	—	%
Surface Hardness	S_H	According to JIS-K5600	3	—	—	H

Test condition : Touch panel 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 : $60\pm 25\%$

4. OPTICAL CHARACTERISTICS

4-1. Optical Char. of Normal Temp. Mode

AT V_{OP}

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	14	20	17	25	3.5	5	—	F: 60 R: 38	—	L: 48 R: 48
NOTE		NOTE 6						NOTE 5			

NOTE :

T : Transmission

M : Color STN Module, 6 O'clock

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

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0°C	640	800	1200	ms	NOTE 2
		25°C	240	300	450		
		50°C	80	100	150		
Response Time (fall)	Tf	0°C	360	450	670	ms	NOTE 2
		25°C	80	100	150		
		50°C	48	60	90		

4-2. Color of CIE Coordinate

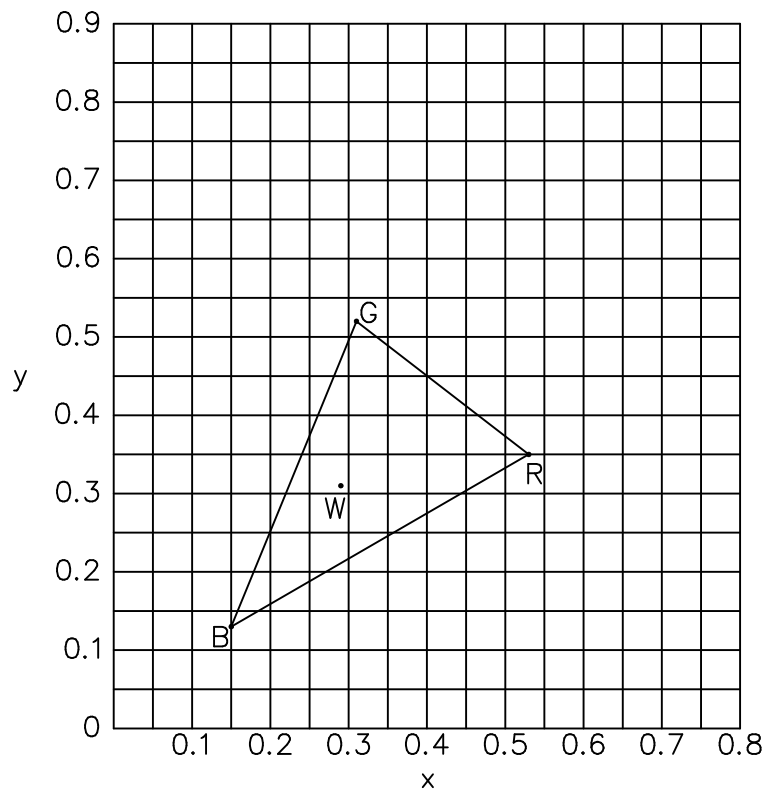
Ta = 25°C

ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	$\phi=0^\circ, \theta=0^\circ$	0.53	Note*
		y		0.35	
	Green	X	$\phi=0^\circ, \theta=0^\circ$	0.31	
		y		0.52	
	Blue	X	$\phi=0^\circ, \theta=0^\circ$	0.15	
		y		0.13	
	White	X	$\phi=0^\circ, \theta=0^\circ$	0.29	
		y		0.31	

Note* Measuring at position 3 on Fig.1
CIE chromaticity diagram

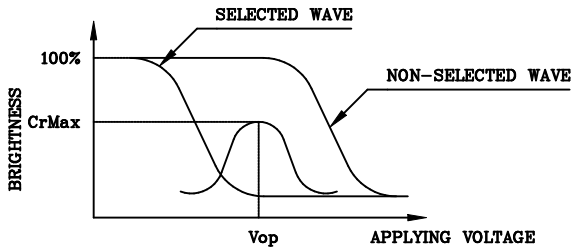
Tolerance : ± 0.05

Fig.1

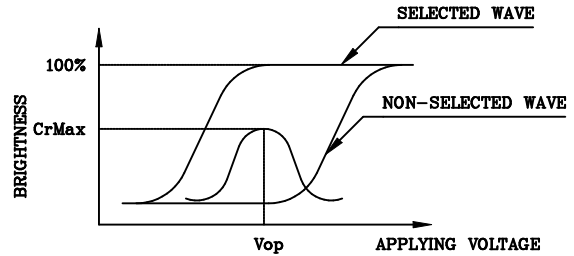


(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



(negative type)

*Conditions

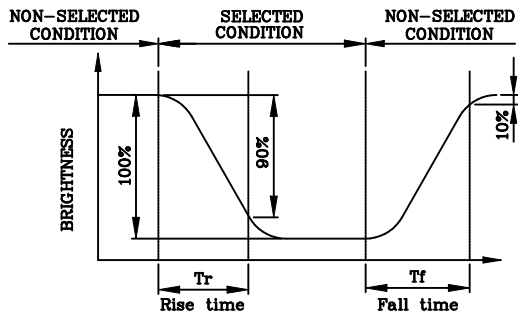
Viewing Angle : 0

Frame Frequency : 120Hz

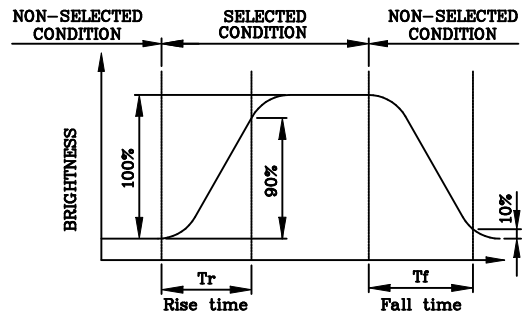
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



(negative type)

*Conditions

Operating Voltage : Vop

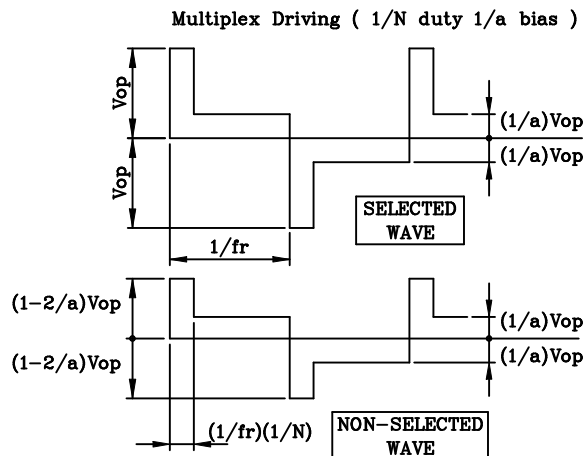
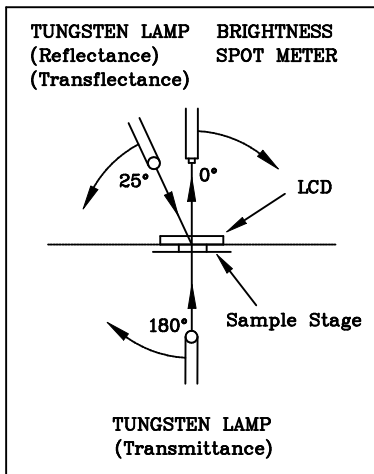
Viewing Angle (θ,φ) : (0,0)

Frame Frequency : 120Hz

Applying Waveform : 1/N duty 1/a bias

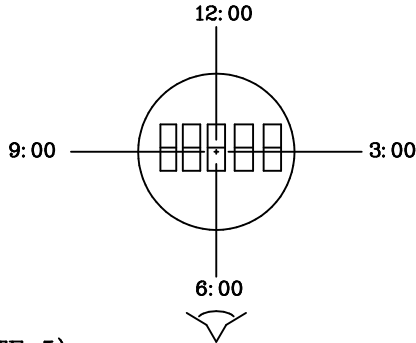
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



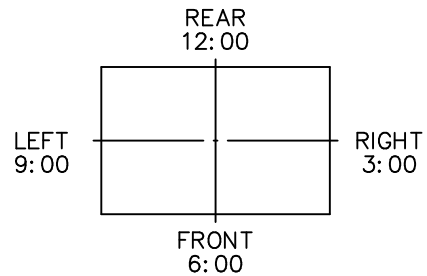
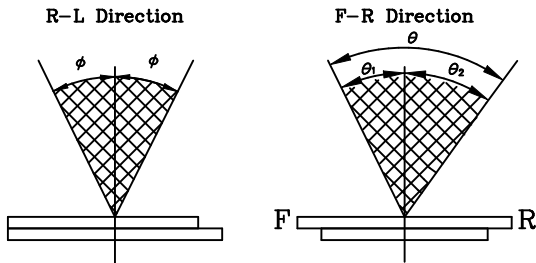
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



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

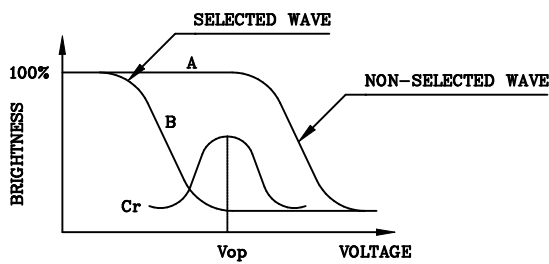
$$\theta = \theta_1 + \theta_2$$

*Conditions

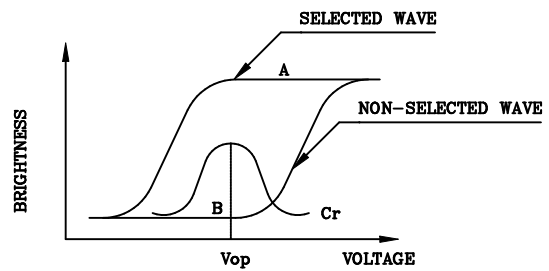
Operating Voltage : V_{op}
 Frame Frequency : 120Hz
 Applying Waveform : 1/N duty 1/a bias
 Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



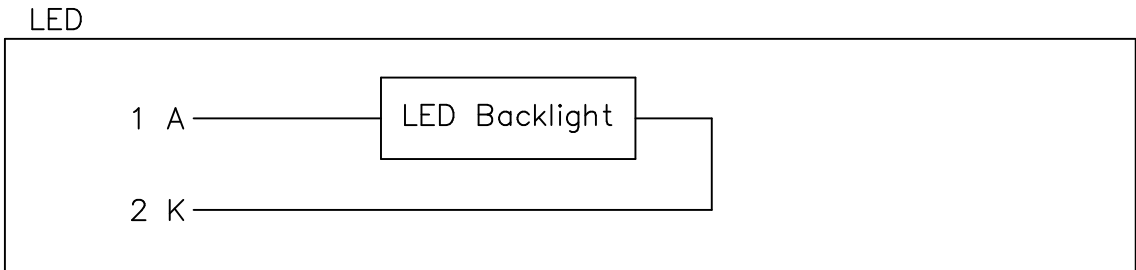
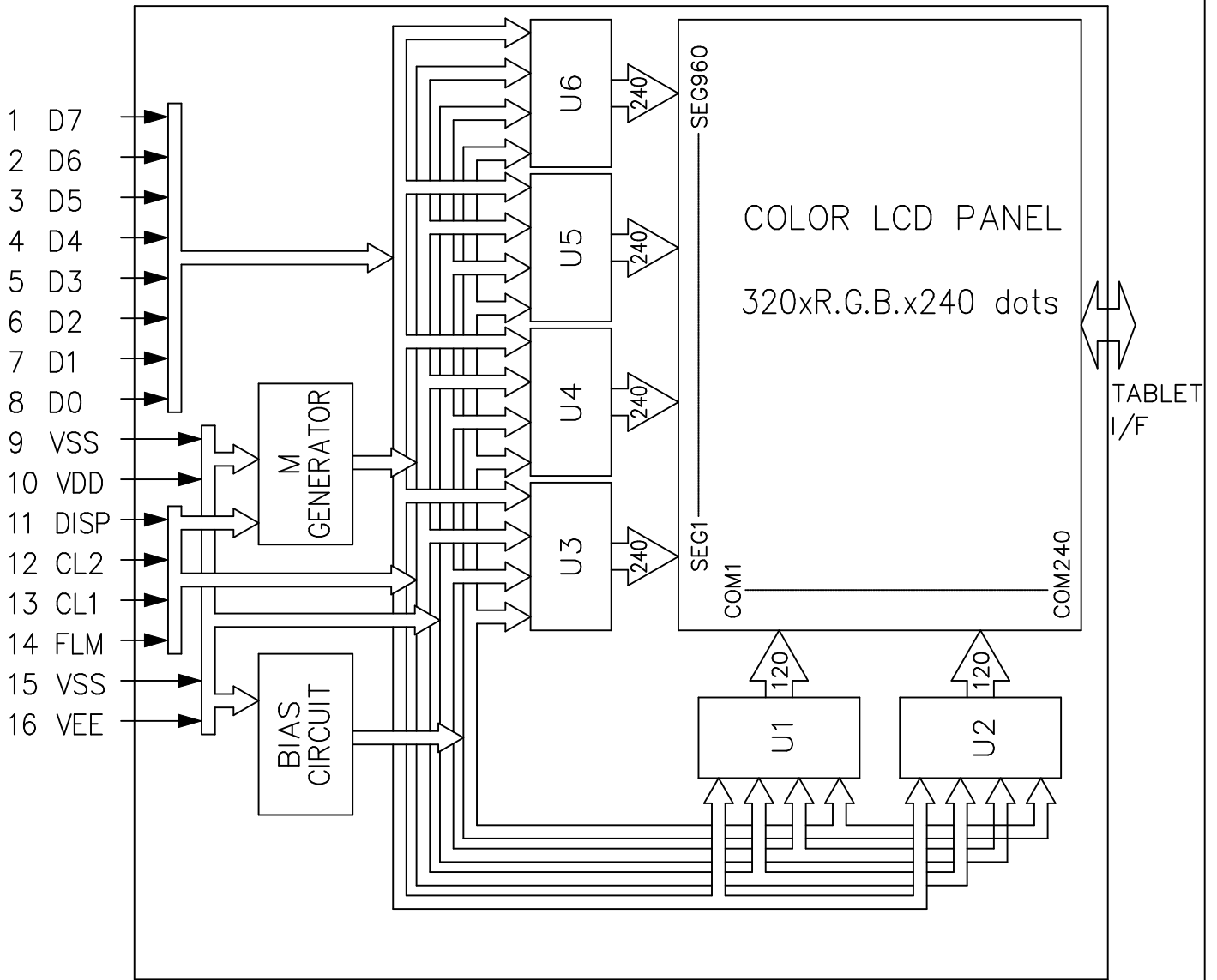
(negative type)

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

*Conditions

Viewing Angle : 0
 Frame Frequency : 120Hz
 Applying Waveform : 1/N duty 1/a bias

5. BLOCK DIAGRAM



6. INTERNAL PIN CONNECTION

LCD

Pin No.	Symbol	Level	Function
1	D7	H/L	Display Data
2	D6	H/L	Display Data
3	D5	H/L	Display Data
4	D4	H/L	Display Data
5	D3	H/L	Display Data
6	D2	H/L	Display Data
7	D1	H/L	Display Data
8	D0	H/L	Display Data
9	VSS	-	GND
10	VDD	-	Power Supply for Logic
11	DISP	H/L	Display Control Signal, H :Display on L :Display off
12	CL2	H/L	Data input clock
13	CL1	H/L	Input data latch signal
14	FLM	H/L	Scan start-up signal
15	VSS	H/L	Power Supply (0V,GND)
16	VEE	-	Power Supply for LCD

LED

Pin No.	Symbol	Level	Function
1	A	-	Power Supply Voltage for LED B/L
2	K	-	GND

TOUCH PANEL

PIN NO	SYMBOL	FUNCTION
1	X2	LEFT DIRECTION
2	Y2	DOWN DIRECTION
3	X1	RIGHT DIRECTION
4	Y1	UP DIRECTION

LCD INTERFACE CONNECTOR

FH12-16S-0.5SV(55) (HIROSE)/Suitable FFC :pitch 0.5mm ,width 8.5mm

LED CONNECTOR

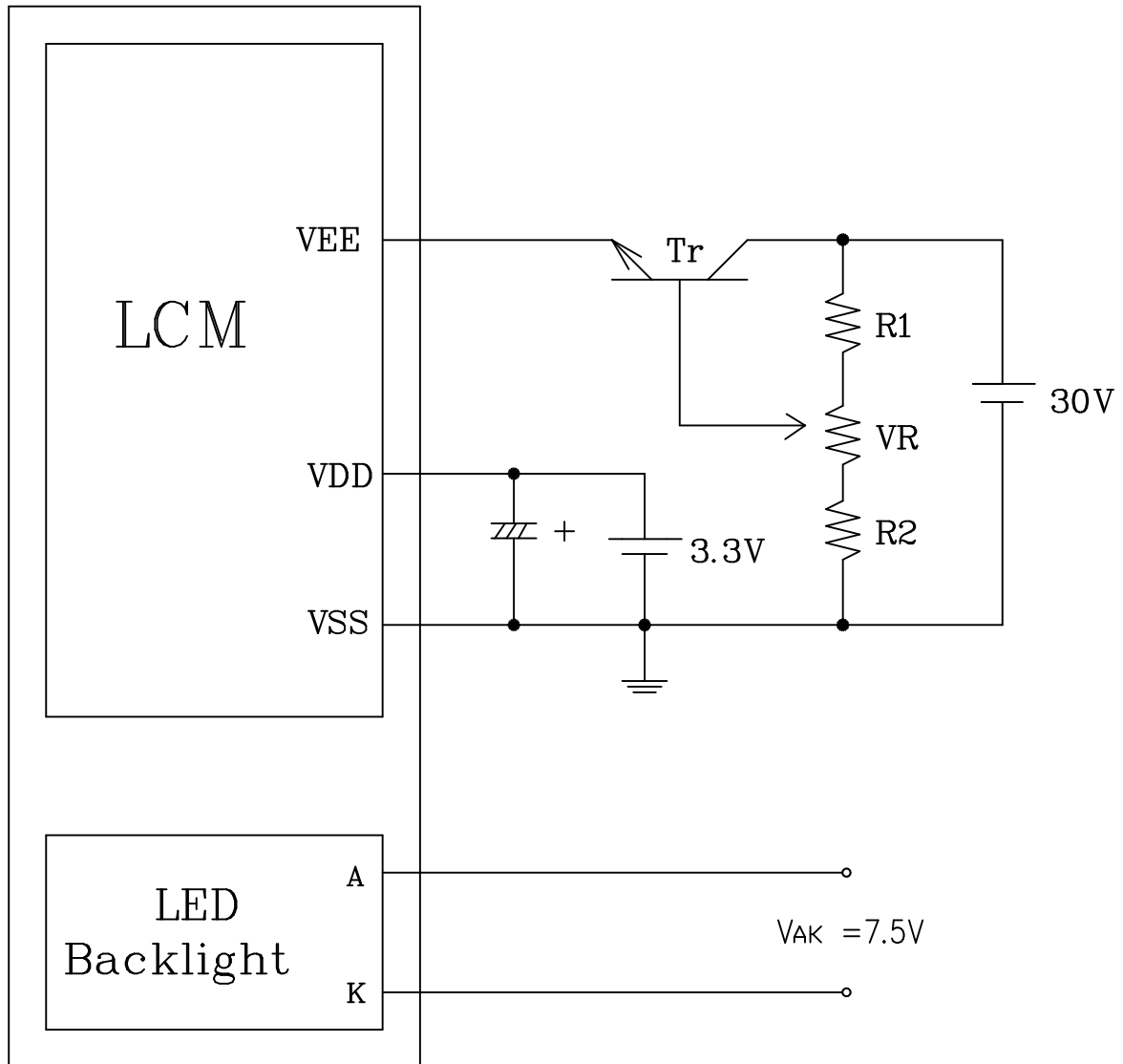
BHSR -02VS-1 (JST)/Suitable Connector :SM02B-BHSS-1-TB (JST)

TOUCH PANEL INTERFACE CABLE

Pitch 1.0mm ,Width 5.0mm/Suitable Connector :52852-0470(molex)

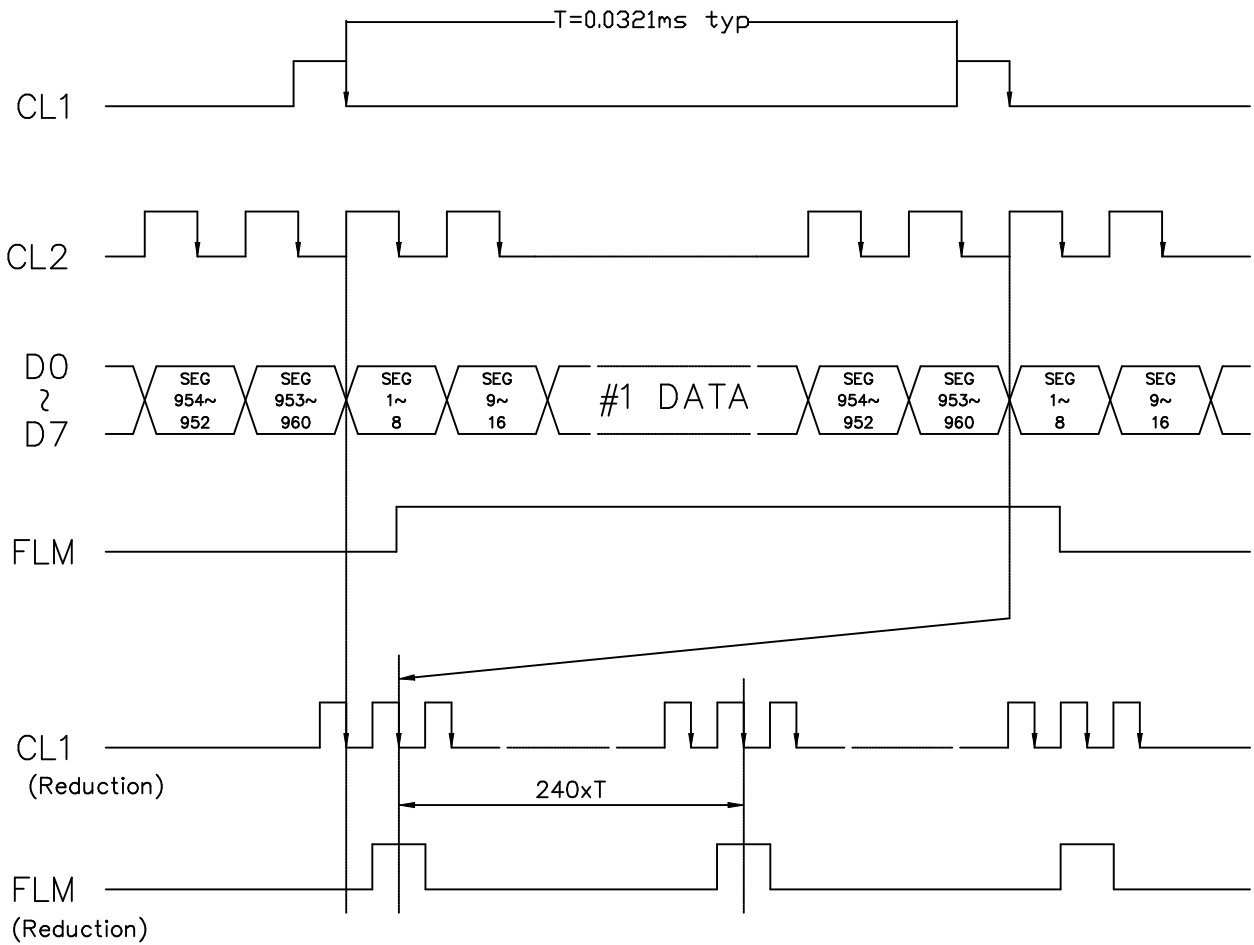
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7. POWER SUPPLY



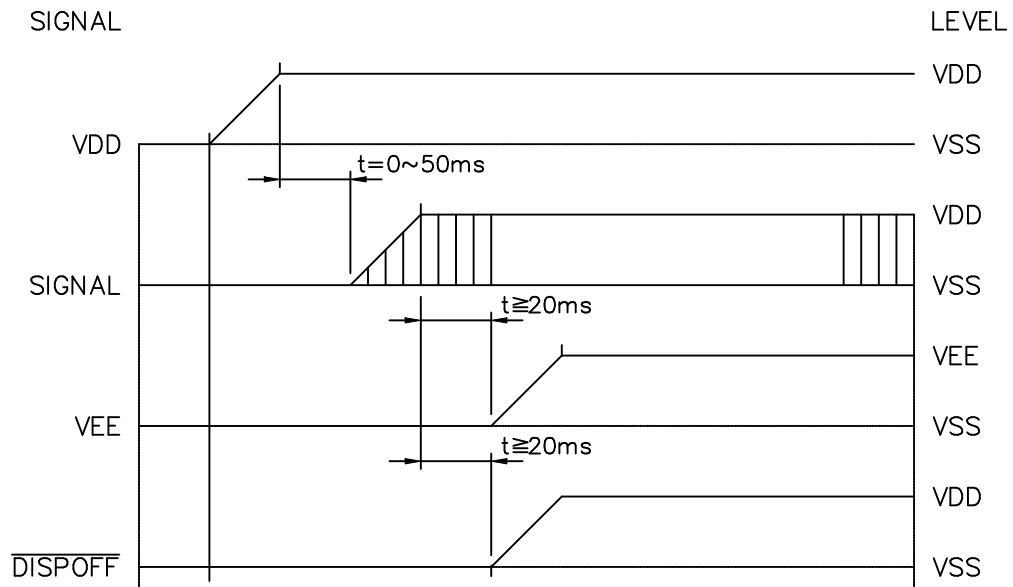
1. $R1 + R2 + VR = 10 \sim 20K \Omega$

8-2 TIMING CHART OF INPUT SIGNAL

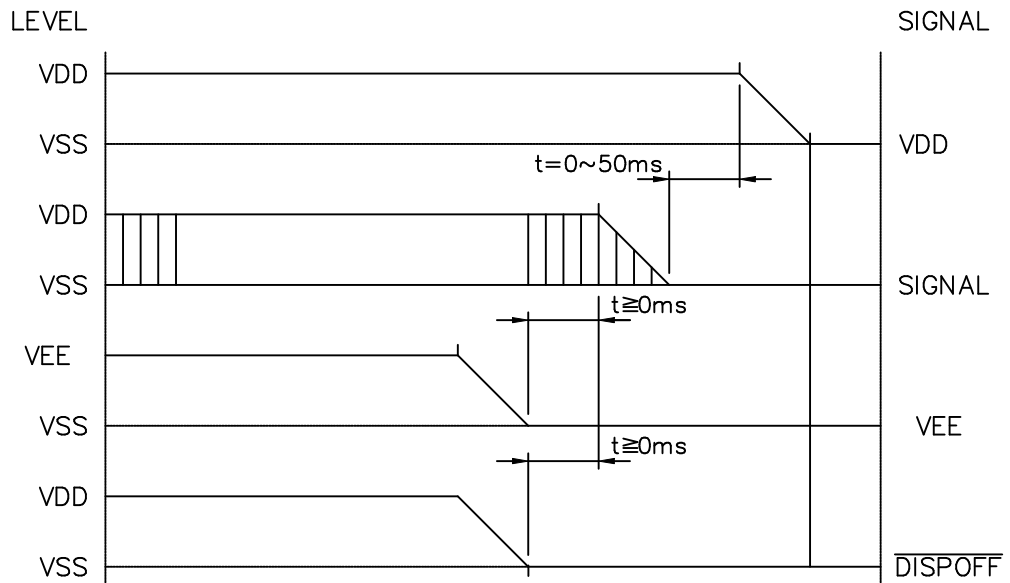


8-3. POWER ON/OFF TIMING

ON SEQUENCE

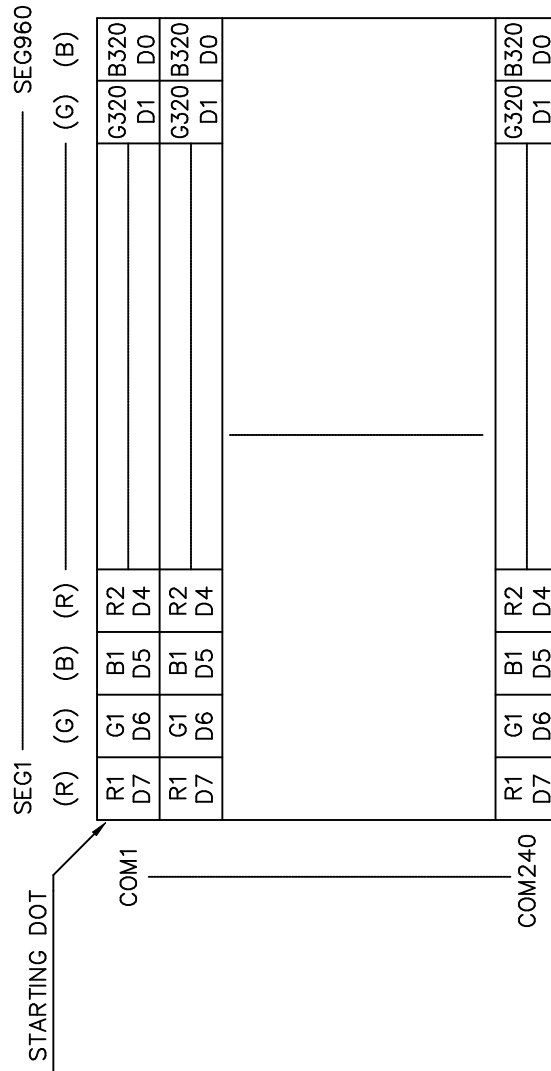


OFF SEQUENCE



Please maintain the above sequence when turning on and off the power supply of the module. If $\overline{\text{DISPOFF}}$ is supplied to the module while internal alternate signal for LCD driving(M) is unstable, DC component will be supplied to the LCD panel. This may cause damage the LCD module.

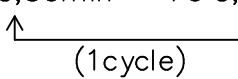
8-4. DISPLAY PATTERN



D0~D7 are 8 bits transmitted data, where D0 is LSB and D7 is MSB.

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 			Appearance without defect	10 cycles

Inspection Provision

1. Purpose

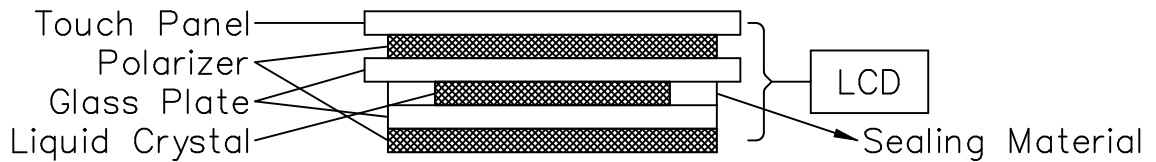
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

2. Applicable Scope

The NAN YA inspection provision is applicable to the arrangement in regard to outgoing inspection and quality assurance after outgoing.

3. Technical Terms

3-1 NAN YA Technical Terms



4. Outgoing Inspection

4-1 Inspection Method

MIL-STD-105E Level II Regular inspection

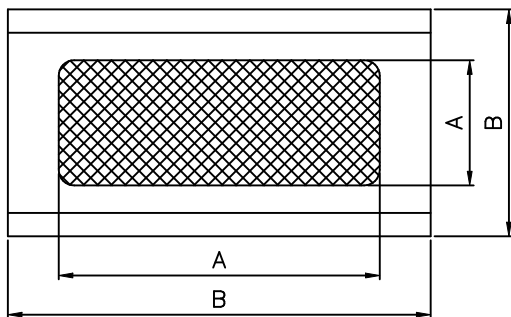
4-2 Inspection Standard

	Item		AQL(%)	Remarks
Major Defect	Dots	Opens Shorts Erroneous operation	0.4	faults which substantially lower the practicality and the initial purpose difficult to achieve.
	Solder appearance	Shorts Loose		
	Cracks	Display surface cracks		
	Touch Panel contact resistance			
	Touch Panel input load			

	Touch Panel linearity		0.4	
	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 Outline

*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 sample to be 30cm to 50cm.

*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)

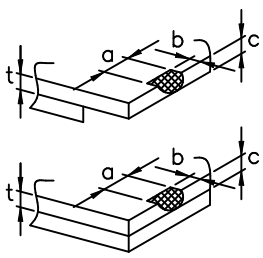
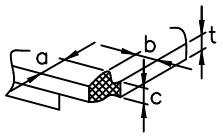
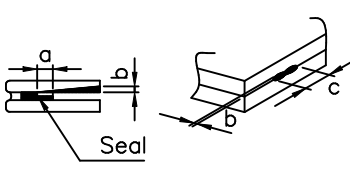
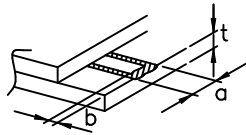
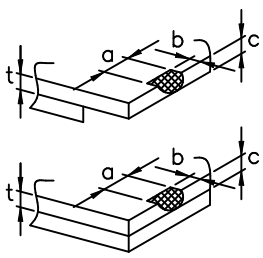
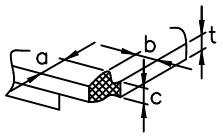
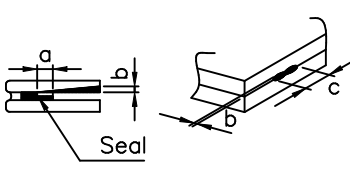
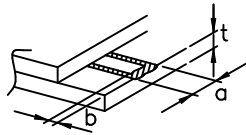
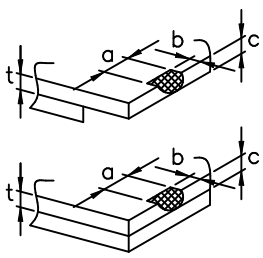
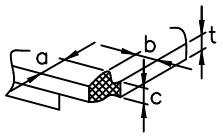
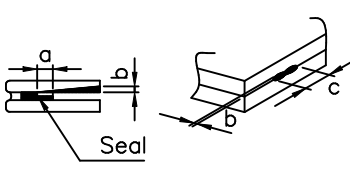
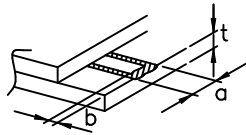
5.Specification for quality check
5-1 Electrical characteristics

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	Touch Panel contact resistance	Within Specified value
7	Touch Panel input load	Within Specified value
8	Touch Panel linearity	Within Specified value
9	Backlight turn on/off	Within Specified value

5-2 External Appearance Defect

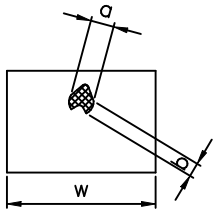
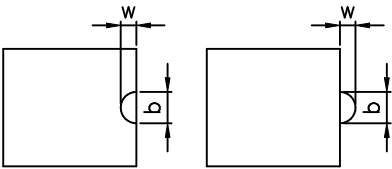
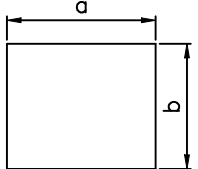
NO.	Item	Criterion																							
1	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	<p>(1)-1-Spots</p> <table border="1" data-bbox="703 488 1401 817"> <thead> <tr> <th data-bbox="703 488 1018 629">Average Diameter(mm):D</th> <th data-bbox="1018 488 1233 629">Number of pieces permitted</th> <th data-bbox="1233 488 1401 629">Minimum Space</th> </tr> </thead> <tbody> <tr> <td data-bbox="703 629 1018 678">D ≤ 0.2</td> <td data-bbox="1018 629 1233 678">Ignore</td> <td data-bbox="1233 629 1401 678">-</td> </tr> <tr> <td data-bbox="703 678 1018 728">0.2 < D ≤ 0.3</td> <td data-bbox="1018 678 1233 728">5</td> <td data-bbox="1233 678 1401 728">10mm</td> </tr> <tr> <td data-bbox="703 728 1018 777">0.3 < D ≤ 0.4</td> <td data-bbox="1018 728 1233 777">2</td> <td data-bbox="1233 728 1401 777">30mm</td> </tr> <tr> <td data-bbox="703 777 1018 817">0.4 < D</td> <td data-bbox="1018 777 1233 817">0</td> <td data-bbox="1233 777 1401 817"></td> </tr> </tbody> </table> <p data-bbox="703 824 1326 909">Number of total pieces is set to within 5 pieces.</p> <p data-bbox="703 943 1449 1115">Note that when there are 2 pieces or more, they are not to be concentrated. Set as: Average diameter = (Long diameter + Short diameter)/2</p> <p data-bbox="655 1149 1449 1189">(1)-2-Blurred Spots(At lighting condition)</p> <table border="1" data-bbox="703 1234 1337 1464"> <thead> <tr> <th data-bbox="703 1234 1018 1323">Average Diameter(mm):D</th> <th data-bbox="1018 1234 1337 1323">Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td data-bbox="703 1323 1018 1373">D ≤ 0.3</td> <td data-bbox="1018 1323 1337 1373">Ignore</td> </tr> <tr> <td data-bbox="703 1373 1018 1422">0.3 < D ≤ 0.75</td> <td data-bbox="1018 1373 1337 1422">5</td> </tr> <tr> <td data-bbox="703 1422 1018 1464">0.75 < D</td> <td data-bbox="1018 1422 1337 1464">0</td> </tr> </tbody> </table> <p data-bbox="703 1471 1326 1556">Number of total pieces is set to within 5 pieces.</p> <p data-bbox="703 1590 1449 1762">Note that when there are 2 pieces or more, they are not to be concentrated. Set as: Average diameter = (Long diameter + Short diameter)/2</p>	Average Diameter(mm):D	Number of pieces permitted	Minimum Space	D ≤ 0.2	Ignore	-	0.2 < D ≤ 0.3	5	10mm	0.3 < D ≤ 0.4	2	30mm	0.4 < D	0		Average Diameter(mm):D	Number of pieces permitted	D ≤ 0.3	Ignore	0.3 < D ≤ 0.75	5	0.75 < D	0
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1	Line	<p>(1)-1-Lines</p> <table border="1" data-bbox="705 443 1433 721"> <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> <p>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.</p> <p>(1)-2-Blurred Lines(At lighting condition)</p> <table border="1" data-bbox="705 1021 1433 1299"> <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> <p>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.</p>	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
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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.																								

4	Air bubbles polarizing plates, and reflection plates	<table border="1" data-bbox="702 392 1209 676"> <tr> <td data-bbox="702 392 957 537">Average Diameter (mm): D</td> <td data-bbox="957 392 1209 537">Number of pieces permitted</td> <td data-bbox="1209 392 1449 676" rowspan="2">Average diameter = (Long diameter + Short diameter)/2</td> </tr> <tr> <td data-bbox="702 537 957 676">D ≤ 0.3 0.3 < D</td> <td data-bbox="957 537 1209 676">Ignore 0</td> </tr> </table> <p data-bbox="702 694 1449 772">Note that when there are 4 pieces or more, they are not to be concentrated.</p>		Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2	D ≤ 0.3 0.3 < D	Ignore 0					
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5	Cracks	<table border="1" data-bbox="654 784 1449 1946"> <tr> <td data-bbox="654 784 1050 1164"> <p data-bbox="654 784 1050 840">(1) General crack</p>  </td> <td data-bbox="1050 784 1449 1164"> <p data-bbox="1050 784 1449 840">$a \leq 5$</p> <p data-bbox="1050 840 1449 884">$b \leq 2$</p> <p data-bbox="1050 884 1449 929">$c \leq t$</p> <p data-bbox="1050 929 1449 1164">Where, a and b are ignored when less than or equal to 0.5 The numbers of pieces are set at up to 5 pieces.</p> </td> </tr> <tr> <td data-bbox="654 1164 1050 1355"> <p data-bbox="654 1164 1050 1220">(2) Corner crack</p>  </td> <td data-bbox="1050 1164 1449 1355"> <p data-bbox="1050 1164 1449 1220">$a \leq 2.5$</p> <p data-bbox="1050 1220 1449 1265">$b \leq 2.5$</p> <p data-bbox="1050 1265 1449 1310">$c \leq t$</p> <p data-bbox="1050 1310 1449 1355">$a + b \leq 4$</p> </td> </tr> <tr> <td data-bbox="654 1355 1050 1624"> <p data-bbox="654 1355 1050 1411">(3) Seal portion crack</p>  </td> <td data-bbox="1050 1355 1449 1624"> <p data-bbox="1050 1355 1449 1400">$a \leq$ The seal width $\times 1/3$</p> <p data-bbox="1050 1400 1449 1444">$b \leq t \times 2/3$</p> <p data-bbox="1050 1444 1449 1489">$c \leq 5$</p> <p data-bbox="1050 1489 1449 1624">The numbers of pieces are set at up to 5 pieces.</p> </td> </tr> <tr> <td data-bbox="654 1624 1050 1848"> <p data-bbox="654 1624 1050 1680">(4) ITO Pin crack</p>  </td> <td data-bbox="1050 1624 1449 1848"> <p data-bbox="1050 1624 1449 1668">$a \leq 5$</p> <p data-bbox="1050 1668 1449 1713">$b \leq 1/3$ pin length</p> <p data-bbox="1050 1713 1449 1758">$c \leq t$</p> </td> </tr> <tr> <td data-bbox="654 1848 1050 1946"> <p data-bbox="654 1848 1050 1904">(5) Progressive cracks</p> </td> <td data-bbox="1050 1848 1449 1946"> <p data-bbox="1050 1848 1449 1946">All taken to be unacceptable.</p> </td> </tr> </table>		<p data-bbox="654 784 1050 840">(1) General crack</p> 	<p data-bbox="1050 784 1449 840">$a \leq 5$</p> <p data-bbox="1050 840 1449 884">$b \leq 2$</p> <p data-bbox="1050 884 1449 929">$c \leq t$</p> <p data-bbox="1050 929 1449 1164">Where, a and b are ignored when less than or equal to 0.5 The numbers of pieces are set at up to 5 pieces.</p>	<p data-bbox="654 1164 1050 1220">(2) Corner crack</p> 	<p data-bbox="1050 1164 1449 1220">$a \leq 2.5$</p> <p data-bbox="1050 1220 1449 1265">$b \leq 2.5$</p> <p data-bbox="1050 1265 1449 1310">$c \leq t$</p> <p data-bbox="1050 1310 1449 1355">$a + b \leq 4$</p>	<p data-bbox="654 1355 1050 1411">(3) Seal portion crack</p> 	<p data-bbox="1050 1355 1449 1400">$a \leq$ The seal width $\times 1/3$</p> <p data-bbox="1050 1400 1449 1444">$b \leq t \times 2/3$</p> <p data-bbox="1050 1444 1449 1489">$c \leq 5$</p> <p data-bbox="1050 1489 1449 1624">The numbers of pieces are set at up to 5 pieces.</p>	<p data-bbox="654 1624 1050 1680">(4) ITO Pin crack</p> 	<p data-bbox="1050 1624 1449 1668">$a \leq 5$</p> <p data-bbox="1050 1668 1449 1713">$b \leq 1/3$ pin length</p> <p data-bbox="1050 1713 1449 1758">$c \leq t$</p>	<p data-bbox="654 1848 1050 1904">(5) Progressive cracks</p>	<p data-bbox="1050 1848 1449 1946">All taken to be unacceptable.</p>
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6	Outer dimensions	Should be within the tolerance.
7	Newton ring(touch panel)	Orbicular of interference fringes is not allowed in the optimum contrast within the active area under viewing angle.
8	Soldering	Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mounting position, etc.

5-3 Dot Appearance Defect

NO.	Item	Criteria
1	Pinhole	 <p>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.</p>
2	Missing	 <p>Dot display a and b are each $\leq 0.2\text{mm}$ The overall total is taken to be with in 10 units.</p>
3	Thick and thin display	 <p>Taken to be within $\pm 1.5\%$ of display character width(a) and height(b).</p>

NOTICE:

• SAFETY

- 1.If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 2.If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

• HANDLING

- 1.Avoid static electricity which can damage the CMOS LSI.
- 2.Do not remove the panel or frame from the module.
- 3.The polarizing plate of the display is very fragile. So, please handle it very carefully.
- 4.Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.Do not use ketonics solvent & Aromatic solvent. Use a soft cloth soaked with a cleaning naphtha solvent.

• STORAGE

- 1.Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 2.Do not place the module near organics solvents or corrosive gases.
- 3.Do not crush, shake, or jolt the module.

• TERMS OF WARRANT

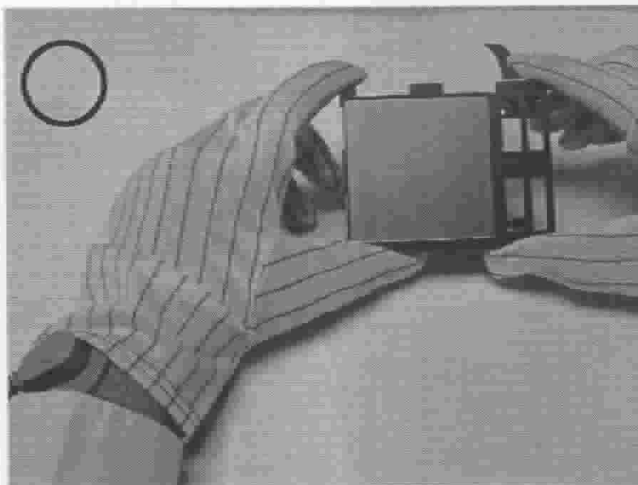
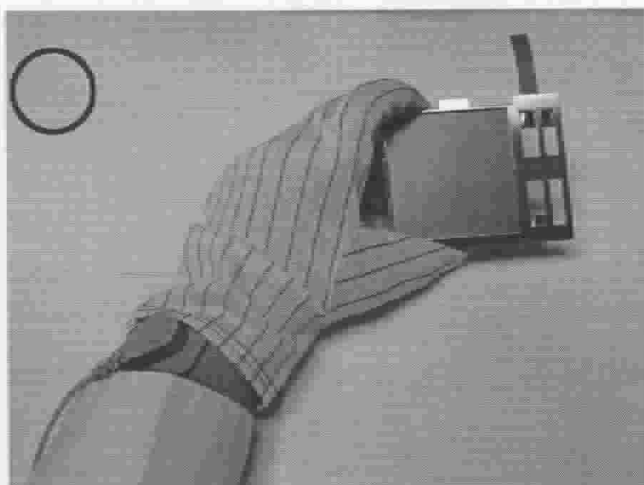
- 1.Acceptance inspection period
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- 2.Applicable warrant period
The period is within twelve months since the date of shipping out under normal using and storage conditions.

THE NOTES OF LCM USING

LCM is easy to damage.

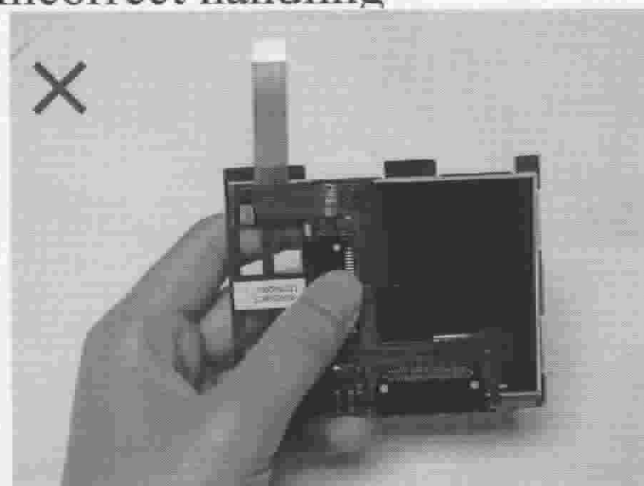
Please follow the notes as bellows, and be careful of handling!

Correct handling

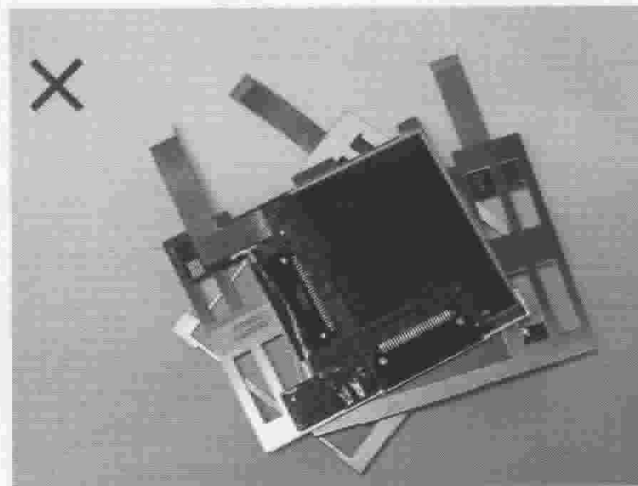


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

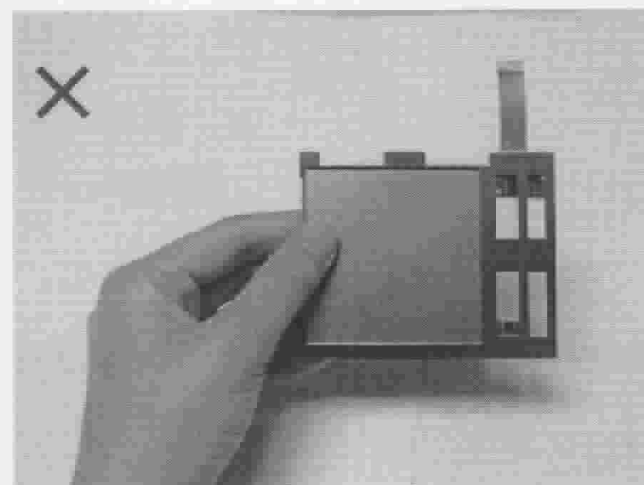
Incorrect handling



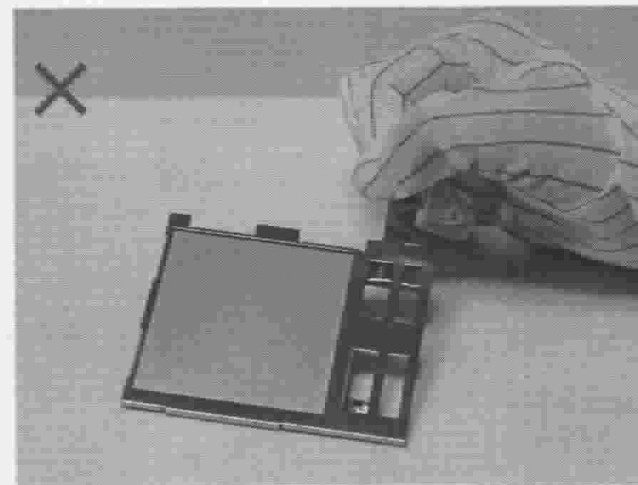
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.



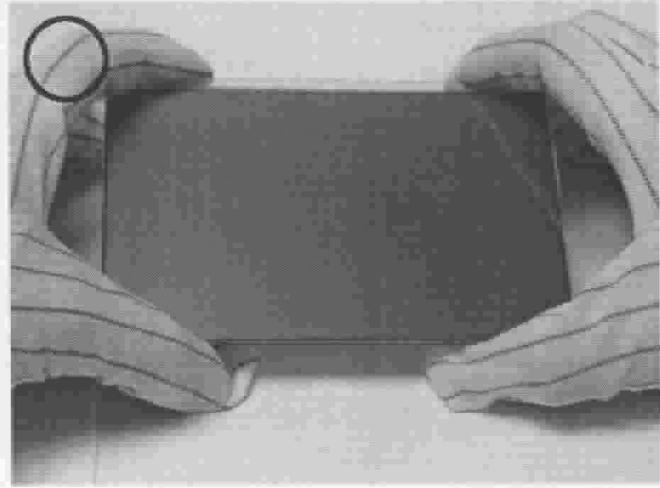
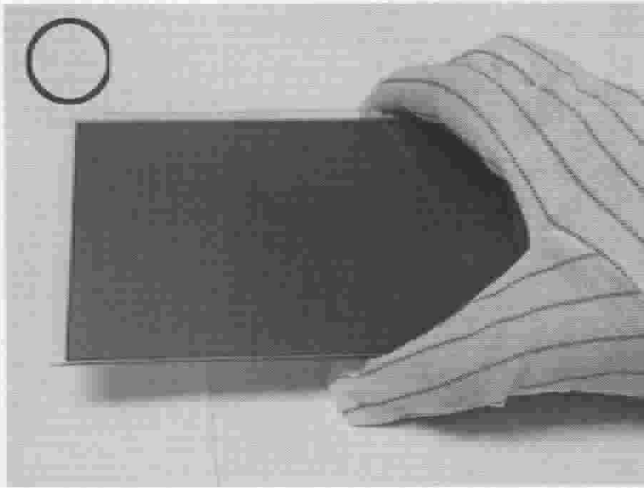
Please don't stretch interface of output.

THE NOTES OF LCD USING

LCD is easy damage.

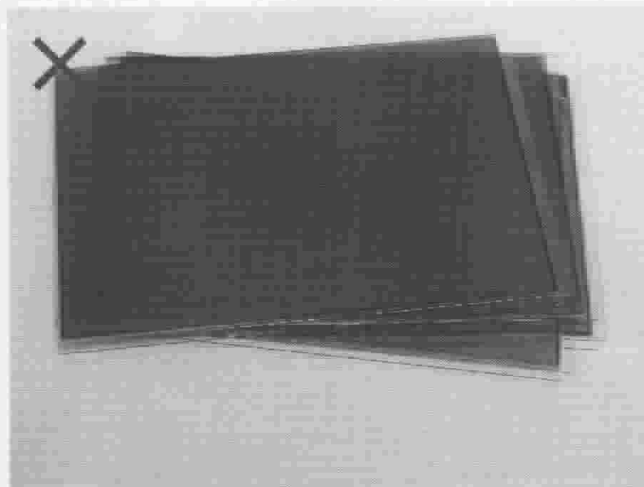
Please follow notes as bellows, and be careful of handling!

Correct handling

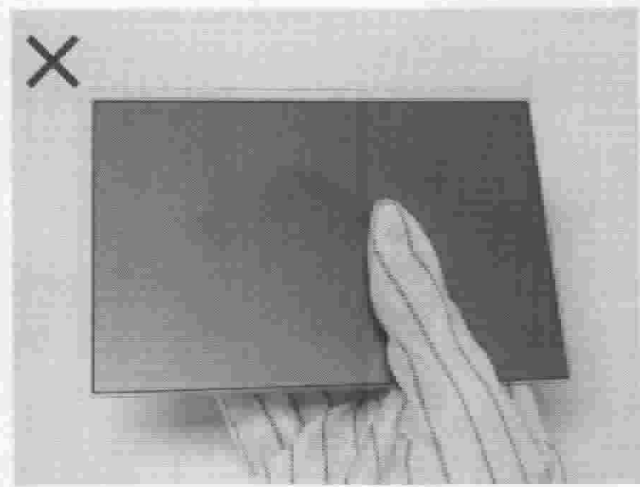


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

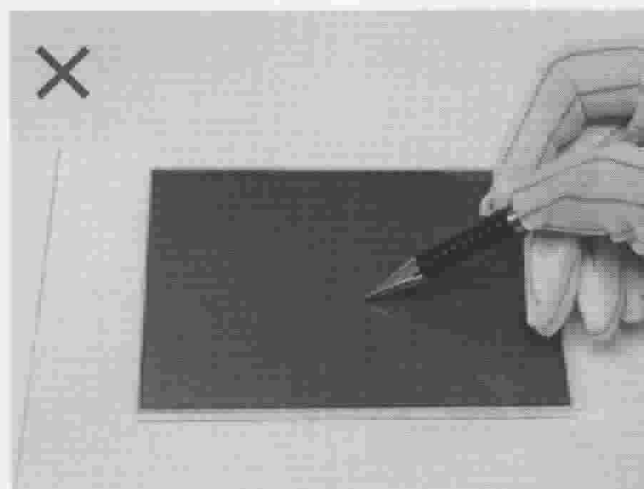
Incorrect handling



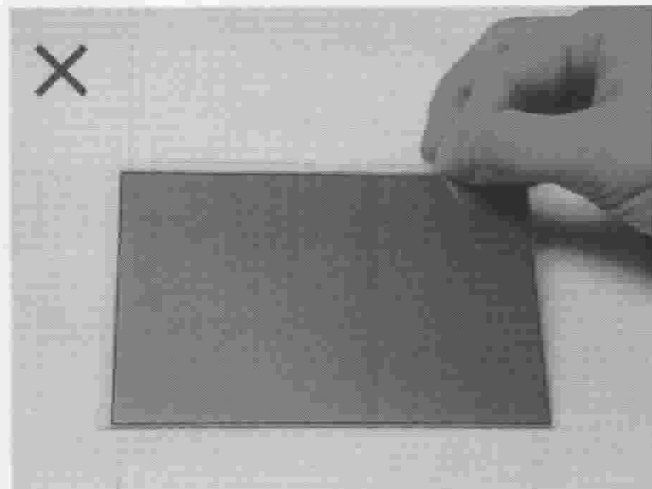
Please don't put one on another LCD.



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.

