

# NAN YA PLASTICS CORPORATION

SPECIFICATION OF  
LCD MODULE  
PRODUCT NO.: LTC79S202J52KS

SPEC. NO.: LM202-52C-0

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT  
ELECTRONIC MATERIALS DIVISION  
NAN YA PLASTICS CORPORATION  
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EDITED ON : Jun. 21. 2006

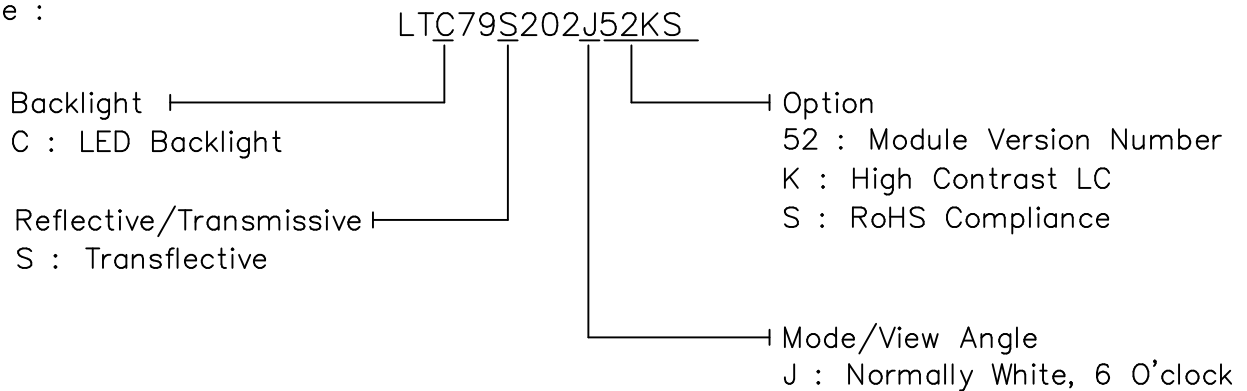
Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER
			W. R. HSU



# 1. MECHANICAL DATA

NO	ITEM	CONTENTS	UNIT
1	Product No.	LTC79S202J52KS	-
2	Module Size	75.1 (W) x 94.1 (H) x MAX 7.9 (D)	mm
3	Dot Size	0.225 (W) x 0.225 (H)	mm
4	Dot Pitch	0.24 (W) x 0.24 (H)	mm
5	Number of Dots	240 (W) x 320 (H)	Dot
6	Duty	1/240	-
7	LCD Display Mode	FSTN, Normally White / Positive Image	-
8	Rear Polarizer	Transflective Type	-
9	Viewing Direction	6	O'clock
10	Backlight	LED	-
11	Controller	Excluded	-
12	DC/DC Converter	Excluded	-
13	Touch Panel	Excluded	-
14	Weight	58 (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.

## 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	WIDE TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	-20	70	-40	80
Humidity (Without Condensation)	Note 2,4		Note 3,4	


Note 2  $T_a \leq 70^\circ\text{C}$  : 75%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
Power Supply for Logic	VDD-VSS	-		3.0	3.3	3.6	V
Input Voltage	VIH	H level		0.8VDD	-	VDD	V
	VIL	L level		0	-	0.2VDD	
Recommended LC Driving Voltage	VLCD-VSS (Vop)	Duty= 1/320	-20°C	28.3	28.7	29.1	V
			0°C	26.9	27.3	27.7	
			25°C	26.3	26.7	27.1	
			50°C	25.1	25.5	25.9	
			70°C	24.5	24.9	25.3	
Power Supply Current	IDD	VDD-VSS=3.3V VEE-VSS=26.7V Ta=25°C Pattern:		-	0.1	0.3	mA
	IEE			-	3.0	5.0	
Surface Luminance of LCM	L	ILED = 55mA Pattern: Dots All ON		-	3	6	cd/m <sup>2</sup>
		ILED = 55mA Pattern: Dots All OFF		5	8	-	

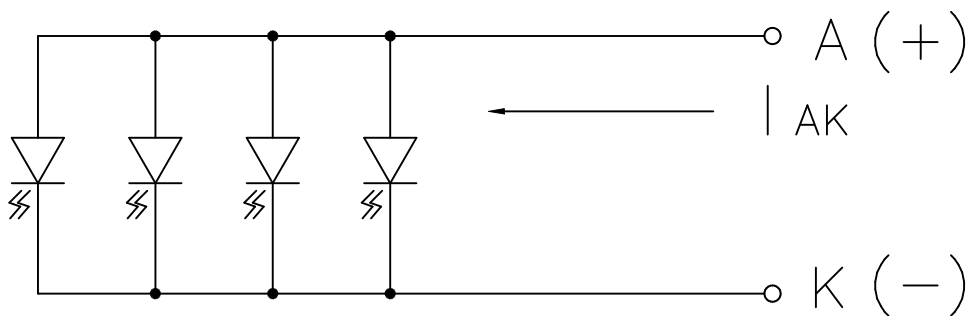
### 3-2.ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used LED Rating (Constant Current Driving)

Temp.=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Peak forward current	$I_P$	-	-	100	mA	-
Maximum reverse voltage	$V_R$	-	-	5	V	-
Applied forward current	$I_{AK}$	-	55	-	mA	-
Applied forward voltage	$V_{AK}$	-	3.5	4.0	V	-
LED power consumption	$P_F$	-	0.20	0.22	W	-
LED life time	$L_L$	-	40000	-	hrs	at $I_{AK} = 55 \text{ mA}$ (*1)

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



## 4. OPTICAL CHARACTERISTICS

### WIDE TEMPERATURE MODE

AT V<sub>OP</sub>

ITEM MODE		Cr(Contrast Ratio)										$\theta$ (Viewing Angle)		$\theta$ (Viewing Angle)	
		-20°C		0°C		25°C		50°C		70°C		25°C		25°C	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
S	J	2.5	3.5	3	4	3.5	5	2.5	3.5	1.5	2	-	F: 40 R: 35	-	L: 35 R: 25
NOTE		NOTE 6										NOTE 5			

NOTE :

S : Transflective

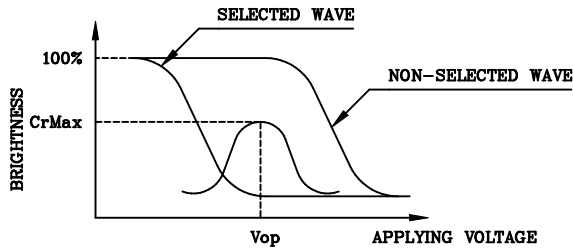
J : Normally White, 6 O'clock

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

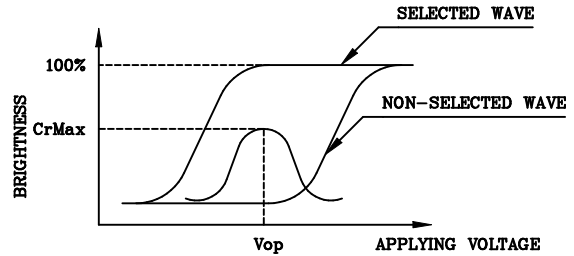
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	-20℃	4000	5000	7500	ms	NOTE 2
		0℃	900	1100	1700		
		25℃	240	300	450		
		50℃	120	150	225		
		70℃	100	130	200		
Response Time (fall)	Tf	-20℃	1600	2000	3000	ms	NOTE 2
		0℃	320	400	600		
		25℃	100	130	200		
		50℃	50	65	100		
		70℃	40	50	65		

(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



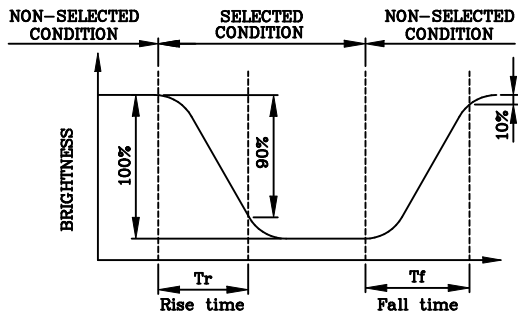
(negative type)

\*Conditions

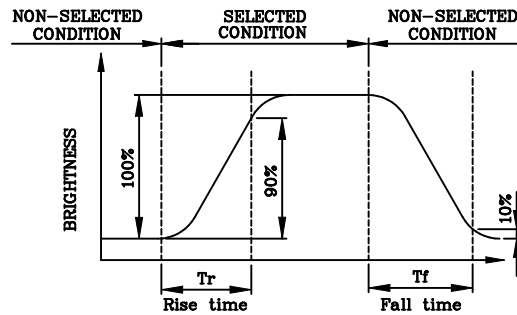
Viewing Angle : 0  
Frame Frequency : 70Hz  
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



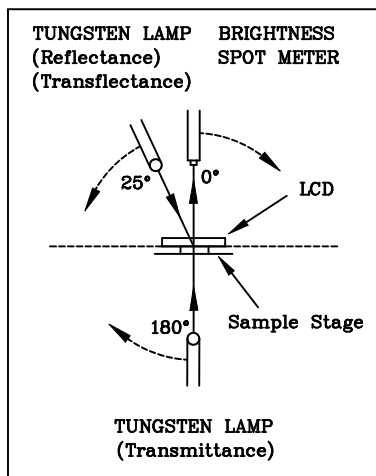
(negative type)

\*Conditions

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

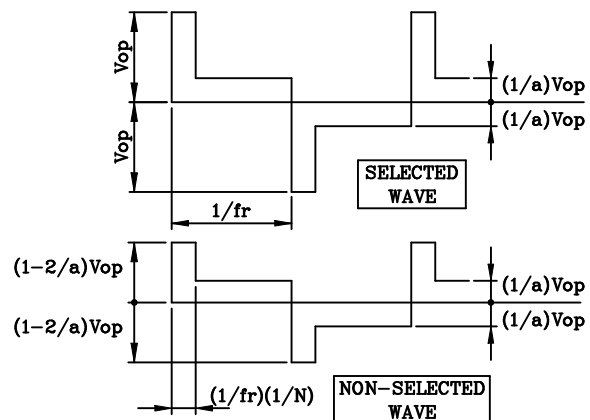
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



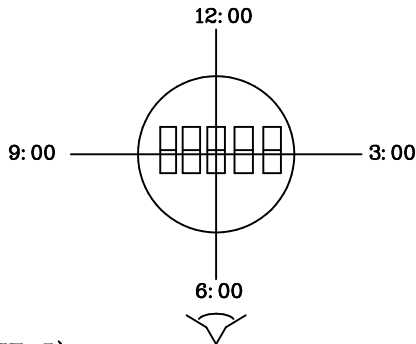
CONST.  
TEMP.  
CHAMBER

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



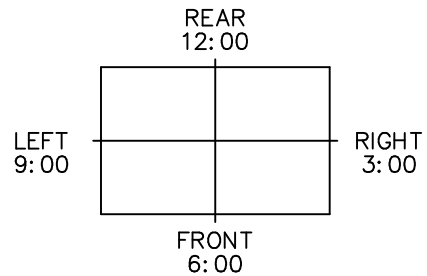
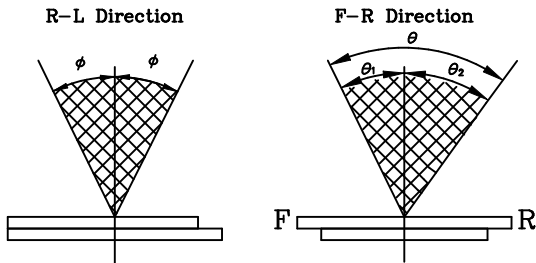
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



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

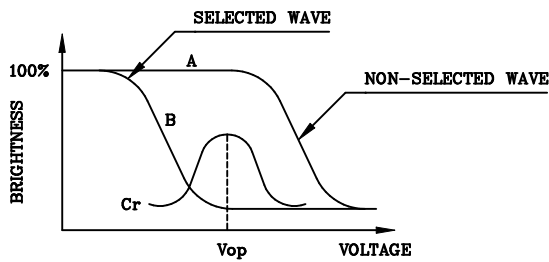
$$\theta = \theta_1 + \theta_2$$

\*Conditions

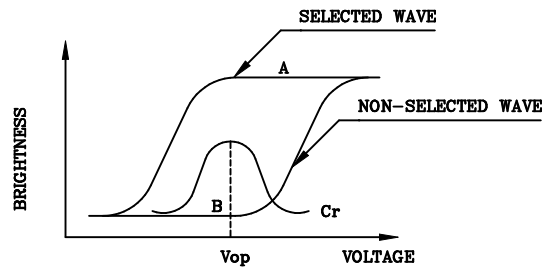
Operating Voltage :  $V_{op}$   
 Frame Frequency : 70Hz  
 Applying Waveform : 1/N duty 1/a bias  
 Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



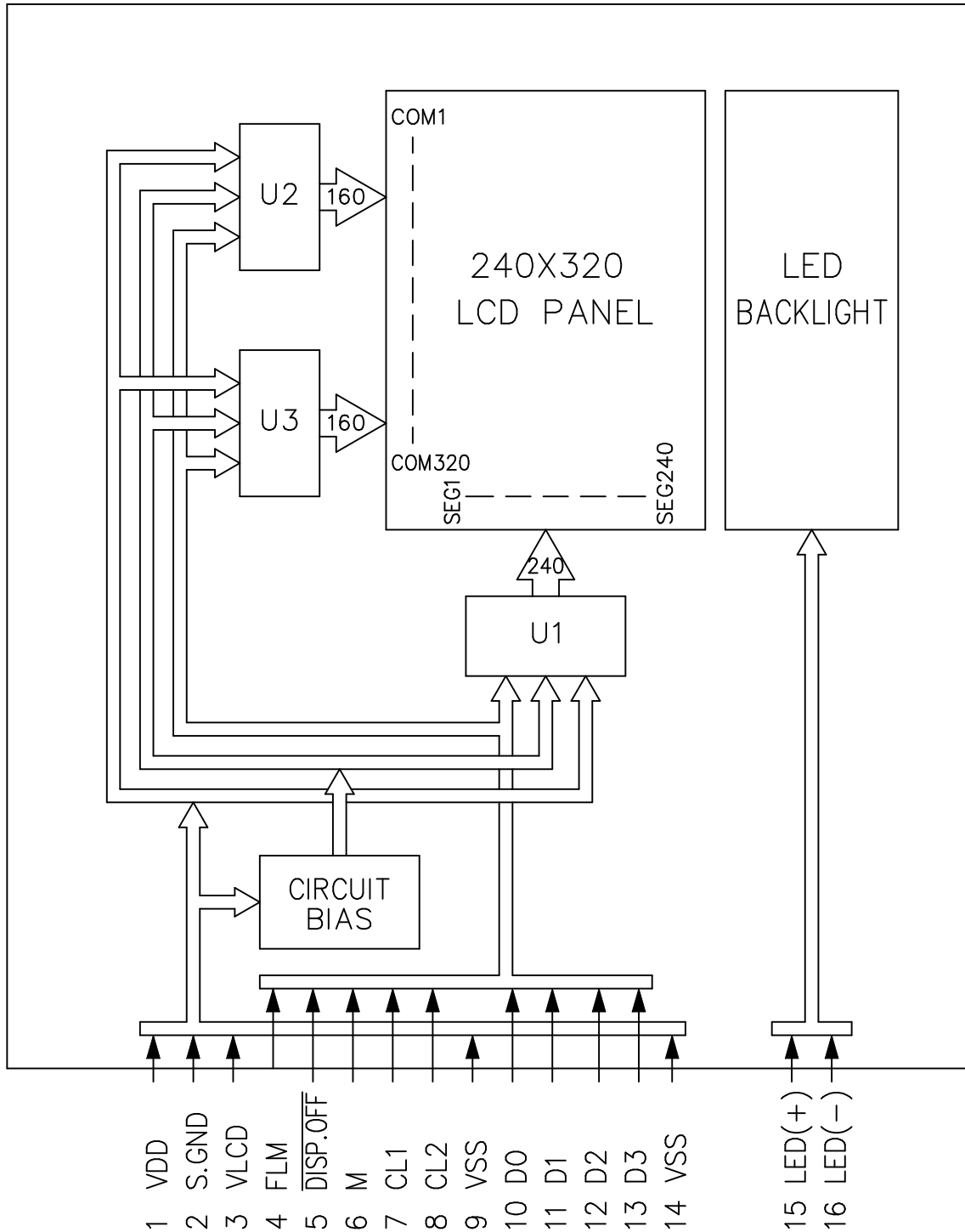
(negative type)

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

\*Conditions

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

# 5. BLOCK DIAGRAM



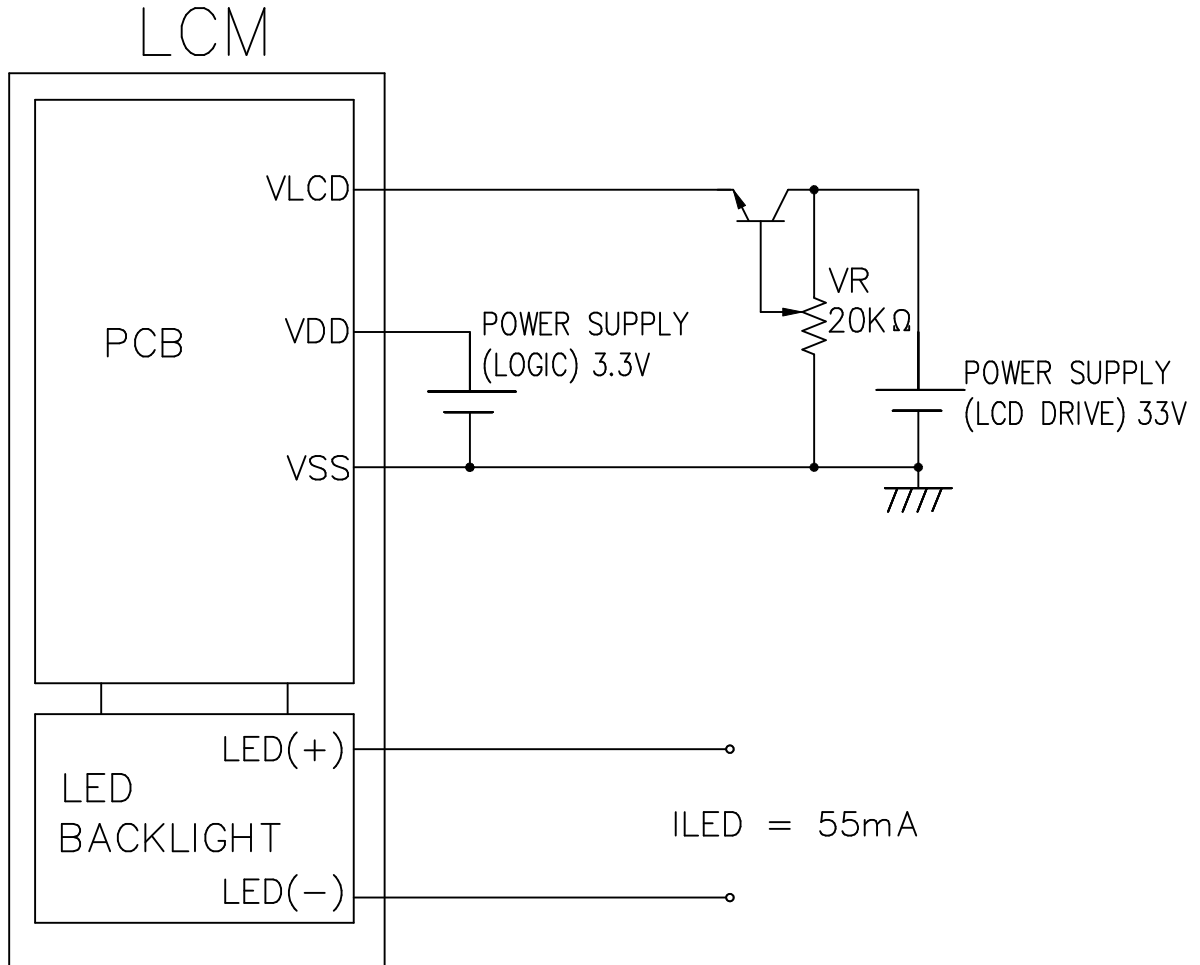
## 6. INTERNAL PIN CONNECTION

FPC ,20 pins,pitch 0.5mm

Pin No.	Symbol	Function
1	VDD	POWER SUPPLY FOR LOGIC
2	S.GND	SHIELD GROUND
3	VLCD	POWER SUPPLY FOR LCD
4	FLM	FIRST LINE MARKER
5	DISP.OFF	H: ON/L: OFF
6	M	SWITCH SIGNAL TO CONVERT LIQUID CRYSTAL DRIVE WAVEFORM INTO AC
7	CL1	DATA LATCH
8	CL2	SHIFT CLOCK
9	VSS	LOGIC GROUND
10	D0	DISPLAY DATA
11	D1	DISPLAY DATA
12	D2	DISPLAY DATA
13	D3	DISPLAY DATA
14	VSS	LOGIC GROUND
15	LED(+)	POWER SUPPLY FOR LED
16	LED(-)	POWER SUPPLY FOR LED
17	NC	NC
18	NC	NC
19	NC	NC
20	NC	NC

Mating Connector:MOLEX 52746-2070

# 7. POWER SUPPLY



# 8. TIMING CHARACTERISTICS

## 8-1. INTERFACE TIMING

@ VDD=3.0V±5%, Ta=-20~85℃

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
CL2 Cycle Time	tC	Fig.a	125	-	-	ns
CL2 Pulse Width	tSWH,tSWL	Fig.a	51	-	-	ns
CL2 Rise/Fall Time	tCR,tCF	Fig.a	-	-	50	ns
Data Set Up Time	tDSU	Fig.a	30	-	-	ns
Data Hold Time	tDHD	Fig.a	40	-	-	ns
CL1 Cycle Time	tL	Fig.b	250	-	-	ns
CL1 "H" Pulse Width	tLWH	Fig.a , Fig.b	51	-	-	ns
CL1 Rise/Fall Time	tLR,tLF	Fig.b	-	-	50	ns
CL2 To CL1 Delay Time	tCL	Fig.a	51	-	-	ns
CL1 To CL2 Delay Time	tLC	Fig.a	51	-	-	ns
FLM TO CL1 SETUP TIME	tFLS	Fig.b	30	-	-	ns
FLM TO CL1 HOLD TIME	tFLH	Fig.b	50	-	-	ns

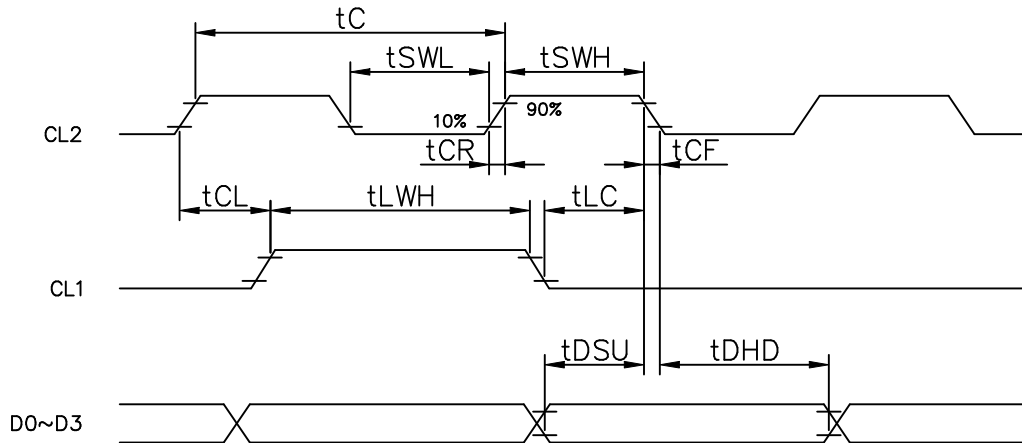


Fig . a Interface timing (SEGMENT)

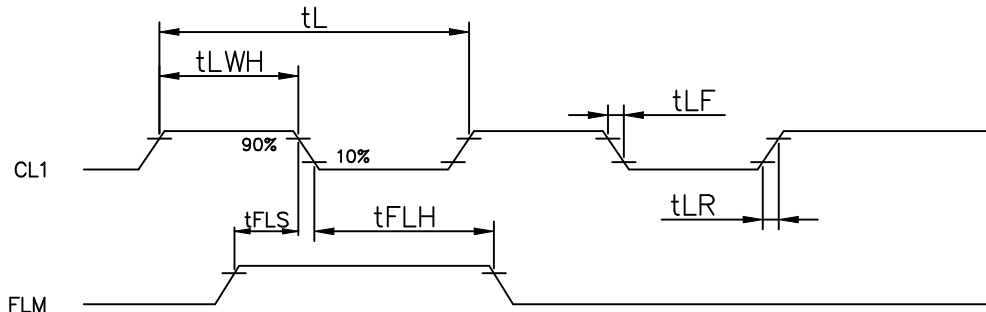
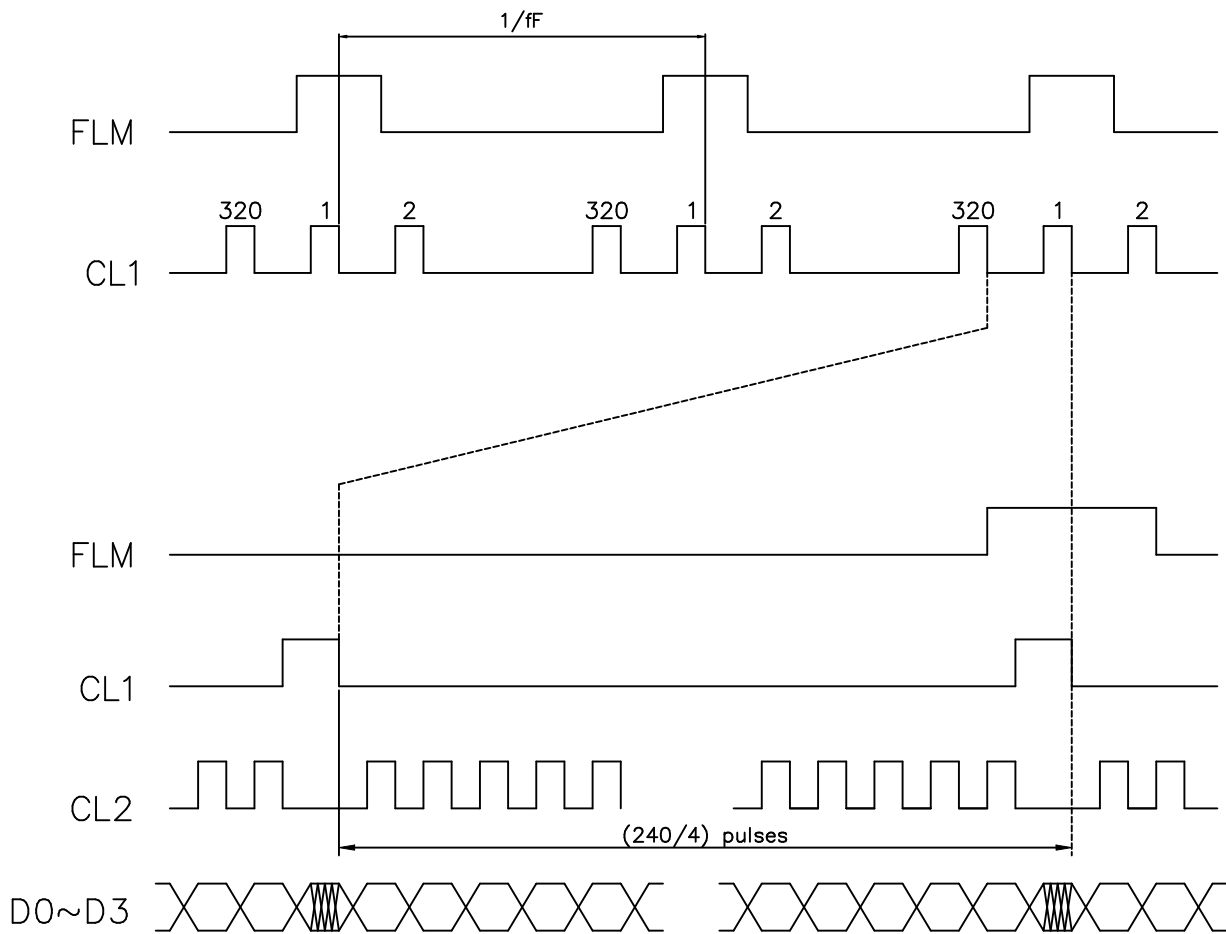
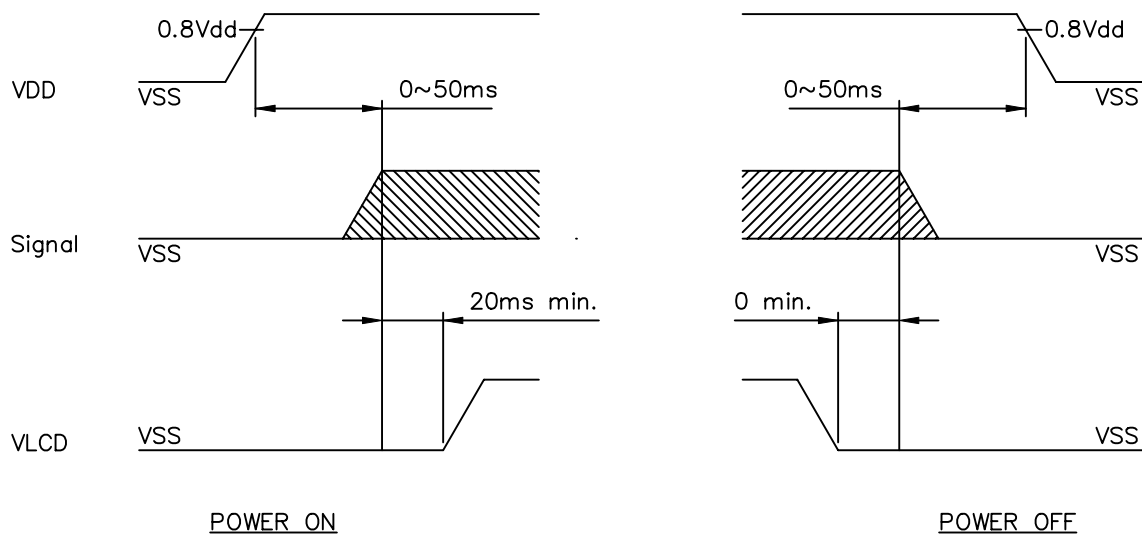


Fig . b Interface timing (COMMON)

8-2. TIMING CHART OF INPUT SIGNAL

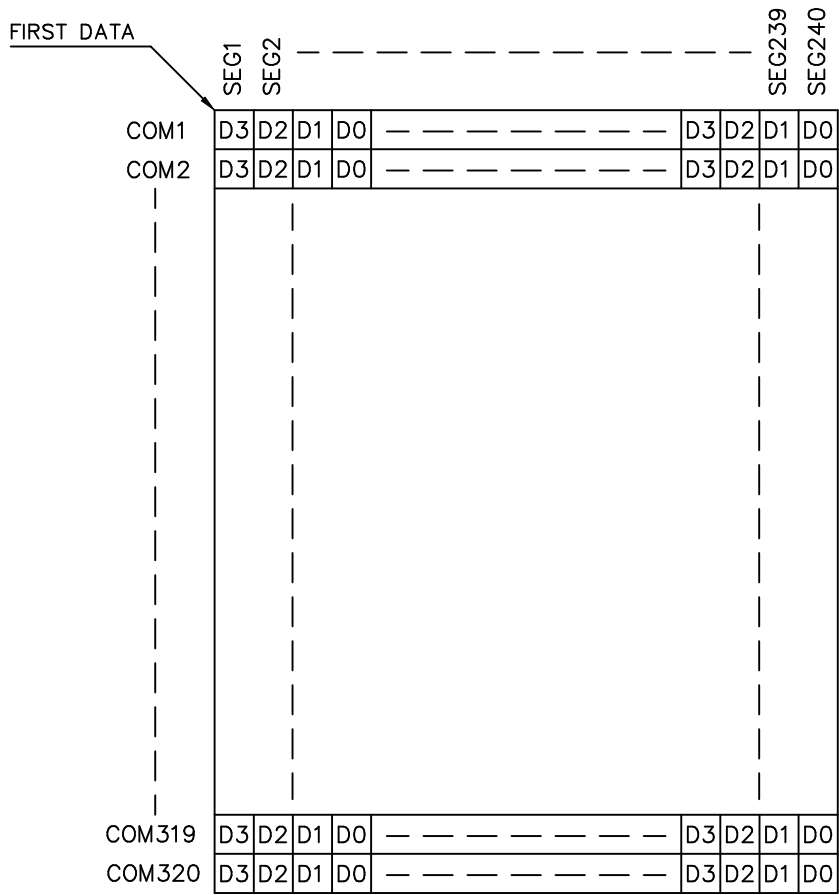


8-3. POWER ON/OFF TIMING



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

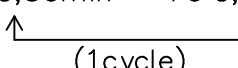
8-4.DISPLAY PATTERN



240 X 320 Dots Matrix

## 9. RELIABILITY TEST

### WIDE TEMPERATURE RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	80°C	120Hrs		Appearance without defect	
2	Low Temp. Storage	-40°C	120Hrs		Appearance without defect	
3	High Temp. & High Humi. Storage	60°C 90%RH	120Hrs		Appearance without defect	
4	High Temp. Operating Display	70°C	120Hrs		Appearance without defect	
5	Low Temp. Operating Display	-20°C	120Hrs		Appearance without defect	
6	Thermal Shock	-20°C, 30min → 70°C, 30min  (1cycle)			Appearance without defect	10 cycles

Inspection Provision

1. Purpose

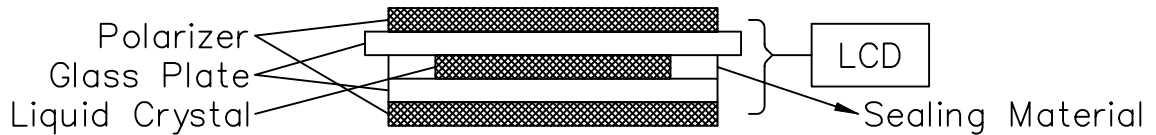
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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

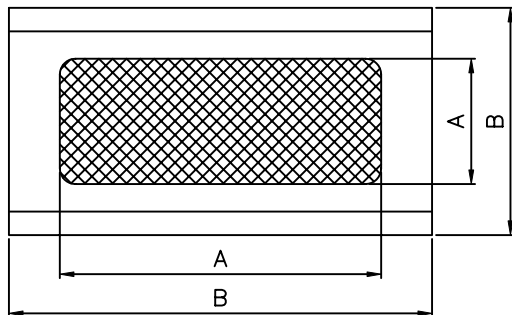
4-2 Inspection Standard

	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		

	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)

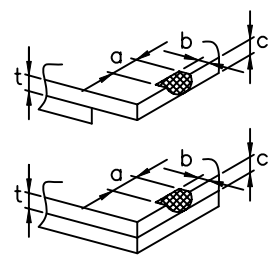
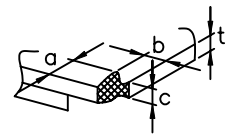
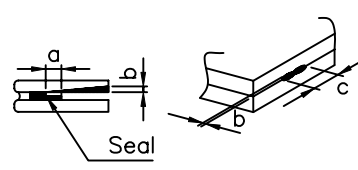
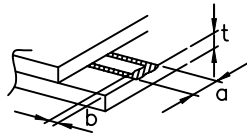
5.Specification for quality check  
5-1 Electrical characteristics

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	Backlight turn on/off	Within Specified value

5-2 External Appearance Defect

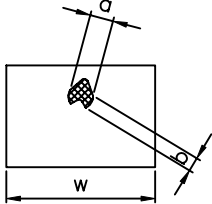
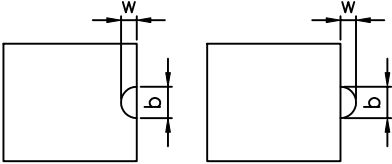
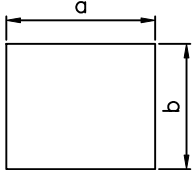
NO.	Item	Criterion																		
1	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	<p>(1)-1-Spots</p> <table border="1" data-bbox="705 495 1337 772"> <thead> <tr> <th>Average Diameter(mm):D</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.1</math></td> <td>Ignore</td> </tr> <tr> <td><math>0.1 &lt; D \leq 0.2</math></td> <td>5</td> </tr> <tr> <td><math>0.2 &lt; D \leq 0.3</math></td> <td>2</td> </tr> <tr> <td><math>0.3 &lt; D</math></td> <td>0</td> </tr> </tbody> </table> <p>Number of total pieces is set to within 5 pieces.</p> <p>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>(1)-2-Blurred Spots(At lighting condition)</p> <table border="1" data-bbox="705 1189 1337 1422"> <thead> <tr> <th>Average Diameter(mm):D</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.3</math></td> <td>Ignore</td> </tr> <tr> <td><math>0.3 &lt; D \leq 0.75</math></td> <td>5</td> </tr> <tr> <td><math>0.75 &lt; D</math></td> <td>0</td> </tr> </tbody> </table> <p>Number of total pieces is set to within 5 pieces.</p> <p>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	$D \leq 0.1$	Ignore	$0.1 < D \leq 0.2$	5	$0.2 < D \leq 0.3$	2	$0.3 < D$	0	Average Diameter(mm):D	Number of pieces permitted	$D \leq 0.3$	Ignore	$0.3 < D \leq 0.75$	5	$0.75 < D$	0
Average Diameter(mm):D	Number of pieces permitted																			
$D \leq 0.1$	Ignore																			
$0.1 < D \leq 0.2$	5																			
$0.2 < D \leq 0.3$	2																			
$0.3 < D$	0																			
Average Diameter(mm):D	Number of pieces permitted																			
$D \leq 0.3$	Ignore																			
$0.3 < D \leq 0.75$	5																			
$0.75 < D$	0																			

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><math>W \leq 0.03</math></td> <td>Ignore</td> <td>Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.08</math></td> <td><math>L \leq 4</math></td> <td>2</td> </tr> <tr> <td><math>0.08 &lt; W \leq 0.1</math></td> <td><math>L \leq 1</math></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 1019 1433 1296"> <thead> <tr> <th>Width(mm): W</th> <th>Length(mm): L</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td><math>W \leq 0.03</math></td> <td>Ignore</td> <td>Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.08</math></td> <td><math>L \leq 3</math></td> <td>6</td> </tr> <tr> <td><math>0.08 &lt; W</math></td> <td><math>3 &lt; L</math></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
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																								
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 1204 683"> <tr> <td data-bbox="702 392 957 537">Average Diameter (mm): D</td> <td data-bbox="957 392 1204 537">Number of pieces permitted</td> <td data-bbox="1204 392 1452 683" rowspan="2">Average diameter = (Long diameter + Short diameter)/2</td> </tr> <tr> <td data-bbox="702 537 957 683">D ≤ 0.3 0.3 &lt; D</td> <td data-bbox="957 537 1204 683">Ignore 0</td> </tr> </table> <p data-bbox="702 694 1452 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
Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2						
D ≤ 0.3 0.3 < D	Ignore 0							
5	Cracks	<p data-bbox="654 784 1045 840">(1) General crack</p> 	<p data-bbox="1045 784 1452 840"><math>a \leq 5</math></p> <p data-bbox="1045 840 1452 884"><math>b \leq 2</math></p> <p data-bbox="1045 884 1452 929"><math>c \leq t</math></p> <p data-bbox="1045 929 1452 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 1045 1220">(2) Corner crack</p> 	<p data-bbox="1045 1164 1452 1220"><math>a \leq 2.5</math></p> <p data-bbox="1045 1220 1452 1265"><math>b \leq 2.5</math></p> <p data-bbox="1045 1265 1452 1310"><math>c \leq t</math></p> <p data-bbox="1045 1310 1452 1355"><math>a + b \leq 4</math></p>					
		<p data-bbox="654 1355 1045 1411">(3) Seal portion crack</p> 	<p data-bbox="1045 1355 1452 1400"><math>a \leq \text{The seal width} \times 1/3</math></p> <p data-bbox="1045 1400 1452 1444"><math>b \leq t \times 2/3</math></p> <p data-bbox="1045 1444 1452 1489"><math>c \leq 5</math></p> <p data-bbox="1045 1489 1452 1624">The numbers of pieces are set at up to 5 pieces.</p>					
		<p data-bbox="654 1624 1045 1680">(4) ITO Pin crack</p> 	<p data-bbox="1045 1624 1452 1668"><math>a \leq 5</math></p> <p data-bbox="1045 1668 1452 1713"><math>b \leq 1/3 \text{ pin length}</math></p> <p data-bbox="1045 1713 1452 1758"><math>c \leq t</math></p>					
		<p data-bbox="654 1848 1045 1904">(5) Progressive cracks</p>	<p data-bbox="1045 1848 1452 1946">All taken to be unacceptable.</p>					

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 <math>\leq 0.2\text{mm}</math> 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 <math>\leq 0.2\text{mm}</math> The overall total is taken to be with in 10 units.</p>
3	Thick and thin display	 <p>Taken to be within <math>\pm 1.5\%</math> 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

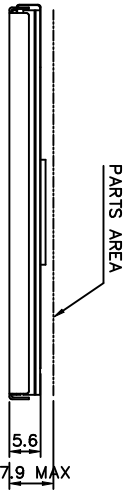
- 1.Avoid static electricity which can damage the CMOS LSI.
- 2.Do not remove the panel or frame from the module.
- 3.The polarizing plate of the display is very fragile. So, please handle it very carefully.
- 4.Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of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

- STORAGE

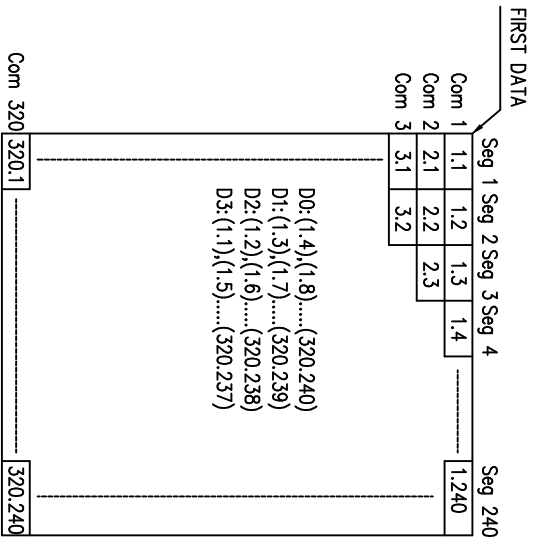
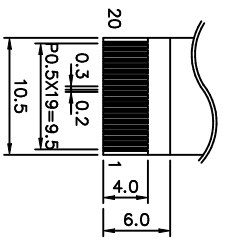
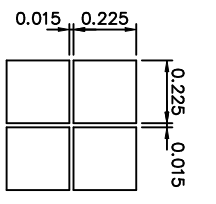
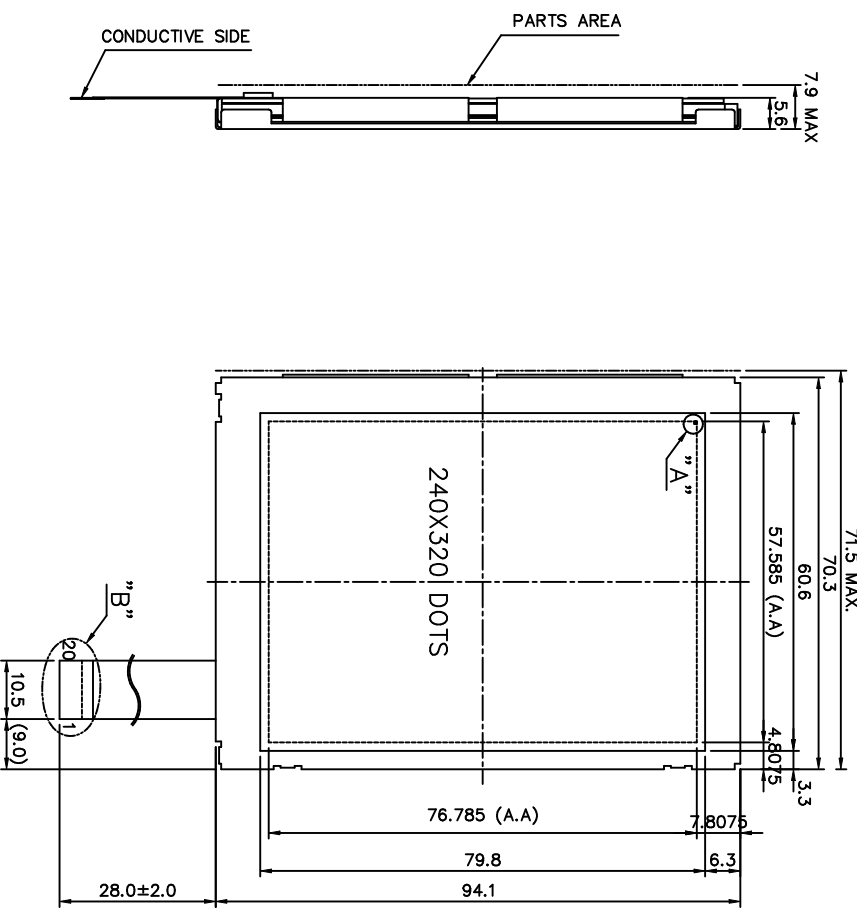
- 1.Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 2.Do not place the module near organics solvents or corrosive gases.
- 3.Do not crush, shake, or jolt the module.

- 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.



VIEW DIRECTION  
(6 O'CLOCK)



- NOTES:
- 1.RESOLUTION: 240X320 DOTS
  - 2.BACKLIGHT: LED (WHITE )
  - 3.FRAME MATERIAL: SECC
  - 4.GLASS THICKNESS: 0.7 mm

GENERAL TOLERANCE LIST

DIMENSION	TOLERANCE
L ≤ 6	±0.25 (mm)
6 < L ≤ 18	±0.3 (mm)
18 < L ≤ 50	±0.4 (mm)
50 < L ≤ 125	±0.5 (mm)
125 < L	±0.6 (mm)
ANGLE	±1° (DEG)

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

製品圖  
 LTC79SS202J52KS

APPROVE	NAME	DATE	THIRD ANGLE P
CHECK			
DESIGN	CLOUDE	95.05.29	SCALE UNIT
DRAWN	CLOUDE	95.05.29	1/1 mm

PIN NO	SYMBOL	LEVEL	FUNCTION	PIN NO	SYMBOL	LEVEL	FUNCTION
1	VDD	H	POWER SUPPLY FOR LOGIC	10	DO		
2	S.GND	-	SHIELD GROUND	11	D1	H/L	DISPLAY DATA
3	VLCD	H	POWER SUPPLY FOR LCD	12	D2		
4	FLM	H	FIRST LINE MARKER	13	D3		
5	DISP.OFF	H/L	H.ON/L.OFF	14	VSS	-	LOGIC GROUND
6	M	H/L	SWITCH SIGNAL TO CONVERT LIQUID CRYSTAL DRIVE WAVEFORM INTO AC	15	LED(+)	-	POWER SUPPLY FOR LED
7	CL1	H+L	DATA LATCH	16	LED(-)	-	POWER SUPPLY FOR LED
8	CL2	H+L	SHIFT CLOCK	17			
9	VSS	-	LOGIC GROUND	18	NC		
				19			
				20			

REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE
△					
△					
△					

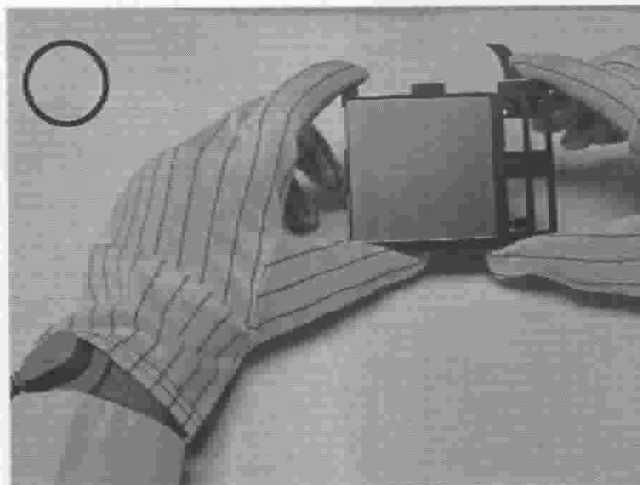
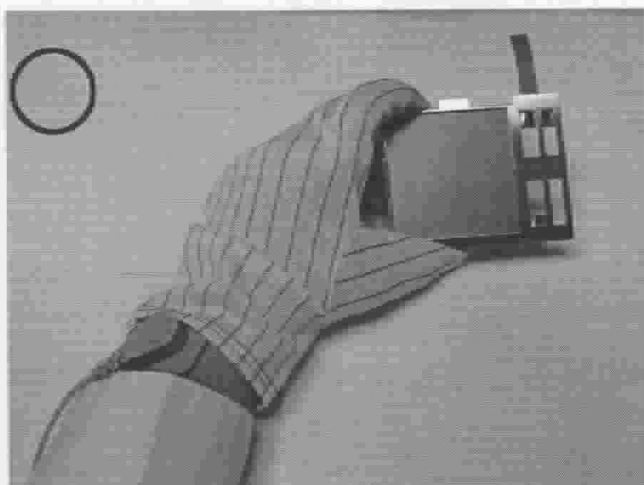
REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE
△					
△					
△					

# THE NOTES OF LCM USING

LCM is easy to damage.

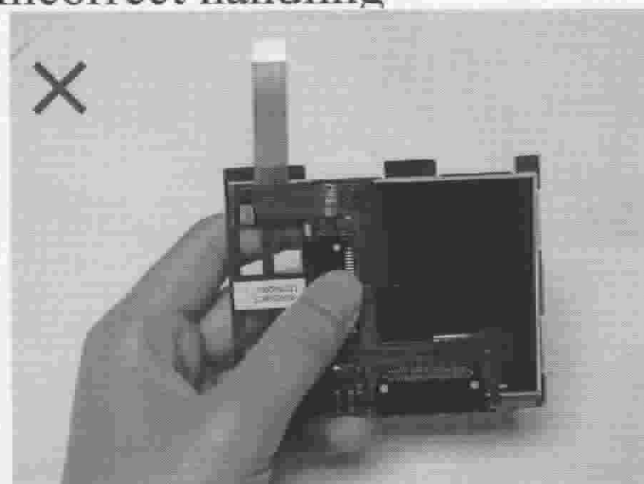
Please follow the notes as bellows, and be careful of handling!

## Correct handling

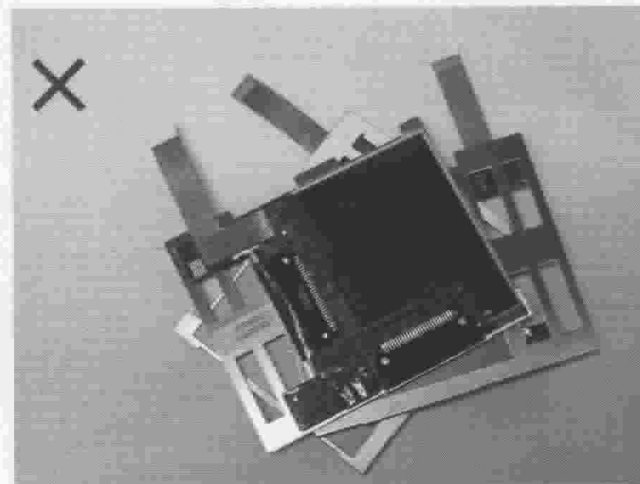


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

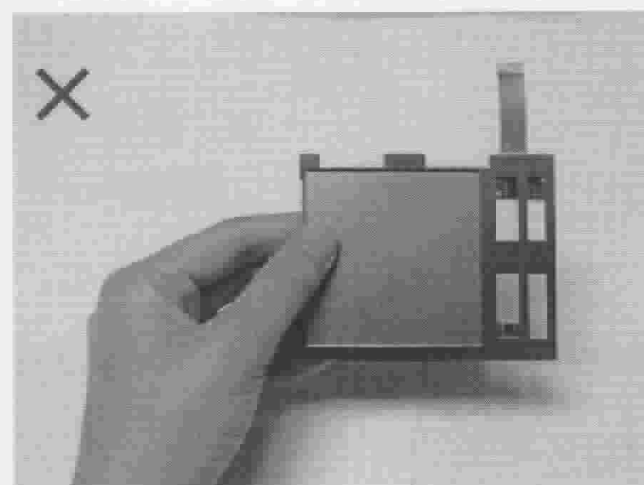
## Incorrect handling



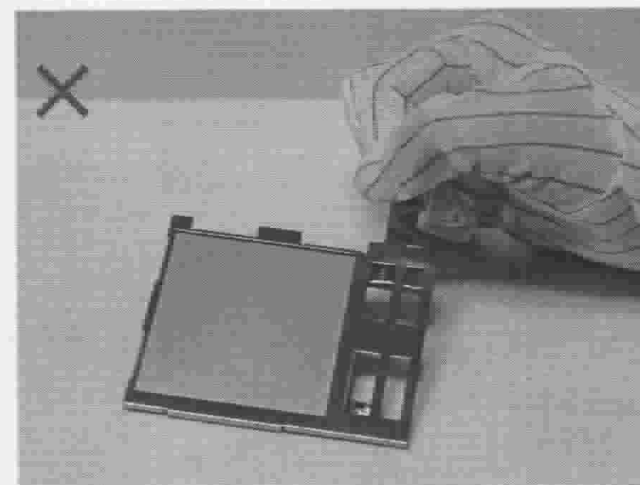
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.



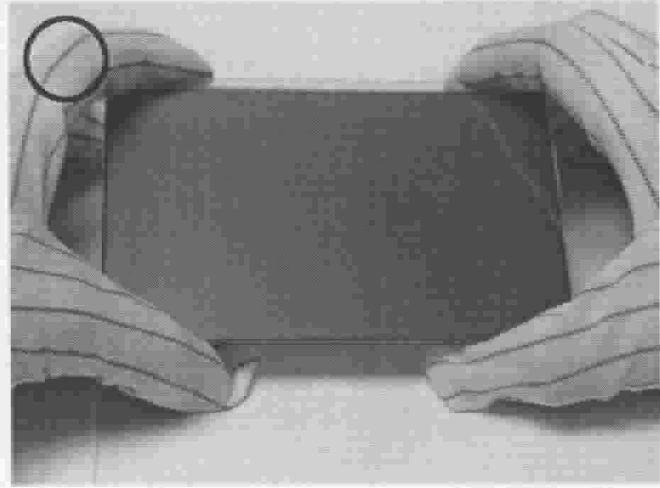
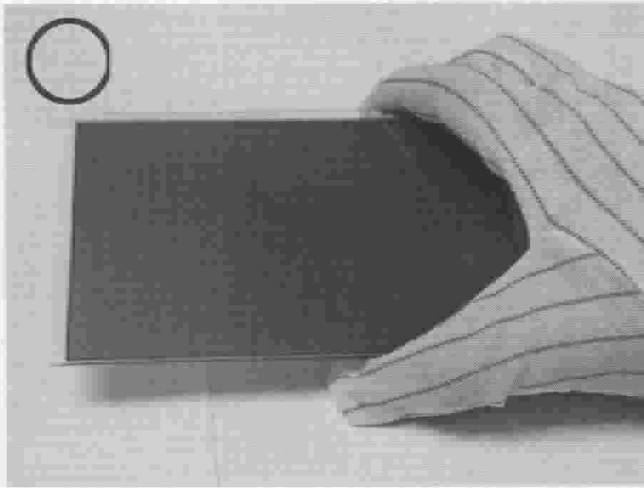
Please don't stretch interface of output.

# THE NOTES OF LCD USING

LCD is easy damage.

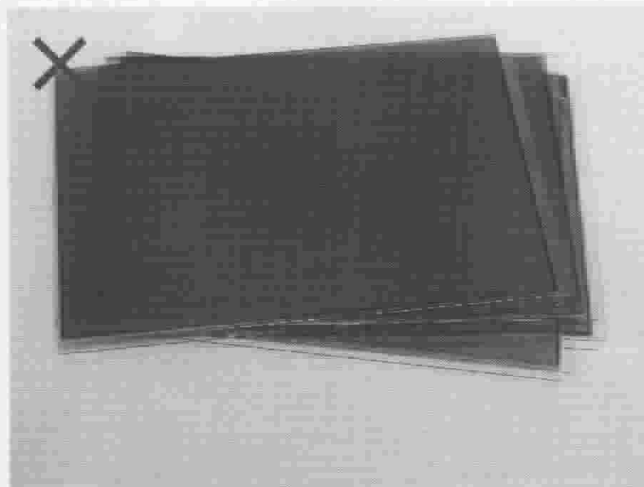
Please follow notes as bellows, and be careful of handling!

## Correct handling

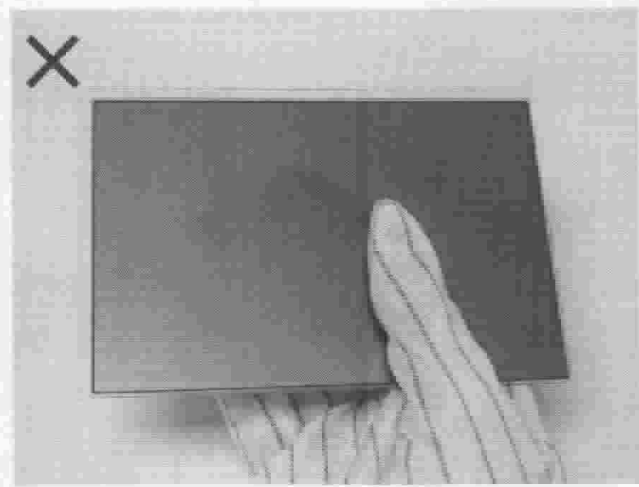


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

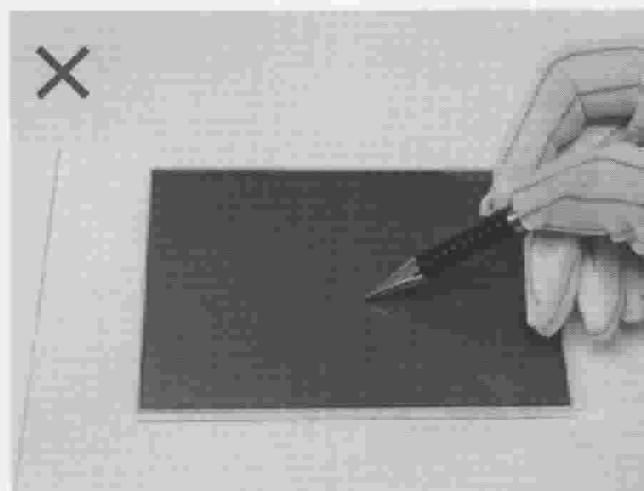
## Incorrect handling



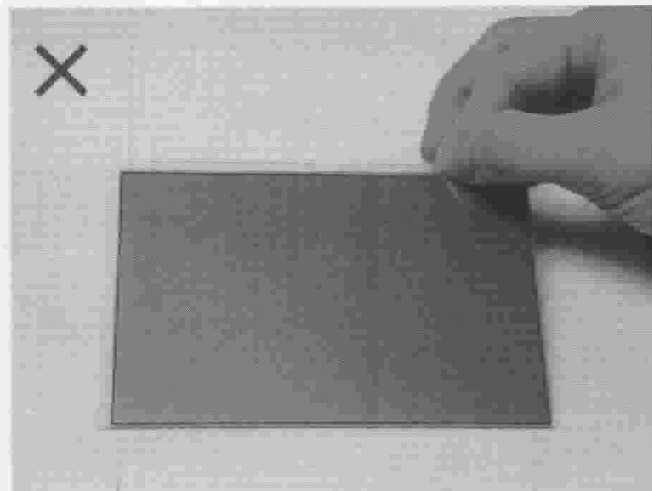
Please don't put one on another LCD.



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.

