NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LCBFAT650MCS_

SPEC. NO.: LM650-0B-0△

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
ELECTRONIC MATERIALS DIVISION
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EDITED ON : AUG. 02, 2007

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

RECORDS OF REVISION

SPEC. NO.: LM650-0B

DATE	REVISED NO.	REF. PAGE	SUMMARY	DESIGN	CHECK
08.02.07'	0	1~24/24	First Issue	J.P.Weng	

1. MECHANICAL DATA

NO	ITEM	CONTENTS	UNIT
1	Product No.	LCBFAT650MCS_	–
2	Module Size	155.5 (W) x 104.5 (H) x 7.0 (D)	mm
3	Dot Size	0.063 (W) x 0.229 (H)	mm
4	Dot Pitch	0.083 (W) x 0.249 (H)	mm
5	Number of Dots	480xRGB (W) x 320 (H)	Dot
6	Duty	1/320	–
7	LCD Display Mode	Color STN / Normally Black	–
8	Rear Polarizer	Transmissive Type	–
9	Viewing Direction	6	O'clock
10	Backlight	CCFL	–
11	Controller IC	Excluded	–
12	Weight	135 (Approx.)	g
			–

Note :

LCBFAT650MCS_

Back Light
B : CCFL Back Light

Reflective/Transmissive
T : Transmissive

Option
C : Anit-glare Film
S : RoHS Compliance
T : SAMPLE

Mode/View Angle
M : Normally Black(Color) ,6 O'clock

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

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD−VSS	−0.3	6.5	V	
Power Supply for LCD Drive	VLCD−VSS	0	30	V	
Input Voltage	VI	−0.3	VDD+0.3	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 Ta ≦ 50°C : 80%RH max

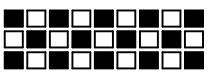
Note 3 Please refer to item of reliability test

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

Frequency	5Hz~13.95Hz	13.95Hz~33Hz	33Hz~51Hz	51Hz~500Hz
Vibration Level	−	2X9.8 m/s²	−	5x9.8 m/s²
Vibration Width	0.2 inch	−	0.036 inch	−
Vibration Direction	X/Y/Z			
Vibration Time	20 min−1 cycle X 3 directions			

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
Input Voltage	VIH	H level		0.8VDD	-	VDD	V
	VIL	L level		0	-	0.2VDD	
Recommended LCD Driving Voltage	VLCD-VSS	Duty=1/320 VDD=3.3V	0°C	26.5	26.9	27.3	V
			25°C	26.1	26.5	26.9	
			50°C	25.7	26.1	26.5	
Supply Current for Logic	IDD	VLCD-VSS = 26.5V Ta=25°C FLM:70 Hz M:861Hz PATTERN: 		-	7.5	12	mA
Supply Current for LCD	ILCD			-	18	27	
Surface Luminance	L	Ta= 25°C Inverter Cotek: 01-B523-0005 Vin=25.4V IL=5mA	PATTERN White	65	80	-	cd/m^2
			PATTERN Black	-	3	-	
LCM Uniformity	U	PATTERN:White		-	80	-	%

3-2.ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used lamp : Rating Temp.=25°C

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Lamp Voltage	V_L	–	320	–	Vrms	–
Lamp current	I_L	–	5	–	mArms	–
Lamp power consumption	P_L	–	1.6	–	W	(*1)
Lamp frequcncy	F_L	30	35	40	kHz	
Starting voltage	V_S	–	–	(377)	Vrms	Ta =25°C
Lamp life time	L_L	–	20000	–	hrs	I_L=5mA

(*1) Power consumption excluded inverter loss .

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

(*3) a. Please follow the table of Lamp Characteristics shown above if not to use the inverter recommended by Nan Ya .

b. If customers want to design inverter by themselves , please inform Nan Ya to offer the detail lamp specification .

3-3.ELECTRICAL CHARACTERISTICS OF TESTED INVERTER

Cotek 01-B523-0005

If the inverter output "CN2" couldn't mating CCFL connector , please refer to specification "INTERNAL PIN CONNECTION" page to fit it.

3-3-1 GENERAL SPECIFICATIONS

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

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

3.3.1.3 DIMENSION : 78.2(L)mm x 16.5(W)mm x MAX 15.9(H)mm

3-3-2 PIN ASSIGNMENTS

INPUT (CN1) CONNECTOR :
JST / S2B-PH-A

NO.	SIGNAL
1	Vin
2	Gnd

OUTPUT (CN2) CONNECTOR :
JST / B4B-PH-A

NO.	SIGNAL
1	AC VOUT
2	NC
3	NC
4	HV

3-3-3 RELATIONSHIP BETWEEN VIN & TUBE CURRENT

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Input Voltage	VIN	–	25.4	–	V	
No Load Output Voltage	Vs	800	–	–	Vrms	
Tube Current	IL	–	5	–	mA	

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℃		25℃		50℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
T	M	13	18	15	20	5.5	8	–	F=45 R=40	–	±35
Note		NOTE 6						NOTE 5			

Note:

T TRANSMISSION

M : NORMALLY BLACK(COLOR), 6 O'CLOCK

AT φ=0° θ=0°

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	800	1000	1500	ms	NOTE 2
		25℃	320	380	600		
		50℃	100	120	180		
Response Time (fall)	Tf	0℃	400	520	800	ms	NOTE 2
		25℃	120	150	230		
		50℃	80	100	150		

4-2.Color of CIE Coordinate

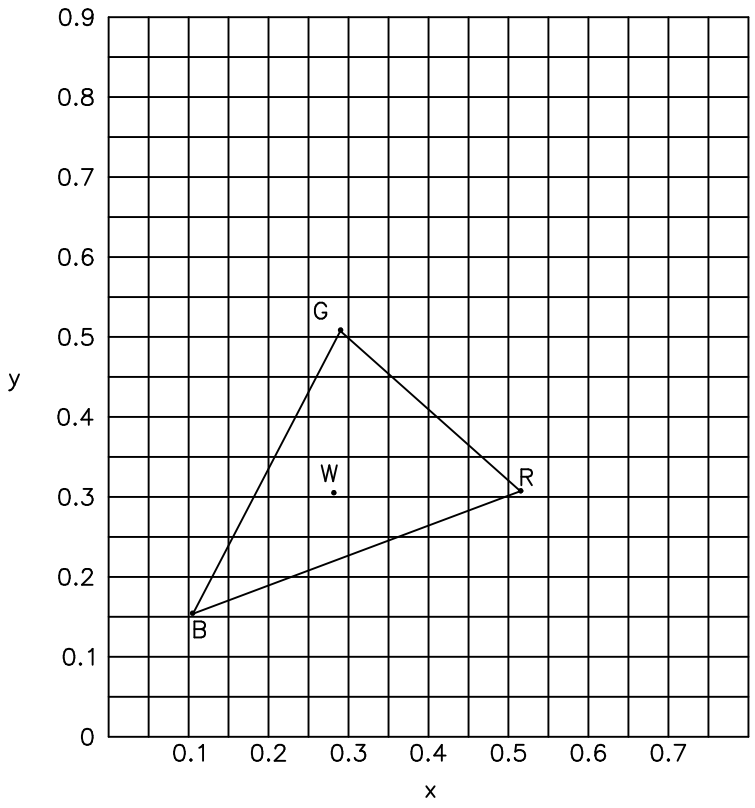
Ta = 25°C

ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	ϕ=0° , θ=0° CCFL BACKLIGHT COLOR DEGREE X=0.297 Y=0.297	0.50	Note※
		y		0.31	
	Green	X		0.29	
		y		0.51	
	Blue	X		0.16	
		y		0.11	
	White	X		0.29	
		y		0.31	

Tolerance : ±0.05

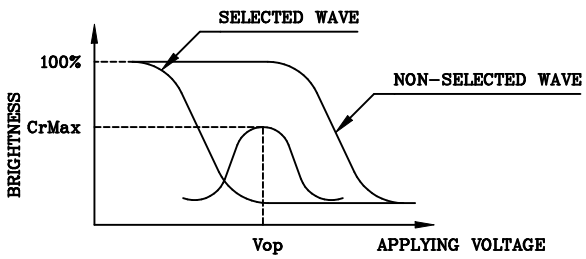
Note※ Measuring at position 3 on Fig.1 CIE chromaticity diagram

Fig.1

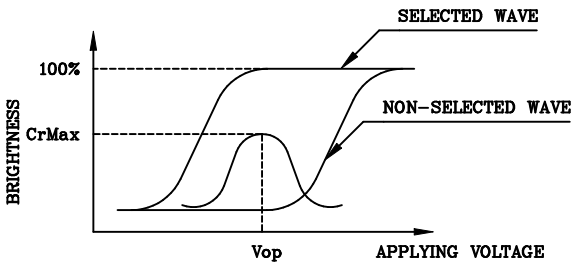


(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



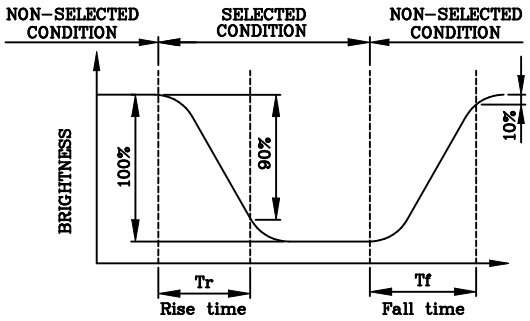
(negative type)

*Conditions

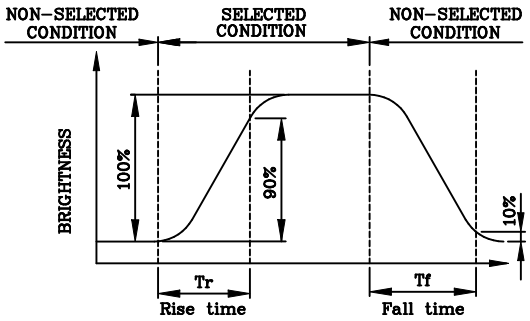
Viewing Angle : 0
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



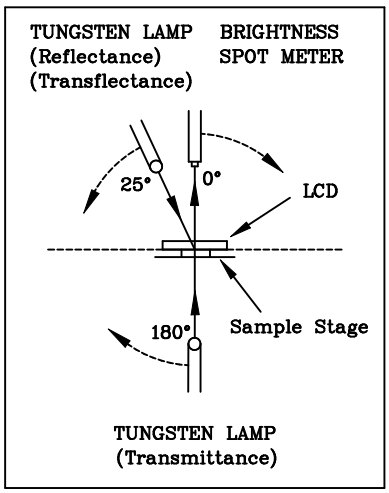
(negative type)

*Conditions

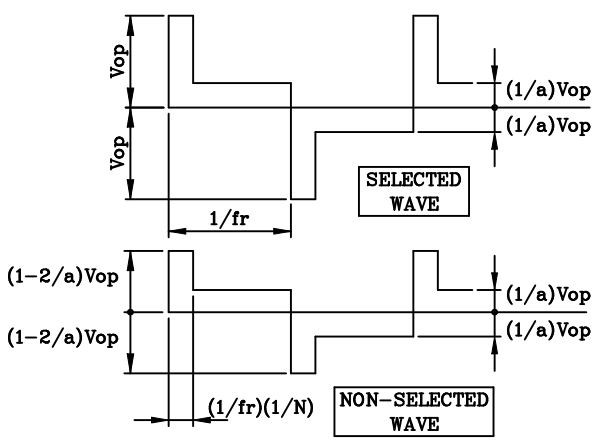
Operating Voltage : Vop
Viewing Angle (θ,ϕ) : (0,0)
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms

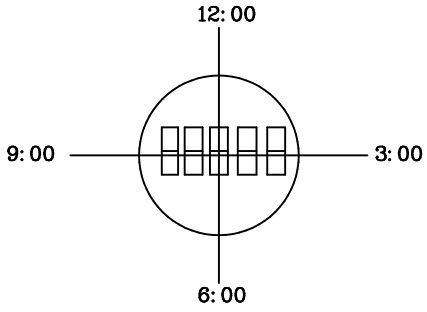


Multiplex Driving (1/N duty 1/a bias)



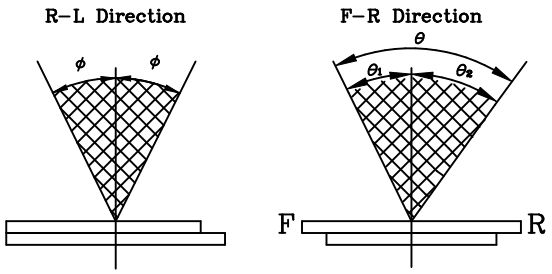
(NOTE 4)

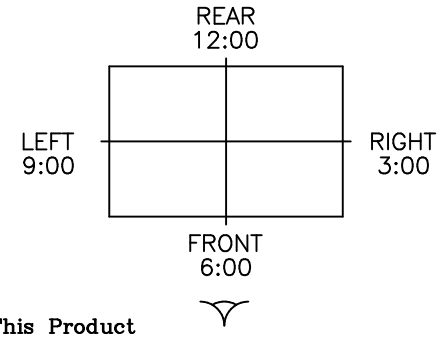
Definition of Viewing Direction



(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 : Vop

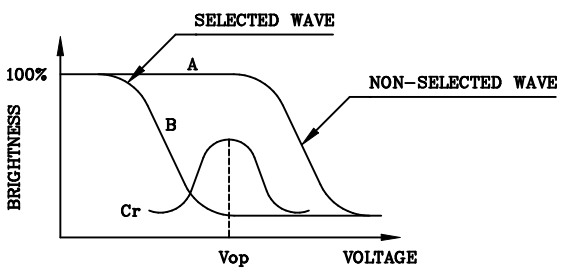
Frame Frequency : 70Hz

Applying Waveform : 1/N duty 1/a bias

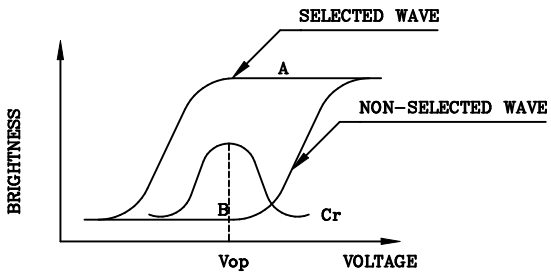
Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



(negative type)

Contrast Ratio : Cr=A/B

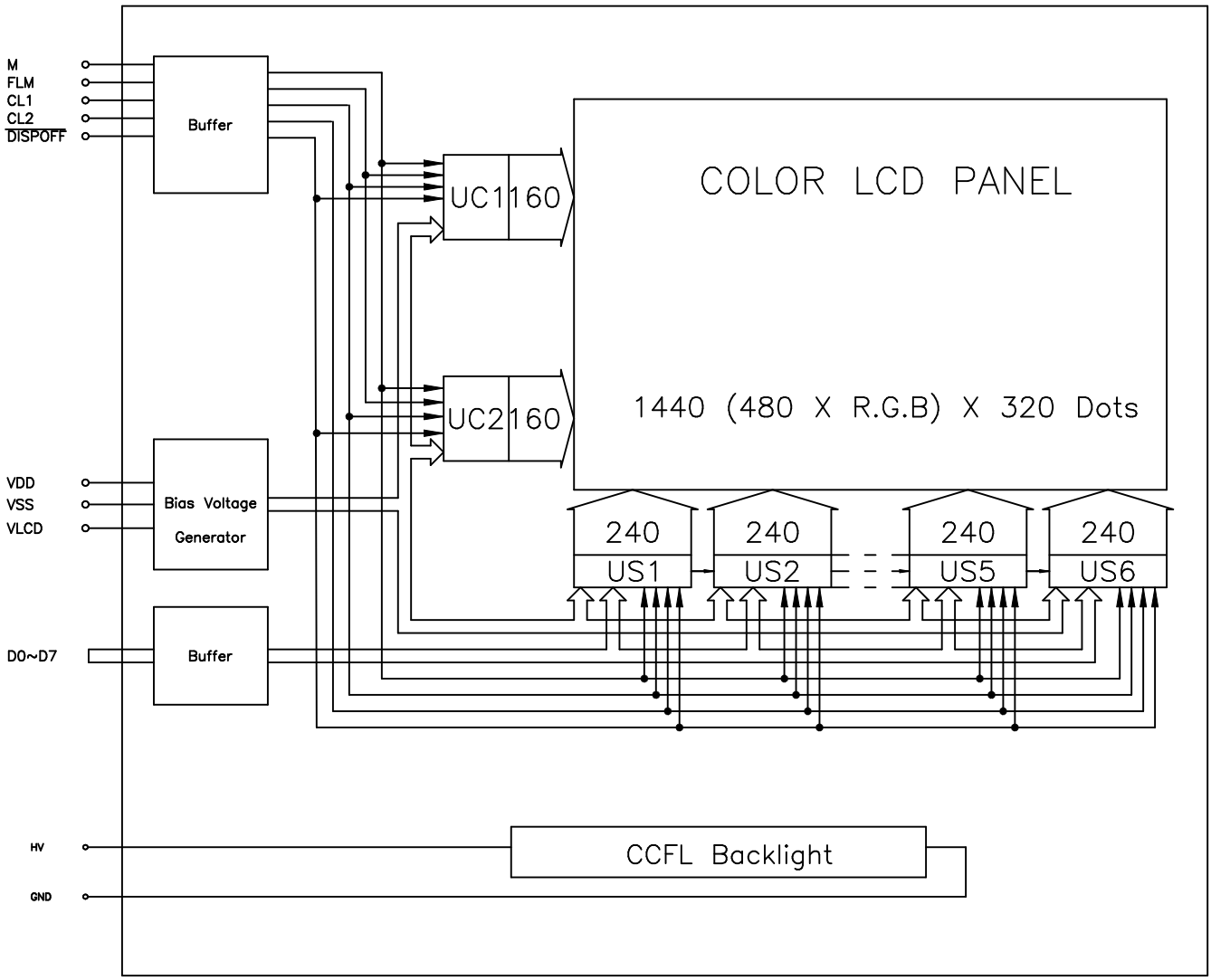
*Conditions

Viewing Angle : 0

Frame Frequency : 70Hz

Applying Waveform : 1/N duty 1/a bias

5. BLOCK DIAGRAM



6.INTERFACE PIN CONNECTION

CN1 LCM I/F : MOLEX 52271-1679 or COMPATIBLE

Mating FPC or FFC : Pitch 1.0 mm,16pin, 0.3 t

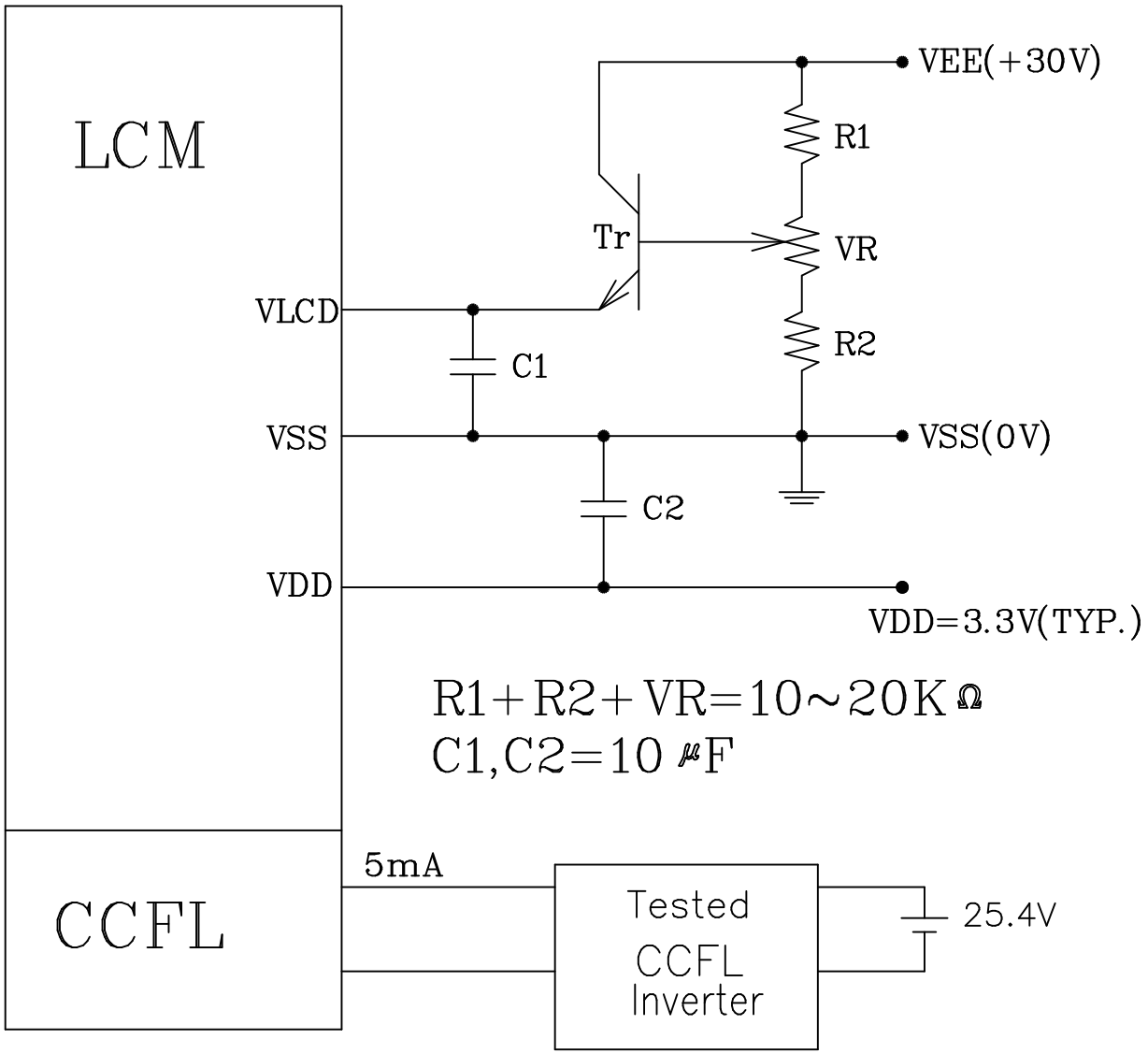
PIN NO	SYMBOL	FUNCTION
1	CL2	DATA SHIFT
2	CL1	DATA LATCH
3	FLM	FIRST LINE MARKER
4	M	CONTROL SIGNAL FOR AC DRIVING
5	D0	DISPLAY DATA
6	D1	
7	D2	
8	D3	
9	D4	
10	D5	
11	D6	
12	D7	
13	VLCD	OPERATING VOLTGE FOR LC DRIVING
14	VDD	POWER SUPPLY FOR LOGIC
15	VSS	GND
16	$\overline{\text{DISP OFF}}$	H: ON / L: OFF

CN2 CFL I/F: JST /PHR-4

Mating Connector : JST/ B4B-PH-A

PIN NO	SYMBOL	FUNCTION
1	VCFL	Power Supply for CFL
2	N.C	——
3	N.C	——
4	GND	GND for CFL

7.POWER SUPPLY



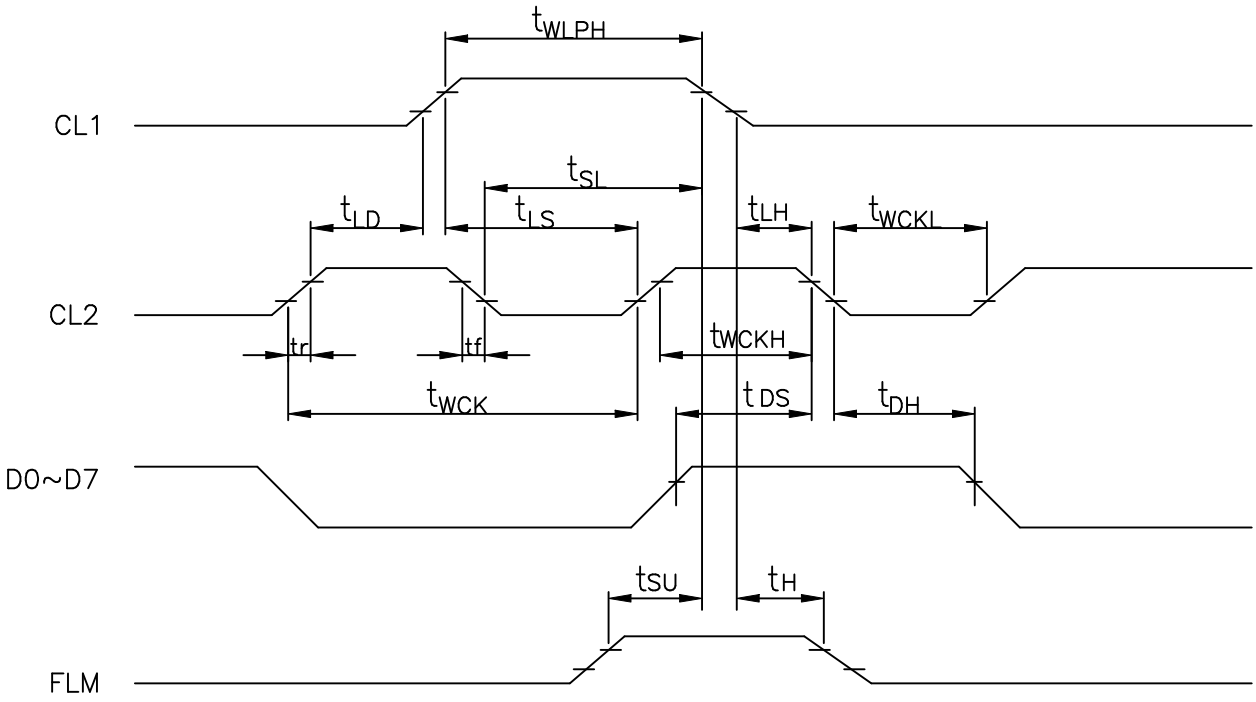
Cotek : 01-B523-0005

8. TIMING CHARACTERISTICS

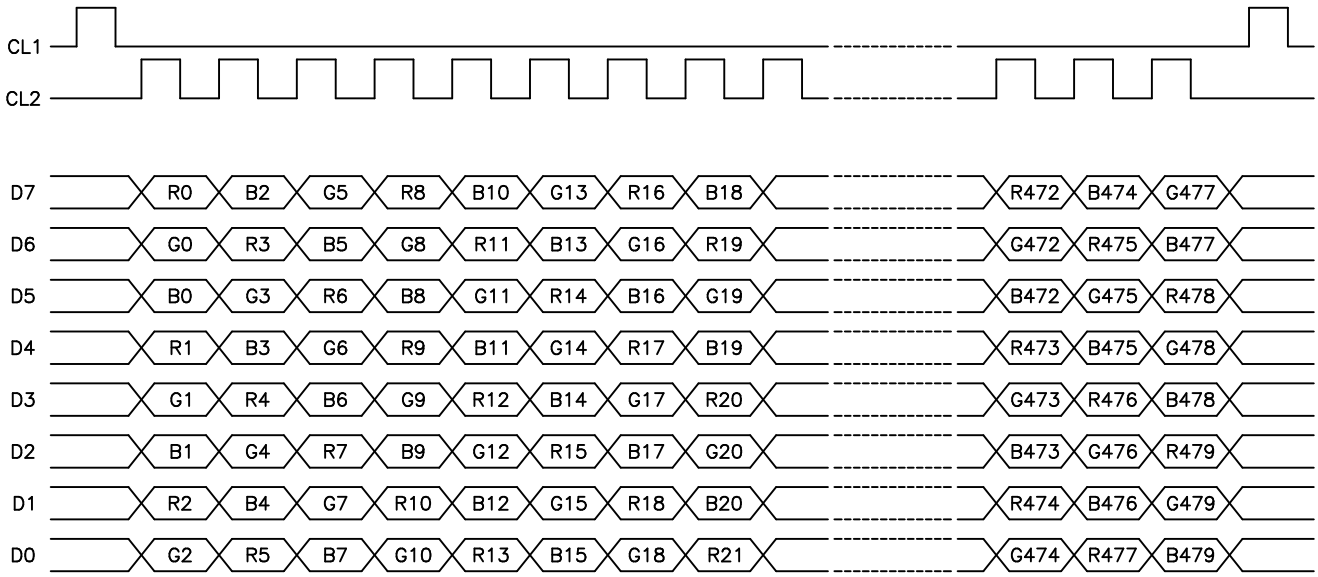
8-1. INTERFACE TIMING

VDD=3.0~4.5V (-30°C~85°C)

Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{WCK}	66	–	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{WCKH}	23	–	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{WCKL}	23	–	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{WLPH}	30	–	ns
CL2→CL1 RISE TIME	t_{LD}	0	–	ns
CL2→CL1 FALL TIME	t_{SL}	50	–	ns
CL1→CL2 RISE TIME	t_{LS}	30	–	ns
CL1→CL2 FALL TIME	t_{LH}	30	–	ns
CLOCK PULSE RISE/FALL TIME	t_r , t_f	–	50	ns
DATA SETUP TIME	t_{DS}	15	–	ns
DATA HOLD TIME	t_{DH}	23	–	ns
FLM SETUP TIME	t_{SU}	30	–	ns
FLM HOLD TIME	t_H	50	–	ns



8-2. TIMING CHART

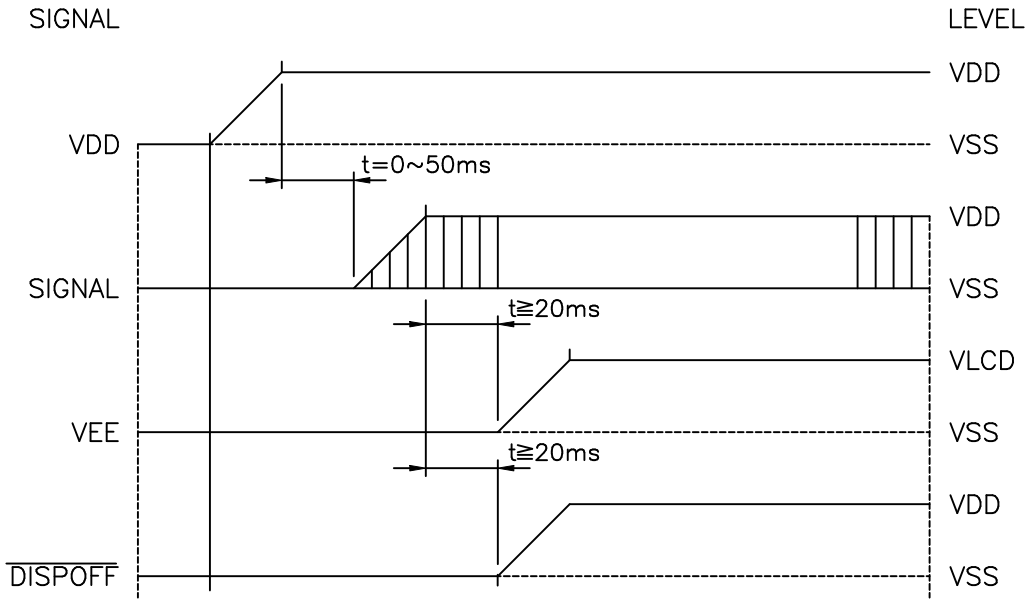


8-3. DISPLAY

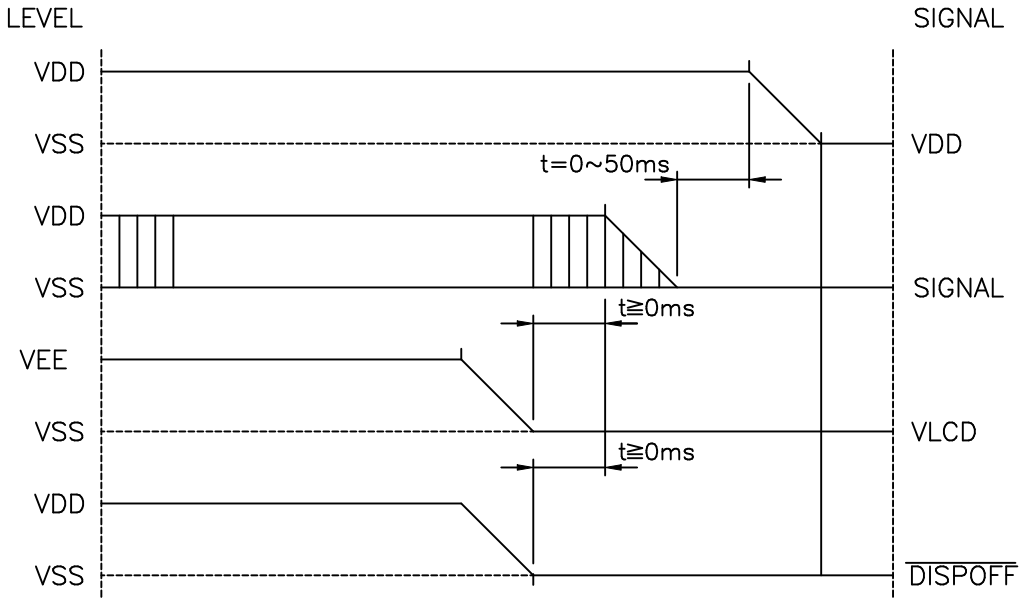
	D7 1	D6 2	D5 3	D4 4	D3 5	D2 6	D1 7	D0 8	...	D7 1433	D6 1434	D5 1435	D4 1436	D3 1437	D2 1438	D1 1439	D0 1440
1	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
2	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
239	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
240	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
241	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
242	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
319	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479
320	R0	G0	B0	R1	G1	B1	R2	G2	...	G477	B477	R478	G478	B478	R479	G479	B479

8-4. 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.

9. 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

Inspection Provision

1.Purpose

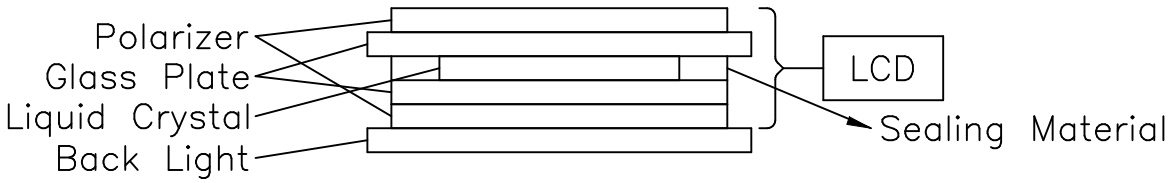
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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 Ispection Method

MIL-STD-105E Level Ⅱ Regular inspection

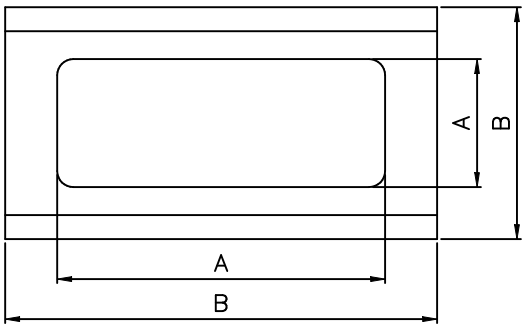
4-2 Inspection Standard

	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 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.

*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	Back Light (CCFL)	Within Specified value

5-2 External Appearance Defect

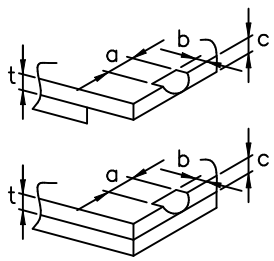
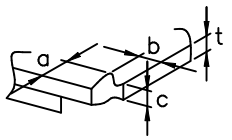
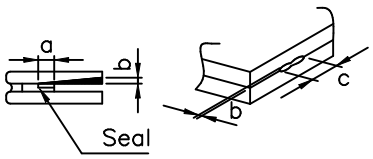
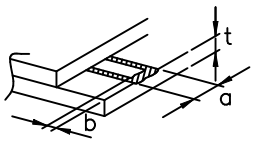
<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th></tr>
<tr><td>1.</td><td>Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)</td><td>
(1)-1-Spots
<table>
<tr><th>Average Diameter(mm):D</th><th>Number of pieces permitted</th><th>Minimum Space</th></tr>
<tr><td>D≦0.2</td><td>Ignore</td><td>-</td></tr>
<tr><td>0.2<D≦0.3</td><td>10</td><td>10mm</td></tr>
<tr><td>0.3<D≦0.4</td><td>5</td><td>30mm</td></tr>
<tr><td>0.4<D</td><td>0</td><td></td></tr>
</table>
Number of total pieces is set to within 10 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≦0.3</td><td>Ignore</td></tr>
<tr><td>0.3<D≦0.75</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.

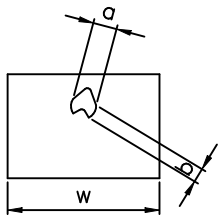
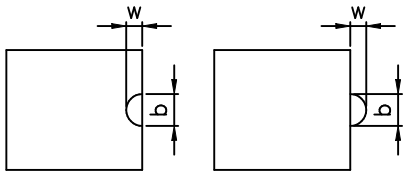
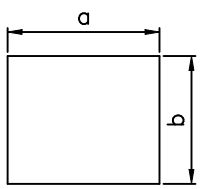
Note that when there are 2 pieces or more, they are not to be concentrated.
Set as: Average diameter = (Long diameter + Short diameter)/2
</td></tr>
</table>

<table>
<tr><td>1.</td><td>Line</td><td>(1)-1-Lines(At non lighting condition)
<table><tr><th>Width(mm):W</th><th>Length(mm):L</th><th>Number of pieces permitted</th></tr><tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr><tr><td>0.03<W≦0.08</td><td>L≦4</td><td>2</td></tr><tr><td>0.08<W≦0.1</td><td>L≦1</td><td>1</td></tr></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 Lines(At lighting condition)
<table><tr><th>Width(mm):W</th><th>Length(mm):L</th><th>Number of pieces permitted</th></tr><tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr><tr><td>0.03<W≦0.08</td><td>L≦3</td><td>6</td></tr><tr><td>0.08<W</td><td>3<L</td><td>None</td></tr></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.</td></tr>
<tr><td>2.</td><td>Scratches(Glass, reflection plates, and polarizing plates)</td><td>In accordance with black spots.
(At non lighting condition)</td></tr>
<tr><td>3.</td><td>Color irregular</td><td>Not remarkable color irregular.</td></tr>
</table>

<table>
<tr><td>4.</td><td>Air bubbles polarizing plates, and reflection plates</td><td colspan="2">
<table>
<tr><th>Average Diameter (mm):D</th><th>Number of pieces permitted</th></tr>
<tr><td>D≦0.3</td><td>Ignore</td></tr>
<tr><td>0.3<D</td><td>0</td></tr>
</table>
Average diameter = (Long diameter + Short diameter)/2
Note that when there are 4 pieces or more, they are not to be concentrated.
</td></tr>
<tr><td rowspan="5">5.</td><td rowspan="5">Cracks</td><td>(1)General crack
 
</td><td>a≦5
b≦2
c≦t
Where, a and b are ignored when less that or equal 0.5. The numbers of pieces are set at up to 5 pieces.</td></tr>
<tr><td>(2)Corner crack
 
</td><td>a≦2.5
b≦2.5
c≦t
a+b≦4</td></tr>
<tr><td>(3)Seal portion crack
 
</td><td>a≦The seal widthx1/3
b≦tx2/3
c≦5
The numbers of pieces are set at up to 5 pieces.</td></tr>
<tr><td>(4)ITO Pin crack
 
</td><td>a≦5
b≦1/3 pin length
c≦t</td></tr>
<tr><td>(5)Progressive cracks</td><td>All taken to be unacceptable.</td></tr>
</table>

6.	Outer dimensions	Should be with in 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 mouting position, etc.
9.	Domain	There is a cluster of white dots gathered will be rejected. A space of 10 mm square, there should be no such a phenomenon. (That's showing in last page)

5-3 Dot Appearance Defect

NO.	Item	Criteria
1.	Pinhole	 Dot display a and b are each ≦0.2mm 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 ≦0.2mm The overall total is taken to be with in 10 units.
3.	Thick and thin display	 Taken to be within±1.5% of display character width(a) and height(b).

NOTICE:

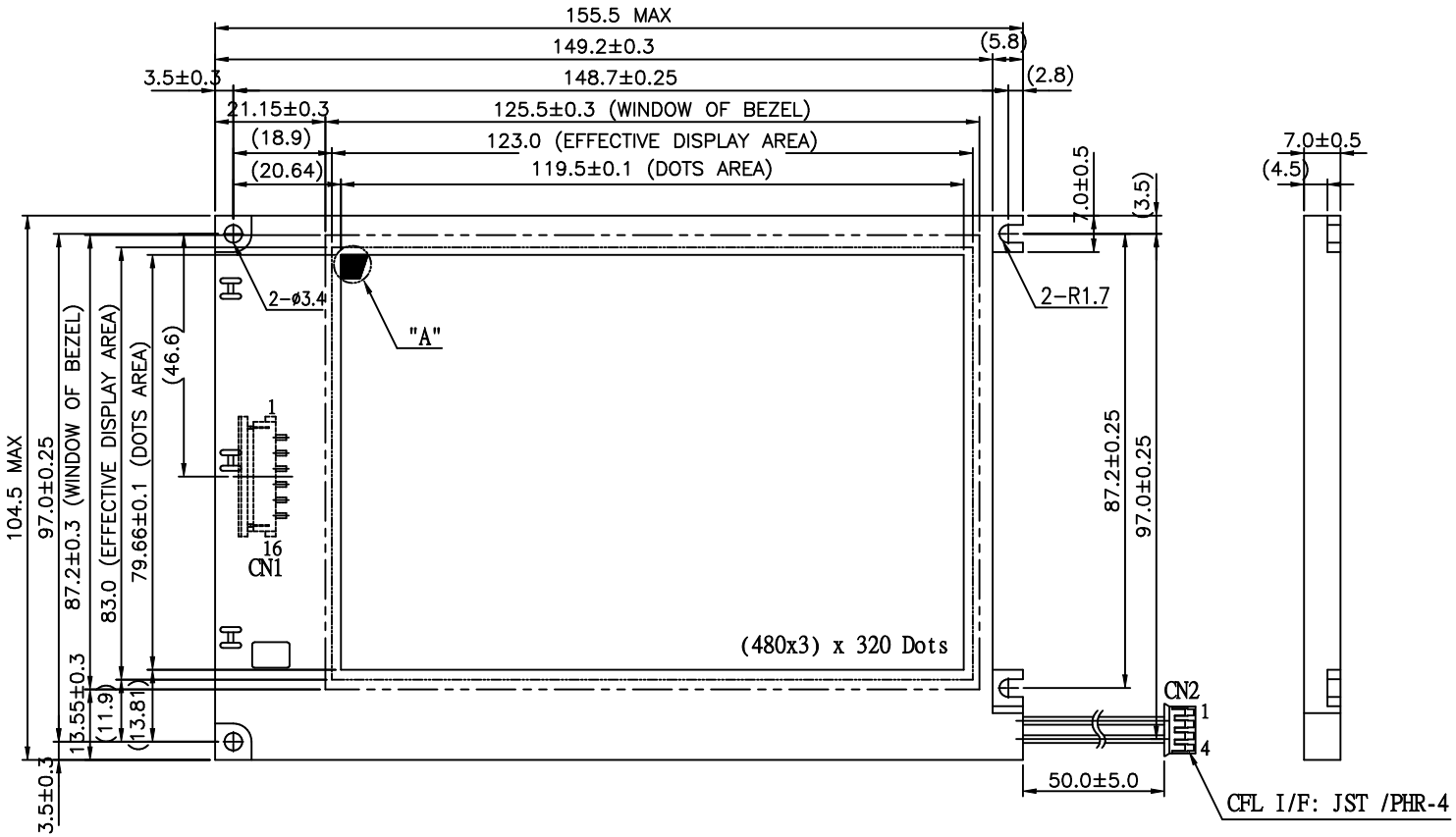
- SAFETY
  1. If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
  2. If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

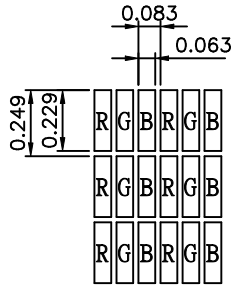
- HANDLING
  1. Avoid static electricity which can damage the CMOS LSI.
  2. Do not remove the panel or frame from the module.
  3. The polarizing plate of the display is very fragile. So, please handle it very carefully.
  4. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch 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°C±5°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.

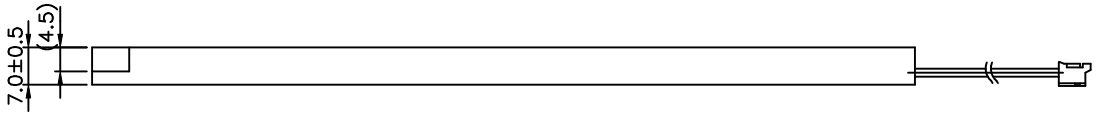
- ADVISE
  1. If that to keep the same image on LCD panel for long time may cause image retained especially in high temperature circumstance. This phenomena will gradually disappear later. The retained time is concerned with the driving condition and image type.
  2. We suggest to use screen saver program to avoid long time still image.





A DETAIL
S = 50:1

VIEW DIRECTION



CN2 CFL I/F: JST /PHR-4

PIN NO	SYMBOL	FUNCTION
1	VCFL	Power Supply for CCFL
2	N.C	—
3	N.C	—
4	GND	GND for CCFL

NOTES :

1. RESOLUTION : (480x3) x 320 DOTS
2. GLASS THICKNESS : 0.7 mm
3. BACKLIGHT : CCFL

CN1 LCM I/F : MOLEX 52271-1679 or COMPATIBLE(FPC: Pitch 1.0 mm,16pin, 0.3t)

PIN NO	SYMBOL	FUNCTION	PIN NO	SYMBOL	FUNCTION
1	CL2	DATA SHIFT	9	D4	DISPLAY DATA
2	CL1	DATA LATCH	10	D5	
3	FLM	FIRST LINE MARKER	11	D6	
4	M	CONTROL SIGNAL FOR AC DRIVING	12	D7	
5	D0	DISPLAY DATA	13	VLCD	OPERATING VOLTGE FOR LC DRIVING
6	D1		14	VDD	POWER SUPPLY FOR LOGIC
7	D2		15	VSS	GND
8	D3		16	DISP OFF	H: ON / L: OFF

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)

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

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

製品圖

LCBFAT650MCS_

	NAME	DATE	THIRD ANGLE P.
APPROVE			
CHECK			
DESIGN	Campos Chen	96.07.05	SCALE / UNIT
DRAWN	Campos Chen	96.07.05	1/1 / mm

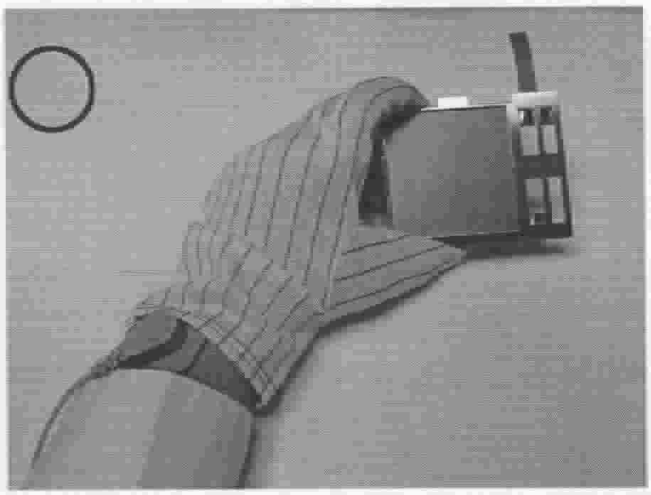
DWG NO. M650BD0A 1/1 0

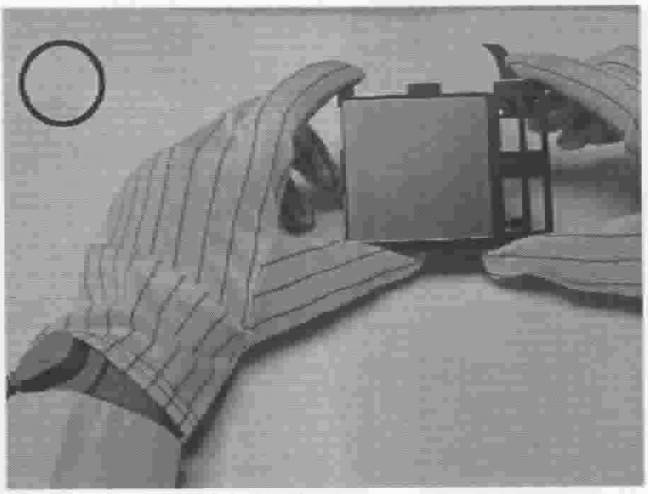
THE NOTES OF LCM USING

LCM is easy to damage.

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

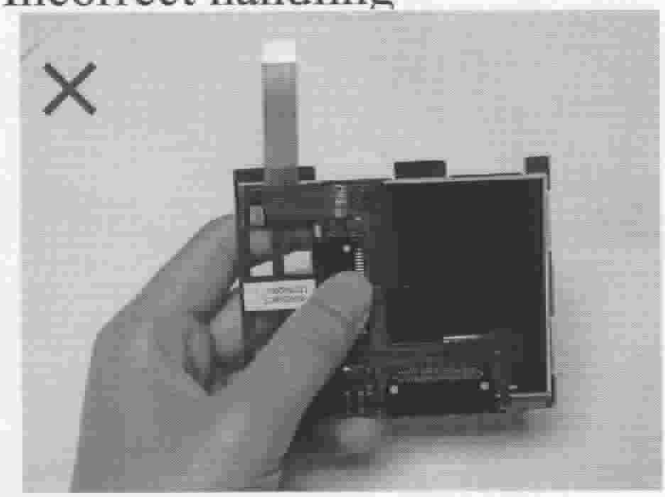
Correct handling



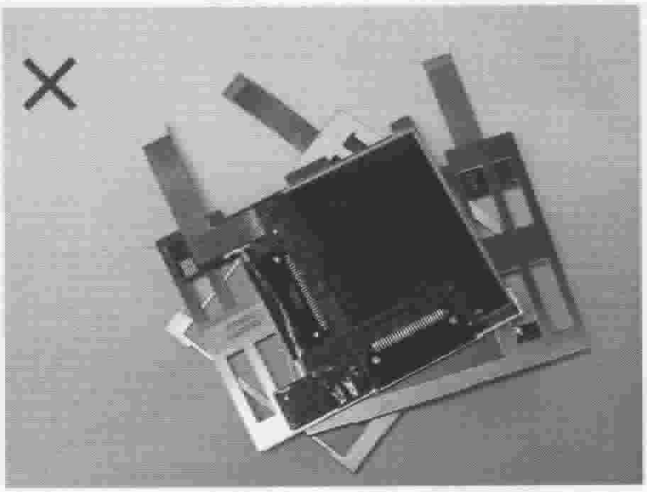


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

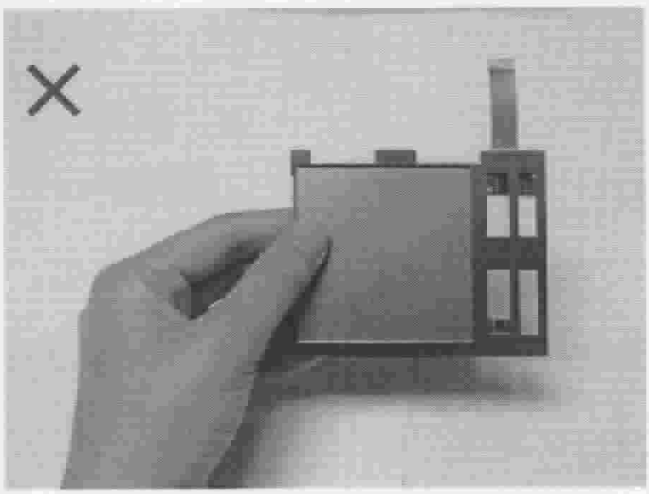
Incorrect handling



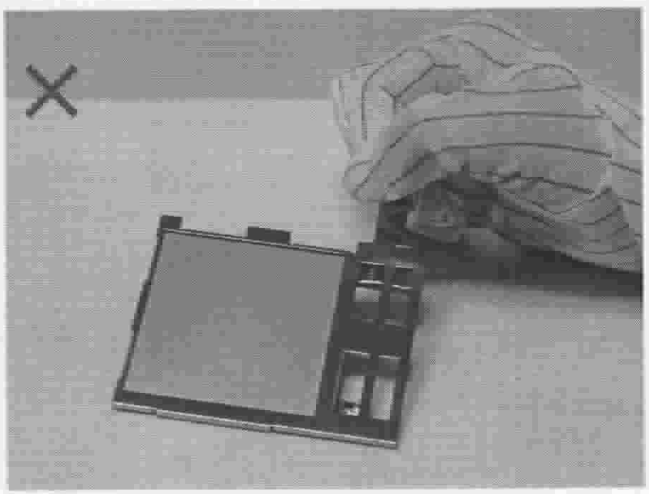
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.

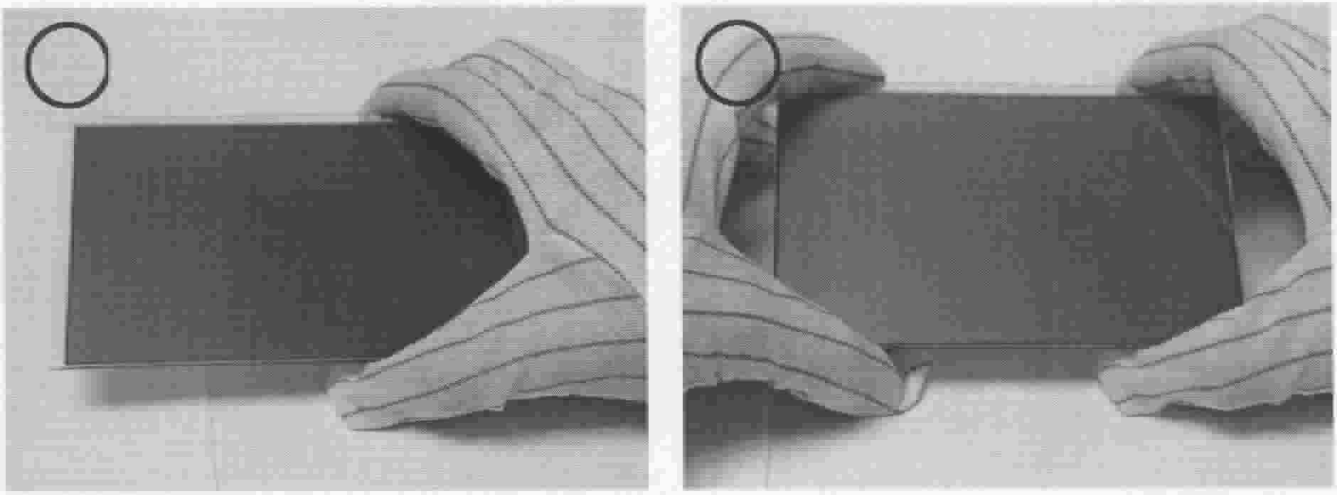


Please don't stretch interface of output.

THE NOTES OF LCD USING

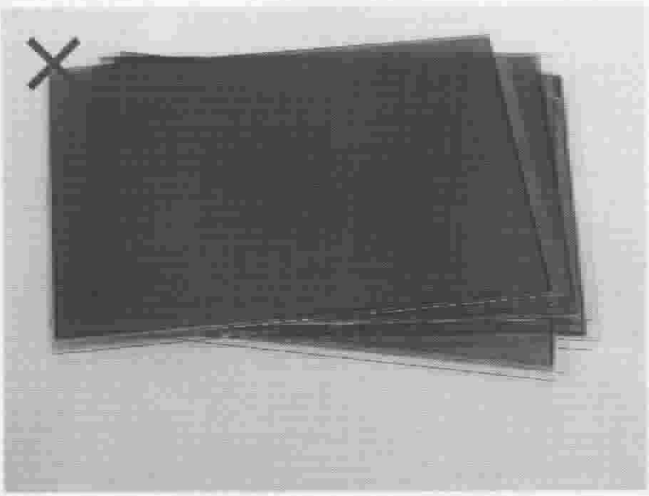
LCD is easy damage.
Please follow notes as bellows, and be careful of handling!

Correct handling

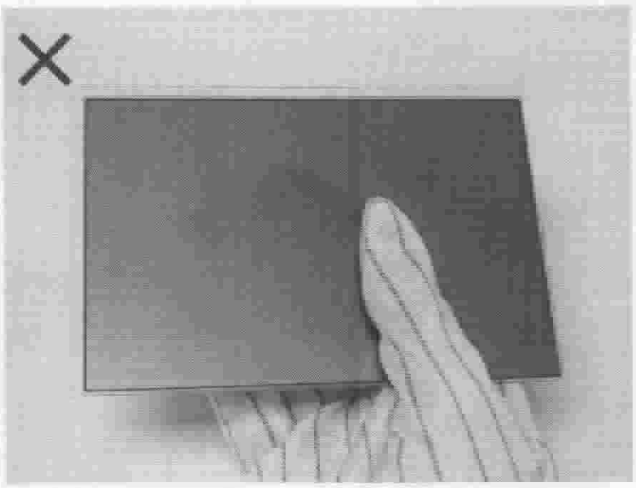


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

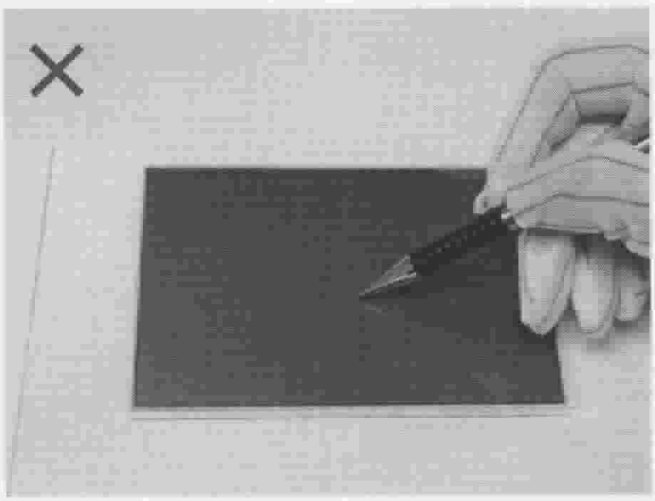
Incorrect handling



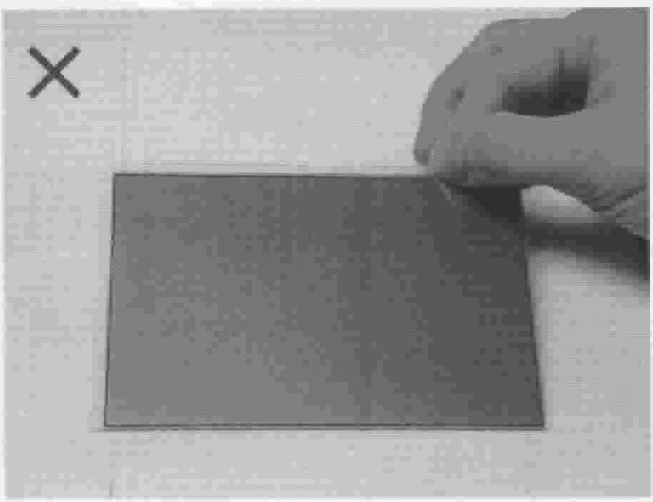
Please don't put one on another LCD.



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.