

NAN YA PLASTICS CORPORATION

SPECIFICATION OF LCD PANEL PRODUCT NO.:LPA34XMS7X

SPEC. NO: LPMS7-1- 1

CUSTOMER
APPROVED BY
DATE:

EDITED ON : Jan. 24. 2008

LCD DEPARTMENT
ELECTRONIC MATERIALS DIVISION
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Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER

SPECIFICATION

1.APPLICATION

This specification shall be applied to 128×(RGB)×160 color LCD panel. PRODUCT NO. LPA34XMS7X for 1/160 duty, 1/11 bias driving.

2.DISPLAY MODE

COLOR STN TRANSMISSIVE TYPE

3.MECHANICAL DATA

NO.	ITEM	NOMINAL DIMENSION	UNIT
1	Panel Dimension	35.8(W)×49.1(H)×1.0(T)	mm
2	Viewing Area	31.8(W)×40.6(H)	mm
3	Display Area	29.173(W)×38.549(H)	mm
4	NO. OF DOTS	128×(RGB)(W)×160(H)	
5	Dot Size	0.065(W)×0.23(H)	mm
6	Dot Space	0.011(W)×0.011(H)	mm
7	Weight	-	g

4.ENVIRONMENTAL ABSOLUTE MAXIMUM RATING

ITEM	WIDE TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	-20	70	-30	80
Humidity (Without Condensation)	Note 1,3		Note 2,3	

Note 1 : Ta ≤ 70°C , 75% RH max.

Note 2 : Please refer to item of reliability test.

Note 3 : Background color will change slightly depending on ambient temperature. That phenomenon is reversib

5.ELECTRICAL AND OPTICAL DATA

NO.	ITEM		SYB.	TEMP °C	MIN.	TYP.	MAX.	UNIT	NOTE	
1	OPERATING VOLTAGE (duty = 1/160) (bias = 1/11)		Vop	-20	16.9	17.4	17.9	V	NOTE1	
				0	16.5	17	17.5			
				25	16.1	16.6	17.1			
				50	15.9	16.4	16.9			
				70	15.7	16.2	16.7			
2	RESPONSE TIME		Tr	RISE TIME	-20	2500	3200	4800	ms	NOTE2
				0	540	680	1100			
				25	205	260	390			
				50	100	130	200			
				70	55	70	110			
			FALL TIME	Tf	-20	2400	3000	4500	ms	
					0	440	550	830		
					25	100	125	190		
					50	55	70	110		
					70	50	60	90		
3	FRAME FREQUENCY		Ff	25	-	70	-	HZ	NOTE3	
4	A.C. RESISTANCE		RLC	25	-	-	-	KΩ	NOTE4	
5	VIEWING DIRECTION		6				O'clock	NOTE5		
6	VIEWING ANGLE		F	$\theta 1$	25	-	35	-	Deg	NOTE6
			R	$\theta 2$		-	20	-		
			L	$\varphi 1$	25	-	30	-		
			R	$\varphi 2$		-	30	-		
7	CONTRAST RATIO		Cr	-20	7	10	13	-	NOTE7	
				0	10.5	15	19.5			
				25	18	26	33.5			
				50	7	10	13			
				70	1.5	2.5	3			

6. RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	80°C	120Hrs		Appearance without defect	
2	Low Temp. Storage	-30°C	120Hrs		Appearance without defect	
3	High Temp. & High Humi. Storage	40°C 90%RH	120Hrs		Appearance without defect	
4	Thermal Shock	$\begin{matrix} \text{---} 30^{\circ}\text{C}, 30\text{min} \rightarrow 25^{\circ}\text{C}, 5\text{min} \text{---} \\ \text{---} 80^{\circ}\text{C}, 30\text{min} \rightarrow 25^{\circ}\text{C}, 5\text{min} \text{---} \end{matrix}$ (1cycle)			Appearance without defect	10 cycles

7. CIE COORDINATE OF COLOR FILTER

ITEM	SYMBOL	CONDITION	VALUE	NOTE
Red	X	$\theta = 0^{\circ}$ $\phi = 0^{\circ}$	0.635	1. Tolerance : ± 0.03
	y		0.343	
Green	X		0.295	
	y		0.578	
Blue	X		0.142	
	y		0.106	

7. PANEL TRANSMITTANCE

MIN 4.2% , TYP 4.8% , When the block light is 2500 nits, the module brightness is 120 nits.

8. CIE COORDINATE OF BLACK LIGHT SUGGESTING

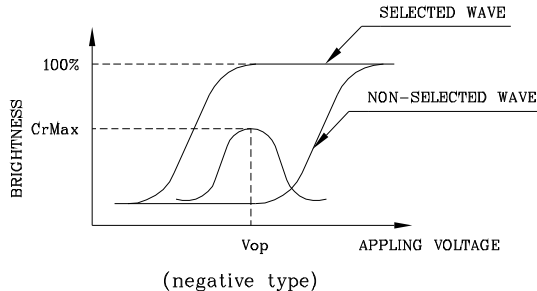
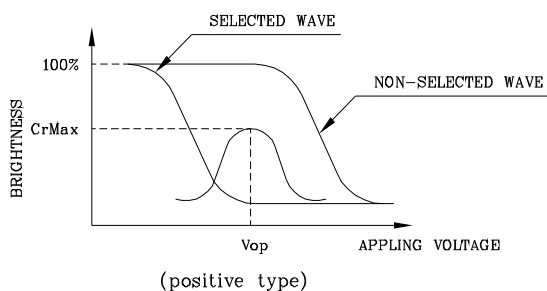
Black Light Color Tone Request : $x=0.31\pm 0.02$, $y=0.31\pm 0.02$

9. CIRCUIT DESIGN SUGGESTING

It's necessary to add a M signal generation circuit (A positive/negative reversed waveform for LCD) to show the best display quality.

(NOTE 1)

Definition of Operation Voltage(Vop)

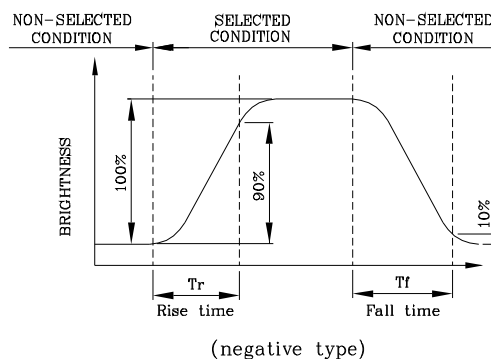
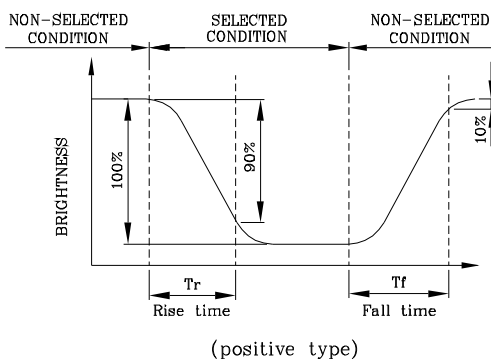


*Conditions

Viewing Angle ($\theta \cdot \phi$) = (0,0)
 Frame Frequency : 70Hz
 Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)

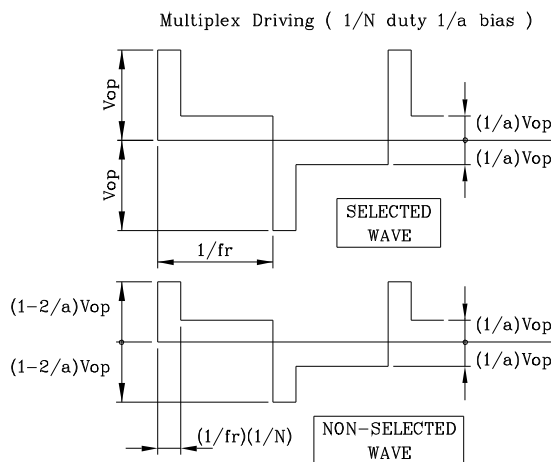
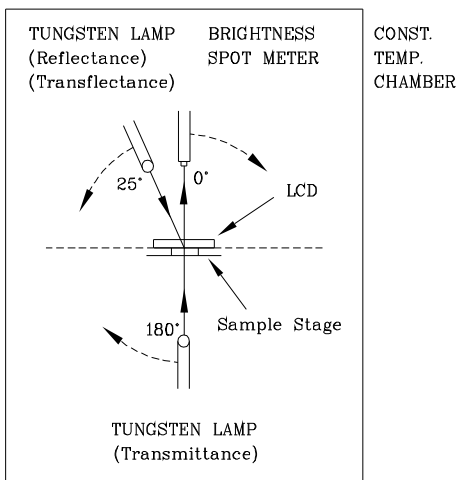


*Conditions

Operating Voltage : Vop
 Viewing Angle ($\theta \cdot \phi$) : (0,0)
 Frame Frequency : 70Hz
 Applying Waveform : 1/N duty 1/a bias

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



(NOTE 4)

Measuring Method of A.C. Resistance

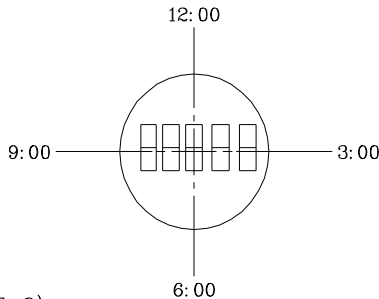


*Conditions

Temperature : 25°C
 Applied Voltage : V_{th} A.C.
 Frame Frequency : 70Hz

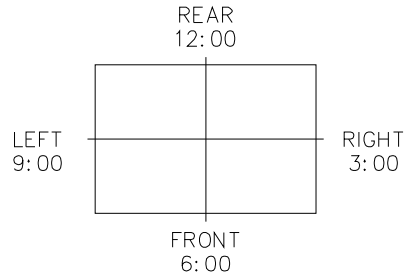
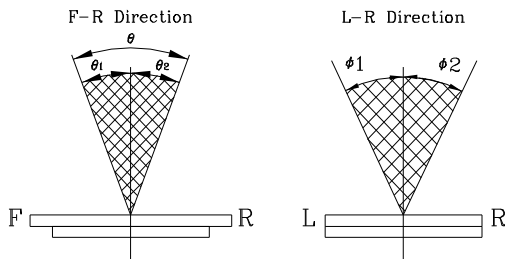
(NOTE 5)

Definition of Viewing Direction



(NOTE 6)

Definition of Viewing Angle



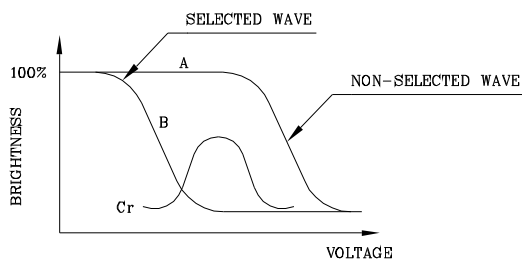
*Conditions

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

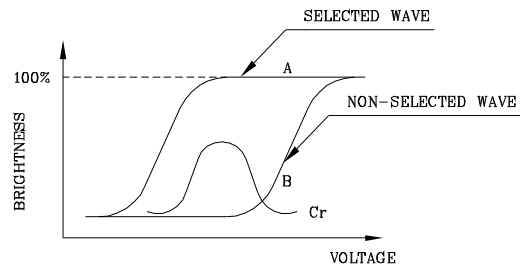
$$\theta = \theta_1 + \theta_2$$

(NOTE 7)

Definition of Contrast Ratio (Cr)



(positive type)



(negative type)

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

*Conditions

Operating Voltage : V_{op}
 Temperature : 25°C
 Viewing Angle ($\theta \cdot \phi$) : (0,0)
 Frame Frequency : 70Hz
 Applying Waveform : 1/N duty 1/a bias

SPECIFICATION

Inspection Provision

1.Purpose

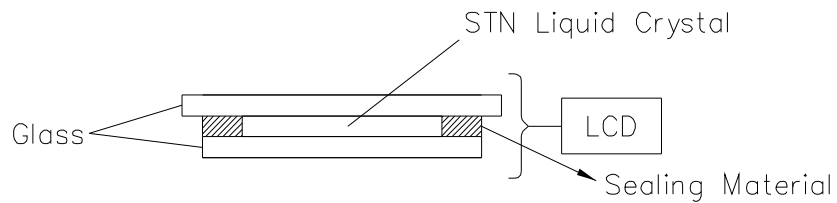
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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

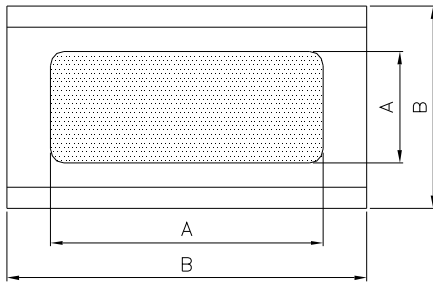
	Item		AQL(%)	Remarks
Major Defect	Dots	Opens Shorts Erroneous operation	0.4	faults which substantially lower the practicality and the initial purpose difficult to achieve.
	Cracks	Display surface cracks		

SPECIFICATION

	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		

4-3 Inspection Provisions
 *Viewing Area Definition

Fig. 1



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

*Inspection place to be 500 to 1000 lux illuminance uniformly without glaring.
 The distance between luminous source(daylight fluorescent lamp and cool white fluorescent lamp) and a sample to be 30cm to 50cm.

SPECIFICATION

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

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

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

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

5.Specification for quality check 5-1 Electrical characteristics

NO.	Item	Criterion
1.	Non operational	Fail
2.	Miss operating	Fail
3.	Missing dot	Fail
4.	Contrast irregular	Fail
5.	Response time	Within Specified value

SPECIFICATION

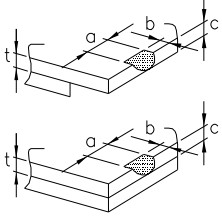
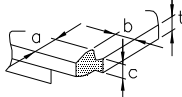
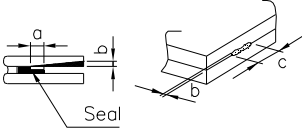
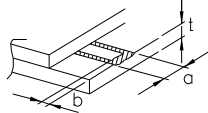
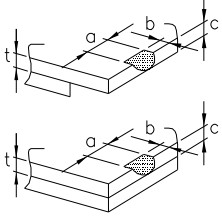
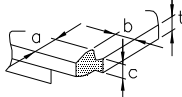
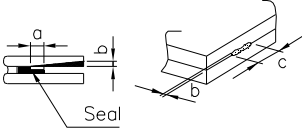
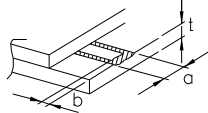
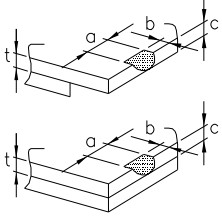
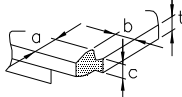
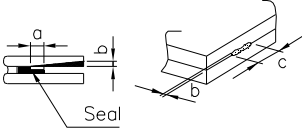
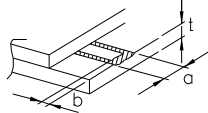
5-2 External Appearance Defect

NO.	Item	Criterion																		
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	<p>(1)Spots</p> <table border="1" data-bbox="715 499 1251 748"> <thead> <tr> <th>Average Diameter(mm):D</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.1$</td> <td>Ignore</td> </tr> <tr> <td>$0.1 < D \leq 0.2$</td> <td>3</td> </tr> <tr> <td>$0.2 < D \leq 0.25$</td> <td>1</td> </tr> <tr> <td>$0.25 < D$</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>(2)Blurred Spots(At lighting condition)</p> <table border="1" data-bbox="715 1117 1251 1323"> <thead> <tr> <th>Average Diameter(mm):D</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.3$</td> <td>Ignore</td> </tr> <tr> <td>$0.3 < D \leq 0.75$</td> <td>2</td> </tr> <tr> <td>$0.75 < D$</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	$0.1 < D \leq 0.2$	3	$0.2 < D \leq 0.25$	1	$0.25 < D$	0	Average Diameter(mm):D	Number of pieces permitted	$D \leq 0.3$	Ignore	$0.3 < D \leq 0.75$	2	$0.75 < D$	0
Average Diameter(mm):D	Number of pieces permitted																			
$D \leq 0.1$	Ignore																			
$0.1 < D \leq 0.2$	3																			
$0.2 < D \leq 0.25$	1																			
$0.25 < D$	0																			
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$0.75 < D$	0																			

SPECIFICATION

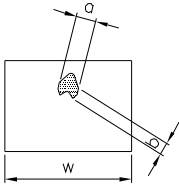
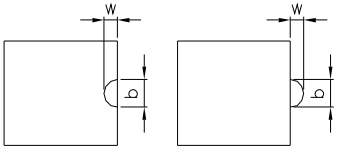
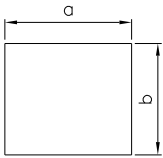
2.	Line defect	<p>(1)Line(At non lighting condition)</p> <table border="1" data-bbox="715 456 1331 703"> <thead> <tr> <th>Width(mm): W</th> <th>Length(mm):L</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.03$</td> <td>Ignore</td> <td>Ignore</td> </tr> <tr> <td>$0.03 < W \leq 0.08$</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>(2)Line(At lighting condition)</p> <table border="1" data-bbox="715 969 1331 1216"> <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
Width(mm): W	Length(mm):L	Number of pieces permitted																								
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$W \leq 0.03$	Ignore	Ignore																								
$0.03 < W \leq 0.08$	$L \leq 3$	6																								
$0.08 < W$	$3 < L$	None																								
3.	Scratches(Glass, reflection plates, and polarizing plates)	In accordance with black spots. (At non lighting condition)																								
4.	Color irregular	Not remarkable color irregular.																								

SPECIFICATION

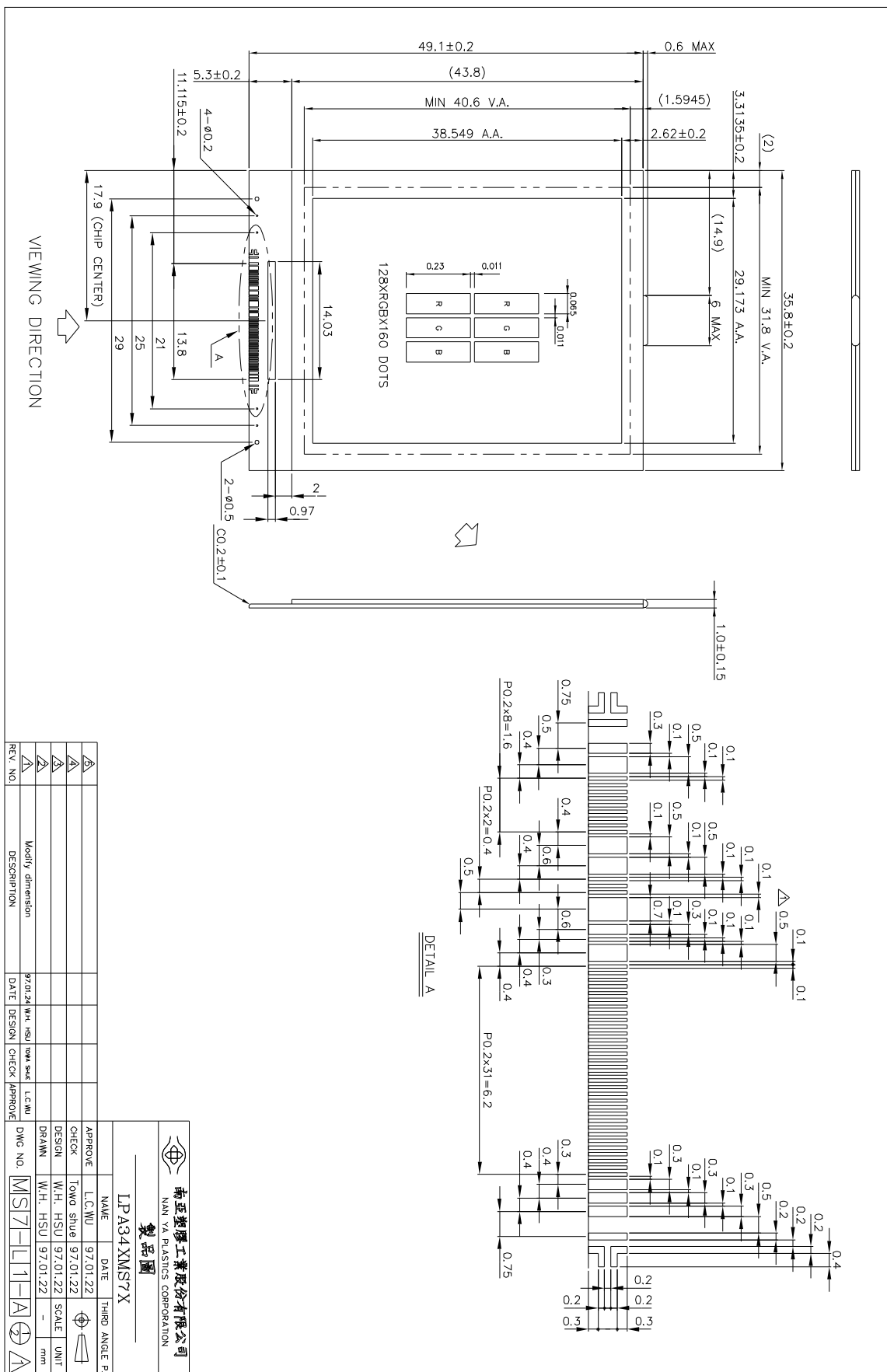
<p>5. Air bubbles polarizing plates, and reflection plates</p>	<table border="1" data-bbox="715 416 1142 667"> <tr> <th data-bbox="715 416 930 539">Average Diameter (mm): D</th> <th data-bbox="930 416 1142 539">Number of pieces permitted</th> <th data-bbox="1142 416 1340 539" rowspan="2">Average diameter = (Long diameter + Short diameter)/2</th> </tr> <tr> <td data-bbox="715 539 930 667"> $D \leq 0.3$ $0.3 < D$ </td> <td data-bbox="930 539 1142 667"> Ignore 0 </td> </tr> </table> <p data-bbox="715 680 1340 757">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	$D \leq 0.3$ $0.3 < D$	Ignore 0					
Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2									
$D \leq 0.3$ $0.3 < D$	Ignore 0										
<p>6. Cracks</p>	<table border="1" data-bbox="671 757 1340 1832"> <tr> <td data-bbox="671 757 1007 1099"> <p>(1) General crack</p>  </td> <td data-bbox="1007 757 1340 1099"> $a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces. </td> </tr> <tr> <td data-bbox="671 1099 1007 1267"> <p>(2) Corner crack</p>  </td> <td data-bbox="1007 1099 1340 1267"> $a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$ </td> </tr> <tr> <td data-bbox="671 1267 1007 1503"> <p>(3) Seal portion crack</p>  </td> <td data-bbox="1007 1267 1340 1503"> $a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$ The numbers of pieces are set at up to 5 pieces. </td> </tr> <tr> <td data-bbox="671 1503 1007 1715"> <p>(4) ITO Pin crack</p>  </td> <td data-bbox="1007 1503 1340 1715"> $a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$ </td> </tr> <tr> <td data-bbox="671 1715 1007 1832"> <p>(5) Progressive cracks</p> </td> <td data-bbox="1007 1715 1340 1832"> All taken to be unacceptable. </td> </tr> </table>	<p>(1) General crack</p> 	$a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces.	<p>(2) Corner crack</p> 	$a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$	<p>(3) Seal portion crack</p> 	$a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$ The numbers of pieces are set at up to 5 pieces.	<p>(4) ITO Pin crack</p> 	$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$	<p>(5) Progressive cracks</p>	All taken to be unacceptable.
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<p>(4) ITO Pin crack</p> 	$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$										
<p>(5) Progressive cracks</p>	All taken to be unacceptable.										
<p>7. Outer dimensions</p>	<p>Should be with in the tolerance.</p>										

SPECIFICATION

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>

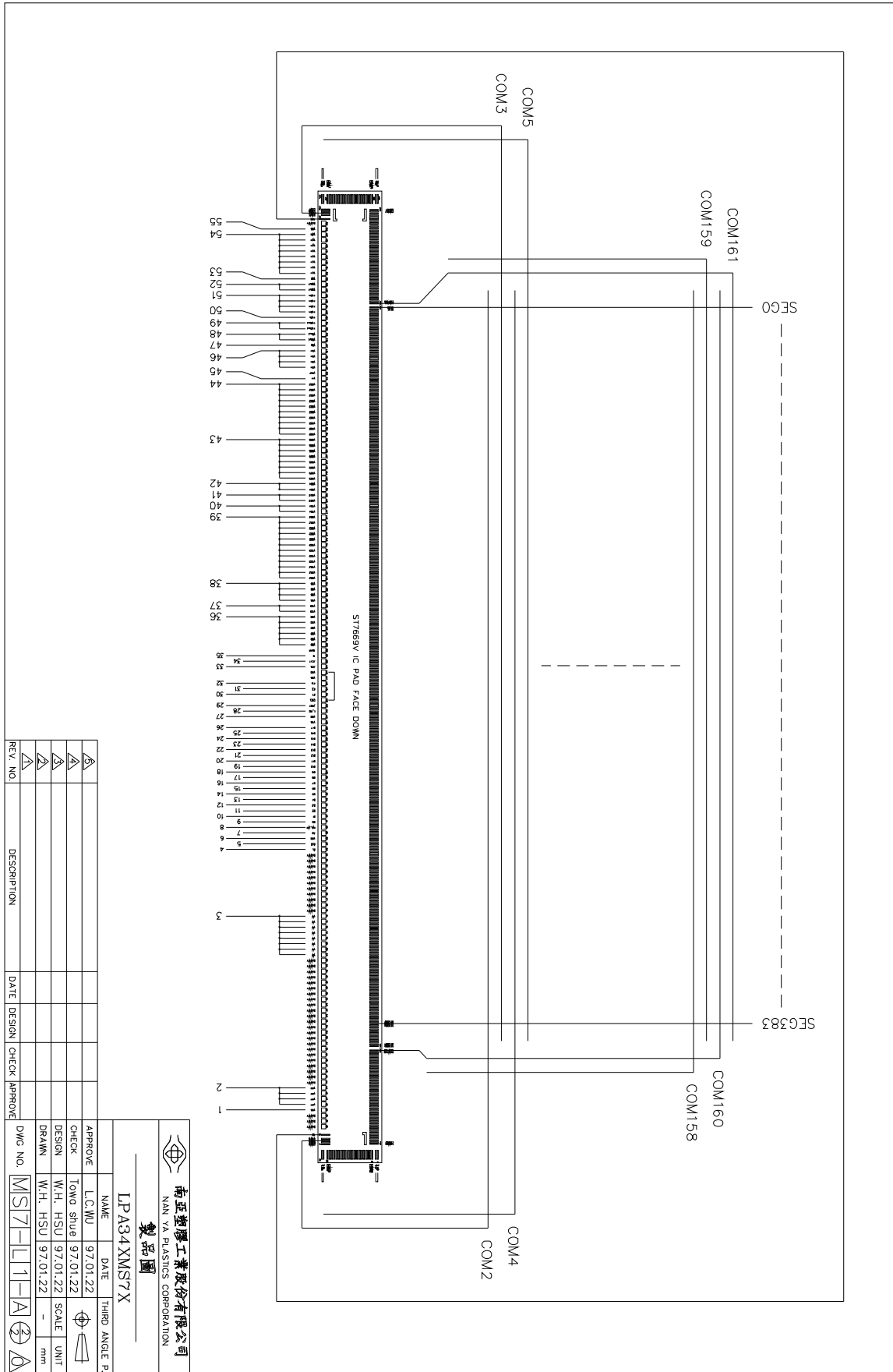
SPECIFICATION



REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE
△	Modify dimension	97.01.24	W.H. HSU	W.H. HSU	L.C. WU
△					
△					
△					

<p>南亞塑膠工業股份有限公司 NAN YA PLASTICS CORPORATION</p>					
製圖圖					
NAME	DATE	THIRD ANGLE P.			
LPA34XM57X	97.01.22				
APPROVE	DATE	THIRD ANGLE P.			
CHECK	97.01.22				
DESIGN	97.01.22	SCALE			
DRAWN	97.01.22	UNIT			
		mm			
DWG. NO.	M57-L11-A				

SPECIFICATION



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

APPROVE	NAME	DATE	THIRD ANGLE P.
CHECK	L.C.WU	97.01.22	
DESIGN	TOWG SHUE	97.01.22	
DRAWN	W.H. HSU	97.01.22	SCALE
	W.H. HSU	97.01.22	UNIT
			mm


 南亚塑膠工業股份有限公司
 NAN YA PLASTICS CORPORATION
 製圖圖

DWG. NO.	MST-L1-A
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