

NAN YA PLASTICS CORPORATION

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SPECIFICATION OF  
LCD PANEL  
PRODUCT NO.: LPAE8T014GCD

SPEC. NO.: LP014-1- $\triangle$ 2

CUSTOMER
APPROVED BY

LCD DEPARTMENT  
ELECTRONIC MATERIALS DIVISION  
NAN YA PLASTICS CORPORATION  
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EDITED ON : APR. 06 ,2006

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



## 1. APPLICATION

This specification shall be applied to 240 X 128 LCD panel.  
PRODUCT NO. LPAE8T014GCD for 1/128 duty, 1/13 bias driving

## 2. DISPLAY MODE

FSTN TRANSMISSION TYPE, NORMALLY BLACK MODE, Anti-glare

## 3. MECHANICAL DATA

NO	ITEM	NOMINAL DIMENSION	UNIT
1.	PANEL DIMENSION	142.0(W)X83.4(H)X2.8(T)	mm
2.	VIEWING AREA	128.0(W)X74.0(H)	mm
3.	DISPLAY AREA	119.97(W)X63.97(H)	mm
4.	NO. OF DOTS	240(W)X128(H)	
5.	DOT SIZE	0.47(W)X0.47(H)	mm
6.	DOT SPACE	0.03(W)X0.03(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 1,2		Note 1,3	

Note 1  $T_a \leq 70^\circ\text{C}$  : 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 reversible.

## 5. ELECTRICAL AND OPTICAL DATA

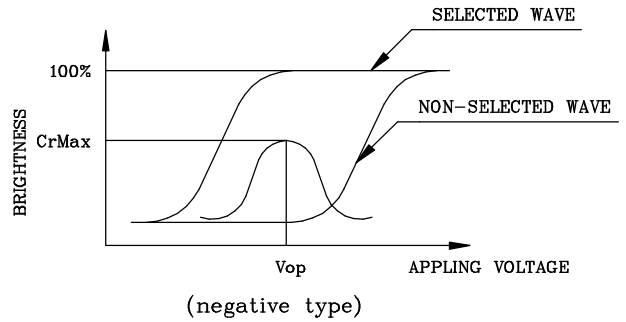
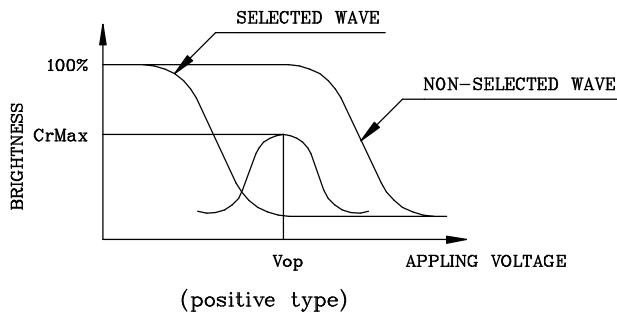
NO	ITEM	SYB.	TEMP. °C	MIN.	TYP.	MAX.	UNIT	NOTE	
1.	OPERATING VOLTAGE ( duty=1/128 ) ( bias=1/13)	Vop	-20 0 25 50 70	19.4 19.1 18.5 18.2 17.8	19.9 19.6 19.0 18.7 18.3	20.4 20.1 19.5 19.2 18.8	V	NOTE1	
2.	RESPONSE TIME	RISE TIME	-20 0 25 50 70	1880 560 230 95 60	2350 700 280 120 70	3500 1050 430 180 100	ms	NOTE2	
		FALL TIME	-20 0 25 50 70	1350 300 80 50 50	1700 380 100 60 60	2550 570 150 90 90	ms		
3.	FRAME FREQUENCY	Ff	25	-	70	-	HZ	NOTE3	
4.	A.C.RESISTANCE	RLC	25	-	-	-	KΩ	NOTE4	
5.	VIEWING DIRECTION	6:00							NOTE5
6.	VIEWING ANGLE	F-R	$\theta$	25	-	70	-	Deg	NOTE6
		R-L	$\phi$	25	-	-35 +35	-		
7.	CONTRAST RATIO	CR	-20 0 25 50 70	12.0 14.0 17.0 5.0 3.0	18.0 20.0 25.0 8.0 4.0	23.0 26.0 30.0 10.0 5.0		NOTE7	

## 6. RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD
1.	HIGH TEMP. STORAGE	70°C	120HR		1.Appearance without defect
2.	LOW TEMP. STORAGE	-20°C	120HR		
3.	HIGH TEMP./ HUMIDITY STORAGE	40°C 90%RH	120HR		
4.	THERMAL SHOCK	-20°C,30min→25°C,5min →70°C,30min→25°C,5min (5 cycles)			

(NOTE 1)

Definition of Operation Voltage(Vop)

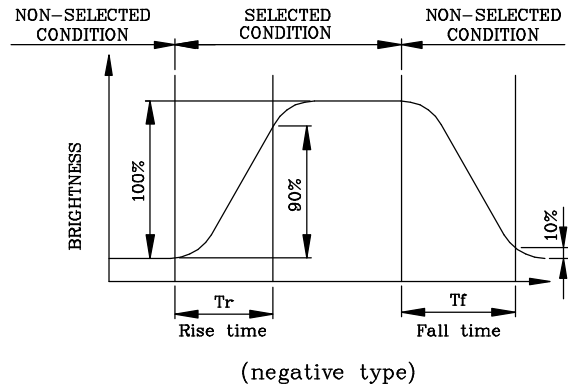
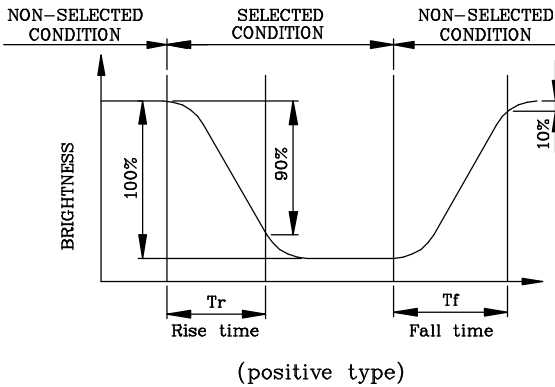


\*Conditions

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

(NOTE 2)

Definition of Response Time(Tr,Tf)

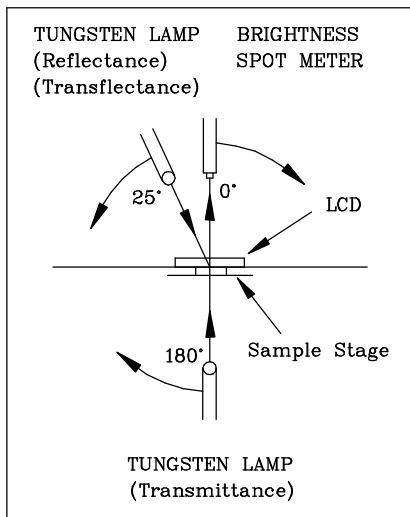


\*Conditions

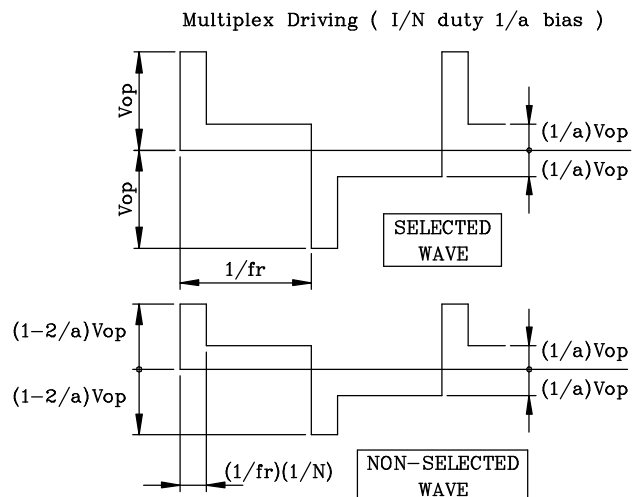
Operating Voltage : Vop  
 Viewing Angle ( $\theta \cdot \phi$ ) : (0,0)  
 Frame Frequency : 70Hz  
 Applying Waveform : I/N duty 1/B bias

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms

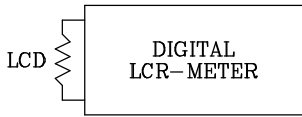


CONST.  
 TEMP.  
 CHAMBER



(NOTE 4)

Measuring Method of A.C. Resistance

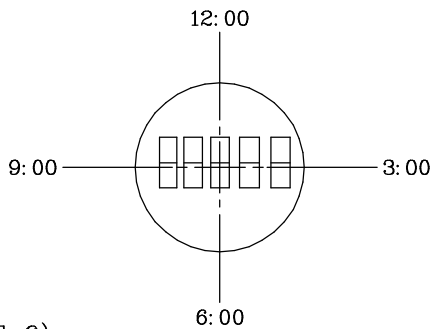


\*Conditions

Temperature : 25°C  
 Applied Voltage : Vth A.C.  
 Frame Frequency : 70Hz

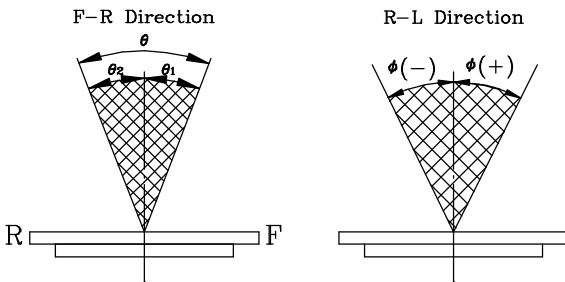
(NOTE 5)

Definition of Viewing Direction



(NOTE 6)

Definition of Viewing Angle



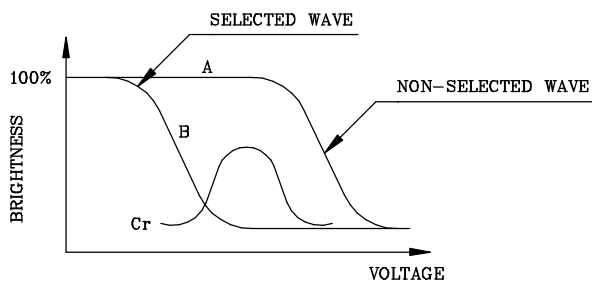
\*Conditions

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

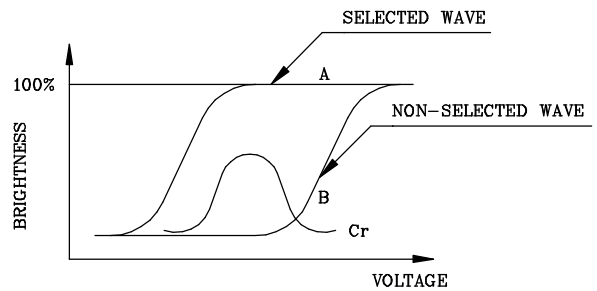
$$\theta = \theta_1 + \theta_2$$

(NOTE 7)

Definition of Contrast Ratio (Cr)



(positive type)



(negative type)

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

\*Conditions

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

Inspection Provision

1. Purpose

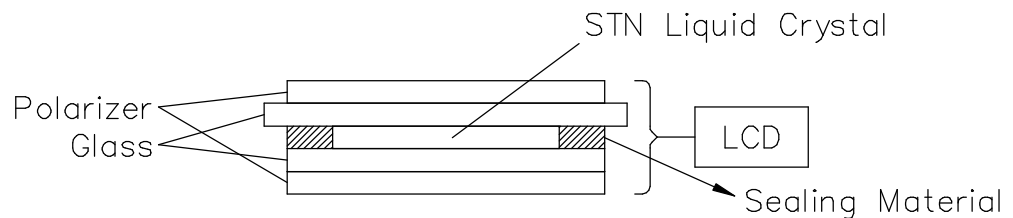
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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 Provision

4-1 Inspection Method

MIL-STD-105E Level II Regular inspection

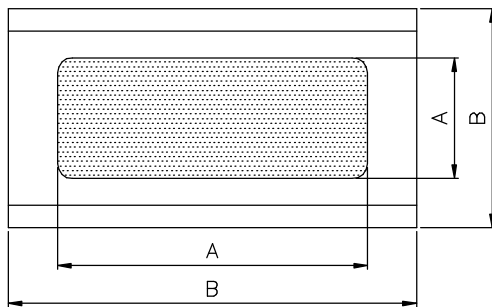
4-2 Inspection Standard

	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 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             $20 \pm 15^{\circ}\text{C}$   
Humidity                 $65 \pm 20\% \text{R.H.}$   
Pressure                 $860 \sim 1060 \text{hPa}(\text{mmbar})$

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

Temperature             $20 \pm 2^{\circ}\text{C}$   
Humidity                 $65 \pm 5\% \text{R.H.}$   
Pressure                 $860 \sim 1060 \text{hPa}(\text{mmbar})$

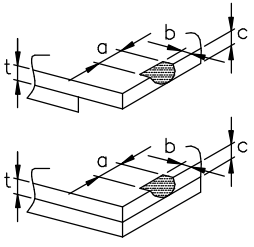
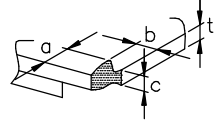
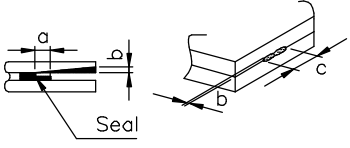
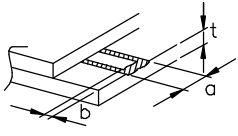
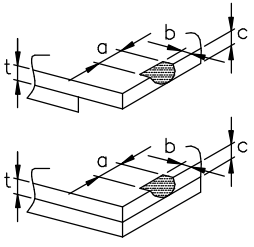
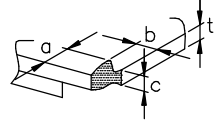
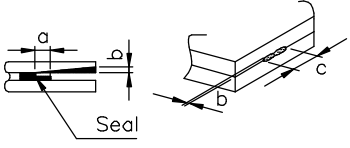
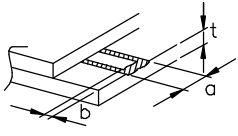
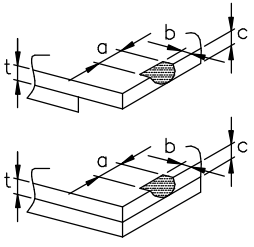
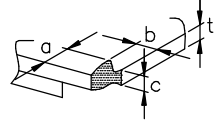
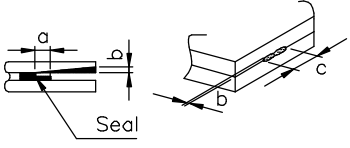
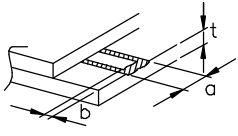
5. Specification for quality check  
5-1 Electrical characteristics

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

5-2 External Appearance Defect

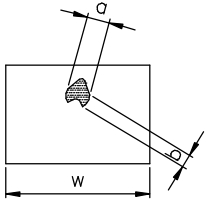
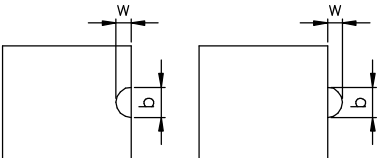
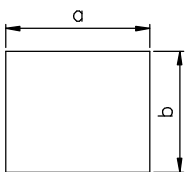
NO.	Item	Criterion																		
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	<p>(1)-1-Spots</p> <table border="1" data-bbox="715 510 1321 779"> <thead> <tr> <th>Average Diameter(mm):D</th> <th>Number of pieces permitted</th> </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="715 1182 1321 1406"> <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
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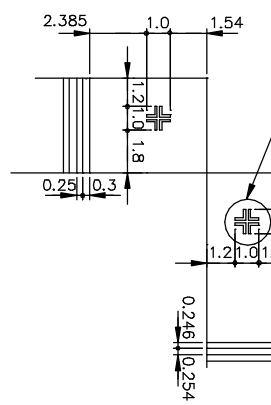
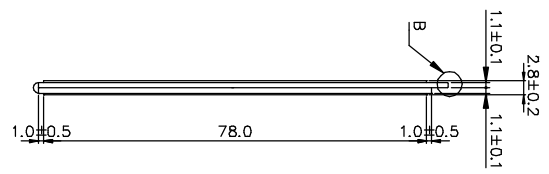
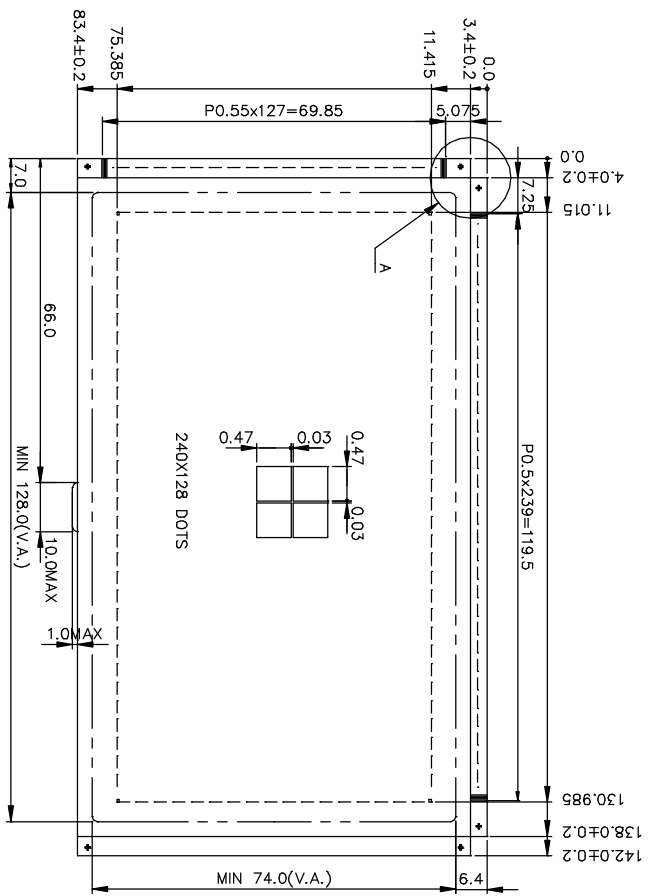
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$0.08 < W$	$3 < L$	None																							
<p>2. Scratches(Glass, reflection plates, and polarizing plates)</p>	<p>In accordance with black spots.          (At non lighting condition)</p>																								
<p>3. Color irregular</p>	<p>Not remarkable color irregular.</p>																								

<p>4. Air bubbles polarizing plates, and reflection plates</p>	<table border="1" data-bbox="710 414 1197 689"> <tr> <th data-bbox="710 414 954 555">Average Diameter (mm): D</th> <th data-bbox="954 414 1197 555">Number of pieces permitted</th> </tr> <tr> <td data-bbox="710 555 954 600"><math>D \leq 0.3</math></td> <td data-bbox="954 555 1197 600">Ignore</td> </tr> <tr> <td data-bbox="710 600 954 689"><math>0.3 &lt; D</math></td> <td data-bbox="954 600 1197 689">0</td> </tr> </table> <p data-bbox="1197 414 1430 638">Average diameter = (Long diameter + Short diameter)/2</p> <p data-bbox="710 705 1430 792">Note that when there are 4 pieces or more, they are not to be concentrated.</p>	Average Diameter (mm): D	Number of pieces permitted	$D \leq 0.3$	Ignore	$0.3 < D$	0				
Average Diameter (mm): D	Number of pieces permitted										
$D \leq 0.3$	Ignore										
$0.3 < D$	0										
<p>5. Cracks</p>	<table border="1" data-bbox="662 792 1430 1912"> <tr> <td data-bbox="662 792 1045 1160"> <p>(1) General crack</p>  </td> <td data-bbox="1045 792 1430 1160"> <p><math>a \leq 5</math>  <math>b \leq 2</math>  <math>c \leq t</math></p> <p>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> </td> </tr> <tr> <td data-bbox="662 1160 1045 1344"> <p>(2) Corner crack</p>  </td> <td data-bbox="1045 1160 1430 1344"> <p><math>a \leq 2.5</math>  <math>b \leq 2.5</math>  <math>c \leq t</math>  <math>a + b \leq 4</math></p> </td> </tr> <tr> <td data-bbox="662 1344 1045 1601"> <p>(3) Seal portion crack</p>  </td> <td data-bbox="1045 1344 1430 1601"> <p><math>a \leq \text{The seal width} \times 1/3</math>  <math>b \leq t \times 2/3</math>  <math>c \leq 5</math></p> <p>The numbers of pieces are set at up to 5 pieces.</p> </td> </tr> <tr> <td data-bbox="662 1601 1045 1825"> <p>(4) ITO Pin crack</p>  </td> <td data-bbox="1045 1601 1430 1825"> <p><math>a \leq 5</math>  <math>b \leq 1/3 \text{ pin length}</math>  <math>c \leq t</math></p> </td> </tr> <tr> <td data-bbox="662 1825 1045 1912"> <p>(5) Progressive cracks</p> </td> <td data-bbox="1045 1825 1430 1912"> <p>All taken to be unacceptable.</p> </td> </tr> </table>	<p>(1) General crack</p> 	<p><math>a \leq 5</math>  <math>b \leq 2</math>  <math>c \leq t</math></p> <p>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>	<p>(2) Corner crack</p> 	<p><math>a \leq 2.5</math>  <math>b \leq 2.5</math>  <math>c \leq t</math>  <math>a + b \leq 4</math></p>	<p>(3) Seal portion crack</p> 	<p><math>a \leq \text{The seal width} \times 1/3</math>  <math>b \leq t \times 2/3</math>  <math>c \leq 5</math></p> <p>The numbers of pieces are set at up to 5 pieces.</p>	<p>(4) ITO Pin crack</p> 	<p><math>a \leq 5</math>  <math>b \leq 1/3 \text{ pin length}</math>  <math>c \leq t</math></p>	<p>(5) Progressive cracks</p>	<p>All taken to be unacceptable.</p>
<p>(1) General crack</p> 	<p><math>a \leq 5</math>  <math>b \leq 2</math>  <math>c \leq t</math></p> <p>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>										
<p>(2) Corner crack</p> 	<p><math>a \leq 2.5</math>  <math>b \leq 2.5</math>  <math>c \leq t</math>  <math>a + b \leq 4</math></p>										
<p>(3) Seal portion crack</p> 	<p><math>a \leq \text{The seal width} \times 1/3</math>  <math>b \leq t \times 2/3</math>  <math>c \leq 5</math></p> <p>The numbers of pieces are set at up to 5 pieces.</p>										
<p>(4) ITO Pin crack</p> 	<p><math>a \leq 5</math>  <math>b \leq 1/3 \text{ pin length}</math>  <math>c \leq t</math></p>										
<p>(5) Progressive cracks</p>	<p>All taken to be unacceptable.</p>										

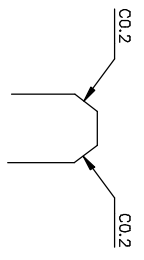
6.	Outer dimensions	Should be with in the tolerance.
7.	Newton ring(touch panel)	Orbicular of interference fringes is not allowed in the optimum contrast within the active area under viewing angle.
8.	Soldering	Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mouting position, etc.

5-3 Dot Appearance Defect

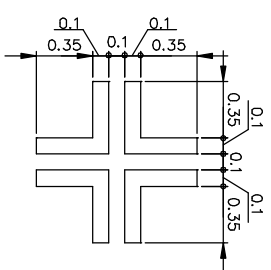
NO.	Item	Criteria
1.	Plinhole	 <p>Dot display a and b are each <math>\leq 0.2\text{mm}</math> The overall total is taken be with in 10 units. Note that they are not to be concentrated.</p>
2.	Missing	 <p>Dot display a and b are each <math>\leq 0.2\text{mm}</math> The overall total is taken to be with 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>



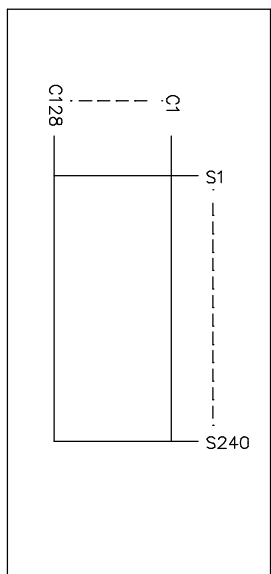
B DETAIL



A DETAIL



C DETAIL



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

NAME	DATE	THIRD ANGLE P.
L.C. WU	94.02.24	
Towd Shue	94.02.24	
W.H. HSU	94.02.24	
W.H. HSU	94.02.24	1/1

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