

NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LMBGAZ032P27CKT
LMBGAT032G27CK

SPEC. NO.: LM032-27-

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
ELECTRONIC MATERIALS DIVISION
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DESIGN MANAGER	DESIGN CHECK	DESIGNER

2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

VSS=0V STANDARD

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	7.0	V	
Power Supply for LCM	VDD-VEE	0	30.0	V	
Input Voltage	VI	-0.3	VDD	V	
CCFL Driving Voltage	VFL	0	500	Vrms	
CCFL Input Current	IFL	-	7.0	mArms	
Static Electricity	-	-	-	-	Note 1

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	-20	70	-30	80
Humidity(Without Condensation)	Note 2,4		Note 3,4	

Note 1 LCM should be grounded during handling LCM.

Note 2 Ta ≤ 70°C : 75%RH max

Ta > 70°C : Absolute humidity must be lower
than the humidity of 75%RH at 70°C

Note 3 Ta at -30°C will be < 48hrs, at 80°C will be < 120hrs

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

3. ELECTRICAL CHARACTERISTICS

(VDD = 5V±5%)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
Power Supply for Logic		VDD-VSS	-	4.75	5.0	5.25	V	
Recommended LC Driving Voltage (High Contrast Ratio LC LCM)		VDD-VO	Duty=1/240 Bias=1/13	-20°C	23.5	23.8	24.1	V
				0°C	22.2	22.5	22.8	
				25°C	21.5	21.8	22.1	
				50°C	20.5	20.8	21.1	
				70°C	19.7	20.0	20.3	
Input Voltage		VIH	H level	0.8VDD	-	VDD	V	
		VIL	L level	0	-	0.2VDD	V	
Power Supply Current		IDD	FLM = 70 Hz VDD = 5.0 V VEE = -24.0 V VDD-VO = 21.8V	-	5.2	8.0	mA	
		IEE	PATTERN : □ ■ □ ■ □ ■ ■ □ ■ □ ■ □	-	4.4	7.0	mA	
CCFL LAMP	Starting Voltage	Vs	-	-	450	1000	Vrms	
	Lamp Voltage	V _L		-	260	-	Vrms	
	Lamp Current	I _L		4	5	6	mArms	
	Lamp Consumption	PL		-	1.3	-	W	
	Lamp Frequency	FL		-	35	-	KHz	
	Lamp Life	LL		-	20000	-	hr	
LCM	Surface Luminance	L	ALL ON	-	25.6	-	cd/m ²	
			ALL OFF	-	86.5	-		

3.1 ELECTRICAL CHARACTERISTICS

(VDD = 5V±5%)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
Power Supply for Logic	VDD-VSS	-	4.75	5.0	5.25	V	
Recommended LC Driving Voltage (High Contrast Ratio LC LCM)	VDD-V0	Duty=1/240 Bias=1/13	-20°C	-	25.0	25.4	V
			0°C	-	23.6	24.0	
			25°C	-	22.9	23.3	
			50°C	-	21.5	21.9	
			70°C	-	20.9	21.3	
Input Voltage	VIH	H level	0.8VDD	-	VDD	V	
	VIL	L level	0	-	0.2VDD	V	
Power Supply Current	IDD	FLM = 70 Hz VDD = 5.0 V VEE = -24.0 V VDD-V0 = 22.9 V	-	4.7	10.0	mA	
	IEE	PATTERN : □ ■ □ ■ □ ■ ■ □ ■ □ ■ □	-	4.2	8.0	mA	
CCFL LAMP	Starting Voltage	Vs	-	450	1000	Vrms	
	Lamp Voltage	VL	-	260	-	Vrms	
	Lamp Current	IL	4	5	6	mArms	
	Lamp Consumption	PL	-	1.3	-	W	
	Lamp Frequency	FL	-	35	-	KHz	
	Lamp Life	LL	-	20000	-	hr	
LCM	Surface Luminance	L	ALL ON	-	154.2	-	cd/m ²
		L	ALL OFF	-	7.8	-	

4. OPTICAL CHARACTERISTICS

AT Vop

ITEM MODE		Cr(Contrast Ratio)										θ (Viewing Angle)		ϕ (Viewing Angle)	
		-20℃		0℃		25℃		50℃		70℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
Z	P	-	6.5	-	7.0	-	6.5	-	6.0	-	4.0	-	34-38	-	35-36
note		NOTE6										NOTE5			

note:

Z : Special Polarizer
P : Normally White

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

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	-20℃	-	3700	-	ms	NOTE 2
		0℃	-	700	-		
		25℃	-	200	-		
		50℃	-	85	-		
		70℃	-	60	-		
Response Time (fall)	Tf	-20℃	-	2700	-	ms	NOTE 2
		0℃	-	500	-		
		25℃	-	140	-		
		50℃	-	80	-		
		70℃	-	60	-		

4.1 OPTICAL CHARACTERISTICS

AT V_{OP}

ITEM MODE		Cr(Contrast Ratio)										θ (Viewing Angle)		ϕ (Viewing Angle)	
		-20℃		0℃		25℃		50℃		70℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
T	G	-	-	-	8.0	-	8.0	-	6.5	-	-	-	76	-	±62
note		NOTE6										NOTE5			

note:

T: TRANSMISSIVE

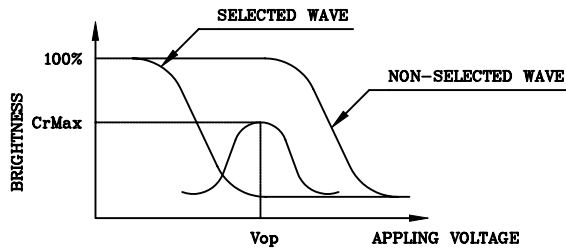
G: NORMALLY BLACK

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

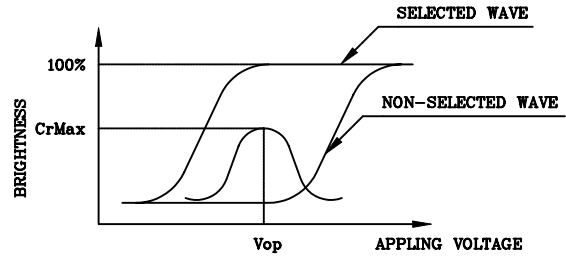
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	-20℃	-	3700	5500	ms	NOTE 2
		0℃	-	660	900		
		25℃	-	160	240		
		50℃	-	110	165		
		70℃	-	75	110		
Response Time (fall)	Tf	-20℃	-	2600	3900	ms	NOTE 2
		0℃	-	560	840		
		25℃	-	90	140		
		50℃	-	75	110		
		70℃	-	50	70		

(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



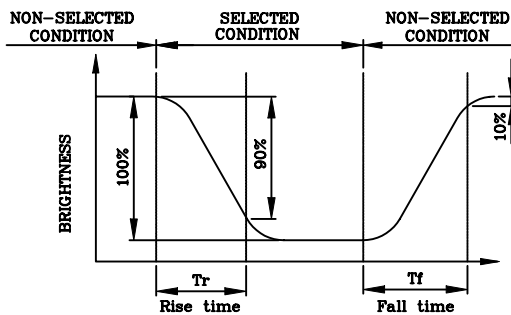
(negative type)

*Conditions

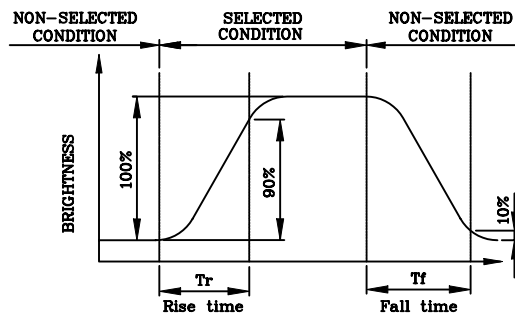
Viewing Angle : 0
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



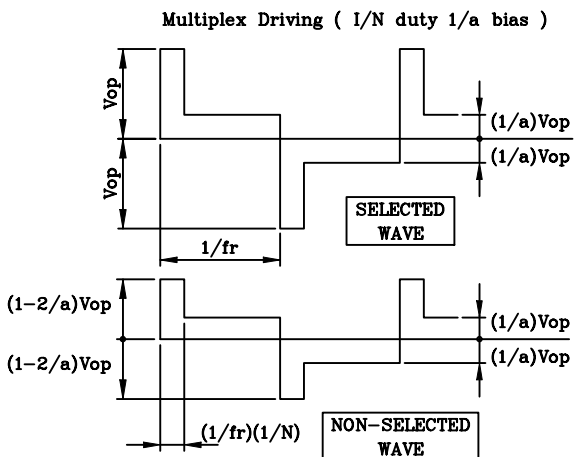
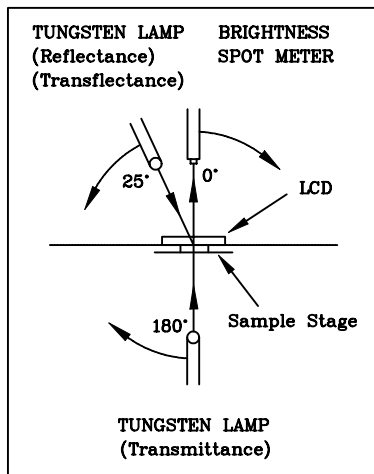
(negative type)

*Conditions

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

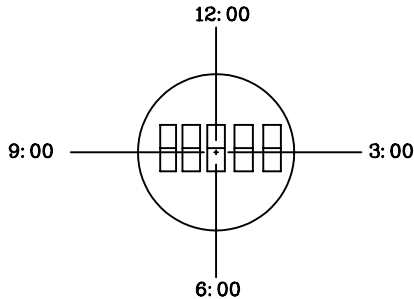
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



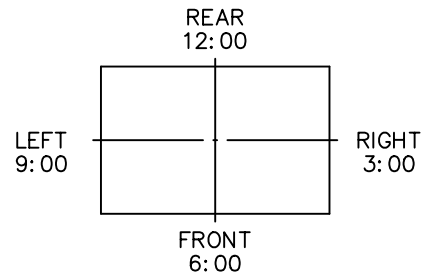
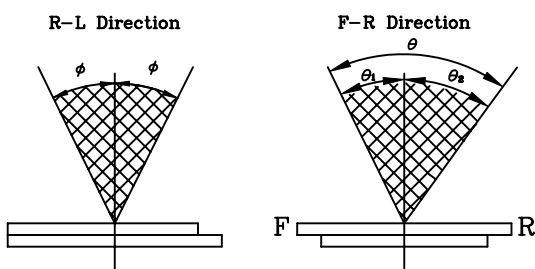
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



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

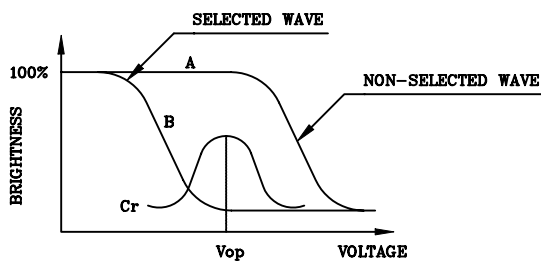
$$\theta = \theta_1 + \theta_2$$

*Conditions

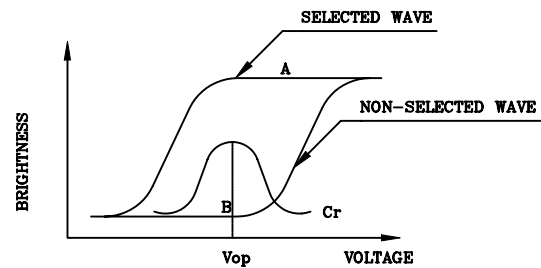
Operating Voltage : V_{op}
 Frame Frequency : 70Hz
 Applying Waveform : 1/N duty 1/a bias
 Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



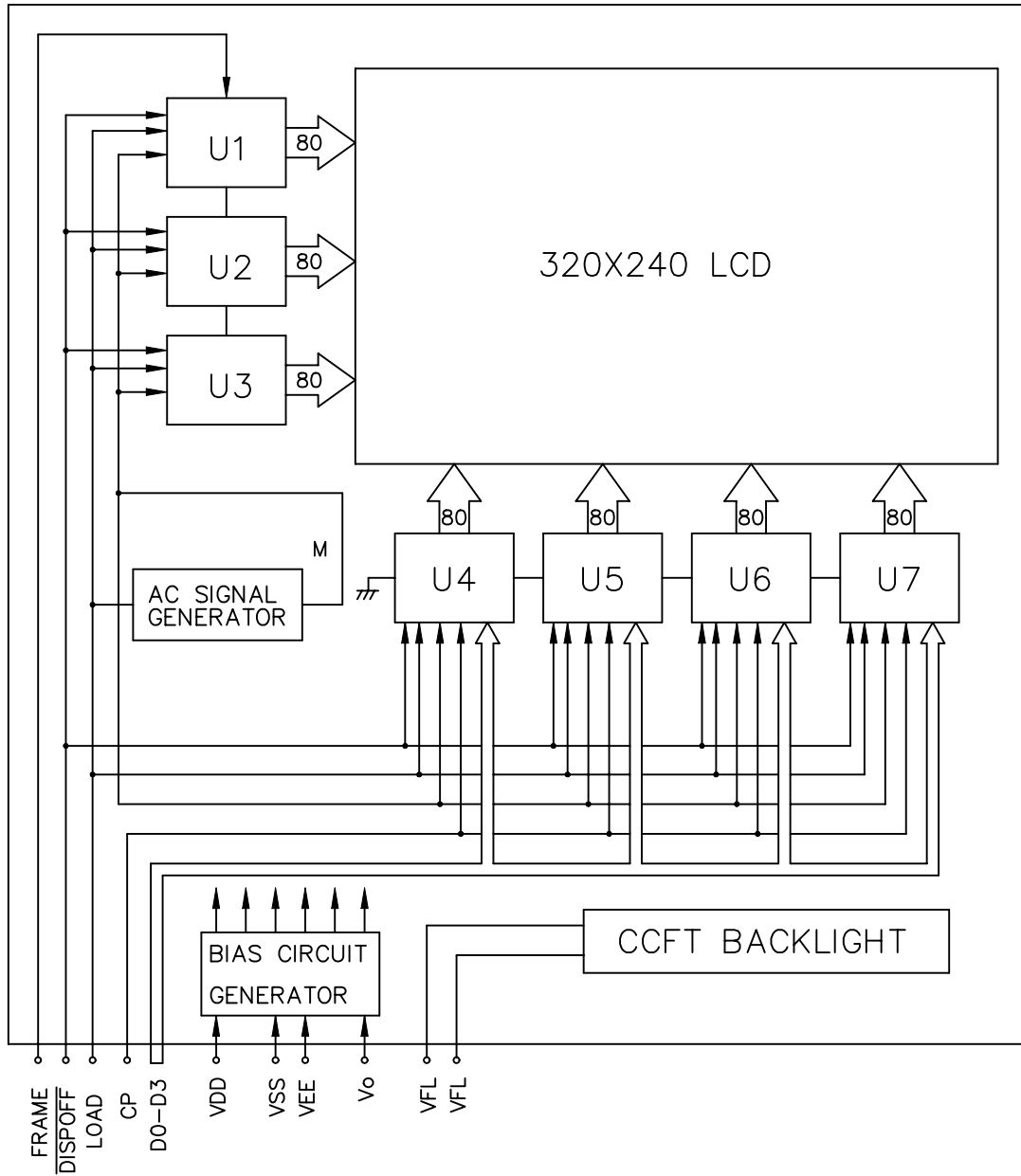
(negative type)

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

*Conditions

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

5. BLOCK DIAGRAM



* AC SIGNAL SETTING

J1	J2	J3	J4	J5	J6	J7	J8
L	H	H	L	L	L	L	L

6. INTERNAL PIN CONNECTION

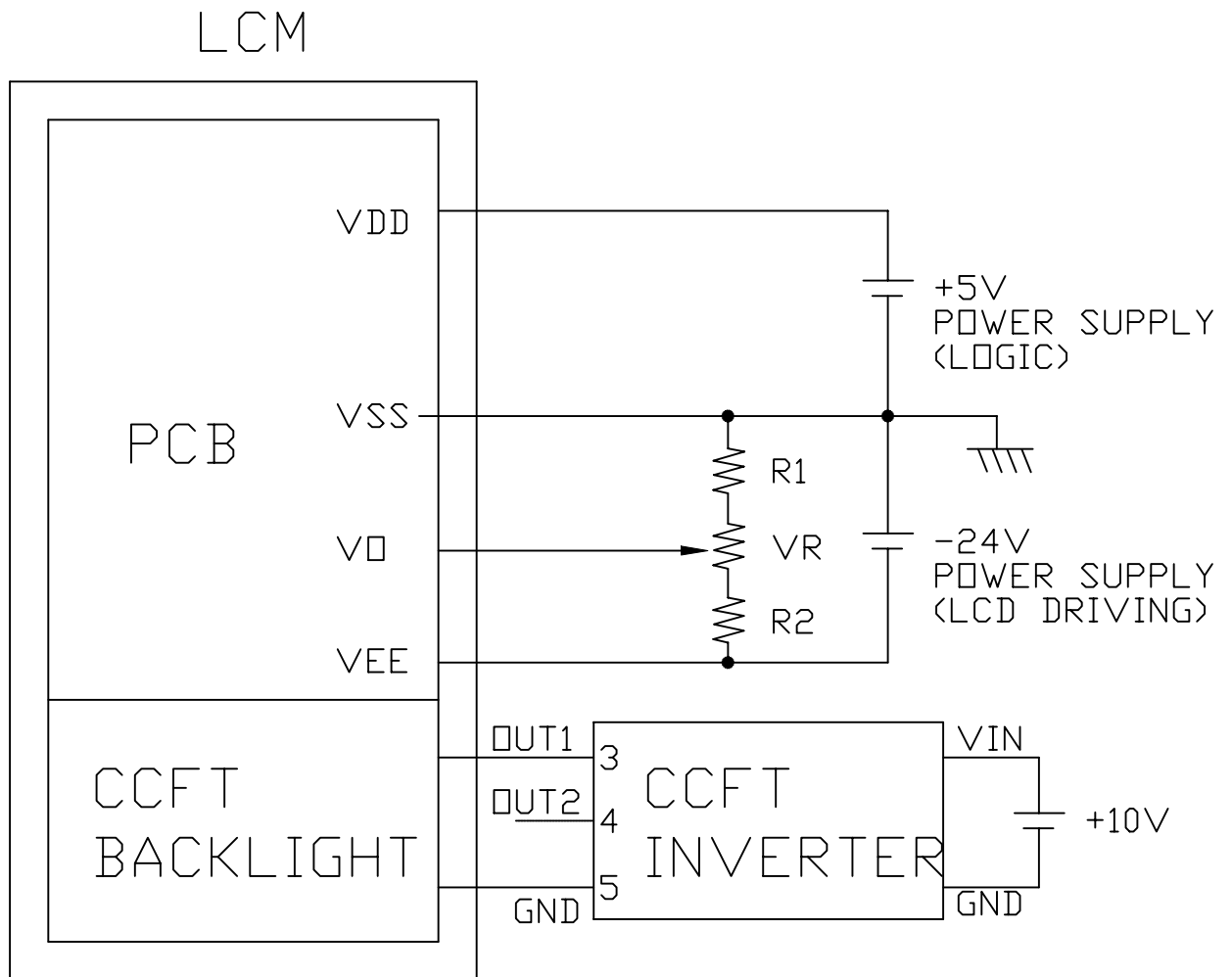
INTERFACE CONNECTOR : FFC PITCH 1.25mm

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	D0	H/L	DISPLAY DATA SIGNAL
2	D1		
3	D2		
4	D3		
5	$\overline{\text{DISPOFF}}$	H/L	H:ON/L:OFF
6	FRAME	H	SCAN START-UP SIGNAL
7	NC	-	NO CONNECTION
8	LOAD	H \rightarrow L	INPUT DATA LATCH SIGNAL
9	CP	H \rightarrow L	DATA INPUT CLOCK SIGNAL
10	VDD	-	POWER SUPPLY FOR LOGIC(+5V)
11	VSS	-	SIGNAL GROUND(0V)
12	VEE	-	POWER SUPPLY FOR LCD
13	VD	-	LCD CONTRAST ADJUST VOLTAGE
14	FGND	-	FRONT PANEL GROUND

CCFL CONNECTOR : J.A.E./IL-G-4S-S3C2

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	HV	-	POWER SUPPLY FOR CCFT BACKLIGHT
2	NC	-	-
3	NC	-	-
4	GND	-	GND FOR CCFT BACKLIGHT

7. POWER SUPPLY

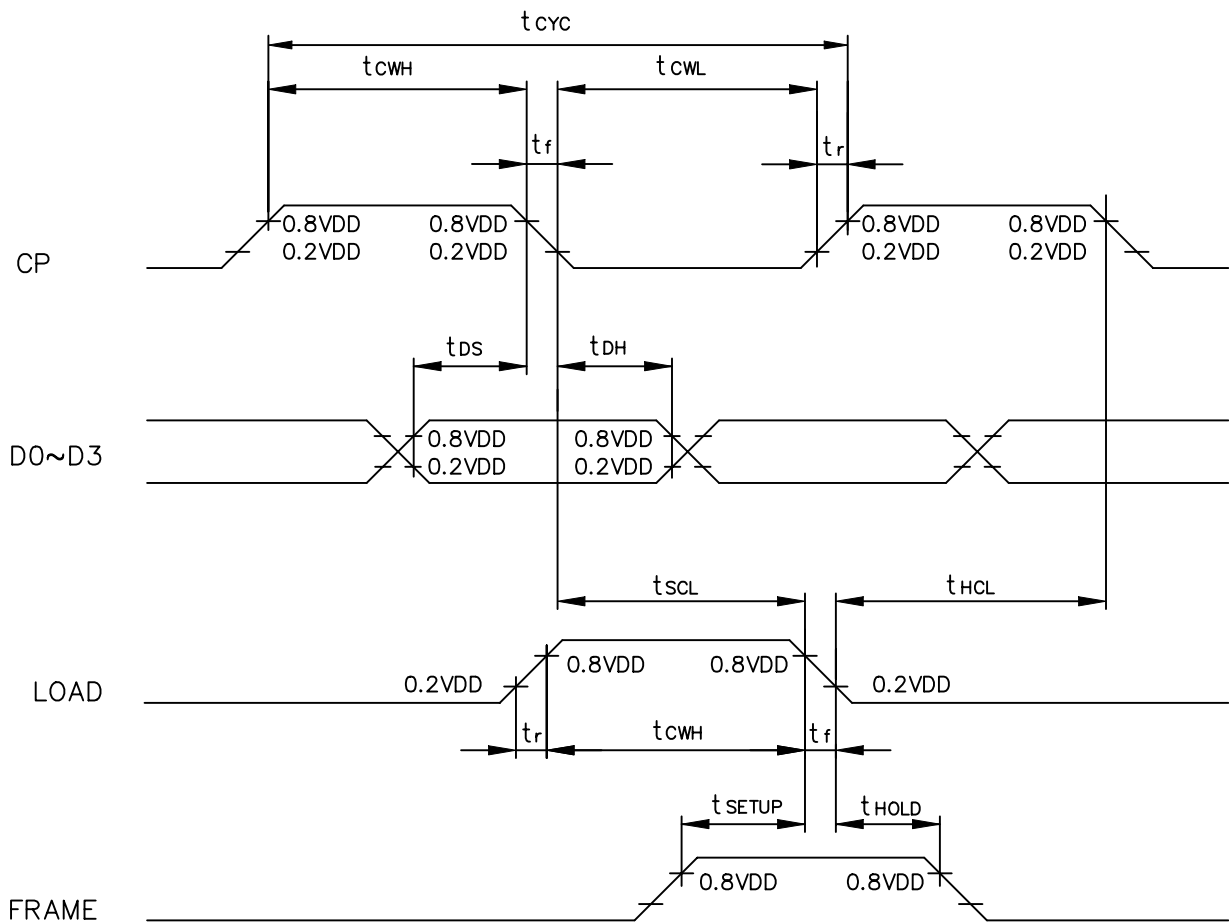


1. $R1 + VR + R2 = 10K \sim 20K \Omega$

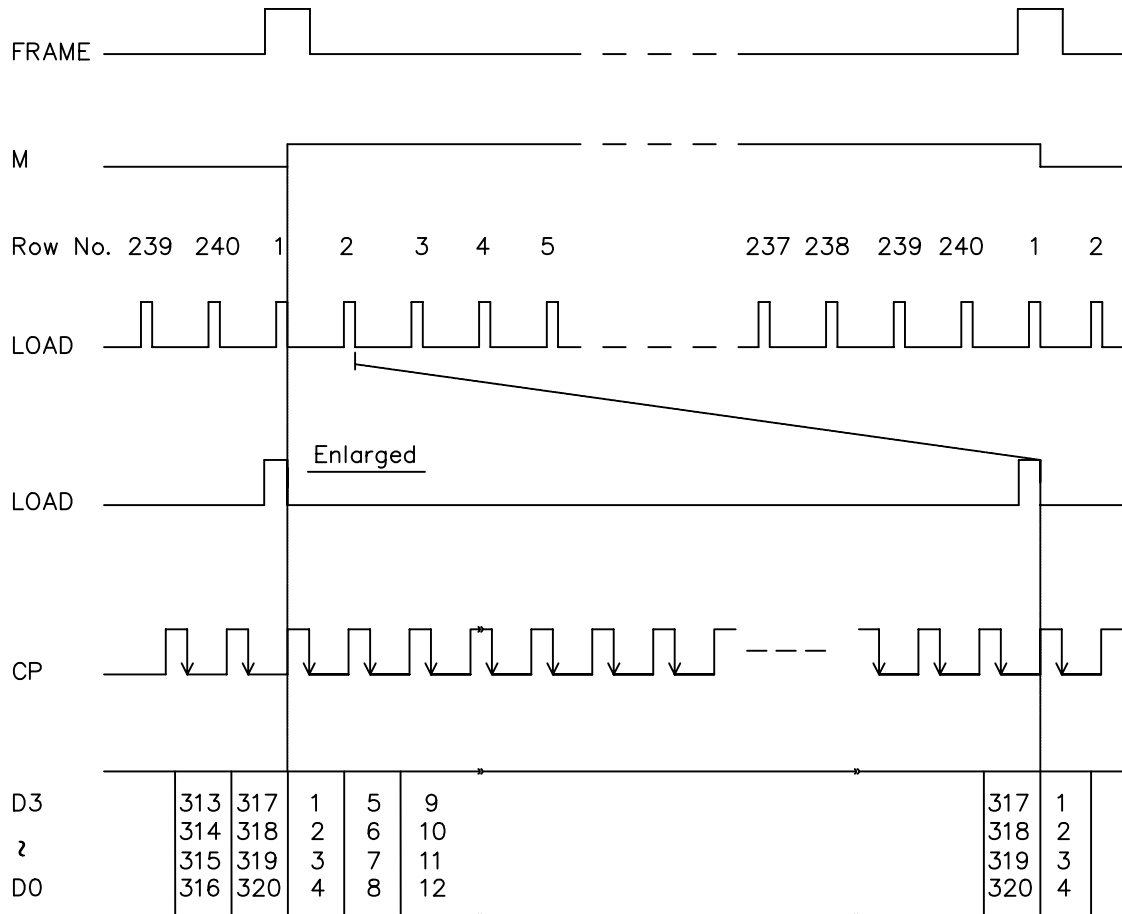
2. RECOMMENDED CCFT INVERTER : CXA-L10L(TDK)
 (OPERATING TEMP. $-10^{\circ} \sim 60^{\circ}C$)

8.1 TIMING CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CLOCK CYCLE TIME	t_{cyc}	125	-	-	ns
CLOCK HIGH LEVEL WIDTH	t_{cwh}	45	-	-	ns
CLOCK LOW LEVEL WIDTH	t_{cwl}	45	-	-	ns
CLOCK RISE TIME	t_r	-	-	30	ns
CLOCK FALL TIME	t_f	-	-	30	ns
DATA SETUP TIME	t_{ds}	30	-	-	ns
DATA HOLD TIME	t_{dh}	30	-	-	ns
CLOCK SETUP TIME	t_{scl}	80	-	-	ns
CLOCK HOLD TIME	t_{hcl}	80	-	-	ns
FRAME SETUP TIME	t_{setup}	30	-	-	ns
FRAME HOLD TIME	t_{hold}	30	-	-	ns



8.2 TIMING CHART OF INPUT SIGNALS



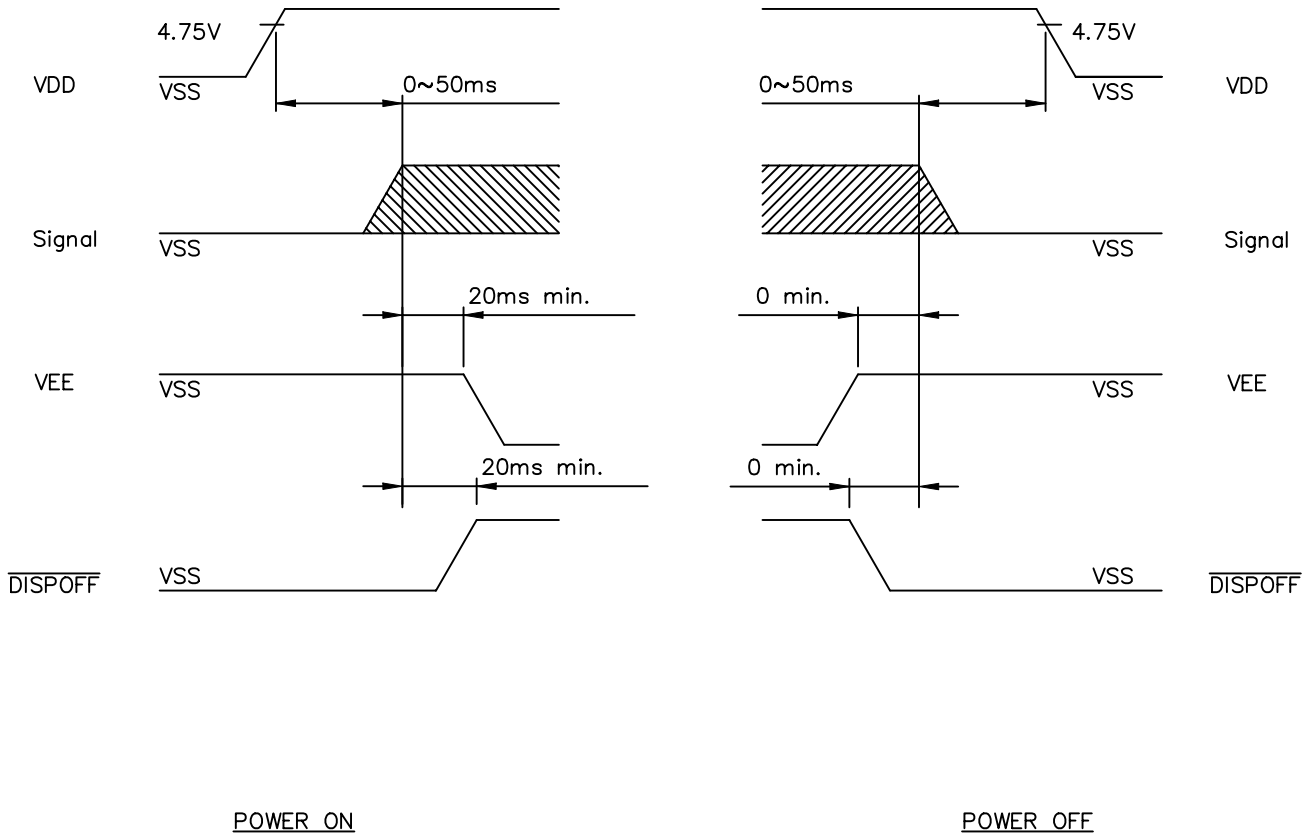
8.3DISPLAY PATTERN

#001	D3	D2	D1	D0	D3		D0	D3	D2	D1	D0
#002	D3	D2	D1	D0	D3		D0	D3	D2	D1	D0
<p>Data Input: Terninal : Dots (Row) on Display</p> <p>D0 : dot 4, dot 8 dot 316, dot 320 D1 : dot 3, dot 7 dot 315, dot 319 D2 : dot 2, dot 6 dot 314, dot 318 D3 : dot 1, dot 5 dot 313, dot 317</p>											
#239	D3	D2	D1	D0	D3		D0	D3	D2	D1	D0
#240	D3	D2	D1	D0	D3		D0	D3	D2	D1	D0
	d1	d2	d3	d4	d5		d316	d317	d318	d319	d320

240 dots

320 dots

8.4 POWER ON/OFF TIMING



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

9. RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	70°C	120HR		Appearance without defect	
2	Low Temp. Storage	-20°C	120HR		Appearance without defect	
3	High Temp. & High Humi. Storage	40°C 90%RH	120HR		Appearance without defect	
4	Thermal Shock	-20°C, 30min → 25°C, 5min → 60°C, 30min → 25°C, 5min (1cycle)			Appearance without defect	5 cycles

Inspection Provision

1. Purpose

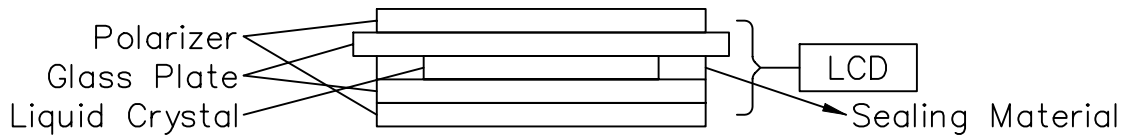
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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 Provision

Outgoing inspection is according to the product inspection manual.
(Per 1-1, 1-2 & 1-3)

4-1 Inspection Method

MIL-STD-105D Level II Regular inspection

4-2 Inspection Standard

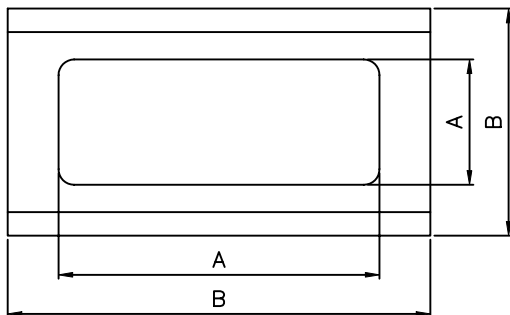
	Item		AQL(%)	Remarks
Major Defect	Dots	Opens Shorts Erroneous operation	0.4	faults which substantially lower the practicality and the initial purpose difficult to achieve.
	Solder appearance	Shorts Loose		
	Cracks	Display surface cracks		

	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)

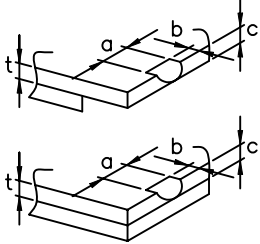
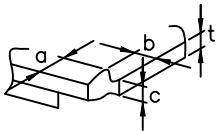
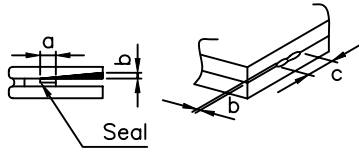
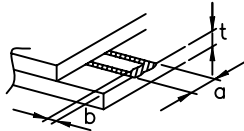
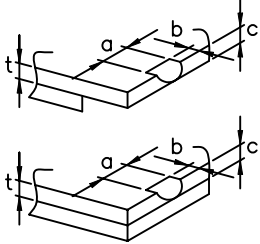
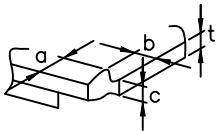
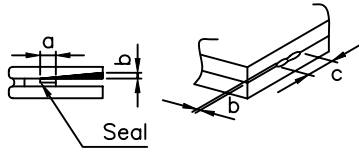
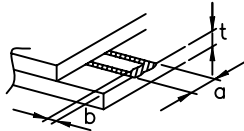
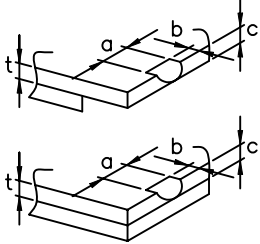
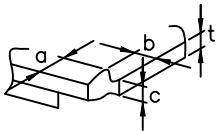
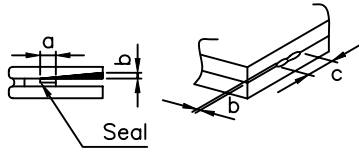
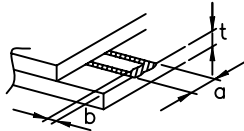
5.Specification for quality check
5-1 Electrical characteristics

NO.	Item	Criterion
1.	Non operational	Fail
2.	Miss operating	Fail
3.	Missing dot	Fail
4.	Contrast irregular	Not allowable
5.	Response time	Within Specified value
6.	Tablet contact resistance	Within Specified value
7.	Tablet input load	Within Specified value
8.	Tablet lineality	Within Specified value
9.	EL 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(At non lighting condition)</p> <table border="1" data-bbox="703 495 1337 775"> <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>5</td> </tr> <tr> <td>$0.2 < D \leq 0.3$</td> <td>2</td> </tr> <tr> <td>$0.3 < D$</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>(1)-2-Spots(At lighting condition)</p> <table border="1" data-bbox="703 1189 1337 1424"> <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>5</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	$0.1 < D \leq 0.2$	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																			

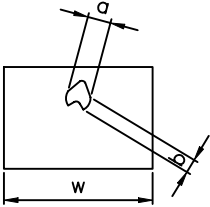
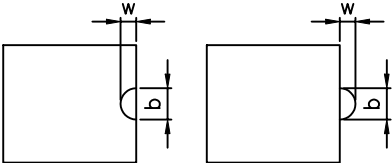
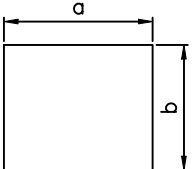
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	<p>(1)-1 Spots(At non lighting condition)</p> <table border="1" data-bbox="705 445 1431 723"> <thead> <tr> <th>Width(mm): W</th> <th>Length(mm): L</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.03$</td> <td>Ignore</td> <td>Ignore</td> </tr> <tr> <td>$0.03 < W \leq 0.08$</td> <td>$L \leq 4$</td> <td>2</td> </tr> <tr> <td>$0.08 < W \leq 0.1$</td> <td>$L \leq 1$</td> <td>1</td> </tr> </tbody> </table> <p>Object exceeding 0.1mm follow the standards of the spots form. Note that when there are 2 pieces or more, they are not to be concentrated.</p> <p>(1)-2 Spots(At lighting condition)</p> <table border="1" data-bbox="705 1021 1431 1299"> <thead> <tr> <th>Width(mm): W</th> <th>Length(mm): L</th> <th>Number of pieces permitted</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.03$</td> <td>Ignore</td> <td>Ignore</td> </tr> <tr> <td>$0.03 < W \leq 0.08$</td> <td>$L \leq 3$</td> <td>6</td> </tr> <tr> <td>$0.08 < W$</td> <td>$3 < L$</td> <td>None</td> </tr> </tbody> </table> <p>Object exceeding 0.1mm follow the standards of the spots form. Note that when there are 2 pieces or more, they are not to be concentrated.</p>	Width(mm): W	Length(mm): L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 4$	2	$0.08 < W \leq 0.1$	$L \leq 1$	1	Width(mm): W	Length(mm): L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 3$	6	$0.08 < W$	$3 < L$	None
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$0.03 < W \leq 0.08$	$L \leq 3$	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.																								

<p>4. Air bubbles polarizing plates, and reflection plates</p>	<table border="1" data-bbox="703 398 1209 680"> <tr> <th data-bbox="703 398 956 539">Average Diameter (mm): D</th> <th data-bbox="956 398 1209 539">Number of pieces permitted</th> <th data-bbox="1209 398 1449 680" rowspan="2">Average diameter = (Long diameter + Short diameter)/2</th> </tr> <tr> <td data-bbox="703 539 956 680">D ≤ 0.3 0.3 < D</td> <td data-bbox="956 539 1209 680">Ignore 0</td> </tr> </table> <p data-bbox="703 696 1410 775">Note that when there are 4 pieces or more, they are not to be concentrated.</p>		Average Diameter (mm): D	Number of pieces permitted	Average diameter = (Long diameter + Short diameter)/2	D ≤ 0.3 0.3 < D	Ignore 0						
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D ≤ 0.3 0.3 < D	Ignore 0												
<p>5. Cracks</p>	<table border="1" data-bbox="654 786 1449 1946"> <tr> <td data-bbox="654 786 1050 1171"> <p>(1) General crack</p>  </td> <td data-bbox="1050 786 1449 1171"> <p>$a \leq 5$ $b \leq 2$ $c \leq t$</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="654 1171 1050 1357"> <p>(2) Corner crack</p>  </td> <td data-bbox="1050 1171 1449 1357"> <p>$a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$</p> </td> </tr> <tr> <td data-bbox="654 1357 1050 1624"> <p>(3) Seal portion crack</p>  </td> <td data-bbox="1050 1357 1449 1624"> <p>$a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$</p> <p>The numbers of pieces are set at up to 5 pieces.</p> </td> </tr> <tr> <td data-bbox="654 1624 1050 1856"> <p>(4) ITO Pin crack</p>  </td> <td data-bbox="1050 1624 1449 1856"> <p>$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$</p> </td> </tr> <tr> <td data-bbox="654 1856 1050 1946"> <p>(5) Progressive cracks</p> </td> <td colspan="2" data-bbox="1050 1856 1449 1946"> <p>All taken to be unacceptable.</p> </td> </tr> </table>		<p>(1) General crack</p> 	<p>$a \leq 5$ $b \leq 2$ $c \leq t$</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>$a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$</p>	<p>(3) Seal portion crack</p> 	<p>$a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$</p> <p>The numbers of pieces are set at up to 5 pieces.</p>	<p>(4) ITO Pin crack</p> 	<p>$a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$</p>	<p>(5) Progressive cracks</p>	<p>All taken to be unacceptable.</p>	
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SPECIFICATION

6.	Outer dimensions	Should be with in the tolerance.
7.	Newton ring	Orbicular of interference fringes. To be non. In case of doubtful judgenemt, agreement shall be reachment.
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.	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>

NOTE:

• 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 with a soft cloth soaked with a cleaning naphtha solvent.

• STORAGE

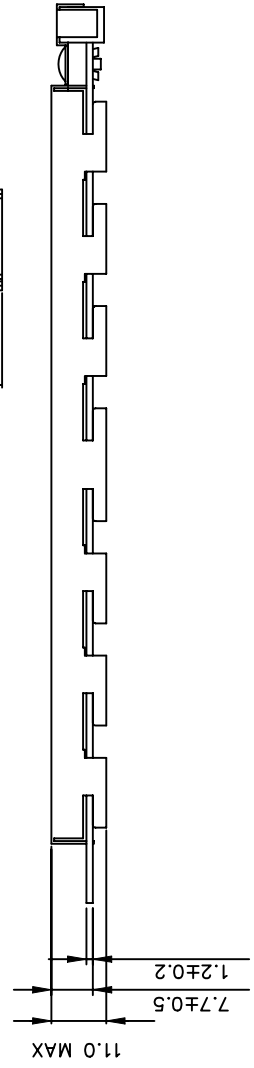
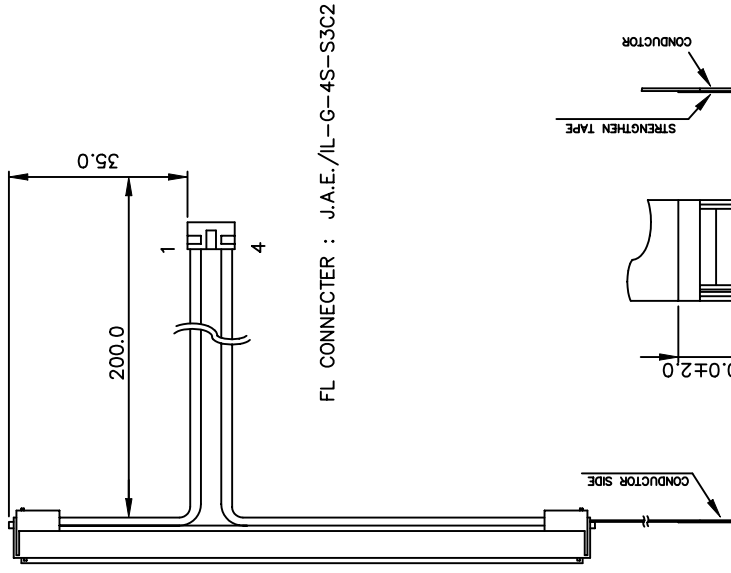
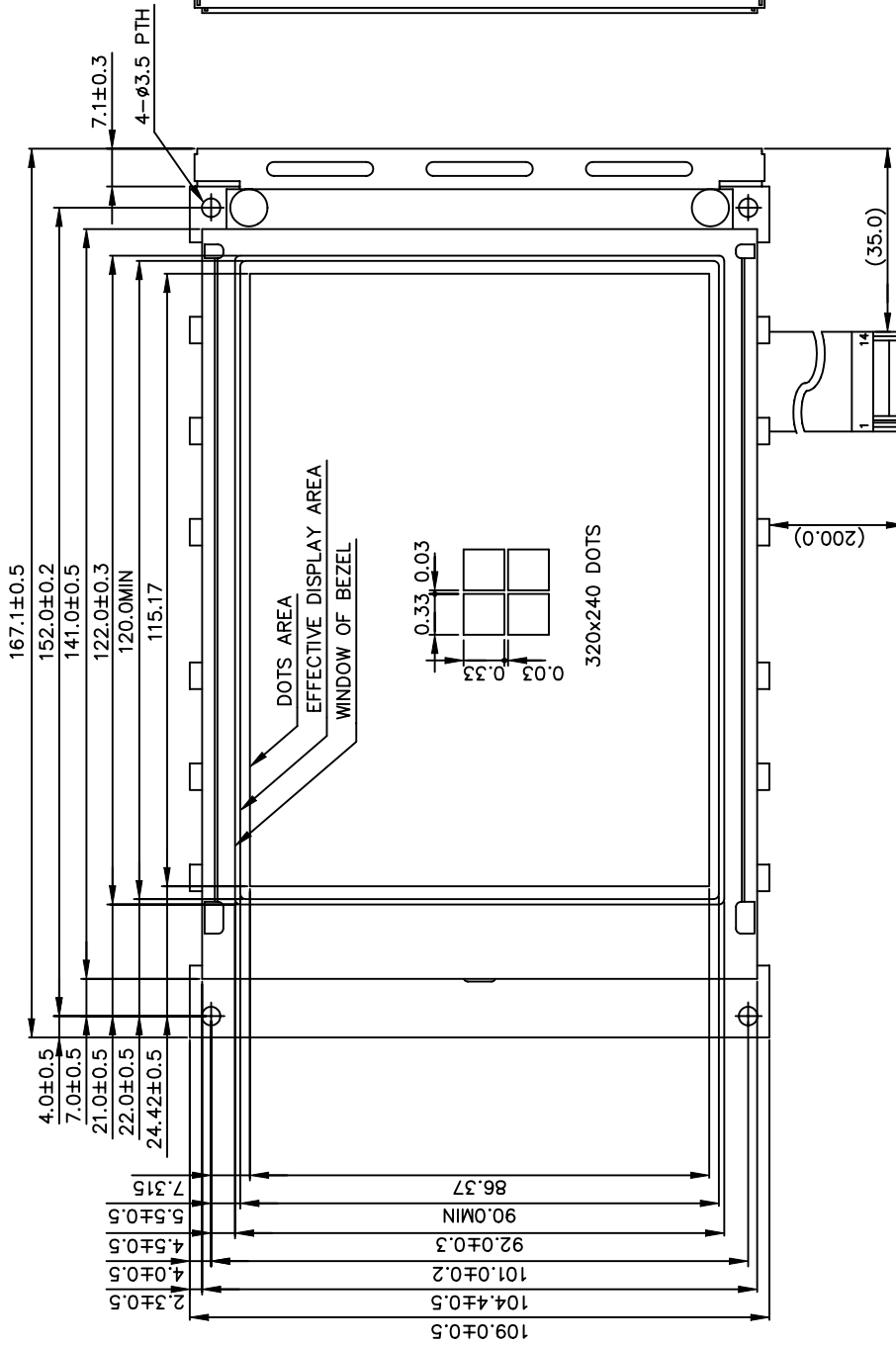
- 1.Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 2.Do not place the module near organics solvents or corrosive gases.
- 3.Do not crush, shake, or jolt the module.

• TERMS OF WARRANT

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

• THE OPERATING LIFE TIME OF BACK LIGHT

- EL : 2000hrs for AC 100Vrms, 400Hz, 20°C , 60%RH
(Operating life time is defined as follows : The final brightness is at 50% of original brightness.)
- CCFT : 20,000hrs for lamp-current 5mA, 35KHz, 25°C
(Operating life time is defined as follows : The final brightness is at 50% of original brightness.)
- LED : 40,000hrs for IF=10mA, 25°C
(Operating life time is defined as follows : The final brightness is at 50% of original brightness.)



PIN NO.	SYMBOL
1	D0
2	D1
3	D2
4	D3
5	DISPOFF
6	FRAME
7	NC
8	LOAD
9	CP
10	VDD
11	VSS
12	VEE
13	VO
14	FGND

- NOTES :
- 1.RESOLUTION : 320 X 240 Dots
 - 2.CONTROLLER : WITHOUT
 - 3.DC/DC : WITHOUT
 - 4.BACKLIGHT:CCFL

info@admatec.ch www.admatec.ch

產品編號	LMBGAX032X27X	NAME	DATE
APPROVE		TITLE	
CHECK		DWG-NO	MB-T032G27CK
DESIGN		REV	REV.A
DRAW	MAY PING 86.05.29	UNIT	1 / 1
		SCALE	1 / 1

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