广州龙宇电子有限公司

Kingtronics Display Technologies Co. Ltd.

产品规格书

Product Specification

客户型号 CustomerP/N:

产品型号 Product P/N: **KG320240A-BNE1BCW-V-S-01 REV:A**

产品类型 Product Type: **Graphic LCM**

产品批号 Lot Code:

数量/日期 Qty. /Date:

检验确认	开发部（R&D）	品质部（QA）	审核（Approved）
Approval	先濡双	叶冬梅	

客户确认栏(For Customer Approval)：

检验结果及意见（Result & Comment）

☐ 合 格（Accept）

☐ 不合格（Reject）

签名(Signature)：_____ 日期(Date)：_____

Contents

1. REVISION HISTORY

Version	Modification Record	Issue Date
-	RELEASED	2006-7-24

2. GENERAL DESCRIPTION

The KG320240A-BNE1BCW-V-S-01 is a 320x240 dot-matrix LCD module. It has a STN(Blue) panel composed of 320 segments and 240 commons. The LCM can be easily accessed by microcontroller via parallel interface. The KG320240A-BNE1BCW-V-S-01 has a build-in DC/DC convertor ,it can saving cost with fewer external parts and generating itself LCD driver voltage .This Module complies with the RoHS instructions of EU.

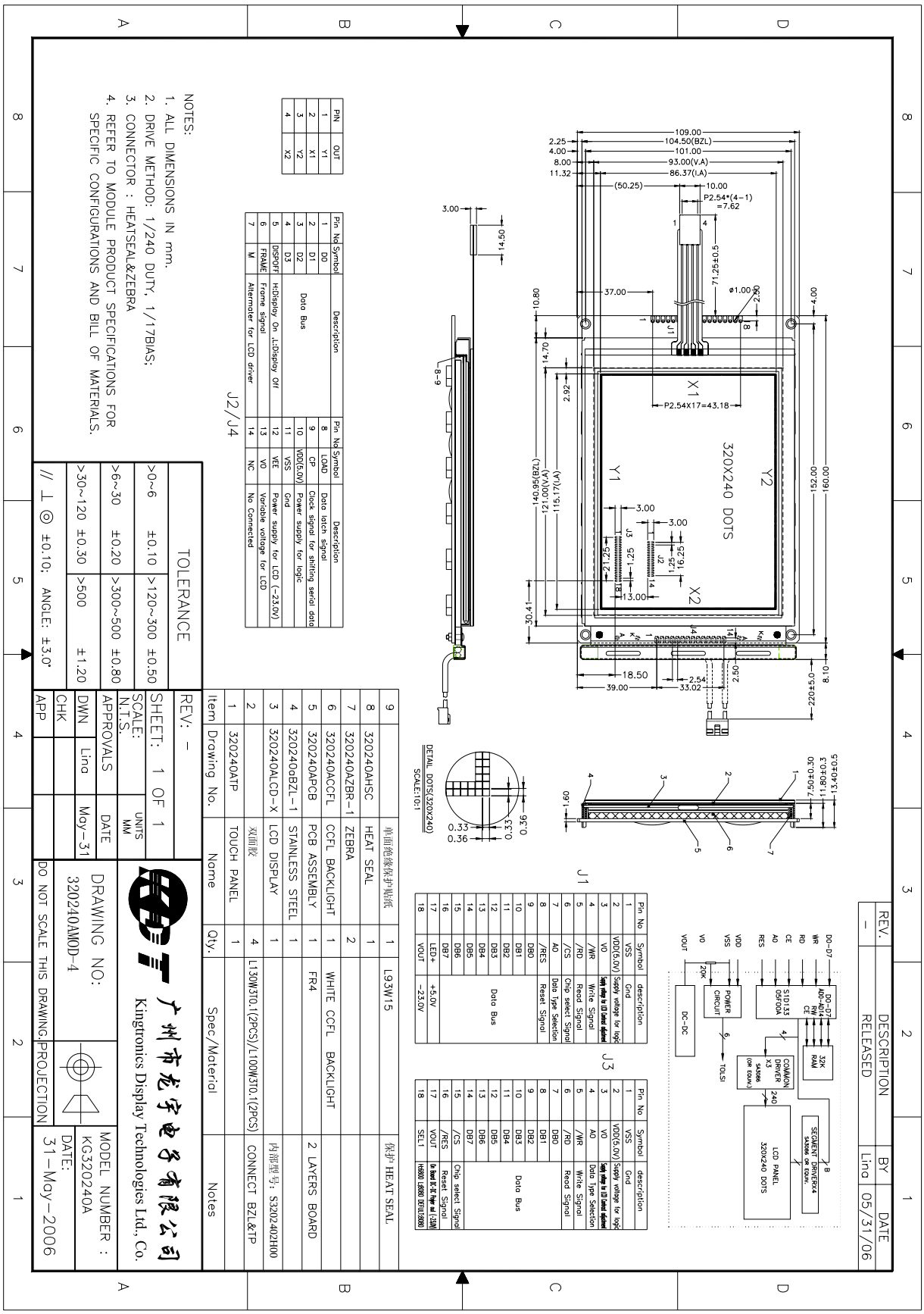
3. FEATURES

Display Mode	STN(Blue)
	NEGATIVE TRANSMISSIVE
Display Format	GRAPHIC 320X240DOTS
MCU Interface	8080-PARALELL
Multiplexing Ratio	1/240
Bias	1/17
OperatingTemperature	-20℃ TO +70℃
Storage Temperature	-30℃ TO +80℃
BLU Color	WHITE CCFL

4. MECHANICAL SPECIFICATION

Item	Specification	Unit
Dimensional Outline	160.0(W) ×109.0(H) ×13.4(T)	**mm**
View Area	121.0(W)×93.0(H)	**mm**
Active Area	115.17(W)×86.37(H)	**mm**
Dots Pitch	0.36(W)×0.36(H)	**mm**
Dots Size	0.30(W)×0.30(H)	**mm**

5. MECHANICAL SPECIFICATION



6. MODULE FUNCTION DESCRIPTION

6. 1. J1 PINS DESCRIPTION

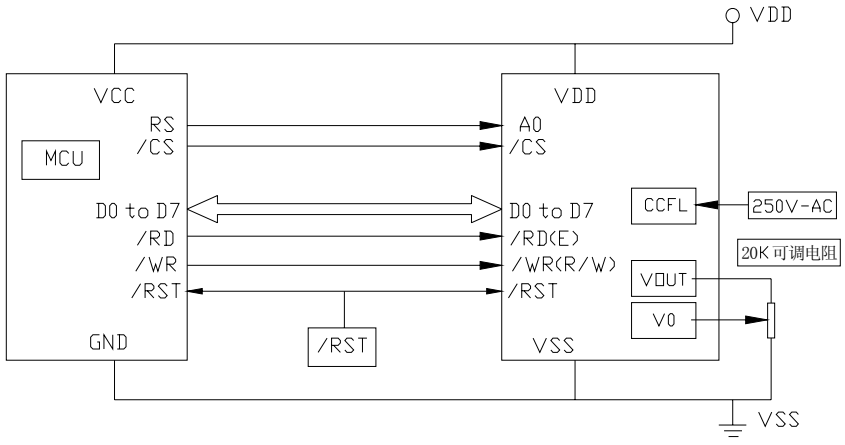
Pin NO.	Symbol	Description
1	VSS	Ground
2	VDD(5.0V)	4.5 to 5.5V supply
3	V0	Supply voltage for LCD contrast adjustment
4	/WR	8080 family: Write signal 6800 family: R/W signal(Note)
5	/RD	8080 family: Read signal 6800 family: Enable clock (E) (Note)
6	/CS	Chip select
7	A0	Data type select
8	/RES	This active-Low input performs a hardware reset on the s1d13305 series. It is a Schmitt-trigger input for enhanced noise immunity; however, care should be taken to ensure that it is not triggered if the supply voltage is lowered
9	DB0	Tristate input/output pins. Connect these pins to an 8-bit microprocessor bus.
10	DB1	
11	DB2	
12	DB3	
13	DB4	
14	DB5	
15	DB6	
16	DB7	
17	LED+	Power supply for LED backlight
18	VOUT	Voltage converter input/output pin

J3 PINS DESCRIPTION

Pin NO.	Symbol	Description
1	VSS	Ground
2	VDD(5.0V)	4.5 to 5.5V supply
3	V0	Supply voltage for LCD contrast adjustment
4	A0	Data type select
5	/WR	8080 family: Write signal 6800 family: R/W signal(Note)
6	/RD	8080 family: Read signal 6800 family: Enable clock (E) (Note)
7	DB0	Tristate input/output pins. Connect these pins to an 8-bit microprocessor bus.
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	/CS	Chip select
16	/RES	This active-Low input performs a hardware reset on the s1d13305 series. It is a Schmitt-trigger input for enhanced noise immunity; however, care should be taken to ensure that it is not triggered if the supply voltage is lowered
17	VOUT	Voltage converter input/output pin
18	SEL1	MPU type selecting pinout：H for 6800 serial MPU；L for 8080 serial。

Note：The MPU type depends on the state of the JP16,be shorted A and B for 6800 serial MPU and A and C for 8080serial MPU.

6．2．REFERENCE CIRCUIT



6．3．TABLE OF INSTRUCTIONS

Class	Command	Code											Hex	Command Description	Command Read Parameters	
		$\overline{RD}$	$\overline{WR}$	A0	D7	D6	D5	D4	D3	D2	D1	D0			No. of Bytes	Section
System control	SYSTEM SET	1	0	1	0	1	0	0	0	0	0	0	40	Initialize device and display	8	8.2.1
	SLEEP IN	1	0	1	0	1	0	1	0	0	1	1	53	Enter standby mode	0	8.2.2
Display control	DISP ON/OFF	1	0	1	0	1	0	1	1	0	0	D	58, 59	Enable and disable display and display flashing	1	8.3.1
	SCROLL	1	0	1	0	1	0	0	0	1	0	0	44	Set display start address and display regions	10	8.3.2
	CSRFORM	1	0	1	0	1	0	1	1	1	0	1	5D	Set cursor type	2	8.3.3
	CGRAM ADR	1	0	1	0	1	0	1	1	1	0	0	5C	Set start address of character generator RAM	2	8.3.6
	CSRDIR	1	0	1	0	1	0	0	1	1	CD 1	CD 0	4C to 4F	Set direction of cursor movement	0	8.3.4
	HDOT SCR	1	0	1	0	1	0	1	1	0	1	0	5A	Set horizontal scroll position	1	8.3.7
	OVLAY	1	0	1	0	1	0	1	1	0	1	1	5B	Set display overlay format	1	8.3.5
Drawing control	CSRW	1	0	1	0	1	0	0	0	1	1	0	46	Set cursor address	2	8.4.1
	CSRR	1	0	1	0	1	0	0	0	1	1	1	47	Read cursor address	2	8.4.2
Memory control	MWRITE	1	0	1	0	1	0	0	0	0	1	0	42	Write to display memory	—	8.5.1
	MREAD	1	0	1	0	1	0	0	0	0	1	1	43	Read from display memory	—	8.5.2

Notes:

1. In general, the internal registers of the S1D13305 series are modified as each command parameter is input. However, the microprocessor does not have to set all the parameters of a command and may send a new command before all parameters have been input. The internal registers for the parameters that have been input will have been changed but the remaining parameter registers are unchanged.

   2-byte parameters (where two bytes are treated as 1 data item) are handled as follows:

   a. CSRW, CSRR: Each byte is processed individually. The microprocessor may read or write just the low byte of the cursor address.

   b. SYSTEM SET, SCROLL, CGRAM ADR: Both parameter bytes are processed together. If the command is changed after half of the parameter has been input, the single byte is ignored.

2. APL and APH are 2-byte parameters, but are treated as two 1-byte parameters.

More detail please refer to the datasheet of S1D13305F00A

7. MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Logical Operating Supply Voltage	VDD	-0.3 to +7.0	V
LCD Driver Voltage Range	VLCD	0 to 30	V
Logical Signal Voltage Range	VIN	-0.3 to VDD+0.3	V
BLU Reverse Voltage	Vr		V
BLU Power Description	Pd		mW
Operating Temperature Range	TOPR	-20℃ TO +70℃	℃
Storage Temperature Range	TSTR	-30℃ TO +80℃	℃

8. ELECTRICAL CHARACTERISTICS

8. 1. DC CHARACTERISTICS OF LOGICAL OPERATION

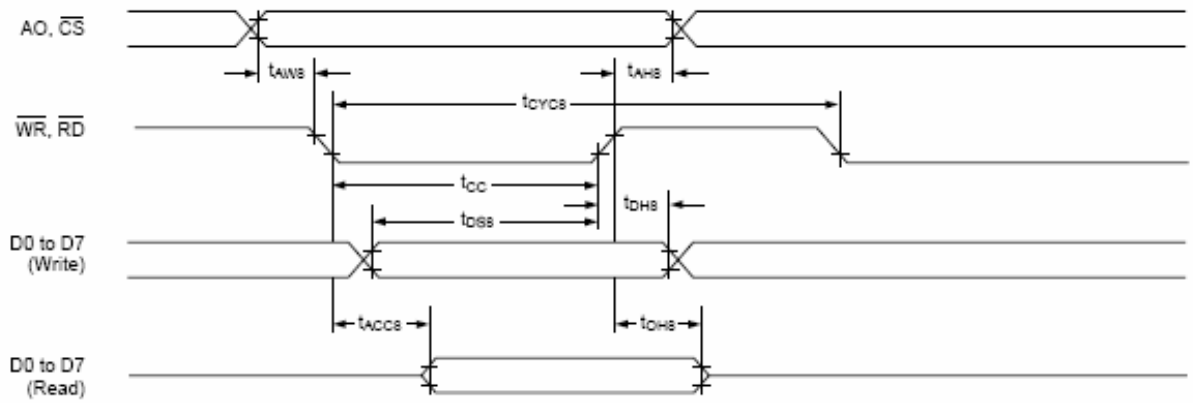
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logical Operating Supply Voltage	VDD	T=25℃	4.5	5.0	5.5	V
Input Voltage H Level	VIH	T=25℃	0.5VDD		VDD	V
Input Voltage L Level	VIL	T=25℃	VSS		0.2VDD	V
Current Consumption	IDD	With DC/DC convertor		50	65	mA
LCD Driving Voltage	VLCD	T=25℃	26.4	26.5	26.6	V

8. 2. CHARACTERISTICS OF BLU

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	Vf	Ta=25℃ AC 50KHz		320		V
Reverse Current	Ir	Ta=25℃		--		uA
Peak wave length	λp	Ta=25℃		--		nm
Spectral Line Half width	Δ λ	Ta=25℃		--		
Luminance	Lv	Ta=25℃		--		cd/㎡
Forward Pules current	Ifp	Ta=25℃		--		mA
Forward Current	If	Ta=25℃ AC=320V 50KHz		5		mA

8. 3. TIMING CHARACTERISTICS

8080 family interface timing



Ta = –20 to 75°C

Signal	Symbol	Parameter	V_{DD} = 4.5 to 5.5V		V_{DD} = 2.7 to 4.5V		Unit	Condition
			Min.	Max.	Min.	Max.		
A0, $\overline{CS}$	t_{AH8}	Address hold time	10	—	10	—	ns	CL = 100pF
	t_{AW8}	Address setup time	0	—	0	—	ns	
$\overline{WR}$, $\overline{RD}$	t_{CYC8}	System cycle time	See note.	—	See note.	—	ns	
	t_{CC}	Strobe pulsewidth	120	—	150	—	ns	
D0 to D7	t_{DS8}	Data setup time	120	—	120	—	ns	
	t_{DH8}	Data hold time	5	—	5	—	ns	
	t_{ACC8}	$\overline{RD}$ access time	—	50	—	80	ns	
	t_{OH8}	Output disable time	10	50	10	55	ns	

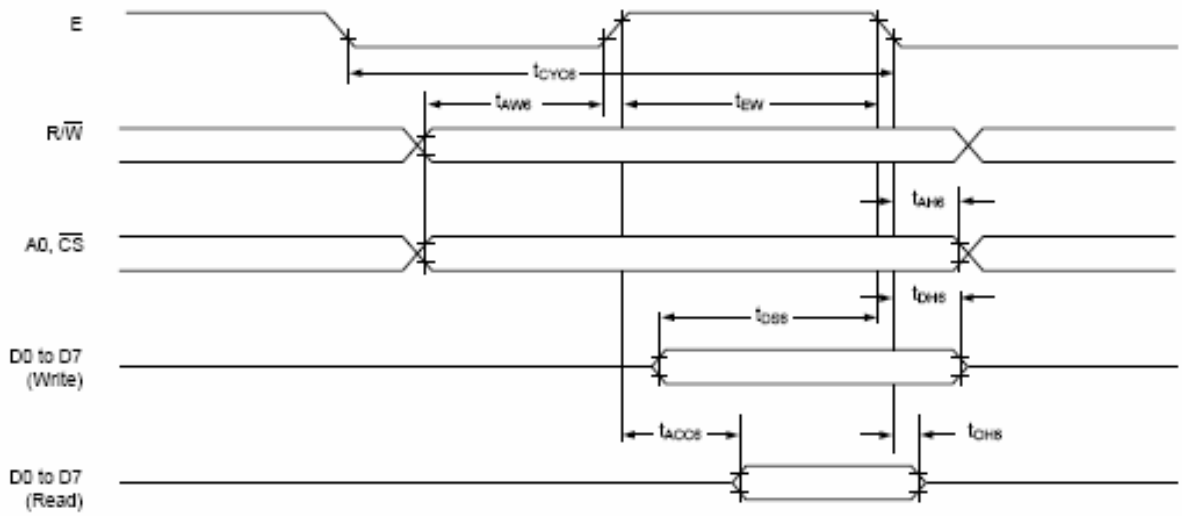
Note: For memory control and system control commands:

$t_{CYC8} = 2t_C + t_{CC} + t_{CEA} + 75 > t_{ACV} + 245$

For all other commands:

$t_{CYC8} = 4t_C + t_{CC} + 30$

6800 family interface timing



Note: t_{CYC6} indicates the interval during which CS is LOW and E is HIGH.

T_a = –20 to 75°C

Signal	Symbol	Parameter	V_{DD} = 4.5 to 5.5V		V_{DD} = 2.7 to 4.5V		Unit	Condition
			Min.	Max.	Min.	Max.		
A0, CS, R/W	t_{CYC6}	System cycle time	See note.	—	See note.	—	ns	CL = 100 pF
	t_{AW6}	Address setup time	0	—	10	—	ns	
	t_{AH6}	Address hold time	0	—	0	—	ns	
D0 to D7	t_{DS6}	Data setup time	100	—	120	—	ns	
	t_{DH6}	Data hold time	0	—	0	—	ns	
	t_{OH6}	Output disable time	10	50	10	75	ns	
	t_{ACC6}	Access time	—	85	—	130	ns	
E	t_{EW}	Enable pulsewidth	120	—	150	—	ns	

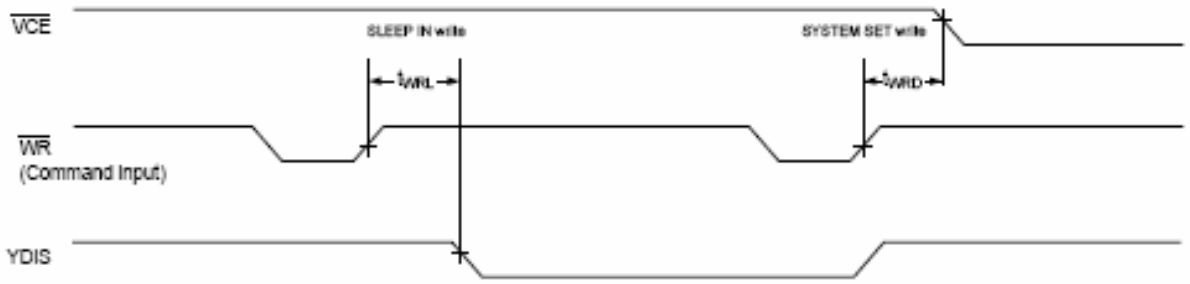
Note: For memory control and system control commands:

$t_{CYC6} = 2t_C + t_{EW} + t_{CEA} + 75 > t_{ACV} + 245$

For all other commands:

$t_{CYC6} = 4t_C + t_{EW} + 30$

SLEEP IN command timing



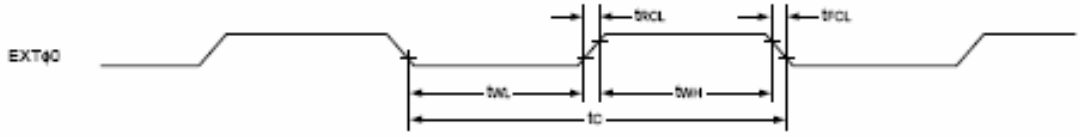
Ta = –20 to 75°C

Signal	Symbol	Parameter	VDD = 4.5 to 5.5V		VDD = 2.7 to 4.5V		Unit	Condition
			Min.	Max.	Min.	Max.		
WR	tWRD	VCE falling-edge delay time	See note 1.	—	See note 1.	—	ns	CL = 100 pF
	tWRL	YDIS falling-edge delay time	—	See note 2.	—	See note 2.	ns	

Notes:

1. $t_{WRD} = 18t_C + t_{OSS} + 40$ (t_{OSS} is the time delay from the sleep state until stable operation)
2. $t_{WRL} = 36t_C \times [TC/R] \times [L/F] + 70$

External oscillator signal timing



Ta = –20 to 75°C

Signal	Symbol	Parameter	VDD = 4.5 to 5.5V		VDD = 2.7 to 4.5V		Unit	Condition
			Min.	Max.	Min.	Max		
EXT ϕ0	tRCL	External clock rise time	—	15	—	15	ns	
	tFCL	External clock fall time	—	15	—	15	ns	
	tWH	External clock HIGH-level pulsewidth	See note 1.	See note 2.	See note 1.	See note 2.	ns	
	tWL	External clock LOW-level pulsewidth	See note 1.	See note 2.	See note 1.	See note 2.	ns	
	tC	External clock period	100	—	125	—	ns	

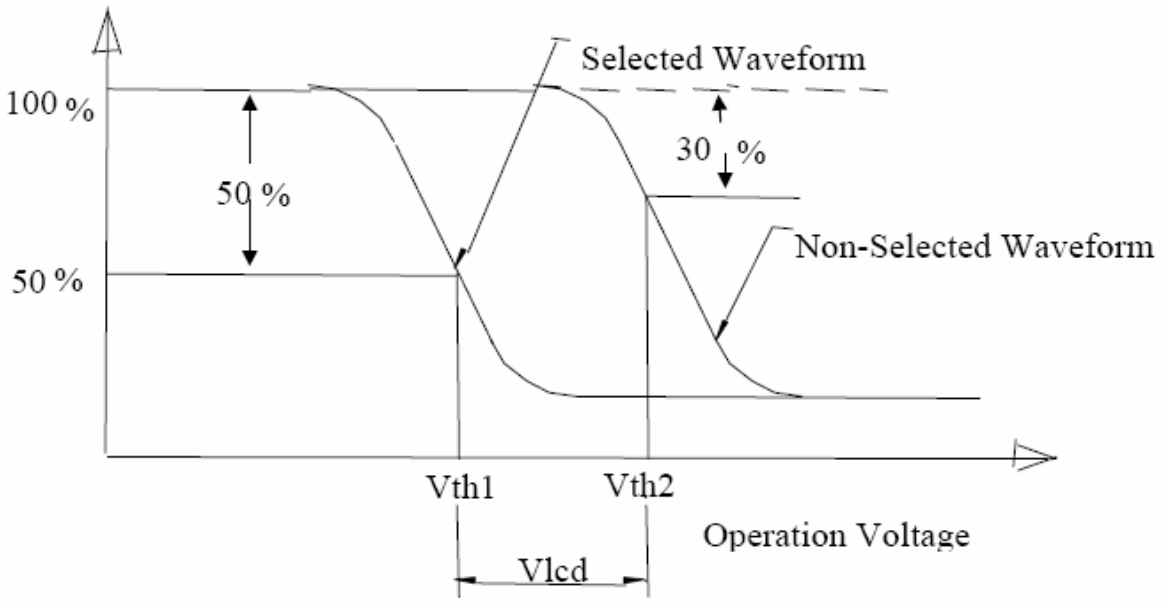
Notes:

1. $(t_C - t_{RCL} - t_{FCL}) \times \frac{475}{1000} < t_{WH}, t_{WL}$
2. $(t_C - t_{RCL} - t_{FCL}) \times \frac{525}{1000} > t_{WH}, t_{WL}$

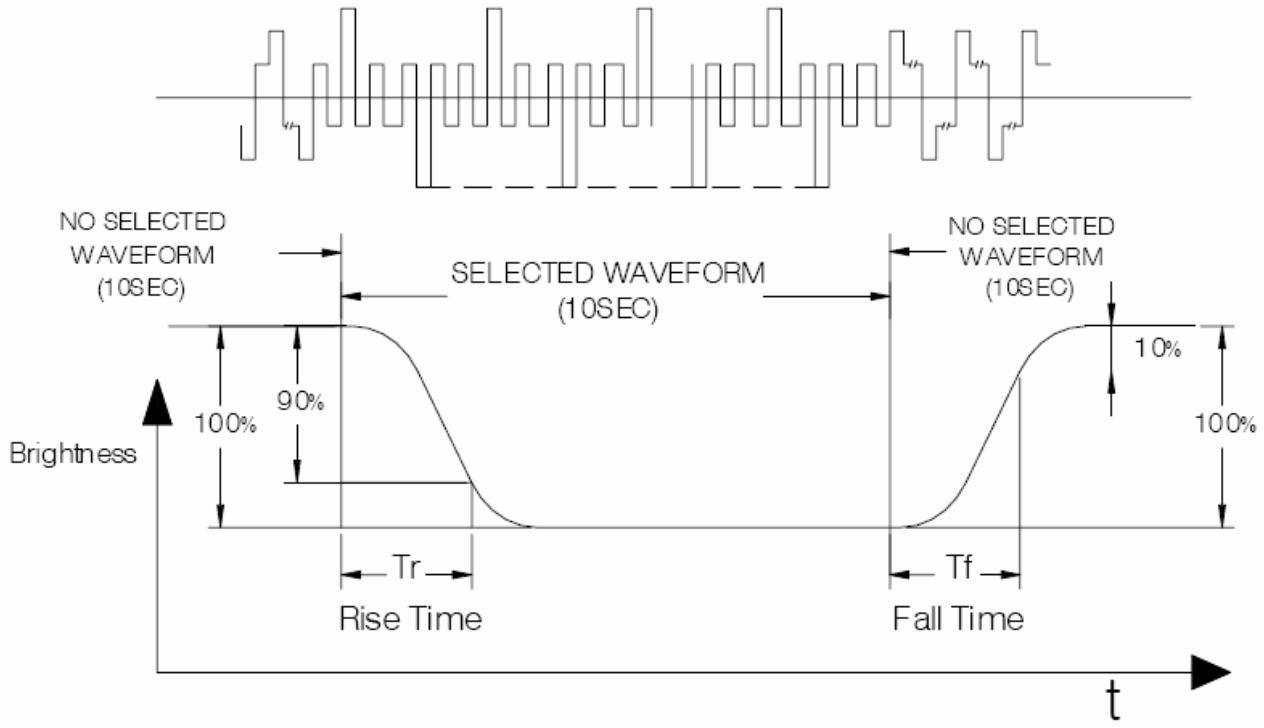
9. ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
LCD driving Voltage(NOTE1)	VLCD	T=0℃				V
		T=25℃	26.4	26.5	26.6	V
		T=50℃				V
Response Time(NOTE2)	Rise Time (Tr)	T=25℃	150	200	250	ms
	Fall Time (Tf)		150	200	250	ms
Contrast Ratio(NOTE4)	Cr	T=25℃ θ = ψ = 0		⩾5		---
Viewing Angle Range(NOTE3)	θ (ψ = 0°)(6")	T=25℃ CR⩾2		45		Deg
	θ (ψ = 90°)(3")			40		Deg
	θ (ψ =180°)(12")			35		Deg
	θ (ψ = 270°)(9")			40		Deg

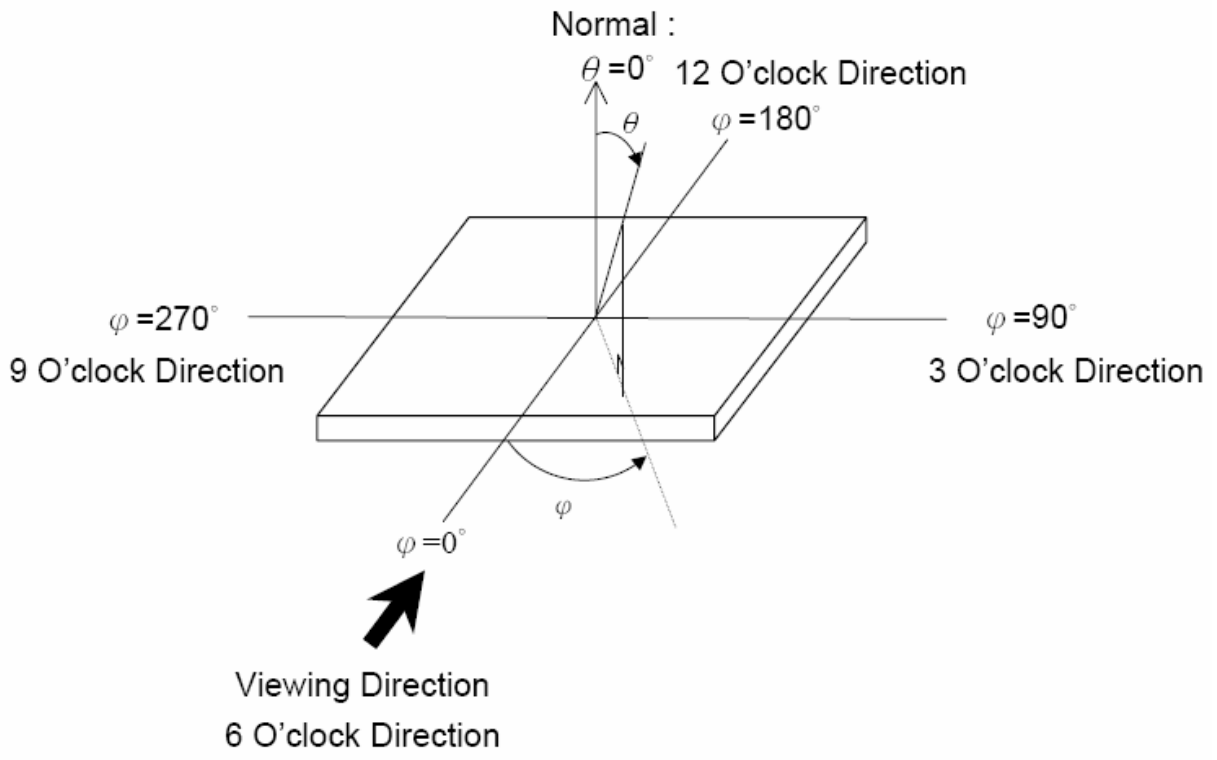
NOTE1 Definition of Driving Voltage(Vlcd) :



NOTE2 Definition of Optical Response Time :

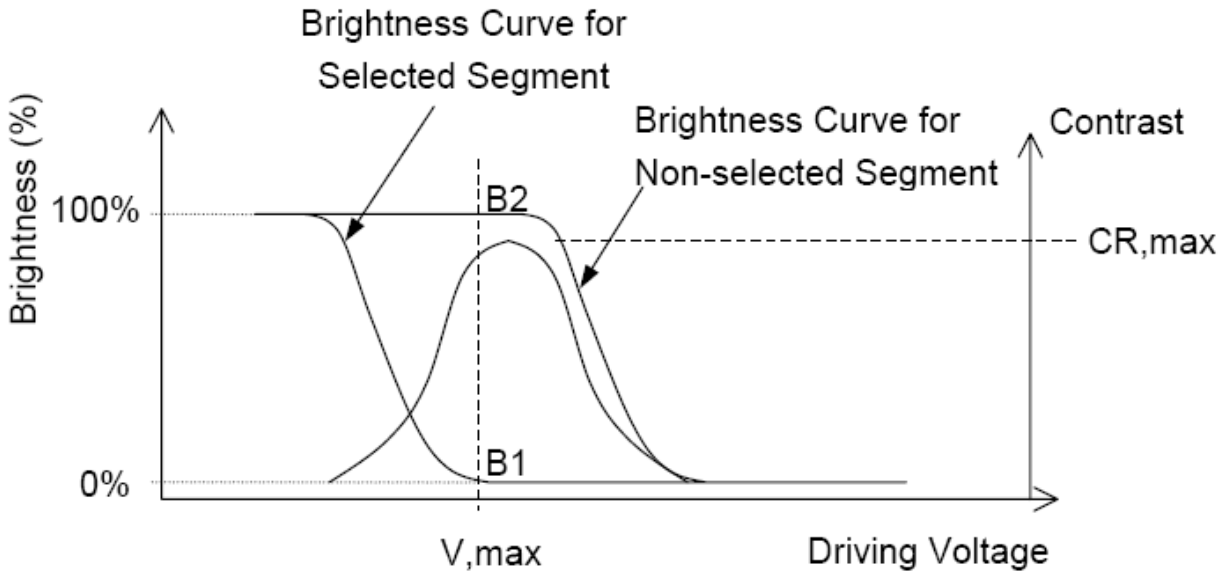


NOTE3 Definition of Viewing Angle θ and Ψ :



NOTE4 Definition of Contrast ratio(CR) :

$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



10. RELIABILITY TESTS

NO.	Item	Condition	Criterion
1	High temperature operation	+70℃ 8h	Total current consumption should be below double of initial value. Cosmetic defects should not be happened. No Defect Of Operational Function In Room Temperature Are Allowable.
2	Low temperature operation	-20℃ 8h	
3	Humidity (without polarizer)	45℃ 90%RH 24h	
4	High temperature storage	+80℃ 8h	
5	Low temperature storage	-30℃ 24h	
6	Thermal shock storage	-15℃→25℃→70℃→25℃ 60min→5min→60min→5min 5 cycle	
7	Vibration (Package state)	10～150Hz 5m/s2 45min	
8	Falling test (Packaged state)	1000mm	
9			

Notes: Judgments should be mode after exposure in room temperature for two hours.

11. PRECAUTIONS FOR USING LCD MODULES

11.1. HANDLING PRECAUTIONS

(1) The display panel is made of glass. Do not subject it to a mechanical shock or impact by dropping it.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten a cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

(6) Solvents other than those above mentioned may damage the polarizer.
Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

(7) Extra care to minimize corrosion of the electrode. Water droplets, moisture condensation or a current flow in a high-humidity environment accelerates corrosion of the electrode.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD Module, make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD Module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Be sure to ground the body when handling he LCD Module.
- Tools required for assembling, such as soldering irons, must be properly grounded.

-To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.

-The LCD Module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

11.2. STORAGE CONDITIONS

When storing, avoid the LCD module to be exposed to direct sunlight of fluorescent lamps. For stability, to keep it away form high temperature and high humidity environment (The best condition is : 23±5°C, 45±20%RH). ESD protection is necessary for long-term storage also.

11.3. OTHERS

(1) Liquid crystals solidify under low temperature (below the storage temperature range)

leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

(2) If the LCD Module have been operating for a long time showing the same display patterns the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear.

(3) A normal operating status can be recovered by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

(4) To minimize the performance degradation of the LCD Module resulting from destruction caused by static electricity etc. exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.

12. USING LCD MODULES

12.1 LIQUID CRYSTAL DISPLAY MODULES

LCD is composed of glass and polarizer. Pay attention to the following items when handling.

(1) Please keep the temperature within specified range for use and storage. Polarization degradation,bubble generation or polarizer peel-off may occur with high temperature and high humidity.

(2) Do not touch, push or rub the exposed polarizers with anything harder than a HB pencil lead (glass,tweezers, etc).

(3) N-hexane is recommended for cleaning the adhesives used to attach front/rear polarizers and reflectors made of organic substances, which will be damaged by chemicals such as acetone, toluene, toluene, ethanol and isopropyl alcohol.

(4) When the display surface becomes dusty, wipe gently with absorbent cotton or other soft material like chamois soaked in petroleum ether. Do not scrub hard to avoid damaging the display surface.

(5) Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading.

(6) Avoid contacting oil and fats.

(7) Condensation on the surface and contact with terminals due to cold will damage, stain or polarizers. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(8) Do not put or attach anything on the display area to avoid leaving marks on.

(9) Do not touch the display with bare hands. This will stain the display area and degrade insulation between terminals (some cosmetics are determinate to the polarizers).

(10)As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring.

12.2 INSTALLING LCD MODULE

Attend to the following items when installing the LCM.

(1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.

(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM

and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

12.3 ELECTRO-STATIC DISCHARGE CONTROL

Since this module uses a CMOS LSI, the same careful attention should be paid for electrostatic discharge as for an ordinary CMOS IC.

(1) Make certain that you are grounded when handing LCM.

(2) Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential.

(3) When soldering the terminal of LCM, make certain the AC power source for the soldering iron does not leak.

(4) When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

(5) As far as possible, make the electric potential of your work clothes and that of the workbenches to the ground potential.

(6) To reduce the generation of electro-static discharge, be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended

.

12.4 PRECAUTIONS FOR OPERATION

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.

(2) Driving the LCD in the voltage above the limit will shorten its lifetime.

(3) Response time is greatly delayed at temperature below the operating temperature range. However,this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.

(4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then on.

(5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore, this product must be used and stored within the specified condition of 23±5°C,

45±20%RH.

(6) When turning the power on, input each signal after the positive/negative voltage becomes stable.

12.5 SAFETY

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

13 Inspection Standard

13.1 Inspection conditions

13.1.1 The environment conditions for inspection shall be as follows:

Room temperature: 25±5℃

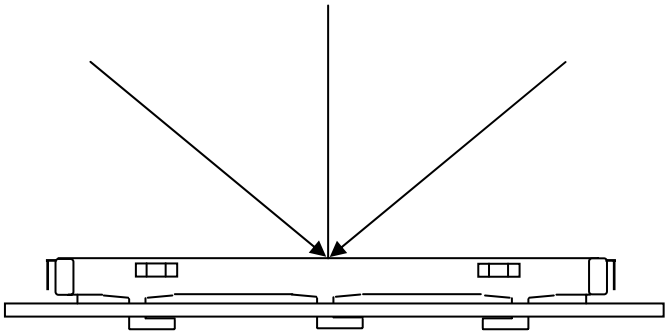
Humidity: 65±20%RH

13.1.2 Manner of appearance test

13.1.2.1 The test must be under 20w X2 or 40w fluorescent light, and the distance of view must be at 30±5 cm.

13.1.2.2 When test the model of transmissive product must add the reflective plate.

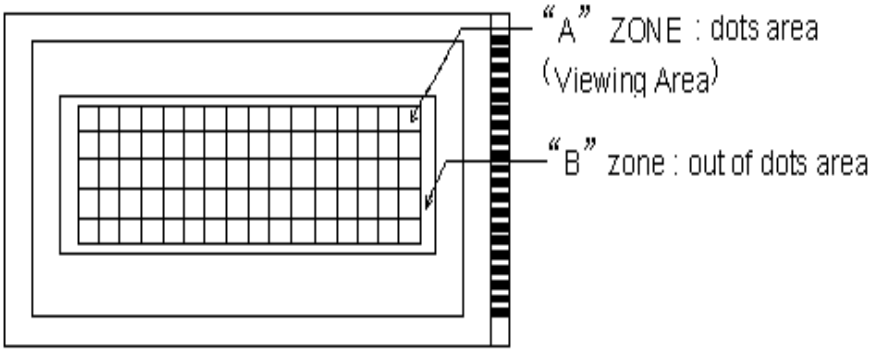
13.1.2.3 The test direction is base on about around 45° of vertical line.



13.1.2.4 Definition of area:

A area: view area.

B area: out of view area (outside dots area).



13.2.Sampling procedures for each item's acceptance level table

Defect type	Sampling procedures	AQL
Major defect	MIL-STD-105E single sampling plans for normal inspection	0.65
Minor defect	MIL-STD-105E single sampling plans for normal inspection	1.00

13.3. Classification of defects

13.3.1 Major defect

A major defect refers to a defect that is considered to substantially degrade usability for product applications.

13.3.2 Minor defect

A minor defect refers to a defect that is not considered to substantially degrade product application, or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation

13.4. Basic sampling principle

13.4.1 It will accord to the AQL when the standard can not be described.

13.4.2 The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

13.4.3 Must add new item on time when it is necessary.

13.5. Nonconforming analysis and Deal With Manner

13.5.1 Nonconforming analysis

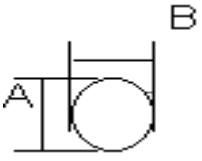
13.5.1.1 Customer should supply the detail data of nonconforming sample and the unsuitable sample.

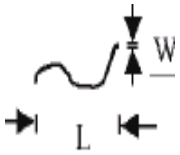
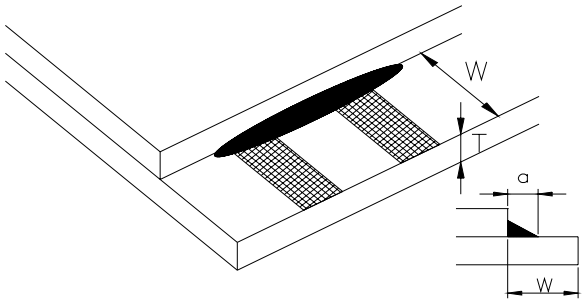
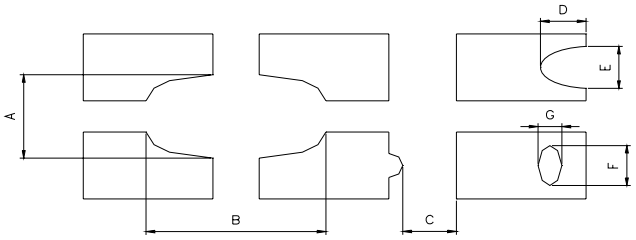
13.5.1.2 After accepting the detail from the customer, the analysis of nonconforming should be finished in two weeks.

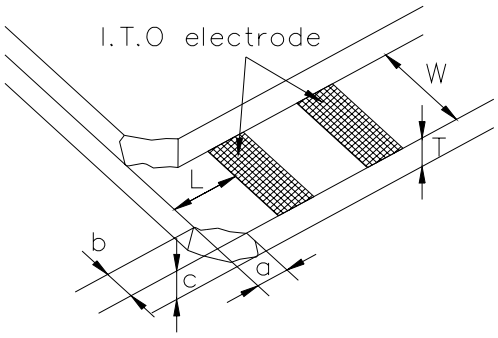
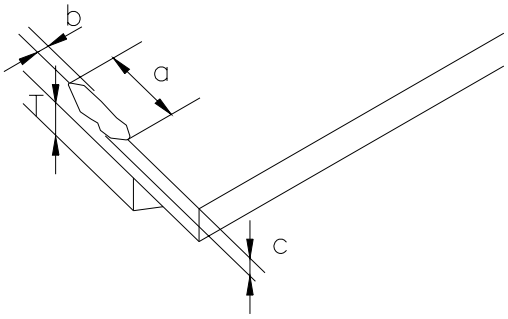
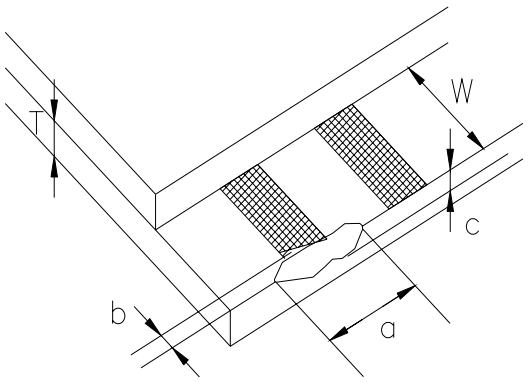
13.5.2 Disposition of nonconforming

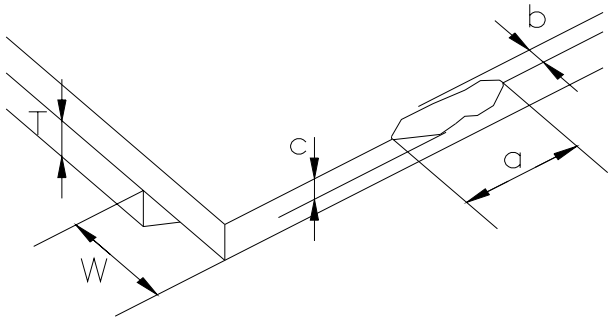
Both supplier and customer should analyze the reason together and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

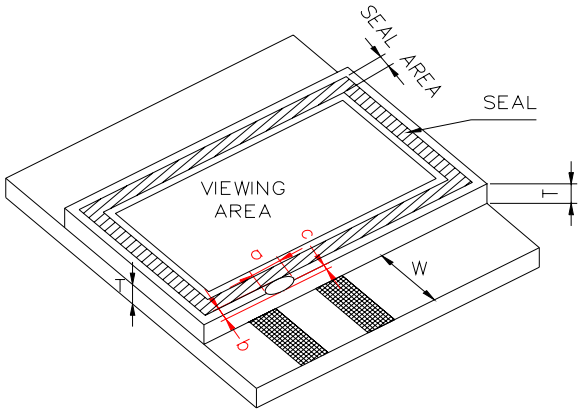
13.6 Standard of inspection (unit: mm)

<table>
<tr><th>NO</th><th>Items</th><th colspan="3">Criterion of defects</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical testing</td><td colspan="3">1.Display missing, Short-circuit;
2.No display, display malfunction;
3.Current consumption exceeds product specifications;
4.LCD viewing angle fault;
5.Mixed wrong type products;
6.Contrast fault.</td><td>Minor</td></tr>
<tr><td>02</td><td>Black or white spots on LCD (display only)</td><td colspan="3">1.Spots on display should be less than (≦) 0.25mm on display
2.No more than 3 white or black spots present.
3.No more than 2 spots or lines within 3mm.</td><td>Minor</td></tr>
<tr><td rowspan="5">03</td><td rowspan="5">Black or white spots (non-display) Contamination (non-display)</td><td rowspan="5">D=(A+B)/2
 
</td><td>Size D</td><td>Acceptable number</td><td rowspan="5">Minor</td></tr>
<tr><td>D≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15 < D≤0.20</td><td>3</td></tr>
<tr><td>0.20 < D≤0.25</td><td>2</td></tr>
<tr><td>0.25 < D≤0.30</td><td>1</td></tr>
<tr><td>04</td><td>Dark lines And</td><td>Width</td><td>Length</td><td>Acceptable number</td><td>Minor</td></tr>
</table>

<table>
<tr><td></td><td>scratches
  </td><td>W≤0.03</td><td>L≤3.00</td><td>3</td><td></td></tr>
<tr><td></td><td></td><td>0.03 < W≤0.05</td><td>L≤2.00</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>0.05 < W≤0.08</td><td>L≤2.00</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>0.08 < W ≤0.10</td><td>L≤3.00</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>W>0.10</td><td>L>3.00</td><td>0</td><td></td></tr>
<tr><td>05</td><td>Bubble in polarizer</td><td colspan="3"><table>
<tr><td>Size D</td><td>Acceptable number</td></tr>
<tr><td>D≤0.20</td><td>Ignore</td></tr>
<tr><td>0.20 < D≤0.40</td><td>3</td></tr>
<tr><td>0.40 < D≤0.60</td><td>2</td></tr>
<tr><td>0.60 < D</td><td>0</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>06</td><td>Glass rest</td><td colspan="3"> 
a ≤ 1/4W</td><td>Minor</td></tr>
<tr><td>07</td><td>Display Pattern</td><td colspan="3"> 
(A+B)/2≤0.25 C≥0 Dot type (unit: mm)
(D+E)/2≤0.25
(F+G)/2≤0.25
Note: (1) Acceptable up to 3 damages.
(2)If there’re two or more pinholes per digit, it is rejected.</td><td>Minor</td></tr>
</table>

<table>
<tr><td rowspan="4">08</td><td rowspan="4">Chip in corner</td><td colspan="4"> 
</td><td rowspan="4">Minor</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>Acceptable</td></tr>
<tr><td>a < 4mm</td><td>b≤W</td><td>C≤T</td><td>3</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td rowspan="4">09</td><td rowspan="4">Chip in other sides</td><td colspan="4"> 
</td><td rowspan="4">Minor</td></tr>
<tr><td>a</td><td>b</td><td>b</td><td>Acceptable</td></tr>
<tr><td>a≤3mm</td><td>b≤1mm</td><td>c≤T</td><td>Ignore</td></tr>
<tr><td>a≤4mm</td><td>b≤1.5mm</td><td>c≤T</td><td>3</td></tr>
<tr><td rowspan="4">10</td><td rowspan="4">Chip in pad (1)</td><td colspan="4"> 
</td><td rowspan="4">Minor</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>Acceptable</td></tr>
<tr><td>a≤2mm</td><td>b≤W/4</td><td>c≤T</td><td>Ignore</td></tr>
<tr><td>a≤3mm</td><td>b≤W/4</td><td>c≤T</td><td>3</td></tr>
</table>

<table>
<tr><td>11</td><td>Chip in pad (2)</td><td>


<table>
<tr><td>a</td><td>b</td><td>b</td><td>Acceptable</td></tr>
<tr><td>a≤3mm</td><td>b≤1mm</td><td>c≤T</td><td>Ignore</td></tr>
<tr><td>a≤4mm</td><td>b≤1.5mm</td><td>c≤T</td><td>3</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>12</td><td>Chip in seal area</td><td>


<table>
<tr><td>a</td><td>b</td><td>c</td><td>Acceptable</td></tr>
<tr><td>A<3mm</td><td>b≤1.5mm</td><td>c≤1/2T</td><td>3</td></tr>
<tr><td colspan="4">Chip is not acceptable if c is greater than 50% of the glass thickness or the seal area is damaged.</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>13</td><td>Backlight</td><td>1.Lumination source flickers.
2.Using spot, lines and contamination standard of LCD to judge the spots or scratches defect on backlight.
3.Not allow unlighted on backlight.
4.Color and luminance of backlight should correspond its specification.</td><td>Major
Minor

Major
Major</td></tr>
</table>

14	PCB, COB	1.COB seal may not have pinholes larger than 0.2mm or contamination. 2.COB seal surface may not have pinholes through to the IC. 3.The height of the COB should not exceed. 4.Beyond 2mm of the seal area, there may not have sealant on the PCB, and the sealant should be no more than three places. 5.No oxidation or contamination on PCB connector. 6.Parts on PCB should correspond the characteristic, and not allow wrong parts, missing parts or additional parts. 7.The jumper on the PCB should correspond to the characteristic. 8.The solder which gets on bezel, LED pad, zebra pad or screw hole pad should be smoothed down.	**Minor** **Minor** **Minor** **Minor** **Minor** **Major** **Minor** **Major**
15	Soldering	1.No un-melted solder pastes on the PCB. 2.No cold solder joints, solder connection missing, oxidation of solder. 3.No short circuits in components on PCB.	**Minor** **Minor** **Minor**
16	General Appearance	1.No oxidation, contamination, curves or bends on interface Pin of TCP. 2.No cracks on interface pin of TCP. 3.No solder residue or solder balls on product. 4.The IC on the TCP may not be damaged. 5.The top edge of the protective strip on the interface pin must be present or look as if it causes the interface pin to sever. 6.The residual rosin or tin oil of soldering (component or chip component) is not turned into brown or black color. 7.Sealant on top ITO circuit is not hard. 8.Pin type must correspond the specification. 9.LCD pin loose or pin missing. 10.Packing method correspond the specification. 11.Dimension and structure correspond the specification sheet. 12.No dirt and break on the heat seal.	**Major** **Minor** **Minor** **Minor** **Minor** **Minor** **Major** **Major** **Major** **Major** **Major** **Major**