

**BOLYMIN**

**SPECIFICATIONS FOR  
LCD MODULE**

**MODEL NO.**  
**BT5.7ADNHW**  
**VER.01**

FOR MESSRS:

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ON DATE OF:

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APPROVED BY:

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**History of Version**

Version	Contents	Date	Note
01	NEW VERSION	2008/03/06	SPEC.

## CONTENTS

1. Numbering System
2. Precautions in use of LCD Modules
3. Features
4. General Specification
5. Absolute Maximum Rating
6. Electrical Characteristics
7. Optical Characteristics
8. Backlight Information
9. Block Diagram
10. Interface Pin Function
11. Color Data Assignment
12. Input Signal
13. Quality Assurance
14. Reliability
15. Appendix (Drawing)

BOLYMIN

# 1. Numbering System

<u>B</u>	<u>T</u>	<u>5.7</u>	<u>A</u>	<u>D</u>	<u>N</u>	<u>H</u>	<u>W</u>	<u>xxx</u>
0	1	2	3	4	5	6	7	8

0	Brand	Bolymin
1	Module Type	T= TFT
2	Format	2.5=2.5inch
3	Version No.	A type
4	LCD Interface	A=Analog D=Digital TTL B=Digital LVDS
5	LCM Interface	C=CVBS S=S-Video Y=Component Y/Pb/Pr D=D-sub 15 for PC M=MCU N=No A/D board
6	Backlight type	H=LED edge/white C=CCFL/white
7	View Angle/ Operating Temperature	B=Bottom/Normal Temperature H=Bottom/Wide Temperature T=Top/Normal Temperature W=Top/Wide Temperature
8	Special Code	p=touch panel \$=RoHS xxx=to be assigned on datasheet

## 2. Precaution in use of LCD Module

- (1) To avoid applying excessive shocks to the module or making any alterations or modifications to it.
- (2) Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
- (3) Don't disassemble the LCM.
- (4) Don't operate it above the absolute maximum rating.
- (5) Don't drop, bend or twist LCM.
- (6) Soldering: only to the I/O terminals.
- (7) Storage: please storage in anti-static electricity container and clean environment.
- (8) Don't touch the elastmer connector, especially insert a backlight panel (EL or CCFL)

## 3. Features

- (1) VGA Resolution
- (2) 6 Bits color driver with 1 channel TTL interface
- (3) Wide range operation temperature

## 4. General Specification

### (1) Physical Specifications

Item	Standard Value	Unit
Number of dots	640x3(RGB)x480	dots
Outline dimension	127.0(W)x 100.0(H)x6.6max(D)	mm
Active area	116.16(W)x 87.12(H)	mm
Dot pitch	0.1815(W)x 0.1815(H)	mm
Surface treatment	Antiglare , Hard-Coating(3H)	
Brightness	220 nit(typ)	cd/m <sup>2</sup>
Contrast ratio	300 : 1	
Backlight unit	LED	
Display color	262,144	colors

### (2) Temperature Range

	Ultra Wide
Operating	-30 ~+85°C
Storage	-40 ~+95°C

## 5. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	$T_{OP}$	-30	—	+85	°C
Storage Temperature	$T_{ST}$	-40	—	+95	°C
Power Supply Voltage	$V_{DD}$	-0.5	—	+5	V
Signal Input Voltage	DCLK , DE R0~R5 G0~G5 B0~B5	-0.5	—	$V_{CC}+0.5$	V
Static Electricity	VESDc	-200	—	+200	V
	VESDm	-15K	—	+15K	V
ICC Rush Current	IRUSH	—	—	1	A

## 6. Electrical Characteristics

( $V_{DD}=3.3V$ ,  $T_a=25^{\circ}C$ )

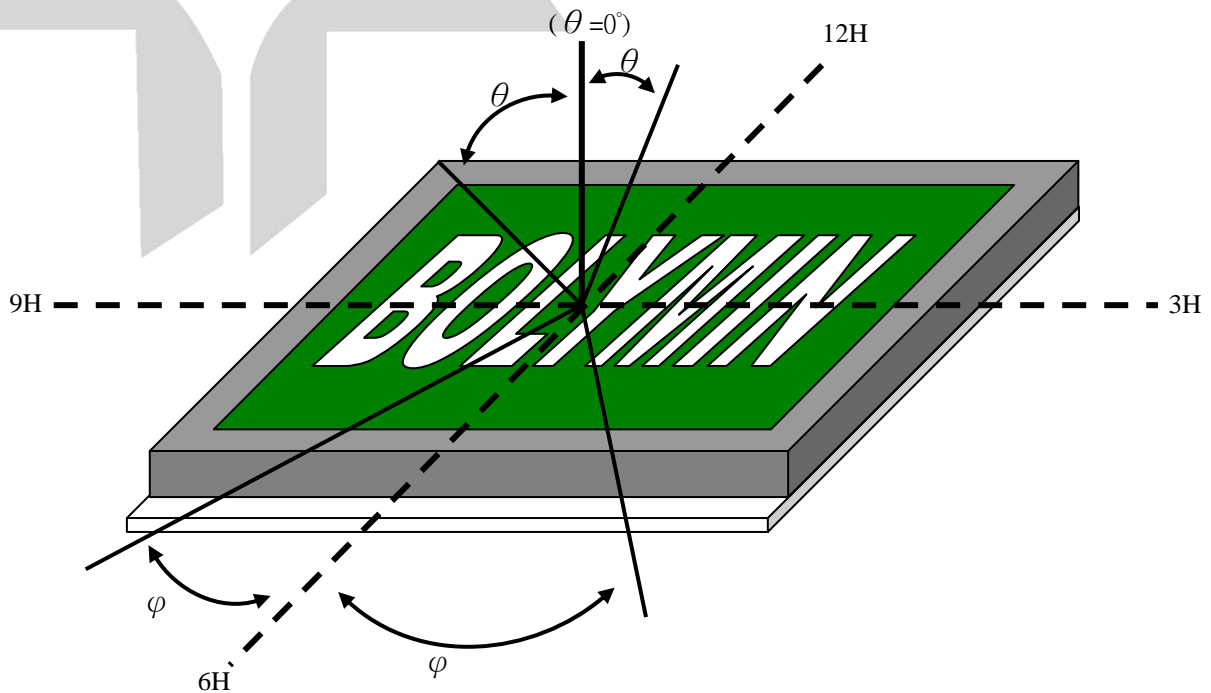
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
IC power voltage	$V_{DD}$		3.0	3.3	3.6	V
High-level input voltage	$V_{IH}$		0.7VDD		VDD	V
Low-level input voltage	$V_{IL}$		0		0.3VDD	V
Consumption current of VDD	$I_{DD}$		-	140	190	mA

## 7. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) $\theta$	$CR \geq 10$	80	100	—	deg
	(H) $\varphi$	$CR \geq 10$	120	140	—	deg
Contrast Ratio	CR	—	200	300	—	—
Response Time 25°C	Tr+Tf	$\Theta = 0^\circ$	—	30	50	ms
Brightness		If=20mA	180	220	—	CD/m <sup>2</sup>

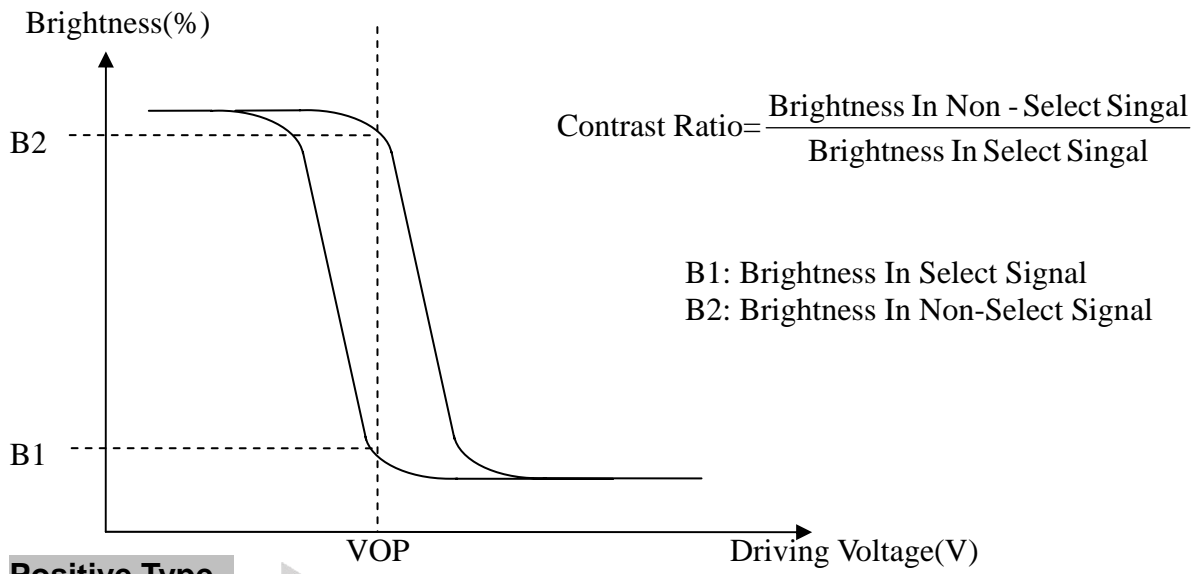
### 7.1 Definitions

#### View Angles

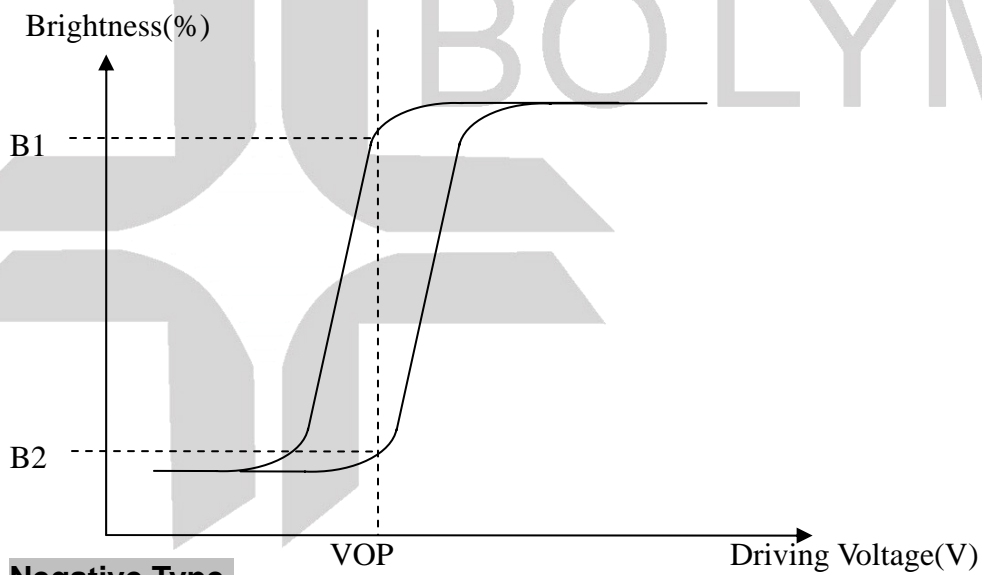




■ Contrast Ratio

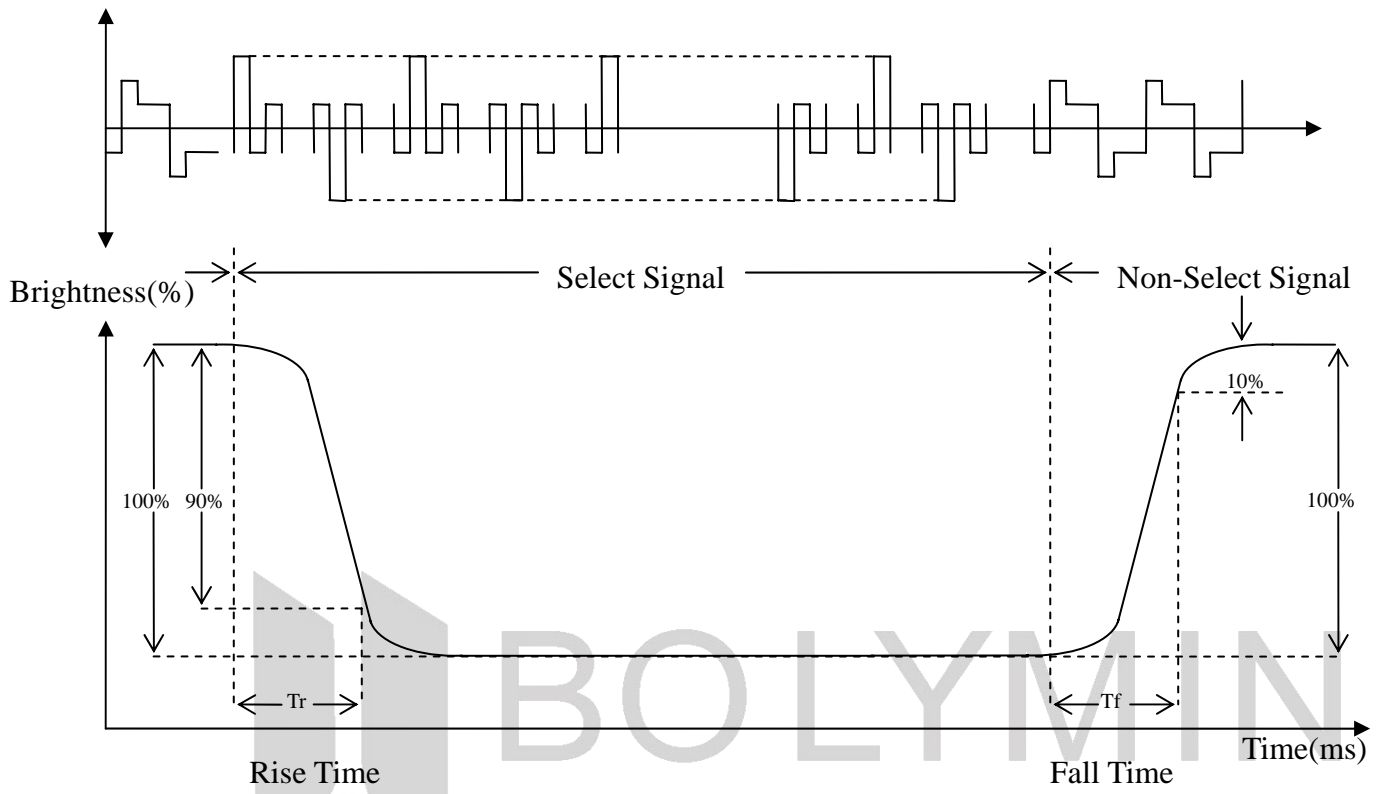


**Positive Type**



**Negative Type**

■ Response time



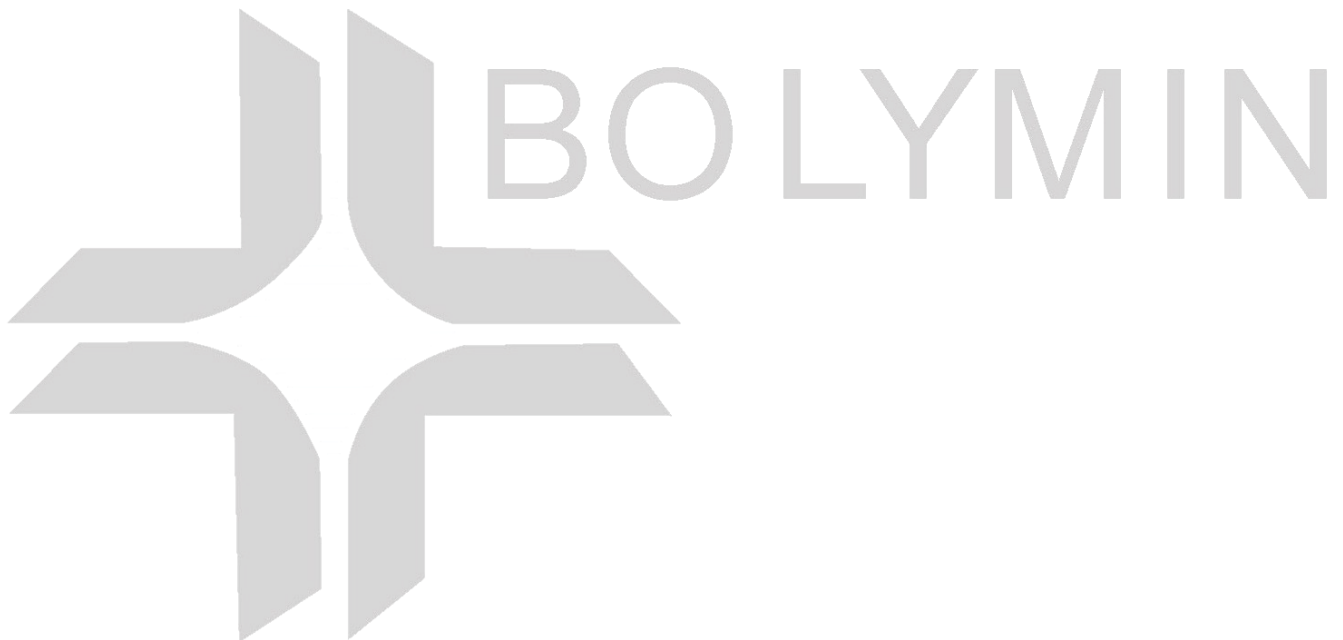
## 8. Backlight Information

Specification

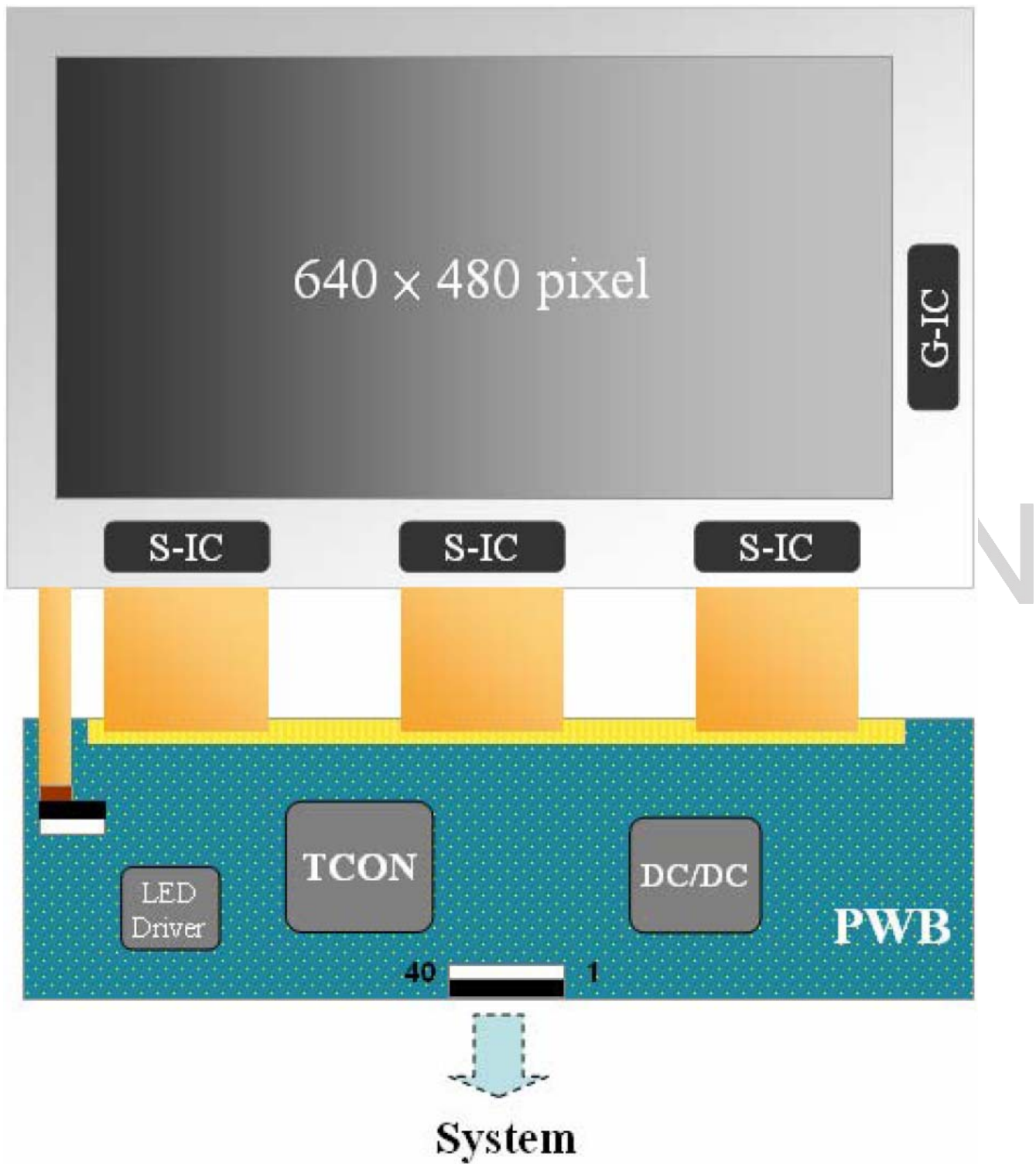
LED / white

(Ta=25°C)

Item	Symbol	Specification			Unit	Condition
		Min	Typ	Max		
Forward voltage	$V_f$	4.5	5.0	5.5	V	If=300mA
Forward current	$I_f$	—	300	350	mA	—
Chromaticity	x	0.283	—	0.343	—	—
	y	0.299	—	0.359	—	—
Color	White					



## 9. Block Diagram



## 10. Interface Pin Function

Pin no	Symbol	Description	Remark
1.	U/D	Up or Down Display Control	
2.	DMS	DE / SYNC Mode Selection	
3.	HSYNC	Honizontal SYNC.	
4.	VLED	Power Supply for LED	
5.	VLED	Power Supply for LED	
6.	VLED	Power Supply for LED	
7.	VCC	Power Supply for LCD	
8.	VSYNC	Vertical SYNC	
9.	DE	Data Enable	
10.	VSS	Power Ground	
11.	VSS	Power Ground	
12.	ADJ	Adjust for LED Brightness	
13.	B5	Blue Data 5 (MSB)	
14.	B4	Blue Data 4	
15.	B3	Blue Data 3	
16.	VSS	Power Ground	
17.	B2	Blue Data 2	
18.	B1	Blue Data 1	
19.	B0	Blue Data 0 (LSB)	
20.	VSS	Power Ground	
21.	G5	Green Data 5 (MSB)	
22.	G4	Green Data 4	
23.	G3	Green Data 3	
24.	VSS	Power Ground	
25.	G2	Green Data 2	
26.	G1	Green Data 1	
27.	G0	Green Data 0 (LSB)	
28.	VSS	Power Ground	
29.	R5	Red Data 5 (MSB)	
30.	R4	Red Data 4	
31.	R3	Red Data 3	
32.	VSS	Power Ground	
33.	R2	Red Data 2	

34.	R1	Red Data 1	
35.	R0	Red Data 0 (LSB)	
36.	VSS	Power Ground	
37.	VSS	Power Ground	
38.	DCLK	Clock Signals	
39.	VSS	Power Ground	
40.	L/R	Left or Right Display Control	

## 11. Color Data Assignment

COLOR	Input Data	R DATA					G DATA					B DATA							
		R5 MSB	R4	R3	R2	R1	R0 LSB	G5 MSB	G4	G3	G2	G1	G0 LSB	B5 MSB	B4	B3	B2	B1	B0 LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

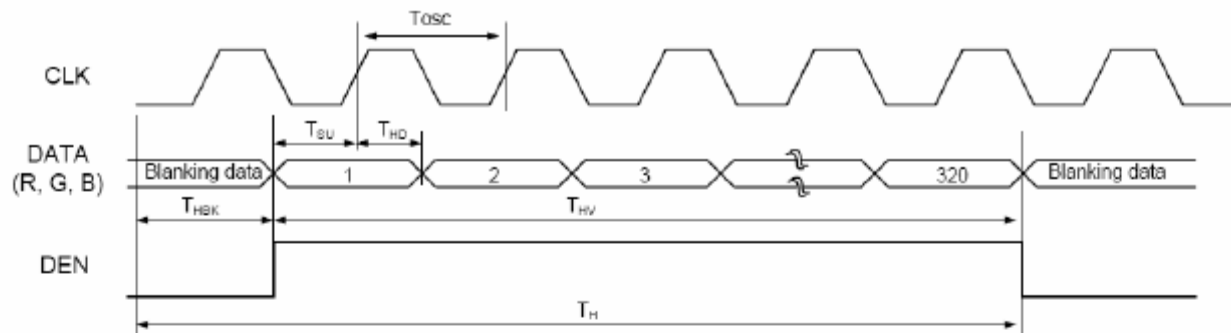
## 12. IINPUT SIGNAL

### 12.1 Timing Specification

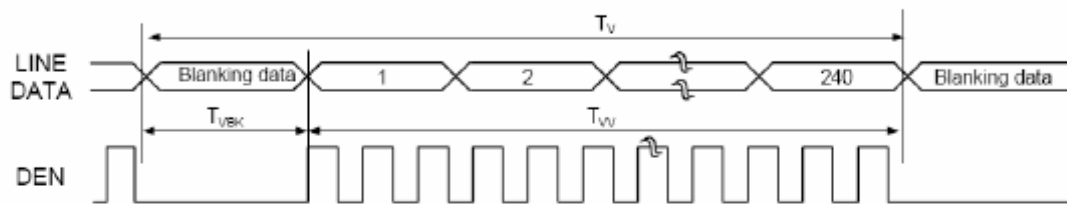
characteristics		Symbol	SPEC			UNIT
			Min	Typ	Max	
DE MODE	Dot Clock	$F_{osc}$	23	25	30	MHz
	Horizontal Period	$T_H$	750	800	900	$T_{osc}$
	Horizontal Valid	$T_{HV}$	640			
	Horizontal Blank	$T_{HBK}$	110	160	260	
	Vertical Period	$T_{VP}$	515	525	560	$T_H$
	Vertical Valid	$T_{VV}$	480			
	Vertical Blank	$T_{VBK}$	35	45	80	
	Vertical Frequency	$F_V$	55	60	65	Hz
SYNC MODE	Horizontal Period	$T_H$	750	800	900	$T_{osc}$
	Horizontal Pulse Width	$T_{HS}$	1	1	1	
	Horizontal Pulse Width + Back Proch	$T_{HPWB}$	46	46	46	
	Horizontal Front Proch	$T_{HF}$	64	114	214	
	Horizontal Valid	$T_{HV}$	640			
	Vertical Period	$T_{VP}$	515	525	560	$T_H$
	Vertical Pulse Width	$T_{VS}$	1	1	1	
	Vertical Pulse Width + Back Proch	$T_{VPWB}$	34	34	34	
	Vertical Front Proch	$T_{VF}$	1	11	46	
	Vertical Valid	$T_{VV}$	480			
	Vertical Frequency	$F_V$	55	60	65	

## 12.2 Timing Chart

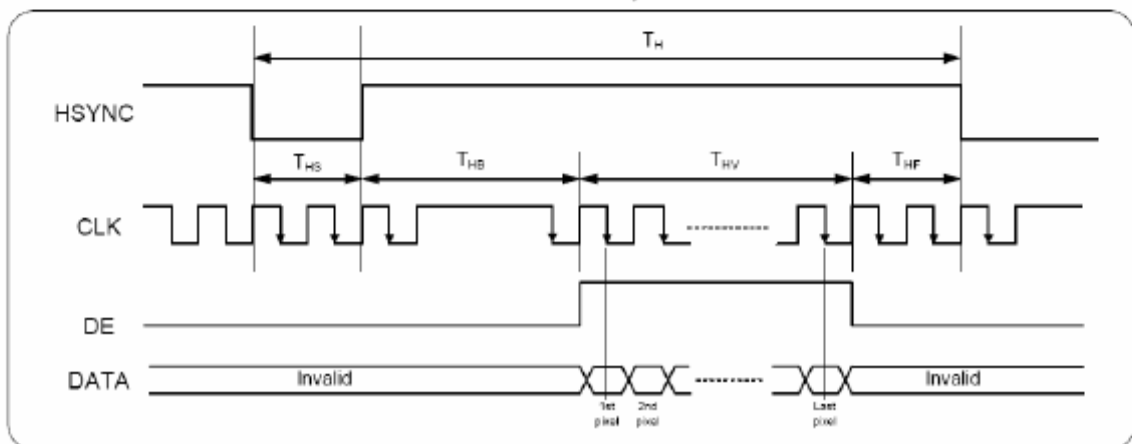
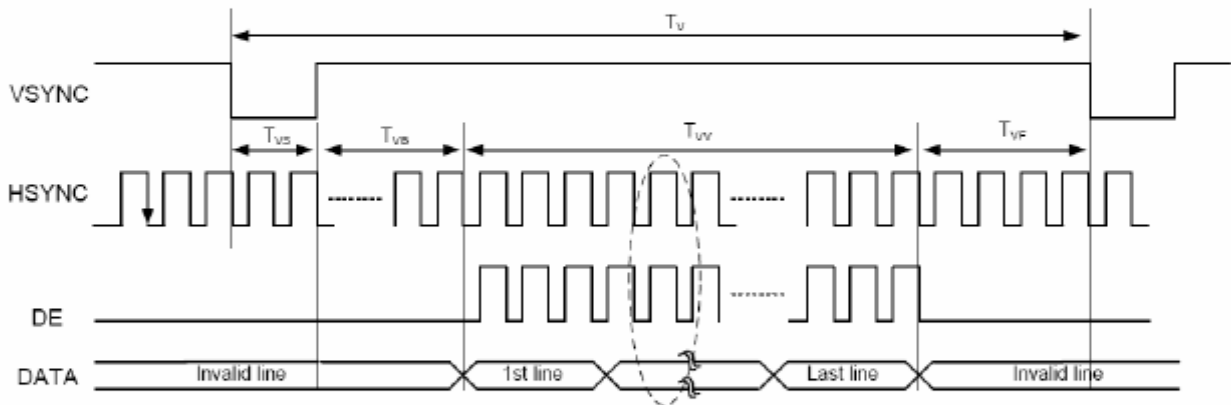
Horizontal Timing Sequence



Vertical Timing Sequence



DE mode Timing

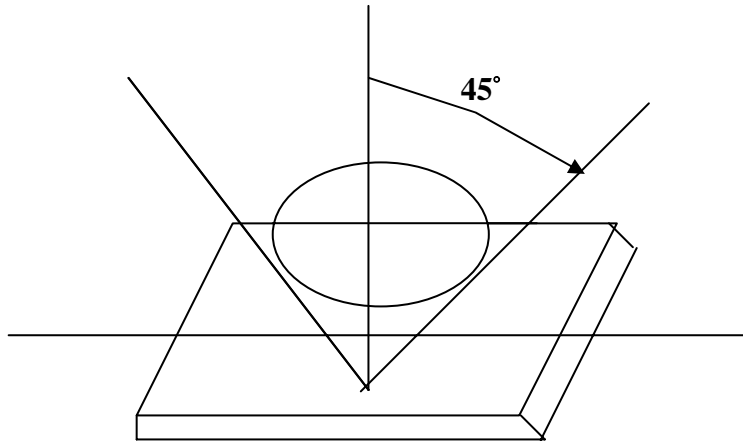




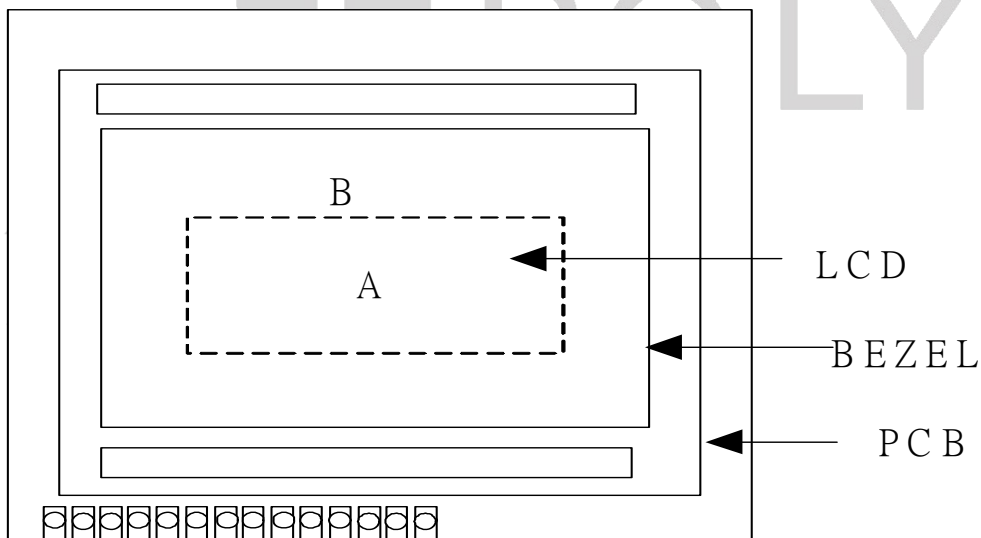
### 13. Quality Assurance

#### 13.1 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.



Definition of applicable Zones

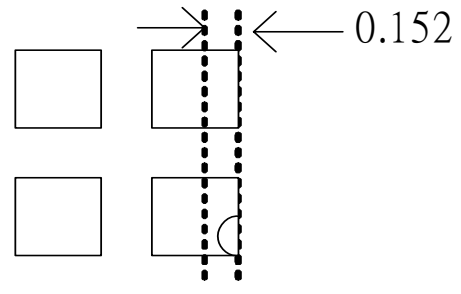
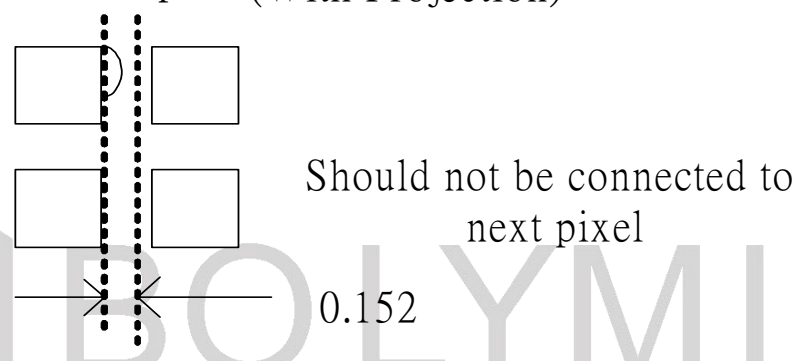
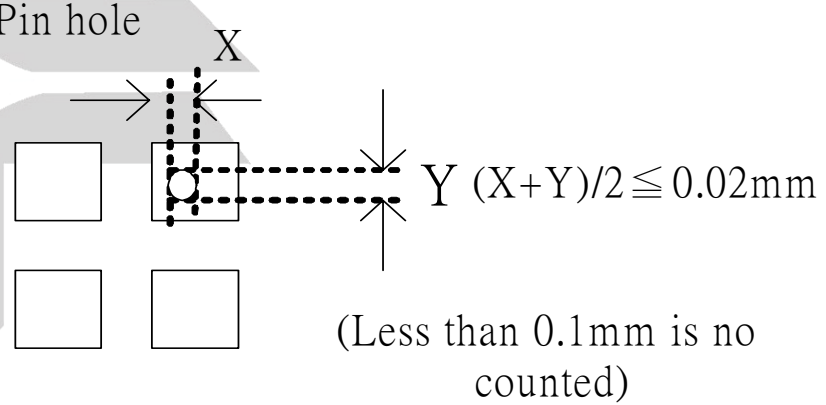
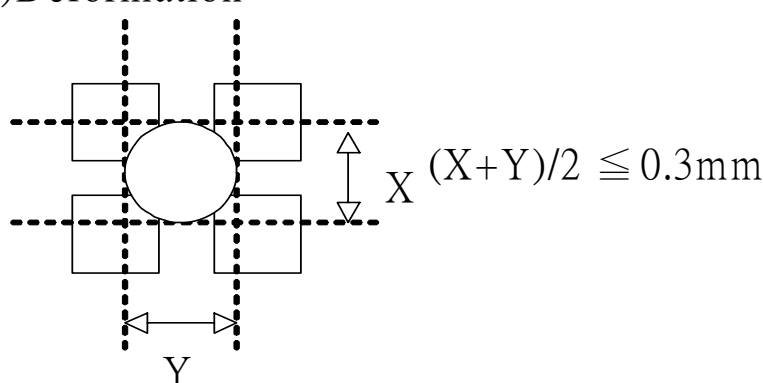


A : Display Area

B : Non-Display Area

### 13.2 Inspection Parameters

NO.	Parameter	Criteria																					
1	Black or White spots	<table border="1"> <thead> <tr> <th rowspan="2">Zone Dimension</th> <th colspan="2">Acceptable Number</th> <th rowspan="2">Class Of Defects</th> <th rowspan="2">Acceptable Level</th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td><math>D &lt; 0.15</math></td> <td>*</td> <td>*</td> <td rowspan="4">Minor</td> <td rowspan="4">2.5</td> </tr> <tr> <td><math>0.15 \leq D \leq 0.2</math></td> <td>4</td> <td>4</td> </tr> <tr> <td><math>0.2 \leq D \leq 0.25</math></td> <td>2</td> <td>2</td> </tr> <tr> <td><math>D \leq 0.3</math></td> <td>0</td> <td>1</td> </tr> </tbody> </table> <p><math>D = (\text{Long} + \text{Short})/2</math>      *: Disregard</p>	Zone Dimension	Acceptable Number		Class Of Defects	Acceptable Level	A	B	$D < 0.15$	*	*	Minor	2.5	$0.15 \leq D \leq 0.2$	4	4	$0.2 \leq D \leq 0.25$	2	2	$D \leq 0.3$	0	1
Zone Dimension	Acceptable Number			Class Of Defects	Acceptable Level																		
	A	B																					
$D < 0.15$	*	*	Minor	2.5																			
$0.15 \leq D \leq 0.2$	4	4																					
$0.2 \leq D \leq 0.25$	2	2																					
$D \leq 0.3$	0	1																					
2	Scratch, Substances	<table border="1"> <thead> <tr> <th rowspan="2">Zone X(mm) Y(mm)</th> <th colspan="2">Acceptable Number</th> <th rowspan="2">Class Of Defects</th> <th rowspan="2">Acceptable Level</th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>*      <math>0.04 \geq W</math></td> <td>*</td> <td>*</td> <td rowspan="4">Minor</td> <td rowspan="4">2.5</td> </tr> <tr> <td><math>3.0 \geq L</math>      <math>0.06 \geq W</math></td> <td>4</td> <td>4</td> </tr> <tr> <td><math>2.0 \geq L</math>      <math>0.08 \geq W</math></td> <td>2</td> <td>3</td> </tr> <tr> <td>—      <math>0.1 &lt; W</math></td> <td>0</td> <td>1</td> </tr> </tbody> </table> <p>X: Length      Y: Width      *: Disregard Total defects should not exceed 4/module</p>	Zone X(mm) Y(mm)	Acceptable Number		Class Of Defects	Acceptable Level	A	B	* $0.04 \geq W$	*	*	Minor	2.5	$3.0 \geq L$ $0.06 \geq W$	4	4	$2.0 \geq L$ $0.08 \geq W$	2	3	— $0.1 < W$	0	1
Zone X(mm) Y(mm)	Acceptable Number			Class Of Defects	Acceptable Level																		
	A	B																					
* $0.04 \geq W$	*	*	Minor	2.5																			
$3.0 \geq L$ $0.06 \geq W$	4	4																					
$2.0 \geq L$ $0.08 \geq W$	2	3																					
— $0.1 < W$	0	1																					
3	Air Bubbles (between glass & polarizer)	<table border="1"> <thead> <tr> <th rowspan="2">Zone Dimension</th> <th colspan="2">Acceptable Number</th> <th rowspan="2">Class Of Defects</th> <th rowspan="2">Acceptable Level</th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.15</math></td> <td>*</td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">2.5</td> </tr> <tr> <td><math>0.15 &lt; D \leq 0.25</math></td> <td>2</td> <td>*</td> </tr> <tr> <td><math>0.25 &lt; D</math></td> <td>0</td> <td>1</td> </tr> </tbody> </table> <p>*: Disregard Total defects shall not excess 3/module.</p>	Zone Dimension	Acceptable Number		Class Of Defects	Acceptable Level	A	B	$D \leq 0.15$	*	*	Minor	2.5	$0.15 < D \leq 0.25$	2	*	$0.25 < D$	0	1			
Zone Dimension	Acceptable Number			Class Of Defects	Acceptable Level																		
	A	B																					
$D \leq 0.15$	*	*	Minor	2.5																			
$0.15 < D \leq 0.25$	2	*																					
$0.25 < D$	0	1																					

<p>4</p> <p>Uniformity</p>	<p>(1) Pixel shape (with Dent)</p>  <p>(2) Pixel shape (With Projection)</p>  <p>(3) Pin hole</p>  <p>(4) Deformation</p>  <p>Total acceptable number : 1/pixel,5/cell</p>
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## 14. Reliability

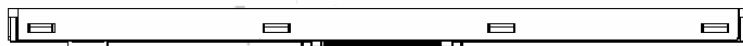
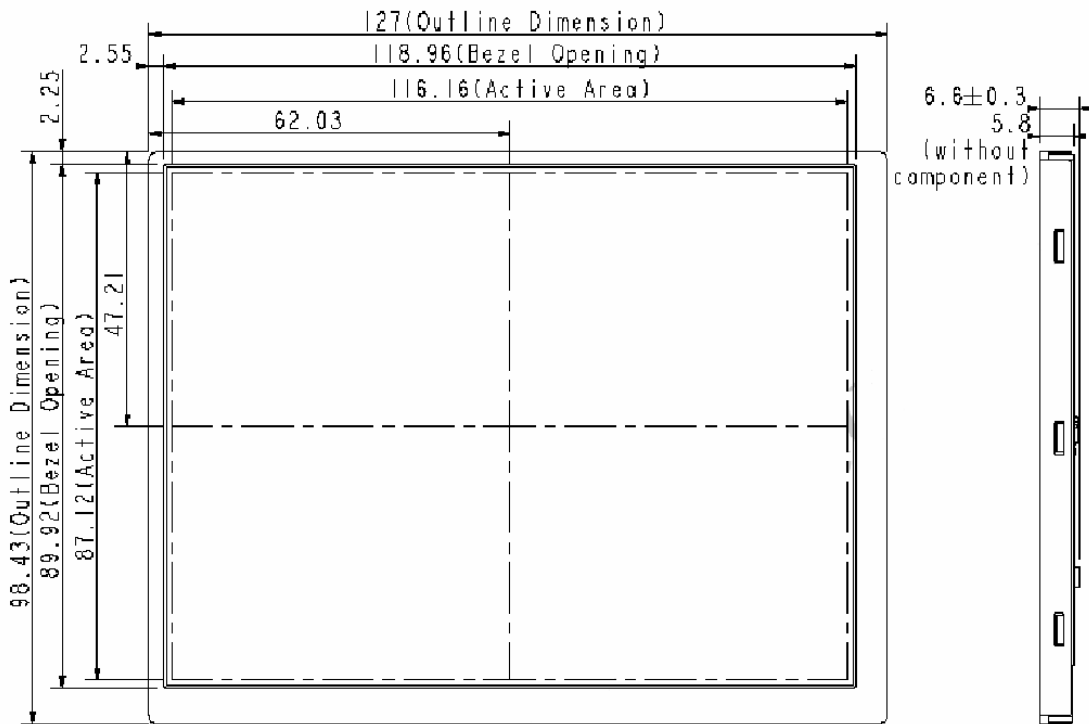
### ■ Content of Reliability Test

Environmental Test				
No.	Test Item	Content of Test	Test Condition	Applicable Standard
1	High Temperature storage	Endurance test applying the high storage temperature for a long time.	60°C 200hrs	-
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-10°C 200hrs	-
3	High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	50°C 200hrs	-
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0°C 200hrs	-
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	60°C, 90%RH 96hrs	-
6	High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	50°C, 90%RH 96hrs	-
7	Temperature Cycle	Endurance test applying the low and high temperature cycle.  <div style="text-align: center;">  <p>-10°C    25°C    60°C ← 30min    5min    30min → 1 cycle</p> </div>	-10°C/60°C 10 cycles	-
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hrs	-
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sign wave 11 msdc 3 times of each direction	-
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar    40hrs	-
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V, RS=1.5kΩ CS=100Pf    1 time	-

\*\*\*Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25°C

## 15. Appendix ( Drawing )

### 15.1 Front view(unit:mm)



### 15.1 Back view(unit:mm)

