# SPECIFICATION
# FOR
# APPROVAL

(● ) Preliminary Specification
(  ) Final Specification

| Title | 8.0”W (800 X RGB X 480)  TFT - LCD |
|---|---|

| | |
|---|---|
| BUYER | |
| MODEL | |

| | |
|---|---|
| SUPPLIER | LG.Philips LCD Co., Ltd. |
| MODEL | |
| SUFFIX | |

| SIGNATURE | DATE |
|---|---|
| / | |
| / | |
| / | |

| APPROVED BY | DATE |
|---|---|
| C.S. KYOUNG /G.Manager | |
| **REVIEWED BY** | |
| J.D. KIM /Manager | |
| **PREPARED BY** | |
| C.K. PARK /Engineer | |

**Product Engineering Dept.**
**LG. Philips LCD Co., Ltd**

## CONTENTS

## RECORD OF REVISIONS

| Revision No. | Revision Date | Page | Summary |
|---|---|---|---|
| 0.0 | Apr.08.2005 | | |
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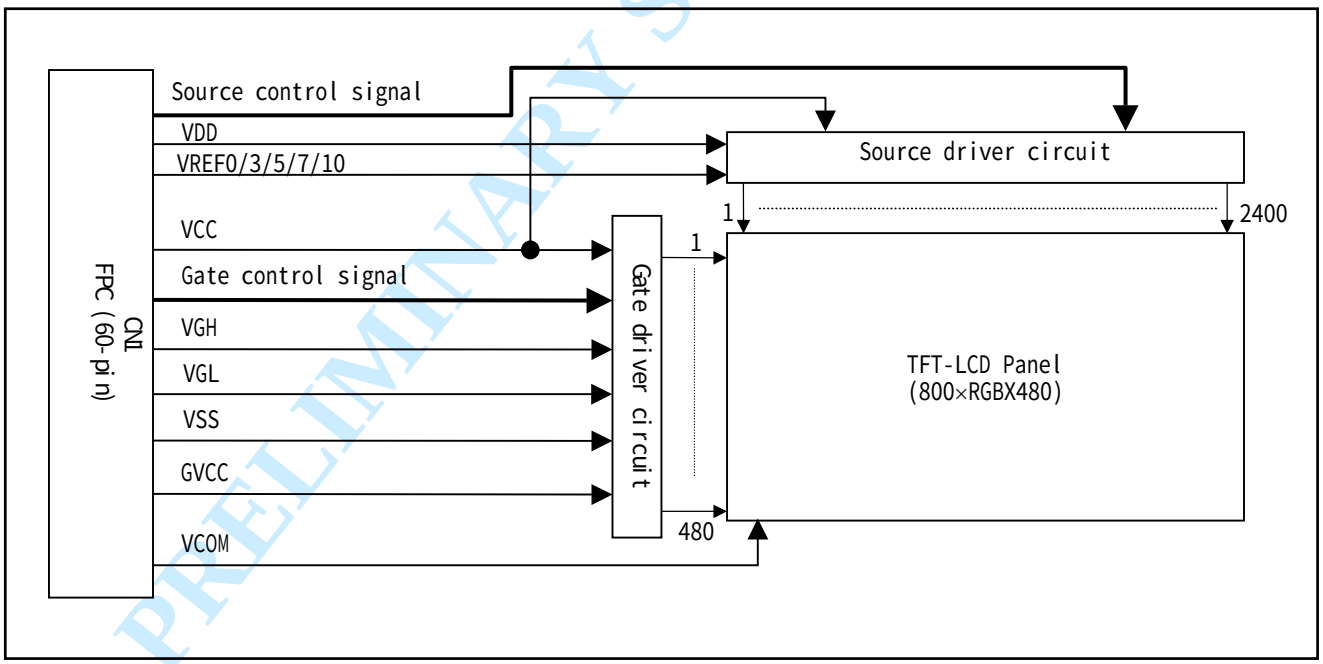
## 1. Summary

The LT080WV3-TJA1 is a **Board Assembly** Product of TFT LCD without any extra system.
This module utilizes amorphous silicon thin film transistors and a 16:9 aspect ratio. A 8.0" active matrix liquid crystal display allows full color to be displayed.
The applications are Portable DVD, Multimedia applications and others AV system.

## 2. Features

- •Utilizes a panel with a 16:9 aspect ratio suitable for use in wide-screen systems.
- •The 8.0" screen produces a high resolution image composed of 384,000 pixel in a stripe arrangement.
- •Wide viewing angle technology is employed. The most suitable viewing direction is in the 6 o'clock.
- •By adopting an active matrix drive, a picture with high contrast is realized.
- •A thin, light and compact module is accomplished through the use of COG mounting technology.
- •By adopting a high aperture panel, high transmittance color filter and high transmission polarizing plates, transmittance ratio is realized.
- •This module is compatible with the Timing controller, developed by LG.Philips LCD.
  [ T-con Model Name : GARNET, Part Number : 0IHYL-0051A ]



## 3. General Specification

| CHARACTERISTIC ITEM | SPECIFICATION |
|---|---|
| Signal Interface | Digital Interface ( CMOS ) |
| Display Technology | a-Si TFT active matrix |
| Display Mode | Normally White, Transmitting Type |
| Screen Size (Diagonal) | 8.0" (20.27㎝) |
| Outline Dimension | 188.6mm (H) X 155.2mm (V) X 1.75mm (D) |
| Active Area | 176.64mm (H) X 99.36mm (H) |
| Number Of dots | 800(H) X 3(R,G,B) X 480(V) |
| Color depth | 6 Bit, 262,144 colors |
| Pixel Pitch | 0.2208 mm × 0.2070 mm |
| Color Filter Array | RGB vertical stripes |
| Weight | 75.6g (Typ) |
| Backlight | CCFL (L Type) |
| Surface Treatment | Anti-Glare Treatment |

## 4. Interface (Input Terminal)

1> TFT-LCD Panel Driving Part

| Pin No. | SYMBOL | FUNCTION | REMARK |
|---|---|---|---|
| 1 | VCOM | Voltage Applied To Color Filter Substrate | |
| 2 | VCOM | Voltage Applied To Color Filter Substrate | |
| 3 | GND | Ground | |
| 4 | GND | Ground | |
| 5 | VDD | Power Line For Source Driver IC | |
| 6 | VDD | Power Line For Source Driver IC | |
| 7 | VREF10 | Voltage For Gamma Correction | |
| 8 | GND | Ground | |
| 9 | GND | Ground | |
| 10 | VCC | Power Line For Logic | |
| 11 | VCC | Power Line For Logic | |
| 12 | VREF0 | Voltage For Gamma Correction | |
| 13 | L_R | Left/Right Scanning Change | |
| 14 | B0 | Blue Data 0 [LSB] | |
| 15 | B1 | Blue Data 1 | |
| 16 | B2 | Blue Data 2 | |
| 17 | B3 | Blue Data 3 | |
| 18 | B4 | Blue Data 4 | |
| 19 | B5 | Blue Data 5 [MSB] | |
| 20 | TP1 | Source Driver Output Enable | |
| 21 | EI01 | Source Scanning Left Start Signal | |
| 22 | VCC | Power Line For Logic | |
| 23 | VCC | Power Line For Logic | |
| 24 | CLK | Source Driver Clock Input | |
| 25 | GND | Ground | |
| 26 | GND | Ground | |
| 27 | REV | Reverse of Input R,G,B Data Code | |
| 28 | EI02 | Source Scanning Right Start Signal | |
| 29 | G0 | Green Data 0 [LSB] | |
| 30 | G1 | Green Data 1 | |

## 4. Interface (Input Terminal)

| Pin No. | SYMBOL | FUNCTION | REMARK |
|---|---|---|---|
| 31 | G2 | Green Data 2 | |
| 32 | G3 | Green Data 3 | |
| 33 | G4 | Green Data 4 | |
| 34 | G5 | Green Data 5 [MSB] | |
| 35 | R0 | Red Data 0 [LSB] | |
| 36 | R1 | Red Data 1 | |
| 37 | R2 | Red Data 2 | |
| 38 | R3 | Red Data 3 | |
| 39 | R4 | Red Data 4 | |
| 40 | R5 | Red Data 5 [MSB] | |
| 41 | GND | Ground | |
| 42 | VREF3 | Voltage For Gamma Correction | |
| 43 | VREF5 | Voltage For Gamma Correction | |
| 44 | VREF7 | Voltage For Gamma Correction | |
| 45 | GND | Ground | |
| 46 | VDD | Power Line For Source Driver IC | |
| 47 | VDD | Power Line For Source Driver IC | |
| 48 | VCOM | Voltage Applied To Color Filter Substrate | |
| 49 | VGH | Gate Driver Positive Voltage | |
| 50 | VGL | Gate Driver Negative Voltage | |
| 51 | VGL | Gate Driver Negative Voltage | |
| 52 | VCOM | Voltage Applied To Color Filter Substrate | |
| 53 | VCOM | Voltage Applied To Color Filter Substrate | |
| 54 | VSS | Power Line For Gate Driver IC Logic | |
| 55 | GVCC | Power Line For Gate Driver IC Logic | |
| 56 | MODE | Control signal for gate driver | |
| 57 | U_D | Up/Down Scanning Change | |
| 58 | SPV | Gate Scanning Start Signal | |
| 59 | CKV | Gate Driver Scanning Clock Pulse | |
| 60 | GND | Ground | |

* Input connector for the operation : FH12K-60S-0.5SH manufactured by Hirose or equivalent,

## 5. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

| PARAMETER | SYMBOL | CONDITION | MIN. | MAX. | UNIT | REMARK |
|---|---|---|---|---|---|---|
| Logic Voltage | VCC | $T_a$=25°C | -0.3 | 6.0 | V | |
| Source Driver Voltage | VDD | $T_a$=25°C | -0.3 | 6.0 | V | |
| Digital Input Signals | $V_{I1}$ | $T_a$=25°C | -0.3 | VCC+0.3 | V | [Note 5-1] |
| Analog Input Signals | $V_{I2}$ | $T_a$=25°C | -0.3 | VDD+0.3 | V | [Note 5-2] |
| Gate Driver Voltage | VGH | $T_a$=25°C | -0.3 | 33 | V | |
| | VGH-VGL | $T_a$=25°C | -0.3 | 33 | V | |
| | GVCC-VSS | $T_a$=25°C | -0.3 | 6.0 | V | |
| Storage Temperature | $T_{st}$ | - | -20 | 70 | °C | [Note 5-3,4] |
| Operating Temperature (Ambient Temperature) | $T_{op}$ | - | -10 | 60 | °C | [Note 5-3,4,5,6] |

[Note 5-1] MODE, U_D, SPV, CKV, EIO1/2, REV, CLK, TP1, L_R, R0-5/G0-5/B0-5
[Note 5-2] VCOM,VREF0/3/5/7/10
[Note 5-3] This rating applies to all parts of the module and should not be exceeded.
[Note 5-4] Maximum wet-bulb temperature is 60°C. Condensation of dew must be avoided as electrical current leaks will occur, causing a degradation of performance specifications.
[Note 5-5] The operating temperature only guarantees operation of the circuit and doesn't guarantee all the contents of Electro-optical specification.
[Note 5-6] Ambient temperature when the backlight is lit (reference value).

## 6. Electrical Characteristics

### 1> Recommended Operating Conditions

TFT-LCD Panel Driving Section

$T_a$=25℃

| PARAMETER | | | | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|---|---|---|---|---|---|---|---|---|---|
| Logic Supply Voltage | | | | VCC | 3.0 | 3.3 | 3.6 | V | |
| Digital Input Signal | High Level | | | $V_{IH}$ | 0.7VCC | - | VCC | V | |
| | Low Level | | | $V_{IL}$ | 0 | - | 0.3VCC | V | |
| Source Driver Supply Voltage | | | | VDD | 4.5 | 5.0 | 5.5 | V | |
| Gate Driver | TFT | Hi | | VGH | 17 | 18 | 19 | | |
| | | Lo | AC | VGLAC | 5.0 | 6.0 | 7.0 | Vp-p | |
| | | | DC | VGLDC | -9.0 | -9.5 | -10.0 | V | |
| | Logic | Hi | | GVCC | -7.5 | -8.0 | -8.5 | V | |
| | | Lo | | VSS | -12.0 | -12.5 | -13.0 | V | |
| Gamma Correction Voltage | AC | | | $V_{VI}$ | 0.1 | - | VDD-0.1 | V | |
| Color Filter Substrate Voltage | AC | | | $VCOM_{AC}$ | 5.0 | 5.5 | 6.0 | Vp-p | |
| | DC | | | $VCOM_{DC}$ | 1.5 | 1.7 | 1.9 | V | |
| Source Driver Supply Current | | | | IDD | - | 40 | 60 | mA | VDD = 5.0V |
| Logic Supply Current | | | | ICC | - | 0.1 | 5.0 | mA | VCC = 3.3V |
| Gate Driver Internal Negative Supply Current | | | | GICC | - | 0.1 | 1.0 | mA | GVCC = -8.0V |
| | | | | ISS | - | 0.1 | 1.0 | mA | VSS = -12.5V |
| Gate Driver High Supply Current | | | | IGH | - | 0.1 | 1.0 | mA | VGH = 18.0V |
| Gate Driver Low Supply Current | | | | IGL | - | 0.1 | 1.0 | mArms | VGLDC = -9.5V |

***** Cautionary Matter : When applying or disconnecting power, please be sure that such action is sequentially carried out for all power supplies. In addition, apply input signals only after power has been turned on.

[Power Sequence]
-Source Driver :
Power on sequence : Case.1) VCC > Logic input > VDD > VREF0 to VREF10.
Case.2) VCC > VDD > VREF0 to VREF10 > Logic input.
Power off sequence is reverse turn of this.
-Gate Driver :
Power on sequence : VCC > VGL > Input signal > VGH.
Power off sequence is reverse turn of this.

**2> Timing Characteristics of input signals**

| | PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | REMARK |
|---|---|---|---|---|---|---|---|
| SOURCE | CLK Cycle Time | tclk | 15.3 | | | ns | CLK |
| | CLK High-Level Period | twh | 4 | | | ns | |
| | CLK Low-Level Period | twl | 4 | | | ns | |
| | DATA/REV Setup Time | tst1 | 2 | | | ns | DATA,REV |
| | DATA/REV Hold Time | th1 | 2 | | | ns | |
| | Start Pulse Setup Time | ts2 | 2 | | | ns | EIO1,EI02 |
| | Start Pulse Hold Time | th2 | 2 | | | ns | |
| | TP1-CLK Setup Time | tstp1 | 2 | | | ns | TP1,CLK |
| | TP1-CLK Hold Time | thtp1 | 2 | | | ns | |
| | Start Pulse Signal Delay Time | td1 | | | 10 | ns | EIO1,EI02 |
| | LCD Drive Signal Delay Time | td2 | | | 3 | us | |
| | | td3 | | | 8 | us | TP1 |
| | TP1 Signal Setup Time | ts3 | 3 | | | CLK | |
| GATE | Clock Frequency | fckv | | | 100 | kHz | CKV |
| | Minimum Clock Width | twh | 0.5 | | | us | |
| | Clock Rise Time | trckv | | | 100 | ns | |
| | Clock Fall Time | tfckv | | | 100 | ns | |
| | Data Setup Time | tsu | 100 | | | ns | CKV,SPV |
| | Data Hold Time | tH | 300 | | | ns | |
| | Mode Setup Time | tsum | 300 | | | ns | CKV,MODE |
| | Rise Time | trs | | | 100 | ns | SPV |
| | Fall Time | tfs | | | 100 | ns | |

(Note 1) Starting point of this time is the first rising point of CLK after rising of EI02(EI01).
(Note 2) At least input one cycle of CKV during “L” period of SPV.

### 3> Detail Description of Pin Functions

1. MODE is used as input pin for selecting output mode of Gate D-IC (Use H)

| MODE | Operation |
|---|---|
| H | Normal Operation of Gate Output |
| L | Set All Gate Output to VGL |

2. U_D is used as input pin for selecting the shifting direction of bi-directional shift register and for setting the cascade sequence of Gate D-IC

| U_D | Cascade Sequence | Output Shift |
|---|---|---|
| H | 1st to 2nd | OG1 to OG240(Up to Down) |
| L | 2nd to 1st | OG240 to OG1(Down to Up) |

3. L_R is is used as input pin for the horizontal scanning direction. If L_R is H, EIO2 is the Input Pin for the Source Start Pulse(SSP). Otherwise(If L_R is L), EIO1 is the Input Pin for the Source Start Pulse.

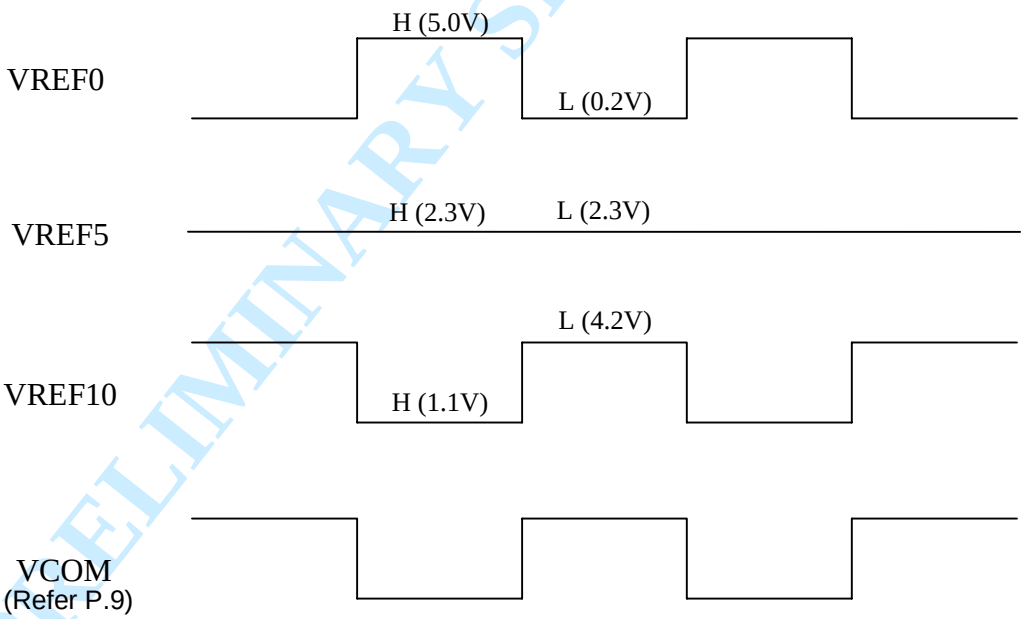
| L_R | Scanning Direction | SSP Input Pin |
|---|---|---|
| H | Form Left to Right | EIO2 |
| L | From Right to Left | EIO1 |

**4> Recommended Gamma Correction Voltage [VREF0 to VREF10]**

UNIT : Voltage

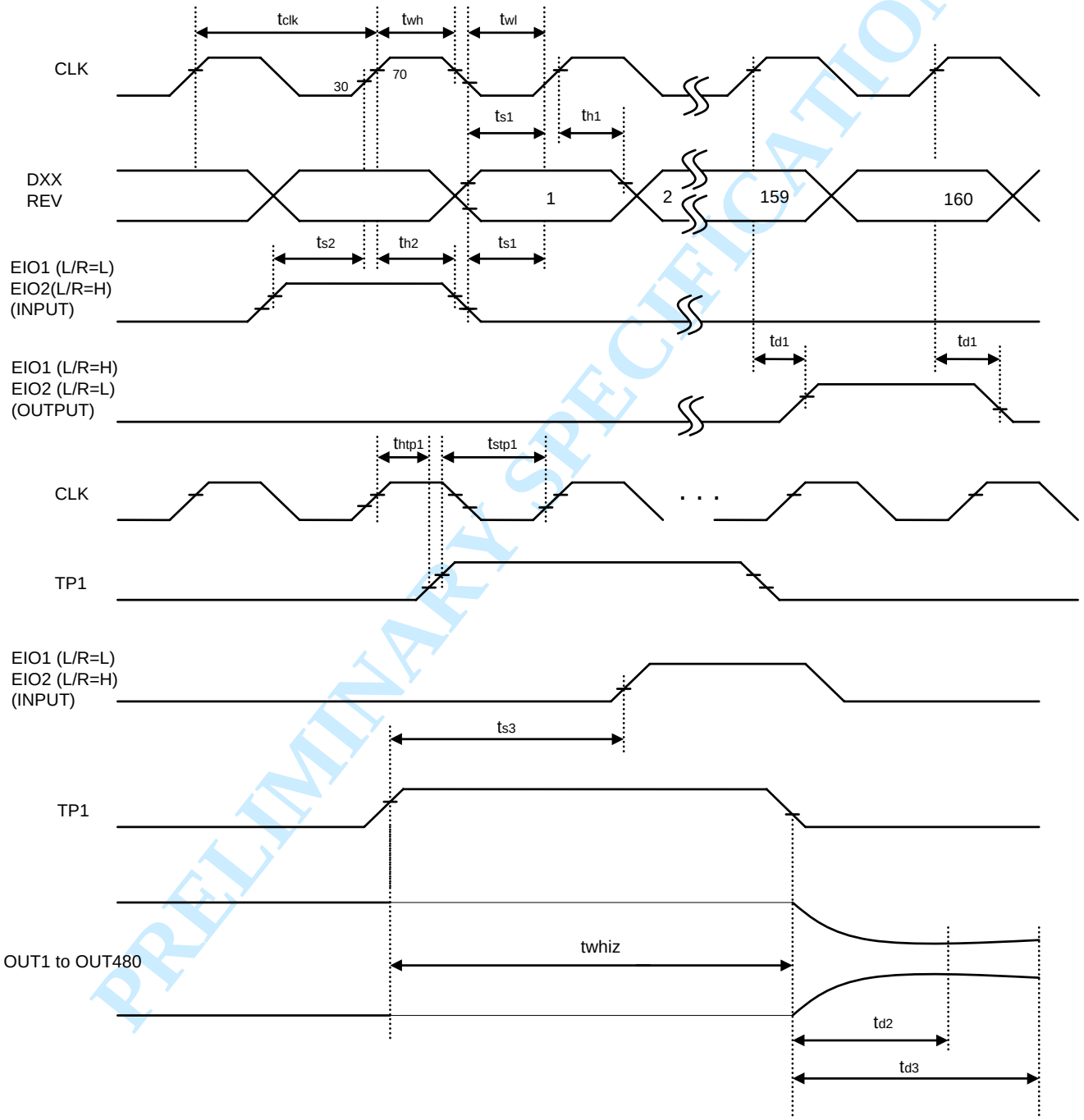
| | H(V) | L(V) |
|---|---|---|
| VREF0 | 5.0 | 0.2 |
| VREF3 | 2.8 | 1.8 |
| VREF5 | 2.3 | 2.3 |
| VREF7 | 1.9 | 2.7 |
| VREF10 | 1.1 | 4.2 |

*** Reference Gamma Wave Form**

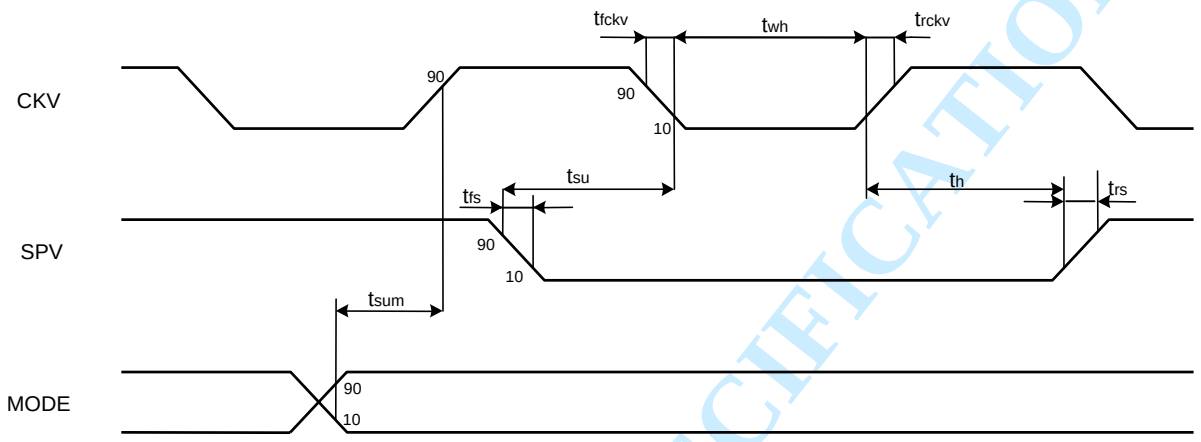


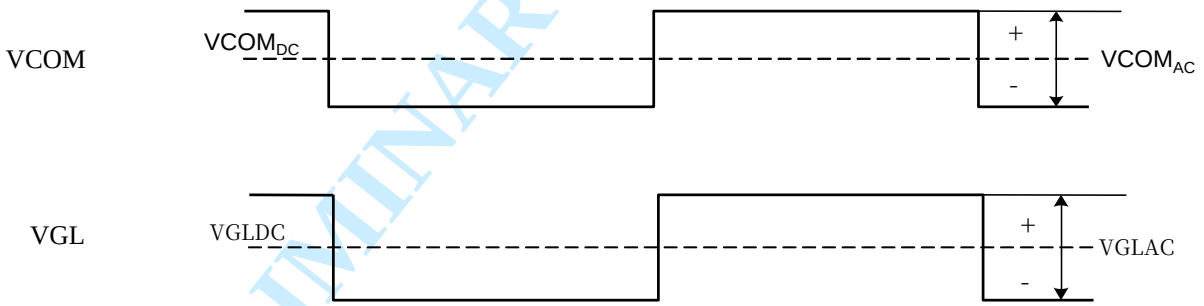
### 5> Timing Diagram

① Source D-IC Timing Diagram



② Gate D-IC Timing Diagram



## 7. Electro-optical Characteristics

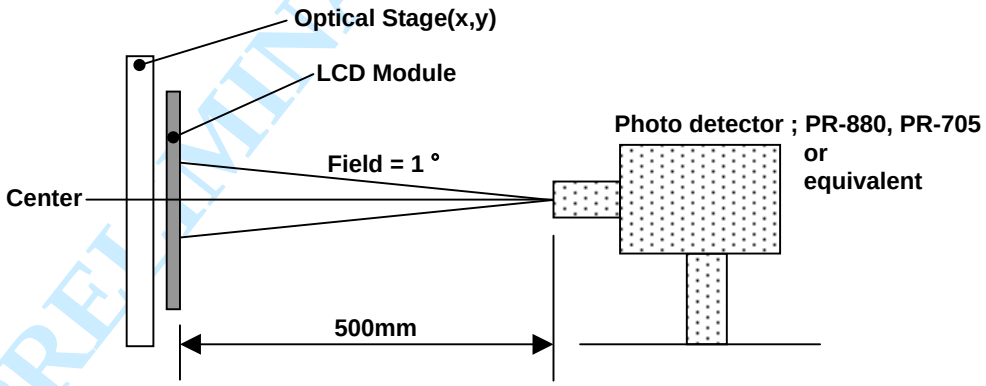
$T_a$=25°C

| Parameter | | Symbol | Condition | Values | | | Units | Notes |
|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | | |
| Contrast Ratio | | CR | Optimal | 300 | 400 | - | - | [Note 7-1] |
| Transmittance (With pol) | | T | Center | - | 6.6 | - | % | |
| Viewing Angle | x axis, right(Φ=0°) | Θr | CR≥10 | 55 | 60 | - | degree | [Note 7-1] [Note 7-2] |
| | x axis, left (Φ=180°) | Θl | | 55 | 60 | - | degree | |
| | y axis, up (Φ=90°) | Θu | | 35 | 40 | - | degree | |
| | y axis, down (Φ=270°) | Θd | | 45 | 50 | - | degree | |
| Response Time | Rise Time | $Tr_R$ | Θ=0° | - | 10 | 15 | ms | [Note 7-3] |
| | Decay Time | $Tr_D$ | | - | 30 | 40 | ms | |

** All electro-optical characteristics are measured under backlight condition.
But, the following conditions are just “Internal Conditions for Quality Test” of LG.Philips LCD.

<Reference Backlight>

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMARK |
|---|---|---|---|---|---|---|
| Luminance | | - | 6010 | - | Nit | Center Point |
| White Color Chromaticity | Wx | 0.284 | 0.299 | 0.314 | - | Center Point |
| | Wy | 0.272 | 0.287 | 0.302 | - | Center Point |

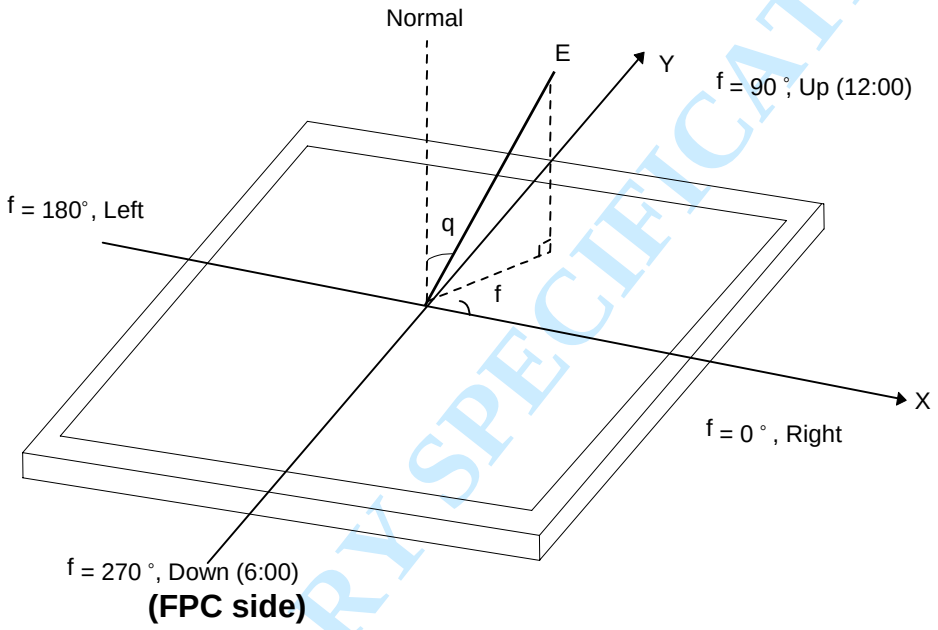



Measuring Condition ;
-Measuring surroundings : Dark Room
-Measuring temperature : $T_a$=25°C
-Adjust operating voltage to get optimum contrast at the center of the display.
-Measured value at the center point of LCD panel after more than 30 minutes while backlight turning on.

[Note 7-1] Contrast ratio is defined as follows ;

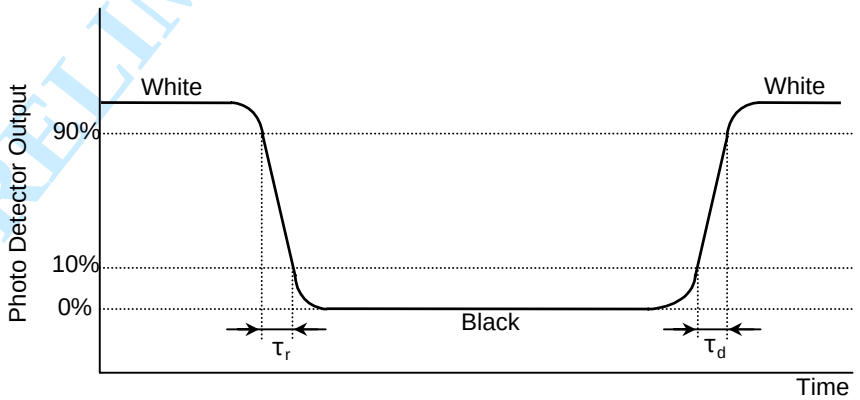
$$\text{Contrast Ratio(CR)} = \frac{\text{Photo detector output with LCD being “white”}}{\text{Photo detector output with LCD being “black”}}$$

[Note 7-2] Viewing angle range is defined as follows;




[Note 7-3]

Response time is obtained by measuring the transition time of photo detector output, when input signals are applied so as to make the area “black” to and from “white”.



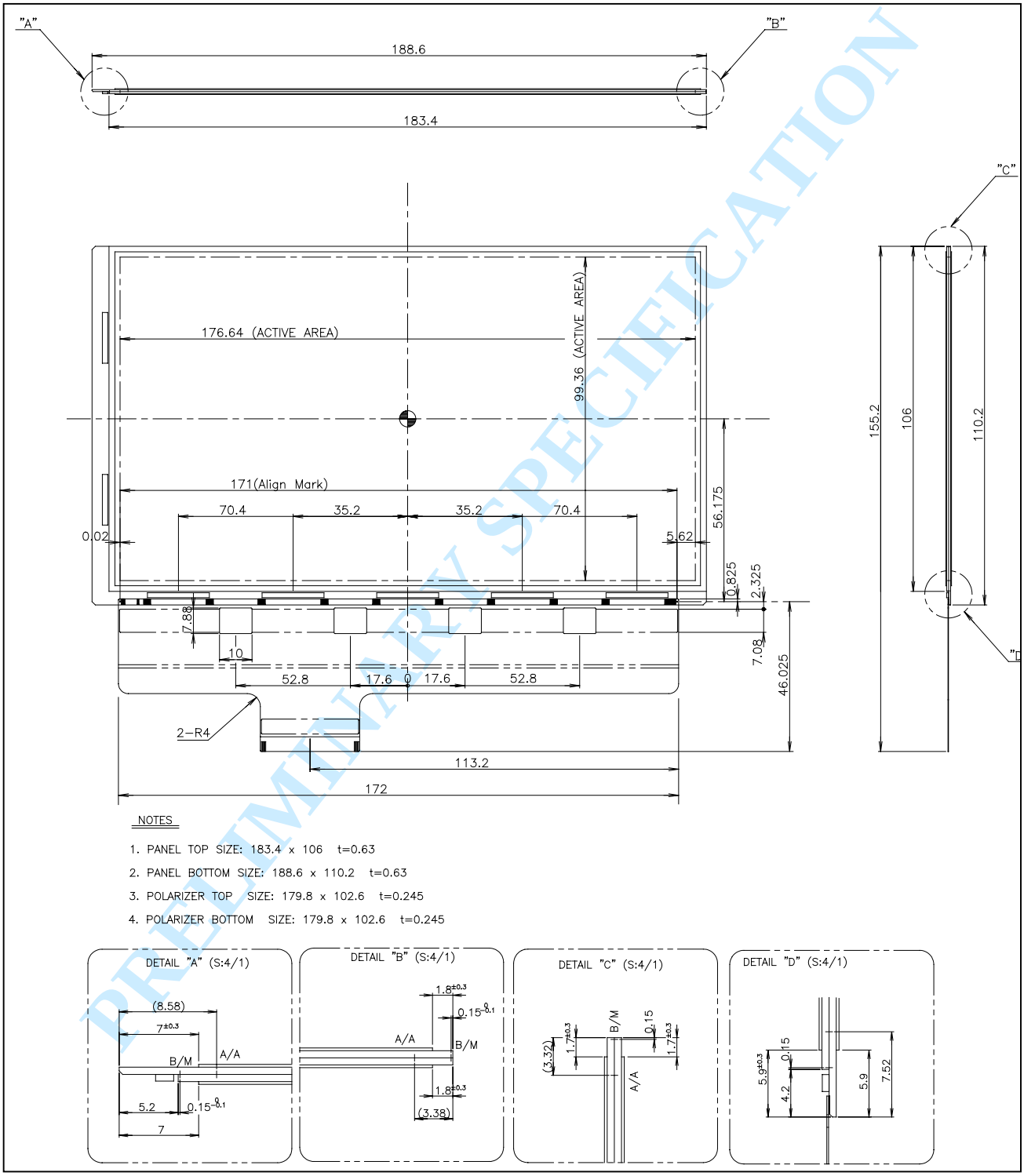
## 8. Mechanical Characteristics

| Parameter | Specification | | Unit | Remark |
|---|---|---|---|---|
| Outline Dimension | Horizontal | 188.6(± 0.5)mm | mm | |
| | Vertical | 155.2(± 0.5)mm | mm | |
| | Depth | 1.75 ± 0.3 mm | mm | |
| Active Display Area | Horizontal | 174.0 mm | mm | |
| | Vertical | 104.4 mm | mm | |
| Weight | 75.6g (Typ.) | | g | |
| Surface Treatment | Anti-Glare Treatment | | - | |

## Product Specification

Note) Unit:[mm], General tolerance: ± 0.5mm

### [ Outline Dimension ]



## 9. Reliability Test

| No. | Test Items | Test Condition | Remark |
|---|---|---|---|
| 1 | High Temperature Storage Test | Ta=70℃ 240h | |
| 2 | Low Temperature Storage Test | Ta=-20℃ 240h | |
| 3 | High Temperature Operation Test | Ta=60℃ 240h | |
| 4 | Low Temperature Operation Test | Ta=-10℃ 240h | |
| 5 | High Temperature and High Humidity Operation Test | Ta=50℃ 80%RH 240h | |
| 6 | Thermal Shock Test | -20℃(0.5h) ~ 70℃(0.5h) / 100 cycles | |

Note)
1. $T_a$= Ambient Temperature.
2. In the normal condition after test, there shall be no display NG issue occurred.
   All the cosmetic specification is judged before the reliability stress.

## 10. Packing

### 10-1. Designation of Lot Mark

a) Lot Mark

| A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

A,B,C : SIZE(INCH)
D : YEAR
E : MONTH
F : FACTORY CODE
G : ASSEMBLY CODE
H ~ M : SERIAL NO.

Note

1. YEAR

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mark | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |

2. MONTH

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mark | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C |

3. FACTORY CODE

| Factory Code | LPL Gumi | LPL Nanjing | HEESUNG |
|---|---|---|---|
| Mark | K | C | D |

4. SERIAL NO.

| Mark | 100001~199999, 200001~299999, 300001~399999, ...., A00001~A99999, ....., Z00001~Z99999 |
|---|---|

b) Location of Lot Mark

Serial NO. is printed on the label. The label is attached to the front side of assembly.
This is subject to change without prior notice.

### 10-2. Packing Form

a) Package quantity in one box :40 pcs
b) Box Size : 384 X 334 X 191 (mm)

## 11. PRECAUTIONS

Please pay attention to the following when you use this TFT LCD module.

### 11-1. MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force(ex. Twisted stress) is not applied to the module.
And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
(3) Please attach a transparent protective plate to the surface in order to protect the polarizer.
Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics deteriorate the polarizer.)
(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzine. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.
(10) The metal case of a module should be contacted to electrical ground of your system.

### 11-2. OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
V=±200mV(Over and under shoot voltage)
(2) Response time depends on the temperature.(In lower temperature, it becomes longer.)
(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time(required time that brightness is stable after turned on) becomes longer.
(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.

## 11-3. ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

## 11-4. PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

## 11-5. STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.

(2) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.

## 11-6. HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) The protection film is attached to the polarizer with a small amount of glue. If some stress is applied to rub the protection film against the polarizer during the time you peel off the film, the glue is apt to remain on the polarizer.
Please carefully peel off the protection film without rubbing it against the polarizer.

(3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.

(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.