GLOMORE

# GM-M-035QV-C1G-L-4

LCD

3.5" QVGA TFT LCD Module
with MCU Interface
with Resistive Touch Panel

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# 1. Revision History

| DATE | VERSION | REVISED PAGE NO. | Note |
|---|---|---|---|
| 2009/08/07 | 1 | | First issue |

# 2. General Specification

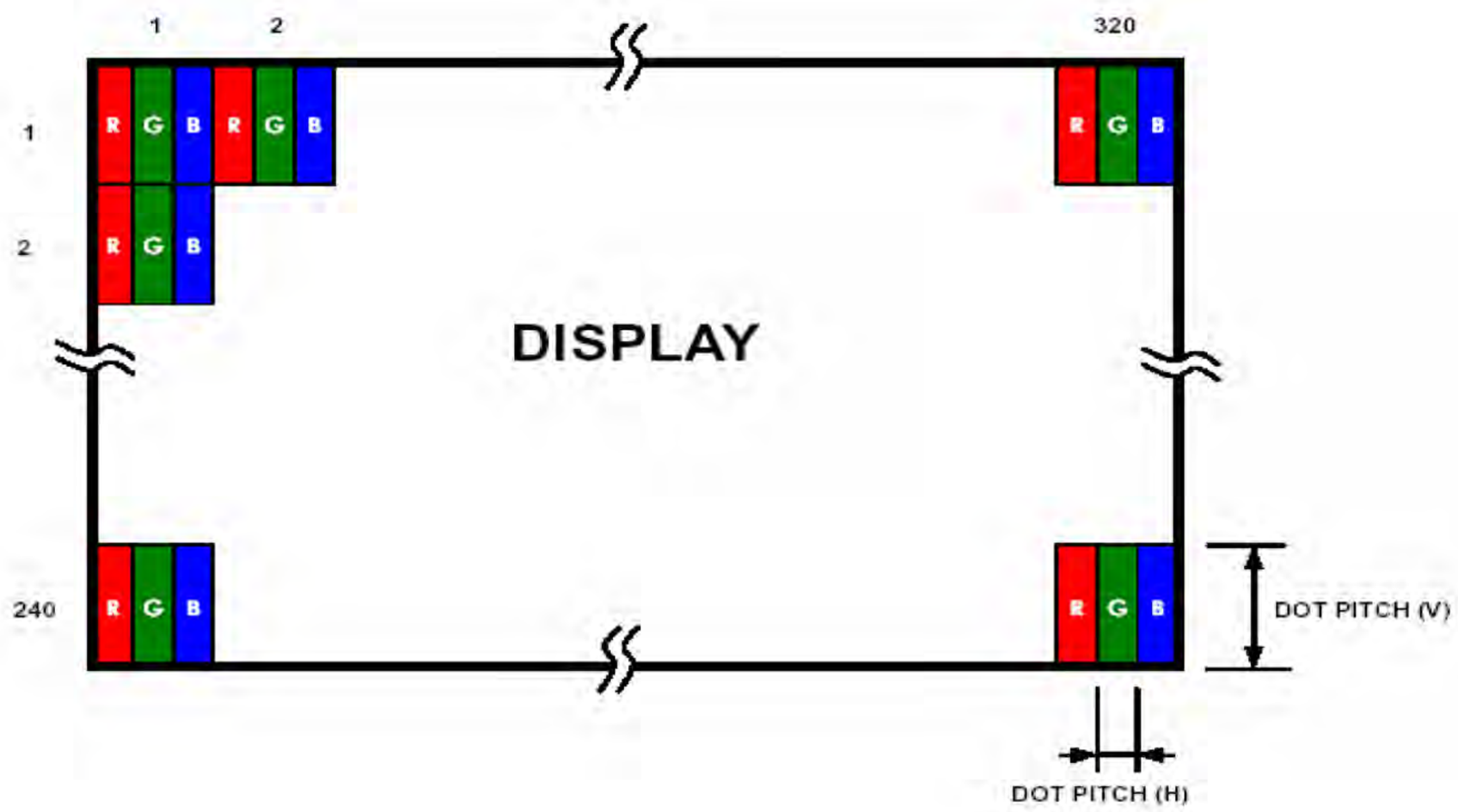
This product is composed of a TFT LCD panel, driver ICs, FPC, Control Board and a backlight unit.

## Features:

- Dot Matrix: 320 x RGB x240
- Module dimension: 93.5 x 66.44 x 9.06 (max.) $mm^3$
- View area: 73.1x55.6 $mm^2$
- Active area: 70.08 x 52.56 $mm^2$
- Dot size: 0.073 x 0.219 $mm^2$
- LCD type: TFT, Negative, Transmissive
- View direction: 6 o'clock
- Backlight Type: LED, Normally White
- Controller IC: SSD1963
- Driving IC package: COG

*Expose the IC number blaze (Luminosity over than 1 cd) when using the LCM may cause IC operating failure.

*Color tone slight changed by temperature and driving voltage.

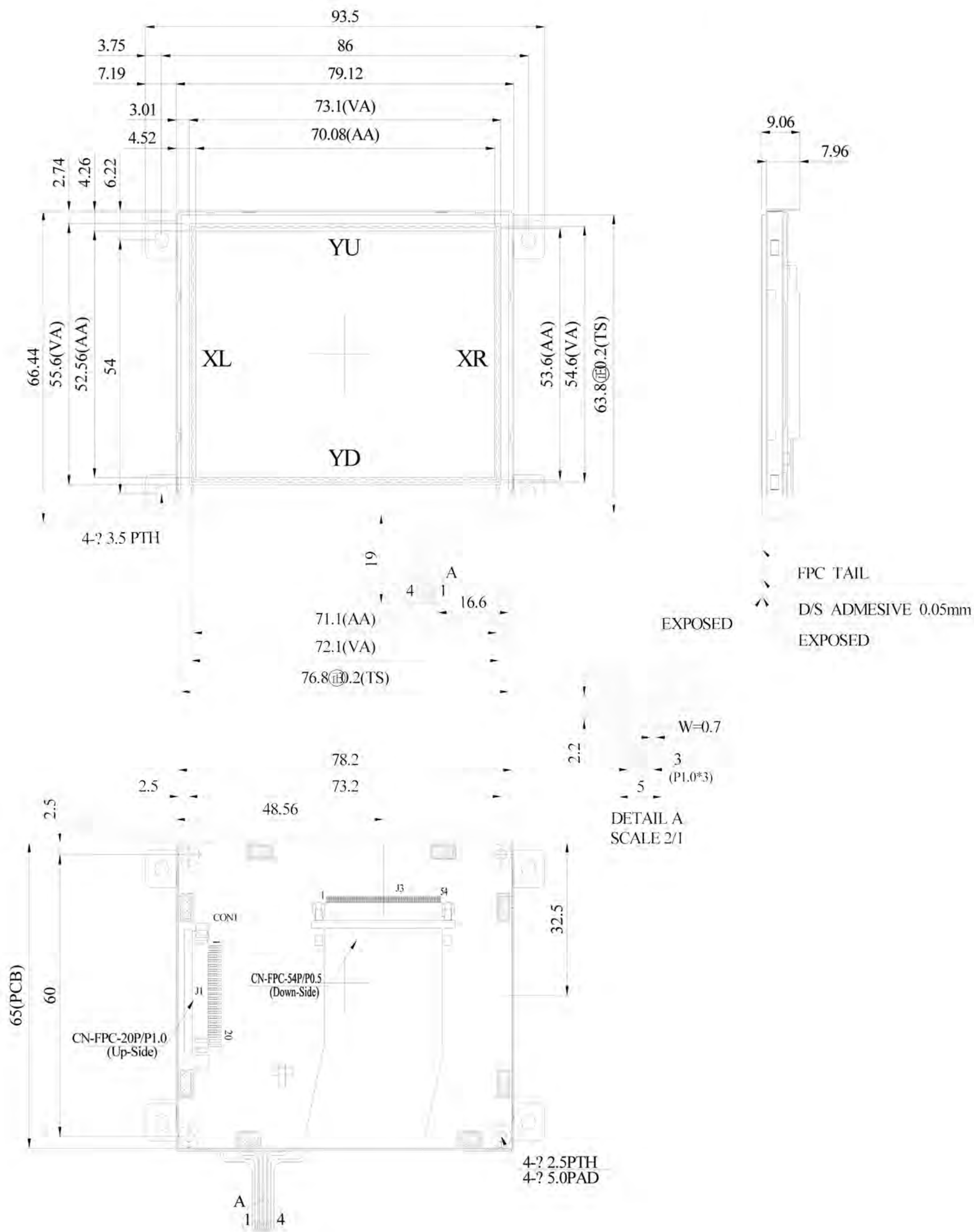


# 4. Interface Pin Function

**Pins Connection to Control Board**

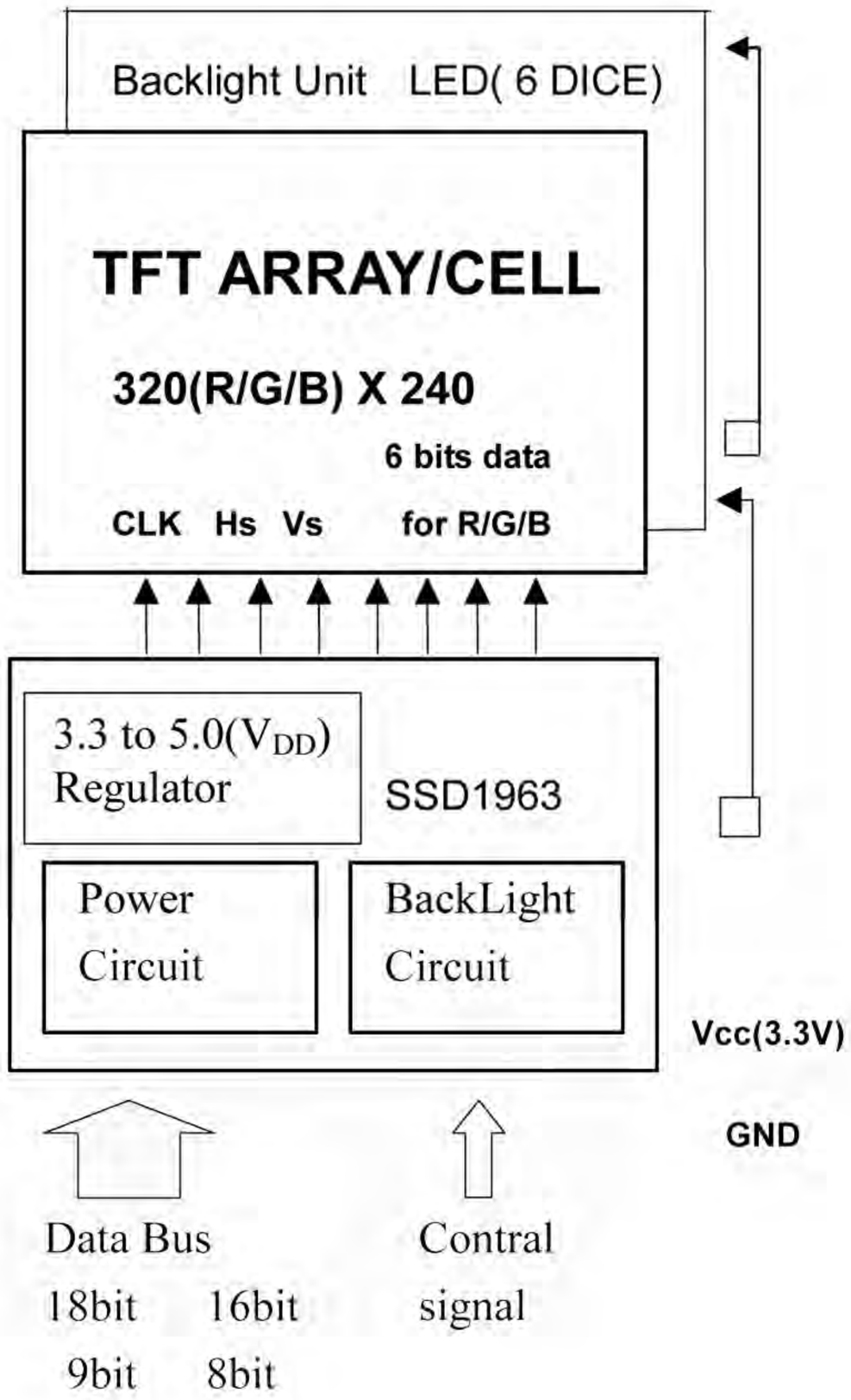
| P/N | Symbol | 8BIT Function |
|---|---|---|
| 1 | GND | Ground |
| 2 | VCC | Power supply for Logic |
| 3 | BL_E | Backlight control (H: On \ L: Off) |
| 4 | RS | Command/Data select |
| 5 | WR | 8080 family MPU interface : Write signal |
| 6 | RD | 8080 family MPU interface: Read signal |
| 7 | DB0 | Data bus |
| 8 | DB1 | |
| 9 | DB2 | |
| 10 | DB3 | |
| 11 | DB4 | |
| 12 | DB5 | |
| 13 | DB6 | |
| 14 | DB7 | |
| 15 | CS | Chip select |
| 16 | RES | REST |
| 17 | NC | No connection |
| 18 | FGND | Frame Gnd |
| 19 | NC | No connection |
| 20 | NC | No connection |
| | | |
| | | |
| | | |
| | | |
| | | |

# 5. Outline Dimension & Block Diagram




CON1

| PIN NO. | SYMBOL | PIN | OUT |
|---|---|---|---|
| 1 | GND | 1 | XR |
| 2 | Vcc | 2 | YD |
| 3 | BL_E | 3 | XL |
| 4 | RS | 4 | YU |
| 5 | WR | | |
| 6 | RD | | |
| 7 | DB0 | | |
| 8 | DB1 | | |
| 9 | DB2 | | |
| 10 | DB3 | | |
| 11 | DB4 | | |
| 12 | DB5 | | |
| 13 | DB6 | | |
| 14 | DB7 | | |
| 15 | CS | | |
| 16 | RES | | |
| 17 | NC | | |
| 18 | FGND | | |
| 19 | NC | | |
| 20 | NC | | |


Backlight Unit LED( 6 DICE)
TFT ARRAY/CELL
320(R/G/B) X 240
6 bits data
CLK Hs Vs for R/G/B
3.3 to 5.0(VDD) Regulator
SSD1963
Power Circuit
BackLight Circuit
Vcc(3.3V)
GND
Data Bus
18bit 16bit
9bit 8bit
Contral signal

# 6. Display Control Instruction

## 6.1 Data transfer order Setting

### Pixel Data Format

Both 6800 and 8080 support 8-bit, 9-bit, 16-bit, 18-bit and 24-bit data bus. Depending on the width of the data bus, the display data are packed into the data bus in different ways.

**Pixel Data Format：**

| Interface | Cycle | D[23] | D[22] | D[21] | D[20] | D[19] | D[18] | D[17] | D[16] | D[15] | D[14] | D[13] | D[12] | D[11] | D[10] | D[9] | D[8] | D[7] | D[6] | D[5] | D[4] | D[3] | D[2] | D[1] | D[0] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 bits | 1st | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| 18 bits | 1st | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| 16 bits (565 format) | 1st | | | | | | | | | R5 | R4 | R3 | R2 | R1 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 |
| 16 bits | 1st | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | X | X | G5 | G4 | G3 | G2 | G1 | G0 | X | X |
| | 2nd | | | | | | | | | B5 | B4 | B3 | B2 | B1 | B0 | X | X | R5 | R4 | R3 | R2 | R1 | R0 | X | X |
| | 3rd | | | | | | | | | G5 | G4 | G3 | G2 | G1 | G0 | X | X | B5 | B4 | B3 | B2 | B1 | B0 | X | X |
| 9 bits | 1st | | | | | | | | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 |
| | 2nd | | | | | | | | | | | | | | | | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| 8 bits | 1st | | | | | | | | | | | | | | | | | R5 | R4 | R3 | R2 | R1 | R0 | X | X |
| | 2nd | | | | | | | | | | | | | | | | | G5 | G4 | G3 | G2 | G1 | G0 | X | X |
| | 3rd | | | | | | | | | | | | | | | | | B5 | B4 | B3 | B2 | B1 | B0 | X | X |

X: Don't Care

## 6.2 Register Depiction

**Please consult the spec of SSD1963**

# 7. Optical Characteristics

Ta=25±2℃, ILED=20mA

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Response time | | Tr | θ =0°、Φ=0 | - | 10 | | ms | Note 3,5 |
| | | Tf | | - | 15 | | ms | |
| Contrast ratio | | CR | At optimized viewing angle | 300 | 400 | - | - | Note 4,5 |
| Color Chromaticity | White | Wx | θ =0°、Φ=0 | (0.26) | (0.31) | (0.36) | | Note 2,6,7 |
| | | Wy | | (0.28) | (0.33) | (0.38) | | |
| | Red | Rx | θ =0°、Φ=0 | | | | | |
| | | Ry | | | | | | |
| | Green | Gx | θ =0°、Φ=0 | | | | | |
| | | Gy | | | | | | |
| | Blue | Bx | θ =0°、Φ=0 | | | | | |
| | | By | | | | | | |
| Viewing angle | Hor. | ΘR | CR≧10 | (50) | (60) | | Deg. | Note 1 |
| | | ΘL | | (50) | (60) | | | |
| | Ver. | ΦT | | (40) | (50) | | | |
| | | ΦB | | (45) | (55) | | | |
| Brightness | | - | - | 200 | 250 | - | cd/m$^2$ | Center of display |

Ta=25±2℃, $I_L$=20mA

Note 1: Definition of viewing angle range

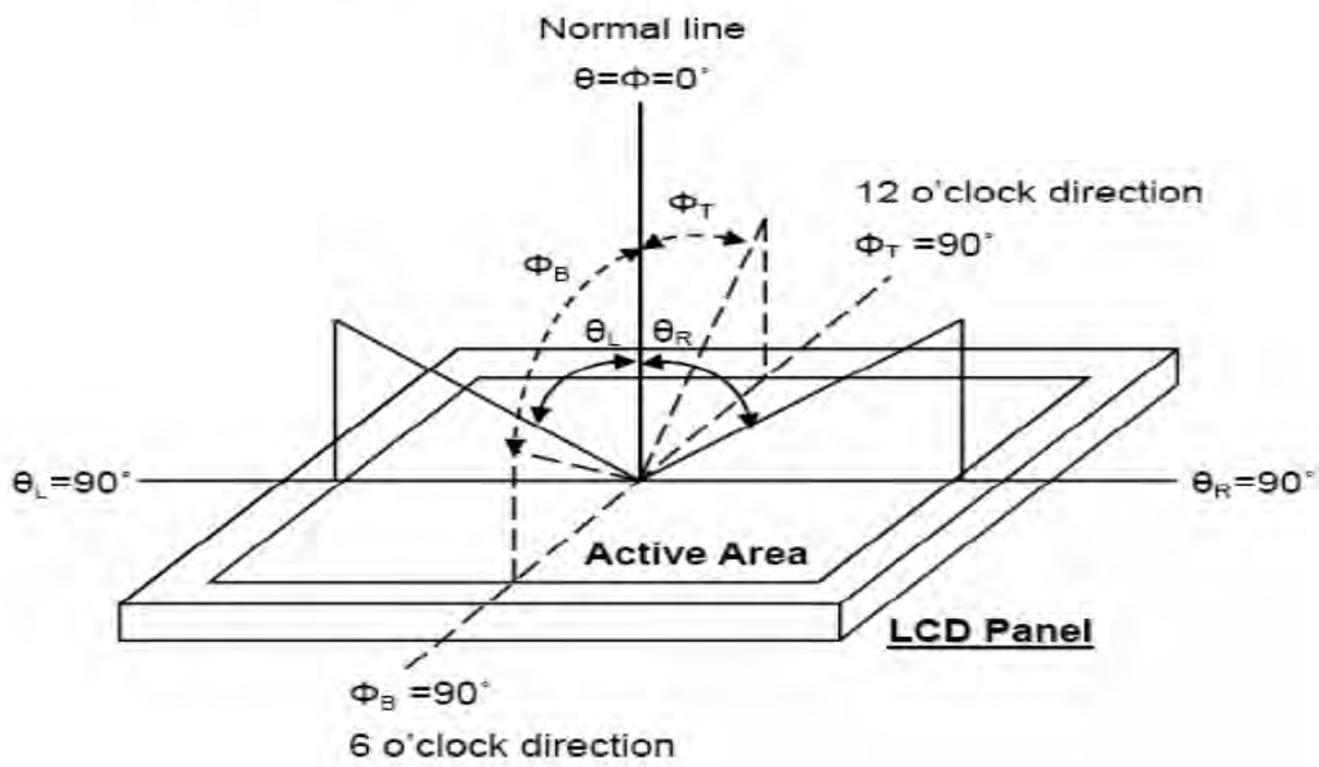



Fig. 8-1 Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

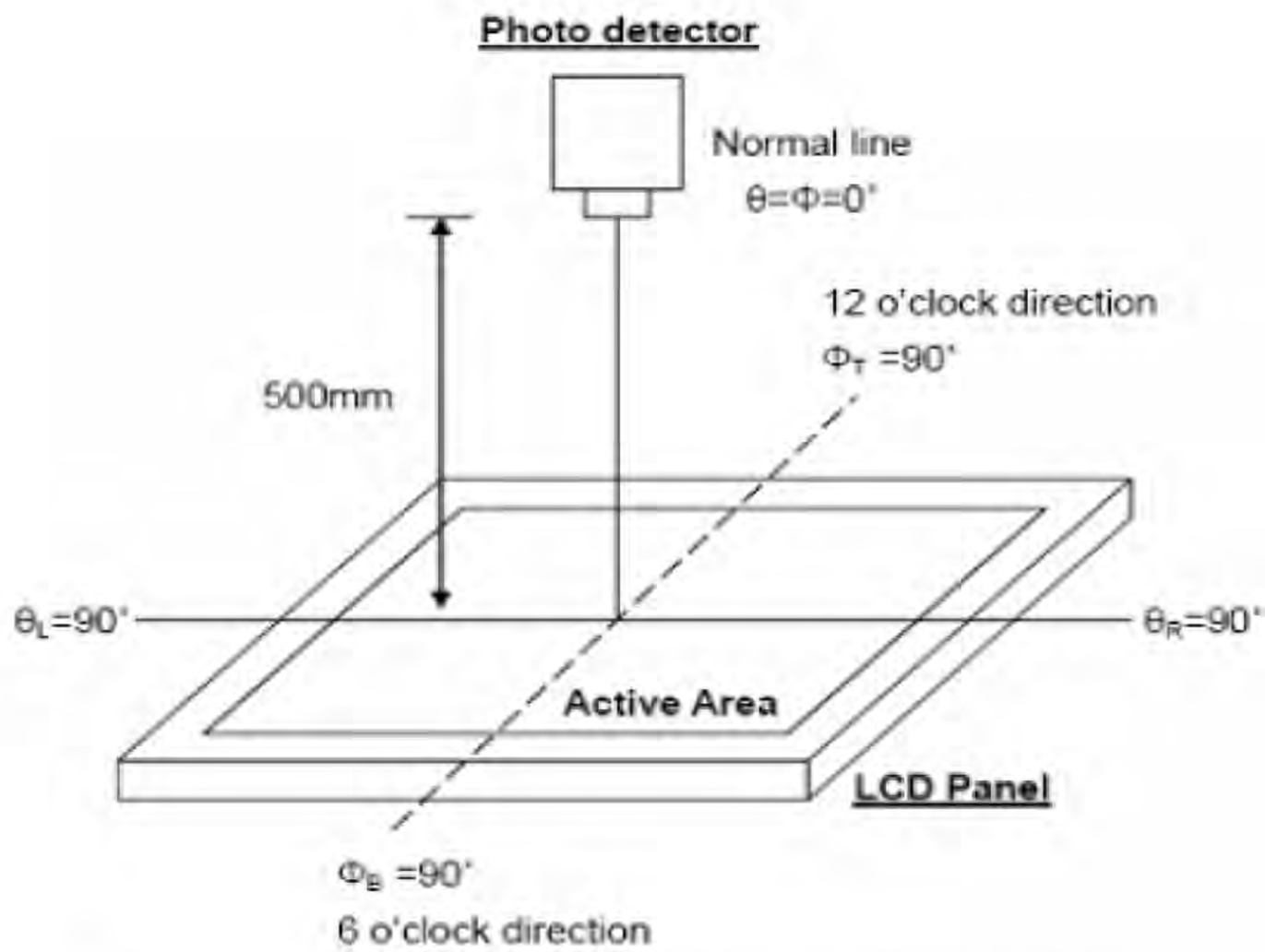
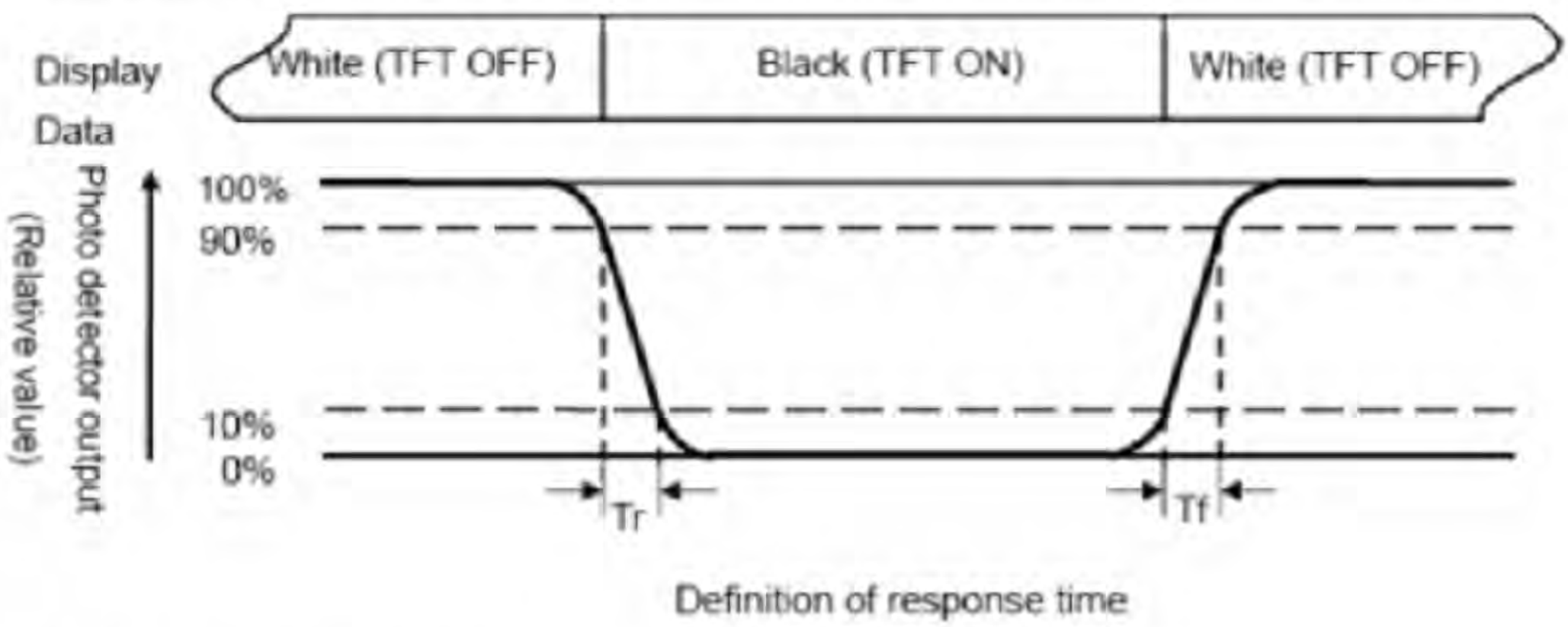



Fig. 8-2 Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time, Tr, is the time between photo detector output intensity changed from 90% to 10% . And fall time, Tf, is the time between photo detector output intensity changed from10% to 90% .




Definition of response time

Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White Vi = Vi50 ± 1.5V

Black Vi = Vi50 ± 2.0V

"±" means that the analog input signal swings in phase with VCOM signal.

"±" means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

$$\text{Note 8 : Uniformity (U)} = \frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\%$$

# 8. Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature | $T_{OP}$ | -20 | — | +70 | ℃ |
| Storage Temperature | $T_{ST}$ | -30 | — | +80 | ℃ |
| Power Voltage | $V_{GH}$ | -0.3 | — | 32.0 | V |
| | $V_{GL}$ | -22.0 | — | 0.3 | V |
| | $V_{GH}$ - $V_{GL}$ | -0.3 | — | +45 | V |
| Input voltage | Vin | -0.5 | — | 4.6 | V |
| Logic output Voltage | $V_{OUT}$ | -0.5 | — | 4.6 | V |

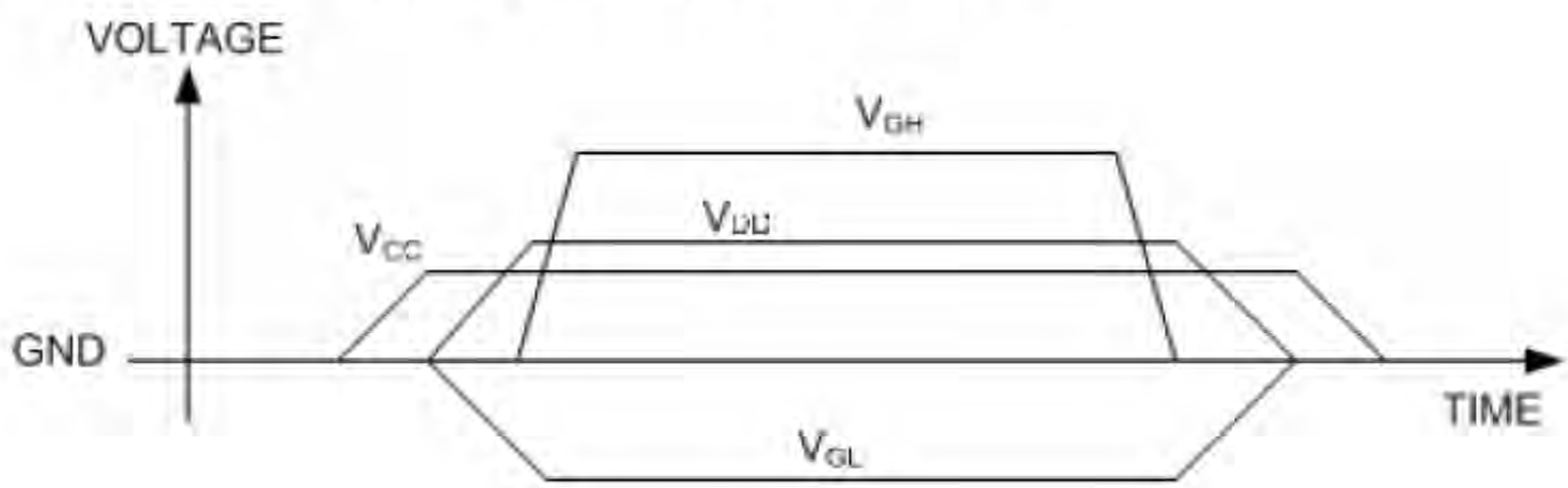
Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

# 9. Electrical Characteristics

**Operating conditions:**

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage For Logic | VCC | — | 3.0 | 3.3 | 3.6 | V |
| Power Supply Voltage | $V_{GH}$ | Ta=25℃ | | 15 | | V |
| | $V_{GL}$ | Ta=25℃ | | -10 | | V |
| Supply Current | $I_{cc}$ | $V_{CC}$=3.3 | | 213 | | mA (*NOTE1) |

*Note1：VcomH& VcomL：Adjust the color with gamma data.



■ DC CHARATERISTICS

**Conditions:**

Voltage referenced to VSS

VDDD, VDDPLL = 1.2V

VDDIO, VDDLCD = 3.3V

TA = 25°C

**DC Characteristics**

| Symbol | Parameter | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| PSTY | Quiescent Power | | | 300 | | uW |
| IIZ | Input leakage current | | -1 | | 1 | uA |
| IOZ | Output leakage current | | -1 | | 1 | uA |
| VOH | Output high voltage | | 0.8VDDIO | | | V |
| VOL | Output low voltage | | | | 0.2VDDIO | V |
| VIH | Input high voltage | | 0.8VDDIO | | VDDIO + 0.5 | V |
| VIL | Input low voltage | | | | 0.2VDDIO | V |

## ■ AC Characteristics

**Conditions:**

Voltage referenced to $V_{SS}$

$V_{DDD}$, $V_{DDPLL}$ = 1.2V

$V_{DDIO}$, $V_{DDLCD}$ = 3.3V

$T_A$ = 25 C

$C_L$ = 50pF (Bus/CPU Interface)

$C_L$ = 0pF (LCD Panel Interface)

### 9.1Clock Timing

**Clock Input Requirements for CLK (PLL-bypass)**

| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| FCLK | Input Clock Frequency (CLK) | | 120 | MHz |
| TCLK | Input Clock period (CLK) | 1/fCLK | | ns |

**Clock Input Requirements for CLK (Using PLL)**

| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| FCLK | Input Clock Frequency (CLK) | 2.5 | 50 | MHz |
| TCLK | Input Clock period (CLK) | 1/fCLK | | ns |

**Clock Input Requirements for crystal oscillator XTAL (Using PLL)**

| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| FXTAL | Input Clock Frequency | 2.5 | 10 | MHz |
| TXTAL | Input Clock period | 1/fXTAL | | ns |

### 9.2 MCU Interface Timing

#### 9.2.1 6800 Mode

**6800 Mode Timing**

| Symbol | Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| tcyc | Reference Clock Cycle Time | 9 | - | - | ns |
| tPWCSL | Pulse width CS# or E low | 1 | - | - | tCYC |
| tPWCSH | Pulse width CS# or E high | 1 | - | - | tCYC |
| tFDRD | First Data Read Delay | 5 | - | - | tCYC |
| tAS | Address Setup Time | 1 | - | - | ns |
| tAH | Address Hold Time | 1 | - | - | ns |
| tDSW | Data Setup Time | 4 | - | - | ns |
| tDHW | Data Hold Time | 1 | - | - | ns |
| tDSR | Data Access Time | - | - | 5 | ns |
| tDHR | Output Hold time | 1 | - | - | ns |

**Figure9-1: 6800 Mode Timing Diagram (Use CS# as Clock)**

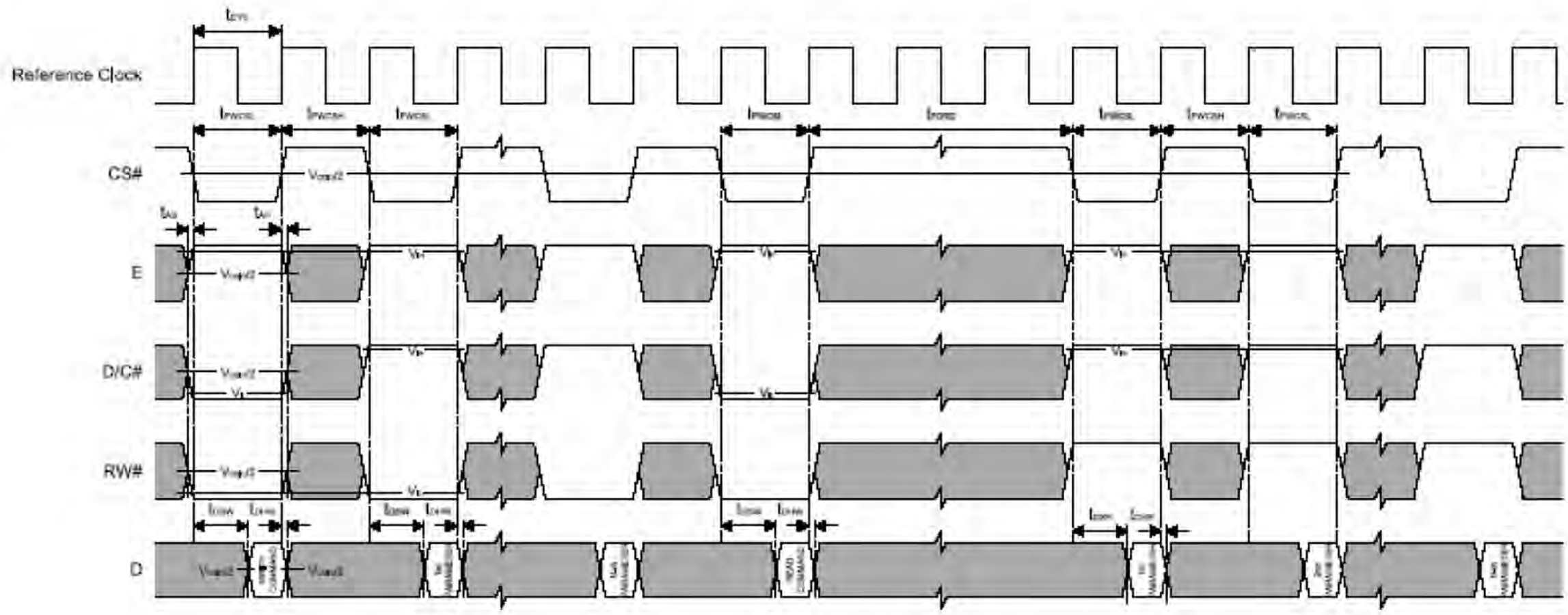
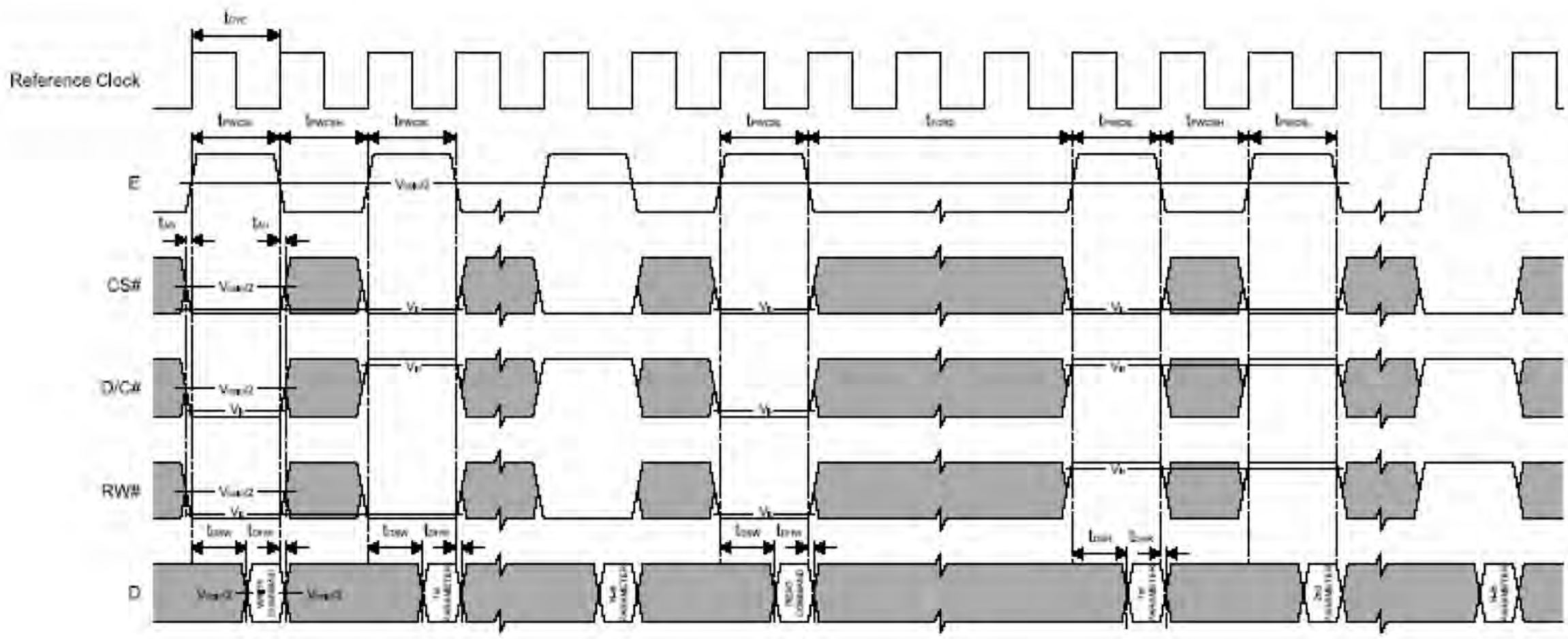



**Figure 9-2: 6800 Mode Timing Diagram (Use E as Clock)**

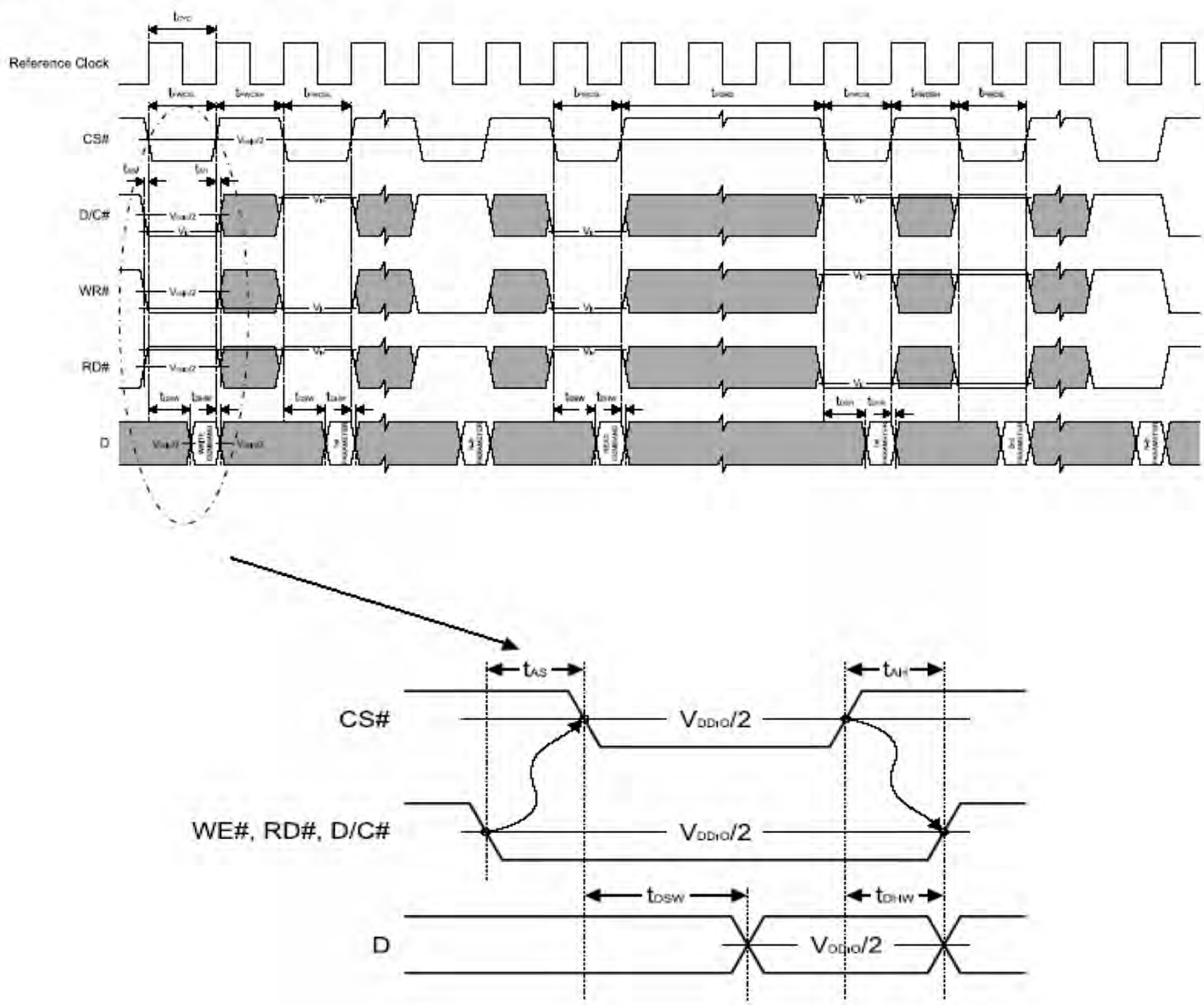


### 9.2.2 8080 Mode Write Cycle

**Table 9-5: 8080 Mode Timing**

| Symbol | Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| tcyc | Reference Clock Cycle Time | 9 | - | - | ns |
| tPWCSL | Pulse width CS# low | 1 | - | - | tCYC |
| tPWCSH | Pulse width CS# high | 1 | - | - | tCYC |
| tFDRD | First Read Data Delay | 5 | - | - | tCYC |
| tAS | Address Setup Time | 1 | - | - | ns |
| tAH | Address Hold Time | 1 | - | - | ns |
| tDSW | Data Setup Time | 4 | - | - | ns |
| tDHW | Data Hold Time | 1 | - | - | ns |
| tDSR | Data Access Time | - | - | 5 | ns |
| tDHR | Output Hold time | 1 | - | - | ns |

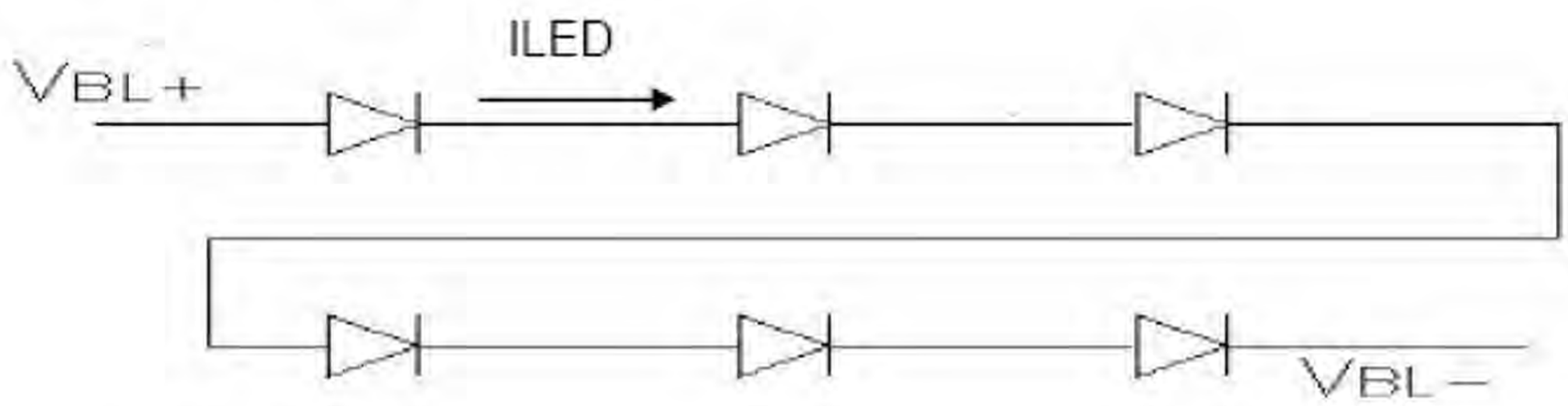
**Figure9-3: 8080 Mode Timing Diagram**



# 10. Backlight Information

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| LED current | | - | 20 | - | mA | |
| Power Consumption | | - | 400 | 420 | mW | |
| LED voltage | VBL+ | 18.6 | 19.8 | 21 | V | Note 1 |
| LED Life Time | - | | (50,000)- | - | Hr | Note 2,3 |

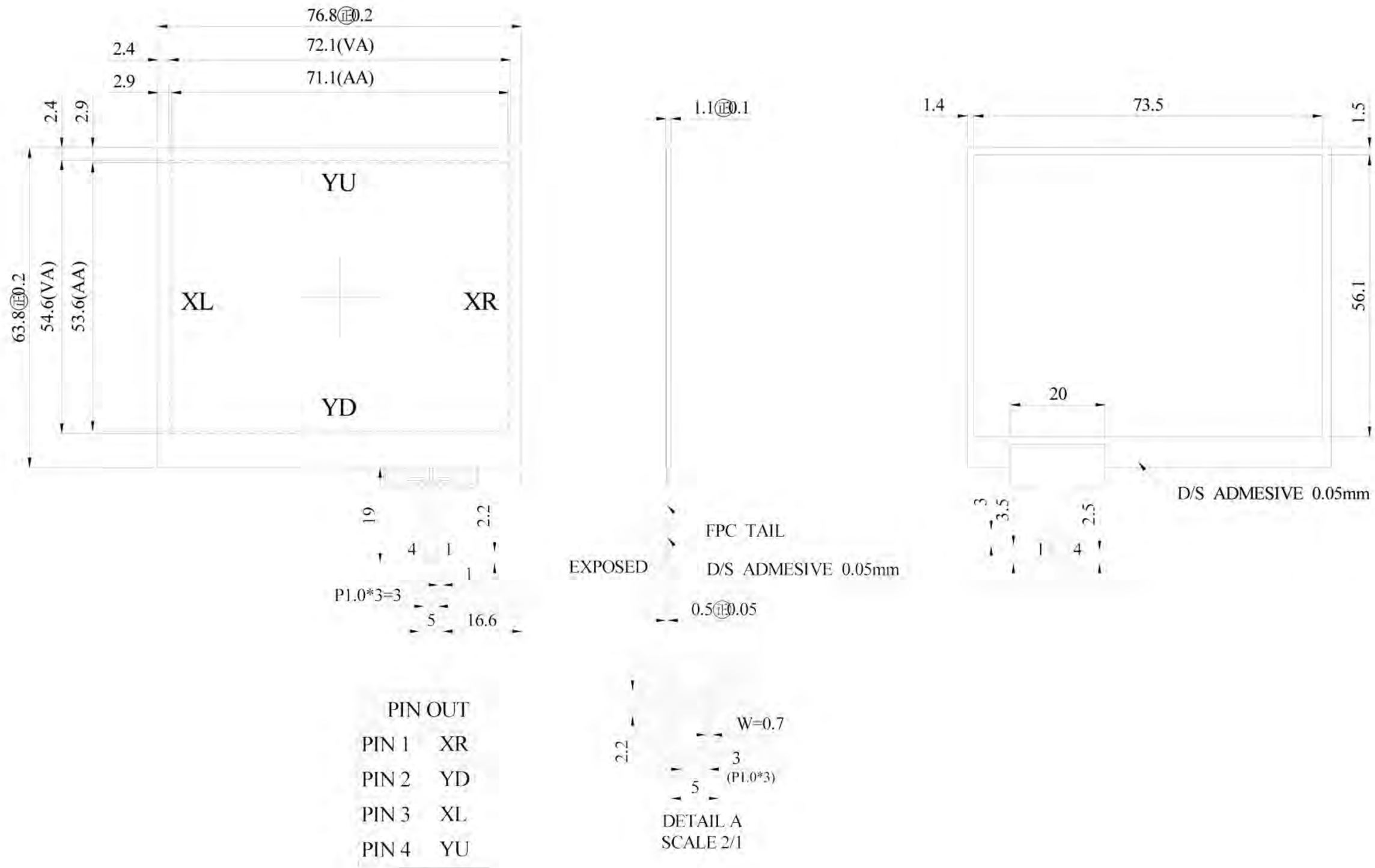
Note 1 : There are 1 Groups LED




Note 2 : Ta = 25 _

Note 3 : Brightness to be decreased to 50% of the initial value

# 11. Touch panel Information




| PIN OUT | |
|---|---|
| PIN 1 | XR |
| PIN 2 | YD |
| PIN 3 | XL |
| PIN 4 | YU |

# 12.Reliability

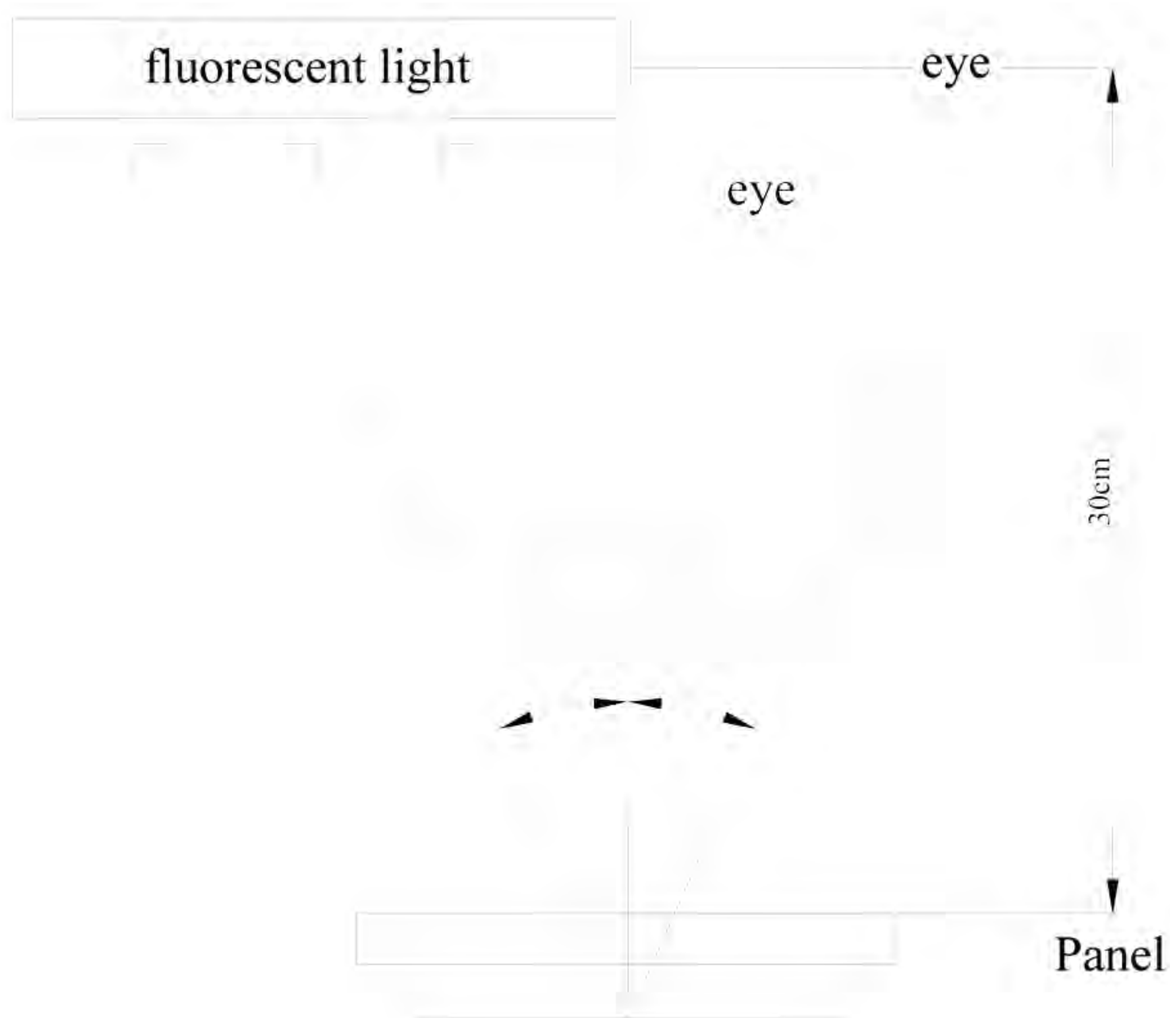
| Test Item | Test Condition |
|---|---|
| High Temperature Operation | 70℃ for 240 hours<br>70° C<br>20° C<br>1hr 240hrs 1hr |
| High Temperature Operation<br>Humidity Operation | 60℃,90%RH for 240 hours<br>60° C 1hr 1hr<br>90%R.H<br>20° C<br>240 hrs |
| Low Temperature Operation | -20℃ for 240hours<br>20° C<br>1hr. 240 hrs. 1hr.<br>-20° C |
| High Temperature Storage | 80℃ for 240 hours<br>80° C<br>20° C<br>1hr 240hrs 1hr |

| Test Item | Test Condition |
|---|---|
| Low Temperature Storage | -30℃ for 240 hours<br>20° C 1hr. 240 hrs. 1hr.<br>-30° C |
| Thermal Shock | -30℃（30min）~+80℃(30min) for 100 cycles<br>-30° C 30 min → +80° C 30 min<br>1cycle;repeat 100 cycles |
| Electrostatic Discharge<br>(Not operation) | Discharge Resistance : 330Ω<br>Energy Storage Capacitor : 150pF<br>Output voltage (1)Contact Discharge ±4KV<br>(2)Air Discharge ±8KV<br>Polarity of the output voltage : positive and negative<br>Discharge times : 5times |
| Package Vibration | Frequency(Random Wave)·10HZ~55HZ~10HZ<br>Amplitude : p-p max/2.94m/s²max<br>Orientation : X， Y ， Z (3axis)<br>Test Time : 1 hr. each axis ,total 3 hrs |
| Package Drop Test | 100cm height natural falling<br>Drop sequence : 1 corner,3 edges,and 6 faces,total 10 times<br>4 1 2 3 5 6<br>1)corner2-3-5<br>2)edge2-5<br>3)edge2-3<br>4)edge3-5<br>5)face5<br>6)face6<br>7)face2<br>8)face4<br>9)face3<br>10)face1 |

# 13. Cosmetic Criteria of LCD Screen

## 13.1 Inspection Condition

- Sample Plan:MIL-STD-105E LEVEL: II
  AQL: Major (MA):0.65%/Minor(MI):1.5%
- Cosmetic inspect 300～500Lux fluorescent light, leaving 30～35cm between panels and eyes ,and between panels and lights.
- Functional in spec under 200 Lux .
- Inspection condition is 23±5℃,50±20%RH maximum.




·Definition of area

A Area: Viewing area.

B Area: Out of viewing.(Don't care cosmetic in outside viewing area)

## 13.2 Inspection specification

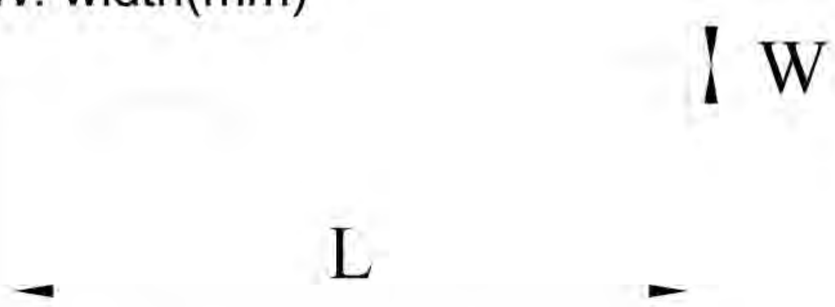
| NO | Item | Acceptable specification | Judgment Criterion |
|---|---|---|---|
| 1 | Electrical Testing (MA) | **1-1 sub pixel classification**<br>● sub pixel: Number of sub pixel doesn't exceed Five dot.<br> <br><br>Sub Pixel(Dot)<br>a>Dark dot ----Four Allowed<br>b>Bright dot---one Allowed<br>c>The definition of dot ----The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.<br>d> Dark sub pixel: The distance more than 5mm between dot and dot.<br>e>Bright sub pixel: The distance more than 20mm between bright dot and bright dot .<br>● Pixel : Three dots link together-----one allowed.<br> <br><br>Pixel<br>**1-2Leakage to light**<br>● Leakage to light be not allowed.<br>**1-3 Picture to shake**<br>● Picture had shake ,twinkle and noise etc. instable of defect that be not allowed.<br>1-4 Function<br>● No display or No function is not allowed.<br>● Source Line, Gate Line is not allowed.<br>● Contrast Ratio exceeds product specifications.<br>● Current consumption exceeds product specifications.<br>● Display malfunction. | N≤4<br>N≤1<br><br>N≤1<br><br>N=0<br><br>N=0<br><br>N=0 |
| 02 | Mechanical Dimension(MA) | 2.1 Mechanical Dimension exceeds product specifications.<br>2-2 Out of frame and boss of plastic changed shape that be not allowed. | N=0 |

| NO | Item | Acceptable specification | Judgment Criterion |
|---|---|---|---|
| 3 | Cosmetic Inspection (MA) | | 2.5 |

3-1 Fiber / Line shapes of defect

| Length | Width | Acceptable number | Mini. space | Acceptable number |
|---|---|---|---|---|
| ---- | W≦0.05 | Ignore | 5mm | Ignore |
| L≦3 | 0.05<W≦0.1 | 3 | | 3 |
| ---- | W>0.1 | Not allowed | --- | Not allowed |
| L>3 | ---- | Not allowed | | Not allowed |

L: length(mm)
W: width(mm)



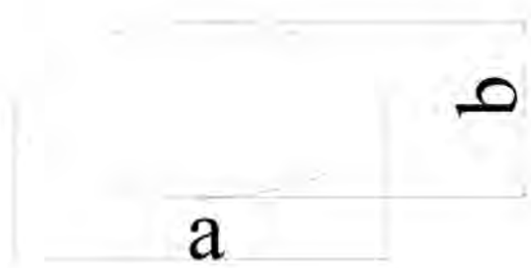

3-2 Blemish: dot shapes of defect.

| Dimension | Acceptable number | Mini. space |
|---|---|---|
| Φ≦0.2 | Ignore | --- |
| 0.2<Φ≦0.3 | 3 | 5mm |
| Φ>0.3 | 0 | ---- |

3-3 Bubble

| Dimension | Acceptable number | Mini. space |
|---|---|---|
| Φ≦0.20 | Ignore | --- |
| 0.2<Φ≦0.3 | 3 | 15mm |
| Φ>0.3 | 0 | ---- |

Foreign Substances




Φ=（a+ b）/2

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection(MA)</td><td>3-4 Scratch<br>● Impassive scratch as below.
<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>----</td><td>W≦0.05</td><td>Ignore</td><td rowspan="3">5mm</td></tr>
<tr><td>L≦3</td><td>0.05<W≦0.1</td><td>3</td></tr>
<tr><td>----</td><td>W>0.1</td><td>Not allowed</td><td rowspan="2">---</td></tr>
<tr><td>L>3</td><td>----</td><td>Not allowed</td></tr>
</table>
3-5 Newton Ring<br>● D≦8mm----allowed<br>● D≧8mm----NG</td><td></td></tr>
<tr><td>4</td><td>Crack/Break(MA)</td><td>Not Allowed.</td><td>N=0</td></tr>
<tr><td>5</td><td>Package (MI)</td><td>5-1 Mixed product types<br>5-2 Shipping q’ty should be the same as “shipping notice form” q’ty.<br>5-3 Outer box can’t broken .</td><td>N=0</td></tr>
</table>

# 14. Precautions in use of LCD Modules

1. 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.

# 15. Material List of Components for RoHs

1. We hereby declares that all of or part of products, including, but not limited to, the LCM, accessories or packages, manufactured and/or delivered to your company (including your subsidiaries and affiliated company) directly or indirectly by our company (including our subsidiaries or affiliated companies) do not intentionally contain any of the substances listed in all applicable EU directives and regulations, including the following substances.

   Exhibit A：The Harmful Material List

| Material | (Cd) | (Pb) | (Hg) | (Cr6+) | PBBs | PBDEs |
|---|---|---|---|---|---|---|
| Limited Value | 100 ppm | 1000 ppm | 1000 ppm | 1000 ppm | 1000 ppm | 1000 ppm |
| Above limited value is set up according to RoHS. | | | | | | |

2. Process for RoHS requirement：
   (1) Use the Sn/Ag/Cu soldering surface；the surface of Pb-free solder is rougher than we used before.
   (2) Heat-resistance temp.：
   Reflow：250℃, 30 seconds Max.；
   Connector soldering wave or hand soldering：320℃, 10 seconds max.
   (3) Temp. curve of reflow, max. Temp.：235±5℃；
   Recommended customer's soldering temp. of connector：280℃, 3 seconds.

# LCM Sample Estimate Feedback Sheet

**Module Number：** _____

| **1、Panel Specification：** | | |
|---|---|---|
| 1. Panel Type： | □ Pass | □ NG ,_____ |
| 2. View Direction： | □ Pass | □ NG ,_____ |
| 3. Numbers of Dots： | □ Pass | □ NG ,_____ |
| 4. View Area： | □ Pass | □ NG ,_____ |
| 5. Active Area： | □ Pass | □ NG ,_____ |
| 6.Operating Temperature： | □ Pass | □ NG ,_____ |
| 7.Storage Temperature： | □ Pass | □ NG ,_____ |
| 8.Others：_____ | | |
| **2、Mechanical Specification：** | | |
| 1. PCB Size： | □ Pass | □ NG ,_____ |
| 2.Frame Size： | □ Pass | □ NG ,_____ |
| 3.Materal of Frame： | □ Pass | □ NG ,_____ |
| 4.Connector Position： | □ Pass | □ NG ,_____ |
| 5.Fix Hole Position： | □ Pass | □ NG ,_____ |
| 6.Backlight Position： | □ Pass | □ NG ,_____ |
| 7. Thickness of PCB： | □ Pass | □ NG ,_____ |
| 8. Height of Frame to PCB： | □ Pass | □ NG ,_____ |
| 9.Height of Module： | □ Pass | □ NG ,_____ |
| 10.Others： | □ Pass | □ NG ,_____ |
| **3、Relative Hole Size：** | | |
| 1.Pitch of Connector： | □ Pass | □ NG ,_____ |
| 2.Hole size of Connector： | □ Pass | □ NG ,_____ |
| 3.Mounting Hole size： | □ Pass | □ NG ,_____ |
| 4.Mounting Hole Type： | □ Pass | □ NG ,_____ |
| 5.Others： | □ Pass | □ NG ,_____ |
| **4、Backlight Specification：** | | |
| 1.B/L Type： | □ Pass | □ NG ,_____ |
| 2.B/L Color： | □ Pass | □ NG ,_____ |
| 3.B/L Driving Voltage (Reference for LED Type)： | □ Pass | □ NG ,_____ |
| 4.B/L Driving Current： | □ Pass | □ NG ,_____ |
| 5.Brightness of B/L： | □ Pass | □ NG ,_____ |
| 6.B/L Solder Method： | □ Pass | □ NG ,_____ |
| 7.Others： | □ Pass | □ NG ,_____ |

>> **Go to page 2** <<

**Module Number**：_____

**5、Electronic Characteristics of Module**：

| | | |
|---|---|---|
| 1.Input Voltage： | □ Pass | □ NG ,_____ |
| 2.Supply Current： | □ Pass | □ NG ,_____ |
| 3.Driving Voltage for LCD： | □ Pass | □ NG ,_____ |
| 4.Contrast for LCD： | □ Pass | □ NG ,_____ |
| 5.B/L Driving Method： | □ Pass | □ NG ,_____ |
| 6.Negative Voltage Output： | □ Pass | □ NG ,_____ |
| 7.Interface Function： | □ Pass | □ NG ,_____ |
| 8.LCD Uniformity： | □ Pass | □ NG ,_____ |
| 9.ESD test： | □ Pass | □ NG ,_____ |
| 10.Others： | □ Pass | □ NG ,_____ |

**6、Summary**：

**Sales signature**：_____

**Customer Signature**：_____ **Date**：  /  /