
Version : 4.0

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| <p>TECHNICAL SPECIFICATION</p> |
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|-----------------------------------|
| <p>MODEL NO : PW080XU4</p> |
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The content of this information is subject to be changed without notice.

Please contact PVI or its agent for further information.

☐ Customer's Confirmation

Customer _____

Date _____

By _____

☐ PVI's Confirmation

Revision History

| Rev. | Eng. | Issued Date | Revised Contents |
|------|------|--------------|--|
| 0.1 | 黃秀晶 | Jan 12, 2007 | Preliminary |
| 1.0 | 黃秀晶 | Feb 2, 2007 | New |
| 2.0 | 黃秀晶 | Jun 07, 2007 | Modify Page 24 12. Reliability Test Operation from -20~60'C to -30~70'C Storage from -20~70'C to -40~80'C TC from -20~70'C(30min), 200cycles to -30~70'C(30min), 200cycles |
| 3.0 | 黃秀晶 | Aug 21, 2007 | Modify Page 19 10. Optical Characteristics White Chromaticity from $x=0.31\pm0.03$; $y=0.33\pm0.03$ to $x=0.31\pm0.05$; $y=0.33\pm0.05$ |
| 4.0 | 黃秀晶 | Feb 25, 2008 | Modify Page 10 8-2) Recommended driving condition for LED backlight |

TECHNICAL SPECIFICATION**CONTENTS**

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1. Application

This technical specification applies to 8" color TFT-LCD module, PW080XU4.
The applications of the panel are car TV, portable DVD, GPS, multimedia applications and others AV system.

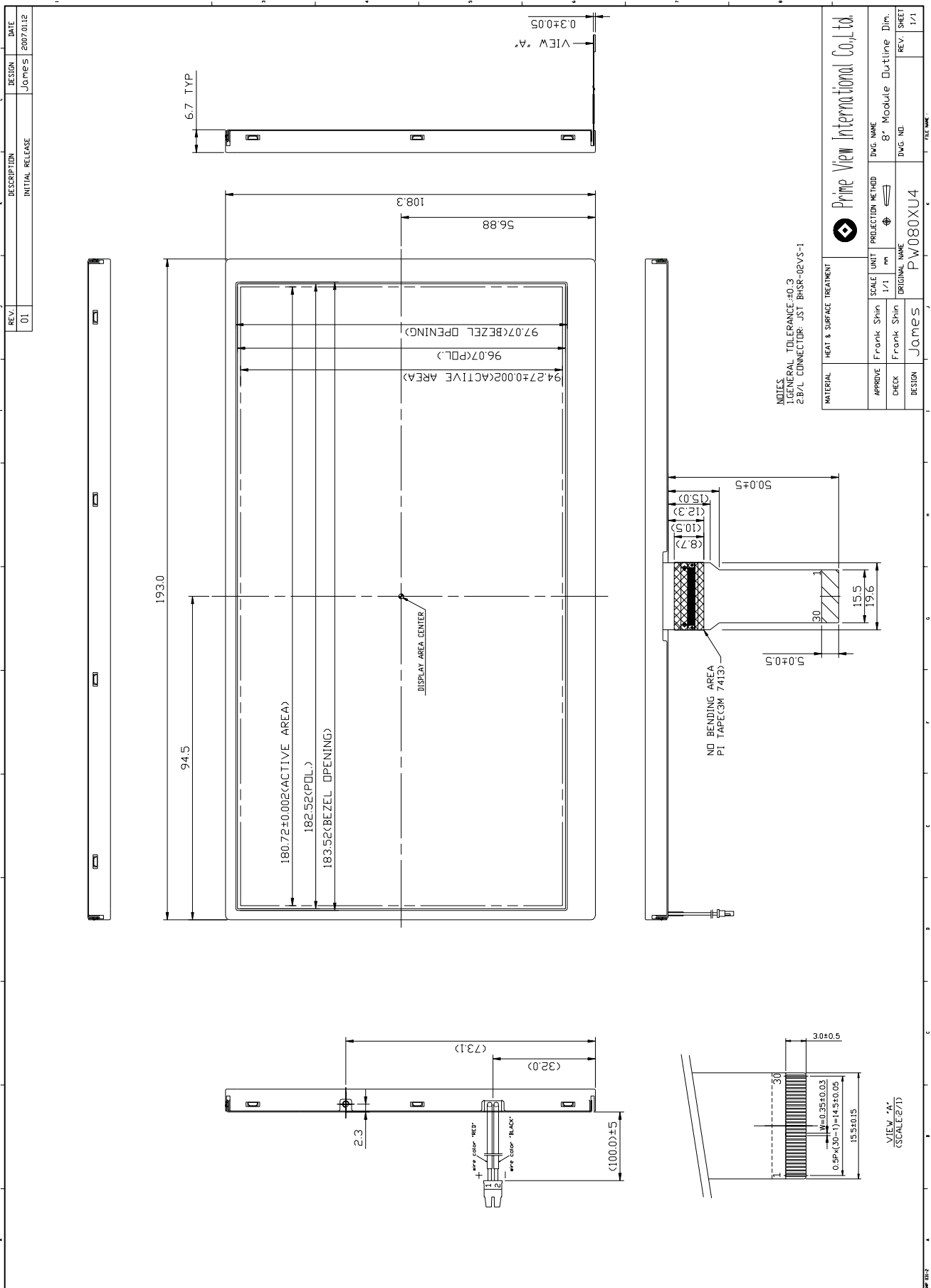
2. Features

- . Amorphous silicon TFT-LCD panel with LED Back-Light unit.
- . Pixel in stripe configuration
- . Compatible with NTSC and PAL system
- . Slim and compact
- . Up / Down and Left / Right Image Reversion
- . Support full , center , wide mode with PVI-1004D
(If customer use PVI-1004D , this panel doesn't support zoom mode)

3. Mechanical Specifications

| parameter | Specifications | Unit |
|--------------------------------|--------------------------------------|---------|
| Screen Size | 8.0 (16:8 diagonal) | Inch |
| Display Format | 480X(R,G,B) X220 | Dot |
| Active Area | 180.72 (H) X94.27 (V) | mm |
| Pixel Pitch | 0.3765 (H) X0.4285 (V) | mm |
| Pixel Configuration | Stripe | |
| Outline Dimension | 193.0 (W) X108.3 (H) X6.7 (D) (typ.) | mm |
| Weight | 218±15 | g |
| Back-light | White LED 27 pcs | |
| Surface Treatment | Anti-Glare | |
| Display mode | Normally white | |
| Gray scale inversion direction | 6 (ref to Page 19 viewing angle) | o'clock |

4. Mechanical Drawing of TFT-LCD Module



5. Input / Output Terminals

LCD Module Connector

FPC Down Connect , 30 Pins , Pitch : 0.5 mm

| Pin No | Symbol | I/O | Description | Remark |
|--------|------------------|-----|---|----------|
| 1 | GND | - | Ground for logic circuit | |
| 2 | V _{CCG} | I | Supply voltage of logic control circuit for gate driver | Note 5-3 |
| 3 | NC | - | No connection | |
| 4 | V _{EE} | I | Negative power for gate driver | Note 5-2 |
| 5 | NC | - | No connection | |
| 6 | V _{GH} | I | Positive power for gate driver | Note 5-4 |
| 7 | NC | - | No connection | |
| 8 | STVD | I/O | Vertical start pulse | Note 5-5 |
| 9 | STVU | I/O | Vertical start pulse | |
| 10 | CLK | I | Shift clock for gate driver | |
| 11 | U/D | I | Up / Down Control for gate driver | Note 5-5 |
| 12 | OE3 | I | Output enable for gate driver | |
| 13 | OE2 | I | Output enable for gate driver | |
| 14 | OE1 | I | Output enable for gate driver | |
| 15 | V _{COM} | I | Common electrode voltage | Note 5-1 |
| 16 | STH2 | I/O | Start pulse for source driver | Note 5-5 |
| 17 | AGND | - | Ground for analog circuit | |
| 18 | V _R | I | Video Input R | |
| 19 | V _G | I | Video Input G | |
| 20 | V _B | I | Video Input B | |
| 21 | GND | - | Ground for digital circuit | |
| 22 | AV _{DD} | I | Supply power for analog circuit | Note 5-3 |
| 23 | CPH1 | I | Sampling and shift clock for source driver | |
| 24 | CPH2 | I | Sampling and shift clock for source driver | |
| 25 | CPH3 | I | Sampling and shift clock for source driver | |
| 26 | V _{CC} | I | Supply power for digital circuit | Note 5-3 |
| 27 | R/L | I | Left / Right Control for source driver | Note 5-5 |
| 28 | NC | I | No Connection | |
| 29 | OEH | I | Output enable for source driver | |
| 30 | STH1 | I/O | Start pulse for source driver | Note 5-5 |

Note 5 – 1 : $V_{COM(TYP.)} = +6V_{PP}$.

Phase of the video signal input and V_{COM}

The relation between these values could refer to 8-1 Operating condition.

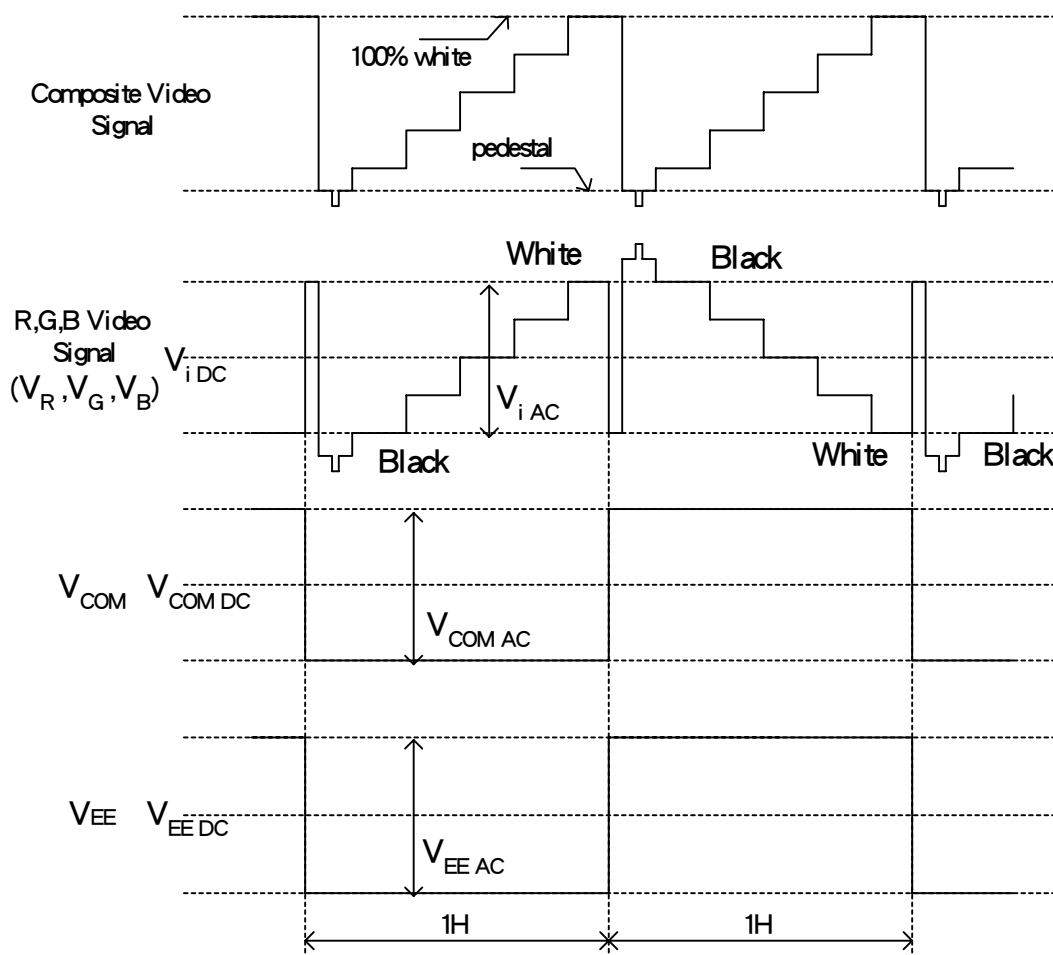


Fig.1

Liquid crystal transmission of the video signal input, V_{COM} and timing

| | V_{COM} | |
|----------------------------|-----------|---------|
| | H Level | L Level |
| Video Signal Input Maximum | Black | White |
| Video Signal Input Minimum | White | Black |

White : maximum transmission / Black : minimum transmission

Note 5 – 2 : $V_{EE(TYP.)} = -12V$

Note 5 – 3 : V_{CCG} , $V_{CC(TYP.)} = +3.3V$, $AV_{DD(TYP.)} = +5V$

Note 5 – 4 : $V_{GH(TYP.)} = +17V$

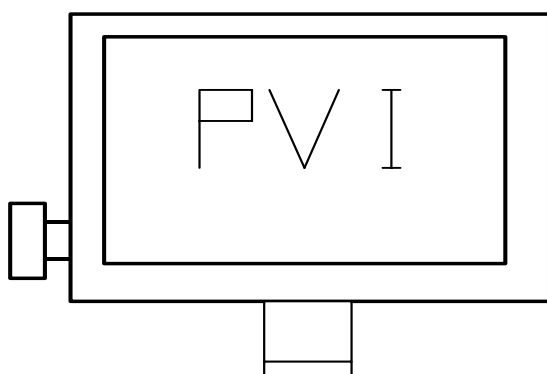
Note 5 – 5 : STH1, STH2 and R/L mode

| R/L | STH1 | STH2 | Remark |
|------------------------|--------|--------|---------------|
| High(V _{CC}) | Input | Output | Left to Right |
| GND | Output | Input | Right to Left |

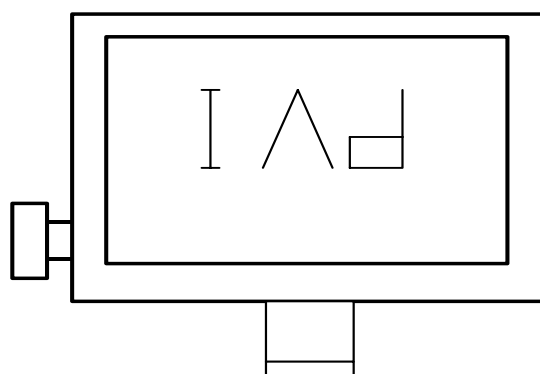
STVD, STVU and U/D mode

| U/D | STVD | STVU | Remark |
|-------------------------|--------|--------|------------|
| High(V _{CCG}) | Input | Output | Down to Up |
| GND | Output | Input | Up to Down |

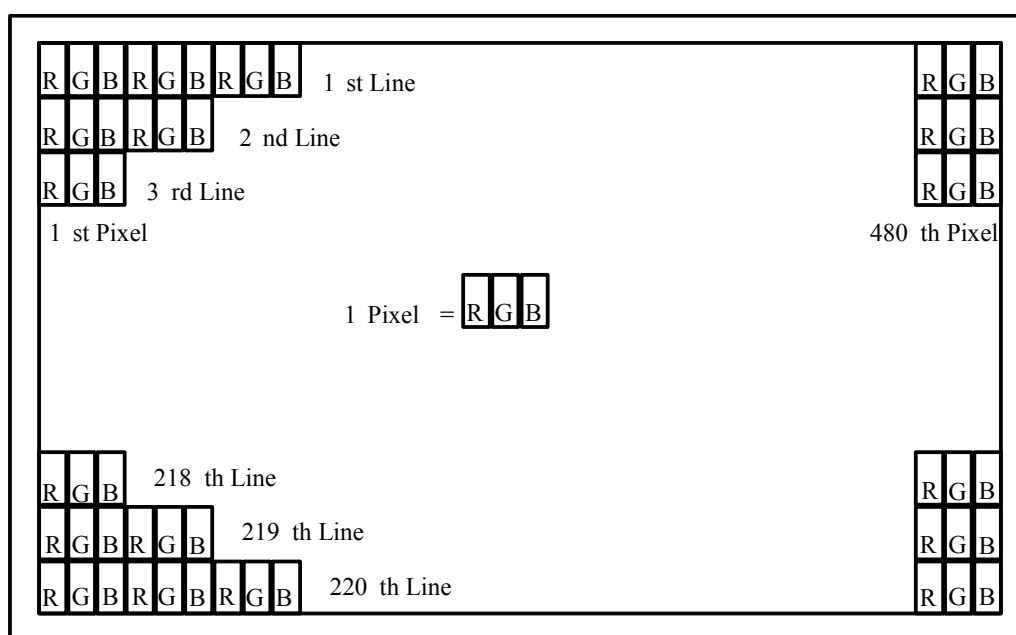
U/D(PIN 11)=Low R/L(PIN 27)=High



U/D(PIN 11)=High R/L(PIN 27)=Low



6. Pixel Arrangement



7. Absolute Maximum Ratings

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

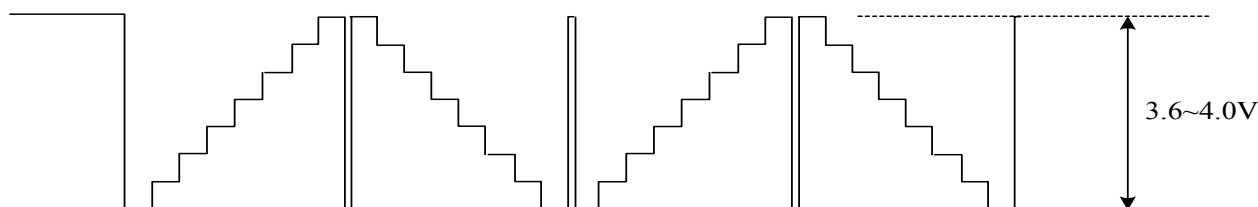
| Parameter | Symbol | MIN. | MAX. | Unit | Remark |
|----------------------------------|------------------|-------|-------|------|--------|
| Supply Voltage for Source Driver | AV_{DD} | -0.3 | +5.8 | V | |
| | V_{CC} | -0.3 | +7.0 | V | |
| Supply Voltage for Gate Driver | V_{CCG} | -0.3 | +7.0 | V | |
| | $V_{GH}-V_{EE}$ | -0.3 | +40.0 | V | |
| | H Level V_{GH} | -0.3 | +32.0 | V | |
| | L Level V_{EE} | -22.0 | +0.3 | V | |

8. Electrical Characteristics

8-1) Recommended Driving condition for TFT-LCD panel

| Parameter | | Symbol | MIN. | Typ. | MAX. | Unit | Remark |
|--|--------------------|--------------------|---------------------|------|---------------------|------------------|--|
| Supply Voltage for Source Driver | Analog | AV _{DD} | +4.5 | +5.0 | +5.5 | V | |
| | Logic | V _{CC} | +3.0 | +3.3 | +3.6 | V | Depend on T/C signal voltage |
| | | | +4.5 | +5.0 | +5.5 | V | |
| Supply Voltage for Gate Driver | V _{GH} | | +15 | +17 | +19 | V | |
| | V _{EE-DC} | | -13.0 | -12 | -11 | V | DC Component of |
| | V _{EE-AC} | | - | +6.0 | - | V _{P-P} | AC Component of |
| | Logic | V _{CCG} | +3.0 | +3.3 | +3.6 | V | Depend on T/C signal voltage |
| | | | +4.5 | +5.0 | +5.5 | V | |
| Analog Signal input Level (VR , VG , VB) | V _{IAC} | | - | +3.6 | +4.0 | V | Note8-1 |
| | V _{IDC} | | - | +2.5 | - | V | |
| Digital input voltage | H level | V _{IH} | 0.7 V _{CC} | - | V _{CC} | V | |
| | L level | V _{IL} | -0.3 | - | 0.3 V _{CC} | V | |
| Digital output voltage | H level | V _{OH} | 0.7 V _{CC} | - | V _{CC} | V | |
| | L level | V _{OL} | -0.3 | - | 0.3 V _{CC} | V | |
| V _{COM} Voltage | | V _{COMAC} | - | +6.0 | - | V _{P-P} | AC Component of V _{COM} |
| | | V _{COMDC} | - | 1.5 | - | V | DC Component of V _{COM} Note8-2 |

Note 8-1 : Both NTSC and PAL system Video Signal input waveform is based on 8 steps gray scale.



Note 8-2 : PVI strongly suggests that the $V_{COM DC}$ level shall be adjustable , and the adjustable level range is $1.5V \pm V$, every module's $V_{COM DC}$ level shall be carefully adjusted to show a best image performance.

PW080XU4

8-2) Recommended driving condition for LED backlight

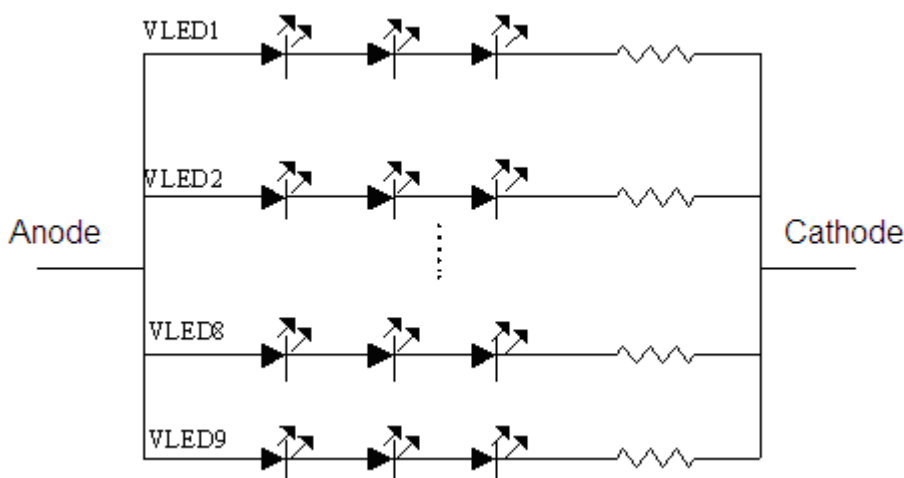
 $T_a = 25^{\circ}\text{C}$

| Parameter | Symbol | Min | TYP | MAX | Unit | Remark |
|---------------------------------|-----------------|-----|-----|------|------|--------------|
| Supply voltage of LED backlight | $V_{LED1\sim9}$ | - | - | (11) | V | Note 8-3 |
| Supply current of LED backlight | $I_{LED1\sim9}$ | - | 20 | - | mA | Note 8-4 |
| Backlight Power Consumption | P_{LED} | - | - | 1.98 | W | Note 8-3/8-5 |

Note 8-3 : $I_{LED} = 20\text{mA}$, constant current

Note 8-4: The LED driving condition is defined for each LED module. (3 LED Serial)
Input current = $20\text{mA} \times 9 = 180\text{mA}$

Note 8-5: $P_{LED} = V_{LED1} \times I_{LED1} + V_{LED2} \times I_{LED2} \dots + V_{LED8} \times I_{LED8} + V_{LED9} \times I_{LED9}$



8-3) Power Consumption

 $T_a = 25^{\circ}\text{C}$

| Parameter | Symbol | Conditions | TYP. | MAX | Unit | Remark |
|--|-----------|--------------------------|-------|-------|------|-------------------------|
| Supply current for Gate Driver (Hi level) | I_{GH} | $V_{GH} = +17\text{V}$ | 0.087 | 0.114 | mA | |
| Supply current for Gate Driver (Low level) | I_{EE} | $V_{EE} = -12\text{V}$ | 1.23 | 1.53 | mA | V_{EE} center voltage |
| Supply current for Source Driver(Digital) | I_{CC} | $V_{CC} = +3.3\text{V}$ | 1.2 | 3.6 | mA | |
| Supply current for Source Driver(Analog) | AV_{DD} | $AV_{DD} = +5\text{V}$ | 5 | 8 | mA | |
| Supply current for Gate Driver (Digital) | I_{CCG} | $V_{CCG} = +3.3\text{V}$ | 0.014 | 0.018 | mA | |
| LCD Panel Power Consumption | - | - | 45.25 | 72.25 | mW | Note 8-6 |
| Back Light Power Consumption | P_{LED} | - | - | 1.98 | W | |

Note 8-6 : The power consumption for back light is not included.

8-4) Backlight driving

Connector type: JST BHSR-02VS-1, PIN No 2 pin

| Pin No | Symbol | Description | Remark |
|--------|--------|--|--------------------|
| 1 | + | Input terminal (Positive electrode side) | Wire color : Red |
| 2 | - | Input terminal (Ground side) | Wire Color : Black |

8-5) Timing Characteristics Of Input Signals

| Characteristics | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---------------------------------|------------|------|-------|------|-----------|-----------|
| Rising time | t_r | - | - | 10 | ns | |
| Falling time | t_f | - | - | 10 | ns | |
| High and low level pulse width | t_{CPH} | 9.2 | 9.6 | 10.0 | MHZ | CPH1~CPH3 |
| CPH pulse duty | t_{CWH} | 30 | 50 | 70 | % | CPH1~CPH3 |
| STH setup time | t_{SUH} | 20 | - | - | ns | STH1,STH2 |
| STH hold time | t_{HDH} | 20 | - | - | ns | STH1,STH2 |
| STH pulse width | t_{STH} | - | 1 | - | t_{CPH} | STH1,STH2 |
| STH period | t_H | 61.5 | 63.5 | 65.5 | μs | STH1,STH2 |
| OEH pulse width | t_{OEH} | - | 1.40 | - | μs | OEH |
| Sample and hold disable time | t_{DIS1} | - | 7.43 | - | μs | |
| OEV pulse width | t_{OEV} | - | 18 | - | μs | OE1,2,3 |
| CLK pulse width | t_{CKV} | - | 31.75 | - | μs | CLK |
| Clean enable time | t_{DIS2} | - | 9.0 | - | μs | |
| Horizontal display timing range | t_{DH} | - | 480 | - | t_{CPH} | |
| STV setup time | t_{SUV} | 400 | - | - | ns | STVU,STVD |
| STV hold time | t_{HDV} | 400 | - | - | ns | STVU,STVD |
| STV pulse width | t_{STV} | - | - | 1 | t_H | STVU,STVD |
| Horizontal lines per field | t_V | 256 | 262 | 268 | t_H | |
| Vertical display start | t_{SV} | - | 10 | - | t_H | |
| Vertical display timing range | t_{DV} | - | 220 | - | t_H | |
| VCOM rising time | t_{RCOM} | - | - | 5 | μs | |
| VCOM falling time | t_{FCOM} | - | - | 5 | μs | |
| VCOM delay time | t_{DCOM} | - | - | 3 | μs | |
| RGB delay time | t_{DRGB} | - | - | 1 | μs | |

8-6) Signal Timing Waveforms

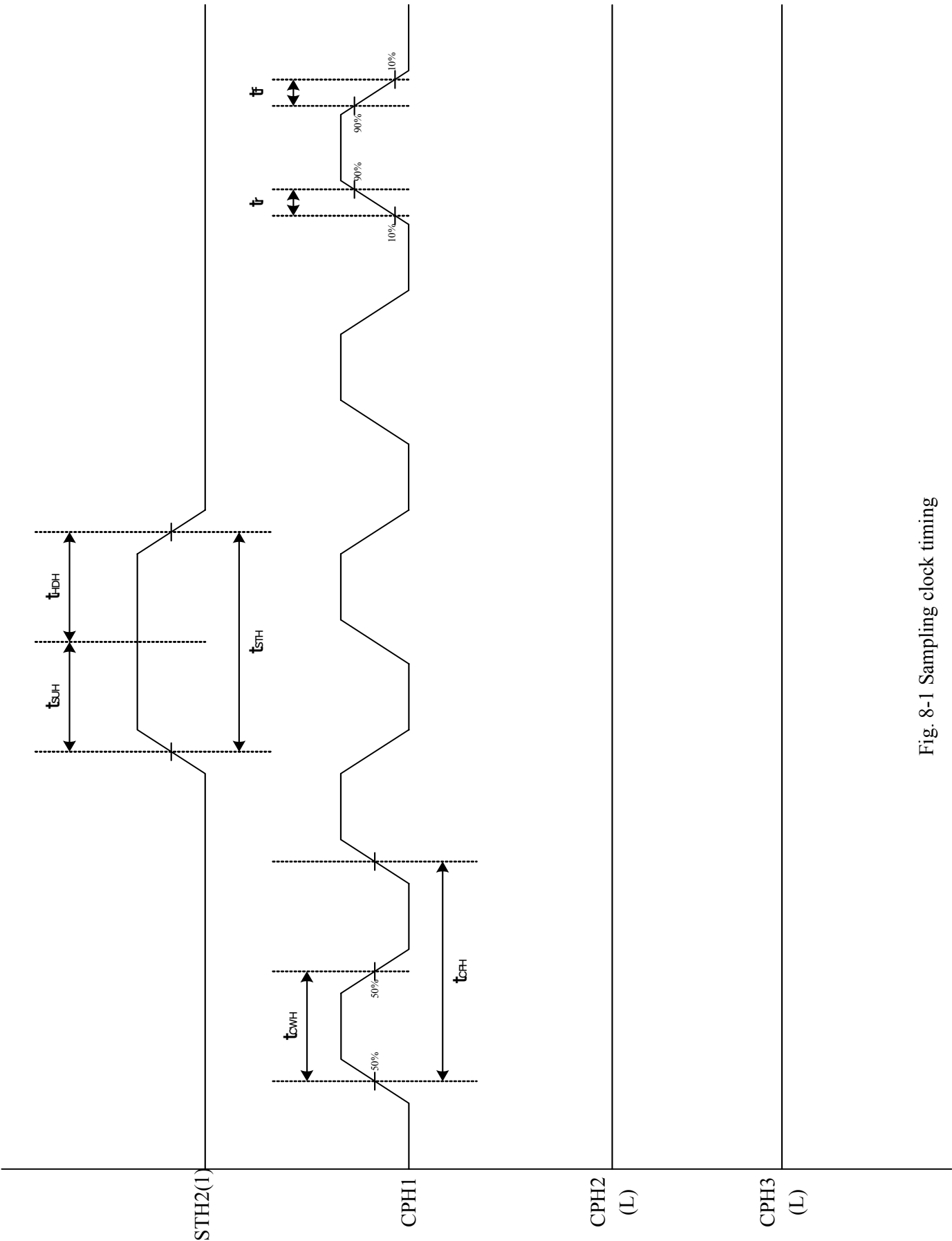


Fig. 8-1 Sampling clock timing

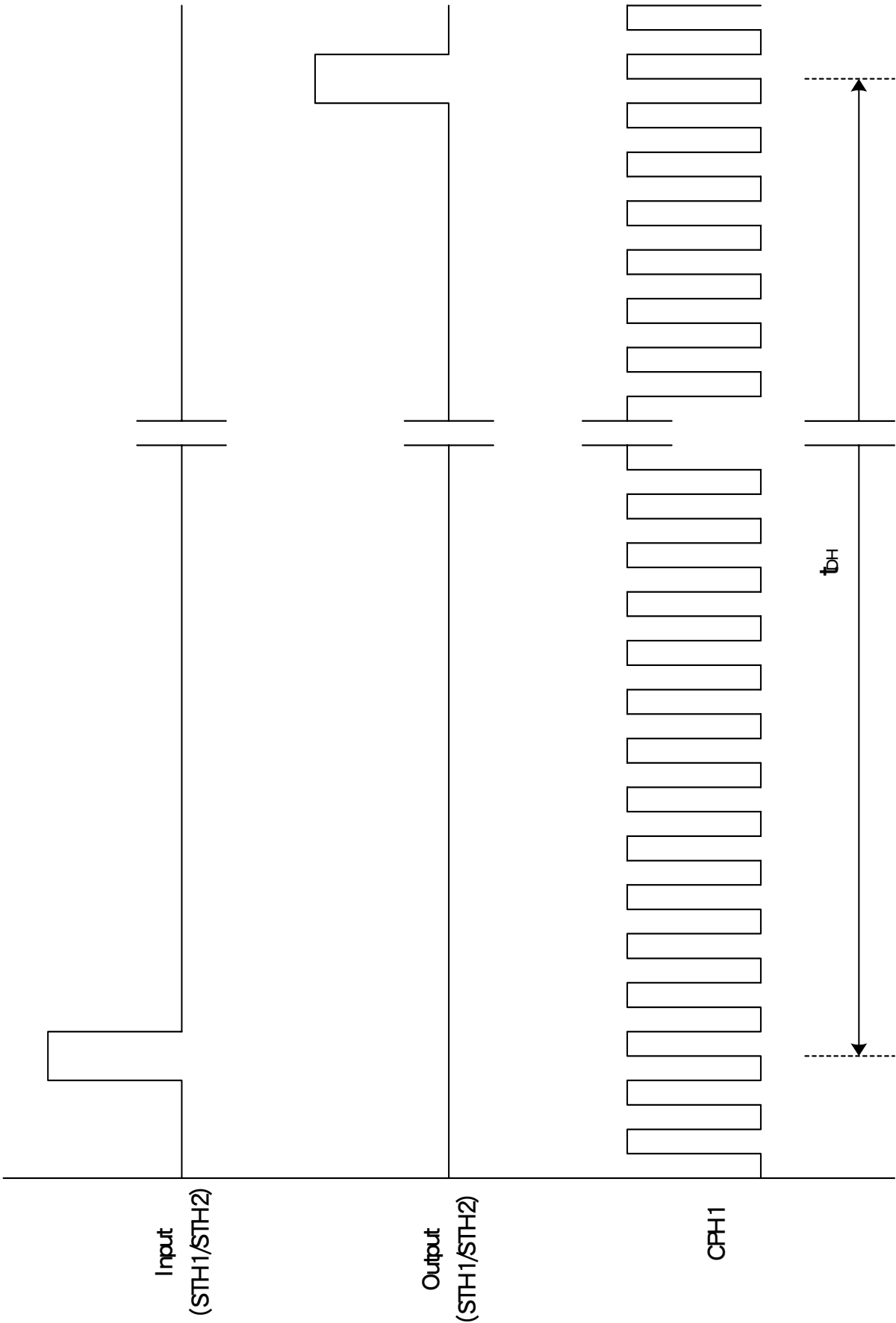


Fig. 8-2 Horizontal display timing range

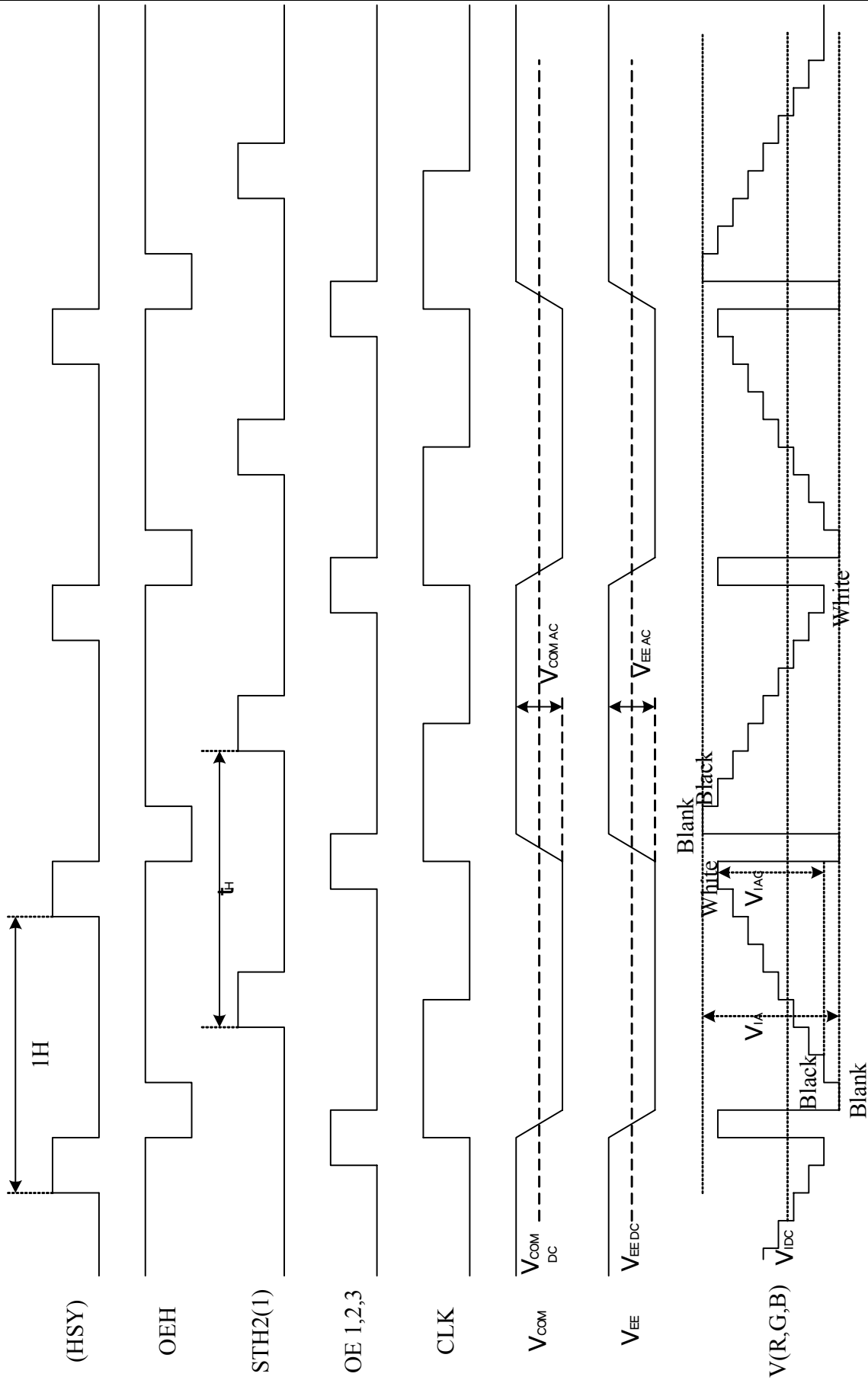
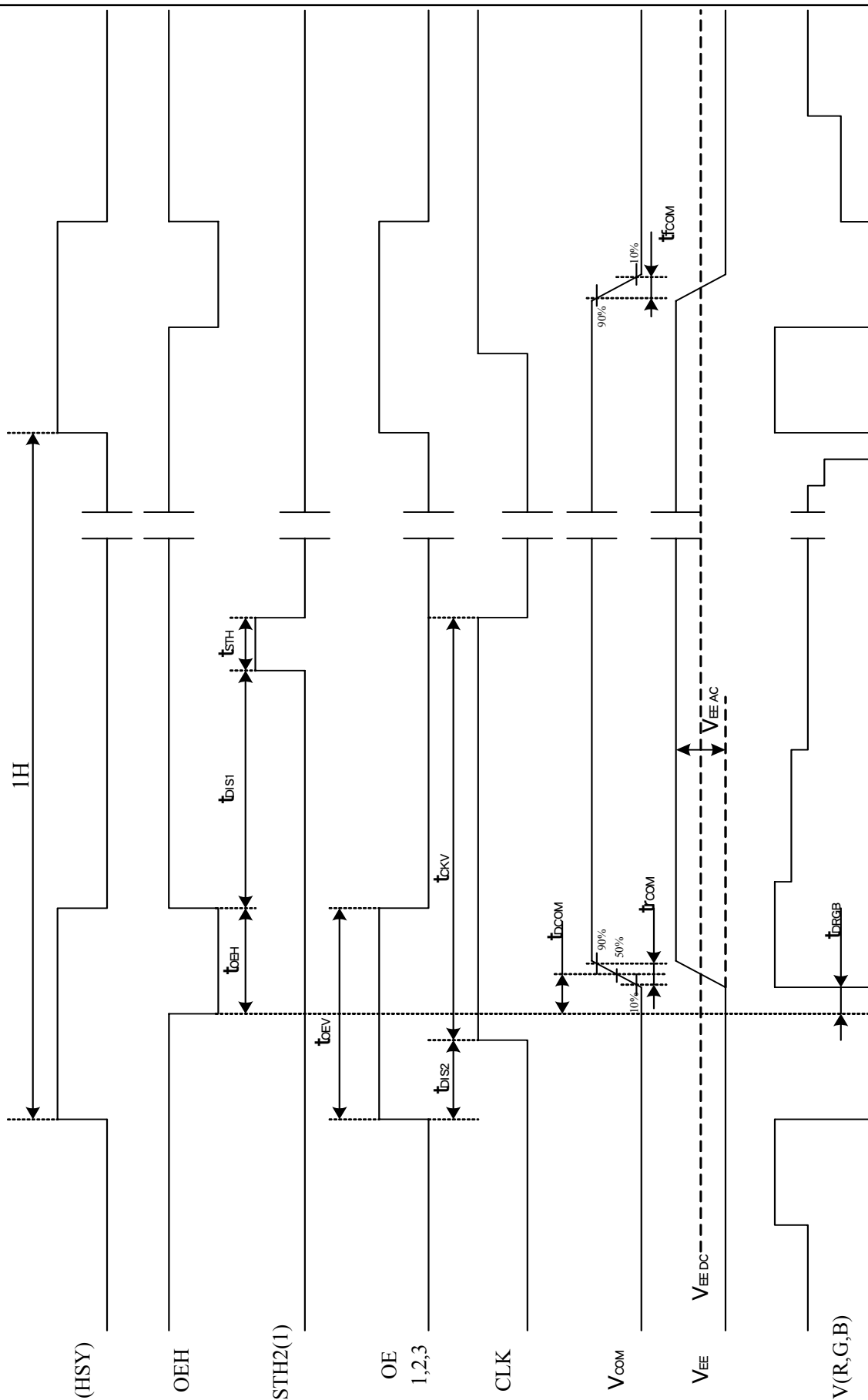


Fig. 8-3 (a) Horizontal timing



Note : The falling edge of OEV should be synchronized with the falling edge of OEH

Fig. 8-3 (b) Detail horizontal timing

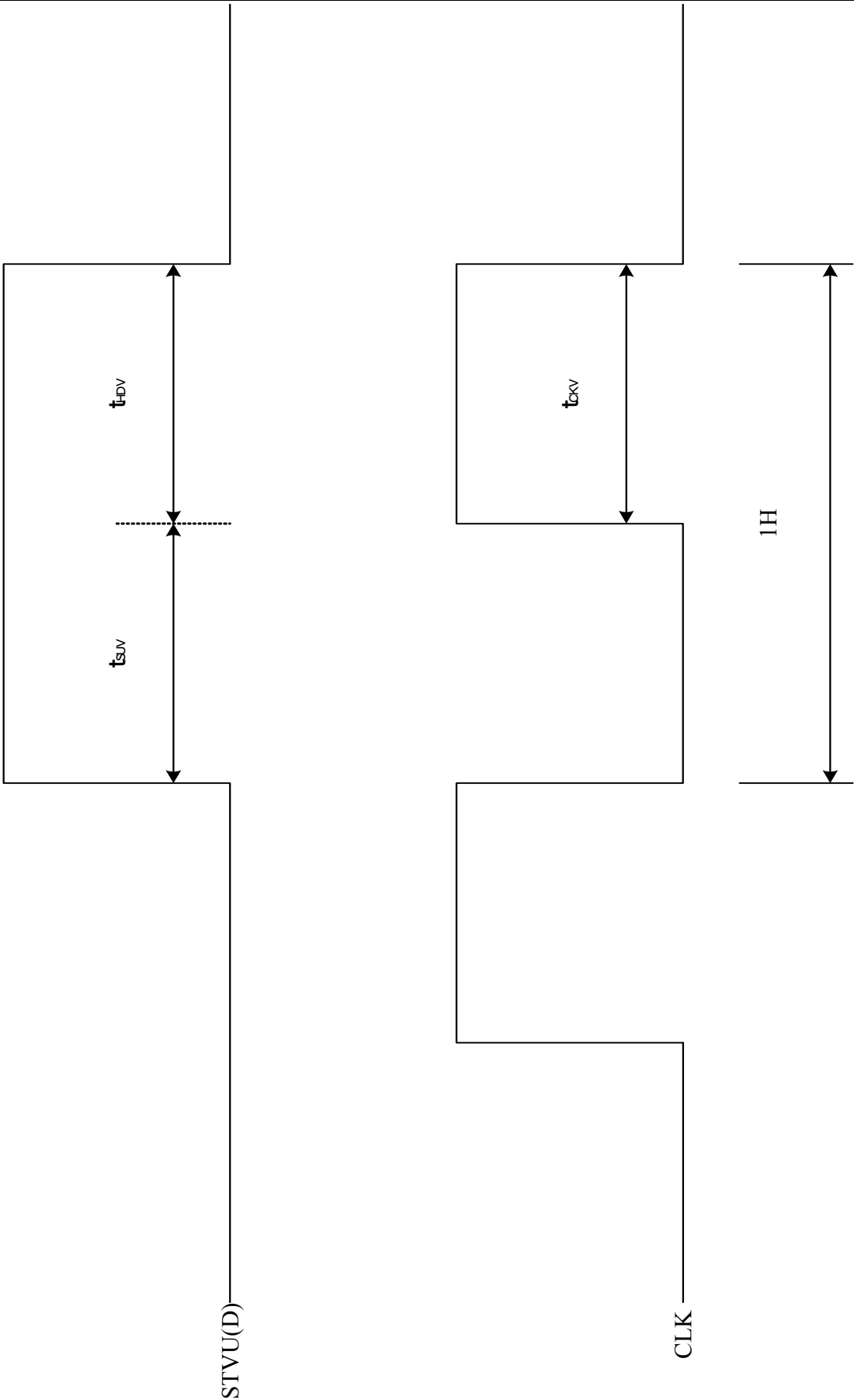


Fig. 8-4 Vertical shift clock timing

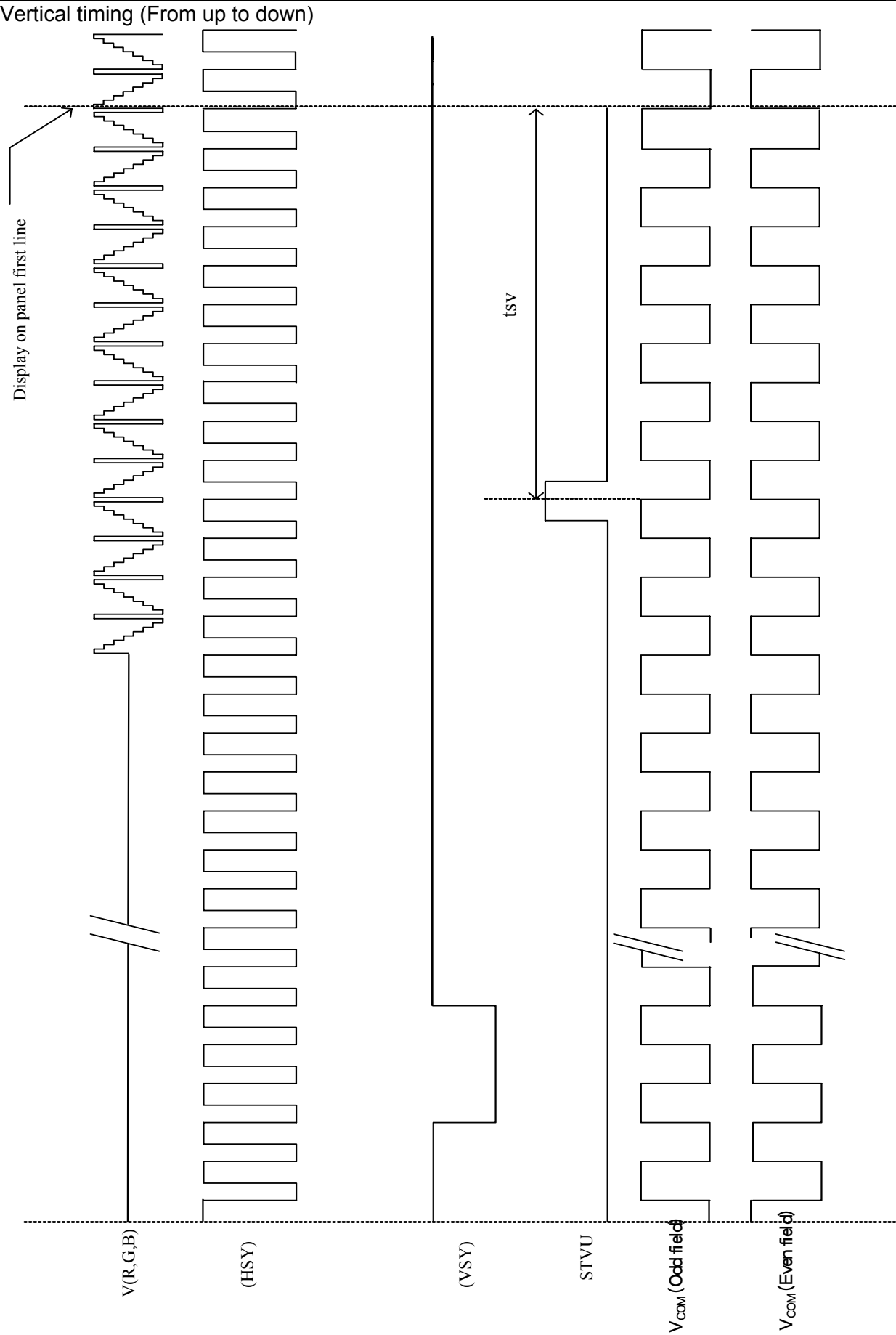


Fig. 8-5 (a) Vertical timing (From Up to Down)

Vertical timing (From down to up)

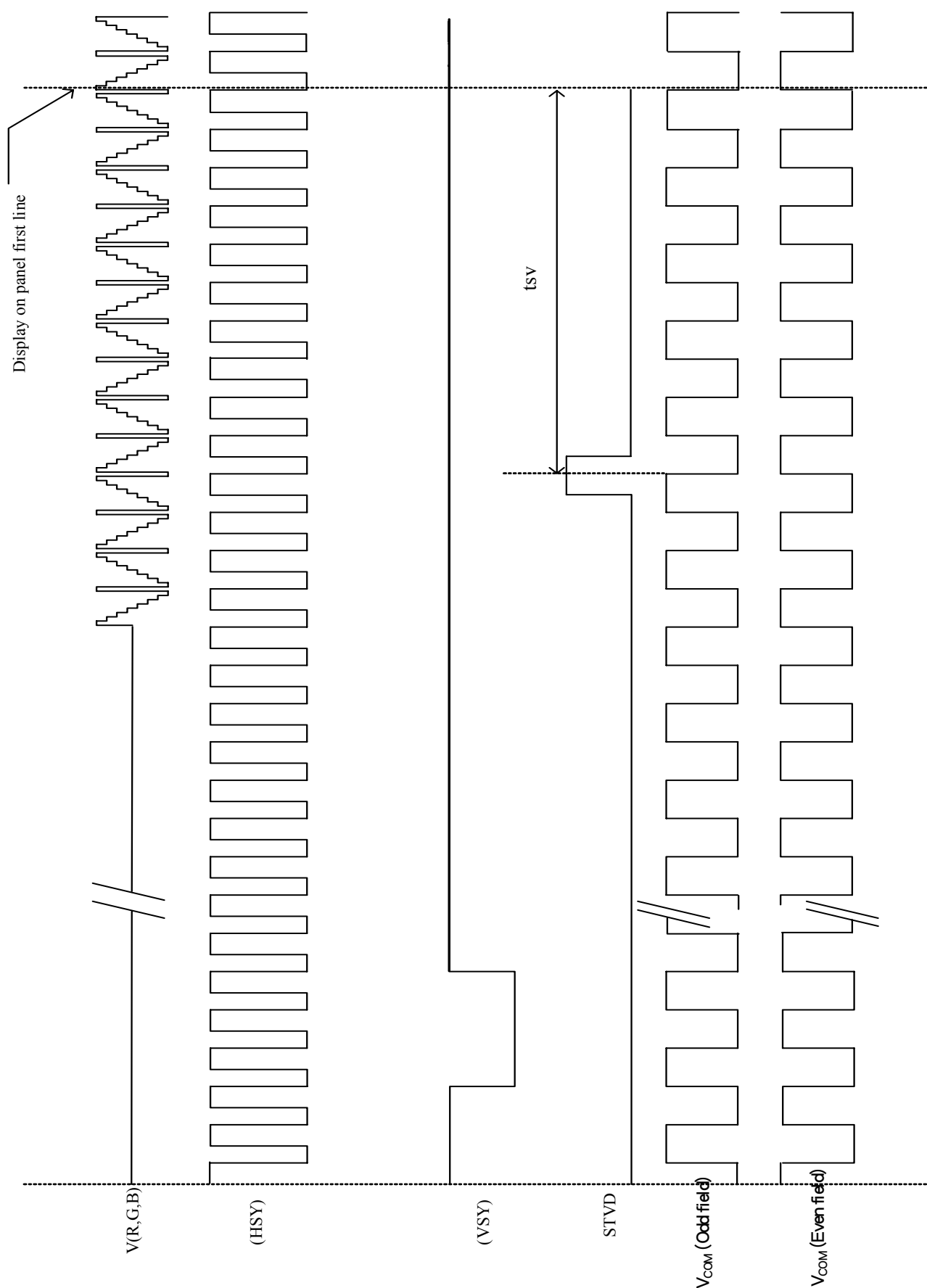
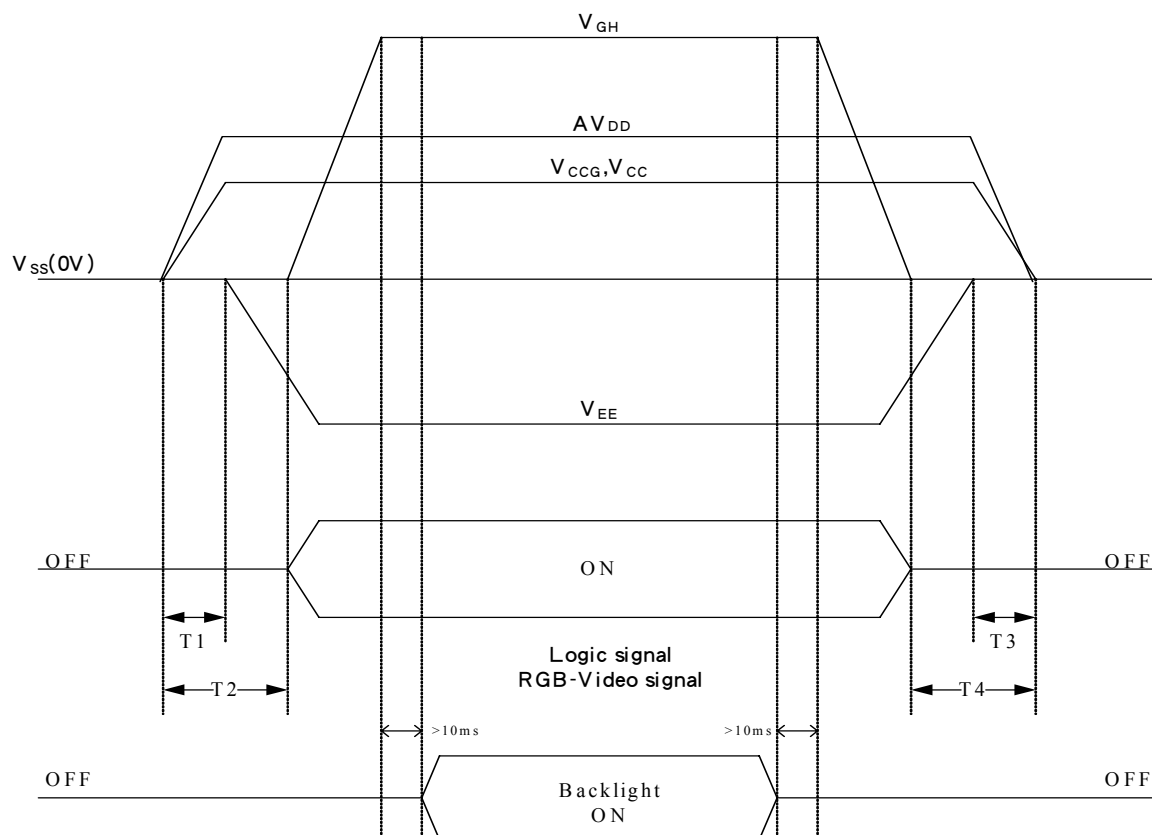


Fig. 8-5 (b) Vertical timing (From Down to Up)

9. Power on Sequence

The Power on Sequence only effect by V_{CC} , AV_{DD} , V_{CCG} , V_{EE} and V_{GH} , the others do not care.



- 1) $10ms \leq T_1 < T_2$
- 2) $0ms < T_3 \leq T_4 \leq 10ms$

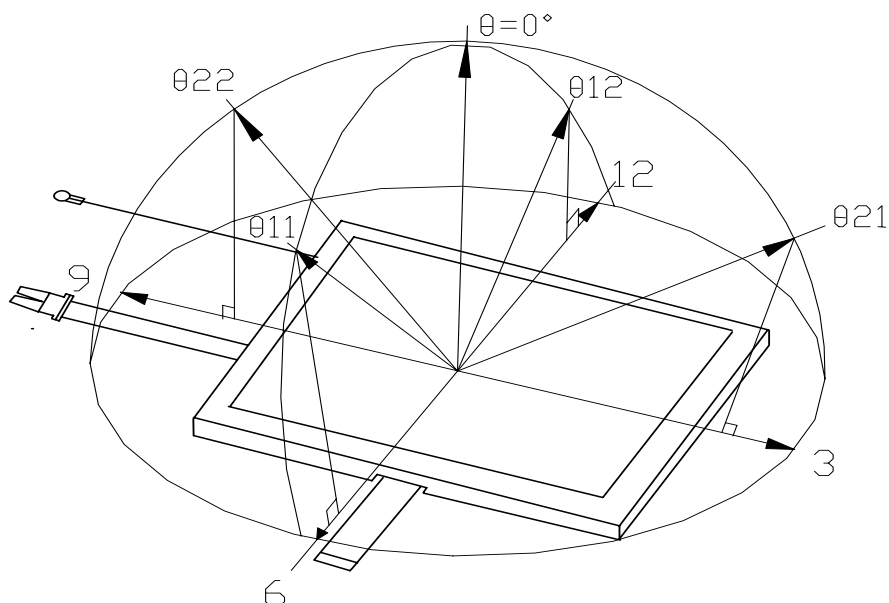
10. Optical Characteristics

10-1) Specification

$T_a = 25^\circ C$

| Parameter | | Symbol | Condition | MIN. | TYP. | MAX. | Unit | Remarks |
|--------------------|------------|--------------------------|----------------------------|-------|------|------|-------------------|-----------|
| Viewing Angle | Horizontal | $\theta\ 21, \theta\ 22$ | $CR \geq 10$ | 45 | 50 | - | deg | Note 10-1 |
| | Vertical | $\theta\ 12$ | | 10 | 15 | - | deg | |
| | | $\theta\ 11$ | | 30 | 35 | - | deg | |
| Contrast Ratio | | CR | At optimized Viewing angle | 300 | 400 | - | - | Note 10-2 |
| Response time | Rise | Tr | $\theta = 0^{\circ}$ | - | 15 | 30 | ms | Note 10-4 |
| | Fall | Tf | | - | 25 | 50 | ms | |
| Brightness | | L | $\theta = 0^{\circ}$ | 250 | 300 | - | cd/m ² | Note 10-3 |
| White Chromaticity | | x | $\theta = 0^{\circ}$ | 0.26 | 0.31 | 0.36 | - | |
| | | y | | 0.28 | 0.33 | 0.38 | - | |
| Uniformity | | U | - | 70 | 75 | - | % | Note 10-5 |
| LED Life Time | | | +25°C | 20000 | - | - | hrs | Note 10-6 |

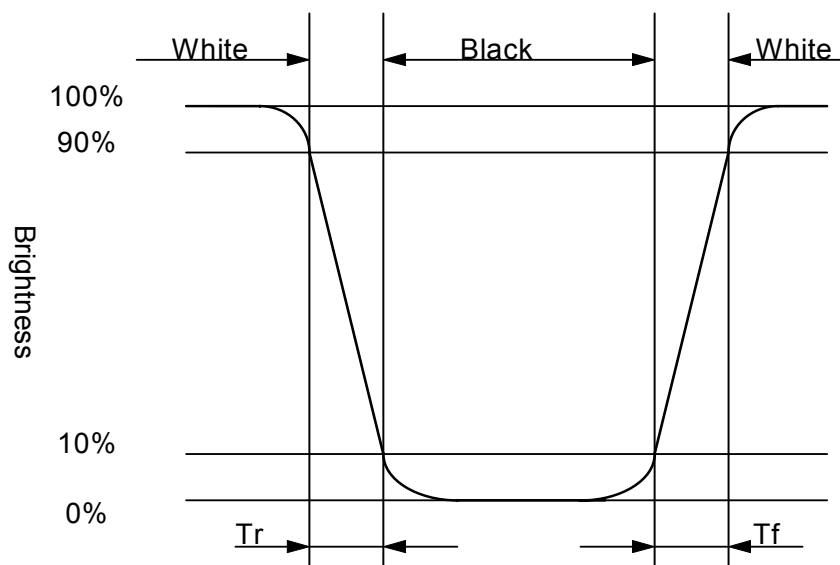
Note 10-1 : The definitions of viewing angles



Note 10-2 : $CR = \frac{\text{Luminance when Testing point is White}}{\text{Luminance when Testing point is Black}}$
 (Testing configuration see 8-2)
 Contrast Ratio is measured in optimum common electrode voltage.

Note 10-3 : 1.Topcon BM-7(fast) luminance meter 1°field of view is used in the testing (after 20~30 minutes operation).
 2.LED B/L current : 180 mA

Note 10-4 : The definition of response time:



Note 10-5 : The uniformity of LCD is defined as

$$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$$

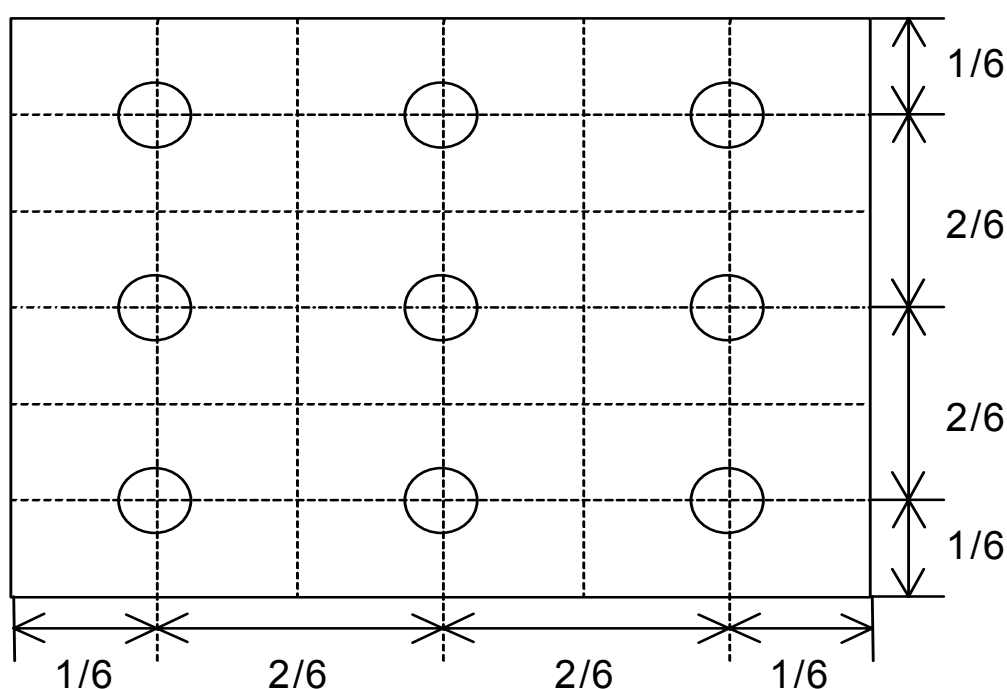
Luminance meter : BM-5A or BM-7 fast (TOPCON)

Measurement distance : 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

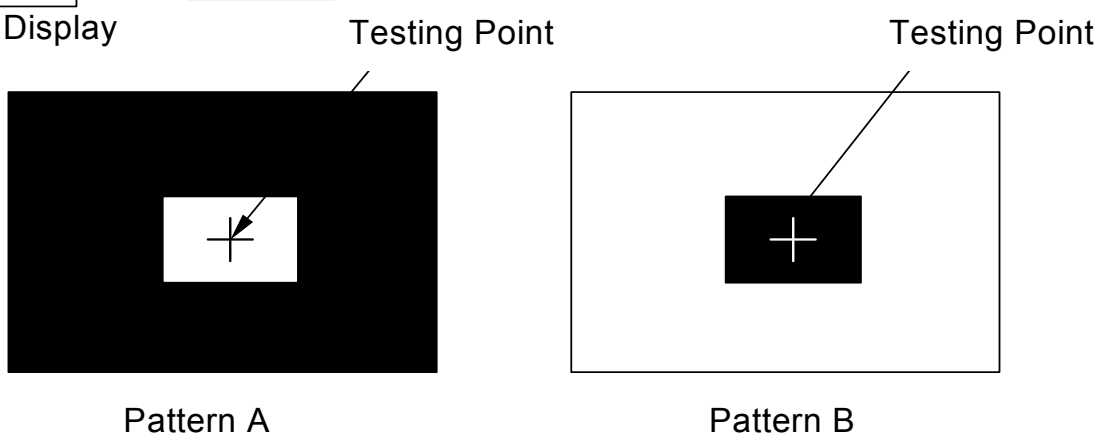
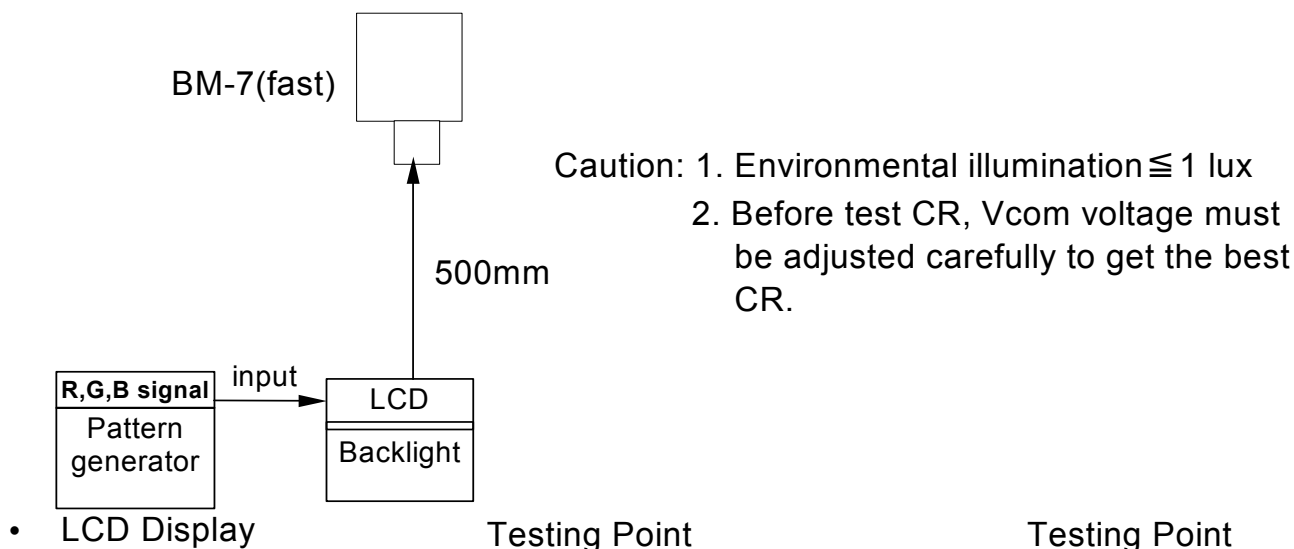
Measuring direction : Perpendicular to the surface of module

The test pattern is white (Gray Level 63).

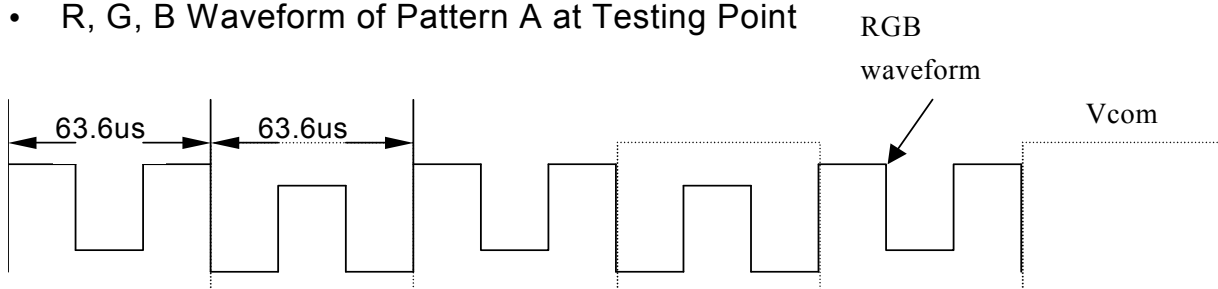


Note 10-6: The “LED Life time “ is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C and $I_{LED} = 20\text{mA}$.

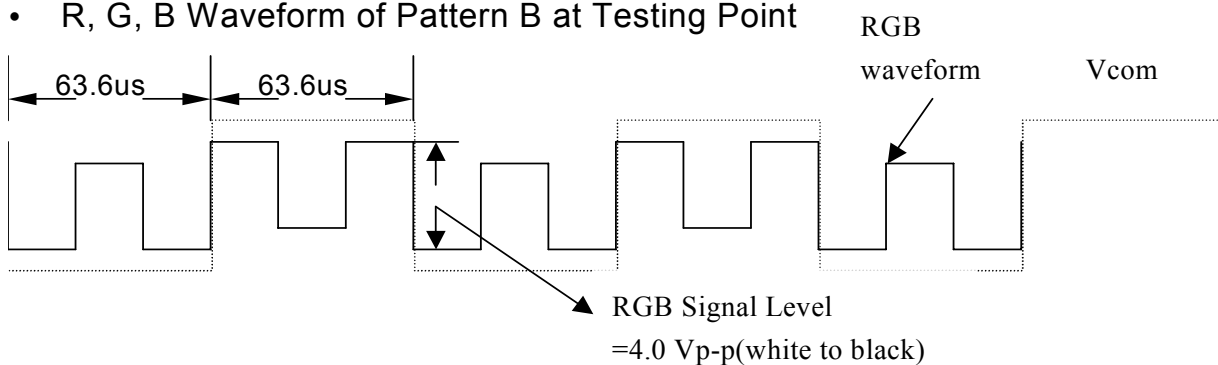
10-2) Testing configuration



• R, G, B Waveform of Pattern A at Testing Point



• R, G, B Waveform of Pattern B at Testing Point



11. Handling Cautions

11-1) Mounting of module

- a) Please power off the module when you connect the input/output connector.
- b) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
- c) Protective film (Laminator) is applied on surface to protect it against scratches and dirt. It is recommended to peel off the laminator before use and taking care of static electricity.

11-2) Precautions in mounting

- a) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.
- b) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.
- c) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.

11-3) Others

- a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.
- b) Store the module at a room temperature place.
- c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.
- d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel.
Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet.
Wash it out immediately with soap.
- e) Observe all other precautionary requirements in handling general electronic components.

11-4) Polarizer mark

The polarizer mark is to describe the direction of wide view angle film how to mach up with the rubbing direction.

12. Reliability Test

| No. | Test Item | Test Condition |
|-----|---|--|
| 1 | High Temperature Storage Test | Ta = +80°C, 240 hrs |
| 2 | Low Temperature Storage Test | Ta = -40°C, 240 hrs |
| 3 | High Temperature Operation Test | Ta = +70°C, 240 hrs |
| 4 | Low Temperature Operation Test | Ta = -30°C, 240 hrs |
| 5 | High Temperature & High Humidity Operation Test | Ta = +60°C, 90%RH, 240 hrs |
| 6 | Thermal Cycling Test (non-operating) | -30°C \longleftrightarrow +70°C, 200Cycles 30 min 30 min |
| 7 | Vibration Test (non-operating) | Frequency : 10 ~ 55 Hz Amplitude : 1 mm Sweep time : 11 mins Test Period : 6 Cycles for each direction of X, Y, Z |
| 8 | Shock Test (non-operating) | 100G, 6ms Direction : $\pm X$, $\pm Y$, $\pm Z$ Cycle : 3 times |
| 9 | Electrostatic Discharge Test (non-operating) | 200pF, 0 Ω \pm 200V 1 time / each terminal |

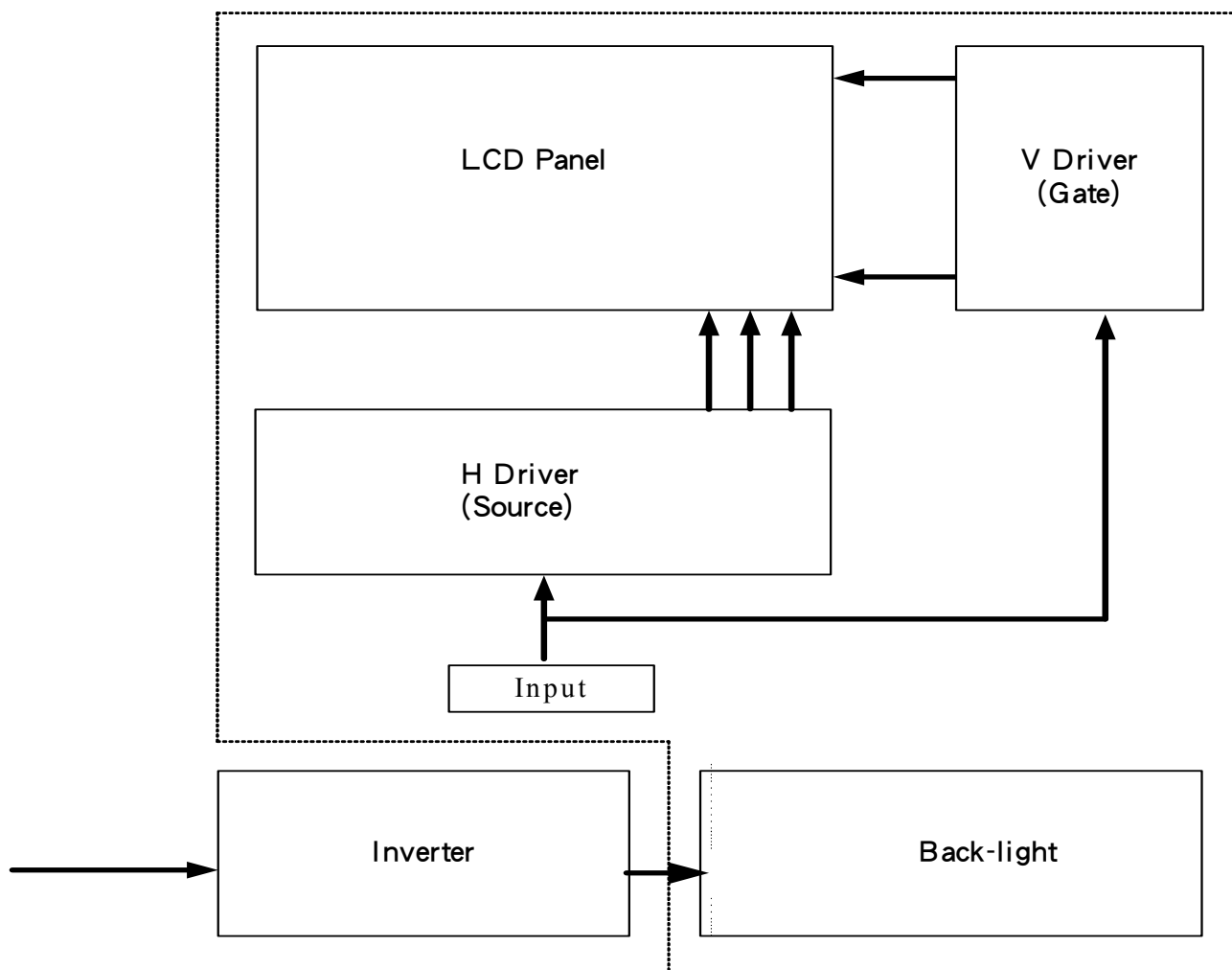
Ta: ambient temperature

Note : The protective film must be removed before temperature test.

[Criteria]

In the standard conditions, there is not display function NG issue occurred. (including : line defect ,no image). All the cosmetic specification is judged before the reliability stress.

13. Block Diagram



14. Packing

| ZONE | REV. | DOCUMENT NO. | DESCRIPTION | DATE | REV. BY |
|------|------|--------------|-------------|------|---------|
|------|------|--------------|-------------|------|---------|

NOTE:

- 1.Q'TY: 20 pcs panel/carton.
- 2.Dimension: 530*295*230mm
- 3.Weight: 7.5 Kg

| ITEM | PART NO. | DESCRIPTION | QTY | REMARK |
|------|------------|-----------------|-----|--------|
| 4 | 50-0100111 | CARTON | 1 | |
| 3 | 50-0500131 | 防静电袋 Pink | 20 | 防静电 |
| 2 | | PW080XU4 Module | 20 | |
| 1 | 50-0301341 | 瓦楞隔板缓冲材 | 1 | 上盖+底座 |

| MTL.SPEC. | | UNSPECIFIED TOL'S | | REMARK | |
|-----------|--------|-------------------|---------|--------|------------------------------|
| | | ANGLE | | | |
| | | ROUGHNESS | | | |
| APPROVE | Franks | 01.08.'07 | SCALE | UNIT | SHEET |
| CHECK | Franks | 01.08.'07 | | | 1 OF 1 |
| DRAWN | James | 01.08.'07 | MTL.NO. | | DWG TITLE |
| | | | | | PW080XU4 Module Packing Draw |
| | | | | | DWG FILE: |
| | | | | | REV. 01 |
| | | | | | A4 SIZE |

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