



☐ Preliminary Specification

☒ Final Specification

## Customer Approve:

QC 品质 : \_\_\_\_\_

R&D 研发 : \_\_\_\_\_

Approved 批准: \_\_\_\_\_

产品型号(Description):   HYY7BIPS27A  

| Compile by<br>编制 | Quality/Engineer<br>品质/工程 | Checked<br>审核 | Approved<br>批准 |
|------------------|---------------------------|---------------|----------------|
|                  |                           |               |                |

**REVISION RECORD**

| <b><u>REV NO</u></b> | <b><u>REV DATE</u></b> | <b><u>CONTENTS</u></b> | <b><u>REMARKS</u></b> |
|----------------------|------------------------|------------------------|-----------------------|
| V.0                  | 2023-09-26             | First Release          |                       |
|                      |                        |                        |                       |
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## 1.0 General description

### 1.1 Introduction

**HY7BIPS27A** is model a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 7.0(16:9) inch diagonally measured active display area with WSVGA (1024horizontal by 600 vertical pixel array) resolution. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.

### 1.2 Features

- Ø **TTL Interface**
- Ø Data enable signal mode
- Ø 24-bit color depth,display 16.7M colors
- Ø Low driving voltage and low power consumption
- Ø ROHS Compliant

### 1.3 General information

| Item              | Specification                 | Unit   | Remarks           |
|-------------------|-------------------------------|--------|-------------------|
| Outline Dimension | 164.9(H) x 100(V) x3.5(body)  | mm     | Tolerance:± 0.2mm |
| Display area      | 154.21(W) x85.92(H)           | mm     |                   |
| Number of Pixel   | 1024(H) x 600(V)              | pixels |                   |
| Pixel pitch       | 0.1506(H) x 0.1432(V)         | mm     |                   |
| Pixel arrangement | Pixels RGB stripe arrangement |        |                   |
| Display mode      | Normally Black                |        |                   |
| Surface treatment | IPS Film                      |        |                   |
| Weight            | TBD (Typ.)                    | gram   |                   |
| Back-light        | Single LED (Side-Light type)  |        |                   |

### 1.4 Mechanical Information

| Item        |               | Min.  | Typ.  | Max.  | Unit |
|-------------|---------------|-------|-------|-------|------|
| Module Size | Horizontal(H) | 164.7 | 164.9 | 165.2 | mm   |
|             | Vertical(V)   | 99.8  | 100   | 100.2 | mm   |
|             | Depth(D)      | 3.3   | 3.5   | 3.7   | mm   |

## 2.0 ABSOLUTE MAXIMUM RATINGS

### 2.1 Electrical Absolute Rating

#### 2.1.1 TFT LCD Module

| Item              | Specification                 | Unit   |
|-------------------|-------------------------------|--------|
| Outline Dimension | 164.9(H) x 100(V) x3.5(body)  | mm     |
| Display area      | 154.21(W) x85.92(H)           | mm     |
| Number of Pixel   | 1024(H) x 600(V)              | pixels |
| Pixel pitch       | 0.1506(H) x 0.1432(V)         | mm     |
| Pixel arrangement | Pixels RGB stripe arrangement |        |
| Display mode      | Normally Black                |        |
| Surface treatment | IPS Film                      |        |
| Weight            | TBD (Typ.)                    | gram   |
| Back-light        | Single LED (Side-Light type)  |        |

#### 2.1.2 Back-Light Unit

| Item              | Symbol | Typ | MIN. | TYP. | MAX. | Unit | Note       |
|-------------------|--------|-----|------|------|------|------|------------|
| Forward voltage   | Vf     | 9.3 | 8.7  | 9.3  | 9.9  | V    | (1)(2)     |
| Forward current   | If     | 180 | --   | --   | --   | mA   | (1)(2) (3) |
| Power Consumption | PBL    | --  | --   | --   | --   | mW   |            |

Note:

(1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) Ta = 25 ± 2 °C

(3) Test Condition: LED current 180 mA

## 3.0 OPTICAL CHARACTERISTICS

### 3.1 Optical Specifications

| Item                             | Symbol     | Temp | Condition          | Min           | Typ    | Max           | Unit   | Remark |
|----------------------------------|------------|------|--------------------|---------------|--------|---------------|--------|--------|
| Viewing Angle range              | Horizontal | θ    | CR > 10            | 80            | 85     | --            | Deg    | Note 1 |
|                                  | Vertical   | θ    |                    | 80            | 85     | --            | Deg    |        |
| Luminance Contrast ratio         | CR         |      | θ = 0°             | 600: 1        | 800: 1 | --            | --     | Note 2 |
| Brightness                       | YL         |      |                    | 400           | 450    | --            | Cd/cm2 |        |
| Transmittance                    | T(%)       |      | θ = 0°             | --            | 5.0    | --            | %      | Note 3 |
| Color Gamut (C light)            |            |      |                    | 45            | 50     | --            | %      |        |
| White chromaticity               |            | Xw   | Θ=0°               | TYP.<br>-0.03 | 0.303  | TYP.<br>+0.03 |        | Note 4 |
|                                  |            | Yw   |                    |               | 0.333  |               |        |        |
| Reproduction of color (C-light)  | Red        | Rx   |                    |               |        |               |        |        |
|                                  |            | Ry   |                    |               |        |               |        |        |
|                                  | Green      | Gx   |                    |               |        |               |        |        |
|                                  |            | Gy   |                    |               |        |               |        |        |
|                                  | Blue       | Bx   |                    |               |        |               |        |        |
|                                  |            | By   |                    |               |        |               |        |        |
| Response Time (Rising + Falling) | Trt        |      | Ta= 25°C<br>θ = 0° | --            | 25     | 40            | ms     | Note 5 |

### 3.2 Measuring Condition

Measuring surrounding: dark room ,LED current IL : 180mA

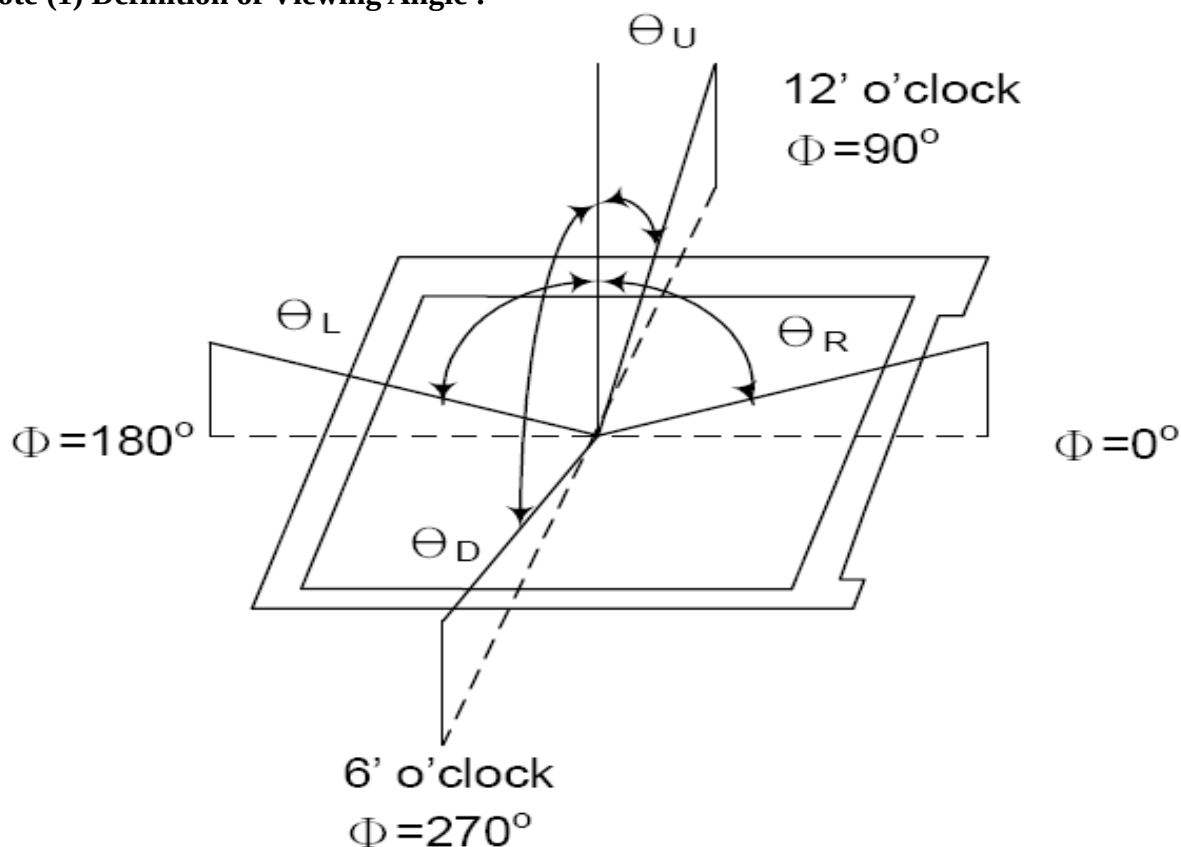
Ambient temperature: 25±2 °C

15min. warm-up time.

### 3.3 Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics. Measuring spot size: 20 ~ 21 mm

**Note (1) Definition of Viewing Angle :**

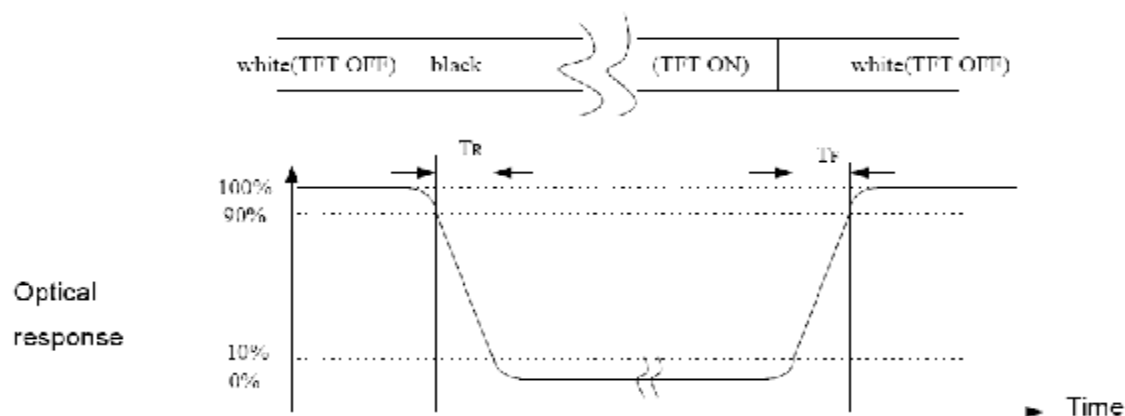


**Note (2) Definition of Contrast Ratio (CR):**

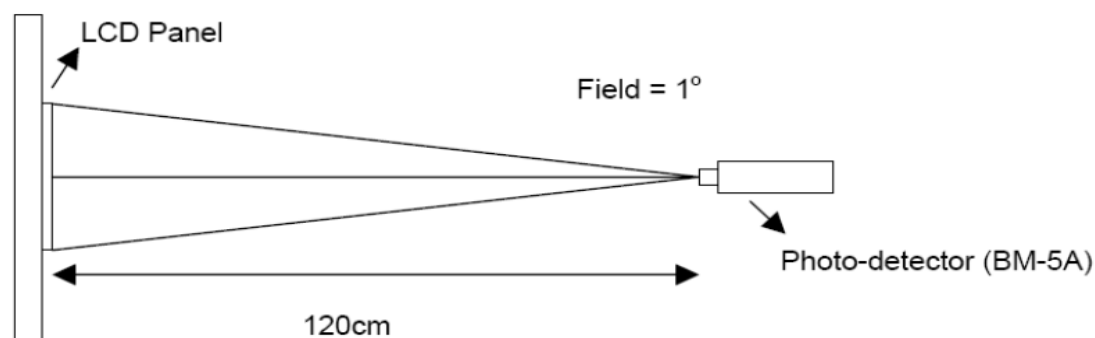
Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

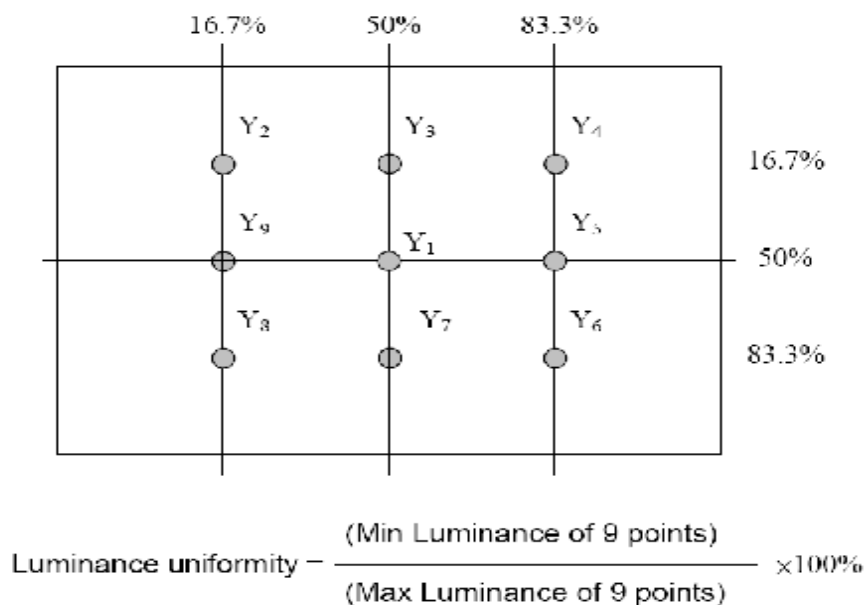
**Note (3) Definition of Response Time: Sum of TR and TF**



Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



## 4.0 INTERFACE PIN CONNECTION

### 4.1 Signal of interface

| Pin No. | Symbol    | Function                       | Remark |
|---------|-----------|--------------------------------|--------|
| 1       | LED+      | Power supply for LED[Anode]    |        |
| 2       | LED+      | Power supply for LED[Anode]    |        |
| 3       | LED+      | Power supply for LED[Anode]    |        |
| 4       | NC        | No Connect                     |        |
| 5       | LED-      | Power supply for LED[Cathode]  |        |
| 6       | LED-      | Power supply for LED[Cathode]  |        |
| 7       | LED-      | Power supply for LED[Cathode]  |        |
| 8       | LED-      | Power supply for LED[Cathode]  |        |
| 9       | GND       | Ground                         |        |
| 10      | GND       | Ground                         |        |
| 11      | MIPI_2P   | MIPI data positive signal(2P)  |        |
| 12      | MIPI_2N   | MIPI data negative signal(2N)  |        |
| 13      | GND       | Ground                         |        |
| 14      | MIPI_1P   | MIPI data positive signal(1P)  |        |
| 15      | MIPI_1N   | MIPI data positive signal(1N)  |        |
| 16      | GND       | Ground                         |        |
| 17      | MIPI_CLKP | MIPI CLK positive signal(CLKP) |        |
| 18      | MIPI_CLKN | MIPI CLK positive signal(CLKN) |        |
| 19      | GND       | Ground                         |        |
| 20      | MIPI_0P   | MIPI data positive signal(0P)  |        |
| 21      | MIPI_0N   | MIPI data positive signal(0N)  |        |
| 22      | GND       | Ground                         |        |
| 23      | MIPI_3P   | MIPI data positive signal(3P)  |        |
| 24      | MIPI_3N   | MIPI data positive signal(3N)  |        |
| 25      | GND       | Ground                         |        |
| 26      | TE        | TE OR /No Connect              |        |
| 27      | RESET     | Reset Pin                      | 1.8V   |
| 28      | ID        | No connection                  |        |
| 29      | VDDIO     | Logic power 1.8V               |        |
| 30      | VDD       | Logic power 3.3V               |        |
| 31      | VDD       | Logic power 3.3V               |        |

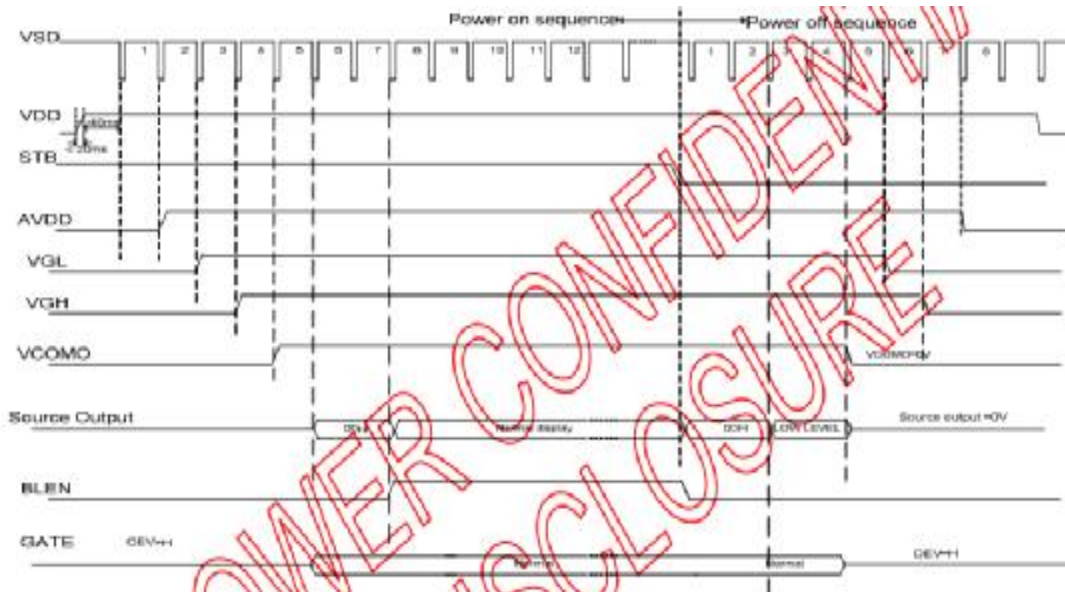
## 5.0 Power On/Off Sequence

To prevent the device damage from latch up, the power on/off sequence shown Below must be followed.

**Power on:** VDD , GND→AVDD , AGND→V1-V14

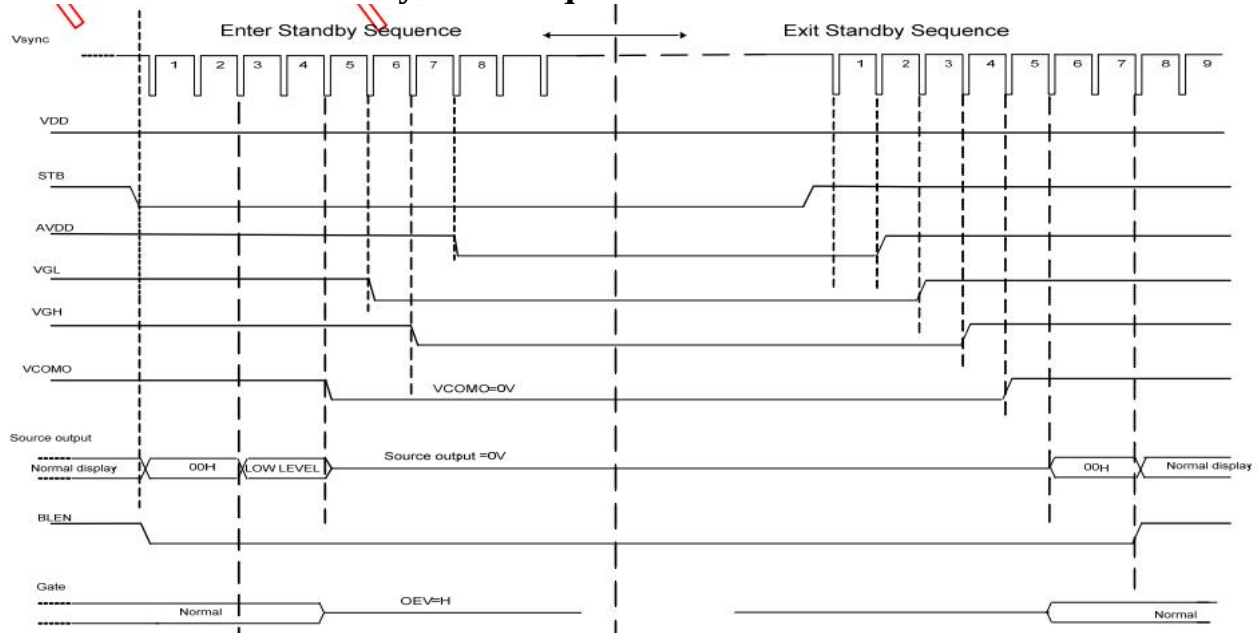
**Power on:** V1-V14→AVDD , AGND→VDD,GND

### 5.1 Power on/off control



I power on/off timing sequence

### 5.2 Enter and exit standby mode sequence



## 6.0 ELECTRICAL CHARACTERISTICS

### 6.1 TFT LCD Module

| Parameter      | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
| Supply Voltage | VDD    | 3.0 | 3.3 | 3.6 | V    |
|                | VGH    | -   | -   | -   | V    |
|                | VGL    | -   | -   | -   | V    |
|                | AVDD   | -   | -   | -   | V    |
| VCOM           | VCOM   | -   | -   | -   | V    |

Note:

- (1) VGH is TFT Gate operating voltage.
- (2) VGL is TFT Gate operating voltage. The low voltage level of VGH signal must be fluctuates with same phase as Vcom.

### 6.2 Back-Light Unit

The backlight system is an edge-lighting type with 27LED.

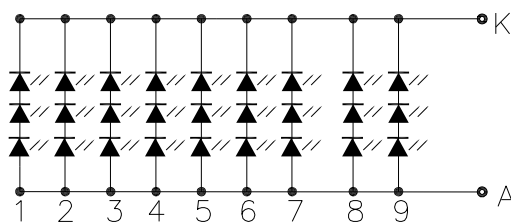
The characteristics of the LED are shown in the following tables.

| Item                    | Symbol | Min.  | Typ. | Max. | Unit | Note   |
|-------------------------|--------|-------|------|------|------|--------|
| LED current             | IL     | -     | 180  | -    | mA   | (2)    |
| LED Voltage             | VL     | -     | 9.3  | -    | V    |        |
| Operating LED life time | Hr     | 20000 | -    | -    | Hour | (1)(2) |

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:  $T_a = 25 \pm 3^\circ \text{C}$ , typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at  $T_a = 25^\circ \text{C}$  and  $IL = 180\text{mA}$ . The LED lifetime could be decreased if operating IL is larger than 180mA. The constant current driving method is suggested.

LED CIRCUIT DIAGRAM:  $3 \times 9 = 27\text{LED}$



### 6.3 DC Characteristics

#### 6.3.1 Absolute Maximum Rating (GND=AGND=0V)

| Parameter              | Symbol           | Spec. |      |          | Unit |
|------------------------|------------------|-------|------|----------|------|
|                        |                  | Min.  | Typ. | Max.     |      |
| Power supply voltage 1 | Vdd              | -0.5  | -    | +3.96    | V    |
| Power supply voltage 2 | Avdd             | -0.5  | -    | +13.5    | V    |
| Logic Output voltage   | Vout             | -0.5  | -    | +5.0     | V    |
| Input voltage          | Vin              | -0.5  | -    | AVDD+0.5 | V    |
| Operation temperature  | T <sub>OPR</sub> | -10   | -    | +50      | °C   |
| Storage temperature    | T <sub>STG</sub> | -20   | -    | +60      | °C   |

Note: (1) All of the Voltages listed above are with respective to GND=0V.

(2) Device is subject to be damaged permanently if stresses belong those absolute maximum ratings listed above.

### 6.3.2 TTL mode DC electrical characteristics

(VDD=2.3~3.6V, AVDD=6.5~13.5V, GND=AGND=0V, TA=-25°C)

| Parameter                           | Symbol            | Spec.              |                    |                    | Unit | Condition                                                                                   |
|-------------------------------------|-------------------|--------------------|--------------------|--------------------|------|---------------------------------------------------------------------------------------------|
|                                     |                   | Min.               | Typ.               | Max.               |      |                                                                                             |
| Power supply voltage                | VDD               | 2.7                | 3.3                | 3.6                | V    | -                                                                                           |
| Power supply voltage                | VDDA              | 6.5                | -                  | 13.5               | V    | -                                                                                           |
| Low level input voltage             | V <sub>IL</sub>   | 0                  | -                  | 0.3VDD             | V    | For digital circuit                                                                         |
| High level input voltage            | V <sub>IH</sub>   | 0.7VDD             | -                  | VDD                | V    | For digital circuit                                                                         |
| Output low voltage                  | V <sub>OL</sub>   | -                  | -                  | VSS+0.4            | V    | I <sub>OL</sub> =400μA                                                                      |
| Output high voltage                 | V <sub>OH</sub>   | VDD-0.4            | -                  | -                  | V    | I <sub>OH</sub> =-400μA                                                                     |
| Pull low/high resistance            | R <sub>i</sub>    | 200                | 250                | 300                | kΩ   | For the digital input pin @VDD=3.3V                                                         |
| Input leakage current               | I <sub>li</sub>   | -                  | -                  | ±1                 | μA   | For digital circuit                                                                         |
| Digital Operation current           | I <sub>dd</sub>   | -                  | 5                  | 14                 | mA   | Dual gate mode or Cascade mode slave, Fclk=50MHz, LD=48KHz, VDD=3.3V, CABC disable, No load |
|                                     |                   | -                  | 7                  | 16                 | mA   | Cascade mode master, Fclk=50MHz, LD=48KHz, VDD=3.3V, CABC disable, No load                  |
| Digital stand-by current            | I <sub>st1</sub>  | -                  | 10                 | 50                 | μA   | Clock & all functions are stopped                                                           |
| Analog Operating current            | I <sub>dda</sub>  | -                  | 6                  | 8                  | mA   | No load, Fclk=50MHz, FLD=48KHz @ VDDA=10V, V1=8V, V14=0.4V                                  |
| Analog Stand-by current             | I <sub>st2</sub>  | -                  | 10                 | 50                 | μA   | No load, clock & all functions are stopped                                                  |
| Input level of V1~V7                | V <sub>ref1</sub> | 0.4VDDA            | -                  | VDDA-1             | V    | Gamma correction voltage input                                                              |
| Input level of V8~V14               | V <sub>ref2</sub> | 0.1                | -                  | 0.6VDDA            | V    | Gamma correction voltage input                                                              |
| Output Voltage deviation            | V <sub>od1</sub>  | -                  | ±20                | ±35                | mV   | V <sub>o</sub> =VSSA+0.1V~VSSA+0.5V & V <sub>o</sub> =VDDA-0.5V~VDDA-0.1V                   |
| Output Voltage deviation            | V <sub>od2</sub>  | -                  | ±15                | ±20                | mV   | V <sub>o</sub> =VSSA+0.5V~VDDA-0.5V                                                         |
| Output Voltage Offset between Chips | V <sub>oc</sub>   | -                  | -                  | ±20                | mV   | V <sub>o</sub> =VSSA+0.5V~VDDA-0.5V                                                         |
| Dynamic Range of Output             | V <sub>dr</sub>   | 0.1                | -                  | VDDA-0.1           | V    | SO1~SO1200                                                                                  |
| Sinking Current of Outputs          | I <sub>OLy</sub>  | 80                 | -                  | -                  | μA   | SO1~SO1200; V <sub>o</sub> =0.1V vs. 1.0V, VDDA=13.5V                                       |
| Driving Current of Outputs          | I <sub>OHy</sub>  | 80                 | -                  | -                  | μA   | SO1~SO1200; V <sub>o</sub> =0.1V vs. 12.5V, VDDA=13.5V                                      |
| Resistance of Gamma Table           | R <sub>g</sub>    | 0.7*R <sub>n</sub> | 1.0*R <sub>n</sub> | 1.3*R <sub>n</sub> | Ω    | R <sub>n</sub> : Internal gamma resistor                                                    |

### I TTL mode DC electrical characteristics

## 6.4 AC Characteristics

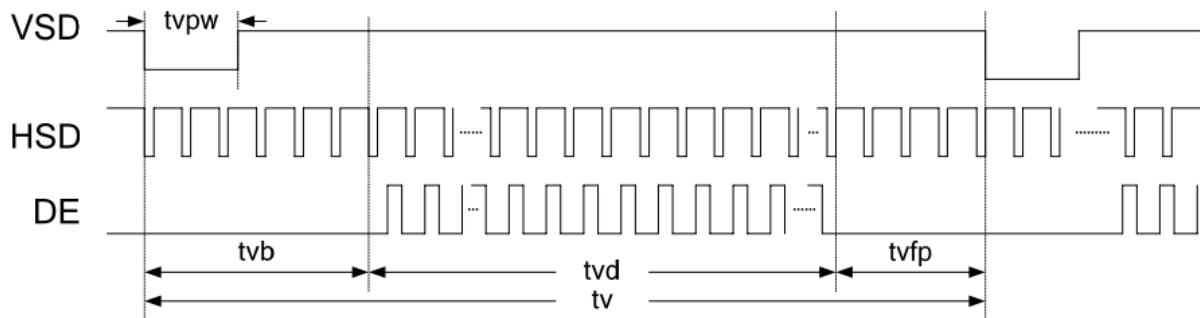
### 6.4.1 TTL mode AC electrical characteristics

| Parameter              | Symbol    | Spec. |      |      | Unit |
|------------------------|-----------|-------|------|------|------|
|                        |           | Min.  | Typ. | Max. |      |
| HS setup time          | $T_{hst}$ | 8     | -    | -    | ns   |
| HS hold time           | $T_{hhd}$ | 8     | -    | -    | ns   |
| VS setup time          | $T_{vst}$ | 8     | -    | -    | ns   |
| VS hold time           | $T_{vhd}$ | 8     | -    | -    | ns   |
| Data setup time        | $T_{dsu}$ | 8     | -    | -    | ns   |
| Data hold time         | $T_{dhd}$ | 8     | -    | -    | ns   |
| DE setup time          | $T_{esu}$ | 8     | -    | -    | ns   |
| DE hold time           | $T_{ehd}$ | 8     | -    | -    | ns   |
| VDD Power On Slew rate | $T_{POR}$ | -     | -    | 20   | ms   |
| RSTB pulse width       | $T_{Rst}$ | 10    | -    | -    | us   |
| CLKIN cycle time       | $T_{cph}$ | 20    | -    | -    | ns   |
| CLKIN pulse duty       | $T_{cwh}$ | 40    | 50   | 60   | %    |
| Output stable time     | $T_{sst}$ | -     | -    | 6    | us   |

I TTL mode AC electrical characteristics

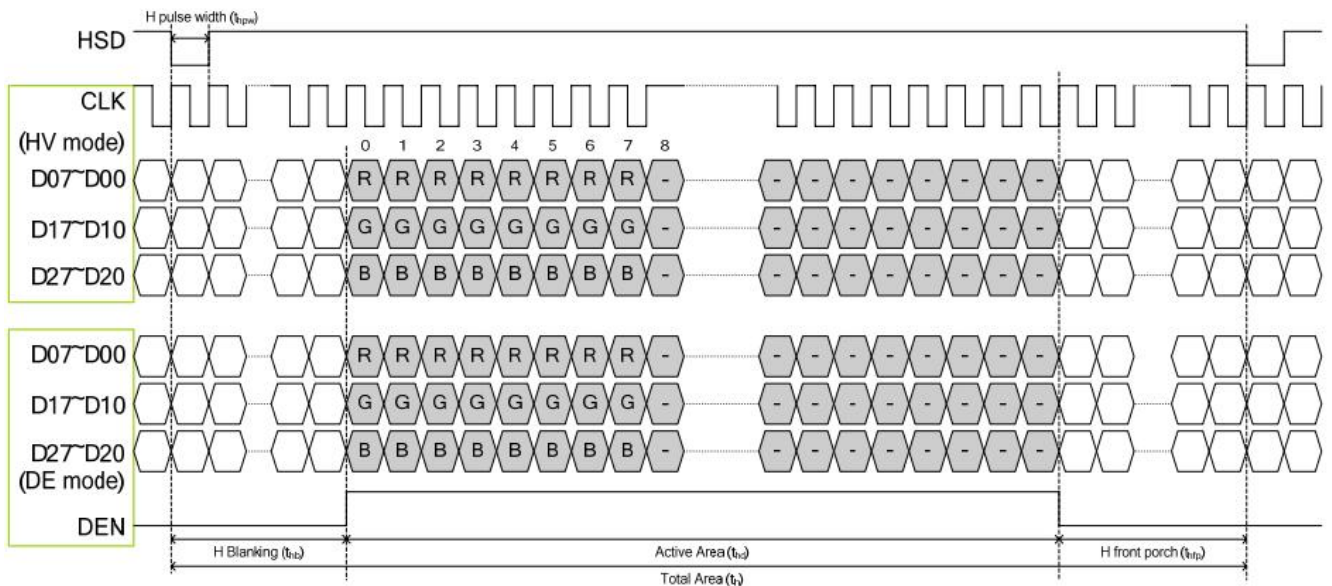
## 6.4.2 TTL mode data input format

### Vertical timing



I Vertical input timing diagram

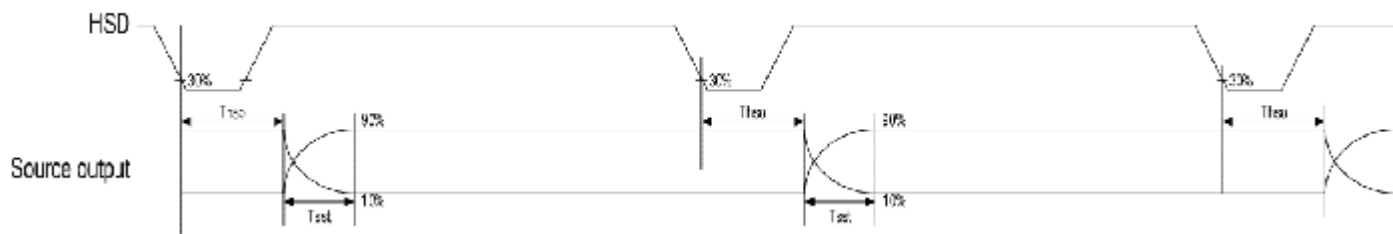
### Horizontal timing



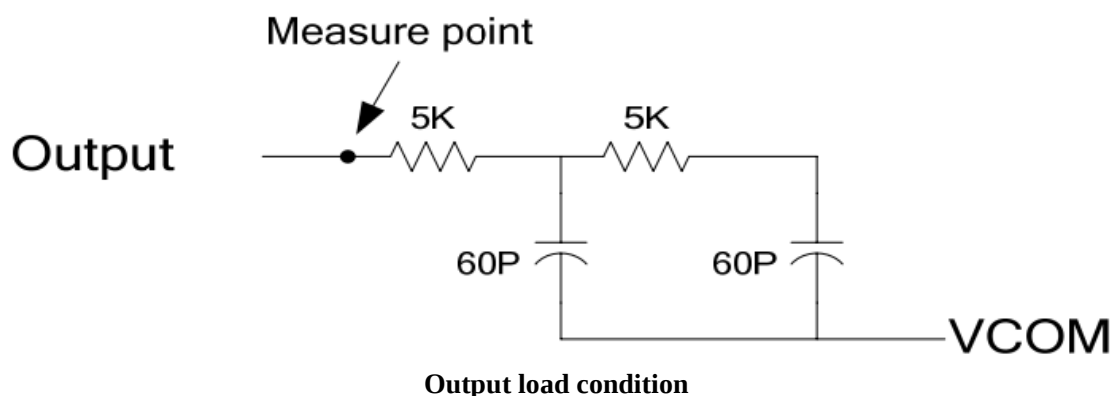
I Horizontal input timing diagram



## 6.5.2 Source output timing diagram (cascade)



Source output timing diagram



## 7.0 Reliability test items

| Test Item                  | Test Conditions                                          | Notes |
|----------------------------|----------------------------------------------------------|-------|
| High temperature Operation | Ta= +50°C, 120hrs                                        |       |
| Low temperature Operation  | Ta= -10°C, 120hrs                                        |       |
| High Temperature Storage   | Ta= +60°C, 120hrs                                        |       |
| Low Temperature Storage    | Ta= -20°C, 120hrs                                        |       |
| Humidity Test              | 60°C ,Humidity 90% ,96hrs                                |       |
| Thermal Shock Test         | -10°C,30min ~ +50°C,30min (30 cycle)                     |       |
| Vibration Test(Packing)    | Sine Wave<br>1.04G, 5~500Hz, XYZ<br>30min/each direction |       |

## 8.0 OUTLINE DIMENSION

## 9.0 General precaution

### 9.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life threatening or otherwise catastrophic.

### 9.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. JYY does not warrant the module, if customers disassemble or modify the module.

### 9.3 Breakage of LCD Panel

8.3.1. If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

8.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

8.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

8.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

### 9.4 Electric Shock

8.4.1. Disconnect power supply before handling LCD module.

8.4.2. Do not pull or fold the LED cable.

8.4.3. Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

### 9.5 Absolute Maximum Ratings and Power Protection Circuit

8.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

8.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

8.5.3. It's recommended to employ protection circuit for power supply.

### 9.6 Operation

8.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

8.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

8.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

8.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

8.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

### 9.7 Mechanism

Please mount LCD module by using mouting holes arranged in four corners tightly.

### 9.8 Static Electricity

8.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

8.8.2. Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

### 9.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.