



## RVT7.0A800480TFWN00

### LCD TFT Datasheet

Rev.1.0  
2014-10-15

| ITEM                           | CONTENTS                        | UNIT              |
|--------------------------------|---------------------------------|-------------------|
| LCD Type                       | TFT/Transmissive/Normally white | /                 |
| Size                           | 7.0                             | Inch              |
| Viewing Direction              | 12:00 (without image inversion) | O' Clock          |
| Gray Scale Inversion Direction | 6:00                            | O' Clock          |
| LCM (W × H × D )               | 165.60 × 100.6 × 6.03           | mm <sup>3</sup>   |
| Active Area (W × H)            | 154.08 × 85.92                  | mm <sup>2</sup>   |
| Dot Pitch (W × H)              | 0.1926 × 0.179                  | mm <sup>2</sup>   |
| Number Of Dots                 | 800 (RGB) × 480                 | /                 |
| Driver IC                      | HX8264+HX8664                   | /                 |
| Backlight Type                 | 21 LEDs                         | /                 |
| Surface Luminance              | 400                             | cd/m <sup>2</sup> |
| Interface Type                 | 24bit RGB                       | /                 |
| Color Depth                    | 16.7M                           | /                 |
| Pixel Arrangement              | RGB Vertical Stripe             | /                 |
| Surface Treatment              | Anti-glare                      |                   |
| Input Voltage                  | 3.3                             | V                 |
| With/Without TSP               | Without TP                      | /                 |
| Weight                         | 189                             | g                 |

**Note 1:** RoHS compliant

**Note 2:** LCM weight tolerance: ± 5%.

## REVISION RECORD

| REVNO. | REVDATE    | CONTENTS        | REMARKS |
|--------|------------|-----------------|---------|
| 1.0    | 2014-10-15 | Initial Release |         |
|        |            |                 |         |
|        |            |                 |         |
|        |            |                 |         |
|        |            |                 |         |

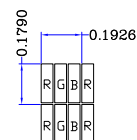
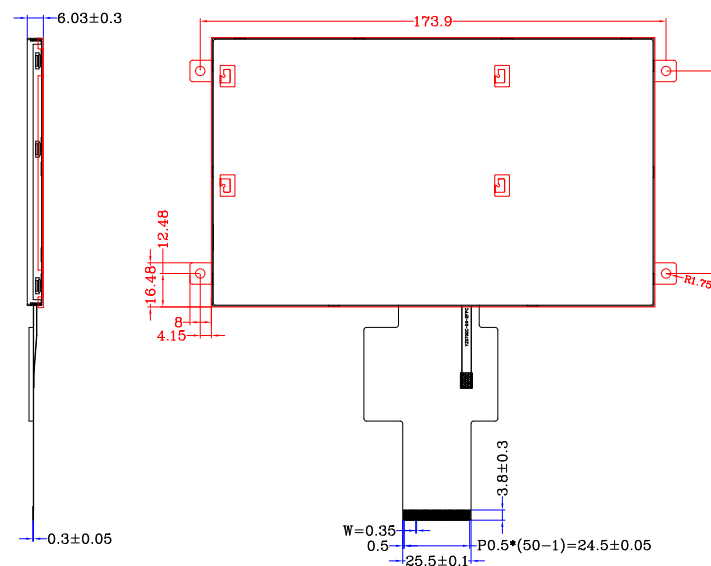
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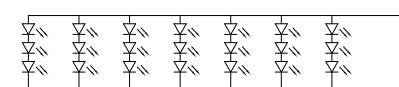
## 1. MODULE CLASSIFICATION INFORMATION

| <b>RV</b> | <b>T</b> | <b>7.0</b> | <b>A</b> | <b>800480</b> | <b>T</b> | <b>F</b> | <b>W</b> | <b>N</b> | <b>00</b> |
|-----------|----------|------------|----------|---------------|----------|----------|----------|----------|-----------|
| 1.        | 2.       | 3.         | 4.       | 5.            | 6.       | 7.       | 8.       | 9.       | 10.       |

|     |                         |                                                                                                    |
|-----|-------------------------|----------------------------------------------------------------------------------------------------|
| 1.  | <b>BRAND</b>            | <b>RV – Riverdi</b>                                                                                |
| 2.  | <b>PRODUCT TYPE</b>     | <b>T – TFT Standard</b><br><b>F – TFT Custom</b>                                                   |
| 3.  | <b>DISPLAY SIZE</b>     | <b>3.5 – 3.5"</b><br><b>4.3 – 4.3"</b><br><b>5.7 – 5.7"</b><br><b>7.0 – 7.0"</b>                   |
| 4.  | <b>MODEL SERIAL NO.</b> | <b>A-Z</b>                                                                                         |
| 5.  | <b>RESOLUTION</b>       | <b>320240 – 320x240 px</b><br><b>480272 – 480x272 px</b><br><b>800480 – 800x480 px</b>             |
| 6.  | <b>INTERFACE</b>        | <b>T – TFT LCD, RGB</b><br><b>L – TFT LCD, LVDS</b><br><b>C – TFT + Controller</b>                 |
| 7.  | <b>FRAME</b>            | <b>N – No Frame</b><br><b>F – Mounting Frame</b>                                                   |
| 8.  | <b>BACKLIGHT TYPE</b>   | <b>W – LED White</b>                                                                               |
| 9.  | <b>TOUCH PANEL</b>      | <b>N – No Touch Panel</b><br><b>R – Resistive Touch Panel</b><br><b>C – Capacitive Touch Panel</b> |
| 10. | <b>VERSION</b>          | <b>00-99</b>                                                                                       |



| PIN DESCRIPTION |        |        |        |
|-----------------|--------|--------|--------|
| PIN NO          | SYMBOL | PIN NO | SYMBOL |
| 1               | VLED+  | 26     | G1     |
| 2               | VLED+  | 27     | G0     |
| 3               | VLED-  | 28     | R7     |
| 4               | VLED-  | 29     | R6     |
| 5               | GND    | 30     | R5     |
| 6               | VCC    | 31     | R4     |
| 7               | VCC    | 32     | R3     |
| 8               | MODE   | 33     | R2     |
| 9               | DE     | 34     | R1     |
| 10              | VSYNC  | 35     | R0     |
| 11              | HSYNC  | 36     | GND    |
| 12              | B7     | 37     | DCLK   |
| 13              | B6     | 38     | GND    |
| 14              | B5     | 39     | LR     |
| 15              | B4     | 40     | UD     |
| 16              | B3     | 41     | VCC    |
| 17              | B2     | 42     | VCC    |
| 18              | B1     | 43     | NC     |
| 19              | B0     | 44     | RESET  |
| 20              | G7     | 45     | NC     |
| 21              | G6     | 46     | NC     |
| 22              | G5     | 47     | D1THB  |
| 23              | G4     | 48     | GND    |
| 24              | G3     | 49     | NC     |
| 25              | G2     | 50     | NC     |



|                                                                                       |                                                                                       |                      |  |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------|--|
| CUSTOMER APVL                                                                         |                                                                                       | DATE                 |  |
| DRAWN                                                                                 | SCALE                                                                                 | TITLE                |  |
| DFTG CHK                                                                              | UNIT                                                                                  | RVT7.0A800480TF WN00 |  |
| ENGR CHK                                                                              | mm                                                                                    | MODEL                |  |
| APPROVAL                                                                              |  | DWG NO               |  |
|  |                                                                                       | PAGE                 |  |
|                                                                                       |                                                                                       | 1/1                  |  |

1. DISPLAY TYPE: TFT,TRANSMISSIVE,POSITIVE
2. OPERATING VOLTAGE: VCC=3.3V
3. VIEWING DIRECTION: 12 O'CLOCK.
4. IC DRIVER: HX8264+HX8664
5. OPERATING TEMP: -20°C ~ 70°C.
6. STORAGE TEMP: -30°C ~ 80°C.
7. LED BACKLIGHT: 21-CHIP WHITE LED, If=180mA,Vf=9.6V.
8. LCM SURFACE LUMINANCE: 400cd/m<sup>2</sup>.
9. GENERAL TOLERANCE: ±0.2.
10. RoHS COMPLIANT.

## 2. ABSOLUTE MAXIMUM RATINGS

| PARAMETER                      | SYMBOL          | MIN  | MAX | UNIT |
|--------------------------------|-----------------|------|-----|------|
| Supply Voltage For Logic       | VCC             | -0.3 | 5.0 | V    |
| LED reverse voltage (each LED) | VR              | -    | 1.2 | V    |
| LED forward voltage (each LED) | IF              | -    | 30  | mA   |
| Operating Temperature          | T <sub>OP</sub> | -20  | 70  | °C   |
| Storage Temperature            | T <sub>ST</sub> | -30  | 80  | °C   |

## 3. ELECTRICAL CHARACTERISTICS

| PARAMETER                 | SYMBOL          | MIN    | TYP  | MAX    | UNIT |
|---------------------------|-----------------|--------|------|--------|------|
| Power voltage             | VCC             | 3.0    | 3.3  | 3.6    | V    |
| Input Current             | IVCC            | -      | 71.4 | -      | mA   |
| Input Voltage ' H ' level | V <sub>IH</sub> | 0.7VCC | -    | VCC    | V    |
| Input Voltage ' L ' level | V <sub>IL</sub> | 0      | -    | 0.3VCC | V    |

## 4. BACKLIGHT CHARACTERISTICS

| ITEM                      | SYMBOL         | MIN   | TYP | MAX  | UNIT |
|---------------------------|----------------|-------|-----|------|------|
| Voltage for LED backlight | V <sub>I</sub> | 9.0   | 9.6 | 10.2 | V    |
| Current for LED backlight | I <sub>I</sub> | 170   | 180 | 200  | mA   |
| LED Life Time             | -              | 20000 | -   | -    | Hrs  |

**Note:** The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C

## 5. ELECTRO-OPTICAL CHARACTERISTICS

| ITEM                       |       | SYMBOL   | CONDITION          | MIN | TYP   | MAX | UNIT              | REMAR  | NO |
|----------------------------|-------|----------|--------------------|-----|-------|-----|-------------------|--------|----|
| Response Time              |       | Tr+Tf    | $\theta=0^\circ$   | -   | 20    | 35  | ms                | FIG 1. | 4  |
| Contrast Ratio             |       | Cr       | $\phi=0^\circ$     | 400 | 500   | -   | ---               | FIG 2. | 1  |
| Luminance Uniformity       |       | $\delta$ |                    | 70  | 75    | -   | %                 | FIG 2. | 3  |
| Surface Luminance          |       | Lv       |                    | -   | 400   | -   | cd/m <sup>2</sup> | FIG 2. | 2  |
| Viewing Angle Range        |       | $\theta$ | $\phi = 90^\circ$  | 40  | 50    | -   | deg               | FIG 3. | 6  |
|                            |       |          | $\phi = 270^\circ$ | 60  | 70    | -   | deg               | FIG 3. |    |
|                            |       |          | $\phi = 0^\circ$   | 60  | 70    | -   | deg               | FIG 3. |    |
|                            |       |          | $\phi = 180^\circ$ | 60  | 70    | -   | deg               | FIG 3. |    |
| CIE (x, y)<br>Chromaticity | Red   | x        | $\theta=0^\circ$   | -   | -     | -   | FIG 2.            |        | 5  |
|                            |       | y        |                    | -   | -     | -   |                   |        |    |
|                            | Green | x        |                    | -   | -     | -   |                   |        |    |
|                            |       | y        |                    | -   | -     | -   |                   |        |    |
|                            | Blue  | x        | $\phi=0^\circ$     | -   | -     | -   |                   |        |    |
|                            |       | y        | Ta=25              | -   | -     | -   |                   |        |    |
|                            | White | x        |                    | -   | 0.280 | -   |                   |        |    |
|                            |       | y        |                    | -   | 0.310 | -   |                   |        |    |

**Note 1.** Contrast Ratio(CR) is defined mathematically as below, for more information see FIG 2.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

**Note 2.** Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

Lv = Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)

**Note 3.** The uniformity in surface luminance  $\delta$  WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see FIG 2.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

**Note 4.** Response time is the time required for the display to transition from white to black (Rise Time, Tr) and from black to white (Decay Time, Tf). For additional information see FIG 1. The test equipment is Autronic-Melchers's ConoScope series.

**Note 5.** CIE (x, y) chromaticity, the x, y value is determined by measuring luminance at each test position 1 through 5, and then make average value.

**Note 6.** Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

**Note 7.** For viewing angle and response time testing, the testing data is based on Autronic-Melchers's ConoScope series. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, CIE the test data is based on TOPCON's BM-5 photo detector.

FIG. 1 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

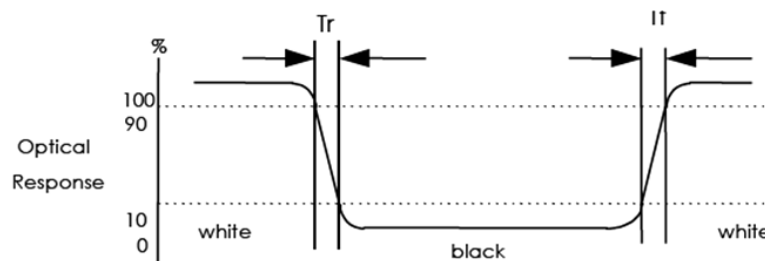


FIG. 2 Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

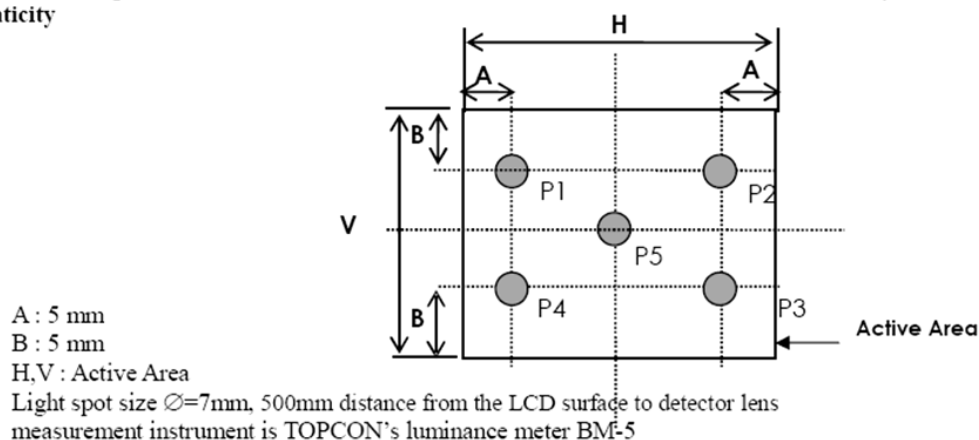
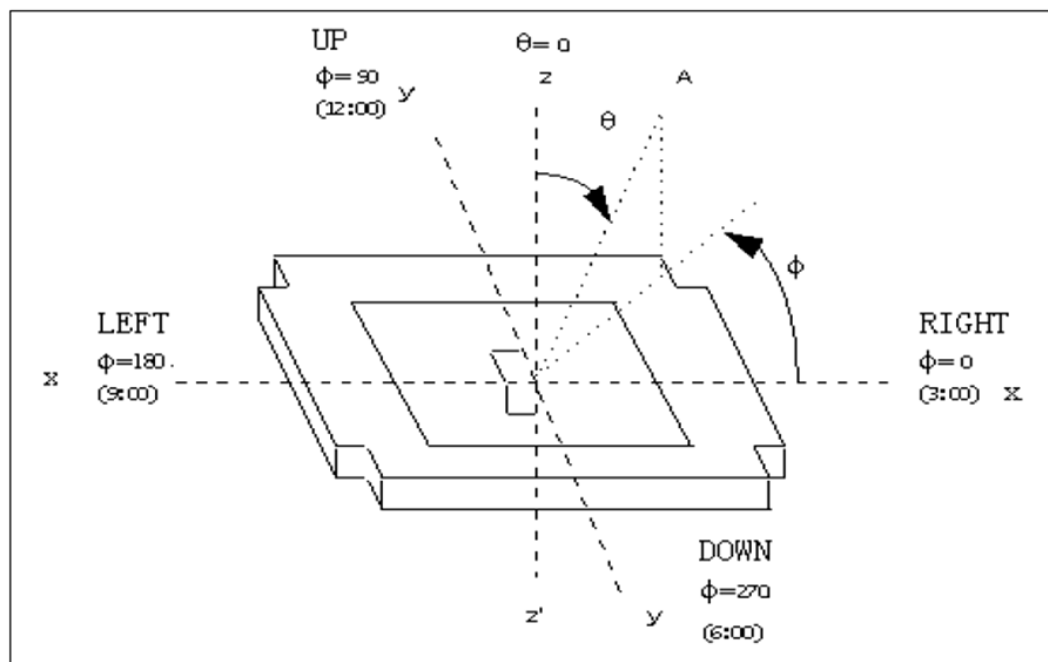


FIG. 3 The definition of viewing angle



## 6. INTERFACE DESCRIPTION

| PIN NO. | SYMBOL | DESCRIPTION              | REMARK |
|---------|--------|--------------------------|--------|
| 1       | VLED+  | Anode Of LED Backlight   |        |
| 2       | VLED+  | Anode Of LED Backlight   |        |
| 3       | VLED-  | Cathode Of LED Backlight |        |
| 4       | VLED-  | Cathode Of LED Backlight |        |
| 5       | GND    | Power Ground             |        |
| 6       | VCC    | Power For Circuit        |        |
| 7       | VCC    | Power For Circuit        |        |
| 8       | MODE   | DE/SYNC Mode Select      | Note 1 |
| 9       | DE     | Data Input Enable        |        |
| 10      | VSYNC  | Vertical Sync Signal     |        |
| 11      | HSYNC  | Horizontal Sync Signal   |        |
| 12      | B7     | Blue Data (MSB)          |        |
| 13      | B6     | Blue Data                |        |
| 14      | B5     | Blue Data                |        |
| 15      | B4     | Blue Data                |        |
| 16      | B3     | Blue Data                |        |
| 17      | B2     | Blue Data                |        |
| 18      | B1     | Blue Data                | Note 2 |
| 19      | B0     | Blue Data (LSB)          | Note 2 |
| 20      | G7     | Green Data (MSB)         |        |
| 21      | G6     | Green Data               |        |
| 22      | G5     | Green Data               |        |
| 23      | G4     | Green Data               |        |
| 24      | G3     | Green Data               |        |
| 25      | G2     | Green Data               |        |
| 26      | G1     | Green Data               | Note 2 |
| 27      | G0     | Green Data (LSB)         | Note 2 |
| 28      | R7     | Red Data (MSB)           |        |
| 29      | R6     | Red Data                 |        |
| 30      | R5     | Red Data                 |        |
| 31      | R4     | Red Data                 |        |

|    |       |                        |            |
|----|-------|------------------------|------------|
| 32 | R3    | Red Data               |            |
| 33 | R2    | Red Data               |            |
| 34 | R1    | Red Data               | Note 2     |
| 35 | R0    | Red Data (LSB)         | Note 2     |
| 36 | GND   | Power Ground           |            |
| 37 | DCLK  | Clock For Input Data   | Note 3     |
| 38 | GND   | Power Ground           |            |
| 39 | LR    | Left / Right Selection | Note 4,5,8 |
| 40 | UD    | Up / Down Selection    | Note 4,5,9 |
| 41 | VCC   | Power For Circuit      |            |
| 42 | VCC   | Power For Circuit      |            |
| 43 | NC    | No Connection          |            |
| 44 | RESET | Global Reset Pin       | Note 6     |
| 45 | NC    | No Connection          |            |
| 46 | NC    | No Connection          |            |
| 47 | DITHB | Dithering Function     | Note 7     |
| 48 | GND   | Power Ground           |            |
| 49 | NC    | No Connection          |            |
| 50 | NC    | No Connection          |            |

**Note 1:** DE/SYNC mode select. Normally (Internally) pulled high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE="0", DE must be grounded.

**Note 2:** When input 18bit RGB data, the two low bits of R, G and B data must be grounded.

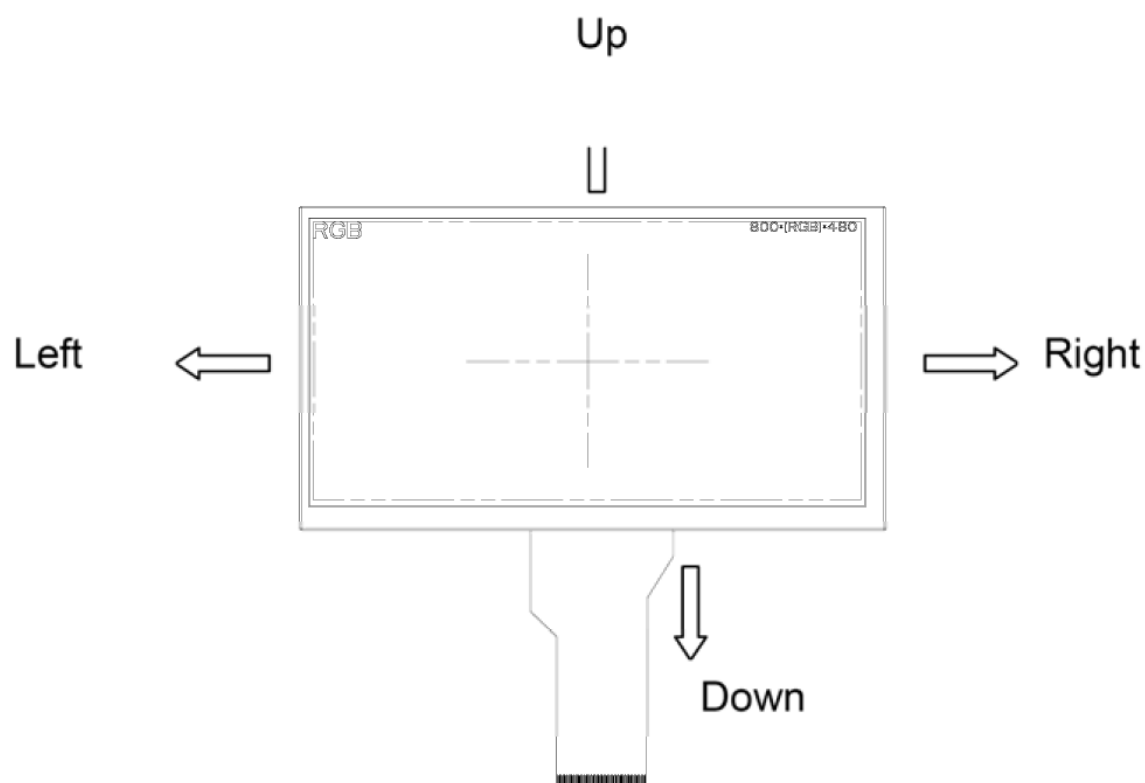
**Note 3:** Data shall be latched at the falling edge of DCLK.

**Note 4:** Selection of scanning mode.

| SET OF SCAN CONTROL INPUT |     | SCANNING DIRECTION        |
|---------------------------|-----|---------------------------|
| UD                        | LR  |                           |
| GND                       | VCC | Up To Down, Left To Right |
| VCC                       | GND | Down To Up, Right To Left |
| GND                       | GND | Up To Down, Right To Left |
| VCC                       | VCC | Down To Up, Left To Right |

**Note 5:** Definition of scanning direction.

Refer to the figure as below:



**Note 6:** Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally (internally) pulled high.

**Note 7:** Dithering function enable control, normally (internally) pull high.

When DITHB="1", Disable internal dithering function,

When DITHB="0", Enable internal dithering function,

**Note 8:** Normally (internally) pull high.

**Note 9:** Normally (internally) pull low.

## 7. LCD TIMING CHARACTERISTICS

### 7.1. Clock and data input time diagram



Figure 1. Horizon input timing diagram

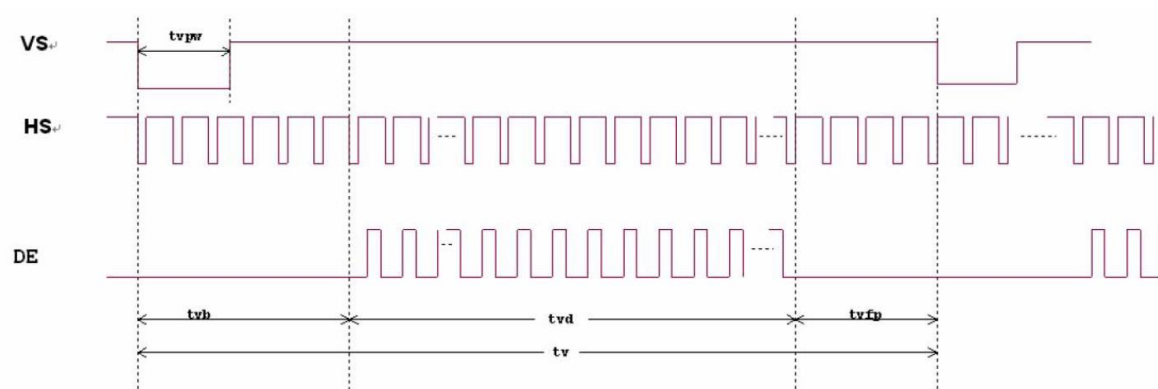


Figure 2. Vertical input timing diagram

## 7.1. Parallel RGB input timing table

| PARAMETER        | SYMBOL | MIN  | TYP  | MAX  | UNIT |
|------------------|--------|------|------|------|------|
| DCLK Frequency   | Fclk   | 26.4 | 33.3 | 46.8 | MHz  |
| VSD Period Time  | Tv     | 510  | 525  | 650  | TH   |
| VSD Display Area | Tvd    | 480  |      |      | TH   |
| VSD Blanking     | Tvb    | 23   |      |      | TH   |
| VSD Front Porch  | Tvfp   | 7    | 22   | 147  | TH   |
| VSD Pulse Width  | Tvpw   | 1    | -    | 20   | TH   |
| HSD Pulse Width  | Thpw   | 1    | -    | 40   | DCLK |
| HSD Period Time  | Th     | 862  | 1056 | 1200 | DCLK |
| HSD Display Area | Thd    | 800  |      |      | DCLK |
| HSD Blanking     | Thb    | 46   |      |      | DCLK |
| HSD Front Porch  | Thfp   | 16   | 210  | 354  | DCLK |

## 8. RELIABILITY TEST

| NO. | TEST ITEM                  | TEST CONDITION                                                                                                                |
|-----|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1   | High Temperature Storage   | 80±2°C/240hours                                                                                                               |
| 2   | Low Temperature Storage    | -30±2°C/240hours                                                                                                              |
| 3   | High Temperature Operating | 70±2°C/240hours                                                                                                               |
| 4   | Low Temperature Operating  | -20±2°C/240hours                                                                                                              |
| 5   | Temperature Cycle          | -30±2°C~25~80±2°C × 20 cycles<br>(30min.) (5min.) (30min.)                                                                    |
| 6   | Damp Proof Test            | 60°C ±5°C × 90%RH/240hours                                                                                                    |
| 7   | Vibration Test             | Frequency 10Hz~55Hz<br>Amplitude of vibration : 1.5mm<br>Sweep: 10Hz~55Hz~10Hz<br>X, Y, Z 2 hours for each direction.         |
| 8   | Package Vibration Test     | Random vibration :0.15G*G/HZ from<br>5-200HZ,-6dB/Octave from 200-500HZ<br>of each direction of X.Y. Z<br>(6 hours for total) |
| 9   | Package Drop Test          | Height:60 cm<br>1 corner,3 edges,6 surfaces                                                                                   |
| 10  | ESD Test                   | ± 2KV, Human body mode,100pF/1500Ω                                                                                            |
| 11  | Mechanical Shock           | 100G 6ms, X, Y, Z 3 times for each<br>direction                                                                               |

