

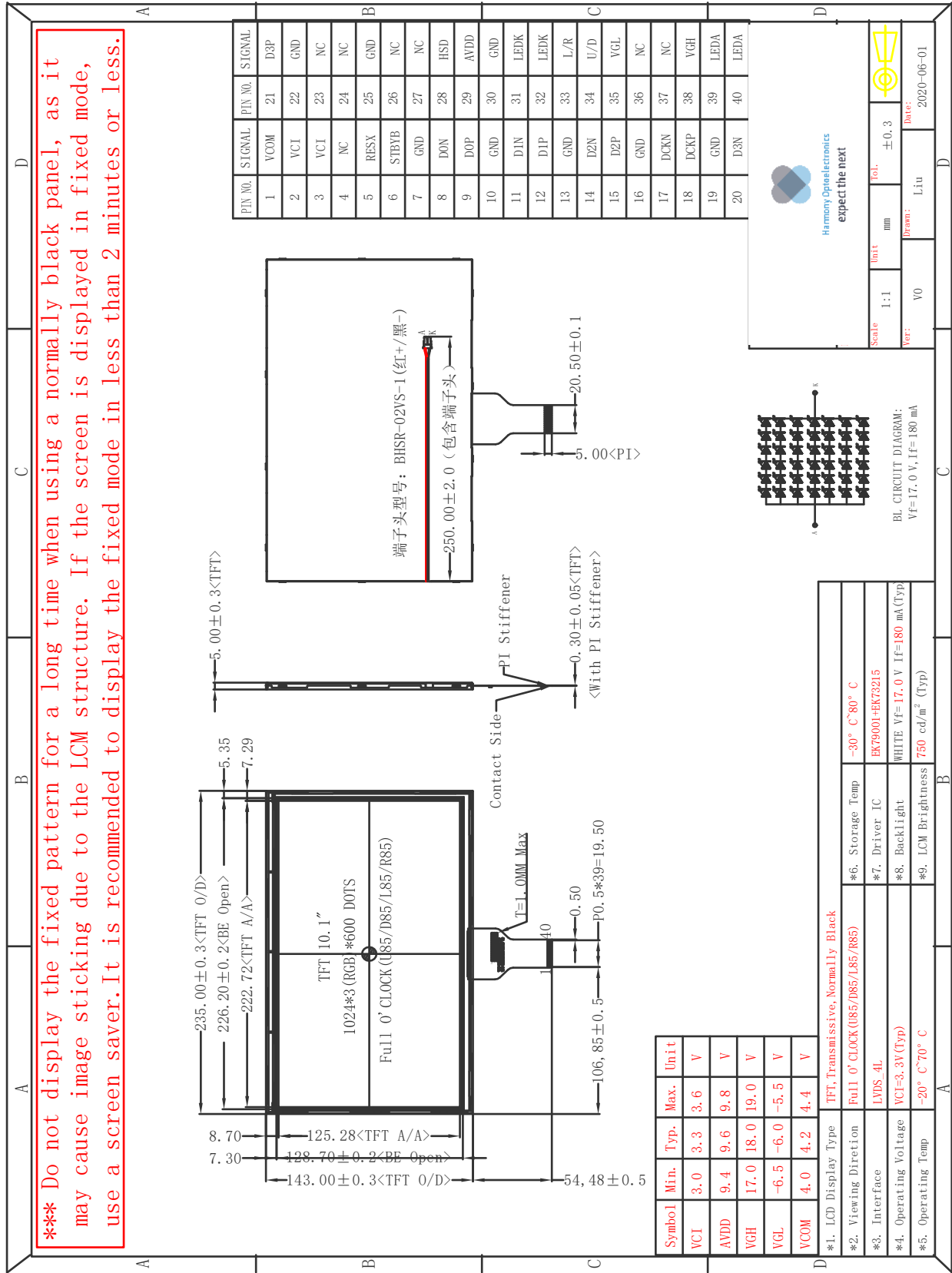
LCM Specification

| | |
|----------------------|--|
| Product type 产品内容 | TFT LCD Module 1024 x 3RGB x 600 Dots 10.1”TFT LCD |
|----------------------|--|

1. General Feature:

| Item | Standard Value | Unit |
|----------------------------|-------------------------------|------|
| Display Size | 10.1" | -- |
| Number of Pixels | 1024(H)x3(RGB)*600(V) | -- |
| Active Area | 222.72(H) *125.28(V) | mm |
| Outline Dimension | 235.00(H) ×143.00(V)× 5.00(T) | mm |
| Viewing Direction | FULL O'Clock | - |
| Interface | LVDS | - |
| Panel Driver IC | EK79001+EK73215 | - |
| Panel Driver Condition | VCI=3.3V | V |
| Backlight | White LED | - |
| Touch Panel | Whitout Touch Panel | - |
| Cap Touch Driver IC | --- | - |
| Cap Touch Driver Condition | --- | V |
| Operation Temperature | -20~70 | °C |
| Storage Temperature | -30~80 | °C |

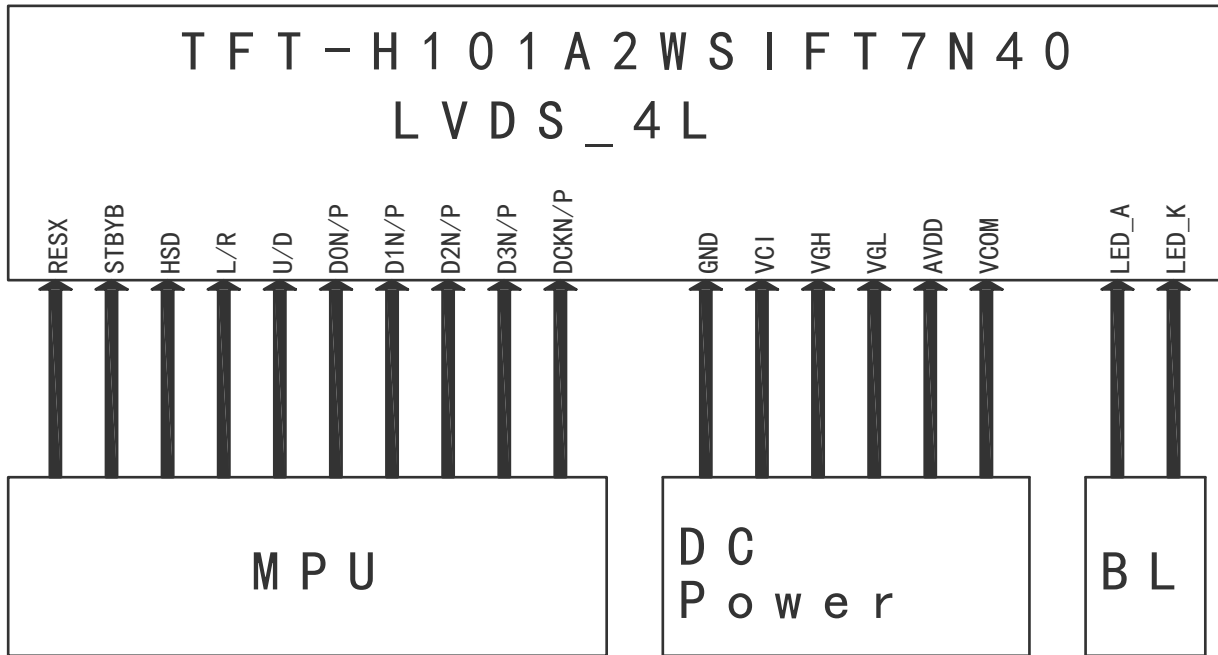
2.Outline Dimensions



3. Pin Description

| Pin NO. | Symbol | Description |
|---------|--------|--|
| 1 | VCOM | VCOM buffer input voltage |
| 2,3 | VCI | Power supply for digital circuits |
| 4 | NC | No Connect |
| 5 | RESX | Global reset pin |
| 6 | STBYB | Standby mode mode control. STBYB = “1”,normal operation;STBYB = “0” ,Standby mode |
| 7 | GND | Ground |
| 8 | D0N | -LVDS differential data input |
| 9 | D0P | +LVDS differential data input |
| 10 | GND | Ground |
| 11 | D1N | -LVDS differential data input |
| 12 | D1P | +LVDS differential data input |
| 13 | GND | Ground |
| 14 | D2N | -LVDS differential data input |
| 15 | D2P | +LVDS differential data input |
| 16 | GND | Ground |
| 17 | DCKN | -LVDS differential clock input |
| 18 | DCKP | +LVDS differential clock input |
| 19 | GND | Ground |
| 20 | D3N | -LVDS differential data input |
| 21 | D3P | +LVDS differential data input |
| 22 | GND | Ground |
| 23,24 | NC | No Connect |
| 25 | GND | Ground |
| 26,27 | NC | No Connect |
| 28 | HSD | 6bit/8bit mode select , L=8 BIT , H=6BIT |
| 29 | AVDD | Power supply for analog circuits |
| 30 | GND | Ground |
| 31,32 | LED_K | LED Cathode/No Connect |
| 33 | L/R | Horizontal inversion |
| 34 | U/D | Vertical inversion |
| 35 | VGL | Gate OFF Voltage |
| 36,37 | NC | No Connect |
| 38 | VGH | Gate ON Voltage |
| 39,40 | LED_A | LED Anode/No Connect |
| -END- | | |

3.2 Wiring Diagram



| Symbol | Min. | Typ. | Max. | Unit |
|--------|------|------|------|------|
| VCI | 3.0 | 3.3 | 3.6 | V |
| AVDD | 9.4 | 9.6 | 9.8 | V |
| VGH | 17.0 | 18.0 | 19.0 | V |
| VGL | -6.5 | -6.0 | -5.5 | V |
| VCOM | 4.0 | 4.2 | 4.4 | V |

| | |
|-------|-------------------------------|
| STBYB | STBYB = "1", Normal operation |
| | STBYB = "0", Standby mode |
| HSD | HSD = "1", 6 bit |
| | HSD = "0", 8 bit |
| U/D | U/D = "1", Down or Up scan |
| | U/D = "0", Up or Down scan |
| L/R | L/R = "1", shift right |
| | L/R = "0", shift left |

4. OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance 1 lux and temperature = 25 ± 2°C) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

4.2 Optical Specifications

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|----------------------------------|------------|------------|--------------------------------|-------|-------|-------|------|--------|
| Viewing Angle Range | Horizontal | Θ L | CR>10 | - | 85 | - | Deg. | Note 1 |
| | | Θ R | | - | 85 | - | Deg. | |
| | Vertical | Θ U | | - | 85 | - | Deg. | |
| | | Θ D | | - | 85 | - | Deg. | |
| Contrast ratio | | CR | $\Theta = 0^\circ$ | - | 800 | - | | Note2 |
| Color Gamutt (C light) | | CG | | - | 50 | - | % | |
| White Chromaticity | | Wx | $\Theta = 0^\circ$ | -0.03 | 0.307 | +0.03 | | |
| | | Wy | | | 0.338 | | | |
| Reproduction of color | Red | Rx | | | 0.605 | | | |
| | | Ry | | | 0.336 | | | |
| | Green | Gx | | | 0.297 | | | |
| | | Gy | | | 0.552 | | | |
| | Blue | Bx | | | 0.139 | | | |
| | | By | | | 0.132 | | | |
| Response Time (Rising + Falling) | | Tr+ Tf | $\Theta = 0^\circ$ Ta= 25°C | - | 30 | 40 | ms | Note5 |
| Transmittance | | Tr | | - | 5.8 | | % | Note3 |

Note :

- Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o' clock direction and the vertical or 6, 12 o' clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 5).
- Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black)

state . (see FIGURE 5) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer.

4. The color chromaticity coordinates specified in the above table shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. The electro-optical response time measurements shall be made as FIGURE 6 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_d .

Figure 4. The Definition of V_{th} & V_{sat}

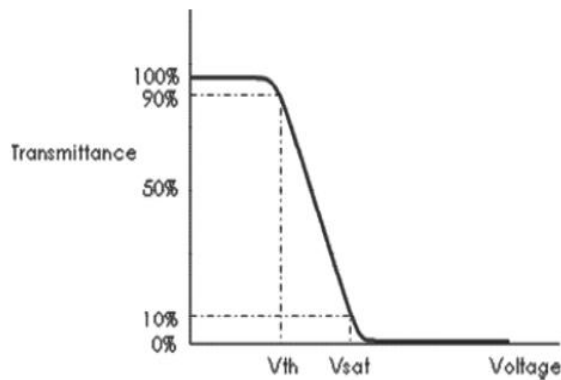


Figure 5. Measurement Set Up

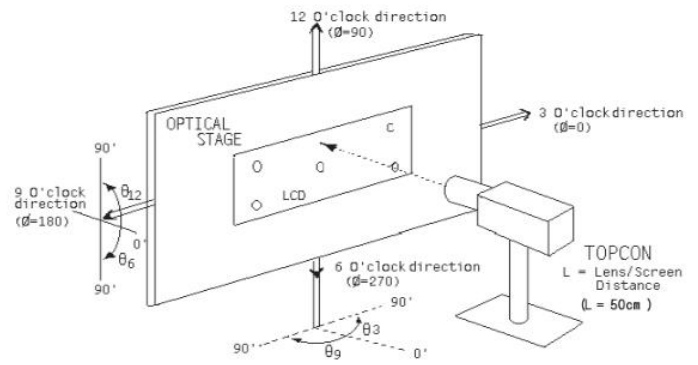
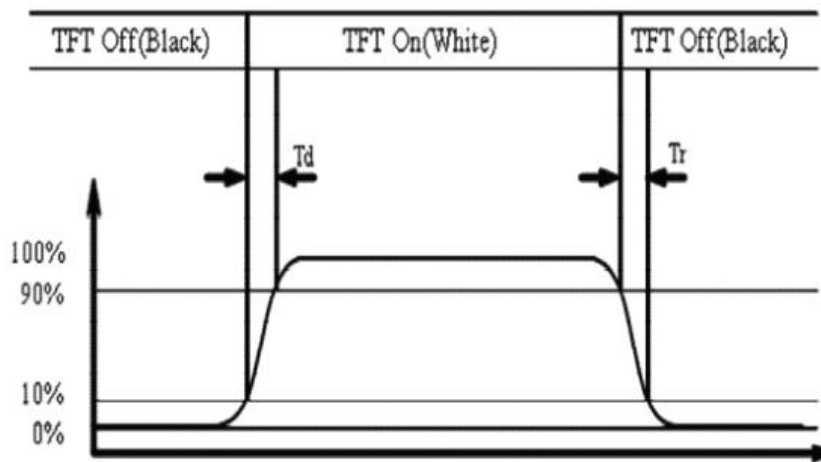


Figure 6. Response Time Testing



5. Electrical Characteristics

5-1 TFT LCD Module Operating Conditions

| Item | Symbol | Condition | Min | Type | Max | Unit |
|------------------------------|--------|-----------|------|------|------|------|
| Analog Power supply | VCI | - | 3.0 | 3.3 | 3.6 | V |
| TFT Gate on voltage | VGH | - | 17.0 | 18.0 | 19.0 | V |
| TFT Gate off voltage | VGL | - | -6.5 | -6 | -5.5 | V |
| TFT Common Electrode Voltage | VCOMH | - | - | 4.4 | - | V |
| | VCOML | - | - | 4.0 | - | |

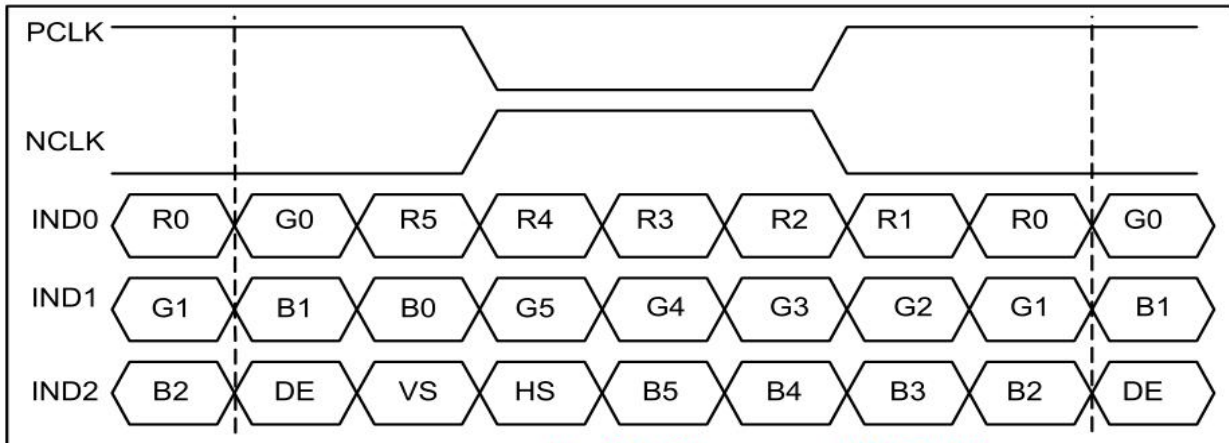
5-2 LED back light specification

| Item | Symbol | Condition | Min | Type | Max | Unit |
|---------------------|--------|-----------|-----|------|-----|-------|
| Forward voltage | Vt | If=30mA | - | 17.0 | - | V |
| Forward current | Ipn | /1-chip | - | 180 | - | mA |
| Luminance(With LCD) | Lv | If=280mA | - | 750 | - | cd/m2 |
| Luminous color | White | | | | | |

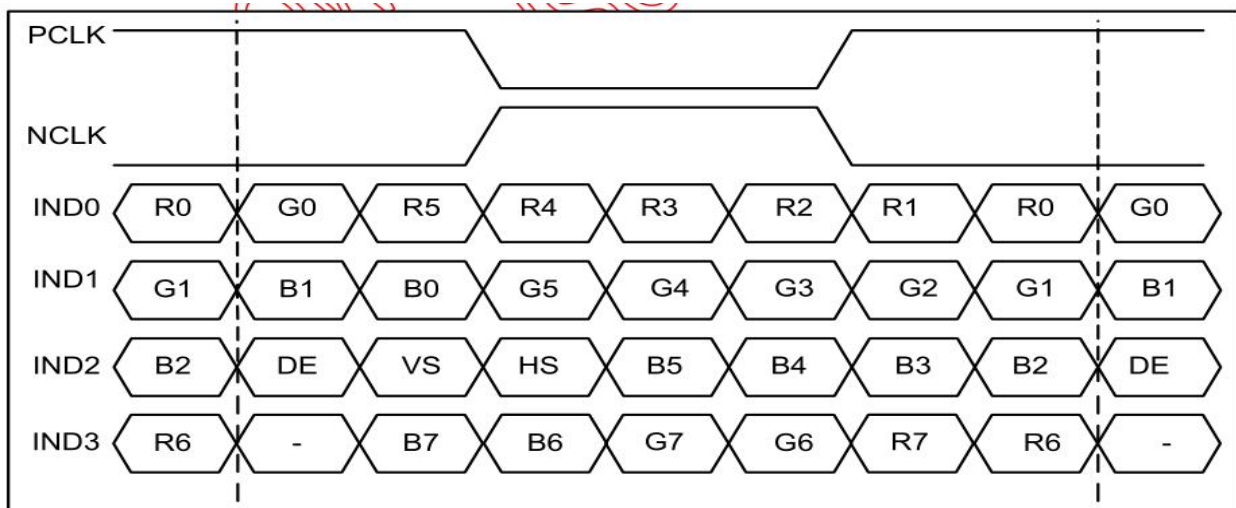
6. Timing Characteristics of Input Signals

6-1 Data Input Format for LVDS

6-1-1 6-bit LVDS input(HSD=" H")



6-1-2 8-bit LVDS input(HSD=" L")



Output Timing Table

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|--------------------------------|--------|------|------|------|------|---------------|
| DCLK frequency | Fclk | - | 65 | 71 | MHz | VDD =2.3~3.6V |
| DCLK cycle time | Tclk | 14.1 | 15.4 | - | ns | |
| DCLK pulse duty | Tcwh | 40 | 50 | 60 | % | Tclk |
| Time from HSD to Source Output | Thso | - | 64 | - | DCLK | |
| Time from HSD to LD | Thld | - | 64 | - | DCLK | |
| Time from HSD to STV | Thstv | - | 2 | - | DCLK | |
| Time from HSD to CKV | Thckv | - | 20 | - | DCLK | |
| Time from HSD to OEV | Thoev | - | 4 | - | DCLK | |
| LD pulse width | Twld | - | 10 | - | DCLK | |
| CKV pulse width | Twckv | - | 66 | - | DCLK | |
| OEV pulse width | Twoev | - | 74 | - | DCLK | |

6-1-3 Timing Characteristic

DE mode

| DE mode | | | | | |
|---------------------------------|----------|-------|------|------|------|
| Parameter | Symbol | Value | | | Unit |
| | | Min. | Typ. | Max. | |
| DCLK frequency @Frame rate=60hz | fclk | 40.8 | 51.2 | 67.2 | Mhz |
| Horizontal display area | thd | 1024 | | | DCLK |
| HSYNC period time | th | 1114 | 1344 | 1400 | DCLK |
| HSYNC blanking | thb+thfp | 90 | 320 | 376 | DCLK |
| Vertical display area | tvd | 600 | | | H |
| VSYNC period time | tv | 610 | 635 | 800 | H |
| VSYNC blanking | tvb+tvfp | 10 | 35 | 200 | H |

HV mode(1)

| HV mode | | | | | |
|---------------------------------|--------|-------|------|------|------|
| Horizontal input timing | | | | | |
| Parameter | Symbol | Value | | | Unit |
| Horizontal display area | thd | 1024 | | | DCLK |
| | | Min. | Typ. | Max. | |
| DCLK frequency@ Frame rate=60hz | fclk | 44.9 | 51.2 | 63 | Mhz |
| 1 Horizontal Line | th | 1200 | 1344 | 1400 | DCLK |
| HSYNC pulse width | thpw | Min. | 1 | | |
| | | Typ. | - | | |
| | | Max. | 140 | | |
| HSYNC back porch | thbp | 160 | 160 | 160 | |
| HSYNC front porch | thfp | 16 | 160 | 216 | |

HV mode(2)

| Vertical input timing | | | | | |
|-----------------------|--------|-------|------|------|------|
| Parameter | Symbol | Value | | | Unit |
| | | Min. | Typ. | Max. | |
| Vertical display area | tvd | 600 | | | H |
| VSYNC period time | tv | 624 | 635 | 750 | H |
| VSYNC pulse width | tvpw | 1 | - | 20 | H |
| VSYNC back porch | tvb | 23 | 23 | 23 | H |
| VSYNC front porch | tvfp | 1 | 12 | 127 | H |