

TECENSTAR

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SPECIFICATION

COG-T800MIWN-01

- Preliminary Specification
- Final Specification



**TECENSTAR PHOTOELECTRIC
TECHNOLOGY CO., LTD.**

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Made By:

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Date:

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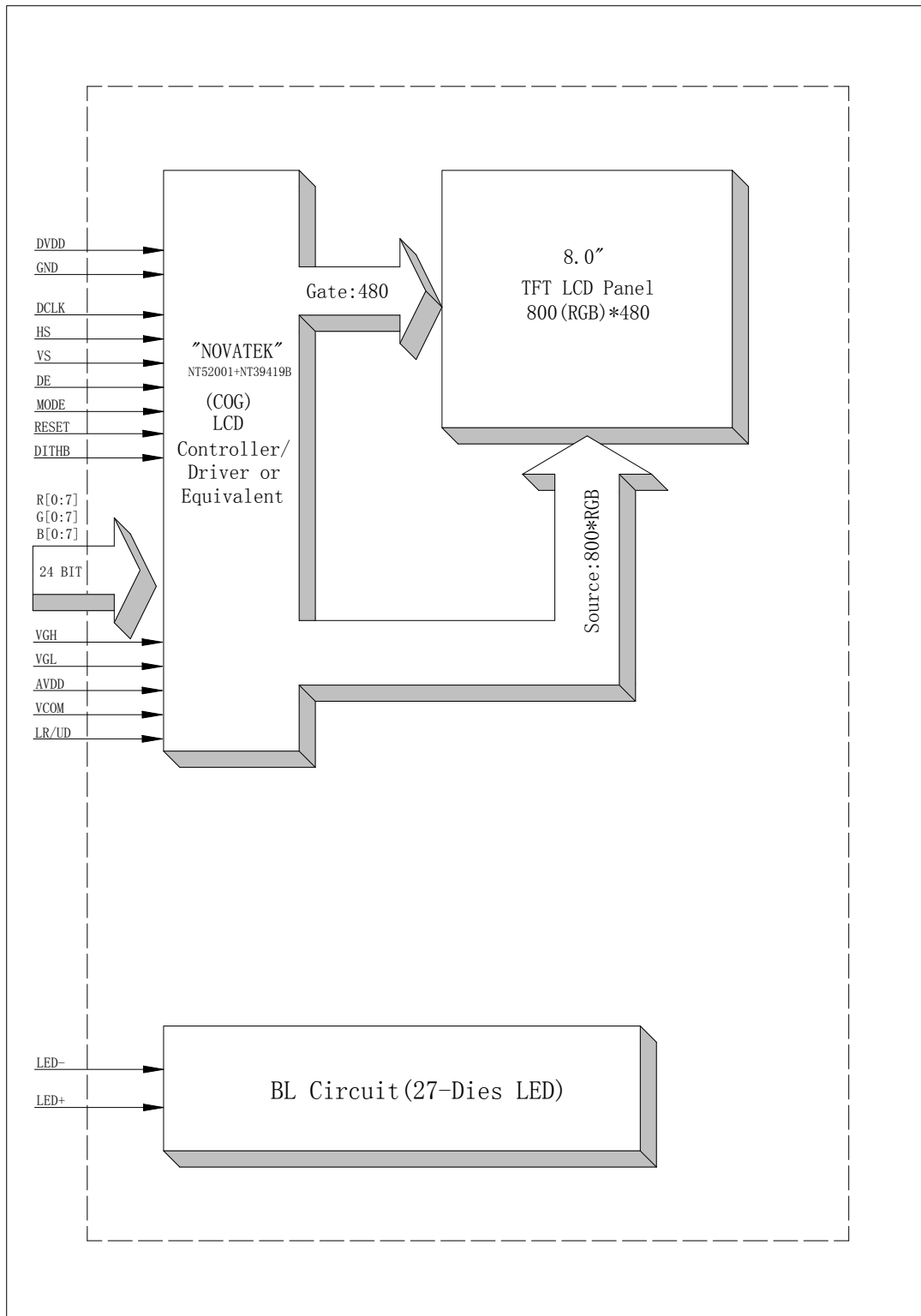
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1. General Specification

| Item | Contents | Unit |
|--------------------------------|--------------------|-------------|
| LCD TYPE | TFT/TRANSMISSIVE | |
| MODULE SIZE (W*H*T) | 192.80*116.90*6.40 | MM |
| ACTIVE SIZE (W*H) | 176.64*99.36 | MM |
| PIXEL PITCH (W*H) | 0.2208*0.2070 | MM |
| NUMBER OF DOTS | 800*480 | |
| DIVER IC | NT52001+NT39419B | |
| INTERFACE TYPE | 24-BIT RGB | |
| TOP POLARIZER TYPE | ANTI-GLARE | |
| RECOMMEND VIEWING DIRECTION | 12 | O'CLOCK |
| GRAY SCALE INVERSION DIRECTION | 6 | O'CLOCK |
| COLORS | 16.7M | |
| BACKLIGHT TYPE | 27-LED WHITE | |
| TOUCH PANEL TYPE | WITHOUT | |

3. Block Diagram



4. Interface Pin Function

| Pin No. | Symbol | Description |
|---------|--------|---------------------------|
| 1 | LED+ | Anode of LED backlight |
| 2 | LED+ | Anode of LED backlight |
| 3 | LED- | Cathode of LED backlight |
| 4 | LED- | Cathode of LED backlight |
| 5 | GND | Power ground |
| 6 | VCOM | Common voltage |
| 7 | DVDD | Power for digital circuit |
| 8 | MODE | DE/SYNC mode select |
| 9 | DE | Data input enable |
| 10 | VS | Vertical sync input |
| 11 | HS | Horizontal sync input |
| 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 |
| 19 | B0 | Blue data(LSB) |
| 20 | G7 | Blue data(LSB) |
| 21 | G6 | Green data |
| 22 | G5 | Green data |
| 23 | G4 | Green data |
| 24 | G3 | Green data |
| 25 | G2 | Green data |
| 26 | G1 | Green data |
| 27 | G0 | Green data(LSB) |
| 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 |
| 35 | R0 | Red data(LSB) |
| 36 | GND | Power Ground |
| 37 | DCLK | Sample clock |
| 38 | GND | Power Ground |
| 39 | L/R | Left / right selection |
| 40 | U/D | Up/down selection |

| | | |
|----|-------|--------------------------|
| 41 | VGH | Gate ON Voltage |
| 42 | VGL | Gate OFF Voltage |
| 43 | AVDD | Power for Analog Circuit |
| 44 | RESET | Global reset pin. |
| 45 | NC | No connection |
| 46 | VCOM | Common Voltage |
| 47 | DITHB | Dithering function |
| 48 | GND | Power Ground |
| 49 | NC | No connection |
| 50 | NC | No connection |

NOTE:

Note1: DE/SYNC mode select. Normally pull 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 18 bits RGB data, the two low bits of R, G and B data must be grounded.

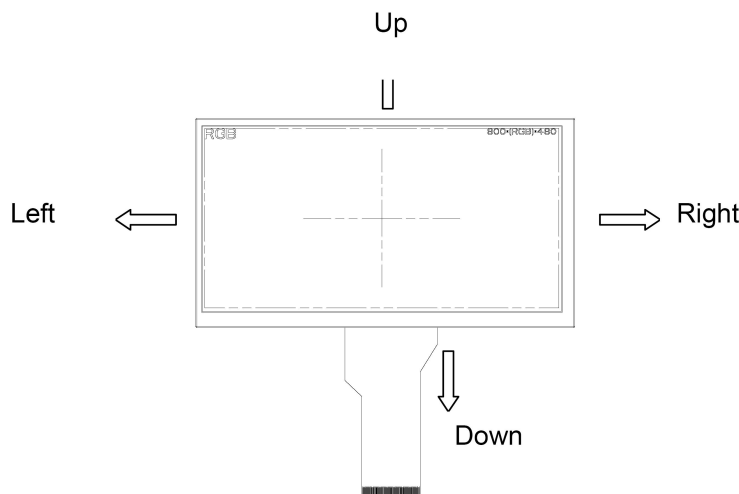
Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode.

| Set of scan control input | | Scanning direction |
|---------------------------|------|---------------------------|
| U/D | L/R | |
| GND | DVDD | Up to down, left to right |
| DVDD | GND | Down to up, right to left |
| GND | GND | Up to down, right to left |
| DVDD | DVDD | 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 connecting with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.

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

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

5. Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|---------------------------|------------------|------|------|------|
| Supply voltage for logic | DVDD | -0.3 | 5 | V |
| Supply voltage for analog | AVDD | -0.5 | 13.5 | V |
| Power supply | VGH | -0.3 | 40 | V |
| Power supply | VGL | -20 | 0.3 | V |
| Power supply | VGH-VGL | - | 40 | V |
| Supply current (One LED) | I _{LED} | | 30 | mA |
| Operating temperature | T _{OP} | -20 | +70 | °C |
| Storage temperature | T _{ST} | -30 | +85 | °C |

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

6. Electrical Characteristics

6.1 Input Power

| Item | Symbol | Min | Typ. | Max | Unit | Applicable terminal |
|---------------------------|------------------|----------|------|---------|------|---------------------|
| Supply Voltage for Analog | DVDD | 3.0 | 3.3 | 3.6 | V | |
| Supply Voltage for Logic | AVDD | 10.2 | 10.4 | 10.6 | V | |
| Power supply | VGH | 15.3 | 16.0 | 16.7 | | |
| Power supply | VGL | -7.7 | -7.0 | -6.3 | | |
| Power supply | VCOM | 4.2 | 4.4 | 4.6 | | |
| Input Voltage | V _{IL} | 0 | - | 0.3DVDD | V | |
| | V _{IH} | 0.7 DVDD | - | DVDD | | |
| Input leakage Current | I _{LKG} | - | | - | μA | |

6.2 Backlight Driving Conditions

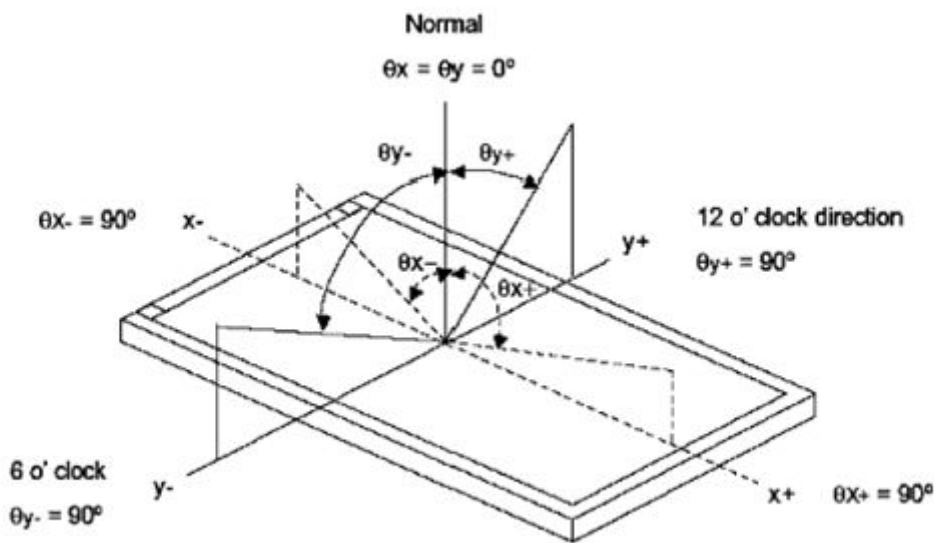
| Item | Symbol | Value | | | Unit | Remark |
|---------------------------|----------------|--------|-------|------|------|-----------------------|
| | | Min. | Typ. | Max. | | |
| Voltage for LED Backlight | V _F | - | 9.6 | 10.8 | V | I _L =180mA |
| Current for LED Backlight | I _L | | 180 | | mA | |
| Power Consumption | P | | 1.344 | | W | |
| LED Life Time | | 30,000 | | | Hr | Note |

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

7. Optical Characteristics

| ITEM | SYMBOL | CONDITIONS | SPECIFICATIONS | | | UNIT | NOTE |
|----------------------|------------------|----------------------|----------------------|------|-------|-----------------|------|
| | | | MIN | TYP. | MAX | | |
| Luminance | L | $I_L = 180\text{mA}$ | - | 450 | - | Cd/m^2 | |
| Contrast Ratio | CR | $\theta = 0^\circ$ | 400 | 500 | | | |
| Response Time | T_{ON} | 25°C | | 10 | 20 | ms | |
| | T_{OFF} | | | 15 | 30 | | |
| CIE Color Coordinate | Red | X_R | Viewing normal angle | | | | |
| | | Y_R | | | | | |
| | Green | X_G | | | | | |
| | | Y_G | | | | | |
| | Blue | X_B | | | | | |
| | | Y_B | | | | | |
| | White | X_W | | | 0.290 | | |
| | | Y_W | | | 0.310 | | |
| Viewing Angle | Hor. | θ_{X+} | $\text{CR} \geq 10$ | 60 | 70 | Degree | |
| | | θ_{X-} | | 60 | 70 | | |
| | Ver. | θ_{Y+} | | 40 | 50 | | |
| | | θ_{Y-} | | 60 | 70 | | |
| Uniformity | Un | | | 70 | 75 | % | |

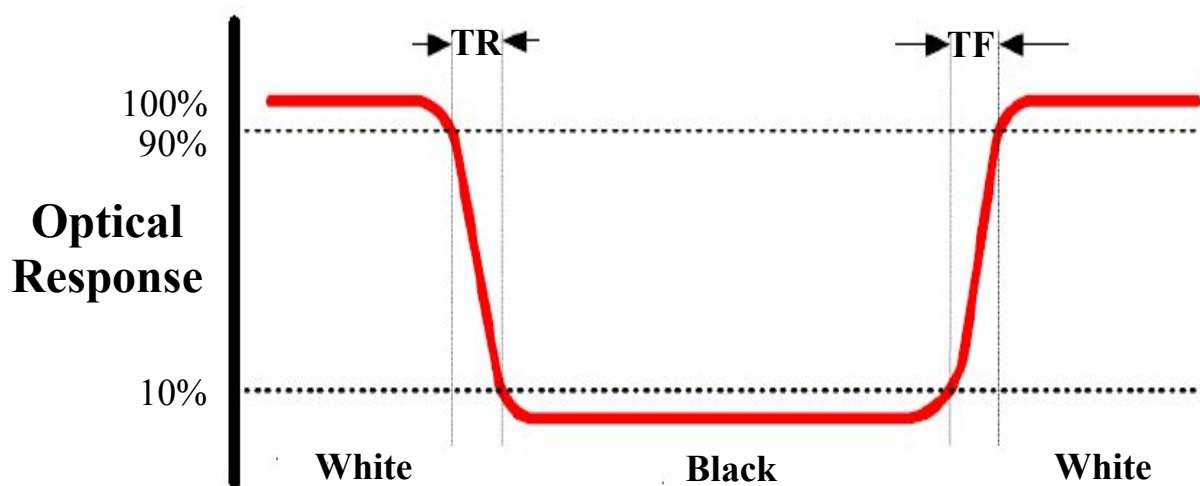
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

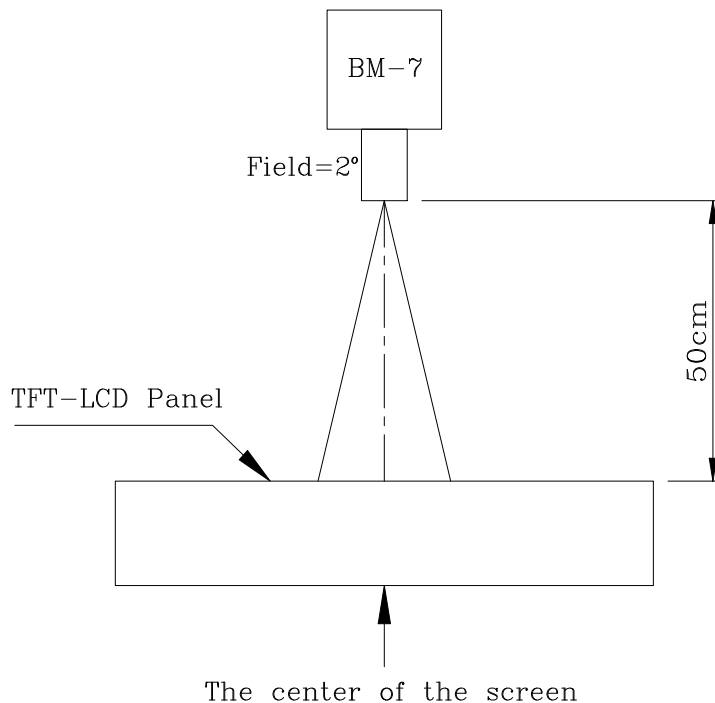
Note 3: Definition of Response Time(T_r, T_f)



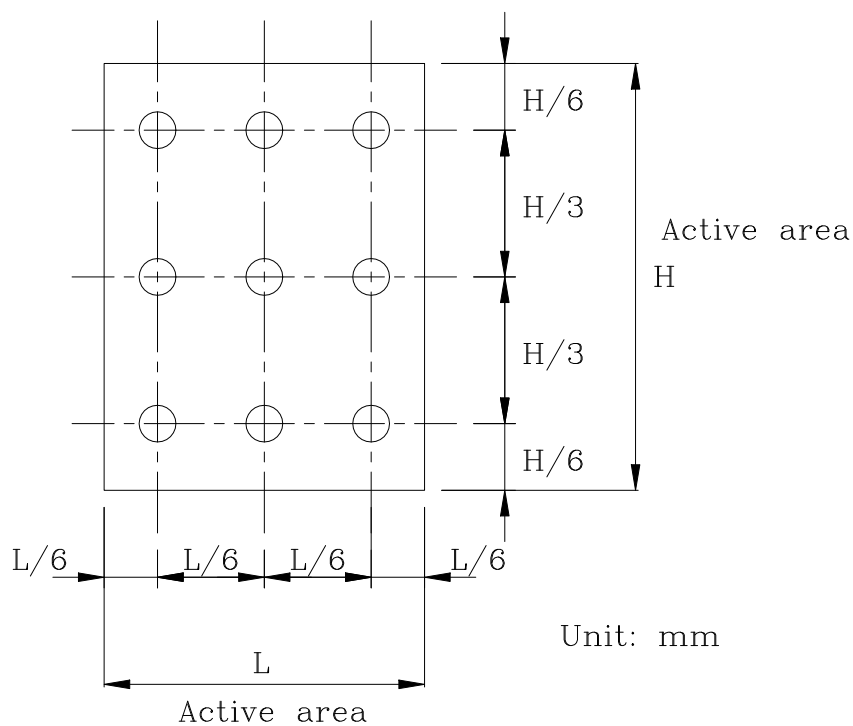
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2° (As measuring “black” image, field=2° is the best testing condition)



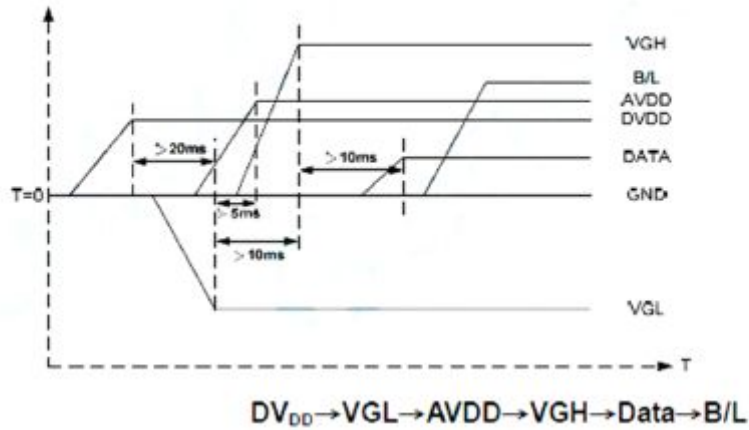
②The Brightness Test Point Setup



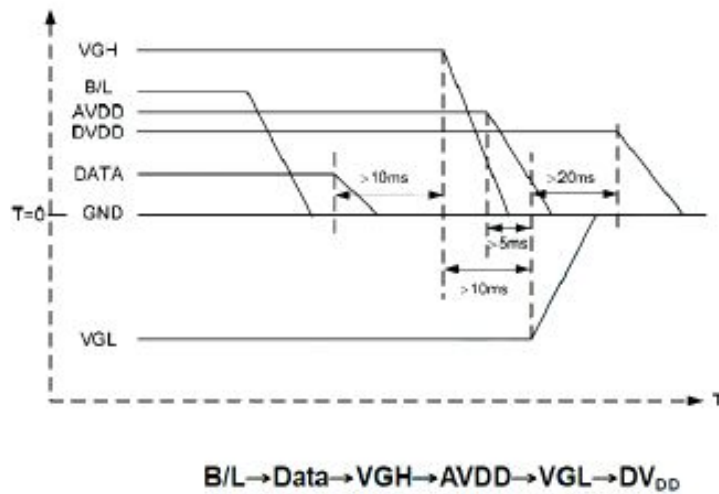
8. Timing Characteristics

8.1 Power Sequence

Power on



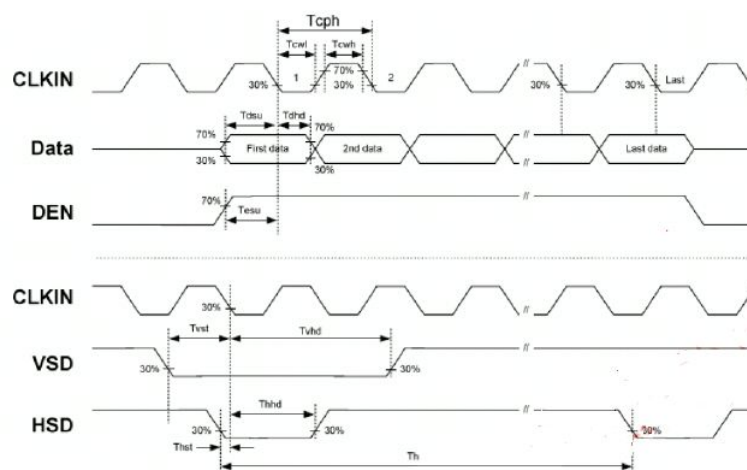
Power off



8.2 AC electrical characteristics

| Item | Symbol | Values | | | Unit | Remark |
|-------------------------|--------|--------|------|------|------|--------------------|
| | | Min. | Typ. | Max. | | |
| HS setup time | Thst | 8 | | | ns | |
| HS hold time | Thhd | 8 | | | ns | |
| VS setup time | Tvst | 8 | | | ns | |
| VS hold time | Tvhd | 8 | | | ns | |
| Data setup time | Tdsu | 8 | | | ns | |
| Data hole time | Tdhd | 8 | | | ns | |
| DE setup time | Tesu | 8 | | | ns | |
| DE hole time | Tehd | 8 | | | ns | |
| DVDD Power On Slew rate | TPOR | - | | 20 | ms | From 0 to 90% DVDD |
| RESET pulse width | TRst | 1 | | | ms | |
| DCLK cycle time | Tcoh | 20 | | | ns | |
| DCLK pulse duty | Tcwh | 40 | 50 | 60 | % | |

8.3 RGB Mode Timing Diagram



8.4 RGB Timing Table

| Item | Symbol | Values | | | Unit | Remark |
|-------------------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Horizontal Display Area | thd | | 800 | | DCLK | |
| DCLK Frequency | fclk | 26.3 | 33.3 | 46.8 | MHz | |
| One Horizontal Line | th | 862 | 1056 | 1200 | DCLK | |
| HS pulse width | thpw | 1 | - | 40 | DCLK | |
| HS Blanking | thb | 46 | 46 | 46 | DCLK | |
| HS Front Porch | thfp | 16 | 210 | 354 | DCLK | |

| Item | Symbol | Values | | | Unit | Remark |
|-----------------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Vertical Display Area | tvd | | 480 | | TH | |
| VS period time | tv | 510 | 525 | 650 | TH | |
| VS pulse width | tvpw | 1 | | 20 | TH | |
| VS Blanking | tvb | 23 | 23 | 23 | TH | |
| VS Front Porch | tvfp | 7 | 22 | 147 | TH | |

8.5 Data input format



Figure 3. 1 Horizontal input timing diagram.

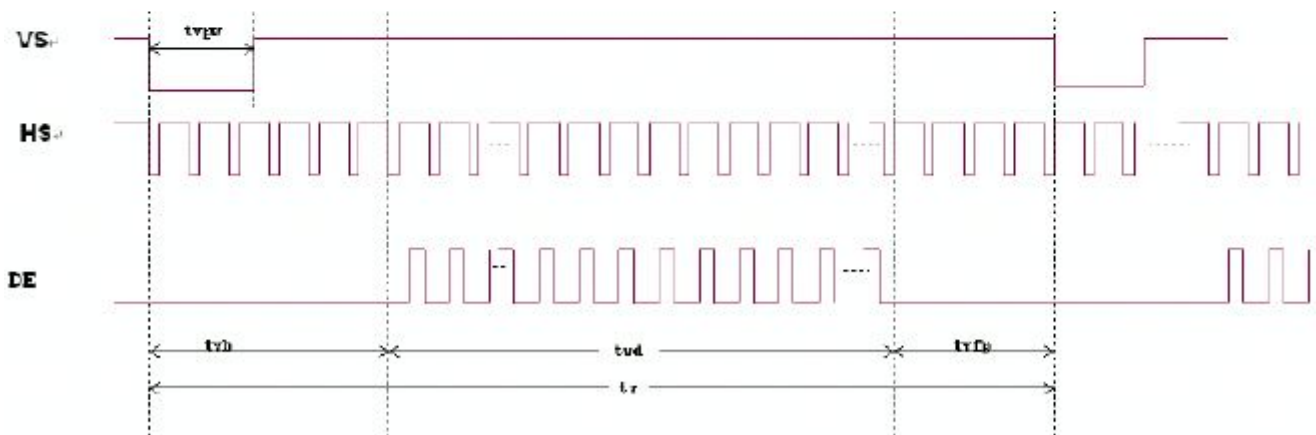


Figure 3. 2 Vertical input timing diagram.

9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

| Item | Test Conditions | Remark |
|--|--|---------------|
| High temperature storage | Ta=85°C 240hrs | NOTE1 , NOTE4 |
| Low temperature storage | Ta=-30°C 240hrs | NOTE1 , NOTE4 |
| High temperature operation | Ta=70°C 240hrs | NOTE2 , NOTE4 |
| Low temperature operation | Ta=-20°C 240hrs | NOTE2 , NOTE4 |
| Operate at high temperature and humidity | +60°C, 90%RH 240hrs | NOTE4 |
| Thermal Shock | -30°C/30min~+80°C/30min for a total 100 cycles, start with cold temperature and end with high temperature. | NOTE4 |
| Vibration Test | Frequency range:10~55HZ Stroke:1.5mm Swap:10HZ~55HZ~10HZ 2 hours of each direction of X.Y. Z (6 hours for total) | |
| Mechanical shock | 100G 6ms, ±X, ±Y, ±Z 3 times for each direction | |
| Package vibration test | Random vibration :0.15G*G/HZ from 5-200 HZ,-6dB/Octave from 200-500HZ of each direction of X.Y. Z (6 hours for total) | |
| Low temperature storage | Height:60cm 1 corner ,3 edges ,6 surfaces | |
| Low temperature storage | ±2KV ,Human Body Mode, 100pF/1500Ω | |

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

10. General Precautions

10.1. Safety

- Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

10.2. Handling

- The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
- The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
- To avoid contamination on the display surface, do not touch the module surface with bare hands.
- Keep a space so that the LCD panels do not touch other components.
- Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
- Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
- Do not leave module in direct sunlight to avoid malfunction of the ICs.

10.3. Static Electricity

- Be sure to ground module before turning on power or operating module.
- Do not apply voltage which exceeds the absolute maximum rating value.

10.4. Storage

- Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
- Do not store the module in surroundings containing organic solvent or corrosive gas.
- Store the module in an anti-electrostatic container or bag.

10.5. Cleaning

- Do not wipe the polarizer with dry cloth. It might cause scratch.
- Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

11. Packing Method

----TBD