# PRODUCT SPECIFICATION

**CDTECH Model:** **S050QWV108HS-DC83**

**CUSTOMER Model:** -

**Description:** **5.0” TFT-LCD Module with CTP**

**Version:** **1.0**

| CDTECH | PREPARED BY | CHECKED BY | APPROVED BY |
|---|---|---|---|
| SIGNATURE | | | |
| DATE | 2023.2.9 | 2023.2.9 | 2023.2.9 |

| | SIGNATURE | DATE |
|---|---|---|
| CUSTOMER APPROVAL | | |

## Record of Revisions

| Version | Revise Date | Description | Page |
|---|---|---|---|
| 1.0 | 2023-02-09 | First Release | - |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# Contents

# 1. General Specifications

## 1.1 LCM General Information

| Item | Specification | Unit |
|---|---|---|
| LCD Size | 5.0 | inch |
| Number of Pixels | 800 (H) RGB x 480 (V) | pixels |
| Display Mode | Normally White | - |
| Viewing Direction | 12 o' clock | o' clock |
| Interface | RGB | - |
| Display Colors | 16.7M | colors |
| Outline Dimension | 120.70 (H) x 75.80 (V) x 6.20 (D) | mm |
| Active Area | 108.00 (H) x 64.80 (V) | mm |
| Pixel Pitch | 0.135 (H) x 0.135 (V) | mm |
| Driver IC | ILI6122+ILI5960 | - |
| Operation Temperature | -20~70 | ℃ |
| Storage Temperature | -30~80 | ℃ |

## 1.2 Touch Panel Information

| Item | Specification |
|---|---|
| Touch Structure | G+G |
| Bonding Type with LCM | Perimeter Bonding |
| Driver IC | GT911 |
| Interface | I²C |
| Touch Count Max | 5 Points |
| Surface treatment | - |
| Surface hardness | 6H |
| I2C slave address | 0x28 |
| Origin of coordinate | Top Left Corner |

Note1:Requirements on environmental protection RoHS compliant.

# 2. Absolute Maximum Ratings

| Item | Symbol | MIN. | MAX. | Unit | Note |
|---|---|---|---|---|---|
| Analog Supply voltage | VDD | -0.3 | 5.0 | V | Note 1 |

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.

# 3. Elecrical Characteristics

## 3.1 Recommended Operating Condition for TFT LCD

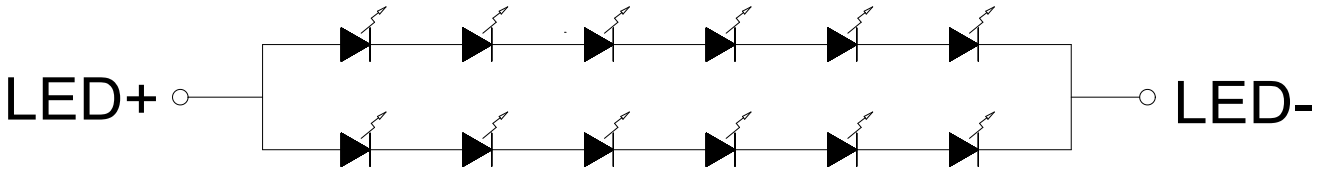
| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Analog Supply voltage | VDD | 3.0 | 3.3 | 3.6 | V | |
| Analog supply current | $I_{VDD}$ | - | TBD | - | mA | VDD=3.3V |
| Logic input voltage | VIH | 0.7*VDD | - | VDD | V | |
| | VIL | GND | - | 0.3*VDD | V | |

## 3.2 Recommended Driving Condition for Backlight

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Driving Current | $I_F$ | - | 40 | - | mA | |
| Driving Voltage | $V_F$ | 16.2 | - | 20.4 | V | |
| Power consumption | $W_{BL}$ | 0.648 | - | 0.816 | W | |
| LED Life-Time | N/A | 30,000 | - | - | Hours | Ta=25℃<br>Note 1 |

Note 1:LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :




### 3.3 Touch Panel

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Power Supply voltage | VDD | - | 3.3 | - | V | |
| Analog supply current | $I_{VDD}$ | - | TBD | - | mA | VDD=3.3V |
| Input high-level voltage | VIH | 0.7*VDD | - | VDD | V | |
| Input low -level voltage | VIL | GND | - | 0.3*VDD | V | |

# 4. Interface Pin Assignment

## 4.1 LCM Pin Assignment

Recommended connector：FH12-40S-0.5SH manufactured by HIROSE

| No. | Symbol | Description |
|---|---|---|
| 1 | VLED- | Power for LED backlight (Cathode) |
| 2 | VLED+ | Power for LED backlight (Anode) |
| 3 | GND | Ground |
| 4 | VDD | Power Supply |
| 5-12 | R0-R7 | Data bus |
| 13-20 | G0-G7 | Data bus |
| 21-28 | B0-B7 | Data bus |
| 29 | GND | Ground |
| 30 | DCLK | Dot clock signal input. Latching input data at its rising edge |
| 31 | DISP | Standby mode. Normally pulled high<br>DISP="1": Normally operation (Default)<br>DISP="0": Timing controller, source driver will turn off ,all output are High-Z |
| 32 | HSYNC | Horizontal sync input. Negative polarity |
| 33 | VSYNC | Vertical sync input. Negative polarity |
| 34 | DE | Data enable input. Active high to enable the input data bus under "DE Mode" |
| 35 | NC | No connection |
| 36 | GND | Ground |
| 37 | NC/XR | No connection |
| 38 | NC/YD | No connection |
| 39 | NC/XL | No connection |
| 40 | NC/YU | No connection |

## 4.2 Touch FPC Pin Assignment

| No. | Symbol | Description |
|---|---|---|
| 1 | RST 3.3V | Reset pin (3.3V) |
| 2 | VDD 3.3V | Power supply (3.3V) |
| 3 | GND | Ground |
| 4 | INT 3.3V | Interrupt signal from CTP (3.3V) |
| 5 | SDA | I2C data input and output |
| 6 | SCL | I2C clock input |

# 5. Interface Characteristics

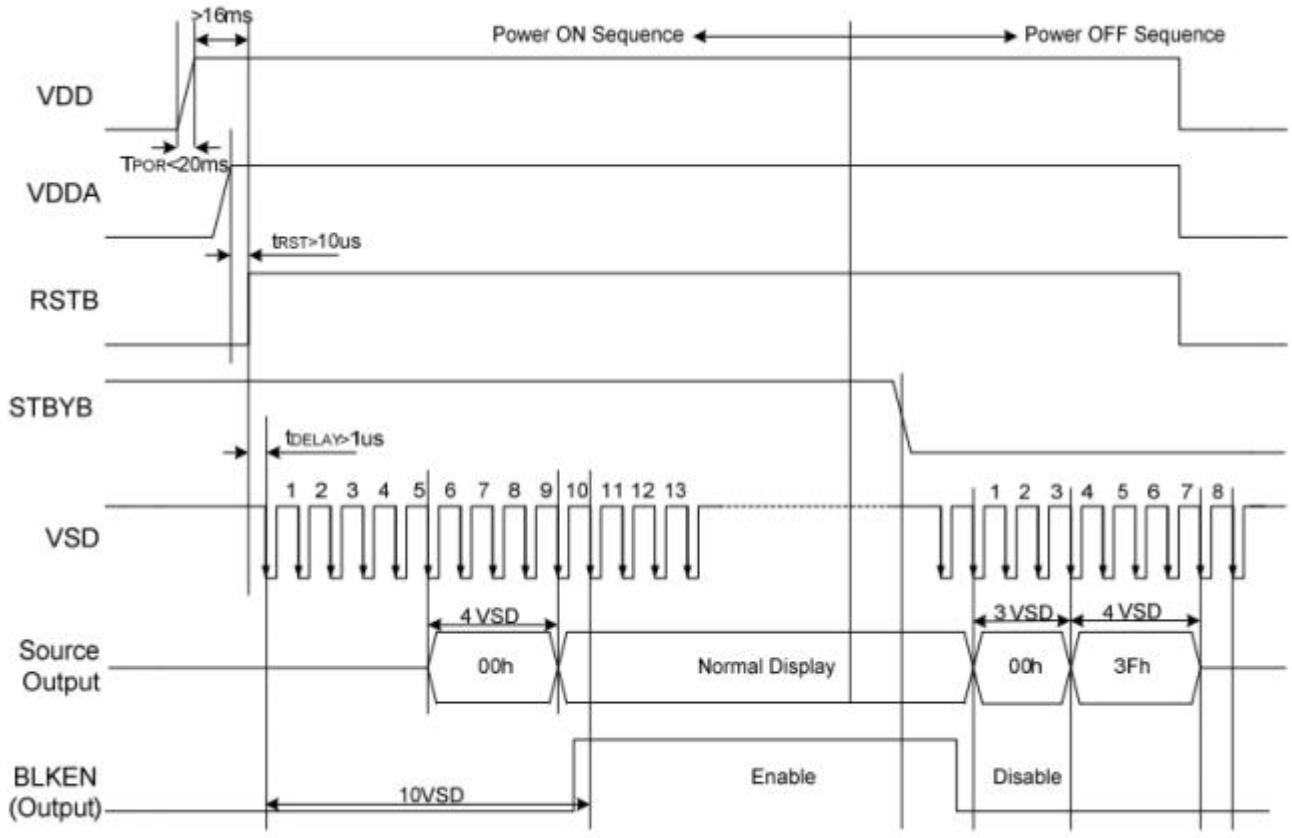
## 5.1 Power ON/OFF Sequence

To prevent the device damage from latch up, the power ON/OFF sequence shown below must be followed.

Power ON: VDD, DGND VDDA, AGND V1 to V14

Power OFF: V1 to V14 VDDA, AGND VDD, DGND

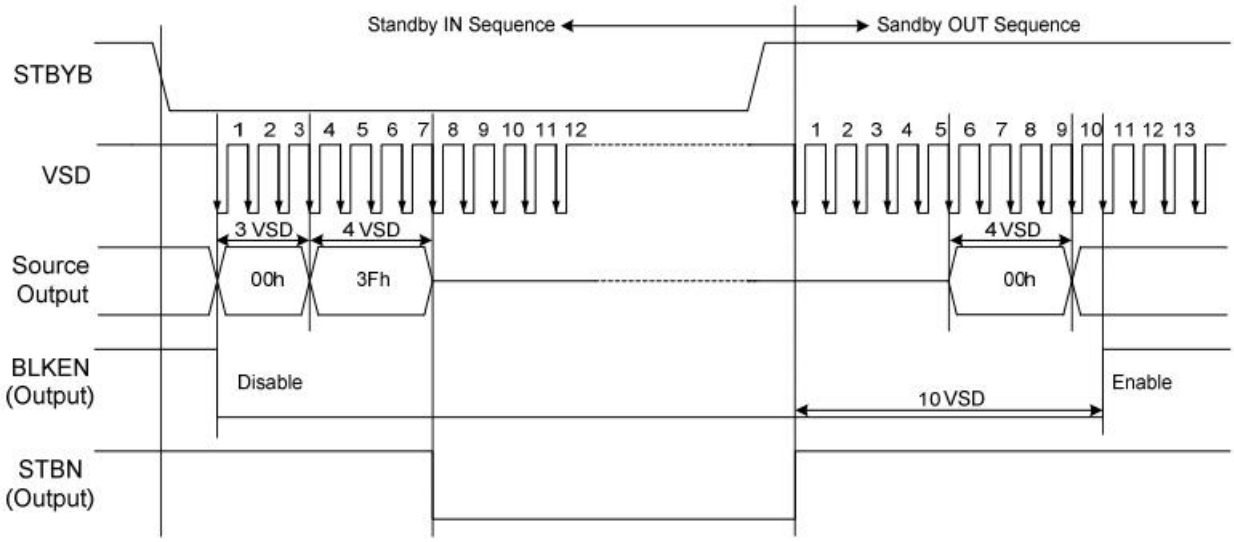
In order to prevent ILI6122 from power ON reset fail, the rising time (tPOR) of the digital power supply VDD should be maintained within given specifications. The power ON/OFF timing sequence is illustrated as below:



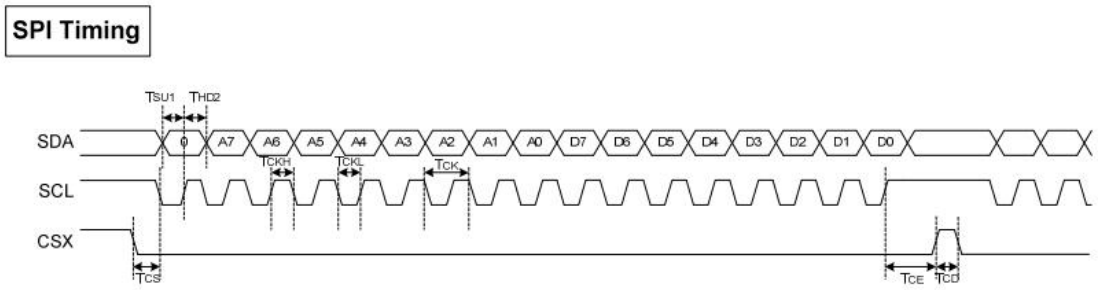

*Note: For prevent anormal operation, $t_{RST}$ must be longer than 10us during Power ON sequence.*

## 5.2 Standby ON/OFF Control

ILI6122 supports Standby mode for saving power consumption, the source driver will turn off and all source output channel will be Hi-Z state when chip in Standby mode. The Standby mode can be controlled via STBYB pin and the Standby ON/FF timing sequence is illustrated as below:

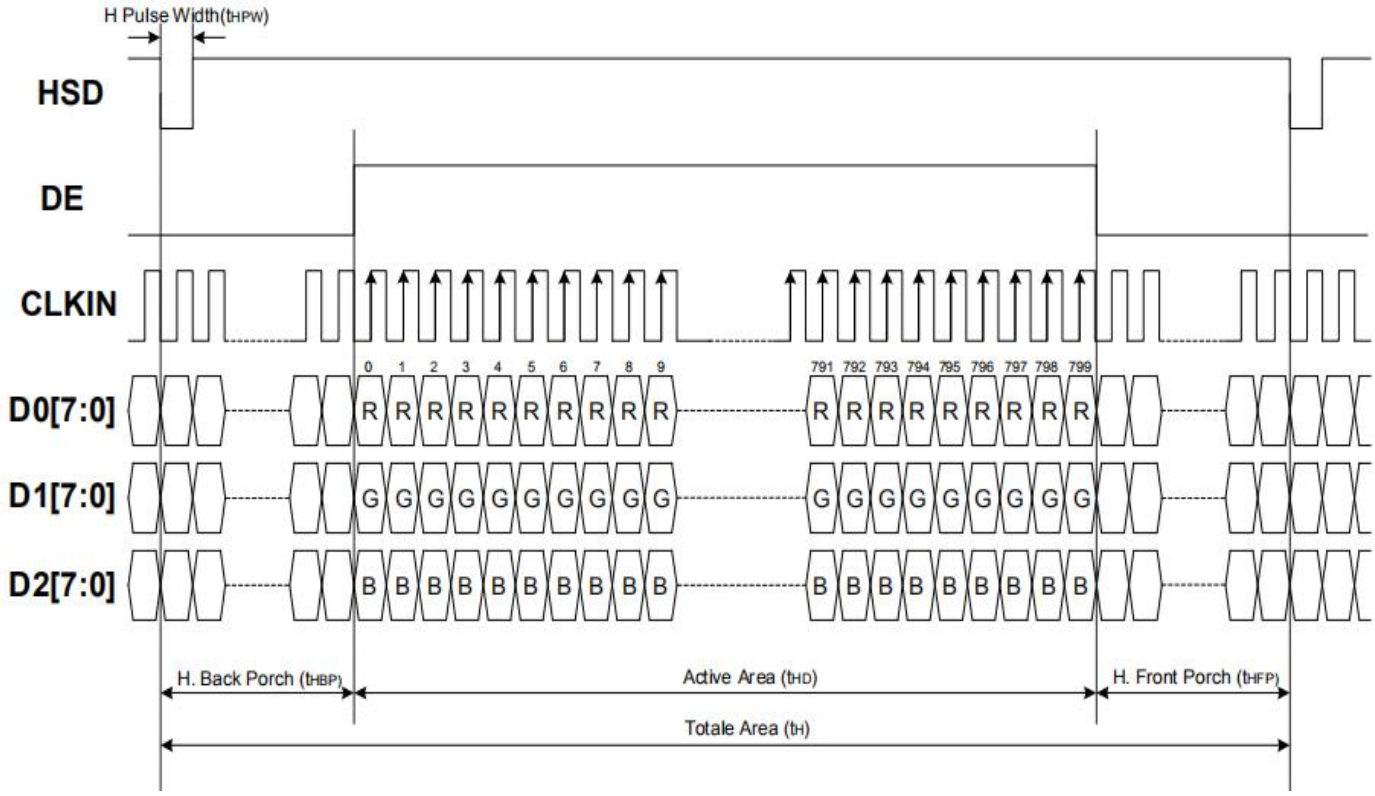



### 5.2.1 Data input format

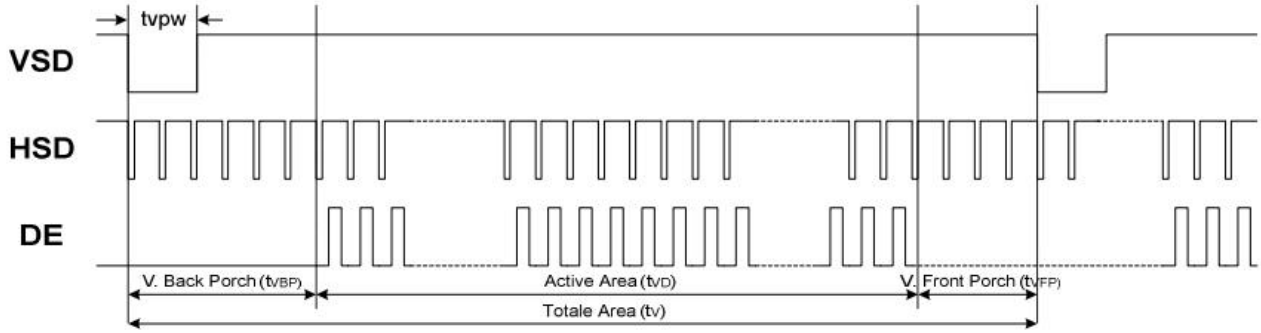



| Parameter | Symbol | Spec | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| SCL period | $T_{CK}$ | 60 | -- | -- | ns | |
| SCL high width | $T_{CKH}$ | 30 | -- | -- | ns | |
| SCL low width | $T_{CKL}$ | 30 | -- | -- | ns | |
| Data setup time | $T_{SU1}$ | 12 | -- | -- | ns | |
| Data hold time | $T_{HD1}$ | 12 | -- | -- | ns | |
| CSX to SCL setup time | $T_{CS}$ | 20 | -- | -- | ns | |
| CSX to SDA hold time | $T_{CE}$ | 20 | -- | -- | ns | |
| SCX high pulse width | $T_{CD}$ | 50 | -- | -- | ns | |

5.2.2 Resolution: 800x480




| Horizontal Input Timing | | | | | | |
|---|---|---|---|---|---|---|
| Parameter | | Symbol | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Horizontal display area | | $t_{HD}$ | -- | 800 | -- | CLKIN |
| CLKIN frequency | | $f_{CLK}$ | -- | 33.3 | 50 | MHz |
| 1 Horizontal line period | | $t_H$ | 862 | 1056 | 1200 | CLKIN |
| HSD pulse width | Min. | $t_{HPW}$ | -- | 1 | -- | CLKIN |
| | Typ. | | -- | -- | -- | CLKIN |
| | Max. | | -- | 40 | -- | CLKIN |
| HSD back porch | SYNC | $t_{HBP}$ | 46 | 46 | 46 | CLKIN |
| HSD front porch | SYNC | $t_{HFP}$ | 16 | 210 | 354 | CLKIN |



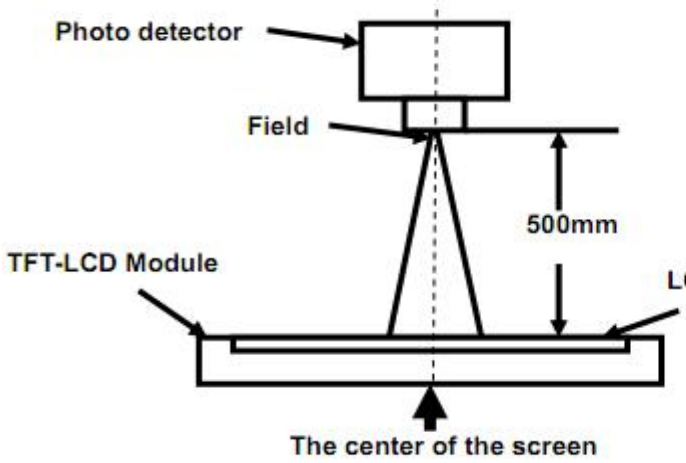

| Vertical Input Timing | | | | | |
|---|---|---|---|---|---|
| Parameter | Symbol | Value | | | Unit |
| | | Min. | Typ. | Max. | |
| Vertical display area | $t_{VD}$ | -- | 480 | -- | HSD |
| VSD period time | $t_V$ | 510 | 525 | 650 | HSD |
| VSD pulse width | $t_{VPW}$ | 1 | -- | 20 | HSD |
| VSD back porch | $t_{VBP}$ | 23 | 23 | 23 | HSD |
| VSD front porch | $t_{VFP}$ | 7 | 22 | 147 | HSD |

# 6. Optical Specifications

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| Viewing Angle (CR≥10) B/L ON | $\theta_T$ | Φ=90°(12 o'clock) | 40 | 50 | - | deg | Note2 |
| | $\theta_B$ | Φ=270°(6 o'clock) | 60 | 70 | - | deg | Note2 |
| | $\theta_L$ | Φ=180°(9 o'clock) | 60 | 70 | - | deg | Note2 |
| | $\theta_R$ | Φ=0°(3 o'clock) | 60 | 70 | - | deg | Note2 |
| Response Time | $T_{ON}$ | Normal θ=Φ=0° | - | 12 | 25 | msec | Note4 |
| | $T_{OFF}$ | | - | 12 | 25 | msec | Note4 |
| Contrast Ratio | CR | | 400 | 500 | - | - | Note1 Note3 |
| Color Chromaticity | $W_X$ | | 0.262 | 0.312 | 0.362 | - | Note1 Note5 |
| | $W_Y$ | | 0.280 | 0.330 | 0.380 | - | Note1 Note5 |
| Luminance | L | | 350 | 400 | - | cd/m² | Note1 Note7 |
| Luminance Uniformity | $Y_U$ | | 75 | 80 | - | % | Note1 Note6 |
| NTSC | - | | - | 49 | - | % | - |

Note 1:Definition of optical measurement system

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.




| Item | Photo detector | Field |
|---|---|---|
| Contrast Ratio | SR-3A | 1° |
| Luminance | | |
| Chromaticity | | |
| Lum Uniformity | | |
| Response Time | BM-7A | 2° |

Note 2:Definition of viewing angle range and measurement system
Viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

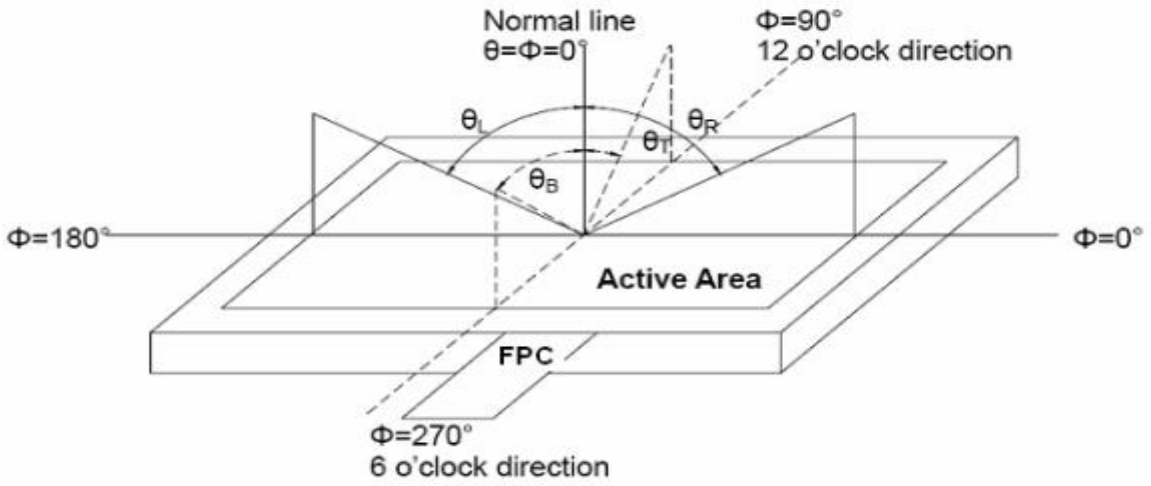


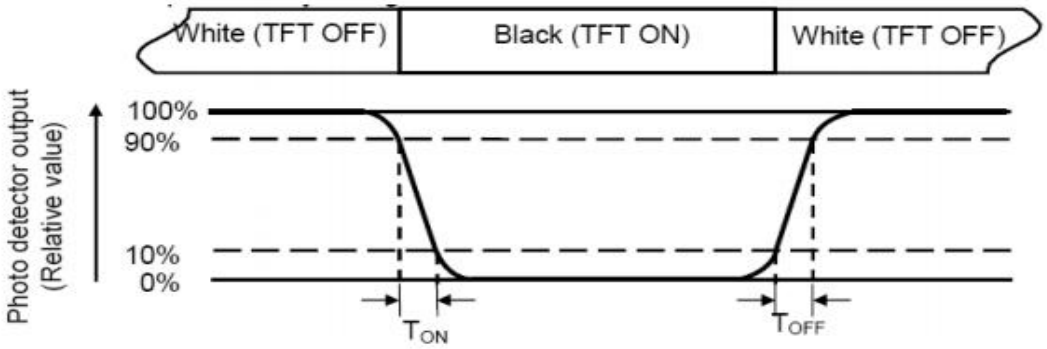

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black”state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.




Note 5:Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6:Definition of Luminance Uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

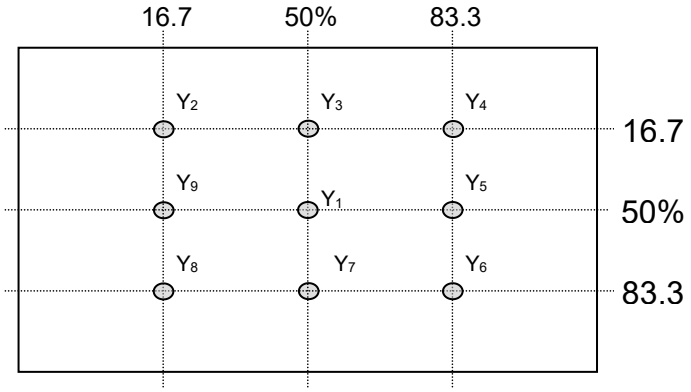



Fig. 2 Definition of points

Note 7:Definition of Luminance (Refer Fig. 2)

Surface luminance is the luminance with all pixels displaying white.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3, ......,Pn).

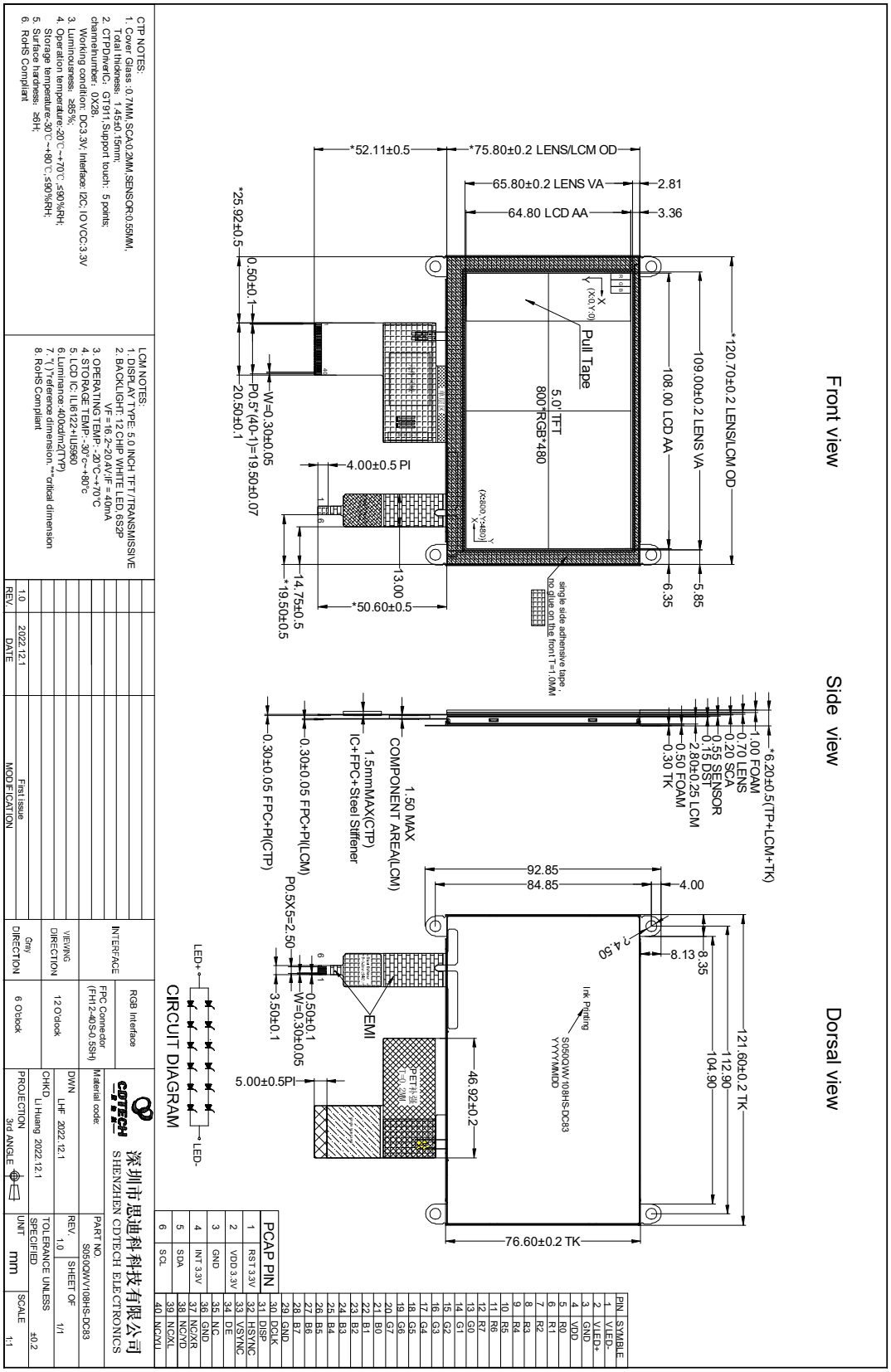
# 7. Reliability Test Items

| Test Item | Test Conditions | |
|---|---|---|
| High Temperature Storage | Ta= +80℃ | 96hrs |
| Low Temperature Storage | Ta= -30℃ | 96hrs |
| High Temperature Operation | Ta= +70℃ | 96hrs |
| Low Temperature Operation | Ta= -20℃ | 96hrs |
| High Temperature and Humidity Storage | Ta= +60℃, 90% RH | 96hrs |
| Thermal Shock (Non-operation) | -30℃/30 min ~ +80℃/30 min for 20 cycles<br>Start with cold temperature<br>end with high temperature | |
| Electro Static Discharge | Contact = ± 4 kV, class B<br>Air = ± 8 kV, class B<br>R=330Ω,C=150pF | |
| Vibration | Sweep: 10Hz~55Hz~10Hz<br>Stroke: 1.5mm<br>2 hrs for each direction of X .Y. Z. | |
| Mechanical Shock | 60G 6ms,±X,±Y,±Z<br>3 times for each direction | |
| Package Drop Test | Height: 60 cm<br>1 corner, 3 edges, 6 surfaces | |

Notes: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

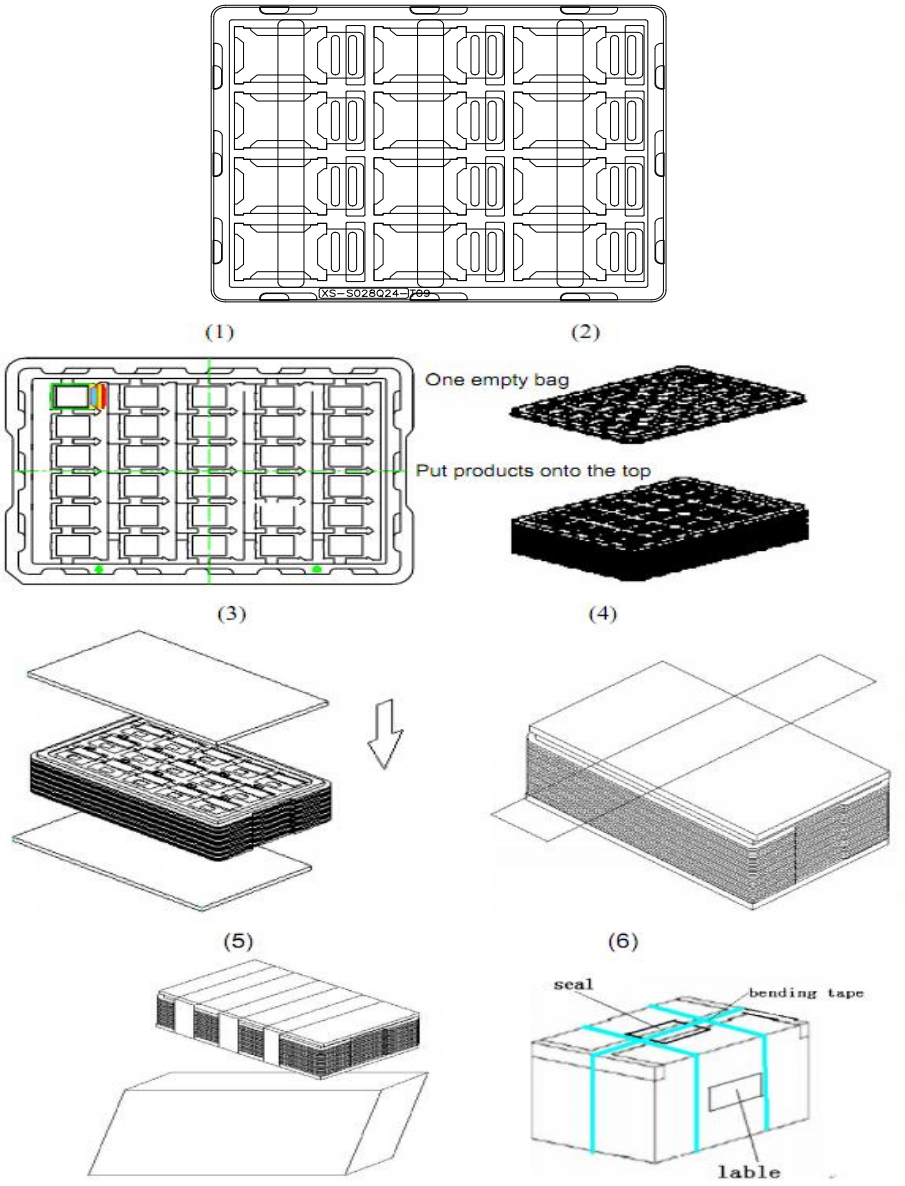
1). Air bubble in the LCD
2). Seal leak or Glass crack
3). Non display or abnormal display
4). Brightness reduction >50%

# 8. Mechanical Drawing



# 9. Packing

**Packing Method**




Steps:

1. Put module into tray cavity
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above
4. Fix the cardboard to the tray stack with adhesive tape
5. Put the tray stack into carton
6. Carton sealing with adhesive tape

# 10. Precautions for Use of LCD modules

## 10.1 Handling Precautions

10.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

10.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketene
- Aromatic solvents

10.1.6. Do not attempt to disassemble the LCD Module.

10.1.7. If the logic circuit power is off, do not apply the input signals.

10.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1. Be sure to ground the body when handling the LCD Modules.

10.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

## 10.2 Storage Precautions

10.2.1.When storing the LCD modules,avoid exposure to direct sunlight or to the light of fluorescent lamps.

10.2.2.The LCD modules should be stored under the storage temperature range if the LCD modules will be stored for a long time,the recommend condition is :

Temperature : 0℃ ~40℃ Relatively humidity: ≤80%

10.2.3.The LCD modules should be stored in the room without acid, alkali and harmful gas.

## 10.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.