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Datasheet

Tianma

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MODEL NO : TM101JVHG32

MODEL VERSION: 01

SPEC VERSION : V2.0

ISSUED DATE: 2018-05-18

- Preliminary Specification
 Final Product Specification

Customer : _____

| Approved by | Notes |
|-------------|-------|
| | |

TIANMA Confirmed :

| Prepared by | Checked by | Approved by |
|---------------|------------|-------------|
| Dongliang Xie | Feng Tan | Kevin Kim |

This technical specification is subjected to change without notice

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Record of Revision

| Rev | Issued Date | Description | Editor |
|-----|-------------|-------------------------------------|---------------|
| 1.0 | 2018-01-23 | Preliminary Specification Released. | Dongliang Xie |
| 2.0 | 2018-05-18 | Final Specification Released | Dongliang Xie |
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1 General Specifications

| Feature | | Spec |
|-----------------------------------|---|-----------------------------------|
| Display Spec. | Size | 10.1 inch |
| | Resolution | 1280(RGB) x 800 |
| | Technology Type | SFT |
| | Pixel Configuration | R.G.B. Vertical Stripe |
| | Pixel Pitch (mm) | 0.1695x0.1695 |
| | Display Mode | TM with Normally Black |
| | Surface Treatment(Up Polarizer) | HC |
| | Viewing Direction | All direction |
| Mechanical Characteristics | LCM (W x H x D) (mm) | LCM: 229.80x149.0 |
| | | CTP+LCM: 258.66x177.30x12.45 |
| | Active Area(mm) | TFT LCD:216.96x135.60 |
| | | CTP: 219.76x138.40 |
| | CTP Structure | G+G (DITO) |
| | CTP Touch Method | PCAP |
| | Number of simultaneous touches | ≤ 5 points @ 7mm copper cylinders |
| | Minimum Touch Area | Φ 7mm |
| | Finger Touch Pitch | ≥14mm |
| | With /Without TSP | With CTSP |
| Matching Connection Type | CN1:JAE FI-SE20P-HFE-E3000 CN2: JAE FI-S6P-HFE-E1500 CN3:MOLEX 53261-0871 | |
| Weight (g) | 466g | |
| Electrical Characteristics | Interface | TFT: LVDS, 6/8bit selectable |
| | | CTP:USB |
| | Color Depth | 262K/16.7M |
| | Driver IC | TFT:ST5084*1,ST5821*3 |
| CTP:ILI2511 | | |

Note 1: Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3: LCM weight tolerance: +/- 5%

2 Input/Output Terminals

2.1 TFT LCD Panel

Connector type: CN1:JAE FI-SE20P-HFE-E3000

CN2: JAE FI-S6P-HFE-E1500 CN3:MOLEX 53261-0871

| No | Symbol | I/O | Description | Comment |
|-----|---------|-----|---|---------|
| CN1 | | | | |
| 1 | IND3+ | I | Positive LVDS Differential data input(3) | |
| 2 | IND3- | I | Negative LVDS Differential data input(3) | |
| 3 | NC | - | No Connection | |
| 4 | SEL6/8 | I | 6bit/8bit mode select H : 6-bit mode L : 8-bit mode | |
| 5 | VSS | P | Power Ground | |
| 6 | PINC | I | Positive LVDS Differential clock input | |
| 7 | NINC- | I | Negative LVDS Differential clock input | |
| 8 | VSS | P | Power Ground | |
| 9 | IND2+ | I | Positive LVDS Differential data input(2) | |
| 10 | IND2- | I | Negative LVDS Differential data input(2) | |
| 11 | VSS | P | Power Ground | |
| 12 | IND1+ | I | Positive LVDS Differential data input(1) | |
| 13 | IND1- | I | Negative LVDS Differential data input(1) | |
| 14 | VSS | P | Power Ground | |
| 15 | IND0+ | I | Positive LVDS Differential data input(0) | |
| 16 | IND0- | I | Negative LVDS Differential data input(0) | |
| 17 | VSS | P | Power Ground | |
| 18 | NC | - | No Connection | |
| 19 | VDD | P | Power Supply | |
| 20 | VDD | P | Power Supply | |
| CN2 | | | | |
| 1 | VLED | P | Backlight power supply | |
| 2 | VLED | P | Backlight power supply | |
| 3 | VLSS | P | VLED Ground | |
| 4 | VLSS | P | VLED Ground | |
| 5 | LED_EN | I | Backlight on/off control | |
| 6 | LED_PWM | I | Backlight dimming control | |
| CN3 | | | | |
| 1 | VDD1 | P | Power for ctp | |
| 2 | D- | I/O | USB data- pin | |
| 3 | D+ | I/O | USB data+ pin | |
| 4 | VSS1 | P | Power Ground | |
| 5 | NC | - | No Connection | |
| 6 | NC | - | No Connection | |
| 7 | NC | - | No Connection | |
| 8 | NC | - | No Connection | |

Note: I/O definition: I/O -----Input/output I-----Input O-----output P----Power/Ground

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3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V

| Item | Symbol | MIN | MAX | Unit | Remark |
|------------------------------|-----------------|-------|------|------------------|------------------|
| Voltage Input | VDD | -0.50 | 5.00 | V | Note1 |
| Operating Temperature | T _{op} | -20.0 | 70.0 | °C | |
| Storage Temperature | T _{st} | -30.0 | 80.0 | °C | |
| Relative Humidity (Note2) | RH | -- | ≤95 | % | Ta≤40°C |
| | | -- | ≤85 | % | 40°C < Ta ≤ 50°C |
| | | -- | ≤55 | % | 50°C < Ta ≤ 60°C |
| | | -- | ≤36 | % | 60°C < Ta ≤ 70°C |
| | | -- | ≤24 | % | 70°C < Ta ≤ 80°C |
| Absolute Humidity | AH | -- | ≤70 | g/m ³ | Ta > 70°C |

Table 3.1 absolute maximum rating

Note1: Input voltage include Rxin0-/+, Rxin1-/+, Rxin2-/+, Rxin3-/+, RxCLK-/+, SEL6/8,VDD.

Note2: Ta means the ambient temperature.

It is necessary to limit the relative humidity to the specified temperature range.

Condensation on the module is not allowed.

3.2 CTP absolute Maximum Ratings

| Item | Symbol | Min. | Max | Unit | Remark |
|-----------------------|------------------|------|-----|------|--------|
| Input Voltage | VDD1 | -0.3 | 5.5 | V | |
| Operating Temperature | T _{OPR} | -20 | 70 | °C | |
| Storage Temperature | T _{STG} | -30 | 80 | °C | |

Table 3.2 CTP absolute Maximum Ratings

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

VDD=3.3V,GND=0V, Ta=25°C

| Item | Symbol | MIN | TYP | MAX | Unit | Remark | |
|--------------------------------------|-------------------|-----------------|------|------|------|--------|--|
| Power supply Voltage | VDD | 3.00 | 3.30 | 3.60 | V | | |
| Power supply ripple | Vp-p | - | - | 100 | mV | | |
| Power supply current | I _{VDD} | - | 300 | - | mA | | |
| Power consumption | P | - | 990 | - | mW | Note1 | |
| Differential input voltage | V _{id} | 200 | - | 600 | mV | | |
| Differential input common voltage | V _{CM} | - | 1.2 | - | V | | |
| Differential input threshold voltage | Low level | V _{TL} | -100 | - | - | mV | |
| | High level | V _{TH} | - | - | 100 | mV | |
| Inrush current | I _{rush} | - | - | 1.5 | A | | |

Table 4.1 LCD module electrical characteristics

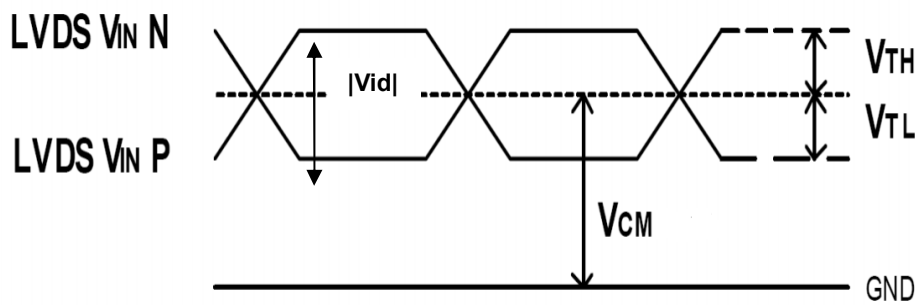


Figure4.1 LVDS DC characteristics

Note1: To test the current dissipation, using the “color bar” testing pattern shown as below:

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

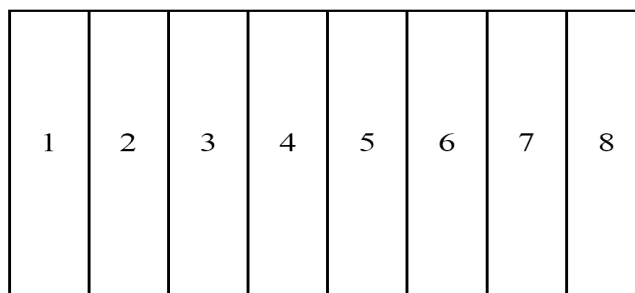


Figure 4.1.2 Current dissipation testing pattern

4.2 CTP recommended Operating Condition

 (T_A= 25°C,VDD1=5.0V)

| Item | Min | Typ | Max | Unit | Note |
|------------------------|-----|-----|-----|------|------|
| Power supply voltage | 4.7 | 5.0 | 5.3 | V | |
| IO voltage | 4.7 | 5.0 | 5.3 | V | 1 |
| Operating mode current | -- | 103 | -- | mA | 2 |

Note1: If there are other voltage requirements, can be realized by changing the design, the adjustable range is 4.7V to 5.3V.

Note2: All current measurement is average current at Operating mode.
condition (T_a=25°C,VDD1=5V)

| No. | Item | Specification | NOTE |
|-----|-------------|--|-----------------|
| 1 | Linearity | ±1.5mm at the center · 2.0mm at the border | Copper stick Φ7 |
| 2 | Veracity | ±1.5mm at the center · 2.0mm at the border | Copper stick Φ7 |
| 3 | Sensitivity | ±1.5mm at the center · 2.0mm at the border | Copper stick Φ7 |

4.3 Driving Backlight

 T_a=25°C

| Item | Symbol | Min | Typ | Max | Unit | Remark | |
|-----------------------------------|------------|------|-------|------|------|--------|--|
| Backlight power supply voltage | VLED | 11.5 | 12 | 12.5 | V | | |
| Backlight power supply current | I_LED | - | 550 | - | mA | | |
| Backlight power consumption | P_LED | - | 6600 | - | mW | | |
| Input voltage for VLED_PWM signal | High level | - | 2.0 | - | 5.0 | V | |
| | Low level | - | 0 | - | 0.4 | V | |
| Input voltage for VLED_EN | High level | - | 2.0 | - | 5.0 | V | |
| | Low level | - | 0 | - | 0.4 | V | |
| VLED_PWM frequency | Fpwm | 200 | - | 10k | HZ | | |
| VLED_PWM duty | D | 0.2 | | 100 | % | Note1 | |
| Operating Life Time | -- | -- | 50000 | -- | hrs | Note2 | |

Note 1: According to LED driver IC characteristics, the minimum value of VLED_PWM duty may vary with VLED_PWM frequency, higher the frequency, bigger the duty.

Note 2: Optical performance should be evaluated at T_a=25°C only.

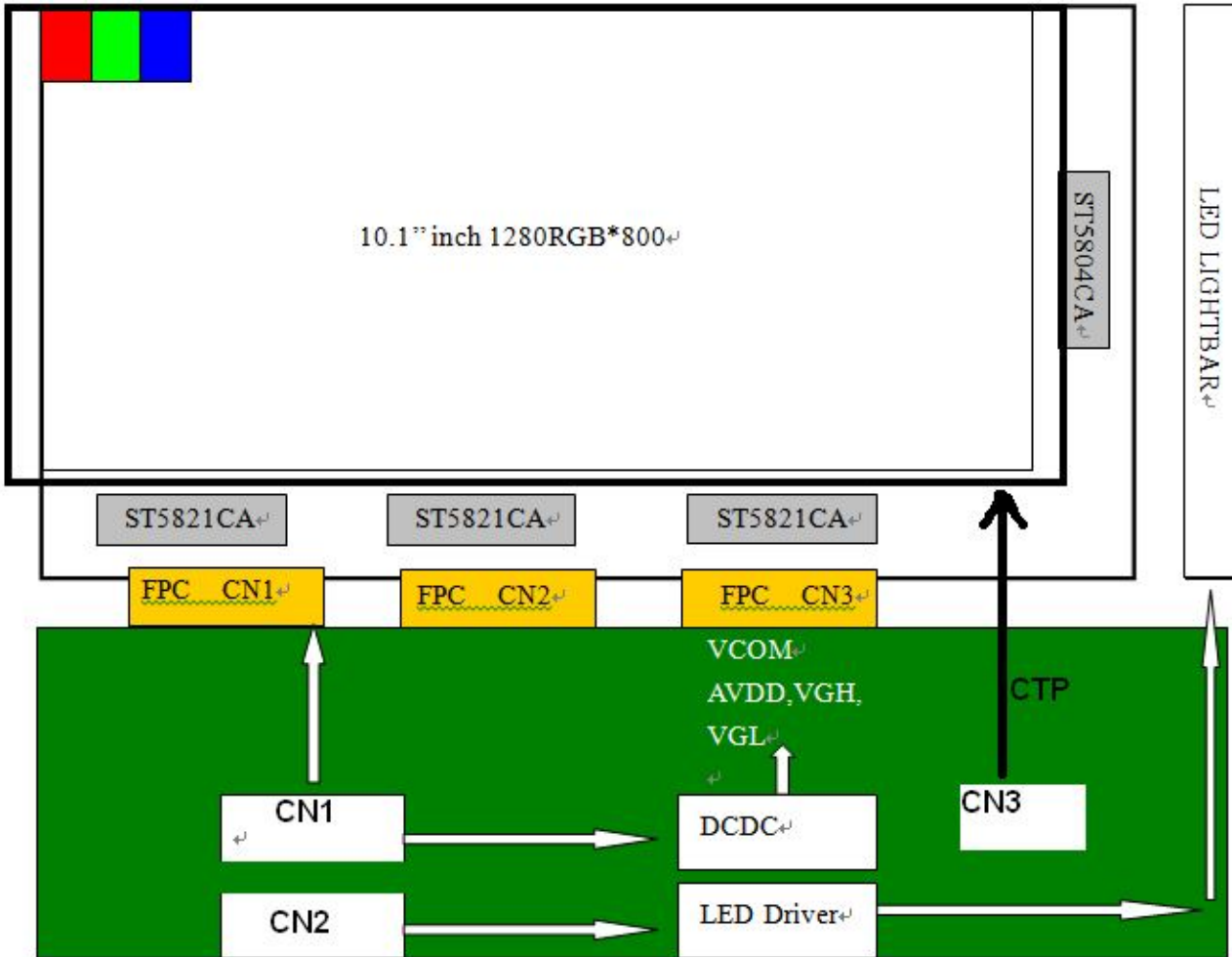
If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.

Operating life means brightness goes down to 50% of initial brightness.

Typical operating life time is estimated data.

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4.4 Block Diagram



5 Timing Chart

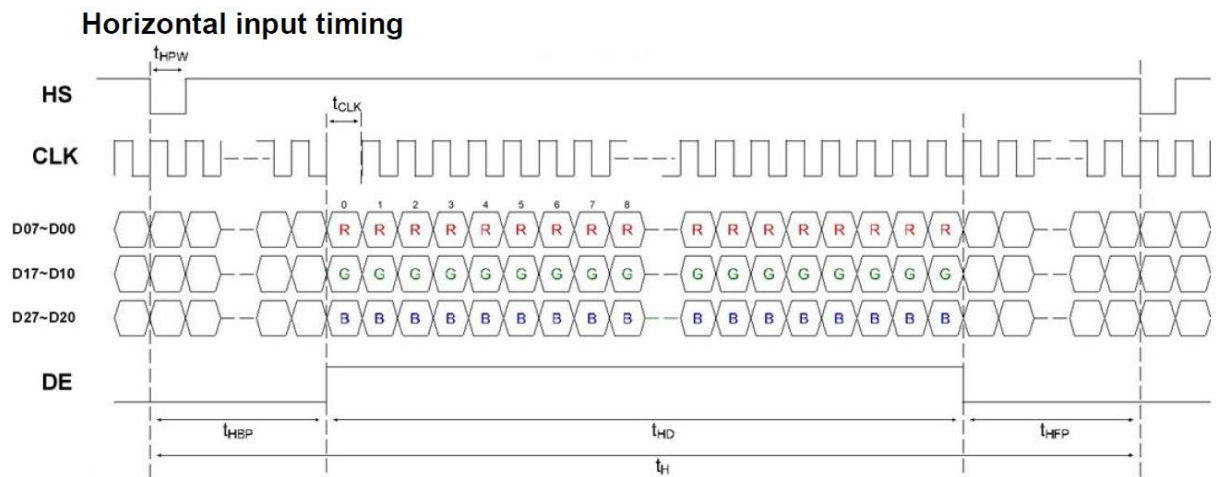
5.1 LVDS signal timing characteristics

VDD=3.3V, GND=0V, Ta=25°C

| Parameter | Symbol | Min | Typ | Max | Unit | Remark |
|--------------------------|--------------------|------|------|-----------------------|------------------|-------------------------------------|
| CLK frequency | 1/t _{clk} | 62.6 | 68.2 | 78.1 | MHz | |
| Horizontal blanking time | t _{HBT} | 20 | 69 | 164 | t _{clk} | t _{hbp} + t _{HFP} |
| Horizontal back porch | t _{HBP} | - | 5 | 164- t _{HFP} | t _{clk} | |
| Horizontal display area | t _{HD} | - | 1280 | - | t _{clk} | |
| Horizontal front porch | t _{HFP} | 15 | 64 | 159 | t _{clk} | |
| Horizontal period | t _H | 1300 | 1349 | 1444 | t _{clk} | |
| Horizontal pulse width | t _{HPW} | - | 1 | 256 | t _{clk} | |
| Vertical blanking time | t _{VBT} | 5 | 42 | 101 | t _H | t _{vbp} + t _{VFP} |
| Vertical back porch | t _{VBP} | - | 2 | 101- t _{VFP} | t _H | |
| Vertical display area | t _{VD} | - | 800 | - | t _H | |
| Vertical front porch | t _{VFP} | 3 | 40 | 99 | t _H | |
| Vertical period | t _V | 803 | 842 | 901 | t _H | |
| Vertical pulse width | t _{VPW} | - | 1 | 128 | t _H | |
| Frame Rate | F | - | 60 | - | HZ | |

Table 5.1 timing parameter

5.2 Input Clock and Data timing Diagram:



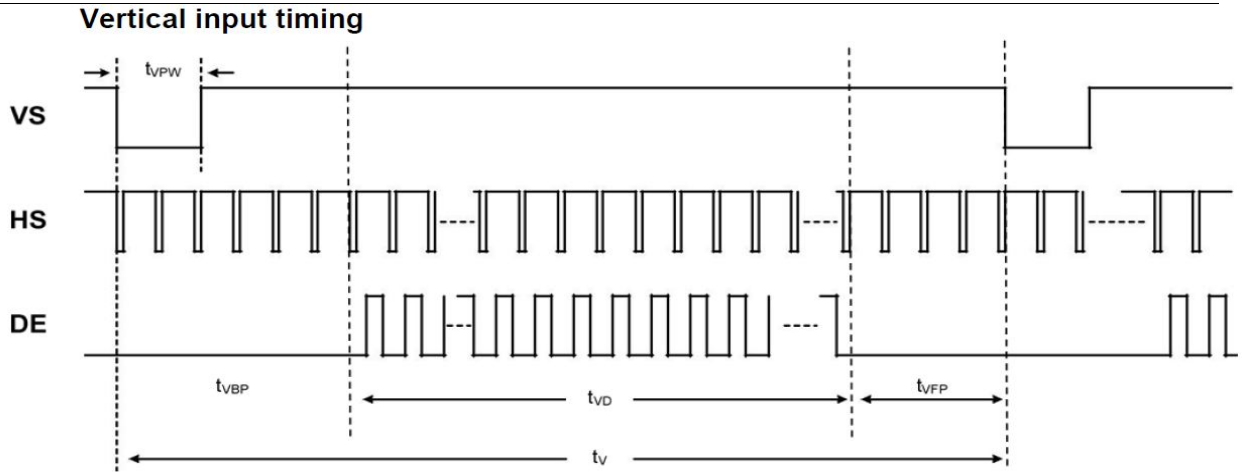
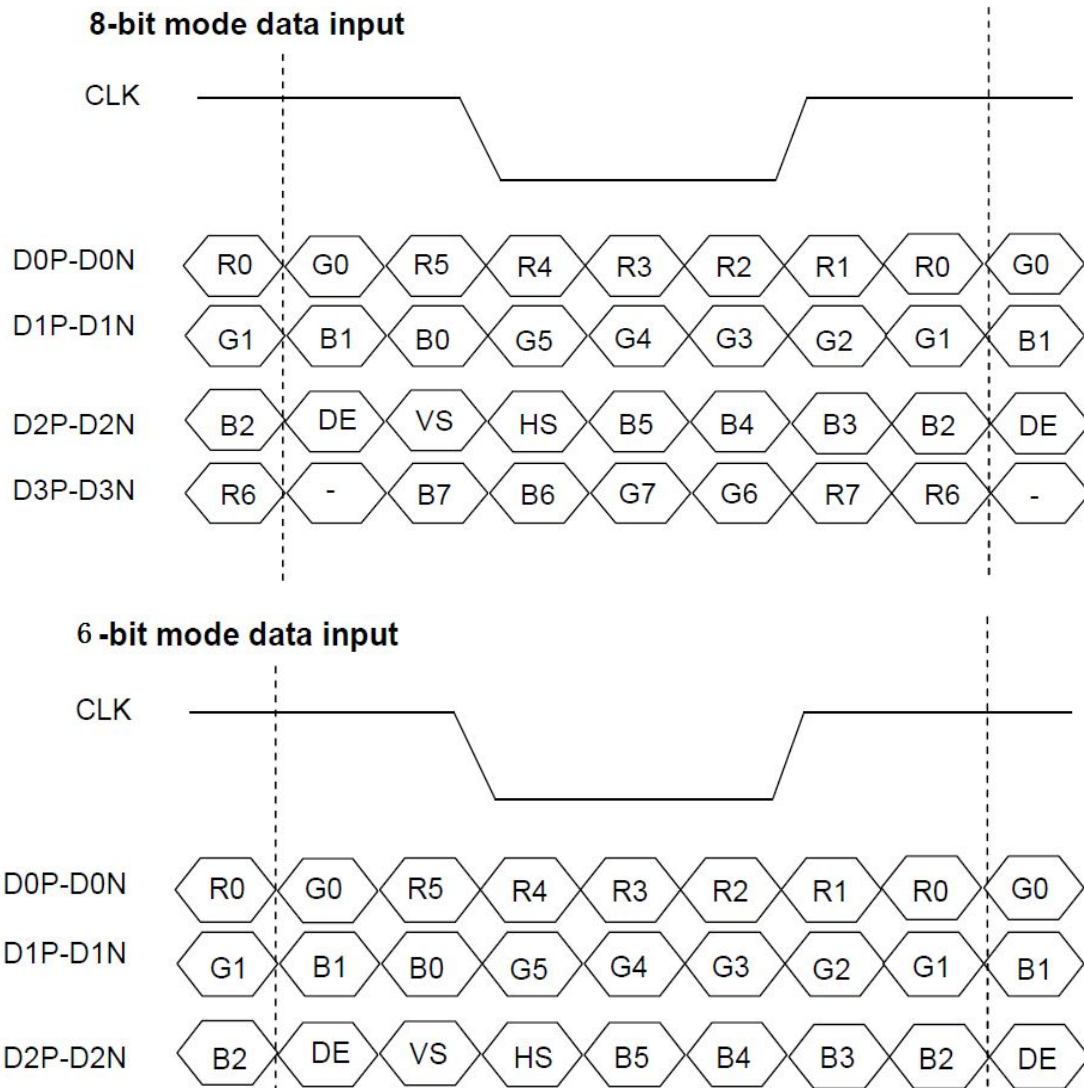


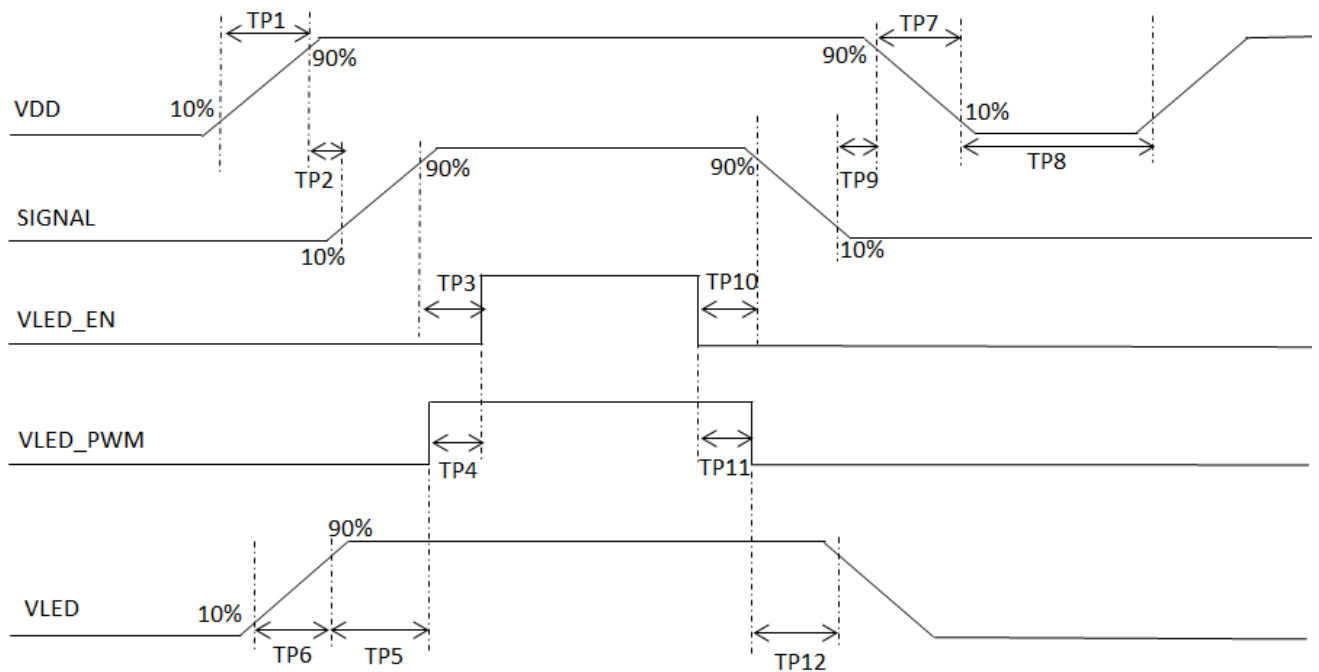
Figure 5.2 Input signal data timing

5.3 LVDS data input format



5.4 Power On/Off Sequence

| Item | Symbol | Min | Typ | Max | Unit | Remark |
|-------------------------------|--------|-----|-----|-----|------|--------|
| VDD on to VDD stable | Tp1 | 0.5 | - | 10 | ms | |
| VDD stable to signal on | Tp2 | 0 | - | 50 | ms | |
| Signal on to VLED_EN on | Tp3 | 200 | - | - | ms | |
| PWM on to VLED_EN on | Tp4 | 0 | - | 200 | ms | |
| VLED to PWM on | Tp5 | 10 | - | - | ms | |
| VLED on to VLED stable | Tp6 | 0.5 | - | 10 | ms | |
| VDD off time | Tp7 | 0 | - | 10 | ms | |
| VDD off to next VDD on | Tp8 | 500 | - | - | ms | |
| Signal off before VDD off | Tp9 | 0 | - | 50 | ms | |
| VLED_EN off before signal off | Tp10 | 200 | - | - | ms | |
| VLED_EN off before PWM off | Tp11 | 0 | - | 200 | ms | |
| PWM off before VLED off | Tp12 | 10 | - | - | ms | |

Table 5.4 Power on/off sequence

Figure 5.4 Interface power on/off sequence

6 Optical Characteristics

Ta=25°C

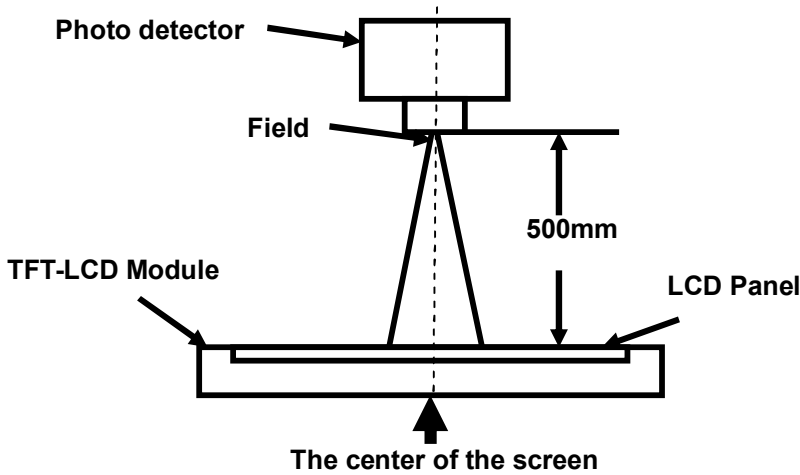
| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark | |
|----------------|------------------|------------------|-----------------|-------|-------|-------------------|----------------|----------------|
| View Angles | θT | $CR \geq 10$ | 75 | 85 | - | Degree | Note 2 | |
| | θB | | 75 | 85 | - | | | |
| | θL | | 75 | 85 | - | | | |
| | θR | | 75 | 85 | - | | | |
| Contrast Ratio | CR | $\theta=0^\circ$ | 500 | 700 | - | - | Note1 Note3 | |
| Response Time | $T_{ON}+T_{OFF}$ | 25°C | - | 25 | 40 | ms | Note1 Note4 | |
| Chromaticity | White | x | Backlight is on | 0.252 | 0.302 | 0.352 | - | Note5 Note1 |
| | | y | | 0.277 | 0.327 | 0.377 | | |
| | Red | x | | 0.532 | 0.582 | 0.632 | | |
| | | y | | 0.274 | 0.324 | 0.374 | | |
| | Green | x | | 0.300 | 0.350 | 0.400 | | |
| | | y | | 0.532 | 0.582 | 0.632 | | |
| | Blue | x | | 0.104 | 0.154 | 0.204 | | |
| | | y | | 0.044 | 0.094 | 0.144 | | |
| Uniformity | U | - | 75 | 80 | - | % | Note1 Note6 | |
| NTSC | - | - | 45 | 50 | - | % | Note 5 | |
| Luminance | L | | 700 | 850 | - | cd/m ² | Note1 Note7 | |

Test Conditions:

1. The ambient temperature is $25 \pm 2^\circ\text{C}$. humidity is $65 \pm 7\%$
2. The test systems refer to Note 1 and Note 2.

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.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD.

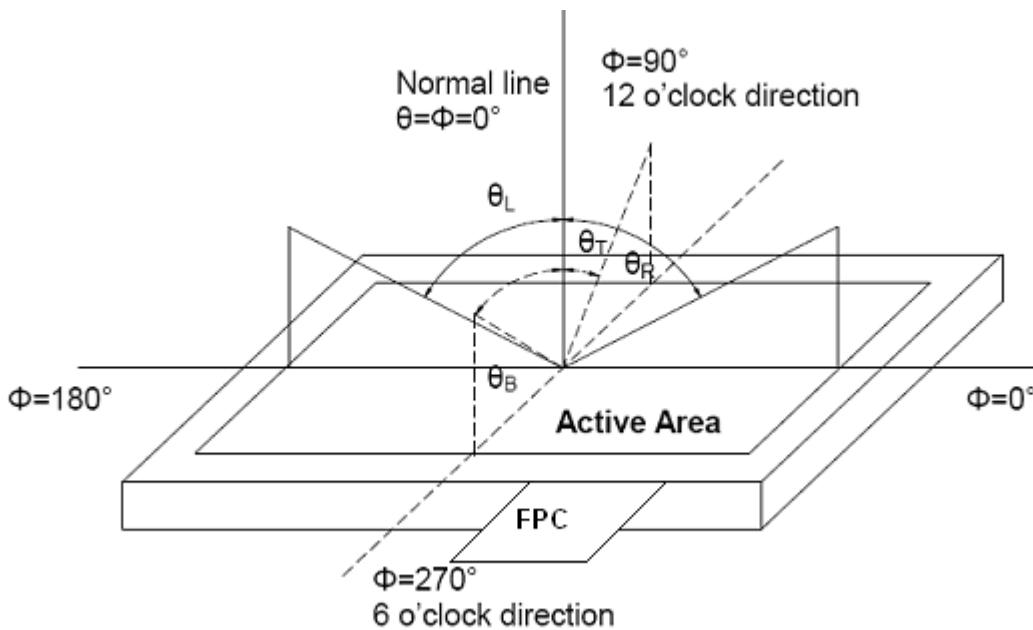


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

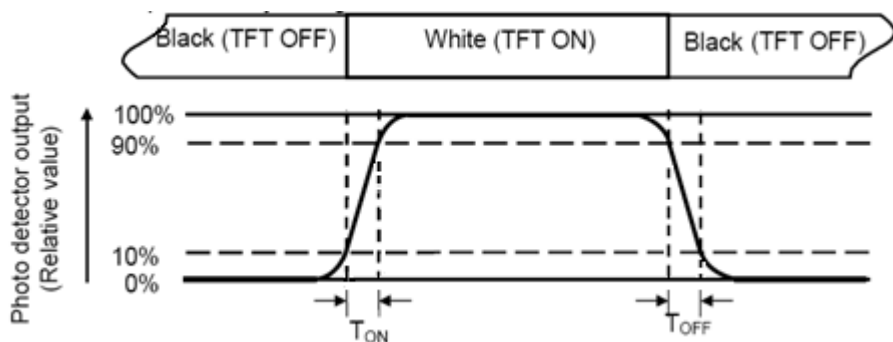
“White state “:The state is that the LCD should driven by Vwhite.

“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

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



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = L_{min} / L_{max}

L-----Active area length W----- Active area width

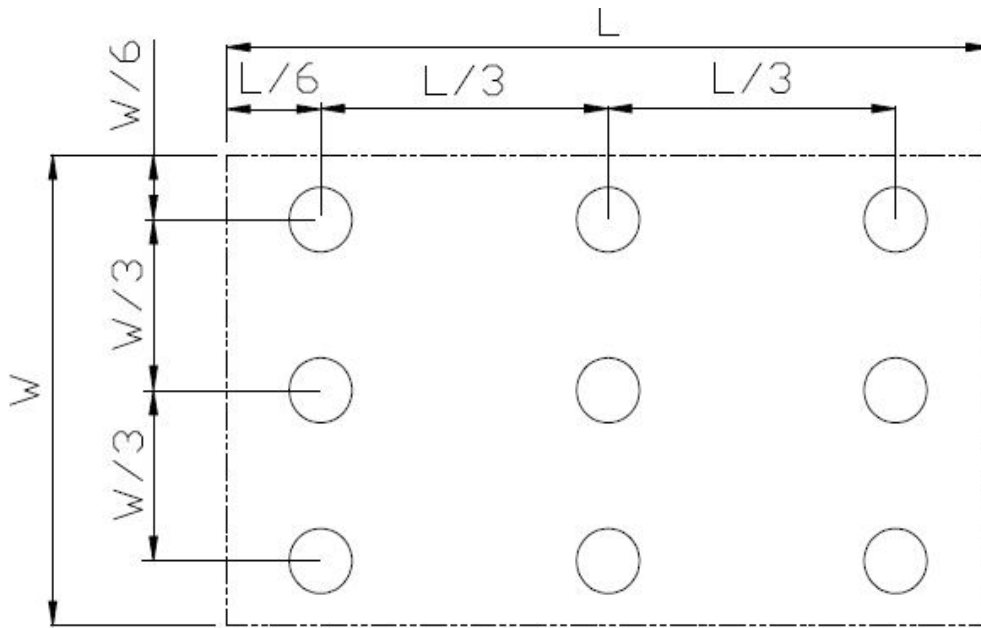


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

7 Environmental / Reliability Test

| No | Test Item | Condition | Remark |
|----|--|--|---|
| 1 | High Temperature Operation | Ts=+70°C, 240hrs | (Note1) IEC60068-2-1:2007 GB2423.2-2008 |
| 2 | Low Temperature Operation | Ta=-20°C, 240hrs | IEC60068-2-1:2007 GB2423.1-2008 |
| 3 | High Temperature Storage (non-operation) | Ta=+80°C, 240hrs | IEC60068-2-1:2007 GB2423.2-2008 |
| 4 | Low Temperature Storage (non-operation) | Ta=-30°C, 240hrs | IEC60068-2-1:2007 GB2423.1-2008 |
| 5 | High Temperature & High Humidity Operation | Ta = +60°C, 90% RH max,240 hours | (Note2) IEC60068-2-78 :2001 GB/T2423.3—2006 |
| 6 | Thermal Shock (non-operation) | -30°C 30 min~+80°C 30 min, Change time:5min,100cycles | Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002 |
| 7 | Electro Static Discharge (operation) | C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15°C~35°C, 30%~60%.86Kpa~106Kpa) | IEC61000-4-2:2001 GB/T17626.2-2006 |
| 8 | Package Drop Test | Height: 60 cm 1 corner, 3 edges, 6 surfaces | IEC60068-2-32:1990 GB/T2423.8—1995 |

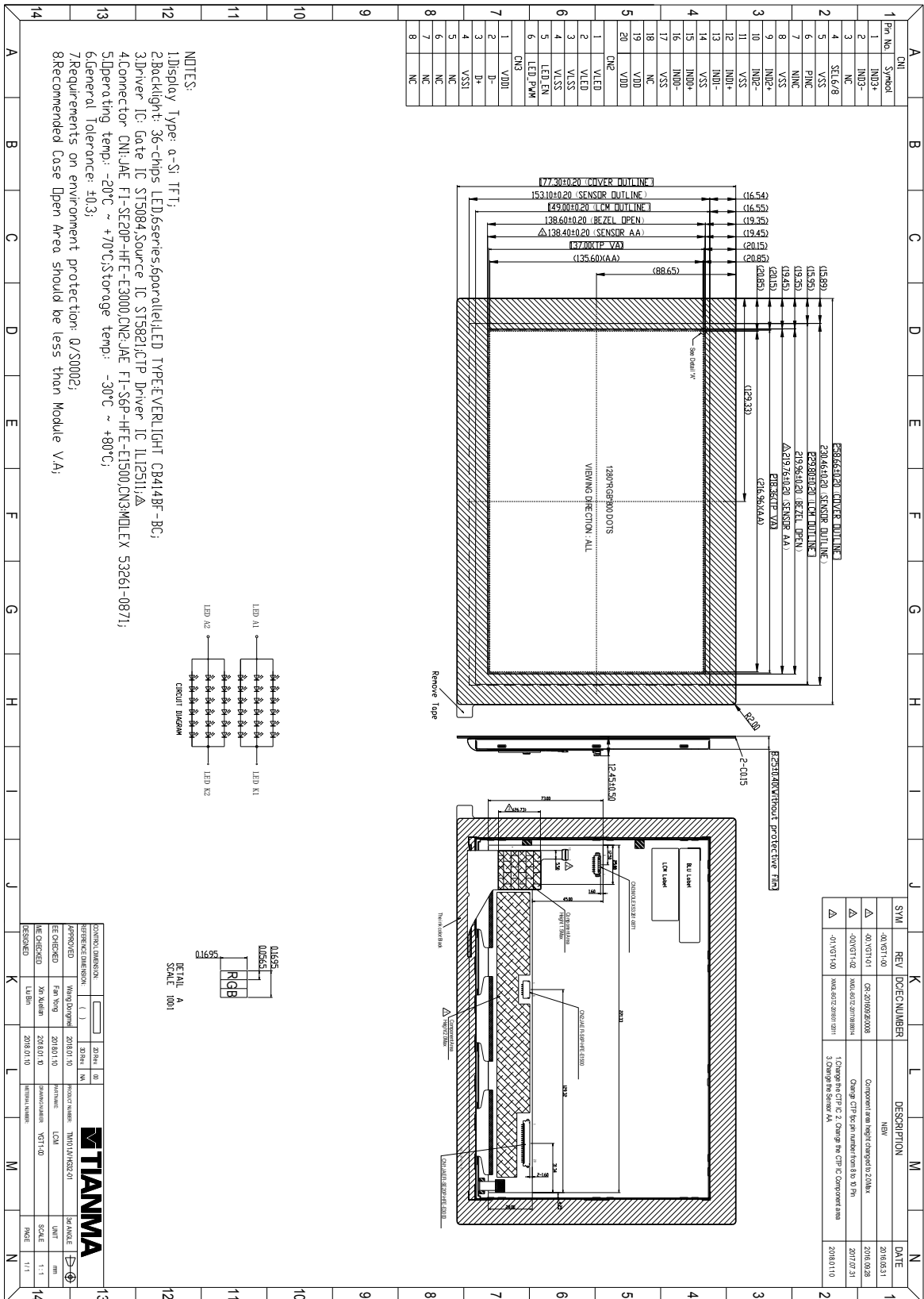
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

Note 4: 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.

8 Mechanical Drawing



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9 Packing Drawing

| No | Item | Model (Material) | Dimensions(mm) | Unit Weight(Kg) | Quantity | Remark |
|----|------------------|---------------------------|--------------------|-----------------|----------|--------|
| 1 | LCM module | TM101JVHG32-01 | 258.66x177.3x12.45 | 0.4656 | 12 | |
| 2 | Tray | PET(Transmit) | 485×330×21mm | 0.224 | 9 | |
| 3 | EPE | EPE | 485X330X5mm | 0.0195 | 3 | |
| 4 | Vacuum Bag | PE | 600×500×0.08mm | 0.05 | 3 | |
| 5 | BOX | Corrugated Paper | 520×345×74mm | 0.3879 | 3 | |
| 6 | Desiccant | Desiccant | 45×35mm | 0.002 | 6 | |
| 7 | Label | Paper | 100×52mm | 0.0001 | 1 | |
| 8 | Carton | Corrugated paper | 544×365×250mm | 1.01 | 1 | |
| 9 | Pearl cotton | TM101JVHG32-01 YPF1-00 | 291.29×247.66×1 | 0.0013 | 6 | |
| 10 | Pearl cotton | TM101JVHG32-01 YPF2-00 | 393.79×257.46×1 | 0.002 | 6 | |
| 11 | Total weight(Kg) | 10.02 kg ± 5% | | | | |

The packing method is shown as below:

9.1 Dummy packing assembling

Desiccant (干燥剂) x2

+

Use empty tray
(一个空盘)

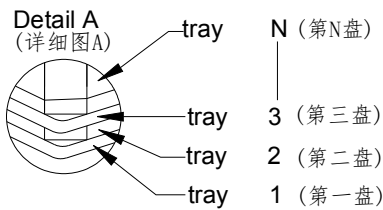
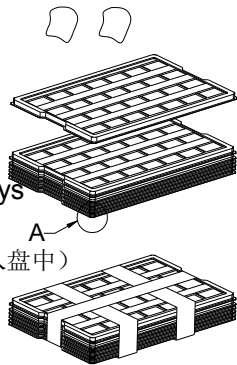
+

Put products into 2 trays
x 2 LCM per tray

将模组、上下层珍珠棉放入盘中

+

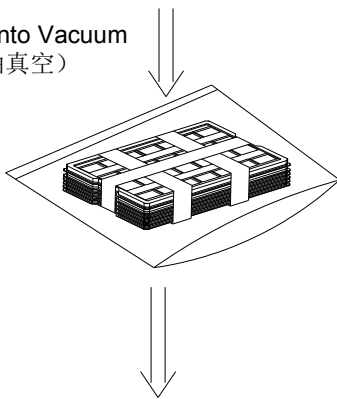
注意：用胶带缠紧



Rotate tray 180 degrees and place on top of stack. Check the tray using Fig.A.

(旋转盘180° 并放在堆叠盘上面, 按图A检查盘是否错开放置。)

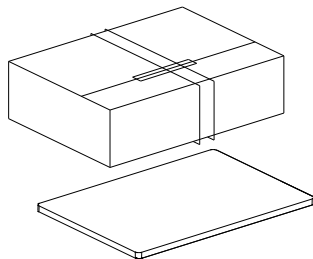
3 Trays into Vacuum bag (不抽真空)



Use strap
(用胶带固定)

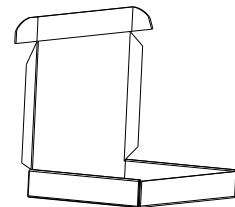
+

EPE(珍珠棉)

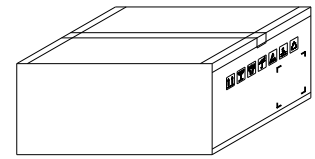


Put into box
(放入彩盒中)

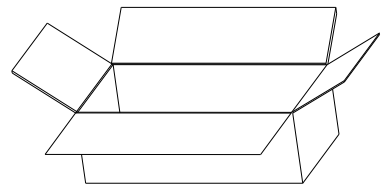
box(彩盒)



The tape to seal carton
(胶带密封纸箱)



carton
(纸箱)

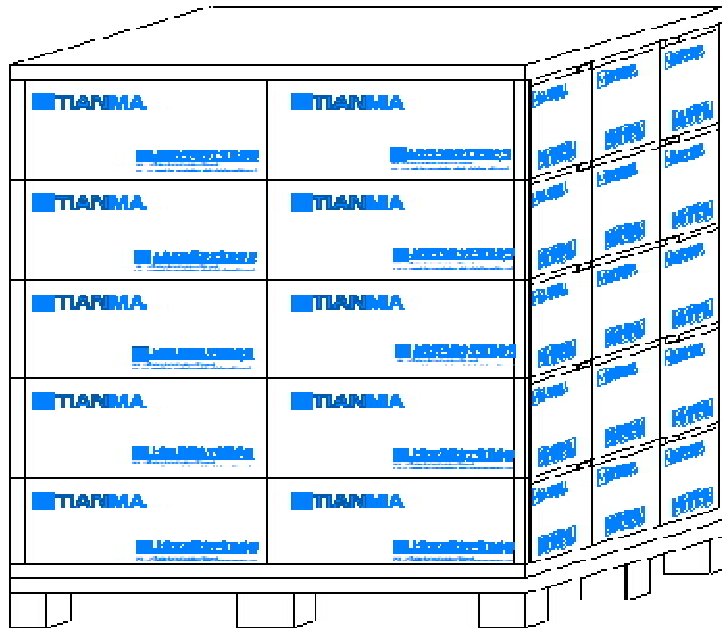


Put into carton
3x2x2=12 LCM
per Carton
(放入纸箱中)

3 box
(3盒模组)



9.2 Stacking method(2x3x5)



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 alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
 - Water
 - Ketone
 - 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°C ~ 40°C 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.

Our company network supports you worldwide with offices in Germany, Austria, Switzerland, the UK and the USA. For more information please contact:

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