# MODEL NO. : TM116VDSP01

# MODEL VERSION: 00

# SPEC VERSION: 2.0

# ISSUED DATE: 2018-10-9

□**Preliminary Specification**
■**Final Product Specification**

**Customer :   Garmin**

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

**TIANMA Confirmed :**

| Prepared by | Checked by | Approved by |
|---|---|---|
| Tiantian Zhao | Xiaoxing Ding | Kevin Kim |

# Table of Contents

## Record of Revision

| Rev | Issued Date | Description | Editor |
|-----|-------------|-------------|--------|
| 1.0 | 2017-12-06 | Preliminary Specification release | Tiantian Zhao |
| 1.1 | 2017-12-11 | 1.Change note at P5(the note is as same sa NLT15.6)<br>2.Change pin description at P6（there was a clerical error at last versions）<br>3.Add more details in BLU description at P8.<br>4.Update NTSC min as 65% at P12.<br>5.Change top bezel open location in 2D drawing at P16.<br>　Modify note 4&5 in 2D drawing at P16.<br>6.Change LED FPC connector as Garmin's requirement at P16.<br>7.Update LED Numbers as 48LED at P4 | Tiantian Zhao |
| 1.2 | 2017-12-15 | 1.Update TFT Block Diagram at P9.<br>2.modify the Screw position at 2D drawing | Tiantian Zhao |
| 1.3 | 2017-12-29 | 1.Update the LED-FPC length in 2D drawing at P16<br>2.update barcode at P20 | Tiantian Zhao |
| 1.4 | 2018-1-04 | Update more data input at P9,P12 | Tiantian Zhao |
| 1.5 | 2018-1-20 | 1.Correct connector at 2D drawing<br>2. Update Data input format at P12 | Tiantian Zhao |
| 1.6 | 2018-4-20 | 1.　Update 2D drawing;<br>2.　Add AVDD,AGH,AGL in spec<br>3.　Add Optical Characteristics | Tiantian Zhao |
| 1.7 | 2018-6-6 | 1.　Add more details at P8;<br>2.　Update 2D drawing;<br>3.　Update package;<br>4.　Update Optical Characteristics at P15. | Tiantian Zhao |
| 1.8 | 2018-8-26 | Update LED current to 40mA | Tiantian Zhao |
| 1.9 | 2018-10-9 | Correct some typing error | Tiantian Zhao |
| 2.0 | 2018-10-9 | FINAL Specification release | Tiantian Zhao |
| 2.1 | 2018-11-22 | Update power consumption in flicker pattern | Lingjie Li |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# 1 General Specification

| Item | Feature | Spec |
|---|---|---|
| **Display spec** | Size | 11.6 inch |
| | Resolution | 1920(RGB) x 1080 |
| | Interface | LVDS |
| | Color Depth | 16M |
| | Technology Type | a-Si |
| | Pixel Pitch | 133.5um*133.5um |
| | Pixel Configuration | R.G.B. Vertical Stripe |
| | Display Mode | TM with Normally black |
| | Surface Treatment(Up Polarizer) | HC |
| | Viewing Direction | All angle |
| | Gray Scale Inversion Direction | All angle |
| | LCM (W x H x D) | 273.50X166.50X7.8 |
| | Drive IC | TFT:NT51625+NT52601 |
| **Mechanical Characteristics** | TFT Active Area | 256.32 x 144.18 |
| | Matching Connection Type | Plug: IPEX 20453-230T-11 Socket :IPEX 20455-030E-76 |
| | LED Numbers | 48 LEDs |
| | Weight | 527g |
| **Electrical Characteristics** | Operation temperature | -20~80 |
| | Storage temperature | -30~85 |

Note 1: Viewing direction for best image quality is different from Gray Scale Inversion Direction, there is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3:  LCM weight tolerance: ± 5%ght toler

Note 4： Polarizer absorption angle pattern：
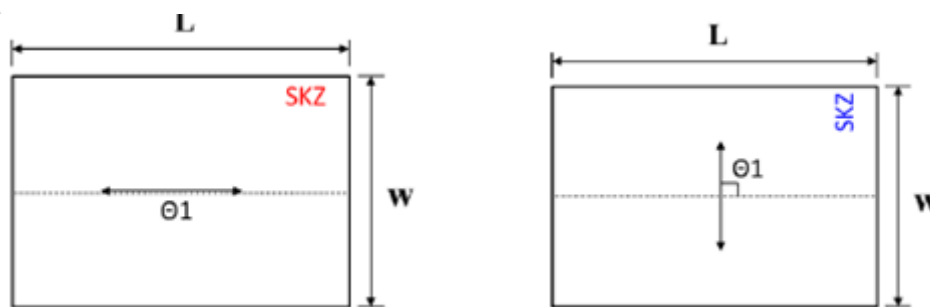


Top Polarizer                    Bottom Polarizer

Top view from Protective Film side

## 2. Input/output Terminals

### 2.1 INPUT TERMINALS PIN ASSIGNMENT

Matched Connector: Plug: IPEX 20453-230T-11
Socket :IPEX 20455-030E-76

| Pin No. | Symbol | I/O (Note1) | Description | Comment |
|---|---|---|---|---|
| 1 | DA0- | I | Odd pixel data 0 | Note1 |
| 2 | DA0+ | I | Odd pixel data 0 | Note1 |
| 3 | DA1- | I | Odd pixel data 1 | Note1 |
| 4 | DA1+ | I | Odd pixel data 1 | Note1 |
| 5 | DA2- | I | Odd pixel data 2 | Note1 |
| 6 | DA2+ | I | Odd pixel data 2 | Note1 |
| 7 | GND | P | Ground | Note2 |
| 8 | CLKA- | I | Odd pixel clock | Note1 |
| 9 | CLKA+ | I | Odd pixel clock | Note1 |
| 10 | DA3- | I | Odd pixel data 3 | Note1 |
| 11 | DA3+ | I | Odd pixel data 3 | Note1 |
| 12 | DB0- | I | Even pixel data 0 | Note1 |
| 13 | DB0+ | I | Even pixel data 0 | Note1 |
| 14 | GND | P | Ground | Note2 |
| 15 | DB1- | I | Even pixel data 1 | Note1 |
| 16 | DB1+ | I | Even pixel data 1 | Note1 |
| 17 | GND | P | Ground | Note2 |
| 18 | DB2- | I | Even pixel data 2 | Note1 |
| 19 | DB2+ | I | Even pixel data 2 | Note1 |
| 20 | CLKB- | I | Even pixel clock | Note1 |
| 21 | CLKB+ | I | Even pixel clock | Note1 |
| 22 | DB3- | I | Even pixel data 3 | Note1 |
| 23 | DB3+ | I | Even pixel data 3 | Note1 |
| 24 | GND | P | Ground | Note2 |
| 25 | GND | P | Ground | Note2 |
| 26 | GND | P | Ground | Note2 |
| 27 | GND | P | Ground | Note2 |
| 28 | VCC | P | Power supply | Note2 |
| 29 | VCC | P | Power supply | Note2 |
| 30 | VCC | P | Power supply | Note2 |

Note 1: twist pair wires with 100$\Omega$ （characteristic impedance）should be used between LCD panel signal processing board and LVDS transmitter.
Note 2:ALL GND and VCC terminals should be used without any non-connected lines.

## 2.2 Backlight PIN ASSIGNMENT

Matched Connector: Kyocera 04 6299 614 020 846+

| Pin No. | Symbol | I/O (Note1) | Description | Comment |
|---|---|---|---|---|
| 1 | A1 | P | Anode 1 | Anode 1&2 must be separate from Anode 3&4 on the LED board. |
| 2 | A2 | P | Anode 2 | |
| 3 | A3 | P | Anode 3 | |
| 4 | A4 | P | Anode 4 | |
| 5 | NC | - | ~ | - |
| 6 | NC | - | ~ | - |
| 7 | K1 | P | Cathode 1 | - |
| 8 | K2 | P | Cathode 2 | - |
| 9 | K3 | P | Cathode 3 | - |
| 10 | K4 | P | Cathode 4 | - |
| 11 | K5 | P | Cathode 5 | - |
| 12 | K6 | P | Cathode 6 | - |
| 13 | K7 | P | Cathode 7 | - |
| 14 | K8 | P | Cathode 8 | - |

## 3.Absolute Maximum Ratings

Ta = 25℃

| Item | Symbol | Min | Max | Unit | Remark |
|------|--------|-----|-----|------|--------|
| Power Voltage | VCC | -0.5 | 5 | V | Note1 |
| Operating Temperature | TOPR | -20 | 80 | ℃ | Note2 |
| Storage Temperature | TSTG | -30 | 85 | ℃ | |
| Relative Humidity Note2 | RH | -- | ≤85 | % | 40℃＜Ta≤50℃ |
| | | -- | ≤55 | % | 50℃＜Ta≤60℃ |
| | | -- | ≤36 | % | 60℃＜Ta≤70℃ |
| | | -- | ≤24 | % | 70℃＜Ta≤80℃ |
| Absolute Humidity | AH | -- | ≤70 | g/㎥ | Ta＞70℃ |

**Table 3.1 absolute maximum rating**

Note1: The parameter is for driver IC (gate driver, source driver) only

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.

# 4.Electrical Characteristics

## 4.1 Driving TFT LCD Panel

Ta = 25℃

| Parameter | Symbol | min. | typ. | max. | Unit | Remarks |
|---|---|---|---|---|---|---|
| Power supply voltage | VCC | 3.0 | 3.3 | 3.6 | V | - |
| Power supply current | ICC (White pattern) | | 480 | 552 | mA | at VCC=3.3V reduce SD Film thickness |
| Permissible ripple voltage | VRP | - | - | 300 | mVp-p | for VCC |
| Power For Analog Circuit | AVDD | 10.5 | 10.7 | 10.9 | V | |
| Gate On Voltage | VGH | 19 | 20 | 21 | V | |
| Gate Off Voltage | VGL | -6.5 | -7.0 | -7.5 | V | |
| Terminating resistance | RT | - | 100 | - | Ω | - |
| (Panel+LSI) Power Consumption | White Mode (60Hz) | | 1584 | 1821 | mW | reduce SD Film thickness |
| Power Consumption | Flicker Mode (60Hz) | | 270 | 310 | mW | reduce SD Film thickness |

**Table 4.1 LCD module electrical characteristics**

Note: Power supply current and Power Consumption are just for reference because of limited test samples, we may update slightly when output final spec.

## 4.2 TFT Driving Backlight

Ta=25℃

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| Forward Current(per string) | $I_F$ | — | 40 | — | mA | 48LED(6LED Serial，8LED Parallel) |
| Forward Current Voltage (per string) | $V_F$ | — | 36.6 | — | V | |
| Backlight Power Consumption | $W_{BL}$ | — | 11712 | — | mW | |
| LED life time | | 10000 | 30000 | | hour | |
| LED supplier | | NF2W257HRT | | | | |

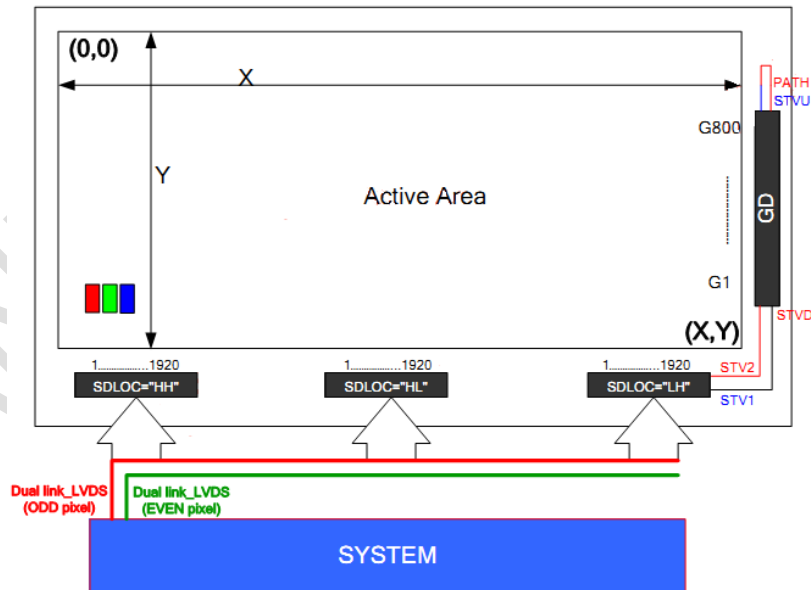Table 4.2 Backlight Unit Electrical Characteristics
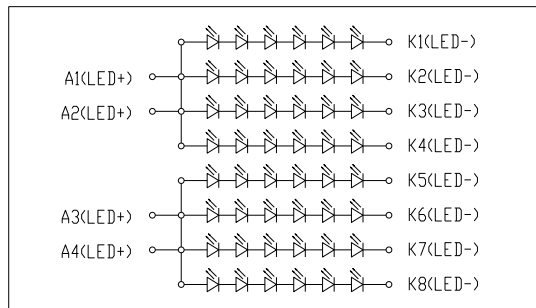


Backlight Circuit Diagram
Figure 4.2.1 LED Driver Circuit

## 4.3 TFT Block Diagram
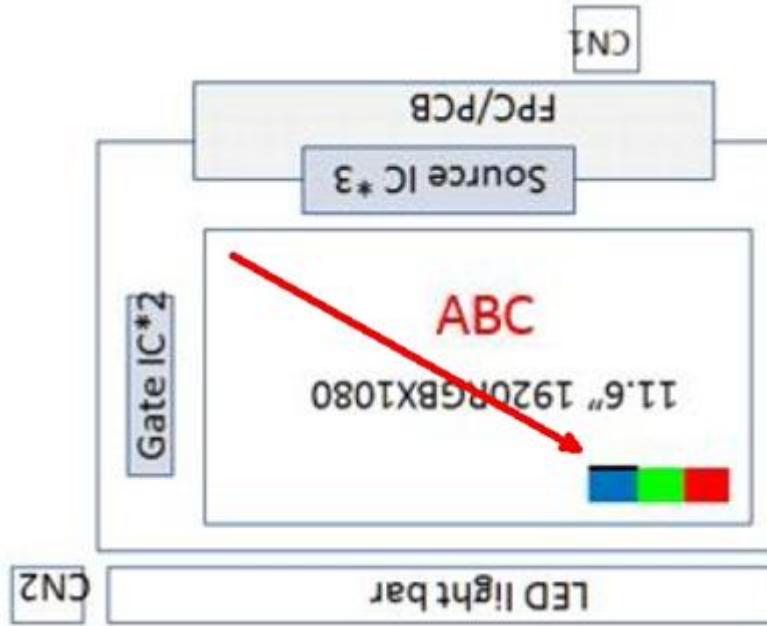


## 4.4 Location Setting for Gate Driver



Location For Source Driver

Note: In Dual-Link LVDS mode: The first pixel on panel(top-left) is odd.

# 5.Timing Chart

## 5.1 LVDS Interface DC Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Differential input high threshold voltage | $R_{xVTH}$ | - | - | +200 | mV | |
| Differential input low threshold voltage | $R_{xVTL}$ | -200 | - | - | mV | |
| Differential input common mode voltage | $R_{xVCM}$ | 1.0 | 1.2 | $1.7-|V_{ID}|/2$ | V | |
| Differential input voltage | $|V_{ID}|$ | 200 | - | 600 | mV | |
| Input Terminal Resistance tolerance | $R_{TERM}$ | -20% | - | +20% | % | RTERM[2:0] ≠ "HHH" |
| Differential input leakage current | $I_{xVLK}$ | -10 | - | +10 | uA | VCC_IF=1.8V, CLKP/N, DxP/N RTERM[2:0] = "HHH" |
| LVDS Digital Stand-by current | $I_{xVST}$ | - | - | 150 | mA | VCC_IF=1.8V, Clock & all functions are stopped, STBYB = L |
| LVDS Digital Operating current | $I_{xVOP}$ | - | - | 40 | uA | VCC_IF=1.8V, $F_{CLK}$ =85MHz, Data pattern: 55h→AAh→55h→AAh |
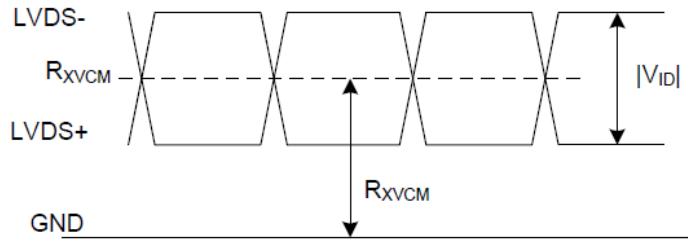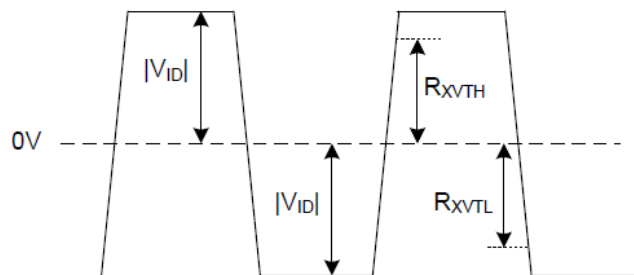


Figure 5.1 LVDS DC Diagram

## 5.2 AC characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Clock frequency | FLVCLK | 25 | - | 85 | MHz | Refer to input timing table for each display resolution. |
| Clock Period | TLVCLK | 40 | - | 11.76 | nsec | |
| Clock high time | TLVCH | - | 4/(7* RXFCLK) | - | ns | |
| Clock low time | TLVCL | - | 3/(7* RXFCLK) | - | ns | |
| Input data skew margin | TRSKM | - | - | 0.25 | UI | VCC_IF=1.8V w/o SSC |
| Strobe width | TSW | 0.5 | - | - | UI | |
| 1 data bit time | UI | - | 1/7 | - | TLV CLK | |
| Position 1 | TPOS1 | -0.25 | 0 | 0.25 | UI | |
| Position 0 | TPOS0 | 0.75 | 1 | 1.25 | UI | |
| Position 6 | TPOS6 | 1.75 | 2 | 2.25 | UI | |
| Position 5 | TPOS5 | 2.75 | 3 | 3.25 | UI | |
| Position 4 | TPOS4 | 3.75 | 4 | 4.25 | UI | |
| Position 3 | TPOS3 | 4.75 | 5 | 5.25 | UI | |
| Position 2 | TPOS2 | 5.75 | 6 | 6.25 | UI | |
| PLL wake-up time | TenPLL | - | - | 150 | us | |
| Modulation Frequency | SSCMF | 23 | - | 93 | KHz | |
| Modulation Rate | SSCMR | -3 | - | +3 | % | LVDS clock = 81MHz, center spread |
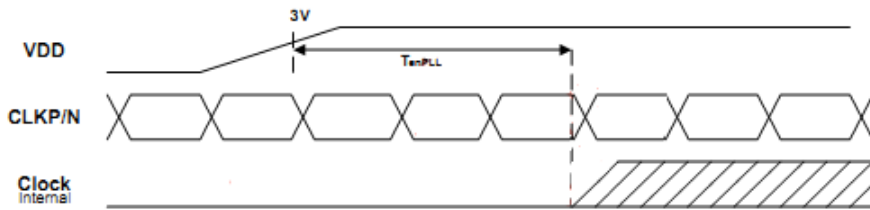
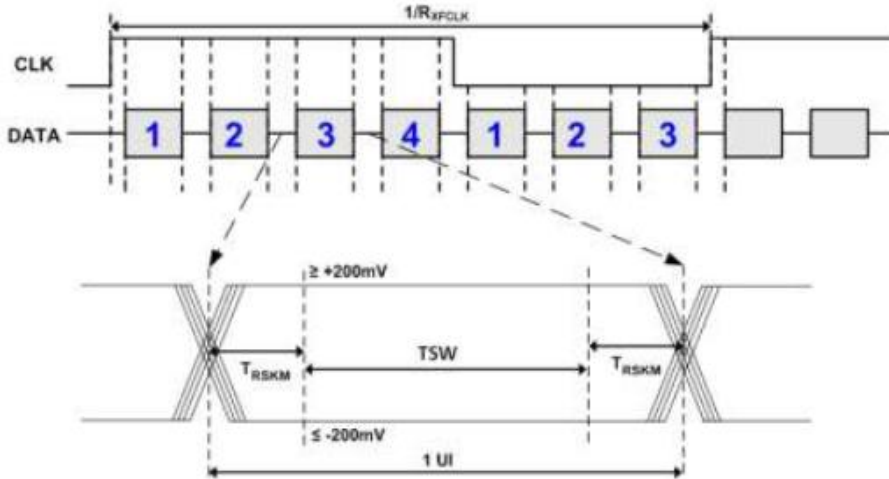Figure 5.2.1 Relationship between VDD, LVDS clock, and internal clock
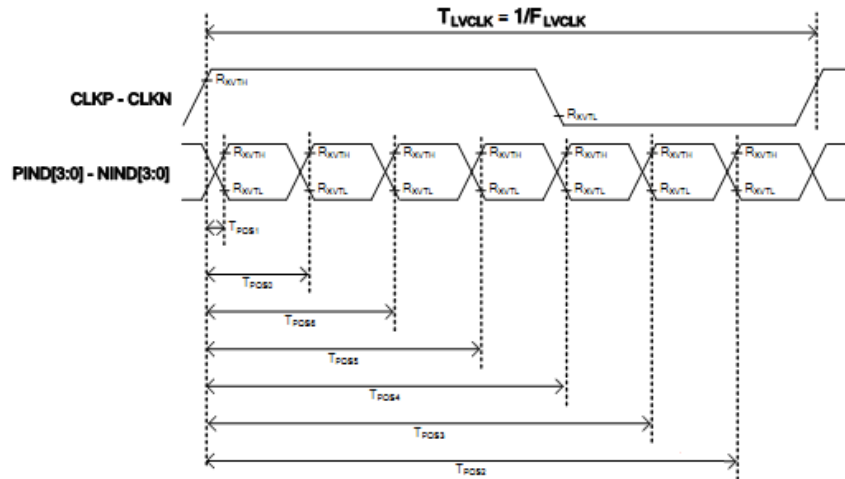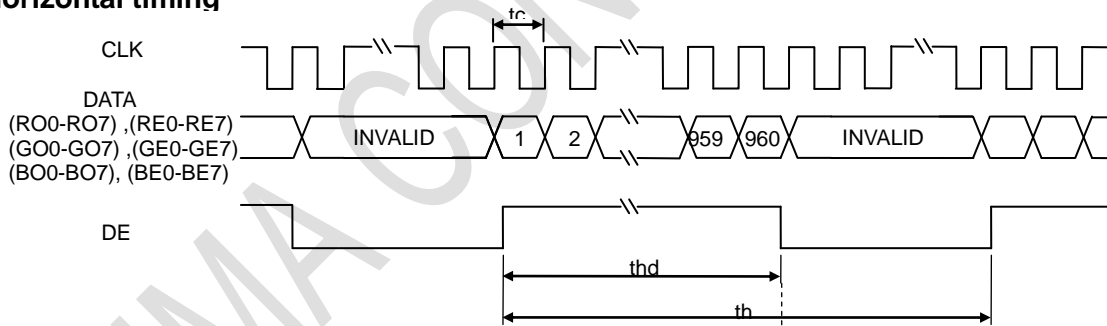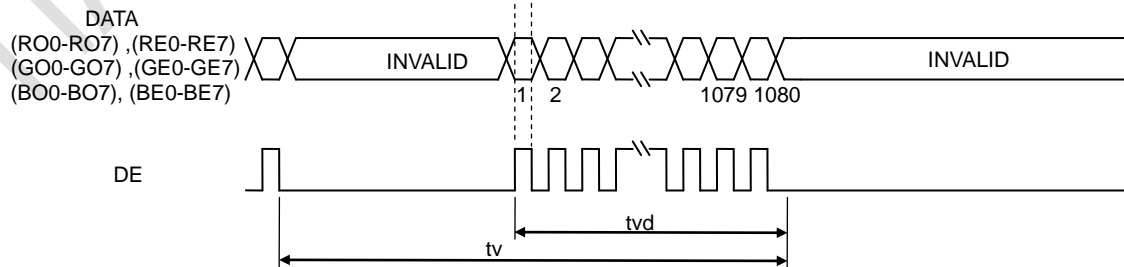
Figure 5.2.2 LVDS Data Skew

Figure 5.2.3 LVDS input timing

## 5.3 Timing input format

### Horizontal timing



### Vertical timing

## 5.1.3 Timing characteristics

(Note1, Note2, Note3)

| Parameter | | | Symbol | min. | typ. | max. | Unit | Remarks |
|---|---|---|---|---|---|---|---|---|
| CLK | Frequency | | 1/tc | 66.6 | 66.8 | 75.1 | MHz | 14.97 ns (typ.) |
| DE | Horizontal | Cycle | th | 1020 | 1024 | 1150 | CLK | |
| | | Display period | thd | | 960 | | CLK | - |
| | Vertical (One frame) | Cycle | tv | 1086 | 1088 | 1209 | H | |
| | | Display period | tvd | | 1080 | | H | |

Note1: Definition of parameters is as follows.
      tc= 1CLK, th= 1H
Note2: See the data sheet of LVDS transmitter.
Note3: Vertical cycle (tv) should be specified in integral multiple of Horizontal cycle (th).

## 5.4 Data input format
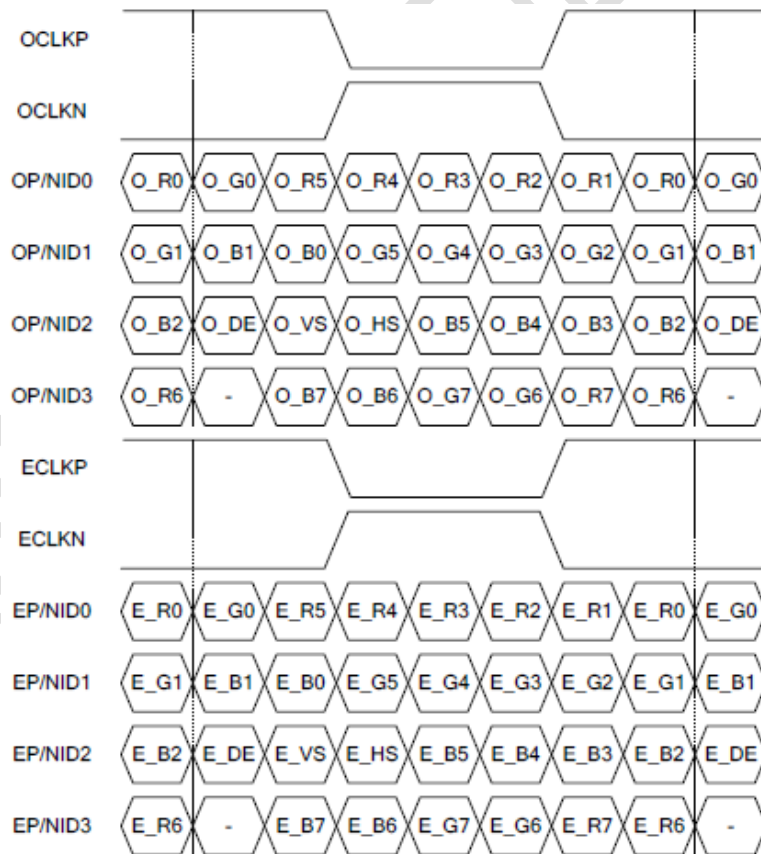


8-bit LVDS Dual Link VESA

# 6. Optical Characteristics

## 6.1 TFT Optical Characteristics

| Item | | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| View Angles | | θT | CR≧10 | 70 | 88 | -- | Degree | Note 2 |
| | | θB | | 70 | 88 | -- | | |
| | | θL | | 70 | 88 | | | |
| | | θR | | 70 | 88 | -- | | |
| Contrast Ratio | | CR | θ=0° | 800 | 900 | -- | | Left/right 0° Top/bottom 5° |
| Response Time | | $T_r$ | 25℃ | -- | 25 | 35 | ms | Note1 Note4 |
| | | $T_f$ | | | | | | |
| Chromaticity | White | x | Backlight is on | 0.254 | 0.304 | 0.354 | | Note5 Note1 |
| | | y | | 0.273 | 0.323 | 0.373 | | |
| | Red | x | | 0.581 | 0.631 | 0.681 | | |
| | | y | | 0.286 | 0.336 | 0.386 | | |
| | Green | x | | 0.262 | 0.312 | 0.362 | | |
| | | y | | 0.562 | 0.612 | 0.662 | | |
| | Blue | x | | 0.099 | 0.149 | 0.199 | | |
| | | y | | 0.003 | 0.053 | 0.103 | | |
| Uniformity | | U | | 70 | 80 | -- | % | Note1、Note6 |
| NTSC | | | | 65 | 70 | -- | % | |
| Luminance | | L | | 1400 | 1600 | -- | cd/m$^2$ | Note7 |
| Flicker | | | | | | -30 | dB | Note8 |
| Crosstalk | | | | | | 1.2 | % | |

Test Conditions:

1. $I_F$= 40mA(one channel), the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.
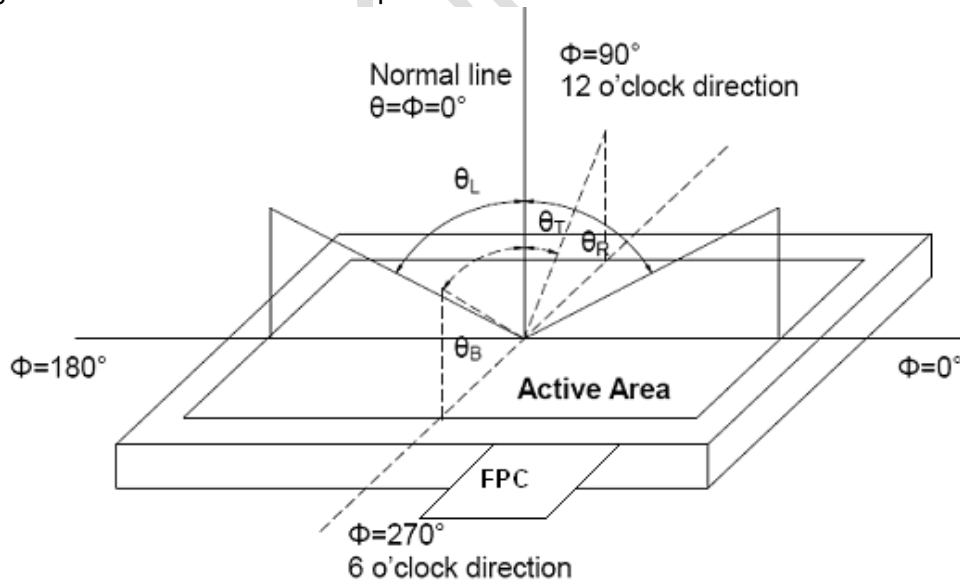
3. Flicker pattern: 128 Grayscale
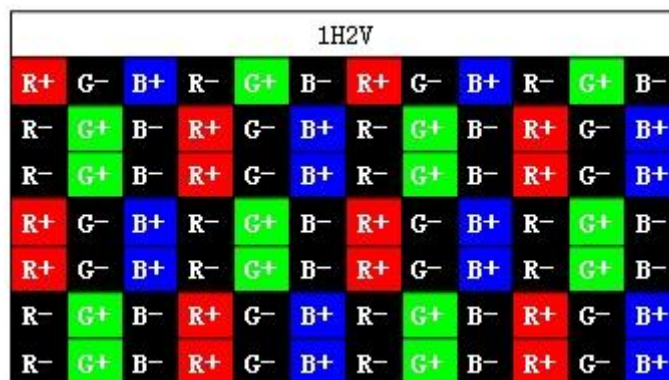
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 10 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.

**Photo detector**

**Field**

**500mm**

**TFT-LCD Module**

**LCD Panel**

**The center of the screen**
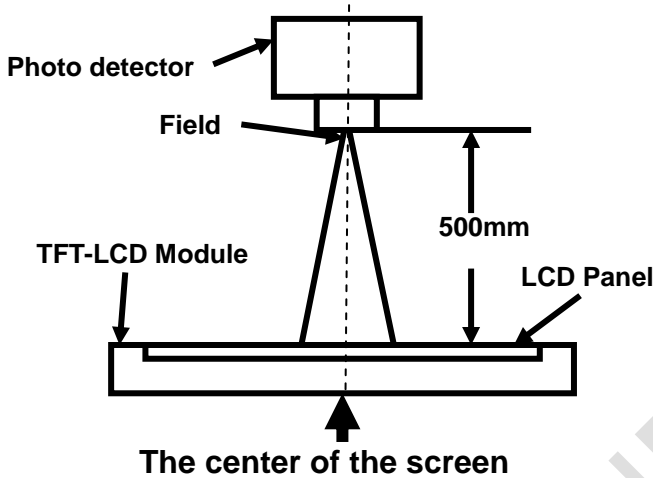
Note 2: Definition of viewing angle range and measurement system.

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

$\Phi=90°$
12 o'clock direction

Normal line
$\theta=\Phi=0°$

$\theta_L$

$\theta_T$
$\theta_R$

$\Phi=180°$

$\theta_B$

**Active Area**

$\Phi=0°$

**FPC**

$\Phi=270°$
6 o'clock direction

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 drive by Vwhite.

"Black state": The state is that the LCD should drive 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 "White" state and "Black" state. Rise time ($T_{ON}$) is the time between photo detector output intensity changed from 90% to 10%. And fall time ($T_{OFF}$) is the time between photo detector output intensity changed from 10% to 90%.
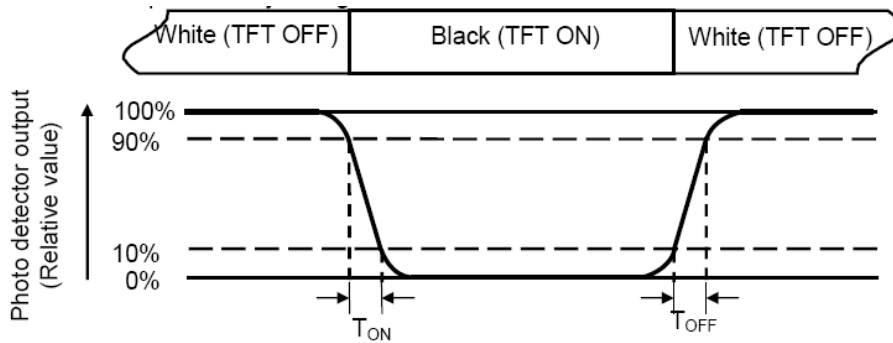
Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.
Note 6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax
L-------Active area length W----- Active area width
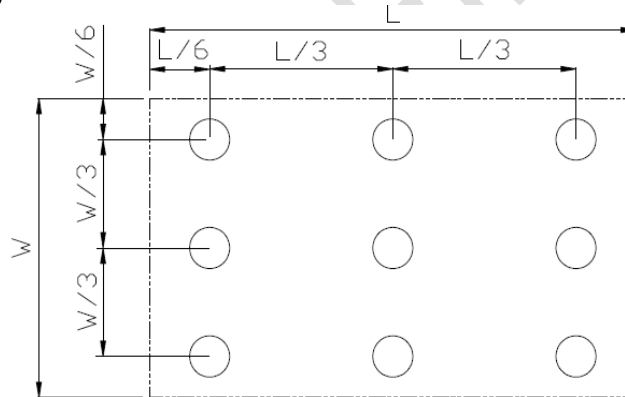


Lmax: The measured Maximum luminance of all measurement position.
Lmin: The measured Minimum luminance of all measurement position.
Note 7: Definition of Luminance:
Measure the luminance of white state at center point.
Note 8：Flicker should be measured by CA 310.

# 7 Environmental / Reliability Test

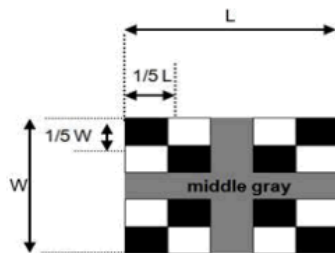| No | Test Item | Condition | Remarks |
|---|---|---|---|
| 1 | High Temperature Operation | Ta = +80℃, 240 hours | Note1,Note6,Note7 IEC60068-2-1,GB2423.2 |
| 2 | Low Temperature Operation | Ta = -20℃, 240 hours | Note1, Note7,IEC60068-2-1 GB2423.1 |
| 3 | High Temperature Storage | Ta = +85℃, 240 hours | Note1, Note7,Note8 IEC60068-2-1 GB2423.2 |
| 4 | Low Temperature Storage | Ta = -30℃, 240 hours | Note1, Note7,EC60068-2-1 GB2423.1 |
| 5 | High Temperature & Humidity Storage | Ta=+60℃、RH=90％, 240 hours | Note1,Note3, Note4,Note7 IEC60068-2-78 GB/T2423.3 |
| 6 | Thermal Shock/ Solder Joint Life Test | -30℃（30min）-80℃（30min）,Change Time:5min,100cycle | Note1,Note9 Start with cold temperature End with high temperature, IEC60068-2-14,GB2423.22 |
| 7 | ESD | C=150pF、R=330Ω Air: ±8KV    Contact:±4KV 5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa) | Note2,Note5, IEC61000-4-2 GB/T17626.2 |
| 8 | Shock Test | Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction | Note2 |
| 9 | Drop Test(package state) | Height:60cm, 1corner,3edges,6surfaces | Note2,IEC60068-2-32 GB/T2423.8 |
| 10 | Image sticking test | 60℃  4 hours judge without release | No Image sticking |

Note1: Ta is the ambient temperature of sample.

Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note3: 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.

Note4: Operate with chess board pattern as blew and lasting time and temperature is 60℃  4 hours. Then judge with 50% gray level, the Image sticking should disappear immediately.

# 8 Mechanical Drawing

NOTES:
1.Display Type: a-Si TFT;
2.Backlight: 48-chips LED, 6series-8parallel;
3.View Direction: ALL;
4.Source IC: NT51625, Gate IC: NT52601;
5.Operation Temperature: -20℃~+80℃;
  Storage Temperature: -30℃~+85℃;
6.General Tolerance: ±0.50;
7.Connector Type:
  CN1: IPEX 20455-030E-76(Socket);
  Matched connector: IPEX 20453-230T-11(Plug);
  CN2 Matched connector: Kyocera 04 6299 614 020 846+;
8.Up bezel material: SECC(t=0.5mm), down bezel material: AL5052(t=1.0mm);
9.Polarizor information:
  Top Anti-glare, Haze 21.6%; Absorption axis: 0°;
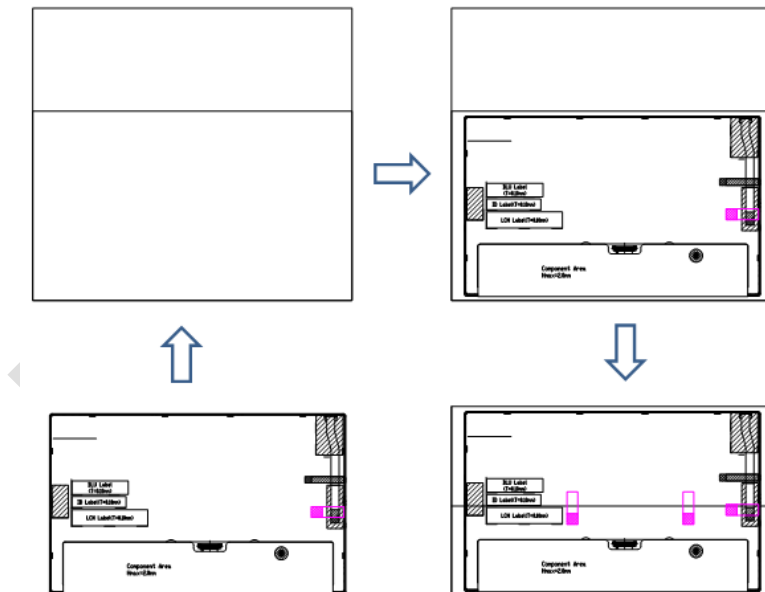  Bottom Hard coating; Absorption axis: 90°;
10.Requirements on environment protection: 0/SD002;
11.Non-marked dimension refer to CAD file and general tolerance;
12.Recommended Case Open Area should be less than Module V.A;
13.EMI film covered up bezel are using conductive tape to GND.

| CN1 | | | CN2 | |
| PIN NO. | Symbol | | PIN NO. | Symbol |
| 1 | DA0- | | 1 | A1(LED+) |
| 2 | DA0+ | | 2 | A2(LED+) |
| 3 | DA1- | | 3 | A3(LED+) |
| 4 | DA1+ | | 4 | A4(LED+) |
| 5 | DA2- | | 5 | NC |
| 6 | DA2+ | | 6 | NC |
| 7 | GND | | 7 | K1(LED-) |
| 8 | CLKA+ | | 8 | K2(LED-) |
| 9 | CLKA- | | 9 | K3(LED-) |
| 10 | DA3+ | | 10 | K4(LED-) |
| 11 | DA3- | | 11 | K5(LED-) |
| 12 | DB0+ | | 12 | K6(LED-) |
| 13 | DB0- | | 13 | K7(LED-) |
| 14 | GND | | 14 | K8(LED-) |
| 15 | DB1- | | | |
| 16 | DB1+ | | | |
| 17 | GND | | | |
| 18 | DB2- | | | |
| 19 | DB2+ | | | |
| 20 | CLKB+ | | | |
| 21 | CLKB- | | | |
| 22 | DB3+ | | | |
| 23 | DB3- | | | |
| 24 | GND | | | |
| 25 | GND | | | |
| 26 | GND | | | |
| 27 | GND | | | |
| 28 | VCC | | | |
| 29 | VCC | | | |
| 30 | VCC | | | |

| | | | | | | | |
| REV | DC/EC NUMBER | DESCRIPTION | DATE |
| | XMGL-BGT7-20180408002 | Up bezel surface black ink printing; Bezel add support structure; Modify LED drive current & PCB protect film outline; Add mark line | 2018-04-10 |

| CONTROL DIMENSION | REFERENCE DIMENSION | ( ) | 2D Rev. | 3D Rev. | NA | 01 |
| DESIGNED | Jin Huohan | 2018-10-09 | PRODUCT NUMBER | TM116VDSP01-00 | 3rd ANGLE | PAGE | 1/1 |
| CHECKED | Yao Lu | 2018-10-09 | PART NAME | LCM OUTLINE | UNIT | mm |
| APPROVED | Du Wanchun | 2018-10-09 | DRAWING NUMBER | YGT1-01 | SCALE | 1:1 |
| | | | MATERIAL NUMBER | TM116VDSP01-00 | | |

11.6" TFT
1920(RGB)×1080
View Direction: ALL

Backlight Circuit Diagram
6S-8P; IF=40mA/LED

RGB Detail
SCALE 100:1

DETAIL A
SCALE 4:1

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## 9.Packaging Material

| No | Item | Model (Material) | Dimensions(mm) | Unit Weight(Kg) | Quantity |
|---|---|---|---|---|---|
| 1 | LCM module | TM116VDSP01-00 | 273.50*166.50*7.80 | 0.527 | 14 |
| 2 | Partition_1 | Corrugated Paper | 513.00×413.00×240 | 1.42 | 1 |
| 3. | Anti-Static Bubble Bag | PE | 270×295 | 0.01 | 14 |
| 4 | Dust-Proof Bag | PE | 700*545 | 0.06 | 1 |
| 5 | Partition_2 | Corrugated Paper | 513×413 | 0.1 | 1 |
| 6 | Corrugated Bar | Corrugated Paper | 367×305×48 | 0.08 | 1 |
| 7 | Crepe Paper Tape | Tape | 30*10 | 0.00003 | 42 |
| 8 | Carton | Corrugated Paper | 530×430×274 | 0.76 | 1 |
| 9 | LABEL | Label | 100×52 | 0.000345 | 1 |
| 10 | Total weight | 10±5%Kg | | | |
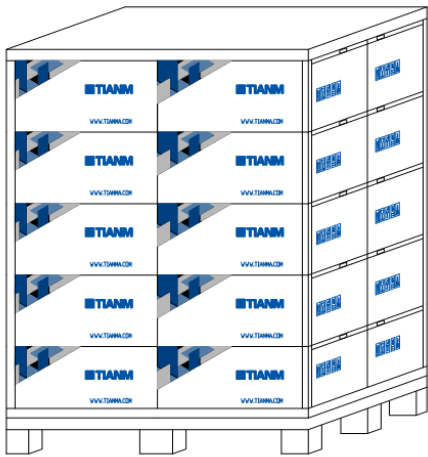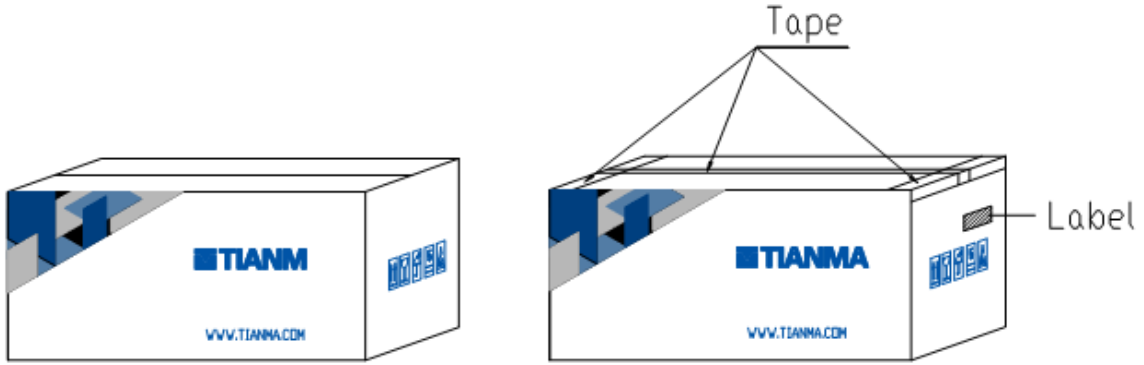
# 10. Precautions for Use of LCD Modules

### 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

    — 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.

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

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

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

    d. 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.

**V TIANMA**

**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** The LCD modules should be no falling and violent shocking during transportation, and

also should avoid excessive press, water, damp and sunshine.

**10.4** Bar Code definition on module

**V TM062RDS01**                              RoHS

LOT NO: O11A114923001                   MADE IN CHINA

OEM NO: SO62RD1A66SA1SA14970007

Take TM062RDS01 as an example.
Lot No:
01  1  A  1 14 9  23 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Management code
② Grade code
③ Version
④ Product line
⑤ Check year（14 meaning is 2014）
⑥ Check month（1~9、A meaning is October, B meaning is November, C meaning is December）
⑦ Check date（01~31）
⑧ Lot Serial No

OEM No：

S 062RD1 A 66   SA 1 SA   1 497 0007
① ②      ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨     ⑩

① AVIC code
② Product No.
③ Version
④ Source IC&Gate IC vender code
⑤ Cell location code
⑥ Cell line code

⑦ Module location code

⑧ Module line code

⑨ YEAR：0~9(1 meaning is 2011，2 meaning is 2012)，month：1~9，A~C，date：1~9，A~V。

⑩ Serial No.