



MODEL NO. : TM070RDH12

ISSUED DATE: 2010-06-07

VERSION : Ver 1.0

- Preliminary Specification
- Final Product Specification

Customer : _____

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

SHANGHAI TIANMA Confirmed :

| Prepared by | Checked by | Approved by |
|-------------|------------|-------------|
| | | |

This technical specification is subjected to change without notice



Table of Contents

| | |
|--|----|
| Table of Contents | 2 |
| Record of Revision..... | 3 |
| 1 General Specifications | 4 |
| 2 Input/Output Terminals | 5 |
| 3 Absolute Maximum Ratings | 7 |
| 4 Electrical Characteristics..... | 8 |
| 5 Timing Chart..... | 13 |
| 6 Optical Characteristics | 17 |
| 7 Environmental / Reliability Test | 20 |
| 8 Mechanical Drawing..... | 21 |
| 9 Packing Drawing | 22 |
| 10 Precautions for Use of LCD Modules..... | 24 |

TIANMA CONFIDENTIAL



1 General Specifications

| Feature | | Spec |
|-----------------------------------|---------------------------------|------------------------|
| Display Spec. | Size | 7.0 inch |
| | Resolution | 800(RGB) x 480 |
| | Interface | RGB 24 bit with TCON |
| | Color Depth | 16.7M |
| | Technology Type | a-Si |
| | Pixel Pitch (mm) | 0.1926x0.1790 |
| | Pixel Configuration | R.G.B. Vertical Stripe |
| | Display Mode | TM with Normally White |
| | Surface Treatment(Up Polarizer) | Anti Glare |
| | Viewing Direction | 12 o'clock |
| | Gray Scale Inversion Direction | 6 o'clock |
| Mechanical Characteristics | LCM (W x H x D) (mm) | 164.9x100.0x5.7 |
| | Active Area(mm) | 154.08X85.92 |
| | With /Without TSP | Without TSP |
| | Weight (g) | TBD |
| | LED Numbers | 21 LEDs |

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 CN1 of FPC

Matching Connector: FH28-60S-0.5SH

| Pin No | Symbol | I/O | Description | Remark |
|--------|--------|-----|---|--------|
| 1 | AGND | P | Ground | |
| 2 | AVDD | P | Analog power | |
| 3 | VCC | P | Digital power supply | |
| 4 | R0 | I | Red data(LSB) | |
| 5 | R1 | I | Red data | |
| 6 | R2 | I | Red data | |
| 7 | R3 | I | Red data | |
| 8 | R4 | I | Red data | |
| 9 | R5 | I | Red data | |
| 10 | R6 | I | Red data | |
| 11 | R7 | I | Red data(MSB) | |
| 12 | G0 | I | Green data(LSB) | |
| 13 | G1 | I | Green data | |
| 14 | G2 | I | Green data | |
| 15 | G3 | I | Green data | |
| 16 | G4 | I | Green data | |
| 17 | G5 | I | Green data | |
| 18 | G6 | I | Green data | |
| 19 | G7 | I | Green data(MSB) | |
| 20 | B0 | I | Blue data(LSB) | |
| 21 | B1 | I | Blue data | |
| 22 | B2 | I | Blue data | |
| 23 | B3 | I | Blue data | |
| 24 | B4 | I | Blue data | |
| 25 | B5 | I | Blue data | |
| 26 | B6 | I | Blue data | |
| 27 | B7 | I | Blue data(MSB) | |
| 28 | DCLK | I | Clock input | |
| 29 | DE | I | Data enable signal. Active high to enable data | |
| 30 | HSD | I | Horizontal sync input. negative polarity | |
| 31 | VSD | I | Vertical sync input. negative polarity | |
| 32 | MODE | I | DE/SYNC mode select. H: DE mode ,L: SYNC mode | |
| 33 | RSTB | I | Global reset pin | |
| 34 | STBYB | I | Standby mode select H: normal operation, L: standby mode | |
| 35 | SHLR | I | Source right or left sequence control | |
| 36 | VCC | P | Digital power | |
| 37 | UPDN | I | Gate up or down scan control | |
| 38 | GND | P | Ground | |
| 39 | AGND | P | Ground | |
| 40 | AVDD | P | Analog power | |
| 41 | VCOM | I | Common voltage input | |

The information contained herein is the exclusive property of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation, and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation.



| | | | | |
|----|------|---|--|--|
| 42 | DITH | I | Dithering setting. H: 6bit resolution, L: 8bit resolution | |
| 43 | NC | - | Not connect | |
| 44 | NC | - | Not connect | |
| 45 | V10 | I | Gamma voltage 10 | |
| 46 | V9 | I | Gamma voltage 9 | |
| 47 | V8 | I | Gamma voltage 8 | |
| 48 | V7 | I | Gamma voltage 7 | |
| 49 | V6 | I | Gamma voltage 6 | |
| 50 | V5 | I | Gamma voltage 5 | |
| 51 | V4 | I | Gamma voltage 4 | |
| 52 | V3 | I | Gamma voltage 3 | |
| 53 | V2 | I | Gamma voltage 2 | |
| 54 | V1 | I | Gamma voltage 1 | |
| 55 | NC | - | Not connect | |
| 56 | VGH | P | Positive power for TFT | |
| 57 | VCC | P | Digital power | |
| 58 | VGL | P | Negative power for TFT | |
| 59 | GND | P | Ground | |
| 60 | NC | - | Not connect | |

Note: I/O definition.

I---Input pin, O---Output pin, P--- Power/Ground, N--- No Connection

2.2 CN2 of LED BLU Connector

| Pin | Symbol | I/O | Description | Remark |
|-----|--------|-----|-------------|-------------|
| 1 | LED+ | P | LED Anode | Red Cable |
| 2 | LED- | P | LED Cathode | White Cable |

2.3 U/D R/L Function Description

| Scan Control Input | | Scanning Direction |
|--------------------|------|---------------------------|
| UPDN | SHLR | |
| GND | VCC | Up to Down, Left to Right |
| VCC | GND | Down to Up, Right to Left |
| GND | GND | Up to Down, Right to Left |
| VCC | VCC | Down to Up, Left to Right |



3 Absolute Maximum Ratings

AGND= GND=0V, Ta = 25°C

| Item | Symbol | Min | Max | Unit | Remark |
|---------------------------|------------------|--------|-------|------|--------------|
| Power Voltage | VCC | -0.50 | 5.00 | V | |
| | AVDD | -0.50 | 15.00 | V | |
| | VGH | -0.30 | 42.00 | V | |
| | VGL | -20.00 | 0.30 | V | |
| | VGH-VGL | -0.30 | 40.00 | V | |
| Backlight Forward Current | I _{LED} | - | 25.0 | mA | For each LED |
| Operating Temperature | T _{OPR} | -20.0 | 70.0 | °C | |
| Storage Temperature | T _{STG} | -30.0 | 80.0 | °C | |



4 Electrical Characteristics

4.1 Recommended Operating Condition

AGND=GND=0V, Ta = 25°C

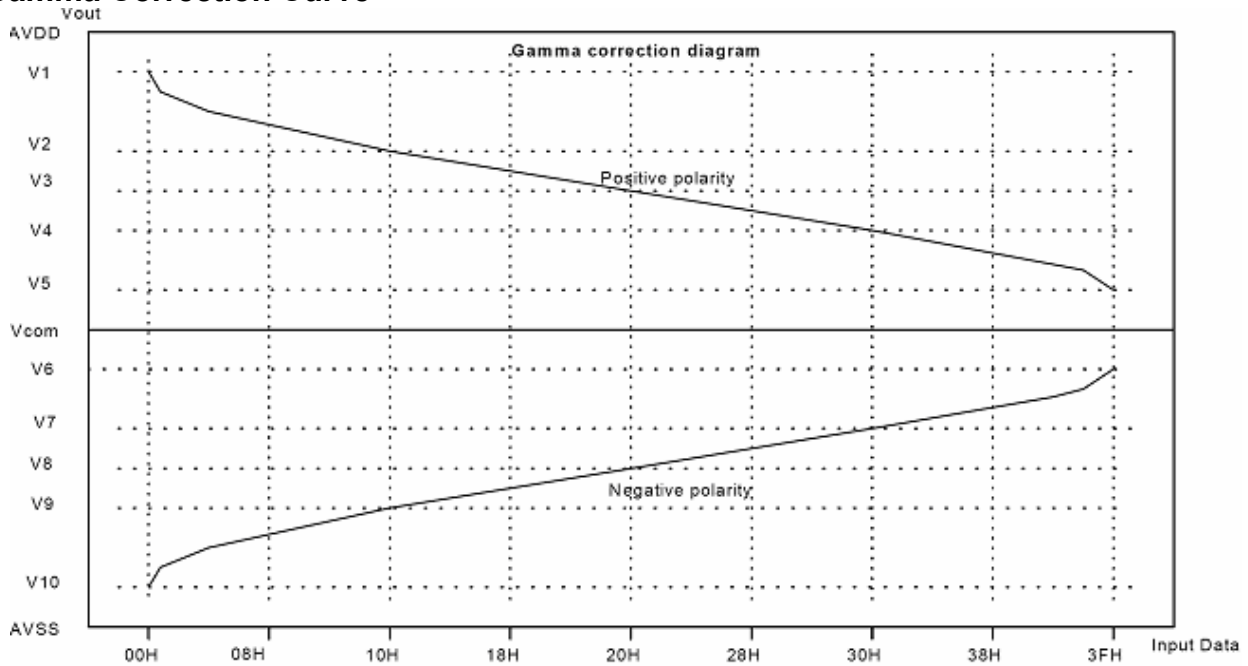
| Parameter | | Symbol | MIN | TYP | MAX | Unit | Remark |
|-----------------------------------|------------|-------------------|----------|------|----------|------|--|
| Digital supply Voltage | | VCC | 3.00 | 3.30 | 3.60 | V | |
| Analog supply Voltage | | AVDD | TBD | TBD | TBD | V | |
| Gate on voltage | | VGH | 19.80 | TBD | 24.20 | V | |
| Gate off voltage | | VGL | -7.70 | TBD | -6.30 | V | |
| Common Electrode Driving Signal | | VCOM | - | TBD | - | V | |
| Input level of Gamma voltage | | V1~V5 | 0.4*AVDD | - | AVDD-1.0 | V | |
| | | V6~V10 | 0.1 | - | 0.6*AVDD | V | |
| Input Signal Voltage | Low Level | V _{IL} | 0 | - | 0.3*VCC | V | R0~R7,G0~G7,0~B7,DE, DCLK,HSD,VSD,MODE, RSTB,STBYB,SHLR,UPDN, DITH |
| | High Level | V _{IH} | 0.7*VCC | - | VCC | V | |
| Current of digital supply voltage | | I _{VCC} | - | - | TBD | mA | VCC=3.3V color bar pattern |
| Current of analog supply voltage | | I _{AVDD} | - | - | TBD | mA | AVDD=Typ color bar pattern |
| Current of Gate on voltage | | I _{VGH} | - | - | TBD | mA | VGH=22.0V |
| Current of Gate off voltage | | I _{VGL} | - | - | TBD | mA | VGL=-7.0V |

Note: The value is for design stage only.



4.2 Gamma Correction Reference Voltage Setting

Gamma Correction Curve



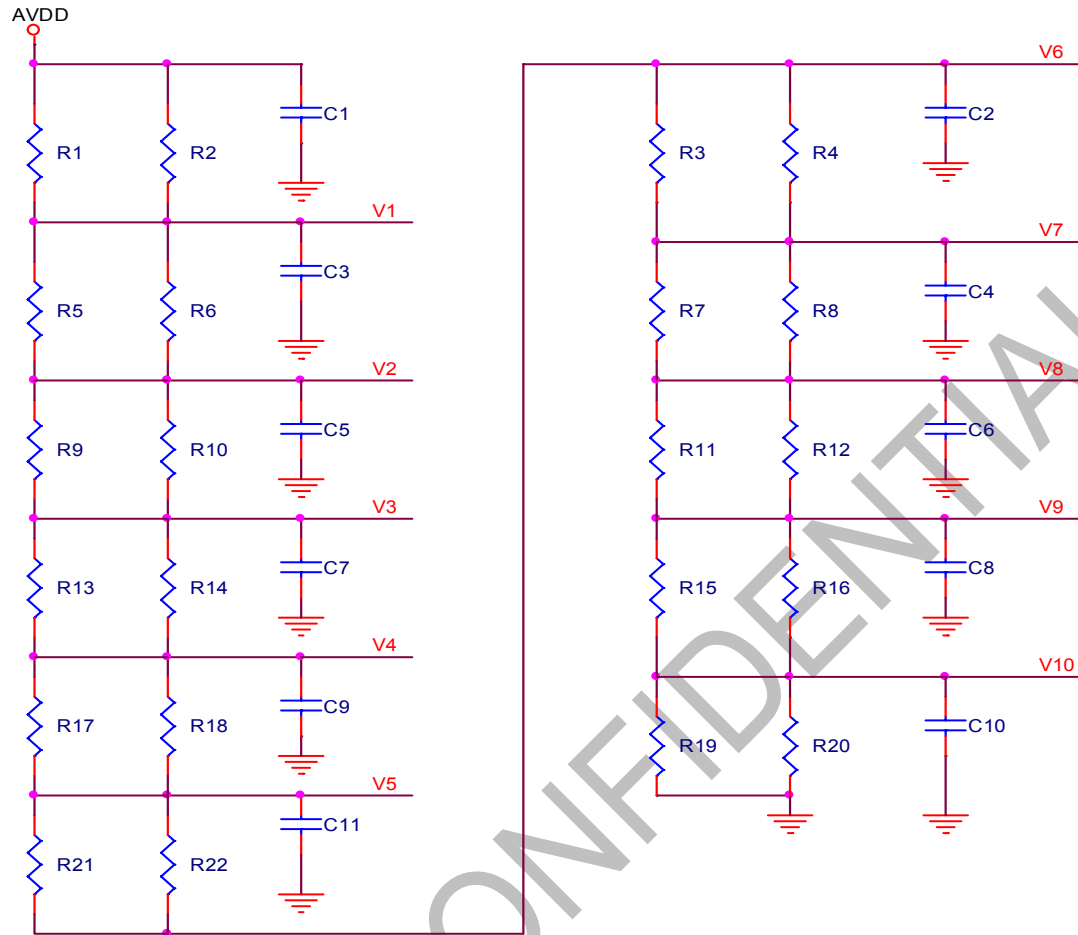
Gamma Correction Reference Voltage Setting

| Parameter | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|--------|-----|----------|----------|------|--------|
| Gamma correction reference voltage V1~V10 | V1 | - | TBD | AVDD-1.0 | V | |
| | V2 | - | TBD | - | V | |
| | V3 | - | TBD | - | V | |
| | V4 | - | TBD | - | V | |
| | V5 | - | TBD | - | V | |
| | V6 | - | TBD | - | V | |
| | V7 | - | TBD | - | V | |
| | V8 | - | TBD | - | V | |
| | V9 | - | TBD | - | V | |
| | V10 | | AGND+0.1 | TBD | - | V |

Note: the value is for design stage only;

AVDD-1.0 > V1 > V2 > V3 > V4 > V5 > V6 > V7 > V8 > V9 > V10 > AGND+0.1V

Gamma Correction Reference Circuit



Gamma Correction Resistance Value

| Symbol | Unit | Resistance | Symbol | Unit | Resistance |
|-----------|------|------------|-----------|------|------------|
| R1// R2 | Ω | TBD | R3// R4 | Ω | TBD |
| R5// R6 | Ω | TBD | R7// R8 | Ω | TBD |
| R9// R10 | Ω | TBD | R11// R12 | Ω | TBD |
| R13// R14 | Ω | TBD | R15// R16 | Ω | TBD |
| R17// R18 | Ω | TBD | R19// R20 | Ω | TBD |
| R21// R22 | Ω | TBD | C1~C10 | uF | TBD |

Note: Setting the resistance only when AVDD=10.60V, AGND=GND=0V



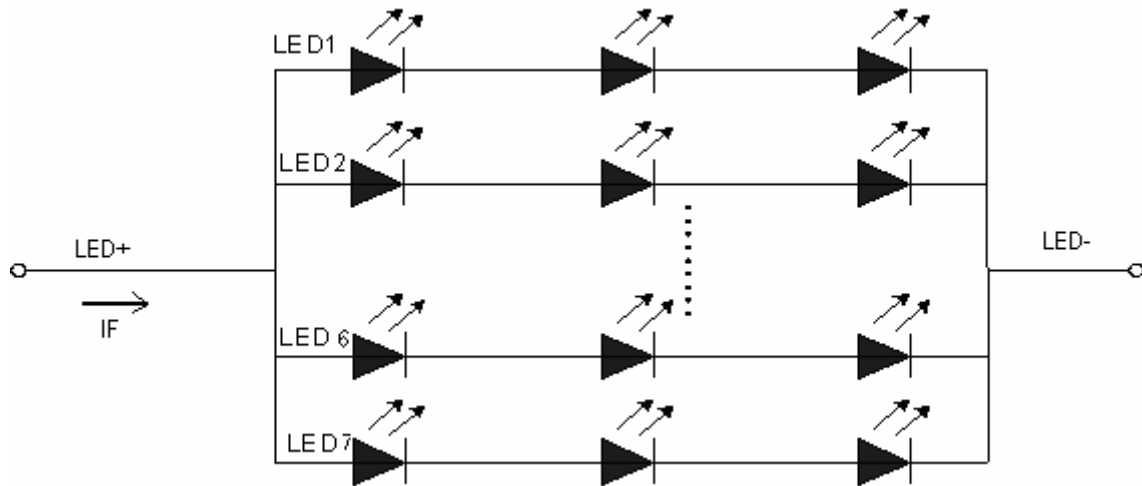
4.3 Recommended Driving Condition for Backlight

Ta=25°C

| Item | Symbol | Min | Typ | Max | Unit | Remark |
|-----------------------------|----------|-----|-------|------|------|---|
| Forward Current | I_F | - | 140.0 | - | mA | 21LEDs (3 LED Serial, 7 LED Parallel) |
| Forward Voltage | V_F | - | 9.6 | 11.4 | V | |
| Backlight Power Consumption | W_{BL} | - | 1344 | - | W | |

Note 1: The LED driving condition is defined for total backlight consumption, and which depend on Forward Current setting.

Note 2: Forward Voltage is just for reference for one serial.



4.4 Absolute Maximum Ratings

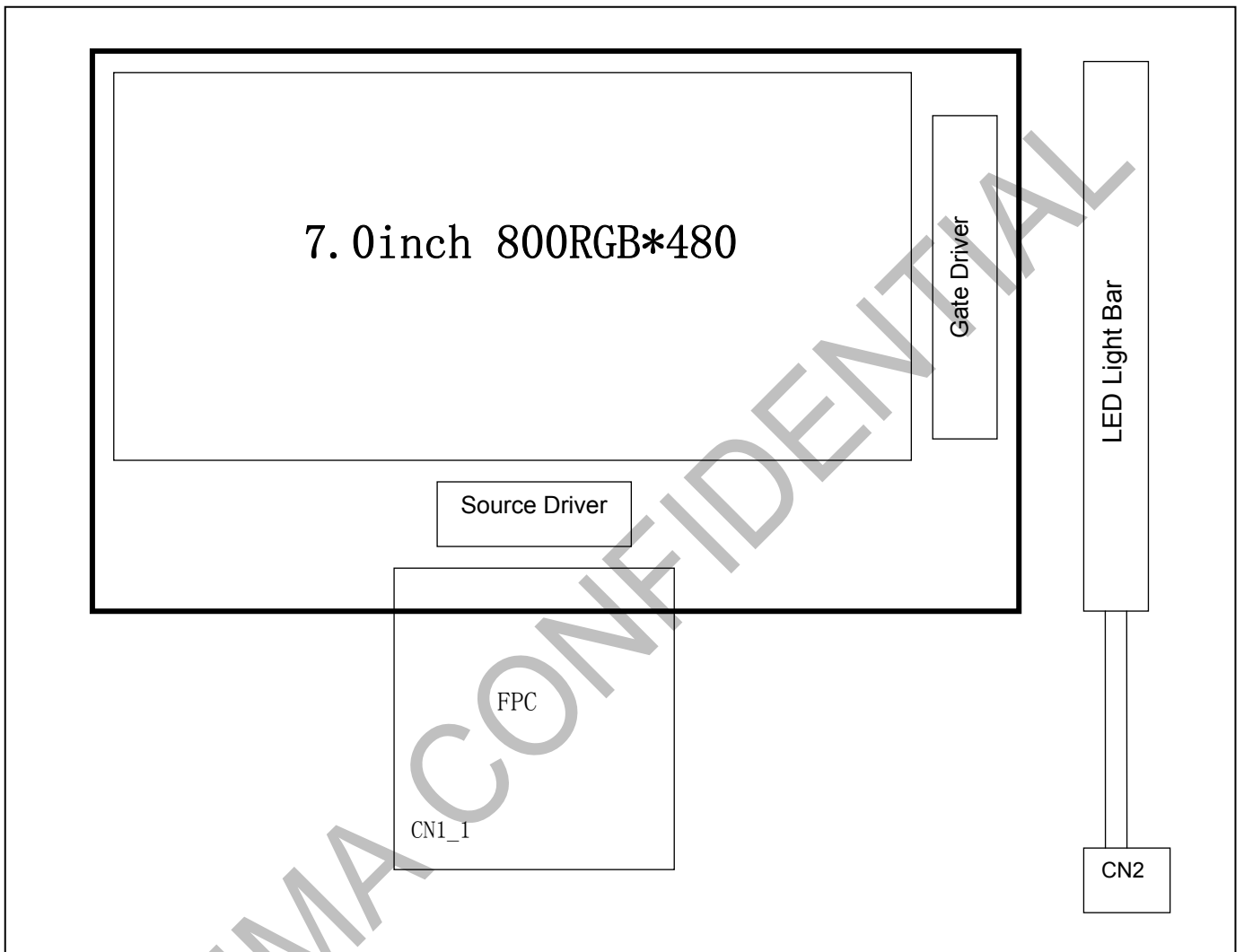
AGND=GND=0V, Ta = 25°C

| Parameter | Symbol | MIN | MAX | Unit | Remark |
|-----------------------|---------|--------|-------|------|--------|
| Power Voltage | VCC | -0.50 | 5.00 | V | |
| | AVDD | -0.50 | 15.00 | V | |
| | VGH | -0.30 | 42.00 | V | |
| | VGL | -20.00 | 0.30 | V | |
| | VGH-VGL | -0.30 | 40.00 | V | |
| Operating Temperature | Top | -20.0 | 70.0 | °C | |
| Storage Temperature | Tst | -30.0 | 80.0 | °C | |

The information contained herein is the exclusive property of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation, and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation.



4.5 Block Diagram





5 Timing Chart

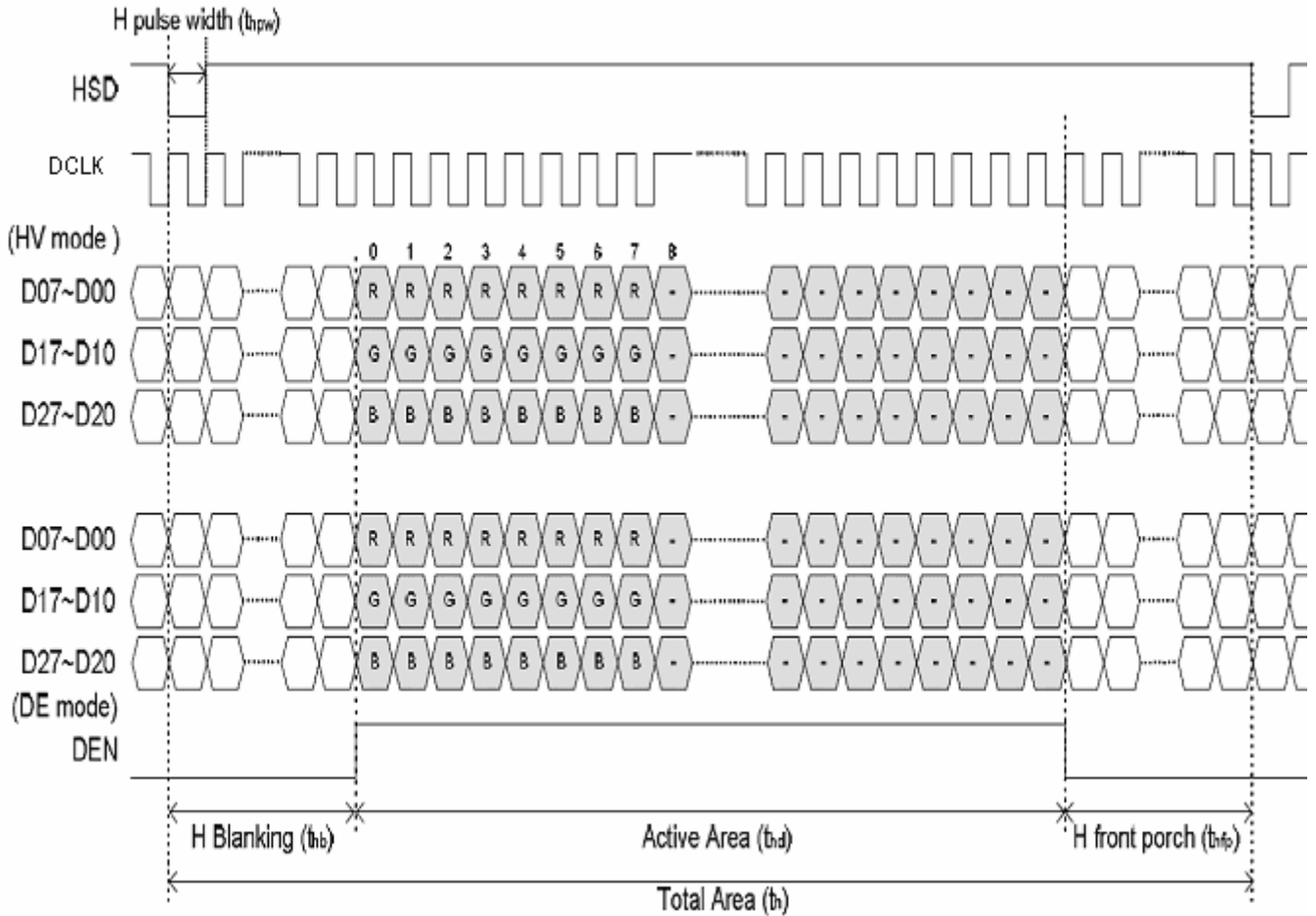
5.1 TFT-LCD Input Timing

VCC=3.3V, AGND=GND=0V, Ta=25°C

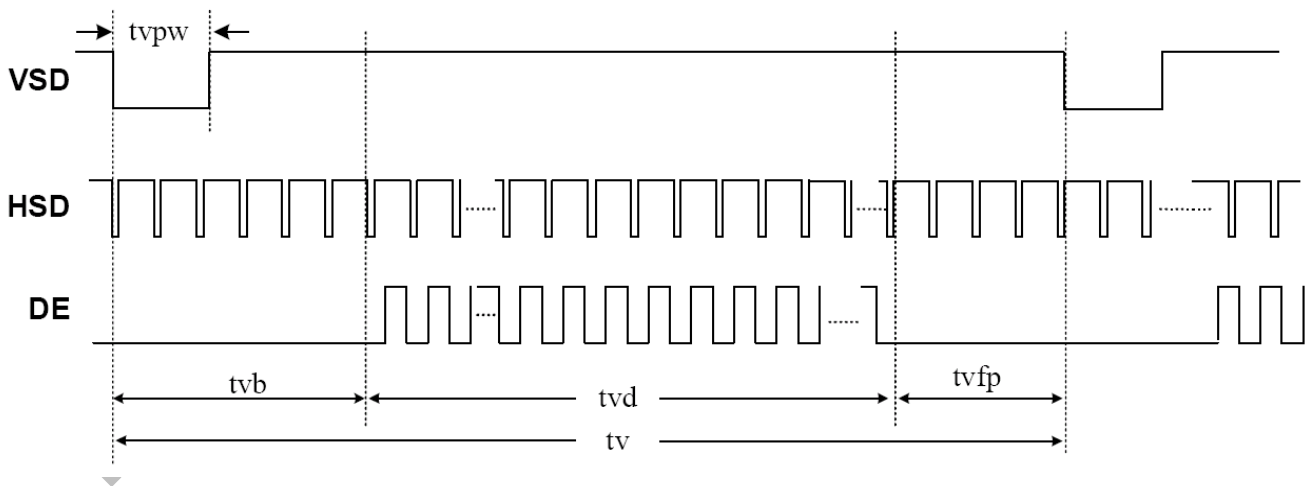
| Parameter | Symbol | Min | Typ | Max | Unit | Remark |
|-----------|--------|-----|------|------|------|--------|
| DCLK | Fclk | - | 30 | 40 | MHZ | |
| | tclk | - | 33.3 | 25.0 | ns | |
| HSD | th | 928 | 928 | 928 | tclk | |
| | thd | 800 | 800 | 800 | tclk | |
| | thpw | 1 | 48 | - | tclk | |
| | thb | 88 | 88 | 88 | tclk | |
| | thfp | 1 | 40 | - | tclk | |
| VSD | tv | 513 | 525 | - | th | |
| | tvd | 480 | 480 | 480 | th | |
| | tpw | 3 | 3 | - | th | |
| | tvb | 32 | 32 | 32 | th | |
| | tvfp | 1 | 13 | - | th | |

Note: DE timing refer to HSD, VSD input timing.

TCON Horizontal Input Timing Diagram



TCON Vertical Input Timing Diagram HV



5.2 Input timing Characteristics of Interface(DCLK,VSD,HSD,DE)

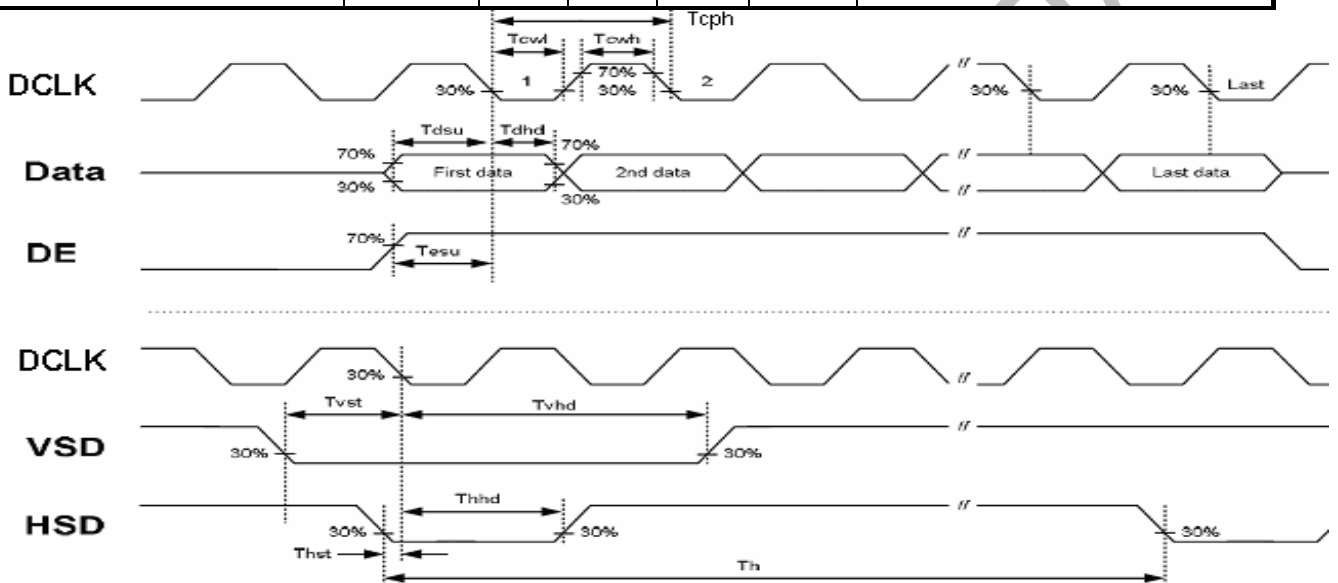
(VCC=3.3V, AVSS=GND=0V, Ta=25°C)

| Parameter | Symbol | Min | Typ | Max | Unit | Remark |
|----------------|--------|-----|------|------|------|--------|
| DCLK frequency | Fclk | - | 30.0 | 40.0 | MHz | |

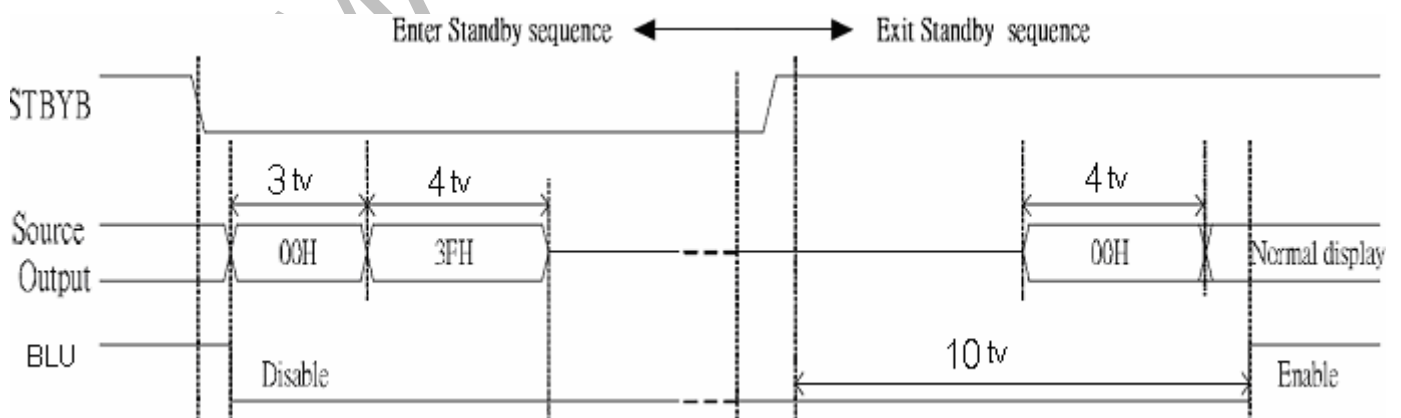
The information contained herein is the exclusive property of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation, and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation.



| | | | | | | |
|------------------|------|-----|------|-----|------|--------------|
| DCLK cycle time | Tcph | - | 33.3 | 25 | ns | |
| DCLK pulse width | Tcw | 40% | 50% | 60% | Tcph | |
| VSD setup time | Tvst | 8 | | | ns | |
| VSD hold time | Tvhd | 8 | - | - | ns | |
| HSD setup time | Thst | 8 | | | ns | |
| HSD hold time | Thhd | 8 | - | - | ns | |
| Data setup time | Tdsu | 8 | | | ns | Data to DCLK |
| Data hold time | Tdhd | 8 | - | - | ns | Data to DCLK |
| DE setup time | Tesu | 8 | - | - | ns | |
| DE hold time | Tehd | 8 | - | - | ns | |

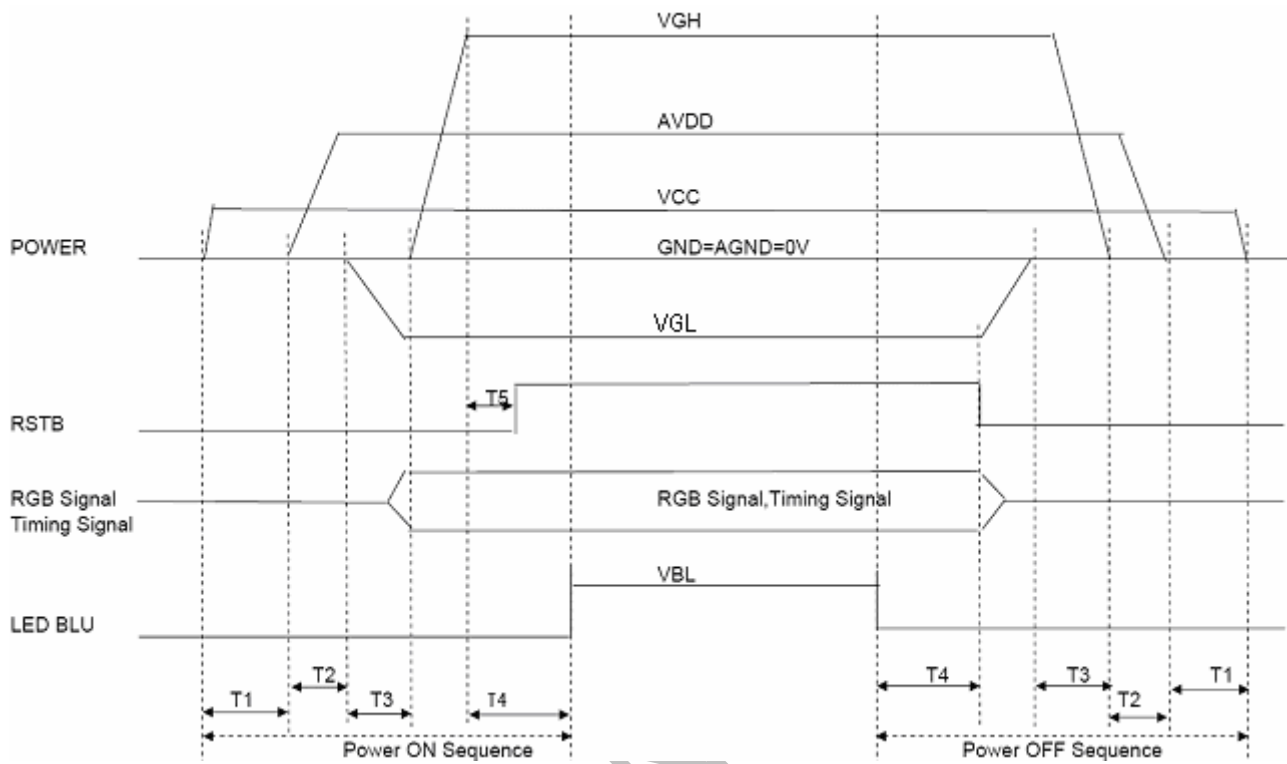


5.3 Enter and Exit Standby Mode Sequence





6. POWER ON/OFF SEQUENCE



Note: $T_1 \geq 20\text{ms}$, $T_2 \geq 20\text{ms}$, $T_3 \geq 5\text{ms}$, $T_4 \geq 100\text{ms}$, $T_5 \geq 5\text{ms}$.

TIANMA.COM



6 Optical Characteristics

Ta=25°C

| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|----------------|------------|------------------|-----|-----|-----|-------------------|----------------|
| View Angles | θ_T | $CR \geq 10$ | 50 | 60 | -- | Degree | Note 2 |
| | θ_B | | 60 | 70 | -- | | |
| | θ_L | | 60 | 70 | -- | | |
| | θ_R | | 60 | 70 | -- | | |
| Contrast Ratio | CR | $\theta=0^\circ$ | 400 | 500 | -- | | Note1 Note3 |
| Response Time | T_{ON} | 25°C | -- | 20 | 30 | ms | Note1 Note4 |
| | T_{OFF} | | | | | | |
| Chromaticity | White | Backlight is on | x | TBD | TBD | TBD | Note1 Note5 |
| | | | y | TBD | TBD | TBD | |
| | Red | | x | TBD | TBD | TBD | |
| | | | y | TBD | TBD | TBD | |
| | Green | | x | TBD | TBD | TBD | |
| | | | y | TBD | TBD | TBD | |
| | Blue | | x | TBD | TBD | TBD | |
| | | | y | TBD | TBD | TBD | |
| Uniformity | U | | 75 | 80 | -- | % | Note1 Note6 |
| NTSC | | | -- | 50 | -- | % | Note 5 |
| Luminance | L | | 280 | 350 | -- | cd/m ² | Note1 Note7 |

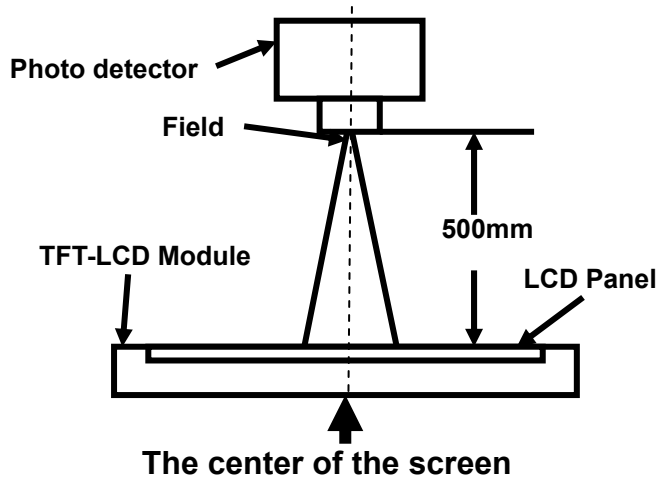
Test Conditions:

1. $I_F = 160 \text{ mA}$, $V_F = 9.6 \text{ V}$, and the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.



Note 1: Definition of optical measurement system.

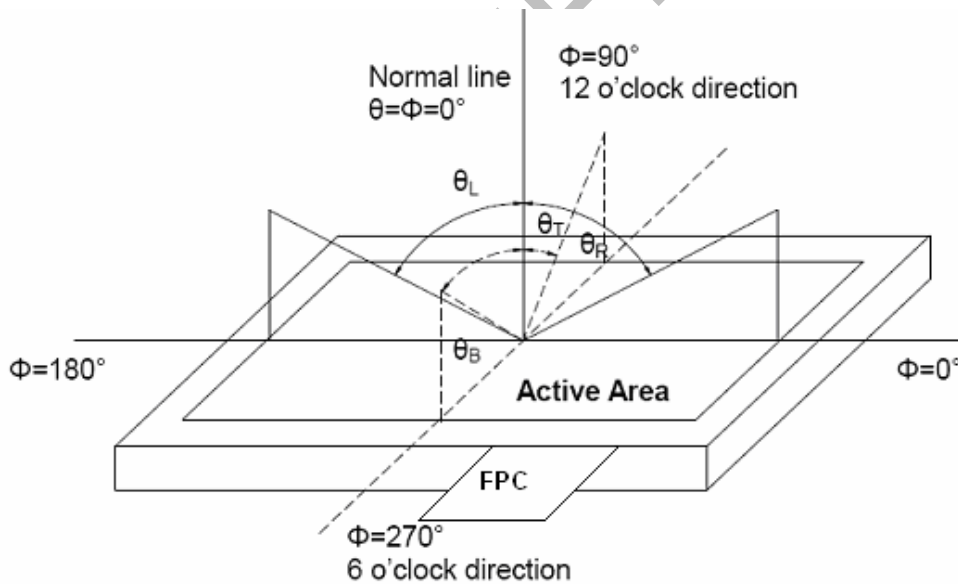
The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



| 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).



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 V_{white}.

“Black state”: The state is that the LCD should drive by V_{black}.

V_{white}: To be determined V_{black}: To be determined.

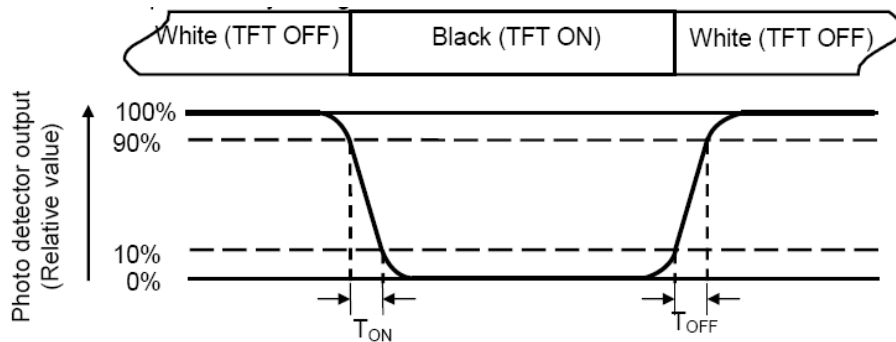
Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and

The information contained herein is the exclusive property of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation, and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation.



“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)

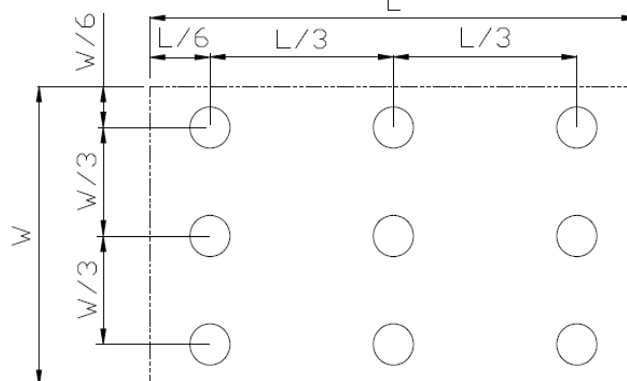
Color coordinates measured at center point of LCD.

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.

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

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



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**

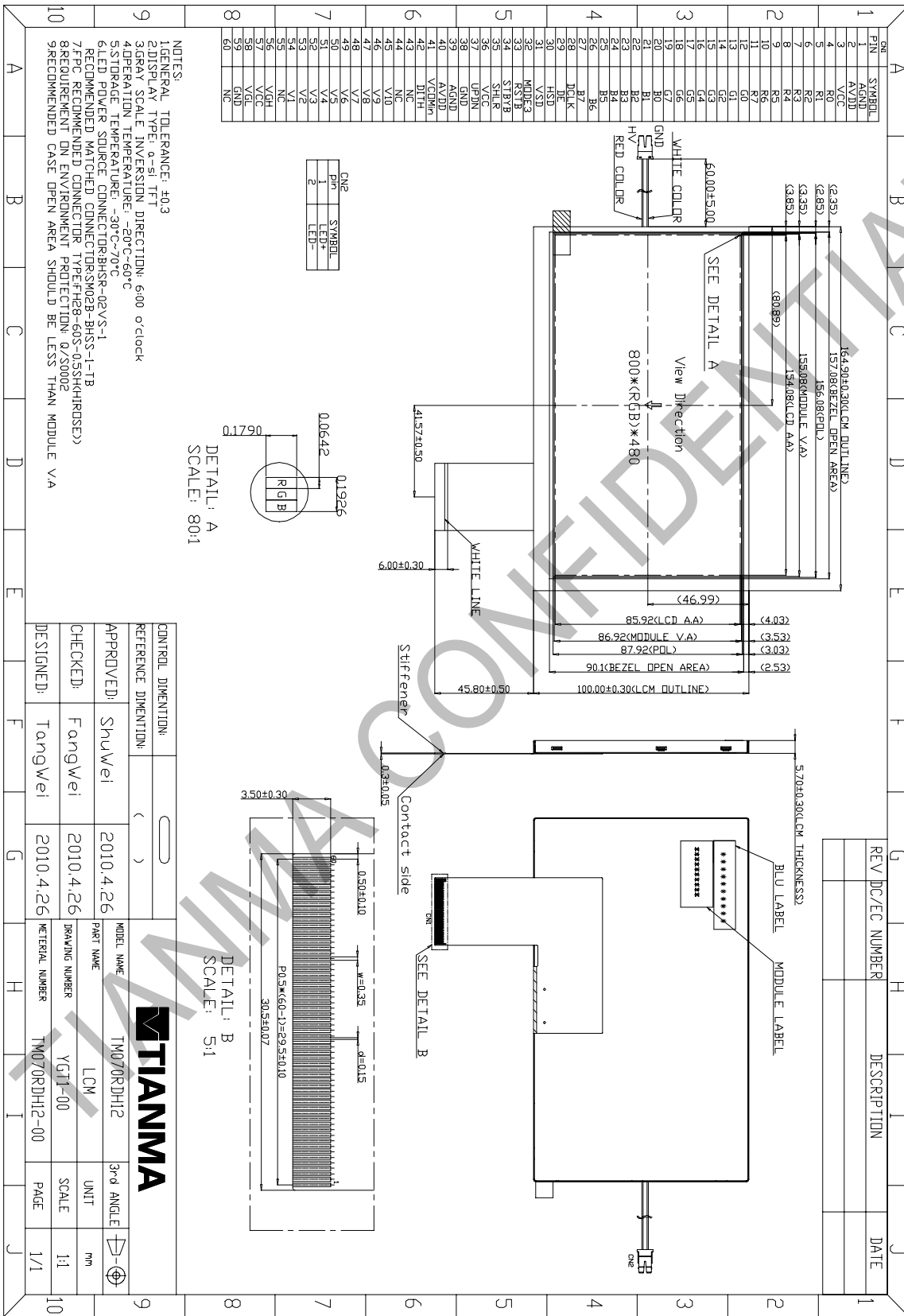
| No | Test Item | Condition | Remarks |
|----|--|--|--|
| 1 | High Temperature Operation | Ts = +70°C, 240 hours | IEC60068-2-1 GB2423.2 |
| 2 | Low Temperature Operation | Ta = -20°C, 240 hours | IEC60068-2-1 GB2423.1 |
| 3 | High Temperature Storage | Ta = +80°C, 240 hours | IEC60068-2-1 GB2423.2 |
| 4 | Low Temperature Storage | Ta = -30°C, 240 hours | IEC60068-2-1 GB2423.1 |
| 5 | Storage at High Temperature and Humidity | Ta = +60°C, 90% RH max,240hours | IEC60068-2-78 GB/T2423.3 |
| 6 | Thermal Shock (non-operation) | -30°C 30 min~+80°C 30 min, Change time:5min, 100 Cycle | Start with cold temperature, End with high temperature, IEC60068-2-14 GB2423.22 |
| 7 | ESD | C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15°C~35°C, 30%~60%.86Kpa~106Kpa) | IEC61000-4-2 GB/T17626.2 |
| 8 | Vibration Test | Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) | IEC60068-2-6 GB/T2423.10 |
| 9 | Mechanical Shock (Non Op) | Half Sine Wave 100G 6ms, ±X,±Y,±Z 3times for each direction | IEC60068-2-27 GB/T2423.5 |
| 10 | Package Drop Test | Height:60cm, 1corner,3edges,6surfaces | IEC60068-2-34 GB/T2423.11 |

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

Note2: Ta is the ambient temperature of samples.



8 Mechanical Drawing



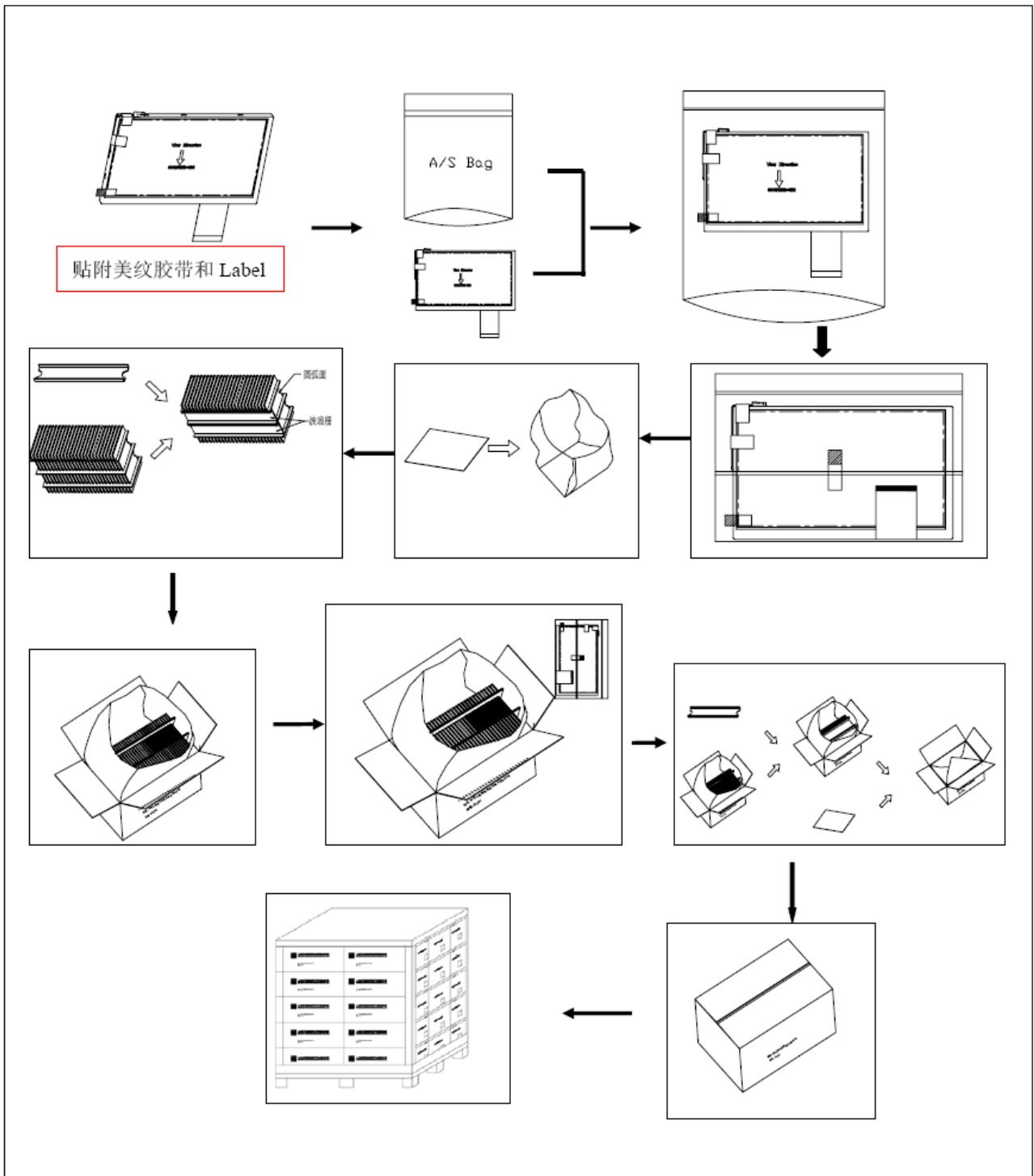
| | | | | | |
|----------------------|---------|-----------------|---------------|------------|-----|
| CONTROL DIMENTION: | () | | | | |
| REFERENCE DIMENTION: | () | | | | |
| APPROVED: | Shuwei | MODEL NAME | TM070RDH12 | 3-rd ANGLE | ▽ |
| CHECKED: | Fangwei | PART NAME | LCM | UNIT | mm |
| DESIGNED: | Tangwei | DRAWING NUMBER | YG1-00 | SCALE | 1:1 |
| | | MATERIAL NUMBER | TM070RDH12-00 | PAGE | 1/1 |



The information contained herein is the exclusive property of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation, and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of SHANGHAI TIANMA MICRO-ELECTRONICS Corporation.

**9 Packing Drawing**

| No | Item | Model(Material) | Dimensions (mm) | Unit Weight (Kg) | Quantity | Remark |
|----|-----------------|------------------|--------------------|------------------|----------|-------------|
| 1 | LCM module | TM070RDH12-00 | 164.90*100.00*5.70 | TBD | 50 | |
| 2 | Partition_1 | Corrugated Paper | 513*333*215 | 2.0 | 1 | |
| 3. | Anti-Static Bag | PE | 160*178*0.05 | 0.01 | 50 | Anti-static |
| 4 | Dust-Proof Bag | PE | 700*545 | 0.0600 | 1 | |
| 5 | Partition_2 | Corrugated Paper | 505*332 | 0.1 | 2 | |
| 6 | Corrugated Bar | Corrugated Paper | 513*148 | 0.06 | 4 | |
| 7 | Beauty-grain | Tape | 30*10 | TBD | 150 | |
| 8 | Dessicant | Dessicant | 45*35 | 0.002 | 8 | |
| 9 | Carton | Corrugated Paper | 530*350*250 | 1.1000 | 1 | |
| 10 | Total weight | TBD±5% | | | | |





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.

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

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