# Product Specification

Part Name: 10.25 inch TFT Display Module
Customer Part ID:
Topovision Part ID: TVT1025A-CP (IPS)
Ver: A

| Customer: |
| --- |
| Approved by |

| From: Topovision Technology Co.,Ltd. |
| --- |
| Approved by |

Notes:

1. Please contact Topovision Technology Co., Ltd. before assigning your product based on this module specification
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Topovision Technology Co., Ltd. for any intellectual property claims or other problems that may result from application based on the module described herein.

# 1. Introduction

## 1.1 Scope of application

This specification applies to the LCD module that is supplied by Topovision Technology CO., LTD.
LCD specification: Dots 1920xRGBx720
As to basic specification of the driver IC, refer to the IC (TBD) specification and data book.
All material & processing of the LCD module should be Lead Free.

## 1.2 TFT features:

Structure: TFT PANNEL+IC +FPC1+BL+CTP;
ALL Viewing Type LCD
1920 dot-segment and 720 dot-common outputs;
16.7M Color can be selected by software;
White LED back light;
LVDS(two port) interface
Touch I2C interface

## 1.3 Applications:

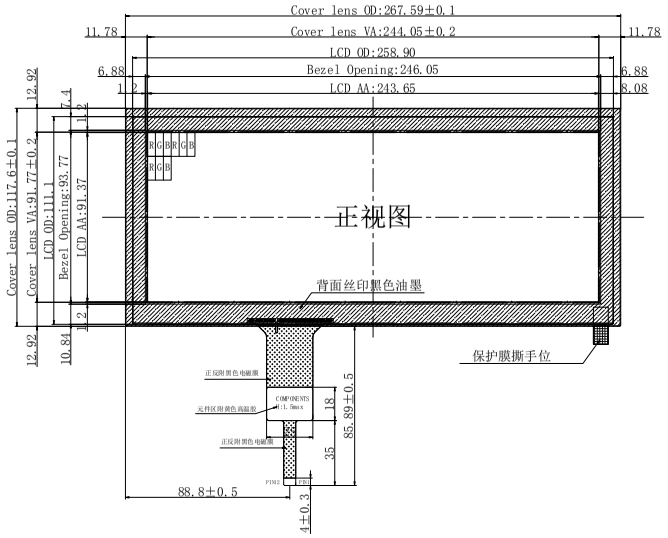
## 2. LCM General specification

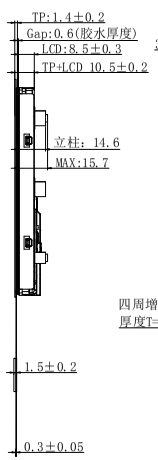
| ITEM | Sandard value | Unit |
|---|---|---|
| LCD Type | Normally Black | -- |
| Drive element | TFT active matrix | -- |
| Number of pixels | 1920*3RGB(H)X720(V) | Dots |
| Pixel arrangement | RGB Vertical Stripe | -- |
| Pixel Pitch (W*H) | 0.1269(H) X 0.1269(V) | mm |
| Active area | 243.648(H) x 91.368(V) | mm |
| Viewing direction | ALL O'CLOCK | - |
| TFT Driver IC | TBD | |
| TFT interface | LVDS(two port) interface | - |
| Approx. Weight | TBD | g |
| LCM Size(W*H*T) | 258.90(W) ×111.1(H) ×7.55 (T) | mm |
| LCM+CTP Size(W*H*T) | 267.59(W) ×117.60(H) ×10.50(T) | mm |
| Touch structure | G+G | |
| Touch Driver IC | GT9271 | - |
| Touch Interface | I2C | |

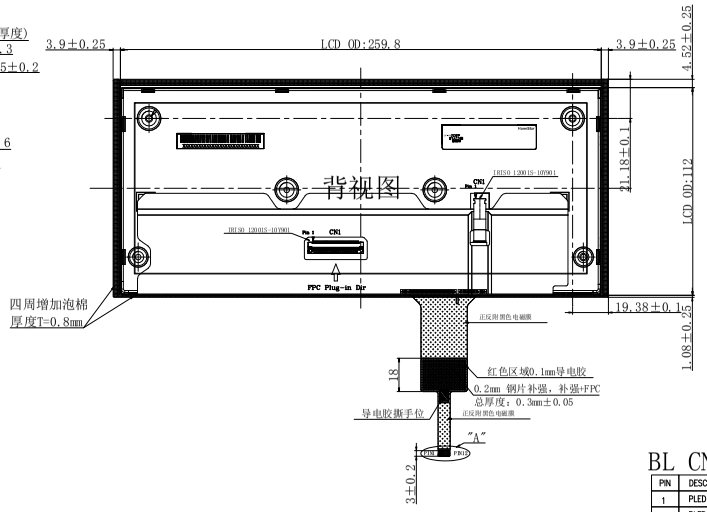
TVT1025A-CP VerA

| REV | DESCRIPTION | DRG DATE | DRAWN BY |
|---|---|---|---|
| | First Desing | 2020.09.01 | |

| 硬件规格: | | | |
|---|---|---|---|
| 触摸点数 | 5点 | TFT分辨率 | |
| IIC通讯电压 | 3.3V | VDD供电电压 | 3.3V |
| IIC通信地址 | | 坐标原点 | 左上方 |



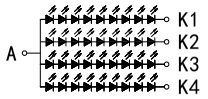

CN2

| PIN | DESC |
|---|---|
| 1 | GND |
| 2 | VDD |
| 3 | VDD |
| 4 | NC |
| 5 | RESET |
| 6 | STBYB |
| 7 | GND |
| 8 | OLV0N |
| 9 | OLV0P |
| 10 | GND |
| 11 | OLV1N |
| 12 | OLV1P |
| 13 | GND |
| 14 | OLV2N |
| 15 | OLV2P |
| 16 | GND |
| 17 | OLVCLKN |
| 18 | OLVCLKP |
| 19 | GND |
| 20 | OLV3N |
| 21 | OLV3P |
| 22 | GND |
| 23 | ELV0N |
| 24 | ELV0P |
| 25 | GND |
| 26 | ELV1N |
| 27 | ELV1P |
| 28 | GND |
| 29 | ELV2N |
| 30 | ELV2P |
| 31 | GND |
| 32 | ELVCLKN |
| 33 | ELVCLKP |
| 34 | GND |
| 35 | ELV3N |
| 36 | ELV3P |
| 37 | GND |
| 38 | GND |
| 39 | RL |
| 40 | TB |
| 41 | NC |
| 42 | NC |
| 43 | NC |
| 44 | VDD |
| 45 | NC |
| 46 | NC |
| 47 | NC |
| 48 | NC |
| 49 | NC |
| 50 | NC |

BL CN1

| PIN | DESC |
|---|---|
| 1 | PLED |
| 2 | PLED |
| 3 | PLED |
| 4 | NC |
| 5 | NTC1 |
| 6 | NTC2(GND) |
| 7 | PLED |
| 8 | PLED |
| 9 | PLED |
| 10 | PLED |

NOTES:
1. DISPLAY TYPE: 10.25", 1920*720 TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL
4. DRIVER IC:
5. LCM (White 9 AVG 1/9) :
   Brightness: --cd/m2 (MIN),800cd/m2 (TYP)
   Uniformity:80%(MIN)
6. BACK LIGHT: 36 chip white LEDs If=300mA(TYP),Vf=27.9V-29.7V
7. OPERATING TEMP: -20° C TO 70° C,STORAGE TEMP: -30° C TO 80° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
   Unspecified Tolerances:±0.20mm
   Modification mark:
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS

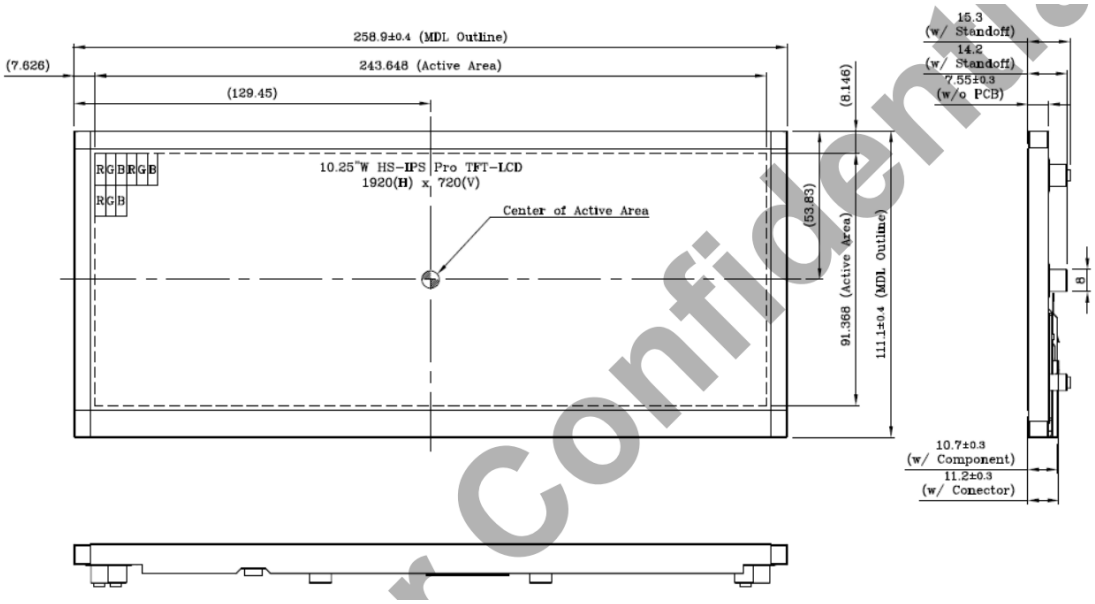


Backlight LED Circuit

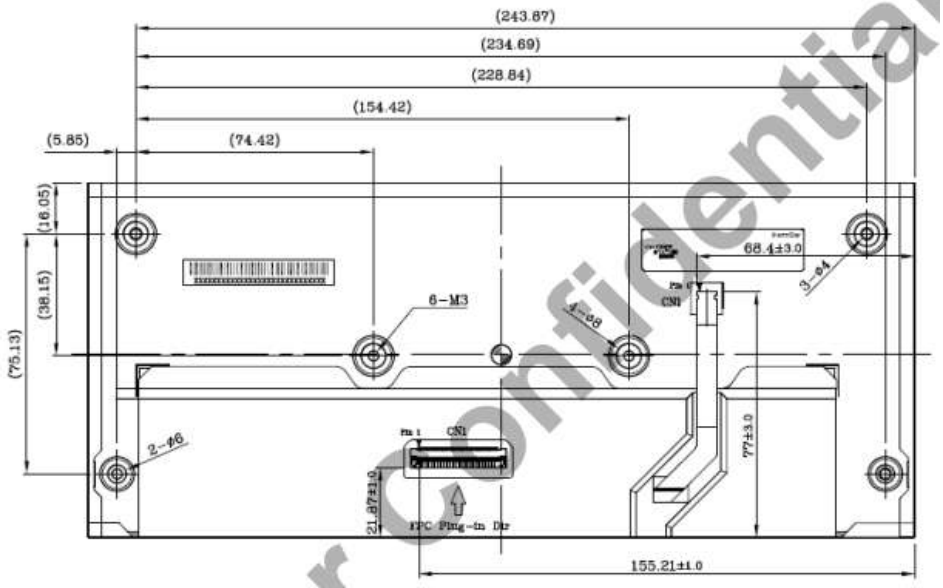
TP DESC

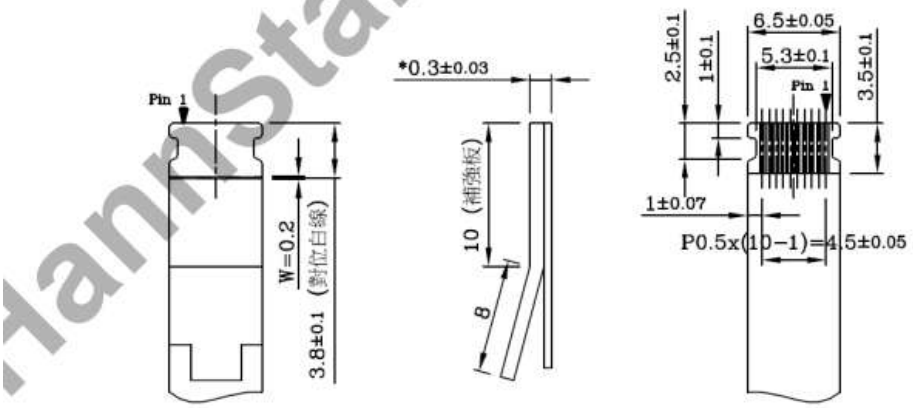
CTP技术参数
1. TP结构：G+G;
2. TP类型：COF;IC选用：GT9271;
   工作电压：2.8V-3.3V
3. 透光率：≥85%
4. 玻璃面板表面硬度：7H
5. 工作环境：-20℃~+70℃，≤85%RH
6. 储存环境：-30℃~+80℃，≤85%RH
7. 未注尺寸公差按±0.2mm
8. 产品符合RoHS标准.

| CUSTOMER APVL | CUSTOMER | DATE | |
|---|---|---|---|
| DRAWN | | SCALE | TITLE: LCM OUTLINE DIMENSION |
| DFTG CHK | | UNIT: mm | |
| ENGR CHK | | | MODEL: TVT1025A-CP |
| APPROVAL | | | |
| TOPOVISION DISPLAY | | DWG NO | PAGE: 1/1 |




General tolerance:+/-0.3mm




CN2(Scale: 2:1)

# 3.Absolute Maximum Rating

| Characteristics | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| LCM Operating Temperature | $T_{OPR}$ | -20 | +70 | °C |
| LCM Storage Temperature | $T_{STG}$ | -30 | +80 | °C |
| TP Operating Temperature & Humidity(20%～90%RH) | $T_{OPR}$ | -20 | +70 | °C |
| TP SStorage Temperature & Humidity(20%～90%RH) | $T_{STG}$ | -30 | +80 | °C |
| Humidity | RH | - | 90 | % |

# 4.Electrical Characteristics

## 4.1 TFT DC Characteristics

| Characteristics | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Supply Voltage for I/O | VDDIO | -- | -- | -- | V |
| Supply Voltage for(DC/DC) | VDD | 3.0 | 3.3 | 3.6 | V |
| Current Consumption | $I_{DD}$ | - | 600 | - | mA |
| | $I_{DD-SLEEP}$ | | 75 | 160 | uA |

## 4.2 Back-Light Unit Characeristics

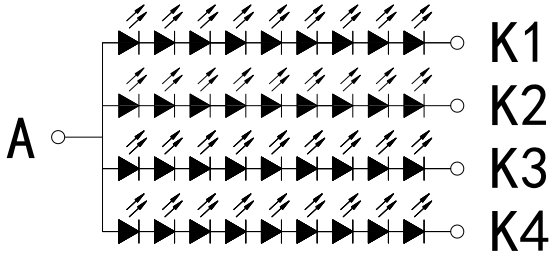
The back-light system is an edge-lighting type with 36 white LEDs. The characteristics of the back-light are shown in the following tables.

| Characteristics | Symbol | Min. | Type | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| Forward Voltage | 27.9 | 14 | | 29.7 | V | - |
| Forward current | $I_F$ | -- | 300 | - | mA | - |
| Luminance(With LCD) | Lv | | 800 | -- | $cd/m^2$ | - |
| LED life time | N/A | ---- | 30,000 | -- | Hr | Note 1 |

Note:

(1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at $I_L$=20mA/LED. The LED life time could be decreased if operating $I_L$ is larger than 25mA/LED.

**Backlight circuit diagram shown in below:**




# 5. Module Function Description

## LCM Functional

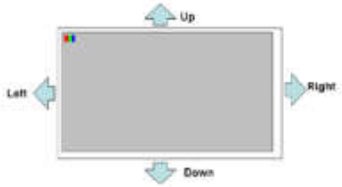
CN1 (Input signal): IRISO 12003S-50Y900

| Pin NO. | Symbol | I/O | Description | Note |
|---|---|---|---|---|
| 1 | GND | P | Ground | |
| 2 | VDD | P | External main and I/O power supply ; +3.3V | |
| 3 | VDD | P | External main and I/O power supply ; +3.3V | |
| 4 | NC | - | Keep floating | |
| 5 | RESET | I | Global reset pin<br>RESET="H",normal operation.(Default)<br>RESET="L",LCM is in reset state. | |
| 6 | STBYB | I | Standby mode control.<br>STBYB="H",normal operation.<br>STBYB="L",LCM is in standby state.(Default) | |
| 7 | GND | P | Ground | |
| 8 | OLV0N | I | LVDS odd data 0- | |
| 9 | OLV0P | I | LVDS odd data 0+ | |
| 10 | GND | P | Ground | |
| 11 | OLV1N | I | LVDS odd data 1- | |
| 12 | OLV1P | I | LVDS odd data 1+ | |
| 13 | GND | P | Ground | |
| 14 | OLV2N | I | LVDS odd data 2- | |
| 15 | OLV2P | I | LVDS odd data 2+ | |
| 16 | GND | P | Ground | |
| 17 | OLVCLKN | I | LVDS odd clk - | |
| 18 | OLVCLKP | I | LVDS odd clk + | |
| 19 | GND | P | Ground | |
| 20 | OLV3N | I | LVDS odd data 3- | |
| 21 | OLV3P | I | LVDS odd data 3+ | |
| 22 | GND | P | Ground | |
| 23 | ELV0N | I | LVDS even data 0- | |
| 24 | ELV0P | I | LVDS even data 0+ | |
| 25 | GND | P | Ground | |
| 26 | ELV1N | I | LVDS even data 1- | |
| 27 | ELV1P | I | LVDS even data 1+ | |
| 28 | GND | P | Ground | |

| | | | | |
|---|---|---|---|---|
| 29 | ELV2N | I | LVDS even data 2- | |
| 30 | ELV2P | I | LVDS even data 2+ | |
| 31 | GND | P | Ground | |
| 32 | ELVCLKN | I | LVDS even clk - | |
| 33 | ELVCLKP | I | LVDS even clk + | |
| 34 | GND | P | Ground | |
| 35 | ELV3N | I | LVDS even data 3- | |
| 36 | ELV3P | I | LVDS even data 3+ | |
| 37 | GND | P | Ground | |
| 38 | GND | P | Ground | |
| 39 | RL | I | Horizontal shift direction (source output) selection.<br>RL = "H": Left -> Right(default)<br>RL = "L": Right -> Left | |
| 40 | TB | I | Vertical shift direction (gate output) selection.<br>TB = "H": Top ->Bottom (default)<br>TB = "L": Bottom->Top | |
| 41 | NC | - | Keep floating | |
| 42 | NC | - | Keep floating,internal used for LCM maker. | |
| 43 | NC | - | Keep floating | |
| 44 | VDD | P | External main and I/O power supply ; +3.3V | |
| 45 | NC | - | Keep floating,internal used for LCM maker. | |
| 46 | NC | - | Keep floating,internal used for LCM maker. | |
| 47 | NC | - | Keep floating,internal used for LCM maker. | |
| 48 | NC | - | Keep floating,internal used for LCM maker. | |
| 49 | NC | - | Keep floating,internal used for LCM maker. | |
| 50 | NC | - | Keep floating,internal used for LCM maker. | |

**Note 1 : TB and RL control function**

| SHLR | UPDN | Data shifting |
|---|---|---|
| VDD | GND | Left→Right ; Down→Up |
| GND | GND | Right→Left ; Down→Up |
| VDD | VDD | Left→Right ; Up→Down(default) |
| GND | VDD | Right→Left ; Up→Down |



## BL Functional

CN2: IRISO 12001S-10Y901

| Pin NO. | Symbol | Description |
|---|---|---|
| 1 | PLED | Power LED anode power supply |
| 2 | PLED | Power LED anode power supply |
| 3 | PLED | Power LED anode power supply |
| 4 | NC | |
| 5 | NTC1 | heat sensor |
| 6 | NTC2(GND) | heat sensor |
| 7 | NLED | Power LED cathode power supply |
| 8 | NLED | Power LED cathode power supply |
| 9 | NLED | Power LED cathode power supply |
| 10 | NLED | Power LED cathode power supply |

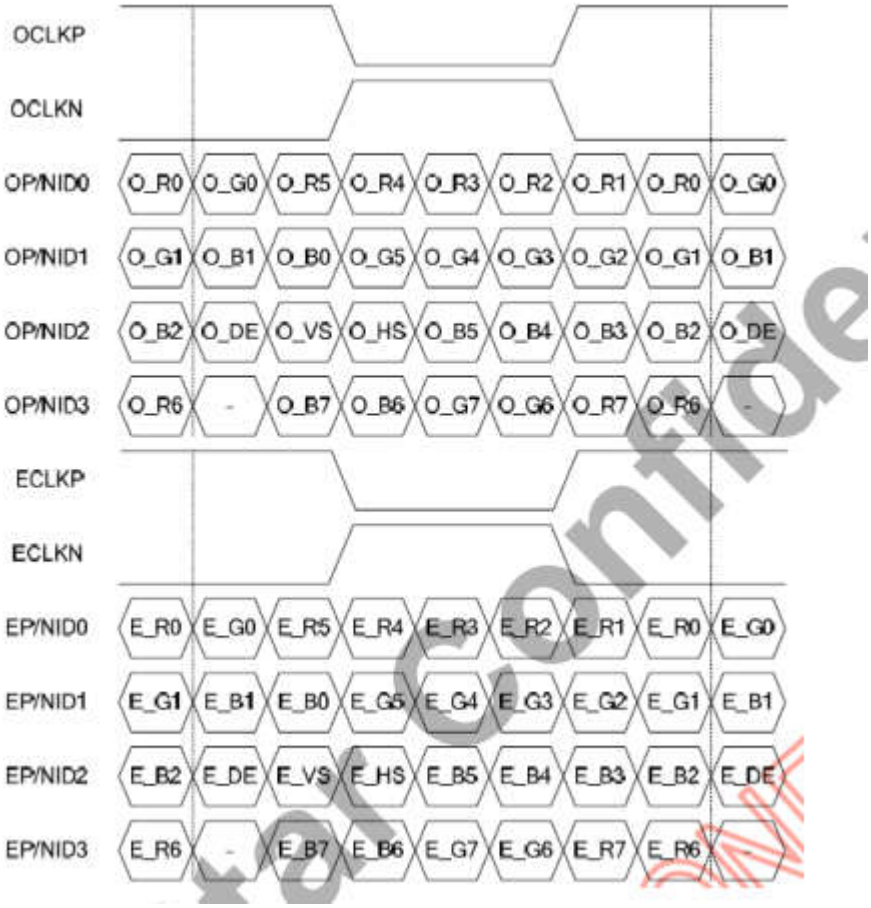
NTC: NCP18XH103F03RB

## TP Functional

| Pin No. | Symbol | TP Functional | Notes |
|---|---|---|---|
| 1 | GND | Power Ground | |
| 2~6 | NC | NC | |
| 7 | TP_SDA | Touch panel I2C data | I/O |
| 8 | TP_SCL | Touch panel I2C clock | I/O |
| 9 | TP_shut down | Touch panel reset | I/O |
| 10 | TP_INT | Touch panel interrupt output | I/O |
| 11 | GND | Power Ground | |
| 12 | TP_VDD | Touch panel I/O PWR supply | |

# 6. Timing Characteristics

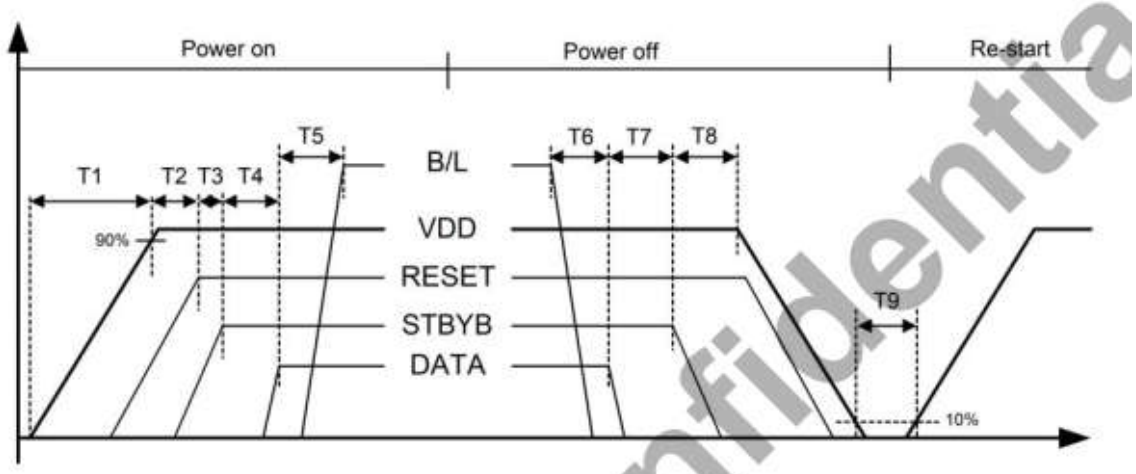
## 6.1 8Bit LVDS input




## 6.2 Interface Timing (DE mode)

| Item | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Frame Rate | -- | 55 | 60 | 65 | Hz |
| Vertical Total Time | $T_V$ | 730 | 732 | 764 | line |
| Vertical Display Time | $T_{VD}$ | | 720 | | |
| Vertical Blanking Time | $T_{VB}$ | 10 | 12 | 44 | line |
| Horizontal Total Time | $T_H$ | 1022 | 1045 | 1080 | clock |
| Horizontal Display Time | $T_{HD}$ | | 960 | | |
| Horizontal Blanking Time | $T_{HB}$ | 62 | 85 | 120 | clock |
| Clock Rate | $1/T_{Clock}$ | 45.4 | 45.9 | 48.5 | MHz |

### 6.3 Power On/Off Sepuence




| Item | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| T1 | 0.5 | -- | 20 | ms |
| T2 | 1 | -- | -- | ms |
| T3 | 1 | -- | -- | ms |
| T4 | 200 | -- | -- | ms |
| T5 | 50 | -- | -- | ms |
| T6 | 50 | -- | -- | ms |
| T7 | 16 | -- | -- | ms |
| T8 | 16 | -- | -- | ms |
| T9 | 1000 | -- | -- | ms |

# 7. Optical Characteristics

## 7.1 Optical Specification

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|---|
| Contrast | | CR | Θ=0 Normal viewing angle | 1000 | 1500 | – | | (1)(2) |
| Response time | 25℃ | TR+TF | | – | – | 30 | msec | (1)(3) |
| | -20℃ | | | – | – | 250 | | |
| | -30℃ | | | – | – | 500 | | |
| White luminance (Center) | | $Y_L$ | | 750 | 1000 | – | cd/m² | (1)(4) ($I_L$=300mA) |
| Color chromaticity (CIE1931) | White | $W_x$ | | ±0.04 | 0.313 | ±0.04 | | (1)(4) |
| | | $W_y$ | | | 0.329 | | | |
| | Red | $R_x$ | | | 0.642 | | | |
| | | $R_y$ | | | 0.332 | | | |
| | Green | $G_x$ | | | 0.288 | | | |
| | | $G_y$ | | | 0.600 | | | |
| | Blue | $B_x$ | | | 0.148 | | | |
| | | $B_y$ | | | 0.065 | | | |
| Viewing angle | Hor. | $\Theta_L$ | CR>10 | 80 | 85 | – | | |
| | | $\Theta_R$ | | 80 | 85 | – | | |
| | Ver. | $\Theta_U$ | | 80 | 85 | – | | |
| | | $\Theta_D$ | | 80 | 85 | – | | |
| Brightness uniformity | | $B_{UNI}$ | Θ=0 | 75 | 80 | – | % | (5) |
| Optima View Direction | | Free | | | | | | (6) |
| Reflection | % | R (%) | – | – | 5.0 | 5.5 | % | (7) |



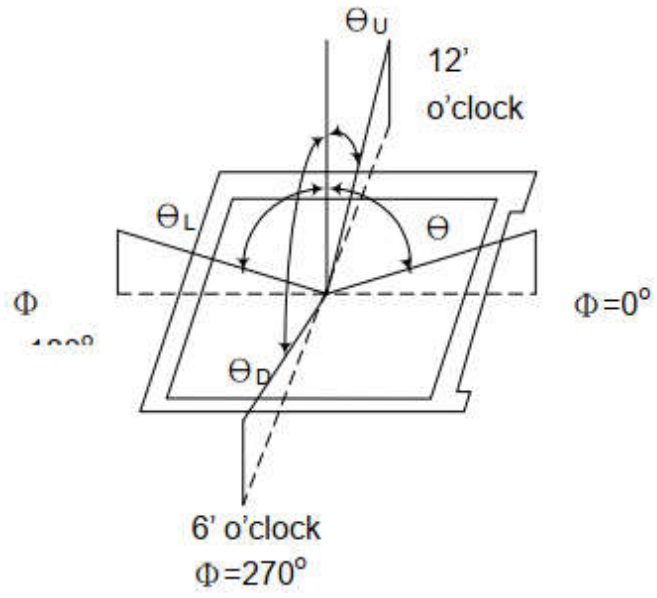
## 7.2 Measuring Condition

- Measuring surrounding：dark room
- LEDcurrent $I_L$：300mA
- Ambient temperature：25±2℃
- 15min. warm-up time.

## 7.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size：20~21mm

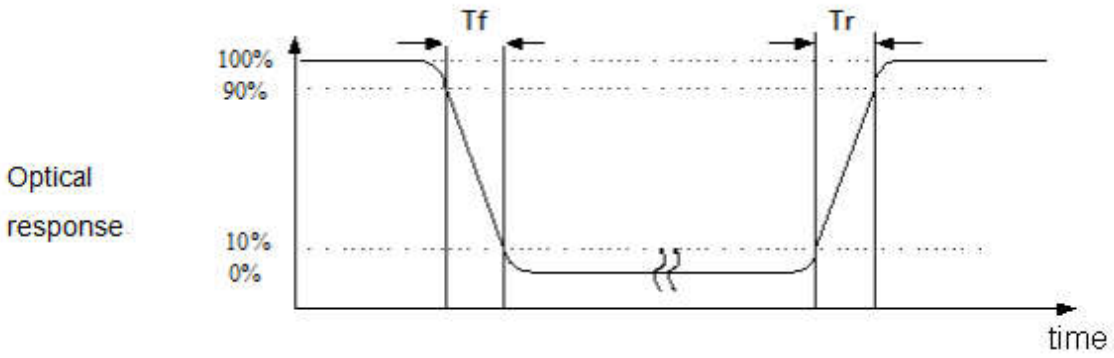
Note (1) Definition of Viewing Angle:



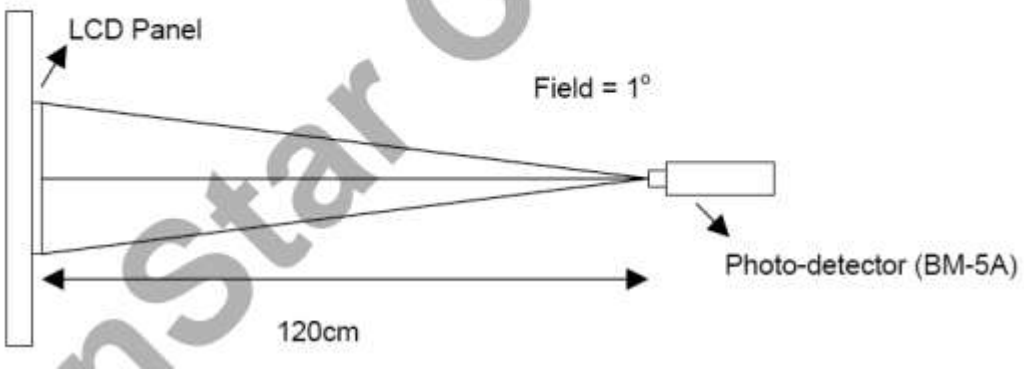

Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

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

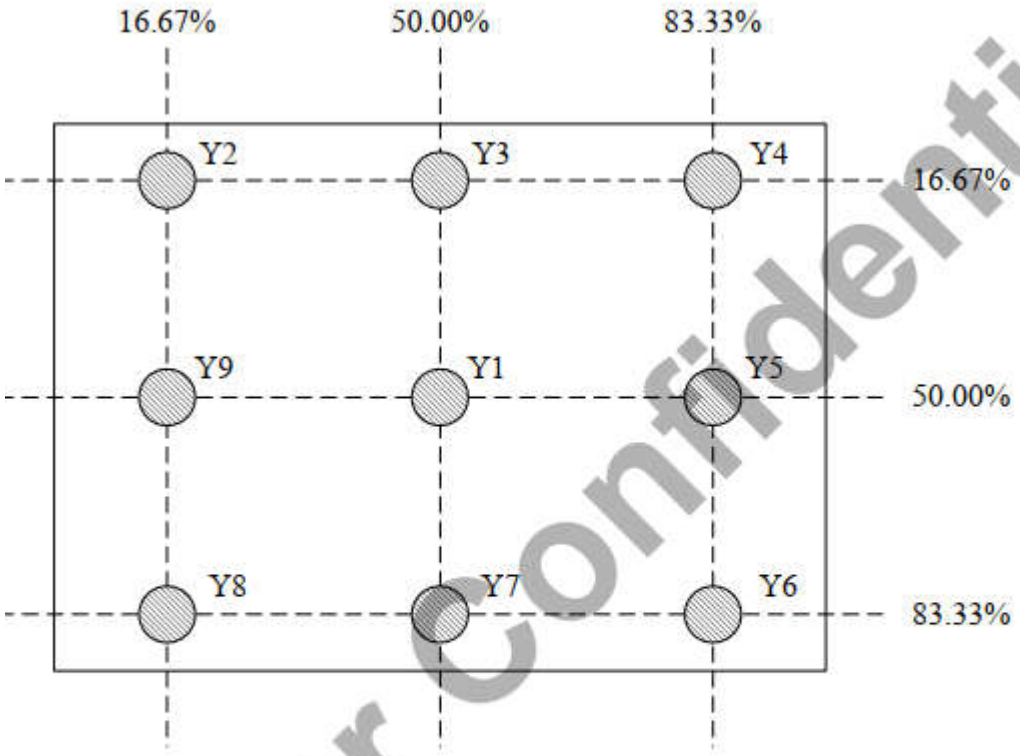
Note (3) Definition of Response Time : Sum of $T_R$ and $T_F$



**Note (4)** Definition of optical measurement setup




**Note (5)** Definition of brightness uniformity




$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

**Note (6)** : Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

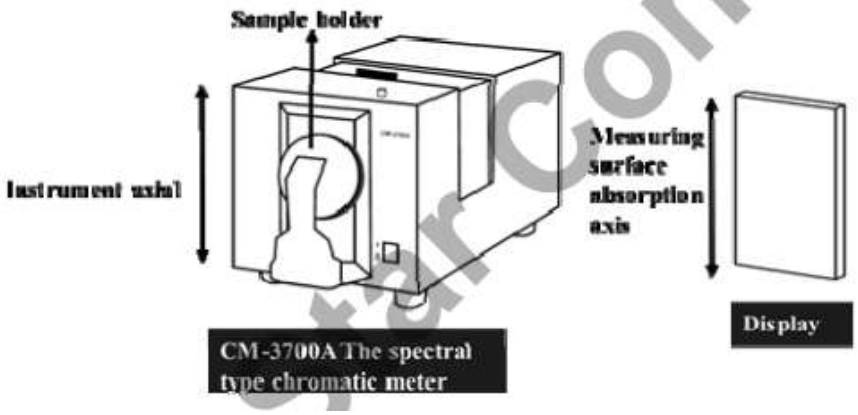
**Note (7)** Definition of CM-3700A(Konica Minolta) Measurement specification

■ The Settings of the instrument：

A. reflection rate;
B. Measuring the aperture: MAV(8mm);
C. Observer perspective: 2°;
D. Specular light: SCI;
E. The light source: D65.

■ The definition of measurement way

Chromatic meter will display the absorption of shaft and spectral type axial parallel alignment, and placed the sample frame for photometry.






## 8. Reliability Test Item

| No. | Test Item | Test Condition | Notes |
|---|---|---|---|
| 1 | High Temp. Storage | +80°C / 96H | 1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed.<br>2. No low temperature bubbles,end seal loose andfall, frame rainbow. |
| 2 | Low Temp. Storage | -30°C / 96H | |
| 3 | High Tempe. Operating | +70°C / 96H | |
| 4 | Low Tempe. Operating | -20°C / 96H | |
| 5 | High Temperature /Humidity storage | 50°C x 90%RH /96H | |
| 6 | Thermal and cold shock | Static state， -20℃（30min） ~70℃（30min），50 cycles | |

## 9. Packing Method----TBD

- END -