深圳市希恩凯电子有限公司
SHENZHEN CNK ELECTRONIC CO.,LTD.

# Product Specification For LCD Module

**Model NO.：CNKT0500-18023A1**

**CUSTOMERITEM NO.：**

**REVISION：A**

☐APPROVAL FOR SPECIFICATIONS ONLY

■ **APPROVAL FOR SPECIFICATIONS AND SAMPLE**

| CUSTOMER： | APPROVED BY： |
|---|---|

CNK LCM R&D CENTER

| APPROVED BY | CHECKED BY | PREPARED BY |
|---|---|---|
| | | |
| DIRECTOR | MANAGER | Engineer |


深圳市希恩凯电子有限公司
SHEN ZHEN CNK ELECTRONICS CO.,LTD
地 址： 惠州市惠阳区西湖村铭仕工业园 2 栋 1-2 楼
电 话： 0752-3556001
传 真： 0752-3556004

http://www.szcnk.com

# REVISION STATUS

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| V1.0 | 2014.07.15 | - | First Issued. | Shiny |

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# 1. General Description

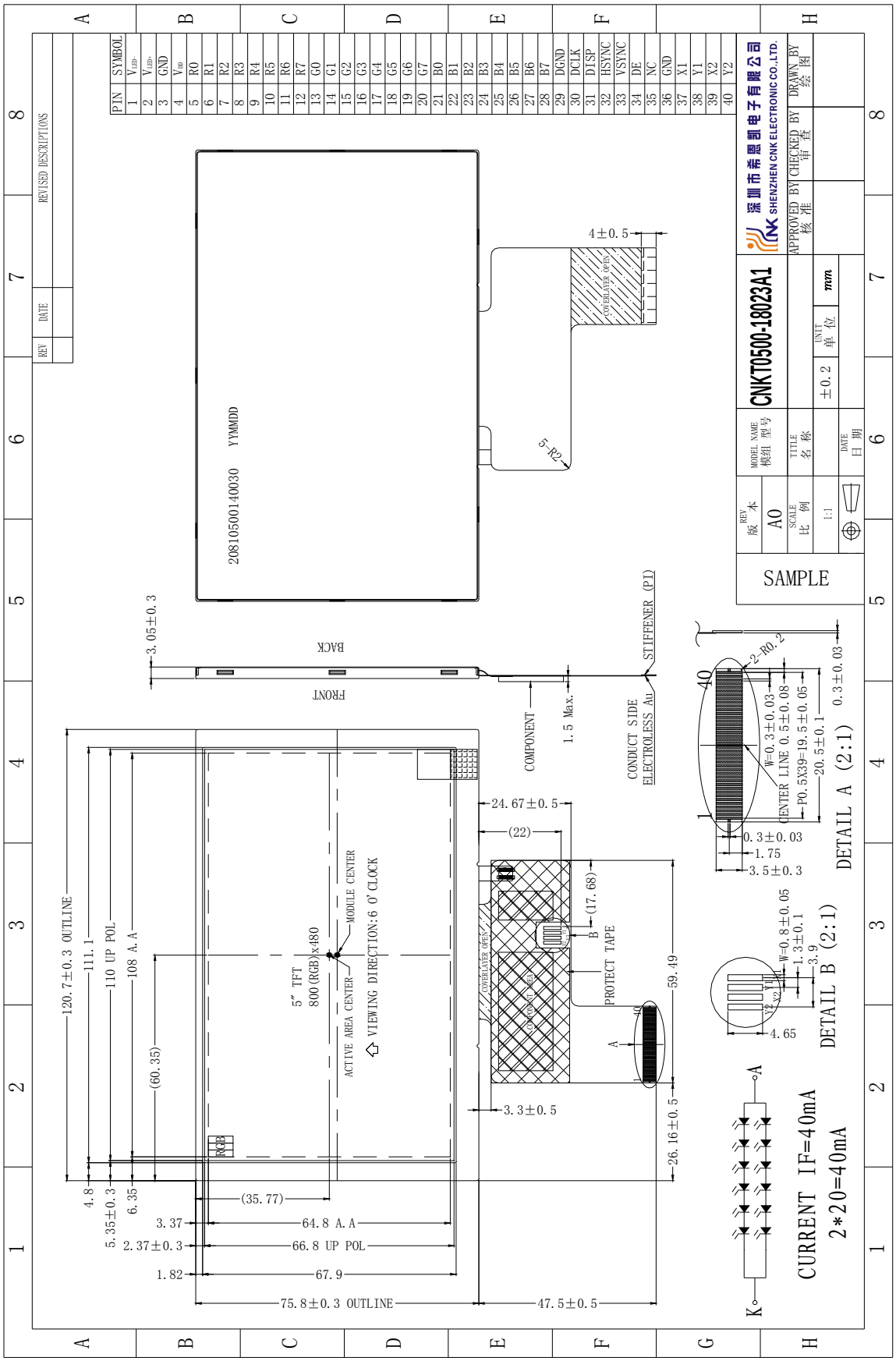
## 1.1 D

CNKT0500-18023A1 is a transmissive type color active matrix liquid crystal display (LCD) which usesamorphous thin film transistor (TFT) as switching devices. This product is composed of a TFTLCD panel, driver ICs, FPC and Backlight.

## 1.2 Features:

| No. | Item | Specification | Unit |
|---|---|---|---|
| 1 | Panel Size | 5” | inch |
| 2 | Number of Pixels | 800(W) x 3(RGB) x480(H) | pixels |
| 3 | Active Area | 108.00(H) x 64.8(V) | mm |
| 4 | Pixel Pitch | 0.135(W) x 0.135(H) | mm |
| 5 | Outline Dimension | 120.70(W) ×75.80(H) ×3.05(T) | mm |
| 6 | Pixel arrangement | RGB vertical stripe | - |
| 7 | Display Mode | Normally white | - |
| 8 | Viewing Direction | 6 o’clock | - |
| 9 | Display Color | 16.7M | - |
| 10 | Luminance(cd/m2) | 300(TYP) | nit |
| 11 | Contrast Ratio | 450(Min) | - |
| 12 | Surface Treatment | Antiglare, Hard-Coating (3H) | - |
| 13 | Interface | 24-bit TTL | - |
| 14 | Backlight | White LED | - |
| 15 | Drive IC | ILI5960 、 ILI6122 | - |
| 16 | Operation Temperature | -20~70 | ℃ |
| 17 | Storage Temperature | -30~80 | ℃ |
| 18 | Weight | - | g |

## 2. MECHANICAL SPECIFICATION



## 3. PIN DESCRIPTION

FPC connector is used for electronics interface.
The recommended model is FH19SC-40S-0.5SH (51) manufactured by HIROSE.

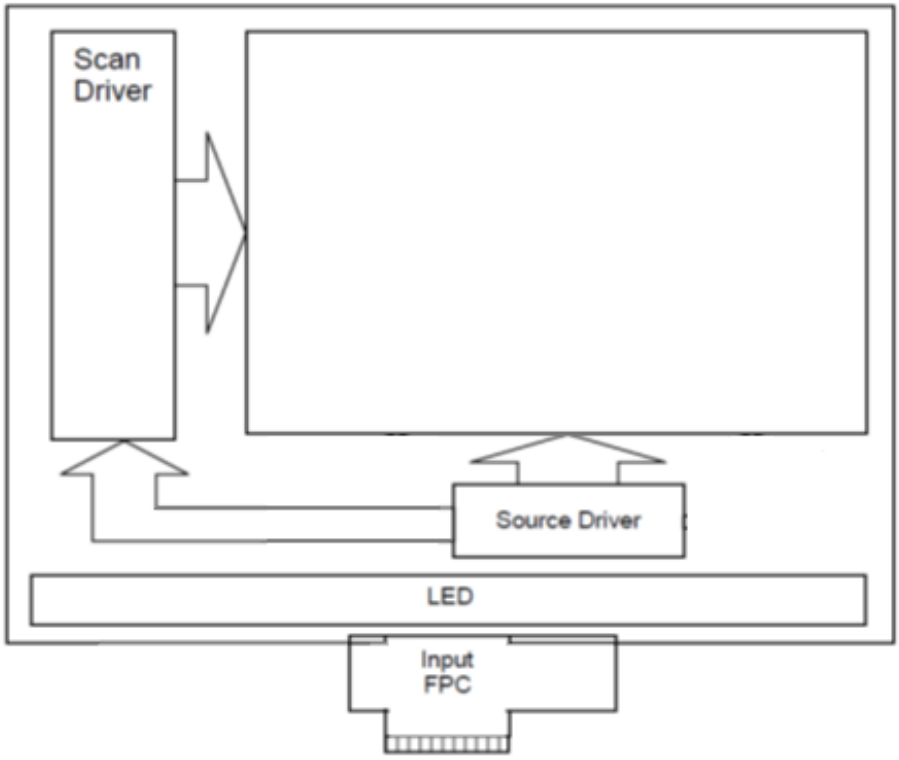
| No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | VLED- | P | Power for LED backlight cathode | |
| 2 | VLED+ | P | Power for LED backlight anode | |
| 3 | GND | P | Power ground | |
| 4 | VDD | P | Power voltage | |
| 5 | R0 | I | Red data (LSB) | |
| 6 | R1 | I | Red data | |
| 7 | R2 | I | Red data | |
| 8 | R3 | I | Red data | |
| 9 | R4 | I | Red data | |
| 10 | R5 | I | Red data | |
| 11 | R6 | I | Red data | |
| 12 | R7 | I | Red data (MSB) | |
| 13 | G0 | I | Green data (LSB) | |
| 14 | G1 | I | Green data | |
| 15 | G2 | I | Green data | |
| 16 | G3 | I | Green data | |
| 17 | G4 | I | Green data | |
| 18 | G5 | I | Green data | |
| 19 | G6 | I | Green data | |
| 20 | G7 | I | Green data (MSB) | |
| 21 | B0 | I | Blue data (LSB) | |
| 22 | B1 | I | Blue data | |
| 23 | B2 | I | Blue data | |
| 24 | B3 | I | Blue data | |
| 25 | B4 | I | Blue data | |
| 26 | B5 | I | Blue data | |
| 27 | B6 | I | Blue data | |
| 28 | B7 | I | Green data (MSB) | |
| 29 | DGND | I | Digital ground | |
| 30 | DCLK | I | Pixel clock | |
| 31 | DISP | I | Display on/ off | *1 |
| 32 | Hsync | I | Horizontal sync signal | |
| 33 | Vsync | I | Vertical sync signal | |
| 34 | DE | I | Data enable | |
| 35 | NC | - | No Connect | |
| 36 | GND | P | Power ground | |
| 37 | X1 | I/O | Right electrode - differential analog | |
| 38 | Y1 | I/O | Bottom electrode - differential analog | |
| 39 | X2 | I/O | Left electrode - differential analog | |
| 40 | Y2 | I/O | Top electrode - differential analog | |

I/O: I: input, O: output, P: power

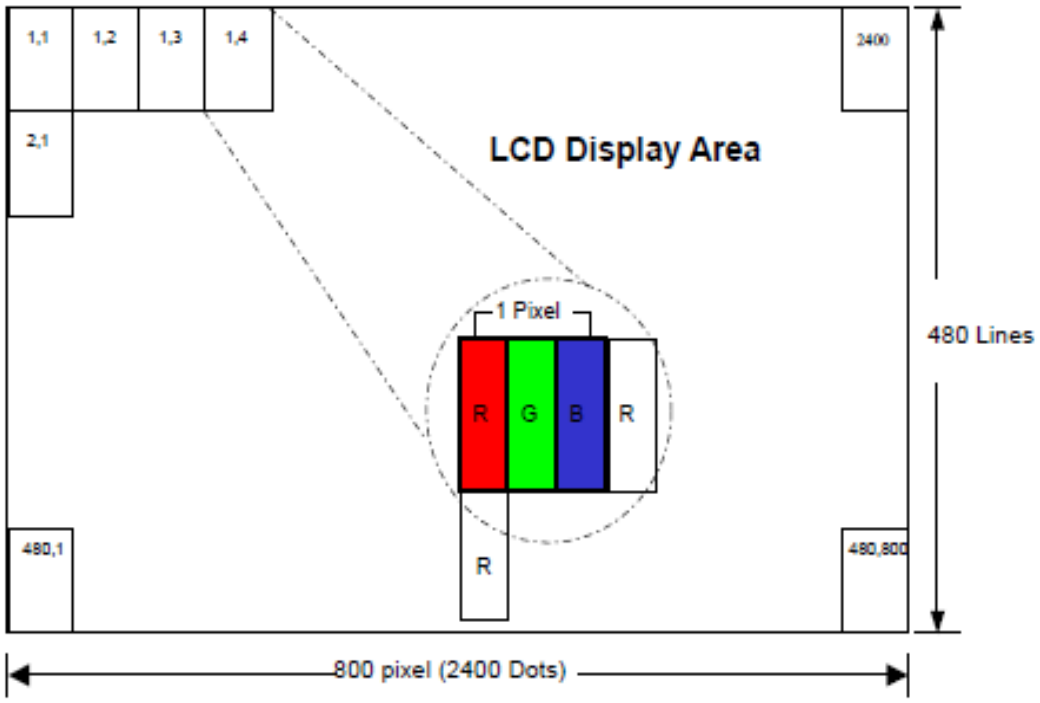
*1 : DISP=0;Sourcediriver will turn off. DISP =1;Normally operation

# 4.BLOCK DIAGRAM

## 4.1 TFT LCD MODULE




## 4.2 PIXEL FORMAT



# 5. ELECTRICAL CHARACTERISTICS

## 5.1 ABSOLUTE MAXIMUM RATINGS

Ta = 25℃

| Item | Symbol | Values | | Unit | Remark |
|---|---|---|---|---|---|
| | | Min. | Max. | | |
| Power Voltage | VDD | -0.5 | 5 | V | - |
| | VGH | -0.3 | 40 | V | - |
| | VGL | -20 | 0.3 | V | - |
| | VGH-VGL | -0.3 | 40 | V | - |

## 5.2 DC CHARACTERISTICS

### 5.2.1 Operating Conditions

| Item | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| TFT Gate On Voltage | VGH | 21 | 22 | 23 | |
| TFT Gate Off Voltage | VGL | -6 | -7 | -8 | |
| TFT Common Electrode Voltage | Vcom | 2.5 | - | 2.9 | |

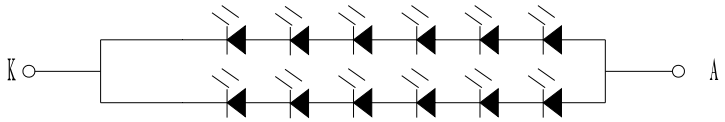
### 5.2.2Current Consumption

| Item | Symbol | Condition | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Gate on Current | IVGH | VGH =21.8 V | - | 9.7 | - | mA | |
| Gate off Current | IVGL | VGL = -7.7 V | - | 11.7 | - | mA | |
| Digital Current | IDVDD | DVDD = 3.3V | - | 141.2 | - | mA | |
| Analog Current | IAVDD | AVDD = 12.55V | - | 25.2 | - | mA | |

## 5.3 BACKLIGHT UNIT

| Item | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| LED Current | Iled | | 40 | | mA | 12LEDS |
| Forward Voltage | VF | 18 | 18.6 | 19.8 | V | IF=40mA |
| Reverse Current | IR | | | 100 | μA | VR=35V,14LEDS |
| Luminous Tolerance | IV-M | 75 | 80 | | % | (MIN/MAX)×100 |
| Power Dissipation | Pd | 1008 | | | mW | 12LEDS |
| Peak Forward Current | Ifp | 60 | | | mA | 12LEDS |
| Reverse Voltage | VR | | | | V | 12LEDS |

### 5.3.1 Internal Circuit Diaguam




CURRENT IF=40mA
2*20=40mA

## 5.4 POWER SEQUENCE

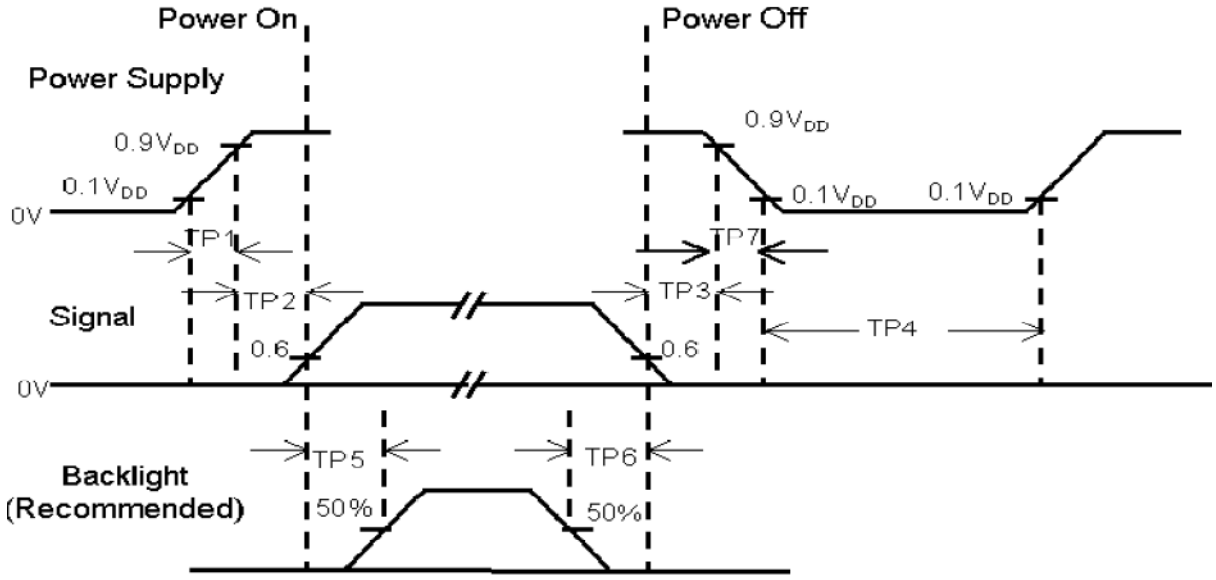
Power On Sequence

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

Power ON: VDD, VSS →AVDD, VSSA→V1 to V14

Power OFF: V1 to V14 →AVDD, VSSA→ VDD, VSS

### 5.4.1 Power on/off control




| Item | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|
| TP1 | 0.5 | -- | 10 | msec | |
| TP2 | 0 | -- | 50 | msec | |
| TP3 | 0 | -- | 50 | msec | |
| TP4 | 1000 | -- | -- | msec | |
| TP5 | 200 | -- | -- | msec | |
| TP6 | 200 | -- | -- | msec | |
| TP7 | 0.5 | -- | 10 | msec | |

**Note** :

**(1)** The supply voltage of the external system for the module input should be the same as the definition of VDD.

**(2)** Apply the lamp volatge within the LCD operation range. When the back-light turns

on before the LCD operation or the LCD truns off before the back-light turns off, the display may momentarily become white.

**(3)** In case of VDD = off level, please keep the level of input signal on the low or keep a high impedance.

**(4)** TP4 should be measured after the module has been fully discharged between power off and on period.

**(5)** Interface signal shall not be kept at high impedance when the power is on.

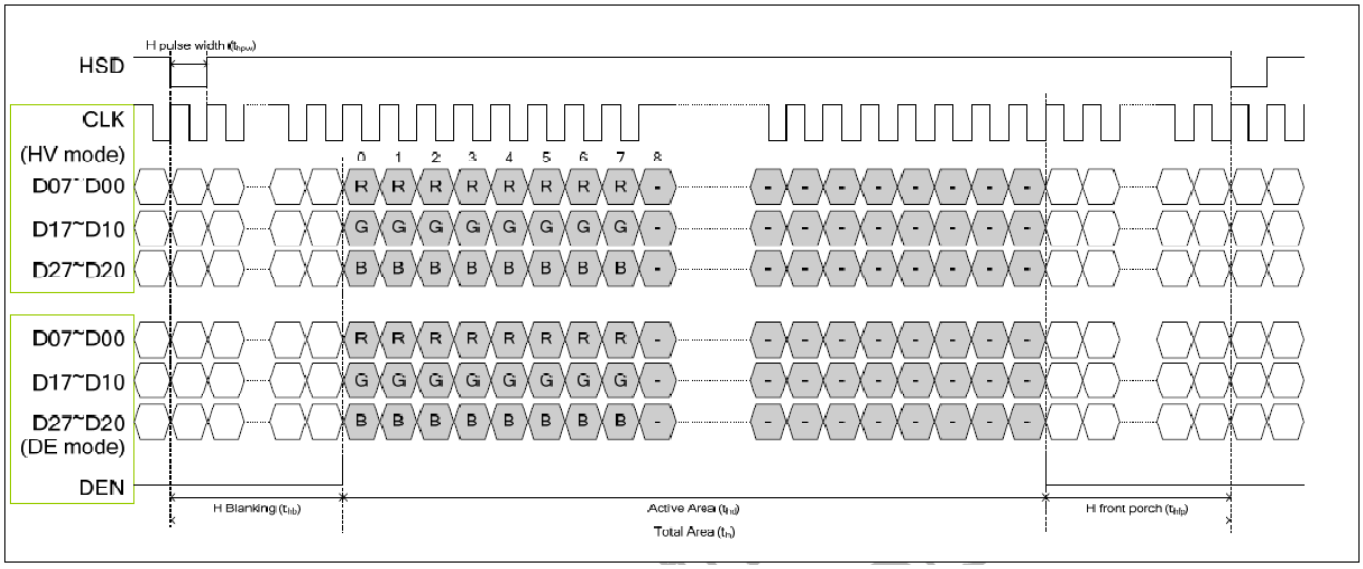
# 6.INPUT SIGNAL TIMING

## 6.1 AC CHARACTERISTICS

| Parameters | Symbol | Spec. | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| HS setup time | Thst | 8 | - | - | ns | |
| HS hold time | Thhd | 8 | - | - | ns | |
| VS setup time | Tvst | 8 | - | - | ns | |
| VS hold time | Tvhd | 8 | - | - | ns | |
| Data setup time | Tdsu | 8 | - | - | ns | |
| Data hold time | Tdhd | 8 | - | - | ns | |
| DE setup time | Tesu | 8 | - | - | ns | |
| DE hold time | Tehd | 8 | - | - | ns | |
| VDD Power On Slew rate | TPOR | - | - | 20 | ms | |
| RSTB pulse width | TRst | 10 | - | - | us | |
| CLKIN cycle time | Tcph | 20 | - | - | ns | |
| CLKIN pulse duty | Tcwh | 40 | 50 | 60 | % | |
| Output stable time | Tsst | - | - | 6 | us | |

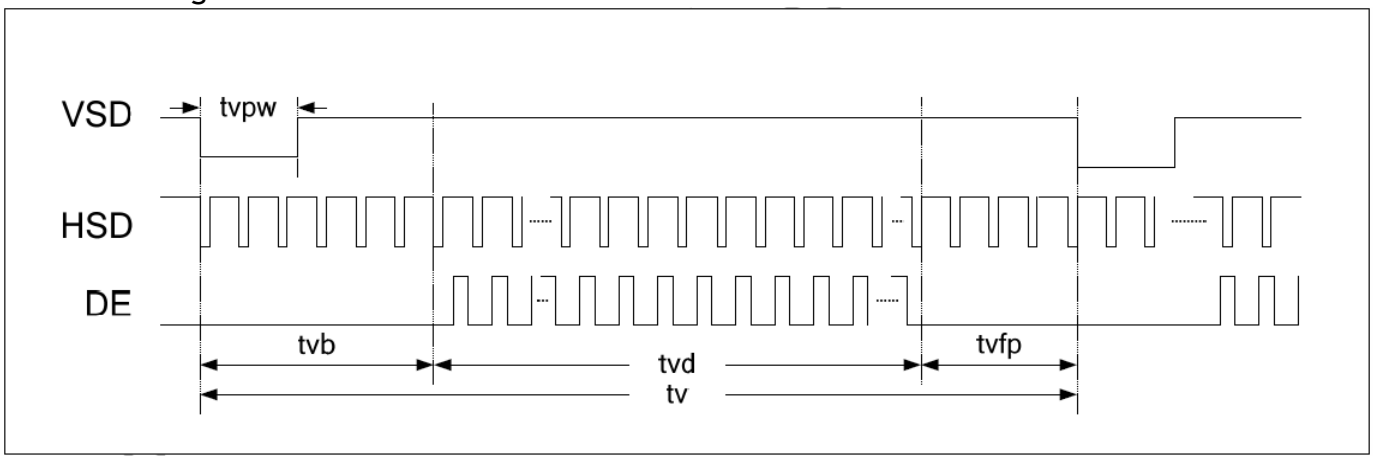
## 6.2DATA INPUT FORMAT

Horizontal timing




| Parameters | Symbol | Spec. | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Horizontal Display Area | thd | | 800 | | DCLK | |
| DCLK frequency | fclk | - | 30 | 50 | MHz | |
| One Horizontal Line | th | 889 | 928 | 1143 | DCLK | |
| HS pulse width | thpw | 1 | 48 | 255 | DCLK | |
| HS Back Porch (Blanking) | thb | | 88 | | DCLK | |
| HS Front Porch | thfp | 1 | 40 | 255 | DCLK | |
| DE mode Blanking | th-thd | 85 | 128 | 512 | DCLK | |

Vertical timing



| Parameters | Symbol | Spec. | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Vertical Display Area | tvd | | 480 | | TH | |
| VS period time | tv | 513 | 525 | 767 | TH | |
| VS pulse width | tvpw | 3 | 3 | 255 | TH | |
| VS Back Porch (Blanking) | tvb | | 32 | | TH | |
| VS Front Porch | tvfp | 1 | 13 | 255 | TH | |
| DE mode Blanking | tv-tvd | 4 | 45 | 255 | TH | |

## 6.3TIMING WAVEFORM TABLE

### 6.3.1Parallel 24-bit RGB mode

| Parameters | Symbol | Spec. | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| CLKIN Frequency | Fclk | - | 40 | 50 | MHz | VDD=3.0V~3.6V |
| CLKIN Cycle Time | Tclk | 20 | 25 | - | ns | - |
| CLKIN Pulse Duty | Tcwh | 40 | 50 | 60 | % | Tclk |
| Time from HSD to Source Output | Thso | | 64 | | CLKIN | - |
| Time from HSD to LD | Thld | | 64 | | CLKIN | - |
| Time from HSD to STV | Thstv | | 2 | | CLKIN | - |
| Time from HSD to CKV | Thckv | | 20 | | CLKIN | - |
| Time from HSD to OEV | Thoev | | 4 | | CLKIN | - |
| LD Pulse Width | Twld | | 10 | | CLKIN | - |
| CKV Pulse Width | Twckv | | 66 | | CLKIN | - |
| OEV Pulse Width | Twoev | | 74 | | CLKIN | - |

## 7. OPTICAL CHARACTERISTICS

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|---|
| Contrast Ratio | | CR | *1) | 450 | | - | -- | Note3 |
| Brightness | | B | | 250 | 300 | - | cd/m2 | |
| Response Time | | TON | 25℃ | - | 20 | 25 | ms | Note4 |
| | | TOFF | | | | | | |
| Color Chromaticity | Red | Rx | θ=ϕ=0° | 0.570 | 0.600 | 0.630 | - | Note3 Note6 Note7 |
| | | Ry | | 0.320 | 0.350 | 0.380 | - | |
| | Green | Gx | θ=ϕ=0° | 0.290 | 0.320 | 0.350 | - | |
| | | Gy | | 0.570 | 0.600 | 0.630 | - | |
| | Blue | Bx | θ=ϕ=0° | 0.110 | 0.140 | 0.170 | - | |
| | | By | | 0.070 | 0.100 | 0.130 | - | |
| | White | Wx | θ=ϕ=0° | 0.250 | 0.290 | 0.330 | - | |
| | | Wy | | 0.290 | 0.330 | 0.370 | - | |
| View angle | | θ T | CR≧10 | 40 | 50 | - | deg. | Note5 |
| | | θ B | | 60 | 70 | - | | |
| | | θ L | | 60 | 70 | - | | |
| | | θ R | | 60 | 70 | - | | |
| NTSC | | | | | 54 | | % | |

Note1: Ambient condition：25℃±2℃，60±10%RH，under 10 Lunx in the darkroom。

Note2: Definition of viewing angle range

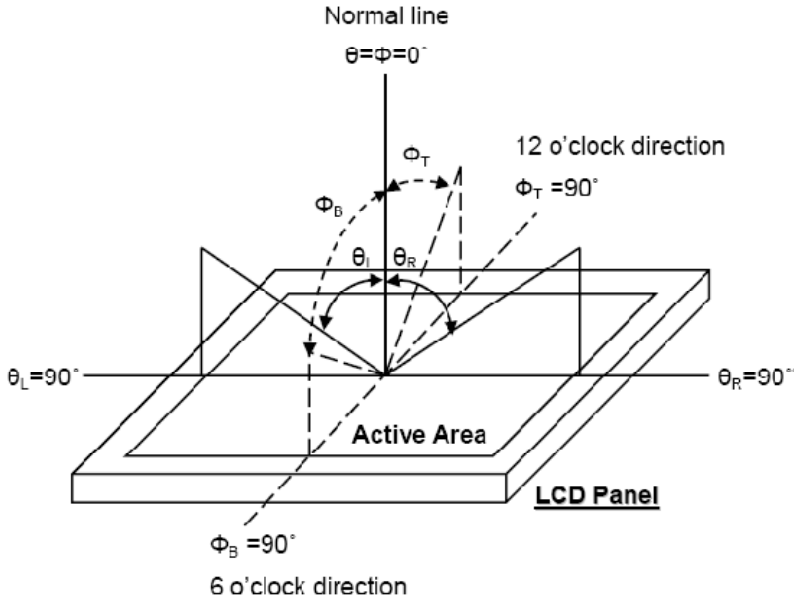



Fig. 6-1 Definition of viewing angle

Note3:Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, themeasurement should be executed. Measurement should be executed in a stable, windless, anddark room. Optical specifications are measured by Topcon BM-7

luminance meter 1.0° field ofview at a distance of 50cm and normal direction.

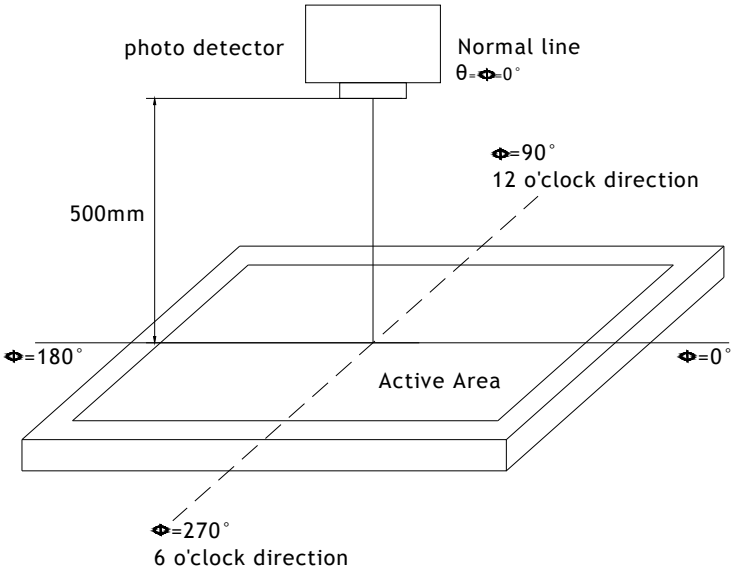



Fig. 6-2 Optical measurement system setup

Note4: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" stateand"Black" state. Rise time, Tr, is the time between photo detector output intensity changed from90%to10%. And fall time, Tf, is the time between photo detector output intensity changedfrom10%to 90%

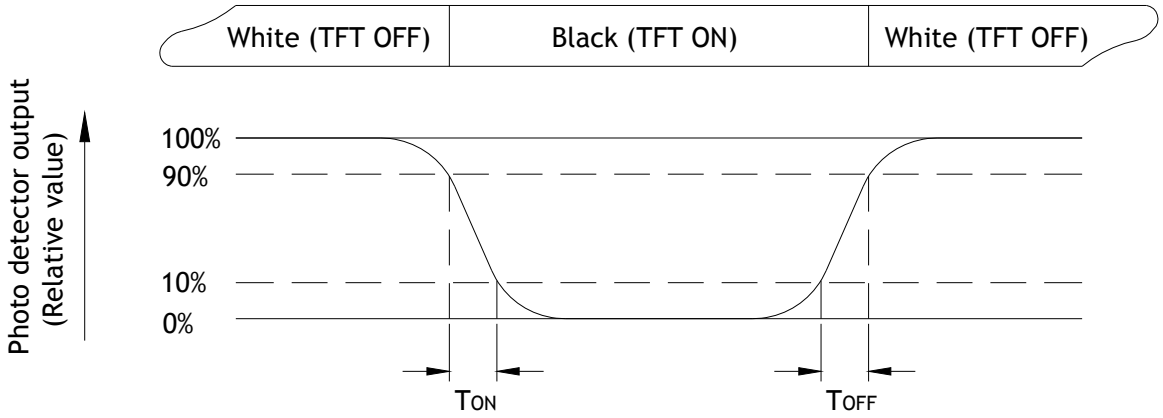



Fig. 6-3 definition of response time

Note5: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note7: Measured at the center area of the panel when all the input terminals of LCD panel areelectrically opened.

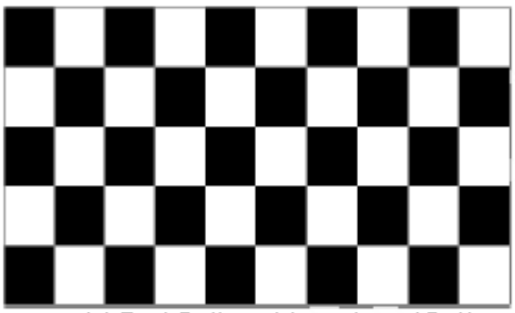
# 8. QUALITY ASSURANCE SYSTEM

## 8.1 TEMPERATURE AND HUMIDITY

| Test Item | Test Condition | Remark |
|---|---|---|
| HighTemperatureStorage | Ta=80℃; 240hrs | |
| Low Temperature Storage | Ta=-30℃; 240hrs | |
| High Temperature Operation | Ta=70℃，240Hrs | |
| LowTemperatureOperation | Ta=-20℃; 240hrs | |
| HighTemperatureHighHumidity Operation | Ta=60℃，90%RH，240Hrs(no condensation) | |
| Thermal Shock | -20℃(0.5h) ~ 70℃(0.5h) / 100cycles | |
| Image Sticking | 25℃ ; 4hrs | Note1 |

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 4hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern )

(b) Gray Pattern

## 8.2 VIBRATION&SHOCK

| Test item | Conditions |
|---|---|
| Packing Shock (non-operation) | 980m/s2,6ms, ±x,y,z 3times for direction |
| Packing Vibration (non-operation) | Frequency range:10 HZ~50HZ<br>Stroke:1.0mm,sweep:10 HZ ~50HZ<br>x,y,z 2 hours for each direction |

## 8.3ESD

| Test item | Conditions | Note |
|---|---|---|
| Electro Static Discharge Test (non-operation) | 150pF，330Ω，<br>Contact:±4KV,Air:±8KV | 1 |
| | 200pF，0Ω，±200V contact test | 2 |

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

# 9. PRECAUTION RELATING PRODUCT HANDLING

## 9.1 MOUNTING PRECAUTIONS

(1) You must mount a module using arranged in four corners or four sides.
(2)You should consider the mounting structure so that uneven force (ex. Twisted stress) is notapplied to the module.And the case on which a module is mounted should have sufficient strength so that externalforce is not transmitted directly to the module.
(3) Please attach a transparent protective plate to the surface in order to protect thepolarizer.Transparent protective plate should have sufficient strength in order to the resist externalforce.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not describe because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are determined to the polarizer)
(7) When the surface becomes dusty, please wipe gently with adsorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

## 9.2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage_V=±200mV(Over and under shoot voltage)
(2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(3) Brightness depends on the temperature. (In lower temperature, it becomes lower)
And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot willoccur.
(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

## 9.3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge.Make certain that treatment persons are connected to ground through wristband etc. Anddon’t touch interface pin directly.

## 9.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

## 9.5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.
(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keepthe temperature between 5 and 35 _ _ at normal humidity.
(2)The polarizer surface should not come in contact with any other object. It is recommendedthat they be stored in the container in which they were shipped.

## 9.6 HANDLING PRECAUTION FOR PROTECTION FILM

(1) When the protection film is peeled off, static electricity is generated between the film andpolarizer. This should be peeled off slowly and carefully by people who are electrically groundedand with well ion-blown equipment or in such a condition, etc.
(2) The protection film is attached to the polarizer with a small amount of glue. Is apt to remainon the polarizer. Please carefully peel off the protection film without rubbing it against the polarizer.
(3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.
(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material likechamois soaked with normal-hexane.

## 1.INCOMING INSPECTION RIGHT

(1) The Incoming Inspection Standard will be agreed and signed by both sides(Customer and Starry) .

## 2. INSPECTION CONDITIONS IS AS FOLLOWS:

(1) Viewing distance is approximately 35 ~ 40 cm
(2) Viewing angle is normal to the LCD panel as Fig -1(30°)
(3) Ambient temperature is approximately 25 ± 5℃
(4) Ambient humidity is 60 ± 5% RH
(5) Ambient illuminance is from 300 ~ 500 Lux.
(6) Input signal timing should be typical value.
(7) Mura & Light leakage inspection at ND-Filter 5%

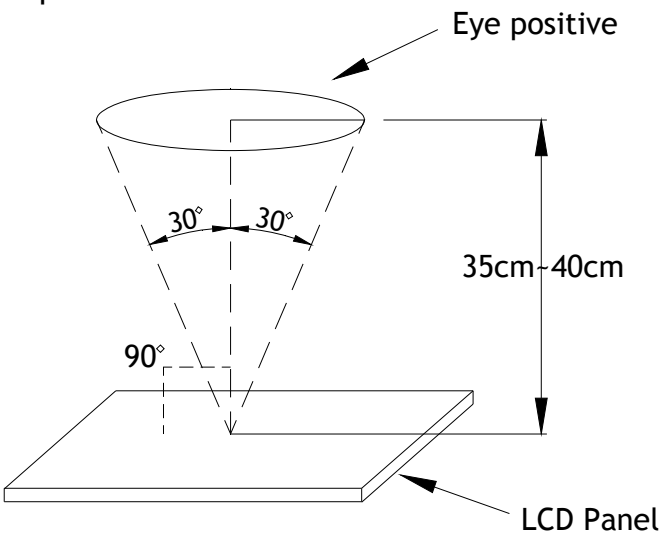



Fig-1

## 3. SPECIAL CONDITION

(1) Viewing distance is close for inspection of adjacent dots and distance between defect dots.
(2) Viewing condition of “Shot block non-uniformity from oblique angle” is as Fig-2.
(3) Exceptional case: View angle ± 40° while inspected image-sticking.

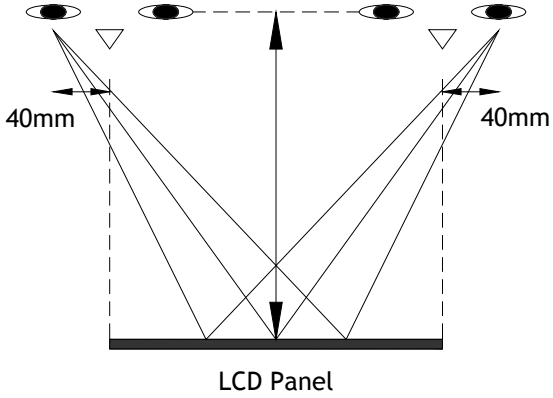


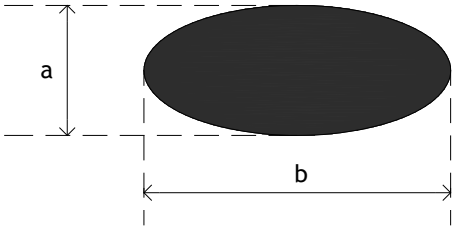

Fig-2

## 4. INSPECTION CRITERIA

| Defecttype | | | Limit | | | Note |
|---|---|---|---|---|---|---|
| Visual defect | Scratch (in active area) | | W≦0.05mm | | Ignore | Note1 |
| | | | 0.05mm≦w≦0.1mm L≦10mm | | N≦4 | |
| | | | 10mm＜L, 0.1mm＜w | | N=0 | |
| | Internal | Spot | Φ＜0.2mm | | Ignore | Note1 |
| | | | 0.2mm≦φ≦0.3mm | | N≦3 | |
| | | | 0.3mm＜φ | | N=0 | |
| | | Fiber | W≦ 0.03 | | Ignore | Note1 |
| | | | 0.03＜ W ≦ 0.04 L ≦5.0 | | N ≦ 4 | |
| | | | 0.04＜ W, L>5.0 | | N=0 | |
| | | Polarizer bubble | Φ＜0.2mm | | Ignore | Note1 |
| | | | 0.2mm≦φ≦0.3mm | | N≦1 | |
| | | | 0.3mm＜φ | | N=0 | |
| | | Dent | Φ＜0.1mm | | Ignore | Note1 |
| | | | 0.1mm≦φ≦0.25mm | | N≦2 | |
| | Mura & Gap | | Not visible through 5% ND filter | | | |
| Electrical Defect | Bright dot | | C Area | O Area | Total | Note2 Note3 |
| | | | N≦0 | N≦1 | N≦1 | |
| | Dark dot | | N≦1 | N≦2 | N≦3 | |
| | Total dot | | N≦1 | N≦3 | N≦3 | |
| | Two adjacent dot | | Not allowed | | | Note4 |
| | Three or more adjacent dot | | Not allowed | | | |
| | Line defect | | Not allowed | | | - |

(1) one pixel consists of 3 sub-pixels, including r, g, and b dot. (sub-pixel = dot)
(2) panel is acceptable if distance between 2 dot defects are greater or equal to 15mm.

Note1：W : Width[mm], L : Length[mm], N : Number, φ: Average Diameter

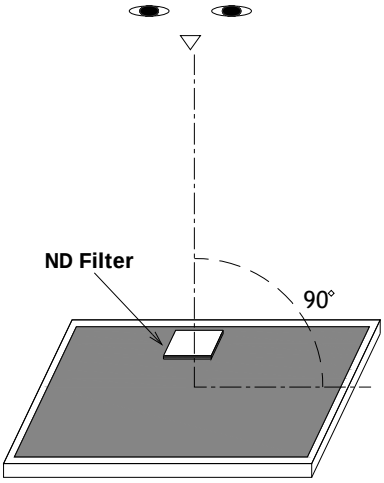



∅=(a+b)/2

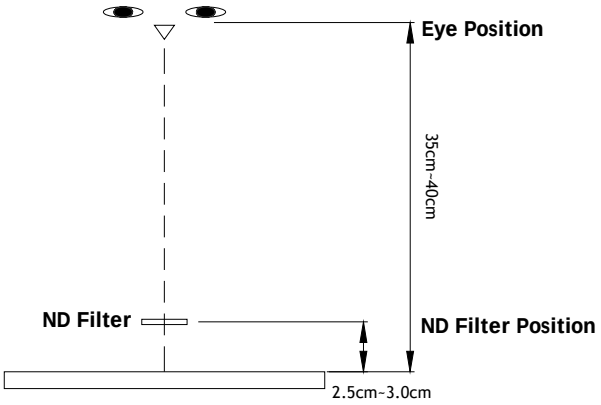
1.(White ,Black) Spot
2.Polarizer Bubble


Scratch & Fiber

Note2： Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixelarea.

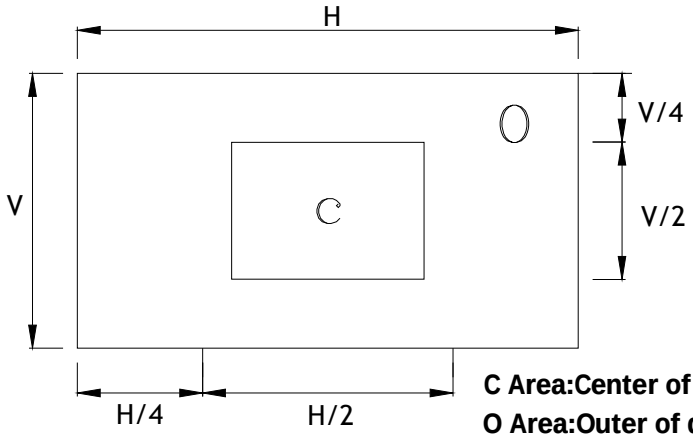



TFT-LCD Panel



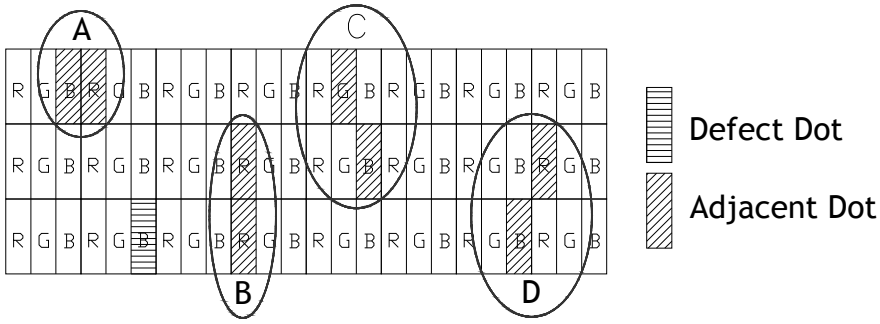

TFT-LCD Panel

Note3：




C Area:Center of display area
O Area:Outer of display area

Note4：Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dart adjacent dot. And they will be counted 2defect dots in total quantity.




Note5：Other condition

(1) The defects that are not defined above and considered to be problem shall be reviewedanddiscussed by both parties.

(2) Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

## 5. HANDLING PRECAUTION

(1) Don't disassemble and reassemble the module by self.
**(禁止自行拆解)**

(2) Acid, alkali, alcohol or touched directly by hand will damage the display.
**(酸性、碱性、酒精或手的直接接触将会损伤显示面)**

(3) Static electricity will damage the module. Please configure grounding device.
**(静电会损伤模组，请装配接地设备)**

(4)The strong vibration, shock, twist or bend will cause material damage, even module broken.
**(强烈的撞击、震动、扭转或弯曲将会造成原材损伤，甚至面板破裂)**

(5) It is easy to cause image sticking while displaying the same pattern for very long time.
**(长期显示同一画面会造成影像残留)**

(6) The response time, brightness and performance will vary from different temperature.
**(响应时间、亮度与均匀性会因温度而有所改变)**

(7) 12 months of the product term, the Microtech shipment date began to count.
**(从迈高达出货之日开始产品保质期为 12 个月)**