# 4.3 inch TFT LCD
# without Touch Panel
# SPECIFICATION

# MODEL NAME: LMCYA043ZHN1

**Date: 2013 / 06 / 10**

Electronic Engineer 尹小軍

Mechanical Engineer 楊子宁

| **Customer Signature** | | |
|---|---|---|
| **Customer** | | |
| **Approved Date** | **Approved By** | **Reviewed By** |
| | | |

# 1. Revision History

| Sample Version | DOC. Version | DATE | DESCRIPTION | | CHANGED BY |
|---|---|---|---|---|---|
| A0 | 00 | 2013-6-10 | Full Spec | First issue | Alex/Jarvis |
| B0 | 00 | 2014-1-22 | Full Spec | 1. Amending View Angle<br>2. LCM drawing<br>3. Electrical Characteristics | 栾俊 |
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## 2. Table of Contents:



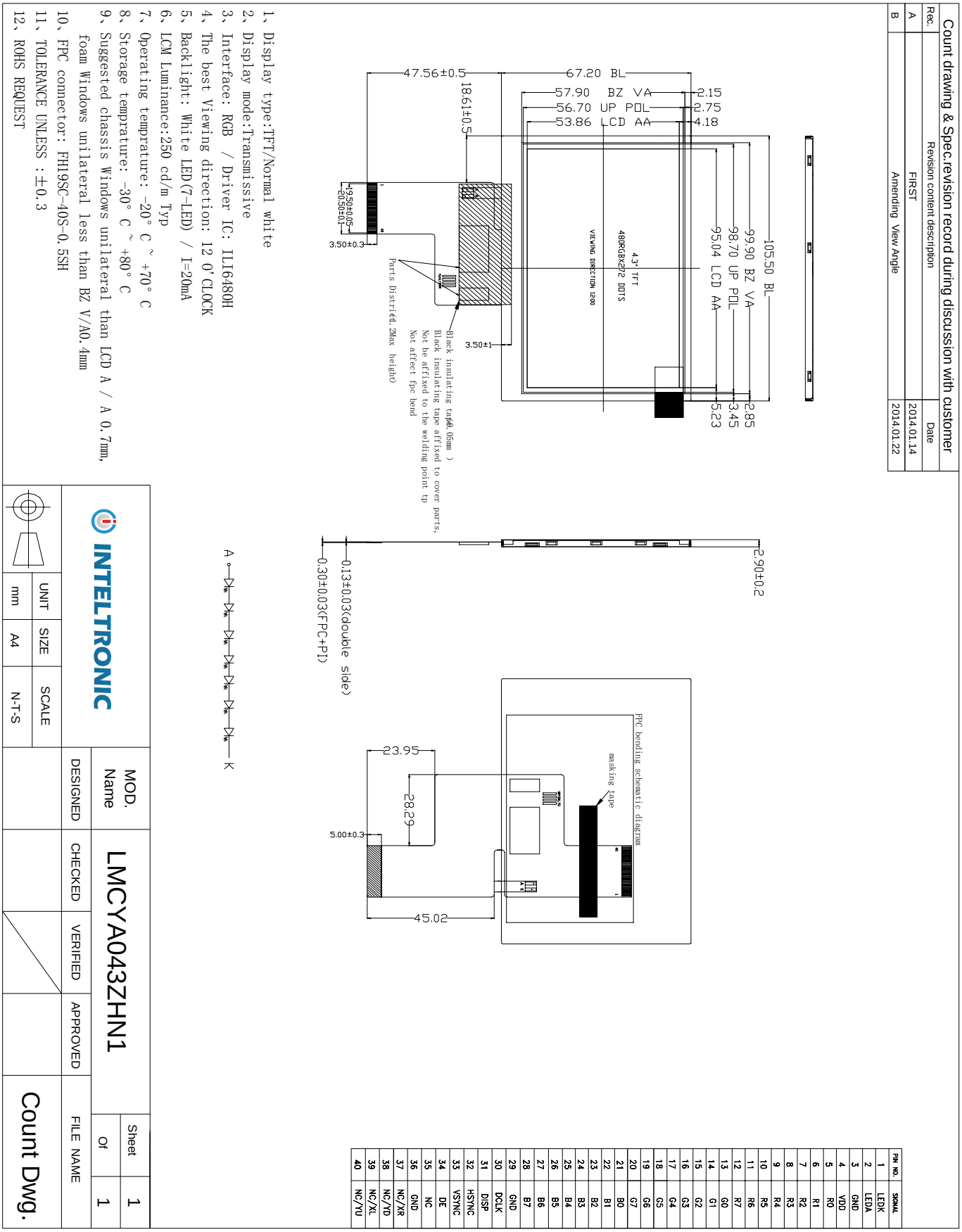


# 3. General Specification:

| ITEM | CONTENTS |
|---|---|
| Module Size | 105.50(W) * 67.20(H) 2.9(T) mm |
| Module Size(With FPC) | 105.50(W) *67.20(H) * 3.03T) mm |
| Display Size(Diagonal) | 4.3 inch |
| Display Format | 480RGB)*272 Pixels |
| Active Area | 95.04(W) *53.86(H) mm |
| Pixel Pitch | 0.198* 0.198mm |
| LCD Type | TFT (16.7M)/ Transmissive / NW |
| The Best View Angle | 12 O'clock |
| Controller IC | ILI6480H |
| Weight | TBD |



# 4. LCM drawing:



# 5. Electrical Characteristics

## 5-1 Absolute Maximum Ratings (Ta=25℃ VSS=0V)

| Item | Symbol | Min. | Type | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Voltage for Logic circuit | VCC | -0.3 | - | 5 | Volt | |
| Operating Temperature | Topr | -20 | - | +70 | ℃ | |
| Storage Temperature | Tstg | -30 | - | +80 | ℃ | |

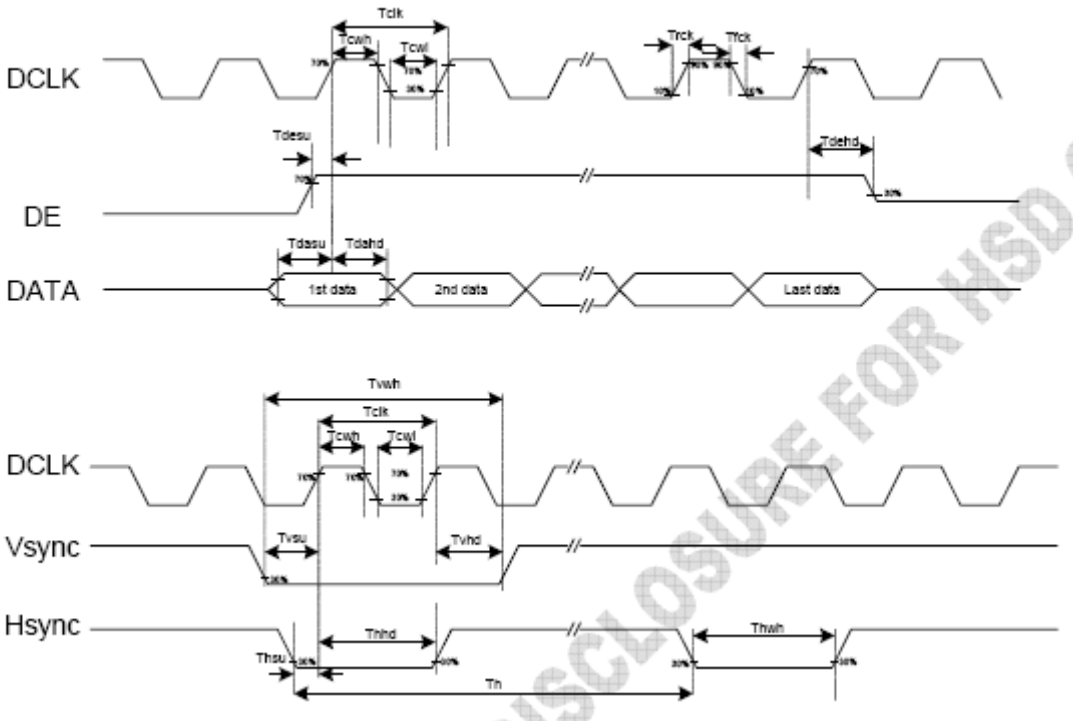
Note1: Absolute maximum rating is the limit value beyond which the IC maybe broken. They do not assure operations.

## 5-2 Operating Conditions (Ta=25℃ )

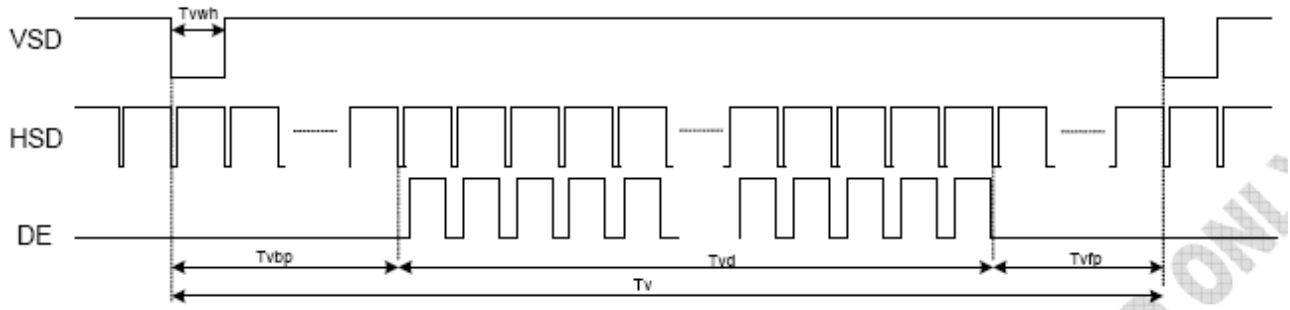
| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Power Supply voltage** | **VCC** | - | **2.7** | **3.3** | **3.6** | **Volt** |
| **Normal mode Current consumption** | **Icc** | | - | **25** | | **mA** |
| **TFT Gate ON Voltage** | **VGH** | - | | 15 | | **V** |
| **TFT Gate OFF Voltage** | **VGL** | - | | -10 | -16 | **V** |

## 5-3 Timing Characteristics

### RGB System Interface

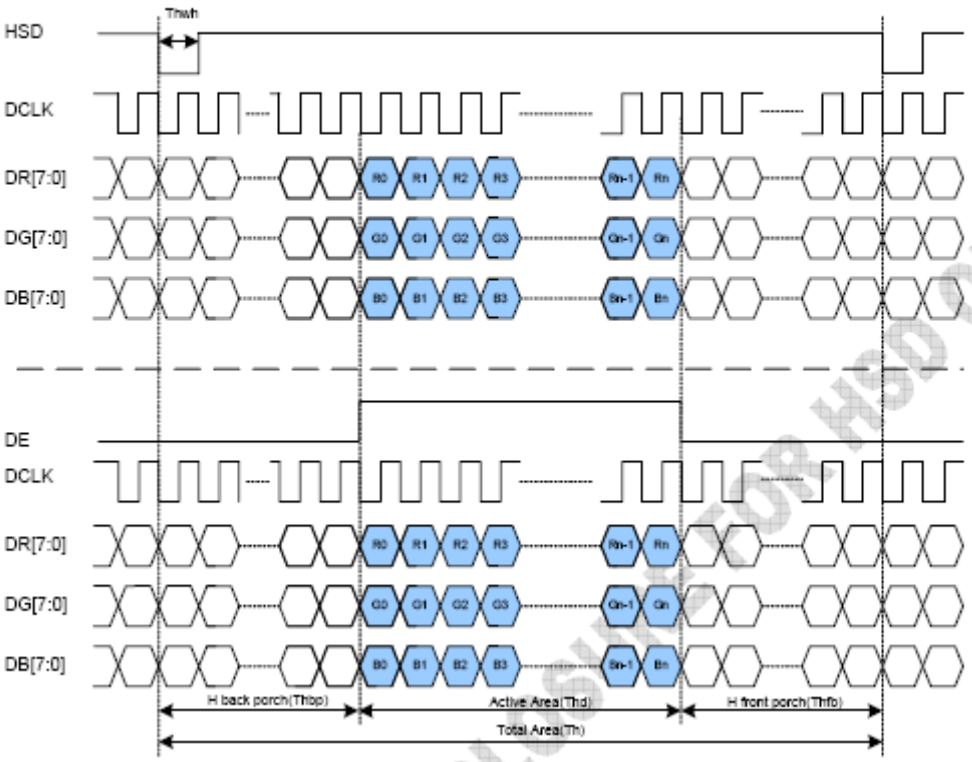


Vertical input timing




Parallel RGB Mode Data format

(HV Mode)




(DE Mode)




**Parallel RGB input timign table**

| Parameter | Symbol | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| DCLK frequency | fclk | 5 | 9 | 12 | MHz |
| VSD period time | Tv | 277 | 288 | 400 | H |
| VSD display area | Tvd | | 272 | | H |
| VSD back porch | Tvb | 3 | 8 | 31 | H |
| VSD front porch | Tvfp | 2 | 8 | 93 | H |
| HSD period time | Th | 520 | 525 | 800 | DCLK |
| HSD display area | Thd | | 480 | | DCLK |
| HSD back porch | Thbp | 36 | 40 | 255 | DCLK |
| HSD front porch | Thfp | 4 | 5 | 65 | DCLK |

# 6. Optical Characteristics:

| Item | | Symbol | Conditions | Specifications | | | Unit | Note |
|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | | |
| Transmittance (Without PZ) | | T(%) | – | - | 19. 1 | - | - | - |
| Contrast Ratio | | CR | Θ=0 Normal Viewing angle | 480 | 600 | - | | - |
| Response time | | TR+TF | – | - | 10 | 20 | ms | - |
| Viewing angle | Hor. | Θx+ | CR≧10 | 65 | 75 | - | deg. | - |
| | | Θx- | | 65 | 75 | - | | |
| | Ver. | Θy+ | | 50 | 60 | - | | |
| | | Θy- | | 60 | 70 | - | | |

Measuring Condition

1. Measuring surrounding: dark room
2. Ambient temperature: 25±2℃
3. 30 min. Warm-up time.

Color of CIE Coordinate:

| Item | | Symbol | Condition | Min. | Typ. | Max. | Brightness |
|---|---|---|---|---|---|---|---|
| Chromaticity Coordinates (Transmissive) | Red | x | θ = 0° Backlight Color Degree X=0.28 Y=0.28 Brightness =250 cd/m2 | 0.616 | 0.631 | 0.646 | TBD cd/m2 |
| | | y | | 0.327 | 0.342 | 0.357 | |
| | Green | x | | 0.306 | 0.321 | 0.336 | TBD cd/m2 |
| | | y | | 0.538 | 0.553 | 0.568 | |
| | Blue | x | | 0.134 | 0.149 | 0.164 | TBD cd/m2 |
| | | y | | 0.168 | 0.183 | 0.198 | |
| | White | x | | 0.292 | 0.307 | 0.322 | TBD cd/m2 |
| | | y | | 0.333 | 0.348 | 0.363 | |



**Measuring Condition**

- Measuring surrounding: dark room
- Ambient temperature: 25±2°C
- 15min. warm-up time.

**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 ~ 21 mm

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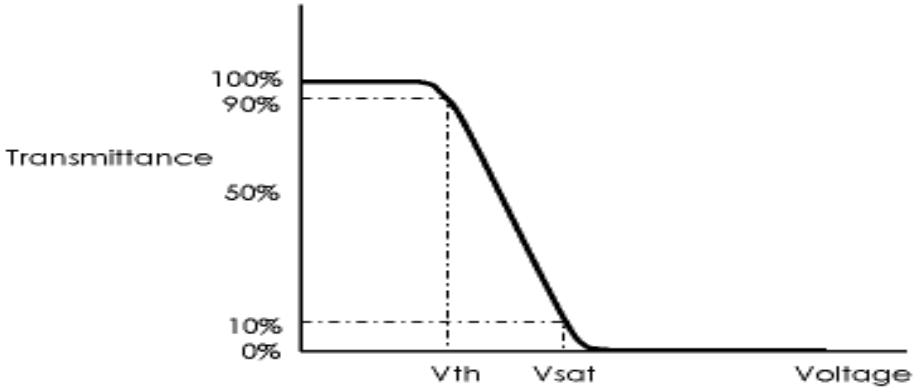
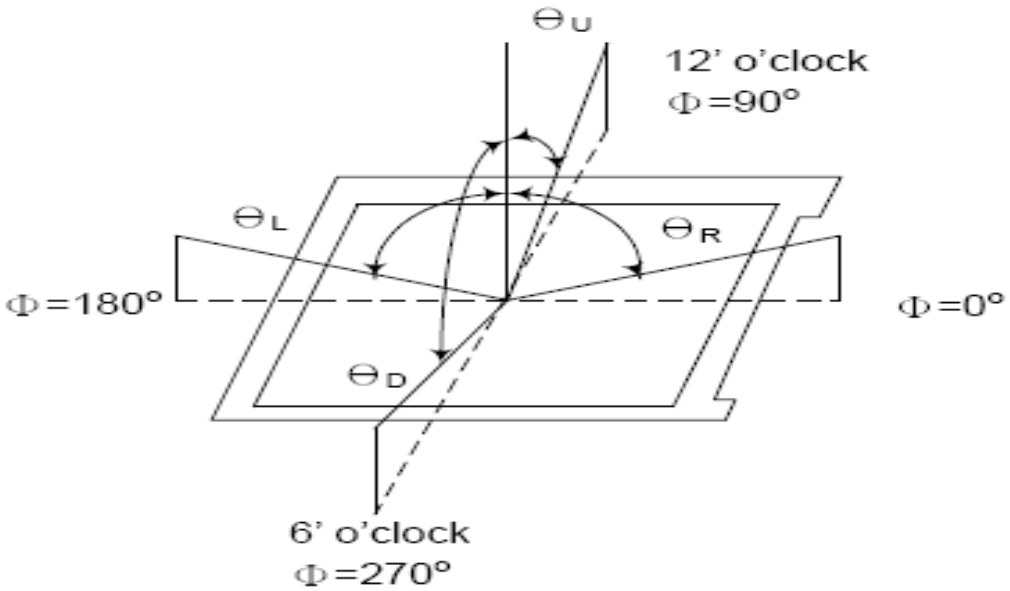
**Note (1)** Definition of Vth and Vsat (at 20℃)



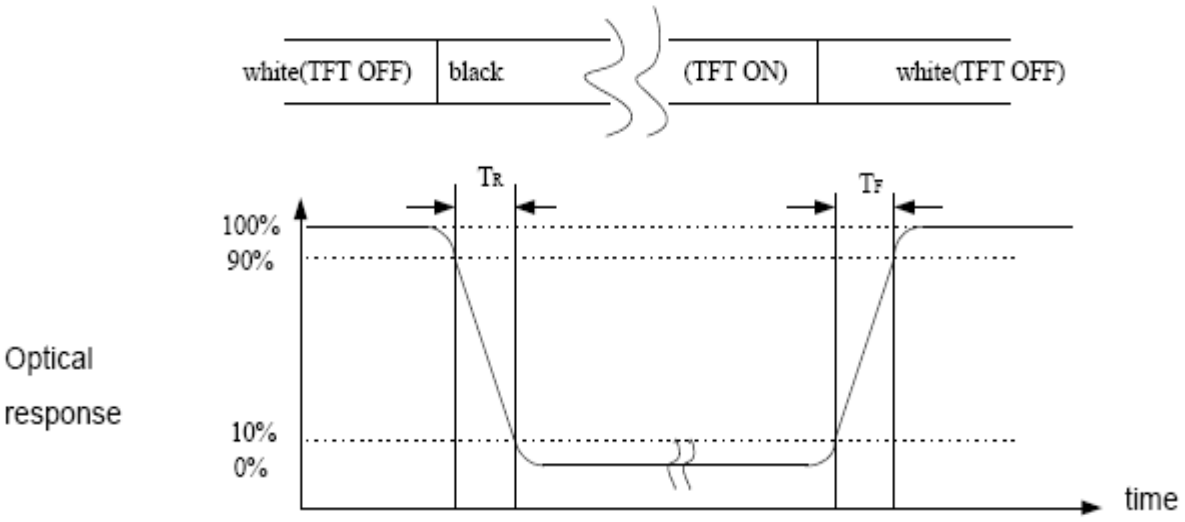

**Note (2)** Definition of Viewing Angle:



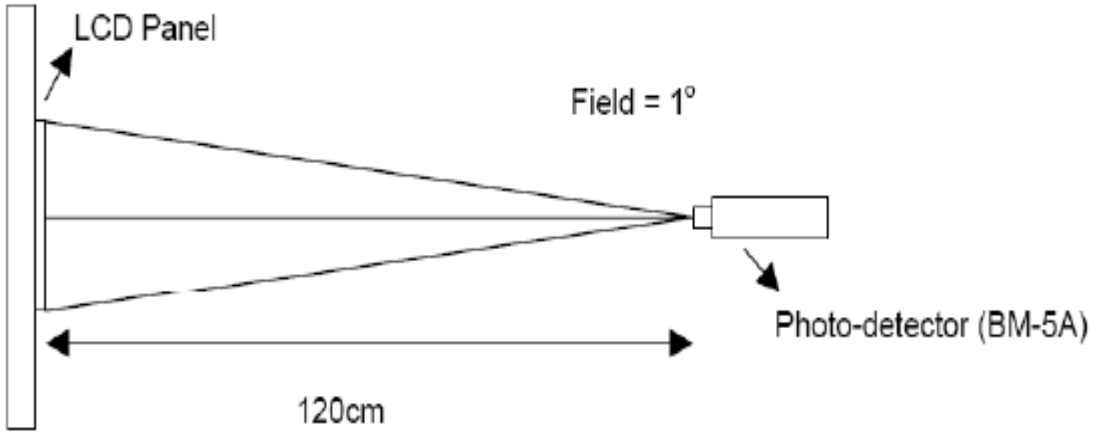
**Note (3)** Definition of Contrast Ratio (CR):
measured at the center point of panel

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

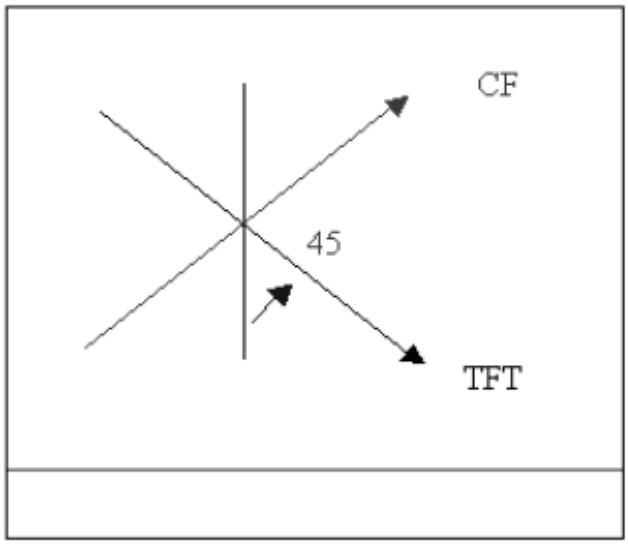
**Note (4)** Definition of Response Time : Sum of $T_R$ and $T_F$




**Note (5)** Definition of optical measurement setup



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




(Alignment Direction)

# 7. Interface Pin Assignment:

## 7-1 LCM FPC Interface

| PIN No. | symbol | level | description |
|---|---|---|---|
| 1 | LEDK | L | Back light- |
| 2 | LEDA | H | Back light+ |
| 3 | GND | H | power ground |
| 4 | VDD | H | power supply(2.7-3.6V) |
| 5-12 | R0-R7 | H/L | Red data bus |
| 13-20 | G0-G7 | H/L | Green data bus |
| 21-28 | B0-B7 | H/L | Blue data bus |
| 29 | GND | L | power ground |
| 30 | DCLK | H/L | Pixel clock signal pin |
| 31 | DISP | H/L | connected to VDDIO in normal operation mode.<br>connected to GND, the IC is in standby mode. |
| 32 | HSYNC | H/L | Horizontal sync. |
| 33 | VSYNC | H/L | Vertical sync. |
| 34 | DE | H/L | Data enable signal |
| 35 | NC | | Not connection |
| 36 | GND | L | power ground |
| 37 | XR | H/L | Touch Panel Pin |
| 38 | YD | H/L | Touch Panel Pin |
| 39 | XL | H/L | Touch Panel Pin |
| 40 | YU | H/L | Touch Panel Pin |



# 8. Backlight:

1. Standard Lamp Styles (Edge Lighting Type):
The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:

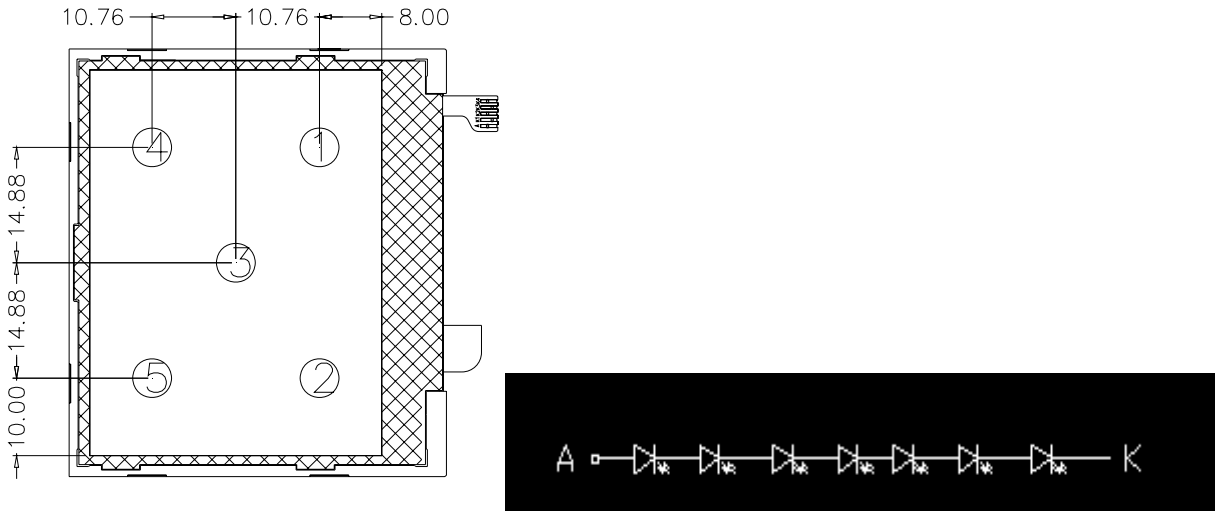
2. The Main Advantages of the LED Backlight are as following:
2.1 The brightness of the backlight can simply be adjusted.
By a resistor or a potentiometer.

3. Data About LED Backlight:

| PARAMETER | Sym. | Min. | Typ. | Max. | Unit | Test Condition | Note |
|---|---|---|---|---|---|---|---|
| Supply Current | I | - | 20 | - | mA | - | |
| Supply Voltage | V | 18.9 | - | 23.1 | V | If=20mA | |
| Reverse Current | IR | - | - | 20 | uA | Vr=5.0V | |
| Luminous Intensity for LCM | Iv | | 250 | - | Cd/m$^2$ | If=20mA | 2 |
| Uniformity for LCM | - | 80 | - | - | % | | 3 |
| Life Time | - | 20000 | 50000 | - | Hr. | | 4 |
| Color | White | | | | | | |

NOTE:
1. Backlight Only
2. Average Luminous Intensity of P1-P5
3. Uniformity = Min/Max * 100%
4. The"LED life time"is defined as the module brightness decrease to 80% original brightness at Ta=25℃ and If=20mA.The LED lifetime could be decreased If is lager than 18mA.The LED can work about 50000 hours

Internal Circuit Diagram




**(Effective spatial Distribution)**

Hole Diameter ø10 mm; 1 to 5 per Position Measured Luminous

# 9. Standard Specification for Reliability:

9–1. Standard Specifications for Reliability of LCD Module

| No | Item | Description |
|---|---|---|
| 01 | High temperature operation | The sample should be allowed to stand at 70℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 02 | Low temperature operation | The sample should be allowed to stand at -20℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 03 | High temperature storage | The sample should be allowed to stand at 80℃ for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 04 | Low temperature storage | The sample should be allowed to stand at -30℃ for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 05 | Moisture storage | The sample should be allowed to stand at 60℃,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours. |
| 06 | Thermal shock storage | The sample should be allowed to stand the following 10 cycles : -30℃ for 30 minutes → normal temperature for 5 minutes → +80℃ for 30 minutes → normal temperature for 5 minutes, as one cycle. |
| 07 | Packing vibration | Frequency range : 10Hz ~ 55Hz<br>Amplitude of vibration : 1.5mm Sweep time: 12 min<br>X,Y,Z 2 hours for each direction. |
| 08 | Packing drop test | According to ISTA 1A 2001. |
| 09 | Electrical Static Discharge | Air: ±4KV 150pF/330Ω 5 times |
| | | Contact: ±2KV 150pF/330Ω 5 time |

*Sample size for each test item is 3~5pcs



9 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 9.2, Standard specifications for Reliability have been executed in order to ensure stability.

| No | Item | Test Model | In section Criteria |
|---|---|---|---|
| 01 | Current Consumption | Refer To Specification | The current consumption should conform to the product specification. |
| 02 | Contrast | Refer To Specification | After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests. |
| 03 | Appearance | Visual inspection | Defect free. |

9- 3. MTBF

| | |
|---|---|
| MTBF | Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±5℃), normal humidity (50±10% RH), and in area not exposed to direct sun light. |



# 10. Handling Precaution:

10-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads,the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The 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

- Store in an ambient temperature of 25±10℃, and in a relative humidity of 50±10%RH. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

10-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: No higher than 280±10℃ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.



# 11. Inspection Specifications

The buyer (customer) shall inspect the modules within twenty calendar days since the delivery date (the "inspection period") at its own cost. The results of the inspection (acceptance or rejection) shall be recorded in writing, and a copy of this writing will be promptly sent to the seller.

The buyer may, under commercially reasonable reject procedures, reject an entire lot in the delivery involved if, within the inspection period, such samples of modules within such lot show an unacceptable number of defects in accordance with this incoming inspection standards, provided however that the buyer must notify the seller in writing of any such rejection promptly, and not later than within three business days of the end of the inspection period.

Should the buyer fail to notify the seller within the inspection period, the buyer's right to reject the modules shall be lapsed and the modules shall be deemed to have been accepted by the buyer.

# 12. Warranty

Inteltronic Inc. warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one year from the date of purchase.

Inteltronic Inc. will be limited to replace or repair any of its module which is found and confirmed defective electrically or visually when inspected in accordance with Inteltronic Inc. general module inspection standard.

This warranty does not apply to any products which have been on customer’s production line, repaired or altered by persons other than repair personnel authorized by Inteltronic Inc., or which have been subject to misuse, abuse, accident or improper installation. Inteltronic Inc. assumes no liability under the terms of this warranty as a consequence of such events.

If an Inteltronic Inc. product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. In returning the modules, they must be properly packaged with original package; there should be detailed description of the failures or defect.

# 13. RMA

Products purchased through Inteltronic Inc. and under warranty may be returned for replacement. Contact support@inteltronicinc.com for RMA number and procedures



# Office Locations

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