

|                              |                                           |                         |                          |                  |
|------------------------------|-------------------------------------------|-------------------------|--------------------------|------------------|
| <b>DJN 帝晶光电</b>              | Shenzhen DJN Optronics Technology Co.,Ltd |                         |                          |                  |
| <b>Product Specification</b> | P/N:<br>98-23050-7363A-H                  | Version:<br>Preliminary | Document:<br>R&-RD-002-B | Page:<br>1 of 19 |

## **PRODUCT SPECIFICATION** **FOR TOUCH DISPLAY MODULE**

**MODULE NO:** 98-23050-7363A-H

**CUSTOMER:** metagrand

|                             |        |
|-----------------------------|--------|
| <b>APPROVED BY CUSTOMER</b> |        |
| Approved by                 | Remark |
|                             |        |

|                        |            |         |             |
|------------------------|------------|---------|-------------|
| <b>APPROVED BY DJN</b> |            |         |             |
| Prepared by            | Checked by |         | Approved by |
|                        | EE         | ME      |             |
| Jason                  | Jason      | Kun Cai | Tom Zhou    |

|                                                                                                                                                                           |                                                                                                                                                         |
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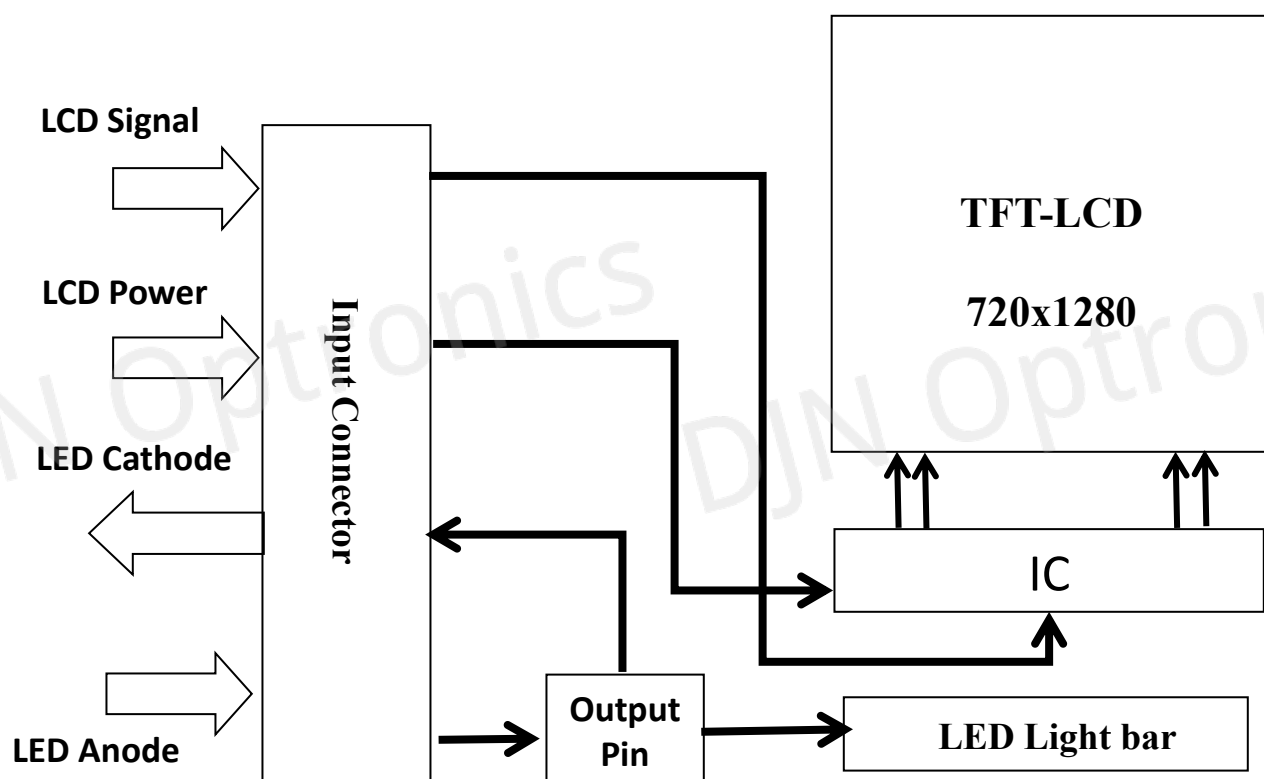
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## 1 General Description

### 1.1 Introduction

7363A is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 4.99 inch panel. Measured active area is designed with 720x1280 resolutions (720 horizontal by 1280 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.



|                              |                                           |                         |                          |                  |
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## 1.2 Features

- 4 Lane MIPI Interface;
- 8-bit color depth, display 16.7M colors
- Thin and light weight
- RoHS Compliant

## 1.3 General Specification

| Item                                                   | Contents               | Unit    |
|--------------------------------------------------------|------------------------|---------|
| LCD Type                                               | IPS                    | -       |
| Number of Dots                                         | 720(W) x RGB x 1280(H) | Dot     |
| Outline dimensions                                     | 83.93*218.6*3.275      | mm      |
| Active area                                            | 62.1*110.4             | mm      |
| Module size                                            | 4.99                   | inch    |
| Viewing direction                                      | ALL                    | o'clock |
| LCD Driver IC                                          | ILI9881C               | -       |
| Interface type                                         | MIPI interface         | -       |
| LCM Input voltage                                      | VDDIO=1.8,VCC=3.3      | V       |
| Backlight Power consumption                            | 762 TYP                | mW      |
| Surface Treatment                                      | AF+AR                  |         |
| All material of MODULE and process measure up to ROHS. |                        |         |

|                                                                                   |                                           |                         |                          |                  |
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## 2 Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

< Table 3. Absolute Maximum Ratings>

| Parameter             |            | Symbol | Min. | Max. | Unit | Remarks |
|-----------------------|------------|--------|------|------|------|---------|
| Power Supply          | LCD Module | VDDIO  | 1.65 | 3.6  | V    |         |
|                       |            | VCC    | 2.5  | 6.6  | V    |         |
| Operating Temperature |            | TOP    | -20  | +70  | °C   | Note 1  |
| Storage Temperature   |            | TST    | -30  | +80  | °C   |         |

Note:

1. Non-condensation.
2. Temp.≤ 60°C, 90%RH Max.

Temp. > 60°C, Absolute humidity shall be less than 90%RH.

|                              |                                           |                         |                          |                  |
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### 3 ELECTRICAL SPECIFICATIONS

#### 3.1 TFT LCD Module

< Table 4. LCD Module Electrical specifications > [Ta =25±2 ℃]

| Parameter            | Symbol             | Min | Typ   | Max   | Unit | Notes                   |
|----------------------|--------------------|-----|-------|-------|------|-------------------------|
| Power Supply Voltage | VDDIO              | 1.7 | 1.8   | 1.9   | V    |                         |
|                      | VCC                | 3.2 | 3.3   | 3.4   | V    |                         |
|                      | LEDA               | -   | 18    | -     | V    |                         |
| Power Supply Current | I <sub>VDDIO</sub> | -   | 18    | 27    | mA   | Note1<br>@White Pattern |
|                      | I <sub>VCC</sub>   | -   | 60    | 90    | mA   |                         |
|                      | I <sub>LEDA</sub>  | -   | 40    | -     | mA   |                         |
| Power Consumption    | PLCD               |     | 230.4 | 345.6 | mW   |                         |

#### Note:

1. The supply voltage is measured and specified at the interface connector of LCM. The current draw and power consumption specified is for VDDIO=1.8V; VCC=3.3V;

The current consumption in this assessment is an estimate only, and the exact values are based on actual measurements.

#### 3.2 Backlight Unit

Table 5. LED Driver Electrical Specifications >



### 3.3 INPUT TERMINAL PIN ASSIGNMENT

#### 3.3.1 Pin assignment for LCD module

< Table6. Pin Assignment for LCD Module >

| Pin No | Symbol   | I/O type | Description                                                                            |
|--------|----------|----------|----------------------------------------------------------------------------------------|
| 1      | GND      | P        | Ground                                                                                 |
| 2      | GND      | P        | Ground                                                                                 |
| 3      | VDD      | P        | Power Supply 3.3V                                                                      |
| 4      | MIPI_D3P | I        | MIPI differential data3 input (Positive)                                               |
| 5      | GND      | P        | Ground                                                                                 |
| 6      | MIPI_D3N | I        | MIPI differential data3 input (Negative)                                               |
| 7      | MTP(NC)  | /        | NC                                                                                     |
| 8      | GND      | P        | Ground                                                                                 |
| 9      | GND      | P        | Ground                                                                                 |
| 10     | MIPI_D2P | I        | MIPI differential data2 input (Positive)                                               |
| 11     | LEDK     | P        | Power for LED Cathode                                                                  |
| 12     | MIPI_D2N | I        | MIPI differential data2 input (Negative)                                               |
| 13     | GND      | P        | Ground                                                                                 |
| 14     | GND      | P        | Ground                                                                                 |
| 15     | LEDA     | P        | Power for LED Anode                                                                    |
| 16     | MIPI_CKP | I        | MIPI differential clock input (Positive)                                               |
| 17     | GND      | P        | Ground                                                                                 |
| 18     | MIPI_CKN | I        | MIPI differential clock input (Negative)                                               |
| 19     | LEDK     | P        | Power for LED Cathode                                                                  |
| 20     | GND      | P        | Ground                                                                                 |
| 21     | GND      | P        | Ground                                                                                 |
| 22     | MIPI_D1P | I        | MIPI differential data1 input (Positive)                                               |
| 23     | VDDIO    | P        | Power Supply 1.8V                                                                      |
| 24     | MIPI_D1N | I        | MIPI differential data1 input (Negative)                                               |
| 25     | GND      | P        | Ground                                                                                 |
| 26     | GND      | P        | Ground                                                                                 |
| 27     | TE       | O        | Tearing effect output signal.                                                          |
| 28     | MIPI_D0P | I/O      | MIPI differential data0 input/output (Positive)                                        |
| 29     | GND      | P        | Ground                                                                                 |
| 30     | MIPI_D0N | I/O      | MIPI differential data0 input/output (Negative)                                        |
| 31     | LED_PWM  | O        | LCD backlight control PWM output pin                                                   |
| 32     | GND      | P        | Ground                                                                                 |
| 33     | GND      | P        | Ground                                                                                 |
| 34     | RESX     | I        | This signal will reset the device and must be applied properly to initialize the chip. |

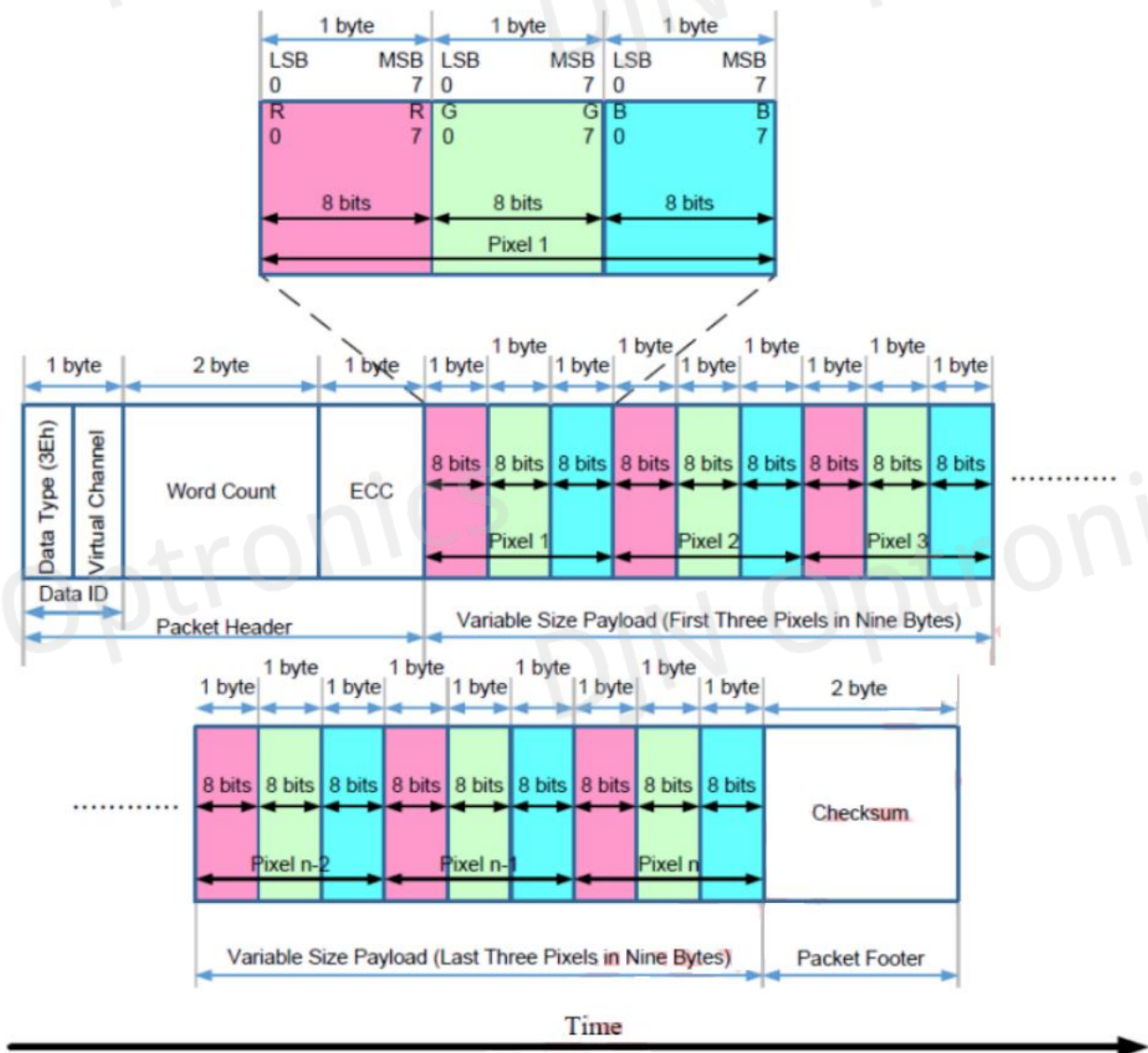
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### 3.3.2 Pin assignment for CTP module

| Pin No | Symbol     | I/O type | Description                                                    |
|--------|------------|----------|----------------------------------------------------------------|
| 1      | GND        | P        | Ground                                                         |
| 2      | SDA_1.8V   | P        | touch I2C date input and output                                |
| 3      | SCL_1.8V   | P        | touch I2C clock input                                          |
| 4      | INT_1.8V   | I        | interrupt request to the host, or wakeup request from the host |
| 5      | RESET_1.8V | P        | touch External reset,low is active                             |
| 6      | VDD_3.3V   | I        | TP Power supply for Input(3.3V)                                |

### 3.4 MIPI Interface Characteristic

#### 3.4.1 Data Format



< MIPI Tx Data Configuration >

### 3.4.2 DC Specification

< Table7. DC Specification >

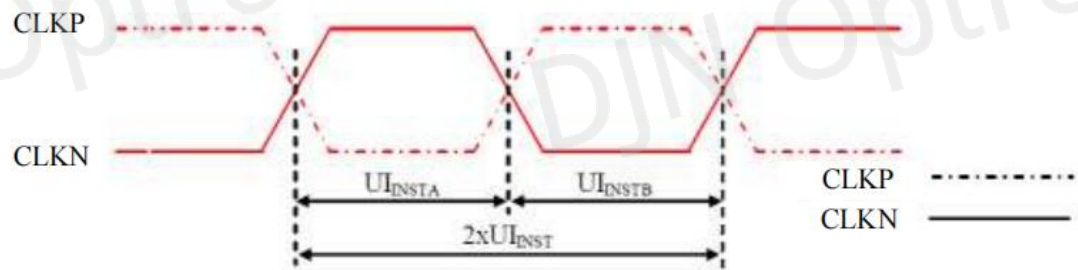
| Item                                                | Symbol            | Condition                           | Min.                                         | Typ. | Max.                                      | Unit | Note    |
|-----------------------------------------------------|-------------------|-------------------------------------|----------------------------------------------|------|-------------------------------------------|------|---------|
| <b>Power &amp; Operation Voltage</b>                |                   |                                     |                                              |      |                                           |      |         |
| Analog operating voltage                            | VC1               | -                                   | 2.5                                          | 2.8  | 6.6                                       | V    |         |
| Analog operating voltage                            | VCIREF            | -                                   | 2.5                                          | 2.8  | 6.6                                       | V    |         |
| Digital operating voltage                           | VDDI              | -                                   | 1.65                                         | 2.8  | 3.6                                       | V    |         |
| Digital operating voltage                           | VCC1              | -                                   | 1.65                                         | 2.8  | 6.6                                       | V    |         |
| Digital operating voltage                           | VCC2              | -                                   | 1.65                                         | 2.8  | 6.6                                       | V    |         |
| DSI operating voltage                               | VDDAM             | -                                   | 1.65                                         | 1.8  | 3.6                                       | V    |         |
| OTP Supply voltage                                  | MTP_PWR           | -                                   | 8.4                                          | 8.5  | 8.6                                       | V    |         |
| Analog operating voltage                            | VSP               | -                                   | 4.5                                          | -    | 6.6                                       | V    |         |
| Analog operating voltage                            | VSN               | -                                   | -6.6                                         | -    | -4.5                                      | V    |         |
| Logic High level input voltage                      | VIH               | -                                   | 0.7*VDDI                                     | -    | VDDI                                      | V    | Note1   |
| Logic Low level input voltage                       | VIL               | -                                   | -0.3                                         | -    | 0.3*VDDI                                  | V    | Note1   |
| Logic High level output voltage<br>TE, LEDPWM       | VOH               | IOH = -1.0mA                        | 0.8*VDDI                                     | -    | VDDI                                      | V    | Note1   |
| Logic Low level output voltage<br>TE, LEDPWM        | VOL               | IOL = +1.0mA                        | 0                                            | -    | 0.2*VDDI                                  | V    | Note1   |
| Gate Driver High Voltage                            | VGH               | -                                   | 8.0                                          | -    | 18                                        | V    |         |
| Gate Driver Low Voltage                             | VGL               | -                                   | -18.0                                        | -    | -7.0                                      | V    |         |
| Driver Supply Voltage                               | -                 | [VGH-VGL]                           | 15                                           | -    | 32                                        | V    |         |
| <b>VCOM Operation</b>                               |                   |                                     |                                              |      |                                           |      |         |
| DC VCOM Amplitude Voltage                           | VCOM              | -                                   | -4.0                                         | -    | 0                                         | V    | Note3   |
| <b>Source Driver</b>                                |                   |                                     |                                              |      |                                           |      |         |
| Source Output Range                                 | VSOUT(+)          | -                                   | 0.3                                          | -    | VREG1OUT-0.1                              | V    | Note4   |
|                                                     | VSOUT(-)          | -                                   | VREG2OUT<br>+0.1                             | -    | -0.3                                      | V    | Note4   |
| Positive Gamma Reference Voltage                    | VREG1OUT          | -                                   | 3.5                                          | -    | VSP-0.5<br>(VSP<=6.1)<br>5.6<br>(VSP>6.1) | V    |         |
| Negative Gamma Reference Voltage                    | VREG2OUT          | -                                   | VSN+0.5<br>(VSN>=-6.1)<br>-5.6<br>(VSN<-6.1) | -    | -3.5                                      | V    |         |
| Source Output Setting Time                          | Tr                | Below with 99%<br>precision         | -                                            | 10   | -                                         | uS   | Note3.4 |
| Output Deviation Voltage<br>(Source Output channel) | Vdev              | Sout>=4.2V<br>Sout<=0.8V            | -                                            | -    | 20                                        | mV   | Note3   |
|                                                     |                   | 4.2V>Sout>0.8V                      | -                                            | -    | 15                                        | mV   |         |
| Output Offset Voltage                               | VOFFSET           | -                                   | -                                            | -    | 35                                        | mV   | Note3   |
| <b>Standby mode current consumption</b>             |                   |                                     |                                              |      |                                           |      |         |
| Sleep In mode                                       | I(VDDI SLP<br>IN) | Ta = 25 °C<br>VCI=2.8V<br>VDDI=1.8V | -                                            | 35   | -                                         | uA   |         |
|                                                     | I(VCI SLP IN)     |                                     | -                                            | 25   | -                                         | uA   |         |

**Notes:**

1. Ta = -30 to 70 °C (to 85 °C no damage) , VCI = 2.5V to 6.6V, VDDI = 1.65V to 3.6V
2. Supply digital VDDI voltage equal or less than analog VCI voltage.
3. Source channel loading = 9KΩ,70pF/channel
4. The maximum value is between with Note 3 and Gamma setting value

|                              |                                           |                         |                          |                   |
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3.4.3 AC Specification



< Timing Diagram of MIPI Transmitter>

< Table8. AC Specification >

| Signal | Symbol                               | Parameter               | Min    | Max  | Unit |
|--------|--------------------------------------|-------------------------|--------|------|------|
| CLKP/N | $2xUI_{INST}$                        | Double UI instantaneous | Note 2 | 25   | ns   |
| CLKP/N | $UI_{INSTA}, UI_{INSTB}$<br>(Note 1) | UI instantaneous Half   | Note 2 | 12.5 | ns   |

|                                                                                   |                                           |                         |                          |                   |
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3.4.5 Interface Timing Parameters

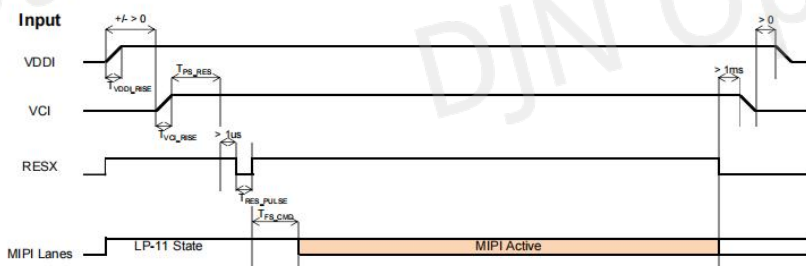
< Table9. Timing Parameter >

| ITEM   |            | Parameter  | MIN | TYP  | MAX |
|--------|------------|------------|-----|------|-----|
| Timing | Horizontal | H Active   | -   | 720  | -   |
|        |            | Hsync      | -   | 33   | -   |
|        |            | HBP        | -   | 100  | -   |
|        |            | HFP        | -   | 100  | -   |
|        | Vertical   | V Active   | -   | 1280 | -   |
|        |            | Vsync      | -   | 2    | -   |
|        |            | VBP        | -   | 30   | -   |
|        |            | VFP        | -   | 20   | -   |
|        |            | Frame Rate | -   | 60   | -   |

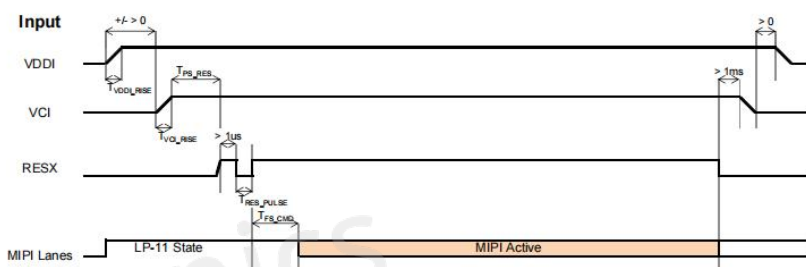


## 3.4.7 Power On/Off Sequence

Case A:



Case B:



&lt; Table11. Sequence Table &gt;

| Symbol           | Characteristics           | Min. | Typ. | Max. | Units |
|------------------|---------------------------|------|------|------|-------|
| $T_{VDDI\_RISE}$ | VDDI Rise time            | 10   | -    | -    | us    |
| $T_{VCI\_RISE}$  | Case A: VCI Rise time     | 130  | -    | -    | us    |
|                  | Case B: VCI Rise time     | 40   |      |      |       |
| $T_{PS\_RES}$    | VDDI/VCI on to Reset high | 5    | -    | -    | ms    |
| $T_{RES\_PULSE}$ | Reset low pulse time      | 10   | -    | -    | us    |
| $T_{FS\_CMD}$    | Reset to first command    | 10   | -    | -    | ms    |

|                              |                                           |                         |                          |                   |
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## 4. OPTICAL SPECIFICATIONS

### 4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance  $\leq 1\text{lux}$  and temperature =  $25\pm 2^{\circ}\text{C}$ ) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-7) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of  $\theta$  and  $\Phi$  equal to  $0^{\circ}$ . We refer to  $\theta_{\phi}=0$  ( $=\theta_3$ ) as the 3 o'clock direction (the "right"),  $\theta_{\phi}=90$  ( $=\theta_{12}$ ) as the 12 o'clock direction ("upward"),  $\theta_{\phi}=180$  ( $=\theta_9$ ) as the 9 o'clock direction ("left") and  $\theta_{\phi}=270$  ( $=\theta_6$ ) as the 6 o'clock direction ("bottom"). While scanning  $\theta$  and/or  $\phi$ , the center of the measuring spot on the Display surface shall stay fixed.

### 4.2 Optical Specifications

< Table13. Optical Table >

| Item                  | Symbol       | Min.  | Typ. | Max.  | Unit   | Condition                                             |
|-----------------------|--------------|-------|------|-------|--------|-------------------------------------------------------|
| Response Time         | Tr+Tf        | -     | 30   | 40    | msec   | Notes(2)                                              |
| Contrast Ratio        | Cr           | 640   | 800  | -     | --     | Notes(3)                                              |
| TLCM Brightness       | Center point | 460   | 520  | -     | Cd/m2  | Notes(1) ,Notes(4)                                    |
| NTSC                  |              | -     | 66   | -     | %      |                                                       |
| Color Coordinate      | Wx           | -0.03 | TBD  | +0.03 |        | Notes(1) ,Notes(4))<br>R,G,B Coordinate for reference |
|                       | Wy           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | Rx           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | Ry           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | Gx           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | Gy           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | Bx           | -0.03 | TBD  | +0.03 |        |                                                       |
|                       | By           | -0.03 | TBD  | +0.03 |        |                                                       |
| Visual angle          | $\theta_U$   | -     | 80   | -     | Degree | Notes(6)                                              |
|                       | $\theta_D$   | -     | 80   | -     |        |                                                       |
|                       | $\theta_L$   | -     | 80   | -     |        |                                                       |
|                       | $\theta_R$   | -     | 80   | -     |        |                                                       |
| Brightness Uniformity | Br           | 80    | -    | -     | %      | Notes(7)                                              |

Test condition:

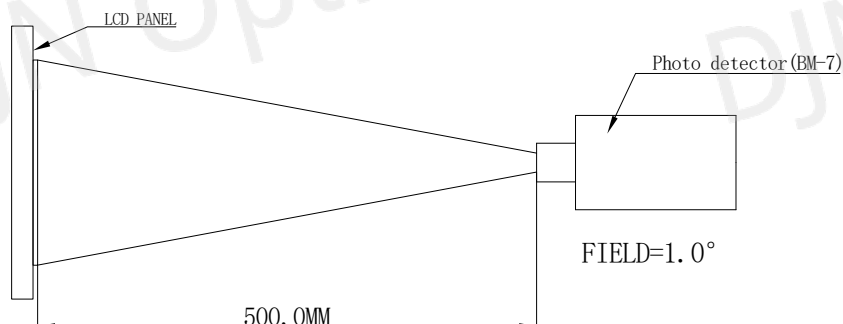
1. LCM signal input refer to "5.3 DC Characteristics", and the ambient temperature is  $25^{\circ}\text{C}$
2. Measuring Equipment  
BM-7 for optical characteristics. Measuring spot size: 20 ~ 21 mm

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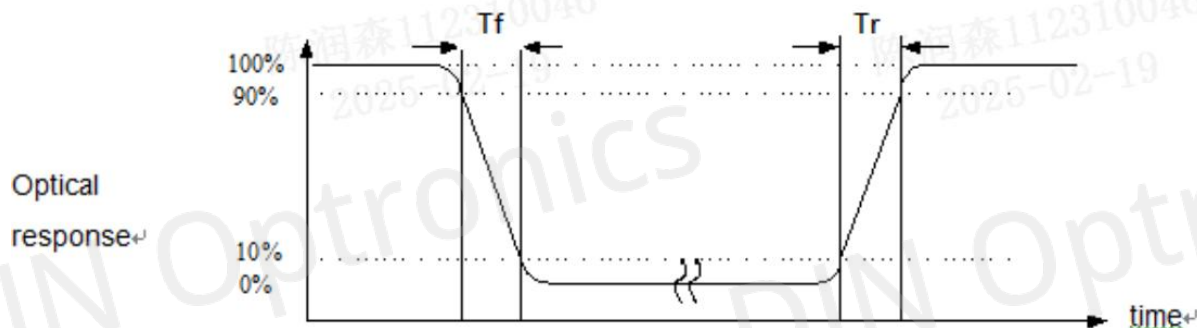
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3. The test systems refer to Notes(1)

Notes (1) Definition of optical measurement setup



Notes (2) Definition of Response Time: Sum of TR and TF



Notes (3) Definition of Contrast Ratio (CR):

Measured at the center point of panel

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

Notes (4) the color coordinate and luminance are measured the centre point of the active area .

Notes (5): crosstalk test method

The point should be marked is, the background of Cross-talk Test Pattern-“gray “ are defined as middle gray scale . For example, RGB 24bit “gray” defined as below:

$$\bullet \triangle B_{pn} = B_{pn}(\text{gray}) / B_{pn}(\text{white})$$

Which n means the dot No. In the Cross-talk Test Pattern ;

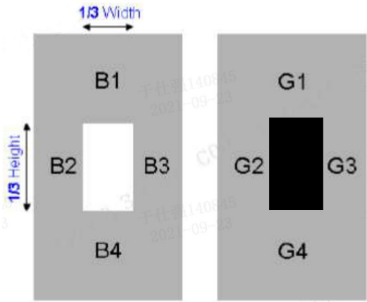
B<sub>pn</sub> (gray) means the brightness of the No.n spots in Cross-talk Test Pattern;

B<sub>pn</sub> (white) means the brightness of the No.n spots in Full white Test Pattern;

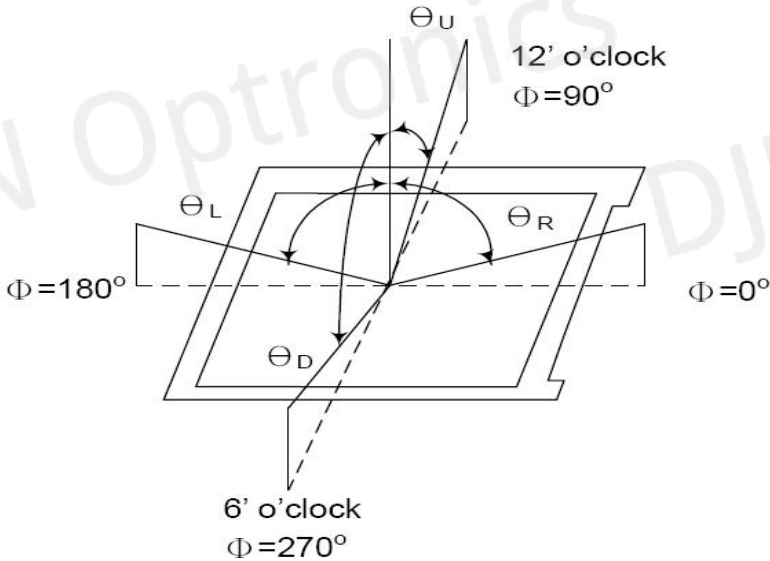
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|                                                                                   |                                           |                         |                          |                   |
|-----------------------------------------------------------------------------------|-------------------------------------------|-------------------------|--------------------------|-------------------|
|  | Shenzhen DJN Optronics Technology Co.,Ltd |                         |                          |                   |
| Product Specification                                                             | P/N:<br>98-23050-7363A-H                  | Version:<br>Preliminary | Document:<br>R&-RD-002-B | Page:<br>16 of 19 |

- $\Delta Bp$  (Max.) = Maximum value in  $\Delta Bp1 \sim \Delta Bp4$ .
- $\Delta Bp$  (Min.) = Minimum value in  $\Delta Bp1 \sim \Delta Bp4$ .
- $\Delta CT = \Delta Bp$  (Max.)/  $\Delta Bp$ (Min.).
- $\Delta CT$  must be less than 1.10

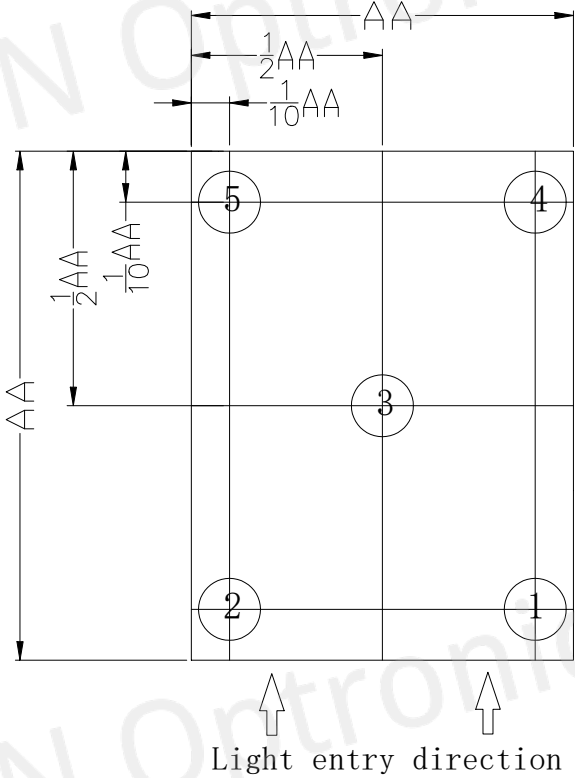


Notes (6) Definition of Viewing Angle :



|                                                                                   |                                           |                         |                          |                   |
|-----------------------------------------------------------------------------------|-------------------------------------------|-------------------------|--------------------------|-------------------|
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Notes (7) Definition of brightness uniformity



|                              |                                           |                         |                          |                   |
|------------------------------|-------------------------------------------|-------------------------|--------------------------|-------------------|
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## 5. Reliability Test

The Reliability test items and its conditions are shown in below

<Table 14. Reliability Test Parameters >

| No | Test Item                       | Conditions         |
|----|---------------------------------|--------------------|
| 1  | High Temperature Operation      | 70°C, 120hr        |
| 2  | High Temperature Storage        | 80°C, 120hr        |
| 3  | Low Temperature Operation       | -20°C, 120hr       |
| 4  | Low Temperature Storage         | -30°C, 120hr       |
| 5  | High Temp. High Humid Operation | 60°C, 90%RH, 120hr |

## 6. Appendix: Mechanical Drawing

