# PRODUCT SPECIFICATION FOR LCD MODULE

**Revision:** 1.0

**Model No:** LSC028I23-S-V1

**Module Type:** COG+FPC+B/L+CTP

| APPROVED SIGNATURE |
| --- |
| |

■ Approved Product Specification only
□ Approved Product Specification and Samples

| Prepared By | Checked By | Approved By |
| --- | --- | --- |
| | | |

# Contents
目录

# 1. General Description

LSC028I23-S-V1 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit and a backlight unit. The panel size is 2.83 inch and the resolution is 240(RGB)*320, the panel can display up to 262k colors.

# 2. Physical Features

| | |
|---|---|
| Display Mode | TFT-LCD Module |
| | Active matrix TFT, Transmissive type |
| Display Format | Graphic 240(RGB)×320 Dot-matrix |
| Input Data | SPI |
| Viewing Direction （Grayscale Inversion） | Free（IPS） |
| Drive | JD9853 |

# 3. Mechanical Specification

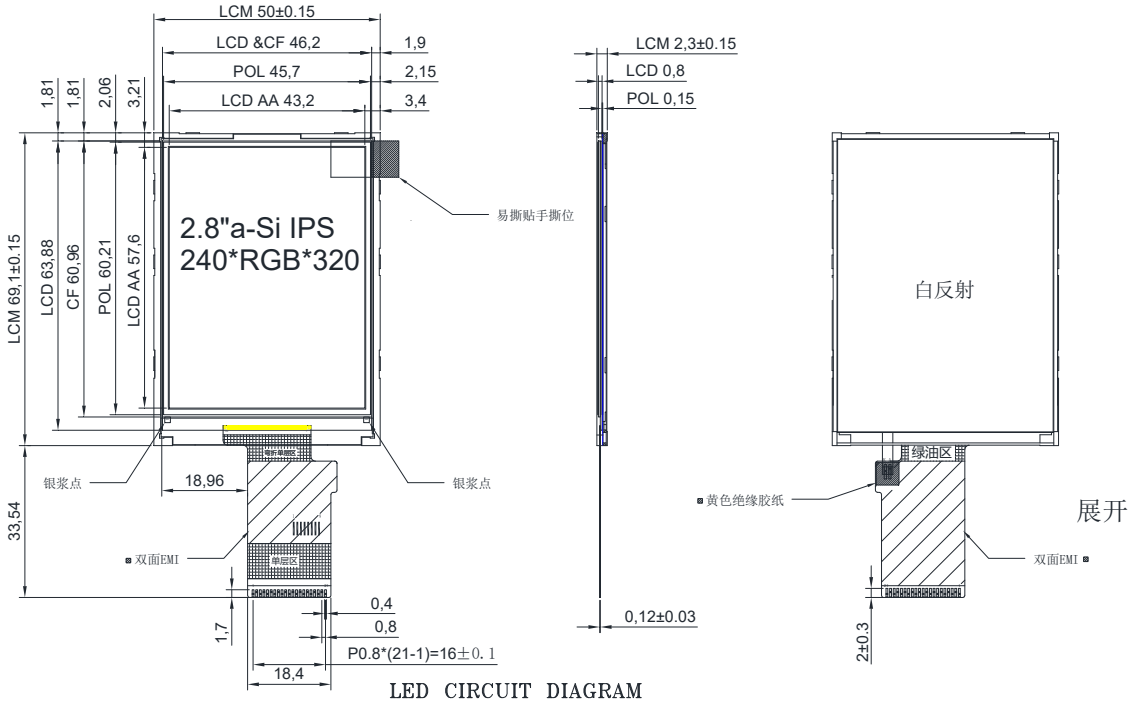
| Item | Specification | Unit |
|---|---|---|
| Module size (H×V×D) | 54.5×79.5×3.4 | mm |
| Number of dots | 240(RGB) ×320 | pixel |
| Active area (H×V) | 43.2×57.60 | mm |

# 4. Outline Dimension

## LCM

Customer No.: CUSTOMER_NO.:

主视图 侧视图 背视图




SPI 4线一通道

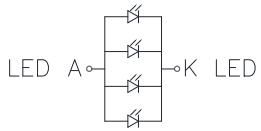
| PIN NO. | pin name |
|---|---|
| 1 | LED_K |
| 2 | LED_A |
| 3 | GND0 |
| 4 | MOSI(3.3V) |
| 5 | SCLK(3.3V) |
| 6 | GND1 |
| 7 | A0(3.3V) |
| 8 | CS(3.3V) |
| 9 | RST(3.3V) |
| 10 | TE(3.3V) |
| 11 | IOVDD(3.3V) |
| 12 | AVDD(3V3) |

接口定义：

| PIN NO. | pin name | PIN NO. | pin name |
|---|---|---|---|
| 1 | MESH1 | 14 | MESH1 |
| 2 | VDD(3.3V) | 15 | CTP_VDD(3.3V) |
| 3 | SCL | 16 | CTP_SCL(3.3V) |
| 4 | SDA | 17 | CTP_SDA(3.3V) |
| 5 | INT | 18 | CTP_INT(3.3V) |
| 6 | RST | 19 | CTP_RST(3.3V) |
| 7 | GND | 20 | MESH3 |
| 8 | MESH2 | 21 | MESH2 |

展开出货

LED CIRCUIT DIAGRAM




驱动条件:IF=80mA,Vf=3V(TYP)

NOTES:

1. DISPLAY TYPE: Main LCD: Transmissive, IPS
2. OPERATING TEMP: -20° C~70° C
3. STORAGE TEMP : -30° C~80° C
4. MAIN LCD DRIVER: JD9853
5. Backlight: 4 Chip-White LED Parallel
6. ROHS COMPLIANCE
7. 建议外壳可视区域比VAmds单边小0.3mm以上
8. 机壳泡棉开窗应比VAmds单边大0.6mm以上
9. TP边缘不能接触到金属导体

TOLERANCE OF SEGMENTS TO EDGE OF GLASS: ±0.2MM

| NO. | NAME | QTY | Part No. | VENDER && NOTE |
|---|---|---|---|---|

| CUSTOMER APPROVE | | AMEND | | | 名称 | 立信（万安）智显科技有限公司 | | |
|---|---|---|---|---|---|---|---|---|
| Mechanical | Electrical | X04 | CONTENT4 | DATE4 | TOLERANCE: DECIMAL .x ± .20 .xx ± .20 ∠ ± 1/4° | PRODUCT NO. LSC028I23-S-V1 | DRAW NO. 图号 | REV A |
| | | X03 | CONTENT3 | DATE3 | | DWN CHEN | DSN CHEN | |
| | | X02 | CONTENT2 | DATE2 | | CHKD LUO | APPD LUO | |
| | | X01 | CONTENT1 | DATE1 | | NOT IN SCALE | UNIT mm | SHEET: 分页号 |
| | | NO. | CONTENT | DATE | | | | |

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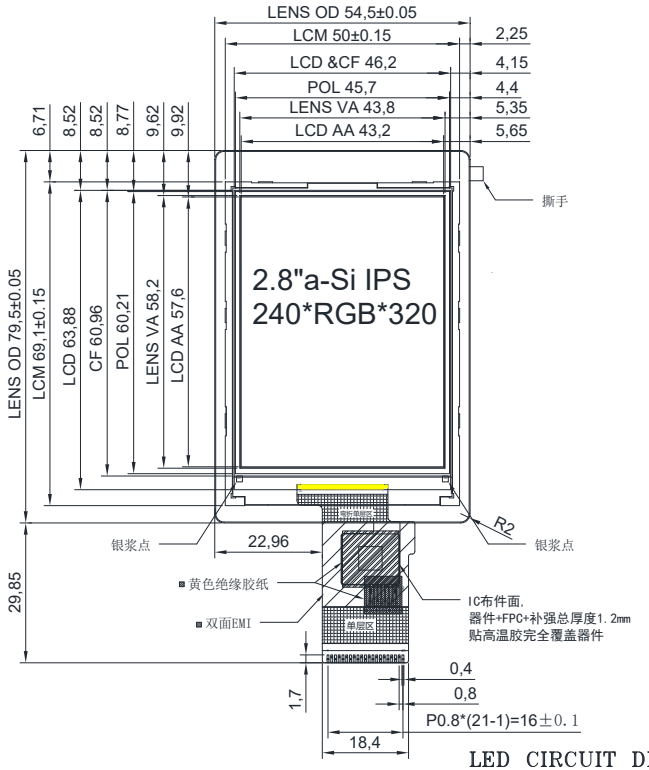
LCM+CTP

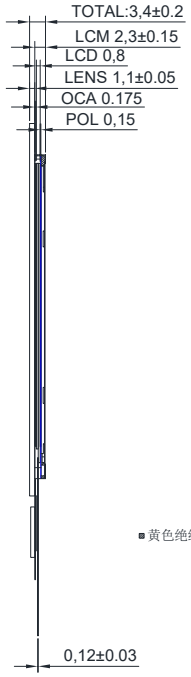
LESSON 立信（万安）智显科技有限公司 Lesson Smart Dispaly Technology Co.,Ltd

Customer No.: CUSTOMER_NO.:

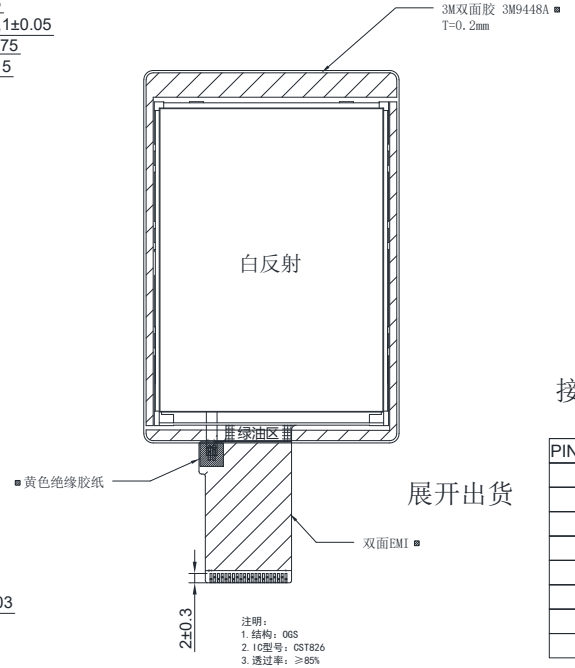
## 主视图




## 侧视图




## 背视图

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注明：
1. 结构：OGS
2. IC型号：CST826
3. 透过率：≥85%
4. 工作温湿度范围：-10℃~60℃；
储存温湿度范围：-20℃~70℃；
5. 表面硬度：≥5H
6. LENS达因值≥30，达因笔品牌Arcotest
7. 未标注公差：±0.20，贴合角度±1°
8. 所有的材料符合ROHS标准
9. [※]为重点尺寸：

正面保护膜保单层出货

SPI 4线一通道

| PIN NO. | pin name |
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NOTES:
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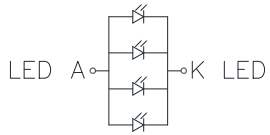
## LED CIRCUIT DIAGRAM




驱动条件：IF=80mA, Vf=3V(TYP)

| NO. | NAME | QTY | Part No. | VENDER && NOTE |
|---|---|---|---|---|

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|---|---|---|---|---|---|---|---|---|
| Mechanical | Electrical | X04 | CONTENT4 | DATE4 | TOLERANCE: DECIMAL .x ± .20 .xx ± .20 ∠ ± 1/4° | PRODUCT NO. LSC028I23-S-V1 | DRAW NO. 图号 | REV A |
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| | | X01 | CONTENT1 | DATE1 | | NOT IN SCALE | UNIT mm | SHEET: 分页号 |
| | | NO. | CONTENT | DATE | | | | |

# 5. Absolute Maximum Ratings

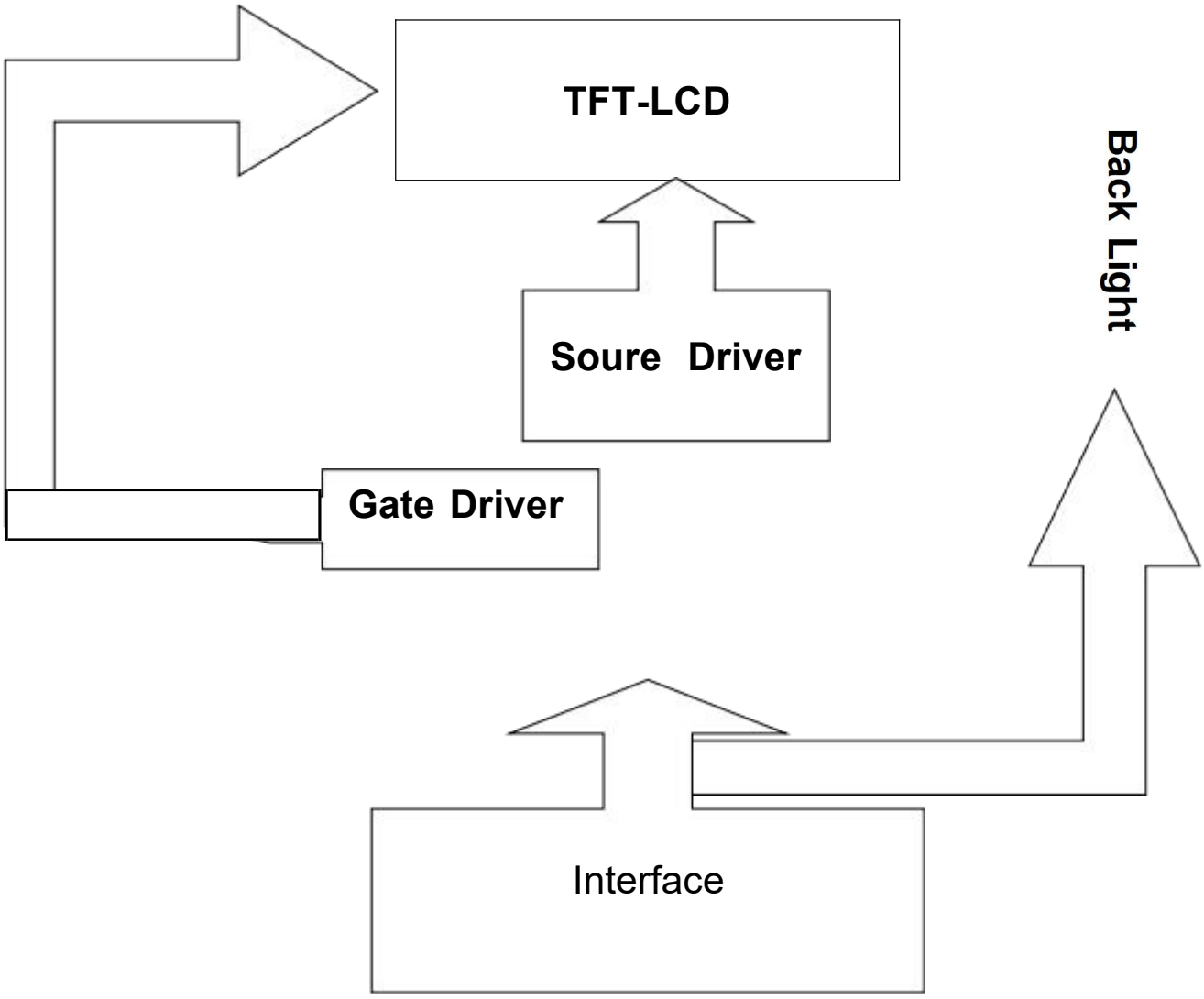
| Item | Symbol | Min | Max | Unit | Remark |
|---|---|---|---|---|---|
| Supply voltage | VCC | -0.3 | 3.6 | V | Note1 Note2 |
| Supply voltage | IOVCC | -0.3 | 3.6 | V | |
| Operating temperature | TOPR | -20 | 70 | ℃ | |
| Storage temperature | TSTR | -30 | 80 | ℃ | |

# 6. Electrical Characteristics

| Item | | Symbol | Rating | | | Unit | Remark |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| Supply voltage | | VCC | 2.6 | 2.8 | 3.53 | V | Note1 |
| Supply voltage | | IOVCC | 1.65 | 2.8 | 3.3 | V | |
| Input Voltage | L level | VIL | 0 | --- | 0.3*IOVCC | V | |
| | H level | VIH | 0.7*IOVCC | --- | IOVCC | V | |

# 7. Module Function Description

## 7-1. Block Diagram Of LCM



# 7-2. Pin Description

| PIN NO. | Symbol | I/O | Description |
|---|---|---|---|
| 1 | LED_K | P | Power for LED backlight cathode |
| 2 | LED_A | P | Power for LED backlight anode |
| 3 | GND | P | Ground |
| 4 | MOSI | /IO | Serial data input |
| 5 | SCLK | I | serial interface clock |
| 6 | GND | P | Ground |
| 7 | A0 | I | Display data/command selection pin |
| 8 | CS | I | Chip select pin |
| 9 | RST | I | Reset signal |
| 10 | TE | O | -Tearing effect output pin to synchronize MPU to frame writing,activated by S/ command. |
| 11 | IOVCC | P | Power Supply |
| 12 | VDD | P | Power Supply |
| 13 | MESH0 | | NC |
| 14 | MESH1 | | NN |
| 15 | CTP_VDD | P | Power Supply |
| 16 | CTP_SCL | I | SCL pin for TP |
| 17 | CTP_SDA | I/O | SDA pin for TP |
| 18 | CTP_INT | I | Interrupt signal for TP |
| 19 | CTP_RST | I | Reset Pin for TP |
| 20 | MESH3 | | NC |
| 21 | MESH2 | | NC |

# 7-3 Timing Characteristics

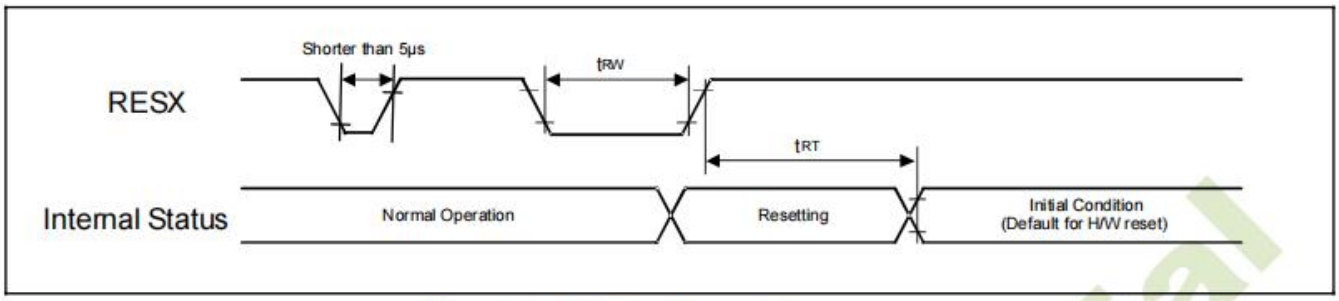



**Figure. 10.7 Reset input timings**

| Symbol | Parameter | Related pins | Min. | Max. | Unit |
|---|---|---|---|---|---|
| $t_{RW}$ | Reset pulse width(2) | RESX | 10 | - | μs |
| $t_{RT}$ | Reset complete time(3) | - | - | 5 (Note 5) | ms |
| | | - | - | 120 (Note 6, 7) | ms |

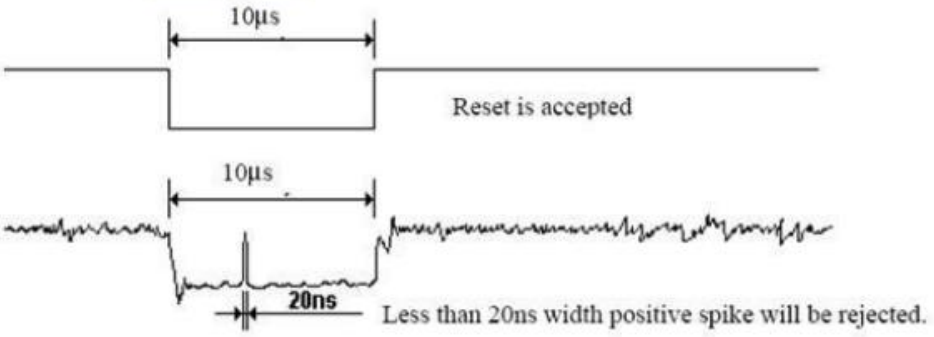
**Note:** (1) The reset complete time also required time for loading ID bytes from OTP to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

(2) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

| RESX Pulse | Action |
|---|---|
| Shorter than 5 μs | Reset Rejected |
| Longer than 10 μs | Reset |
| Between 5 μs and 10 μs | Reset Start |

(3) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then returns to Default condition for H/W reset.

(4) Spike Rejection also applies during a valid reset pulse as shown below:




(5) When Reset is applied during Sleep In Mode.

(6) When Reset is applied during Sleep Out Mode.

(7) It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

## Serial Interface Timing Characteristics (4-line SPI)

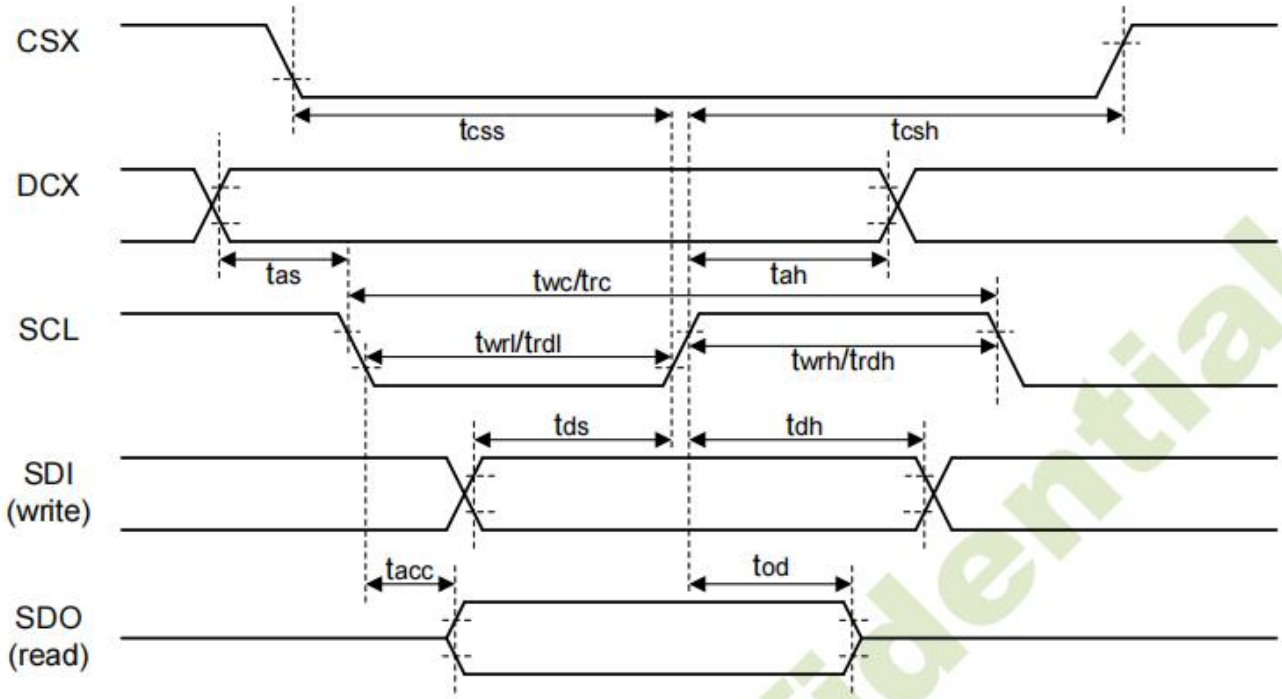



**Figure. 10.4 4-line Serial Interface Timing Characteristics**

| Signal | Symbol | Parameter | Min. | Max. | Unit | Description |
|---|---|---|---|---|---|---|
| CSX | tcss | Chip select setup time (Write) | 15 | | ns | |
| | tcsh | Chip select setup time (Write) | 15 | | ns | |
| | tcss | Chip select hold time (Read) | 60 | | ns | |
| | tcsh | Chip select hold time (Read) | 65 | | ns | |
| DCX | tas | Address setup time | 10 | | ns | |
| | tah | Address hold time (Write/Read) | 10 | | ns | |
| SCL (write) | twc | Write cycle | 16 | | ns | |
| | twrh | Control pulse “H” duration | 7 | | ns | |
| | twrl | Control pulse “L” duration | 7 | | ns | |
| SCL (read) | trc | Read cycle | 150 | | ns | |
| | trdh | Control pulse “H” duration | 60 | | ns | |
| | trdl | Control pulse “L” duration | 60 | | ns | |
| SDI/SDO (write) | tds | Data setup time | 7 | | ns | |
| | tdt | Data hold time | 7 | | ns | |
| SDI/SDO (read) | tracc | Read access time | 20 | | ns | |
| | tod | Output disable time | 25 | | ns | |

# 8. Electro-Optical Characteristics

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Response time | | Tr +Tf | θx = θy =0 | --- | -- | 35 | ms | Note 1 |
| Contrast Ratio | | CR | | 1000 | 1500 | --- | --- | Note 2 |
| Transmittance | | T% | | 4.5 | 4.8 | --- | % | |
| Color Chromaticity (CIE1931) | White | W x | θx = θy =0 | --- | 0.302 | --- | --- | |
| | | W y | | --- | 0.320 | --- | --- | |
| Viewing angle | $\theta_T$ | | CR > 10 | --- | 85 | --- | Deg. | Note 3 |
| | $\theta_B$ | | | --- | 85 | --- | | |
| | $\theta_L$ | | | --- | 85 | --- | | |
| | $\theta_R$ | | | --- | 85 | --- | | |

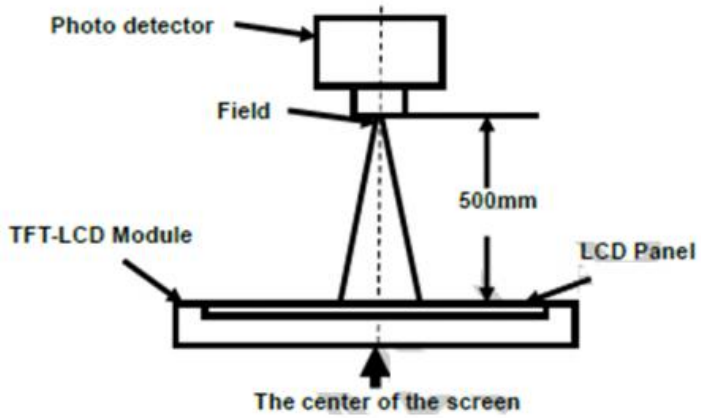
Note 1: Measuring Conditions:

The optical characteristics are determined after the unit has been 'ON' and stable at the maximum brightness, in a dark environment at an ambient temperature at 25°C ± 2°C.

Note 2: Definition of optical measurement system.

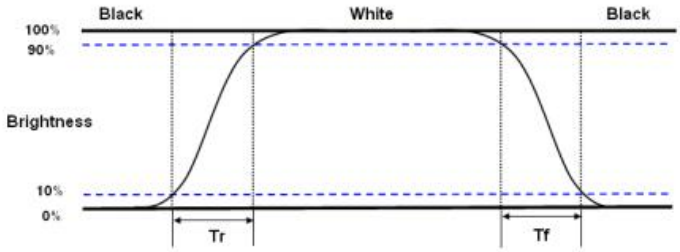
The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

| Item | Photo detector | Field |
|---|---|---|
| Contrast Ratio | BM-5A | 1° |
| Transmittance | | |
| Chromaticity | LCF-2100M | 1° |
| Response Time | TRD-100 | 2° |




Note 3: Definition of response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (Tr) is the time between photo detector output intensity changed from 10% to 90%. And fail time (Tf) is the time between photo detector out intensity changed from 90% to 10%.

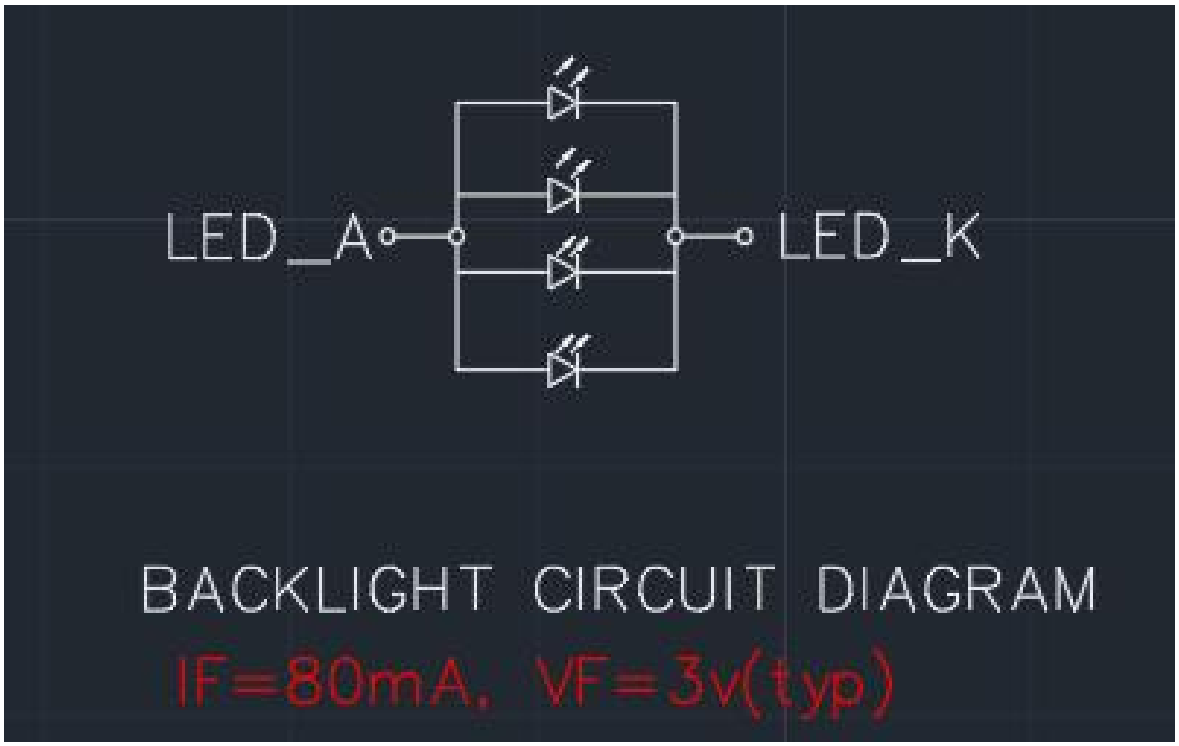



Note 4: Definition of contrast ratio:

Contrast ratio is measured at the center point of LCD and calculated by the following formula:

Contrast Ratio (CR)= Luminance measured when LCD on the " White" state

**Note(4) Backlight circuit**



# 9.Records Of Version

| Version | Revise Date | Page | Content |
|---|---|---|---|
| 00 | 2025-10-30 | ALL | New released |
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