



## Surenno STP0280D2-240320 Series TFT LCD Panel User Manual

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### STP0280D2-240320 Series TFT LCD Panel User Manual



<https://www.aliexpress.com/item/4000529764310.html>

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## General Description

|                   |                                           |
|-------------------|-------------------------------------------|
| MODEL NO          | STP0280D2-240320 YT280L008                |
| Display Mode      | Transmissive                              |
| Display Format    | Graphic 240RGB*320 Dot-matrix 240xRGBx320 |
| Input Data        | 4 Line-SPI/8bit/16bit interface 4         |
| Viewing Direction | 12 o'clock                                |
| Drive             | ST7789V                                   |

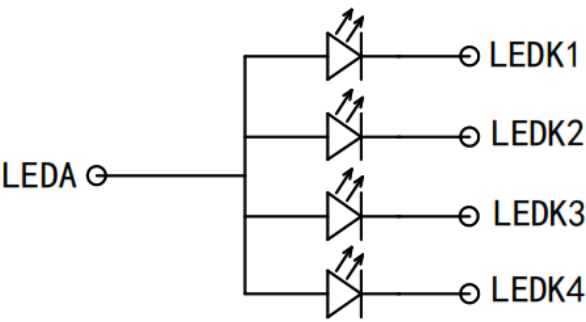
## Mechanical Specification

| Item                | Specifications                                                                      | Unit |
|---------------------|-------------------------------------------------------------------------------------|------|
| Dimensional outline | 50.00(W)*69.20(H)*2.60(T) NTP<br>50.00(W)*69.20(H)*3.80(T) RTP<br>(FPC not include) | mm   |
| Resolution          | 240RGB*320                                                                          | dots |
| LCD Active area     | 36.72(W)*48.96 (H)                                                                  | mm   |
| Pixel size          | 0.153(W)*0.153(H)                                                                   | mm   |

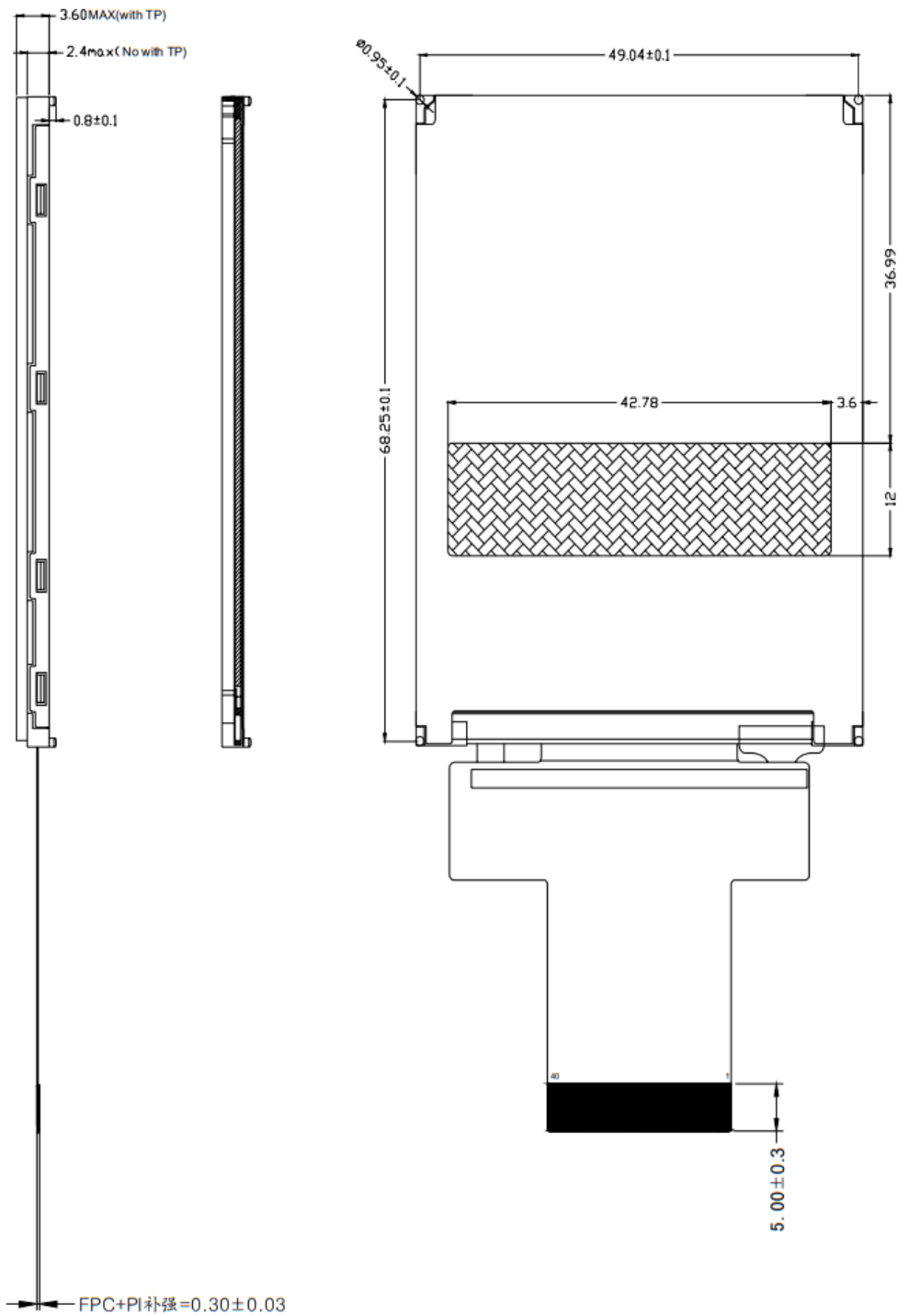
## Mechanical Dimension



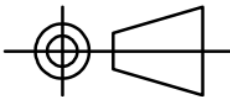
- 6. GENERAL TOLERANCE: ±0.20
- 7. ROHS



CIRCUIT DIAGRAM  
(I=60MA V=3.0-3.4V)



| PIN | SYMBOL       | PIN | SYMBOL |
|-----|--------------|-----|--------|
| 1   | XL/X-        | 21  | DB4    |
| 2   | YU/Y-        | 22  | DB5    |
| 3   | XR/X+        | 23  | DB6    |
| 4   | YD/Y+        | 24  | DB7    |
| 5   | GND          | 25  | DB8    |
| 6   | VDDI         | 26  | DB9    |
| 7   | VDD          | 27  | DB10   |
| 8   | TE           | 28  | DB11   |
| 9   | CSX/SPI CSX  | 29  | DB12   |
| 10  | DCX/SPI SCL  | 30  | DB13   |
| 11  | WRX/A0(SP14) | 31  | DB14   |
| 12  | RDX          | 32  | DB15   |
| 13  | SPI SDI/SDA  | 33  | LED-A  |
| 14  | SPI SDO      | 34  | LED-K  |
| 15  | RESX         | 35  | LED-K  |
| 16  | GND          | 36  | LED-K  |
| 17  | DB0          | 37  | GND    |
| 18  | DB1          | 38  | IMO    |
| 19  | DB2          | 39  | IM1    |
| 20  | DB3          | 40  | IM2    |

|                                                                                                                                    |  |                              |             |                                                                                                             |         |
|------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|-------------|-------------------------------------------------------------------------------------------------------------|---------|
| <br><b>SHENZHEN SURENOO TECHNOLOGY CO.,LTD.</b> |  |                              |             | Third Perspective:<br> |         |
| Product number:                                                                                                                    |  | STP0280D2-240320 (YT280S008) |             |                                                                                                             |         |
| Part Model:                                                                                                                        |  | LCM Outline                  |             | confirm:                                                                                                    |         |
| Version:                                                                                                                           |  | v0.0                         | unit:       | MM                                                                                                          | Audit:  |
| date:                                                                                                                              |  | 2018.08.16                   | Proportion: | 1:01                                                                                                        | design: |
| UNMRKED TOLERANCE: +0.20 mm                                                                                                        |  |                              |             | page number:                                                                                                | 1 OF 1  |

## Electrical Maximum Ratings

| Item                    | Symbol | Min | Max | Unit | Note |
|-------------------------|--------|-----|-----|------|------|
| Supply voltage (VDDI)   | V      | 1.8 | 3.3 | V    | —    |
| Supply voltage (VDD)    | V      | 2.8 | 3.3 | V    | —    |
| Operating temperature 1 | TOPR   | -20 | 70  | °C   | —    |
| Storage temperature     | TSTR   | -30 | 80  | °C   | —    |

✳️**NOTE:** VDDI and VDD can be directly connected together and share a set of voltage (2.8V~3.3V) for power supply.

### Brightness characteristic & Power dissipation

| Item                           | Symbol | Min | Typical | Max | Unit              |
|--------------------------------|--------|-----|---------|-----|-------------------|
| LED module Forward voltage     | V LED  | 2.9 | 3.1     | 3.3 | V                 |
| LED module current             | I LED  | —   | 60      | —   | mA                |
| LCD Surface Luminance          | Ls     | 250 | 300     | —   | Cd/m <sup>2</sup> |
| LCM Surface brightness uniform | L D    | 80  | —       | —   | %                 |
| LCD power dissipation          | P LCD  | —   | 0.22    | —   | W                 |

✳️**NOTE:** PLCD=VDD \* (I LED+I LCD)

### Module Function Description

| PIN No | Symbol      | Description                                                                                                   | Notes |
|--------|-------------|---------------------------------------------------------------------------------------------------------------|-------|
| 1      | XL(X-)      | Touch panel Logical foot                                                                                      | —     |
| 2      | YU(Y+)      | Touch panel Logical foot                                                                                      | —     |
| 3      | XR(X+)      | Touch panel Logical foot                                                                                      | —     |
| 4      | YD(Y+)      | Touch panel Logical foot                                                                                      | —     |
| 5      | GND         | Ground                                                                                                        | —     |
| 6      | VDDI        | Power Supply for I/O System.                                                                                  | —     |
| 7      | VDD         | Power Supply for Analog, Digital System and Booster Circuit.                                                  | —     |
| 8      | TE          | Tearing effect signal is used to synchronize MCU to frame memory                                              | —     |
| 9      | CSX/SPI CSX | -Chip selection pin<br>Low enable.<br>High disable.                                                           | —     |
| 10     | DCX/SPI SCL | -Display data/command selection pin in parallel interface.<br>-This pin is used to be serial interface clock. | —     |

|       |              |                                                                                                                                                                                                                                                                                                                                                                                  |                        |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
|-------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|-----|---------------------|----------|---|---|---|-----------------------|----------|---|---|---|----------------------|---------|---|---|---|------------------------|----------------|---|
| 11    | WRX/A0(SPI4) | -Write enable in MCU parallel interface.<br>– Display data/command selection pin in 4-line serial interface.                                                                                                                                                                                                                                                                     | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 12    | RDX          | -Read enable in 8080 MCU parallel interface.<br>-If not used, please fix this pin at VDDI or GND.                                                                                                                                                                                                                                                                                | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 13    | SPI SDI/SDA  | SPI interface input pin.<br>-The data is latched on the rising edge of the SCL signal.<br>-If not used, please fix this pin at VDDI or DGND level.                                                                                                                                                                                                                               | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 14    | SPI SDO      | -SPI interface output pin.<br>-The data is output on the falling edge of the SCL signal.<br>-If not used, let this pin open.                                                                                                                                                                                                                                                     | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 15    | RESX         | -This signal will reset the device and it must be applied to properly initialize the chip.<br>-Signal is active low.                                                                                                                                                                                                                                                             | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 16    | GND          | Ground                                                                                                                                                                                                                                                                                                                                                                           | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 17-24 | DB0-DB7      | MCU parallel interface data bus.                                                                                                                                                                                                                                                                                                                                                 | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 25-32 | DB8-DB15     | MCU parallel interface data bus.                                                                                                                                                                                                                                                                                                                                                 | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 33    | LED-A        | Anode of Backlight (2.9V-3.3V Typical:3.1V)                                                                                                                                                                                                                                                                                                                                      | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 34-36 | LED-K        | Cathode of Backlight                                                                                                                                                                                                                                                                                                                                                             | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 37    | GND          | Ground                                                                                                                                                                                                                                                                                                                                                                           | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 38    | IM0          | -The MCU interface mode select.                                                                                                                                                                                                                                                                                                                                                  | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 39    | IM1          | <table><tr><td>IM2</td><td>IM1</td><td>IM0</td><td>MCU interfaced Mode</td><td>Data pin</td></tr><tr><td>0</td><td>0</td><td>0</td><td>80-16bit parallel I/F</td><td>DB0-DB15</td></tr><tr><td>0</td><td>0</td><td>1</td><td>80-8bit parallel I/F</td><td>D15-DB8</td></tr><tr><td>1</td><td>1</td><td>0</td><td>4-line 8bit serial I/F</td><td>SDA:in SDO:out</td></tr></table> | IM2                    | IM1            | IM0 | MCU interfaced Mode | Data pin | 0 | 0 | 0 | 80-16bit parallel I/F | DB0-DB15 | 0 | 0 | 1 | 80-8bit parallel I/F | D15-DB8 | 1 | 1 | 0 | 4-line 8bit serial I/F | SDA:in SDO:out | – |
| IM2   | IM1          | IM0                                                                                                                                                                                                                                                                                                                                                                              | MCU interfaced Mode    | Data pin       |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 0     | 0            | 0                                                                                                                                                                                                                                                                                                                                                                                | 80-16bit parallel I/F  | DB0-DB15       |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 0     | 0            | 1                                                                                                                                                                                                                                                                                                                                                                                | 80-8bit parallel I/F   | D15-DB8        |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 1     | 1            | 0                                                                                                                                                                                                                                                                                                                                                                                | 4-line 8bit serial I/F | SDA:in SDO:out |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |
| 40    | IM2          | <b>*NOTE:</b> In the circuit of the display screen, IM3 is fixedly connected to high level.                                                                                                                                                                                                                                                                                      | –                      |                |     |                     |          |   |   |   |                       |          |   |   |   |                      |         |   |   |   |                        |                |   |

**Figure 6-1: Display screen Bit parallel port reference application circuit STP0280D2 MCU-16**

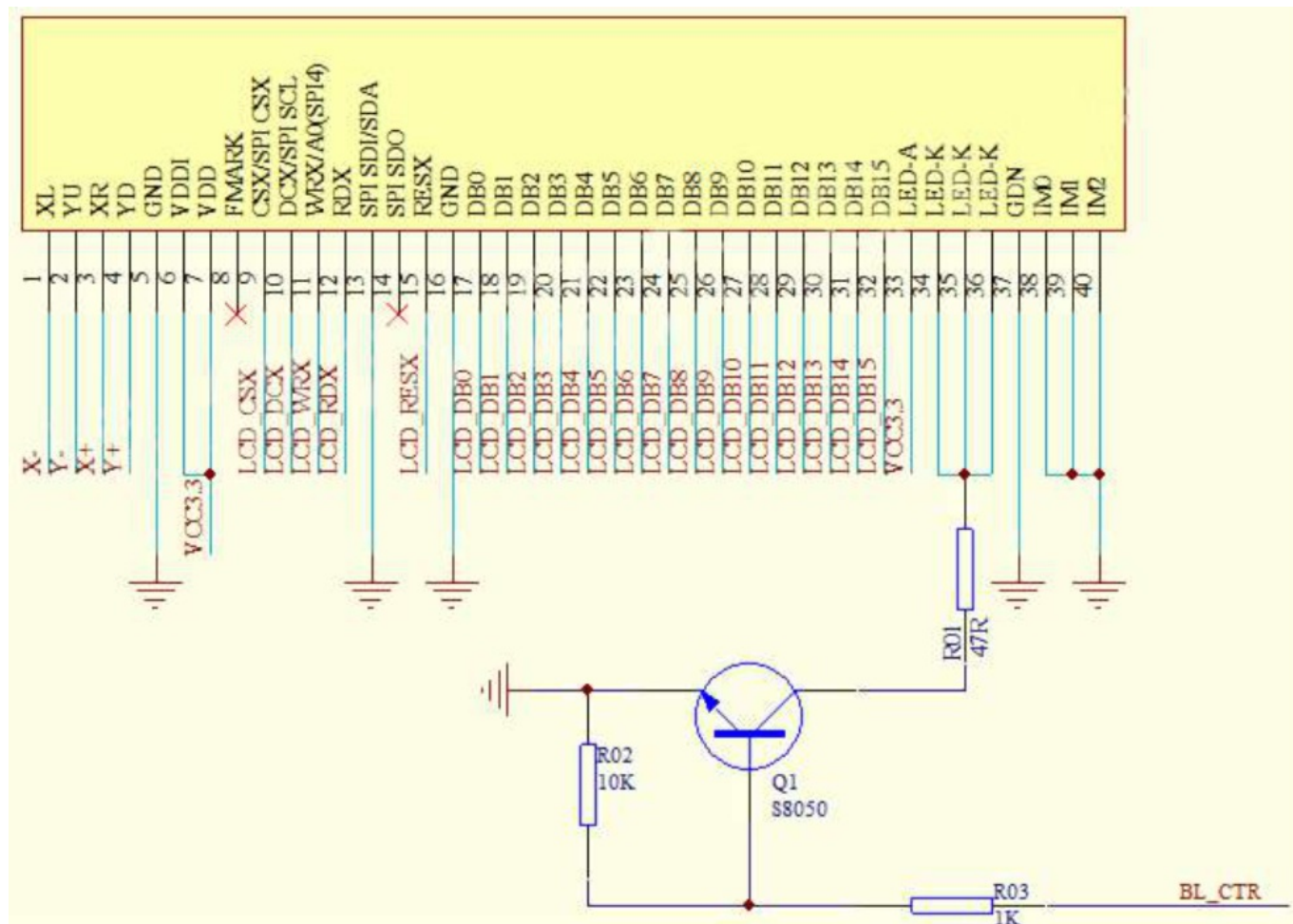
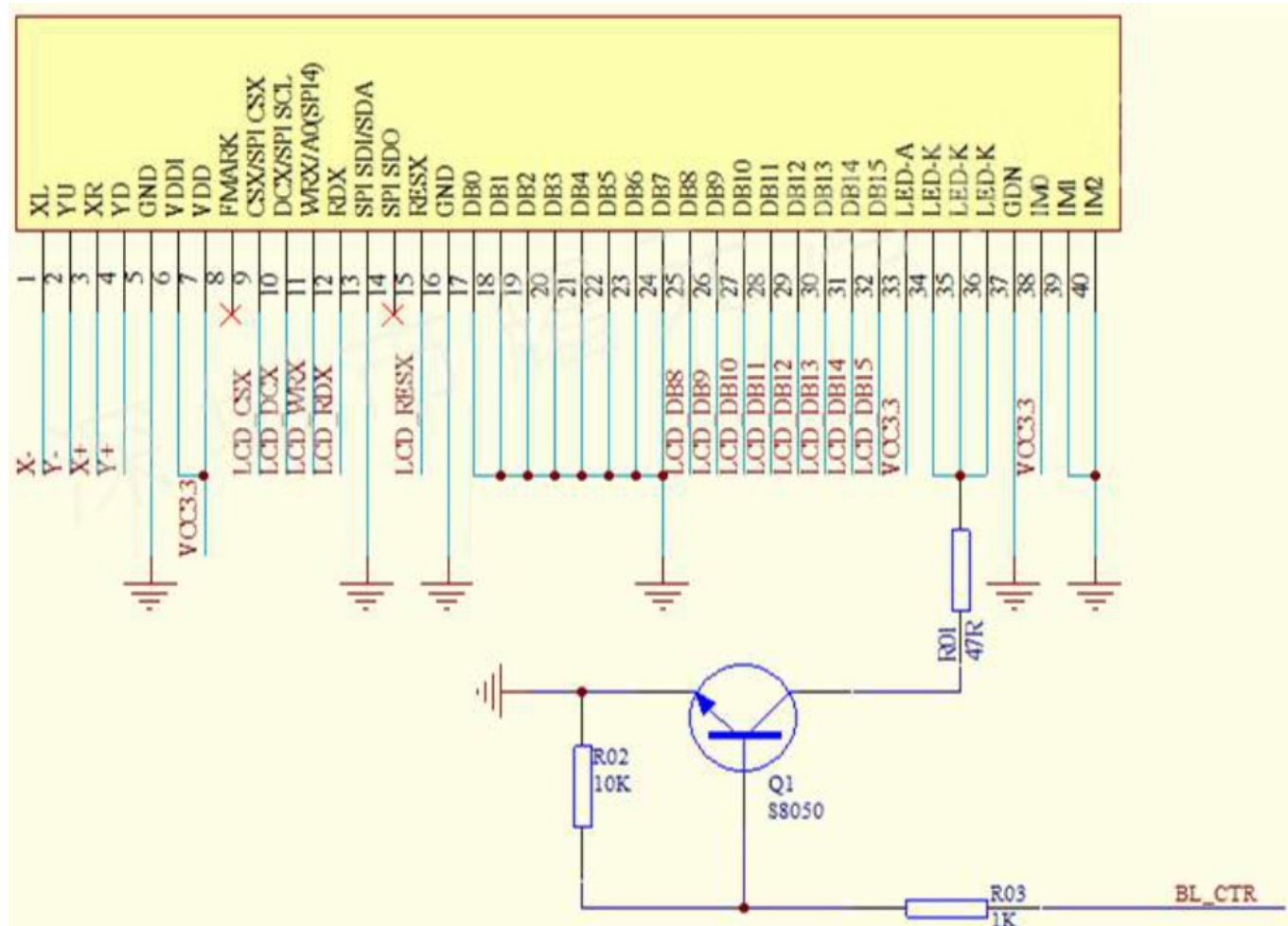
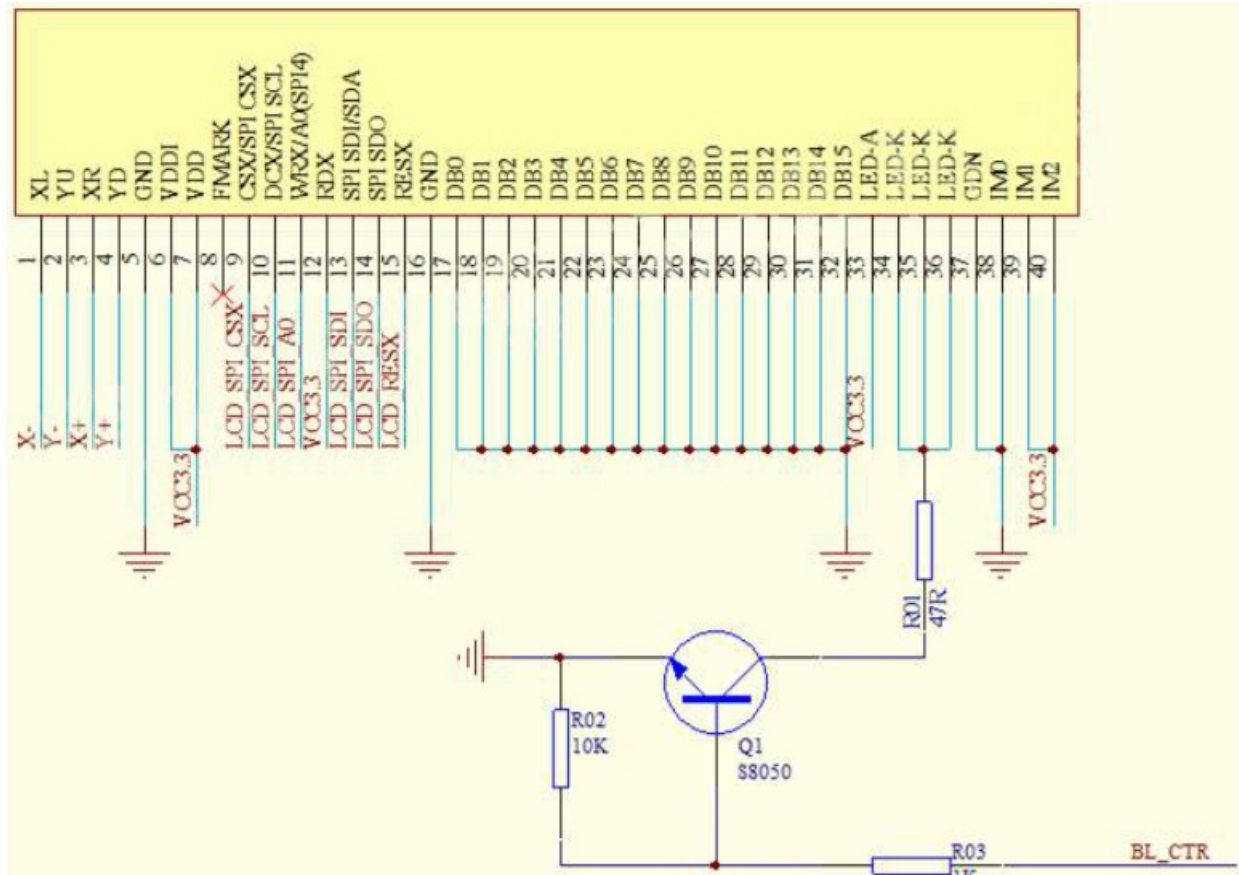


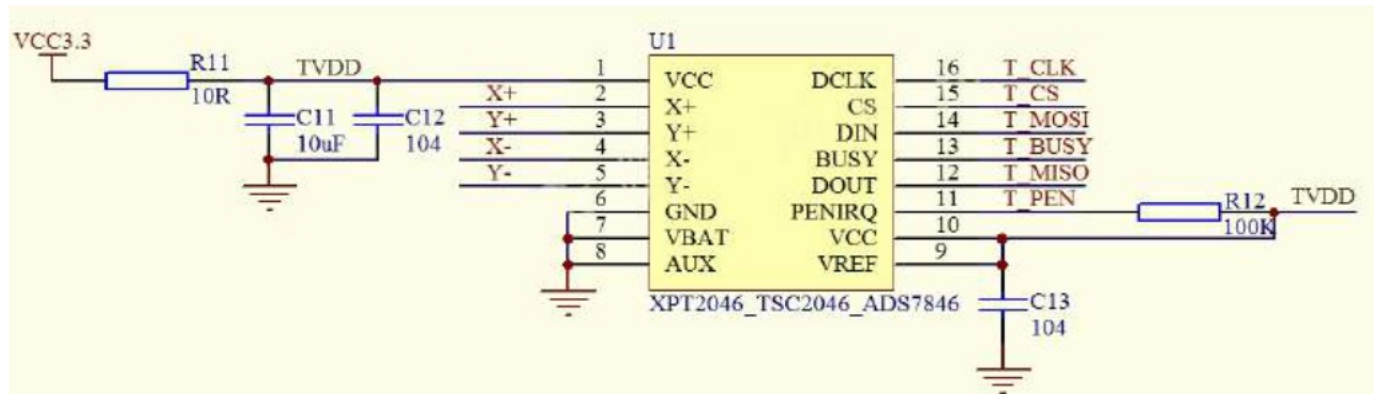
Figure 6-1: Display screen Bit parallel port reference application circuit STP0280D2 MCU-8



**Figure 6-2: Display screen STP0280D2 4-W SPI serial port reference application circuit**



**Figure 6-3: Touch screen reference application circuit**

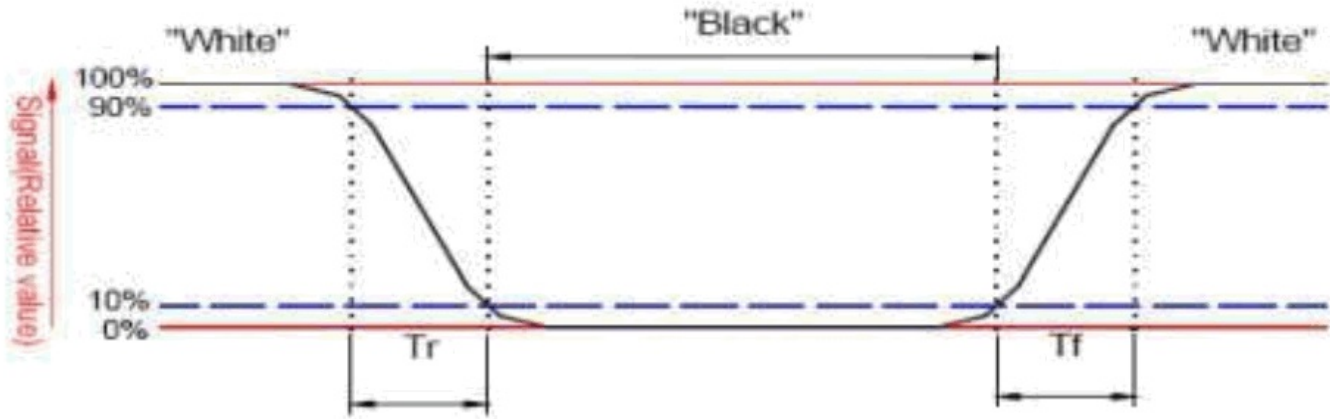


**※NOTE:**

1. If it is a version without touch screen, refer to Figure 6-1 or Figure 6-2 to connect the circuit, and connect the XL, YU, XR, YD of the display screen Just touch the foot and hang it in the air.
2. For the version with touch, refer to Figure 6-3 Touch Application Connection Circuit.

**Response time & Contrast ratio**

| Item           | Symbol | Condition          | Remark |      |      | Unit |
|----------------|--------|--------------------|--------|------|------|------|
|                |        |                    | Min.   | Typ. | Max. |      |
| Response time  | Tr+Tf  | $\theta = 0^\circ$ | –      | 25   | 40   | ms   |
| Contrast ratio | CR     | $\theta = 0^\circ$ | 350    | 500  | –    | –    |



Response time graph

Contrast ratio (CR)=

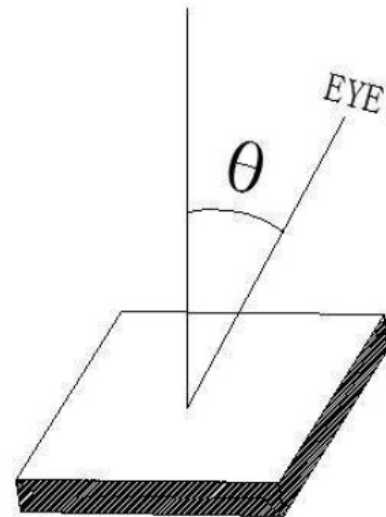
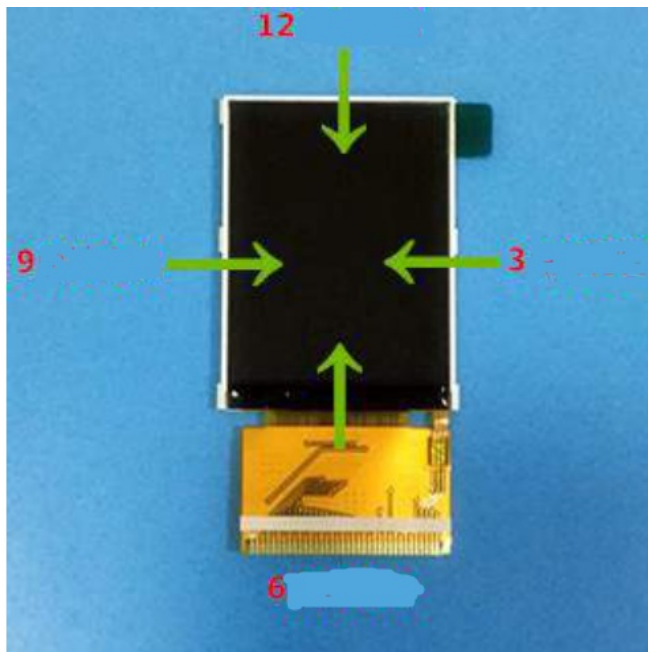
Brightness on the "white" state

Brightness on the "black" state

Contrast calculation formula

Viewing Angle

| Item          | Symbol | Condition    | Remark |      |      | Unit |
|---------------|--------|--------------|--------|------|------|------|
|               |        |              | Min.   | Typ. | Max. |      |
| Viewing angle | Top    | $CR \geq 10$ | 40     | 50   | –    | Deg. |
|               | Bottom | $CI \geq 10$ | 55     | 65   | –    |      |
|               | Left   | $CR \geq 10$ | 55     | 65   | –    |      |
|               | Right  | $CR \geq 10$ | 55     | 65   | –    |      |

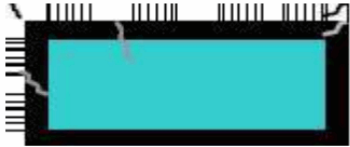


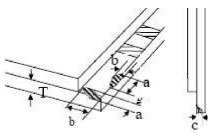
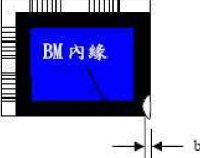
**NOTE:** The angle of view of 3 o'clock, 6 o'clock, 9 o'clock, and 12 o'clock refers to the angle ( $\theta$ ) between the lines perpendicular to the surface of the screen and the line of sight of the eye.

### Reliability Trial

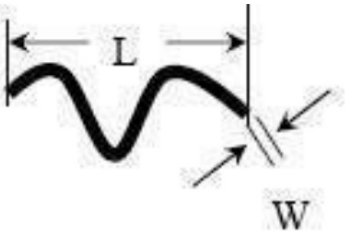
| NO. | ITEM                                         | CONDITION                               | CRITERION                                                           |
|-----|----------------------------------------------|-----------------------------------------|---------------------------------------------------------------------|
| 1   | High Temperature Non-Operating Test          | 80°C *120Hrs                            | No Defect Of Operational Function In Room Temperature Are Allowable |
| 2   | Low Temperature Non-Operating Test           | -30 C*120Hrs                            |                                                                     |
| 3   | High Temperature/Humidity Non Operating Test | 60°C*90%RH*120Hrs                       |                                                                     |
| 4   | High Temperature Operating Test              | 70°C*72Hrs                              |                                                                     |
| 5   | Low Temperature Operating Test               | 20°C *72Hrs                             |                                                                     |
| 6   | Thermal Shock Test                           | -20°C (30Min) Q 70°C (30 Min) *10CYCLES |                                                                     |

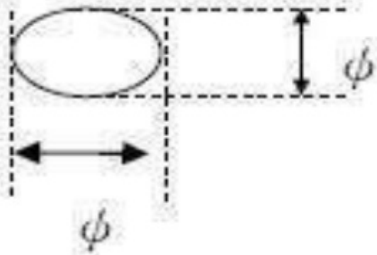
### Inspection standards

| NO | Defect item                                      | Criteria                                                                                                                                        | Remark                                                                              |
|----|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1  | Dimension Unconformity (Major defect)            | By Engineering Drawing                                                                                                                          |                                                                                     |
| 2  | Cracks (Major defect)                            | 1. Linear cracks panel Reject<br>2. Nonlinear crack contrast by limited sample                                                                  |  |
| 3  | Glass extrude the conductive area (minor defect) | a: disregards and no influence assemblage.<br>1) $b \leq 1/3$ Pin width (non bonding area) Accept<br>2) bonding area $\leq 0.5\text{mm}$ Accept | A: Length, b: Width                                                                 |

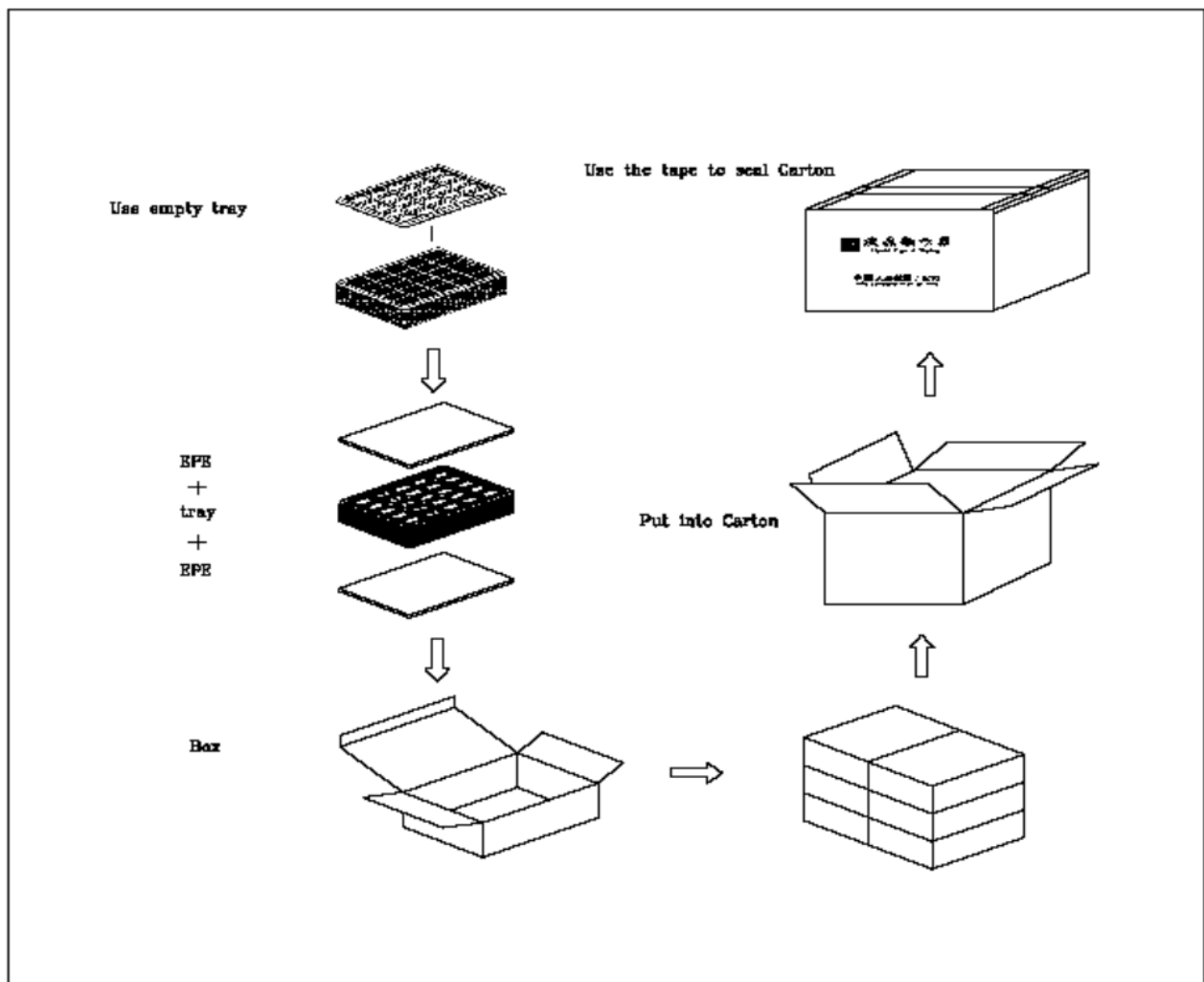
|   |                                                      |                                                                                                                                                                                                              |                                                                                                                               |
|---|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 4 | Pin-side ,conductive area damaged (minor defect)     | (a c: disregards)<br>$b \leq 1/3$ of effective length for bonding electrode Accept                                                                                                                           | a: length, b: Width<br>h, c: Thickness<br> |
| 5 | Pin-side, non-conductive area damaged (minor defect) | 1) Damage area don't touch the ITO (Including contraposition mark, except scribing mark) Accept<br>2) $C < T$ $b \leq 1/3$ of width Accept<br>3) $c = T$ b not touch the seal glue Accept<br>4) a disregards | a: Length, b: Width<br>c: Thickness<br>   |
| 6 | Non-pin-side damage (minor defect)                   | $c < T$<br>1) b exceeds $1/3 B_m$ Reject<br>$c = T$<br>b not touch the seal glue Reject                                                                                                                      | c: Thickness b: width of damage<br>      |

## 10.2 LCD appearance defect(View area)

| NO | Defect item                                                    | Criteria                       |           | Remark                                                                                                                                              |
|----|----------------------------------------------------------------|--------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Fiber, glass cratch, pol arizer scratch/folded ( minor defect) | Specification                  | Allowable | note 1:L: Length, W: Width<br>note 2: disregard if out of AA<br> |
|    |                                                                | W- 0.03mm                      | disregard |                                                                                                                                                     |
|    |                                                                | 0.03mm<W O. 05mm;1_ , - 3. 0mm | 2         |                                                                                                                                                     |
|    |                                                                | 0.05mm<W O. 1mm; L-< = 3. 0mm  | 1         |                                                                                                                                                     |
|    |                                                                | W>0.1mm;L>3.0mm                | 0         |                                                                                                                                                     |
| 2  | Polarizer bubble, conc ave and convex (minor defect)           | 0.2mm                          | disregard | note 1: (l)= (L+W) /2, L : Length, W :Width<br>note 2:disregard if out of AA                                                                        |
|    |                                                                | 0.2mm< (l) 0. 3mm              | 2         |                                                                                                                                                     |
|    |                                                                | 0.3mm< (1) 0. 5mm              | 1         |                                                                                                                                                     |
|    |                                                                | 0.5mm< (1)                     | 0         |                                                                                                                                                     |
| 3  | Black dots, dirty dots,                                        | (1) 0.15 mm                    | disregard | note 2:disregard if out of AA                                                                                                                       |

|   |                                       |                          |           |                                                                                      |
|---|---------------------------------------|--------------------------|-----------|--------------------------------------------------------------------------------------|
|   | impurities, eye winker (minor defect) | 0.15mm< (1) -.. O. 25m m | 2         |  |
|   |                                       | 0.25mm< (1) -.. 0. 3m    | 1         |                                                                                      |
|   |                                       | 0.3mm< (1)               | 0         |                                                                                      |
| 4 | Polarizer prick (minor defect)        | (1) 0.1mm                | disregard | note 1: (1) = (L+W) /2, L=Length, W=Width<br>note2:the distance between two dots>5mm |
|   |                                       | 0.1mm< (1) 0. 25m        | 3         |                                                                                      |
|   |                                       | (1) >O. 25mm             | 0         |                                                                                      |

## Package Method



<https://wa.me/qr/4GGOIDYZ2PXXN1>

<https://wa.me/qr/4GGOIDYZ2PXXN1>

<http://qr.kakao.com/talk/THom9tzJN5OMzvX1vTL1V.LvnEc->

|                                                                                  |                                                                                                         |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  |                       |
| <a href="https://line.me/ti/p/oas8BmVLVd">https://line.me/ti/p/oas8BmVLVd</a>    | <a href="https://u.wechat.com/EAK0B_I2YfPLwx3tRqiKkf4">https://u.wechat.com/EAK0B_I2YfPLwx3tRqiKkf4</a> |

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**Documents / Resources**

|                                                                                    |                                                                                                                                                                                            |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><a href="#">Surenoo STP0280D2-240320 Series TFT LCD Panel</a> [pdf] User Manual<br/>STP0280D2-240320 Series TFT LCD Panel, STP0280D2-240320 Series, TFT LCD Panel, LCD Panel, Panel</p> |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**References**

- [Surenoo Tech: Professional LCD Module Supplier Since 2005](#)