# SPECIFICATION FOR APPROVAL

**Customer:** _____

**Model Name:** BR101JIH4250-B4 V.1

**Date:** 2021.04.21

**Version:** 1.0

■ **Preliminary Specification**

☐ **Final Specification**

**For Customer's Acceptance**

| Approved by | Comment |
|---|---|
| | |

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| Approved by | Reviewed by | Prepared by |
|---|---|---|
| | | |

# Contents

# 1. Record of Revision

| Version | Revise Date | Content | Editor |
|---|---|---|---|
| 1.0 | 2021/04/21 | First Release. | |
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## 2 General Specifications

| Feature | | Spec |
|---|---|---|
| Characteristics | LCD Size | 10.1 inch |
| | Display Format | 1024 (RGB) × 600 |
| | Interface | LVDS |
| | Color Depth | 16.7M |
| | Technology type | a-Si |
| | Display Spec. | - |
| | Display Mode | Normally White |
| | Driver IC | HX8282+HX8696 |
| | Surface Treatment | - |
| | Viewing Direction | 12 O'CLOCK |
| | Gray Viewing Direction | 6 O'CLOCK |
| Mechanical | LCM (W x H x D) (mm) | 235.0*143.0*4.6 |
| | Active Area(mm) | 222.72*125.28 |
| | With /Without TSP | Without |
| | Weight (g) | TBD |
| | LED Numbers | 42 LEDs |

Note 1: Viewing direction is following the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

# 3 Input/Output Terminals

| Pin No | Symbol | I/O | Function | |
|---|---|---|---|---|
| 1 | GND | P | Ground | |
| 2 | AVDD | P | Power supply for analog circuit. | |
| 3 | DVDD | P | Power supply for digital circuit. | |
| 4 | GND | P | Ground | |
| 5 | VCOM | P | VCOM Voltage | |
| 6 | DVDD | P | Power supply for digital circuit. | |
| 7 | GND | P | Ground | |
| 8~14 | V14~V8 | | Not connection | |
| 15 | GND | P | Ground | |
| 16 | DVDD_LVDS | P | LVDS Power, Same to DVDD | |
| 17 | GND | P | Ground | |
| 18 | PIND3 | I | Positive LVDS differential data input | |
| 19 | NIND3 | I | Negative LVDS differential data input | |
| 20 | GND | P | Ground | |
| 21 | PINC | I | Positive LVDS differential clock input | |
| 22 | NINC | I | Negative LVDS differential clock input | |
| 23 | GND | P | Ground | |
| 24 | PIND2 | I | Positive LVDS differential data input | |
| 25 | NIND2 | I | Negative LVDS differential data input | |
| 26 | GND | P | Ground | |
| 27 | PIND1 | I | Positive LVDS differential data input | |
| 28 | NIND1 | I | Negative LVDS differential data input | |
| 29 | GND | P | Ground | |
| 30 | PIND0 | I | Positive LVDS differential data input | |
| 31 | NIND0 | I | Negative LVDS differential data input | |
| 32 | GND | P | Ground | |
| 32 | GND_LVDS | P | LVDS Ground | |
| 33 | GND | P | Ground | |
| 34 | GRB | I | Global reset pin | NOTE 1 |
| 35 | STBYB | I | Standby mode control. Normally pull high<br>STBYB=L: TCON and source driver are off and all source outputs keep low level.<br>STBYB=H: Normal operation. (Default) | |
| 36 | SHLR | I | Left or right display control | NOTE 2 |
| 37 | DVDD | P | Power supply for digital circuit. | |
| 38 | UPDN | I | Up or down display control | NOTE 2 |
| 39 | GND | P | Ground | |
| 40 | AVDD | P | Power supply for analog circuit. | |
| 41 | VCOM | P | VCOM Voltage | |
| 42 | DITH | I | Dithering function enable control. | NOTE 3 |
| 43 | GND | P | Ground | |

| | | | | |
|---|---|---|---|---|
| 44 | DVDD | P | Power supply for digital circuit. | |
| 45 | GND | P | Ground | |
| 46~52 | V7~V1 | | Not connection | |
| 53 | GND | P | Ground | |
| 54 | DVDD | P | Power supply for digital circuit. | |
| 55 | SELB | I | 6bit/8bit mode select<br>SELB = "0" , LVDS input data is<br>8 bits SELB = "1" , LVDS input data is 6 bits | NOTE 3 |
| 56 | VGH | P | Positive power for TFT | |
| 57 | DVDD | P | Power supply for digital circuit. | |
| 58 | VGL | P | Negative power for TFT | |
| 59 | GND | P | Ground | |
| 60 | NC | | Not connection | |

I: input, O: output, P: Power

Note1： Global reset pin: Active low to enter reset mode. Suggest connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ, C=0.1μF) Note: If RC is not added, users must follow the rule, T2 > 15ms on page 18 item 6.5 power on/off sequence.

Note2： When L/R=”0”, set right to left scan direction. When L/R=”1”, set left to right scan direction. When U/D=”0”, set top to bottom scan direction. When U/D=”1”, set bottom to top scan direction.

Note3： If LVDS input data is 6 bits, SELB must be set to High; DITH must be set to Low.(262K Colors) If LVDS input data is 8 bits, SELB must be set to Low; DITH must be set to High.(16.2M Colors)

# 4 Absolute Maximum Ratings

| Item | Symbol | MIN | MAX | Unit | Remark |
|---|---|---|---|---|---|
| Supply Voltage | $D_{Vdd}$ | -0.3 | +3.6 | V | |
| Analog Supply Voltage, AVDD,VGH,VGL | $V_{AVDD}$ | -0.3 | +15.0 | V | |
| | VGH | -0.3 | +30.0 | V | |
| | VGL | -15.0 | +0.3 | V | |
| Operating Temperature | $T_{OPR}$ | -20 | 70 | ℃ | |
| Storage Temperature | $T_{STG}$ | -30 | 80 | ℃ | |

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

# 5 Electrical Characteristics

## 5.1 Operating conditions:

(TA = 25° C, GND = AGND = 0V)

| Parameter | Symbol | Min | Typ. | Max | Unit | Remark |
|---|---|---|---|---|---|---|
| Power Voltage | VDD | 3.0 | 3.3 | 3.6 | V | |
| | AVDD | 10.0 | 10.4 | 10.8 | V | |
| | VCOM | 4.0 | 4.4 | 4.8 | V | Note 3 |
| | VGH | 24.0 | 25.0 | 26.0 | V | Note 1 |
| | VGL | -8.0 | -7.0 | -6.0 | V | Note 2 |
| Input logic high voltage | $V_{IH}$ | 0.8VDD | - | VDD | V | |
| Input logic low voltage | $V_{IL}$ | 0 | - | 0.2VDD | V | |

Note:

*1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

The storage structure of this model is $C_{ST}$ (Storage on Common)

*3. Vcom must be adjusted to optimize display quality Crosstalk, Contrast Ratio and etc.

## 5.2 Driving Backlight

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| LED current | $I_F$ | 126 | 140 | 175 | mA | |
| Power Consumption | | - | - | - | mW | |
| LED Voltage | $V_F$ | 17.4 | 18.3 | 20.4 | V | Note 1 |
| LED Life Time | $W_{BL}$ | 30000 | - | - | Hr | Note 2 |

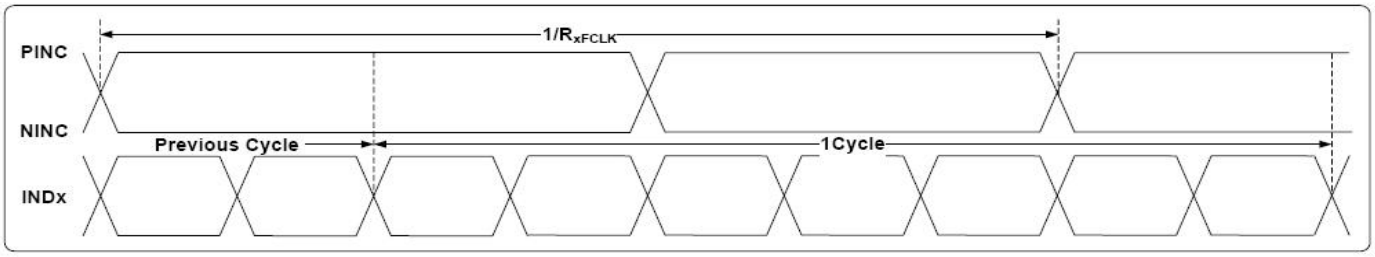
Note 1 : There are 6series*7=42 LED

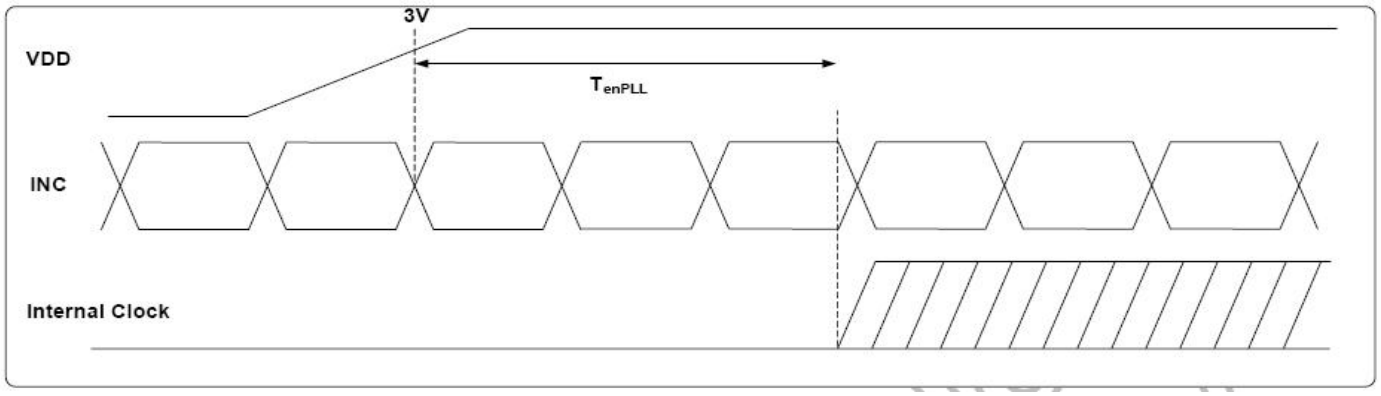
Note 2 : The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and $I_L$ =140mA. The LED lifetime could be decreased if operating $I_L$ is lager than 175mA.

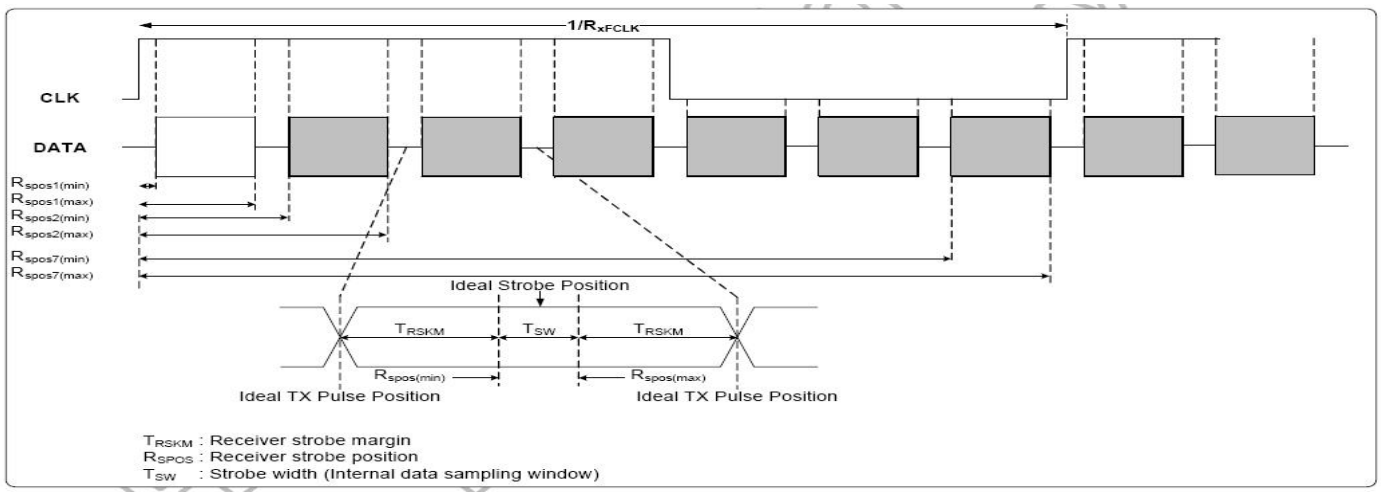
# 6 AC electrical Specification &Interface Timing

## 6.1 LVDS Mode AC electrical Specification

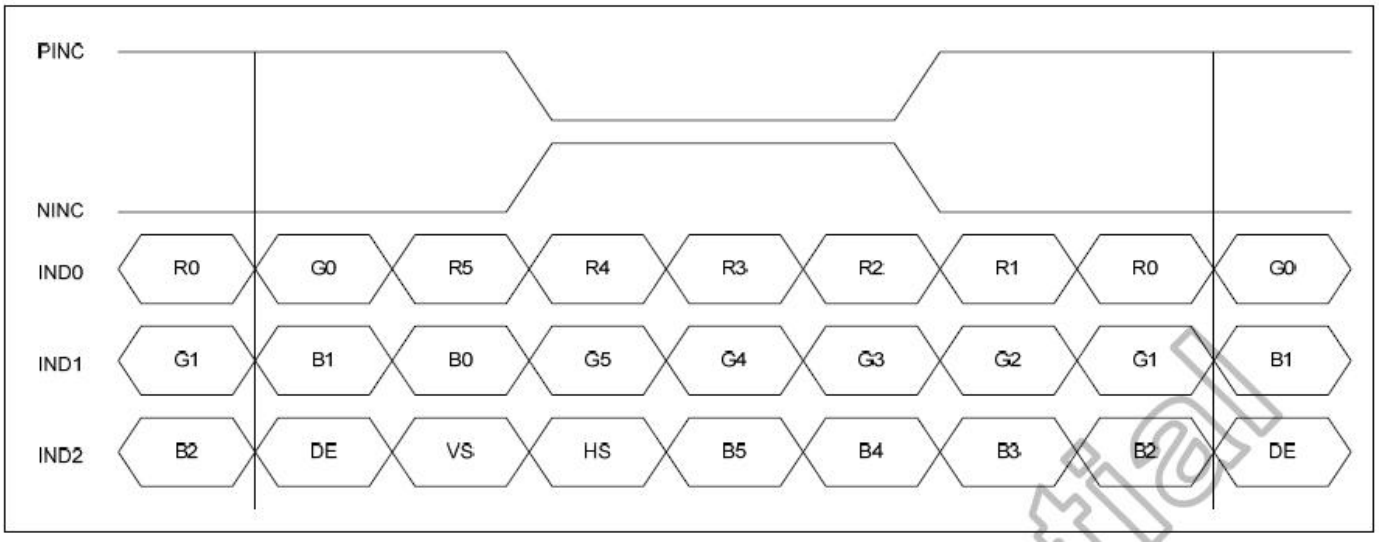
| Parameter | Symbol | Spec. | | | Unit | Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Clock frequency | $R_{XFCLK}$ | 20 | - | 71 | MHz | - |
| Input data skew margin | $T_{RSKM}$ | 500 | - | - | pS | $\|V_{ID}\|$=400mV<br>$R_{XVCM}$=1.2V<br>$R_{XFCLK}$=71MHz |
| Clock high time | $T_{LVCH}$ | - | 4/(7* $R_{XFCLK}$) | - | ns | - |
| Clock low time | $T_{LVCL}$ | - | 3/(7* $R_{XFCLK}$) | - | ns | - |
| PLL wake-up time | $T_{emPLL}$ | - | - | 150 | μs | - |



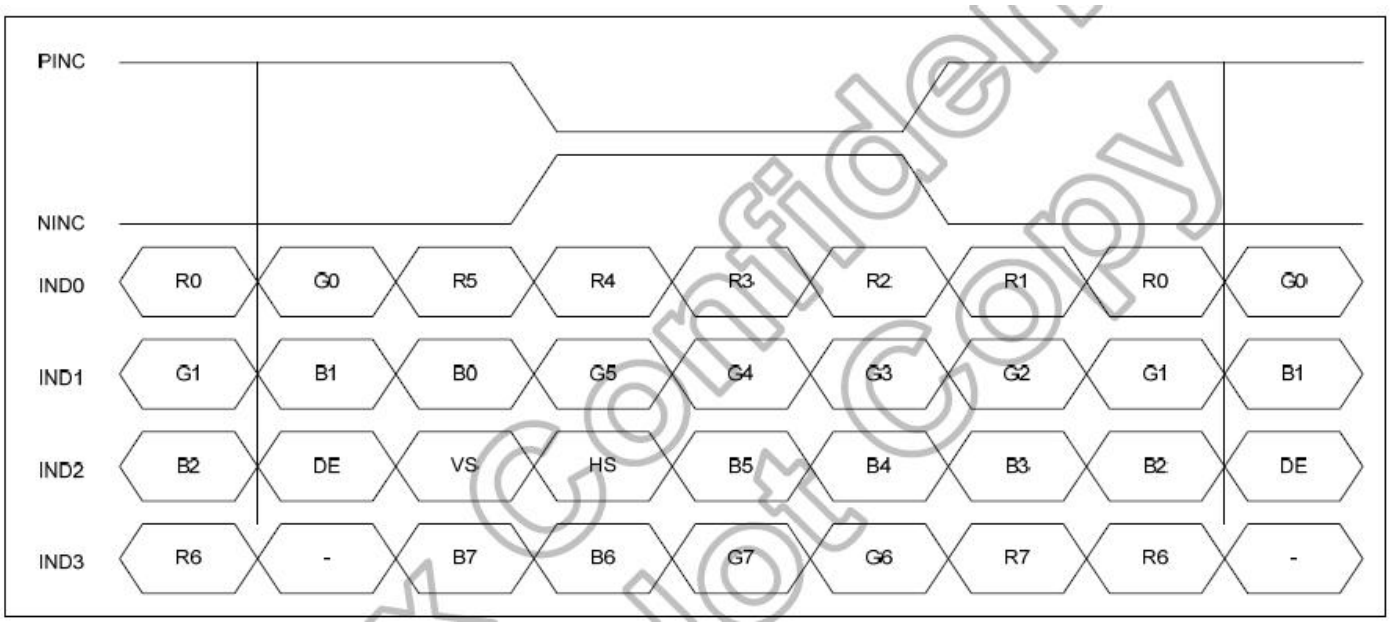



## 6.2 LVDS Mode data input format




**6-bit LVDS input**




**8-bit LVDS input**

## 6.3 Parallel RGB input timing table

### DE mode

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| DCLK Frequency | fclk | 40.8 | 51.2 | 67.2 | MHz |
| Horizontal Display Area | thd | | 1024 | | DCLK |
| HSD Period | th | 1114 | 1344 | 1600 | DCLK |
| HSD Blanking | thb+ thfp | 90 | 320 | 376 | DCLK |
| Vertical Display Area | tvd | | 600 | | $T_H$ |
| VSD Period | tvbp | 610 | 635 | 800 | $T_H$ |
| VSD Blanking | tvbp+ tvfp | 10 | 35 | 200 | $T_H$ |

### HV Mode

**Horizontal timing**

| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| DCLK Frequency | fclk | 44.9 | 51.2 | 63 | MHz |
| Horizontal Display Area | thd | | 1024 | | DCLK |
| HSD Period | th | 1200 | 1344 | 1400 | DCLK |
| HSD Pulse Width | thpw | 1 | - | 140 | DCLK |
| HSD Back Porch | thbp | | 160 | | DCLK |
| HSD Front Porch | thfp | 16 | 160 | 216 | DCLK |

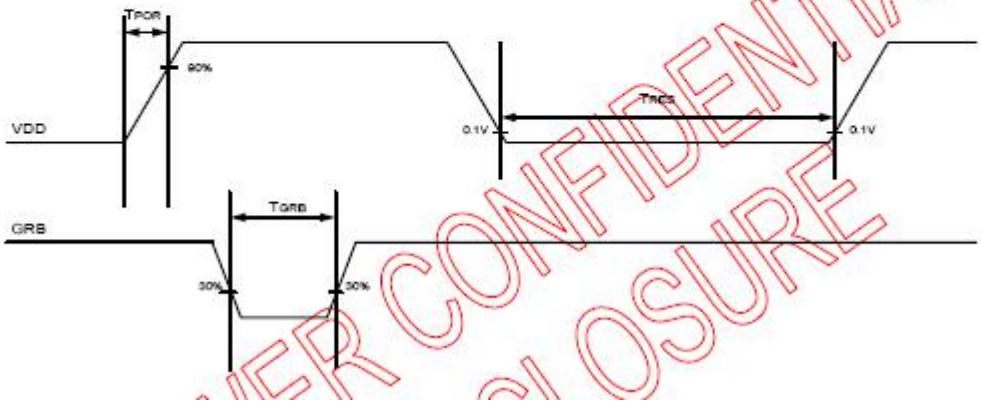
**Vertical Timing**

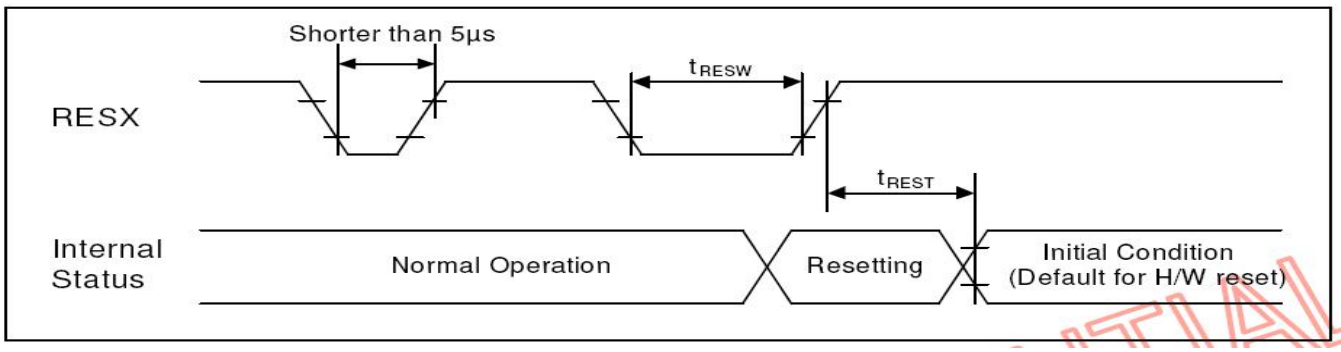
| Parameter | Symbol | Spec. | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Vertical Display Area | tvd | | 600 | | $T_H$ |
| VSD Period | tv | 624 | 635 | 750 | $T_H$ |
| VSD Pulse Width | tvpw | 1 | - | 20 | $T_H$ |
| VSD Back Porch | tvbp | | 23 | | $T_H$ |
| VSD Front Porch | tvfp | 1 | 12 | 127 | $T_H$ |

## 6.4 Reset Timing:

VDD/GRB AC characteristic

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| VDD power slew rate | $T_{POR}$ | - | - | 20 | ms | From 0 to 90% VDD |
| GRB active pulse width | $T_{GRB}$ | 1 | - | - | ms | VDD=VDD_IF= 1.8V |
| VDD resettle time | $T_{RES}$ | 1 | - | - | s | |



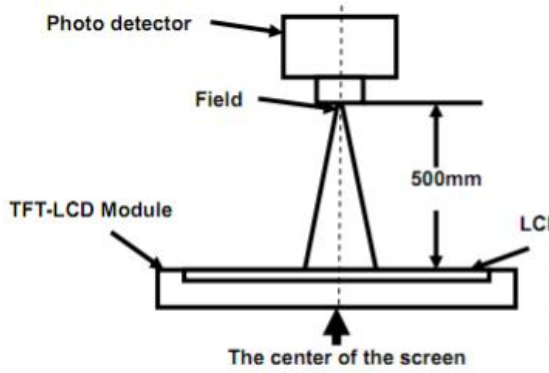



# 7 Optical Characteristics

| Items | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|---|
| Viewing angles | | $\theta_T$ | Center CR≥10 | 55 | 70 | - | Degree. | Note2 |
| | | $\theta_B$ | | 45 | 60 | - | | |
| | | $\theta_L$ | | 60 | 70 | - | | |
| | | $\theta_R$ | | 60 | 70 | - | | |
| Contrast Ratio | | CR | Θ =0 | 600 | 800 | - | - | Note1, Note3 |
| Response Time | | $T_{ON}$ | 25°C | - | 10 | 15 | ms | Note1, Note4 |
| | | $T_{OFF}$ | | - | 15 | 20 | | |
| Chromaticity | White | $X_W$ | Backlight is on | 0.230 | 0.280 | 0.330 | - | Note1, Note5 |
| | | $Y_W$ | | 0.280 | 0.330 | 0.380 | - | |
| | Red | $X_R$ | | | TBD | | - | |
| | | $Y_R$ | | | TBD | | - | |
| | Green | $X_G$ | | | TBD | | - | |
| | | $Y_G$ | | | TBD | | - | |
| | Blue | $X_B$ | | | TBD | | - | |
| | | $Y_B$ | | | TBD | | - | |
| Uniformity | | U | | 70 | 75 | - | % | Note1, Note6 |
| NTSC | | | | | 50 | | % | Note5 |
| Luminance | | L | | 400 | 450 | | | Note1, Note7 |

Test Conditions:
1. IF= 20mA(one channel),the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: 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-7A | 1° |
| Luminance | | |
| Chromaticity | | |
| Lum Uniformity | | |
| Response Time | SR-3A | 2° |

Note 2: Definition of viewing angle range and measurement system.
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

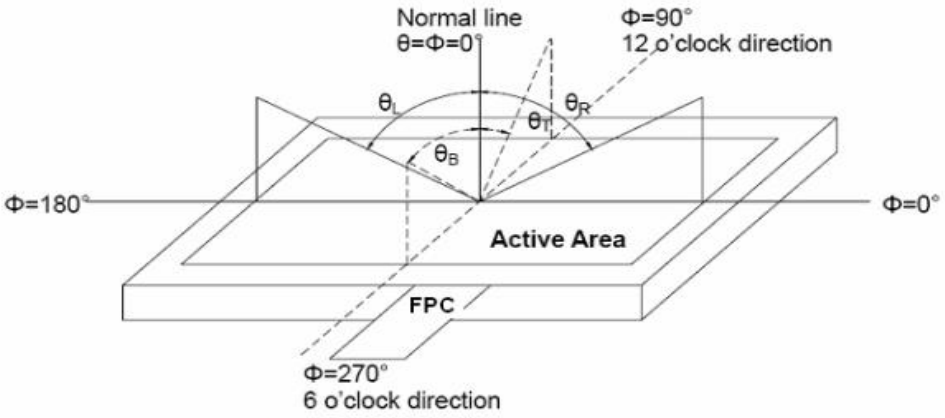


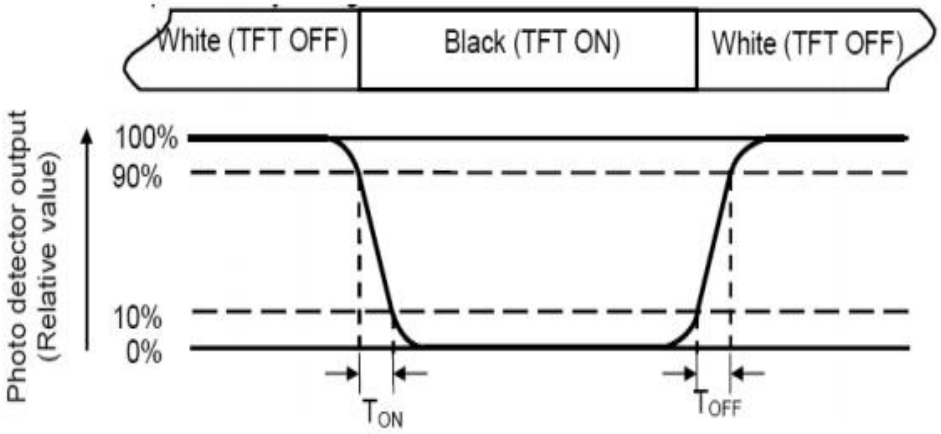

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval Between “White” state and “Black” state. Rise time (TON) is the time between Photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is The time between photo detector output intensity changed from 10% to 90%




Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area

Luminance Uniformity (U) = Lmin/ Lmax X100%

L-------Active area length W----- Active area width

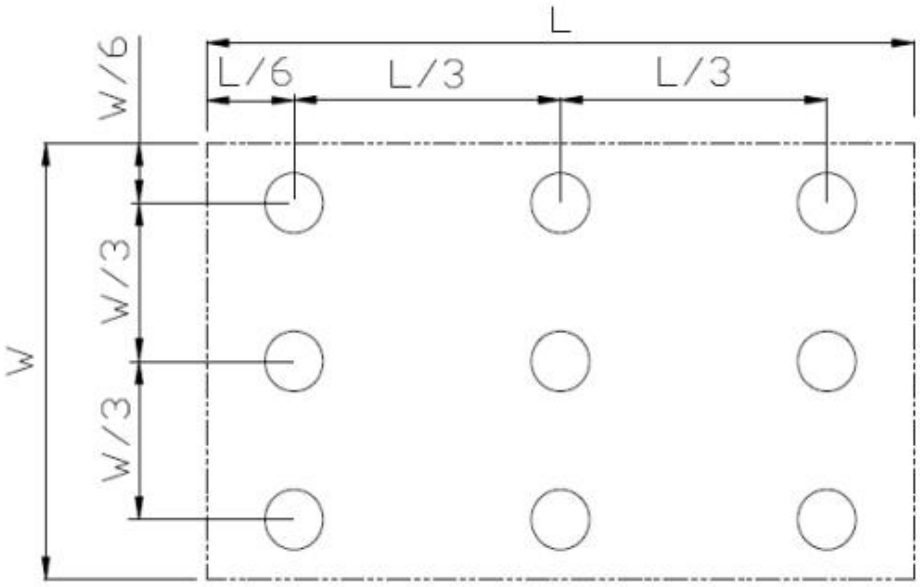



Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

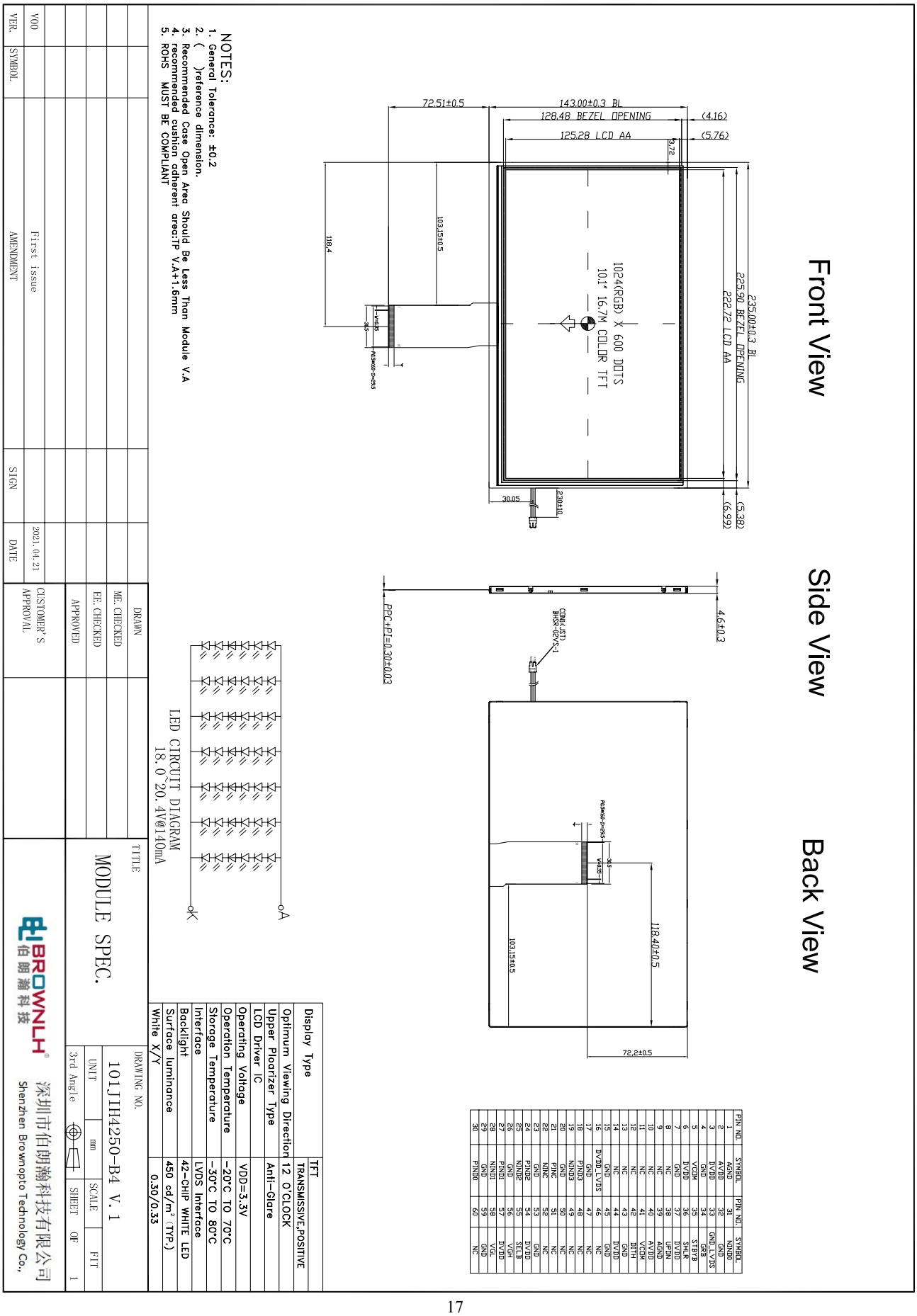
Measure the luminance of white state at center point.

# 8 Environmental / Reliability Tests

| No | Test Item | Condition | Remarks |
|---|---|---|---|
| 1 | High Temperature Operation | Ts= +70℃, 96hrs | Note 1 IEC60068-2-2, GB2423. 2-89 |
| 2 | Low Temperature Operation | Ta= -20℃, 96hrs | Note 2 IEC60068-2-1 GB2423.1-89 |
| 3 | High Temperature Storage | Ta= +80℃, 96hrs | IEC60068-2-2 GB2423. 2-89 |
| 4 | Low Temperature Storage | Ta= -30℃, 96hrs | IEC60068-2-1 GB/T2423.1-89 |
| 5 | High Temperature & Humidity Storage | Ta= +60℃, 90% RH max, 96 hours | IEC60068-2-3 GB/T2423.3-2006 |
| 6 | Thermal Shock (Non-operation) | -30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle | Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87 |
| 7 | Electro Static Discharge (Operation) | C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa) | IEC61000-4-2 GB/T17626.2-1998 |
| 8 | Vibration (Non-operation) | Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition) | IEC60068-2-6 GB/T2423.5-1995 |
| 9 | Shock (Non-operation) | 60G 6ms, ± X, ±Y , ± Z 3 times for each direction | IEC60068-2-27 GB/T2423.5-1995 |
| 10 | Package Drop Test | Height: 60 cm, 1 corner, 3 edges, 6 surfaces | IEC60068-2-32 GB/T2423.8-1995 |

Note: 1. $T_S$ is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

# 9 Mechanical Drawin




| PIN NO. | SYMBOL | PIN NO. | SYMBOL |
|---|---|---|---|
| 1 | AGND | 31 | NINDO |
| 2 | AVDD | 32 | GND |
| 3 | DVDD | 33 | GND_LVDS |
| 4 | VCOM | 34 | STBYB |
| 5 | DVDD | 35 | STH_R |
| 6 | GND | 36 | DVDD |
| 7 | NC | 37 | UPDN |
| 8 | NC | 38 | AGND |
| 9 | NC | 39 | AVDD |
| 10 | NC | 40 | VCOM |
| 11 | NC | 41 | DITH |
| 12 | NC | 42 | DVDD |
| 13 | NC | 43 | DVDD |
| 14 | NC | 44 | DVDD |
| 15 | GND | 45 | GND |
| 16 | DVDD_LVDS | 46 | NC |
| 17 | GND | 47 | NC |
| 18 | PINO3 | 48 | NC |
| 19 | NINO3 | 49 | NC |
| 20 | GND | 50 | NC |
| 21 | PINC | 51 | NC |
| 22 | NINC | 52 | NC |
| 23 | GND | 53 | GND |
| 24 | PINO2 | 54 | DVDD |
| 25 | NINO2 | 55 | SELB |
| 26 | GND | 56 | VGH |
| 27 | PINO1 | 57 | DVDD |
| 28 | NINO1 | 58 | VGL |
| 29 | GND | 59 | GND |
| 30 | PINO0 | 60 | NC |

| | |
|---|---|
| Display Type | TFT TRANSMISSIVE,POSITIVE |
| Optimum Viewing Direction | 12 O'CLOCK |
| Upper Ploarizer Type | Anti-Glare |
| LCD Driver IC | |
| Operating Voltage | VDD=3.3V |
| Operation Temperature | -20°C TO 70°C |
| Storage Temperature | -30°C TO 80°C |
| Interface | LVDS Interface |
| Backlight | 42-CHIP WHITE LED |
| Surface luminance | 450 cd/m² (TYP.) |
| White X/Y | 0.30/0.33 |

| VER. | SYMBOL | AMENDMENT | SIGN | DATE |
|---|---|---|---|---|
| V00 | | First issue | | 2021.04.21 |

| | | |
|---|---|---|
| DRAWN | | |
| ME. CHECKED | | |
| EE. CHECKED | | |
| APPROVED | | |
| CUSTOMER'S APPROVAL | | |

TITLE: MODULE SPEC.

DRAWING NO.: 101JIH4250-B4 V.1

| UNIT | mm | SCALE | FIT |
|---|---|---|---|
| 3rd Angle | | SHEET | OF 1 |

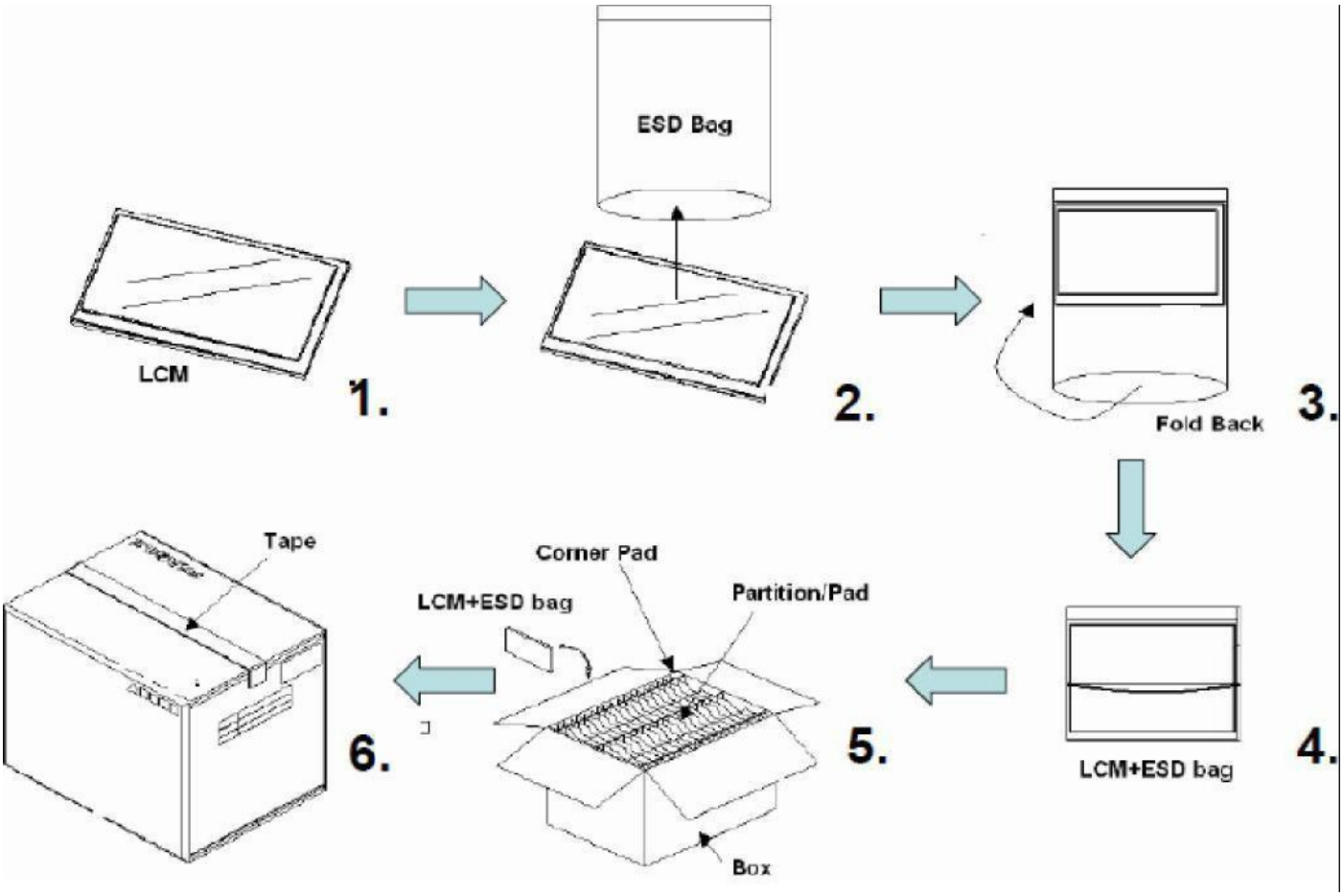
BROWNLH 伯朗瀚科技
深圳市伯朗瀚科技有限公司
Shenzhen Brownopto Technology Co.,

# 1 0.Packing

## 10.1Packing form

| LCM Model | LCM Qty. in the box | Inner Box Size ( mm ) | Note |
|---|---|---|---|
| 101JIH4250 -B4 V.1 | 40 pcs/box | 430±5 x 320±5 x 210±5 | |

## 10.2 Packing assembly drawings




| Items | Material | Notice |
|---|---|---|
| Box | Corrugated Paper Board | AB Flute |
| Partition/Pad | Corrugated Paper Board | B Flute |
| Corner Pad | Corrugated Paper Board | AB Flute |
| ESD bag | PE | |

# 11. Precautions for Use of LCD modules

**11.1 Handling Precautions**

11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

Water ； Ketene ； Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

11.1.7. If the logic circuit power is off, do not apply the input signals.

11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1. Be sure to ground the body when handling the LCD Modules.

11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4. The LCD 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.

**11.2 Storage Precautions**

11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

11.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

**11.3 Transportation Precautions**

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.