# CDTech(H.K.)Electronics Limited

## Product Specification

| | |
|---|---|
| **Model Name** | S080QXG04EA |
| **Description** | TFT LCD Module(Standard Model)<br>8.0" XGA<br>1024(RGB)x768 Dots |
| **Date** | 2016/10/10 |
| **Version** | 2.0 |

| **Approved by/Date** | **Check by/Date** | **Prepared by/Date** |
|---|---|---|
| Sam 2016/10/10 | Borger 2016/10/10 | Li Huang 2016/10/10 |

| **Customer Approval** | |
|---|---|
| | |
| **Date** | |

## Table of Contents

1. Record of Revision ..... 3
2. General Specifications ..... 4
3. Input/Output Terminals ..... 5
4. Absolute Maximum Rating ..... 6
5. Electrical characteristics ..... 7
6. Optical Characteristics ..... 14
7. Environmental / Reliability Tests ..... 18
8. Mechanical Drawing ..... 19
9. Packing ..... 20
10. Precautions for Use of LCD modules ..... 21

## 1. Record of Revision

| Rev | Issued Date | Description | Editor |
|---|---|---|---|
| 1.0 | 2016/08/29 | First Release. | Li Huang |
| 2.0 | 2016/10/10 | Update PN | Jack Guo |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## 2. General Specifications

| Feature | | Spec |
|---|---|---|
| Characteristics | Size | 8.0 inch |
| | Resolution | 1024(horizontal)*768(Vertical) |
| | Interface | LVDS |
| | Connect type | Connector |
| | Display Colors | 16.7M |
| | Technology type | a-Si |
| | Pixel pitch (mm) | 0.1583*0.1583 |
| | Pixel Configuration | R.G.B.-Stripe |
| | Display Mode | Normally Black |
| | Driver IC | TBD |
| | Viewing Direction | Full view |
| Mechanical | LCM (W x H x D) (mm) | 183.00*141.00*6.15 |
| | Active Area(mm) | 162.05*121.54 |
| | Weight (g) | 169 g |
| | LED Numbers | 27 LEDs |

Note 1: Requirements on Environmental Protection: RoHs
Note 2: LCM weight tolerance: +/- 5%

## 3. Input/Output Terminals

| No. | Symbol | Description |
|---|---|---|
| 1 | VCOM | Common voltage |
| 2 | VDD | 3.3V Power |
| 3 | VDD | 3.3V Power |
| 4 | NC | Not connect |
| 5 | RESET | Global reset pin Active low enter reset state Suggest to connecting with an RC reset Normally pull hight(R=100K,C=1UF) |
| 6 | STBYB | Standby mode normally pull high STBYB="1",timing control ,source driver will turn off all output are high-Z |
| 7 | GND | System Ground |
| 8 | RXIN0- | Negative LVDS differential data input |
| 9 | RXIN0+ | Positive LVDS differential data input |
| 10 | GND | System Ground |
| 11 | RXIN1- | Negative LVDS differential data input |
| 12 | RXIN1+ | Positive LVDS differential data input |
| 13 | GND | System Ground |
| 14 | RXIN2- | Negative LVDS differential data input |
| 15 | RXIN12+ | Positive LVDS differential data input |
| 16 | GND | System Ground |
| 17 | RXCLK- | Negative LVDS differential clock input |
| 18 | RXCLK+ | Positive LVDS differential clock input |
| 19 | GND | System Ground |
| 20 | RXIN3- | Negative LVDS differential data input |
| 21 | RXIN3+ | Positive LVDS differential data input |
| 22 | GND | System Ground |
| 23 | NC | Not connect |
| 24 | NC | Not connect |
| 25 | GND | System Ground |
| 26 | NC | Not connect |
| 27 | DIMO | Backlight CABC controller signal output |
| 28 | SELB | 6bit/8bit mode select H:6bit /L:8bit Note1 |
| 29 | AVDD | Power for Analog Circuit |
| 30 | GND | System Ground |
| 31 | NC(LED-) | Not connect |
| 32 | NC(LED-) | Not connect |

| | | | |
|---|---|---|---|
| 33 | L/R | Horizontal inversion | Note3 |
| 34 | U/D | Vertical inversion | Note3 |
| 35 | VGL | Positive power for TFT | |
| 36 | CABCEN1 | CABC H/W enable | Note2 |
| 37 | CABCEN0 | CABC H/W enable | Note2 |
| 38 | VGH | Positive power for TFT | |
| 39 | NC(LED+) | Not connect | |
| 40 | NC(LED+) | Not connect | |

I: input, O: output, P: Power
Note1: If LVDS input data is 6 bits, selb must be set to High;
If LVDS input data is 8 bits, selb must be set to Low.
Note2: When CABC_EN=”00”, CABC OFF.
When CABC_EN=”01”, user interface image.
When CABC_EN=”10”, still picture.
When CABC_EN=”11”, moving image.
When CABC off, don’t connect DIMO, else connect it to backlight.
Note3: 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.

## 4. Absolute Maximum Rating

| Item | Symbol | MIN | Typ | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | -0.3 | - | 5 | V | - |
| Operating Temperature | $T_{OPR}$ | -20 | - | 70 | ℃ | - |
| Storage Temperature | $T_{STG}$ | -30 | - | 80 | ℃ | |

# 5. Electrical characteristics

## 5.1 Driving TFT LCD Panel

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| Power voltage | $V_{CC}$ | 3.0 | 3.3 | 3.6 | V | - |
| | $AV_{DD}$ | 9.8 | 10 | 10.2 | V | - |
| | $V_{GH}$ | 18.6 | 18.9 | 19.2 | V | - |
| | $V_{GL}$ | 8.1 | 7.8 | 7.5 | V | - |
| Input signal voltage | $V_{COM}$ | 2.6 | 3.6 | 4.6 | V | - |
| Input logic high voltage | $V_{IH}$ | 0.7Vcc | - | Vcc | V | - |
| Input logic low voltage | $V_{IL}$ | - | - | 0.3Vcc | V | |

Note 1: Be sure to apply VCC and VGL to the LCD first, and then apply VGH.

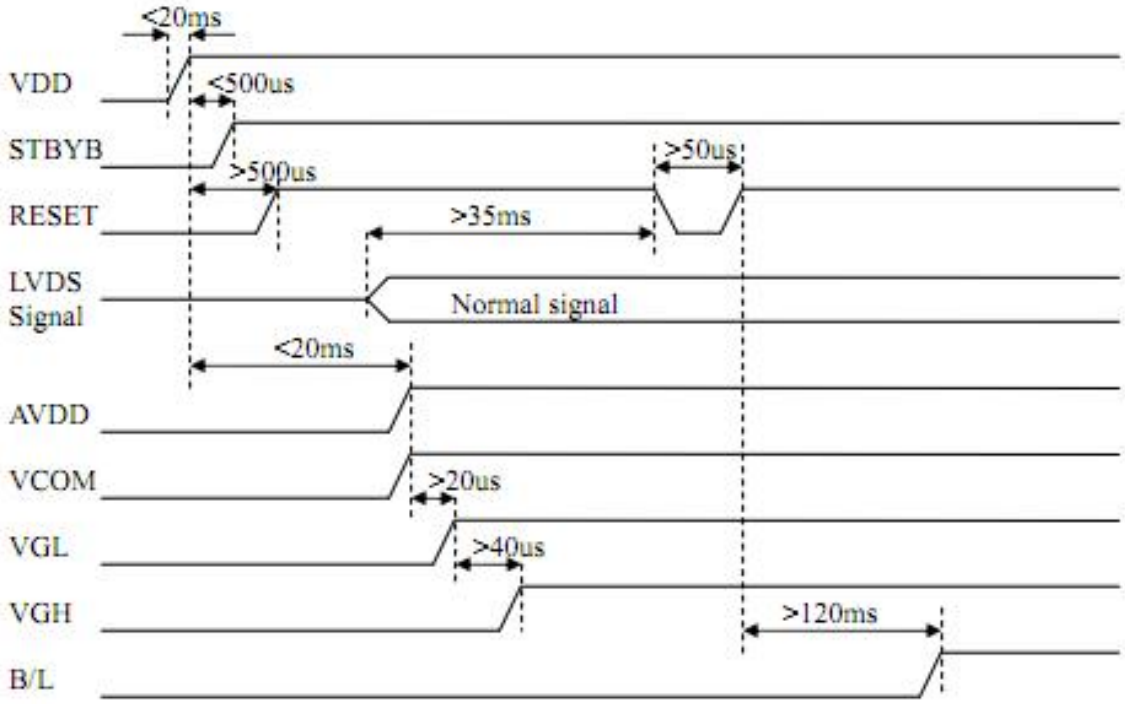
Note 2: VCC setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: Typical Vcom is only a reference value; it must be optimized according to each LCM, please use VR and base on below application circuit.

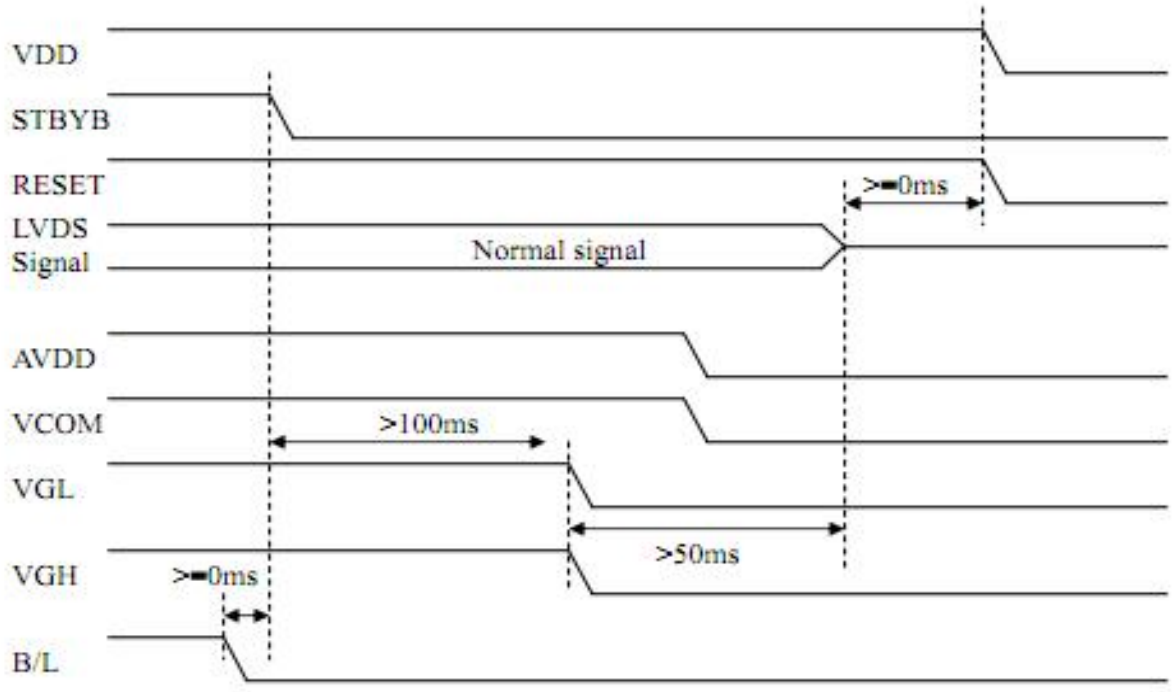
Note 4: Reset, stbyb, selb, L/R, U/D, cabcen0, cabcen 1.

## 5.2 Power ON.OFF sequence

### 5.2.1. Power on:




### 5.2.2. Power off:

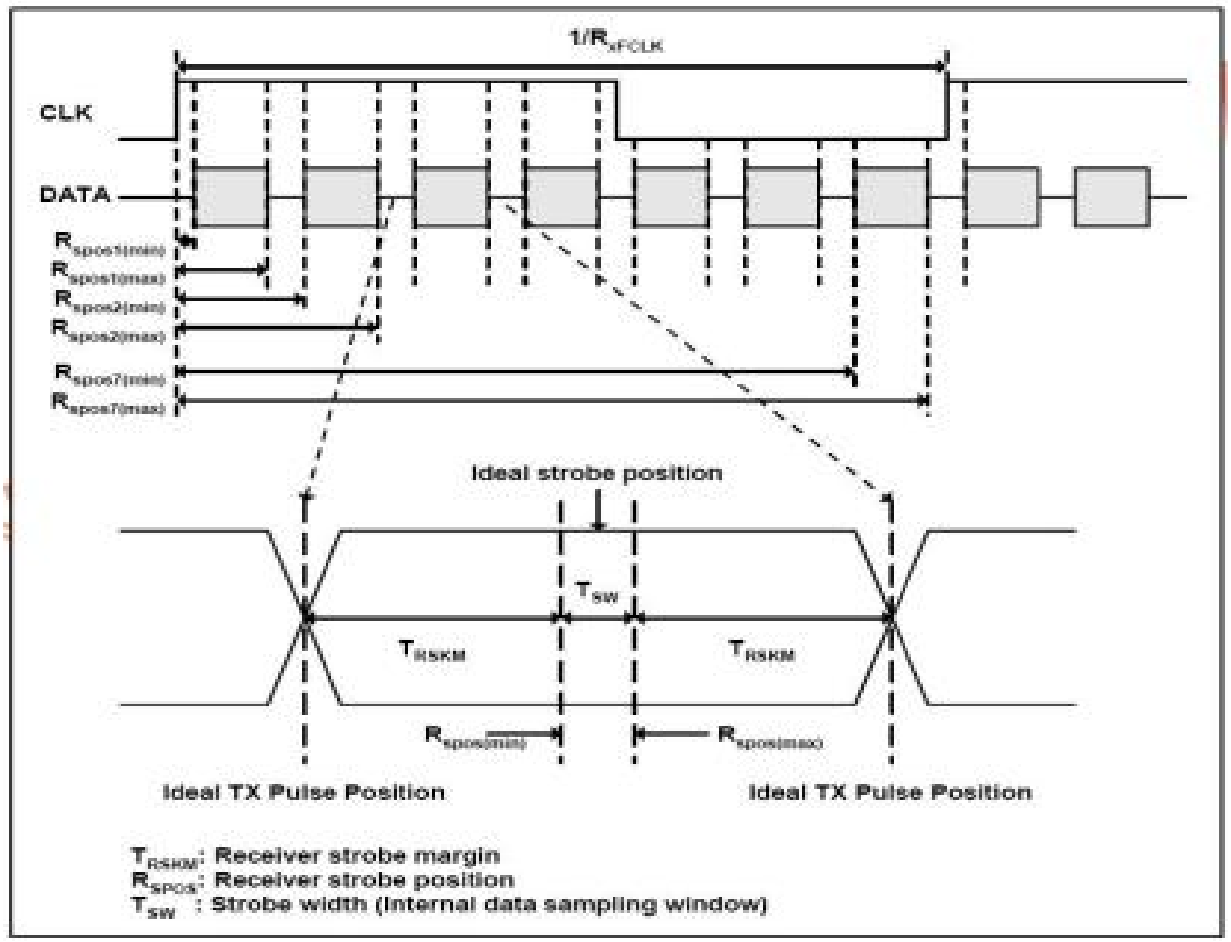


## 5.3 Timing Characteristics

### 5.3.1 AC electrical characteristics

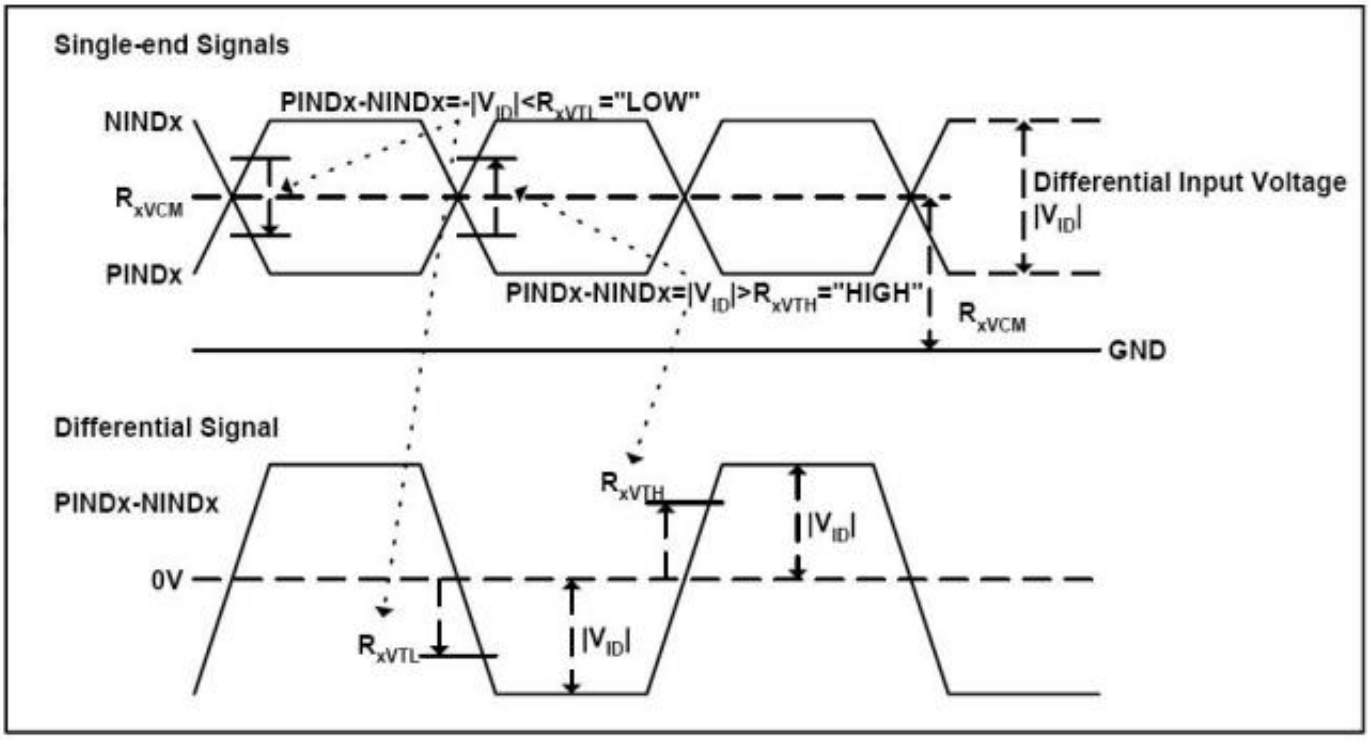
| Parameter | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Clock frequency | $R_{xFCLK}$ | 20 | - | 71 | MHz | |
| Input data skew margin | $T_{RSKM}$ | 500 | - | - | ps | |
| Clock high time | $T_{LVCH}$ | - | $4/(7* R_{xFCLK})$ | - | ns | |
| Clock low time | $T_{LVCL}$ | - | $3/(7* R_{xFCLK})$ | - | ns | |

### 5.3.2. Input Clock and Data Timing Diagram



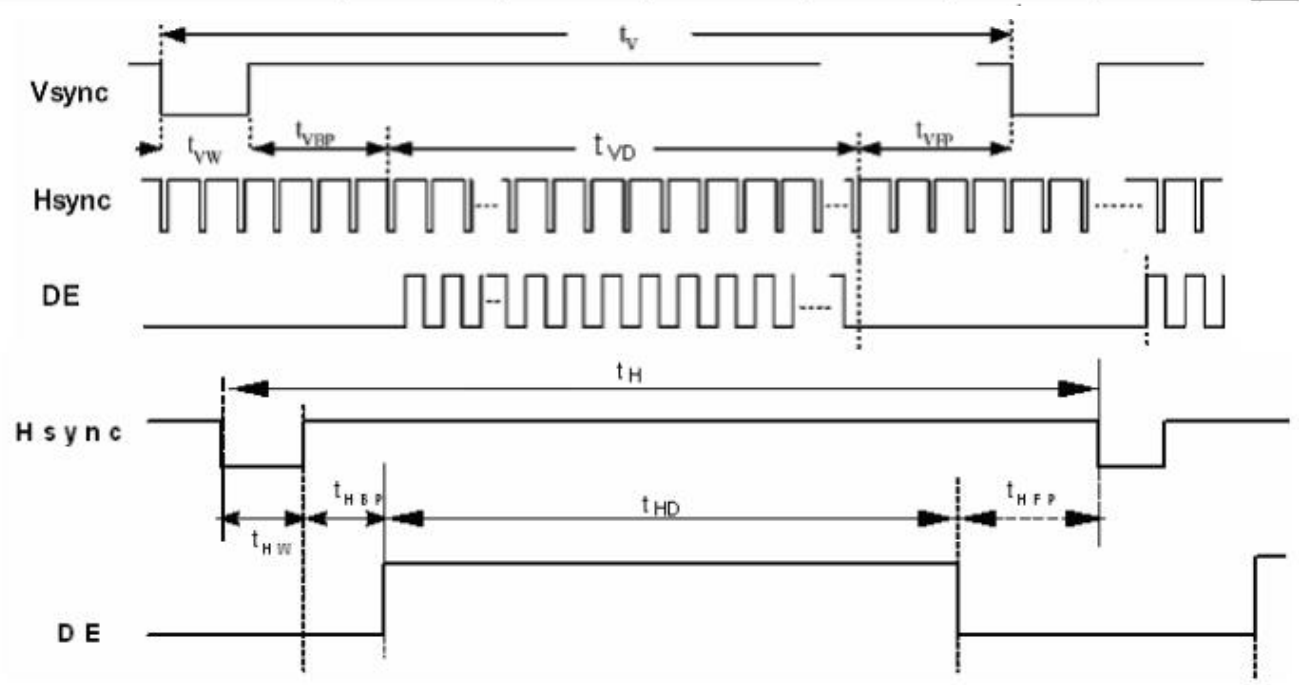
### 5.3.2 DC Electrical Characteristics

| Parameter | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Differential input high Threshold voltage | $R_{xVTH}$ | - | - | +0.1 | V | |
| Differential input low Threshold voltage | $R_{xVTL}$ | -0.1 | - | - | V | |
| Input voltage range (singled-end) | $R_{xVIN}$ | 0 | - | 2.4 | V | |
| Differential input common mode voltage | $R_{xVCM}$ | $\|V_{ID}\|/2$ | - | $2.4-\|V_{ID}\|/2$ | V | |
| Differential voltage | $\|V_{ID}\|$ | 0.2 | - | 0.6 | V | |
| Differential input leakage current | $RV_{xiiz}$ | -10 | - | +10 | uA | |



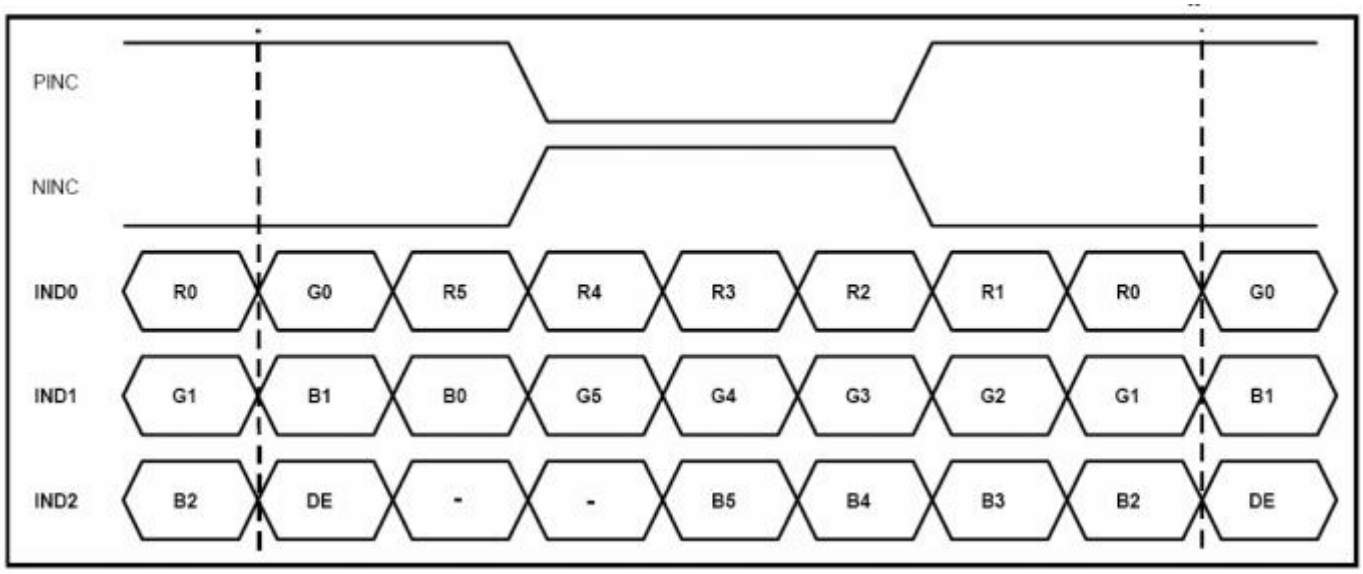
### 5.3.3 Timing Diagram

| Item | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Clock Frequency | fclk | 52 | 65 | 71 | MHz | Frame rate =TBD |
| Horizontal display area | thd | | 1024 | | | |
| HS period time | th | 1114 | 1344 | 1400 | DCLK | |
| HS Blanking | thb+thfp | 90 | 320 | 376 | DCLK | |
| Vertical display area | tvd | | 768 | | | |
| VS period time | tv | 778 | 806 | 845 | H | |
| VS Blanking | tvb+tvfp | 10 | 38 | 77 | H | |




### 3.3.5. Data Input Format

**6bit LVDS input**


PINC
NINC
IND0
R0
G0
R5
R4
R3
R2
R1
R0
G0
IND1
G1
B1
B0
G5
G4
G3
G2
G1
B1
IND2
B2
DE
-
-
B5
B4
B3
B2
DE

## 5.4 LED Driving Conditions

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|---|---|---|---|---|---|---|
| Forward Current | $I_F$ | - | 540 | 585 | mA | |
| Forward Voltage | $V_F$ | - | 9.6 | 9.9 | V | |
| Backlight Power consumption | $W_{BL}$ | - | 5.18 | 5.79 | W | |
| LED Lifetime | | 50000 | - | - | Hrs | |

Note 1: Each LED: IF =60 mA, VF =3.2+/0.2V.
Note 2: Optical performance should be evaluated at Ta=25℃ only.
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

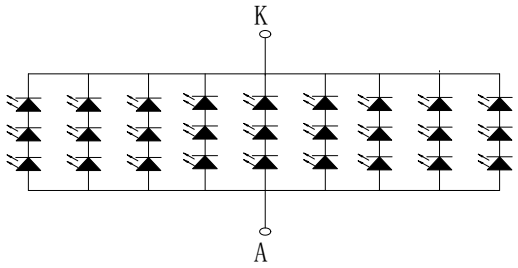



Figure: LED connection of backlight(Constant Current)

## 6. Optical Characteristics

| Items | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark | Note |
|---|---|---|---|---|---|---|---|---|---|
| Response time | | Tr+Tf | - | - | 25 | 50 | ms | FIG.1 | Note4 |
| Contrast Ratio | | CR | | | 800 | - | - | FIG.2 | Note1 |
| Surface luminance | | LV | θ =0° | 900 | 1000 | - | cd/m2 | FIG.2 | Note2 |
| Luminance uniformity | | Yu | θ =0° | 80 | - | - | % | FIG.2 | Note3 |
| Viewing angle | | θ Cr>10 | ∅=90° | - | 85 | - | deg | FIG.3 | Note6 |
| | | | ∅=270° | - | 85 | - | deg | FIG.3 | |
| | | | ∅=0° | - | 85 | - | deg | FIG.3 | |
| | | | ∅=180° | - | 85 | - | deg | FIG.3 | |
| Chromaticity | Red | $R_X$ | θ =0° ∅=0° Ta=25° | TBD | TBD | TBD | - | FIG.2 CIE1931 | Note5 |
| | | $R_Y$ | | TBD | TBD | TBD | - | | |
| | Green | $G_X$ | | TBD | TBD | TBD | - | | |
| | | $G_Y$ | | TBD | TBD | TBD | - | | |
| | Blue | $B_X$ | | TBD | TBD | TBD | - | | |
| | | $B_Y$ | | TBD | TBD | TBD | - | | |
| | White | $W_X$ | | 0.26 | 0.31 | 0.36 | - | | |
| | | $W_Y$ | | 0.28 | 0.33 | 0.38 | - | | |

**Note1. Definition of contrast ratio**

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

$$\text{Contrast ratio} = \frac{\text{Luminance measured when LCD on the “White” state}}{\text{Luminance measured when LCD on the “Black” state}}$$

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON’s BM-5 or BM-7 photo detector or compatible.

**Note2. Definition of surface luminance.**

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3, ......,Pn)

**Note3. Definition of luminance uniformity**

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance.For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

**Note4. 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 90% to 10%. And fall time (Tf) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

**Note5. Definition of color chromaticity (CIE1931)**

CIE (x,y) chromaticity,The x,y value is determined by screen active area center position P5.For more information see FIG.2.

**Note6. Definition of viewing angle**

Viewing angle is the angle at which the contrast ratio is greater than 10. Angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers’s ConoScope or DMS series Instruments or compatible.

**FIG.1.The definition of response Time**

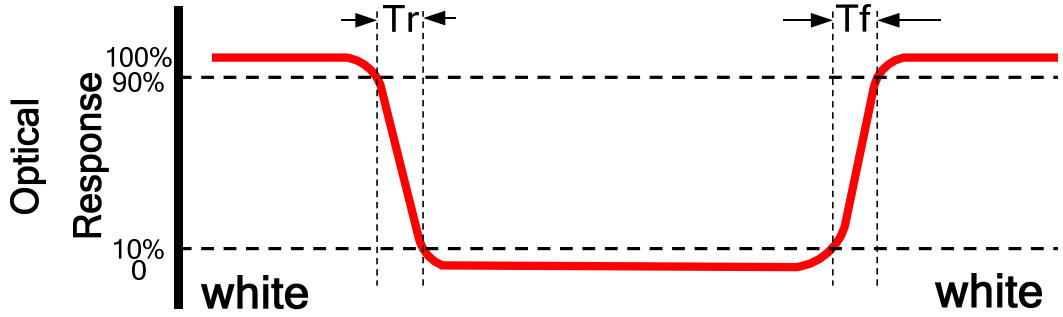



**FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity**

Size : S≤5"(see Figure a) A : 5 mm B : 5 mm
H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure a.
measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

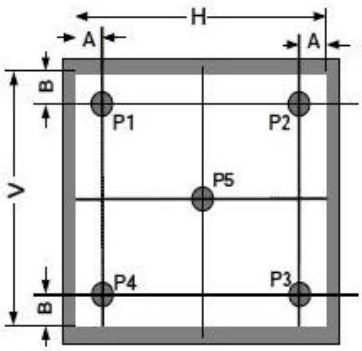



Figure a

Size : 5"＜S≤12.3"(see Figure b) H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or compatible distance from the LCD surface to detector lens.
test spot position : see Figure b.
measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

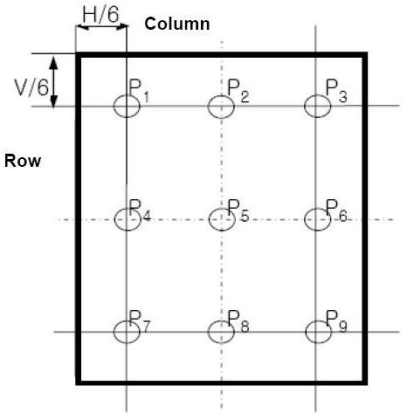



Figure b

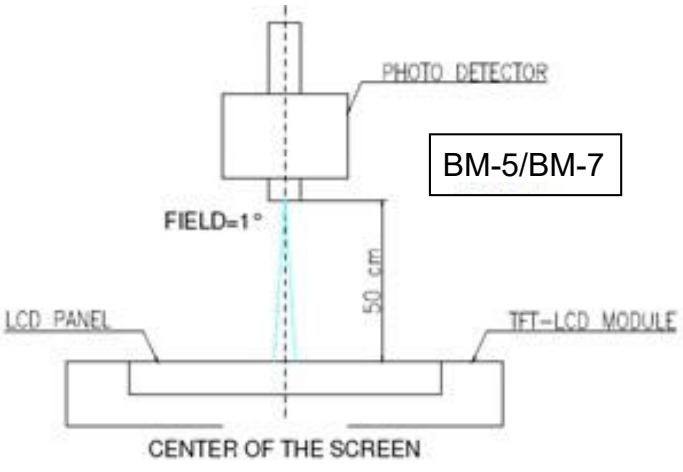
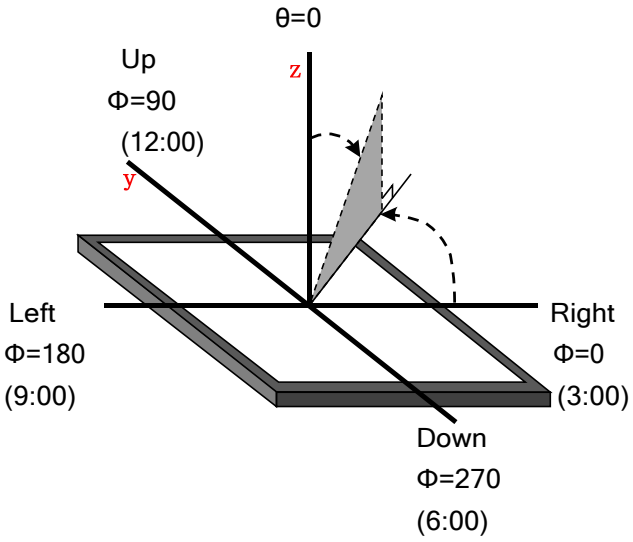



Figure c

**FIG.3.The definition of viewing angle**

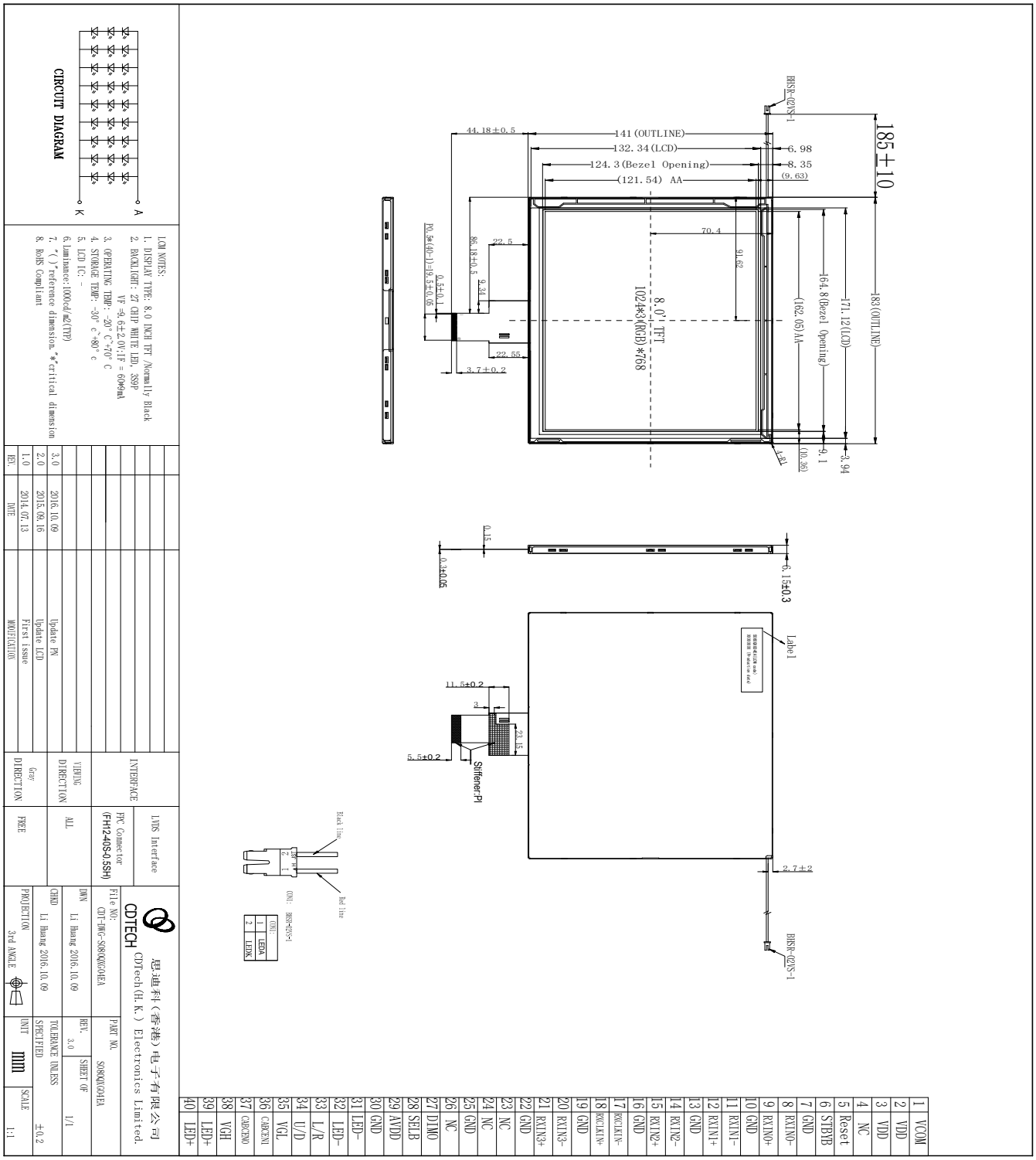


## 7. Environmental / Reliability Tests

| 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℃, 120hrs | IEC60068-2-2 GB2423. 2-89 |
| 4 | Low Temperature Storage | Ta= -30℃, 120hrs | IEC60068-2-1 GB/T2423.1-89 |
| 5 | High Temperature & Humidity Storage | Ta= +60℃, 90% RH max,120 hours | IEC60068-2-3 GB/T2423.3-2006 |
| 6 | Thermal Shock (Non-operation) | -20℃ 30 min ~ +60℃ 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: 80 cm, 1 corner, 3 edges, 6 surfaces | IEC60068-2-32 GB/T2423.8-1995 |

Note:1. Ts is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.
3. The size of sample is 5pcs.

## 8. Mechanical Drawing




CIRCUIT DIAGRAM

A
K

LCM NOTES:
1. DISPLAY TYPE: 8.0 INCH TFT /Normally Black
2. BACKLIGHT: 2T CHIP WHITE LED, 3SSP
VF =9.6±2.0V, IF = 60MmA
3. OPERATING TEMP: -20° C~70° C
4. STORAGE TEMP: -30° C~+80° c
5. LCD IC: —
6. Luminance: 1000cd/m2(TYP)
7. "( )"reference dimension, "*"critical dimension
8. RoHS Compliant

| REV. | DATE | MODIFICATION |
|---|---|---|
| 3.0 | 2016.10.09 | Update PN |
| 2.0 | 2015.08.16 | Update LCD |
| 1.0 | 2014.07.13 | First issue |

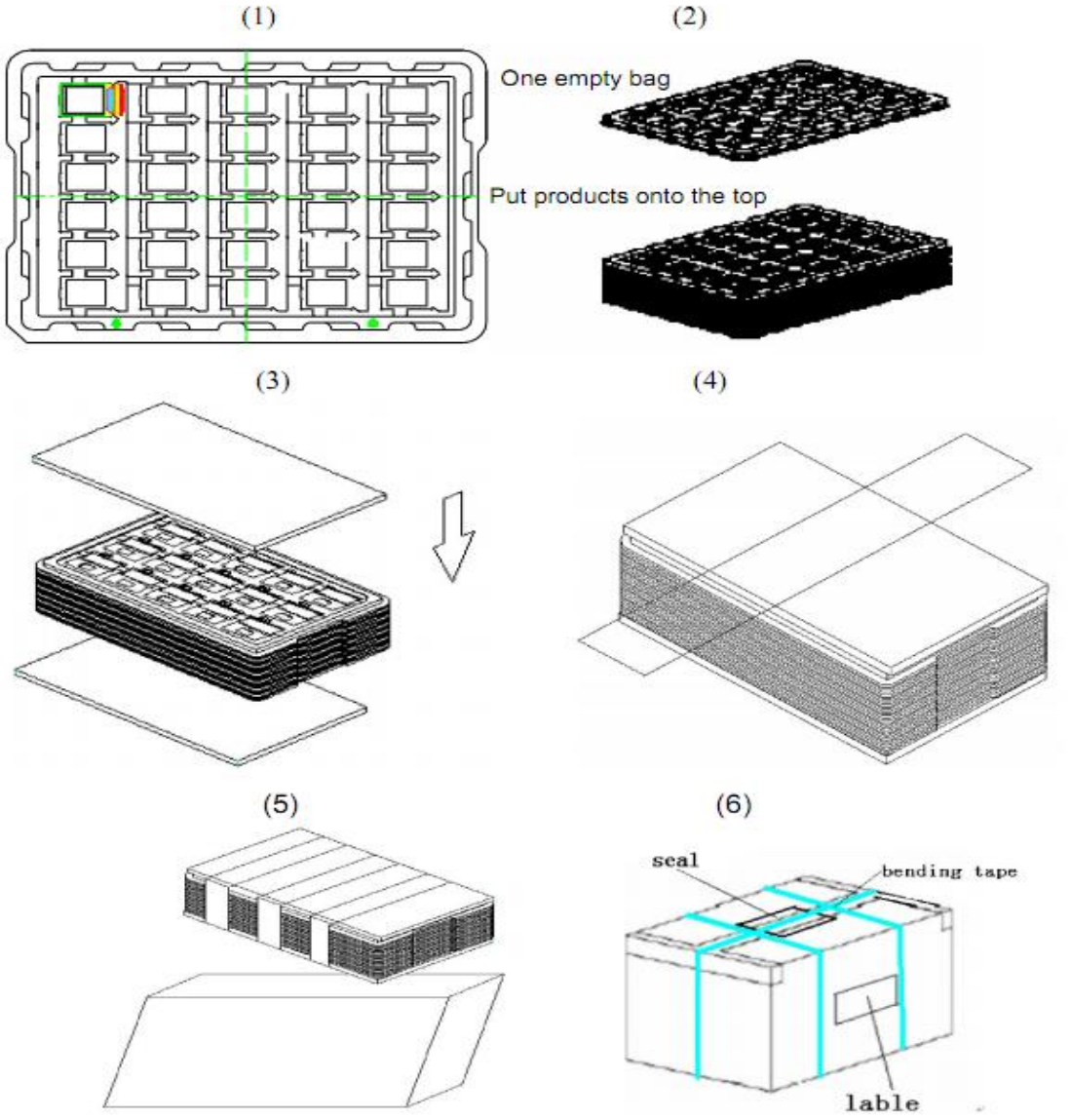
INTERFACE: LVDS Interface
EPC Connector (FH12-40S-0.5SH)
VIEWING DIRECTION: ALL
Gray DIRECTION: FREE

思迪科(香港)电子有限公司
CDTech(H.K.) Electronics Limited.

| | |
|---|---|
| File NO: | CDT-DWG-S080WQG04EA |
| PART NO. | S080WQG04EA |
| DWN | Li Huang 2016.10.09 |
| REV. | 3.0 |
| SHEET OF | 1/1 |
| CHKD | Li Huang 2016.10.09 |
| TOLERANCE UNLESS SPECIFIED | ±0.2 |
| PROJECTION | 3rd ANGLE |
| UNIT | mm |
| SCALE | 1:1 |

## 9. Packing

**Packing Method**




1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

# 10. Precautions for Use of LCD modules

## 11.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

## 10.2 Storage Precautions

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

10.2.2. 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%

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

## 10.3 Transportation Precautions

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