



**PROPRIETARY NOTE**

THIS SPECIFICATION IS THE PROPERTY OF BOEFZ AND SHALL NOT BE REPRODUCED OR COPIED WITHOUT THE WRITTEN PERMISSION OF BOEFZ AND MUST BE RETURNED TO BOEFZ UPON ITS REQUEST

SPEC. NUMBER  
NO. S8-65-AA-047

PRODUCT GROUP  
TFT-LCD

Rev. P2

ISSUE DATE  
2020.12.14

PAGE  
1 OF 31

**TITLE :**

**DV430FHB-N10 (Rev.2.1) Product Specification**

Hefei BOE Display Technology Co.,Ltd

BOE Final Spec for Qiangfeng



PRODUCT GROUP

REV

ISSUE DATE

TFT- LCD PRODUCT

P2

2020.12.14

SPEC. NUMBER  
NO. S8-65-AA-047

SPEC. TITLE  
DV430FHB-N10(Rev.2.1) Product Specification

PAGE  
2 OF 31

REVISION HISTORY

| REV. | ECN No. | DESCRIPTION OF CHANGES             | DATE       | PREPARED   |
|------|---------|------------------------------------|------------|------------|
| P0   | -       | Initial Release                    | 2019.07.31 | Jituo Tang |
| P1   | All     | Update Spec.Title                  | 2019.08.14 | Jituo Tang |
| P2   | -       | Add Landscape and Portrait Enabled | 2020.12.14 | Qian Cheng |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |
|      |         |                                    |            |            |

BOE Final Spec for Qiangfeng

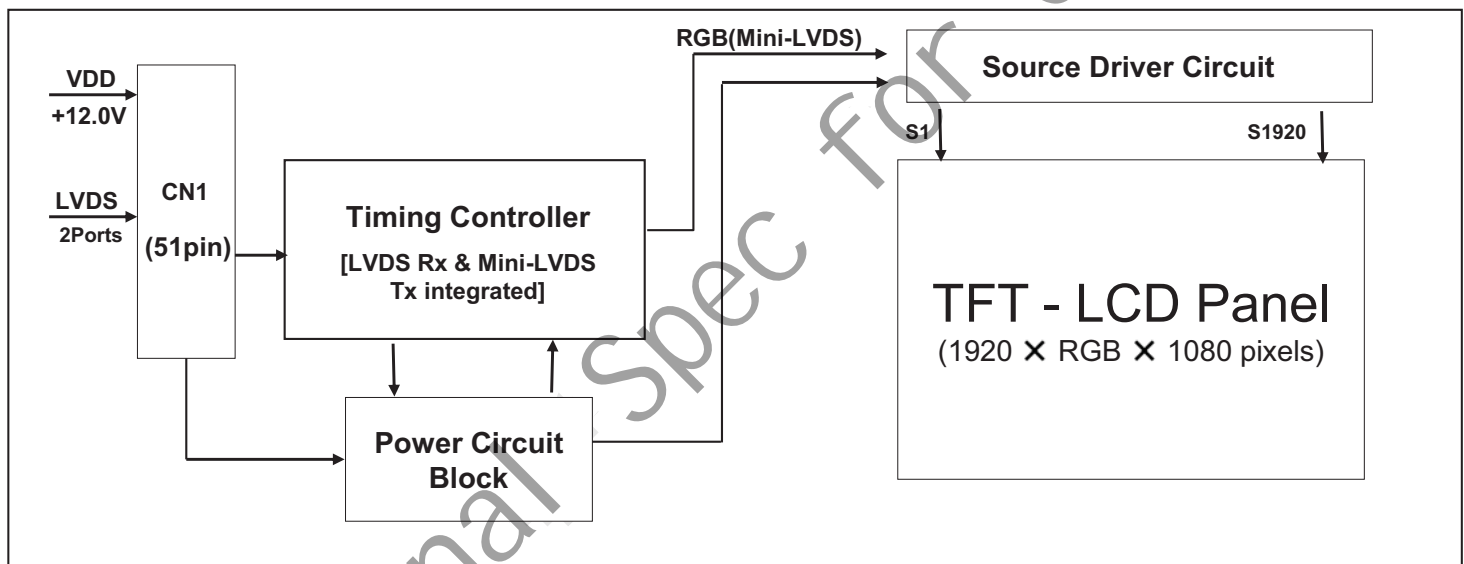
**Contents**

| No | ITEM   | Page |
|----|--|------|
|    | REVISIONS HISTORY  | 2    |
|    | CONTENTS   | 3    |
| 1  | GENERAL DESCRIPTION  | 4    |
|    | 1.1 Introduction   |      |
|    | 1.2 Features   |      |
|    | 1.3 Applications   |      |
|    | 1.4 General Specification  |      |
| 2  | ABSOLUTE MAXIMUM RATINGS   | 6    |
| 3  | ELECTRICAL SPECIFICATIONS  | 7    |
|    | 3.1 TFT LCD Open Cell  |      |
| 4  | INTERFACE CONNECTION   | 8    |
|    | 4.1 Open Cell Input Signal & Power                               |      |
|    | 4.2 LVDS Interface   |      |
|    | 4.3 LVDS Rx Interface Timing Parameter                           |      |
|    | 4.4 LVDS Rx Interface Eye Diagram                                |      |
|    | 4.5 LVDS Receiver Differential Input                             |      |
| 5  | SIGNAL TIMING SPECIFICATIONS                                     | 18   |
|    | 5.1 Timing Parameters (DE only mode)                             |      |
|    | 5.2 Signal Timing Waveform                                       |      |
|    | 5.3 Input Signals, Basic Display Colors and Gray Scale of Colors |      |
|    | 5.4 Power Sequence   |      |
| 6  | OPTICAL SPECIFICATIONS   | 22   |
| 7  | MECHANICAL CHARACTERISTICS                                       | 24   |
| 8  | RELIABILITY TEST   | 25   |
| 9  | PRODCUT SERIAL NUMBER  | 26   |
| 10 | PACKING INFORMATION  | 27   |
| 11 | HANDING & CAUTIONS   | 29   |
| 12 | APPENDIX   | 30   |

## 1.0 GENERAL DESCRIPTION

### 1.1 Introduction

DV430FHB-N10 is a color active matrix TFT LCD open cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This open cell has a 42.5 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 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. The TFT-LCD panel is adapted for a low reflection and higher color type.



### 1.2 Features

- LVDS interface with 2 pixel / clock
- High-speed response
- Low color shift image quality
- 8-bit color depth, display 16.7M colors
- Wide viewing angle, gate driver use GOA mode
- DE (Data Enable) only mode
- ADS technology is applied for high display quality
- RoHS compliant

### 1.3 Application

- Home Alone Multimedia TFT-LCD TV
- Display Terminals for Control System
- Full High Definition TV(FHD TV)
- AV application Products

### 1.4 General Specification

&lt; Table 1. General Specifications &gt;

| Parameter               | Specification  | Unit   | Remark                       |
|-------------------------|--|--------|------------------------------|
| Active area             | 940.896(H) × 529.254(V)                                      | mm     |                              |
| Number of pixels        | 1920(H) × 1080(V)  | pixels |                              |
| Pixel pitch             | 163.35(H) × 490.05(V)  | um     |                              |
| Pixel arrangement       | Pixels RGB Vertical stripe                                   |        |                              |
| Display colors          | 16.7M (8bits True)   | colors |                              |
| Display mode            | Transmission mode, Normally Black                            |        |                              |
| Open Cell Transmittance | 6.30 (Typ.)  | %      | At center point with BOE BLU |
| Weight                  | 1510 (Typ.)  | gram   |                              |
| Power Consumption       | 6.0  | Watt   |                              |
| Surface Treatment       | Haze 1% , 3H , Anti-Glare Layer(for Front) , Clear(for Rear) |        |                              |
| Possible display type   | Landscape and Portrait Enabled                               |        |                              |

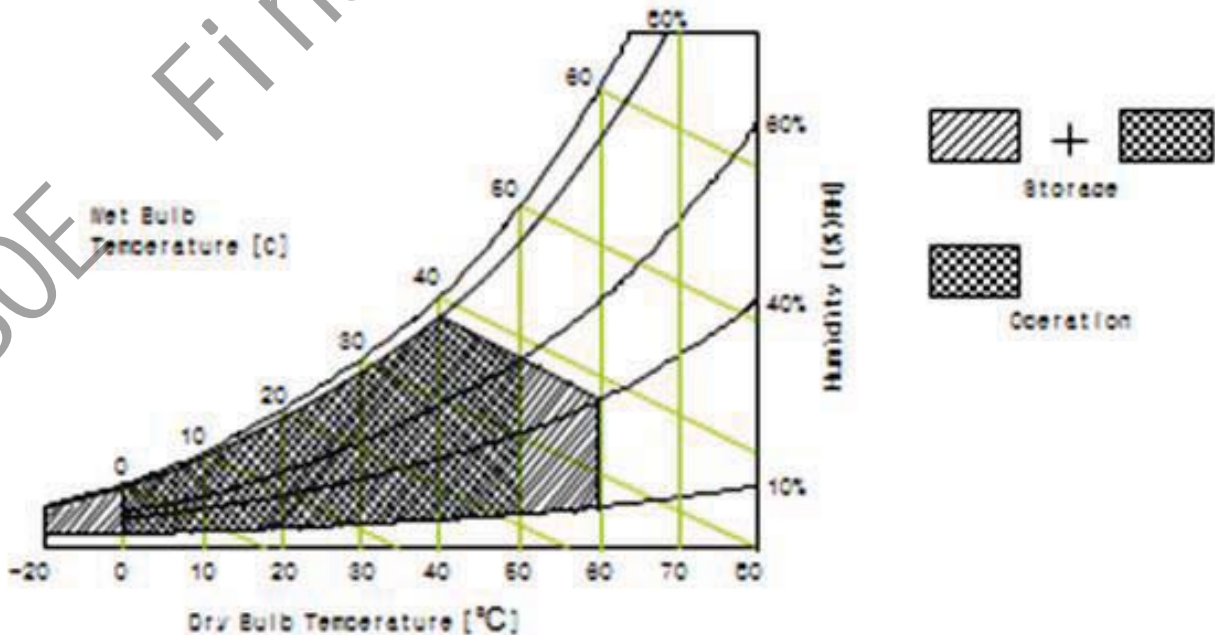
### 2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Open Cell Electrical Specifications > [VSS=GND=0V]

| Parameter                  | Symbol           | Min.    | Max. | Unit | Remark     |
|----------------------------|------------------|---------|------|------|------------|
| Power Supply Voltage       | VDD              | VSS-0.3 | 13.5 | V    | Ta = 25 °C |
| Operating Temperature      | T <sub>OP</sub>  | 0       | +50  | °C   | Note 1     |
| Storage Temperature        | T <sub>SUR</sub> | -20     | +60  | °C   |            |
|                            | T <sub>ST</sub>  | -20     | +60  | °C   |            |
| Operating Ambient Humidity | Hop              | 10      | 80   | %RH  |            |
| Storage Humidity           | Hst              | 10      | 80   | %RH  |            |

Note 1 : Temperature and relative humidity range are shown in the figure below.  
Wet bulb temperature should be 39 °C max. and no condensation of water.



### 3.0 ELECTRICAL SPECIFICATIONS

#### 3.1 TFT LCD Open Cell

< Table 3. Open Cell Electrical Specifications >

[Ta=25±2 °C]

| Parameter                   | Symbol                                    | Values |      |      | Unit | Remark |  |
|-----------------------------|---|--------|------|------|------|--------|--|
|                             |   | Min    | Typ  | Max  |      |        |  |
| Power Supply Input Voltage  | VDD                                       | 10.8   | 12   | 13.2 | Vdc  |        |  |
| Power Supply Ripple Voltage | VRP                                       |        |      | 300  | mV   |        |  |
| Power Supply Current        | IDD                                       | -      | 500  | 950  | mA   | Note 1 |  |
| Power Consumption           | PDD                                       | -      | 6.0  | 11.4 | Watt |        |  |
| Rush current                | IRUSH                                     | -      | -    | 3.0  | A    | Note 2 |  |
| LVDS Interface              | Differential Input High Threshold Voltage | VLVTH  | +100 |      | +300 | mV     |  |
|                             | Differential Input Low Threshold Voltage  | VLVTL  | -300 |      | -100 | mV     |  |
|                             | Common Input Voltage                      | VLVC   | 1.0  | 1.2  | 1.4  | V      |  |
| CMOS Interface              | Input High Threshold Voltage              | VIH    | 2.7  | -    | 3.3  | V      |  |
|                             | Input Low Threshold Voltage               | VIL    | 0    | -    | 0.6  | V      |  |

Note 1 : The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=12.0V,

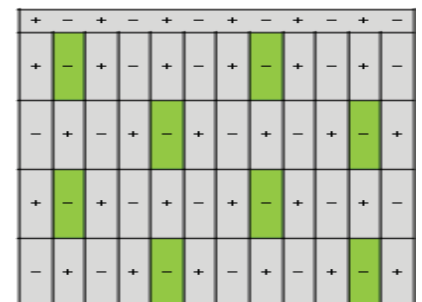
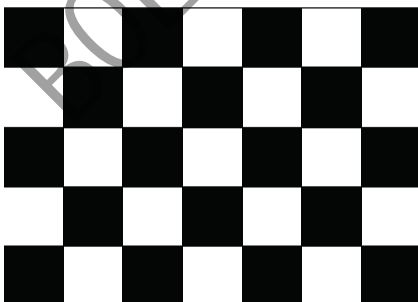
Frame rate  $f_v=60\text{Hz}$  and Clock frequency = 74.25MHz.

Test Pattern of power supply current

a) Typ : Mosaic 7X5 (L0/L255)

b) Max : Horizontal 1 Line (L0/L255)

c) Flicker Pattern



Note 2 : The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

**4.0 INTERFACE CONNECTION****4.1 Open Cell Input Signal & Power**

&lt; Table 4. Open Cell Input Connector Pin Configuration &gt;

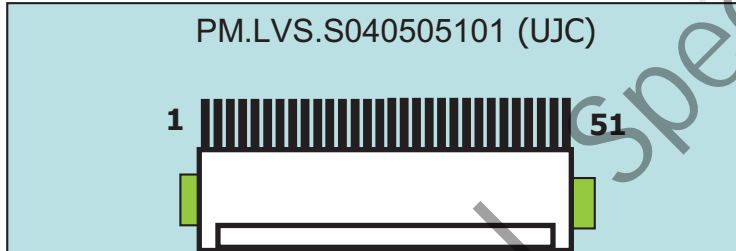
| Pin No | Symbol  | Description  | Pin No | Symbol  | Description   |
|--------|---------|--|--------|---------|---|
| 1      | NC      | No Connection  | 21     | GND     | Ground  |
| 2      | SDA     | I <sup>2</sup> C Data                                    | 22     | CH1[3]- | First pixel negative LVDS differential data input. Pair3  |
| 3      | SCL     | I <sup>2</sup> C Clock                                   | 23     | CH1[3]+ | First pixel positive LVDS differential data input. Pair3  |
| 4      | NC      | Not Connected  | 24     | NC      | Not Connected   |
| 5      | NC      | Not Connected  | 25     | NC      | Not Connected   |
| 6      | NC      | Not Connected  | 26     | NC      | Not Connected   |
| 7      | SELLVDS | High: JEIDA<br>Low or Open: VESA                         | 27     | NC      | Not Connected   |
| 8      | NC      | Not Connected  | 28     | CH2[0]- | Second pixel negative LVDS differential data input. Pair0 |
| 9      | NC      | Not Connected  | 29     | CH2[0]+ | Second pixel positive LVDS differential data input. Pair0 |
| 10     | NC      | Not Connected  | 30     | CH2[1]- | Second pixel negative LVDS differential data input. Pair1 |
| 11     | GND     | Ground   | 31     | CH2[1]+ | Second pixel positive LVDS differential data input. Pair1 |
| 12     | CH1[0]- | First pixel negative LVDS differential data input. Pair0 | 32     | CH2[2]- | Second pixel negative LVDS differential data input. Pair2 |
| 13     | CH1[0]+ | First pixel positive LVDS differential data input. Pair0 | 33     | CH2[2]+ | Second pixel positive LVDS differential data input. Pair2 |
| 14     | CH1[1]- | First pixel negative LVDS differential data input. Pair1 | 34     | GND     | Ground  |
| 15     | CH1[1]+ | First pixel positive LVDS differential data input. Pair1 | 35     | CH2CLK- | Second pixel negative LVDS clock                          |
| 16     | CH1[2]- | First pixel negative LVDS differential data input. Pair2 | 36     | CH2CLK+ | Second pixel positive LVDS clock                          |
| 17     | CH1[2]+ | First pixel positive LVDS differential data input. Pair2 | 37     | GND     | Ground  |
| 18     | GND     | Ground   | 38     | CH2[3]- | Second pixel negative LVDS differential data input. Pair3 |
| 19     | CH1CLK- | First pixel negative LVDS clock                          | 39     | CH2[3]+ | Second pixel positive LVDS differential data input. Pair3 |
| 20     | CH1CLK+ | First pixel positive LVDS clock                          | 40     | NC      | Not Connected   |



| Pin No | Symbol | Description   | Pin No | Symbol | Description        |
|--------|--------|---------------|--------|--------|--------------------|
| 41     | NC     | Not Connected | 47     | NC     | Not Connected      |
| 42     | NC     | Not Connected | 48     | VCC    | Input Voltage +12V |
| 43     | NC     | Not Connected | 49     | VCC    | Input Voltage +12V |
| 44     | GND    | Ground        | 50     | VCC    | Input Voltage +12V |
| 45     | GND    | Ground        | 51     | VCC    | Input Voltage +12V |
| 46     | GND    | Ground        |        |        |                    |

- Notes :
1. NC(Not Connected) : This pins are only used for BOE internal operations.
  2. Input Level of LVDS signal is based on the EIA-644 Standard.
  3. LVDS\_SEL : This pin is used for selecting LVDS signal data format.  
If this Pin : High (3.3V) → JEIDA LVDS format  
Otherwise : Low (GND) or Open (NC) → Normal NS LVDS format

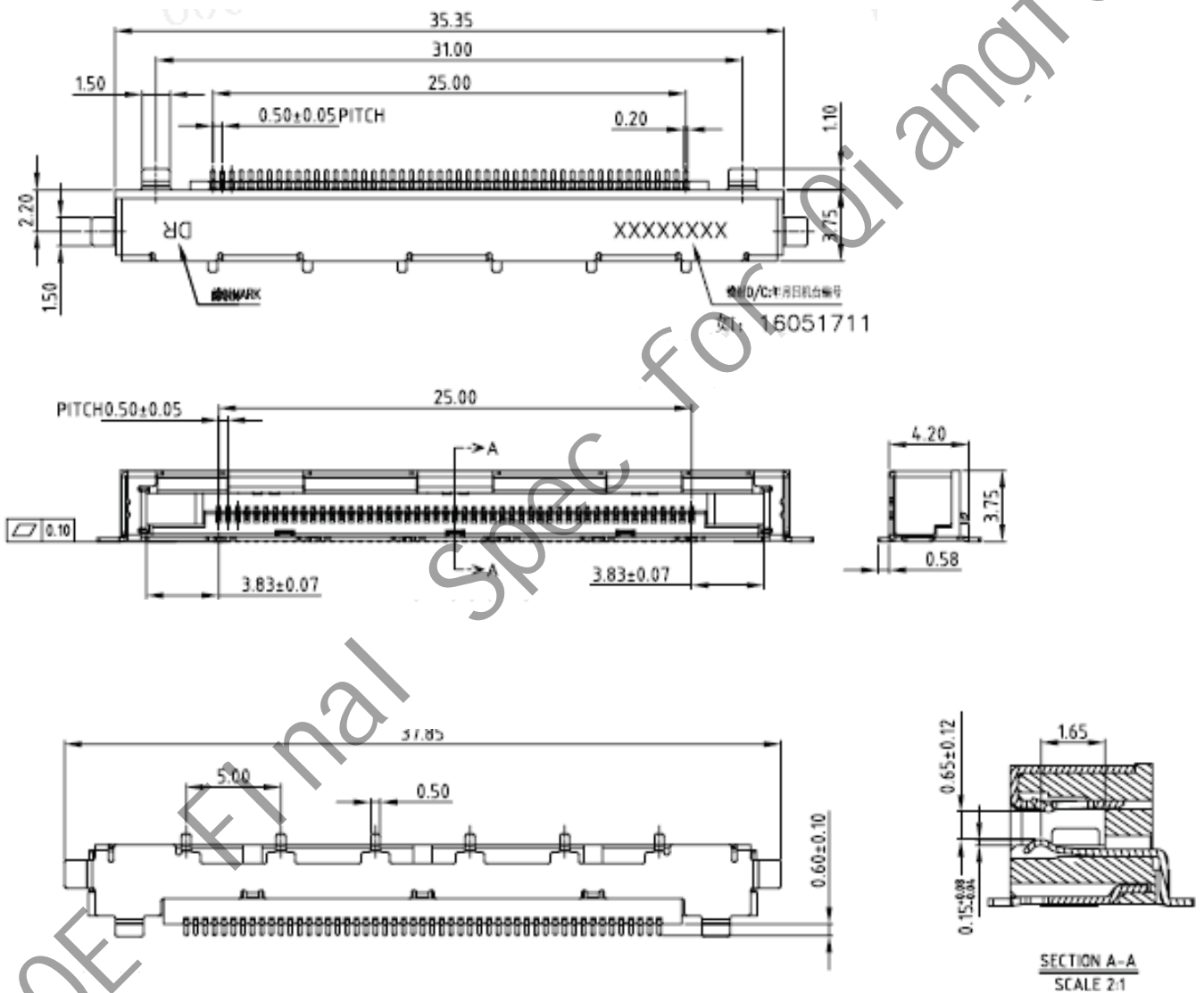
### Rear view of LCM



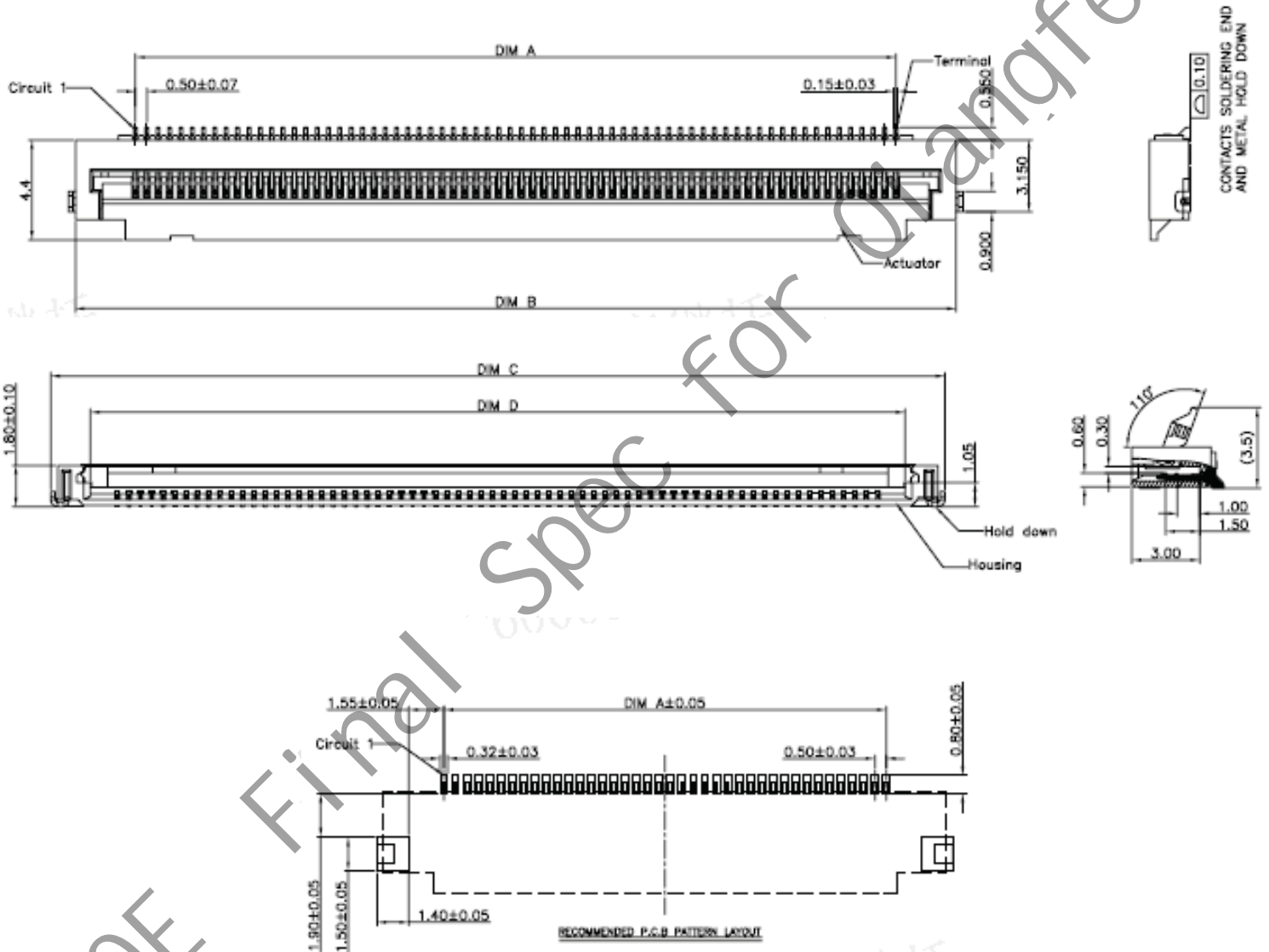
### BIST Pattern

| PT1:Black<br>(2sec) | PT2:White<br>( 2sec) | PT3:Red<br>(2sec) | PT4:Gree<br>n(2sec) | PT5:Blue<br>(2sec) |
|---------------------|----------------------|-------------------|---------------------|--------------------|
|                     |                      |                   |                     |                    |

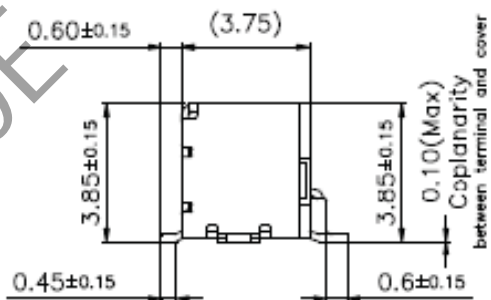
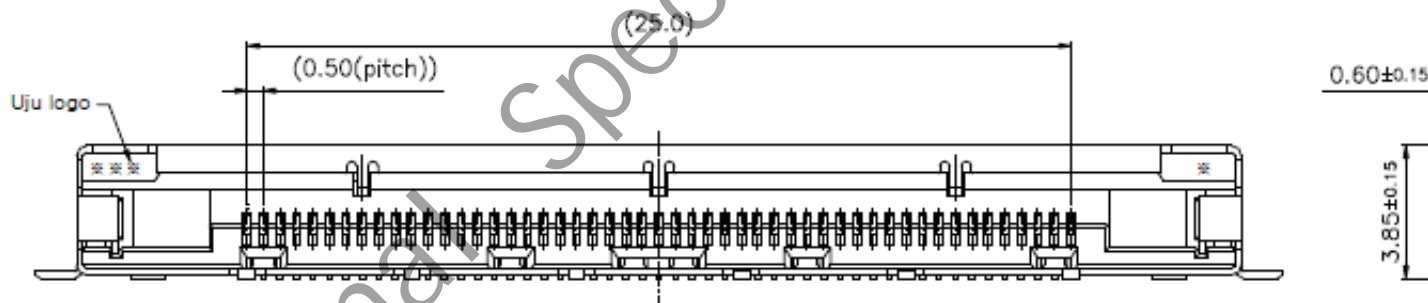
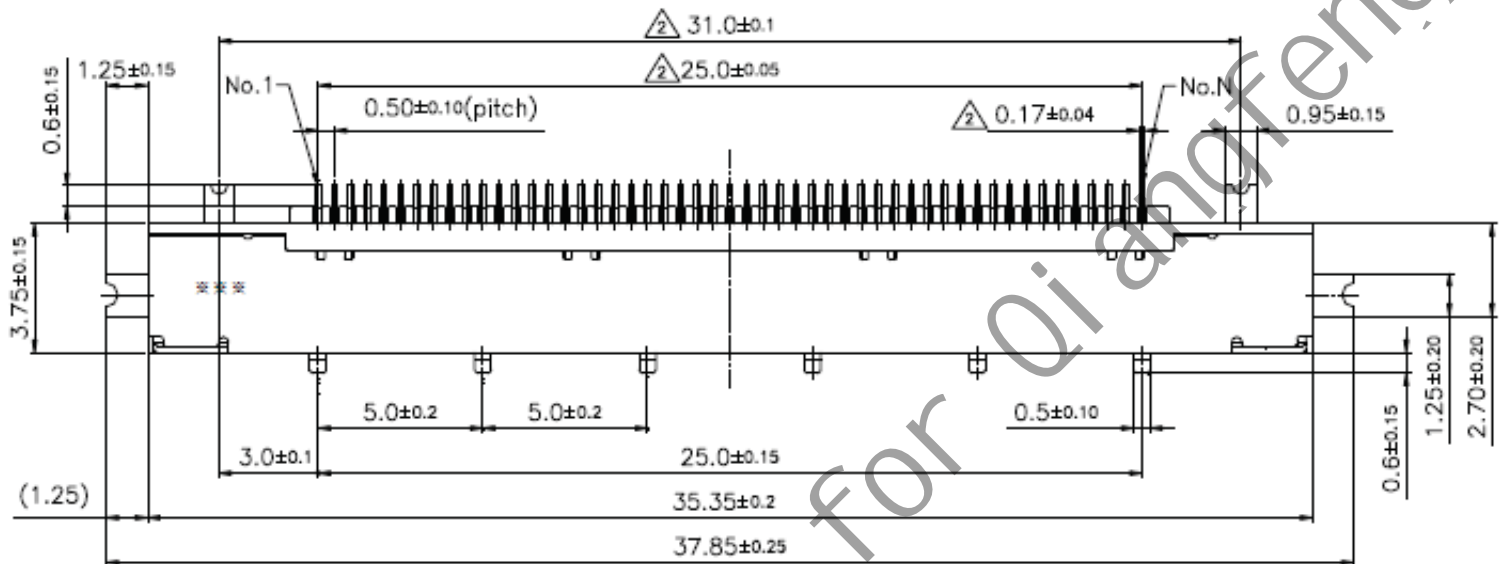
-51 pin LVDS Connector — 0.5Ph H3.75 LVDS(Deren)



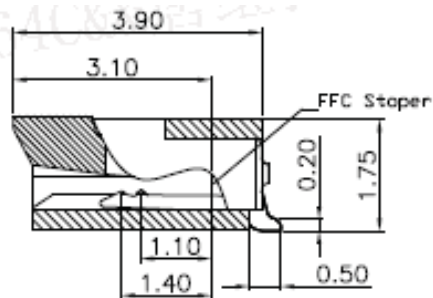
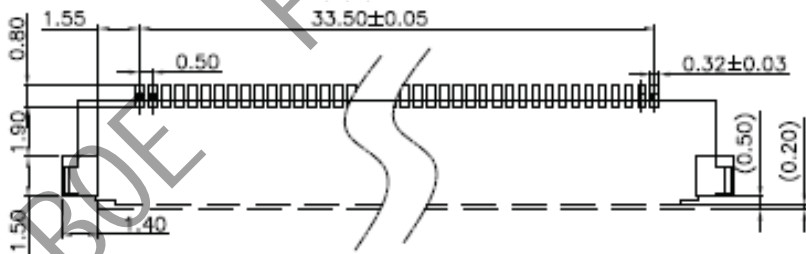
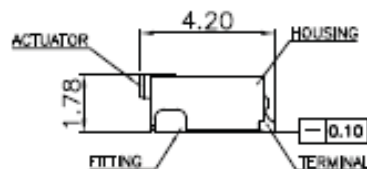
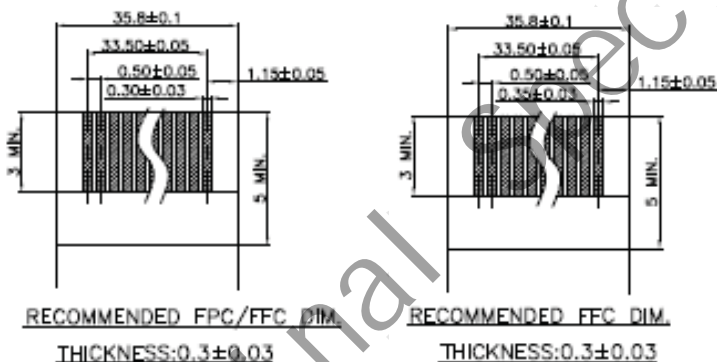
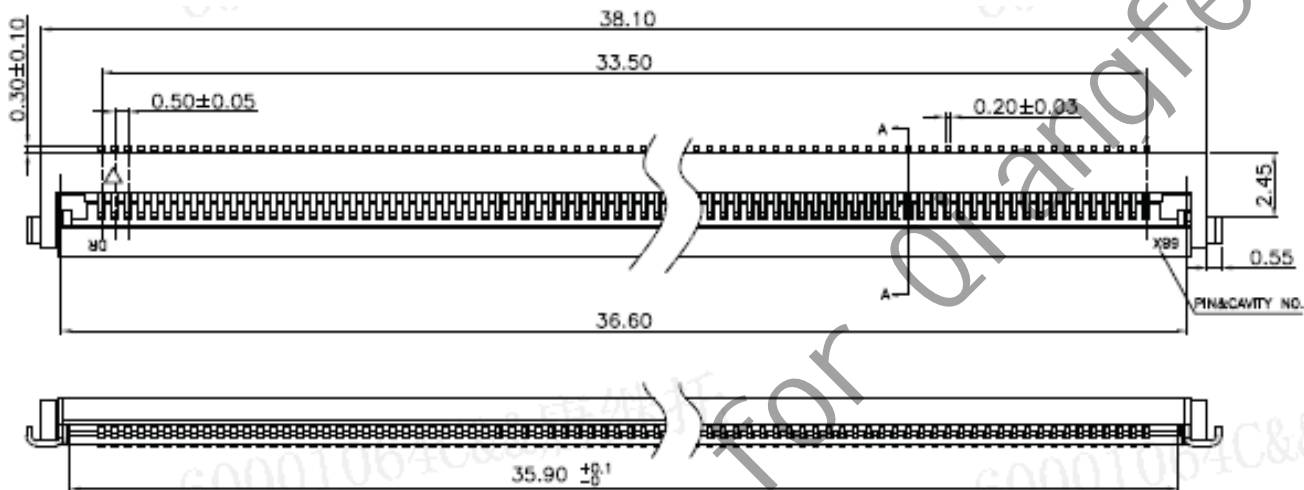
### -51 pin LVDS Connector — PM.FPC.SAFC666801(UJC)



### -51 pin LVDS Connector — IS050-C51B-C39-S(UJU)



- 68 pin FFC Connector :FC0568-L3920W420H180-N02(Deren)



### 4.2 LVDS Interface

- LVDS Receiver : Timing Controller (LVDS Rx merged) / LVDS Data : Pixel Data
- < Table 5. Open Cell Input Connector Pin Configuration >

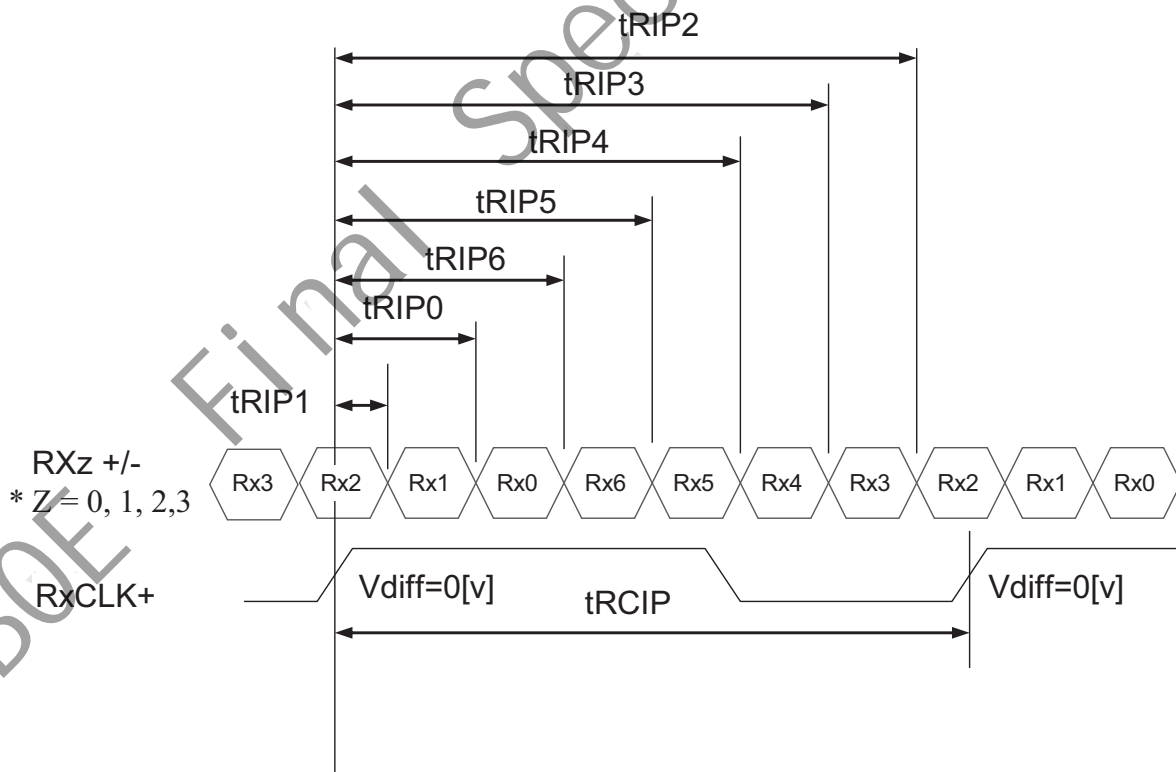
| Channel No. | Data No. | 8-bit LVDS Type |       |
|-------------|----------|-----------------|-------|
|             |          | NS              | JEIDA |
| 0           | Bit-0    | R0              | R2    |
|             | Bit-1    | R1              | R3    |
|             | Bit-2    | R2              | R4    |
|             | Bit-3    | R3              | R5    |
|             | Bit-4    | R4              | R6    |
|             | Bit-5    | R5              | R7    |
|             | Bit-6    | G0              | G2    |
| 1           | Bit-0    | G1              | G3    |
|             | Bit-1    | G2              | G4    |
|             | Bit-2    | G3              | G5    |
|             | Bit-3    | G4              | G6    |
|             | Bit-4    | G5              | G7    |
|             | Bit-5    | B0              | B2    |
|             | Bit-6    | B1              | B3    |
| 2           | Bit-0    | B2              | B4    |
|             | Bit-1    | B3              | B5    |
|             | Bit-2    | B4              | B6    |
|             | Bit-3    | B5              | B7    |
|             | Bit-4    | HS              | HS    |
|             | Bit-5    | VS              | VS    |
|             | Bit-6    | DE              | DE    |
| 3           | Bit-0    | R6              | R0    |
|             | Bit-1    | R7              | R1    |
|             | Bit-2    | G6              | G0    |
|             | Bit-3    | G7              | G1    |
|             | Bit-4    | B6              | B0    |
|             | Bit-5    | B7              | B1    |
|             | Bit-6    | -               |       |

### 4.3 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 6.

<Table 6. LVDS Rx Interface Timing Specification>

| Item         | Symbol | Min              | Typ          | Max              | Unit | Remark |
|--------------|--------|------------------|--------------|------------------|------|--------|
| CLKIN Period | tRCIP  | 10.31            | 13.47(10.78) | 15.87            | nsec |        |
| Input Data 0 | tRIP1  | -0.42            | 0.0          | +0.42            | nsec |        |
| Input Data 1 | tRIP0  | tRCIP/7-0.42     | tRCIP/7      | tRCIP/7+0.42     | nsec |        |
| Input Data 2 | tRIP6  | 2 × tRCIP/7-0.42 | 2 × tRCIP/7  | 2 × tRCIP/7+0.42 | nsec |        |
| Input Data 3 | tRIP5  | 3 × tRCIP/7-0.42 | 3 × tRCIP/7  | 3 × tRCIP/7+0.42 | nsec |        |
| Input Data 4 | tRIP4  | 4 × tRCIP/7-0.42 | 4 × tRCIP/7  | 4 × tRCIP/7+0.42 | nsec |        |
| Input Data 5 | tRIP3  | 5 × tRCIP/7-0.42 | 5 × tRCIP/7  | 5 × tRCIP/7+0.42 | nsec |        |
| Input Data 6 | tRIP2  | 6 × tRCIP/7-0.42 | 6 × tRCIP/7  | 6 × tRCIP/7+0.42 | nsec |        |

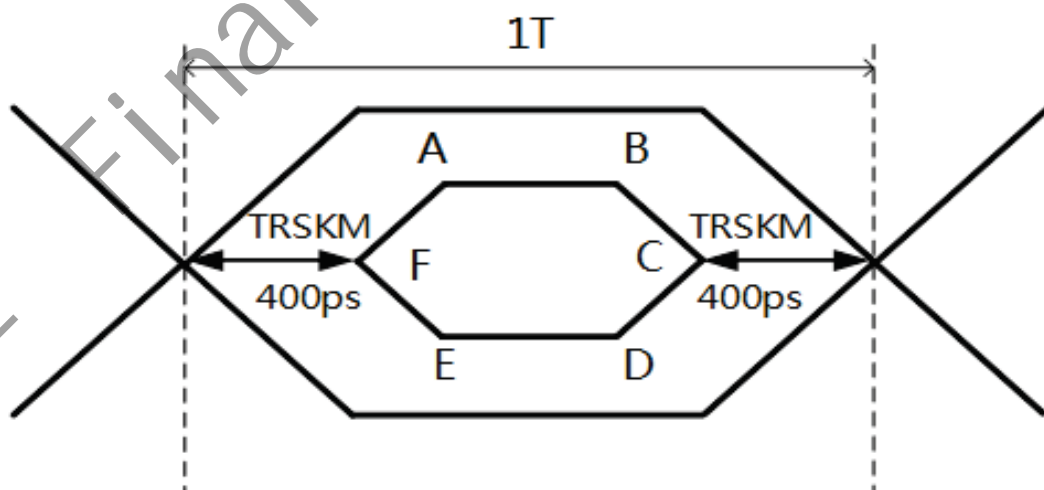


\*  $V_{diff} = (RXz+) - (RXz-), \dots, (RXCLK+) - (RXCLK-)$

### 4.4 LVDS Rx Interface Eye Diagram

< Table 7. LVDS Rx Interface Eye Diagram >

| Symbol | Min | Typ  | Max | Unit | Note |
|--------|-----|------|-----|------|------|
| A      | -   | 100  | -   | mV   |      |
| B      | -   | 100  | -   | mV   |      |
| C      | -   | 0    | -   | mV   |      |
| D      | -   | -100 | -   | mV   |      |
| E      | -   | -100 | -   | mV   |      |
| F      | -   | 0    | -   | mV   |      |



- Notes: 1. Time F to A,B to C,C to D,E to F is 150p second.  
 2. LVDS clock=85Mhz.  
 3. The time A to B=1T-2\*TRSKM-2\*150ps.

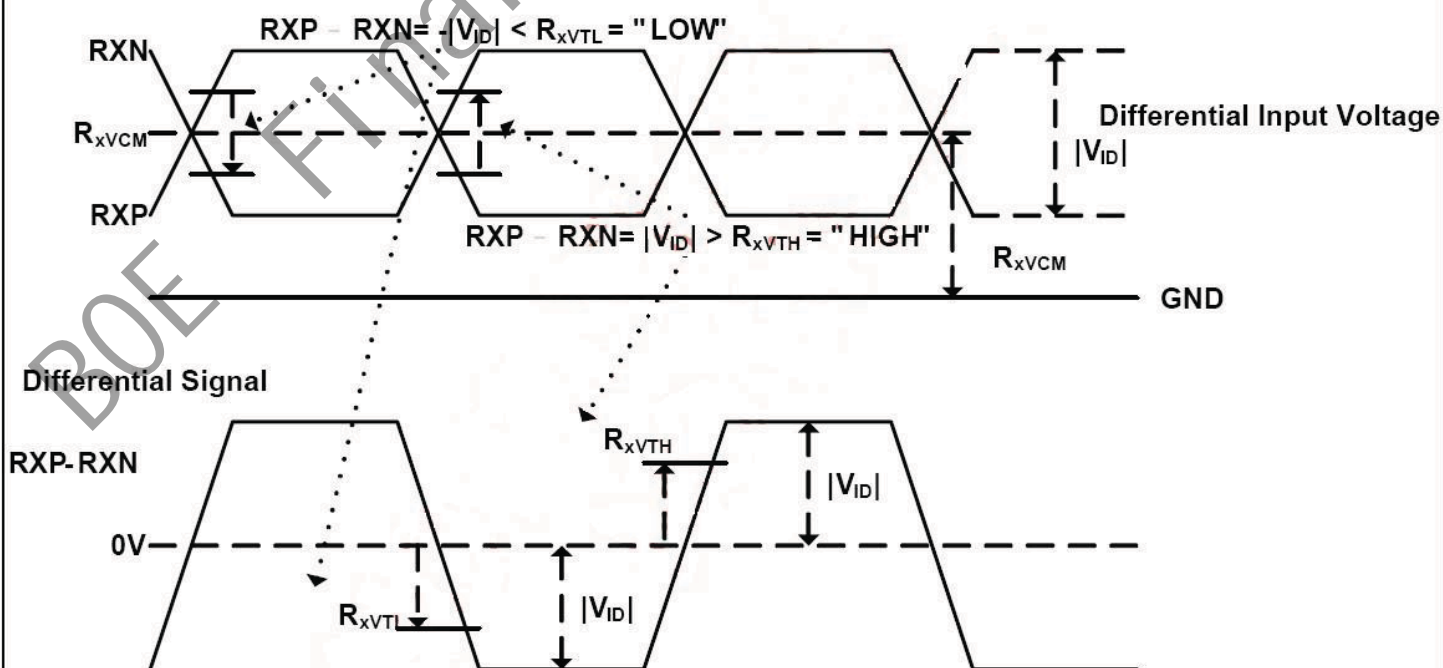


### 4.5 LVDS Receiver Differential Input

< Table 7-1. LVDS Receiver Differential Input >

| Symbol     | Parameter                                 | Min          | Typ | Max                | Unit | Condition         |
|------------|---|--------------|-----|--------------------|------|-------------------|
| $R_{xVTH}$ | Differential input high threshold voltage |              |     | +0.1v              | V    | $R_{xVCM} = 1.2V$ |
| $R_{xVTL}$ | Differential input low threshold voltage  | -0.1V        |     |                    | V    |                   |
| $R_{xVIN}$ | Input voltage range (singled-end)         | 0            |     | 2.4                | V    |                   |
| $R_{xVCM}$ | Differential input common mode voltage    | $ V_{ID} /2$ |     | $2.4 -  V_{ID} /2$ | V    |                   |
| $ V_{ID} $ | Differential input voltage                | 0.1          |     | 0.6                | V    |                   |

#### Single-end Signals



### 5.0 SIGNAL TIMING SPECIFICATION

#### 5.1 Timing Parameters (DE only mode)

< Table 8. Timing Table >

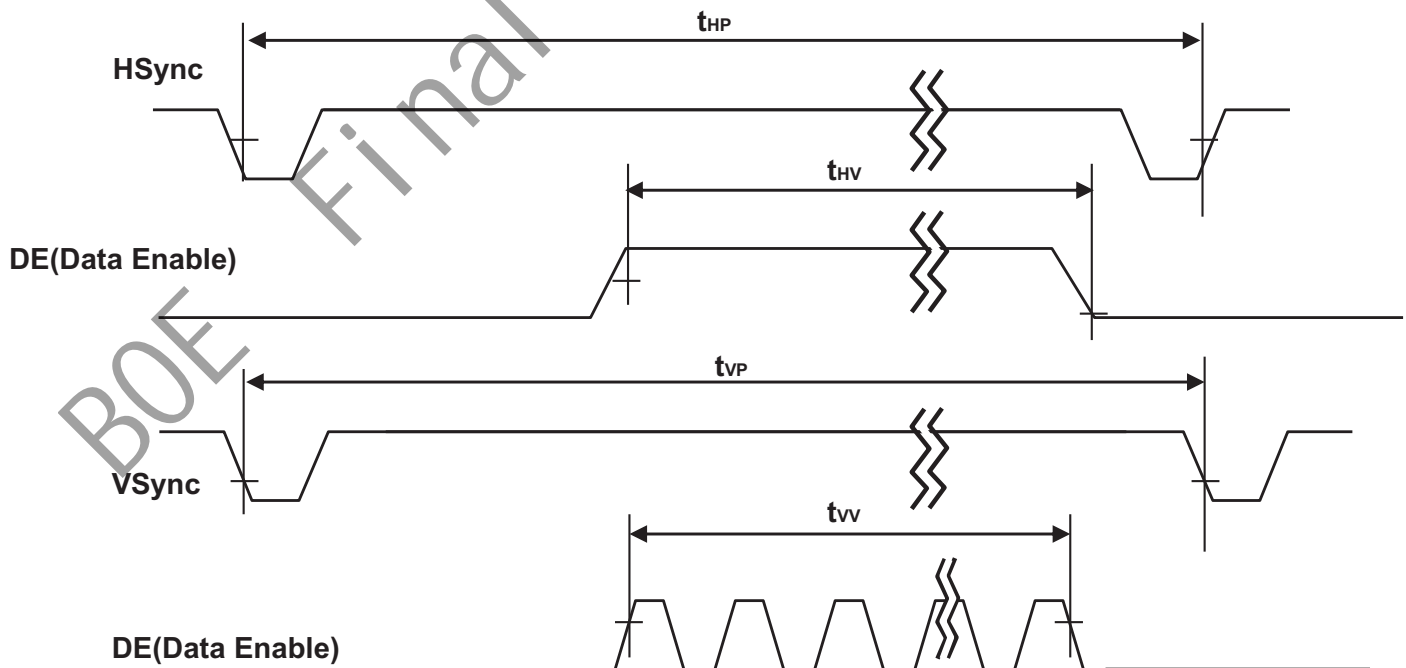
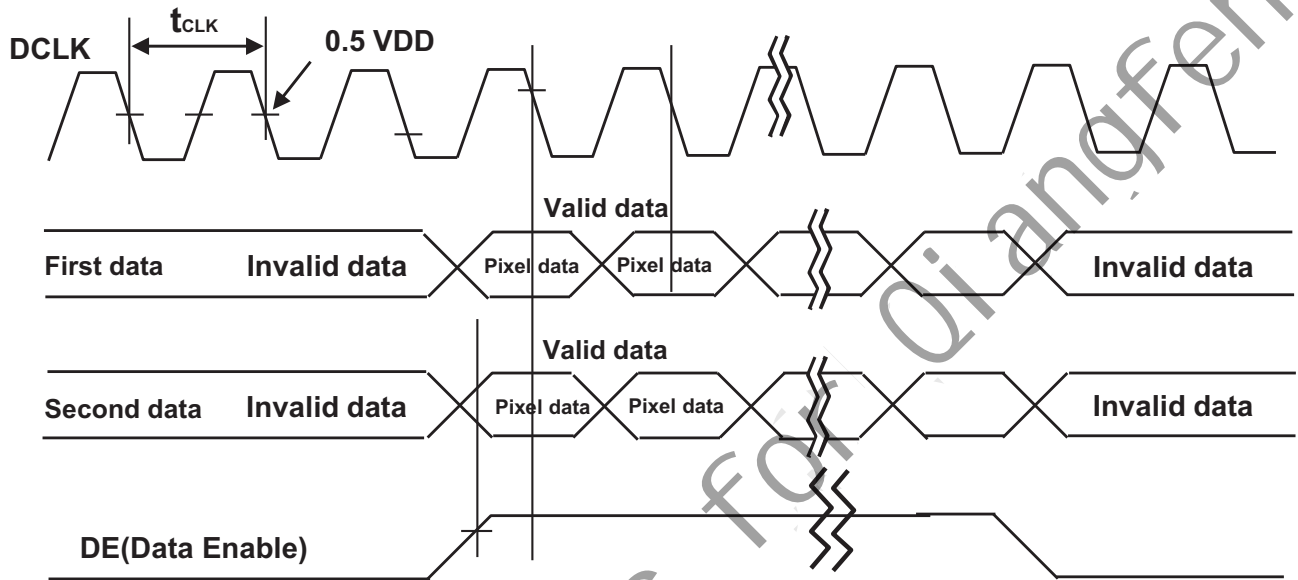
| Item                           |           | Symbols | Min             | Typ   | Max  | Unit  |                  |
|--------------------------------|-----------|---------|-----------------|-------|------|-------|------------------|
| Clock                          | Frequency | 1/Tc    | 60              | 74.25 | 78   | MHz   |                  |
|                                | High Time | Tch     | -               | 4/7Tc | -    |       |                  |
|                                | Low Time  | Tcl     | -               | 4/7Tc | -    |       |                  |
| Frame Period                   |           | Tv      | 1100            | 1125  | 1149 | lines |                  |
|                                |           |         | 48.5            | 60    | 63   | Hz    |                  |
| Horizontal Active Display Term |           | Valid   | t <sub>HV</sub> | -     | 960  | -     | t <sub>CLK</sub> |
|                                |           | Total   | t <sub>HP</sub> | 1060  | 1100 | 1200  | t <sub>CLK</sub> |
| Vertical Active Display Term   |           | Valid   | t <sub>VV</sub> | -     | 1080 | -     | t <sub>HP</sub>  |
|                                |           | Total   | t <sub>VP</sub> | 1100  | 1125 | 1149  | t <sub>HP</sub>  |

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

< Table 9. LVDS Input SSCG >

| Symbol             | Parameter   | Condition  | Min  | Typ   | Max  | Unit |
|--------------------|---|--|------|-------|------|------|
| F                  | LVDS Input frequency                                  | -  | 45   | 74.25 | 85   | MHz  |
| T <sub>LVSK</sub>  | LVDS channel to channel skew                          | F=100MHz<br>V <sub>IC</sub> =1.2V<br>V <sub>ID</sub> =±400mV | -380 | -     | +380 | ps   |
| F <sub>LVMOD</sub> | Modulating frequency of input clock during SSC        |  | -    | -     | 85   | KHz  |
| F <sub>LVDEV</sub> | Maximum deviation of input clock frequency during SSC |  | -3   | -     | +3   | %    |
| T <sub>CY-CY</sub> | Cycle to Cycle jitter                                 |  | -    | -     | 100  | ps   |

### 5.2 Signal Timing Waveform



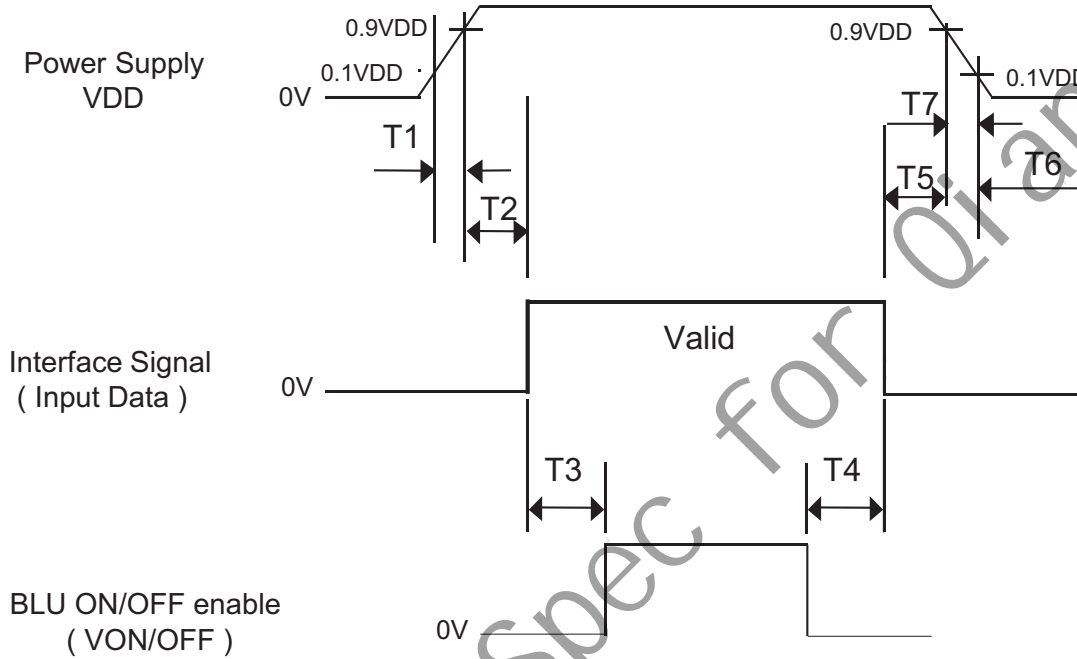
### 5.3 Input Signals, Basic Display Colors and Gray Scale of Colors

< Table 10. Input Signal and Display Color Table >

| Color & Gray Scale  |          | Input Data Signal |    |    |    |    |    |    |    |            |    |    |    |    |    |    |    |           |    |    |    |    |    |    |
|---------------------|----------|-------------------|----|----|----|----|----|----|----|------------|----|----|----|----|----|----|----|-----------|----|----|----|----|----|----|
|                     |          | Red Data          |    |    |    |    |    |    |    | Green Data |    |    |    |    |    |    |    | Blue Data |    |    |    |    |    |    |
|                     |          | R7                | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7         | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7        | B6 | B5 | B4 | B3 | B2 | B1 |
| Basic Colors        | Black    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Blue     | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Green    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Cyan     | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Red      | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Magenta  | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | Yellow   | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | White    | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |
| Gray Scale of Red   | Black    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | 0                 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | Darker   | 0                 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | ↑                 |    |    |    |    |    |    |    | ↑          |    |    |    |    |    |    |    | ↑         |    |    |    |    |    |    |
|                     | ▽        | ↓                 |    |    |    |    |    |    |    | ↓          |    |    |    |    |    |    |    | ↓         |    |    |    |    |    |    |
|                     | Brighter | 1                 | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | ▽        | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Red      | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  | 0  |
| Gray Scale of Green | Black    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | Darker   | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | ↑                 |    |    |    |    |    |    |    | ↑          |    |    |    |    |    |    |    | ↑         |    |    |    |    |    |    |
|                     | ▽        | ↓                 |    |    |    |    |    |    |    | ↓          |    |    |    |    |    |    |    | ↓         |    |    |    |    |    |    |
|                     | Brighter | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | ▽        | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | Green    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
| Gray Scale of Blue  | Black    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 1  |    |
|                     | Darker   | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 1  |    |
|                     | △        | ↑                 |    |    |    |    |    |    |    | ↑          |    |    |    |    |    |    |    | ↑         |    |    |    |    |    |    |
|                     | ▽        | ↓                 |    |    |    |    |    |    |    | ↓          |    |    |    |    |    |    |    | ↓         |    |    |    |    |    |    |
|                     | Brighter | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 0  |
|                     | ▽        | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 0  |
|                     | Blue     | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |
| Gray Scale of White | Black    | 0                 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 0  |    |
|                     | △        | 0                 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0         | 0  | 0  | 0  | 0  | 1  |    |
|                     | Darker   | 0                 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0         | 0  | 0  | 0  | 0  | 1  |    |
|                     | △        | ↑                 |    |    |    |    |    |    |    | ↑          |    |    |    |    |    |    |    | ↑         |    |    |    |    |    |    |
|                     | ▽        | ↓                 |    |    |    |    |    |    |    | ↓          |    |    |    |    |    |    |    | ↓         |    |    |    |    |    |    |
|                     | Brighter | 1                 | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 1          | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 1         | 1  | 1  | 1  | 1  | 0  | 1  |
|                     | ▽        | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1         | 1  | 1  | 1  | 1  | 1  | 0  |
|                     | White    | 1                 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1          | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1         | 1  | 1  | 1  | 1  | 1  | 1  |

### 5.4 Power Sequence

To prevent a latch-up or DC operation of the Open Cell, the power on/off sequence shall be as shown in below



< Table 11. Sequence Table >

| Parameter | Values |     |     | Units |
|-----------|--------|-----|-----|-------|
|           | Min    | Typ | Max |       |
| T1        | 0.5    | -   | 20  | ms    |
| T2        | 10     | -   | 100 | ms    |
| T3        | 200    | -   | -   | ms    |
| T4        | 200    | -   | -   | ms    |
| T5        | 0      | -   | -   | ms    |
| T6        | 1      | -   | -   | s     |

- Notes:
1. Back Light must be turn on after power for logic and interface signal are valid.
  2. Even though T1 is out of SPEC, it is still ok if the inrush current of VDD is below the limit.
  3. When  $VDD < 0.9VDD(Typ.)$ , Power off.
  4. T7 decreases smoothly, if there were rebounding voltage, it must smaller than 5 volts.

### 6.0 OPTICAL SPECIFICATIONS

The test of optical specifications shall be measured in a dark room (ambient luminance  $\leq 1$  lux and temperature  $= 25 \pm 2^\circ\text{C}$ ) with the equipment of Luminance meter system (Goniometer system and PR730) and test unit shall be located at an approximate distance 180cm 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. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 12.0V at  $25^\circ\text{C}$ . Optimum viewing angle direction is 6 'clock.

< Table 12. Optical Table >

[VDD = 12.0V, Frame rate = 60Hz, Ta = 25  $\pm$   $2^\circ\text{C}$ ]

| Parameter             |            | Symbol        | Condition  | Min            | Typ    | Max            | Unit | Remark |
|-----------------------|------------|---------------|--|----------------|--------|----------------|------|--------|
| Viewing Angle         | Horizontal | $\theta_3$    | CR > 10  |                | 89     |                | Deg. | Note 1 |
|                       |            | $\theta_9$    |  |                | 89     |                | Deg. |        |
|                       | Vertical   | $\theta_{12}$ |  |                | 89     |                | Deg. |        |
|                       |            | $\theta_6$    |  |                | 89     |                | Deg. |        |
| Contrast ratio        |            | CR            |  | 800:1          | 1200:1 | -              |      | Note 2 |
| Reproduction of color | White      | $W_x$         | $\theta = 0^\circ$<br>(Center)<br>Normal<br>Viewing<br>Angle | TYP.<br>- 0.03 | 0.277  | TYP.<br>+ 0.03 |      | Note 3 |
|                       |            | $W_y$         |  |                | 0.274  |                |      |        |
|                       | Red        | $R_x$         |  |                | 0.645  |                |      |        |
|                       |            | $R_y$         |  |                | 0.334  |                |      |        |
|                       | Green      | $G_x$         |  |                | 0.305  |                |      |        |
|                       |            | $G_y$         |  |                | 0.608  |                |      |        |
|                       | Blue       | $B_x$         |  |                | 0.153  |                |      |        |
|                       |            | $B_y$         |  |                | 0.050  |                |      |        |
| Response Time         | G to G     | $T_g$         |  | -              | 8      | 10             | ms   | Note 4 |
| Gamma Scale           |            |               |  | 2.0            | 2.2    | 2.4            |      |        |
| Cell Transmittance    |            |               |  | 5.9            | 6.3    |                | %    | Note 5 |

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of  $\theta = 0^\circ$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See Figure 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. The color chromaticity coordinates specified in Table 9. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel. The BLU is used by BOE.
4. Response time Tg is the average time required for display transition by switching the input signal as below table and is based on Frame rate fV =60Hz to optimize. Each time in below table is defined as Figure 2 and shall be measured by switching the

| Measured Response Time | Target |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
|------------------------|--------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                        | 0      | 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 143 | 159 | 175 | 191 | 207 | 223 | 239 | 255 |
| 0                      |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 15                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 31                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 47                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 63                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 79                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 95                     |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 111                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 127                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 143                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 159                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 175                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 191                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 207                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 223                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 239                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |
| 255                    |        |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |

5. Definition of Transmittance (T%) :  
Module is with white(L255) signal input

$$\text{Transmittance} = \frac{\text{Luminance of LCD Module}}{\text{Luminance of BLU}} \times 100 \%$$

## 7.0 MECHANICAL CHARACTERISTICS

### 7.1 Dimensional Requirements

Figure 3(located in Appendix) shows mechanical outlines for the model DV430FHB-N10. Other parameters are shown in Table 13.

< Table 13. Dimensional Parameters >

| Parameter        | Specification                                | Unit   |
|------------------|--|--------|
| Active area      | 940.896 (H) × 529.254(V)                     | mm     |
| Pixel pitch      | 163.35 (H) × 490.05(V)                       | um     |
| Number of pixels | 1920(H) × 1080(V) (1 pixel = R + G + B dots) | pixels |
| Weight           | 1510(Typ.)                                   | g      |

### 7.2 Surface Treatment and Polarizer Hardness

The surface of the LCD has an Low haze coating to Reduce scratching. Front Polarizer hardness is at least 3H.



## 8.0 RELIABILITY TEST

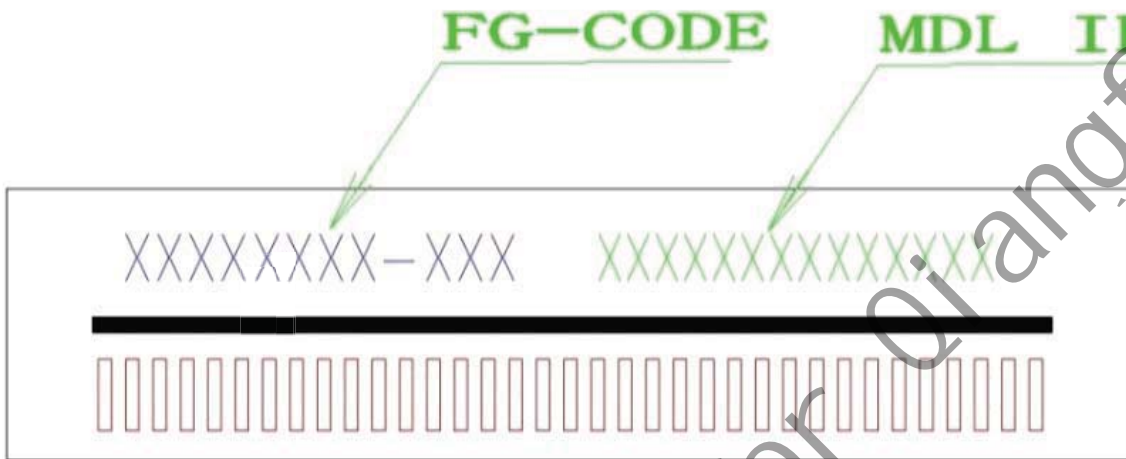
The Reliability test items and its conditions are shown in below.

< Table 14. Reliability Test Parameters >

| No | Test Items                                      | Conditions                              |
|----|---|---|
| 1  | High temperature storage test                   | Ta = 60 °C, 240 hrs                     |
| 2  | Low temperature storage test                    | Ta = -20 °C, 240 hrs                    |
| 3  | High temperature & high humidity operation test | Ta = 50 °C, 80%RH, 240hrs               |
| 4  | High temperature operation test                 | Ta = 50 °C, 240hrs                      |
| 5  | Low temperature operation test                  | Ta = -5 °C, 240hrs                      |
| 6  | Thermal shock                                   | Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle |

This test condition is based on BOE module.

### 9.0 PRODCUT SERIAL NUMBER



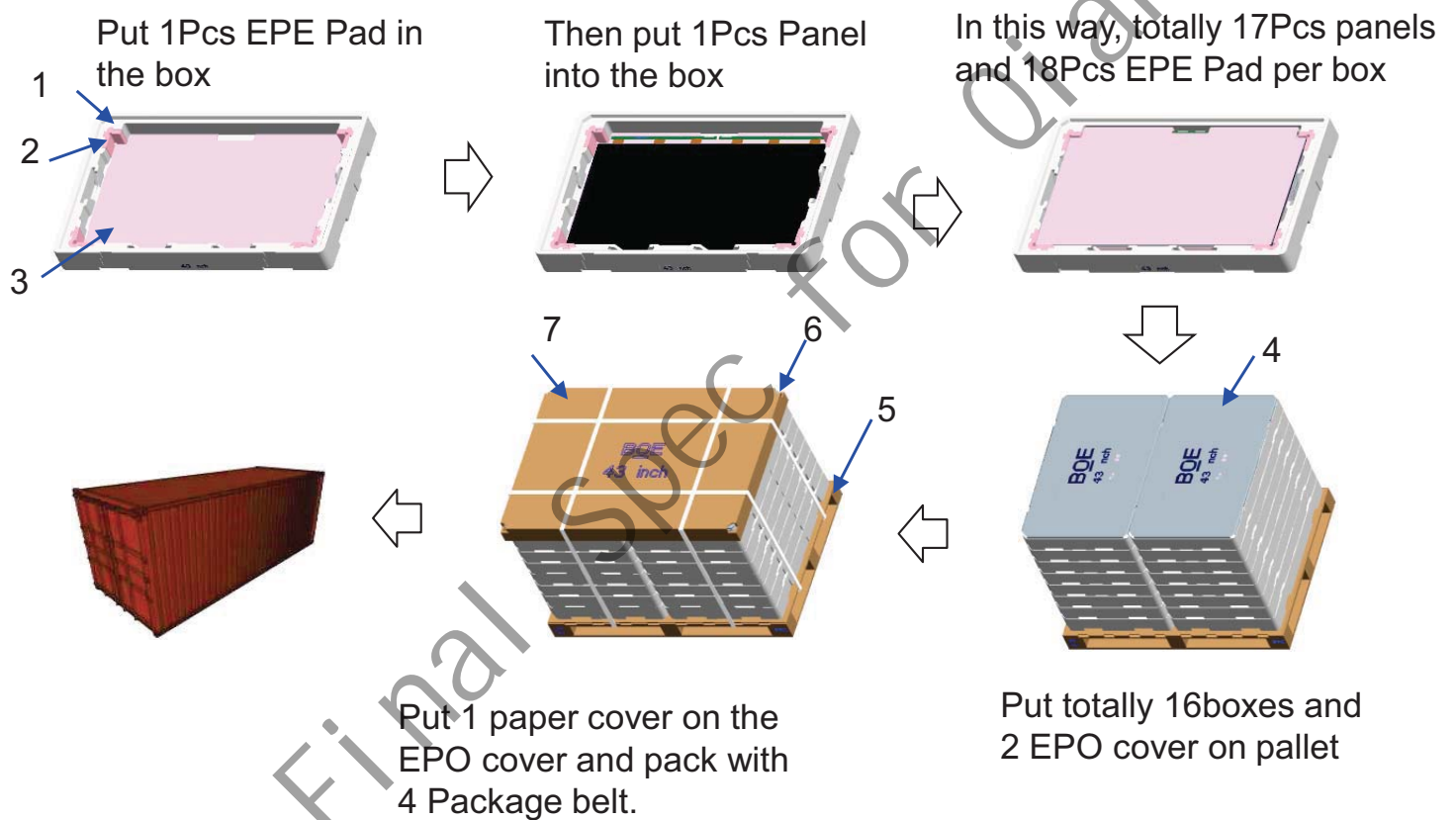
MDL ID Naming Rule:

| Digit<br>Code | 1               | 2 | 3     | 4    | 5    | 6 | 7     | 8   | 9 | 10 | 11 | 12                     | 13 | 14 | 15 | 16 | 17 |
|---------------|-----------------|---|-------|------|------|---|-------|---|---|----|----|------------------------|----|----|----|----|----|
| Code          | S               | L | S     | 9    | 2    | 0 | 3     | 5   | 9 | 4  | 2  | 0                      | A  | A  | 0  | 0  | 0  |
| Description   | Model Code /GBN |   | Grade | Line | Year |   | Month | Model Extension Code (Last 4 Digits Of FG-CODE) |   |    |    | Serial No 00001-ZZZZZZ |    |    |    |    |    |

### 10.0 PACKING INFORMATION

BOE provides the standard shipping container for customers, unless customer specifies their packing information. The standard packing method and Barcode information are shown in below.

#### 10.1 Packing Order



**Cautions:** When transferring in warehouse or factory, the arm length of electric forklift or hand pallet truck must be longer than the pallet.

| No. | Description | Material        |
|-----|-------------|-----------------|
| 1   | Bottom      | EPO             |
| 2   | Cushion     | EPP             |
| 3   | Pad         | EPE             |
| 4   | Cover       | EPO             |
| 5   | Pallet      | Wood+ Paper+ PE |
| 6   | Band        | PP              |
| 7   | Cover       | Paper           |

### 10.2 Packing Note

- Box Dimension : 1100(±3)mmL × 705(±2)mmW × 127(±1.5)mmH
- Package Quantity in one Box : 17pcs

### 10.3 Box Label

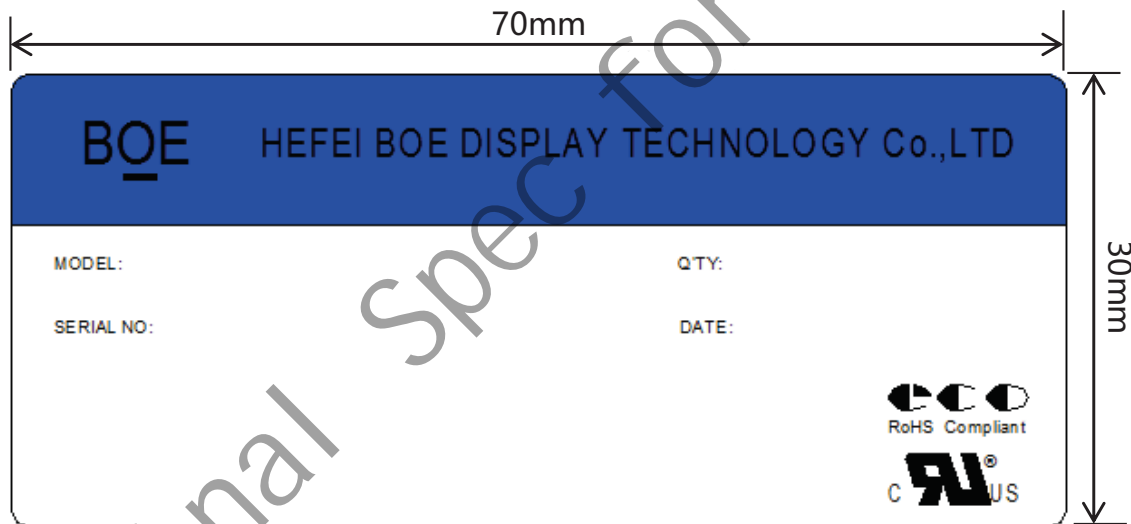
- Label Size : 70 mm (L) × 30 mm (W)
- Contents

Model : DV430FHB-N10 ( FG Code of Product )

Q`ty : 17 Open Cell in one box.

Serial No. : Box Serial No.

Date : Packing Date



#### Box ID Naming Rule:

| Digit Code  | 1            | 2 | 3     | 4    | 5    | 6 | 7      | 8             | 9                         | 10 | 11 | 12 | 13 |
|-------------|--------------|---|-------|------|------|---|--------|---------------|---------------------------|----|----|----|----|
| Code        | S            | L | S     | 9    | 2    | 0 | 3      | 5             | 9                         | 4  | 2  | 0  | 0  |
| Description | Products GBN |   | Grade | Line | Year |   | Mon th | Revision Code | Serial No<br>00001-ZZZZZZ |    |    |    |    |

### 10.4 Packing Material ESD Specification

| Item                                      | SPEC  |
|---|---|
| Surface Resistance<br>[10 <sup>n</sup> Ω] | Control by 10 <sup>6</sup> ~10 <sup>11</sup><br>- Box, Spacer |

## 11.0 HANDLING & CAUTIONS

### (1) Cautions when taking out the Panel

- Pick the pouch only, when taking out panel from a shipping package.

### (2) Cautions for handling the panel

- As the electrostatic discharges may break the LCD panel, handle the LCD panel with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD panel should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD panel is operating.
- Put the panel display side down on a flat horizontal plane.
- Handle connectors and cables with care.

### (3) Cautions for the operation

- When the panel is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the panel would be damaged.

### (4) Cautions for the atmosphere

- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD panel in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

### (5) Cautions for the panel characteristics

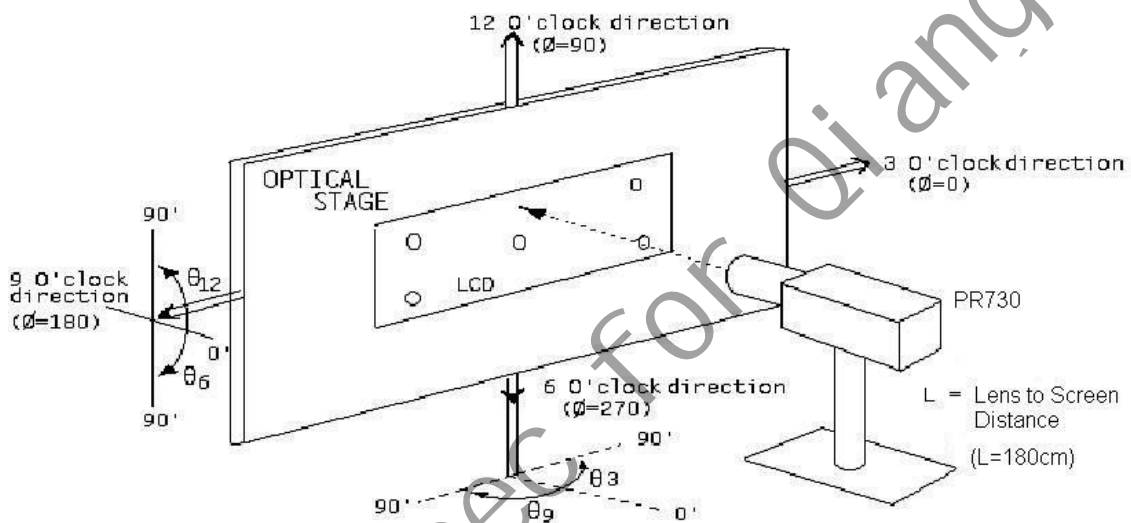
- Do not apply fixed pattern data signal to the LCD panel at product aging.
- Applying fixed pattern for a long time may cause image sticking.

### (6) Other cautions

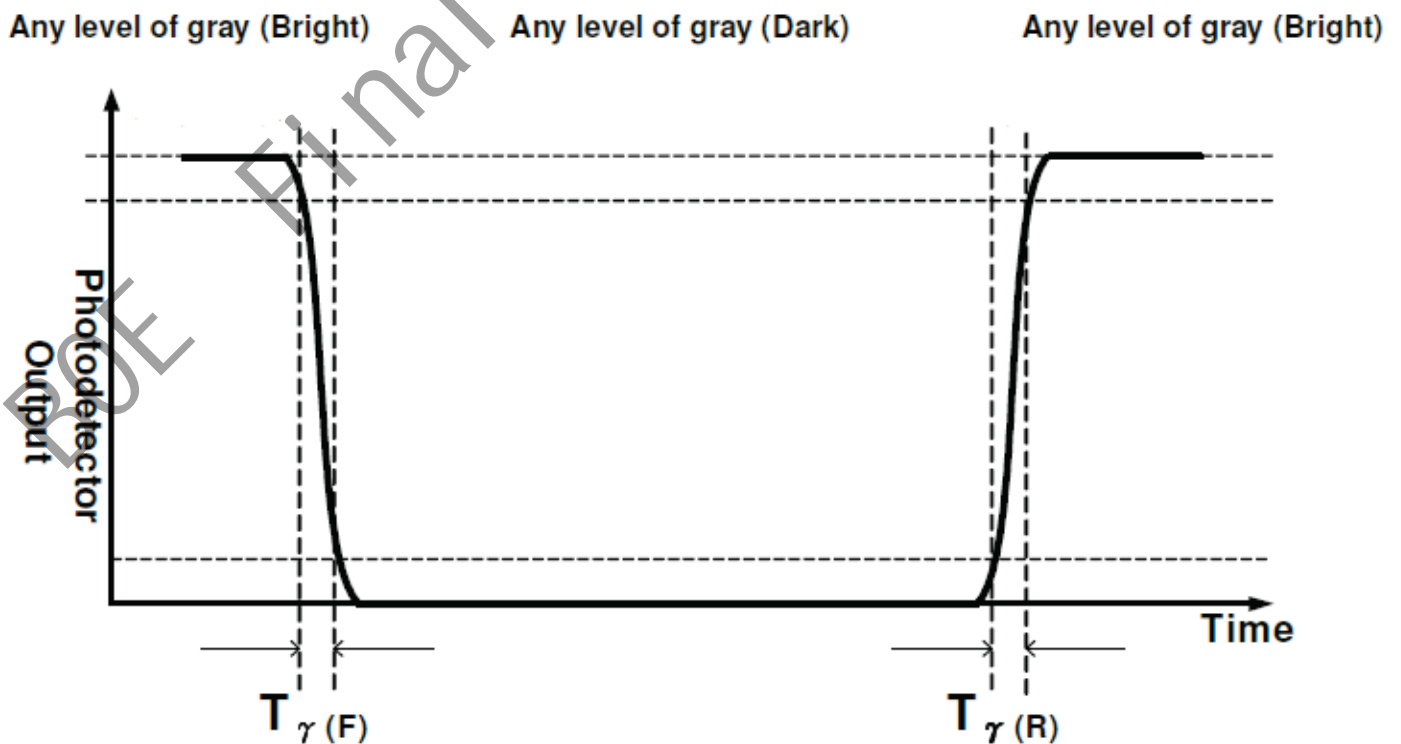
- Do not disassemble and/or re-assemble LCD panel.
- Do not re-adjust variable resistor or switch etc.
- When returning the panel for repair or etc., Please pack the panel not to be broken. We recommend to use the original shipping packages.

## 12.0 APPENDIX

< Figure 1. Measurement Set Up >



< Figure 2. Response Time Testing >



< Figure 3. TFT-LCD Open Cell Outline Dimensions (Front View) >

