

# TFT-DISPLAY DATASHEET

## DATA IMAGE

Model: FG0700GYDSSWBGT1

### BRIEF SPEC.:

Main Feature

Landscape Type

Anti Glare

Normali Withe

Active Screen Area

152.4 x 91.44(mm)

Diagonal | Format

7" | 15:9

Resolution

800 X 480

Colors

8Bit

Backlight

Normally White

Brightness

800 cd/m<sup>2</sup>

LED Life Time

T.B.D

Interface

RGB

Viewing Angle

70/70 L/R 50/60

Touchscreen

No

Power Supply

3.3 V (Typ.)

Module Outline

169.8 x 106 x 11.89 (mm)

Operation Temperature

-20 ... +70 °C

Storage Temperature

-30... +80 °C

Surface Treatment

Anti-Glare Hard Coating (3H)



# DATA IMAGE CORPORATION

## TFT Module Specification

Preliminary

ITEM NO.: FG0700GYDSSWBGT1

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|                    |               |              |               |              |
|--------------------|---------------|--------------|---------------|--------------|
| Customer Companies | QA Approval   | QA Check     | R&D Approval  | R&D Check    |
|                    | <i>pretty</i> | <i>Seven</i> | <i>Gromer</i> | <i>Lisa</i>  |
| Approved by        | Version:      | Issued Date: | Sheet Code:   | Total Pages: |
|                    | 1             | 17/FEB/16'   |               | 26           |



### 3. GENERAL SPECIFICATIONS

| Parameter   | Specifications                   | Unit |
|---|----------------------------------|------|
| Screen Size   | 7 (diagonal)                     | inch |
| Display Format  | 800(H) x (R,G,B) x 480(V)        | dot  |
| Active Area   | 152.4(H) x 91.44(V)              | mm   |
| Dot Pitch   | 0.1905 (H) x 0.1905 (V)          | mm   |
| Pixel Configuration   | Stripe                           |      |
| Outline Dimension   | 169.8(W) x 106(H) x 11.89 (D)    | mm   |
| Surface treatment   | Anti-glare and hard coating (3H) |      |
| Back-light  | LED                              |      |
| Display mode  | Normally white                   |      |
| Weight  | TBD                              | g    |
| View Angle direction  | 6 o'clock                        |      |
| Our components and processes are compliant to RoHS and REACH standard |                                  |      |

### 4. ABSOLUTE MAXIMUM RATINGS

GND=0V

| Parameter               | Symbol        | MIN.                      | MAX.    | Unit | Remark          |
|-------------------------|---------------|---------------------------|---------|------|-----------------|
| Digital Power Voltage 1 | VCC           | -0.3                      | 7       | V    | Ta=25°C         |
| Digital Power Voltage 2 | VDDG          | -0.3                      | 7       | V    |                 |
| Analog Power Voltage    | AVDD          | -0.3                      | 13.5    | V    |                 |
| Gamma Voltage           | V1, V5        | 0.4AVDD                   | AVDD    | V    |                 |
| Gamma Voltage           | V6, V10       | -0.3                      | 0.6AVDD | V    |                 |
| Gate On Voltage         | VGH           | -0.3                      | 42      | V    |                 |
| Gate Off Voltage        | VGL           | VGH-42                    | 0.3     | V    |                 |
| Operating temperature   | Top           | -20                       | 70      | °C   | Module surface* |
| Storage temperature     | Tst           | -30                       | 80      | °C   | -               |
| Humidity                | Operation     | 20%~90% relative humidity |         |      | Ta<=60°C        |
|                         | Non Operation | 5%~90% relative humidity  |         |      | Ta<=60°C        |

### 5. ELECTRICAL CHARACTERISTICS

#### 5.1 Operating Conditions

GND=0V, fH=31.5KHz, fV=60Hz, fCLK=33.26MHz, Ta=25°C

| Parameter               | Symbol          | MIN.               | Typ. | MAX.               | Unit | Remark |
|-------------------------|-----------------|--------------------|------|--------------------|------|--------|
| Digital Power Voltage 1 | VCC             | 3.0                | 3.3  | 3.6                | V    |        |
| Digital Power Voltage 2 | VDDG            | 3.0                | 3.3  | 3.6                | V    |        |
| Analog Power Voltage    | AVDD            | 11.5               | 12   | 12.5               | V    |        |
| Gate On Power Voltage   | VGH             | 15                 | 16   | 17                 | V    |        |
| Gate Off Power Voltage  | VGL             | -8                 | -7   | -6                 | V    |        |
| Common Power Voltage    | VCOM            | 4.2                | 4.7  | 5.2                | V    |        |
| Input H/L level voltage | V <sub>IH</sub> | 0.7V <sub>cc</sub> | --   | V <sub>cc</sub>    | V    |        |
|                         | V <sub>IL</sub> | 0                  | --   | 0.3V <sub>cc</sub> | V    |        |

### 5.2 Current consumption

GND=0V, f<sub>H</sub>=31.5KHz, f<sub>V</sub>=60Hz, f<sub>CLK</sub>=33.26MHz, T<sub>a</sub>=25°C

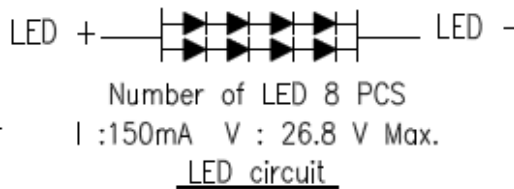
| Parameter          | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|--------------------|--------|-----------|------|------|------|------|--------|
| Current for driver | IGH    | VGH=16V   | -    | 0.2  | 0.4  | mA   |        |
|                    | IGL    | VGL=-7V   | -    | 0.2  | 0.4  | mA   |        |
|                    | IVCC   | VCC=3.3V  | -    | 25   | 35   | mA   |        |
|                    | IVDDG  | VDDG=3.3V | -    | 50   | 100  | μA   |        |
|                    | IAVDD  | AVDD=12V  | -    | 25   | 35   | mA   |        |

### 5.3 Backlight Driving Consumption

T<sub>a</sub>=25°C

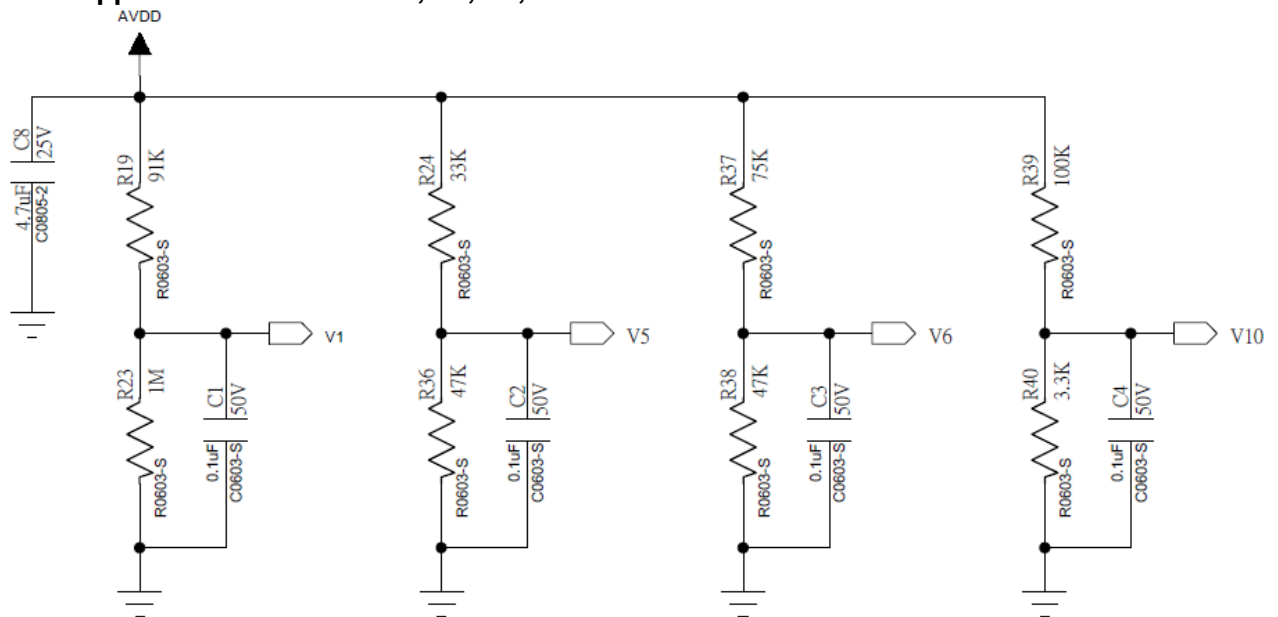
| Parameter          | Symbol         | Min.   | Typ. | Max. | Unit | Remark |
|--------------------|----------------|--------|------|------|------|--------|
| LED voltage        | V <sub>L</sub> | -      | 26.8 | -    | V    |        |
| LED current        | I <sub>L</sub> | -      | 150  | -    | mA   | total  |
| LED dice life time |                | T.B.D. | -    | -    | hr   | Note2  |

Note1 : LED circuit



Note2 : The "LED dice life time" is defined as the brightness decrease to 50% original brightness that the ambient temperature is 18°C ~28°C and LED dice current=75mA.

### 5.4 Application Circuit for V1, V5, V6, V10



## 6. INPUT SIGNAL CHARACTERISTICS

### 6.1 AC Characteristics

#### 6.1.1 AC Electrical Characteristics

| ITEM            | SYMBOL    | MIN. | TYP. | MAX. | UNIT |
|-----------------|-----------|------|------|------|------|
| HS setup time   | $T_{hst}$ | 6    | -    | -    | ns   |
| HS hold time    | $T_{hhd}$ | 6    | -    | -    | ns   |
| VS setup time   | $T_{vst}$ | 6    | -    | -    | ns   |
| VS hold time    | $T_{vhd}$ | 6    | -    | -    | ns   |
| Data setup time | $T_{dsu}$ | 6    | -    | -    | ns   |
| Data hold time  | $T_{dhd}$ | 6    | -    | -    | ns   |
| DE setup time   | $T_{esu}$ | 6    | -    | -    | ns   |

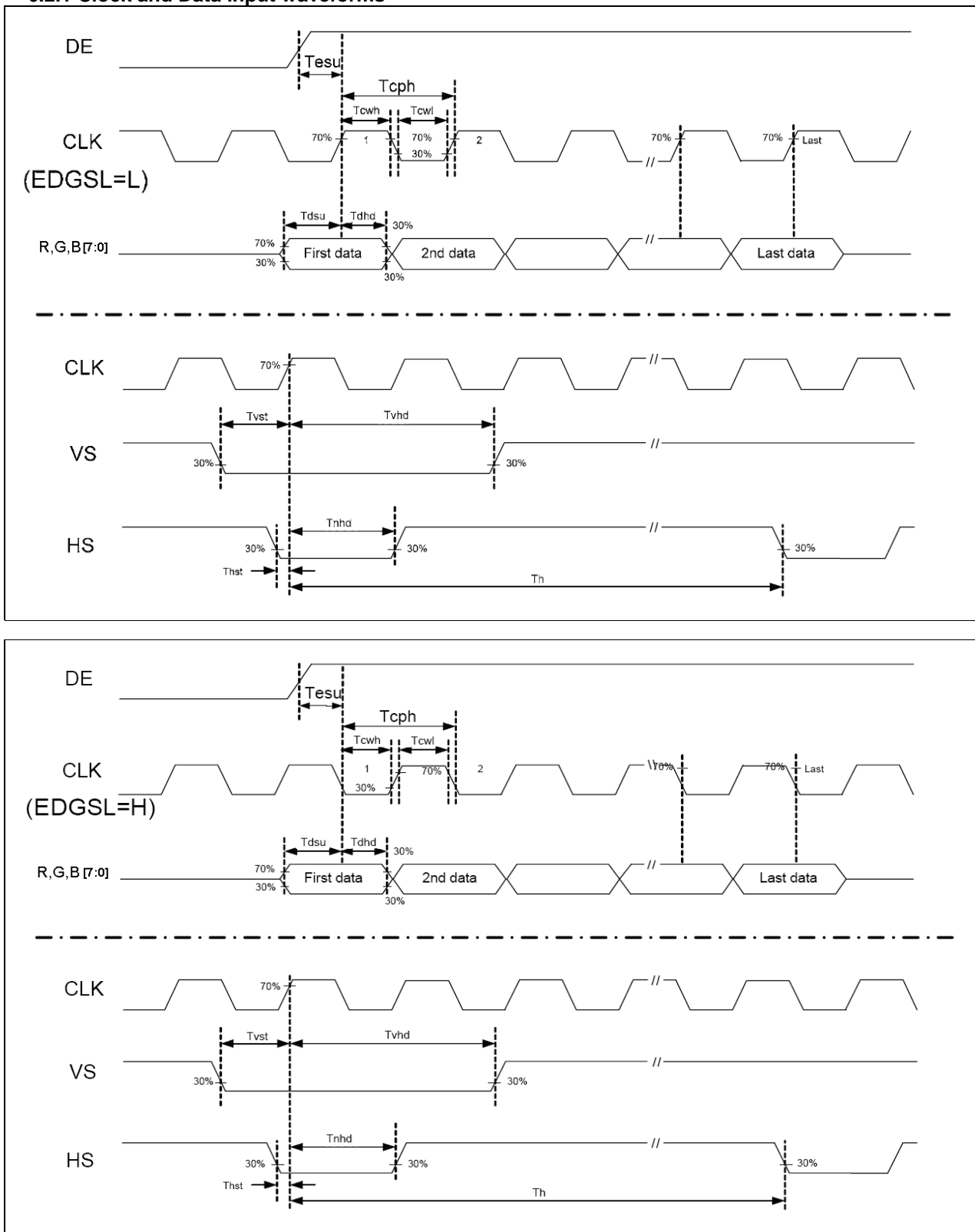
#### 6.1.2 Resolution :

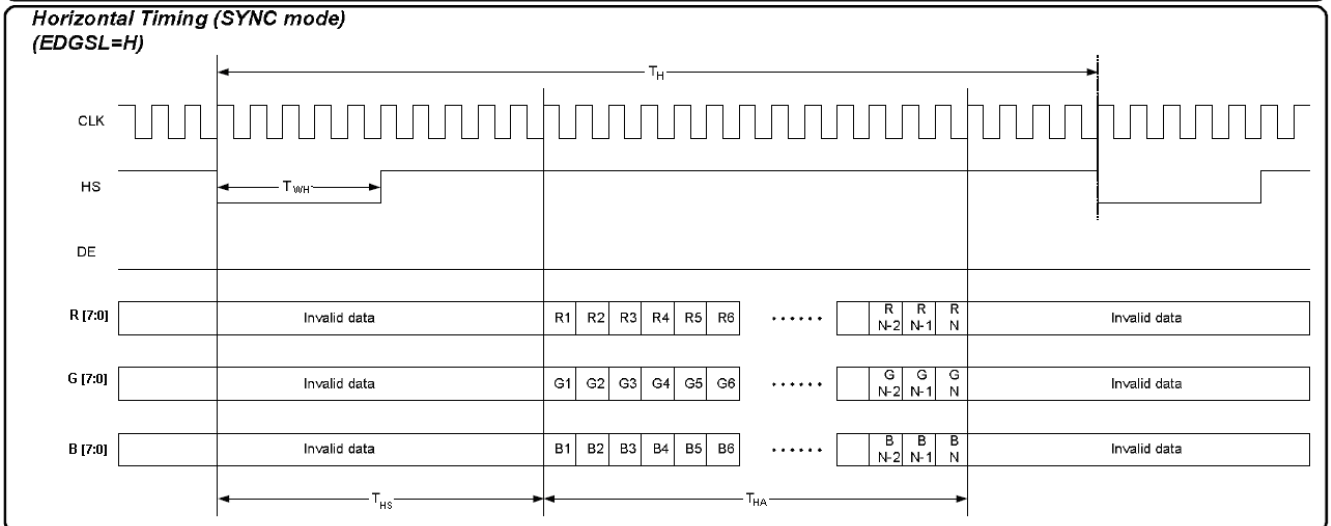
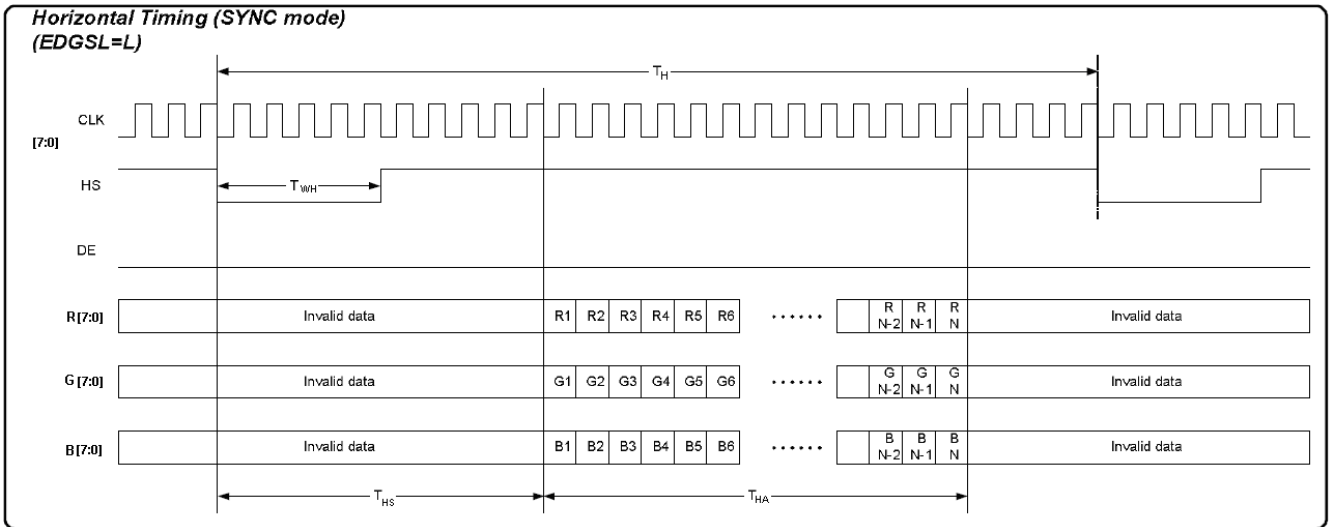
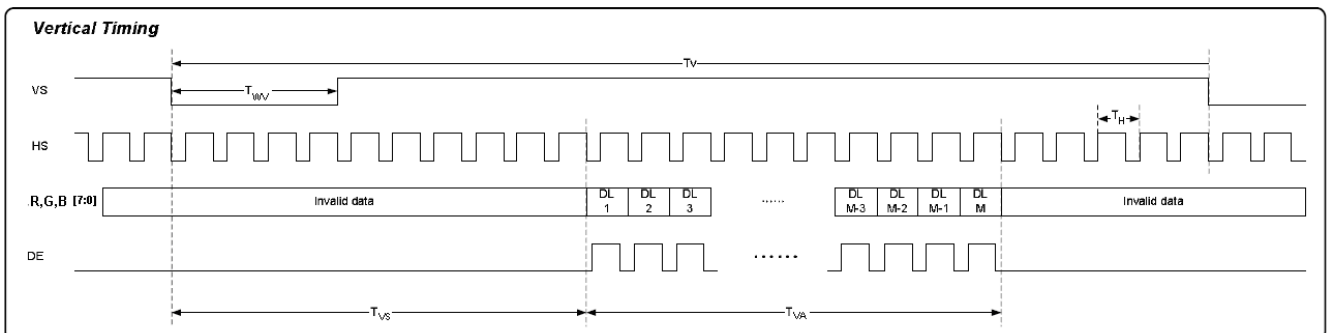
- sync mode

| ITEM                          | SYMBOL    | MIN. | TYP.  | MAX. | UNIT      |
|-------------------------------|-----------|------|-------|------|-----------|
| CLK frequency                 | $F_{CPH}$ | -    | 33.26 | -    | MHz       |
| CLK period                    | $T_{CPH}$ | -    | 30.06 | -    | ns        |
| CLK pulse duty                | $T_{CWH}$ | 40   | 50    | 60   | %         |
| HS period                     | $T_H$     | -    | 1056  | -    | $T_{CPH}$ |
| HS pulse width                | $T_{WH}$  | 1    | 128   | -    | $T_{CPH}$ |
| HS-first horizontal data time | $T_{HS}$  | 216  |       |      | $T_{CPH}$ |
| HS Active Time                | $T_{HA}$  | -    | 800   | -    | $T_{CPH}$ |
| VS period                     | $T_V$     | -    | 525   | -    | $T_H$     |
| VS pulse width                | $T_{WV}$  | 1    | 2     | -    | $T_H$     |
| VS-DE time                    | $T_{VS}$  | 35   |       |      | $T_H$     |
| VS Active Time                | $T_{VA}$  | -    | 480   | -    | $T_H$     |

- DE mode

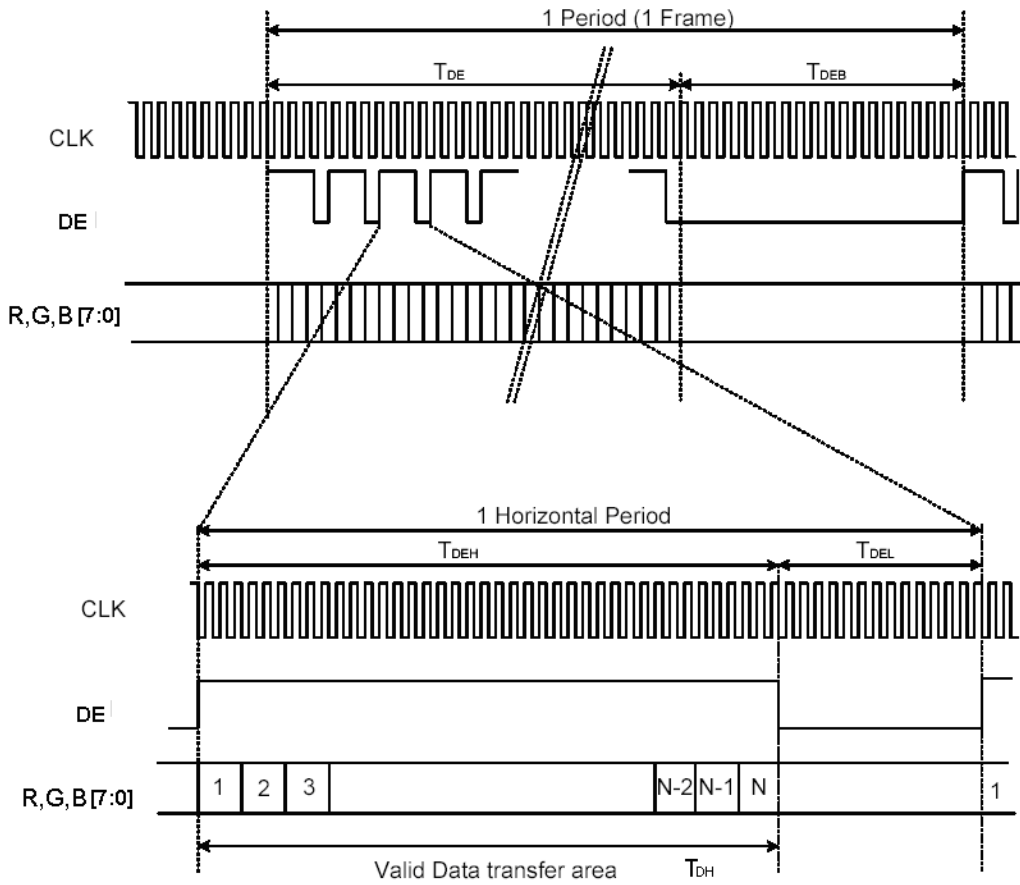
| ITEM              | SYMBOL            | MIN. | TYP.  | MAX. | UNIT              |
|-------------------|-------------------|------|-------|------|-------------------|
| CLK frequency     | $F_{CPH}$         | -    | 33.26 | -    | MHz               |
| CLK period        | $T_{CPH}$         | -    | 30.06 | -    | ns                |
| CLK pulse duty    | $T_{CWH}$         | 40   | 50    | 60   | %                 |
| DE period         | $T_{DEH}+T_{DEL}$ | 1000 | 1056  | 1200 | $T_{CPH}$         |
| DE pulse width    | $T_{DH}$          | -    | 800   | -    | $T_{CPH}$         |
| DE frame blanking | $T_{HS}$          | 10   | 45    | 110  | $T_{DEH}+T_{DEL}$ |
| DE frame width    | $T_{EP}$          | -    | 480   | -    | $T_{DEH}+T_{DEL}$ |

**6.2 Timing Controller Timing Chart**
**6.2.1 Clock and Data input waveforms**

**Figure 1 Clock and Data input waveforms.**

**6.2.2 Data Input format**

**Figure 2 SYNC Mode Horizontal Data Format**

**Figure 3 SYNC Mode Vertical Data Format**



**6.2.3 DE Mode Data Format**



N=800

**Figure 4 DE Mode Data Format**

**6.3 Color Data Input Assignment**

| COLOR               | DISPLAY | DATA SIGNAL |    |    |    |    |    |    |       |    |    |    |    |    |    |      |    |    |    |    |    |    |    |    |    |   |   |         |   | GRAY SCALE LEVEL |
|---------------------|---------|-------------|----|----|----|----|----|----|-------|----|----|----|----|----|----|------|----|----|----|----|----|----|----|----|----|---|---|---------|---|------------------|
|                     |         | RED         |    |    |    |    |    |    | GREEN |    |    |    |    |    |    | BLUE |    |    |    |    |    |    |    |    |    |   |   |         |   |                  |
|                     |         | R0          | R1 | R2 | R3 | R4 | R5 | R6 | R7    | G0 | G1 | G2 | G3 | G4 | G5 | G6   | G7 | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |   |   |         |   |                  |
| BASIC COLOR         | 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       | - |                  |
|                     | BLUE    | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 1  | 1  | 1  | 1  | 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  | 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  | 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  | 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  | 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  | 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  | 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 | R0      |   |                  |
|                     | DARK ↑  | 1           | 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 | R1      |   |                  |
|                     |         | 0           | 1  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | R2      |   |                  |
|                     |         | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | R3~R252 |   |                  |
|                     | LIGHT ↓ | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | R3~R252 |   |                  |
|                     |         | 1           | 0  | 1  | 1  | 1  | 1  | 1  | 1     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | R253    |   |                  |
|                     |         | 0           | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | R254    |   |                  |
|                     | RED     | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | R255    |   |                  |
| 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 | G0      |   |                  |
|                     | DARK ↑  | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 1  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | G1      |   |                  |
|                     |         | 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 | 0 | G2      |   |                  |
|                     |         | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | G3~G252 |   |                  |
|                     | LIGHT ↓ | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | G3~G252 |   |                  |
|                     |         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 1  | 0  | 1  | 1  | 1  | 1  | 1    | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | G253    |   |                  |
|                     |         | 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 | G254    |   |                  |
|                     | GREEN   | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | G255    |   |                  |
| 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 | B0      |   |                  |
|                     | DARK ↑  | 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 | B1      |   |                  |
|                     |         | 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 | B2      |   |                  |
|                     |         | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | B3~B252 |   |                  |
|                     | LIGHT ↓ | :           | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  | :  | :  | :  | :  | : | : | B3~B252 |   |                  |
|                     |         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 1  | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 1 | 1 | B253    |   |                  |
|                     |         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 | 1 | B254    |   |                  |
|                     | BLUE    | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 | 1 | B255    |   |                  |

Note) Definition of Gray :

R<sub>n</sub> : Red Gray, G<sub>n</sub> : Green Gray, B<sub>n</sub> : Blue Gray (n = Gray level)

Input Signal : 0 = Low level voltage, 1 = High level voltage

### 7. OPTICAL CHARACTERISTIC

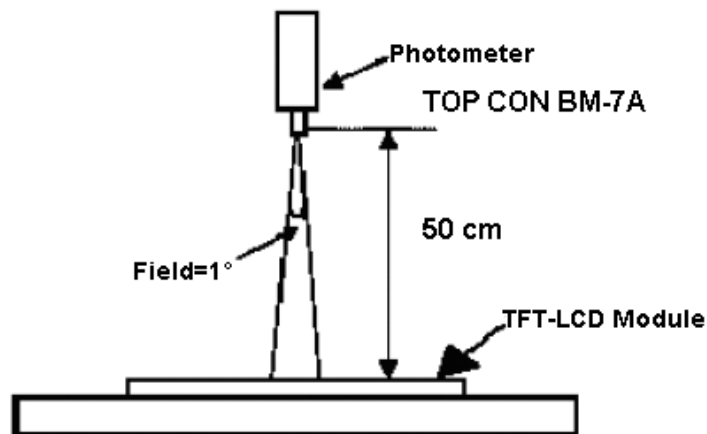
| Parameter      | Symbol     | Condition                             | MIN.         | TYP.  | MAX.         | Unit              | Remarks  |
|----------------|------------|---------------------------------------|--------------|-------|--------------|-------------------|----------|
| Viewing Angle  | Horizontal | $\theta_{x+}$                         | 60           | 70    | --           | deg               | Note 1,4 |
|                |            | $\theta_{x-}$                         | 60           | 70    | --           |                   |          |
|                | Vertical   | $\theta_{y+}$                         | 40           | 50    | --           |                   |          |
|                |            | $\theta_{y-}$                         | 50           | 60    | --           |                   |          |
| Contrast Ratio | CR         | at optimized viewing angle            | 300          | 400   | --           |                   | Note 1,3 |
| Response time  | Rise       | Tr                                    | -            | 5     | 10           | ms                | Note 1,6 |
|                | Fall       | Tf                                    | -            | 15    | 20           | ms                |          |
| Uniformity     | B-uni      | $\theta_x=\theta_y=0^\circ$           | 70           | 80    | --           | %                 | Note1,5  |
| Brightness     | L          | $\theta_x=\theta_y=0^\circ$           | 640          | 800   | --           | cd/m <sup>2</sup> | Note 1,2 |
| Chromaticity   | $x_W$      | Center<br>$\theta_x=\theta_y=0^\circ$ | Typ<br>-0.05 | 0.302 | Typ<br>+0.05 |                   | Note 1,7 |
|                | $y_W$      |                                       |              | 0.339 |              |                   |          |
|                | $x_R$      |                                       |              | 0.575 |              |                   |          |
|                | $y_R$      |                                       |              | 0.360 |              |                   |          |
|                | $x_G$      |                                       |              | 0.331 |              |                   |          |
|                | $y_G$      |                                       |              | 0.571 |              |                   |          |
|                | $x_B$      |                                       |              | 0.149 |              |                   |          |
|                | $y_B$      |                                       |              | 0.138 |              |                   |          |
| Image sticking | tis        | 2 hours                               |              |       | 2            | Sec               | Note 8   |

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance  $\leq 1$  lux, and at room temperature).

The operation temperature is  $25^\circ\text{C} \pm 2^\circ\text{C}$  and LED Backlight Current  $I_L=150\text{mA}$ .

The measurement method is shown in Note1.

Note1: The method of optical measurement:

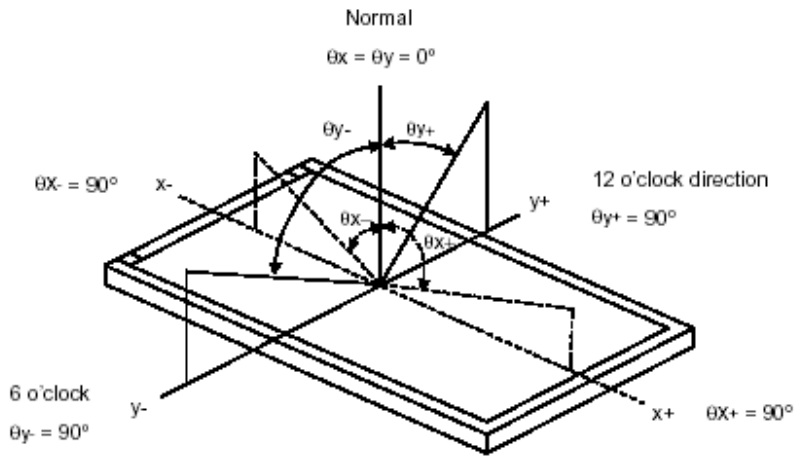


Note2: Measured at the center area of the panel and at the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

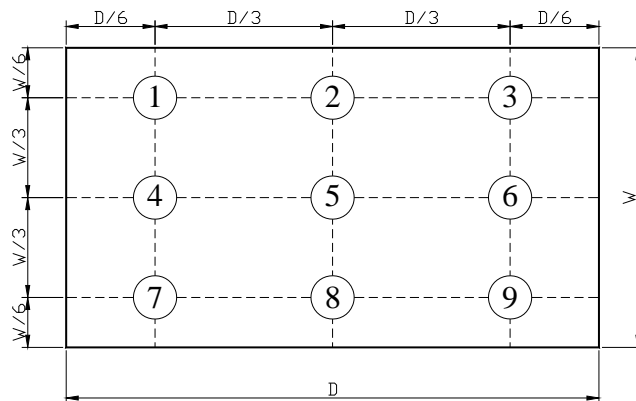
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



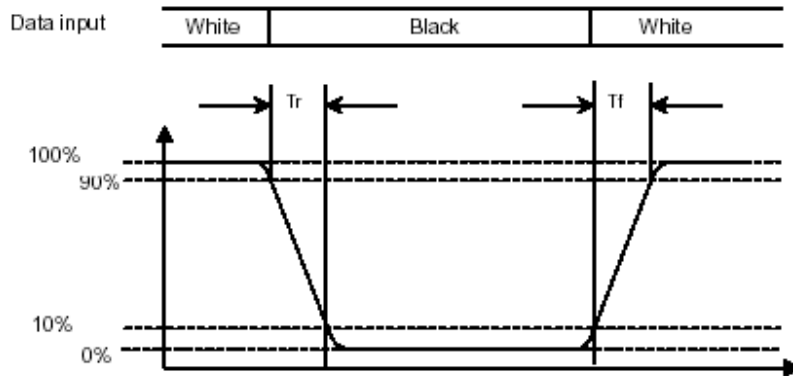
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9 points}} \quad (\text{Note 5}).$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure.



Note 7: Definition of Chromaticity:

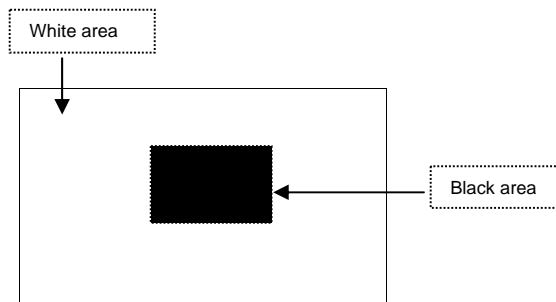
The color coordinates  $(x_W, y_W), (x_R, y_R), (x_G, y_G),$  and  $(x_B, y_B)$  are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen.

The previous image shall not persist more than 2 sec at 25 °C

**Image sticking pattern**



## 8. PIN CONNECTIONS

| Pin NO. | SYMBOL | DESCRIPTION  |
|---------|--------|--|
| 1       | GND    | Power Ground   |
| 2       | VGL    | Gate OFF Power Supply Voltage  |
| 3       | VDDG   | Gate Driver Power Supply Input (+3.3V)   |
| 4       | NC     | No Connection  |
| 5       | VGH    | Gate ON Power Supply Voltage   |
| 6       | VCOM   | Common voltage input   |
| 7       | UD     | Gate Driver Up/Down scan setting<br>When UD=H, reverse scan<br>When UD=L, normal scan(Default pull low)  |
| 8       | HS     | Horizontal sync. Signal.   |
| 9       | VS     | Vertical sync. Signal.   |
| 10      | DE     | Input data enable control<br>When DE mode, active High to enable data input.   |
| 11      | B7     | Blue data(MSB)   |
| 12      | B6     | Blue data  |
| 13      | B5     | Blue data  |
| 14      | B4     | Blue data  |
| 15      | B3     | Blue data  |
| 16      | B2     | Blue data  |
| 17      | B1     | Blue data  |
| 18      | B0     | Blue data(LSB)   |
| 19      | GND    | Power Ground   |
| 20      | CLK    | Clock signal<br>User can input different polarity CLK by EDGSL setting.(Default pull low)  |
| 21      | GND    | Power Ground   |
| 22      | G7     | Green data(MSB)  |
| 23      | G6     | Green data   |
| 24      | G5     | Green data   |
| 25      | G4     | Green data   |
| 26      | G3     | Green data   |
| 27      | G2     | Green data   |
| 28      | G1     | Green data   |
| 29      | G0     | Green data(LSB)  |
| 30      | GND    | Power Ground   |
| 31      | R7     | Red data(MSB)  |
| 32      | R6     | Red data   |
| 33      | R5     | Red data   |
| 34      | R4     | Red data   |
| 35      | R3     | Red data   |
| 36      | R2     | Red data   |
| 37      | R1     | Red data   |
| 38      | R0     | Red data(LSB)  |
| 39      | RESETB | Hard ware global rest. Low active  |
| 40      | LR     | Shift direction of Source Driver IC internal shift register is controlled by this pin as show below.<br>LR=H SO1--> ... ..SO1200(Default pull high)<br>LR=L SO1--> ... ..SO1 |
| 41      | VCC    | Digital power Supply Input(+3.3V)  |

|    |       |   |
|----|-------|---|
| 42 | GND   | Power Ground  |
| 43 | V10   | Gamma voltage level 10  |
| 44 | V6    | Gamma voltage level 6   |
| 45 | V5    | Gamma voltage level 5   |
| 46 | V1    | Gamma voltage level 1   |
| 47 | AVDD  | Analog power Supply Input (+12V)  |
| 48 | GND   | Power Ground  |
| 49 | EDGSL | Define input clock polarity<br>When EDGSL=L, Latch data by rising edge of CLK(Default pull high)<br>When EDGSL=H, CLK polarity is inverted, Latch data by falling edge of CLK |
| 50 | VCOM  | Common voltage input  |

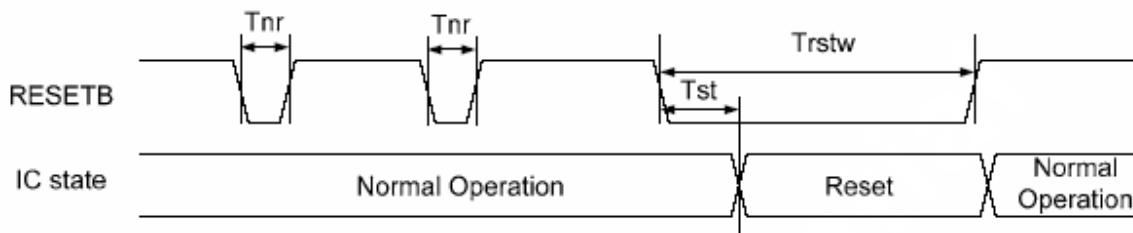
Remarks:

- 1) If DE signal is fixed low, SYNC mode is used. Otherwise, DE mode is used.
- 2) LR&UD setting

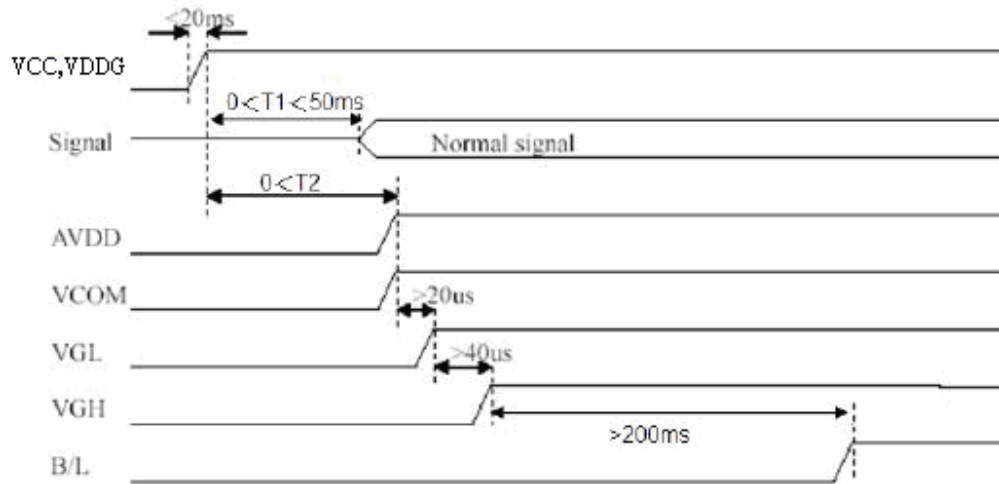
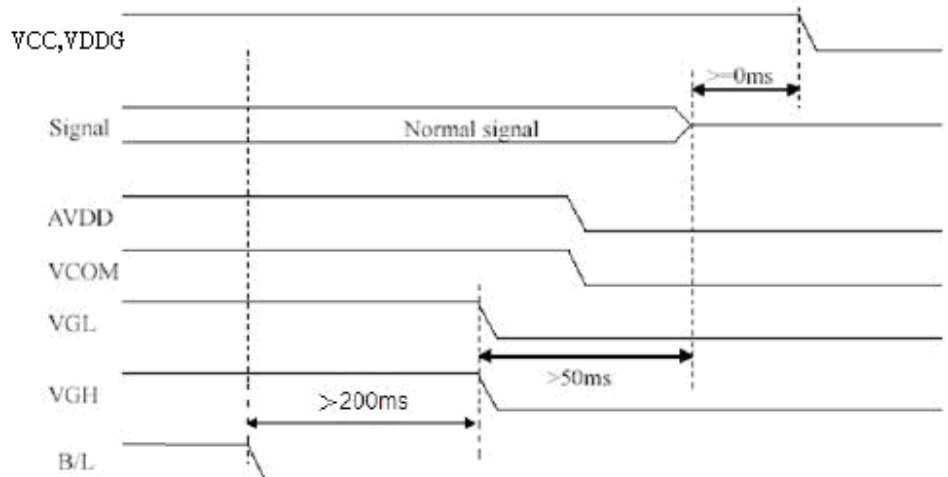
| LR | UD | Function                                      |
|----|----|---|
| 1  | 0  | Normally display                              |
| 0  | 0  | Left and Right opposite                       |
| 1  | 1  | Up and Down opposite                          |
| 0  | 1  | Left and Right opposite, Up and Down opposite |

3) Hardware Reset Timing

| ITEM                       | SYMBOL     | MIN. | TYP. | MAX. | UNIT    |
|----------------------------|------------|------|------|------|---------|
| RESETB low pulse width     | $T_{rstw}$ | 10   | -    | -    | $\mu s$ |
| Negative noise pulse width | $T_{nr}$   |      | -    | 4    | $\mu s$ |
| Reset start time           | $T_{st}$   | 4    | -    |      | $\mu s$ |

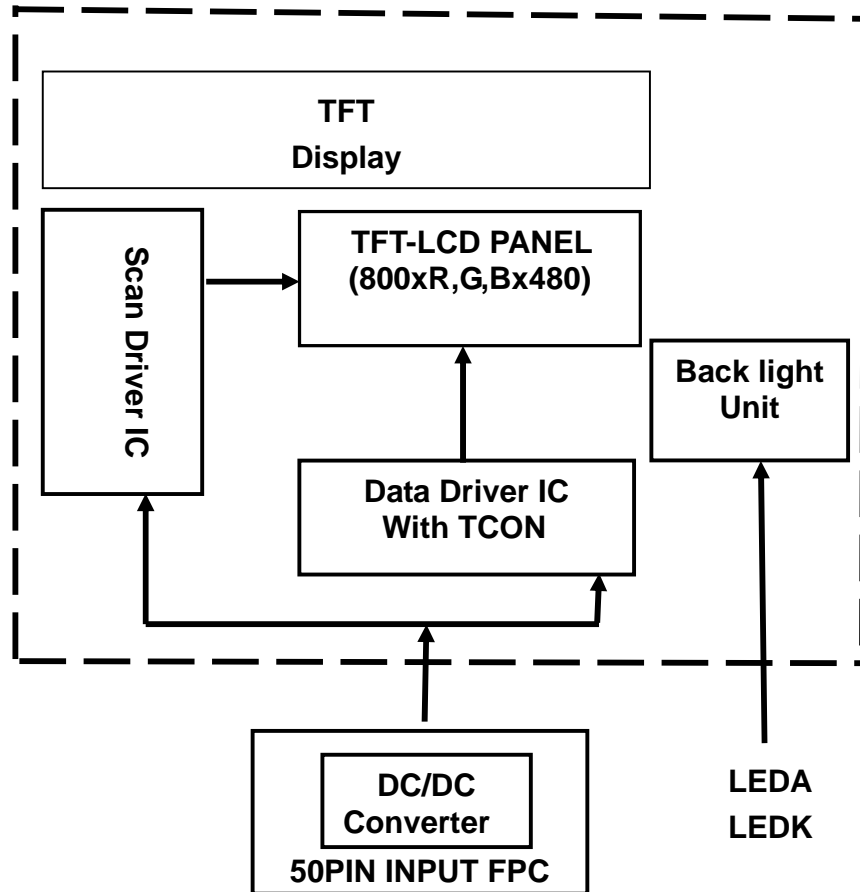


## 4) Power Signal sequence:

**Power on:**

**Power off:**




**9. BLOCK DIAGRAM**



## 10. TOUCH PANEL CHARACTERISTICS

### 1. Input Method and Activation Force

| Input Method                        | Activation Force |
|-------------------------------------|------------------|
| 0.8mm dia. Delrin Polyacetal stylus | 80gf Max.        |
| 8.0mm dia. Silicon "finger"         | 80gf Max.        |

### 2. Typical Optical Characteristics

| ITEM                       | Parameter |
|----------------------------|-----------|
| Visible Light Transmission | 83% typ.  |
| Haze                       | 5%typ.    |

### 3. Electrical Specification

| ITEM                     | Parameter          |
|--------------------------|--------------------|
| Operating Voltage        | DC 7V Max          |
| Circuit close resistance | X 400~1500Ω        |
|                          | Y 200~1200Ω        |
| Circuit open resistance  | 20MΩ min at 25V DC |
| Contact bounce           | ≤20ms              |
| Linear Test              | ≤1.5%              |

### 4. Linearity

| ITEM                                | Parameter |
|-------------------------------------|-----------|
| Linear Test Specification Direction | X ≤1.5%   |
|                                     | Y ≤1.5%   |

### 5. Specification

| ITEM                  | Parameter   |
|-----------------------|-------------|
| Operating Temperature | -30°C~+85°C |
| Storage Temperature   | -40°C~+85°C |

### 6. Durability test:

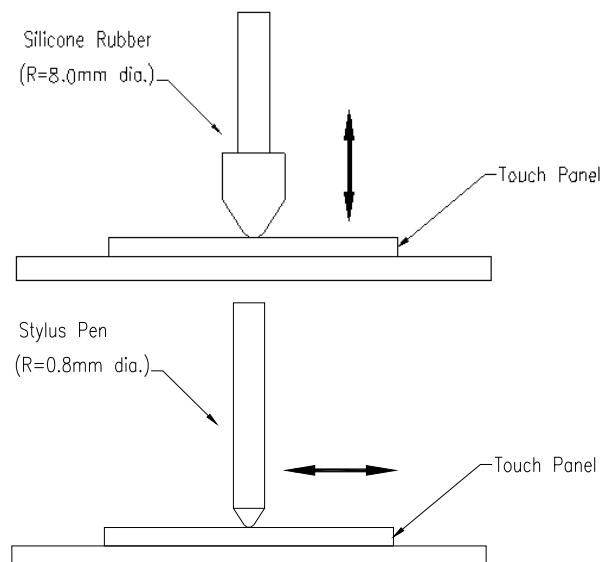
6.1 Touch panel is hit 1 millions times with a silicone rubber of R8 finger, hitting rate is by 250g at 2 times per second. The measurement must satisfy the following:

- Circuit close resistance: x400~1500Ω ; y 200~1200Ω
- Circuit open resistance: >20MΩ min at 25V DC
- Contact bounce: ≤20ms
- Linearity test: ≤3%

#### 6.2 Stylus writing

Touch panel is drawn by R0.8 Darling stylus pen, at 250g forces, repeat one inch by 100k times. The measurement must satisfy the following:

- Circuit close resistance: x 400~1500Ω ; y 200~1200Ω
- Circuit open resistance: >20MΩ min at 25V DC
- Contact bounce: ≤20ms
- Linearity test: ≤3%



## 11. QUALITY ASSURANCE

### 11.1 Test Condition

#### 11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature :  $25 \pm 5^{\circ}\text{C}$

Humidity :  $65 \pm 5\%$

#### 11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

#### 11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

#### 11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

#### 11.1.5 Test Method

| No. | Reliability Test Item                             | Test Level  | Remark        |
|-----|---|---|---------------|
| 1   | High Temperature Storage Test                     | T=80°C,240hrs   | IEC68-2-2     |
| 2   | Low Temperature Storage Test                      | T=-30°C,240hrs  | IEC68-2-1     |
| 3   | High Temperature Operation Test                   | T=70°C,240hrs   | IEC68-2-2     |
| 4   | Low Temperature Operation Test                    | T=-20°C,240hrs  | IEC68-2-1     |
| 5   | High Temperature and High Humidity Operation Test | T=60°C,90%RH,240hrs   | IEC68-2-3     |
| 6   | Thermal Cycling Test<br>(No operation)            | -30°C → +25°C → +80°C ,100 Cycles<br>30 min    5 min    30 min  | IEC68-2-14    |
| 7   | Vibration Test                                    | Frequency : 10 ~ 55 Hz<br>Amplitude : 1.5 mm<br>Sweep Time : 11mins<br>Test Period : 6 Cycles for each Direction of X,Y,Z | IEC68-2-6     |
| 8   | Shock Test  | 100G, 6ms<br>Direction : ± X,± Y,± Z<br>Cycle : 3 times   | IEC68-2-27    |
| 9   | ESD Test  | State: operating<br>Location: LCM/TP surface<br>Condition:150pf 330Ω<br>Contact +/- 8kV Air +/-15kV<br>Criteria: Class C  | IEC 61000-4-2 |

### 11.3 Inspection condition

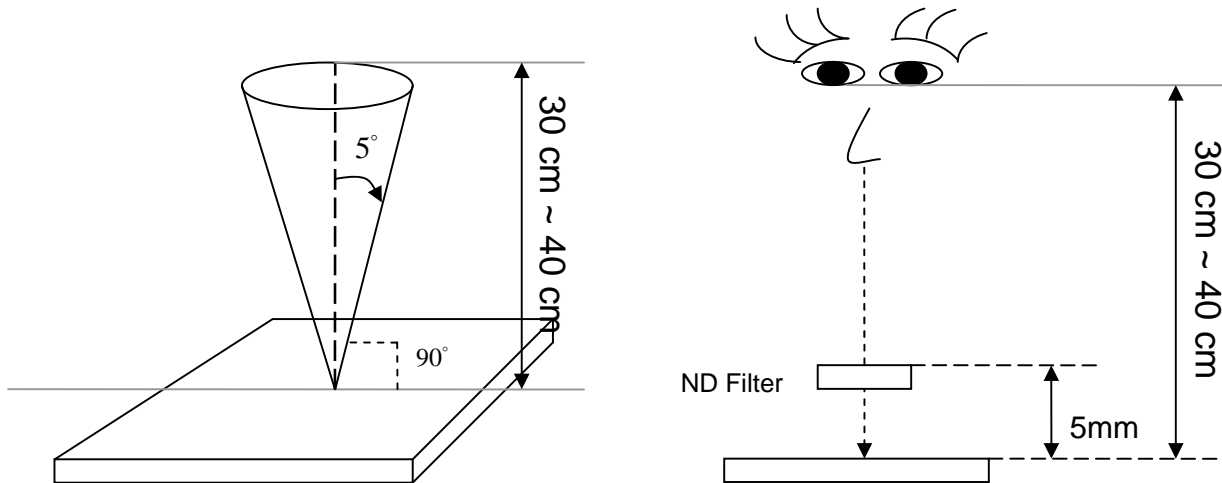
#### 11.3.1 Inspection conditions

11.3.1.1 Inspection Distance :  $35 \pm 5$  cm

11.3.1.2 View Angle :

(1) Inspection under operating condition :  $\pm 5^\circ$

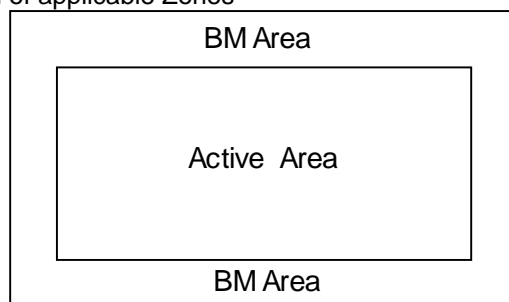
(2) Inspection under non-operating condition :  $\pm 45^\circ$



#### 11.3.2 Environment conditions :

|                       |                       |                          |
|-----------------------|-----------------------|--------------------------|
| Ambient Temperature : |                       | $25 \pm 5^\circ\text{C}$ |
| Ambient Humidity :    |                       | $65 \pm 5\%$             |
| Ambient Illumination  | Cosmetic Inspection   | More than 600lux         |
|                       | Functional Inspection | 300 ~ 800lux             |

#### 11.3.3 Definition of applicable Zones



## 11.3.4 Inspection Parameters

| No.  | Parameter                           | Criteria   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|--|-------------------------------------|--|-------------------|-------------------|------------------------------------|------------------|------------------------------------|--------|--|-----|--|-----|--|---|-----------------|---|---|---------------|---|---|
| 1  | Operating                           | Display function: No Display malfunction (Major)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Contrast ratio (Black, White):<br>Does not meet specified range in the spec. (Major) (Note:3)  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Point Defect (Red, green, blue, dark): Active area $\leq 8$ dots (Minor)(Note:1)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | <table border="1"> <thead> <tr> <th>Item</th> <th>Acceptable number</th> <th>Total</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td>Bright</td> <td>4</td> <td rowspan="2">8</td> <td rowspan="4">Minor</td> <td rowspan="4">1.5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> <tr> <td>Adjacent Bright</td> <td>1</td> <td>1</td> </tr> <tr> <td>Adjacent Dark</td> <td>1</td> <td>1</td> </tr> </tbody> </table>   | Item              | Acceptable number | Total                              | Class Of Defects | AQL Level                          | Bright | 4  | 8   | Minor  | 1.5 | Dark                                   | 4 | Adjacent Bright | 1 | 1 | Adjacent Dark | 1 | 1 |
|  |                                     | Item   | Acceptable number | Total             | Class Of Defects                   | AQL Level        |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Bright   | 4                 | 8                 | Minor                              | 1.5              |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Dark   | 4                 |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Adjacent Bright  | 1                 | 1                 |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Adjacent Dark  | 1                 | 1                 |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| Non-uniformity:<br>Visible through 2%ND filter white, R, G, B and gray 50%pattern. (Minor)   |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| Foreign material in Black or White spots shape ( $W > 1/4L$ ) (Note: 5)  |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.3</math></td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>0.3 &lt; D \leq 0.5</math></td> <td>4</td> </tr> <tr> <td><math>D &gt; 0.5</math></td> <td>0</td> </tr> </tbody> </table>  | Dimension                           | Acceptable number  | Class Of Defects  | AQL Level         | $D \leq 0.3$                       | *                | Minor                              | 1.5    | $0.3 < D \leq 0.5$                                       | 4   | $D > 0.5$  | 0   |  |   |                 |   |   |               |   |   |
| Dimension  | Acceptable number                   | Class Of Defects   | AQL Level         |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $D \leq 0.3$   | *                                   | Minor  | 1.5               |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $0.3 < D \leq 0.5$   | 4                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $D > 0.5$  | 0                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| D = (Long + Short) / 2 * : Disregard   |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| Foreign Material in Line or spiral shape ( $W \leq 1/4L$ ) (Note: 4)   |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.1\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.07\text{mm} &lt; W \leq 0.1\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W &lt; 0.07\text{mm}</math></td> <td>*</td> </tr> </tbody> </table> | Dimension                           | Acceptable number  | Class Of Defects  | AQL Level         | $W > 0.1\text{mm}, L > 5\text{mm}$ | 0                | Minor                              | 1.5    | $L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.1\text{mm}$ | 4   | $L \leq 5\text{mm}, W < 0.07\text{mm}$                   | *   |  |   |                 |   |   |               |   |   |
| Dimension  | Acceptable number                   | Class Of Defects   | AQL Level         |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $W > 0.1\text{mm}, L > 5\text{mm}$   | 0                                   | Minor  | 1.5               |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.1\text{mm}$   | 4                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $L \leq 5\text{mm}, W < 0.07\text{mm}$   | *                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| L : Length W : Width * : Disregard   |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| 2  | External Inspection (non-operating) | Dimension: Outline (Major)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Bezel appearance: uneven (Minor)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Scratch on the Polarize & Touch Panel : (Note:2)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.1\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.07\text{mm} &lt; W \leq 0.1\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W &lt; 0.07\text{mm}</math></td> <td>*</td> </tr> </tbody> </table> | Dimension         | Acceptable number | Class Of Defects                   | AQL Level        | $W > 0.1\text{mm}, L > 5\text{mm}$ | 0      | Minor  | 1.5 | $L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.1\text{mm}$ | 4   | $L \leq 5\text{mm}, W < 0.07\text{mm}$ | * |                 |   |   |               |   |   |
|  |                                     | Dimension  | Acceptable number | Class Of Defects  | AQL Level                          |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | $W > 0.1\text{mm}, L > 5\text{mm}$   | 0                 | Minor             | 1.5                                |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | $L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.1\text{mm}$   | 4                 |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | $L \leq 5\text{mm}, W < 0.07\text{mm}$   | *                 |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | L : Length W : Width * : Disregard   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
|  |                                     | Dent and spots shape on the polarize (Note:2): (Note: 5)   |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.3</math></td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>0.3 &lt; D \leq 0.5</math></td> <td>4</td> </tr> <tr> <td><math>D &gt; 0.5</math></td> <td>0</td> </tr> </tbody> </table>  | Dimension                           | Acceptable number  | Class Of Defects  | AQL Level         | $D \leq 0.3$                       | *                | Minor                              | 1.5    | $0.3 < D \leq 0.5$                                       | 4   | $D > 0.5$  | 0   |  |   |                 |   |   |               |   |   |
| Dimension  | Acceptable number                   | Class Of Defects   | AQL Level         |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $D \leq 0.3$   | *                                   | Minor  | 1.5               |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $0.3 < D \leq 0.5$   | 4                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| $D > 0.5$  | 0                                   |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |
| D = (Long + Short) / 2 * : Disregard   |                                     |  |                   |                   |                                    |                  |                                    |        |  |     |  |     |  |   |                 |   |   |               |   |   |

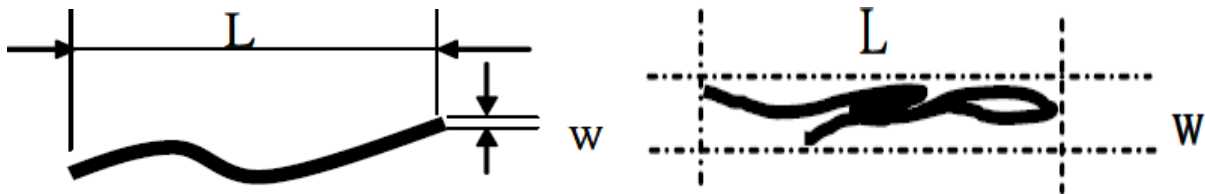
| 3                 | TP Newton Rings if LCM with TP | Dimension   | Acceptable number  | Class Of Defects | AQL Level |
|-------------------|--------------------------------|---|--|------------------|-----------|
|                   |                                | The area of the Newton ring is more than 1/6 view area of the touch panel.  | 0  |                  |           |
|                   |                                | The area of the Newton ring is less than 1/6 view area of the touch panel; and no character affected and line distorted after touch panel lightening. | Ignore   | Minor            | 1.5       |
| <b>Definition</b> |                                |   |  |                  |           |
| Class of defects  | <b>Major</b>                   | AQL 0.65  | It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function. |                  |           |
|                   | <b>Minor</b>                   | AQL 1.5   | It is a defect that will not result in functioning problem with deviation classified.  |                  |           |

Note:1.(a)Bright point defect is defined as point defect of R,G,B with area >1/2 pixel respectively  
 (b)Dark point defect is defined as visible in full white pattern.  
 (c)The point defect must under 2% ND Filter visible .

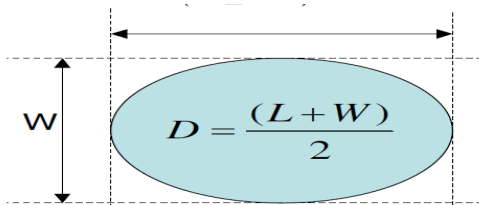
Note:2 The external inspection should be conducted at the distance 30± 5cm between the eyes of inspector and the panel .

Note:3 Luminance measurement for contrast ratio is at the distance 50± 5cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note:4 W-Width in mm , L-length of Max.(L1,L2) in mm.



Note:5 Spot Foreign Material ( $W \geq L/4$ )



#### 11.4 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

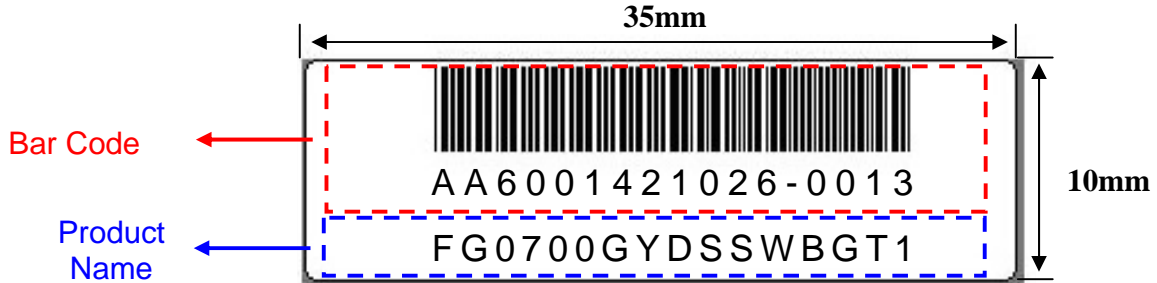
Sampling type: normal inspection, single sampling

Sampling table: ISO2859

Inspection level: Level II

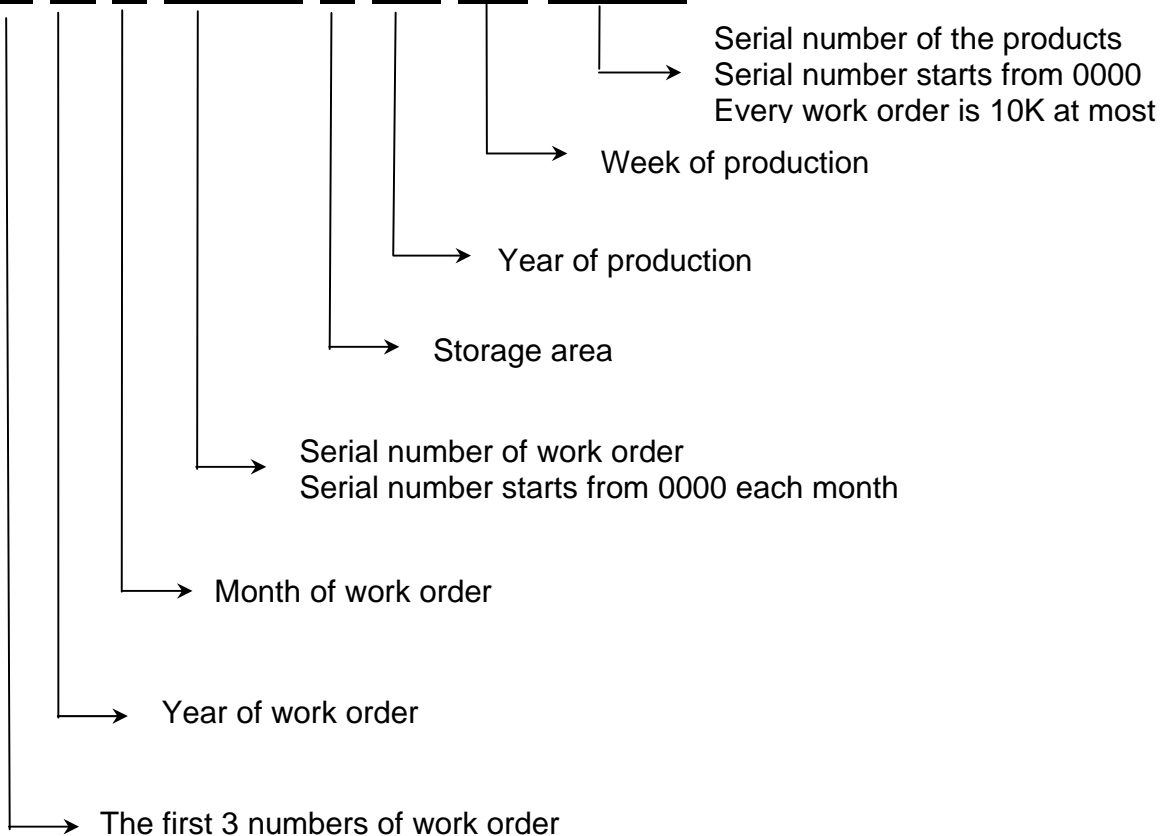
## 12. LCM Product Label Define

### Product Label style:

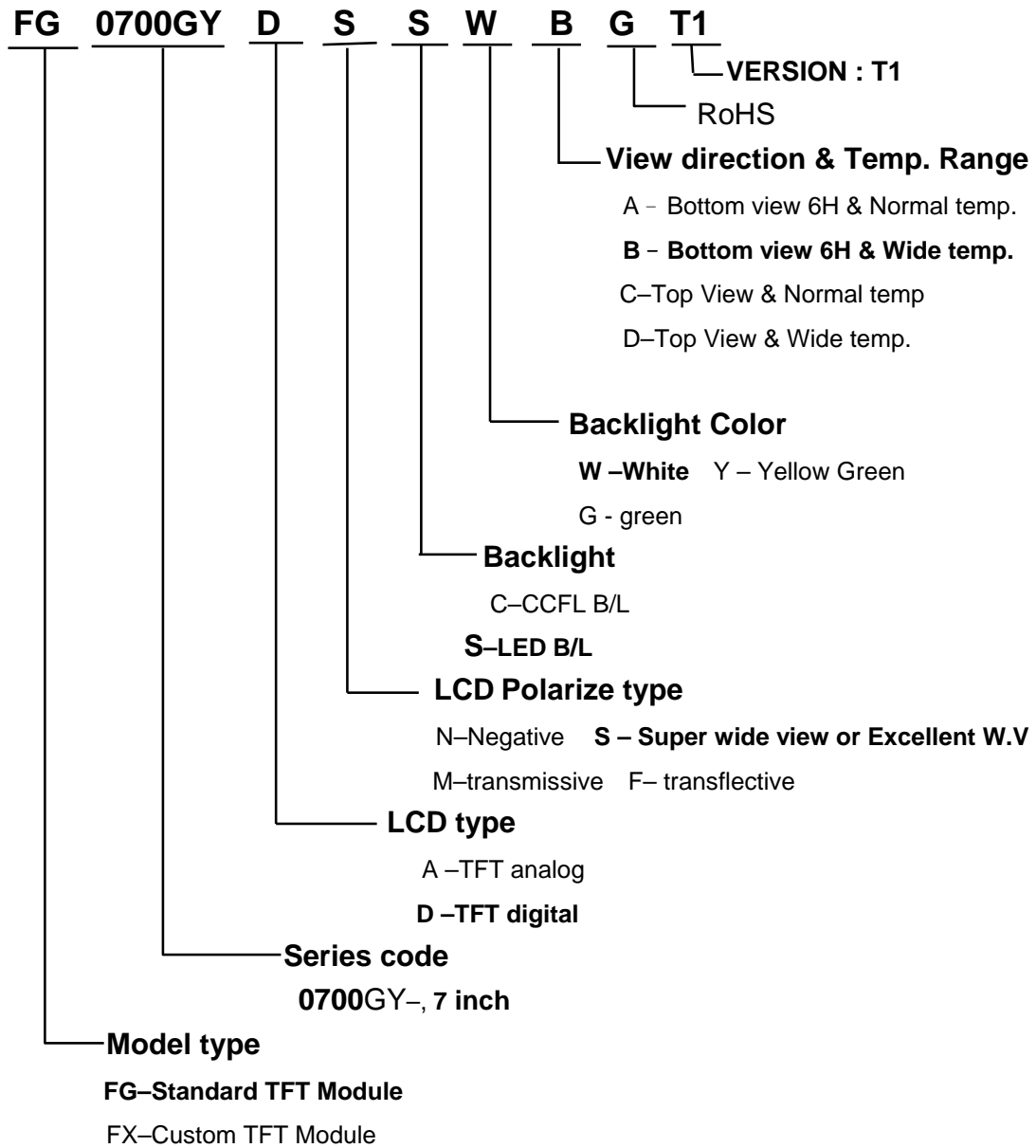


### BarCode Define:

**A A 6 0014 2 10 26-0013**



**Product Name Define:**





### 13. PRECAUTIONS IN USE LCM

#### 1. ASSEMBLY PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5) Do not open the case because inside circuits do not have sufficient strength.
- (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

#### 2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

#### 3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.

The modules should be kept in antistatic bags or other containers resistant to static for storage.

- (2) Only properly grounded soldering irons should be used.
- (3) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (4) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (5) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

#### 4. STORAGE PRECAUTIONS

- (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

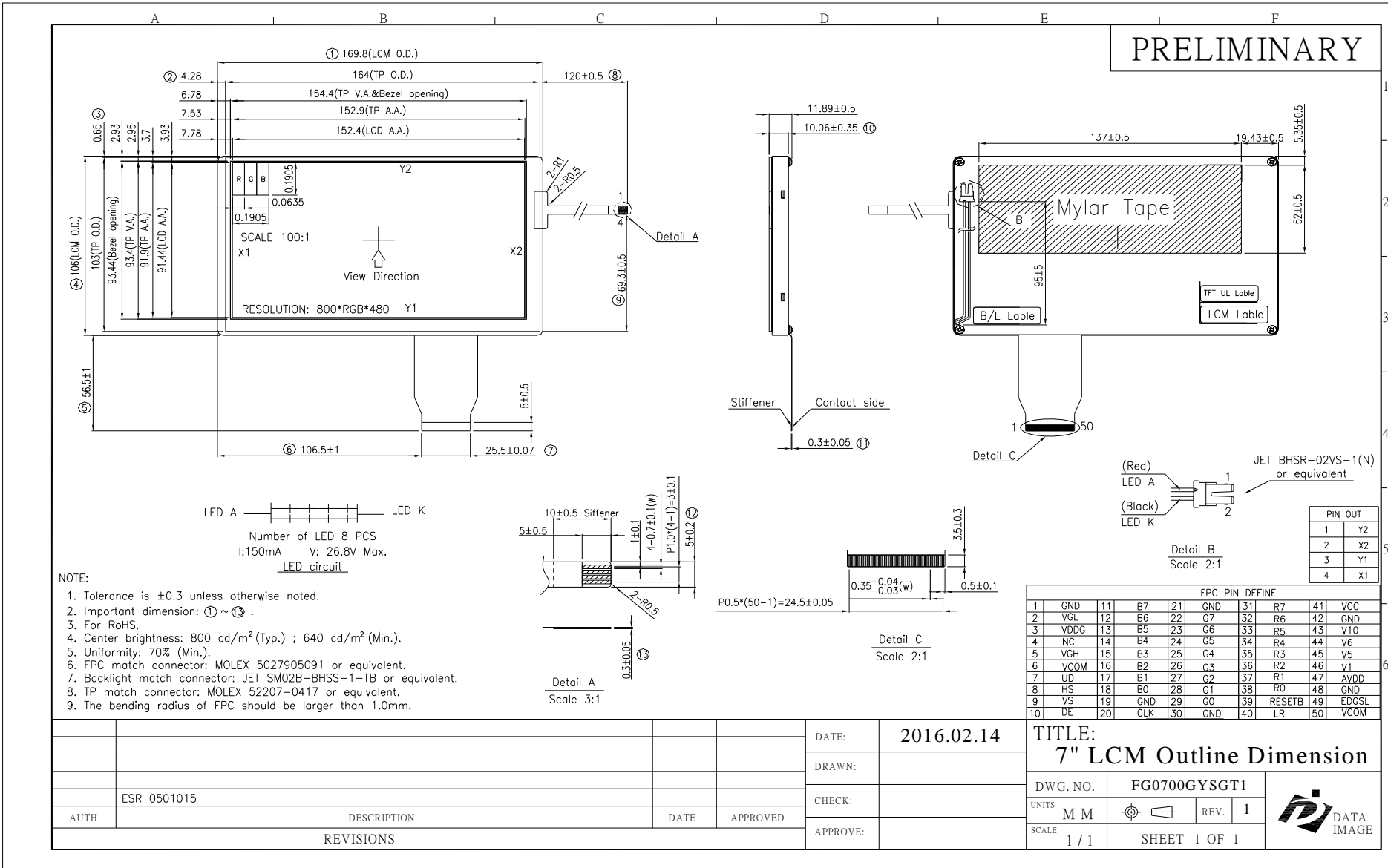
#### 5. OTHERS

- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
  - (4) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
  - (5) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
  - (6) Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

#### 6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

Confidential Document  
**14. OUTLINE DRAWING**



**15. PACKAGE INFORMATION**

T.B.D.