

Tentative Specification  
Preliminary Specification  
Approval Specification

MODEL NO.: G133IGE  
SUFFIX: L03

**Customer:**

**APPROVED BY**

**SIGNATURE**

**Name / Title** \_\_\_\_\_

Note

\_\_\_\_\_  
Please return 1 copy for your confirmation with your signature and comments.

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**REVISION HISTORY**

| Version | Date        | Section | Description   |
|---------|-------------|---------|---|
| Ver 1.0 | Apr. 6, '11 | All     | G133IGE-L03 Preliminary specification was first issued. |

1. GENERAL DESCRIPTION

1.1 OVERVIEW

G133IGE-L03 is a 13.3" TFT Liquid Crystal Display module and 20 pins LVDS interface. This module supports 1280 x 800 WXGA mode and can display 262K or 16.2M colors. The converter circuit for LED is built in.

1.2 FEATURES

- WXGA (1280 x 800 pixels) resolution
- LVDS (Low Voltage Differential Signaling) interface
- LED light source

1.3 APPLICATION

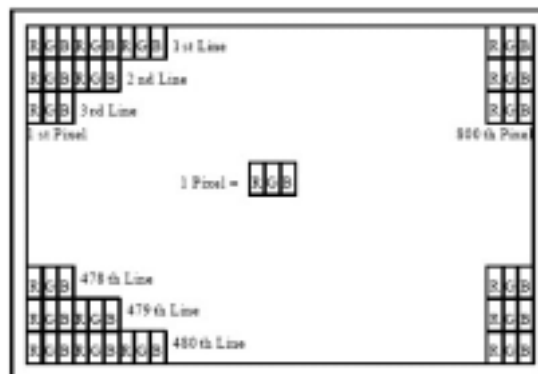
- Industry Application

1.4 GENERAL SPECIFICATIONS

| Item                     | Specification                   | Unit  | Note |
|--------------------------|---------------------------------|-------|------|
| Diagonal Size            | 13.3                            | inch  |      |
| Active Area              | 286.08 x 178.8                  | mm    | (1)  |
| Bezel Opening Area       | 289.1 x 181.8                   | mm    |      |
| Driver Element           | a-si TFT active matrix          | -     | -    |
| Pixel Number             | 1280 x R.G.B. x 800             | pixel | -    |
| Pixel Pitch              | 0.2235 x 0.2235                 | mm    | -    |
| Pixel Arrangement        | RGB vertical stripe             | -     | (2)  |
| Display Colors           | 262k or 16.2M                   | color | -    |
| Display Mode             | Normally White                  | -     | -    |
| Surface Treatment        | Anti-glare, Hard Coating ( 3H ) | -     | -    |
| Module Power Consumption | (6.5)                           | W     | Typ. |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2)



1.5 MECHANICAL SPECIFICATIONS

| Item        |                | Min.  | Typ.  | Max.  | Unit | Note |
|-------------|----------------|-------|-------|-------|------|------|
| Module Size | Horizontal (H) | 298.5 | 299   | 299.5 | mm   | (1)  |
|             | Vertical (V)   | 194.5 | 195   | 195.5 | mm   |      |
|             | Depth (D)      | -     | (7.4) | (7.9) | mm   |      |
| Weight      |                | -     | (365) | (380) | g    |      |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

2. ABSOLUTE MAXIMUM RATINGS

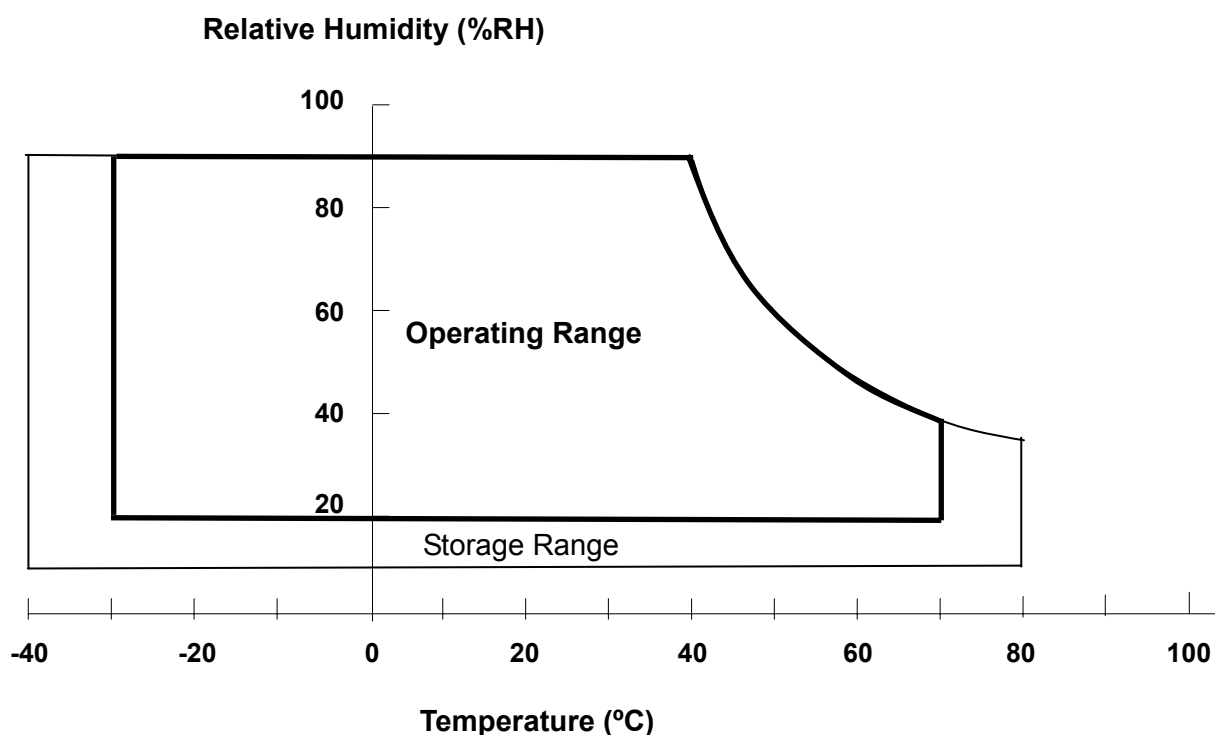
2.1 ABSOLUTE RATINGS OF ENVIRONMENT

| Item                          | Symbol          | Value |      | Unit | Note |
|-------------------------------|-----------------|-------|------|------|------|
|                               |                 | Min.  | Max. |      |      |
| Operating Ambient Temperature | T <sub>OP</sub> | -30   | +70  | °C   |      |
| Storage Temperature           | T <sub>ST</sub> | -30   | +80  | °C   |      |

Note (1) Temperature and relative humidity range is shown in the figure below.

(2) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).

(3) No condensation.



2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Ta = 25 ± 2 °C

| Item                 | Symbol | Value  |      | Unit | Note |
|----------------------|--------|--------|------|------|------|
|                      |        | Min.   | Max. |      |      |
| Power Supply Voltage | Vcc    | (-0.3) | (4)  | V    | (1)  |

2.2.2 LED CONVERTER

| Item              | Symbol         | Value |       | Unit | Note     |
|-------------------|----------------|-------|-------|------|----------|
|                   |                | Min.  | Max.  |      |          |
| Converter Voltage | V <sub>i</sub> | (4.5) | (24)  | V    | (1), (2) |
| Enable Voltage    | EN             | ---   | (5.5) | V    |          |
| Backlight Adjust  | ADJ            | ---   | (5.5) | V    |          |

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for LED converter (Refer to 3.2 for further information).

3. ELECTRICAL CHARACTERISTICS

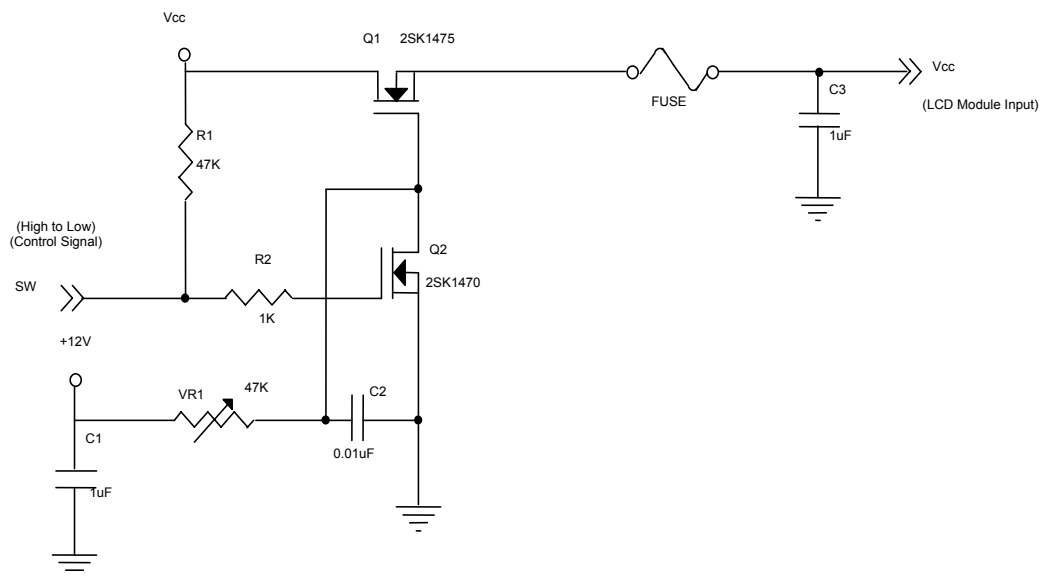
3.1 RECOMMENDED OPERATION CONDITION

Ta = 25 ± 2 °C

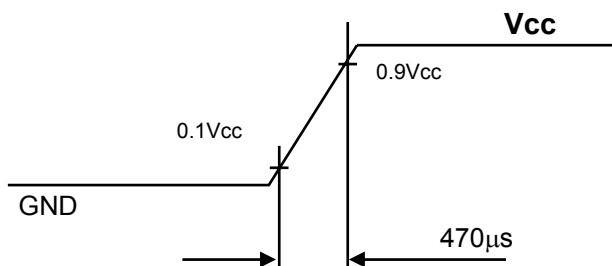
| Parameter                              | Symbol                | Value  |       |        | Unit | Note                          |
|--|-----------------------|--------|-------|--------|------|-------------------------------|
|  |                       | Min.   | Typ.  | Max.   |      |                               |
| Power Supply Voltage                   | V <sub>CC</sub>       | (3.0)  | (3.3) | (3.6)  | V    | -                             |
| Permissible Ripple Voltage             | V <sub>RP</sub>       |        | (50)  |        | mV   | -                             |
| Rush Current                           | I <sub>RUSH</sub>     |        |       | (1.5)  | A    | (2)                           |
| Initial Stage Current                  | I <sub>IS</sub>       |        |       | (1.0)  | A    | (2)                           |
| Power Supply Current                   | White                 |        | (330) | (370)  | mA   | (3)a                          |
|  | Black                 |        | (450) | (490)  | mA   | (3)b                          |
| LVDS Differential Input High Threshold | V <sub>TH(LVDS)</sub> |        |       | (+100) | mV   | (4),<br>V <sub>CM</sub> =1.2V |
| LVDS Differential Input Low Threshold  | V <sub>TL(LVDS)</sub> | (-100) |       |        | mV   | (4)<br>V <sub>CM</sub> =1.2V  |
| LVDS Common Mode Voltage               | V <sub>CM</sub>       | (0.7)  |       | (2.0)  | V    | (4)                           |
| LVDS Differential Input Voltage        | V <sub>ID</sub>       | (100)  |       | (600)  | mV   | (4)                           |
| Terminating Resistor                   | R <sub>T</sub>        |        | (100) |        | Ohm  |                               |

Note (1) The assembly should be always operated within above ranges.

Note (2) Measurement Conditions:



**Vcc rising time is 470µs**





Note (3) The specified power supply current is under the conditions at  $V_{CC} = 3.3V$ ,  $T_a = 25 \pm 2^\circ C$ ,  $f_v = 60$  Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



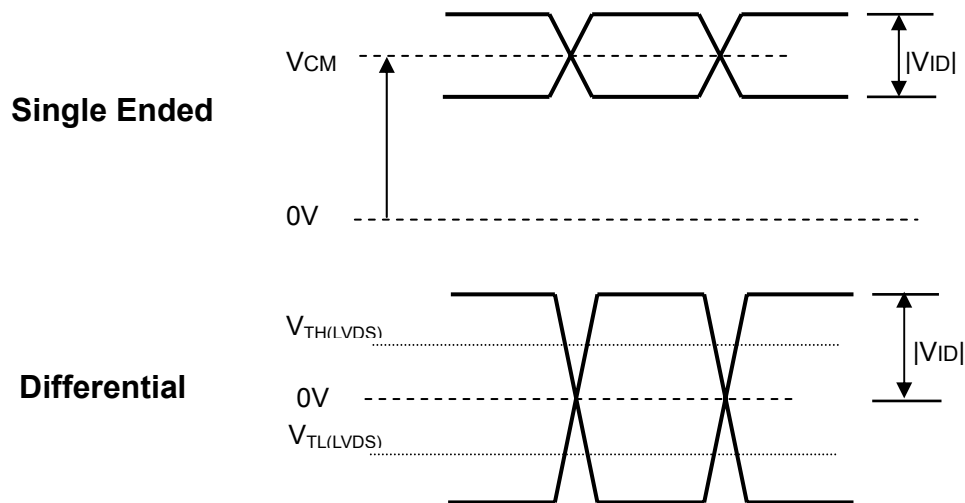
Active Area

b. Black Pattern



Active Area

Note (4) The parameters of LVDS signals are defined as the following figures.



3.2 BACKLIGHT UNIT

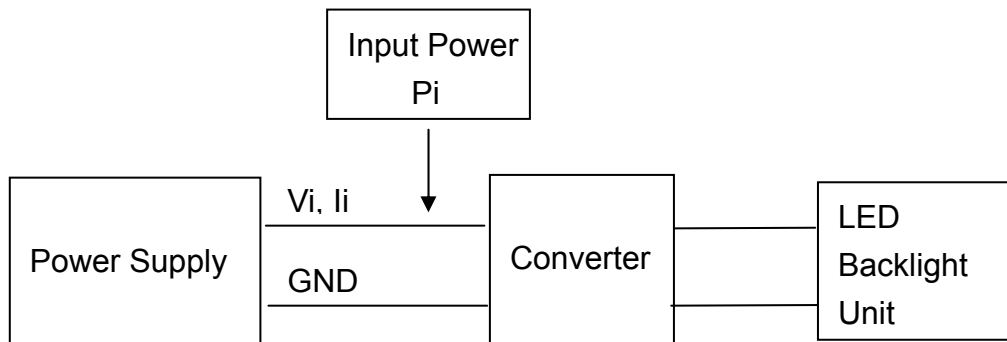
Ta = 25 ± 2 °C

| Parameter                      | Symbol           | Value    |        |        | Unit | Note                      |
|--------------------------------|------------------|----------|--------|--------|------|---------------------------|
|                                |                  | Min.     | Typ.   | Max.   |      |                           |
| Converter Power Supply Voltage | V <sub>i</sub>   | (10.8)   | (12.0) | (13.2) | V    |                           |
| Converter Power Supply Current | I <sub>i</sub>   | ---      | (0.43) | ---    | A    | @ Vi = 12V<br>(Duty 100%) |
| Converter Power Consumption    | P <sub>LED</sub> | ---      | (5.16) | ---    | W    | @ Vi = 12V<br>(Duty 100%) |
| EN Control Level               | Backlight on     | (1.6)    | ---    | (5)    | V    |                           |
|                                | Backlight off    | (0)      | ---    | (1)    | V    |                           |
| PWM Control Level              | PWM High Level   | (1.3)    | ---    | (5)    | V    |                           |
|                                | PWM Low Level    | (0)      | ---    | (0.65) | V    |                           |
| PWM Control Duty Ratio         |                  | (10)     |        | (100)  | %    |                           |
| PWM Control Frequency          | f <sub>PWM</sub> | (100)    | (200)  | (10K)  | Hz   |                           |
| LED Life Time                  | L <sub>L</sub>   | (30,000) |        |        | Hrs  | (2)                       |

Note (1) LED current is measured by utilizing a high frequency current meter as shown below:

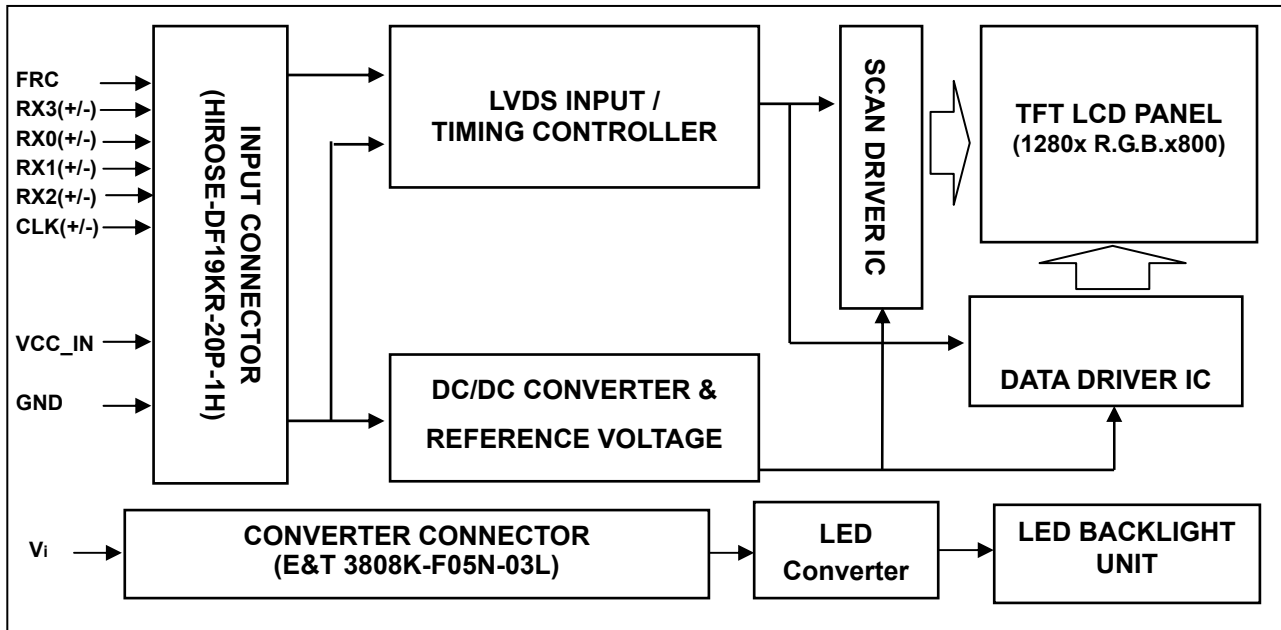
Note (2) The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ± 2 °C and I<sub>LED</sub> = 20mA<sub>DC</sub>(LED forward current) until the brightness becomes ≤ 50% of its original value.

Note (3) Please note that LED life will be shorter than the average life described in the specification if operate in higher ambient temperature.



4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



## 5. INPUT TERMINAL PIN ASSIGNMENT

### 5.1 LVDS I/O PIN ASSIGNMENT

| Pin | Symbol | Description  | Polarity | Remark                |
|-----|--------|--|----------|-----------------------|
| 1   | Vss    | Ground   |          |                       |
| 2   | Vcc    | Power Supply +3.3 V (typical)  |          |                       |
| 3   | Vcc    | Power Supply +3.3 V (typical)  |          |                       |
| 4   | NC     | Non-Connection   |          |                       |
| 5   | FRC    | Dithering control setting<br>When FRC=H, the width of data input 8 bits<br>When FRC=L, the width of data input 6 bits<br>and set Dx0 and Dx1 to logical low (Default is L) |          | H is 3.3V<br>L is GND |
| 6   | Rxin3- | LVDS Differential Data Input   | Negative |                       |
| 7   | Rxin3+ | LVDS Differential Data Input   | Positive |                       |
| 8   | Rxin0- | LVDS Differential Data Input   | Negative |                       |
| 9   | Rxin0+ | LVDS Differential Data Input   | Positive |                       |
| 10  | Vss    | Ground   |          |                       |
| 11  | Rxin1- | LVDS Differential Data Input   | Negative |                       |
| 12  | Rxin1+ | LVDS Differential Data Input   | Positive |                       |
| 13  | Vss    | Ground   |          |                       |
| 14  | Rxin2- | LVDS Differential Data Input   | Negative |                       |
| 15  | Rxin2+ | LVDS Differential Data Input   | Positive |                       |
| 16  | Vss    | Ground   |          |                       |
| 17  | CLK-   | LVDS Clock Data Input  | Negative | LVDS Level Clock      |
| 18  | CLK+   | LVDS Clock Data Input  | Positive |                       |
| 19  | Vss    | Ground   |          |                       |
| 20  | Vss    | Ground   |          |                       |

Note (1) User's connector Part No.: DF19G-20S-1SD (HIROSE) or equivalent DF19G-20S-1For DF19G-20S-1C

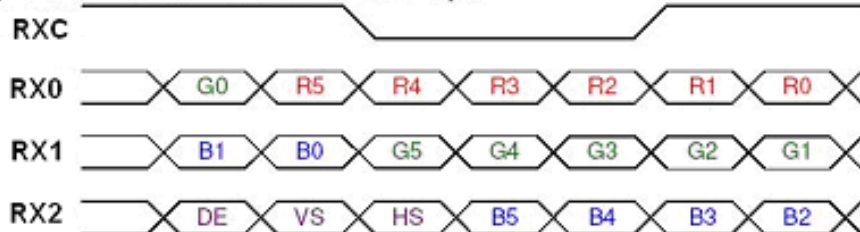
### 5.2 BACKLIGHT PIN ASSIGNMENT (Converter connector pin)

| Pin | Symbol | Description             | Remark                                |
|-----|--------|-------------------------|---------------------------------------|
| 1   | Vi     | Converter input voltage | 12V                                   |
| 2   | VGND   | Converter ground        | Ground                                |
| 3   | EN     | Enable pin              | 3.3V                                  |
| 4   | ADJ    | Backlight Adjust        | PWM Dimming<br>(Hi: 3.3VDC, Lo: 0VDC) |
| 5   | NC     | Not Connect             | Ground                                |

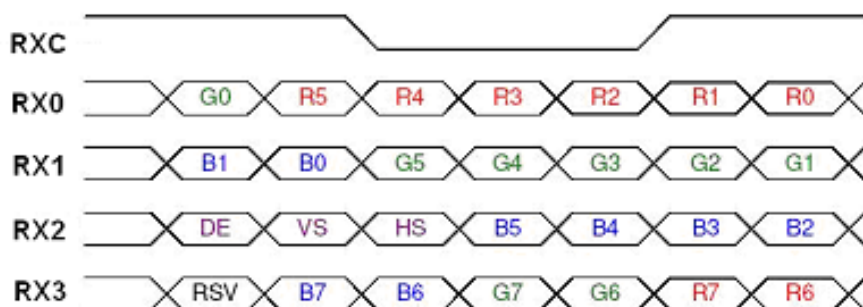
Note (1) User's connector Part No: E&T H208K-P05N-02B or equivalent

5.3 TIMING DIAGRAM OF LVDS INPUT SIGNAL

**FRC = "Low" or "NC" for 6 bits LVDS Input**



**FRC = "High" for 8 bits LVDS Input**



**5.4 COLOR DATA INPUT ASSIGNMENT**

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input. ( 0: Low Level Voltage, 1: High Level Voltage)

| Color               |                 | Data Signal |    |    |    |    |    |       |    |    |    |    |    |      |    |    |    |    |    |
|---------------------|-----------------|-------------|----|----|----|----|----|-------|----|----|----|----|----|------|----|----|----|----|----|
|                     |                 | Red         |    |    |    |    |    | Green |    |    |    |    |    | Blue |    |    |    |    |    |
|                     |                 | R5          | R4 | R3 | R2 | R1 | R0 | G5    | G4 | G3 | G2 | G1 | G0 | B5   | B4 | B3 | B2 | B1 | B0 |
| Basic Colors        | Black           | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Red             | 1           | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Green           | 0           | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Blue            | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  |
|                     | Cyan            | 0           | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  |
|                     | Magenta         | 1           | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  |
|                     | Yellow          | 1           | 1  | 1  | 1  | 1  | 1  | 1     | 1  | 1  | 1  | 1  | 1  | 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  |
| Gray Scale Of Red   | Red(0) / Dark   | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Red(1)          | 0           | 0  | 0  | 0  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Red(2)          | 0           | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | Red(61)         | 1           | 1  | 1  | 1  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Red(62)         | 1           | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Red(63)         | 1           | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
| Gray Scale Of Green | Green(0) / Dark | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Green(1)        | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Green(2)        | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | Green(61)       | 0           | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Green(62)       | 0           | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Green(63)       | 0           | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |
| Gray Scale Of Blue  | Blue(0) / Dark  | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |
|                     | Blue(1)         | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 1  |
|                     | Blue(2)         | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 1  | 0  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | ⋮               | ⋮           | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮    | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  |
|                     | Blue(61)        | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 0  | 1  |
|                     | Blue(62)        | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 0  |
|                     | Blue(63)        | 0           | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1    | 1  | 1  | 1  | 1  | 1  |

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

( 0: Low Level Voltage, 1: High Level Voltage)

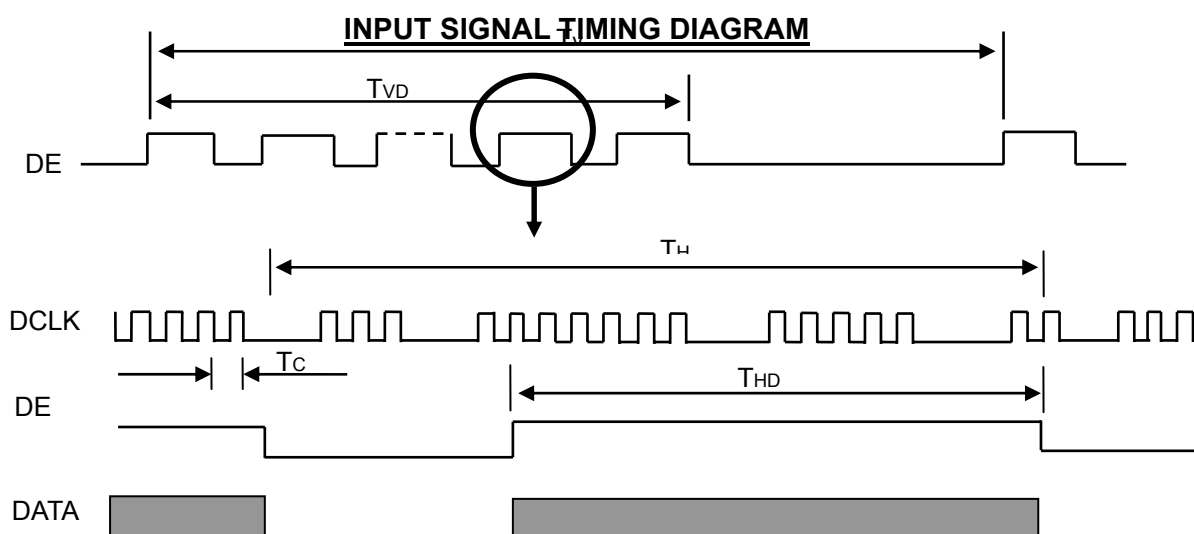
| Color               |                | Data Signal |    |    |    |    |    |    |    |       |    |    |    |    |    |    |    |      |    |    |    |    |    |    |
|---------------------|----------------|-------------|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|------|----|----|----|----|----|----|
|                     |                | Red         |    |    |    |    |    |    |    | Green |    |    |    |    |    |    |    | Blue |    |    |    |    |    |    |
|                     |                | 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  |
|                     | Red            | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  | 0  |
|                     | Green          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 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  |
|                     | Cyan           | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1    | 1  | 1  | 1  | 1  | 1  | 1  |
|                     | 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   | Red(0) / Dark  | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Red(1)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Red(2)         | 0           | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | Red(253)       | 1           | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Red(254)       | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Red(255)       | 1           | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
| Gray Scale Of Green | Green(0)/ Dark | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Green(1)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Green(2)       | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | Green(253)     | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Green(254)     | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Green(255)     | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0    | 0  | 0  | 0  | 0  | 0  |    |
| Gray Scale Of Blue  | Blue(0) / Dark | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 0  |    |
|                     | Blue(1)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 1  |    |
|                     | Blue(2)        | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0  | 0  | 0  | 0  | 1  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | :              | :           | :  | :  | :  | :  | :  | :  | :  | :     | :  | :  | :  | :  | :  | :  | :  | :    | :  | :  | :  | :  | :  |    |
|                     | Blue(253)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 0  |    |
|                     | Blue(254)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  |    |
|                     | Blue(255)      | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0     | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1    | 1  | 1  | 1  | 1  | 1  |    |

6. INTERFACE TIMING

6.1 TIMING CHARACTERISTICS

The specifications of input signal timing are as the following table and timing diagram.

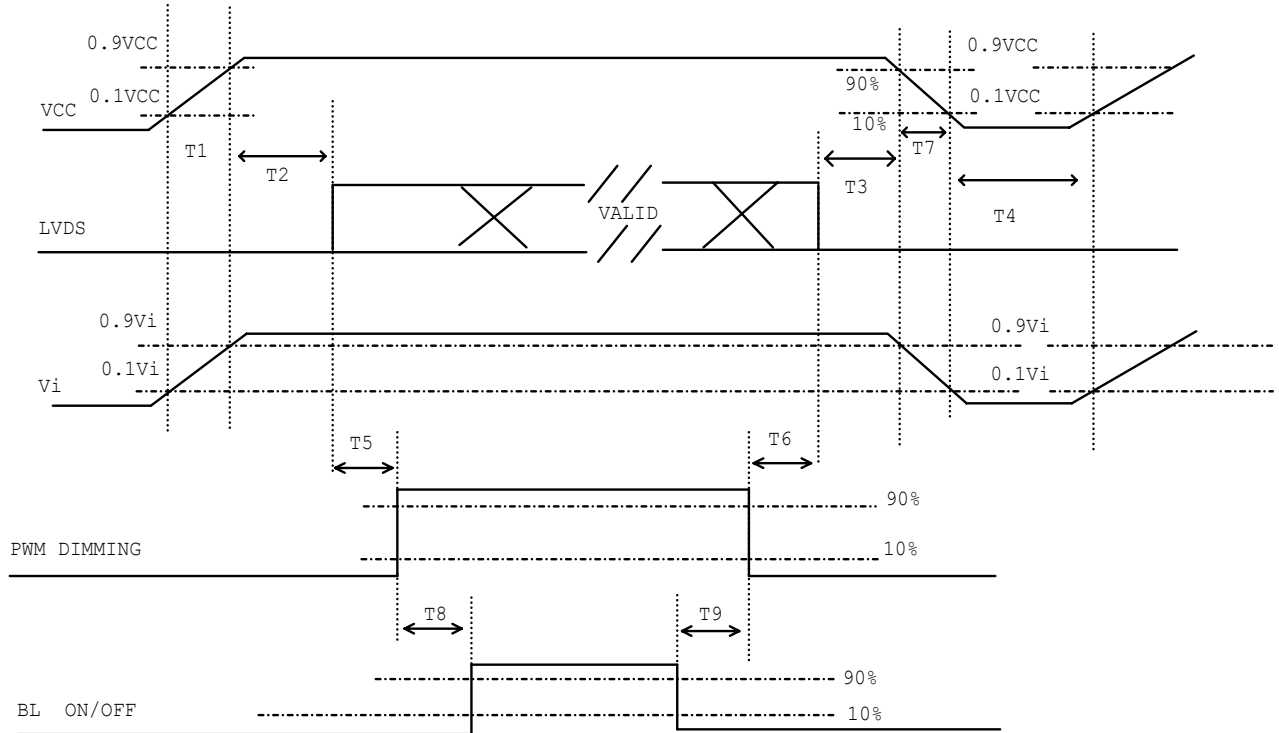
| Signal | Item                       | Symbol | Min.   | Typ.   | Max.   | Unit | Note |
|--------|----------------------------|--------|--------|--------|--------|------|------|
| DCLK   | Frequency                  | 1/Tc   | (50)   | (71)   | (80)   | MHz  | -    |
| DE     | Vertical Total Time        | TV     | (810)  | (823)  | (1023) | TH   | -    |
|        | Vertical Addressing Time   | TVD    | (800)  | (800)  | (800)  | TH   | -    |
|        | Horizontal Total Time      | TH     | (1360) | (1440) | (1800) | Tc   | -    |
|        | Horizontal Addressing Time | THD    | (1280) | (1280) | (1280) | Tc   | -    |





## 6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below



### Power ON/OFF sequence

Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0 V.

Note (3) The Backlight converter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

| Parameter | Value |     |       | Units |
|-----------|-------|-----|-------|-------|
|           | Min   | Typ | Max   |       |
| T1        | (0.5) | -   | (10)  | ms    |
| T2        | (0)   | -   | (50)  | ms    |
| T3        | (0)   | -   | (50)  | ms    |
| T4        | (500) | -   | -     | ms    |
| T5        | (20)  | -   | -     | ms    |
| T6        | (10)  | -   | -     | ms    |
| T7        | (5)   | -   | (300) | ms    |
| T8        | (10)  | -   | -     | ms    |
| T9        | (10)  | -   | -     | ms    |

## 7. OPTICAL CHARACTERISTICS

### 7.1 TEST CONDITIONS

| Item                | Symbol  | Value | Unit |
|---------------------|---|-------|------|
| Ambient Temperature | Ta  | 25±2  | °C   |
| Ambient Humidity    | Ha  | 50±10 | %RH  |
| Supply Voltage      | V <sub>CC</sub>   | 3.3   | V    |
| Input Signal        | According to typical value in "3. ELECTRICAL CHARACTERISTICS" |       |      |
| Current             | I <sub>f</sub>  | 20±3  | mA   |
| Converter Duty      |   | 100   | %    |

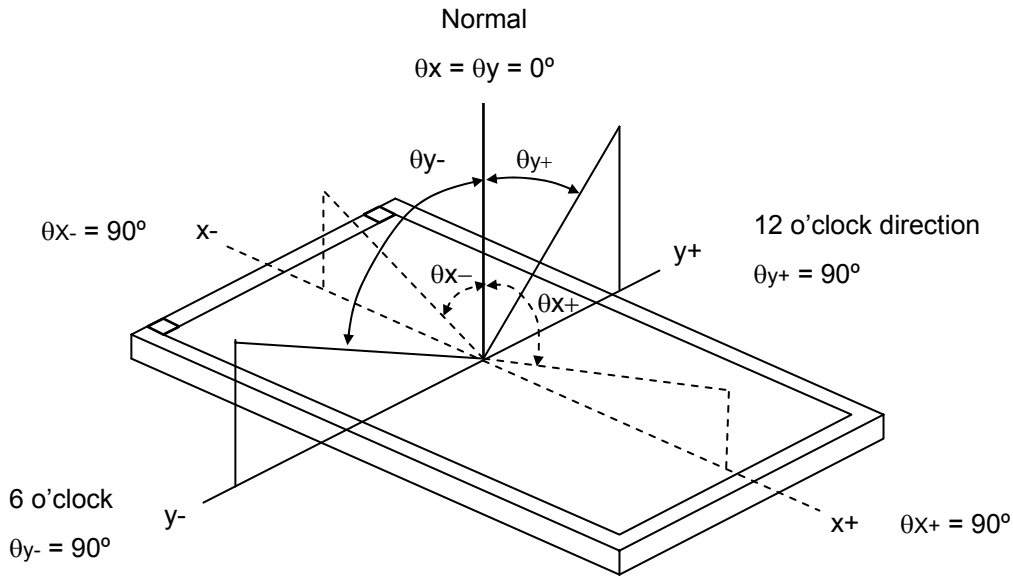
Note (1) I<sub>f</sub> means the forward current of each channel

### 7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

| Item                      |            | Symbol          | Condition  | Min.          | Typ.    | Max.          | Unit              | Note     |          |
|---------------------------|------------|-----------------|--|---------------|---------|---------------|-------------------|----------|----------|
| Color Chromaticity        | Red        | R <sub>x</sub>  | $\theta_x=0^\circ, \theta_y=0^\circ$<br>Viewing Normal Angle | Typ -<br>0.05 | (0.606) | Typ +<br>0.05 |                   | (1), (6) |          |
|                           |            | R <sub>y</sub>  |  |               | (0.342) |               |                   |          |          |
|                           | Green      | G <sub>x</sub>  |  |               | (0.338) |               |                   |          |          |
|                           |            | G <sub>y</sub>  |  |               | (0.541) |               |                   |          |          |
|                           | Blue       | B <sub>x</sub>  |  |               | (0.158) |               |                   |          |          |
|                           |            | B <sub>y</sub>  |  |               | (0.144) |               |                   |          |          |
|                           | White      | W <sub>x</sub>  |  |               | (0.313) |               |                   |          |          |
|                           |            | W <sub>y</sub>  |  |               | (0.329) |               |                   |          |          |
| Center Luminance of White |            | L <sub>C</sub>  |  | (400)         | (500)   |               | cd/m <sup>2</sup> | (4), (6) |          |
| Contrast Ratio            |            | CR              |  | (550)         | (800)   |               | -                 | (2), (6) |          |
| Response Time             |            | T <sub>R</sub>  |  |               | (6)     | (11)          | Ms                | (3)      |          |
|                           |            | T <sub>F</sub>  |  |               | (10)    | (15)          | Ms                |          |          |
| White Variation           |            | δW              |  |               | (1.25)  | (1.4)         | -                 | (5), (6) |          |
| Viewing Angle             | Horizontal | θ <sub>x+</sub> | CR ≥ 10  |               | (60)    | (70)          |                   | Deg.     | (1), (6) |
|                           |            | θ <sub>x-</sub> |  |               | (60)    | (70)          |                   |          |          |
|                           | Vertical   | θ <sub>y+</sub> |  |               | (50)    | (60)          |                   |          |          |
|                           |            | θ <sub>y-</sub> |  |               | (50)    | (60)          |                   |          |          |

Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

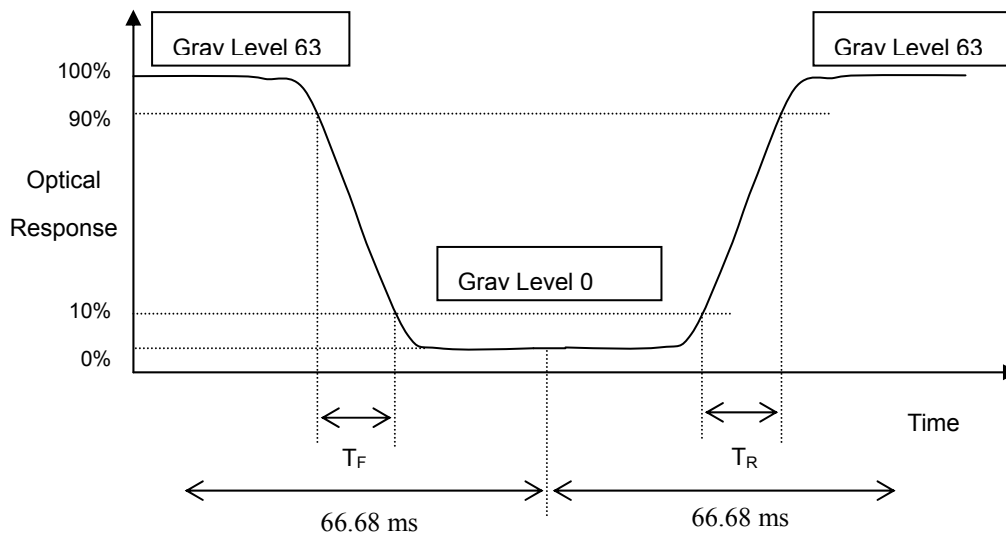
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

Note (3) Definition of Response Time ( $T_R, T_F$ ) and measurement method:



Note (4) Definition of Luminance of White ( $L_C$ ):

Measure the luminance of gray level 63 at center point

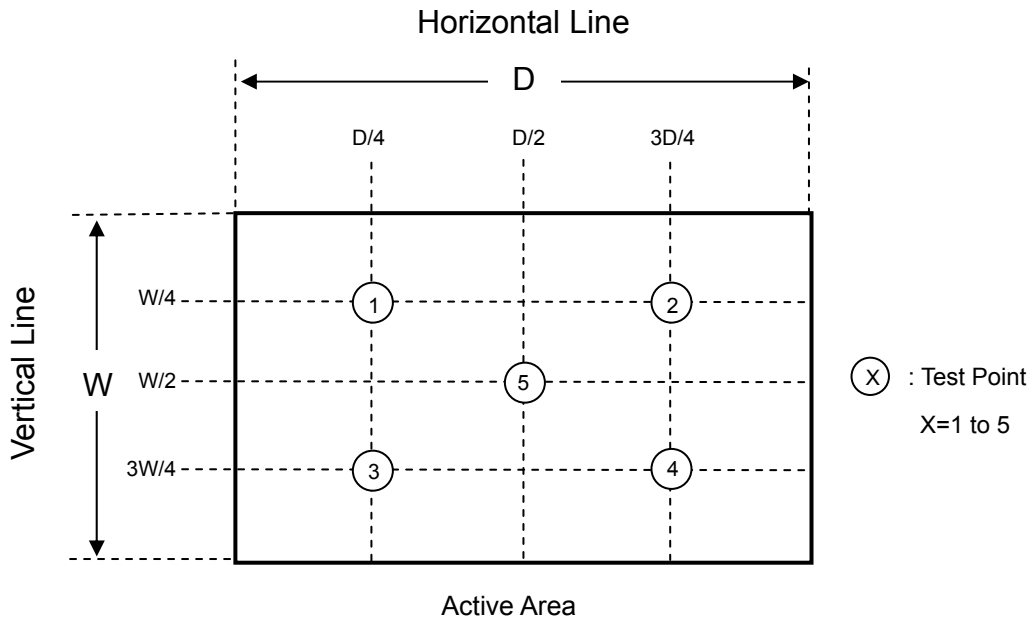
$$L_C = L(5)$$

$L(x)$  is corresponding to the luminance of the point X at Figure in Note (5).

Note (5) Definition of White Variation ( $\delta W$ ):

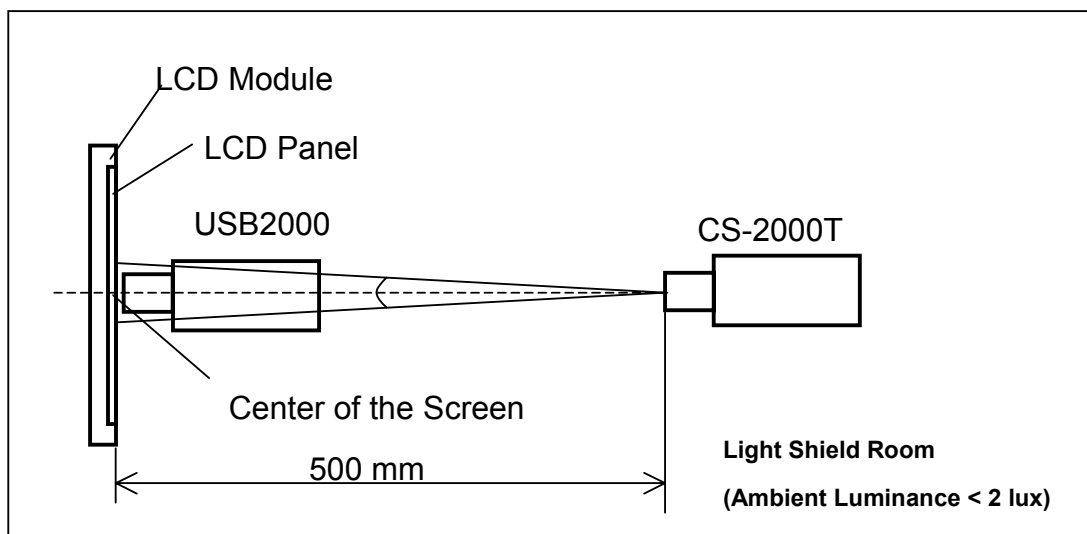
Measure the luminance of gray level 63 at 5 points

$$\delta W = \text{Maximum} [L(1), L(2), L(3), L(4), L(5)] / \text{Minimum} [L(1), L(2), L(3), L(4), L(5)]$$



Note (6) Measurement Setup:

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



8. RELIABILITY TEST

8.1 RELIABILITY TEST CONDITION

| No. | Test Item                                  | Test Condition                                       | Note    |
|-----|--|--|---------|
| 1   | High Temperature Storage                   | 80°C, 240 hours                                      | (1) (2) |
| 2   | Low Temperature Storage                    | -30°C, 240 hours                                     |         |
| 3   | Thermal Shock Storage                      | {{(-30°C, 0.5 hour) (80°C, 0.5 hour)}, 100 cycles    |         |
| 4   | High Temperature Operating                 | 70°C, 240 hours                                      |         |
| 5   | Low Temperature Operating                  | -30°C, 240 hours                                     |         |
| 6   | High Temperature & High Humidity Operating | 60°C, 90% RH, 240hours                               |         |
| 7   | Shock (Non-Operating)                      | 200G, 2ms, half sine wave, 1 time for ± X, ± Y, ± Z. | (3)     |
| 8   | Vibration (Non-Operating)                  | 1.5G, 10~300Hz, 10min/cycle, 3 cycles each X,Y,Z     | (3)     |

Note (1) There should be no condensation on the surface of panel during test.

Note (2) The temperature of panel display surface area should be 80°C Max.

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note (4) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before the reliability test.

9. PACKAGING

9.1 PACKING SPECIFICATIONS

- (1) 20pcs LCD modules / 1 Box
- (2) Box dimensions: 520(L)x310(W)x415(H)mm
- (3) Weight: approximately 13 Kg (20modules per box)

9.2 PACKING METHOD

- (1) Carton Packing should have no failure in the following reliability test items.

| Test Item     | Test Conditions  | Note          |
|---------------|--|---------------|
| Vibration     | ISTA STANDARD<br>Random, Frequency Range: 2 – 200 Hz<br>Top & Bottom: 30 minutes (+Z), 10 min (-Z),<br>Right & Left: 10 minutes (X)<br>Back & Forth 10 minutes (Y) | Non Operation |
| Dropping Test | 1 Angle, 3 Edge, 6 Face, 61 cm   | Non Operation |

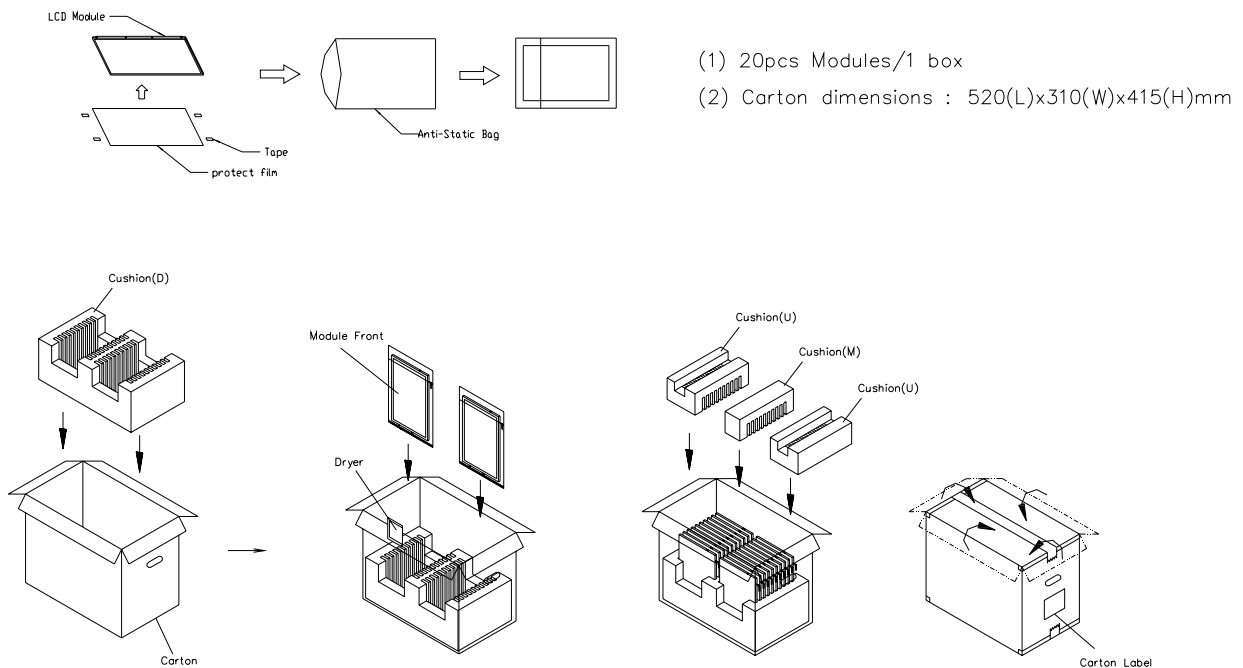


Figure. 9-1 Packing method

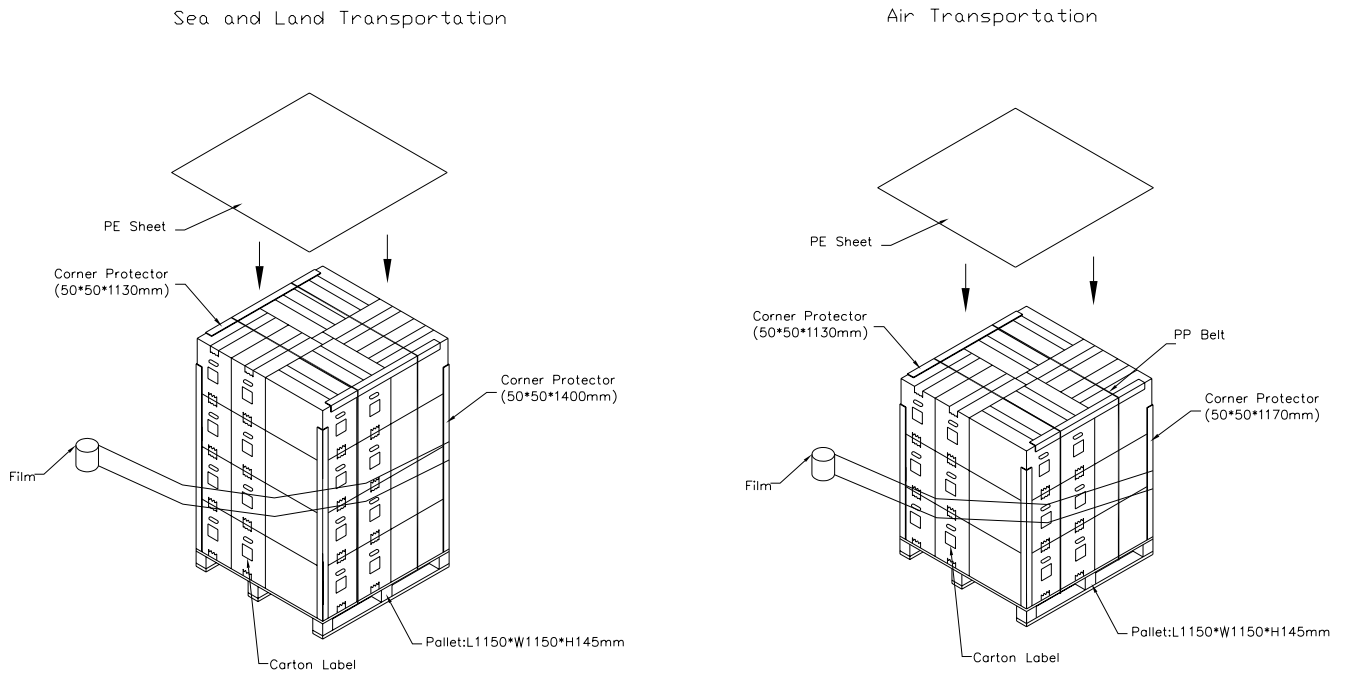


Figure. 9-2 Packing method

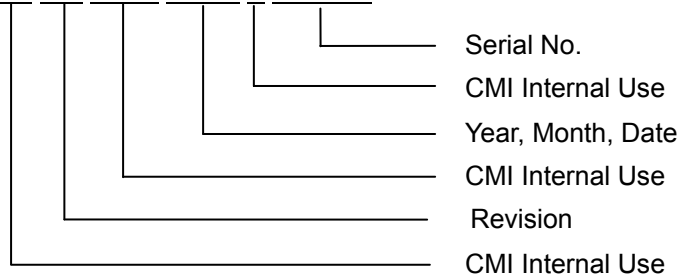
10. DEFINITION OF LABEL

10.1 CMI MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: G133IGE -L03
- (b) Revision: Rev. XX, for example: A1, ..., C1, C2 ...etc.
- (c) Serial ID: XXXXXXXXYMDXNNNN



Serial ID includes the information as below:

- (a) Manufactured Date: Year: 1~9, for 2001~2009  
 Month: 1~9, A~C, for Jan. ~ Dec.  
 Day: 1~9, A~Y, for 1<sup>st</sup> to 31<sup>st</sup>, exclude I , O and U
- (b) Revision Code: cover all the change  
 Serial No.: Manufacturing sequence of product



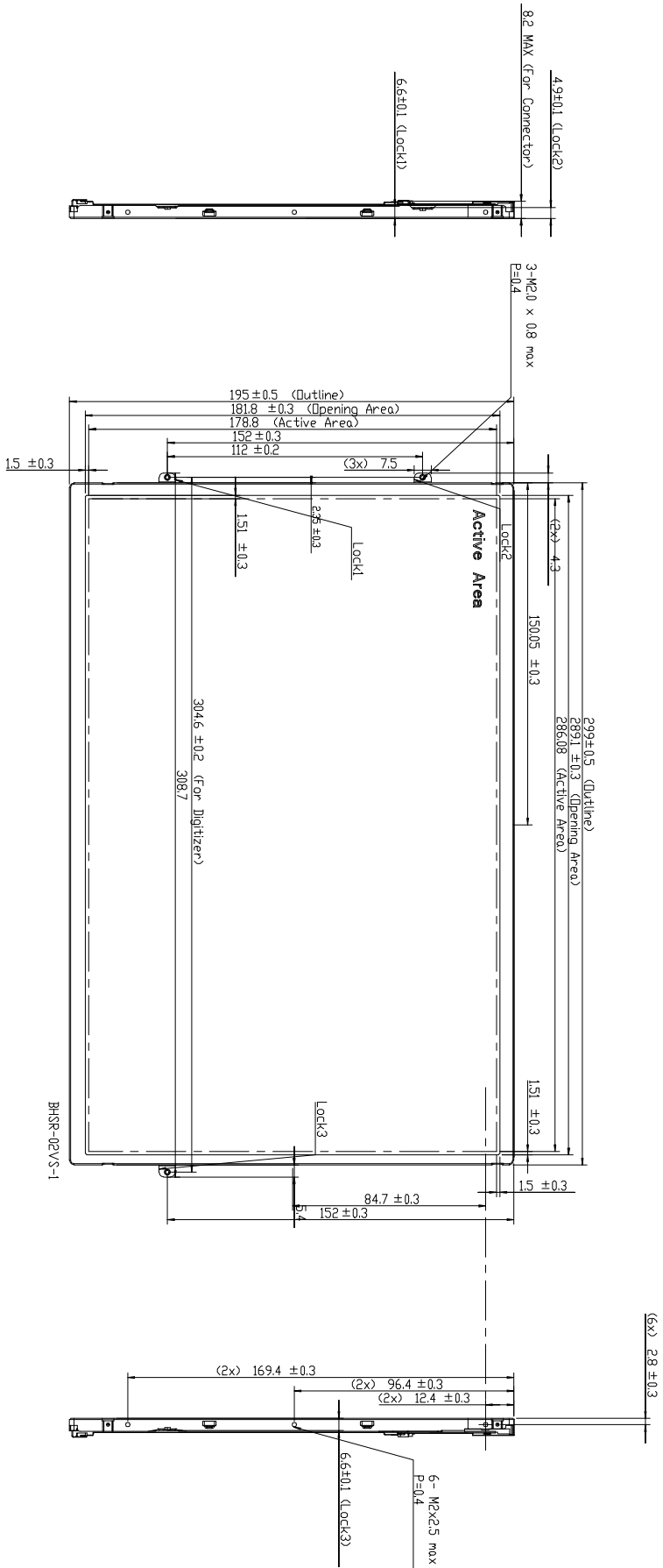
## 11. PRECAUTIONS

### 11.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- (4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- (5) Do not pull the I/F connector in or out while the module is operating.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- (9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (10) When ambient temperature is lower than 10°C may reduce the display quality. For example, the response time will become slowly.
- (11) Do not keep same pattern in a long period of time. It may cause image sticking on LCD

### 11.2 SAFETY PRECAUTIONS

- (1) Do not disassemble the module or insert anything into the Backlight unit to prevent electrical shock.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.

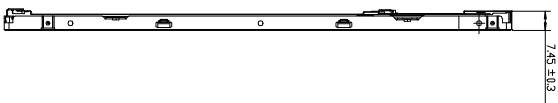
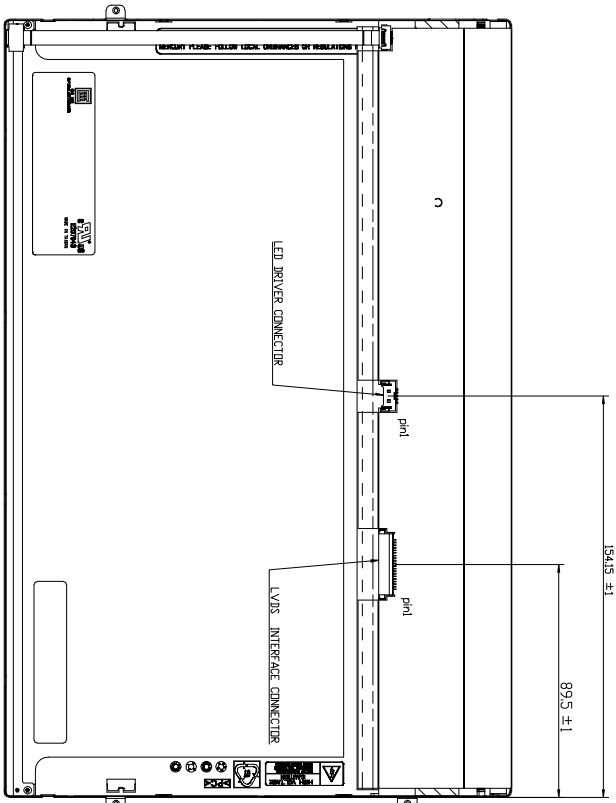


- NOTES:  
 1. GENERAL TOLERANCE : ±0.5 MM  
 2. SCREW TORQUE FOR FRONT MOUNTING SHALL NOT EXCEED 1.5 KGF-CM  
 3. SCREW HOLE DEPTH 2.5MM MAX  
 4. MAX SCREW TORQUE : 2. KGF-CM

| Rev | Description | Date | Checked By | Approved By | ECN No. | Remark |
|-----|-------------|------|------------|-------------|---------|--------|
| 1   |             |      |            |             |         |        |
| 2   |             |      |            |             |         |        |

| General | Tolerance | Unless Specified |
|---------|-----------|------------------|
| 0-6     | ±0.1      | ±0.3             |
| 6-30    | ±0.15     | ±0.5             |
| 30-500  | ±0.2      | ±1.0             |

|  |                    |       |     |
|--|--------------------|-------|-----|
| TITLE                                    | NST ADHOC CABLE-43 | REV   | 1.0 |
| Checked                                  |                    | Drawn |     |
| Approved                                 |                    | Scale | 1:1 |
| DATE                                     | 12-06-2011         | Scale | 1:1 |
| CHI MET                                  |                    |       |     |
| PTEL ELECTRONICS CORP.                   |                    |       |     |
| ALL RIGHTS RESERVED. COMPANY PROPRIETARY |                    |       |     |



| Mark | Description | Date | Changed By | Approved By | ECN No. | Remark |
|------|-------------|------|------------|-------------|---------|--------|
| 2    |             |      |            |             |         |        |
| 3    |             |      |            |             |         |        |
| 4    |             |      |            |             |         |        |
| 5    |             |      |            |             |         |        |
| 6    |             |      |            |             |         |        |
| 7    |             |      |            |             |         |        |
| 8    |             |      |            |             |         |        |
| 9    |             |      |            |             |         |        |
| 10   |             |      |            |             |         |        |
| 11   |             |      |            |             |         |        |
| 12   |             |      |            |             |         |        |
| 13   |             |      |            |             |         |        |
| 14   |             |      |            |             |         |        |
| 15   |             |      |            |             |         |        |
| 16   |             |      |            |             |         |        |

| General | Tolerance | Unless Specified | Surface Finish |
|---------|-----------|------------------|----------------|
| 0-6     | ±0.1      | 300-600          | ±0.3           |
| 6-30    | ±0.15     | 600-             | ±0.6           |
| 30-500  | ±0.2      | RANGE            | ±1.0           |

|   |                   |                |
|---|-------------------|----------------|
| TITLE: N551 MODULE CARRIER-43             |                   | REV: 1         |
| Checked                                   | Drawing No.       | 100            |
| Designed                                  | Part No.          | 100            |
| Assembled                                 | Material          | 100            |
| Drawn                                     | Date: 08-May-2008 | Scale: 1:1     |
| CHI MET                                   |                   | Sheet: 2 of 11 |
| CHI ELECTRONICS CORP.                     |                   | Part No.       |
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