

SAMSUNG**ELECTRONICS**

Preliminary



TO :
DATE : July. 16, 2009.

SAMSUNG TFT-LCD
MODEL NO. : LTN121W3-L01

NOTE : Extension code [-*]
→ LTN121W3-L01-
Surface type [**Glare**]

Any Modification of Spec is not allowed without SEC' permission

LCD DEVELOPMENT G1. MOBILE DIVISION
SAMSUNG ELECTRONICS CO., LTD.

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|----------------|--------------|---------------|-----------------|-------------|--------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 1 / 31 |
|----------------|--------------|---------------|-----------------|-------------|--------|

Preliminary

CONTENTS

| | |
|---|--------------|
| Revision History | ----- (3) |
| General Description | ----- (4) |
| 1. Absolute Maximum Ratings | ----- (5) |
| 1.1 Absolute Ratings of environment | |
| 1.2 Electrical Absolute Ratings | |
| 2. Optical Characteristics | ----- (7) |
| 3. Electrical Characteristics | ----- (10) |
| 3.1 TFT LCD Module | |
| 3.2 Backlight Unit | |
| 3.3 LED Driver | |
| 4. Block Diagram | ----- (13) |
| 4.1 TFT LCD Module | |
| 5. Input Terminal Pin Assignment | ----- (14) |
| 5.1 Input Signal & Power | |
| 5.2 LVDS Interface | |
| 5.3 Timing Diagrams of LVDS For Transmitting | |
| 5.4 Input Signals, Basic Display Colors and Gray Scale of Each Color. | |
| 5.5 Pixel format | |
| 5.6 LED Driver Connector & Pin Assignment | |
| 6. Interface Timing | ----- (20) |
| 6.1 Timing Parameters | |
| 6.2 Timing Diagrams of interface Signal | |
| 6.3 Power ON/OFF Sequence | |
| 7. Outline Dimension | ----- (22) |
| 8. Packing | ----- (24) |
| 9. Markings & Others | ----- (25) |
| 10. General Precautions | ----- (27) |
| 11. EDID | ----- (29) |

Samsung Secret

| | | | | | |
|----------------|--------------|---------------|-----------------|-------------|--------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 2 / 31 |
|----------------|--------------|---------------|-----------------|-------------|--------|

REVISION HISTORY

Preliminary

| Date | Revision No. | Page | Summary |
|----------------|--------------|------|---|
| July. 16, 2009 | P00 | All | LTN121W3-L01 Model preliminary spec was issued first. |
| | | | |

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Preliminary

GENERAL DESCRIPTION

DESCRIPTION

LTN121W3-L01 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as switching devices. This model is composed of a TFT LCD panel, a driver circuit and a backlight unit. The resolution of a 12.1" contains 1280 x 800 pixels and can display up to 262,144 colors. 6 O'clock direction is the optimum viewing angle.

FEATURES

- High contrast ratio, high aperture structure
- WXGA (1280 x 800 pixels) resolution
- Low power consumption
- Fast Response
- LED Back Light with LED Driver
- DE(Data enable) only mode
- 3.3V LVDS Interface
- Onboard EEDID chip
- Pb-free product (RoHS compliant)

APPLICATIONS

- Notebook PC
- If the usage of this product is not for PC application, but for others, please contact SEC

GENERAL INFORMATION

| Item | Specification | Unit | Note |
|-------------------|--|-------|------|
| Display area | 261.12(H) x 163.2(V) (12.1" wide diagonal) | mm | |
| Driver element | a-Si TFT active matrix | | |
| Display colors | 262,144 | | |
| Number of pixel | 1280 x 800 | pixel | |
| Pixel arrangement | RGB vertical stripe | | |
| Pixel pitch | 0.204(H) x 0.204(V) (TYP.) | mm | |
| Display Mode | Normally white | | |
| Surface treatment | Haze 0, Hard-Coating 3H | | |

Samsung Secret

| | | | | | |
|----------------|--------------|---------------|-----------------|-------------|--------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 4 / 31 |
|----------------|--------------|---------------|-----------------|-------------|--------|

Preliminary

Mechanical Information

| Item | | Min. | Typ. | Max. | Unit | Note |
|-------------|----------------|-------|-------|-------|------|--------------|
| Module size | Horizontal (H) | 275.3 | 275.8 | 276.3 | mm | |
| | Vertical (V) | 179.5 | 180.0 | 180.5 | mm | |
| | Depth (D) | - | 5.2 | 5.5 | mm | (1) |
| Weight | | - | 220 | 230 | G | w/ converter |

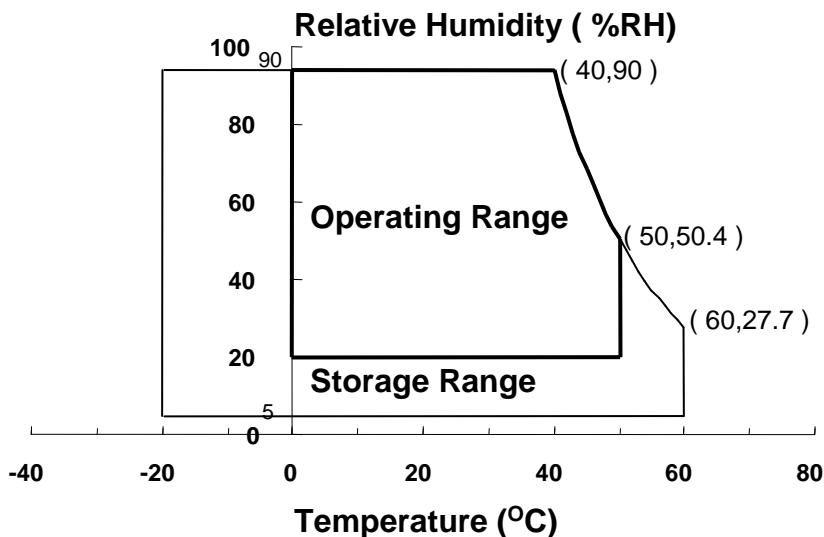
Note (1) Measurement condition of outline dimension
 . Equipment : Bernier Calipers
 . Push Force : 500g · f (minimum)

1. ABSOLUTE MAXIMUM RATINGS

1.1 ENVIRONMENTAL ABSOLUTE RATINGS

| Item | Symbol | Min. | Max. | Unit | Note |
|---|------------------|------|------|------|---------|
| Storage temperate | T _{STG} | -20 | 60 | °C | (1) |
| Operating temperate (Temperature of glass surface) | T _{OPR} | 0 | 50 | °C | (1) |
| Shock (non-operating) | Snop | - | 240 | G | (2),(4) |
| Vibration (non-operating) | Vnop | - | 2.41 | G | (3),(4) |

Note (1) Temperature and relative humidity range are shown in the figure below.
 95 % RH Max. (40 °C ≥ Ta)
 Maximum wet - bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation



- (2) 2ms, half sine wave, one time for ±X, ±Y, ±Z.
- (3) 5 - 500 Hz, random vibration, 30min for X, Y, Z.
- (4) At testing Vibration and Shock, the fixture in holding the Module to be tested have to be hard and rigid enough so that the Module would not be twisted or bent by the fixture.

Samsung Secret

Preliminary

1.2 ELECTRICAL ABSOLUTE RATINGS

(1) TFT LCD MODULE

 $V_{DD} = 3.3V$, $V_{SS} = GND = 0V$

| Item | Symbol | Min. | Max. | Unit | Note |
|----------------------|----------|----------------|----------------|------|------|
| Power Supply Voltage | V_{DD} | $V_{DD} - 0.3$ | $V_{DD} + 0.3$ | V | (1) |
| Logic Input Voltage | V_{IN} | $V_{DD} - 0.3$ | $V_{DD} + 0.3$ | V | (1) |

Note (1) Within T_a (25 ± 2 °C)**Samsung Secret**

| | | | | | |
|----------------|--------------|---------------|-----------------|-------------|--------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 6 / 31 |
|----------------|--------------|---------------|-----------------|-------------|--------|

Preliminary

2. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (5).
Measuring equipment : TOPCON BM-5A and PR-650

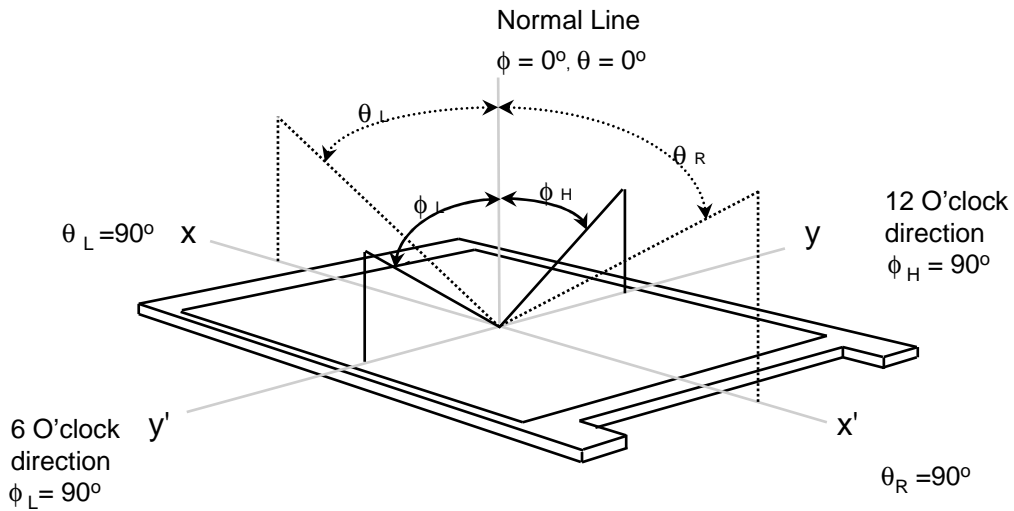
* Ta = 25 ± 2 °C, V_{DD}=3.3V, fv= 60Hz, fd_{CLK} = 69.3MHz, IF = 16.0 mA

| Item | | Symbol | Condition | Min. | Typ. | Max | Unit | Note |
|---|-------|--------------------|--|-------|-------|---------|-------------------|-----------------------|
| Contrast Ratio (5 Points) | | CR | Normal Viewing Angle φ = 0 θ = 0 | 200 | 300 | - | - | (1), (2), (5) |
| Response Time at Ta (Rising + Falling) | | T _{RT} | | - | 25 | 35 | msec | (1), (3) |
| Average Luminance of White (5 Points) | | Y _{L,AVE} | | 170 | 220 | - | cd/m ² | IF=16.0mA (1), (4) |
| Color Chromaticity (CIE) | Red | R _X | | 0.530 | 0.580 | 0.630 | - | (1), (5) PR-650 |
| | | R _Y | | 0.305 | 0.355 | 0.405 | | |
| | Green | G _X | | 0.305 | 0.355 | 0.405 | | |
| | | G _Y | | 0.505 | 0.550 | 0.605 | | |
| | Blue | B _X | | 0.100 | 0.150 | 0.200 | | |
| | | B _Y | | 0.060 | 0.110 | 0.160 | | |
| | White | W _X | | 0.263 | 0.313 | 0.363 | | |
| | | W _Y | 0.279 | 0.329 | 0.379 | | | |
| Viewing Angle | Hor. | θ _L | CR ≥ 10 At center | 40 | 45 | Degrees | (1), (5) BM-5A | |
| | | θ _H | | 40 | 45 | | | |
| | Ver. | φ _H | | 10 | 15 | | | |
| | | φ _L | | 25 | 30 | | | |
| 13 Points White Variation | | δ _L | - | - | 1.7 | - | (6) | |

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Preliminary

Note 1) Definition of Viewing Angle : Viewing angle range($10 \leq C/R$)

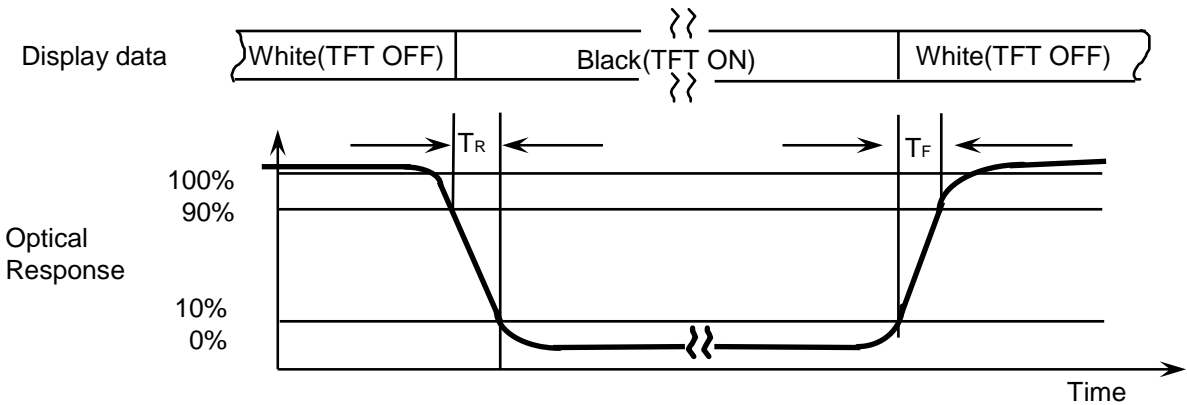


Note 2) Definition of Contrast Ratio (CR) : Ratio of gray max (Gmax) ,gray min (Gmin) at 5 points(4, 5, 7, 9, 10)

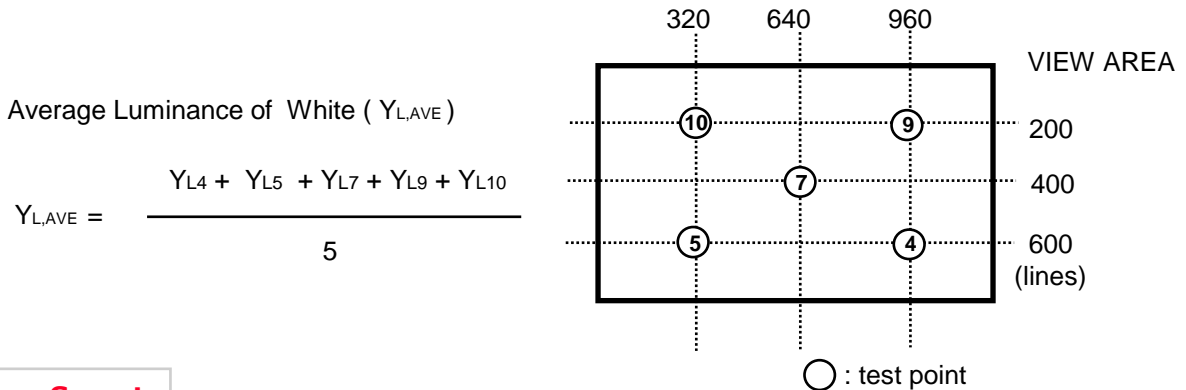
$$CR = \frac{CR(4) + CR(5) + CR(7) + CR(9) + CR(10)}{5}$$

Points : (4) , (5) , (7) , (9) , (10) at the figure of Note (6).

Note 3) Definition of Response time :



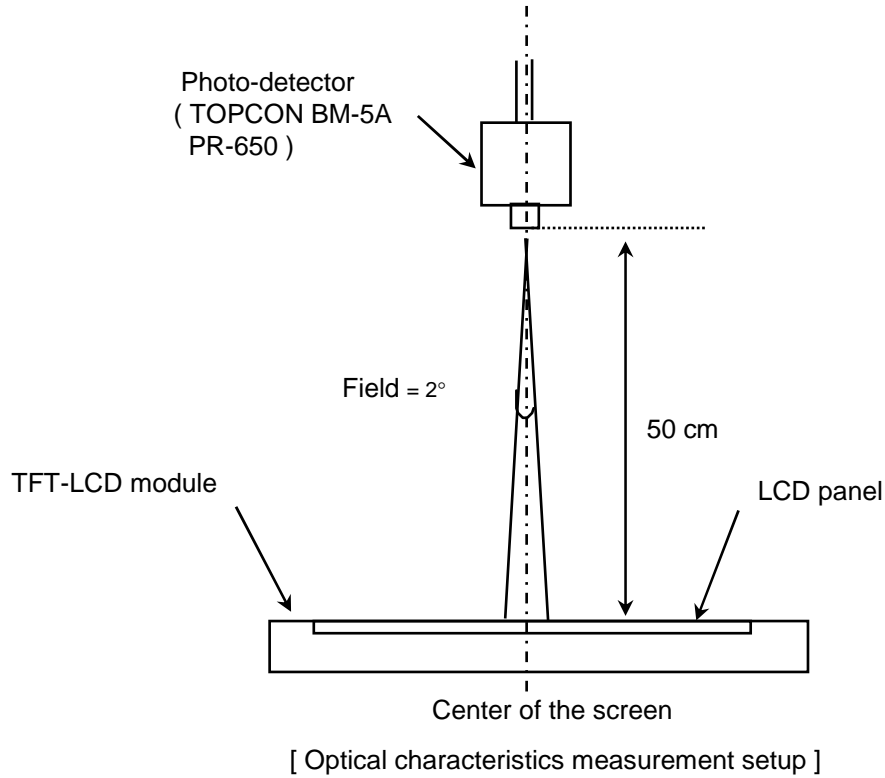
Note 4) Definition of Average Luminance of White : measure the luminance of white at 5 points.



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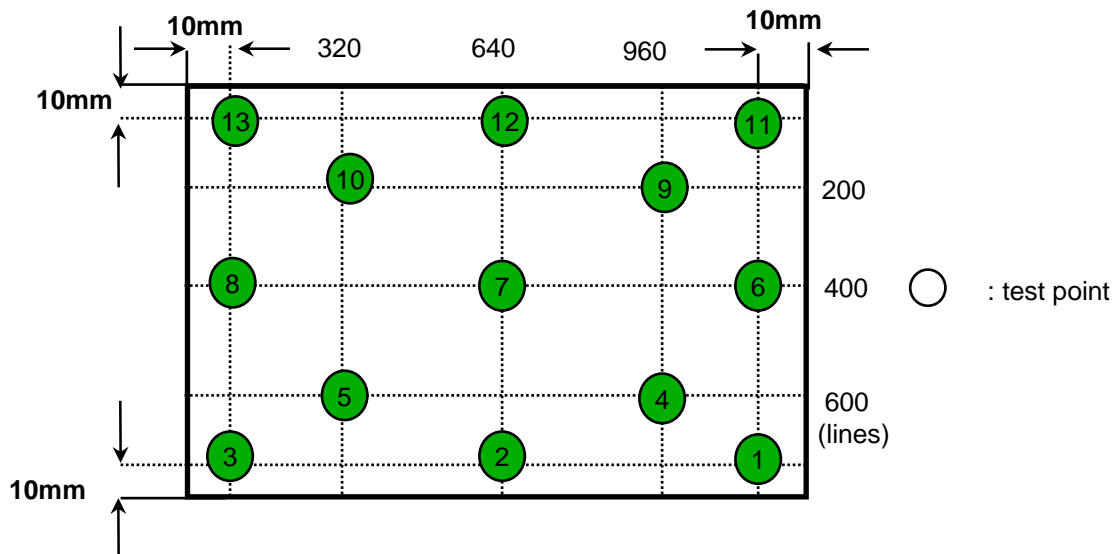
Preliminary

Note 5) After stabilizing and leaving the panel alone at a given temperature for 30 min , the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. 30 min after lighting the backlight. This should be measured in the center of screen.
 LED forward current : 16.0mA (Converter: Foxconn)
 Environment condition : $T_a = 25 \pm 2 \text{ }^\circ\text{C}$



Note 6) Definition of 13 points white variation (δL), CR variation(C_{VER}) [① ~ ⑬]

$$\delta L = \frac{\text{Maximum luminance of 13 points}}{\text{Minimum luminance of 13 points}}$$



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3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

Ta= 25 ± 2°C

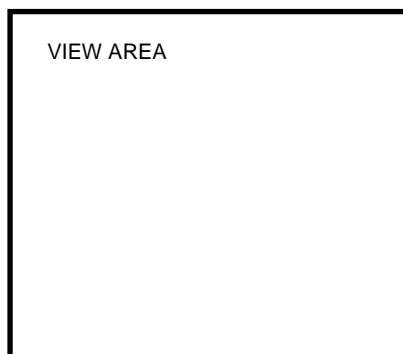
| Item | Symbol | Min. | Typ. | Max. | Unit | Note | |
|--|-------------------|-----------------|-------|------|------|------|-------------------------|
| Voltage of Power Supply | V _{DD} | 3.0 | 3.3 | 3.6 | V | | |
| Differential Input Voltage for LVDS Receiver Threshold | High | V _{IH} | - | - | +100 | mV | V _{CM} = +1.2V |
| | Low | V _{IL} | -100 | - | - | mV | |
| Vsync Frequency | f _V | - | 60 | - | Hz | | |
| Hsync Frequency | f _H | - | 48.96 | - | KHz | | |
| Main Frequency | f _{DCLK} | 67.2 | 69.3 | 70.6 | MHz | | |
| Rush Current | I _{RUSH} | - | - | 1.5 | A | (4) | |
| Current of Power Supply | White | I _{DD} | - | 240 | - | mA | (2),(3)*a |
| | Mosaic | | - | 260 | - | mA | (2),(3)*b |
| | V. stripe | | - | 280 | 360 | mA | (2),(3)*c |

Note (1) Display data pins and timing signal pins should be connected.(GND = 0V)

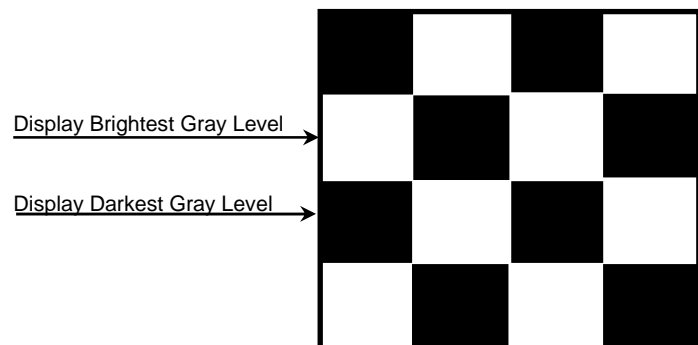
(2) f_V = 60Hz, f_{DCLK} = 69.3MHz, V_{DD} = 3.3V , DC Current.

(3) Power dissipation pattern

*a) White Pattern



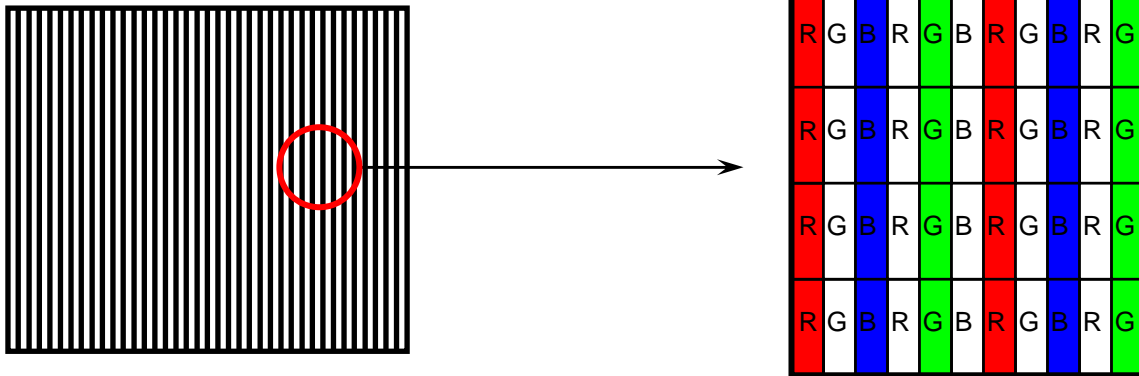
*b) Mosaic Pattern



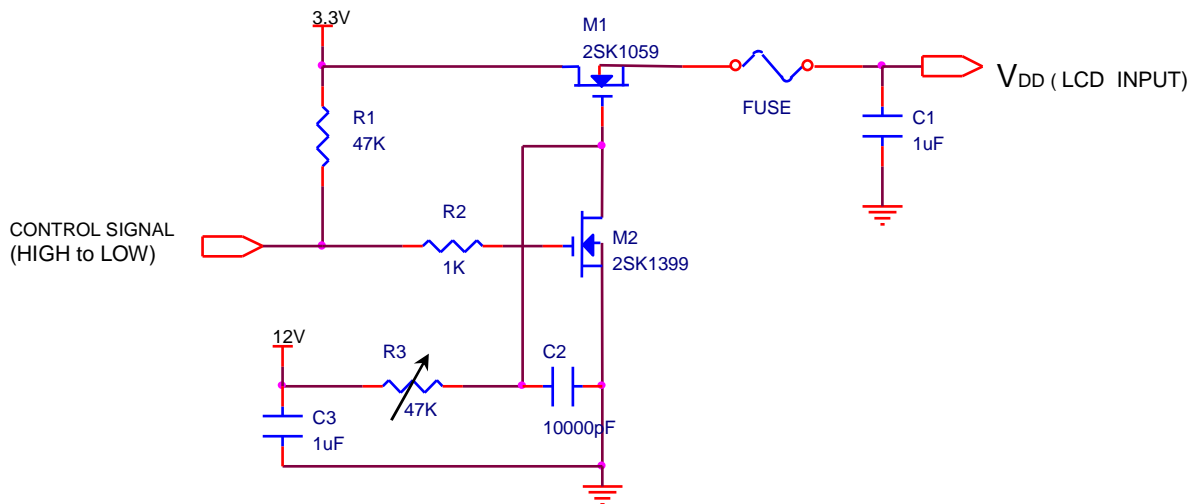
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Preliminary

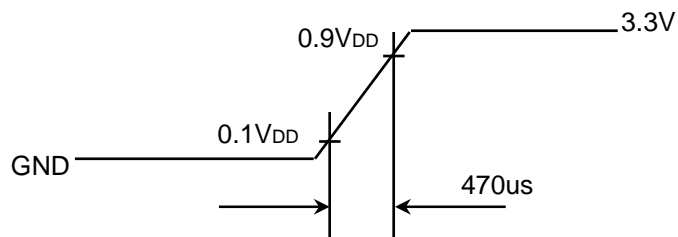
*c) 1dot Vertical stripe pattern



4) Rush current measurement condition



V_{DD} rising time is 470us



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3.2 BACK-LIGHT UNIT

Ta= 25 ± 2 °C

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---------------------|--------|--------|------|------|------|------------------|
| LED Forward Current | IF | - | 16 | - | mA | |
| LED Forward Voltage | VF | - | 3.2 | - | V | |
| LED Array Voltage | VP | - | 25.6 | - | V | VF X 8 LEDs |
| Power Consumption | P | - | 2.46 | - | W | IF X VF X 48LEDs |
| Operating Life Time | Hr | 10,000 | - | - | Hour | (1) |

Note (1) Life time (Hr) of LEDs can be defined as the time in which it continues to operate under the condition Ta= 25 ± 2 °C and IF = 16.0 mArms until one of the following event occurs.

1. When the brightness becomes 50% or lower than the original.
2. When the Effective ignition length becomes 80% or lower than the original value.
(Effective ignition length is defined as an area that has less than 70% brightness compared to the brightness in the center point.)

3.3 LED Driver

- LED Driver Manufacturer : Foxconn

Ta= 25 ± 2 °C

| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|-------------------|------|------|------|------|-----------------------------------|
| Input Voltage | V _{in} | 8.0 | 12.0 | 21.0 | V | |
| Input Current | I | - | 320 | - | mA | |
| Input Power | P _{in} | - | 2.8 | 3 | W | |
| Operating Frequency | F _o | 675 | 750 | 825 | kHz | |
| Output PWM Frequency | F _{PWM} | 190 | 210 | 230 | Hz | |
| Burst Ratio | D | 20 | - | 100 | % | |
| External PWM Dimming Control Frequency (BLIM) | F _{BLIM} | 13.0 | 17.5 | 25.0 | kHz | Vin=8~21V, BLIM=PWM 0V~3.3V |
| Output Current (each LED string) | I _{out} | 15.3 | 16.0 | 16.7 | mA | Vin=8~21V, BLIM=100% |
| | | 2.55 | 2.95 | 3.35 | mA | Vin=8~21V, BLIM=20% |
| Output Power | P _{out} | - | 2.6 | - | W | BLIM=100% |
| Efficiency | η | 80 | - | - | % | BLIM=100% |

Note - Test Equipment : Fluke 45

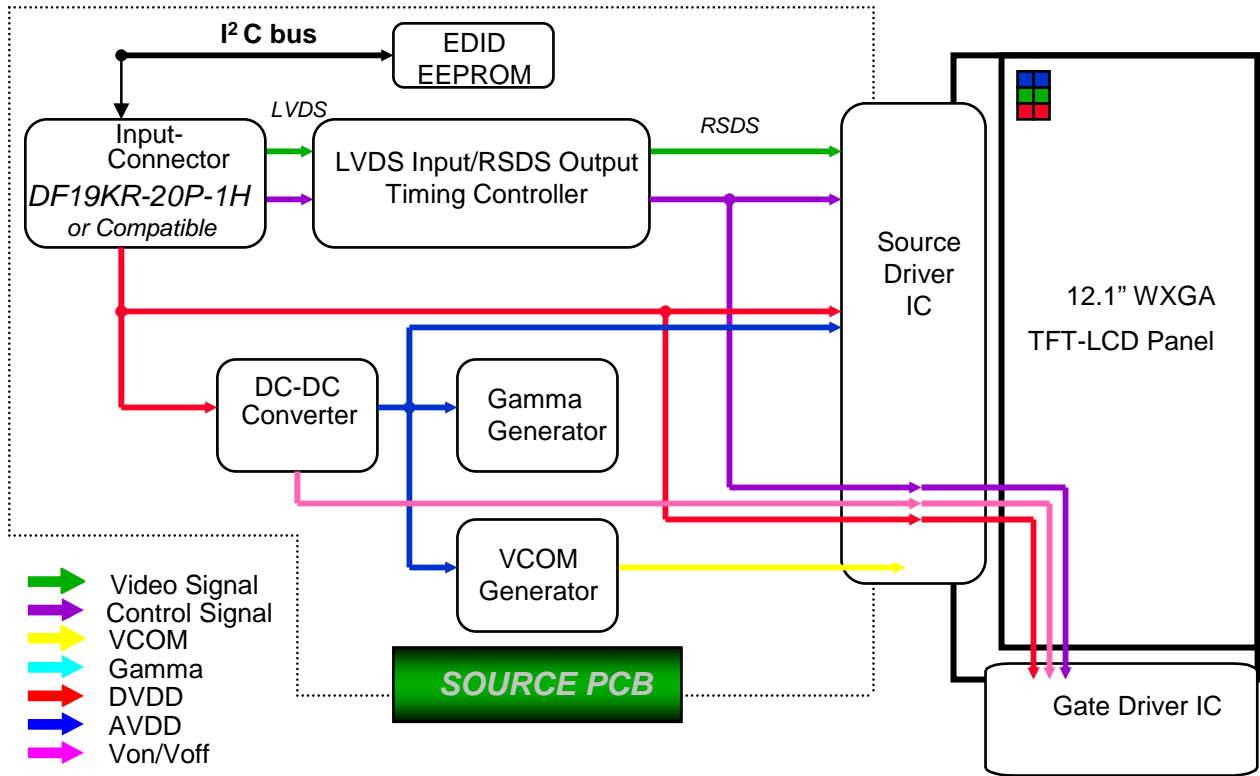
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|---------|--------------|--------|-----------------|------|---------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 12 / 31 |
|---------|--------------|--------|-----------------|------|---------|

Preliminary

4. BLOCK DIAGRAM

4.1 TFT LCD Module



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5. INPUT TERMINAL PIN ASSIGNMENT**5.1. Input Signal & Power (LVDS, Connector : DF19KR-20P-1H by Hirose or equivalent)**

| No. | Symbol | Function | Polarity | Remarks |
|-----|----------|--|----------|---------|
| 1 | VSS | Ground | | |
| 2 | VDD | POWER SUPPLY +3.3V | | |
| 3 | VDD | POWER SUPPLY +3.3V | | |
| 4 | VEEDID | DDC 3.3V Power | | |
| 5 | N.C | No connection | Positive | |
| 6 | CLKEDID | DDC Clock | | |
| 7 | DATAEDID | DDC data | | |
| 8 | RxIN0- | LVDS Differential Data INPUT (R0-R5,G0) | Negative | |
| 9 | RxIN0+ | LVDS Differential Data INPUT (R0-R5,G0) | Positive | |
| 10 | GND | Ground | | |
| 11 | RxIN1- | LVDS Differential Data INPUT (G1-G5,B0-B1) | Negative | |
| 12 | RxIN1+ | LVDS Differential Data INPUT (Odd G1-G5,B0-B1) | Positive | |
| 13 | GND | Ground | | |
| 14 | RxIN2- | LVDS Differential Data INPUT (B2-B5,Sync,DE) | Negative | |
| 15 | RxIN2+ | LVDS Differential Data INPUT (B2-B5,Sync,DE) | Positive | |
| 16 | GND | Ground | | |
| 17 | RxCLK- | LVDS Differential Data INPUT | Negative | |
| 18 | RxCLK+ | LVDS Differential Data INPUT | Positive | |
| 19 | GND | Ground | | |
| 20 | GND | Ground | | |

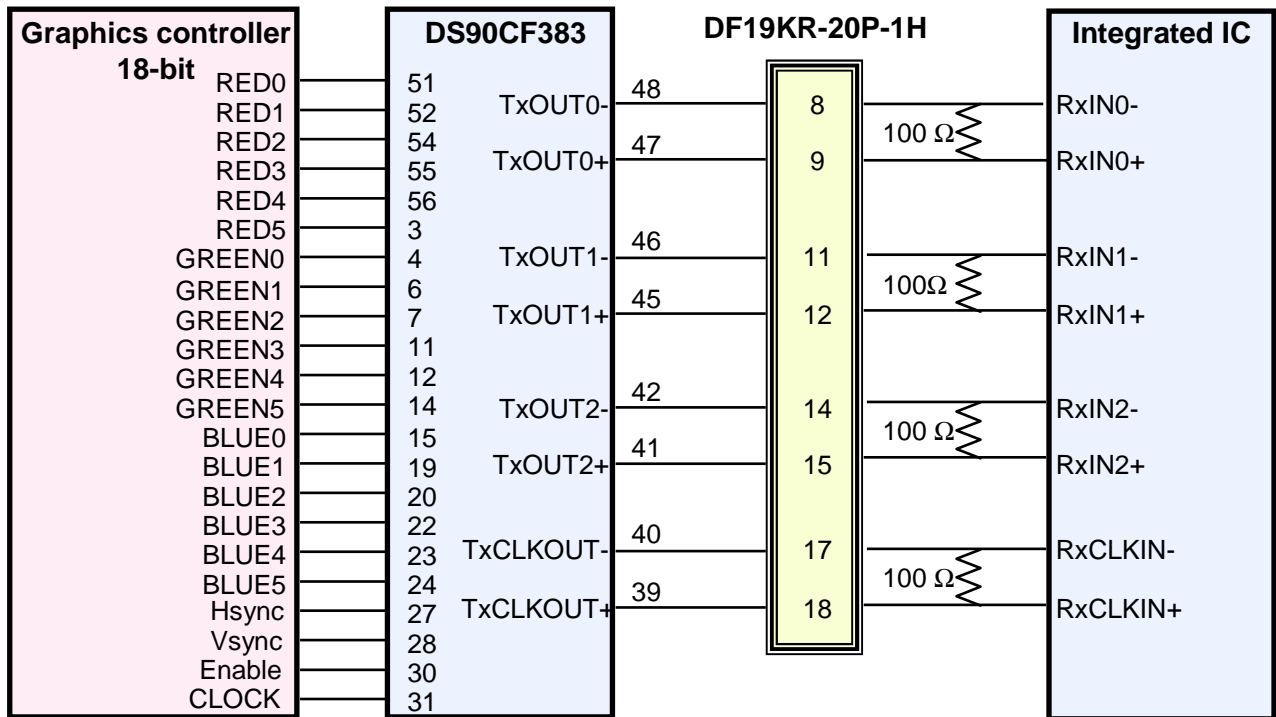
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5.2 LVDS Interface : Transmitter DS90CF363 or Compatible

| Pin No. | Name | RGB Signal | Pin No. | Name | RGB Signal |
|---------|--------|------------|---------|---------|------------|
| 51 | TxIN0 | R0 | 14 | TxIN14 | G5 |
| 52 | TxIN1 | R1 | 15 | TxIN15 | B0 |
| 54 | TxIN2 | R2 | 19 | TxIN18 | B1 |
| 55 | TxIN3 | R3 | 20 | TxIN19 | B2 |
| 56 | TxIN4 | R4 | 22 | TxIN20 | B3 |
| 3 | TxIN6 | R5 | 23 | TxIN21 | B4 |
| 4 | TxIN7 | G0 | 24 | TxIN22 | B5 |
| 6 | TxIN8 | G1 | 27 | TxIN24 | Hsync |
| 7 | TxIN9 | G2 | 28 | TxIN25 | Vsync |
| 11 | TxIN12 | G3 | 30 | TxIN26 | DE |
| 12 | TxIN13 | G4 | 31 | TxCLKIN | Clock |

LVDS INTERFACE



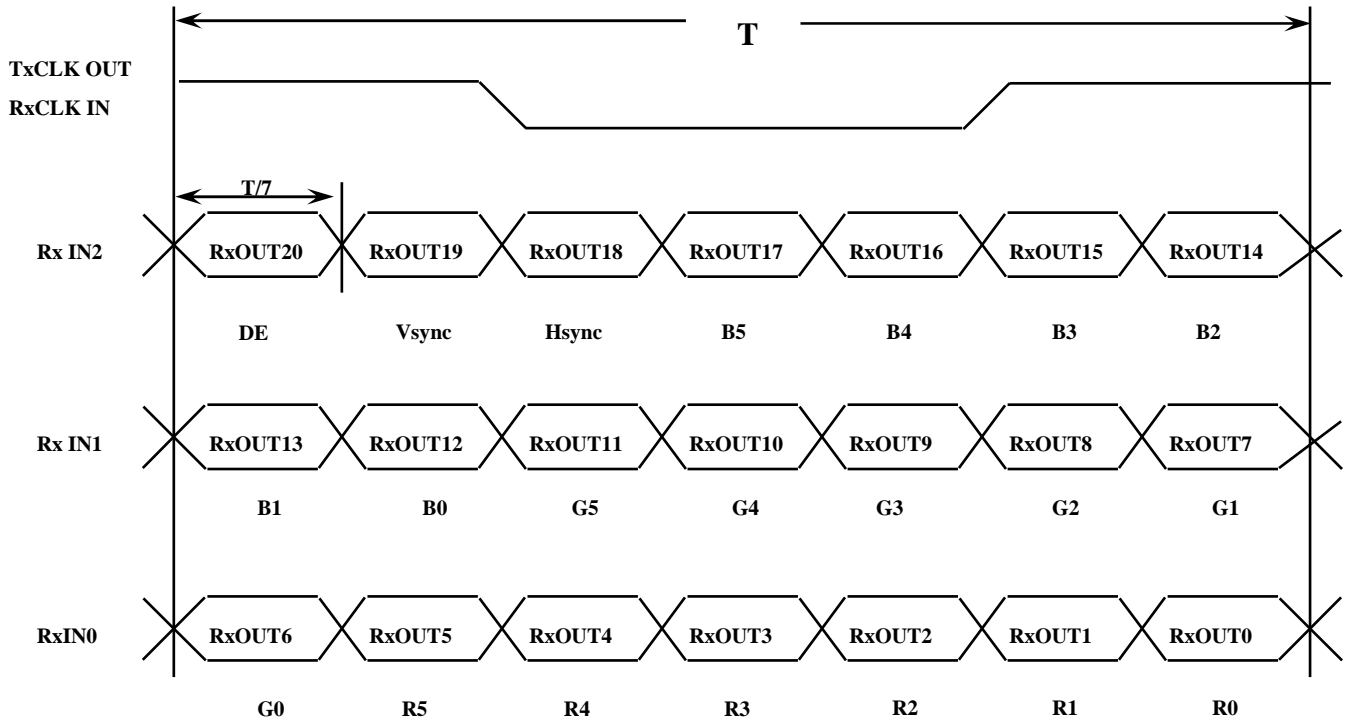
Note : The LCD Module uses a 100ohm resistor between positive and negative lines of each receiver input.

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5.3 Timing Diagrams of LVDS For Transmission

LVDS Receiver : Integrated T-CON



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5.4 Input Signals, Basic Display Colors and Gray Scale of Each Color

| Color | Display | Data Signal | | | | | | | | | | | | | | | | | Gray Scale Level |
|---------------------|---------|-------------|----|----|----|----|-------|----|----|----|----|------|----|----|----|----|----|----|------------------|
| | | Red | | | | | Green | | | | | Blue | | | | | | | |
| | | R0 | R1 | R2 | R3 | R4 | R5 | G0 | G1 | G2 | G3 | G4 | G5 | B0 | B1 | B2 | B3 | 45 | |
| Basic Colors | Black | 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 | 1 | 1 | 1 | 1 | 1 | - |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | - |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | - |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | - |
| | White | 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 | R0 |
| | Dark | 1 | 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 | R3~R60 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | ↓ | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | R61 |
| | Light | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | R62 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | R63 |
| Gray Scale Of Green | Black | 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 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | G1 |
| | ↑ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | G3~G60 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | ↓ | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | G61 |
| | Light | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | G62 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | G63 |
| Gray Scale Of Blue | Black | 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 | 1 | 0 | 0 | 0 | 0 | B1 |
| | ↑ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | B3~B60 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | |
| | ↓ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | B61 |
| | Light | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | B62 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | B63 |

Note 1) Definition of gray :

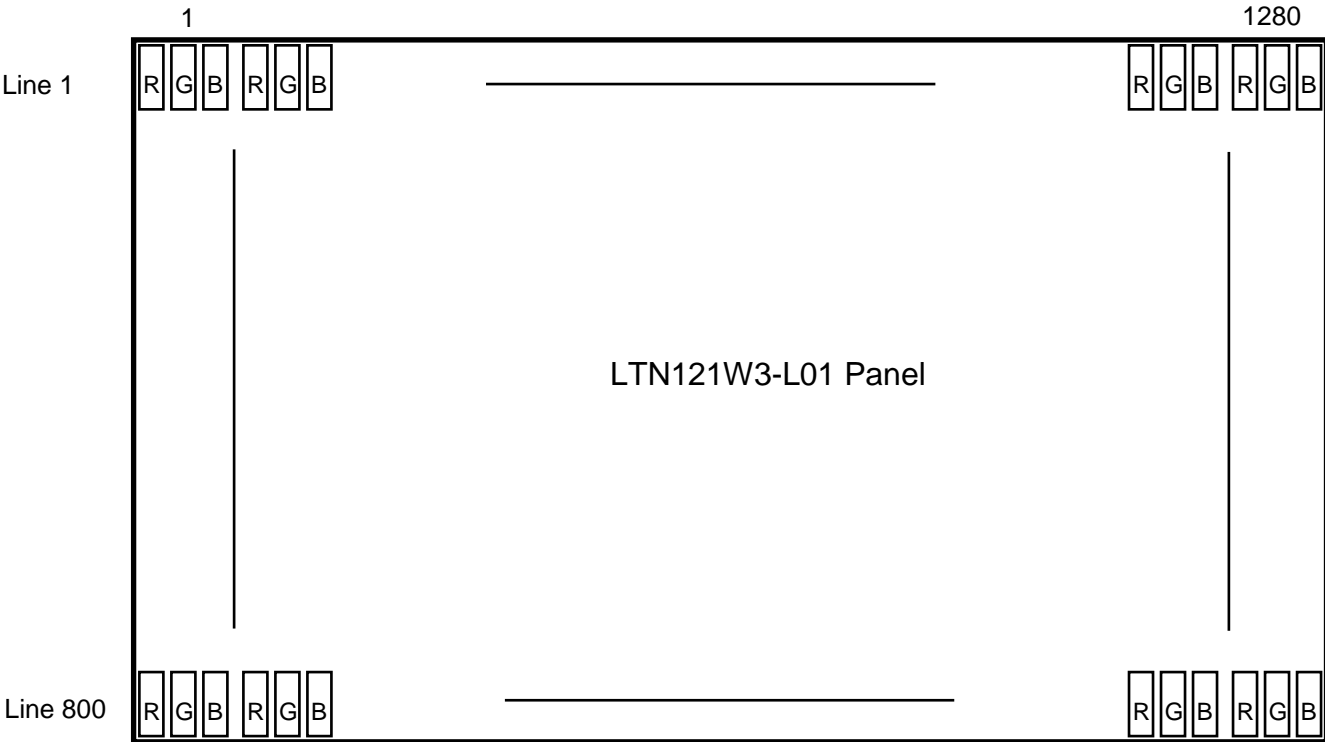
Rn: Red gray, Gn: Green gray, Bn: Blue gray (n=gray level)

Note 2) Input signal: 0 =Low level voltage, 1=High level voltage

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5.5 Pixel Format in the display



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5.6 LED Driver Connector & Pin Assignment

(1) Input Connector : ACES-87213 or equivalent

| Pin No. | Symbol | Description |
|---------|--------|---|
| 1 | NC | No connection |
| 2 | BLIM | System input PWM signal for brightness adjustment |
| 3 | 5VSW | +5V DC Power for converter on/off control |
| 4, 5 | GND | Power System Return |
| 6, 7 | VIN | Supply Voltage : 8V ~ 21V |

(2) Output Connector : KYOCERA 00-6298-009-100-883

| Pin No. | Symbol | Description |
|---------|--------|---|
| 1, 2 | VO | Converter output to LED strings in panel |
| 3 | NC | No connection |
| 4 | FB6 | 6 th LED string current return |
| 5 | FB5 | 5 th LED string current return |
| 6 | FB4 | 4 th LED string current return |
| 7 | FB3 | 3 rd LED string current return |
| 8 | FB2 | 2 nd LED string current return |
| 9 | FB1 | 1 st LED string current return |

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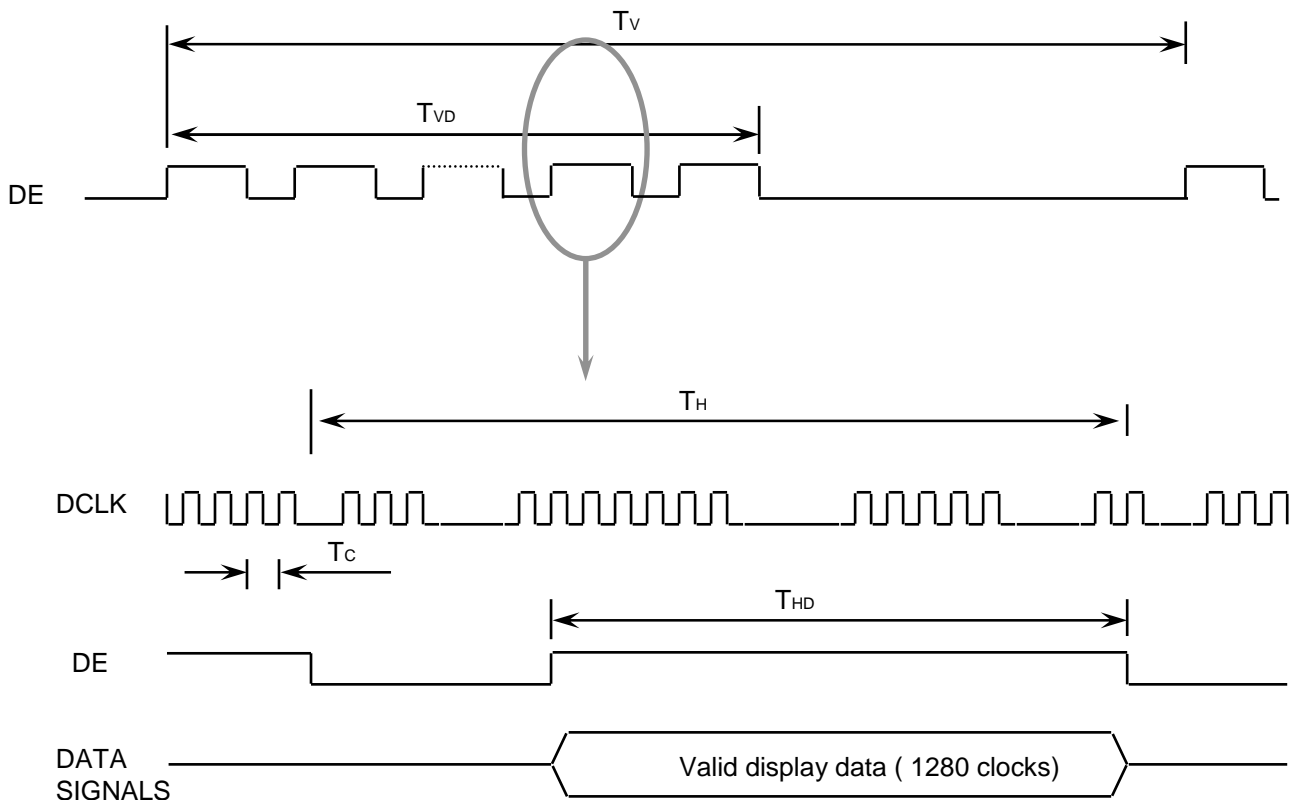
Preliminary

6. INTERFACE TIMING

6.1 Timing Parameters

| Signal | Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|--------------------------------|----------------|--------|------|------|------|--------|------|
| Frame Frequency | Cycle | TV | 804 | 816 | 828 | Lines | |
| Vertical Active Display Term | Display Period | TVD | - | 800 | - | Lines | |
| One Line Scanning Time | Cycle | TH | 1302 | 1415 | 1514 | Clocks | |
| Horizontal Active Display Term | Display Period | THD | - | 1280 | - | Clocks | |

6.2 Timing diagrams of interface signal

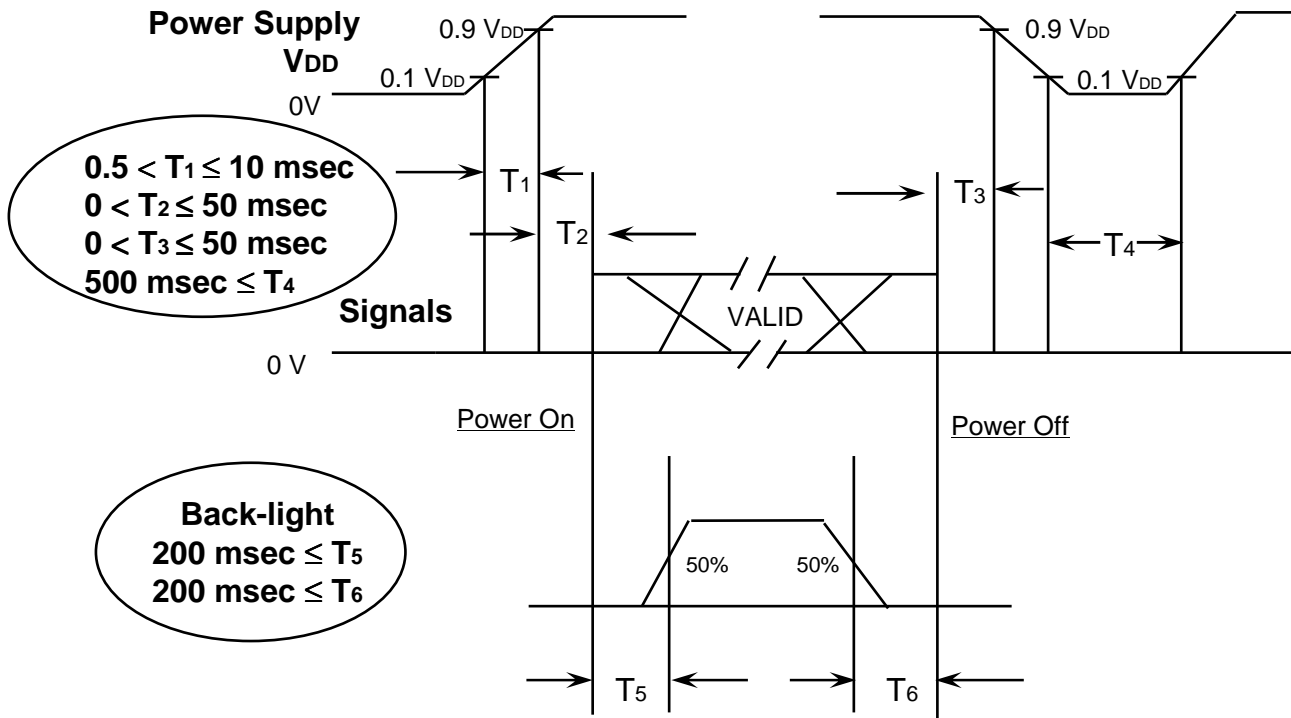


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6.3 Power ON/OFF Sequence

Preliminary

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



Power ON/OFF Sequence

- T1 : Vdd rising time from 10% to 90%
- T2 : The time from Vdd to valid data at power ON.
- T3 : The time from valid data off to Vdd off at power Off.
- T4 : Vdd off time for Windows restart
- T5 : The time from valid data to B/L enable at power ON.
- T6 : The time from valid data off to B/L disable at power Off.

NOTE.

- (1) The supply voltage of the external system for the module input should be the same as the definition of VDD.
- (2) Back-light should be turned on after the valid data input and turned off before the valid data off in order to prevent showing unwanted screen.
- (3) In case of VDD = off level, please keep the level of input signals on the low or keep a high impedance.
- (4) T4 should be measured after the module has been fully discharged between power off and on period.
- (5) Interface signal shall not be kept at high impedance when the power is on.

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7. Mechanical Outline Dimension

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Refer to the next page

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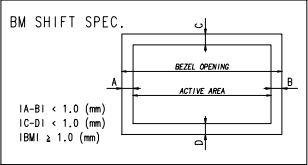
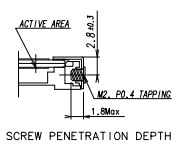
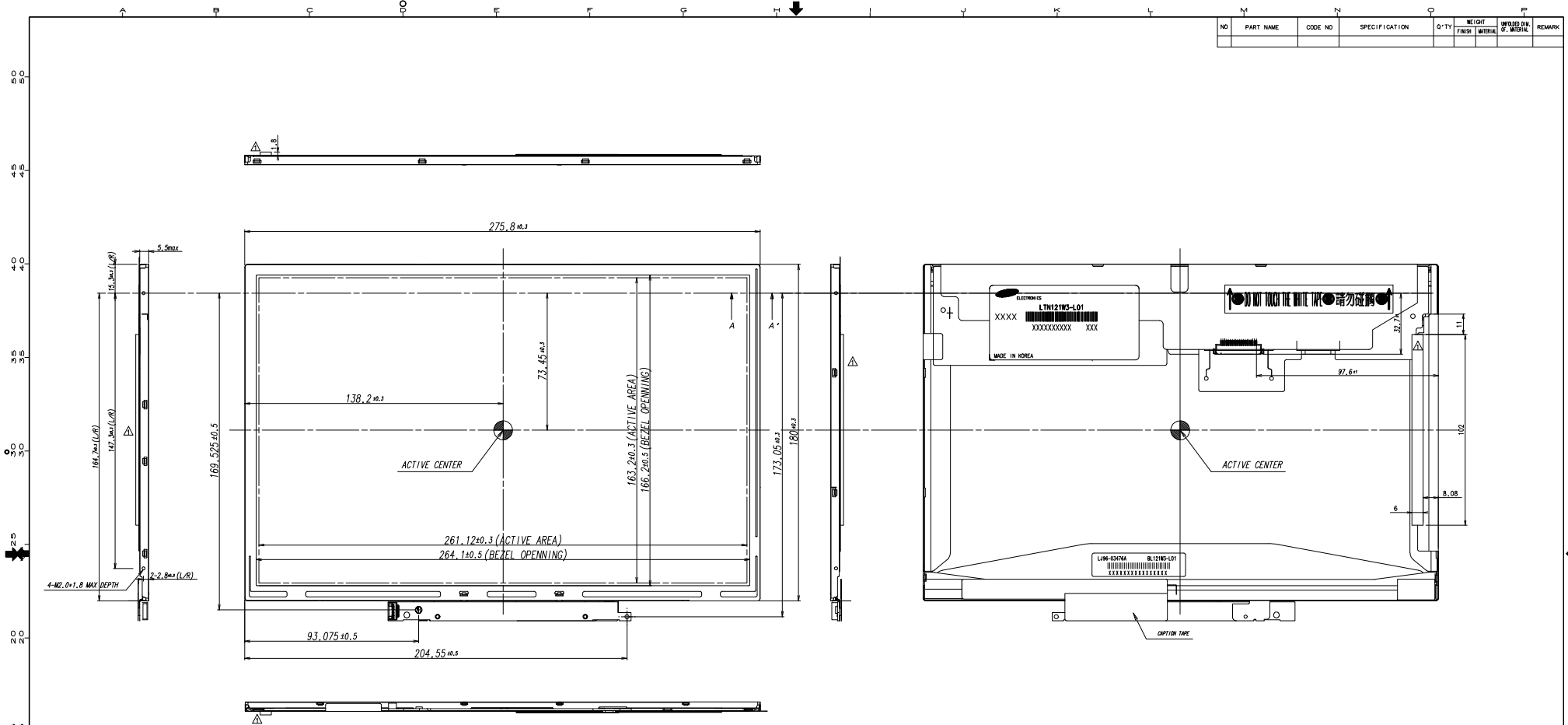
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| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 22 / 31 |
|----------------|--------------|---------------|-----------------|-------------|---------|

Preliminary

This page will be replaced with the outline drawing after producing PDF file.

Samsung Secret

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|----------------|--------------|---------------|-----------------|-------------|---------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 23 / 31 |
|----------------|--------------|---------------|-----------------|-------------|---------|



SECTION A-A' (S=3/1)

- * NOTE
- INPUT CONN. SPEC
- PART NO / MAKER : DF19KR-20P-1H / HIROSE (or compatible)
 - MATCHING CONN. SPEC
- PART NO / MAKER : DF19G-20S-1C / HIROSE (or compatible)
 - CONVERTER CONN. SPEC
- PART NO / MAKER : ACES-87213 (or compatible)
 - ALLOWED DEPTH OF USERHOLE SCREW INSERTION IS 1.8mm MAX.
 - MAXIMUM SCREW TORQUE SPEC : 2.5kgf-cm Max
 - MODULE WEIGHT SPEC : 210g TYP, 220g MAX (WITHOUT CONVERTER)
220g TYP, 230g MAX (WITH CONVERTER)
 - MEASURING FORCE : 750 +/- 250gf-cm

| REV | NO | DATE | DESCRIPTION OF REVISION | REASON | CHG'D BY |
|-----|----------|------|-------------------------|-----------------------|----------|
| 001 | 07.08.22 | | ADD RUBBER | TO SOLVE GLASS BROKEN | J.E.YOO |

| REV | DATE | DESCRIPTION OF REVISION | REASON | CHK'D BY | |
|---|----------|-------------------------|---------|----------|---------|
| 1/1 | 07.08.02 | Y.S.HMK | Y.S.HMK | H.S.DHM | D.C.YMG |
| MODEL NAME: LTN121W3-L01 PART/SHEET NAME: OUTLINE DIMENSION SHEET 1/1 SPEC. NO.: 0595731-001 CODE NO.: | | | | | |

SAMSUNG ELECTRONICS

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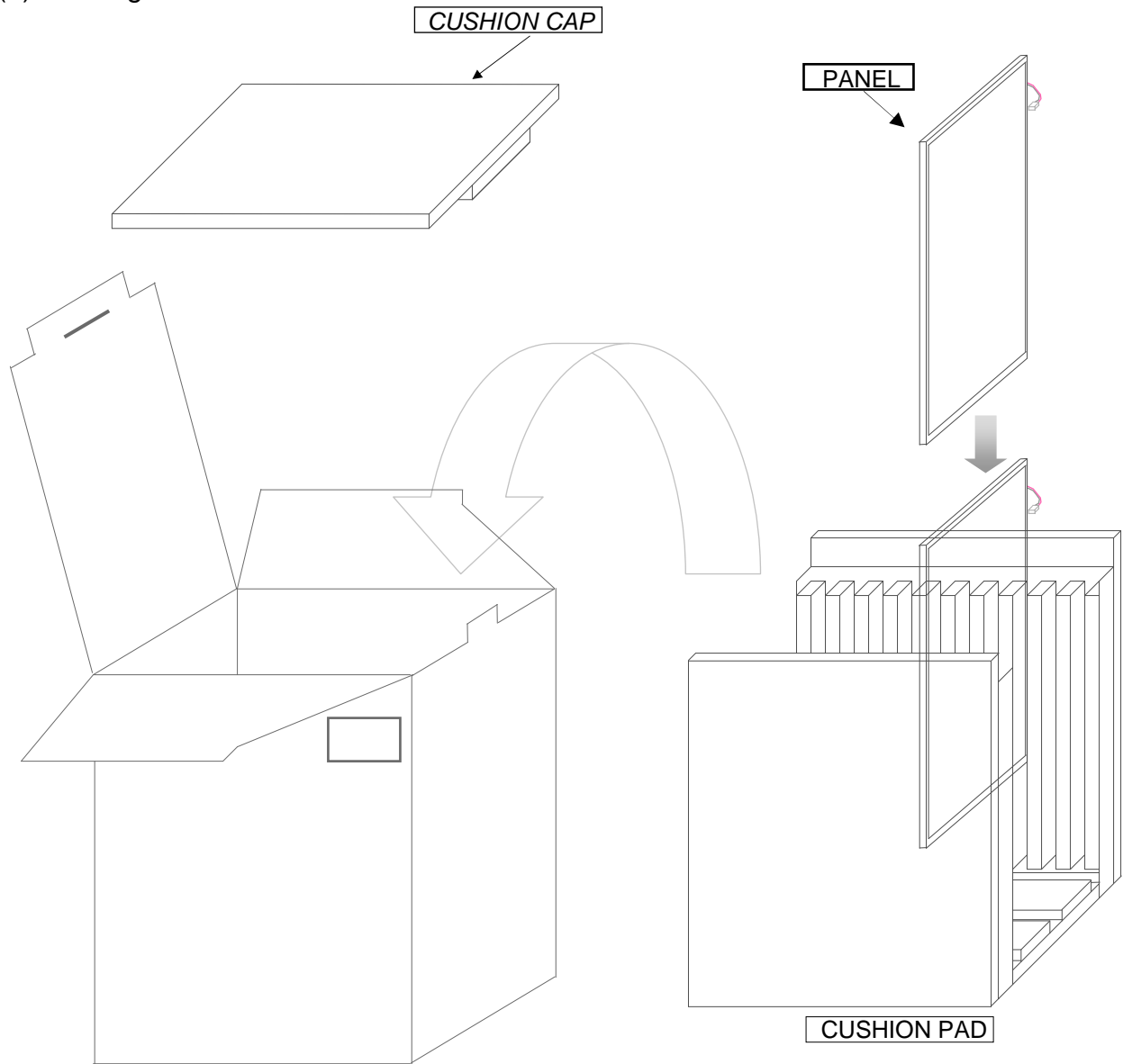
8. PACKING

1. CARTON(Internal Package)

(1) Packing Form

Corrugated Cardboard box and Corrupad form as shock absorber

(2) Packing Method



PACKING CASE

- Note 1) Total Weight : Approximately 4.0 kg
 2) Acceptance number of piling : 10 sets
 3) Carton size : 295(W) × 280(D) × 364(H)
 4) MAX accumulation quantity : 5 cartons

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|---------|--------------|--------|-----------------|------|---------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 24 / 31 |
|---------|--------------|--------|-----------------|------|---------|

Preliminary

| No | Part name | Quantity |
|----|---|----------|
| 1 | Static electric protective sack | 10 |
| 2 | Packing case (Inner box) included shock absorber | 1 set |
| 3 | Pictorial marking | 2 pcs |
| 4 | Carton | 1 set |

9. MARKINGS & OTHERS

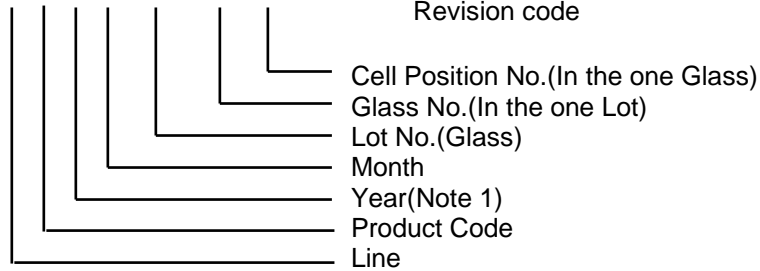
A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

(1)Parts number : LTN121W3-L01

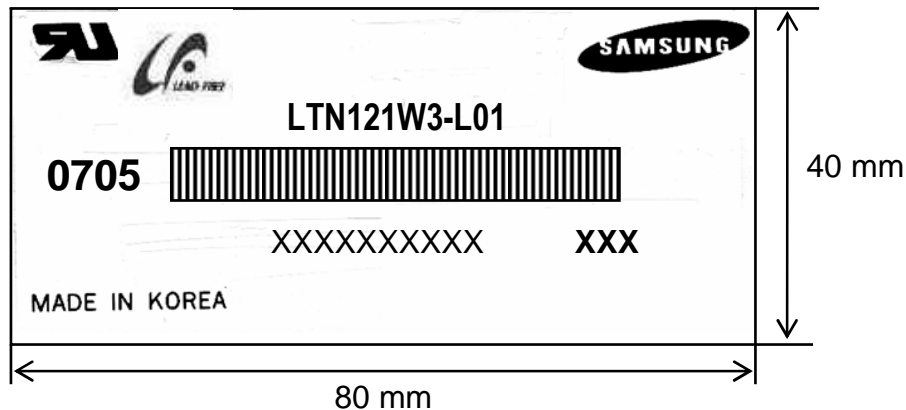
(2)Revision : Three letters

(3)Lot number : X X X X XXX XX X XXX

Revision code



(4) Nameplate Indication

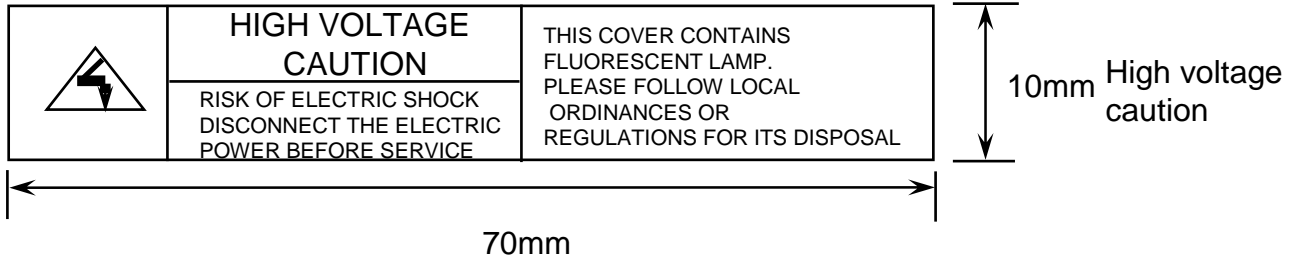


Parts name : LTN121W3-L01
 Lot number : XXXXXXXXXXXX
 Inspected work week : 0705(2007 year 5th week)
 Product Revision Code : XXX

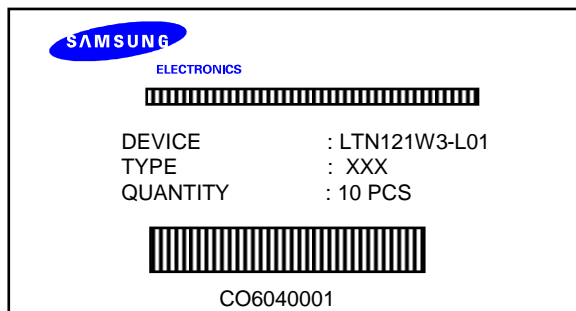
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High voltage caution label



(5) Packing small box attach



(6) Packing box Marking : Samsung TFT-LCD Brand Name



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10. GENERAL PRECAUTIONS

Preliminary

1. Handling

- (a) When the module is assembled, It should be attached to the system firmly using every mounting holes. Be careful not to twist and bend the modules.
- (b) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module and LED back-light.
- (c) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a HB pencil lead.
- (d) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, Staining and discoloration may occur.
- (e) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (f) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (g) 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, legs or clothes, it must be washed away thoroughly with soap.
- (h) Protect the module from static, it may cause damage to the C-MOS Gate Array IC.
- (i) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (j) Do not disassemble the module.
- (k) Do not pull or fold the lamp wire.
- (l) Do not adjust the variable resistor which is located on the back side.
- (m) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (n) Pins of I/F connector shall not be touched directly with bare hands.

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| | | | | | |
|----------------|--------------|---------------|-----------------|-------------|---------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 27 / 31 |
|----------------|--------------|---------------|-----------------|-------------|---------|

Preliminary

2. STORAGE

- (a) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%.
- (b) Do not store the TFT-LCD module in direct sunlight.
- (c) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

3. OPERATION

- (a) Do not connect, disconnect the module in the “ Power On” condition.
- (b) Power supply should always be turned on/off by following item 6.3 “ Power on/off sequence “.
- (c) 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.
- (d) The cable between the back-light connector and its converter power supply shall be a minimized length and be connected directly . The longer cable between the back-light and the converter may cause lower luminance of LED backlight.
- (e) The standard limited warranty is only applicable when the module is used for general notebook applications. If used for purposes other than as specified, SEC is not to be held reliable for the defective operations. It is strongly recommended to contact SEC to find out fitness for a particular purpose.

4. OTHERS

- (a) Ultra-violet ray filter is necessary for outdoor operation.
- (b) Avoid condensation of water. It may result in improper operation or disconnection of electrode.
- (c) Do not exceed the absolute maximum rating value. (the supply voltage variation, variation in part contents and environmental temperature, so on)
Otherwise the module may be damaged.
- (d) If the module displays the same pattern continuously for a long period of time, it can be the situation when the image “sticks” to the screen.
- (e) This module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

Samsung Secret

| | | | | | |
|----------------|--------------|---------------|-----------------|-------------|---------|
| Doc.No. | LTN121W3-L01 | Rev.No | 04-P00-G-090716 | Page | 28 / 31 |
|----------------|--------------|---------------|-----------------|-------------|---------|

11. EDID

Preliminary

| | | | | | | |
|----|------------------------|----|----------|-----|--------|-----------------------------|
| 00 | Header | 00 | 00000000 | 0 | | EDID Header |
| 01 | | FF | 11111111 | 255 | | |
| 02 | | FF | 11111111 | 255 | | |
| 03 | | FF | 11111111 | 255 | | |
| 04 | | FF | 11111111 | 255 | | |
| 05 | | FF | 11111111 | 255 | | |
| 06 | | FF | 11111111 | 255 | | |
| 07 | | 00 | 00000000 | 0 | | |
| 08 | ID Manufacturer Name | 4C | 01001100 | 76 | S | 3 character ID |
| 09 | | A3 | 10100011 | 163 | E C | "SEC" |
| 0A | ID Product Code | 41 | 01000001 | 65 | [A] | |
| 0B | | 47 | 01000111 | 71 | [G] | |
| 0C | 32-bit serial no. | 00 | 00000000 | 0 | | |
| 0D | | 00 | 00000000 | 0 | | |
| 0E | | 00 | 00000000 | 0 | | |
| 0F | | 00 | 00000000 | 0 | | |
| 10 | Week of manufacture | 00 | 00000000 | 0 | | |
| 11 | Year of manufacture | 11 | 00010001 | 17 | 2007 | 2007 |
| 12 | EDID Structure Ver. | 01 | 00000001 | 1 | 1 | EDID Ver. 1.0 |
| 13 | EDID revision # | 03 | 00000011 | 3 | 3 | EDID Rev. 3 |
| 14 | Video input definition | 80 | 10000000 | 128 | | |
| 15 | Max H image size | 1A | 00011010 | 26 | 26 | 26 cm(approx) |
| 16 | Max V image size | 10 | 00010000 | 16 | 16 | 16 cm(approx) |
| 17 | Display Gamma | 78 | 01111000 | 120 | 2.2 | Gamma 2.2 |
| 18 | Feature support | 0A | 00001010 | 10 | | |
| 19 | Red/green low bits | 87 | 10000111 | 135 | | 10000111 |
| 1A | Blue/white low bits | F5 | 11110101 | 245 | | 11111110 |
| 1B | Red x/ high bits | 94 | 10010100 | 148 | 0.580 | Red x0.580= 1001010010 |
| 1C | Red y | 57 | 01010111 | 87 | 0.340 | Red y0.340= 0101011100 |
| 1D | Green x | 4F | 01001111 | 79 | 0.310 | Green x0.310= 0100111101 |
| 1E | Green y | 8C | 10001100 | 140 | 0.550 | Green y0.550= 1000110011 |
| 1F | Blue x | 27 | 00100111 | 39 | 0.155 | Blue x0.155= 0010011111 |
| 20 | Blue y | 27 | 00100111 | 39 | 0.155 | Blue y0.155= 0010011111 |
| 21 | White x | 50 | 01010000 | 80 | 0.313 | White x0.313= 0101000001 |
| 22 | White y | 54 | 01010100 | 84 | 0.329 | White y0.329= 0101010001 |
| 23 | Established timing 1 | 00 | 00000000 | 0 | | |
| 24 | Established timing 2 | 00 | 00000000 | 0 | | |
| 25 | Established timing 3 | 00 | 00000000 | 0 | | |

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Preliminary

| | | | | | | | |
|----|---------------------------------------|---------------------------------------|----------|----------|---------------------------|---------------------------------|-------------------------------|
| 26 | Standard timing #1 | 01 | 00000001 | 1 | | not used | |
| 27 | | 01 | 00000001 | 1 | | | |
| 28 | Standard timing #2 | 01 | 00000001 | 1 | | not used | |
| 29 | | 01 | 00000001 | 1 | | | |
| 2A | Standard timing #3 | 01 | 00000001 | 1 | | not used | |
| 2B | | 01 | 00000001 | 1 | | | |
| 2C | Standard timing #4 | 01 | 00000001 | 1 | | not used | |
| 2D | | 01 | 00000001 | 1 | | | |
| 2E | Standard timing #5 | 01 | 00000001 | 1 | | not used | |
| 2F | | 01 | 00000001 | 1 | | | |
| 30 | Standard timing #6 | 01 | 00000001 | 1 | | not used | |
| 31 | | 01 | 00000001 | 1 | | | |
| 32 | Standard timing #7 | 01 | 00000001 | 1 | | not used | |
| 33 | | 01 | 00000001 | 1 | | | |
| 34 | Standard timing #8 | 01 | 00000001 | 1 | | not used | |
| 35 | | 01 | 00000001 | 1 | | | |
| 36 | Detailed timing/monitor descriptor #1 | 15 | 00010101 | 21 | 69.33 | Main clock= 69.33 MHz | |
| 37 | | 1B | 00011011 | 27 | | | |
| 38 | | 00 | 00000000 | 0 | 1280 | Hor active=640*2 pixels | |
| 39 | | 88 | 10001000 | 136 | 136 | Hor blanking=136 pixels | |
| 3A | | 50 | 01010000 | 80 | | 4bit : 4bit | |
| 3B | | 20 | 00100000 | 32 | 800 | Vertical active=800 lines | |
| 3C | | 10 | 00010000 | 16 | 16 | Vertical blanking=16 lines | |
| 3D | | 30 | 00110000 | 48 | | 4bit : 4bit | |
| 3E | | 10 | 00010000 | 16 | 16 | Hor sync. Offset=16 pixels | |
| 3F | | 30 | 00110000 | 48 | 48 | H sync. Width=48 pixels | |
| 40 | | Detailed timing/monitor descriptor #1 | 13 | 00010011 | 19 | 1 | V sync. Offset=1 lines |
| | | | | | | 3 | V sync. Width=3 lines |
| 41 | | | 00 | 00000000 | 0 | | 2bit : 2bit :2bit :2bit |
| 42 | | | 05 | 00000101 | 5 | 261 | H image size= 261 mm(approx) |
| 43 | | | A3 | 10100011 | 163 | 163 | V image size = 163 mm(approx) |
| 44 | | | 10 | 00010000 | 16 | | |
| 45 | | | 00 | 00000000 | 0 | | No Horizontal Border |
| 46 | | 00 | 00000000 | 0 | | No Vertical Border | |
| 47 | | 19 | 00011001 | 25 | | | |
| 48 | Detailed timing/monitor descriptor #2 | 00 | 00000000 | 0 | | Manufacturer Specified (Timing) | |
| 49 | | 00 | 00000000 | 0 | | | |
| 4A | | 00 | 00000000 | 0 | | | |
| 4B | | 0F | 00001111 | 15 | | | |
| 4C | | 00 | 00000000 | 0 | | | |
| 4D | | 00 | 00000000 | 0 | | Value=HSPWmin / 2 | |
| 4E | | 00 | 00000000 | 0 | | Value=HSPWmax / 2 | |
| 4F | | 00 | 00000000 | 0 | | Value=Thbpmin / 2 | |
| 50 | | 00 | 00000000 | 0 | | Value=Thbpmax / 2 | |
| 51 | | 00 | 00000000 | 0 | | Value=VSPWmin / 2 | |
| 52 | | 00 | 00000000 | 0 | | Value=VSPWmax / 2 | |
| 53 | | 00 | 00000000 | 0 | | Value=TVbpmin / 2 | |
| 54 | | 00 | 00000000 | 0 | | Value=TVbpmax / 2 | |
| 55 | | 23 | 00100011 | 35 | | Thpmin=value*2 + HA pixelclks | |
| 56 | | 87 | 10000111 | 135 | | Thpmax=value*2 + HA pixelclks | |
| 57 | 02 | 00000010 | 2 | | Tvpmin=value*2 + VA lines | | |
| 58 | 64 | 01100100 | 100 | | Tvpmax=value*2 + VA lines | | |
| 59 | 01 | 00000001 | 1 | | Module revision | | |

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Preliminary

| | | | | | | |
|----|---------------------------------------|----------|----------|-----|-----|--------------------------|
| 5A | Detailed timing/monitor descriptor #3 | 00 | 00000000 | 0 | | ASCII Data String Tag |
| 5B | | 00 | 00000000 | 0 | | |
| 5C | | 00 | 00000000 | 0 | | |
| 5D | | FE | 11111110 | 254 | | |
| 5E | | 00 | 00000000 | 0 | | |
| 5F | | 53 | 01010011 | 83 | [S] | |
| 60 | | 41 | 01000001 | 65 | [A] | |
| 61 | | 4D | 01001101 | 77 | [M] | |
| 62 | | 53 | 01010011 | 83 | [S] | |
| 63 | | 55 | 01010101 | 85 | [U] | |
| 64 | | 4E | 01001110 | 78 | [N] | |
| 65 | | 47 | 01000111 | 71 | [G] | |
| 66 | | 0A | 00001010 | 10 | [Y] | |
| 67 | | 20 | 00100000 | 32 | [] | |
| 68 | | 20 | 00100000 | 32 | [] | |
| 69 | | 20 | 00100000 | 32 | [] | |
| 6A | 20 | 00100000 | 32 | [] | | |
| 6B | 20 | 00100000 | 32 | [] | | |
| 6C | Detailed timing/monitor descriptor #4 | 00 | 00000000 | 0 | | Monitor Name Tag (ASCII) |
| 6D | | 00 | 00000000 | 0 | | |
| 6E | | 00 | 00000000 | 0 | | |
| 6F | | FE | 11111110 | 254 | | |
| 70 | | 00 | 00000000 | 0 | | |
| 71 | | 4C | 01001100 | 76 | [L] | |
| 72 | | 54 | 01010100 | 84 | [T] | |
| 73 | | 4E | 01001110 | 78 | [N] | |
| 74 | | 31 | 00110001 | 49 | [1] | |
| 75 | | 32 | 00110010 | 50 | [2] | |
| 76 | | 31 | 00110001 | 49 | [1] | |
| 77 | | 57 | 01010111 | 87 | [W] | |
| 78 | | 33 | 00110011 | 51 | [3] | |
| 79 | | 2D | 00101101 | 45 | [] | |
| 7A | | 4C | 01001100 | 76 | [L] | |
| 7B | | 30 | 00110000 | 48 | [0] | |
| 7C | 31 | 00110001 | 49 | [1] | | |
| 7D | 0A | 00001010 | 10 | [Y] | | |
| 7E | Extension Flag | 00 | 00000000 | 0 | | |
| 7F | Checksum | AA | 10101010 | 170 | | |

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