
PRODUCT SPECIFICATIONS

For Customer: _____ : APPROVAL FOR SPECIFICATION

Customer Model No. _____ : APPROVAL FOR SAMPLE

Module No.: AN0708-B3E1302-37E501 Date : 2019.12.26

Version :0

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For Customer's Acceptance:

| Approved By | Comment |
|-------------|---------|
| | |

| PREPARED | CHECKED | VERIFIED BY QA DEPT | VERIFIED BY R&D DEPT |
|----------|---------|------------------------|-------------------------|
| | | | |

2. Revision Record

| Date | Rev.N o. | Page | Revision Items | Prepared |
|------------|-------------|------|-------------------|----------|
| 2019.12.26 | V0 | | The first release | |
| | | | | |

3. General Specifications

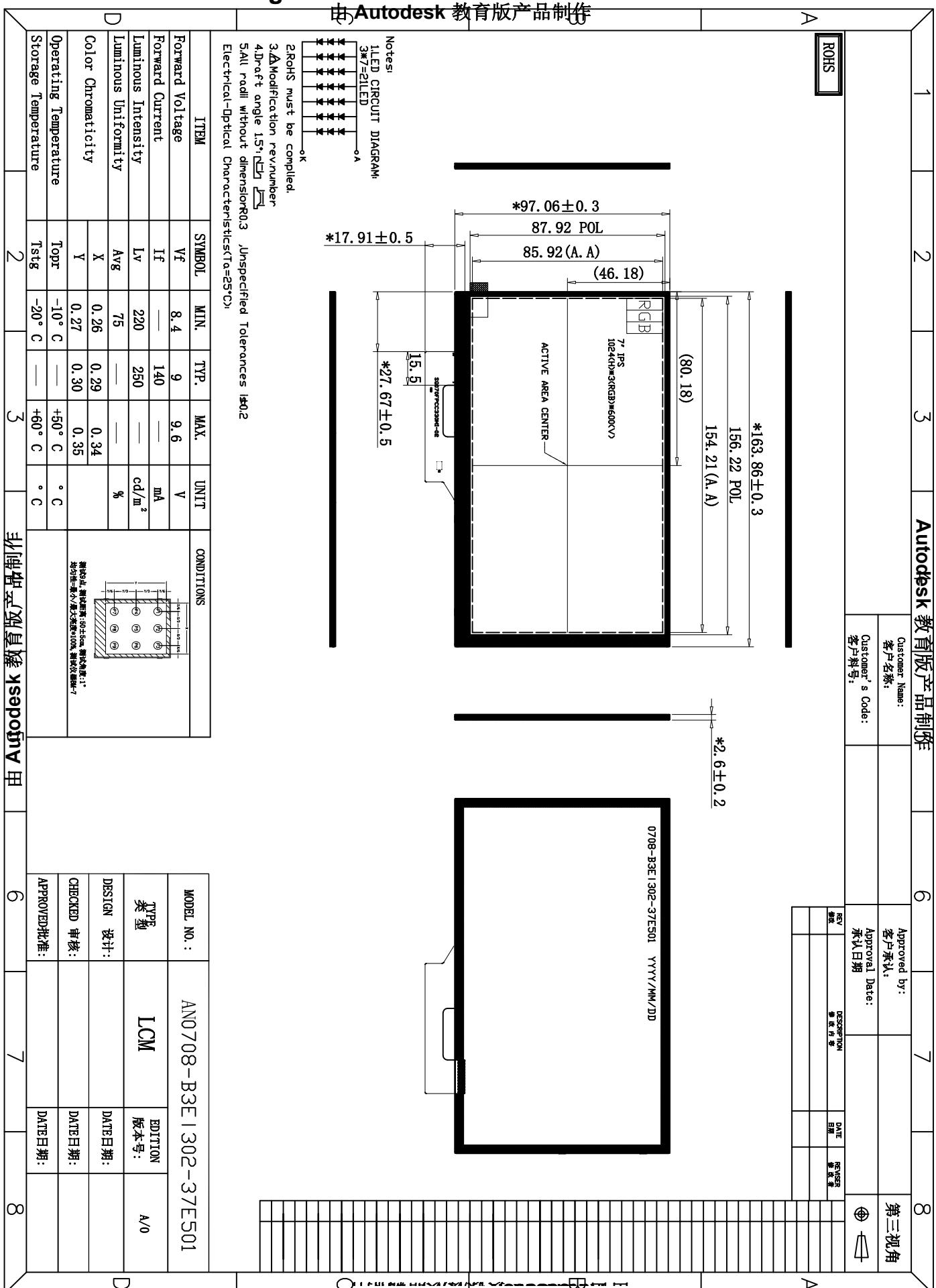
AN0708-B3E1302-37E501

is a color active matrix TFT LCD single cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This panel has a 7 inch diagonally measured active area with WSVGA resolutions (1024 horizontal by 600 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.

| Parameter | Specification | Unit | Remarks |
|-------------------|------------------------|--------|----------|
| Active area | 154.2144(H) × 85.92(V) | mm | |
| CF size | 159(H) × 91(V) | mm | |
| Number of pixels | 1024 (H) × 600 (V) | pixels | |
| Pixel pitch | 0.0502(H) × 0.143.2(V) | mm | 非 1:3 结构 |
| Pixel arrangement | RGB Vertical stripe | | |
| Display colors | 16.7M | colors | |
| Color Gamut | 50 | % | @C Light |
| Display mode | Normally Black | | |
| Panel Size | 162.2 (H) x 95.7 (V) | mm | |

4. Outline Drawing

由 Autodesk 教育版产品制作



5. Absolute Maximum Ratings(Ta=25°C)

Environmental Absolute Maximum Ratings

| Item | Storage | | Operating | | Note |
|---------------------|---------|------|-----------|------|------|
| | MIN. | MAX. | MIN. | MAX. | |
| Ambient Temperature | -20°C | 60°C | 10 °C | 50°C | 1,2 |
| Humidity | - | - | - | - | 3 |

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.

The phenomenon is reversible.

3. Ta<=40°C:85%RH MAX.

Ta>=40°C:Absolute humidity must be lower than the humidity of 85%RH at 40°C.

6. Electrical Specifications and Instruction Code

6.1 Electrical Characteristics(Vss=0V,Ta=25°C)

| Parameter | Symbol | Values | | | Unit | Notes |
|---|--------------------------|---------|-----|------|------|-------|
| | | Min | Typ | Max | | |
| Power Supply Input Voltage | VDD | 1.71 | 1.8 | 1.89 | Vdc | |
| Power Supply Ripple Voltage | VRP | - | - | 200 | mV | |
| Power Supply Current | IDD | - | 35 | 45 | mA | 1 |
| Input High Threshold Voltage | VIH | 1.32 | - | 1.89 | V | |
| Input Low Threshold Voltage | VIL | 0 | - | 0.57 | V | |
| Time that the transmitter shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode | TCLK-POST | 60+52UI | - | - | ns | |
| Detection time that the clock has stopped toggling | TCLK-MISS | - | - | 60 | ns | |
| Time to drive LP-00 to prepare for HS clock transmission | TCLK-PREPARE | 38 | - | 95 | ns | |
| Minimum lead HS-0 drive period before starting clock | TCLK-PREPARE + TCLK-ZERO | 300 | - | - | ns | |
| Time to enable Clock Lane receiver line termination measured from when Dn cross VIL,MAX | THS-TERM-EN | - | - | 38 | ns | |
| Minimum time that the HS clock must be prior to any associated data lane beginning the transmission from LP to HS mode | TCLK-PRE | 8 | - | - | UI | |
| Time to drive HS differential state after last payload clock bit of a HS transmission burst | TCLK-TRAIL | 60 | - | - | ns | |

6.2 LED backlight specification(V_{SS}=0V ,Ta=25°C)

| Item | | Symbol | Condition | Min | Typ | Max | Unit | Note |
|-----------------|----------------|-----------------|-------------------|-----|-----|-----|------|------|
| Supply voltage | - | - | - | - | 9.6 | - | V | 1 |
| Supply current | I _f | - | - | - | 140 | - | mA | 2 |
| Forward current | Normal | I _{pn} | 3-chip series x 7 | - | 140 | - | mA | |
| | Dimming | I _{pd} | | - | - | - | | |

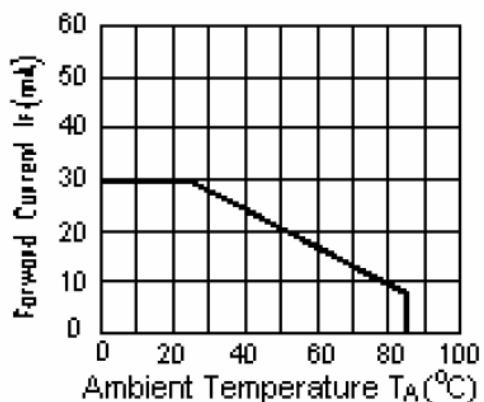
Note:

1: V_{LED}=V_{LED(+)}-V_{LED(-)}.

2:The current of LED is 20mA.

A LED drive in constant current mode is recommended.

3: LED power consumption is around 0.297W.



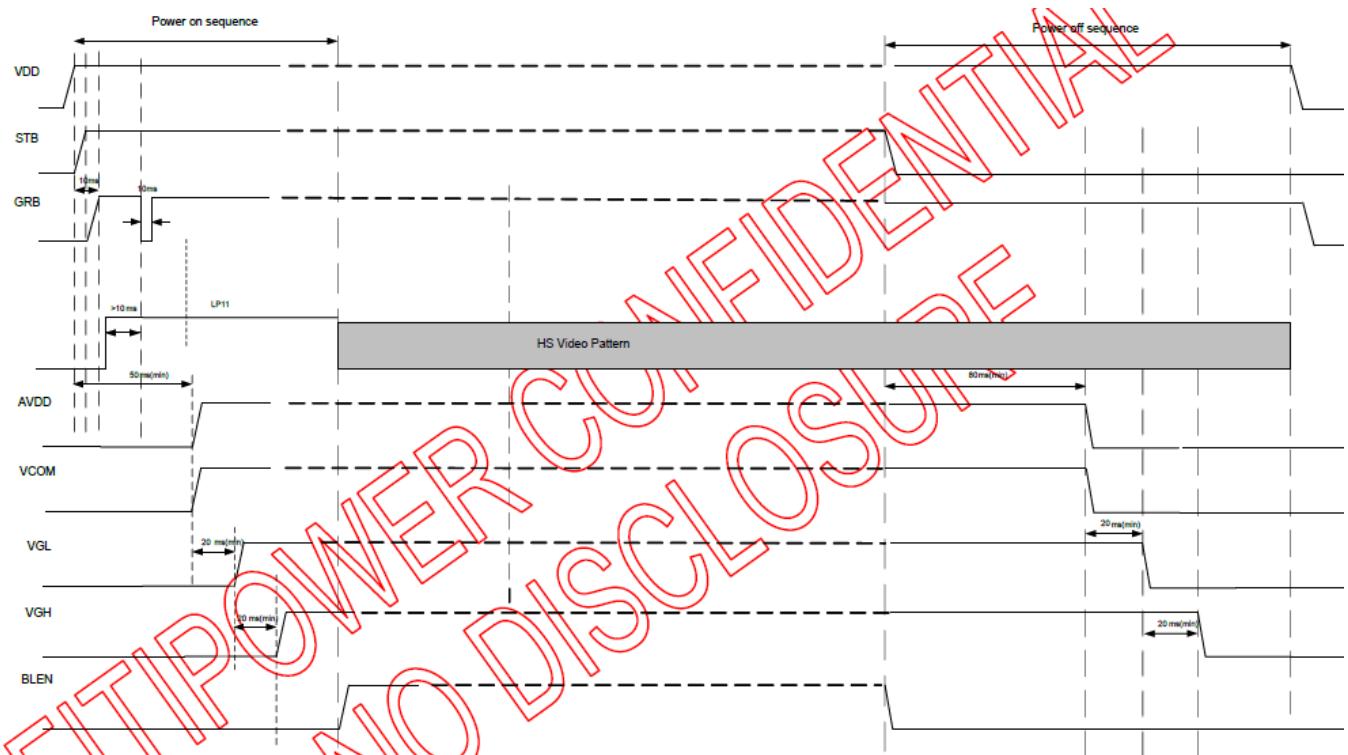
CIRCUIT DIAGRAM

6.3 Interface signals

| Pin No. | Symbol | Function | Remark |
|---------|--------|-------------------------------|--------|
| 1-2 | LED+ | LED Anode | |
| 3 | VGH | Gate ON Voltage | |
| 4 | VGL | Gate OFF Voltage | |
| 5 | UPDN | Gate Up or Down scan control | |
| 6 | SHLR | Source Right or Left sequence | |
| 7-8 | LED- | LED Cathode | |
| 9 | AVDD | Power for Analog Circuit | |
| 10 | GND | Ground | |
| 11 | RXIN3P | MIPI Data lane3 input | |
| 12 | RXIN3N | | |
| 13 | GND | Ground | |
| 14 | RXIN2P | MIPI Data lane2 input | |
| 15 | RXIN2N | | |
| 16 | GND | Ground | |
| 17 | RXCLKP | MIPI CLK input | |
| 18 | RXCLKN | | |
| 19 | GND | Ground | |
| 20 | RXIN1P | MIPI Data lane1 input | |
| 21 | RXIN1N | | |
| 22 | GND | Ground | |
| 23 | RXIN0P | MIPI Data lane0 input | |
| 24 | RXIN0N | | |
| 25 | GND | Ground | |
| 26 | STBYB | Standby mode | |
| 27 | RESET | Global reset pin | |
| 28 | VDD | Power Supply (1.8V) | |
| 29 | VDD | Power Supply (1.8V) | |
| 30 | VCOM | Common Voltage | |

6.4 Power On/Off Sequence

In order to prevent IC from power on reset fail, the rising time(TPOR) of the digital power Supply VDD should be maintained within the given specifications. Refer to “AC Characteristics” for more detail on timing.



Notes:

1. CLK and Data Lanes should keep in LP11(stop state) before GRB

6.5 OPTICAL SPECIFICATION

The test of Optical specifications shall be measured in a dark room (ambient luminance $\leq 1\text{lux}$ and temperature = $25\pm 2^\circ\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and ϕ equal to 0° . We refer to $\theta\phi=0$ ($=03$) as the 3 o'clock direction (the "right"), $\theta\phi=90$ ($=012$) as the 12 o'clock direction ("upward"), $\theta\phi=180$ ($=09$) as the 9 o'clock direction ("left") and $\theta\phi=270$ ($=06$) as the 6 o'clock direction ("bottom"). While scanning θ and/or ϕ , the center of the measuring spot on the Display surface shall stay fixed.
Optimum viewing angle direction is 12 "clock.

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark | |
|----------------------------------|------------|---------------|--|--------|-------|------|------|---------------------------|--|
| Viewing Angle range | Horizontal | Θ_3 | CR > 10 | - | 85 | - | Deg. | WV-Pol Note 1 | |
| | | Θ_9 | | - | 85 | - | Deg. | | |
| | Vertical | Θ_{12} | | - | 85 | - | Deg. | | |
| | | Θ_6 | | - | 85 | - | Deg. | | |
| Luminance Contrast ratio | | CR | | - | 800 | - | | Note 2 | |
| Cell Transmittance | | Tr | $\Theta = 0^\circ$ | 4.8 | 5.0 | - | % | Base on C Light Note 3 | |
| White Chromaticity | | x_w | | 0.308 | | | | Note 4 Base on C Light | |
| | | y_w | | 0.336 | | | | | |
| Reproduction of color (C light) | Red | R_x | | 0.599 | | | | | |
| | | R_y | | 0.338 | | | | | |
| | Green | G_x | | - 0.03 | 0.299 | | | | |
| | | G_y | | | 0.550 | | | | |
| | Blue | B_x | | | 0.139 | | | | |
| | | B_y | | | 0.131 | | | | |
| Color Gamut (C light) | | | | - | 50 | - | % | | |
| Response Time (Rising + Falling) | | T_{RT} | Ta= 25°C $\Theta = 0^\circ$ | - | 30 | 40 | ms | Note 5 | |

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 5).
2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 5) Luminance Contrast Ratio (CR) is defined mathematically.

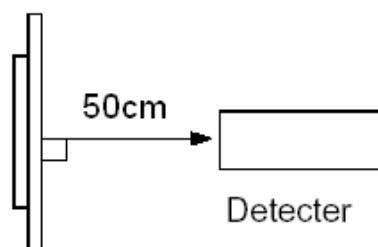
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer.
4. The color chromaticity coordinates specified in Table 6 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
5. The electro-optical response time measurements shall be made as FIGURE 6 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

6.Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: $T_a=25^\circ\text{C}$.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

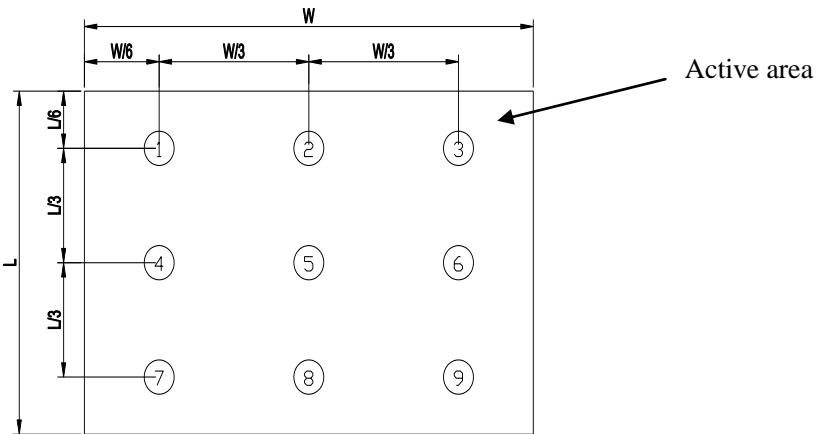


7. The luminance uniformity is calculated by using following formula.

$$\Delta B_p = B_p (\text{Min.}) / B_p (\text{Max.}) \times 100 (\%)$$

$B_p (\text{Max.})$ = Maximum brightness in 9 measured spots

$B_p (\text{Min.})$ = Minimum brightness in 9 measured spots.



8. The definition of viewing angle:

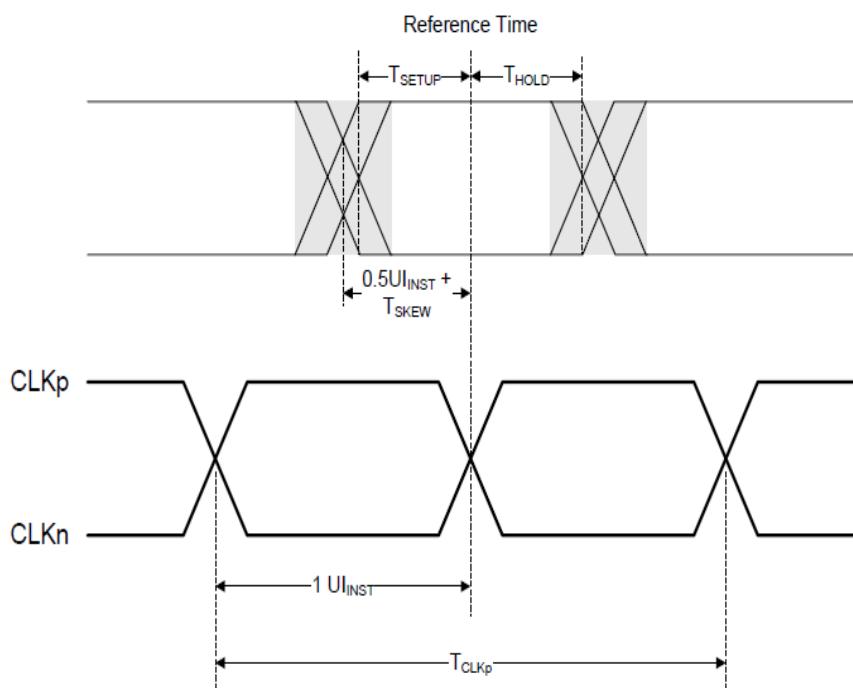
Refer to the graph below marked by θ and ϕ

7.0 MIPI INTERFACE AC PARAMETER

The specification of the MIPI interface High speed transmission is shown in Table 5.

< Table 5. High speed transmission >

| Parameter | Symbol | Min | Typ | Max | Unit |
|--|------------|-------|------|------|--------|
| Clock frequency | RxFCLK | 40.8 | 51.2 | 67.2 | MHz |
| UI instantaneous | UIINST | 2 | - | 12.5 | ns |
| Data to Clock Skew(measured at transmitter) | TSKEW(TX) | -0.15 | - | 0.15 | UIINST |
| Data to Clock Setup time(measured at receiver) | TSETUP(RX) | 0.15 | - | - | UIINST |
| Data to Clock Hold time(measured at receiver) | THOLD(RX) | 0.15 | - | - | UIINST |
| 20%~80% rise time and fall time | TR, TF | 150 | - | - | ps |
| | | - | - | 0.3 | UIINST |



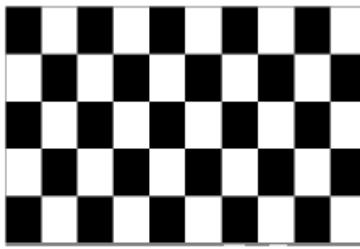
8. Reliability Test Items and Criteria

8.1 TEMPERATURE AND HUMIDITY

| Test Item | Test Condition | Remark |
|--|---|--|
| High Temperature Storage | Ta=60°C; 72hrs | IEC60068-2-1: 2007 GB2423.2-2008 |
| Low Temperature Storage | Ta=-20°C; 72hrs | IEC60068-2-1: 2007 GB2423.1-2008 |
| High Temperature Operation | Ta=50°C; 72hrs | IEC60068-2-1: 2007 GB2423.2-2008 |
| Low Temperature Operation | Ta=-10°C; 72hrs | IEC60068-2-1: 2007 GB2423.1-2008 |
| High Temperature High Humidity Operation | Ta=50°C, 90%RH, 72Hrs(no condensation) | IEC60068-2-78: 2001 GB/T2423.3-2006 |
| Thermal Shock | -20°C(0.5h) ~ 60°C(0.5h) / 10cycles | Start with cold temperature , End with high temperature, IEC60068-2-14:1984,GB2423.22-2002 |
| Image Sticking | 25°C ; 2hrs | Note1 |

Note1:Condition of image sticking test : $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after 5 mins, the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

8.2 ESD

| Test item | Conditions | Remark | |
|--|--|--------|--|
| Electro Static Discharge Test (non-operation) | 150pF, 330Ω, Contact: $\pm 3\text{KV}$,Air: $\pm 8\text{KV}$ | 1 | IEC61000-4-2: 2001 GB/T17626.2-2006 |
| | 200pF, 0Ω, $\pm 200\text{V}$ contact test | 2 | |

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins