



RAYSTAR

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RFH700A7-AIW-LNG

SPECIFICATION

CUSTOMER:

| | |
|-------------|--|
| APPROVED BY | |
| PCB VERSION | |
| DATE | |

FOR CUSTOMER USE ONLY

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
|----------|-------------|------------|-------------|
| | | | |

Release DATE:

Revision History

| VERSION | DATE | REVISED PAGE NO. | Note |
|---------|------------|------------------|-------------|
| 0 | 2019/05/06 | | First issue |

RAYSTAR OPTRONICS

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1. Module Classification Information

| | | | | | | | | | | | | |
|----------|----------|----------|-----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| R | F | H | 70 | 0A7 | - | A | I | W | - | L | N | G |
| 1 | 2 | 3 | 4 | 5 | - | 6 | 7 | 8 | - | 9 | 10 | 11 |

| Item | Description | |
|------|---|--|
| 1 | R : Raystar Optronics Inc. | |
| 2 | Display Type : F→TFT Type, J→ Custom TFT | |
| 3 | Solution: A: 128x160 B:320x234 C:320x240 D:480x234 E:480x272 F:800x480 G:640x480 H:1024x600 I:320x480 J:240x320 K:1280x800 L:240x400 M:1024x768 N:128x128 O:480x800 P:640x320 Q:800x600 S:480x128 T:800x320 | |
| 4 | Display Size : 7.0" TFT | |
| 5 | Version Code. | |
| 6 | Model Type: A : TFT LCD E : TFT+FR+CONTROL BOARD J : TFT+FR+A/D BOARD N : TFT+FR+A/D BOARD+CONTROL BOARD S : TFT+FR+POWER BOARD (DC TO DC) 1 : TFT+CONTROL BOARD | 6 : TFT+FR H : TFT+D/V BOARD I : TFT+FR+D/V BOARD B : TFT+POWER BD |
| 7 | Polarizer Type, Temperature range, View direction | I→Transmissive, W. T, 6:00 ; C→Transmissive, N. T, 6:00 L→Transmissive, W.T,12:00 ; F→Transmissive, N.T,12:00 Y→Transmissive,W.T, IPS TFT ; A→Transmissive, N.T, IPS TFT Z→Transmissive, W.T, O-TFT R→Transmissive, Super W.T, O-TFT N→Transmissive, Super W.T, 6:00; Q→Transmissive, Super W.T, 12:00 V→Transmissive, Super W.T, VA TFT |
| 8 | Backlight | W : LED, White H : LED, High Light White F : CCFL, White |
| 9 | Driver Method | D: Digital A: Analog L : LVDS M:MIPI |
| 10 | Interface | N : without control board A : 8Bit B : 16Bit S:SPI Interface R: RS232 U:USB I: I2C |
| 11 | TS | N : Without TS S : resistive touch panel C : capacitive touch panel capacitive touch panel (G-F-F) G : capacitive touch panel(G-G) |

2.Summary

TFT 7.0" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT_LCD module, It is usually designed for industrial application and this module follows RoHs.

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3.General Specifications

- Size: 7.0 inch
- Dot Matrix: 1024 x RGBx600(TFT) dots
- Module dimension: 164.8(W) x 99.8(H) x 7.325(D) mm
- Active area: 154.2144 x 85.92 mm
- Dot pitch: 0.1506 x 0.1432 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Aspect Ratio: 16:9
- Control IC: NA
- TFT Driver IC: EK79001HE + EK73215BCGA
- TFT Interface: LVDS
- Backlight Type: LED, Normally White
- CTP IC: FT5426 or Equivalent
- CTP Interface: I2C
- CTP FW Version: V03
- With /Without TP: With CTP
- Surface: Glare

*Color tone slight changed by temperature and driving voltage.

4.Interface

4.1. LCM PIN Definition

FPC Connector is used for the module electronics interface. The recommended model is FH12A-40S-0.5SH manufactured by Hirose.

| Pin No. | Symbol | I/O | Function | Remark |
|---------|----------|-----|--|--------|
| 1 | VCOM | P | Common Voltage | |
| 2 | VDD | P | Digital circuit | |
| 3 | VDD | P | Digital circuit | |
| 4 | NC | --- | No connection | |
| 5 | Reset | I | Global reset pin | |
| 6 | STBYB | I | Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z | |
| 7 | GND | P | Ground | |
| 8 | RXIN0- | I | Negative LVDS differential data input | |
| 9 | RXIN0+ | I | Positive LVDS differential data input | |
| 10 | GND | P | Ground | |
| 11 | RXIN1- | I | Negative LVDS differential data input | |
| 12 | RXIN1+ | I | Positive LVDS differential data input | |
| 13 | GND | P | Ground | |
| 14 | RXIN2- | I | Negative LVDS differential data input | |
| 15 | RXIN2+ | I | Positive LVDS differential data input | |
| 16 | GND | P | Ground | |
| 17 | RXCLKIN- | I | Negative LVDS differential clock input | |
| 18 | RXCLKIN+ | I | Positive LVDS differential clock input | |
| 19 | GND | P | Ground | |
| 20 | RXIN3- | I | Negative LVDS differential data input | |
| 21 | RXIN3+ | I | Positive LVDS differential data input | |
| 22 | GND | P | Ground | |
| 23 | NC | --- | No connection | |

| | | | | |
|----|------|-----|--|--|
| 24 | NC | --- | No connection | |
| 25 | GND | P | Ground | |
| 26 | NC | --- | No connection | |
| 27 | DIMO | O | Backlight CABC controller signal output | |
| 28 | SELB | I | 6bit/8bit mode select H:6bit / L:8bit | |
| 29 | AVDD | P | Power for Analog Circuit | |
| 30 | GND | P | Ground | |
| 31 | LED- | P | LED Cathode | |
| 32 | LED- | P | LED Cathode | |
| 33 | L/R | I | Horizontal inversion | |
| 34 | U/D | I | Vertical inversion | |
| 35 | VGL | P | Negative power for TFT | |
| 36 | GND | P | Ground | |
| 37 | GND | P | Ground | |
| 38 | VGH | P | Positive power for TFT | |
| 39 | LED+ | P | LED Anode | |
| 40 | LED+ | P | LED Anode | |

I:input ,O:output,P:power

Note

When L/R="0",set right to left scan direction.

When L/R="1",set left to right scan direction.

When U/D="0",set top to bottom scan direction.

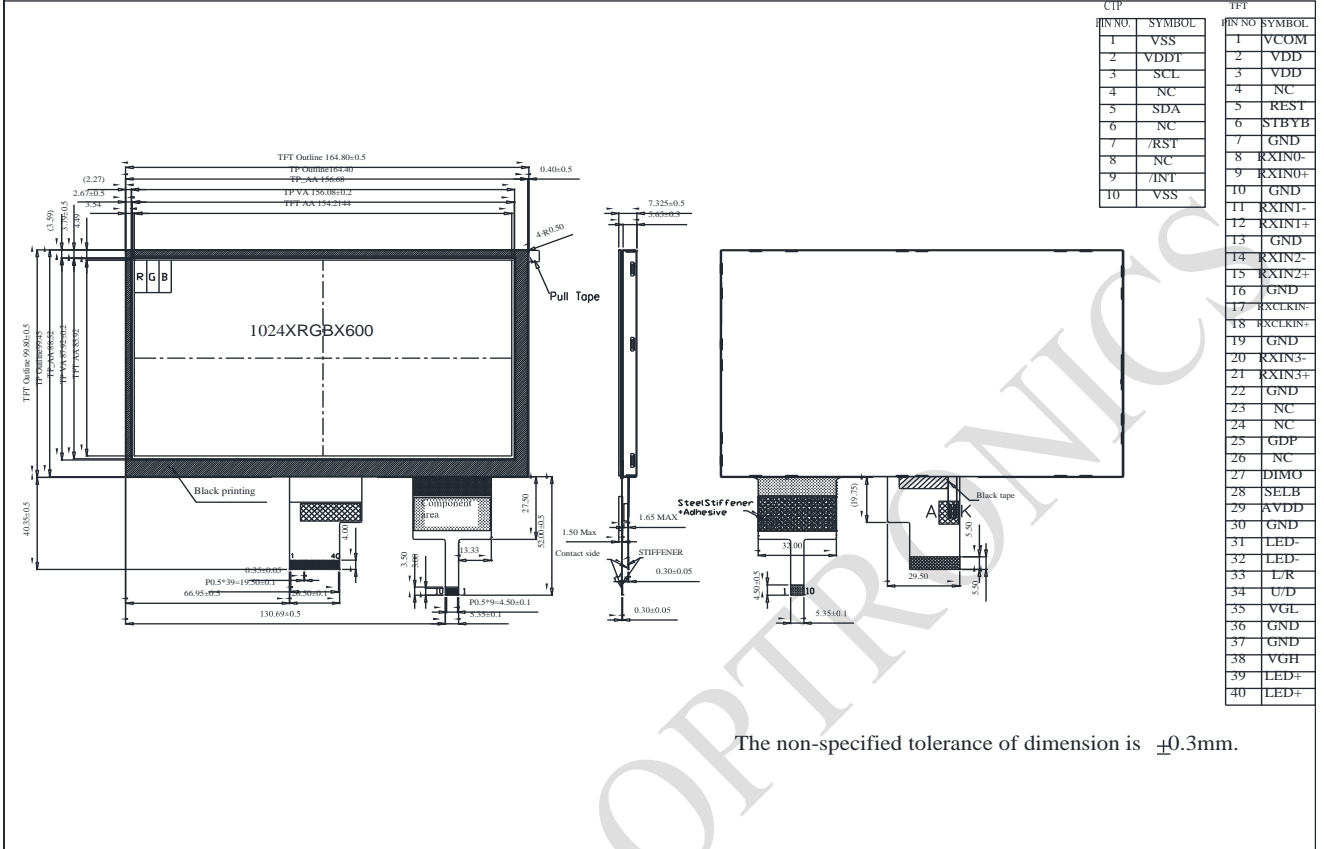
When U/D="1",set bottom to top scan direction.

CTP PIN Definition

| Pin | Symbol | Function | Remark |
|-----|--------|--------------------------------|--------|
| 1 | VSS | Ground for analog circuit | |
| 2 | VDDT | Power Supply : +3.0V | |
| 3 | SCL | I2C clock input | |
| 4 | NC | No connect | |
| 5 | SDA | I2C data input and output | |
| 6 | NC | No connect | |
| 7 | /RST | External Reset, Low is active | |
| 8 | NC | No connect | |
| 9 | /INT | External interrupt to the host | |
| 10 | VSS | Ground for analog circuit | |

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5. Contour Drawing



6. Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-----|-----|-----|------|
| Operating Temperature | TOP | -20 | — | +70 | °C |
| Storage Temperature | TST | -30 | — | +80 | °C |

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C

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7. Electrical Characteristics

7.1. Typical Operation Conditions

(Note 1)

| Item | Symbol | Values | | | Unit | Remark |
|--------------------------------|--------|----------|------|----------|------|----------|
| | | Min. | Typ. | Max. | | |
| Power voltage | DVDD | 3.0 | 3.3 | 3.6 | V | Note 2 |
| | AVDD | 9.4 | 9.6 | 9.8 | V | |
| | VGH | 17 | 18 | 19 | V | |
| | VGL | -6.6 | -6.0 | -5.4 | V | |
| Supply Voltage For Touch Logic | VDDT | 4.4 | 5.0 | 5.5 | V | USB TYPE |
| Input signal voltage | VCOM | 3.1 | 3.3 | 3.6 | V | |
| Input logic high voltage | VIH | 0.7 DVDD | - | DVDD | V | Note 3 |
| Input logic low voltage | VIL | 0 | - | 0.3 DVDD | V | |

Note 1: Be sure to apply DVDD and VGL to the LCD first, and then apply VGH.

Note 2: DVDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK, HS, VS, RESET, U/D, L/R, DE, R0~R7, G0~G7, B0~B7, MODE, DITHB.

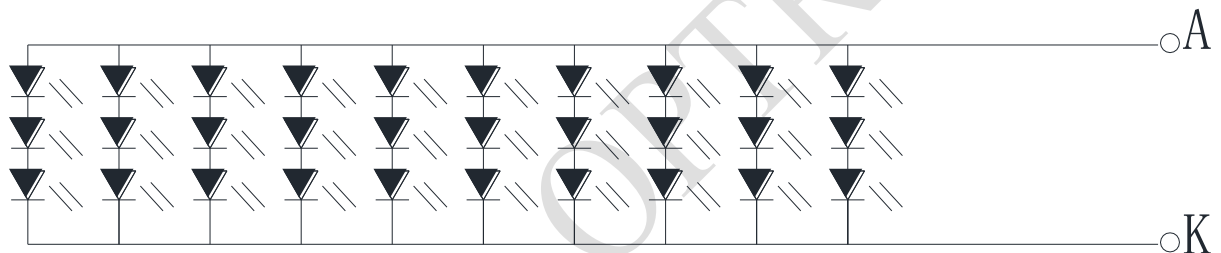
7.2. Current Consumption

| Item | Symbol | Values | | | Unit | Remark |
|--------------------|--------|--------|------|------|------|-------------|
| | | Min. | Typ. | Max. | | |
| Current for Driver | IGH | - | 0.2 | 1.0 | mA | VGH = 18.0V |
| | IGL | - | 0.2 | 1.0 | mA | VGL = -6.0V |
| | IDVDD | - | 4.0 | 10 | mA | DVDD = 3.3V |
| | IAVDD | - | 20 | 50 | mA | AVDD = 9.6V |

7.3. Backlight Driving Conditions

| Item | Symbol | Values | | | Unit | Remark |
|---------------------------|--------|--------|--------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Voltage for LED backlight | VL | 8.4 | 9.8 | 10.8 | V | Note 1 |
| Current for LED backlight | IL | -- | 300 | -- | mA | |
| LED life time | - | - | 50,000 | - | Hr | Note 2 |

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and IL =300mA.
 Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =300mA. The LED lifetime could be decreased if operating IL is larger than 300mA.

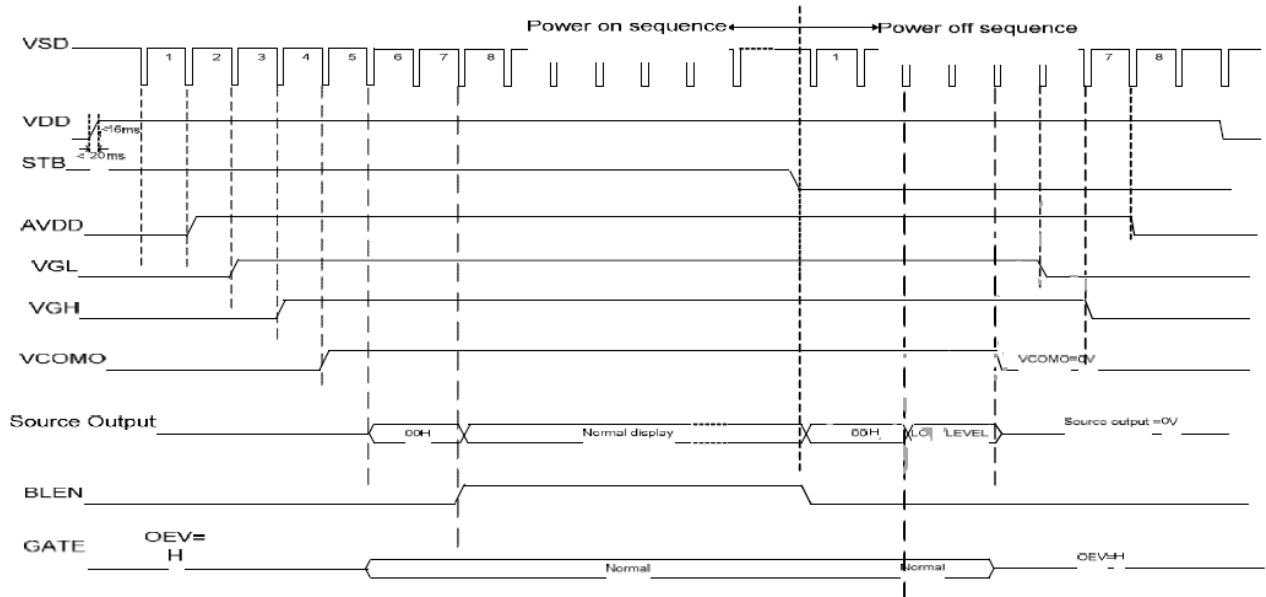


Backlight 30LED Circuit

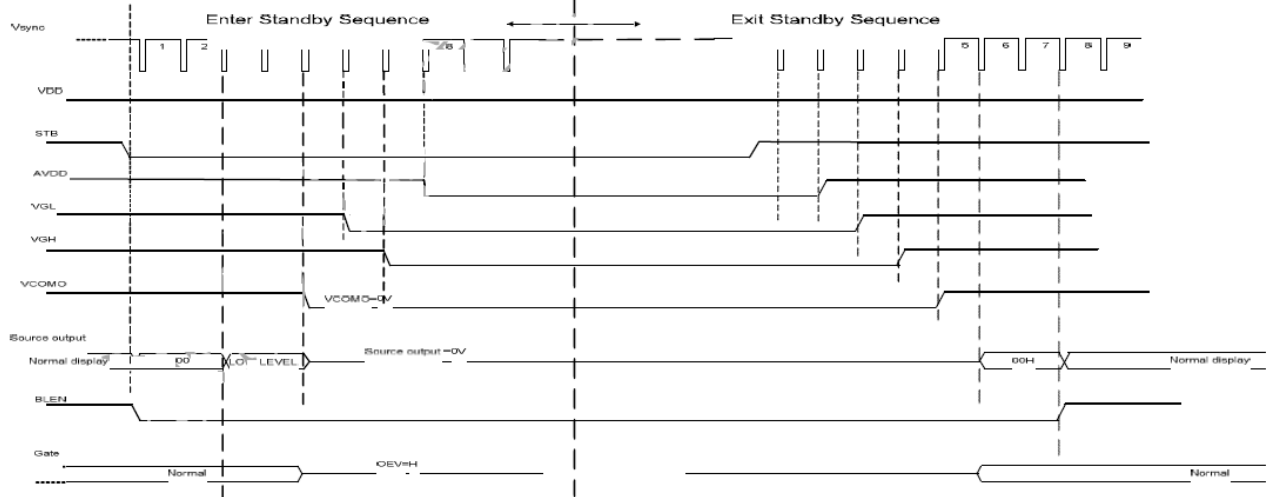
8.Operation Sequence

8.1. Power Sequence

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



Power on/off timing chart

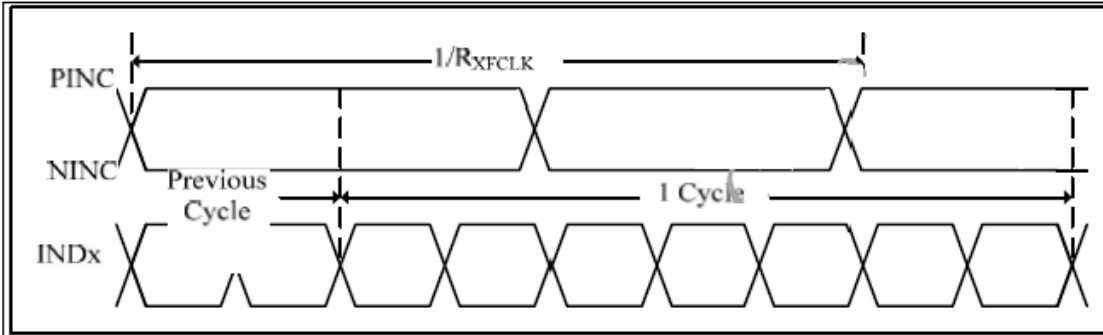


Enter and Exit standby Mode timing chart

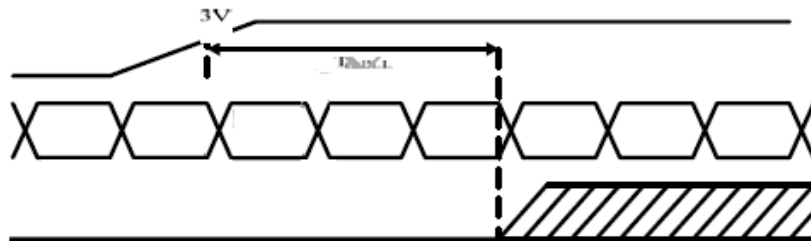
Note : Low level=3Fh, when NBW=L (normally white)
 Low level=00h, when NBW=H (normally black)

8.2. Timing Characteristics
AC Electrical Characteristics

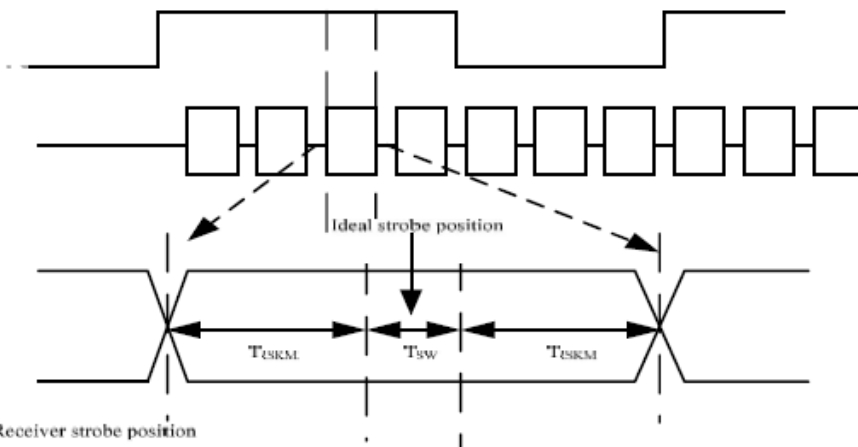
| Parameter | Symbol | condition | Min. | Typ. | Max. | Unit |
|------------------------|--------|--|------|---------------|------|------|
| Clock frequency | RxFCLK | | 20 | - | 71 | MHz |
| Input data skew margin | TRSKM | VID =400mV RxVCM=1.2V RxFCLK=71MHz | 500 | - | - | ps |
| Clock high time | TLVCH | | - | 4/(7* RxFCLK) | - | ns |
| Clock low time | TLVCL | | - | 3/(7* RxFCLK) | - | ns |
| PLL wake-up-time | TenPLL | | | | 150 | us |



LVDS timing(1)

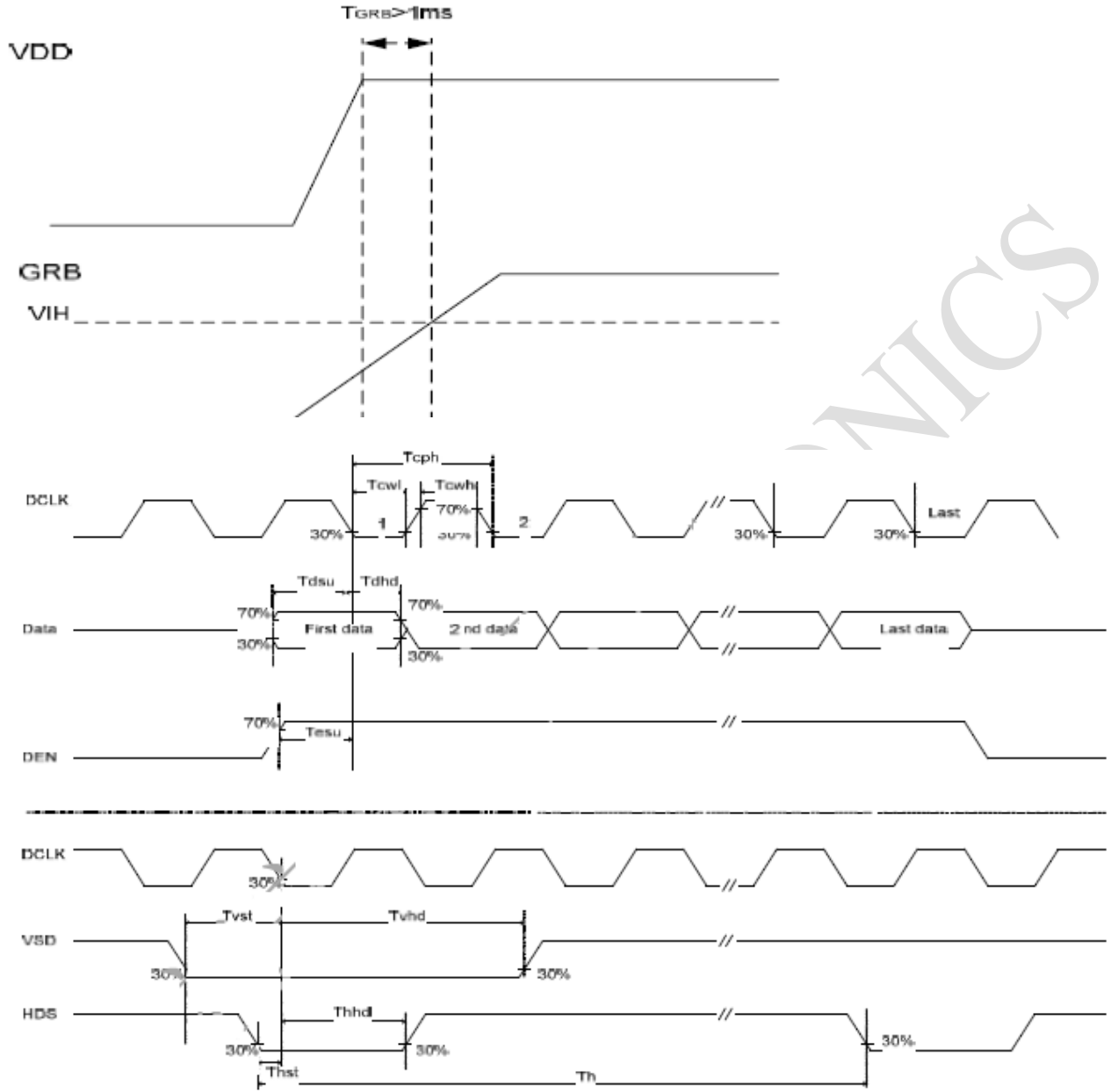


LVDS timing(2)



T_{SW}:Receiver strobe position
T_{SKM}:Receiver strobe margin

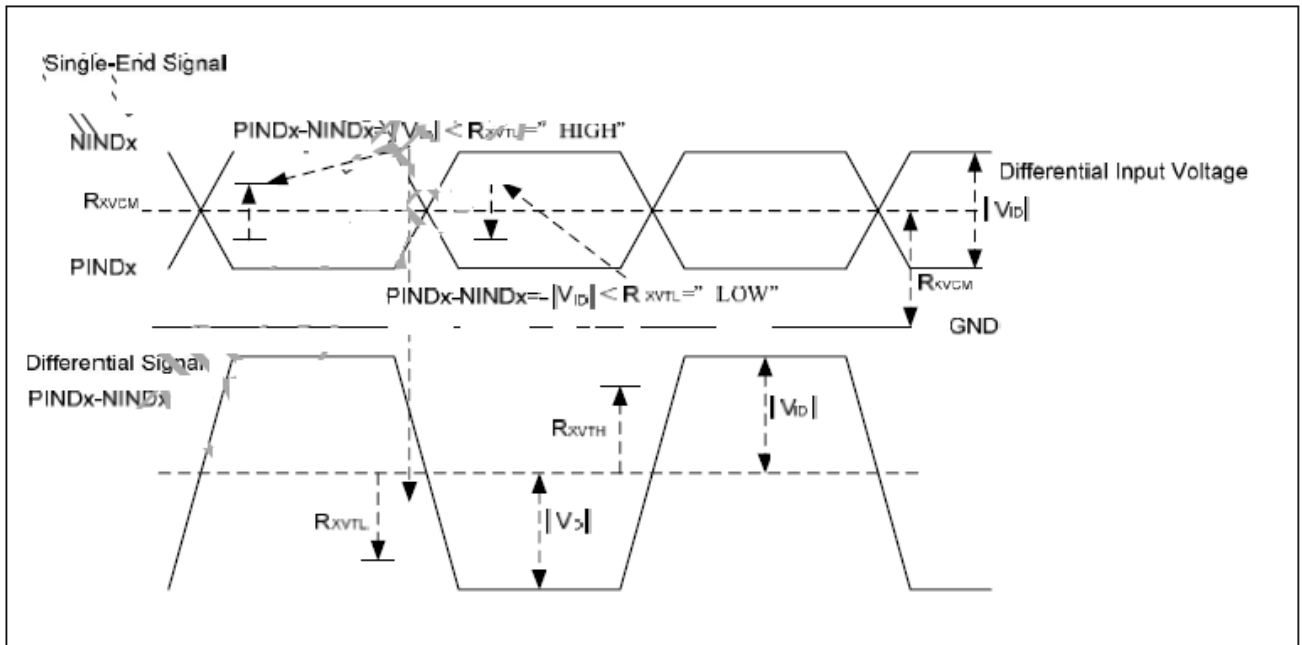
LVDS timing(3)



Parallel Input Clock and Data timing

8.3. LVDS DC Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---------|-----------|---------|---------------|------|---------------------------|
| Differential input high Threshold voltage | RxVTH | - | - | +0.1 | | |
| Differential input low Threshold voltage | RxVTL | -0.1 | - | - | V | |
| Input voltage range (singled-end) | RxVIN | 0 | - | 2.4 | V | |
| Differential input common mode voltage | RxVCM | $ VID /2$ | - | $2.4- VID /2$ | V | |
| Differential input voltage | $ VID $ | 0.2 | - | 0.6 | V | |
| Differential input leakage current | RVxliz | -10 | - | +10 | uA | |
| LVDS Digital operating Current | Iddlvsd | - | 40(TBD) | 50 | mA | Fclk=65Mhz VDD=3.3V |
| LVDS Digital Standby Current | Istlvds | -- | 10(TBD) | 50 | uA | Clock & all Functions are |



LVDS DC Characteristics

HV mode(1)

HV mode

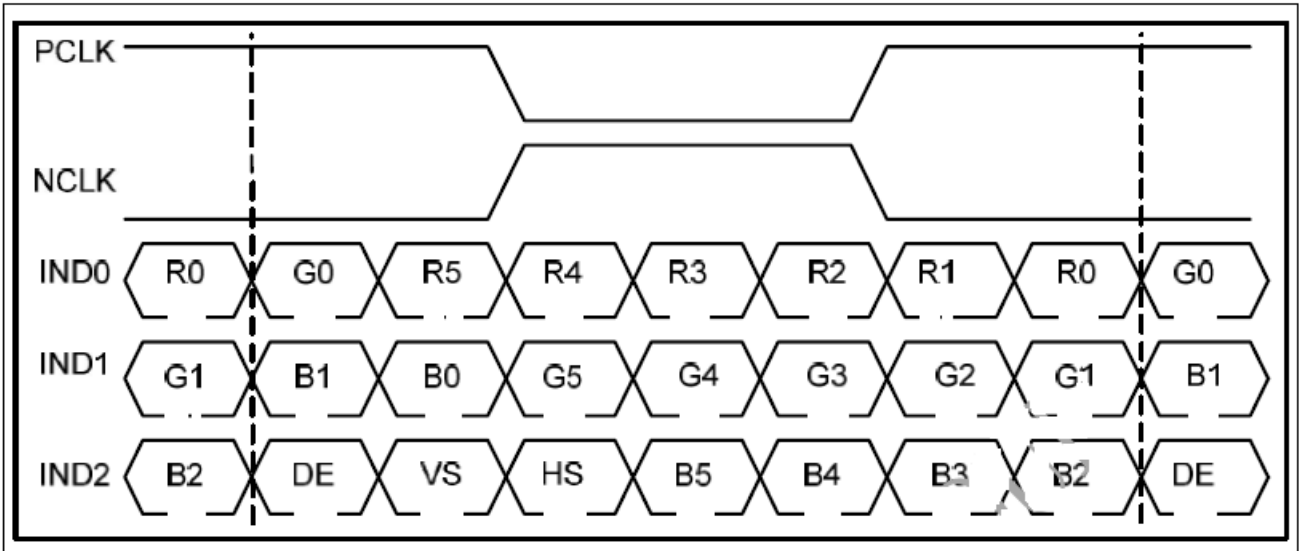
Horizontal input timing

| Parameter | | Symbol | Value | | | Unit |
|----------------------------------|------|--------|-------|------|------|------|
| Horizontal display area | | thn | 1024 | | | DCLK |
| DCLK frequency @ Frame rate=60hz | | fclk | Min. | Typ. | Max. | Mhz |
| | | | 44.9 | 51.2 | 63 | |
| 1 Horizontal Line | | Th | 1200 | 1344 | 1400 | DCLK |
| HSYNC pulse width | Min. | thpw | 1 | | | |
| | Typ. | | - | | | |
| | Max. | | 140 | | | |
| HSYNC back porch | | thbp | 160 | 160 | 160 | |
| HSYNC front porch | | thfp | 16 | 160 | 216 | |

HV mode(2)

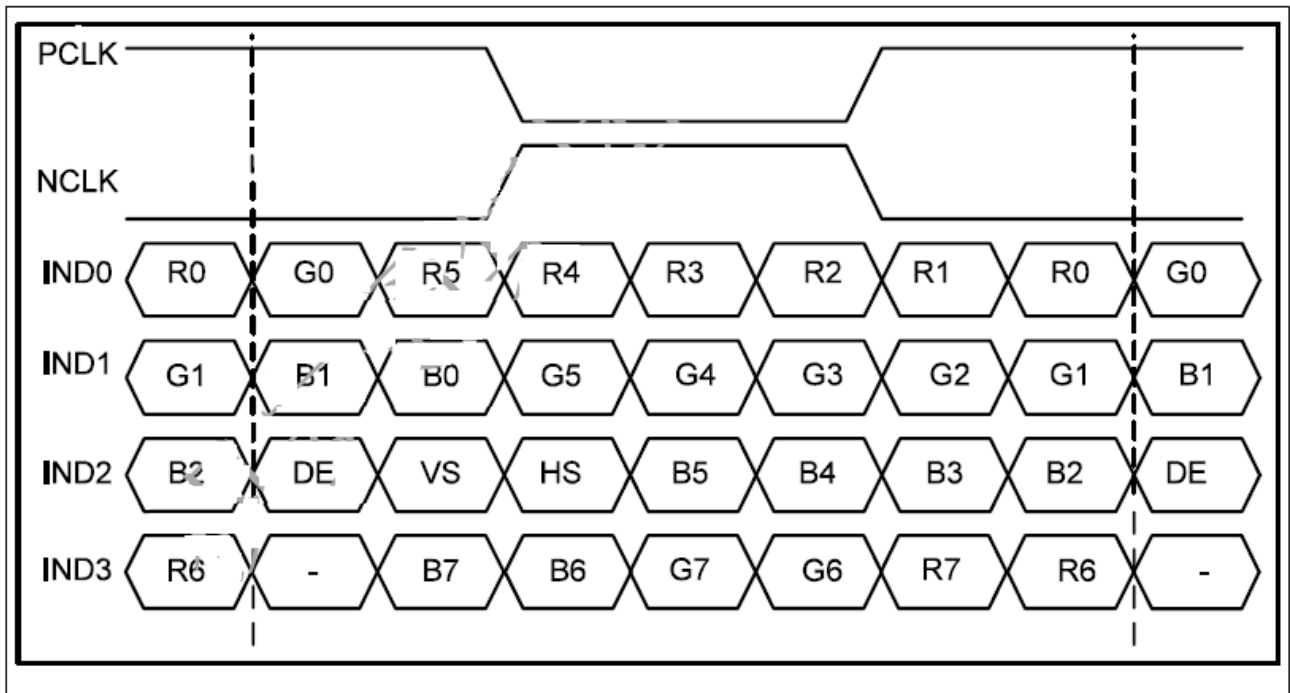
| Parameter | Symbol | Value | | | Unit |
|-----------------------|--------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| Vertical display area | tvd | 600 | | | H |
| VSYNC period time | tv | 624 | 635 | 750 | H |
| VSYNC pulse width | tvpw | 1 | - | 20 | H |
| VSYNC back porch | tvb | 23 | 23 | 23 | H |
| VSYNC front porch | tvfp | 1 | 12 | 127 | H |

Data Input Format
6bit LVDS input(HSD="H")



6-bit LVDS input timing chart

8bit LVDS input(HSD="L")



8-bit LVDS input timing chart

9. Optical Characteristics

| Item | Symbol | Condition. | Min | Typ. | Max. | Unit | Remark | |
|--|--------|-----------------------------------|-----------------------------|------|------|-------------------|-------------------|------------|
| Response time | Tr | $\theta=0^\circ$ 、 $\phi=0^\circ$ | - | 25 | 40 | .ms | Note 3 | |
| | Tf | | | | | | | |
| Contrast ratio | CR | At optimized viewing angle | 600 | 800 | - | - | Note 4 | |
| Color Chromaticity | White | Wx | $\theta=0^\circ$ 、 $\phi=0$ | 0.26 | 0.31 | 0.36 | - | Note 2,5,6 |
| | | Wy | | 0.28 | 0.33 | 0.38 | - | |
| Viewing angle (Gray Scale Inversion Direction) | Hor. | θ_R | $CR \geq 10$ | 70 | 80 | - | Deg. | Note 1 |
| | | θ_L | | 70 | 80 | - | | |
| | Ver. | ϕ_T | | 50 | 60 | - | | |
| | | ϕ_B | | 60 | 70 | - | | |
| Brightness | - | - | 400 | 450 | - | cd/m ² | Center of display | |
| Uniformity | (U) | - | 70 | - | - | % | Note 5 | |

Ta=25±2°C,

Note 1: Definition of viewing angle range

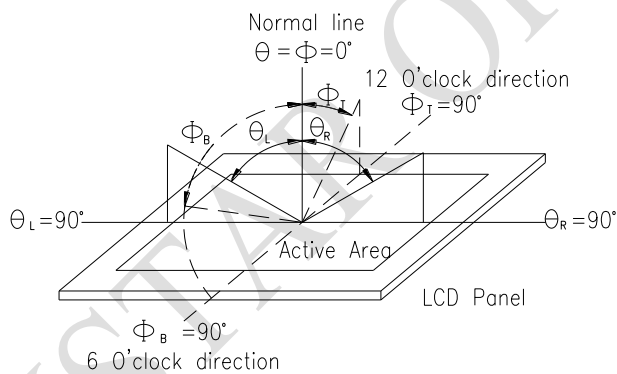


Fig. 9.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

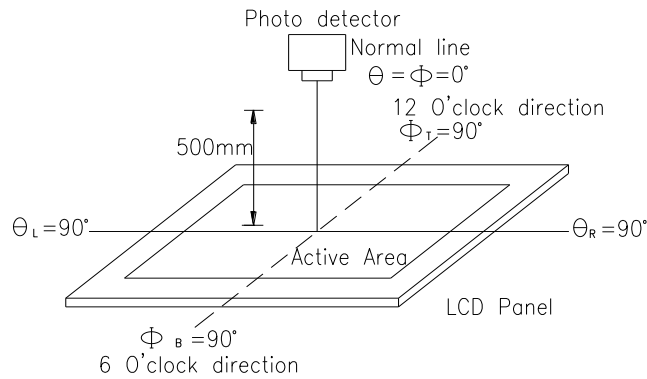
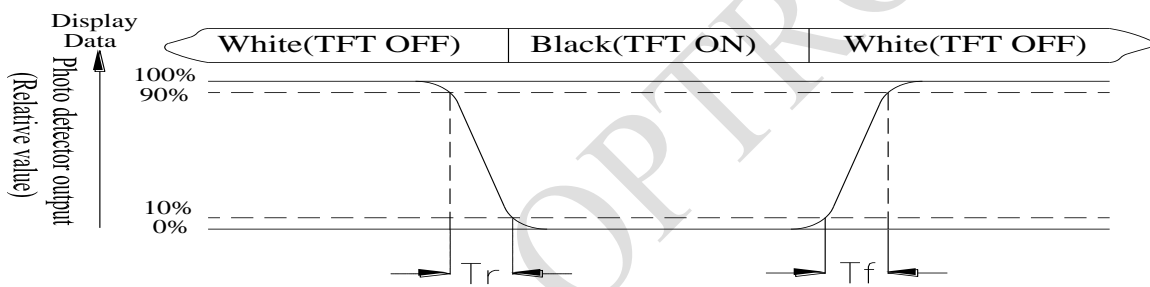


Fig. 9.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = $L_{min}/L_{max} \times 100\%$

L = Active area length

W = Active area width

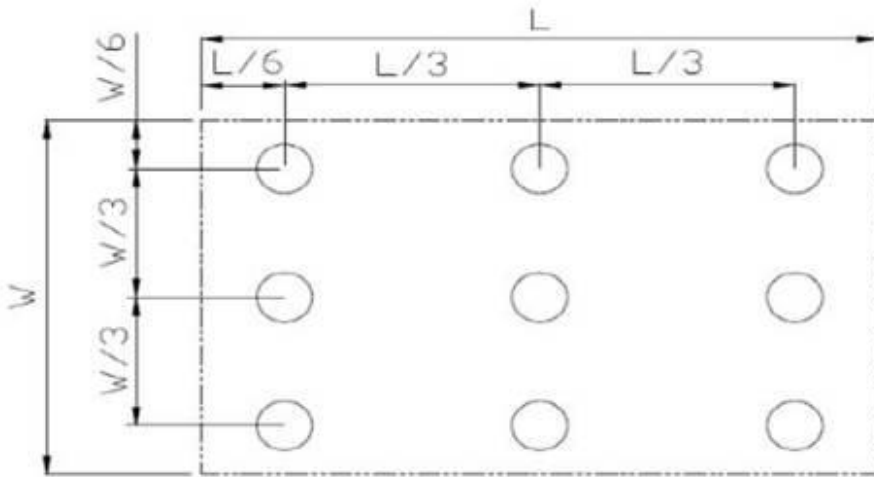


Fig 9.3. Definition of uniformity

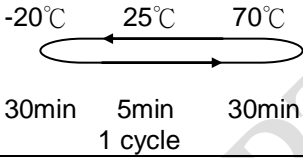
Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

10. Reliability

Content of Reliability Test (Wide temperature, -20°C ~70°C)

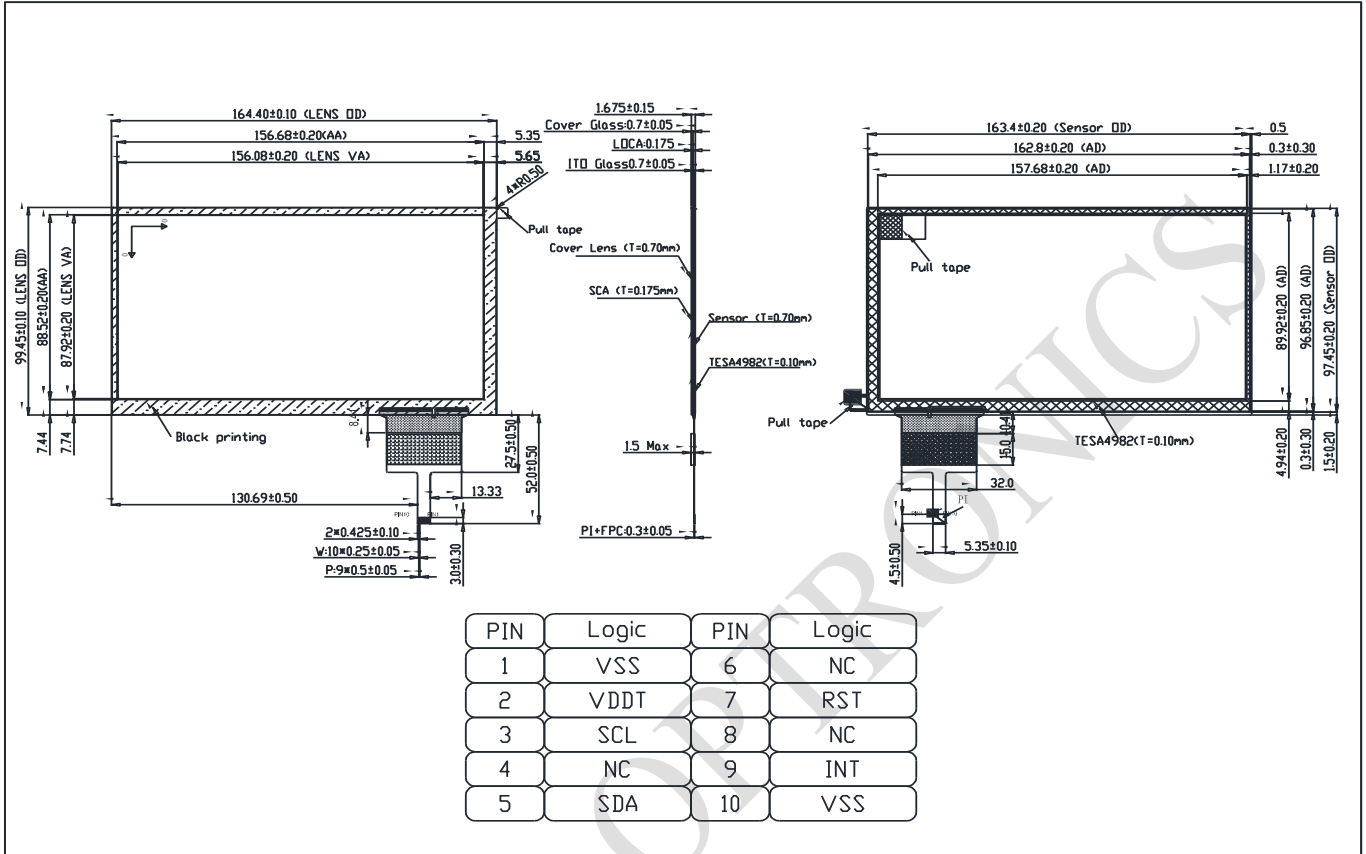
| Environmental Test | | | |
|--------------------------------------|--|---|------|
| Test Item | Content of Test | Test Condition | Note |
| High Temperature storage | Endurance test applying the high storage temperature for a long time. | 80°C 200hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30°C 200hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time. | 70°C 200hrs | — |
| Low Temperature Operation | Endurance test applying the electric stress under low temperature for a long time. | -20°C 200hrs | 1 |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 60°C, 90%RH max | 60°C, 90%RH 96hrs | 1,2 |
| Thermal shock resistance | The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;">  <p>-20°C 25°C 70°C</p> <p>30min 5min 30min</p> <p>1 cycle</p> </div> | -20°C/70°C 10 cycles | — |
| Vibration test | Endurance test applying the vibration during transportation and using. | Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes | 3 |
| Static electricity test | Endurance test applying the electric stress to the terminal. | VS=±600V(contact) , ±800v(air), RS=330Ω CS=150pF 10 times | — |

Note1: No dew condensation to be observed.

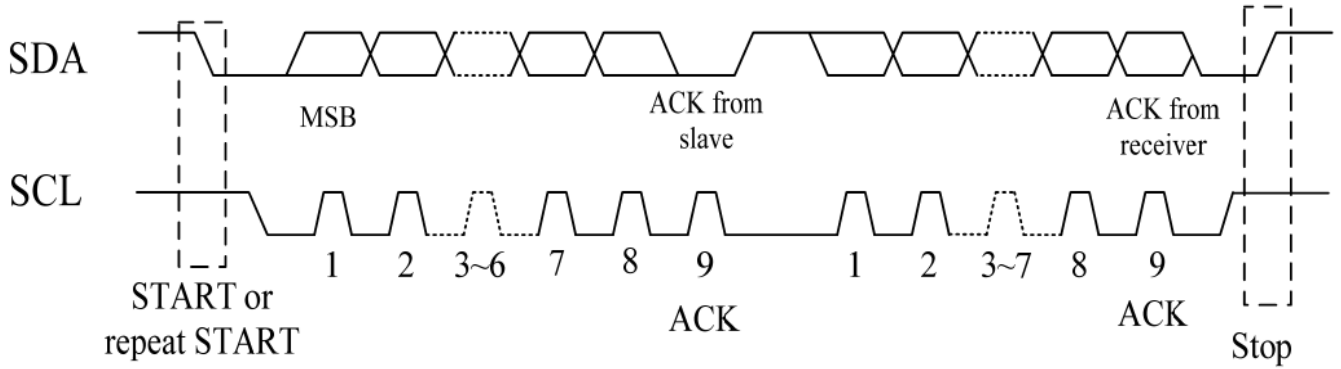
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

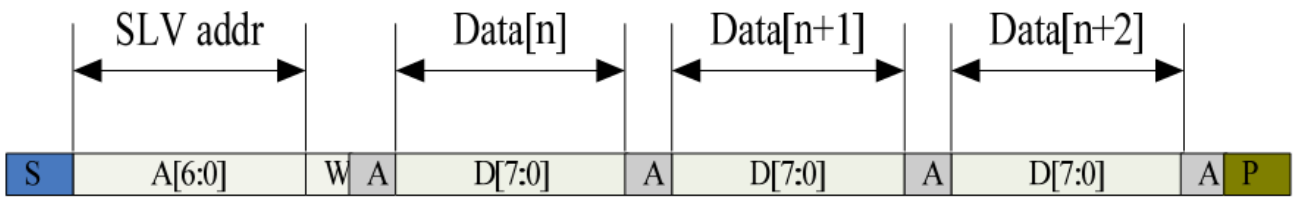
11.Touch Panel Information



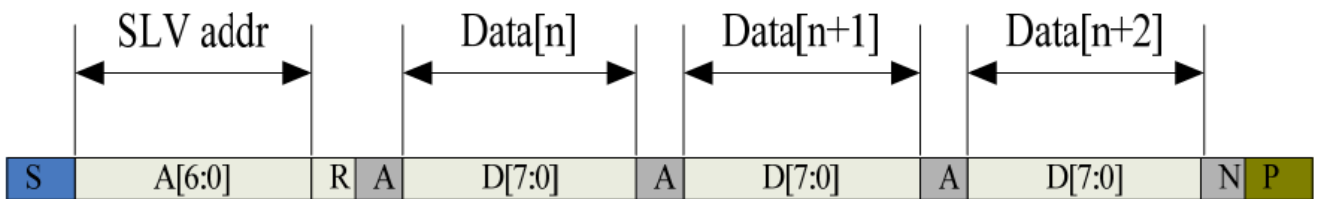
11.1. CTP I2C Timing:



I2C Serial Data Transfer Format



I2C master write, slave read



I2C master read, slave write

| Mnemonics | Description |
|-----------|--|
| S | I2C Start or I2C Restart |
| A[6:0] | Slave address |
| R/W | READ/WRITE bit, '1' for read, '0' for write |
| A(N) | ACK(NACK) bit |
| P | STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet) |

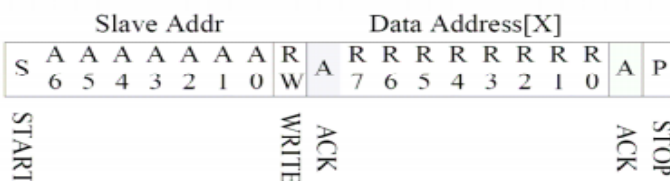
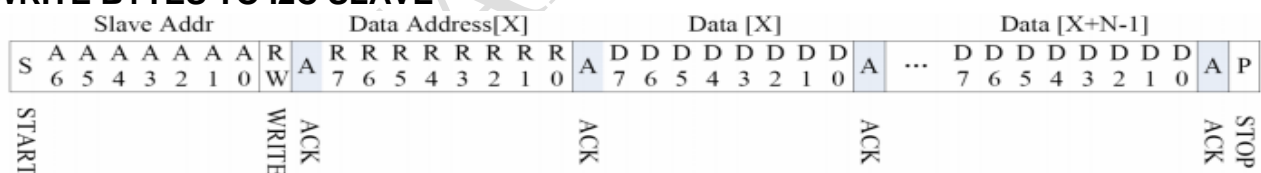
Lists the meanings of the mnemonics used in the above figures

| Parameter | Unit | Min | Max |
|--|------|-----|-----|
| SCL frequency | KHz | 0 | 400 |
| Bus free time between a STOP and START condition | us | 1.3 | \ |
| Hold time (repeated) START condition | us | 0.6 | \ |
| Data setup time | ns | 100 | \ |
| Setup time for a repeated START condition | us | 0.6 | \ |
| Setup time for STOP condition | us | 0.6 | \ |

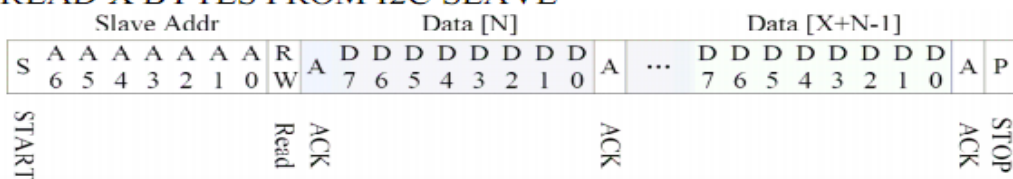
Interface Timing Characteristics

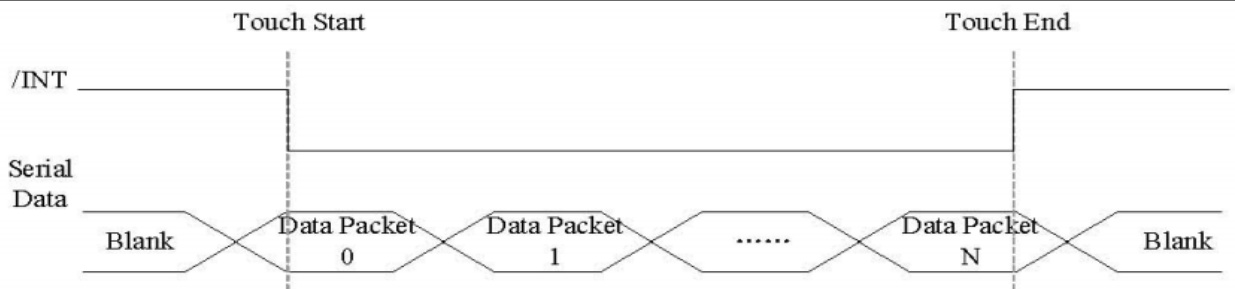
AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA. HERE IS THE TIMING TO GET TOUCH DATA.

WRITE BYTES TO I2C SLAVE



READ X BYTES FROM I2C SLAVE





Address: 0X38

TOUCH DATA READ PROTOCOL

| NAME | VALUE | DESCRIPTION |
|--------------------------------|-------|--|
| START CH | 0X00 | START COMMAND FOR CTPM TOUCH DATA PACKET,HOST MUST SEND CTPM A START CH COMMAND BEFORE READ TOUCH DATA |
| Lst READ BYTE ~ LAST READ BYTE | | TOUCH DATA PACKET SENT BY CTPM,EACH BYTE HAS 8-BIT DATA ,A TOUCH DATA PACKET CONSISTS OF N BYTE |

| Address | Name | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | Host Access |
|---------|--------------|---------------------------------------|-------------------|------|--|------|------|------|------|-------------|
| 00h | Devide__Mode | — | Device Model[2:0] | | | — | | | | RW |
| 01h | Gest_ID | Gesture ID[7:0] | | | | | | | | R |
| 02h | TD__Status | — | | | Number of touch points[3:0] | | | | | R |
| 03h | Touch1__XH | 1 st Event Flag | — | | 1 st Touch X Position[11:8] | | | | | R |
| 04h | Touch1__XL | 1 st Touch X Position[7:0] | | | | | | | | R |
| 05h | Touch1__YH | 1 st Touch ID[3:0] | | | 1 st Touch Y Position[11:8] | | | | | R |
| 06h | Touch1__YL | 1 st Touch Y Position[7:0] | | | | | | | | R |
| 09h | Touch2__XH | 2 nd Event Flag | — | | 2 nd Touch X Position[11:8] | | | | | R |
| 0Ah | Touch2__XL | 2 nd Touch X Position[7:0] | | | | | | | | R |
| 0Bh | Touch2__YH | 2nd Touch ID[3:0] | | | 2ndTouch Y Position[11:8] | | | | | R |
| 0Ch | Touch2__YL | 2nd Touch Y Position[7:0] | | | | | | | | R |
| 0Fh | Touch3__XH | 3rdEvent Flag | — | | 3rdTouch X Position[11:8] | | | | | R |

| | | | | | |
|-----|------------|---------------------------|---------------------------|---------------------------|---|
| 10h | Touch3__XL | 3rd Touch X Position[7:0] | | R | |
| 11h | Touch3__YH | 3rdTouch ID[3:0] | 3rdTouch Y Position[11:8] | R | |
| 12h | Touch3__YL | 3rd Touch Y Position[7:0] | | R | |
| 15h | Touch4__XH | 4thEvent Flag | — | 4thTouch X Position[11:8] | R |
| 16h | Touch4__XL | 4th Touch X Position[7:0] | | R | |
| 17h | Touch4__YH | 4thTouch ID[3:0] | 4thTouch Y Position[11:8] | R | |
| 18h | Touch4__YL | 4th Touch Y Position[7:0] | | R | |
| 1Bh | Touch5__XH | 5thEvent Flag | — | 5thTouch X Position[11:8] | R |
| 1Ch | Touch5__XL | 5th Touch X Position[7:0] | | R | |
| 1Dh | Touch5__YH | 5thTouch ID[3:0] | 5thTouch Y Position[11:8] | R | |
| 1Eh | Touch5__YL | 5th Touch Y Position[7:0] | | R | |

LCM Sample Estimate Feedback Sheet

Module Number : _____

1 、 Panel Specification :

| | | |
|----------------------------|-------------------------------|-------------------------------------|
| 1. Panel Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. View Direction : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Numbers of Dots : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. View Area : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Active Area : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. Operating Temperature : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Storage Temperature : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8. Others : | _____ | |

2 、 Mechanical Specification :

| | | |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. PCB Size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. Frame Size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Material of Frame : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. Connector Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Fix Hole Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. Backlight Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Thickness of PCB : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8. Height of Frame to PCB : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 9. Height of Module : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 10. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

3 、 Relative Hole Size :

| | | |
|-----------------------------|-------------------------------|-------------------------------------|
| 1. Pitch of Connector : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. Hole size of Connector : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. Mounting Hole size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. Mounting Hole Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

4 、 Backlight Specification :

| | | |
|---|-------------------------------|-------------------------------------|
| 1. B/L Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2. B/L Color : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3. B/L Driving Voltage (Reference for LED Type) : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4. B/L Driving Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5. Brightness of B/L : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6. B/L Solder Method : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |

>> **Go to page 2** <<

| | | |
|---|-------------------------------|-------------------------------------|
| Module Number : _____ | | |
| 5 · <u>Electronic Characteristics of Module</u> : | | |
| 1.Input Voltage : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 2.Supply Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 3.Driving Voltage for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 4.Contrast for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 5.B/L Driving Method : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6.Negative Voltage Output : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 7.Interface Function : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 8.LCD Uniformity : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 9.ESD test : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 10.Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , _____ |
| 6 · <u>Summary</u> : | | |
| <p style="text-align: right; margin-right: 100px;">Sales signature : _____</p> <p style="text-align: right; margin-right: 100px;">Customer Signature : _____ <u>Date</u> : / /</p> | | |

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