



晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

| | |
|--------------------------|----------------------------|
| CUSTOMER | |
| CUSTOMER PART NO. | |
| AMPIRE PART NO. | AM-800600C4TMQW-A1H |
| APPROVED BY | |
| DATE | |

- Approved For Specifications
 Approved For Specifications & Sample

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| | | |

RECORD OF REVISION

| Revision Date | Page | Contents | Editor |
|---------------|------|--|--------|
| 2013/03/15 | -- | New Release | Emil |
| 2013/03/19 | 3 | Correct the interface description. | Emil |
| 2013/03/28 | 11 | Correct the pin definition. | Emil |
| 2013/03/28 | 3 | Correct the LCM construction (without TP). | Emil |
| 2013/04/08 | 11 | Mention the default setting. | Emil |
| 2013/04/15 | 5 | Correct the LED voltage | Bob |

1. Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8" TFT-LCD panel, LED backlight, LED driver unit and power circuit unit.

- (1) Construction: 8" a-Si TFT active matrix, White LED Backlight and LED driver unit.
- (2) Resolution (pixel): 800(R.G.B) X600
- (3) Number of the Colors : 262K colors (R , G , B 6 bit digital each)
- (4) LCD type : Transmissive , normally White
- (5) Interface: LVDS interface 20 pin
- (6) Power Supply Voltage: 3.3V for logic voltage, 5.0V for LED driver power voltage.
- (7) Viewing Direction: 6 O'clock (Gray Inversion)

2. PHYSICAL SPECIFICATIONS

| Item | Specifications | unit |
|-------------------|-------------------------------|------|
| LCD size | 8 inch (Diagonal) | |
| Resolution | 800 x 3(RGB) x 600 | dot |
| Dot pitch | 0.0675(W) x 0.2025(H) | mm |
| Active area | 162.0(W) x 121.5(H) | mm |
| Module size | 183.0(W) x 141.0(H) x 8.36(D) | mm |
| Surface treatment | Anti-Glare | |
| Color arrangement | RGB-stripe | |
| interface | LVDS | |
| Weight | T.B.D. | g |

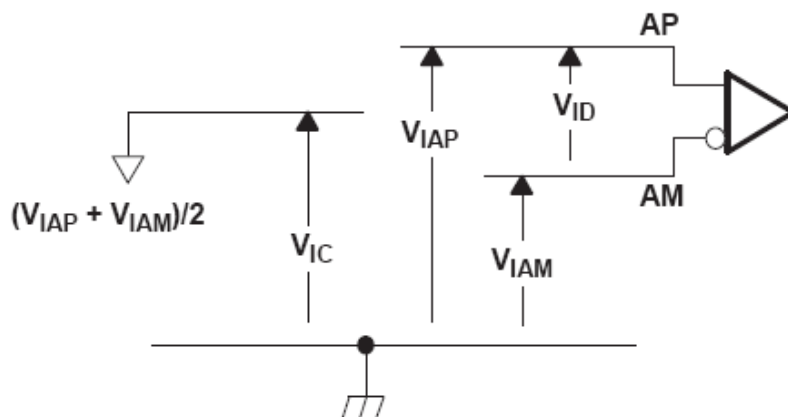
3. ABSOLUTE MAX. RATINGS

| Item | Symbol | Values | | UNIT | Note |
|-----------------------|--------|--------|------|------|------|
| | | Min. | Max. | | |
| Power voltage | VCC | -0.3 | 4.6 | V | |
| | VLED | -0.3 | 6.0 | | |
| Operation temperature | TOP | -20 | 70 | °C | |
| Storage temperature | TST | -30 | 80 | °C | |

4. ELECTRICAL CHARACTERISTICS

4-1 TFT LCD Module

| | | MIN | NOM | MAX | UNIT |
|-----------------|--------------------------------------|----------------------|-----|----------------------------|------|
| V _{CC} | Supply voltage | 3 | 3.3 | 3.6 | V |
| V _{IH} | High-level input voltage (SHTDN) | 2 | | | V |
| V _{IL} | Low-level input voltage (SHTDN) | | | 0.8 | V |
| V _{ID} | Magnitude differential input voltage | 0.1 | | 0.6 | V |
| V _{IC} | Common-mode input voltage | $\frac{ V_{ID} }{2}$ | | $2.4 - \frac{ V_{ID} }{2}$ | V |



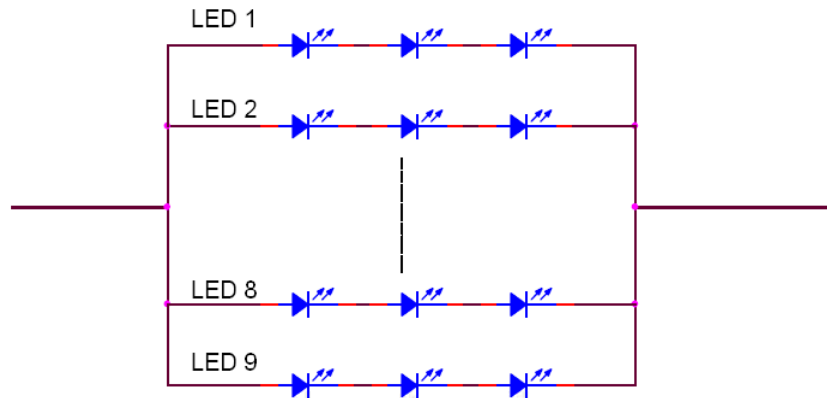
| Item | Symbol | Values | | | Unit | Remark |
|--------------------------------|------------------|--------|-----|-----|------|---|
| | | MIN | TYP | MAX | | |
| LED Driver Power Voltage | V _{LED} | 4.5 | 5.0 | 5.5 | V | |
| LED Driver Current Consumption | I _{LED} | -- | 410 | -- | mA | V _{LED} =5V V _{ADJ} =3.3V (duty 100%) |

4-2 Backlight Driving Conditions

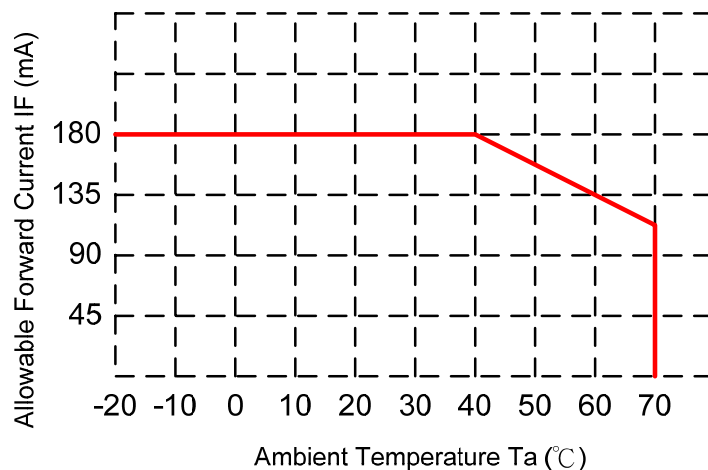
| Item | Symbol | Values | | | Unit | Note |
|---------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| LED voltage | VL | -- | 9.9 | 10.5 | V | Note 1 |
| LED current | IL | 162 | 180 | 198 | mA | Note 1 |
| LED life time | -- | 20,000 | -- | -- | Hr | Note 2 |

Note 1 : The LED Supply Voltage is defined by the number of LED at $T_a=25^{\circ}\text{C}$ and $I_L=180\text{mA}$.

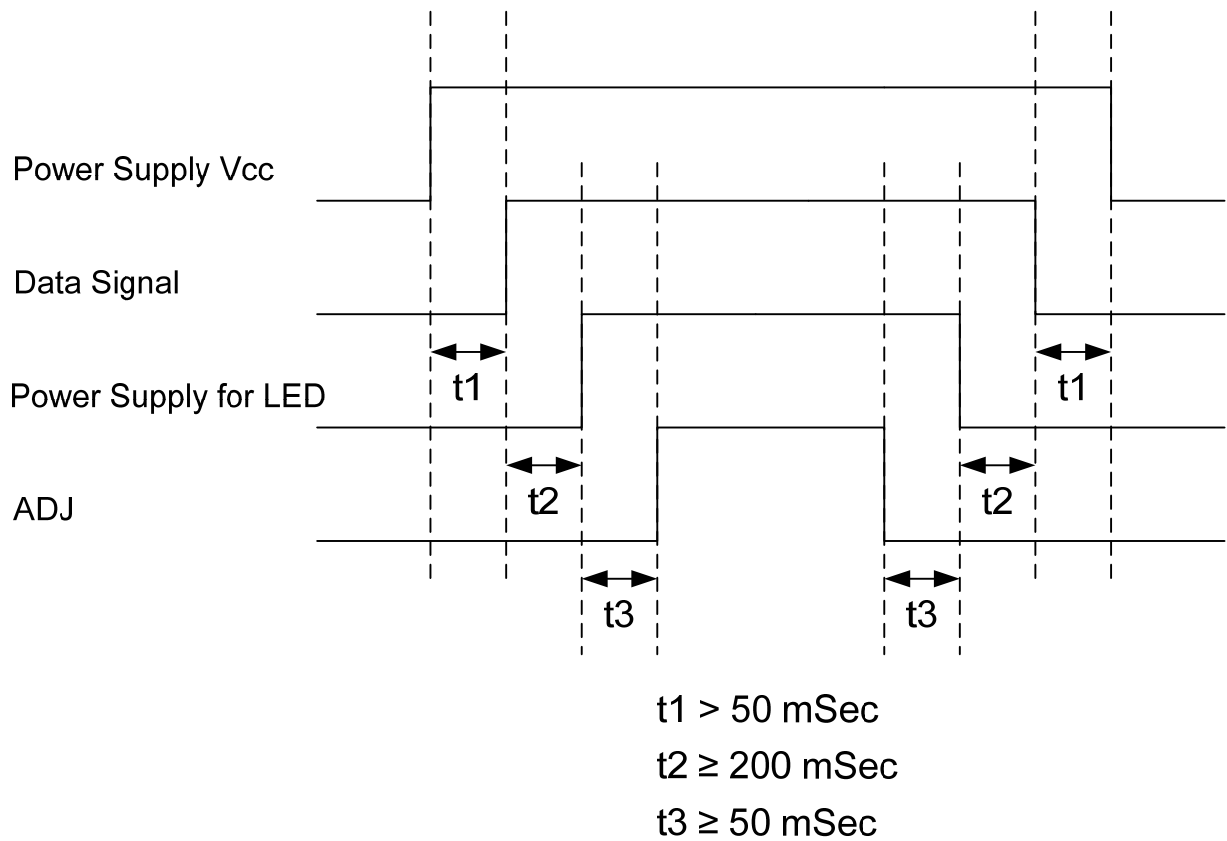
Note 2 : The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=180\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 180mA.



Note 3 : When LCM is operated over 40°C ambient temperature, the I_{LED} should be follow :



4-3 Power Sequence



Note : Data Signal includes DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

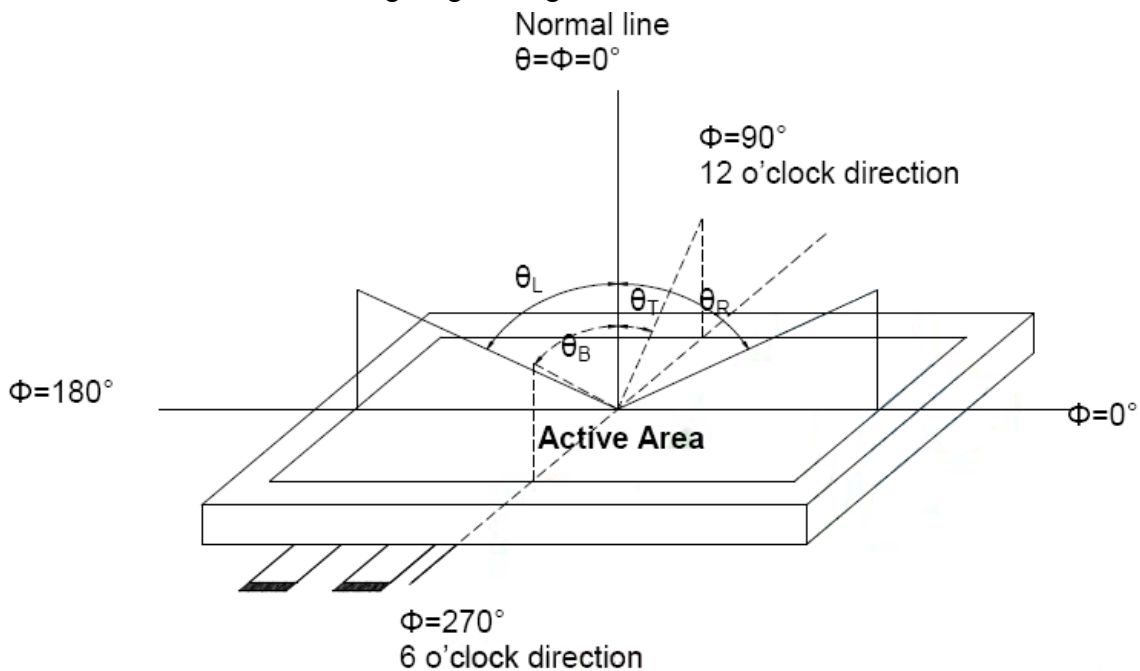
5. Optical Specifications

| Item | Symbol | Condition | Values | | | Unit | Note |
|---------------------------------|------------|-------------------------------------|--------|------|------|-------------------|-------|
| | | | Min. | Typ. | Max. | | |
| Viewing angle (CR \geq 10) | θ L | $\Phi = 180^\circ$ (9 o'clock) | 60 | 70 | -- | degree | Note1 |
| | θ R | $\Phi = 0^\circ$ (3 o'clock) | 60 | 70 | -- | | |
| | θ T | $\Phi = 90^\circ$ (12 o'clock) | 40 | 50 | -- | | |
| | θ B | $\Phi = 270^\circ$ (6 o'clock) | 60 | 70 | -- | | |
| Response time | TON | Normal $\theta = \Phi = 0^\circ$ | -- | 10 | 20 | msec | Note3 |
| | TOFF | | -- | 15 | 30 | msec | |
| Contrast ratio | CR | | 400 | 500 | -- | -- | Note4 |
| Color chromaticity | WX | | 0.26 | 0.31 | 0.36 | -- | Note5 |
| | WY | | 0.28 | 0.33 | 0.38 | -- | Note6 |
| Luminance | L | | 200 | 250 | -- | cd/m ² | Note6 |
| Luminance uniformity | YU | | 70 | 75 | -- | % | Note7 |

Test Conditions :

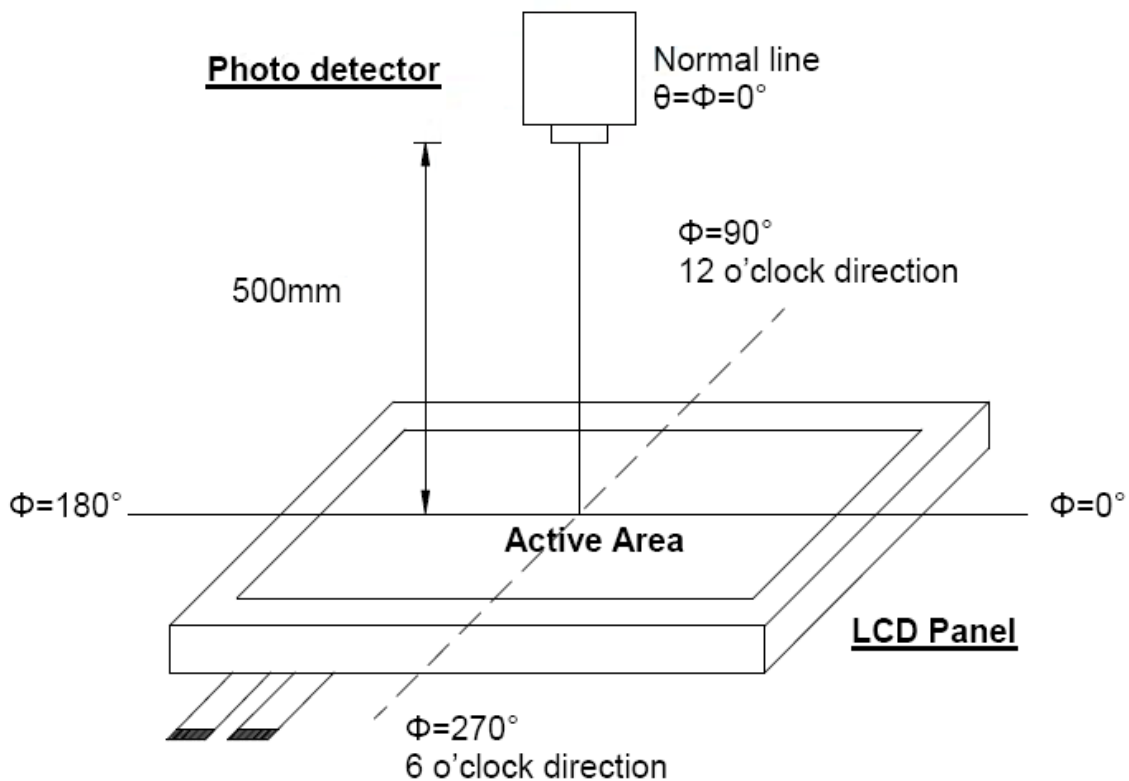
1. VCC = 3.3V, IL = 180mA (Backlight current), the ambient temperature is 25°C.
2. The test systems refer to Note 2.

Note 1 : Definition of viewing angle range



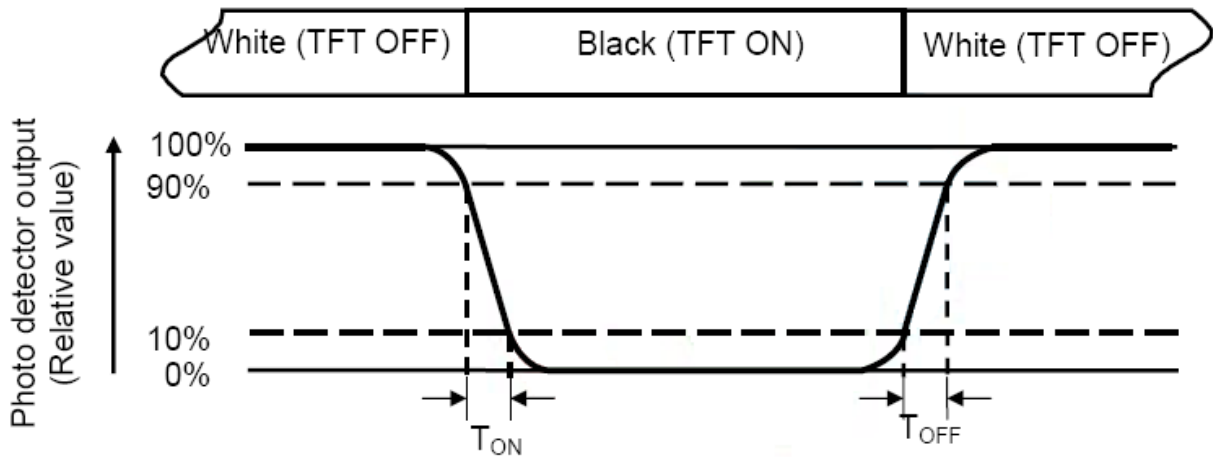
Note 2 : Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view : 1° / Height : 500mm.)



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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 4 : Definition of contrast ratio

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

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

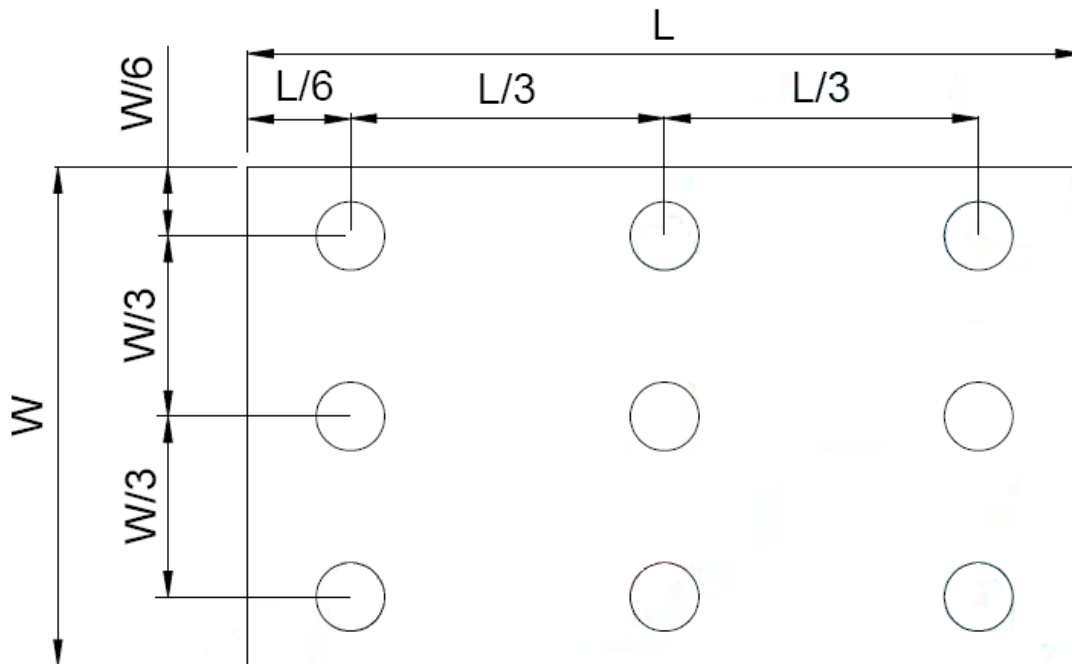
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

Note 7 : Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

L ----- Active area length W ----- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

6. INTERFACE

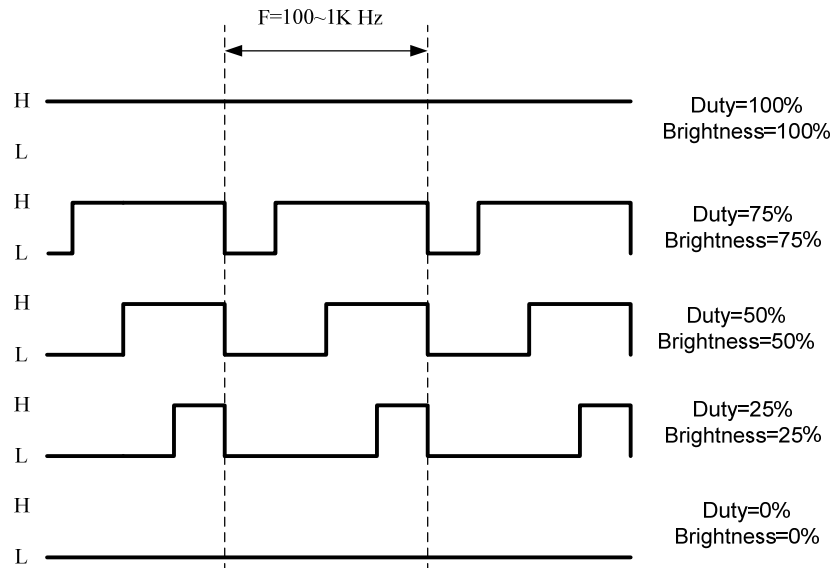
TFT LCD Panel Driving Section

| Pin No. | Symbol | Description | Note |
|---------|----------|---|------|
| 1 | VDD | POWER SUPPLY:3.3V | |
| 2 | VDD | POWER SUPPLY:3.3V | |
| 3 | GND | Power Ground | |
| 4 | GND | Power Ground | |
| 5 | IN0- | Transmission Data | |
| 6 | IN0+ | Transmission Data | |
| 7 | GND | Power Ground | |
| 8 | IN1- | Transmission Data | |
| 9 | IN1+ | Transmission Data | |
| 10 | GND | Power Ground | |
| 11 | IN2- | Transmission Data | |
| 12 | IN2+ | Transmission Data | |
| 13 | GND | Power Ground | |
| 14 | CLK- | Sampling Clock | |
| 15 | CLK+ | Sampling Clock | |
| 16 | GND | Power Ground | |
| 17 | ADJ | Adjust the LED brightness | (1) |
| 18 | NC | No connection. | |
| 19 | GND/VLED | JP7=1-2 & JP5=2-3short →power supply of LED driver circuit. | (2) |
| 20 | GND/VLED | JP7=2-3 & JP5=1-2short →GND terminal. (default setting) | |

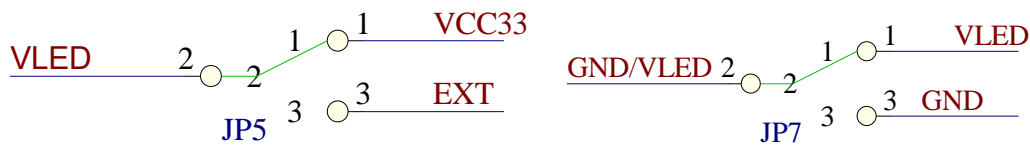
NOTE :

(1) Pin3: ADJ is PWM signal input. It is for brightness control.

| ITEM | SYMBOL | MIN | TYP | MAX | UNIT |
|-----------------------------|-----------|-----|-----|---------------------|------|
| ADJ signal frequency | f_{PWM} | 100 | -- | 1K | Hz |
| ADJ signal logic level High | V_{IH} | 2V | -- | V_{LED} (5.0V) | V |
| ADJ signal logic level Low | V_{IL} | 0 | -- | 0.5 | V |

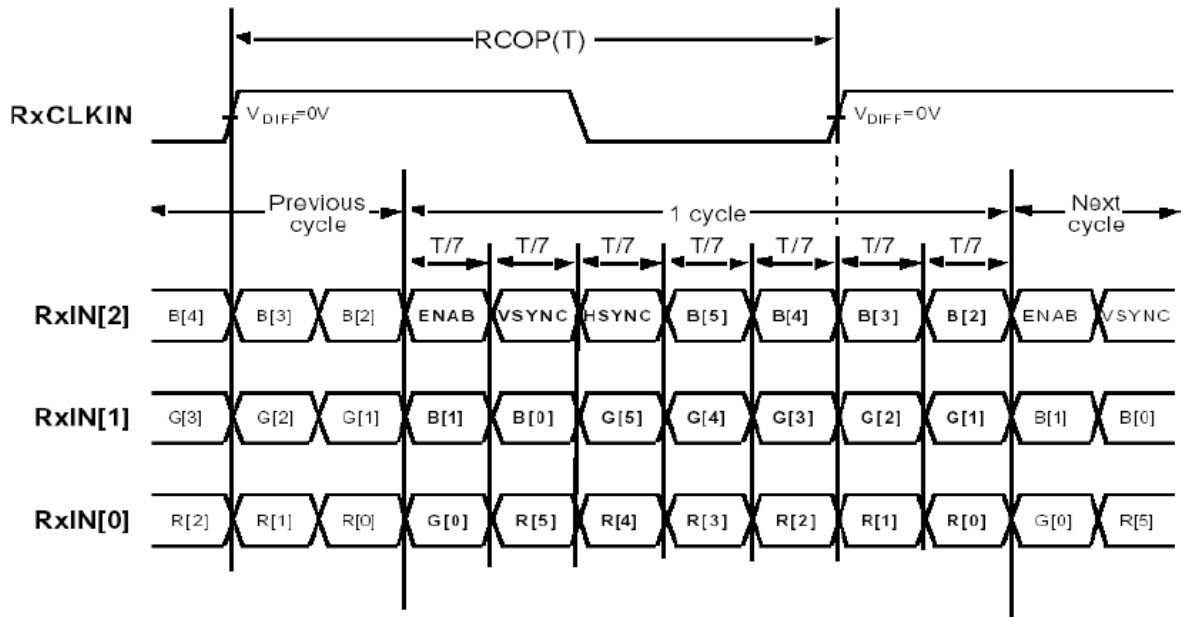


(2)



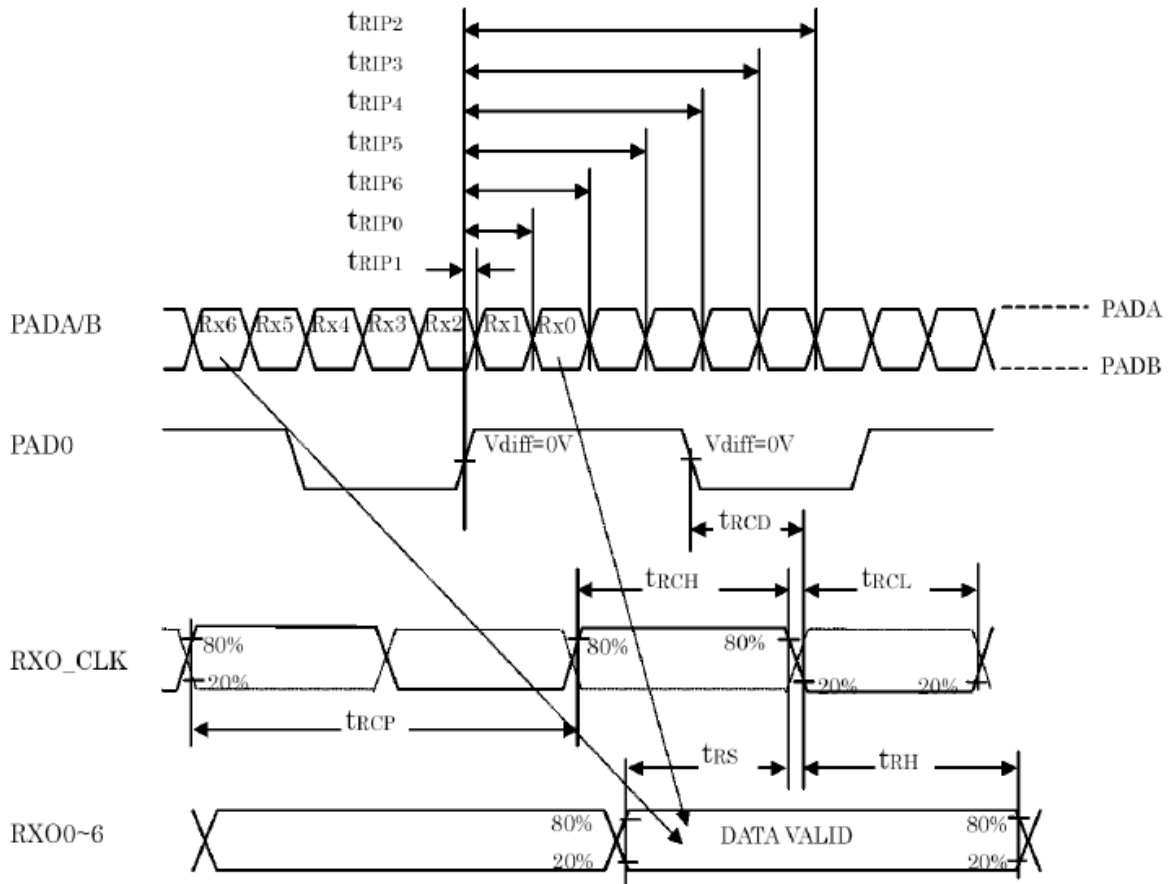
7. INPUT SIGNAL :

7-1 LVDS SIGNAL :



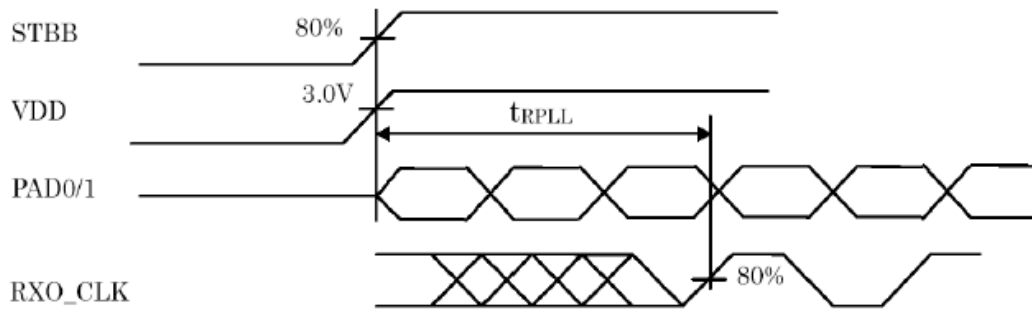
Note : R/G/B[5]s are MSBs and R/G/B[0]s are LSBs

7-2 LVDS AC Timing Diagram :

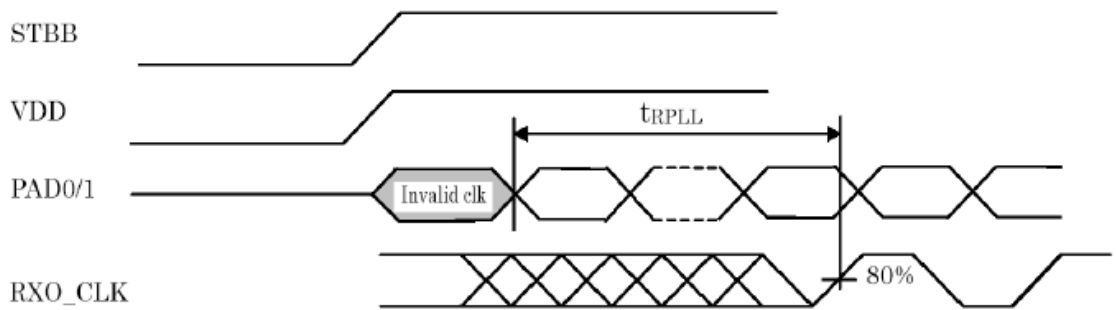


7-3 Phase Lock Loop Set Time :

(Case1)



(Case2)



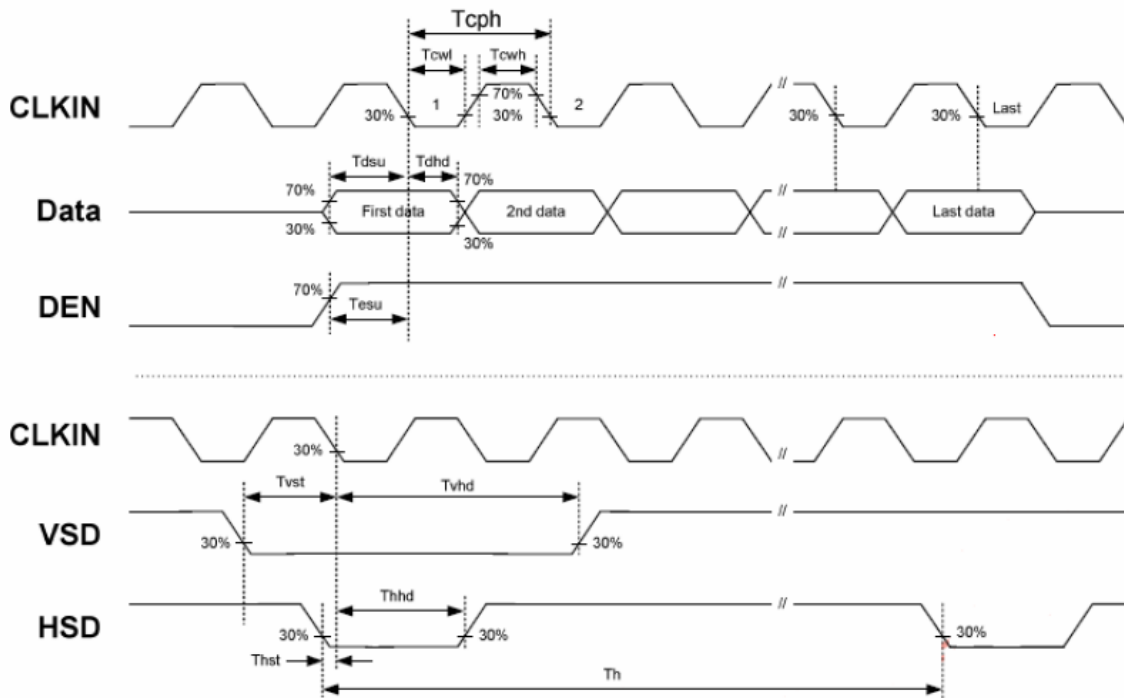
7-3 AC Electrical Characteristics

| Item | Symbol | Values | | | Unit | Remark |
|------------------------|-----------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| HS setup time | T_{hst} | 8 | - | - | Ns | |
| HS hold time | T_{hhd} | 8 | - | - | Ns | |
| VS setup time | T_{vst} | 8 | - | - | Ns | |
| VS hold time | T_{vhd} | 8 | - | - | Ns | |
| Data setup time | T_{dsu} | 8 | - | - | Ns | |
| Data hole time | T_{dhd} | 8 | - | - | Ns | |
| DE setup time | T_{esu} | 8 | - | - | Ns | |
| DE hole time | T_{ehd} | 8 | - | - | Ns | |
| VDD Power On Slew rate | T_{POR} | - | - | 20 | ms | |
| RSTB pulse width | T_{Rst} | 10 | - | - | us | |
| CLKIN cycle time | T_{coh} | 20 | - | - | Ns | |
| CLKIN pulse duty | T_{cwh} | 40 | 50 | 60 | % | |
| Output stable time | T_{sst} | - | - | 6 | us | |

7-4 Recommended Input Timing of LVDS transmitter

| Item | Symbol | Values | | | Unit | Remark |
|-------------------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Horizontal Display Area | thd | - | 800 | - | DCLK | |
| DCLK Frequency | fclk | - | 40 | 50 | MHz | |
| One Horizontal Line | th | 862 | 1056 | 1200 | DCLK | |
| HS pulse width | thpw | 1 | - | 40 | DCLK | |
| HS Back Porch(Blanking) | thb | 46 | 46 | 46 | DCLK | |
| HS Front Porch | thfp | 16 | 210 | 354 | DCLK | |

| Item | Symbol | Values | | | Unit | Remark |
|-------------------------|--------|--------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Vertical Display Area | tvd | - | 600 | - | TH | |
| VS period time | tv | 624 | 635 | 700 | TH | |
| VS pulse width | tvpw | 1 | - | 20 | TH | |
| VS Back Porch(Blanking) | tvb | 23 | 23 | 23 | TH | |
| VS Front Porch | tvfp | 1 | 12 | 77 | TH | |



8. RELIABILITY TEST CONDITIONS

(Note 3)

| Item | Test Conditions | Note |
|--|--|----------|
| High Temperature Storage | Ta = 80°C 240 hrs | Note 1,4 |
| Low Temperature Storage | Ta = -30°C 240 hrs | Note 1,4 |
| High Temperature Operation | Ts = 70°C 240 hrs | Note 2,4 |
| Low Temperature Operation | Ta = -20°C 240 hrs | Note1,4 |
| Operate at High Temperature and Humidity | +40°C, 90%RH 240 hrs | |
| Thermal Shock | -30°C /30 min ~ +80°C /30 min for a total 100 cycles, Start with cold temperature and end with high temperature | |
| Vibration Test | Frequency range : 10 ~ 55Hz Stroke : 1.5mm Sweep : 10Hz ~ 55Hz ~ 10Hz 2 hours for each direction of X. Y. Z. (6 hours for total) | |
| Mechanical Shock | 100G 6ms, ±X, ±Y, ±Z 3 times for each direction | |
| Package Vibration Test | Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500Hz 2 hours for each direction of X. Y. Z. (6 hours for total) | |
| Package Drop Test | Height : 60 cm 1 comer, 3 edges, 6 surfaces | |
| Electro Static Discharge | ±2KV, Human Body Mode, 100pF/1500Ω | |

Note 1 : Ta is the ambient temperature of samples.

Note 2 : Ts is the temperature of panel's surface.

Note 3 : In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4 : Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

9. General Precautions

9-1 Safety

Liquid crystal is poisonous. Do not put it your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

9-2 Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

9-3 Static Electricity

1. Be sure to ground module before turning on power or operation module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

9-4 Storage

1. Store the module in a dark room where must keep at $+25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

9-5 Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

9-5 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.

10. OUTLINE DIMENSION

