



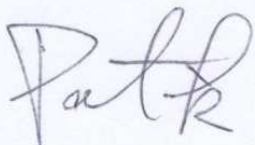


晶采光電科技股份有限公司  
AMPIRE CO., LTD.

## SPECIFICATIONS FOR LCD MODULE

|                          |                            |
|--------------------------|----------------------------|
| <b>CUSTOMER</b>          |                            |
| <b>CUSTOMER PART NO.</b> |                            |
| <b>AMPIRE PART NO.</b>   | <b>AM-800600P4TMQW-A0H</b> |
| <b>APPROVED BY</b>       |                            |
| <b>DATE</b>              |                            |

- Approved For Specifications
- Approved For Specifications & Sample

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|---|---|---|
|  |  |  |

## RECORD OF REVISION

| Revision Date | Page | Contents    | Editor |
|---------------|------|-------------|--------|
| 2013/12/5     | --   | New Release | Kokai  |

## 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 power circuit board.
- (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: 20 Pin (LVDS interface)
- (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       | 200.4(W) x 141.0(H) x 10.35(D) | mm   |
| Color arrangement | RGB-stripe                     |      |
| interface         | Digital                        |      |

### 3. ABSOLUTE MAX. RATINGS

| Item                  | Symbol | Values |         | UNIT | Note   |
|-----------------------|--------|--------|---------|------|--------|
|                       |        | Min.   | Max.    |      |        |
| Power voltage         | VCC    | -0.5   | 5       | V    |        |
|                       | VLED   | -0.5   | 18      |      |        |
| Input signal voltage  | Vi     | -0.3   | VCC+0.3 | V    | Note 1 |
| Operation temperature | TOP    | -20    | 70      | °C   |        |
| Storage temperature   | TST    | -30    | 80      | °C   |        |

Note 1: The product is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

Signals include : DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

## 4. ELECTRICAL CHARACTERISTICS

### 4-1 Typical Operation Conditions

| Item                | Symbol                   | Values   |             |     | Unit        | Remark                    |
|---------------------|--------------------------|----------|-------------|-----|-------------|---------------------------|
|                     |                          | MIN      | TYP         | MAX |             |                           |
| Power Voltage       | $V_{CC}$                 | 3.0      | 3.3         | 3.6 | V           | Note 1,2                  |
| Power Consumption   | $I_{CC}$                 | -        | 125         | -   | mA          | Note 1,2<br>$V_{CC}=3.3V$ |
| Logic Input Voltage | Input Voltage            | $V_{IN}$ | 0           | -   | $V_{CC}$    | V                         |
|                     | Logic input high voltage | $V_{TH}$ | $0.7V_{CC}$ | -   | $V_{CC}$    | V<br>Note 3               |
|                     | Logic input low voltage  | $V_{TL}$ | GND         | -   | $0.3V_{CC}$ | V<br>Note 3               |

Note 1: Value for Power Board combined panel.

Note 2:  $V_{CC}$  setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

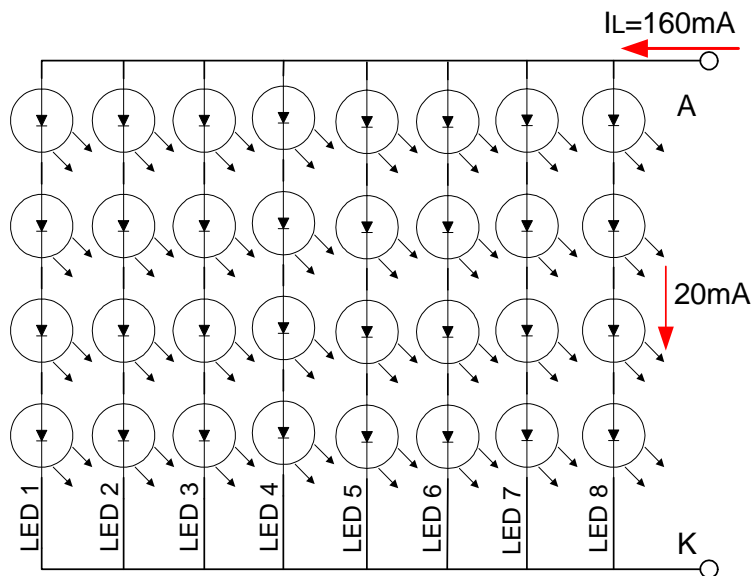
## 4-2 Backlight Driving Conditions

| Item                                | Symbol           | Values |      |      | Unit | Note                                |
|-------------------------------------|------------------|--------|------|------|------|-------------------------------------|
|                                     |                  | Min.   | Typ. | Max. |      |                                     |
| LED Driver voltage                  | VLED             | 4.5    | 5    | 5.5  | V    |                                     |
| Power Supply Current For LED Driver | ILED             | -      | 510  | -    | mA   | VLED=5V<br>VADJ=3.3V<br>(duty 100%) |
| ADJ Input Voltage                   | V <sub>ADJ</sub> | -      | 3.3  | 5    | V    | duty=100%<br>Note(3)                |
| LED voltage                         | V <sub>AK</sub>  | 12     | 13.2 | 14.4 | V    | I <sub>L</sub> =160mA<br>Ta=25°C    |
| LED current                         | I <sub>L</sub>   | 144    | 160  | 178  | mA   | Ta=25°C                             |
|                                     |                  | --     | 120  | --   | mA   | Ta=60°C                             |
| LED Life Time                       | -                | --     | 25K  | --   | Hour | Note (2)                            |

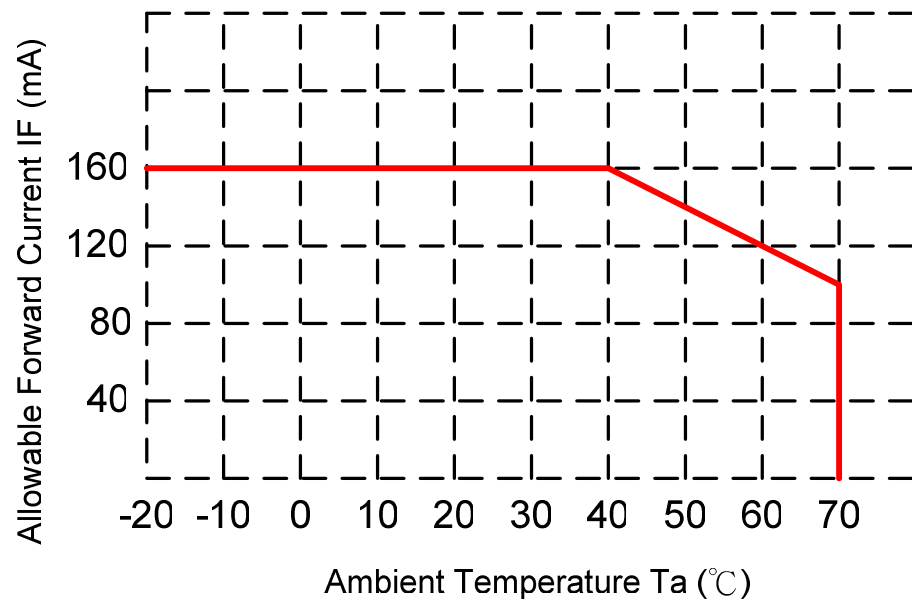
Note (1) The constant current source is needed for white LED back-light driving.

When LCM is operated over 60 deg.C ambient temperature, the I<sub>L</sub> of the LED back-light should be adjusted to 120mA max

Note (2) Brightness to be decreased to 50% of the initial value.



When LCM is operated over 40°C ambient temperature, the ILED should be follow :



## 5. Optical Specifications

| Item                            | Symbol     | Condition                           | Values |       |       | Unit              | Note           |
|---------------------------------|------------|-------------------------------------|--------|-------|-------|-------------------|----------------|
|                                 |            |                                     | Min.   | Typ.  | Max.  |                   |                |
| Viewing angle<br>(CR $\geq$ 10) | $\theta$ L | $\Phi = 180^\circ$<br>(9 o'clock)   | 60     | 70    | --    | degree            | Note1          |
|                                 | $\theta$ R | $\Phi = 0^\circ$<br>(3 o'clock)     | 60     | 70    | --    |                   |                |
|                                 | $\theta$ T | $\Phi = 90^\circ$<br>(12 o'clock)   | 40     | 50    | --    |                   |                |
|                                 | $\theta$ B | $\Phi = 270^\circ$<br>(6 o'clock)   | 60     | 70    | --    |                   |                |
| Response time                   | TON        | T=25°                               | --     | 25    | 30    | msec              | Note3          |
|                                 | TOFF       |                                     | --     | 25    | 30    | msec              |                |
| Contrast ratio                  | CR         | Normal<br>$\theta = \Phi = 0^\circ$ | 400    | 500   | --    | --                | Note4          |
| Color chromaticity              | Rx         |                                     | 0.553  | 0.603 | 0.653 | --                | Note5<br>Note6 |
|                                 | Ry         |                                     | 0.275  | 0.325 | 0.375 |                   |                |
|                                 | Gx         |                                     | 0.254  | 0.304 | 0.354 |                   |                |
|                                 | Gy         |                                     | 0.502  | 0.552 | 0.602 |                   |                |
|                                 | Bx         |                                     | 0.088  | 0.138 | 0.188 |                   |                |
|                                 | By         |                                     | 0.086  | 0.136 | 0.186 |                   |                |
|                                 | Wx         |                                     | 0.264  | 0.314 | 0.364 |                   |                |
|                                 | Wy         |                                     | 0.288  | 0.338 | 0.388 | --                |                |
| Luminance                       | L          |                                     | 400    | 500   | --    | cd/m <sup>2</sup> | Note6          |
| Transmittance                   | L          | 5.8                                 | 6.1    | --    | %     | Note7             |                |

Test Conditions:

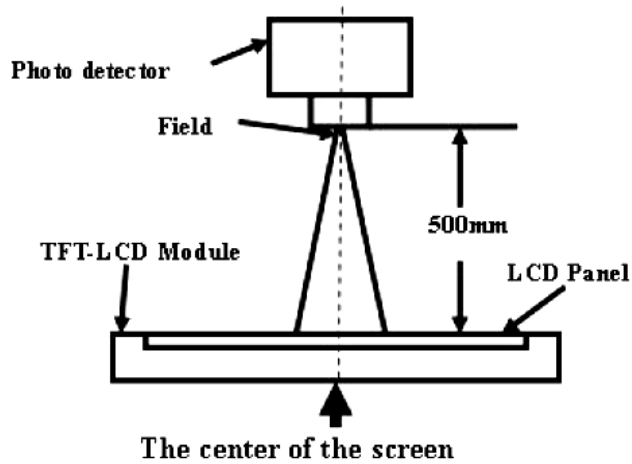
1. The ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD

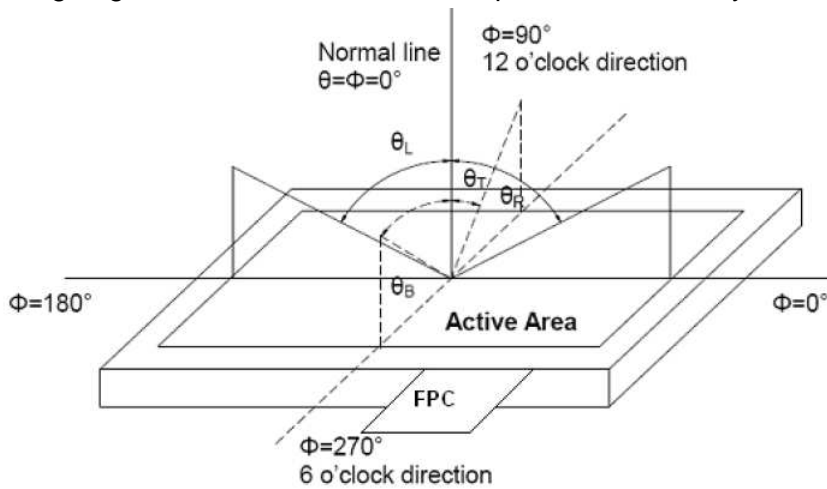
panel must be ground when measuring the center area of the panel.



| Item           | Photo detector | Field |
|----------------|----------------|-------|
| Contrast Ratio | BM-5A          | 1°    |
| Luminance      |                |       |
| Lum Uniformity |                |       |
| Chromaticity   | SR-3A          |       |
| Response Time  | TRD100         | -     |

Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note 3: Definition of contrast ratio.

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

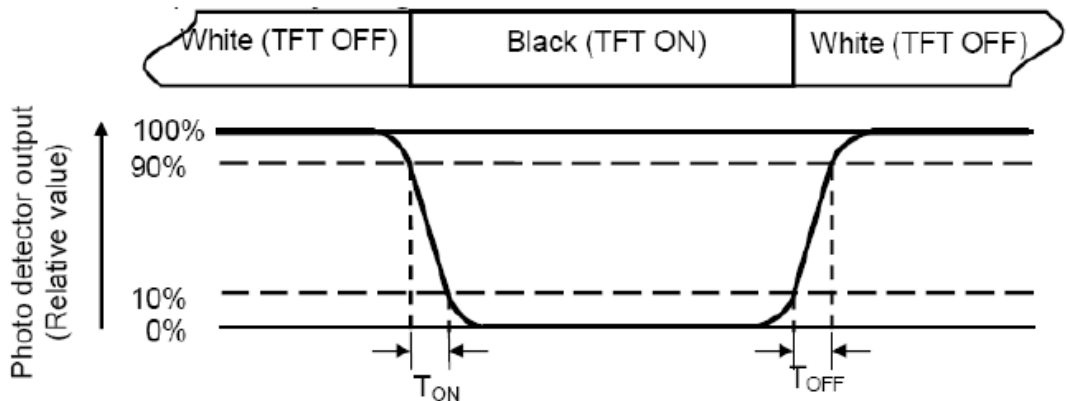
“White state “: The state is that the LCD should drive by  $V_{white}$ .

“Black state”: The state is that the LCD should drive by  $V_{black}$ .

$V_{white}$ : To be determined  $V_{black}$ : To be determined.

Note 4: 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 5: Definition of color chromaticity (CIE1931) Color coordinates measured at center point of LCD.

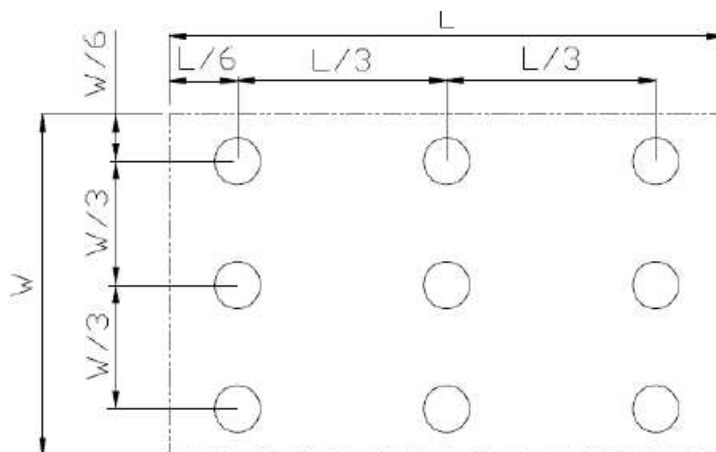
Note 6: Definition of Luminance Uniformity.

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at

the center of each measuring area.

Luminance Uniformity ( $U$ ) =  $L_{min} / L_{max}$

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



$L_{max}$ : The measured Maximum luminance of all measurement position.

$L_{min}$ : The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance.

Measure the luminance of white state at center point.

## 6. INTERFACE

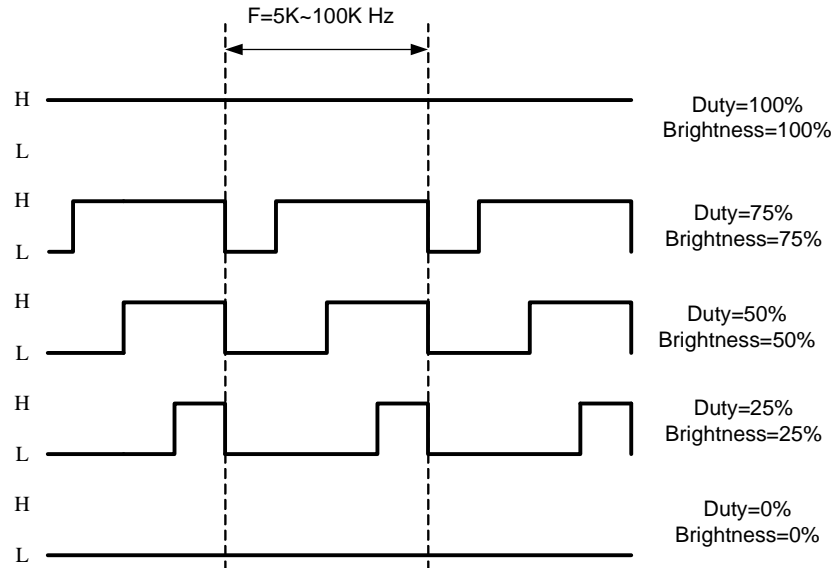
### TFT LCD Panel Driving Section

| 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      | VLED   | POWER SUPPLY for Backlight : 5V |      |
| 18      | VLED   | POWER SUPPLY for Backlight : 5V |      |
| 19      | GND    | Power Ground                    |      |
| 20      | ADJ    | Adjust the LED brightness       |      |

NOTE :

(1) Pin19: ADJ is PWM signal input. It is for brightness control.

| ITEM                        | SYMBOL    | MIN  | TYP | MAX                 | UNIT |
|-----------------------------|-----------|------|-----|---------------------|------|
| ADJ signal frequency        | $f_{PWM}$ | 5K   | 20K | 100K                | Hz   |
| ADJ signal logic level High | $V_{IH}$  | 2.4V | --  | $V_{LED}$<br>(5.0V) | V    |
| ADJ signal logic level Low  | $V_{IL}$  | 0    | --  | 0.8                 | V    |



## 7. INTERFACE TIMING (The information as below is to be defined.)

### 7.0 Recommended Timing Setting Of TCON

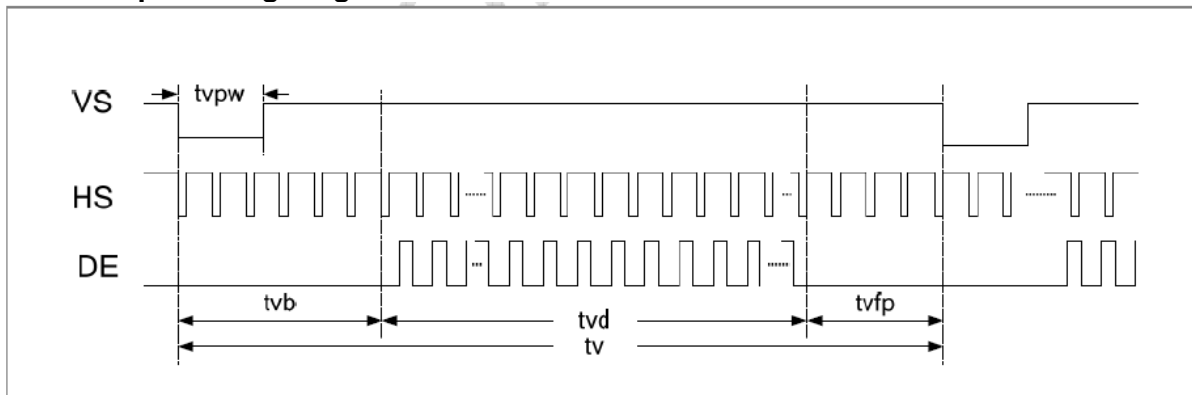
#### TCON (Embedded In Source IC) Input Timing (DCLK, HSD, VSD, DE)

VCC=3.3V, AVDD=12.5V, AGND=GND=0V, Ta=25°C

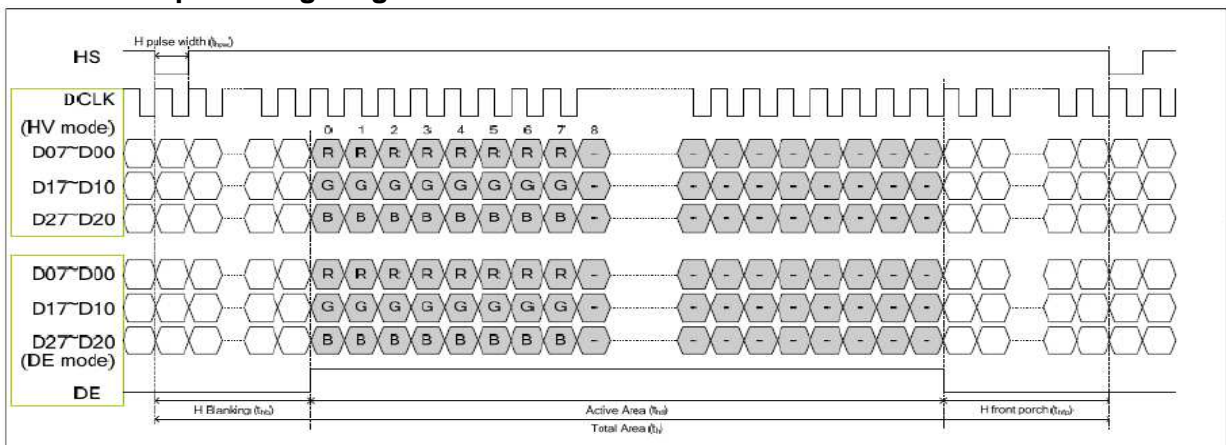
| Parameter | Symbol           | Min | Typ. | Max | Unit             | Remark |
|-----------|------------------|-----|------|-----|------------------|--------|
| DCLK      | F <sub>clk</sub> | -   | 40   | 50  | MHz              | -      |
|           | t <sub>clk</sub> | 20  | 25   | -   | ns               | -      |
| HSD       | t <sub>h</sub>   | -   | 1000 | -   | t <sub>clk</sub> | -      |
|           | t <sub>hd</sub>  | -   | 800  | -   | t <sub>clk</sub> | -      |
|           | t <sub>hpw</sub> | 1   | 48   | -   | t <sub>clk</sub> | -      |
|           | t <sub>hb</sub>  | -   | 88   | -   | t <sub>clk</sub> | -      |
|           | t <sub>hfp</sub> | -   | 112  | -   | t <sub>clk</sub> | -      |
| VSD       | t <sub>v</sub>   | -   | 660  | -   | th               | -      |
|           | t <sub>vd</sub>  | -   | 600  | -   | th               | -      |
|           | t <sub>vpw</sub> | -   | 3    | -   | th               | -      |
|           | t <sub>vb</sub>  | -   | 39   | -   | th               | -      |
|           | t <sub>vfp</sub> | -   | 21   | -   | th               | -      |

Note: DE timing refer to HSD, VSD input timing.

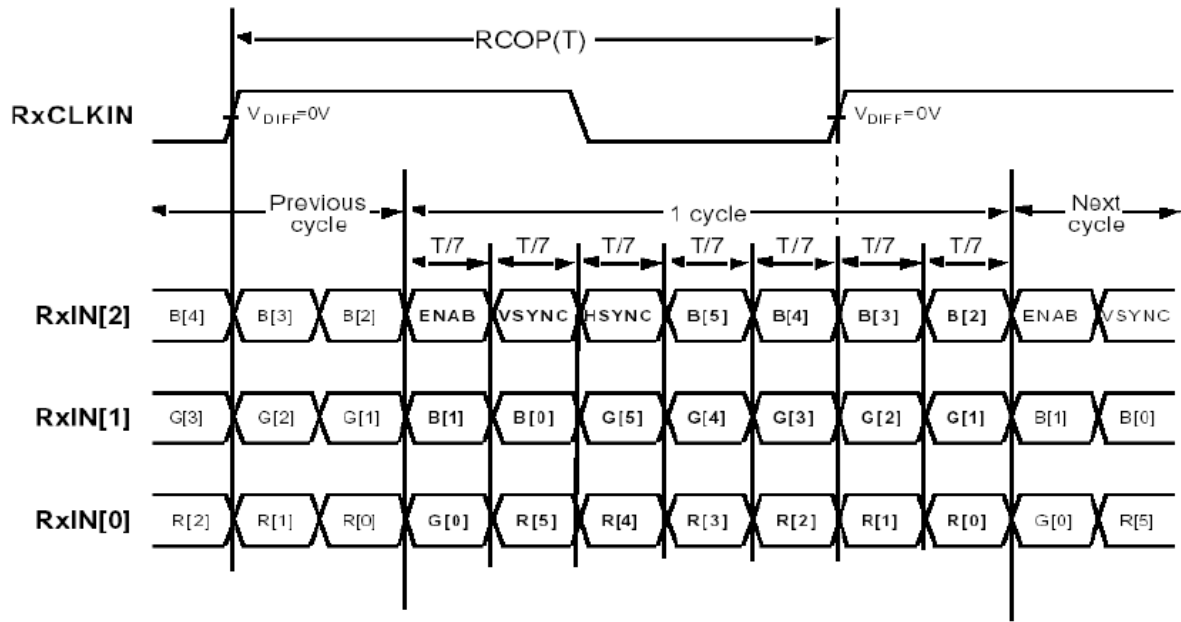
#### Vertical input timing Diagram:



#### Horizontal input timing Diagram:

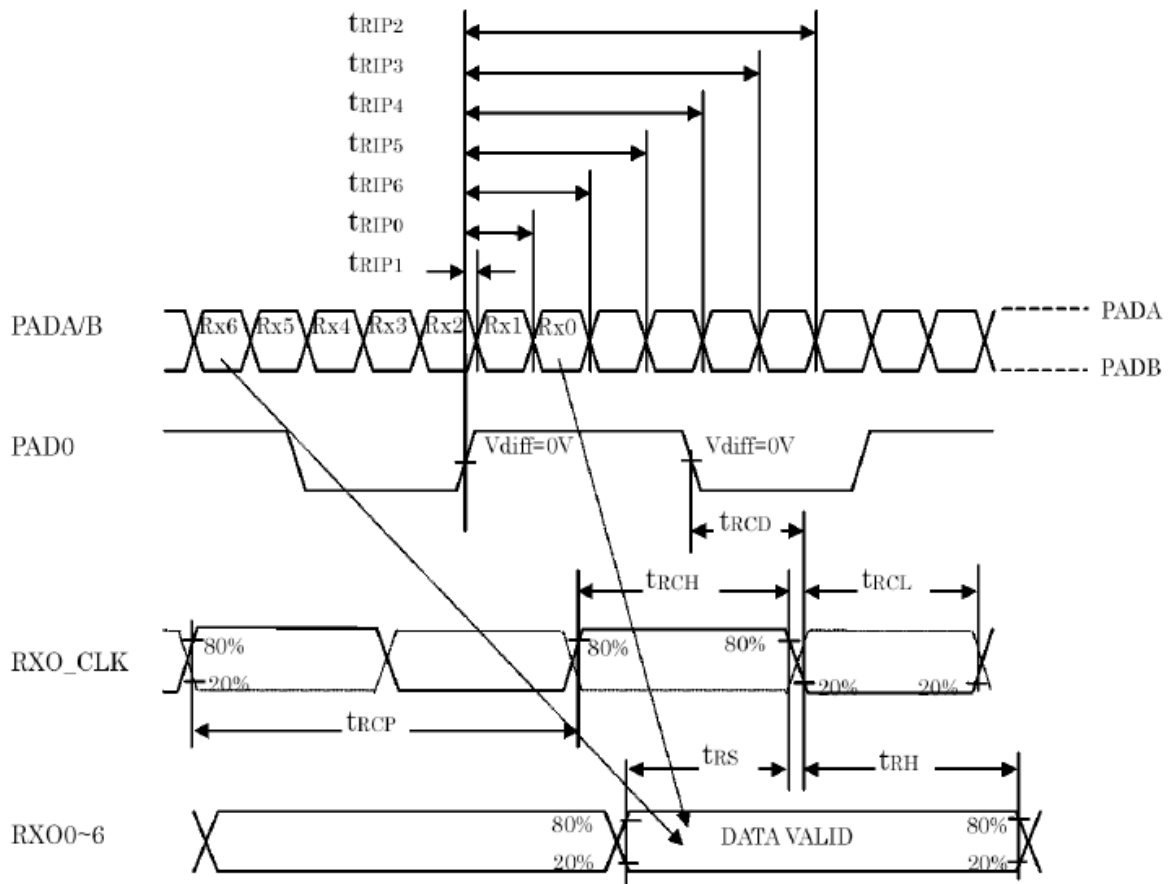


### 7-1 LVDS SIGNAL :



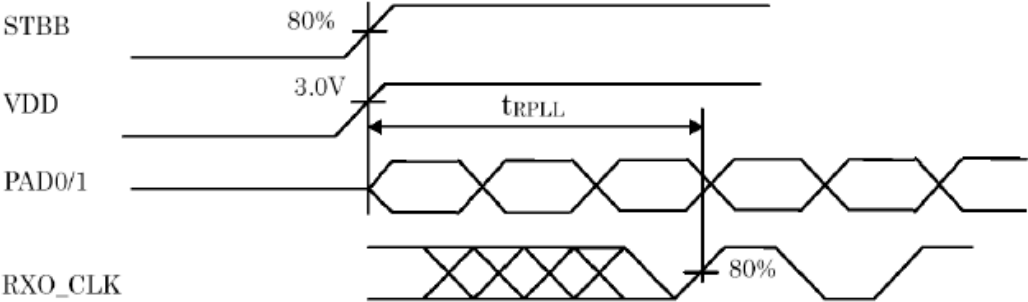
Note : R/G/B[5]s are MSBs and R/G/B[0]s are LSBs

### 7-2 LVDS AC Timing Diagram :

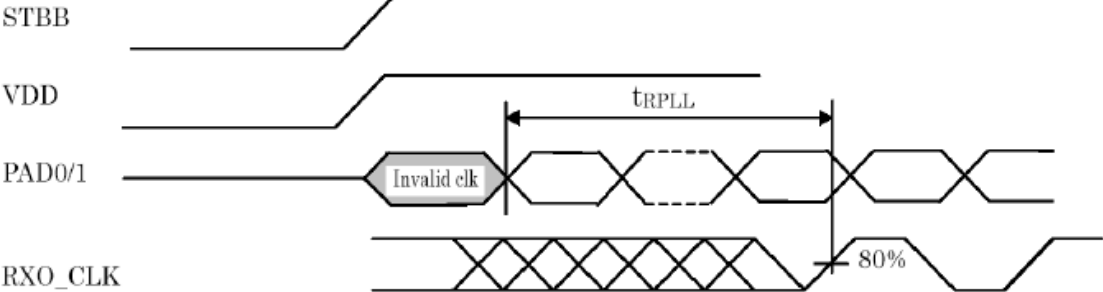


### 7-3 Phase Lock Loop Set Time :

(Case1)



(Case2)

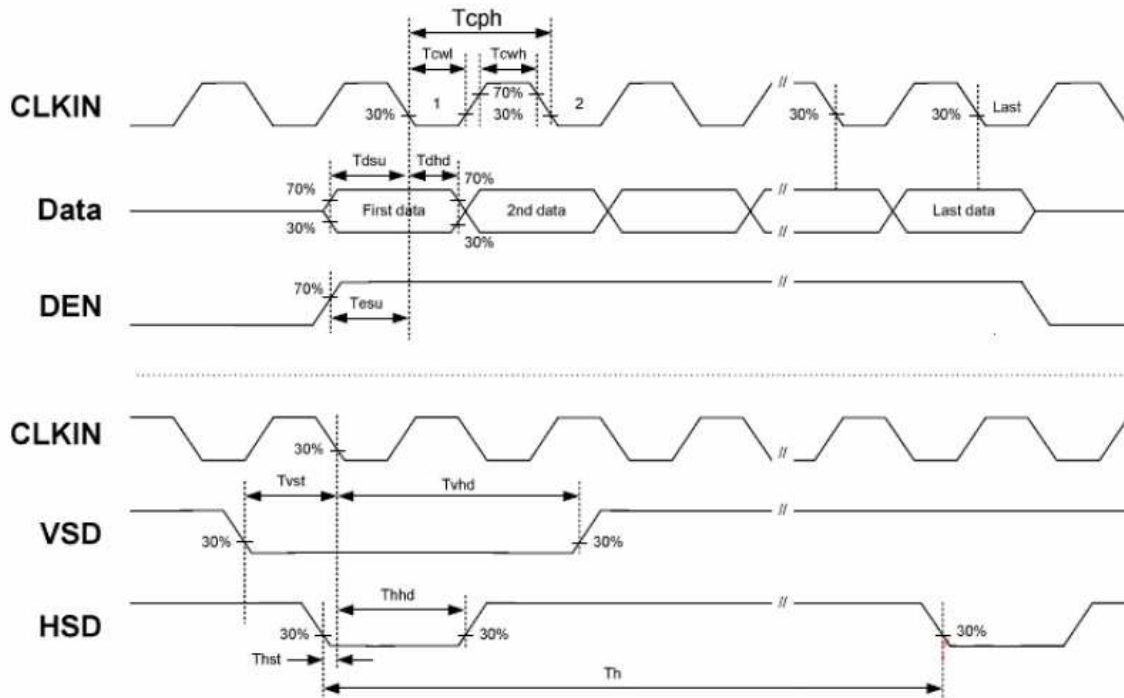


## 7-4 Switching Characteristics :

< recommended operating condition (unless otherwise noted) >

| Parameter                                 | Symbol     | min      | typ  | max      | Unit |
|---|------------|----------|------|----------|------|
| RXO_CLK Period                            | $t_{RCP}$  | 11.76    | T    | 50       | ns   |
| RXO_CLK High Time                         | $t_{RCH}$  | -        | T/2  | -        | ns   |
| RXO_CLK Low Time                          | $t_{RCL}$  | -        | T/2  | -        | ns   |
| PAD0/1 to RXO_CLK Delay                   | $t_{RCD}$  | -        | 3T/7 | -        | ns   |
| Data Setup to RXO_CLK                     | $t_{RS}$   | 1.9      | -    | -        | ns   |
| Data Hold from RXO_CLK                    | $t_{RH}$   | 3.0      | -    | -        | ns   |
| Input Data Position 0 (T=11.76ns) (note1) | $t_{RIP1}$ | -0.4     | 0    | 0.4      | ns   |
| Input Data Position 1 (T=11.76ns) (note1) | $t_{RIP0}$ | T/7-0.4  | T/7  | T/7+0.4  | ns   |
| Input Data Position 2 (T=11.76ns) (note1) | $t_{RIP6}$ | 2T/7-0.4 | 2T/7 | 2T/7+0.4 | ns   |
| Input Data Position 3 (T=11.76ns) (note1) | $t_{RIP5}$ | 3T/7-0.4 | 3T/7 | 3T/7+0.4 | ns   |
| Input Data Position 4 (T=11.76ns) (note1) | $t_{RIP4}$ | 4T/7-0.4 | 4T/7 | 4T/7+0.4 | ns   |
| Input Data Position 5 (T=11.76ns) (note1) | $t_{RIP3}$ | 5T/7-0.4 | 5T/7 | 5T/7+0.4 | ns   |
| Input Data Position 6 (T=11.76ns) (note1) | $t_{RIP2}$ | 6T/7-0.4 | 6T/7 | 6T/7+0.4 | ns   |
| Phase Lock Loop Set                       | $t_{RPLL}$ | -        | -    | 10       | ms   |

note1 : VDD=3.3V, Ta=25°C





## 8. RELIABILITY TEST CONDITIONS

| Test Item                                | Test Conditions  | Note |
|--|--|------|
| High Temperature Operation               | 70±3°C , t=240 hrs   |      |
| Low Temperature Operation                | -20±3°C , t=240 hrs  |      |
| High Temperature Storage                 | 80±3°C , t=240 hrs   | 1,2  |
| Low Temperature Storage                  | -30±3°C , t=240 hrs  | 1,2  |
| Storage at High Temperature and Humidity | 60°C, 90% RH , 240 hrs   | 1,2  |
| Thermal Shock Test                       | -20°C (30min) ~ 70°C (30min)<br>100 cycles   | 1,2  |
| Vibration Test (Packing)                 | Sweep frequency : 10 ~ 55 ~ 10<br>Hz/1min<br>Amplitude : 0.75mm<br>Test direction : X.Y.Z/3 axis<br>Duration : 30min/each axis | 2    |

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

## 10. General Precautions

### 10-1 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.

### 10-2 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.

### 10-3 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.

### 10-4 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.

### 10-5 Cleaning

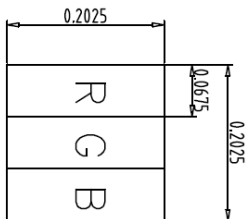
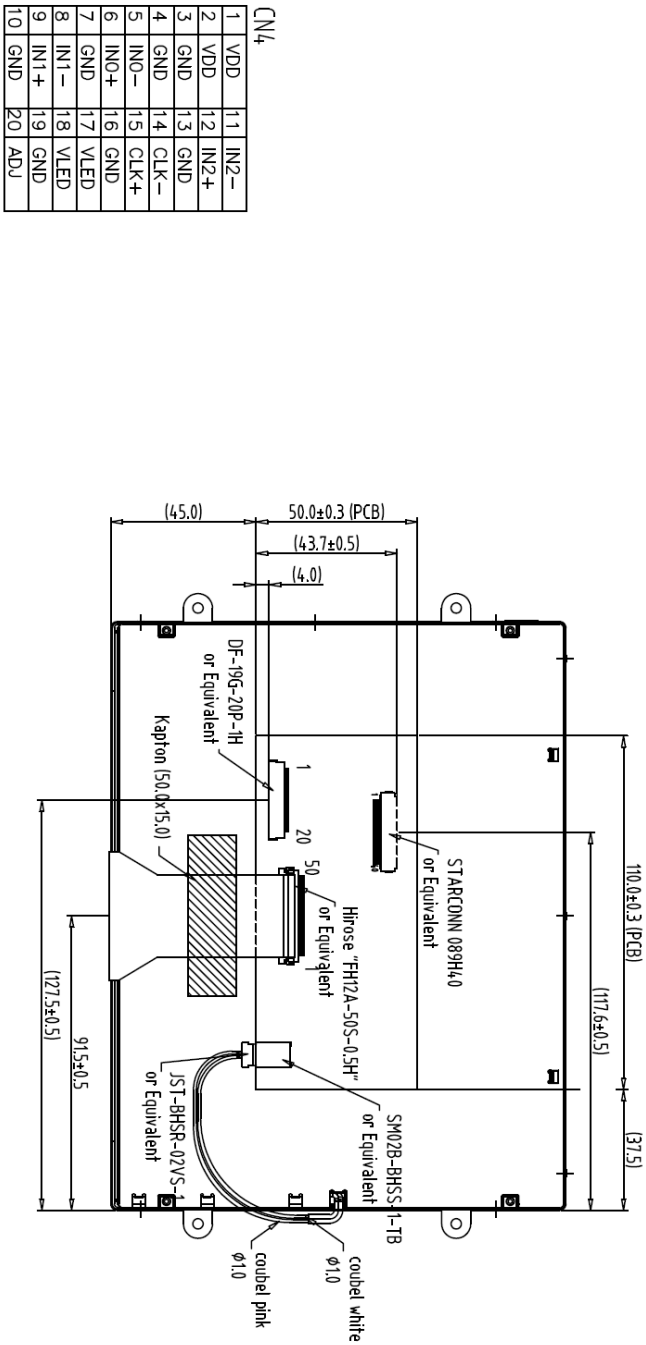
1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

### 10-6 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
3. **Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.**



| REV | REVISION RECORD                        | DATE     | NAME  |
|-----|--|----------|-------|
| 0   | NEW RELEASE                            | 01-14-11 | EMILY |
| 1   | TFT-800600-85A-0 Rename to 800600P1-A0 | 05-07-11 | EMILY |
| 2   | 增加適用機種 (800600P4-A0 & 800600P4-A1)     | 06-04-11 | EMILY |



A Block

CN4

|    |      |    |      |
|----|------|----|------|
| 1  | VDD  | 11 | IN2- |
| 2  | VDD  | 12 | IN2+ |
| 3  | GND  | 13 | GND  |
| 4  | GND  | 14 | CLK- |
| 5  | INO- | 15 | CLK+ |
| 6  | INO+ | 16 | GND  |
| 7  | GND  | 17 | VLED |
| 8  | INI- | 18 | VLED |
| 9  | INI+ | 19 | GND  |
| 10 | GND  | 20 | ADJ  |

- Note:
1. Unless indicated, Tolerance Grade "±0.3".
  2. UV Glue For OLB Protection.
  3. CN1:BHSR-02VS-1
  4. CN2:P0.5 50Pin Connector:Hirose "FH12A-50S-0.5H" or Equivalent
  5. CN4:P1.0 20Pin Connector:HIROSHI DF19G-20P-1H or Equivalent

Back View

適用機種:  
 800600P1-A0  
 800600P1-A1  
 800600P4-A0  
 800600P4-A1

| 1 | TFT-800600-85A-0 | 2  | TOLERANCE GRADE(±) | A | B | DIM.        | MM    | DWG.  | EMILY | DATE | TITLE                  |
|---|------------------|----|--------------------|---|---|-------------|-------|-------|-------|------|------------------------|
| 2 |                  | 8  |                    |   |   | IE NO.      |       | CHEK  |       | DATE | 800600P1-A0            |
| 3 |                  | 9  |                    |   |   | PARTS NO.   | LCM-1 | APPD. |       | DATE | (8.0"+LVDS+LED Driver) |
| 4 |                  | 10 |                    |   |   | 800600P1-A0 |       |       |       |      | DWG. NO.               |
| 5 |                  | 11 |                    |   |   |             |       |       |       |      | *110116MB              |
| 6 |                  | 12 |                    |   |   |             |       |       |       |      | SHEET 1 OF 1           |

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 AMPIRE CO., LTD.