



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-800600P6TMQW-B0H |
| APPROVED BY | |
| DATE | |

- Approved For Specifications
 Approved For Specifications & Sample

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| APPROVED BY | CHECKED BY | ORGANIZED BY |
|-------------|------------|--------------|
| | | |

RECORD OF REVISION

| Revision Date | Page | Contents | Editor |
|----------------------|-------------|-----------------|---------------|
| 2014/05/12 | -- | New Release | Simon |

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 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: 40 Pin (RGB interface)
- (6) Power Supply Voltage: 3.3V for logic voltage, **12V for LED driver power voltage.**
- (7) Viewing Direction: 6 O'clock (The direction it's hard to be discolored)

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 |
| Surface treatment | Anti-Glare | |
| Color arrangement | RGB-stripe | |
| interface | Digital | |
| Weight | 270 | g |

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 | V _i | -0.3 | VCC+0.3 | V | Note 1 |
| Operation temperature | T _{OP} | -20 | 70 | °C | |
| Storage temperature | T _{ST} | -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} | - | 10 | 15 | mA | Note 1,2 VCC=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 | Note 3 |
| | Logic input low voltage | V _{TL} | GND | - | 0.3V _{CC} | V | Note 3 |

Note 1: Value for Power Board combined panel.

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

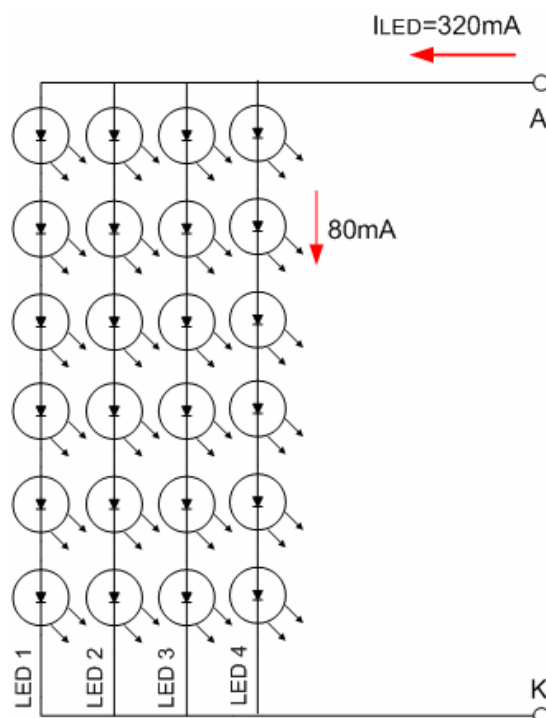
Note 3: DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

4-2 Backlight Driving Conditions

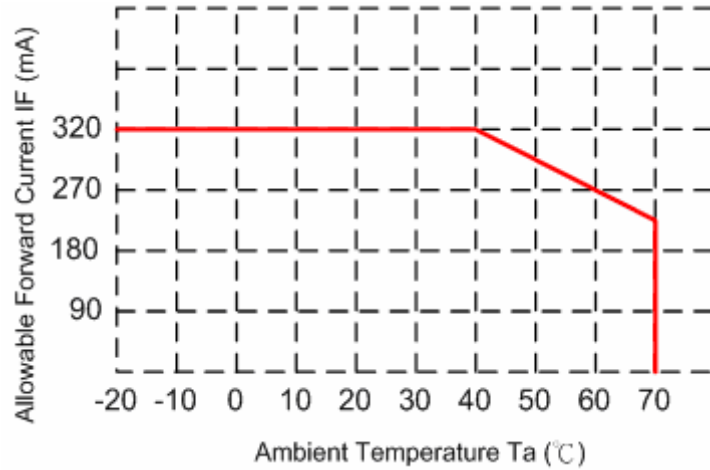
| Item | Symbol | Values | | | Unit | Note |
|-------------------------------------|------------------|--------|------|------|------|--------------------------------------|
| | | Min. | Typ. | Max. | | |
| LED Driver voltage | VLED | -- | 12 | -- | V | |
| Power Supply Current For LED Driver | ILED | - | 640 | - | mA | VLED=12V VADJ=3.3V (duty 100%) |
| ADJ Input Voltage | V _{ADJ} | - | 3.3 | 5 | V | duty=100% Note(3) |
| LED voltage | V _{AK} | -- | 19.8 | -- | V | I _L =320mA Ta=25°C |
| LED current | I _L | 324 | 320 | 396 | mA | Ta=25°C |
| | | -- | 270 | -- | mA | Ta=60°C |
| LED Life Time | - | -- | 50K | -- | 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_L of the LED back-light should be adjusted to 270mA max

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

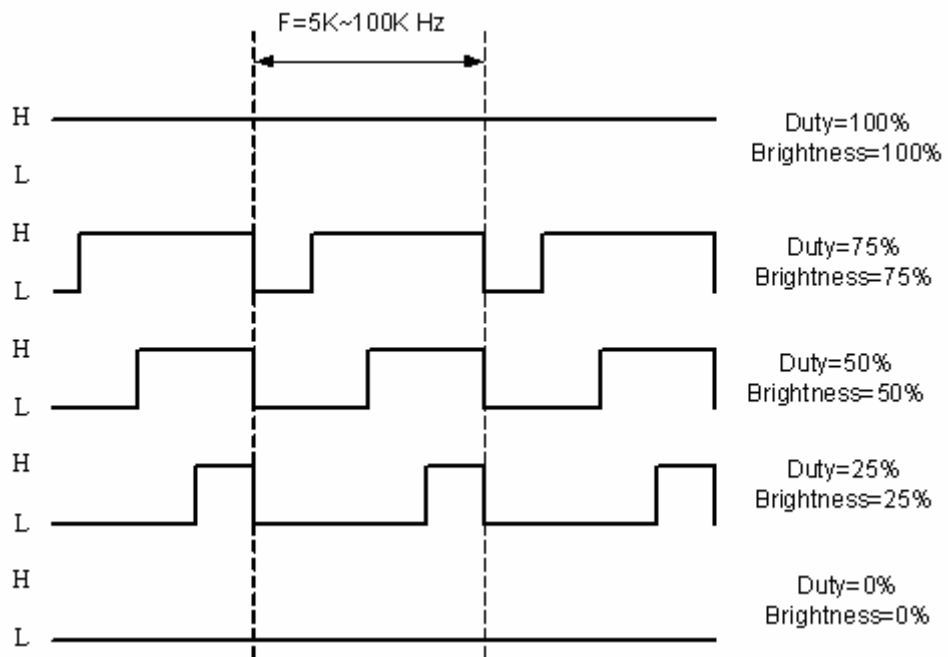


When LCM is operated over 40°C ambient temperature, the ILED should be follow :

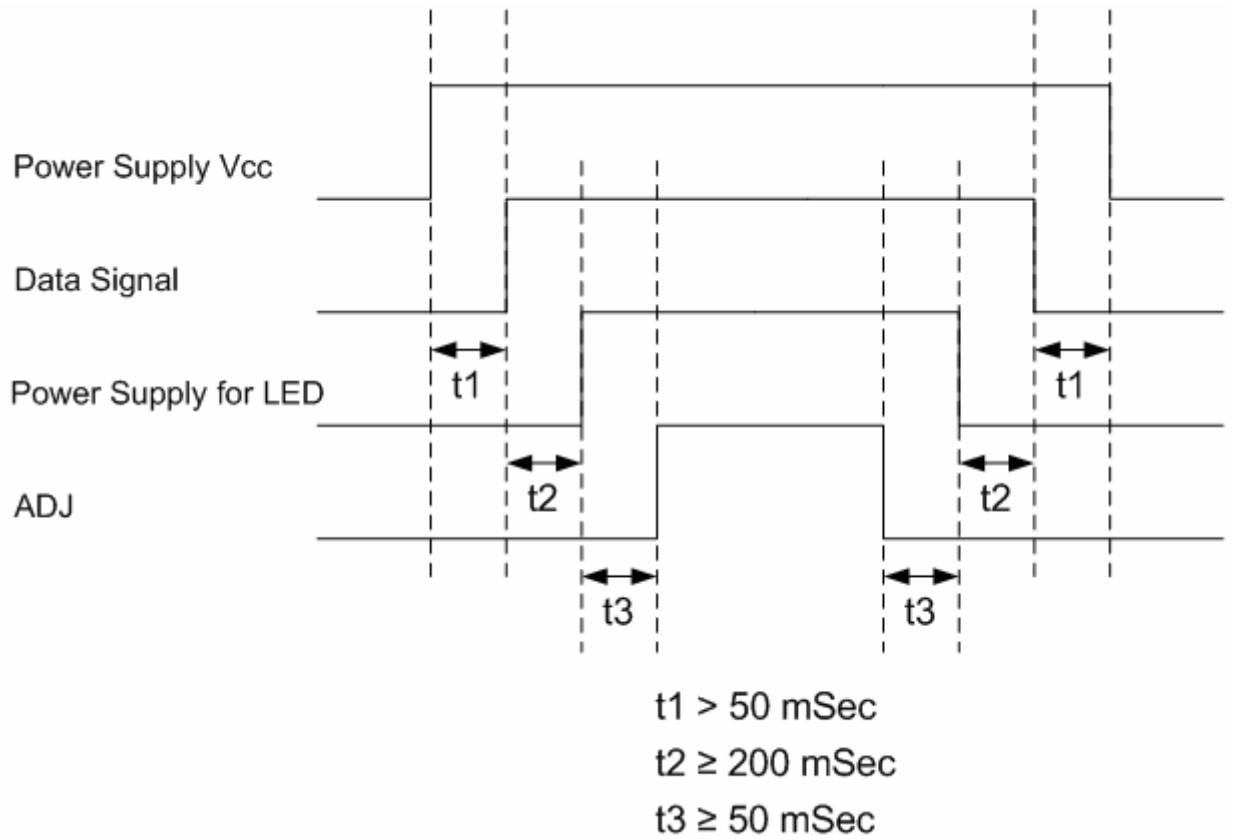


Note (3) VLEDADJ is PWM signal input. It is for brightness control.

| ITEM | SYMBOL | MIN | TYP | MAX | UNIT |
|-----------------------------|-----------|-----|-----|------|------|
| ADJ signal frequency | f_{PWM} | 5K | 20K | 100K | Hz |
| ADJ signal logic level High | V_{IH} | 2.4 | 3.3 | 5.0 | V |
| ADJ signal logic level Low | V_{IL} | 0 | -- | 0.8 | V |



4-3 Power Sequence



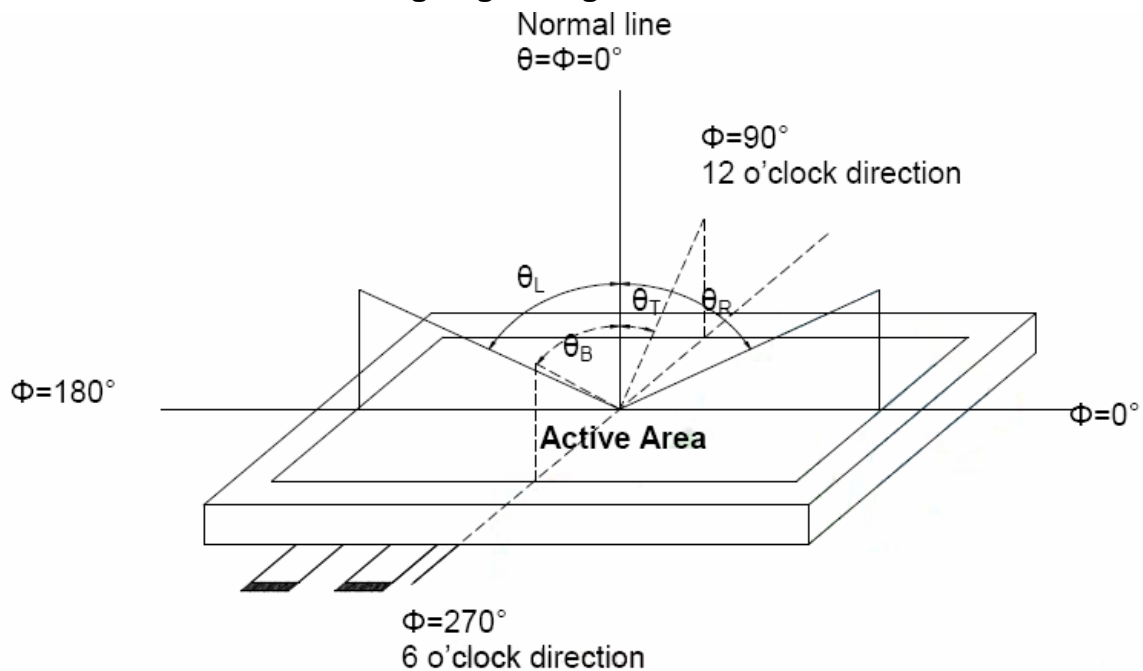
5. Optical Specifications

| Item | Symbol | Condition | Values | | | Unit | Note |
|---------------------------------|------------|-------------------------------------|--------|-------|-------------------|--------|----------------|
| | | | Min. | Typ. | Max. | | |
| Viewing angle (CR \geq 10) | θL | $\Phi = 180^\circ$ (9 o'clock) | 60 | 70 | -- | degree | Note1 |
| | θR | $\Phi = 0^\circ$ (3 o'clock) | 60 | 70 | -- | | |
| | θT | $\Phi = 90^\circ$ (12 o'clock) | 40 | 50 | -- | | |
| | θB | $\Phi = 270^\circ$ (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 | Rx | | 0.578 | 0.628 | 0.678 | -- | Note5 Note6 |
| | Ry | | 0.294 | 0.344 | 0.394 | | |
| | Gx | | 0.289 | 0.339 | 0.389 | | |
| | Gy | | 0.538 | 0.588 | 0.538 | | |
| | Bx | | 0.104 | 0.154 | 0.204 | | |
| | By | | 0.081 | 0.131 | 0.181 | | |
| | Wx | | 0.26 | 0.31 | 0.36 | | |
| | Wy | 0.28 | 0.33 | 0.38 | -- | | |
| Luminance | L | 800 | 1000 | -- | cd/m ² | Note6 | |
| Luminance uniformity | YU | 70 | 75 | -- | % | Note7 | |

Test Conditions:

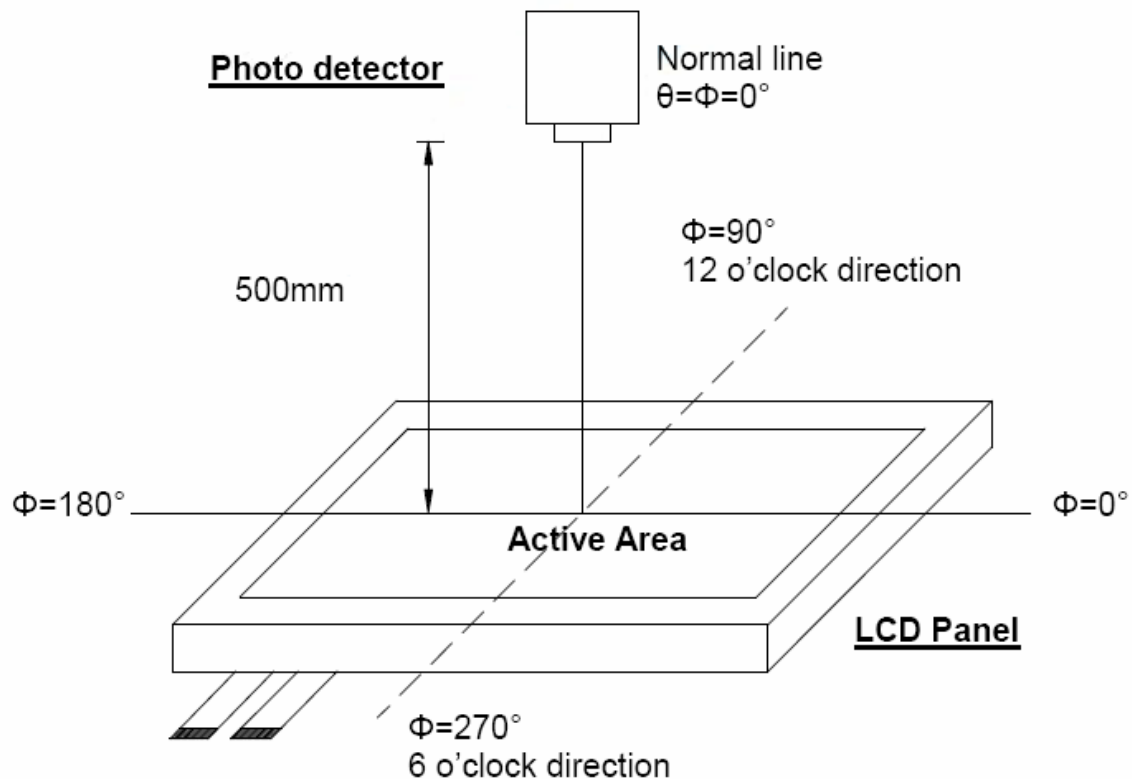
1. $V_{LED} = 12V$, $I_L = 320mA$ (Backlight current), the ambient temperature is $25^\circ C$.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range



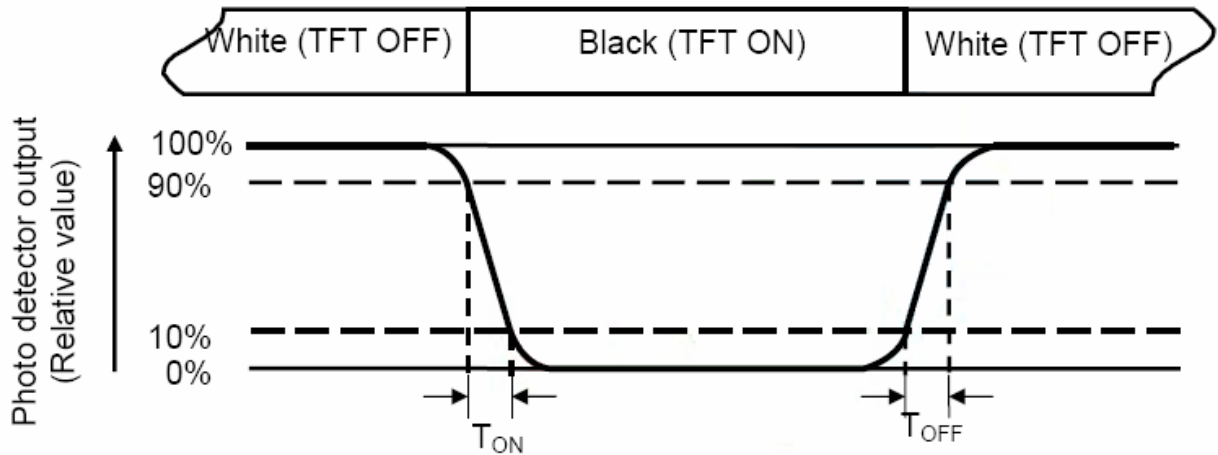
Note 2: Definition of optical measurement system.

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)

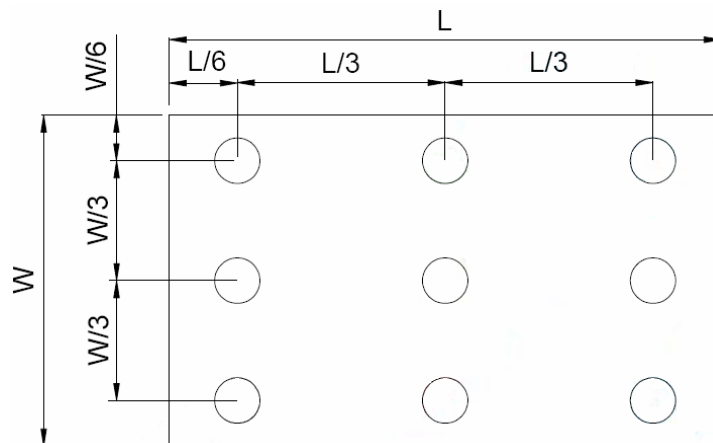
Color coordinated measured at center point of LCD.

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.

$$\Delta L = [L(\text{min.}) \text{ of } 9 \text{ points} / L(\text{max.}) \text{ of } 9 \text{ points}] \times 100\%$$



6. INTERFACE

TFT LCD Panel Driving Section

| Pin No. | Symbol | I/O | Description | Note |
|---------|--------|-----|---|------|
| 1 | VLED | P | Voltage for LED circuit (5.0V) | |
| 2 | VLED | P | Voltage for LED circuit (5.0V) | |
| 3 | ADJ | I | Adjust the LED brightness | (1) |
| 4 | GLED | P | Ground for LED circuit | |
| 5 | GLED | P | Ground for LED circuit | |
| 6 | VCC | P | Power supply for digital circuit (3.3V) | |
| 7 | VCC | P | Power supply for digital circuit (3.3V) | |
| 8 | MODE | I | DE or SYNC mode control | (2) |
| 9 | DE | I | Data enable | |
| 10 | VSYNC | I | VSYNC signal input | |
| 11 | HSYNC | I | HSYNC signal input | |
| 12 | GND | P | Power ground | |
| 13 | B5 | I | Blue data input (MSB) | |
| 14 | B4 | I | Blue data input | |
| 15 | B3 | I | Blue data input | |
| 16 | GND | P | Power ground | |
| 17 | B2 | I | Blue data input | |
| 18 | B1 | I | Blue data input | |
| 19 | B0 | I | Blue data input (LSB) | |
| 20 | GND | P | Power ground | |
| 21 | G5 | I | Green data input (MSB) | |
| 22 | G4 | I | Green data input | |
| 23 | G3 | I | Green data input | |
| 24 | GND | P | Power ground | |
| 25 | G2 | I | Green data input | |

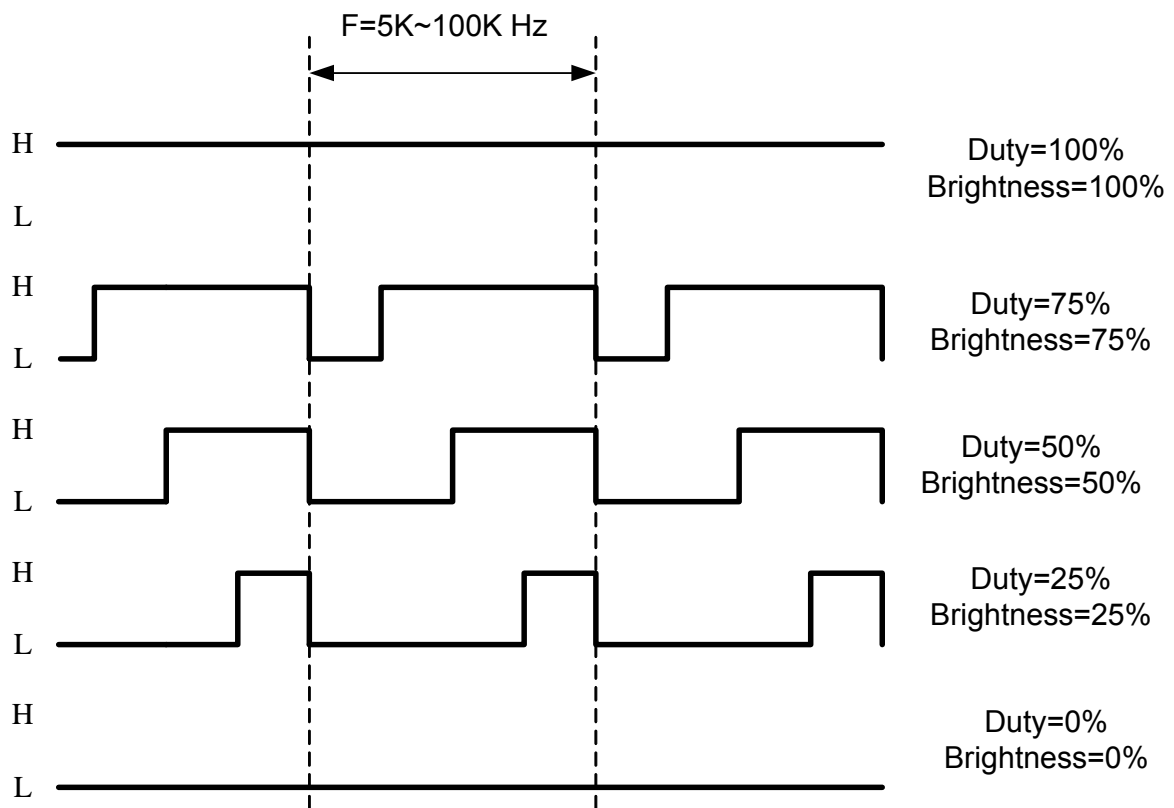
| | | | | |
|----|------|---|---|-----|
| 26 | G1 | I | Green data input | |
| 27 | G0 | I | Green data input (LSB) | |
| 28 | GND | P | Power ground | |
| 29 | R5 | I | Red data input (MSB) | |
| 30 | R4 | I | Red data input | |
| 31 | R3 | I | Red data input | |
| 32 | GND | P | Power ground | |
| 33 | R2 | I | Red data input | |
| 34 | R1 | I | Red data input | |
| 35 | R0 | I | Red data input (LSB) | |
| 36 | GND | P | Power ground | |
| 37 | DCLK | I | Sample clock | |
| 38 | GND | P | Power ground | |
| 39 | L/R | I | Select left to right scanning direction | (3) |
| 40 | U/D | I | Select up or down scanning direction | (3) |

I: input, O: output, P: power

NOTE:

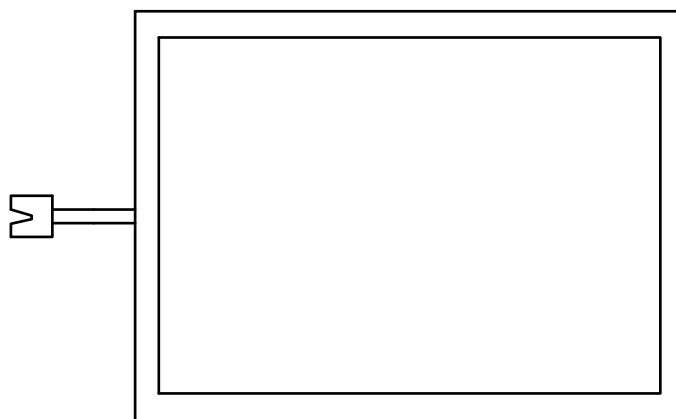
(1) Pin19: ADJ is PWM signal input. It is for brightness control.

| ITEM | SYMBOL | MIN | TYP | MAX | UNIT |
|-----------------------------|-----------------|-----|-----|------|------|
| ADJ signal frequency | f_{PWM} | 5K | 20K | 100K | Hz |
| ADJ signal logic level High | V _{IH} | 2.4 | 3.3 | 5.0 | V |
| ADJ signal logic level Low | V _{IL} | 0 | -- | 0.8 | V |



(3) Selection of scanning mode

| Setting of scan control input | | Scanning direction |
|-------------------------------|-----|---------------------------|
| U/D | L/R | |
| GND | VCC | Up to Down, Left to Right |
| VCC | GND | Down to Up, Right to Left |
| GND | GND | Up to Down, Right to Left |
| VCC | VCC | Down to Up, Left to Right |



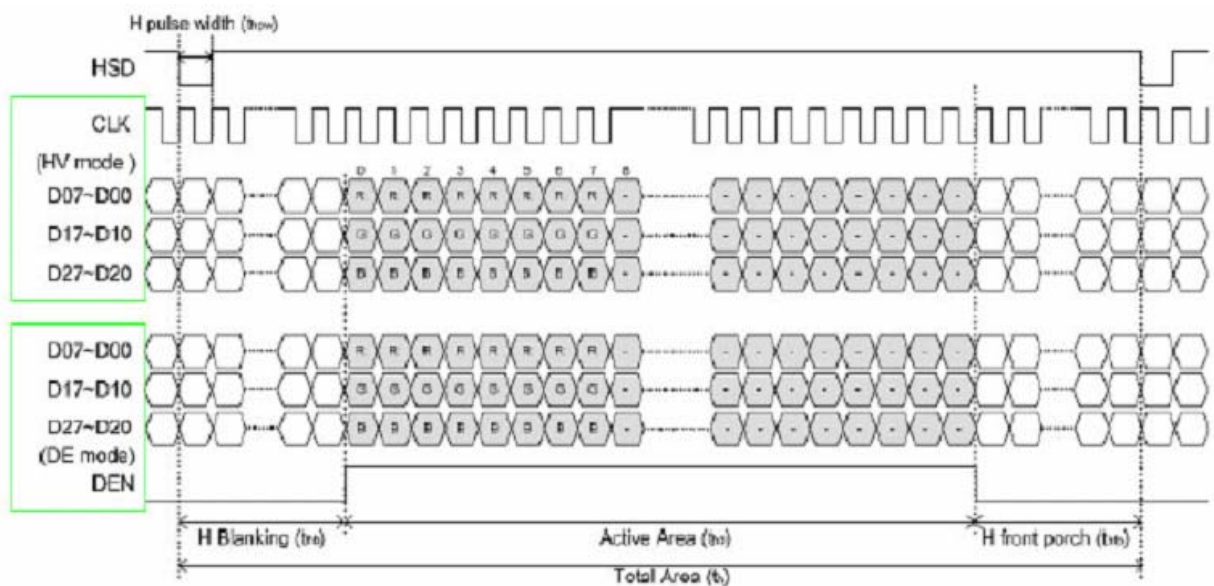
7. INPUT SIGNAL:

7-1

Horizontal Timing

| Parameter | Symbol | Spec | | | Unit |
|-------------------------|--------|------|------|------|------|
| | | Min. | Typ. | Max. | |
| Horizontal Display Area | thd | - | 800 | - | CLK |
| CLK Frequency | fclk | - | 40 | 50 | MHz |
| One Horizontal Line | th | 862 | 1056 | 1200 | CLK |
| HS Pulse Width | thpw | 1 | - | 40 | CLK |
| HS Back Porch | thb | 46 | | | CLK |
| HS Front Porch | thfp | 16 | 210 | 354 | CLK |

Horizontal Input Timing

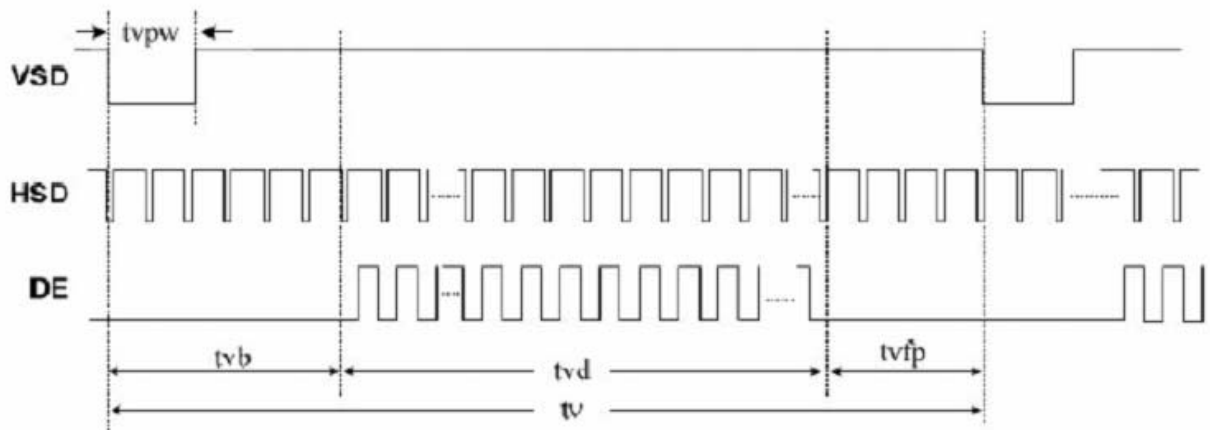


7-2

Vertical Timing

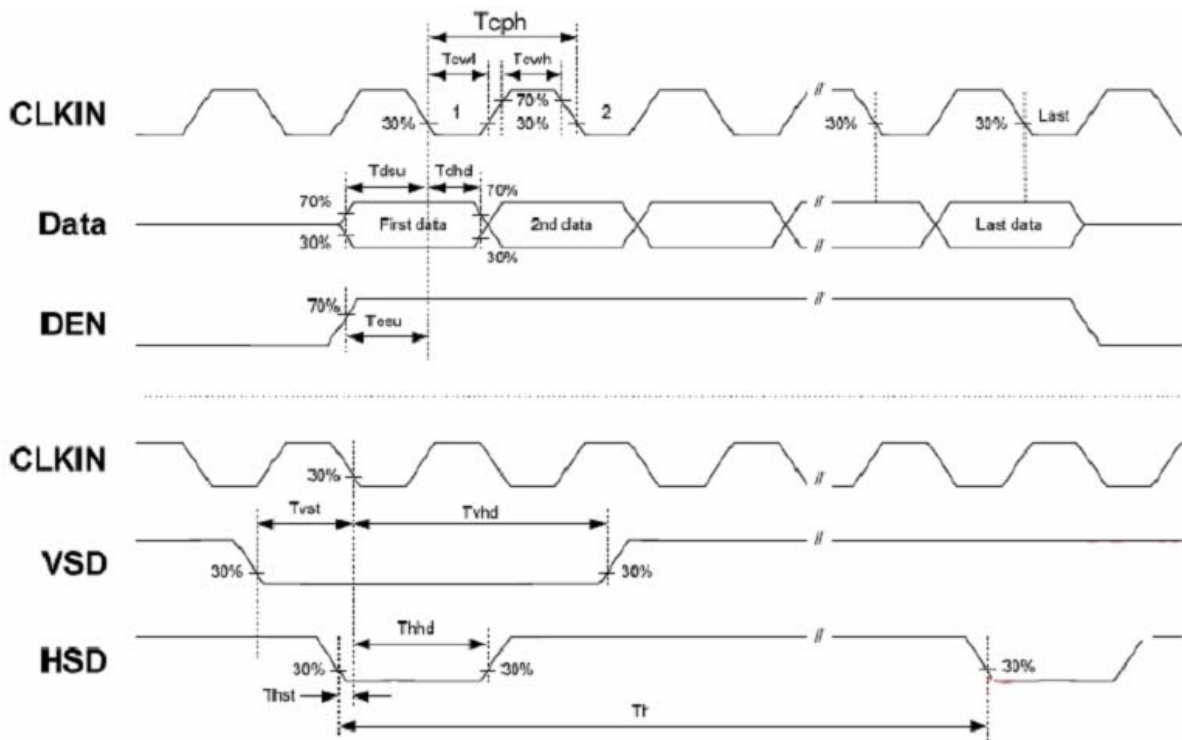
| Parameter | Symbol | Spec | | | Unit |
|-----------------------|--------|------|------|------|------|
| | | Min. | Typ. | Max. | |
| Vertical Display Area | tvd | - | 600 | - | th |
| VS Period Time | tv | 624 | 635 | 700 | th |
| VS Pulse Width | tvpw | 1 | - | 20 | th |
| VS Back Porch | tvb | 23 | | | th |
| VS Front Porch | tvfp | 1 | 12 | 77 | th |

Vertical Input Timing



(VDD= 3.0 to 3.6V, AVDD= 6.5 to 13.5V, GND=AGND= 0V, TA= -20 to +85 °C)

| Parameter | Symbol | Rating | | | Unit | Condition |
|------------------|--------|--------|------|------|------|------------------------------------|
| | | Min. | Typ. | Max. | | |
| CLKIN cycle time | Tcph | 20 | - | - | ns | |
| CLKIN pulse duty | Tcwh | 40 | 50 | 60 | % | |
| VSD setup time | Tvst | 8 | - | - | ns | |
| VSD hold time | Tvhd | 8 | | | ns | |
| HSD setup time | Thst | 8 | | | ns | |
| HSD hold time | Thhd | 8 | - | - | ns | |
| Data set-up time | Tdsu | 8 | - | - | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| Data hold time | Tdhd | 8 | - | - | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| DEN setup time | Tesu | 8 | - | - | ns | |
| DEN hold time | Tehd | 8 | - | - | ns | |



8. ELIABILITY TEST CONDITIONS

| Test Item | Test Conditions | Note |
|----------------------------|---|------|
| High Temperature Operation | 70±3°C ,Dry t=240 hrs | |
| Low Temperature Operation | -20±3°C, Dry t=240 hrs | |
| High Temperature Storage | 80±3°C , Dry t=240 hrs | 1,2 |
| Low Temperature Storage | -30±3°C ,Dry t=240 hrs | 1,2 |
| Thermal Shock Test | -20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry) | 1,2 |
| Humidity Test | 60 °C, Humidity 90%, 240 hrs | 1,2 |
| Vibration Test (Packing) | Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis | 2 |

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

Note 2 : The module should be inspected after 1hour storage in normal conditions

(15-35°C , 45-65%RH).

Definitions of life end point :

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

9. USE PRECAUTIONS

9-1 Handling precautions

- (1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
- (2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
- (3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
- (1) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

9-2 Installing precautions

- (1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. $1M\Omega$ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
- (2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
- (3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
- (4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off

9-3 Storage precautions

- (1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
- (2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
- (3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

9-4 Operating precautions

(1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.

(2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.

(3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC drive voltage.

(4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.

(5) Make certain that each signal noise level is within the standard (L level: $0.2V_{dd}$ or less and H level: $0.8V_{dd}$ or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.

(6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.

(7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.

(8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

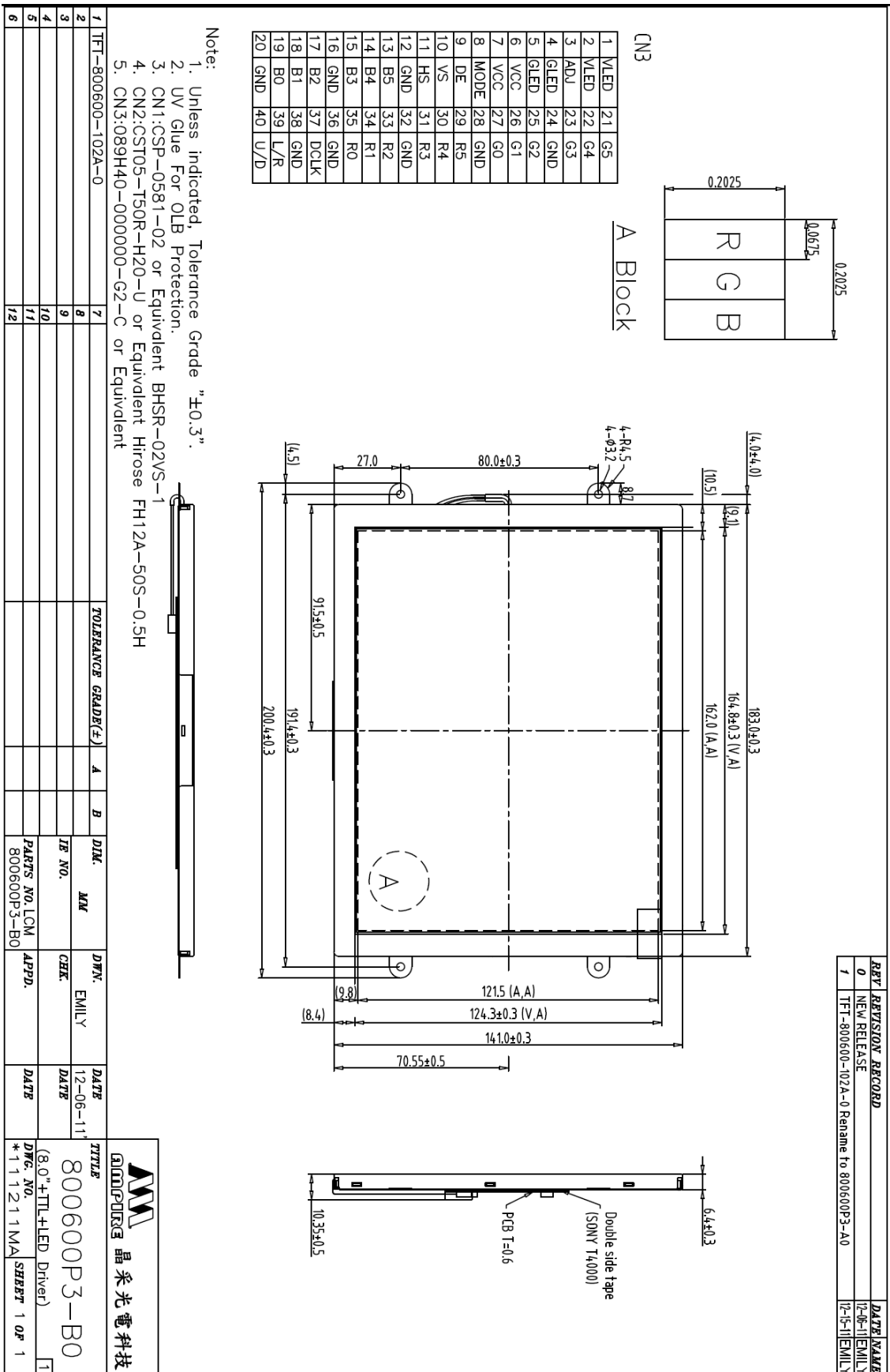
9-5 Other

(1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.

(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.

(3) AMIPRE will provide one year warranty for all products and three months warranty for all repairing products..

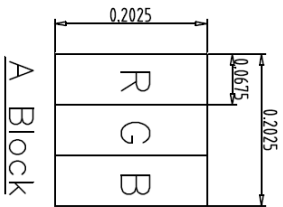
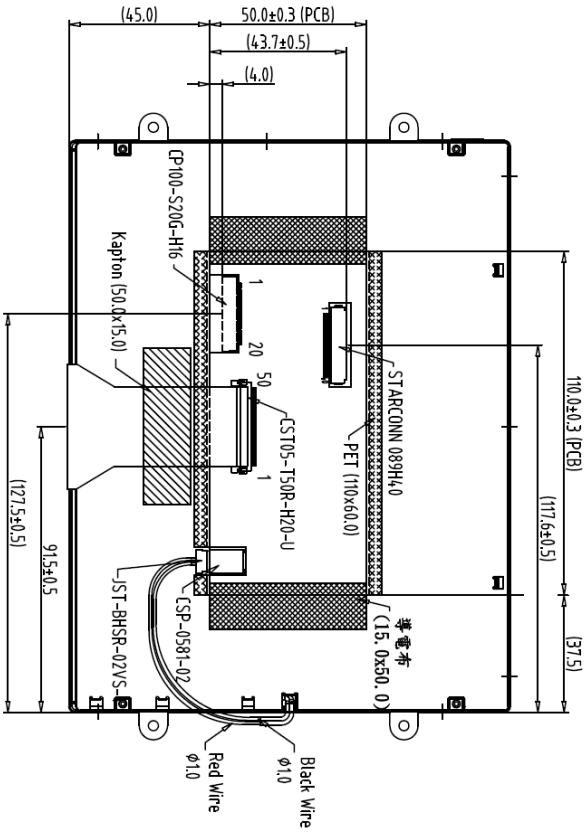
10. OUTLINE DIMENSION



| REV | REVISION RECORD | DATE | NAME |
|-----|---|----------|-------|
| 0 | NEW RELEASE | 12-06-11 | EMILY |
| 1 | TFT-800600-102A-0 Rename to 800600P3-A0 | 12-15-11 | EMILY |

CN3

| | | | |
|----|------|----|------|
| 1 | MLED | 21 | G5 |
| 2 | MLED | 22 | G4 |
| 3 | ADJ | 23 | G3 |
| 4 | GLED | 24 | GND |
| 5 | GLED | 25 | G2 |
| 6 | VCC | 26 | G1 |
| 7 | VCC | 27 | G0 |
| 8 | MODE | 28 | GND |
| 9 | DE | 29 | R5 |
| 10 | VS | 30 | R4 |
| 11 | HS | 31 | R3 |
| 12 | GND | 32 | GND |
| 13 | B5 | 33 | R2 |
| 14 | B4 | 34 | R1 |
| 15 | B3 | 35 | R0 |
| 16 | GND | 36 | GND |
| 17 | B2 | 37 | DCLK |
| 18 | B1 | 38 | GND |
| 19 | B0 | 39 | L/R |
| 20 | GND | 40 | U/D |



Back View

- Note:
1. Unless indicated, Tolerance Grade "±0.3".
 2. UV Glue For OLB Protection.
 3. CN1:CSP-0581-02 or Equivalent BHSR-02VS-1
 4. CN2:CST05-T50R-H20-U or Equivalent Hirose FH12A-50S-0.5H
 5. CN3:089H40-000000-G2-C or Equivalent

| TFT-800600-102A-0 | 7 | TOLERANCE GRADE(F) | A | B | MM | DEV. | DATE | TTITLE |
|-------------------|----|--------------------|---|---|----|-------|----------|-----------------------|
| | 8 | | | | | EMILY | 12-06-11 | 800600P3-B0 |
| | 9 | | | | | CHEK | DATE | (8.0°+TTL+LED Driver) |
| | 10 | | | | | | | DWG. NO. |
| | 11 | | | | | | | *111212MA |
| | 12 | | | | | | | SHEET 1 OF 1 |

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