



PRODUCT SPECIFICATIONS

For Customer: _____

: APPROVAL FOR SPECIFICATION

Customer Model No. PV05711D0160M-CT

: APPROVAL FOR SAMPLE

Module No.:

Date : 2023-09-26

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For Customer's Acceptance:

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

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



3. General Specifications

PV05711D0160M-CT is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC , FPC, a backlight unit and CTP. The 5.7'' display area contains 640 x 480pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

3.1 LCD Parameter

| Item | Contents | Unit | Note |
|-----------------------|--------------------------|---------|------|
| LCD Type | TFT | - | |
| Display color | 16.7M | | |
| Viewing Direction | ALL | O'Clock | |
| Operating temperature | -20~+70 | °C | |
| Storage temperature | -30~+80 | °C | |
| Module size | Refer to outline drawing | mm | |
| Active Area(W×H) | 115.20X86.40 | mm | |
| Number of Dots | 640×480 | dots | |
| TFT Driver IC | JD9168S | - | |
| Power Supply Voltage | 3.3 | V | |
| Outline Dimensions | Refer to outline drawing | - | |
| Backlight | 3X7-LEDs | pcs | |
| Weight | TBD | g | |

Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.



3.2 CTP Parameter

| Item | Contents | Unit | Note |
|----------------------|-------------------------------|------|------|
| Outline Size | 133(H)X104.43(V)X2.55(T) | mm | |
| Cover View Area | 115.4(H)X86.6(V) | | |
| CTP Resolution | 16384*16384 | dots | |
| Interface Mode | IIC | - | |
| Touch Mode | 10 Human fingers multi-touch | - | |
| Surface hardness | $\geq 6H$ | - | |
| Transparency | $\geq 85\%$ | - | |
| Accuracy | Centre +/-1.5mm,Edge +/-2.5mm | mm | |
| CTP Controller | ILI2511 | - | |
| Power Supply Voltage | 3.3 | V | |



5. Absolute Maximum Ratings(Ta=25 °C)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25 °C)

| Item | Symbol | Min. | Max. | Unit | Note |
|--------------------------|-----------------|------|------|------|------|
| Power Supply Voltage | V _{DD} | -0.3 | 3.6 | V | 1, 2 |
| CTP Power Supply Voltage | VDD | 2.8 | 3.3 | V | 1, 2 |

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. VCC >V_{SS} must be maintained.
3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

| Item | Storage | | Operating | | Note |
|---------------------|---------|------|-----------|------|------|
| | MIN. | MAX. | MIN. | MAX. | |
| Ambient Temperature | -30°C | 80°C | -20°C | 70°C | 1,2 |
| Humidity | - | - | - | - | 3 |

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.
The phenomenon is reversible.
3. Ta<=40 °C:85%RH MAX.
Ta>=40 °C:Absolute humidity must be lower than the humidity of 85%RH at 40 °C.



6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics(V_{SS}=0V ,T_a=25°C)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit | Note |
|---------------|--------------------|----------------------|------------|------------|------|------------|------|
| Power supply | IOVCC | T _a =25°C | 2.5 | 3.3 | 3.6 | V | |
| Input voltage | 'H' | V _{IH} | IOVCC=3.3V | 0.7V*IOVCC | - | IOVCC | V |
| | 'L' | V _{IL} | IOVCC=3.3V | 0 | - | 0.3V*IOVCC | V |
| Power supply | AVDD | T _a =25°C | 4.5 | 5.79 | 6.0 | V | |
| Power supply | AVEE | T _a =25°C | 2.5 | -5.77 | -6.0 | V | |
| Power supply | I _{IOVCC} | T _a =25°C | - | 5.52 | - | mA | |
| Power supply | I _{AVDD} | T _a =25°C | - | 8.16 | - | mA | |
| Power supply | I _{AVEE} | T _a =25°C | - | 7.89 | - | mA | |

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

| Item | Symbol | Condition | Min | Typ | Max | Unit | Note |
|----------------|----------------|-----------------------|-----|-----|-----|------|------|
| Supply voltage | V _f | I _f =140mA | 8.4 | 9.0 | 9.9 | V | |
| Uniformity | Δ Bp | I _f =140mA | 80 | - | - | % | |
| Life time | - | I _f =140mA | 20K | - | - | hour | 1 |

Note:

1 : The "LED Life time" is defined as the module brightness decrease to 50% original brightness at T=25°C and I_f=220mA. The LED Life time could be decreased if operating I_f is larger than 220mA.



6.3 Interface signals

| Pin No. | Symbol | I/O | Function |
|---------|---------|-----|--|
| 1 | SDA | I | Serial data input / output pin in SPI interface operation. |
| 2 | CSX | I | Chip select pin. 0: Chip can be accessed; 1: Chip cannot be accessed. |
| 3 | SCL | I | Serial clock input in SPI interface . |
| 4 | RESET | I | Global reset signal input pin. |
| 5-12 | B0-B7 | I | Blue data bus. |
| 13-20 | G0-G7 | I | Green data bus. |
| 21-28 | R0-R7 | I | Red data bus. |
| 29 | GS | I | Gate driver scan direction on panel module |
| 30 | SS | I | Source driver scan direction on panel module. |
| 31 | LAN0 | I | Select the lane mode as listed below. |
| 32 | LAN1 | I | Select the lane mode as listed below. |
| 33 | LVMFMT | I | Data format select for LVDS mode. |
| 34 | STBYB | I | Standby mode control pin. |
| 35-36 | IM1-IM0 | I | RGB IF data format (RGB565 / RGB666 / RGB888) is selected by DCS command (0x3A). |
| 37 | DCLK | I | Pixel clock input in RGB interface. |
| 38 | DE | I | Data enable input in RGB interface. |
| 39 | VS | I | Vertical sync input in RGB interface. |
| 40 | HS | I | Horizontal sync input in RGB interface. |
| 41 | DS2 | P | Ground. |
| 42 | DS1 | P | Ground. |
| 43 | DS0 | P | Ground. |
| 44 | PS | I | A power supply for the I/O circuit. |
| 45 | GND | P | Ground. |
| 46 | DON | I | -LVDS differential data input (Data lane 0). |
| 47 | DOP | I | +LVDS differential data input (Data lane 0). |
| 48 | D1N | I | -LVDS differential data input (Data lane 1). |
| 49 | D1P | I | +LVDS differential data input (Data lane 1). |
| 50 | CKN | I | -LVDS differential clock signal data input. |
| 51 | CKP | I | +LVDS differential clock signal data input. |
| 52 | D2N | I | -LVDS differential data input (Data lane 2). |
| 53 | D2P | I | +LVDS differential data input (Data lane 2). |
| 54 | D3N | I | -LVDS differential data input (Data lane 3). |
| 55 | D3P | P | +LVDS differential data input (Data lane 3). |
| 56 | IOVCC | I | A power supply for the I/O circuit. |
| 57 | AVDD | I | Input positive power from system/ external power IC. |
| 58 | AVEE | I | Input negative power from system/ external power IC. |
| 59 | VPP | I | External High voltage pin is used in OTP program mode, the power is |



| | | | |
|----|-----|---|------------------|
| | | | operate at 7.5V. |
| 60 | GND | P | Ground. |

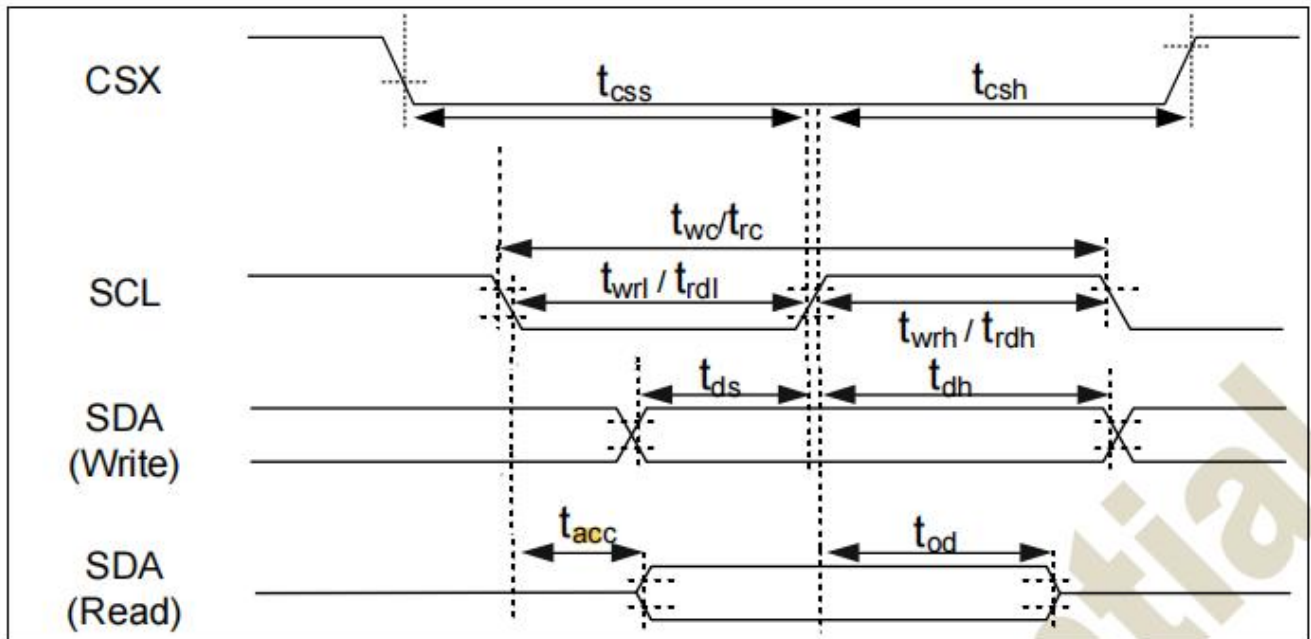
CTP interface

| Pin No. | Symbol | I/O | Function |
|---------|--------|-----|------------------------------|
| 1 | SCL | I | Serial interface clock |
| 2 | SDA | I/O | Serial input/output data bus |
| 3 | GND | P | Ground. |
| 4 | RST | I | Reset signal |
| 5 | INT | O | External Interrupt pin |
| 6 | VCC | P | Power supply |



6.4 Timing Characteristics

6.4.1 SPI mode data input format



SPI interface AC characteristics

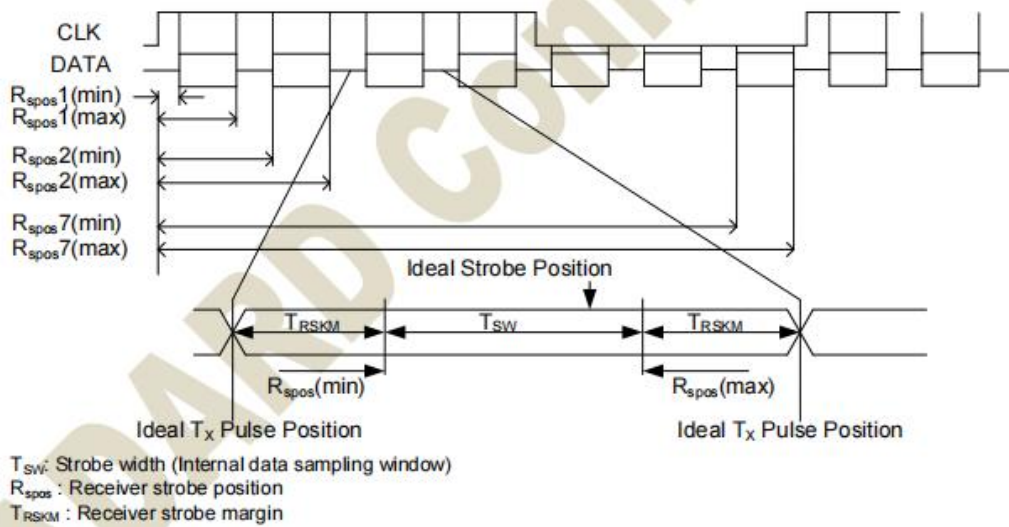
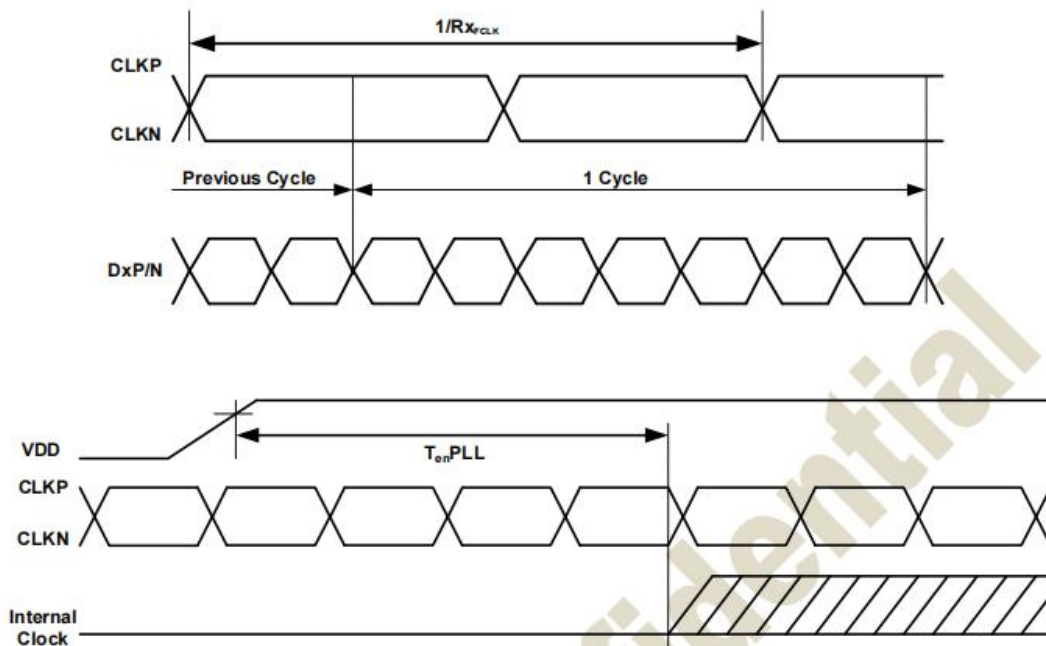
($T_A=25^{\circ}\text{C}$, $\text{IOVCC}=3.3\text{V}$, $\text{VCI}=3.3\text{V}$)

| Signal | Symbol | Parameter | Min. | Max. | Unit | Description |
|----------------|-----------|--------------------------------|------|------|------|---------------------|
| CSX | t_{css} | Chip select setup time (Write) | 40 | - | ns | - |
| | t_{csh} | Chip select setup time (Read) | 40 | - | | |
| SCL (Write) | t_{wc} | Write cycle | 100 | - | ns | - |
| | t_{wrh} | Control pulse "H" duration | 40 | - | | |
| | t_{wrl} | Control pulse "L" duration | 40 | - | | |
| SCL (Read) | t_{rc} | Read cycle | 150 | - | ns | - |
| | t_{rdh} | Control pulse "H" duration | 60 | - | | |
| | t_{rdl} | Control pulse "L" duration | 60 | - | | |
| SDA (Write) | t_{ds} | Data setup time | 30 | - | ns | Note ⁽¹⁾ |
| | t_{dt} | Data hold time | 30 | - | | |
| SDA (Read) | t_{acc} | Read access time | - | 35 | ns | |
| | t_{od} | Output disable time | 10 | 50 | | |

SPI interface AC characteristics



6.4.2 LVDS mode data input format



LVDS AC characteristics



6.4.2 LVDS mode AC electrical Characteristics

| Signal | Symbol | Min. | Typ | Max. | Unit | Description |
|------------------------|---------------------|------|----------------------------|------|------|--|
| Clock frequency | R _X FCLK | 30 | - | TBD | MHz | Refer to input timing table for each display resolution |
| Input data skew margin | T _{RSKM} | 500 | - | - | ps | VID = 200mV R _x VCM = 1.2V R _x FCLK = 81MHz |
| Clock high time | T _{LVCH} | - | 4/(7x R _X FCLK) | - | ns | - |
| Clock low time | T _{LVCL} | - | 3/(7xR _X FCLK) | - | ns | - |
| PLL wake-up time | T _{enPLL} | - | - | 150 | us | - |

LVDS AC characteristics



7. Optical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Note | |
|-------------------------|--------------------------------|------------------------------------|------------------------------------|--------------|------|-------------------|------|-----|
| Brightness | Bp | $\theta=0^\circ$ | - | 500 | - | Cd/m ² | 1 | |
| Uniformity | ΔBp | $\Phi=0^\circ$ | 80 | - | - | % | 1,2 | |
| Viewing Angle | 3:00 | Cr \geq 10 | 75 | 80 | - | Deg | 3 | |
| | 6:00 | | 75 | 80 | - | | | |
| | 9:00 | | 75 | 80 | - | | | |
| | 12:00 | | 75 | 80 | - | | | |
| Contrast Ratio | Cr | $\theta=0^\circ$ $\Phi=0^\circ$ | 1000 | 1200 | - | - | 4 | |
| Response Time | T _r +T _f | | - | 30 | 35 | ms | 5 | |
| Color of CIE Coordinate | W | x | $\theta=0^\circ$ $\Phi=0^\circ$ | Typ-0 .05 | TBD | Typ+0. 05 | - | 1,6 |
| | | y | | | | | - | |
| | R | x | $\theta=0^\circ$ $\Phi=0^\circ$ | | | | - | |
| | | y | | | | | - | |
| | G | x | $\theta=0^\circ$ $\Phi=0^\circ$ | | | | - | |
| | | y | | | | | - | |
| | B | x | $\theta=0^\circ$ $\Phi=0^\circ$ | | | | - | |
| | | y | | | | | - | |
| transmittance | TR | - | 4.0 | 4.7 | - | % | | |
| Color Gamut | CG | - | 55 | 60 | - | % | | |

Note: The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment PR-705 (Φ8mm)

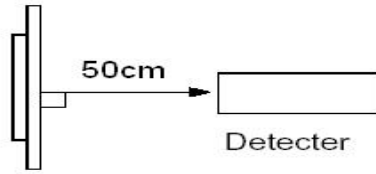
Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25 °C.
- Adjust operating voltage to get optimum contrast at the center of the display.

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



turning on.

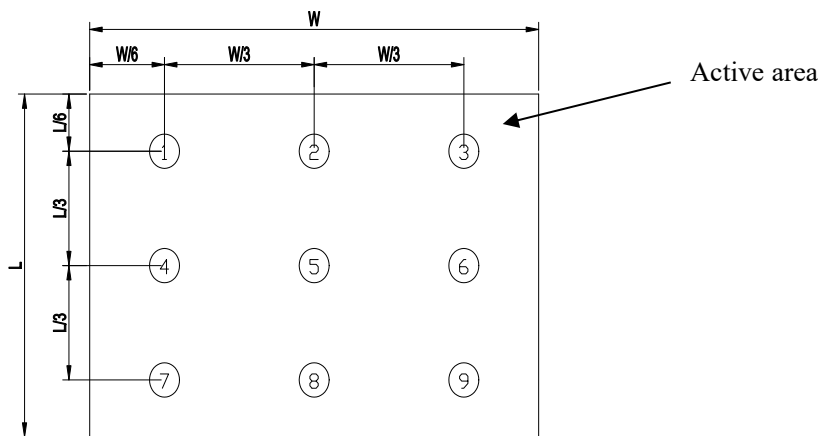


Note 2: The luminance uniformity is calculated by using following formula.

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

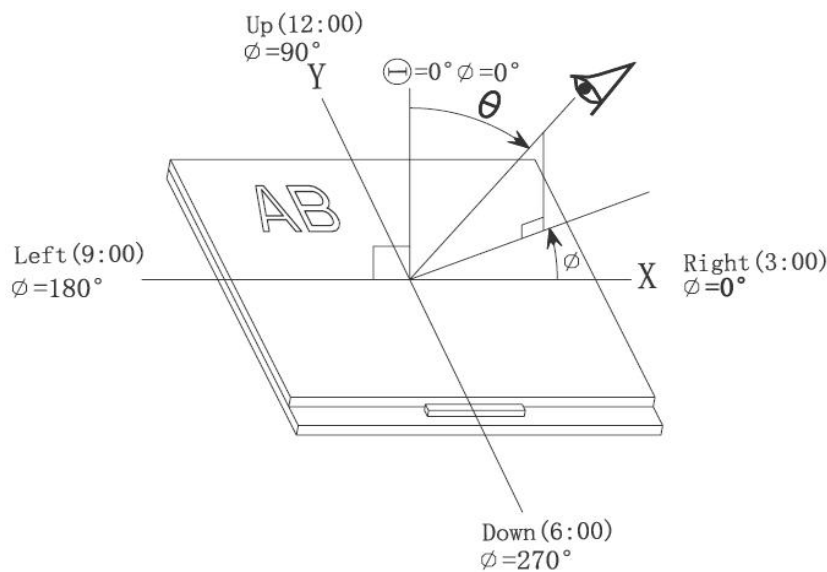
$Bp (\text{Max.})$ = Maximum brightness in 9 measured spots

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

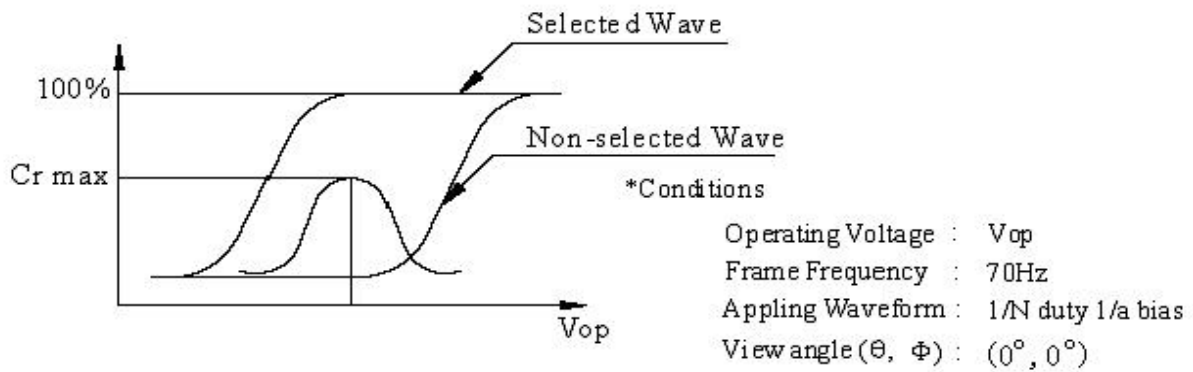


Note 3: The definition of viewing angle:

Refer to the graph below marked by ϑ and Φ



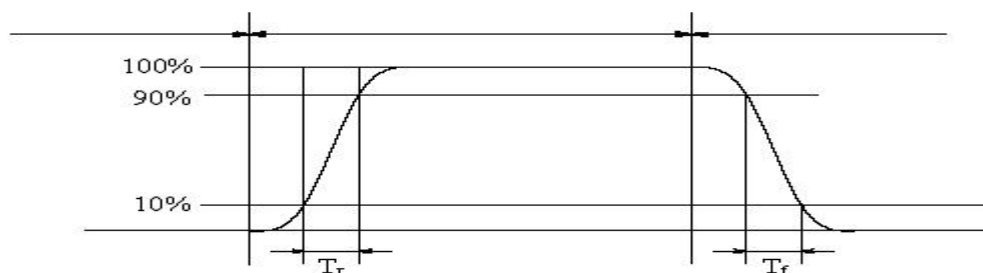
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

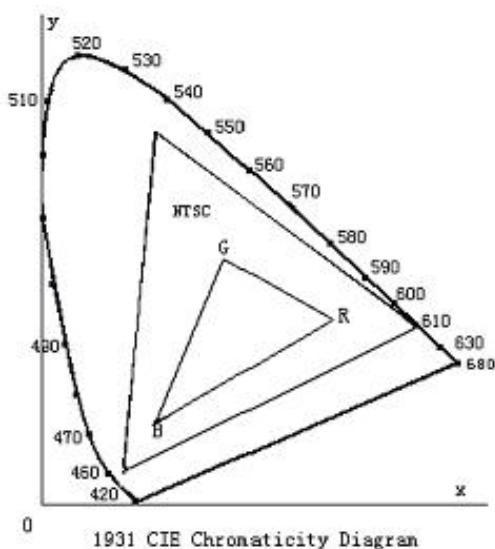
Note 5: Definition of Response time. (Test LCD using DMS501):

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

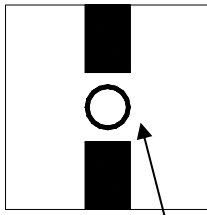


Color gamut:

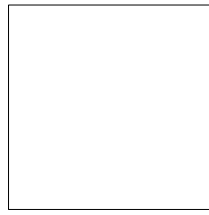
$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

$$\text{Cross talk ratio}(\%) = \frac{|\text{pattern A Brightness} - \text{pattern B Brightness}|}{\text{pattern A Brightness}} \times 100$$



Pattern A



Pattern B

Measurement point(center)

Electric volume value=3F+/-3Hex



8. Reliability Test Items and Criteria

| Test Item | Test condition | Remark |
|--|---|---------------|
| High Temperature Storage | Ta =80°C 96hrs | Note1,Note3,4 |
| Low Temperature Storage | Ta = -30°C 96hrs | Note1,Note3,4 |
| High Temperature Operation | Ts = 70°C 96hrs | Note2,Note3,4 |
| Low Temperature Operation | Ta = -20°C 96hrs | Note1,Note3,4 |
| Operation at High Temperature/Humidity | +60°C, 90%RH 96hrs | Note3,4 |
| Thermal Shock | -20°C/30 min ~ +60°C/30 min for a total 20 cycles, Start with cold temperature and end with high temperature. | Note3,4 |

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. Precautions for Use of LCD Modules

9.1 Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol — Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water — Ketone — Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.



9.2 Storage precautions

9.2.1 *When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.*

9.2.2 *The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:*

Temperature : 0 °C ~ 40 °C

Relatively humidity: ≤80%

9.2.3 *The LCD modules should be stored in the room without acid, alkali and harmful gas.*

9.3 *The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.*

END