| Messrs. | | | | | |
|---|---|---|---|---|---|
| Product Specification | Model: | MTF-T057AMSLP-V4 | Rev. No. | Issued Date. | Page. |
| | | | *B* | *March.13, 09* | *1 / 33* |

# LIQUID CRYSTAL DISPLAY MODULE
# MODEL: MTF-T057AMSLP-V4
# Customer's No.:

| Acceptance |
|---|
| |

*Microtips Technology Inc.*
*12F. No.31 Lane 169, Kang Ning St.,*
*His-Chih, Taipei Hsien, Taiwan*
*FAX: 886-2-26958625*

| Approved and Checked by |
|---|
| |

| Approved by | Checked by | | Made by |
|---|---|---|---|
| 微 端<br>2009/03/13<br>李 剛 | 微 端<br>2009/03/13<br>蔡 宜 夢 | 微 端<br>2009/03/13<br>陳 世 文 | 微 端<br>2009/03/13<br>許 瓊 窈 |

## Revise Records

| Rev. | Date | Contents | Written | Approved |
|---|---|---|---|---|
| A | 2008/06/18 | Specification released | Sherry Chen | Steele Lee |
| B | 2009/03/13 | See Note2. | Jill Hsu | Steele Lee |
| | | | | |
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## Special Notes

| | |
|---|---|
| Note1. | The LCD module is compliant with RoHS. |
| Note2. | Modified power circuit to eliminate flicker. ( IC: AIC1896 ) |
| Note3. | |
| Note4. | |
| Note5. | |
| | |
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# Contents

## 1. GENERAL DESCRIPTION AND FEATURES

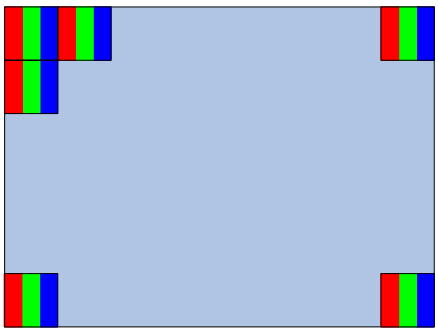
MTF-T057AMSLP-V4 is a TM (Transmissive) type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a driver circuit and a back-light unit. The resolution of a 5.7" contains 320RGB×240 dots and can display up to 262K colors. The following table described the features of MTF-T057AMSLP-V4.

1.1 Features

- Transmissive type with LED back-light.
- TN (Twisted Nematic) mode.
- Digital RGB (6bits/color) Data Transfer
- Backlight-driving DC/AC inverter is not built in this module.
- clock setting, like sharp compatible (data will be stable on the falling edge)

1.2 General Specifications

| Item | Specification | Unit |
|---|---|---|
| Screen Size | 5.7 inches diagonal | -- |
| Display Resolution | 320 x RGB x 240 | Dot |
| Pixel Pitch | 0.36 (H) ×0.36 (V) | mm |
| Active Area | 115.2 (W) x 86.4 (H) | mm |
| Outline Dimension | 144.0 (W) x 104.6 (H) x 11.0 (T),<br>without FPCB tail and connector cable | mm |
| Weight | 175g (MTF-T057AMSLN-V4) | -- |
| | 212g (MTF-T057AMSLP-V4) | |
| Display Mode | Normally White/Transmissive/Wide view | -- |
| Pixel Arrangement | RGB-Vertical Stripe | -- |
| Surface Treatment | Anti-Glare(3H) | -- |
| Viewing Direction | 6 o'clock | -- |
| Input Interface | Digital RGB (6bits/color) Data Transfer | -- |
| TFT Driver | Source: Himax HX8218A, Gate: Himax HX8615A | -- |
| Color Garmut | NTSC 58% | -- |



## 2. INPUT TERMINAL PIN ASSIGNMENT

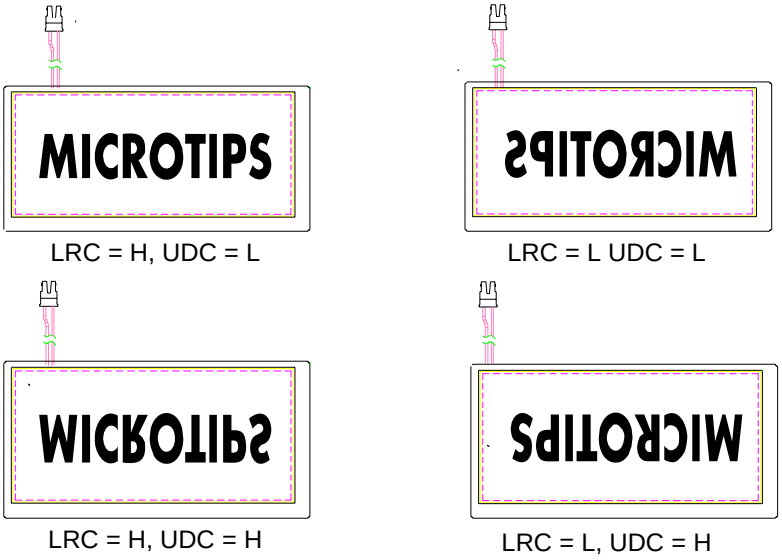
2.1 Pin Assignment

| Pin No. | Symbol | I/O | Function | Remark |
|---|---|---|---|---|
| 1 | DGND | -- | GND | -- |
| 2 | DCLK | I | Clock signal for sampling each data signal | -- |
| 3 | Hsync | I | Horizontal synchronous signal (Negative) | -- |
| 4 | Vsync | I | Vertical synchronous signal (Negative) | -- |
| 5 | GND | I | GND | -- |
| 6 | R0 | I | RED data signal (LSB) | -- |
| 7 | R1 | I | RED data signal | -- |
| 8 | R2 | I | RED data signal | -- |
| 9 | R3 | I | RED data signal | -- |
| 10 | R4 | I | RED data signal | -- |
| 11 | R5 | I | RED data signal (MSB) | -- |
| 12 | GND | -- | GND | -- |
| 13 | G0 | I | GREEN data signal (LSB) | -- |
| 14 | G1 | I | GREEN data signal | -- |
| 15 | G2 | I | GREEN data signal | -- |
| 16 | G3 | I | GREEN data signal | -- |
| 17 | G4 | I | GREEN data signal | -- |
| 18 | G5 | I | GREEN data signal (MSB) | -- |
| 19 | GND | -- | GND | -- |
| 20 | B0 | I | BLUE data signal(LSB) | -- |
| 21 | B1 | I | BLUE data signal | -- |
| 22 | B2 | I | BLUE data signal | -- |
| 23 | B3 | I | BLUE data signal | -- |
| 24 | B4 | I | BLUE data signal | -- |
| 25 | B5 | I | BLUE data signal(MSB) | -- |
| 26 | GND | -- | GND | -- |
| 27 | DEN | I | Signal to settle the horizontal display position (Positive) | Note5-1 |
| 28 | $V_{DD}$ | -- | ＋3.3V power supply | -- |
| 29 | $V_{DD}$ | -- | ＋3.3V power supply | -- |

| | | | | |
|---|---|---|---|---|
| 30 | LRC | I | Horizontal display mode select signal L: Normal<br>H: Left / Right reverse mode | Note5-2 |
| 31 | UDC | I | Vertical display mode select signal H: Normal<br>L: Up / Down reverse mode | Note5-3 |
| 32 | NC | -- | No Connection | -- |
| 33 | GND | I | GND | -- |

Note5-1 The horizontal display start timing is settled in accordance with a rising timing of ENAB signal. In case ENAB is fixed "Low", the horizontal start timing is determined. Don't keep ENAB “High" during operation.

Note5-2,3



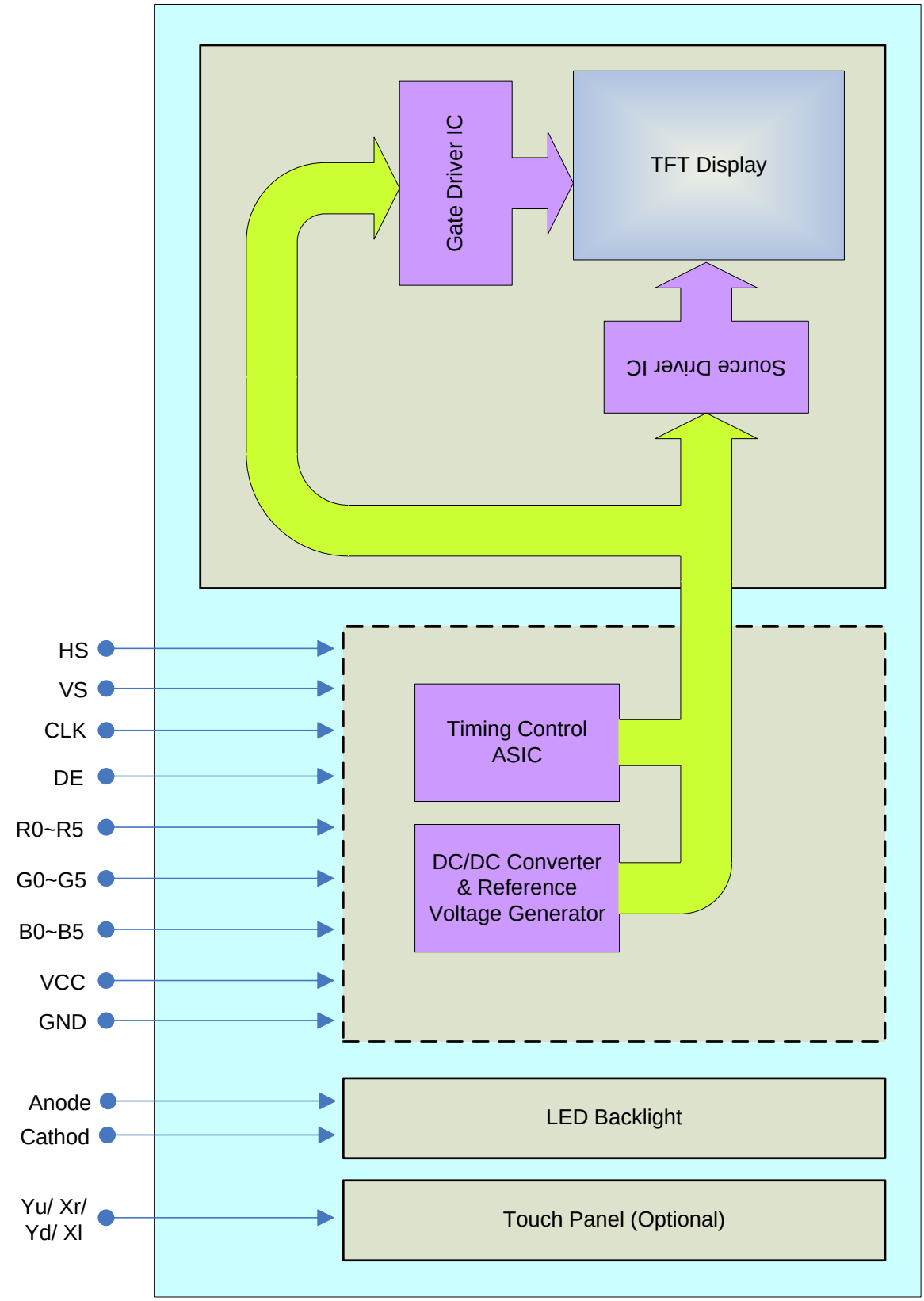

2.2 Back-light Unit (BLU)

| Pin No. | Symbol | Function | Remark |
|---|---|---|---|
| 1 | LEDA | Power Supply for LED backlight | -- |
| 2 | LEDK | GND for LED backlight | -- |

2.3 Touch Panel Pin Assignment

| Pin No. | Designation |
|---|---|
| 1 | YU |
| 2 | XR |
| 3 | YD |
| 4 | XL |

## 3. BLOCK DIAGRAM



## 4. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (1).
Measuring equipment: LCD-5000, BM-5A, BM-7, PR-650, EZ-Contrast

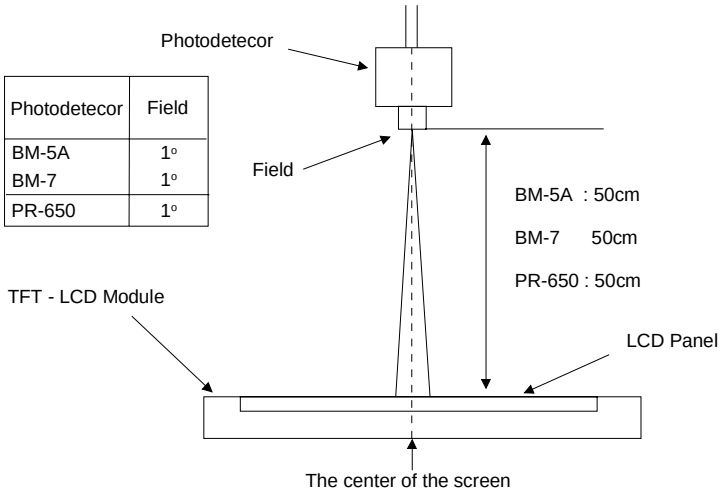
(Ta=25°C , $I_F$=300mA)

| Item | | Symbol | Condition | Min | Type | Max | Unit | Note |
|---|---|---|---|---|---|---|---|---|
| Brightness | MTF-T057AMSLN-V4 | Br | 300mA/6.6V | 500 | 550 | -- | cd/m$^2$ | Note 1 |
| | MTF-T057AMSLP-V4 | | | 400 | 440 | -- | cd/m$^2$ | |
| Response time | | $T_r$ | θ=0° | -- | 15 | 20 | ms | Note 2 |
| | | $T_f$ | | -- | 35 | 50 | ms | |
| Contrast ratio | | CR | At optimized viewing angle | 150 | 250 | -- | -- | Note 3 |
| Color Chromaticity | Red | $R_X$ | θ=0° Normal Viewing Angle | 0.610 | 0.640 | 0.670 | -- | -- |
| | | $R_Y$ | | 0.314 | 0.344 | 0.374 | | |
| | Green | $G_X$ | | 0.268 | 0.298 | 0.328 | -- | |
| | | $G_Y$ | | 0.553 | 0.583 | 0.613 | | |
| | Blue | $B_X$ | | 0.107 | 0.137 | 0.167 | -- | |
| | | $B_Y$ | | 0.139 | 0.159 | 0.179 | | |
| | White | Wx | | 0.282 | 0.312 | 0.342 | -- | |
| | | Wy | | 0.319 | 0.349 | 0.379 | | |
| Viewing Angle (6H) | Hor. | $\theta_R$ | CR≥10 | -- | 65 | -- | Degree | Note 4 |
| | | $\theta_L$ | | -- | 65 | -- | | |
| | Ver. | $\theta_B$ | | -- | 50 | -- | | |
| | | $\theta_F$ | | -- | 65 | -- | | |
| LED Life time | 25°C | LL | $I_F$=300mA $V_F$=6.6V | -- | 50k | -- | Hours | Note 5 |

Note 1: Test Equipment Setup

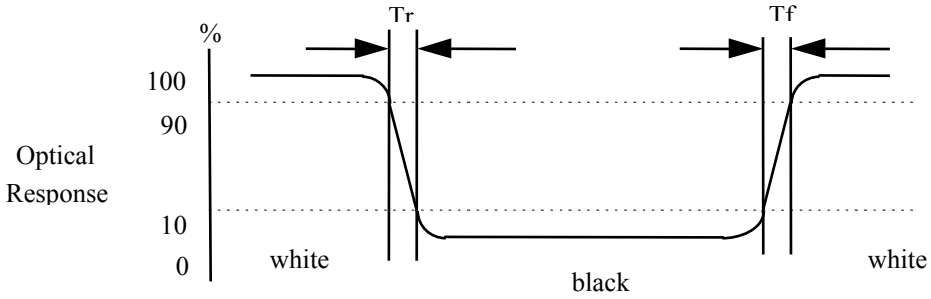
After stabilizing and leaving the panel alone at a given temperature for 30 min., the measurement should be executed. Measurement should be executed in a stable, windless, and dark room, 30 min. after turning the back light on. This should be measured in the center of screen.

Back-Light current: 300mA
Environment condition: 1. Ta=25±2°C
2. Illuminations≦1 lux




Note 2: Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

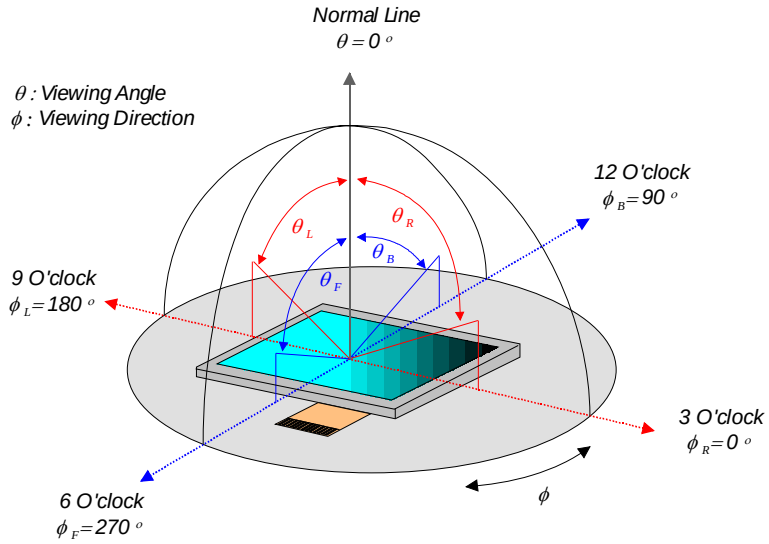



Note 3: Definition of contrast ratio:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at “white state”}}{\text{Brightness measured when LCD is at “black state”}}$$

Note 4: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

View Angle




Note 5: This is the reference value. The white-LED life time is defined as a time when brightness not to become under 50% of the original value (at Ta=25°C)

## 5. ABSOLUTE MAXIMUM RATINGS

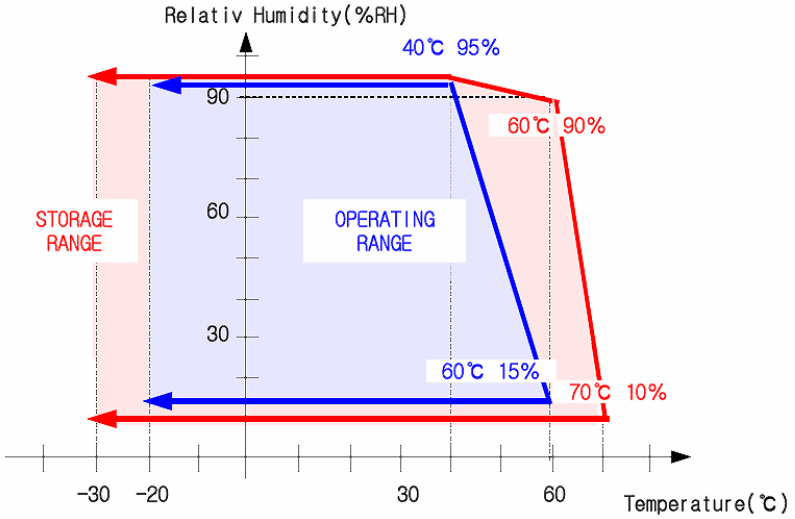
5.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25°C, $V_{SS}$=GND=0)

| Item | Symbol | Min. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Storage temperature | $T_{STG}$ | -30 | 80 | °C | (1) |
| Operating temperature (Ambient temperature) | $T_{OPR}$ | -20 | 70 | °C | (1), (2) |

Note (1) 95 % RH Max. ( 40 °C ≥ Ta )
Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C) No condensation.




(2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

5.2 Electrical Absolute Maximum Rating

(Ta=25°C, $V_{SS}$=GND=0)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Power Supply Voltage | $V_{DD}$ | -0.3 | -- | +7.0 | V | Note 1 |
| Permissive input ripple voltage | $V_{RF}$ | -- | -- | 100 | mVp-p | $V_{DD}$ = +3.3V |
| Input voltage (Low) | $V_{IL}$ | 0 | -- | 0.3 $V_{DD}$ | V | Note 2 |
| Input voltage (High) | $V_{IH}$ | 0.7 $V_{DD}$ | -- | +5.5 | V | |
| Input current (Low) | $I_{OL1}$ | -- | -- | 10 | μA | $V_I$=0V, Note 2 |
| Input current (High) | $I_{OH1}$ | -- | -- | 10 | μA | $V_I$=3.3~5.0V, Note 3 |
| | $I_{OH2}$ | -- | -- | 100 | μA | $V_I$=3.3~5.0V, Note 4 |

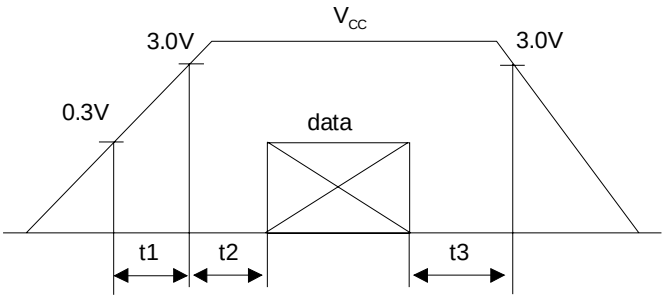
Note1:

$V_{DD}$ -turn-on conditions

0 < t1 ≤ 20ms

0 < t2 ≤ 50ms

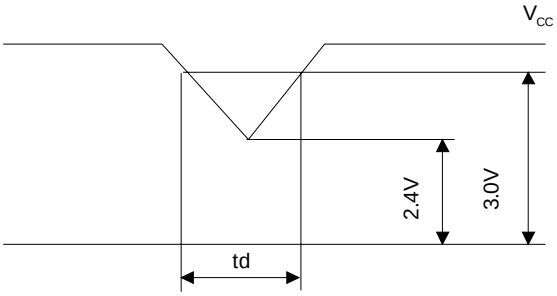
0 < t3 ≤ 1s




$V_{DD}$ -dip conditions

$V_{DD}$ -dip conditions should also follow the $V_{DD}$ -turn-on conditions

Td ≤ 20ms




Note2: CLK, R0~R5, G0~G5, B0~B5, Hsync, Vsync, DE, R/L, U/D
Note3: CLK, R0~R5, G0~G5, B0~B5, Hsync, Vsync, R/L, U/D
Note4: DE

## 6. ELECTRICAL CHARACTERISTICS

### 6.1 DC Electrical Characteristics

(Ta=25±2°C, $V_{SS}$=GND=0)

| Item | | Symbol | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|---|
| Supply Voltage | | $V_{DD}$ | 3.0 | 3.3 | 3.6 | V | -- |
| Supply Current | | $I_{DD}$ | 40 | 50 | 60 | mA | Note 2 |
| Input Voltage for logic | L Level | $V_{IH}$ | 0.7 $V_{DD}$ | -- | $V_{DD}$ | V | Note 1 |
| | H Level | $V_{IL}$ | 0 | -- | 0.3 $V_{DD}$ | V | -- |

Note1: Hsync, Vsync, DEN, DCLK, R0~R5, G0~G5, B0~B5
Note2: fV =60Hz , Ta=25°C , Display pattern : All Black

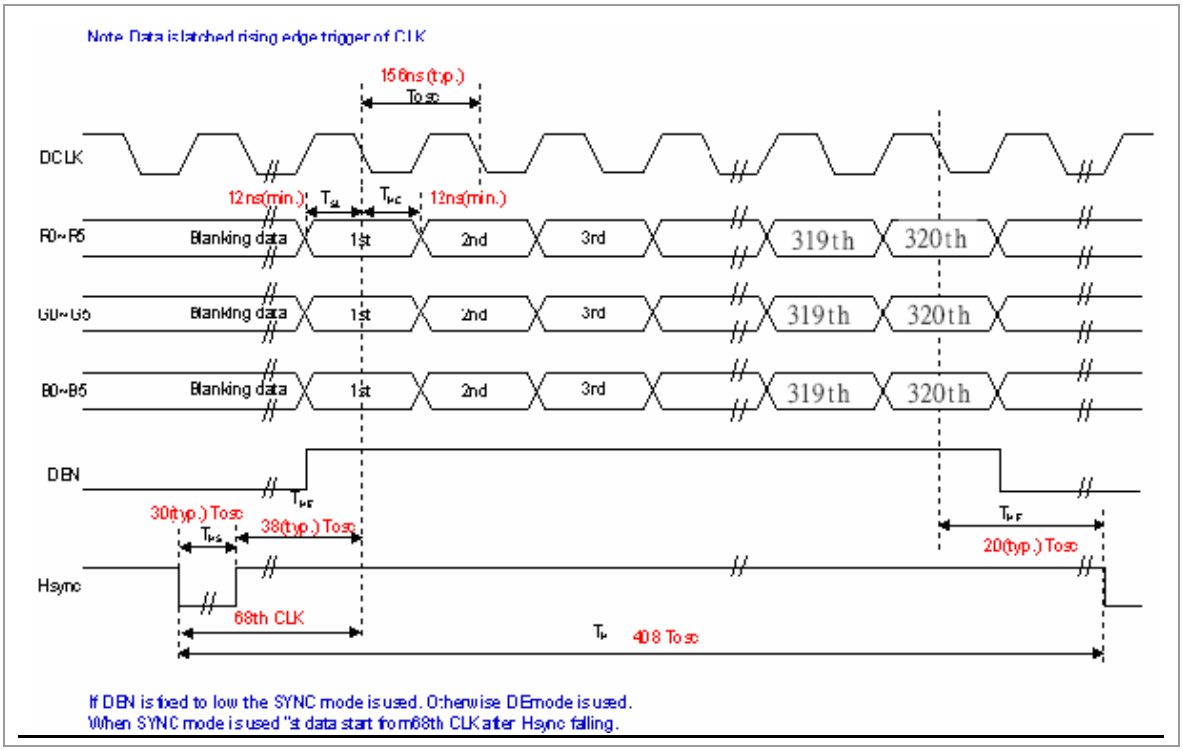
6.2 AC Timing Characteristic of The LCD

6.2.1 Timing Condition

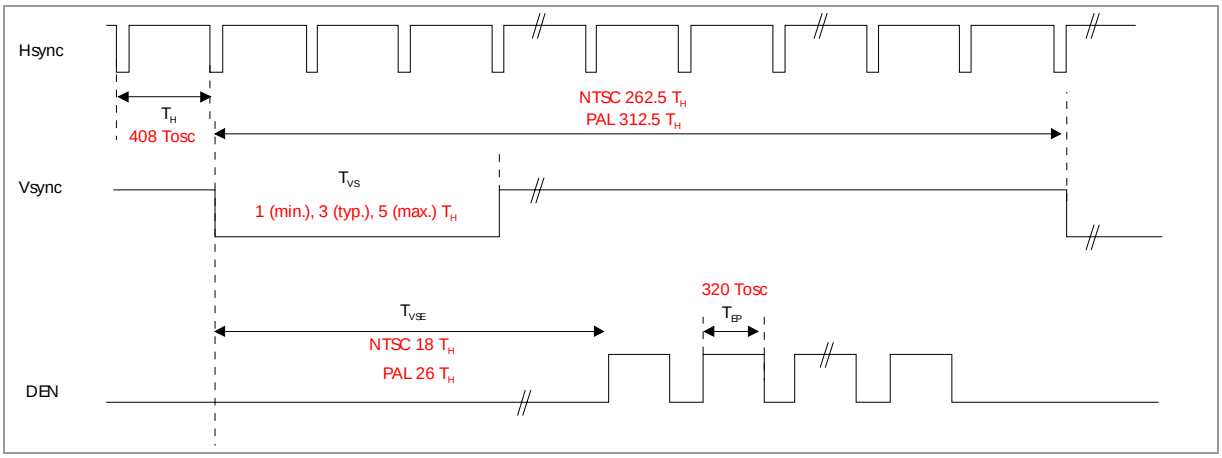
| Signal | Parameter | | Symbol | Min. | Typ. | Max. | Unit. | Remark |
|---|---|---|---|---|---|---|---|---|
| DCLK | DCLK period | | $T_{OSC}$ | -- | 156 | -- | ns | -- |
| | Frequency | | $F_{OSC}$ | -- | 6.4 | -- | MHz | -- |
| | DCLK High plus width | | $T_{CH}$ | -- | 78 | -- | ns | -- |
| | DCLK Low plus width | | $T_{CL}$ | -- | 78 | -- | ns | -- |
| RGB DATA | Data setup time | | $T_{SU}$ | 12 | -- | -- | ns | -- |
| | Data hold time | | $T_{HD}$ | 12 | -- | -- | ns | -- |
| Hsync | Hsync period | | $T_H$ | -- | 408 | -- | $T_{OSC}$ | -- |
| | Hsync pulse width | | $T_{HS}$ | 5 | 30 | -- | $T_{OSC}$ | -- |
| | Back-Parch | | $T_{HB}$ | -- | 38 | -- | $T_{OSC}$ | -- |
| | Front-Parch | | $T_{HF}$ | -- | 20 | -- | $T_{OSC}$ | -- |
| | Hsync rising time | | $T_{Cr}$ | -- | -- | 700 | ns | -- |
| | Hsync falling time | | $T_{Cf}$ | -- | -- | 300 | ns | -- |
| Vsync | Vsync period | NTSC | -- | -- | 262.5 | -- | $T_H$ | -- |
| | | PAL | -- | -- | 312.5 | -- | $T_H$ | -- |
| | Vsync pulse width | | $T_{VS}$ | 1 | 3 | 5 | $T_H$ | -- |
| | Back-Porch | NTSC | $T_{VB}$ | -- | 15 | -- | $T_H$ | -- |
| | | PAL | | -- | 23 | -- | $T_H$ | -- |
| | Display Period | | $T_{VD}$ | -- | 240 | -- | $T_H$ | -- |
| | Front Porch | NTSC | $T_{VF}$ | -- | 4.5 | -- | $T_H$ | -- |
| | | PAL | | -- | 46.5 | -- | $T_H$ | -- |
| | Vsync rising time | | $T_{Vr}$ | -- | -- | 700 | ns | -- |
| | Vsync falling time | | $T_{Vf}$ | -- | -- | 1.5 | µs | -- |
| | Vsync falling to Hsync rising time for odd field | | $T_{HVO}$ | 1 | -- | -- | $T_{OSC}$ | -- |
| | Vsync falling to Hsync falling time for even field | | $T_{HVE}$ | 1 | -- | -- | $T_{OSC}$ | -- |
| DEN | Vsync-DEN time | NTSC | $T_{VSE}$ | -- | 18 | -- | $T_H$ | -- |
| | | PAL | $T_{VSE}$ | -- | 26 | -- | $T_H$ | -- |
| | Hsync-DEN time | | $T_{HE}$ | 36 | 68 | 88 | $T_{OSC}$ | -- |
| | DEN plus width | | $T_{EP}$ | -- | 320 | -- | $T_{OSC}$ | -- |

Note: If DEN is fixed to low, the SYNC mode is used. Otherwise DE mode is used. When SYNC mode is used, 1st data start from 68th CLK after Hsync falling

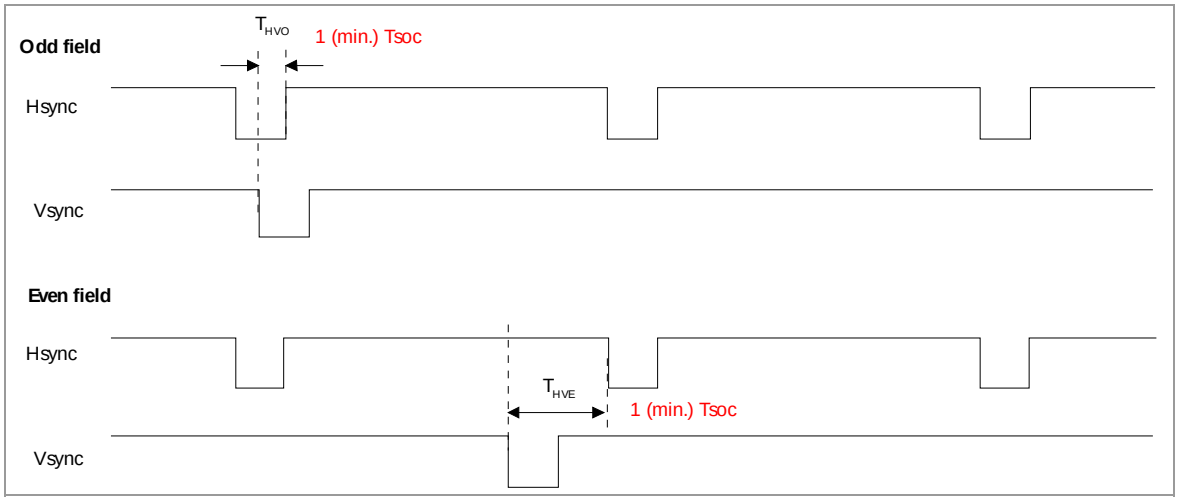
6.2.2 Horizontal Display Timing




6.2.3 Vertical Display Timing



6.2.4 Hsync and Vsyne Timing



## 7. BACKLIGHT SPECIFICATIONS

### 7.1 Absolute Maximum Ratings

Ta=25°C

| Item | Symbol | Maximum rating | Unit | Note |
|---|---|---|---|---|
| Peak Forward Current | $I_{FM}$ | 450 | mA | (1) |
| Reverse Voltage | $V_R$ | 10 | V | -- |
| Power Dissipation | $P_D$ | 3300 | mW | -- |
| Operating Temperature | $T_{OP}$ | -20~70 | ℃ | -- |
| Storage Temperature | $T_{ST}$ | -30~80 | ℃ | -- |

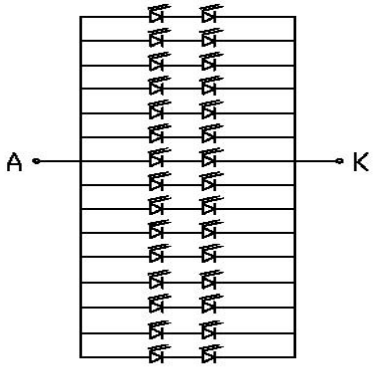
Note (1): Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded.
Functional operation should be restricted to the conditions described under normal operating conditions.

### 7.2 Electrical/Operating Characteristics

Ta = 25°C

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Condition |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | -- | 6.6 | -- | V | Ta=25℃ IF=300mA |
| LED Current | $I_F$ | -- | 300 | -- | mA | |
| Uniformity* | -- | 80 | -- | -- | % | |
| Chromaticity Coordinates | X | 0.26 | 0.29 | 0.32 | -- | |
| | Y | 0.26 | 0.29 | 0.32 | -- | |

*: Uniformity = (Min./Max.) x 100%



## 8. DISPLAYED COLOR AND INPUT DATA

| | | Color & Gray Scale | Data Signal | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Color | | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Red(0) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Green(0) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Blue(0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Red | | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Red(62) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Red(61) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Red(31) | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Red(1) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Red(0) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Green | | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Green(62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Green(61) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Green(31) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Green(1) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Green(0) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blue | | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Blue(62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | Blue(61) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Blue(31) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | | Blue(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| | | Blue(0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

## 9. INSPECTION PROVISION

9.1 Purpose

The Microtips inspection provision provides outgoing inspection provision and its expected quality levelbased on our outgoing inspection of Microtips LCD produces.

9.2 Applicable Scope

The Microtip inspection provision is applicable to the arrangement in regard to outgoing inspection andquality assurance after outgoing.

9.3 Technical Terms

9.3.1 Microtips Technical Terms


9.4 Outgoing Inspection

9.4.1 Inspection Method

MIL-STD-105E Level Ⅱ Regular inspection

9.4.2 Inspection Standard

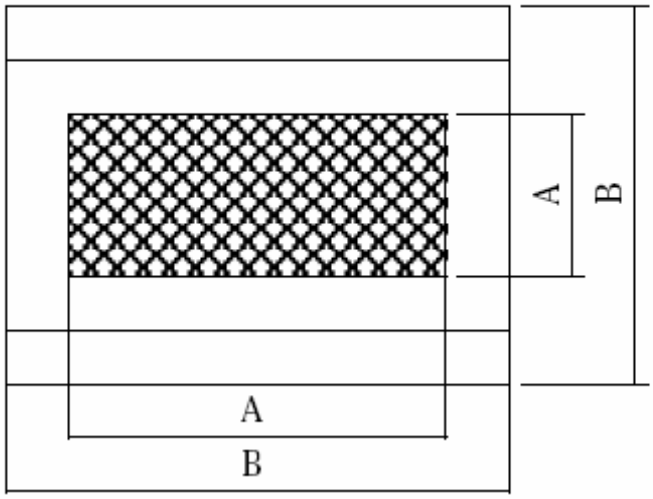
| | Item | | AQL(%) | Remarks |
|---|---|---|---|---|
| Major Defect | Dots | Opens<br>Shorts<br>Erroneous operation | 0.4 | faults which substantially lower the practicality and the initial purpose difficult to achieve |
| | Solder appearance | Shorts<br>Loose | | |
| | Cracks | Display surface cracks | | |

| | | | | |
|---|---|---|---|---|
| | Dimensions | External from Dimensions | 0.4 | |
| Minor Defect | Inside the glass | Black spots | 0.65 | faults which appear to pose almost no obstacle to the practicality, effective use, and operation. |
| | Polarizing plate | Scratches, foreign Matter, air bubbles, and peeling | | |
| | Dots | Pinhole, deformation | | |
| | Color tone | Color unevenness | | |
| | Solder appearance | Cold solder Solder projections | | |

9.4.3 Inspection Provisions

*Viewing Area Definition

Fig. 1




A : Zone Viewing Area

B : Zone Glass Plate Outline

*Inspection place to be 500 to 1000 lux illuminance uniformly without glaring.The distance between luminous source(daylight fluorescent lamp and cool white fluorescentlamp) and sample to be 30 cm to 50 cm.

*Test and measurement are performed under the following conditions, unless otherwise specified.

Temperature 20 ± 15℃
Humidity 65 ± 20%R.H.
Pressure 860~1060hPa(mmbar)

In case of doubtful judgment, it is performed under the following conditions.

Temperature 20 ± 2℃
Humidity 65 ± 5%R.H.
Pressure 860~1060hPa(mmbar)

9.5 Specification for qualitycheck

9.5.1 Electrical characteristics :

| NO. | Item | Criterion |
|---|---|---|
| 1 | Non operational | Fail |
| 2 | Miss operating | Fail |
| 3 | Contrast irregular | Fail |
| 4 | Response time | Within Specified value |

9.5.2 Components soldering :

Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mounting position, etc.

9.5.3 Inspection Standard for TFT panel

The environmental condition of inspection :

The environmental condition and visual inspection shall be conducted as below.

(1) Ambient temperature : 25±5℃
(2) Humidity : 25~75% RH
(3) External appearance inspection shall be conducted by using a single 20W fluorescent lamp or equivalent illumination.
(4) Visual inspection on the operation condition for cosmetic shall be conducted at the distance 30cm or more between the LCD panels and eyes of inspector. The viewing angle shall be 90 degree to the front surface of display panel.
(5) Ambient Illumination: 300~500 Lux for external appearance inspection.
(6) Ambient Illumination: 100~200 Lux for light on inspection.

9.5.4 Inspection Criteria

(1) Definition of dot defect induced from the panel inside

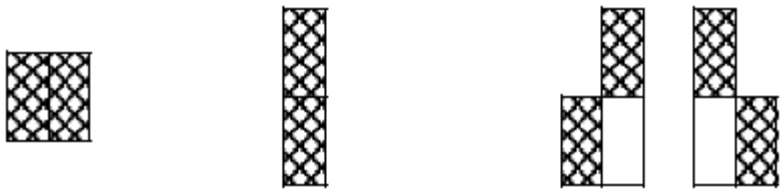
a) The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

b) Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

c) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green , blue picture.

d) 2 dot adjacent = 1pair = 2 dots

Picture:



2 dot adjacent　　2 dot adjacent (vertical)　　2 dot adjacent (slant)

(2) Display Inspection

| NO. | Item | | | Acceptable Count |
|---|---|---|---|---|
| 1 | Dot defect | Bright Dot | Random | N ≦ 2 |
| | | | 2 dots adjacent | N ≦ 0 |
| | | Dark Dot | Random | N ≦ 3 |
| | | | 2 dots adjacent | N ≦ 1 |
| | | Total bright and dark dot | | N ≦ 4 |
| | Functional failure (V-line/ H-line/Cross line etc.) | | | Not allowable |
| | Mura | It's OK if mura is slight visible through 6% ND filter. (Judged by limit sample if it is necessary) | | |
| 2 | Newton ring (touch panel) | Orbicular of interference fringes is not allowed in the optimum contrast within the active area under viewing angle. | | |
| 3 | Distance | Minimum Distance Between Bright Dots | | L ≧ 5mm |
| | | Minimum Distance Between Dark Dots | | L ≧ 5mm |

(3) Appearance inspection

| NO. | Item | Standards |
|---|---|---|
| 1 | Panel Crack | Not allow. It is shown in Fig.1. |
| 2 | Broken CF Non -lead Side of TFT | The broken in the area of W > 2mm is ignored, L is ignored. It is shown in Fig.2. |
| 3 | Broken Lead Side of TFT | FPC lead, electrical line or alignment mark can't be damaged. It is shown in Fig.3. |
| 4 | Broken Corner of TFT at Lead Side | FPC lead. electrical line or alignment mark can't be damaged. It is shown in Fig.4. |
| 5 | Burr of TFT / CF Edge | The distance of burr from the edge of TFT / CF, W ≦ 0.3mm. It is shown in Fig.5. |
| 6 | Foreign Black / White/Bright Spot | (1) 0.15 < D ≦ 0.5 mm, N≦ 4 ; (2) D ≦ 0.15mm, Ignore. It is shown in Fig.6. |
| 7 | Foreign Black / White/Bright Line | (1) 0.05<W≦ 0.1 mm, 0.3<L≦2 mm, N≦ 4.<br>(2) W ≦ 0.05mm and L≦ 0.3mm Ignore.<br>It is shown in Fig.7. |
| 8 | Color irregular | Not remarkable color irregular. |

Fig.5.

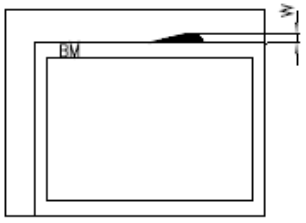
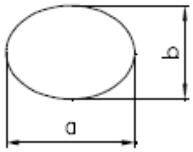



Fig.6.




D=(a+b)/2

Fig.7.

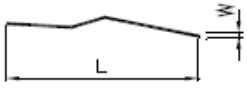
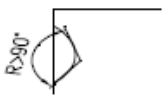



Fig.8.




Notes

1. W : Width
2. L : Length
3. D : Average Diameter
4. N : Count
5. All the angle of the broken must be larger than 90° . It is shown in Fig.8. (R>90° )

9.5.5 External Appearance Defect

<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th></tr>
<tr><td>1</td><td>Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)</td><td>Spots
<table>
<tr><th>Average Diameter (mm):D</th><th>Number of pieces permitted</th></tr>
<tr><td>D≦0.2</td><td>Ignore</td></tr>
<tr><td>0.2<D≦0.3</td><td>5</td></tr>
<tr><td>0.3<D≦0.4</td><td>2</td></tr>
<tr><td>0.4<D</td><td>0</td></tr>
</table>
Number of total pieces is set to within 5 pieces.<br><br>Note that when there are 2 pieces or more, they are not to be concentrated. Set as: Average diameter = (Long diameter + Short diameter)/2</td></tr>
<tr><td>2</td><td>Line</td><td>Lines
<table>
<tr><th>Width(mm):W</th><th>Length(mm): L</th><th>Number of pieces permitted</th></tr>
<tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr>
<tr><td>0.03<W≦0.08</td><td>L≦4</td><td>2</td></tr>
<tr><td>0.08<W≦0.1</td><td>L≦1</td><td>1</td></tr>
</table>
Object exceeding 0.1mm follow the standards of the spots form.<br><br>Diameter of spots = $\frac{\text{Length} + \text{Width}}{2}$ of Line<br><br>Note that when there are 2 pieces or more, they are not to be concentrated.</td></tr>
</table>

<table>
<tr>
<td>3</td>
<td>Air bubbles polarizing plates, and reflection plates</td>
<td>
<table>
<tr><td>Average Diameter (mm):D</td><td>Number of pieces permitted</td><td rowspan="3">Average diameter = (Long diameter + Short diameter)/2</td></tr>
<tr><td>D≦0.05</td><td>Ignore</td></tr>
<tr><td>0.05<D≦0.3</td><td>3</td></tr>
<tr><td colspan="3">Note that when there are 4 pieces or more, they are not to be concentrated.</td></tr>
</table>
</td>
</tr>
<tr>
<td>4</td>
<td>Poarizer Scratch</td>
<td>
Dot Line
<table>
<tr><td>Diameter (Φ) mm</td><td>Acceptable Number</td></tr>
<tr><td>Φ≦0.1</td><td>Ignore</td></tr>
<tr><td>0.1<Φ≦0.2</td><td>1</td></tr>
<tr><td>0.2≦Φ</td><td>0</td></tr>
</table>
Line Defect
<table>
<tr><td>Width : (W) mm</td><td>Length : (L)mm</td><td>Acceptable Number</td></tr>
<tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr>
<tr><td>0.03<W≦0.08</td><td>L≦4</td><td>4</td></tr>
</table>
If the width more than 0.08,must follow the criteria<br>of dot defect.<br>
Diameter of spots = $\frac{\text{Length} + \text{Width}}{2}$ of Line
</td>
</tr>
</table>

NOTICE:

SAFETY

1. If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
2. If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

HANDLING

1. Avoid static electricity which can damage the CMOS LSI.
2. Do not remove the panel or frame from the module.
3. The polarizing plate of the display is very fragile. So, please handle it very carefully.
4. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
5. Do not use ketone solvent & Aromatic solvent. Use a soft cloth soaked with a cleaning Naphtha solvent.

STORAGE

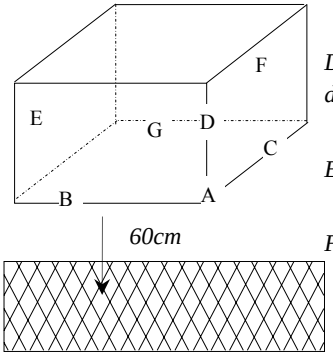
1. Store the panel or module in a dark place where the temperature is 25±5℃ and the humidity is below 65% RH.
2. Do not place the module near organics solvents or corrosive gases.
3. Do not crush, shake, or jolt the module.

TERMS OF WARRANT

1. Acceptance inspection period The period is within one month after the arrival of contracted commodity at the buyer's factory site.
2. Applicable warrant period
   The period is within twelve months since the date of shipping out under normal using and storage conditions.

## 10. RELIABILITY CONDITION

10.1 LCM Reliability Test

| No. | Parameter | Condition |
|---|---|---|
| 1 | High Temperature Operating | 70°C±2°C, 240 hrs (Operation state) |
| 2 | Low Temperature Operating | -20°C±2°C, 240 hrs (Operation state) |
| 3 | High Temperature Storage | 80°C±2°C, 240 hrs |
| 4 | Low Temperature Storage | -30°C±2°C, 240 hrs |
| 5 | Damp Proof Test | 40°C±2°C, 90~95%, 96hrs |
| 6 | Vibration Test | Total fixed amplitude: 1.5mm<br>Vibration Frequency: 10~55Hz<br>One cycle 60 seconds to 3 direction of X, Y, Z each 15 minutes. |
| 7 | Shock Test | To be measured after dropping from 60cm high on the concrete surface in packing state.<br>  <br>*Dropping method corner dropping*<br>*A corner: once*<br>*Edge dropping*<br>*B, C, D edge: once*<br>*Face dropping*<br>*E, F, G face: once* |

Notes: 1. No dew condensation to be observed.
2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.
3. Vibration test will be conducted to the product itself without putting I in a container.

10.2 Touch panel Reliability

| No. | Items | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| 1 | Activation Force | 100 | 130 | 150 | g | 1. within active area.<br>2. R8.0mm polyacetal pen or finger. |
| 2 | Surface Hardness | 3 | -- | -- | H | Judgment ref. JIS-K5600 |
| 3 | Durability (Writing Life) | 100,000 | -- | -- | characters | 1. within active area.<br>2. R0.8mm polyacetal pen.<br>3. Load: 150g<br>4. Speed: 60mm/sec |
| 4 | Durability (Hitting Life) | 1,000,000 | -- | -- | touches | 1. within active area.<br>2. R0.8mm polyacetal pen.<br>3. Load: 250g<br>4. Frequency: 3 times/sec |

## 11. PRECAUTIONS

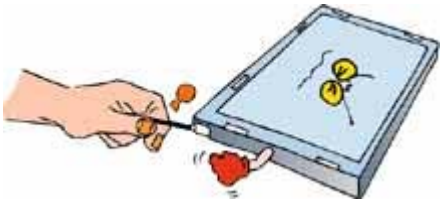
11.1 Operation

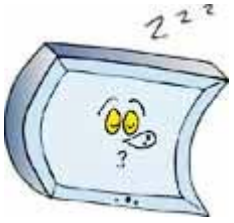
Burn-in sometimes happens when the same character was displayed at along time. Therefore, to prevent Burn-in, it is recommended to set up a Screen-saver function.

11.2 Safety

The liquid crystal in the LCD is poisonous, DO NOT put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

11.3 Handling

| | |
|---|---|
|  | a. The LCD module shall be installed flat, without twisting or bending.<br>b. COF or FPC has narrow pattern width, so easily become open circuit by external force. DO NOT apply pressure to COF or FPC especially in bending area. |
|  | c. To avoid damage in appearance or malfunction, DO NOT subject the module to mechanical shock or to excessive force on its surface. |
|  | d. The polarizer attached to the display is very easy to be damaged, handle it with care to avoid scratching. |
|  | e. To avoid contamination on the display surface, DO NOT touch the display surface with bare hands.<br>f. Provide a space so that the LCD module does not come into contact with other components. |

| | |
|---|---|
|  | g. To protect the LCD panel from external pressure, put covering glass (acrylic board or similar board) to keep appropriate space between them. |
|  | h. Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur. |
|  | i. Property of semiconductor devices may be affected when they are exposed to light possibly resulting in malfunctioning of the ICs. To prevent such malfunctioning of the ICs, your design and mounting layout done are so that the IC is not exposed to light in actual use. |
|  | j. Strong light exposure causes degradation of color filter. It may not recover |
|  | k. DO NOT contact with water to avoid Metal corrosion.<br>l. When it is not in use, the screen must be turned off or the pattern must be frequently changed by a screen saver. If it displays the same pattern for a long period of time, brightness down/image sticking may develop due to the LCD structure. |
|  | m. Never disassemble LCD product under any circumstances. If unqualified operators or users assemble the product after disassembling it, it may not function or its operation may be seriously affected. |

11.4 Static electricity

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge.

| | |
|---|---|
|  | a. The LCD module shall be installed flat, without twisting or bending. Ground soldering iron tips, tools and testers when they operate.<br>b. Ground your body when handling the products.<br>c. DO NOT apply voltage to the input terminal without applying power supply.<br>d. DO NOT apply voltage that exceeds the absolute maximum rating.<br>e. Store the products in an anti-electrostatic container.<br>f. Peel off protect tape, attached to polarizer, slowly to minimize ESD damage. |

11.5 Storage

| | |
|---|---|
|  | Store the products in a dark place at +5 ~ +25 degree C, low humidity (50%RH or less).<br>DO NOT store the products in an atmosphere containing organic solvents or corrosive gases. |

11.6 Cleaning

| | |
|---|---|
|  | a. DO NOT wipe the polarizer with dry cloth, as it might cause scratch.<br>b. Wipe the polarizer with a soft cloth soaked with petroleum IPA, other chemical might damage. |

11.7 Waste

| | |
|---|---|
|  | When dispose of LCD module, manage it at the production waste according to the relevant laws and regulations. |

## 12. WARRANTY

This product has been manufactured to your company's specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

1 13 months guarantee starts from the date code.

2 We cannot accept responsibility for any defect, which may arise from additional manufacturing of the product (including disassembly and reassembly), after product delivery.

3 We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.

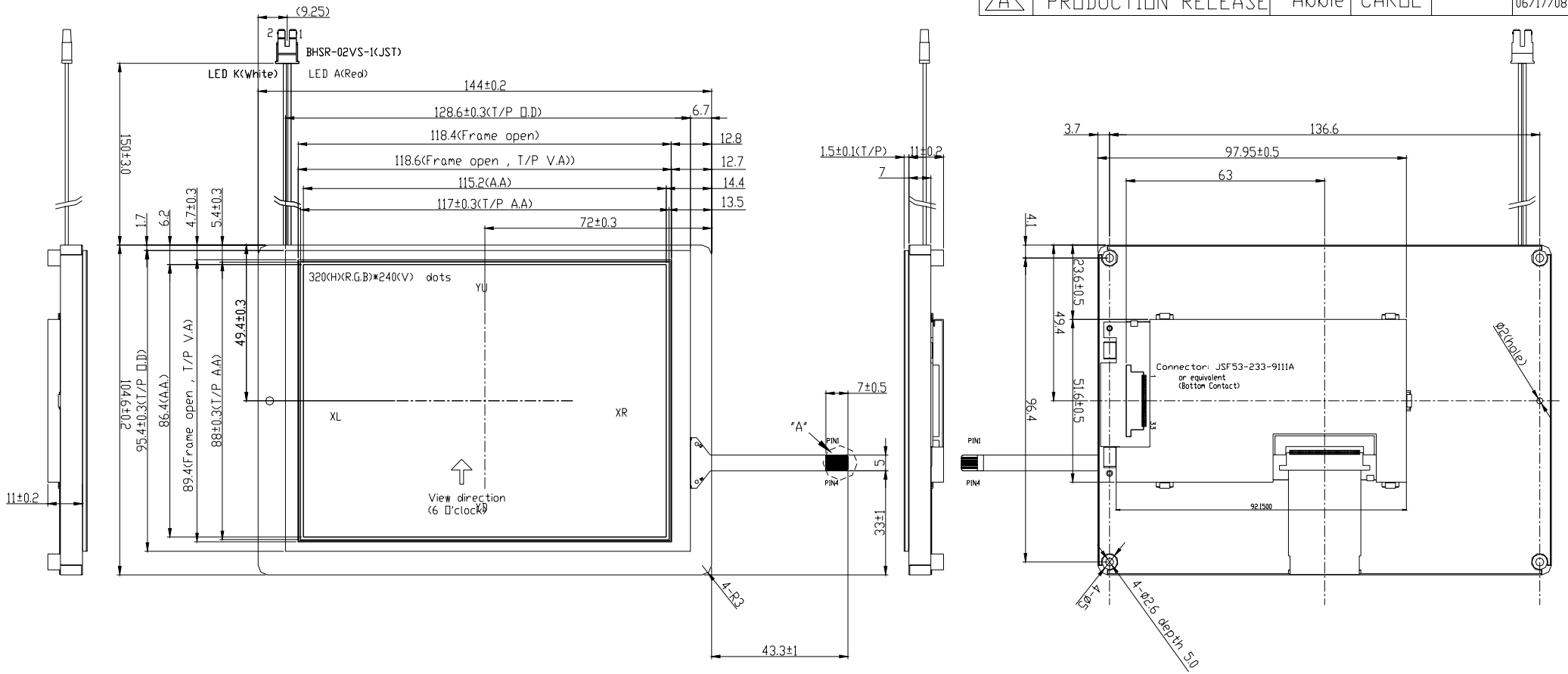
4 We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed your company's acceptance inspection procedures.

5 We cannot accept responsibility for industrial property, which may arise through the use of your product, with exception to those issues relating directly to the structure or method of manufacturing of our product. Microtips-origin longer than one year from Microtips production.

## 13. DIMENSIONAL OUTLINES

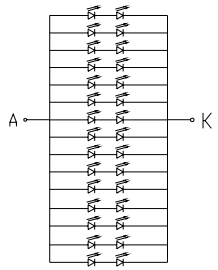
See next page…..

| REV. | DESCRIPTION | DRAWN | CHECK | APP'D | DATE |
|---|---|---|---|---|---|
| A | PRODUCTION RELEASE | Abbie | CAROL | | 06/17/08' |




PIN ASSIGNMENT:

| | | | |
|---|---|---|---|
| 1.DGND | 11.R5 | 21.B1 | 31.UDC |
| 2.DCLK | 12.GND | 22.B2 | 32.NC |
| 3.HSYNC | 13.G0 | 23.B3 | 33.GND |
| 4.VSYNC | 14.G1 | 24.B4 | |
| 5.GND | 15.G2 | 25.B5 | |
| 6.R0 | 16.G3 | 26.GND | |
| 7.R1 | 17.G4 | 27.DEN | |
| 8.R2 | 18.G5 | 28.VDD | |
| 9.R3 | 19.GND | 29.VDD | |
| 10.R4 | 20.B0 | 30.LRC | |




BL Circuit Diagram

Backlight:Test condition:IF=300mA(定電流),VF=6.6V(TYP)

| PIN ASSIGNMENT | |
|---|---|
| PIN NO. | DESIGNATION |
| 1 | YU |
| 2 | XR |
| 3 | YD |
| 4 | XL |

| NO. | PART NAME | Q'TY | DATE: | MATERIAL | FINISH |
|---|---|---|---|---|---|
| | MTF-T057AMSLP-V4 | | 06/17/08' | | |

| DRAWN | CHECK | APP'D | UNIT:MM | SCALE: 1 / 1 | PRODUCT: MTF-T057AMSLP-V4 |
|---|---|---|---|---|---|
| Abbie | Carol | | | UNLESS OTHERWISE SPECIFIED TOLERANCE ON FRACTIONS DECIMALS ANGLES 0.20 0.5° | DWG NO.: FT057AMSLP0-V4 |
| | | | | | FILE: DWG\Design\NPD\MTF\MTF-T057AMSLP-V4\2D |
| | | | | | SHEET 1 / 1 Rev: A |

Microtips Technology

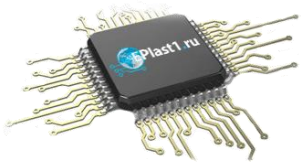
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.