

APPROVAL SHEET

承认书

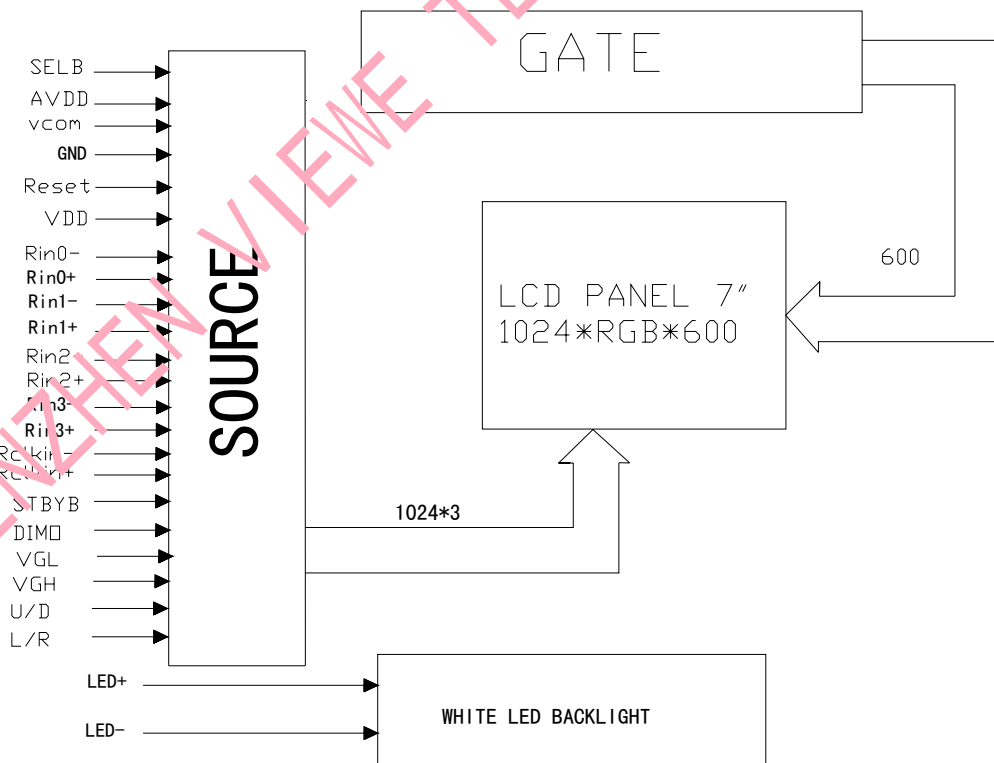
| | |
|----------------------------------|---|
| Customer 客户名称 | |
| Part NO. 产品型号 | UEW070WS-RB40-L034 |
| Product type 产品内容 | Mode: Transmissive type .Normally white. TFT LCD Module LCD Module: Graphic 1024RGB*600Dot-matrix |
| Remarks 备注栏 | <input type="checkbox"/> APPROVAL FOR SEPCIFICATIONS ONLY <input checked="" type="checkbox"/> APPROVAL FOR SEPCIFICATIONS AND SAMPLE |
| Signature by Customer: 客户确认签章 | |

| Issued by | Checked by | Approved by |
|-----------|------------|-------------|
| | | |

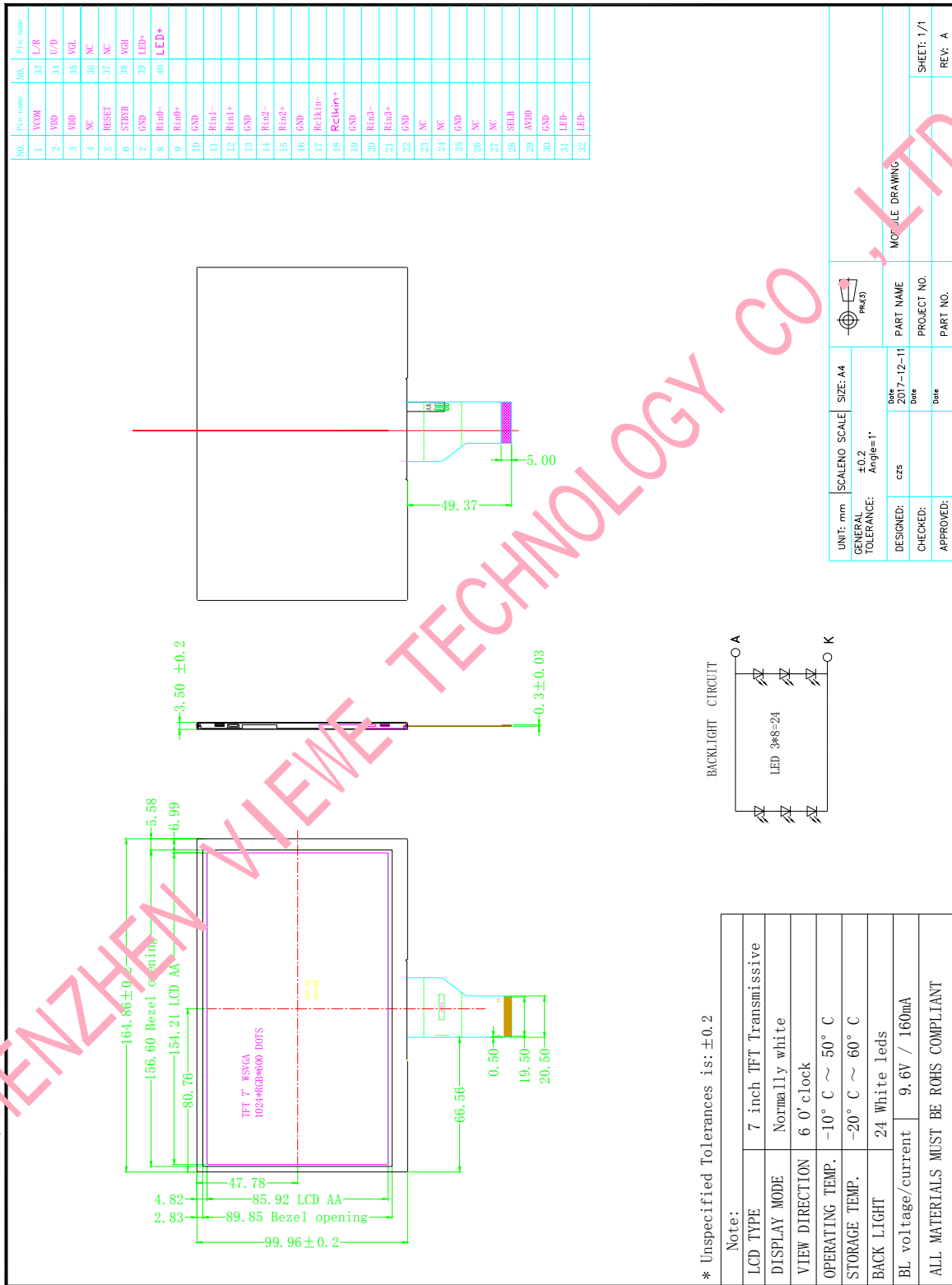
1. PHYSICAL DATA

| Item | Contents | Unit |
|---------------------|----------------------------|-----------------|
| LCD type | TFT TRANSMISSIVE | --- |
| Viewing direction | 6 | o'clock |
| Module size (W×H×T) | 165 × 100 × 3.5 | mm ³ |
| Active area(W×H) | 154.2144×85.92 | mm |
| Number of dots(W×H) | 1024(RGB) × 600 | dots |
| Pixel Pitch(W×H) | 0.1506×0.1432 | mm |
| Driver IC | EK79001 | --- |
| Colors | 16.7M | --- |
| Backlight Type | 24 white leds 9.6V /160.mA | --- |
| Interface Type | LVDS | --- |

2. BLOCK DIAGRAM



3. Mechanical Dimension



4. Pin Descriptions

| Pin No. | Symbol | Functional | Notes |
|---------|---------|--|-------|
| 1 | VCOM | Common Voltage | |
| 2~3 | VDD | Power Supply for digital circuit | |
| 4 | NC | No connection | |
| 5 | RESET | Global reset pin | |
| 6 | STBYB | Standby mode, Normally pulled high | |
| 7 | GND | Ground | |
| 8 | Rin0- | -LVDS differential data input | |
| 9 | Rin0+ | +LVDS differential data input | |
| 10 | GND | Ground | |
| 11 | Rin1- | -LVDS differential data input | |
| 12 | Rin1+ | +LVDS differential data input | |
| 13 | GND | Ground | |
| 14 | Rin2- | -LVDS differential data input | |
| 15 | Rin2+ | +LVDS differential data input | |
| 16 | GND | Ground | |
| 17 | RclkIN- | -LVDS differential clock input | |
| 18 | RclkIN+ | +LVDS differential clock input | |
| 19 | GND | Ground | |
| 20 | Rin3- | -LVDS differential data input | |
| 21 | Rin3+ | +LVDS differential data input | |
| 22 | GND | Ground | |
| 23-24 | NC | No connection | |
| 25 | GND | Ground | |
| 26 | NC | No connection | |
| 27 | NC | No connection | |
| 28 | SELB | 6bot/8bit mode select , L=8 BIT , H=6BIT | |
| 29 | AVDD | Power for Analog Circuit | |
| 30 | GND | Ground | |
| 31-32 | LED- | LED Cathode | |
| 33 | L/R | Horizontal inversion | |
| 34 | U/D | Vertical inversion | |
| 35 | VGL | Gate OFF Voltage | |
| 36 | NC | No connection | |
| 37 | NC | No connection | |
| 38 | VGH | Gate ON Voltage | |
| 39-40 | LED+ | LED Anode | |

5. ABSOLUTE MAXIMUM RATINGS

(GND=AGND=0V)

| Parameter | Symbol | Min | Max | Unit |
|-----------------------|------------------|------|--------|------|
| Power supply1 | V _{DD} | -0.5 | +3.96 | V |
| Power supply2 | Avdd | -0.5 | +13.85 | V |
| Operating temperature | T _{OPR} | -10 | 50 | °C |
| Storage temperature | T _{STG} | -20 | 60 | °C |

Input voltage for BOE LCD at temperature 25°C

| | |
|------|------|
| VGH | 18V |
| VGL | -6V |
| AVDD | 9.6V |
| VCOM | 3.8V |

Note: Please adjust Vcom to make the flicker level be minimum

6. DC ELECTRICAL CHARACTERISTICS FOR LVDS

LVDS DC characteristic

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|------------|--------------|---------|--------------------|------|--------------------------------|
| Differential input high threshold voltage | RxVTH | | | +0.1V | V | RxVCM=1.2V |
| Differential input low threshold voltage | RxVTL | -0.1 | | | V | |
| Input voltage range(single-end) | RxVIN | 0 | | 2.4 | V | |
| Differential input common mode voltage | RxVCM | $ V_{ID} /2$ | | $2.4 - V_{ID} /2$ | V | |
| Differential input voltage | $ V_{ID} $ | 0.2 | | 0.6 | V | |
| Differential input leakage current | RxVTH | -10 | | +10 | V | |
| LVDS Digital Operating Current | Iddlvds | - | 40(TBD) | 50 | mA | Fclk=65Mhz, VDD=3.3V |
| LVDS Digital Standby Current | Istlvds | - | 10(TBD) | 30 | uA | Clock & all functions are stop |

7. LVDS MODE AC ELECTRICAL CHARACTERISTICS

(Detail please refer IC data sheet)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------|--------|--|------|------------------|------|------|
| Clock Frequency | RxFCLK | | 20 | - | 71 | MHz |
| Input data skew margin | TRSKM | $ V_{ID} =400mV$ RxVCM=1.2V RxFCLK=71MHz | 500 | | | ps |
| Clock High Time | TLVCH | | | $4/(7 * RxFCLK)$ | | ns |
| Clock Low Time | TLVCL | | | $3/(7 * RxFCLK)$ | | ns |
| PLL wake-up-time | TenPLL | | | | 150 | us |

8. Data input format for LVDS

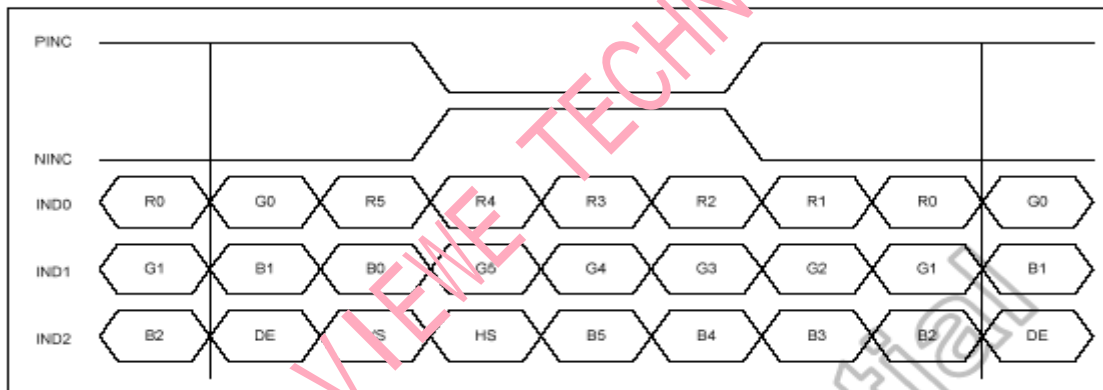
8.1 Timer characteristic

DE mode

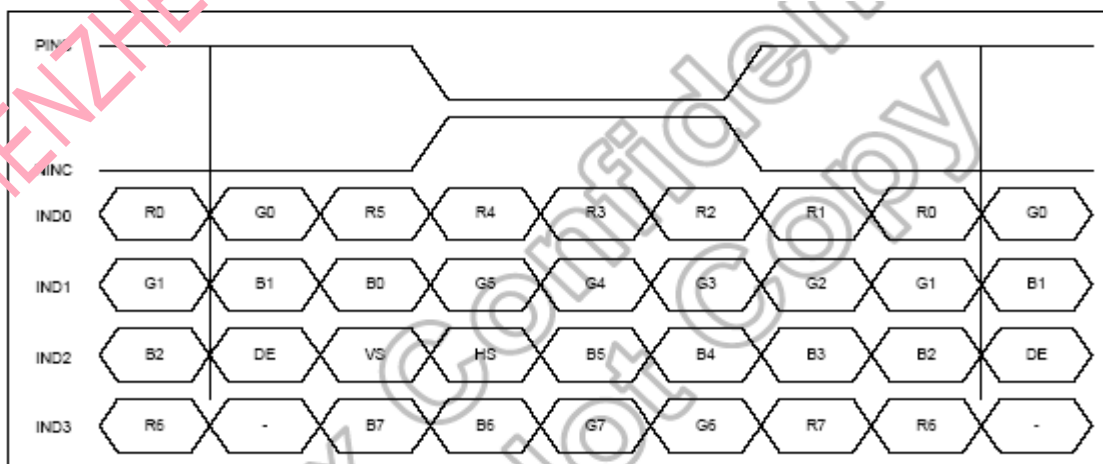
DE mode

| Parameter | Symbol | Value | | | Unit |
|---------------------------------|----------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| DCLK frequency @Frame rate=60hz | fclk | 40.8 | 51.2 | 67.2 | Mhz |
| Horizontal display area | thd | 1024 | | | DCLK |
| HSYNC period time | th | 1114 | 1344 | 1400 | DCLK |
| HSYNC blanking | thb+thfp | 90 | 320 | 375 | DCLK |
| Vertical display area | tvd | 600 | | | H |
| VSYNC period time | tv | 610 | 635 | 800 | H |
| VSYNC blanking | tvb+tvfp | 10 | 35 | 200 | H |

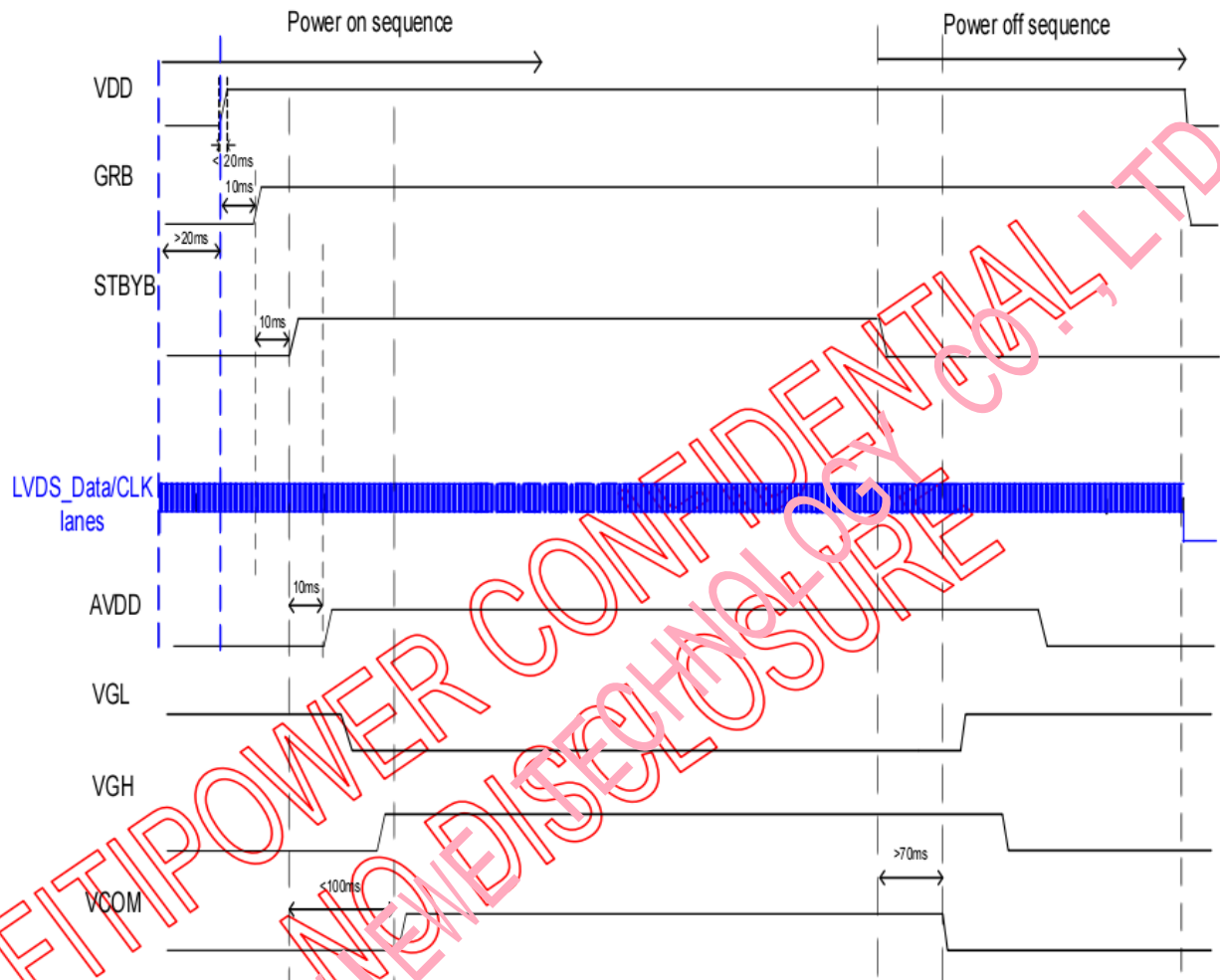
8.2 For 6-Bit LVDS input



8.3 For 8-bit LVDS input



8.4 Power on/off timing sequence for LVDS interface



9. Backlight Characteristic

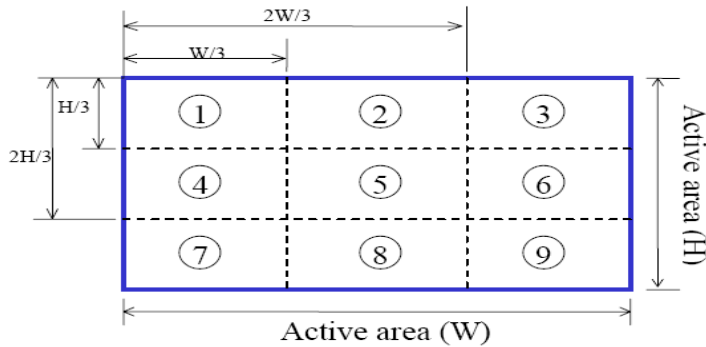
| Item | Symbol | Min | Typical | Max | Unit |
|-----------------------------------|-----------|-----|---------|-----|------|
| LED module Forward voltage | V_{LED} | -- | 9.6 | -- | V |
| LED module current | I_{LED} | -- | 160 | -- | mA |
| L/G Surface Luminance ★1 | L_S | -- | tbd | -- | mcD |
| LCM Surface brightness uniform ★2 | L_D | 80 | -- | -- | % |

★ 1 Test condition is:

- Center point on active area.
- Best Contrast.

★2 Uniform measure condition:

- (1) Measure 9 point. Measure location show below;
- (2) $\text{Uniform} = (\text{Min. brightness} / \text{Max. brightness}) * 100\%$
- (3) Best Contrast.



10. Electro-optical Characteristics

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark |
|--------------------------|-------|----------------|--------------|------|------|------|----------------------|--------|
| Viewing angle range | Hor. | $\phi 3$ | $CR \geq 10$ | 60 | 70 | | Deg. | |
| | | $\phi 9$ | | 60 | 70 | Deg. | | |
| | Ver. | $\phi 12$ | | 50 | 60 | Deg. | | |
| | | $\phi 6$ | | 60 | 70 | Deg. | | |
| Color gamut (C light) | | | | 50 | | % | | |
| Luminance Contrast ratio | T (%) | $\phi 0^\circ$ | 600 | 800 | | | 200cd/m ² | |
| Response Time | TRT | Temp=25° C | | 25 | 40 | ms | | |

11. Reliability

11.1 Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal

11.2 Test condition

| NO. | ITEM | CONDITION | CRITERION |
|-----|--|-------------------------------|---|
| 1 | High Temperature Non-Operating Test | 60°C*240Hrs | 。 No Defect Of Operational Function In Room Temperature Are Allowable |
| 2 | Low Temperature Non-Operating Test | -20°C*240Hrs | |
| 3 | High Temperature/Humidity Non Operating Test | 60°C*90%RH*240Hrs | |
| 4 | High Temperature Operating Test | 50°C*240Hrs | 。 IDD of LCM in Pre-and Post-Test Should Follow Specification |
| 5 | Low Temperature Operating Test | -10°C*240Hrs | |
| 6 | Thermal Shock Test | -10 °C (30Min)– 50 °C (30Min) | |
| | | *10CYCLES | |

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

12. Inspection standards

1. AQL(Acceptable Quality Level)

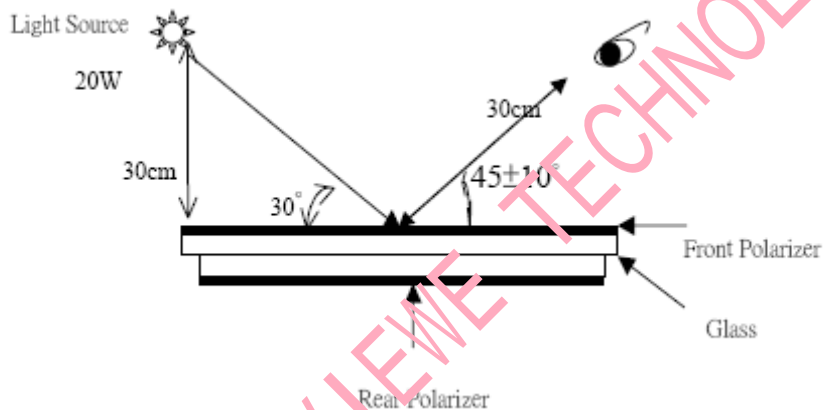
AQL of major and minor defect.

| | MAJOR DEFECT | MINOR DEFECT |
|-----|--------------|--------------|
| AQL | 0.65 | 1.5 |

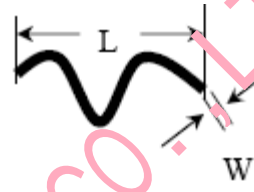
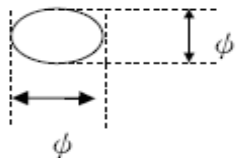
2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is 1000 ± 200 . (Darkroom's lux: 100 ± 50), About an angle of incidence 30° , a distance of 30 cm with an angle of $45 \pm 10^\circ$ to check the products without uncovering the film!

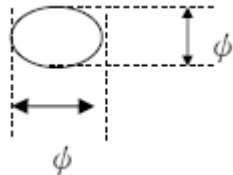
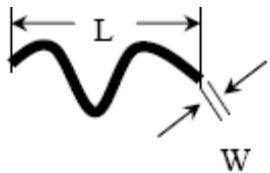
(As shown below)



3. Inspection item and criteria
3.1 Visual inspection criterion in immobility
3.1.1 LCD appearance defect (View area)

| NO | Defect item | Criteria | | Remark |
|----|---|--|-----------|--|
| | | Specification | Allowable | |
| 1 | Fiber、glass cratch、polarizer scratch/folded (minor defect) | $W \leq 0.03\text{mm}$ | disregard | note1: L: Length, W: Width note2: disregard if out of AA  |
| | | $0.03\text{mm} < W \leq 0.05\text{mm};$ $L \leq 3.0\text{mm}$ | 2 | |
| | | $0.05\text{mm} < W \leq 0.1\text{mm};$ $L \leq 3.0\text{mm}$ | 1 | |
| | | $W > 0.1\text{mm}; L > 3.0\text{mm}$ | 0 | |
| | | | | |
| 2 | Polarizer bubble、 concave and convex (minor defect) | $\phi \leq 0.2\text{mm}$ | disregard | note1: $\phi = (L+W)/2$, L: Length, W: Width note2: disregard if out of AA |
| | | $0.2\text{mm} < \phi \leq 0.3\text{mm}$ | 2 | |
| | | $0.3\text{mm} < \phi \leq 0.5\text{mm}$ | 1 | |
| | | $0.5\text{mm} < \phi$ | 0 | |
| 3 | Black dots、dirty dots、 impurities、eye winker (minor defect) | $\phi \leq 0.15\text{mm}$ | disregard | note2: disregard if out of AA  |
| | | $0.15\text{mm} < \phi \leq 0.25\text{mm}$ | 2 | |
| | | $0.25\text{mm} < \phi \leq 0.3\text{mm}$ | 1 | |
| | | $0.3\text{mm} < \phi$ | 0 | |
| 4 | Polarizer prick (minor defect) | $\phi \leq 0.1\text{mm}$ | disregard | note1: $\phi = (L+W)/2$, L=Length, W=Width note2: the distance between two dots > 5mm |
| | | $0.1\text{mm} < \phi \leq 0.25\text{mm}$ | 3 | |
| | | $\phi > 0.25\text{mm}$ | 0 | |

3.2 Electrical criteria

| NO | Defect item | Criteria | Remark | |
|----|---|---|-------------------|---|
| 1 | No display (major defect) | No display 【Reject】 | | |
| 2 | Missing line (major defect) | Missing line 【Reject】 | | |
| 3 | Seg-com light and dark (major defect) | Seg-com light and dark 【Reject】 | ND filter 2% test | |
| 4 | No display in immobility (major defect) | No display in immobility 【Reject】 | | |
| 5 | Flicker of Pattern (major defect) | Flicker of Pattern 【Reject】 | | |
| 6 | Mura (major defect) | ND filter 2% test | | |
| 7 | Over current (major defect) | Over current 【Reject】 | | |
| 8 | Voltage out of specification (major defect) | Voltage out of specification 【Reject】 | | |
| 9 | Pattern blur, error code (major defect) | Pattern blur, error code 【Reject】 | | |
| 10 | Dark light, Flicker (major defect) | Dark light, Flicker 【Reject】 | | |
| 11 | Black/white dots、Dirty dots、eye winker (major defect) | Specification | Allowable | Note1:disregard if out of AA  |
| | | $\phi \leq 0.15\text{mm}$ | disregard | |
| | | $0.15\text{mm} < \phi \leq 0.25\text{mm}$ | 2 | |
| | | $0.25\text{mm} < \phi \leq 0.3\text{mm}$ | 1 | |
| | $0.3\text{mm} < \phi$ | 0 | | |
| 12 | Fiber, glass clutch, Polarizer scratch/forded (major defect) | $W \leq 0.03\text{mm}$ | disregard | Note1:L: Length, W: Width Note2: disregard if out of AA  |
| | | $0.03\text{mm} < W \leq 0.05\text{mm}$ $L \leq 3.0\text{mm}$ | 2 | |
| | | $0.05\text{mm} < W \leq 0.1\text{mm}$ $L \leq 3.0\text{mm}$ | 1 | |
| | | $W > 0.1\text{mm}; L > 3.0\text{mm}$ | 0 | |

13.Precautions for using LCD modules.

13.1 Safety

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

13.2 Storage Conditions

- (4) Store the panel or module in a dark place where the temperature is $23 \pm 5^{\circ}\text{C}$ and the humidity is below $45 \pm 20\% \text{RH}$.
- (5) Store in anti-static electricity container.
- (6) Store in clean environment, free from dust, active gas, and solvent.
- (7) Do not place the module near organics solvents or corrosive gases.
- (8) Do not crush, shake, or jolt the module.

13.3 Handling Precautions

- (9) Avoid static electricity, which can damage the CMOS LSI.
- (10) The polarizing plate of the display is very fragile, please handle it very carefully.
- (11) Do not give external shock.
- (12) Do not apply excessive force on the surface.
- (13) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (14) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (15) Do not operate it above the absolute maximum rating.
- (16) Do not remove the panel or frame from the module.

13.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.