



深圳市勋瑞光电科技有限公司

Xunrui Shenzhen Optoelectronics Technology Co., Ltd.



CERT. No. QAC0946535 (ISO9001) CERT. No. HKG002005 (ISO14001)

Product Specification

Customer: _____

Model Name: **H20LQ 046A0**

Date: _____

Version: _____

Preliminary Specification

Final Specification

For Customer's Acceptance

| Approved by | Comment |
|-------------|---------|
| | |

| Approved by | Reviewed by | Prepared by |
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Contents

| | |
|--|----|
| 1.Record of Revision..... | 3 |
| 2 .General Specifications..... | 4 |
| 3 .Input/Output Terminals | 5 |
| 4. Absolute Maximum Ratings | 6 |
| 5 .Electrical Characteristics | 6 |
| 6 .Interface Timing..... | 7 |
| 7. Optical Characteristics | 11 |
| 8 . Environmental / Reliability Tests | 14 |
| 9. Mechanical Drawing..... | 15 |
| 1 0.Packing..... | 15 |
| 11. Precautions For Use of LCD modules | 16 |



2 General Specifications

| | Feature | Spec |
|-----------------|------------------------|-----------------|
| Characteristics | LCD Size | 2 inch |
| | Display Format | 320 (RGB) × 240 |
| | Interface | MCU |
| | Color Depth | 262K |
| | Technology type | a-Si |
| | Display Spec. | |
| | Display Mode | Normally White |
| | Driver IC | ILI9342C |
| | Surface Treatment | Haze 20% |
| | Viewing Direction | 12 O'clock |
| | Gray Viewing Direction | 6 O'clock |
| Mechanical | LCM (W x H x D) (mm) | 46.1*40.96*2.53 |
| | Active Area(mm) | 40.8x 30.6 |
| | With /Without TSP | Without TSP |
| | Weight (g) | TBD |
| | LED Numbers | 2 LEDs |

Note 1: Viewing direction is following the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5%



3 Input/Output Terminals

| No. | Symbol | Description |
|-------|--------|---------------------------------------|
| 1 | GND | Ground |
| 2 | IOVCC | Power supply for logic operation 1.8V |
| 3 | VCC | System power supply 2.8V |
| 4 | DB0 | Data bus |
| 5 | DB1 | Data bus |
| 6 | DB2 | Data bus |
| 7 | DB3 | Data bus |
| 8 | DB4 | Data bus |
| 9 | DB5 | Data bus |
| 10 | DB6 | Data bus |
| 11 | DB7 | Data bus |
| 12 | GND | Ground |
| 13 | RESET | Reset Signal pin ("Low" is enable) |
| 14 | CS | Chip select |
| 15 | RS | Serial data select |
| 16 | WR | Write signal |
| 17 | RD | Read signal |
| 18 | TE | TE PIN |
| 19 | GND | Ground |
| 20 | LEDA | LED backlight anode |
| 21 | LEDK | LED backlight cathode |
| 22 | VGL | VGL power supply |
| 23 | VGH | VGH power supply |
| 24~40 | NC | |



4 Absolute Maximum Ratings

| Item | Symbol | MIN | MAX | Unit | Remark |
|-----------------------|-----------|------|--------------|------|--------|
| Supply Voltage | V_{DD} | -0.3 | 5.0 | V | |
| Input Signal Voltage | V_{in} | -0.3 | $V_{DD}+0.3$ | V | |
| Logic Output Voltage | V_{OUT} | -0.3 | $V_{DD}+0.3$ | V | |
| Operating Temperature | T_{OPR} | -10 | 60 | °C | |
| Storage Temperature | T_{STG} | -20 | 70 | °C | |

5 Electrical Characteristics

5.1 Operating conditions:

| Parameter | Symbol | MIN | TYP | MAX | Unit | Remark |
|-----------------------------|----------|-----|------|-----|------|--------|
| Power Voltage | V_{CC} | 2.6 | 2.8 | 3.4 | V | |
| Driver supply voltag | VGH-VGL | | 0~30 | | | |

5.2 Driving Backlight

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|-------------------|----------|-----|-----|-----|------|--------------------|
| LED current | I_F | - | 40 | 50 | mA | Note 1 Note 2,3 |
| Power Consumption | | | | | mW | |
| LED Voltage | V_F | | 3.2 | | V | |
| LED Life Time | W_{BL} | - | TBD | - | Hr | |

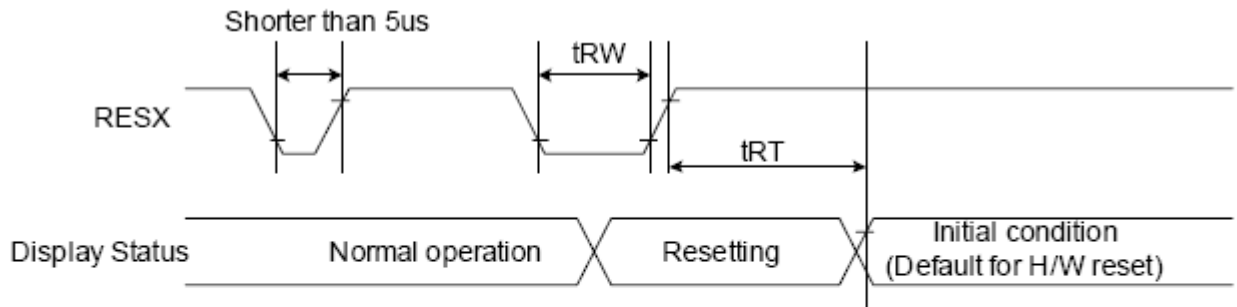
Note 1 : There are 1 Groups LED

Note 2 : $T_a = 25^\circ\text{C}$

Note 3 : Brightness to be decreased to 50% of the initial value



6.2 Reset Timing



| Signal | Symbol | Parameter | Min | Max | Unit |
|--------|--------|----------------------|-----|---------------------|------|
| RESX | tRW | Reset pulse duration | 10 | | uS |
| | tRT | Reset cancel | | 5 (note 1,5) | mS |
| | | | | 120 (note 1,6,7) | mS |

Note 1: The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NV memory to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

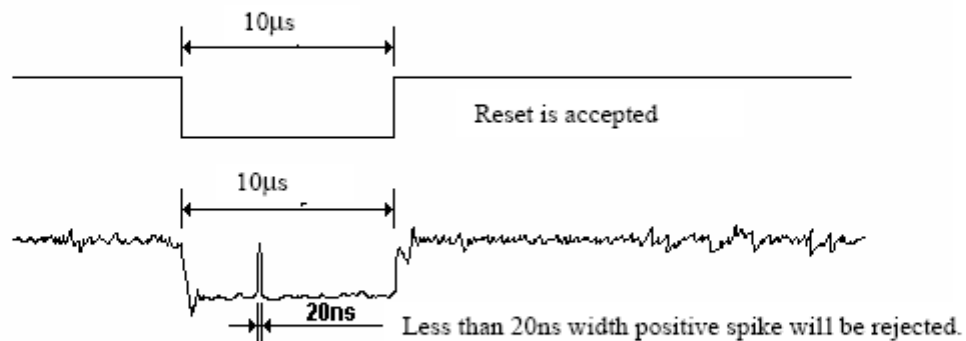
Note 2: Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below: -

| RESX Pulse | Action |
|----------------------|----------------|
| Shorter than 5us | Reset Rejected |
| Longer than 10us | Reset |
| Between 5us and 10us | Reset starts |



Note 3: During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out-mode. The display remains the blank state in Sleep In-mode.) And then return to Default condition for Hardware Reset.

Note 4: Spike Rejection also applies during a valid reset pulse as shown below:



Note 5: When Reset applied during Sleep In Mode.

Note 6: When Reset applied during Sleep Out Mode.

Note 7: It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.



7 Optical Characteristics

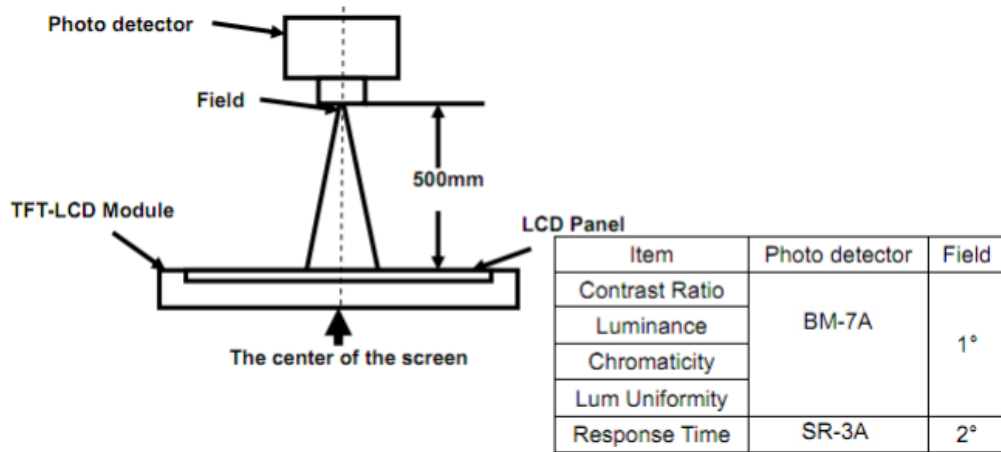
| Items | Symbol | Condition | Min. | Typ. | Max. | Unit | Remark | |
|----------------|------------|------------------------|-------|-------|-------|---------|-----------------|-----------------|
| Viewing angles | θ_T | Center CR \geq 10 | | 30 | - | Degree. | Note2 | |
| | θ_B | | | 45 | - | | | |
| | θ_L | | | 45 | - | | | |
| | θ_R | | | 45 | - | | | |
| Contrast Ratio | CR | $\Theta = 0$ | - | 500 | - | - | Note1, Note3 | |
| Response Time | T_{ON} | 25°C | - | 20 | 35 | ms | Note1, Note4 | |
| | T_{OFF} | | - | 25 | 40 | | | |
| Chromaticity | White | Backlight is on | X_W | 0.282 | 0.312 | 0.342 | - | Note1, Note5 |
| | | | Y_W | 0.319 | 0.349 | 0.379 | - | |
| | Red | | X_R | 0.609 | 0.639 | 0.669 | - | |
| | | | Y_R | 0.314 | 0.344 | 0.374 | - | |
| | Green | | X_G | 0.264 | 0.294 | 0.324 | - | |
| | | | Y_G | 0.557 | 0.587 | 0.617 | - | |
| | Blue | | X_B | 0.102 | 0.132 | 0.162 | - | |
| | | | Y_B | 0.106 | 0.136 | 0.166 | - | |
| Uniformity | U | | 80 | - | - | % | Note1, Note6 | |
| NTSC | | | | 50 | | % | Note5 | |
| Luminance | L | | 200 | 250 | | | Note1, Note7 | |

Test Conditions:

1. IF= 20mA(one channel),the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



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

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

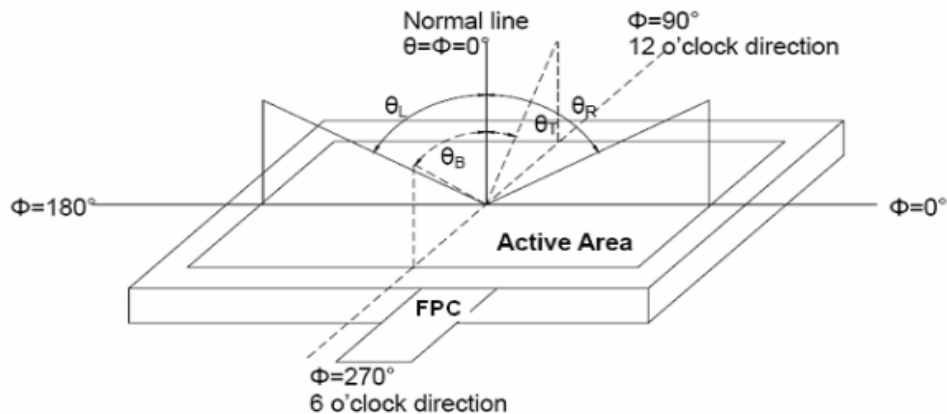


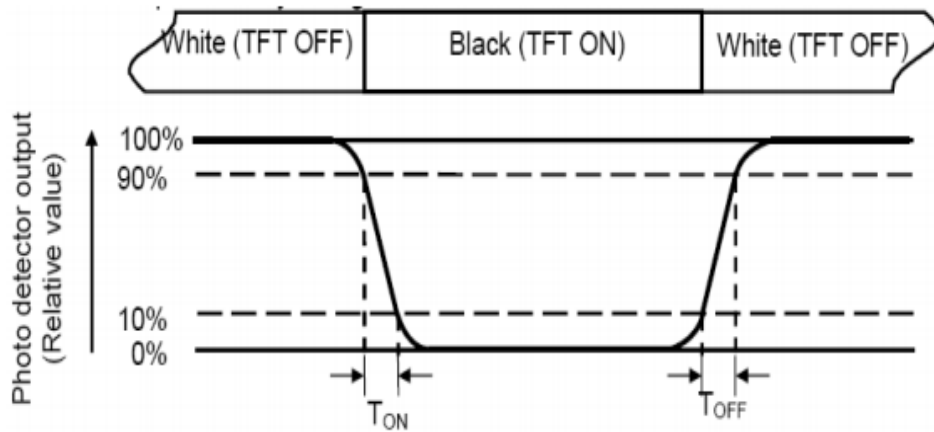
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval Between "White" state and "Black" state. Rise time (TON) is the time between Photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is The time between photo detector output intensity changed from 10% to 90%



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

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

Luminance Uniformity (U) = $L_{min} / L_{max} \times 100\%$

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

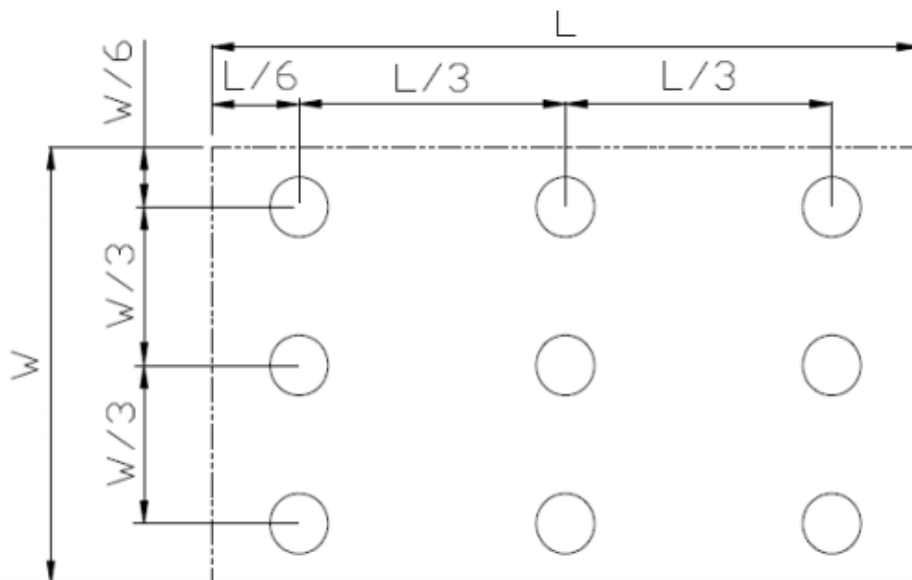


Fig. 2 Definition of uniformity

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

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

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.



8 Environmental / Reliability Tests

| No | Test Item | Condition | Remarks |
|----|--------------------------------------|--|--|
| 1 | High Temperature Operation | T _s = 60°C, 240hrs | Note 1 IEC60068-2-2, GB2423. 2-89 |
| 2 | Low Temperature Operation | T _a = -10°C, 240hrs | Note 2 IEC60068-2-1 GB2423.1-89 |
| 3 | High Temperature Storage | T _a = +70°C, 240hrs | IEC60068-2-2 GB2423. 2-89 |
| 4 | Low Temperature Storage | T _a = -20°C, 240hrs | IEC60068-2-1 GB/T2423.1-89 |
| 5 | High Temperature & Humidity Storage | T _a = +60°C, 90% RH max, 160 hours | IEC60068-2-3 GB/T2423.3-2006 |
| 6 | Thermal Shock (Non-operation) | -30°C 30 min ~ +80°C 30 min Change time: 5min, 30 Cycle | Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87 |
| 7 | Electro Static Discharge (Operation) | C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15°C ~ 35°C, 30% ~ 60%, 86Kpa ~ 106Kpa) | IEC61000-4-2 GB/T17626.2-1998 |
| 8 | Vibration (Non-operation) | Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition) | IEC60068-2-6 GB/T2423.5-1995 |
| 9 | Shock (Non-operation) | 60G 6ms, ± X, ±Y , ± Z 3 times for each direction | IEC60068-2-27 GB/T2423.5-1995 |
| 10 | Package Drop Test | Height: 60 cm, 1 corner, 3 edges, 6 surfaces | IEC60068-2-32 GB/T2423.8-1995 |

Note: 1. T_s is the temperature of panel's surface.

2. T_a is the ambient temperature of sample.



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1 0.Packing

TBD



11. Precautions for Use of LCD modules

11.1 Handling Precautions

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

11.1.2. 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.

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

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

11.1.5. 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 ; Ketene ; Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

11.1.8.4. 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.

11.2 Storage Precautions

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

11.2.2. 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℃ ~ 40℃ Relatively humidity: ≤80%

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

11.3 Transportation Precautions

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