深圳市拓普微科技开发有限公司
SHENZHEN TOPWAY TECHNOLOGY CO., LTD.

# LMT101DNMFDD-ABN

LCD Module User Manual

| Prepared by: | Checked by: | Approved by: |
|---|---|---|
| **Lu jianhui** | | |
| Date: 2017-11-10 | Date: | Date: |

| Rev. | Descriptions | Release Date |
|---|---|---|
| 0.1 | Preliminary release | 2017-11-10 |
| | | |
| | | |
| | | |

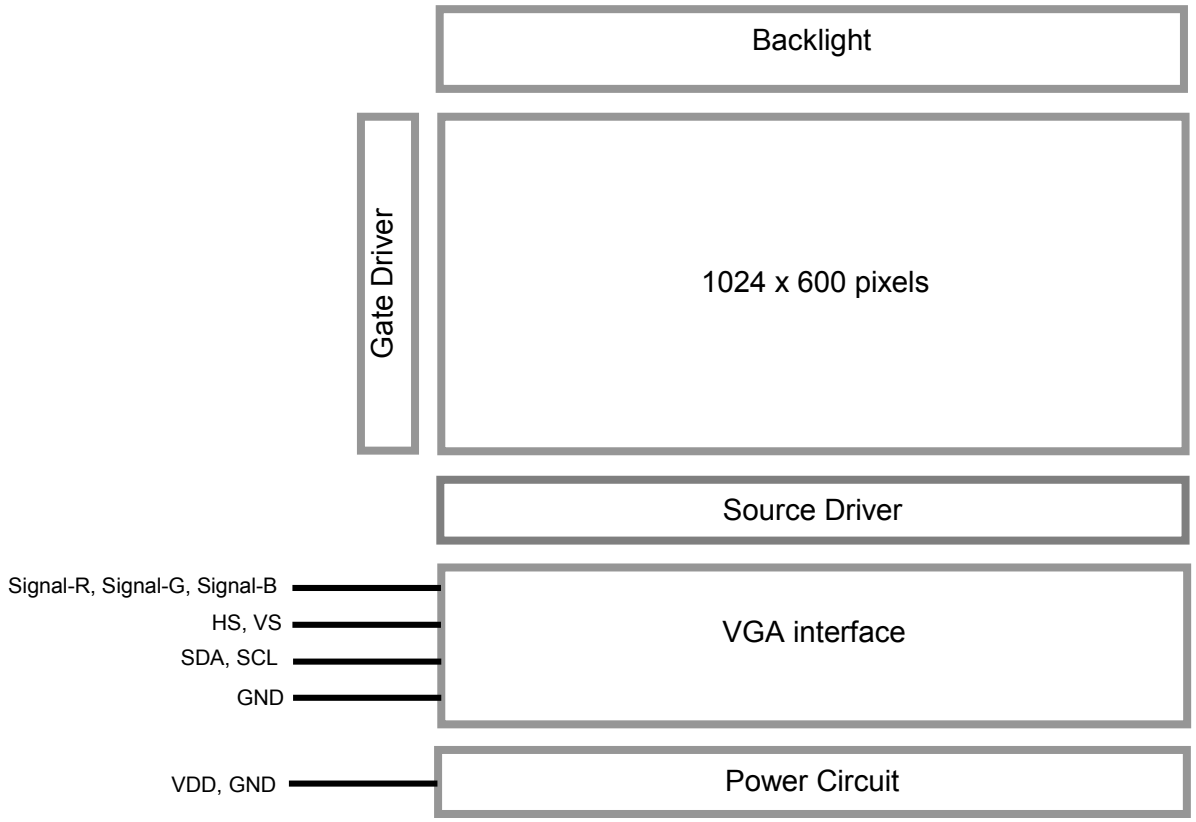
# Table of Content

# 1. General Specification

| | |
|---|---|
| Signal Interface : | VGA |
| Display Mode : | Transmissive / Normal White |
| Screen Size(Diagonal) : | 10.1” |
| Outline Dimension : | 251.0 x 140.0x 13.6 (mm)<br>(see attached drawing for details) |
| Active Area : | 222.72 x 125.28 (mm) |
| Number of dots : | 1024 x 600 |
| Pixel Pitch : | 0.2175 x 0.2088 (mm) |
| Pixel Configuration : | RGB Stripe |
| Backlight : | LED |
| Surface Treatment : | AG,HC,(3H) |
| Viewing Direction : | 6 o’clock(*1)(gray-scale inverse)<br>12 o’clock(*2) |
| Operating Temperature : | 0 ~ +50°C |
| Storage Temperature : | -10 ~ +60°C |

Note:
*1. For saturated color display content (eg. pure-red, pure-green, pure-blue, or pure-colors-combinations).
*2. For “color scales” display content.
*3. Color tone may slightly change by Temperature and Driving Condition.

# 2. Block Diagram



# 3. Terminal Function

## 3.1 K1 Power Terminal

| Pin No. | Pin Name | I/O | Descriptions |
|---|---|---|---|
| 1 | VDD | Power | Positive Power Supply |
| 2 | VDD | Power | Positive Power Supply |
| 3 | NC | - | No connection |
| 4 | NC | - | No connection |
| 5 | VSS | Power | Power Ground |
| 6 | VSS | Power | Power Ground |

## 3.2 K2 VGA Terminal

| Pin No. | Pin Name | I/O | Descriptions |
|---|---|---|---|
| 1 | GND | Power | Signal Ground |
| 2 | VS | I | Analogue VGA Vertical Sync signal input |
| 3 | HS | I | Analogue VGA Horizontal Sync signal input |
| 4 | GND | Power | Signal Ground |
| 5 | Signal-R | I | Analogue VGA Red signal input |
| 6 | GND | Power | Signal Ground |
| 7 | Signal-G | I | Analogue VGA Green signal input |
| 8 | GND | Power | Signal Ground |
| 9 | Signal-B | I | Analogue VGA Blue signal input |
| 10 | GND | Power | Signal Ground |
| 11 | SDA | I/O | Serial data |
| 12 | SCL | I | Serial clock |

# 4. Absolute Maximum Ratings

Top=25℃, VDD =12V ,GND=0V

| Items | Symbol | Min. | Max. | Unit | Condition |
|---|---|---|---|---|---|
| Power Supply voltage | VDD | -0.3 | 12.5 | V | |
| Operating Temperature | $T_{OP}$ | 0 | 50 | ℃ | No Condensation |
| Storage Temperature | $T_{ST}$ | -10 | 60 | ℃ | No Condensation |
| Operating and Storage Humidity | HSTG | 10% | 90% | %(RH) | |

Note:

*1. This rating applies to all parts of the module. And should not be exceeded.

*2. The operating temperature only guarantees operation of the circuit. The contrast, response speed, and the other specification related to electro-optical display quality is determined at the room temperature, $T_{OP}$=25℃

*3. Ambient temperature when the backlight is lit (reference value)

*4. Any Stresses exceeding the Absolute Maximum Ratings may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

# 5. Electrical Characteristics

## 5.1 Driving TFT LCD Panel

Top=25℃, VDD =12V ,GND=0V

| Items | Symbol | MIN. | TYP. | MAX. | Unit | Note |
|---|---|---|---|---|---|---|
| Supply Voltage | VDD | 11.5 | 12.0 | 12.5 | V | |
| VDD Power Consumption | $I_{VDD}$ | 300 | 345 | 600 | mA | *1 |

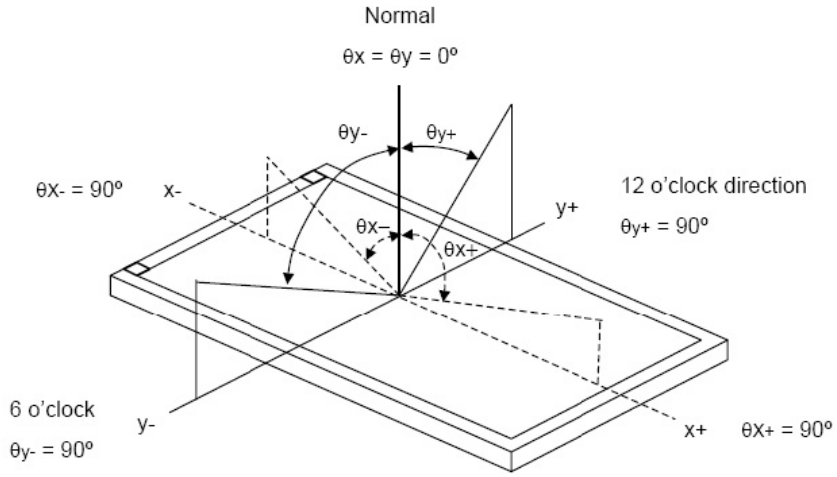
Note.

*1. Normal display condition

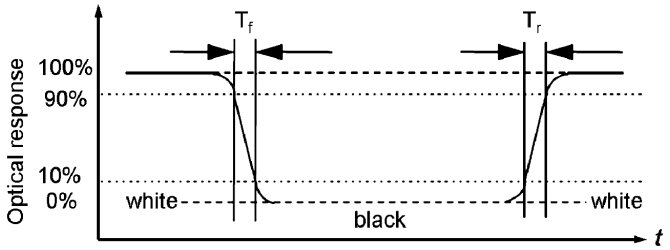
# 6. Optical Characteristics

| Item | Symbol | Condition | MIN. | TYP. | MAX. | UNIT | Note. |
|---|---|---|---|---|---|---|---|
| Viewing angle (CR≥10) | $\theta_L$ | 9 o'clock | 70 | 80 | - | degree | *2 |
| | $\theta_R$ | 3 o'clock | 70 | 80 | - | | |
| | $\theta_T$ | 12 o'clock | 65 | 75 | - | | |
| | $\theta_B$ | 6 o'clock | 70 | 80 | - | | |
| Response Time | $T_f$ | Normal θ=0° | - | 7 | 10 | msec | *3 |
| | $T_r$ | | - | 9 | 18 | msec | |
| Contrast ratio | CR | | 600 | 800 | - | - | *1 |
| Color chromaticlty | $W_X$ | | 0.241 | 0.281 | 0.321 | - | |
| | $W_Y$ | | 0.260 | 0.300 | 0.340 | - | |
| Luminance | L | | 250 | 300 | - | $cd/m^2$ | *4 |
| Luminance uniformity | $Y_U$ | | 70 | 80 | - | % | *4 |

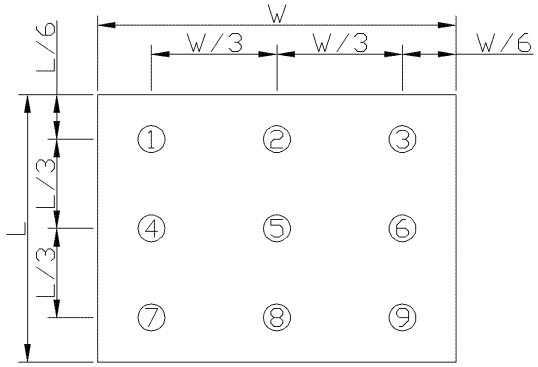
Note:
*1. Definition of Contrast Ratio
The contrast ratio could be calculate by the following expression:
Contrast Ratio (CR) = Luminanc with all pixels white / Luminance with all pixels black
*2 Definition of Viewing Angle




*3 Definition of response time




*4 Definition of Luminance Uniformity
Luminance uniformity (Lu)=
Min. Luminance form pt1~pt9 / Max Luminance form Pt1~pt9



# 7. Precautions of using LCD Modules

**Mounting**

- Mounting must use holes arranged in four corners or four sides.
- The mounting structure so provide even force on to LCD module. Uneven force (ex. Twisted stress) should not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- It is suggested to attach a transparent protective plate to the surface in order to protect the polarizer. It should have sufficient strength in order to the resist external force.
- The housing should adopt radiation structure to satisfy the temperature specification.
- Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. Never rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics deteriorate the polarizer.)
- When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzine. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
- Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer

**Operating**

- The spike noise causes the mis-operation of circuits. It should be within the ±200mV level (Over and under shoot voltage)
- Response time depends on the temperature.(In lower temperature, it becomes longer.)
- Brightness depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time(required time that brightness is stable after turned on) becomes longer.
- 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.
- When fixed patterns are displayed for a long time, remnant image is likely to occur.
- Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference

**Electrostatic Discharge Control**

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

**Strong Light Exposure**

Strong light exposure causes degradation of polarizer and color filter.

**Storage**

When storing modules as spares for a long time, the following precautions are necessary.

- Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
- The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

**Protection Film**

- When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- The protection film is attached to the polarizer with a small amount of glue. If some stress is applied to rub the protection film against the polarizer during the time you peel off the film, the glue is apt tore main on the polarizer. Please carefully peel off the protection film without rubbing it against the polarizer.
- When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.
- You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

**Transportation**

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