



# LMT104DNEFWU-AAA

## LCD Module User Manual

Prepared by:  <b>LU</b>  Date: 2018-1-18	Checked by:    Date:	Approved by:    Date:
--	----------------------------------	-----------------------------------

Rev.	Descriptions	Release Date
0.1	Preliminary release	2018-1-18

**Table of Content**

<b>1. General Specification .....</b>	<b>3</b>
<b>2. Block Diagram.....</b>	<b>3</b>
<b>3. Terminal Function.....</b>	<b>4</b>
3.1 K1 Power Terminal.....	4
3.2 K2 HDMI Terminal.....	4
3.3 K3 VGA Terminal .....	4
3.4 K4 Touch Panel controller Terminal .....	5
<b>4. Absolute Maximum Ratings .....</b>	<b>5</b>
<b>5. Electrical Characteristics .....</b>	<b>5</b>
5.1 Driving TFT LCD Panel .....	5
<b>6. Optical Characteristics .....</b>	<b>6</b>
<b>7. Touch panel Design Precautions.....</b>	<b>7</b>
<b>8. Precautions of using LCD Modules .....</b>	<b>8</b>
8.1 Handling Precautions .....	8
8.2 Storage precautions .....	8
8.3 Transportation Precautions .....	8

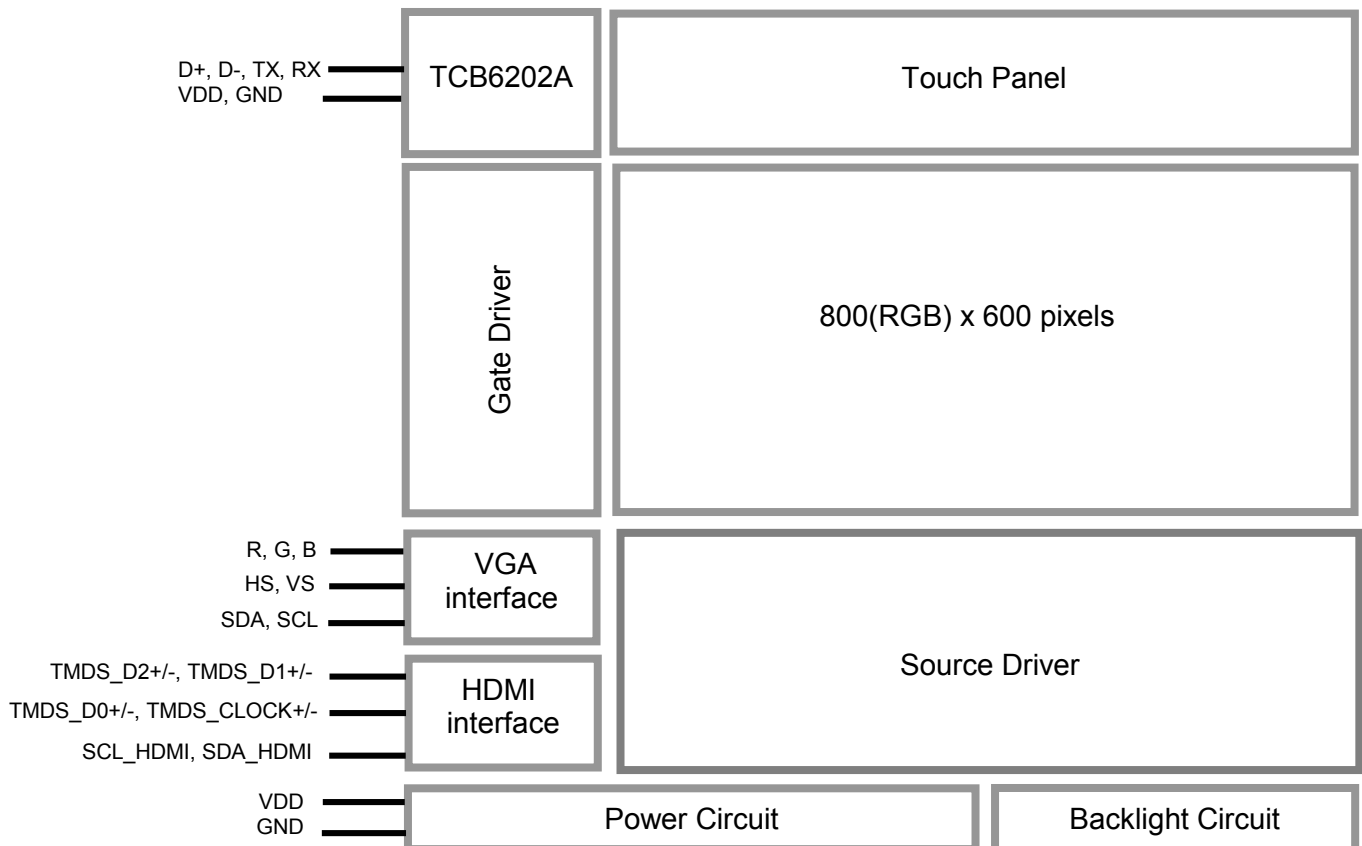
**1. General Specification**

Signal Interface :	VGA/HDMI
Display Mode :	Transmissive / Normal White
Screen Size(Diagonal) :	10.4 inch
Outline Dimension :	248.0 x 177.0x 21.8(mm)
	(see attached drawing for details)
Active Area :	211.2 x158.4 (mm)
Color Depth:	16.7M
Number of dots :	800 x 3(RGB) x600
Pixel Pitch :	0.264x0.264 (mm)
Pixel Configuration :	R.G.B. Vertical Stripe
Backlight :	White LED
Surface Treatment :	Anti-Glare
Viewing Direction :	12H (*1)
	6H (*2)(gray scale inverse)
Touch Panel:	Resistive Touch Panel
	Built in Touch Panel Controller
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
1,2	VDD	Power	Power Supply (12.0V)
3,4	NC	-	No connection
5,6	GND	Power	Power Supply GND (0V)

#### 3.2 K2 HDMI Terminal

Pin No.	Pin Name	I/O	Descriptions
1	TMDS_D2+	Input	HDMI receive positive signal channel2
2	TMDS_D2 shield	Power	Signal Ground
3	TMDS_D2-	Input	HDMI receive negative signal channel2
4	TMDS_D1+	Input	HDMI receive positive signal channel1
5	TMDS_D1 shield	Power	Signal Ground
6	TMDS_D1-	Input	HDMI receive negative signal channel1
7	TMDS_D0+	Input	HDMI receive positive signal channel0
8	TMDS_D0 shield	Power	Signal Ground
9	TMDS_D0-	Input	HDMI receive negative signal channel0
10	TMDS_Clock+	Input	HDMI receive positive signal clock
11	TMDS_Clock shield	Power	Signal Ground
12	TMDS_Clock-	Input	HDMI receive negative signal clock
13	NC	-	No connection
14	NC	-	No connection
15	SCL_HDMI	Input	Serial data clock
16	SDA_HDMI	I/O	Serial data out
17	GND	Power	Signal Ground
18	+5V Power	Power	Power supply for DDC memory
19	Hot Plug Detect	lutput	Hot Plug Detect signal

#### 3.3 K3 VGA Terminal

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

Note:

1. Support Standard VGA Signal, from PC:  
Recommend: 800x600, 60Hz

### 3.4 K4 Touch Panel controller Terminal

Pin No.	Pin Name	I/O	Descriptions
1	GND	Power	Power Supply GND (0V)
2	VCC	Power	Positive power supply (5.0V)
3	GND	Power	Power Supply GND (0V)
4	D+	I/O	USB D+ signal
5	D-	I/O	USB D- signal
6	GND	Power	Power Supply GND (0V)
7	VCC	Power	Positive power supply (5.0V)
8	GND	Power	Power Supply GND (0V)
9	TX	Output	RS-232 Tx Signal
10	RX	Input	RS-232 Rx Signal

## 4. Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit	Condition
Power Supply Voltage	VDD	-0.3	+12.5	V	
Power Supply Voltage	VCC	-0.3	+5.3	V	
Operating Temperature	T <sub>OP</sub>	-0	50	°C	No Condensation
Storage Temperature	T <sub>ST</sub>	-10	60	°C	No Condensation

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<sub>OP</sub>=25°C.
- \*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°C, VDD =12.0V ,GND=0V

Items	Symbol	MIN.	TYP.	MAX.	Unit	Note
Supply Voltage	VDD	11.5	12.0	12.5	V	
Supply Voltage	VCC	4.7	5.0	5.3	V	
VDD Power Consumption	I <sub>VDD</sub>	-	360	720	mA	
VCC Power Consumption	I <sub>VCC</sub>	-	20	40	mA	

6. Optical Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	UNIT	Note.
Viewing angle (CR ≥ 10)	$\theta_L$	9 o'clock	60	70	-	degree	*2
	$\theta_R$	3 o'clock	60	70	-		
	$\theta_T$	12 o'clock	50	60	-		
	$\theta_B$	6 o'clock	60	70	-		
Response Time	$T_f$	Normal $\theta=0^\circ$	-	10	15	msec	*3
	$T_r$		-	15	25	msec	
Contrast Ratio	CR		400	500	-	-	*1
Color Chromaticity	$W_X$		0.259	0.309	0.359	-	
	$W_Y$		0.284	0.334	0.384	-	
Luminance	L		250			cd/m <sup>2</sup>	*4
Luminance uniformity	U		75	80	-	%	*4

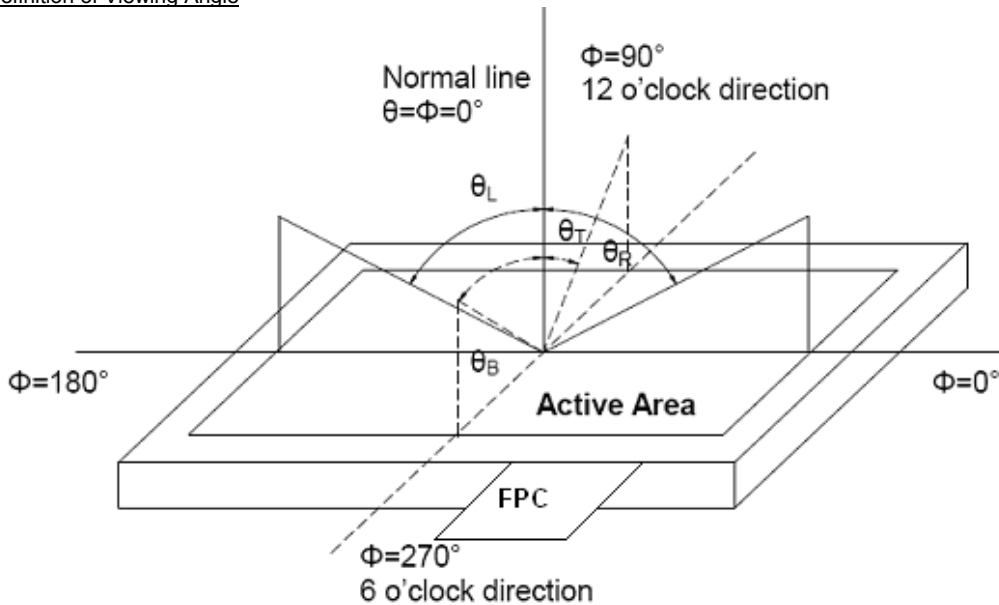
Note:

\*1. Definition of Contrast Ratio

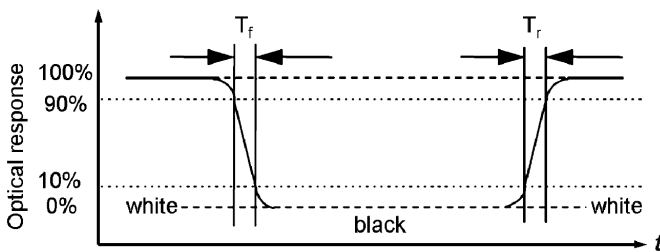
The contrast ratio could be calculate by the following expression:

Contrast Ratio (CR) = Luminanc with all pixels white / Luminance with all pixels black

\*2 Definition of Viewing Angle



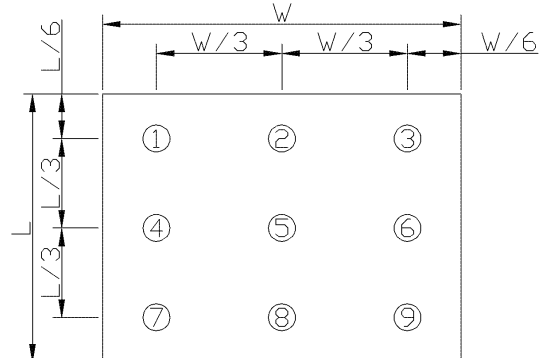
\*3 Definition of response time



\*4 Definition of Luminance Uniformity

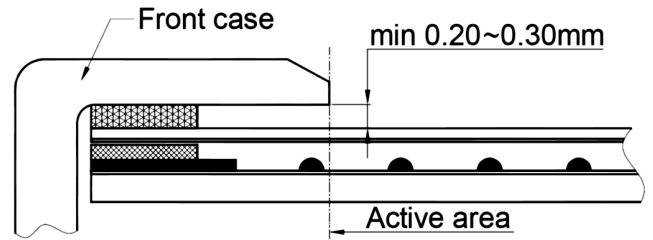
Luminance uniformity (Lu)=

Min. Luminance form pt1~pt9 / Max Luminance form Pt1~pt9

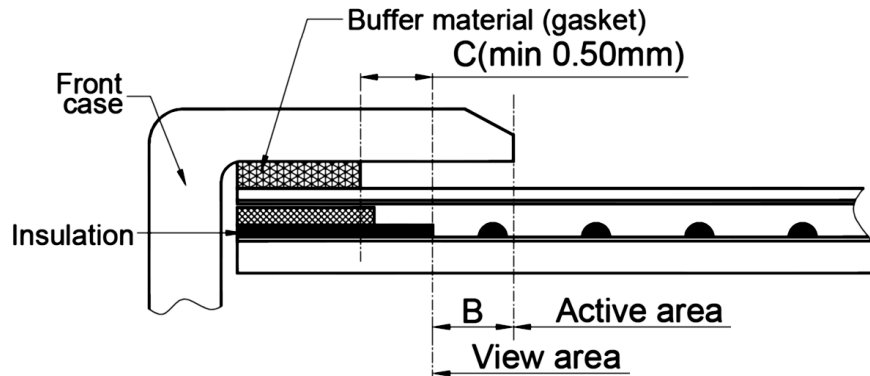


**7. Touch panel Design Precautions**

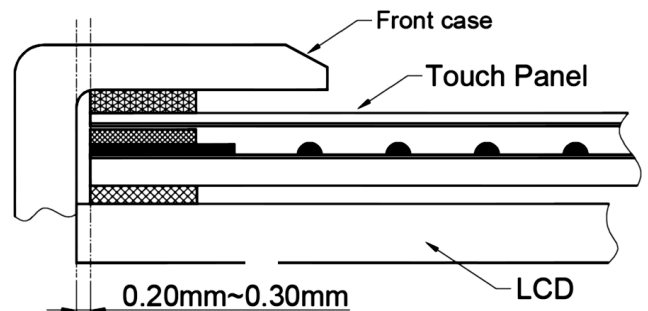
1. It should prevent front case touching the touch panel Active Area (A.A.) to prevent abnormal touch. It should left gab (e.g. 0.2~0.3mm) in between.



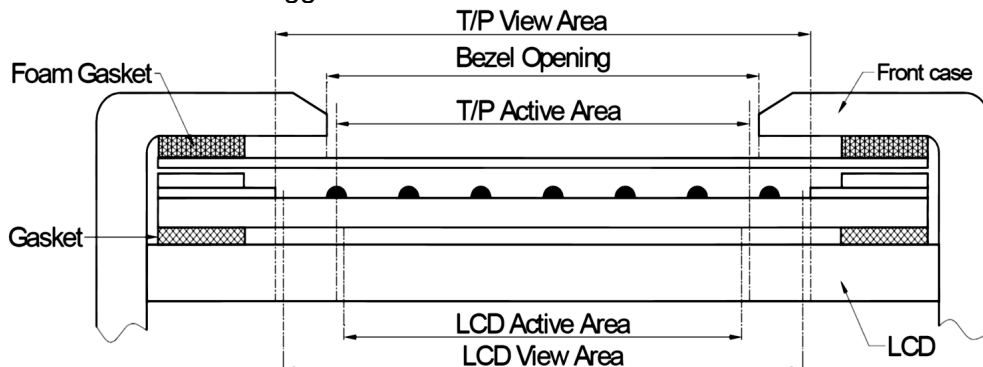
2. Outer case design should take care about the area outside the A.A. Those areas contain circuit wires which is having different thickness. Touching those areas could deform the ITO film. As a result case the ITO cold be damaged and shorten its lifetime. It is suggested to protect those areas with gasket (between the front case and the touch panel). The suggested figures are  $B \geq 0.50\text{mm}$ ;  $C \geq 0.50\text{mm}$ .



3. The front case side wall should keep space (e.g. 0.2 ~ 0.3mm) from the touch panel.



4. In general design, touch panel V.A. should be bigger than the LCD V.A. and touch panel A.A. should be bigger than the LCD A.A.



## 8. Precautions of using LCD Modules

### 8.1 Handling Precautions

- 7.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 7.1.2 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.
- 7.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 7.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 7.1.5 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
- 7.1.6 Do not attempt to disassemble the LCD Module.
- 7.1.7 If the logic circuit power is off, do not apply the input signals.
- 7.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
- 7.1.8.1 Be sure to ground the body when handling the LCD Modules.
- 7.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.
- 7.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
- 7.1.8.4 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.

### 8.2 Storage precautions

- 7.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 7.2.2 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%
- 7.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

### 8.3 Transportation Precautions

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