

# LMT088EAPFWA-NAN

## LCD Module User Manual

Prepared by:	Checked by:	Approved by:
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Rev.	Descriptions	Edit	Release Date
0.1	Preliminary release	Song Mao	2025-08-01

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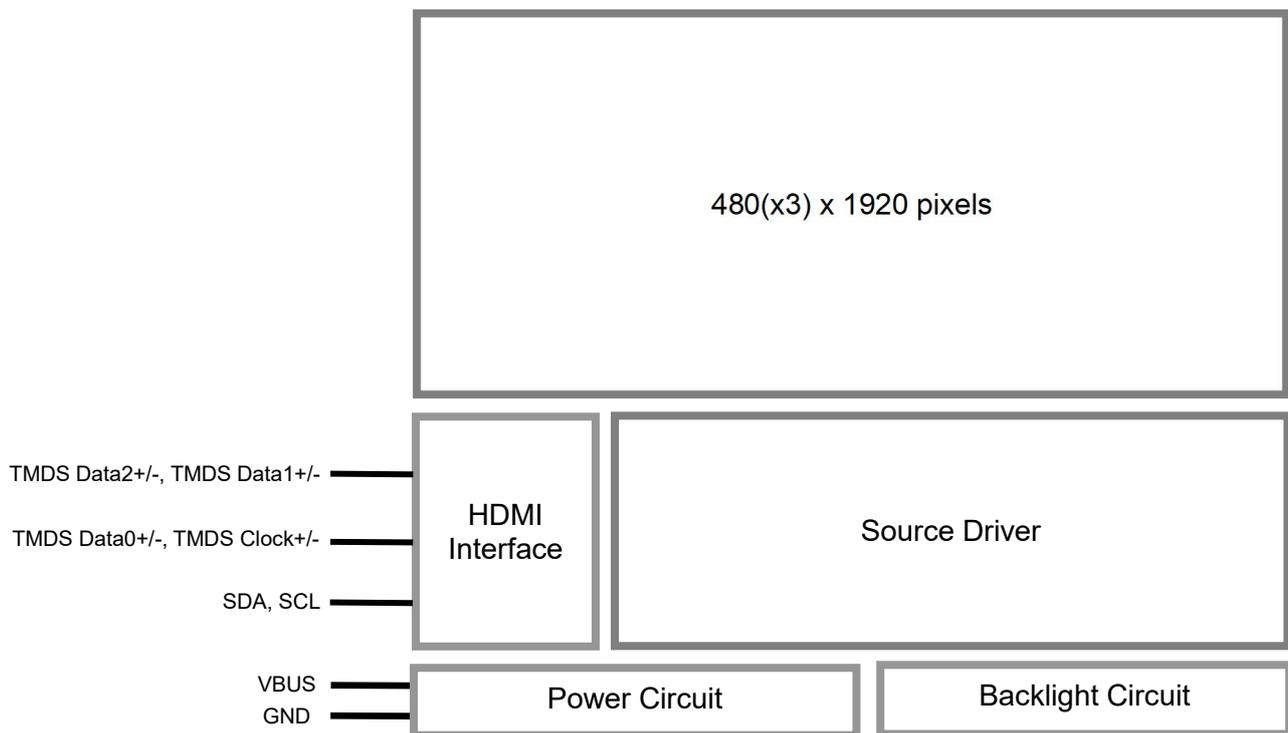
## 1. General Specification

Screen Size(Diagonal) :	8.8"
Active Area :	54.72 x 218.88 (mm)
Number of dots :	480x3(RGB) x 1920
Pixel Pitch :	0.114 x 0.114 (mm)
Color Depth:	16.7M
Display Technology	a-Si TFT active matrix
Signal Interface :	HDMI
Display Mode :	Transmissive / Normal Black
Outline Dimension :	70.4 x 252.0 x 12.7max (mm) (see outline drawing for details)
Pixel Configuration :	RGB Stripe
Viewing Direction :	Full
Backlight :	LED
Operating Temperature :	-20°C ~ +70°C
Storage Temperature :	-30°C ~ +80°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	IO	Descriptions
A1/B12	GND	Power	Power Supply GND (0V)
A4/B9	VBUS	Power	Positive Power Supply(5.0V)
A5	NC	-	No connection
B8	NC	-	No connection
B7	NC	-	No connection
A6	NC	-	No connection
B6	NC	-	No connection
A7	NC	-	No connection
B5	NC	-	No connection
A8	NC	-	No connection
B4/A9	VBUS	Power	Positive Power Supply(5.0V)
A12/B1	GND	Power	Power Supply GND (0V)

Note: \*1. Terminal: USB TYPE-C

#### 3.2 K2 Micro HDMI Terminal

Pin No.	Pin Name	IO	Descriptions
1	Hot Plug Detect	Output	Hot Plug Detect signal
2	Utility	-	No connection
3	TMDS Data2+	Input	HDMI receiver positive signal channel 2
4	TMDS Data2 Shield	Power	Signal Ground
5	TMDS Data2-	Input	HDMI receiver negative signal channel 2
6	TMDS Data1+	Input	HDMI receiver positive signal channel 1
7	TMDS Data1 Shield	Power	Signal Ground
8	TMDS Data1-	Input	HDMI receiver negative signal channel 1
9	TMDS Data0+	Input	HDMI receiver positive signal channel 0
10	TMDS Data0 Shield	Power	Signal Ground
11	TMDS Data0-	Input	HDMI receiver negative signal channel 0
12	TMDS Clock+	Input	HDMI receiver positive signal clock
13	TMDS Clock Shield	Power	Signal Ground
14	TMDS Clock-	Input	HDMI receiver negative signal clock
15	CEC	-	No connection
16	DDC/CEC Ground	Power	Signal Ground
17	SCL	Input	Serial data clock
18	SDA	Output	Serial data out
19	+5V Power	Power	Power supply for DDC memory

Note: \*1. Support Standard HDMI Signal, from PC:  
- 480x1920,60Hz

### 4. Absolute Maximum Ratings

Top=25°C, VBUS =5.0V ,GND=0V

Items	Symbol	Min.	Max.	Unit	Condition
Power Supply Voltage	VBUS	-0.3	+5.5	V	
Operating Temperature	T <sub>OP</sub>	-20	70	°C	No Condensation
Storage Temperature	T <sub>ST</sub>	-30	80	°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, VBUS =5.0V ,GND=0V

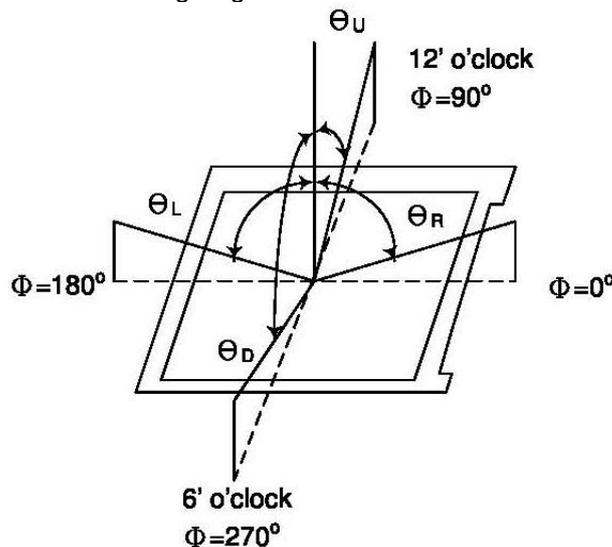
Items	Symbol	MIN.	TYP.	MAX.	Unit	Note
Supply Voltage	VBUS	4.5	5.0	5.5	V	
VDD Power Consumption	I <sub>VBUS</sub>	-	800	-	mA	

## 6. Optical Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	UNIT	Note.	
Contrast	CR	θ=0 Normal viewing angle	600	800	-	-	Note 1,2,4	
Response Time	Tr+Tf		-	30	40	msec	Note 1,3	
White Luminance(Center)	L		-	600	-	cd/m <sup>2</sup>	Note 1,4	
Chromaticity	Red		R <sub>X</sub>	0.576	0.626	0.676		Note 1,4
			R <sub>Y</sub>	0.295	0.345	0.395		
	Green		G <sub>X</sub>	0.262	0.312	0.362		
			G <sub>Y</sub>	0.493	0.543	0.593		
	Blue		B <sub>X</sub>	0.097	0.147	0.197		
			B <sub>Y</sub>	0.059	0.109	0.159		
	White		W <sub>X</sub>	0.250	0.300	0.350		
		W <sub>Y</sub>	0.272	0.322	0.372			
Viewing angle	Hor.	θ <sub>L</sub>	75	85	-		Note 1,4	
		θ <sub>R</sub>	75	85	-			
	Ver.	θ <sub>L</sub>	75	85	-			
		θ <sub>D</sub>	75	85	-			
Brightness uniformity	B <sub>UNI</sub>	θ=0 (9point)	70	80	-		Note 5	
NTSC				50		%		
View Direction			Full				Note 6	

Measuring surrounding: dark room  
 LED current IL:160mA  
 Ambient temperature:25±2°C  
 15min.warm-up time.

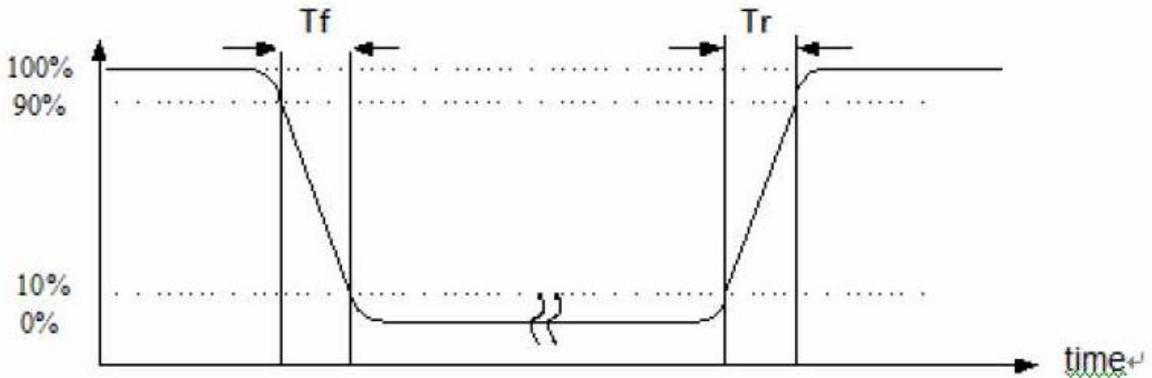
Note 1: Definition of Viewing Angle:



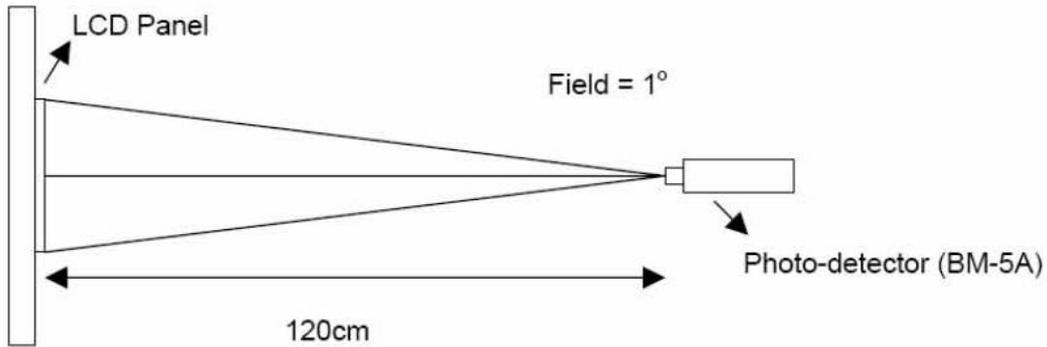
Note 2: Definition of contrast ratio(CR)  
 Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

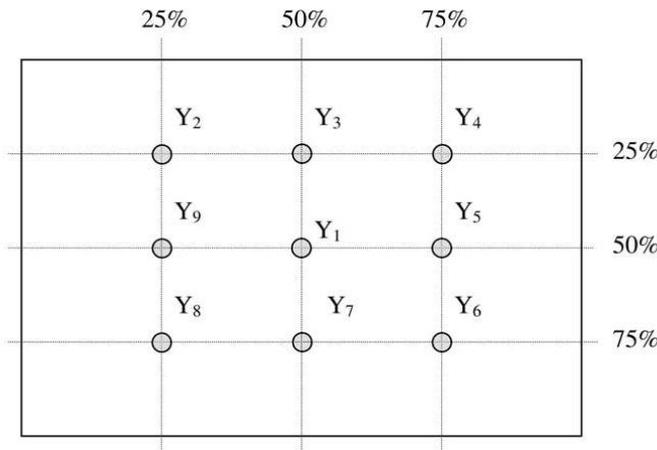
Note 3: Definition of Response time: Sum of  $T_R$  and  $T_F$



Note 4: Definition of optical measurement setup



Note 5: Definition of Average Luminance Uniformity of White(Center)  
 Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

Note 6: Rubbing Direction (The different Rubbing Direction will cause the different optimal view direction.)

## 7. LCD Module Design and Handling Precaution

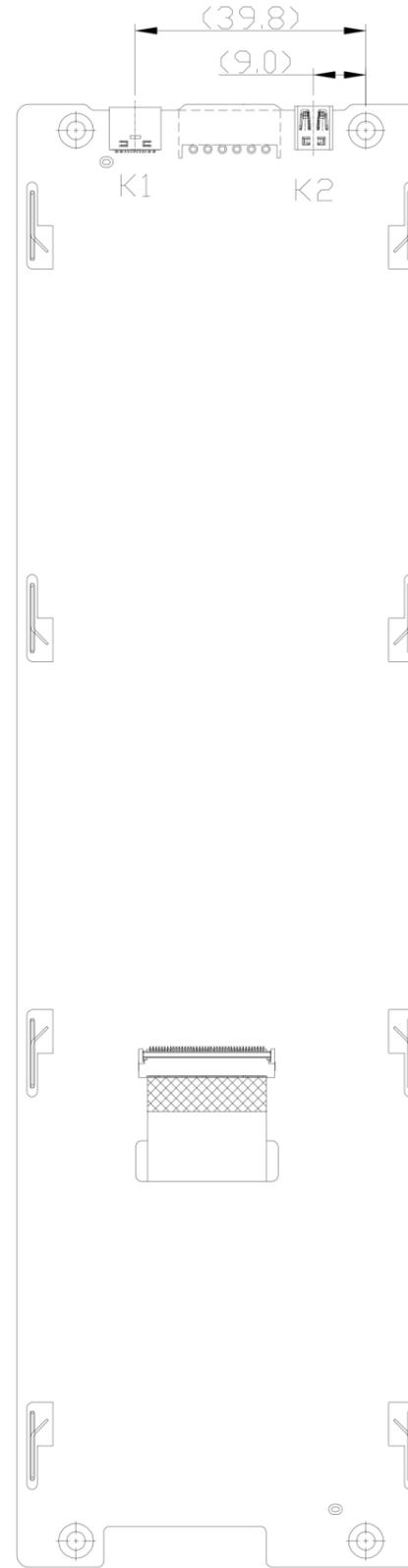
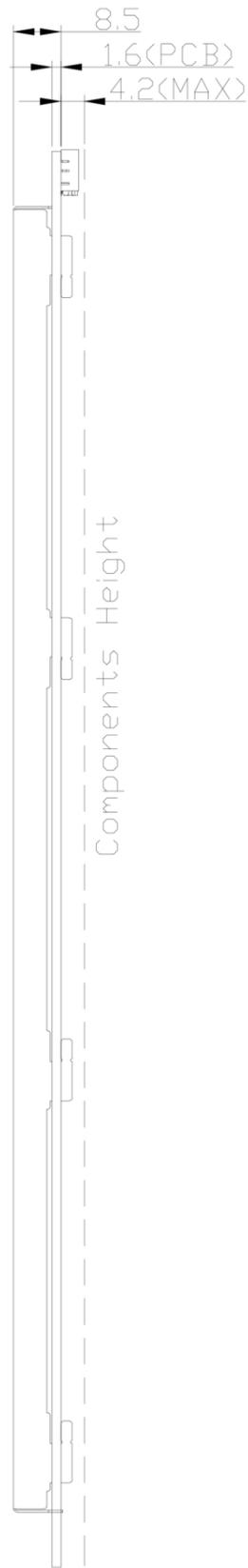
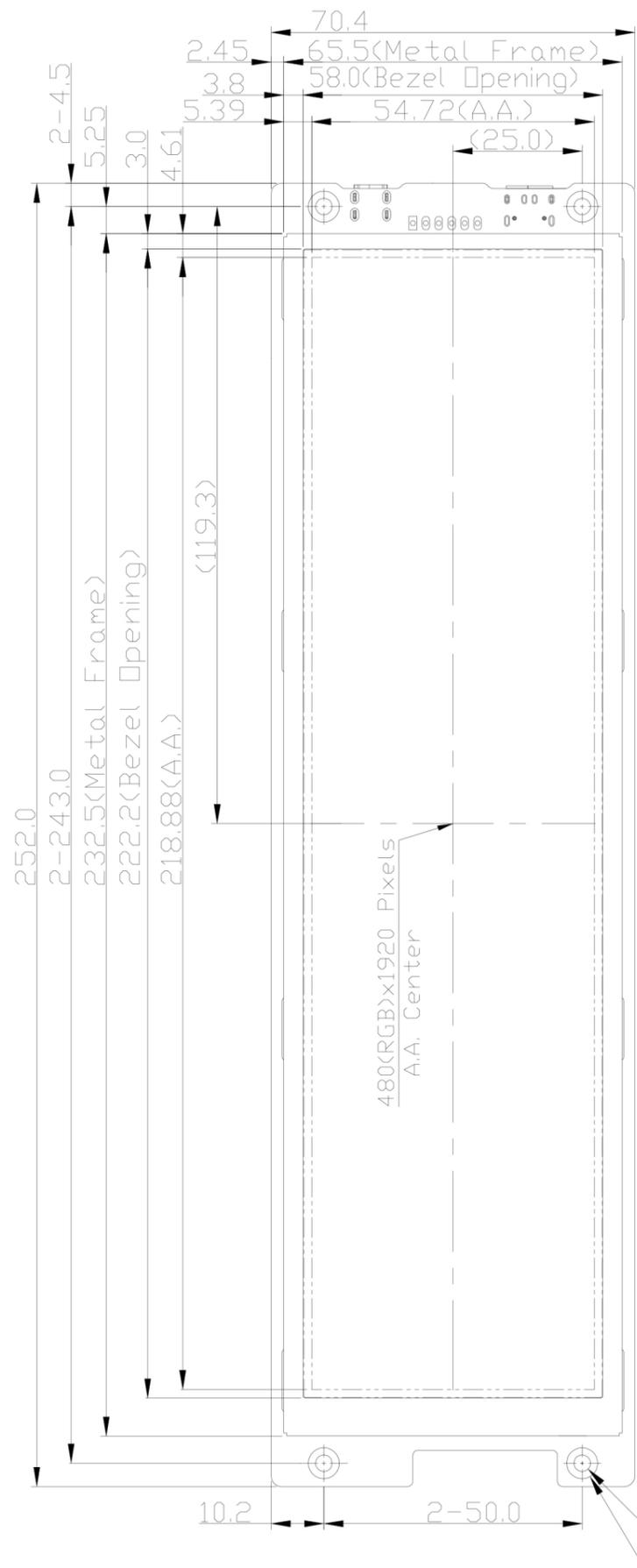
- Please ensure V0, VCOM is adjustable, to enable LCD module get the best contrast ratio under different temperatures, view angles and positions.
- Normally display quality should be judged under the best contrast ratio within viewable area. Unexpected display pattern may come out under abnormal contrast ratio.
- Never operate the LCD module exceed the absolute maximum ratings.
- Never apply signal to the LCD module without power supply.
- Keep signal line as short as possible to reduce external noise interference.
- IC chip (e.g. TAB or COG) is sensitive to light. Strong light might cause malfunction. Light sealing structure casing is recommended.
- Make sure there is enough space (with cushion) between case and LCD panel, to prevent external force passed on to the panel; otherwise that may cause damage to the LCD and degrade its display result.
- Avoid showing a display pattern on screen for a long time (continuous ON segment).
- LCD module reliability may be reduced by temperature shock.
- When storing and operating LCD module, avoid exposure to direct sunlight, high humidity, high or low temperature. They may damage or degrade the LCD module.
- Never leave LCD module in extreme condition (max./min storage/operate temperature) for more than 48hr.
- Recommend LCD module storage conditions is 0 C~40 C <80%RH.
- LCD module should be stored in the room without acid, alkali and harmful gas.
- Avoid dropping & violent shocking during transportation, and no excessive pressure press, moisture and sunlight.
- LCD module can be easily damaged by static electricity. Please maintain an optimum anti-static working environment to protect the LCD module. (eg. ground the soldering irons properly)
- Be sure to ground the body when handling LCD module.
- Only hold LCD module by its sides. Never hold LCD module by applying force on the heat seal or TAB.
- When soldering, control the temperature and duration avoid damaging the backlight guide or diffuser which might degrade the display result such as uneven display.
- Never let LCD module contact with corrosive liquids, which might cause damage to the backlight guide or the electric circuit of LCD module.
- Only clean LCD with a soft dry cloth, Isopropyl Alcohol or Ethyl Alcohol. Other solvents (e.g. water) may damage the LCD.
- Never add force to components of LCD module. It may cause invisible damage or degrade the module's reliability.
- When mounting LCD module, please make sure it is free from twisting, warping and bending.
- Do not add excessive force on surface of LCD, which may cause the display color change abnormally.
- LCD panel is made with glass. Any mechanical shock (e.g. dropping from high place) will damage the LCD module.

- Protective film is attached on LCD screen. Be careful when peeling off this protective film, since static electricity may be generated.
- Polarizer on LCD gets scratched easily. If possible, do not remove LCD protective film until the last step of installation.
- When peeling off protective film from LCD, static charge may cause abnormal display pattern. The symptom is normal, and it will turn back to normal in a short while.
- LCD panel has sharp edges, please handle with care.
- Never attempt to disassemble or rework LCD module.
- If display panel is damaged and liquid crystal substance 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.

## Warranty

This product has been manufactured to our 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.

- We cannot accept responsibility for any defect, which may arise from additional manufacturing of the product (including disassembly and reassembly), after product delivery.
- We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.
- We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed our company's acceptance inspection procedures.
- When the product is in CCFL models, CCFL service life and brightness will vary according to the performance of the inverter used, leaks, etc. We cannot accept responsibility for product performance, reliability, or defect, which may arise.
- We cannot accept responsibility for intellectual property of a third part, which may arise through the application of our product to our assembly with exception to those issues relating directly to the structure or method of manufacturing of our product.



K1 Terminal	
No	Pin Name
A1/B12	GND
A4/B9	VBUS
A5	NC
B8	NC
B7	NC
A6	NC
B6	NC
A7	NC
B5	NC
A8	NC
B4/A9	VBUS
A12/B1	GND

K2 Terminal	
No	Pin Name
1	Hot Plug Detect
2	Utility
3	TMDS DATA2+
4	TMDS DATA2+ Shield
5	TMDS DATA2-
6	TMDS DATA1+
7	TMDS DATA1+ Shield
8	TMDS DATA1-
9	TMDS DATA0+
10	TMDS DATA0 Shield
11	TMDS DATA0-
12	TMDS Clock+
13	TMDS Clock Shield
14	TMDS Clock-
15	CEC
16	DDC/CEC Ground
17	SCL
18	SDA
19	+5V Power

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- Note:
- \*1. LCD Display Type: TFT, Transmissive
  - \*2. Pixel Arrangement: RGB-STRIPE
  - \*3. Operating Voltage: 5.0V
  - \*4. Backlight: White LED
  - \*5. Color Depth : 16.7M (24bit) color

- \*6. Terminal K1: USB TYPE-C or equivalent  
Terminal K2: 19Pin, Micro HDMI (Type-D) or equivalent
- \*7. Operating Temperature : -20°C~70°C
- \*8. Storage Temperature : -30°C~80°C
- \*9. Unmarked Tolerance : ≤150,±0.3; >150,±0.5

C				
B				
A				
Rev	Note			Date
Dwg	Title			
LMT088EAPFWA-NAN Outline Dwg				
Dwg No.	MK-008811-1-1		Date	2025-04-28
Scale	Tol.	Unit	Paper Size	
1/1		mm	A3	
Approved	Checked		Drawn	Taoqingwen