

RoHS  
Compliant



## Description

MP010839 is a 12.1 (16:10) inch diagonally measured active display with high resolution XGA 1280 × 800 display and high brightness. This model is composed of a TFT LCD panel, backlight system and HDMI . It is designed to make Raspberry Pi usage easy. You can simply use this TFT display with your Raspberry Pi, or also you can use this as computer display with any device which has HDMI output. This 12.1" TFT model comes in 1280 × 800 resolution that would be great for embedded computing usage too.

## Features

| No. | Item                           | Specification                       | Unit              |
|-----|--------------------------------|-------------------------------------|-------------------|
| 1   | Panel Size                     | 12.1"                               | Inch              |
| 2   | Number of Pixels               | 1280 (W) x RGB x 800 (H)            | Pixels            |
| 3   | Active Area                    | 261.12 (W) × 163.2 (H)              | mm                |
| 4   | Pixel Pitch                    | 0.204 (W) x 0.204 (H)               | mm                |
| 5   | Outline Dimension              | 278 (W) × 184 (H) × 22.6(T)         | mm                |
| 6   | Number of Colours              | 16.7M                               | --                |
| 7   | Display Mode                   | IPS / Normally Black / Transmissive | --                |
| 8   | View Direction                 | Free direction                      | --                |
| 9   | Display Format                 | RGB vertical stripe                 | --                |
| 10  | Surface Treatment              | Anti-Glare (3H)                     | --                |
| 11  | Contrast Ratio                 | 1000 (Typ.)                         | --                |
| 12  | Luminance (cd/m <sup>2</sup> ) | 600 (Typ.)                          | cd/m <sup>2</sup> |
| 13  | Video Input Interface          | HDMI (Compliance HDMI V1.4)         | --                |
| 14  | Backlight                      | White LED                           | --                |
| 15  | Operation Temperature          | -30 to 80                           | °C                |
| 16  | Storage Temperature            | -30 to 85                           | °C                |
| 17  | Weight                         | (505)                               | g                 |



## HDMI (CN3) [HDMI A TYPE:PHD0911A2301E or compatible]

| Pin No. | Symbol    | I/O | Function            |
|---------|-----------|-----|---------------------|
| 1       | TMDS 2+   | I   | TMDS Data2+         |
| 2       | GND       | P   | TMDS Data2 Shield   |
| 3       | TMDS 2-   | I   | TMDS Data2-         |
| 4       | TMDS 1+   | I   | TMDS Data1+         |
| 5       | GND       | P   | TMDS Data1 Shield   |
| 6       | TMDS 1-   | I   | TMDS Data1-         |
| 7       | TMDS 0+   | I   | TMDS Data0+         |
| 8       | GND       | P   | TMDS Data0 Shield   |
| 9       | TMDS 0-   | I   | TMDS Data0-         |
| 10      | TMDS CLK+ | I   | TMDS Clock+         |
| 11      | GND       | P   | TMDS Clock Shield   |
| 12      | TMDS CLK- | I   | TMDS Clock-         |
| 13      | N.C.      | -   | N.C.                |
| 14      | N.C.      | -   | N.C.                |
| 15      | DDC_SCL   | I   | IIC SCL to EDID ROM |
| 16      | DDC_SDA   | I/O | IIC SDA to EDID ROM |
| 17      | GND       | P   | DDC/CEC Ground      |
| 18      | HD_5V     | P   | +5V Power           |
| 19      | HPD       | O   | Hot Plug Detect     |

## Absolute Maximum Ratings

### Electrical Absolute Rating

#### HDMI TFT LCD Module

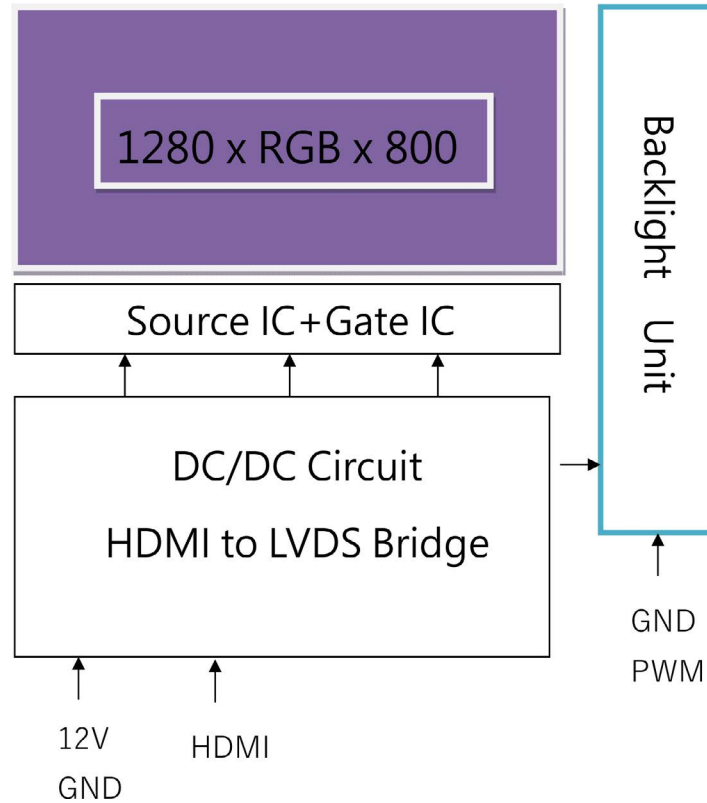
| Item                 | Symbol | Values |      | Unit |
|----------------------|--------|--------|------|------|
|                      |        | Min    | Max. |      |
| Power supply voltage | 12V    | 10     | 14   | V    |

### Environment Absolute Rating

| Item                  | Symbol | Values |      | Unit | Note                |
|-----------------------|--------|--------|------|------|---------------------|
|                       |        | Min    | Max. |      |                     |
| Operating Temperature | Top    | -30    | 80   | °C   | Ambient temperature |
| Storage Temperature   | Tst    |        |      |      |                     |

## Block Diagram

TFT LCD Module



## Electrical Characteristics

HDMI TFT LCD Module

| Item                       | Symbol                 | Values |      |      | Unit | Note                                 |
|----------------------------|------------------------|--------|------|------|------|--------------------------------------|
|                            |                        | Min    | Typ. | Max. |      |                                      |
| Supply Voltage             | 12V                    | 11     | 12   | 13   | V    |                                      |
| PWM frequency              |                        | 190    | 200  | 20K  | Hz   |                                      |
| PWM Duty                   |                        | 5      | -    | 100  | %    | (3), Suggestion @190Hz ≤ fPWM < 1kHz |
|                            |                        | 20     | -    |      |      | (3), @1kHz ≤ fPWM ≤ 20kHz            |
| PWM Dimming Voltage        | V <sub>PWM-IH</sub>    | 3      | 3.3  | 5    | V    |                                      |
|                            | V <sub>PWM-IL</sub>    | 0      | -    | 0.3  |      |                                      |
| LED Enable Control Voltage | V <sub>LED_EN-IH</sub> | 3      | 3.3  | 5    |      |                                      |
|                            | V <sub>LED_EN-IL</sub> | -      | -    | 0.3  |      |                                      |
| Supply Current             | ICC(12V)               | -      | TBD  | -    | mA   |                                      |
| LED life time              |                        | 50000  | -    | -    | Hr   | (1)                                  |

### Note

The "LED life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C 60% RH.

## Optical Characteristics

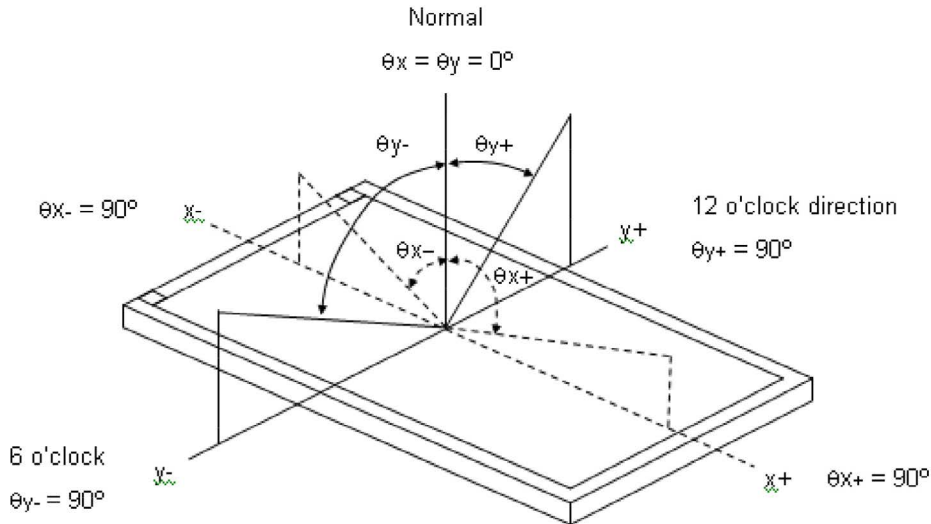
| Item                   |            | Symbol        | Condition  | Min.  | Typ.  | Max.  | Unit  | Note   |
|------------------------|------------|---------------|--|-------|-------|-------|-------|--------|
| Brightness             |            | --            | Note1,<br>Note 3,<br>( $\theta = 0^\circ$ ,<br>Normal<br>Viewing<br>Angle) | 480   | 600   | --    | cd/m2 | (4)(5) |
| Contrast Ratio         |            | CR            |  | 800   | 1000  | --    | --    | (2)(5) |
| White Variation        |            | $\delta W$    |  | --    | 1.25  | 1.4   | --    | (5)(6) |
| Response Time          |            | Tr            |  | --    | 12    | 17    | ms    | (3)    |
|                        |            | Tf            |  | --    | 8     | 13    |       |        |
| Colour<br>Chromaticity | White      | Wx            |  | 0.263 | 0.313 | 0.363 | --    | (1)(5) |
|                        |            | Wy            |  | 0.279 | 0.329 | 0.379 |       |        |
|                        | Red        | Rx            |  | 0.602 | 0.652 | 0.702 |       |        |
|                        |            | Ry            |  | 0.288 | 0.338 | 0.388 |       |        |
|                        | Green      | Gx            |  | 0.276 | 0.326 | 0.376 |       |        |
|                        |            | Gy            | 0.558  | 0.608 | 0.658 |       |       |        |
|                        | Blue       | Bx            | 0.1  | 0.15  | 0.2   |       |       |        |
|                        |            | By            | 0.003  | 0.053 | 0.103 |       |       |        |
| View angle             | Horizontal | $\theta_{x+}$ | Center<br>CR $\geq$ 10   | 80    | 88    | --    | Deg   | (1)(5) |
|                        |            | $\theta_{x-}$ |  |       |       |       |       |        |
|                        | Vertical   | $\theta_{Y+}$ |  |       |       |       |       |        |
|                        |            | $\theta_{Y-}$ |  |       |       |       |       |        |

**Note:**

**Test Conditions**

| Item                | Symbol  | Value       | Unit       |
|---------------------|---|-------------|------------|
| Ambient Temperature | Ta  | 25 $\pm$ 2  | $^\circ$ C |
| Ambient Humidity    | Ha  | 50 $\pm$ 10 | %RH        |
| Supply Voltage      | Vcc   | 3.3         | V          |
| Convertor Voltage   | According to typical value in "3. Electrical Characteristics" |             |            |
| Convertor Duty      |   |             |            |

Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

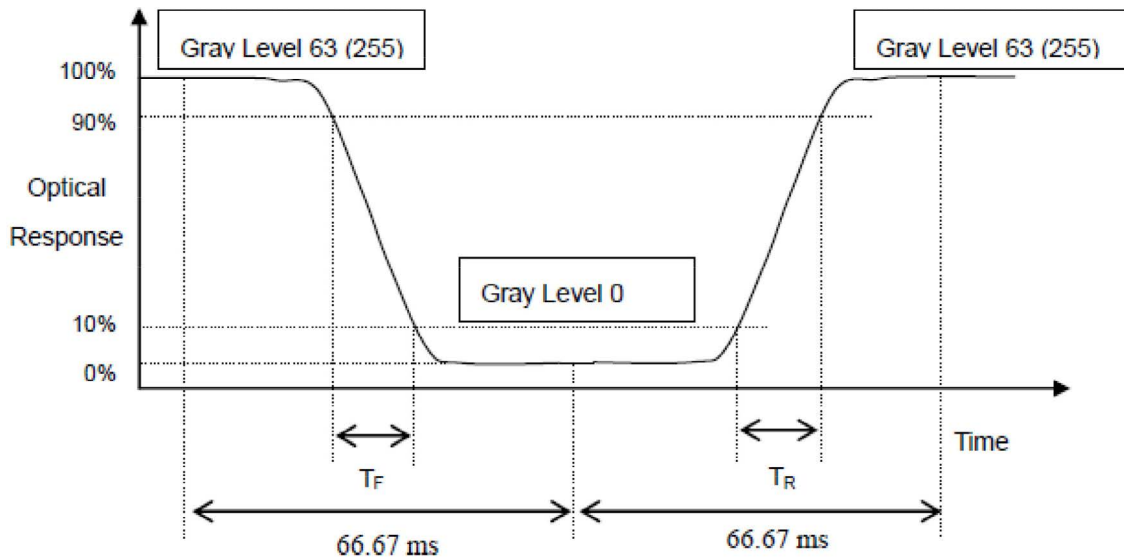
L63: Luminance of gray level 255

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time ( $T_R, T_F$ ):



Note (4) Definition of Luminance of White ( $L_c$ ):

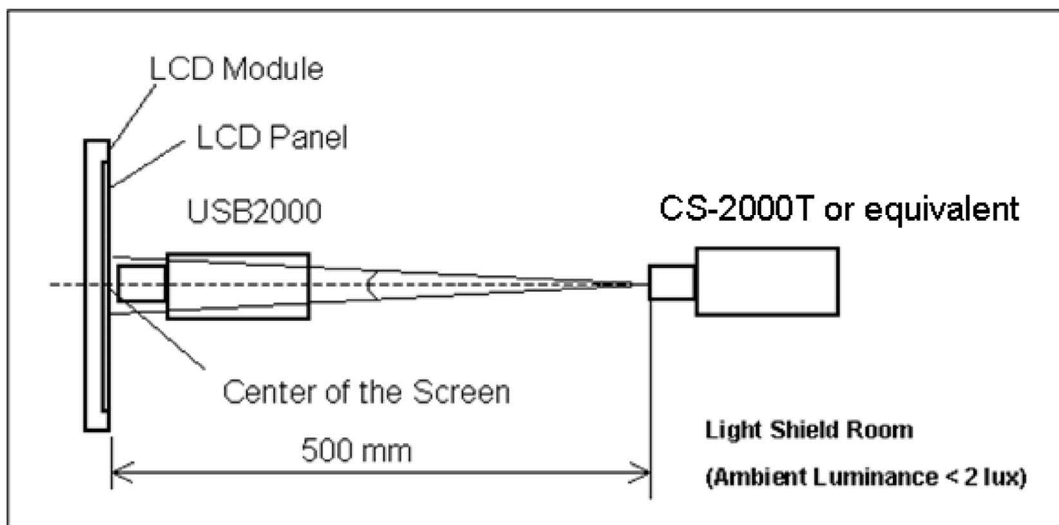
Measure the luminance of gray level 255 at center points

$$L_c = L (5)$$

$L (x)$  is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

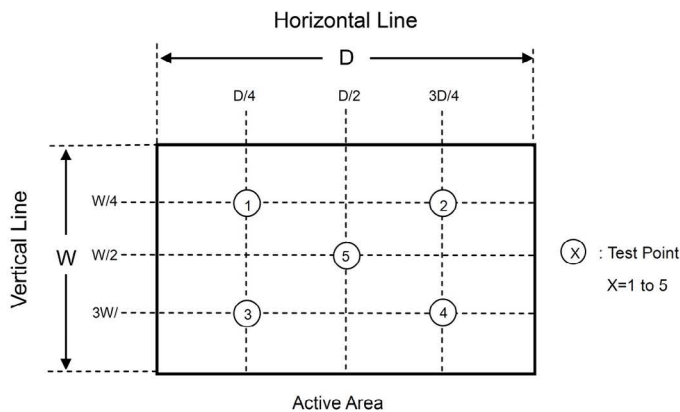
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note (6) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \frac{\text{Maximum [L (1), L (2), L (3), L (4), L (5)]}}{\text{Minimum [L (1), L (2), L (3), L (4), L (5)]}}$$



## Part Number Table

| Description                      | Part Number |
|----------------------------------|-------------|
| TFT LCD, 12.1", HDMI, 1280 × 800 | MP010839    |

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