



## Description

This product is a 9" (16:9) diagonally measured active display with high resolution WXGA 1024×600 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. 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 9" TFT model comes in 1024×600 resolution that would be great for embedded computing usage too.

## Specifications

Panel Size	: 9"
Number of Pixels	: 1024 (W) × RGB × 600 (H) Pixels
Active Area	: 196.61mm (W) × 114.15mm (H)
Pixel Pitch	: 0.192mm (W) × 0.19025mm (H)
Outline Dimension	: 210.7mm (W) × 126.4mm (H) × 20.7mm (T)
Number of Colours	: 16.7M
Display Mode	: IPS / Normally Black / Transmissive
View Direction	: Free Direction
Display Format	: RGB vertical stripe
Surface Treatment	: Anti-Glare
Contrast Ratio	: 800 (Typ.)
Luminance	: 1200cd/m <sup>2</sup> (Typ.)
Video Input Interface	: HDMI (Compliance HDMI V1.4)
Backlight	: White LED
Operation Temperature	: -20°C to +70°C
Storage Temperature	: -30°C to +80°C
Weight	: 245g

## Absolute Maximum Ratings

### Electrical Absolute Rating

#### HDMI TFT LCD Module

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

### Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Operating Temperature	Top	-20	-	+70	°C	Ambient Temperature
Storage Temperature	Tst	-30	-	+80		

## Electrical Characteristics

### HDMI TFT LCD Module

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	12V	11	12	13	V	
PWM frequency		100	-	10K	Hz	
PWM Duty		17	-	100	%	<17%=OFF
PWM Dimming Voltage	VPWM-IH	3.3	-	8	V	
	VPWM-IL	-	0.3	-	V	
Supply Current	ICC(12V)	-	(TBD)	-	mA	
LED life time		40000	-	-	Hr	(1)

**Note 1:**

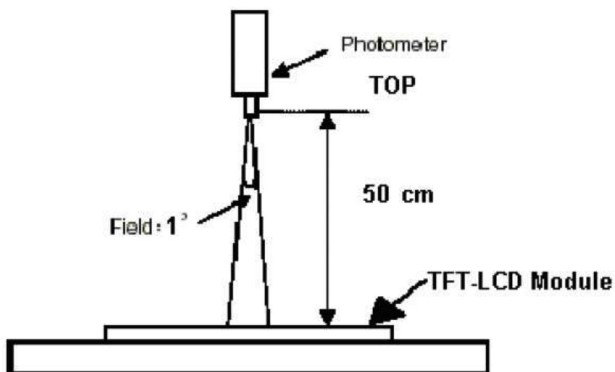
The "LED life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C 60% RH.

## Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Brightness		-	Note1, Note 3, ( $\theta = 0^\circ$ , Normal Viewing Angle)	960	1200	-	cd/m <sup>2</sup>
Uniformity		B-uni		70	75	-	%
Contrast Ratio		CR		600	800	-	-
Response Time		Tr + Tf		-	30	40	ms
Colour Chromaticity	White	Wx		0.26	0.31	0.36	-
		Wy	0.28	0.33	0.38	-	
View angle	Horizontal	$\theta_{x+}$	Center CR $\geq$ 10	80	85	-	
		$\theta_{x-}$		80	85		
	Vertical	$\theta_{Y+}$		80	85		
		$\theta_{Y-}$		80	85		

Note: The following optical specifications shall be measured in a darkroom or equivalent state(ambient luminance  $\leq$ 1 lux, and at room temperature). The operation temperature is 25°C $\pm$ 2°C.

**Note 1: The method of optical measurement**

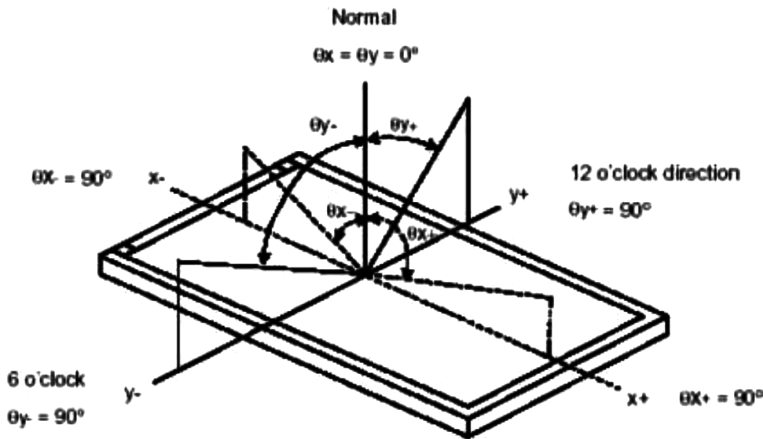


**Note 2:** Measured at the centre area of the panel and at the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

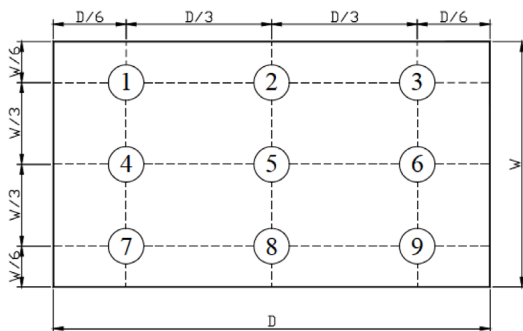
**Note 3:** Definition of Contrast Ratio (CR):

CR = Luminance with all pixels in white state ÷ Luminance with all pixels in Black state

**Note 4:** Definition of Viewing Angle:



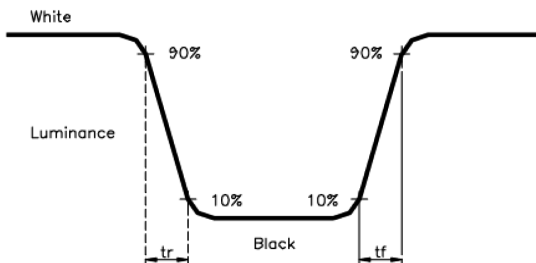
**Note 5:** Definition of Brightness Uniformity (B-uni):



B-uni = (Minimum luminance of 9 points ÷ Maximum luminance of 9 points) X 100%

**Note 6:** Definition of Response Time:

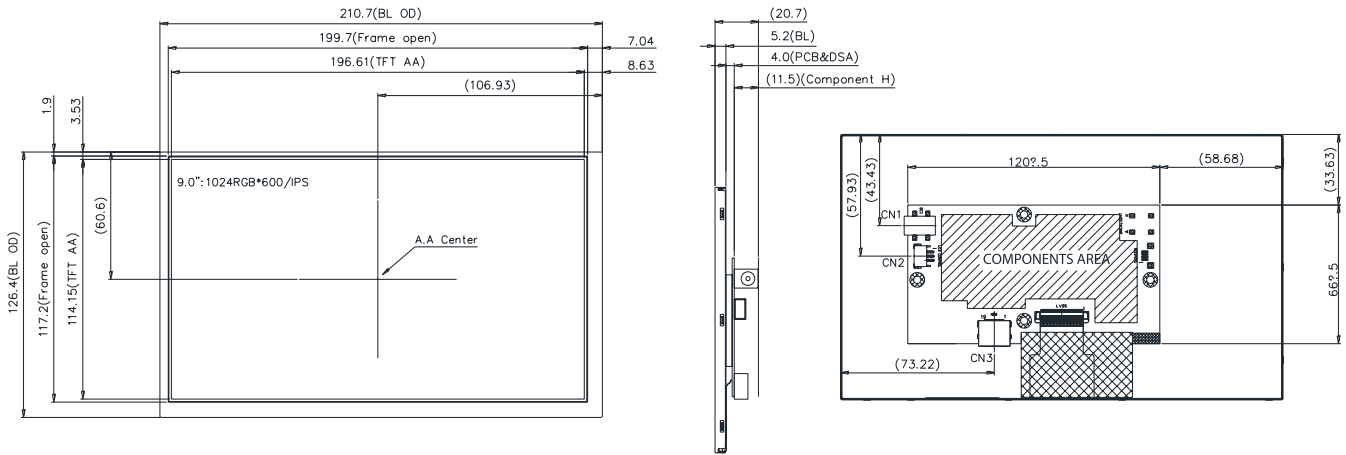
The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure



**Note 7:** Definition of Chromaticity:

The colour coordinates  $(W_x, W_y), (R_x, R_y), (G_x, G_y),$  and  $(B_x, B_y)$  are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

## Diagram



Dimensions : Millimetres



## Pin Description

### Power Input (CN1)

Pin No.	Symbol	I/O	Function	Note
1	12V	P	Power Supply +12V	12V 
2	GND	P	Ground	

### Back-light Control (CN2)

Pin No.	Symbol	I/O	Function	Note
1	GND	P	Ground	-
2	PWM	I	Back-light Dimming control (internal pull up to 3.3V)	*
3	N.C.	-	N.C.	-

\* When PWM not connected, back-light default is typical brightness.

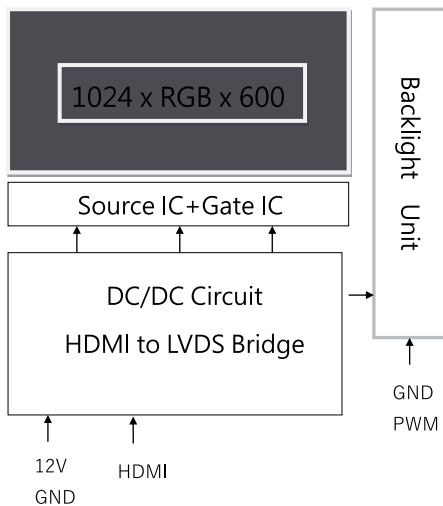
### HDMI (CN3)

Pin No.	Symbol	I/O	Function	Note
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+	

Pin No.	Symbol	I/O	Function	Note
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	

## Block Diagram

### TFT LCD Module



## Part Number Table

Description	Part Number
TFT LCD, 9", HDMI, 1024x600	MP013329

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