

**Display Elektronik GmbH**

# DATA SHEET

TFT MODULE

**DEM 1024600H TMH-PW-N  
(A-TOUCH)**

**7,0“ TFT + TP**

**Product Specification**

**Ver.: 3**

**26.01.2018**

## Revision History

VERSION	DATE	REVISED PAGE NO.	Note
0	12.04.2017		First Issue
1	17.07.2017		Modify Temperature and Counter Drawing Modify Interface.
2	03.11.2017		Add LED Lifetime
3	26.01.2018		Modify temperature

# **Contents**

1. Summary
2. General Specification
3. Interface
4. Counter Drawing
5. Absolute Maximum Ratings
6. Electrical Characteristics
7. Optical Characteristics
8. Reliability
9. Touch Panel Information

## 1. Summary

TFT 7.0" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is composed of a TFT\_LCD module. It is usually designed for industrial application and this module follows RoHS.

## 2. General Specifications

- Size: 7.0 Inch
- Dot Matrix: 1024 x RGB x 600 Dots
- Module Dimension: 165.00 x 99.80 x 25.30 mm
- Active Area: 154.2114 x 85.92 mm
- Dot Pitch: 0.1506 x 0.1432 mm
- LCD Type: TFT, Normally White TN, Transmissive
- View Direction: 12 O'Clock
- Gray Scale Inversion Direction: 6 O'Clock
- Aspect Ratio: 16:9
- Backlight Type: LED, Normally White
- With /Without TP: With Resistive Touch
- Interface: HDMI
- Surface: Anti-Glare

\*Color tone slight changed by temperature and driving voltage.

**3. Interface****3.1. CON5/CON6**

Pin No.	Symbol	Function	Remark
1	3.3V	Raspberry Pi:Power 3.3V	
2	5V	Raspberry Pi:Power 5V	
3	SDA	CTP_SDA (For CTP type Reserved)	
4	5V	Raspberry Pi:Power 5V	
5	SCL	CTP_SCL (For CTP type Reserved)	
6	GND	Raspberry Pi:GND	
7	GPIO04	Raspberry Pi:GPIO04	
8	GPIO14	Raspberry Pi:GPIO14	
9	GND	Raspberry Pi:GND	
10	GPIO15	Raspberry Pi:GPIO15	
11	RST	CTP_RST (For CTP type Reserved)	
12	ACTIVE	GPIO	
13	WAKE	CTP_WAKE (For CTP type Reserved)	
14	GND	Raspberry Pi:GND	
15	INT	CTP_INT (For CTP type Reserved)	
16	GPIO23	Raspberry Pi:GPIO23	
17	3.3V	Power Supply	
18	GPIO24	Raspberry Pi:GPIO24	
19	GPIO10	Raspberry Pi:GPIO10	
20	GND	Raspberry Pi:GND	
21	GPIO09	Raspberry Pi:GPIO09	
22	GPIO25	Raspberry Pi:GPIO25	
23	GPIO11	Raspberry Pi:GPIO11	
24	GPIO08	Raspberry Pi:GPIO08	
25	GND	Raspberry Pi:GND	
26	GPIO07	Raspberry Pi:GPIO07	
27	ID_SD	Raspberry Pi:ID_SD	
28	ID_SC	Raspberry Pi:ID_SC	
29	GPIO05	Raspberry Pi:GPIO05	

30	GND	Raspberry Pi:GND	
31	GPIO06	Raspberry Pi:GPIO06	
32	GPIO12	Raspberry Pi:GPIO12	
33	GPIO13	Raspberry Pi:GPIO13	
34	GND	Raspberry Pi:GND	
35	GPIO19	Raspberry Pi:GPIO19	
36	GPIO16	Raspberry Pi:GPIO16	
37	GPIO26	Raspberry Pi:GPIO26	
38	GPIO20	Raspberry Pi:GPIO20	
39	GND	Raspberry Pi:GND	
40	GPIO21	Raspberry Pi:GPIO21	

**3.2. HDMI**

Pin No.	Symbol	I/O	Function	Remark
1	Rx2+	I	+LVDS Differential Data Input	
2	GND	P	Ground	
3	Rx2-	I	-LVDS Differential Data Input	
4	Rx1+	I	+LVDS Differential Data Input	
5	GND	P	Ground	
6	Rx1-	I	-LVDS Differential Data Input	
7	Rx0+	I	+LVDS Differential Data Input	
8	GND	P	Ground	
9	Rx0-	I	-LVDS Differential Data Input	
10	RxC+	I	+LVDS Differential Clock Input	
11	GND	P	Ground	
12	RxC-	I	-LVDS Differential Clock Input	
13-14	NC	-	No connection	
15	SCL	I/O	DDC(Data Display Channel) Clock	
16	SDA	I/O	DDC(Data Display Channel) Data	
17	GND	P	Ground	
18	5V	P	Power Supply	
19	Detect	I/O	Hot plug detect	

I: input, O: output, P: Power

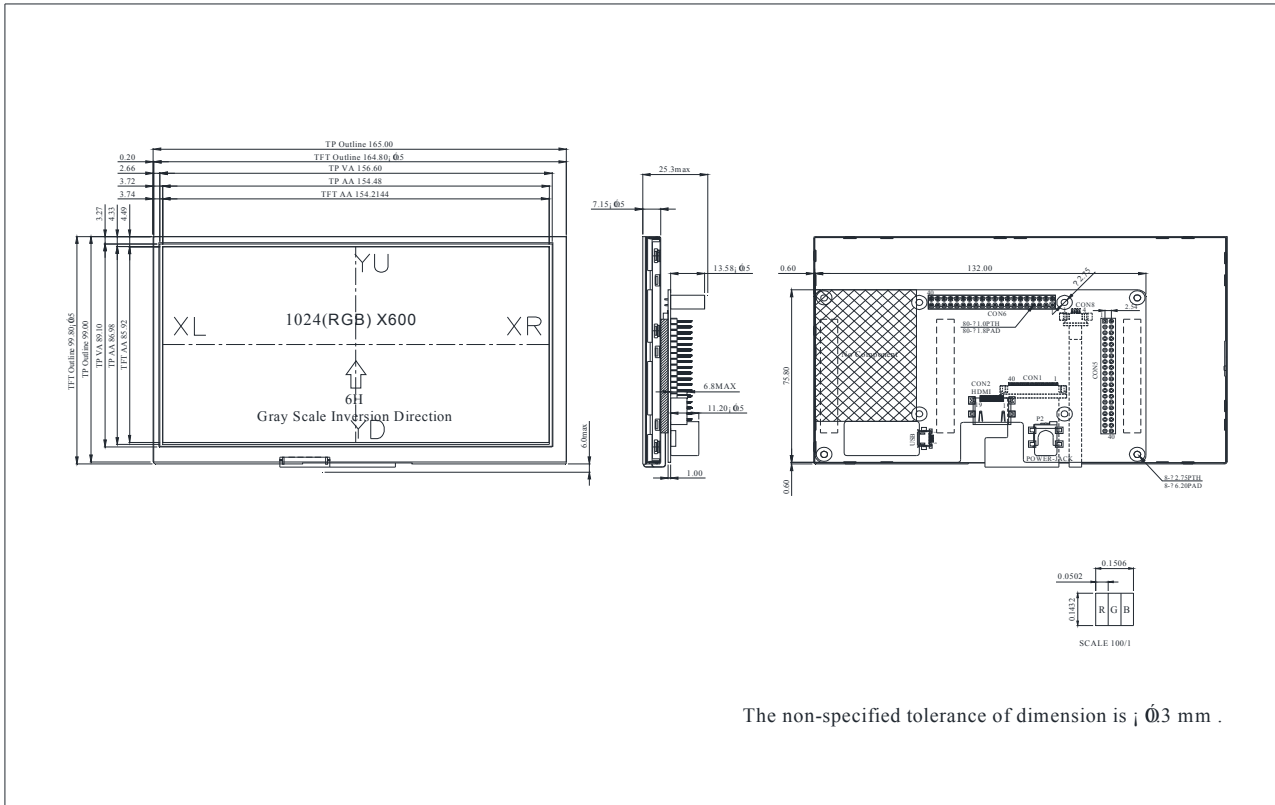
**3.3. USB**

Pin No.	Symbol	I/O	Function	Remark
1	5V	P	Power Supply	
2	D-	I/O	USB Data -	
3	D+	I/O	USB Data +	
4	NC	-	No connection	
5	GND	P	Ground	

**3.4. POWER JACK**

Pin No.	Symbol	I/O	Function	Remark
1	VLED+	P	Power Supply	
2	VLED-	P	Ground	
3	NC		No connection	

### 4. Counter Drawing





### **5. Absolute Maximum Ratings**

<b>Item</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
Operating Temperature	T <sub>OP</sub>	-20	—	+70	°C
Storage Temperature	T <sub>ST</sub>	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp.  $\leq +60^{\circ}\text{C}$ , 90% RH MAX. Temp.  $> +60^{\circ}\text{C}$ , Absolute humidity shall be less than 90% RH at  $+60^{\circ}\text{C}$

## 6. Electrical Characteristics

### 6.1. Typical Operation Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	MAX.		
Power Voltage	VDD	4.5	5.0	5.5	V	Note 2

Note 1: Be sure to apply VDD and VGL to the LCD first, and then apply VGH.

Note 2: VDD setting should match the signals output voltage

### 6.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	MAX.		
	IVCC	-	1000	-	mA	VCC =3.3V
	IVDD	-	1660	-	mA	VDD =5V
	IVLED(5V)		1.5		A	VLED=5V
	LED life time	--	50.000	-	Hr	Note1,2

Note 1:

The LED Supply Voltage is defined by the number of LED at Ta=+25°C and IL =300mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=+25°C and IL =300mA. The LED lifetime could be decreased if operating IL is larger than 300mA.

### 7. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	$T_r$	$\theta=0^\circ, \phi=0^\circ$	-	25	40	.ms	Note 3	
	$T_f$							
Contrast ratio	CR	At optimized viewing angle	600	800	-	-	Note 4	
Color Chromaticity	White	$W_x$	$\theta=0^\circ, \phi=0$	0.26	0.31	0.36	-	Note 2,5,6
				$W_y$	0.28	0.33	0.38	
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\Theta_R$	CR $\geq 10$	70	80	-	Deg.	Note 1
		$\Theta_L$		70	80	-		
	Ver.	$\Phi_T$		50	60	-		
		$\Phi_B$		60	70	-		
Brightness	-	-	350	400	-	cd/m <sup>2</sup>	Center of display	

Ta=25°C ± 2°C,

Note 1: Definition of viewing angle range

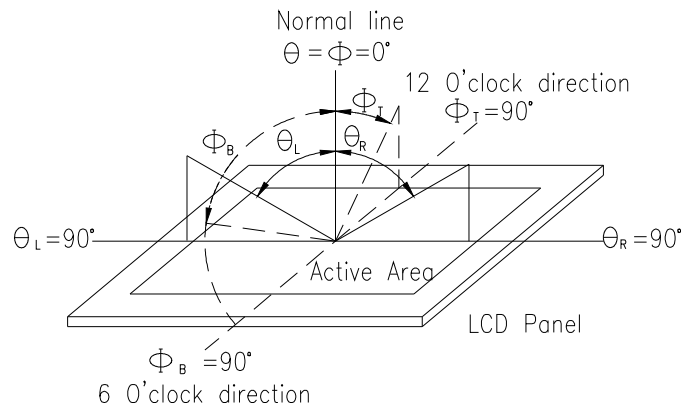


Fig. 8.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

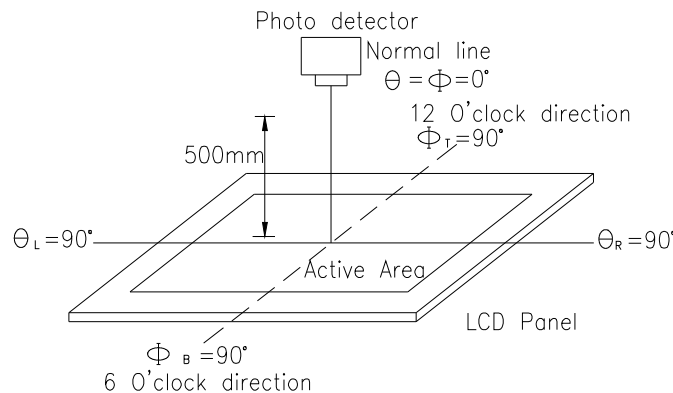
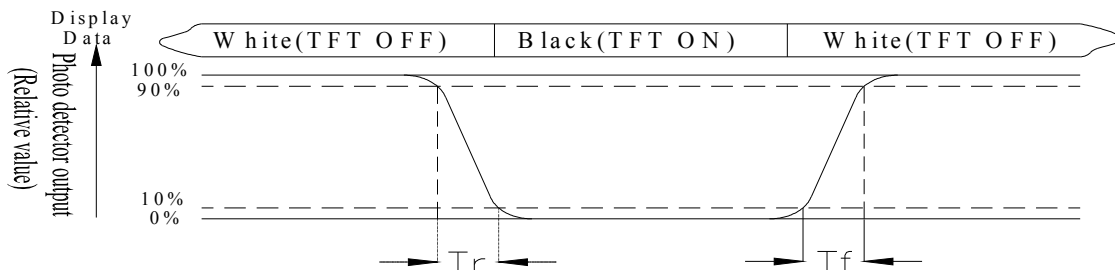


Fig. 8.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

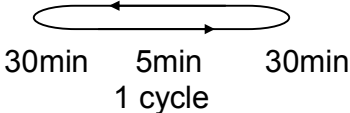
Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

## 8. Reliability

Content of Reliability Test (Wide temperature, 0°C~ +70°C)

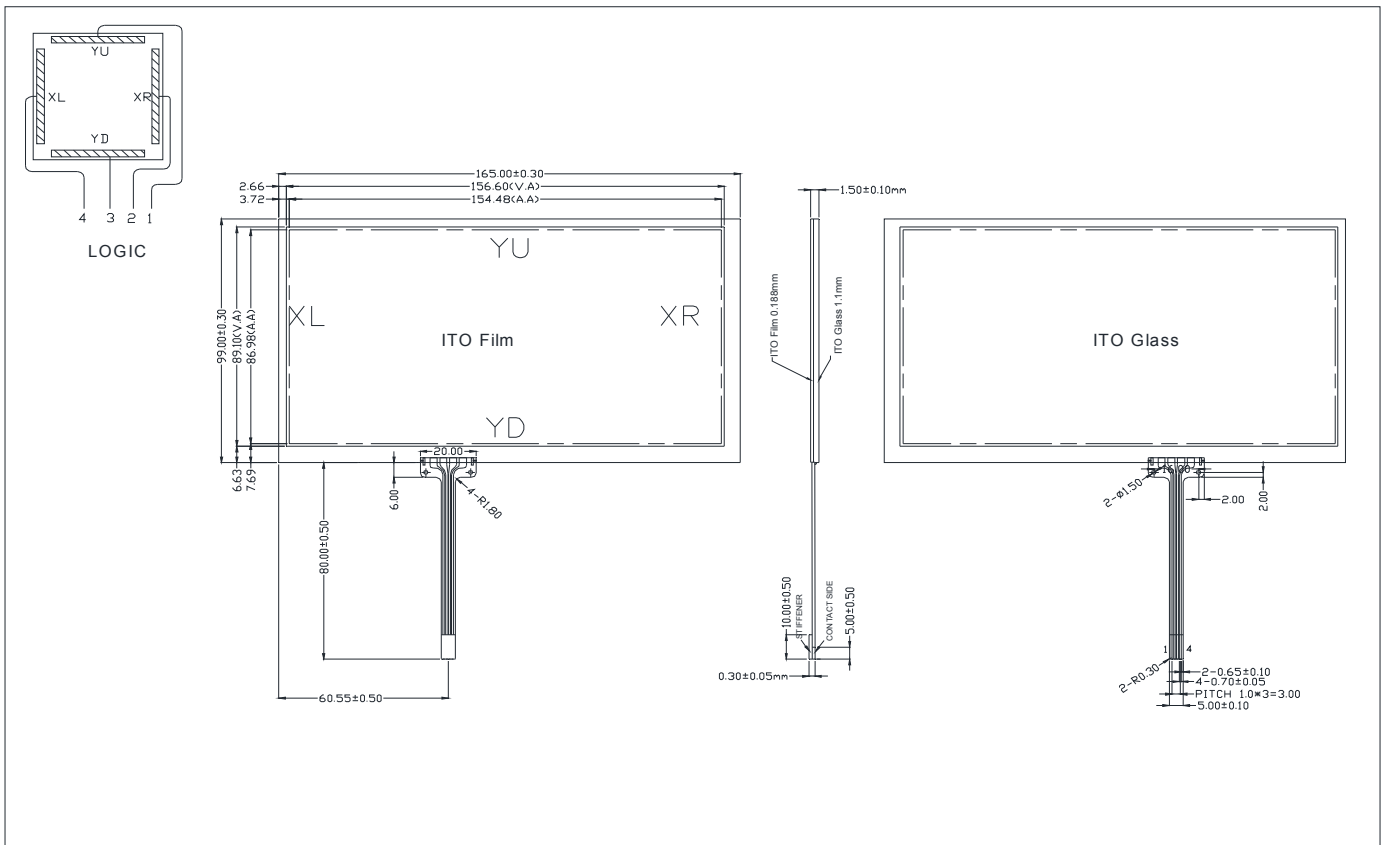
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-20°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	+70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	+60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20°C +25°C +70°C  30min 5min 30min 1 cycle	-20°C/+70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(Contact) ±800V(Air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

### 9. Touch Panel Information



#### Resistance Touch Panel General Specifications

Item	Description
Driving Condition	DC3V~7V
Operating Force	30g~80g
Linearity max	≤±1.5%
Insulating Resistance	> 10MΩ · 25V(DC)
Light Transparence	70%
Structure Type	ITO Film/ITO Glass(F/G)
Surface Hardness	3H typ
Pen Hitting Durability (with the Silicon Rubber)	> 1000,000 times
X Axis Resistance	430 Ω ~ 910 Ω
Y Axis Resistance	150 Ω ~ 530 Ω