

APPROVAL SHEET

承认书

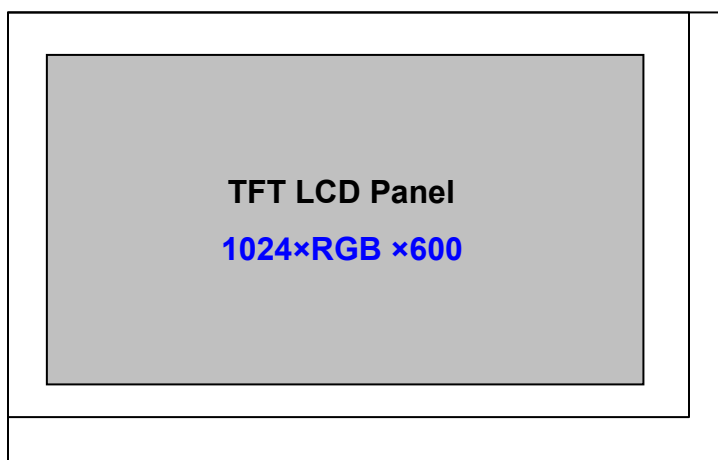
客户名称 Customer	
产品型号 Part NO.	M101B30-42-273-0101
产品内容 Product type	Mode: TFT LCD Module
备注栏 Remarks	<input type="checkbox"/> APPROVAL FOR SEPCIFICATIONS ONLY <input checked="" type="checkbox"/> APPROVAL FOR SEPCIFICATIONS AND SAMPLE
客户确认签章 Signature by Customer:	
备注/ Notes:	

PREPARED BY	CHECKED BY	APPROVED BY

1.0 GENERAL DESCRIPTION

1.1 Introduction

The TFT MODE is a color active matrix TFT LCD single cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This panel has a 10.1 inch diagonally measured active area with WSVGA resolutions (1024 horizontal by 600 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.



1.2 Features

- Thin and light weight
- 0.5t Glass
- IC(COG) 1+1
- Gate & Data Layer交替

1.3 Application

- GPS Device
- Pad

1.4 General Specification

The followings are general specifications at the single cell.

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	222.72(H) × 125.28(V)	mm	
CF size	228.0(H) × 130.5(V)	mm	
Number of pixels	1024 (H) × 600 (V)	pixels	
Pixel pitch	0.0725(H) × 0.2088(V)	mm	非 1:3结构
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M	colors	
Color Gamut	50	%	@C Light
Display mode	Normally Black		
Panel Size	230.4 (H) x 134.2 (V)	mm	

2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings >

Parameter	Symbol	Min.	Max.	Unit	Remarks
LC operating Voltage ^[1]	V _{OP}		4.6	V	Ta=25+/-2°C
Operating Temperature (Humidity)	T _{OP}	-20	+70	°C	
	RH		90	%	At 60°C
Storage Temperature (Humidity)	T _{ST}	-30	+80	°C	
	RH		90	%	At 60°C

[1] Liquid Crystal driving voltage

Due to the characteristics of LC Material, this voltage varies with environmental temperature.

3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3. Electrical specifications >

[Ta = 25±2 °C]

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
Power Supply Input Voltage	VDD	1.71	1.8	1.89	Vdc	
Power Supply Ripple Voltage	VRP	-	-	200	mV	
Power Supply Current	IDD	-	35	45	mA	1
Input High Threshold Voltage	VIH	1.32	-	1.89	V	
Input Low Threshold Voltage	VIL	0	-	0.57	V	
Time that the transmitter shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	TCLK-POST	60+52UI	-	-	ns	
Detection time that the clock has stopped toggling	TCLK-MISS	-	-	60	ns	
Time to drive LP-00 to prepare for HS clock transmission	TCLK-PREPARE	38	-	95	ns	
Minimum lead HS-0 drive period before starting clock	TCLK-PREPARE + TCLK-ZERO	300	-	-	ns	
Time to enable Clock Lane receiver line termination measured from when Dn cross VIL,MAX	THS-TERM-EN	-	-	38	ns	
Minimum time that the HS clock must be prior to any associated data lane beginning the transmission from LP to HS mode	TCLK-PRE	8	-	-	UI	
Time to drive HS differential state after last payload clock bit of a HS transmission burst	TCLK-TRAIL	60	-	-	ns	

3.0 ELECTRICAL SPECIFICATIONS

3.2Electrical Specifications

< Table 4.Panel Electrical specifications >

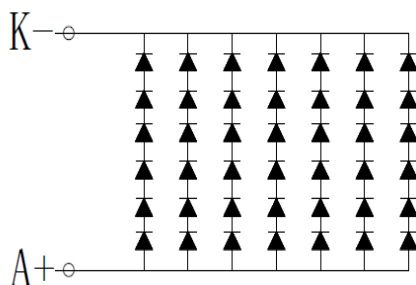
[Ta =25±2 °C]

Parameter	Symbol	Value	Unit	Remarks
Power For Analog Circuit	AVDD	9.6	V	
TFT Gate ON Voltage	VGH	18	V	VGH- VGL<=40 V
TFT Gate OFF Voltage	VGL	-6	V	
TFT Common Electrode Voltage	VCOMH	4.4	V	
	VCOML	4.0	V	

Notes :

1. VGH is TFT Gate operating voltage.
2. VGL is TFT Gate operating voltage. The low voltage level of VGL signal must be fluctuates with same phase as Vcom.
3. Vcom must be adjusted to optimize display quality, as Crosstalk and Contrast Ratio etc..
4. The value is just the reference value. The customer can optimize the setting value by the different D-IC.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply voltage of white LED backlight	VL	17.3	18.0	21.6	V	Note 1
Current for LED backlight	IL		140		mA	
Luminance (on the module surface,CA-210)			450	-	cd/m ²	
LED life time	-	50,000	-	-	Hr	Note 2



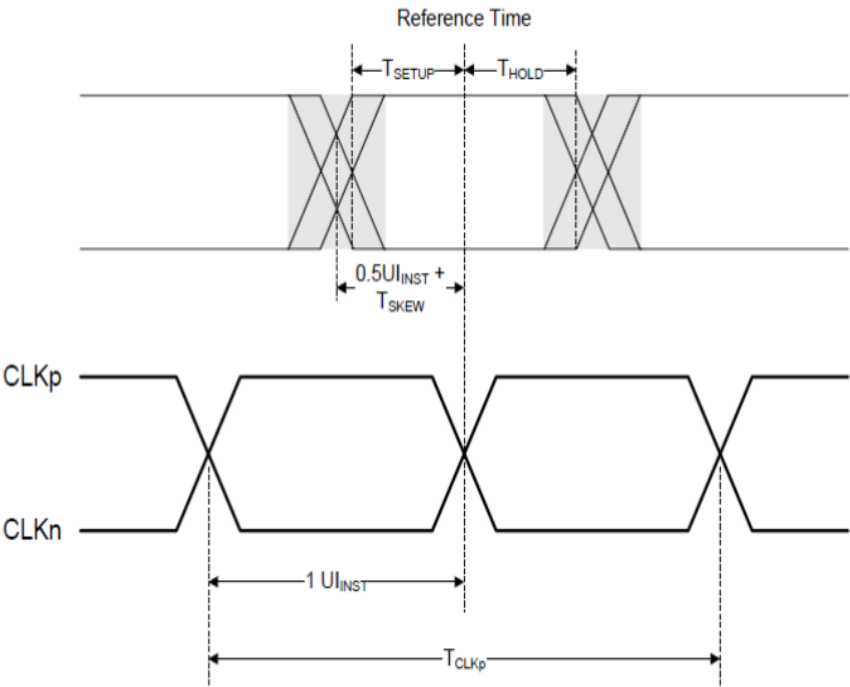
6*7=42LED

4.0 MIPI INTERFACE AC PARAMETER

The specification of the MIPI interface High speed transmission is shown in Table 5.

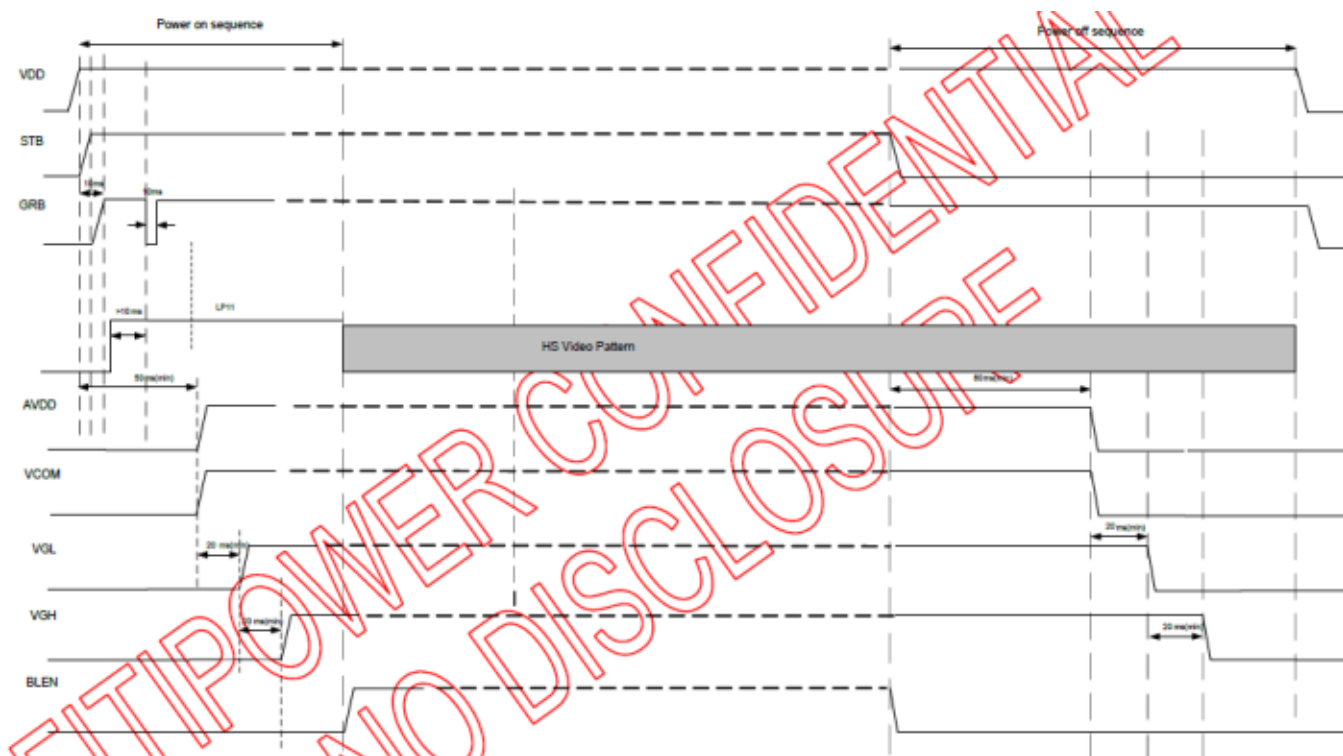
< Table 5. High speed transmission >

Parameter	Symbol	Min	Typ	Max	Unit
Clock frequency	RxFCLK	40.8	51.2	67.2	MHz
UI instantaneous	UIINST	2	-	12.5	ns
Data to Clock Skew(measured at transmitter)	TSKEW(TX)	-0.15	-	0.15	UIINST
Data to Clock Setup time(measured at receiver)	TSETUP(RX)	0.15	-	-	UIINST
Data to Clock Hold time(measured at receiver)	THOLD(RX)	0.15	-	-	UIINST
20%~80% rise time and fall time	TR, TF	150	-	-	ps
					UIINST



5.0 POWER SEQUENCE

In order to prevent IC from power on reset fail, the rising time(TPOR) of the digital power Supply VDD should be maintained within the given specifications. Refer to “AC Characteristics” for more detail on timing.



Notes:

1. CLK and Data Lanes should keep in LP11(stop state) before GRB

6.0 OPTICAL SPECIFICATION

6.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance $\leq 1\text{lux}$ and temperature = $25\pm 2^{\circ}\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0° . We refer to $\theta\phi=0$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta\phi=90$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta\phi=180$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta\phi=270$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or ϕ , the center of the measuring spot on the Display surface shall stay fixed.

Optimum viewing angle direction is 12 "clock.

6.2 Optical Specifications

< Table 6. Optical Specifications >

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	85	-	Deg.	WV-Pol Note 1
		Θ_9		-	85	-	Deg.	
	Vertical	Θ_{12}		-	85	-	Deg.	
		Θ_6		-	85	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	-	800	-		Note 2
Cell Transmittance		Tr		4.8	5.8	-	%	Base on C Light Note 3
White Chromaticity		x_w		TYP. - 0.03	0.307	TYP. + 0.03		Note 4 Base on C Light
		y_w			0.338			
Reproduction of color (C light)	Red	R_x			0.605			
		R_y			0.336			
	Green	G_x			0.297			
		G_y			0.552			
	Blue	B_x			0.139			
		B_y			0.132			
Color Gamut (C light)				-	50	-	%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C $\Theta = 0^\circ$	-	30	40	ms	Note 5

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 5).
2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 5) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer.
4. The color chromaticity coordinates specified in Table 6 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Calculation is based on C light.
5. The electro-optical response time measurements shall be made as FIGURE 6 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_d .

7.0 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

<Table 7. Reliability Test Parameters >

No	Test Items	Conditions	
1	High temperature storage test	Ta = 80 °C, 240 hrs	Note 1
2	Low temperature storage test	Ta = -30 °C, 240 hrs	
3	High temperature & high humidity (operation test)	Ta = 60 °C, 90%RH, 240hrs	
4	High temperature operation test	Ta = 70 °C, 24hrs	
5	Low temperature operation test	Ta = -20 °C, 24hrs	
6	Thermal shock	Ta = -30 °C ↔ 80 °C (0.5 hr), 100 cycle	
7	PCT	121°C 100% 2atm, 24hr	Note 2
8	Packing Vibration Test	f=5-200Hz/a=1.47G/Random/X,Y,±Z/各30min	
9	Drop Test	一角三棱六面, 自由落体各跌落一次	

8.0 FPC/IC PIN ASSIGNMENT

Figure 1. FPC Pin Assignment

[illegible]

9.0 APPENDIX

Figure 4. The Definition of V_{th} & V_{sat}

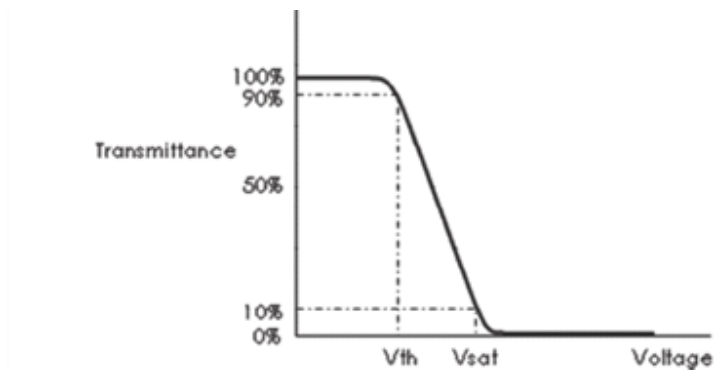


Figure 5. Measurement Set Up

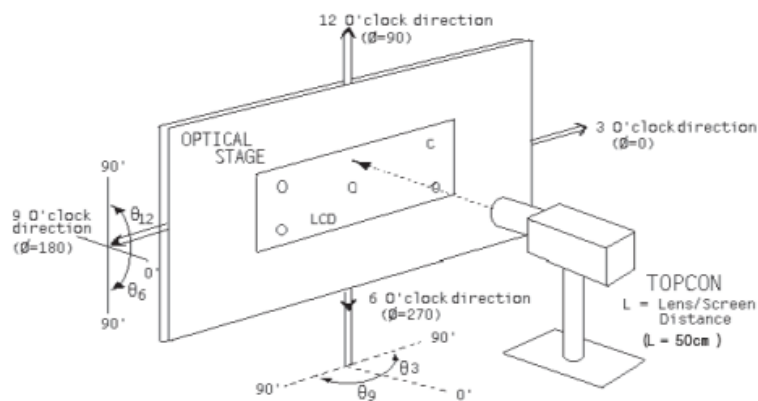


Figure 6. Response Time Testing

