

LCD MODULE SPECIFICATION

Customer:	

Module No.: XY101WXV35CT2-M1687B

Date: 2023-04-01

Version: <u>2.0</u>

For Customer's Acceptance:

Approved by	Comment

Approved by	Checked by	Prepared by		
Jack.li	Ray.Zhou	Luck.Yang		



Table of Contents

Rec	ord of Revision	3
1	General Specifications	4
2	Pin Assignment	5
3	Absolute Maximum Ratings	6
4.	Electrical Characteristics	7
5	Timing Chart	8
6	Optical Characteristics	.11
7	Environmental / Reliability Test	.14
8	Mechanical Drawing	.15
9	Precautions for Use of LCD Modules	.16



Record of Revision

Rev.	Date	Description	Editor
0.0	2020-06-19	First release	Luck.Yang
1.0	2023-02-25	Update parameter	Luck.Yang
2.0	2023-04-01	Update CAD	Luck.Yang



1 General Specifications

No.	Item	Specification	Remark
1	LCD Size	10.1 inch (Diagonal)	
2	Driver Element	a-Si TFT active matrix	
3	Resolution	800 (RGB) ×1280	
4	Display Mode	Normally Black, Transmissive	
5	Pixel Pitch(mm)	0.0564 (H) × 0.1692 (V)	
6	Display Colors	16.7M	
7	Surface Treatment		
8	Color Arrangement	RGB-Stripe	
9	Interface	MIPI	
10	Viewing Direction	All	
11	Gray Scale Inversion	/	Note 1
12	Outline Dimension (mm)	174.37 (W) × 256.37 (H) × 4.21(T)	
13	Active Area (mm)	135.36(W) × 216.58 (H)	
14	Touch Screen	With CTP	
15	Display Driver IC	ILI9881C	
16	Touch Driver IC	GT9271	

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180° shift.

Note 2: RoHS compliant.



2 Pin Assignment

2.1LCD Pin assignment

Match connector : 0.5mm pitch FPC/FFC,T=0.3mm. Type of connector on FPC: XF2M-4015-1A (OMRON) or equivalent.

PIN	Symbol	I/O	Description	Remark		
1	NC	-	Not connect, open pin			
2	VDD	Р	Power Supply 2.8V			
3	VDD	Р	Power Supply 2.8V			
4	GND	Р	Ground			
5	RESET	Ι	LCM Reset input signal			
6	NC	-	Not connect, open pin			
7	GND	Р	Ground			
8	MIPI_D0N	I/O	DSI-D0- data signals			
9	MIPI_D0P	I/O	DSI-D0+ data signals			
10	GND	Р	Ground			
11	MIPI_D1N	I	DSI-D1- data signals			
12	MIPI_D1P	I	DSI-D1+ data signals			
13	GND	Р	Ground			
14	MIPI_CLKN	Ι	DSI-CLK- clock signals			
15	MIPI_CLKP	I	DSI-CLK+ clock signals			
16	GND	Р	Ground			
17	MIPI_D2N	I	DSI-D2-data signals			
18	MIPI_D2P	I	DSI-D2+data signals			
19	GND	Р	Ground			
20	MIPI_D3N	Ι	DSI-D3- data signals			
21	MIPI_D3P	Ι	DSI-D3+ data signals			
22	GND	Р	Ground			
23	NC	-	Not connect, open pin			
24	NC	-	Not connect, open pin			
25	GND	Р	Ground			
26	NC	-	Not connect, open pin			
27	PWM	0	LCD backlight control PWM output PIN, leave the pin open when not in use.			
28	NC	-	Not connect, open pin			
29	NC	-	Not connect, open pin			
30	GND	Р	Ground			



XY101WXV35CT2-M1687B

31	LED-	Р	Power voltage for LED backlight Cathode
32	LED-	Р	Power voltage for LED backlight Cathode
33	NC	-	Not connect, open pin
34	NC	-	Not connect, open pin
35	NC	-	Not connect, open pin
36	NC	-	Not connect, open pin
37	NC	-	Not connect, open pin
38	NC	-	Not connect, open pin
39	LED+	Р	Power voltage for LED backlight Anode
40	LED+	Р	Power voltage for LED backlight Anode

I---Input, O---Output, P--- Power/Ground

2.2 Touch panel pin assignment

Match connector: XF2M-0815-1A by OMRON or equivalent

No.	Symbol	Description
1	GND	Ground
2	CTP-VDD	2.8~3.3V, TP_Power
3	CTP-VDDIO	2.8~3.3V, TP I/O_Power
4	SDA	TP_I2C_SDA (2.8~3.3V),4.7K~10K pull up resistor needed
5	SCL	TP_I2C _SCL(2.8~3.3V), 4.7K~10K pull up resistor needed
6	RESET	TP_External reset.
7	INT	TP_External interrupt.
8	GND	Ground

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
	VDD	-0.30	+4.0	V	
Power Voltage	CTP-VDD	-0.30	+3.6	V	TP POWER
	CTP-VDDIO	-0.30	+3.6	V	TP POWER
Operating Temperature	Тор	-20.0	70.0	°C	
Storage Temperature	T _{st}	-30.0	80.0	°C	
Operating and Storage Humidity	H _{stg}	10%	90%	%(RH)	



4. Electrical Characteristics

4.1 Recommended Operating Condition

VDD=2.8V, GND=0V, Ta = 25℃

	Item	Symbol	Min.	Тур.	Max.	Unit	Remark
Analog supply	/Digital Voltage	VDD	2.8	3.0	3.3	V	
TP Pow	er	CTP-VDD	2.8	3.0	3.3	V	
TP I/O	Power	CTP-VDDI O	2.8	3.0	3.3	V	
Input	Low Level	V _{IL}	0	-	0.3xVDD	V	
Signal Voltag e	High Level	V _{IH}	0.7 x VDD	-	VDD	V	
Current analog voltage	t of TP supply	Ictp-vddio 2.8v	-	20	40	mA	
Current supply	t of analog voltage	Ivdd	_	50	80	mA	VDD=2.8V, color bar pattern

4.2 Backlight Unit Driving Condition

Item	Symbol	Min.	Тур.	Max.	Unit	Remark
Forward Current	I _F	-	80	100	mA	
Forward Current Voltage	V _F	-	22.4	23.8	V	28 LEDS
Backlight Power Consumption	W _{BL}	-	1792	2380	mW	LED Parallel)
Operating Life Time		30000			hrs	Note 2, Note 3

Note1: The LED driving condition is defined for each module (4LED Serial, 7 LED Parallel).

Note2: When LCM is operated, the stable forward current should be inputted. And forward voltage is for reference only.

Note3: Optical performance should be evaluated at $Ta=25^{\circ}C$ When LED is driven at high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

Note4: The LED driving condition is defined for each LED module.



5 Timing Chart

5.1 DSI Interface Timing Characteristics High Speed Mode – Clock Channel Timing



Figure : DSI Clock Channel Timing

Table : DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Мах	Unit
CLKP/N	2xUI _{INST}	Double UI instantaneous	Note 2	25	ns
CLKP/N	UI _{INSTA} ,UI _{INSTB} (Note 1)	Ul instantaneous Half	Note 2	12.5	ns

Notes:

- 1. UI = UIINSTA = UIINSTB
- 2. Define the minimum value, see Table

Table : Limited Clock Channel Speed

Data type	Two Lanes speed	Three Lanes speed	Four Lanes speed
Data Type = 00 1110 (0Eh), RGB 565, 16 UI per Pixel	566 Mbps	466 Mbps	366 Mbps
Data Type = 01 1110 (1Eh), RGB 666, 18 UI per Pixel	637 Mbps	525 Mbps	412 Mbps
Data Type = 10 1110 (2Eh), RGB 666 Loosely, 24 UI per Pixel	850 Mbps	750 Mbps	650 Mbps
Data Type = 11 1110 (3Eh), RGB 888, 24 UI per Pixel	850 Mbps	750 Mbps	650 Mbps



High Speed Mode – Data Clock Channel Timing

Figure : DSI Data to Clock Channel Timings

Table	:	DSI	Data	to	Clock	Channel	Timings

Signal	Symbol	Parameter	Min	Max
D-DAL - O 14	t _{DS}	Data to Clock Setup time	0.15xUI	-
DnP/N, n=0 and 1	t _{DH}	Clock to Data Hold Time	0.15xUI	-

5.2 Recommended Timing Setting of TCON

TCON (Embedded in Source IC) Input Timing (DCLK, HS, VS, DE) VDD=2.8V, GND=0V, Ta=25°C

Parameter	Symbol	Min.	Тур.	Max.	Unit	Remar k
DCLK	Fclk	-	72	-	MHz	
DCLK	tclk	-	13.9	-	ns	
	thd	-	800	-	tclk	
	thpw	-	6	-	tclk	
нзр	thb	-	50	-	tclk	
	thfp	-	50	-	tclk	
VSD	tvd	-	1280	-	th	
	tvpw	-	2	-	th	
	tvb	-	20	-	th	
	tvfp	-	20	-	th	

Note: For reference only, it needs to be adjusted according to the actual display effect.

5.3 Reset input timing



Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
tresw	*1) Reset low pulse width	RESX	10	-	-	-	us
		-	2	-	5	When reset applied during Sleep in mode	ms
trest	*2) Reset complete time	1	8	-	120	When reset applied during Sleep out mode	ms

Table: Reset input timing



5.4 Power On/Off Timing



6 Optical Characteristics

							-	Ta=25℃
Item		Symbol	Condition	Min.	Тур.	Max.	Unit	Remark
		өт		-	80	-		
		ӨВ	CD > 10	-	80	-		Note 2
view Angles		θL	CK = 10	-	80	-	Degree	Note 2
		θR		-	80	-		
Contrast Ratio	0	CR	θ=0°	800	1000	-		Note1 Note3
Response Time		T _{ON} T _{OFF}	25℃		25	35	ms	Note1 Note4
	White	x		0.272	0.302	0.332		
		У		0.299	0.329	0.359		
	Red	x		0.611	0.641	0.671		
		У	Backlight	0.303	0.333	0.363		Note1
Chromaticity	Green	x	is on	0.264	0.284	0.314		Note5
		У		0.519	0.549	0.579		
	Blue	x		0.110	0.140	0.170		
		у		0.071	0.101	0.131		
Uniformity		U		75	80	-	%	Note1 Note6
NTSC				-	60	-	%	Note 5
Luminance		L		_	380	-	cd/m²	Note1 Note7

Test Conditions:

- 1. IF= 80 mA, VF=22.4 V and the ambient temperature is $25\pm2^{\circ}$ C.humidity is $65\pm7\%$
- 2. The test systems refer to Note 1 and Note 2.



Note 1: Definition of optical measurement system.

Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio		
Luminance		10
Chromaticity	SK-3A	T
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).



Note 3: Definition of contrast ratio

Contrast ratio (CR) = Luminance measured when LCD is on the "White" state Luminance measured when LCD is on the "Black" state

"White state ": The state is that the LCD should drive by Vwhite.

"Black state": The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.



Note 4: 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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L----- Active area length W----- Active area width



Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of luminance:

Measure the luminance of white state at center point.



7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70°C, 240 hours	No abnormalities in functions
2	Low Temperature Operation	Ta = -20°C, 240 hours	No abnormalities in functions
3	High Temperature Storage	Ta = +80°C, 240 hours	No abnormalities in functions
4	Low Temperature Storage	Ta = -30°C, 240 hours	No abnormalities in functions
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	No abnormalities in functions
6	Thermal Shock (non-operating)	-30° C 30 min~ $+70^{\circ}$ C 30 min, Change time: 0.5 hour 5 min 0.5 hour.10 Cycle	Start with cold temperature, End with high temperature,
7	ESD	C=150pF, R=330 Ω ,5point/panel Air: ±8Kv, 5times; Contact:±4Kv,5times (Environment:15 $^{\circ}$ C~35 $^{\circ}$ C, 30%~60%.86Kpa~106Kpa)	No abnormalities in functions

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of samples.



XY101WXV35CT2-M1687B

8 Mechanical Drawing





9 Precautions for Use of LCD Modules

Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it 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.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol

- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.8.1 Be sure to ground the body when handling the LCD Modules.

9.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

Storage Precautions

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is: Temperature : 0° C ~ 40° C Relatively humidity: $\leq 80\%$

9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

Transportation Precautions

9.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.