

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS101I05-R-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

- ☒ Approved Product Specification only
- ☐ Approved Product Specification and Samples

<u>Prepared By</u>	<u>Checked By</u>	<u>Approved By</u>

Contents

目录

1. General Description	3
2. Physical Features	3
3. Mechanical Specification	3
4. Outline Dimension	4
5. Absolute Maximum Ratings	5
6. Electrical Characteristics	5
7. Module Function Description	6
8. Electro-Optical Characteristics	11
9. Records Of Version	15

1. General Description

LS101I05-R-V1 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit and a backlight unit. The panel size is 10.1 inch and the resolution is 1024(RGB)*600, the panel can display up to 16.7M colors.

2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 1024(RGB)×600 Dot-matrix
Input Data	RGB 24 BIT
Viewing Direction (Grayscale Inversion)	Free (IPS)
Drive	

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	235 ×143 ×5.2	mm
Number of dots	1024(RGB) × 600	pixel
Active area (H×V)	222.72×125.28	mm

由 Autodesk 教育版产品制作

5. Absolute Maximum Ratings

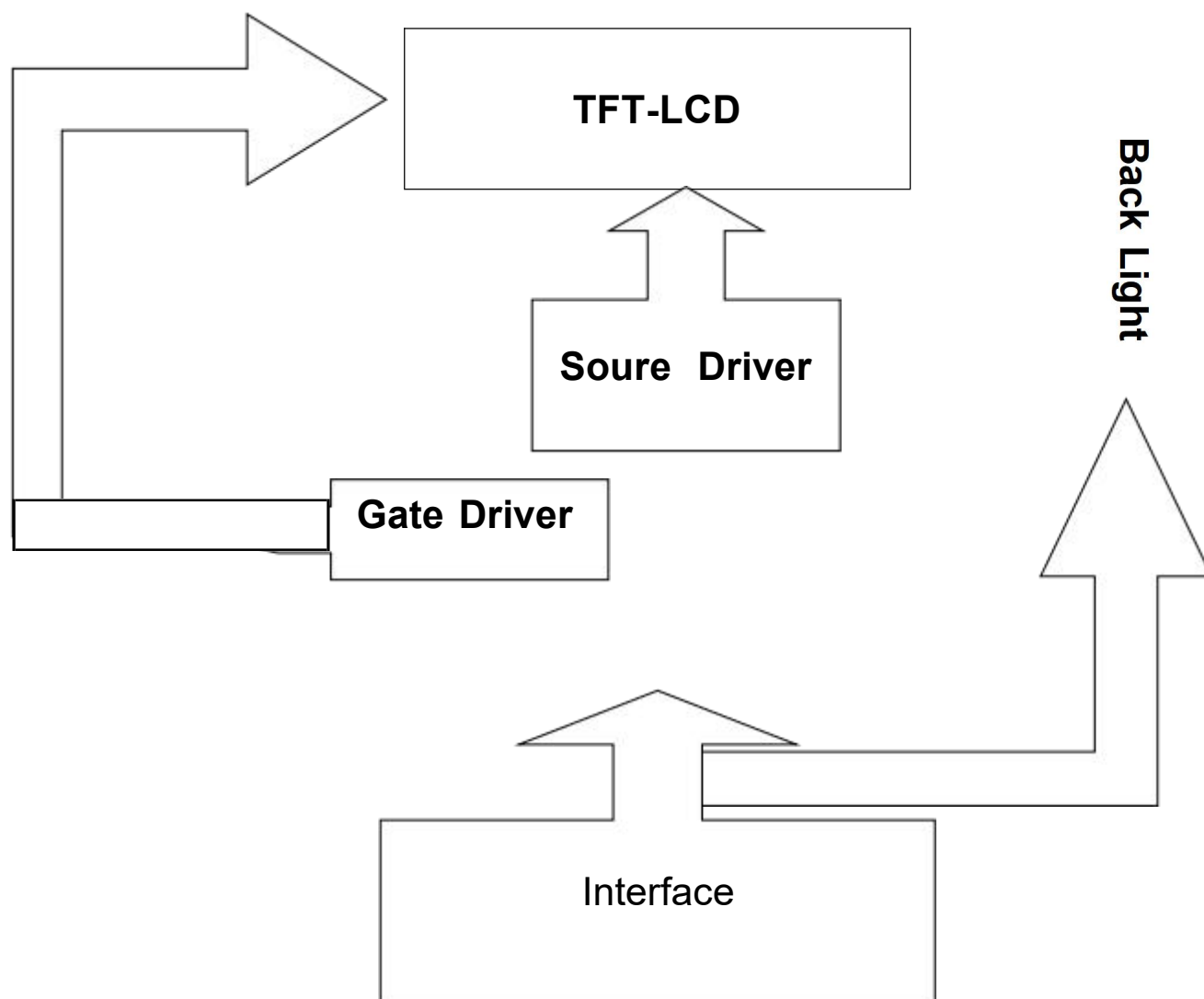
Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	DVDD	-0.3	3.6	V
Analog Supply Voltage	AVDD	0	13.5	V
TFT Gate ON Voltage	VGH	-0.3	20	V
TFT Gate OFF Voltage	VGL	-20	0.3	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		DVDD	3.0	3.3	3.6	V	Note1
Input Voltage	L level	VIL	0	---	0.3*IOVCC	V	
	H level	VIH	0.7*IOVCC	---	IOVCC	V	

7. Module Function Description

7- 1. Block Diagram Of LCM



7-2. Pin Description

Pin NO.	SYMBOL	I/O	DESCRIPTION	Remark
1	VLED+	-	Power for LED backlight (Anode)	
2	VLED+	-	Power for LED backlight (Anode)	
3	VLED-	-	Power for LED backlight (Cathode)	
4	VLED-	-	Power for LED backlight (Cathode)	
5	GND	P	Power ground	
6	VCOM	I	Common Voltage	
7	DVDD	P	Digital Power	
8	MODE	I	DE/SYNC mode select.	Note 1
9	DE	I	Data Enable signal	
10	VSYNC	I	Vertical sync input	
11	HSYNC	I	Horizontal sync input	
12	B7	I	Blue data (MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	Note 2
19	B0	I	Blue data (LSB)	Note 2
20	G7	I	Green data (MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	
26	G1	I	Green data	Note 2
27	G0	I	Green data (LSB)	Note 2

28	R7	I	Red data (MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	Note 2
35	R0	I	Red data (LSB)	Note 2
36	GND	P	Power ground	
37	DCLK	I	Clock input	Note 3
38	GND	P	Power ground	
39	SHLR	I	Left / Right Selection	Note 4,5
40	UPDN	I	Up / Down Selection	Note 4,5
41	VGH	P	Gate ON Voltage	
42	VGL	P	Gate OFF Voltage	
43	AVDD	P	Power for Analog Circuit	
44	RESET	I	Global reset pin	Note 6
45	NC	-	Not connection	
46	VCOM	I	Common Voltage	
47	DITH	I	Dithering function enable control	Note 7
48	GND	P	Power ground	
49	NC	-	Not connection	
50	NC	-	Not connection	

I: input, O: output, P: Power

Note 1: DE / SYNC mode select under TTL mode. Normally pull high

H : DE mode.

L : HSD/VSD mode.

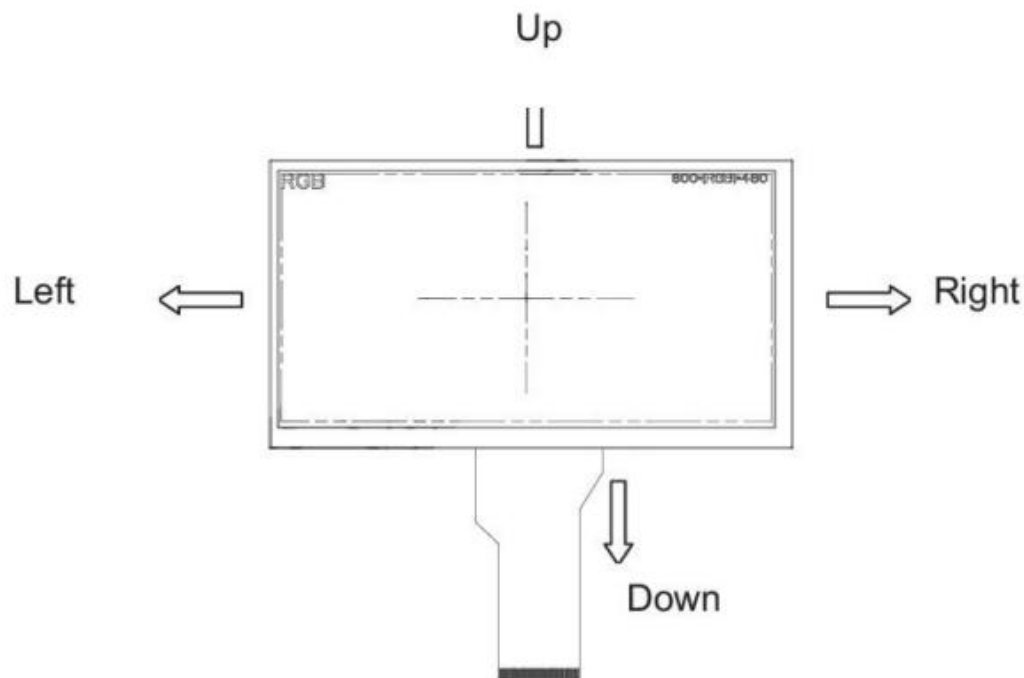
Note 2: When input 18 bits RGB data,the two low bits of R,G and B data must be grounded

Note 3: Data shall be latched at the falling edge of DCLK

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV _{DD}	Up to down, left to right
DV _{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV _{DD}	DV _{DD}	Down to up, left to right

Note 5: Definition of scanning direction.
Refer to the figure as below:



Note 6: Global reset pin. Active Low to enter Reset State. Normally pull high. It's necessary to connecting with an RC delay circuit for stability.
(GRB delay VDD larger than 1ms)

Note 7: Dithering function enable control.
DITHER = "1", Enable internal dithering function
DITHER = "0", Disable internal dithering function.

7-3 Timing Characteristics

DE mode

DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode

Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	Mhz
			44.9	51.2	63	
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode(2)

Vertical input timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

8. Electro-Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	$\theta_x = \theta_y = 0$	---	20	25	ms	Note 1
Contrast Ratio		CR		---	800	---	---	Note 2
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	TBD	---	---	
		W y		---	TBD	---	---	
Viewing angle	θ_T		CR > 10	---	85	---	Deg.	Note 3
	θ_B			---	85	---		
	θ_L			---	85	---		
	θ_R			---	85	---		
Luminance ($I_F = 20mA$)		L		---	450	---	cd/m2	Note4

Note: The parameter is slightly changed by temperature, driving voltage and materiel

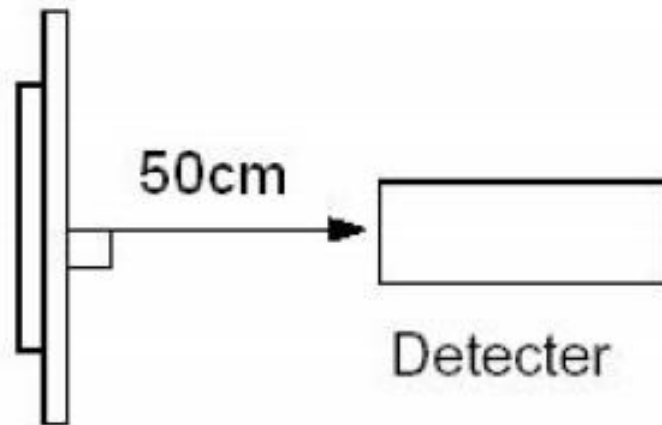
Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white.

The brightness is the average value of 9 measured spots. Measurement equipment PR-705 (Φ8mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25℃.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

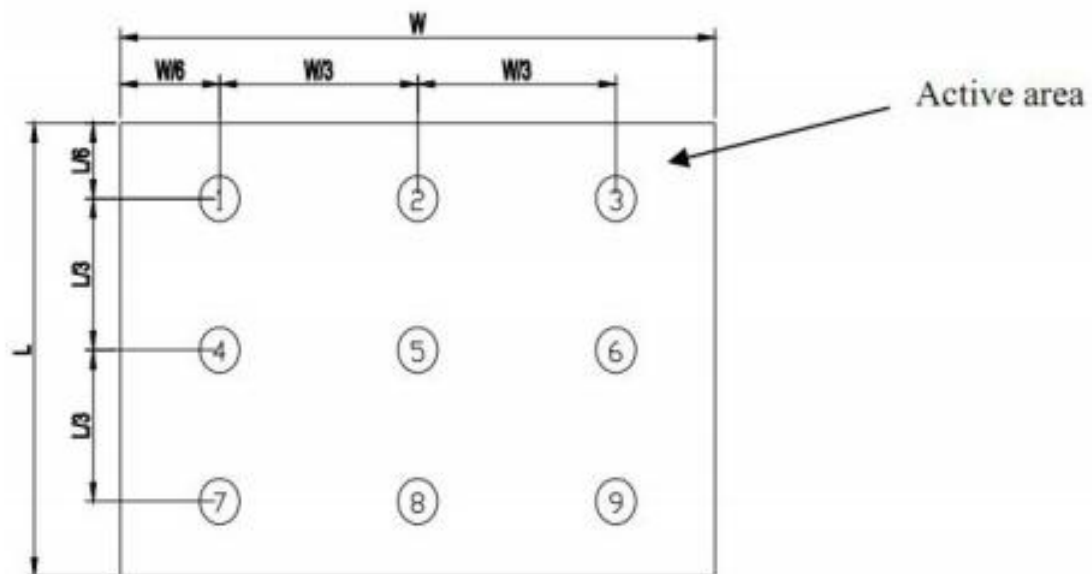


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp \text{ (Min.)} / Bp \text{ (Max.)} \times 100 \text{ (\%)}$$

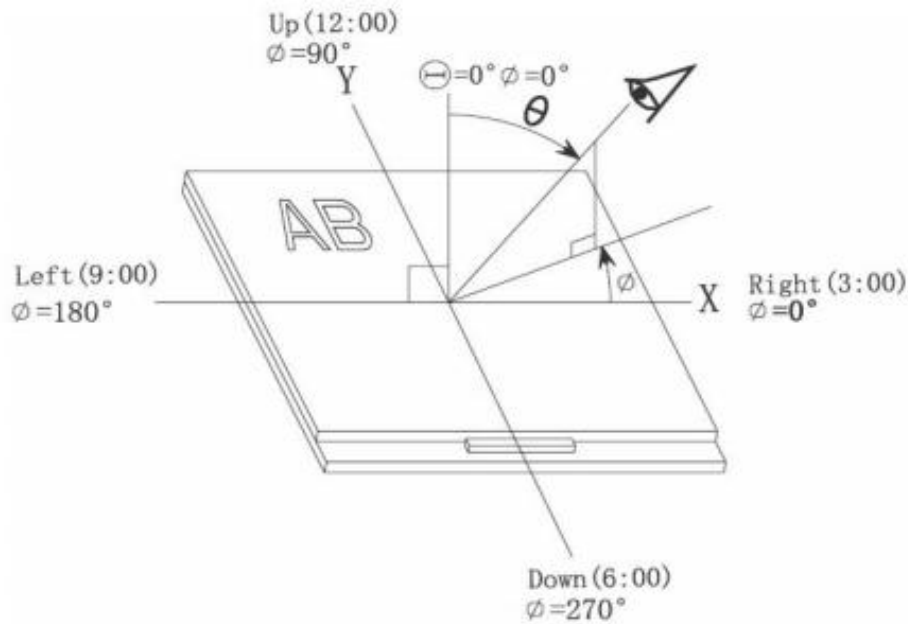
$Bp \text{ (Max.)}$ = Maximum brightness in 9 measured spots

$Bp \text{ (Min.)}$ = Minimum brightness in 9 measured spots.

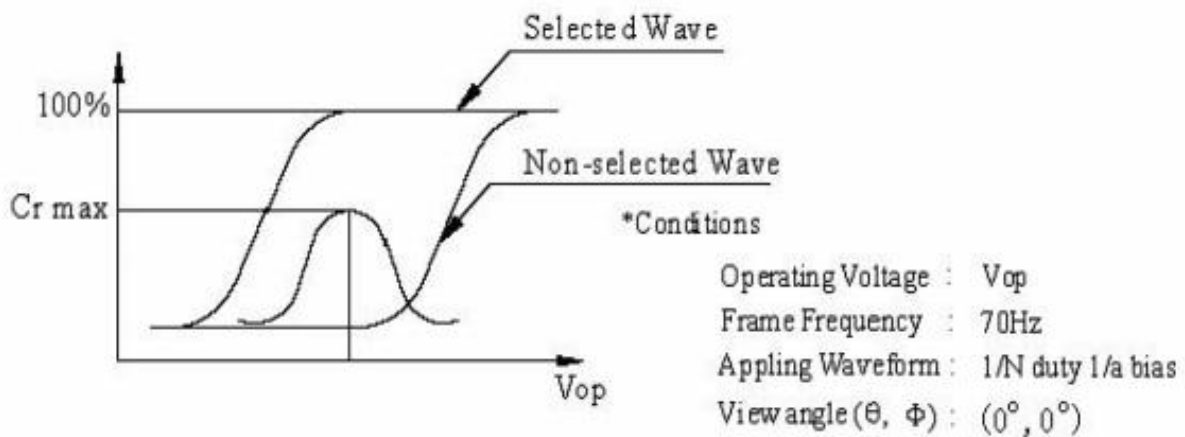


Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and ϕ



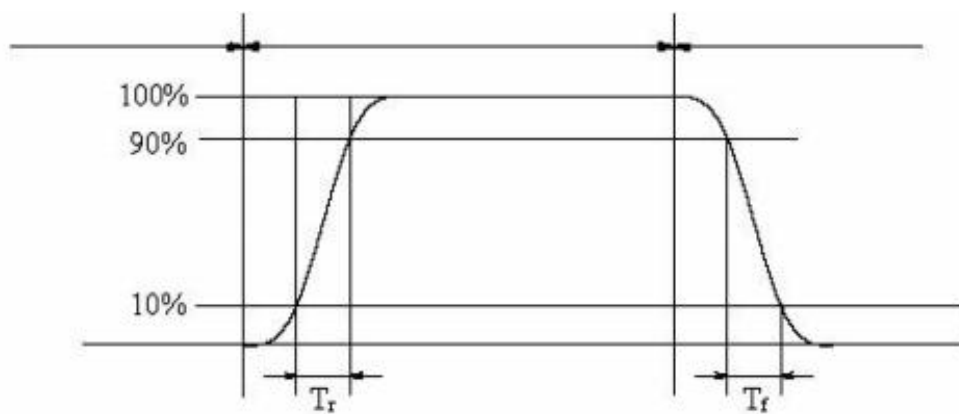
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

Note 5: Definition of Response time. (Test LCD using DMS501):

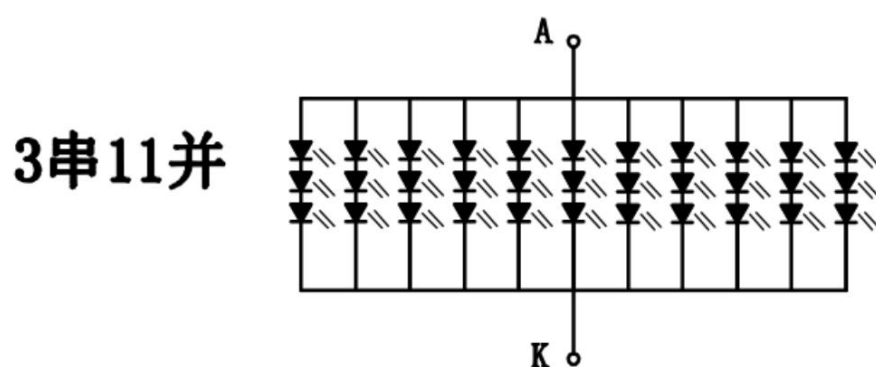
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.Refer to figure as below.



The definition of response time

Note(4) Backlight circuit

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	-	-	9.0	9.6	11.0	V	1
Supply current	I_f	-	-	220	-	mA	2



9.Records Of Version

Version	Revise Date	Page	Content
00	2024-4-23	ALL	New released