

PRODUCT SPECIFICATIONS

For Customer:_____ ☐ : APPROVAL FOR SPECIFICATION

Customer Model No._____ ☐ : APPROVAL FOR SAMPLE

ModuleNo.: SH05ZJWQ65L-5001-07 Date:2023.11.19

Version : A

Table of Contents

No.	Item	Page
1	Cover Sheet(Table of Contents)	
2	Revision Record	
3	General Specifications	
4	Outline Drawing	
5	Absolute Maximum Ratings	
6	Electrical Specifications and Instruction Code	
7	Optical Characteristics	
8	Reliability Test Items and Criteria	
9	Quality Level	
10	Packing Reliability	

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT

2. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared
2023.11.19	A		Thefirstrelease	

3. General Specifications

SH05ZJWQ65L-5001-07 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light unit. The 5.0" display area contains 480x 272 pixels and can display up to 16.7M colors. This product accords with RoHS

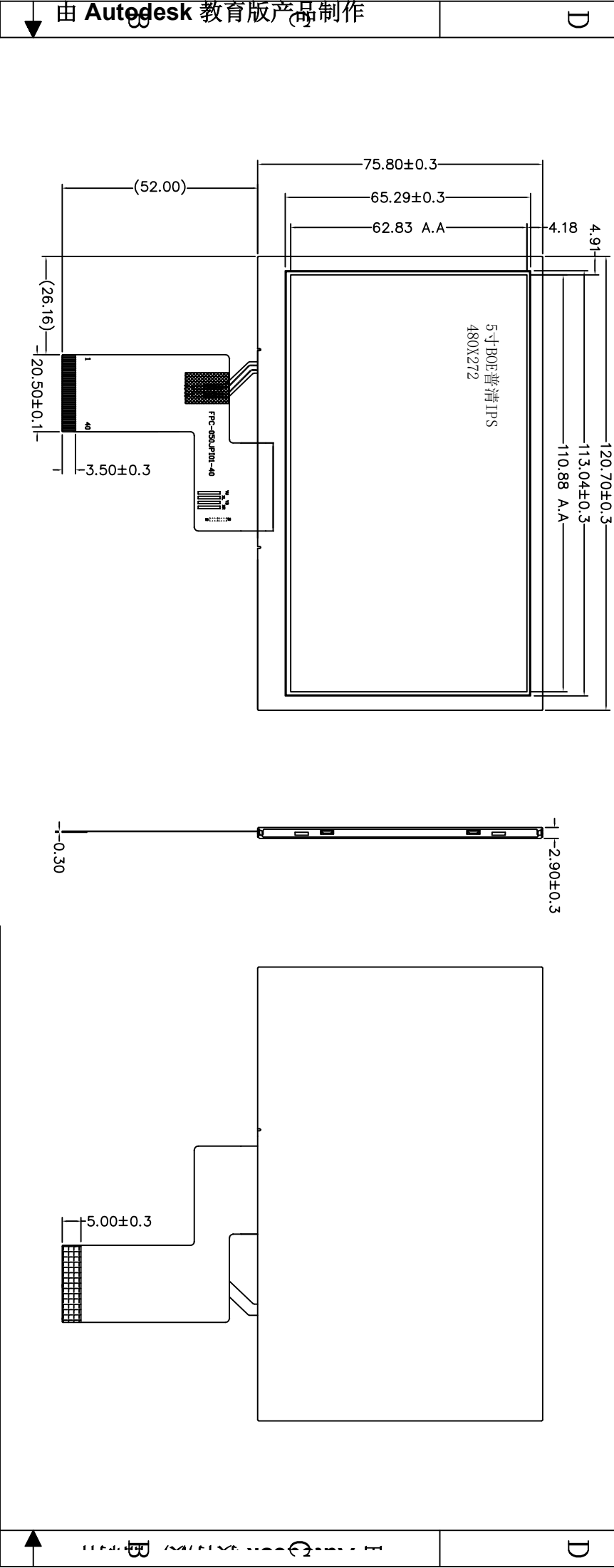
Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		1
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	°C	
Storage temperature	-30~+80	°C	
Module size	120.70(W)×75.80(H)×3.05(T)	mm	2
Active Area(W×H)	110.88X62.832	mm	
Number of Dots	480×272	dots	
Power Supply Voltage	3.3	V	
Backlight Type	6X2-LEDs (white)	PCS	
Interface Type	RGB 24-bit	-	

environmental criterion.

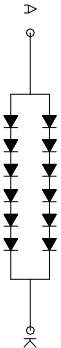
Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.

REV	DESCRIPTION	DATE
A	初版	



由 Autodesk 教育版产品制作



Specification:

- 1). Display mode: 16.7M, TFT/Transmissive
- 2). Operating temp.: Storage temp.:
- 3). Backlight: * hip White LED
- 4). Dimensions with mark "*" are important, with mark "()" are referenced

TITLE: ASSEMBLY		DO NOT SCALE THIS DRAWING, GENERAL TOLERANCE: ±0.2			
MODULE NO.:		REV	A		
DRAWN BY:		DATE:		PROJECTION:	UNIT: mm
CHECKED BY:		DATE:		SCALE:N.T.S	UNIT: mm
APPROVED BY:		DATE:		SHEET: 1 OF 1	

5. Absolute Maximum Ratings(Ta=25°C)

5.1 Electrical Absolute Maximum Ratings.(V_{SS}=0V ,Ta=25°C)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{CC}	-0.3	3.6	V	1, 2
Logic Signal Input /Output Voltage	V _{I/OVCC}	-0.3	V _{CC} +0.5	V	
Power Supply Voltage for LCD	V _{op}	0	3.6	V	
Current of LED	I _{LED}	0	20	mA	

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged.
Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V_{CC} > V_{SS} must be maintained.
3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30°C	80°C	-20°C	70°C	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.
The phenomenon is reversible.
3. Ta≤40°C:85%RH MAX.
Ta>40°C:Absolute humidity must be lower than the humidity of 85%RH at 40°C.

6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics($V_{SS}=0V$, $T_a=25^{\circ}C$)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VCC	$T_a=25^{\circ}C$	3.0	3.3	3.6	V	
Input voltage	'H'	V_{IH}	$V_{CC}=2.8V$	$0.8V_{CC}$	-	V_{CC}	V	
	'L'	V_{IL}	$V_{CC}=2.8V$	0	-	$0.2V_{CC}$	V	
Current Consumption		I_{CC1}	Normal mode	-	-	-	mA	2
		I_{CC2}	Sleep mode	-	0.06	0.09	mA	2

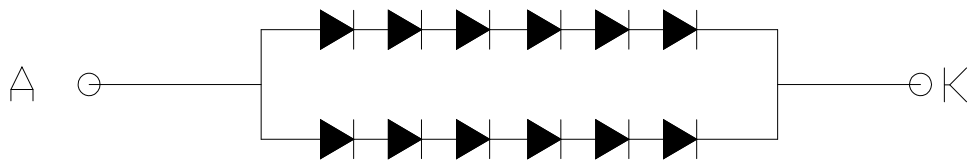
Note:

1:When an optimum contrast is obtained in transmissive mode.

2: Tested in 1×1 chessboard pattern.

6.2 LED backlight specification(VSS=0V ,Ta=25℃)

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage		-	-	-	19.2	-	V	1
Supply current		I _f	-	-	40	-	mA	2
Forward current	Normal	I _{pn}	6X2-chip Serial	-	40	-	mA	
	Dimming	I _{pd}		-	-	-		



Note:

- 1: $V_{LED}=V_{LED(+)}-V_{LED(-)}$.
- 2:The current of LED is 20mA.
A LED drive in constant current mode is recommended.
- 3: LED power consumption is around 0.132W.

6.3 Interface signals

Pin NO.	SYMBOL	DESCRIPTION
1	LEDK	Power for LED backlight (Cathode)
2	LEDA	Power for LED backlight (Anode)
3	GND	Power ground
4	VDD	Digital Power
5~12	R0-R7	Red data bus
13~20	G0-G7	Green data bus
21~28	B0-B7	Blue data bus
29	GND	GND
30	PCLK	Data clock
31	DISP	Standby mode select pin
32	HSYNC	Line SYNC signal
33	VSYNC	Frame SYNC signal
34	DE	Data enable pin
35	NC	NC
36	GND	GND
37	XR	Touch Panel Control pin
38	YD	
39	XL	
40	YU	

7. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	$\theta=0^\circ$ $\Phi=0^\circ$	-	500	-	Cd/m ²	1
Uniformity	\triangle Bp		75	80	-	%	1,2
Viewing Angle	3:00	Cr \geq 10		85		Deg	3
	6:00			85			
	9:00			85			
	12:00			85			
Contrast Ratio	Cr	$\theta=0^\circ$ $\Phi=0^\circ$	800	1000			
Response Time	Trt		-	30	-	ms	5
Color of CIE Coordinate	W	$\theta=0^\circ$ $\Phi=0^\circ$	0.248	0.298	0.348	-	1,6
			0.277	0.327	0.377	-	
NTSC Ratio				60		%	

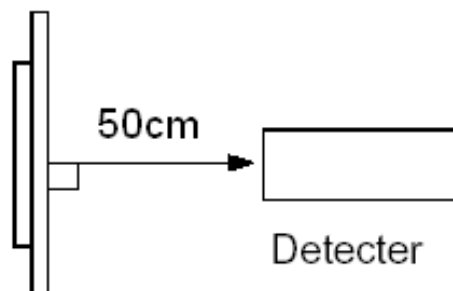
Note: The parameter is slightly changed by temperature, driving voltage and materiel

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 (Φ 8mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25°C.
- 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.

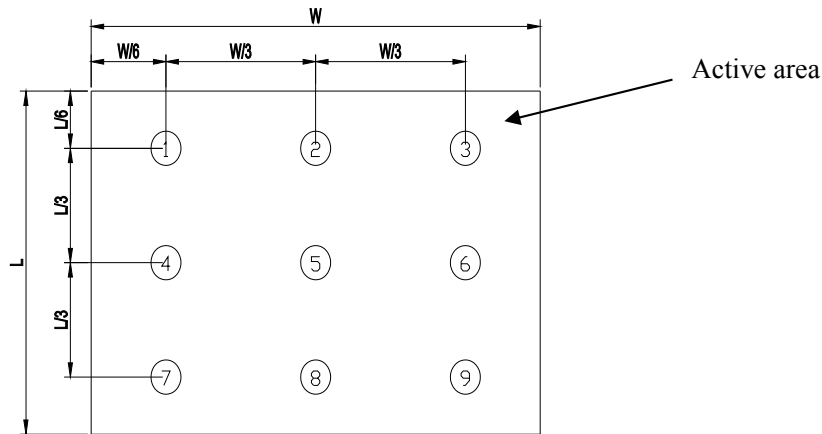


Note 2: The luminance uniformity is calculated by using following formula.

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

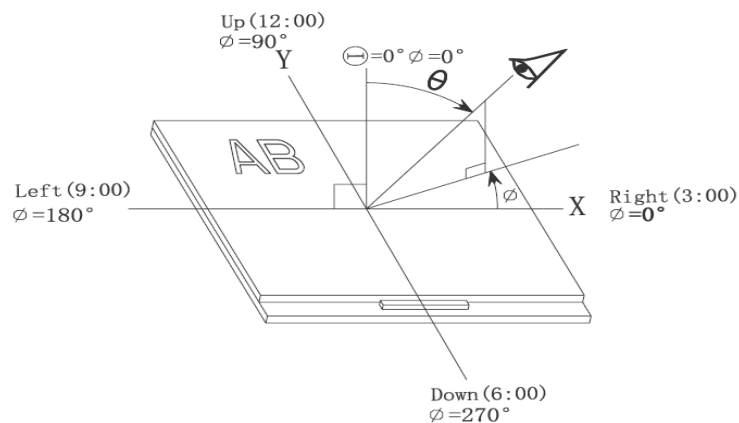
Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.

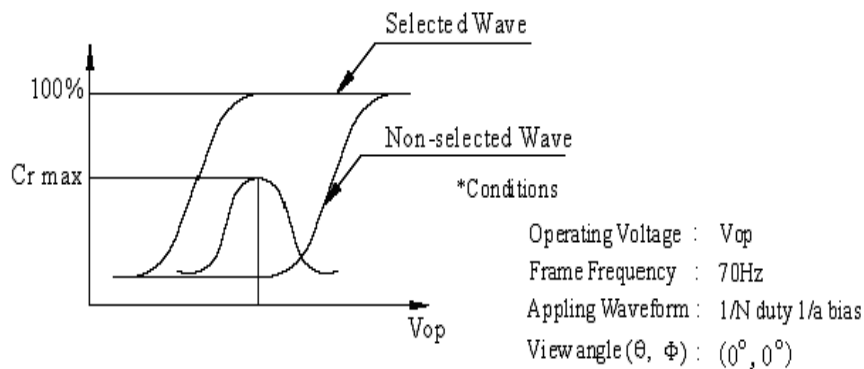


Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and ϕ



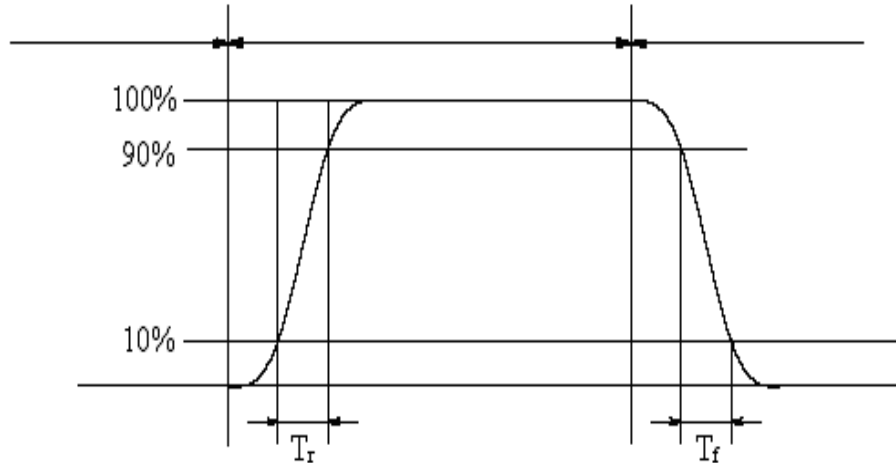
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



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

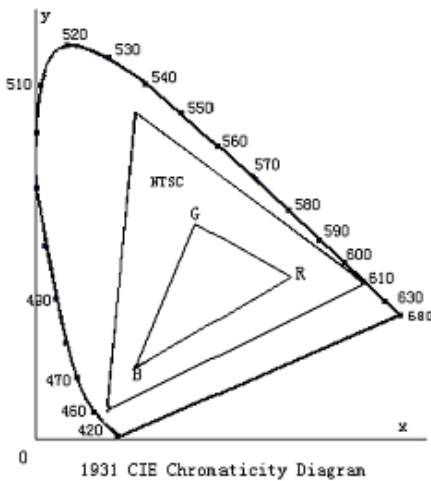
Note 5: Definition of Response time. (Test LCD using DMS501):

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 6: Definition of Color of CIE Coordinate and NTSC Ratio.

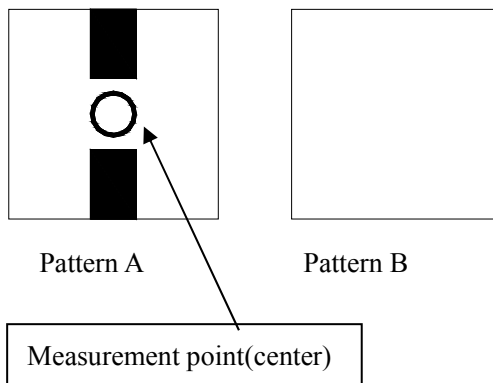


Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

Cross talk ratio(%)=| pattern A Brightness-pattern B Brightness | /pattern A Brightness*100



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80°C±2°C 96H Restore 2H at 25°C Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	70°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	-20°C±2°C 96H Restore 4H at 25°C Power on	
5	High Temperature/Humidity Operation	60°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-30°C←25°C→80°C 30min 5min 30min after 5 cycle, Restore 2H at 25°C Power off	
7	Vibration Test	10Hz~150Hz, 100m/s ² , 120min	Not allowed cosmetic and electrical defects.
8	Shock Test	Half- sine wave, 300m/s ² , 11ms	
9	ESD Test	Air discharge: +/-8KV, Contact discharge: 4KV	

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

9 Quality level

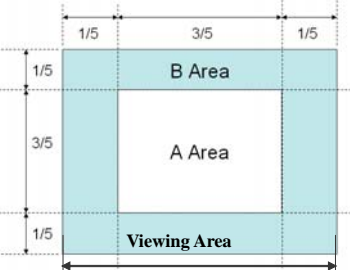
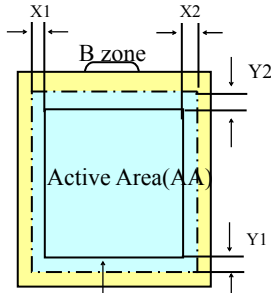
9.1 Classification of defects

Major defects (MA): A major defect refers to a defect that may substantially

degrade usability for product applications, including all functional defects(such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

Minor defects (MI): A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

9.2 Definition of inspection range

<p>For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1).</p> <p>A area : center of viewing area B area : periphery of viewing area C area : Outside viewing area</p> <p>For other defects, dividing two areas to make a judgment (according figure 2).</p> <p>A zone : Inside Viewing area B zone : Outside Viewing area</p> <p>X1(A.A~V.A): 2mm X2(A.A~V.A): 2mm Y1(A.A~V.A): 2mm Y2(A.A~V.A): 2mm</p>	 <p>Figure 1</p>  <p>Figure 2</p>
--	--

9.3 Inspection items and general notes

General notes	<p>1.Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and SH.</p> <p>2.iewing area should be the area which SH guarantees.</p> <p>3.Limit sample should be prior to this Inspection standard.</p> <p>4.Viewing judgment should be under static pattern.</p> <p>5.Inspection conditions Inspection distance: 250 mm (from the sample) Temperature : 25±5 °C Inspection angle : 45 degrees in 12 o'clock direction (all defects in viewing area should be inspected from this direction)</p>	
Inspection items	Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble	The color of a small area is different from the remainder. The phenomenon doesn't change with voltage
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage
	Polarizer defect	Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass
	Dot defect (TFT LCD)	The pixel appears bright or dark abnormally when display

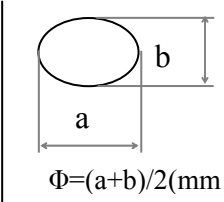
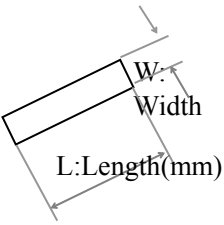
	Functional defect	No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction
	Glass defect	Glass crack, Shaved corner of glass, Surplus glass
	PCB defect	Components assembly defect

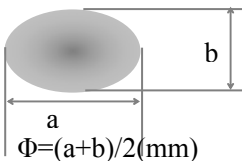

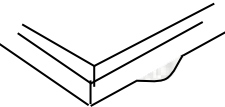
9.4 Outgoing Inspection level

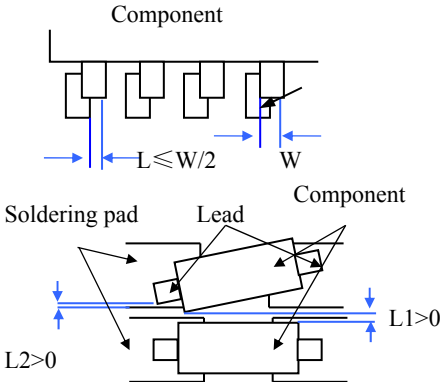
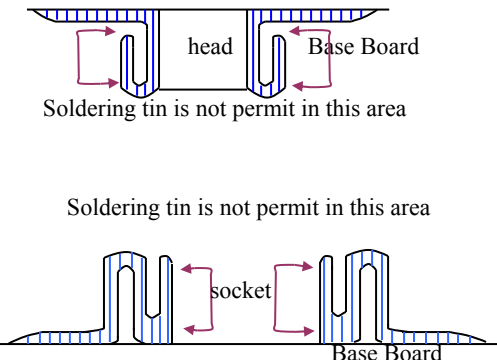
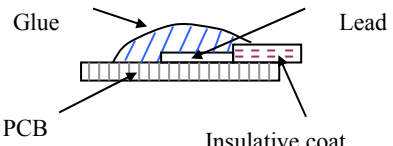
Outgoing Inspection standard	Inspection conditions	Inspection				
		Min.	Max.	Unit	IL	AQL
Major Defects	See 8.3 general notes	See 8.5			II	0.065
Minor Defects	See 8.3 general notes	See 8.5			II	0.065

Note: Sampling standard conforms to GB2828

9.5 Inspection Items and Criteria

Inspection items			Judgment standard			
			Category		Acceptable number	
					A zone	B zone
1	Black spot, White spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass	 $\Phi=(a+b)/2(\text{mm})$ $(a/b<2.5)$	A	$\Phi\leq 0.20$	Neglected	Neglected
			B	$0.20<\Phi\leq 0.25$	3	Neglected
			C	$0.25<\Phi\leq 0.3$	2	Neglected
			D	$0.3<\Phi\leq 0.4$	1	3
			E	$0.4<\Phi\leq 0.5$	0	2
			Total defective point(B,C)		1	-
2	Black line, White line, and Particle Between Polarizer and glass, Scratch on glass	 $L/W\geq 2.5$	A	$W\leq 0.03$	Neglected	Neglected
			B	$0.03<W\leq 0.05$ $L\leq 3.0$	3	Neglected
			C	$0.05<W\leq 0.1$ $L\leq 3.0$	2	Neglected
			D	$0.05<W\leq 0.1$ $L\leq 4.0$	1	3
			E	$W>0.1$ $L>4.0$	0	2
			Total defective point(B,C)		1	-
3	Bright spot		any size		none	none

4	Contrast variation		A	$\Phi < 0.2$	Neglected	Neglected
			B	$0.2 < \Phi \leq 0.3$	2	
			C	$0.3 < \Phi \leq 0.4$	1	
			D	$0.4 < \Phi$	0	
			Total defective point(B,C)			3
5	Bubble inside cell		any size		none	none
6	Polarizer defect (if Polarizer is used)	Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.	Refer to item 1 and item 2.			
		Bubble, dent and convex	A	$\Phi \leq 0.1$	Neglected	Neglected
			B	$0.1 < \Phi \leq 0.2$	2	Neglected
C	$0.2 < \Phi \leq 0.3$	1	2			
7	Surplus glass	Stage surplus glass 	$B \leq 0.3\text{mm}$			
		Surrounding surplus glass 	Should not influence outline dimension and assembling.			
8	Open segment or open common		Not permitted			
9	Short circuit		Not permitted			
10	False viewing direction		Not permitted			
11	Contrast ratio uneven		According to the limit specimen			
12	Crosstalk		According to the limit specimen			
13	Black /White spot(display)		Refer to item 1			
14	Black /White line(display)		Refer to item 2			

			Judgment standard	
Inspection items			Category(application: B zone)	
16	PCB defect	<p>Component soldering:</p> <p>No cold soldering、short、open circuit、burr、tin ball</p> <p>The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1);</p> <p>the sheet component deviation:</p> <p>Pin deviates from the pad and contact with the near components is not permitted (Pic.2)</p>		
		<p>lead defect:</p> <p>The lead lack must be less than 1/3 of its width;</p> <p>The lead burr must be less than 1/3 of the seam;</p> <p>Impurities connect with the near leads is not permitted</p>		
		<p>Connector soldering:</p> <p>Soldering tin is at contact position of the plug and socket is not permitted</p> <p>No foundation is scald</p> <p>Serious cave distortion on plug and socket contact pin is not permitted</p>		
		<p>Glue on root of the speaker receiver and motor lead:</p> <p>The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.</p>		

10. Precautions for Use of LCD Modules

10.1 Handling Precautions

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

10.1.2 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.

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

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

10.1.5 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

10.1.6 Do not attempt to disassemble the LCD Module.

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

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

- a. Be sure to ground the body when handling the LCD Modules.
- b. Tools required for assembly, such as soldering irons, must be properly ground.
- c. To reduce the amount of static electricity generated, do not conduct

assembly and other work under dry conditions.

- d. 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.

10.2 Storage precautions

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

10.2.2 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 : $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$

Relatively humidity: $\leq 80\%$

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

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

8. Electrical specifications

8.1 Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Power Supply Voltage	VDD	- 0.3 ~ +4.6	V
IO Supply Voltage	VDDI	- 0.3 ~ +4.6	V
Charge Pump Supply Voltage	PVDD	- 0.3 ~ +4.6	V
Logic Input Voltage Range	VIN	-0.3 ~ VDDI + 0.3	V
Logic Output Voltage Range	VO	-0.3 ~ VDDI + 0.3	V
Operating Temperature Range	TOPR	-30 ~ +85	°C
Storage Temperature Range	TSTG	-40 ~ +125	°C

Note: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded. Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

8.2. DC Characteristics

8.2.1. Recommended Operating Range

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3	3.3	3.6	V	
IO Supply Voltage	VDDI	1.65	-	VDD	V	
Charge Pump Supply Voltage	PVDD	3	3.3	3.6	V	
NVM Supply Voltage	VPP	7.4	7.5	7.6	V	

8.2.2. DC Characteristics for Digital Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic-High Input Voltage	V _{ih}	0.7V _{DDI}	-	V _{DDI}	V	V _{DDI} =3.3V
Logic-Low Input Voltage	V _{il}	DGND	-	0.3V _{DDI}	V	V _{DDI} =3.3V
Logic-High Output Voltage	V _{oh}	V _{DDI} -0.4	-	V _{DDI}	V	V _{DDI} =3.3V
Logic-Low Output Voltage	V _{ol}	DGND	-	DGND+0.4	V	V _{DDI} =3.3V

8.2.3. DC Characteristics for Analog Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive High-voltage power	VGH	13	15	16	V	PVDD=3.3V
Negative High-voltage power	VGL	-10	-10	-7	V	PVDD=3.3V
Output Voltage Deviation	Vod		±35	±45	mV	
Standby Current	Isc			50	uA	VDD=PVDD=3.3V
Operation Current	Ioc		20		mA	No Load, VDD=VDDI= PVDD=3.3V @ FR=60Hz

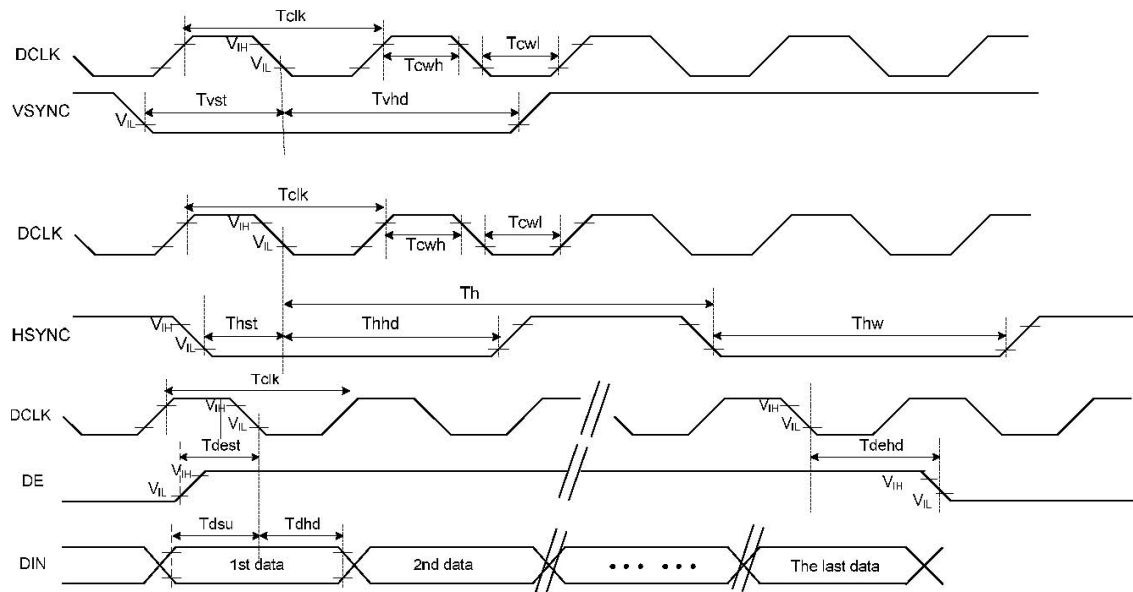
8.3. AC Characteristics

VDD=VDDI= 3.3V, AGND= 0V

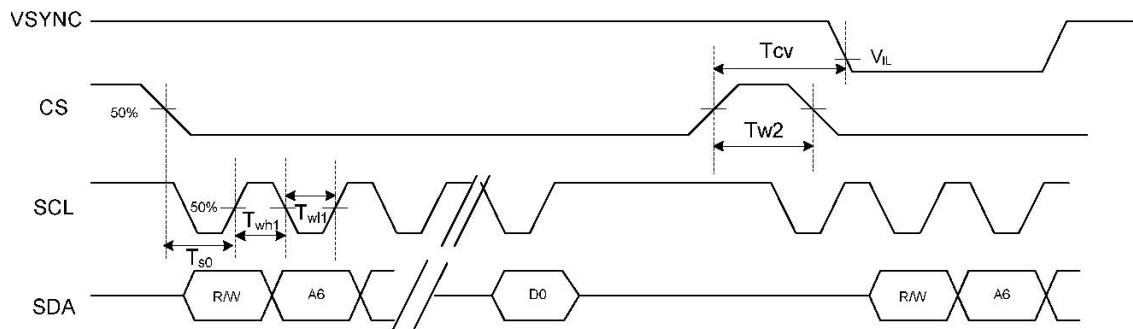
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR			20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50		us	R=10Kohm, C=1uF
Input/ Output timing						
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1			DCLK	
Hsync period	Th	55	60	65	us	
Vsync setup time	Tvst	12			ns	
Vsync hold time	Tvhd	12			ns	
Hsync setup time	Thst	12			ns	
Hsync hold time	Thhd	12			ns	
Data setup time	Tdsu	12			ns	
Data hold time	Tdhd	12			ns	
DE setup time	Tdest	12			ns	
DE setup time	Tdehd	12			ns	
SD output stable time	Tst			12	us	Output settled within +20Mv Loading =6.8k+28.2pF
GD output rise and fall time	Tgst			6	us	Output settled (5%~95%), Loading = 4.7k+29.8pF
3-wire serial communication						
Delay between CSB and Vsync	Tcv	1			us	
CS input setup time	Ts0	50			ns	
Serial data input setup time	Ts1	50			ns	
CS input hold time	Th0	50			ns	
Serial data input hold time	Th1	50			ns	
SCL pulse high width	Twh1	50			ns	
SCL pulse low width	Twl1	50			ns	
CS pulse high width	Tw2	400			ns	

8.4. AC Timing Diagram

8.4.1. Clock and Data Input Timing Diagram



8.4.2. 3-Wire Communication Timing Diagram



9. INPUT DATA FORMAT

9.1. RGB Input Timing Table

9.1.1. Parallel 24-bit RGB Timing Table

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
Frame Pate		FR			75	Hz	
Line Period		Tlp	24			us	
HSYNC	Period Time	Th		531		DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp		43		DCLK	By H_Blanking setting
	Front Porch	Thfp		8		DCLK	
	Pulse Width	Thw		4		DCLK	
VSYNC	Period Time	Tv		292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp		12		H	By V_Blanking setting
	Front Porch	Tvfp		8		H	
	Pulse Width	Tvw		4		H	

Note:

1. It is necessary to keep Tvbp =12, Tvfp = 8 , Tw = 4 and Thbp = 43, Thfp = 8 Thw = 4 in sync mode.
2. The Max Value and Min Value of porch must satisfy the range of Frame Pate and Line Period
3. It is necessary to keep Thbp>10, Tvbp+Tvfp<128

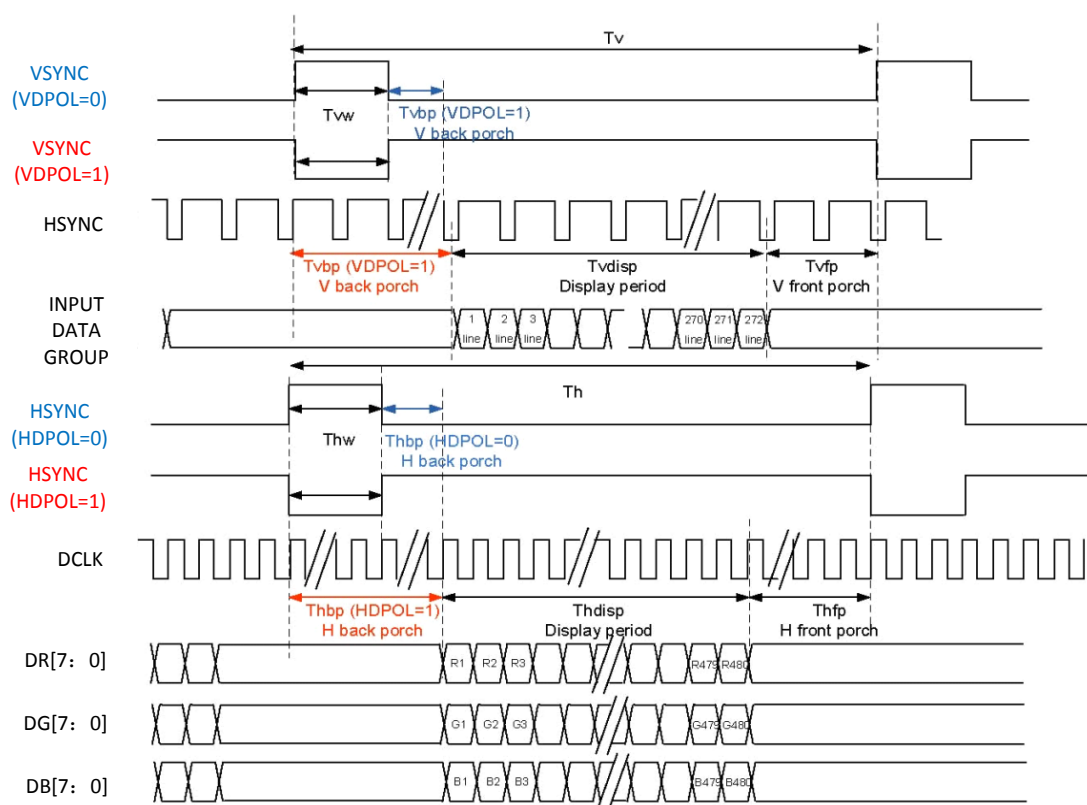
9.1.2. Serial 8-bit RGB Timing Table

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	24	27	30	MHz	
DCLK Period		Tclk	33	37	42	ns	
Frame Pate		FR			75	Hz	
Line period		Lp	24			us	
HSYNC	Period Time	Th		1491		DCLK	
	Display Period	Thdisp		1440		DCLK	
	Back Porch	Thbp		43		DCLK	By H_Blanking setting
	Front Porch	Thfp		8		DCLK	
	Pulse Width	Thw		4		DCLK	
VSYNC	Period Time	Tv		292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp		12		H	By V_Blanking setting
	Front Porch	Tvfp		8		H	
	Pulse Width	Tvw		4		H	

Note:

1. It is necessary to keep Tvbp =12, Tvfp = 8 , Tw = 4 and Thbp = 43, Thfp = 8 Thw = 4 in sync mode.
2. The Max Value and Min Value of porch must satisfy the range of Frame Pate and Line Period
3. It is necessary to keep Thbp>10, Tvbp+Tvfp<128

9.2. SYNC Mode Timing Diagram



9.3. SYNC-DE Mode Timing Diagram

