高展工业智能显示科技（深圳）有限公司

Gaozhan Industrial Intelligent Display Technology (Shenzhen) Co.,Ltd.

SPECIFICATION
FOR
LCD MODULE

Customer : _____

Product Model: GZ80210-DIT096TH

Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

☐ LCM Machinery OK **Checked By** _____ ☐ LCM Display OK **Checked By** _____	☐ LCM OK ☐ NG，Problem survey: **Approved By** _____

※ **The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.**

DOCUMENT REVISION HISTORY

Version	Contents	DATE	CHANGED BY
0 0	Original	2024-2-28	WU HX

Contents

1.FUNCTION & FEATURES

No.	Item	Specification
1	**LCD size**	0.96**inch**
2	**Resolution**	80 (RGB)X160
3	**Display mode**	**Normally** Black
4	**Pixel pitch**	**0**.135 **x 0.**1356V
5	**Active area**	10.8(H) × 21.7(V)
6	**Module size**	13.5(W)*27.95(H)*1.91(T)
7	**Pixel arrangement**	**RGB-stripe**
8	**Interface**	SPI

2.PIN DESCRIPTION

Pin No.	Symbol	Function
1	LEDA	Power Supply For LED Backlight Anode Input.
2	GND	Ground.
3	RES	Reset Signal input pin.
4	RS	Register selection signal.
5	SDA	Serial data input/output pin.
6	SCL	Serial clock signal.
7	VDD	VDD
8	CS	Chip selection signal.

3.DC CHARACTERISTICS

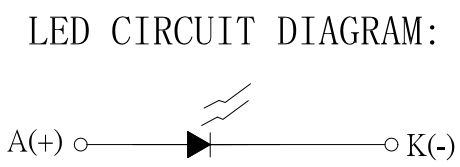
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Analog Supply Voltage	V_{DD}	2.6	2.8	3.3	V	-
Input High Voltage	V_{IH}	0.7VDD	-	VDD	V	Digital input pins
Input Low Voltage	V_{IL}	GND	-	0.3VDD	mA	Digital input pins
Output High Voltage	V_{oH}	0.8VDD	-	VDD	mA	Digital input pins
Output High Voltage	V_{oL}	GND	-	0.2VDD	W	Digital input pins
(Panel+LSI) Power Consumption	Black Mode	-	-	60	mA	VDD=2.8V
	Sleeping Mode	-	-	100	uA	VDD=2.8V

3.1 LED Back Light Specification (1 White Chips)

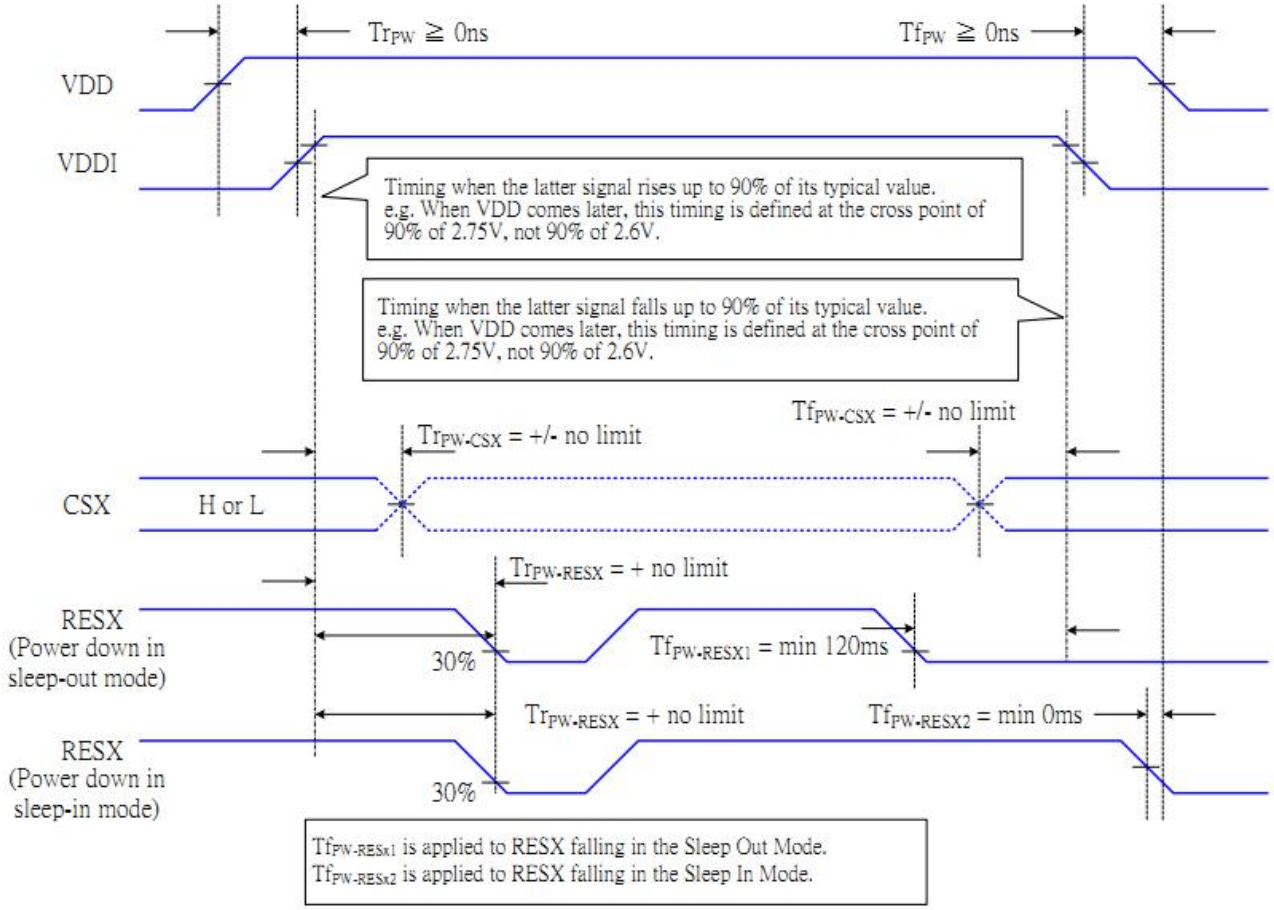
Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	Vf	If=20mA	3.0	3.2	3.4	V
Uniformity (with L/G)	ΔB_p	If=20mA	75	80	-	%
Luminance for LCM	/	If=20mA		450	-	cd/m^2
Backlight Power Consumption	WBL	If=20mA	-	256	-	mW
Backlight Color	White					

Note:LED Circuit

Backlight LED Circuit

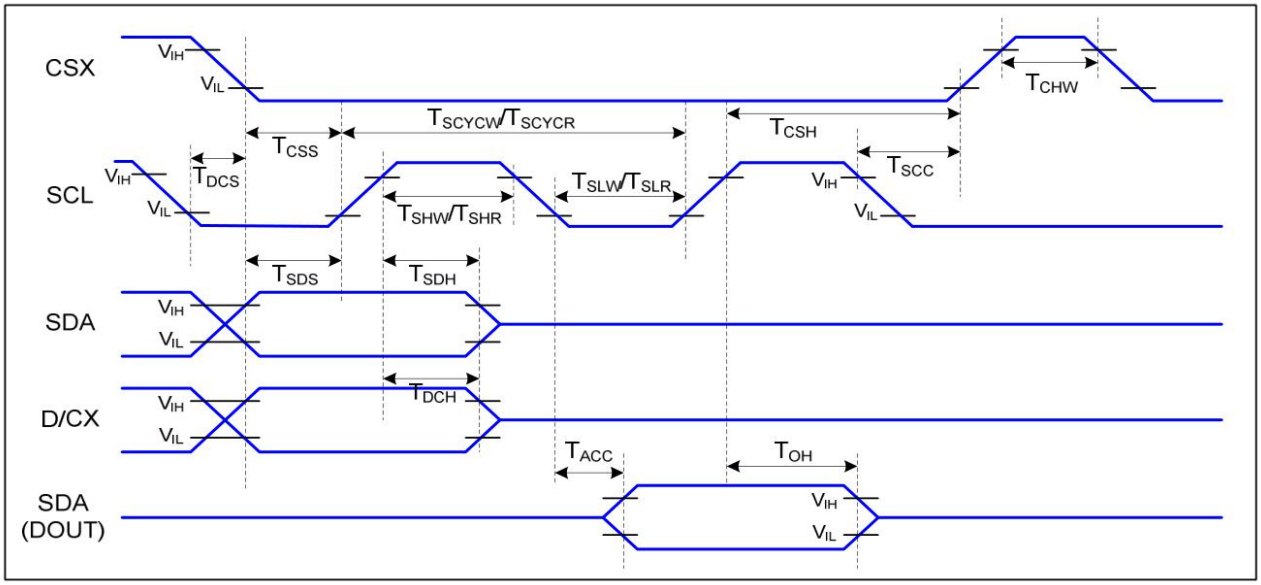


4.POWER SEQUENCE



5.TIMING CHARACTERISTICS

Serial Interface Characteristics (4-line Serial)



Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.5~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	45		ns	
	TCSH	Chip Select Hold Time (Write)	45		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select “H” Pulse Width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	66		ns	-Write Command & Data Ram
	TSHW	SCL “H” Pulse Width (Write)	15		ns	
	TSLW	SCL “L” Pulse Width (Write)	15		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	-Read Command & Data Ram
	TSHR	SCL “H” Pulse Width (Read)	60		ns	
	TSLR	SCL “L” Pulse Width (Read)	60		ns	
D/CX	TDCS	D/CX Setup Time	10		ns	
	TDCH	D/CX Hold Time	10		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

5.1 Optical specifications

Item		Symbol	Condition	Values			Unit	Remark
				Min.	Typ.	Max.		
Viewing Angle Range	Left	θ_L	CR≧10	70	80	-	degree	Note 1
	Right	θ_R		70	80	-		
	Top	Φ_T		70	80	-		
	Botto	Φ_B		70	80	-		
Response Time		T_{on} +T_{off}	Normal θ=Φ=0˚	-	30	40	ms	
Contrast Ratio		CR	Normal θ=Φ=0˚	640	800	-	-	
Luminance		L	Normal θ=Φ=0˚	400	450	-	cd/m^2	
Color Chromaticity (CIE1931)	Red	Rx	Normal θ=Φ=0˚	0.560	0.610	0.660		
		Ry		0.283	0.333	0.383		
	Grenn	X		0.231	0.281	0.331		
		Y		0.483	0.533	0.583		
	Blue	X		0.096	0.146	0.196		
		Y		0.088	0.138	0.188		
	White	X		0.237	0.287	0.337		
		Y		0.246	0.296	0.346		
Uniformity		U		80			%	
NTSC				45	50		%	-

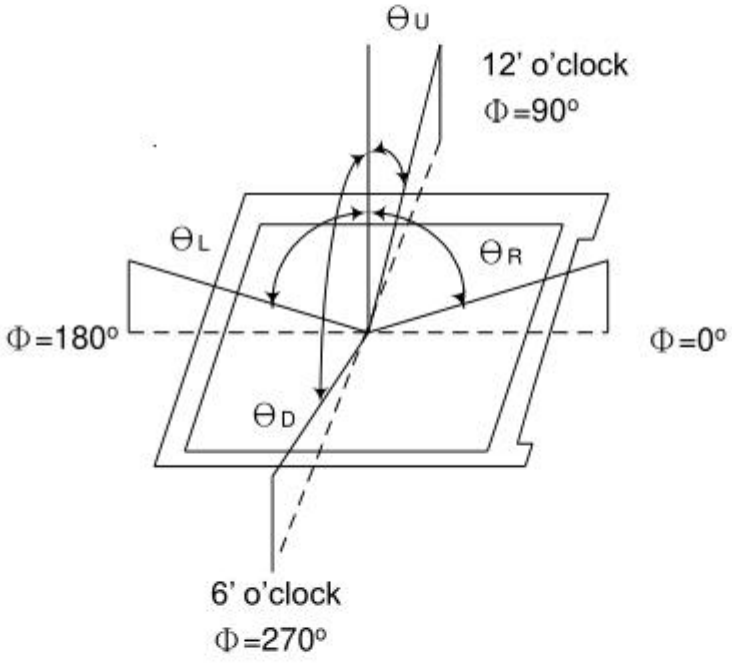
Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2°C
- 15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Note (1) Definition of Viewing Angle:



Note (2) Definition of Contrast Ratio (CR):
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

6.Reliability Test Conditions And Methods

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 120 hrs	
Low Temperature Storage	Ta =-30℃ 120hrs	
High Temperature Operation	Ts = 70℃ 120hrs	
Low Temperature Operation	Ta = -20℃ 120hrs	
Operate at High Temperature and Humidity	60℃, 90%RH max. 120hrs	Operation
Thermal Shock	-20℃~ +70℃ 10 cycles 1Hrs/cycle	Non-operation
Vibration Test	Frequency:10Hz~55Hz~10 Amplitude:1.5mm X,Y,Z direction for total 3ho (Packing Condition)	
Drooping Tes	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
Electrostatic Discharge	Contact=±4KV, class B Air=±8KV, class B	

7. Handling Precautions

7.1 Mounting method

The LCD panel of G Z LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

7.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent [recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Salfur (S)

If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Salfur (S) from customer, Responsibility is on customer.

7.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

7.4 packing

- Module employ LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

7.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color

in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.

- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

7.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

7.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

8. Precaution for use

8.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

8.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to G Z , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

9. Outline Dimension