

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LSI0128HG003A

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>

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1. General Description

LSI0128HG003A 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 1.28 inch and the resolution is 240(RGB)*240, the panel can display up to 262k colors.

2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 240(RGB)×240 Dot-matrix
Input Data	16-bits 8080 interface
Viewing Direction (Grayscale Inversion)	Free (IPS)
Drive	GC9A01A

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	35.2 ×37.24 ×0.5	mm
Number of dots	240(RGB) ×240	pixel
Display Area	Φ 32.4	mm

5. Absolute Maximum Ratings

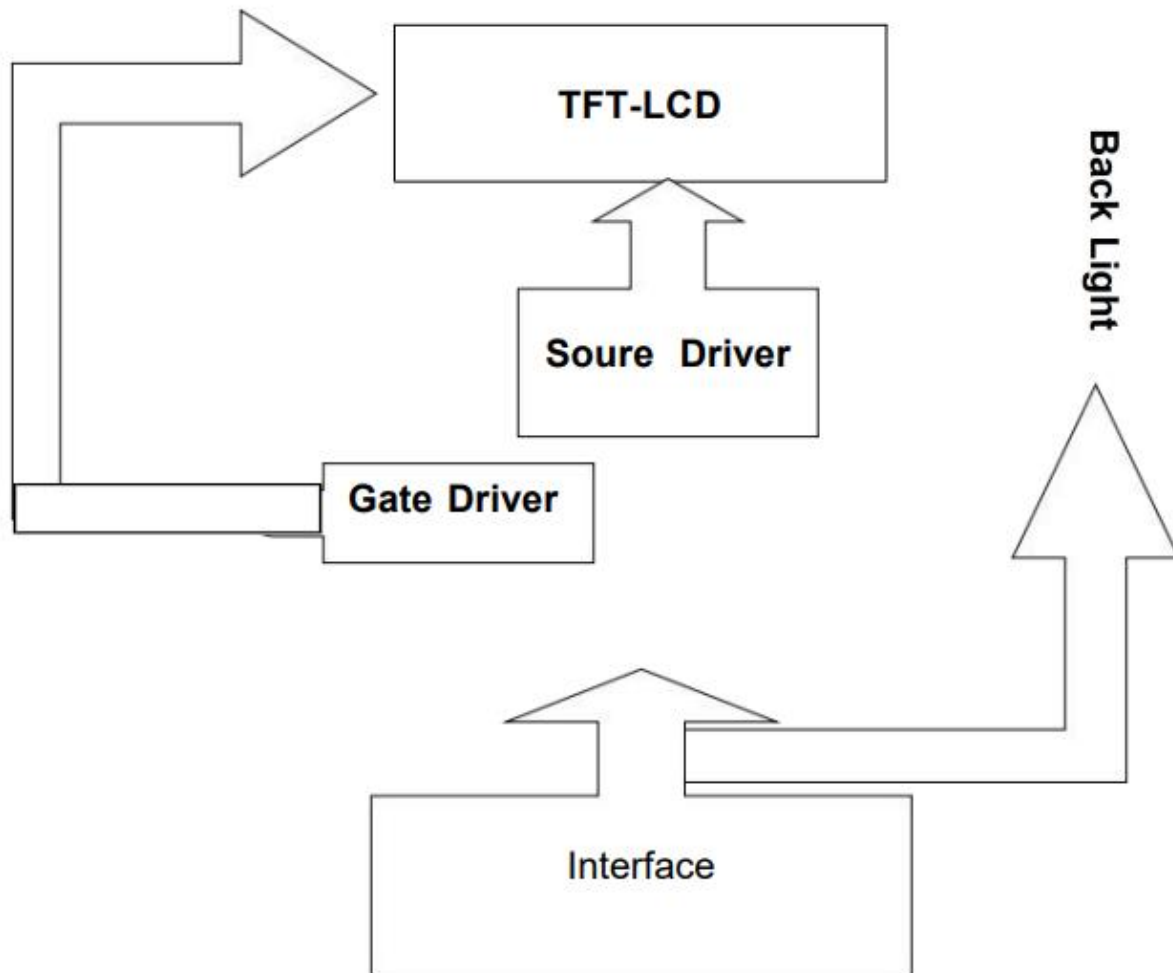
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-10	60	°C	
Storage temperature	TSTR	-20	70	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.5	2.8	3.3	V	Note1
Supply voltage		IOVCC	1.65	2.8	3.3	V	
Input Voltage	L level	VIL	0	---	0.3*IOVCC	V	
	H level	VIH	0.7*IOVCC	---	IOVCC	V	
LCD Drive Power current		ILCD		TBD		mA	

7. Module Function Description

7- 1. Block Diagram Of LCM



7-2. Pin Description

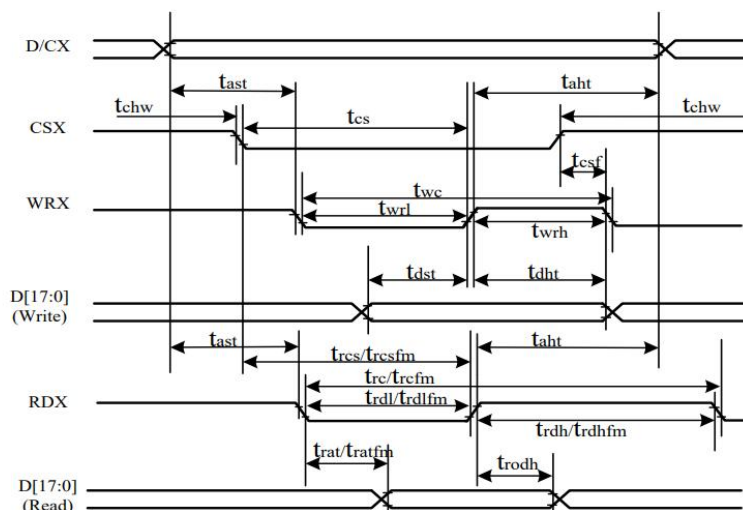
PIN NO.	Symbol	I/O	Description
1	VCI	P	power supply
2	VDD	P	power supply
3	GND	P	Ground
4	DB15	I/O	bi-directional data bus for
5	DB14	I/O	bi-directional data bus for
6	DB13	I/O	bi-directional data bus for
7	DB12	I/O	bi-directional data bus for
8	DB11	I/O	bi-directional data bus for
9	DB10	I/O	bi-directional data bus for
10	DB9	I/O	bi-directional data bus for
11	DB8	I/O	bi-directional data bus for
12	DB7	I/O	bi-directional data bus for
13	DB6	I/O	bi-directional data bus for
14	DB5	I/O	bi-directional data bus for
15	DB4	I/O	bi-directional data bus for
16	DB3	I/O	bi-directional data bus for
	DB2	I/O	bi-directional data bus for
	DB1	I/O	bi-directional data bus for
	DB0	I/O	bi-directional data bus for
	SDA	I	Serial in/out signal
	GND	P	Ground
	RD	I	Serves as a write signal and writes data at the rising edge.
	WR	I	Serves as a read signal and MCU read data at the rising edge.
	RS	I	This pin is used to select "Data or Command" in the parallel interface
	CS	I	Chip select input pin
	RES	I	Chip reset signal
	IMO	I	Select the interface mode
	IM1	I	Select the interface mode
	IM2	I	Select the interface mode
	A	P	Power for LED backlight anode
	K	P	Power for LED backlight cathode

7-3 Timing Characteristics

Display Parallel 18/16/9/8-bit Interface Timing Characteristics

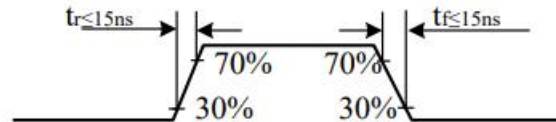
(8080- I)

1.



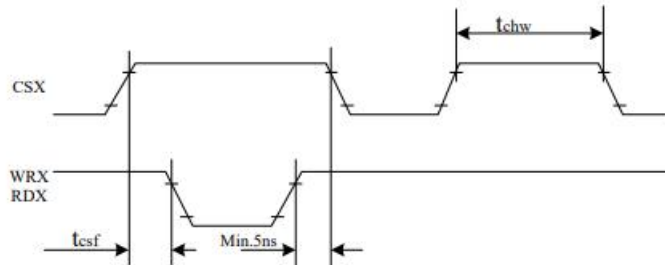
Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time(Write/Read)	0	-	ns	
CSX	tch	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time(Write)	15	-	ns	
	trcs	Chip Select setup time(Read ID)	45	-	ns	
	trcsfm	Chip Select setup time(Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	tce	Write Cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX(FM)	trcfm	Read Cycle (FM)	380	-	ns	
	trdhfm	Read Control H duration(FM)	180	-	ns	
	trdlfm	Read Control L duration(FM)	200	-	ns	
RDX(ID)	trc	Read Cycle (ID)	160	-	ns	
	trdh	Read Control H pulse duration	90	-	ns	
	trdl	Read Control L pulse duration	70	-	ns	
D[17:0], D[15:0]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF
	tdht	Write data hold time	10	-	ns	
D[8:0], D[7:0]	trat	Read access time	-	40	ns	For minimum CL=8pF
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

Figure91.



CSX timings :

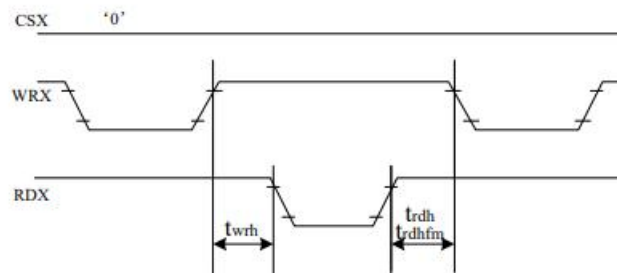
Figure92.



Note: Logic high and low levels are specified as 30% and 70% of $IOVCC$ for Input signals.

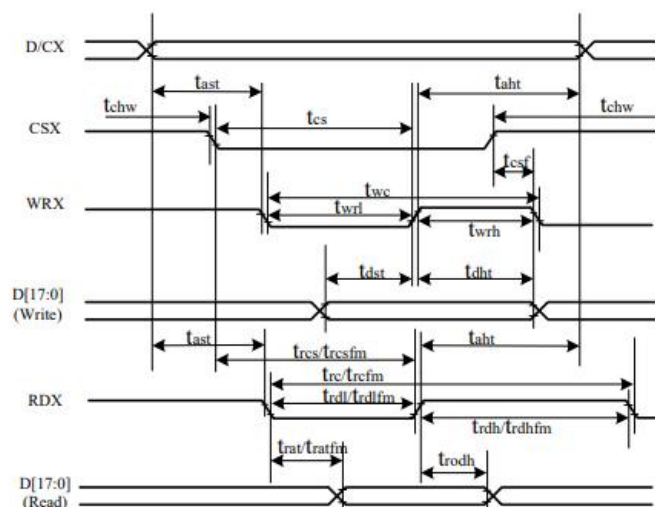
Write to read or read to write timings:

Figure92.



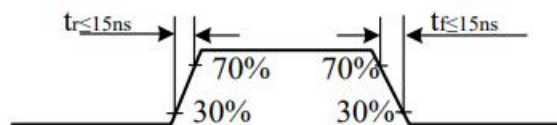
Note: Logic high and low levels are specified as 30% and 70% of $IOVCC$ for Input signals.

Display Parallel 18/16/9/8-bit Interface Timing Characteristics (8080- II)



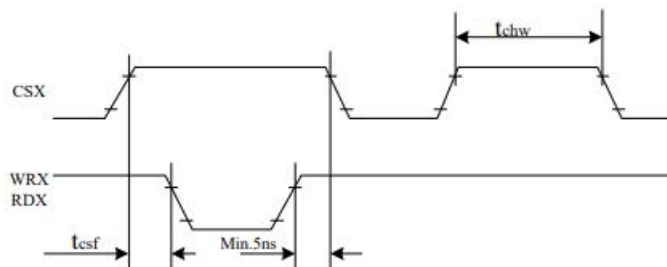
Signal	Symbol	Parameter	min	max	Unit	Description
DCX	t _{ast}	Address setup time	0	-	ns	
	t _{ah}	Address hold time(Write/Read)	0	-	ns	
CSX	t _{chw}	CSX "H" pulse width	0	-	ns	
	t _{cs}	Chip Select setup time(Write)	15	-	ns	
	t _{res}	Chip Select setup time(Read ID)	45	-	ns	
	t _{resfm}	Chip Select setup time(Read FM)	355	-	ns	
	t _{csf}	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	t _{wc}	Write Cycle	66	-	ns	
	t _{wrh}	Write Control pulse H duration	15	-	ns	
	t _{wrl}	Write Control pulse L duration	15	-	ns	
RDX(FM)	t _{rcfm}	Read Cycle (FM)	380	-	ns	
	t _{rdhfm}	Read Control H duration(FM)	180	-	ns	
	t _{rdlfm}	Read Control L duration(FM)	200	-	ns	
RDX(ID)	t _{rc}	Read Cycle (ID)	160	-	ns	
	t _{rdh}	Read Control pulse H duration	90	-	ns	
	t _{rdl}	Read Control pulse L duration	70	-	ns	
D[17:0], D[17:10] &D[8:1], D[17:10] ,D[17:9]	t _{dst}	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	t _{dht}	Write data hold time	10	-	ns	
	t _{rat}	Read access time	-	40	ns	
	t _{ratfm}	Read access time	-	340	ns	
	t _{rod}	Read output disable time	20	80	ns	

Figure94.



CSX timings :

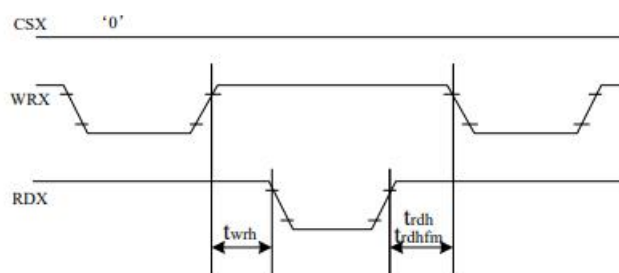
Figure95.



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

Write to read or read to write timings:

Figure96.



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

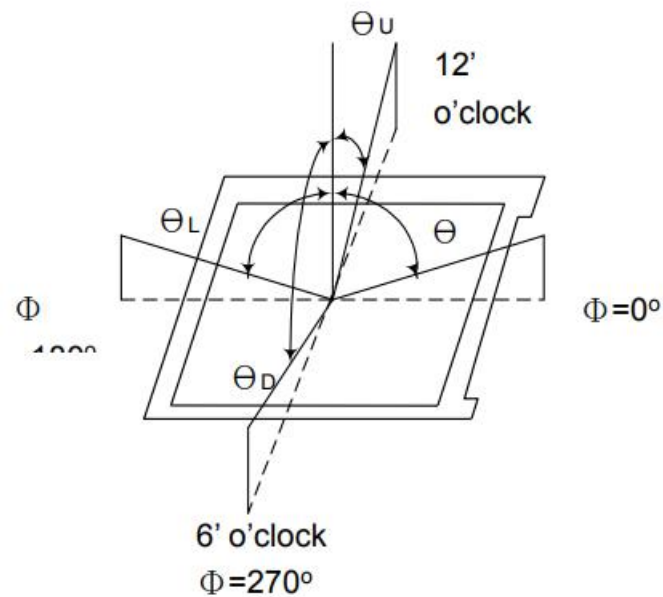
8. Electro-Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	$\theta_x = \theta_y = 0$	---	30	35	ms	Note 1
Contrast Ratio		CR		900	1100	---	---	Note 2
Transmittance		T%		3.06	3.6	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.324	---	---	
		W y		---	0.347	---	---	
Viewing angle	θ_T		CR > 10	---	85	---	Deg.	Note 3
	θ_B			---	85	---		
	θ_L			---	85	---		
	θ_R			---	85	---		
Luminance ($I_F = 40mA$)		L			TBD	---	cd/m2	Note4

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

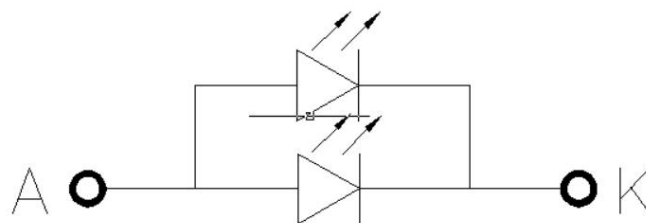
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Viewing Angle:



Note(4) Backlight circuit

a. Light Source: LED*2(White)



$$I_f = 40\text{mA} \quad V_f = 3.0\text{V} \sim 3.4\text{V}$$

9.Records Of Version

Version	Revise Date	Page	Content
00	2024-1-17	All	New released