

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LSC028I18-S-V1

Module Type: COG+FPC+B/L+CTP

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

LSC028I18-S-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 2.83 inch and the resolution is 240(RGB)*320, 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)×320 Dot-matrix
Input Data	SPI
Viewing Direction (Grayscale Inversion)	Free (IPS)
Drive	GC9309NA

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	55.11 ×80.72×3.54	mm
Number of dots	240(RGB) ×320	pixel
Active area (H×V)	43.2×57.60	mm





5. Absolute Maximum Ratings

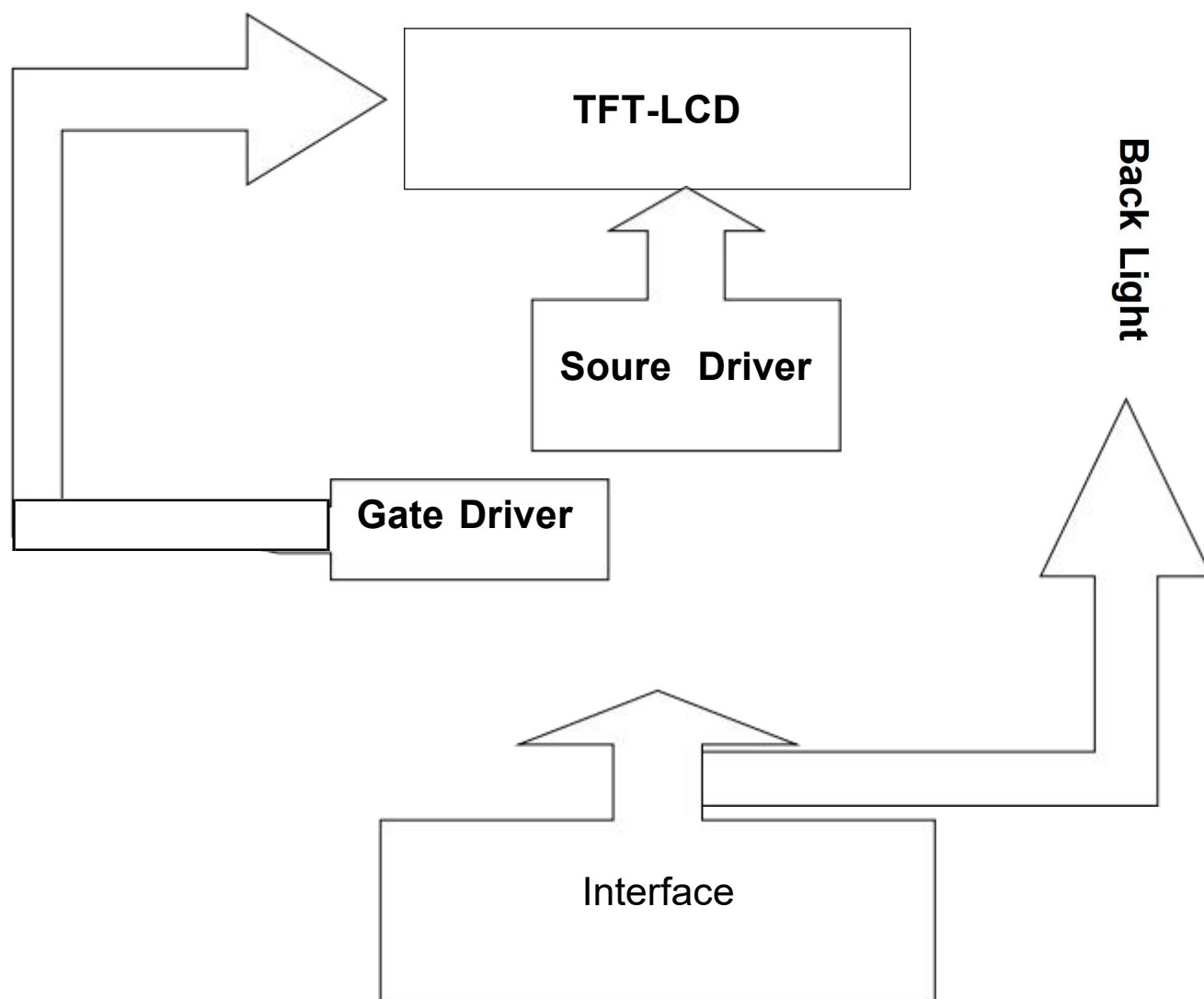
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.6	2.8	3.5	V	Note1
Supply voltage		IOVCC	1.65	2.8	3.5	V	
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
1	GND	P	Ground
2	MESH1		NC
3	MESH3		NC
4	CTP_VDD	P	Power Supply
5	CTP_SCL	I	SCL pin for TP
6	CTP_SDA	I/O	SDA pin for TP
7	CTP_INT	I	Interrupt signal for TP
8	CTP_RSTN	I	Reset Pin for TP
9	GND	P	Ground
10	MESH4		NC
11	MESH2		NC
12	LEDK	P	Power for LED backlight cathode
13	LEDA	P	Power for LED backlight anode
14	GND	P	Ground
15	SDA	I/O	Serial data input
16	SCLK	I	serial interface clock
17	GND	P	Ground
18	RS	I	Display data/command selection pin
19	CS	I	Chip select pin
20	RST	I	Reset signal
21	TE	O	-Tearing effect output pin to synchronize MPU to frame writing,activated by S/ command.
22	IOVCC	P	Power Supply
23	VDD	P	Power Supply
24	GND	P	Ground

7-3 Timing Characteristics

7.3. Power ON/OFF Sequence

IOVCC and VCI can be applied in any order.

VCI and IOVCC can be power down in any order.

During power off, if LCD is in the Sleep Out mode, VCI and IOVCC must be powered down minimum 120msec after RESX has been released.

During power off, if LCD is in the Sleep In mode, IOVCC or VCI can be powered down minimum 0msec after

RESX has been released.

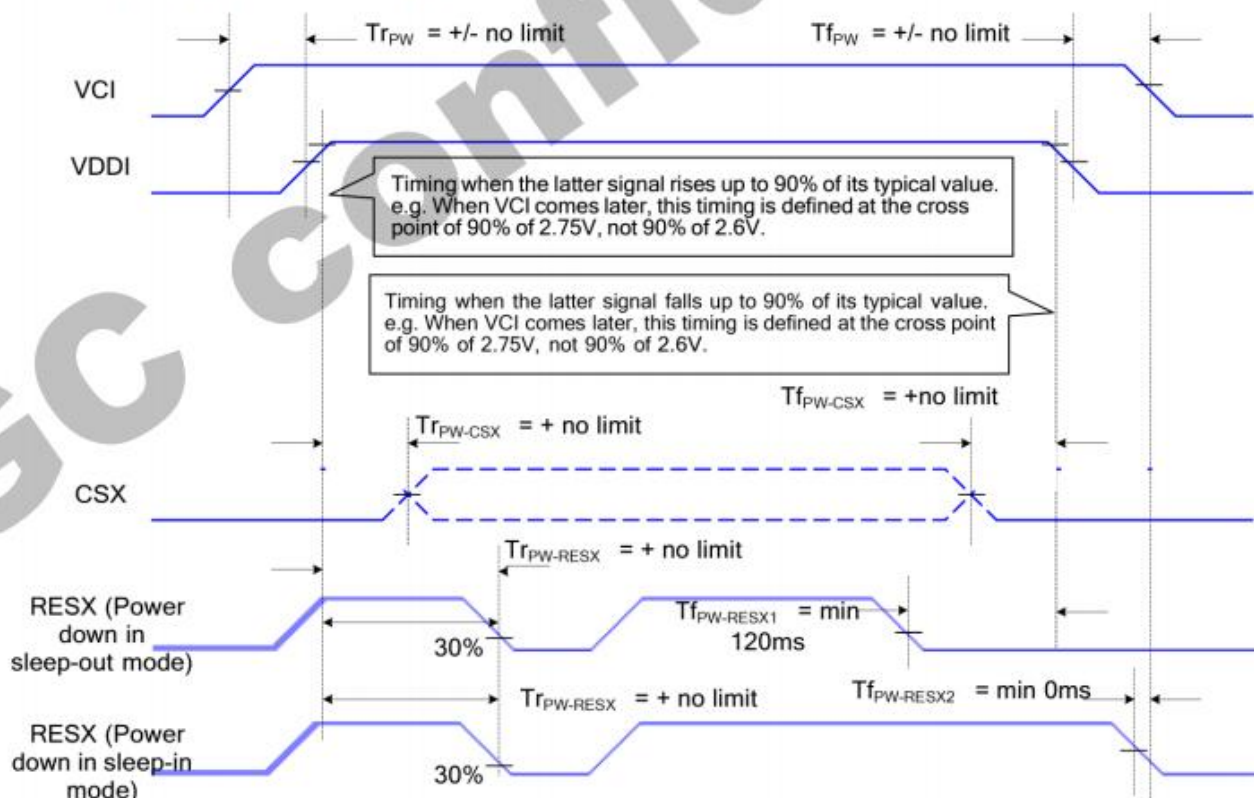
CSX can be applied at any timing or can be permanently grounded. RESX has priority over CSX.

Note 1: There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.

Note 2: There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.

Note 3: If RESX line is not held stable by host during Power On Sequence as defined in the sequence below, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.

The power on/off sequence is illustrated below



7.4.4. Display Serial Interface Timing Characteristics (4-line SPI system)

Figure98.

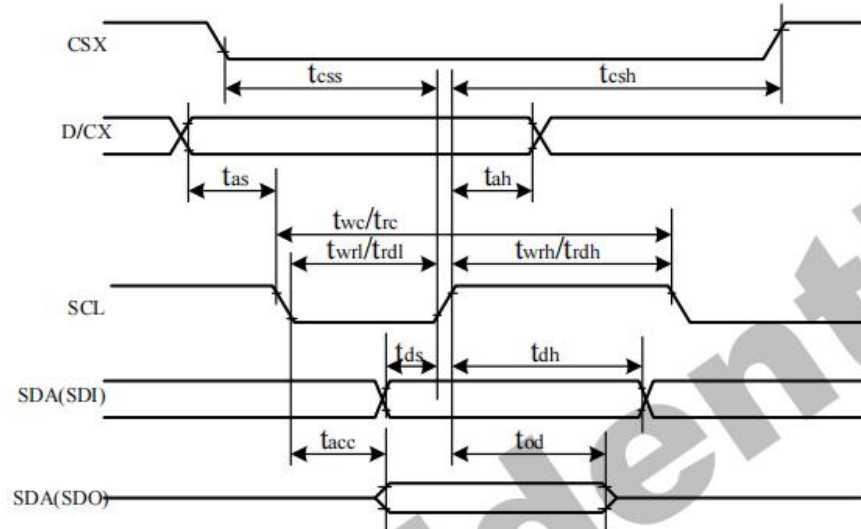
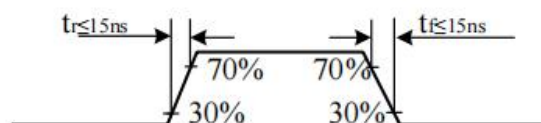


Table48.

Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	20	-	ns	
	t_{csh}	Chip select hold time (Read)	40	-	ns	
SCL	t_{wc}	Serial Clock Cycle (Write)	10	-	ns	
	t_{wrh}	SCL "H" Pulse Width (Write)	5	-	ns	
	t_{wrl}	SCL "L" Pulse Width (Write)	5	-	ns	
	t_{rc}	Serial Clock Cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" Pulse Width (Read)	60	-	ns	
	t_{rdl}	SCL "L" Pulse Width (Read)	60	-	ns	
D/CX	t_{asc}	D/CX setup time	10	-	ns	
	t_{ah}	D/CX hold time (Write/Read)	10	-	ns	
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	5	-	ns	
	t_{dh}	Data hold time (Write)	5	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	-	ns	

Note: $T_a = 25^\circ\text{C}$, $IOVCC=1.65\text{V to }3.3\text{V}$, $VCI=2.5\text{V to }3.3\text{V}$, $AGND=VSS=0\text{V}$

Figure99.

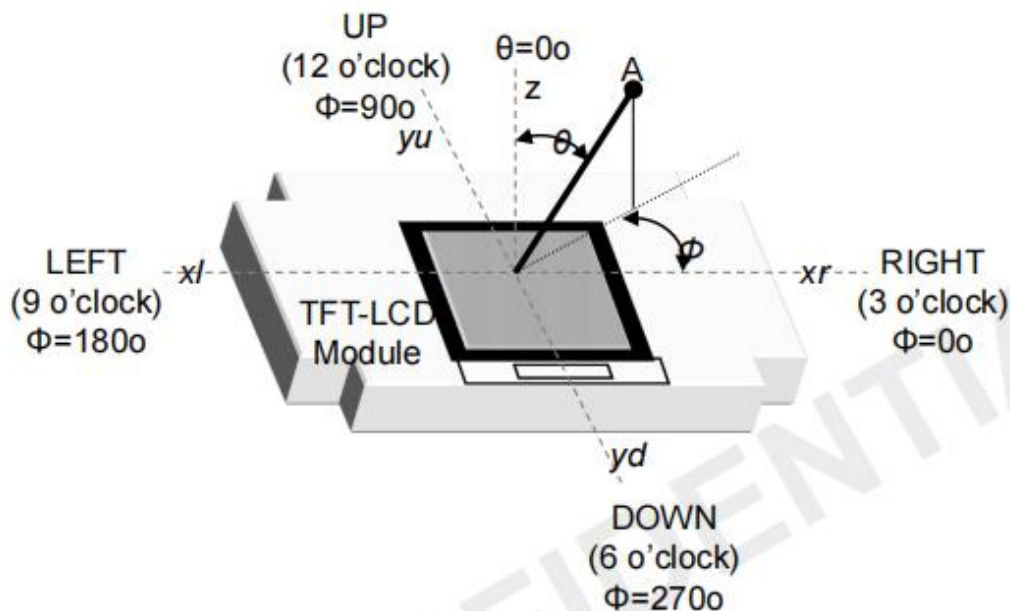


8. Electro-Optical Characteristics

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		1000	1200	---	---	Note 2
Transmittance		T%		4.5	4.8	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.308	---	---	
		W y		---	0.339	---	---	
Viewing angle	θ_T		CR > 10	---	80	---	Deg.	Note 3
	θ_B			---	80	---		
	θ_L			---	80	---		
	θ_R			---	80	---		

Note 4.1: Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure 8).

<Figure 8. Viewing Angle Range Is Defined As Follows>



Note 4.2: Contrast measurements shall be made at viewing angle of $\Theta=0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. Luminance Contrast Ratio (CR) is defined mathematically.

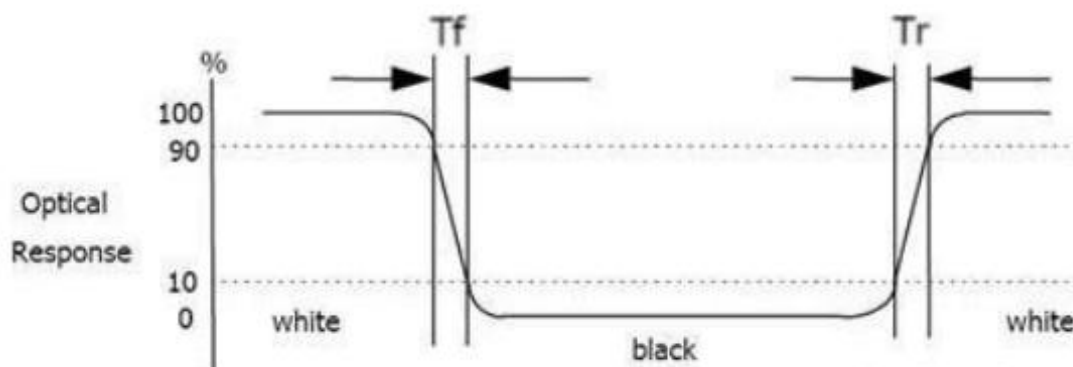
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 4.3: Transmittance is the Value with Polarizer.

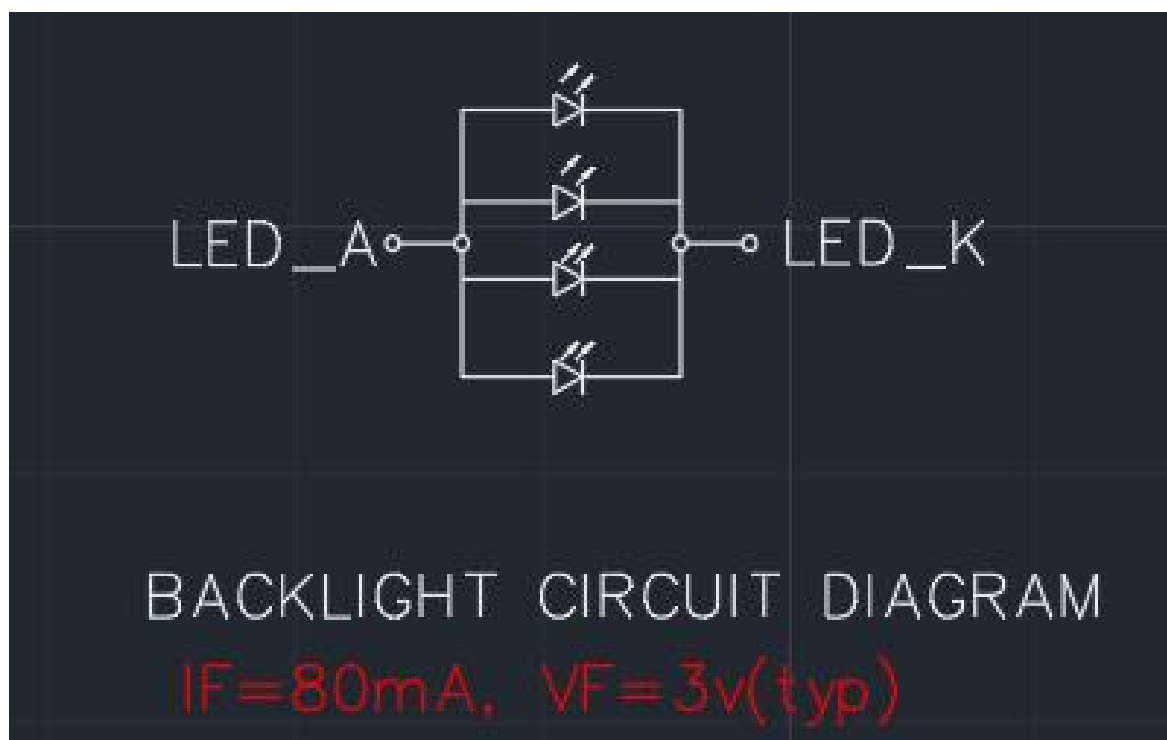
Note 4.4: The color chromaticity coordinates specified in Table 16 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

Note 4.5: The electro-optical response time measurements shall be made as Figure 9 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_f .

<Figure 9. Response Time Testing>



Note(4) Backlight circuit



9.Records Of Version

Version	Revise Date	Page	Content
00	2025-10-10	ALL	New released