

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS018I02-QS-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

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

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1. General Description

LS018I02-QS-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 1.8 inch and the resolution is 360(RGB)*360, the panel can display up to 262k colors.

2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 360(RGB)×360 Dot-matrix
Input Data	QSPI
Viewing Direction (Grayscale Inversion)	Free (IPS)
Drive	ST77916

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	48.08 ×49.95 ×1.96	mm
Number of dots	360(RGB) ×360	pixel
Active area (H×V)	45.684×45.684	mm



5. Absolute Maximum Ratings

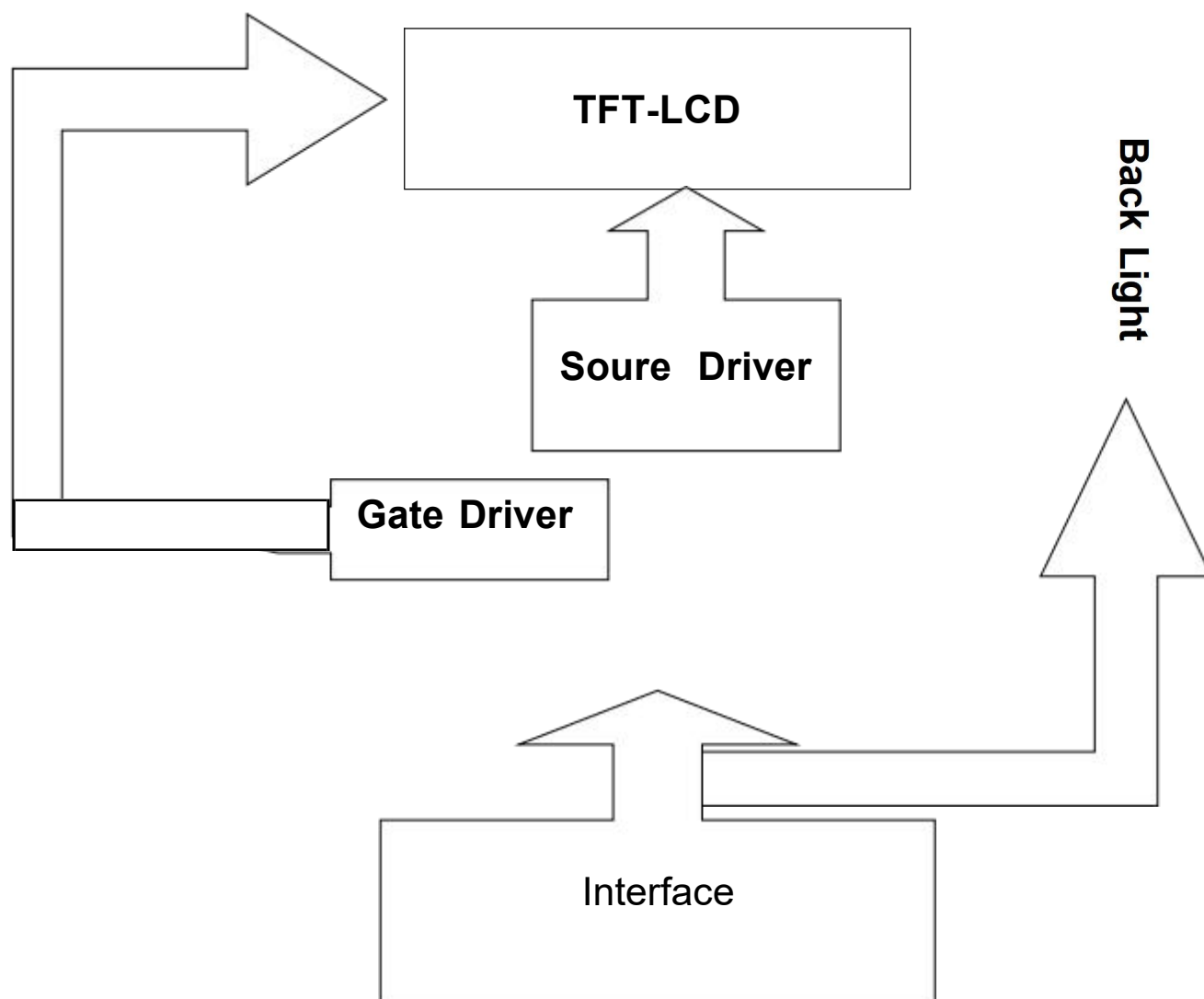
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.0	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.65	2.8	3.3	V	Note1
Supply voltage		IOVCC	1.65	1.8	3.3	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	TP_VCC		power supply
2	TP_RST		Reset Pin for TP
3	TP_INT		Interrupt signal for TP
4	TP_SCL		SCL pin for TP
5	TP_SDA		SDA pin for TP
6	CS		Chip select pin
7	QSPI_CLK		Clock in SPI interface. (SCL)
8	QSPI_IO0		QSPI interface data bus
9	QSPI_IO1		QSPI interface data bus
10	QSPI_IO2		QSPI interface data bus
11	QSPI_IO3		QSPI interface data bus
12	RST		This signal will reset the device and it must be applied to properly initialize the chip
13	VCC		power supply
14	LEDK		Power for LED backlight cathode
15	LEDA		Power for LED backlight anode
16	GND		Ground

7-3 Timing Characteristics

7.4.5 QSPI Interface Characteristics:

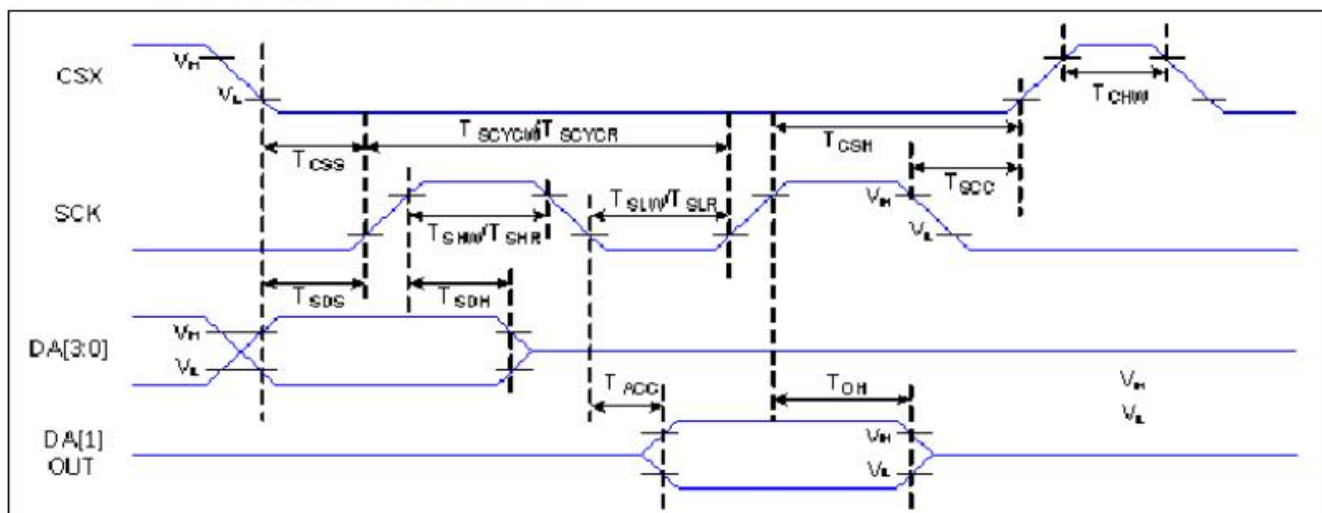


Figure 7 QSPI Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.65 to 3.3V, GND=RGND=0V, Ta=25 °C

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T _{CSS}	Chip select setup time (write)	15		ns	
	T _{CSH}	Chip select hold time (write)	15		ns	
	T _{CSS}	Chip select setup time (read)	60		ns	
	T _{SCC}	Chip select hold time (read)	65		ns	
	T _{CHW}	Chip select "H" pulse width	40		ns	
			200		ns	Note1
SCL	T _{SCYCW}	Serial clock cycle (Write)	16		ns	
	T _{SHW}	SCL "H" pulse width (Write)	7		ns	
	T _{SLW}	SCL "L" pulse width (Write)	7		ns	
	T _{SCYCR}	Serial clock cycle (Read)	150		ns	
	T _{SHR}	SCL "H" pulse width (Read)	60		ns	
	T _{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T _{SDS}	Data setup time	7		ns	
	T _{SDH}	Data hold time	7		ns	
DOUT	T _{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T _{OH}	Output disable time	15	50	ns	For minimum CL=8pF

Table 5 QSPI Interface Characteristics

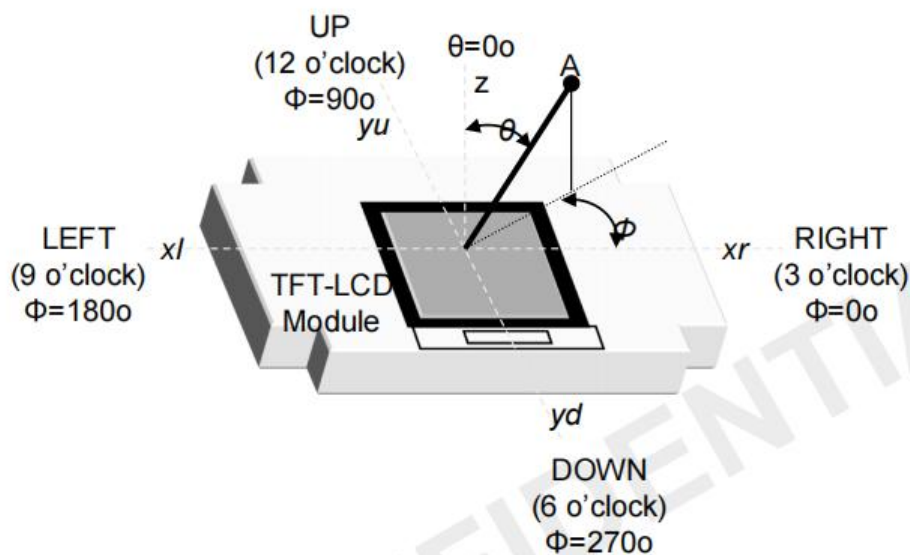
Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

8. Electro-Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	$\theta_x = \theta_y = 0$	---	25	35	ms	Note 1
Contrast Ratio		CR		800	1200	---	---	Note 2
Transmittance		T%		3.4	4.0	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.297	---	---	
		W y		---	0.337	---	---	
Viewing angle	θ_T		CR > 10	80	85	---	Deg.	Note 3
	θ_B			80	85	---		
	θ_L			80	85	---		
	θ_R			80	85	---		

Note 5.1: 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 5).

<Figure 5. Viewing Angle Range Is Defined As Follows>



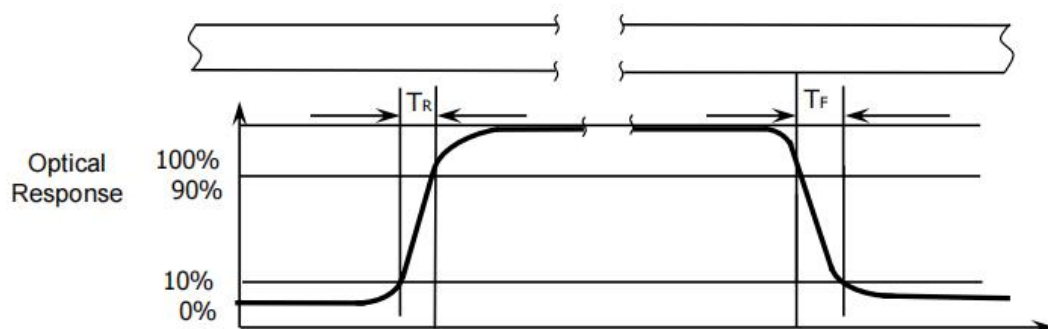
Note 5.2: Contrast measurements shall be made at viewing angle of $\Theta=0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. Luminance Contrast Ratio (CR) is defined mathematically.

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

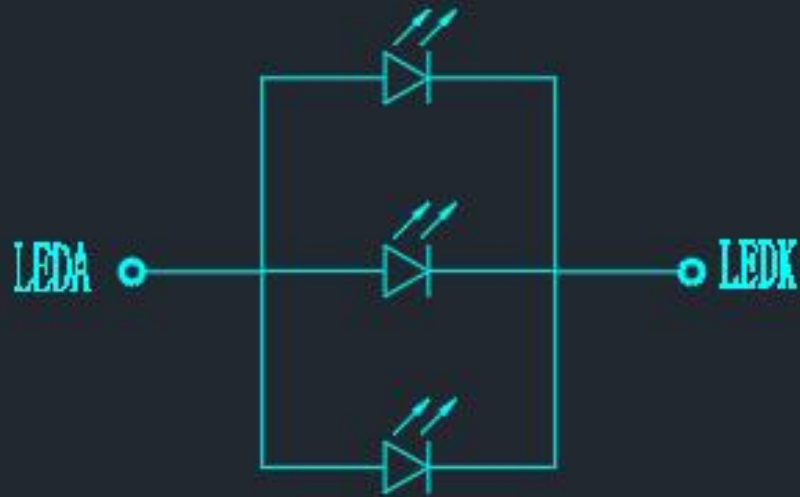
Note 5.3: Transmittance is the Value with Polarizer(HC+Clear) & silicate BLU (Film structure is on Table 6) .

Note 5.5: The electro-optical response time measurements shall be made as Figure 6 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 6. Response Time Testing>



Note(4) Backlight circuit



$I_f = 60\text{mA}$, $V_f = 6\text{V}$ (Typ)

9.Records Of Version

Version	Revise Date	Page	Content
00	2024-12-2	ALL	New released