

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS021I02-QS-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

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

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LESSON

1. General Description

LS021I02-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 2.1 inch and the resolution is 360(RGB)*360, the panel can display up to 262k colors.

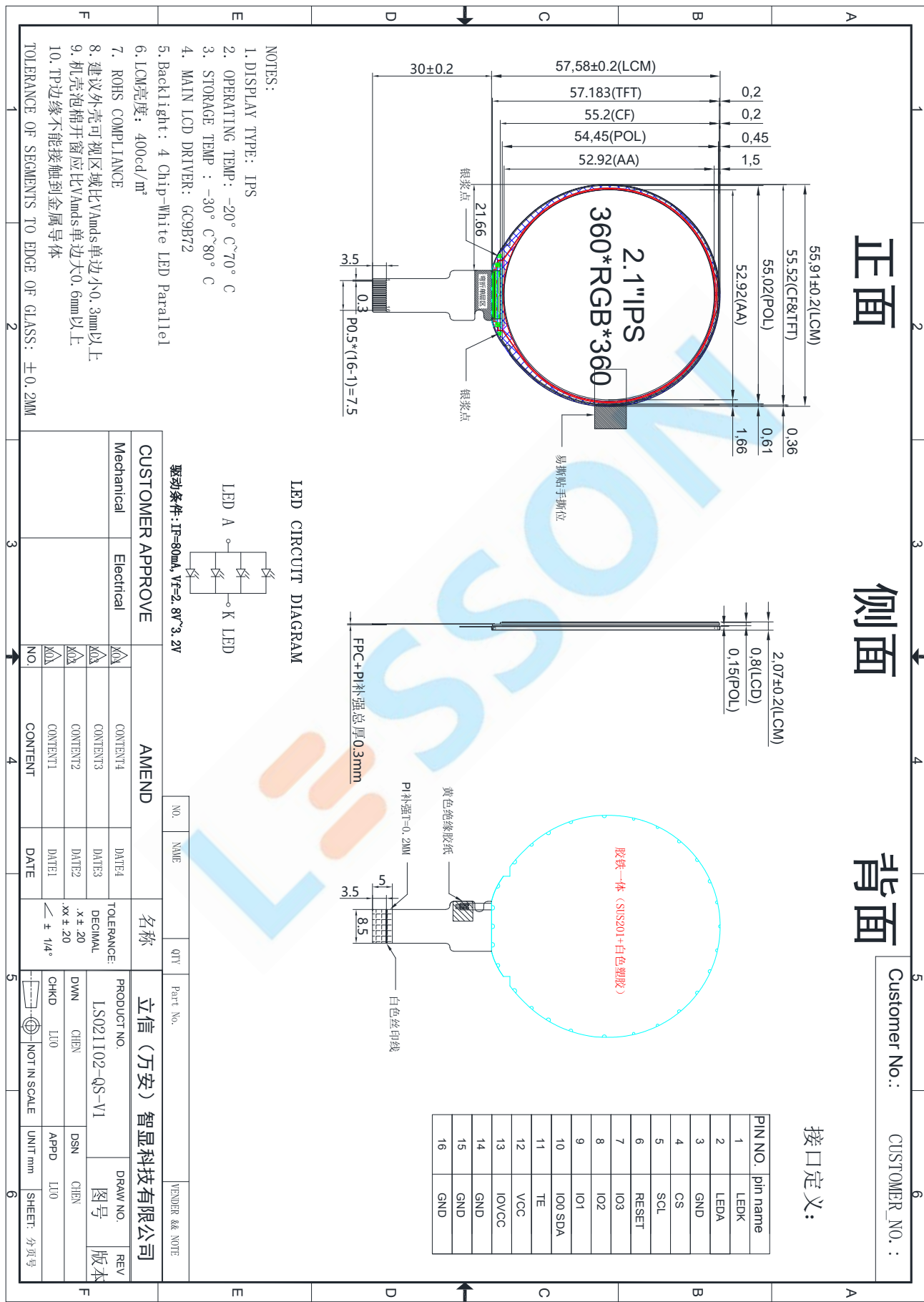
2. Physical Features

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	GC9B72

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	55.91 ×57.58 ×2.07	mm
Number of dots	360(RGB) ×360	pixel
Active area (H×V)	52.92×52.92	mm

4. Outline Dimension



5. Absolute Maximum Ratings

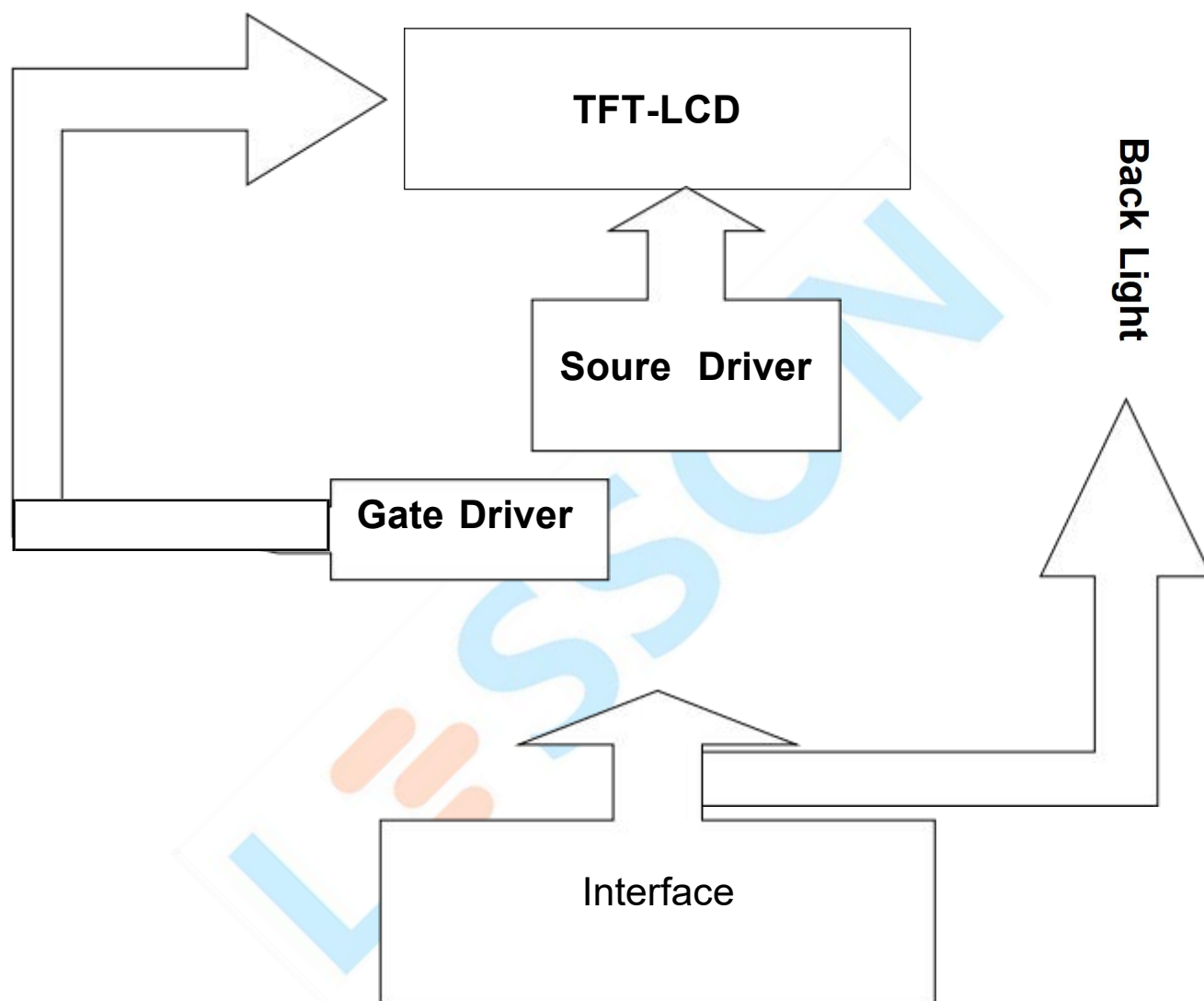
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.6	2.8	3.3	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	

7. Module Function Description

7- 1. Block Diagram Of LCM



7-2. Pin Description

PIN NO.	Symbol	I/O	Description
1	LEDK	P	Power for LED backlight cathode
2	LEDA	P	Power for LED backlight anode
3	GND	P	Ground
4	CS	I	Chip select pin
5	SCL	I	Clock in SPI interface. (SCL)
6	RESET	I	This signal will reset the device and it must be applied to properly initialize the chip
7	IO3	I	QSPI interface data bus
8	IO2	I	QSPI interface data bus
9	IO1	I	QSPI interface data bus
10	IO0 SDA	I/O	QSPI interface data bus
11	TE	O	Tearing effect output pin to synchronize MPU to frame writing, activated by S/W command. When this pin is not activated, this pin is low. If not used, open this pin.
12	VCC	P	power supply
13	IOVCC	P	power supply
14	GND	P	Ground
15	GND	P	Ground
16	GND	P	Ground

7-3 Timing Characteristics

Figure100.

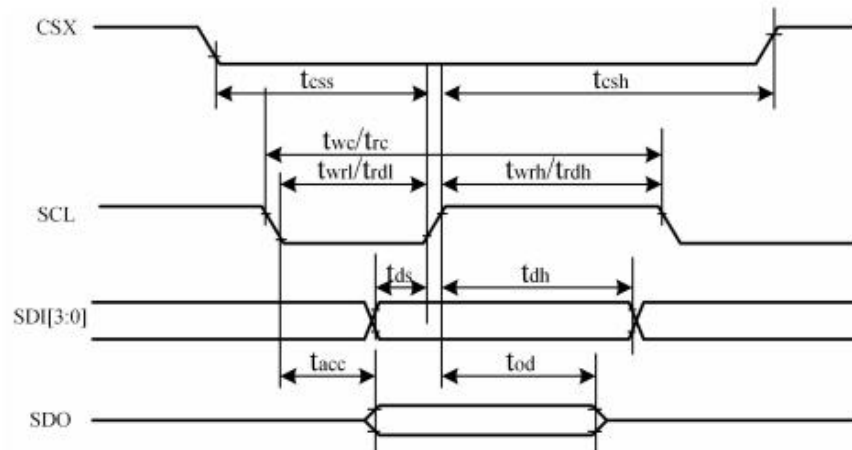
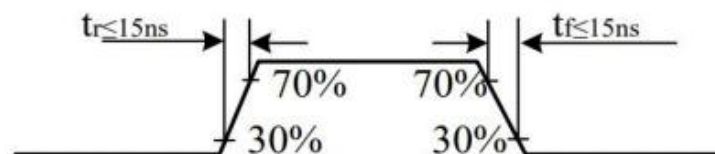


Table49.

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)	20	-	ns	
	t_{wrh}	SCL "H" Pulse Width (Write)	10	-	ns	
	t_{wrl}	SCL "L" Pulse Width (Write)	10	-	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	
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	10	-	ns	
	t_{dh}	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	20	-	ns	

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

Figure101.

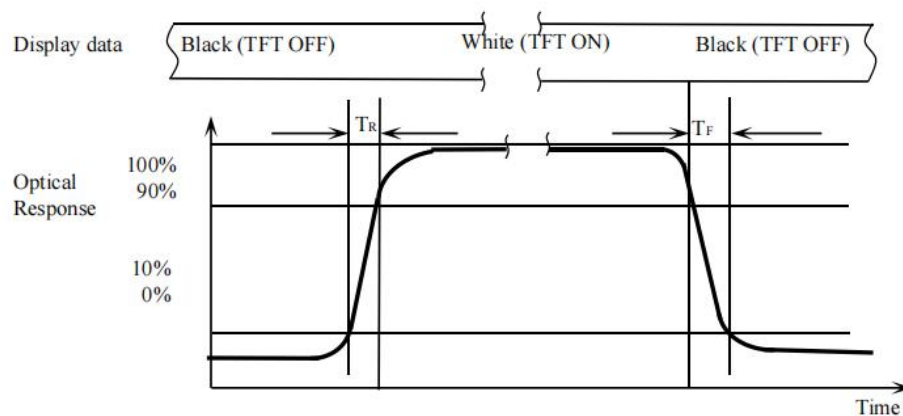


8. Electro-Optical Characteristics

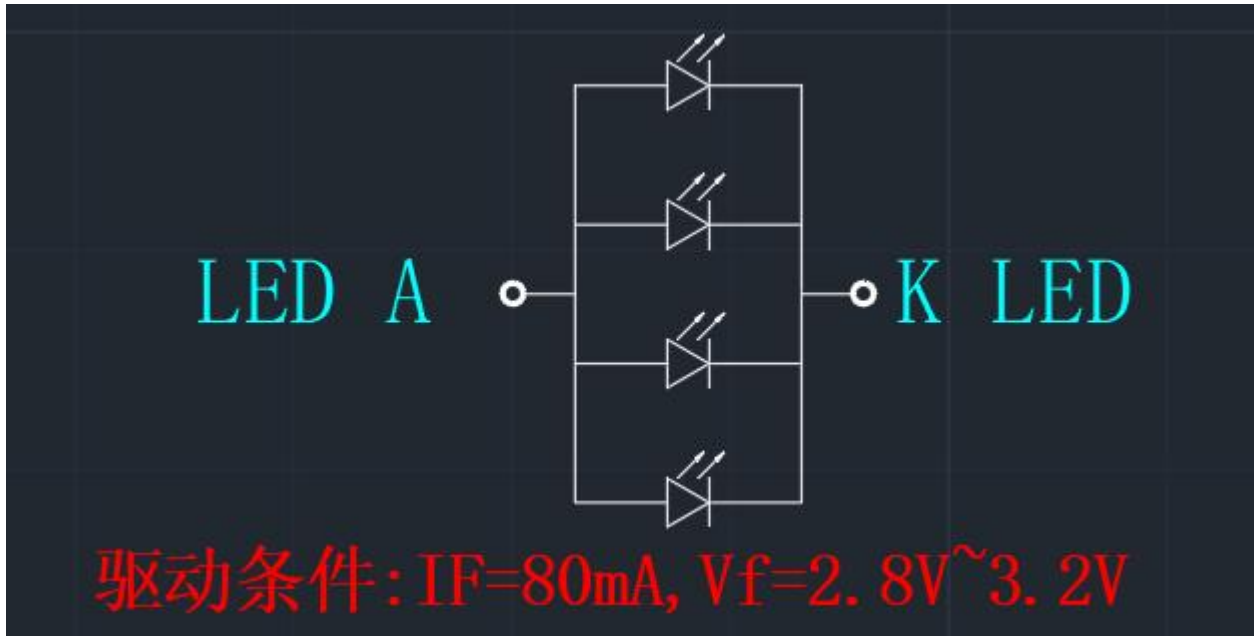
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	$\theta_x = \theta_y = 0$	---	25	35	ms	Note 1
Contrast Ratio		CR		900	1200	---	---	Note 2
Transmittance		T%		3.9	4.3	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.307	---	---	
		W y		---	0.316	---	---	
Viewing angle	θ_T		CR > 10	80	85	---	Deg.	Note 3
	θ_B			80	85	---		
	θ_L			80	85	---		
	θ_R			80	85	---		

Notes :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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. The Angle of viewing is related to the type of polarizer , need note POL type , wide view or others.
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. (See Figure 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$
3. Transmittance is the Value without APF and without CG.
4. The color chromaticity coordinates specified in Table 4. 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. The chromaticity coordinates are based on BOE backlight.
5. The electro-optical response time measurements shall shown in below table by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.



Note(4) Backlight circuit



9. Records Of Version

Version	Revise Date	Page	Content
00	2026-5-18	ALL	New released