

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS0177T02-S-V1

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

LS0177T02-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 1.77 inch and the resolution is 128(RGB)*160, the panel can display up to 262k colors.

2. Physical Features

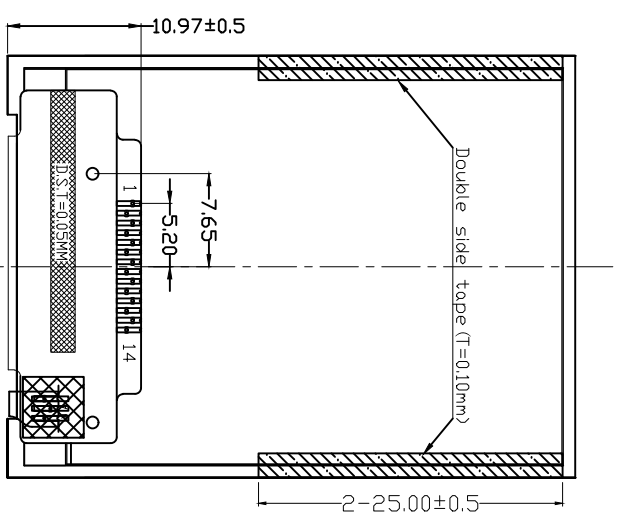
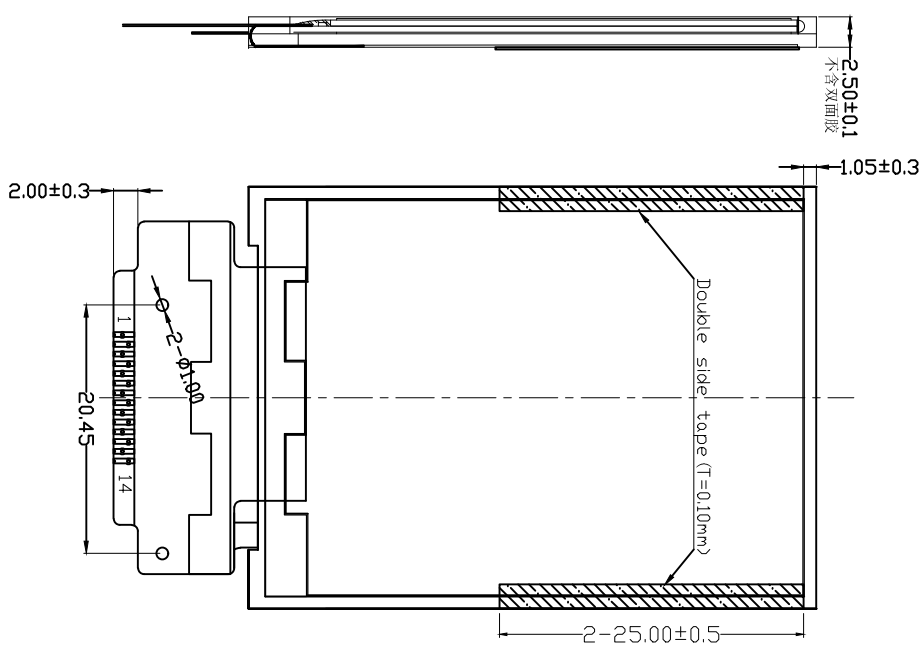
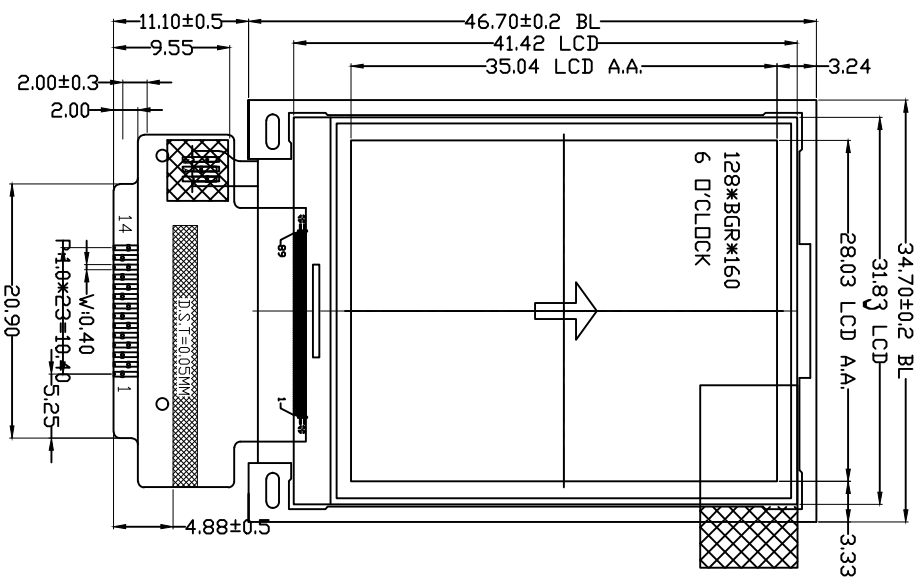
Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 128(RGB)×160 Dot-matrix
Input Data	4-line serial interface
Viewing Direction (Grayscale Inversion)	TN
Drive	ST7735V3

3. Mechanical Specification

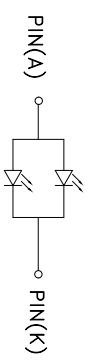
Item	Specification	Unit
Module size (H×V×D)	34.7 ×46.7×2.5	mm
Number of dots	128(RGB) ×160	pixel
Active area (H×V)	28.03×35.04	mm

Customer's Approval	
Customer	
Date	

No.	PIN NAME
1	NC
2	VSS
3	LED-
4	LED+
5	VSS
6	/RET
7	A0
8	SDA
9	SCK
10	VPDA
11	VDDIC
12	/CS
13	VSS
14	NC



FPC 弯折参考示意图



$I=15 \times 2 \text{mA}$ (定电流驱)
 $V=3.3 \text{V}$ (参考电压)

CIRCUIT DIAGRAM

- NOTES:
- 1.DISPLAY TYPE: Main LCD:262K TFT TRANSMISSIVE 6:00
 2. OPERATING TEMP: -20°C~70°C
 3. STORAGE TEMP : -30°C~80°C
 4. MAIN LCD DRIVER:
 5. BACKLIGHT: 2CHIP-WHITE LED
 6. RHDS COMPLIANCY
 7. GENERAL TOLERANCE:±0.2

REVISED RECORD					立信（万安）智显科技有限公司		
A							
B							
C							
D							
E							

5. Absolute Maximum Ratings

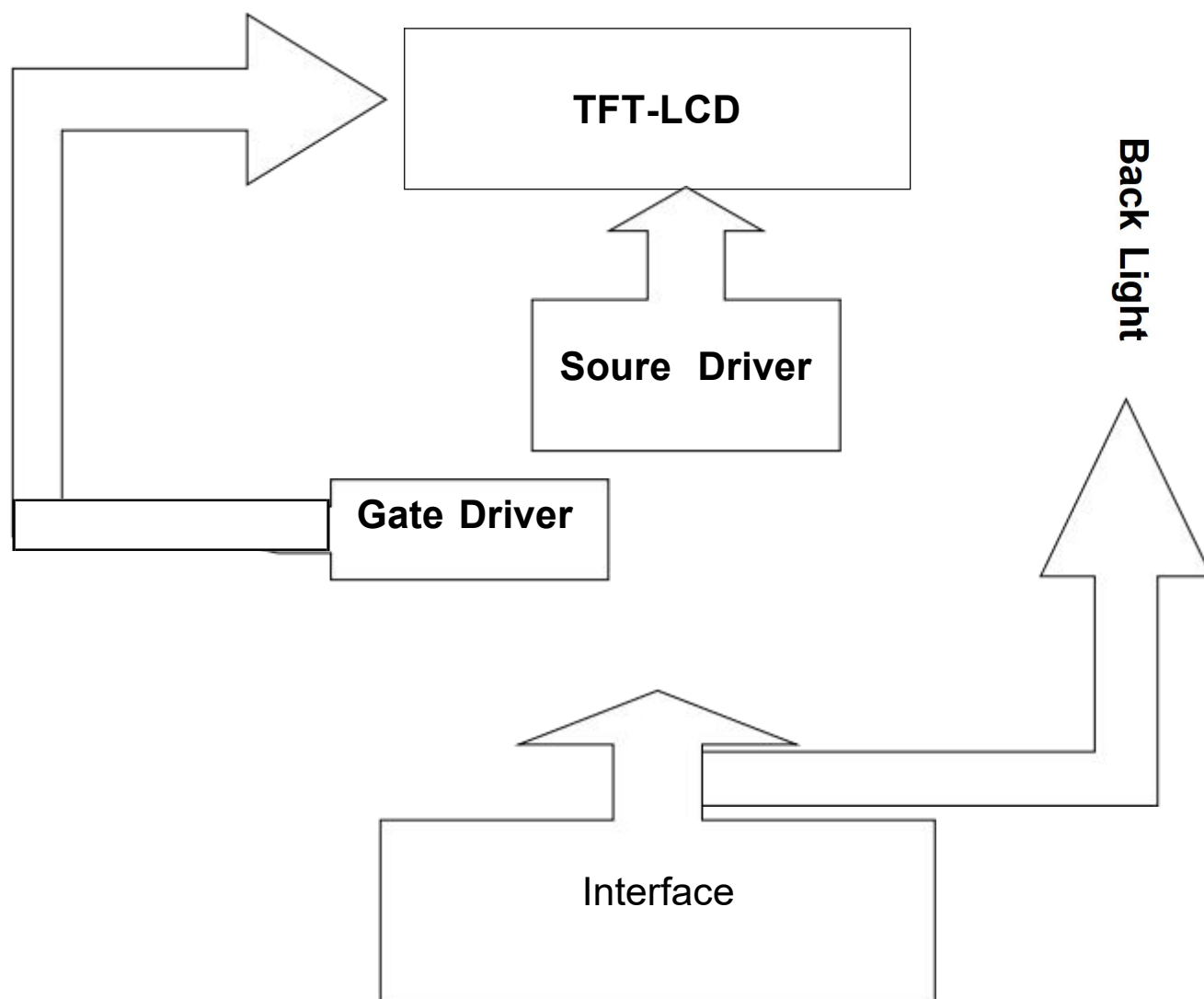
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.5	2.75	3.7	V	Note1
Supply voltage		IOVCC	1.65	1.8	3.7	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	NC		
2	VSS	P	Ground
3	LED-	P	Power for LED backlight cathode
4	LED+	P	Power for LED backlight anode
5	VSS	P	Ground
6	REST	I	Reset pin.
7	A0	I	Command and Data select pin
8	SDA	I/O	Serial data input/output PIN
9	SCK	I	Serial clock pin
10	VDD	P	power supply
11	VDDIO	P	power supply
12	CS	I	Chip select pin
13	VSS	P	Ground
14	NC		

7-3 Timing Characteristics

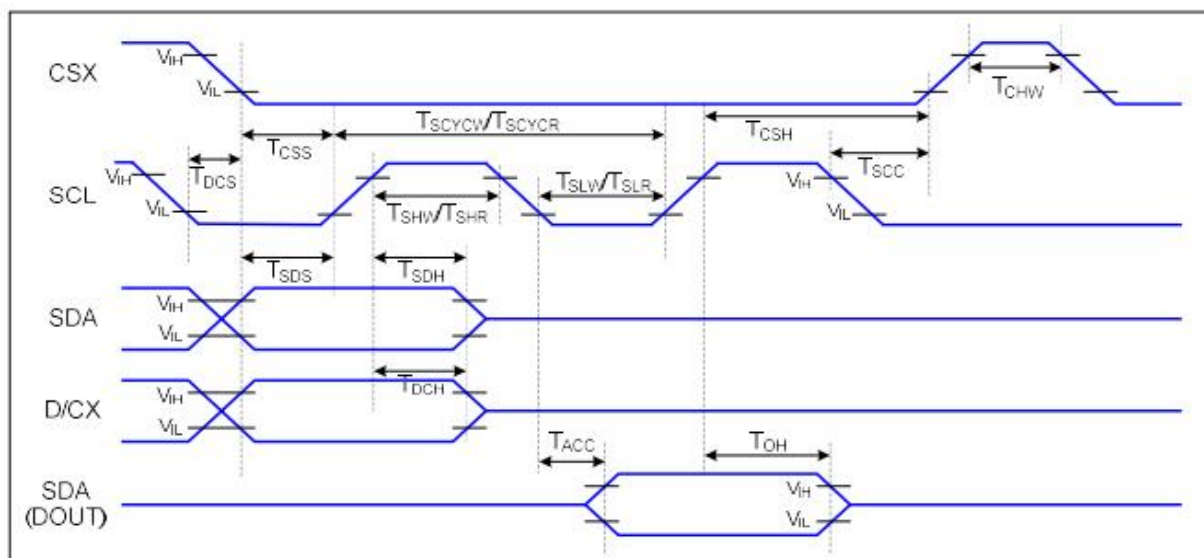


Figure 7 4-line Serial Interface Timing

$T_a = 25^\circ\text{C}$, $V_{DDI} = 1.65 \sim 3.7\text{V}$, $V_{DD} = 2.5 \sim 3.7\text{V}$

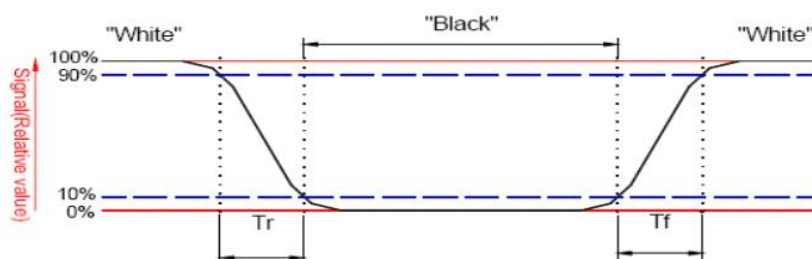
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	15		ns	
	TCSH	Chip Select Hold Time (Write)	15		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select "H" Pulse Width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	20		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	10		ns	
	TSLW	SCL "L" Pulse Width (Write)	10		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 $CL = 30\text{pF}$ For Minimum $CL = 8\text{pF}$
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

Table 7 4-line Serial Interface Characteristics

Note : The rising time and falling time (T_r , T_f) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of V_{DDI} 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	60	ms	Note 1
Contrast Ratio		CR		200	300	---	---	Note 2
Transmittance		T%		6.21	6.8	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.309	---	---	
		W y		---	0.327	---	---	
Viewing angle	θ_T		CR > 10	---	45	---	Deg.	Note 3
	θ_B			---	20	---		
	θ_L			---	45	---		
	θ_R			---	45	---		

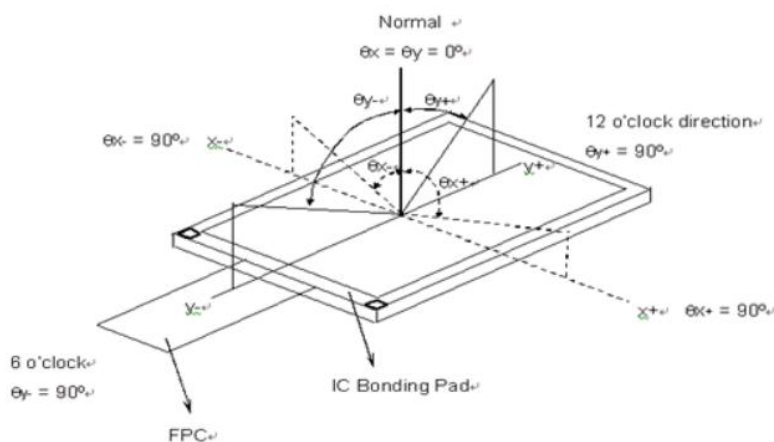


Note 7: Definition of contrast ratio:

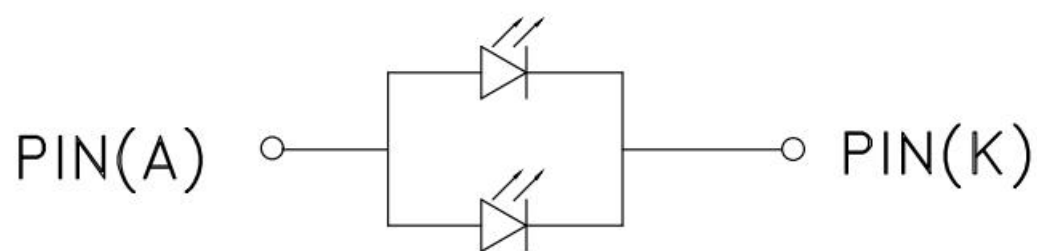
Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Note 8: Definition of viewing angle



Note(4) Backlight circuit



$I=15 \times 2\text{mA}$ (定电流驱)

$V=3.3\text{V}$ (参考电压)

CIRCUIT DIAGRAM

9.Records Of Version

Version	Revise Date	Page	Content
00		ALL	New released