

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS0154I05-S-V2

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

LS0154I05-S-V2 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 1.54 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	SPI
Viewing Direction (Grayscale Inversion)	IPS
Drive	ST7789P3

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	31.52 ×33.72 ×2.04	mm
Number of dots	240(RGB) ×240	pixel
Active area (H×V)	27.72×27.72	mm



5. Absolute Maximum Ratings

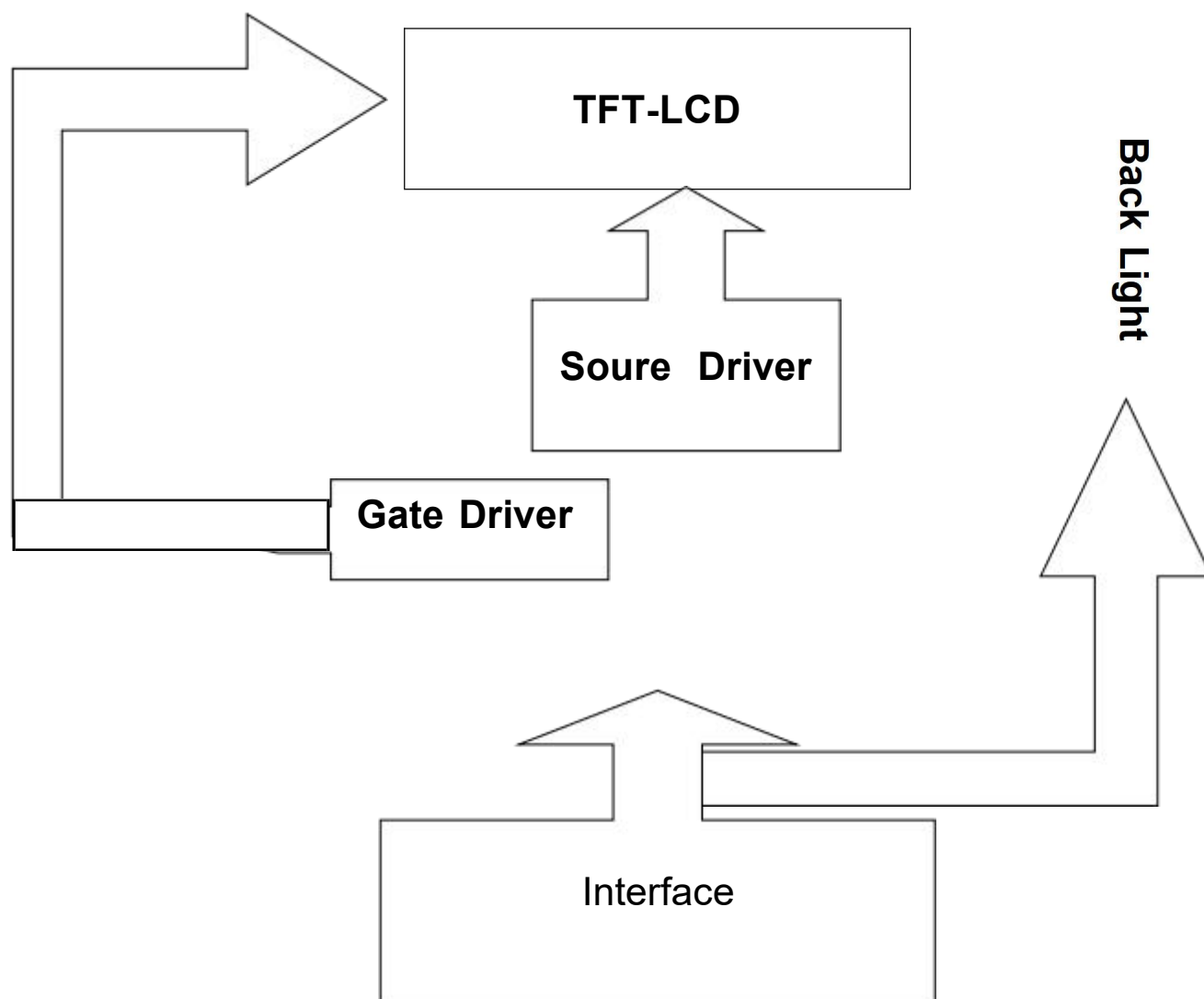
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.4	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	CS	I	Chip selection pin
2	GND	P	Ground
3	SCLK	I	Serial clock pin
4	RST	I	This signal will reset the device and it must be applied to properly initialize the chip.
5	SDA	I	SPI interface input pin.
6	TE	O	Tearing effect signal is used to synchronize MCU to frame memory
7	DCX	I	Display data/command selection pin in 4-line serial interface.
8	IOVCC	P	power supply
9	VCC	P	power supply
10	VCC	P	power supply
11	GND	P	Ground
12	GND	P	Ground
13	LED A	P	Power for LED backlight anode
14	LED A	P	Power for LED backlight anode
15	LED K	P	Power for LED backlight cathode

7-3 Timing Characteristics

7.4.3 Serial Interface Characteristics (4-line serial):

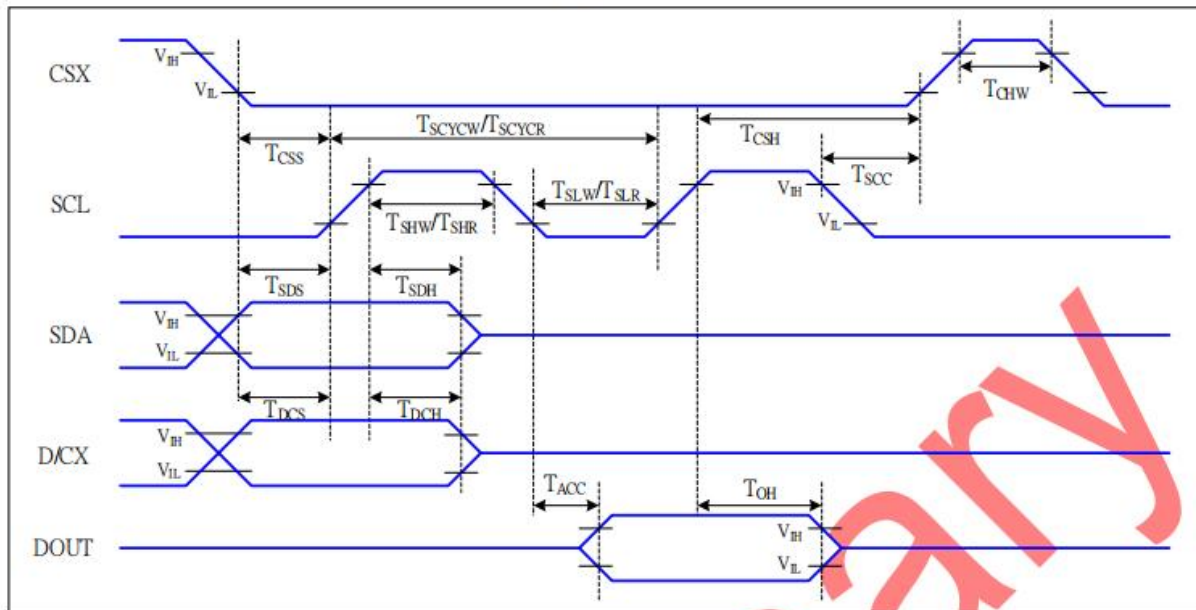


Figure 5 4-line serial Interface Timing Characteristics

$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	TBD	-	ns	
	T_{CSH}	Chip select hold time (write)	TBD	-	ns	
	T_{CSS}	Chip select setup time (read)	TBD	-	ns	
	T_{SCC}	Chip select hold time (read)	TBD	-	ns	
	T_{CHW}	Chip select "H" pulse width	TBD	-	ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	TBD	-	ns	-write command & data ram
	T_{SHW}	SCL "H" pulse width (Write)	TBD	-	ns	
	T_{SLW}	SCL "L" pulse width (Write)	TBD	-	ns	
	T_{SCYCR}	Serial clock cycle (Read)	TBD	-	ns	-read command & data ram
	T_{SHR}	SCL "H" pulse width (Read)	TBD	-	ns	
	T_{SLR}	SCL "L" pulse width (Read)	TBD	-	ns	
D/CX	T_{DCS}	D/CX setup time	TBD	-	ns	
	T_{DCH}	D/CX hold time	TBD	-	ns	
SDA (DIN)	T_{SDS}	Data setup time	TBD	-	ns	
	T_{SDH}	Data hold time	TBD	-	ns	
DOUT	T_{ACC}	Access time	TBD	TBD	ns	For maximum $CL=30pF$
	T_{OH}	Output disable time	TBD	TBD	ns	For minimum $CL=8pF$

Table 6 4-line serial Interface Characteristics

Note 1 : 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	---	ms	Note 1
Contrast Ratio		CR		---	250	---	---	Note 2
Transmittance		T%		4.5	5	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.308	---	---	
		W y		---	0.325	---	---	
Viewing angle	θ_T		CR > 10	---	45	---	Deg.	Note 3
	θ_B			---	20	---		
	θ_L			---	45	---		
	θ_R			---	45	---		

Note 1: Ambient temperature = 25°C.

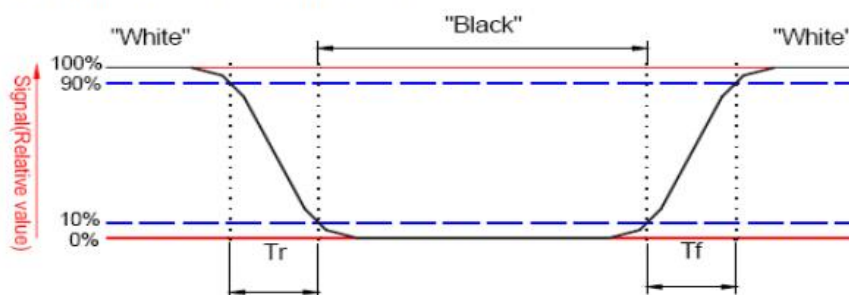
Note 2: To be measured with a viewing cone of 2° by Topcon luminance meter BM-5A.

Note 3: To be measured with Otsuta chromaticity meter LCF-2100M, CF only measure under C light simulation.

Note 4: CTC shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer

Note 5: Definition of response time:

The output signals of TRD-100 are measured when the input signals are changed to "White" (falling time) and from "White" to "Black" (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.

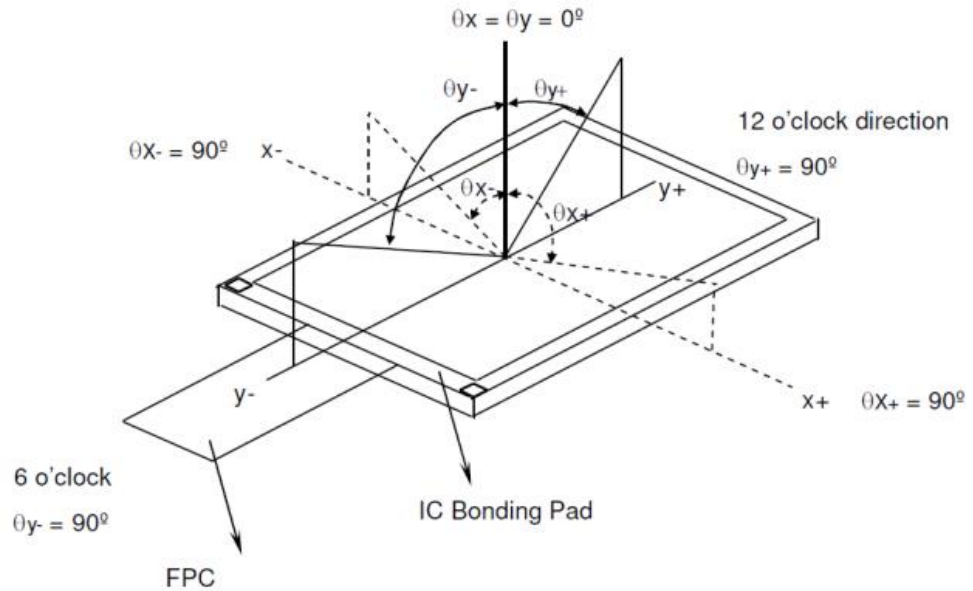


Note 6: Definition of contrast ratio:

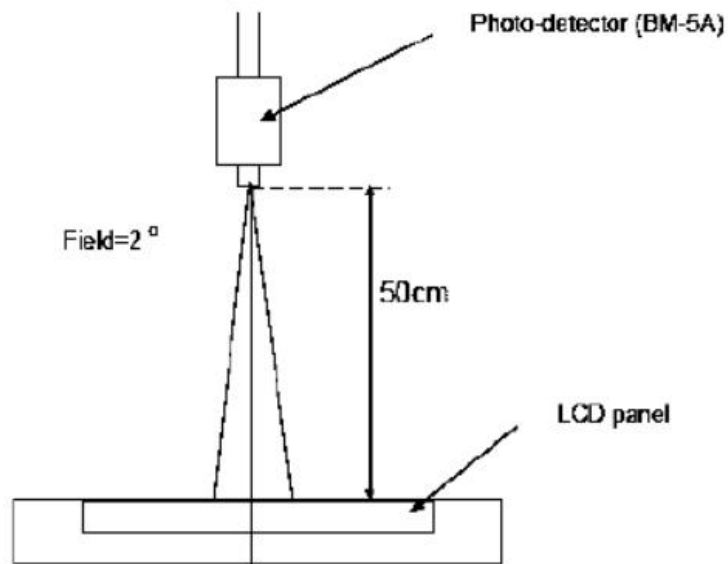
Contrast ratio is calculated by the following formula.

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

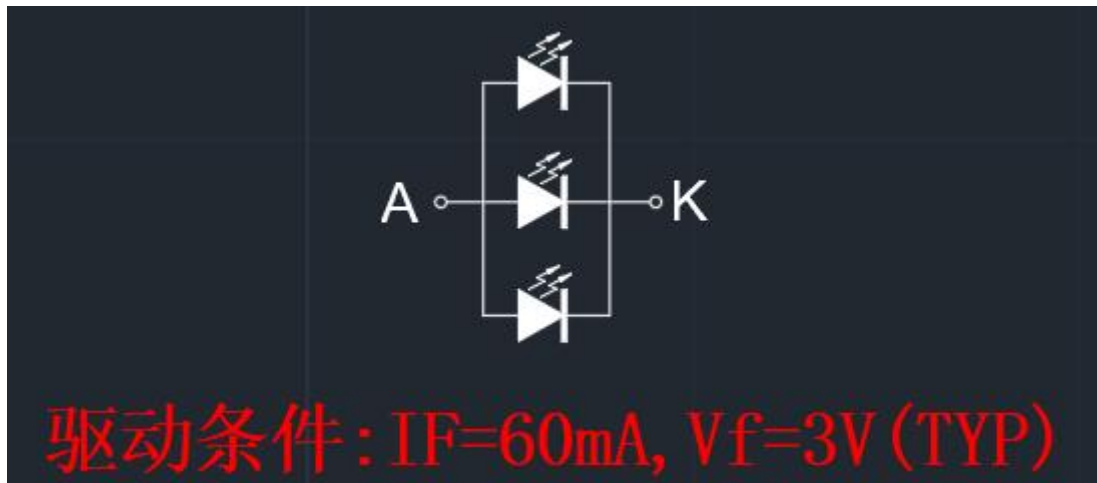
Note 7: Definition of viewing angle



Note 8: Optical characteristic measurement setup.



Note(4) Backlight circuit



9.Records Of Version

Version	Revise Date	Page	Content
00	2026-1-20	ALL	New released