

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS0144T05-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

LS0144T05-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 1.44 inch and the resolution is 128(RGB)*128, the panel can display up to 262k colors.

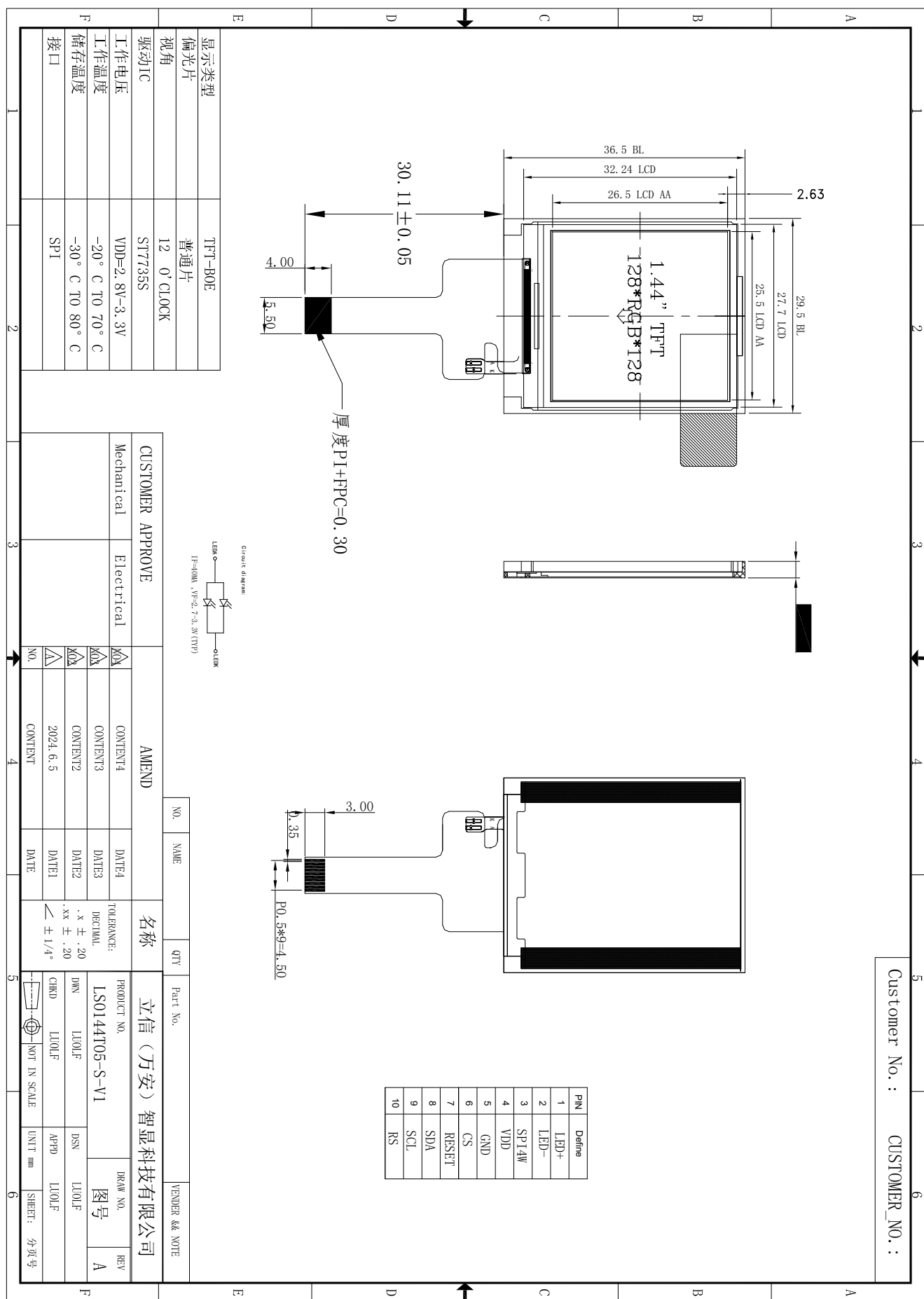
2. Physical Features

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

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	29.5 ×36.5 ×2.5	mm
Number of dots	128(RGB) ×128	pixel
Active area (H×V)	25.5×26.5	mm

4. Outline Dimension



5. Absolute Maximum Ratings

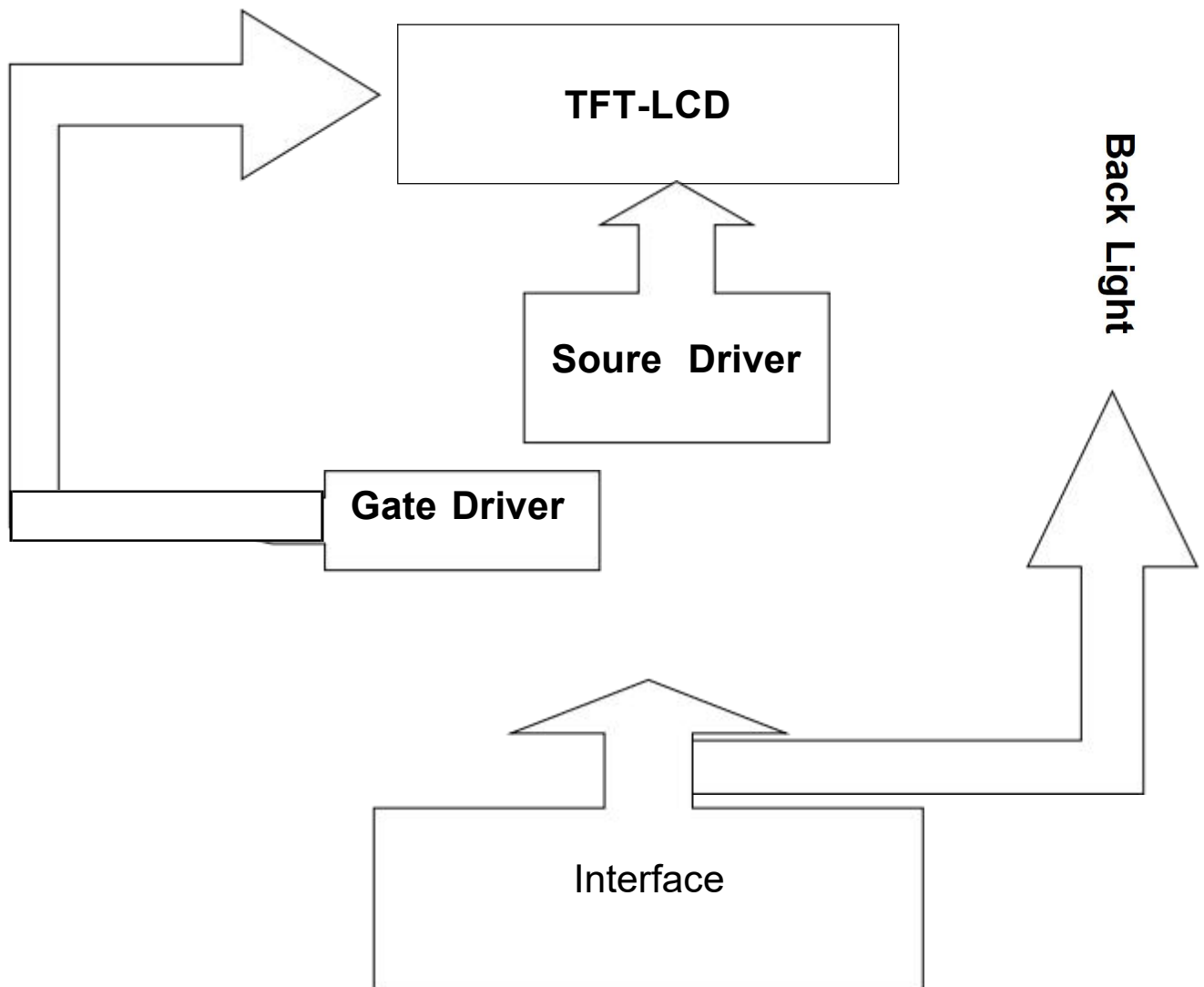
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.6	V	Note1 Note2
Supply voltage	IOVCC	-0.3	4.6	V	
Operating temperature	TOPR	-20	70	°C	
Storage temperature	TSTR	-30	80	°C	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.5	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	LED+	P	Backlight LED Anode pin.
2	LED-	P	Backlight LED cathode pin.
3	SPI4W	I	SPI4W=' 0' , 3-line SPI Enable. - SPI4W='1', 4-line SPI Enable.
4	VDD	P	Power supply for analog circuit blocks
5	GND	P	Ground .
6	CS	I	Chip selection signal.
7	RESET	I	This signal will reset the device and it must be applied to properly initialize the chip.
8	SDA	I/O	Serial input/output data.
9	SCL	I	Clock signa.
10	RS	I	Data/command selection pin in 4-line serial interface.

7-3 Timing Characteristics

8.3 Serial Interface Characteristics (3-line Serial)

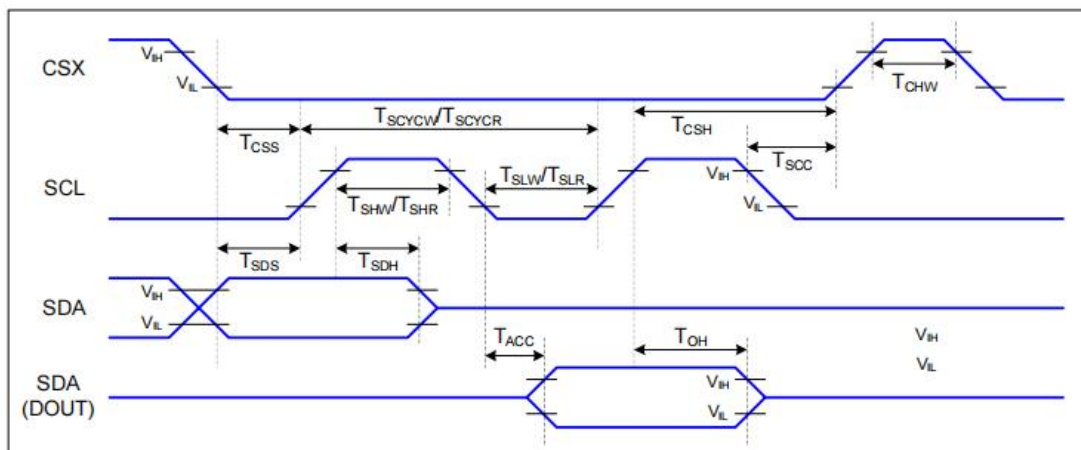


Figure 6 3-line Serial Interface Timing

T_a=25 °C, V_{DDI}=1.65~3.7V, V_{DD}=2.5~3.7V

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	
	TSHW	SCL "H" Pulse Width (Write)	10		ns	
	TSLW	SCL "L" Pulse Width (Write)	10		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	
	TSHR	SCL "H" Pulse Width (Read)	60		ns	
	TSLR	SCL "L" Pulse Width (Read)	60		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

Table 6 3-line Serial Interface Characteristics

8.4 Serial Interface Characteristics (4-line Serial)

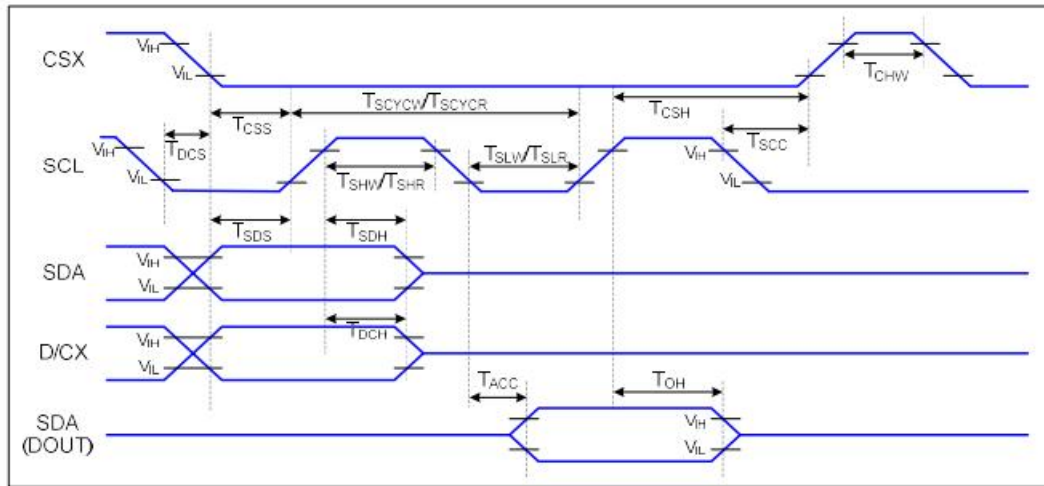


Figure 7 4-line Serial Interface Timing

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

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	
	TSBW	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	
	TSBR	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 $C_L = 30\text{pF}$ For Minimum $C_L = 8\text{pF}$
	TSBH	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	$T_r + T_f$	$\theta_x = \theta_y = 0$	---	25	30	ms	Note 1
Contrast Ratio	CR		300	600	---	---	Note 2
Transmittance	T%		3.9	5.5	---	%	
Color Chromaticity (CIE1931)	White	W_x	$\theta_x = \theta_y = 0$	0.301	---	---	
		W_y		0.327	---	---	
Viewing angle	θ_T	CR > 10	---	70	---	Deg.	Note 3
	θ_B		---	60	---		
	θ_L		---	75	---		
	θ_R		---	75	---		

FIG. 2 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”. This definition is valid for a normally black display. For a normally white display the opposite definition applies.

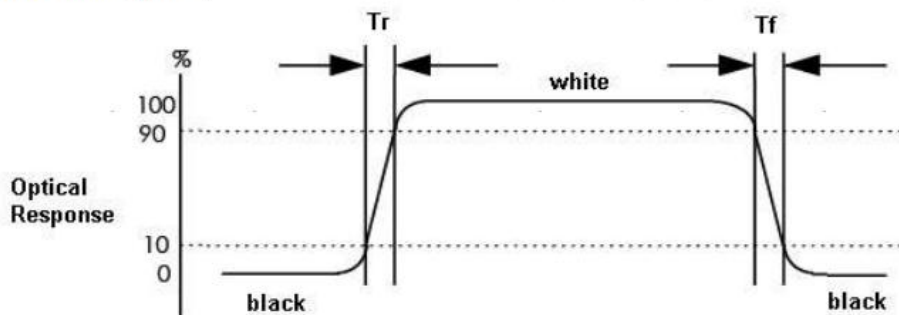
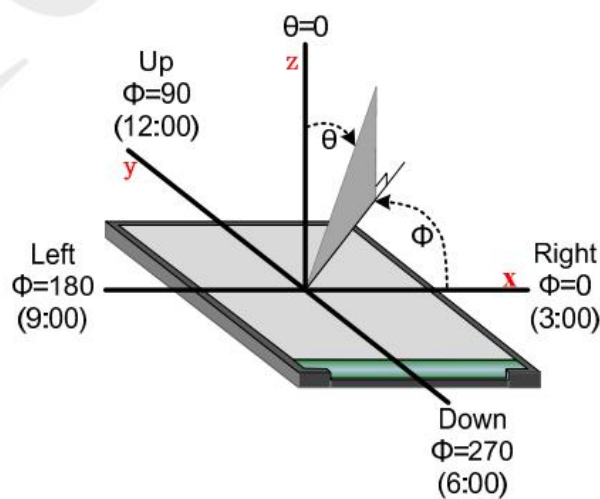
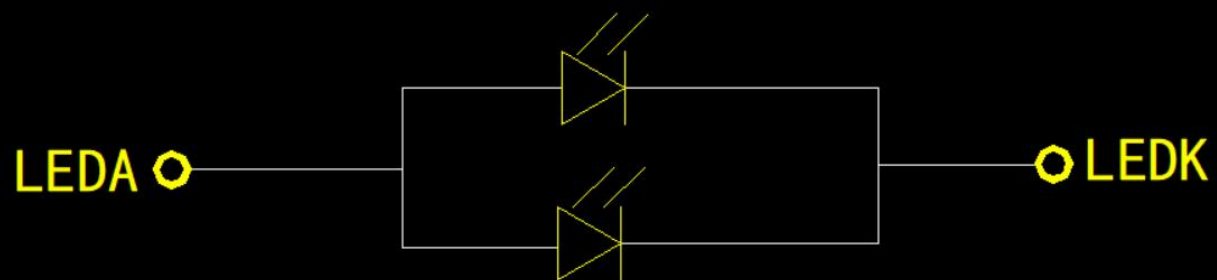


FIG. 3 The definition of viewing angle



Note(4) Backlight circuit

Circuit diagram:



$I_F=40\text{MA}$, $V_F=2.7-3.3\text{V (TYP)}$

9.Records Of Version

Version	Revise Date	Page	Content
00	2025-1-2	ALL	New released