



深圳市光立电子有限公司

Shenzhen GL Electronics Co.,Ltd

LCM APPROVAL SHEET

模组承认书

版本(Version): V0

Project No.		GL180TFT12A	
Customer			
Module No.			
Product type		Type:	TFT LCD Display
		Resolution:	360x 360 Dots
		Screen Size:	1.8inch
Signature by customer:			
Structure size:		<input type="checkbox"/> OK_____	Mark :
		<input type="checkbox"/> NG_____	
Electric features:		<input type="checkbox"/> OK_____	Mark:
		<input type="checkbox"/> NG_____	
Company	Designed by	Checked by	Approved by
Signature			
Rev.	Date	Description	
V0	2024-10-18	Preliminary Specification Release	

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Revision History

Rev	Issued Date	Description		Page	Editor
1.0	Oct. 12,2024	First release		All	

1 General Specifications

Feature		Specifications
Display Spec.	LCD type	1.8 inch
	Resolution (H*V)	360(RGB) *360
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	IPS/Transmissive/Normally Black
	Viewing Direction	All
	Gray Scale Inversion Direction	--
Mechanical Characteristics	OutlineDimensions (W x H x T) (mm)	48.08(H) *49.95(V)*1.96(T)
	Active Area(mm)	45.68 (H)*45.68(V)
	With /Without Touch screen	Without
	Match Connector Type	0.3 Pitch 39 Pin
	Backlight Type	White LED
	Weight (g)	TBD
Electrical Characteristics	Interface	MIPI/QSPI/8BIT/SPI/SPI+RGB
	Number of color	16.7M
	Driver IC	ST77916

2 Pin Assignment

NO	SYMBOL	FUNCTION																																													
1	GND	Power Ground																																													
2	LEDK	LED Cathode																																													
3	LEDA	LED Anode																																													
4	GND	Power Ground																																													
5	CP	MIPI-DSI clock lane positive-end input pin																																													
6	CN	MIPI-DSI clock lane negative-end input pin																																													
7	GND	Power Ground																																													
8	D0P	MIPI-DSI data lane positive-end input pin. (Data lane 0 positive polarity))																																													
9	D0N	MIPI-DSI data lane negative-end input pin.(Data lane 0 negative polarity)																																													
10	GND	Power Ground																																													
11	IM0	<table><tr><th>IM2</th><th>IM1</th><th>IM0</th><th>MPU Interface Mode</th><th>Data pin</th></tr><tr><td>0</td><td>0</td><td>0</td><td>3-line 9bit serial I/F</td><td>SDA: in/out</td></tr><tr><td>0</td><td>0</td><td>1</td><td>MIPI_3-line 9bit serial I/F</td><td>SDA: in/out DP/DN</td></tr><tr><td>0</td><td>1</td><td>0</td><td>2 data lane serial I/F</td><td>SDA1: in/out SDA2: in</td></tr><tr><td>0</td><td>1</td><td>1</td><td>QSPI I/F</td><td>SDA[3:0]: in/out</td></tr><tr><td>1</td><td>0</td><td>0</td><td>RGB_3-line 9bit serial I/F</td><td>SDA: in/out DB[5:0]: out</td></tr><tr><td>1</td><td>0</td><td>1</td><td>RGB_4-line 8bit serial I/F</td><td>SDA: in/out DB[5:0]: out</td></tr><tr><td>1</td><td>1</td><td>0</td><td>4-line 8bit serial I/F</td><td>SDA: in/out</td></tr><tr><td>1</td><td>1</td><td>1</td><td>80-8bit parallel I/F</td><td>DB[7:0]</td></tr></table>	IM2	IM1	IM0	MPU Interface Mode	Data pin	0	0	0	3-line 9bit serial I/F	SDA: in/out	0	0	1	MIPI_3-line 9bit serial I/F	SDA: in/out DP/DN	0	1	0	2 data lane serial I/F	SDA1: in/out SDA2: in	0	1	1	QSPI I/F	SDA[3:0]: in/out	1	0	0	RGB_3-line 9bit serial I/F	SDA: in/out DB[5:0]: out	1	0	1	RGB_4-line 8bit serial I/F	SDA: in/out DB[5:0]: out	1	1	0	4-line 8bit serial I/F	SDA: in/out	1	1	1	80-8bit parallel I/F	DB[7:0]
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1	1	1	80-8bit parallel I/F	DB[7:0]																																											
12	IM1																																														
13	IM2																																														
14	IOVCC	Power Supply for logic, VDDIO= 1.65V~3.3V.																																													
15	VCC	Power Supply for Analog, VDD=2.4V~3.3V																																													
16	VS	Vertical (Frame) synchronizing input signal in RGB interface																																													
17	HS	Horizontal (Line) synchronizing input signal in RGB interface																																													
18	TE	Tearing effect output pin to synchronize MCU to frame writing. This pin is low when it is not activated. If not used, please open it																																													
19	RESET	This signal will reset the device and must be applied to properly initialize the chip. Signal is low active																																													
20	GND	Power Ground																																													

21	D7	Data signal for DBI Type B mode
22	D6	Data signal for DBI Type B mode
23	D5	Data signal for DBI Type B mode
24	D4	Data signal for DBI Type B mode
25	D3(SDA3)	Data signal for DBI Type B mode
26	D2(SDA2)	Data signal for DBI Type B mode
27	D1(SDA1)	Data signal for DBI Type B mode
28	D0(SDA0)	Data signal for DBI Type B mode
29	CS	Chip select pin ofDBI Type B mode. Low active.
30	RD(SCL)	Read Control pulse H duration
31	WR	Write enable in MCU parallel interface
32	DCX	Display data/command selection pin in parallel interface
33	GND	Power Ground
34	TP-SCL	Touch panel I2C clock
35	TP-SDA	Touch panel I2C data
36	TP-RESET	Touch panel reset
37	TP-INT	Touch panel interrupt output.If not used, please open it.
38	TP-VCC	Touch panel Power output
39	GND	Power Ground

3 Absolute Maximum Ratings

GND=0V, Ta= 25℃

Item	Symbol	Value	Unit
Power supply voltage for logic	V _{DD}	0.3~3.6	V
Input voltage	V _{in}	V _{DD} +0.3	V
Operating temperature	T _{opr}	-20 to 70	℃
Storage temperature	T _{stg}	-30 to 80	℃

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

GND=0V, Ta=25℃

Item	Symbol	Min	Type	Max	Unit	Test condition
Operating voltage	V _{DD}	2.6	2.8	3.3	V	-
Supply current	I _{DD}	-	-	60	mA	V _{DD} =2.8V, Ta=25℃
Input voltage	V _{IH}	0.8V _{DD}	-	V _{DD}	V	-
	V _{IL}	0	-	0.2V _{DD}	V	
Input leakage current	I _{IL}	-1.0	-	1.0	μA	V _{IN} =V _{DD} or V _{SS}

Note: Voltage greater than above may damage the module.

All voltages are specified relative to VSS=0V.

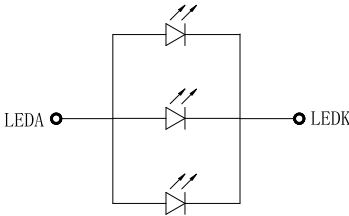
4.2 Driving Backlight

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I _F	--	60	-	mA	
Forward Voltage	V _F	-	6.4	-	V	
Connection mode	P	--	3P	--		
LED number	/		3		pcs	
LED life time		20000			hours	

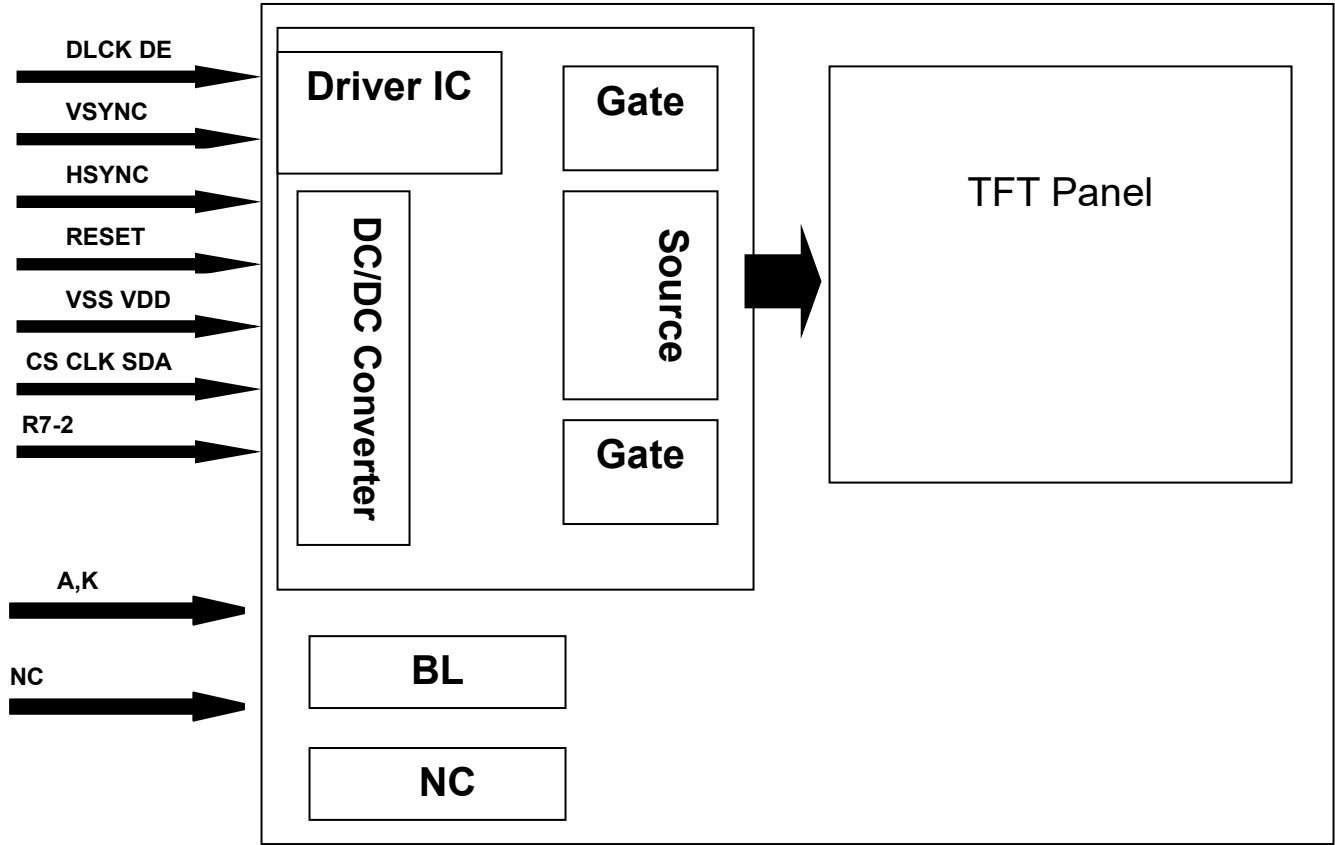
Note1: Optical performance should be evaluated at Ta=25℃ only .If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

LED CIRCUIT DIAGRAM:



If=60mA Vf=6.4V 双芯灯

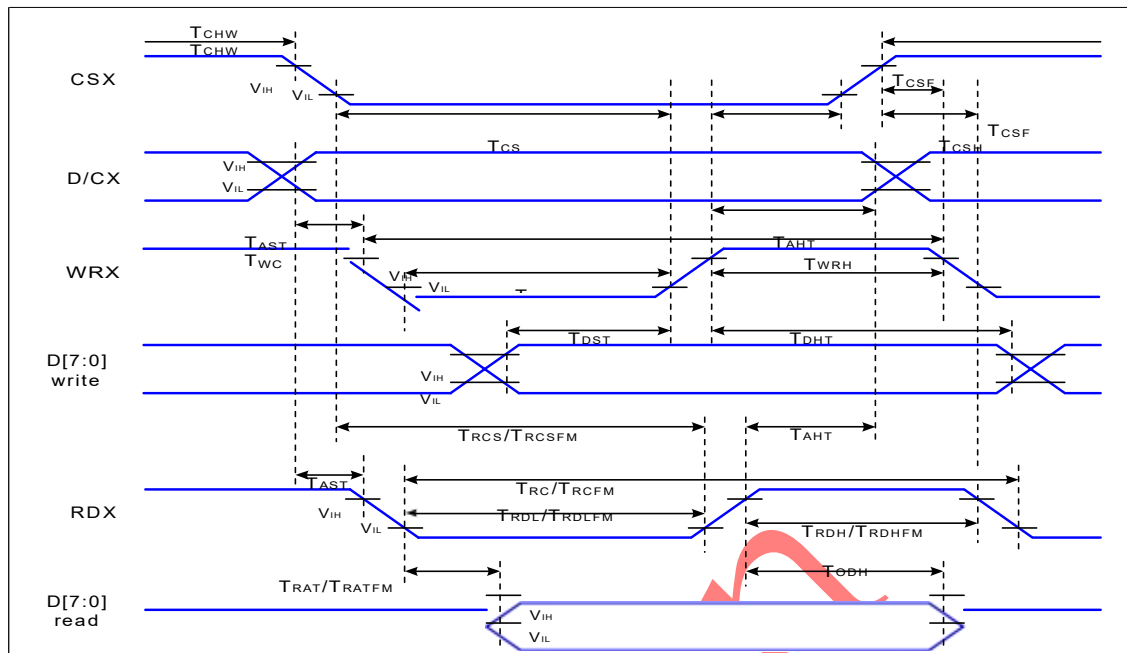
4.3 Block Diagram



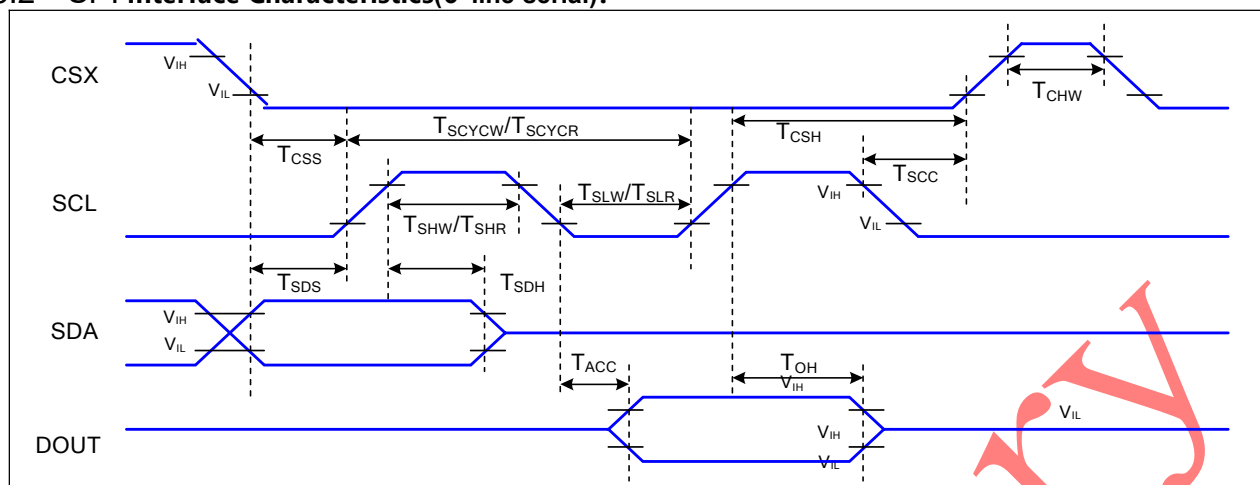
5 INTERFACE TIMING

5.1 RGB Interface Characteristics:

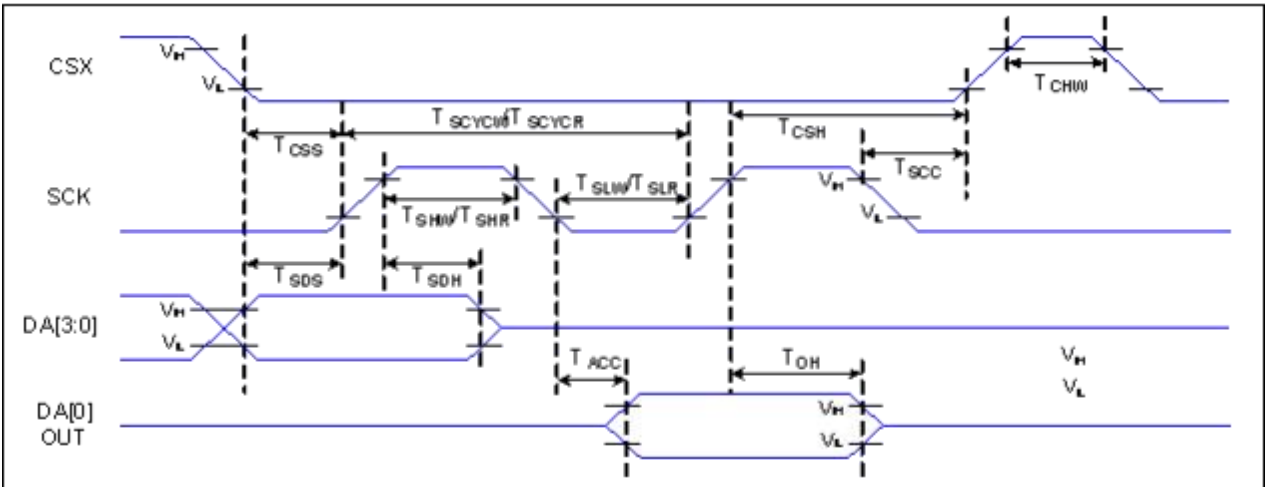
Rising and falling time on clock and data channel



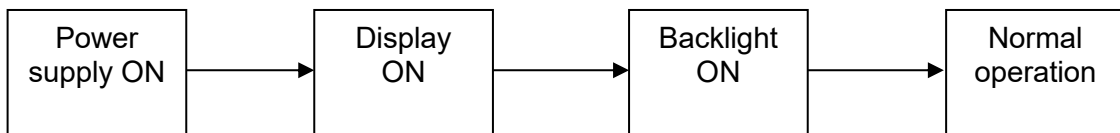
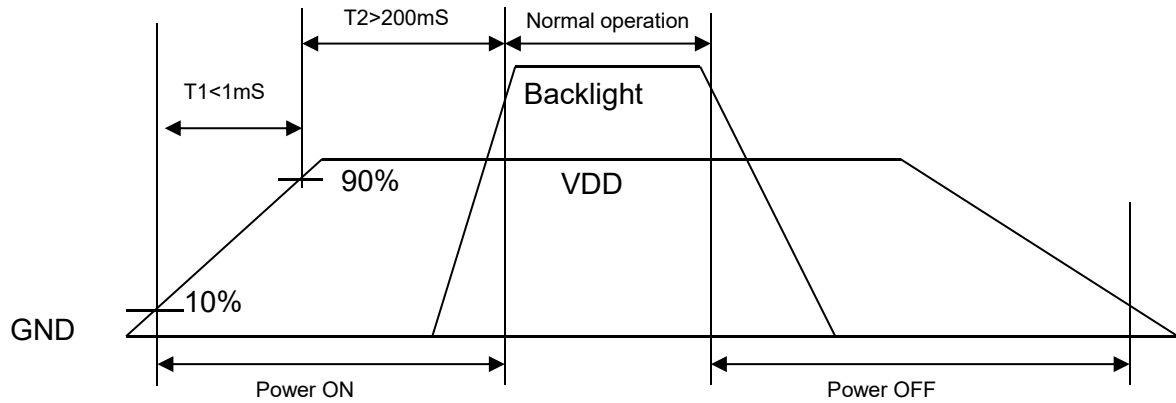
5.2 SPI Interface Characteristics(3-line serial):



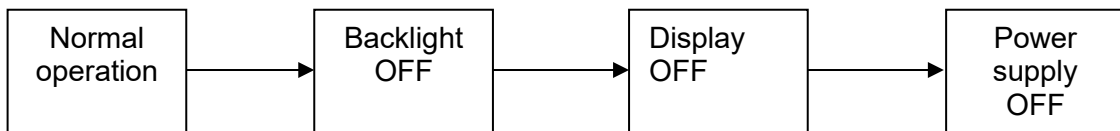
5.3 QSPI Interface Characteristics:



5.4 Power ON/OFF Timing



Power ON sequence



Power OFF sequence

6 Optical Characteristics

Ta=25°C

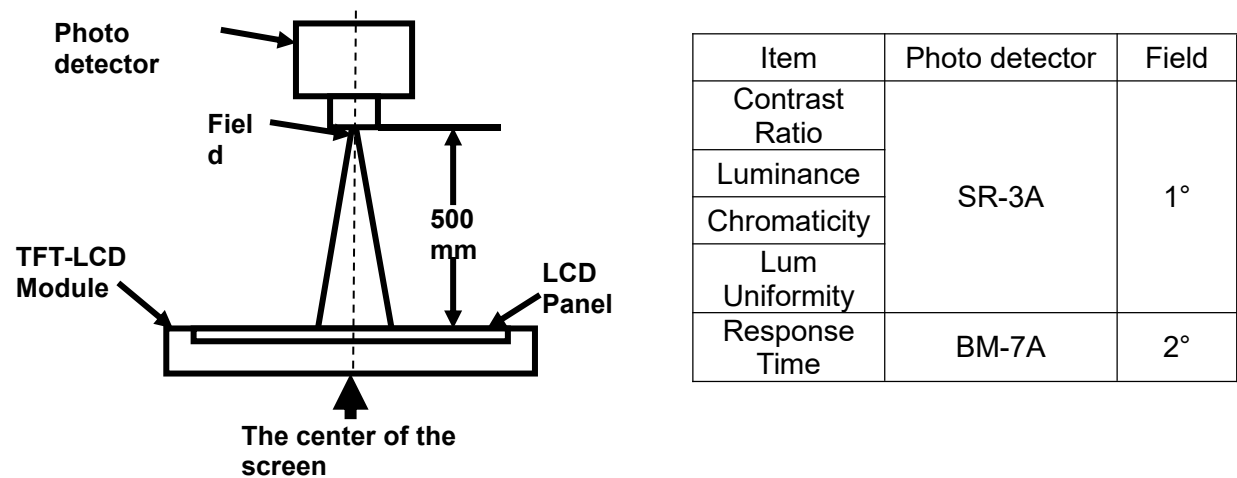
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	$CR \geq 10$		85	-	Degree	Note 2
	θB			85	-		
	θL			85	-		
	θR			85	-		
Contrast Ratio	CR	$\theta=0^\circ$	800	1200	-	-	Note1 Note3
Response Time	T_{ON}	25°C	-	30	40	ms	Note1 Note4
	T_{OFF}						
Uniformity	U	-	-	-	-	%	Note1 Note6
NTSC	-	-	60	65	-	%	Note 5
Luminance	L		-	300	-	cd/m ²	Note1 Note7

Test Conditions: $V_F=6.4V$, $I_F=60mA$, the ambient temperature is 25°C.

1. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

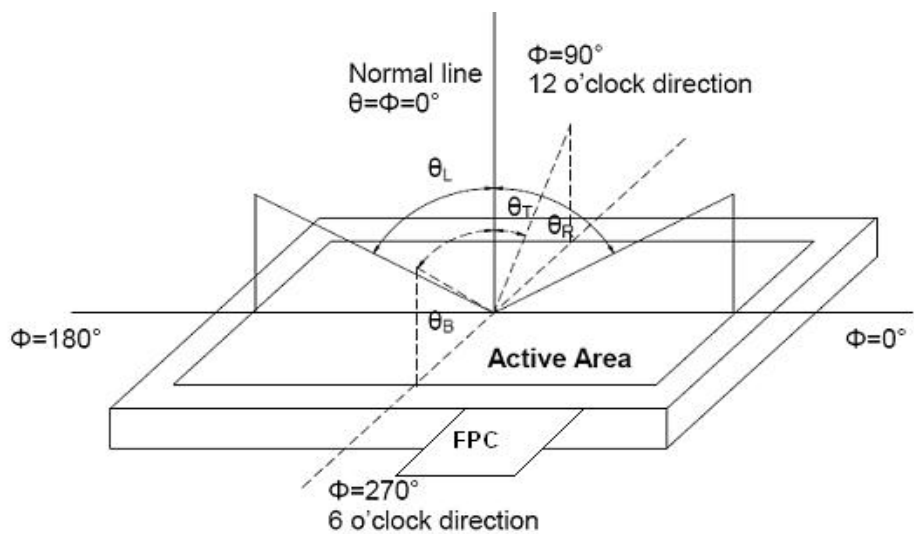


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

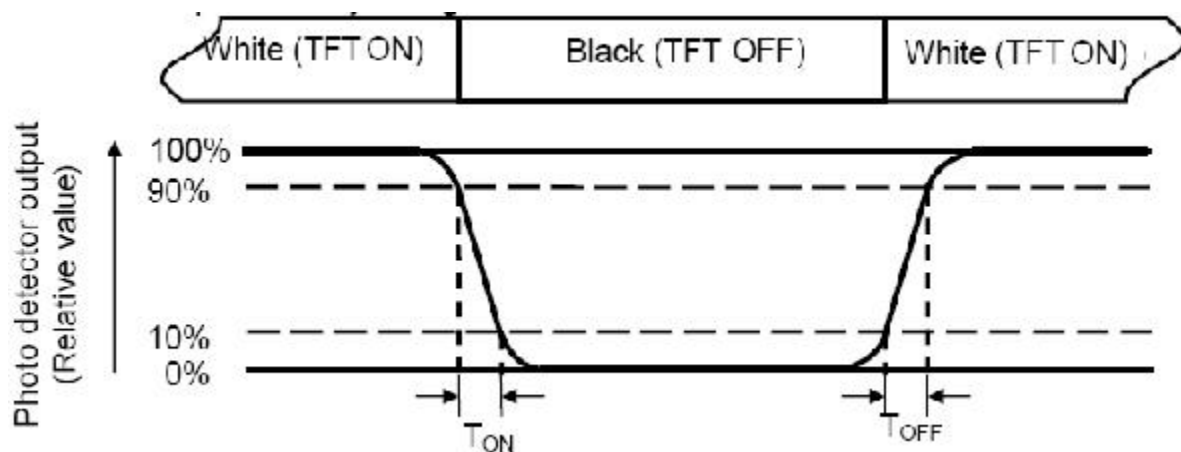
“White state “: The state is that the LCD should be driven by V_{white}.

“Black state”: The state is that the LCD should be driven by V_{black}.

V_{white}: To be determined V_{black}: To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = L_{min} / L_{max}

L-----Active area length W----- Active area width

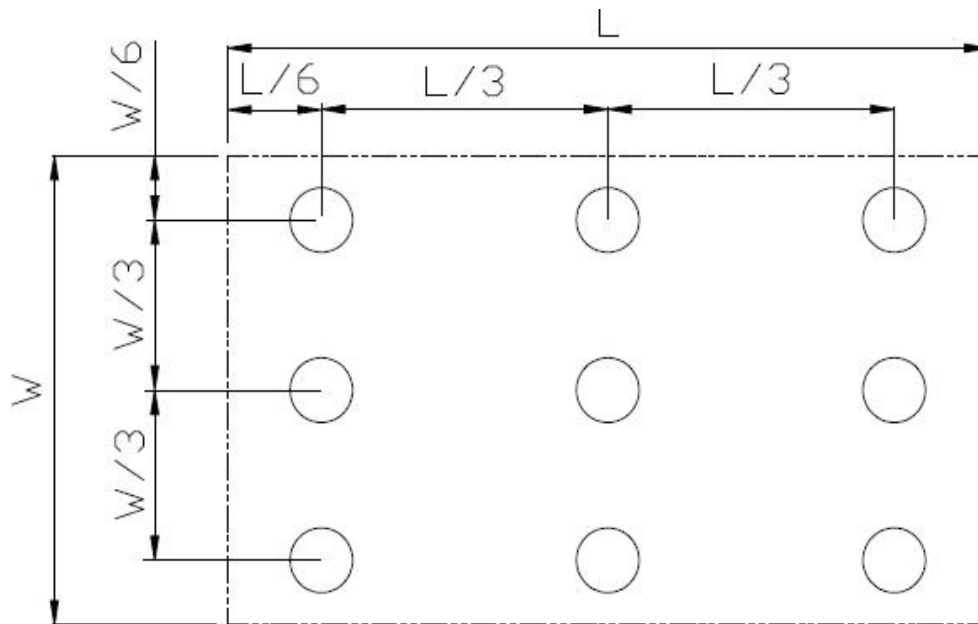


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

7 Environmental / Reliability Test

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80°C	120	No abnormalities in functions and appearance
High temp. Operating	70°C	120	
Low temp. Storage	-30°C	120	
Low temp. Operating	-20°C	120	
Humidity	60°C/ 90%RH	120	
Thermal Shock(Non-operation)	-20°C ← 25°C →70°C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 1~10pcs.
- 3.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

8 Mechanical Drawing

1. Unit:mm.
2. Δ Modification rev. number.
3. All radii: without dimension R0.3mm.
4. All draft angles to be 1:5°
5. Inspected Tolerances: ±: ±0.20mm
6. LED Driver IC: ST77916 Interface: MIF/GET/8BIT/SMT+RGB
7. LED Driver Voltage: 2.8±0.3V
8. Color: White
9. Operating Temperature: -20° — +70° C
10. Storage Temperature: -30° — +80° C

Customer Name: Approval Date: Approval By: Please Confirm This Drawing On/Before

客户名称: 承认日期: 承认人: 请签回此图

DESIGN: (设计) CHECKED: (检查) APPROVED: (批准) SPECIFICATION CUSTOMER'S CODE: (客户型号) EDITION: (版本号)

RoHS

正视图

侧视图

背视图

展开出货

1. 020
2. 1.20E
3. 1.20A
4. 020
5. 02
6. 02
7. 020
8. MIF/GET
9. MIF/GET
10. 020
11. 200
12. 100
13. 200C
14. 100C (3.3V)
15. 100
16. 100
17. 100
18. 100
19. 100
20. 100
21. 100
22. 100
23. 100
24. 100
25. 100 (3.3V)
26. 100 (3.3V)
27. 100 (3.3V)
28. 100 (3.3V)
29. 100 (3.3V)
30. 100 (3.3V)
31. 100 (3.3V)
32. 100 (3.3V)
33. 100 (3.3V)
34. 100 (3.3V)
35. 100 (3.3V)
36. 100 (3.3V)
37. 100 (3.3V)
38. 100 (3.3V)
39. 100 (3.3V)
40. 100 (3.3V)

9 Precautions For Use of LCD Modules

9.1 Handling Precautions

9.1.1.0 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.1.1 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.1.2 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.1.3 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.1.4 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.1.5 Do not attempt to disassemble the LCD Module.

9.1.1.6 If the logic circuit power is off, do not apply the input signals.

9.1.1.7 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.1.8 Be sure to ground the body when handling the LCD Modules.

9.1.1.9 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.1.10 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.1.11 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

9.1.1.12 Storage precautions

9.1.1.13 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.1.1.14 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

9.1.1.15 The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.2 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.