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TFT DISPLAY SPECIFICATION

WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

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Winstar Display Co., LTD
華凌光電股份有限公司
WEB: https://www.winstar.com.tw E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WFN0128A2T0YADNN000

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	**PCB VERSION:** **DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2025/07/01			

TFT Display Inspection Specification: https://www.winstar.com.tw/technology/download.html
Precaution in use of TFT module: https://www.winstar.com.tw/technology/download/declaration.html

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Winstar Display Co., LTD
華凌光電股份有限公司

MODLE NO：

RECORDS OF REVISION			DOC. FIRST ISSUE
VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2025/05/08		First issue
A	2025/07/01		Modify Active area and TFT Driver IC

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Contents

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1.Module Classification Information

W	F	N	0128	A2	T	0Y	A	D	N	N	0	00
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

①	Brand：WINSTAR DISPLAY CORPORATION				
②	Display Type：F→TFT Type, J→Custom TFT				
③	N: Normal E：EFD M：MIP				
④	Display Size：1.28” TFT				
⑤	Model serials no.				
⑥	Backlight Type：	F：	CCFL, White	T：	LED, White
		S：	LED, High Light White	Z：	Nichia LED, White
		N：	With out Backlight	A：	Front Light

⑦ LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction

Operating Temperature	**Normal temperature**				**Super Wide temperature**					
LCD tape	TN		IPS	VA	TN				IPS	VA
View angle	6H	12H			6H	12H	O-Film	OD-Film		
Reflective	AA	-	-	AT	AN	-	-	-	AW	AV
Transflective	0B	0E	-	02	0M	0P	-	-	08	04
Transmissive	0C	0F	0A	0T	0N	0Q	0R	0S	0W	0V

Operating Temperature	**Wide temperature**									
LCD tape	TN								IPS	VA
View angle	6H	12H	2H	3H	9H	O-Film	OD-Film	All View		
Reflective	AG	AJ	AB	-	-	-	-	05	AY	AX
Transflective	0H	0K	-	0G	0D	0U	-	-	07	03
Transmissive	0I	0L	-	-	-	0Z	0J	-	0Y	0X

⑧	A：	TFT LCD	G：	TFT+ Screw holes
	B：	TFT+ Screw holes+ Control board	H：	TFT+ D/V board
	C：	TFT+ Screw holes + A/D board	I：	TFT+ Screw holes +D/V board
	D：	TFT+ Screw holes + A/D board + Control board	J：	TFT+ Power board
	E：	TFT+ Screw holes + Power board	Z：	TFT+ Power board (Embedded)
	F：	TFT+ Control board		

⑨	A：Analog	B：6-bits parallel	D：Digital	E：eDP
	L：LVDS	M：MIPI	S：SPI	

⑩ Interface:

A：8Bit	B：16Bit	E：eDP	H：HDMI	I：I2C Interface	M：MIPI
N：Without Control board	P：DP	R：RS232	S：SPI	U：USB	

⑪ TS:

A：	CTP + Optical bonding	B：	CTP + USB	C：	CTP
D：	CTP + USB + Optical bonding	E：	RTP + Optical bonding	F：	CG + Optical bonding
H：	CTP + Only G-sensor	J：	CTP + Only G-sensor + USB	L：	CTP+ Hover Touch
N：	Without TS	Q：	in-cell	R：	on-cell
T：	RTP	U：	CG	V：	in-cell + CG
W：	on-cell + CG				

⑫	Version:
⑬	Serial No.: Serial number (00~99)

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2.Summary

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 1.28” TFT-LCD contains 240x240 pixels, and can display up to 65K/262K colors.

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3.General Specifications

Item	Dimension	Unit
Size	1.28	inch
Dot Matrix	240 x RGB x 240 (TFT)	dots
Module dimension	35.6 x 37.74 x 1.48	mm
Active area	32.4 x 32.4	mm
Pixel pitch	0.135 X 0.135	mm
LCD type	TFT, Normally Black, Transmissive	
Viewing Angle	85/85/85/85	
TFT Interface	8/9/16/18bit MCU 3/4SPI+16/18BIT RGB 3/4 SERIAL	
Backlight Type	LED ,Normally White	
TFT Driver IC	GC9A01 or Equivalent	
With /Without TP	Without TP	
Surface	Anti-Glare	

*Color tone slight changed by temperature and driving voltage.

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4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	℃
Storage Temperature	TST	-30	—	+80	℃

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. ≦ 60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃

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5.Electrical Characteristics

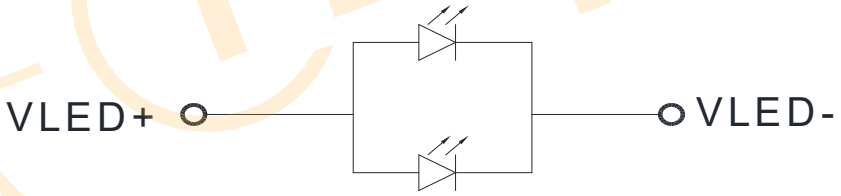
5.1. Operating conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VCC	2.5	2.8	3.3	V	
Digital interface supple Voltage	IOVCC	1.65	2.8	3.3	V	
Normal mode Current consumption	ICC	--	6	12	mA	
Level input voltage	VIH	0.7*IOVCC	--	IOVCC	V	
	VIL	GND	--	0.3*IOVCC	V	
Level output voltage	VOH	0.8*IOVCC	--	IOVCC	V	
	VOL	GND	--	0.2*IOVCC	V	

5.2. LED driving conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	-	-	40	-	mA	-
LED voltage	VLED+	2.8	3.0	3.2	V	Note 1
LED Life Time	-	50000	-	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



CIRCUIT DIAGRAM

Note 2 : Ta = 25 ℃
Note 3 : Brightness to be decreased to 50% of the initial value
Note 4 : The single LED lamp case

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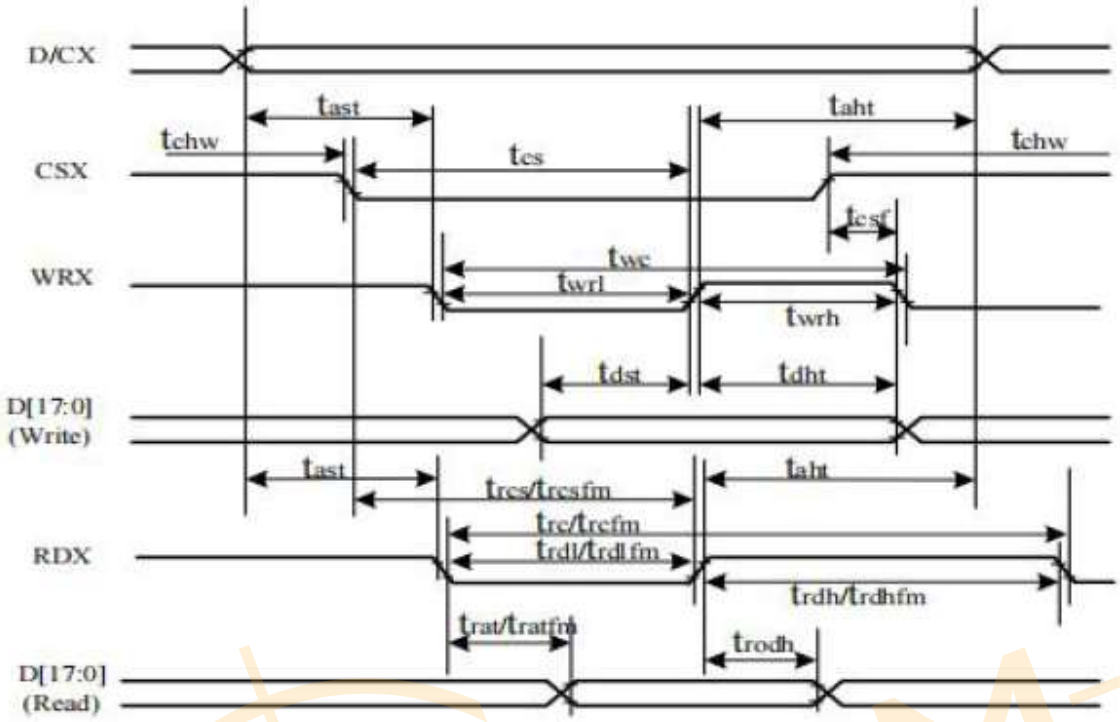
6.AC Characteristics

6.1. Display Parallel 18/16/9/8-bit Interface Timing Characteristics (8080)



Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0		ns	
	taht	Address hold time(Write/Read)	0		ns	
CSX	tchw	CSX "H" pulse width	0		ns	
	tcs	Chip Select setup time(Write)	15		ns	
	trcs	Chip Select setup time(Read ID)	45		ns	
	trcsfm	Chip Select setup time(Read FM)	355		ns	
	tcsf	Chip Select Wait time (Write/Read)	10		ns	
WRX	twc	Write Cycle	66		ns	
	twrh	Write Control pulse H duration	15		ns	
	twrl	Write Control pulse L duration	15		ns	
RDX(FM)	trcfm	Read Cycle (FM)	380		ns	
	trdhfm	Read Control H duration(FM)	180		ns	
	trdlfm	Read Control L duration(FM)	200		ns	
RDX(ID)	trc	Read Cycle (ID)	160		ns	
	trdh	Read Control H pulse duration	90		ns	
	trdl	Read Control L pulse duration	70		ns	
D[17:0] D[I5:0]	tdst	Write data setup time	10		ns	For maximum CL=30pF
	tdht	Write data hold time	10		ns	
D[8:0] D[7:0]	trat	Read access time	-	40	ns	For minimum CL=8pF
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

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Note: Ta = 25 ºC,IOVCC=1.65V to 3.3V,VCC=2.5V to 3.3V,GND=0V

Figure 1

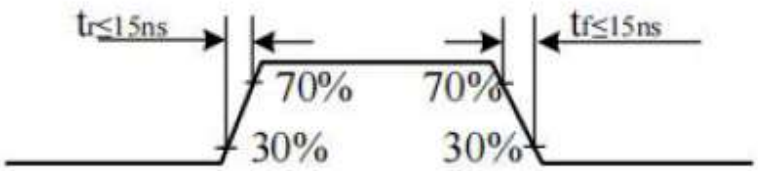
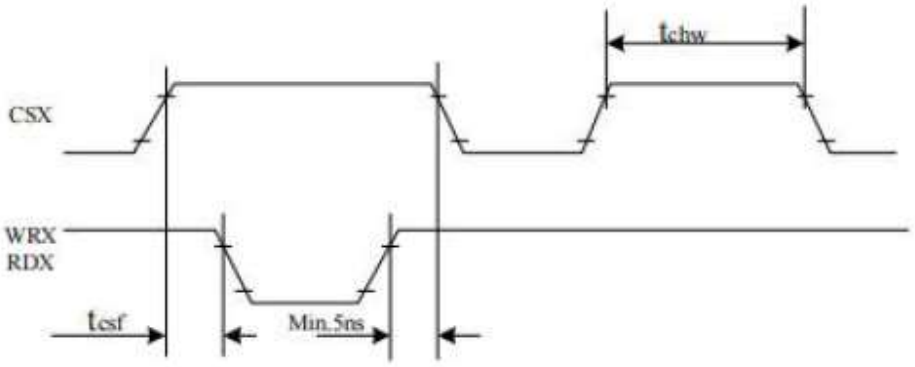


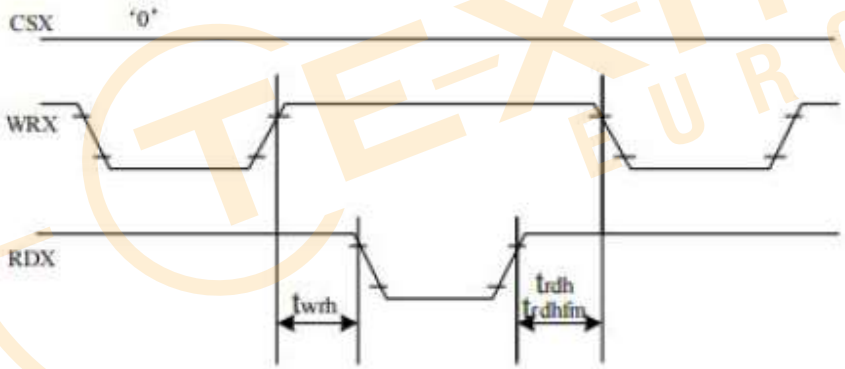
Figure 2



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

Write to read or read to write timings:

Figure 3



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

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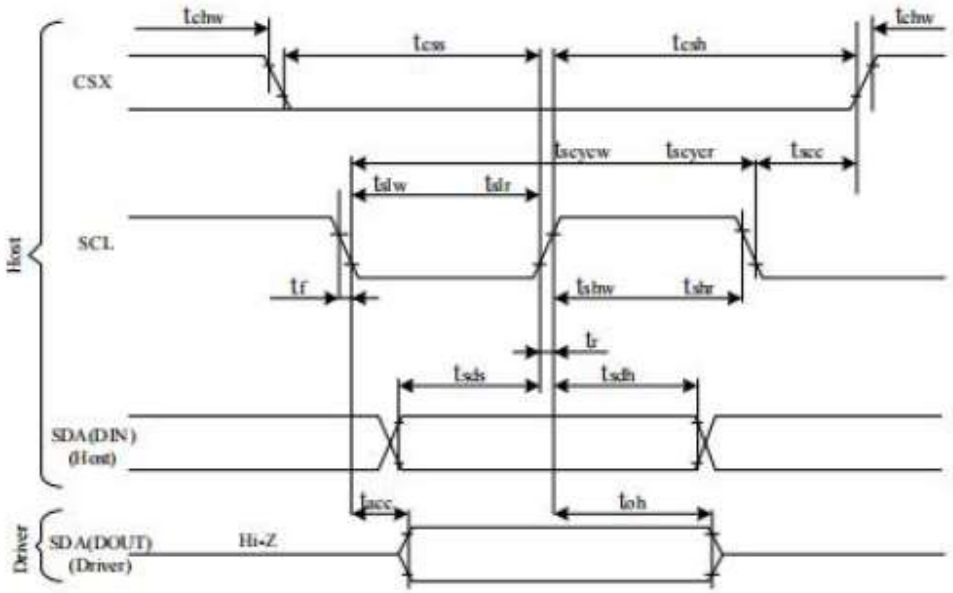
6.2. Display Serial Interface Timing Characteristics (3-line SPI system)

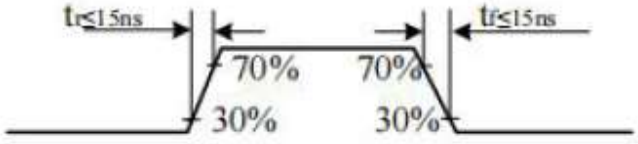
Figure 4



Signal	Symbol	Parameter	min	max	Unit	Description
SCL	tscycw	Serial Clock Cycle (Write)	10		ns	
	tshw	SCL "H" Pulse Width (Write)	5		ns	
	tslw	SCL "L" Pulse Width (Write)	5		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/SDI (Input)	tsds	Data setup time (Write)	5		ns	
	tsdh	Data hold time (Write)	5		ns	
SDA/SDO(Output)	tacc	Access time (Read)	10		ns	
CSX	tscc	SCL-CSX	10		ns	
	tchw	CSX "H" Pulse Width	10		ns	
	tcss	CSX-SCL Time	20		ns	
	tcsh		40		ns	

Note: Ta = 25 ºC,IOVCC=I.65Vto3.3V, VCC=2.5V to 3.3V. GND=0V

Figure5



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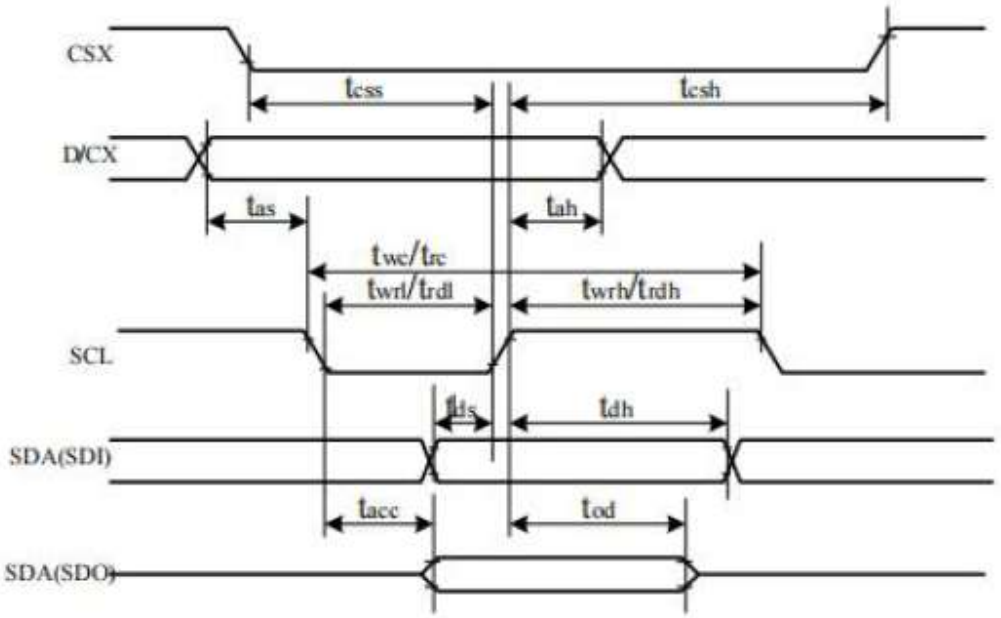
6.3. Display Serial Interface Timing Characteristics (4-line SPI system)

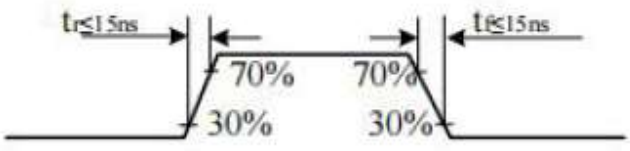
Figure6



Signal	Symbol	Parameter	min	Max	unit	Description
CSX	tcss	Chip select time (Write)	20		ns	
	tcsh	Chip select hold time (Read)	40		ns	
SCL	twc	Serial Clock Cycle (Write)	10		ns	
	twrh	SCL "H" Pulse Width (Write)	5		ns	
	twrl	SCL "L" Pulse Width (Write)	5		ns	
	trc	Serial Clock Cycle (Read)	150		ns	
	trdh	SCL "H" Pulse Width (Read)	60		ns	
	trdl	SCL"L" Pulse Width (Read)	60		ns	
D/CX	tas	D/CX setup time	10		ns	
	tah	D/CX hold time (Write/Read)	10		ns	
SDA/SDI (Input)	tds	Data setup time (Write)	5		ns	
	tdh	Data hold time (Write)	5		ns	
SDA/SDO (Output)	tacc	Access time (Read)	10		ns	

Note: Ta =25 °C, IOVCC=l.65V to 3.3V. VCC=2.5V to 3.3V, GND=0V

Figure7



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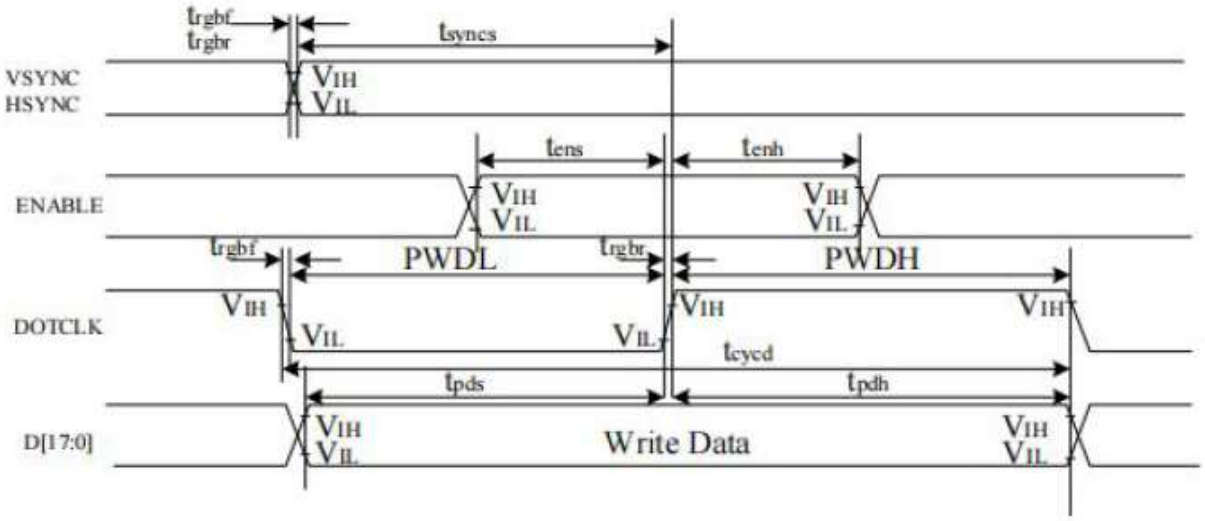
6.4. Parallel 18/16/6-bit RGB Interface Timing Characteristics

Figure8



Signal	Symbol	Parameter	min	Max	unit	Description
VSYNC/ HSYNC	tsyncs	VSYNC/HSYNC setup time	15		ns	18/16-bit bus RGB interface mode
	tsynch	VSYNC/HSYNC hold time	15		ns	
DE	tens	DE setup time	15		ns	
	tenh	DE hold time	15		ns	
D[17:0]	tpos	Data setup time	15		ns	
	tpdh	Date hold time	15		ns	
DOTCLK	PWDH	DOTCLK high-level period	15		ns	
	PWDL	DOTCLK low- level period	15		ns	
	tcycd	DOTCLK cycle time	100		ns	
	trgbr.trgbf	DOTCLK ,HSYNC,VSYNC rise/fall time	-	15	ns	
VSYNC/ HSYNC	tsyncs	VSYNC/HSYNC setup time	15		ns	6-bit bus RGB interface mode
	tsynch	VSYNC/HSYNC hold time	15		ns	
DE	tens	DE setup time	15		ns	
	tenh	DE hold time	15		n$	
D[17:0]	tpos	Data setup time	15		ns	
	tpdh	Dale hold time	15		ns	
DOTCLK	PWDH	DOTCLK high-level pulse period	15		ns	
	PWDL	DOTCLK low -level pulse period	15		ns	
	tcycd	DOTCLK cycle time	100		ns	
	trgbr.trgbf	DOTCLK ,HSYNC,VSYNC rise/fall time	-	15	ns	

Note: Ta =25 °C, IOVCC=l.65V to 3.3V. VCC=2.5V to 3.3V, GND=0V

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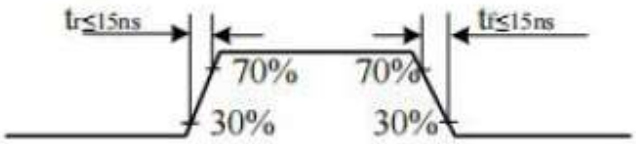
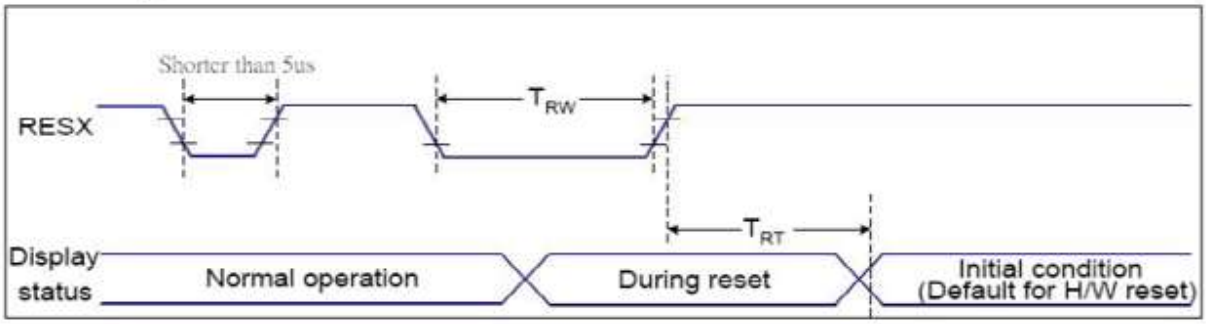


6.5. Reset Timing Characteristics



IOVCC=1.65 to 3.3V, VCC=2.4 to 3.3V. GND=0V, Ta= 25 ºC

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1,5)	ms
				120 (Note 1,6, 7)	ms

Notes:

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out -mode. The display remains the blank state in Sleep In -mode.) and then return to Default condition for Hardware Reset.

4. Spike Rejection also applies during a valid reset pulse as shown below:

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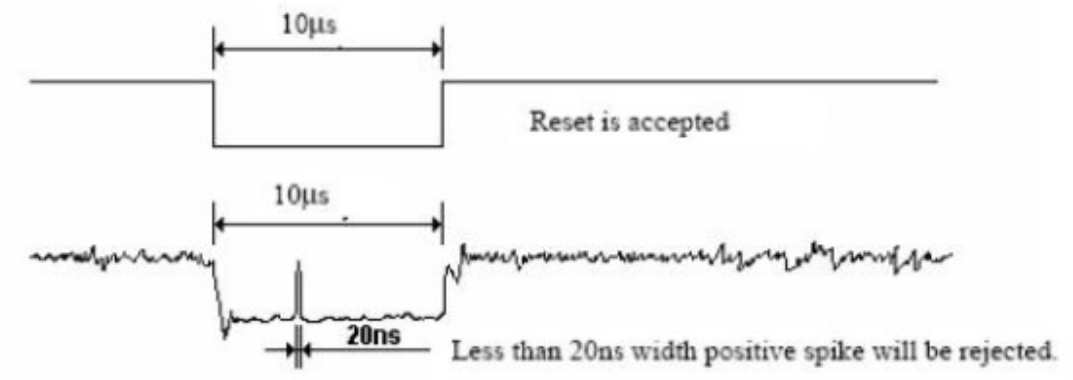

5.When Reset applied during Sleep In Mode
6.When Reset applied during Sleep Out Mode.
7.It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

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7.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	θ=0°、Φ=0°	-	30	35	.ms	Note 3
Contrast ratio		CR	At optimized viewing angle	500	700	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.214	0.264	0.314	-	Note 2,5,6
		Wy		0.245	0.295	0.345	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	80	85	-	Deg.	Note 1
		ΘL		80	85	-		
	Ver.	ΦT		80	85	-		
		ΦB		80	85	-		
Brightness		-	-	430	500	-	cd/m²	Center of display
Uniformity		(U)	-	75	-	-	%	Note 5

Ta=25±2℃,

Note 1: Definition of viewing angle range

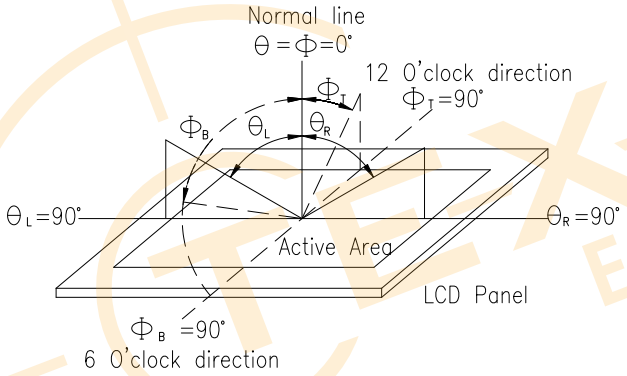

Fig. 7.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

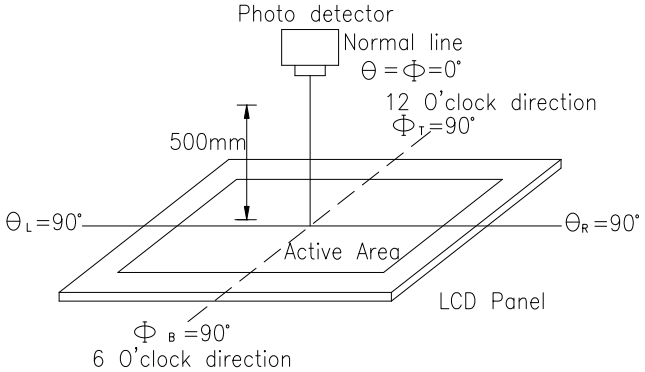

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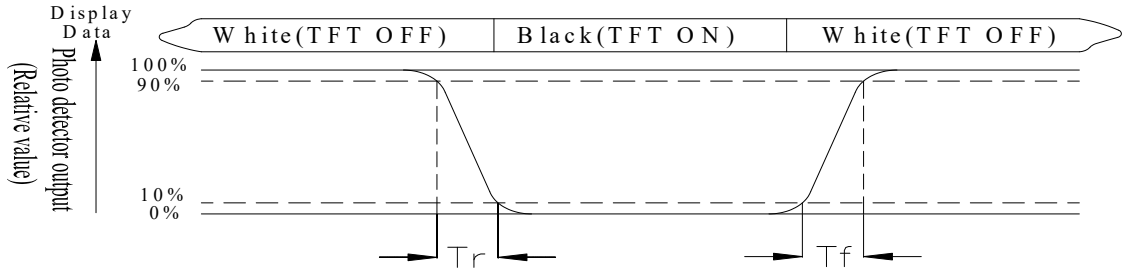
Fig. 7.2. Optical measurement system setup

Note 3: Definition of Response time:
The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, Tr, is the time between photo detector output intensity changed from 90%to 10%. And fall time, Tf, is the time between photo detector output intensity changed from 10%to 90%



Note 4: Definition of contrast ratio:
The contrast ratio is defined as the following expression.

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

Note 5: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.
Luminance Uniformity (U) = Lmin/Lmax x100%
L = Active area length
W = Active area width

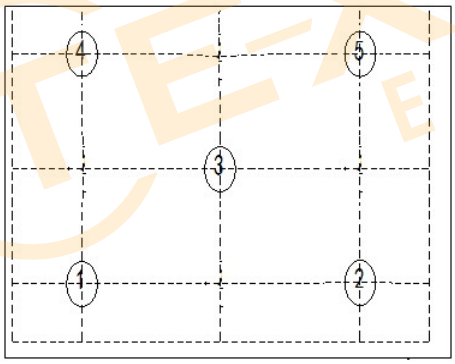


Fig7.3. Definition of uniformity

Note 6: Definition of color chromaticity (CIE 1931)
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

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8.Interface

8.1. LCM PIN Definition

Pin No	Symbol	Function	I/O
1	VLED+	Anode pin of backlight	P
2	VLED*	Cathode pin of backlight	P
3	GND	Ground.	P
4	GND	Ground.	P
5	VCC	Supply voltage (2.5-3.3V).	P
6	IOVCC	Supply voltage (1.65-3.3V).	P
7	RESET	This signal will reset the device and must be applied to properly initialize the chip.	I
8	WR(SPI-RS)	-Write enable in MCU parallel interface. Display data/command selection pin in 4-line serial interface. Second Data lane in 2 data lane serial interface. -If not used, please fix this pin at IOVCC or GND.	I
9	CS	Chip select input pin (“Low” enable ,CSX). Fix this pin at IOVCC or GND when not in use.	I
10	RS(SPI-SCL)	-Display data/command selection pin in parallel interface.(D/CX) -This pin is used to be serial interface clock. (SCL) DC=’1’: display data or parameter. DC=’0’: command data. -If not used, please fix this pin at IOVCC or GND.	I
11	RD	Serves as a read signal and MCU read data at the rising edge. Fix this pin at IOVCC or GND when not in use.	I
12	PCLK	Dot clock signal for RGB interface operation. (DOTCLK) Fix this pin at IOVCC or GND when not in use.	I
13	DE	Data enable signal for RGB interface operation. (ENABLE) fix this pin at IOVCC or GND when not in use.	I
14	VSYNC	Frame synchronizing signal for RGB interface operation. fix this pin at IOVCC or GND when not in use.	I
15	HSYNC	Line synchronizing signal for RGB interface operation. fix this pin at IOVCC or GND when not in use.	I
16	TE	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.	I
17	NC	No connection	O
18	SDA	The data is latched on the rising edge of the SCL signal. If not used, please fix this pin at IOVCC or GND level	I/O

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19-36	DB17-DB0	18-bit parallel bi-directional data bus for MCU system and RGB interface mode . 18-bit RGB DB0:BLUE LSB--DB5:BLUE MSB; DB6:GREEN LSB--DB11:GREEN,MSB; DB12:RED LSB--DB17:RED MSB. 16-bit RGB: DB1:BLUE LSB--DB5:BLUE MSB; DB6:GREEN LSB--DB11:GREEN,MSB; DB13:RED LSB--DB17:RED MSB. mode Fix to GND level when not in use	I/O
37	IM0	MPU Parallel interface bus and serial interface select If use RGB Interface must select serial interface. Fix this pin at IOVCC and GND.	I
38	IM1		
39	IM3		

MCU interface SET for IM PINS

IM3	IM1	IM0	Interface Type	DB Pin in use
L	L	L	8080 MCU 8-bit bus interface	DB7-DB0
L	H	L	8080 MCU 16-bit bus interface	DB15- DB0
L	L	H	8080 MCU 9-bit bus interface	DB8- DB0
L	H	H	8080 MCU 18-bit bus interface	DB17- DB0
H	L	H	3-wire 9-bit data serial interface	SDA:In/Out
			2 data line serial interface	SDA:In/Out,DCX:In
H	H	H	4-wire 8-bit data serial interface	SDA:In/Out

Note:
1.Input Pin if not use, please connect to GND.
Output Pin if not use, please empty
2.If use RGB interface must select serial interface

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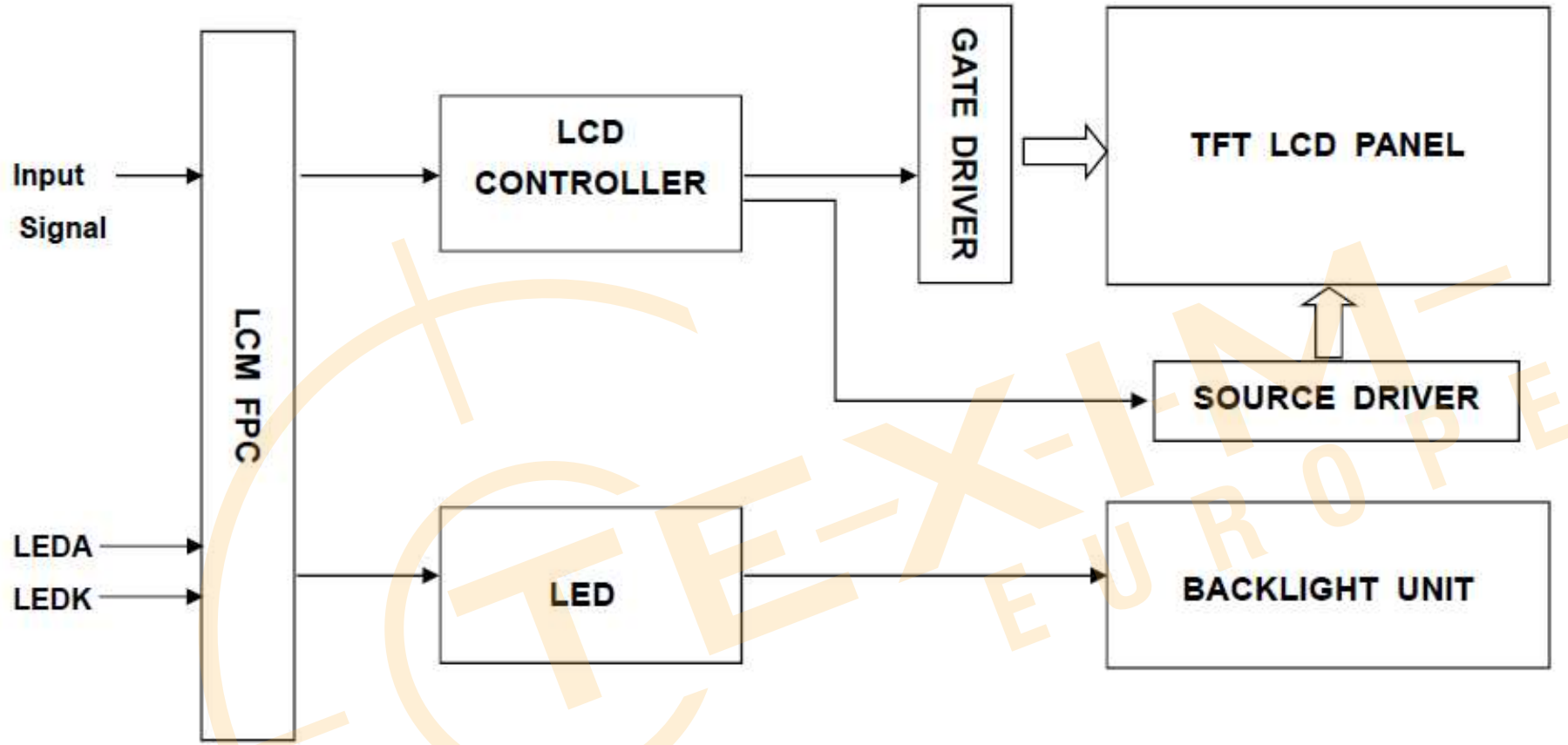
9.Block Diagram



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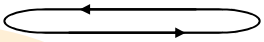
10.Reliability

Content of Reliability Test (Wide temperature, -20℃~70℃)

Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 96hrs	2
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 96hrs	1,2
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 20 cycles of storage -10℃ 25℃ 60℃  30min 5min 30min 1 cycle	-10℃/60℃ 20 cycles	2
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±TBD(contact), ± TBD V(air), RS=330Ω CS=150pF 5 times	4

Note1: No dew condensation to be observed.
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.
Note3: The packing have to including into the vibration testing.
Note4: Endurance test applying the electric stress to the finished product housing

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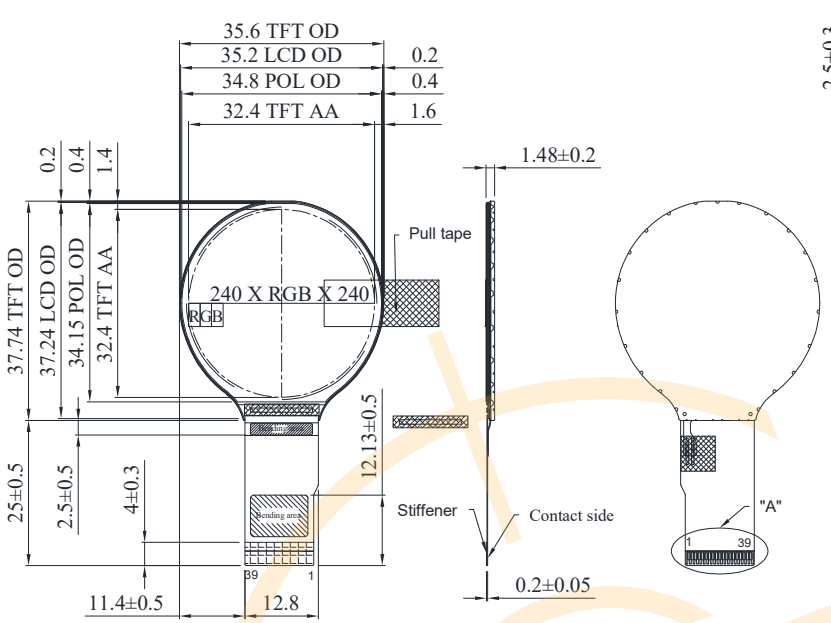
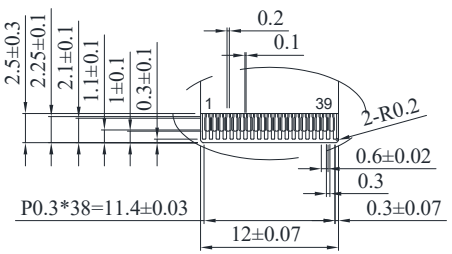
11.Contour Drawing





Detail : "A"

Scale : 2/1

FH26-39S-0.3SHW

PIN No.	SYMBOL
1	VLED+
2	VLED-
3	GND
4	GND
5	VCC
6	IOVCC
7	RESET
8	WR(SPI-RS)
9	CS
10	RS(SPI-SCL)
11	RD
12	PCLK
13	DE
14	VSYNC
15	HSYNC
16	TE
17	NC
18	SDA
19	DB17
20	DB16
21	DB15
22	DB14
23	DB13
24	DB12
25	DB11
26	DB10
27	DB09
28	DB08
29	DB07
30	DB06
31	DB05
32	DB04
33	DB03
34	DB02
35	DB01
36	DB0
37	IM0
38	IM1
39	IM3

MCU interface SET for IM PINS.

IM3	IM1	IM0	Interface type	DB Pin in use
0	0	0	8080 MCU 8-bit bus interface	DB7-DB0
0	1	0	8080 MCU16-bit bus interface	DB15-DB0
0	0	1	8080 MCU 9-bit bus interface	DB8-DB0
0	1	1	8080 MCU18-bit bus interface	DB17-DB0
1	0	1	3-wire 9-bit data serial interface	SDA:In/Out
			2 data line serial interface	SDA:In/Out, DCX:In
1	1	1	4-wire 8-bit data serial interface	SDA:In/Out

NOTE:
1. Input Pin if not use, please connect to GND.
   Output Pin if not use, please empty.
2. If use RGB interface must select serial interface.

The non-specified tolerance of dimension is ±0.3 mm .

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12.Initial Code For Reference

```
void GC9A01_initial(void)
{

    Write_Command(0xFE);
    Write_Command(0xEF);

    Write_Command(0xEB);
    Write_Data(0x14);

    Write_Command(0x84);
    Write_Data(0x60);

    Write_Command(0x85);
    Write_Data(0xFF);

    Write_Command(0x86);
    Write_Data(0xFF);

    Write_Command(0x87);
    Write_Data(0xFF);

    Write_Command(0x8E);
    Write_Data(0xFF);

    Write_Command(0x8F);
    Write_Data(0xFF);

    Write_Command(0x88);
    Write_Data(0x0A);

    Write_Command(0x89);
    Write_Data(0x23);
```

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```
Write_Command(0x8B);
Write_Data(0x80);

Write_Command(0x8C);
Write_Data(0x01);

Write_Command(0x8D);
Write_Data(0x03);

Write_Command(0xB5);
Write_Data(0x10);
Write_Data(0x10);

Write_Command(0xB6);
Write_Data(0x00);
Write_Data(0x00);

Write_Command(0x36);
Write_Data(0x48) ;

Write_Command(0x3A);
Write_Data(0x05);

Write_Command(0x90);
Write_Data(0x08);
Write_Data(0x08);
Write_Data(0x08);
Write_Data(0x08);

Write_Command(0xBA);
Write_Data(0x0A);

Write_Command(0xBD);
```

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```
Write_Data(0x06);
Write_Command(0xBC);
Write_Data(0x00);

Write_Command(0xFF);
Write_Data(0x60);
Write_Data(0x01);
Write_Data(0x04);

Write_Command(0xC3);
Write_Data(0x0C);

Write_Command(0xC4);
Write_Data(0x0C);

Write_Command(0xC9);
Write_Data(0x22);

Write_Command(0xBE);
Write_Data(0x11);


Write_Command(0xE1);
Write_Data(0x10);
Write_Data(0x0E);

Write_Command(0xDF);
Write_Data(0x21);
Write_Data(0x0C);
Write_Data(0x02);

Write_Command(0xF0);
Write_Data(0x45);
Write_Data(0x09);
```

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```
Write_Data(0x08);
Write_Data(0x08);
Write_Data(0x26);
Write_Data(0x2A);

Write_Command(0xF1);
Write_Data(0x43);
Write_Data(0x70);
Write_Data(0x72);
Write_Data(0x36);
Write_Data(0x37);
Write_Data(0x6F);

Write_Command(0xF2);
Write_Data(0x45);
Write_Data(0x09);
Write_Data(0x08);
Write_Data(0x08);
Write_Data(0x26);
Write_Data(0x2A);

Write_Command(0xF3);
Write_Data(0x43);
Write_Data(0x70);
Write_Data(0x72);
Write_Data(0x36);
Write_Data(0x37);
Write_Data(0x6F);

Write_Command(0xED);
Write_Data(0x1B);
Write_Data(0x0B);

Write_Command(0xAE);
```

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```
Write_Data(0x77);

Write_Command(0xCD);
Write_Data(0x63);

Write_Command(0x70);
Write_Data(0x07);
Write_Data(0x07);
Write_Data(0x04);
Write_Data(0x0F);
Write_Data(0x0F);
Write_Data(0x09);
Write_Data(0x07);
Write_Data(0x08);
Write_Data(0x03);

Write_Command(0xE8);
Write_Data(0x24);

Write_Command(0xE9);
Write_Data(0x08);

Write_Command(0x60);
Write_Data(0x38);
Write_Data(0x14);
Write_Data(0x2D);
Write_Data(0x6D);
Write_Data(0x38);
Write_Data(0x16);
Write_Data(0x2D);
Write_Data(0x6D);

Write_Command(0x61);
Write_Data(0x3A);
```

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```
Write_Data(0x02);
Write_Data(0x6D);
Write_Data(0x2D);
Write_Data(0xFA);
Write_Data(0x0F);
Write_Data(0x6D);
Write_Data(0x6D);

Write_Command(0x62);
Write_Data(0x38);
Write_Data(0x18);
Write_Data(0x72);
Write_Data(0x00);
Write_Data(0x2D);
Write_Data(0x6D);

Write_Data(0x38);
Write_Data(0x1C);
Write_Data(0x72);
Write_Data(0x04);
Write_Data(0x2D);
Write_Data(0x6D);

Write_Command(0x63);
Write_Data(0x7A);
Write_Data(0x1F);
Write_Data(0x72);
Write_Data(0x0F);
Write_Data(0x6D);
Write_Data(0x6D);

Write_Command(0x66);
Write_Data(0xF4);
Write_Data(0x00);
```

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```
Write_Data(0xCD);
Write_Data(0x02);
Write_Data(0x4C);
Write_Data(0x5D);
Write_Data(0xBA);
Write_Data(0x01);
Write_Data(0x00);
Write_Data(0x00);

Write_Command(0x67);
Write_Data(0x00);
Write_Data(0x2F);
Write_Data(0x00);
Write_Data(0x00);
Write_Data(0x10);
Write_Data(0xAB);
Write_Data(0x91);
Write_Data(0x80);
Write_Data(0x20);
Write_Data(0x98);


Write_Command(0x74);
Write_Data(0x10);
Write_Data(0x80);
Write_Data(0x80);
Write_Data(0x00);
Write_Data(0x00);
Write_Data(0x4E);
Write_Data(0x00);

Write_Command(0x98);
Write_Data(0x3E);
Write_Data(0x07);
```

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```
    Write_Command(0x99);
    Write_Data(0x3E);
    Write_Data(0x07);

    Write_Command(0x35);
    Write_Data(0x00);

    Write_Command(0x21);

    Write_Command(0x2a);
    Write_Data(0x00);
    Write_Data(0x00);
    Write_Data(0x00);
    Write_Data(0xEF);

    Write_Command(0x2b);
    Write_Data(0x00);
    Write_Data(0x00);
    Write_Data(0x00);
    Write_Data(0xEF);

    Write_Command(0x11);
    delay1(200);
    Write_Command(0x29);
    delay1(200);
    Write_Command(0x2C);

}
```

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winstar **LCM Sample Estimate Feedback Sheet**

Module Number： _____ **Page: 1**

1、Panel Specification：

1.	Panel Type：	□ Pass	□ NG , _____
2.	View Direction：	□ Pass	□ NG , _____
3.	Numbers of Dots：	□ Pass	□ NG , _____
4.	View Area：	□ Pass	□ NG , _____
5.	Active Area：	□ Pass	□ NG , _____
6.	Operating Temperature：	□ Pass	□ NG , _____
7.	Storage Temperature：	□ Pass	□ NG , _____
8.	Others： _____		

2、Mechanical

1.	PCB Size：	□ Pass	□ NG , _____
2.	Frame Size：	□ Pass	□ NG , _____
3.	Material of Frame：	□ Pass	□ NG , _____
4.	Connector Position：	□ Pass	□ NG , _____
5.	Fix Hole Position：	□ Pass	□ NG , _____
6.	Backlight Position：	□ Pass	□ NG , _____
7.	Thickness of PCB：	□ Pass	□ NG , _____
8.	Height of Frame to PCB：	□ Pass	□ NG , _____
9.	Height of Module：	□ Pass	□ NG , _____
10.	Others：	□ Pass	□ NG , _____

3、Relative Hole Size：

1.	Pitch of Connector：	□ Pass	□ NG , _____
2.	Hole size of Connector：	□ Pass	□ NG , _____
3.	Mounting Hole size：	□ Pass	□ NG , _____
4.	Mounting Hole Type：	□ Pass	□ NG , _____
5.	Others：	□ Pass	□ NG , _____

4、Backlight Specification：

1.	B/L Type：	□ Pass	□ NG , _____
2.	B/L Color：	□ Pass	□ NG , _____
3.	B/L Driving Voltage (Reference for LED Type)：	□ Pass	□ NG , _____
4.	B/L Driving Current：	□ Pass	□ NG , _____
5.	Brightness of B/L：	□ Pass	□ NG , _____
6.	B/L Solder Method：	□ Pass	□ NG , _____
7.	Others：	□ Pass	□ NG , _____

>> **Go to page 2** <<

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5、Electronic Characteristics of Module：

1.	Input Voltage：	□ Pass	□ NG ,_____
2.	Supply Current：	□ Pass	□ NG ,_____
3.	Driving Voltage for LCD：	□ Pass	□ NG ,_____
4.	Contrast for LCD：	□ Pass	□ NG ,_____
5.	B/L Driving Method：	□ Pass	□ NG ,_____
6.	Negative Voltage Output：	□ Pass	□ NG ,_____
7.	Interface Function：	□ Pass	□ NG ,_____
8.	LCD Uniformity：	□ Pass	□ NG ,_____
9.	ESD test：	□ Pass	□ NG ,_____
10.	Others：	□ Pass	□ NG ,_____

6、Summary：

Sales signature：_____

Customer Signature：_____ **Date**：____/____/____

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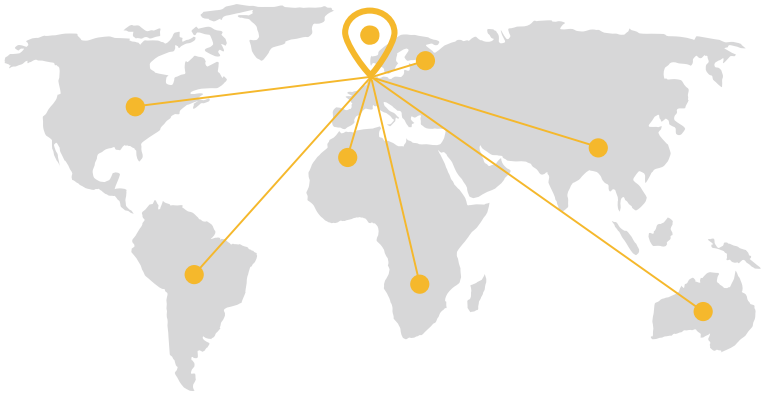

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