TFT DISPLAY SPECIFICATION

WINSTAR Display Co.,Ltd.

華凌光電股份有限公司

Winstar Display Co., LTD
華凌光電股份有限公司
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SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF0299ATYAC2MNR0

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

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2024/06/13			

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

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	2024/04/10		First issue
A	2024/06/13		Add Summary ,Static electricity test and Initial Code Modify Timing Characteristics

Contents

1.Module Classification Information

W	F	0299	A	T	Y	A	C2	M	N	R	0	#
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	Display Size：029.9” TFT		
④	Model serials no.		
⑤	Backlight Type：	F→CCFL, White S→LED, High Light White	T→LED, White Z→Nichia LED, White
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	A→Transmissive, N.T, IPS TFT C→Transmissive, N. T, 6:00 ; F→Transmissive, N.T,12:00 ; I→Transmissive, W. T, 6:00 K→Transflective, W.T,12:00 L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00	Q→Transmissive, Super W.T, 12:00 R→Transmissive, Super W.T, O-TFT V→Transmissive, Super W.T, VA TFT W→Transmissive, Super W.T, IPS TFT X→Transmissive, W.T, VA TFT Y→Transmissive, W.T, IPS TFT Z→Transmissive, W.T, O-TFT
⑦	A：TFT LCD B：TFT+SCREW HOLES+CONTROL BOARD C：TFT+ SCREW HOLES +A/D BOARD D：TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD E：TFT+ SCREW HOLES +POWER BOARD		F：TFT+CONTROL BOARD G：TFT+ SCREW HOLES H：TFT+D/V BOARD I：TFT+ SCREW HOLES +D/V BOARD J：TFT+POWER BD

⑧ Resolution:

M	1024768	N	128128	P	1280800	Q	480800	R	640320	S	480128
T	800320	U	8001280	**V**	176220	W	1280398	X	1024250	Y	1920720
B3	340800	B4	2801424	B5	12001920	B6	4801280	B7	800800	B8	40160
B9	320120	C2	268800	C3	240180						

⑨	D: Digital	L:LVDS	M:MIPI	E:eDP

⑩ Interface:

N	Without control board	A	8Bit	B	16Bit	E	eDP	H	HDMI
I	I2C Interface	R	RS232	S	SPI Interface	U	USB		

⑪ TS:

N	Without TS	T	Resistive touch panel	C	Capacitive touch panel (G-F-F)
G	Capacitive touch panel (G-G)			C1	Capacitive touch panel (G-F-F)+OCA
C2	Capacitive touch panel (G-F-F)+OCR			G1	Capacitive touch panel (G-G)+OCA
Q	in-cell			R	on-cell

⑫	Version:	X:Raspberry pi	V: Raspberry pi 3B+

⑬	Special Code	#:Fit in with ROHS directive regulations

2.Summary

TFT 2.99” is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This TFT LCD has a 2.99 (1:3) inch diagonally measured active display area with 268x800 (268 horizontal by 800 vertical pixel) resolution.

3.General Specifications

Item	Dimension	Unit
Size	2.99”	inch
Dot Matrix	268 x RGB x 800(TFT)	dots
Module dimension	26.52 (W) x 78.2 (H) x 2.46 (D)	mm
Active area	24.12 x 72.0	mm
Pixel Pitch	0.09 x 0.09	mm
LCD type	TFT, Normally Black, Transmissive	
TFT Interface	2-Lanes MIPI	
TFT Driver IC	GC9503 or Equivalent	
Viewing angle	80/80/80/80	
CTP Driver IC	CST328 or Equivalent	
CTP Interface	I2C	
CTP FW Version	1.0.3	
CTP Resolution	268*820	
Backlight Type	LED,Normally White	
With /Without TP	With CTP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

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. ≦50℃, 90% RH MAX. Temp.＞50℃, Absolute humidity shall be less than 90% RH at 50℃

5.Electrical Characteristics

5.1. Operating conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage for analog circuit	VIO28	2.6	2.8	3.6	V
Working current for VIO28	—	—	43.0	65.0	mA
Supply voltage for logic circuit	VIO18	1.65	1.8	3.3	V
Input voltage 'H'level	VIH	0.7*VIO18	—	VIO18	V
Input voltage 'L'level	VIL	GND	—	0.3*VIO18	V
Output voltage 'H'level	VOH	0.8*VIO18	—	VIO18	V
Output voltage 'L'level	VOL	GND	—	0.2*VIO18	V
Supply CTP	CTP_VDD	2.65	2.8	3.3	V
	CTP_IDD	—	7.0	11.0	mA

Note: to avoid power supply noise, please avoid using driving conditions close to min, or max value

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	—	—	20	—	mA	—
LED voltage	VLED+	17.4	18	19.2	V	Note 1
LED Life Time	—	—	40,000	—	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED

Backlight LED Circuit

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

6.Timing Characteristics

6.1. For 268x800 panel

SYNC mode

Horizontal input timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	268	-	DCLK	
DCLK Frequency	fclk	-	20	-	MHz	
One Horizontal Line	th	-	338	-	DCLK	
HS pulse width	thpw	-	10	-	DCLK	
HS Blanking	thb	-	70	-	DCLK	
HS Front Porch	thfp	-	30	-	DCLK	

Vertical input timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	800	-	TH	
VS period time	tv	-	825	-	TH	
VS pulse width	tvpw	-	2	-	TH	
VS Blanking	tvb	-	25	-	TH	
VS Front Porch	tvfp	-	8	-	TH	

6.2. High speed data transmission

Figure 1 clock channel timing

VDDI=1.8,VDD=2.8, AGND=DGND=0V, Ta=25 ℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-CLK+/-	$2\times UI_{INSTA}$	Double UI instantaneous	4	25	ns	
DSI-CLK+/-	UI_{INSTA} UI_{INSTB}	UI instantaneous halfs	2	12.5	ns	$UI = UI_{INSTA} = UI_{INSTB}$
DSI-Dn+/-	tDS	Data to clock setup time	0.15	-	UI	
DSI-Dn+/-	tDH	Data to clock hold time	0.15	-	UI	

Figure 2 High speed mode timing Characteristics

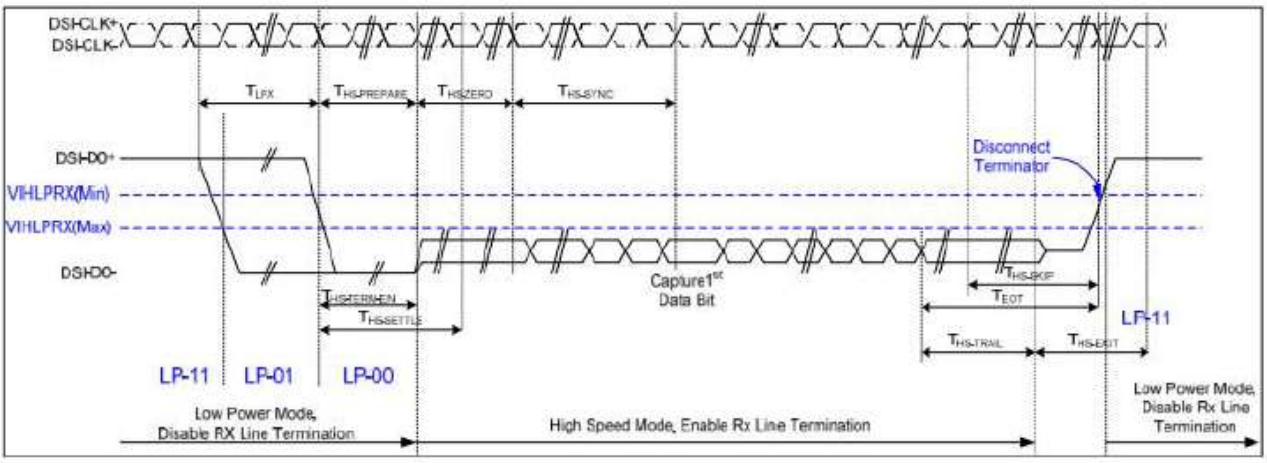


Figure 3 High speed data transmission timing sequence

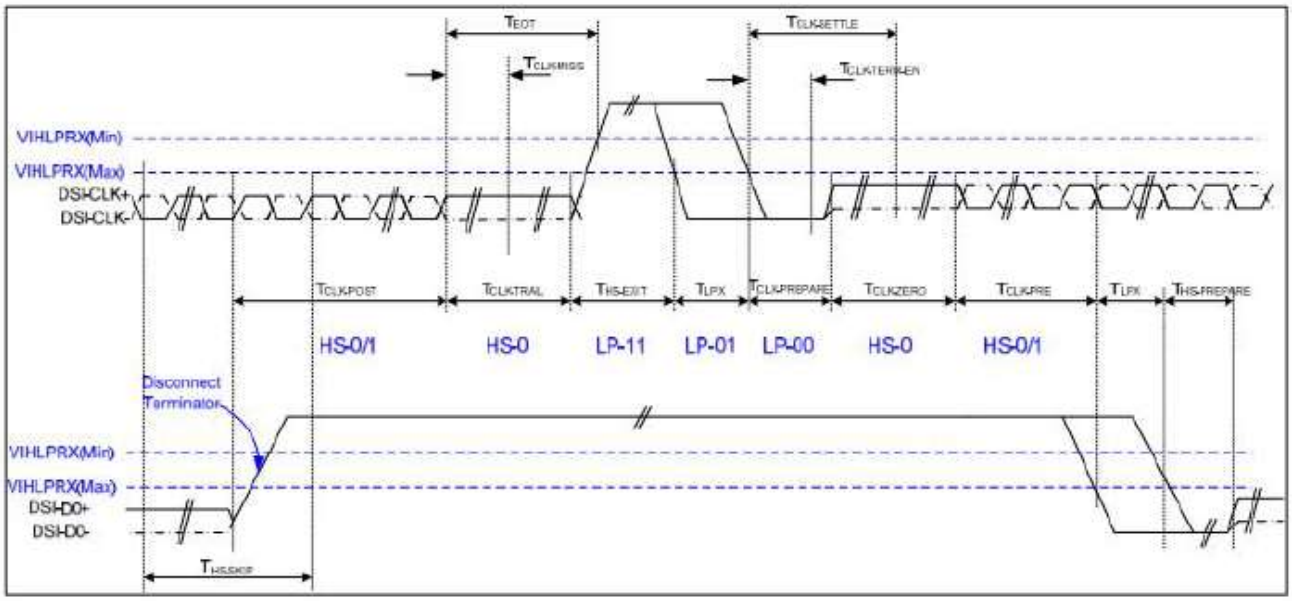


Figure 4 Switching the Clock Lane between Clock Transmission and LP Mode

6.3. Lowe Power Mode

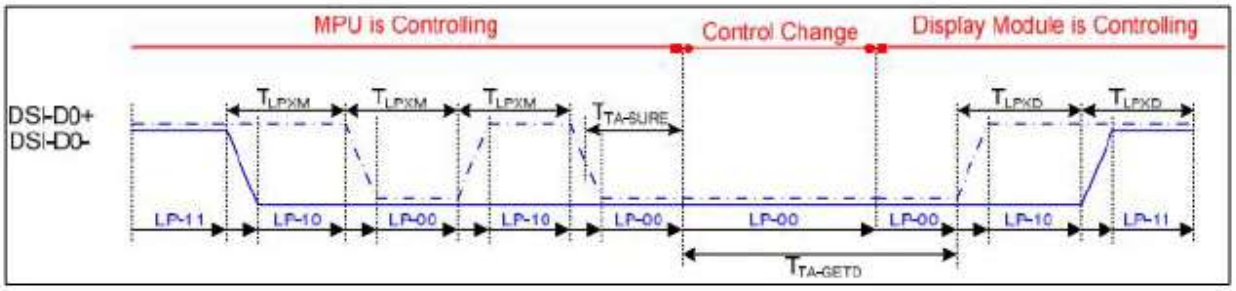


Figure 5 Bus Turnaround (BTA) from display module to MPU Timing

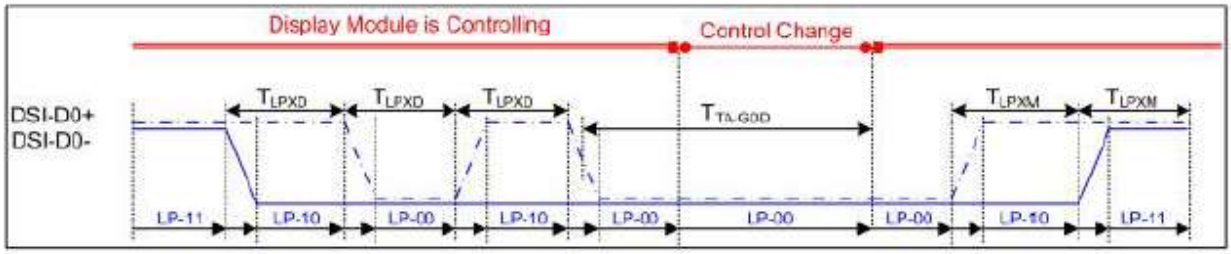


Table 1 Bus Turnaround (BTA) from MPU to display module Timing

DSI-Dn+/-	TLPX	Length of any low power state period	50	-	ns	Input
DSI-Dn+/-	THS-PREPARE	Time to drive LP-00 to prepare for HS transmission	40+4 UI	85+6 UI	ns	Input
DSI-Dn+/-	THS-TERM-EN	Time to enable data receiver line termination measured from when Dn crosses VILMAX	-	35+4 UI	ns	Input
DSI-Dn+/-	THS-PREPARE + THS-ZERO	THS-PREPARE + time to drive HS-0 before the sync sequence	140+ 10UI	-	ns	Input

Table 2 Mipi Interface Low Power Mode Timing Characteristics

6.4. VDD(VIO28) VDDI(VIO18) Input power sequence

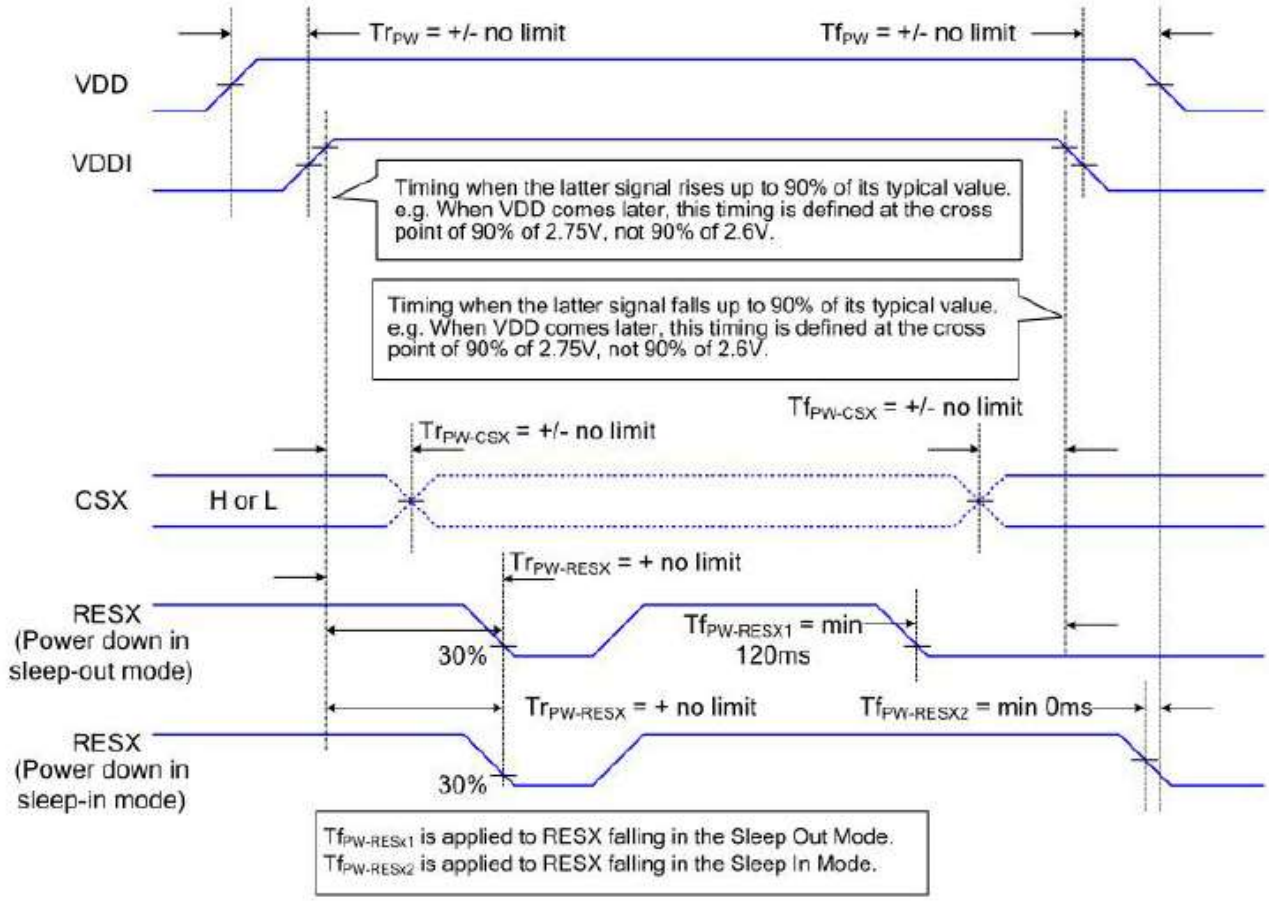
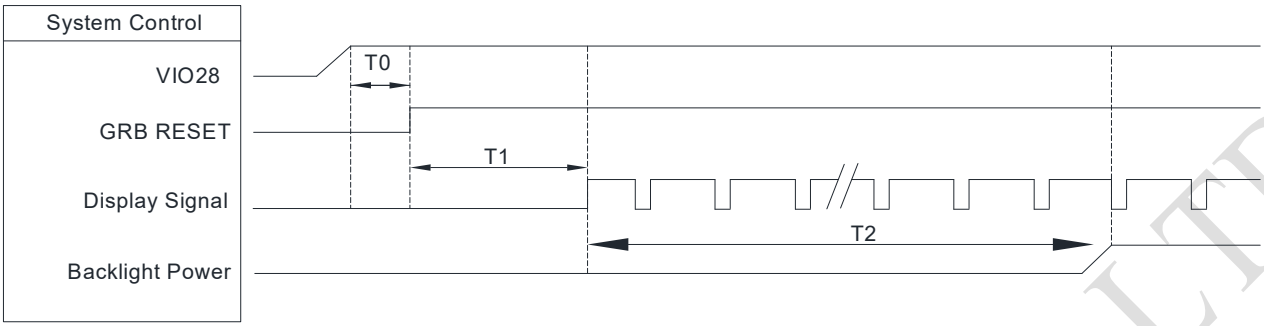


Figure 6 VIO28/ VIO18 input power on/of sequence

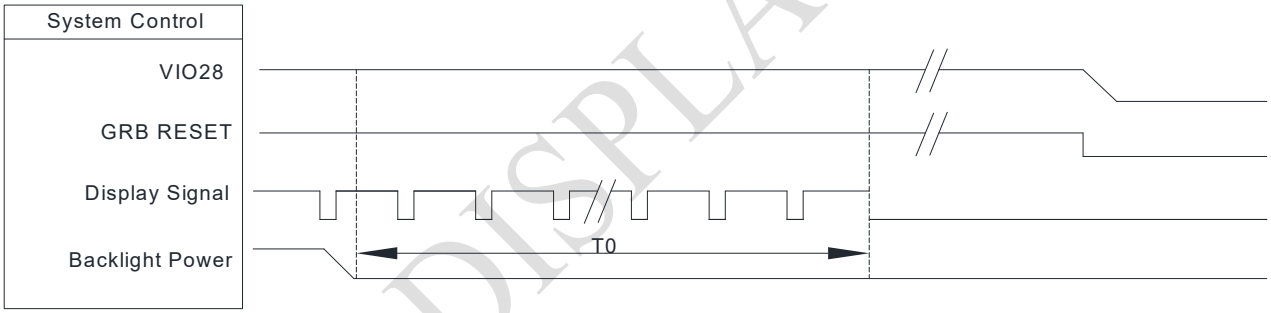
6.5. Power ON/OFF Sequence

1.Power - On Timing Sequence



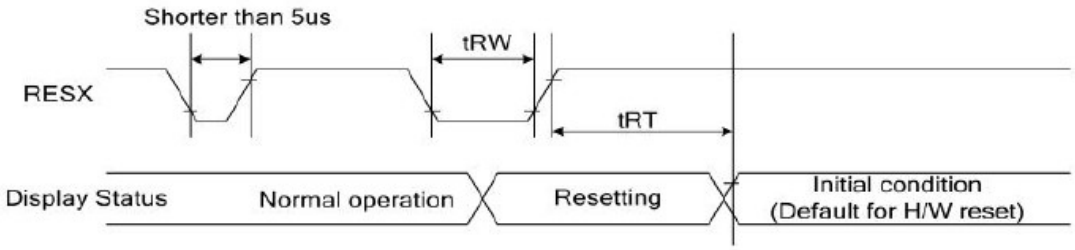
Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET=”High to Display Signal output	10	ms
T2	Display signal output to Backlight Power on	250	ms

2.Power - off Timing Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to IC internal voltage discharge complete	85	ms

7.Reset Timing



Signal	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 also includes required time for loading ID bytes, VCOM setting and other settings fromEEPROM (or similar device) to registers.

This loading is done every time when there is HW reset cancel time (tRT) within 10 ms after a rising edgeof RESX.

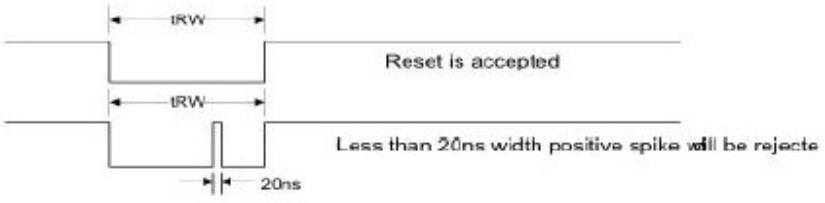
2.Spike due to an electrostatic discharge on RESX line does not cause irregular system reset accordingto the table below ：

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 at Sleep-Out status. The display remains the blank state in Sleep-In mode). Then return to Defaultcondition for Hardware Reset

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



5.When Reset applied during Sleep-In Mode.

6.When Reset applied during Sleep-Out Mode

7.It is necessary to wait 10ms after releasing RESX before sending commands.

Also Sleep Outcommand cannot be sent for 120 ms.

8.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	θ=0°、Φ=0°	-	30	40	ms	Note 3
Contrast ratio		CR	At optimized viewing angle	-	1200	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.30	0.33	0.36		Note 2,6,7
		Wy		0.33	0.36	0.39		
Viewing angle	Hor.	ΘR	CR≧10	-	80	-	Deg.	Note 1
		ΘL		-	80	-		
	Ver.	ΦT		-	80	-		
		ΦB		-	80	-		
Brightness		-	-	500	530	-	cd/m2	Center of display
Uniformity		(U)	-	70	-	-	%	Note5

Ta=25±2℃

Note 1: Definition of viewing angle range

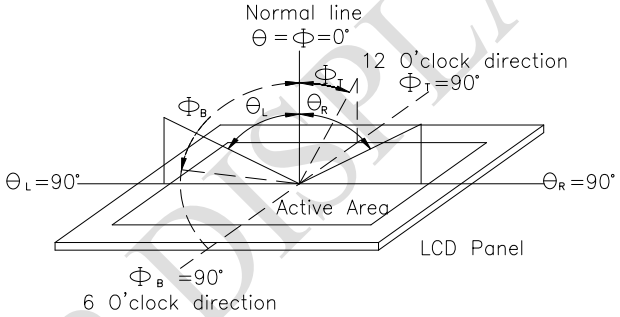


Fig. 8.1. Definition of viewing angle

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-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

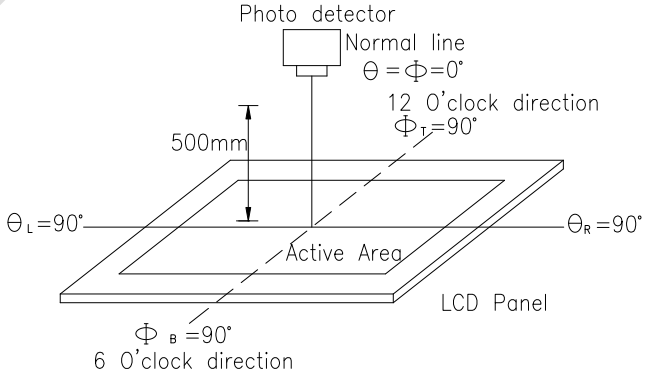
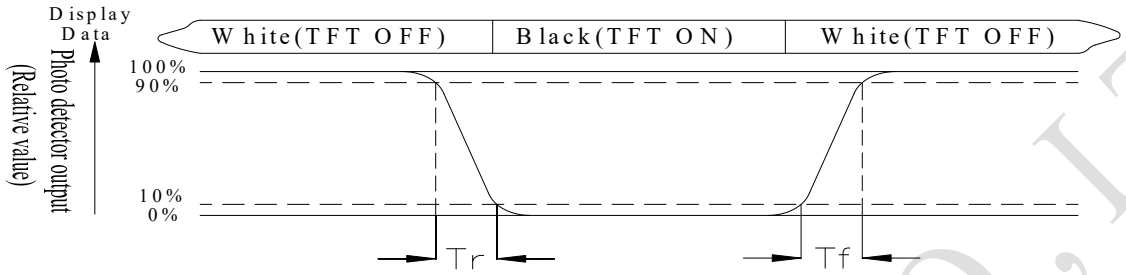


Fig. 8.2. Optical measurement system setup

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

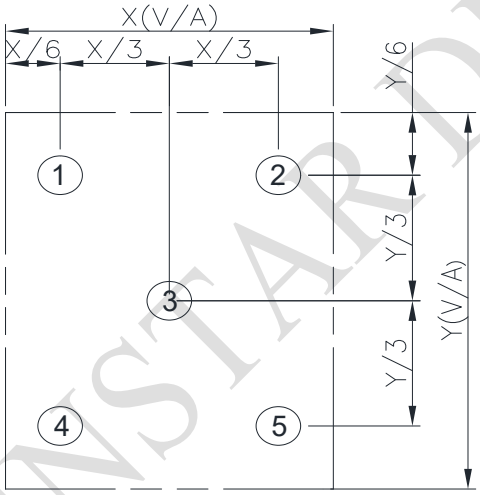


Fig 8.3. Definition of uniformity

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.

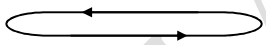
9.Interface

9.1. LCM PIN Definition

Pin No.	Symbol	Description
1	NC	No connection
2	NC	No connection
3	GND	Power ground
4	NC	No connection
5	NC	No connection
6	GND	Power ground
7	DP1	MIPI-DSI data lane 1 posivtve input pin
8	DN1	MIPI-DSI data lane 1 negtive input pin
9	GND	Power ground
10	DP0	MIPI-DSI data lane 0 posivtve input pin
11	DN0	MIPI-DSI data lane 0 negtive input pin
12	GND	Power ground
13	CLKP	MIPI-DSI data lane posivtve input pin
14	CLKN	MIPI-DSI data lane negtive input pin
15	GND	Power ground
16	RST	Reset signal(low active)
17	TE	Serves TE (Tearing Effect) pin on MPU interface
18	VLED-	LED backlight cathode
19	VLED-	LED backlight cathode
20	VLED+	LED backlight anode
21	VLED+	LED backlight anode
22	VIO28	Analog power supply
23	VIO18	Power supply for the logic power and I/O circuit
24	CTP_SDA	TP-SDA
25	CTP_SCL	TP-SCL
26	CTP_EINT	TP-EINT
27	CTP_VDD	TP-VCC
28	NC	No connection
29	CTP_RST	TP-RESET
30	GND	Power ground

10.Reliability

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

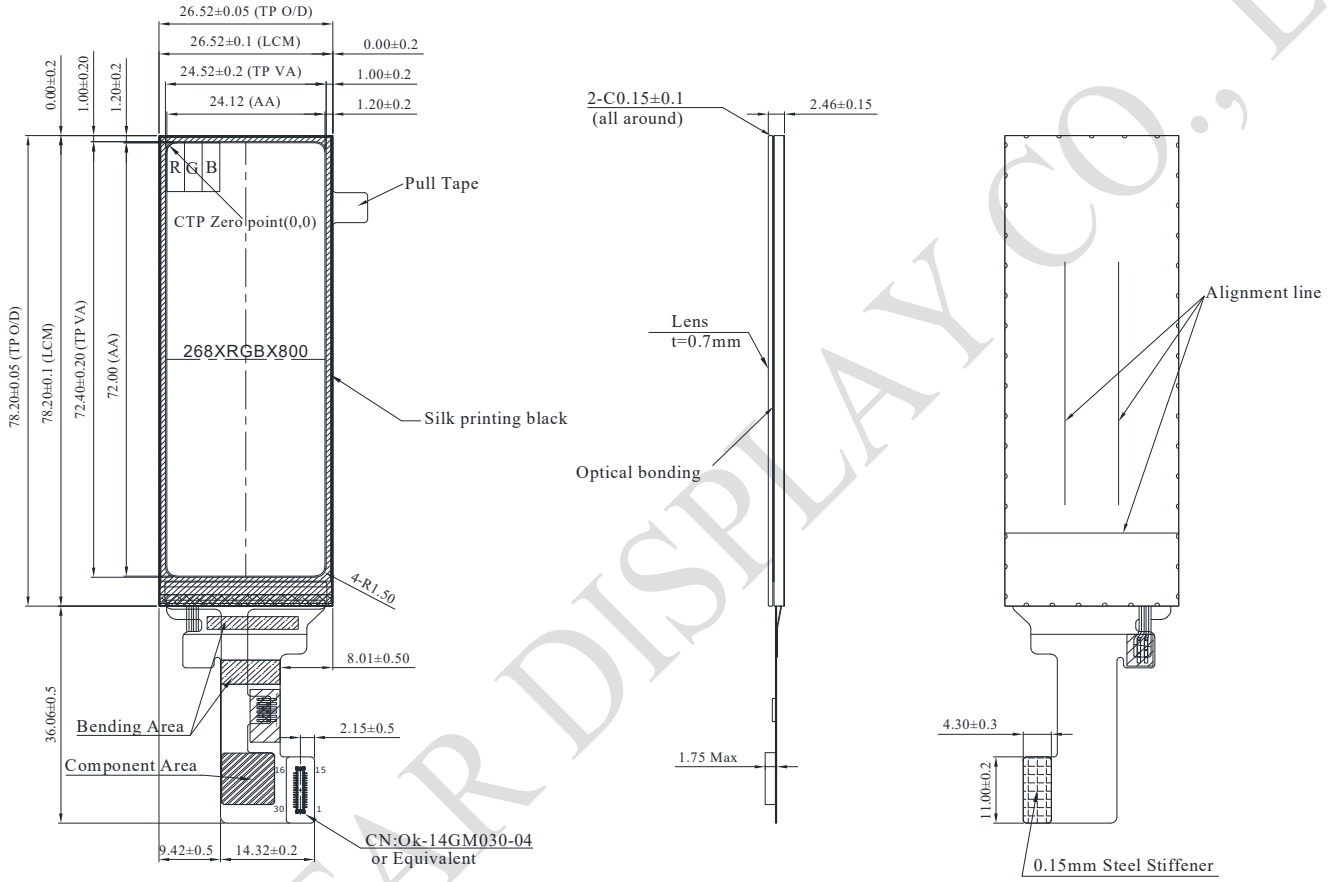
Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 96hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 96hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 50℃,90%RH max	50℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃ 25℃ 70℃  30min 5min 30min 1 cycle	-20℃/70℃ 10 cycles	——
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=±2KV(contact), ±6KV(air), RS=330Ω CS=150pF 10 times	——

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.

11.Contour Drawing



PIN:	SYMBLE
1	NC
2	NC
3	GND
4	NC
5	NC
6	GND
7	DP1
8	DN1
9	GND
10	DP0
11	DN0
12	GND
13	CLKP
14	CLKN
15	GND
16	RST
17	TE
18	VLED-
19	VLED-
20	VLED+
21	VLED+
22	VIO28
23	VIO18
24	CTP_SDA
25	CTP_SCL
26	CTP_EINT
27	CTP_VDD
28	NC
29	CTP_RST
30	GND

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

12.Initial Code For Reference

```
void GC9503V_init_code(void)
{
    cmd_buf(0xF0, 5, {0x55, 0xAA, 0x52, 0x08, 0x00});
    cmd_buf(0xF6, 2, {0x5A, 0x87});

    cmd_buf(0xC1, 1, {0x3F});
    cmd_buf(0xCD, 1, {0x25});
    cmd_buf(0xC9, 1, {0x10});
    cmd_buf(0xF8, 1, {0x8A});
    cmd_buf(0xAC, 1, {0x65});
    cmd_buf(0xA7, 1, {0x47});
    cmd_buf(0xA0, 1, {0xCC});
    cmd_buf(0x86, 4, {0x99, 0xA3, 0xA3, 0x21});
    cmd_buf(0x87, 3, {0x04, 0x03, 0x66});

    cmd_buf(0xFA, 4, {0x08, 0x08, 0x00, 0x04});
    cmd_buf(0xA3, 1, {0x6E});
    cmd_buf(0xFD, 3, {0x28, 0x3C, 0x00});

    cmd_buf(0x9A, 1, {0x91});
    cmd_buf(0x9B, 1, {0x68});
    cmd_buf(0x82, 2, {0x65, 0x65});
    cmd_buf(0xB1, 1, {0x10});
    cmd_buf(0x7A, 2, {0x0F, 0x13});
    cmd_buf(0x7B, 2, {0x0F, 0x13});

    cmd_buf(0x6D, 32,{0x08, 0x02, 0x10, 0x0E, 0x0C, 0x0A, 0x19, 0x1A, 0x1F,
0x00, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x1E, 0x00,
0x1F, 0x1A, 0x19, 0x09, 0x0B, 0x0D, 0x0F, 0x01, 0x07});

    cmd_buf(0x64, 16, {0x38, 0x05, 0x03, 0x23, 0x03, 0x03, 0x38, 0x04, 0x03,
0x24, 0x03, 0x03, 0x72, 0x50, 0x72, 0x50});
    cmd_buf(0x65, 16, {0x38, 0x03, 0x03, 0x25, 0x03, 0x03, 0x38, 0x02, 0x03,
0x26, 0x03, 0x03, 0x72, 0x50, 0x72, 0x50});
    cmd_buf(0x67, 16, {0x30, 0x01, 0x03, 0x29, 0x03, 0x03, 0x30, 0x02, 0x03,
0x2A, 0x03, 0x03, 0x72, 0x50, 0x72, 0x50});
    cmd_buf(0x66, 16, {0x38, 0x01, 0x03, 0x27, 0x03, 0x03, 0x30, 0x00, 0x03,
0x28, 0x03, 0x03, 0x72, 0x50, 0x72, 0x50});

    cmd_buf(0x60, 8, {0x14, 0x22, 0x14, 0x22, 0x00, 0x00, 0x08});

    cmd_buf(0x63, 8, {0x33, 0x1D, 0x72, 0x50, 0x33, 0x1E, 0x72, 0x50});
    cmd_buf(0x68, 13,{0x3B, 0x08, 0x10, 0x08, 0x10, 0x00, 0x12, 0x08, 0x10,
0x08, 0x10, 0x00, 0x13});
    cmd_buf(0x69, 7, {0x14, 0x22, 0x14, 0x22, 0x00, 0x00, 0x08});

    cmd_buf(0x6B, 1, {0x07});
```

```
            cmd_buf(0xD1, 52, {0x00, 0x00, 0x00, 0x10, 0x00, 0x2F, 0x00, 0x48, 0x00,
0x62, 0x00, 0x80, 0x00, 0xA8, 0x00, 0xDA, 0x01, 0x00, 0x01, 0x4A, 0x01, 0x7F, 0x01,
0xCD, 0x02, 0x0C, 0x02, 0x0E, 0x02, 0x48, 0x02, 0x8D, 0x02, 0xBA, 0x02, 0xF8, 0x03,
0x20, 0x03, 0x55, 0x03, 0x6b, 0x03, 0x9b, 0x03, 0xac, 0x03, 0xb8, 0x03, 0xe0, 0x03,
0xFF});

        cmd_buf(0xD2, 52, {0x00, 0x00, 0x00, 0x10, 0x00, 0x2F, 0x00, 0x48, 0x00, 0x62,
0x00, 0x80, 0x00, 0xA8, 0x00, 0xDA, 0x01, 0x00, 0x01, 0x4A, 0x01, 0x7F, 0x01, 0xCD,
0x02, 0x0C, 0x02, 0x0E, 0x02, 0x48, 0x02, 0x8D, 0x02, 0xBA, 0x02, 0xF8, 0x03, 0x20,
0x03, 0x55, 0x03, 0x6b, 0x03, 0x9b, 0x03, 0xac, 0x03, 0xb8, 0x03, 0xe0, 0x03, 0xFF});

        cmd_buf(0xD3, 52,
{0x00,0x00,0x00,0x10,0x00,0x2F,0x00,0x48,0x00,0x62,0x00,0x80,0x00,0xA8,0x00,0xDA,0
x01,0x00,0x01,0x4A,0x01,0x7F,0x01,0xCD,0x02,0x0C,0x02,0x0E,0x02,0x48,0x02,0x8D,0x
02,0xBA,0x02,0xF8,0x03,0x20,0x03,0x55,0x03,0x6b,0x03,0x9b,0x03,0xac,0x03,0xb8,0x0
3,0xe0,0x03,0xFF});

        cmd_buf(0xD4, 52,
{0x00,0x00,0x00,0x10,0x00,0x2F,0x00,0x48,0x00,0x62,0x00,0x80,0x00,0xA8,0x00,0xDA,0
x01,0x00,0x01,0x4A,0x01,0x7F,0x01,0xCD,0x02,0x0C,0x02,0x0E,0x02,0x48,0x02,0x8D,0x
02,0xBA,0x02,0xF8,0x03,0x20,0x03,0x55,0x03,0x6b,0x03,0x9b,0x03,0xac,0x03,0xb8,0x0
3,0xe0,0x03,0xFF});

        cmd_buf(0xD5, 52,
{0x00,0x00,0x00,0x10,0x00,0x2F,0x00,0x48,0x00,0x62,0x00,0x80,0x00,0xA8,0x00,0xDA,0
x01,0x00,0x01,0x4A,0x01,0x7F,0x01,0xCD,0x02,0x0C,0x02,0x0E,0x02,0x48,0x02,0x8D,0x
02,0xBA,0x02,0xF8,0x03,0x20,0x03,0x55,0x03,0x6b,0x03,0x9b,0x03,0xac,0x03,0xb8,0x0
3,0xe0,0x03,0xFF});

        cmd_buf(0xD6, 52,
{0x00,0x00,0x00,0x10,0x00,0x2F,0x00,0x48,0x00,0x62,0x00,0x80,0x00,0xA8,0x00,0xDA,0
x01,0x00,0x01,0x4A,0x01,0x7F,0x01,0xCD,0x02,0x0C,0x02,0x0E,0x02,0x48,0x02,0x8D,0x
02,0xBA,0x02,0xF8,0x03,0x20,0x03,0x55,0x03,0x6b,0x03,0x9b,0x03,0xac,0x03,0xb8,0x0
3,0xe0,0x03,0xFF});
            cmd_buf(0x11, 1, {0x00});
            delay_ms(120);
            cmd_buf(0x29, 1, {0x00});
        }
```

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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 , _____

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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**：____/____/____