



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.: WF57STIACDNN0#

<p align="center">APPROVED BY:</p> <p align="center">(FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: _____</p> <p>DATA: _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2017/08/22			

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>

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2013/10/21		First issue
A	2014/02/14		Modify Package Specification.
B	2015/03/12		Add size & Surface. Modify Block Diagram & Static electricity test.
C	2015/03/16		Remove the description of TFT color part
D	2015/04/27		Modify Reliability.
E	2015/11/02		Modify Initial Code.
F	2016/01/21		Modify Static electricity test
G	2016/08/10		Modify Vibration test.
H	2016/10/05		Modify Summary Add Aspect Ratio
I	2017/08/22		Remove Package Specification

Contents

- 1.Module Classification Information
- 2.Summary
- 3.General Specification
- 4.Absolute Maximum Ratings
- 5.Electrical Characteristics
- 6.DC Characteristics
- 7.AC Characteristics
- 8.Optical Characteristics
- 9.Interface
- 10.Block Diagram
- 11.Reliability
- 12.Contour Drawing
- 13.Initial Code For Reference

1.Module Classification Information

W F 57 S T I A C D N N 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 : 5.7" 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:											
	A	128160	B	320234	C	320240	D	480234	E	480272	F	640480
	G	800480	H	1024600	I	320480	J	240320	K	800600	L	240400
	M	1024768	N	128128	P	1280800	Q	480800	R	640320	S	480128
	T	800320	U	8001280	V	176220	W	1280398	X	1024250	Y	1920720
	Z	800200	2	1024324	3	7201280	4	19201200	5	1366768	6	1280320
⑨	D: Digital L : LVDS M:MIPI											
⑩	Interface:											
	N	Without control board			A	8Bit		B	16Bit		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				
	G2	Capacitive touch panel (G-G)+OCR					B	CTP+GG+USB				
⑫	Version: X:Raspberry pi											
⑬	Special Code		#:Fit in with ROHS directive regulations									

2.Summary

The 5.7 " TN Mono TFT that is offers improved contrast ,viewing angle, brightness and response time over traditional passive monochrome products. Increased display brightness display brightness is a key factor for design engineers when selecting a display that must vividly show pictures and alphanumeric data.The TFT cell is manufactured using high aperture panel technology and high transmission polarizer. The result is a clear and extremely bright display.

3. General Specifications

Item	Dimension	Unit
Size	5.7	inch
Dot Matrix	320 x 240	dots
Module dimension	160.0 x 109.0 x 7.0	mm
Active area	115.2 x 86.4	mm
Dot pitch	0.36 x 0.36	mm
LCD type	TFT, Positive, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Aspect Ratio	4:3	
Gray Scale	16 Gray scale (4BPP)/ 4 Gray scale (2BPP)/ 2 Gray scale (1BPP)	
Driver IC	ST7511U	
Backlight Type	LED, Normally White	
With /Without TP	Without TP	
Surface	Glare	

* Mono tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

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

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

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C

5. Electrical Characteristics

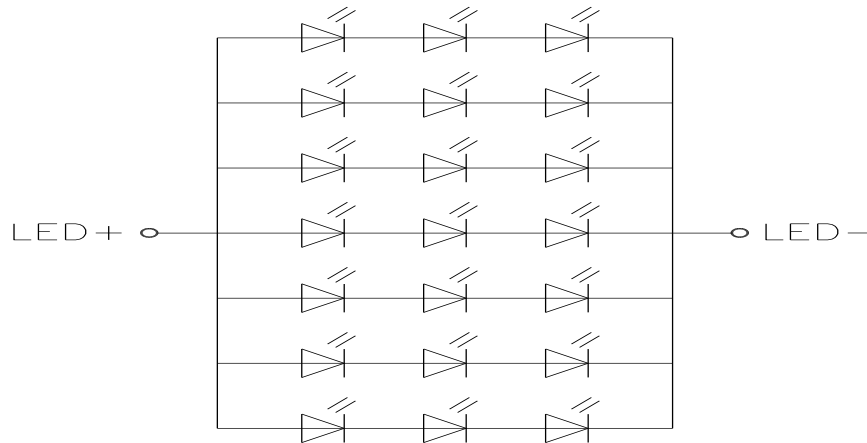
5.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	3.0	3.3	3.6	V	
Supply Current For LCM	IDD	—	—	20	30	mA	Note1
Power Consumption	—	—	—	66	108	mW	

Note1: This value is test for VDD=3.3V only

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	140	-	mA	
Power Consumption		1120	-	1386	mW	
LED voltage	VLED+	8.0	9.0	9.9	V	Note 1
LED Life Time		-	50,000	-	Hr	Note 2,3,4



Note 1 : Power supply the back light specification

Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

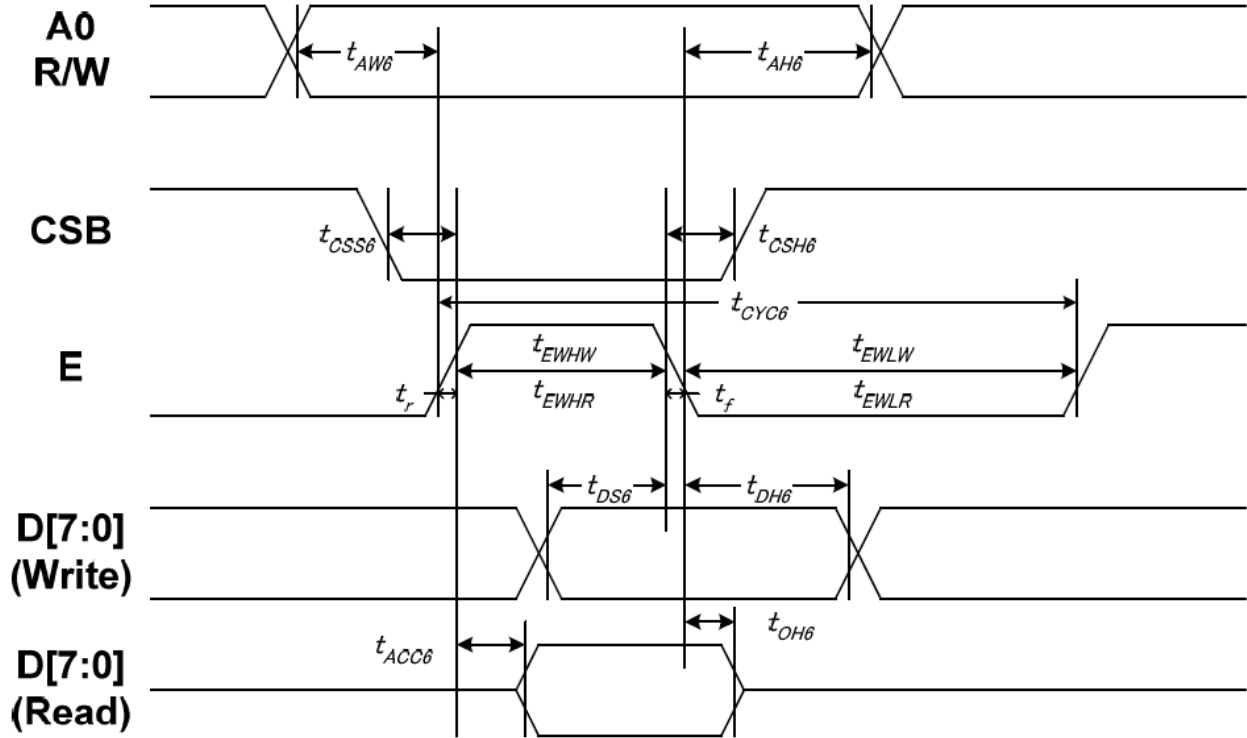
Note 4 : The single LED lamp case

6.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	V_{IL}	0	-	0.3VDD	V	
High level input voltage	V_{IH}	0.7VDD	-	VDD	V	

7.AC Characteristics

7.1. System Bus Timing for 6800 Series MPU

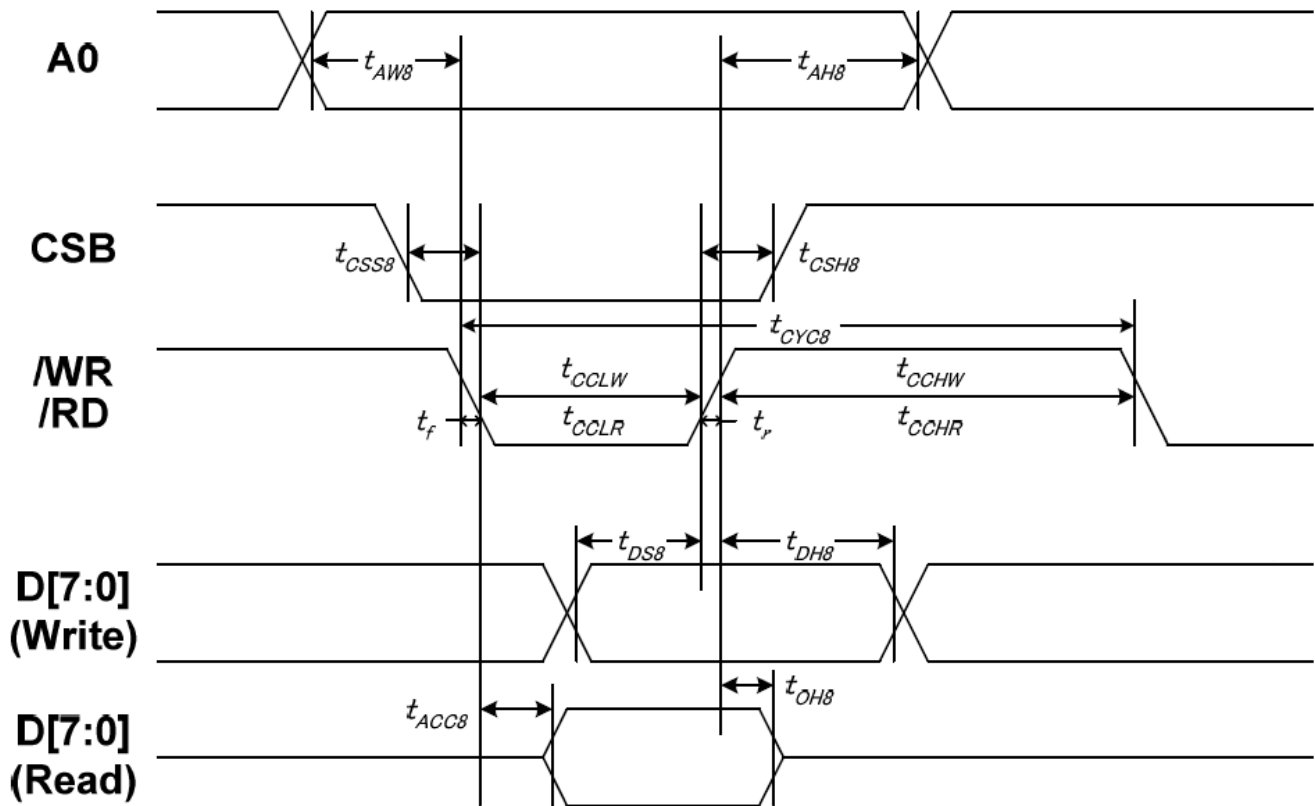


Item	Signal	Symbol	Condition	Min	Max	Unit
Address setup time	A0	tAW6	-	10	-	ns
Address hold time		tAH6	-	0	-	
System cycle time	E	tCYC6	-	200	-	
Enable L pulse width (WRITE)		tEHLW	-	100	-	
Enable H pulse width (WRITE)		tEHWL	-	100	-	
Enable L pulse width (READ)		tEHLR	-	130	-	
Enable H pulse width (READ)		tEHWL	-	130	-	
CSB setup time		CSB	tCSS6	-	100	
CSB hold time	tCSH6		-	100	-	
Write data setup time	D[7:0]	tDS6	-	70	-	
Write data hold time		tDH6	-	20	-	
Read data access time		tACC6	CL = 100 pF	-	80	
Read data output disable time		tOH6	CL = 100 pF	15	80	

Note:

1. The input signal rise time and fall time (t_r , t_f) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leq (t_{CYC8} - t_{CCLW} - t_{CCHW})$ for $(t_r + t_f) \leq (t_{CYC8} - t_{CCLR} - t_{CCHR})$ are specified.
2. All timing is specified using 20% and 80% of VDDI as the reference.
3. t_{CCLW} and t_{CCLR} are specified as the overlap between CSB being "L" and /WR and /RD being at the "L" level. CSB and /WR (or /RD) cannot act at the same time and CSB should be 100ns wider than /WR (or /RD).

7.2. System Bus Timing for 8080 Series MPU

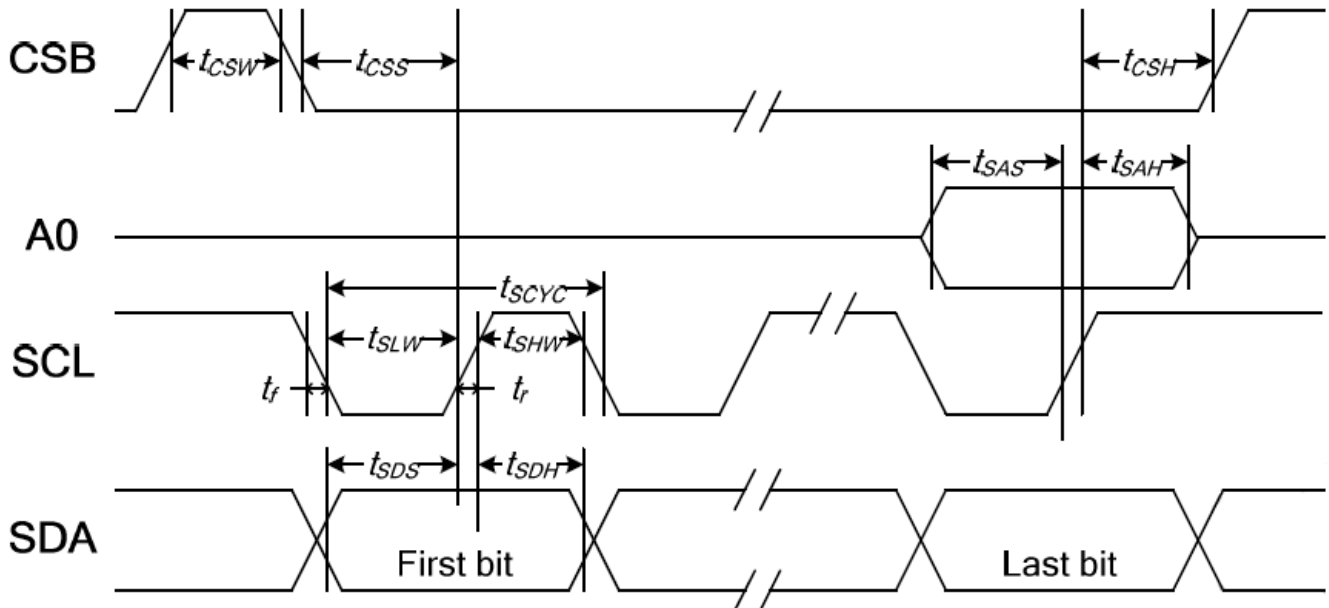


Item	Signal	Symbol	Condition	Min	Max	Unit
Address setup time	A0	tAW8	-	10	-	ns
Address hold time		tAH8	-	0	-	
System cycle time		tCYC8	-	200	-	
/WR L pulse width (WRITE)		/WR	tCCLW	-	100	
/WR H pulse width (WRITE)		tCCHW	-	100	-	
/RD L pulse width (READ)	/RD	tCCLR	-	120	-	
/RD H pulse width (READ)		tCCHR	-	120	-	
CSB setup time	CSB	tCSS8	-	100	-	
CSB hold time		tCSH8	-	100	-	
Write data setup time	D[7:0]	tDS8	-	70	-	
Write data hold time		tDH8	-	20	-	
Read data access time	D[7:0]	tACC8	CL = 100 pF	-	80	
Read data output disable time		tOH8	CL = 100 pF	15	80	

Note:

- The input signal rise time and fall time (t_r , t_f) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leq (t_{CYC8} - t_{CCLW} - t_{CCHW})$ for $(t_r + t_f) \leq (t_{CYC8} - t_{CCLR} - t_{CCHR})$ are specified.
- All timing is specified using 20% and 80% of VDDI as the reference.
- t_{CCLW} and t_{CCLR} are specified as the overlap between CSB being "L" and /WR and /RD being at the "L" level. CSB and /WR (or /RD) cannot act at the same time and CSB should be 100ns wider than /WR (or /RD).

7.3. System Bus Timing for 4-Line Serial Interface

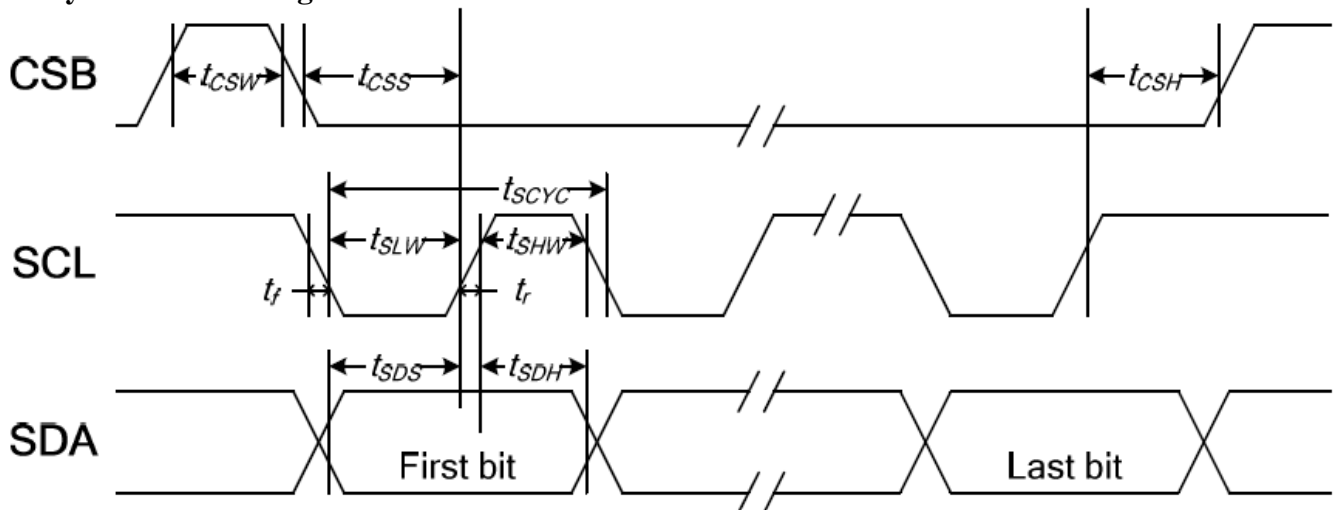


Item	Signal	Symbol	Condition	Min	Max	Unit
Serial clock period		tSCYC	-	80	-	ns
SCL "H" pulse width	SCL	tSHW	-	40	-	
SCL "L" pulse width	SCL	tSLW	-	40	-	
Address setup time	A0	tSAS	-	40	-	
Address hold time	A0	tSAH	-	40	-	
Data setup time	SDA	tSDS	-	15	-	
Data hold time	SDA	tSDH	-	20	-	
CSB-SCL time		tCSS	-	40	-	
CSB-SCL time	CSB	tCSH	-	40	-	
CSB "H" pulse width	CSB	tCSW	-	15	-	

Note:

1. The input signal rise and fall time (t_r , t_f) are specified at 15 ns or less.
2. All timing is specified using 20% and 80% of VDDI as the standard.

7.4. System Bus Timing for 3-Line Serial Interface



Item	Signal	Symbol	Condition	Min	Max	Unit
Serial clock period	SCL	tSCYC	-	80	-	ns
SCL "H" pulse width		tSHW	-	40	-	
SCL "L" pulse width		tSLW	-	40	-	
Data setup time	SDA	tSDS	-	15	-	
Data hold time		tSDH	-	20	-	
CSB-SCL time	CSB	tCSS	-	40	-	
CSB-SCL time		tCSH	-	40	-	
CSB "H" pulse width		tCSW	-	15	-	

Note:

1. The input signal rise and fall time (tr, tf) are specified at 15 ns or less.
2. All timing is specified using 20% and 80% of VDDI as the standard.

8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark		
Response time	Tr	$\theta = 0^\circ$ 、 $\Phi = 0^\circ$	-	20	30	.ms	Note 3,5		
	Tf		-	10	15	.ms			
Contrast ratio	CR	At optimized viewing angle	-	800	-	-	Note 4,5		
Viewing angle (Gray Scale Inversion Direction)	Hor.	Θ_R	CR ≥ 10			60		Deg.	Note 1
		Θ_L				60			
	Ver.	Φ_T				60			
		Φ_B				50			
Brightness	-	-	900	1000	-	cd/m ²	Center of display		

Ta=25±2°C, IL=140mA

Note 1: Definition of viewing angle range

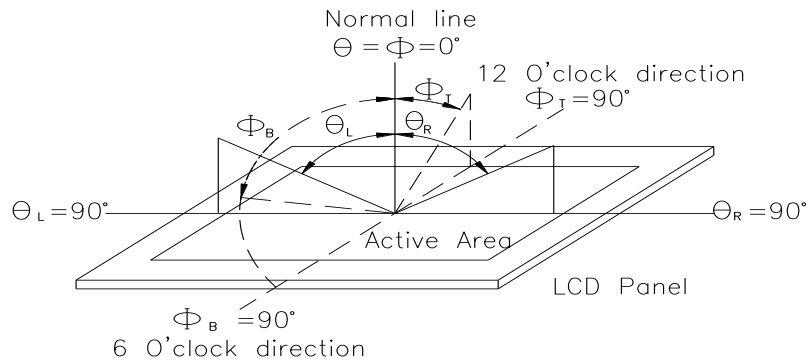


Fig.8.1. Definition of viewing angle

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.

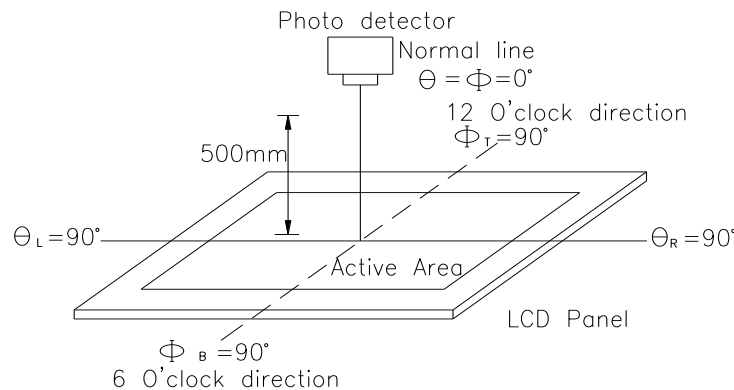
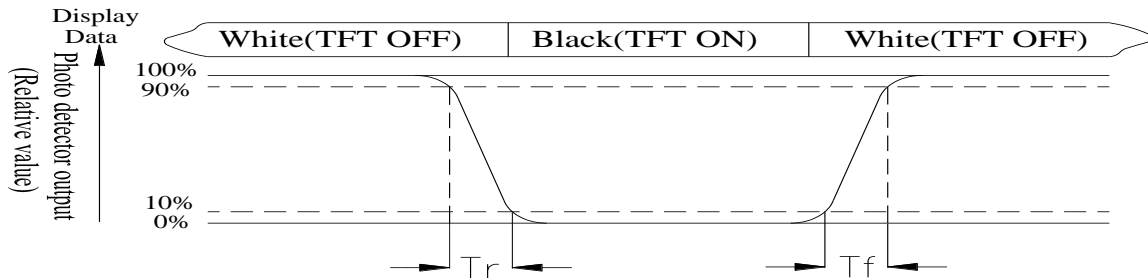


Fig. 8.2. Optical measurement system setup

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, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , 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: White $V_i = V_{i50} \pm 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: 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	Symbol	Function	Remark
1	GND	System ground	
2	VDD	Power Supply : +3.3V	
3	NC	No connect	
4	A0	Data/Command select	
5	/WR(R/W)	Write strobe signal	
6	/RD(E)	Read strobe signal	
7	DB0	Data bus	
8	DB1	Data bus	
9	DB2	Data bus	
10	DB3	Data bus	
11	DB4	Data bus	
12	DB5	Data bus	
13	DB6	Data bus	
14	DB7	Data bus	
15	/CS	Chip select	
16	/RESET(RSTB)	Hardware reset	
17	IF0	Mode select	Note1
18	IF1		
19	NC	No connect	
20	NC	No connect	
21	NC	No connect	
22	NC	No connect	

Note1:

Setting		MCU Type	Interface Pin Function				
IF1	IF0		CSB	A0	RWR	ERD	D[7:0]
L	L	Parallel 8080 series MCU	CSB	A0	/WR	/RD	D[7:0]
L	H	Parallel 6800 series MCU			R/W	E	
H	H	Serial 4-Line series MCU			-	-	D7=SCL, D0=SDA, D[6:1] are not used
H	L	Serial 3-Line series MCU			-	-	

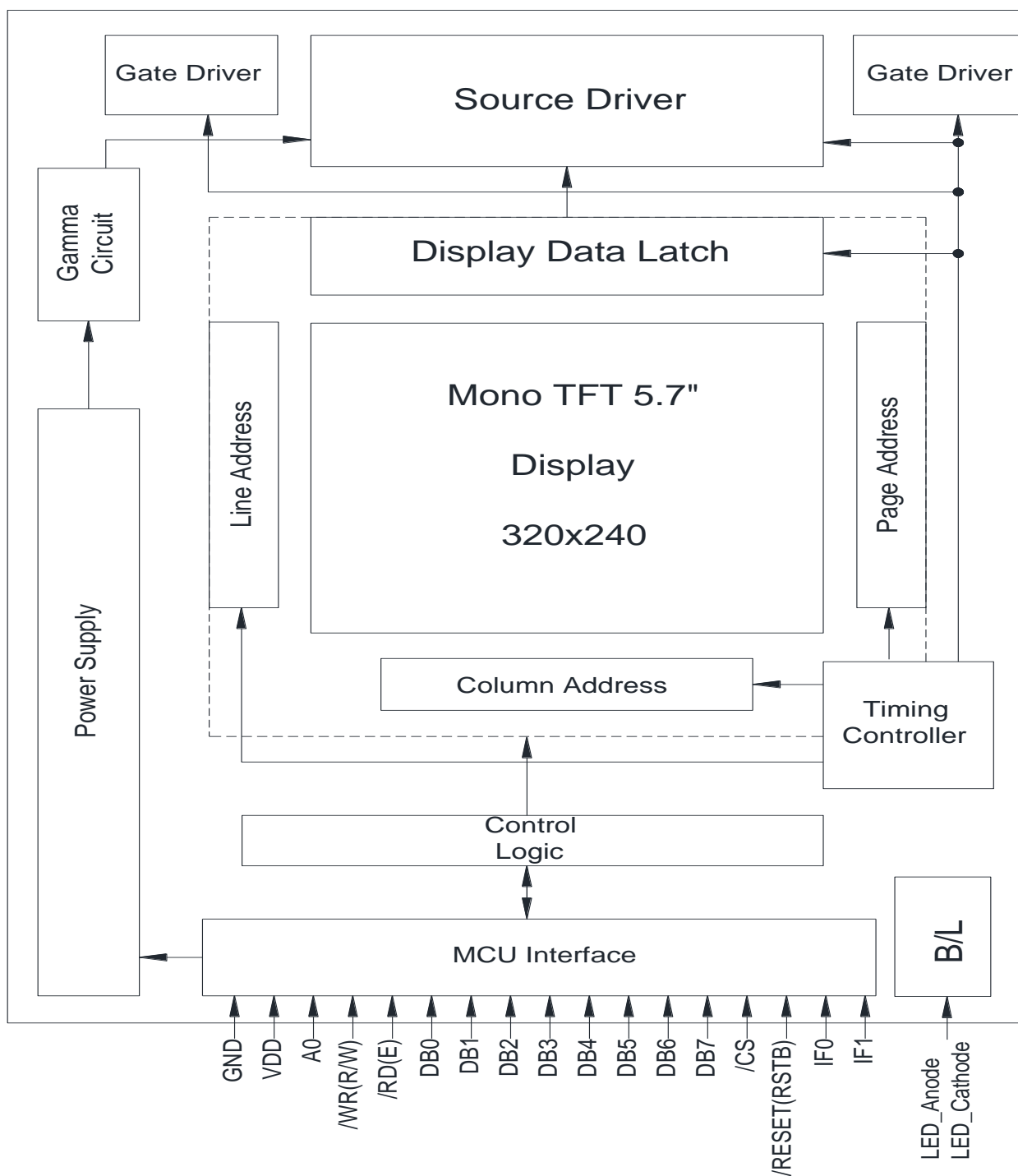
The un-used pins are marked as “-” and should be connected to “H” by VDDI.

9.2. Backlight Unit Section(CN2)

LED Light Bar connector is used for the the integral backlight system. The recommended model is “JST XH-3” manufactured by JST.

Pin No.	Symbol	I/O	Function	Remark
1	V _{LED+}	P	Power for LED backlight anode (A)	Red
3	V _{LED-}	P	Power for LED backlight cathode (K)	White

10. Block Diagram



11. Reliability

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

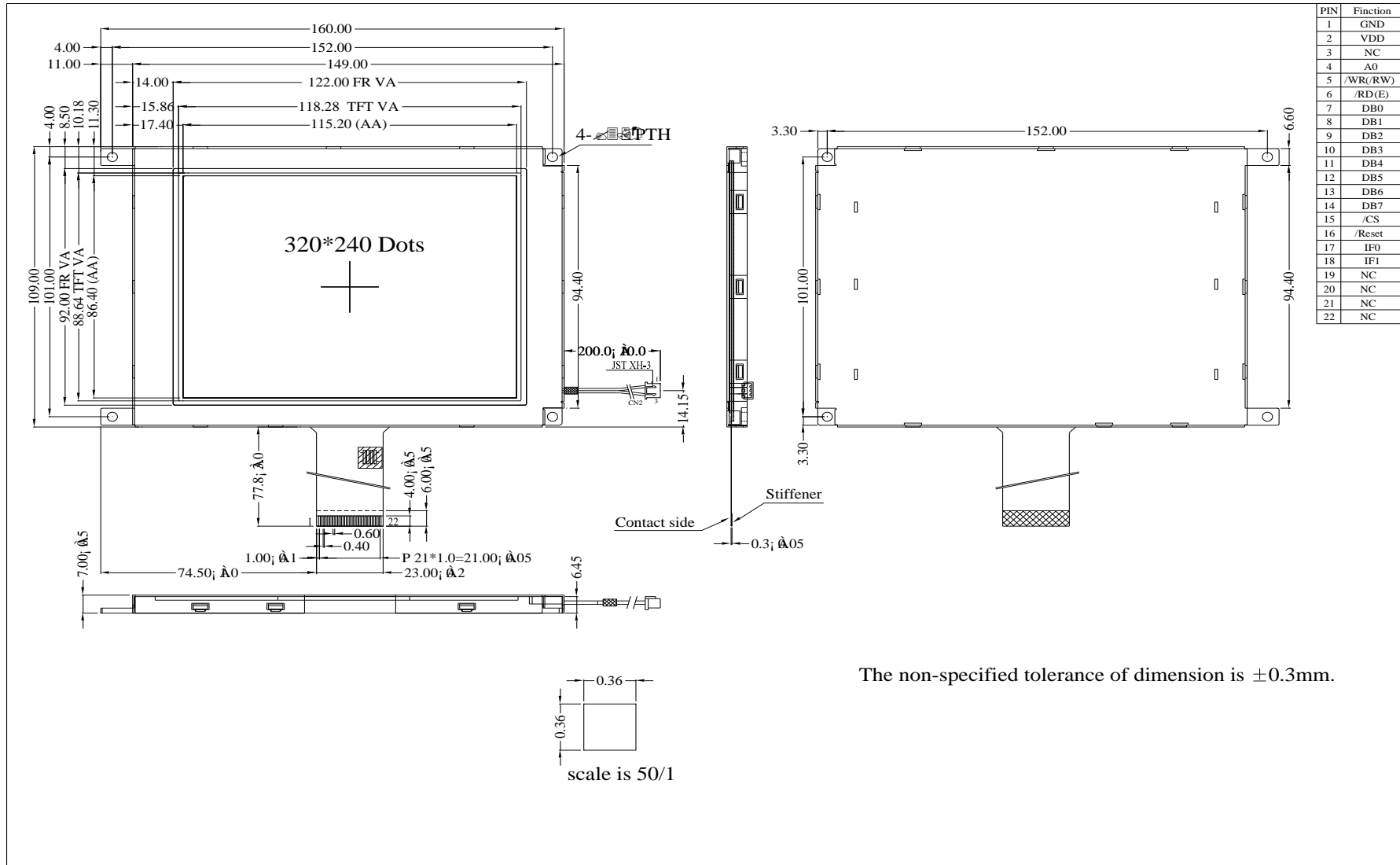
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	<p>The sample should be allowed stand the following 10 cycles of operation</p> <p style="text-align: center;">-20°C 25°C 70°C</p> <p style="text-align: center;">30min 5min 30min</p> <p style="text-align: center;">1 cycle</p>	-20°C/70°C 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=±600V(contact), ±800v(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.

12. Contour Drawing



The non-specified tolerance of dimension is $\pm 0.3\text{mm}$.

13.Initial Code For Reference

```
void Initial_code()
{
    Write_Command(0xae);
    Write_Data(0xa5);

    Write_Command(0x61);
    Write_Data(0x8f);
    Write_Data(0x04);
    Write_Data(0xa5);
    Write_Data(0xa5);

    Write_Command(0x62);
    Write_Data(0x36);
    Write_Data(0x0b);
    Write_Data(0x0b);
    Write_Data(0xa5);

    Write_Command(0x33);
    Write_Data(0x07);
    Write_Data(0x2c);
    Write_Data(0x09);
    Write_Data(0x2a);

    Write_Command(0x63);
    Write_Data(0x09);
    Write_Data(0x17);
    Write_Data(0xa5);
    Write_Data(0xa5);

    Write_Command(0x91);
    Write_Data(0x00);
    Write_Data(0x16);
    Write_Data(0x1B);
    Write_Data(0x1C);
    Write_Command(0x92);
    Write_Data(0x1E);
    Write_Data(0x1F);
    Write_Data(0x20);
    Write_Data(0x21);
    Write_Command(0x93);
    Write_Data(0x23);
    Write_Data(0x24);
    Write_Data(0x26);
    Write_Data(0x28);
    Write_Command(0x94);
    Write_Data(0x2B);
    Write_Data(0x2F);
    Write_Data(0x34);
}
```

```
Write_Data(0x3f);
Write_Command(0x99);
Write_Data(0x00);
Write_Data(0x16);
Write_Data(0x1B);
Write_Data(0x1C);
Write_Command(0x9a);
Write_Data(0x1E);
Write_Data(0x1F);
Write_Data(0x20);
Write_Data(0x21);
Write_Command(0x9b);
Write_Data(0x23);
Write_Data(0x24);
Write_Data(0x26);
Write_Data(0x28);
Write_Command(0x9c);
Write_Data(0x2B);
Write_Data(0x2F);
Write_Data(0x34);
Write_Data(0x3F);
```

```
Write_Command(0x12);
Write_Data(0xa5);
```

```
Write_Command(0x24);
Write_Data(0x01);
Write_Data(0xa5);
Write_Data(0xa5);
Write_Data(0xa5);
```

```
Write_Command(0x22);
Write_Data(0x00);
Write_Data(0xa5);
Write_Data(0xa5);
Write_Data(0xa5);
```

```
Write_Command(0x15);
Write_Data(0xa5);
```

```
_nop_();
```

```
}
```



Module Number : _____

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 Specification :

- 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** <<



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 : / / _____