



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司



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WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF80BTIAGDNNC#

<p>APPROVED BY:</p> <p>(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: 2023/09/26			

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	2023/09/26		First issue

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Contents

1.Module Classification Information

2.Summary

3.General Specifications

4.Absolute Maximum Ratings

5.Electrical Characteristics

6.AC Characteristics

7.Optical Characteristics

8.Interface

9.Block Diagram

10.Reliability

11.Contour Drawing

12.Other

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1.Module Classification Information

W F 80 B T I A G D N N C #
 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 : 8.0" 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									

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2.Summary

TFT 8.0” is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is a composed of a TFT-LCD Panel, driver ICs and a backlight unit.

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3. General Specifications

Item	Dimension	Unit
Size	8.0	inch
Dot Matrix	800 xRGBx480(TFT)	dots
Module dimension	192.80 x 116.90 x 6.4	mm
Active area	176.64 x 99.36	mm
Pixel size	0.2208 x 0.2070	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Interface	24 Bit RGB	
Aspect Ratio	16:9	
Backlight Type	LED, Normally White	
With /Without TP	Without TP	
Surface	Anti-Glare	

*Color tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{OP}	-20	—	+70	°C
Storage Temperature	T _{ST}	-30	—	+80	°C
Supply Voltage	DVDD	-0.3	—	5.0	V

Note 1: If Ta below 50°C, the maximal humidity is 90% RH, if Ta over 50°C, absolute humidity should be less than 60% RH

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

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5. Electrical Characteristics

5.1. Operating conditions:

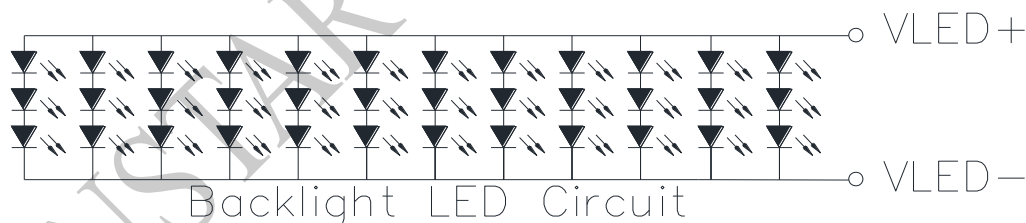
Item	Symbol	Values			Unit
		Min	Typ	Max	
Digital Power supply voltage	DVDD	3.0	3.3	3.6	V
Analog Power supply voltage	AVDD	10.3	10.4	10.5	V
TFT Device on voltage	VGH	15.3	16.0	16.7	V
TFT Device off voltage	VGL	-7.7	-7.0	-6.3	V
Common electrode driving voltage	VCOM	3.4	4.4	5.4	V
High level Input voltage	VIH	0.7DVDD	—	DVDD	V
Low level Input voltage	VIL	0	—	0.3DVDD	V

Note: Typical VCOM is only a reference value. It must be optimized according to each LCM. Please use VR.

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I _{LED}	—	240	—	mA	—
LED voltage	V _{LED}	8.4	9.2	10.6	V	Note 1
LED Life Time	—	—	20,000	—	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : $T_a = 25\text{ }^\circ\text{C}$

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

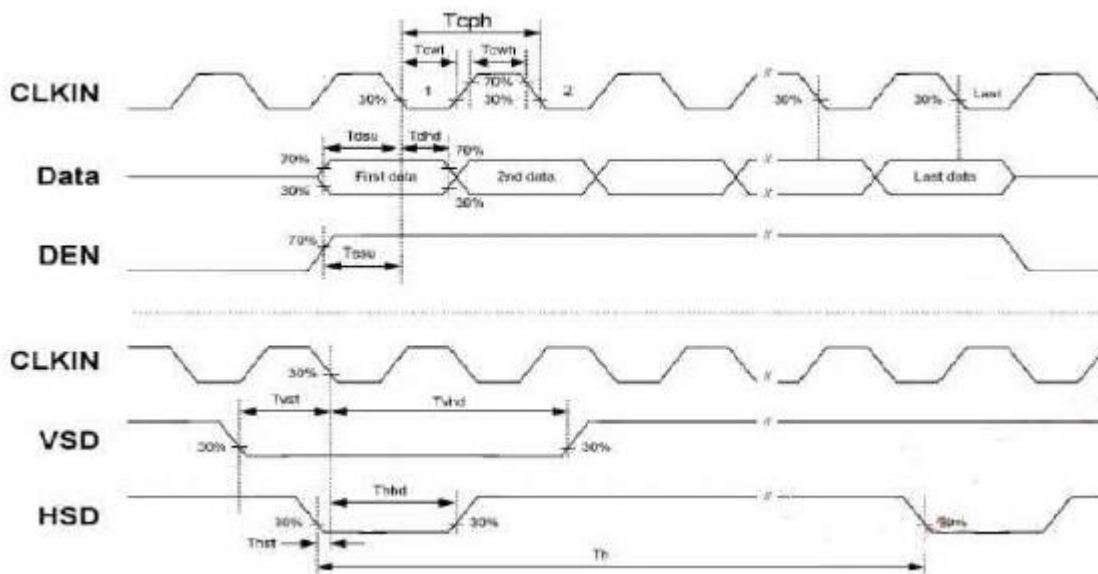
Note 4 : The single LED lamp case

6.AC Characteristics

6.1. AC Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
DCLK cycle time	Tcph	25			ns
DCLK frequency	fclk		33.3	40	MHZ
DCLK pulse duty	Tcwh	40	50	60	%
VSD setup time	Tvs	8			ns
VSD hold time	Tvhd	8			ns
HSD setup time	Thst	8			ns
HSD hold time	Thhd	8			ns
Data setup time	Tdsu	8			ns
Data hold time	Tdhd	8			ns
DE setup time	Tesu	8			ns
DE hold time	Tehd	8			ns
Horizontal display area	thd		800		Tcph
HSD period time	th		1056		Tcph
HSD pulse width	thpw	1		40	Tcph
HSD back porch	thb	46	46	46	Tcph
HSD front porch	thfp	16	210	354	Tcph
Vertical display area	tvd		480		th
VSD period time	tv		525		th
VSD pulse width	tvpw	1		20	th
VSD back porch	tvb	23	23	23	th
VSD front porch	tvfp	7	22	147	th

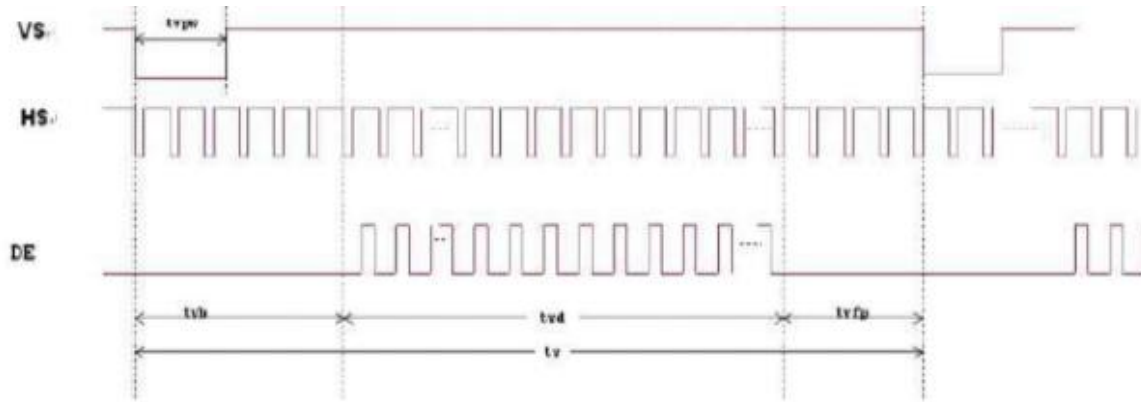
6.2. Input clock and Data Timing Diagram



6.3. Data Input Format

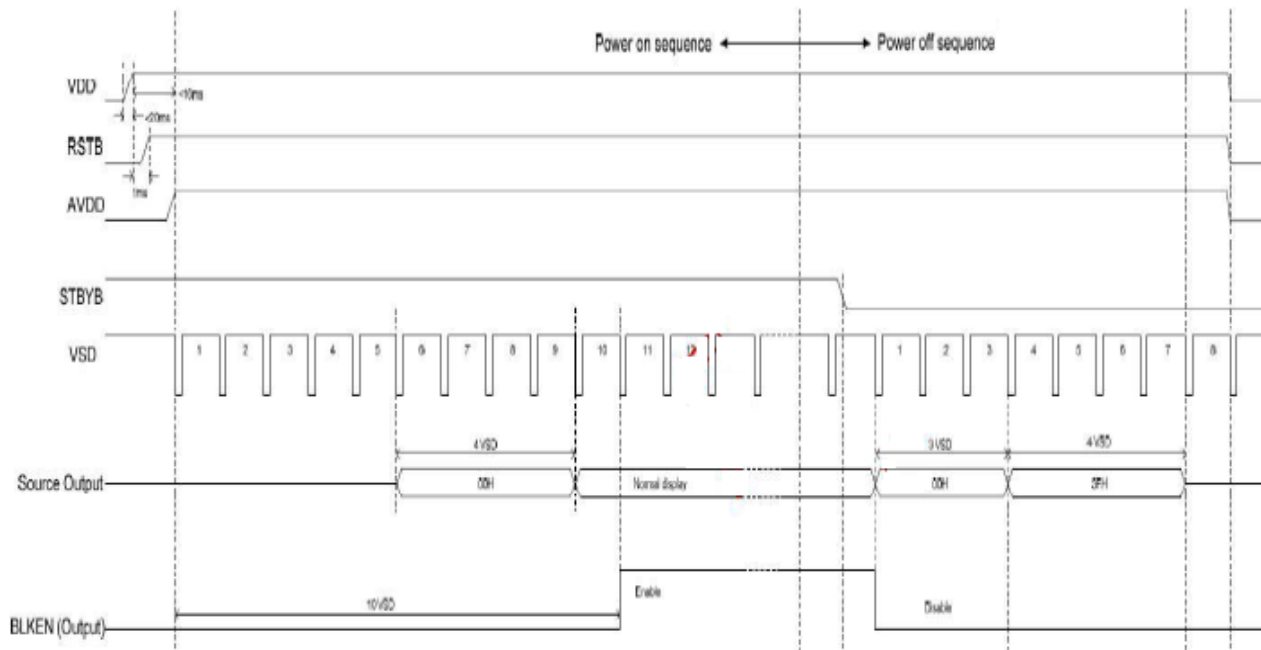


Horizontal input timing diagram.



Vertical input timing diagram.

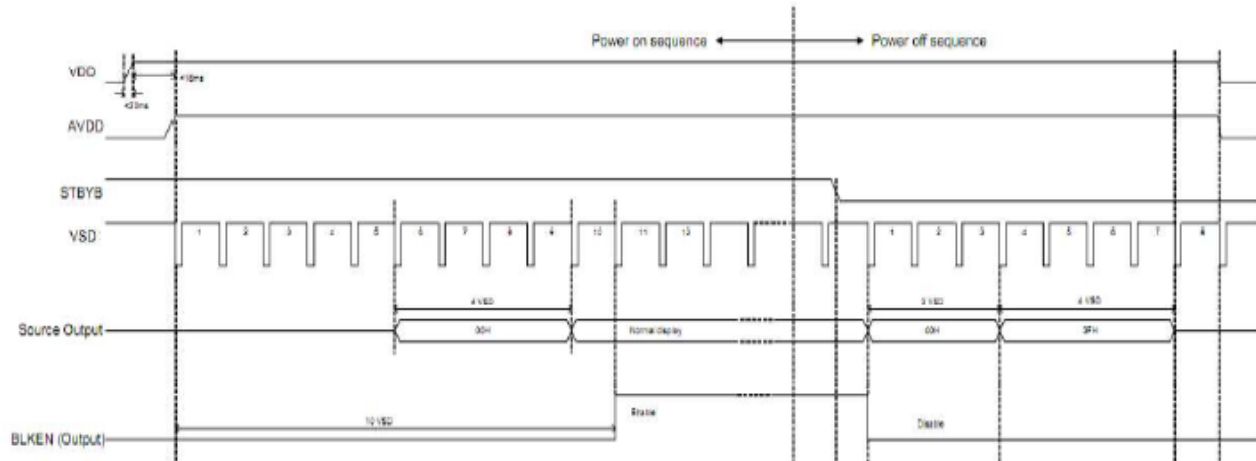
Reset time sequence



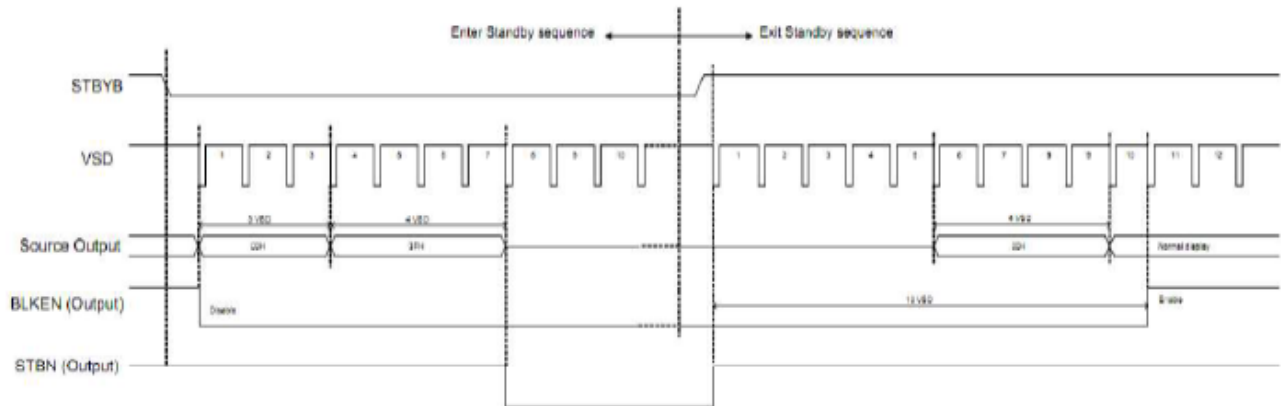
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6.4. Power On/Off Sequence

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to "AC Characteristics" for more detail on timing. This is another paragraph of sub-function description



Power-On/Off Timing Sequence



Enter and Exit Standby Mode Sequence

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7. Optical Characteristics

TFT LCD characteristic

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ$ 、 $\Phi=0^\circ$	-	10	20	ms	Note 3	
	Tf		-	15	30			
Contrast ratio	CR	At optimized viewing angle	400	500	-	-	Note 4	
Color Chromaticity	White	$\theta=0^\circ$ 、 $\Phi=0^\circ$	Wx	0.261	0.311	0.361	-	Note 2,6,7
	Wy		0.293	0.343	0.393	-		
Viewing angle (Gray Scale Inversion Direction)	Hor.	$CR \geq 10$	Θ_R	55	70	-	Deg.	Note Note 1
			Θ_L	55	70	-		
	Ver.		Φ_T	35	50	-		
			Φ_B	55	70	-		
Brightness	-	-	350	420	-	cd/m ²	Center of display	
Uniformity	(U)	-	70	-	-	%	Note 5	

Note 1: Definition of viewing angle range

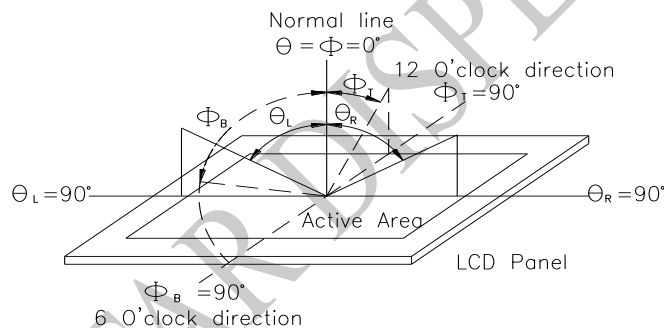


Fig Definition of viewing angle

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.

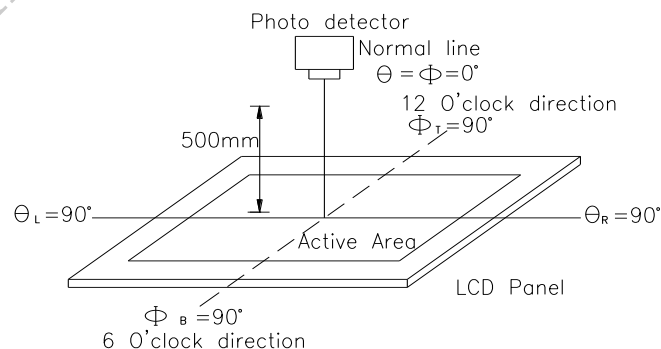
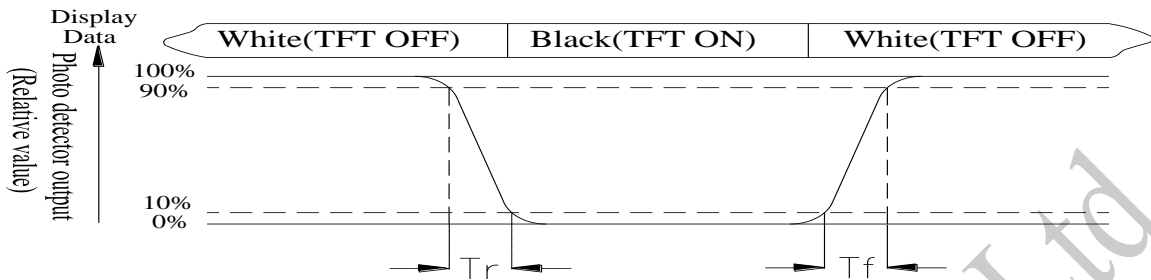


Fig Optical measurement system setup

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: 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.

$$\text{Luminance Uniformity (U)} = \text{Lmin/Lmax} \times 100\%$$

L = Active area length

W = Active area width

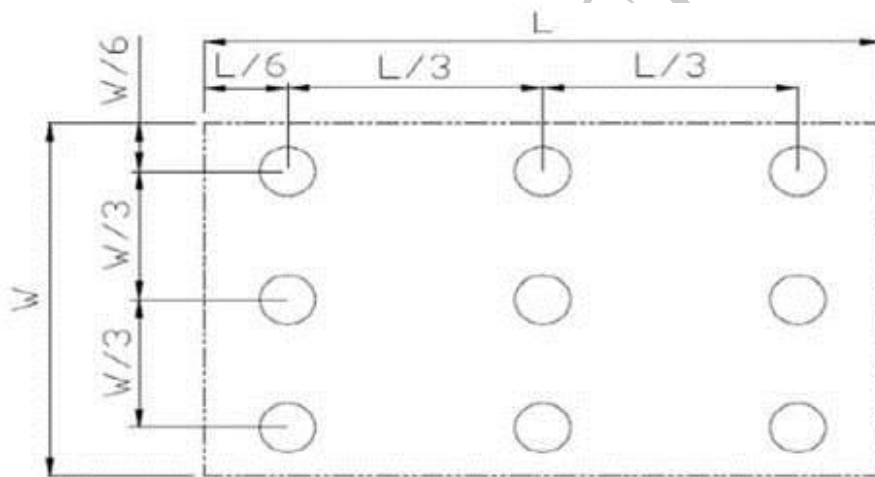


Fig Definition of uniformity

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.

8.Interface

8.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	VLED+	Power for LED backlight(Anode)	
2	VLED+	Power for LED backlight(Anode)	
3	VLED-	Power for LED backlight(Cathode)	
4	VLED-	Power for LED backlight(Cathode)	
5	GND	Ground	
6	VCOM	Common voltage input	
7	DVDD	Digital power supply	
8	MODE	DE/SYNC mode select. H:DE mode. L:SYNC mode	Note 1
9	DE	Data enable signal, active high to enable	
10	VS	Vertical Sync Input, negative polarity	
11	HS	Horizontal Sync Input, negative polarity	
12	B7	Blue data(MSB)	
13	B6	Blue data	
14	B5	Blue data	
15	B4	Blue data	
16	B3	Blue data	
17	B2	Blue data	
18	B1	Blue data	Note 2
19	B0	Blue data(LSB)	Note 2
20	G7	Green data(MSB)	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	
24	G3	Green data	
25	G2	Green data	
26	G1	Green data	Note 2
27	G0	Green data(LSB)	Note 2
28	R7	Red data(MSB)	
29	R6	Red data	
30	R5	Red data	

31	R4	Red data	
32	R3	Red data	
33	R2	Red data	
34	R1	Red data	Note 2
35	R0	Red data(LSB)	Note 2
36	GND	Ground	
37	DCLK	Clock for input data	Note 3
38	GND	Ground	
39	L/R	Source left or right sequence control	Note 4,5
40	U/D	Gate up or down scan control	Note 4,5
41	V _{GH}	Positive power of TFT	
42	V _{GL}	Negative power of TFT	
43	AV _{DD}	Analog power supply	
44	RESET	Global reset pin.	Note 6
45	NC	No connection	
46	V _{COM}	Common Voltage input	
47	DITHB	Dithering setting H: 6 bit resolution , L: 8 bit resolution	Note 7
48	GND	Ground	
49	NC	No connection	
50	NC	No connection	

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS can pull high or be ground.

When select SYNC mode, MODE="0", DE can pull high or be ground.

Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

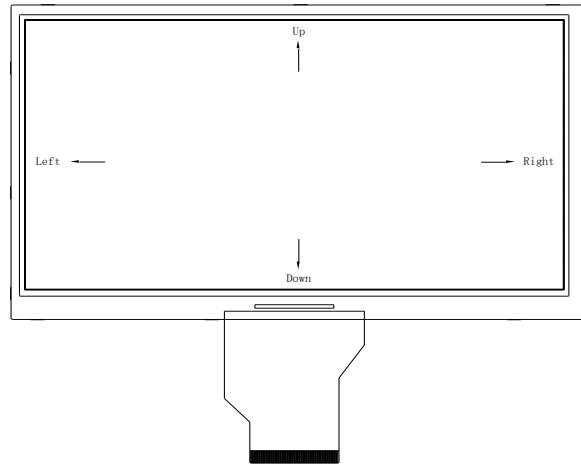
Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DVDD	Up to down, left to right
DVDD	GND	Down to up, right to left
GND	GND	Up to down, right to left
DVDD	DVDD	Down to up, left to right

Note 5: Definition of scanning direction.

Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

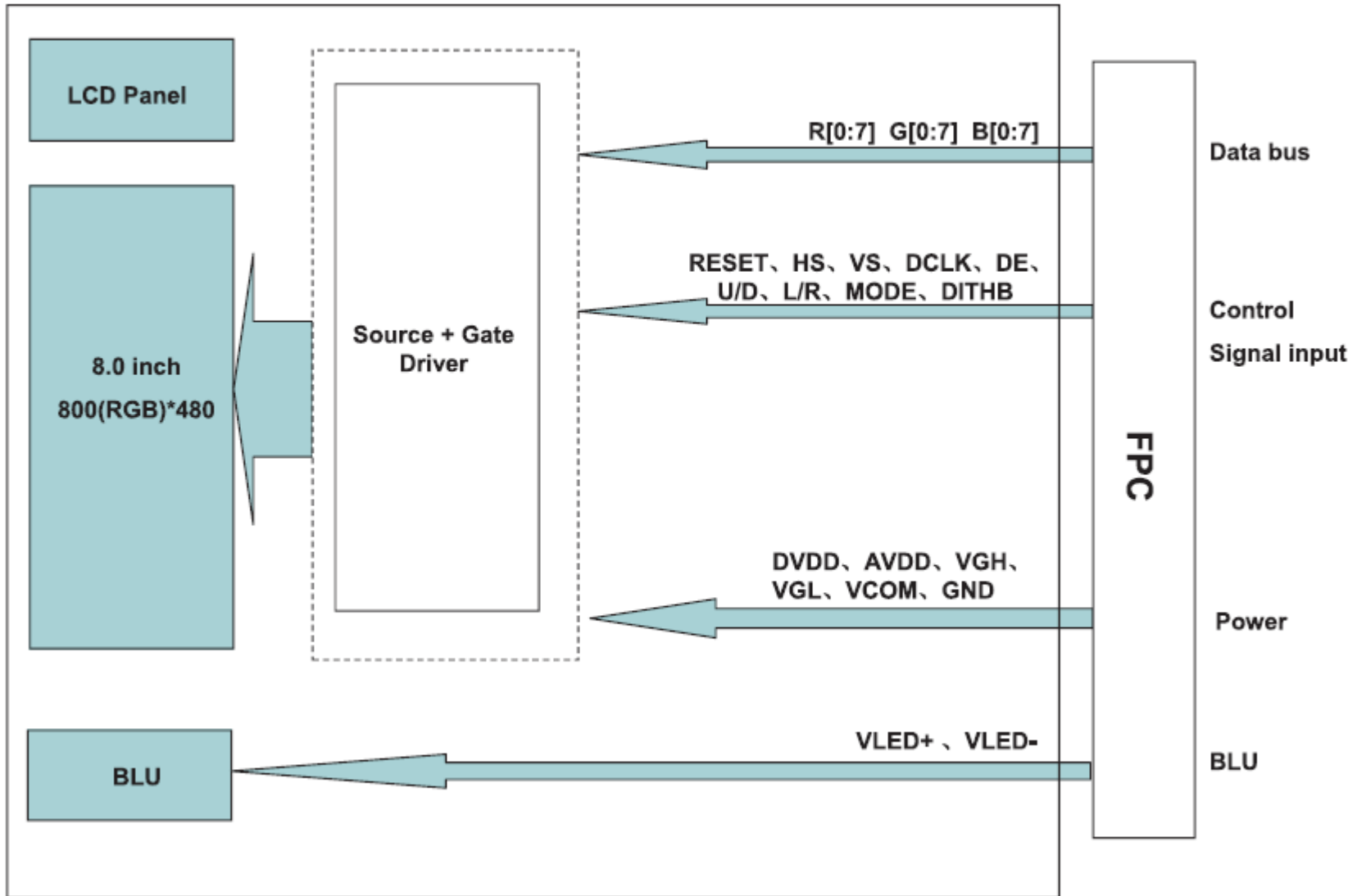
Note 7: Dithering function enable control, normally pull high.

When DITHB="1", Disable internal dithering function,

When DITHB="0", Enable internal dithering function,

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9. Block Diagram



10. Reliability

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

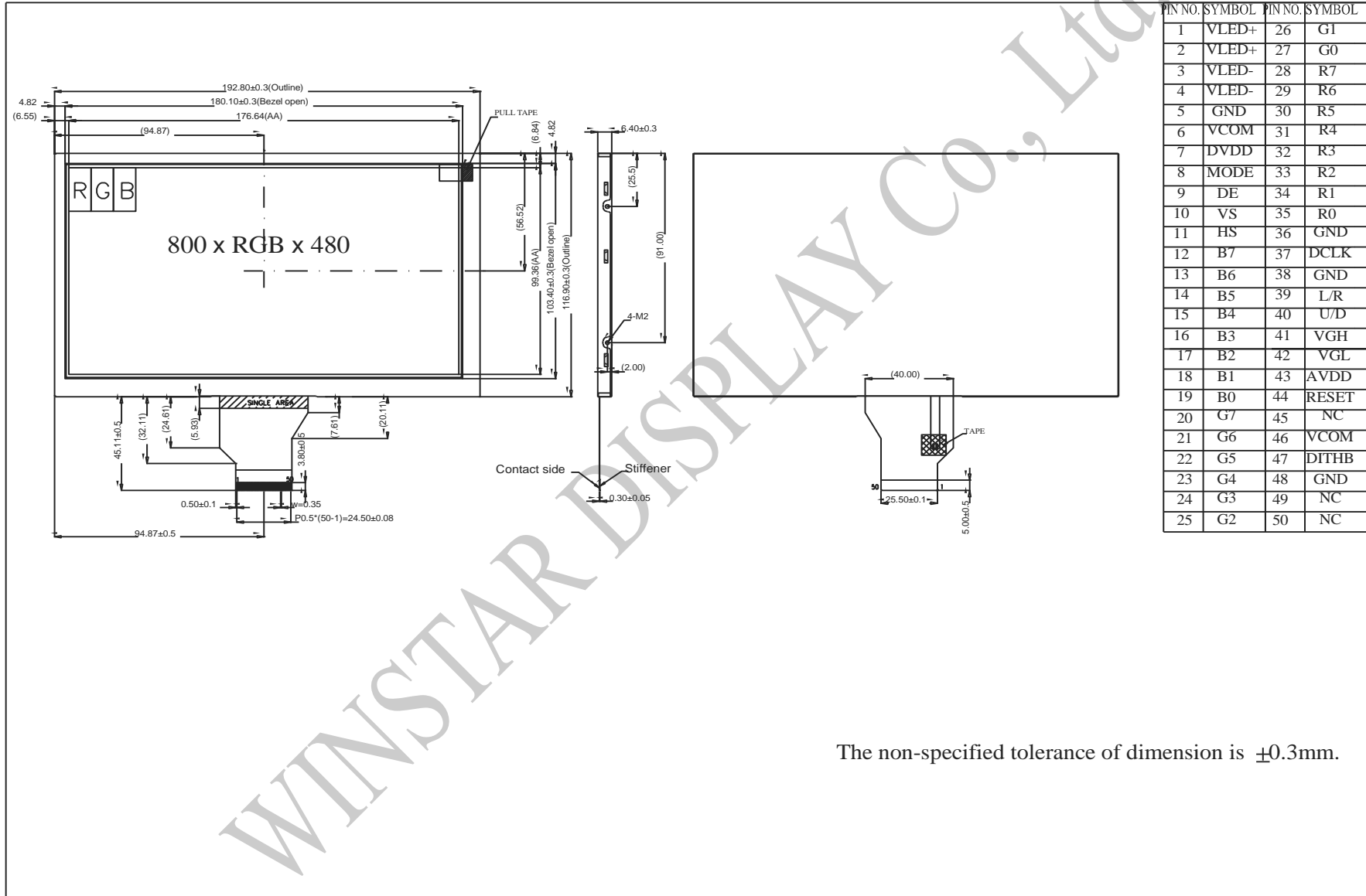
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="margin: 0;">-20°C 25°C 70°C</p> <p style="margin: 0;">30min 5min 30min</p> <p style="margin: 0;">1 cycle</p> </div>	-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.

11. Contour Drawing



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



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 : 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) : 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 , _____



Winstar Module Number : _____

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 : / / _____

