



**WINSTAR Display Co.,Ltd.**  
**華凌光電股份有限公司**



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**華凌光電股份有限公司**

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## SPECIFICATION

**CUSTOMER :** \_\_\_\_\_

**MODULE NO.:** WF103BSYA7LNN0#

<p><b>APPROVED BY:</b></p> <p>( FOR CUSTOMER USE ONLY )</p>	<p><b>PCB VERSION:</b> _____</p> <p><b>DATA:</b> _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
<b>ISSUED DATE: 2018/03/15</b>			



**RECORDS OF REVISION**

**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	<b>SUMMARY</b>
0	2018/03/15		First issue

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# 1.Module Classification Information

W F 103 B S Y A 7 L 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 : 10.3" 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	7	1280480	8	4801920							
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**

WF103 is 10.3” color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs ,control circuit and LED backlight. By applying 1280×480 images are displayed on the 10.3” diagonal screen. Display 16.7M colors by R.G.B signal input.

### **3.General Specifications**

<b>Item</b>	<b>Dimension</b>	<b>Unit</b>
Size	10.3 (10.25)	inch
Dot Matrix	1280 x R.G.B. x 480	dots
Module dimension	265.2*109.8*7.0	mm
Active area	243.84 *91.44	mm
Dot pitch	0.1905 x 0.1905	mm
LCD type	TFT, Normally black, Transmissive	
Viewing angle	85/85/85/85	
Backlight Type	LED ,Normally White	
Interface	LVDS	
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	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  $60^{\circ}\text{C}$

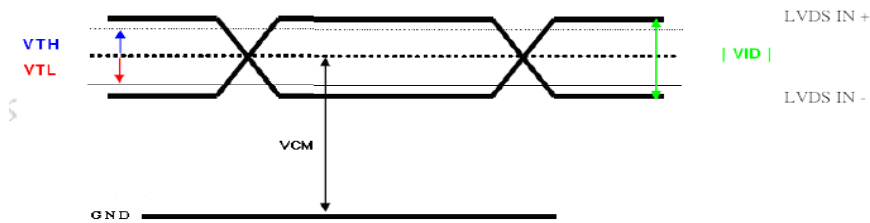


# 5. Electrical Characteristics

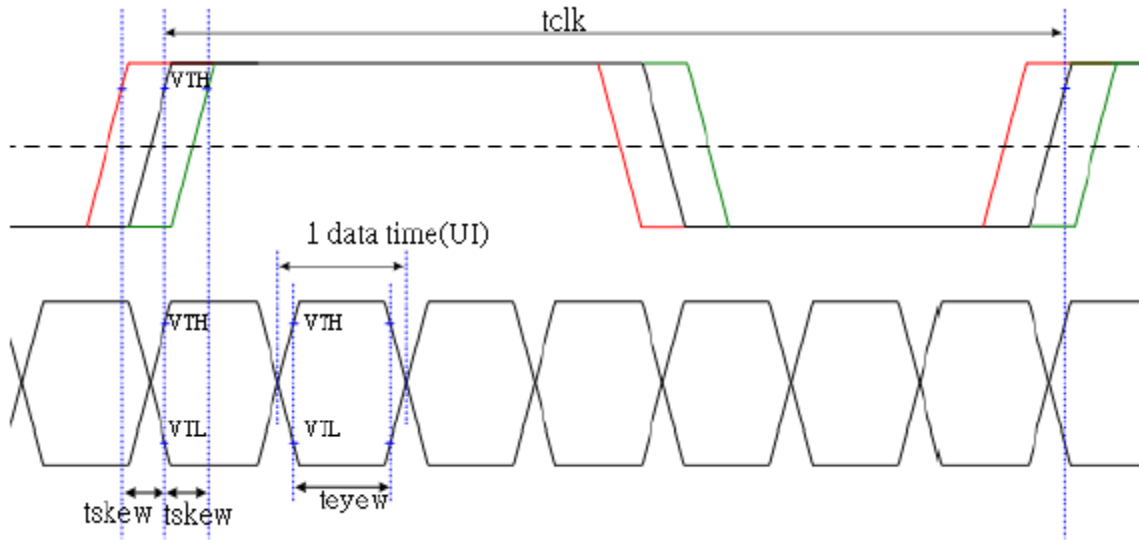
## 5.1. TFT LCD

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	DVDD VDD_LVDS	3	3.3	3.6	V	
Logic Input Voltage (LVDS:IN+,IN-)	VCM	$\frac{ VID }{2}$	-	DVDD-1.2	V	Note1
	VID	200	-	600	mV	Note1
	VTH	-	-	100	mV	VCM=1.2V Note2
	VTL	-100	-	-	mV	
1 Data time	UI	-	tclk*1/7	-	tclk	Note2
LVDS clock to data skew	tskew	-	-	0.2	UI	
input data eye width	teyew	0.6	-	-	UI	
Analog Power Supply Voltage	AVDD	12.8	13	13.2	V	
Gate On Power Supply Voltage	VGH	21	22	23	V	
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	
	VIL	GND	-	0.3*DVDD	V	
Gamma Voltage	V1	-	12.35	-	V	Note3
	V2	-	10.26	-	V	
	V3	-	9.70	-	V	
	V4	-	9.02	-	V	
	V5	-	8.44	-	V	
	V6	-	7.96	-	V	
	V7	-	6.98	-	V	
	V8	-	6.07	-	V	
	V9	-	5.09	-	V	
	V10	-	4.6	-	V	
	V11	-	4.02	-	V	
	V12	-	3.35	-	V	
	V13	-	2.79	-	V	
	V14	-	0.71	-	V	

Note1: Single-ended LVDS signal



Note2: Differential LVDS signal



Note3:(1)Gamma voltage is the reference voltage for customer, it could be adjust by customer.

(2)The voltage of these pins must be:

$$V1 > V2 > V3 > V4 > V5 > V6 > V7 > V8 > V9 > V10 > V11 > V12 > V13 > V14$$

$$AVDD - 0.1 > V1 \sim V7 > 0.4AVDD ; 0.6AVDD > V8 \sim V14 > AGND + 0.1$$

Recommend: VCOM must be optimized according to each LCM. Please adjust VR to make the flicker level be minimum for getting excellent image.

## 5.2. TFT-LCD Current Consumption

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
Gate on Current	IVGH	VGH = 22V	-	0.5	1	mA	Note1
Gate off Current	IVGL	VGL = -6V	-	0.5	1	mA	Note1
Digital Current	IDVDD	DVDD = 3.3V	-	25	35	mA	Note1
Analog Current	IAVDD	AVDD = 13V	-	30	60	mA	Note1
Total Power Consumption	PC	-	-	486.5	923.5	mW	Note1

Note1: Typical: Under 256 gray pattern  
Maximum: Under white pattern



256 gray pattern

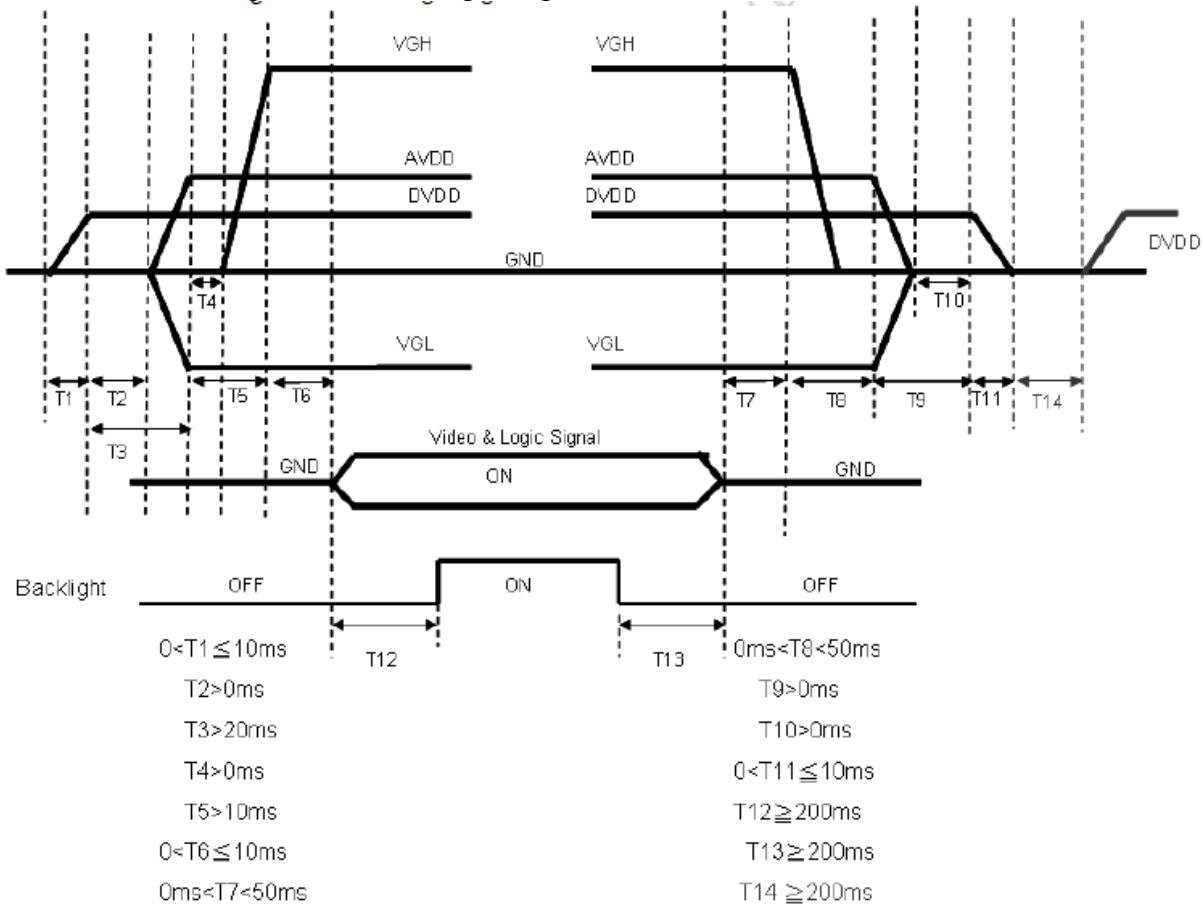


White Pattern

## 5.3. Power, Signal sequence

Power On: DVDD → AVDD/VGL → VGH → Video & Logic Signal → Backlight

Power Off: Backlight → Video & Logic Signal → VGH → AVDD/VGL → DVDD

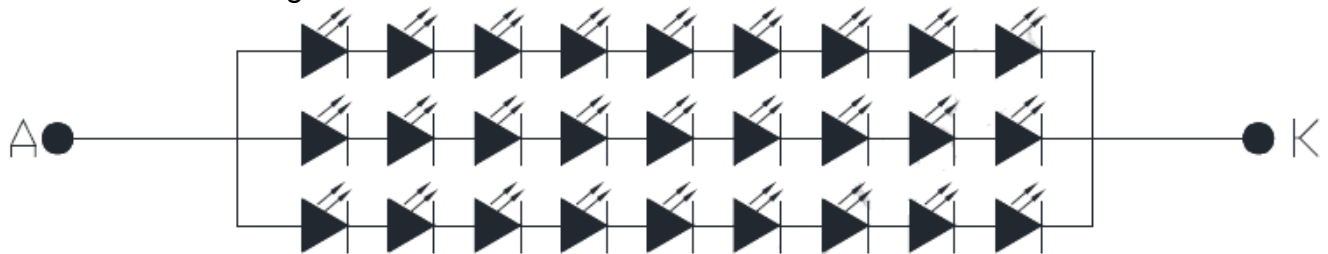


### 5.4. Backlight Driving Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
LED current	IL	Ta=25°C (70mA/serise)	-	210	-	mA	
LED voltage	VL	Ta=25°C (70mA/serise)	23.814	26.964	30.114	V	
Power consumption	WL	Ta=25°C (70mA/serise)	-	5.662	-	W	
LED Lifetime		Ta=25°C IF=70mA	30000			Hr	

Remarks:

Note1:LED Circuit Diagram



Note2:A:Anode(+),K:Cathode(1)

Note3:Suggestion: Using the constant current control to avoid the leakage light and brightness quality issue.

Note4:Definition of Led lifetime: Luminance < Initial luminance 50%

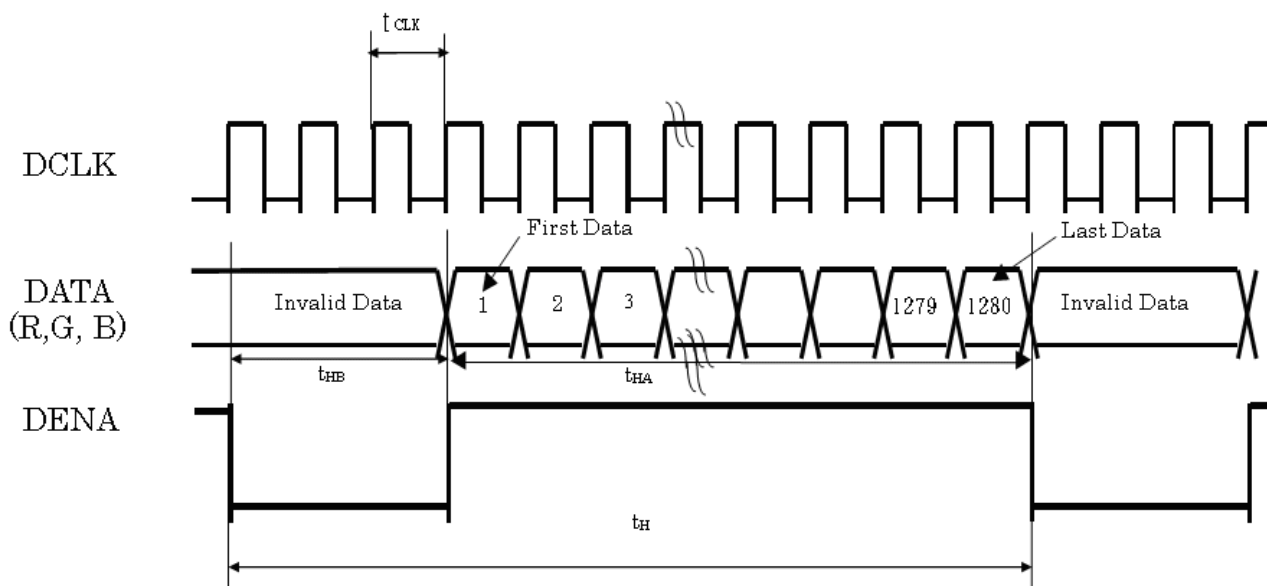
# 6. Input Signal (DE Only Mode)

## 6.1. Timing Specification

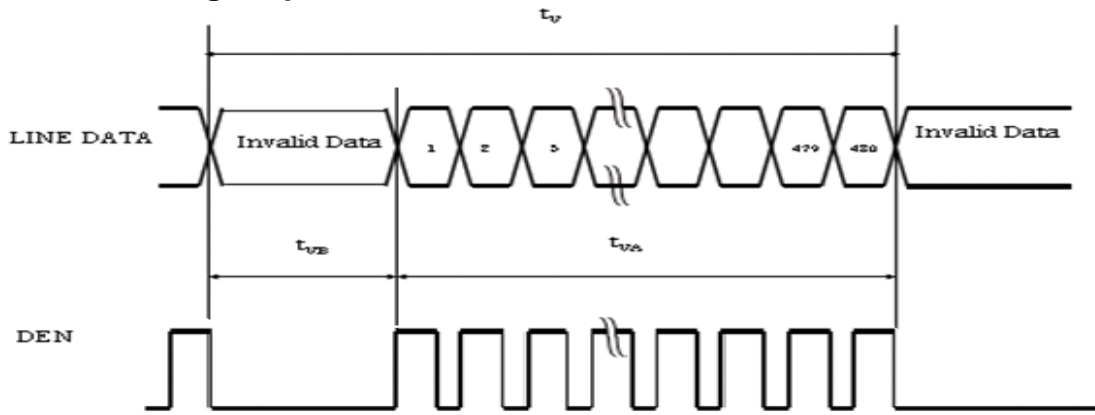
Item			Symbol	Min.	Typ.	Max.	Unit	
LVDS input signal sequence	CLK Frequency		tclk	42	45	60	MHz	
LCD input signal Sequence (Input LVDS Transmitter)	DENA	Horizontal	Horizontal total Time	t <sub>H</sub>	1373	1413	1488	tCLK
			Horizontal effective Time	t <sub>HA</sub>	1280			tCLK
			Horizontal Blank Time	t <sub>HB</sub>	93	133	208	tCLK
	Vertical	Vertical total Time	t <sub>V</sub>	517	533	672	tH	
		Vertical effective Time	t <sub>VA</sub>	480			tH	
		Vertical Blank Time	t <sub>VB</sub>	37	53	192	tH	

## 6.2. Timing sequence (Timing chart)

### Horizontal Timing Sequence

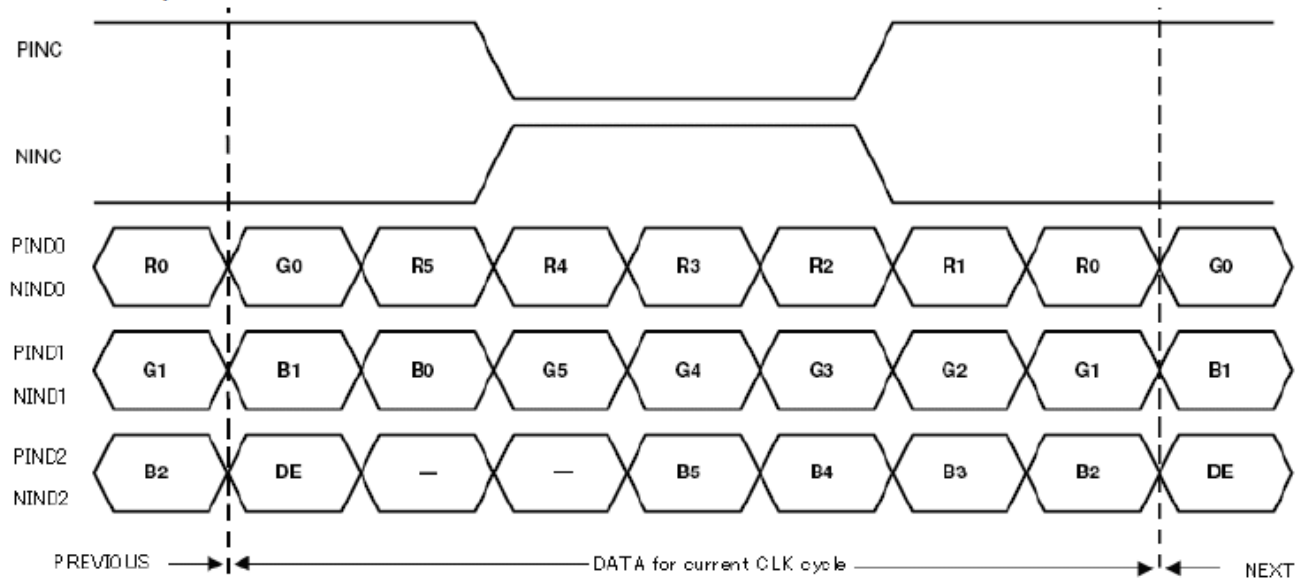


## Vertical Timing Sequence

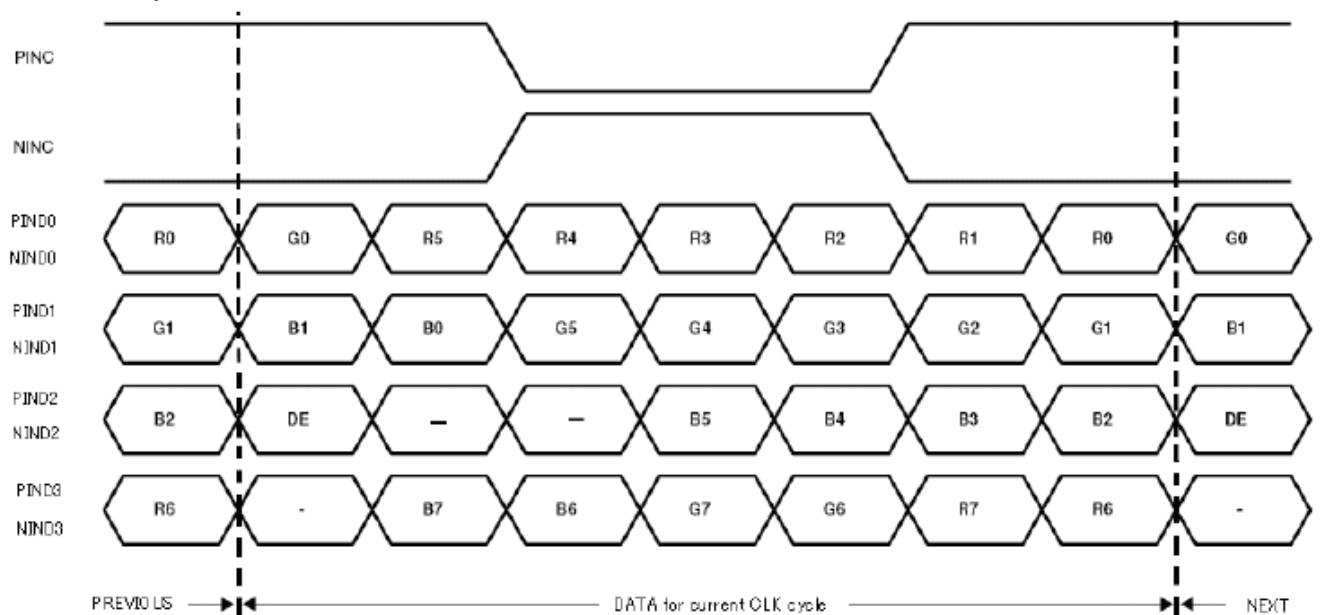


## LVDS Input Data mapping

### 6 Bit LVDS input



### 8 Bit LVDS input



## Color Data Reference

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note:

1. Gray level: Color(n): n is level order; higher n means brighter level.
2. DATA: 1: high , 0: low

# 7. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	25	35	.ms	Note 3,5	
	Tf							
Contrast ratio	CR	At optimized viewing angle	600	1000	-	-	Note 4,5	
Color Chromaticity	White	Wx	$\theta=0^\circ$ 、 $\phi=0$	0.260	0.300	0.340	Note 2,6,7	
		Wy		0.270	0.312	0.352		
Viewing angle	Hor.	$\Theta_R$	$CR \geq 10$	75	85	-	Deg.	Note 1
		$\Theta_L$		75	85	-		
	Ver.	$\Phi_T$		75	85	-		
		$\Phi_B$		75	85	-		
Brightness	-	-	640	800	-	cd/m <sup>2</sup>	Center of display	

Ta=25±2°C,

Note 1: Definition of viewing angle range

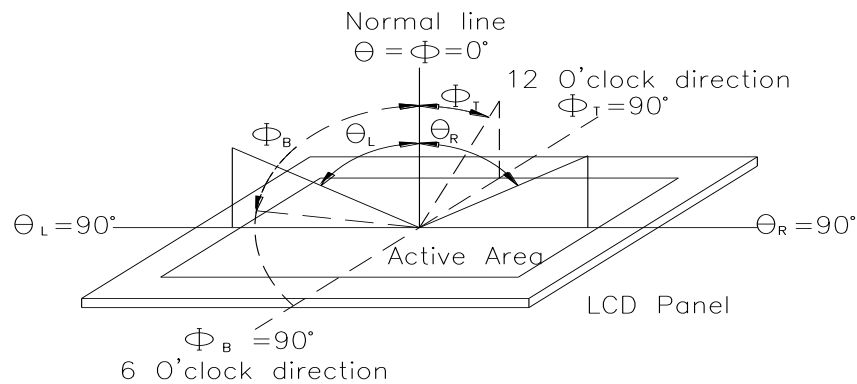


Fig.7.1. Definition of viewing angle

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



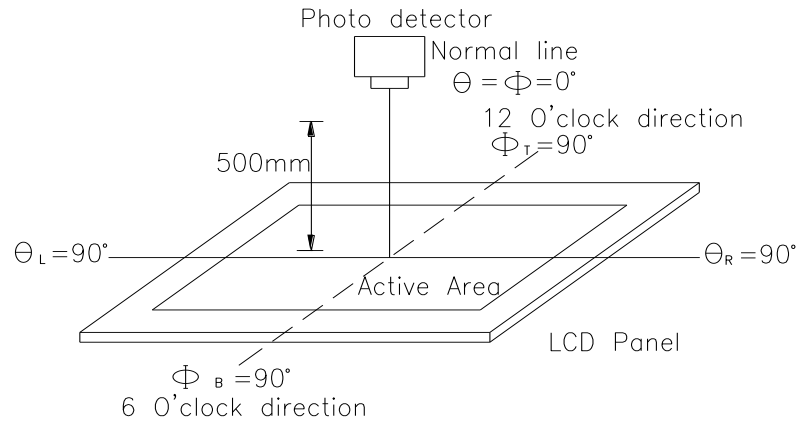
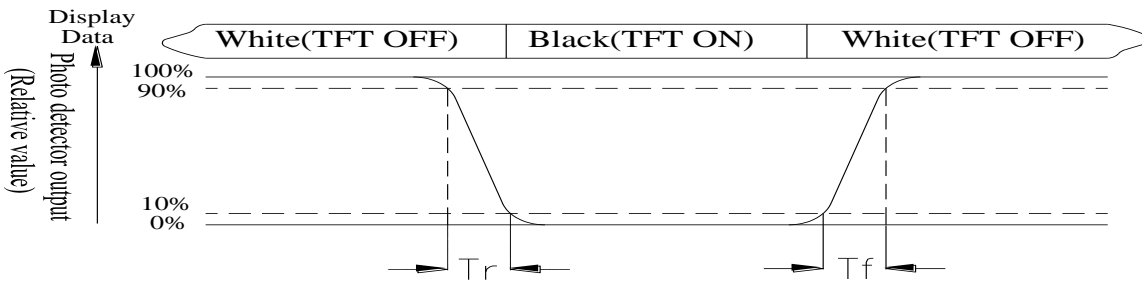


Fig. 7.2. Optical measurement system setup

**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,  $T_r$ , 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: 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 (CN1)

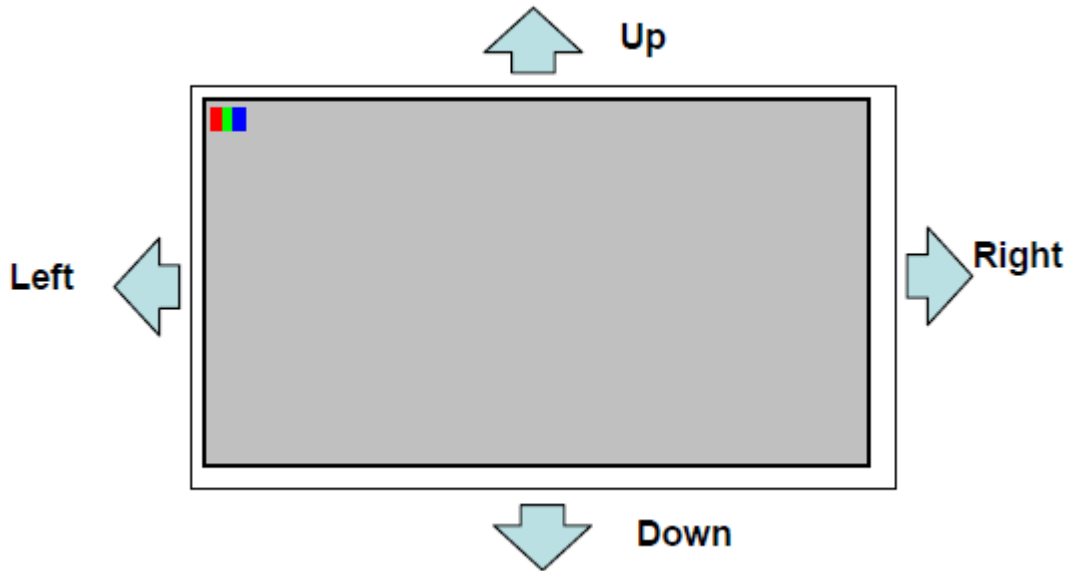
Pin No	Symbol	Description
1	AGND	Analog ground
2	AVDD	Analog power
3	DVDD	Digital power
4	GND	Digital ground
5	NC	Not connect
6	DVDD	Digital power
7	GND	Digital ground
8	V14	Gamma correction voltage reference
9	V13	
10	V12	
11	V11	
12	V10	
13	V9	
14	V8	
15	GND	Digital ground
16	DVDD_LVDS	LVDS power
17	GND	Digital ground
18	PIND3	Positive LVDS differential data input
19	NIND3	Negative LVDS differential data input
20	GND	Digital ground
21	PINC	Positive LVDS differential clock input
22	NINC	Negative LVDS differential clock input
23	GND	Digital ground
24	PIND2	Positive LVDS differential data input
25	NIND2	Negative LVDS differential data input
26	GND	Digital ground
27	PIND1	Positive LVDS differential data input
28	NIND1	Negative LVDS differential data input
29	GND	Digital ground
30	PIND0	Positive LVDS differential data input

31	NIND0	Negative LVDS differential data input
32	GND	Digital ground
33	GND_LVDS	LVDS ground
34	GRB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=47KΩ , C=1uF)
35	STBYB	Standby mode, normally pull high STBYB="1", normal operation STBYB="0", timing control, source driver will turn off, all output are GND, suggest to turn off AVDD power simultaneously
36	SHLR	Left or right display control
37	DVDD	Digital power
38	UPDN	Up / down display control
39	AGND	Analog ground
40	AVDD	Analog power
41	NC	Not connect
42	NC	Not connect
43	GND	Digital ground
44	DVDD	Digital Power
45	GND	Digital ground
46	V7	Gamma correction voltage reference
47	V6	
48	V5	
49	V4	
50	V3	
51	V2	
52	V1	
53	GND	Digital ground
54	DVDD	Digital power
55	SELB	6bit/8bit mode select, SELB = "1", LVDS input data is 8bits SELB = "0", LVDS input data is 6bits
56	VGH	Positive power for TFT
57	DVDD	Digital power for Gate IC
58	VGL	Negative power for TFT
59	GND	Digital ground for Gate IC
60	NC	Not connect

Remarks: Mating connector: 089K60-000100-G2-R (STARCONN)

Note 1:UPDN and SHLR control function

SHLR	UPDN	Data shifting
DVDD	GND	Left→Right,UP→Down(default)
GND	GND	Right→Left; UP→Down
DVDD	DVDD	Left→Right, Down→UP
GND	DVDD	Right→Left; Down→UP



### 8.2. CN2 (LED backlight)

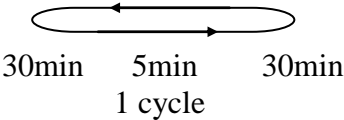
Pin No.	Symbol	Function	Remark
1	+	positive pole	BLACK
2	-	negative pole	WHITE

Input connector : BHSR-02VS-1(JST)

Outlet connector: SM02B-BHSS-1(JST)

# 9. Reliability

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

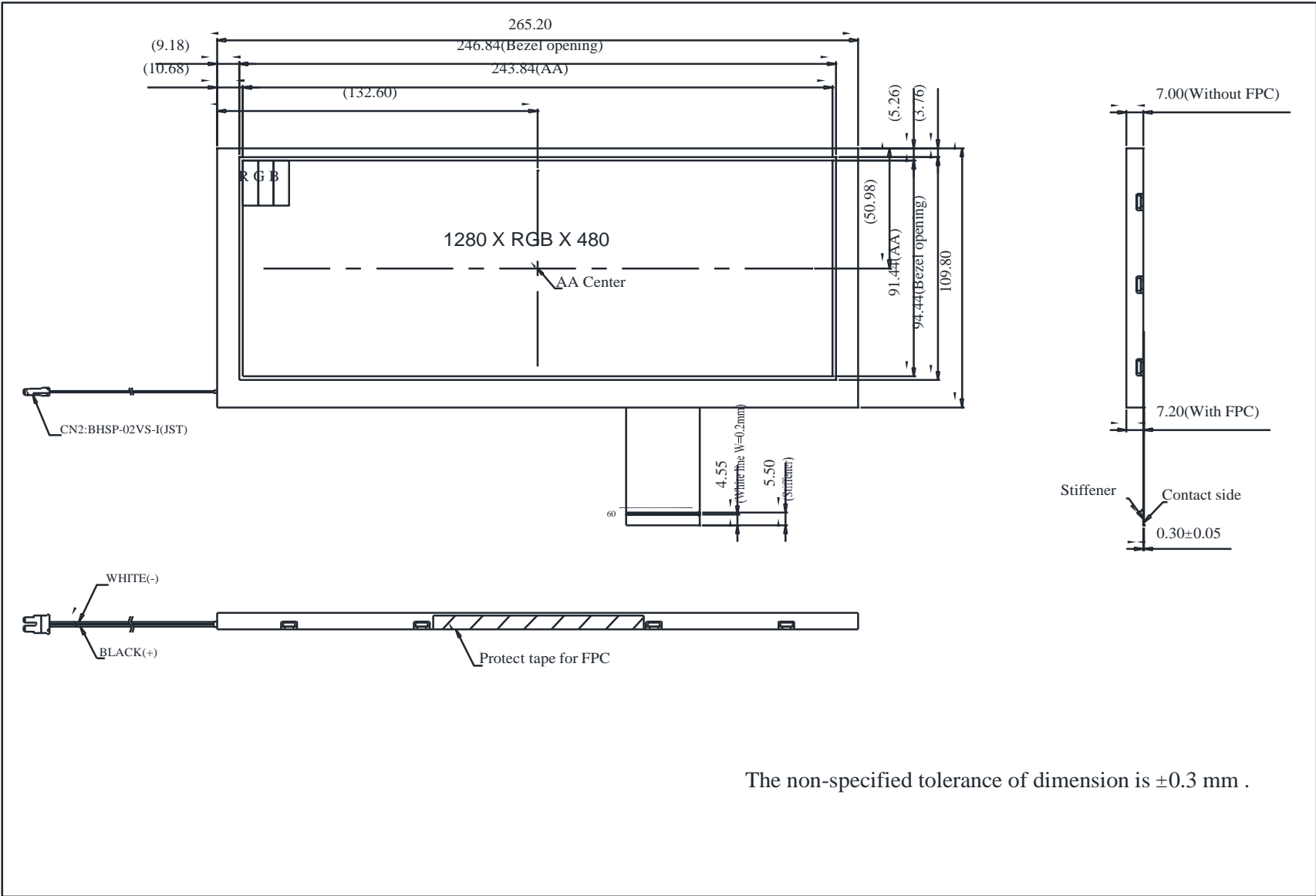
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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 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.

# 10. Contour Drawing

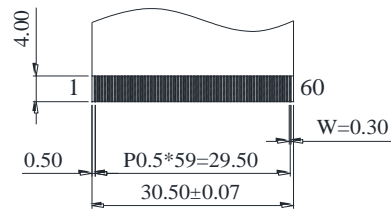
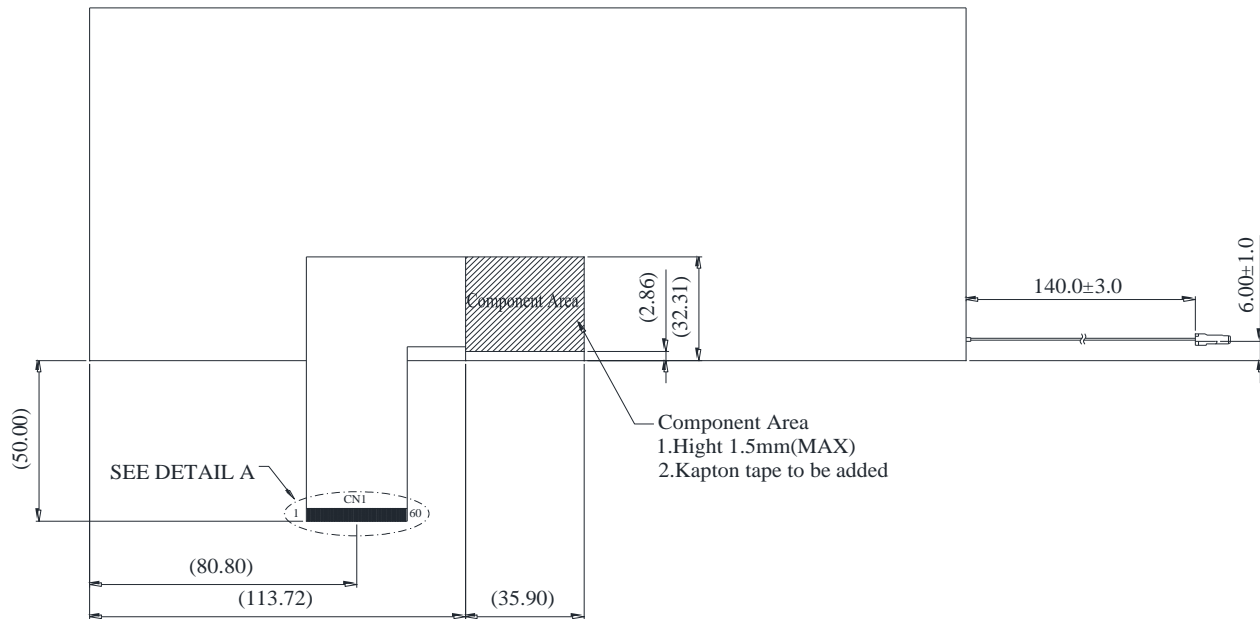


CN1

PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	AGND	31	NIND0
2	AVDD	32	GND
3	DVDD	33	GND_LVDS
4	GND	34	GRB
5	NC	35	STBYB
6	DVDD	36	SHLR
7	GND	37	DVDD
8	V14	38	UPDN
9	V13	39	AGND
10	V12	40	AVDD
11	V11	41	NC
12	V10	42	NC
13	V9	43	GND
14	V8	44	DVDD
15	GND	45	GND
16	DVDD_LVDS	46	V7
17	GND	47	V6
18	PIND3	48	V5
19	NIND3	49	V4
20	GND	50	V3
21	PINC	51	V2
22	NINC	52	V1
23	GND	53	GND
24	PIND2	54	DVDD
25	NIND2	55	SELB
26	GND	56	VGH
27	PIND1	57	DVDD
28	NIND1	58	VGL
29	GND	59	GND
30	PIND0	60	NC

CN2

PIN	SYMBOL
BLACK	+
WHITE	-



DETAIL A  
SCALE 2/1

The non-specified tolerance of dimension is  $\pm 0.3$  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 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** <<





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 :        /        /        \_\_\_\_\_