



**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.:** WJ43C7TWAEDNNO#

<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: 2021/08/18</b>			

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.	<b>SUMMARY</b>
0	2021/08/18		First issue

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# 1. Module Classification Information

W J 43 C7 T W A E 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 : 4.3" 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
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**

TFT 4.3" is a IPS transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT\_LCD module, It is usually designed for industrial application and this module follows RoHs,

### 3.General Specifications

Item	Dimension	Unit
Size	4.3	inch
Dot Matrix	480 x RGBx272(TFT)	dots
Module dimension	105.5(W) x 67.2(H) x 3.85 (D)	mm
Active area	95.04 x 53.856	mm
Pixel pitch	0.198 x 0.198	mm
LCD type	TFT, Normally Black, Transmissive	
Viewing Angle	80/80/80/80	
Aspect Ratio	16:9	
TFT Driver IC	SC7283 or equivalent	
Interface	24-bit RGB	
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	TOP	-40	—	+85	°C
Storage Temperature	TST	-40	—	+85	°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. Operating conditions:

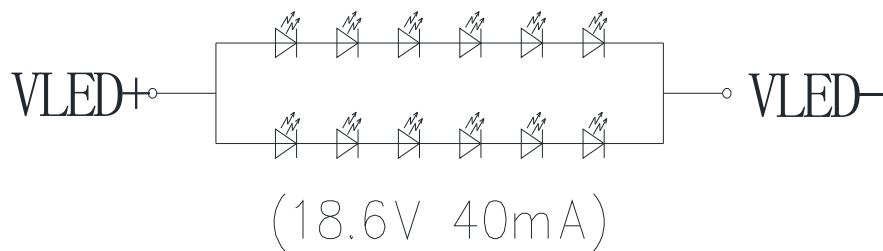
Item	Symbol	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VCC	3.0	-	3.6	V	
Supply Current For LCM	ICC	-	25	37.5	mA	Note1

Note 1 : This value is test for VCC=3.3V , Ta=25 °C only

## 5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	-	-	40	-	mA	-
LED voltage	VLED+	16.2	18.6	20.4	V	Note 1
LED Life Time	-	-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



CIRCUIT DIAGRAM

Note 2 : Ta = 25 °C

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

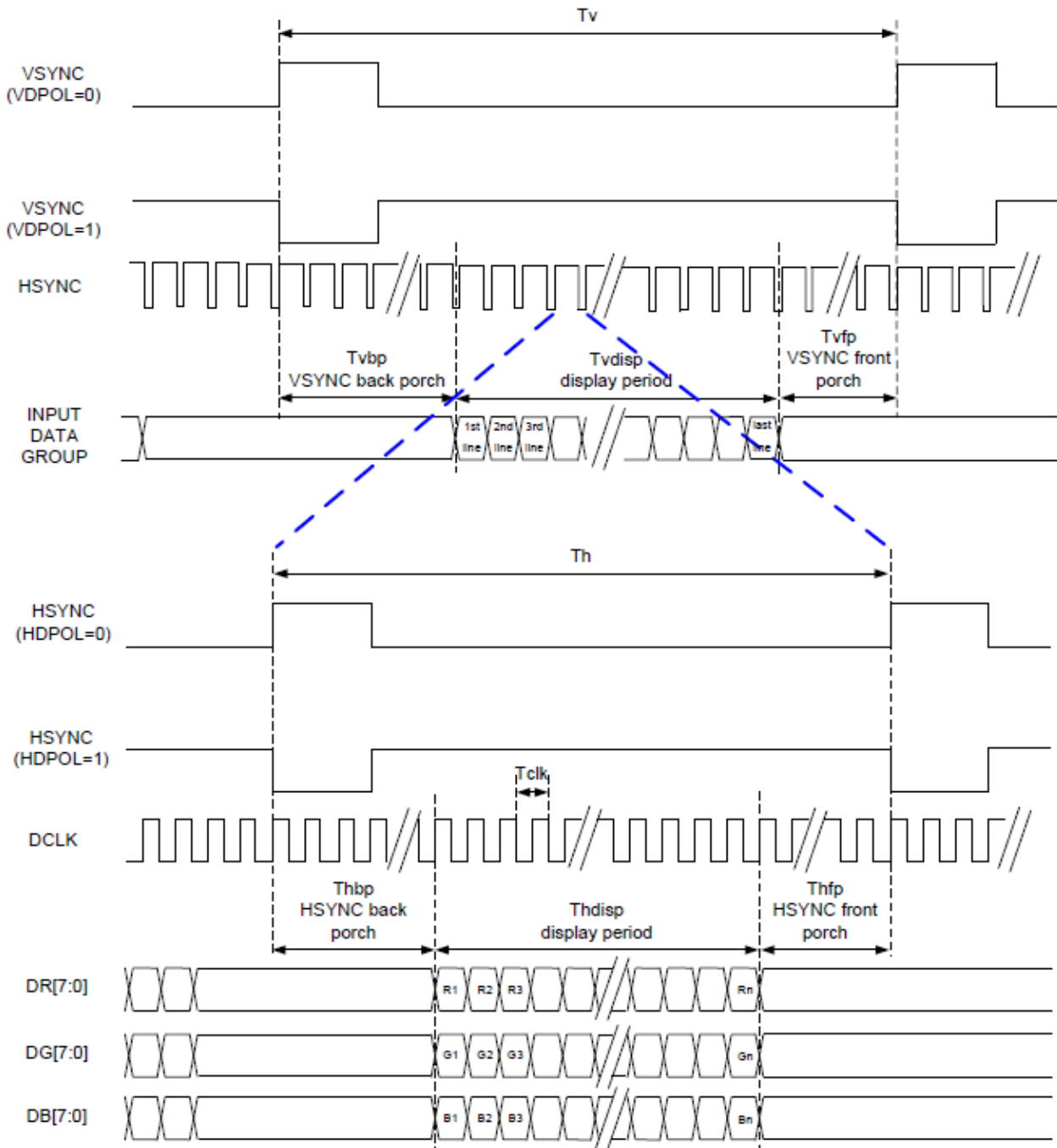
Note 4 : The single LED lamp case

# 6.AC Characteristics

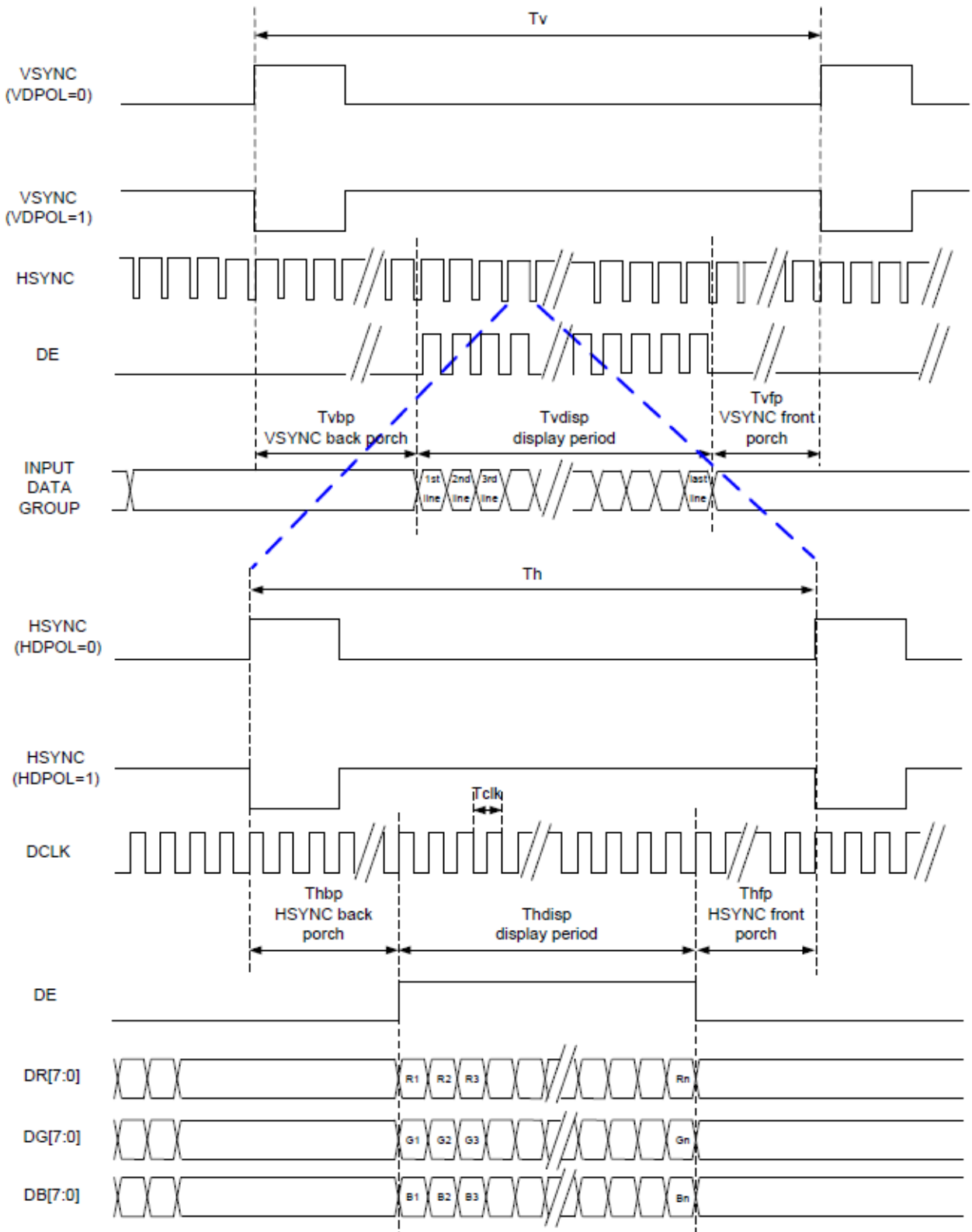
AC Electrical Characteristics (VCC= 3.3V, GND= 0V, TA=25°C)

## 6.1. RGB Interface

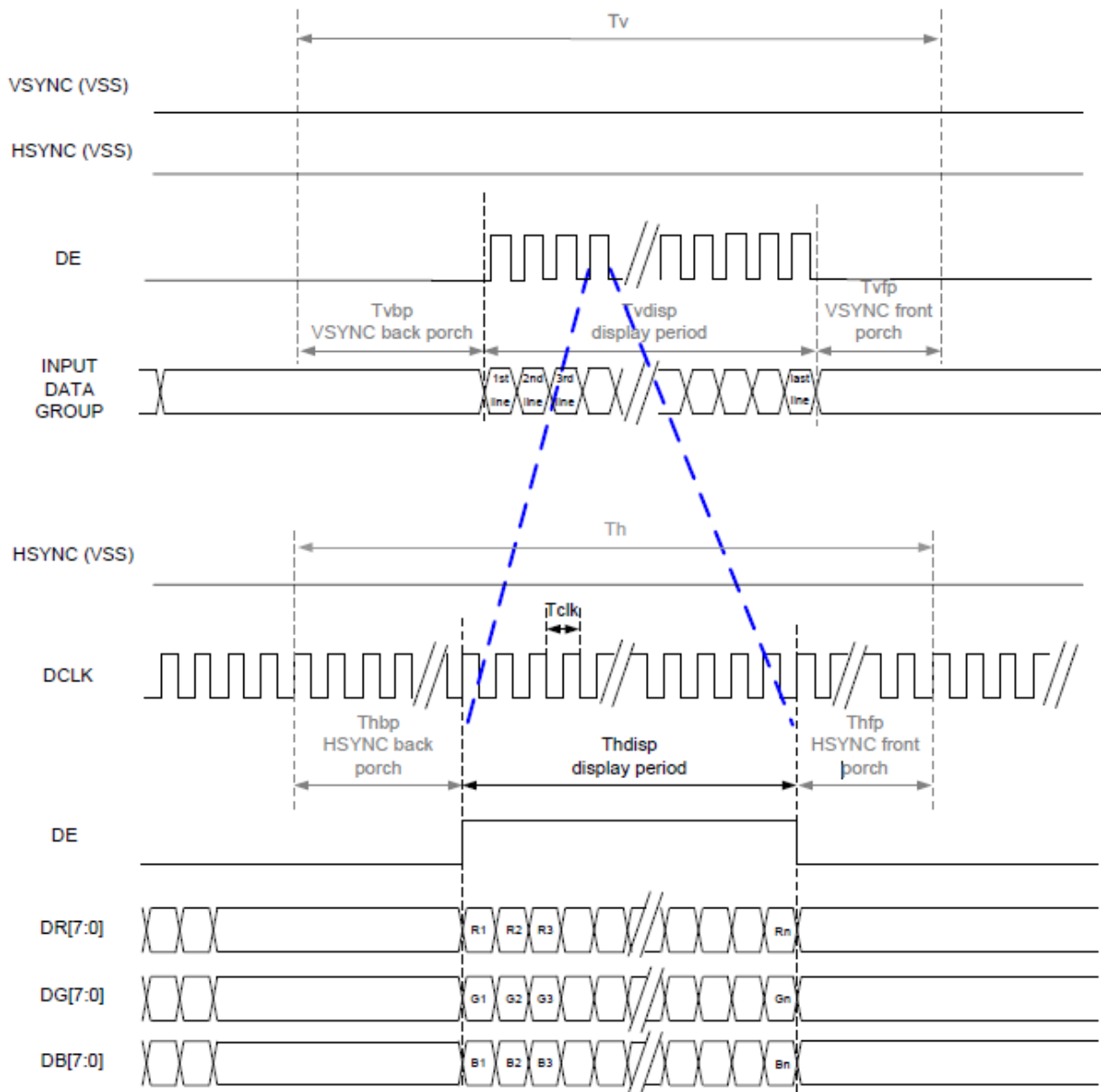
### 1. SYNC Mode



## 2. SYNC-DE Mode



### 3. DE Mode



RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side.

## 6.2. Parallel 24 bit RGB Input Timing Table

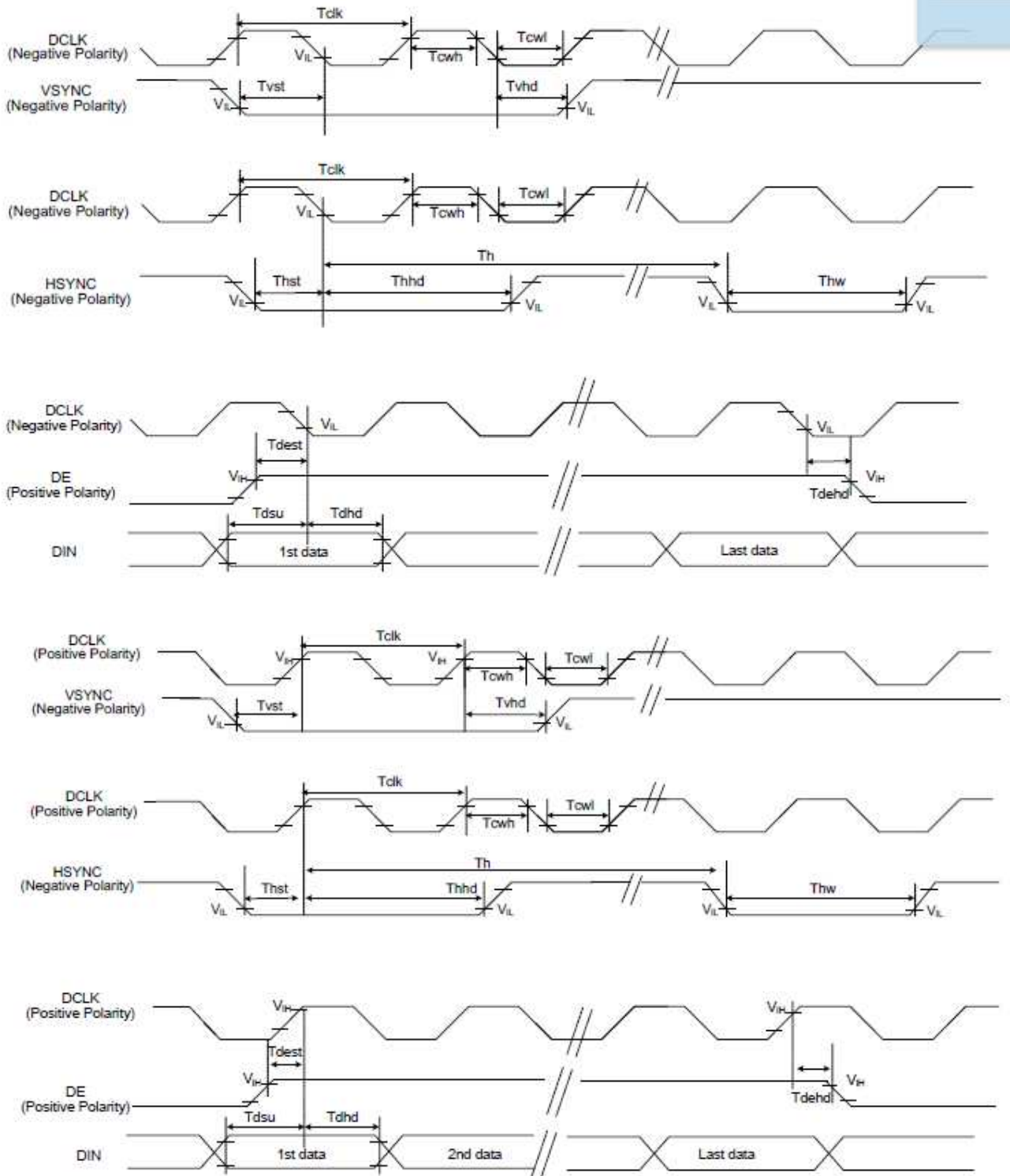
(Parallel 24-bit RGB Input Timing (VCC= 3.3V, GND= 0V, TA=25°C))

480RGB X 272 Resolution Timing Table							
Item	Symbol	Min.	Typ.	Max.	Unit	Remark	
DCLK Frequency	Fclk	8	9	12	MHZ		
DCLK Period	Tclk	83	111	125	ns		
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	Thbp of SYNC mode set by H_BLANKING[7:0]
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	HSYNC	
	Display Period	Tvdisp		272		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	Tvbp of SYNC mode set by V_BLANKING[7:0]
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

### 6.3. System Bus Timing for RGB Interface

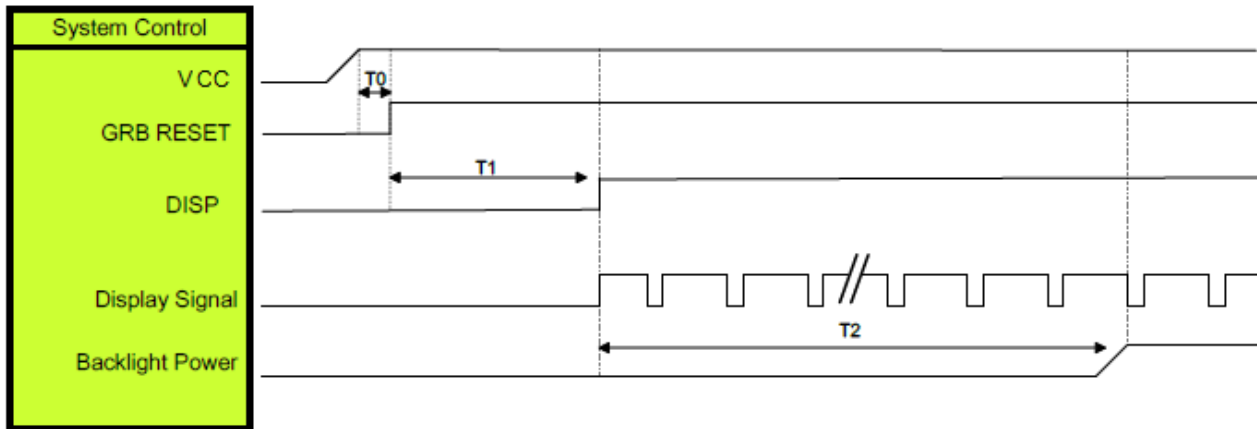
(VCC= 3.3V, GND= 0V, TA=25°C)



Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	Tcw	40	50	60	%	
HSYNC Width	Thw	2	-	-	DCLK	
VSYNC Setup Time	Tvst	12	-	-	ns	
VSYNC Hold Time	Tvhd	12	-	-	ns	
HSYNC Setup Time	Thst	12	-	-	ns	
HSYNC Hold Time	Thhd	12	-	-	ns	
Data Setup Time	Tdsu	12	-	-	ns	
Data Hold Time	Tdhd	12	-	-	ns	
DE Setup Time	Tdest	12	-	-	ns	
DE Hold Time	Tdehd	12	-	-	ns	

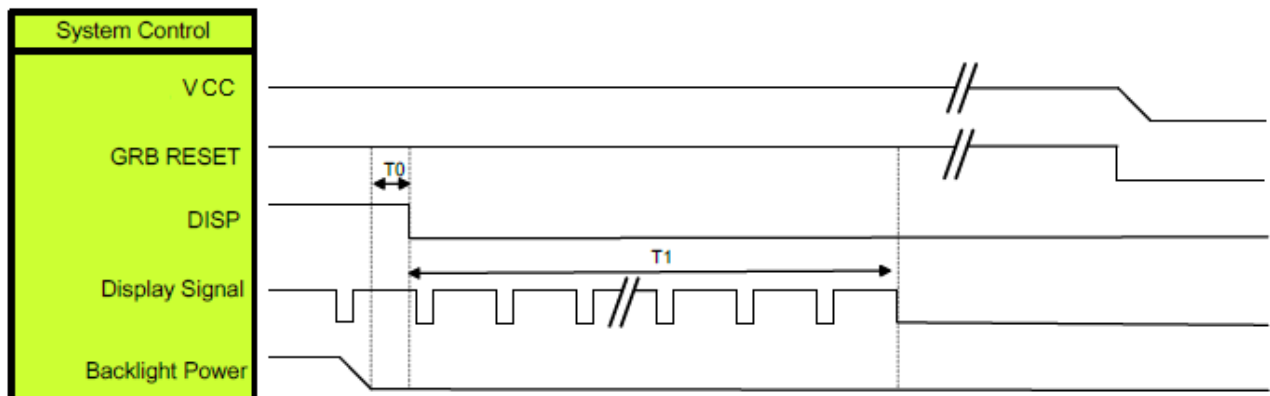
# 7. Power sequence

## 7.1. Power On Sequence



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

## 7.2. Power Off Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms



# 8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr+ Tf	$\theta=0^\circ, \Phi=0^\circ$	-	30	40	ms	Note 3	
Contrast ratio	CR	At optimized viewing angle	640	800	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ, \Phi=0^\circ$	0.27	0.32	0.37	-	Note 2,6,7
		Wy		0.295	0.345	0.395	-	
Viewing angle	Hor.	$\Theta_R$	$CR \geq 10$	70	80	-	Deg.	Note 1
		$\Theta_L$		70	80	-		
	Ver.	$\Phi_T$		70	80	-		
		$\Phi_B$		70	80	-		
Brightness	-	-	500	600	-	cd/m <sup>2</sup>	Center of display	
Uniformity	(U)	-	75	-	-	%	Note 5	

Ta=25±2°C, IL=40mA

Note 1: Definition of viewing angle range

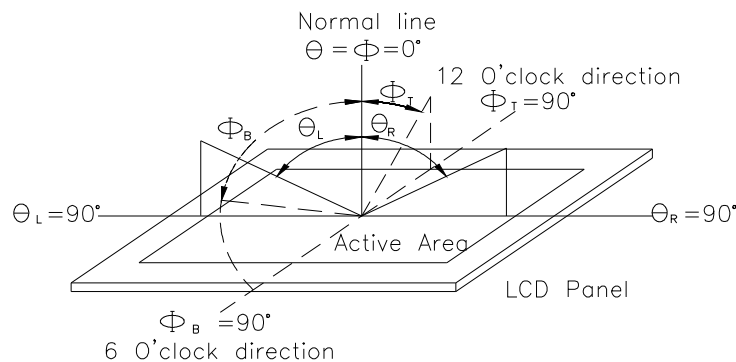


Fig. 8.1. Definition of viewing angle

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

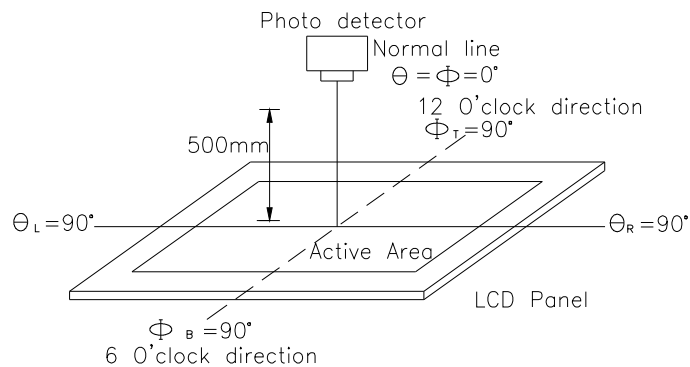
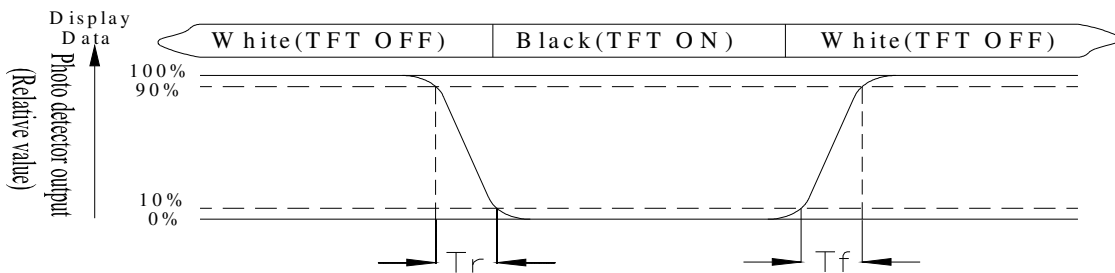


Fig. 8.2. Optical measurement system setup

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: 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

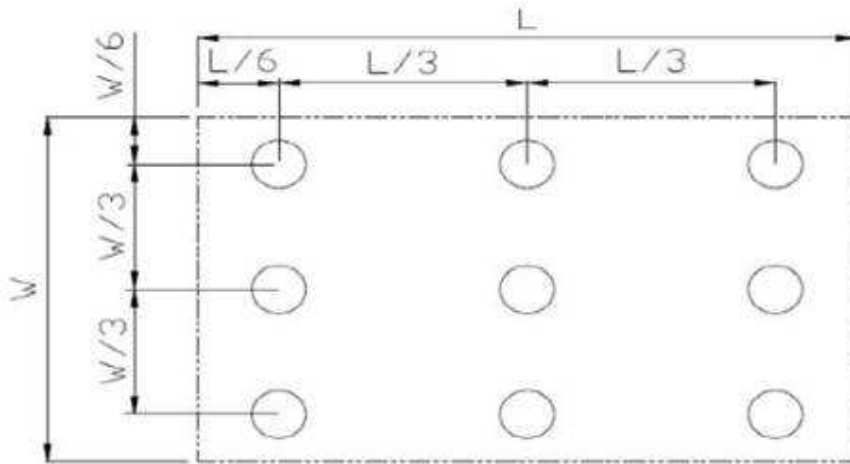


Fig 8.3. Definition of uniformity

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.

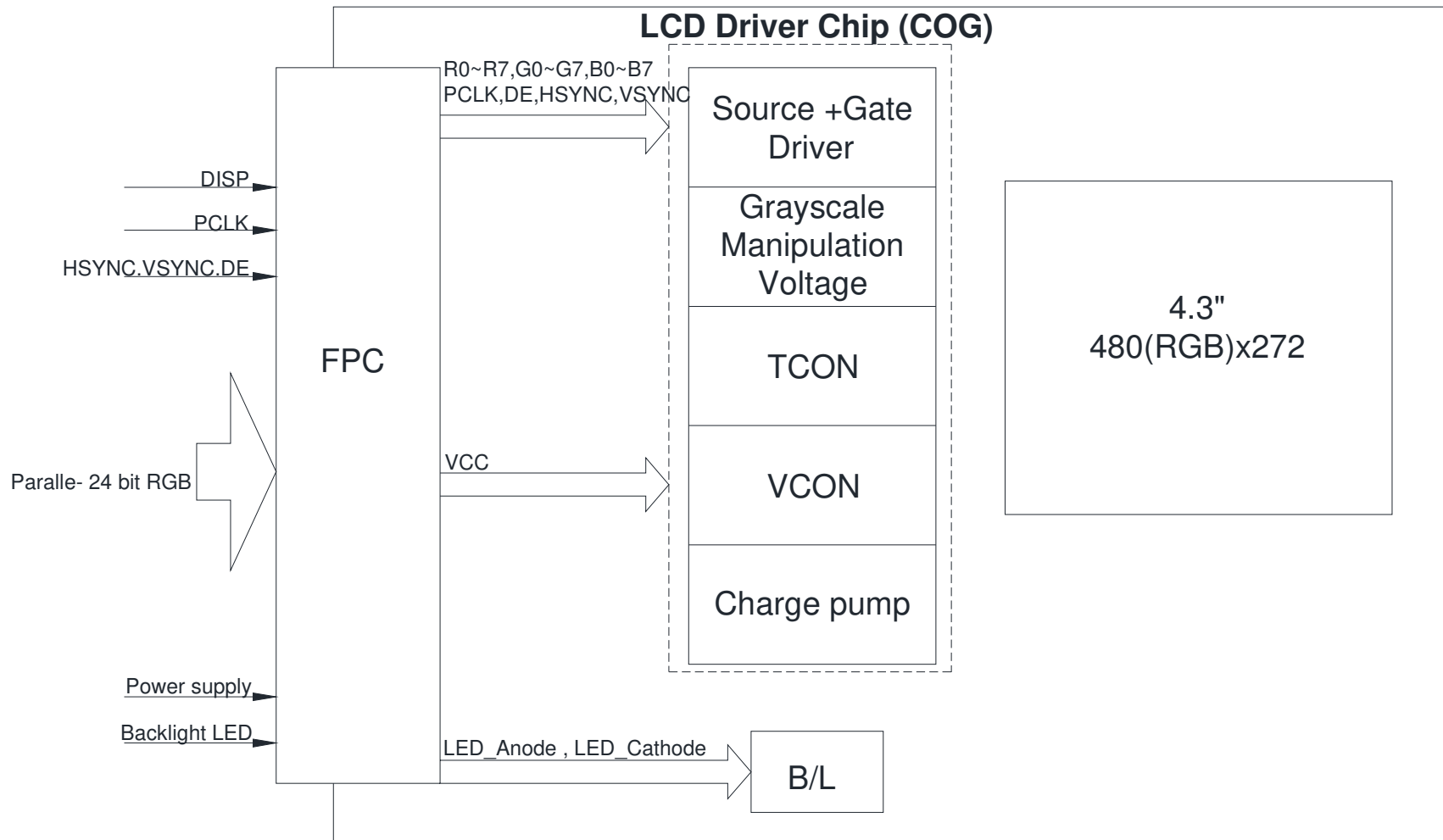
# 9.Interface

## 9.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	VLED+	Power for LED backlight anode	
2	VLED-	Power for LED backlight cathode	
3	VCC	Power voltage	
4	VCC	Power voltage	
5	R0	Red data	
6	R1	Red data	
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data	
13	GND	Power ground	
14	G0	Green data	
15	G1	Green data	
16	G2	Green data	
17	G3	Green data	
18	G4	Green data	
19	G5	Green data	
20	G6	Green data	
21	G7	Green data	
22	GND	Power ground	
23	B0	Blue data	
24	B1	Blue data	
25	B2	Blue data	
26	B3	Blue data	
27	B4	Blue data	
28	B5	Blue data	
29	B6	Blue data	
30	B7	Blue data	

31	GND	Power ground							
32	PCLK	Pixel clock input pin (DCLK)							
33	DISP	DISP sets the display mode. <table border="1" data-bbox="459 349 1235 479"> <thead> <tr> <th>DISP</th> <th>Function Description</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>Standby mode</td> </tr> <tr> <td>H</td> <td>Normal display mode</td> </tr> </tbody> </table>	DISP	Function Description	L	Standby mode	H	Normal display mode	
DISP	Function Description								
L	Standby mode								
H	Normal display mode								
34	HSYNC	Horizontal sync signal, default is negative polarity.							
35	VSYNC	Vertical sync signal, default is negative polarity.							
36	DE	Data input enable.							
37	NC(XR)	No connection							
38	NC(YD)	No connection							
39	NC(XL)	No connection							
40	NC(YU)	No connection							

# Block Diagram



# 11. Reliability

Content of Reliability Test (Super Wide temperature, -40°C ~85°C)

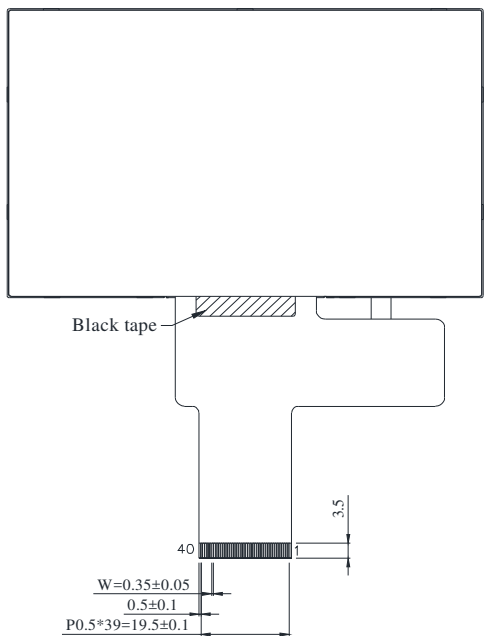
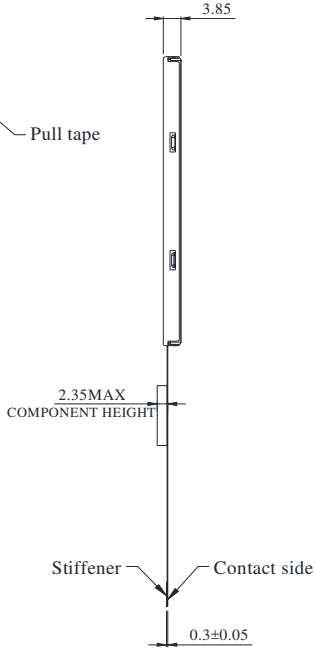
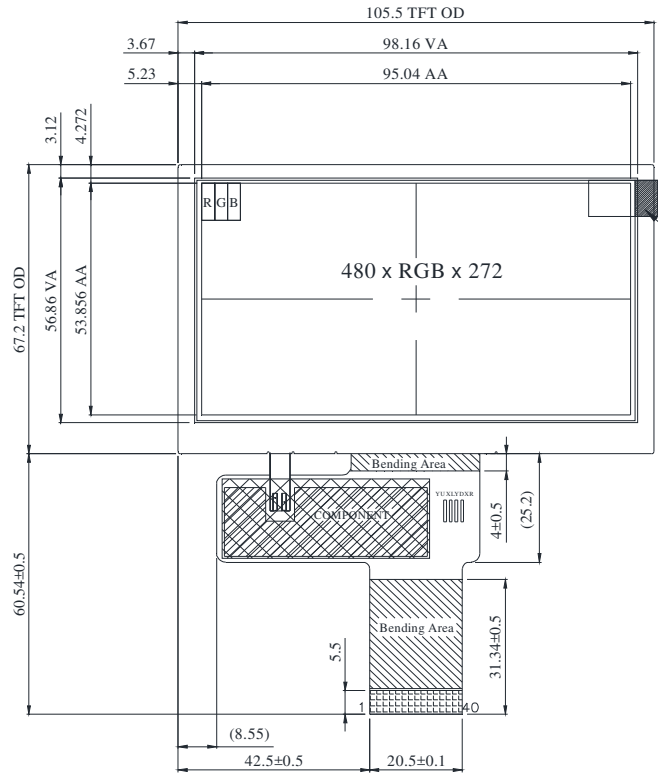
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	85°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-40°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	85°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-40°C 200hrs	1
High Temperature/ Humidity storage	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;">-40°C    25°C    85°C</p> <p style="margin: 0;">30min    5min    30min</p> <p style="margin: 0;">1 cycle</p> </div>	-40°C/85°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



PIN NO.	SYMBOL
1	VLED+
2	VLED-
3	VCC
4	VCC
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	GND
14	G0
15	G1
16	G2
17	G3
18	G4
19	G5
20	G6
21	G7
22	GND
23	B0
24	B1
25	B2
26	B3
27	B4
28	B5
29	B6
30	B7
31	GND
32	PCLK
33	DISP
34	HSYNC
35	VSYNC
36	DE
37	NC(XR)
38	NC(YD)
39	NC(XL)
40	NC(YU)

Note.  
380nm transmittance(UV Cut at 380nm)<1.0%

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