SPECIFICATION
OF
LCD MODULE

MODULE NO.: AFY480272A0-4.3N6NTN-C

Customer Approval:

☐ **Accept** ☐ **Reject**

FUTURE FOCUS	SIGNATURE	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

Sample Version	Doc. Version	DATE	DESCRIPTION	CHECKED BY
0001	A0	2014-07-20	First Release.	

CONTENTS

NUMBER SYSTEM INTRODUCTION:

AFY240320A0-2.8N6NTN-C:

AF: Orient Display TFT;

Y: JAZZ TFT;

240320: Length * width pixel;

A0: Product Version;

2.8: Diagonal Dimension;

N: LCD Mode (N: TN; I: IPS; V: VA)

6: Viewing Direction (6-> 6:00; 12->12:00; Unavailable for IPS and VA);

N: Temperature Range (N: Normal; W: Wide);

T: Polarizer (T:Transimissive; F:Transflective);

N: Luminance (N: Normal <300 nit; M: Middle >=300 & <600 nit;
H: High >=600 nit);

C: TP Option (R: Resistive TP; C: Capacitive TP; N: Without TP);

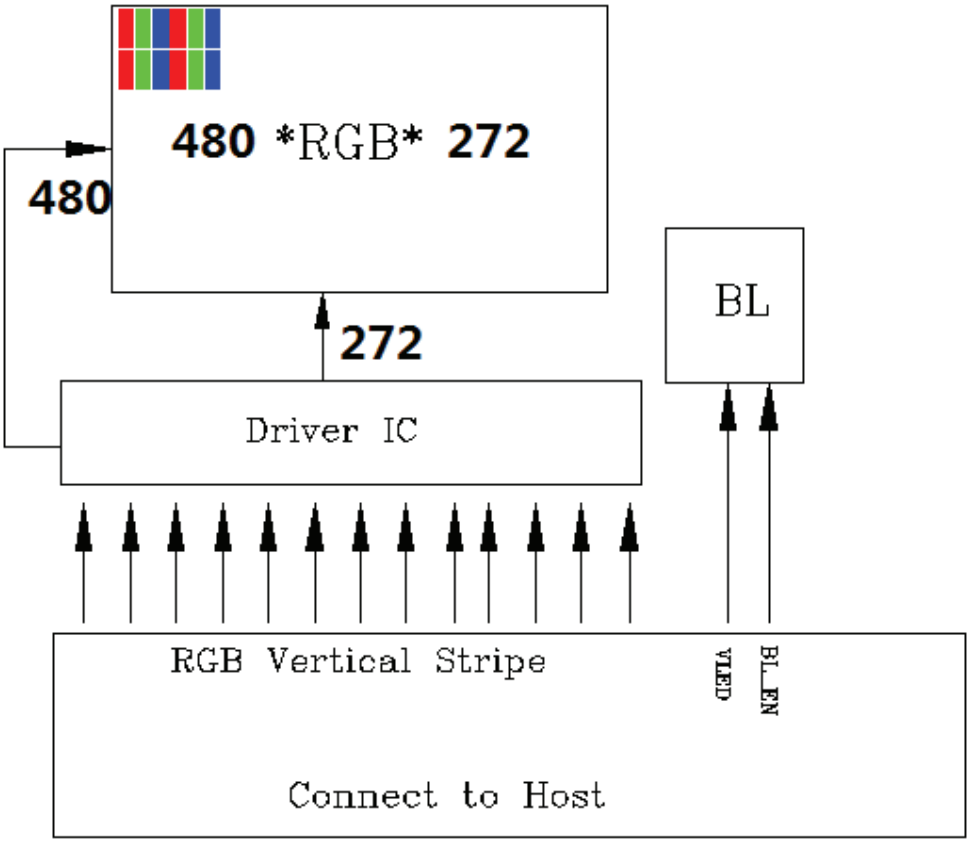
►

1. GENERAL SPECIFICATIONS:

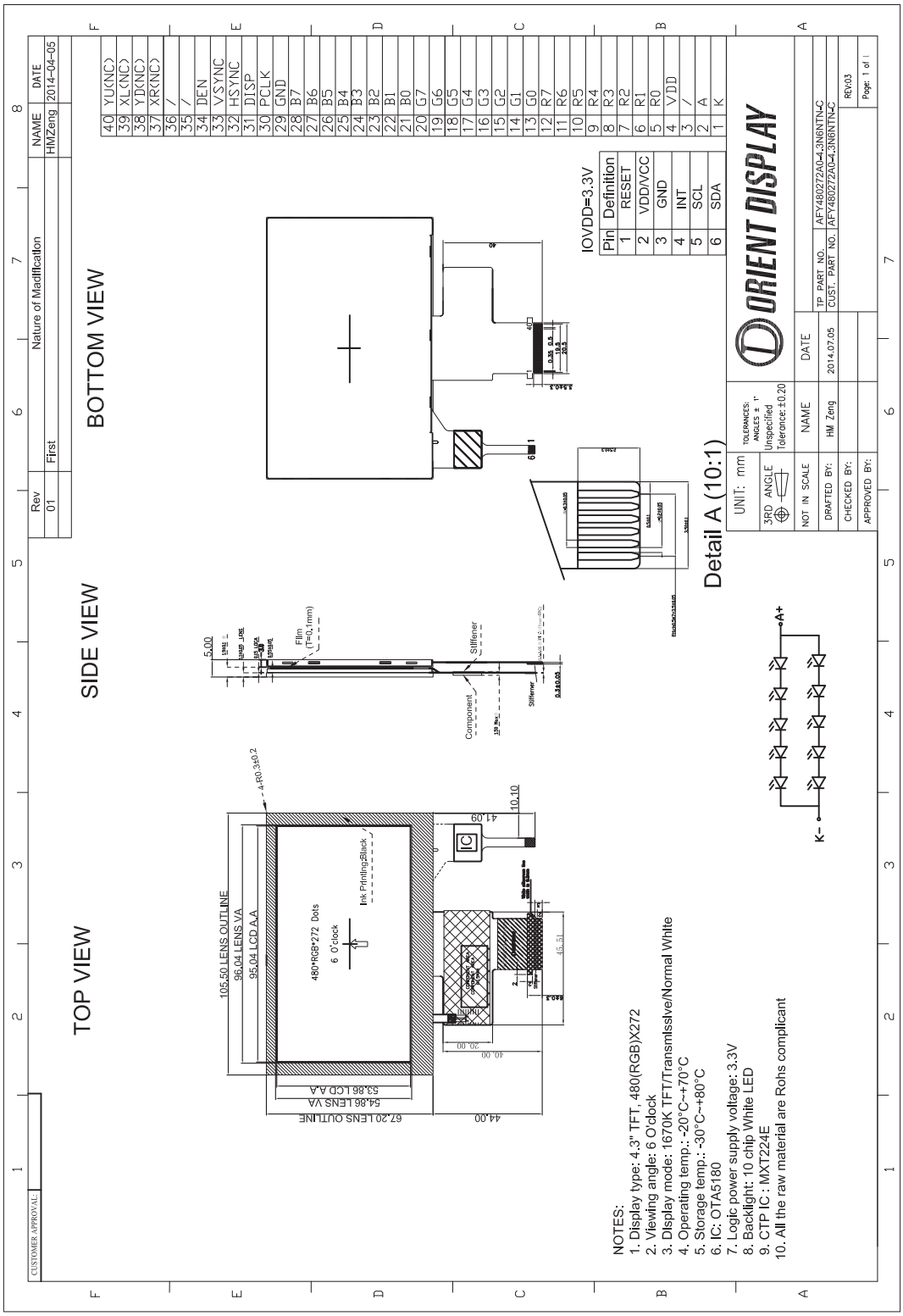
ITEM	SPECIFICATION	UNIT
OUTLINE DIMEMSIONS	105.5 (W) X67.2 (H) X5.0 (D)	mm
DISPLAY SIZE	4.3	inch
DOT PITCH	0.198mmX0.198mm	mm
NUMBER OF DOTS	480*（RGB）*272	-
DRIVER IC	OTA5180A	-
LCD TYPE	TFT(16.7M) TRANSMISSIVE	-
INTERFACE	RGB 24BITS	
BACKLIGHT TYPE	LED White	-
VIEWING DIRECTION	6 O'clock	-
GRAY SCALE DIRECTION	6 O'clock	-

***See attached drawing for details.**

2.BLOCK DIAGRAM:



3.DIMENSIONAL OUTLINE



NOTES:
1. Display type: 4.3" TFT, 480(RGB)X272
2. Viewing angle: 6 O'clock
3. Display mode: 1670K TFT/Transmlsslve/Normal White
4. Operating temp.: -20°C~+70°C
5. Storage temp.: -30°C~+80°C
6. IC: OTA5180
7. Logic power supply voltage: 3.3V
8. Backlight: 10 chip White LED
9. CTP IC : MXT224E
10. All the raw material are Rohs complicant

4. PIN DESCRIPTION:

NO.	PIN NAME	Type	Description
1	LED-	P	Power supply for LED (Cathode)
2	LED+	P	Power supply for LED (Anode)
3	/	/	NC
4	VDD	P	Power voltage
5	R0	I	RED data signal(LSB)
6	R1	I	RED data signal
7	R2	I	RED data signal
8	R3	I	RED data signal
9	R4	I	RED data signal
10	R5	I	RED data signal
11	R6	I	RED data signal
12	R7	I	RED data signal(MSB)
13	G0	I	GREEN data signal(LSB)
14	G1	I	GREEN data signal
15	G2	I	GREEN data signal
16	G3	I	GREEN data signal
17	G4	I	GREEN data signal
18	G5	I	GREEN data signal
19	G6	I	GREEN data signal
20	G7	I	GREEN data signal(MSB)
21	B0	I	BLUE data signal(LSB)
22	B1	I	BLUE data signal
23	B2	I	BLUE data signal
24	B3	I	BLUE data signal
25	B4	I	BLUE data signal
26	B5	I	BLUE data signal
27	B6	I	BLUE data signal
28	B7	I	BLUE data signal(MSB)
29	GND	P	Ground(0V)
30	DOTCLK	I	Pixel clock signal
31	DISP	I	Display on/ off
32	HSYNC	I	Horizontal synchronizing signal
33	VSYNC	I	Vertical synchronizing signal
34	DE	I	Data enable
35	/	/	NC
36	/	/	NC
37	XR(NC)	-	No connection
38	YD(NC)	-	No connection
39	XL(NC)	-	No connection
40	YU(NC)	-	No connection

Note: I: input, 0: output, P: Power

CTP interface description

Interface NO.	NAME	I/O or connect to	DESCRIPTION
1	RESET	I	Reset low
2	VDD	P	Power of CTP DC3.3V
3	GND	P	Ground
4	INT	O	State change interrupt
5	SCL	I	Serial interface clock
6	SDA	I/O	Serial interface date

NOTE: (FOR CTP)

Please download details at http://www.orientdisplay.com/pdf/mXT224E.pdf

5.ELECTRICAL CHARACTERISTICS

5.1 Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Power Supply for Pump	VDD	-0.3	4.5	V	

Note: Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions see AC/DC Electrical Characteristics

5.2DC Characteristics

5.2.1 Operating Conditions

Item	Symbol	Values			Unit	Conditions
		Min	Typ.	Max.		
Charge Pump Supply Voltage	PVDD	3	3.3	3.6	V	PWR_SEL=H
Digital Supply Voltage	VDD	3	3.3	3.6	V	PWR_SEL=H
Digital Interface Supply	VDDIO	1.65	1.8	VDD	V	
Digital Input Voltage	Di	0	-	VDDIO	V	
OTP Supply Voltage	V_OTP	7.4	7.5	7.6	V	
VCOM AC Voltage	VCOMH-VCOML	3.46	-	6.2	V	

5.2.2 DC Characteristics for Digital Circuit

Item	Symbol	Values			Unit	Conditions
		Min	Typ.	Max.		
Low Level Input Voltage	Vil	GND	-	0.3xVDDIO	v	
High Level Input Voltage	Vih	0.7xVDDIO	-	VDDIO	uA	
High Level Output Voltage	Voh	VDDIO-0.4	-	VDDIO	ohm	
Low Level Output Voltage	Vol	GND	-	GND+0.4	uA	
Input Leakage Current	Iil			±1.0		
Pull High/Low Resistor	Rp	-	100K	-	ohm	

5.2.3 DC Characteristics for Analog Circuit

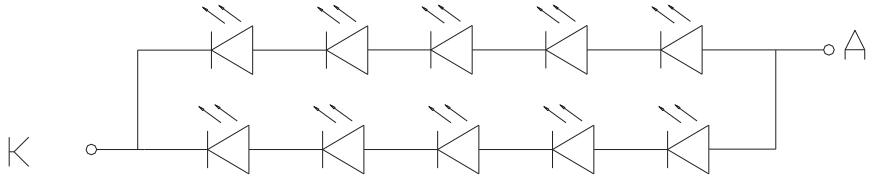
VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, TA = - 20℃ to 80 ℃

Item	Symbol	Values			Unit	Conditions
		Min	Typ.	Max.		
Analog Supply Voltage	VDD2		5		V	
Positive High-voltage power	VGH	9	15	16	V	No Load. By VGH_SEL setting.
Negative High-voltage power	VGL	-11	-10	-7	V	No Load. By VGL_SEL setting.
VCOMH Output Level	VCOMH	3.26		5.8	V	By VCOMH setting.
VCOML Output Level	VCOML	-2		-0.2	V	By VCOML setting
Output Voltage Deviation	Vod	-	±20	±35	mV	VO = 0.15V ~ 0.5V, 3.45V~3.8V
		-	±15	±20		VO = 0.5V ~ 3.45V
Output Dynamic Range	Vdr	0.2	-	5.3		MVA Mode
		0.15		4.8		TN Mode
VCOM Low Level Output Current	IOLFRP		-10		mA	VCOM AC output = 0.5V
VCOM High Level Output Current	IOHFRP		-10		mA	VCOM AC output = 5.7V
Analog Standby Current	Iast	-	-	20	uA	
Analog Operation Current	IDD	-	5.0	-	mA	Without panel loading

5.3 DC BackLight Unit

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Average luminous Intensity	Iv		250		cd/ m2	IF=40mA
Chromaticity Coordinates	X	0.234	0.284	0.334		IF=40mA
	Y	0.273	0.323	0.373		IF=40mA
Forward Voltage	VF		16.0	17.0	V	IF=40mA
Reverse Current	IR			50	μA	VR=20V,1LED
Luminous Tolerance	IV-M	80			%	(MIN/MAX)×100
Power Dissipation	Pd	640			mW	
Peak Forward Current	Ifp	100			mA	
Reverse Voltage	VR	5			V	

5.3.1 Internal Circuit Diagram

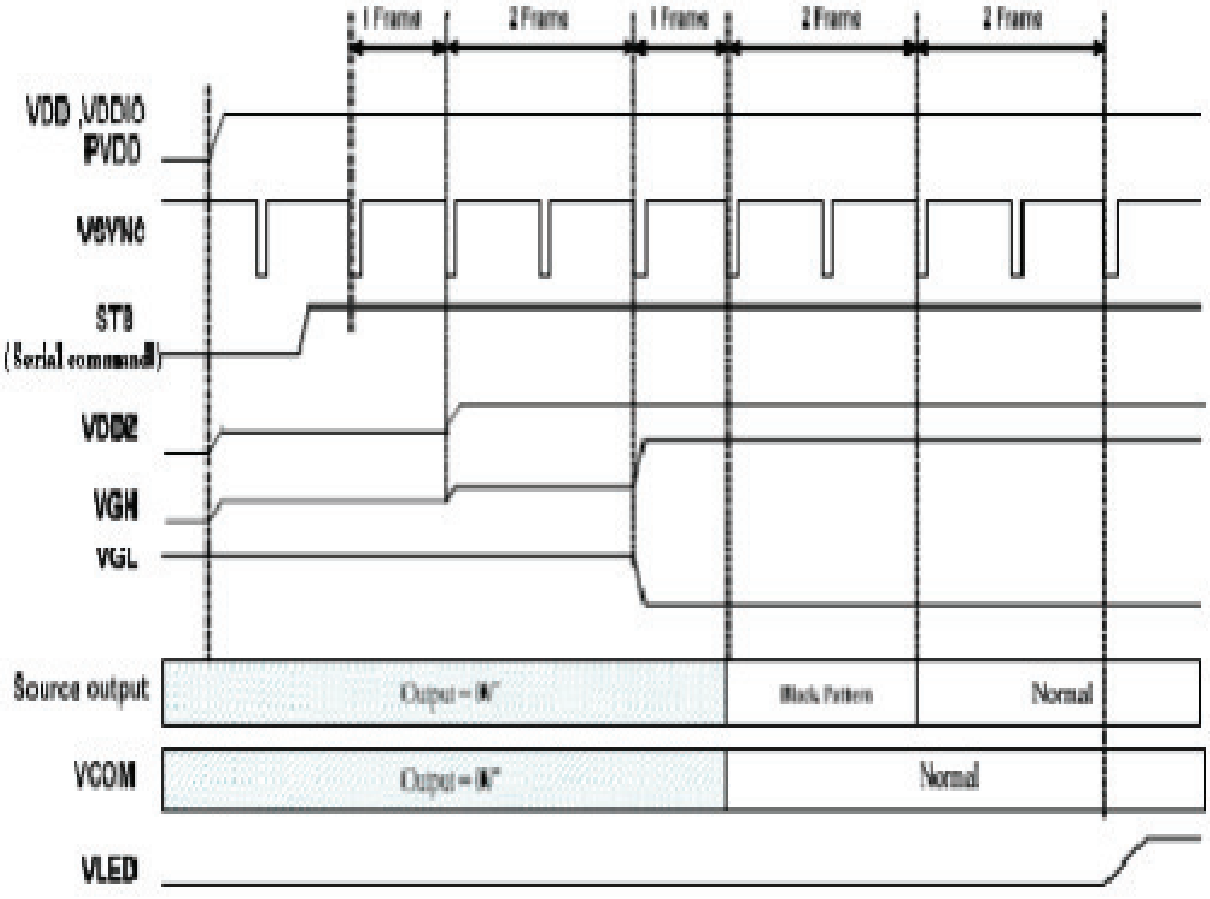


B/L CIRCUIT DIAGRAM

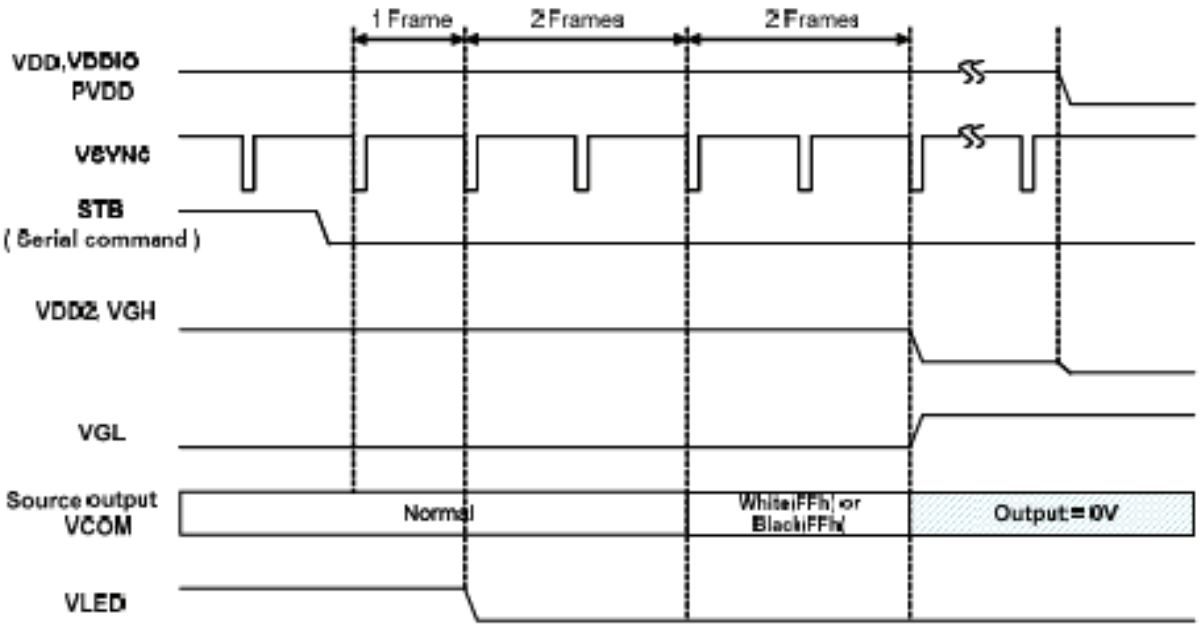
10 PCS WHITE LED;IF =40mA,VF=16V

5.4 POWER SEQUENCE

Power On Sequence



Power Off Sequence



Note:

a. When normally-black LC is used, please send black pattern to discharge the panel.
b. When normally-white LC is applied, please send white pattern to discharge the pane

6.INPUT SIGNAL TIMING

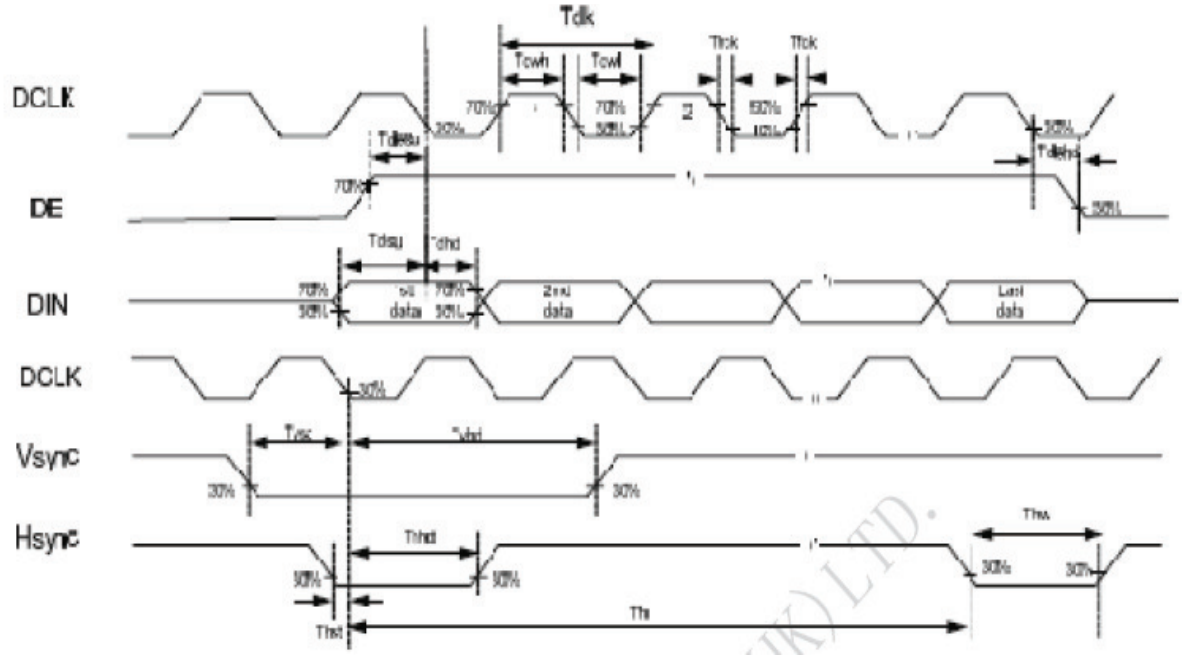
6.1AC Characteristics

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, TA = -20℃ to 80℃

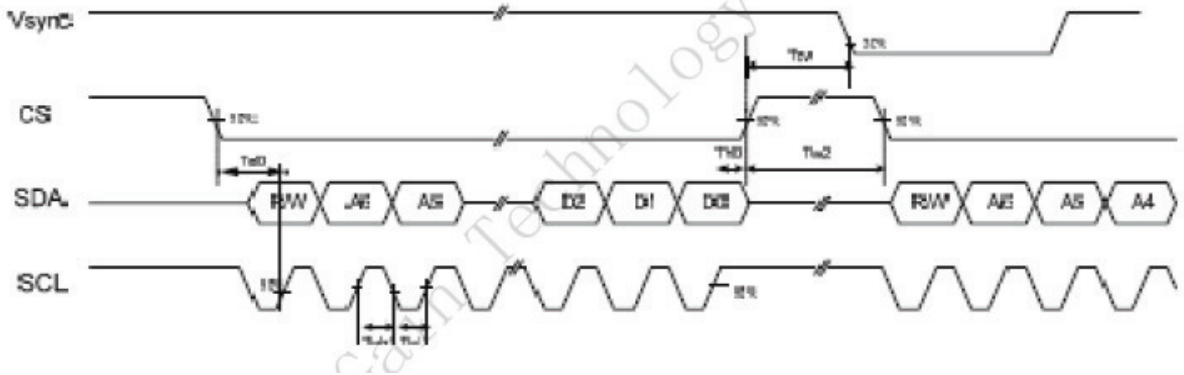
Item	Symbol	Min.	Typ.	Max.	Unit	Note
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1.0	-	-	DCLK	
Hsync period	Th	55	60	65	us	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data set-up time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE set-up time	Tdesu	12	-	-	ns	
DE hold time	Tdehd	12	-	-	ns	
SD output stable time	Tst	-	10	12	us	
GD output rise and fall time	Tgst	-	500	1000	ns	
Serial communication						
Delay between CSB and Vsync	Tcv	1			us	
CS input setup time	Ts0	50			ns	
Serial data input setup time	Ts1	50			ns	
CS input hold time	Th0	50			ns	
Serial data input hold time	Th1	50			ns	
SCL pulse high width	Twh1	50			ns	
SCL pulse low width	Twl1	50			ns	
CS pulse high width	Tw2	400			ns	

6.2 AC Timing Diagram

6.2.1Clock and Data Input Timing Diagram



6.2.2 3-wire communication timing diagram

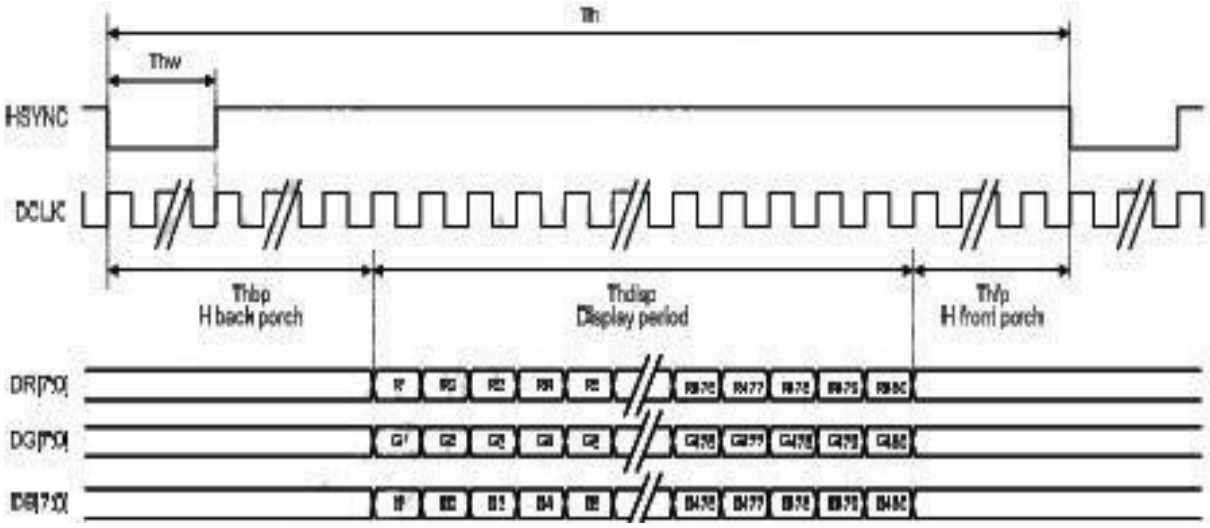


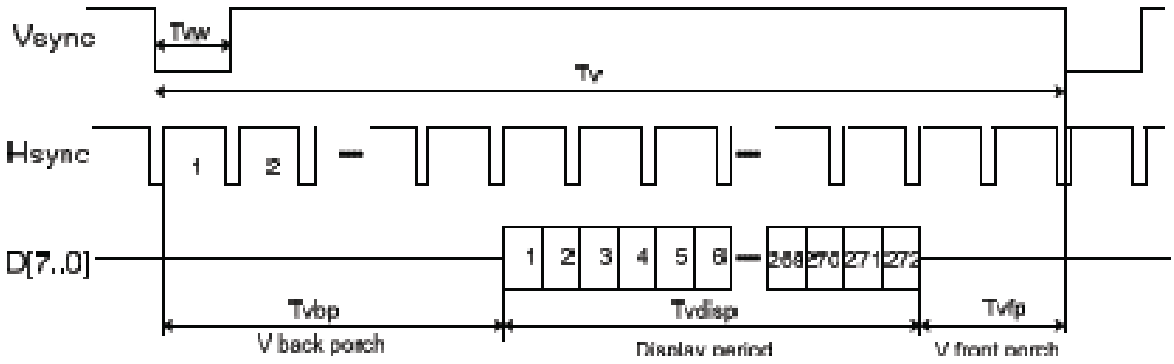
6.3 Parallel RGB Data Format

6.3.1 Parallel RGB Input Timing Table

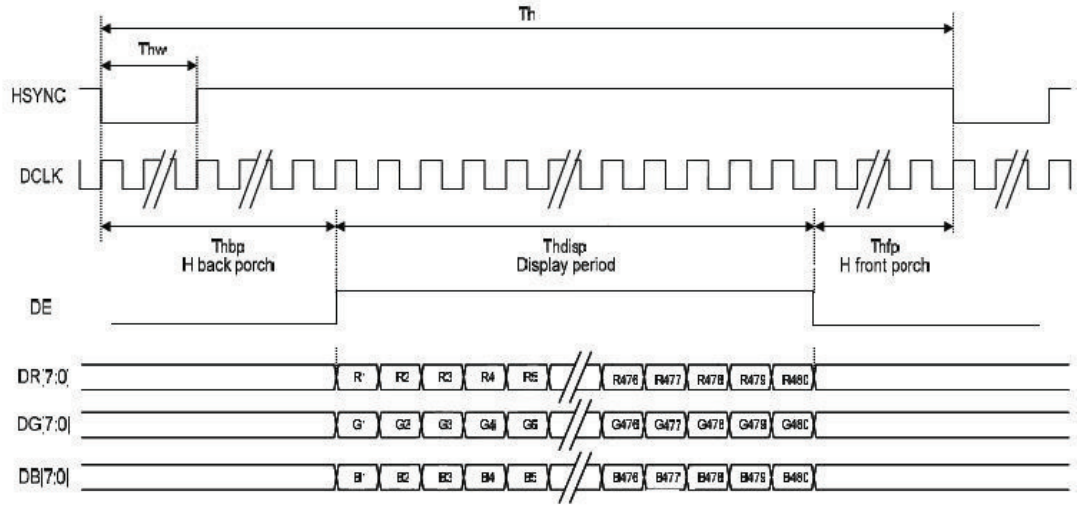
Item		Symbol	Min.	Typ.	Max.	Unit	Note
DCLK Frequency		Fclk	5	9	12	MHz	
DCLK Period		Tclk	83	110	200	ns	
Hsync	Period Time	Th	490	531	605	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	8	43		DCLK	By H_BLANKING Setting
	Front Porch	Thfp	2	8		DCLK	
	Pulse Width	Thw	1			DCLK	
Vsync	Period Time	Tv	275	288	335	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12		H	ByV_BLANKING setting
	Front Porch	Tvfp	1	4		H	
	Pulse Width	Tvw	1	10		H	

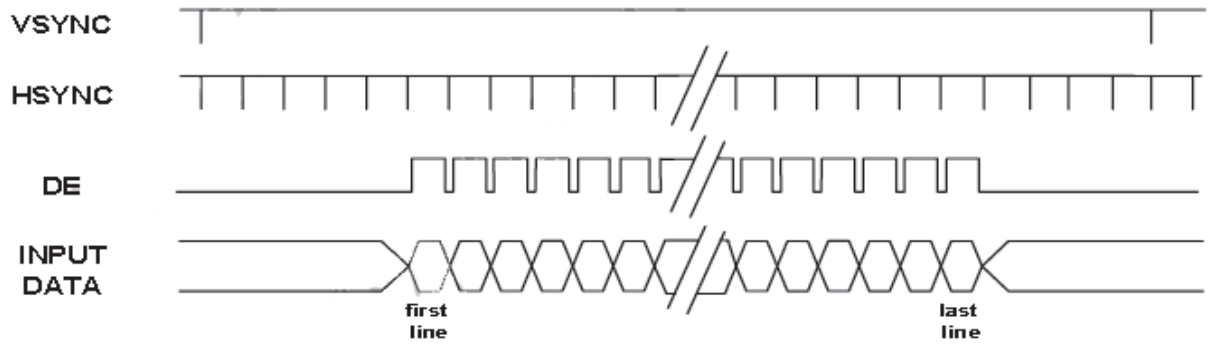
6.3.1 SYNC Mode Timing Diagram





6.3.2 SYNC-DE Mode Timing Diagram





6.4 Controller Information

IC: OTA5180A

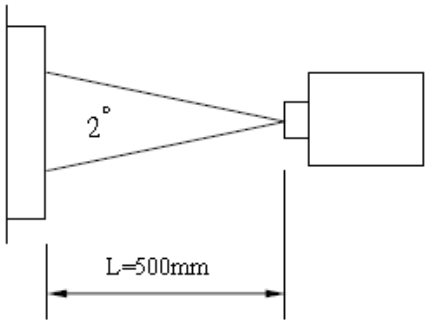
Please download IC specification at http://www.orientdisplay.com/pdf/OTA5180A.pdf

7. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	*1)		400	-	-	Note 3
Brightness		B		280	300		cd/m2	
Response Time		Tr+ Tf	*3)	-	30	45	ms	Note 4
Color Filter Chromaticity with C light	White	x	Θ=Ø=0°	0.234	0.284	0.334		Note 6
		y		0.273	0.323	0.373		
	Red	x	Θ=Ø=0°	0.515	0.565	0.615		
		y		0.284	0.334	0.384		
	Green	x	Θ=Ø=0°	0.286	0.336	0.386		
		y		0.520	0.570	0.620		
	Blue	x	Θ=Ø=0°	0.094	0.144	0.194		
		y		0.062	0.112	0.162		
View angle	Ver.	θ*2)	CR≧10	90	110	-		
						-		Note 5
	Hor.	ψ*2)		110	130	-		
						-		

Note1:Ambient condition：25℃±2℃，60±10%RH，under 10 Lunx in the darkroom.

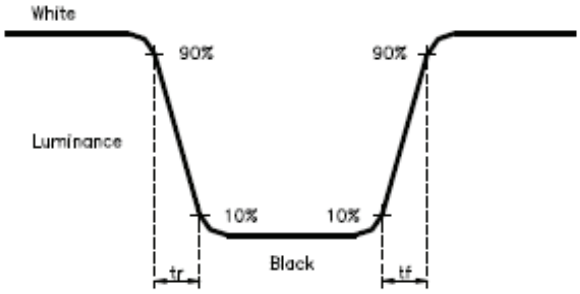
Note2:Measure device：BM-7，viewing cone=1°,IL=20mA



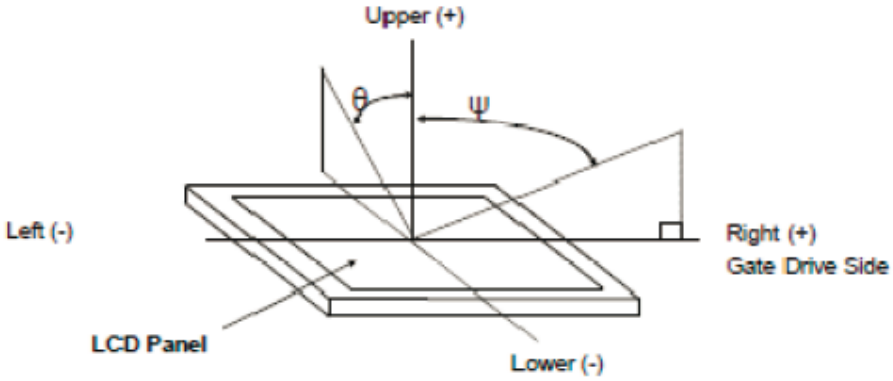
Note3: Definition of Contrast Ratio:

CR = White Luminance (ON) / Black Luminance (OFF)

Note4: Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



Note5:Definition of viewing angle (θ，ψ):



Definition of viewing angle

Note6: Light source: C light

8. Reliability

Please download details at http://www.orientdisplay.com/Reliability.html

9. Specification of Quality Assurance

Please download details at http://www.orientdisplay.com/Delivery-TFT.html

10. General Precautions

Please download details at http://www.orientdisplay.com/General-Precautions.html

11. Limited Warranty

Please download details at http://www.orientdisplay.com/Warranty.html

12. Package

Orient Display Corporation reserves the right to change this specification.