



Doc.No.: AFY800480A0-7.0N6NTM

REV : A0

PAGE : 1/17

EFFECTIVE DATE : 2013-03-26

# SPECIFICATION OF LCD MODULE

MODULE NO: AFY800480A0-7.0N6NTM

Customer Approval:

Accept

Reject

FUTURE FOCUS	SIGNATURE	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		



Doc.No.: AFY800480A0-7.0N6NTM

REV : A0

PAGE : 2/17

EFFECTIVE DATE : 2013-03-26

Sample Version	Doc. Version	DATE	DESCRIPTION	CHECKED BY
0001	A0	2013-03-26	First Release	



Doc.No.: AFY800480A0-7.0N6NTM

REV : A0

PAGE : 3/17

EFFECTIVE DATE : 2013-03-26

## CONTENTS

List	Description	Page No.
	NUMBER SYSTEM INTRODUCTION	4
1	GENERAL SPECIFICATIONS	4
2	BLOCK DIAGRAM	5
3	DIMENSIONAL OUTLINE	6
4	PIN DESCRIPTION	7
5	ELECTRICAL CHARACTERISTICS	8
6	INPUT SIGNAL TIMING	11
7	OPTICAL CHARACTERISTICS	13
8	RELIABILITY	16
9	SPECIFICATION OF QUALITY ASSURANCE	16
10	GENERAL PRECAUTION	16
11	LIMITED WARRANTY	16
12	PACKAGE	17

## NUMBER SYSTEM INTRODUCTION:

AFY800480A0-7.0N6NTM-R:

AF: Orient Display TFT;

Y: JAZZ TFT;

800480: Length \* width pixel;

A0: Product Version;

7.0: 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:Transmissive; F:Transflective);

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

H: High >=600 nit);

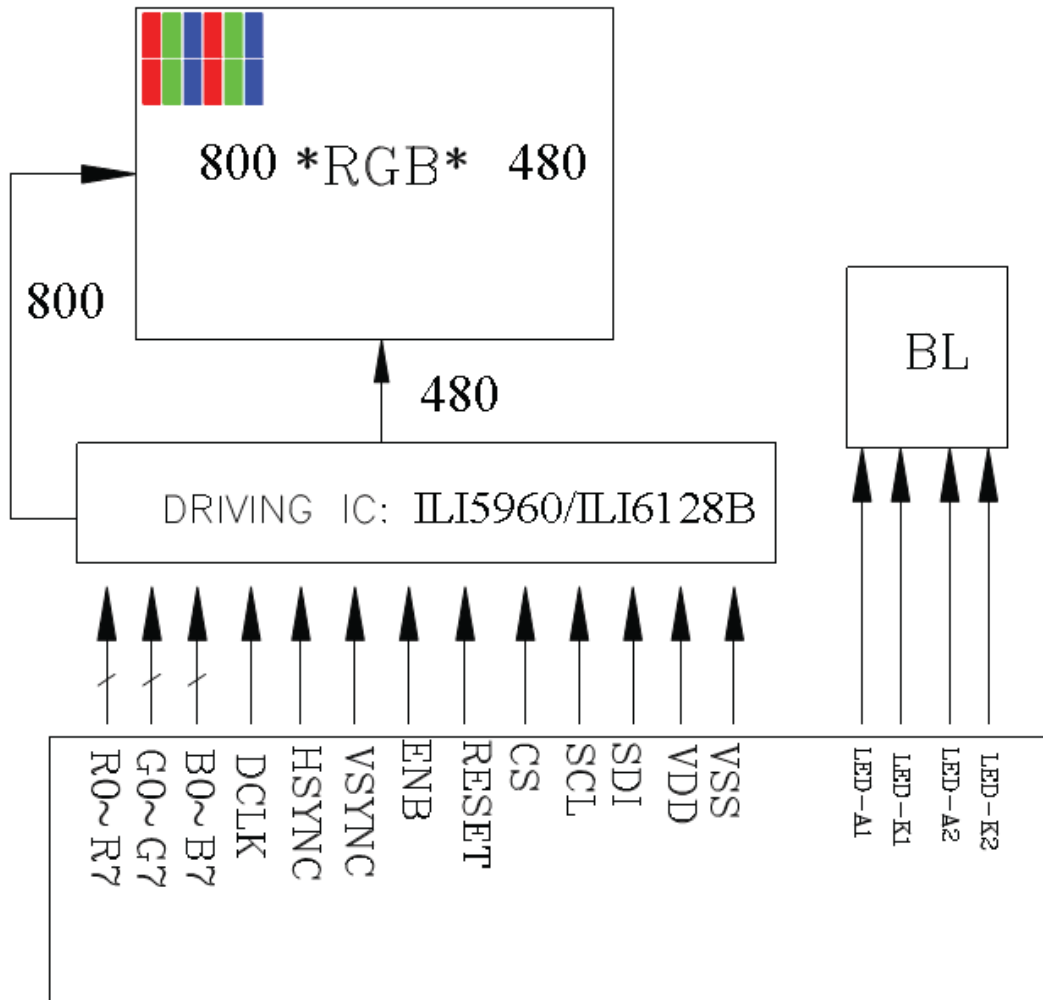
R: TP Option (R: Resistive TP; C: Capacitive TP; N: Without TP);

## 1. GENERAL SPECIFICATIONS

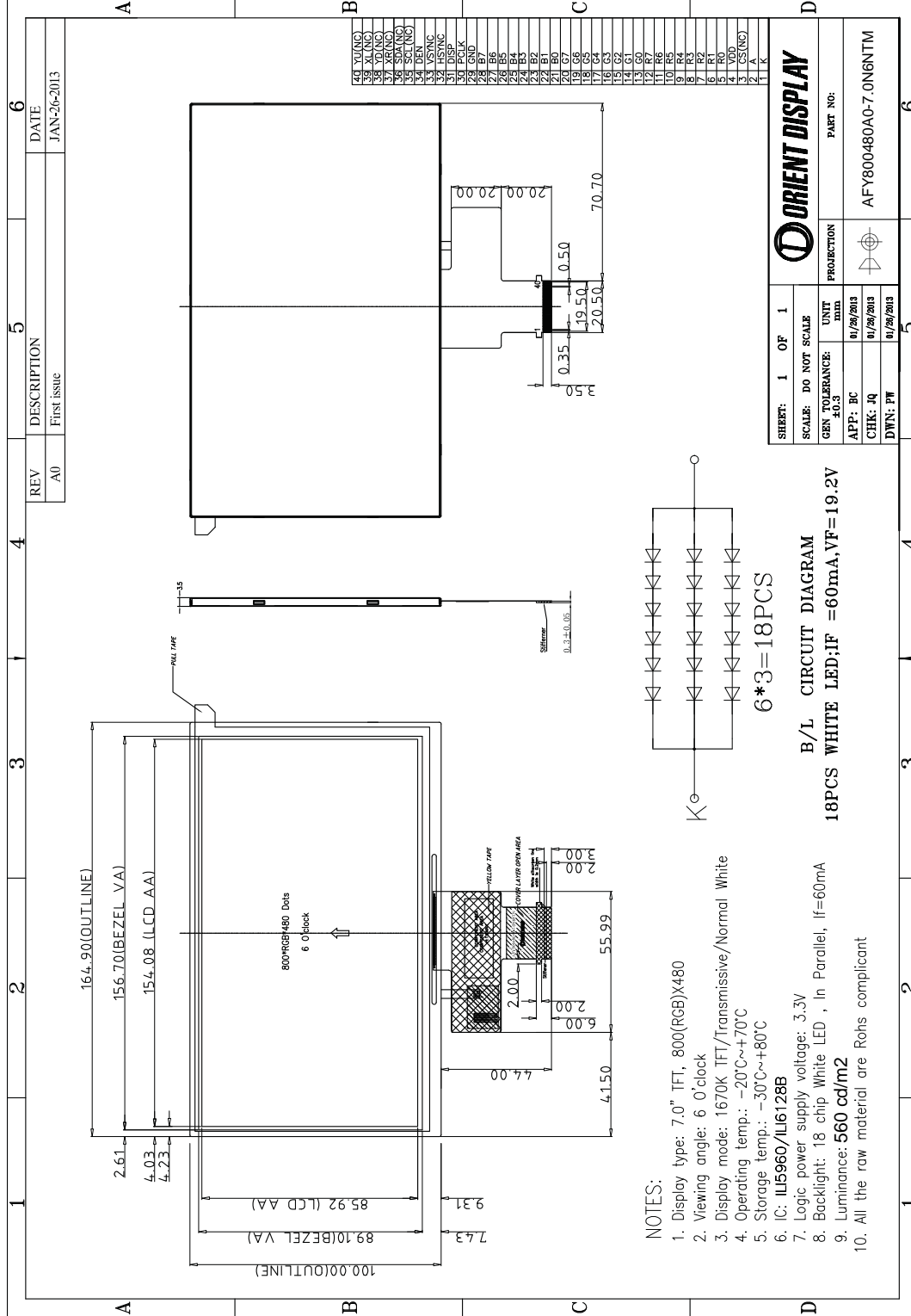
ITEM	SPECIFICATION	UNIT
OUTLINE DIMENSIONS	164.9 (W) X100 (H) X3.5 (D)	mm
DISPLAY SIZE	7.0	inch
DOT PITCH	0.1926mmX0.1790mm	mm
NUMBER OF DOTS	800* (RGB) *480	-
DRIVER IC	ILI5960/ILI6128B	-
LCD TYPE	TFT(16.7M) TRANSMISSIVE	-
INTERFACE	RGB 24BITS	-
BACKLIGHT TYPE	LED White	-
VIEWING DIRECTION	6 O'clock	-
GRAY SCALE INVERSION DIRECTION	6 O'clock	

\*See attached drawing for details.

## 2. BLOCK DIAGRAM

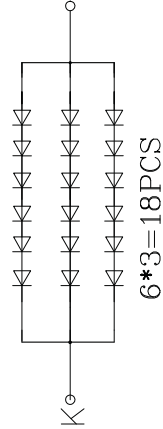


### 3. DIMENSIONAL OUTLINE



**NOTES:**

1. Display type: 7.0" TFT, 800(RGB)x480
2. Viewing angle: 6 0'clock
3. Display mode: 1670K TFT/Transmissive/Normal White
4. Operating temp.: -20°C~+70°C
5. Storage temp.: -30°C~+80°C
6. IC: ILI5960/ILI6128B
7. Logic power supply voltage: 3.3V
8. Backlight: 18 chip White LED , In Parallel, If=60mA
9. Luminance: 560 cd/m<sup>2</sup>
10. All the raw material are Rohs compliant



**B/L CIRCUIT DIAGRAM**

18PCS WHITE LED;IF =60mA,VF=19.2V

SHEET: 1 OF 1				PART NO:	
SCALE: DO NOT SCALE	UNIT: MM	PROJECTION:	AFY800480A0-7.0N6NTM		
GEN TOLERANCE: ±0.3	DATE: 01/28/2013				
APP: BC	CHK: JQ				
DWN: PW	DATE: 01/28/2013				

49	YL(NG)
39	X(NG)
38	YO(NG)
37	YO(NG)
36	YO(NG)
35	SO(L)NG)
34	DEN
33	VS(NC)
32	DISP
31	DISP
30	POLK
29	GND
28	B6
27	B6
26	B5
25	B4
24	B4
23	B2
22	B1
21	B0
20	G5
19	G5
18	G4
17	G4
16	G3
15	G3
14	G1
13	G0
12	G0
11	R7
10	R5
9	R4
8	R3
7	R3
6	R1
5	RO
4	VS(UG)
3	A
2	A
1	K

#### 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	CS (NC)	-	No connection
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	I	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	SCL (NC)	-	No connection
36	SDA (NC)	-	No connection
37	XR (NC)	-	No connection
38	YD (NC)	-	No connection
39	XL (NC)	-	No connection
40	YU (NC)	-	No connection

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

## 5. ELECTRICAL CHARACTERISTICS

### 5.1 Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min	Max		
Power Supply for Pump	VCC	-0.3	5.0	V	
Operating temperature range	To	-20	70	Degree C	
Storage temperature range	Ts	-30	80	Degree C	
Logic input voltage range	VI	-0.3	VCC+0.3	V	
Logic input voltage range	VO	-0.3	VCC+0.3	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

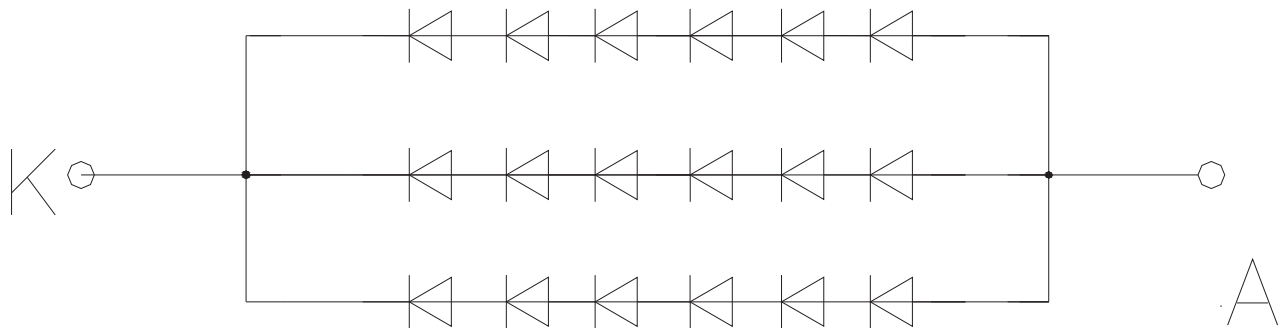
### 5.2 DC Characteristics

Item	Symbol	Values			Unit	Conditions
		Min	Typ	Max		
Low Level Input Voltage	Vil	GND	-	0.3xVCC	v	
High Level Input Voltage	Vih	0.7xVCC	-	VCC	uA	
High Level Output Voltage	Voh	VCC-0.4	-	VCC	ohm	
Low Level Output Voltage	Vol	GND	-	GND+0.4	uA	
Power Supply	VCC	2.8	3.3	3.6	V	
Input Leakage Current	Iil			±1.0	uA	
Pull High/Low Resistor	Rp	-	100K	-	ohm	



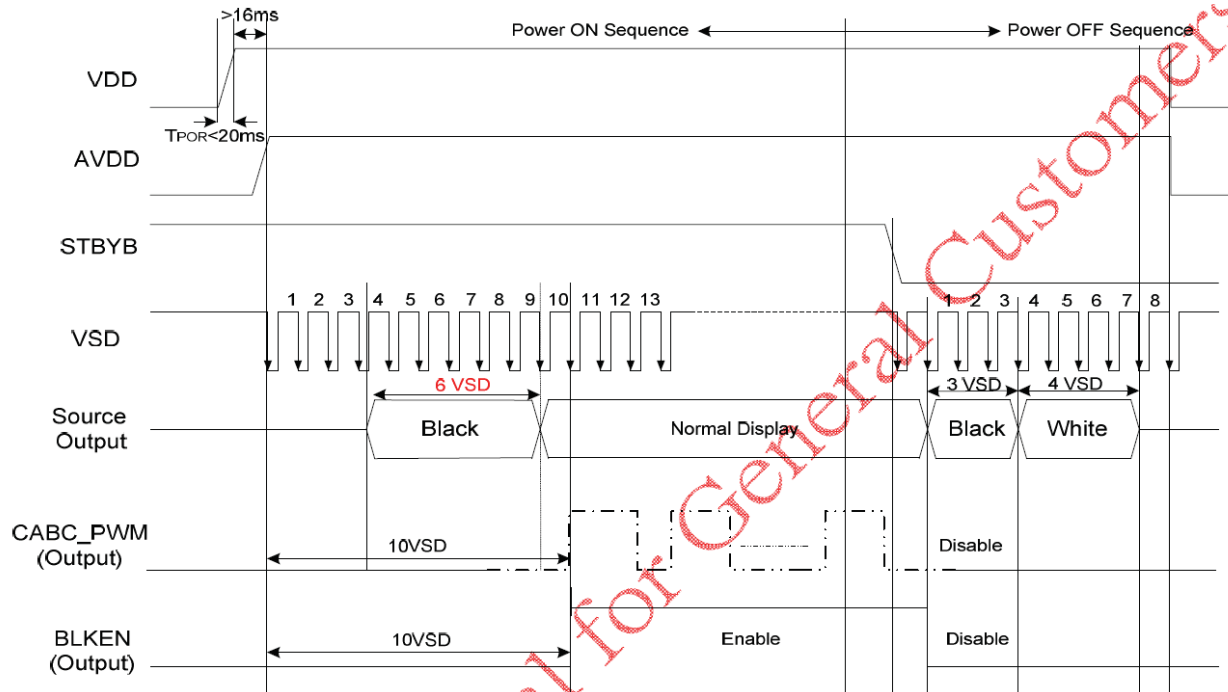
### 5.3 DC Backlight Unit

Item	Symbol	Min	Typ	Max	Unit	Remark
Average luminous Intensity	Iv		560		cd/m <sup>2</sup>	IF=60mA
Chromaticity Coordinates	X	0.234	0.284	0.334		IF=60mA
	Y	0.273	0.323	0.373		IF=60mA
Forward Voltage	VF		19.2	20.4	V	IF=60mA
Reverse Current	IR			50	μA	VR=10V, 1LED
Luminous Tolerance	IV-M	80			%	(MIN/MAX)×100
Power Dissipation	Pd	1152			mW	
Reverse Voltage	VR	5			V	

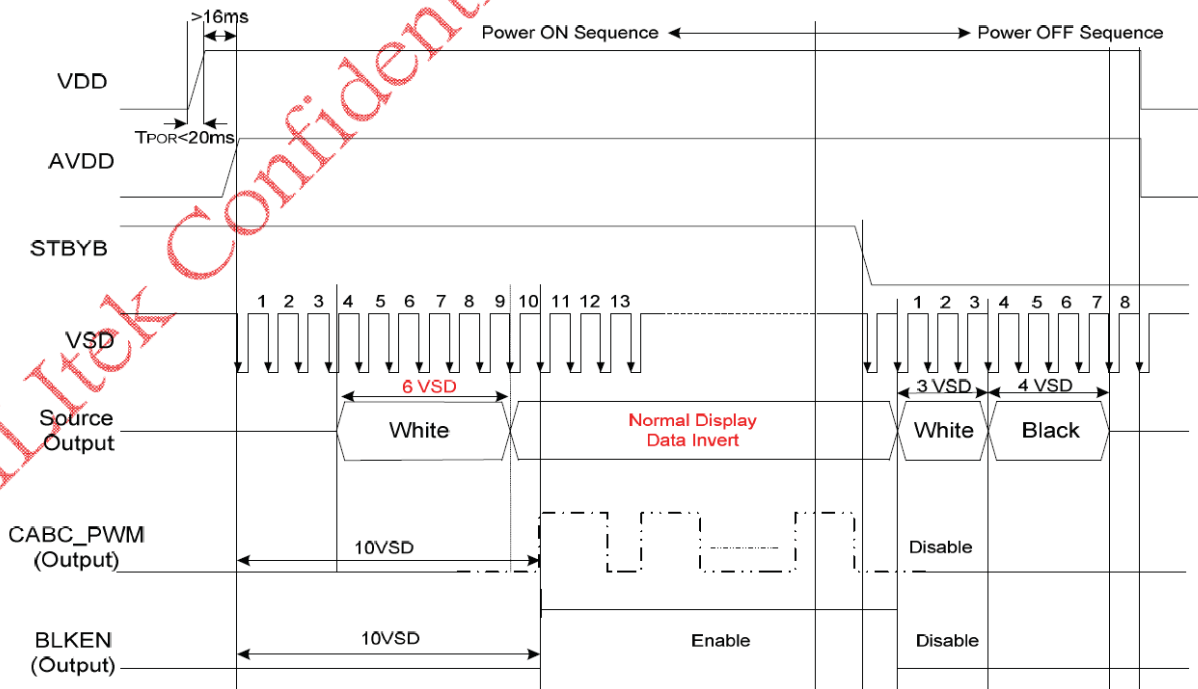


$$6 * 3 = 18 \text{ PCS}$$

### 5.4 Power On/Off sequence



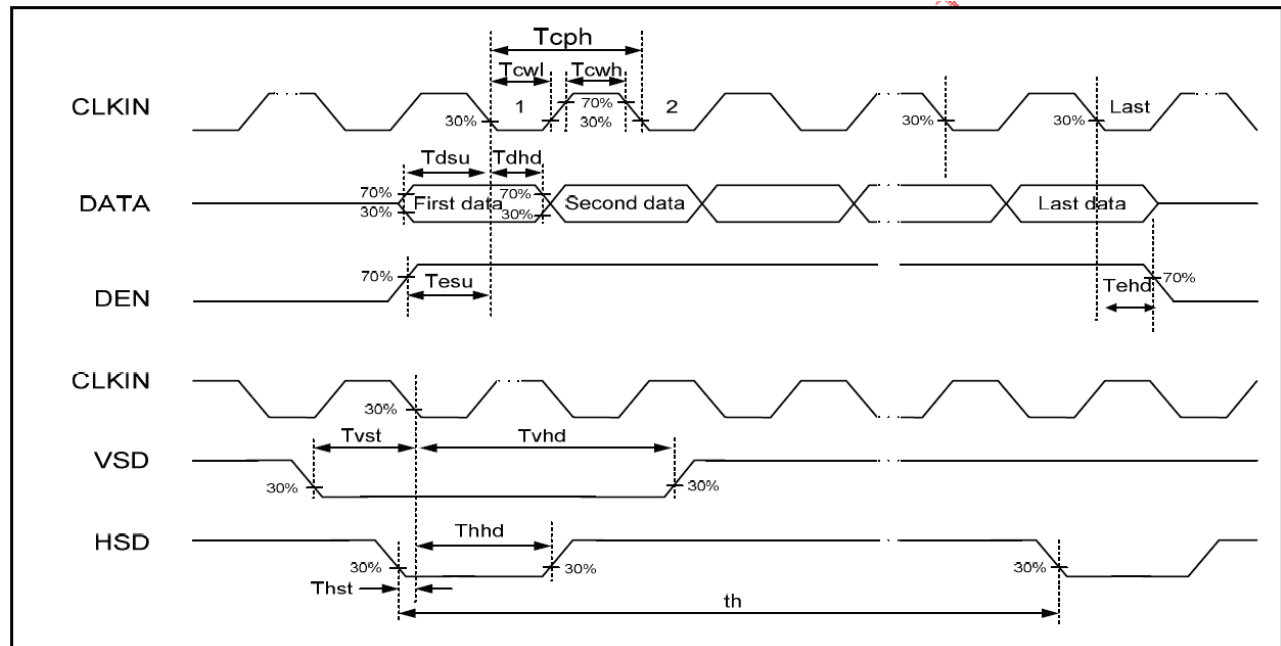
Case2: REV = H



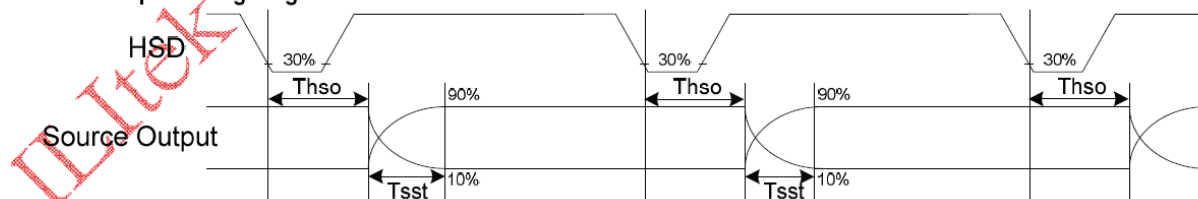
## 6. INPUT SIGNAL TIMING

### 6.1 AC Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
VDD Power On Slew rate	TPOR	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width	Trst	10	-	-	us	CLKIN = 45MHz
STBYB pulse width	Tstbyb	8	-	-	VS	
CLKIN cycle time	Tcph	20			ns	
CLKIN pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8	-	-	ns	
VSD hold time	Tvhd	8	-	-	ns	
HSD setup time	Thst	8	-	-	ns	
HSD hold time	Thhd	8	-	-	ns	
Data set-up time	Tdsu	8	-	-	ns	D0R[7:0], D1G[7:0], D2B[7:0] to CLKIN
Data hold time	Tdhd	8	-	-	ns	D0R[7:0], D1G[7:0], D2B[7:0] to CLKIN
DE setup time	Tesu	8	-	-	ns	
DE hold time	Tehd	8	-	-	ns	
Output stable time	Tsst	-	-	6	us	10% to 90% target voltage. CL=120pF, R=10K ohm



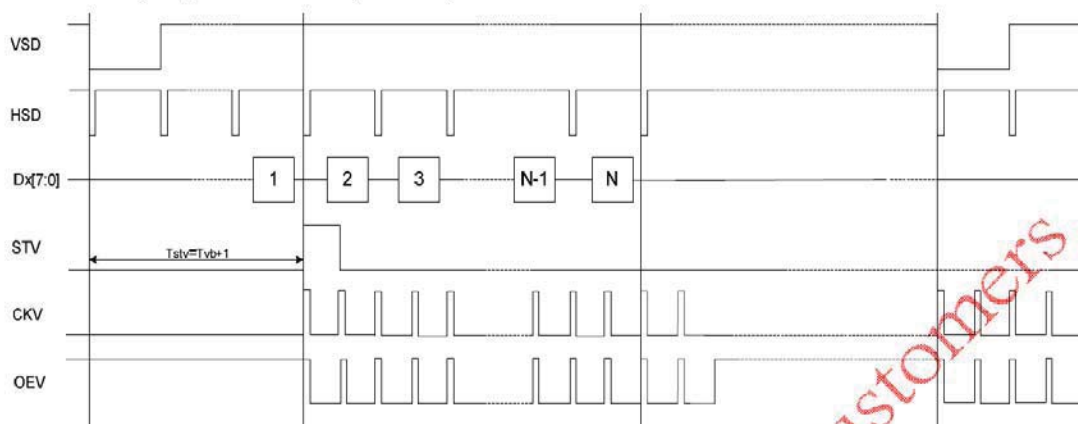
Source output timing diagram



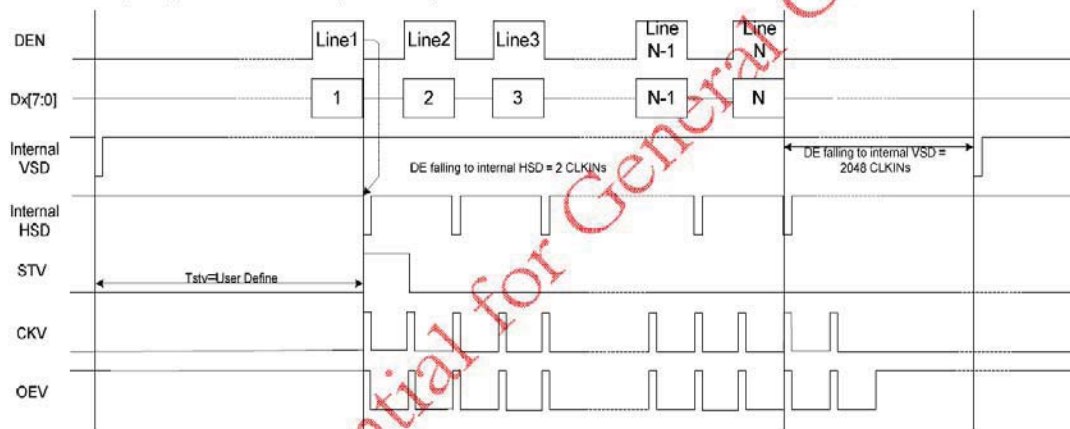
## 6.2 Data Transaction Timing in Parallel RGB (24 bit) Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	33	50	MHz	VDD = 2.7V ~3.6V
CLKIN Cycle Time	Tclk	20	30	-	ns	
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	37	-	CLKIN	
Time from HSD to LD	Thld	-	20	-	CLKIN	
Time from HSD to STV	Thstv	-	2	-	CLKIN	
Time from HSD to CKV	Thckv	-	20	-	CLKIN	
Time from HSD to OEV	Thoev	-	4	-	CLKIN	
LD Pulse Width	Twld	-	16	-	CLKIN	
CKV Pulse Width	Twckv	-	66	-	CLKIN	
OEV Pulse Width	Twoev	-	74	-	CLKIN	

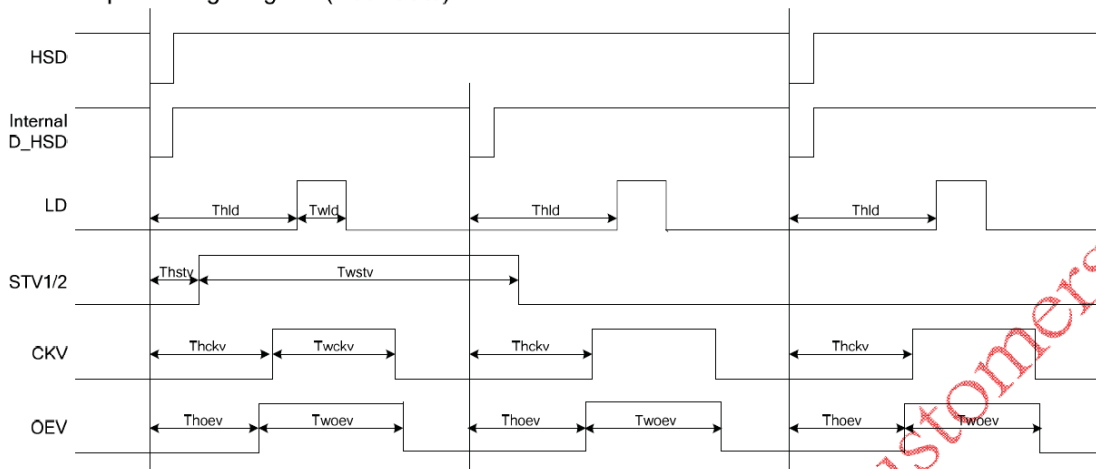
Vertical Timing Diagram of HV Mode (Dual Gate)



Vertical Timing Diagram of DE Mode (Dual Gate)



Gate Output Timing Diagram (Dual Gate)



### 6.3 Controller Information

IC: ILI5960/ ILI6128B

 Please download IC specification at <http://www.orientdisplay.com/pdf/ILI5960.pdf>  
<http://www.orientdisplay.com/pdf/ILI6128B.pdf>

## 7. OPTICAL CHARACTERISTICS

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark		
Viewing Angle range	Horizontal	$\Theta_3$	CR > 10	70	75	-	Deg.	WV-Pol Note 1		
		$\Theta_9$		70	75	-	Deg.			
	Vertical	$\Theta_{12}$		65	70	-	Deg.			
		$\Theta_6$		70	75	-	Deg.			
Luminance Contrast ratio		CR		400	500	-		Note 2		
Cell Transmittance		Tr		-	6.03	-	%	Base on C Light Note 3		
White Chromaticity		$X_w$	$\Theta = 0^\circ$	0.294	0.304	0.314		Note 4 CF Glass		
		$Y_w$		0.329	0.339	0.349				
Reproduction of color (C light)	Red	$R_x$		0.586	0.601	0.616				
		$R_y$		0.309	0.324	0.339				
	Green	$G_x$		0.291	0.301	0.311				
		$G_y$		0.552	0.567	0.582				
Blue	$B_x$	0.133		0.143	0.153					
	$B_y$	0.159		0.174	0.189					
Color Gamut (C light)					-	50	-		%	
Response Time (Rising + Falling)		$T_{RT}$		$T_a = 25^\circ C$ $\Theta = 0^\circ$	-	25	-		ms	Note 5

**Note :**

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).
2. Contrast measurements shall be made at viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Transmittance is the Value with Polarizer
4. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
5. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is  $T_r$ , and 90% to 10% is  $T_d$ .

Figure 2. The Definition of  $V_{th}$  &  $V_{sat}$

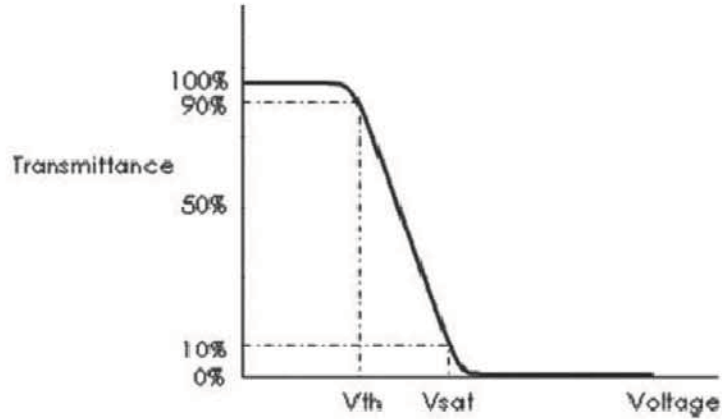


Figure 3. Measurement Set Up

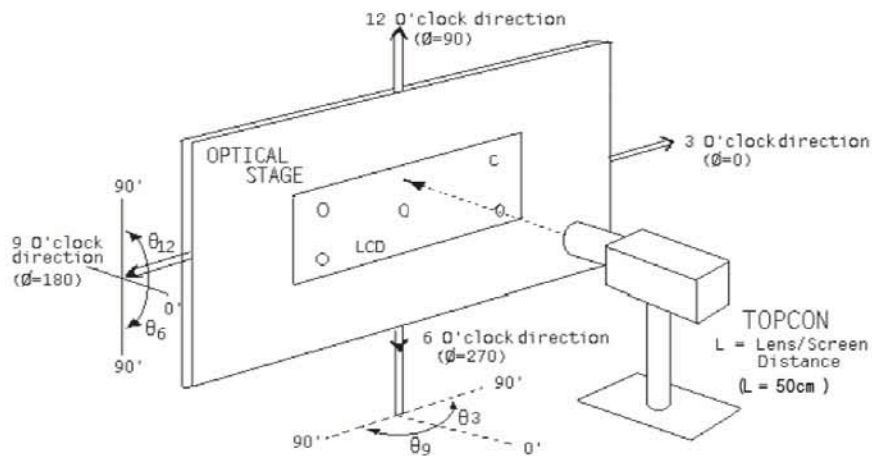
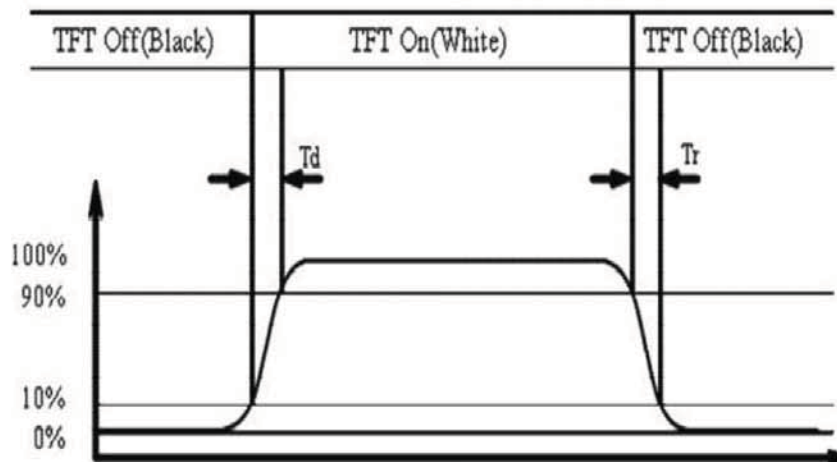


Figure 4. Response Time Testing





Doc.No.: AFY800480A0-7.0N6NTM

REV : A0

PAGE : 16/17

EFFECTIVE DATE : 2013-03-26

## **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**

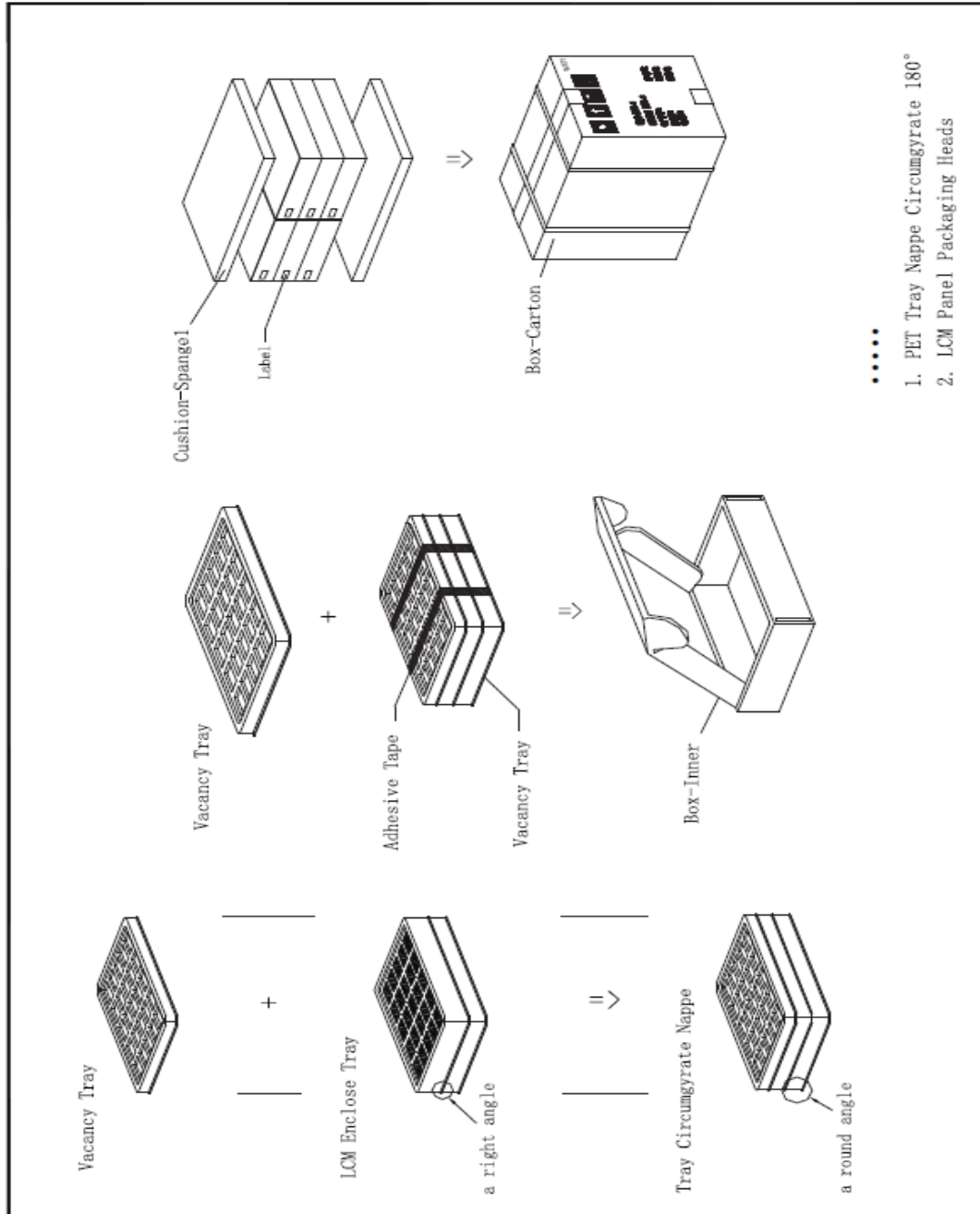
Please download details at <http://www.orientdisplay.com/General-Precautions.html>

## **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.