



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.



CERT. No. QAC0946535 (ISO9001)      CERT. No. HKG002005 (ISO14001)

## Product Specification

**Customer:** \_\_\_\_\_

**Model Name:**          **H032HQ45E2503**    

**Date:** \_\_\_\_\_

**Version:** \_\_\_\_\_

Preliminary Specification

Final Specification

### For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## Table of Contents

1. Record of Revision.....	3
2. General Specifications.....	4
3. Input/Output Terminals.....	5
4. Absolute Maximum Ratings.....	6
5. Electrical Characteristics.....	6
6. Interface Timing.....	8
7. Optical Characteristics.....	10
8. Environmental / Reliability Tests.....	13
9. Mechanical Drawing.....	14
10. Packing.....	15
11. Precautions For Use of LCD modules.....	16



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2017/03/07	First Release	Rich Liang



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 2. General Specifications

	Feature	Spec
<b>Characteristics</b>	Size	3.2 inch
	Resolution	240(horizontal)*320(Vertical)
	Interface	MCU/RGB
	Connect type	Soldering
	Display Colors	262K
	Technology type	a-Si
	Pixel pitch (mm)	0.153x 0.153
	Pixel Configuration	R.G.B.Stripe
	Display Mode	Normally White
	Driver IC	ILI9341V
	Viewing Direction	6 O'clock
	Gray Scale Inversion Direction	12 O'clock
<b>Mechanical</b>	LCM (W x H x D) (mm)	55.04*77.6*2.5
	Active Area(mm)	48.6*64.8
	With /Without TSP	Without
	Weight (g)	15 g
	LED Numbers	6 LEDs

Note 1: Viewing direction for best image quality is different from TFT definition; there is a 180 degree shift.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5%



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 3. Input/output Terminals

No.	Symbol	Description																																																																																													
1	VSS	Ground																																																																																													
2	XL	Touch panel signal																																																																																													
3	XR	Touch panel signal																																																																																													
4	YD	Touch panel signal																																																																																													
5	YU	Touch panel signal																																																																																													
6	VSS	Ground																																																																																													
7	IM0	<table border="1"> <thead> <tr> <th rowspan="2">IM3</th> <th rowspan="2">IM2</th> <th rowspan="2">IM1</th> <th rowspan="2">IM0</th> <th rowspan="2">MCU-Interface Mode</th> <th colspan="2">Pins in use</th> </tr> <tr> <th>Register/Content</th> <th>GRAM</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>8080 MCU 8-bit bus interface I</td> <td>D[7:0]</td> <td>D[7:0],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>8080 MCU 16-bit bus interface I</td> <td>D[7:0]</td> <td>D[15:0],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td rowspan="3">8</td> <td rowspan="3">IM1</td> <td>0</td> <td>1</td> <td>0</td> <td>8080 MCU 9-bit bus interface I</td> <td>D[7:0]</td> <td>D[8:0],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>8080 MCU 18-bit bus interface I</td> <td>D[7:0]</td> <td>D[17:0],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>3-wire 9-bit data serial interface I</td> <td colspan="2">SCL,SDA,CSX</td> </tr> <tr> <td rowspan="5">9</td> <td rowspan="5">IM2</td> <td>0</td> <td>1</td> <td>1</td> <td>4-wire 8-bit data serial interface I</td> <td colspan="2">SCL,SDA,D/CX,CSX</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>8080 MCU 16-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:10],D[8:1],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>8080 MCU 8-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:10],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>8080 MCU 18-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:0],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>8080 MCU 9-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:9],WRX,RDX,CSX,D/CX</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>3-wire 9-bit data serial interface II</td> <td colspan="2">SCL,SDI,SDO,CSX</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>4-wire 8-bit data serial interface II</td> <td colspan="2">SCL,SDI,D/CX,SDO,CSX</td> </tr> </tbody> </table>	IM3	IM2	IM1	IM0	MCU-Interface Mode	Pins in use		Register/Content	GRAM	0	0	0	0	8080 MCU 8-bit bus interface I	D[7:0]	D[7:0],WRX,RDX,CSX,D/CX	0	0	0	1	8080 MCU 16-bit bus interface I	D[7:0]	D[15:0],WRX,RDX,CSX,D/CX	8	IM1	0	1	0	8080 MCU 9-bit bus interface I	D[7:0]	D[8:0],WRX,RDX,CSX,D/CX	0	1	1	8080 MCU 18-bit bus interface I	D[7:0]	D[17:0],WRX,RDX,CSX,D/CX	0	1	0	3-wire 9-bit data serial interface I	SCL,SDA,CSX		9	IM2	0	1	1	4-wire 8-bit data serial interface I	SCL,SDA,D/CX,CSX		1	0	0	0	8080 MCU 16-bit bus interface II	D[8:1]	D[17:10],D[8:1],WRX,RDX,CSX,D/CX	1	0	0	1	8080 MCU 8-bit bus interface II	D[17:10]	D[17:10],WRX,RDX,CSX,D/CX	1	0	1	0	8080 MCU 18-bit bus interface II	D[8:1]	D[17:0],WRX,RDX,CSX,D/CX	1	0	1	1	8080 MCU 9-bit bus interface II	D[17:10]	D[17:9],WRX,RDX,CSX,D/CX	1	1	0	1	3-wire 9-bit data serial interface II	SCL,SDI,SDO,CSX		1	1	1	0	4-wire 8-bit data serial interface II	SCL,SDI,D/CX,SDO,CSX	
IM3	IM2	IM1						IM0	MCU-Interface Mode	Pins in use																																																																																					
			Register/Content	GRAM																																																																																											
0	0	0	0	8080 MCU 8-bit bus interface I	D[7:0]	D[7:0],WRX,RDX,CSX,D/CX																																																																																									
0	0	0	1	8080 MCU 16-bit bus interface I	D[7:0]	D[15:0],WRX,RDX,CSX,D/CX																																																																																									
8	IM1	0	1	0	8080 MCU 9-bit bus interface I	D[7:0]	D[8:0],WRX,RDX,CSX,D/CX																																																																																								
		0	1	1	8080 MCU 18-bit bus interface I	D[7:0]	D[17:0],WRX,RDX,CSX,D/CX																																																																																								
		0	1	0	3-wire 9-bit data serial interface I	SCL,SDA,CSX																																																																																									
9	IM2	0	1	1	4-wire 8-bit data serial interface I	SCL,SDA,D/CX,CSX																																																																																									
		1	0	0	0	8080 MCU 16-bit bus interface II	D[8:1]	D[17:10],D[8:1],WRX,RDX,CSX,D/CX																																																																																							
		1	0	0	1	8080 MCU 8-bit bus interface II	D[17:10]	D[17:10],WRX,RDX,CSX,D/CX																																																																																							
		1	0	1	0	8080 MCU 18-bit bus interface II	D[8:1]	D[17:0],WRX,RDX,CSX,D/CX																																																																																							
		1	0	1	1	8080 MCU 9-bit bus interface II	D[17:10]	D[17:9],WRX,RDX,CSX,D/CX																																																																																							
1	1	0	1	3-wire 9-bit data serial interface II	SCL,SDI,SDO,CSX																																																																																										
1	1	1	0	4-wire 8-bit data serial interface II	SCL,SDI,D/CX,SDO,CSX																																																																																										
10	SDO	Serial output signal If not used, open this pin																																																																																													
11	NC	-																																																																																													
12	SDI	Serial input signal ( <i>Fix to VDDI level when not in us</i> )																																																																																													
13	D17	Data bus																																																																																													
14	D16	Data bus																																																																																													
15	DB15	Data bus																																																																																													
16	DB14	Data bus																																																																																													
17	DB13	Data bus																																																																																													
18	DB12	Data bus																																																																																													
19	DB11	Data bus																																																																																													
20	DB10	Data bus																																																																																													
21	DB9	Data bus																																																																																													
22	DB8	Data bus																																																																																													
23	DB7	Data bus																																																																																													
24	DB6	Data bus																																																																																													



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

25	DB5	Data bus
26	DB4	Data bus
27	DB3	Data bus
28	DB2	Data bus
29	DB1	Data bus
30	DB0	Data bus
31	CS	Chip select pin
32	RESET	Reset signal pin
33	RS/SCL	A register select signal/ Synchronous clock signal (SCL) in serial Interface
34	WR	Write signal pin <i>(Fix to VDDI level when not in us)</i>
35	RD	Read signal pin <i>(Fix to VDDI level when not in us)</i>
36	VSYNC	Frame Synchronous Signal <i>(Fix to VDDI level when not in us)</i>
37	HSYNC	Line Synchronous Signal <i>(Fix to VDDI level when not in us)</i>
38	DOCLK	Dot-clock signal and oscillator source <i>(Fix to VDDI level when not in us)</i>
39	ENABLE	Display enable signal <i>(Fix to VDDI level when not in us)</i>
40	VCC	power supply for interface logic circuits
41	VCC	power supply for interface logic circuits
42	VSS	Ground
43	LEDK	LED Cathode K
44	LEDA	LED Anode A
45	VSS	Ground



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 4. Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	$V_{CC}$	2.5	4.8	V	
Input Voltage	IOVCC	1.65	3.3	V	
Operating Temperature	$T_{OPR}$	-10	60	°C	
Storage Temperature	$T_{STG}$	-20	70	°C	

## 5. Electrical Characteristics

### 5.1 Driving TFT LCD Panel

$T_a = 25\text{ }^{\circ}\text{C}$

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Analog Supply Voltage	$V_{CC}$	2.5	-	3.3	V	
Logic Signal Input /Output Voltage	IOVCC	1.65		3.3	V	
Input Signal Voltage	Low Level	$V_{IL}$	VSS	-	0.3x IOVCC	V
	High Level	$V_{IH}$	0.7x IOVCC	-	IOVCC	V
TFT Common Electrode	$V_{COMH}$	2.5	-	5	V	
TFT Gate ON Voltage	$V_{GH}$	10	-	16	V	
TFT Gate ON Voltage	$V_{GL}$	-10	-	-5	V	



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	$I_F$	-	90		mA	
Forward Voltage	$V_F$	-	3.2	3.3	V	
Backlight Power consumption	$W_{BL}$	-	0.256	0.33	W	
LED Lifetime		25000	-	-	Hrs	

Note 1: Each LED:  $I_F = 15 \text{ mA}$ ,  $V_F = 3.2 \text{ V}$ .

Note 2: Optical performance should be evaluated at  $T_a = 25^\circ \text{C}$  only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness.

Typical operating life time is estimated data.





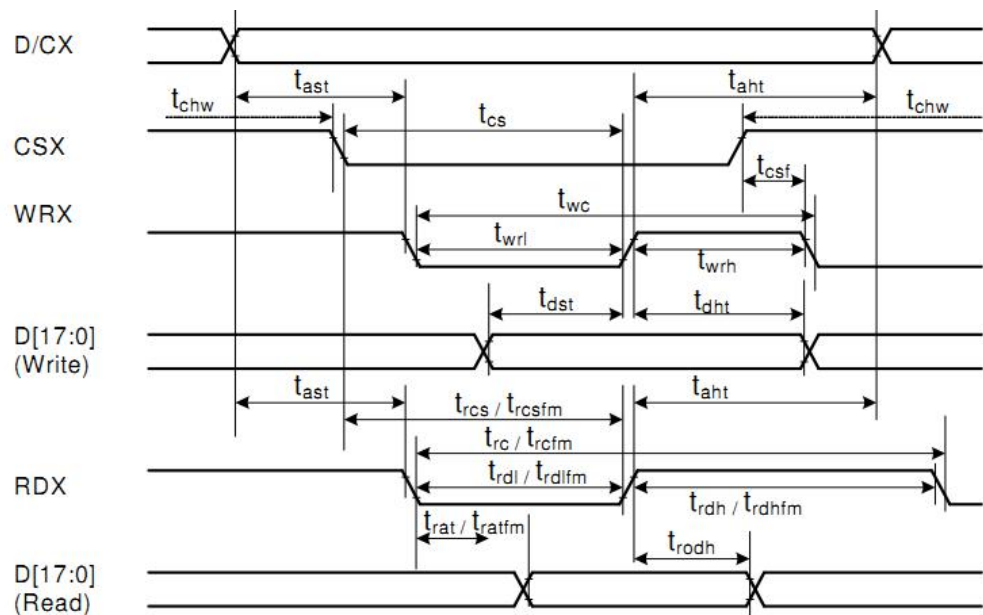
# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6. Interface Timing

### 6.1 Timing Parameter

#### 6.1.1 Parallel 18/16/9/8 bit interface timing(8080-II system)



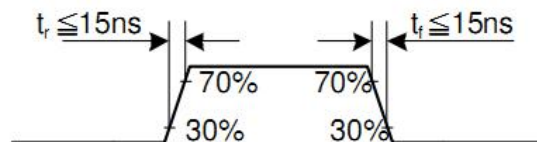


# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	0	-	ns	
CSX	tchwh	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[17:10]&D[8:1], D[17:10], D[17:9]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

Note:  $T_a = -30$  to  $70$  °C,  $V_{DDI} = 1.65V$  to  $3.3V$ ,  $V_{CI} = 2.5V$  to  $3.3V$ ,  $V_{SS} = 0V$ .

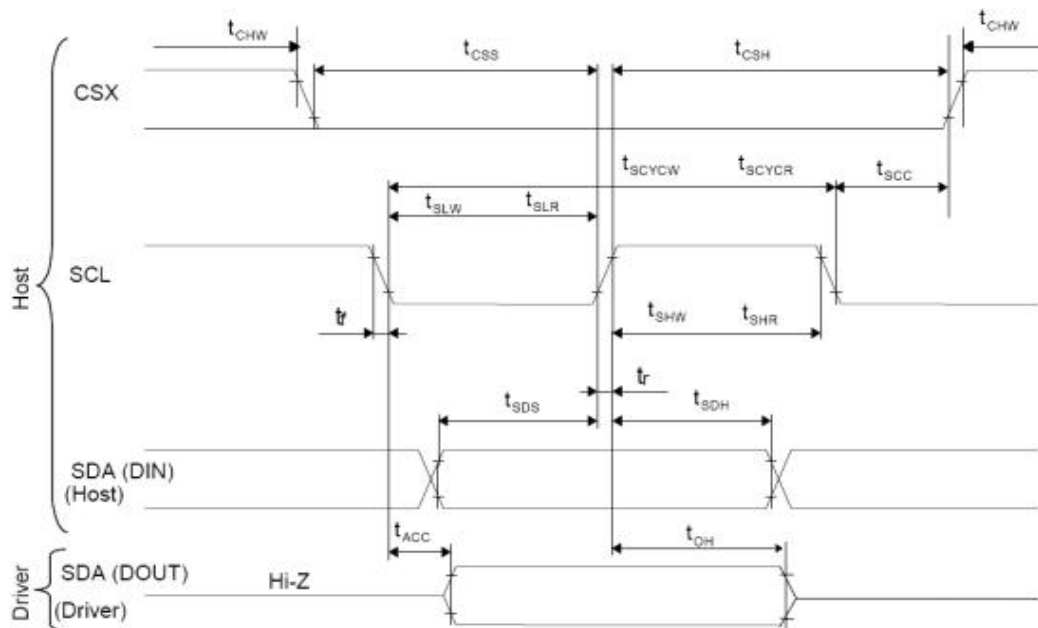




# 深圳市勋瑞光电科技有限公司

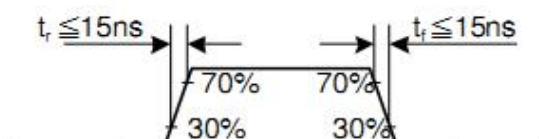
Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6.1.2 Serial interface timing characteristics(3-line SPI system)



Signal	Symbol	Parameter	min	max	Unit	Description
SCL	tscycw	Serial Clock Cycle (Write)	100	-	ns	
	tshw	SCL "H" Pulse Width (Write)	40	-	ns	
	tslw	SCL "L" Pulse Width (Write)	40	-	ns	
	tscycr	Serial Clock Cycle (Read)	150	-	ns	
	tshr	SCL "H" Pulse Width (Read)	60	-	ns	
	tslr	SCL "L" Pulse Width (Read)	60	-	ns	
SDA / SDI (Input)	tsds	Data setup time (Write)	30	-	ns	
	tsdh	Data hold time (Write)	30	-	ns	
SDA / SDO (Output)	tacc	Access time (Read)	10	-	ns	
	toh	Output disable time (Read)	10	50	ns	
CSX	tsc	SCL-CSX	20	-	ns	
	tch	CSX "H" Pulse Width	40	-	ns	
	tcss	CSX-SCL Time	60	-	ns	
	tcs		65	-	ns	

Note:  $T_a = 25\text{ }^\circ\text{C}$ ,  $V_{DDI}=1.65\text{V to }3.3\text{V}$ ,  $V_{CI}=2.5\text{V to }3.3\text{V}$ ,  $AGND=V_{SS}=0\text{V}$

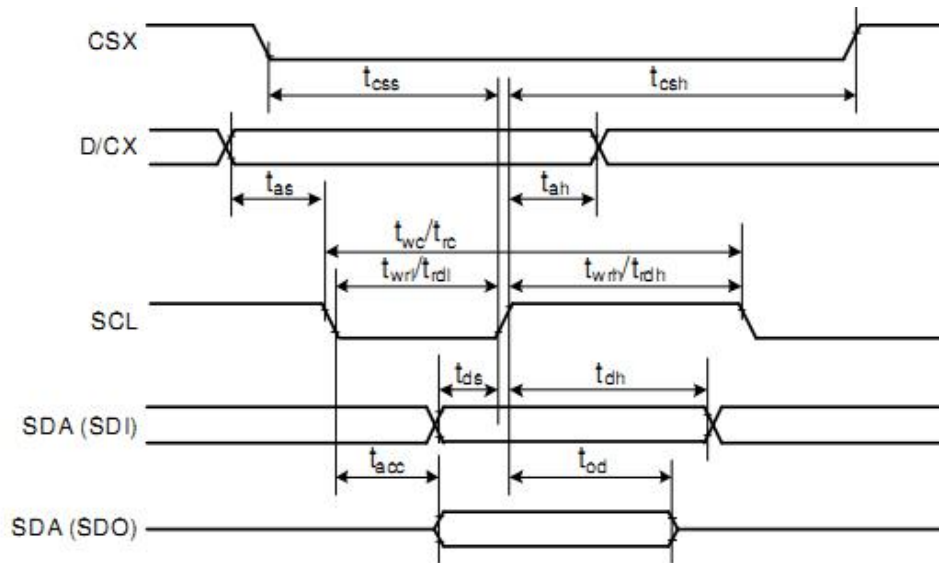




# 深圳市勋瑞光电科技有限公司

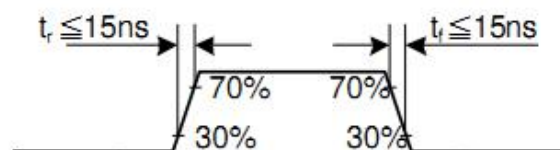
Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6.1.3 Serial interface timing characteristics(4-line SPI system)



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tcss	Chip select time (Write)	40	-	ns	
	tcsh	Chip select hold time (Read)	40	-	ns	
SCL	twc	Serial clock cycle (Write)	100	-	ns	
	trh	SCL "H" pulse width (Write)	40	-	ns	
	trl	SCL "L" pulse width (Write)	40	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL "H" pulse width (Read)	60	-	ns	
	trdl	SCL "L" pulse width (Read)	60	-	ns	
D/CX	tas	D/CX setup time	10	-		
	tah	D/CX hold time (Write / Read)	10	-		
SDA / SDI (Input)	tds	Data setup time (Write)	30	-	ns	
	tdh	Data hold time (Write)	30	-	ns	
SDA / SDO (Output)	tacc	Access time (Read)	10	-	ns	For maximum CL=30pF
	tod	Output disable time (Read)	10	50	ns	For minimum CL=8pF

Note:  $T_a = 25\text{ }^\circ\text{C}$ ,  $V_{DDI}=1.65\text{V to }3.3\text{V}$ ,  $V_{CI}=2.5\text{V to }3.3\text{V}$ ,  $AGND=VSS=0\text{V}$

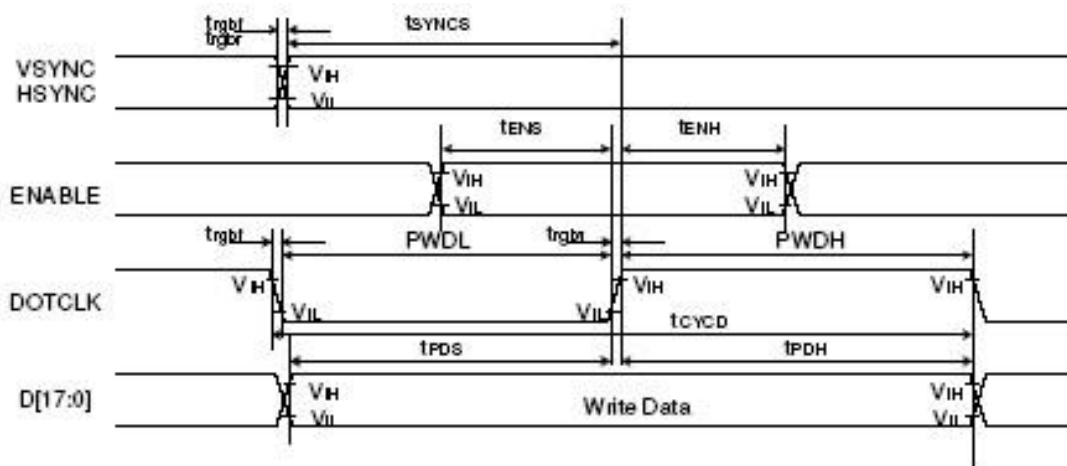




# 深圳市勋瑞光电科技有限公司

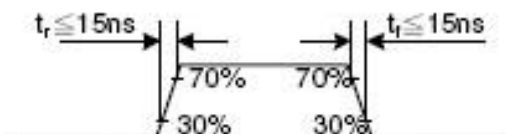
Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6.1.4 Parallel 18/16/9/8 bit RGB interface timing



Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC / HSYNC	$t_{syncs}$	VSYNC/HSYNC setup time	15	-	ns	18/16-bit bus RGB interface mode
	$t_{synch}$	VSYNC/HSYNC hold time	15	-	ns	
DE	$t_{des}$	DE setup time	15	-	ns	
	$t_{deh}$	DE hold time	15	-	ns	
D[17:0]	$t_{dcs}$	Data setup time	15	-	ns	
	$t_{dch}$	Data hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level period	15	-	ns	
	PWDL	DOTCLK low-level period	15	-	ns	
	$t_{cycp}$	DOTCLK cycle time	100	-	ns	
	$t_{tr}, t_{trf}$	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	
VSYNC / HSYNC	$t_{syncs}$	VSYNC/HSYNC setup time	15	-	ns	6-bit bus RGB interface mode
	$t_{synch}$	VSYNC/HSYNC hold time	15	-	ns	
DE	$t_{des}$	DE setup time	15	-	ns	
	$t_{deh}$	DE hold time	15	-	ns	
D[17:0]	$t_{dcs}$	Data setup time	15	-	ns	
	$t_{dch}$	Data hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level pulse period	15	-	ns	
	PWDL	DOTCLK low-level pulse period	15	-	ns	
	$t_{cycp}$	DOTCLK cycle time	100	-	ns	
	$t_{tr}, t_{trf}$	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	

Note:  $T_a$  = -30 to 70 °C,  $V_{DD1}$  = 1.65V to 3.3V,  $V_{CI}$  = 2.5V to 3.3V,  $AGND$  =  $V_{SS}$  = 0V

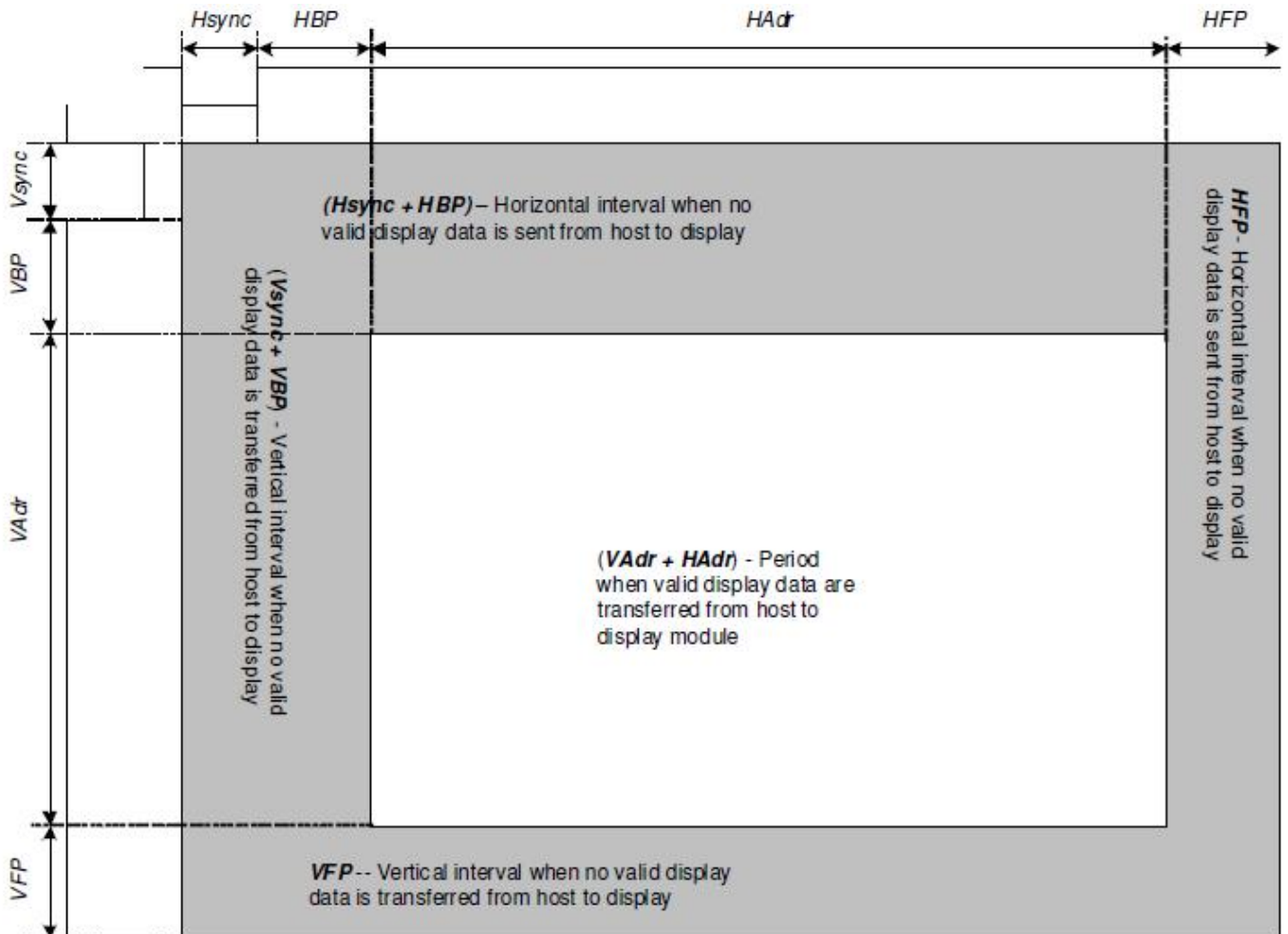






# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

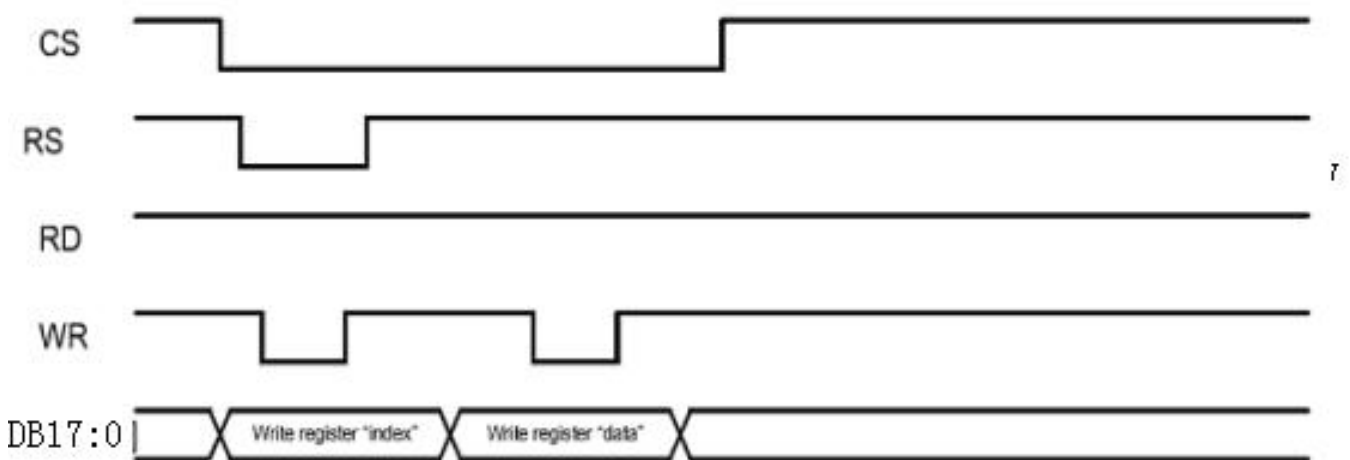


Parameters	Symbols	Condition	Min.	Typ.	Max.	Units
Horizontal Synchronization	Hsync		2	10	16	DOTCLK
Horizontal Back Porch	HBP		2	20	24	DOTCLK
Horizontal Address	HAdr		-	240	-	DOTCLK
Horizontal Front Porch	HFP		2	10	16	DOTCLK
Vertical Synchronization	Vsync		1	2	4	Line
Vertical Back Porch	VBP		1	2	-	Line
Vertical Address	VAdr		-	320	-	Line
Vertical Front Porch	VFP		3	4	-	Line

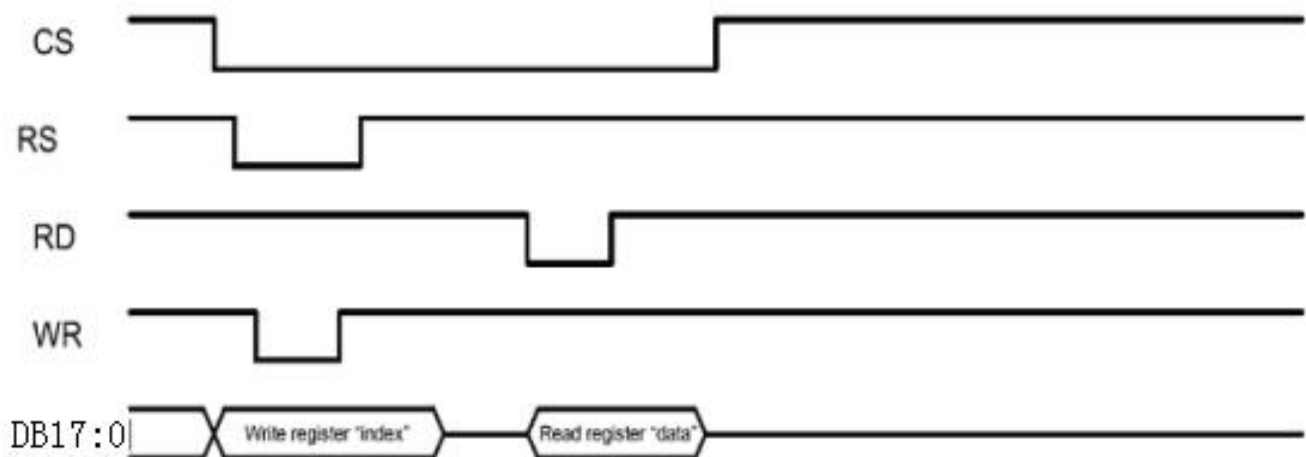


## 6.2 Register Write/Read Timing

### (a) Write to register



### (b) Read from register



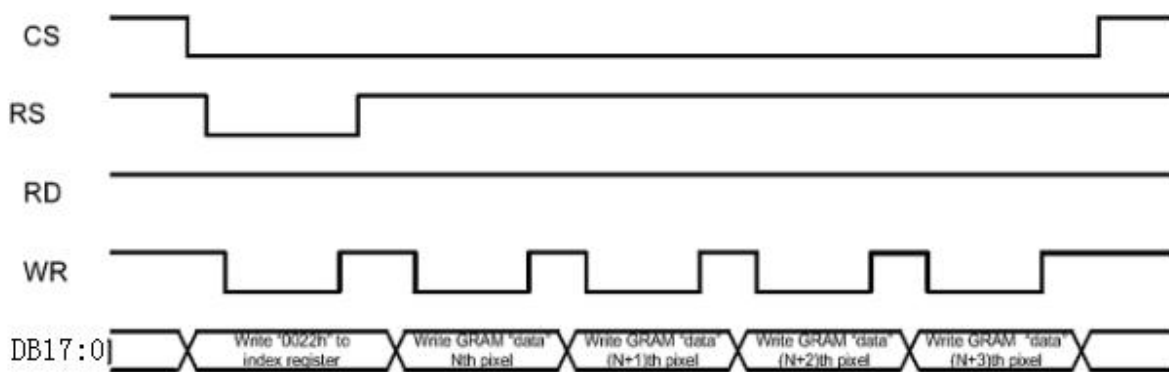


# 深圳市勋瑞光电科技有限公司

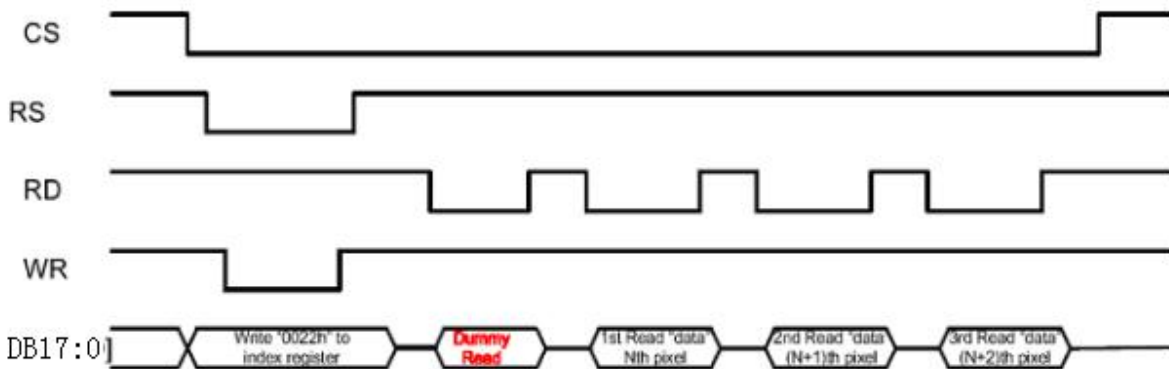
Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6.3 GRAM Wite/Read Timing

### (a) Write to GRAM



### (b) Read from GRAM





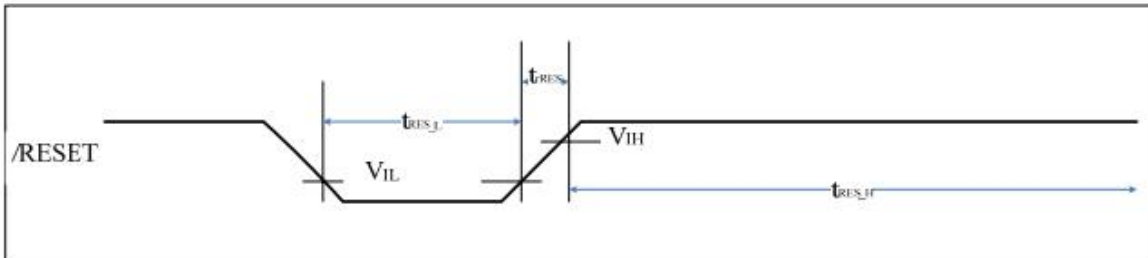


# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 6.4 Reset Timing Characteristics

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	$t_{RESL}$	ms	1	-	-
Reset rise time	$t_{RES}$	$\mu s$	-	-	10
Reset high-level width	$t_{RESH}$	ms	50		



Reset timing



## 7. Optical Characteristics

Items	Symbol	Condition	Min	Typ	Max	Unit	Remark	
Viewing angles	$\theta_T$	Center CR $\geq$ 10	-	65	-	Degree	Note2	
	$\theta_B$		-	55	-			
	$\theta_L$		-	65	-			
	$\theta_R$		-	65	-			
Contrast Ratio	CR	$\Theta = 0$	300	350	-	-	Note1, Note3	
Response Time	$T_{ON}$	25°C	-	20	30	ms	Note1, Note4	
	$T_{OFF}$		-	25	35			
Chromaticity	White	Backlight is on	$X_W$	0.26	0.31	0.36	-	Note1, Note5
			$Y_W$	0.28	0.33	0.38	-	
Uniformity	U		80	-	-	%	Note1, Note6	
NTSC			-	50	-	%	Note5	
Luminance	L		-	250	-	nits	Note1, Note7	

Test Conditions:

1. IF= 20mA (one channel), the ambient temperature is 25.
2. The test systems refer to Note 1 and Note 2.

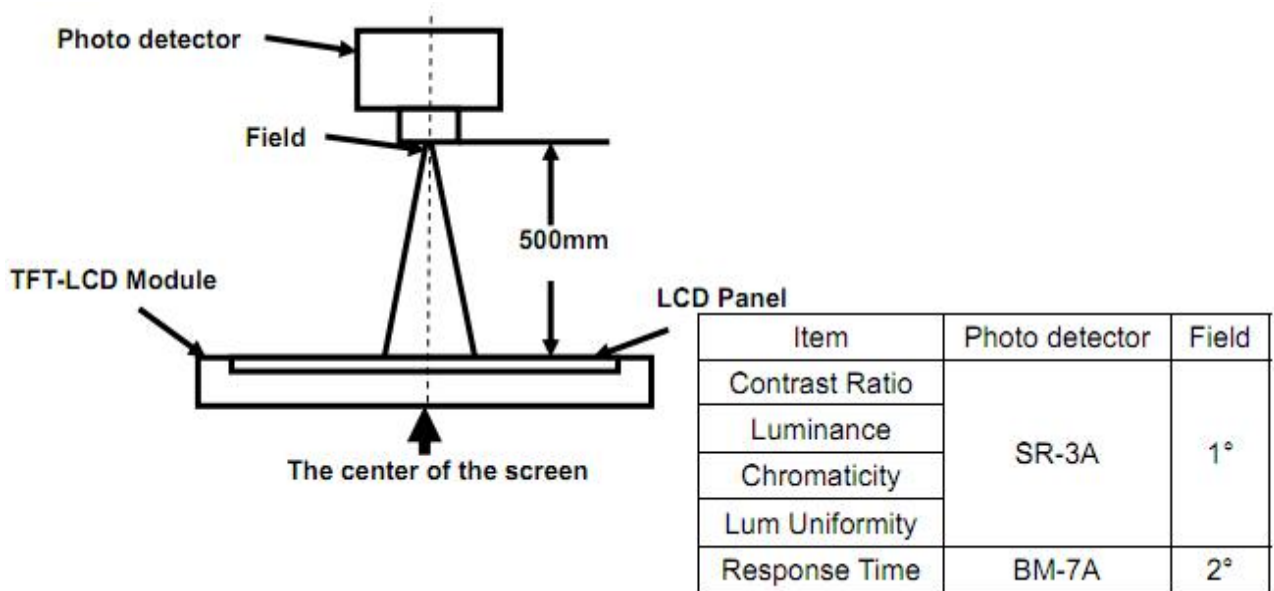
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.



Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

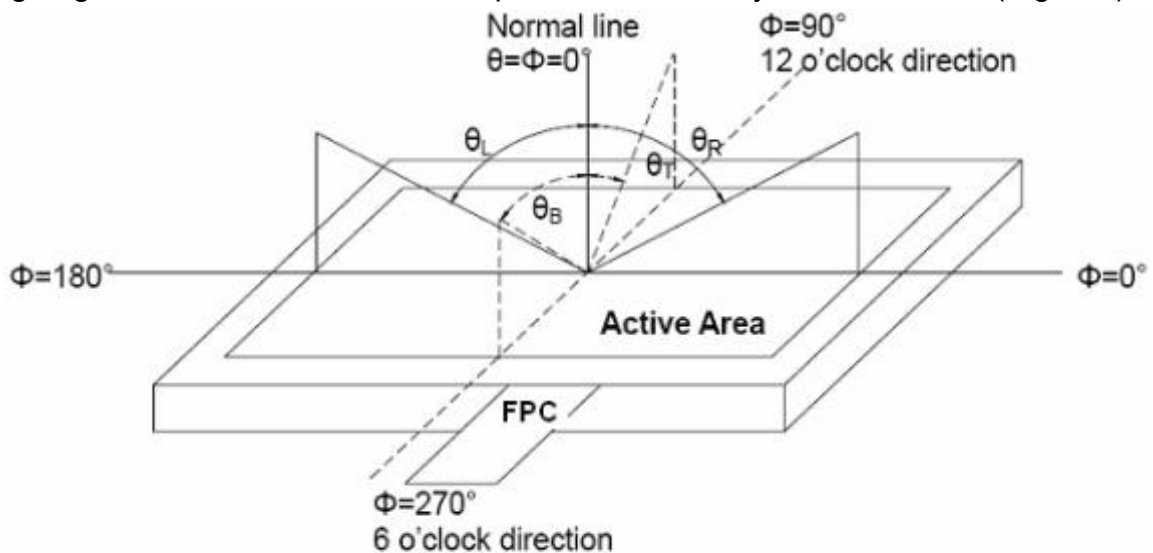


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

“White state “: The state is that the LCD should drive by V<sub>white</sub>.



# 深圳市勋瑞光电科技有限公司

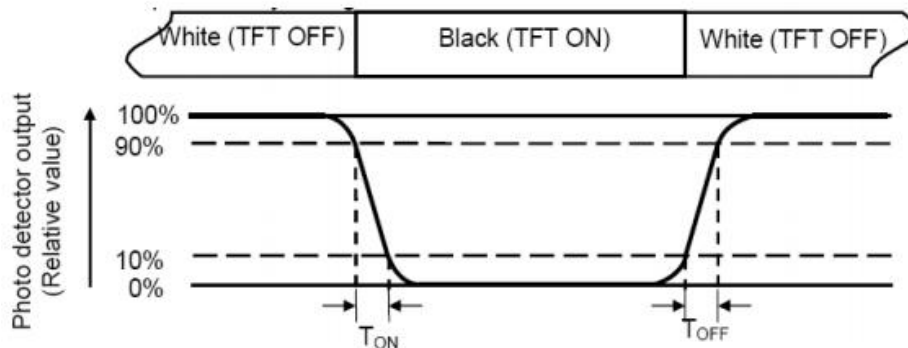
Xunrui photoelectric technology (shenzhen) CO.,LTD.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931).

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) =  $L_{min} / L_{max}$

L-----Active area length W----- Active area width

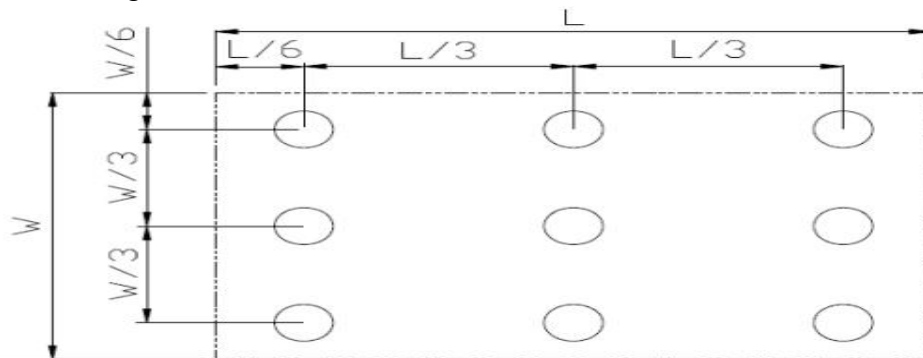


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +60°C, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -10°C, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +70°C, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -20°C, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60°C, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-20°C 30 min ~ +70°C 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5times; (Environment: 15°C ~35°C, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z,3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. TS is the temperature of panel's surface.

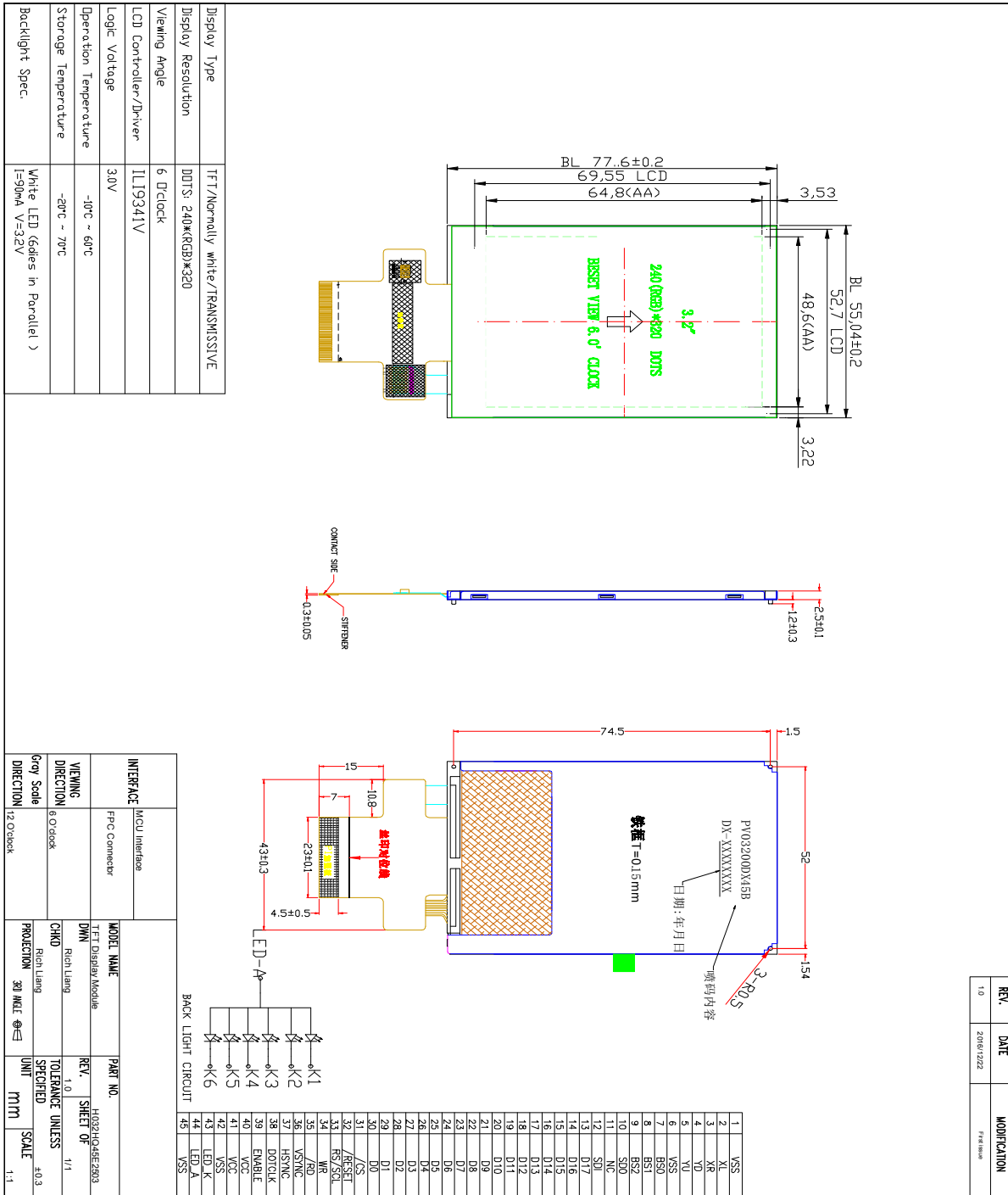
Note: 2. Ta is the ambient temperature of sample.



# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 9. Mechanical Drawing



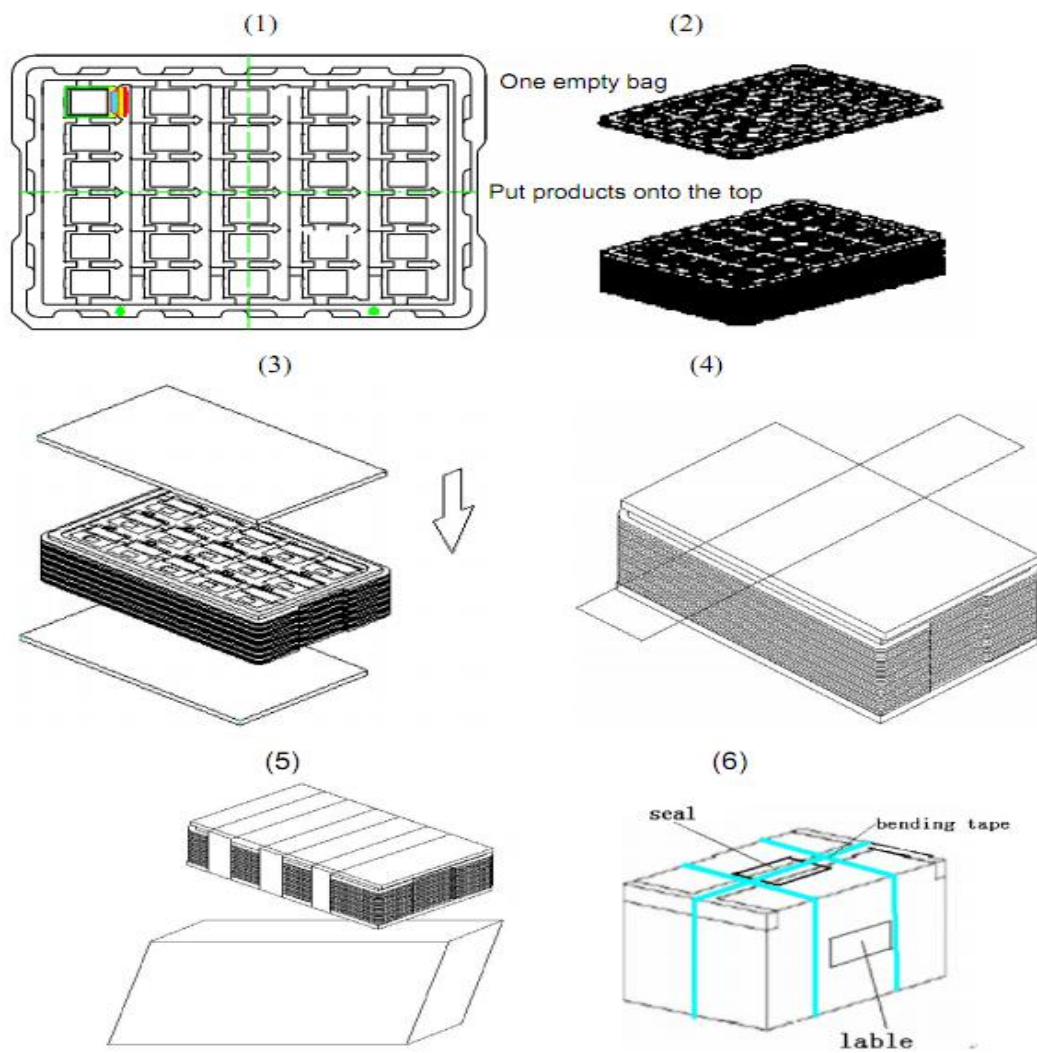


# 深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO.,LTD.

## 10. Packing

### Packing Method



1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.





## 11. Precautions for Use of LCD modules

### 11.1 Handling Precautions

11.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water - Ketone
- Aromatic solvents

11.1.6 Do not attempt to disassemble the LCD Module.

11.1.7 If the logic circuit power is off, do not apply the input signals.

11.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1 Be sure to ground the body when handling the LCD Modules.

11.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

### 11.2 Storage Precautions

11.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2 The LCD modules should be stored under the storage temperature range if the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

11.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

### 11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.