



深圳市思迪科科技有限公司

SHENZHEN CDTECH ELECTRONICS

Product Specification

Model Name	S043HWQ65HP
Description	4.3" WVGA 480(RGB)x272 Dots
Date	2021/03/18
Version	1.0

Approved by/Date	Check by/Date	Prepared by/Date
ZHP 2021/03/18	HZX 2021/03/18	ZWF 2021/03/18

Customer Approval	
Date	



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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2021/03/18	First Release.	ZWF

2. General Specifications

	Feature	Spec
Characteristics	Size	4.3 inch
	Resolution	480(horizontal)*272(Vertical)
	Interface	RGB-18bit
	Connect type	Connector
	Display Colors	16.2M
	Pixel pitch (mm)	0.1188*0.1122
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally black
	LCD Driver IC	SC7283
	Viewing Direction	IPS
Mechanical	LCM (W x H x D) (mm)	104.90*66.60*2.75
	Active Area(mm)	95.04 x 53.86
	With /Without TP	Without TP
	Weight (g)	0.05kg
	LED Numbers	10 LEDS

Note 1: Requirements on Environmental Protection: RoHs

Note 2: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

LCD PIN-MAP

No.	Symbol	Description
1	VLED-	Backlight LED Cathode
2	VLED+	Backlight LED Anode.
3	DGND1	Ground
4	L/R	Horizontal inversion (Note 2)
5	U/D	Vertical inversion (Note 2)
6-7	NC	No connect .
8	AGND1	Ground
9-16	NC	No connect
17	AGND2	Ground
18-20	NC	No connect
21	VDD(3.3V)	Power supply
22	NC	No connect
23	AGND3	Ground
24-26	NC	No connect
27	IOVCC	Power supply for I/O
28	RESET	Reset Pin for LCD
29	DGND2	Ground
30	IOVCC	Power supply for I/O
31	NC	No connect
32	DGND3	Ground
33	SHUT	Normally pulled high. SHUT="1": Normally operation (Default) SHUT="0": Timing controller, source driver will turn off ,all output are High-Z.
34	CSB	Chip select pin of serial interface ,if is not used should be connected to "VDD".
35	SDI	Data input pin in serial mode ,if is not used should be connected to "GND".
36	SCK	Clock input pin in serial mode ,if is not used should be connected to "GND".
37	AGND4	Ground
38	DEN	Data enable input. Active high to enable the input data bus under "DE Mode."
39	B5	Data bus (MSB)
40	B4	Data bus
41	B3	Data bus
42	B2	Data bus
43	B1	Data bus

44	B0	Data bus (LSB)
45	G5	Data bus (MSB)
46	G4	Data bus
47	G3	Data bus
48	G2	Data bus
49	G1	Data bus
50	G0	Data bus (LSB)
51	R5	Data bus (MSB)
52	R4	Data bus
53	R3	Data bus
54	R2	Data bus
55	R1	Data bus
56	R0	Data bus (LSB)
57	VSYNC	Vertical sync input. Negative polarity..
58	HSYNC	Horizontal sync input. Negative polarity.
59	DOTCLK	Dot clock signal input. Latching input data at its rising edge.
60	NC	No connect
61	DGND4	System Ground
62-64	NC	No connect
65	DGND5	System Ground
66-67	NC	No connect

Note 2: when L/R=0 set right to left scan direction
when L/R=1 set left to right scan direction
when U/D=1 set top to bottom scan direction
when U/D=0 set bottom to top scan direction

4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	VDD	-0.5	-	3.96	V	-
Operating Temperature	TOPR	-30	-	85	°C	-
Storage Temperature	TSTG	-30	-	85	°C	

5. Electrical Characteristics

5.1 Driving TFT LCD Panel

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		V _{DD}	3.0	3.3	3.6	V	
Input Signal Voltage	Low Leve	V _{IL}	GND	-	0.3x VDD	V	
	High Level	V _{IH}	0.7x VDD	-	VDD	V	
Output Signal Voltage	Low Leve	V _{IL}	GND	-	VDD+0.4	V	
	High Level	V _{IH}	VDD-0.4	-	VDD	V	
(Panel+LSI) Power Consumption		Black Mode (60Hz)	-	74		nW	
		Standby	-	50	-	uW	

5.2 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I _F	-	40	50	mA	
Forward Voltage	V _F	14.8	16	17.2	V	
Backlight Power consumption	W _{BL}	-	0.640	0.825	W	
LED Lifetime		-	30000	-	Hrs	

Note 1: Each LED: I_F =20 mA, V_F =2.8~3.4V.

Note 2: Optical performance should be evaluated at Ta=25℃ 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.

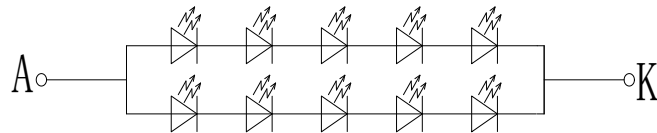
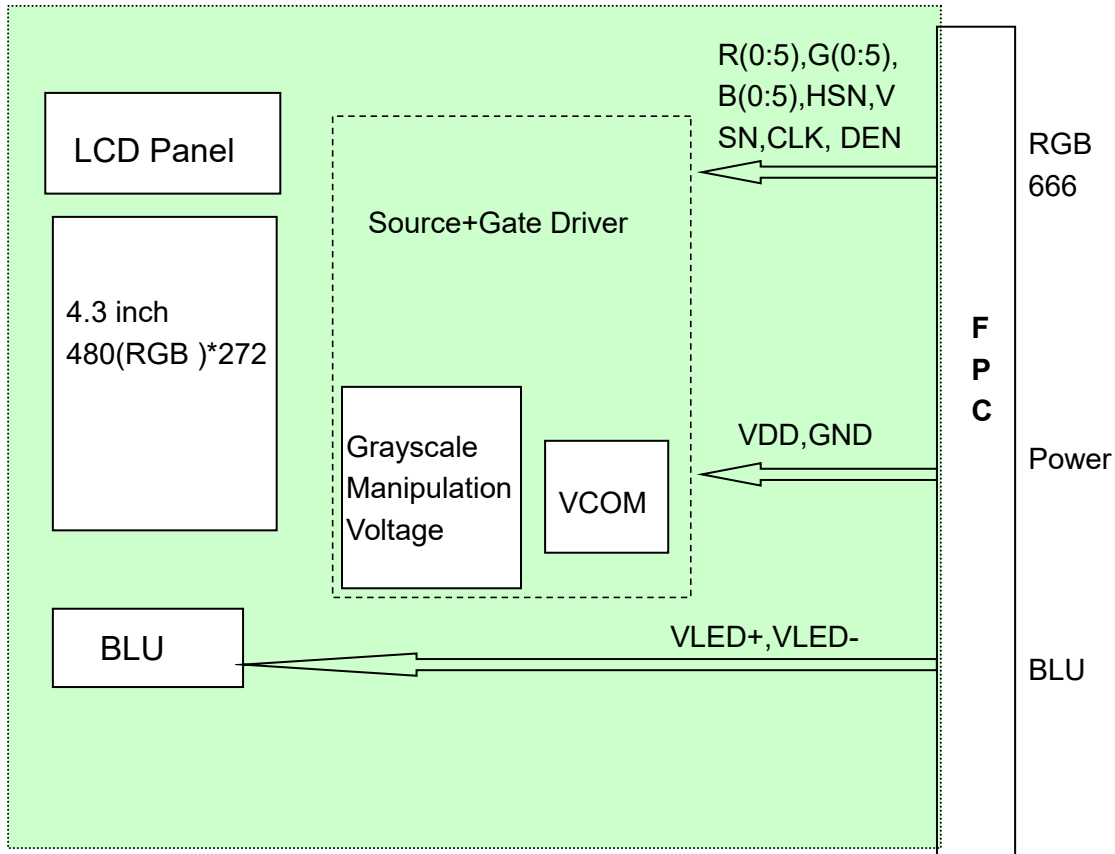


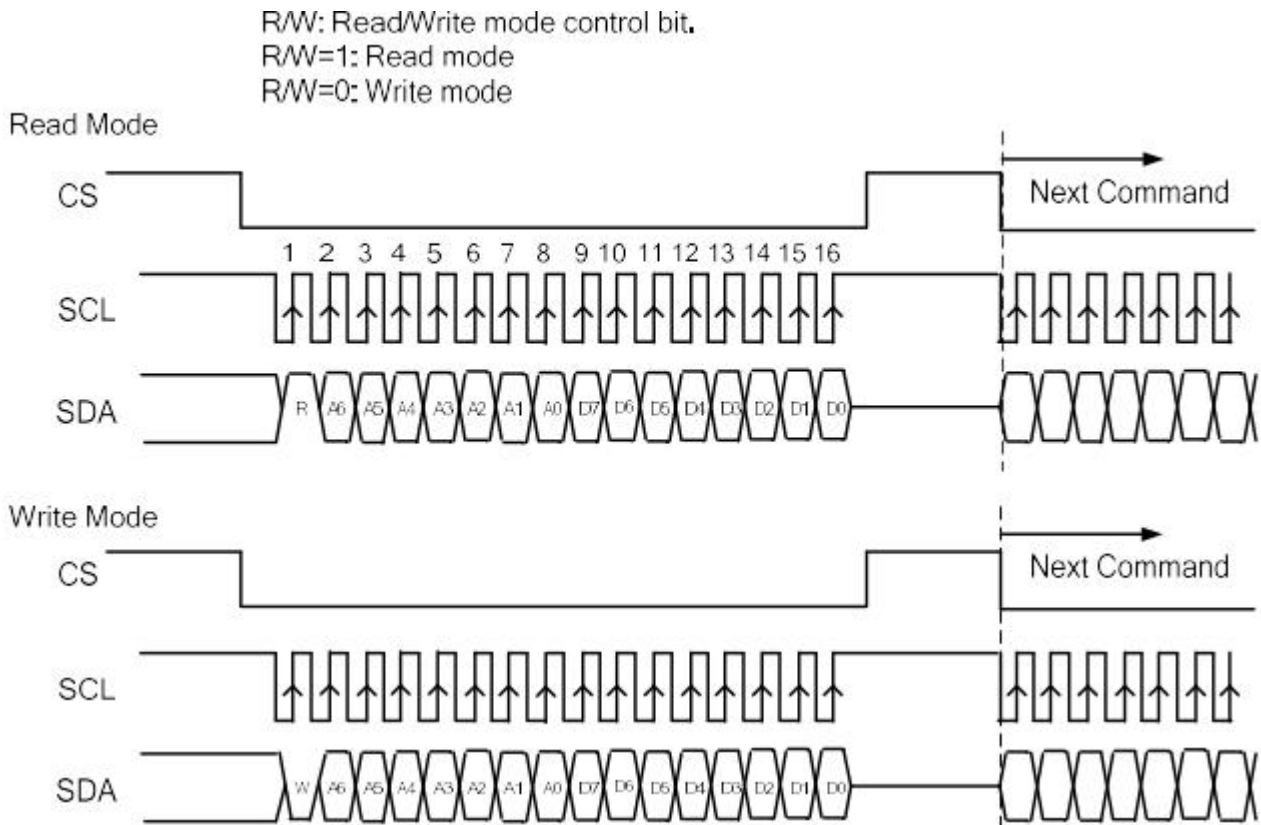
Figure: LED connection of backlight(Constant Current)

5.3 Block Diagram



6. Interface Timing

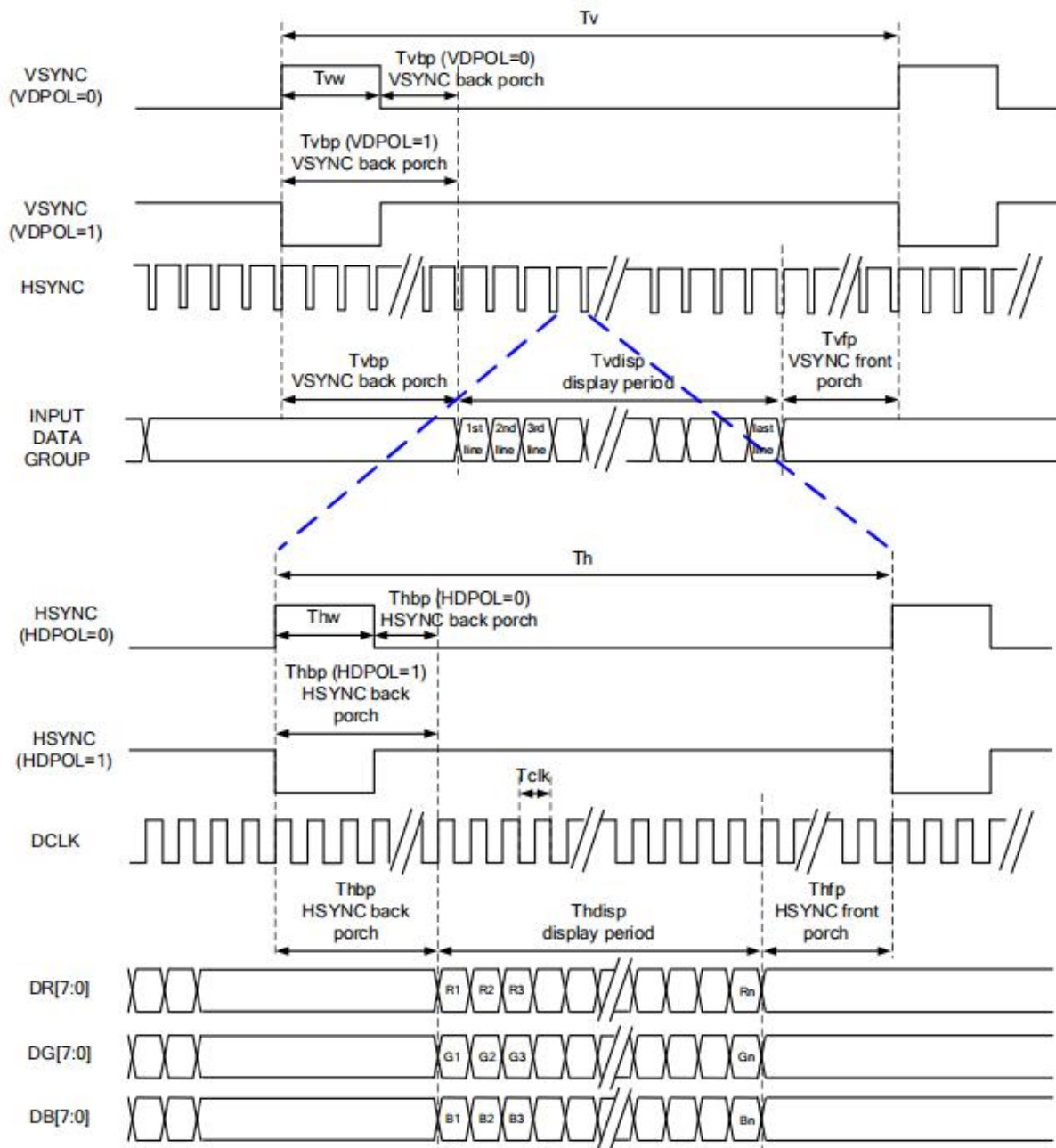
6.1 3-wire Serial Interface



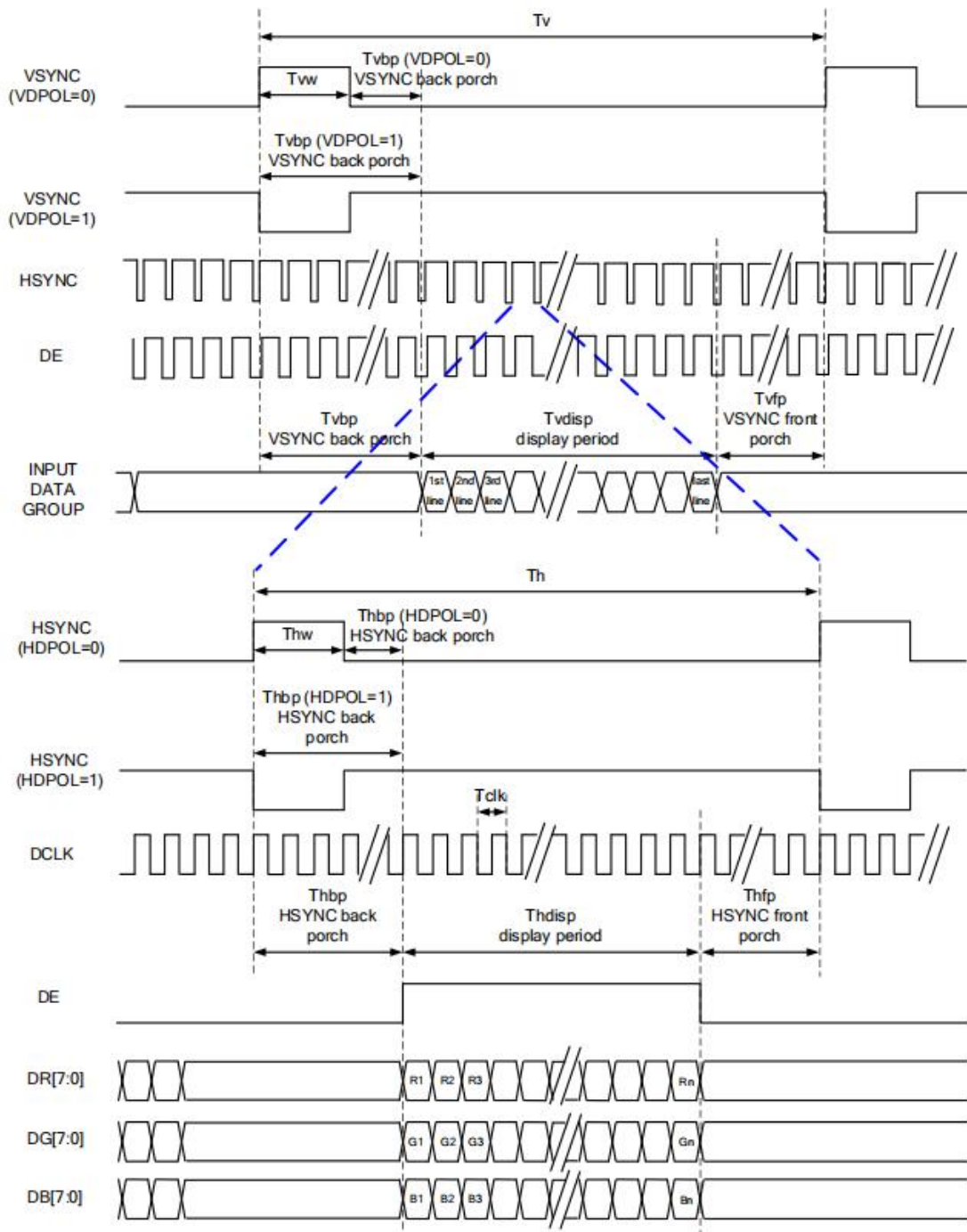
- Each serial command consists of 16 bits of data which is loaded one bit a time at the rising edge of serial clock SCL.
- Command loading operation starts from the falling edge of CS and is completed at the next rising edge of CS.
- The serial control block is operational after power on reset, but commands are established by the VSYNC signal. If command is transferred multiple times for the same register, the last command before the VSYNC signal is valid.
- If less than 16 bits of SCL are input while CS is low, the transferred data is ignored.
- If 16 bits or more of SCL are input while CS is low, the previous 16 bits of transferred data before then rising edge of CS pulse are valid data.
- Serial block operates with the SCL clock
- Serial data can be accepted in the power save mode.
- After power on reset or GRB reset, it is required 100ms delay to begin SPI communication.

6.2 RGB Interface

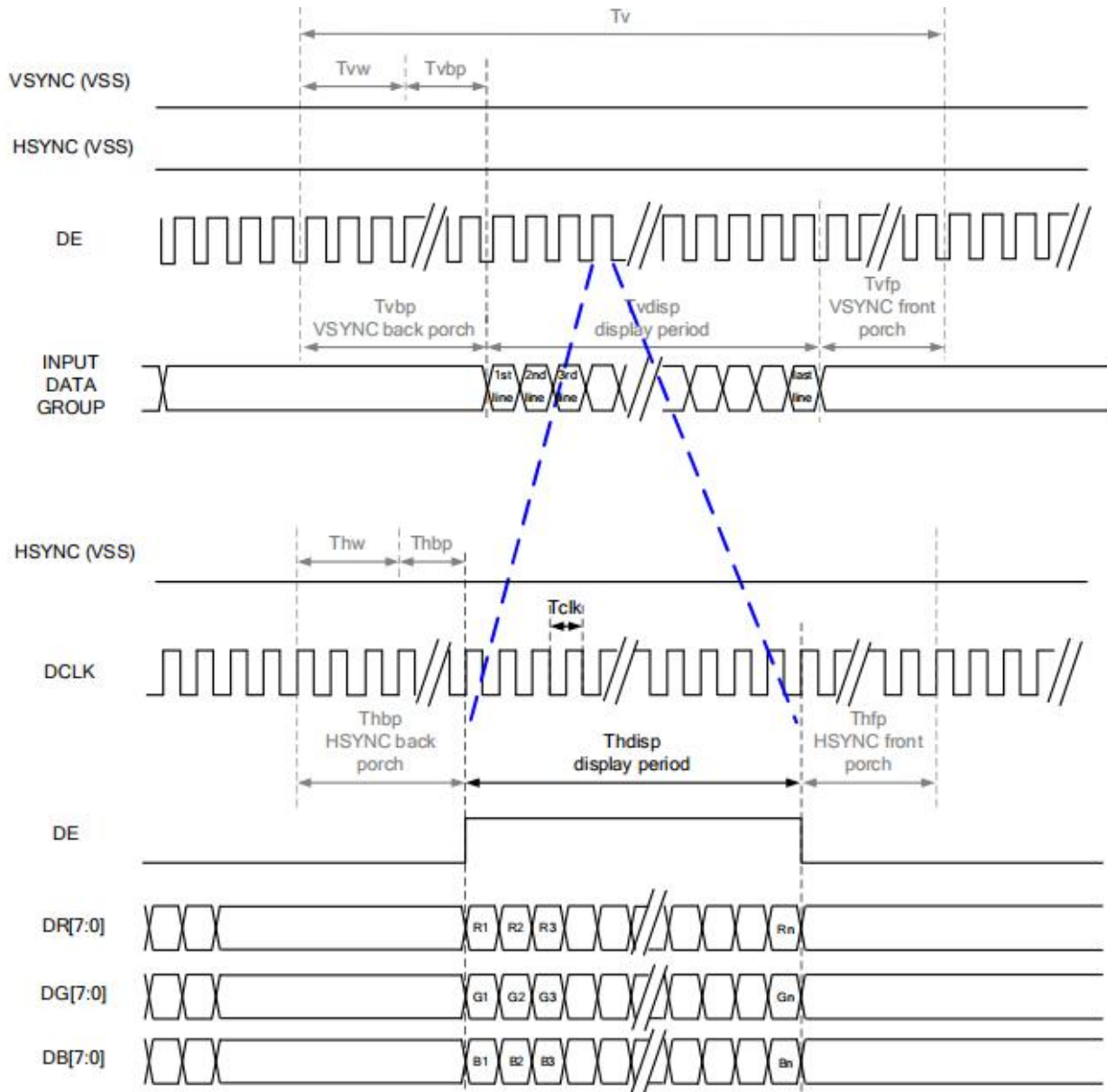
6.2.1 SYNC Mode



6.2.2 SYNC-DE Mode



6.2.3 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.

6.2.4 Parallel 24 bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 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
	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
	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.

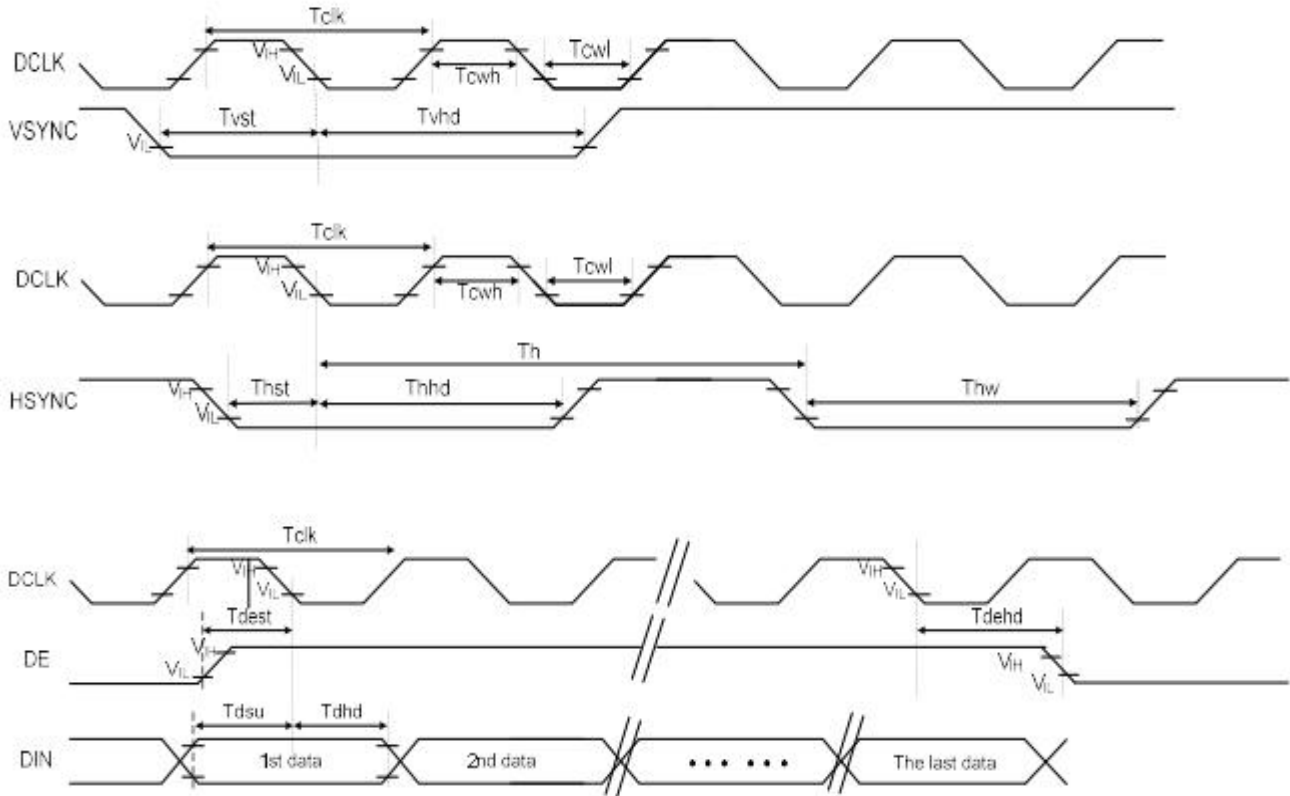
6.2.5 Serial 8 bit RGB Input Timing Table

Serial 8-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

480RGB X 272 Resolution Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency	Fclk	24	27	30	MHz	
DCLK Period	Tclk	33	37	42	ns	
HSYNC	Period Time	Th	1445	1491	1558	DCLK
	Display Period	Thdisp	1440			DCLK
	Back Porch	Thbp	3	43	43	DCLK
	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
	Front Porch	Tvfp	2	8	37	HSYNC
	Pulse Width	Tvw	2	4	12	HSYNC

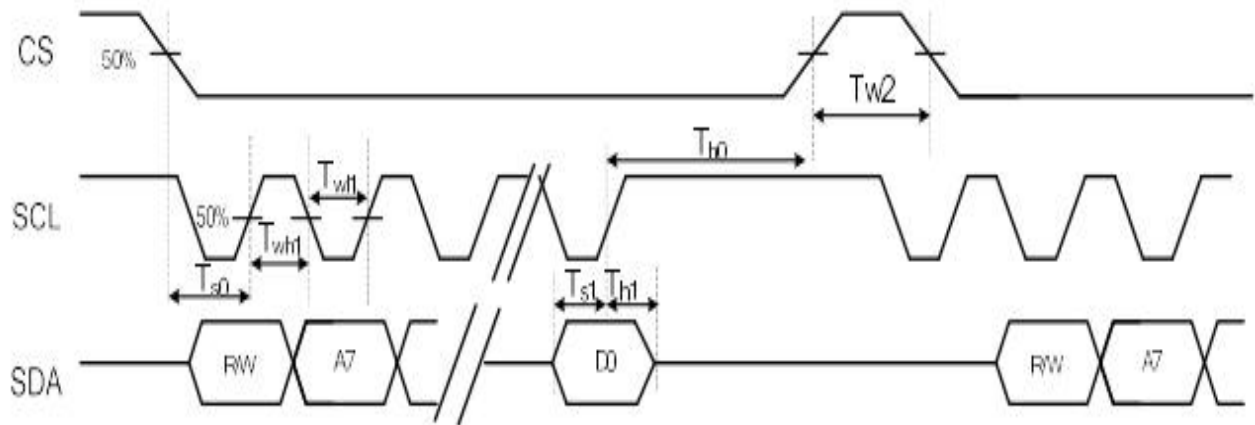
Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

6.3 System Bus Timing for RGB Interface



Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	T_{cw}	40	50	60	%	
HSYNC Width	T_{hw}	2	-	-	DCLK	
HSYNC Period	T_h	55	60	65	us	
VSYNC Setup Time	T_{vst}	12	-	-	ns	
VSYNC Hold Time	T_{vh}	12	-	-	ns	
HSYNC Setup Time	T_{hst}	12	-	-	ns	
HSYNC Hold Time	T_{hh}	12	-	-	ns	
Data Setup Time	T_{dsu}	12	-	-	ns	
Data Hold Time	T_{dh}	12	-	-	ns	
DE Setup Time	T_{dst}	12	-	-	ns	
DE Hold Time	T_{dehd}	12	-	-	ns	

6.4 System Bus Timing for 3-Wire SPI Interface



Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
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 Write Pulse High Width	Twh1	50	-	-	ns	
SCL Write Pulse Low Width	Twl1	50	-	-	ns	
SCL Read Pulse High Width	Trh1	300	-	-	ns	
SCL Read Pulse Low Width	Trl1	300	-	-	ns	
CS Pulse High Width	Tw2	400	-	-	ns	

7. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Tr+Tf	-	-	30	40	ms	FIG.1	Note4
Contrast Ratio		CR		640	800	-	-	FIG.2	Note1
Surface luminance		LV	$\theta = 0^\circ$	400	500	-	cd/m ²	FIG.2	Note2
Luminance uniformity		Yu	$\theta = 0^\circ$	75	80	-	%	FIG.2	Note3
NTSC		-	$\theta = 0^\circ$	45	50	-	%	FIG.2	Note5
Viewing angle		θ_T	Center CR ≥ 10	70	80	-	deg	FIG.3	Note6
		θ_B		70	80	-	deg	FIG.3	
		θ_L		70	80	-	deg	FIG.3	
		θ_R		70	80	-	deg	FIG.3	
Chromaticity	Red	R _X	$\theta = 0^\circ$ $\phi = 0^\circ$ Ta=25°	0.57	0.620	0.67	-	FIG.2 CIE1931	Note5
		R _Y		0.278	0.328	0.378	-		
	Green	G _X		0.284	0.334	0.384	-		
		G _Y		0.494	0.544	0.594	-		
	Blue	B _X		0.089	0.139	0.189	-		
		B _Y		0.083	0.133	0.183	-		
	White	W _X		0.2651	0.3151	0.3651	-		
		W _Y		0.2764	0.3264	0.3764	-		

Note1. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

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

For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing data is based on TOPCON's BM-5 or BM-7 photo detector or compatible.

Note2. Definition of surface luminance.

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3,,Pn)

Note3. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

Note4. 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%. For additional information see FIG1.

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. Angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers' s ConoScope or DMS series Instruments or compatible.

FIG.1. The definition of response Time

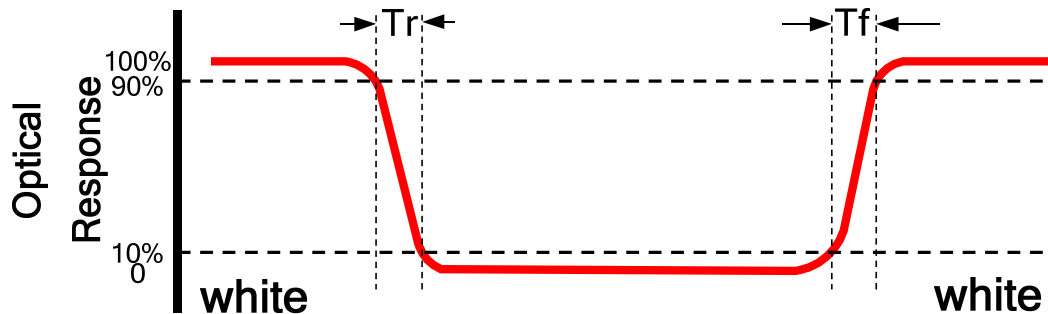


FIG.2. Measuring method for contrast ratio, surface luminance,

luminance uniformity, CIE (x,y) chromaticity

Size : $S \leq 5"$ (see Figure a) A : 5 mm B : 5 mm

H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

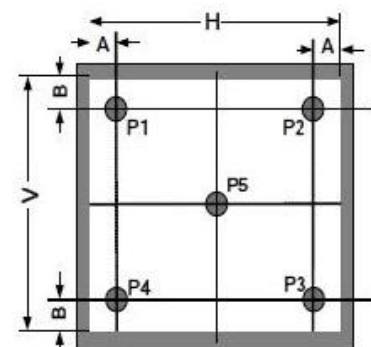


Figure a

Size : $5" < S \leq 12.3"$ (see Figure b) H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure b.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

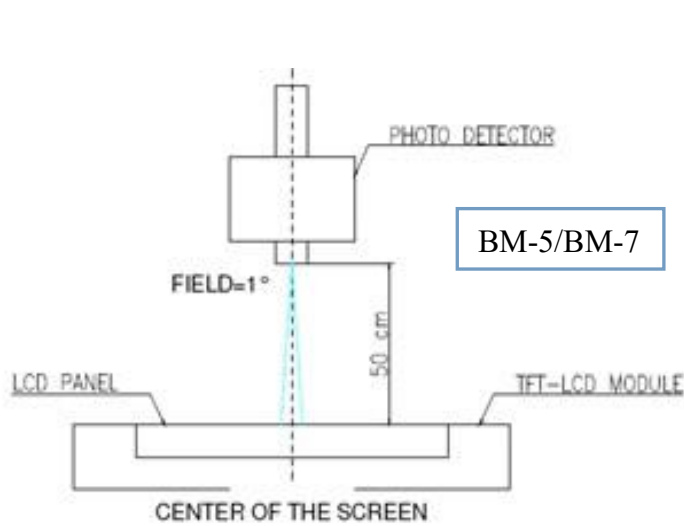


Figure c

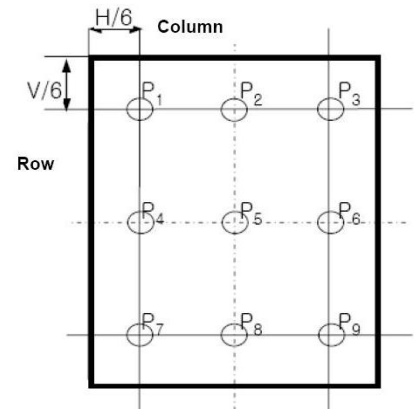
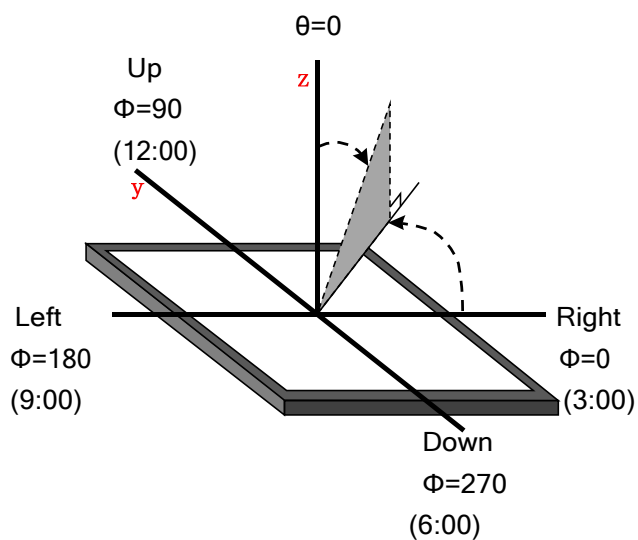


Figure b

FIG.3.The definition of viewing angle



8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +85°C, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -30°C, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +85°C,96hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30°C, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation	Ta= +60°C, 90% RH max,96 hours	IEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30°C 30 min ~ +80°C 30 min Change time: 5min, 20 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14:1984, GB2423.22-2002
7	ESD	C=150pF, R=330 Ω, 5 points/panel , Air:±8KV, 5 times Contact: ±4KV, 5 times (Environment: 15°C ~ 35°C, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.5mm , Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10-1995
9	Mechanical Shock (Non-operation)	Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995



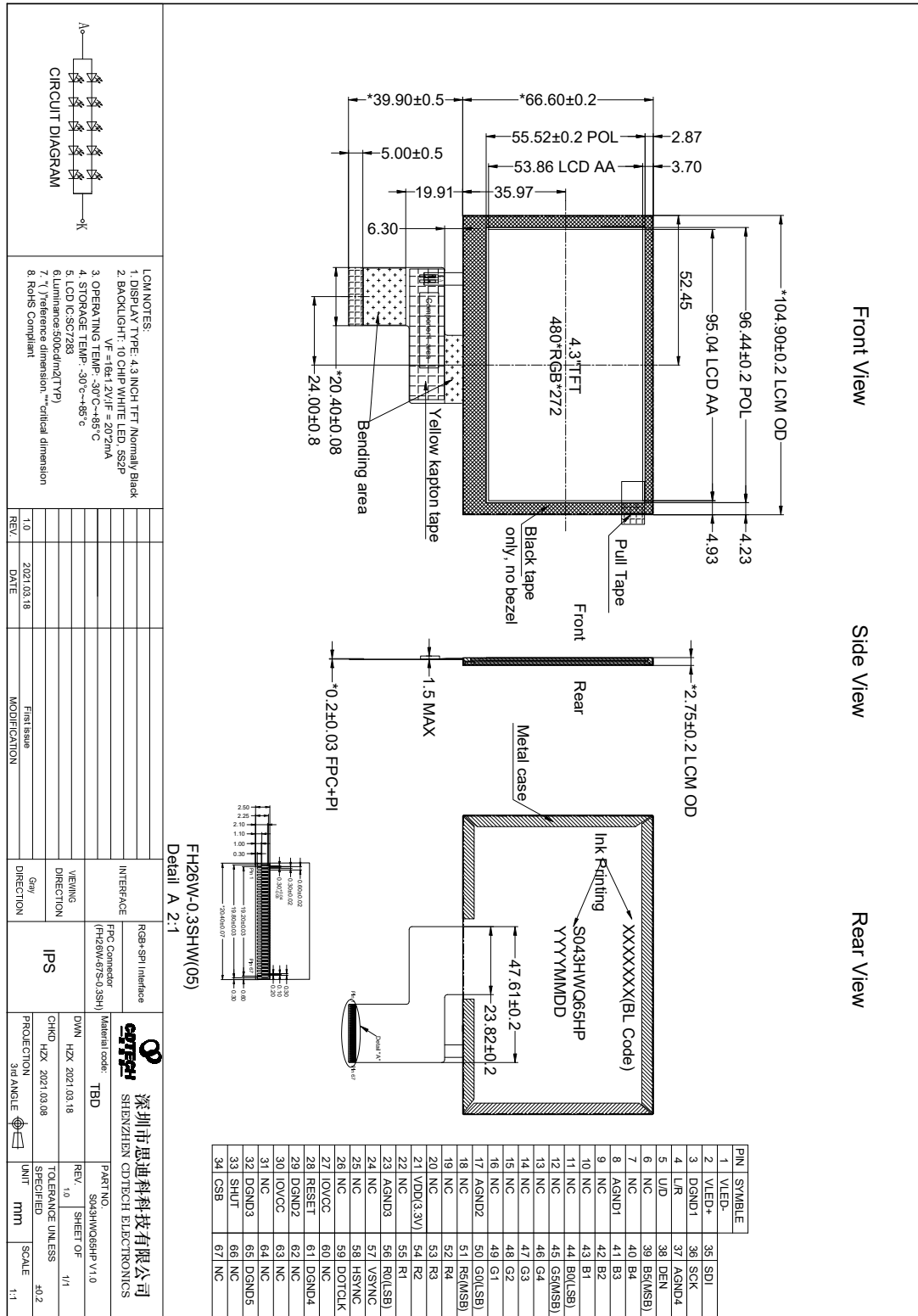
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Notes:

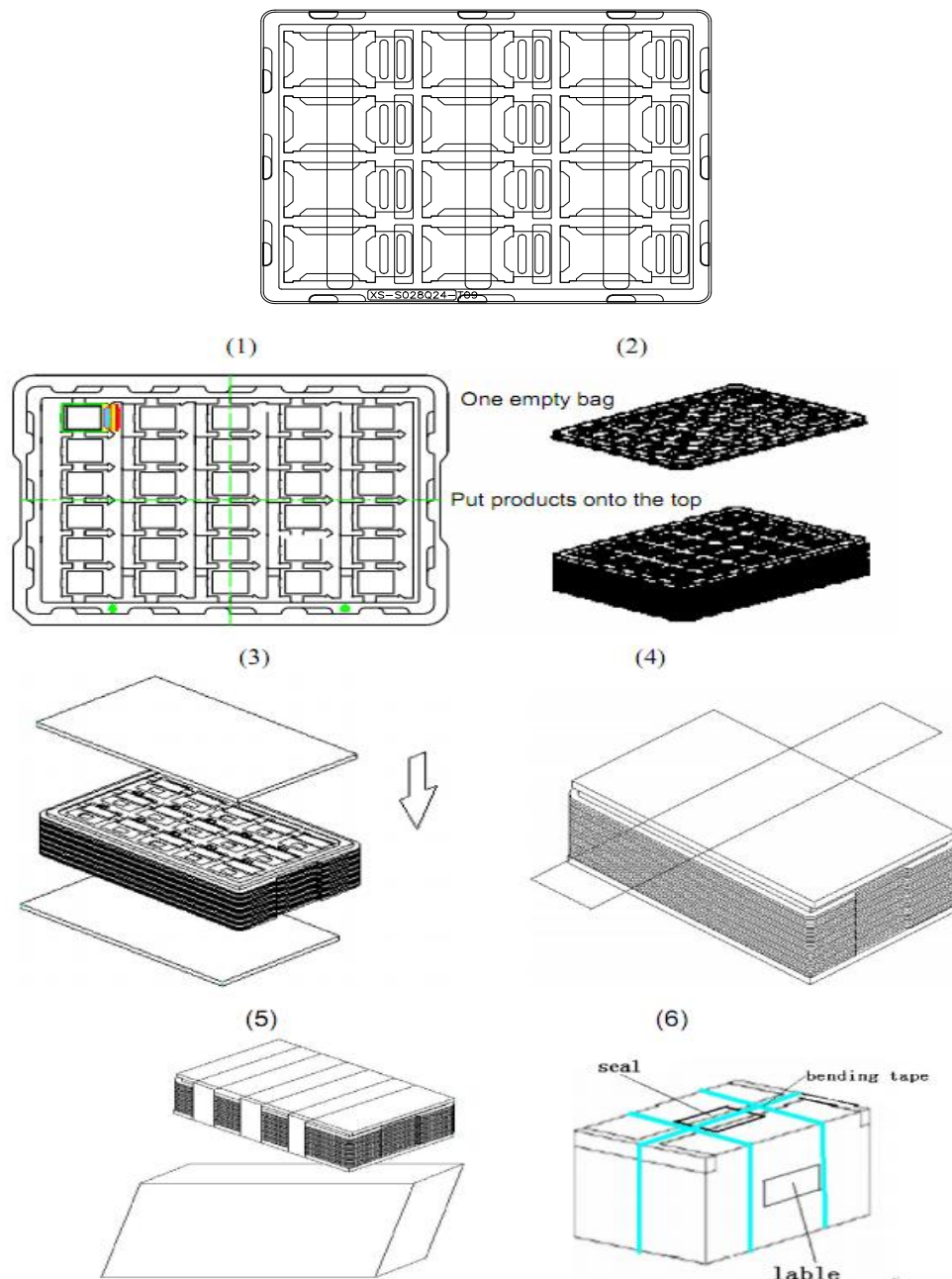
1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:
 - 1).Air bubble in the LCD;
 - 2).Seal leak
 - 3).Non-display
 - 4).missing segments
 - 5).Glass crack
 - 6).CR reduction >40%
 - 7).IDD increase >100%
 - 8).Brightness reduction >50%
 - 9).Color coordinate tolerance >0.05
2. ≤ 7.0 inch: The size of sample is 5pcs;
 > 7.0 inch: The size of sample is 2pcs;
3. One test sample must complete each test item;
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
5. In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module.

9. Mechanical Drawing



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
- Ketene
- 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



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