



Product Specification

Customer: _____
Model Name: H050I WV40I3516-CT29
Date: 2023.03.15
Version: V0

Preliminary Specification

Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by



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2 General Specifications

	Feature	Spec
Characteristics	Size	5.0inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	RGB-24bit
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.045 x 0.1350
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	ST7265
	Viewing Direction	ALL
Mechanical	LCM+CTP (W x H x D) (mm)	155.83*113.37*5.07
	Active Area(mm)	108 x 64.80
	With /Without TSP	Without
	Weight (g)	TBD
	LED Numbers	12LEDs

Note 1: Viewing direction is following the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

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



3 Input/Output Terminals

No.	Symbol	Description
1	VBL-	Backlight LED Cathode
2	VBL+	Backlight LED Anode.
3	GND	System Ground
4	VCC	Power supply for logic operation
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	GND	System Ground
30	CLK	Pixel clock signal
31	DISP	Display on/off control
32	HSYNC	Horizontal Sync signal
33	VSYNC	Vertical Sync signal
34	DEN	Data Enable
35	NC	No connect
36	GND	System Ground
37	XR(NC)	The right side signal of TP
38	YD(NC)	The down side signal of TP
39	XL(NC)	The left side signal of TP
40	YU(NC)	The up side signal of TP



4 Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Power Supply Voltage	VDD	- 0.3 ~ +4.0	V
IO Supply Voltage	VDDI	- 0.3 ~ +4.0	V
Charge Pump Supply Voltage	PVDD	- 0.3 ~ +4.0	V
Logic Input Voltage Range	VIN	-0.3 ~ VDDI + 0.3	V
Logic Output Voltage Range	VOU	-0.3 ~ VDDI + 0.3	V
Operating Temperature Range	TOPR	-30~ +85	°C
Storage Temperature Range	TSTG	-30~ +85	°C

Note:

- 1. That the stress exceeds the Limiting Value listed above it may cause the driver IC permanent damage. These values are for stress only. IC should be operated under the DC/AC Characteristic conditions for normal operation. If these conditions are not met, IC operation may be error and the reliability may be deteriorated.*
- 2. Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to VSS unless otherwise noted.*
- 3. Insure the voltage levels of VDDI, VDD, PVDD always matches the correct relation:
 $3.1V \leq VDDI \leq VDD = PVDD \leq 3.6V$*
- 4. VIN should be less than or equal to 3.6V. (VIN ≤ 3.6V)*
- 5. Panel display quality depends on panel loading, and it may have the different performance at low/high temperature.*
- 6. To avoid IC being affected by backlight temperature, it is recommended that the backlight led position shouldn't be near the periphery of IC.*
- 7. IC can be operated normally at -30~85 degrees, but display quality at high/low temperatures may have different effect according to*



5 Electrical Characteristics

5.1 Typical operation conditions

DC Electrical Characteristics (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C, Bare Chip)

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3.1	3.3	3.6	V	
IO Supply Voltage	VDDI	3.1	3.3	3.6	V	
Charge Pump Supply Voltage	PVDD	3.1	3.3	3.6	V	
TFT gate on voltage	VGH	9	15.5	17	V	
TFT gate off voltage	VGL	-11.5	-11.5	-7	V	
TFT common electrode voltage	Vcom(DC)	0.23	0.53	0.83	V	
Output Voltage Deviation	Vod	-	±40	±50	mV	
Standby Current	Isc	-	-	50	uA	
Operation Current	Ioc	-	40	-	mA	
Logic-High Input Voltage	Vih	0.7VDDI	-	VDDI	V	
Logic-Low Input Voltage	Vil	DGND	-	0.3VDDI	V	
Logic-High Output Voltage	Voh	VDDI-0.4	-	VDDI	V	
Logic-Low Output Voltage	Vol	DGND	-	DGND+0.4	V	

Note: (1) Vcom must be adjusted to optimize display quality: cross-talk, contrast ratio and etc.

(2) VGH is TFT gate operating voltage

(3) VGL is TFT gate operating voltage

(4) Environmental condition: 25±5

(5) Reference waveform for panel light on is as below: (release after sample output)



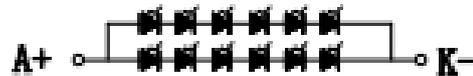
5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	-	40	-	mA	Note 1 Note 2,3
Power Consumption		-	720	-	mW	
LED Voltage	V_F	16.8	18	19.2	V	
LED Life Time	W_{BL}	25000			Hr	

Note 1 : There are 2 Groups LED

Note 2 : $T_a = 25^\circ\text{C}$

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

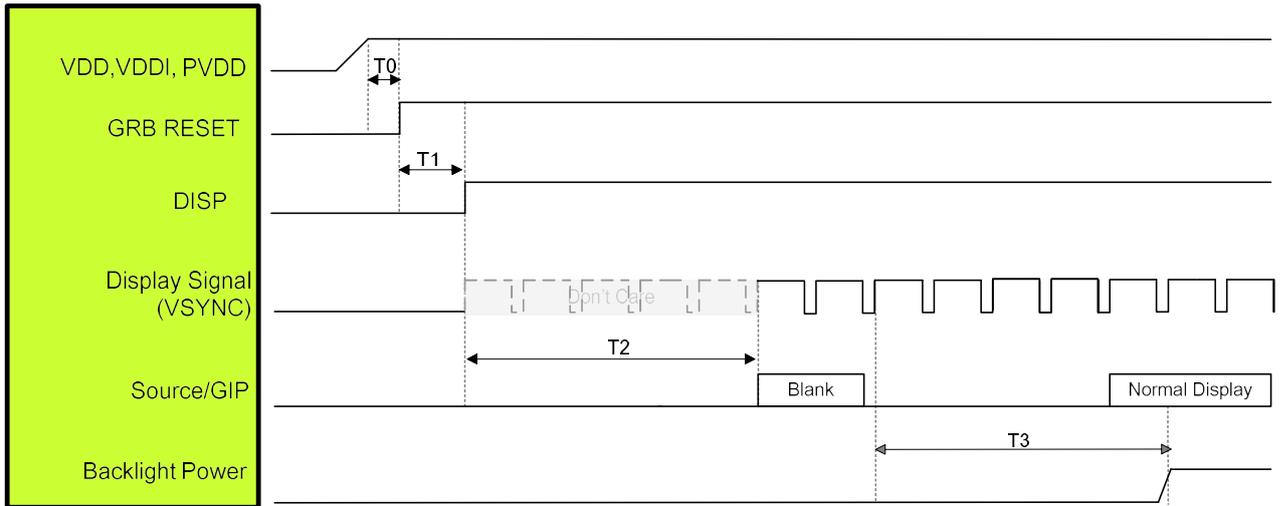


BACKLIGHT CIRCUIT DIAGRAM:



6. POWER ON/OFF SEQUENCE

6.1 Power On Sequence

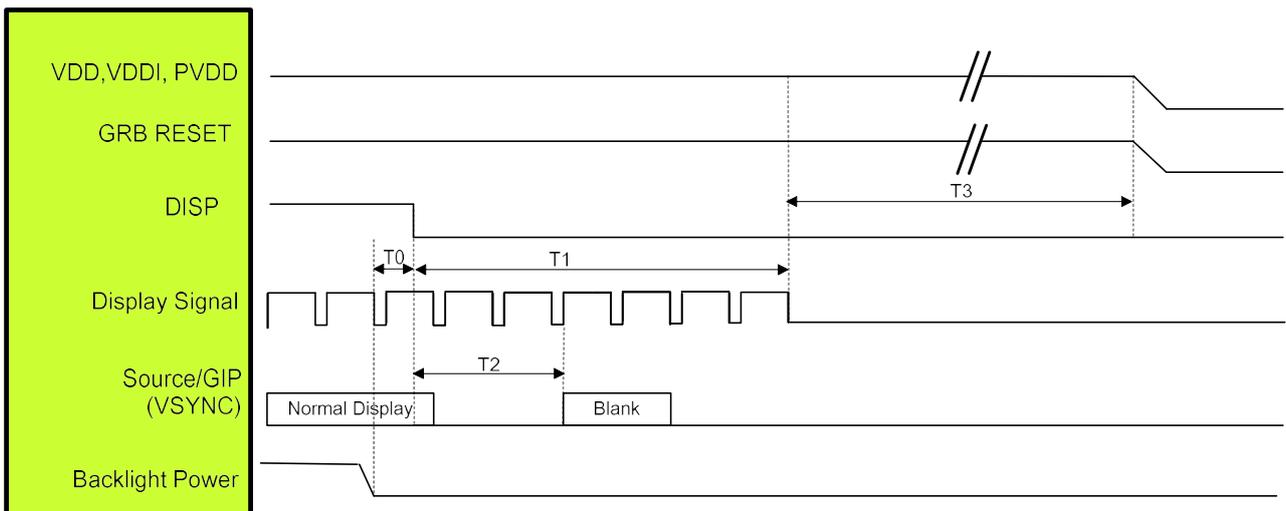


Symbol	Description	Time	Unit
T0	System power stability to GRB RESET signal	≥1	ms
T1	GRB RESET= "High" to DISP="High"	≥10	ms
T2	DISP="High" to Source/GIP scan blank	85	ms
T3	Display Signal input to Backlight power on (base on Display Signal Frame Rate 60Hz)	≥100	ms

Note:

- When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.
- RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]
- LVDS interface Display signal: DCLK P/N; RX[3:0] P/N

6.1.2 Power Off Sequence



Symbol	Description	Time	Unit
T0	Backlight Power off to DISP="Low"	≥1	ms
T1	DISP="Low" to IC internal voltage discharge complete	100	ms
T2	DISP="Low" to Source/GIP scan blank (base on Display Signal Frame Rate 60Hz)	≤50	ms
T3	IC internal voltage discharge is completed to VDD/VDDI/PVDD off	>0	ms



7.Interface Timing

7.1 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency	Fclk	23	25	27	MHz	.
HSYNC	Period Time	Th	808	816	848	DCLK
	Display Period	Thdisp	800			DCLK
	Back Porch	Thbp	4	8	24	DCLK
	Front Porch	Thfp	4	8	24	DCLK
	Pulse Width	Thw	2	4	8	DCLK
VSYNC	Period Time	Tv	496	512	528	HSYNC
	Display Period	Tvdisp	480			HSYNC
	Back Porch	Tvbp	8	16	24	HSYNC
	Front Porch	Tvfp	8	16	24	HSYNC
	Pulse Width	Tvw	2	4	8	HSYNC

Note: 1. The minimum blanking time depends on the GIP timing of the panel specification

2. To ensure the compatibility of different panels, it is recommended to use the typical setting.

3. It is necessary to keep Tvbp =8 and Thbp =8 in sync mode. DE mode is unnecessary to keep it.

4. The maximum DCLK Frequency is 27MHz. If the case needs faster DCLK, please contact Sitronix .

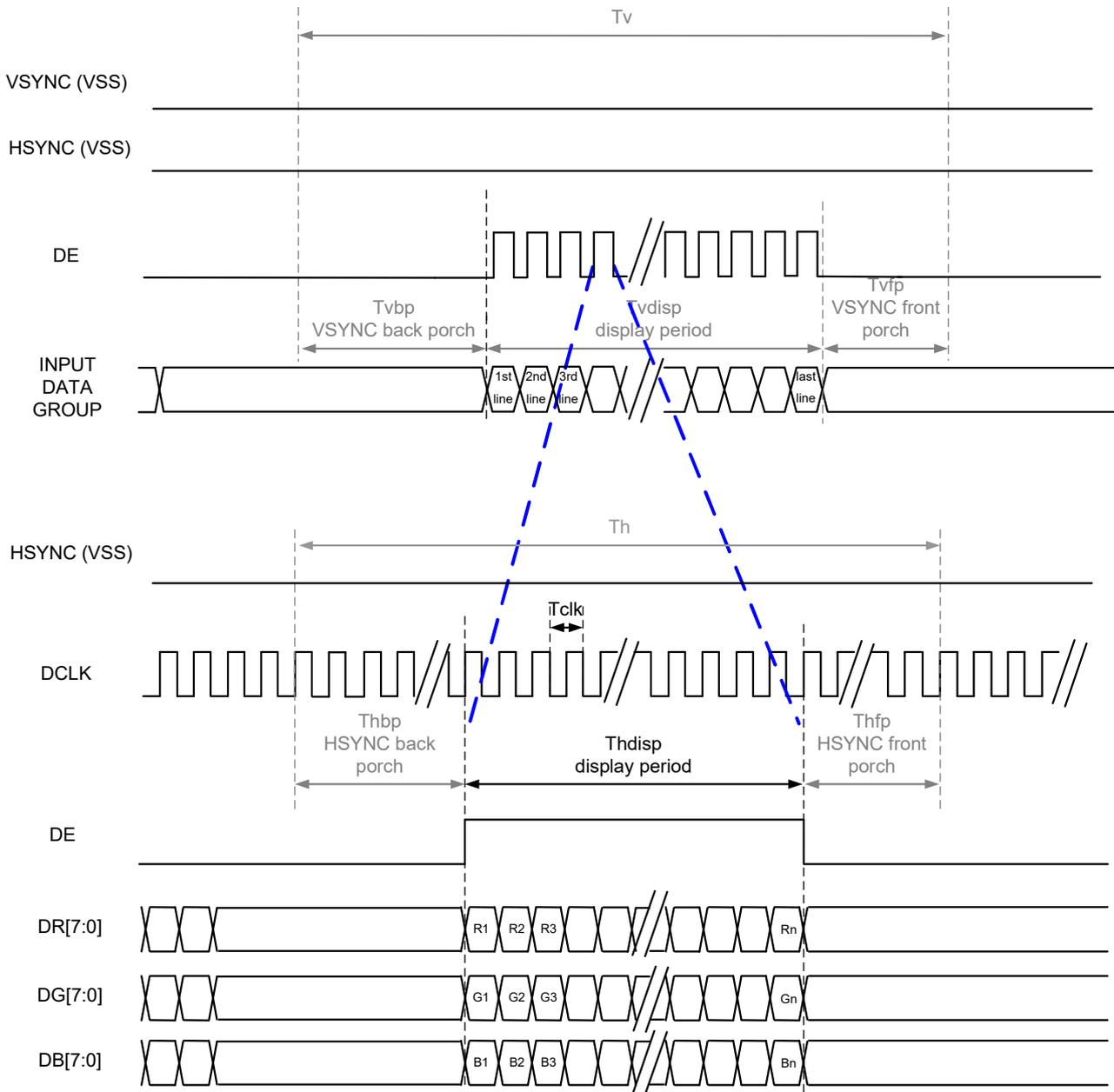
7.1.2 RGB Interface

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

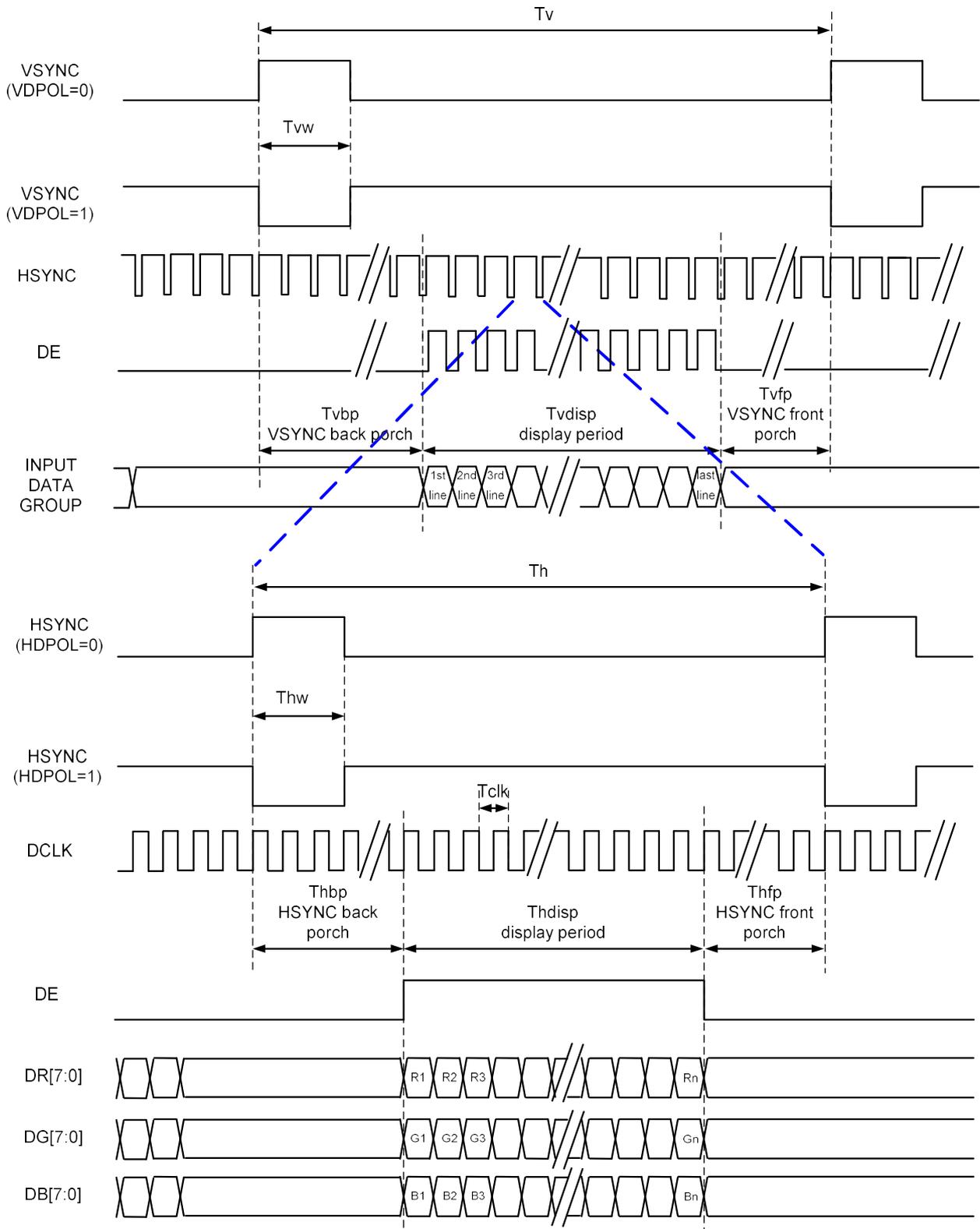


7.2 DE Mode



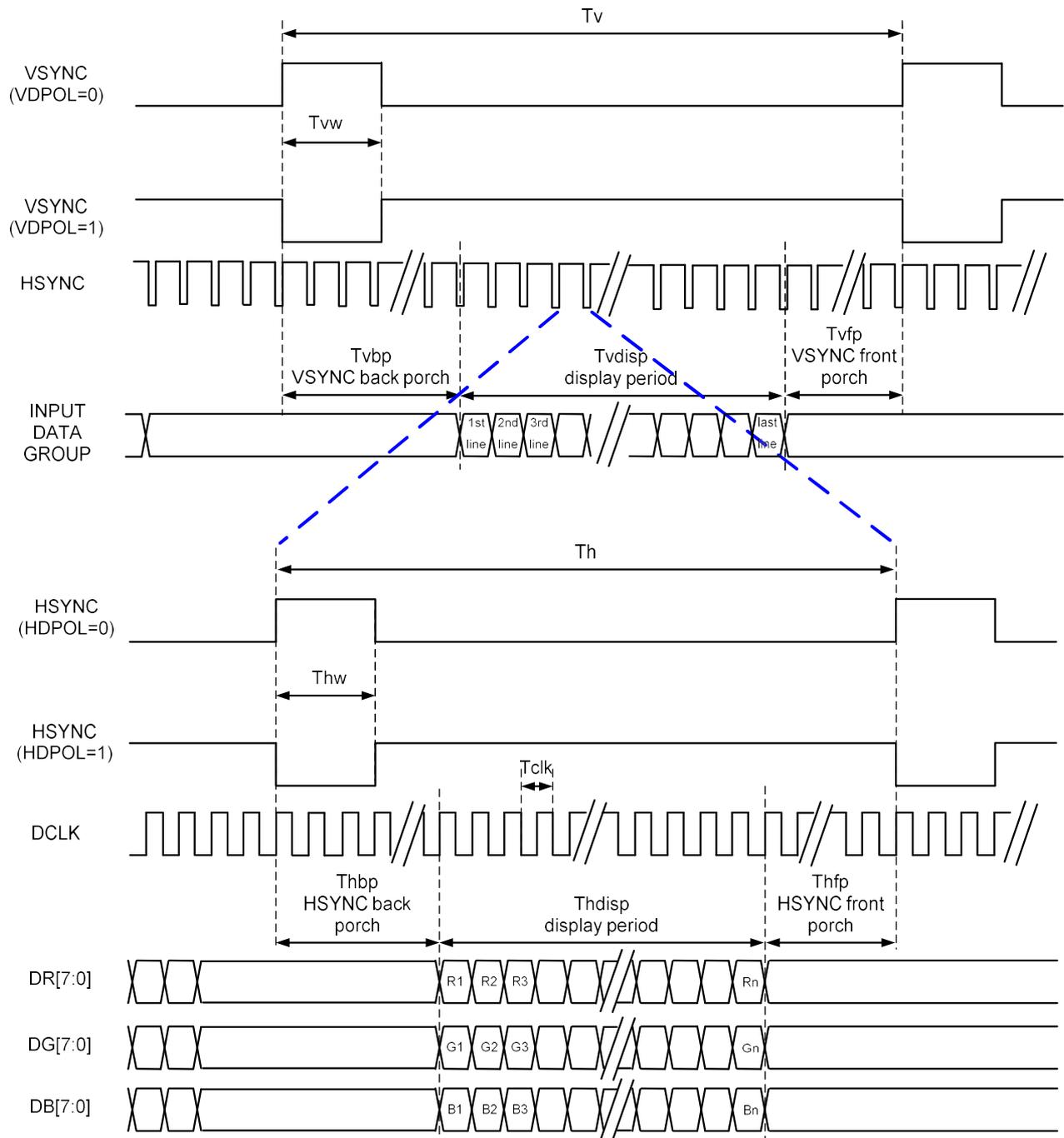


7.3 SYNC-DE Mode





7.4 SYNC Mode





8 Optical Characteristics

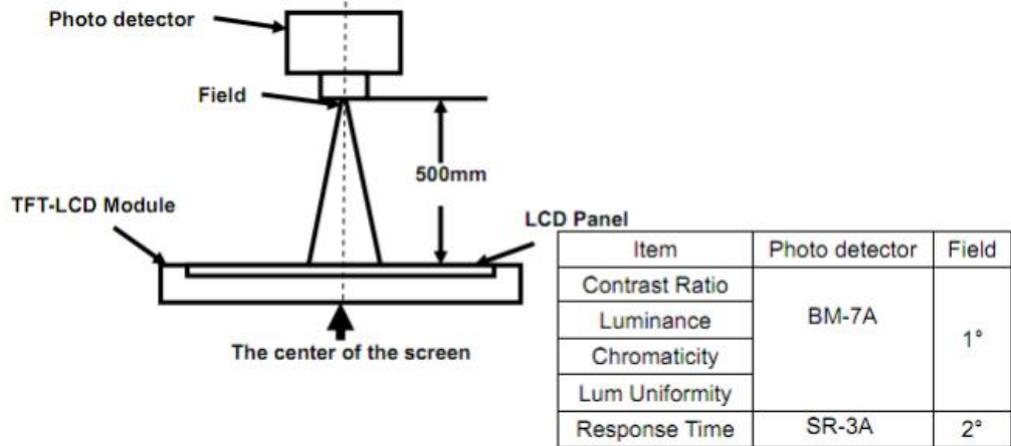
Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Viewing angles	θ_T	Center CR \geq 10	70	80	-	Degree.	Note2	
	θ_B		70	80	-			
	θ_L		70	80	-			
	θ_R		70	80	-			
Contrast Ratio	CR	$\Theta = 0$	700	1000	-	-	Note1, Note3	
Response Time	T_{ON+} T_{OFF}	25°C	-	30	40	ms	Note1, Note4	
Chromaticity	White	Backlight is on	X_W	0.291	0.311	0.331	-	Note1, Note5
			Y_W	0.324	0.344	0.364	-	
	Red		X_R	0.621	0.641	0.661	-	
			Y_R	0.323	0.344	0.368	-	
	Green		X_G	0.277	0.297	0.317	-	
			Y_G	0.546	0.566	0.586	-	
	Blue		X_B	0.113	0.133	0.153	-	
			Y_B	0.101	0.121	0.141	-	
Uniformity	U		80	-	-	%	Note1, Note6	
NTSC			55	60	-	%	Note5	
Luminance (LCM+CTP)	L		250	300	-	CD/M2	Note1, Note7	

Test Conditions:

1. IF=40ma (one channel),the ambient temperature is 25°C.
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.



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).

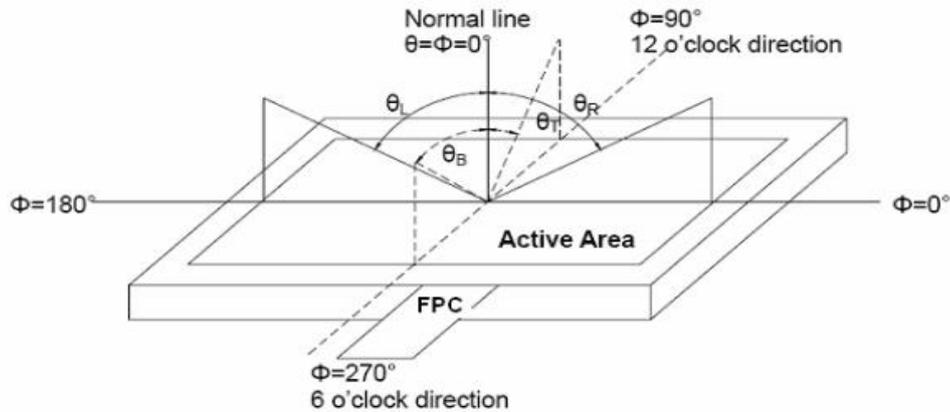


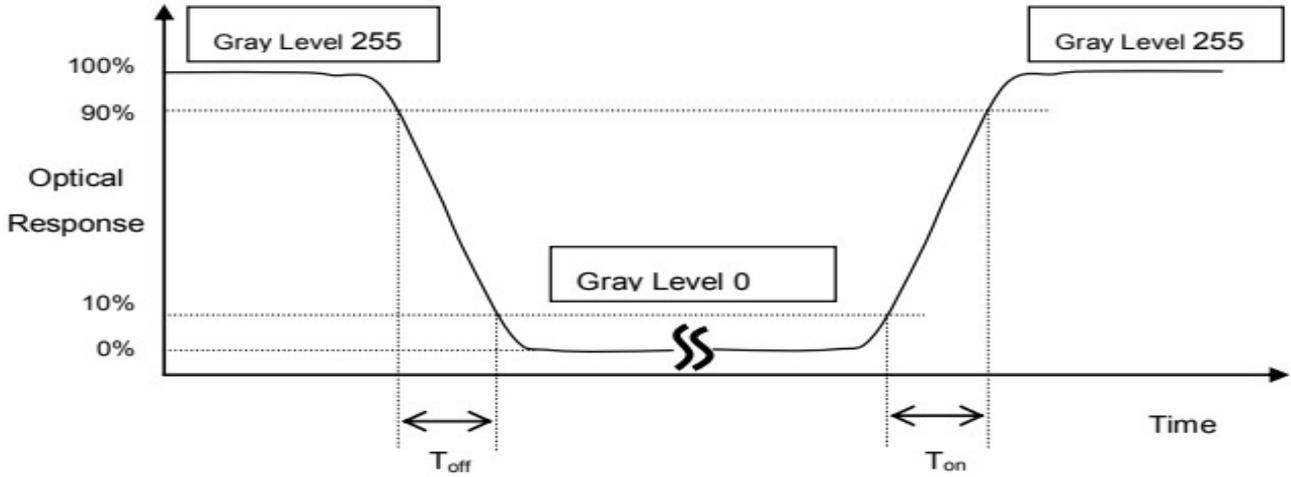
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

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 10% to 90%. And fall time (TOFF) is The time between photo detector output intensity changed from 90% to 10%



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) = $L_{min} / L_{max} \times 100\%$

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

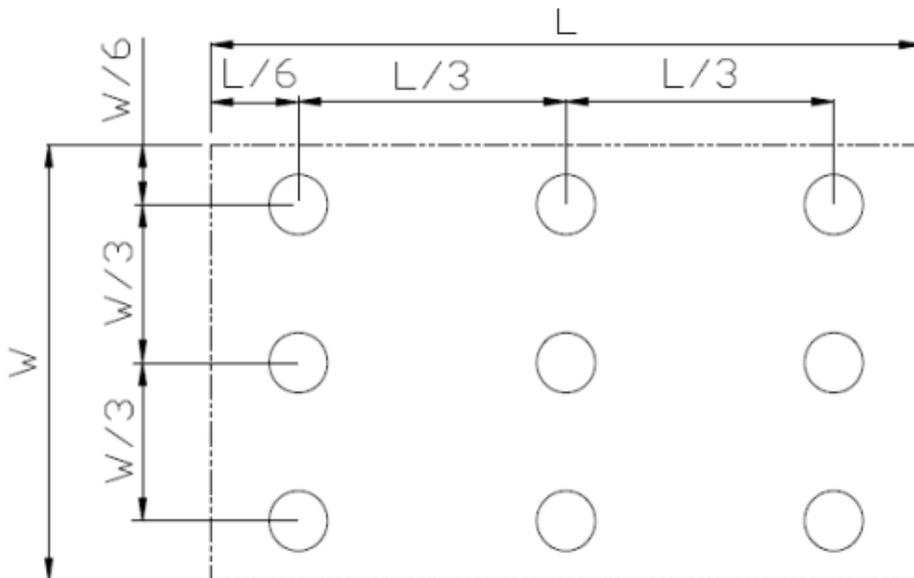


Fig. 2 Definition of uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

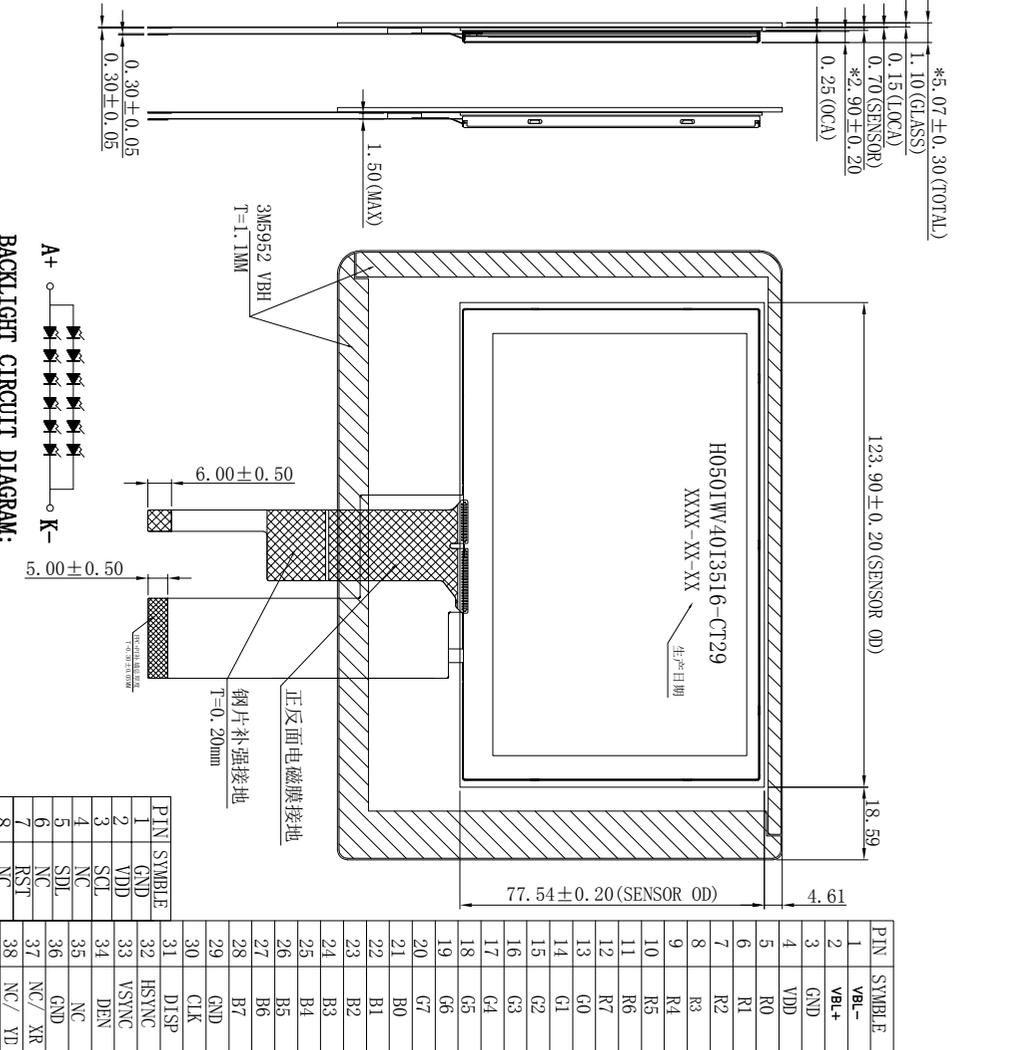
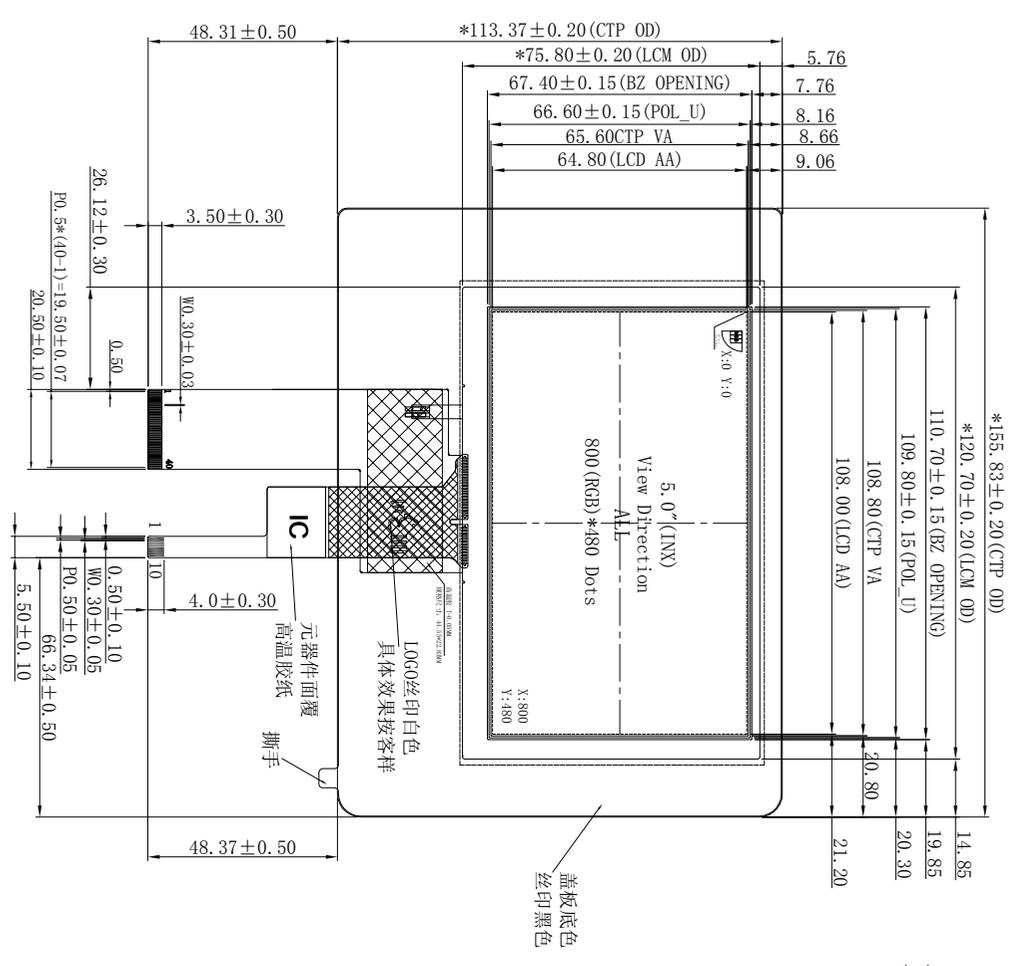


9 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	T _s = +70°C, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	T _a = -20°C, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	T _a = +80°C, 96hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	T _a = -30°C, 96hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	T _a = +60°C, 90% RH max, 96 hours	IEC60068-2-3 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, GB2423.22-87
7	Electro Discharge (Operation) Static	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 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: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_s is the temperature of panel's surface.
2. T_a is the ambient temperature of sample.

10. Mechanical Drawing



BACKLIGHT CIRCUIT DIAGRAM:
(If=40mA, 16.8V~19.2V)

PIN	SYMBLE
1	VB+
2	VB+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	DISP
32	HSYNC
33	VSYNC
34	DEN
35	NC
5	SDL
6	NC
7	RST
8	NC/ X0
9	NC/ X1
10	GND

- NOTES:
1. DISPLAY TYPE: 5.0 INCH TFT /TRANSMISSIVE
 2. BACKLIGHT: 12 CHIP WHITE LED, IN PARALLEL
 3. OPERATING TEMP: -20° C~+70° C
 4. STORAGE TEMP: -30° C~+80° C
 5. RESOLUTION: 800XRGBX480
 6. LCD IC: ST7265
 7. Typical Luminance: 250nits (MIN), 300nits (TYP)
 8. "()" reference dimension. "*" critical dimension
 9. RoHS Compliant

- CTP技术要求:
- 1、结构6+6: Cover Glass+LOC+A-TTO GLASS+PPC, Cover Glass: 1.1MM, LOC A: 0.15mm, TTO GLASS: 0.7mm, 总厚度: 1.95±0.15mm;
 - 2、IC型号: FT5440X05 (OP), 通道数: 12 (Tx) *50 (Rx), 支持5点触摸, 工作电压: 3.3V, 中断方式: 下拉脉冲, PFC接口定义为IC标准接口, 10H电压: 3.3V, IC地址: 0x70;
 - 3、透光率: ≥85%, TP分辨率: X: 800, Y: 480 (可按客户要求);
 - 4、工作温度范围: -20°C~+70°C, ≤900kHz;
 - 5、表面硬度: ≥6H (750gF/铅笔硬度测试);
 - 6、Cover glass材质: 钢化玻璃, 产品符合RoHS标准;
 - 7、其他未标注公差: ±0.2;

INTERFACE	RGB Interface	MODEL NAME	H0501WV4013516-CT
VIEWING DIRECTION	FPC Connector	TFT Display Module	DWN
Gray Scale DIRECTION	ALL	CHKD	REV. SHEET OF 1/1
		PROJECTION	3RD ANGLE
		UNIT	MM
		SCALE	1:1

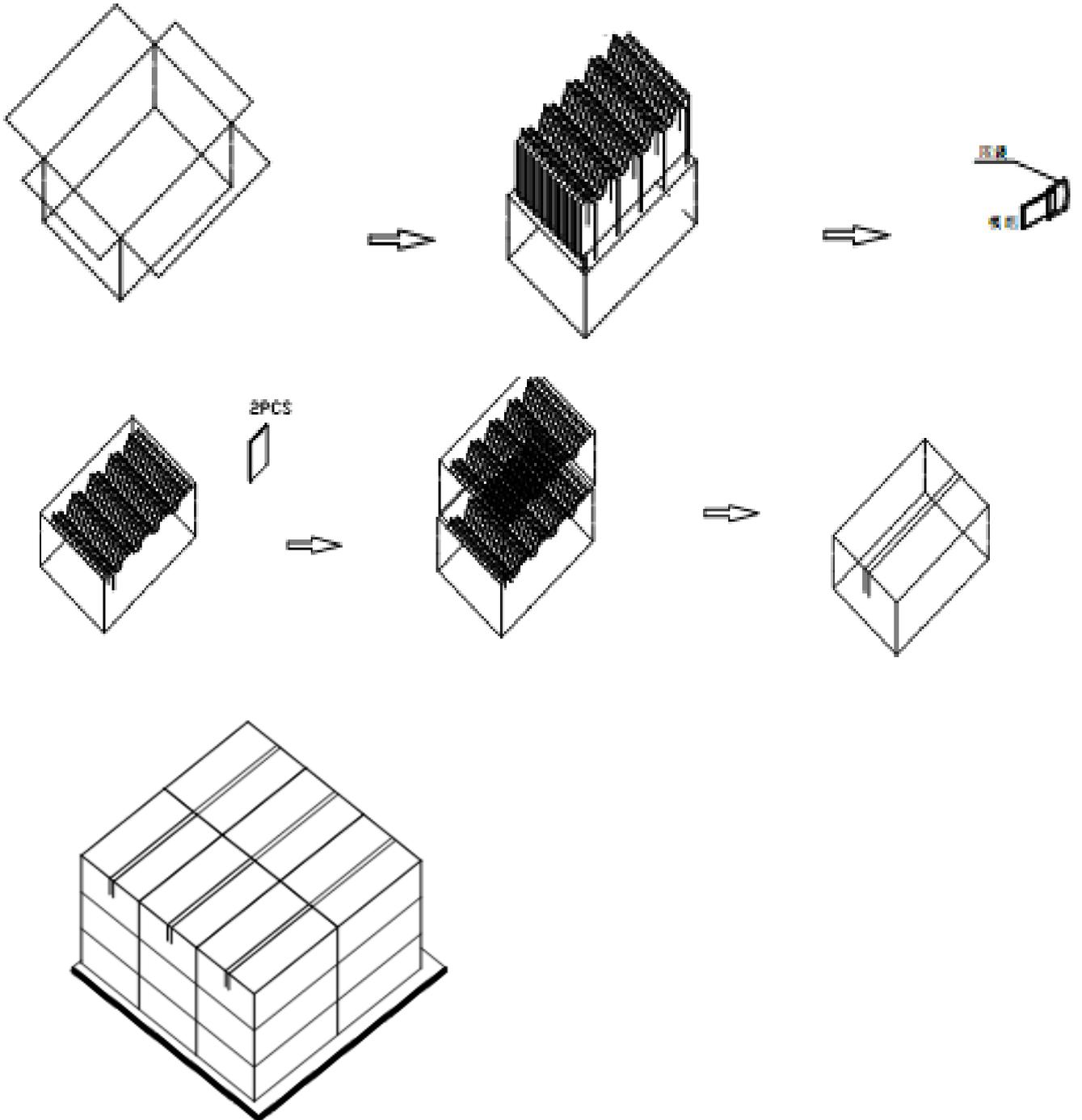


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1 1.Packing

Packing Method





12. 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°C ~ 40°C 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.