PRODUCT SPECIFICATION

10.1 INCH TFT LCD WITH CTP

MODEL: HS101WSM-IT5010C

Customer Approval:

Shenzhen CS Technology Co., Ltd

Contents

Shenzhen CS Technology Co., Ltd

1. General Specifications

No.	Item	Specification	Remark
1	Size	10.1 inch	
2	Resolution	1024*600	
3	Interface	TTL	
4	Connect type	Connector	
5	Color Depth	16.7M	
6	Technology type	a-Si	
7	Pixel pitch	0.2175*0.2088	(mm)
8	Pixel Configuration	R.G.B.-Stripe	
9	Display Mode	Normally Black	
10	Driver IC	HX8282A11+HX8696A0	
11	Viewing Direction	IPS	
12	LCM (W x H x D)	235*143*5	(mm)
13	Active Area	222.72x 125.28	(mm)
14	Weight (g)	TBD	
15	LED Numbers	42 LEDs	

Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

2. Pin Assignment

No.	Symbol	Description
1, 2	VLED+	Power for LED backlight (Anode)
3, 4	VLED-	Power for LED backlight (Cathode)
5	GND	Power ground
6	VCOM	Common voltage
7	DVDD	Digital Power
8	MODE	DE/SYNC mode select (Note1)
9	DE	Data Input Enable
10	VS	Vertical Sync Input
11	HS	Horizontal Sync Input
12	B7	Blue data
13	B6	Blue data
14	B5	Blue data
15	B4	Blue data
16	B3	Blue data
17	B2	Blue data
18	B1	Blue data
19	B0	Blue data
20	G7	Green data
21	G6	Green data
22	G5	Green data
23	G4	Green data
24	G3	Green data
25	G2	Green data
26	G1	Green data
27	G0	Green data
28	R7	Red data
29	R6	Red data
30	R5	Red data
31	R4	Red data
32	R3	Red data
33	R2	Red data
34	R1	Red data
35	R0	Red data
36	GND	Power ground
37	DOCLK	Clock input
38	GND	Power ground
39	L/R	Right/ left selection (Note2)

40	U/D	Up/down selection (Note3)
41	VGH	Gate ON voltage
42	VGL	Gate OFF voltage
43	AVDD	Power for Analog circuit
44	RESET	Global reset pin
45	NC	No connection
46	VCOM	Common voltage
47	DITHB	Dithering function (Note 4)
48	GND	Power ground
49	NC	No connection
50	NC	No connection

Note1: DE/SYNC mode select, Normally pull high.
　　　When MODE=H, DE mode
　　　When MODE=L, SYNC mode
Note2: Source Driver internal shift register is controlled by this pin as shown
　　　below: Normally pull high.
　　　SHLR=H: SO1→SO2→SO3→···→SO1536 (Default)
　　　SHLR=L: SO1536→SO1535→SO1534→···→SO1
Note3: Gate Driver Up/down scan setting. Normally pull low.
　　　When UPDN=H, reverse scan.
　　　STV1 output vertical start pulse and UD pin output "H" to Gate driver
　　　When UPDN=L, normal scan. (Default)
　　　STV2 output vertical start pulse and UD pin output "L" to Gate driver
Note4: Dithering function enable control. Normally pull low.
　　　When DITHER=H, Enable internal dithering function
　　　When DITHER=L, Disable internal dithering function

3. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Digital Supply Voltage	V_{DD}	-0.5	3.96	V	
TFT Gate on Voltage	VGH	-0.3	42	V	
TFT Gate off Voltage	VGL	VGH-42	0.3	V	
Analog power Supply Voltage	AVDD	-0.5	14.85	V	
Signal input Voltage	NIN0-NIN2 PIN0-PIN2 NINC,PINC	-0.5	3.96	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

4. Electrical Characteristics

4.1 Typical Operation Conditions

Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3	3.3	3.6	V	
TFT Gate on Voltage	VGH	17	18	19	V	
TFT Gate off Voltage	VGL	-7	-6	-5	V	
Analog power Supply Voltage	AVDD	9.4	9.6	9.8	V	
TFT Common electrode Voltage	VCOM	3.67	3.87	4.07	V	
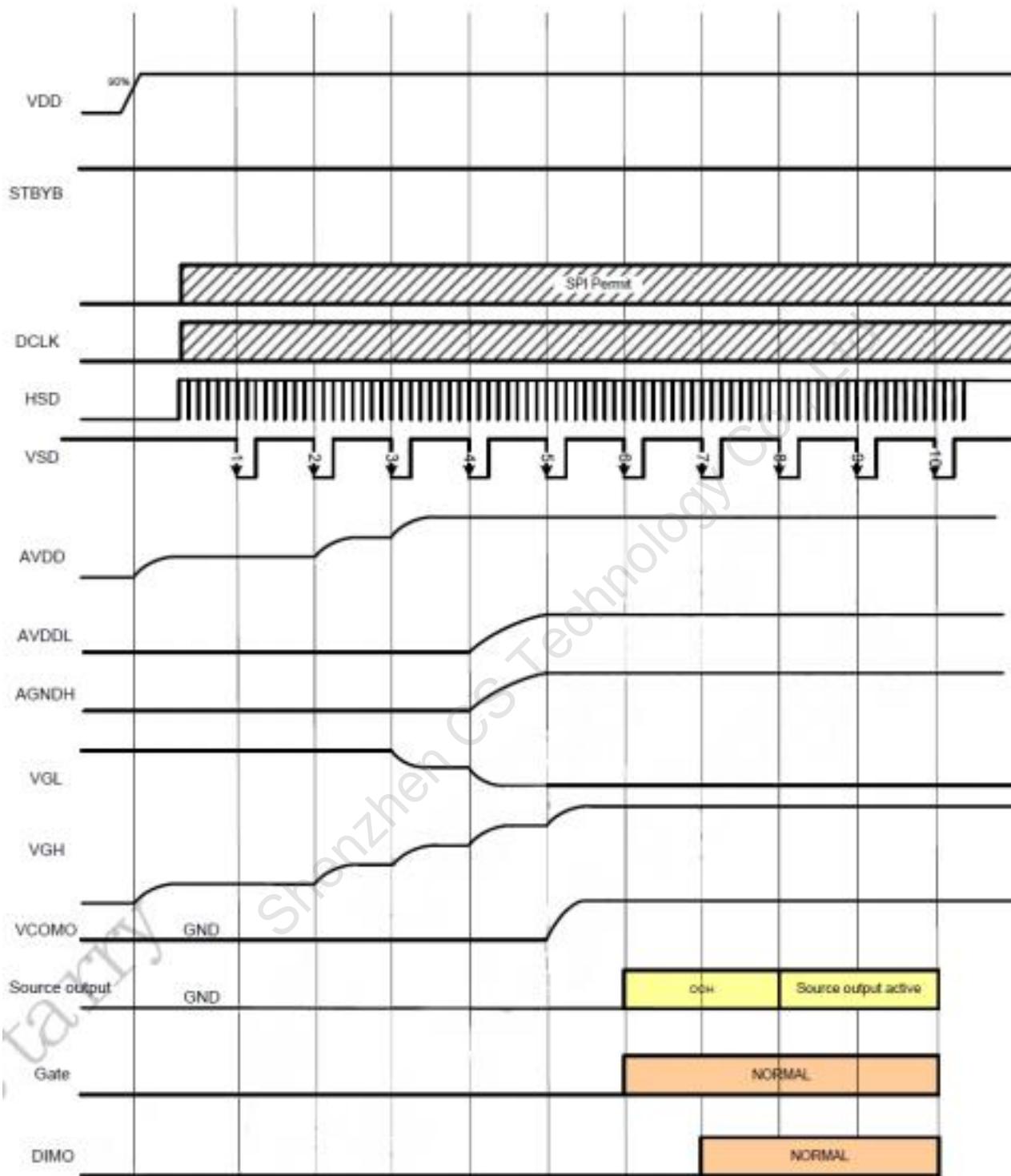
## 4.2 Power sequence
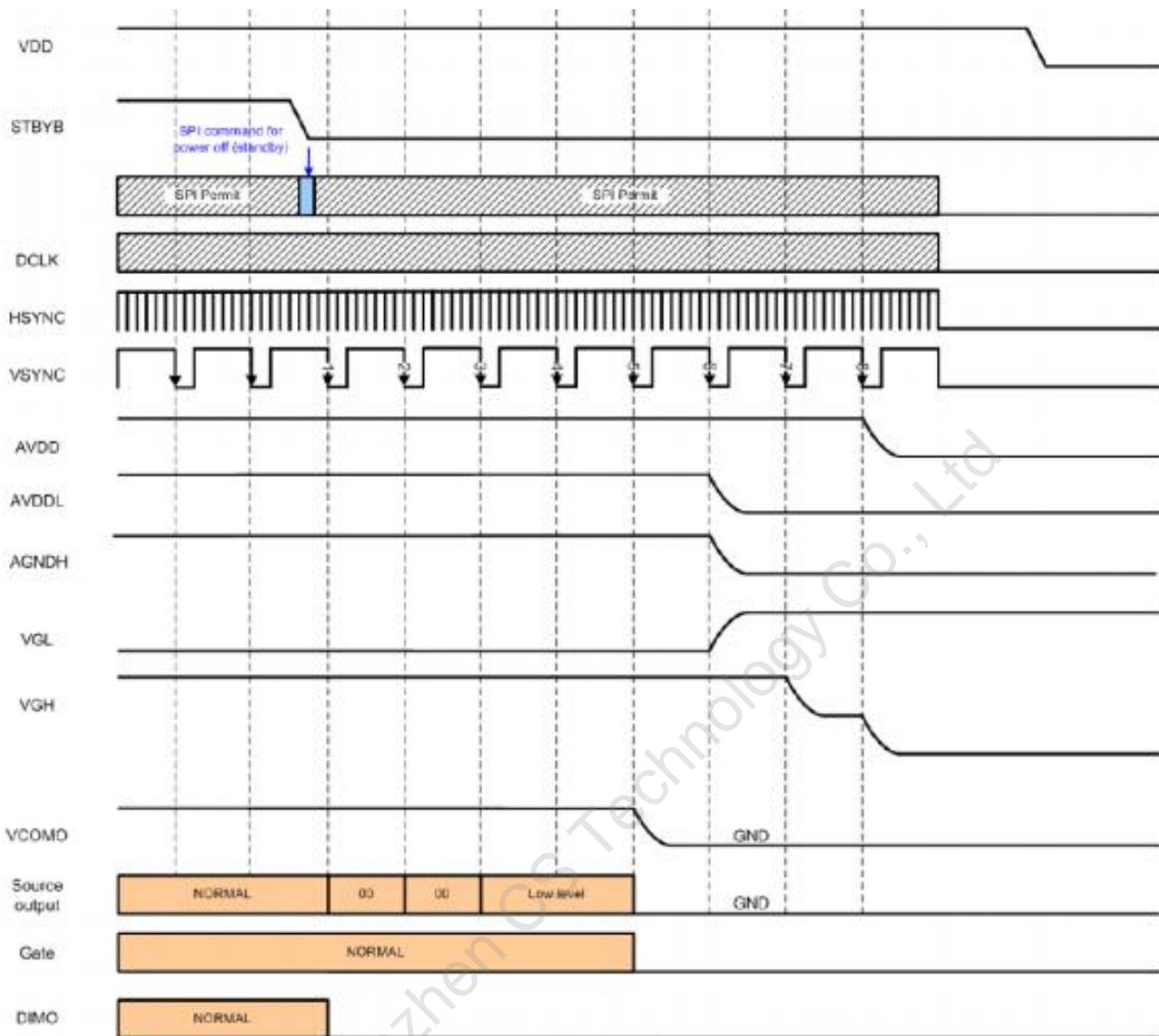
To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND → AVDD, AGND → V1 to V14
Power off: V1 to V14 → AVDD, AGND→ VDD, GND

Power off: V1 to V14 → AVDD, AGND→ VDD, GND

Power off timing sequence

Note: Low level=3FH, when NBW=L (Normally white)
Low level=00H, when NBW=H (Normally black

4.3 Timing Characteristics

DE MODE

Parameter		Value			Unit
		Min.	TYP.	MAX.	
DCLK Frequency		40	52	67	MHz
H Active	thd		1024		DCLK
H Total	th	1114	1344	1400	DCLK
HSYNC blanking		90	320	376	DCLK
V Active	tvd		600		H
V Total	tv	610	635	800	H
VSYNC blanking		10	35	200	H

HV MODE

H input timing

Parameter		Value			Unit
		Min.	TYP.	MAX.	
DCLK Frequency		45	52	63	MHz
H Active	thd		1024		DCLK
H Total	th	1200	1344	1400	DCLK
HSYNC blanking	thb	160	160	160	DCLK
HSYNC front porch	thfp	16	160	216	DCLK
HSYNC pulse width	thpw	1	-	140	DCLK

V input timing

Parameter		Value			Unit
		Min.	TYP.	MAX.	
V Active	tvd		600		DCLK
V Total	tvb	624	635	750	DCLK
VSYNC blanking	tvb	23	23	23	DCLK
VSYNC front porch	tvfp	1	12	127	DCLK
VSYNC pulse width	tvpw	1	-	20	DCLK

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

4.4 Driving Backlight

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	-	450	-	mA	
Forward Voltage	V_F	8.7	9.6	10.5	V	
Reverse current	IR		50		uA	
Power dissipation	Pd				mW	
Peak forward current	IFP		100		mA	
Peak forward current	VR		5		V	
Backlight Power consumption	W_{BL}	30000	-	-	H	

Note 1: Each LED : IF =60 mA, VF =3.3V.

(High power LED chip, support 60mA maximum, can not exceed it. For actual product 32mA is ok.)

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.

5. Optical Characteristics
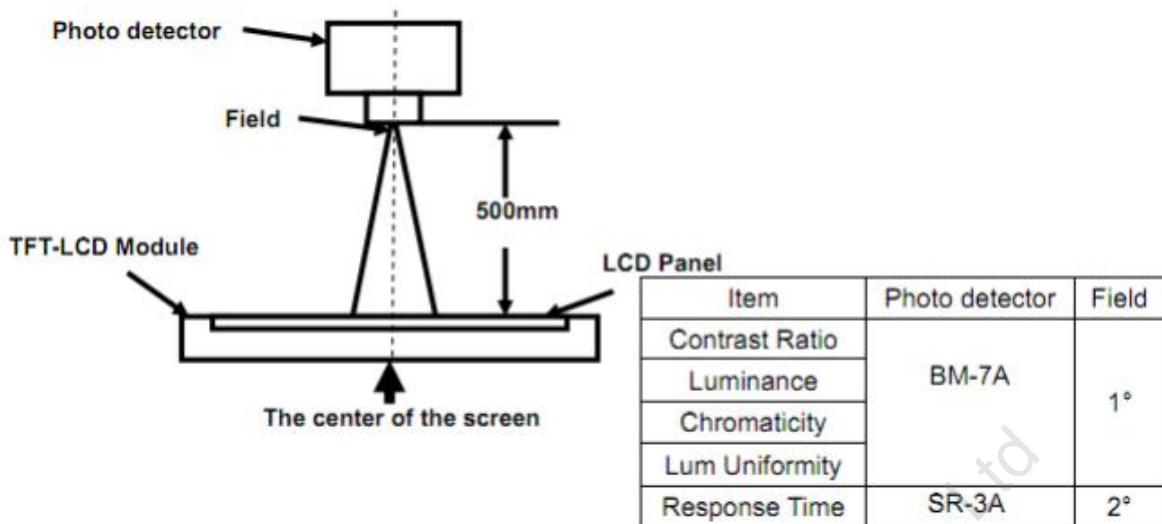
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10		80	-	Degree.	Note2
		θ_B			80	-		
		θ_L			80	-		
		θ_R			80	-		
Contrast Ratio		CR	Θ =0		800	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	10	20	ms	Note1, Note4
		T_{OFF}		-	25	40		
Chromaticity	White	X_W	Backlight is on	0.262	0.302	0.342	-	Note1, Note5
		Y_W		0.298	0.338	0.378	-	
	Red	X_R		0.566	0.606	0.646	-	
		Y_R		0.285	0.325	0.365	-	
	Green	X_G		0.263	0.303	0.343	-	
		Y_G		0.527	0.567	0.607	-	
	Blue	X_B		0.107	0.147	0.187	-	
		Y_B		0.121	0.161	0.201	-	
Uniformity		U		75	80	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L			1000		cd/m2	Note1, Note7

Test Conditions:
1. IF= 25mA(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.

Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°

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).
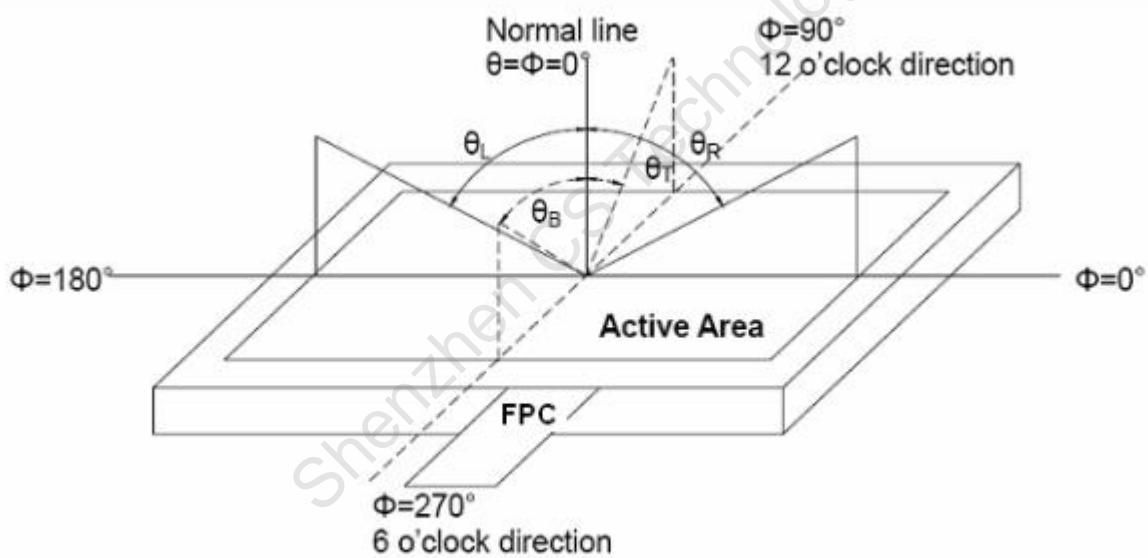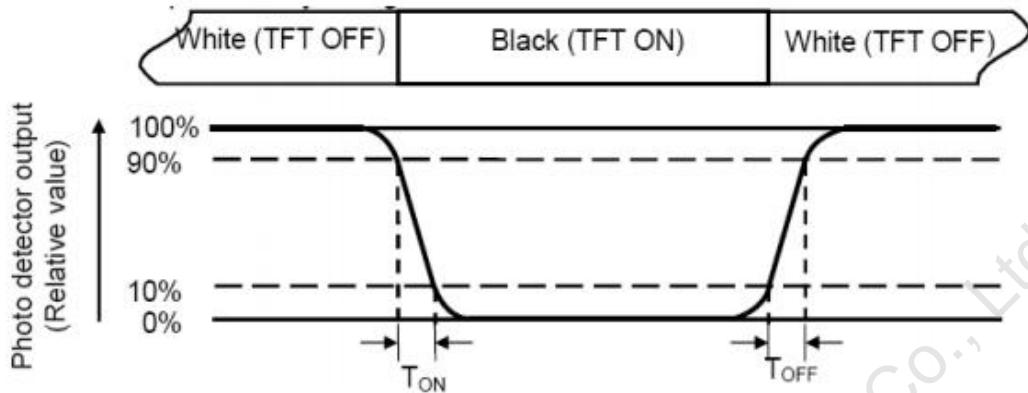
Fig. 1 Definition of viewing angle

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 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) = Lmin/ Lmax X100%

L-------Active area length W----- Active area width
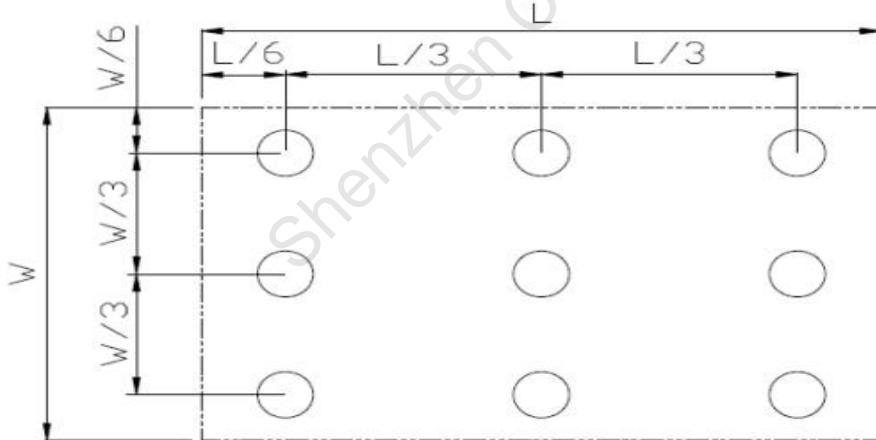
Fig. 2 Definition of uniformity

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.

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6. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Operation	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
Low Temperature Operation	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
Electric Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
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
Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995
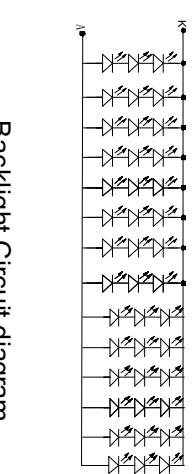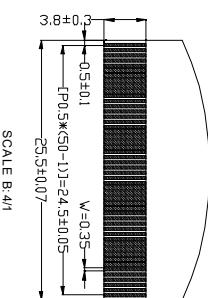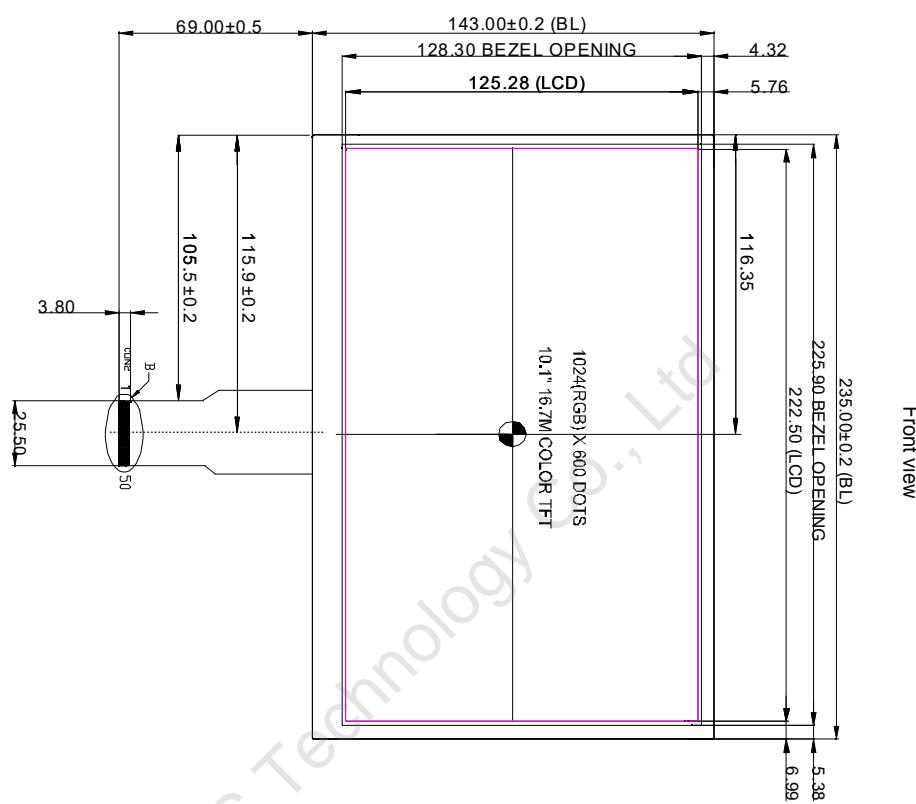
Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.
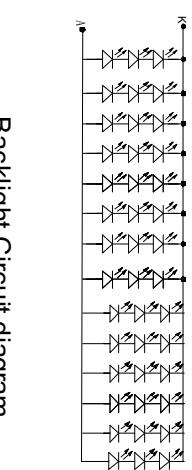
7. Mechanical Drawing For LCD
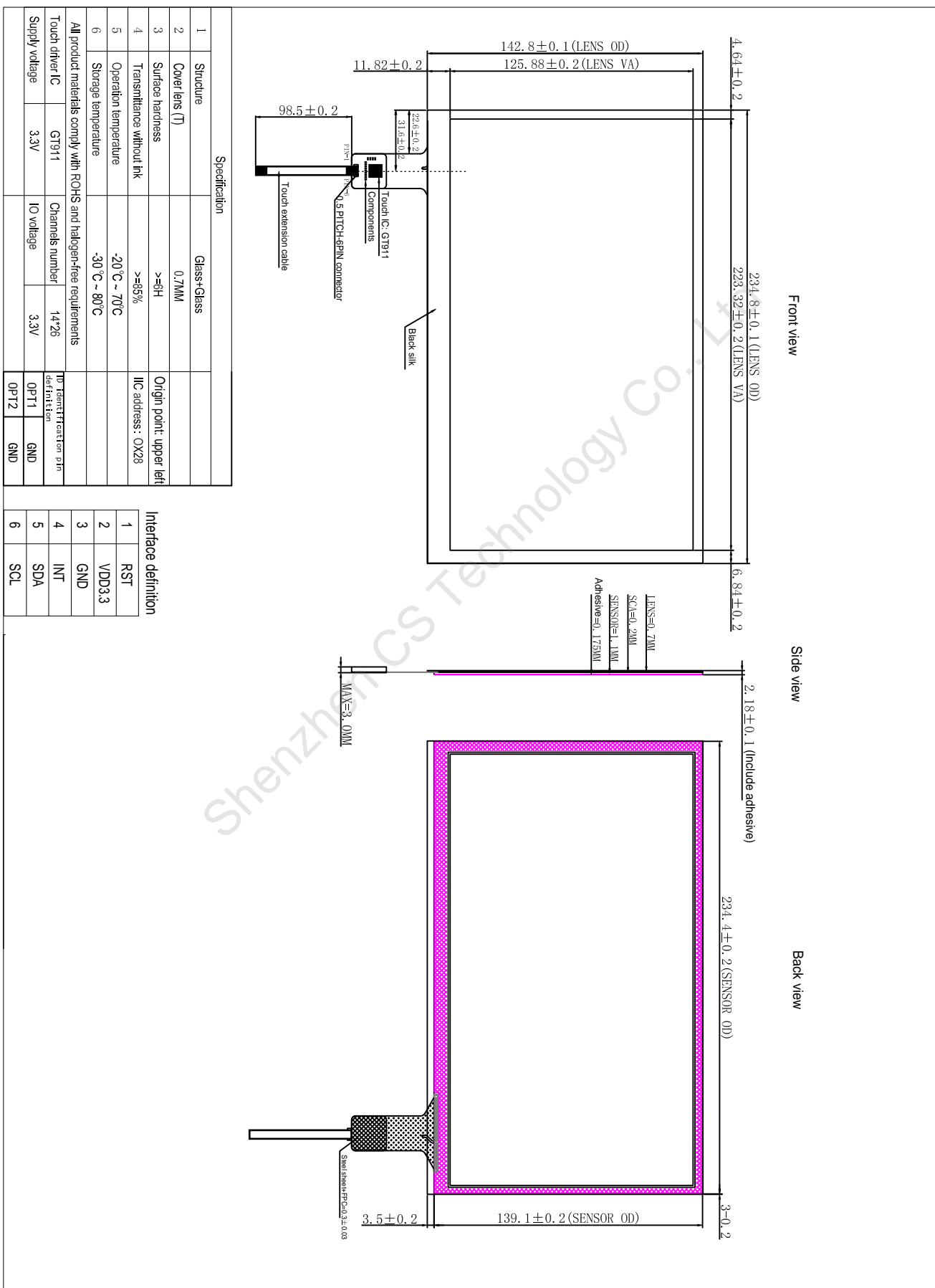
NOTE:
1. 10.1",Transmissive,Normal BLACK TFT,16M,1024RGB*600
2. Operating TEMP.:-20°C~70°C
3. Storage TEMP.:-30°C~80°C
4. Undefined tolerances:±0. 20mm
5. The product should measure up with RoHS standard

69.00±0.5
143.00±0.2 (BL)
128.30 BEZEL OPENING
125.28 (LCD)
4.32
5.76

3.80
105.5±0.2
115.9±0.2
116.35
225.90 BEZEL OPENING
235.00±0.2 (BL)
222.50 (LCD)
25.50
5.38
6.99

1024(RGB)X 600 DOTS
10.1" 16.7M COLOR TFT

Front view

SCALE B:4/1
3.8±0.3
0.5±0.1
[P0.5*(50-1)]=24.5±0.05
25.5±0.07
W=0.35

PPC+PI=0.30±0.03

Side view
5±0.3

Back view

5.00

Backlight Circuit diagram

K
A

8. Mechanical Drawing For CTP

Specification

1	Structure	Glass+Glass	
2	Cover lens (T)	0.7MM	
3	Surface hardness	>=6H	
4	Transmittance without ink	>=85%	
5	Operation temperature	-20℃ ~ 70℃	
6	Storage temperature	-30℃ ~ 80℃	
	All product materials comply with ROHS and halogen-free requirements		
	Touch driver IC	GT911	IIC address: 0X28
		Channels number	14*26	Origin point: upper left
	Supply voltage	3.3V	IO voltage	3.3V	ID identification pin definition	OPT1	OPT2
					GND	GND

Interface definition

1	RST
2	VDD3.3
3	GND
4	INT
5	SDA
6	SCL

9. Precautions For Use of Modules

9.1 Handling Precautions

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

9.1.2. 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.

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

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

9.1.5. 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

9.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

9.1.8.4. 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.

9.2 Storage Precautions

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

10.2.2. 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%

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

9.3 Transportation Precautions

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