PRODUCT SPECIFICATION

10.1 INCH TFT LCD WITH CTP

MODEL: HS101WSB-IT5000C

Customer Approval:

Contents

1. General Specifications

No.	Item	Specification	Remark
1	Size	10.1 inch	
2	Resolution	1024x600	
3	Interface	TTL	
4	Connect type	Connector	
5	Color depth	16.7M	
6	Technology type	a-Si	
7	Pixel pitch	0.0725x0.2088mm	
8	Pixel configuration	R.G.B.-Stripe	
9	Display mode	Normally Black	
10	Viewing direction	IPS (All view angle)	
11	Integral size (LCD+CTP)	249 (W) x 152.8 (H) x 7.18 (D)mm	Note 1
12	Module size (LCD)	235 (W) x 143 (H) x 5.0 (D)mm	Note 1
13	Active area	222.9 x 125.28mm	
14	Weight (g)	TBD	
15	LED Numbers	27 LEDs	

Note 1: Refer to Mechanical Drawing

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
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

40	U/D	Up/down selection
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
48	GND	Power ground
49	NC	No connection
50	NC	No connection

3. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Digital Supply Voltage	V_{DD}	-0.5	3.96	V	
Logic Output Voltage	Vout	-0.5	5.0	V	
Input Voltage	Vin	-0.5	AVDD+0.5	V	
Analog power Supply Voltage	AVDD	-0.5	13.5	V	
Operating Temperature	T_{OPR}	-10	60	℃	
Storage Temperature	T_{STG}	-10	60	℃	

4. Electrical Characteristics

4.1 Typical Operation Conditions

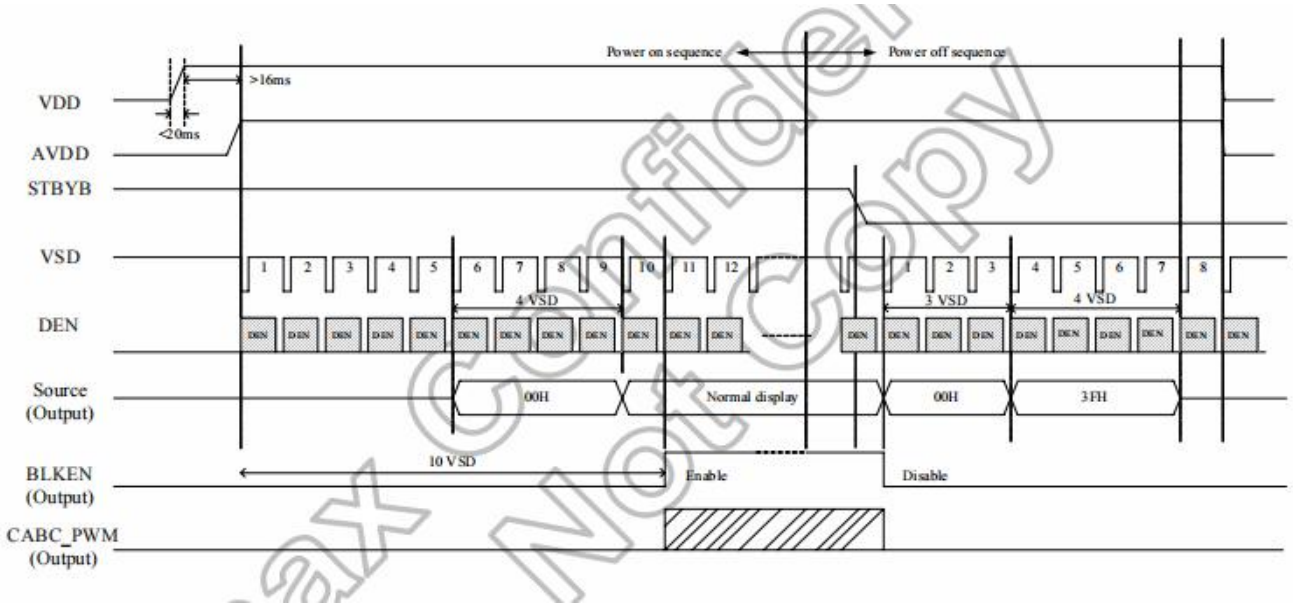
Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
TFT Gate on Voltage	VGH	17.7	18	18.3	V	
TFT Gate off Voltage	VGL	-7.0	-6.0	-5.0	V	
Analog power Supply Voltage	AVDD	9.3	9.6	9.9	V	
TFT Common electrode Voltage	VCOM	4.0	4.2	4.4	V	

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



4.3 AC Characteristics

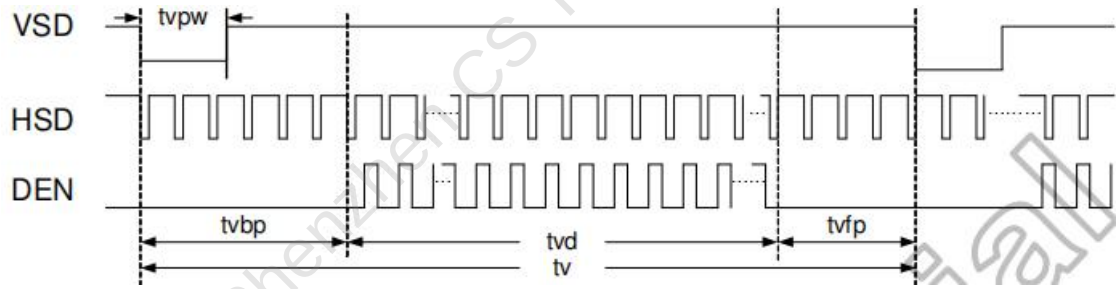
4.3.1 TTL mode AC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
VDD Power On Slew rate	T_{POR}	-	-	20	ms	From 0V to 90% VDD
RSTB pulse width	T_{Rst}	50	-	-	μs	DCLK=65MHz
DCLK cycle time	T_{cph}	14	-	-	ns	-
DCLK pulse duty	T_{cwh}	40	50	60	%	-
VSD setup time	T_{vst}	5	-	-	ns	-
VSD hold time	T_{vhd}	5	-	-	ns	-
HSD setup time	T_{hst}	5	-	-	ns	-
HSD hold time	T_{hhd}	5	-	-	ns	-
Data set-up time	T_{dsu}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
Data hold time	T_{dhd}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
DE setup time	T_{esu}	5	-	-	ns	-
DE hold time	T_{ehd}	5	-	-	ns	-
Output stable time	T_{sst}	-	-	6	μs	10% to 90% target voltage. CL=90pF, R=10K ohm (Cascade)
				3		Dual gate

- **TTL mode AC electrical characteristics**

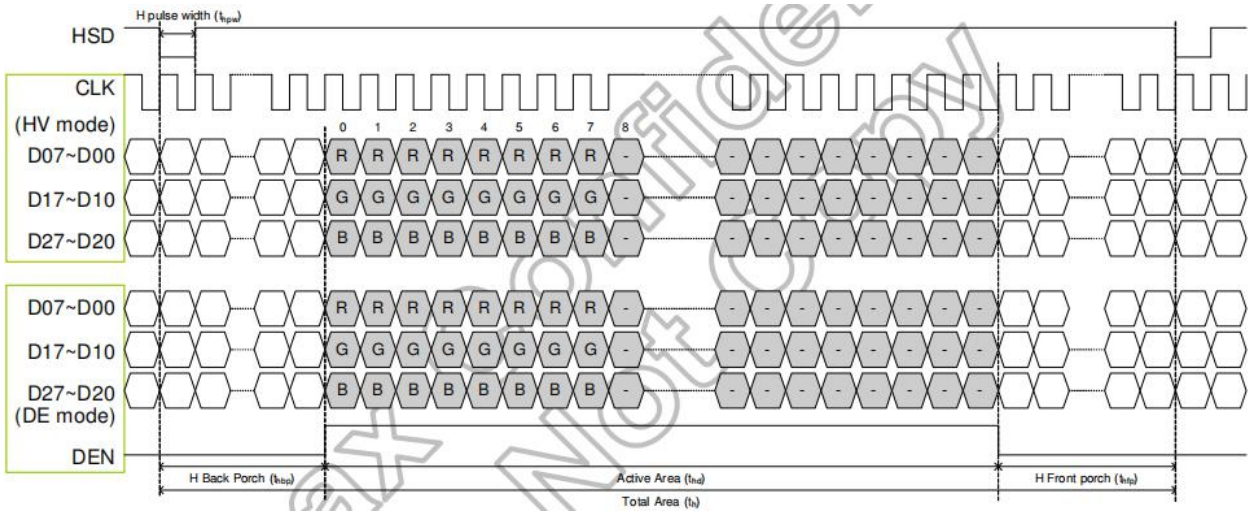
4.3.2 TTL mode data input format

Vertical timing



- **Vertical input timing diagram**

Horizontal timing



- **Horizontal input timing diagram**

4.3.3 Input timing table

➢ **DE mode**

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Horizontal Display Area	thd	-	1024	-	DCLK	
DCLK frequency	fclk	40.8	51.2	67.2	MHz	
HSD Period	th	1114	1344	1400	DCLK	
HSD Blanking	Thb+thfp	90	320	376	DCLK	
Vertical Display Area	tvd		600		TH	
VSD Period	th	610	635	800	TH	
VSD Blanking	Thb+thfp	10	35	200	TH	

➢ **HV mode**

Horizontal timing

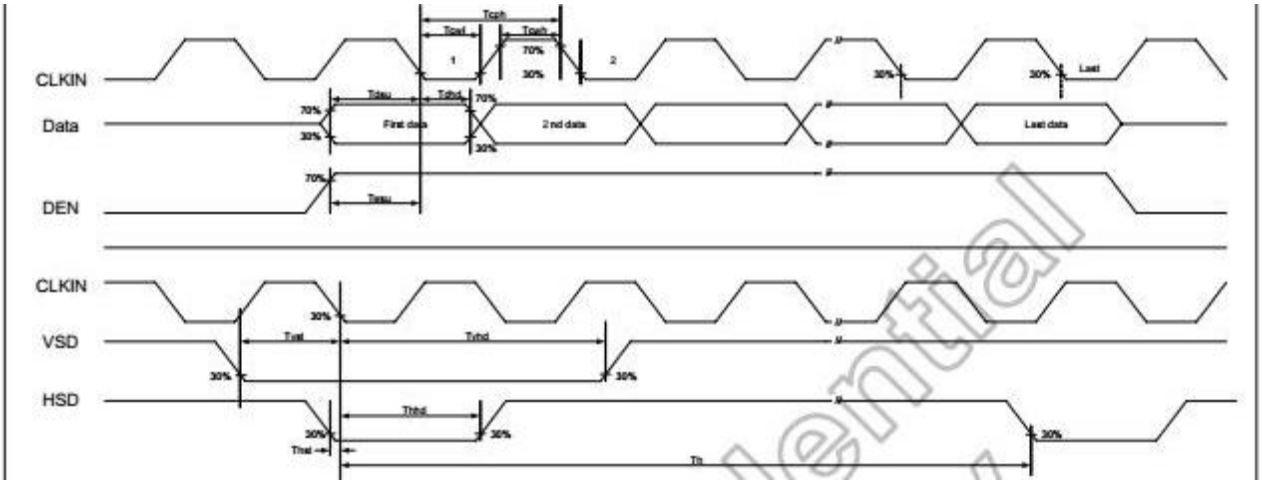
Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Horizontal Display Area	thd		1024		DCLK	
DCLK frequency	fclk	40.9	51.2	63	MHz	
HSD Period	th	1200	1344	1400	DCLK	
HS pulse width	thpw	1	-	140	DCLK	
HS Back Porch(Blanking)	thbp		160		DCLK	
HS Front Porch	thfp	16	160	216	DCLK	

Vertical timing

Parameter	Symbol	Min.	Typ.	Max	Unit	Note
Vertical Display Area	tvd		600		TH	
VS period time	tv	624	635	750	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvbp		23		TH	
HS Front Porch	tvfp	1	12	127	TH	

4.4 Timing Diagram of Interface Signal

4.4.1 Input clock and data timing diagram



Input clock and data timing diagram

5. Optical Characteristics

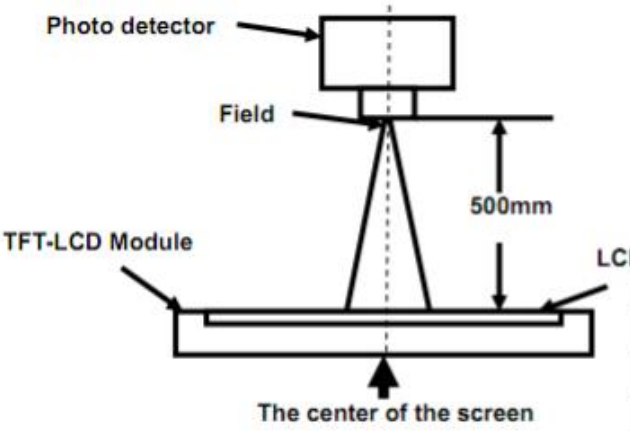
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θX+	Center CR≥10	80	85	-	Degree.	Note2
		θX-		80	85	-		
		θY+		80	85	-		
		θY-		80	85	-		
Contrast Ratio		CR	Θ =0	-	800	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	10	20	ms	Note1, Note4
		T_{OFF}		-	25	40		
Chromaticity	White	X_W	Backlight is on	-	0.298	-	-	Note1, Note5
		Y_W		-	0.334	-	-	
	Red	X_R		-	0.605	-	-	
		Y_R		-	0.372	-	-	
	Green	X_G		-	0.297	-	-	
		Y_G		-	0.563	-	-	
	Blue	X_B		-	0.144	-	-	
		Y_B		-	0.169	-	-	
Luminance		L		-	300	-	cd/m2	Note1

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).

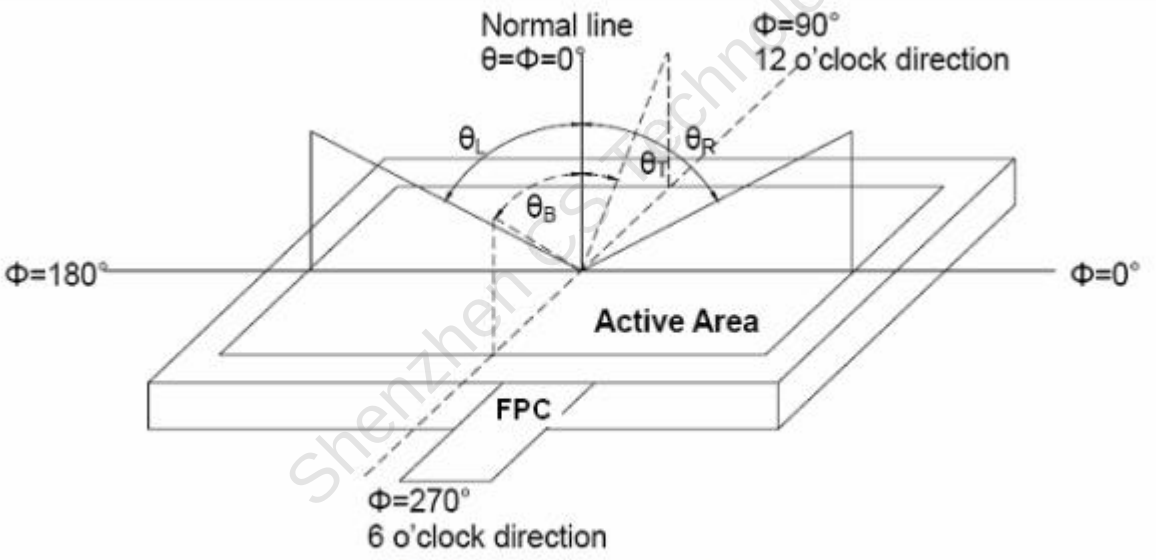
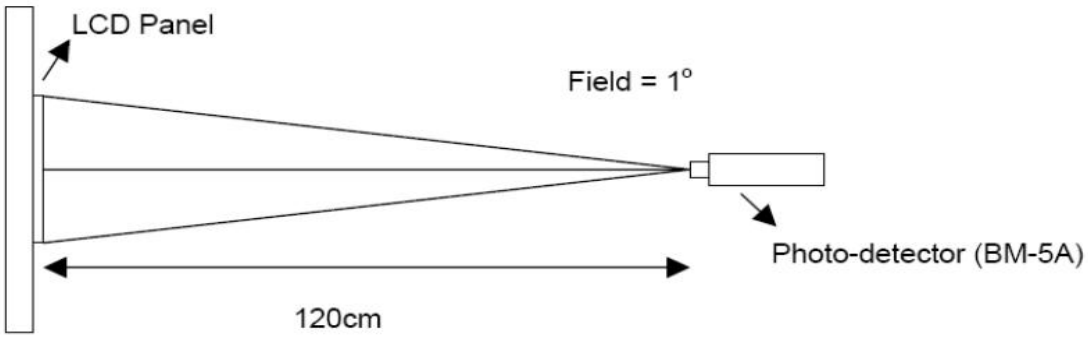


Fig. 1 Definition of viewing angle

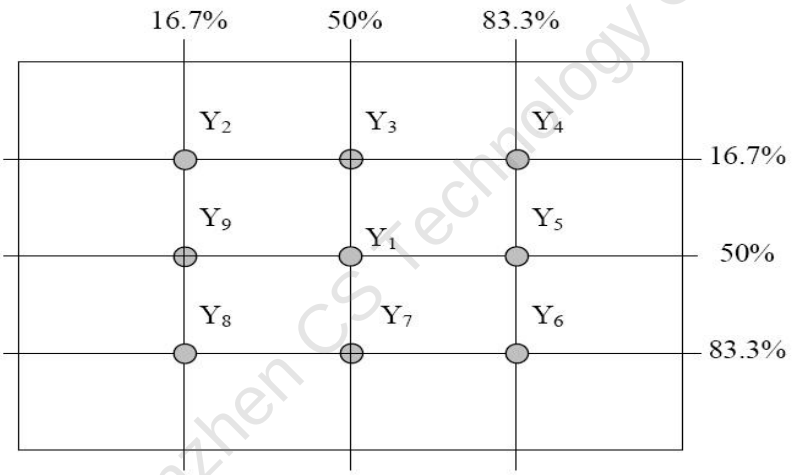
Note 3: Definition of contrast ratio

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

Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

5.1. Backlight Characteristic

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	Ta=25 ºC, V_F=3.2V/LED	8.4	**9.6**	10.2	V
Forward Current	I_F	Ta=25 ºC, I_F=20mA/LED	-	**180**	-	mA
Power dissipation	P_D	-	-	**1692**	1836	mW
Uniformity	Avg	-	-	80	-	%
LED working life(25℃)	-		-	20000	-	Hrs
Drive method	**Constant current**					
LED Configuration	27 White LEDs (3 LEDs in one string and 9 groups in parallel)					

Note1：LED life time defined as follows: The final brightness is at 50% of original brightness.
The environmental conducted under ambient air flow, at Ta=25±2 ºC,60%RH±5%, I_F=20mA/LED.

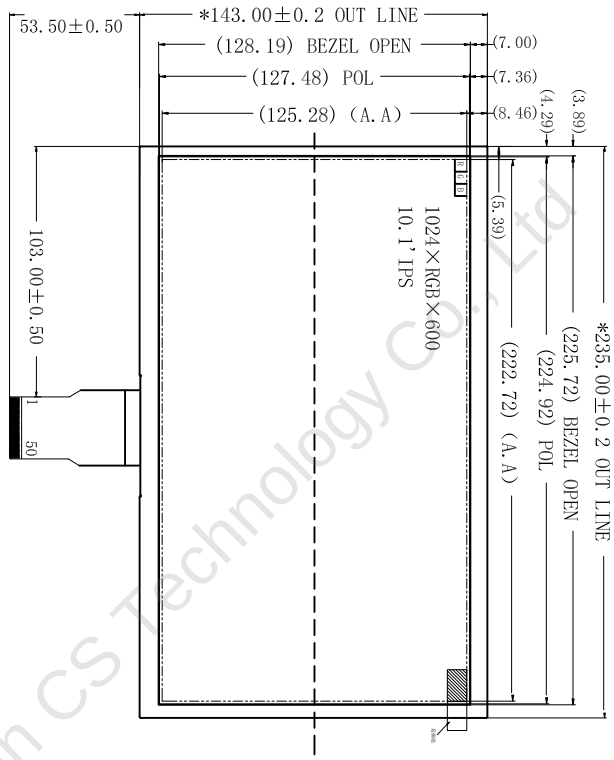
6. Reliability Test Items

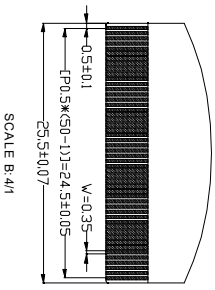
Item	Test Conditions	Remark
High Temperature Operation	Ts= +60℃, 120hrs	Note 1 IEC60068-2-2, GB2423. 2-89
Low Temperature Operation	Ta= -10℃, 120hrs	Note 2 IEC60068-2-1 GB2423.1-89
High Temperature Storage	Ta= +60℃, 120hrs	IEC60068-2-2 GB2423. 2-89
Low Temperature Storage	Ta= -10℃, 120hrs	IEC60068-2-1 GB/T2423.1-89
High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 96 hours	IEC60068-2-3 GB/T2423.3-2006
Thermal Shock	-20℃ 30 min ~ +60℃ 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)	Sine Wave 1.04G, 5~500Hz, XYZ 30min/each direction	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

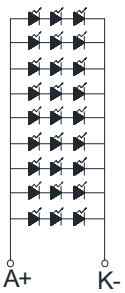
Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

7. Mechanical Drawing For LCD

NOTE:
1. 10.1",Transmissive,Normal Black TFT ,16.7M,1024RGB*600
2. Operating TEMP:-10°C~60°C
3. Storage TEMP:-10°C~60°C
4. Undefined tolerance:±0. 20mm
5. The product should measure up with RoHS standard

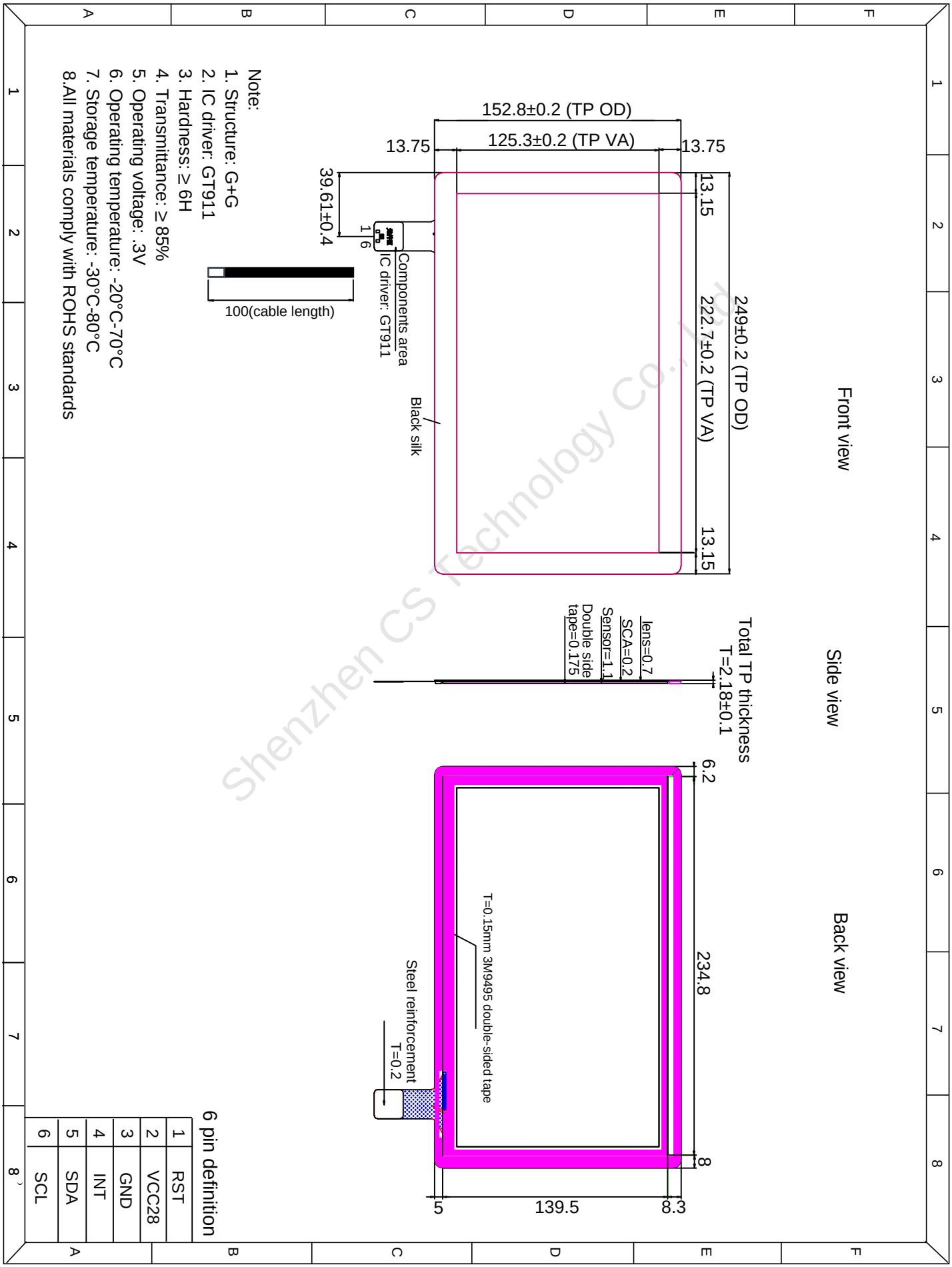






Backlight Circuit diagram

Mechanical Drawing For CTP



Note:

1. Structure: G+G
2. IC driver: GT911
3. Hardness: ≥ 6H
4. Transmittance: ≥ 85%
5. Operating voltage: .3V
6. Operating temperature: -20°C-70°C
7. Storage temperature: -30°C-80°C
8. All materials comply with ROHS standards

6 pin definition

1	RST
2	VCC28
3	GND
4	INT
5	SDA
6	SCL

8. Precautions For Use of Modules

8.1 Handling Precautions

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

8.1.2. 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.

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

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

8.1.5. 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

8.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

8.1.8.4. 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.

8.2 Storage Precautions

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

8.2.2. 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%

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

8.3 Transportation Precautions

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