MODEL NO. : TM084SDHG02-00

ISSUED DATE: 2014-10-14

VERSION : Ver 1.0

■Preliminary Specification
□Final Product Specification

Customer :_____

Approved by	Notes

SHANGHAI TIANMA Confirmed :

Prepared by	Checked by	Approved by
Gang.li		

This technical specification is subjected to change without prior notice.

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2014-10-14	Preliminary Specification released	Gang.li

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1 General Specifications

Feature		Spec
Display Spec.	Size	8.4 inch
	Resolution	800(RGB) x 600
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.213×0.213
	Display Mode	Transmissive, Normally white
	Surface Treatment	Anti-Glare
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	189.75x 149.4 x 4.8
	Active Area(mm)	170.4 (W) X127.8(H)
	With /Without TSP	Without TSP
	Matching Connection Type(CN1)	FH28-60S-0.5SH(Hirose)
	Matching Connection Type(CN2)	BHSR-02VS-1
	LED Numbers	27 LEDS
	Weight (g)	TBD
Electrical Characteristics	Interface	TTL(RGB 24bit)
	Color Depth	16.7M
	Driver IC	NT51008B*2+NT52002*1

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: Q/S0002

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

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2 Input/Output Terminals

2.1 CN1 of FPC

FPC down Connector type: FH28-60S-0.5SH(Hirose)

Pin	Symbol	I/O	Description	Remark
1	GND	P	Ground	
2	NC	-	No connection	
3	VCC	P	Power supply	
4	R0	I	Red data Input(LSB)	
5	R1	I	Red data Input	
6	R2	I	Red data Input	
7	R3	I	Red data Input	
8	R4	I	Red data Input	
9	R5	I	Red data Input	
10	R6	I	Red data Input	
11	R7	I	Red data Input(MSB)	
12	G0	I	Green data Input(LSB)	
13	G1	I	Green data Input	
14	G2	I	Green data Input	
15	G3	I	Green data Input	
16	G4	I	Green data Input	
17	G5	I	Green data Input	
18	G6	I	Green data Input	
19	G7	I	Green data Input(MSB)	
20	B0	I	Blue data Input(LSB)	
21	B1	I	Blue data Input	
22	B2	I	Blue data Input	
23	B3	I	Blue data Input	
24	B4	I	Blue data Input	
25	B5	I	Blue data Input	
26	B6	I	Blue data Input	
27	B7	I	Blue data Input(MSB)	
28	DCLK	I	Clock input(Latch data at falling edge)	
29	DE	I	Data enable	
30	HSYNC	I	Horizontal sync input. Negative polarity	
31	VSYNC	I	Vertical sync input. Negative polarity	
32	MODE3	I	DE/SYNC mode select .normally pull high H:DE mode .L:HV mode	
33	RSTB	I	Global reset pin. RSTB=“0”,module reset; RSTB=“1” normal operation	
34	STBYB	I	Standby mode, normally pull high STBYB="1",normal operation STBYB="0",source driver will turn off, all output are high-Z	
35	SHLR	I	Source right or left sequence control,normally pull high SHLR="L", shift left: last data=S1<-S2…S1200=first data ; SHLR="H", shift right :first data=S1->S2…S1200=last data	
36	VCC	P	Power supply	

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37	UPDN	I	Gate up or down scan control. Normally pull low UPDN="L" , DOWN shift :G1->G2…->G600 ; UPDN="H", up shift: G1<-G2…<-G600	
38	GND	P	Ground	
39	GND	P	Ground	
40	NC	-	No connection	
41	NC	-	No connection	
42	DITH	I	Dithering setting DITH="H" 6bit resolution (last 2 bits of input data truncated, default setting) DITH="L" 8bit resolution	
43	NC	-	No connection	
44	NC	-	No connection	
45	NC	-	No connection	
46	NC	-	No connection	
47	NC	-	No connection	
48	NC	-	No connection	
49	NC	-	No connection	
50	NC	-	No connection	
51	NC	-	No connection	
52	NC	-	No connection	
53	NC	-	No connection	
54	NC	-	No connection	
55	NC	-	No connection	
56	NC	-	No connection	
57	NC	-	No connection	
58	NC	-	No connection	
59	NC	-	No connection	
60	NC	-	No connection	

I---Input, O---Output, P--- Power/Ground, "-" ---No connection

Table 2.1 terminal pin assignments

2.2 CN2 pin assignment (Backlight interface)

Connector type: BHSR-02VS-1
Mating Connector: SBHT-002T-P0.5 or equivalent

Pin	Symbol	I/O	Description	Remark
1	LED+(Anode)	P	LED power supply (high voltage)	
2	LED-(Cathode)	P	LED power supply (low voltage)	

Table 2.2 Backlight terminal pin assignments

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3 Absolute Maximum Ratings

GND=0V, Ta = 25℃

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	-0.5	5.0	V	
Data Input voltage	V_{IN}	-0.5	5.0	V	Note2
Backlight forward current	I_{LED}	-	30	mA	For each LED
Operating Temperature	Top	-20	70	℃	Note1
Storage Temperature	Tst	-30	80	℃	Note1

Note1: The parameter is for driver IC (gate driver, source driver) only.
Note2: Signals include Rx,Gx,Bx,DCLK,DE,HSYNC,VSYNC,MODE3,RSTB,STBYB,SHLR, DITH.

Table 3.1 absolute maximum rating

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4 Electrical Characteristics

4.1 Recommended Operating Condition

VCC=3.3V，GND=0V，Ta = 25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
Supply Voltage		VCC	3.0	3.3	3.6	V	
Input Signal Voltage	Low Level	V_{IL}	0	--	0.3xVCC	V	
	High Level	V_{IH}	0.7xVCC	--	VCC	V	
Output Signal Voltage	Low Level	V_{OL}	--	--	GND+0.4	V	
	High Level	V_{OH}	VCC-0.4	--	--	V	
(Panel+LSI) Power Consumption		Black Mode (60Hz)		TBD		mW	Note1
		Standby Mode		TBD		mW	

Table 4.1 LCD module electrical characteristics

Note1: To test the current dissipation, use “all Black Pattern”.

4.2 Backlight Unit Driving Condition

LED_GND=GND=0V, Ta = 25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Channel1	I_F	-	180	-	mA	Note 1
Forward Voltage	V_F	-	9.6	-	V	
Backlight Power Consumption	W_{BL}	-	1728	-	mW	
Life Time	-	20,000	30,000		Hrs	Note 3

Table 4.2 LED backlight characteristics

Note 1: 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 an estimated data.

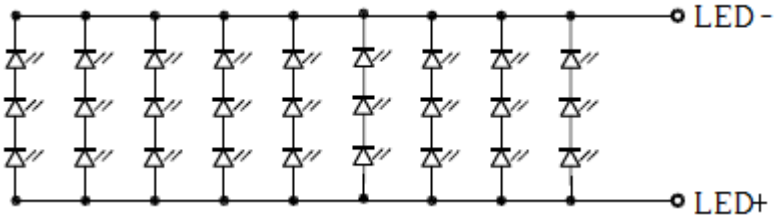
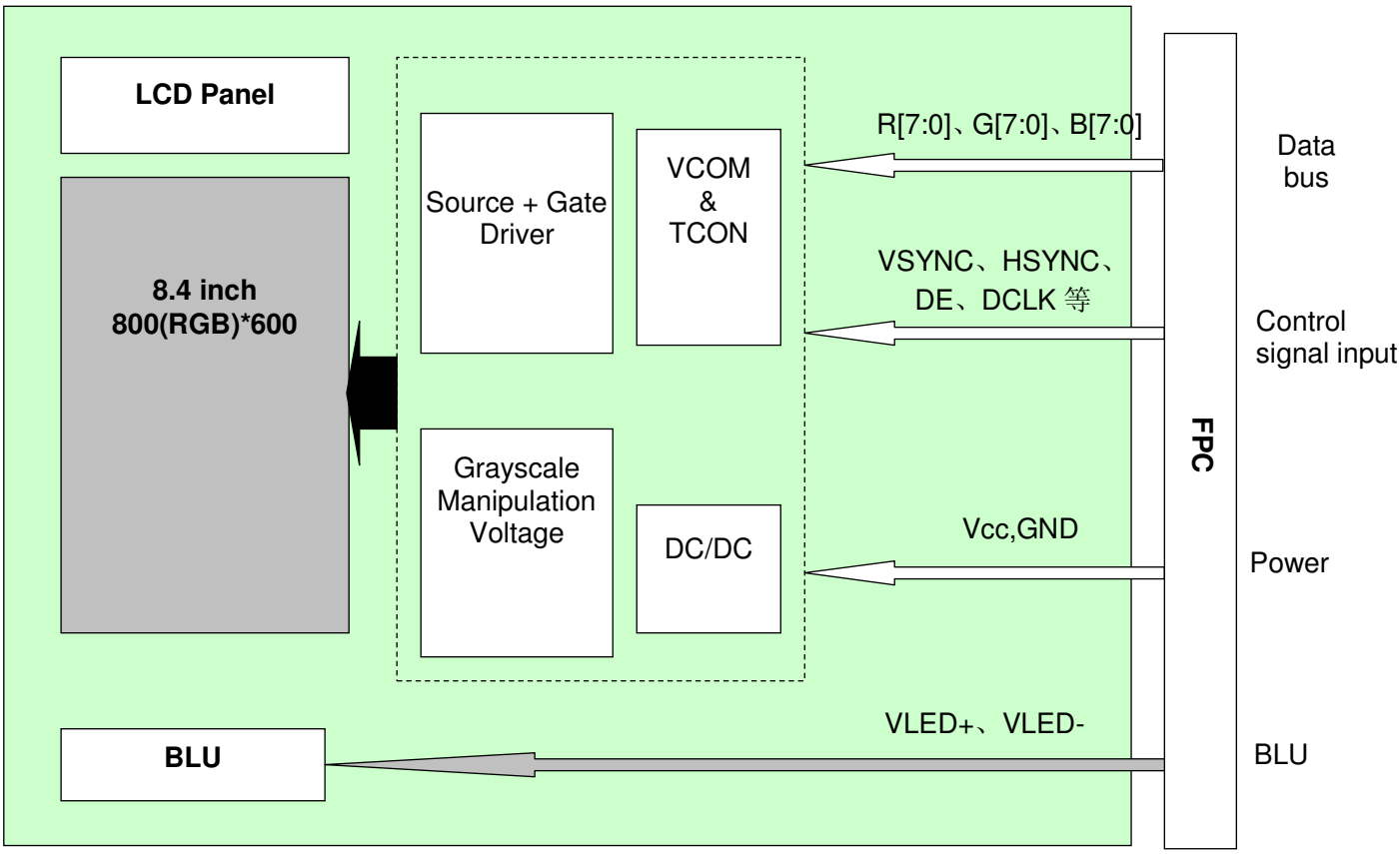


Figure4.2 LED connection of backlight

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4.3 BLOCK DIAGRAM



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5 Timing Chart

5.1.1 AC characteristics

VCC=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ	Max	Unit	Remark
HSYNC Setup Time	T_{hst}	8	-	-	ns	
HSYNC Hold Time	T_{hhd}	8	-	-	ns	
VSYNC Setup Time	T_{vst}	8			ns	
VSYNC Hold Time	T_{vhd}	8	-	-	ns	
Data Setup Time	T_{dsu}	8			ns	
Data Hold Time	T_{dhd}	8	-	-	ns	
DE Setup Time	T_{esu}	8	-	-	ns	
DE Hold Time	T_{ehd}	8	-	-	ns	
CLKIN Cycle Time	T_{cph}	14	-	-	ns	
CLKIN Pulse Width	T_{cwh}	40	50	60	%	
Output stable time	Tsst	-	-	6	us	
VCC Power ON Slew rate	Tpor	-	-	20	ms	From 0V to 90% VCC
RSTB pulse width	TRst	50	-	-	us	DCLK = 65MHz

Table 5.1 AC characteristics

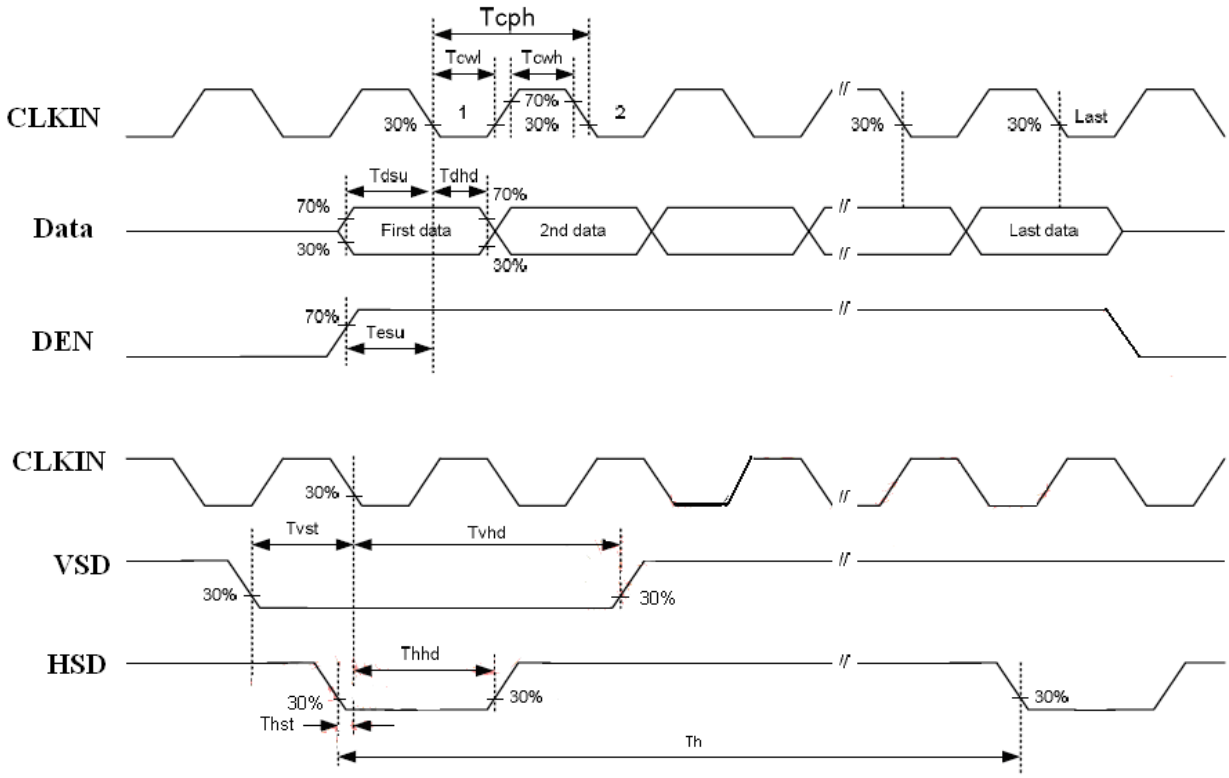


Figure 5.1 AC characteristics

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5.2 Data input timing

5.2.1 Input timing at DE mode

VCC=3.3V, GND=0V, Ta=25℃

	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Dclk frequency(Frame rate=60HZ)		Fclk	33	39.6	60	MHz	Tclk=1/Fclk
Horizontal section	Horizontal total	TH	890	1000	1300	Tclk	
	Horizontal blanking	THC	90	200	500	Tclk	Note1
	Valid Data Width	THD	-	800	-	Tclk	
Vertical section	Vertical total	TV	610	660	800	TH	
	Vertical blanking	TVC	10	60	200	TH	Note1
	Valid Data Width	TVD	-	600	-	TH	

Table 5.2.1 input timing (DE mode)

5.2.2 Input timing at HV mode

VCC=3.3V, GND=0V, Ta=25℃

	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Dclk frequency(Frame rate=60HZ)		Fclk	35	39.6	50	MHz	Tclk=1/Fclk
Horizontal section	Horizontal pulse width	THPW	1	-	40	Tclk	
	Horizontal total	TH	900	1000	1200	Tclk	
	Horizontal back porch	THB	88	88	88	Tclk	
	Horizontal front porch	THFP	12	112	312	Tclk	
	Valid Data Width	THD	-	800	-	Tclk	
Vertical section	Vertical pulse width	TVPW	1	-	20	TH	
	Vertical total	TV	640	660	700	TH	
	Vertical back porch	TVB	39	39	39	TH	
	Vertical front porch	TVFP	1	21	61	TH	
	Valid Data Width	TVD	-	600	-	TH	

Table 5.2.2 input timing (HV mode)

Note1: THC=THB+THFP, TVC=TVB+TVFP, In HV mode, it is necessary to keep it in typical value.

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5.3 Data input Timing Diagram

5.3.1 Vertical Input Timing Diagram

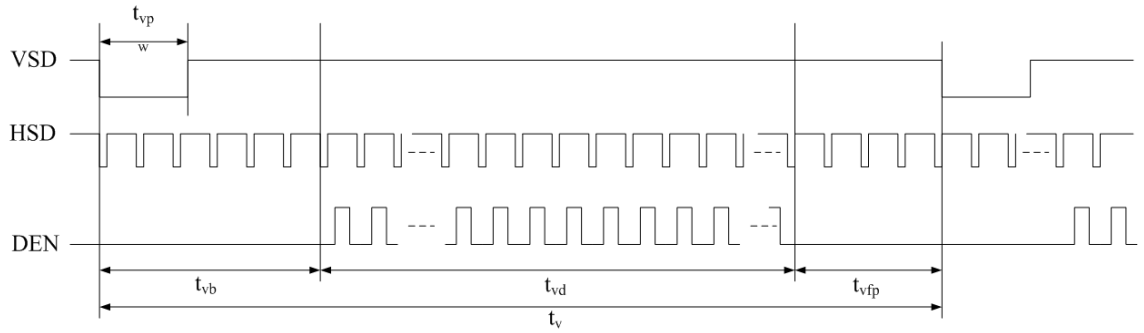


Figure 5.3.1 Vertical Input Timing Diagram

5.3.2 Horizontal Input Timing Diagram

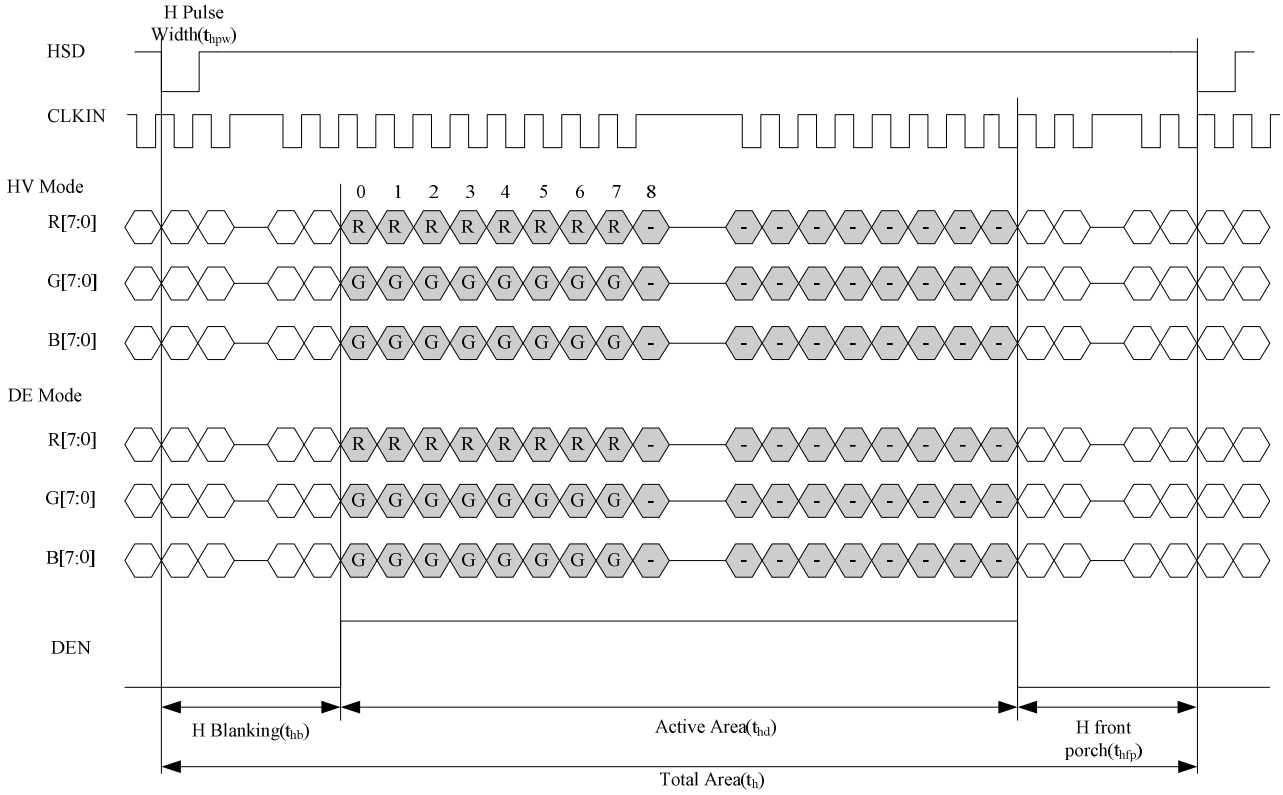


Figure5.3.2 Vertical Input Timing Diagram

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5.4 POWER ON/OFF SEQUENCE

Item	Symbol	Min	Typ	Max	Unit	Remark
VCC 3.3V to signal starting	Tp1	5	-	50	ms	
VCC rising time	Tr	0.1	-	5	ms	Note1
Signal starting to backlight on	Tp2	150	-	-	ms	
Signal off to VCC 0V	Tp3	5	-	50	ms	
Backlight off to signal off	Tp4	150	-	-	ms	

Table 5.4 POWER ON/OFF SEQUENCE

Note1: Tr means the time of input voltage rise from 10% to 90%.

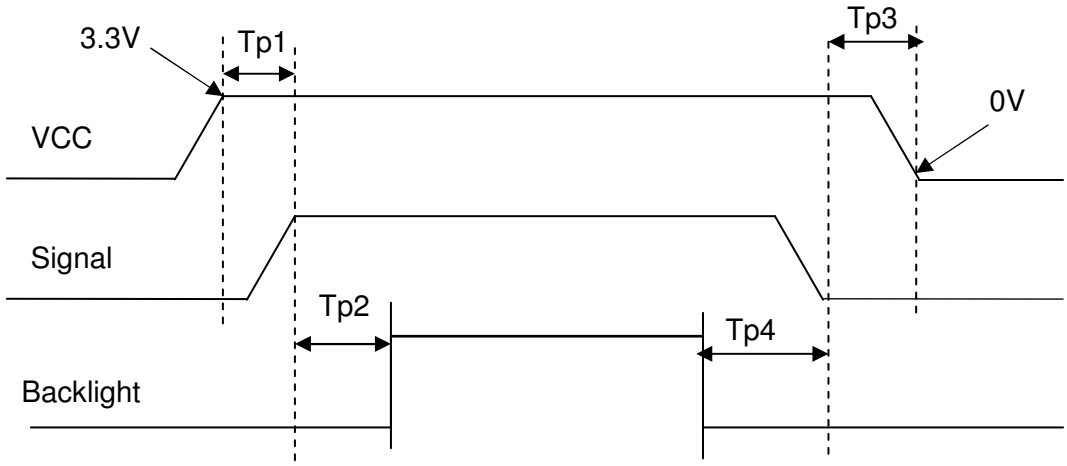


Figure5.4 Interface power on/off sequence

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6 Optical Characteristics

Ta=25℃

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	50	60	-	Degree	Note 2
		θB		60	70	-		
		θL		60	70	-		
		θR		60	70	-		
Contrast Ratio		CR	θ=0°	400	500	-		Note1 Note3
Response Time		T_{ON}	25℃	-	20	30	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	TBD	TBD	TBD		Note1 Note5
		y		TBD	TBD	TBD		
	Red	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
	Green	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
	Blue	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
Uniformity		U		70	75	-	%	Note1 Note6
NTSC				-	50	-	%	Note 5
Luminance（Without TP）		L		250	330	-	cd/m^2	Note1 Note7

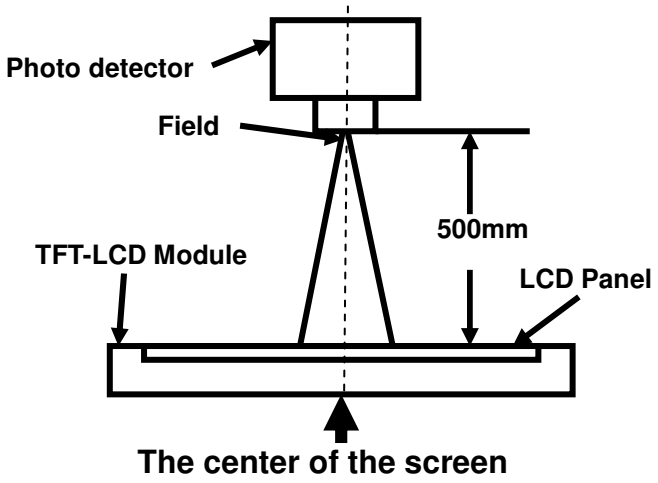
Test Conditions:

1. I_F= 180 mA, V_F=10.5 V and the ambient temperature is 25±2℃.humidity is 65±7%
2. The test systems refer to Note 1 and Note 2.

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Note 1: Definition of optical measurement system.

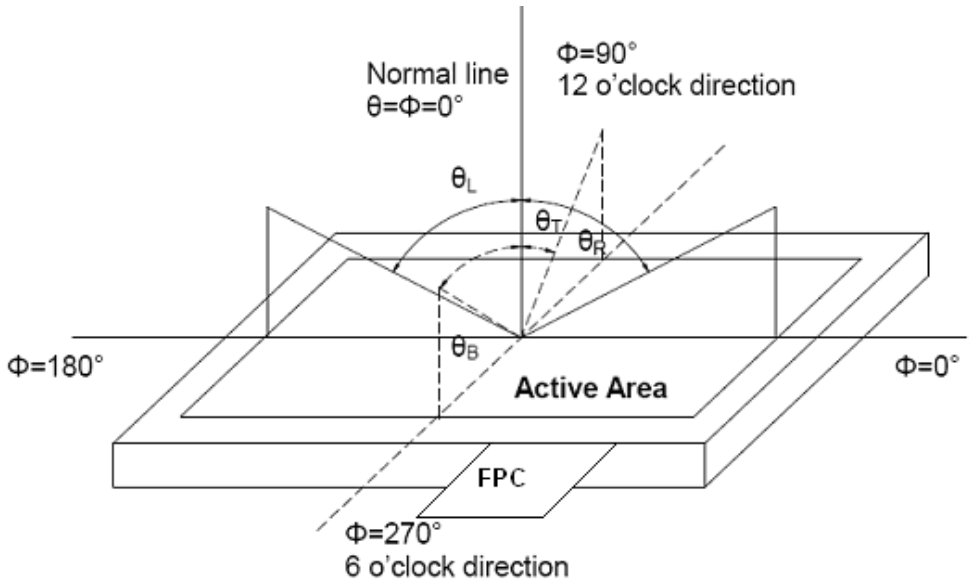
The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



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



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 Vwhite.

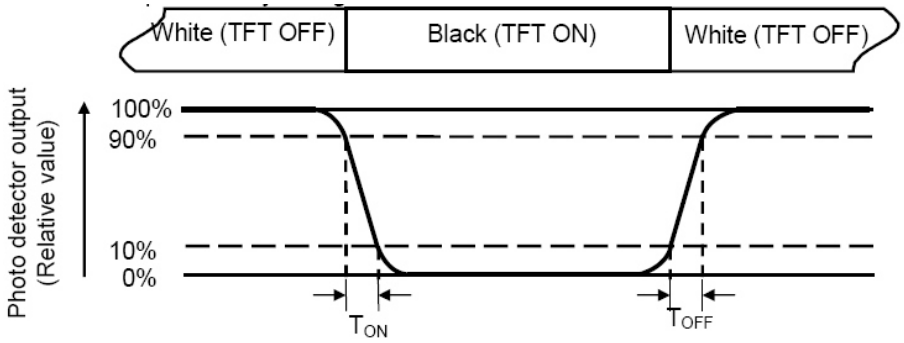
“Black state”: The state is that the LCD should drive by Vblack.

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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 (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

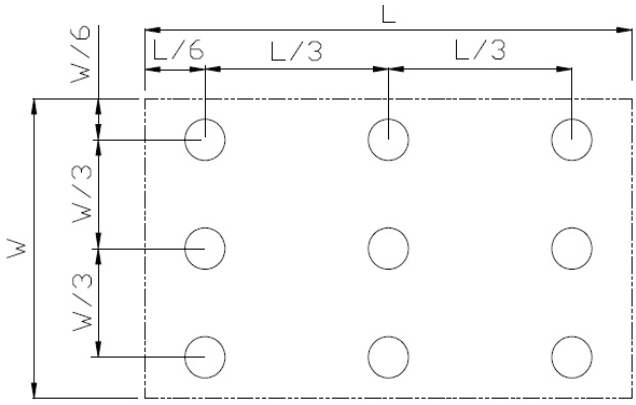
Color coordinates measured at center point of LCD.

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

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



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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7 Environmental / Reliability Test

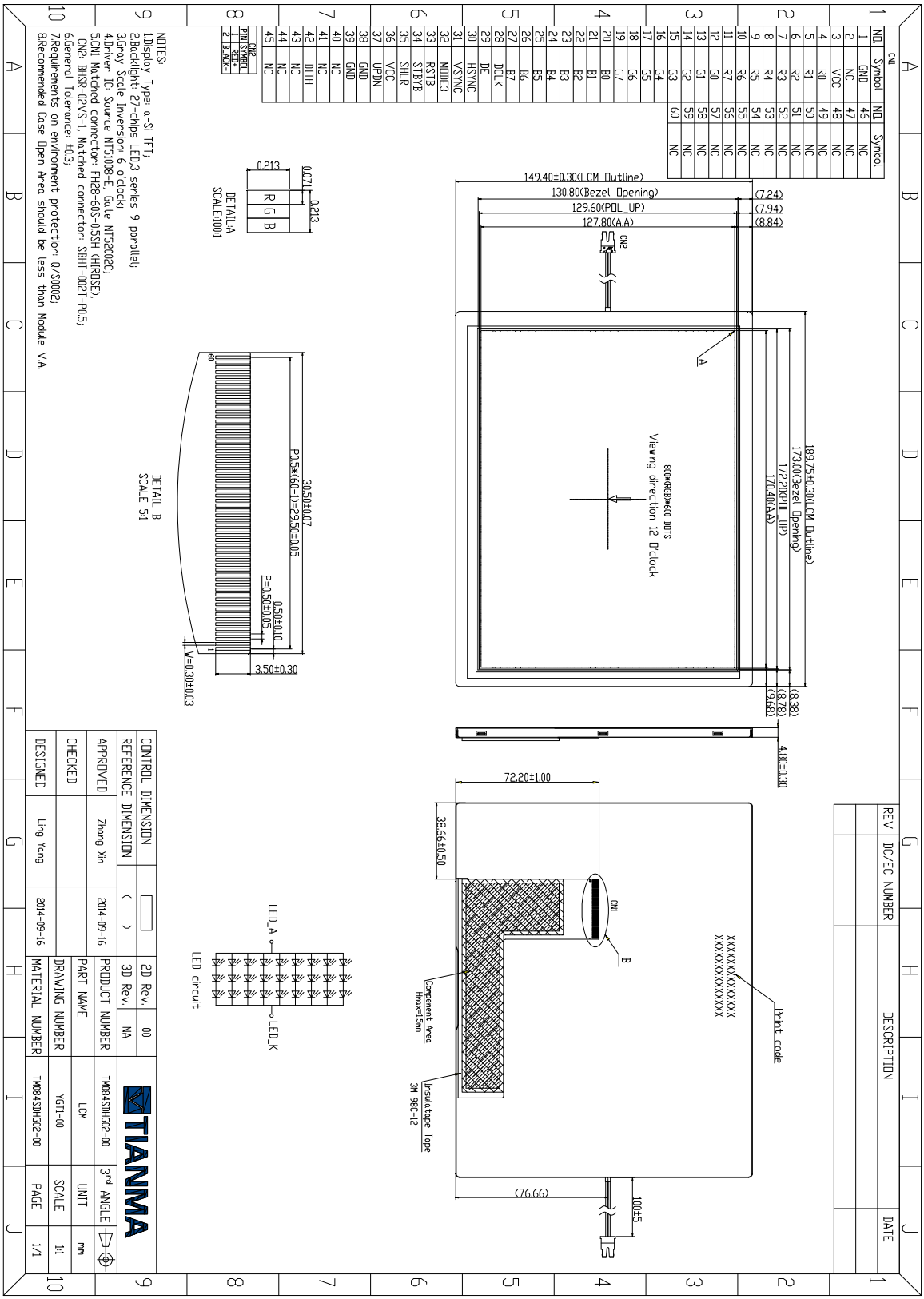
No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	IEC60068-2-1 GB2423.2
2	Low Temperature Operation	Ta = -20℃, 240 hours	IEC60068-2-1 GB2423.1
3	High Temperature Storage	Ta = +80℃, 240 hours	IEC60068-2-1 GB2423.2
4	Low Temperature Storage	Ta = -30℃, 240 hours	IEC60068-2-1 GB2423.1
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	IEC60068-2-78 GB/T2423.3
6	Thermal Shock (non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 100 Cycle	Start with cold temperature, End with high temperature, IEC60068-2-14,GB2423.22
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2 GB/T17626.2
8	Vibration Test	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 GB/T2423.10
9	Mechanical Shock (Non Op)	Half Sine Wave 60G 6ms, ±X,±Y,±Z 3times for each direction	IEC60068-2-27 GB/T2423.5
10	Package Drop Test	Height:60cm, 1corner,3edges,6surfaces	IEC60068-2-32 GB/T2423.8

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of samples.

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8 Mechanical Drawing



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9 Packing drawing

No.	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM084SDHG02-00	189.75X149.4X4.8	TBD	36	
2	Partition_1	Corrugated paper	527X348X217	1.571	1	
3	Anti-static Bag	PE	161X253X0.05	0.001	36	Anti-static
4	Dust-Proof Bag	PE	700X545	0.06	1	
5	Partition_2	Corrugated Paper	505X332X4.0	0.092	2	
6	Corrugated Bar	Corrugated paper	348X173	0.057	4	
7	Carton	Corrugated paper	544X365X250	0.76	1	
8	Beauty-grain	Beauty-grain	30x10	0.001	2	
9	Label	label	100x52	0.001	1	
10	Total weight	TBD(kg±10%)				

Table 9: Packing specification and quantity

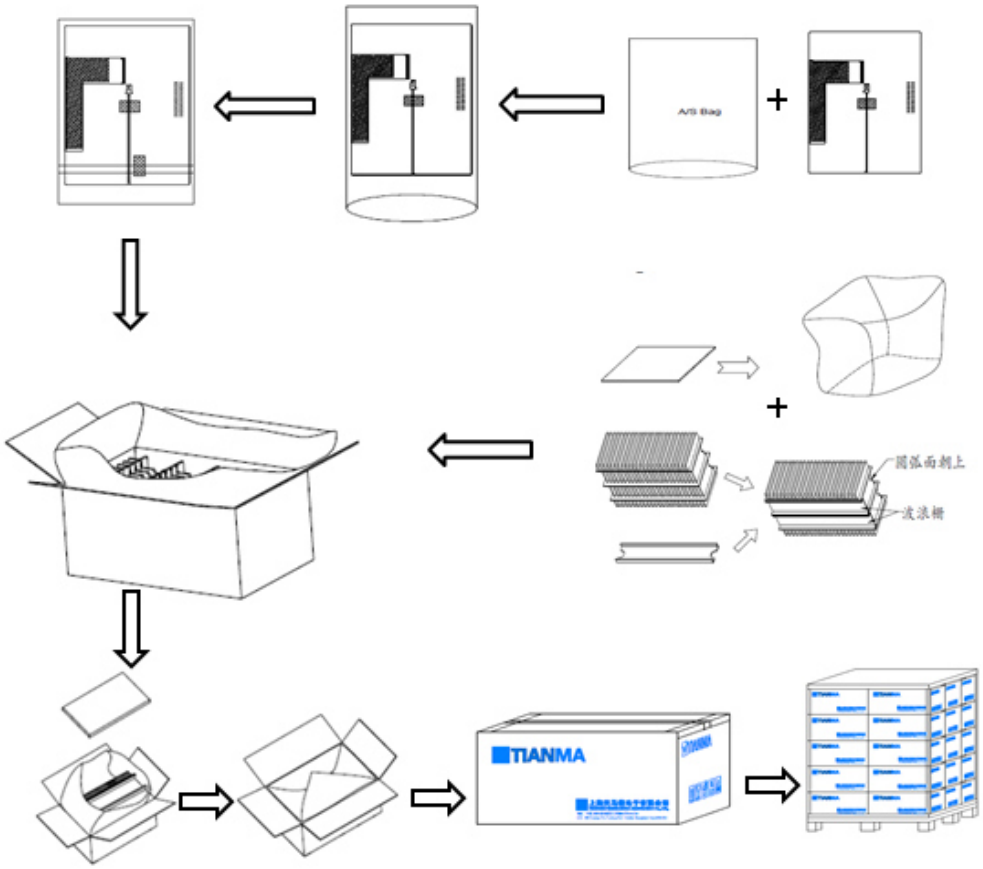


Figure 9: Packing instruction

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10 Precautions for Use of LCD Modules

10.1 Handling Precautions

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

10.1.2 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.

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

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

10.1.5 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

10.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4 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.

10.2 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 0℃ ～ 40℃,Relatively humidity: ≤80%

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

10.3 Transportation Precautions

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

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