



深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAY TECH. CO, TD.

TFT-LCD Module Specification

Module NO.: TST080SVBH-15B

Version: V1.0

APPROVAL FOR SPECIFICATION

APPROVAL FOR SAMPLE

For Customer' s Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Organized by

Version No.	Date	Content	Remark
V1.0	2019-11-5	Initial Release	

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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	8 inch	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800(W) RGB x 600(H)	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.2025 (w)x 0.2025(H)	
6	Active area	162(W) x 121.5(H) mm	
7	Module size	183(W) × 141(H) × 3.5(D) mm	Note 1
8	View direction	12	O'clock
9	Surface treatment	Anti-Glare	
10	Color arrangement	RGB-stripe	
11	Interface	RGB	
12	Lcm power consumption	2.1W	TYP
13	Drive IC	HX8264D02+HX8696A01	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignmen

FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

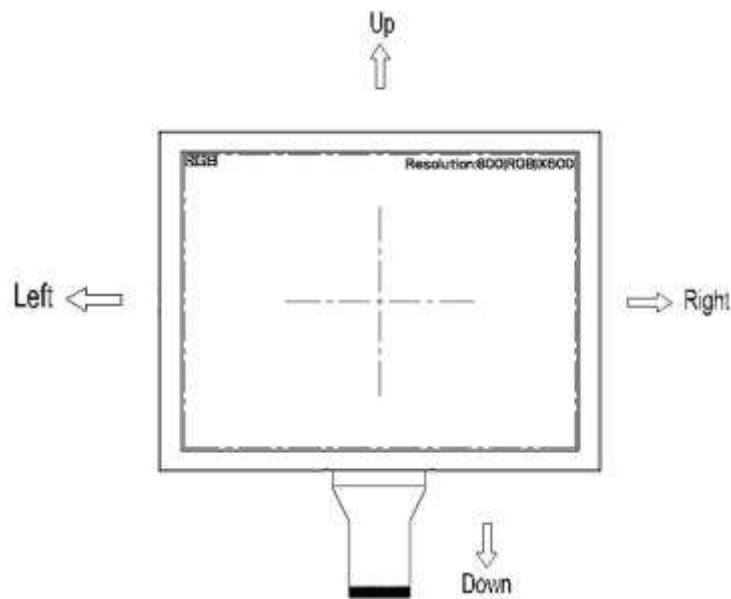
Pin. No	Symbol	I/O	Function	Remark
1-2	VLED+	P	Power for LED Backlight (Anode)	
3-4	VLED-	P	Power for LED Backlight (Cathode)	
5	GND	P	Power ground	
6	VCOM	p	Common voltage	
7	VCC	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12-19	B7-B0	I	Blue data,B7 is MSB,B0 is LSB.	
20-27	G7-G0	I	Green data,B7 is MSB,B0 is LSB.	
28-35	R7-R0	I	Red data,B7 is MSB,B0 is LSB.	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	L/R	I	Left/right selection	Note 1
40	U/D	I	Up/down selection	Note 1
41	VGH	P	Gate ON Voltage	
42	VGL	P	Gate OFF Voltage	
43	AVDD	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	
45	NC	-	No connect	
46	VCOM	p	Common Voltage	

47	DITHB	I	Dithering function enable control.normally pull high.	
48	GND	P	Power ground	
49-50	NC	-	No connection	

I: input; O: output; P: Power or Ground(0V).

Note 1:

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV _{DD}	Up to down, left to right
DV _{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV _{DD}	DV _{DD}	Down to up, left to right



3. Operation Specifications

3.1. Typical Operation Conditions

Test condition: GND=0V, TA=25 °C

Note1

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VCC	3.0	3.3	3.6	V	Note 2
	AVDD	11	11.2	11.4	V	
	VGH	19	21	23	V	
	VGL	-8	-7.8	-7.6	V	
Input signal voltage	VCOM	3.6	3.8	4.0	V	Note 3
Input logic high voltage	V _{IH}	0.7 V _{CC}	-	V _{CC}	V	Note 4
Input logic low voltage	V _{IL}	0	-	0.3 V _{CC}	V	
Current for Drive	VCC	-	15	30	MA	
	AVDD	-	20	50	MA	
	VGH	-	0.5	1	MA	
	VGL	-	0.5	1	MA	

Note1: Be sure to apply VCC and VGL to the LCD first, and then apply VGH.

Note 2: VCC setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: Typical VCOM is only a reference value. It must be optimized according to each LCM. Please use VR and base on below application circuit.

Note 4: DCLK, HS, VS, RESET, U/D, L/R, DE, R0-R7, G0-G7, B0-B7, MODE, DITHB.

3.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_L	8.4	9.6	10.5	V	Note 1
Current for LED Backlight	I_L	-	160	-	mA	
LED life time	-	20,000	-	-	Hr	Note 2

Note1: $V_L=9.6V$, $I_L=160mA$ (Backlight circuit: 3series connection, 8 parallel connection), the ambient temperature is $25^{\circ}C$.

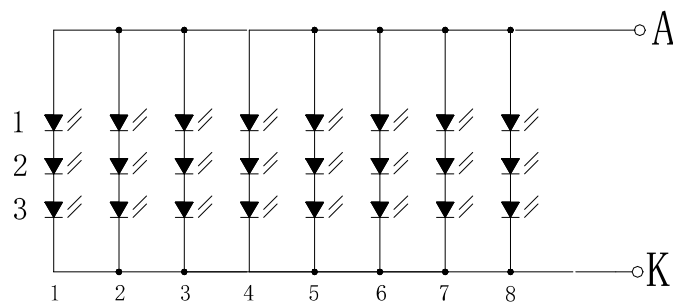
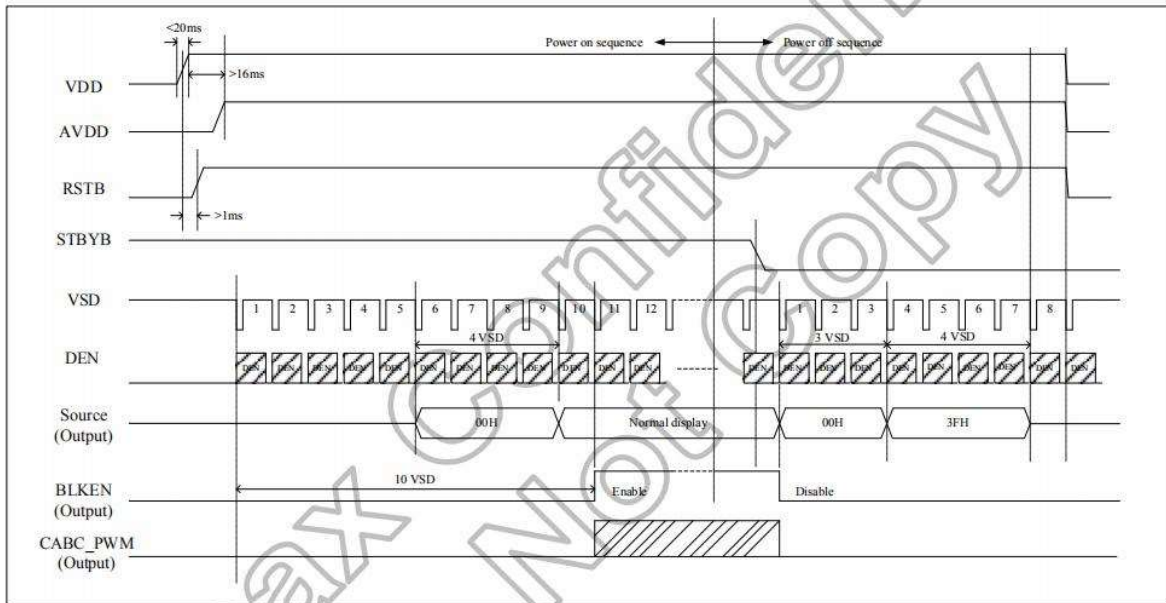


Fig. 3-1 LED test circuit diagram

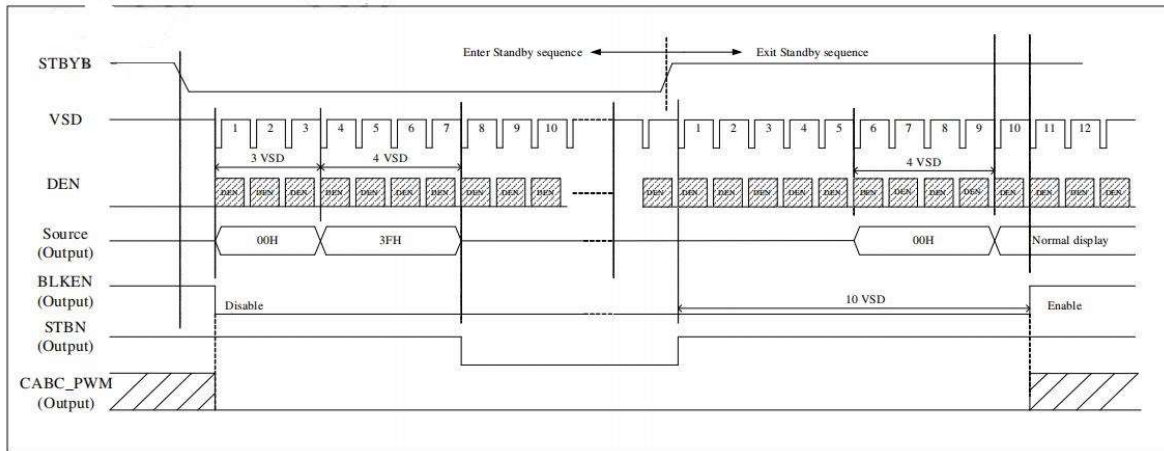
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}C$ and $I_L =160mA$. The LED lifetime could be decreased if operating I_L is larger than 200mA.

3.3. Timming Sequence

Power on/off timing:



Enter and exit standby mode sequence:



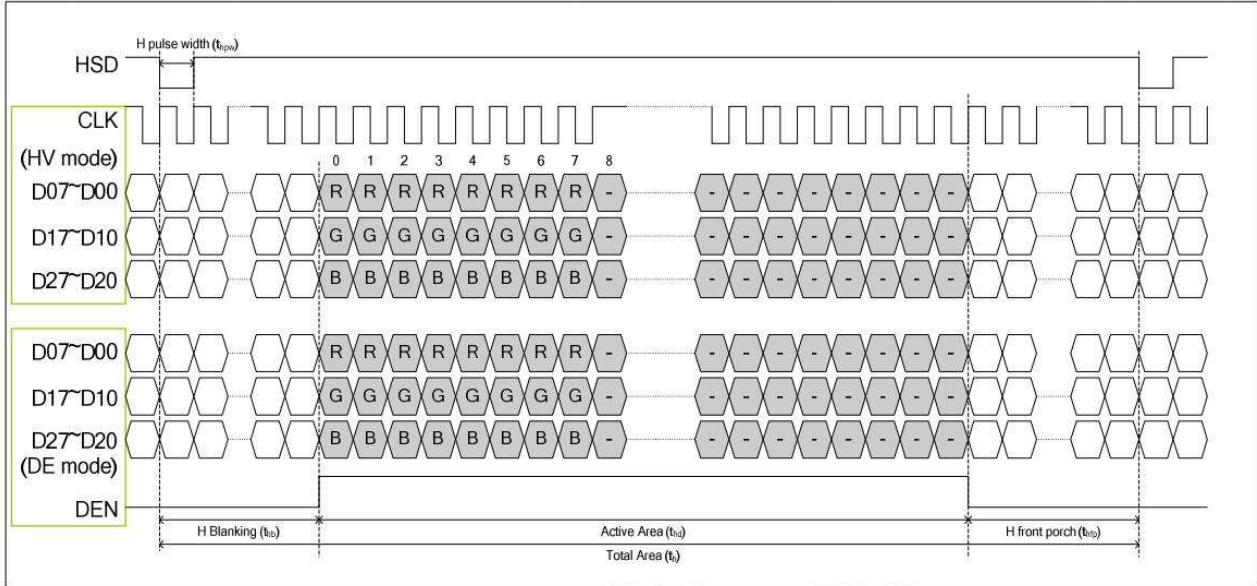
3.4. Timing Characteristics

3.4.1. AC Electrical Characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	8	-	-	ns
HS hold time	T_{hhd}	8	-	-	ns
VS setup time	T_{vst}	8	-	-	ns
VS 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
VDD Power On Slew rate	T_{POR}	-	-	20	ms
RSTB pulse width	T_{Rst}	10	-	-	us
CLKIN cycle time	T_{cph}	20	-	-	ns
CLKIN pulse duty	T_{cwh}	40	50	60	%
Output stable time	T_{sst}	-	-	6	us

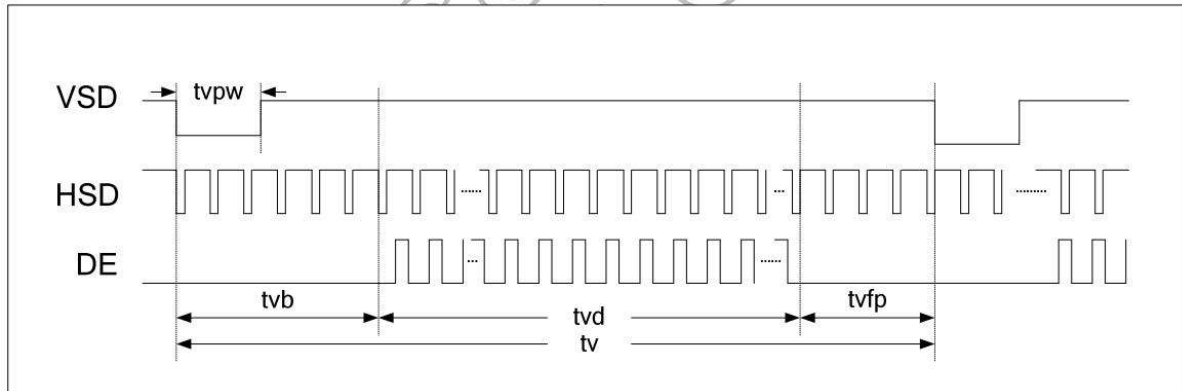
3.4.2. Input Clock and Data Timing Diagram:

Horizontal timing:



Parameter	Symbol	Spec.			Unit
		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		DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	62	256	400	DCLK

Vertical timing:



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	t_{vd}		600		T_H
VS period time	t_v	624	635	700	T_H
VS pulse width	t_{vpw}	1	-	20	T_H
VS Back Porch (Blanking)	t_{vb}		23		T_H
VS Front Porch	t_{vfp}	1	12	77	T_H
DE mode Blanking	$t_v - t_{vd}$	24	35	100	T_H

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	65	75	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	65	75	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	60	70	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	65	75	-		
Response time	T_{ON+} T_{OFF}	Normal $\theta=\Phi=0^\circ$	-	20	30	msec	Note 2
Contrast ratio	CR		-	500	-	-	Note 3
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 4
	W_Y		0.28	0.33	0.38	-	Note 5 Note 6
Luminance (central point)	L		300	380	-	cd/m ²	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7

The test systems refer to Note 2.

Note 1: Definition of viewing angle range

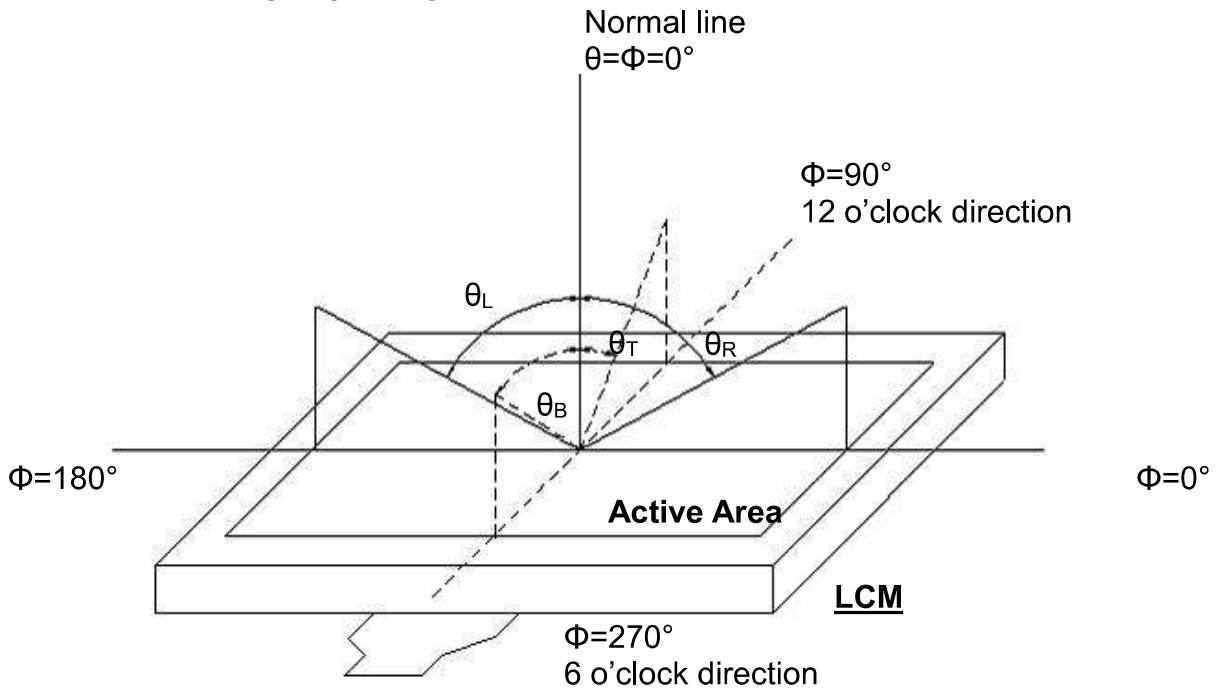


Fig. 4-2 Definition of viewing angle

Note 2: 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%.

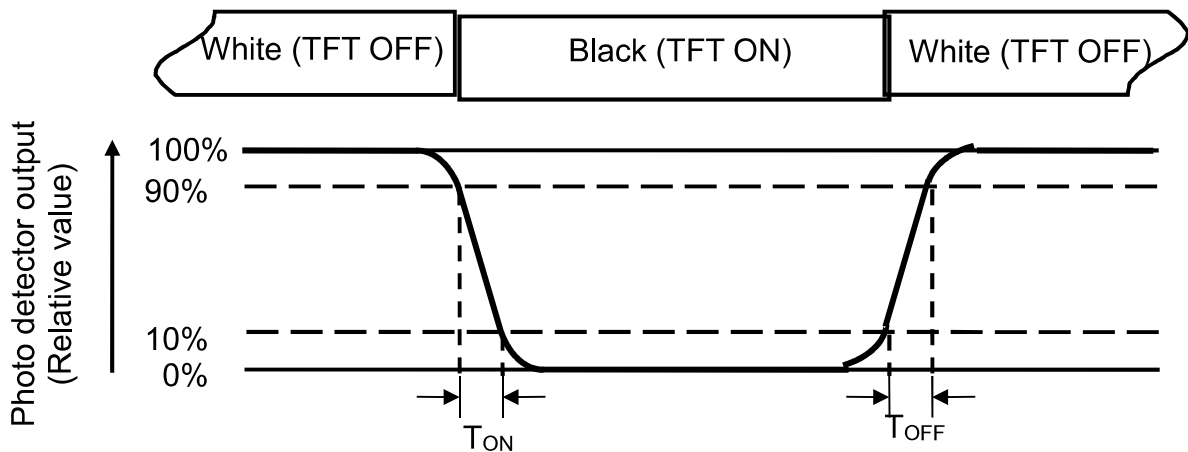


Fig. 4-3 Definition of response time

Note 3: Definition of contrast ratio

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

Note 4: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.) or CA-210.

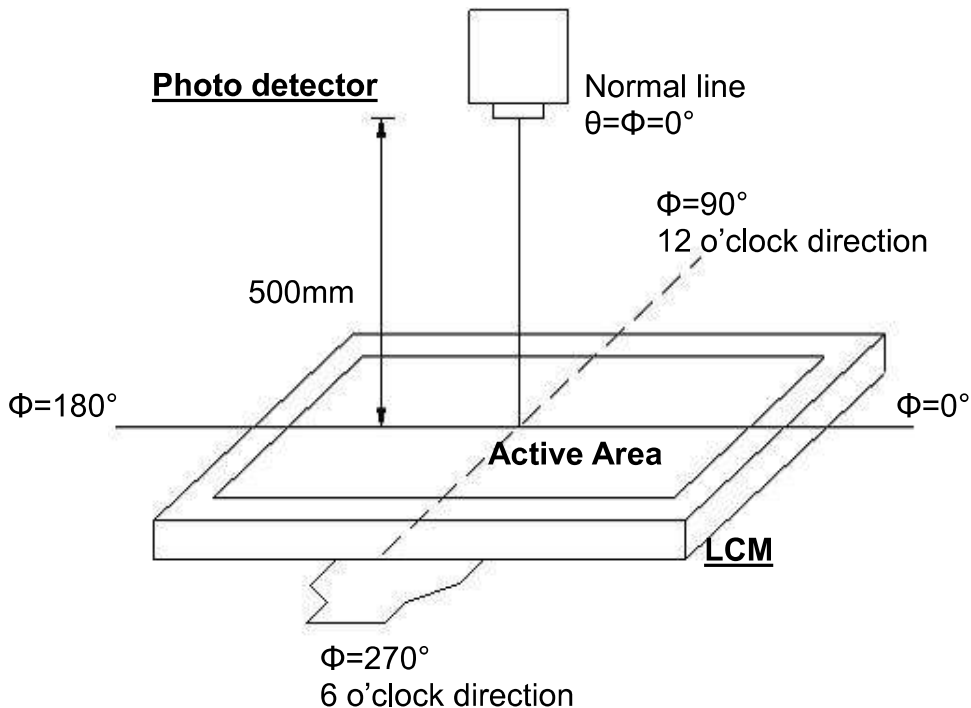


Fig. 4-3 Optical measurement system setup

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L = 160\text{mA}$.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas(Refer to Fig. 4-4).

Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

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

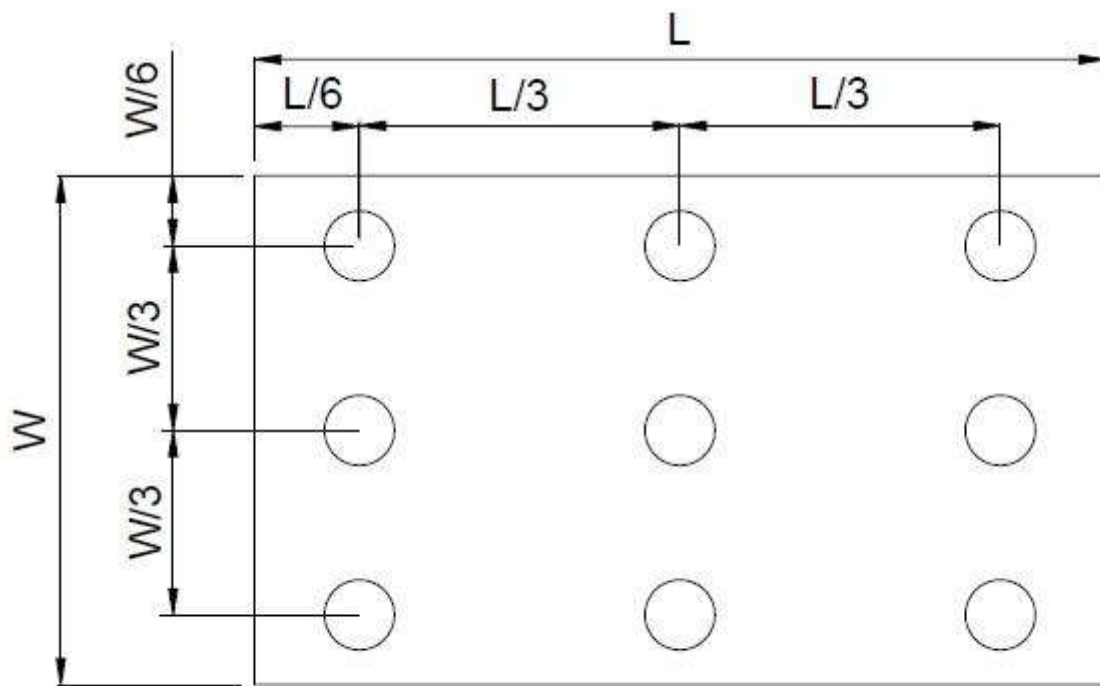


Fig. 4-4 Definition of measuring points

B_{MAX}: The measured maximum luminance of all measurement position.

B_{MIN}: The measured minimum luminance of all measurement position.

5. Reliability Test Items

Item	Test Conditions	Criterion
High Temperature Storage	Ta = 80°C 240hrs	A,B,C,D,E
Low Temperature Storage	Ta = -30°C 240hrs	A,B,C,D,E
High Temperature Operation	Ts = 70°C 240hrs	A,B,C,D,E
Low Temperature Operation	Ta = -20°C 240hrs	A,B,C,D,E
Operate at High Temperature and Humidity	+60°C, 90%RH 240hrs	A,B,C,D,E
Thermal Shock(non operation)	-30°C/30 min ~ +80°C/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	A,B,C,D,E
Vibration Test	Sweep:10Hz~55Hz~10Hz 2G 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	A,B,C,D,E
Electro Static Discharge	Contact=+/-4KV, Air=+/-8KV,(R=330R,C=150pF), 1 sec,9point,10times/point;	A,B,C,D,E

※Criterion:

A.LCM each function is OK,.

B.LCM appearance inspection without abnormalities (Including scratch, damage, corrosion and serious deformation)

C.LCM brightness above the Min. value of Spec.

D. Luminance uniformity above the Min. value of Spec.

E. Color chromaticity within tolerance range

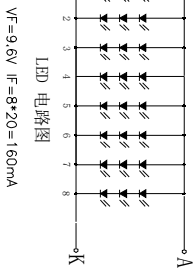
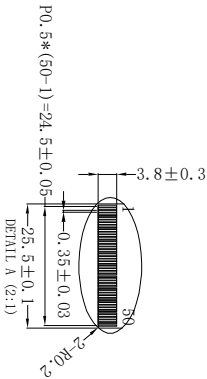
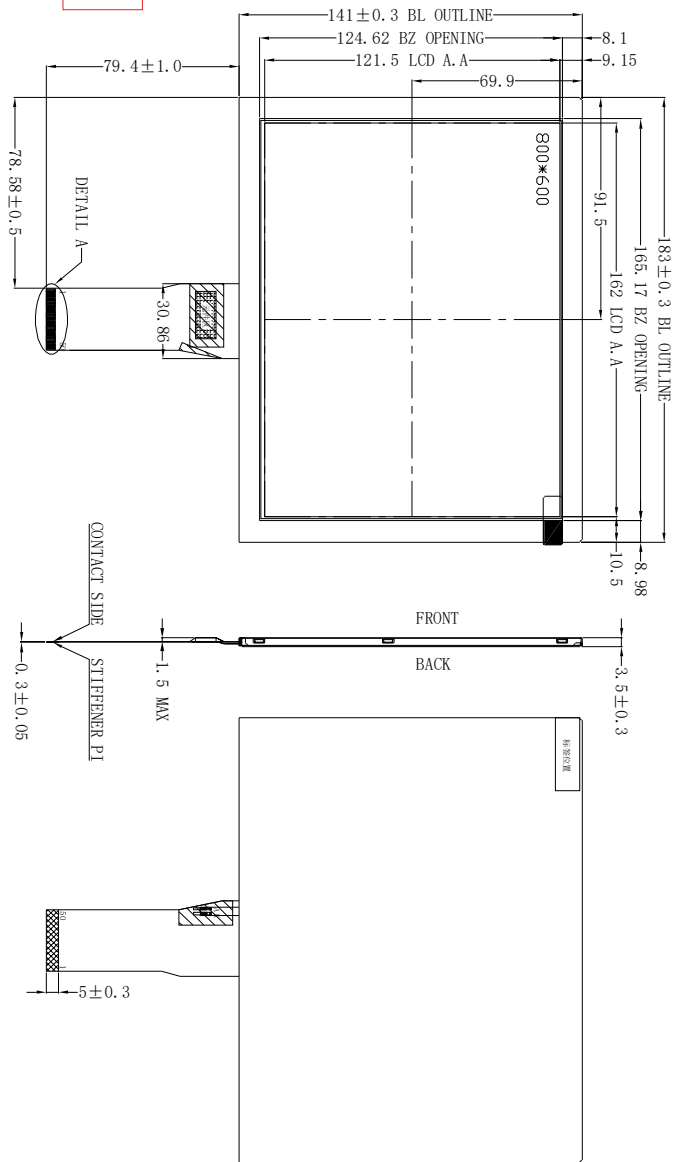
6. Mechanical Drawing

LCD Type	8.0" TFT transmissive, Normally white, TN
Resolution	800(RGB)*600
View Direction	12 O'CLOCK
Driver IC	HX8264D02+HX896A01
Color Depth	16.7M
Interface Types	TTL(RGB24-bit)
Operating voltage	3.3V
T/Plens	Without
Backlight LEDs	24 LEDs, 1.60mA, 9.6V
Surface luminance	380 cd/m ²
Operating temperature	-20 °C~70 °C
Storage Temperature	-30 °C~80 °C
High Temperature & High Humidity	60°C 90% max

GENERAL TOLERANCE: ±0.3

PIN#	NAME	PIN#	NAME
1	VEH	26	G-1
2	VEH	27	G-0
3	VEH	28	R-7
4	VEH	29	R-6
5	GND	30	R-5
6	WGM	31	R-4
7	VCC	32	R-3
8	MODE	33	R-2
9	DE	34	R-1
10	VS	35	RO
11	HS	36	GND
12	E7	37	DC/CK
13	E6	38	GND
14	E5	39	L/R
15	E4	40	U/D
16	E3	41	VGH
17	E2	42	VGL
18	E1	43	A0/D
19	EO	44	RESST
20	G7	45	NC
21	G6	46	WGM
22	G5	47	DMH8
23	G4	48	GND
24	G3	49	NC
25	G2	50	NC

Backlight with DEBFF



Need to pay attention to the key size with *

版本 (Version)	变更记录 (Change History)	日期 (Date)	视角 (View):	比例 (Proportion):	设计 (DESIGN)	审核 (AUDITING)	批准 (APPROVED)
A0	update the FPC design	2019.10.26	单位 (Unit):	页 (Page):	1 / 1		
A1	update the Operating temperature	2019.11.5	产品型号 (Product Type):	TST080SVBH-15B	2019.11.5		

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7. Package Drawing

TDB

8. General Precautions

8.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

8.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.

2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.

3. To avoid contamination on the display surface, do not touch the module surface with bare hands.

4. Keep a space so that the LCD panels do not touch other components.

5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.

6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.

7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

8.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.

2. Do not apply voltage which exceeds the absolute maximum rating value.

8.4. Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.

2. Do not store the module in surroundings containing organic solvent or corrosive gas.

3. Store the module in an anti-electrostatic container or bag.

8.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.

2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.