华芯科技有限公司
HUAXIN TECHNOLOGY CO.,LTD

SPECIFICATION
FOR
LCD MODULE

Customer : _____

CustomerP/N _____

Model No. : ESHX035HHD8490ANT

Version : **1.0**

Date : **2022-08-09**

Final Approval by Customer

LCM Machinery OK ☐	Checked By	
LCM Display OK ☐	Checked By	
LCM NG ☐ LCM OK ☐	Approved By	

Confirmed :

DESIGN	CHECK	APPROVAL

Table of Contents

Revision History

Rev	Issued Date	Description	Page	Editor
1.0	Aug.09,2022	First release	All	

1   General Specifications

Feature		Specifications
Display Spec.	LCD type	3.54inch
	Resolution (H*V)	800*(RGB)*640
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Normally White	Normally Black
	Viewing Direction	ALL
Mechanical Characteristics	OutlineDimensions (W x H x T) (mm)	97.6*87.39*4.12
	Active Area(mm)	90*72
	With /Without Touch screen	Without
	Match Connector Type	0.5 pitch 40pin
	Backlight Type	LED
	Weight (g)	TBD
Electrical Characteristics	Interface	SPI+RGB
	Number of color	16.7M
	Driver IC	ST5892BAA

2   Pin Assignment

NO.	PIN NAME	Description
1-2	A	Backlight LED Power
3-4	K	Backlight LED Ground
5	GND	Ground
6	VDD	A power supply for the logic power and I/O circuit.
7-14	R0-R7	Red data,R7 is MSB,R0 is LSB.
15-22	G0-G7	Green data,G7 is MSB,G0 is LSB.
23-30	B0-B7	Blue data,B7 is MSB,B0 is LSB.
31	GND	Ground
32	DCLK	Pixel clock input pin
33	STBYB	Standby mode
34	HSYNC	Horizontal sync signal; negative polarity
35	VSYNC	Vertical sync signal; negative polarity
36	DE	Data input enable. Active High to enable the data input
37	VPP	Power for OTP
38	SDA	Serial data input for SPI interface
39	SCL	Clock signal for SPI interface
40	CS	Chip select signal for SPI interface

3 Absolute Maximum Ratings

GND=0V, Ta= 25℃

Item	Symbol	Value	Unit
Power supply voltage for logic	V_{DD}	3.0~3.6	V
Input voltage	Vin	V_{DD}+0.3	V
Operating temperature	Topr	-20 to 70	℃
Storage temperature	Tstg	-30 to 80	℃

Note: Note1: Absolute maximum rating is the limit value beyond which the IC maybe broken.
They do not assure operations.
Note2: Background color changes slightly depending on ambient temperature. This Phenomenon is reversible.

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

Item	Symbol	Min	Type	Max	Unit	Test condition
Power voltage	VDD	3.0	3.3	3.6	V	-
Input logic high voltage	VIH	0.9VDD	-	VDD	V	
Input logic low voltage	VIL	0	-	0.3VDD	V	

4.2 Driving Backlight

Ta=25℃

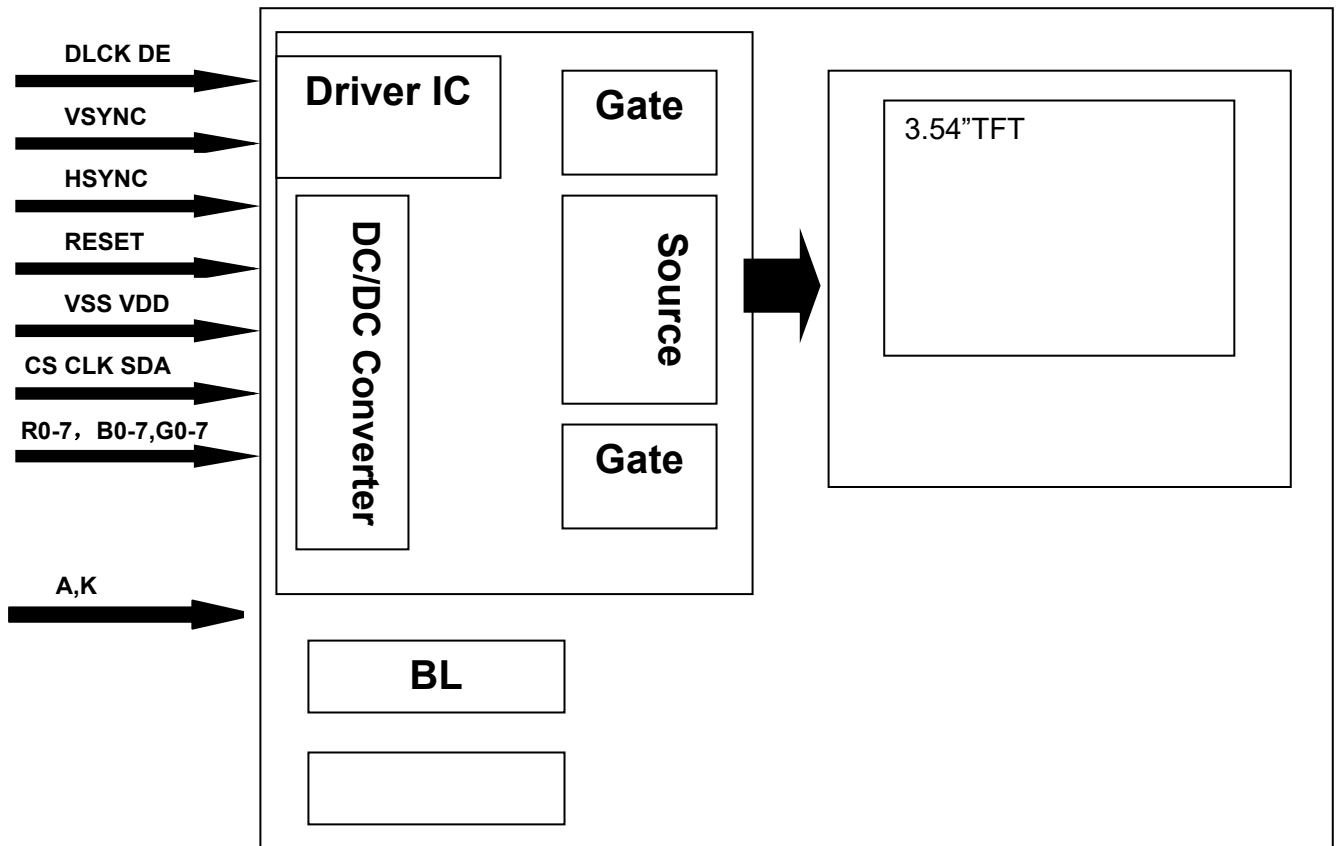| Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	180	--	mA	
Forward Voltage	V_F	16.8	20.4	-	V	
Connection mode	-	--	6S2P	--		
LED number	/		12		pcs	
LED Life			20000		Hrs	

Note1: Optical performance should be evaluated at Ta=25℃ only .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.
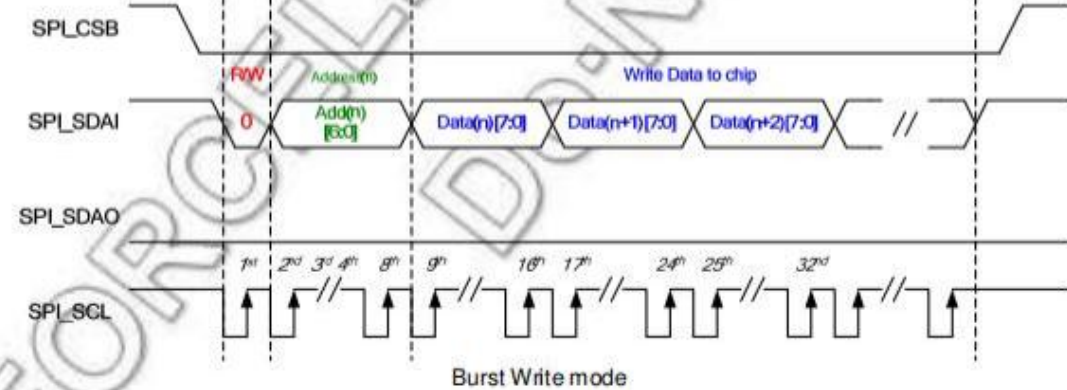
LED CIRCUIT DIAGRAM:
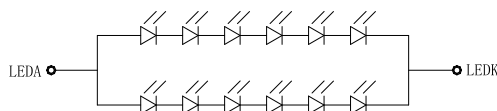
If=180mA Vf=16.8~20.4V

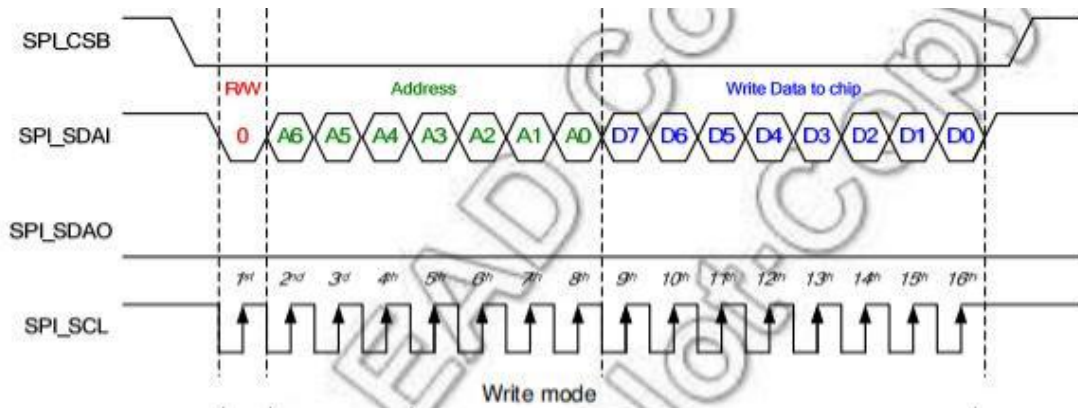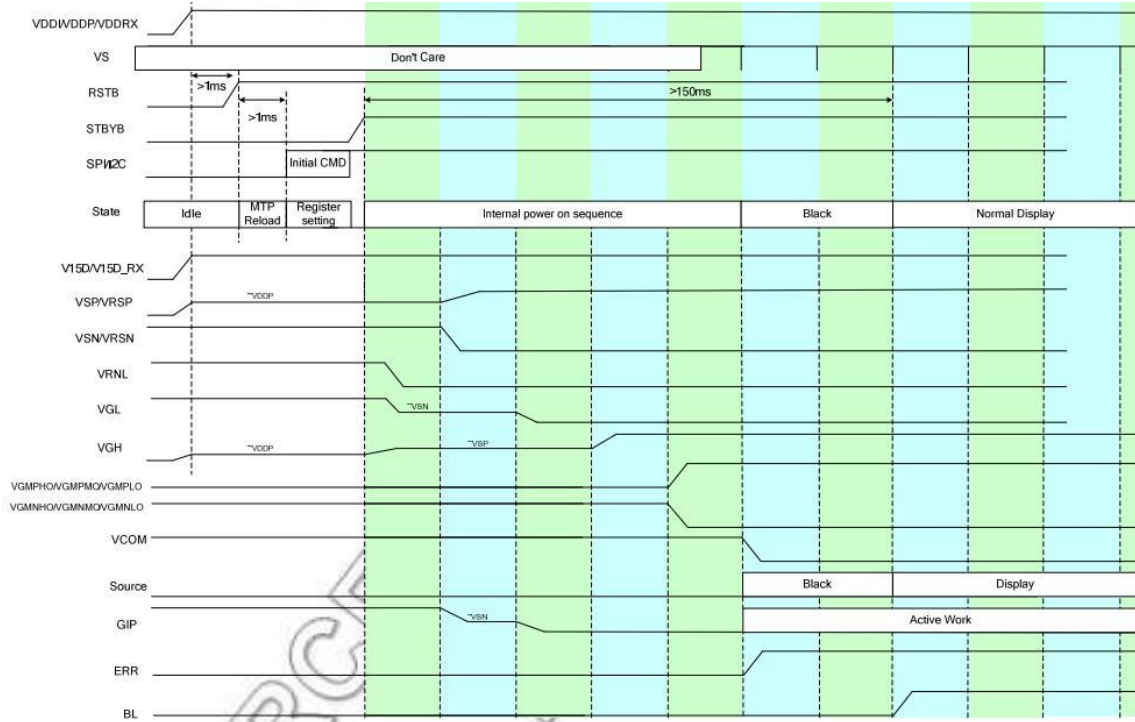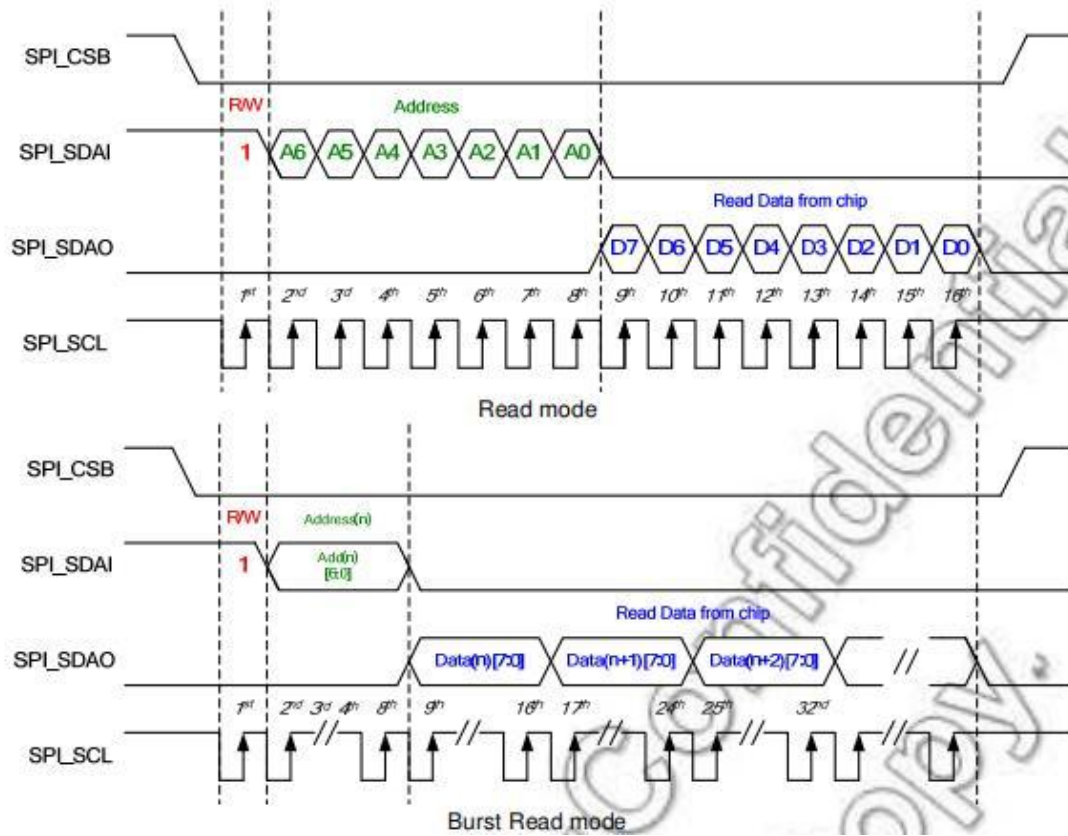## 4.3 Block Diagram

DLCK DE
VSYNC
HSYNC
RESET
VSS VDD
CS CLK SDA
R0-7，B0-7,G0-7

A,K

Driver IC

DC/DC Converter

Gate

Source

Gate

3.54"TFT

BL

5 INTERFACE TIMING

Write mode

Burst Write mode

Read mode

Burst Read mode

Parallel RGB888

| Pin	1st Data	2nd Data	3rd Data	...	Nth Data
D00	1'R0	2'R0	3'R0	...	N'R0
D01	1'R1	2'R1	3'R1	...	N'R1
D02	1'R2	2'R2	3'R2	...	N'R2
D03	1'R3	2'R3	3'R3	...	N'R3
D04	1'R4	2'R4	3'R4	...	N'R4
D05	1'R5	2'R5	3'R5	...	N'R5
D06	1'R6	2'R6	3'R6	...	N'R6
D07	1'R7	2'R7	3'R7	...	N'R7
D10	1'G0	2'G0	3'G0	...	N'G0
D11	1'G1	2'G1	3'G1	...	N'G1
D12	1'G2	2'G2	3'G2	...	N'G2
D13	1'G3	2'G3	3'G3	...	N'G3
D14	1'G4	2'G4	3'G4	...	N'G4
D15	1'G5	2'G5	3'G5	...	N'G5
D16	1'G6	2'G6	3'G6	...	N'G6
D17	1'G7	2'G7	3'G7	...	N'G7
D20	1'B0	2'B0	3'B0	...	N'B0
D21	1'B1	2'B1	3'B1	...	N'B1
D22	1'B2	2'B2	3'B2	...	N'B2
D23	1'B3	2'B3	3'B3	...	N'B3
D24	1'B4	2'B4	3'B4	...	N'B4
D25	1'B5	2'B5	3'B5	...	N'B5
D26	1'B6	2'B6	3'B6	...	N'B6
D27	1'B7	2'B7	3'B7	...	N'B7

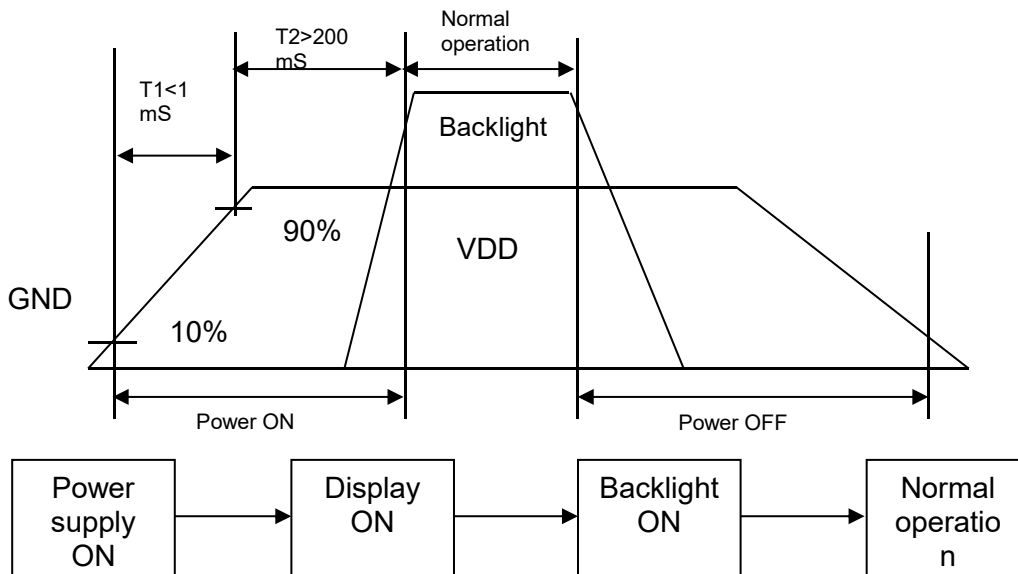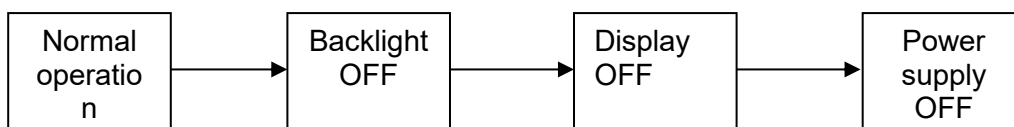## SYNC MODE

Parallel RGB
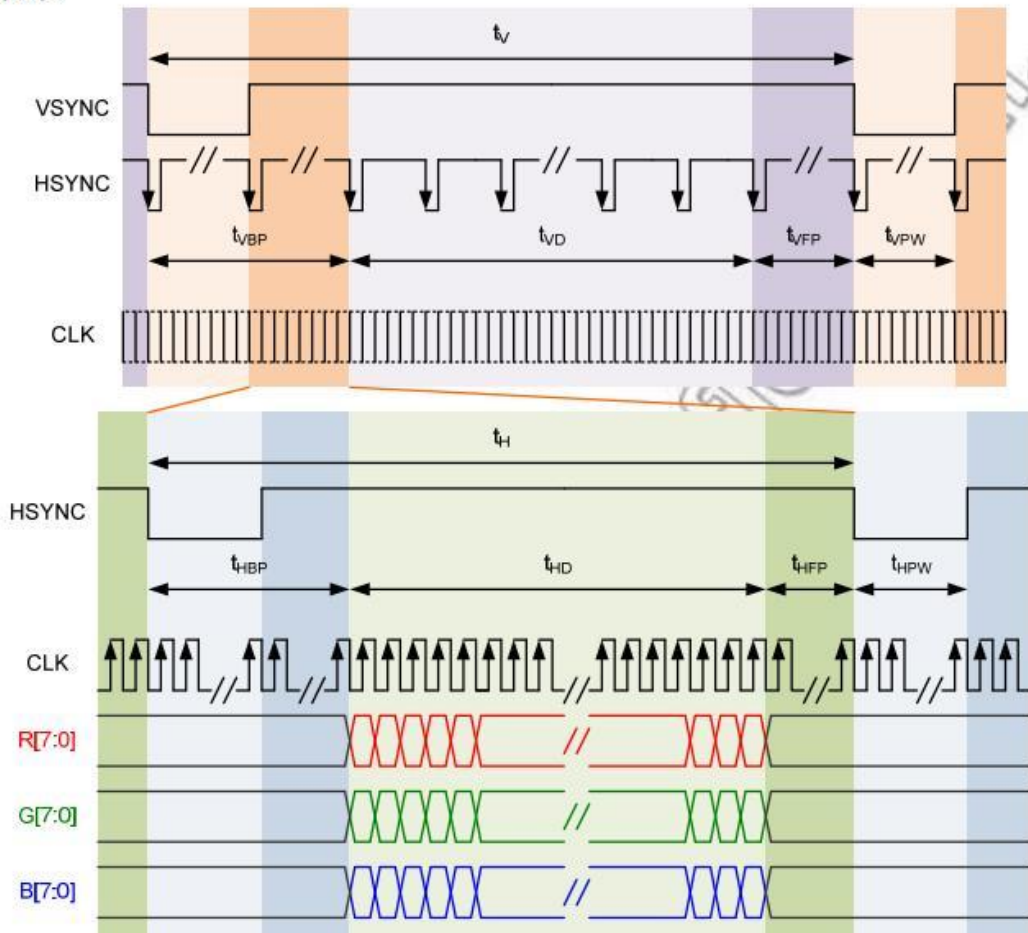
DE MODE
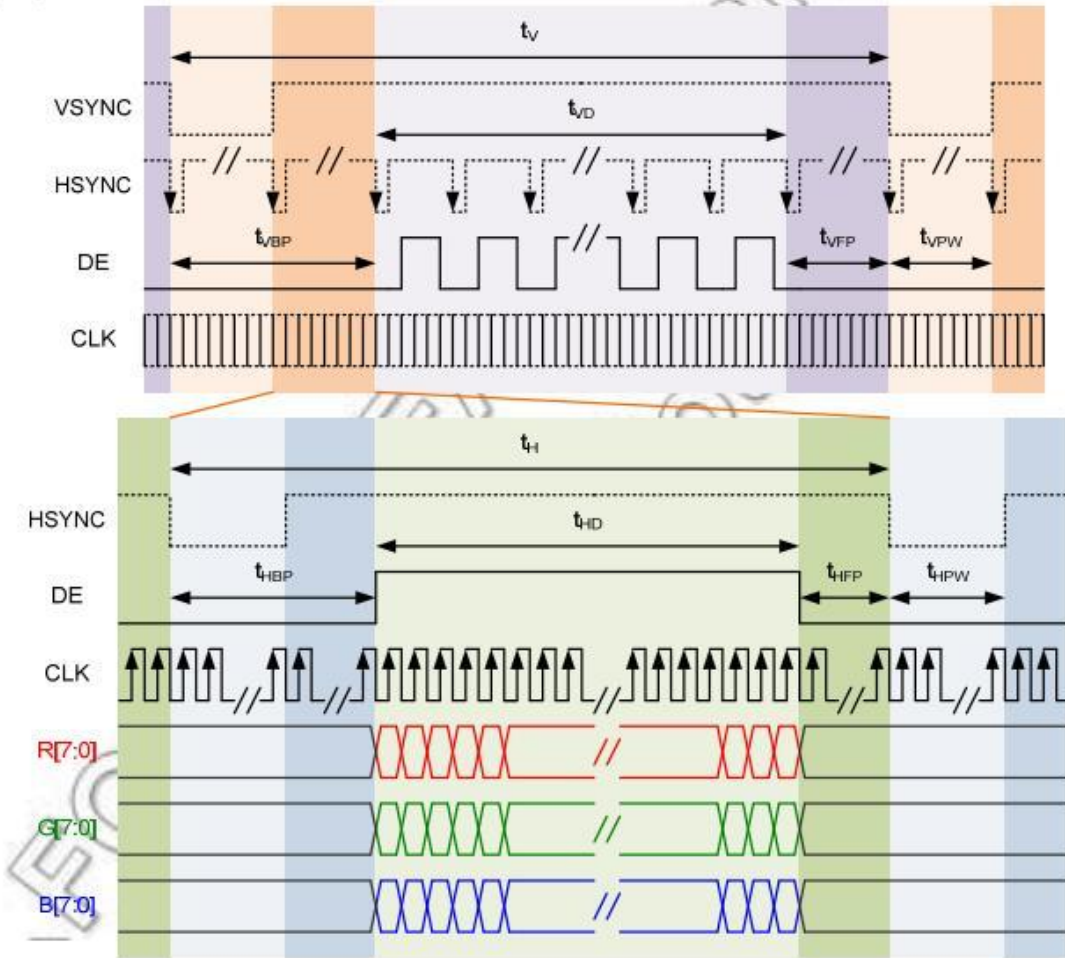
5.1 Power ON/OFF Timing

Power ON sequence

Power OFF sequence

6 Optical Characteristics

Ta=25℃

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	CR≧10	80	85	-	Degree	Note 2
	θB		80	85	-		
	θL		80	85	-		
	θR		80	85	-		
Contrast Ratio	CR	θ=0°	1000	1200	-	-	Note1 Note3
Response Time	T_{ON}	25℃	-	30	40	ms	Note1 Note4
	T_{OFF}						
Uniformity	U	-	70	80	-	%	Note1 Note6
NTSC	-	-	65	70	-	%	Note 5
Luminance	L		1000	1200	-	cd/m^2	Note1 Note7

Test Conditions:

1. V_F=20.4V, I_F=180mA, the ambient temperature is 25℃.

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.

Photo detector

Field

500 mm

TFT-LCD Module

LCD Panel

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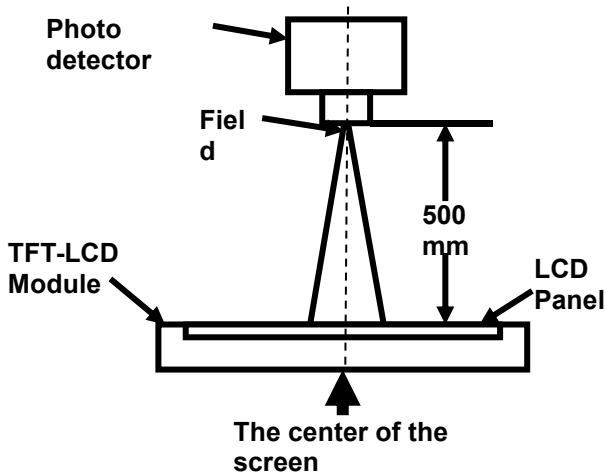
Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

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)。

Normal line θ=Φ=0°

Φ=90° 12 o'clock direction

θ_L

θ_T θ_R

θ_B

Φ=180°

Φ=0°

Active Area

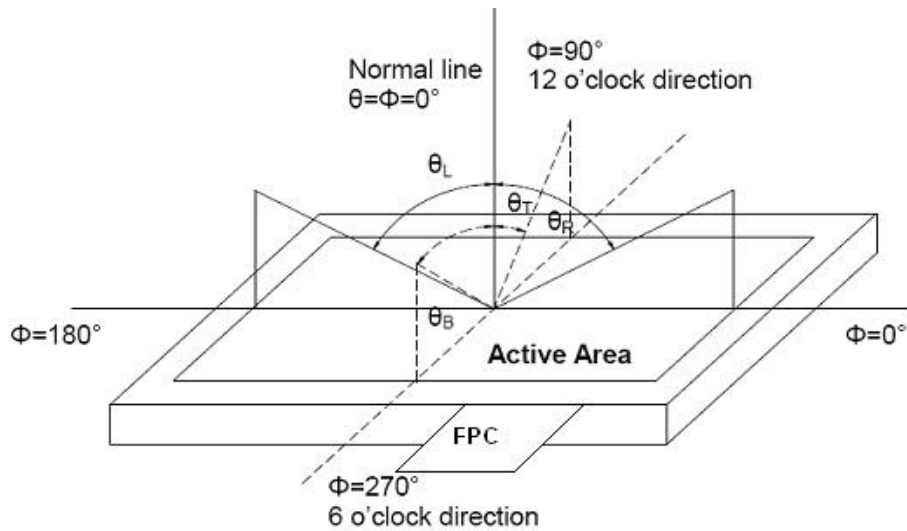FPC

Φ=270° 6 o'clock direction

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

"White state ":The state is that the LCD should be driven by Vwhite.

"Black state": The state is that the LCD should be driven by Vblack.

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 (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%.
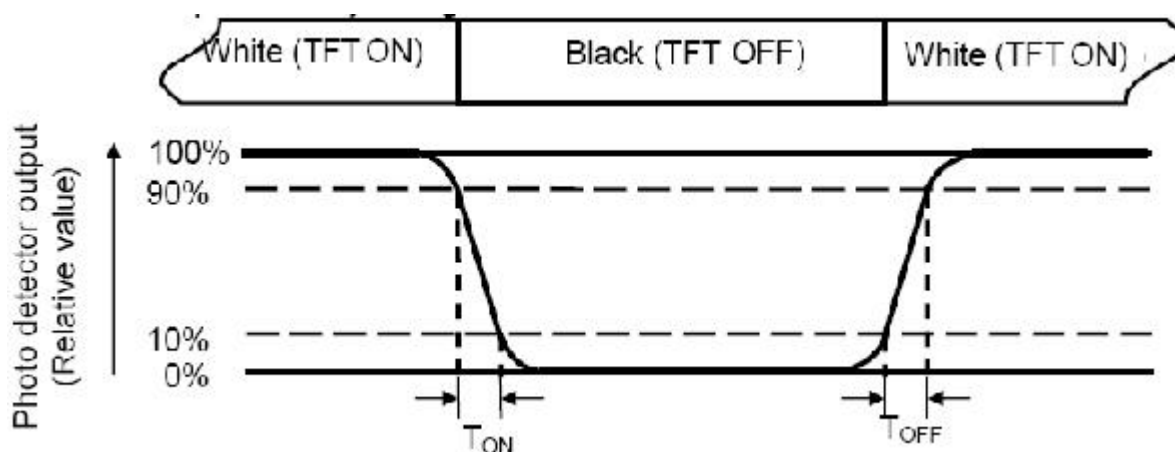
Note 5: Definition of color chromaticity (CIE1931)

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

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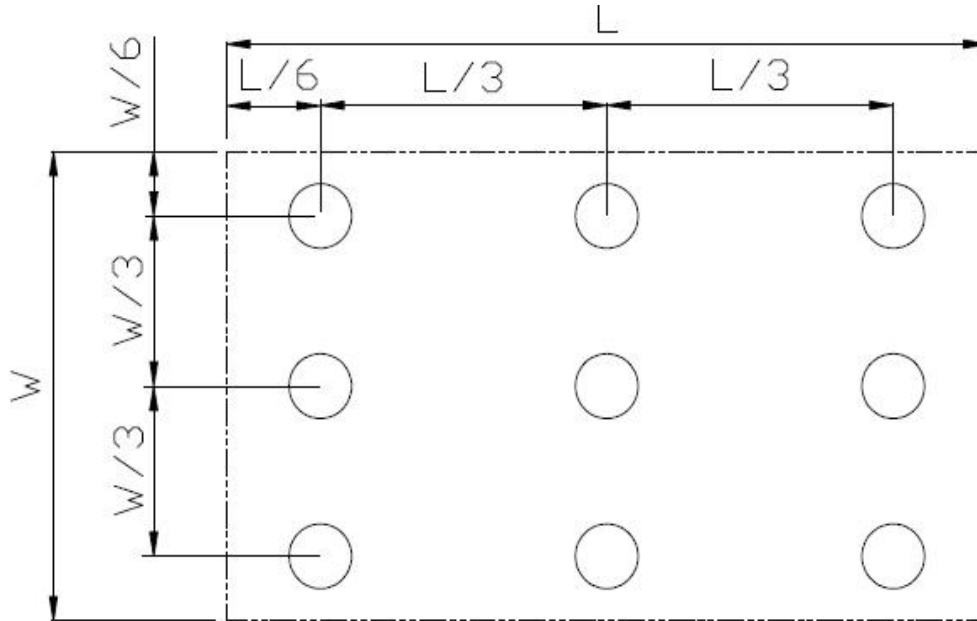
Fig. 2 Definition of uniformity

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.

7   Environmental / Reliability Test

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80°C	120	No abnormalities in functions and appearance
High temp. Operating	70°C	120	
Low temp. Storage	-30°C	120	
Low temp. Operating	-20°C	120	
Humidity	60°C/ 90%RH	120	
Thermal Shock(Non-operation)	-0°C ← 25°C →70°C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 1~10pcs.

3.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

8 Mechanical Drawing

DESIGN:(设计) HOU

CHECKED:(检查)

APPROVED:(批准)

SPECIFICATION

CUSTOMER'S CODE:(客户型号)

规格

Date:(日期) 2022.07.07

Page:(页数) 1/1

图纸视角: ⊕

EDITION:(版本号)

EDITION:(版本号) 01

Front view

side view

back view

FPC展开出货

3.54inch
800(RGB)*640
ALL
Center of Active Area

83.79±0.15 LCM
82.11(TFT)
79.11(CF)
72(Active Area)
0.65
3.30
3
3.8

97.60±0.15 LCM
96(TFT&CF)
90(Active Area)
3.8

30.00±0.5
20.50
40
4.50

银浆点
银浆点
易断贴

2.00±0.5

0.30±0.2
1.26±0.05
4.12±0.2

LED CIRCUIT DIAGRAM:
LEDA
LEDK
If=180mA, Vf=16.8~20.4V

胶铝一体 AL5052(T=0.4mm)
19.50
40
0.50
辅助补强胶≈0.2mm

1.Unit:mm.
2. Modification rev.number.
3.All radii without dimension R0.3mm.
4.All draft angles to be 1.5°.
5.Unspecified Tolerances is :±0.20mm.
6.LCD Driver IC:ST5892B
7.LCD Driver Voltage :2.8±0.3V
8.Color :White
9.Operating Temperature : -20°-- +70°C
10.Storage Temperature : -30°-- +80°C
11. Requirements on Environmental Protection: ROHS HSF

Customer Name:
客户名称
Approval Date:
承认日期
Approved By:
承认

Rohs Compliant
华芯科技
HUAXIN TECHNOLOGY CO.,LTD

Please Confirm This Drawing On/Before
请 鉴 回 此 图

TITLE: LCM
PART NO.: ESHX035HHD8490ANT
SCALE:1/1 UNIT:mm PAGE:1/1
REV:1.0
APPROVE DISNER
CHECK DISNER

No.	Symbol
1-2	A
3-4	X
5	GND
6	VDD
7-14	R0-R7
15-22	G0-G7
23-30	B0-B7
31	GND
32	DCLK
33	STBYB
34	HSYNC
35	VSYNC
36	DE
37	VPP
38	SDA
39	SCL
40	CS

ROHS

9 Precautions For Use of LCD Modules

9.1 Handling Precautions

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

9.1.1.2 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.

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

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

9.1.1.5 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

9.1.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

9.1.1.12 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.

9.1.1.13 Storage precautions

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

9.1.1.15 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:

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

9.2 Transportation Precautions

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