FANNAL ELECTRONICS

FN0620D001A

Product Specification Rev.V1

BUYER	
SUPPLIER	FANNAL Electronics CO., LTD
FG-Code	FN0620D001A

☐ Preliminary Specification

☑ Approval Specification

ITEM	BUYER SIGNATURE	DATE
Quality		
R&D		
Approved		

ITEM	SUPPLIER SIGNATURE	DATE
Prepared	DONG	2023-04-20
Reviewed	XIONG	2023-04-20
Approved	JACK	2023-04-20

REVISION HISTORY

REV.	Page.	DESCRIPTION OF CHANGES	DATE	PREPARED
V0		Initial Release	2023-03-21	JACK
V1		Adding optical parameters	2023-04-20	Dong

Contents

1.0 General Description /一般说明

1.1 Application /应用

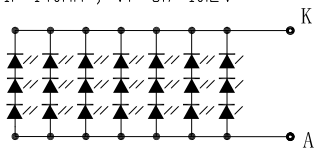
- ☑ Industrial
- ☐ Fitness equipment
- ☐ POS
- ☑ Automotive
- ☐ Rail traffic
- ☐ Digital & Consumer
- ☐ Medical
- ☐ Military-industrial
- ☐ Outdoor highlight

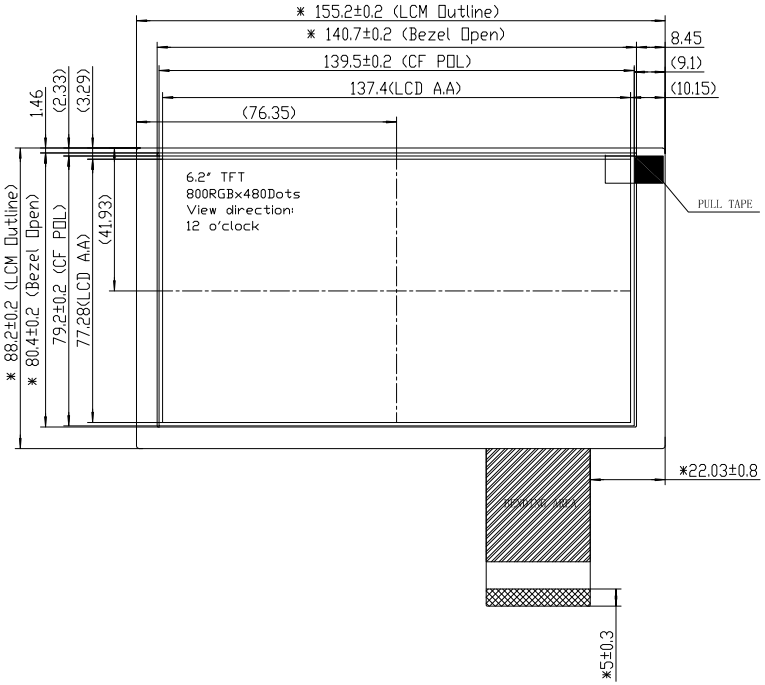
1.2 General Specification /通用技术条件

Parameter	Specification	Unit
LCD size	6.2 (Diagonal)	inch
Resolution Ratio	800(H)×480(V)	pixels
Pixel Pitch	0.1717x0.1610(V)	mm
Active Area	137.4(H)×77.28(V)	mm
Module Size	155.2(W)×88.2(H)×4.9(D)	mm
Display Mode	Normally White	
Interface	RGB 24Bit	
Pixel arrangement	RGB-Vertical Stripe	
View Direction	12 o’ clock	
Power Supply	3.3	V
Power Consumption	1.8	W
Weight	115	g
Luminance	550 (TYP.)	cd/m²
Driver IC	HX8264-D&HX8664-B	

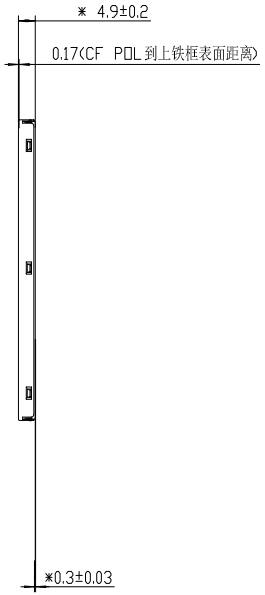
VER.	SYMBOL	AMENDMENT	SIGN	DATE
A		First issue	LCF	2023-03-20

LED CIRCUIT DIAGRAM:
BACKLIGHT:3S7P=21 CHIP-WHITE LED
IF=140mA ; VF=8.7~10.2V

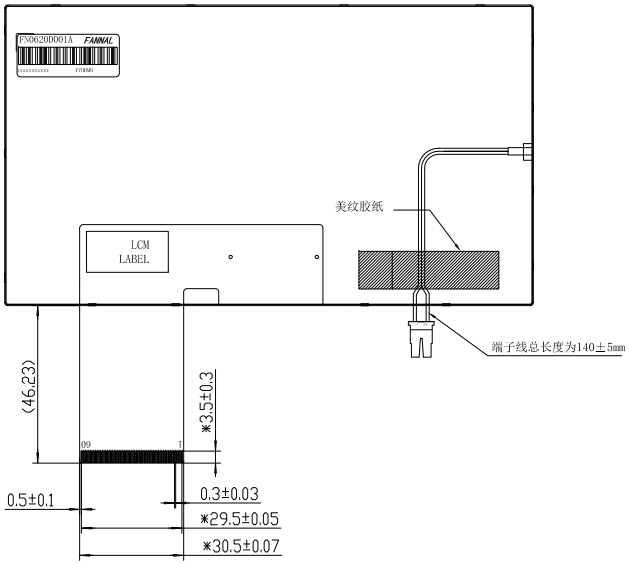




TOP VIEW



SIDE VIEW



BOTTOM VIEW

SIZE	6.2 Inch	Interface	RGB 24bit
Resolution Ratio	800x480	Power Supply	3.3V
LCD Type	■Transmissive □Tranflective □Reflective	Connection Mode	■FPC Plug-in □FPC Soldering □Connector
Display Mode	□Normally Black ■Normally White	Driver IC	HX8264-D & HX8664-B
Display Direction	□6 ■12 □3 □9 □Free	Operation Temperature	-20~+70
Contrast Ratio	500:1	Storage Temperature	-30~+80
Luminance	550(Typ.) 500(Min.)	Environmental Requirements	■RoHS-2.0 □REACH
Uniformity	75% Min	Unmarked Tolerance	±0.2mm

PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	AGND	13	G1	25	B5	37	UPDN	49	V6
2	AVDD	14	G2	26	B6	38	GND	50	V5
3	VCC	15	G3	27	B7	39	AGND	51	V4
4	R0	16	G4	28	DCLK	40	AVDD	52	V3
5	R1	17	G5	29	DE	41	VCOM	53	V2
6	R2	18	G6	30	HSD	42	DITHB	54	V1
7	R3	19	G7	31	VSD	43	NC	55	NC
8	R4	20	B0	32	MODE	44	NC	56	VGH
9	R5	21	B1	33	RSTB	45	V10	57	VCC
10	R6	22	B2	34	STBYB	46	V9	58	VGL
11	R7	23	B3	35	SHLR	47	V8	59	GND
12	G0	24	B4	36	VCC	48	V7	60	NC

DRAWN	LCF
CHECKED	DONG
APPROVED	
CSR APPROVED	
Customer No:	
SHEET	1 OF 1

TITLE
MODULE SPEC.

Drawing NO: FN0620D001A
Project No:

FANNAL ELECTRONICS CO., LTD

3.0 ABSOLUTE MAXIMUM RATINGS /绝对最大额定值

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage1	VCC	-0.5	3.96	V	Note 1
Power Supply Voltage2	AVDD	-0.5	14.85	V	
Logic Output Voltage	Vout	-0.5	5.0	V	
Input Voltage	VIN	-0.5	AVDD+0.5	V	
Operating Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	
Relative Humidity Note 2	RH	--	≤95	%	Ta≤40℃
		--	≤85	%	40℃ < Ta≤50℃
		--	≤55	%	50℃ < Ta≤60℃
		--	≤36	%	60℃ < Ta≤70℃
		--	≤24	%	70℃ < Ta≤80℃
Storage Humidity	H_{ST}	--	≤70	g/m³	Ta > 70℃

Note1: Input voltage include R0~R5, G0~G5, B0~B5, Dotclk, Hsync, Vsync, Enable, R/L, U/D. (For your reference)
Note2: Ta means the ambient temperature.
It is necessary to limit the relative humidity to the specified temperature range.
Condensation on the module is not allowed.

4.0 ELECTRICAL SPECIFICATIONS/电气规范

4.1 TFT LCM Module

[Ta =25±2 ℃]

Parameter		Symbol	Min.	Typ.	Max.	Unit
Logic Supply Voltage 1		VCC	2.8	3.3	3.6	V
Logic Supply Voltage 2		AVDD	10.3	10.5	10.8	V
Logic Supply Voltage 3		VGH	19.7	20.0	20.3	V
Logic Supply Voltage 4		VGL	-7.3	-7.0	-6.7	V
Logic Supply Voltage 6		VCOM	3.9	4.0	4.1	V
Input Signal Voltage	Low Level	VIL	0	-	0.3VCC	V
	High Level	VIH	0.7VCC	-	VCC	V
Output Signal Voltage	Low Level	VOL	-	-	GND+0.4	V
	High Level	VOH	VCC-0.4	-	-	V
Power Consumption		Black Mode(60Hz)	-	355	-	mW

4.2 Backlight Driving Conditions /背光驱动条件

[Ta =25±2 ℃]

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Forward Current Voltage	V_F	8.7	9.6	10.2	V	Note 1
Forward Current	If	-	140	-	mA	
Backlight Power Consumption	Wbl	-	1.344	-	W	
LED Life Time	-	30000	-	-	Hrs	Note 2

Note1: Under LCM operating, the stable forward current should be inputted. And forward voltage is for reference only.

Note2: Optical performance should be evaluated at Ta=25℃. 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.

5.0 Interface Description/接口说明

Connector Name/Designation	Interface Connector/Interface Card
Type Part Number	FPC 60PIN 0.5Pitch
Mating Housing Part Number	FH28-60S-0.5SH

5.1 Pin assignment for LCM module /模组引脚分配

Pin No.	Symbol	Description	Note.
1	AGND	Ground	
2	AVDD	Analog Power	
3	VCC	Digital Power Supply	
4	R0	Red Data (LSB)	Note 1
5-11	R1-R7	Red Data	Note 2
12	G0	Green Data (LSB)	Note 3
13-19	G1-G7	Green Data	Note 4
20	B0	Blue Data (LSB)	Note 5
21-27	B1-B7	Blue Data	Note 6
28	DCLK	Dot Clock Input	Note 7
29	DE	Data Enable Signal	
30	HSD	Horizontal Sync Input, Negative Polarity	
31	VSD	Vertical Sync Input, Negative Polarity	
32	MODE	DE/SYNC Mode Select. Normally pull high	Note 8
33	RSTB	Global Reset Pin	
34	STBYB	Standby Mode Select; H:normal operation, L:standby mode	
35	SHLR	Source Right or Left Sequence Control	
36	VCC	Digital Power	
37	UPDN	Gate Up or Down Scan Control	
38	GND	Ground	
39	AGND	Ground	

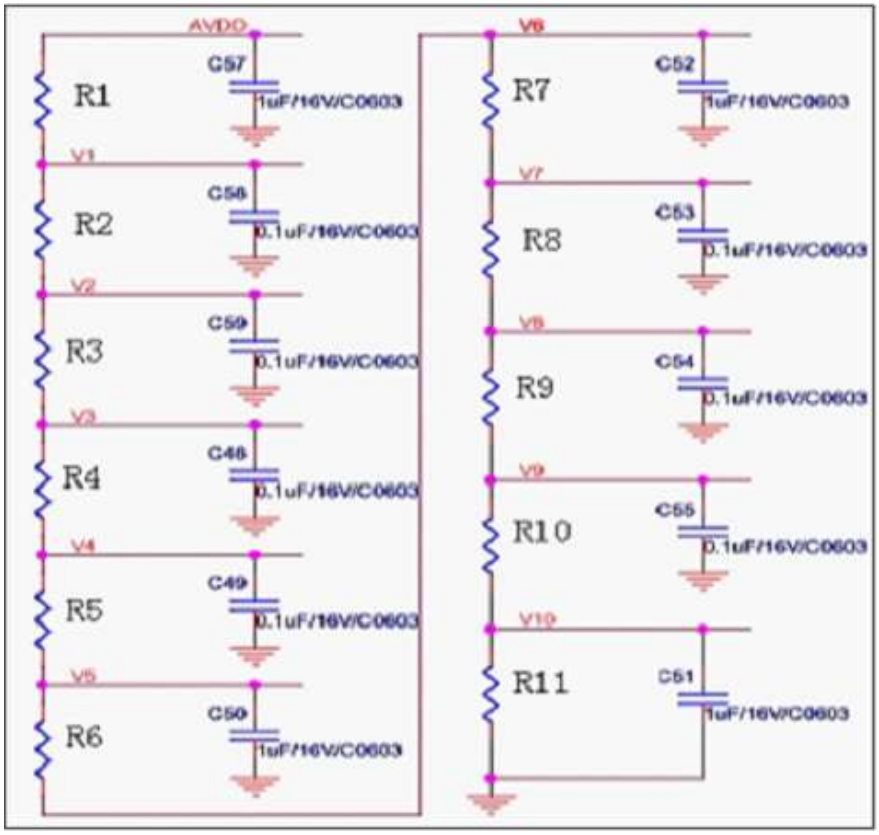
Pin No.	Symbol	Description	Note.
40	AVDD	Analog power	
41	VCOM	Common Voltage Input	
42	DITHB	Dithering Setting. H:6bit Resolution, L:8bitt Resolution	Note 9
43-44	NC	No Connection	
45	V10	Gamma Voltage 10	
46	V9	Gamma Voltage 9	
47	V8	Gamma Voltage 8	
48	V7	Gamma Voltage 7	
49	V6	Gamma Voltage 6	
50	V5	Gamma Voltage 5	
51	V4	Gamma Voltage 4	
52	V3	Gamma Voltage 3	
53	V2	Gamma Voltage 2	
54	V1	Gamma Voltage 1	
55	NC	No Connection	
56	VGH	Positive Power for TFT	
57	VCC	Digital Power	
58	VGL	Negative power for TFT	
59	GND	Ground	
60	NC	No Connection	

Note 1: When input 18 bits RGB data,R0 must be grounded.
Note 2: When input 18 bits RGB data,R1 must be grounded.
Note 3: When input 18 bits RGB data,G0 must be grounded.
Note 4: When input 18 bits RGB data,G1 must be grounded.
Note 5: When input 18 bits RGB data,B0 must be grounded.
Note 6: When input 18 bits RGB data,B1 must be grounded.
Note 7: Data shall be latched at the falling edge of DCLK
Note 8: H: DE mode(Default),L: SYNC mode.
Note 9: DITHB=1,disable internal dithering function; DITHB=0, enable internal dithering function

5.2 U/D R/L Function Description

Scan Control Input		Scanning Direction
UPDN	SHLR	
GND	VCC	Up to Down, Left to Right
VCC	GND	Down to Up, Right to Left
GND	GND	Up to Down, Right to Left
VCC	VCC	Down to Up, Left to Right

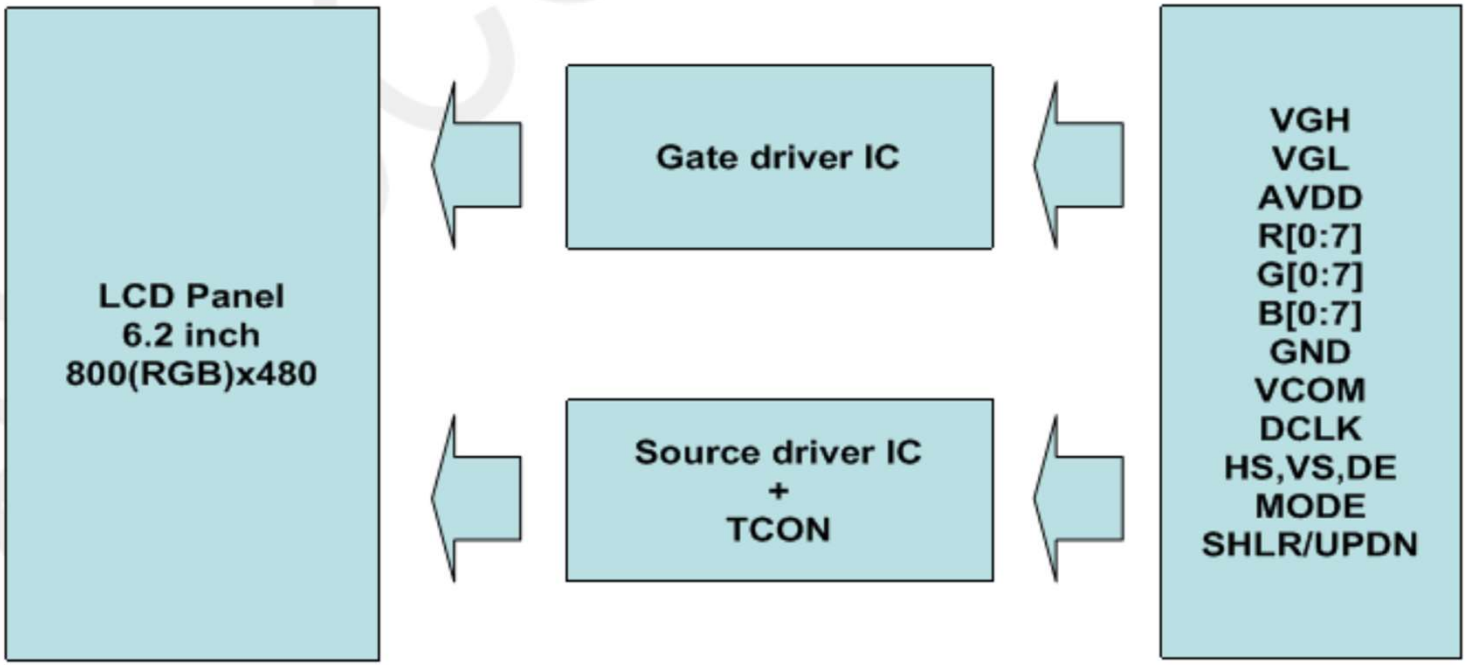
5.3 Gamma Correction Reference Voltage Setting



Symbol	Unit	Resistance
R1	Ω	124
R2	Ω	732
R3	Ω	232
R4	Ω	154
R5	Ω	698
R6	Ω	39
R7	Ω	698
R8	Ω	154
R9	Ω	232
R10	Ω	732
R11	Ω	110

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Gamma correction reference voltage V1~V10 (AVDD=10.5V)	V1	-	10.04	-	V	
	V2	-	8.09	-	V	
	V3	-	7.48	-	V	
	V4	-	7.07	-	V	
	V5	-	5.22	-	V	
	V6	-	5.11	-	V	
	V7	-	3.26	-	V	
	V8	-	2.85	-	V	
	V9	-	2.24	-	V	
	V10	-	0.29	-	V	

5.4 Block Diagram



5.5 Timing Chart

5.5.1 Input Clock and Data Timing(800x480)

Parameter	Symbol	Min	Typ	Max	Unit
DCLK Frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
Horizontal Display Area	thd		800		DCLK
HS Pulse width	thpw	1	48	255	DCLK
HS Back Porch	thb		88		DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE Mode Blanking	th-thd	85	128	512	DCLK
VS Period time	tv	513	525	767	Th
Vertical Display Area	tvd		480		Th
VS Pulse Width	tvpw	3	3	255	Th
VS Back Porch	tvb		32		Th
VS Front Porch	tvfp	1	13	255	Th
DE Mode Blanking	Tv-tvd	4	45	255	Th

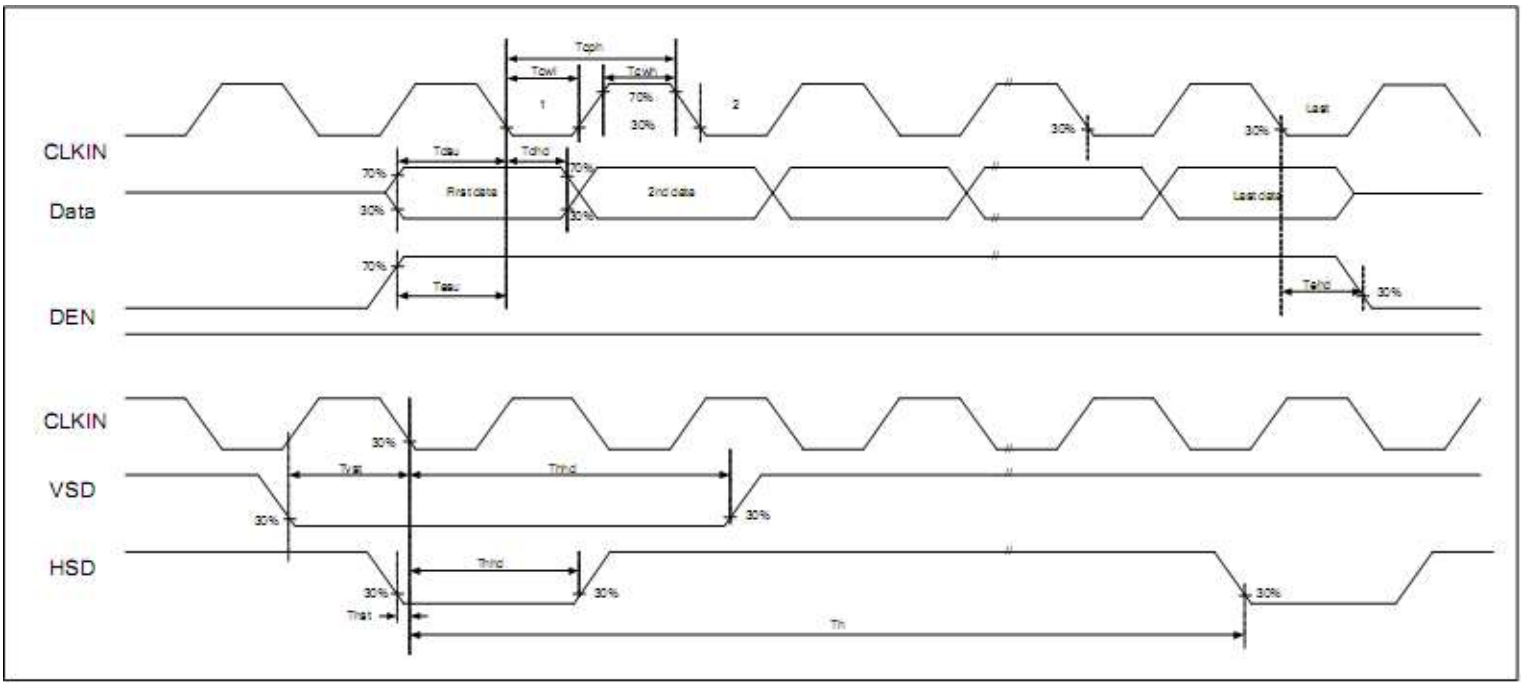
Input Timing (DCLK, HSD, VSD, DE)

5.5.2 Timing Waveform Table(Parallel 24-bit RGB mode)

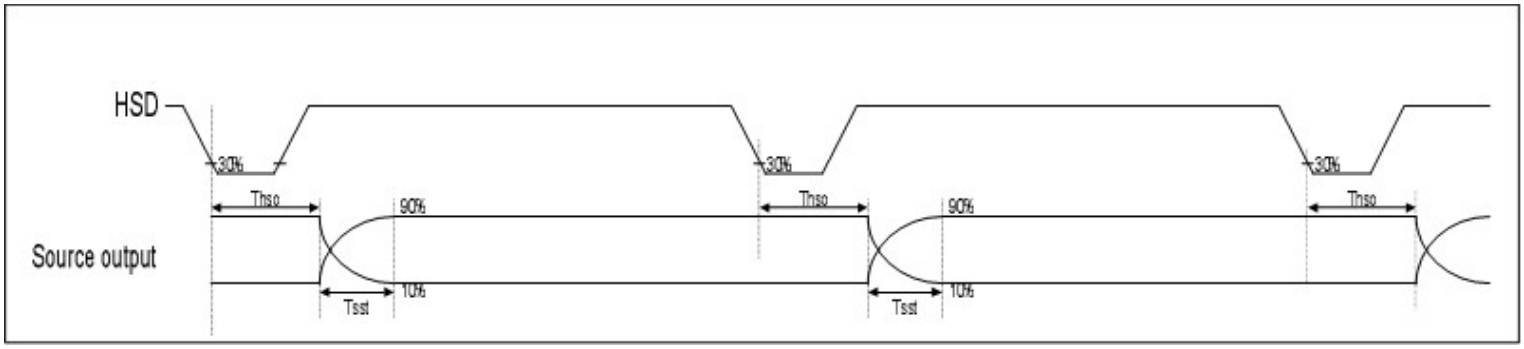
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso		64		CLKN	-
Time from HSD to LD	Thld		64		CLKN	-
Time from HSD to STV	Thstv		2		CLKN	-
Time from HSD to CKV	Thckv		20		CLKN	-
Time from HSD to OEV	Thoev		4		CLKN	-
LD Pulse Width	Twld		10		CLKN	-
CKV Pulse Width	Twckv		66		CLKN	-
OEV Pulse Width	Twoev		74		CLKN	-

Parallel 24-bit RGB mode

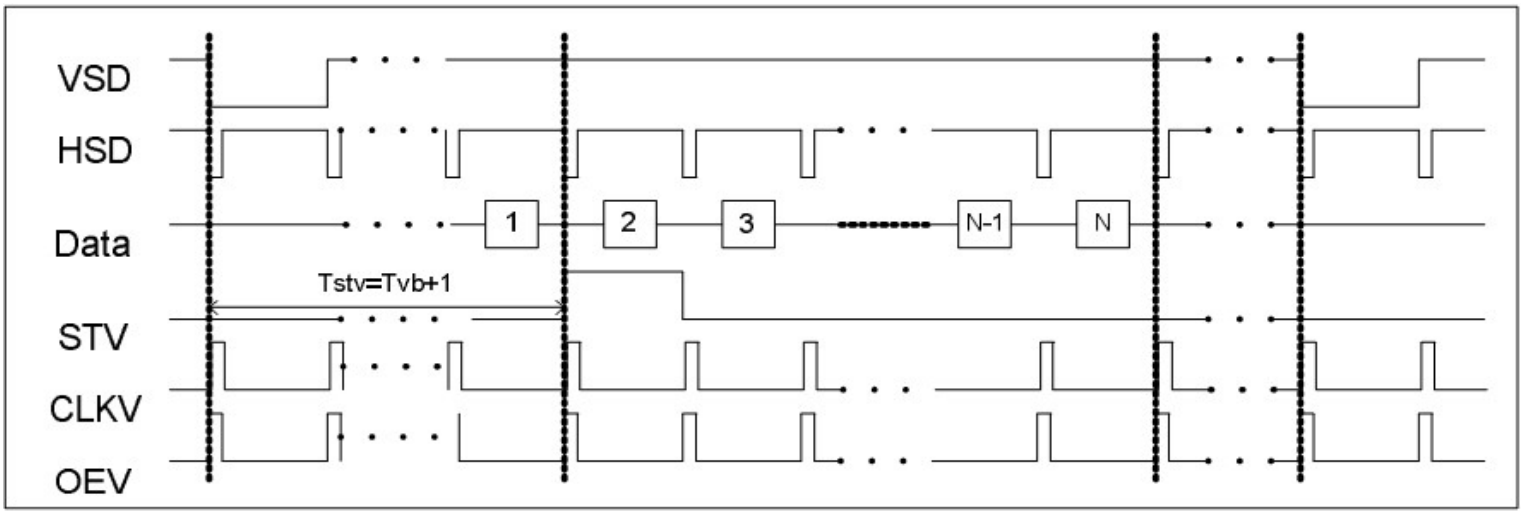
5.6 Timing Diagram



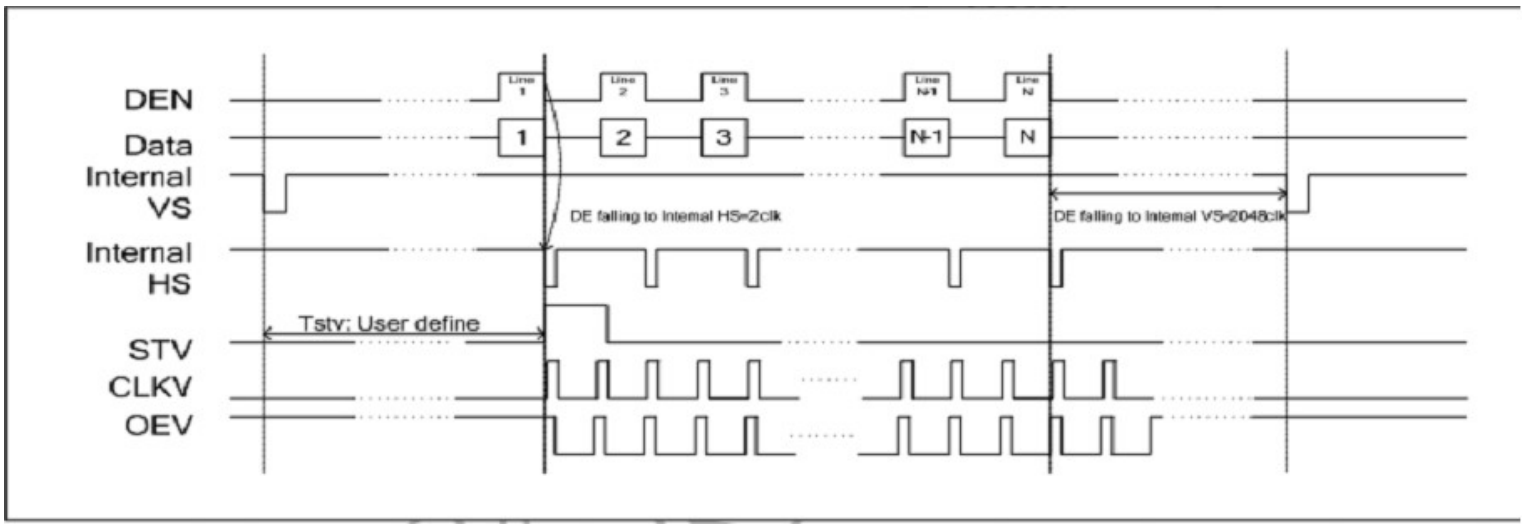
TTL Input Clock and Data timing Diagram



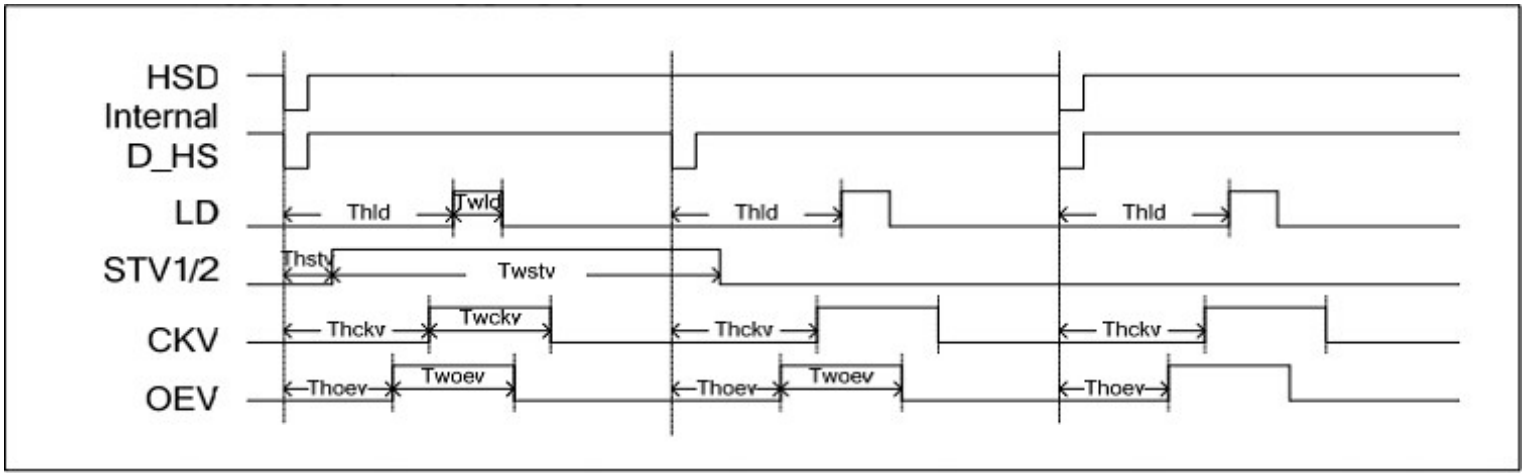
Source Output Timing Diagram



Vertical Timing Diagram HV (Dual Gate)



Vertical Timing Diagram DE (Dual Gate)



Gate Output Timing Diagram (Dual Gate)

5.7Power On/Off Sequence

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Source IC:

Power ON : VDD, VSS --> VDDA, VSSA --> V1 to V14

Power OFF: V1 to V14 --> VDDA, VSSA --> VDD, VSS

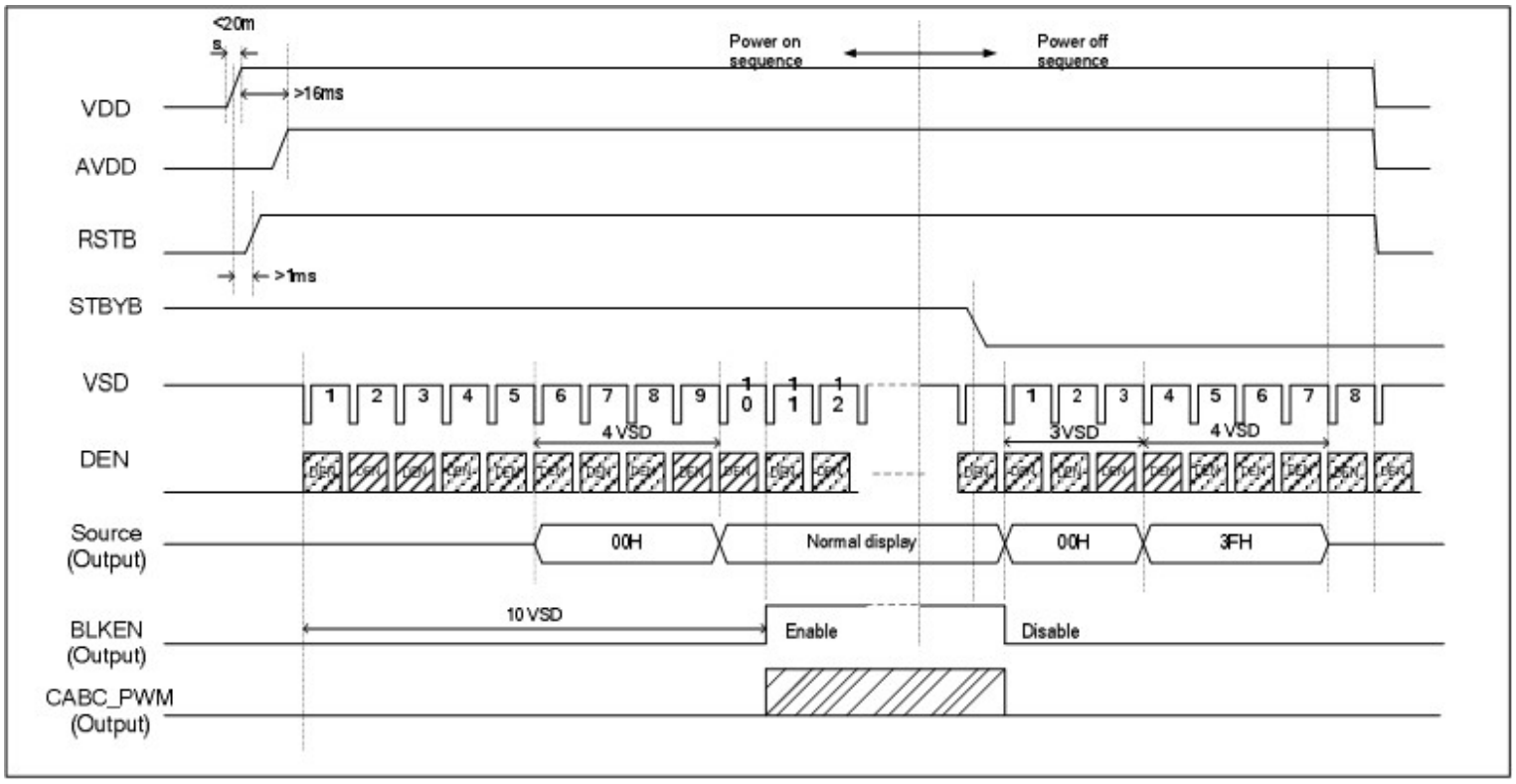
Gate IC:

Power ON : VDD→VEE→VGH

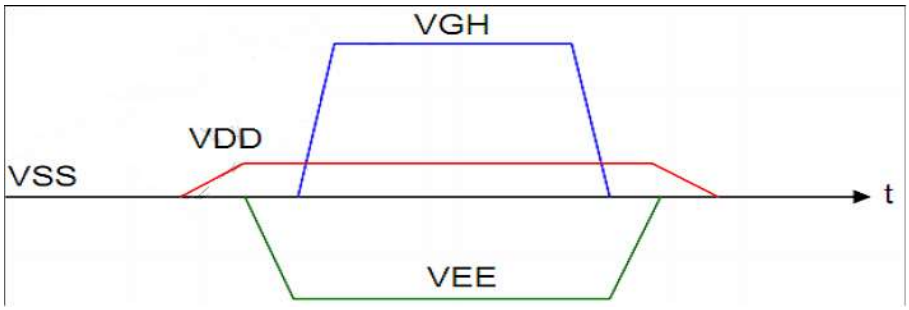
Power OFF: VGH→VEE→VDD

Note :VDDA = AVDD; VDD = VCC；VSS = GND； VSSA = GND；VEE = VGL

5.8 Power On/Off Control



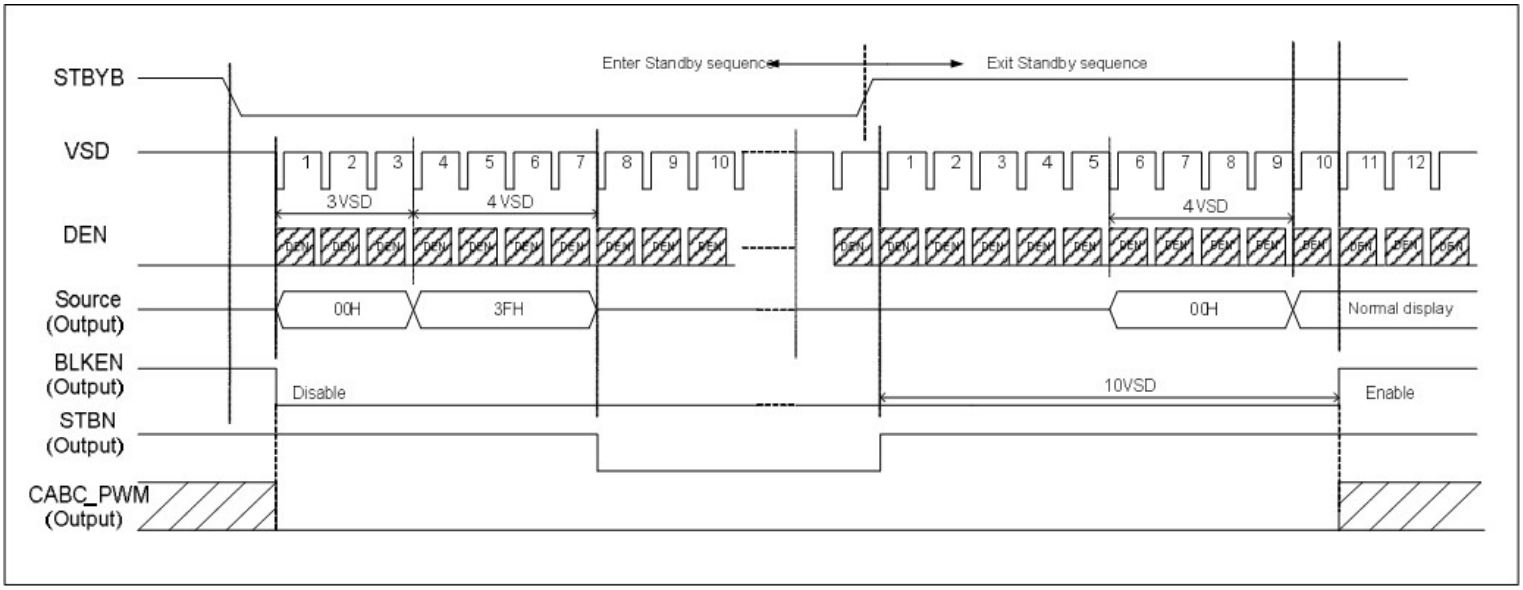
Source Power On/Off Timing Sequence



Gate Power On/Off Timing Sequence

5.9 Enter And Exit Standby Moe Sequence

HX8264-D has a power on/off sequence control function. In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within t he given specifications. lease refer to “AC Characteristics” for more detail on timing.



Enter And Exit Standby Mode Sequence

6.0 OPTICAL SPECIFICATIONS /光学规格

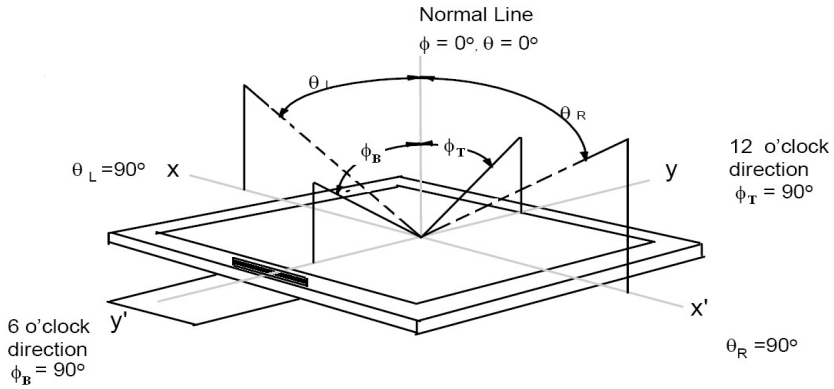
6.1 Overview /概述

The test of optical specifications shall be measured in a dark room (ambient luminance ≤1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to θØ=0 (=θ3) as the 3 o'clock direction (the "right"), θØ=90 (= θ12) as the 12 o'clock direction ("upward"), θØ=180 (= θ9) as the 9 o'clock direction ("left") and θØ=270(= θ6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the display surface shall stay fixed.

6.2 Optical Specifications /光学规格

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	θL	Cr≥10	65	75	-	deg	Note 1
	θ_R		65	75	-		
	ψ_T		50	60	-		
	ψ_B		60	70	-		
Contrast Ratio	Cr	θ=0° FF=0°	400	500	-	-	Note 2
Response Time	Tr+Tf		--	20	30	ms	Note 3
Color Coordinate of CIE1931	Wx	θ=0°	0.236	0.266	0.296	-	Note 4
	Wy		0.228	0.258	0.288		
	Rx		0.540	0.570	0.600		
	Ry		0.276	0.306	0.336		
	Gx		0.312	0.342	0.372		
	Gy		0.561	0.591	0.621		
	Bx		0.125	0.155	0.185		
	By		0.035	0.065	0.095		
Uniformity	U		80	--	--	%	Note 5
Color Gamut			45	50	--	%	
Luminance	L		500	550	--	cd/m²	Note 6

Note 1:**The definition of Viewing Angle**
Refer to the graph below marked by θ and Φ.



Note2:**ThedefinitionofContrastRatio**

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is at “White” state}}{\text{Luminance When LCD is at “Black” state}}$$

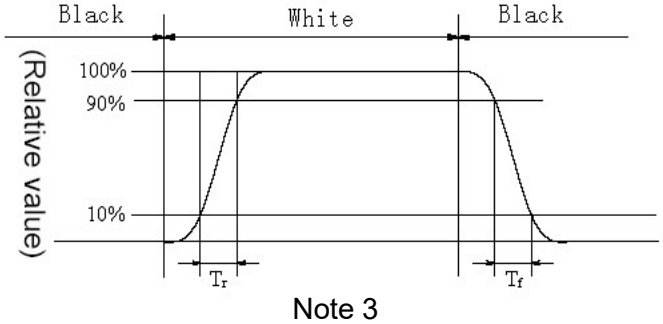
(Contrast Ratio is measured in optimum common electrode voltage)

Note3:**DefinitionofResponse time.**(Test LCD using RD80S or similar equipments):
The output sign also photo detector are measured when the input sign also are changed from “black ” to “white” (Voltage falling time)and from “white” to “black” (Voltage rising time), respectively . The response time is defined as the time interval between the 10% and 90% of amplitudes . Refer to fi gures below.

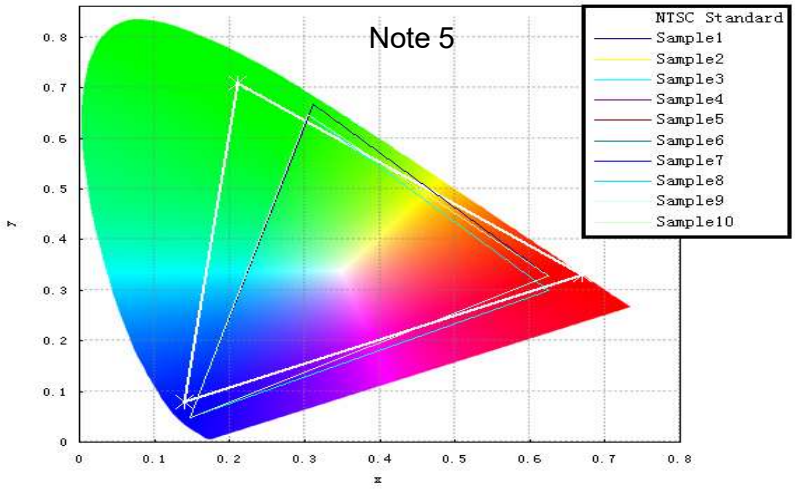
Note 4: Color Coordinates of CIE 1931
The test condition is at ILED=20mA and measured on the surface of LCD module at 25℃.
Measurement equipment:CS2000 or similar equipments
The Color Coordinate (CIE 1931) is the measurement of the center of the display shown in below figure.

Note 5: Definition of Color of CIE Coordinate and NTSC Ratio.

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



Note 3



7.0 RELIABLITY TEST /可靠性测试

The Reliability test items and its conditions are shown in below.

No	Test Items	Conditions	Testing standard
1	High temperature storage test	Ta=+80℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low temperature storage test	Ta=-30℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High temperature operation test	Ta=+70℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low temperature operation test	Ta=-20℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	High temperature & humidity (storage test)	Ta=+60℃, 90%RH max, 240 hours	IEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal Shock Test	-20℃ 30min~70℃ 30min, Change time:5min 20cycle	Start with cold temperature End with high temperature IEC60068-2-14:1984,GB2423.22-2002
7	Vibration Test	Frequency range:10Hz-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/T17626.2
8	Mechanical shock	Half Sine Wave 100G 6ms,+X,+Y,+Z 3times for each direction	IEC60068-2-27 GB/T2423.5
9	Dropping test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995
10	ESD test	C=150pF, R=330 Ω, 5 points/panel Air:±6KV, 5 times; Contact: ±4KV, 5times; (Environment:15℃~35℃，30%~60%RH,86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006 Class C

Notes:

1、Maximum acceleration 20g，1g=9.8m/s²

2、Maximum amplitude 5mm

3、Maximum acceleration =0.002 x F² (frequency Hz) x D (amplitude p-pmm)

• 8.0 Precautions /注意事项

• Please pay attention to the followings when you use this TFT LCD Panel.

• 8.1 Mounting Precautions /安装注意事项

• (1) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

• (2) You must mount a module using specified mounting holes (Details refer to the drawings).

• (3) Please make sure to avoid external forces applied to the Source PCB or FPC and D-IC during the process of handling or assembling. If not, It causes panel damage or malfunction.

• (4) Note that polarizers are very fragile and could be easily damaged. Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.

• (5) Do not pull or fold the source D-IC which connect the source PCB or FPC and the panel.

• Do not pull or fold the LED wire.

• (6) After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with alcohol or purified water.

• Do not strong polar solvent because they cause chemical damage to the polarizer.

• (7) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

• (8) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

• (9) Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it f alls from a high place or receives a strong shock, the glass may be broken.

• (10) Do not disassemble the module.

• (11) To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.

• (12) If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.

• (13)Do not drop water or any chemicals onto the LCD’s surface.

8.2 Operating Precautions /操作注意事项

- (1) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (2) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
- (3) The electrochemical reaction caused by DC voltage will lead to LCD degradation, so DC drive should be avoided.
- (4) The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.
- (5) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
- (6) Design the length of cable to connect between the connector for back-light and the converter as short as possible and the shorter cable shall be connected directly.
The longer cable between that of back-light and that of converter may cause the luminance of LED to lower and need a higher startup voltage(Vs).
- (7) Connectors are precise devices for connecting PCB and transmitting electrical signals. Operators should insert and unplug MDL in parallel when assembling MDL.
- (8) Do not connect or disconnect the cable to/ from the module at the "Power On" condition.
- (9) When the module is operating, do not lose CLK, ENAB signals. If any one these signals is lost, the LCD panel would be damaged.
- (10) Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
- (11) Do not re-adjust variable resistor or switch etc.
- (12) For the Q/Single/OC Product, If the LED designed side view, LED bar should be putted in the L ong/short side；Otherwise, its reliability and function may not be guaranteed.

注:
①(1)涉及到Pol相关条目适用于OC/MDL出货产品,
②(6)(7)涉及到connector相关适用于OC/MDL出货产品
③ (12) 涉及到客户进行BLU设计，LED Bar位置需要避开GOA位置;

8.3 Electrostatic Discharge Control /静电放电控制

- (1) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly. Keep products as far away from static electricity as possible.
- (2) Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.

8.4 Precautions for Strong Light Exposure /强光照射注意事项

It is not allowed to store or run directly in strong light or in high temperature and humidity for a long ti me; Strong light exposure causes degradation of polarizer and color filter.

8.5 Storage Precautions /存储注意事项

When storing modules as spares for a long time, the following precautions are necessary.

•(1) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.
Temperature : 5 ~ 40 ℃

•(2) Humidity : 35 ~ 75 %RH

•(3) Period : 6 months

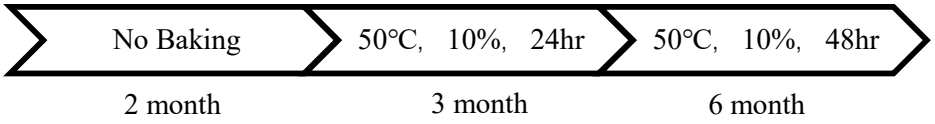
•(4) Control of ventilation and temperature is necessary.

•(5) Please make sure to protect the product from strong light exposure, water or moisture.
Be careful for condensation.

•(6) Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.

•(7)Do not store the LCD near organic solvents or corrosive gasses.

•(8) Please keep the Modules/OC/FOG at a circumstance shown below Fig.



8.6 Precautions for Protection Film /保护膜注意事项

• (1) Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and th e humidity of working room should be kept over 50%RH to reduce the risk of static charge.

• (2) In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

8.7 Appropriate Condition for Display /适当的显示条件

•(1) Normal operating condition
- Temperature: 0 ~ 40℃
- Operating Ambient Humidity : 10 ~ 90 %
- Display pattern: dynamic pattern (Real display)
- Suitable operating time: under 12 hours a day.

•(2) Special operating condition

If the product will be used in extreme conditions such as high temperature, humidity, display patterns or 7*24hrs operation time etc.., It is strongly recommended to contact us for Application engineering advi ce. Otherwise, its reliability and function may not be guaranteed.

•(3)Black image or moving image is strongly recommended as a screen save.

- (4) Lifetime in this spec. is guaranteed only when commercial display is used according to operating usages.
- (5) Please contact us in advance when you display the same pattern for a long time.
- (6) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" or "turn off" to the screen. To avoid image sticking, it is recommended to use a screen saver.
- (7) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
- (8) Dew drop atmosphere should be avoided.
- (9) The storage room should be equipped with a good ventilation facility and avoid to expose to corrosive gas , which has a temperature controlling system.
- (10) The LCD should be avoided to expose to corrosive gas for long time, ,the LCD may be affected by the gas as SO2 ,H2S etc.
- (11) When expose to drastic fluctuation of temperature (hot to cold or cold to hot) ,the LCD may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
- (12) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation

8.8 Others /其他

A. LC Leak /液晶泄露

- If the liquid crystal material leaks from the panel, it is recommended to wash the LC with acetone or ethanol and then burn it.
- In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- If LC in mouth, mouth need to be washed, drink plenty of water to induce vomiting and follow medical advice.
- If LC touch eyes, eyes need to be washed with running water at least 15 minutes.

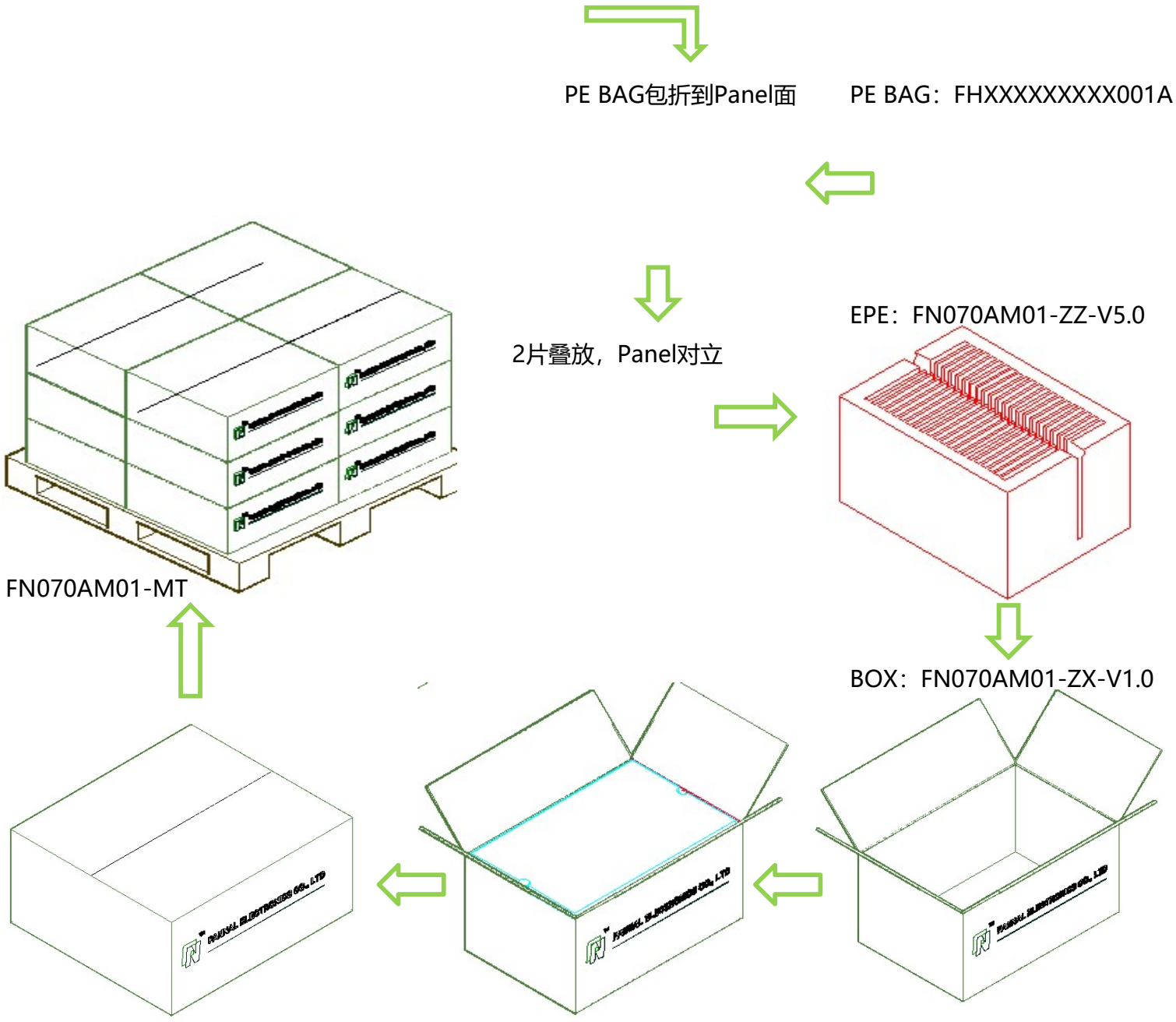
B. Rework /返工

- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

C. In order to prevent potential problems, flicker should be adjusted by optimizing the Vcom value in customer LCM Line (适用于Q/Single/OC出货产品)

9.0 PACKING INFORMATION(产品形态： LCM)

LCM MODEL	LCM Qty. in the Box	Carton Size(mm)	LCM Qty. in the Pallet
TBD			

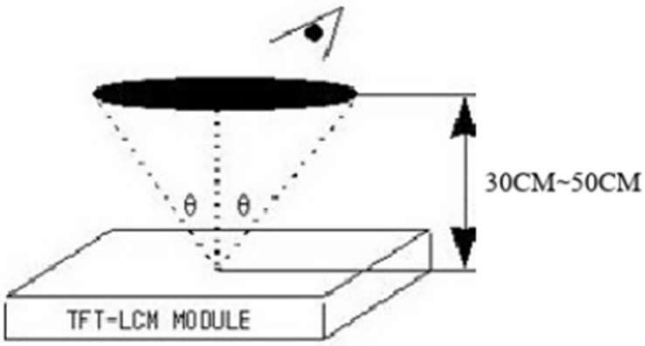


10.0 VISUAL INSPECTION CRITERIA FOR ALL CUSTMERS /所有客户的目视检查标准

10.1 Sampling Method /抽样方法

Unless otherwise agreed upon in writing, the sampling insepction shall be applied to t he Customers incoming inspection.

10.1.1 Lot size：1 pallet per same model
10.1.2 Sampling type：Random sampling
10.1.3 Inspection level：II
10.1.4 Sampling table：MIL-STD-105E



10.2 Inspection Environment /检验环境

10.2.1 Ambient conditions
a. Ambient Temperature:25±3℃
b. Relative Humidity:65±20%RH
c. Ambient Illumination:300-700LUX(Normal:500LUX)

10.2.2 Viewing Distance
The distance between the LCM and the inspector's eyes shall be at least 30cm-50cm

10.2.3 Viewing Angle
performing in front of the panel
[Vertical]：±25degree
[Horizontal]：±40degree

10.2.4 Inspection Area:
Display Area(Active Area)

10.3 Definitions /定义

10.3.1 Dark / Bright Spots
Points on display which appear dark/bright and usually result form the contamination. These defects do not vary in size or intensity(contrast)when contrast is varied.
10.3.2 Dark / Bright Lines
Lines on display which appear dark/bright and usually result from the contamination.
10.3.3 Polarizer Scratch
Lines on display which are seen across a darker background and do not vary in size.
10.3.4 Polarizer Dent
White spots on display which appear againse a darker backgound and do not vary in size.
103.5 Bright Dot Defects
Dots(sub-pixels)on display which appear bright in the display area and visible throug h the 5%ND filter at Black Pattern.

10.3.6 Dark Dot Defects

Dots(sub-pixels)on display which appear dark in the display area at R.G.B Color Pattern.

10.3.7 Line Defects

All line defects on display which appear brigh/dark such as vertical,horizontal,or cross lines.

10.3.8 Mura

Mura on display which appears darker/brighter against background birghtness on parts of display area.

10.3.9 BM Defects

Bright(white)Points on display which are off BM(Black Matrix).

10.3.10 Visual Inspection

Inspection for LCM when the unit turns on.

10.3.11 Appearance Inspection

External inspection for LCM when the unit turns off.

10.3.12 Other

Defects which cannot be classified into the above defect definitions.

Note 1: Bright& Dark dots are not smaller than a sub-pixel(Dots smaller than a sub-pixel are not counted as defect dots)

10.4 Inspectin Criteria /检验标准

Refer to 《TFT LCM general inspection standard》

10.5 Verification /验证

The supplier can verify the defective LCMs to segregate the responsibilities at customer's facility or can request the Customer to ship the defective LCMs to assigned place for verification

This verificatin result shall be agreed mutually buy the Customer and Supplier. This result can be corrected/changed after detail failure analysis at Supplier's facilities.

10.6 Supplier Induced Defects /供应商引起的缺陷

All of the Supplier induced defective LCMs shall be returned to the Supplier for repair or replacement.

Bfore return the defective LCMs, the Customer needs Supplier's confirmatin with RMA Number.

All of the returned LCMs shall be returned to the Customer within agreed time period.

10.7 Customer Induced Defects /顾客引起的缺陷

The Customer can return the custmoer induced defective LCMs to the Supplier for repair.

The repair cost for Customer induced defective LCMs shall be agreed with both parties, Customer and Supplier.

10.8 Warranty Period /质量保证期

In-warranty period is Eighteen(18)Months from manufacturing month of LCM

Note：

a. Eighteen months are composed of twelfth months in-warranty period and sixth months distribution period

b. The manufacturing Month is on the LCMs as Supplier's serial No.

10.9 Repair Warranty /维修保证书

Repair warranty is Twelve(12)Months from repaired month for repaired LCMs

Note：a. The Label for repair will be added after repairing.

10.10 Warranty avoidance /避免担保

The warranty will be avoided in cases of below:

a. When the warranty period is expired.

b. The Customer induced defective LCMs.

c. When the LCMs were repaired by 3rd party without Suppolier's approval.

d.When the LCMs were treated like Disassemble and Rework by the Customer and/or Customer's representatives without Supplier's approval.

10.11 Others /其他

If any problems arise with the LCMs supplied by supplier, the customer and supplier will coopeate and make ettorts to solve it with mutual contidence and respect