Product Specification

To:

Product Name: C068SWW4-0

Document Issue Date: 2018/2/26

Customer	InfoVision Optoelectronics
SIGNATURE _____ _____ _____ Please return 1 copy for your confirmation with your signature and comments.	**SIGNATURE** **REVIEWED BY CQM** _____ **PREPARED BY FAE** _____

Note : 1. Please contact InfoVision Company before designing your product based on this product.

2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by IVO for any intellectual property claims or other problems that may result from application based on the module described herein.

FQ-7-30-0-009-03D

Revision	Date	Page	Revised Content/Summary	Remark
00	2018/2/26	--	First issued.	

CONTENTS

1 General Descriptions

1.1 Introduction

The C068SWW4-0 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) Sub Sheet that uses amorphous silicon TFT as a switching device. This TFT LCD panel (Single Chip) has a 6.8 inch diagonally measured active display area with WXGA resolution (480 horizontal by 1,280 vertical pixels array).

1.2 Features

- 6.8 Inch TFT-LCD Panel
- Supported WXGA Resolution
- Compatible with RoHS Standard

1.3 General Characteristics

Table 1 General Characteristics

Item	Specification		Unit	Note
Outline Dimension (H x V x D)	63.4208x169.0888x1.0		mm	Single Chip
Active Area (H x V)	60.2208x160.5888		mm	Single Chip
Number of Pixels (H x V)	480x 1,280		-	Single Chip
Pixel Size (H x V)	0.12546x0.12546		mm	Single Chip
Pixel Arrangement	RGB Stripe		-	-
Display Type	Transmissive		-	-
Display Mode	Normally Black		-	-
Cell Thickness	CF: 0.50±0.05		mm	-
	TFT: 0.50±0.05			
Driver IC(Recommendation)	ICN9706		-	-
Weight	26.6(Typ.)	29.46(Max.)	g	Single Chip
	573.44(Typ.)	631.34(Max.)		Sub A
	573.44(Typ.)	631.34 (Max.)		Sub B

2 Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Conditions
LC Operating Voltage	V_{op}	-5.0	5.0	V	(1),(2),(3),(4)
Operating Temperature	T_{gs}	-20	85	℃	
Storage Temperature	T_a	-30	85	℃	
Operating Humidity	H_{op}	10	90	%RH	
Storage Humidity	H_{st}	10	90	%RH	

Note(1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

Note(2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. Normal conditions are defined as: Temperature: 25℃, Humidity: 55± 10%RH.

Note(3) Unpredictable results may occur when it was used in extreme conditions. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note(4) Wet bulb temperature should be lower than 57.8℃, and no condensation of water. Besides, protect the module from static electricity.

3 Electrical Specifications

Table 3 Electrical Specifications

No.	Item	Min.	Typ.	Max.	Unit
1	Vcom voltage	-1.182	-0.682	-0.3	V
2	Frame Rate	55	60	65	Hz
3	VGH voltage	15	16	17	V
4	VGL voltage	-12	-11	-10	V

Note(1) Both VGH and VGL are TFT gate operation voltage.

Note(2) The setting of electrical parameters should follow the initial code specified by IVO. Vcom must be adjusted to optimize display quality.

Note(3) All the contents of electrical specifications and display fineness are guaranteed under Normal Conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH.

4 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

Table 4 Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Transmittance	Center		3.96	4.40	-	%	Under C-light (1),(5),(7),(8) θx=θy=0°
Contrast Ratio	Center		800	900	-	-	(1),(3),(6),(7),(8) θx=θy=0°
Response Time	Rising + Falling		-	30	35	ms	(1),(4),(6),(7),(8) θx=θy=0°
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.03	0.630	Typ. +0.03	-	Under C-light (1),(5),(8) θx=θy=0°
	Red y			0.319		-	
	Green x			0.293		-	
	Green y			0.544		-	
	Blue x			0.143		-	
	Blue y			0.126		-	
	White x			0.303		-	
	White y			0.328		-	
NTSC	CIE1931		50	55	-	%	
Viewing Angle (CR≥10)	Horizontal	θ_{x+}	80	85	-	degree	(1),(2),(6),(7),(8)
		θ_{x-}	80	85	-		
	Vertical	θ_{y+}	80	85	-		
		θ_{y-}	80	85	-		

Note(1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

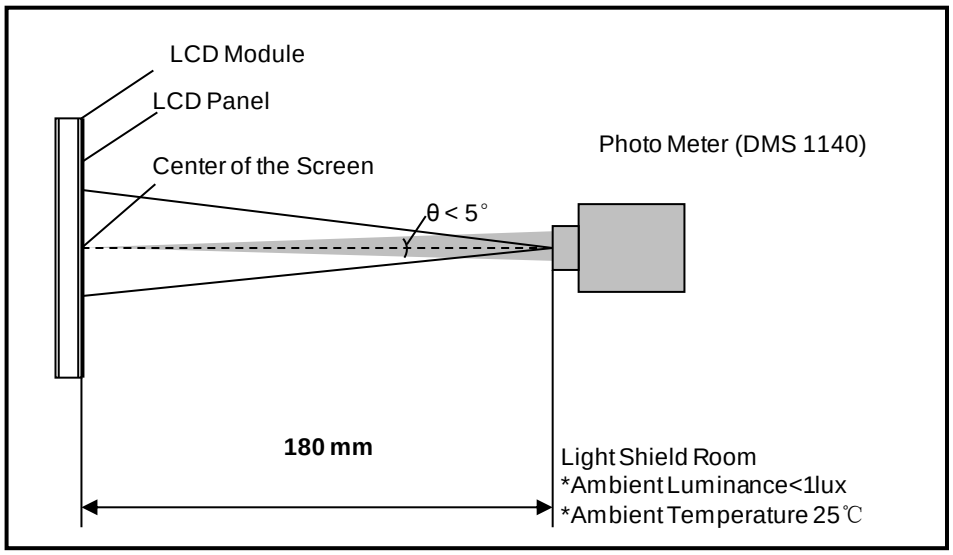


Figure 1 Optical Characteristic Measurement Equipment and Method

Note(2) Definition of Viewing Angle.

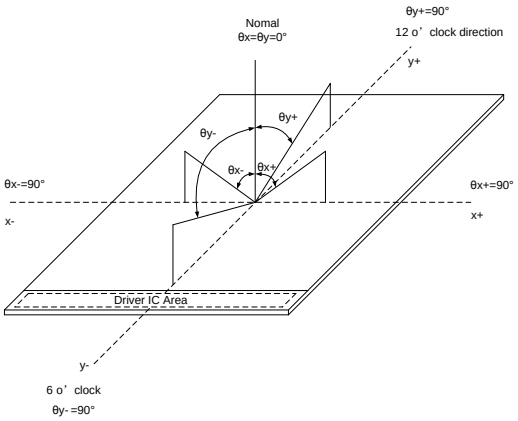


Figure 2 Definition of Viewing Angle

Note(3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression:

Contrast Ratio (CR) = the luminance of White pattern/ the luminance of Black pattern

Note(4) Definition of Response Time

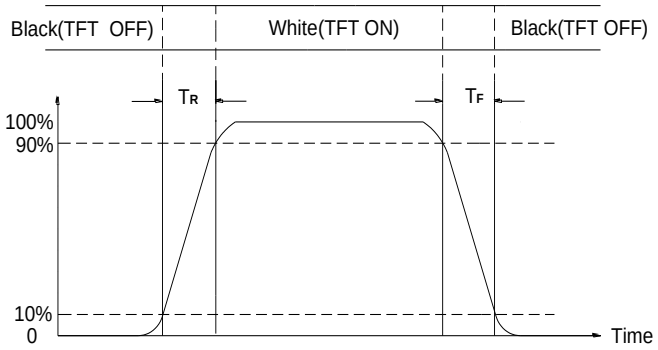


Figure 3 Definition of Response Time

Note(5) C-light Spectrum

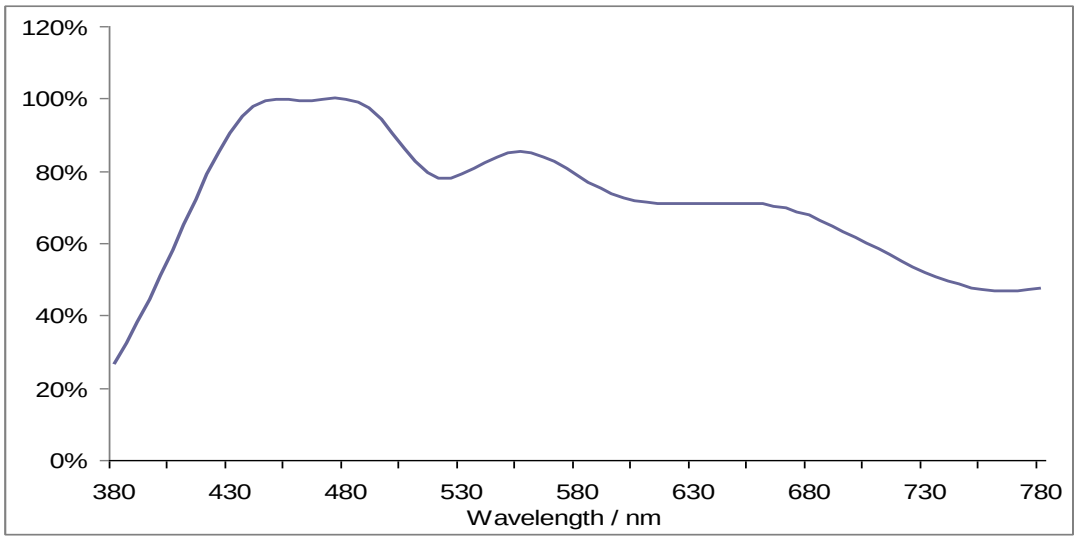


Figure 4 C-Light Spectrum

Note(6) The Back Light Spectrum

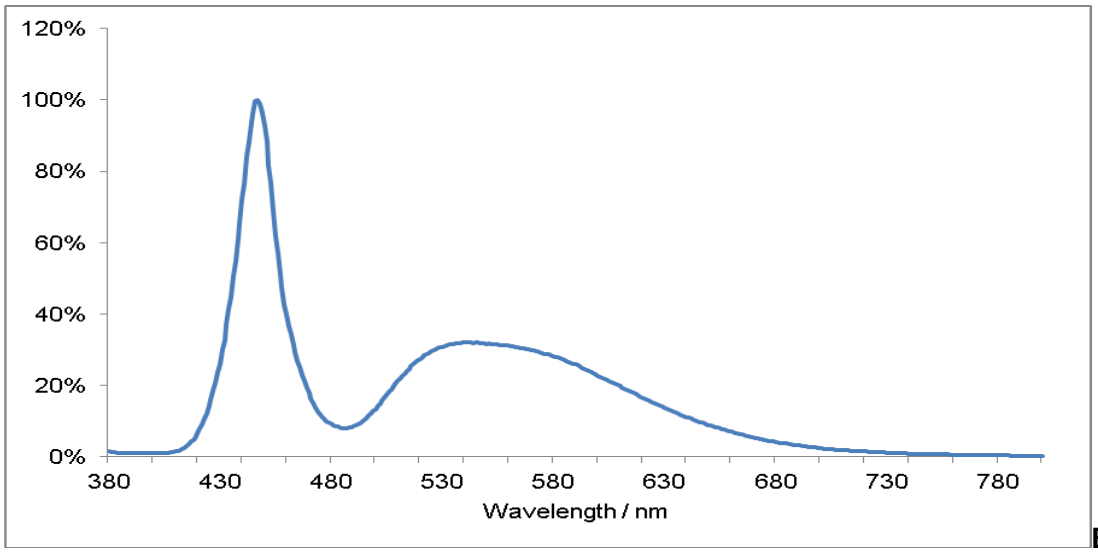


Figure 5 Back Light Spectrum

Note(7) The polarizer type: SLP-5115AS-08-T (HC)/CF; SLP-5115AG6-08-T (Clear)/TFT.

Note(8) All optical data are based on IVO given system & nominal parameter & testing machine in this document.

Note(9) The direction of polarizer. It is recommended that customer should choose O Mode or E Mode according to the actual situation.

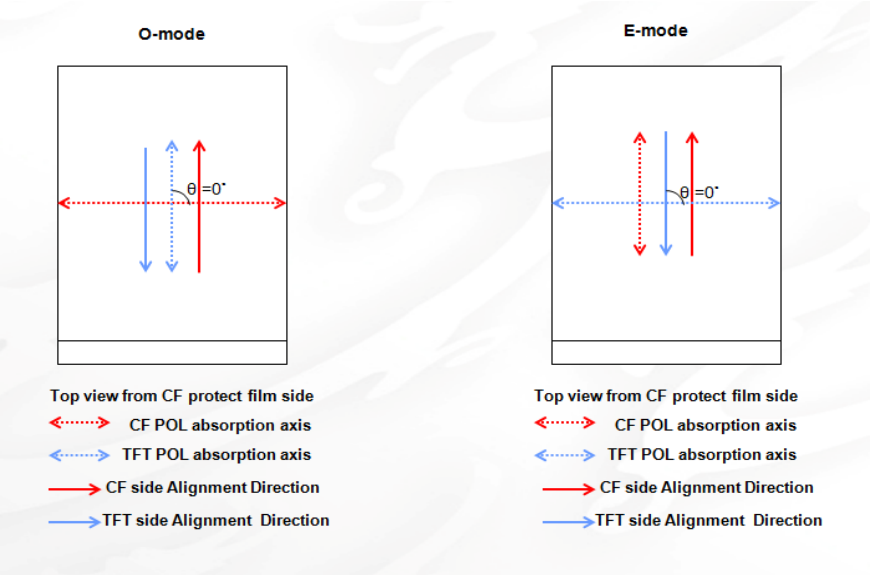


Figure 6 Polarizer Direction

5 Pixel Format

The figure shows the relation of the input signals and LCD panel pixel format.

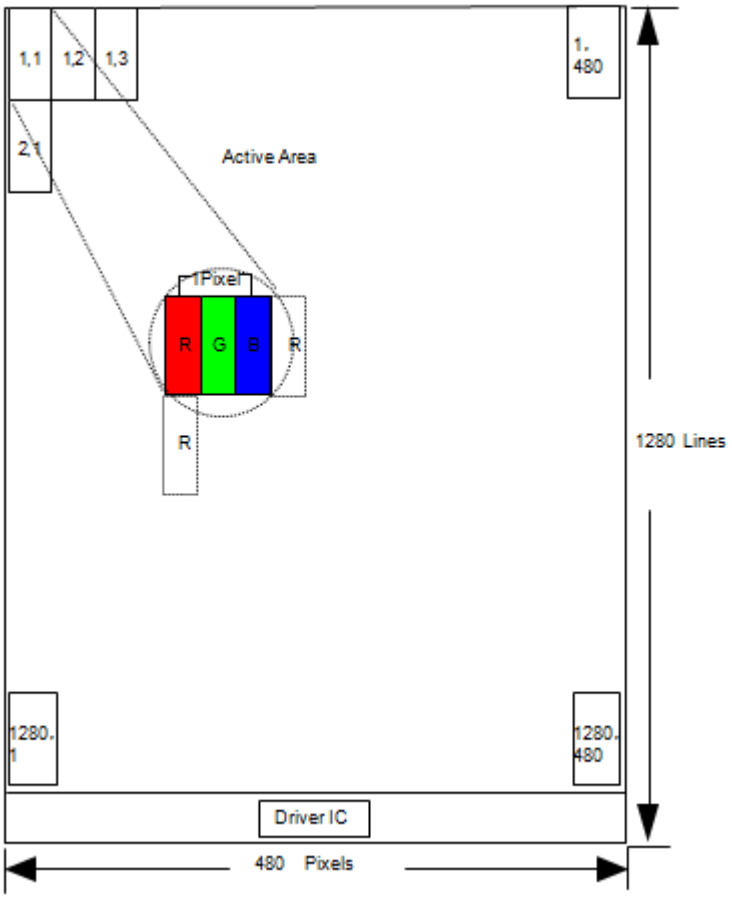
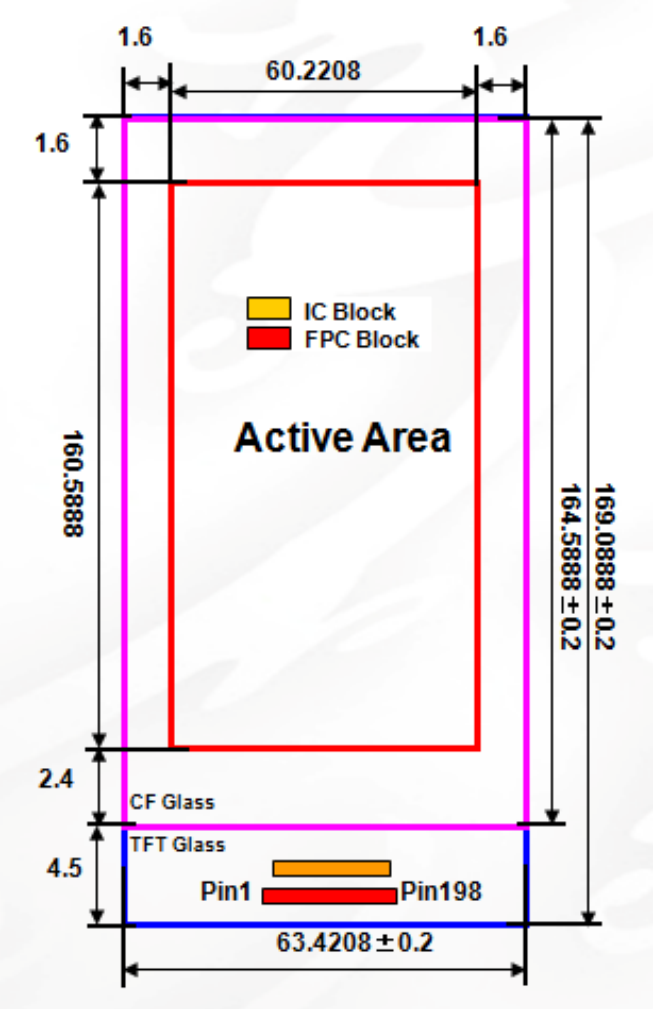


Figure 7 Pixel Format

6 Outline Size

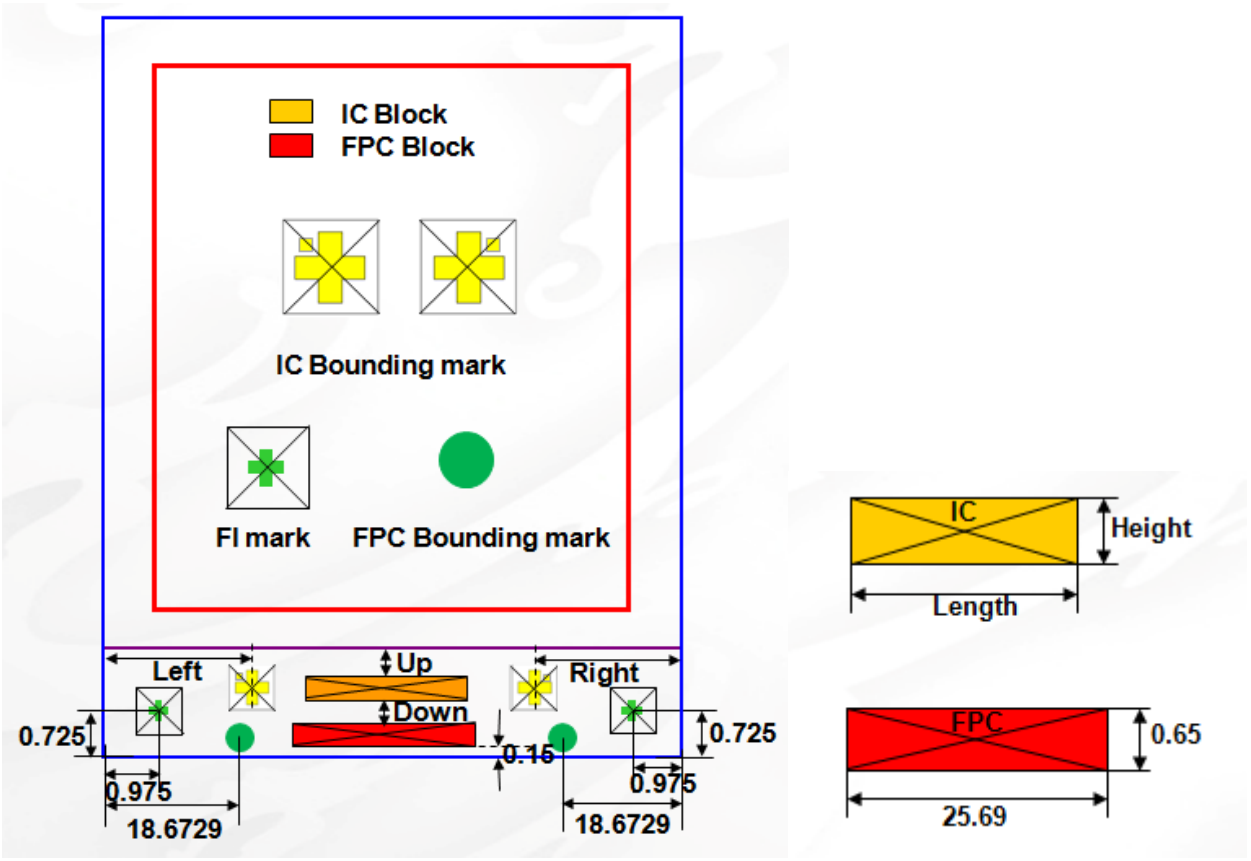
6.1 Outline Size of Single Chip



Unit: mm

Figure 8 Outline Size of Single Chip

6.2 IC & FPC Position on Cell

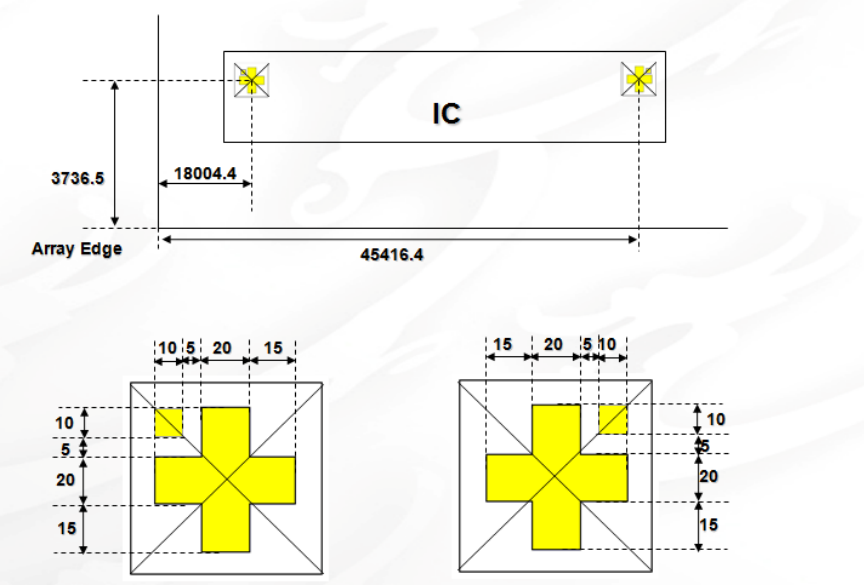


Unit: mm

Figure 9 IC and FPC Position Information

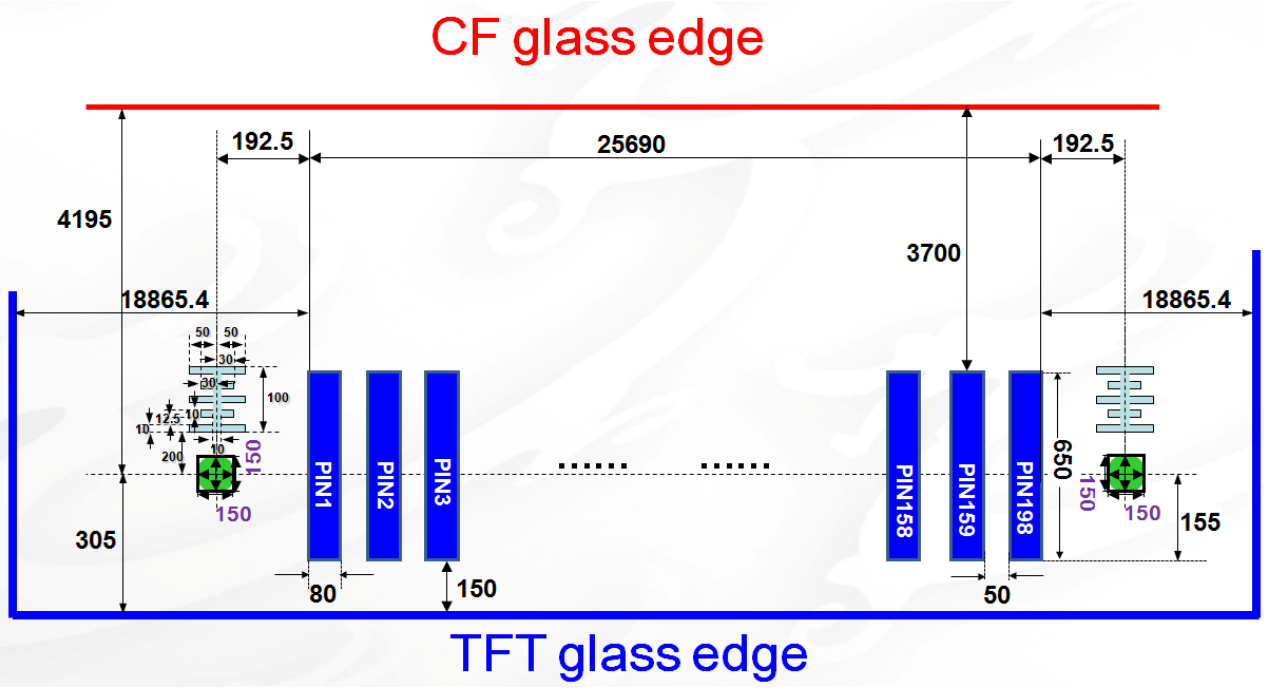
Table 5 IC Position Information

IC Name	Up(um)	Down(um)	Left(um)	Right(um)	Height(um)	Length(um)
ICN9706	610	2160	18004.4	18004.4	930	27680



Unit: um

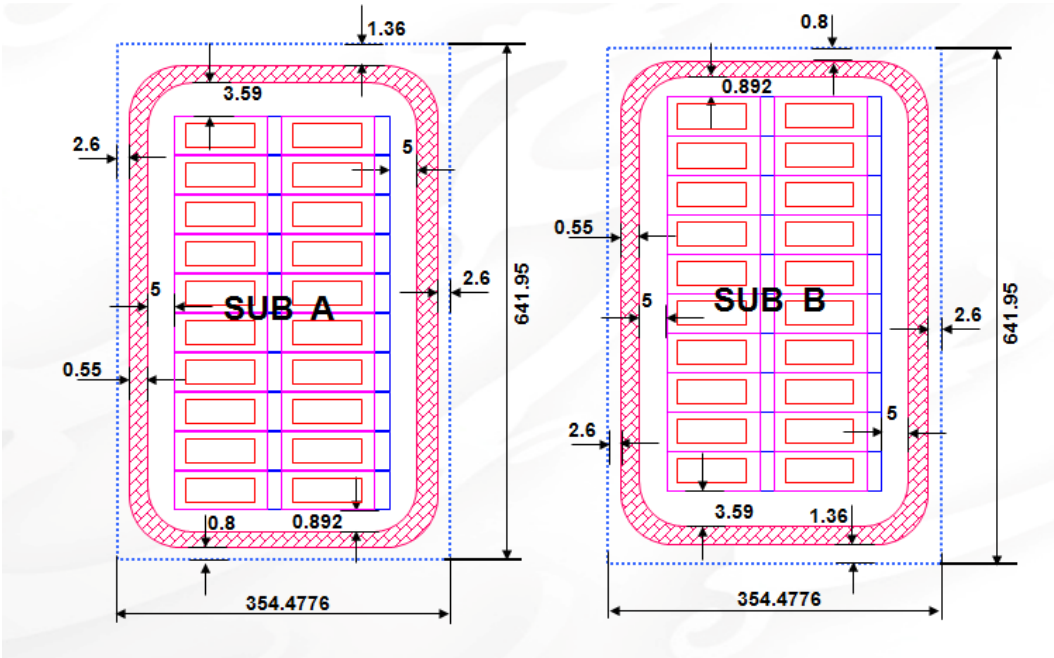
Figure 10 IC Position Information



Unit: um

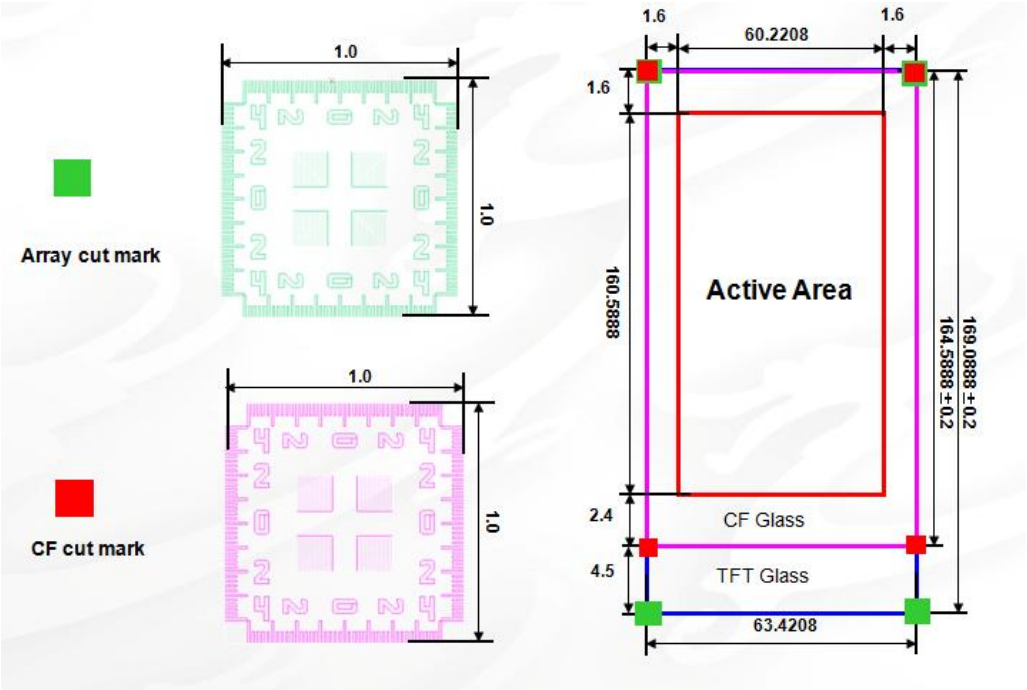
Figure 11 FPC Position Information

6.3 Outline Size of Sub Sheet and Cut Mark



Unit: mm

Figure 12 Outline Size of Sub Sheet (Sub A & Sub B)



Unit: mm

Figure 13 Outline Size of Cut Mark

6.4 Cell Thickness

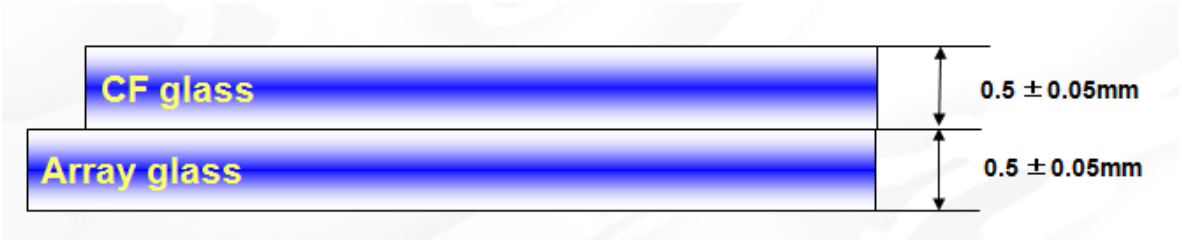
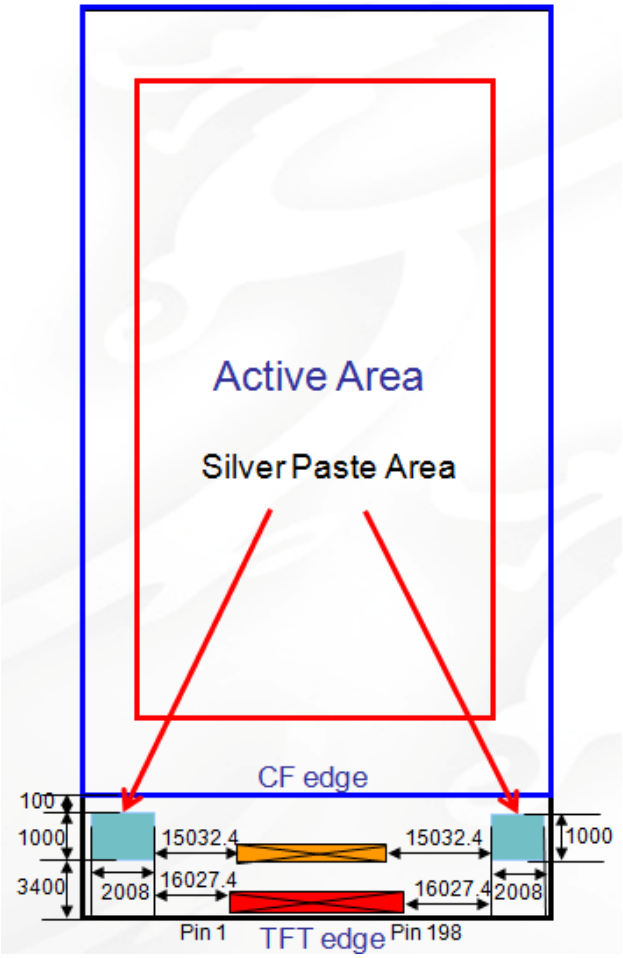


Figure 14 Cell Thickness

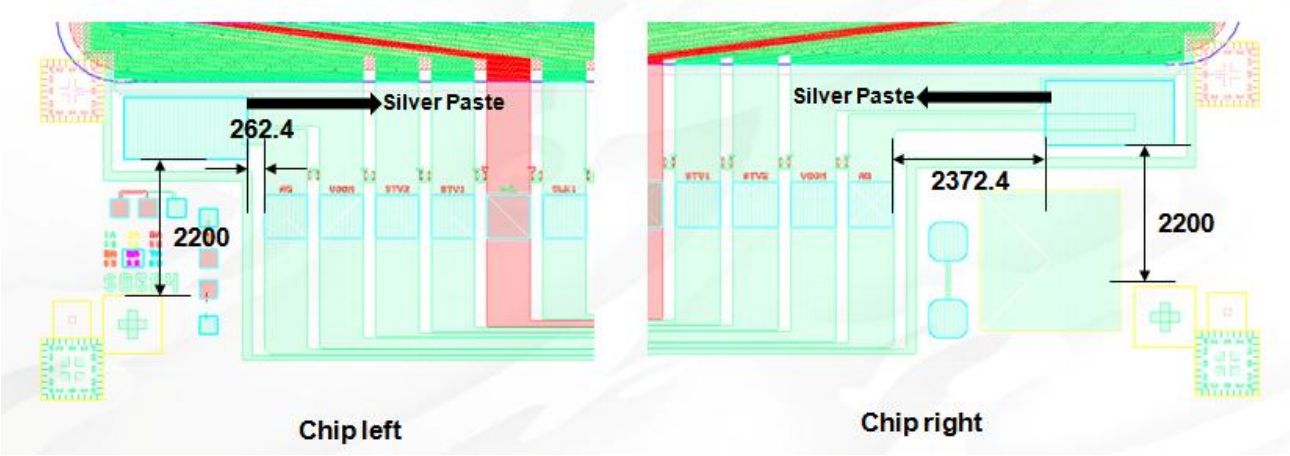
6.5 Silver Paste Position



Unit: um

Figure 15 Silver Paste Position

6.6 Silver Paste on the Pad

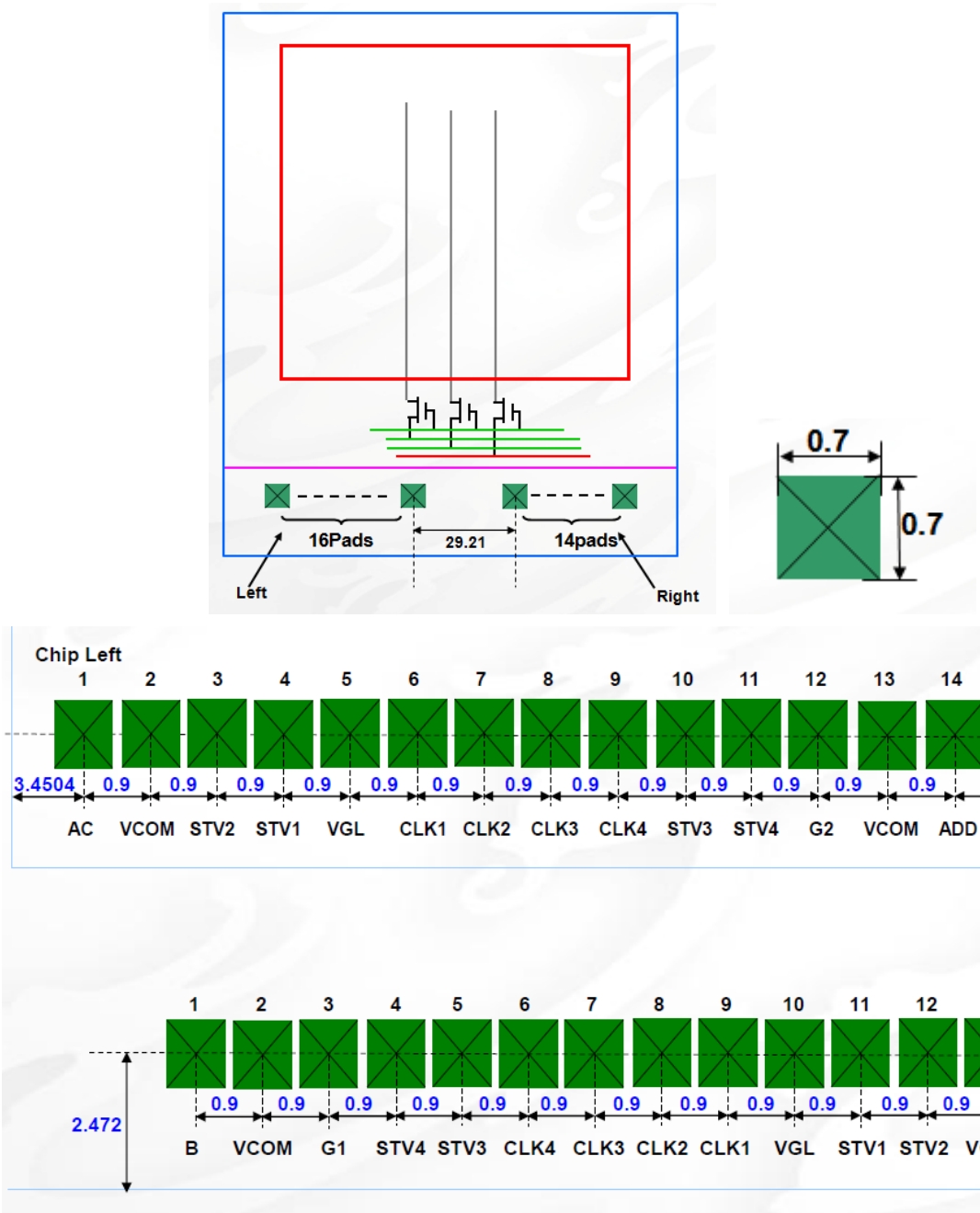


Unit: um

Figure 16 Silver Paste on the Pad

7 Cell Light-On Information

7.1 Cell Light-On Test Pad Drawing



Unit: mm

Figure 17 Cell Light-On Test Pad Drawing

7.2 Cell Light-On Test Waveform

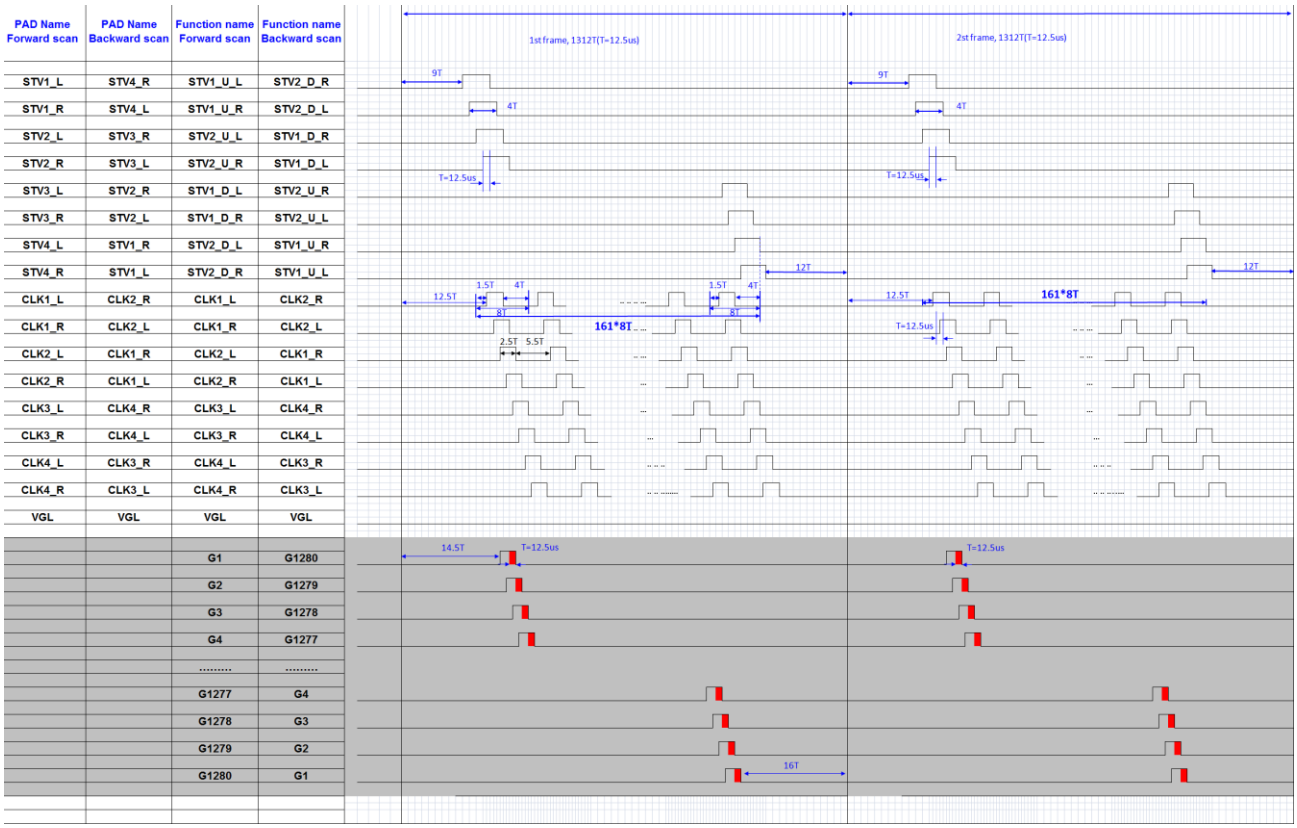


Figure 18 Cell Light-On Test Waveform

Table 6 Voltage for Cell Test

Item	Black	Gray	White
VGH	16V		
VGL	-11V		
VCOM	-0.682V		
ADD	17~25V		
S1_VDH	0.1V	2.5V	5.2V
S1_VDL	-0.1V	-2.5V	-5.2V
S2_VDH	0.1V	2.5V	5.2V
S2_VDL	-0.1V	-2.5V	-5.2V

7.3 LCD FPC Input Pin Assignment

Table 7 LCD FPC Input Pin Assignment

No.	Pin define	No.	Pin define	No.	Pin define	No.	Pin define	No.	Pin define	No.	Pin define
1	GND	34	C22P	67	VSSA	100	BS0	133	DB	166	HS_VSS
2	GND	35	C22P	68	VSSAC	101	VSSD	134	VSSD	167	HS_VSS
3	VCOM	36	C21N	69	VSSD	102	RESX	135	TEST_OSC	168	HS_VSS
4	DUMMY	37	C21N	70	VSSD	103	RESX	136	VSP	169	DUMMY
5	DUMMY	38	C21N	71	VCI	104	TE_TOUCH	137	VSP	170	HS_D3P
6	VGL_REG	39	C21P	72	VCI	105	TE_TOUCH	138	TS	171	DUMMY
7	VGL_REG	40	C21P	73	VTESTOUTP	106	TE_TOUCH	139	TS	172	HS_D3N
8	VSSD	41	VSN	74	VPP	107	TE	140	TS	173	HS_VSS
9	VSSD	42	VSN	75	VPP	108	TE	141	VSSD	174	HS_D2P
10	VCI	43	VSP	76	VCSW1	109	CABC_PWM_OUT	142	VSSD	175	DUMMY
11	VCI	44	VSP	77	VCSW1	110	SCL	143	VSSD	176	HS_D2N
12	VCI	45	VSP	78	VCSW1	111	CSX	144	VSSD	177	DUMMY
13	VGL	46	C42N	79	VCSW2	112	DCX	145	VSSD	178	HS_VSS
14	VGL	47	C42N	80	VCSW2	113	PCLK	146	VDDD	179	HS_CP
15	C32N	48	C42P	81	VCSW2	114	DE	147	VDDD	180	HS_CN
16	C32N	49	C42P	82	VSSD	115	VSYNC	148	VDDD	181	DUMMY
17	C32P	50	C42P	83	VSSD	116	HSYNC	149	VDDD	182	HS_VSS
18	C32P	51	C41N	84	VSSD	117	DUMMY	150	VDDD	183	DUMMY
19	C32P	52	C41N	85	VDDD	118	DUMMY	151	VDDD	184	HS_D1P
20	C31N	53	C41P	86	VDDD	119	DUMMY	152	IOVCC	185	HS_D1N
21	C31N	54	C41P	87	IOVCC	120	DUMMY	153	IOVCC	186	DUMMY
22	C31P	55	VCL	88	PCCS1	121	DUMMY	154	IOVCC	187	HS_VSS
23	C31P	56	VCL	89	VSSD	122	BIST	155	IOVCC	188	HS_DOP
24	C31P	57	VCI	90	PCCS0	123	VSN	156	IOVCC	189	HS_DON
25	VSSD	58	VCI	91	IOVCC	124	DUMMY	157	HS_VCC	190	DUMMY
26	VSSD	59	VCI	92	BS2	125	DB	158	HS_VCC	191	HS_VSS
27	VCI	60	VSSD	93	VSSD	126	DB	159	HS_VC	192	VTESTOUTN
28	VCI	61	VSSD	94	DUMMY	127	DB	160	HS_VCC	193	VSSA
29	VGH	62	VREF	95	IOVCC	128	DB	161	HS_LDO	194	VSSA
30	VGH	63	VGMN	96	DUMMY	129	DB	162	HS_LDO	195	VSSA
31	C22N	64	VGMP	97	VSSD	130	DB	163	HS_LDO	196	VCOM
32	C22N	65	VSSA	98	BS1	131	DB	164	HS_LDO	197	GND
33	C22N	66	VSSA	99	IOVCC	132	DB	165	HS_VSS	198	GND

8 Reliability Condition

Table 8 Reliability Condition

NO	Item	Condition
1	High temperature Operation	T_{gs}=85℃,240hours
2	Low temperature Operation	T_{gs} =-20℃,240hours
3	High temperature Storage	T_a=85℃,240hours
4	Low temperature Storage	T_a=-30℃,240hours
5	High temperature/High humidity Operation	T_{gs}=60℃, 90%RH,240hours

Note(1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the IVO document before reliable test. Only check the function of the panel after reliability test.

Note(2) The setting of electrical parameters should follow the initial code specified by IVO before reliability test. Besides, in OTP mode, Vcom must be adjusted to optimize display quality. It is recommended to use the backlight that specified by IVO.

Note(3) The sample must be released for 24 hours under normal conditions before judging. Furthermore, all the judgment must be made under normal conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature.

Note(4) During the test, it is unaccepted to have condensate water remains. Besides, protect the module from static electricity.

9.IVO Recommended Packaging

9.1 Sub Sheet Packaging

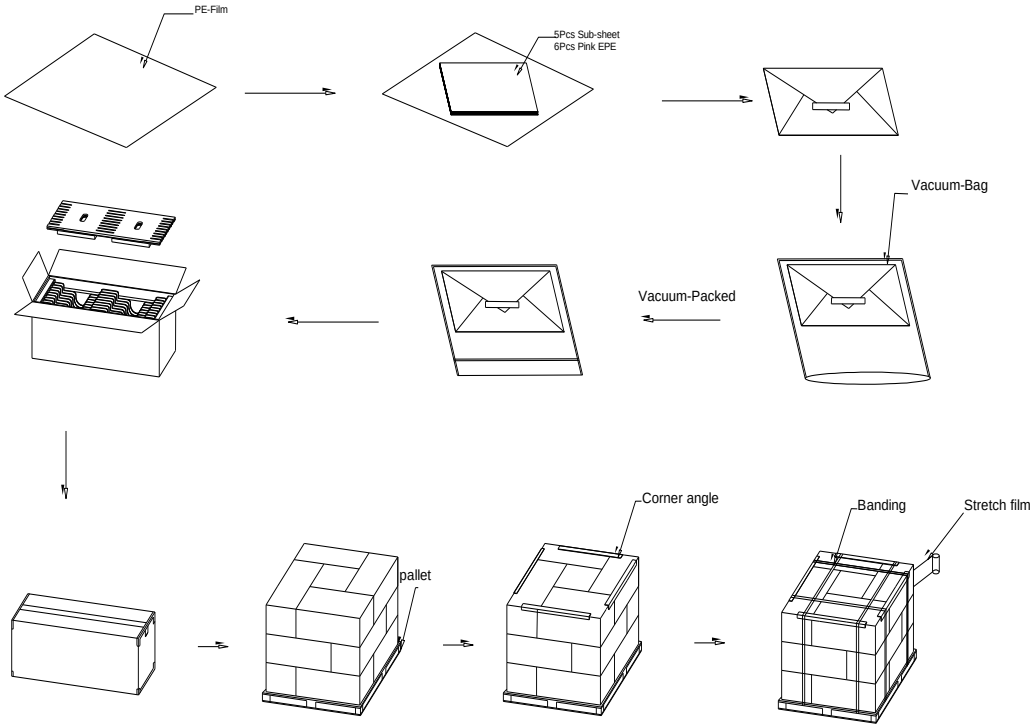


Figure 19 Sub Sheet Packaging

10 General Precaution

10.1 Use Restriction

This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems and any other appliance where performance failure could be life-threatening or lead to be catastrophic.

10.2 Operation Precaution

(1) The LCD product should be operated under normal conditions.
Normal conditions are defined as below:
Temperature: 25℃
Humidity: 55±10%
Display pattern: continually changing pattern (Not stationary)
(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)
(3) Image sticking may occur when the module displayed the same pattern for long time.
(4) Do not connect or disconnect the panel in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

10.3 Handling Precaution

(1) All the operators should be electrically grounded through adequate methods such as an anti-static wrist band, and with ionized air blowing to the panel surface when handling.
(2) Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.
(3) Do not apply strong mechanical impact or static load to the panel, so as to avoid breaking it.
(4) Clean the panel gently with absorbent cotton or soft cloth when it is dirty.
(5) Wipe off saliva or water drops on the polarizer, as soon as possible. Otherwise, it may cause deformation and fading of color.
(6) Desirable cleaners are IPA (Isopropyl Alcohol) or hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
(7) When expose to drastic fluctuation of temperature (hot to cold or cold to hot), the LCD panel may be affected; It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the panel. Besides, smear or spot will remain after condensate water evaporating.
(8) The TFT-LCD Panel shall be installed flat, without twisting or bending
(9) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

10.4 Storage Precaution

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

(1) Store them in a dark place. Do not expose to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(2) The product's glass 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.
(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

10.5 Reprocessing Precaution

In order to ensure original product status, protective measures must be assessed before any reprocessing, including UV, ESD and high temperature prevention, etc.. Product storage and usage condition also must be considered. For glass slimming process, we insist to strictly observe IVO standard operation procedure《Slimming Process Instruction》

10.6 Disposal

When disposing LCD panel, obey the local environmental regulations.