Document Title	C050SWYG-2 Customer Approved Specification			Page No.	1/23
Document No.		Issue date	2016/06/20	Revision	00

Customer Approved Specification

To:

Product Name: C050SWYG-2

Document Issue Date: 2016/06/20

Customer	InfoVision Optoelectronics
SIGNATURE _____ _____ _____ Please return 1 copy for your confirmation with your signature and comments.	**SIGNATURE** **QA** _____ **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	Old Description	New Description	Remark
00	2016/6/20	ALL	--	First issue	

CONTENTS

1 General Descriptions

1.1 Introduction

The C050SWYG is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) Single Chip that uses amorphous silicon TFT as a switching device. This TFT LCD panel has a 4.95 inch diagonally measured active display area with FWVGA resolution (480 horizontal by 854 vertical pixels array).

1.2 Features

- 4.95" TFT-LCD Panel
- Supported FWVGA Resolution
- Compatible with RoHS Standard

1.3 General Characteristics

Table 1 General Characteristics

Item	Specification	Unit	Note
Outline Dimension (H x V x D)	64.46x117.40x 0.40	mm	Single Chip
Active Area (H x V)	61.56 x 109.52	mm	Single Chip
Number of Pixels (H x V)	480x 854	-	Single Chip
Pixel Size (H x V)	0.12825x0.12825	mm	Single Chip
Pixel Arrangement	RGB Stripe	mm	-
Display Type	Transmissive	-	-
Display Mode	Normally Black	-	-
Cell Thickness	CF: 0.20±0.03	mm	Single Chip
	TFT: 0.20±0.03		
Driver IC(Recommendation)	Himax8379C/OTM8019A/ILI9806E	-	-
Weight	7.59 (Typ) 8.73 (Max)	g	Single Chip

2 Absolute Maximum Ratings

Table 2 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit	Conditions
LC Operating Voltage	V_{op}	-5	5	V	(1),(2), (3),(4)
Operating Temperature	T_{gs}	-20	70	℃	
Storage Temperature	T_a	-30	80	℃	
Operating Humidity	H_{op}	10	80	%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 39℃, 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	-0.8	-0.3	0.2	V
2	Frame Rate	55	60	65	Hz
3	Vgh voltage	14	15	16	V
4	Vgl voltage	-11	-10	-9	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. V_{com} 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		4.5	4.8	-	%	(1),(6),(8),(9)
Contrast Ratio	Center		900	1200	-	-	(1),(4),(7),(8),(9)
Response Time	Rising + Falling		-	35	40	ms	(1),(5),(7),(8),(9)
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.03	0.659	Typ. +0.03	-	Under C-light
	Red y			0.322		-	
	Green x			0.290		-	
	Green y			0.588		-	
	Blue x			0.134		-	
	Blue y			0.124		-	
	White x			0.298		-	
	White y			0.328		-	
NTSC	CIE1931		65	67.3	-	-	(1),(6),(8),(9)
Viewing Angle （CR>10）	Horizontal	Θ_{x+}	80	85	-	degree	(1), (3),(7),(8),(9)
		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 changeing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in windless room.

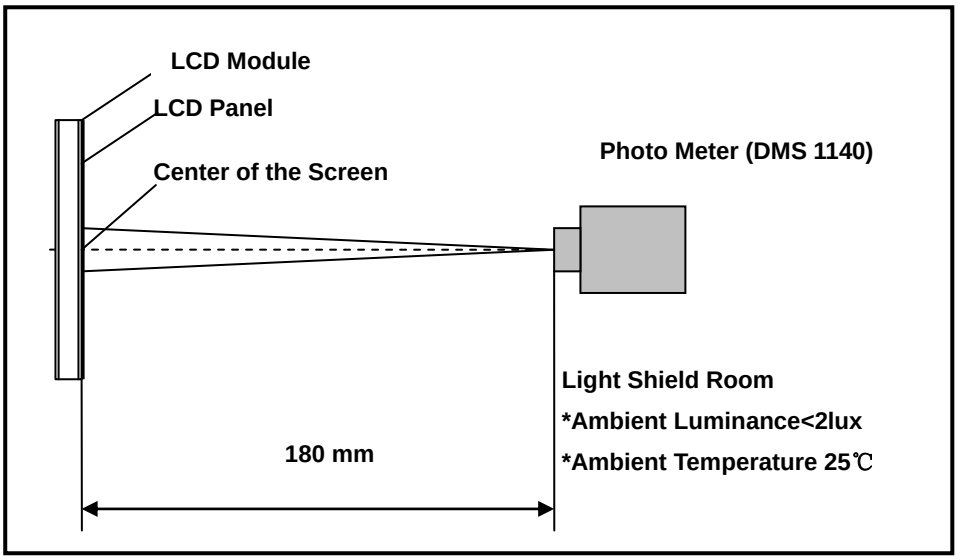


Figure 1 Measurement Setup

Note (2) Flicker Measurement Setup

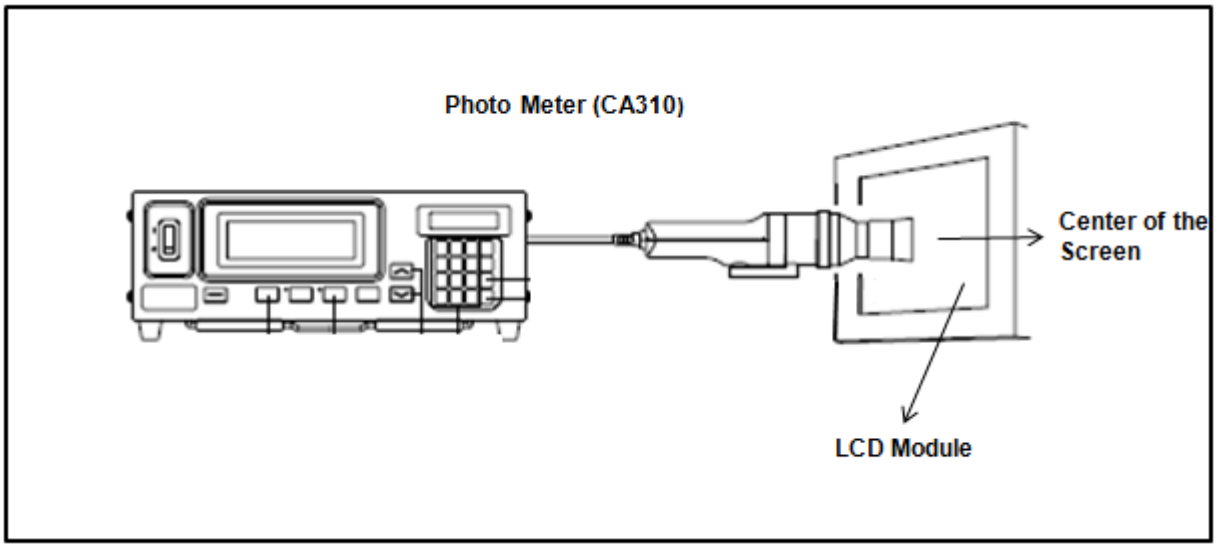


Figure 2 Measurement Setup

Note (3) Definition of Viewing Angle

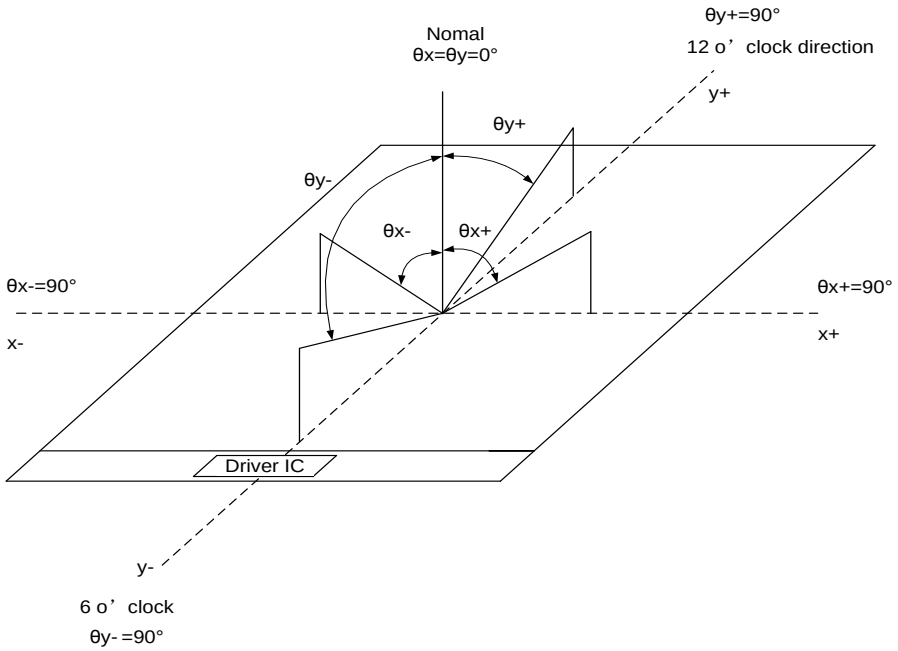


Figure 3 Definition of Viewing Angle

Note (4) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L255 / L0

L255: Luminance of gray level 255, L0: Luminance of gray level 0

Note (5) Definition of Response Time

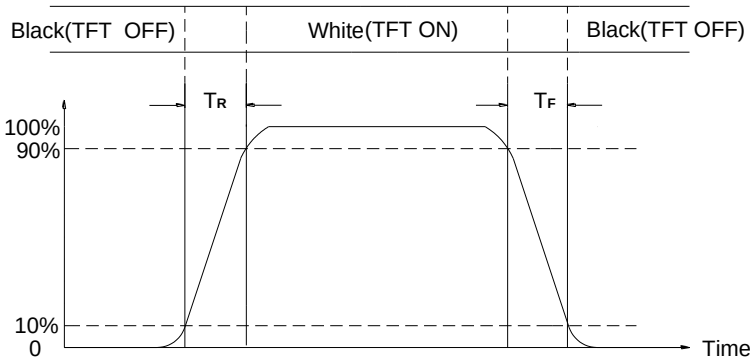


Figure 4 Definition of Response Time

Note (6) Light source is the C-Llight which is supplied by IVO

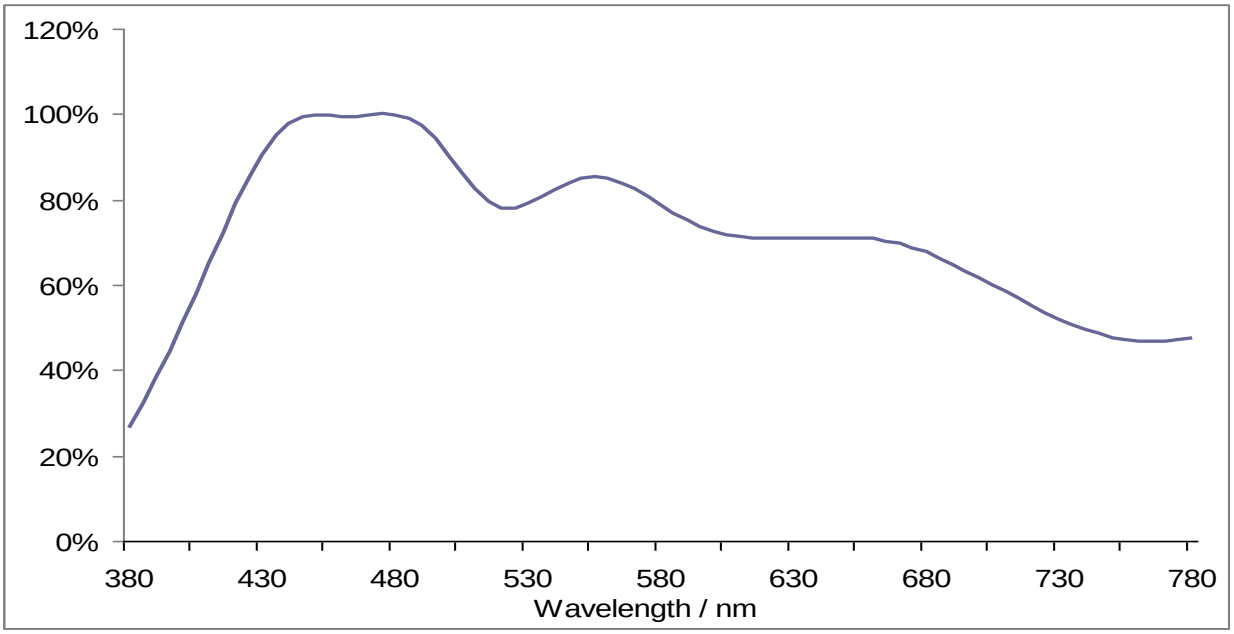


Figure 5 C-Light Spectrum

Note (7) The Normal polarizer type: Sapo/CF, Sapo/TFT.
Note (8) All optical data 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

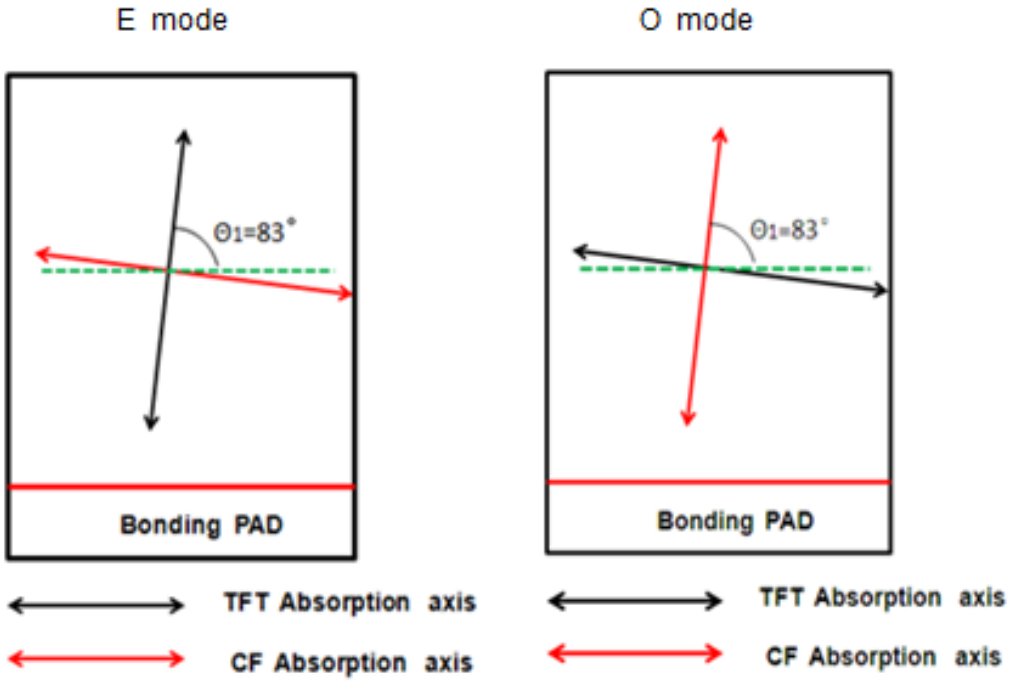


Figure 7 Polarizer Direction

5 Pixel Format

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

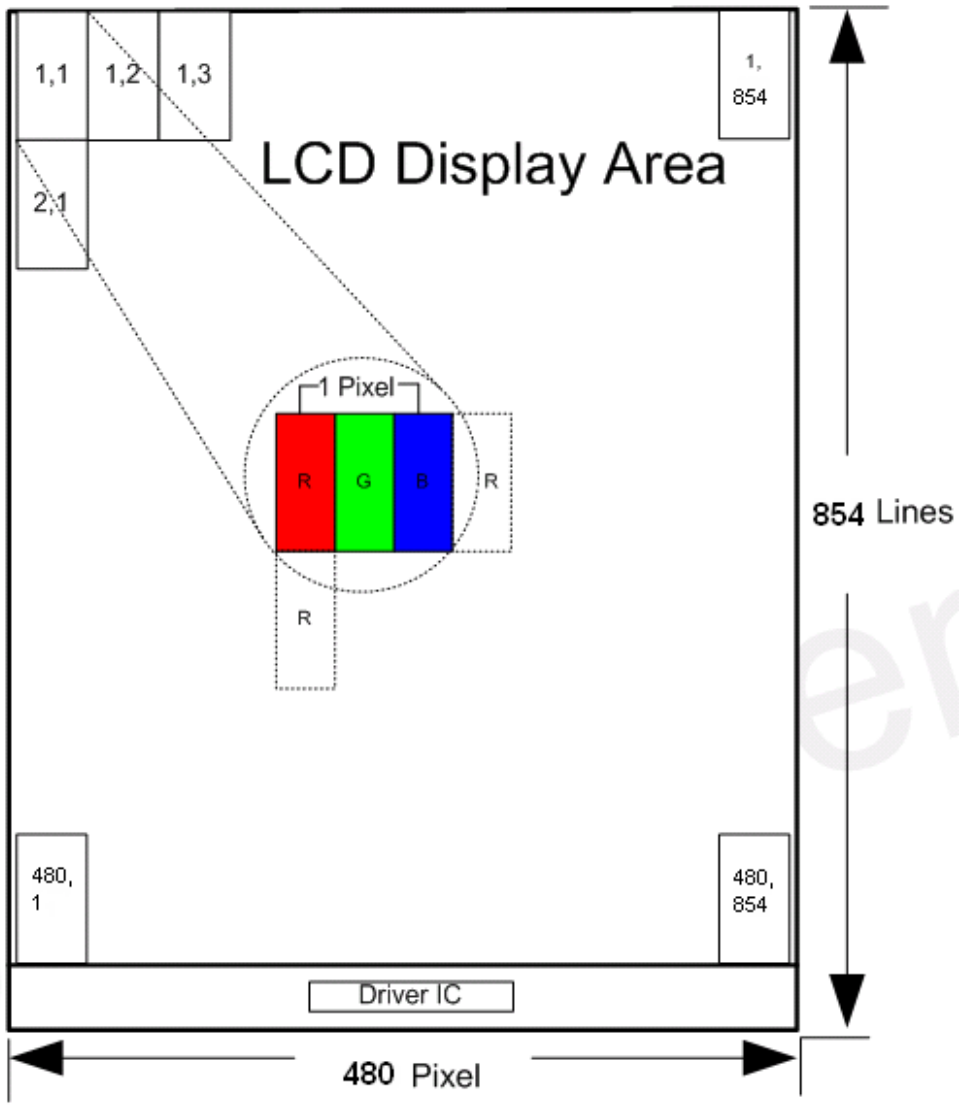
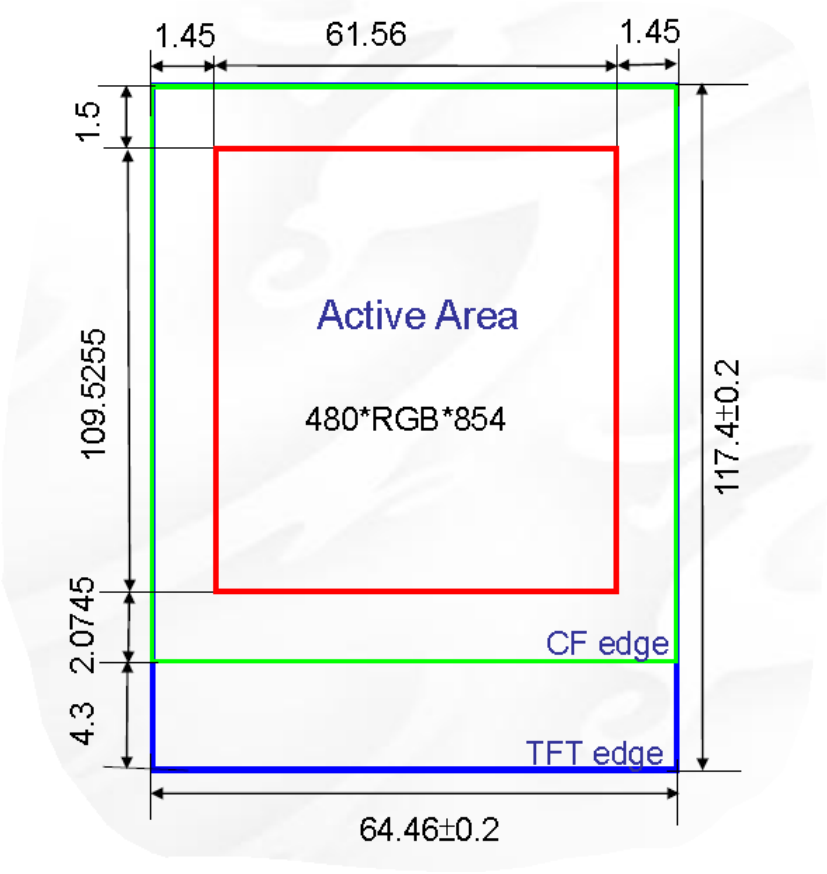


Figure 8 Pixel Format

6 Outline Size

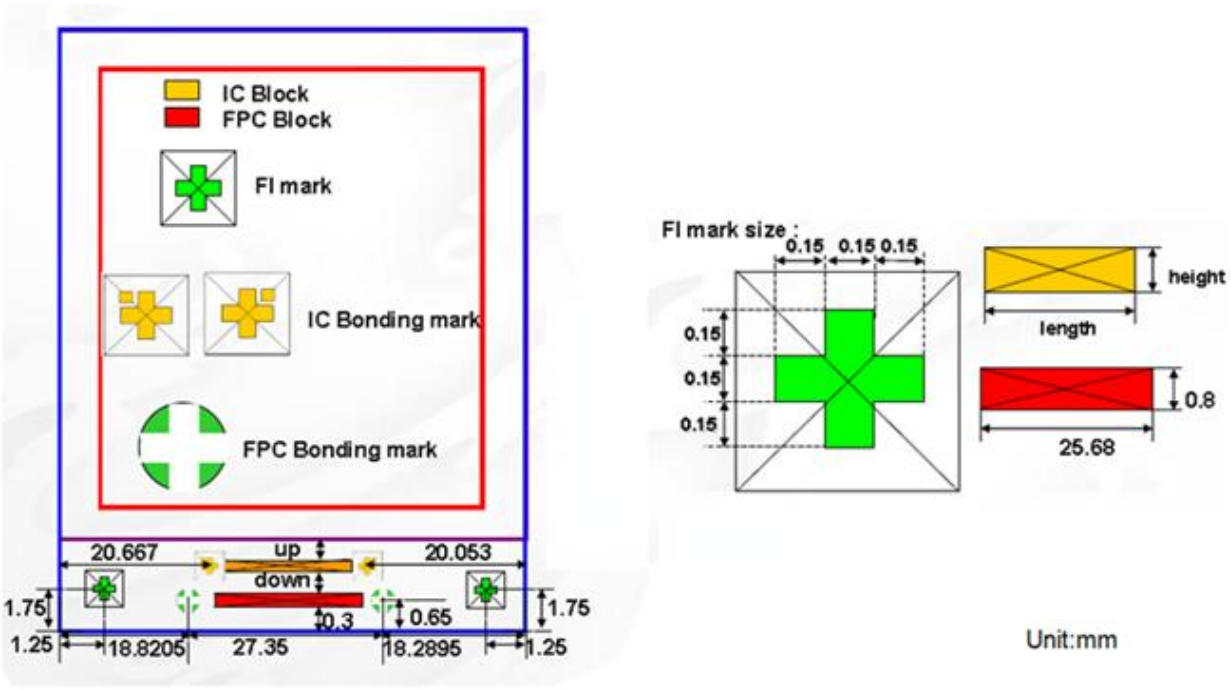
6.1 Outline Size of Single Chip



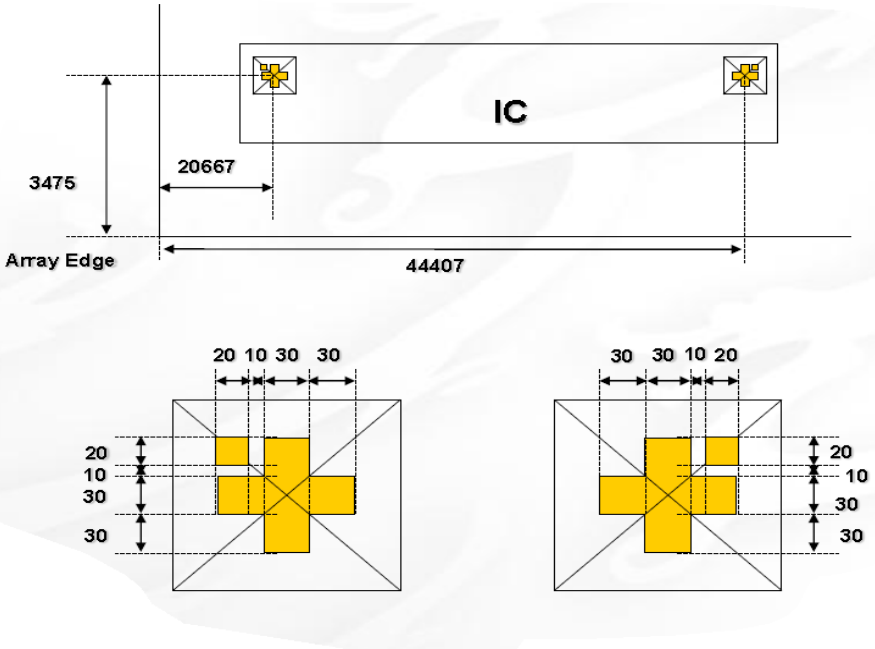
Unit: mm

Figure 9 Outline Size of Single Chip

6.2 IC / FPC Position Size On Cell

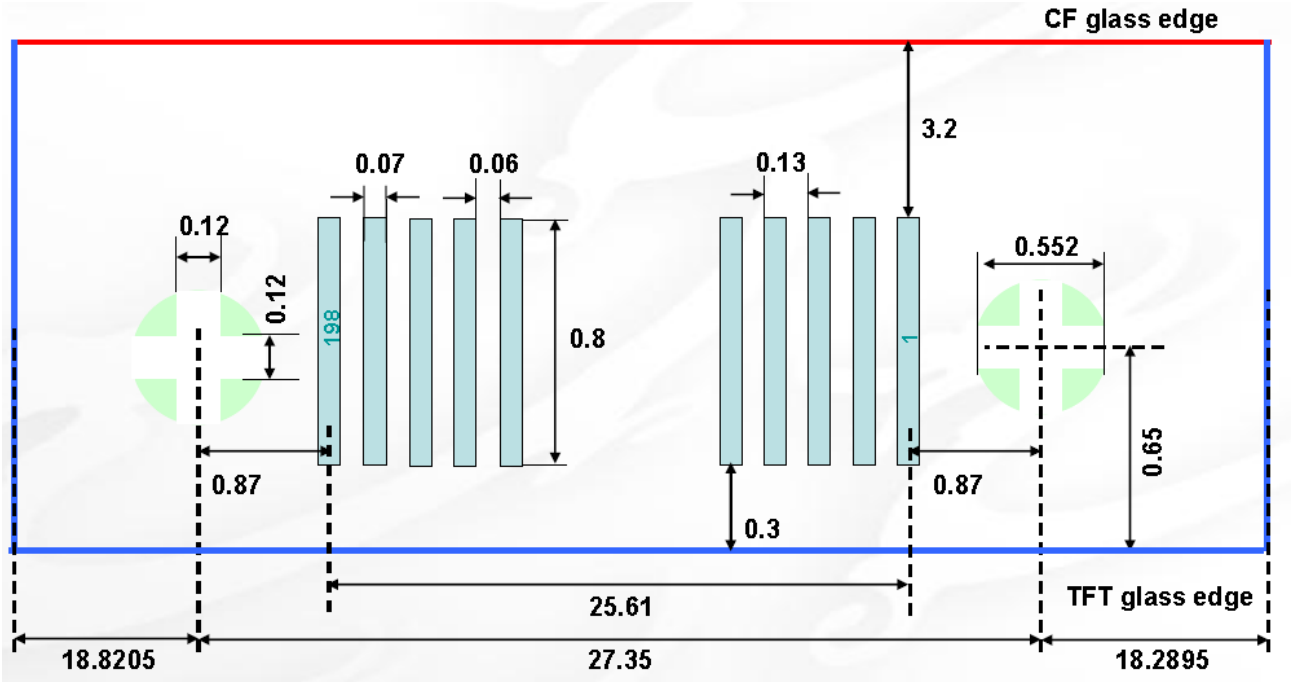


IC Name	Up(um)	Down(um)	Left(um)	Right(um)	Height(um)	Length(um)
Himax8379C	730	1670	20537	19923	800	24000
OTM8019A	715	1650	20537	19923	835	24000
ILI9806E	730	1670	20537	19923	800	24000



Unit:um

Figure 10 IC Position Information



Unit: mm

Figure 11 FPC Position Information

6.3 Cell Thickness

Figure 12 Cell Thickness

6.4 The Distance Between silver paste and Bonding area

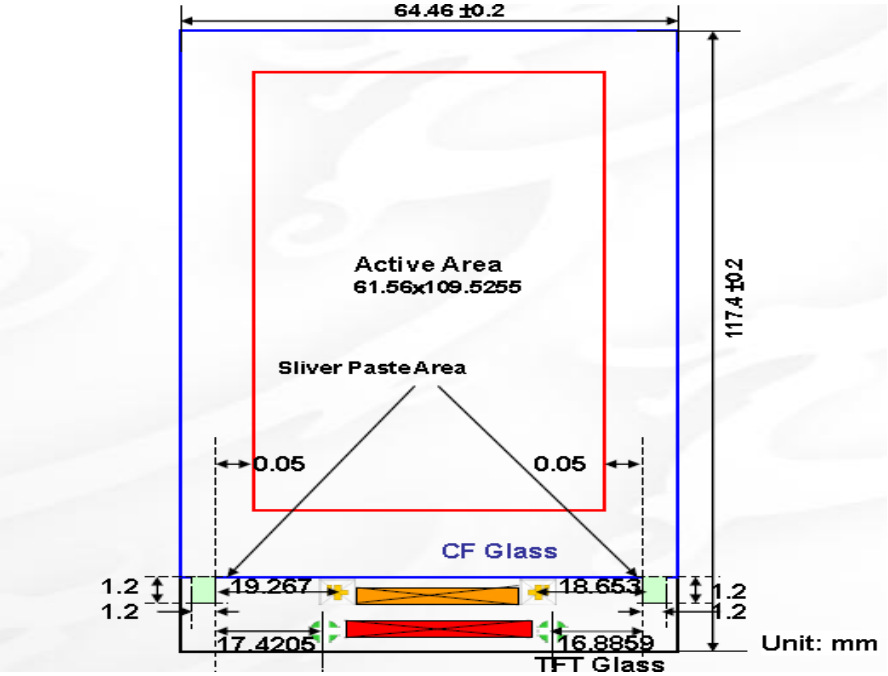
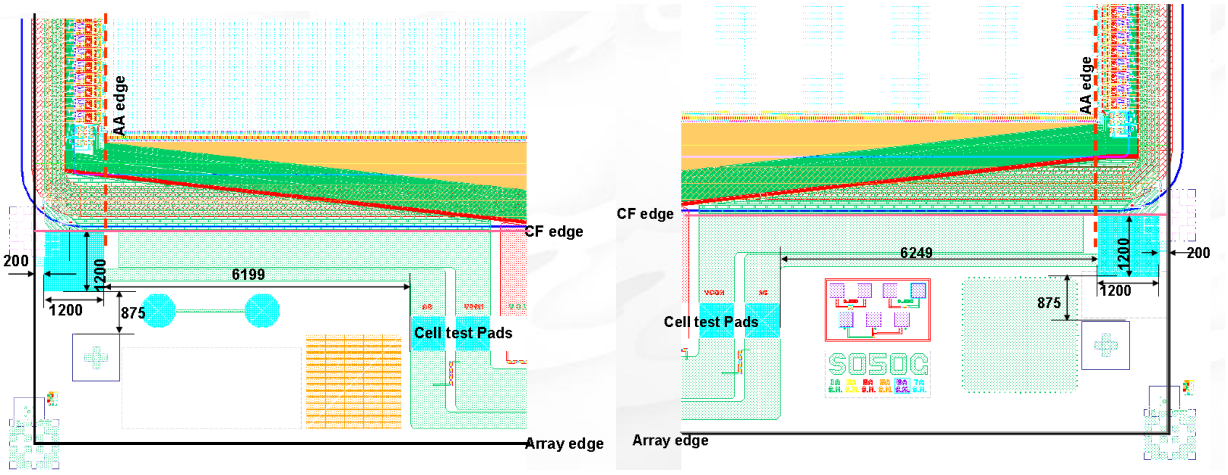


Figure 13 The Distance Between silver paste and Bonding area

6.5 The Silver Paste To The Pad Or Bonding Mark



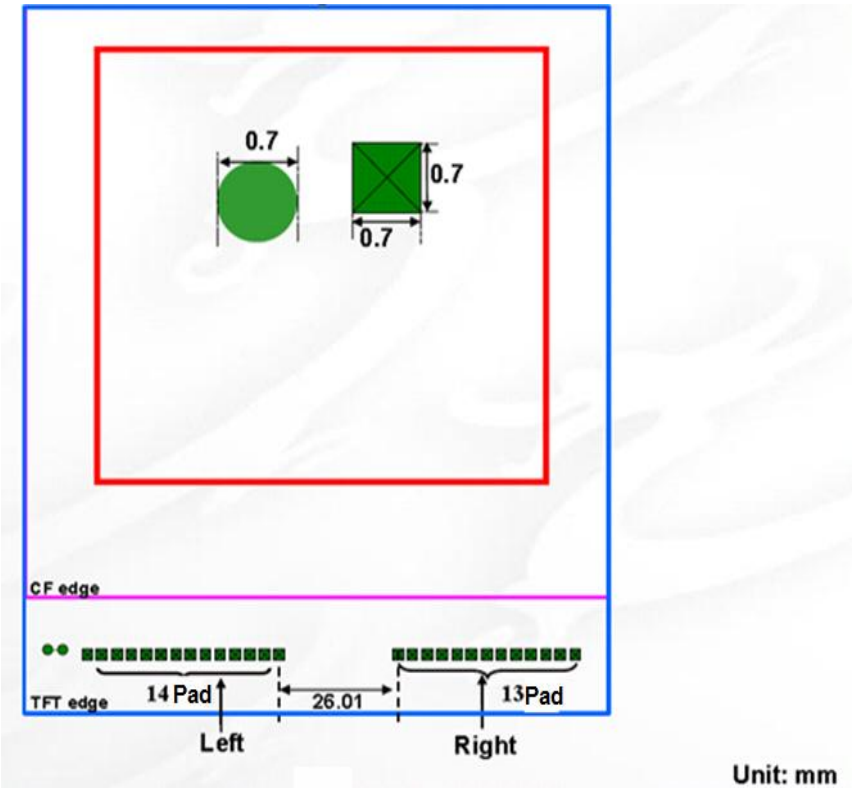
Left **Right**

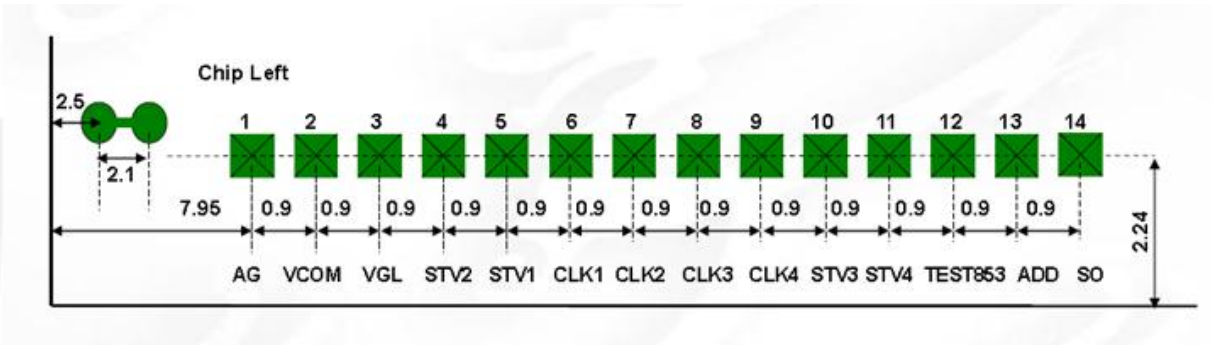
Unit: um

Figure 14 The Silver Paste To The Pad Or Bonding Mark

7 Cell Light-On Information

7.1 Cell Light-On Test Pad Drawing





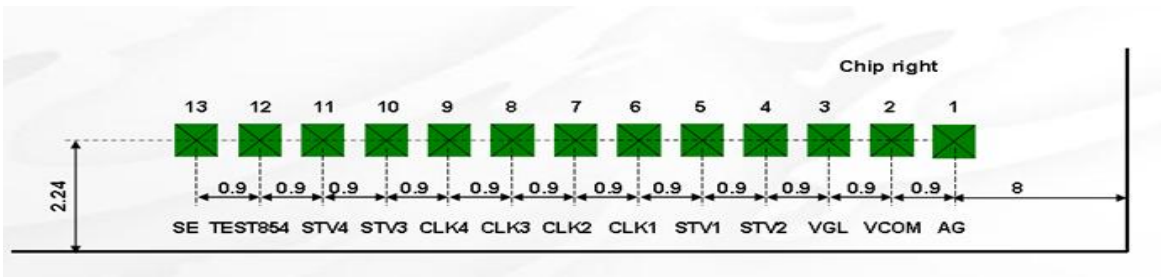
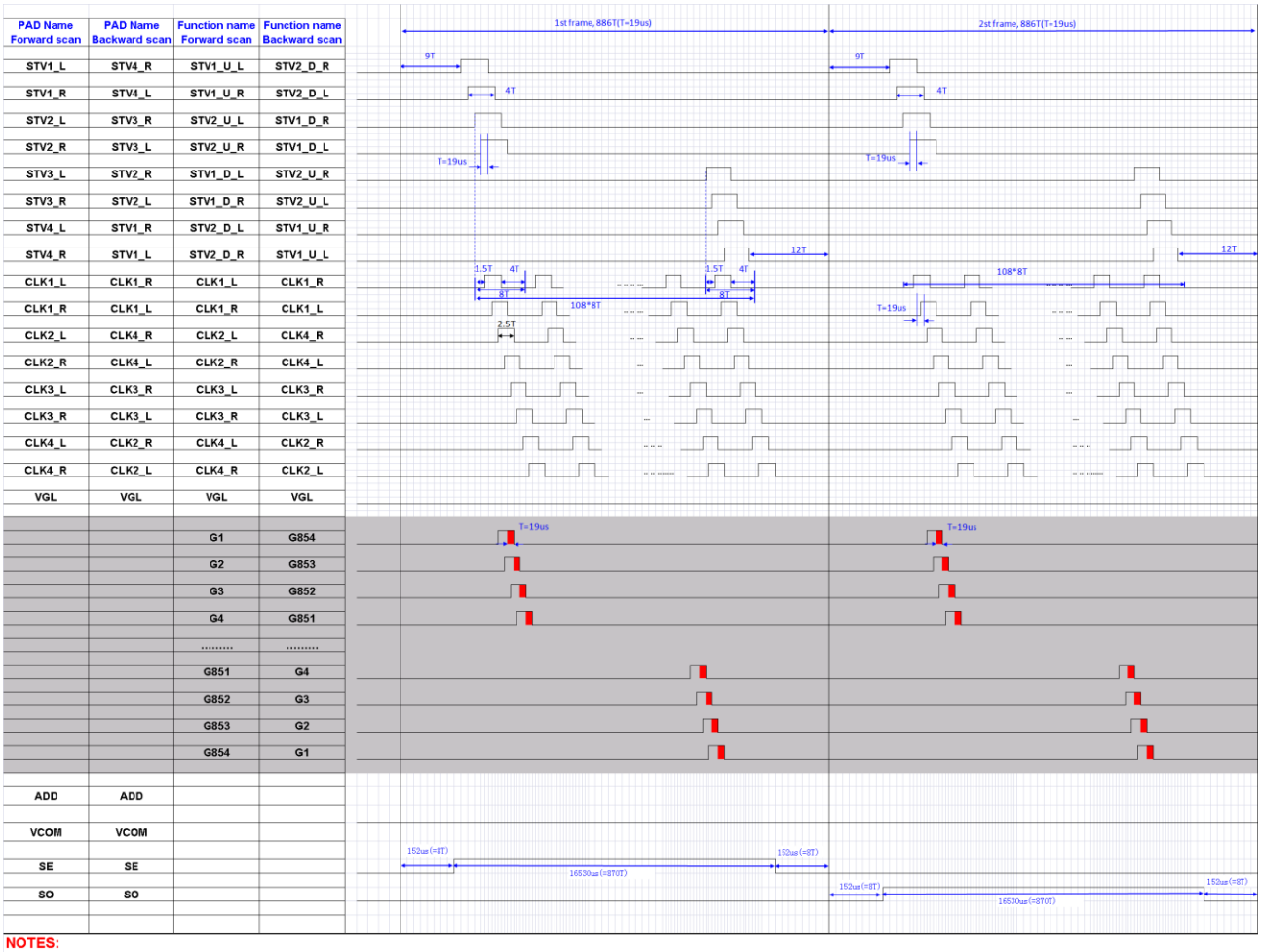


Figure 15 Cell Light-On Test Pad Drawing

Unit:mm

7.2 Cell Light-On Test Waveform



NOTES:
(1) For Cell Test, Need to check GIA forward and backward scan function.
(2)VCOM=-0.3V, VDH=5V,VDL=-5V，Vadd=20V;
(3) GIA control signal : VGH=15V,VGL=-10V;

Figure 16 Cell Light-On Test Waveform

Table 5 Voltage For Cell Test

Item	Black	25%Gray	50%Gray	White
VGH(V)	15V			
VGL(V)	-10V			
VCOM(V)	-0.3V			
ADD(V)	20V			
SE_VDH(V)	0.2V	1.63V	2.1V	5V
SE_VDL(V)	-0.2V	-1.63V	-2.1V	-5V
SO_VDH(V)	0.2V	1.63V	2.1V	5V
SO_VDL(V)	-0.2V	-1.63V	-2.1V	-5V

7.3 FPC Pin Assignment

No.	Pin name	No.	Pin name	No.	Pin name	No.	Pin name	No.	Pin name
1	DUMMY	41	IM3	81	D5	121	VDDAM	161	VDDB
2	NULL	42	IM2	82	D4	122	VDDR	162	VDDB
3	GND	43	IM1	83	D3	123	T_DUMMY	163	VCL
4	GND	44	IM0	84	D2	124	T_DUMMY	164	VCL
5	DUMMY	45	GPO3	85	D1	125	VSSR	165	AVSS
6	DUMMY	46	GPO2	86	D0	126	VREFCP	166	VSSB
7	GND	47	GPO1	87	DE	127	VRGH	167	C31P
8	DUMMY	48	GPO0	88	PCLK	128	EXTP	168	C31N
9	VCOM	49	EXB1T	89	HS	129	CSP	169	C32P
10	MTP	50	TE_L	90	VS	130	EXTN	170	C32N
11	VGLX	51	TE_L	91	LEDPWM	131	CSN	171	C32N
12	VGLO	52	VSEL	92	LEDPWM	132	VDDB	172	DVDD
13	VGL_REG	53	SDO	93	LEDON	133	VSSB	173	DVSS
14	VRGH	54	SDI	94	ERR	134	C11P	174	C41P
15	VCL	55	DCX	95	VDDI	135	C11N	175	C41P
16	VREF	56	SCL	96	VSSI	136	C11N	176	C41N
17	VSSA	57	RDX	97	AVDD	137	C12P	177	C41N
18	VDDA	58	CSX	98	AVDD	138	C12N	178	VGH
19	VDDR	59	RESX	99	AVSS	139	C13P	179	VGHO
20	VSSR	60	RESX	100	AVEE	140	C13N	180	VRGH
21	VDD_DET	61	VSSI	101	AVEE	141	C14P	181	C51P
22	EXB2T	62	VDDI	102	VDDA	142	C14P	182	C51P
23	VGSN	63	D23	103	DVSS	143	C14N	183	C51P
24	VGSP	64	D22	104	DVDD	144	C14N	184	C51N
25	VGMN	65	D21	105	VSSAM	145	AVDD	185	C51N
26	VGMP	66	D20	106	HSSI_D1_P	146	AVDD	186	VGL_REG
27	DVSS	67	D19	107	HSSI_D1_N	147	AVSS	187	VGLO
28	DVDD	68	D18	108	VSSAM	148	AVEE	188	VGL
29	DVDD	69	D17	109	HSSI_CLK_P	149	C21P	189	VCOM
30	VDDB	70	D16	110	HSSI_CLK_N	150	C21N	190	VCOM
31	VDDB	71	D15	111	VSSAM	151	C22P	191	GND
32	VCL	72	D14	112	VSSAM	152	C22N	192	GND
33	AVSS	73	D13	113	HSSI_D0_P	153	C23P	193	DUMMY
34	LANSEL	74	D12	114	HSSI_D0_P	154	C23P	194	DUMMY
35	DSWAP	75	D11	115	HSSI_D0_N	155	C23N	195	GND
36	PSWAP	76	D10	116	HSSI_D0_N	156	C23N	196	GND
37	DSTB_SEL	77	D9	117	VSSAM	157	C24P	197	NULL
38	NBWSEL	78	D8	118	VSSAM	158	C24P	198	DUMMY
39	RGBBP	79	D7	119	MVDDL	159	C24N		
40	I2C_SA0	80	D6	120	MVDDA	160	C24N		

Figure 17 FPC Pin Assignment

8 Reliability Condition

Table 6 Reliability Condition

NO	Item	Condition
1	High temperature Storage	T_a=80℃,240hours
2	Low temperature Storage	T_a=-30℃,240hours
3	High temperature Operate	T_{gs}=70℃,240hours
4	Low temperature Operate	T_a=-20℃,240hours
5	High temperature/High humidity Operate	T_{gs}=60℃, 90%RH,240hours

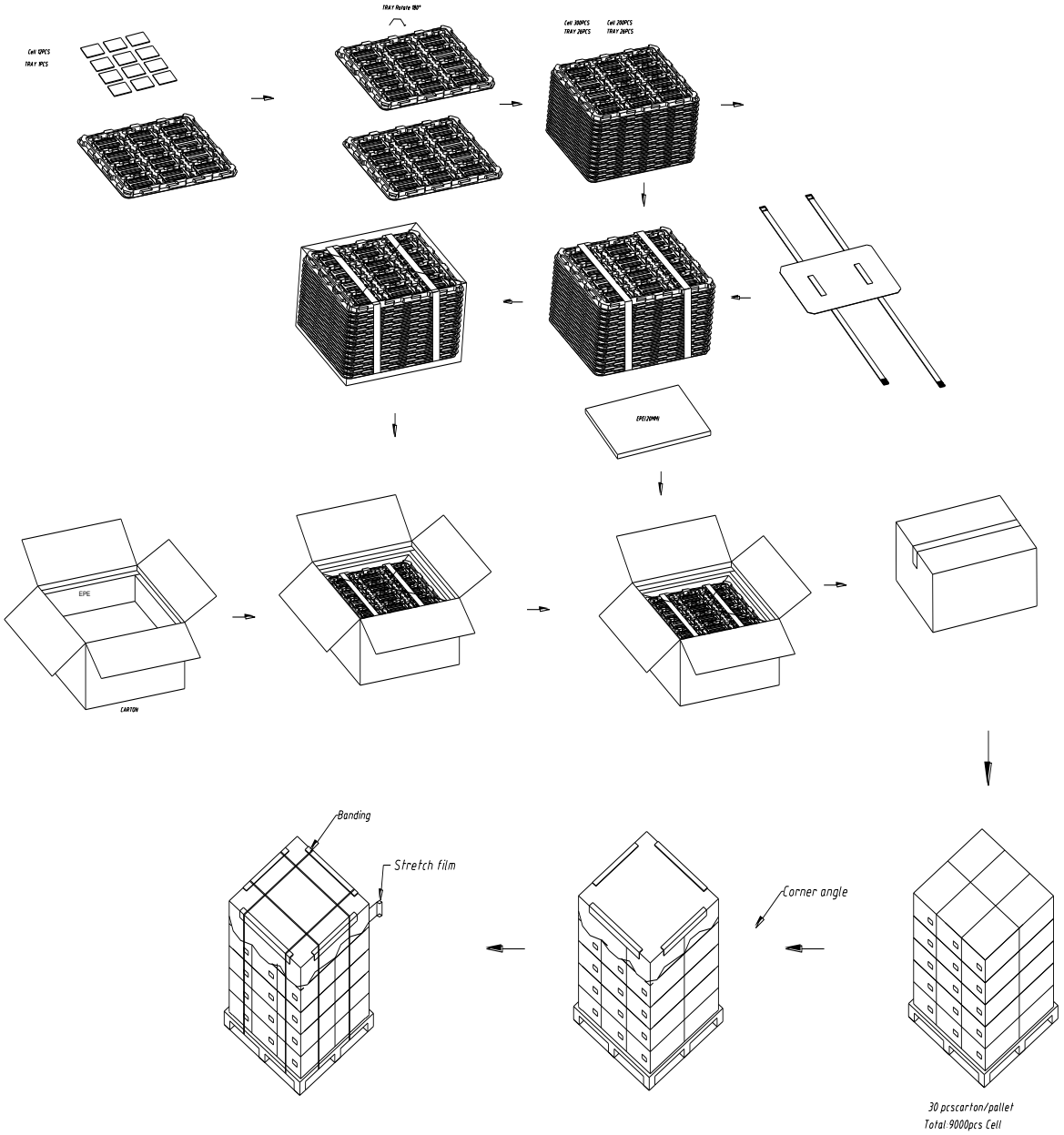
Note (1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the IVO document before reliable test. Only check the function of the panel after reliability test.

Note (2) The setting of electrical parameters should follow the initial code specified by IVO before reliability test. Besides, in OTP mode, V_{com} must be adjusted to optimize display quality. The backlight should be 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 Cell 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 TFT-LCD panel 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 TFT-LCD 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 Disposal

When disposing LCD panel, obey the local environmental regulations.