Chunghwa Picture Tubes, Ltd.
Product Specification

TFT LCD

CLAF050WH41 TXX

APPROVED BY	CHECKED BY	PREPARED BY

Prepared by :

Product Planning Management Division

Mobile TFT Product Business Unit

CHUNGHWA PICTURE TUBES, LTD.

1127 Hopin Rd., Padeh, Taoyuan, Taiwan 334, R.O.C.
TEL: +886-3-3675151 FAX: +886-3-377--3858

Doc.No:	SPEC_CLAF050WH41_CPT_150121	Issue Date	20150121

REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)	--	2015.01.21

CONTENTS

1. OVERVIEW

CPT CLAF050WH41 TXX s a cell product after LC ODF. This is a 16:9 aspect ratio panel for the mobile application.

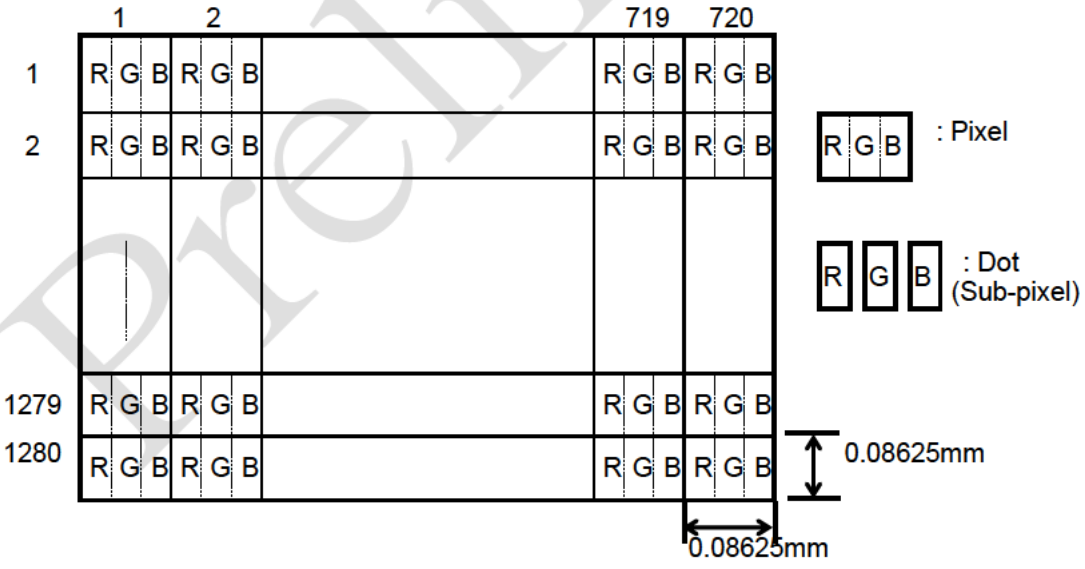
The 5” screen produces a high resolution image that is composed of 1,152,000 pixel elements in a stripe arrangement.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Panel Size	4.99 inch
Display Area (mm)	62.1(H)x110.4(V)
CF glass dimension	64.5×114.235 x 0.20 (Thickness)
TFT glass dimension	64.5×117.435 (H) x 0.20 (Thickness)
Number of Pixels	720(RGB)x1280
Pixel Pitch (mm)	86.25um X86.25um
Color Pixel Arrangement	RGB Stripe
NTSC 1931	70% (CF)
Display Mode	FFS
Driving Method	TFT active matrix
Viewing Angle	85/85/85/85 typ@ CR>10
Suggesting IC	OTM1284A -C16

Note:The FPC circuit design is possibly different according to the individual suggesting IC internal circuit definition and application. Please refer to the IC datasheet respectively.

LCD Cell Drawing
(Note 1)



The LCD Products listed on this document are not suitable for use of aerospace equipment, submarine cables, nuclear reactor control system and life support systems. If customers intend to use these LCD products for above application or not listed in "Standard" as follows, please contact our sales people in advance.

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Remark
Enviromental Phase					
Operating Ambient Temperature	T_{OP}	-20	+70	˚C	
Operating Ambient Humidity	H_{OP}	10	90	% (RH)	
Storage Temperature	T_{STG}	-30	+80	˚C	
Storage Humidity	H_{STG}	10	90	% (RH)	
Electrical Phase					
TFT Gate High Voltage	*VGH*	15	18	V	
TFT Gate Low Voltage	*VGL*	-12	-9	V	
TFT Common Electrode Voltage	*VCOM DC*	-3.5	0	V	NOTE3
TFT Feed-Through Voltage	*ΔVp*	0.6	1.2	V	

Note 1. The absolute maximum ratings are the values that must not be exceeded at any time for this product. It is not allowed for any of these ratings to be exceeded. Should a product be used with any of the absolute maximum ratings exceeded, the characteristics of the product may not be recovered, or in an extreme case, the product may be permanently destroyed.

Therefore, when desigining a system incorporating the product, make sure that adequate attentions be paid to the variations in the supply voltages, the characteristics of parts that are connected, surges in the input and output lines, and the ambient temperatures.

Note 2. This specification applys after the driver IC mounting and the FPC mounting. (This specification isn't applicable at time of driver IC un-mounting and FPC un-mounting.)

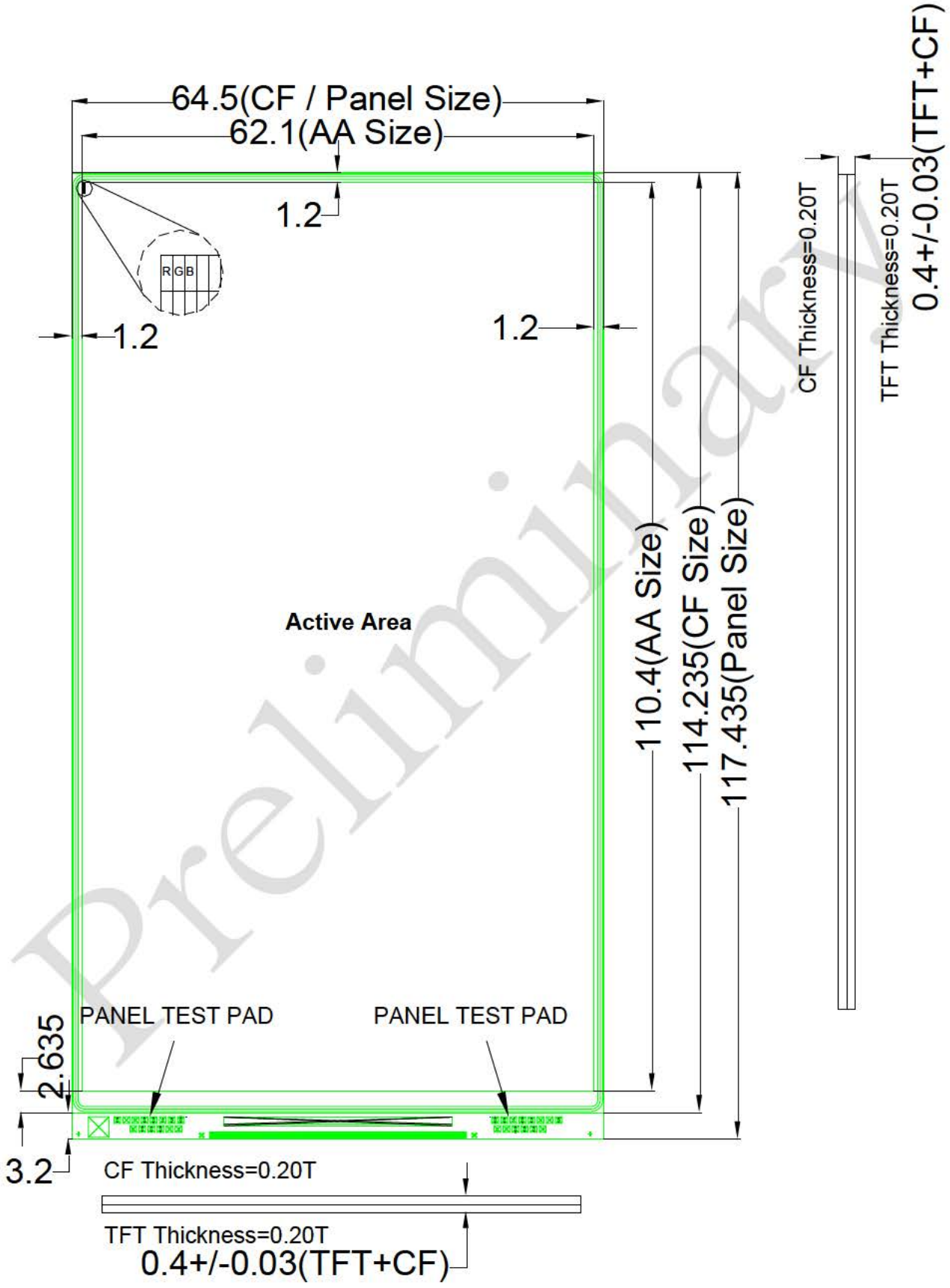
LCD should keep the condition that dew dosen't storage in case of driver IC un-mounting and FPC un-mounting. Dew may break the LCD. Especially part is very weak for dew.

Note 3. Vcom must be adjusted to optimize display quality, as Crosstalk and Contrast Ratio etc.,

3. MECHANICAL SPECIFICATIONS

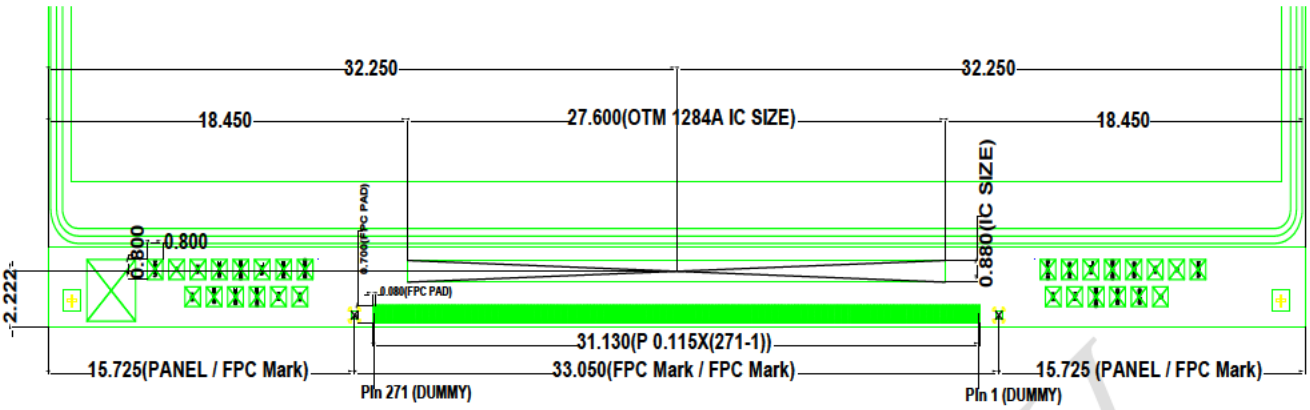
3.1 Outline Dimension

(unit: mm)



3.2.1 IC & FPC Pad

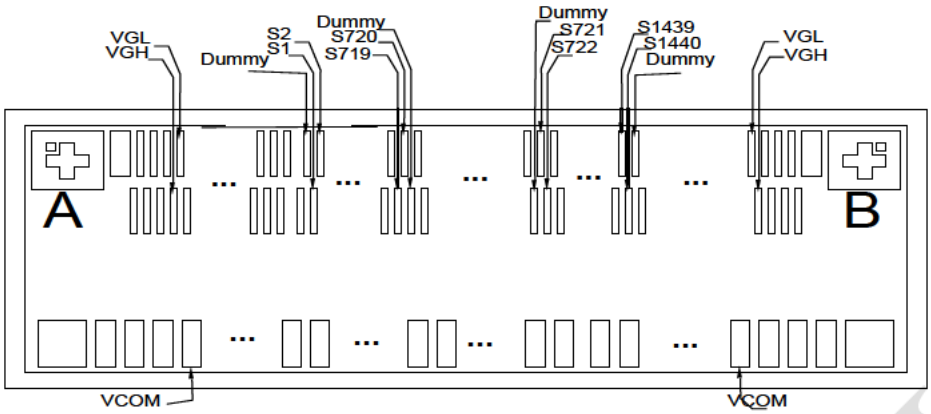
(unit = mm)



Note. Color Filter is in the upper side , TFT is in the bottom side

3.2.2 COG Design (DOM)

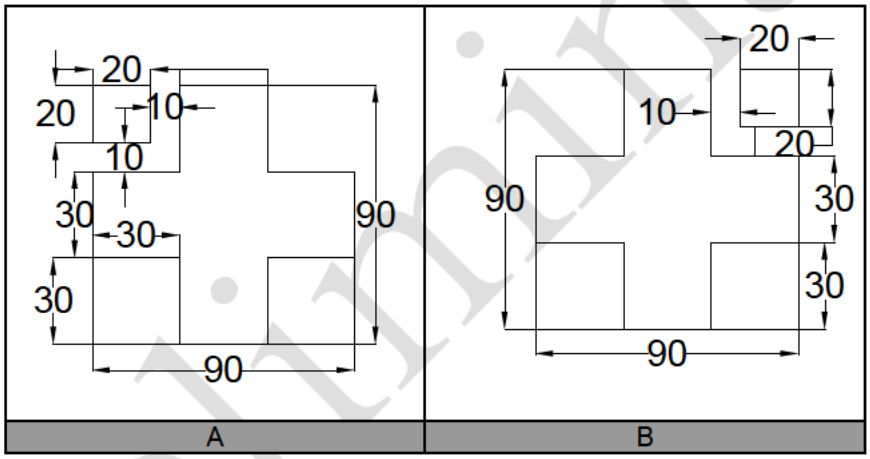
- IC：



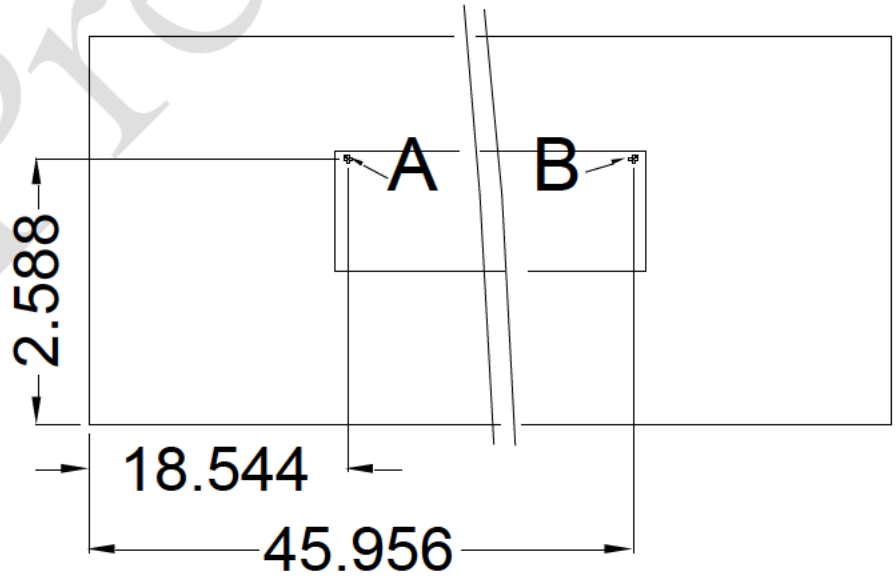
1. Chip Size

IC	Chip Size
OTM1284	27.6mm x 0.88mm

2. Alignment Mark Size & Position ：

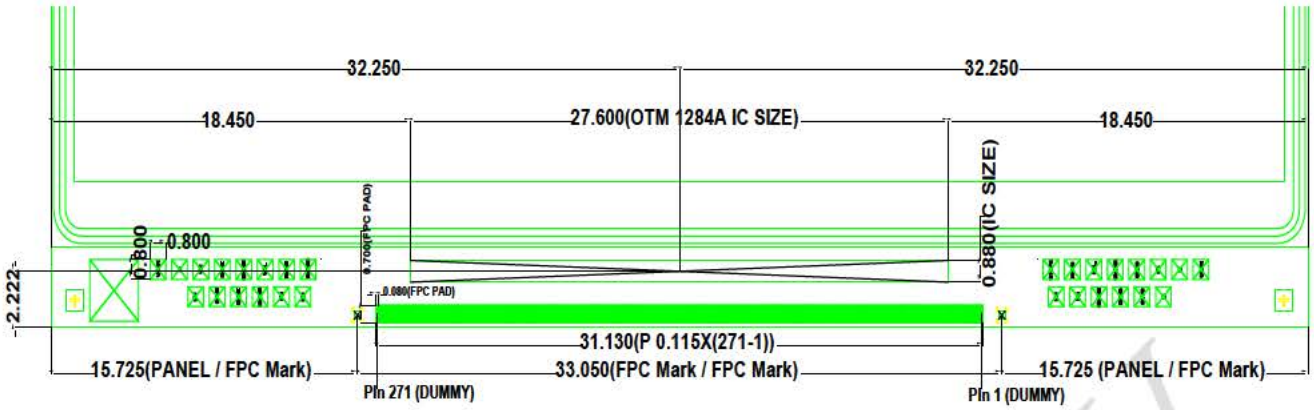


Unit： mm

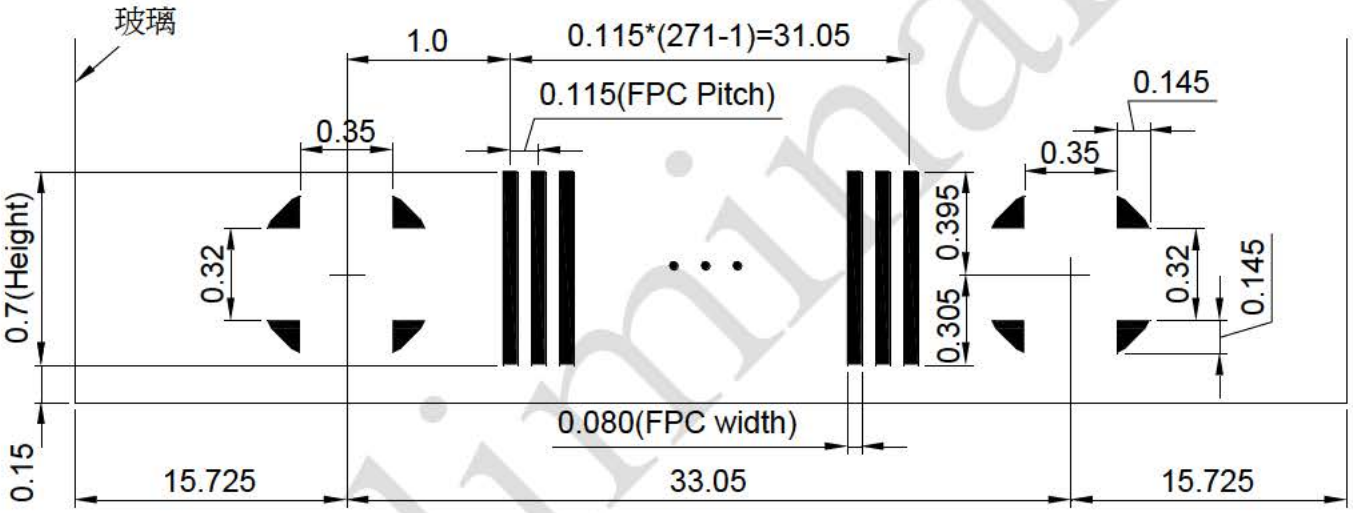


3.2.3 FPC Pad

(unit = mm)



Detail FPC：



3.2.4 FPC Pin Assignment

FPC Pin Assignment (OTM1284A-C16)

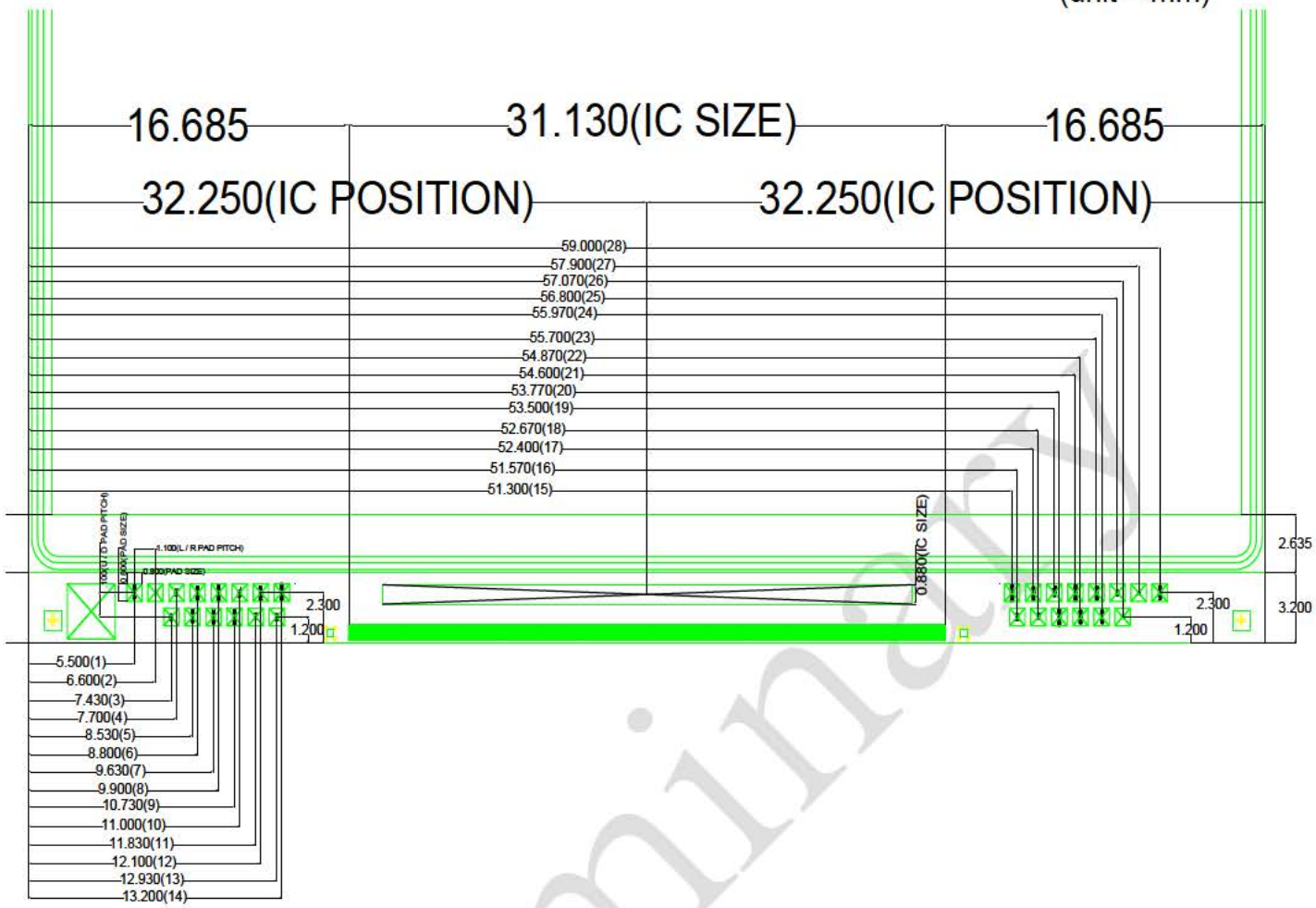
Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol
1	DUMMY	71	VCC	141	VSS	211	C21N
2	DUMMY	72	VCC	142	IM0	212	C21N
3	GND	73	VCC	143	VDDI	213	C22P
4	GND	74	VDD_18	144	IM1	214	C22P
5	VCOM	75	VDD_18	145	VSS	215	C22N
6	VCOM	76	VDD_18	146	RS0	216	C22N
7	DUMMY	77	VDD_18	147	VDDI	217	VGH
8	DUMMY	78	VDD_18	148	RS1	218	VGH
9	DUMMY	79	VDD_18	149	VSS	219	VCI
10	DUMMY	80	VDD_18	150	LANSEL	220	VCI
11	DUMMY	81	VDD_18	151	VDDI	221	DUMMY
12	DUMMY	82	VSS	152	BOOSTM0	222	VSS
13	DUMMY	83	VSS	153	VSS	223	VSS
14	DUMMY	84	VSS	154	BOOSTM1	224	VSS
15	DUMMY	85	VSS	155	VCC	225	C23P
16	DUMMY	86	TOUT0	156	VCC	226	C23P
17	DUMMY	87	VDDA	157	VCC	227	C23N
18	DUMMY	88	VDDA	158	VCC	228	C23N
19	DUMMY	89	VDDA	159	VDD_18V	229	C24P
20	DUMMY	90	VDDA	160	VDD_18V	230	C24P
21	DUMMY	91	VDDA	161	VDD_18V	231	DUMMY
22	VCOM	92	VDDA	162	VDD_18V	232	C24N
23	VSSA	93	VDDA	163	VSS	233	C24N
24	VSSA	94	VSS	164	VSS	234	C24N
25	VSSA	95	VSS	165	VSS	235	C24N
26	VSSA	96	VSS	166	VSS	236	VGL
27	LVDSVSS	97	VSS	167	EXTN	237	VGL
28	LVDSVSS	98	VSS	168	EXTN	238	VGL
29	D0N	99	VSS	169	EXTN	239	VGL
30	D0N	100	C51P	170	EXTP	240	DUMMY
31	D0P	101	DUMMY	171	EXTP	241	DUMMY
32	D0P	102	C51P	172	EXTP	242	DUMMY
33	LVDSVSS	103	C51P	173	MTP_PWR	243	DUMMY
34	LVDSVSS	104	C51N	174	MTP_PWR	244	DUMMY
35	D1N	105	C51N	175	VCI	245	DUMMY
36	D1N	106	C51N	176	VCI	246	VCOMR
37	D1P	107	VSS	177	DUMMY	247	VCOMR
38	D1P	108	C52P	178	DUMMY	248	DUMMYR1
39	LVDSVSS	109	C52P	179	VSSA	249	VCOM
40	LVDSVSS	110	C52P	180	VSSA	250	DUMMY
41	CLKN	111	C52N	181	DUMMY	251	DUMMY
42	CLKN	112	C52N	182	VSSA	252	DUMMY

43	CLKP	113	C52N	183	VSSA	253	DUMMY
44	CLKP	114	NVDDA	184	DUMMY	254	DUMMY
45	LVDSVSS	115	NVDDA	185	GVDD	255	DUMMY
46	LVDSVSS	116	VSS	186	NGVDD	256	DUMMY
47	D2N	117	D7	187	VREF	257	DUMMY
48	D2N	118	D6	188	VSS	258	DUMMY
49	D2P	119	D5	189	VSS	259	DUMMY
50	D2P	120	D4	190	VCI	260	DUMMY
51	LVDSVSS	121	D3	191	VCI	261	DUMMY
52	LVDSVSS	122	D2	192	VCL	262	DUMMY
53	LVDSVSS	123	D1	193	C41P	263	DUMMY
54	D3N	124	D0	194	C41P	264	DUMMY
55	D3N	125	HS	195	C41N	265	VGL
56	D3P	126	VS	196	C41N	266	VCOM
57	D3P	127	GOUT_SEL	197	C42P	267	VCOM
58	LVDSVSS	128	PCLK	198	C42P	268	GND
59	LVDSVSS	129	DCX	199	C42N	269	GND
60	LVDSVSS	130	CSX	200	C42N	270	DUMMY
61	LVDSVSS	131	SCL	201	C42N	271	DUMMY
62	LVDSVDD	132	SDI	202	C42N		
63	LVDSVDD	133	SDO	203	CSP		
64	LVDSVDD	134	LEDPWM	204	VSP		
65	LVDSVDD	135	TE	205	VSP		
66	VDDAM	136	TE1	206	DUMMY		
67	VDDAM	137	RESX	207	VSN		
68	VDDAM	138	TEST2	208	CSN		
69	VDDAM	139	TEST1	209	C21P		
70	VCC	140	TEST0	210	C21P		

Note : DUMMY don’t connect

3.3.1 Panel Check Pad in Panel

(unit = mm)

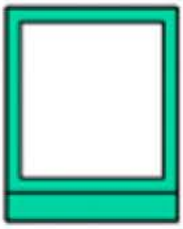


Panel Check Pad				
Pad Size	*800 μm x 800 μm*			
Pad Pitch	*1100 μm*			
Pad Name	*01*	VCOM	15	G1279
	02	R	16	BW
	03	SW	17	RSTO
	04	G2	18	FW
	05	STVE	19	VGL
	06	CK1E	20	CK2BO
	07	CK2E	21	CK1BO
	08	CK1BE	22	CK2O
	09	CK2BE	23	CK1O
	10	VGL	24	STVO
	11	FW	25	G1
	12	RSTE	26	B
	13	BW	27	G
	14	G1280	*28*	VCOM

3.3.2 CELL Test Light Wavefrmo

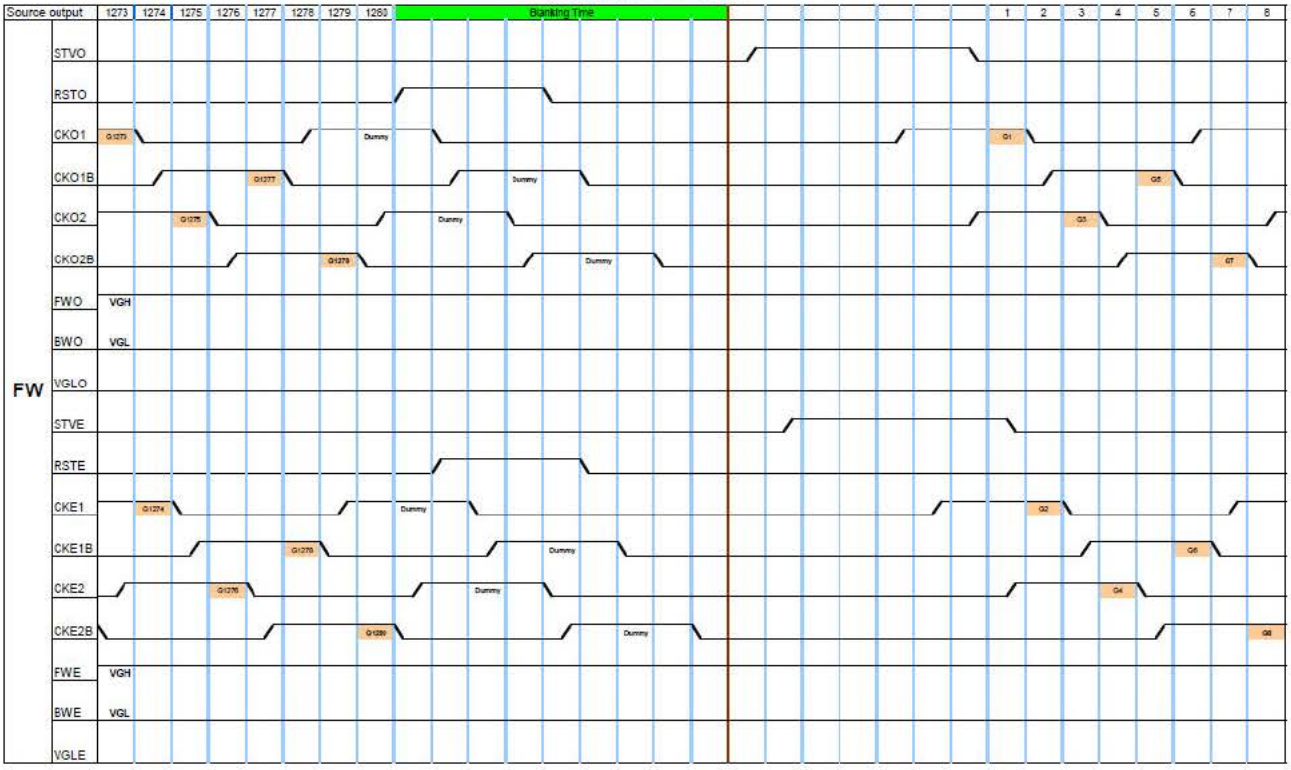
Frame	D_GB	D_RG	D_BR	SW	Vcom
White (W)	L	L	L	H	DC/GND
Black (BK)	H	H	H	H	DC/GND
Gray (GY)	Gray	Gray	Gray	H	DC/GND
Zebra Stripe (Z)	H	H	H	H	DC/GND

Display Mode：FFS, Normally White
Every Frame stay > 2sec.
Ex. LC = 5V, Vcom = 0V
Data H = ±5V, Data L = 0V, Data Gray = ±2.5V
SW_H = 10V above (on duty), SW_L = -6V (not on duty)
VGL, CK1~CK8, STV1, STV2, RST1, RST2...etc, please follow the timing char below.



3.3.3 GIP Timing Chart

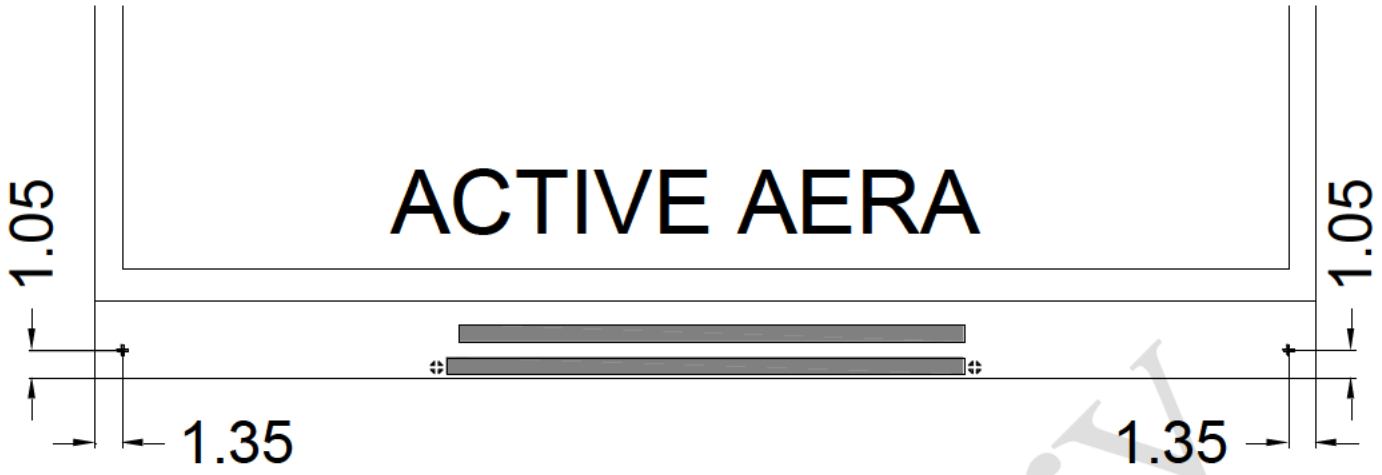
< Forward scan >



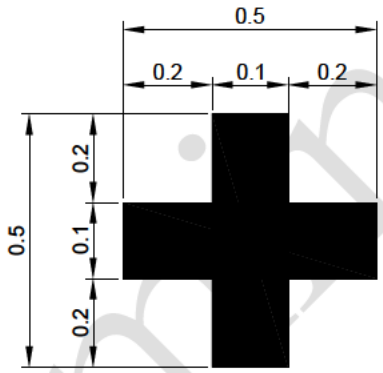
< Backward scan >

3.4 Cross Mark

(unit = mm)



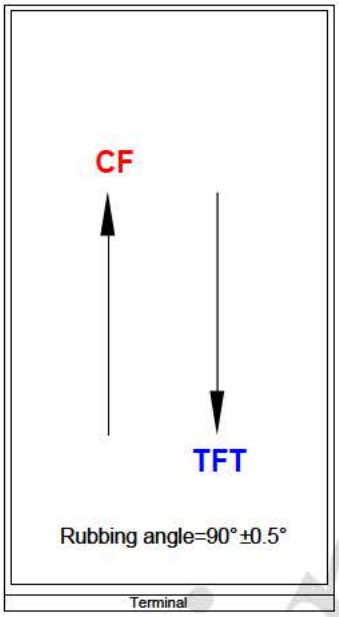
Detail Cross Mark:



4. CELL PROCESS RULES

Item	Specification
Cell gap	3.6±0.2um
Assembly precision	±3.5um

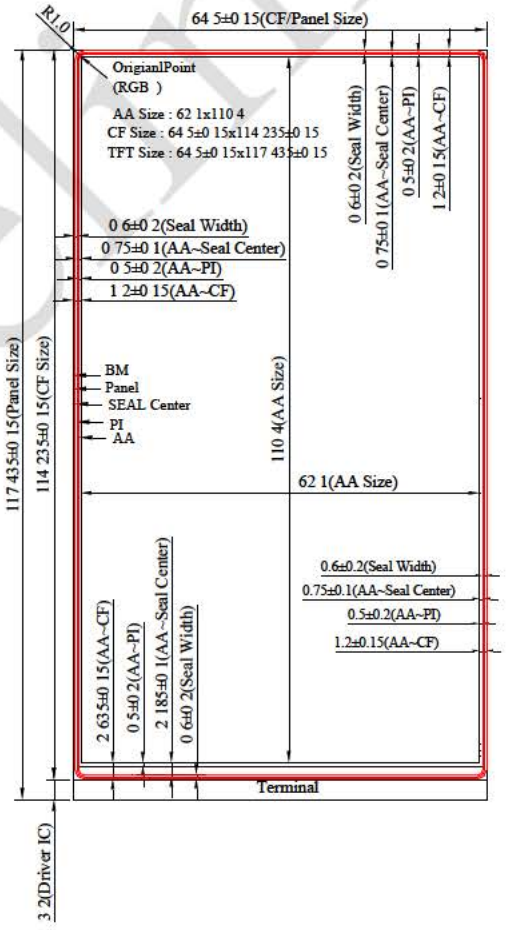
4.1 Rubbing Direction



View From CF Glass Side

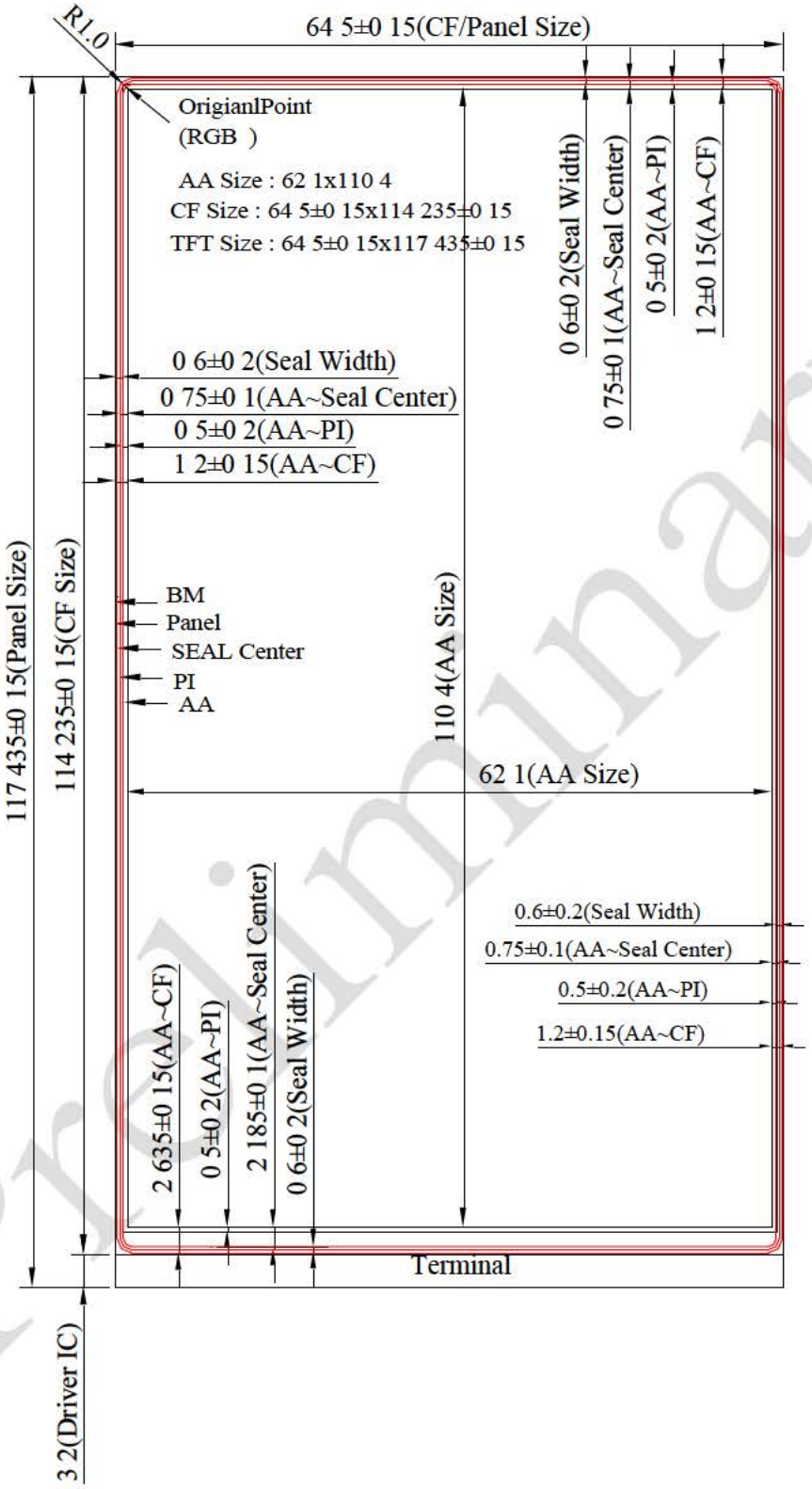
4.2 PI Pattern

(unit = mm)



4.3 Seal Pattern

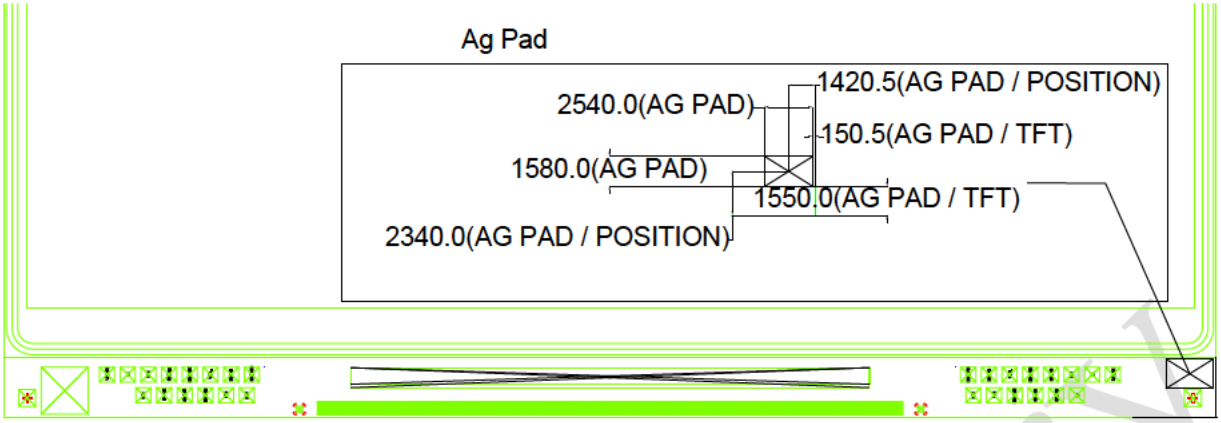
(unit = mm)
(unit = mm)



Notes:
1.Seal width (Typ.) = 0.6±0.2 mm
2.With ODF process，Seal junction length = 15 mm (max.) and width = (0.6+0.4) mm
3. Seal Center to CF Edge = 0.45±0.2mm

4.4 Ag Pad Size & Position

(unit = um)

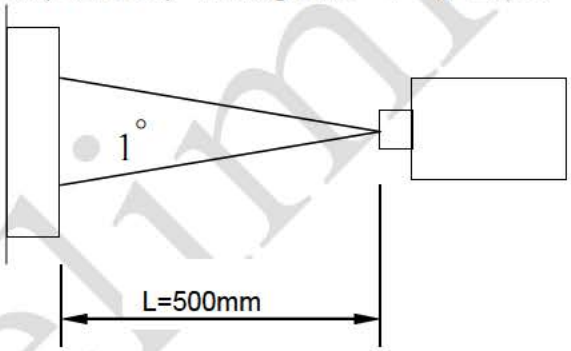


5. OPTICAL SPECIFICATION

(Taransmittance, contrast ratio, response time, viewing angle results are using CPT LC(Vlc=5V) + CPT Polarizer + Corresponding Backlight, reference only)
Ambient condition：25 ± 2°C，60 ± 10% RH，under 10 Lunx in the darkroom

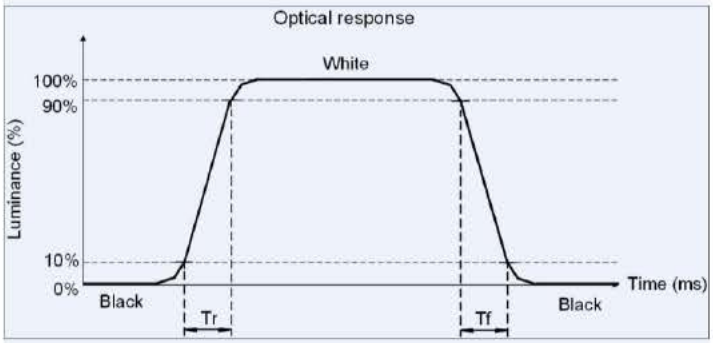
ITEM		SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Transmittance (With Polarizer)	HC/APCF	T_{PL}		$\theta = \phi = 0°$	4.0	4.6	--	%	Note 1
Contrast Ratio		CR			600	800	---		Note 2
Response Time		Tr+Tf		$\theta = \phi = 0°$	---	30	40	ms	Note 3
Viewing angle	Vertical	U	--	CR≧10	75	85	--	degree	Note 4
		D	--		75	85	--	degree	
	Horizontal	L	--		75	85	--	degree	
		R	--		75	85	--	degree	
Color Filter Chromacicity	W	x		$\theta = \phi = 0°$	0.275	0.295	0.315		Note 5
		y			0.303	0.323	0.343		
	R	x			0.640	0.660	0.680		
		y			0.303	0.323	0.343		
	G	x			0.238	0.258	0.278		
		y			0.570	0.590	0.610		
	B	x			0.117	0.137	0.157		
		y			0.069	0.089	0.109		
	NTSC				65%	70%	--	%	

Note 1. Measure device：BM-5A (TOPCON)，viewing cone = 1°，I_L= 20mA。



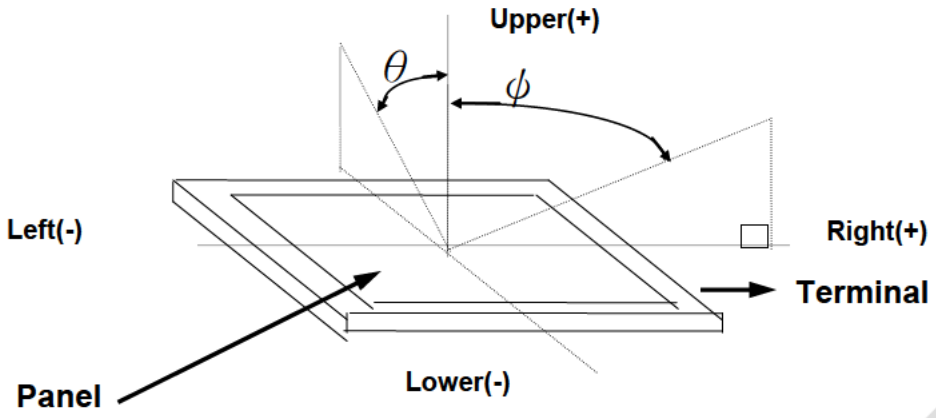
Note 2. Definition of Contrast Ratio：
CR = White Luminance (ON) / Black Luminance (OFF)

Note 3. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively.

Note 4. Definition of view angle(θ，ϕ)：



Note 5. Light source: C light.

6. reliability test item

N0.	TEST ITEM	CONDITIONS
1	High Temperature and High Humidity Operation	60℃, 90%RH, 240Hrs
2	High temperature operation	70℃, 240Hrs
3	Low temperature operation	-20℃, 240Hrs
4	High temperature storage	80℃, 240Hrs
5	Low temperature storage	-30℃, 240Hrs
6	Image Sticking	25℃, 5×5 pattern, 5min → immediately(128 階)
7		25℃, 5×5 pattern, 1Hr → in 5min at the middle gray scale(128 階)

NOTE
1. All judgement of display are performed after temperature of panel return to room temperature.
2. Display function should be no change under normal operating condition.
3. Under no condensation of dew.
4. CPT only guarantee the above 7 test items, and without guarantee the others.