

Doc. Number:

- ☐ Tentative Specification
☐ Preliminary Specification
☒ Approval Specification

MODEL NO : F050A04-601

Customer:

APPROVED BY

SIGNATURE

Name / Title

Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By
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REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver. 0.0	2019/11/08	All	All	Product spec was first issued for LCD cut.
Ver. 1.0	2019/12/02	All	All	Version update.
Ver. 2.0	2020/02/27	All	All	Version update.
Ver. 2.1	2020/09/08	All	All	Version update

1. PURPOSE

The specification F050A04-601 is a 4.96" a-Si TFT Liquid Crystal Display ODF cell. The ODF cell has been designed by Innolux, and manufactured by Innolux under the agreement of customer. The a-Si TFT-LCD cell will be applied to a high transmittance operating in the normally white mode a-Si TFT-LCD product.

2. GENERAL RULES OF SINGLE PANEL

2.1 GENERAL SPECIFICATION

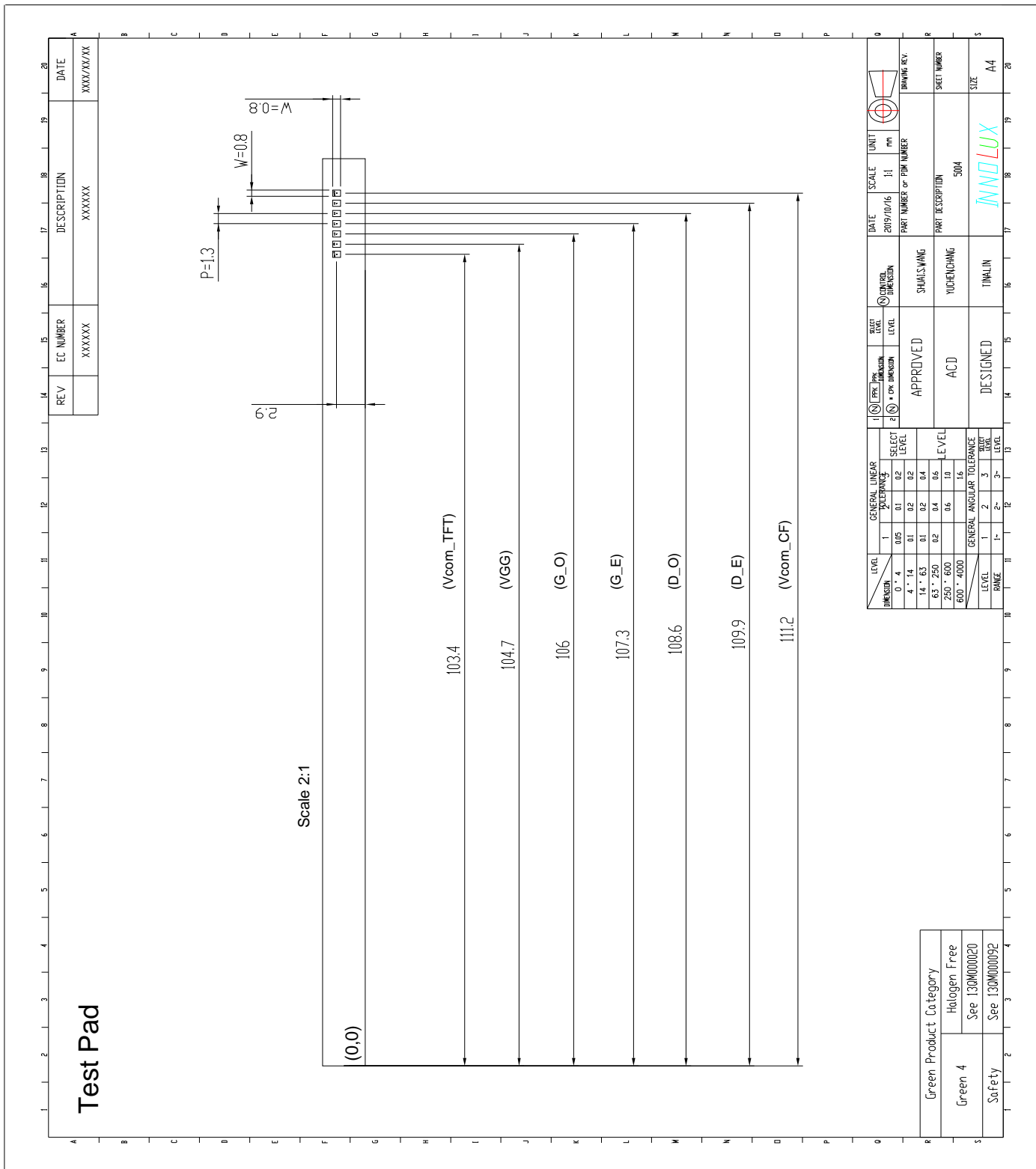
	Item		Specification	unit
1	Glass thickness	TFT	0.5	mm
		CF	0.5	
2	Shipping mode		Cut	-
3	Shipping size		453.72mm (H) x 358.8 (V) x 1.0 (D)	mm
4	Panel outline dimension		115.6 (H) x 74.38 (V) x 1.0(D)	mm
5	Active screen size		108.0(H) x 64.8(V)	mm
6	Resolution		800RGB x 480	pixel
7	Pixel driving element		a-Si TFT	-
8	Sub pixel size		45.0 x 135.0	um
9	Pixel arrangement		RGB-island	-
10	View direction (Gray inversion)		6 o'clock	-
11	Cell gap		4.0 ± 0.3	um
12	Driver IC		Source IC: ILI6137 <Note2> Gate IC: ILI5960 <Note3>	-
13	Weight without POL		232.9 ± 10%	g

<<Note> 1. This model is designed by the driver IC with bumping compensation.

2. Compatible IC : EK9173 / HX8264 / ILI6122 / ST5623

3. Compatible IC : EK73002 / HX8664 / ST5091

2.2.1 OUTLINE DIMENSION



3. PIN ASSIGNMENT

3.1 FPC/IC PIN ASSIGNMENT TABLE

Pad No.	Pad Name	Connect to	FPC Pin Name	FPC Pin No.
	ILI6137			
X	X	X	DUMMY	108
X	X	Panel_VCOM	VCOM_CF_107	107
X	X	Panel_VCOM	VCOM_CF_106	106
X	X	FPC	VGL	105
X	X	Panel_VCOM	VCOM_TFT_104	104
1	SHIELDING	X	X	X
2	SHIELDING	X	X	X
3	SHIELDING	X	X	X
4	SHIELDING	X	X	X
5	COM1_B	X	X	X
6	COM1_B	X	X	X
7	SHIELDING	X	X	X
8	SHIELDING	X	X	X
9	AGND	FPC	AGND_103	103
10	AGND	FPC		
11	AGND	FPC	AGND_102	102
12	AGND	FPC		
13	SHIELDING	X	X	X
14	FB (Reserved)	X	X	X
15	FB (Reserved)	X	X	X
16	SHIELDING	X	X	X
17	DRV (Reserved)	X	X	X
18	DRV (Reserved)	X	X	X
19	TP0	X	X	X
20	TP0	X	X	X
21	TP1	X	X	X
22	TP1	X	X	X
23	TP2	X	X	X
24	TP2	X	X	X
25	TP3	X	X	X
26	TP3	X	X	X
27	TP4	X	X	X
28	TP4	X	X	X
29	Dummy	X	X	X

30	REV	X	X	X
31	SHIELDING	X	X	X
32	INVSEL	X	X	X
33	INVSEL	X	X	X
34	SHIELDING	X	X	X
35	CABC_EN	FPC	TB1_101	101
36	CABC_EN	FPC		
37	SHIELDING	X	X	X
38	PWM_EN (Reserved)	X	X	X
39	PWM_EN (Reserved)	X	X	X
40	SHIELDING	X	X	X
41	CSX	FPC	TB2_100	100
42	CSX	FPC		
43	SHIELDING	X	X	X
44	SCL/DBC[0]	FPC	TB3_99	99
45	SCL/DBC[0]	FPC		
46	SHIELDING	X	X	X
47	SDA/DBC[1]	FPC	TB4_98	98
48	SDA/DBC[1]	FPC		
49	SHIELDING	X	X	X
50	SHIELDING	X	X	X
51	GOSEQ	FPC	GOSEQ_97	97
52	GOSEQ	FPC		
53	SHIELDING	X	X	X
54	BIST	FPC	BIST_96	96
55	BIST	FPC		
56	SHIELDING	X	X	X
57	RES0	FPC	RES0_95	95
58	RES0	FPC		
59	SHIELDING	X	X	X
60	DBC/3	FPC	CFSEL_94	94
61	DBC/3	FPC		
62	SHIELDING	X	X	X
63	CLKPOL	FPC	CLKPOL_93	93
64	CLKPOL	FPC		
65	SHIELDING	X	X	X
66	DITHB	FPC	DITHB_92	92
67	DITHB	FPC		
68	SHIELDING	X	X	X

69	MODE	FPC	MODE_91	91
70	MODE	FPC		
71	SHIELDING	X	X	X
72	SHLR	FPC	SHLR_90	90
73	SHLR	FPC		
74	SHIELDING	X	X	X
75	UPDN	FPC	UPDN_89	89
76	UPDN	FPC		
77	SHIELDING	X	X	X
78	STBYB	FPC	STBYB_88	88
79	STBYB	FPC		
80	SHIELDING	X	X	X
81	RSTB	FPC	RSTB_87	87
82	RSTB	FPC		
83	SHIELDING	X	X	X
84	BLKEN	FPC	BLKEN_86	86
85	BLKEN	FPC		
86	SHIELDING	X	X	X
87	VSET	FPC	VSET_85	85
88	VSET	FPC		
89	TP6	X	X	X
90	TP6	X	X	X
91	TP7	X	X	X
92	TP7	X	X	X
93	TP8	X	X	X
94	TP8	X	X	X
95	TP9	X	X	X
96	TP9	X	X	X
97	TP10	X	X	X
98	Dummy	FPC	GND_84	84
99	DCMP_EN	FPC	DCMP_EN_83	83
100	DUMMY	FPC	VCC_82	82
101	SHIELDING	X	X	X
102	AVDD	FPC	AVDD_81	81
103	AVDD	FPC		
104	AVDD	FPC		
105	AVDD	FPC		
106	AVDD	FPC	AVDD_80	80
107	AVDD	FPC		

108	AVDD	FPC		
109	AVDD	FPC		
110	SHIELDING	X	X	X
111	V1	FPC	V1_79	79
112	V1	FPC		
113	SHIELDING	X	X	X
114	V2	FPC	V2_78	78
115	V2	FPC		
116	SHIELDING	X	X	X
117	V3	FPC	V3_77	77
118	V3	FPC		
119	SHIELDING	X	X	X
120	V4	FPC	V4_76	76
121	V4	FPC		
122	SHIELDING	X	X	X
123	V5	FPC	V5_75	75
124	V5	FPC		
125	SHIELDING	X	X	X
126	V6	FPC	V6_74	74
127	V6	FPC		
128	SHIELDING	X	X	X
129	V7	FPC	V7_73	73
130	V7	FPC		
131	SHIELDING	X	X	X
132	V8	FPC	V8_72	72
133	V8	FPC		
134	SHIELDING	X	X	X
135	V9	FPC	V9_71	71
136	V9	FPC		
137	SHIELDING	X	X	X
138	V10	FPC	V10_70	70
139	V10	FPC		
140	SHIELDING	X	X	X
141	V11	FPC	V11_69	69
142	V11	FPC		
143	SHIELDING	X	X	X
144	V12	FPC	V12_68	68
145	V12	FPC		
146	SHIELDING	X	X	X

147	V13	FPC	V13_67	67
148	V13	FPC		
149	SHIELDING	X	X	X
150	V14	FPC	V14_66	66
151	V14	FPC		
152	SHIELDING	X	X	X
153	AGND	FPC	AGND_65	65
154	AGND	FPC		
155	AGND	FPC		
156	AGND	FPC		
157	AGND	FPC	AGND_64	64
158	AGND	FPC		
159	AGND	FPC		
160	AGND	FPC		
161	SHIELDING	X	X	X
162	SHIELDING	X	X	X
163	GND	FPC	GND_63	63
164	GND	FPC		
165	GND	FPC	GND_62	62
166	GND	FPC		
167	SHIELDING	X	X	X
168	SHIELDING	X	X	X
169	VDD	FPC	VCC_61	61
170	VDD	FPC		
171	VDD	FPC	VCC_60	60
172	VDD	FPC		
173	DASHD	FPC	GND_59	59
174	VSD	FPC	VSD_58	58
175	VSD	FPC		
176	DASHD	FPC	GND_57	57
177	HSD	FPC	HSD_56	56
178	HSD	FPC		
179	DASHD	FPC	GND_55	55
180	DEN	FPC	DEN_54	54
181	DEN	FPC		
182	DASHD	FPC	GND_53	53
183	CLKIN	FPC	CLKIN_52	52
184	CLKIN	FPC		
185	DASHD	FPC	GND_51	51

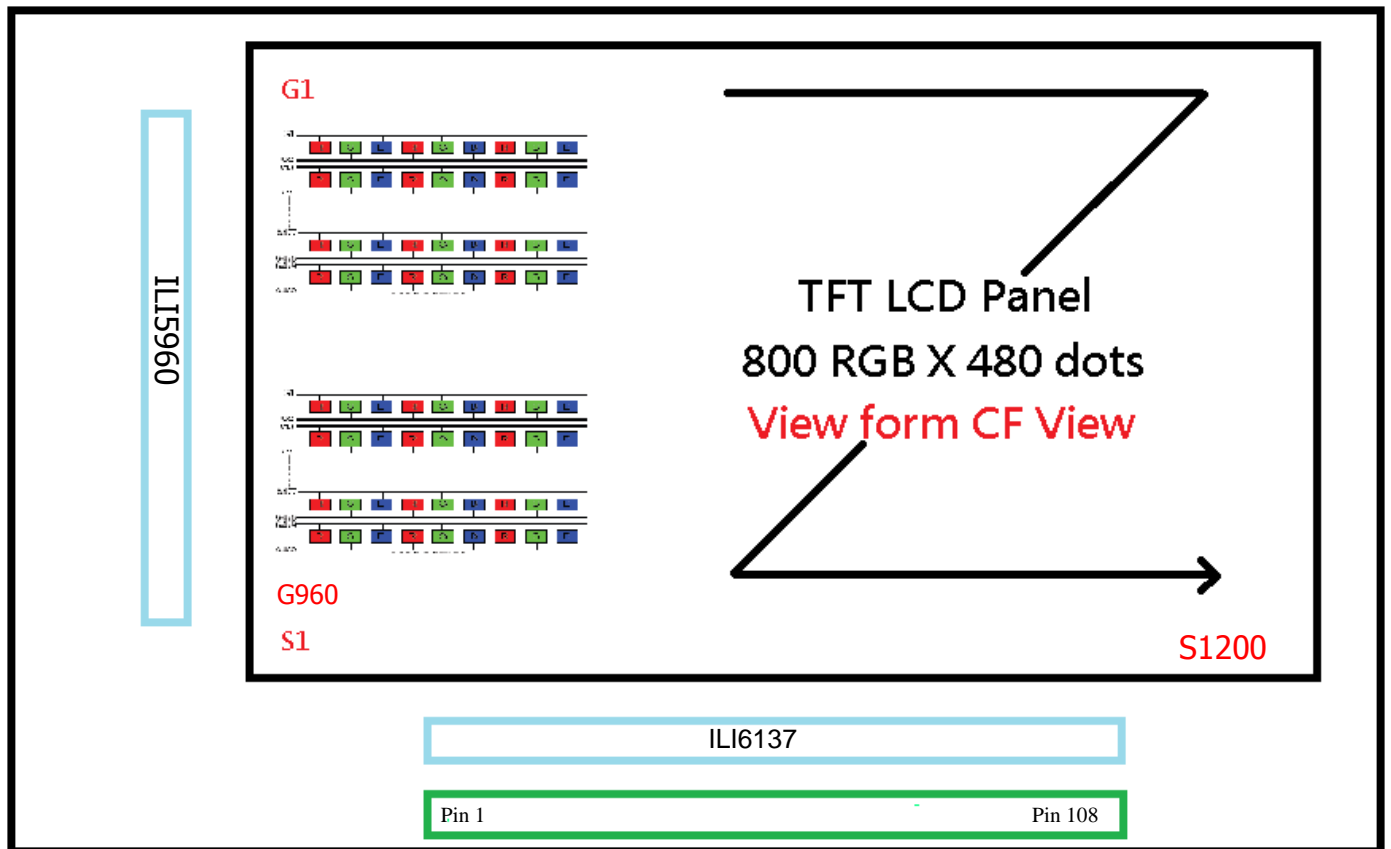
186	D27	FPC	D27_50	50
187	D27	FPC		
188	D26	FPC	D26_49	49
189	D26	FPC		
190	DASHD	FPC	GND_48	48
191	D25	FPC	D25_47	47
192	D25	FPC		
193	D24	FPC	D24_46	46
194	D24	FPC		
195	DASHD	FPC	GND_45	45
196	D23	FPC	D23_44	44
197	D23	FPC		
198	D22	FPC	D22_43	43
199	D22	FPC		
200	DASHD	FPC	GND_42	42
201	D21	FPC	D21_41	41
202	D21	FPC		
203	D20	FPC	D20_40	40
204	D20	FPC		
205	DASHD	FPC	GND_39	39
206	D17	FPC	D17_38	38
207	D17	FPC		
208	D16	FPC	D16_37	37
209	D16	FPC		
210	DASHD	FPC	GND_36	36
211	D15	FPC	D15_35	35
212	D15	FPC		
213	D14	FPC	D14_34	34
214	D14	FPC		
215	DASHD	FPC	GND_33	33
216	D13	FPC	D13_32	32
217	D13	FPC		
218	D12	FPC	D12_31	31
219	D12	FPC		
220	DASHD	FPC	GND_30	30
221	D11	FPC	D11_29	29
222	D11	FPC		
223	D10	FPC	D10_28	28
224	D10	FPC		

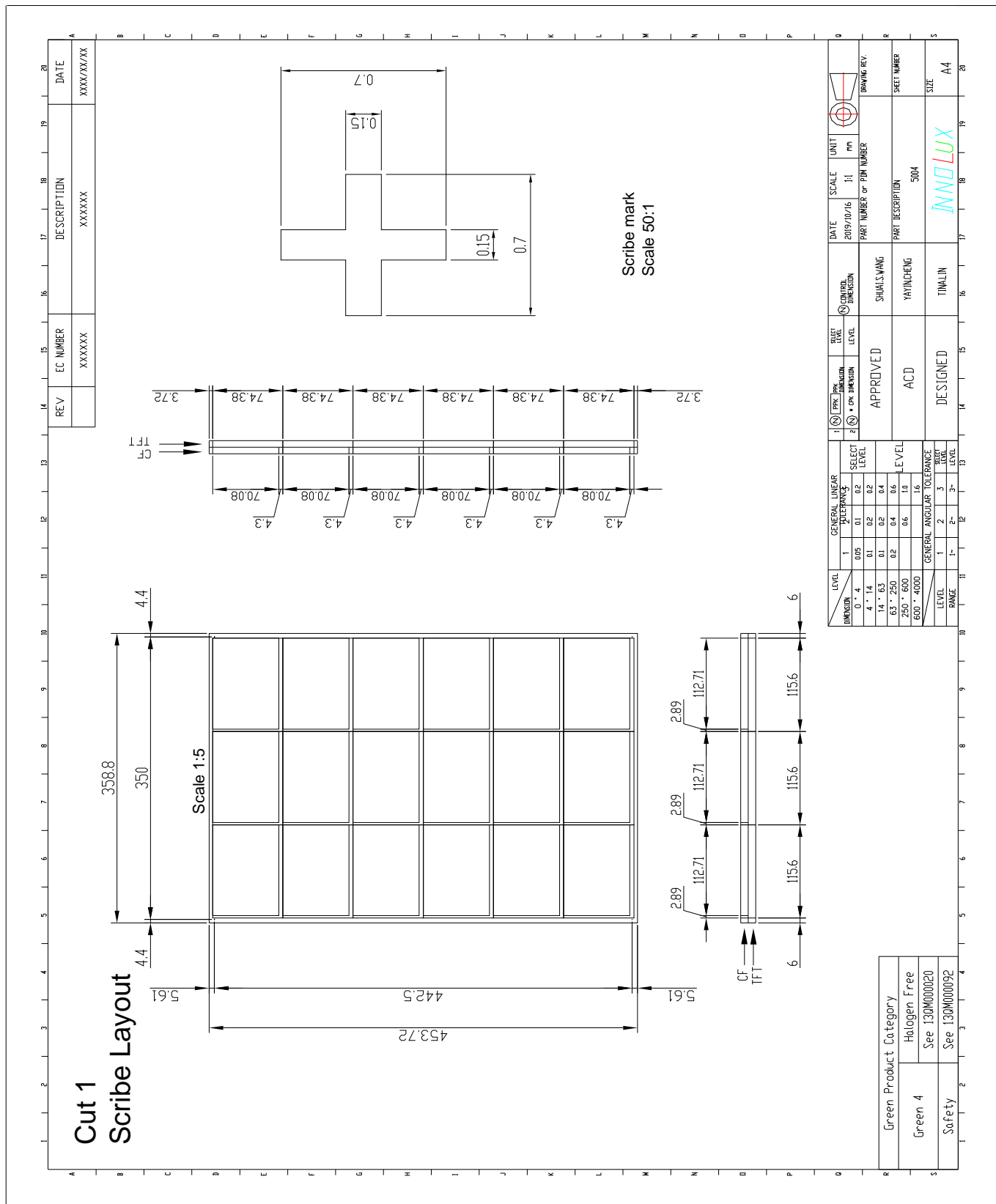
225	DASHD	FPC	GND_27	27
226	D07	FPC	D07_26	26
227	D07	FPC		
228	D06	FPC	D06_25	25
229	D06	FPC		
230	DASHD	FPC	GND_24	24
231	D05	FPC	D05_23	23
232	D05	FPC		
233	D04	FPC	D04_22	22
234	D04	FPC		
235	DASHD	FPC	GND_21	21
236	D03	FPC	D03_20	20
237	D03	FPC		
238	D02	FPC	D02_19	19
239	D02	FPC		
240	DASHD	FPC	GND_18	18
241	D01	FPC	D01_17	17
242	D01	FPC		
243	D00	FPC	D00_16	16
244	D00	FPC		
245	DASHD	FPC	GND_15	15
246	SHIELDING	X	X	X
247	SHIELDING	X	X	X
248	SHIELDING	X	X	X
249	SHIELDING	X	X	X
250	AVDD	FPC	AVDD_14	14
251	AVDD	FPC		
252	AVDD	FPC	AVDD_13	13
253	AVDD	FPC		
254	SHIELDING	X	X	X
255	SHIELDING	X	X	X
256	COM2_B	FPC	VCOM_TFT_12	12
257	COM2_B	FPC	VCOM_TFT_11	11
Pad No.	Pad Name	Connect to	FPC Pin Name	FPC Pin No.
	ILI5960			
X	X	Panel_VCOM	VCOM_CF_10	10
1215	VGH	FPC	VGH_8 VGH_9	8 9
1216	VGH	FPC		
1217	VGH	FPC		

1218	VDD	FPC	VCC_6 VCC_7	6 7
1219	VDD	FPC		
1220	VDD	FPC		
1221	VEE	FPC	VGL_4 VGL_5	4 5
1222	VEE	FPC		
1223	VEE	FPC		
1	VSS	FPC	GND_2 GND_3	2 3
2	VSS	FPC		
3	VSS	FPC		
4	VSS	FPC		
X	X	FPC	DUMMY_1	1

Note: Source Driver IC is ILI6137, Gate Driver IC is ILI5960

3.2 SCHEMATIC PANEL LAYOUT





5.ELECTRICAL SPECIFICATION

Item	Symbol	Specification			Unit
		Min.	Typ.	Max.	
TFT gate on voltage	VGH	14.5	(15)	15.5	V
TFT gate on voltage	VGL	-8.5	-8	-7.5	V
TFT common electrode voltage	Vcom(DC)	3.7	4.2	4.7	V

Note: (1) Vcom must be adjusted to optimize display quality: cross-talk, contrast ratio and etc.

(2) VGH is TFT gate operating voltage

(3) VGL is TFT gate operating voltage

(4) Environmental condition: 25±5

(5) Reference waveform for panel light on is as below: (release after sample output)

(unit: V)	Black	25% Gray	50% Gray	75% Gray	White
Positive	10.0	8.1	7.5	7.1	5.4
Negative	0.2	2.1	2.7	3.1	4.8

6. OPTICAL SPECIFICATION (light source: C light)

Item		Symbol	Conditions	Specifications			Unit	Note
				Min.	Typ.	Max.		
Transmittance (w/o APCF)		T%	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	3.55	4.48	--	%	All left side data are based on Innolux's following condition – 1. LC: TN 2. Light Source: C light 3. Polarizer: Up: NWF-LN-SEG-AGS1 Down: NWF-LN-SEG-AGS1 4. Machine: DMS-803 5. By quick: VLC dark 4.9V VLC white 0.3V
Contrast Ratio		CR		400	500	--	--	
Response Time		T _{on} + T _{off}		-	25	50	ms	
Viewing Angle	Hor.	θ_{x+}	Center CR>10	60	70	--	deg.	
		θ_{x-}		60	70	--		
	Ver.	θ_{y+}		40	50	--		
		θ_{y-}		60	70	--		
CF only Color Chromaticity (CIE 1931)	Red	R _x	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	0.559	0.579	0.599	-	Under C light Simulation
		R _y		0.288	0.308	0.328	-	
	Green	G _x		0.296	0.316	0.336	-	
		G _y		0.533	0.553	0.573	-	
	Blue	B _x		0.118	0.138	0.158	-	
		B _y		0.109	0.129	0.149	-	
	White	W _x		0.292	0.312	0.332	-	
		W _y		0.310	0.330	0.350	-	
	Color Gamut					49	--	

*Note(1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

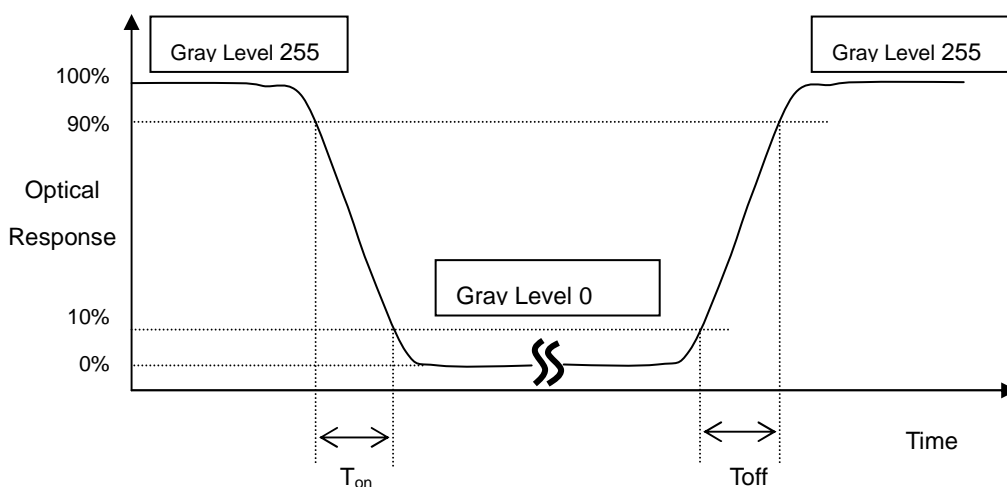
L255 : Luminance of gray level 255

L 0: Luminance of gray level 0

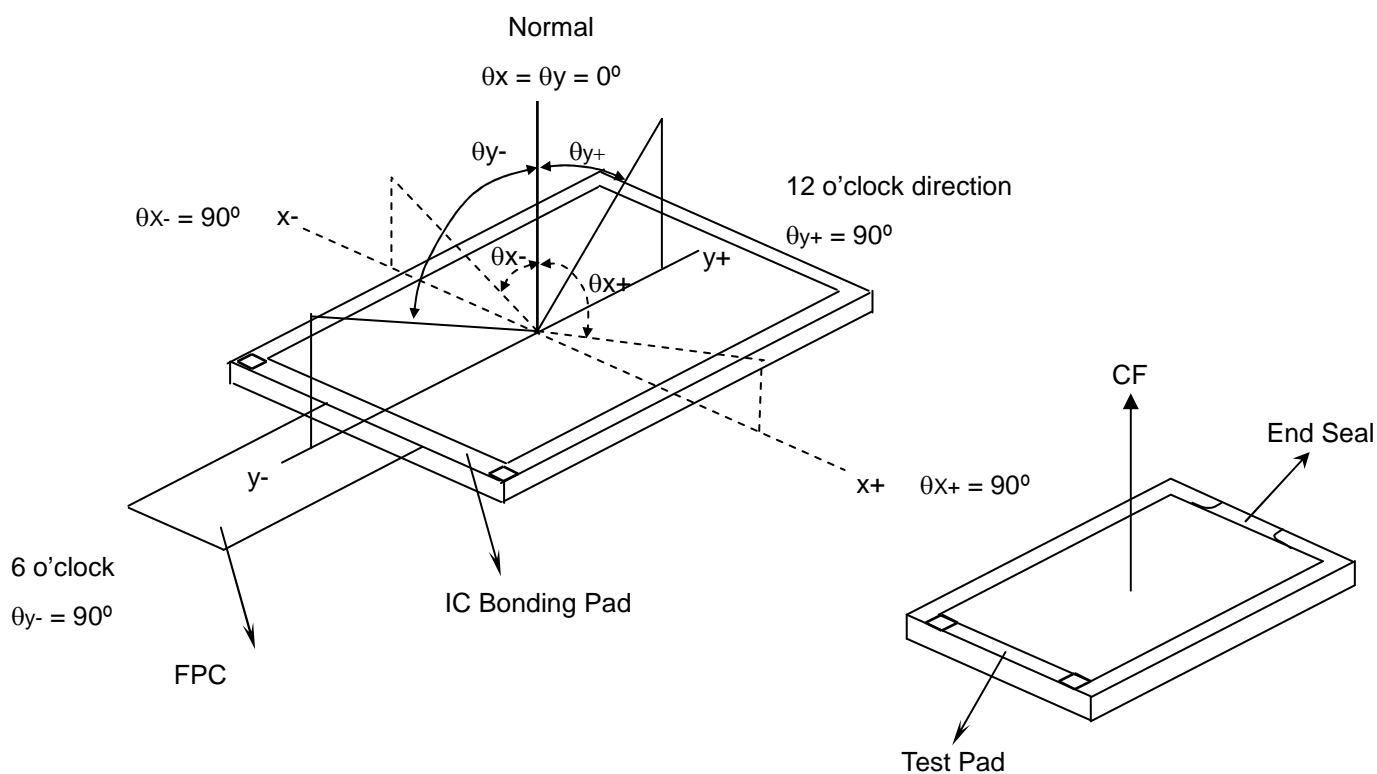
$$CR = CR (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (T_{on} , T_{off}):

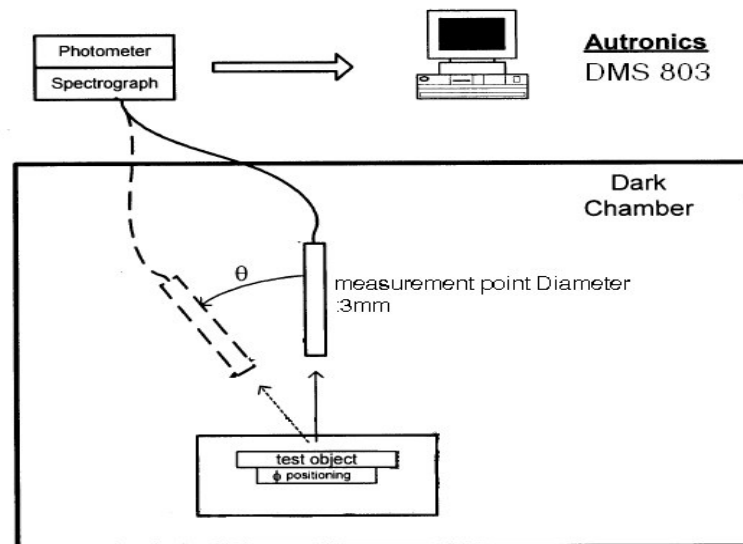


*Note(3) Definition of Viewing Angle

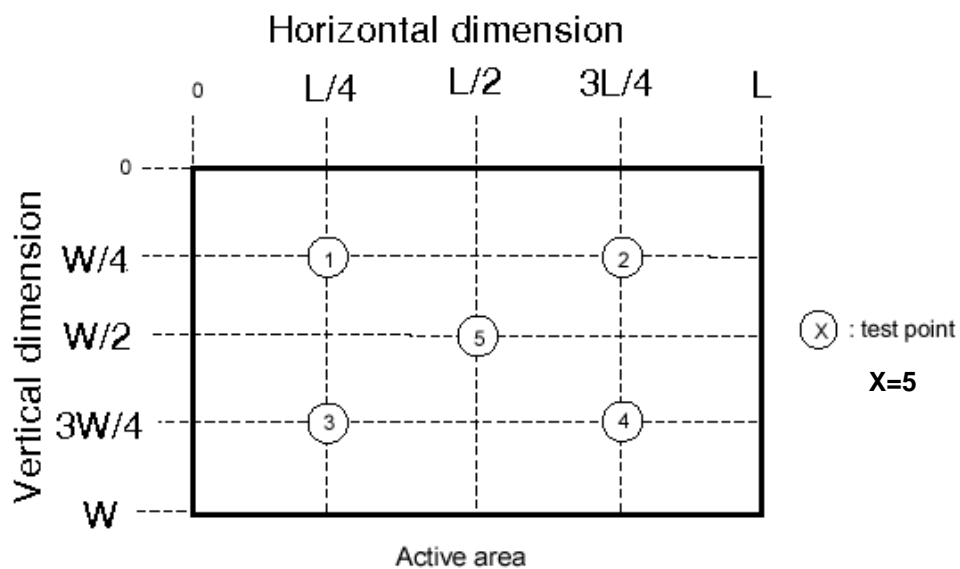


***Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



***Note (5)**



7. RELIABILITY SPECIFICATION

No.	Test Item	Test Condition	Check Time
1	High Temp Storage	90°C	240 hrs
2	Low Temp Storage	-40°C	240 hrs
3	High Temp Operation	85°C	240 hrs
4	Low Temp Operation	-30°C	240 hrs
5	High Temp & High Humidity Operation	60°C, 90%RH	240 hrs

Note:

- (1)The test samples have recovery time need more than 2 hours at room temperature before the function check. In the standard conditions , there is no abnormal display function occurred .
- (2)After the reliability test , the product only guarantees operational function , but don't guarantee all of the cosmetic specification.
- (3)Under no condensation of dew.

8. PACKAGE FORM

8.1 CELL ACKAGE

1 2 3 4 5 6 7 8
A B C D E F

A B C D E F
1 2 3 4 5 6 7 8

Packing Drawing

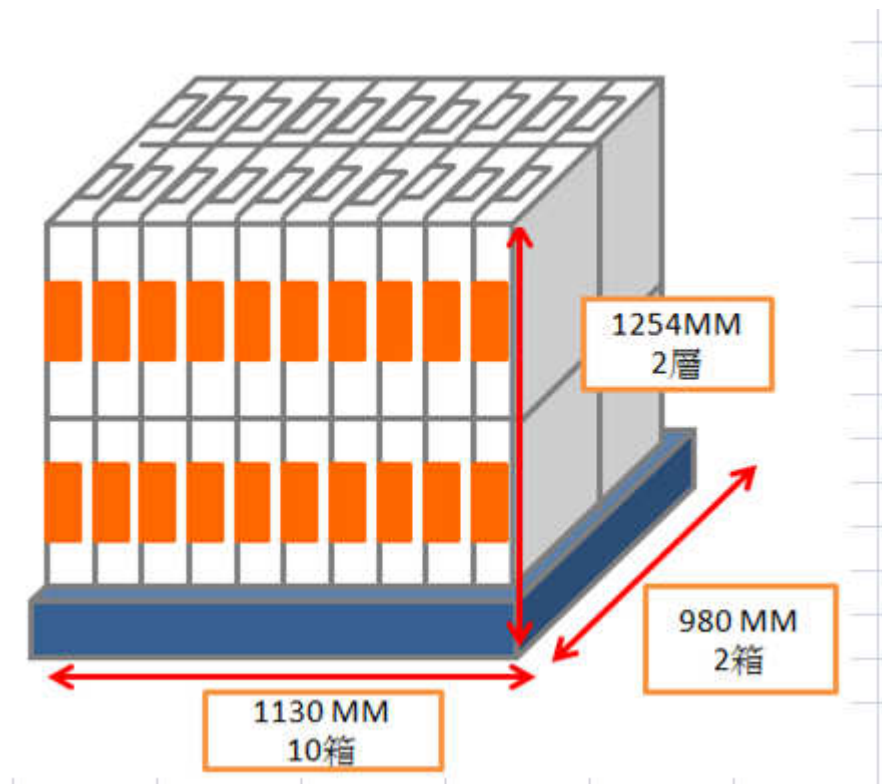
Packing List:

No.	Item	Model(Material)	Dimensions(mm)	Unit	Weight(kg)	Quantity	Remark
1	T0_5"DH Cut	2420S0500402F	453.72*358.8*1	Cut	0.283	30	
2	1/4 Cut EPS Dense	8701B00003000	552*463*109	EA	0.56	1	Color:White
3	1/4 Cut PP PAD	8301B00217000	371*322*0.5	Pcs	0.057	31	Color:White
4	Flat Vacuum Bag	8401B0000L000	850*850*0.08	Pcs	0.01	0.5	
5	BOX RFID Label	8D01B0000L9000	90*50	Pcs	0.01	1	Color:Orange
6	Shipping Label	R16020101WD0	90*50	Pcs	0.01	1	Color:White

Dense Packing

DATE	DESCRIPTION	UNIT	SCALE	3rd ANGLE	MODEL NAME
APPROVED	CHING-LIU	2018/08/08	1:1		F050A04-601
CHECKED	YICHA-HUANG	2018/08/08			PART NUMBER
DESIGNED	YICHA-HUANG	2018/08/08			DRAWING REV.

8.2 PALLET PACKAGE





箱體料號：8701B000J3000

外箱尺寸 mm	單層堆疊	堆疊層數	總堆疊箱數	棧板材積 mm	堆疊材積 mm
552*463*109	20	2	40	1130*980*150	1130*980*1254