

# TFT LCD Product Specification



## MODEL NO.: F02804-02U

Customer :

Approved by : \_\_\_\_\_

Note :

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APPL Dept.	
Approval	Prepare
	

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**REVISION HISTORY**

Version	Date	Page (New)	Section	Description
Ver 0.0	2007/07/13	All	All	Product Specification was first issued.
Ver 0.1	2007/07/27	7	2.2.3	Exchange the test pad position of R with B.

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## 1. Purpose

The specification F02804-02U is a 2.8" TFT Liquid Crystal Display cell cut. The cell cut has been designed by CMO, and is to be manufactured by CMO under the agreement of Customer. The TFT-LCD cell cut will be applied to a high transmittance mode\_TFT-LCD product.

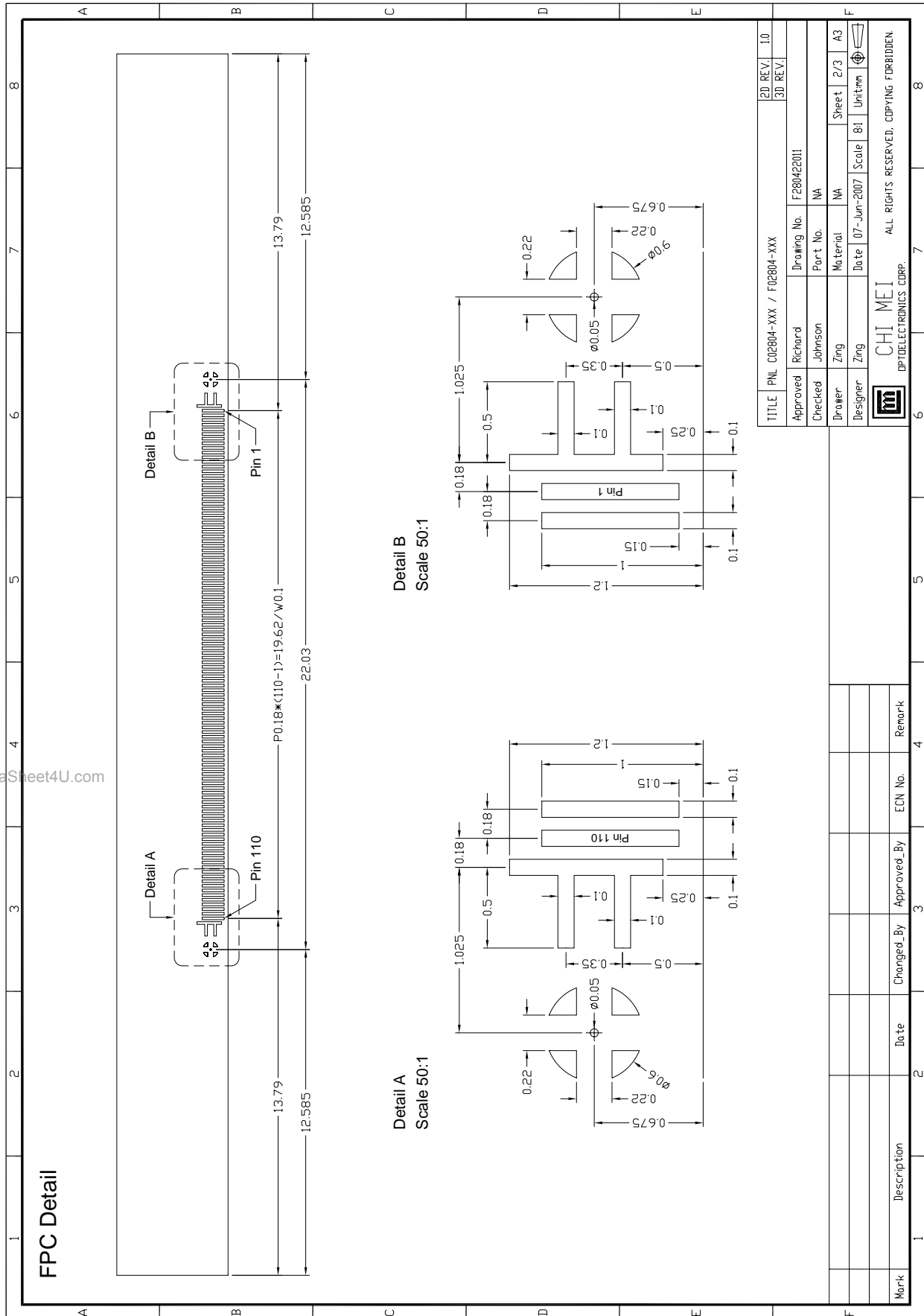
## 2. General Specification

### 2.1 General Spec.

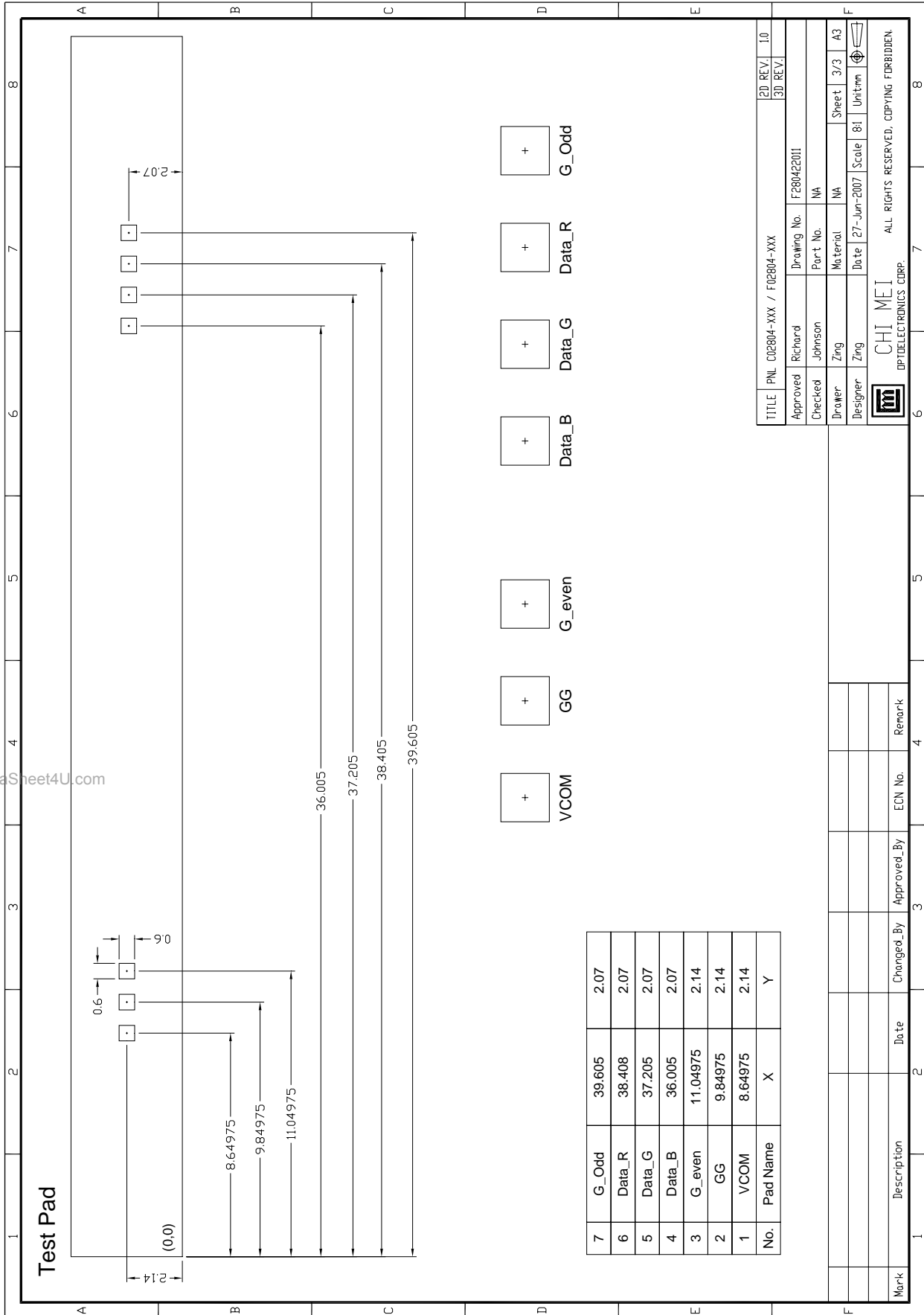
Item		Specification	unit
Substrate thickness	t	0.5	mm
Mother glass size	cut	340 (H) x 440 (V) x 1.0 (D)	mm
Panel outline dimension		47.2 (H) x 65.6 (V) x 1.0 (D)	mm
Active screen size		2.8" Diagonal	inch
Resolution		240RGB X 320	pixel
Pixel size		60x180	um
Pixel arrangement		Stripe	--
Pixel driving element		a-Si TFT	-
Viewing Direction		12 o'clock	--
Driver IC		HX8347	--
Pre-tilt angle	$\alpha$	3 ~ 5	degree
Cell gap		$4.7 \pm 0.3$	um
Assembly precision		$\pm 5$	um
Weight (cut)		$355 \pm 10\%$	g



### 2.2.2 FPC Detail



### 2.2.3 TEST PAD



No.	Pad Name	X	Y
7	G_Odd	39.605	2.07
6	Data_R	38.408	2.07
5	Data_G	37.205	2.07
4	Data_B	36.005	2.07
3	G_even	11.04975	2.14
2	GG	9.84975	2.14
1	VCOM	8.64975	2.14

TITLE	PNL C02804-XXX / F02804-XXX			2D REV.	1.0
Approved	Richard Johnson	Drawing No.	F280422011	3D REV.	
Checked		Part No.	NA		
Drawer	Zing Zing	Material	NA	Sheet	3/3 A3
Designer	Zing Zing	Date	27-Jun-2007	Scale	8:1 Unit:mm

Mark	Description	Date	Changed_By	Approved_By	ECN No.	Remark

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### 3. Pin Assignment

#### 3.1 FPC / IC Pin Assignment Table

HX8347		FPC		
Pad No	Pad Name	Connect to	PinOut Name	FPC PinOut NumBer
		FPC Panel VCOM	VCOM	1
				2
1	DUMMY1	—		
2	TEST1	—		
3	IOGNDDUM	—		
4	OSC	FPC	OSC	3
5	P68	FPC	P68	4
6	EXTC	FPC	EXTC	5
7	BS0	FPC	BS0	6
8	BS1	FPC	BS1	7
9	BS2	FPC	BS2	8
10	IFSEL0	FPC	IFSEL0	9
11	TEST2	—		
12	DUMMY2	—		
13	DUMMY3	—		
14	DUMMY4	—		
15	DUMMY5	—		
16	DUMMY6	—		
17	DUMMY7	—		
18	DUMMY8	—		
19	NRESET	FPC	NRESET	10
20	NRESET			
21	VSYNC	FPC	VSYNC	11
22	HSYNC	FPC	HSYNC	12
23	DOTCLK	FPC	DOTCLK	13
24	ENABLE	FPC	ENABLE	14
25	D17	FPC	D17	15
26	D16	FPC	D16	16
27	D15	FPC	D15	17
28	D14	FPC	D14	18
29	D13	FPC	D13	19
30	DUMMY9	—		
31	D12	FPC	D12	20
32	D11	FPC	D11	21
33	D10	FPC	D10	22
34	D9	FPC	D9	23
35	D8	FPC	D8	24
36	TEST3	—		
37	DUMMY10	—		
38	D7	FPC	D7	25
39	D6	FPC	D6	26
40	D5	FPC	D5	27
41	D4	FPC	D4	28
42	D3	FPC	D3	29
43	D2	FPC	D2	30
44	D1	FPC	D1	31
45	D0	FPC	D0	32
46	DUMMY11	—		
47	SDO	FPC	SDO	33
48	SDI	FPC	SDI	34
49	NRD_E	FPC	NRD_E	35
50	NWR_RNW	FPC	NWR_RNW	36
51	DNC_SCL	FPC	DNC_SCL	37
52	NCS	FPC	NCS	38
53	NISD	FPC	NISD	39
54	BURN	FPC	BURN	40
55	TE	FPC	TE	41
56	DUMMY12	—		
57	TS8	—		
58	TS7	—		
59	TS6	—		
60	TS5	—		
61	TS4	—		
62	TS3	—		
63	TS2	—		
64	TS1	—		
65	TS0	—		
66	REGVDD	FPC	REGVDD	42
67	IOVCC	FPC	IOVCC	43
68	IOVCC			
69	IOVCC			
70	IOVCC			44
71	IOVCC			
72	IOVCC			
73	VCI	FPC	VCI	46
74	VCI			
75	VCI			
76	VCI			
77	VCI			
78	VCI			47
79	VCI			
80	VCI			
81	VCI			
82	VCI			
83	VCI	48		
				49

← should connect to FPC PinOut 58,59



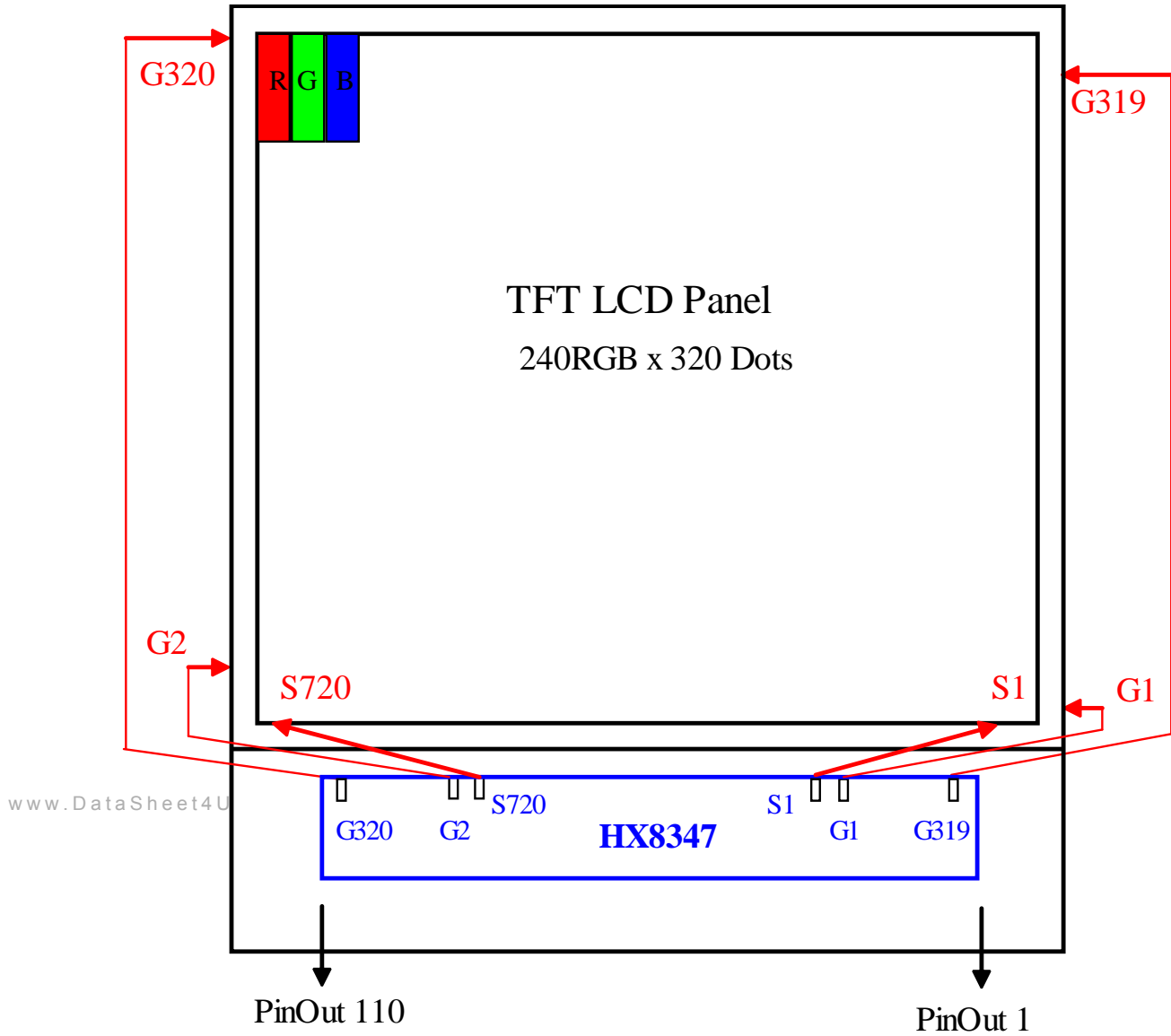
HX8347		FPC		
Pad No	Pad Name	Connect to	PinOut Name	FPC PinOut NumBer
84	VBGP	FPC	VBGP	50
85	VSSA	FPC	VSSA	51
86	VSSA			
87	VSSA			
88	VSSA			
89	VSSA			
90	VSSA			
91	VSSA	FPC	VGS	52
92	VSSA			
93	VGS	FPC	VSSD	53
94	VGS			
95	VSSD			
96	VSSD			
97	VSSD			
98	VSSD			
99	VSSD	FPC	VSSD	54
100	VSSD			
101	VSSD			
102	VSSD			
103	VSSD			
104	VSSD			
105	VMONI	—		
106	VTEST	—		
107	DUMMY13	—		
108	VCOM	FPC	VCOM	55
109	VCOM			
110	VCOM			
111	VCOM			
112	VCOM			
113	VCOM			
114	VCOM	FPC	VCOMH	56
115	VCOMH			
116	VCOMH			
117	VCOMH			
118	VCOMH			
119	VCOMH			
120	VCOMH	FPC	VCOML	57
121	VCOML			
122	VCOML			
123	VCOML			
124	VCOML			
125	VCOML			
126	VREG1	FPC	VREG1	58
127	VREG1			
128	VREG1			
129	VCOMR	FPC	VCOMR	59
130	TMAG	—		
131	VCL	FPC	VCL	60
132	VCL			
133	VCL			
134	VCL			
135	VCL			
136	VCL			
137	DDVDH	FPC	DDVDH	61
138	DDVDH			
139	DDVDH			
140	DDVDH			
141	DDVDH			
142	DDVDH			
143	VREG3	FPC	VREG3	62
144	VREG3			
145	VREG3			
146	VDDD	FPC	VDDD	63
147	VDDD			
148	VDDD			
149	VDDD			
150	VDDD			
151	VDDD			
152	VDDD			
153	VDDD			
154	VDDD			
155	VDDD			
156	VDDD			
157	VDDD			
158	VDDD	FPC	DUMMYR14	64
159	VDDD			
160	VDDD	FPC	DUMMYR15	65
161	VDDD			
162	VDDD			
163	DUMMYR14	FPC	DUMMYR14	66
164	DUMMYR15	FPC	DUMMYR15	67

← measure the COG bonding resistance

HX8347		FPC		
Pad No	Pad Name	Connect to	PinOut Name	FPC PinOut NumBer
165	CX11B	FPC	CX11B	79
166	CX11B			
167	CX11B			
168	CX11B			
169	CX11B	FPC	CX11A	80
170	CX11A			
171	CX11A			
172	CX11A			
173	CX11A	FPC	C11B	81
174	CX11A			
175	C11B			
176	C11B			
177	C11B	FPC	C11A	82
178	C11B			
179	C11B			
180	C11A			
181	C11A	FPC	VGL	83
182	C11A			
183	C11A			
184	C11A			
185	VGL	FPC Quick_GG	VGL	84
186	VGL			
187	VGL			
188	VGL			
189	VGL			
190	VGL			
191	VGL	FPC	VGH	85
192	VGL			
193	VGL			
194	VGL			
195	VSSA	—	VGH	86
196	VSSA	—		
197	VSSA	—		
198	VGH	FPC		VGH
199	VGH			
200	VGH			
201	VGH			
202	VGH	FPC	C12B	88
203	VGH			
204	DUMMY16			—
205	DUMMY17			—
206	C12B	FPC	C12A	89
207	C12B			
208	C12B			
209	C12B			
210	C12A	FPC	C21B	90
211	C12A			
212	C12A			
213	C12A			
214	C21B	FPC	C21A	91
215	C21B			
216	C21B			
217	C21B			
218	C21B	FPC	C22B	92
219	C21B			
220	C21B			
221	C21A			
222	C21A	FPC	C22A	93
223	C21A			
224	C21A			
225	C21A			
226	C21A	FPC	VCOM	94
227	C21A			
228	C22B			
229	C22B			
230	C22B	FPC	VCOM	95
231	C22B			
232	C22B			
233	C22B			
234	C22B	FPC	VCOM	96
235	C22A			
236	C22A			
237	C22A			
238	C22A	FPC	VCOM	97
239	C22A			
240	C22A			
241	C22A			
242	DUMMY18	—	VCOM	98
243	DUMMY19	—		99

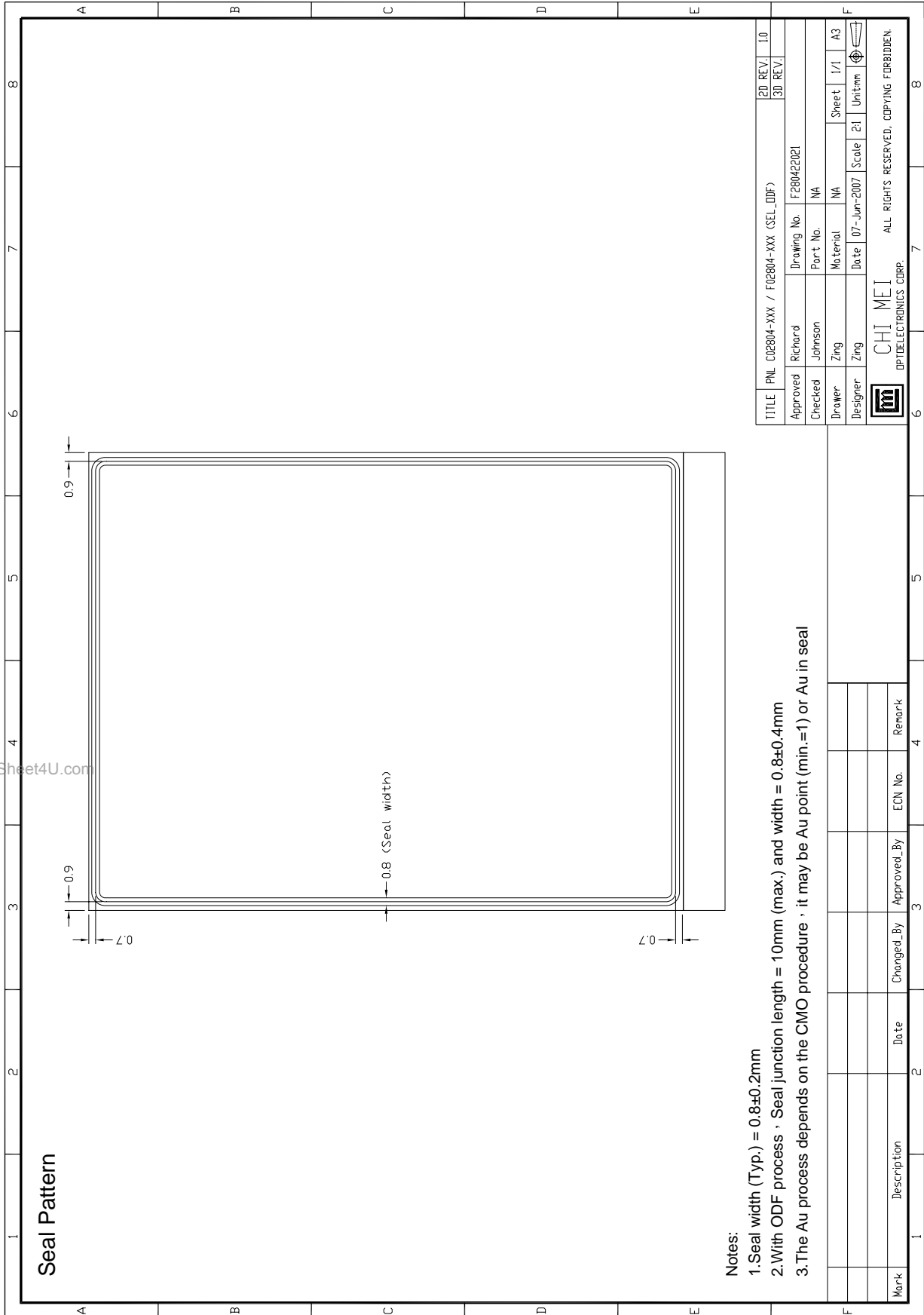
← should connect to FPC PinOut 58,59

3.2 Schematic Panel Layout



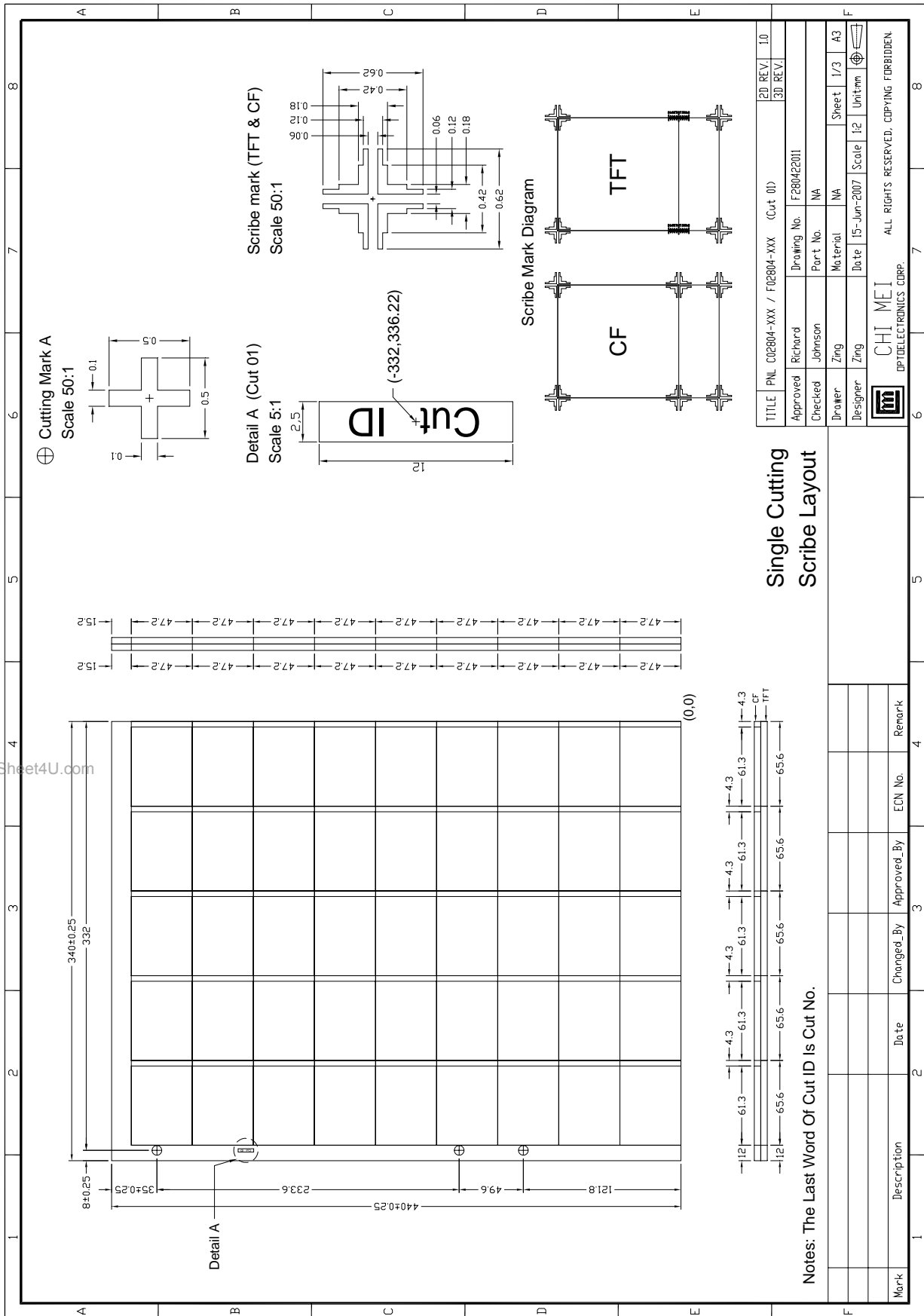
### 4. CELL PROCESS RULES

#### 4.1 SEAL PATTERN (ODF)



### 4.2 CELL SCRIBE LAYOUT

#### Cut01



TITLE	P/NL C02804-XXX / F02804-XXX (Cut 01)		2D REV.	1.0
Approved	Richard Johnson	Drawing No.	F280422011	
Checked	Zing Zing	Part No.	NA	
Drawer	Zing Zing	Material	NA	Sheet 1/3
Designer	Zing Zing	Date	15-Jun-2007	Scale 1:2
		Unit	mm	A3

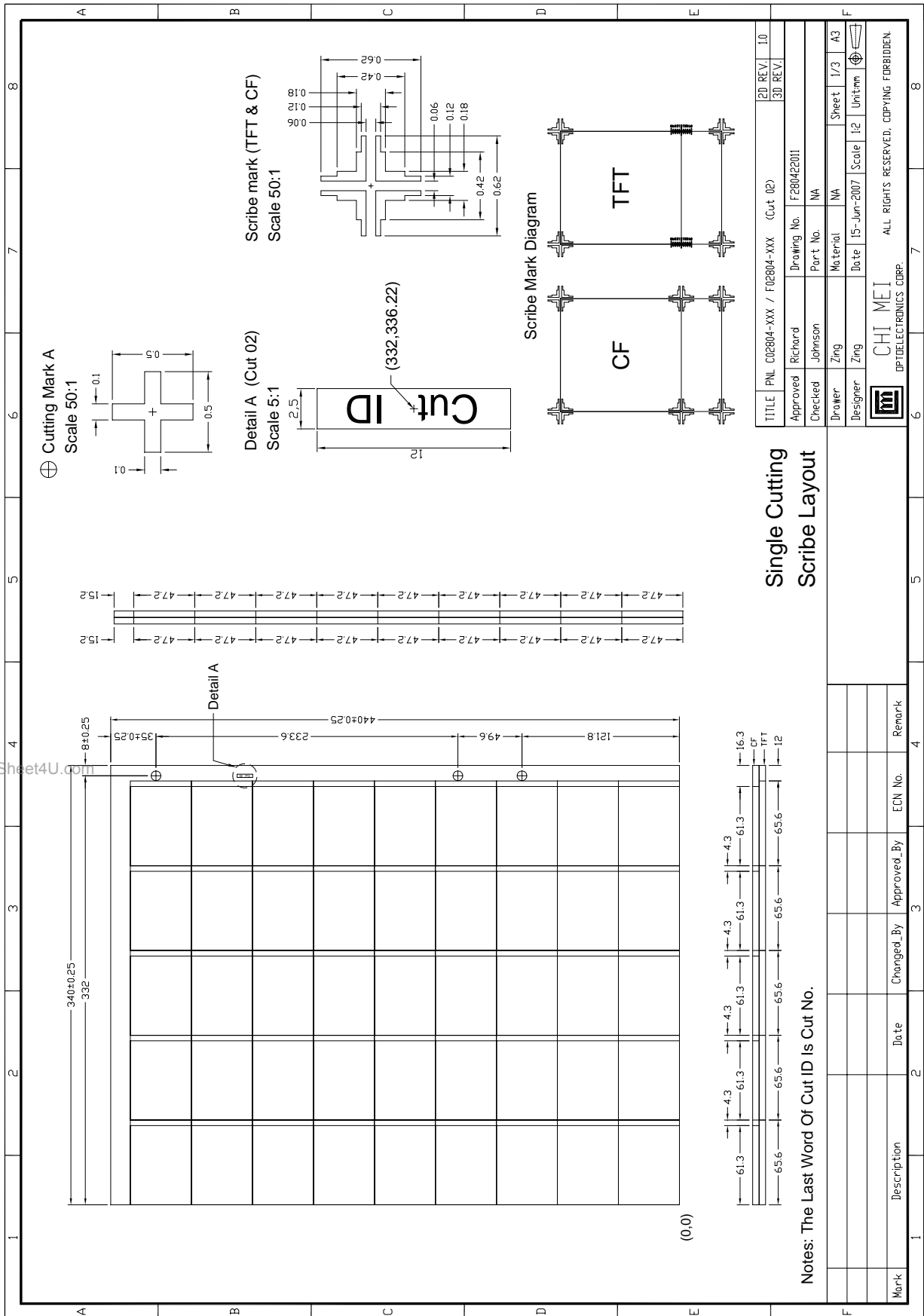
**Single Cutting Scribe Layout**

Mark	Description	Date	Changed By	Approved By	ECN No.	Remark

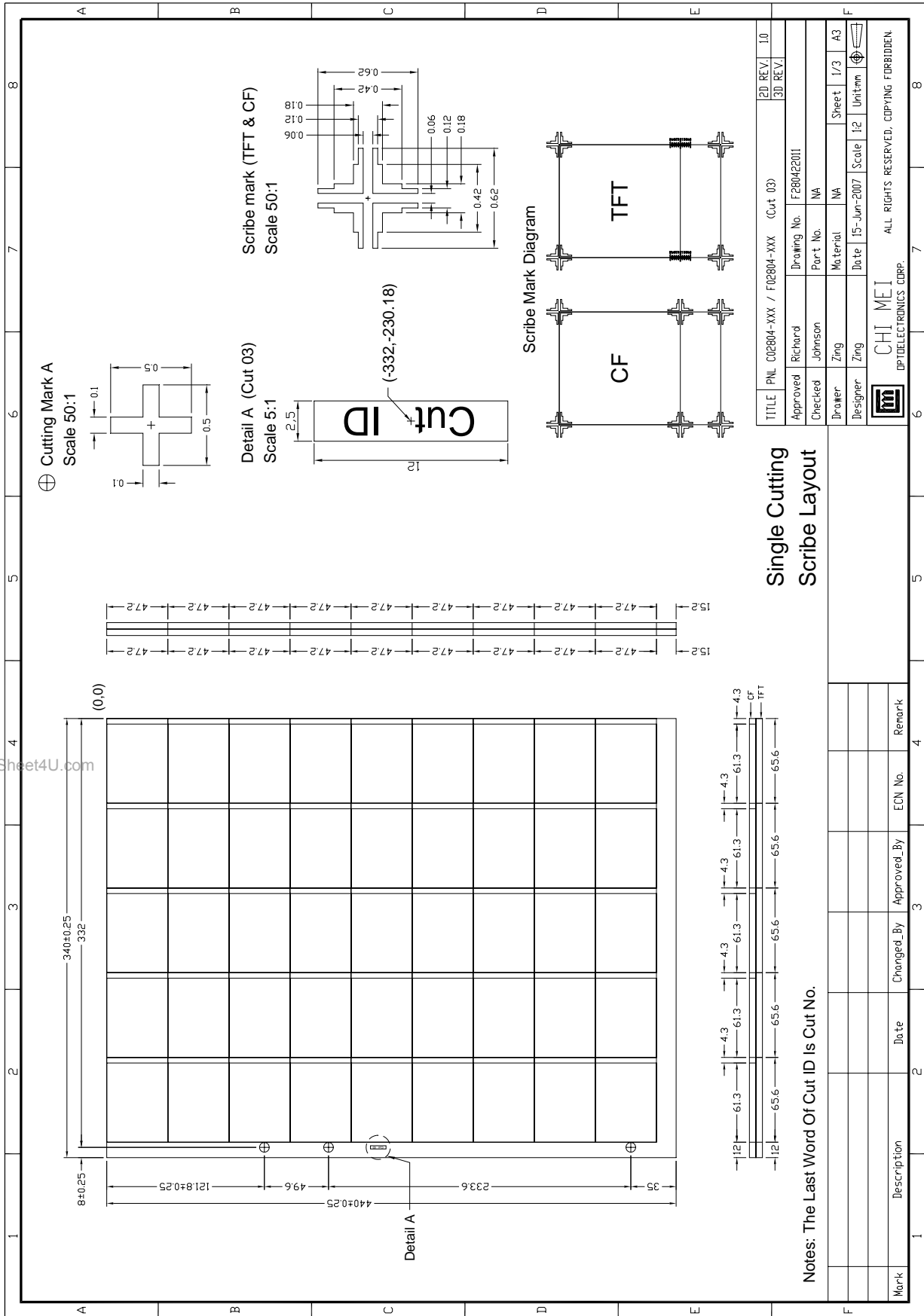
Notes: The Last Word Of Cut ID Is Cut No.

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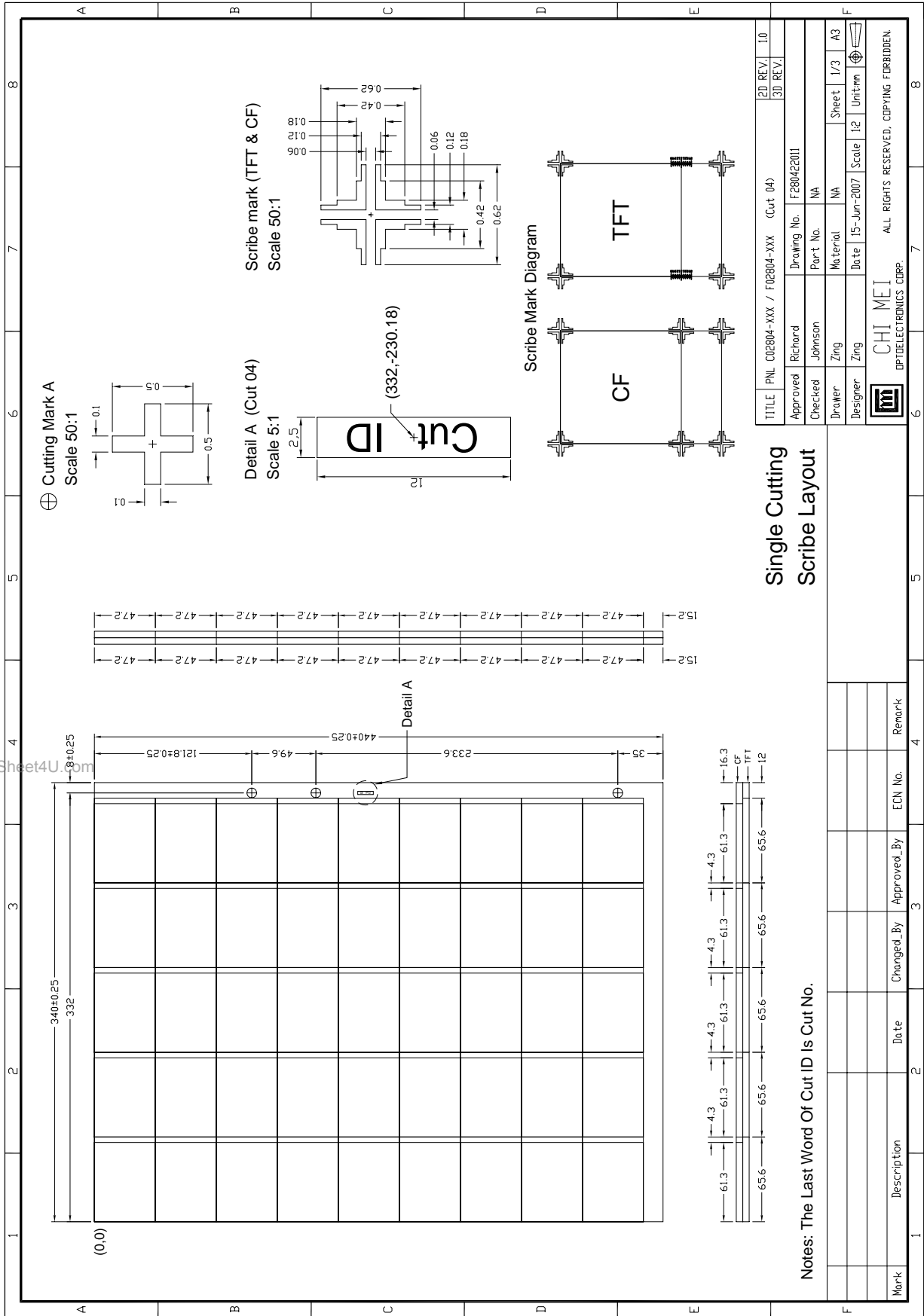
**Cut02**



**Cut03**



**Cut04**





### 5. ELECTRICAL SPECIFICATION

Item	Symbol	Specification			Unit
		Min.	Typ	Max.	
TFT gate on voltage	VGH	-	15	-	V
TFT gate off voltage	VGL	-	-8	-	V
TFT common electrode voltage	VcomH	2.5	-	4.5	V
	VcomL	-2.0	-	0	

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°C

## 6.OPTICAL SPECIFICATIONS

Light source: C light, using CMO TN LC + Polarizer reference only

Item	Symbol	Conditions	Specifications			Unit	Note	
			Min.	Typ.	Max.			
Transmittance	T%	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	NA	6.3	NA	%	All left side data are based on CMO's following condition --  NTSC: 60% LC: 5091 <b>Light : C Light</b> (Machine:BM5A) Polarizer without DBEF <b>Reference Only</b>	
Contrast Ratio	CR		150	250	NA	--		
Response Time	$T_R$		NA	15	20	ms		
	$T_F$		NA	35	50	ms		
Chromaticity	Red		$X_R$	0.603	0.633	0.663		
			$Y_R$	0.296	0.326	0.356		
	Green		$X_G$	0.267	0.297	0.327		
			$Y_G$	0.547	0.577	0.607		
	Blue		$X_B$	0.103	0.133	0.163		
			$Y_B$	0.099	0.129	0.159		
White	$X_W$	0.264	0.294	0.324				
	$Y_W$	0.304	0.334	0.364				
Viewing Angle	Hor.	$\theta_{x+}$	-	45	-	deg.		
		$\theta_{x-}$	-	45	-			
	Ver.	$\theta_{y+}$	-	35	-			
		$\theta_{y-}$	-	15	-			

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

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

L63: Luminance of gray level 63

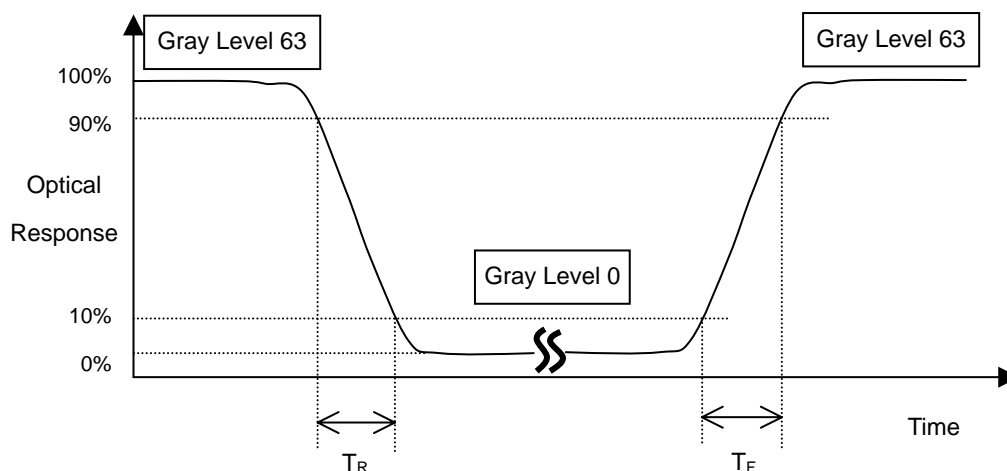
L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (10)$$

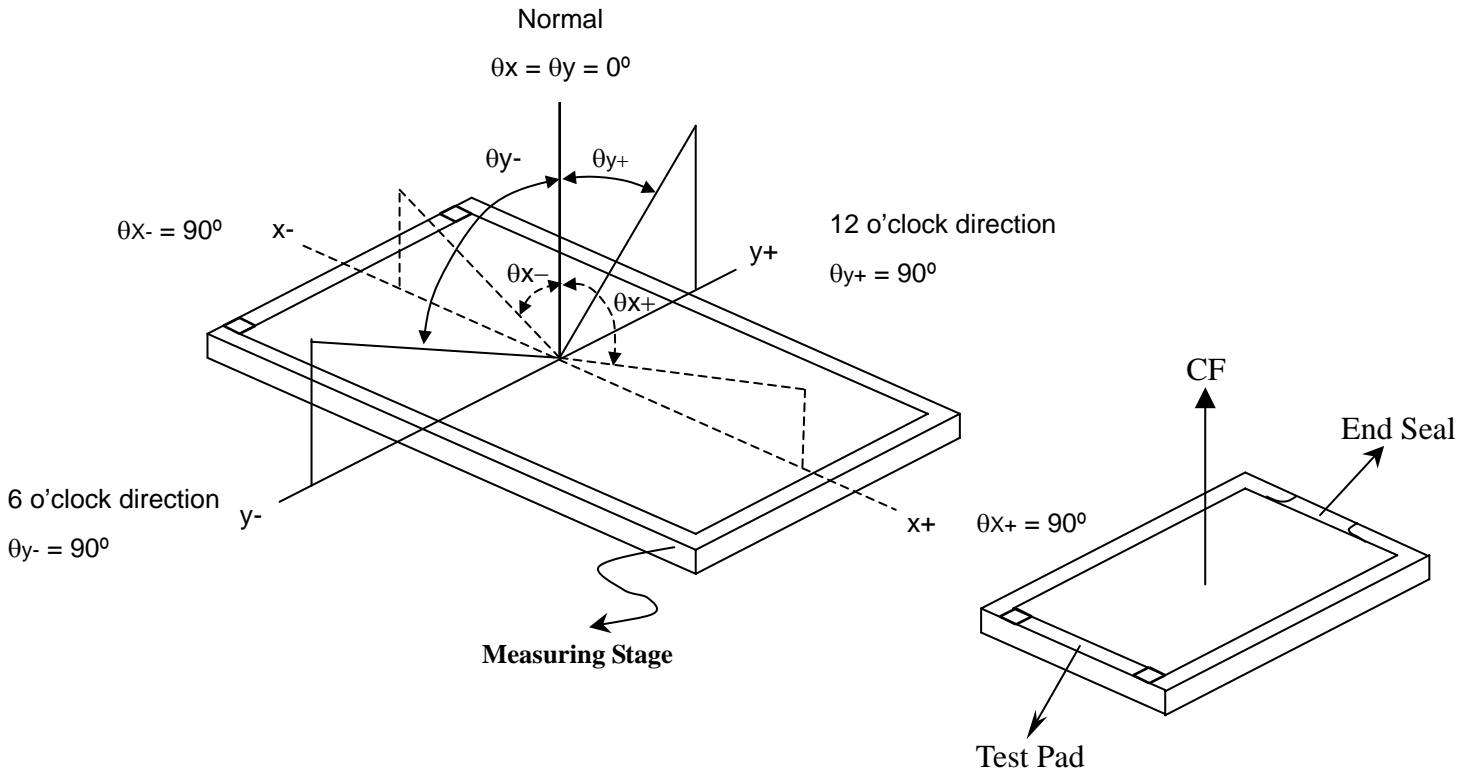
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CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

\*Note (2) Definition of Response Time ( $T_R$ ,  $T_F$ ):

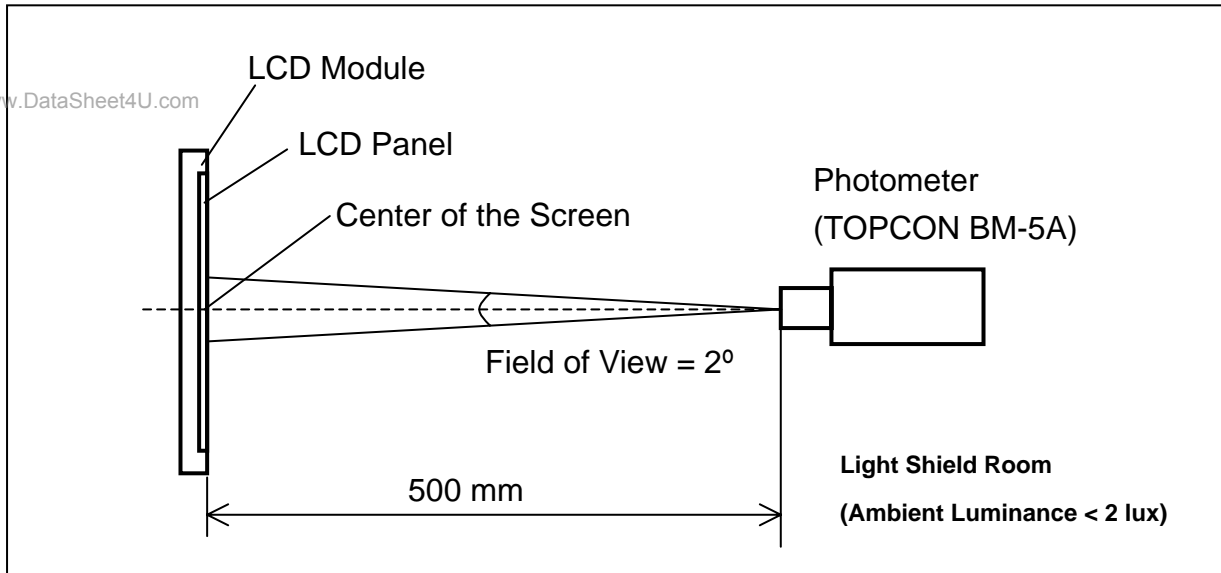


\*Note(3) Definition of Viewing Angle

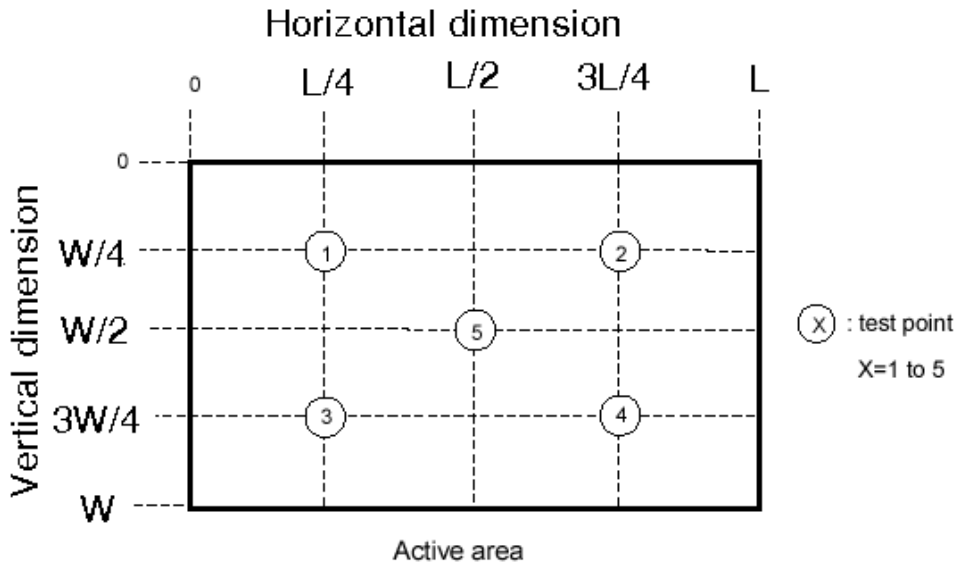


\*Note (4) Measurement Set-Up:

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	$T= 80^{\circ}\text{C}$	240 hrs
2	Low temp storage	$T= -30^{\circ}\text{C}$	240 hrs
3	High temp operation	$T= 70^{\circ}\text{C}$	240 hrs
4	Low temp operation	$T= -20^{\circ}\text{C}$	240 hrs
5	High temp & high humidity	$T=60^{\circ}\text{C}$ $H=90\%$	240 hrs

Reliability Test Criteria:

Display function should be no change under normal operating condition.

## 8. PACKAGE FORM

### 8.1 CUTS PACKAGE

Approx. weight table (kg)

Cell t	net wt.	gross wt.
1.4	16.28	21.58
1.26	14.65	19.95
1.2	13.95	19.25
1.0	11.60	16.90
0.8	9.32	14.62
0.6	6.95	12.25
0.4	4.65	9.95

Package material Qty per carton

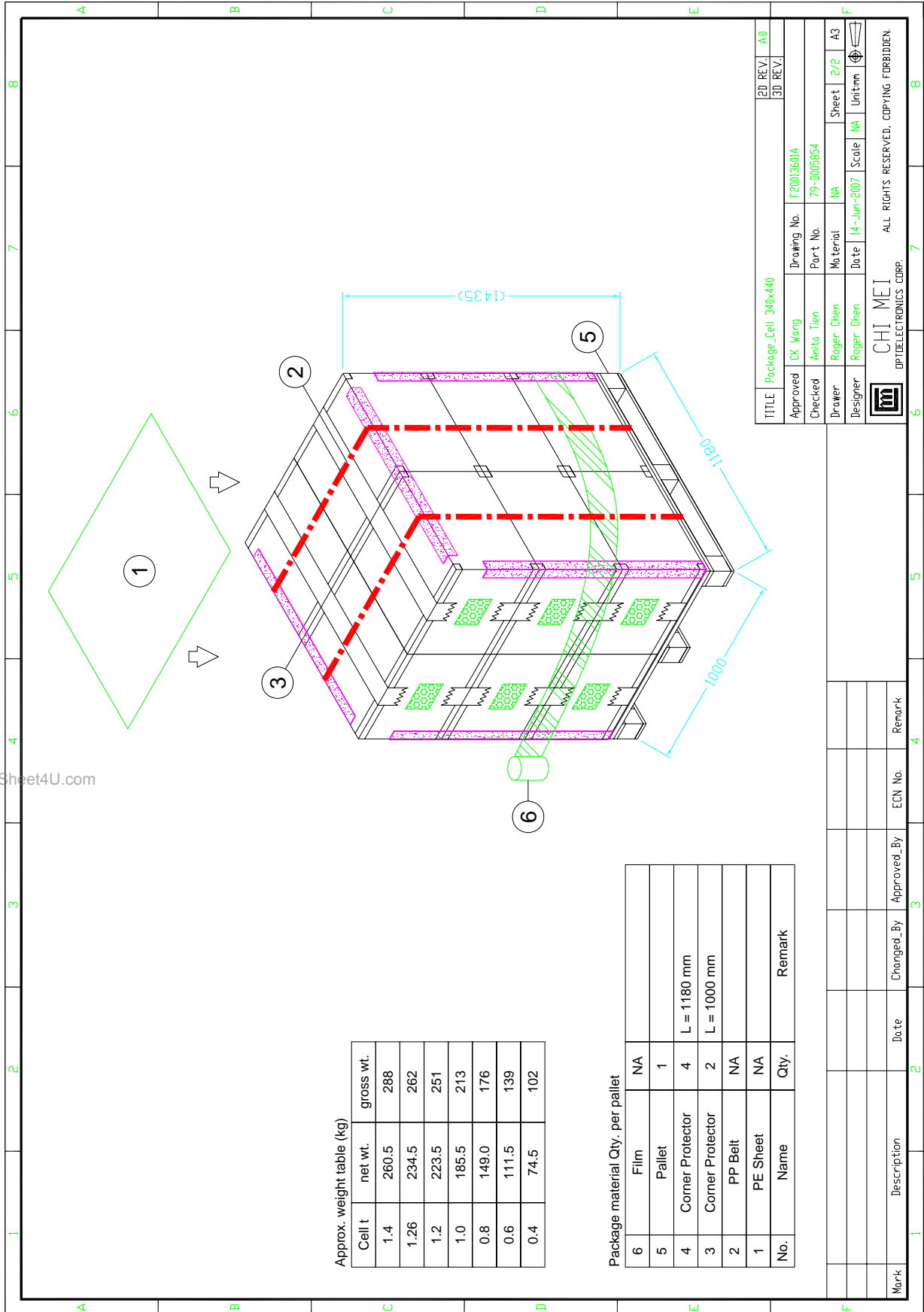
No.	Description	Qty.	Remark
9	Cell	36	
8	EPE Cushion	2	
7	Carton	1	
6	Bag	1	
5	Label	2	
4	Dyer	2	
3	Cover + EVA	3	
2	Carton (inner)	1	Cover & Bottom
1	EPE Cushion	1	
	PE Foam	2	
	Name		
	Qty.		
	Remark		

Mark	Description	Date	Changed By	Approved By	ECN No.	Remark

TITLE	Package_Cell_340x440	2D REV.	A0
Approved	CK Wong	Drawing No.	F20013601A
Checked	Anita Tien	Part No.	79-DXXXX
Drawer	Icetea	Material	MA
Designer	Roger Chen	Date	14-Jun-2007
		Scale	NA
		Unit:mm	
		Sheet	1/2
		Unit:mm	

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### 8.2 PALLET PACKAGE



Approx. weight table (kg)

Cell t	net wt.	gross wt.
1.4	260.5	288
1.26	234.5	262
1.2	223.5	251
1.0	185.5	213
0.8	149.0	176
0.6	111.5	139
0.4	74.5	102

Package material Qty. per pallet

No.	Name	Qty.	Remark
6	Film	NA	
5	Pallet	1	
4	Corner Protector	4	L = 1180 mm
3	Corner Protector	2	L = 1000 mm
2	PP Belt	NA	
1	PE Sheet	NA	

Mark	Description	Date	Changed_By	Approved_By	ECN No.	Remark

TITLE	Package_Cell 340x440	2D REV.	A.0
Approved	CK Wang	Drawing No.	F2003601A
Checked	Anita Tien	Part No.	79-0005854
Drawer	Roger Chen	Material	NA
Designer	Roger Chen	Date	14-Jun-2007
		Scale	NA
		Sheet	2/2
		Unit:mm	A3

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### 8.3 Label Information

**Cut01 Label**

PO No. : \_\_\_\_\_

Part ID : LX2804LLB311 \_\_\_\_\_

Model Name : F02804-02U  
ZX2804XXX1 \_\_\_\_\_

Carton/ Lot ID : \_\_\_\_\_ Quantities : \_\_\_\_

**Cut02 Label**

PO No. : \_\_\_\_\_

Part ID : LX2804LLB312 \_\_\_\_\_

Model Name : F02804-02U  
ZX2804XXX1 \_\_\_\_\_

Carton/ Lot ID : \_\_\_\_\_ Quantities : \_\_\_\_

**Cut03 Label**

PO No. : \_\_\_\_\_

Part ID : LX2804LLB313 \_\_\_\_\_

Model Name : F02804-02U  
ZX2804XXX1 \_\_\_\_\_

Carton/ Lot ID : \_\_\_\_\_ Quantities : \_\_\_\_

**Cut04 Label**

PO No. : \_\_\_\_\_

Part ID : LX2804LLB314 \_\_\_\_\_

Model Name : F02804-02U  
ZX2804XXX1 \_\_\_\_\_

Carton/ Lot ID : \_\_\_\_\_ Quantities : \_\_\_\_